

Draft Environmental Impact Report on
**Local Funding Mechanisms for Comprehensive Flood
Control Improvements for the Sacramento Area**



**Volume I: Programmatic Evaluation of the
Proposed Funding Mechanisms**

November 2006

EDAW | **AECOM**

Volume I

Table of Contents

Chapter/Section	Page
Acronyms and Abbreviations	v
1 Introduction	1-1
1.1 Purpose of this Document	1-1
1.2 Summary Description of the Proposed Projects	1-1
1.3 Type of EIR	1-3
1.4 Scope of the Programmatic Analysis in Volume I	1-4
1.5 Intended Uses of the EIR / Agency Roles and Responsibilities	1-5
1.6 Documents Incorporated by Reference	1-6
1.7 Organization of this EIR	1-8
1.8 Standard Terminology Used in Volume I	1-9
1.9 Public Participation and the EIR Process	1-10
2 Background	2-1
2.1 Introduction	2-1
2.2 Historical Flood Risk	2-3
2.3 Storms of 1986	2-3
2.4 Local, State, and Federal Response	2-3
2.5 Sacramento Urban Levee Reconstruction Project	2-4
2.6 North Area Local Project	2-4
2.7 American River Common Features Project	2-5
2.8 South Sacramento Streams Project	2-7
2.9 Folsom Dam Reoperation	2-7
2.10 Folsom Dam Improvements	2-8
2.11 Conclusion	2-9
3 Project Description	3-1
3.1 Project Objectives	3-1
3.2 Key Features and Geographic Scope of the Proposed Project	3-1
3.3 Existing Flood Control Features in the Study Area	3-4
3.4 Description of Activities and Improvements that would be Funded Using the Proposed Funding Mechanisms	3-9
4 Environmental Setting, Impacts, and Mitigation	4.1-1
4.1 Approach to the Environmental Analysis	4.1-1
4.2 Agriculture and Land Use	4.2-1
4.3 Geology and Soils	4.3-1
4.4 Hydrology and Hydraulics	4.4-1
4.5 Water Quality	4.5-1
4.6 Fisheries and Aquatic Resources	4.6-1
4.7 Terrestrial Biological Resources	4.7-1
4.8 Cultural Resources	4.8-1
4.9 Paleontological Resources	4.9-1
4.10 Transportation and Circulation	4.10-1

Volume I

Table of Contents

Chapter/Section	Page
4.11 Air Quality.....	4.11-1
4.12 Noise.....	4.12-1
4.13 Recreation.....	4.13-1
4.14 Visual Resources	4.14-1
4.15 Utilities and Service Systems	4.15-1
4.16 Hazards and Hazardous Materials	4.16-1
5 Cumulative Impacts	5-1
5.1 CEQA Requirements.....	5-1
5.2 Projects with Effects Similar to Those of the Proposed Project.....	5-1
5.3 Analysis of Cumulative Impacts	5-2
6 Other CEQA-Required Sections	6-1
6.1 Growth-Inducing Effects	6-1
6.2 Significant and Unavoidable Impacts.....	6-5
6.3 Significant Irreversible Environmental Impacts.....	6-5
7 Alternatives	7-1
7.1 Alternatives Development.....	7-1
7.2 Comparison of the Alternatives.....	7-4
7.3 Environmentally Superior Alternative	7-12
8 List of Preparers	8-1
9 References	9-1
 Appendices	
A Notice of Preparation and Scoping Comments	
B Mitigation Incorporated into Proposed Improvements Covered in Previous Environmental Documents (on CD in back cover)	
C Hydraulic Modeling Results	
D SAFCA Legislative Framework for Flood Control and Flood Risk Management in the Sacramento Valley – Endorsed by Sacramento Area Council of Governments, April 2006	

Volume I

List of Exhibits and Tables

Page

Exhibits

2-1	Regional Settings.....	2-2
3-1	Project Benefit Areas.....	3-3
3-2	Project Area for Comprehensive Sacramento Area Flood Protection	3-5
3-3	Folsom Dam and Lower American River Project Areas.....	3-11
3-4	Folsom Dam Improvements	3-14
3-5	Sacramento River Flood Control Project (SRFCP).....	3-21
3-6	Underseepage and Through-Seepage Levee Risks.....	3-23
3-7	Representative American River Levee Improvements.....	3-24
3-8	Sacramento River (Downstream of I-80) with Deep Cutoff Wall.....	3-25
3-9	Sacramento River (Downstream of I-80) with Relief Wells	3-26
3-10	Natomas Cross Canal	3-27
3-11	Sacramento River (Upstream of I-80) with Seepage Berm.....	3-28
3-12	Sacramento River (Upstream of I-80) with Deep Cutoff Wall.....	3-29
3-13	Sacramento River (Upstream of I-80) with Relief Wells	3-30
4.4-1	Sacramento River Flood Control Project Design Flows	4.4-5
4.7-1	Natomas Basin Conservancy Mitigation Lands	4.7-4
4.9-1	Rock Formations in the Folsom Dam, Natomas, and North Sacramento Ares	4.9-2
4.12-1	Typical Noise Levels.....	4.12-5
6-1	Preferred Blueprint Scenario Map.....	6-4
7-1	Conceptual Natomas Cross Levee Alignment.....	7-9

Tables

ES-1	Summary of Impacts and Mitigation Measures for Volume I, Program-Level Analysis of Proposed Funding Mechanisms.....	ES-5
ES-2	Summary of Impacts and Mitigation Measures for Volume II, Project-Level Analysis of Proposed NCC Phase I Improvements	ES-11
3-1	Summary of Improvements To Be Funded By the Proposed Local Funding Mechanisms	3-44
4.4-1	Basin Characteristics	4.4-4
4.6-1	Fishes Present in the Lower Sacramento and American Rivers, the NCC, and/or the NEMDC/Steelhead Creek	4.6-4
4.6-2	Special-Status Fish Potentially Occurring in the Lower Sacramento and American Rivers, the NCC, and/or the NEMDC/Steelhead Creek	4.6-6

Volume I

List of Exhibits and Tables

Page

Tables (continued)

4.7-1	Special-Status Plant Species with Potential to Occur in the Program Study Area.....	4.7-7
4.7-2	Special-Status Wildlife Species with Potential to Occur in the Program Study Area.....	4.7-10
4.11-1	Ambient Air Quality Standards and Attainment Designations for Southern Sutter, Sacramento, Western Placer, and El Dorado Counties	4.11-2
4.12-1	Local Government Non-Transportation Noise Standards (dBA)	4.12-2
4.12-2	Local Government Transportation Noise Standards (dBA)	4.12-3
4.12-3	Typical Construction Equipment Noise Levels.....	4.12-8
4.12-4	Typical Construction Equipment Vibration Levels.....	4.12-9
7-1	Alternatives Comparison.....	7-13
7-2	Comparison Matrix of the Environmental Impacts of Project Alternatives	7-15

Volume I

Acronyms and Abbreviations

°F	Fahrenheit
µg	micrograms
AB	Assembly Bill
ACHP	Advisory Council on Historic Preservation
AFB	Air Force Base
APE	area of potential effect
AQAP	air quality attainment plans
AQMD	Air Quality Management District
ARB	California Air Resources Board
ARFCD	American River Flood Control District
ARWP	American River Watershed Program
BACT	best available control technology for toxics
Bay-Delta	San Francisco Bay/Sacramento–San Joaquin Delta
BMP	best management practice
BP	Before Present
Bypass	Sacramento River and the Yolo Basin
CAA	federal Clean Air Act
CAAA	federal Clean Air Act Amendments of 1990
CAAQS	California ambient air quality standards
Cal-EPA	California Environmental Protection Agency
Cal-OSHA	California Occupational Safety and Health Administration
Caltrans	California Department of Transportation
CCAA	California Clean Air Act
CDF	California Department of Forestry and Fire Protection
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CHP	California Highway Patrol
CLUP	comprehensive land use plan
CNDDB	California Natural Diversity Database
CNEL	Community Noise Equivalent Level
CNPS	California Native Plant Society
CO	carbon monoxide
Common Features Project	American River Common Features Project
Comprehensive Study	Sacramento and San Joaquin River basins California Comprehensive Study

Volume I

Acronyms and Abbreviations

CPRR	Central Pacific Railroad
CRHR	California Register of Historical Resources
CSUS	California State University, Sacramento
CTR	California Toxics Rule
CVP	Central Valley Project
CWA	Clean Water Act
dB	decibels
dBA	A-weighted decibel
dBA/DD	A-weighted decibel per doubling of distance
DEIR	Draft Environmental Impact Report
Delta	Sacramento–San Joaquin Delta
DFG	California Department of Fish and Game
DHS	California Department of Health Services
DO	dissolved oxygen
DPR	California Department of Parks and Recreation
DSM	deep soil mixing
DWR	California Department of Water Resources
EC	electrical conductivity
EDCAQMD	El Dorado County Air Quality Management District
EFH	essential fish habitat
EIR	environmental impact report
EIS	environmental impact statement
EMD	Sacramento County Environmental Management Department
EPA	U.S. Environmental Protection Agency
ER-M	Effects Range-Median
ESA	federal Endangered Species Act
ESU	Evolutionarily Significant Unit
FBO	Forecast-based operations
FEIR	Final Environmental Impact Report
FEMA	Federal Emergency Management Agency
FIP	Federal Implementation Plan
FLSRA	Folsom Lake State Recreation Area
FMMP	Farmland Mapping and Monitoring Program
FPP	Farmland Protection Program
FPPA	Farmland Protection Policy Act
FRAQMD	Feather River Air Quality Management District

Volume I

Acronyms and Abbreviations

FTA	Federal Transit Administration
gWh	gigawatts per hour
HAP	hazardous air pollutants
House	U.S. House of Representatives
HRA	health risk assessment
HRP	Habitat Restoration Program
HWCL	Hazardous Waste Control Law
I-5	Interstate 5
I-80	Interstate 80
in/sec	inches per second
Joint Vision	City/County North Natomas Joint Vision Plan
LAFCo	Sacramento County Local Agency Formation Commission
L _{dn}	Day-Night Noise Level
L _{eq}	Equivalent Noise Level
LESA	Land Evaluation and Site Assessment
LEV	Low-Emission Vehicle
L _{max}	Maximum Noise Level
L _{min}	Minimum Noise Level
LOS	level of service
Lv	velocity level
LWD	large woody debris
M	magnitude
MACT	maximum available control technology for toxics
MBTA	Migratory Bird Treaty Act
mm	millimeter
MOA	memorandum of agreement
msl	mean sea level
msl	mean sea level
MWh	megawatts per hour
MW-mo	megawatts per month
NAAQS	national ambient air quality standards
NAHC	Native American Heritage Commission
NALP	North Area Local Project
NBHCP	Natomas Basin Habitat Conservation Plan
NCC	Natomas Cross Canal
NCC Phase 1 Improvements	Natomas Cross Canal South Levee Phase 1 Improvements

Volume I

Acronyms and Abbreviations

NEMDC	Natomas East Main Drainage Canal
NEPA	National Environmental Policy Act
NESHAP	national emissions standards for hazardous air pollutants
NFIP	National Flood Insurance Program
NHPA	National Historic Preservation Act
NLEP	Natomas Levee Evaluation Program
NLIP	Natomas Levee Improvement Program
NMFS	National Oceanic and Atmospheric Administration, National Marine Fisheries Service
NMWC	Natomas Central Mutual Water Company
NNCP	North Natomas Community Plan
NO	nitric oxide
NO ₂	nitrogen dioxide
NOI	Notice of Intent
NOP	Notice of Preparation
NO _x	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSSG	North Sacramento Streams Group
NSVAB	Northern Sacramento Valley Air Basin
NTR	National Toxics Rule
OEHHA	Office of Environmental Health Hazard Assessment
OES	Office of Emergency Services
OSHA	U.S. Department of Labor Occupational Safety & Health Administration
ozone	photochemical smog
PA	programmatic agreement
PCAPCD	Placer County Air Pollution Control District
PCBs	polychlorinated biphenyls
PGCC	Pleasant Grove Creek Canal
PM	particulate matter
PM ₁₀	respirable particulate matter
PM _{2.5}	fine particulate matter
ppm	part per million
PPV	peak particle velocity
PRG	preliminary remediation goals
RBDD	Red Bluff Diversion Dam

Volume I

Acronyms and Abbreviations

RCRA	Resource Conservation and Recovery Act
RD	Reclamation District
Reclamation	U.S. Department of the Interior, Bureau of Reclamation
RM	River Mile
RMS	root mean square
ROG	reactive organic gases
RWQCB	California Regional Water Quality Control Board
SACOG	Sacramento Area Council of Governments
SAFCA	Sacramento Area Flood Control Agency
SCB	soil-cement-bentonite
SEL	Sound Exposure Level
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SIR	Supplemental Information Report
SMAQMD	Sacramento Metropolitan Air Quality Management District
SMARA	Surface Mining and Reclamation Act
SMUD	Sacramento Municipal Utility District
SO ₂	sulfur dioxide
SR	State Route
SRA	shaded riverine aquatic
SRFCP	Sacramento River Flood Control Project
SRWTP	Sacramento Regional Wastewater Treatment Plant
SSSG	South Sacramento Streams Group
SVAB	Sacramento Valley Air Basin
SVP	Society of Vertebrate Paleontology
SWP	State Water Project
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAC	toxic air contaminant
TAF	thousand acre-feet
TDS	total dissolved solids
The Reclamation Board	California Reclamation Board
TMDL	total maximum daily load
TNBC	The Natomas Basin Conservancy
TPY	tons per year
TRD	trench remixing deep

Volume I

Acronyms and Abbreviations

UCMP	University of California, Berkeley Museum of Paleontology
UPRR	Union Pacific Railroad
UPRR	Union Pacific Railroad
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VdB	vibration decibels
VELB	valley elderberry longhorn beetle
WAPA	Western Area Power Administration
WDR	waste discharge requirement
WRDA	Water Resources Development Act

1 INTRODUCTION

1.1 PURPOSE OF THIS DOCUMENT

The California Environmental Quality Act (CEQA) (Public Resources Code [PRC] Section 21000 et seq.) requires a public agency to prepare an environmental impact report (EIR) for any project that it proposes to carry out or approve that may have a significant direct or indirect effect on the environment. The Sacramento Area Flood Control Agency (SAFCA) is proposing to create new funding mechanisms, specifically an assessment district and a development fee program, that would provide the local share of the cost of constructing and maintaining the flood control improvements needed to provide improved flood protection for the Sacramento metropolitan area (Sacramento) and related environmental mitigation and floodplain habitat restoration (referred to hereinafter collectively as “improvements” or “improvement projects”). SAFCA has determined that the projects that would receive funding from these funding mechanisms may have significant effects on the environment. As the lead agency for complying with CEQA, SAFCA has therefore directed the preparation of an EIR to analyze these potentially significant effects.

In addition, SAFCA is proposing construction of the initial project that would be funded using the new funding mechanisms, the Natomas Cross Canal South Levee Phase 1 Improvements (NCC Phase 1 Improvements). SAFCA has directed that the EIR also analyze the potentially significant environmental effects of the proposed NCC Phase 1 Improvements.

An EIR is an informational document that is intended to inform public agency decisionmakers and the general public of the significant adverse environmental effects of a project, identify feasible measures that would minimize those effects, and describe a reasonable range of alternatives to the project that would feasibly attain most of the basic project objectives but would avoid or substantially lessen the significant environmental effects of the project. The purpose of an EIR is not to recommend either approval or denial of a project. If all the significant effects of the proposed project cannot be mitigated to a less-than-significant level, CEQA requires decisionmakers to balance the benefits of a project against its significant unavoidable environmental effects in deciding whether to carry out the project. As the lead agency, SAFCA will consider the information presented in the EIR, comments received on the EIR, and responses to those comments, along with other information, when determining whether to approve the proposed funding mechanisms and the proposed construction of the NCC Phase 1 Improvements. If the EIR identifies any environmental impacts of either project as significant and unavoidable, SAFCA may still approve that project if it determines that the social, economic, legal, or other benefits outweigh the project’s unavoidable adverse environmental effects.

Volume I of this draft EIR (DEIR) presents a program-level analysis of the significant environmental effects of the activities that would be funded by the proposed new funding mechanisms, and Volume II presents a project-level analysis of the proposed NCC Phase 1 Improvements. The DEIR has been prepared in accordance with the requirements of CEQA and the State CEQA Guidelines (California Code of Regulations [CCR] Title 14, Section 15000 et seq.). The EIR process is described further in Section 1.9, “Public Participation and the EIR Process.”

1.2 SUMMARY DESCRIPTION OF THE PROPOSED PROJECTS

1.2.1 NEW FUNDING MECHANISMS

The overall project objective is to create new funding mechanisms for the local share of the cost of constructing and maintaining flood control improvements and related environmental mitigation and habitat enhancements along the lower American and Sacramento Rivers and their tributaries in the Sacramento metropolitan area (Sacramento). The specific project objectives are to (1) complete the projects necessary to provide 100-year flood protection for developed areas in Sacramento’s major floodplains as quickly as possible, (2) provide urban-standard (“200-year”) flood protection for developed areas in Sacramento’s major floodplains over time, and

(3) ensure that new development in the undeveloped areas of Sacramento's major floodplains does not substantially increase the expected damage of an uncontrolled flood.

To meet these objectives, SAFCA proposes to create an assessment district and a development fee program to provide funding for the following activities and improvements:

- ▶ **Folsom Dam improvements**—physical and operational improvements to Folsom Dam that would increase the dam's low-level discharge and flood control storage capacities and upgrade the dam's temperature control capability;
- ▶ **Folsom Bridge construction**—construction of a new bridge across the American River downstream of Folsom Dam to mitigate the significant transportation-related effects of dam modifications and address dam security concerns;
- ▶ **Common Features levee improvements below Folsom Dam**—completion of improvements to the levees along the lower American and Sacramento Rivers that would allow these levees to safely contain sustained releases of up to 160,000 cubic feet per second from Folsom Dam;
- ▶ **Natomas Levee Improvement Program**—improvements to the levees around the Natomas area to address ongoing erosion, freeboard deficiencies, and seepage and stability conditions;
- ▶ **South Sacramento Streams Group channel improvements**—completion of improvements to the flood control channels along Morrison Creek, Elder Creek, Unionhouse Creek, and Florin Creek (i.e., the "South Sacramento Streams Group" [SSSG]);
- ▶ **North Sacramento flood control improvements**—completion of improvements to the levees along Dry/Robla Creek, Arcade Creek, Magpie Creek Diversion Channel, and the Natomas East Main Drainage Canal (NEMDC)/Steelhead Creek (i.e., the "North Sacramento Streams Group" [NSSG]);
- ▶ **American River Parkway habitat enhancement projects**—improvements to portions of the American River Parkway that would enhance floodplain and upland habitat values;
- ▶ **Levee integrity program**—a long-term urban levee and channel maintenance program to preserve the conveyance capacity of the lower American and Sacramento Rivers and their tributaries, and ensure that the levees protecting Sacramento perform with a high degree of reliability; and
- ▶ **Rural floodplain preservation program**—a long-term easement acquisition program to preserve the rural character and incidental flood storage capacity of agricultural lands in levee-protected floodplains upstream and just downstream of the Fremont Weir.

1.2.2 NCC PHASE 1 IMPROVEMENTS

To make it possible to proceed with a first phase of levee improvements in the Natomas area in 2007, before the start of the next flood season, SAFCA also is proposing at this time to implement the NCC Phase 1 Improvements project. The proposed NCC Phase 1 Improvements would involve constructing a cutoff wall in the westerly 12,500 feet of the Natomas Cross Canal (NCC) south levee to remediate through-seepage and underseepage conditions. The NCC Phase 1 Improvements will be considered for approval by SAFCA concurrently with consideration of approval of the proposed funding mechanisms.

1.3 TYPE OF EIR

1.3.1 COMBINED PROGRAM EIR AND PROJECT EIR

This EIR is a combined program EIR and project EIR. Volume I contains the program EIR component, and Volume II contains the project EIR component.

A program EIR is an EIR prepared on a series of actions that can be characterized as one large project and that are related geographically; as logical parts in the chain of contemplated actions; in connection with issuance of rules, regulations, plans, or other general criteria to govern the conduct of a continuing program; or as individual activities carried out under the same authorizing statutory or regulatory authority and having generally similar environmental effects that can be mitigated in similar ways (State CEQA Guidelines Section 15168). A program EIR enables a lead agency to examine the overall effects of the proposed course of action and to consider broad policy alternatives and programwide mitigation measures at an early time in the decision-making process when the agency has greater flexibility to deal with basic problems or cumulative impacts. The subject of the agency's approval decision is the overall program addressed in the EIR. When subsequent activities in the program are proposed, the agency must determine whether the environmental effects of those activities were covered in the program EIR and whether additional environmental documents must be prepared. If a later activity would have effects that were not examined in the program EIR, a project-specific CEQA document must be prepared. The project-level CEQA documents may incorporate by reference general discussions from the broader EIR and focus on the impacts of the individual projects that implement the plan, program, or policy.

The program-level analysis in Volume I broadly examines the significant environmental effects that could result from creating the proposed new funding mechanisms, specifically the physical effects associated with the program of flood control improvements and related environmental mitigation and habitat enhancements that these mechanisms would be used to finance. The program-level CEQA documentation will provide SAFCA with the environmental information needed to support its decision whether to create the proposed funding mechanisms.

The analysis in Volume II of this EIR is the project-level analysis of the NCC Phase 1 Improvements, which constitutes one of the individual projects that would be funded in part by the new funding mechanisms. The analysis in Volume II relies for general information on the documentation provided in the program-level analysis in Volume I and focuses on the site-specific impacts of the NCC Phase 1 Improvements. The project-level CEQA documentation will provide SAFCA with the environmental information needed to support its decision whether to approve construction of the NCC Phase 1 Improvements.

The next section describes the CEQA documentation process for additional individual projects that would be funded in part with financing generated through the proposed funding mechanisms.

1.3.2 CEQA DOCUMENTATION REQUIRED TO IMPLEMENT INDIVIDUAL IMPROVEMENT PROJECTS

Project-level CEQA compliance is required to implement the improvement projects to which SAFCA would commit funding generated through the proposed funding mechanisms. These projects are listed in Section 1.2.1, above. Volume II of this DEIR contains the project-level analysis of the initial phase of one of these improvement projects, the NCC Phase 1 Improvements.

Various levels of additional environmental review may be needed for the improvement projects to be paid for by the proposed funding mechanisms. For some of these projects, such as additional improvements to the Natomas levee system for which SAFCA is lead agency, SAFCA will prepare additional project-level CEQA documents when the improvements have been sufficiently planned and the projects are ready to be presented to the decision makers. These future project-level CEQA documents will focus on project- and site-specific impacts that are not

addressed in detail in this program EIR, while relying on the program EIR for general discussions and the analysis of broader impact topics, such as cumulative impacts.

Other projects listed in Section 1.2.1, such as Folsom Dam modifications and construction of a bridge below Folsom Dam, have been or currently are being analyzed in project-specific CEQA documents prepared by other agencies. If SAFCA approves the proposed new funding mechanisms, it will have the opportunity to fulfill its duties as a CEQA responsible agency by relying on these CEQA documents when deciding whether to approve funding for these projects.

For other flood control improvements listed in Section 1.2.1, including improvements to the levees along the lower American and Sacramento Rivers and along Morrison Creek and its tributaries, SAFCA has previously prepared and certified or adopted adequate project-level CEQA documentation and has partially implemented the improvements covered by that documentation, but now intends to complete these improvements using funding from the proposed funding mechanisms. In these cases, no additional project-level CEQA compliance would be needed for project implementation once the proposed funding mechanisms are approved. (See Chapter 3 for a description of the status of environmental review of the individual projects listed in Section 1.2.1.)

1.4 SCOPE OF THE PROGRAMMATIC ANALYSIS IN VOLUME I

CEQA (PRC Section 21002.1) and the State CEQA Guidelines (Section 15143) allow a lead agency to focus the discussion in the EIR on the potential environmental effects of a proposed project that the lead agency has determined may be significant. Lead agencies may limit discussion of other effects to a brief explanation as to why those effects would not be significant. During initial scoping with the public and governmental agencies and based on review of available information, it was determined that formation of the proposed funding mechanisms and subsequent implementation of the projects that receive local financing through these funding mechanisms would not result in significant environmental effects related to the following resources:

- ▶ **Mineral Resources**—Analyses of effects on mineral resources under CEQA generally focus on whether a project would hinder the extraction and use of known mineral commodities. The only known mineral resource in the program study area is decomposed granite present in the Folsom Reservoir area, where past mining has occurred. There is no future potential for the commercial mining of this material in the dam and reservoir vicinity. Furthermore, some potential improvements to Folsom Dam could entail the extraction and productive use this material, potentially precluding the need to obtain similar material elsewhere. Therefore, no potentially significant effects on known mineral resources are anticipated as a result of construction activities associated with the flood control improvement program. Except around Folsom Reservoir, where storage levels may be increased, any operational changes would be confined to the limits of the existing flood control system. No known mineral resources would be affected by these potential changes or other potential hydraulic changes within the flood conveyance system.
- ▶ **Population and Housing**—The flood control program would take place incrementally over several years and would not require the construction of new housing to accommodate workers, nor would it involve the displacement of a substantial number of people or residences.

For these reasons, these resource topics are not discussed further in this EIR. The removal of soil from agricultural lands for use in construction is discussed in Section 4.2, “Agriculture and Land Use.” The use of soil and aggregate resources for levee improvements, precluding their use for other purposes, is also discussed in Section 6.3, “Significant Irreversible Environmental Impacts.” The relationship of the potential program of flood control improvements to population growth is discussed in Section 6.1, “Growth-Inducing Effects.”

Volume I analyzes potential impacts on the following resource areas:

- ▶ Agriculture and Land Use
- ▶ Geology and Soils
- ▶ Hydrology and Hydraulics
- ▶ Water Quality
- ▶ Fisheries and Aquatic Resources
- ▶ Terrestrial Biological Resources
- ▶ Cultural Resources
- ▶ Paleontological Resources
- ▶ Transportation and Circulation
- ▶ Air Quality
- ▶ Noise
- ▶ Recreation
- ▶ Visual Resources
- ▶ Utilities and Service Systems
- ▶ Hazards and Hazardous Materials

The scope of the project-level analysis of the NCC Phase 1 Improvements is described in Chapter 1 of Volume II.

1.5 INTENDED USES OF THE EIR / AGENCY ROLES AND RESPONSIBILITIES

SAFCA is the CEQA lead agency for the proposed funding mechanisms and the NCC Phase 1 Improvements, and has primary authority for approval of these projects. This EIR will be used by SAFCA and CEQA responsible agencies to fulfill the requirements of CEQA. It also may be used as an informational document by federal agencies that could have permitting or approval authority (including partial funding) for aspects of the projects, and by other local and state agencies, including CEQA trustee agencies, that may have an interest in resources that could be affected by the projects.

A CEQA responsible agency is a state agency, board, or commission or any local or regional agency, other than the lead agency, that has discretionary approval power over a project. Responsible agencies must actively participate in the lead agency's CEQA process and review the lead agency's CEQA document. This EIR will be used by responsible agencies to ensure that they have met the requirements of CEQA before deciding whether to approve or permit project elements over which they have authority.

Creation of the proposed funding mechanisms would not require the approval of any agencies other than SAFCA. However, individual projects implemented using local financing generated through the funding mechanisms, including the NCC Phase 1 Improvements, would require permits and authorizations from, or coordination with, numerous federal, state, and local agencies. The following is a list of the agencies that may have responsibility or jurisdiction over the implementation of flood control improvements and the permits or authorizations that may apply to the individual flood control projects:

- ▶ U.S. Army Corps of Engineers (USACE): permitting under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act and approval of federal project levee modifications, modifications to Folsom Dam, and construction of the bridge below Folsom Dam.
- ▶ U.S. Fish and Wildlife Service (USFWS): Endangered Species Act (ESA) consultation and incidental take authorization.
- ▶ National Marine Fisheries Service (NMFS): ESA consultation and incidental take authorization.

- ▶ U.S. Department of the Interior, Bureau of Reclamation (Reclamation): approval of Folsom Dam modifications and construction of the bridge downstream of Folsom Dam.
- ▶ California Regional Water Quality Control Board (RWQCB), Central Valley Region (Region 5): National Pollutant Discharge Elimination System (NPDES) permitting pursuant to Clean Water Act Section 402, and Clean Water Act Section 401 certification when permitting under Section 404 of the Clean Water Act is required.
- ▶ California Department of Fish and Game (DFG): compliance with the California Endangered Species Act (CESA) and Fish and Game Code Section 1602 (Streambed Alteration).
- ▶ State Lands Commission: possible land use lease and protection of public trust resources associated with Sovereign Lands of the state, including navigable waterways.
- ▶ California Reclamation Board (The Reclamation Board) and local reclamation districts: levee and floodway encroachment permits.
- ▶ California State Office of Historic Preservation: National Historic Preservation Act Section 106 compliance for projects with federal involvement.
- ▶ California Parks and Recreation Department: encroachment permit for historic Walnut Grove railroad.
- ▶ Sutter and Sacramento Counties: permits for compliance with the State's Surface Mining and Reclamation Act (SMARA), and other possible construction authorizations/encroachment permits.
- ▶ Placer and El Dorado Counties: possible construction authorizations/encroachment permits.
- ▶ Feather River Air Quality Management District (AQMD), Sacramento Metropolitan AQMD, Placer County Air Pollution Control District, and El Dorado AQMD: review of effects on air quality and permit to construct/permit to operate.
- ▶ City of Folsom: approval of bridge construction below Folsom Dam.
- ▶ City of Sacramento: possible construction authorizations/encroachment permits.

A trustee agency is a state agency that has jurisdiction by law over natural resources that are held in trust for the people of the State of California. Trustee agencies that have jurisdiction over resources potentially affected by the individual flood control projects that could receive funding generated through the proposed funding mechanisms are DFG for fish and wildlife resources, the California Department of Parks and Recreation for lands around Folsom Dam, and the California State Lands Commission for navigable waterways.

1.6 DOCUMENTS INCORPORATED BY REFERENCE

In accordance with the State CEQA Guidelines, the following documents are incorporated by reference into this EIR, and relevant portions of these documents are summarized in this EIR:

- ▶ Sacramento Area Flood Control Agency. 2000 (April). *Draft Program Environmental Impact Report on Flood Control Improvements Along the Mainstem of the American River. Volume I.* Sacramento, CA. Prepared by Jones & Stokes Associates, Sacramento, CA.
- ▶ Sacramento Area Flood Control Agency. 2004 (December). *South Sacramento Streams Project Supplemental Draft Environmental Impact Report.* Sacramento, CA. Prepared by ESA, Sacramento, CA.

- ▶ Sacramento Area Flood Control Agency. 2005 (February). *South Sacramento Streams Project Supplemental Final Environmental Impact Report*. Sacramento, CA. Prepared by ESA, Sacramento, CA.
- ▶ Sacramento Area Flood Control Agency. 2006 (July 14). *Natomas Levee Evaluation Study, Prepared for SAFCA in Support of the Natomas Basin Components of the American River Common Features Project, Final Report*. Sacramento, CA.
- ▶ Sacramento Area Flood Control Agency and U.S. Army Corps of Engineers. 2001 (July). *Draft Supplemental Environmental Impact Report/Environmental Assessment for the South Sacramento County Streams Project, Camray Borrow Site and Additional Aspects of Levee Work on North Beach Lake Levee*. Sacramento, CA. Prepared by EDAW, Sacramento, CA.
- ▶ Sacramento Area Flood Control Agency and U.S. Army Corps of Engineers. 2001 (October). *Final Supplemental Environmental Impact Report/Environmental Assessment for the South Sacramento County Streams Project, Camray Borrow Site and Additional Aspects of Levee Work on North Beach Lake Levee*. Sacramento, CA. Prepared by EDAW, Sacramento, CA.
- ▶ U.S. Army Corps of Engineers. 2004 (December). *Environmental Assessment for the South Sacramento County Streams Project Design Refinements*. USACE Sacramento District, Sacramento, CA.
- ▶ U.S. Army Corps of Engineers, SAFCA, and California Reclamation Board. 2002 (February). *American River Watershed, California, Long-Term Study, Final Supplemental Plan Formulation Report/Environmental Impact Statement/Environmental Impact Report. Volume I – Integrated Document and Volume II – Appendices, Environmental*. USACE Sacramento District, SAFCA, and The Reclamation Board, Sacramento, CA.
- ▶ U.S. Army Corps of Engineers and California Reclamation Board. 1998 (March). *Streambank Protection for the Lower American River Final Environmental Impact Report and Supplemental Environmental Impact Statement V for the Sacramento River Bank Protection Project*. USACE Sacramento District and The Reclamation Board, Sacramento, CA. Prepared by Jones & Stokes Associates, Sacramento, CA.
- ▶ U.S. Army Corps of Engineers and California Reclamation Board. 2001 (August). *Final Environmental Assessment/Initial Study American River Watershed, California, Folsom Dam Modification Project*. USACE Sacramento District and The Reclamation Board, Sacramento, CA.
- ▶ U.S. Army Corps of Engineers and California Reclamation Board. 2002 (April). *American River Watershed Common Features Project Lower American River Features as Modified by the Water Resources Development Act of 1999, Environmental Assessment/Initial Study and Finding of No Significant Impact*. USACE Sacramento District and The Reclamation Board, Sacramento, CA.
- ▶ U.S. Army Corps of Engineers and California Reclamation Board. 2005 (October). *American River Common Features, Lower American River Features Mayhew Levee, Sacramento County, California, Draft Environmental Impact Statement/Environmental Impact Report*. USACE Sacramento District and The Reclamation Board, Sacramento, CA.
- ▶ U.S. Army Corps of Engineers and California Reclamation Board. 2006 (June). *Final Environmental Assessment/Initial Study, American River Common Features Pocket Area Geotechnical Reaches 2 and 9*. USACE Sacramento District and The Reclamation Board, Sacramento, CA.
- ▶ U.S. Army Corps of Engineers and City of Folsom. 2006 (September). *American River Watershed Project Post Authorization Decision Document, Folsom Dam Raise, Folsom Bridge, Final Supplemental Environmental Impact Statement/Environmental Impact Report*. USACE Sacramento District, Sacramento, CA, and City of Folsom, CA.

- ▶ U.S. Army Corps of Engineers and City of Sacramento. 1996 (April). *Magpie Creek, California, Section 205 Final Detailed Project Report and Final Environmental Impact Statement/Environmental Impact Report*. USACE Sacramento District and City of Sacramento, Sacramento, CA.
- ▶ U.S. Army Corps of Engineers and City of Sacramento. 1997 (August). *Supplemental Report to the Magpie Creek, California, Section 205 Final Detailed Project Report and Final Environmental Impact Statement/Environmental Impact Report*. USACE Sacramento District and City of Sacramento, Sacramento, CA.
- ▶ U.S. Department of the Interior, Bureau of Reclamation. 2003. *Long-Term Reoperation of Folsom Dam and Reservoir, Final Environmental Assessment*. Sacramento, CA.

These documents are available for inspection at the SAFCA offices at 1007 7th Street, 7th Floor, Sacramento, California, during normal business hours.

1.7 ORGANIZATION OF THIS EIR

Volume I contains the program-level analysis of the potential significant environmental effects associated with the projects that would be funded, at least in part, by the proposed funding mechanisms and is organized as follows:

- ▶ **Executive Summary** summarizes the proposed project, alternatives, significant environmental effects that would result from project implementation, and mitigation measures proposed to reduce or eliminate those impacts.
- ▶ **Chapter 1, “Introduction,”** describes the purpose, context, and organization of the DEIR.
- ▶ **Chapter 2, “Background,”** describes the conditions, circumstances, and history of SAFCA’s flood control efforts and funding mechanisms.
- ▶ **Chapter 3, “Project Description,”** generally describes the range of the flood control improvements that would be funded with approval and implementation of the proposed funding mechanisms.
- ▶ **Chapter 4, “Environmental Setting, Impacts, and Mitigation,”** describes, by environmental issue area, the existing environmental setting; broadly discusses the potential environmental impacts associated with the flood control improvements described in Chapter 3; and identifies feasible mitigation measures to avoid or substantially lessen significant environmental effects.
- ▶ **Chapter 5, “Cumulative Impacts,”** discusses the cumulative impacts that would result from the proposed project in combination with past, current, and probable future projects that could affect the same resources.
- ▶ **Chapter 6, “Other CEQA-Required Sections,”** discusses the project’s growth-inducing impacts, significant and unavoidable impacts, and significant irreversible environmental changes.
- ▶ **Chapter 7, “Alternatives,”** describes alternatives to the proposed project and analyzes their significant environmental effects in comparison to the proposed project.
- ▶ **Chapter 8, “Report Preparation,”** identifies the preparers of this DEIR.
- ▶ **Chapter 9, “References,”** contains a comprehensive listing of the sources of information used in the preparation of Volume I, including agencies or individuals consulted.

► **Appendices:**

- Appendix A, “Notice of Preparation and Scoping Comments,”
- Appendix B, “Mitigation Incorporated into Proposed Improvements Covered in Previous Environmental Documents,”
- Appendix C, “Hydraulic Modeling Results,” and
- Appendix D, “SAFCA Legislative Framework for Flood Control and Flood Risk Management in the Sacramento Valley – Endorsed by Sacramento Area Council of Governments, April 2006”

Volume II contains the project-level analysis of the potential environmental effects of the NCC Phase 1 Improvements. The organization of Volume II is described in Chapter 1 of that volume.

1.8 STANDARD TERMINOLOGY USED IN VOLUME I

The following are standard terms as used in Volume I:

Proposed project—SAFCA’s proposed creation of new funding mechanisms, specifically, an assessment district and a development fee program to provide the local share of funding for the activities and improvements listed in Section 1.2.1 above.

Project alternatives—Alternative ways of feasibly attaining most of the basic project objectives that also would avoid or substantially lessen any significant effects of the proposed project. CEQA requires that an EIR describe and evaluate a “reasonable range” of project alternatives. See Chapter 7, “Alternatives.”

Assessment district—Funding mechanism used by a state or local government agency to assess property that will receive a special benefit from the construction, acquisition, or maintenance of public improvements funded by the assessments.

Development fee—Funding mechanism applied by a local government agency as a condition of development approval to address the impacts of land development and apportion the cost of mitigation projects that benefit such development.

100-year flood protection—Project design standard that is intended to provide protection against a flood with a 1% annual chance of occurrence so as to meet the minimum requirements of the National Flood Insurance Program (NFIP) as determined by the Federal Emergency Management Agency (FEMA).

Urban-standard (“200-year”) flood protection—Project design standard that is intended to provide protection against the most severe floods that are considered reasonably foreseeable based on existing hydrological records. For the Sacramento metropolitan area, these design floods are comparable in size to the “200-year” floods centered on the lower Sacramento and American Rivers as identified in the Sacramento and San Joaquin River Basins Comprehensive Study completed by the USACE and The Reclamation Board in 2002 (USACE and The Reclamation Board 2002).

Sacramento—Metropolitan area comprising the City of Sacramento and portions of the County of Sacramento within SAFCA’s jurisdiction.

Expected damage—A measure of flood risk that integrates the likelihood and consequences of uncontrolled flooding.

Project sites—Locations where activities associated with individual projects financed in part by the proposed funding mechanisms could occur. Project sites discussed in Volume I include, but are not limited to, the potential locations of Folsom Dam facility modifications, bridge construction downstream of Folsom Dam, levee

improvements along the Sacramento and American Rivers and their tributaries, soil borrow areas, construction staging areas, and ditch realignments.

Program study area—The area encompassing the project sites of all the potential components of the comprehensive flood control program that may be funded in part with funds generated by the proposed funding mechanisms.

Levels of impact significance:

- ▶ **No impact**—No change from existing conditions.
- ▶ **Significant impact**—A substantial or potentially substantial adverse change in any of the physical conditions within the area affected by the project, as demonstrated by exceeding the defined significance thresholds without the implementation of feasible mitigation. Where available, feasible mitigation is identified that would eliminate or reduce a significant impact to a less-than-significant level.
- ▶ **Less-than-significant impact**—A physical effect on the environment that does not exceed the defined significance thresholds.
- ▶ **Significant and unavoidable impact**—A significant environmental effect that exceeds the defined thresholds of significance and that cannot be reduced to a less-than-significant level through the implementation of feasible mitigation measures.

1.9 PUBLIC PARTICIPATION AND THE EIR PROCESS

On July 21, 2006, SAFCA issued a Notice of Preparation (NOP) of a DEIR and filed the NOP with the State Clearinghouse. The public comment period on the NOP ended on August 22, 2006. A scoping meeting was held on August 2, 2006, to solicit input on the scope of the DEIR from interested agencies, individuals, and organizations. The NOP and copies of the scoping comments provided to SAFCA are included in Appendix A.

In accordance with CEQA review requirements, this DEIR is being distributed for public and agency review and comment for a 45-day period, which ends on January 2, 2007. This distribution ensures that interested parties have an opportunity to express their views regarding the significant environmental effects of the project, and to ensure that information pertinent to permits and approvals is provided to the decision makers for SAFCA and the CEQA responsible agencies. This document is available for review by the public during normal business hours at the SAFCA office at 1007 7th Street, 7th Floor, Sacramento.

SAFCA will hold two public meetings during the comment period, at which it will receive input from agencies and the public on the DEIR. The meetings will be held on November 20, 2006 at 3:30 p.m. and on December 15, 2006 at 10:00 a.m. in the chambers of the Sacramento County Board of Supervisors, 700 H Street, Sacramento, California. In addition, written comments from the public, reviewing agencies, and stakeholders will be accepted throughout the public comment period. Comments must be received by SAFCA **by 5:00 p.m. on January 2, 2007**, at the following address, fax number, or e-mail address:

Attn: John Bassett / DEIR Comments
Sacramento Area Flood Control Agency
1007 7th Street, 7th Floor
Sacramento, CA 95814
Fax number: (916) 874-8289
E-mail address: BassettJ@SacCounty.net

If comments are provided via e-mail, *please include the project title in the subject line, attach comments in MS Word format, and include the commenter's U.S. Postal Service mailing address.*

Following consideration of these comments, SAFCA will prepare written responses to comments on environmental issues, and prepare a Final EIR (FEIR) that will describe the disposition of any significant environmental issues raised in the comments on the DEIR. Written responses must be provided to public agencies on comments made by those agencies at least 10 days before the EIR can be certified. Following this 10-day period, the SAFCA Board will consider certifying the FEIR if it is determined to be in compliance with CEQA, and will rely on the certified FEIR when considering approval of the proposed funding mechanisms and the NCC Phase 1 Improvements.

In accordance with the requirements of CEQA, if the SAFCA Board decides to approve one or both of the proposed projects analyzed in this EIR, it will make written findings with respect to each significant environmental effect identified in the EIR that explains that project changes or alterations are required to avoid or substantially lessen the effect; such changes or alterations are within the responsibility and jurisdiction of another public agency and have been adopted, or can and should be adopted, by such other agency; or specific economic, legal, social, technological, or other considerations render the mitigation measures or project alternatives identified in the FEIR infeasible. In addition, if the SAFCA Board decides to approve either project but determines that it would have unavoidable environmental effects, the Board will adopt a "Statement of Overriding Considerations" that explains why the benefits of the project outweigh its significant effects on the environment, based on information in the EIR and other information in the project record.

At the time of project approval, the SAFCA Board must also adopt a reporting or monitoring program for those measures that it has adopted and incorporated into the project in order to mitigate or avoid significant effects on the environment. The reporting or monitoring program must be designed to ensure compliance during project implementation.

Following project approval, a Notice of Determination documenting the decision will be issued.

2 BACKGROUND

2.1 INTRODUCTION

SAFCA was created in 1989 through a Joint Exercise of Powers Agreement by the City of Sacramento, the County of Sacramento, the County of Sutter, the American River Flood Control District (ARFCD), and Reclamation District (RD) 1000 to address the vulnerability of the Sacramento metropolitan area (Sacramento) to catastrophic flooding. In 1990, the California Legislature enacted the Sacramento Area Flood Control Agency Act (Water Code Appendix, Section 130-1 et seq.) giving SAFCA broad authority to finance flood control projects and directing SAFCA to carry out its flood control responsibilities in ways that provide optimum protection to the natural environment.

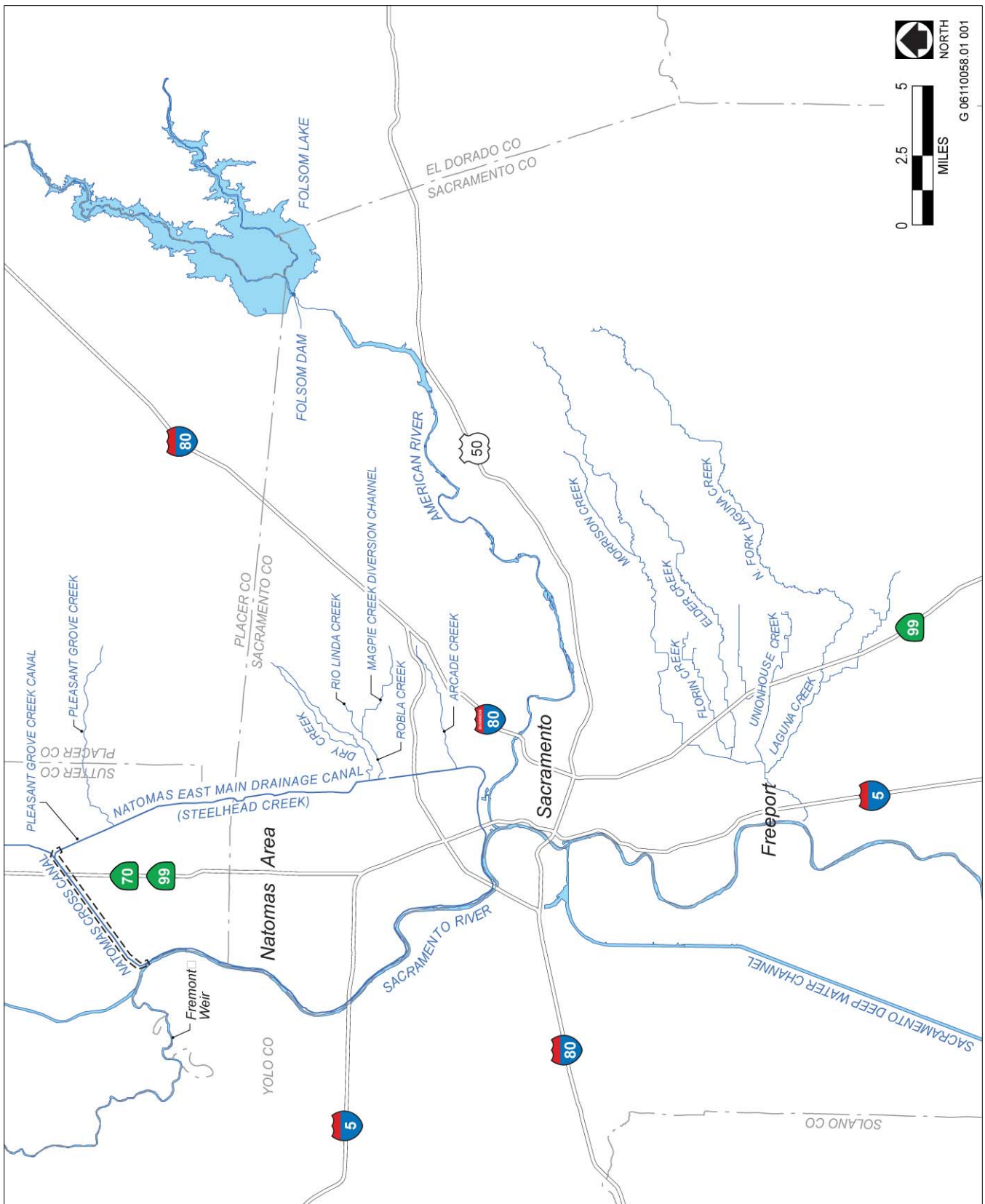
SAFCA's activities are currently funded from development fees and annual assessments imposed on benefiting properties in three separate districts in Sacramento and Sutter Counties. District 1 provides funding for SAFCA's planning, administration, and operation and maintenance expenses, and covers all the properties in the Natomas area, including those lying within Sutter County, and most of the properties in Sacramento County lying within the drainage basin of the American River. District 2 provides funding for capital improvements to the levees protecting Natomas and North Sacramento along the Natomas East Main Drainage Canal (NEMDC, or Steelhead Creek) and lower Dry and Arcade Creeks and covers all the properties directly benefiting from these improvements. District 3 provides funding for physical and operational improvements to Folsom Dam, the levees along the American River, and the levees and related flood control facilities along Morrison Creek and its tributaries in south Sacramento County and covers all the properties benefiting from these improvements.

SAFCA's program for improving Sacramento's flood control system consists of the following elements:

- ▶ Provide at least a 100-year level of flood protection as quickly as possible to the areas within the Federal Emergency Management Agency (FEMA) 100-year floodplain.
- ▶ Work toward achieving urban-standard ("200-year") flood protection over time.
- ▶ Ensure the structural integrity of the levee system.

SAFCA has carried out this flood risk management program on a step-by-step basis in coordination with the USACE, the Reclamation, The Reclamation Board, and the California Department of Water Resources (DWR), generating the local share of the costs of the improvements in this program. A combination of levee improvements and modification of the flood control operation at Folsom Dam has made it possible to achieve the 100-year flood protection objective for the Natomas area and for most of the properties in the floodplain along the lower Sacramento and American Rivers. Levee construction contracts are in place to ensure that a large number of additional parcels reach this milestone by the end of 2006. This will leave a small number of parcels in the federally regulated 100-year floodplain along the American River upstream of the Mayhew Drain and along Morrison Creek and its tributaries in south Sacramento. These parcels will be protected incrementally over the next 4–6 years. Notwithstanding these achievements, the transition to a comprehensive flood control program for Sacramento, providing urban-standard ("200-year") flood protection, has been slower and more costly than anticipated. The new financing mechanisms evaluated in this EIR would provide the local share of funding needed to complete previously approved projects and modifications to those projects, as listed in Section 1.2.1 in Chapter 1, so as to achieve 200-year flood protection and ensure the structural integrity of the levee system over time.

The remainder of this chapter provides an overview of the history of the Sacramento flood control system and SAFCA's accomplishments to date. Exhibit 2-1 shows the Sacramento region and the rivers and tributary channels discussed in the following sections.



Source: CaSil; EDAW 2006

Regional Setting

Exhibit 2-1

2.2 HISTORICAL FLOOD RISK

Because of unique topographical and meteorological factors, the Sacramento River basin, including the Sacramento River's major tributaries, the Feather and American Rivers, is capable of producing significantly higher peak flood discharge per square mile of drainage area than any other major river basin in the United States. Consequently, flood control has always been a major concern to the agricultural and urban settlers in the basin. Nevertheless, a coordinated flood control plan for the basin was not initiated until after the historic Sacramento River floods of 1907 and 1909. These two floods triggered the comprehensive, federally financed and managed flood control effort that has unfolded over the past 85 years under the leadership of the USACE and The Reclamation Board. The product of this effort is the Sacramento River Flood Control Project (SRFCP), an integrated system of levees, overflow bypass channels, and dams that was designed and constructed by federal, state, and local interests over several decades of the 20th century to protect farmlands, towns, and cities in the Sacramento Valley from large floods. Despite this effort, Sacramento today has the greatest risk of flooding of any major city in the country.

2.3 STORMS OF 1986

In 1986, the largest flood ever recorded for the Sacramento and American Rivers tested the limits of the system's storage and conveyance capacity and caused levee failures in many areas of the Sacramento Valley that resulted in millions of dollars of property damage. The flood exposed several deficiencies in the flood control system protecting Sacramento: (1) unstable levees along the east bank of the Sacramento River that were susceptible to failure because of the porous nature of the material used in their construction, (2) inadequate conveyance capacity in the drainage channels around Natomas that serve to divert runoff from the foothills into the Sacramento and American Rivers, and (3) inadequate reservoir storage capacity for controlling large floods in the American River watershed.

Prior to 1986, FEMA judged that the SRFCP could safely contain a 100-year flood event along the Sacramento and American Rivers. This judgment informed Sacramento's entry into the National Flood Insurance Program (NFIP) in the late 1970s and allowed property owners in the protected Sacramento and American River floodplains to obtain flood insurance on a voluntary basis at favorable rates. After 1986, the USACE concluded that the SRFCP's deficiencies rendered Sacramento vulnerable to about a 70-year flood. This conclusion caused FEMA, administrator of the NFIP, to issue new floodplain maps in November 1989 indicating that most of the City of Sacramento and portions of Sacramento and Sutter Counties were in the 100-year floodplain. These new maps required property owners within this mapped floodplain to maintain flood insurance through the NFIP.

2.4 LOCAL, STATE, AND FEDERAL RESPONSE

SAFCA was formed in September 1989 to work with the USACE and the State of California through The Reclamation Board within the framework of the federally authorized American River Watershed Program (ARWP) to provide all of Sacramento's SRFCP-protected floodplains with at least a 100-year level of flood protection as quickly as possible, while working to achieve a 200-year level of flood protection over time. The rationale for this flood risk reduction program was that an uncontrolled flood would expose Sacramento's low-lying, heavily urbanized floodplains to a potentially catastrophic loss of life and property. A 100-year level of flood protection, or an annual risk of flooding of 1% or less, is the minimum national standard for protecting urban areas and it was essential to meet this standard as quickly as possible. However, given the likely consequences of an uncontrolled flood, it was also necessary to work toward the higher standard of protecting Sacramento from at least a 200-year flood, because this was considered to represent the most severe flood that could reasonably be expected to occur along the Sacramento and American Rivers. This flood risk reduction program was subsequently characterized as progressing from high risk (less than 100-year protection), through moderate risk (greater than 100-year but less than 200-year protection), to low risk (greater than 200-year protection).

2.5 SACRAMENTO URBAN LEVEE RECONSTRUCTION PROJECT

To achieve the goals of the ARWP, the USACE proposed to quickly implement a levee stabilization project along the 33-mile reach of the Sacramento River east levee that protects Natomas, downtown Sacramento, and the Pocket area of Sacramento, and to pursue a comprehensive program of levee improvements along the diversion channels around Natomas combined with construction of a flood control dam near Auburn to control flows in the lower American River. The levee stabilization effort focused on the two segments of the east levee of the Sacramento River upstream and downstream of the American River: the downstream segment connecting the American River south levee to the North Beach Lake levee near the town of Freeport and the upstream segment connecting the American River north levee to the south levee of the Natomas Cross Canal (NCC) near Verona. These levees had been constructed in the early part of the 20th century using materials dredged from the river channel that contained significant amounts of sand and silt dislodged from the foothills and mountains along the east side of the Sacramento Valley during the hydraulic mining era. These materials proved to be extremely porous when subjected to the prolonged high flows produced by the storms of 1986, particularly in the Natomas area, where levee failure due to seepage through the levee was avoided only through a massive effort to shore up the levee during the height of the flood.

The stabilization effort, which was referred to as the Sacramento Urban Levee Reconstruction Project, employed two measures to address this seepage problem. Where space permitted, as in much of the upper Natomas area, the plan called for construction of a seepage stability berm along the land side of the levee to intercept any water seeping through the levee and discharge it onto adjacent agricultural lands along the toe of the levee. Where space was limited, as in the Pocket area and the lower Natomas area, the plan called for construction of a slurry cutoff wall excavated through the levee and into less permeable ground below. This cutoff wall serves as a barrier to seepage through the permeable levee embankment soils. Construction of these improvements, covering approximately 33 miles of the Sacramento River east levee, was initiated in 1990 and completed in 1993.

2.6 NORTH AREA LOCAL PROJECT

With the completion of the Sacramento Urban Levee Reconstruction Project, attention shifted to the American River and the diversion channels around the Natomas area. Here the ARWP focused on raising the diversion channel levees and controlling water surface elevations in the channels and the lower American River by constructing a flood detention dam at Auburn. This plan was presented to Congress in 1992. However, in the face of opposition to the detention dam, Congress authorized only the levee improvements around Natomas and directed that these improvements should proceed while the USACE reevaluated the options for controlling high flow along the remainder of the lower American River. The legislation left open the possibility that the authorized improvements could be constructed by nonfederal interests in exchange for future credits or reimbursements.

Taking advantage of this provision, SAFCA opted to move forward with a slightly redesigned plan that would protect Natomas from a 200-year flood along the American River without the benefit of the Auburn flood detention dam. This plan was feasible because of the design of the American River levee system upstream of Natomas. The last segment of this system was constructed in 1958, after the completion of Folsom Dam. Believing that the dam afforded protection against extremely large floods, the USACE permitted the American River north levee to be extended upstream from Cal Expo to the Carmichael Bluffs along an alignment very near the north bank of the river channel, thus cutting off a historical overflow area and creating a relatively narrow river channel. This channel cannot contain very high flows discharged from Folsom Dam. Instead, such flows are likely to trigger a levee failure upstream of Natomas, thus causing large volumes of flood water to flow into the surrounding floodplains of the American River outside of Natomas. Levee failures such as this would limit the flows reaching the lower portion of the American River channel.

With this knowledge, SAFCA revised the design of the diversion channel levee improvements to contain the maximum water surface elevation likely to be produced by a 200-year flood along the southeastern flank of Natomas, combining foothill runoff with American River flows and reflecting the effects of upstream levee

failures. Based on this design, SAFCA raised the east and west levees of the NEMDC, the north and south levees of Arcade Creek, and the south levee of Dry/Robla Creek. In addition, SAFCA constructed a new levee along the north side of Dry Creek, extended the south Robla Creek levee, and installed a new stormwater pumping station in the NEMDC channel connecting the new Dry Creek north levee to the raised NEMDC west levee. Finally, SAFCA strengthened the south levee of the NCC and portions of the Pleasant Grove Creek Canal levee in Sutter County to control flooding along the northern perimeter of Natomas.

This North Area Local Project (NALP) was substantially completed in 1996. That same year, as part of the ongoing ARWP, the USACE issued a Supplemental Information Report (SIR) to Congress concluding that the project provided Natomas with enough protection to control at least a 200-year flood along the American River and about a 140-year flood along the Sacramento River. Judged by the standards of SAFCA's adopted flood risk reduction program, the areas protected by the NALP had progressed from a high-risk to a moderate-risk status. On this basis, in 1998 the USACE certified that the levees around Natomas and along the lower reaches of Dry and Arcade Creeks were adequate to meet FEMA standards, and the properties protected by these levees were mapped out of the federally regulated 100-year floodplain.

2.7 AMERICAN RIVER COMMON FEATURES PROJECT

The 1996 SIR principally addressed the requirements of providing at least a 200-year level of flood protection to all portions of Sacramento. The report concluded that with a slight increase in the height of the Sacramento River east levee just downstream from its junction with the south levee of the NCC, the Natomas area could be secured from a 200-year flood along the Sacramento River. With respect to the remainder of the floodplain, the report indicated that a combination of increased flood control storage and improvements to the levees along the lower American River would be needed to achieve 200-year flood protection. The levee improvements in the Natomas area and along the lower American River were judged to be a "common feature" in any long-term flood risk reduction strategy for Sacramento. Accordingly, based on the information provided in the SIR, Congress directed the USACE to initiate extensive improvements to the levees along the American River upstream of the Natomas area and to address the residual risk of flooding along the east levee of the Sacramento River downstream of the NCC as part of the ongoing ARWP. These improvements were referred to as the American River Common Features Project (Common Features Project).

Shortly after the conclusion of the 1996 federal legislative session, the Sacramento Valley was again visited by a flood of record magnitude. The storms of 1997 produced flows in the lower Sacramento and American Rivers comparable to those of the storms of 1986. Nevertheless, the levees around the Natomas area, improved by the NALP and the levee stabilization work that preceded it, passed these flows without the significant signs of stress that occurred in 1986. However, the flood did cause failures of some SRFCP levees along the Feather River and Sutter Bypass upstream of Natomas. The USACE's post-flood assessment concluded that deep underseepage may have contributed to these levee failures. Underseepage can act as a levee failure mechanism where the soils in the ground beneath a levee contain materials that are sufficiently permeable to transmit water under high pressure from the river side to the land side of the levee. During a flood event, these high-pressure flows can create a strong upward force. If the soil mantle on the land side of the levee is not able to withstand or safely release this uplift force, the result can be a rupture of the soil mantle, allowing seepage to erode and remove the soils below the levee. In severe cases, the levee can collapse into the void that is created and be overtopped by flood water.

The post-1997 flood analysis led to a broadening of the scope of the Common Features Project. In 1999, Congress directed the USACE to raise and strengthen the levees along the American River as necessary to safely contain sustained releases of up to 160,000 cubic feet per second from Folsom Dam. In addition, the USACE determined that the project design should more fully address the threat of deep underseepage. As a result, the Common Features Project was revised to include deeper and more extensive cutoff walls, including cutoff measures at levee road and utility crossings; levee raising along the north levee of the American River between H Street and Watt Avenue; levee and bank armoring at several locations deemed susceptible to erosion during sustained high-flow events; reconstruction of the nonfederal levee along the south bank of the American River upstream of the

Mayhew Drainage Canal; and construction of a closure structure across the Mayhew Drainage Canal to prevent backup of floodwater on Folsom Boulevard. Between 1999 and 2004, enough of this work was completed to provide a 100-year level of protection to more than 55,000 parcels in the northern portion of the floodplain along the lower American and Sacramento Rivers. Since 2004, additional work has been underway to extend this protection to another 25,000 parcels in the southern portion of the American/Sacramento River floodplain. This additional work is expected to be completed by the end of 2006.

In the Natomas area, after initiating the design of the project to raise the east levee of the Sacramento River, engineers reviewed the conditions observed during the 1997 flood where the levee intersects RD 1000's North Canal near the Prichard Lake pumping station. This area had a history of seepage problems that were addressed by installing a drained stability berm along the landside face of the levee as part of the Sacramento Urban Levee Reconstruction Project. However, during the 1997 flood, sand boils and significant seepage developed near the levee toe, and the review indicated that deep underseepage was a possible concern. The USACE formed a project management team to pursue this concern. The team, which included consultants with expertise in soil mechanics and geotechnical exploration and evaluation, met periodically to review the investigation plan and conclusions, and to provide guidance on alternative remediation measures. As the investigation proceeded, it became apparent that more information on subsurface conditions was needed. A program of soil borings and samplings began in 2000 and was completed in late 2001. Analysis of the accumulated data indicated that a threat of underseepage-induced failures exists along the Sacramento River east bank levee and the NCC south bank levee during high-water conditions. Preliminary identification of alternatives was completed, and the USACE and its partners began a public involvement program to identify issues of concern to the local community before developing a final design for congressional approval.

Public scoping meetings were held in July 2002 to present information on the preliminary levee modifications and receive comments from the public. It was anticipated that information obtained in these scoping meetings would be used to assist in plan formulation and to complete the draft environmental documents necessary to meet both federal and state requirements.

Because of the magnitude and anticipated cost of the recommended work, and because deep underseepage was a newly recognized concern in the Sacramento Valley, the USACE and its nonfederal partners (the State of California and SAFCA), determined that a panel of experts should be convened to review and refine the USACE's guidelines for evaluating the risk of underseepage and designing remedial measures.

The USACE's Levee Seepage Task Force was convened in early 2003 and completed its work in July 2003. Based on its findings, the USACE developed a new Standard Operating Procedure Engineering Design Guidance 2003 (SOP EDG-03) for Geotechnical Levee Practice, recommending guidelines for evaluation, design, and maintenance, which were adopted by USACE's Sacramento District in August 2004. The most important recommendation embodied in the new SOP EDG-03 was that additional resources should be used in the evaluation, feasibility, and design phases of a project so that less conservative and more cost-effective remedial measures could be recommended for construction.

With the new SOP EDG-03 as a guide, the USACE, the State of California, and SAFCA collaborated to develop a plan for moving forward with the Natomas levee improvements needed to achieve 200-year flood protection, while at the same time addressing priority levee deficiencies that might be identified. It was agreed that SAFCA would take the lead in conducting a Natomas levee evaluation study that would be the basis for planning additional levee improvements. In addition, it was agreed that the USACE would conduct a reevaluation of data collected from earlier studies in light of the new SOP, using the 100-year flood profile as a basis for evaluation.

Using the new guidelines, the USACE reanalyzed the boring data that it had collected earlier, and summarized its findings in November 2005. For water surface elevations produced by a 100-year flood, the USACE determined that, at some locations, calculated exit gradients exceeded the adopted guideline for levee stability and the borings

indicated a potential for subsurface permeability that could threaten the stability of the affected levees if not addressed.

SAFCA initiated the Natomas Levee Evaluation Program in June 2005, including extensive additional geotechnical explorations along the Natomas levees and along a proposed setback or backup levee alignment for the northern 5.5 miles of the Sacramento River east levee. SAFCA's study focused on the potential for seepage failure in a 200-year flood event along the south levee of the NCC, the east levee of the Sacramento River, and the north levee of the American River. Unresolved levee freeboard and streambank erosion issues affecting these levees were also evaluated to identify the scope of the improvements needed to safely contain a 200-year flood. Lastly, to identify the magnitude of the problems and prioritize remedial activities, the potential for seepage failure was also assessed for a 100-year flood event. The results of the USACE's November 2005 report and SAFCA's Natomas Levee Evaluation Program study report reconfirmed the USACE's post-1997 flood concerns regarding underseepage and underscore the need for a substantial expansion of the scope of the Common Features Project in Natomas.

2.8 SOUTH SACRAMENTO STREAMS PROJECT

The homes and businesses at risk in the southern portion of the American/Sacramento River floodplain are also subject to flooding from the combined effects of high flows in Morrison Creek and its tributaries, Florin, Elder, and Unionhouse Creeks (South Sacramento Streams Group, or SSSG), along the southern border of the City of Sacramento and high flows in the Cosumnes and Mokelumne Rivers, which raise water surface elevations in the Beach/Stone Lake floodplain south of the city. These high waters also threaten the Sacramento Regional Wastewater Treatment Plant (SRWTP).

To address this flood risk, Congress in 1999 authorized a project that included a ring levee around the SRWTP, levee and related improvements to increase the conveyance capacity of the contributing streams and to add freeboard to the Beach Lake levee, and hydraulic mitigation for homes scattered throughout the Beach/Stone Lake floodplain. This South Sacramento Streams Project and modifications and refinements to specific components of the project were evaluated in several environmental documents prepared by SAFCA, The Reclamation Board, and the USACE. Most recently, these agencies identified design improvements needed to achieve minimum FEMA certifiable 100-year level of flood protection when previously performed flood hydrology studies were found to need revision and update. In 2004 and 2005, SAFCA directed the preparation of a supplemental EIR that evaluated the significant environmental effects of these improvements. The project consists of excavating selected stream channels, retrofitting stream passage beneath several local bridge crossings, installing floodwalls at select locations, realigning portions of existing levees, and installing box culverts at several stream crossings. To date, a new perimeter levee has been constructed around the SRWTP and the existing North Beach Lake levee extending from the Sacramento River to the Union Pacific Railroad (UPRR) tracks has been raised and strengthened. A construction contract has been issued to construct a new floodwall along the north bank of Morrison Creek from to the UPRR to Brookfield Drive north of Mack Road by the end of 2006. Completion of these improvements will contribute to providing 100-year flood protection to the homes and businesses in the southern portion of the American/Sacramento River floodplain.

2.9 FOLSOM DAM REOPERATION

Folsom Dam Reoperation, also known as variable storage space operation or "Folsom Reoperation," increases the space allocated to flood control at Folsom Reservoir based on the availability of storage space for flood waters in three large, nonfederal reservoirs located in the upper reaches of the American River watershed. Current federal requirements for flood control at Folsom Dam are set forth in a flood control diagram issued by the USACE in 1986 that requires Reclamation to reduce the water conservation pool to no more than 575 thousand acre-feet (TAF) during the flood season, leaving space for at least 400 TAF of flood storage. This "400 fixed" diagram does not account for additional incidental flood control storage available in the three largest nonfederal reservoirs in the American River basin above Folsom Dam—Hell Hole, French Meadows, and Union Valley Reservoirs.

These reservoirs are operated primarily for hydropower but provide as much as 200 TAF of creditable storage space for flood control during the flood season. Under the variable storage space operation, which has been in place since 1995 through an agreement between SAFCA and Reclamation, Reclamation is obligated to vary the space allocated to flood control at Folsom Dam based on the percentage of this creditable space that is available on a day-to-day basis. When creditable space declines, Reclamation must reduce the water conservation pool at Folsom Reservoir and correspondingly increase the dam's flood storage capacity.

Under the terms of the agreement, this reduction in water conservation storage is limited to 270 TAF, creating a maximum flood control storage capacity of 670 TAF under a zero upstream credit condition. Once modifications to Folsom Dam are implemented to increase the dam's low-level discharge capabilities (see Section 2.10, "Folsom Dam Improvements," below), the variable storage space operation would be continued in a slightly modified form through the issuance of a revised flood control diagram for Folsom Dam by the USACE allowing for variable flood control storage space between 400 TAF and 600 TAF.

2.10 FOLSOM DAM IMPROVEMENTS

Limitations in the capacity of the existing outlet works and spillway of Folsom Dam restrict release capability until the reservoir is about 75% full. This means that much of the space dedicated to flood control under the variable storage space operation is filled before the full capacity of the downstream river channel is used. Planning studies to address these limitations and to consider increasing the flood storage capacity of the Folsom facility were initiated during the 1990s as part of the ongoing ARWP, resulting in congressional authorization of the Folsom Dam Modification Project in 1999 and the Folsom Dam Raise Project in 2003. The objective of these projects is to reduce damages from flooding to Sacramento by increasing the efficiency and availability of flood storage capacity at Folsom Reservoir. The Folsom Dam Raise Project would entail increasing flood storage at Folsom Dam by raising the dam by as much as 7 feet. The Folsom Dam Modification Project would achieve improvements in flood storage capacity by increasing outlet efficiencies at Folsom Dam to enable water to be released earlier in a flood event prior to the peak flood inflow. It was initially believed that these increased efficiencies could be created by enlarging the dam's existing low-level outlets and constructing new outlets by drilling through the main dam. However, cost concerns associated with this approach caused the USACE to reevaluate alternative modification options that would perform as a functional equivalent to the low-level outlet modifications.

At the same time the USACE was investigating flood control options for Folsom Dam, Reclamation was evaluating dam safety issues related to all of the Folsom Dam and Reservoir facilities, including public safety risks due to hydrologic, seismic, and static concerns. During fall 2005, Congress requested that the USACE and Reclamation combine their efforts to determine a joint project that would address both flood control and dam safety concerns. Since that time, engineers from both federal agencies have been working together on this joint effort.

Under this joint effort, Reclamation and USACE engineers and environmental planners identified and screened measures that would achieve Reclamation's dam safety and USACE's flood damage reduction objectives. A portion of this effort centered on identifying alternatives that would serve as a functionally equivalent project to the authorized Folsom Dam Modification and Folsom Dam Raise Projects. The result of this process is a set of five alternatives currently under study that include combinations of various dam modification features, including options for raising the main dam, modifying emergency spillway gates and other main dam facilities, constructing an auxiliary spillway, modifying wing dams, and raising Mormon Island Auxiliary Dam and dikes. These features are intended to accomplish in an integrated fashion the separate objectives of the outlet modification and dam raise projects.

Because construction associated with raising the dam and with completing other dam modifications would take many years to complete and would necessitate numerous road closures of the Folsom Dam Road, a temporary bridge to replace this roadway was initially proposed in 2002 as a part of the Folsom Dam Raise Project. In 2003,

Reclamation closed Folsom Dam Road indefinitely for security and public safety reasons, resulting in substantial effects on area traffic patterns. In 2003, Congress authorized the Folsom Dam Raise Project, including construction of a permanent bridge just downstream of Folsom Dam. The Folsom Bridge Project is being implemented by the USACE and the City of Folsom; however, a portion of the cost of the project is allocable to flood control. The local share of this cost must be paid by SAFCA.

2.11 CONCLUSION

Since its formation, SAFCA has exercised its statutory authority to collect special assessments and development fees to fund the local share of the cost of modifying the flood control operation at Folsom Dam and implementing levee improvements around the Natomas area and along the lower American and Sacramento Rivers that has made it possible to provide 100-year flood protection to most of the properties protected by the federal–state flood control system in Sacramento. This has been a cooperative local–state–federal effort. When current construction contracts are completed by the end of 2006, only a relatively small number of parcels will remain in the federally regulated 100-year floodplain along the American River upstream of the Mayhew Drain and along Morrison Creek and its tributaries in south Sacramento. Improvements to provide 100-year protection to these parcels will be implemented incrementally over the next 4–6 years.

Despite the achievements described above, the transition to a comprehensive flood control program for Sacramento, providing urban-standard (“200-year”) flood protection has been slower and more costly than anticipated. New design standards focusing on the risk of underseepage have significantly expanded the scope of the levee improvements needed to achieve this urban standard, particularly in the Natomas area where recently identified underseepage problems may cause this area to be mapped back into the federally regulated 100-year floodplain. In addition, design challenges associated with increasing the low-level discharge capacity of Folsom Dam and increasing the space available for flood storage in the reservoir have raised the cost and slowed the progress of this element of the comprehensive improvement program. With its state and federal partners, SAFCA is addressing these challenges by modifying the program and proposing new funding mechanisms to ensure 100-year flood protection in the Natomas area, complete the projects that are needed to achieve 200-year flood protection in all of the major floodplains in Sacramento, and ensure the structural integrity of the levee system over time. These projects are described in Chapter 3.

3 PROJECT DESCRIPTION

This chapter is organized as follows:

- ▶ Section 3.1 states the project objectives.
- ▶ Section 3.2 summarizes the key features of the proposed project and describes its geographic scope.
- ▶ Section 3.3 describes the existing flood control facilities in the study area.
- ▶ Section 3.4 describes the flood control improvements that would be funded by the proposed funding mechanisms.

3.1 PROJECT OBJECTIVES

The overall project objective is to create new funding mechanisms for the local share of the cost of constructing and maintaining flood control improvements and related environmental mitigation and habitat enhancements along the lower American and Sacramento Rivers and their tributaries in the Sacramento metropolitan area (Sacramento). The specific project objectives are to (1) complete the projects necessary to provide 100-year flood protection for developed areas in Sacramento's major floodplains as quickly as possible, (2) provide urban-standard ("200-year") flood protection for developed areas in Sacramento's major floodplains over time, and (3) ensure that new development in the undeveloped areas of Sacramento's major floodplains does not substantially increase the expected damage of an uncontrolled flood.

3.2 KEY FEATURES AND GEOGRAPHIC SCOPE OF THE PROPOSED PROJECT

3.2.1 PROJECT FEATURES

To meet the project objectives, SAFCA proposes to create a new assessment district and a development fee program to fund the following activities, which are described in the sections indicated:

- ▶ **Folsom Dam improvements**—physical and operational improvements to Folsom Dam that would increase the dam's low-level discharge and flood control storage capacities and upgrade the dam's temperature control capability (Section 3.4.1);
- ▶ **Folsom Bridge construction**—construction of a new bridge across the American River downstream of Folsom Dam to mitigate the significant transportation-related effects of dam modifications and address dam security concerns (Section 3.4.2);
- ▶ **Common Features levee improvements below Folsom Dam**—completion of improvements to the levees along the lower American and Sacramento Rivers that would allow these levees to safely contain sustained releases of up to 160,000 cubic feet per second (cfs) from Folsom Dam (Section 3.4.3);
- ▶ **Natomas Levee Improvement Program**—improvements to the levees around the Natomas area to address ongoing erosion, freeboard deficiencies, and seepage and stability conditions (Section 3.4.4);
- ▶ **South Sacramento Streams Group channel improvements**—completion of improvements to the flood control channels along Morrison Creek, Elder Creek, Unionhouse Creek, and Florin Creek (i.e., the "South Sacramento Streams Group" [SSSG]) (Section 3.4.5);

- ▶ **North Sacramento flood control improvements**—completion of improvements to the levees along Dry/Robla Creek, Arcade Creek, Magpie Creek Diversion Channel, and the Natomas East Main Drainage Canal (NEMDC)/Steelhead Creek (i.e., the “North Sacramento Streams Group” [NSSG]) (Section 3.4.6);
- ▶ **American River Parkway habitat enhancement projects**—improvements to portions of the American River Parkway that would enhance floodplain and upland habitat values (Section 3.4.7);
- ▶ **Levee integrity program**—a long-term urban levee and channel maintenance program to preserve the conveyance capacity of the lower American and Sacramento Rivers and their tributaries, and ensure that the levees protecting Sacramento perform with a high degree of reliability (Section 3.4.8); and
- ▶ **Rural floodplain preservation program**—a long-term easement acquisition program to preserve the rural character and incidental flood storage capacity of agricultural lands in levee-protected floodplains upstream and just downstream of the Fremont Weir (Section 3.4.9).

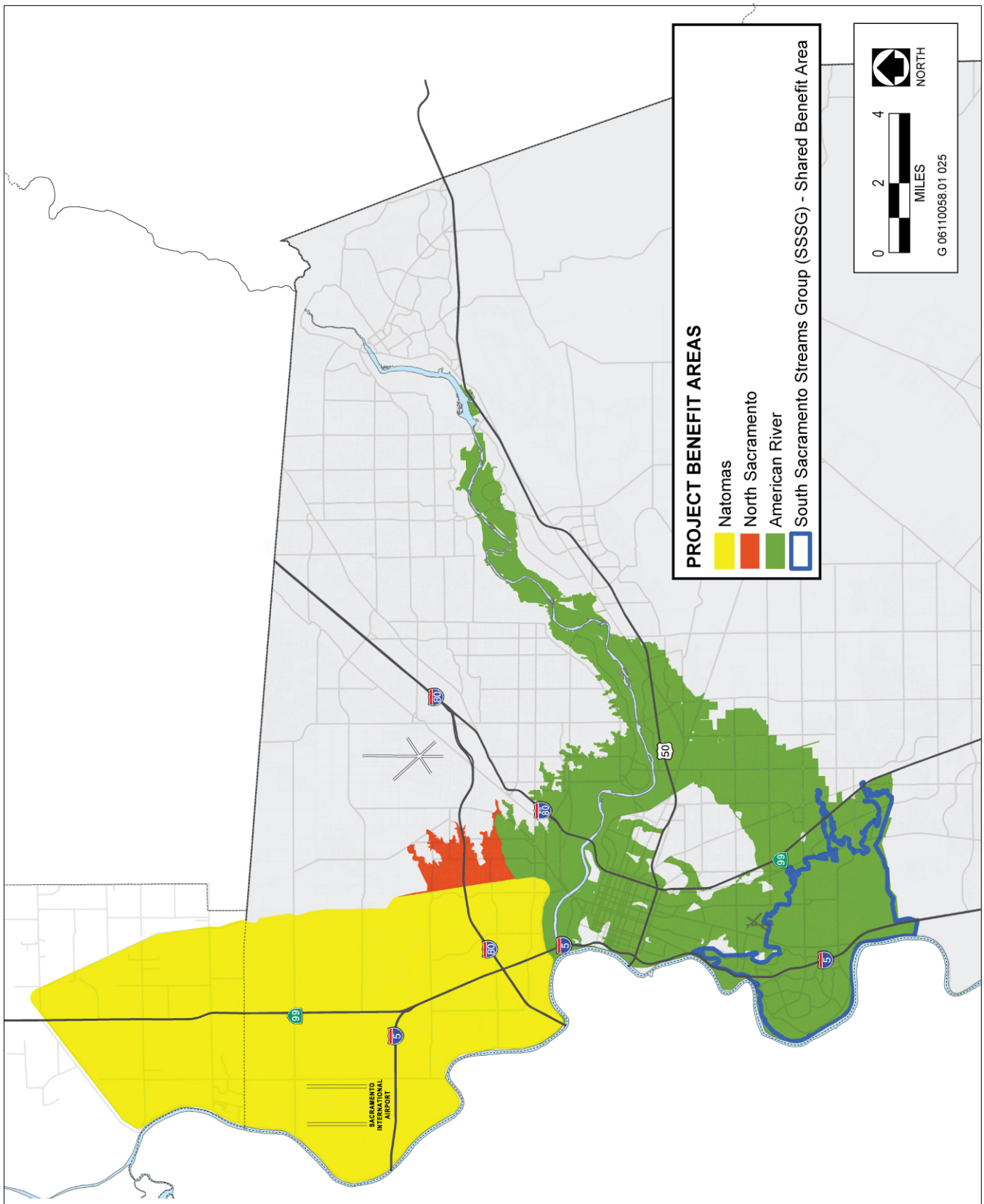
The proposed assessment district would encompass the properties in the developed areas within SAFCA’s jurisdictional boundary in Sacramento and Sutter Counties that would specially benefit from the activities and improvements listed above. These properties are located in the four major floodplain areas shown in Exhibit 3-1: the Natomas area, the lower American River area, the SSSG area, and the North Sacramento area. The assessments would be apportioned to each benefiting property based on flood-damage reduction benefits received from the financed activities. The benefiting properties would be divided into four benefit zones based on the location of these activities and the floodplain areas being protected. Within each of these zones, benefits would be calculated according to a formula for expected flood damage that is based on the following factors: land use (residential, commercial, industrial, etc.), first-floor square footage of structures, expected depth of flooding, and property acreage.

The proposed development fee program would apply to undeveloped areas in the Natomas and lower American River areas that are developed for urban use after the assessment district is formed. The purpose of the development fee program would be to ensure that this new development does not substantially increase the expected damage of an uncontrolled flood. Toward this end, the development fees would be used to reduce the risk of flooding through investments in strengthening the levees along the lower American and Sacramento Rivers and their tributaries and preserving the incidental flood storage capacity of rural areas in levee-protected floodplains upstream and immediately downstream of the Fremont Weir.

3.2.2 GEOGRAPHIC SCOPE OF THE PROPOSED PROJECT

As indicated above, the proposed funding mechanisms would apply to all of the properties within SAFCA’s jurisdictional boundary that are currently subject to inundation in the event of a “200-year” flood along the lower American and Sacramento Rivers and their tributaries, including the Natomas area, the lower American River area, the SSSG area, and the North Sacramento area (Exhibit 3-1). The proposed funding mechanisms would provide the local share of the cost of the following improvements:

- ▶ Folsom Dam physical and operational improvements would involve modification of Folsom Dam and Reservoir facilities in Sacramento, Placer, and El Dorado Counties.
- ▶ Folsom Bridge would be constructed downstream of Folsom Dam in the City of Folsom in Sacramento County.
- ▶ Common Features levee improvements below Folsom Dam would involve improvements to the levees along the lower American and Sacramento Rivers.



Source: Parsons Brinckerhoff 2006

Project Benefit Areas

Exhibit 3-1

- ▶ Natomas levee improvements would be implemented as part of the Natomas Levee Improvement Program (NLIP) around the Natomas area in the City and County of Sacramento and in Sutter County.
- ▶ SSSG channel improvements would occur along Morrison Creek, Elder Creek, Unionhouse Creek, and Florin Creek in the City and County of Sacramento.
- ▶ The North Sacramento flood control improvements would occur along the NEMDC/Steelhead Creek, Dry/Robla Creek, Arcade Creek, and the Magpie Creek Diversion Channel in the City and County of Sacramento.
- ▶ American River Parkway habitat enhancement would occur at the Bushy Lake and Woodlake sites along the lower reach of the American River Parkway in the City and County of Sacramento.
- ▶ The levee integrity program would apply to all the channels and levees within SAFCA's jurisdictional boundaries in the City and County of Sacramento and in Sutter County.
- ▶ The rural floodplain preservation program would involve select agricultural lands in levee-protected floodplains in Sutter and Yolo Counties upstream and just downstream of the Fremont Weir.

The locations of the activities and improvements are shown in Exhibit 3-2.

3.3 EXISTING FLOOD CONTROL FEATURES IN THE STUDY AREA

The study area for this EIR, referred to herein as the “program study area,” is the general Sacramento area (referred to herein as “Sacramento”), specifically the locations in the City and County of Sacramento and Sutter County where the construction and habitat enhancement activities listed above would take place, and the agricultural areas upstream in Sutter and Yolo Counties where rural floodplain preservation would be pursued. For analysis of water resources, the study area also includes channel locations upstream and downstream within the regional flood control system, as described in Section 4.4, “Hydrology and Hydraulics.”

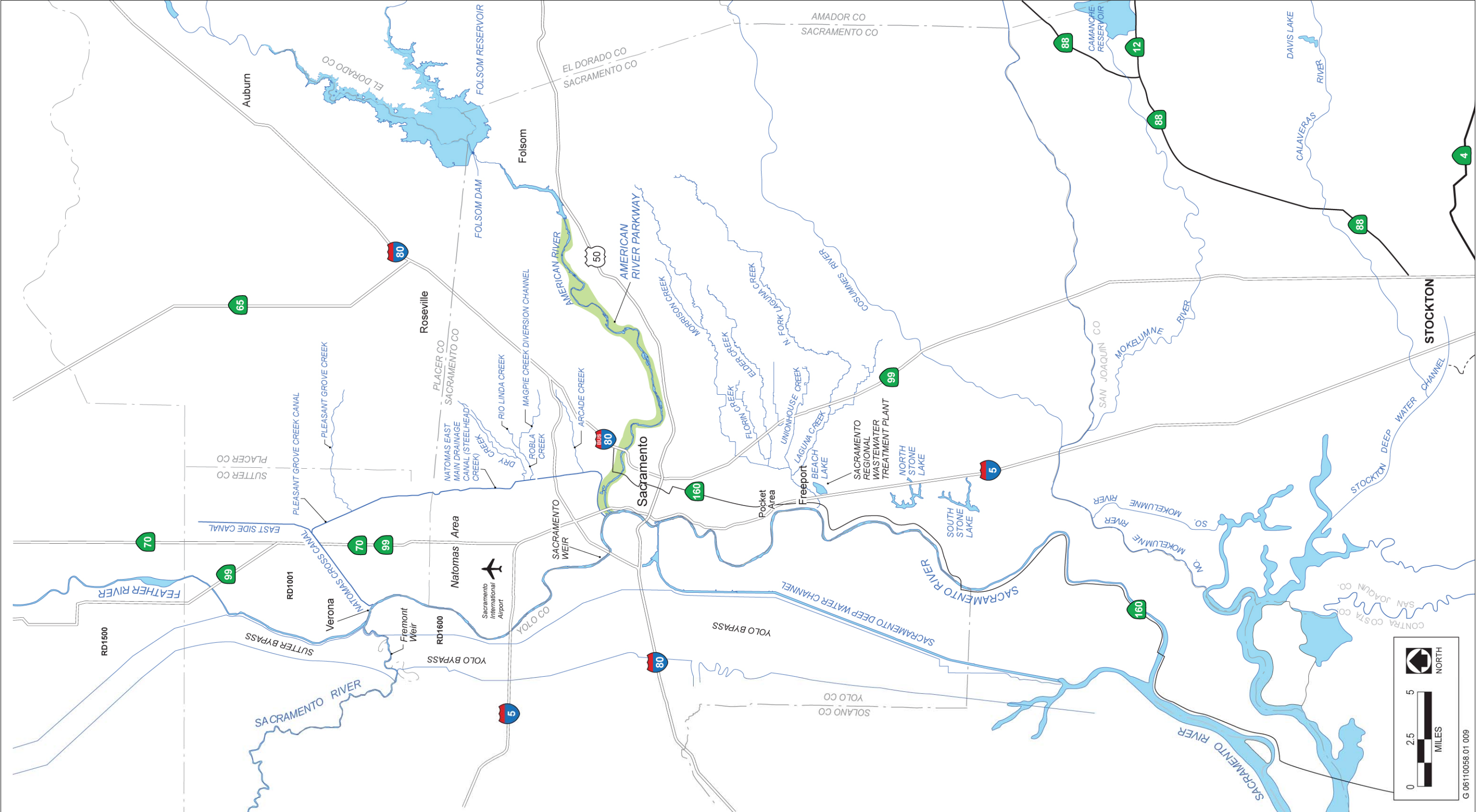
For purposes of describing environmental impacts, the program study area is considered in terms of the following subareas:

- ▶ the Folsom Dam and Reservoir area,
- ▶ the lower American River area,
- ▶ the Natomas area,
- ▶ the SSSG area,
- ▶ the North Sacramento area, and
- ▶ levee-protected agricultural areas upstream and just downstream of the Fremont Weir.

The following subsections describe the existing flood control features of these areas.

3.3.1 FOLSOM DAM AND RESERVOIR

Folsom Dam and Reservoir, located about 25 miles east of downtown Sacramento, are part of the multipurpose Central Valley Project (CVP). The dam and reservoir are managed and operated for flood control by the U.S. Department of the Interior, Bureau of Reclamation (Reclamation) pursuant to criteria established by the U.S. Army Corps of Engineers (USACE) that are set forth in the current flood control diagram adopted in 1986. Folsom Dam regulates runoff from a drainage area of approximately 1,860 square miles. Folsom Reservoir supplies water for irrigation, municipal, and industrial use and for hydropower generation; serves as the focal point of the heavily used Folsom State Recreation Area; and provides critical flood protection for residents and property in the American River floodplain in Sacramento.



Source: CaSil; EDAW 2006

Project Area for Comprehensive Sacramento Area Flood Protection

Exhibit 3-2

The main dam consists of a concrete gravity section flanked on each side by an earthen wing dam. Eight earthen dikes totaling about 2 miles in length connect high ground around the periphery of the reservoir to the main dam across the river channel and the Mormon Island Auxiliary Dam across Blue Ravine. At full pool, the reservoir has approximately 75 miles of shoreline, a surface area of about 12,000 acres, and a maximum storage capacity of about 975 thousand acre-feet (TAF). Water supplies are delivered and power is generated by releases through three penstocks on the right side of the main dam.

Lake Natoma serves as an afterbay to Folsom Reservoir. It allows dam operators to coordinate power generation and flows in the lower American River channel during normal reservoir operations. Lake Natoma has a surface area of 500 acres and fluctuates between 4 and 7 feet daily. Under the management of the California Department of Parks and Recreation, Lake Natoma provides nonmotorized water recreation, swimming, and bank fishing opportunities.

3.3.2 LOWER AMERICAN RIVER AREA

The lower American River channel extends 23 miles from Lake Natoma to the confluence with the Sacramento River. The portion of the Sacramento River east levee within SAFCA's jurisdictional boundaries extends for about 33 miles from the community of Verona at the northwest corner of the Natomas area to near the town of Freeport along the southerly border of the City of Sacramento.

The American River channel is confined by high ground along its upper reach. The lower 13 miles (approximately) are leveed. Both the north and south levees downstream of Cal Expo are units of the Sacramento River Flood Control Project (SRFCP). These levees were designed to control flows up to 180,000 cfs and maintain 3 feet of levee freeboard. "Freeboard" is the vertical distance between the design maximum water level and the top of a levee or dam, and is a safety factor intended to accommodate the possible effect of unpredictable conditions that could increase stages above the design water surface. The design heights of these levees were established when there was no confinement of flows along the north bank upstream of the present location of Cal Expo and agricultural lands in the area now known as Campus Commons provided overbank storage during large floods in the watershed. This storage was eliminated by construction of the north levee upstream of Cal Expo, which significantly narrowed the floodway, particularly in the river reach adjacent to California State University, Sacramento (CSUS). This portion of the north levee constitutes the American River Levee Project and was constructed in conjunction with Folsom Dam. This levee segment was designed to contain sustained releases of 115,000 cfs from Folsom Dam with at least 5 feet of freeboard, and other short-term releases of up to 152,000 cfs with 3 feet of freeboard.

A local levee, constructed and maintained by Sacramento County, serves as both the east levee of the Mayhew Drain and a portion of the south levee of the American River. This levee, although not designed to federal standards, is high enough to contain releases up to 130,000 cfs with 3 feet of freeboard. It extends for about 1 mile upstream from the Mayhew Drain.

The protected American River floodplain covers about 6,000 acres north of the river, including Cal Expo, the Campus Commons subdivision, and a portion of North Sacramento south of Arcade Creek. South of the river, the floodplain covers about 30,000 acres and encompasses much of downtown Sacramento, including the State Capitol, CSUS, the City of Sacramento's Fairbairn water treatment facility, and large residential areas. Grade elevations in most of these areas are substantially lower than water surface elevations in the river channels during major floods. Therefore, there is potential for extensive deep flooding in the event the levees are overtopped or fail. Much of this area is also subject to flooding from a failure of the east levee of the Sacramento River between the mouth of the American River and the town of Freeport. This portion of the channel, a part of the SRFCP, is designed to carry floodflows of about 110,000 cfs. These flows are controlled by the operation of the Sacramento and Fremont Weirs and the Sacramento and Yolo Bypass systems.

During flood events, most of the Sacramento River flows upstream of Verona are diverted away from the Sacramento River channel and into the Yolo Bypass via the Fremont Weir, an ungated low weir located at the confluence of the Sacramento and Feather Rivers and the Sutter Bypass. The Yolo Bypass is a large, leveed conveyance area extending from the Fremont Weir to Cache Slough, which serves as cropland and wildlife habitat during most of the year and provides overflow capacity for the Sacramento, Feather, and American Rivers during the flood season. Downstream of the Fremont Weir is the Sacramento Weir, a low, gated weir along the west bank of the Sacramento River about 3 miles upstream of the mouth of the American River. When flows in the Sacramento River at the I Street Bridge reach 98,000 cfs, the weir is opened and flows are diverted through the Sacramento Weir to the Sacramento Bypass and on to the Yolo Bypass.

3.3.3 NATOMAS AREA

The Natomas area is the approximately 53,000-acre area bordered by the leveed channels of the Natomas Cross Canal (NCC) on the north; Pleasant Grove Creek Canal (PGCC) and the NEMDC/Steelhead Creek on the east, the American River on the south, and the Sacramento River on the west. The NCC diverts the runoff from a large watershed in western Placer and southern Sutter Counties around the Natomas area and is a major contributor to the flows in the upper reach of the Sacramento River channel in SAFCA's jurisdiction. The NEMDC/Steelhead Creek is an engineered channel along the southeastern flank of Natomas that diverts runoff from tributary watersheds east of Natomas into the lower Sacramento and American River channels. Tributaries to the NEMDC/Steelhead Creek include Dry Creek, Arcade Creek, Rio Linda Creek, Robla Creek, and Magpie Creek Diversion Channel. The Natomas area, historically an agricultural area, is the location of the Sacramento International Airport and the site of extensive recent development and planned new business and residential development. As described in Sections 2.6 ("North Area Local Project") and 2.7 ("American River Common Features Project"), levee improvements substantially completed in 1996 under the North Area Local Project (NALP) significantly improved flood protection for the Natomas area. However, levee freeboard in a few locations is insufficient to provide protection from a 200-year flood, recent studies indicate the potential for underseepage and through-seepage in many locations, and several sites of substantial bank erosion exist along the Sacramento River east levee and portions of the NCC and NEMDC/Steelhead Creek levees that must be addressed to protect the bank and provide levee stability.

3.3.4 SOUTH SACRAMENTO STREAMS GROUP AREA

The SSSG area covers parts of the Morrison Creek watershed southeast of the American River floodplain. Streams in the Sierra foothills southeast of Sacramento flow west, join Morrison Creek and its tributaries—Florin Creek, Elder Creek, Unionhouse Creek, Laguna Creek, and North Fork Laguna Creek—and drain into Beach-Stone Lakes on the west. Part of this area lies within the Sacramento city limits, and the rest lies in Sacramento County southeast of the city. A substantial number of homes and businesses in this area have been subject to flooding from the combined effects of high flows in Morrison Creek and its tributaries and high flows in the Cosumnes and Mokelumne Rivers, which raise water surface elevations in the Beach/Stone Lake floodplain. SAFCA, the California Reclamation Board (The Reclamation Board), and the USACE have made substantial advances in flood protection in this area since 1999, and the area is the focus of ongoing improvements, as described in Section 2.8, "South Sacramento Streams Project."

3.3.5 NORTH SACRAMENTO AREA

The North Sacramento area covers parts of the Dry Creek, Robla Creek, Arcade Creek, and Magpie Creek watersheds north of the American River floodplain. These streams, which originate in the Sierra Nevada foothills northeast of Sacramento, flow west, discharge into the NEMDC/Steelhead Creek, and drain into the Sacramento River through the lower NEMDC/Steelhead Creek along the edge of Discovery Park during low flows and into the lower American River during high flows. Because of this high-flow connection to the American River, homes and businesses in the Natomas area and in the North Sacramento and Woodlake areas east of Natomas are subject to flooding from the combined effects of high flows in Dry/Robla Creek, Arcade Creek, Magpie Creek, and the

lower American River. SAFCA has substantially reduced the risk of flooding in these areas through construction of the improvements included in the NALP. However, these improvements did not address the potential for flooding from the Magpie Creek Diversion Channel, nor did they address the potential for underseepage, which may occur where the NALP-improved levee foundations encounter old streambeds or other permeable soil conditions.

3.3.6 AGRICULTURAL AREAS ABOVE AND DIRECTLY BELOW THE FREMONT WEIR

The Fremont Weir is approximately 2 miles upstream of Verona and 3 miles from the mouth of the NCC at the Sacramento River, which is the northwestern corner of SAFCA's jurisdictional boundary. Upstream of the weir are the Sacramento River, the Sutter Bypass, and the Feather River, and downstream is the Yolo Bypass. North of the Fremont Weir in Sutter County, between the Sacramento River on the west and the Sutter Bypass on the east, is the Reclamation District (RD) 1500 service area. Just below and east of the weir in Yolo County lies the RD 1600 service area between the Yolo Bypass on the west and the Sacramento River on the east. These two service areas are very sparsely populated, containing scattered rural residences. The RD 1500 area also includes the town of Robbins, with a population of about 2,000, about 8 miles north of the Fremont Weir.

Northeast of the Fremont Weir in Sutter County, west of State Route (SR) 70 and north of the NCC, is the RD 1001 service area. The RD 1001 service area includes the small communities of Verona about 2 miles downstream of the Fremont Weir and Nicolaus, East Nicolaus, Trowbridge, and Rio Oso upstream of the Feather River–Sutter Bypass confluence. Most of the lands in the RD 1001 area are designated for agricultural use in the Sutter County General Plan, with smaller portions designated “Park and Recreation.”

Seasonal agriculture is the dominant land use in the areas surrounding the weir, including the Sutter and Yolo Bypasses. The primary seasonal crops in the area include rice, safflower, tomatoes, corn, and other grains. Farming activity is concentrated in spring and summer, when flooding is uncommon. The floodplain in this area also supports various natural habitat types, including riparian, wetlands, upland, and permanent (perennial) ponds. Many wetland areas are managed for waterfowl, including the Fremont Weir Wildlife Area located at the weir on the Sacramento River.

3.4 DESCRIPTION OF ACTIVITIES AND IMPROVEMENTS THAT WOULD BE FUNDED USING THE PROPOSED FUNDING MECHANISMS

The following sections describe the activities and improvements that SAFCA would fund using the proposed assessment district and development fee program, as listed in Section 3.2.1. The activities are described at a general, programmatic level of detail consistent with the intended use of this EIR to support SAFCA's decision whether to create the proposed funding mechanisms. The status of previous and ongoing environmental review for the improvements is also described, as appropriate and where such information is available. Table 3-1, at the end of this chapter, summarizes the proposed activities and specifies their locations, the areas that would derive additional flood protection from the activities, and the environmental review documents that contain additional information on these activities.

3.4.1 FOLSOM DAM IMPROVEMENTS

The proposed funding mechanisms would be used to fund physical and operational improvements to Folsom Dam that would increase the dam's low-level discharge and flood control storage capacities and upgrade the dam's temperature control capability. Specifically, the improvements would include the following:

- ▶ increasing Folsom Dam's low-level discharge capacity by constructing a new gated auxiliary spillway south of the main dam (Section 3.4.1.1);

- ▶ increasing the “surcharge” space available for storage of flood water above the reservoir’s gross pool elevation by replacing or modifying the dam’s three emergency spillway gates and constructing a 3.5-foot parapet wall across the earthen dikes and wing dams (Section 3.4.1.1);
- ▶ modifying the temperature control shutters at Folsom Dam to improve the ability to manage the reservoir’s cold-water pool and thereby improve conditions for lower American River fisheries (Section 3.4.1.2);
- ▶ permanently implementing a variable storage space flood control operation to take advantage of 200 TAF of flood storage capacity in three nonfederal reservoirs upstream of Folsom Dam (Section 3.4.1.3); and
- ▶ implementing forecast-based operations (Section 3.4.1.4).

These activities are described in the following subsections. Exhibit 3-3 shows the locations of the improvements described below.

3.4.1.1 FOLSOM DAM LOW-LEVEL DISCHARGE CAPACITY AND SURCHARGE STORAGE SPACE

Several concepts have been studied during the last decade for improving Folsom Dam operations by improving the dam’s low-level discharge capacity and increasing surcharge storage space. These are summarized in Section 2.10, “Folsom Dam Improvements.” The improvements that are still under consideration to improve flood control operations are increasing the low-level discharge capacity of Folsom Dam through construction of an auxiliary spillway and increasing surcharge storage by modifying the emergency spillway gates and constructing a 3.5-foot concrete parapet wall along the top of the earthen structures composing the dam. These improvements are described below.

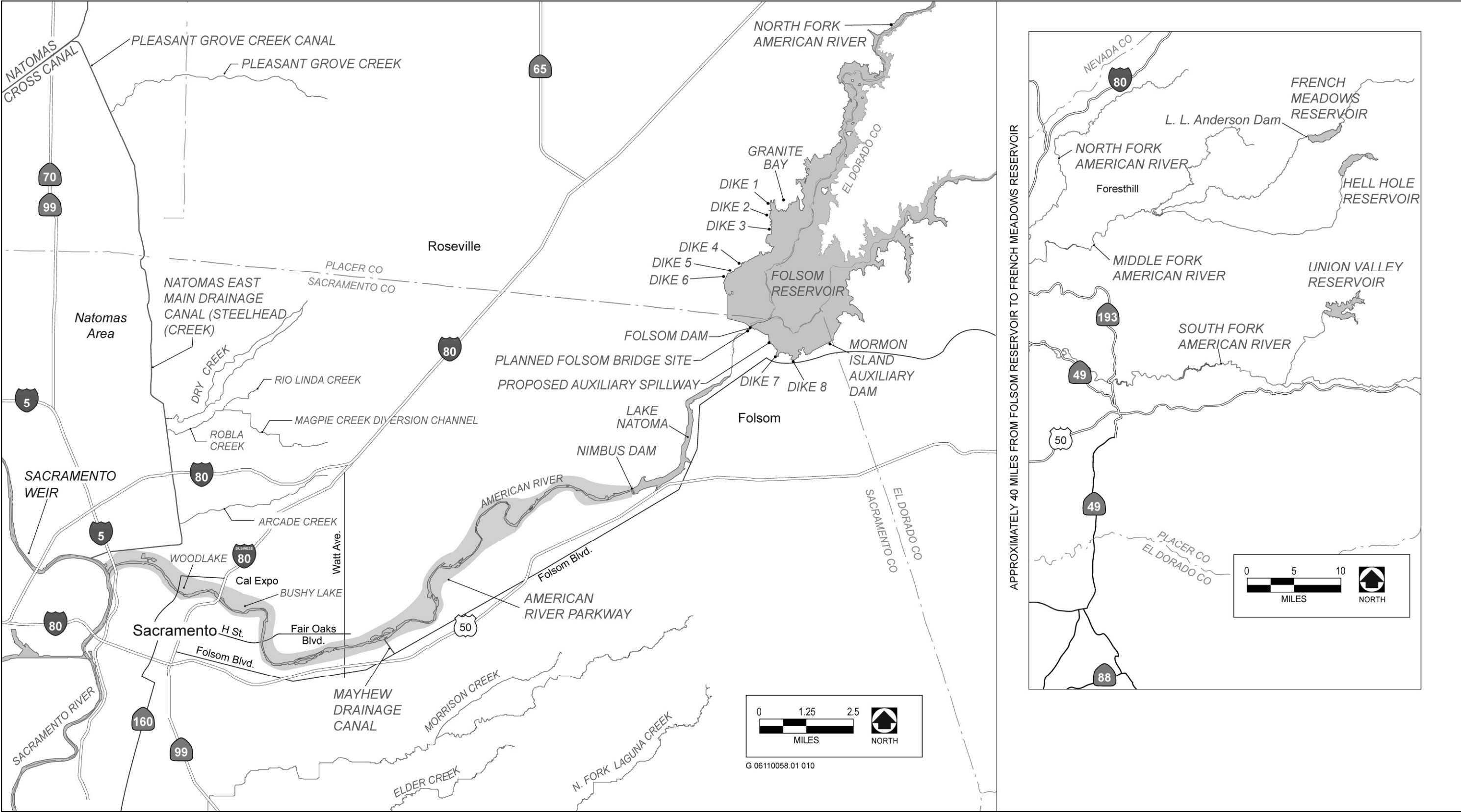
Purpose and Need

During a flood event, initial releases from Folsom Reservoir are made through the power penstocks and through eight gated river outlets, which have a maximum total combined capacity of approximately 35,000 cfs, until inflowing water causes the reservoir to fill to elevation 429 feet mean sea level (msl). Because of the configuration of the spillway, the “objective” release of 115,000 cfs, which represents the design carrying capacity of the leveed channel downstream of the dam for sustained releases, cannot be achieved until the reservoir pool reaches 446 feet msl, at which point the pool contains 755 TAF of water and only 220 TAF of empty space remains to store inflows in excess of the design release. This limited low-level discharge capacity means that much of the space dedicated to flood control under the variable storage space operation is filled before the full capacity of the downstream channel is used.

Moreover, because of the current design of Folsom Dam’s emergency spillway, dam operators cannot make full use of the dam’s surcharge storage space in normal flood operations. Surcharge storage refers to the space above the level of the gross pool when Folsom Reservoir is considered full under normal operations (elevation 466 feet msl) and below the minimum freeboard required for dam safety. This space can contain as much as 117 TAF of water above the 975-TAF gross pool (SAFCA 2000). Only about half of this space is currently available for use in normal flood operations because it is not possible to store water above 471 feet msl without opening Folsom Dam’s emergency spillway gates and damaging the stilling basin at the foot of the dam.

Proposed Folsom Dam Improvements

As described in Section 2.10, the Folsom Dam Modification Project was authorized by Congress in 1999 to increase the dam’s discharge capacity through its low-level river outlets and to enlarge the surcharge storage space available for flood control by modifying the dam’s emergency spillway gates. In 2003, Congress authorized



Source: CaSil; EDAW 2006

Folsom Dam and Lower American River Project Areas

Exhibit 3-3

the USACE to further enlarge this surcharge storage space by raising the top of the dam. The dam raise was also intended to address ongoing dam safety deficiencies, pending completion of a full analysis of these deficiencies by Reclamation. Since 2005, engineers from the USACE and Reclamation have been working with the California Department of Water Resources, The Reclamation Board, and SAFCA in a coordinated effort to address the dam's flood control and dam safety issues in a cost-effective manner. The agencies are conducting a detailed evaluation of alternatives to expeditiously implement engineering measures to reduce the potential for dam failure due to seismic, static, and hydrologic conditions, while incrementally increasing the dam's surcharge storage and low-level discharge capacities. The flood control measures produced by this effort will modify and refine the previously authorized improvements.

Following are the main features of the combined project that would provide flood damage reduction benefits:

- ▶ constructing a new gated auxiliary spillway;
- ▶ replacing or modifying the existing three emergency spillway gates; and
- ▶ constructing a 3.5-foot concrete parapet wall along the top of the dam's earthen dikes and wing dams.

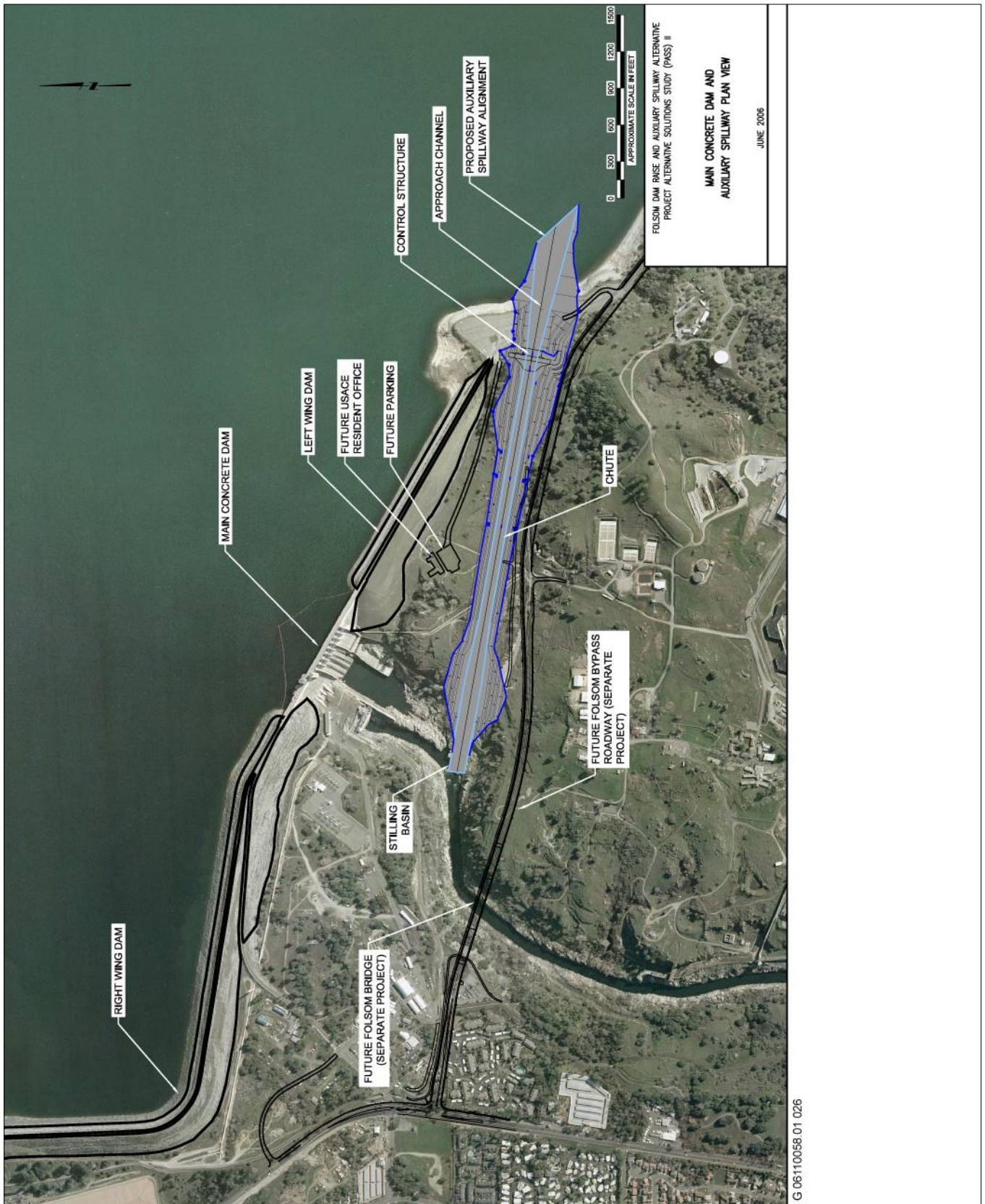
The auxiliary spillway would increase the dam's low-level discharge capacity. It would be constructed on a natural ridge in the area east of the concrete dam (Exhibit 3-4). Construction would involve the removal of approximately 3.2 million cubic yards of material in order to form the channel for the spillway. This new facility would include a concrete-lined approach channel and discharge chute in the left abutment below the left wing dam leading down to Folsom Dam's existing stilling basin, which would be enlarged to handle the increased discharges through the spillway. These auxiliary spillway discharges would be controlled through the installation of six submerged tainter gates (23 feet wide by 33 feet high) that would be operated conjunctively during flood events with Folsom Dam's five existing main spillway gates.

Construction of the spillway would be phased to fully meet dam safety objectives on an interim basis while design and construction of flood control objective elements are implemented on a permanent basis. Earthen material excavated from the spillway would eventually become borrow material for the raising and/or strengthening of wing dams and dikes. Borrow areas for additional earthen material and/or for excavation and subsequent processing of granitic material would be developed adjacent to Granite Bay, Beal's Point, and Folsom Point.

Modification or replacement of Folsom Dam's three existing emergency spillway gates and construction of a 3.5-foot concrete parapet wall along the top of Folsom's earthen dikes and wing dams would allow dam operators to store flood water up to elevation 476 feet msl, thus adding approximately 50 TAF of surcharge storage capacity to the flood control operation.

Status of Environmental Review

SAFCA analyzed the surcharge increase and enlargement of the stilling basin to accommodate increased low-level discharges at a program level in its certified *Program Environmental Impact Report on Flood Control Improvements Along the Mainstem of the American River* (SAFCA 2000). The USACE and The Reclamation Board evaluated the environmental effects of these modifications at a project level and presented conclusions of the analysis in a finding of no significant impact and mitigated negative declaration in their *Final Environmental Assessment/Initial Study, American River Watershed, California, Folsom Dam Modification Project* (USACE and The Reclamation Board 2001), which augmented and incorporated by reference a 1996 supplemental information report and supplemental environmental impact statement/environmental impact report (EIS/EIR) that had evaluated this plan and other concepts to increase flood protection along the American River. The modifications were also addressed at a project level in *American River Watershed, California, Long-Term Study Final Supplemental Plan Formulation Report/EIS/EIR* (USACE, SAFCA, and The Reclamation Board 2002). The environmental effects of the combined project are currently being analyzed in an EIS/EIR being prepared with Reclamation and The Reclamation Board as the federal lead agency and the state lead agency, respectively. The USACE is a federal cooperating agency and SAFCA is a CEQA responsible agency for this study.



Folsom Dam Improvements

Exhibit 3-4

3.4.1.2 FOLSOM DAM TEMPERATURE CONTROL SHUTTERS

Purpose and Need

The construction of Folsom Dam artificially restricted salmon and steelhead life cycles to the 23-mile lower American River, and biological monitoring has indicated that water temperatures in the lower American River have tended to exceed those necessary to sustain existing spawning and rearing salmon and steelhead populations. Maintenance of optimal water temperatures for spawning and rearing depends on the dam's ability to deliver cold-water releases to the lower American River at critical times of the year. Limiting factors include structural features of the dam and the actual volume of the cold-water pool behind the dam during summer and fall, when demand for cold water is highest.

Folsom Dam's temperature control shutters are a series of large, solid metal plates or panels within metal tracks that can be lowered or raised to allow reservoir water to enter the three penstocks leading to the dam's power-generating turbines and then to the lower American River. Each of the three power penstock intakes is enclosed in a housing that supports a set of 45 removable 13-foot-high shutter panels. Each group of 45 shutters is arranged in five vertical columns of nine panels each. A varying number of shutters can be raised to draw water from various reservoir elevations, thereby controlling the temperature of water entering the lower American River. Currently, there is no capability to raise each of the 45 shutters individually and independently. The shutters are bolted together such that in each column, the top three are raised as a unit, the next two as a unit, and the last four as a unit (i.e., 3-2-4 configuration). This is an improvement over the previous, constraining 1-1-7 arrangement, and has measurably improved Reclamation's ability to manage the cold-water pool. However, the arrangement still presents many limitations on effective temperature control. The temperature shutters are manually adjusted because of the structural features of the penstocks. Manual operation does not allow for the flexibility and timeliness needed to optimize management of the cold-water pool, because manipulating the shutters is labor intensive, time-consuming, and, therefore, less frequent than desirable for optimal temperature management downstream. In addition, more cold water must be released to achieve a particular temperature objective than would be necessary with a more efficient system with high operational flexibility. Greater flexibility in shutter operation is needed to increase operational efficiency and improve downstream fish habitat conditions.

Proposed Modifications of the Temperature Control Shutters

Based on temperature management studies sponsored by Reclamation, reconfiguration and mechanization of the dam's temperature control shutter system are proposed as the most effective means of reducing downstream temperatures. The preferred reconfiguration would consist of modifying the shutter housings to allow each of the top seven shutters to be raised and lowered independently, with the lower two shutters in each column operated as a single unit (1-1-1-1-1-1-2, or 7[1]-2, configuration). This configuration would provide the greatest possible operational flexibility using the existing shutters, allowing the reservoir withdrawals to occur at 13-foot intervals. Because of structural, operational, and institutional issues, the 7(1)-2 configuration would be built for automated operation. Automation of the temperature shutters would increase the physical and operational capability of the penstocks, thereby optimizing the management of the cold-water pool and providing the greatest operational flexibility and responsiveness year round.

Alternatively, a less flexible 1-1-2-2-3 configuration could be created, and operation would continue to be manual. This configuration, which would allow for selection of six different release elevations instead of the present four, is part of the variable storage space program now being implemented by agreement between SAFCA and Reclamation. This alternative would be funded by SAFCA pursuant to the terms of that agreement if the automated operation does not go forward.

Status of Environmental Review

Modification of the temperature control shutters was analyzed at a project level in *American River Watershed, California, Long-Term Study Final Supplemental Plan Formulation Report/EIS/EIR* (USACE, SAFCA, and The Reclamation Board 2002).

3.4.1.3 PERMANENT VARIABLE STORAGE SPACE FLOOD CONTROL OPERATIONS

Purpose and Need

As described in Section 2.9, “Folsom Dam Reoperation,” the USACE’s current flood control diagram for Folsom Dam requires Reclamation to maintain a minimum of 400 TAF of storage space in the reservoir for flood control during the flood season. This “400 fixed” diagram does not account for the 200 TAF of creditable storage space available in French Meadows, Hell Hole, and Union Valley Reservoirs above Folsom Dam and Reservoir (Exhibit 3-3). These reservoirs account for more than 60% of the total upstream storage capacity above Folsom Reservoir. Greater flood protection could be provided by Folsom Dam and Reservoir if the flood control diagram were modified to a variable storage space operation that requires increases in the amount of flood control storage space in Folsom Reservoir when the available flood storage space upstream decreases.

Proposed Flood Control Operations

Under permanent variable storage space operations, also known as “Folsom Reoperation,” Reclamation would be obligated to vary the space allocated to flood control at Folsom Reservoir based on the percentage of the creditable space in French Meadows, Hell Hole, and Union Valley Reservoirs that is available on a day-to-day basis. When all 200 TAF of the upstream storage space is available, Folsom’s water conservation pool and resulting flood storage capacity could be maintained at 575 TAF and 400 TAF, respectively, effectively providing a total of 600 TAF of flood storage capacity. When creditable space declines, Reclamation would be obligated to reduce Folsom Reservoir’s water conservation pool and correspondingly increase the reservoir’s flood storage capacity to maintain the overall total of 600 TAF of flood storage capacity.

Variable storage space operation has been implemented on a temporary basis through an extension of the reservoir operations agreement that SAFCA and Reclamation executed in March 1995, which is intended to guide reservoir operations until improvements to the low-level discharge capacity of the dam are completed (see below). The extended agreement obligates Reclamation to reduce the water conservation pool by as much as 270 TAF, creating a maximum flood control storage capacity of 670 TAF at Folsom Reservoir under a zero upstream storage credit condition. Once improvements to the low-level discharge capacity of the dam have been achieved, the variable storage space operation would be continued in a slightly modified form through the USACE’s issuance of a revised flood control diagram for Folsom Dam. The revised flood control diagram would call for reductions in water conservation of as much as 200 TAF, creating a maximum flood control storage capacity of 600 TAF at Folsom Reservoir under a zero upstream credit condition. Congress, in the Water Resources Development Act (WRDA) of 1999 (Public Law 106-53, Section 101[a][6]), directed that Folsom Reoperation shall be implemented upon completion of the Folsom Dam outlet improvements described below.

Status of Environmental Review

The environmental effects of variable storage space operations were analyzed at a project level in SAFCA’s certified *Program Environmental Impact Report on Flood Control Improvements Along the Mainstem of the American River* (SAFCA 2000). These environmental effects were subsequently analyzed again in Reclamation’s *Long-Term Reoperation of Folsom Dam and Reservoir, Final Environmental Assessment* (Reclamation 2003).

3.4.1.4 FORECAST-BASED OPERATIONS

Purpose and Need

Common reservoir operating practice is to base operating rules on current information about reservoir storage without direct use of inflow forecasts. Historically, the uncertainties of storm forecasting have justified this practice. However, as forecasting methods have improved, interest has grown in incorporating inflow forecasts in reservoir operations to improve flood protection levels through more effective use of reservoir storage capacity.

Forecast-based operations (FBO) is the term used to describe the practice of operating a multipurpose dam and its associated reservoir, such as Folsom Dam and Reservoir, using forecasts of inflow into the reservoir to make decisions on when and how much water to release from the reservoir for flood control. The purpose of FBO is to increase the empty space in the reservoir when it is needed to enhance the reservoir's flood control capacity, and to reduce this empty space when it is not needed for flood control so as to better balance the water, power, recreational, and environmental needs that are served by the reservoir. FBO would be used to improve the operational efficiency of Folsom Dam for both flood control and water supply within the operating parameters (e.g., objective releases and variable storage space operations) in effect for the dam at the time of its implementation.

Proposed FBO Implementation

The FBO purposes would be achieved through the following operating strategies.

The “advance release” strategy would use inflow forecasts 3 to 5 days in advance of extreme precipitation events to release water stored in the reservoir, including water stored in the space normally allocated to water conservation. Because the planned physical and operational improvements to Folsom Dam would allow the dam to safely contain a “200-year” flood event that would be significantly larger than the largest floods ever recorded in the American River basin (1986 and 1997), the advance release strategy would rarely, if ever, be needed to respond to forecasts of very extreme precipitation.

The “conditional storage” strategy would use inflow forecasts to determine when it is safe to store water in the reservoir space normally allocated to flood control. This strategy could be employed on a regular basis during the spring refill cycle when the flood season is ending, the demands of the flood control operation are diminishing, and the reservoir is being gradually refilled with rain and snowmelt, and during the fall drawdown cycle when the reservoir is being gradually emptied for the flood season. The rate of filling and emptying is currently specified in the variable storage space flood control operation based on the needs dictated by the hydrological record of flood events in the American River basin and storage conditions in the upstream reservoirs. The conditional storage strategy would allow dam operators to reduce the empty space otherwise required for flood control if the inflow forecast shows no indication of extreme precipitation. This would increase the volume of stored water available to meet the water, power, recreation, and environmental demands on the reservoir.

In addition to these operational strategies, the implementation of FBO would likely include the installation of new precipitation and streamflow gages in the watershed above Folsom Reservoir.

Federal authorization for implementing FBO is indicated in a series of congressional mandates adopted in the 1990s. In the Defense Appropriations Act of 1993 (Public Law 102-396, Section 9159 [f][2][B]), Congress directed the Secretary of the Army and the Secretary of the Interior to jointly develop and implement a flood management plan for the American River and Folsom Dam that:

- ▶ ensures prompt, reliable, and full utilization of the flood control capability at Folsom Dam and other water resources development projects in the American River watershed;
- ▶ maximizes the flood control capability within Folsom Dam's flood space reservation;

- ▶ identifies and makes recommendations to improve the stream gage network and flood forecast system for the upper American River watershed; and
- ▶ recognizes that reservoir releases need to be made as quickly as possible in anticipation of incoming flow and in accordance with existing documents, including Appendix II of the USACE Master Reservoir Regulation Manual for Folsom Dam/Reservoir adopted October 1, 1956 and revised in March 1959.

The referenced Reservoir Regulation Manual contained early versions of the advance release and conditional storage strategies based on “forecasts of inflow,” which were curtailed in the 1970s and 1980s in response to the severe drought and flood conditions experienced during those periods. The above provisions indicate Congress’s interest in reinvigorating these strategies. This interest is further clarified in the 1999 WRDA. There, Congress authorized construction of the Folsom Dam Modification Project and directed the USACE, upon completion of the project, to update the Flood Management Plan authorized in the Defense Appropriations Act of 1993 to reflect the operational capabilities created by the modifications to Folsom Dam’s outlet works and improved weather forecasts based on the Advanced Hydrologic Prediction System of the National Weather Service.

Status of Environmental Review

The proposed FBO has not been analyzed previously under CEQA.

3.4.2 FOLSOM BRIDGE

Purpose and Need

The roadway across Folsom Dam was designed and built to service the dam, but use of the road was expanded later to provide access to lake recreation facilities. Encroaching urban development resulted in the dam roadway becoming an important regional traffic link. However, public traffic across the dam has impeded dam operation and maintenance work. As described in Section 2.10, “Folsom Dam Improvements,” construction of a new bridge over the American River to replace the public use of the roadway across Folsom Dam was considered a necessary component of the Folsom Dam Raise project because of the long-term disruption to traffic that would result from the prolonged construction associated with dam modification. A temporary bridge was initially proposed to mitigate the effects of these closures.

Reclamation came to regard the public traffic across the dam as a safety and security problem, recognizing that public access makes the dam vulnerable to potential vandalism, terrorism, and toxic spills. In February 2003, Reclamation closed Folsom Dam Road indefinitely for security and public safety reasons. This road closure had significant effects on the traffic patterns in the area. Congress subsequently authorized the Folsom Dam Raise Project, including authorization of construction of a permanent bridge as mitigation, just downstream of Folsom Dam. Since the congressionally authorized project is intended to address dam security as well as mitigate traffic disruption during construction of dam modifications, SAFCA would contribute funding only to the portion of the bridge construction costs that represents traffic mitigation.

Planned New Bridge Construction

The Folsom Bridge Project would involve constructing a permanent bridge and roadway across the American River downstream of Folsom Dam that will be designed to meet federal, California Department of Transportation, and City of Folsom standards. The bridge would be constructed just below the dam (Exhibits 3-3 and 3-4) between the intersections of Folsom Dam Road with East Natoma Street on the east and Folsom-Auburn Road on the west. The project would include reconfiguring local intersections, roadways, and bicycle facilities, and relocating other facilities, including a Reclamation storage yard, California Department of Parks and Recreation offices, and utility poles and towers.

Status of Environmental Review

The environmental effects of constructing a temporary bridge were analyzed in *American River Watershed, California, Long-Term Study Final Supplemental Plan Study/EIS/EIR* (USACE, SAFCA, and The Reclamation Board 2002). The USACE and the City of Folsom prepared a supplemental EIS/EIR to evaluate a permanent bridge with four different roadway and intersection configurations (USACE and City of Folsom 2006), and the City of Folsom certified the final EIR and approved the project in September 2006.

3.4.3 COMMON FEATURES LEVEE IMPROVEMENTS BELOW FOLSOM DAM

The proposed funding mechanisms would be used to fund the following improvements to the American and Sacramento River levee systems to allow this system to safely convey sustained releases up to 160,000 cfs from Folsom Dam:

- ▶ raising approximately 12,500 feet of the north levee of the American River from Watt Avenue to the Cal Expo area west of H Street approximately 1 foot to ensure that there is 3 feet of freeboard above the 160,000-cfs flow;
- ▶ raising portions of the east levee of the Sacramento River in the Pocket area and in the vicinity of the town of Freeport to provide adequate freeboard above the “200-year” design water surface;
- ▶ reconstructing 4,300 feet of the nonfederal levee along the south bank of the American River upstream of the Mayhew Drain;
- ▶ constructing a closure structure with flap gates across the Mayhew Drain to prevent backup of floodwater on Folsom Boulevard during high-flow events in the American River and installing cutoff walls in the east and west levees of the Mayhew Drain;
- ▶ constructing approximately 2 miles of cutoff walls along the north levee of the American River and installing cutoff wall closure structures at several roadway and utility crossings along the north and south levees of the American River to control underseepage;
- ▶ constructing a combination of cutoff walls and relief wells along approximately 7 miles of the east levee of the Sacramento River in the vicinity of the Pocket area to control underseepage; and
- ▶ armoring portions of the north and south levees of the American River and their adjacent banks to address the potential for erosion during sustained high-flow events.

Exhibit 3-5 shows the SRFCP, including the American and Sacramento River levee system within SAFCA’s jurisdiction. Exhibit 3-6 illustrates the levee through-seepage and underseepage processes described below under “Need for Levee Seepage Improvements.” Exhibits 3-7 through 3-13 show representative proposed levee improvements described in this section.

Purpose and Need

Need for Levee Raising

In order to complement the above-described physical and operational improvements to Folsom Dam and permit dam operators to safely contain a “200-year” design flood along the lower American River, the dam’s emergency spillway release diagram must be modified to call for an increase in releases from the reservoir up to a maximum of 160,000 cfs when storage and projected inflow indicate that reservoir design flood conditions exist. The modified diagram will call for this emergency release to be maintained for as long as possible to allow dam operators to safely contain the reservoir design flood. Although making such large, controlled releases during

reservoir design flood conditions would temporarily raise water surface elevations downstream from Folsom Dam, doing so could help prevent later, even larger uncontrolled releases and higher water surface elevations if dam operators lose control of the flood. Segments of the leveed channels of the American and Sacramento Rivers downstream of Folsom Dam, including the nonfederal levee on the left (south) bank of the American River upstream of the Mayhew Drain, do not have the required minimum of 3 feet of freeboard above the design flow of these channels for sustained releases of 160,000 cfs from Folsom Dam and therefore must be raised.

Need for Levee Seepage Improvements

As described in Section 2.7, “American River Common Features Project,” following the floods of 1997, the USACE recommended a broader scope for the Common Features Project to address potential levee seepage conditions along the lower American and Sacramento Rivers.

Underseepage can occur where levees are constructed on low-permeability foundation soil (silt and clay) underlain by a higher-permeability layer (sand and gravel), and makes the levee susceptible to failure during periods of high river stage. Under these conditions, seepage travels horizontally under the levee and then is forced vertically upward through the low-permeability foundation layer, often referred to as a “blanket” (Exhibit 3-6). Failure of the blanket can occur either by uplift, a condition in which the blanket does not have enough weight to resist the confined pressure acting upon the bottom of the blanket, or by piping (internal erosion) caused by water flowing under high vertical gradients through the erodable blanket. Underseepage failure conditions can exist with as little as one order of magnitude difference between the permeabilities of the blanket layer and the underlying more pervious layer. Excessive underseepage gradients can be corrected by constructing cutoff walls, seepage berms, combination seepage/stability berms, and relief wells. The choice of levee improvement is influenced by the depth and continuity of pervious soil layers, adjacent land use, environmental constraints, construction cost, construction schedule, and long-term maintenance capability.

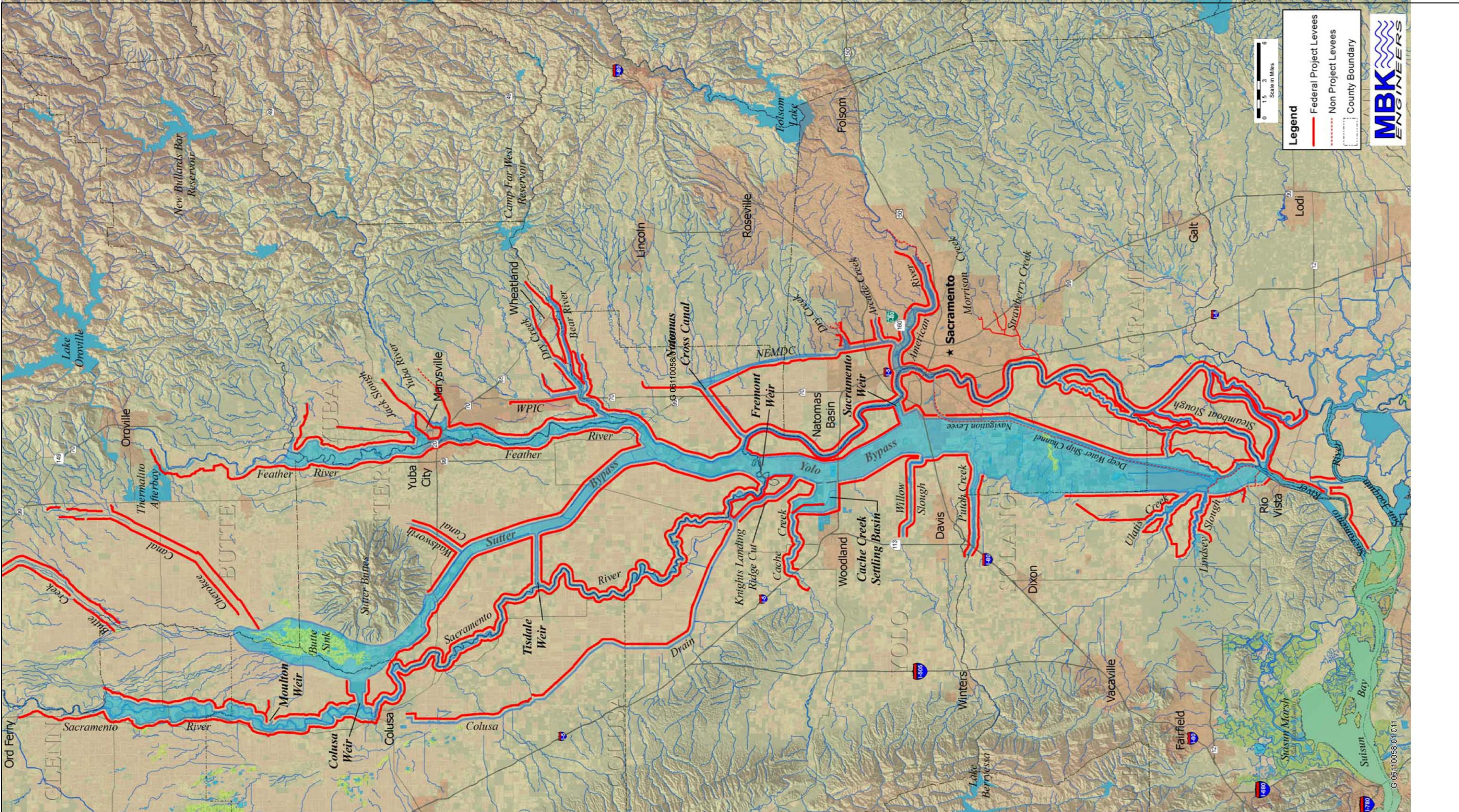
Through-seepage is seepage through a levee embankment that can occur during periods of high river stage. Depending on the duration of high water and the permeability of embankment soil, seepage may exit the landside face of the levee (Exhibit 3-6). Seepage can also pass directly through pervious layers in the levee if such layers are present. Under these conditions, the stability of the landside levee slope may be reduced. Through-seepage can be corrected by constructing cutoff walls or stability berms.

Need for Mayhew Drain Improvements

The Mayhew Drain provides an outlet to the American River for discharging stormwater runoff generated by urban development in an unincorporated area of Sacramento County. The drain operates by gravity flow to the river. Because of the elevation of the ground in the area, releases of 160,000 cfs from Folsom Dam would cause a reversal of flows in the drain, resulting in inundation along or overtopping of Folsom Boulevard. To prevent this result, a closure structure with flap gates needs to be constructed across the drain. This structure would permit gravity flow of stormwater into the river in most flood events, but would cut off the connection between the river and the drain during design flood conditions. Additionally, cutoff walls need to be installed in the east and west levees of the Mayhew Drain north of Folsom Boulevard to prevent underseepage failures during high-flow events in the American River.

Need for Levee and Bank Protection

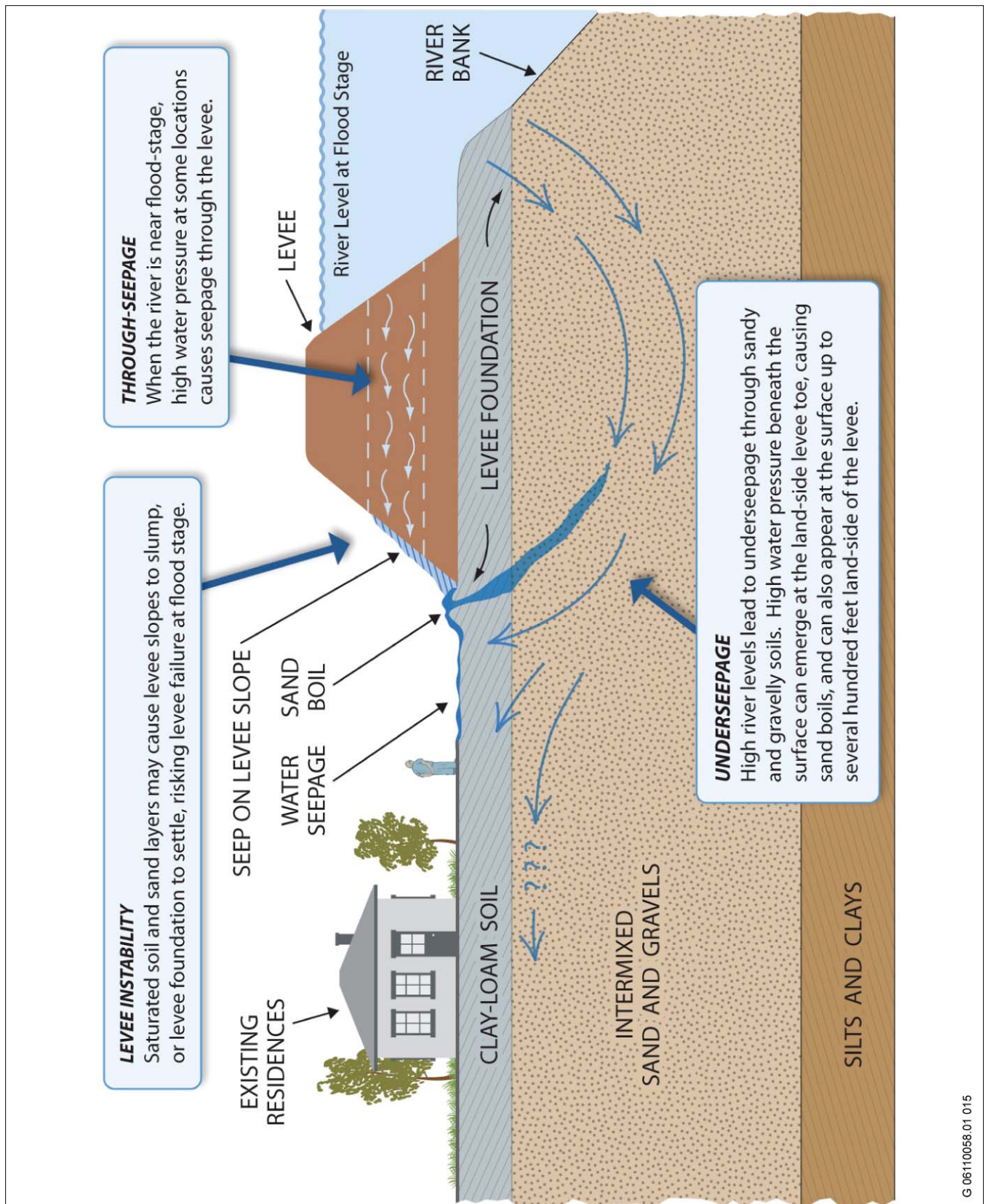
The American River levee system was constructed in phases over several decades. Almost the entire south bank levee and the north bank levee up to about H Street were constructed before Folsom Dam was completed. Without the regulating effect of the dam, these levees were designed to maintain a relatively wide channel at the lower end of the river with a large overflow area on the north side of the river upstream of H Street. After the dam was completed, this overflow area was reclaimed through construction of a new levee relatively close to the river channel extending from H Street to the Carmichael Bluffs. This new levee had the effect of increasing flow velocities in the newly confined channel. In sustained high-flow events, these velocities are capable of triggering



Source: MBK Engineers 2006

Sacramento River Flood Control Project (SRFCP)

Exhibit 3-5

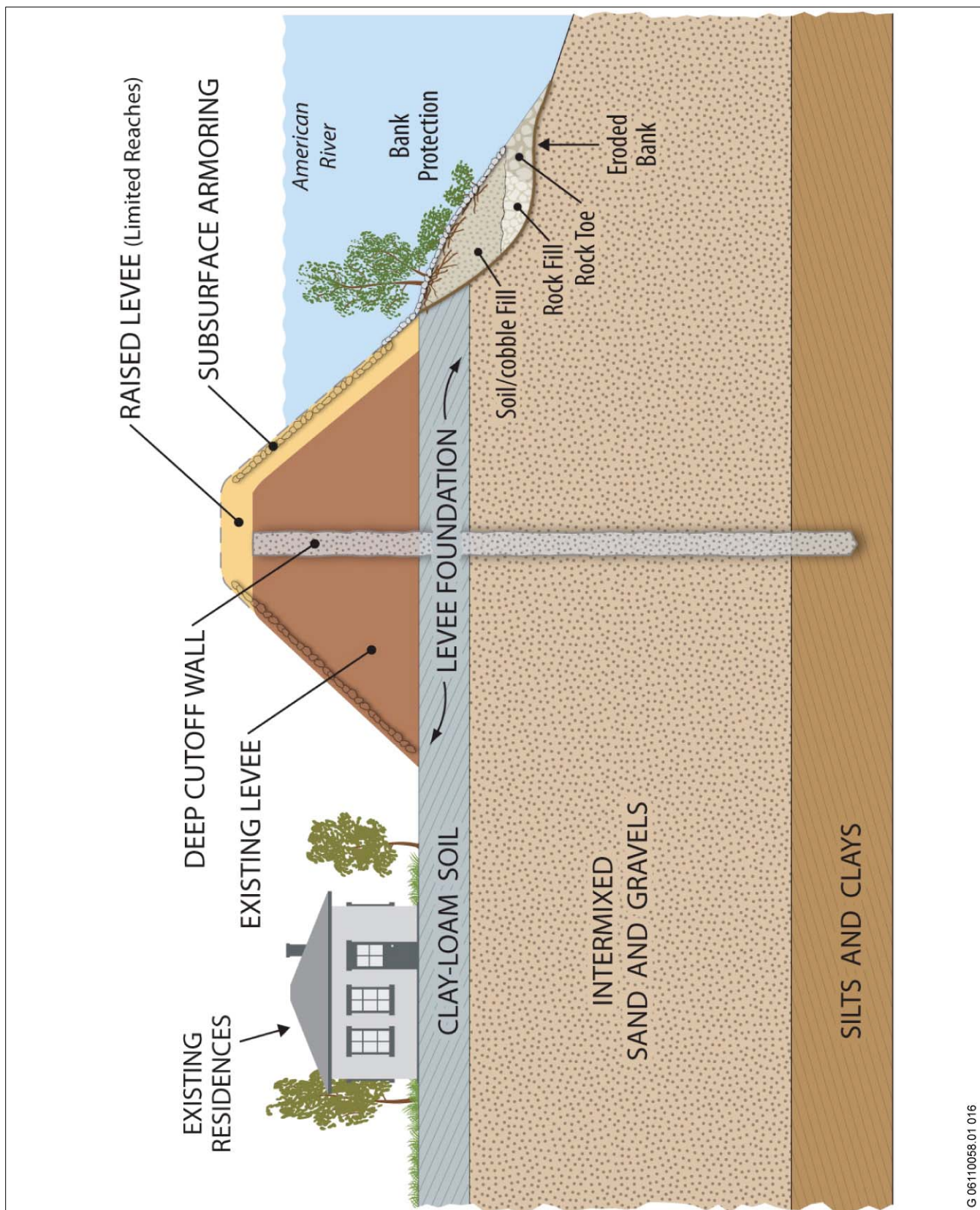


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Source: Jones & Stokes 2006

Underseepage and Through-Seepage Levee Risks

Exhibit 3-6

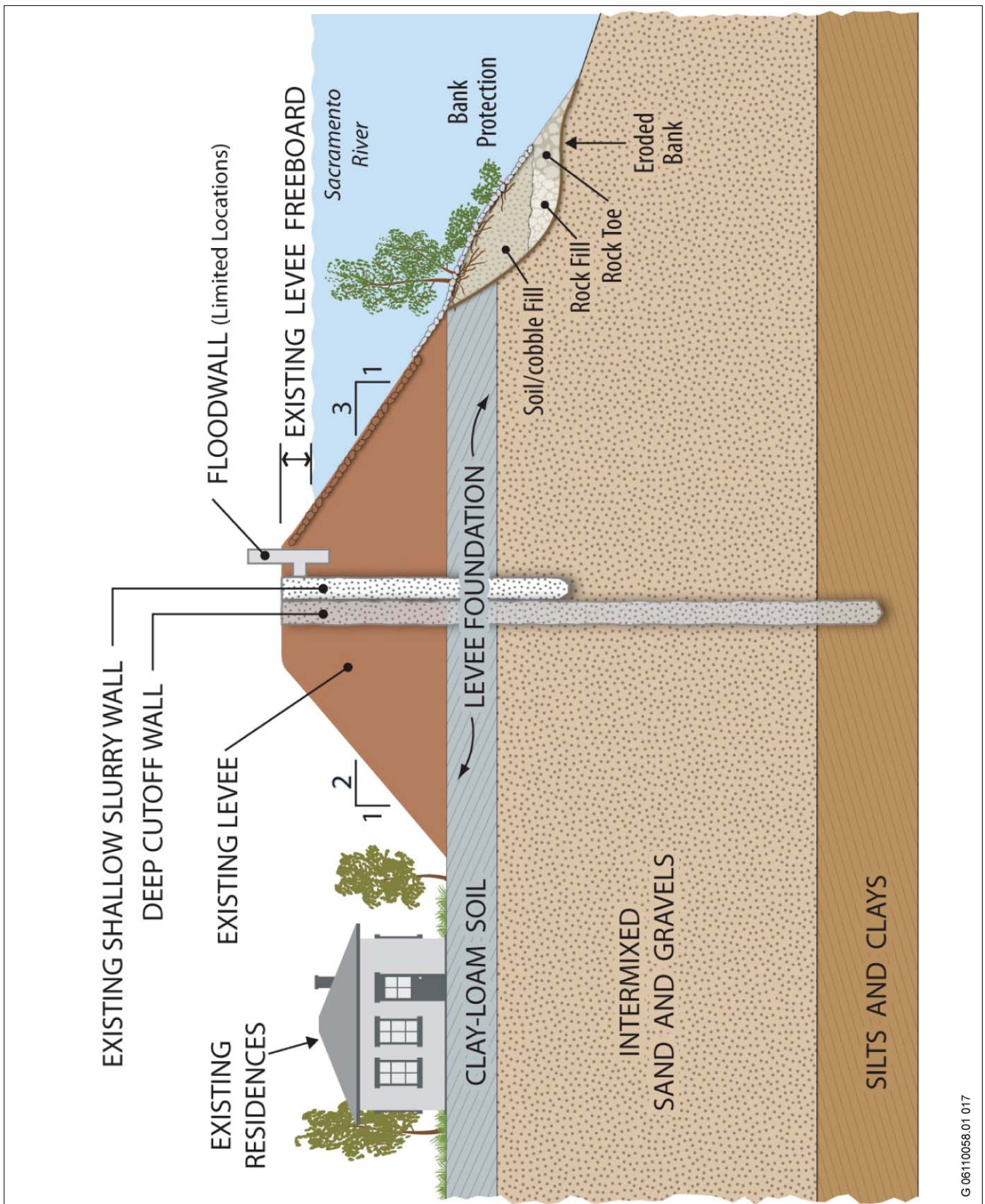


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Source: Jones & Stokes 2006

Representative American River Levee Improvements

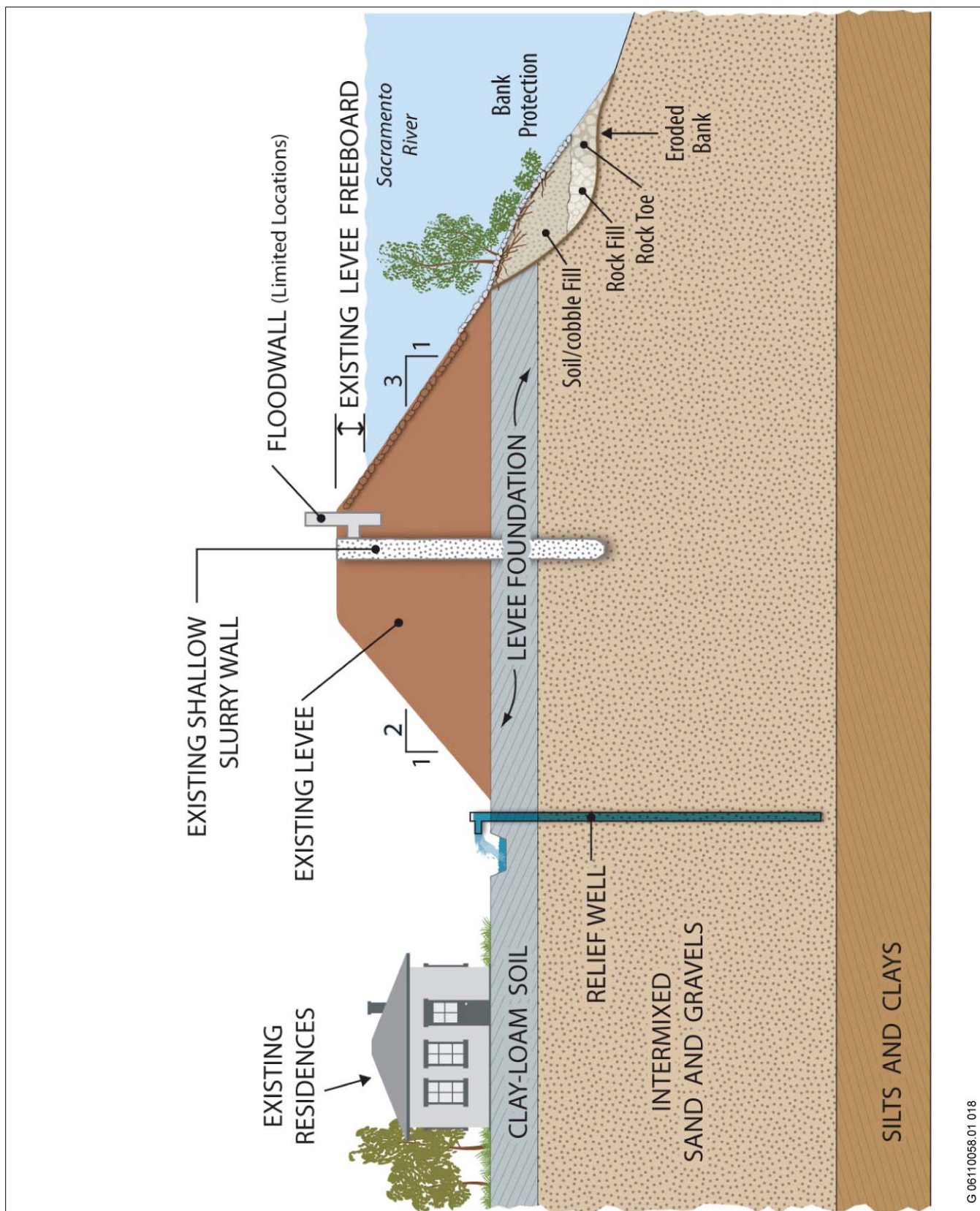
Exhibit 3-7



Source: Jones & Stokes 2006

Sacramento River (Downstream of I-80) with Deep Cutoff Wall

Exhibit 3-8

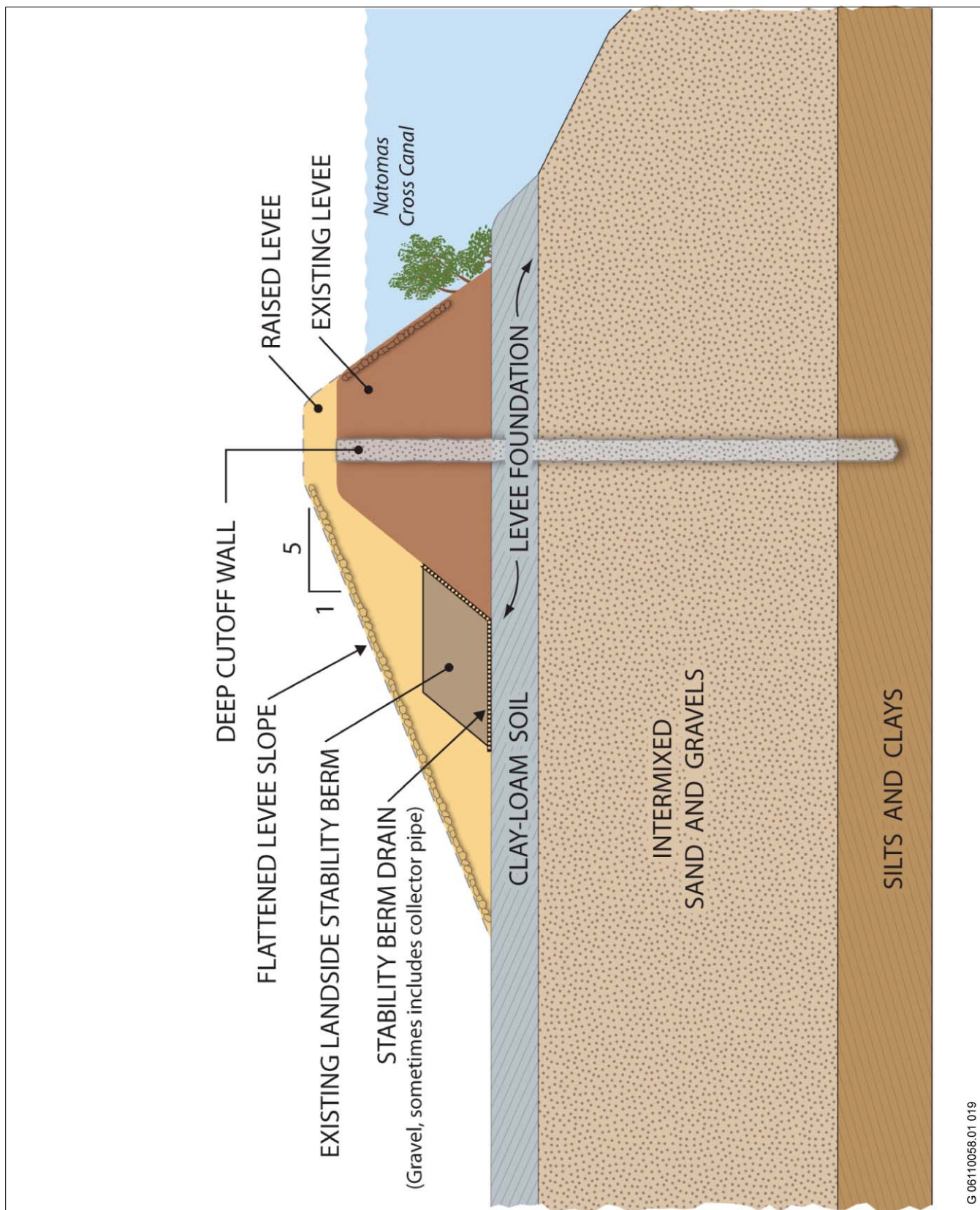


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Source: Jones & Stokes 2006

Sacramento River (Downstream of I-80) with Relief Wells

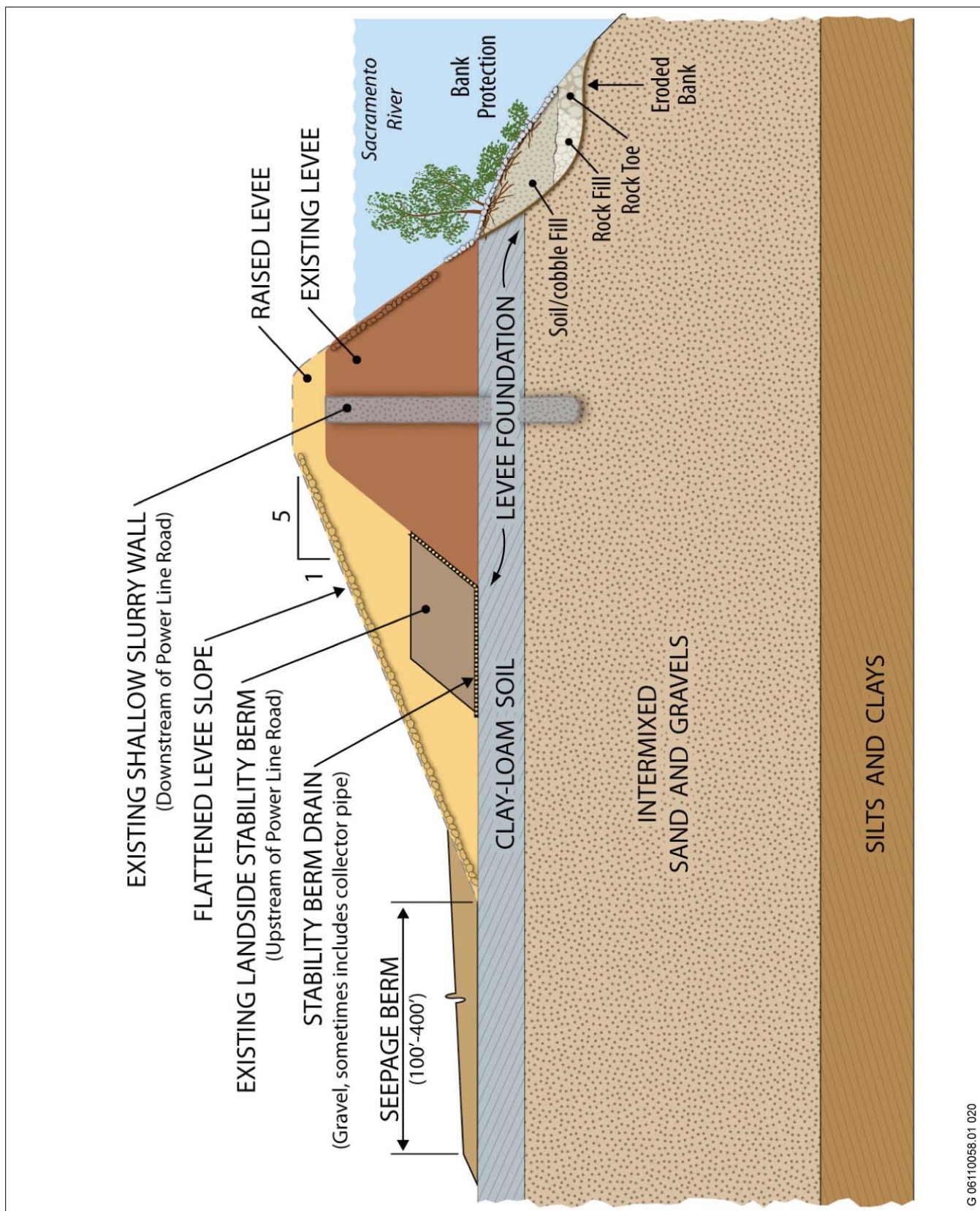
Exhibit 3-9



Source: Jones & Stokes 2006

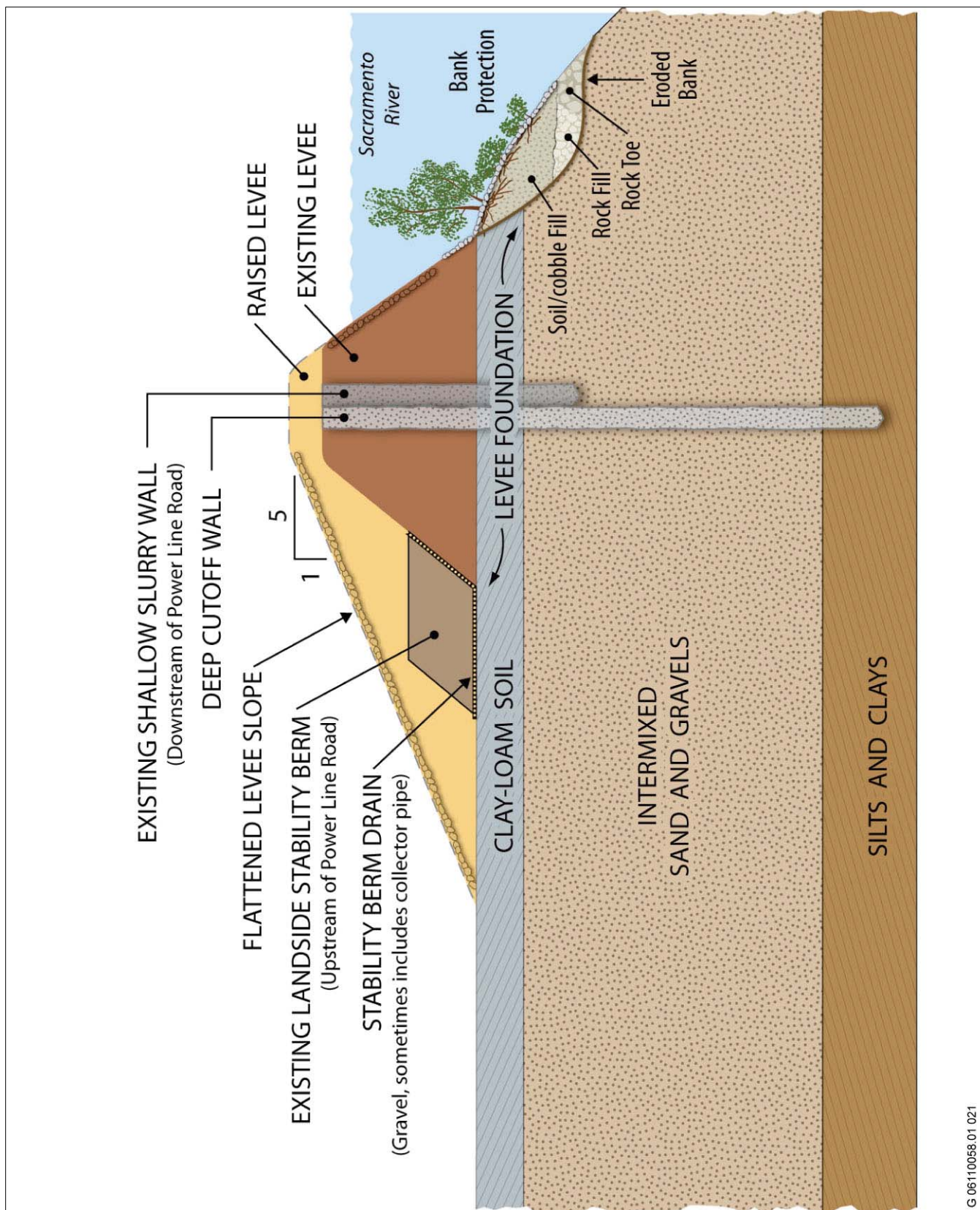
Natomas Cross Canal

Exhibit 3-10



Sacramento River (Upstream of I-80) with Seepage Berm

Exhibit 3-11

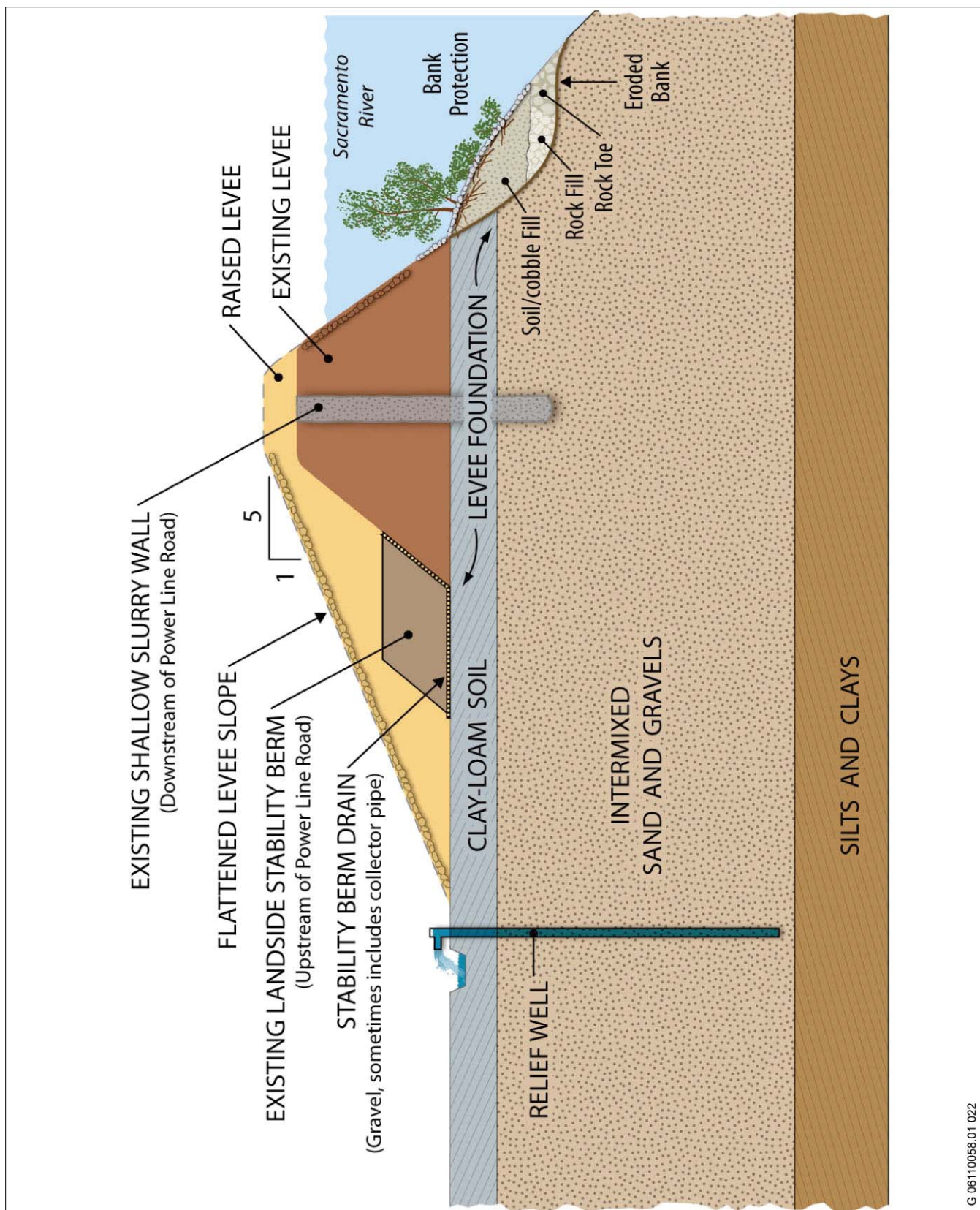


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Source: Jones & Stokes 2006

Sacramento River (Upstream of I-80) with Deep Cutoff Wall

Exhibit 3-12



Sacramento River (Upstream of I-80) with Relief Wells

Exhibit 3-13

substantial erosion along the banks of the river and along the waterside slope of the levees. Other segments of the American River levee system are also subject to erosion either because of their location along an outer bend of the river where the greatest flow velocities occur or because they are subject to persistent wave wash generated by boaters in the lower river.

Because the velocities generated by flows in the lower American River are too high to be controlled by natural vegetation, the risk of erosion can be effectively addressed only through the placement of erosion-resistant rock along the exposed levee and bank surfaces.

Similar protection is also needed along portions of the lower Sacramento River where erosion is a significant risk because of the combined effects of persistent boat wake activity and prolonged high flows. This risk is exacerbated by the narrowness of the leveed river channel based on the design of the SRFCP. When this system was designed, river navigation was an important regional economic concern. The channel was often clogged with sandbars produced by hydraulic mining debris discharges from the upper watersheds of the Feather, Yuba, and American Rivers. Using levees to confine the channel was thought to provide the dual benefits of preventing flooding and increasing river velocities in order to rid the channel of its sandbars. This strategy turned out to be quite successful. Rivers tend to transport sediment and once hydraulic mining was curtailed, its residual debris was scoured from the channel. However, having completed this task, the river began scouring the sandy, silty materials in the banks on which the levees were constructed. This sort of erosion, which is exacerbated by persistent boat wake activity, has become a long-term threat to the stability of the levee system. As in the case of the lower American River, this threat can be effectively addressed only through the armoring of the affected banks and levees with erosion-resistant rock.

This sort of rock protection has been installed in many locations along the lower American and Sacramento Rivers. More of it is needed.

Proposed Levee Raising Methods

In 1999, Congress directed the USACE to raise and strengthen the lower American River levees as necessary to safely contain sustained releases of up to 160,000 cfs from Folsom Dam. The proposed levee raises on the American River would involve raising the right (north) levee by about 1 foot for a distance of about 2.5 miles roughly from Watt Avenue to the Cal Expo area west of H Street, and raising the nonfederal levee along the left (south) bank of the river upstream of the Mayhew Drain by about 3 feet for a distance of about 4,300 feet to meet federal levee standards (Exhibit 3-7). In addition, the east levee of the Sacramento River may need to be raised by approximately 1 foot in the Pocket area and in the vicinity of the town of Freeport.

Freeboard deficiencies would be corrected by raising the levees to achieve the specifications established by the USACE, which require a minimum of 3 feet of freeboard above the 160,000-cfs water surface profile. Freeboard deficiencies may be mitigated by crown-only raises, full levee raises, or floodwalls, as described below:

- ▶ **Crown-only raise**—For a minor levee crown elevation raise (typically 6 inches or less), the recommended levee repair may be to raise the levee crown area only. However, a crown-only raise is feasible only where there is enough existing crown width to accommodate the raise without narrowing the crown to widths less than the minimum requirement, typically 20 feet.
- ▶ **Full levee raise**—For levees requiring a crown raise in excess of 6 inches, the required crown elevation can be met through full levee raises (i.e., an embankment raise from the landside or waterside toe [or both] upward to the increased crown elevation). This requires excavating the levee slope to provide a working platform, typically 10 feet wide, and rebuilding the levee to the appropriate elevation. The final levee configuration must meet the USACE criteria of a 20-foot-wide minimum crown, a 3:1 horizontal to vertical (3H:1V) waterside slope, and a 3H:1V (preferred) or 2H:1V (maximum) landside slope.

- Floodwall—As an alternative to a levee crown raise, the required crown elevation may be met through the use of a floodwall (Exhibits 3-8 and 3-9). A floodwall typically is constructed by trenching to a depth equal to three times the required wall height (to prevent seepage beneath the wall) and constructing a reinforced concrete wall to the required elevation. Some crown hardening on the land side of the floodwall may be required to prevent erosion due to minor overtopping.

Where existing development limits the available space on the land side of the levees, the levees may be raised on the water side rather than the land side. In some cases, property may need to be acquired on the land side to accommodate an enlarged levee footprint. The crown of the levee would be resurfaced and the slopes seeded with erosion control vegetation. Levee raises would be conducted in conjunction with seepage remediation, as described below, wherever possible.

Proposed Seepage Remediation Methods

Typical treatment methods for addressing underseepage and through-seepage are construction of cutoff walls, construction of seepage and/or stability berms, and installation and operation of relief wells. The specific locations of different treatments will depend on the results of detailed geotechnical investigations and site-specific conditions near the remediation sites (e.g., extent of development on the land side of the levee, which may preclude the construction of a wide berm). Refer to Exhibits 3-7 through 3-9 for illustrations of typical seepage remediation methods that would be used on the lower American River and the Sacramento River below Interstate 80 (I-80).

Cutoff Walls

Cutoff walls reduce levee through-seepage and underseepage by providing a barrier of low-permeability material through the levee and levee foundation where sandy or gravelly soils of higher permeability can transmit seepage during high water stages. Cutoff walls are installed to depths sufficient to minimize seepage both through the levee and beneath it. The depths for cutoff walls necessary to limit underseepage at the design water surface elevation to gradients specified by the USACE are determined by geotechnical analysis. Cutoff walls for underseepage are generally installed to depths that will tie in with existing impervious or lower permeability soil layers beneath the levee foundation. Cutoff walls are shown in Exhibits 3-7 through 3-9.

Cutoff walls can be constructed by a number of methods to suit site conditions and schedule requirements. The most common methods include the installation of cutoff walls consisting of a soil-cement-bentonite (SCB) mix or a soil-bentonite mix using conventional trench methods, deep soil mixing (DSM) or trench remixing deep (TRD), and interlocking steel sheet piles. Additionally, cutoff walls can be constructed at either the levee centerline or at the levee waterside toe. The available working area for construction must be about 30 feet wide. In some locations, the lack of a bench of sufficient width on the water side of the levee, the presence of vegetation, or other factors may preclude construction of a waterside cutoff wall.

Conventional slurry cutoff walls are typically constructed using an excavator with a long-stick boom capable of digging a trench to a maximum depth of approximately 80 feet. Bentonite slurry is placed in the trench during trench excavation to prevent caving while the SCB backfill material is mixed. Excavated soil is then mixed with cement and bentonite clay to achieve the required cutoff wall strength and permeability, and is backfilled into the trench. Construction of a conventional slurry cutoff wall through the center of the levee typically requires that the existing levee be degraded as much as one-third of the levee height to prevent hydraulic fracturing. For cutoff walls constructed using interlocking sheet piles, the sheet piles are typically driven by a hydraulic or pneumatically-operated vibratory pile driving head attached to a crane. Depending upon the soil types and depth requirements, pre-drilling may be required.

Seepage and Stability Berms

Seepage berms are wide embankments placed outward from the levee landside toe to lengthen the underseepage path and thereby lower the exit gradient of seepage through permeable layers under the levees to acceptable levels. There are various types of seepage berms, including impervious, semipervious, sand, and free-draining seepage berms. For this project, one of two types of seepage berm would be used: an impervious berm or a hybrid type, which uses soil mass over a drain rock layer encapsulated in filter fabric to control the exit gradient of seepage through material underlying the levee. Seepage berms typically extend 100 to 400 feet from the levee. The berm thickness depends on the severity of the seepage pressure, but generally berms are 5 feet thick near the landside toe and taper to a thickness of 3 feet at the prescribed distance from the toe. A seepage collection ditch likely will be constructed at the landward toe of all seepage berms.

Stability berms are narrower bench fill structures constructed on the landside slope of the levee to buttress the slope and enhance slope stability, particularly where seepage is a concern. Stability berms are typically less than 50 feet wide. The size and shape of a stability berm is determined according to the stabilizing mass required to achieve an adequate factor of safety against slope instability. A layer of drain rock under the stability berm and extending up the levee slope may be included to collect and drain levee through-seepage. Stability berms are an option only where through-seepage (and not underseepage) is of concern.

Relief Wells

Relief wells provide protection against levee underseepage by providing a path for underseepage to exit to the ground surface at the landside toe of the levee without creating sand boils or piping levee foundation materials. Relief wells are an option for addressing underseepage only in reaches where continuous sand and gravel layers have been identified by the geotechnical analysis.

Relief wells are constructed near the levee landside toe to provide pressure relief beneath surficial fine-grained soils (clay or silt “blanket”) (Exhibit 3-9). The wells are constructed using soil boring equipment to bore a hole vertically through the fine-grained blanket layer and into the coarse-grained aquifer layer beneath. Pipe casings and filters are installed to allow the pressurized water to flow to the ground surface, thereby relieving the pressures beneath the clay blanket. Relief wells either may discharge onto open ground or may require conveyance to a stormwater drainage system or a pump station. The wells require regular maintenance to ensure proper operation.

Proposed Improvements to the Mayhew Drain

The modifications of the Mayhew Drain would consist of installing an earthen and concrete embankment with flap gates across the drain. During normal flows, the flap gates would be open and water would be discharged from the drain to the lower American River by gravity. During high flows, the flap gates would close to prevent water from spilling out through the drain when flows in the river reach 160,000 cfs. Congress authorized this modification of the Mayhew Drain in the 1999 WRDA.

Proposed Erosion Control Methods

Bank protection efforts would be conducted using standard design and construction techniques to control erosion and conserve and replace the ecological values and functions of riparian and aquatic habitats that may be affected by the ongoing threat of erosion or proposed bank protection projects. Efforts would also be made to further establish the interdependency of bank protection and habitat conservation and enhancement, and to find ways to implement projects that meet these goals.

Erosion protection would consist of the placement of rock revetment along the waterside slope of the levee at bank protection sites where erosion may threaten levee stability (Exhibits 3-7 through 3-9). Wherever possible, the bank protection would be designed both to control erosion and to maintain existing vegetation and instream

woody material as much as possible. This can be accomplished by incorporating rock benches that serve as buffers against extreme toe scour and shear stress while providing space for planting riparian vegetation and creating a platform to support aquatic habitat features.

Most construction activities associated with bank protection, with the exception of planting and staging activities, would be conducted from a barge on the water side of the riverbank or on top of placed fill material. The top of the levee or adjacent open space areas would be used for staging of vehicles and plant materials as necessary.

The proposed bank protection work would (1) minimize the loss of riparian vegetation and endangered species habitat from construction activities; (2) halt erosion, thereby preventing the eventual damage of the flood control levee and loss of nearshore aquatic habitat and riparian habitat that would likely occur if the project were not constructed; and (3) provide compensation for effects on existing riparian habitat and nearshore aquatic habitat.

Status of Environmental Review

The environmental impacts of portions of the proposed levee improvements described above have been evaluated in *American River Watershed Common Features Project Lower American River Features as Modified by the Water Resources Development Act of 1999 Environmental Assessment/Initial Study and Finding of No Significant Impact* (USACE and The Reclamation Board 2002); *American River Common Features, Lower American River Features Mayhew Levee, Sacramento County, California Draft EIS/EIR* (USACE and The Reclamation Board 2005); and *Final Environmental Assessment/Initial Study, American River Common Features Pocket Area Geotechnical Reaches 2 and 9* (USACE and The Reclamation Board 2006).

3.4.4 NATOMAS LEVEE IMPROVEMENT PROGRAM

The improvements that would be undertaken as part of SAFCA's NLIP include the following treatments to the levees protecting the Natomas area:

- ▶ freeboard increases along portions of the Sacramento River east levee, the NCC south levee, and the PGCC and NEMDC/Steelhead Creek west levee;
- ▶ erosion treatments on the Sacramento River east levee, the NCC south levee, and the PGCC and NEMDC/Steelhead Creek west levee; and
- ▶ seepage remediation on the NCC south levee, the Sacramento River east levee, the American River north levee, and the PGCC and NEMDC/Steelhead Creek west levee.

Exhibit 3-5 shows the Natomas area levee system.

Purpose and Need

Following the floods of 1997, the USACE and SAFCA assessed subsurface conditions to determine the need for deep underseepage remediation for the Natomas area levees. These studies determined that, at some locations, there exists a potential for subsurface permeability that could threaten the stability of the affected levees if not addressed. In 2005 and early 2006, SAFCA conducted additional assessments of seepage potential along the east levee of the Sacramento River, the south levee of the NCC, and the north levee of the American River in its Natomas Levee Evaluation Study and concluded that approximately 26 miles of these levees protecting the Natomas area are in need of improvements to correct seepage potential. This study also included evaluation of the potential for levee-threatening erosion along the east bank of the Sacramento River, the south bank of the NCC, and the west bank of the PGCC and NEMDC/Steelhead Creek. The north bank of the American River was not included in this assessment because of the extensive width of the berm between the levee and the low-flow river channel and the relatively low velocities in this reach of the river. Ten sites were identified along the Sacramento

River east levee as having moderate to high potential for erosion that could lead to levee failure if not checked. Several sites along the NCC south levee and the PGCC and NEMDC/Steelhead Creek west levee were identified as needing further erosion analyses. In addition, levee height improvements in some locations on the Sacramento River east levee and the NCC south levee are needed to provide adequate freeboard to provide protection from a 200-year flood. The NLIP would correct these freeboard deficiencies, levee seepage potential, and streambank erosion conditions to provide a 200-year level of protection.

Proposed Flood Control Improvements

Levee Raises

Freeboard deficiencies on the Natomas levees would be corrected to achieve a minimum of 3 feet of freeboard above the 200-year water surface elevation (Exhibits 3-10 through 3-13). Freeboard deficiencies may be addressed by crown-only raises, full levee raises, or floodwalls, as described above in Section 3.4.3.

Bank Protection

The bank protection component of the NLIP involves the placement of rock revetment along the waterside slope of the levee at 10 NLIP bank protection sites located along the left (east) bank of the Sacramento River. Additional erosion protection work also may be needed at several sites along the NCC south levee and the PGCC and NEMDC/Steelhead Creek west levee. As described above in Section 3.4.3, the bank protection would be designed to control erosion and maintain existing vegetation and instream woody material to the extent possible to provide riparian and shaded riverine aquatic habitat. This can be achieved through the construction of rock benches that serve as buffers against extreme toe scour and shear stress while providing space for planting riparian vegetation and creating a platform to support aquatic habitat features. Bank protection on the Sacramento River is illustrated in Exhibits 3-11 through 3-13.

Most of the construction activities, with the exception of planting and staging activities, would be conducted on the waterside of the riverbank from a barge or on top of the placed fill material. The top of the levee and adjacent open space areas would be used for staging of vehicles and plant materials as necessary. In general, the bank protection sites along the Sacramento River east levee would likely be accessed from the river to minimize impacts from access from the land side.

Seepage Remediation

Potential alternatives for addressing through-seepage and underseepage in the Natomas area include cutoff walls, seepage berms and stability berms, and relief wells, which are all described above in Section 3.4.3. These features are illustrated in Exhibits 3-10 through 3-13.

Status of Environmental Review

The NLIP activities have not been analyzed previously under CEQA.

3.4.5 SOUTH SACRAMENTO STREAMS GROUP CHANNEL IMPROVEMENTS

Purpose and Need

As described in Section 2.8, “South Sacramento Streams Project,” in addition to being subject to flood risk from the American and Sacramento Rivers, the southern portion of the American/Sacramento River floodplain is also subject to flooding from the combined effects of high flows in Morrison Creek and its tributaries (the SSSG) and high flows in the Cosumnes and Mokelumne Rivers, which raise water surface elevations in the Beach/Stone Lake floodplain south of Sacramento. In 1999, Congress authorized a program of levee and other facility improvements to increase flood protection in the south Sacramento area. SAFCA, The Reclamation Board, and

the USACE have completed substantial improvements bringing the area closer to having the 100-year level of protection needed to achieve Federal Emergency Management Agency (FEMA) accreditation of the subject levees. The agencies recently identified and analyzed design improvements needed to provide this level of flood protection after previously performed flood hydrology studies were found to need revision and update. Many of these improvements are yet to be implemented.

Flood Control Improvements

The SSSG flood control improvements currently consist of the following elements:

- ▶ excavating selected reaches of Morrison Creek, Elder Creek, Florin Creek, and Unionhouse Creek and constructing floodwalls to increase the channel capacity and ensure safe containment design flood flows;
- ▶ retrofitting stream passage beneath several local bridge crossings to ensure unimpeded passage of flood flows;
- ▶ realigning portions of existing levees; and
- ▶ installing box culverts at several Florin Creek crossings to increase the effective flow area and reduce the head loss.

These measures, when combined, would increase the capacity of these streams to convey a 100-year flood event and meet FEMA criteria.

Exhibit 3-2 shows the SSSG channels, and Exhibit 3-5 shows the SSSG levees.

Status of Environmental Review

The environmental effects of the South Sacramento Streams Project flood control improvements have been analyzed in several CEQA documents. The USACE and SAFCA prepared a joint EIS/EIR in 1999 and 2000, and SAFCA approved the South Sacramento Streams Project in 2000. Subsequent environmental documents were prepared addressing changes to specific components of the flood control improvement project (SAFCA and USACE 2001a, 2001b). The USACE prepared an environmental assessment on project design refinements (USACE 2004), and SAFCA most recently prepared the *South Sacramento Streams Project Supplemental EIR* to address various refined design elements (SAFCA 2004, 2005).

3.4.6 NORTH SACRAMENTO FLOOD CONTROL IMPROVEMENTS

Purpose and Need

The North Sacramento area east of Natomas contains several urbanized floodplains that are threatened by peak flood flows in the streams that run through the area, including Dry Creek, Robla Creek, Arcade Creek, and Magpie Creek (the “North Sacramento Streams Group,” or NSSG). These streams are hydraulically connected to the lower American River through the NEMDC/Steelhead Creek, which forms the eastern boundary of the Natomas area and carries flows from the NSSG to the lower American River in flood conditions. Accordingly, the risk of flooding in the North Sacramento and Natomas areas can become acute when high flows in the NSSG combine with high flows in the lower American River.

In 1993, Congress authorized a program of levee and other facility improvements, referred to as the Natomas Features in the 1992 American River Watershed Investigation Feasibility Report, to provide a “200-year” level of flood protection in the Natomas and North Sacramento areas. Under this authorization, SAFCA completed substantial levee and related flood control improvements as part of the NALP. These improvements included levee raising and strengthening along the north and south levees of Arcade Creek, the east and west levees of the NEMDC/Steelhead Creek, and the south levee of Dry/Robla Creek; construction of a new levee along the north

side of Dry/Robla Creek; and construction of new pumping station in the NEMDC/Steelhead Creek. As a result of this work, in 1998 the USACE certified that the improved levee system met minimum FEMA requirements for safe containment of a 100-year flood, and in 1999 the USACE approved the first phase of reimbursements to SAFCA for the federal share of the cost of the completed improvements. In 2003, The Reclamation Board provided the first phase of reimbursement for the state's share of the cost of these improvements.

Since the completion of the NALP, changes have been made in USACE levee design requirements and guidance documents that warrant additional investigation of seepage and underseepage conditions affecting the levee system in North Sacramento that were not addressed by the NALP. Depending on the outcome of this investigation and analysis, design and construction of additional improvements to the Dry Creek north levee, the Dry/Robla Creek south levee, and the Arcade Creek north and south levees may be required to provide "200-year" urban-standard flood protection to the urban areas protected by these levees.

In addition, the NALP did not fully address the risk of flooding to the floodplain along old Magpie Creek in the City of Sacramento. Extending eastward from the east levee of the NEMDC/Steelhead Creek, this floodplain is also threatened by floodwaters overtopping the Magpie Creek Diversion Channel left bank levee. This channel was constructed by the USACE and The Reclamation Board in the 1950s to divert high flows in the upper portion of Magpie Creek to Dry/Robla Creek so that these flows could enter the NEMDC/Steelhead Creek by gravity in lieu of being pumped over the east levee of the NEMDC. Since the early 1990s, SAFCA has been working with the USACE and The Reclamation Board to improve the Magpie Creek Diversion Channel levee and channel so as to reduce the risk of overflow into the old Magpie Creek floodplain downstream of the diversion channel. This effort has focused on a combination of floodplain storage and levee rehabilitation improvements that would be carried out under the USACE's small projects authority.

Proposed Flood Control Improvements

The improvements needed to further improve flood protection along the NSSG consist of the following elements:

- ▶ subsurface investigations and geotechnical analyses of the NEMDC/Steelhead Creek east levee, Dry Creek north levee, the Dry/Robla Creek south levee, and the Arcade Creek north and south levees to evaluate their ability to ensure safe containment of design flood flows;
- ▶ retrofitting the levees and appurtenant drainage features to resist stability, through-seepage, and underseepage issues identified by the above investigations and analyses;
- ▶ rehabilitation of the Magpie Creek Diversion Channel west levee in the vicinity of Raley Boulevard to prevent or reduce overflow into the old Magpie Creek floodplain; and
- ▶ right-of-way acquisition to allow maintenance of the flood control facilities.

Exhibit 3-2 shows the location of the NSSG, where these improvements would be implemented.

Status of Environmental Review

The environmental impacts of the proposed improvements to the Magpie Creek Diversion Channel west levee have been evaluated by the USACE and the City of Sacramento in a final Detailed Project Report and Final EIS/EIR and a supplemental report (USACE and City of Sacramento 1996, 1997). Other improvements potentially affecting the NSSG have not yet been evaluated.

3.4.7 AMERICAN RIVER PARKWAY HABITAT ENHANCEMENT PROJECTS

Purpose and Need

The lower American River ecosystem has been significantly degraded by mining, development, floodplain constrictions (including bridges, levees, diversions, and the parkway system), dam construction, and flow modifications that have occurred over the past 150 years. These modifications have severely altered the physical processes that sustained natural habitat values within the ecosystem. The American River Parkway corridor contains substantially all that remains of the historical floodplain and its associated aquatic, wetland, and riparian habitat. The proposed funding mechanisms would be used to finance floodplain habitat enhancements along the lower 5 miles of the American River Parkway and upland habitat enhancements in two areas in the parkway, referred to as the Bushy Lake and Woodlake sites (Exhibit 3-3). The floodplain habitat enhancements are part of SAFCA's variable storage space operations agreement with Reclamation (Reclamation 2003). The upland habitat enhancements are part of the locally preferred plan that SAFCA resolved to support at the conclusion of the long-term study of a comprehensive solution to flood control problems in Sacramento conducted as part of the federally authorized American River Watershed Investigation (USACE, SAFCA, and The Reclamation Board 2002).

The intent of these habitat enhancements is to reestablish the attributes of a functioning and self-regulating ecosystem and to restore, to the extent possible, fish and wildlife habitat values in the lower American River. These enhancements are included in the flood control program to address a new state-local cost sharing mandate adopted by the California Legislature in 2000. Under this mandate, the state's contribution to the nonfederal cost of federally authorized flood control projects will vary between 50% and 70% depending on the extent to which the project has been designed to incorporate multi-objective benefits, such as ecosystem restoration, in addition to flood control. Although the state has yet to adopt guidelines for this new cost-sharing mandate, inclusion of these habitat enhancements in Sacramento's flood control program will likely reduce the local share of the cost of this program.

Floodplain Habitat Enhancements

In conjunction with implementation of its variable storage space operations agreement with Reclamation, SAFCA has also committed to improving floodplain habitat on the lower American River for Sacramento splittail spawning and rearing. The proposed floodplain habitat enhancement approach is to replicate or enhance slough habitats on the wide northern floodplain of the river between River Miles 0 and 5 (right bank). Existing habitats would be replaced with higher quality and quantities of riparian, wetland, and aquatic habitat. The enhancement would involve earthwork and revegetation, the amount of which would depend on the specific location of the work and final design.

Upland Habitat Enhancements

The Woodlake site consists of 283 acres of open space and spans the north bank of the lower American River between River Mile (RM) 2 and RM 4. Nonnative invasive weeds have spread on the site, and the site is a good candidate for ecosystem restoration to reverse this spread and the associated ecological degradation within the lower American River corridor. The Bushy Lake site consists of 337 acres just upstream of the Woodlake site between RM 4 and RM 5.5 on the north bank of the river. Bushy Lake covers about 12 acres of the site's central area. Cal Expo, an agency of the State of California, owns the floodplain. In 1976, the California State Legislature set Bushy Lake aside as a state preserve. The site was previously graded in anticipation of golf course development, and approximately 10 acres of the site is used as overflow parking during the state fair. The site lacks a natural hydrological system to support the riparian plant species and wildlife around Bushy Lake.

Restoration activities would include grading and excavating soils on the floodplain and creating side channels off the main American River channel to provide hydrology supportive of wetlands riparian habitat. Nonnative

vegetation would be removed and replaced with native riparian woodland, wetlands, and oak woodland/savannah. The restoration would be designed such that the configuration of the main American River channel would not be affected. The changes associated with the floodplain terraces and side channels would be relatively minor in relation to the width of the floodplain in this reach of the river. Flows would be reintroduced to the Woodlake site, and Bushy Lake would receive a more reliable water source, resulting in an improvement in the quality of water draining into the American River from this site.

At the Woodlake site, known and potential cultural resources would need to be integrated into restoration planning and design. At the Bushy Lake site, existing high-quality habitats, especially valley elderberry longhorn beetle (VELB) habitat, must be protected and incorporated into the project design. In addition, overflow parking for Cal Expo needs to be maintained.

Status of Environmental Review

The floodplain habitat enhancement projects were evaluated at a program level in SAFCA's certified *Program Environmental Impact Report on Flood Control Improvements Along the Mainstem of the American River* (SAFCA 2000) and in Reclamation's *Long-Term Reoperation of Folsom Dam and Reservoir, Final Environmental Assessment* (Reclamation 2003). The Bushy Lake and Woodlake habitat enhancement projects were evaluated at a project level in *American River Watershed, California, Long-Term Study Final Supplemental Plan Formulation Report/EIS/EIR* (USACE, SAFCA, and The Reclamation Board 2002).

3.4.8 LEVEE INTEGRITY PROGRAM

Purpose and Need

The federal–state flood control system protecting Sacramento encompasses over 100 miles of earthen levees that constitute the area's last line of defense against potentially catastrophic flooding (Exhibit 3-5). This line of defense may be overwhelmed by river or stream flows that exceed its containment capacity, or it may fail at weak points due to the stress of prolonged high water. The levee system has been built up over many decades with materials of variable quality and construction techniques on river and streamside foundations composed of unknown soil quality, and the levees themselves and their foundations are perpetually subject to weakening due to wind-, wave-, and flow-generated erosion; seepage; settlement; and structural infringement by human activities and burrowing mammals. Ensuring levee integrity is an essential element of achieving SAFCA's objectives of providing "200-year" urban-standard flood protection to existing development in Sacramento's floodplains and avoiding an increase in the risk of damage as new development occurs in these floodplains over time.

Activities to Be Covered by the Proposed Funding Mechanisms

Levee integrity work covers a broad range of activities extending from regular urban levee maintenance to a variety of waterside and landside levee strengthening efforts, including bank protection, levee armoring, levee toe stabilization, levee widening, encroachment management, vegetation management, improved system access, operations during a flood event, and repairs to damaged infrastructure. These activities, which are briefly described below, would be funded in part by the proposed new funding mechanisms.

Urban Levee Maintenance

Conducting regular maintenance of the levee system is the cornerstone of ensuring the integrity of urban levees. Given the extensive length of the levee system and the wide variety of threats to their integrity, the potential for failure is increased greatly if a thorough and aggressive maintenance program is not in place. Primary components of urban levee maintenance include vegetation, slope, and rodent management.

Vegetation on levees would be controlled to a level that provides adequate cover to prevent surface erosion without contributing to an increased level of flood risk. Vegetation would be managed to a level that does not inhibit the ability of flood managers to visually inspect levees for damage, result in damage to the levee structure if a large tree is uprooted, have a negative effect on floodway capacity, or redirect flows in a manner that threatens levee integrity. Vegetation would be controlled through mechanical means or the use of herbicides or controlled burning.

Levee slopes would be maintained to design specifications in order to preserve their integrity. Slumping or uneven levee slopes are less stable and difficult to inspect and maintain (e.g., mow). Levees also will be surveyed for erosion and settling, the latter to ensure that slopes and height are of adequate dimensions. Any problems identified as a result of slumping, settling, or erosion would be repaired expeditiously. Repairs include mechanical recontouring of levee slopes, adding soil material to recover adequate dimensions, and increasing the amount of vegetative ground cover or rock material to protect against erosion.

Finally, ground-burrowing rodents can inflict a great deal of damage to levees if their burrows penetrate the levee cross section. Their burrows can serve as paths for levee seepage that can lead to a levee failure. Ground-burrowing rodents would be controlled to a level necessary to maintain levee integrity. Methods of control include inspection for burrows, filling in burrows so they are inaccessible, trapping rodents, and implementing rodent control programs designed by a Pest Control Advisor.

Flood Operations

During a flood event, consistent monitoring of the system and timely response to identified problems are essential to avoiding a catastrophic levee failure. During such an event, the levee maintaining agency is required to patrol the levee system 24 hours a day monitoring for boils, seepage, erosion, or other signs of levee distress. Should a problem be identified that requires immediate action, the local agency will mobilize its forces along with outside contractors to initiate a flood fight. This typically requires the use of plastic sheeting, sand bags, rock, and other flood fight materials. In remote locations, access to the emergency site must be improved to allow large equipment and heavy trucks to bring materials to the site.

Even if a flood fight is not required to stabilize a levee, damage caused by a flood event must be immediately repaired to restore the system in preparation for the remainder of the flood season. Following the flood season, permanent repairs must be made prior to the next flood season.

Bank Protection

Erosion that may ultimately threaten the integrity of flood control levees and contribute to the loss of important natural habitats is an ongoing problem. Additional bank protection projects will be needed to protect the levees, provide geotechnical stability to levees where the existing berms (which often provide a substantial amount of geotechnical stability) have been lost, and protect the finite amount of remaining soil berms and the valuable riparian vegetation that the berms support.

The bank protection component of the long-term channel and urban levee maintenance program would be implemented principally along portions of the lower American and Sacramento Rivers. The funded activities would be designed to proactively control erosion in a manner that addresses problems before they become large scale, thereby reducing costs, and that conserves and enhances important natural habitats before they are completely lost. The goal of the maintenance program would be to balance the need to provide an increased level of flood protection with the conservation and enhancement of natural resources and river-related recreational opportunities.

Bank protection methods would be as described in Sections 3.4.3 and 3.4.4 above. Standard design and construction techniques would be used to control erosion and conserve and replace the ecological values and functions of riparian and aquatic habitats that may be affected by the ongoing threat of erosion or proposed bank

protection projects. Efforts also would be made to further establish the interdependency of bank protection and habitat conservation and enhancement and to find ways to implement projects that meet these goals.

This program also would enhance habitat in areas without erosion to offset impacts associated with bank protection projects that cannot be fully mitigated on-site and to provide a natural form of bank protection. The conservation of low bank vegetation can play a significant levee protection role by binding weak soils, reducing floodflow velocity near the banks, and effectively attenuating boat wake and wind wave energy that would otherwise incrementally deteriorate the lower banks where vegetation is not present.

Levee Strengthening

Levee strengthening includes a wide range of activities necessary to ensure the integrity of an urban levee system over time. These activities include levee armoring, levee toe stabilization, and levee widening. Each of these activities is discussed below.

Levee Armoring. Levee armoring involves the placement of rock on the waterside and/or landside of the levee to stabilize the slope, strengthen the levee structure, and prevent erosion that may result from high-velocity flows or levee overtopping. The need for levee armoring varies within the system as a result of the different design and operational conditions along the Sacramento and American Rivers. The Sacramento River is most often subject to long-duration high flows that can last for months and saturate the levee structure and subject levees to prolonged periods of stress. The lower American River, while not as prone to prolonged high flows, is subject to relatively short-duration but extremely high peak flows, lasting from 3 to 7 days. These high-velocity peak flows can be erosive, exert sudden and extreme pressure on the levees, and possibly overtop the levees because of inadequate channel capacity.

Levee armoring on the water side of the levee would be implemented in areas where there is inadequate protection from erosion and where increased levee strength is required. This activity would be implemented principally along the south levee of the NCC and portions of the east levee of the Sacramento River and the north and south levees of the American River. Levee armoring on the land side of the levee, possibly in combination with waterside armoring, would be implemented principally along the south levee of the NCC, where wind-driven waves could imperil the levee in the event that upstream levees fail, and along the north and south levees of the American River in locations where overtopping could occur in the event of a flood exceeding the design flood control storage capacity of Folsom Dam. Armoring the landside slope would reduce the risk of a complete levee failure by controlling erosion as water flows over the levee structure. Avoidance of a levee failure would in turn reduce the volume of flood water entering the developed floodplain and lower the damages suffered by the structures in the floodplain.

Levee Toe Stabilization. The design of levee armoring work on the water side of the levee could be broadened to include measures to ensure levee toe stabilization. As previously described, the levee system was constructed over a long period of time and the relationship of the levee to the berm and river channel exhibits a wide variety of physical configurations. In some locations, principally along the east levee of the Sacramento River, the levee is located immediately adjacent to the river channel and consists of a very steep and potentially unstable slope. This levee could be at risk during high-flow events, whether it be for sustained periods or during short-duration peak flows, or during seismic events as a result of an inadequately supported levee toe. This risk could be reduced through the placement of rock along the waterside toe of the levee to protect against erosion and create a berm that would provide a stable footing for the levee.

Levee Widening. Existing levees in the project area typically meet USACE standards; however, these are minimum standards, and in extreme flood events, problems may be encountered due to long periods of sustained high flows, particularly along the south levee of the NCC and portions of the east levee of the Sacramento River. Levee widening in these areas, where adequate right-of-way is available, would reduce the risk of levee failure

through the addition of a landside berm, an overall widening of the levee from the levee toe to levee crown, or a reduction of the landside levee slope (e.g., from 2H:1V to 5H:1V).

Encroachment Management

Currently, most levees in the project area meet the minimum design standards established by the USACE; however, commercial or residential development often extends up to or very near the landside toe of the levee. This condition does not provide adequate access to the levee or allow for any future modifications to the levee that would result in a higher level of flood protection for urban areas, such as gentler levee slopes and an increased levee footprint. As previously described in this section and Section 3.4.3, many levees may require remedial measures to control underseepage and/or increase stability that may include installation of a landside berm.

Encroachments within and adjacent to the levee system must be managed to ensure levee integrity; access for routine and emergency operation and maintenance activities; and adequate space to accommodate future levee improvements such as levee widening, landside seepage berms, or flattened levee slopes. Encroachments must also be managed to ensure that they do not impede flow or inappropriately constrain the operation of the flood control system. Encroachment management would include acquiring property for maintenance access in some locations in the levee system and removing encroachments, such as stairways, fences, houses, and other structures, from levees and landside levee toes where they affect the stability of levee slopes, hinder inspection and repair access, and limit stability and seepage remediation options.

Planning for property acquisition may be carried out by agencies with land use authority, in concert with SAFCA's flood risk reduction program, through general plan amendments, zoning, local building codes, or other permitting processes. The desired end result would be controlled development within a minimum of 50 feet from the landside levee toe up to a maximum of approximately 400 feet from the landside levee toe. Providing an area of this size along levee corridors would work to ensure that permanent buildings and residences are not damaged or removed in the future when flood control agencies respond to levee weaknesses during major floods or construct major levee repairs that may require widening or realigning a levee segment on the landward side of the existing levee.

Inspections would be conducted to identify areas where there are encroachments within the existing levee structures or easements that affect levee integrity, inspection, or access. SAFCA would work with the landowners to have the encroachments modified or removed to meet acceptable flood protection standards. Additionally, areas that do not have a minimum of 400 feet between the landside levee toe and existing or planned development would be identified, and SAFCA would work with the local land use agency and landowners to develop the means to modify existing development and/or limit future development in those areas to provide adequate room for flood maintenance activities and future levee improvements.

Also, although vegetative cover is needed for erosion control of levee slopes, new USACE criteria will likely require that trees and other large woody vegetation that are currently left in place as a part of regular maintenance be removed from the levees because their root systems can create paths for levee seepage and trees can become uprooted and undermine the integrity of levee slopes. The program would include the removal of trees and other large woody vegetation that poses such problems.

Protecting the system's conveyance capacity and ability to safely pass flood flows is another key component of managing encroachments. Vegetation and some constructed facilities on the water side of the levees can reduce conveyance capacity, redirect flows in a manner that threatens flood control infrastructure by inducing erosion, or inappropriately constrain the operation of the flood control system. The program would manage vegetation that adversely affects flood flows. Nonnative vegetation would be targeted for removal, and native vegetation would be preserved in place, where feasible, or its removal compensated for in other locations to the extent feasible.

Additionally, facilities and structures that inappropriately constrain flood operations or compromise flood safety would be removed or redesigned. These facilities could include the 4-acre Riverdale Mobile Home Park that is currently located along the north bank of the American River just east of Highway 160. This facility has space to accommodate as many as 80 mobile homes at a ground elevation that could subject these facilities to inundation in the event that flood conditions along the American River compel Folsom Dam operators to raise releases from the dam to 160,000 cfs. Although it might be possible to avoid mobile home damage through effective pre-flood evacuation planning and implementation, it appears that the two dozen homes currently occupying the site would be difficult or impossible to remove rapidly from the floodplain in the event of a flood threat. Accordingly, removal of these facilities, potentially including their relocation to a suitable alternative location outside the floodplain, would be an appropriate flood management activity.

Status of Environmental Review

Most of this program of activities has not been analyzed under CEQA. Future streambank protection activities along the lower American River have been analyzed at a programmatic level in *Streambank Protection for the Lower American River Final EIR and Supplemental EIS V for the Sacramento River Bank Projection Project* (USACE and The Reclamation Board 1998).

3.4.9 RURAL FLOODPLAIN PRESERVATION

Purpose and Need

The SRFCP is an integrated system of levees, bypass channels, and dams that protects several hundred thousand acres of mostly agricultural land in the Sacramento Valley from seasonal flooding. Urban development covers only a small fraction of the protected area centered in the cities that were established along the Sacramento River and its principal tributaries during the gold rush era when these rivers constituted the most reliable form of transportation in the flood-prone portions of the valley. These urban centers, including the core of the City of Sacramento and the Natomas area, as well as the cities of West Sacramento, Yuba City, Marysville, and their surrounding floodplains, contain over 200,000 residential, commercial, and industrial structures that could suffer significant damage in the event of a severe flood. By contrast, the sparsely populated agricultural lands protected by the SRFCP are likely to suffer far less damage in such an event. Depending on their geographic location, acquiring easements over these agricultural lands could serve to attenuate the risk of urban flooding by preserving incidental flood storage capacity in extreme flow events, and would help avoid any substantial increase in the risk of damage caused by placing additional structures in the floodplains protected by the proposed improvements.

Easement Acquisition

During a severe flood in the Sacramento Valley, rural levee failures upstream and just downstream of the Fremont Weir could lower water surface elevations in the Sacramento River channel downstream of the weir by more than 1 foot, thus reducing the risk of a failure of the urban levees along the east bank of the Sacramento River and the south bank of the NCC. Preserving this ability to lower Sacramento River water surface elevation is one of the flood risk management strategies that could be funded by the proposed new funding mechanisms. This strategy would be pursued through the acquisition of agricultural preservation easements from willing sellers in Sutter and Yolo Counties. These easements would be designed to: (1) preserve existing agricultural and other open space uses by retiring speculative developments rights on the affected properties, and (2) compensate the sellers in advance for any damage to their land that may occur as a result of a severe flood. The easements would thus diminish the likelihood that the rural levees protecting these properties would be upgraded to an urban standard.

Status of Environmental Review

The environmental effects of this activity have not been analyzed under CEQA.

Table 3-1 Summary of Improvements To Be Funded By the Proposed Local Funding Mechanisms						
SAFCA Program Component	Element	Description	Location ¹	Protected Area ²	Location of Detailed Description in DEIR	Previous Documents ³
Folsom Dam Physical Improvements	Low-level discharge improvements	Construct gated auxiliary spillway with a concrete-lined approach channel and discharge chute, and enlarge existing stilling basin	Folsom Dam – east of main dam adjacent to left wing dam (Exhibits 3-3 and 3-4)	LAR	Section 3.4.1.1	1, 11, 15
	Surcharge storage improvements	Modify or replace existing three emergency spillway gates	Folsom Dam – emergency spillway (Exhibits 3-3 and 3-4)	LAR	Section 3.4.1.1	1, 11, 15
		Construct 3.5-foot concrete parapet wall	Folsom Dam – earthen wing dams and dikes (Exhibits 3-3 and 3-4)	LAR	Section 3.4.1.1	1, 11, 15
	Temperature shutter improvements	Modify three existing temperature shutter mechanisms and provide for automated control	Folsom Dam – hydropower unit intake facilities (Exhibit 3-3)	LAR	Section 3.4.1.2	15
Folsom Dam Operational Improvements	Variable storage space for flood control	Implement new flood control diagram requiring variable flood storage space (400–600,000 acre-feet) based on upstream storage conditions	Folsom Reservoir (Exhibit 3-3)	LAR	Section 3.4.1.3	1, 16
	Forecast-based operations	Implement new flood control diagram permitting conditional water storage in flood control space and advance release of water storage outside of flood control space based on forecasted reservoir inflows	Folsom Reservoir (Exhibit 3-3)	LAR	Section 3.4.1.4	N/A
New Folsom Bridge	Bridge across American River	Construct new four-lane bridge crossing American River just downstream of Folsom Dam	Downstream of Folsom Dam (Exhibits 3-3 and 3-4)	LAR	Section 3.4.2	7, 15
Common Features Levee Improvements Below Folsom Dam	Levee raising	Raise approximately 2.5 miles of American River north levee by approximately 1 foot	North bank of American River roughly between Watt Avenue and H Street (Exhibit 3-3)	LAR	Section 3.4.3	N/A
		Raise several miles of the Sacramento River east levee approximately 1 foot	East levee of Sacramento River in the Pocket area and the vicinity of the town of Freeport (Exhibit 3-2)	LAR	Section 3.4.3	14
		Raise approximately 4,300 feet of the south levee of the American River by approximately 3 feet	South bank of American River between the Mayhew Drain and Gristmill (Exhibit 3-3)	LAR	Section 3.4.3	12, 13

**Table 3-1
Summary of Improvements To Be Funded By the Proposed Local Funding Mechanisms**

SAFCA Program Component	Element	Description	Location ¹	Protected Area ²	Location of Detailed Description in DEIR	Previous Documents ³
	Underseepage Control	Construct 4,300 feet of underseepage cutoff wall along the south levee of the American River	South bank of American River between Mayhew Drain and Gristmill (Exhibit 3-3)	LAR	Section 3.4.3	12, 13
		Install cutoff wall closure structures at several road and utility crossings along both sides of the American River	North and South levees of American River (Exhibit 3-5)	LAR	Section 3.4.3	N/A
		Construct approximately 7 miles of cutoff walls and/or relief wells at several locations along the east levee of the Sacramento River	East levee of Sacramento River in vicinity of Pocket area (Exhibit 3-5)	LAR	Section 3.4.3	14
	Closure structure	Construct a concrete closure structure with flap gates across the Mayhew Drain and install cutoff walls in the east and west levees of the Mayhew Drain north of Folsom Boulevard	South levee of American River at RM 11 (Exhibit 3-5)	LAR	Section 3.4.3	12
	Erosion control	Construct approximately 10 miles of bank and levee armoring improvements	North and south levees of American River (Exhibit 3-5)	LAR	Section 3.4.3	N/A
Natomas Levee Improvement Program	Levee raising	Raise approximately 20 miles of levee by approximately 3 feet	East levee of Sacramento River, south levee of NCC, and west levee of PGCC (Exhibit 3-5)	Natomas	Section 3.4.4	N/A
	Underseepage Control	Construct approximately 20 to 30 miles of a combination of cutoff walls, earthen seepage berms, and relief wells to control underseepage	South levee of NCC, east levee of Sacramento River, north levee of American River, west levee of NEMDC, and west levee of PGCC (Exhibit 3-5)	Natomas	Section 3.4.4	N/A
	Erosion control	Construct approximately 3 miles of bank protection improvements	East bank of Sacramento River, south levee of NCC, and west levee of PGCC/NEMDC (Exhibit 3-5)	Natomas	Section 3.4.4	N/A

Table 3-1 Summary of Improvements To Be Funded By the Proposed Local Funding Mechanisms						
SAFCA Program Component	Element	Description	Location ¹	Protected Area ²	Location of Detailed Description in DEIR	Previous Documents ³
South Sacramento Streams Channel Improvements	Channel excavation	Excavate approximately 9.5 miles channel to increase conveyance capacity	Morrison, Elder, Unionhouse, and Florin Creeks (Exhibit 3-2)	SSSG	Section 3.4.5	4, 5, 6
	Bridge and culvert improvements	Construct 15 new concrete box culverts beneath bridge crossings to increase conveyance capacity	Morrison, Elder, Unionhouse, and Florin Creeks (Exhibit 3-2)	SSSG	Section 3.4.5	2, 3, 4, 5, 6
	Floodwall construction	Construct approximately 19 miles of concrete and sheet pile floodwalls to contain high stream flows	Morrison, Elder, Unionhouse, and Florin Creeks (Exhibit 3-2)	SSSG	Section 3.4.5	2, 3
North Sacramento Flood Control Improvements	Underseepage control	Conduct subsurface investigations and geotechnical analyses, and retrofit levees and drainage features to address through-seepage and underseepage based on results of these studies	Dry Creek north levee, Dry/Robla Creek south levees, Arcade Creek north and south levees (Exhibit 3-2)	North Sacramento	Section 3.4.6	N/A
	Levee rehabilitation	Rehabilitate the Magpie Creek Diversion Channel west levee	Magpie Creek Diversion Channel in the vicinity of Raley Boulevard (Exhibit 3-2)	North Sacramento	Section 3.4.6	8, 9
	Right-of-way acquisition	Acquire right-of-way to allow maintenance of flood control facilities	Dry/Robla Creek, Arcade Creek, Magpie Creek Diversion Channel (Exhibit 3-2)	North Sacramento	Section 3.4.6	N/A
American River Parkway Habitat Enhancement	Remove nonnative vegetation	Remove star thistle and other invasive weeds on approximately 100 acres of land in the upper floodplain of the American River Parkway	Woodlake and Cal Expo areas of American River Parkway (Exhibit 3-3)	LAR	Section 3.4.7	15
	Create upland habitat	Plant and establish native riparian vegetation, including grassland, shrubs, and trees on approximately 180 acres of land in the upper floodplain of the American River Parkway	Woodlake and Cal Expo areas of American River Parkway (Exhibit 3-3)	LAR	Section 3.4.7	15
	Create shallow floodplain habitat	Lower shoreline bank elevations and install woody material and native plants adapted to seasonal inundation	Lower 5 miles of American River channel between RM 0 and RM 5 (Exhibit 3-3)	LAR	Section 3.4.7	15

Table 3-1
Summary of Improvements To Be Funded By the Proposed Local Funding Mechanisms

SAFCA Program Component	Element	Description	Location ¹	Protected Area ²	Location of Detailed Description in DEIR	Previous Documents ³
	Create side channels	Excavate side channels around the perimeter of Bushy Lake and create approximately 30 acres of seasonal wetland habitat	Cal Expo area of American River Parkway (Exhibit 3-3)	LAR	Section 3.4.7	15
Levee Integrity Program	Urban levee maintenance	Ensure that all levees in the project area are maintained to an urban levee standard	All levees in project area (Exhibit 3-5)	All areas	Section 3.4.8	N/A
	Flood operations	Ensure that local levee maintaining agencies are able to carry out levee patrols and flood fights, as necessary during flood events	All levees in project area (Exhibit 3-5)	All areas	Section 3.4.8	N/A
	Bank protection	Construct bank protection improvements as required to control erosion generated by river flows and boat wake along the lower American and Sacramento Rivers and their tributaries	All channels in project area (Exhibit 3-2)	All areas	Section 3.4.8	10
	Levee strengthening	Buttress and armor levees as necessary to reduce the risk of failure in the event of prolonged high water and, where appropriate, overtopping	All levees in project area (Exhibit 3-5)	All areas	Section 3.4.8	N/A
	Encroachment management	Maintain the conveyance capacity of flood control channels by relocating and redesigning obstructions and appropriately managing vegetative roughness	All channels in project area (Exhibit 3-2)	All areas	Section 3.4.8	N/A
		Ensure that residential, commercial, industrial, and agricultural improvements and utilities and infrastructure supporting these improvements are properly designed to maintain the structural integrity of the levee system and provide adequate space for ongoing maintenance and improvement of the levee system	All levees in project area (Exhibit 3-5)	All areas	Section 3.4.8	N/A
Rural Floodplain Preservation	Easement acquisition	Acquire easements from willing sellers to retire development rights and preserve the agricultural character and incidental flood storage capacity of rural floodplains	Rural areas within levee protected floodplains upstream and just downstream of Fremont Weir (Exhibit 3-2)	Natomas, LAR	Section 3.4.9	N/A

Table 3-1

SAFCA Program Component	Element	Description	Location ¹	Protected Area ²	Location of Detailed Description in DEIR	Previous Documents ³
Notes:						
¹ NCC = Natomas Cross Canal NEMDC = Natomas East Main Drainage Canal PGCC = Pleasant Grove Creek Canal RM = River Mile						
² Protected Areas: LAR = lower American River area Natomas = Natomas area North Sacramento = North Sacramento area SSSG = South Sacramento Streams Group area						
³ Previous Documents: Environmental document(s) in which all or part of the element described has been previously analyzed; see Chapter 9, "References," for full titles and reference information:						
1 SAFCA. 2000 (April). <i>Draft Program EIR on Flood Control Improvements Along the Mainstem of the American River. Volume I.</i>						
2 SAFCA. 2004 (December). <i>South Sacramento Streams Project Supplemental Draft EIR.</i>						
3 SAFCA. 2005 (February). <i>South Sacramento Streams Project Supplemental Final EIR.</i>						
4 SAFCA and USACE. 2001a (July). <i>Draft Supplemental EIR/EA for the South Sacramento County Streams Project, Camray Borrow Site and Additional Aspects of Levee Work on North Beach Lake Levee.</i>						
5 SAFCA and USACE. 2001b (October). <i>Final Supplemental EIR/EA for the South Sacramento County Streams Project, Camray Borrow Site and Additional Aspects of Levee Work on North Beach Lake Levee.</i>						
6 U.S. Army Corps of Engineers (USACE). 2004 (December). <i>EA for the South Sacramento County Streams Project Design Refinements.</i>						
7 USACE and City of Folsom. 2006 (September). <i>American River Watershed Project Post Authorization Decision Document, Folsom Dam Raise, Folsom Bridge, Final Supplemental EIS/EIR.</i>						
8 USACE and City of Sacramento. 1996 (April). <i>Maggie Creek, California, Section 205 Final Detailed Project Report and Final Environmental Impact Statement/Environmental Impact Report.</i>						
9 USACE and City of Sacramento. 1997 (August). <i>Supplemental Report to the Maggie Creek, California, Section 205 Final Detailed Project Report and Final Environmental Impact Statement/Environmental Impact Report.</i>						
10 USACE and California Reclamation Board (The Reclamation Board). 1998 (March). <i>Streambank Protection for the Lower American River. Final EIR and Supplemental EIS V for the Sacramento River Bank Projection Project.</i>						
11 USACE and The Reclamation Board. 2001 (August). <i>Final EA/IS, American River Watershed, California, Folsom Dam Modification Project.</i>						
12 USACE and The Reclamation Board. 2002 (April). <i>American River Watershed Common Features Project Lower American River Features as Modified by the Water Resources Development Act of 1999, EA/IS and FONSI.</i>						
13 USACE and The Reclamation Board. 2005 (October). <i>American River Common Features, Lower American River Features Mayhew Levee, Sacramento County, California, Draft EIS/EIR.</i>						
14 USACE and The Reclamation Board. 2006 (June). <i>Final EA/IS, American River Common Features Pocket Area Geotechnical Reaches 2 and 9.</i>						
15 USACE, SAFCA, and The Reclamation Board. 2002. <i>American River Watershed, California, Long-Term Study, Final Supplemental Plan Formulation Report/EIS/EIR. Volume I – Integrated Document and Volume II – Appendices, Environmental.</i>						
16 U.S. Department of the Interior, Bureau of Reclamation. 2003. <i>Long-Term Reoperation of Folsom Dam and Reservoir, Final EA.</i>						
N/A Not applicable (environmental effects not previously analyzed).						

4 ENVIRONMENTAL SETTING, IMPACTS, AND MITIGATION

This chapter describes the general approach to the environmental analysis; relevant setting information; and the results of the analysis of direct and indirect significant environmental impacts of the proposed project. Cumulative impacts and growth-inducing impacts are discussed in Chapters 5 and 6, respectively.

Section 4.1 discusses the general approach to the environmental impact analysis, including the relationship of this EIR to previously prepared environmental analyses. The remainder of the chapter, Sections 4.2 through 4.16, describes by resource topic the regulatory and environmental setting, impact mechanisms and impact analysis conclusions, and mitigation measures.

4.1 APPROACH TO THE ENVIRONMENTAL ANALYSIS

4.1.1 GENERAL APPROACH AND LEVEL OF DETAIL

In accordance with Section 15126.2 of the State CEQA Guidelines, this EIR identifies and focuses on the significant direct and indirect environmental effects of the proposed project, giving due consideration to both its short-term and its long-term effects. Short-term effects identified in the EIR are generally those associated with construction, and long-term effects are generally those associated with operation of flood control facilities.

4.1.1.1 PROGRAM-LEVEL ANALYSIS

As explained in Section 1.3.1, “Combined Program and Project EIR,” the EIR examines at a broad, programmatic level the significant environmental effects that could result from creating the proposed new funding mechanisms, specifically the physical effects associated with the program of flood control improvements and related environmental mitigation and habitat enhancements that these mechanisms would be used to finance. This level of analysis is sufficient to provide SAFCA with the environmental information needed to support its decision whether to create the proposed funding mechanisms. Refer to Section 1.3.2, “CEQA Documentation Required to Implement Individual Improvement Projects,” for information on the project-level CEQA compliance necessary for SAFCA to decide whether to go forward with implementing individual improvements and to commit funds generated through the proposed funding mechanisms to those improvements that would be implemented by other agencies.

4.1.1.2 FOLSOM DAM AND FOLSOM BRIDGE PROJECTS

Although all impacts of the proposed project are addressed at a program level in this EIR, for some resource topics, more specific impacts and mitigation measures are described for Folsom Dam modifications and the Folsom Bridge project than for other components of the proposed project. This is the case for the following reasons: (1) For these topics, different construction techniques and impact mechanisms are anticipated for the Folsom Dam and/or Folsom Bridge projects than are anticipated for the other components (e.g., blasting for Folsom Dam modifications, long-term changes in traffic patterns in the case of Folsom Bridge). (2) The Folsom Dam improvements and Folsom Bridge construction are discrete projects, whereas flood control improvements to levees and channels would include both the discrete projects that are defined in Sections 3.4.3 through 3.4.6 in Chapter 3 and the long-term levee integrity program actions that are described in Section 3.4.8 (urban levee maintenance, flood operations, bank protection, levee strengthening, and encroachment management), which are not as specifically defined and would be implemented over time throughout the flood control system.

4.1.2 USE OF PREVIOUSLY PREPARED ENVIRONMENTAL DOCUMENTATION IN THIS EIR

Much of the setting and environmental analysis information in this EIR relies on information in environmental documents that were prepared previously by SAFCA and other agencies on flood control improvements and habitat enhancements that SAFCA would fund using the proposed funding mechanisms. These previously prepared documents are discussed for each individual activity and improvement described in Sections 3.4.1 through 3.4.9 under the subheading “Status of Environmental Review” and are summarized in Table 3-1. The mitigation measures adopted and incorporated into those projects are listed in Appendix B. The approach to the analysis of the individual activities and improvements in Sections 4.2 through 4.16 and in Chapter 5 is as follows:

► Folsom Dam improvements:

- **Surcharge storage space**—This EIR relies on and includes a summary of the relevant information and the analyses of impacts from the previously published EIRs that analyzed increasing Folsom Reservoir surcharge storage (SAFCA 2000; U.S. Army Corps of Engineers [USACE] and State of California Reclamation Board [The Reclamation Board] 2001; and USACE, SAFCA, and The Reclamation Board 2002).
- **Low-level discharge capacity**—This EIR presents a new, programmatic analysis of the significant impacts of the proposed new spillway that is consistent with the project-level analysis of this improvement currently being performed by the USACE and The Reclamation Board, and also summarizes and relies on relevant information on increasing Folsom Dam low-level discharge capacity in SAFCA (2000), USACE and The Reclamation Board (2001), and USACE, SAFCA, and The Reclamation Board (2002).
- **Temperature control shutters**—Modification of the temperature control shutters was analyzed at a project level in *American River Watershed, California, Long-Term Study Final Supplemental Plan Formulation Report/EIS/EIR* (USACE, SAFCA, and The Reclamation Board 2002). SAFCA has not yet certified the EIR portion of the 2002 final supplemental plan study/EIS/EIR or approved the project analyzed in the document because of the uncertainty of local funding for project implementation.
- **Permanent variable storage space flood control operations**—The environmental effects of permanent variable storage space operations were analyzed at a project level in SAFCA’s certified *Program Environmental Impact Report on Flood Control Improvements Along the Mainstem of the American River* (SAFCA 2000). There is no significant new information regarding this Folsom Dam improvement component that would change the results of the previous analysis meaningfully. SAFCA’s certified EIR and approved mitigation monitoring and reporting program adequately disclose the environmental effects of permanent variable storage space operations and mitigation measures that were adopted and incorporated into the project. These environmental effects were subsequently analyzed again by the Department of the Interior, Bureau of Reclamation (Reclamation) in accordance with the National Environmental Policy Act (NEPA) in *Long-Term Reoperation of Folsom Dam and Reservoir, Final Environmental Assessment* (Reclamation 2003). This EIR relies on and summarizes information in these documents.
- **Forecast-based operations (FBO)**—The proposed FBO has not been analyzed previously under CEQA. FBO would be used to improve the operational efficiency of Folsom Dam for both flood control and water supply within the operating parameters (e.g., objective releases and variable storage space operations) in effect for the dam at the time of its implementation. Therefore, any significant environmental impacts associated with FBO implementation are encompassed by the impact analysis for the other Folsom Dam physical and operational modifications analyzed in this EIR.

- ▶ **Folsom Bridge construction:** The environmental effects of constructing a temporary bridge downstream of Folsom Dam were analyzed in USACE, SAFCA, and The Reclamation Board 2002. The USACE and the City of Folsom prepared a supplemental EIS/EIR to evaluate the significant environmental impact of constructing a permanent bridge downstream of the dam (USACE and City of Folsom 2006), and the City of Folsom certified the final EIR and approved the project in September 2006. This program EIR incorporates the final supplemental EIS/EIR by reference and summarizes the impact analysis presented in that document.
- ▶ **Common Features levee improvements below Folsom Dam:** The environmental impacts of portions of the proposed levee improvements have been evaluated by the USACE and The Reclamation Board (2002, 2005, 2006). This EIR relies on the information in those documents and supplements it with broad, program-level analysis encompassing the range of improvement types contemplated for funding through the proposed funding mechanisms.
- ▶ **Natomas Levee Improvement Program (NLIP):** The NLIP activities have not been analyzed under CEQA. This EIR provides a broad, program-level analysis of the types of activities that could be included in the NLIP.
- ▶ **Natomas Levee Improvement Program (NLIP) channel improvements:** SAFCA and the USACE have prepared several documents analyzing the significant effects of the South Sacramento Streams Project flood control improvements, most recently a supplemental EIR/environmental assessment (SAFCA and USACE 2001a, 2001b), a supplemental environmental assessment that addresses various refined design elements (USACE 2004), and a supplemental EIR that also addresses those refinements (SAFCA 2004, 2005). The supplemental EIR incorporates by reference the information presented in previous documents prepared for the South Sacramento Streams Project and summarizes data and conclusions from those documents. There is no significant new information regarding these improvements that would meaningfully change the results of the analysis presented in these documents. The CEQA documents previously prepared and certified by SAFCA and the approved mitigation monitoring and reporting programs adequately disclose the environmental effects of the SSSG flood control improvements and adopted mitigation measures. This program EIR relies on these previous documents and summarizes information from them, and does not reanalyze the significant environmental impacts of these improvements.
- ▶ **North Sacramento flood control improvements:** The environmental impacts of the proposed improvements to the Magpie Creek Diversion Channel west levee have been evaluated by the USACE and the City of Sacramento (USACE and City of Sacramento 1996, 1997). For this portion of the proposed improvements, this EIR relies on relevant information and the analysis of impacts from these published documents, and supplements this information with new program-level analysis. Other improvements potentially affecting the North Sacramento Streams Group (NSSG) area have not yet been evaluated.
- ▶ **American River Parkway habitat enhancement projects:** The Bushy Lake and Woodlake habitat enhancement projects were evaluated at a general level in SAFCA's 2000 program-level EIR, and at a project level in the supplemental plan formulation report/EIS/EIR prepared by the USACE, SAFCA, and The Reclamation Board (2002). As noted above under "Temperature control shutters," SAFCA did not certify the EIR portion of the 2002 document or approve the project analyzed in the document because of the uncertainty of local funding for project implementation. This program EIR relies on and includes a summary of the relevant information and the analysis of impacts from the 2000 and 2002 documents.
- ▶ **Levee integrity program:** Most of this program of activities has not been analyzed under CEQA. Future streambank protection activities along the lower American River have been analyzed at a programmatic level in *Streambank Protection for the Lower American River Final EIR and Supplemental EIS V for the Sacramento River Bank Protection Project* (USACE and The Reclamation Board 1998). This EIR relies on and summarizes information in that document and provides additional program-level analysis of the anticipated types of activities that may be undertaken to ensure levee integrity under this program.

- **Rural floodplain preservation program:** Maintaining the existing uses of the lands in the RD 1600, RD 1500, and RD 1001 service areas where the easements would be acquired, and maintaining the existing rural level of flood protection for those areas would not have direct or indirect significant environmental impacts in comparison with existing conditions. Therefore, while the environmental effects of this activity have not been analyzed in a prior environmental document, this component is not addressed further in the discussions of significant impacts in this chapter.

4.1.3 OPERATIONAL EFFECTS PREVIOUSLY ADDRESSED BY SAFCA

SAFCA conducted a project-level analysis of the effects of the permanent variable storage space flood control operation (Folsom Dam reoperation) in its *Program Environmental Impact Report on Flood Control Improvements Along the Mainstem of the American River* (SAFCA 2000). The analysis was based on simulations of reservoir operations conducted using Reclamation's PROSIM model and, for the analysis of impacts on fish, water-temperature modeling that used the PROSIM results as input. That analysis concluded that the only potentially significant environmental impacts that would result from Folsom Dam reoperation would be impacts on cultural resources. Mitigation was incorporated into the project to mitigate these impacts to a less-than-significant level (see Appendix B).

No substantial changes in the proposed project, no substantial changes with respect to the circumstances under which the project would be undertaken, and no new information of substantial importance implicate new significant effects on the environment or a substantial increase in the severity of previously identified significant effects with respect to the issue areas addressed in SAFCA (2000). Therefore, these conclusions remain valid and are relied on in this EIR. The impact analyses and conclusions are summarized below for these topics.

As noted above, although the proposed FBO has not been analyzed previously under CEQA, it would be used to improve the operational efficiency of Folsom Dam for both flood control and water supply within the operating parameters (e.g., objective releases and variable storage space operations) in effect for the dam at the time of its implementation. Therefore, any significant environmental impacts associated with FBO implementation are subsumed by the impact analysis for the other Folsom Dam physical and operational modifications analyzed in this EIR.

4.1.3.1 WATER SUPPLY, HYDROPOWER, AND HYDRAULICS

The modeling results for the 70-year hydrologic record indicate that water deliveries to Central Valley Project (CVP) and State Water Project (SWP) customers would be the same under variable storage space flood control operation and baseline condition flood-control diagrams. There would be no impacts on water supply attributable to the modified operations.

Modeling results for hydropower for the 70-year hydrologic record showed a reduction of CVP hydropower capacity and power generation. Based on the period of record, average annual losses in CVP hydropower capacity and power generation were estimated to be 12 megawatts per month (MW-mo) and 11 gigawatts per hour (gWh), respectively. The analysis also showed that the changes in water surface elevations at Folsom Reservoir attributable to the variable storage space operation could increase the amount of energy that local water districts need to operate pumping plants that divert water from the reservoir. Based on the period of record, the average annual increase in required energy was estimated to be 150 megawatts per hour (MWh). The impact on power supply is considered less than significant because losses of hydropower capacity and power generation resulting from operations under the variable storage space flood control diagram would be offset by purchases of replacement capacity and power with funds provided by SAFCA. Local energy costs would be offset by transfer payments from SAFCA to the affected agencies, consistent with current arrangements for interim variable storage space operations.

The variable storage space operation was determined to reduce downstream river levels for all floods less than the 175-year flood (99.43% of all floods). For floods exceeding the 175-year flood, modified operations, in addition to levee improvements on the lower American River were determined to result in a small, less-than-significant, increase in river stages. See Section 4.4, “Hydraulics and Hydrology,” for the results of additional modeling performed for this EIR.

4.1.3.2 WATER QUALITY

Modeling results indicate that reservoir water surface elevation would not be appreciably affected by Folsom reoperation. During spring and summer, when the potential for nuisance algae blooms is highest, average elevations would decrease by a maximum of 1 foot compared to the baseline. The modeling results showed a decrease of more than 5 feet in only 1 month based on the 70-year period of record. The relatively minor changes in water surface elevation would not induce taste and odor problems and would therefore be less than significant.

Combined with reconfiguration of the Folsom Dam temperature shutters, the variable storage space operation was found to have less-than-significant effects on downstream temperatures in the lower American River. Further, reoperation would not result in appreciable changes in the Delta export-to-inflow ratio or the position of X2 and Delta water quality effects would therefore be less than significant.

4.1.3.3 FISH

The analysis of effects of Folsom Dam reoperation on fish concluded that the seasonal changes in storage during some years would not substantially affect the availability of coldwater habitat or adversely affect the primary prey species of coldwater fish. It also concluded that the changes in reservoir storage would result in a minor reduction in the availability of littoral habitat used by juvenile warmwater fish in some months of some years, but that these reductions would not substantially reduce the average annual survival rates of young-of-the-year warmwater fish or increase the probability of potential nest dewatering events during the primary warmwater fish-spawning period. For these reasons, it was determined that the variable storage space operation would have a less-than-significant effect on Folsom Reservoir fisheries.

The analysis further concluded that the operational changes would have less-than-significant or beneficial effects on steelhead, fall-run chinook salmon, striped bass, and American shad downstream of the dam in the lower American River and would have negligible effects on storage levels, and fisheries, in Shasta, Trinity, and Keswick Reservoirs and in the Sacramento River. With regard to splittail in the lower American River, the analysis concluded that shallow water areas used by splittail as spawning habitat would be increased in some years but decreased in more years, but that the overall small reduction resulting from the flow modifications would be offset through an increase in the extent and quality of the riparian habitat available for splittail spawning in the lower American River. The lower American River floodplain habitat enhancements included in SAFCA’s proposed program of funded improvements and described in Section 3.4.7 would provide this offset and are included in SAFCA’s variable storage space operations agreement with Reclamation.

4.1.3.4 VEGETATION

The effects of Folsom Dam reoperation on terrestrial biological resources evaluated resources around Folsom Reservoir and on riparian vegetation downstream on the American River. The analysis found that the changes in flow regime would not affect any sensitive habitats at Folsom Reservoir, would not adversely affect the ability of riparian tree and shrub species to regenerate, and would not adversely affect freshwater marsh along the lower American River.

In addition, potential effects on vegetation from increased inundation associated with increased surcharge storage have also been analyzed by the USACE and the California Reclamation Board (The Reclamation Board) (2001) and the USACE, SAFCA, and The Reclamation Board (2002). Both analyses concluded that the frequency and

duration of extended inundation periods would be within the tolerance limits of natural vegetation communities and that no substantial increase in mortality or decrease in vigor of natural vegetation is expected to result from this program component. No substantial changes in the proposed project, no substantial changes with respect to the circumstances under which the project would be undertaken, and no new information of substantial importance implicate new significant effects on the environment with respect to this issue. Therefore, this conclusion remains valid and is also relied on in this EIR.

4.1.3.5 RECREATION

The hydrologic modeling was used to compare reservoir water surface elevations under the proposed variable storage space operation with baseline conditions and determine potential effects on water-dependent and water-enhanced recreation opportunities. The model results indicate that the maximum change in water surface elevation during May, June, and July was estimated to be 0.3 foot. For August and September, the model results showed water surface elevations below optimal conditions but essentially the same as under the baseline. River flows below Nimbus Dam were found to be very similar to the baseline conditions. Therefore, recreation impacts were found to be less than significant.

4.1.3.6 VISUAL RESOURCES

Although variable storage space operations may result in longer or more frequent periods of reduced water levels at Folsom Reservoir, the magnitude of the fluctuations in the water surface level would not be substantially different from the magnitude of fluctuations under baseline conditions. Because the modified operation would not change the visual character or degrade the quality of views of Folsom Reservoir, the impact on visual resources would be less than significant.

4.1.3.7 CULTURAL RESOURCES

Cultural resources located within the drawdown zone of Folsom Reservoir are currently subject to damaging natural processes and human activities but may still contain viable research data. Implementing the permanent variable storage space operation could expose existing sites in the shoreline elevation range to longer and more frequent inundation periods. The evaluation of water surface elevation changes at Folsom Reservoir indicated that effects on cultural resources resulting from water-level fluctuations in the zone between 380 feet and 430 feet could be significant. SAFCA and Reclamation agreed to cooperate with the State Office of Historic Preservation to ensure compliance with the National Historic Preservation Act in the form of development and implementation of a research design for inventory, evaluation, data recovery, and/or protection of archaeological resources that may be affected by Folsom reoperation.

4.1.4 SECTION CONTENTS AND DEFINITION OF TERMS

For the reasons explained in Section 1.4, “Scope of the Programmatic Analysis in Volume I,” SAFCA determined during initial project scoping that the proposed project would not result in significant environmental effects related to mineral resources and population and housing. Consequently, these subjects are not addressed in this chapter. Chapter 4 addresses the following resource topics:

- ▶ Section 4.2, Agriculture and Land Use
- ▶ Section 4.3, Geology and Soils
- ▶ Section 4.4, Hydrology and Hydraulics
- ▶ Section 4.5, Water Quality
- ▶ Section 4.6, Fisheries and Aquatic Resources
- ▶ Section 4.7, Terrestrial Biological Resources
- ▶ Section 4.8, Cultural Resources
- ▶ Section 4.9, Paleontological Resources

- ▶ Section 4.10, Transportation and Circulation
- ▶ Section 4.11, Air Quality
- ▶ Section 4.12, Noise
- ▶ Section 4.13, Recreation
- ▶ Section 4.14, Visual Resources
- ▶ Section 4.15, Utilities and Service Systems
- ▶ Section 4.16, Hazards and Hazardous Materials

Sections 4.2 through 4.16 follow the same general format:

“Regulatory Setting” identifies the plans, policies, laws, and regulations that are relevant to the topic. Federal funding would be used for many of the individual projects that SAFCA would fund in part through the proposed funding mechanisms, and several projects would be implemented by the USACE and/or Reclamation, making these projects subject to several federal laws and regulations, including but not limited to NEPA, the Clean Water Act, and the National Historic Preservation Act. Hence, applicable federal laws and regulations are described in addition to state and local requirements.

“Environmental Setting” provides an overview of the existing physical conditions in the project area at the time the notice of preparation was published that could be affected by implementation of the proposed project.

“Environmental Impacts” identifies the direct and indirect impacts of the proposed project on the environment, in accordance with State CEQA Guidelines Sections 15125 and 15143. The significance criteria (sometimes called “thresholds of significance”) used in this EIR are based on the checklist presented in Appendix G of the State CEQA Guidelines; best available data; and regulatory standards of federal, state, and local agencies. The level of each impact is determined by comparing the effects of the proposed project to the environmental setting.

“Mitigation Measures” describes the measures proposed to avoid, minimize, rectify, reduce, or compensate for significant impacts of the project, in accordance with the State CEQA Guidelines (Section 15126.4). Each identified mitigation measure is labeled numerically to correspond with the number of the impact that would be mitigated by the measure. The EIR must describe any feasible measures that could minimize significant adverse impacts, and the measures are to be fully enforceable through incorporation into the project (Public Resources Code Section 21081.6[b]). Mitigation measures are not required for effects that are found to be less than significant.

Where sufficient feasible mitigation is not available to reduce impacts to a less-than-significant level, the impacts are identified as remaining “significant and unavoidable.”

Most components of the proposed project would be implemented by the USACE and The Reclamation Board. The Folsom Bridge project would be implemented by the USACE and the City of Folsom. The Natomas levee improvements and floodplain preservation through easement acquisition would be implemented by SAFCA. The levee integrity program would be implemented in part by SAFCA. Where SAFCA is the implementing agency, SAFCA shall implement the listed mitigation measures. Where SAFCA is not the implementing agency, the mitigation measures have been adopted, or can and should be adopted, by the implementing agencies.

4.2 AGRICULTURE AND LAND USE

This section addresses the effects of components of the proposed project on agricultural land uses, and also addresses consistency of the project with existing land uses in the program study area and with policies intended to express the planning goals of applicable jurisdictions.

4.2.1 REGULATORY SETTING

4.2.1.1 FEDERAL

Farmland Protection Policy Act of 1981

The Farmland Protection Policy Act (FPPA) is intended to minimize the impact of federal programs with respect to the conversion of farmland to nonagricultural uses. It ensures that, to the extent possible, federal programs are administered to be compatible with state, local, and private programs and policies to protect farmland. The Natural Resources Conservation Service (NRCS) is the agency primarily responsible for implementing the FPPA.

The FPPA established the Farmland Protection Program (FPP) and the Land Evaluation and Site Assessment (LESA) system, which are discussed below in further detail. The NRCS administers the FPP, which is a voluntary program that provides funds to help purchase development rights to keep productive farmland in agricultural uses. The program provides matching funds to state, local, and tribal government entities and nongovernmental organizations with existing farmland protection programs to purchase conservation easements. Participating landowners agree not to convert the land to nonagricultural uses and retain all rights to the property for future agriculture. A minimum 30-year term is required for conservation easements, and priority is given to applications with perpetual easements. NRCS provides up to 50% of the fair market value of the easement (NRCS 2006).

The LESA system is a tool used to rank lands for suitability and inclusion in the FPP. LESA evaluates several factors, including soil potential for agriculture, location, market access, and adjacent land use. These factors are used to rank land parcels for inclusion in the FPP based on local resource evaluation and site considerations (NRCS 2006).

4.2.1.2 STATE

California Important Farmland Inventory System and Farmland Mapping and Monitoring Program

The California Department of Conservation, Office of Land Conservation, maintains a statewide inventory of farmlands. These lands are mapped by the Division of Land Resource Protection as part of the Farmland Mapping and Monitoring Program (FMMP). The maps are updated every 2 years with the use of aerial photographs, a computer mapping system, public review, and field reconnaissance. Farmlands are divided into the following five categories based on their suitability for agriculture:

- ▶ **Prime Farmland**—land that has the best combination of physical and chemical characteristics for crop production. It has the soil quality, growing season, and moisture supply needed to produce sustained high yields of crops when treated and managed.
- ▶ **Farmland of Statewide Importance**—land other than Prime Farmland that has a good combination of physical and chemical characteristics for crop production.
- ▶ **Unique Farmland**—land that does not meet the criteria for Prime Farmland or Farmland of Statewide Importance, but has been used for the production of specific crops with high economic value.

- ▶ **Farmland of Local Importance**—land that is either currently producing crops or has the capability of production, but does not meet the criteria of the categories above.
- ▶ **Grazing Land**—land on which the vegetation is suited to the grazing of livestock.

Other categories used in the FMMP mapping system are “urban and built-up lands,” “lands committed to nonagricultural use,” and “other lands” (land that does not meet the criteria of any of the other categories).

Williamson Act Contracts

The California Land Conservation Act of 1965, commonly known as the Williamson Act, enables local governments to enter into contracts with private landowners for the purpose of promoting the continued use of the relevant land in agricultural or related open space use. In return, landowners receive property tax assessments that are based on farming and open space uses instead of full market value. Local governments receive an annual subvention (subsidy) of forgone property tax revenues from the state via the Open Space Subvention Act of 1971.

The Williamson Act empowers local governments to establish “agricultural preserves” consisting of lands devoted to agricultural uses and other uses compatible therewith. Upon establishment of such preserves, the locality may offer to owners of included agricultural land the opportunity to enter into annually renewable contracts that restrict the land to agricultural use for at least 10 years (i.e., the contract continues to run for 10 years following the first date upon which the contract is not renewed). In return, the landowner is guaranteed a relatively stable tax rate, based on the value of the land for agricultural/open space use only and unaffected by its development potential.

Cancellation of a Williamson Act contract involves an extensive review and approval process, in addition to payment of fees of up to 12.5% of the property value. The local jurisdiction approving the cancellation must find that the cancellation is consistent with the purpose of the California Land Conservation Act or is in the public interest. Several subfindings must be made to support either finding, as defined in California Government Code Section 51282.

4.2.1.3 GENERAL PLANS AND LAND USE PLANS

The land use diagrams in the general plans assign land use designations, which define appropriate land uses in the designated areas. The zoning codes are used to implement the policies and provisions of the general plans of the different jurisdictions. Flood control works are consistent with the general plans’ designated land uses. The general plans that pertain to the program study area contain land use goals and policies intended to guide development and discourage incompatible land uses.

Sacramento County General Plan

The *Agricultural Element of the Sacramento County General Plan* (Sacramento County 1993) describes the goals of this element as the challenge of “maintenance of the County’s agricultural lands, [and] their agricultural productivity....” The following objective and policies may be relevant to this analysis.

Objective: Retain agricultural land holdings in units large enough to guarantee future and continued agricultural use.

Policy AG-7. Agricultural zoning district boundaries shall be rational and shall respect parcel boundaries.

Policy AG-8. Agricultural land divisions shall not adversely affect the integrity of agricultural pursuits. Agricultural land divisions may be denied if the reviewing authority finds that the division of land is likely to create circumstances inconsistent with this policy.

Sutter County General Plan

The Land Use Element of the *Sutter County General Plan* (Sutter County 1996) designates the proposed general distribution, location, and extent of all uses of land, including land for agriculture and includes the following agricultural resource goal and policy that may be relevant to this analysis.

Goal 6.A. To preserve high quality agricultural land for agricultural purposes.

Policy 6.B-3. The County shall encourage the continued operation and expansion of existing agricultural industries.

Sacramento International Airport and Sacramento Executive Airport Comprehensive Land Use Plans

Some flood control improvement projects in the Natomas area and in the South Sacramento Streams Group (SSSG) area could be located within the “Influence Area” of Sacramento International Airport and Sacramento Executive Airport, respectively (SACOG 2006a, 2006b). Both airports have adopted comprehensive land use plans (CLUPs) that include policies to protect public health, safety, and welfare through the adoption of land use standards that minimize the public’s exposure to safety hazards and excessive levels of noise, and prevent the encroachment of incompatible land uses around public-use airports.

Natomas Basin Habitat Conservation Plan

The Natomas Basin Habitat Conservation Plan (NBHCP) (City of Sacramento, Sutter County, and The Natomas Basin Conservancy [TNBC] 2003) was developed to promote biological conservation in conjunction with economic and urban development in the Natomas area. The NBHCP establishes a multi-species conservation program to minimize and mitigate the expected loss of habitat values and incidental take of “covered species” that could result from urban development and operation and maintenance of irrigation and drainage systems. Mitigation lands established in the Natomas area in accordance with the NBHCP are managed by TNBC. The NBHCP is described in Section 4.7, “Terrestrial Biological Resources.”

American River Parkway Plan

The American River Parkway Plan was produced in 1962. The plan was revised in 1968 and again in 1976, with significant public input. The plan calls for evaluation and revision, if necessary, every 5 years. The current version of the American River Parkway Plan was adopted in 1985 by the Sacramento County Board of Supervisors, the Sacramento City Council, and the California Legislature. The goals of the plan are to:

- ▶ provide, protect, and enhance for public use a continuous open space greenbelt extending from the Sacramento River to the Sierra Nevada;
- ▶ provide appropriate access and facilities so present and future generations can enjoy the amenities and resources of the parkway;
- ▶ preserve, protect, interpret, and improve the natural, archaeological, historical, and recreational resources of the parkway, including an adequate flow of high-quality water, anadromous and resident fisheries, migratory and resident wildlife habitat, and diverse natural vegetation; and
- ▶ mitigate adverse effects of activities and facilities adjacent to the parkway.

The policies establish that the purpose and need for a project affecting the parkway must be approved by the Sacramento County Board of Supervisors. The Urban American River Parkway Act specifies that all “[a]ctions of state and local agencies with regard to land use decisions shall be consistent with the American River Parkway

Plan. (Pub. Res. Code § 5842[b].) This requirement, however, is subject to the provision that the Act is not to be construed to impair the authority and responsibilities of state or local public agencies in maintaining and operating the flood control channel, levees, and pump stations, except that these operations, “as nearly as practicable,” must be consistent with the Parkway Plan. (Pub. Res. Code § 5842[b][1].)

The parkway plan contains the following policies and standards that may apply to this project.

Policies

Policy 1.2	Development in the Parkway shall be minimal, and to the extent possible, shall not occur in areas of natural ecosystems that are still relatively undisturbed.
Policy 2.1	Any development within the Parkway shall be designed and located so as to minimize impacts upon native vegetation, and appropriate mitigation measures shall be incorporated into the project.
Policy 2.4	Protection of the environmental quality of the Parkway shall be the first priority management responsibility.
Policy 2.6	Where appropriate, damaged areas within the Parkway should be reclaimed for recreational use or restored to a naturalistic condition, consistent with the Plan’s designated land use categories.
Policy 3.4	Levee protection and slope stabilization methods are allowed within the Parkway only where the Board of Supervisors determines that there is a demonstrated need to protect the health, safety, and welfare of the community. These methods shall result in minimal damage to riparian vegetation and wildlife.
Policy 3.4.1	Levee protection and slope stabilization projects shall include a revegetation program which screens the project from view and assures a naturalistic appearance.
Policy 3.4.2	Erosion control programs shall contain measures to minimize damage to riparian vegetation and wildlife. Riprap shall not be used unless slope, current, and vegetation conditions will provide substantial vegetative screening.
Policy 6.4	Levees should be used to separate the Parkway visually and functionally from adjoining land uses.
Policies 10.1 and 10.2	All planning activities, uses, and facilities in the Parkway shall be compatible with the goals and policies of the Plan.

Standards

- ▶ Specific erosion control standards require minimizing damage to native plants, riparian vegetation and wildlife and re-vegetating and screening levee and bank stabilization projects.
- ▶ Vegetation is preferred as an erosion control method, and other methods, including the use of engineered rock rip rap, are to be avoided unless they are both necessary and can be screened from view.

Folsom State Recreation Area General Plan

The Folsom State Recreation Area General Plan, developed by the California Department of Parks and Recreation (DPR), guides land use activities in the Folsom Lake State Recreation Area, which includes the Auburn Dam area, Folsom Reservoir, and Lake Natoma. The overall goal of the general plan is to provide open space and

improved recreation opportunities. The DPR planning process is integrated with Reclamation's resource management planning process. DPR and Reclamation are currently developing an integrated Folsom Lake State Recreation Area (FLSRA) General Plan and Resource Management Plan Update to meet the requirements of both agencies' planning processes. The integrated plan is intended to provide for the protection of natural and cultural resources, provide for and manage recreational opportunities, and outline the future development of public facilities.

Dry Creek Parkway Master Plan

The Dry Creek Parkway Master Plan, adopted and developed by Sacramento County, guides land use activities in the Dry Creek Parkway in Sacramento County. The overall goal of the master plan is to enhance recreation opportunities in the county.

4.2.2 ENVIRONMENTAL SETTING

4.2.2.1 FOLSOM DAM AND RESERVOIR AREA

Folsom Reservoir was created for flood control, water storage, and power generation and is operated by the U.S. Department of the Interior, Bureau of Reclamation (Reclamation). The land surrounding Folsom Dam and Reservoir is mostly federally owned land designated for recreational and flood control use and is managed by DPR through an agreement with Reclamation as part of the FLSRA. The FLSRA consists mostly of open space and extends 19 miles from the downstream side of Auburn to Nimbus Dam. It encompasses Folsom Dam and Reservoir, the lowest reaches of the North and South Forks of the American River, and Lake Natoma.

Folsom Dam and the southernmost portion of Folsom Reservoir are in Sacramento County. Above the Sacramento County line, the western portion of the reservoir is in Placer County, and the eastern portion is in El Dorado County (Exhibit 3-3). Folsom Dam is within the city limits of the City of Folsom, and the American River flows from Folsom Reservoir through the City of Folsom to Lake Natoma. The unincorporated communities of Granite Bay, Horseshoe Bar, Penryn, and Newcastle are adjacent to Folsom Lake in Placer County. The designated land uses for most of the lands in Placer County adjacent to Folsom Reservoir are rural residential and urban residential. In El Dorado County, designated land uses adjacent to the reservoir include residential, tourist recreational, and commercial.

Some agricultural lands classified as Farmland of Local Importance by the FMMP are present along the North and South Forks of the American River. These lands would not be affected by activities that would receive local funding generated through the proposed funding mechanisms and therefore are not discussed further in this document. Land adjacent to Dikes 7 and 8 and the Mormon Island Auxiliary Dam is classified by the FMMP as grazing land.

4.2.2.2 LOWER AMERICAN RIVER AREA

Between Folsom Dam and the confluence with the Sacramento River, the lower American River is bordered by the American River Parkway (Exhibit 3-2). The parkway is flanked by homes and businesses along the riverbanks and levees. Most of the Sacramento River below the confluence with the American River to Freeport is flanked by urban and residential uses. No Prime Farmland, Unique Farmland, or Farmland of Statewide Importance is designated along the Sacramento River levee in this area, except for a single, small parcel of Unique Farmland near Folsom Dam (California Department of Conservation 2006).

4.2.2.3 NATOMAS AREA

The Natomas area is in both Sacramento and Sutter Counties, and a portion is within the City of Sacramento (Exhibit 3-2). The Natomas area is the location of extensive recent development and planned and proposed new

business and residential development in both counties. The southern part of the area contains mostly urban commercial and residential land uses within the City of Sacramento. Suburban residential developments back up to the land side of the Sacramento River east levee upstream of the confluence with the American River until about San Juan Road. Farther north are many scattered rural residences and farms, and scattered residences line much of the water side of the Garden Highway from the City of Sacramento to north of the airport.

Much of the farmland in the Natomas area is designated by the FMMP as Prime Farmland and Farmland of Statewide Importance (California Department of Conservation 2006).

4.2.2.4 SOUTH SACRAMENTO STREAMS GROUP AREA

The northern portion of the SSSG area is within the city limits of the City of Sacramento, and the remainder is in unincorporated Sacramento County. Land uses include residential, commercial, light industrial, college, wastewater treatment plant, railroad, agricultural, and vacant land. There are scattered parcels of Prime Farmland, Unique Farmland, and Farmland of Statewide Importance in the SSSG area (California Department of Conservation 2006).

4.2.2.5 NORTH SACRAMENTO AREA

The North Sacramento Streams Group (NSSG) channels, in the north part of the City of Sacramento, are surrounded by residential, commercial, and open space uses. There are several parcels of Prime Farmland in the NSSG vicinity (California Department of Conservation 2006).

4.2.3 ENVIRONMENTAL IMPACTS

4.2.3.1 SIGNIFICANCE CRITERIA

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. The proposed project was determined to result in a significant effect on agricultural resources or land use planning if it would:

- ▶ physically divide an established community;
- ▶ conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect;
- ▶ conflict with any applicable habitat conservation plan or natural community conservation plan;
- ▶ conflict with existing zoning for agricultural use or a Williamson Act contract; or
- ▶ convert or result in the conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to nonagricultural uses.

The proposed funding mechanisms would contribute the local share to flood control improvements at Folsom Dam, the construction of Folsom Bridge to facilitate travel between parts of the City of Folsom, improvements to existing levees and streambanks in the Sacramento area, habitat improvements within the American River Parkway, and the acquisition of easements in rural floodplains that would maintain those lands in their existing, or similar, uses. Many of the proposed flood control improvements consist of projects located near residential areas (e.g., SSSG and NSSG areas), but none would create a new division through any community or residential cluster. Therefore, no impacts related to the physical division of communities would result from implementation the proposed project, and this issue is not discussed further.

The threshold related to Williamson Act contracts is not relevant to this analysis because Williamson Act contracts are deemed null and void when Williamson Act land is acquired for a public improvement by a public agency (Government Code Section 51295).

See Section 4.7, “Terrestrial Biological Resources,” for the analysis of consistency of the proposed project with the NBHCP. That analysis concludes that, with mitigation, no inconsistency would result from implementation of the proposed project.

4.2.3.2 IMPACT ANALYSIS

IMPACT 4.2-a **Conflicts with Land Use Plans and Policies.** *The proposed project would not conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect. This impact would be less than significant.*

The Folsom Dam modifications and associated borrow activities would take place on federal land within the FLSRA. These activities would be consistent with the flood control purpose of the dam and reservoir facility and would not conflict with applicable land use plans or policies. Folsom Bridge construction would not change any land uses or result in a land use conflict. Individual flood control projects along the lower American River, such as reconstruction of the levee upstream of the Mayhew Drain, could encroach on American River Parkway land and cause permanent loss of recreational and natural resource values; however, the parkway plan allows for the authority of local agencies to maintain and operate flood control works as long as these actions are consistent with the plan “as nearly as practicable.” As described in Section 4.13, “Recreation,” mitigation would be required to compensate for encroachments on parkway land. Some levee and channel improvement projects in the Natomas and SSSG areas would be located within the Influence Area of Sacramento International Airport and Sacramento Executive Airport, but the flood control improvements within these areas would not modify land uses within those areas or include components, such as the creation of water features that could attract waterfowl and thereby introduce hazards into these areas. Some projects along the Sacramento River and the Natomas Cross Canal would result in a widened landside levee and berm footprint, removing edges of agricultural parcels from agricultural use in some locations; however, these edge conversions are not expected to conflict with the goals or policies of Sacramento and Sutter Counties intended to retain agricultural land holdings in units large enough to guarantee future and continued agricultural use and to preserve high-quality agricultural land for agricultural purposes. Furthermore, these flood control improvements of flood control facilities along river and stream channels would be consistent with the community flood protection goals of the jurisdictions in which they would take place. The proposed project would not conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect. This impact would be less than significant.

IMPACT 4.2-b **Conversion of Important Farmland to Nonagricultural Uses.** *Landside levee widening, construction of new or expanded landside berms, excavation of borrow sites, or the creation of mitigation features for impacts on biological species or sensitive habitats could convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to nonagricultural uses. This impact would be significant.*

Seepage remediation projects implemented as part of SAFCA’s program of improvements are likely to include wide landside berms in some locations where they could encroach on lands classified by the FMMP as Prime or Unique Farmland or Farmland of Statewide Importance. Levee crown raises, requiring landside widening of levees would also be undertaken in many locations where the levee footprint could encroach onto such lands. Relief wells may need to be installed in some locations with these FMMP designations, removing edges of fields from agricultural use. Substantial amounts of borrow material will be required for the anticipated levee improvements, and borrow sites may need to be developed on lands that have been in productive agricultural use. Additionally, construction activities are likely to result in effects on sensitive biological resources, potentially requiring the development of mitigation lands and possibly converting parcels that have been in active agricultural

use to nonagricultural use for this purpose. An estimated total of 500 acres of agricultural land may be converted to nonagricultural uses under the proposed project. This impact would be significant.

4.2.4 MITIGATION MEASURES

No mitigation is required for Impact 4.2-a (conflicts with plans and policies). Mitigation is described below for Impact 4.2-b (conversion of farmland).

Mitigation Measure 4.2-b for Conversion of Important Farmland to Nonagricultural Uses: Minimize Important Farmland Conversion to the Extent Practicable and Feasible.

The agencies implementing program components shall ensure that the following measures are implemented with regard to Prime Farmland, Unique Farmland, and Farmland of Statewide Importance to minimize impacts on these lands.

- a) Sites for borrow excavation shall be configured to minimize the fragmentation of lands that are to remain in agricultural use. Contiguous parcels of agricultural land of sufficient size to support their efficient use for continued agricultural production shall be retained to the extent practicable and feasible.
- b) To the extent practicable and feasible, when expanding the footprint of a flood control facility (e.g., levee or berm) onto agricultural land, the most productive topsoil from the construction footprint shall be salvaged and redistributed to less productive agricultural lands in the vicinity of the construction area that could benefit from the introduction of good-quality soil. By agreement between the implementing agencies or landowners of affected properties and the recipient(s) of the topsoil, the recipient(s) would be required to use the topsoil for agricultural purposes.
- c) Use during project construction of utilities that are needed for agricultural uses (including wells, pipelines, and power lines) and of agricultural drainage systems shall be minimized so that agricultural uses are not disrupted.
- d) Disturbance of agricultural land and agricultural operations during construction shall be minimized by locating construction staging areas on sites that are fallow, that are already developed or disturbed, or that are to be discontinued for use as agricultural land, and by using existing roads to access construction areas to the extent possible.
- e) To the extent feasible, joint mitigation shall be pursued to use lands acquired for flood control purposes as mitigation land for NBHCP programs so that agricultural land conversion is minimized.
- f) Rural floodplain easements shall be acquired at a 1 to 1 ratio of acreage on which easements are acquired to acreage of Prime Farmland, Unique Farmland, and Farmland of Statewide Importance, and the lands on which the easements are acquired shall be maintained in agricultural use.

Implementing this mitigation measure would reduce potential for impacts on Prime Farmland, Unique Farmland, and Farmland of Statewide Importance, but would not reduce the impact to a less-than-significant level because conversion of Important Farmland could still occur.

4.3 GEOLOGY AND SOILS

This section addresses issues related to geologic hazards, specifically seismicity and soil erosion. The loss of agriculturally productive topsoil through agricultural land conversion is addressed in Section 4.2, “Agriculture and Land Use.” Water quality effects of erosion are discussed in Section 4.5, “Water Quality.” Paleontological resources and unique geological features are addressed in Section 4.9, “Paleontological Resources.” Exposure to hazards through the disturbance of geologic units containing naturally occurring asbestos, serpentine, or ultramafic rock are addressed in Section 4.11, “Air Quality.”

4.3.1 REGULATORY SETTING

4.3.1.1 EARTHQUAKE HAZARDS

The Alquist-Priolo Earthquake Fault Zoning Act (Public Resources Code Section 2621 et seq.) was passed by the California Legislature to prevent the construction of buildings used for human occupancy on the surface trace of active faults. Local agencies must regulate most development in fault zones established by the State Geologist known as Alquist-Priolo Earthquake Fault Zones. The California Seismic Hazards Mapping Act of 1990 (Public Resources Code Sections 2690–2699.6) addresses the exposure of development to seismic hazards other than surface rupture, such as liquefaction and induced landslides, and authorizes a lead agency for a project to withhold development permits until geologic or soils investigations are conducted for specific sites and mitigation measures are incorporated into plans to reduce hazards associated with seismicity and unstable soils. SAFCA’s proposed improvements would not entail the construction of buildings for human occupancy. Therefore, these laws are not applicable to the proposed project.

4.3.1.2 SOIL EROSION

For a levee to be recognized by the Federal Emergency Management Agency (FEMA) as providing a “100-year” level of flood protection, the levee must be shown to satisfy several criteria, including embankment protection against erosion. Specific requirements are contained in Code of Federal Regulations (CFR), Title, 44, Section 65.10.

Construction-generated erosion is regulated under the federal Clean Water Act (CWA) and under local grading ordinances. The State Water Resources Control Board (SWRCB) and the Regional Water Quality Control Boards (RWQCBs) regulate discharges of waste into the waters of the state through National Pollutant Discharge Elimination System (NPDES) permits, which are authorized under Section 402 of the federal CWA. NPDES stormwater permits apply to general ground-disturbing construction activities that would disturb more than 1 acre, including clearing, grading, excavation, and reconstruction of existing facilities. The NPDES permitting process and other regulatory requirements for the protection of water quality are described in Section 4.5, “Water Quality.”

The state Surface Mining and Reclamation Act of 1975 (Public Resources Code Section 2710 et seq.) (SMARA) addresses surface mining of minerals and requires mitigation to reduce adverse impacts on public health, property, and the environment. SMARA applies to an individual or entity that would disturb more than 1 acre or remove more than 1,000 cubic yards of material through surface mining activities, including the excavation of borrow pits for soil material. The U.S. Army Corps of Engineers (USACE) and the California Reclamation Board (The Reclamation Board) are not subject to SMARA requirements. SMARA is implemented through ordinances for permitting developed by local government “lead agencies” that provide the regulatory framework under which local mining and reclamation activities are conducted. The State Mining and Geology Board reviews the local ordinances to ensure that they meet the procedures established by SMARA. The general process consists of obtaining a permit to mine material, implementing a reclamation plan to return the land to a useable condition, and providing financial assurances to ensure the feasibility of the reclamation plan. The process of reclamation includes maintaining water and air quality and minimizing flooding, erosion, and damage to wildlife and aquatic

habitats caused by surface mining. The final step in this process is often topsoil replacement and revegetation with suitable plant species.

4.3.2 ENVIRONMENTAL SETTING

4.3.2.1 GEOLOGY

The Folsom Dam and Reservoir area and the lower American River are situated in the lower portion of the American River basin, which straddles the margin between the Sacramento Valley and the Sierra Nevada Foothills section of the Sierra Nevada Geomorphic Province. A geomorphic province consists of an area of similar geologic origin and erosional/depositional history. The Sierra Nevada represents the core of an ancient chain of volcanoes exhumed by faulting and dissected by erosion. The lower portion of the American River basin lies primarily within the Foothills Metamorphic Belt, which consists of volcanic and sedimentary rocks that have undergone varying degrees of regional metamorphism. These metavolcanic and metasedimentary strata are as much as several hundred million years old. Igneous, metamorphic, and sedimentary rock types are present in the Folsom Dam and Reservoir area. The four major rock types in the area are ultramafic intrusive rocks, metamorphics, granodiorite intrusive rocks, and volcanic mudflows and alluvial deposits. Ultramafic rock contains naturally occurring asbestos.

The western portion of the program study area lies largely in the Sacramento Valley portion of the Great Valley Geomorphic Province. The Great Valley is a large valley trending northwest-southeast that is bounded by the Sierra Nevada to the east and south, the Coast Ranges to the west, and the Klamath Mountains to the north. The Great Valley is drained by the Sacramento and San Joaquin Rivers, which join and flow out of the Great Valley province through San Francisco Bay. This geomorphic province is an asymmetric trough approximately 400 miles long and 50 miles wide that is characterized by a relatively flat alluvial plain made up of a deep sequence of sediment deposits from Jurassic (180 million years ago) to recent age. The sediments in the Great Valley vary between 3 and 6 miles in thickness and were derived primarily from erosion of the Sierra Nevada to the east, with lesser material from the Coast Ranges to the west. The eastern edge of the Sacramento Valley is flanked by uplifted and tilted sedimentary strata that overlie rocks of the Foothills Metamorphic Belt and are in turn overlain on the west by younger alluvium.

The Sacramento Valley has been a depositional basin throughout most of the late Mesozoic and Cenozoic time. A vast accumulation of sediments was deposited during cyclic transgressions and regressions of a shallow sea that once inundated the valley. Overlying the thick sequence of sedimentary rock units that form the deeply buried bedrock units in the mid-basin areas of the valley are Late Pleistocene and Holocene (Recent) alluvial deposits, consisting of reworked fan and stream materials that were deposited by streams prior to the construction of the existing flood control systems. The youngest geomorphic features in the program study area are low floodplains, which are found primarily along the Sacramento and American Rivers. The natural floodplains of these rivers are very wide in this area because the land is relatively flat. These major drainage ways were originally confined within broad natural levees sloping away from the rivers or streams. The natural levees formed through the deposition of alluvium during periods of flooding. As flood waters lost energy, the coarser materials settled out nearest the rivers and streams, forming the natural levees and sand bars in the vicinity of the river channel. The finer material was carried in suspension farther from the rivers or streams, and settled out in quiet water areas such as swales, abandoned meander channels, and lakes. However, because the streams have meandered and reworked the previously deposited sediments, extreme variations in material types may be found over a limited distance or depth.

Flanking the Recent alluvial deposits in the program study area are late Pleistocene alluvial fan and terrace deposits of the Modesto and Riverbank Formations (Helley and Harwood 1985). Stream terrace deposits, mapped as the Modesto Formation, are higher in elevation and older than floodplain sediments. Before the construction of the existing levees, these stream terraces were occasionally flooded, but only small amounts of sediment were

deposited during flood events. The lower fan terraces of the Riverbank Formation are higher in elevation and older than stream terraces, and were only rarely flooded.

4.3.2.2 SEISMICITY

The program study area has experienced relatively low seismic activity in the past and does not contain any Alquist-Priolo Earthquake Fault Zones (California Geological Survey 1999, Hart and Bryant 1999).

The Folsom Dam and Reservoir area is in the Foothills Fault system, which is located in the metamorphic belt. This system consists of northwest-trending vertical faults and is divided into two zones, the Western Melones Fault zone and the Western Bear Mountain Fault zone. The west trace of the Bear Mountain Fault zone transects the upper reaches of the North Fork arm and crosses the South Fork arm of the reservoir. The last movement of this system occurred 140 million years ago, and the fault is not considered active (USACE and City of Folsom 2006).

Numerous earthquakes of magnitude (M) 5.0 or greater have occurred on regional faults, primarily those within the San Andreas Fault System. The west side of the Central Valley is a seismically active region. The greatest historical amount of ground shaking along the west side of the Sacramento Valley resulted from the April 1892 earthquakes in the vicinity of Vacaville and Winters. The 1892 earthquakes are believed to have been produced by the Coast Range blind thrust fault located along the western margin of the Central Valley. The estimated magnitudes (based on reported intensities) are in the range of M 6.5. For the period 1900–1974, two earthquakes of magnitude M 4.0 and M 4.9 had epicenters just west of (I-5) and north of Highway 20 near Williams (Sutter County 1996). The nearest known active (Holocene or Historic) fault trace to the program study area is the Dunnigan Hills fault, approximately 30 miles northwest of downtown Sacramento (Jennings 1994). The Cleveland Hills fault, near Lake Oroville, is mapped approximately 60 miles north of the program study area. The 1975 Oroville earthquake (5.7 Richter magnitude) caused surface rupture on portions of the Cleveland Hills fault. (California Department of Water Resources 1979).

Potential seismic hazards resulting from a nearby moderate to major earthquake can generally be classified as primary and secondary. The primary effect is fault ground rupture, also called surface faulting. Because there are no active faults mapped in the program study area by the California Geological Survey or the U.S. Geological Survey, and the area is not located within an Alquist-Priolo Earthquake Fault Zone, fault ground rupture is unlikely. Common secondary seismic hazards include ground shaking, liquefaction, subsidence, and seiches. These hazards are discussed briefly below:

- ▶ **Ground shaking.** Seismic ground shaking refers to ground motion that results from the release of stored energy during an earthquake. The intensity of ground shaking depends on the distance from the earthquake epicenter to the site, the magnitude of the earthquake, site soil conditions, and the characteristic of the source. The program study area has a relatively low risk of seismic ground shaking (California Geological Survey 2003, Petersen et al. 1996).
- ▶ **Ground failure/liquefaction.** Liquefaction is a process by which water-saturated materials (including soil, sediment, and certain types of volcanic deposits) lose strength and may fail during strong ground shaking, when granular materials are transformed from a solid state into a liquefied state as a result of increased pore-water pressure. Structures on ground that undergoes liquefaction may sink or suffer major structural damage. Liquefaction is most likely to occur in low-lying areas where the substrate consists of poorly consolidated to unconsolidated water-saturated sediments or similar deposits of artificial fill. Liquefaction during an earthquake requires strong shaking continuing for a long period and loose, clean granular materials (particularly sands) that may settle and compact because of the shaking. Evidence of liquefaction may be observed in “sand boils,” which are expulsions of sand and water from below the surface due to increased pore-water pressure below the surface. Areas paralleling the Sacramento River that contain clean sand layers

with low relative densities coinciding with a relatively high water table have generally high liquefaction potential.

- ▶ **Subsidence and settlement.** Subsidence is the gradual settling or sudden sinking of the ground surface resulting from subsurface movement of earth materials. Seismically induced settlement refers to the compaction of soils and alluvium caused by ground shaking. Fine-grained soils are subject to seismic settlement and differential settlement. Areas underlain by low-density silts and clays associated with fluvial depositional environments are susceptible to seismically induced settlement. These environments include old lakes, sloughs, swamps, and streambeds. The amount of settlement may range from a few inches to several feet. The potential for differential settlement is highest and occurs over the largest areas during great earthquakes. A potential for differential settlement exists where low-density and unconsolidated material is encountered, such as overbank river deposits (present day and historical) common along the Sacramento River.
- ▶ **Seismic seiches.** A seiche is an earthquake-induced wave within an enclosed or restricted body of water, such as a lake, reservoir, or channel. Seiches can cause a body of water to overtop and damage levees and dams and may lead to inundation of surrounding areas. While a seiche in the program study area could be damaging, the risk of seiches is low, given the distance from active faults and the anticipated short duration of any seismic ground shaking in the area.

4.3.2.3 SOILS

Published soils data indicated that soils in the Folsom Dam and American River portion of the study area are not subject to structural loss of strength or to excessive shrinking and swelling (SAFCA 2000, USACE and City of Folsom 2006). However, water-saturated alluvium may be subject to liquefaction if exposed to seismic ground shaking.

The Sacramento and Sutter County Soil Surveys (Natural Resources Conservation Service [NRCS] 1988, 1993) identify a variety of soil map units in the valley portion of the study area. Most of the soils on the valley floor are shallow to moderately deep, sloping, well-drained soils with very slowly permeable subsoils underlain with hardpan. These soils have good natural drainage, slow subsoil permeability, and slow runoff (NRCS 1998, 1993).

The Natomas area generally consists of deep soils derived from alluvial sources, which range from low to high permeability rates and low to high shrink-swell potential. Soils range from low to high hazard ratings for construction of roads, buildings, and other structures related to soil bearing strength, shrink-swell potential, and the potential for cave-ins during excavation. Soils immediately adjacent to the Sacramento River are dominated by deep, nearly level, well-drained loamy and sandy soils. The natural drainage is good, and the soils have slow to moderate subsoil permeability. The river terraces consist of very deep, well-drained alluvial soils. (NRCS 1993, 1998.)

4.3.3 ENVIRONMENTAL IMPACTS

Effects associated with geology and soils that could result from project-related activities were evaluated based on expected construction practices, materials used to construct the proposed improvements, general locations, and the nature of proposed operations.

4.3.3.2 SIGNIFICANCE CRITERIA

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. The proposed project was determined to result in a significant effect related to geology and soils if it would:

- ▶ result in substantial soil erosion or the loss of topsoil;
- ▶ expose people or structures to potential substantial adverse impacts, including risk of loss, injury, or death through the rupture of a known earthquake fault, strong seismic shaking, seismic-related ground failure, soil liquefaction, or landslides;
- ▶ locate project facilities on a geologic unit that is unstable, or that would become unstable as a result of the proposed project, and potentially result in on-site or off-site landslide, lateral spreading, subsidence, liquefaction or collapse;
- ▶ locate project facilities on expansive soil, creating substantial risks to property;
- ▶ have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater; or
- ▶ destroy a unique geologic feature.

Landslides are not a concern in relation to the proposed project because the Folsom Dam and Reservoir area has thin soils and slopes are not steep there, and the remainder of the program study area is relatively flat. The proposed improvements would not involve the construction of any structures intended for human occupancy or the construction or modification of any structure in an area subject to seismic ground shaking or seismic-related ground failure. Therefore, the proposed program of improvements would not expose people to potential substantial adverse effects, including the risk of loss, injury, or death, involving rupture of a known earthquake fault, strong seismic ground shaking, seismic-related ground failure, or landslides.

All flood control facility construction or modification conducted as part of the proposed program of improvements would be designed based on the results of detailed geotechnical engineering studies and would be required to comply with standard engineering practices for levee and dam design. The Reclamation Board standards are the primary state standards applicable to program levee improvements; these are stated in Title 23, Division 1, Article 8, Sections 111–137 of the California Code of Regulations. The Reclamation Board standards direct that levee design and construction be in accordance with *Engineering Design and Construction of Levees* (USACE 2000), the primary federal standard applicable to levee improvements. The USACE, the U. S Department of the Interior, Bureau of Reclamation, and the California Division of Safety of Dams criteria govern the design and construction of dams. Because the design and construction of flood control improvements and maintenance of the facilities must comply with the regulatory standards of these agencies, it is assumed that the design and construction of all modifications to the flood control system under the proposed project would meet or exceed applicable design standards for static and dynamic stability, secondary effects related to ground shaking, and seepage.

Because the individual flood control projects would not involve the use of wastewater disposal systems of any kind, there would be no impact related to the ability of project site soils to support the use of septic systems. Therefore, these issues are not addressed further in this EIR.

There are no unique geologic features in the program study area. Therefore, the individual flood control projects would not destroy such features and this issue is not discussed further in this EIR.

4.3.3.3 IMPACT ANALYSIS

IMPACT 4.3-a Potential Temporary, Short-Term Construction-Related Erosion. *Ground-disturbing activities associated with construction of improvements included in the proposed program could result in substantial soil erosion and loss of topsoil at construction, habitat improvement, and borrow sites. This potential impact would be significant.*

Project implementation would include substantial construction activity over large areas, and would include excavation for the new Folsom Dam auxiliary spillway, soil removal for borrow, trenching, construction of earthen berms, levee crown degradation and reconstruction for cutoff wall installation, grading, and other ground-disturbing activities. These activities would result in the temporary disturbance of soil and could expose disturbed areas to winter storm events. Rainfall of sufficient intensity could dislodge soil particles from the soil surface. Once particles are dislodged and the storm is large enough to generate runoff, substantial localized erosion could occur. In addition, soil disturbance during the summer months could result in substantial loss of topsoil because of wind erosion. The potential for substantial erosion or loss of topsoil during construction would be a significant impact.

4.3.4 MITIGATION MEASURES

Mitigation Measure 4.3-a for Potential Temporary, Short-Term Construction-Related Erosion: Implement Standard Best Management Practices (BMPs), Prepare and Implement a Stormwater Pollution Prevention Plan (SWPPP), and Comply with National Pollutant Discharge Elimination System (NPDES) Permit Conditions.

This measure is the same as Mitigation Measure 4.5-a in Section 4.5, “Water Quality.” See the description in that section. Implementing this mitigation measure would reduce potential soil erosion impacts to a less-than-significant level.

4.4 HYDROLOGY AND HYDRAULICS

This section addresses seasonal flooding and flood management as defining elements of the physical environment in the project area and evaluates the effects of SAFCA's proposed program of improvements on these elements.

4.4.1 REGULATORY SETTING

4.4.1.1 FEDERAL

The federal government, primarily through the USACE, has played a major role in shaping flood management policies and regulations affecting the Sacramento River drainage basin. In the latter part of the 19th century, lacking any specific flood control authority, the USACE influenced Sacramento River planning and management activities through its authority to facilitate navigation of the nation's waterways. The major issue affecting the river during this period was hydraulic mining, which generated enormous discharges of sediment into the lower Sacramento, Feather, Yuba, and American Rivers. Once this mining activity was declared a nuisance and halted by the California courts, the USACE participated in designing and constructing debris dams and other works designed to prevent hydraulic mining sediment from clogging the rivers.

In the 20th century, the federal government played an increasingly central role in flood management activities in the Sacramento River drainage basin based on a series of federal laws, including the Flood Control Acts of 1917, 1928, 1936, and 1944, under which Congress gave the USACE specific authority to participate with the State of California and local agencies in planning and constructing the SRFCP. The SRFCP is the comprehensive system of levees, bypass channels, and multipurpose dams that was initially conceived by state engineers to prevent a recurrence of the catastrophic flooding that occurred in the Sacramento Valley as a result of the record floods of 1907 and 1909. This system was essentially completed in 1968.

In the 1970s, Congress broadened the federal role in flood damage reduction activities to include floodplain management. This was accomplished through adoption of the National Flood Insurance Act of 1973, which made federal funding for post-flood relief and recovery efforts contingent on local participation in the NFIP. Administered by the FEMA, the NFIP establishes minimum standards for insuring existing structures in floodplain areas against flood damage and for designing new structures in these areas to avoid such damage. These minimum standards apply in areas that are subject to inundation in the event of a "100-year" flood.

In the lower Sacramento Valley, most counties and cities joined the NFIP in the late 1970s and early 1980s based on 100-year floodplain maps drawn up by FEMA. For areas protected by the SRFCP, these maps were developed in consultation with the USACE, which concluded that the design of the SRFCP was generally adequate to contain a 100-year flood in accordance with FEMA's freeboard and related levee safety requirements. However, the record flood of 1986 exposed serious deficiencies in the structural soundness of many SRFCP levees. This caused FEMA to promulgate new 100-year floodplain maps in several communities, including the Sacramento area. The flood of 1997 raised additional concerns about the permeability of the soil materials in the foundations supporting many SRFCP levees. Nearly a decade later, the catastrophic consequences of flooding in New Orleans from Hurricane Katrina in August 2005, have triggered widespread interest in updating NFIP policies and programs. FEMA is undertaking a new round of floodplain mapping and has announced that levees such as those comprising the SRFCP will be deemed deficient unless the affected local community provides the technical data necessary to demonstrate that their levees meet the NFIP's minimum standards.

4.4.1.2 STATE

The State of California has also played a major role in shaping flood management policies and regulations affecting the Sacramento River drainage basin. In fact, it was the state that took the lead in promoting the development of the SRFCP in the aftermath of the 1907 and 1909 floods. Prior to that time, the state's role had been confined to creating the legal framework for forming local agencies specifically for the purpose of

reclaiming and farming the floodplains of the Sacramento Valley. However, these extraordinarily damaging floods, occurring against the backdrop of decades of strife between local agencies attempting to protect themselves, convinced progressive-era legislators that a coherent, state-managed plan of flood protection was needed in the Sacramento Valley. The outline of the SRFCP was adopted by the Legislature in 1911 and The Reclamation Board was established to facilitate construction of the plan and to regulate its operation and maintenance.

With the subsequent emergence of the federal government as the principal financier of the SRFCP, the California Legislature designated The Reclamation Board as the non-federal sponsor responsible for managing the plan through a series of cost-sharing and administrative agreements with the USACE. These agreements require The Reclamation Board to operate and maintain the SRFCP in accordance with requirements approved by the USACE. The Reclamation Board has in turn passed many of these requirements along to the affected local agencies through a separate series of local cost-sharing and administrative agreements. The entire arrangement is backed up by legislative enactments contained in the State Water Code that give The Reclamation Board regulatory authority over all activities affecting the levees and related facilities of the SRFCP.

During the last decade, a combination of circumstances has focused increasing statewide attention on The Reclamation Board's regulatory and developmental responsibilities in connection with the SRFCP. First, many of the system's protected floodplains are coming under increasing urban growth pressure as housing costs induce more and more of the state's citizens to migrate to the Central Valley. Second, the state's courts have expanded the common law of inverse condemnation related to flooding, holding the state liable for the performance of the SRFCP and other Central Valley flood control facilities for which the state has provided operation and maintenance assurances to the USACE. Third, the flooding of New Orleans has underscored the consequences of failing to adequately protect densely populated urban areas that are subject to deep flooding in the event of a levee failure. These developments have produced the most intense legislative dialogue on the future of the state plan of flood protection since the adoption of the SRFCP in 1911.

In part, this dialogue has been informed by the results of the Sacramento and San Joaquin River basins California Comprehensive Study (Comprehensive Study), which was undertaken following the 1997 flood by The Reclamation Board and the USACE in coordination with a consortium of federal, state, and local governmental agencies and private groups and organizations in California's Central Valley, with the objective of developing a comprehensive plan for flood damage reduction and environmental restoration purposes for the Sacramento and San Joaquin River basins. An interim report (USACE and the Reclamation Board 2002) identified the Comprehensive Plan as an approach to developing projects in the future to reduce damages from flooding and restore the ecosystem in the Sacramento-San Joaquin River basins. The Comprehensive Plan consists of three elements:

- ▶ a set of principles to guide future projects,
- ▶ an approach to develop projects that takes into consideration system-wide effects, and
- ▶ a call to create the institutional arrangements necessary to consistently apply the Comprehensive Study's guiding principles in maintaining the flood management system and developing future projects.

The following are the Comprehensive Study's guiding principles:

- ▶ recognize that public safety is the primary purpose of the flood management system;
- ▶ promote effective floodplain management;
- ▶ promote agriculture and open space protection;
- ▶ avoid hydraulic and hydrologic impacts;

- ▶ plan system conveyance capacity that is compatible with all intended uses;
- ▶ provide for sediment continuity;
- ▶ use an ecosystem approach to restore and sustain the health, productivity, and diversity of the floodplain corridors;
- ▶ optimize use of existing facilities;
- ▶ integrate with the CALFED Bay-Delta Program and other programs; and
- ▶ promote multi-purpose projects to improve flood management and ecosystem restoration.

Although the Comprehensive Study is not a regulatory program per se, consistency with its goals and objectives is important for any project affecting flood control in the Sacramento and San Joaquin River basins.

4.4.1.3 LOCAL

Local agencies have always played a key role in operating and maintaining the SRFCP. This role is typically played by rural reclamation districts formed under applicable provisions of the California Water Code. In some areas, the local agency is an urban flood control district or a city or county. In Sacramento, RD 1000 is responsible for operating and maintaining the levees around the Natomas area, the American River Flood Control District operates and maintains the levees along the American River and in North Sacramento, and the City and County of Sacramento operate and maintain small reaches of the SRFCP levee system. Because none of these agencies alone has either the resources or the jurisdiction to manage all of the SRFCP levees in the Sacramento area, they have banded together in SAFCA to provide a principal point of local contact with The Reclamation Board and the USACE.

The flood control improvements previously implemented by SAFCA are described in Chapters 2 and 3. The proposed program of improvements is the next in the series of steps that SAFCA has taken since its formation to address the flood protection needs of the Sacramento area. Toward this end, in November 2005, the SAFCA Board endorsed a white paper outlining a legislative framework for comprehensively addressing flood control and flood risk management issues in the Lower Sacramento Valley. This white paper was subsequently endorsed with minor revisions in April 2006 by the Sacramento Area Council of Governments. It calls for the adoption of a new set of standards to guide the development of the SRFCP over the next several decades: (1) a standard for protecting agricultural areas that is consistent with the historical design of the SRFCP, (2) a new standard for protecting the small communities of the Sacramento Valley that is consistent with the requirements of the NFIP, and (3) a new standard for protecting urban areas that exceeds the minimum requirements of the NFIP. The white paper is included in Appendix D of this EIR.

These standards reflect three different approaches to developing the hydrology (flood flows) that will guide management of the SRFCP: (1) using the historical floods of 1907 and 1909 as the basis for protecting agricultural areas; (2) using the federally adopted statistical approach to defining the 100-year flood (1% chance of being exceeded in a given year) as the basis for protecting small communities; and (3) using a hypothetical design flood representing the most severe combination of meteorologic and hydrologic conditions that are considered reasonably characteristic for the Sacramento River drainage basin and its sub-basins as the basis for protecting urban areas. For purposes of developing this urban design flood, SAFCA believes it is appropriate to use Comprehensive Study procedures for estimating the 200-year flood. Because of the problems associated with extrapolating the actual frequency of this flood, SAFCA refers to this design as “200-year” urban standard flood protection.

4.4.2 ENVIRONMENTAL SETTING

4.4.2.1 HYDROLOGY

The project area lies at the confluence of two of the largest rivers in California, the Sacramento and American Rivers. The Sacramento River drainage basin covers approximately 26,150 square miles and includes the Feather River drainage basin totaling approximately 5,500 square miles. The American River drains a much smaller watershed totaling approximately 2,100 square miles, of which 90% is upstream of Folsom Dam. Despite their size, both the American and the Feather River basins have the potential to generate very high peak floods. Table 4.4-1 compares the runoff characteristics of these drainage basins.

Table 4.4-1 Basin Characteristics				
Basin	Watershed Area (square miles)	Flood of Record (year)	Unregulated Flow Record 1-Day Flow (cfs)	Flow per Square Mile (cfs)
American River at Fair Oaks Gage	1,888	1997	249,000	132
Sacramento River at Latitude of Verona	21,251	1997	624,000	29
Feather River at Shanghai Bend	5,313	1997	534,000	101
Sacramento River at Latitude of Sacramento	26,150	1997	840,000	32
cfs = cubic feet per second Source: MBK Engineers				

The American and Feather Rivers produce about 90% of the flood flows approaching Sacramento from the north and the east. Both historically and as part of the design of the SRFCP, flood flows approaching from the north are split between the Sacramento River and the Yolo Basin (Bypass). As shown in Exhibit 4.4-1, under the current design of the SRFCP, the Yolo Bypass absorbs about 70% of this flow at latitude of Verona and 80% at latitude of Sacramento. To the east, the entire flow of the American River must be passed through the urban core of Sacramento. Improved flood protection for the Sacramento area is thus dependent on the strength of the levee system along the lower Sacramento and American Rivers and on the capability of Folsom Dam to limit American River flows to the design capacity of this system.

The SRFCP was designed based on the flows and water surface elevations produced by the great floods of 1907 and 1909. The project design considered that areas inundated by these floods would be protected by levees, thus increasing flood flows downstream due to the elimination of floodplain storage. Because the 1907 and 1909 floods were the largest to occur since 1862, it was assumed that floods of this magnitude would recur very infrequently throughout the watershed. In fact, based on the continuous record of streamflow data since the SRFCP was approved, it appears that the 1907 and 1909 floods are approximately equal to a 10-year flood (10% annual exceedence probability) along the American and Feather Rivers. Consequently, the original plan of flood control has been modified numerous times to account for changes in the SRFCP design flood and the flood risk associated with the urban areas in the American and Feather River basins. The most recent modifications have involved the construction of Folsom Dam and the extension of the levee along the north side of the American River and the construction of Oroville Dam and New Bullards Bar Dam in the Feather River basin.

See Chapter 2, “Background,” for detailed information on the flood control history, major waterways and tributaries, flood control facilities, and flood control operations of the program study area.

4.4.2.2 LEVEE DESIGN

When the SRFCP was conceived, river navigation was an important element of the Sacramento Valley's transportation infrastructure. Hydraulic mining debris had clogged river channels and added significant uncertainty and cost to navigation. The SRFCP was designed in part to address this problem. Thus, the mainstem river levees were placed close to the channel to confine river flows in flood stage and use the energy of the river to drive hydraulic mining sediments out of the system. This design also reduced the cost of levee construction by taking advantage of the high ground built up by the river over time along its banks and by making it possible for existing technology (the clam shell dredge and hydraulic suction dredge) to efficiently use the sediment in the channel as a borrow source for the levees.

This design, although well suited to address the technical and financial challenges of a previous era, has left a succeeding generation of flood managers with two systemic problems and levee risk factors: chronic erosion and seepage. The location of the mainstem river levees close to the edge of the river channel did succeed in driving hydraulic sediments from the system. This effort was in turn complemented by the construction of debris dams and, later, large multipurpose dams on the mainstem rivers that prevented the downstream migration of new sources of sediment and introduced a new summer irrigation-based flow regime to the SRFCP. These developments fueled a new pattern of erosion in the mainstem rivers characterized by the steady deepening and widening of the river channels below the dams. Widening occurs when the channel hits a stable bottom layer and begins to exert its energy against the banks and berms supporting the levees. Since the portion of these berms separating the levees from the river channel is relatively narrow, this erosion threatens the stability of the levees. This threat is addressed by armoring the affected portion of the berm, which deflects the river's energy and may lead to increased erosion elsewhere in the system. Over time, this process was clearly recognized by flood managers, and by the mid-1950s it was agreed that bank protection would be a permanent capital cost of operating the SRFCP.

For several decades, this erosion control program proceeded without significant complication. However, the enactment of a series of state and federal laws and regulations protecting the environment has created serious cost and regulatory impediments to the program. The mainstem rivers serve as critical migratory corridors for the anadromous fish that inhabit the Central Valley. These fish are a part of the ecosystem that the SRFCP and the mainstem dams have altered. Traditional bank protection methods have the potential to degrade the remnants of the ecosystem supporting the fish and aquatic species inhabiting the mainstem rivers by removing streamside vegetation, including irreplaceable old growth trees, clearing large woody debris from the channel bottom, and creating homogenous rock surfaces along the re-engineered berm. These methods are inconsistent with adopted environmental resource management policies, and flood managers must redesign the SRFCP bank protection program to address this inconsistency.

The other major risk factor created by the design of the SRFCP levees is seepage. First, because many segments of the mainstem levee system were constructed using relatively porous hydraulic mining sediments borrowed from the river channel, the levees have a propensity to seep when subjected to prolonged high water surface elevations such as occurred during the floods of 1986 and 1997. Through-seepage was deemed a levee system design deficiency in the aftermath of the 1986 flood, and a substantial capital improvement program has been underway since the early 1990s to address this deficiency. Second, because the mainstem levees are constructed on high berms relatively close to the river channel, the same energy that was harnessed to drive hydraulic mining sediment from the system also exerts itself against the sandy alluvial soil layers that lie beneath the levees. In high-flow condition, this energy is strong enough to push water through these layers in volumes great enough to exert an uplift force capable of fracturing the soil mantle landside of the levee. This "underseepage" can occur where levees are constructed on low-permeability foundation soil (silt and clay) underlain by a higher-permeability layer (sand and gravel), and makes the levee susceptible to failure during periods of high river stage. Under these conditions, seepage travels horizontally under the levee and then is forced vertically upward through the low-permeability foundation layer, often referred to as a "blanket" (see Exhibit 3-6 in Chapter 3, "Project Description"). Failure of the blanket can occur either by uplift, a condition in which the blanket does not have

enough weight to resist the confined pressure acting upon the bottom of the blanket, or by piping (internal erosion) caused by water flowing under high vertical gradients through the erodable blanket. Underseepage failure conditions can exist with as little as one order of magnitude difference between the permeabilities of the blanket layer and the underlying more pervious layer. Excessive underseepage gradients can be corrected by constructing cutoff walls, seepage berms, combination seepage/stability berms, and relief wells. The choice of levee improvement is influenced by the depth and continuity of pervious soil layers, adjacent land use, environmental constraints, construction cost, construction schedule, and long-term maintenance capability.

4.4.2.3 RESERVOIR OPERATIONS

As noted above, the major modifications to the SRFCP since its initial design have involved the construction of multipurpose dams on the major tributaries of the Sacramento River basin. The four most recently constructed dams (Folsom Dam, Oroville Dam, Black Butte Dam, and New Bullards Bar Dam) combined with Shasta Dam, constructed in 1941, account for over 9 million acre-feet of reservoir storage capacity for flood control. To the extent possible, these facilities are operated within the design parameters of the SRFCP. They have significantly increased the flood protection provided to the major urban areas in the Sacramento River basin (Sacramento, West Sacramento, Yuba City, and Marysville) and have led to differing flood exceedence probabilities on the various tributaries covered by the state plan.

For more than a decade, flood managers have been focusing on opportunities for further reducing flood risk through improved reservoir operations. The most notable achievement in this regard is the variable storage space operation that was initiated at Folsom Dam and Reservoir in 1995 and is discussed in Chapters 2 and 3. Work is also under way to improve coordination of the flood control operations at Oroville Dam and New Bullards Bar Dam to optimize use of the SRFCP-designated channel capacity of the lower Feather River based on the timing of flows entering the channel from the upper Feather River, the Yuba River, and the Bear River. SAFCA's proposed improvement plan includes physical modifications to Folsom Dam that would allow optimal use of the channel capacity of the lower American River during large floods and more flexible use of the reservoir storage space behind the dam during the flood season based on forecast flood inflows.

4.4.3 ENVIRONMENTAL IMPACTS

Impacts of the variable storage space operation on water supply, hydropower, and downstream hydraulics were previously analyzed at a project level by SAFCA in *Program Environmental Impact Report on Flood Control Improvements Along the Mainstem of the American River* (SAFCA 2000). These impacts are summarized in Section 4.1.3, "Operational Effects Previously Addressed by SAFCA." No substantial changes in the proposed project, no substantial changes with respect to the circumstances under which the project would be undertaken, and no new information of substantial importance implicate new significant effects on the environment with respect to these issue areas. Additional hydraulic modeling was performed for the present analysis regarding the levee raising and strengthening portions of the proposed program evaluated in this EIR. The results of this additional analysis are described below.

4.4.3.1 SIGNIFICANCE CRITERIA

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines and professional practice. The proposed project was determined to result in a significant effect on hydrology or hydraulics if it would:

- ▶ substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level;
- ▶ create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff;

- ▶ place housing within a 100-year flood hazard area or place within a 100-year flood hazard area structures that would impede or redirect flood flows;
- ▶ expose people or structures to a significant risk of loss, injury, or death involving flooding; or
- ▶ substantially alter the existing drainage pattern of a site or an area, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on-site or off-site.

None of the components of the proposed program would result in effects on groundwater; substantially increase amounts of runoff; or place housing or other structures, with the exception of flood control facilities, in a 100-year flood hazard area. Therefore, the first three significance criteria do not apply to this analysis.

In determining whether a proposed project would expose people or structures to a significant risk due to flooding, SAFCA uses the following thresholds:

- ▶ whether the proposed project would cause encroachment on SRFCP design levee freeboard outside the project area; or
- ▶ whether the proposed project would cause a significant increase in flooding, defined as an increase of 0.1 foot or more, in an area that is outside the protection of the SRFCP.

4.4.3.2 IMPACT ANALYSIS

IMPACT 4.4-a *Hydraulic Effects of the Proposed Improvement Program. The proposed program includes raising and strengthening several reaches of levees and modifying flood operations of Folsom Dam through physical and operational improvements. The effects of these modifications on design SRFCP water surface elevations, including the water surface elevations associated with 100-, and 200-year conditions, show that hydraulic impacts upstream of, downstream of, and within the program study area would be less than significant.*

The proposed program includes raising and strengthening levees in several reaches of the lower American and Sacramento Rivers and on the NCC. These improvements would reduce the risk of overtopping and failure of these levees, thereby causing more water to be retained in the channels under extreme flood conditions. This, in turn, could increase the potential for overtopping and failure elsewhere in the SRFCP system, either within the Sacramento metropolitan area or upstream or downstream of this area. These potential adverse effects would be offset, however, by the increased efficiency in Folsom Dam storage and release operations that are included in the proposed program.

MBK Engineers performed a hydraulic impact analysis for SAFCA to analyze the effects of the proposed program on flood risk within the program study area, both upstream and downstream of the study area. The analysis was performed using MBK Engineers' version of the Sacramento River UNET hydraulic simulation model that was developed by the USACE for the Comprehensive Study. The impacts of the following set of components were evaluated:

- ▶ increased surcharge storage at Folsom Reservoir,
- ▶ operations with the proposed low-level release capability provided by the proposed new spillway,
- ▶ levee raising and strengthening along the lower American and Sacramento Rivers that would allow these levees to safely contain sustained releases of up to 160,000 cfs from Folsom Dam,
- ▶ raising of portions of the east levee of the Sacramento River to provide adequate freeboard above the "200-year" urban design water surface, and

- ▶ raising of the NCC south levee to provide adequate freeboard above the “200-year” urban design water surface.

The simulations were based on the following hydrologic conditions:

- ▶ 100-year (Sacramento River) hydrology,
- ▶ 200-year (Sacramento River) hydrology, and
- ▶ 200-year (Sacramento River) hydrology with concurrent 200-year Folsom Dam release (200+ year hydrologic condition).

In order to determine whether the proposed improvements would cause encroachment on SRFCP design levee freeboard outside the project area, MBK looked at three conditions: (1) whether the improvements would increase the “1957” water surface profiles that serve as the minimum design standard for all reaches of the SRFCP; (2) whether the improvements would increase the 100-year water surface elevation in any urban areas upstream or downstream of the program study area; and (3) whether the improvements would increase the 200-year water surface elevation in any urban areas upstream or downstream of the program study area. With respect to the minimum design of the SRFCP, MBK concluded that all the levees in the project area, including those that would be improved as part of the proposed program, currently contain the “1957” profile and there would be no increase in the Folsom Dam release that is included in this design condition. Therefore, the proposed improvements would not alter the SRFCP’s “1957” water surface profiles or cause encroachment into the levee freeboard associated with these profiles.

With respect to the proposed program’s effects on 100-year and 200-year water surface elevations in urban areas protected by SRFCP levees, MBK focused on the waterways in the vicinity of the City of West Sacramento at the following locations: Sacramento River at the Sacramento Weir, mouth of the American River, I Street Gage, and Freeport Bridge, and Yolo Bypass at the mouth of the Sacramento Bypass. As a result of the proposed improvements, the analysis also showed a reduction in the number of program study area levee failures under these extreme conditions. However, the potentially negative effects of retaining additional flood water in the channel as a result of these reductions in levee failures were shown to be offset by the increased efficiency in Folsom Dam flood operations. Thus, at all of the selected locations, except the Yolo Bypass at the mouth of the Sacramento Bypass, all 100-year and 200-year peak water surface elevations were lower under future conditions than under existing conditions. At the Yolo Bypass/Sacramento Bypass location, the 100-year and 200+-year peak water surface elevations would be lower, but the 200-year water surface elevation would 0.09 foot higher under future conditions than under existing conditions.

This result reflects a counter-effect of increasing the efficiency of Folsom Dam. Under this modeled flood scenario (200-year flood on the Sacramento River with a flood on the American River between a 100-year and 200-year flood frequency) the step-up of releases from Folsom Dam would be quicker than under existing conditions, producing the slight increase in pre-project water surface elevations shown in the model. However, because this water surface elevation would be more than 3 feet below the top of the south levee of the Sacramento Bypass and more than 6 feet below the top of the east levee of the Yolo Bypass, there would be no encroachment into SRFCP design levee freeboard. Therefore, the impact would be less than significant.

In order to determine whether the proposed program would cause a significant increase in flooding in an area that is outside the protection of the SRFCP, MBK compared 100-year and 200-year water surface elevations with and without the proposed improvements along the Sacramento River between Verona and the American River, where a number of residential structures have been built on the water side of the east levee, and at the mouth of the NCC, where water surface elevations govern flood conditions on rural residential lands east of Natomas. MBK determined that there was a slight reduction in the 100-year and 200-year water surface elevations in the vicinity of the Sacramento Weir (0.10 foot) and slight increases in the 100-year and 200-year water surface elevations in the vicinity of Verona (0.05 foot and 0.03 foot, respectively). These slight increases, which are also counter-

effects of increasing the efficiency of Folsom Dam, are below SAFCA's significance thresholds. Therefore, the project would not cause a significant increase in flooding in areas outside the protection of the SRFCP, and the impact would be less than significant.

See Appendix C for the modeling methods and results.

IMPACT **Disruption of Local Drainage Systems.** *New or expanded berms constructed on the land side of levees could cross drainage infrastructure maintained by local landowners or local agencies in some locations or alter surface runoff patterns. Because interference with drainage could cause or exacerbate local flooding, this impact would be significant.*

4.4-b

Landside earthen seepage berms would be constructed in parts of the levee system to remediate seepage where sufficient width is available, such as along the Sacramento River upstream of Interstate 80 and along the NCC. The construction of new or expanded berms could cross existing drainage infrastructure maintained by local agencies and landowners, potentially severing parts of the landowners' drainage system and altering surface drainage. The presence of a berm itself could alter the course of local runoff. Because interruption of drainage patterns could cause or exacerbate local flooding, this potential impact would be significant.

4.4.4 MITIGATION MEASURES

No mitigation is required for Impact 4.4-a (hydraulic effects). Mitigation is provided below for Impact 4.4-b (disruption of local drainage systems).

Mitigation Measure 4.4-b for Disruption of Local Drainage Systems: Coordinate with Owners and Operators, Prepare Drainage Studies as Needed, and Remediate Impacts through Project Design.

The agencies implementing program components and their primary contractors for engineering design and construction shall ensure that the following measures are implemented to avoid significant effects associated with disruption of local drainage systems.

During project design, project engineers shall coordinate with owners and operators of local drainage systems and landowners served by the systems to evaluate pre-and post-project drainage needs, and design features to remediate any project-related substantial drainage disruption or alteration in runoff that would increase the potential for local flooding. If substantial alteration of runoff patterns or disruption of a local drainage system could result from a project feature, a drainage study shall be prepared as part of project design. The study shall consider the design flows of any existing facilities that would be crossed by project features and develop appropriate plans for relocation or other modification of these facilities and construction of new facilities, as needed, to ensure equivalent functioning of the system during and after construction. If no drainage facilities (e.g., ditches, canals) would be affected, but project features would have a substantial adverse impact on runoff amounts and/or patterns, then new drainage systems shall be included in the design of project improvements to ensure that the project would not result in new or increased local flooding. Any necessary features to remediate project-induced drainage problems shall be constructed before the project is completed or as part of the project, depending upon site-specific conditions.

Implementing this mitigation measure would reduce the potential impact on local drainage systems to a less-than-significant level.

4.5 WATER QUALITY

4.5.1 REGULATORY SETTING

4.5.1.1 FEDERAL

Clean Water Act

The Clean Water Act (CWA) is the country's primary surface water protection legislation. The CWA was established to restore and maintain the chemical, physical, and biological integrity of surface waters to support "the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water" through a variety of regulatory and non-regulatory tools, including establishing water quality standards, issuing permits, monitoring discharges, and managing polluted runoff. The U.S. Environmental Protection Agency (EPA) is the federal agency with primary authority for implementing regulations adopted pursuant to the CWA, and has delegated the State of California as the authority to implement and oversee most of the California programs authorized or adopted for CWA compliance through the Porter-Cologne Water Quality Control Act of 1969.

In accordance with CWA Section 404, the USACE regulates and issues permits for activities that involve the discharge of dredged or fill materials into "waters of the United States." Waters of the United States include navigable waters of the United States, interstate waters, all other waters where the use or degradation or destruction of the waters could affect interstate or foreign commerce, tributaries to any of these waters, and wetlands that meet any of these criteria or that are adjacent to any of these waters or their tributaries. Many surface waters and wetlands in California meet the criteria for waters of the United States. While important to water quality, the Section 404 program also addresses overall aquatic habitat functions and is therefore addressed in more detail in Sections 4.6, "Fisheries and Aquatic Resources," and 4.7, "Terrestrial Biological Resources."

Implementation of CWA Sections 402 and 401 is delegated to the State of California through the SWRCB. These CWA sections are described below in Section 4.5.1.2.

4.5.1.2 STATE

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act of 1969 complements and establishes the state policies subject to CWA. The act established the SWRCB and nine RWQCBs. The SWRCB is the primary state agency responsible for protecting the quality of California's surface water and groundwater supplies, but much of its daily implementation authority is delegated to the nine RWQCBs. The Porter-Cologne Water Quality Control Act authorizes the SWRCB to issue waste discharge requirements (WDRs) and NPDES permits (described below), and requires that either the SWRCB or the RWQCBs adopt water quality control plans (Basin Plans) for the protection of surface water and groundwater quality. The program study area is within the jurisdiction of the Central Valley RWQCB, Region 5, which has adopted its Basin Plan, as described in the next section.

Basin Plan

Pursuant to the Porter-Cologne Water Quality Control Act, the Central Valley RWQCB prepares and updates its Basin Plan every three years, with the most recent update completed in September 2004. The Basin Plan describes the officially designated beneficial uses for specific surface water and groundwater resources and the enforceable water quality objectives necessary to protect those beneficial uses.

The Basin Plan includes numerical and narrative water quality objectives for physical and chemical water quality constituents. Constituents for which numerical objectives are set include temperature; dissolved oxygen (DO); turbidity; pH; total dissolved solids (TDS); electrical conductivity (EC); bacterial content; and various specific

ions, trace metals, and synthetic organic compounds. Narrative objectives are set for parameters such as suspended solids, bio-stimulatory substances (e.g., nitrogen and phosphorus), oil and grease, color, taste, odor, and aquatic toxicity. Narrative objectives are often precursors to numeric objectives. The primary mechanism that the RWQCB uses to ensure conformance with Basin Plan water quality objectives and implementation policies and procedures is WDR issuance for projects that may discharge wastes to land or water. WDRs specify terms and conditions that must be followed during the implementation and operation of a project.

Clean Water Act Section 303(d)

Under CWA Section 303(d) and California's Porter-Cologne Water Quality Control Act of 1969, the State of California is required to establish beneficial uses of state waters and to adopt water quality standards to protect those beneficial uses. Section 303(d) establishes the total maximum daily load (TMDL) process to assist in guiding the application of state water quality standards, requiring the states to identify streams whose water quality is "impaired" (affected by the presence of pollutants or contaminants) and to establish the TMDL or the maximum quantity of a particular contaminant that a water body can assimilate without adverse effect.

Clean Water Act Section 401

Under CWA Section 401(a)(1), applicants for a federal license or permit to conduct activities that may result in the discharge of a pollutant into waters of the United States must obtain certification from the state in which the discharge would originate or, if appropriate, from the interstate water pollution control agency with jurisdiction over affected waters at the point where the discharge would originate. Therefore, all projects with a federal component that may affect state water quality (including projects that require federal agency approval such as issuance of a Section 404 permit) must also comply with CWA Section 401. The RWQCBs administer the Section 401 program with the intent of prescribing measures for the applicant's project that are necessary to avoid, minimize, or mitigate adverse impacts on water quality and ecosystems.

California Toxics Rule and State Implementation Policy

The California Toxics Rule (CTR) was promulgated in 2000 in response to requirements of the EPA National Toxics Rule (NTR). The NTR and CTR criteria are regulatory criteria adopted to inland surface waters, enclosed bays, and estuaries in California that are subject to regulation pursuant to Section 303(c) of the CWA. The NTR and CTR include criteria for the protection of aquatic life and human health. Human health criteria (water and organisms) apply to all waters with a Municipal and Domestic Water Supply Beneficial Use designation as indicated in the RWQCBs' Basin Plans. The Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California, also known as the State Implementation Plan (SIP), was adopted by the SWRCB in 2000 to establish provisions for translating CTR criteria, NTR criteria, and basin plan water quality objectives for toxic pollutants into the following:

- ▶ NPDES permit effluent limits;
- ▶ compliance determinations;
- ▶ monitoring for 2,3,7,8-TCDD equivalents;
- ▶ chronic toxicity control provisions;
- ▶ initiating site-specific objective development; and
- ▶ granting exceptions.

Waste Discharge Requirements and National Pollutant Discharge Elimination System Permits

SWRCB and the RWQCBs regulate discharges of waste into waters of the state through WDRs, which are authorized under the state Porter-Cologne Water Quality Control Act, and through NPDES permits, which are authorized under Section 402 of the federal CWA. The Porter-Cologne Water Quality Control Act defines waters of the state as "any surface water or ground water, including saline waters, within the boundaries of the state."

Some waters that qualify as waters of the state, such as isolated wetlands, do not necessarily qualify as waters of the United States.

The RWQCBs issue WDRs to regulate activities of entities subject to the state’s jurisdiction that would discharge waste that may affect groundwater quality or that may discharge waste in a diffused manner (e.g., through erosion from soil disturbance). The RWQCB administers a general WDR/NPDES permit process for low-threat discharges from construction dewatering activities that discharge to surface waters (i.e., removal of accumulated water during excavation). A Notice of Intent (NOI) to discharge must be submitted to the RWQCB prior to the activity, and the general order contains a set of standard terms and conditions for compliance with discharge prohibitions, specific effluent and receiving water limitations, required solids disposal activities, water quality monitoring protocols, and applicable water quality criteria. When numerous discharge locations are anticipated, the general order allows the applicant to submit a Pollution Prevention, Monitoring, and Reporting Plan that provides for consolidated identification of discharges, monitoring, and reporting procedures. The RWQCB can also issue a waiver to dewatering discharges if the discharge would not enter a water body.

The RWQCBs issue NPDES permits for waste discharges to surface water from both point and nonpoint sources. The NPDES permit system includes an individual system for municipal wastewater treatment plants and several categories of stormwater discharges. NPDES stormwater permits apply to industrial facilities and any general ground-disturbing construction activity that disturb more than 1 acre.

Before construction of such projects, applicants must submit an NOI to discharge stormwater to the RWQCB, and must prepare a Storm Water Pollution Prevention Plan (SWPPP). A SWPPP generally describes proposed construction activities, receiving waters, stormwater discharge locations, and best management practices (BMPs) that will be used to reduce project construction effects on receiving water quality. A number of “good housekeeping” BMPs are also generally included in a SWPPP to control waste discharges during the dry months. An appropriate selection of post-construction, permanent pollution control and treatment measures must also be considered for implementation where necessary to prevent long-term water quality impairment.

The NPDES permitting process for general construction activities requires the applicant to:

- ▶ file an NOI to discharge stormwater;
- ▶ prepare a SWPPP that identifies BMPs to prevent or minimize the discharge of sediments and other contaminants with the potential to affect beneficial uses or lead to violations of water quality objectives; and
- ▶ complete a self-implemented inspection, monitoring, and reporting program for BMP performance.

Fish and Game Code Section 1602

All diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake in California that supports wildlife resources is subject to regulation by the California Department of Fish and Game, pursuant to Section 1602 of the California Fish and Game Code. See Section 4.7, “Terrestrial Biological Resources,” for a description of this regulation.

4.5.1.3 REGULATORY GUIDANCE FOR AQUATIC SEDIMENT

There are no sediment quality objectives promulgated in the Basin Plan or other regulatory criteria pertaining to ambient concentrations of chemical constituents in aquatic sediments. However, if a project results in the removal of sediment, the material is subject to state and federal hazardous waste regulations and an RWQCB-designated waste classification program. The California Department of Health Services (DHS) administers the hazardous waste regulations, which are based on numerical concentration criteria and govern the disposal options for the material. EPA also has established preliminary remediation goals (PRGs) that are concentration values based on human health risks for classifying hazardous waste conditions in soil material using specific assumptions about

receptor exposure. PRGs are guidance values only and are not legally binding enforcement criteria. PRGs are established for industrial and residential sites.

For those sediments that are not classified as hazardous, the RWQCB method is used to classify material as “designated,” “nonhazardous solid,” or “inert.” Designated levels of allowable total and soluble contaminant concentrations are established based on the site-specific water bodies that may be affected through reuse of the material, beneficial uses of those water resources, potential of the waste to impair water quality, and factors of environmental attenuation and leachability of the contaminants from the material. Wastes having contaminant concentrations exceeding the designated levels must be directed to waste management units (i.e., landfills) for disposal as “hazardous” wastes.

The RWQCB administers the reuse of contaminated “nonhazardous” sediment for creation, enhancement, and restoration of wetlands. The wetland reuse criteria were developed in part based on Effects Range-Low (ER-L) and Effects Range-Median (ER-M) criteria originally developed by the National Oceanic and Atmospheric Administration, National Marine Fisheries Service. The ER-L and ER-M criteria are often used as surrogates to assess potential toxicity to organisms (Long et al. 1995, 1998). The guidelines were developed to identify concentrations of contaminants associated with biological effects in laboratory, field, or modeling studies. The ER-L value is the concentration equivalent to the lower 10th percentile of the compiled study data. Sediment concentrations below the ER-L level are interpreted as “rarely” associated with adverse effects. The ER-M value is the concentration equivalent to the 50th percentile of the compiled study data. Sediment concentrations above the ER-M level are interpreted as “frequently” associated with adverse effects.

The RWQCB criteria specify the allowable use based on two categories:

- ▶ use for wetland non-cover where exposure to the aquatic environment would be limited, and
- ▶ wetland cover or levee construction where sediments would be exposed to the water.

Recently, there has been a national effort to revise freshwater aquatic sediment quality criteria for general assessments of potential toxicity thresholds (MacDonald et al. 2000).

4.5.2 ENVIRONMENTAL SETTING

See Chapter 2, “Background,” for detailed information on the flood control history, major waterways and tributaries, flood control facilities, and flood control operations of the program study area.

Surface water quality in the hydrologic region is generally good, although possible sources of contamination that can affect water quality include turbidity; pesticides and fertilizers from agricultural runoff; water temperature exceedances; and toxic heavy metals, such as mercury, copper, zinc, and cadmium from acid mine drainage (U.S. Geological Survey [USGS] 2000; DWR 2005). The portion of the Sacramento River forming the western boundary of the program study area is part of a 16-mile segment from Knights Landing to the Delta that is on the 303(d) list for diazinon from agricultural sources, mercury from abandoned mines, and toxicity from unknown sources (Central Valley RWQCB 2002).

Designated beneficial uses for the Sacramento River and all tributaries from the Colusa Basin Drain, upstream of the program study area, to the I Street Bridge in Sacramento, as defined by the Basin Plan (Central Valley RWQCB 2004) include:

- ▶ municipal, industrial, and agricultural supply;
- ▶ irrigation;
- ▶ contact and noncontact recreation;
- ▶ coldwater fish habitat, migration, and spawning;
- ▶ warmwater fish habitat, migration, and spawning;

- ▶ wildlife habitat;
- ▶ power generation; and
- ▶ navigation.

4.5.3 ENVIRONMENTAL IMPACTS

Impacts of the variable storage space operation on water quality were previously analyzed at a project level by SAFCA in *Program Environmental Impact Report on Flood Control Improvements Along the Mainstem of the American River* (SAFCA 2000). These impacts were found to be less than significant and are summarized in Section 4.1.3, “Operational Effects Previously Addressed by SAFCA.” No substantial changes in the proposed project, no substantial changes with respect to the circumstances under which the project would be undertaken, and no new information of substantial importance implicate new significant effects on the environment with respect to water quality.

4.5.3.1 SIGNIFICANCE CRITERIA

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. The proposed project was determined to result in a significant effect on water quality if it would:

- ▶ violate any water quality standards or waste discharge requirements or otherwise substantially degrade water quality; or
- ▶ substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted).

The proposed project would have no components that would interfere substantially with groundwater recharge. Therefore, this issue is not discussed below.

4.5.3.2 IMPACT ANALYSIS

IMPACT 4.5-a Temporary Water Quality Effects from Stormwater Runoff, Erosion, and Spills Associated with Construction. *Ground-disturbing activities associated with construction of improvements included in the proposed program could result in soil erosion and sedimentation at Folsom Reservoir, in local drainages, and in receiving waterways. Construction activities could also discharge waste petroleum products or other construction-related substances into these water bodies in runoff. Because these materials could adversely affect channel water quality, this potential impact would be significant.*

Ground-disturbing construction activities associated with physical Folsom Dam modifications, bridge construction, levee and channel improvements, habitat enhancement, and levee integrity program activities can discharge disturbed and eroded soil, petroleum products, and other construction-related wastes (e.g., concrete, solvents) into receiving waters and temporarily impair water quality. Soil and associated contaminants that enter receiving waters through stormwater runoff and erosion can increase turbidity, stimulate algae growth, increase sedimentation of aquatic habitat, and introduce compounds that are toxic to aquatic organisms. Accidental spills of construction-related substances such as oils and fuels can contaminate both surface water and groundwater. Slurry that would be used for seepage cutoff walls in levees is usually composed of bentonite and water, and because it has the consistency of liquid mud when being placed during construction, improper handling or storage could result in exposure or release down-gradient to nearby surface water, thereby degrading water quality. The extent of potential water quality effects resulting from such contamination would depend on the following factors: tendency for erosion of soil types encountered, types of construction practices, extent of the disturbed area,

duration of construction activities, timing of construction activities in relation to the rainy season, proximity to receiving water bodies, and sensitivity of those water bodies to contaminants of concern.

In addition, excavated areas that fill with groundwater or surface drainage during construction activities would require dewatering. Effluent from dewatering operations can contain high levels of suspended sediment and often contains high levels of petroleum products and other construction-related contaminants as well. This effluent could be directly released to local receiving waters, thereby degrading water quality.

Because the release of soil or other construction-related materials into water bodies adjacent to and downstream of construction areas could adversely affect reservoir or channel water quality, this potential impact would be significant.

IMPACT 4.5-b **Mobilization of Mercury and Other Metals Associated with Spillway Construction.** *Ground-disturbing activities associated with construction of the spillway at Folsom Dam could result in the mobilization of sediments containing mercury and other metals into the water column and the lower American River. This potential impact would be significant.*

Sediments in Folsom Reservoir contain elemental mercury and other metals from historical mining practices or that naturally occur in the bedrock of the American River. Mercury can be toxic to both aquatic organisms and humans. Construction of the auxiliary spillway could result in the mobilization of sediment containing mercury and other metals into the water column and the lower American River. Because the potential exists for mercury and other metals to be released at levels that adversely affect water quality, this potential impact would be significant.

4.5.4 MITIGATION MEASURES

Mitigation is described below for Impact 4.5-a (stormwater runoff and spills) and Impact 4.5-b (mercury and other metals).

Mitigation Measure 4.5-a for Temporary Water Quality Effects from Stormwater Runoff, Erosion, and Spills Associated with Construction: Implement Standard Best Management Practices (BMPs), Prepare and Implement a Storm Water Pollution Prevention Plan (SWPPP), and Comply with National Pollutant Discharge Elimination System (NPDES) Permit Conditions.

The agencies implementing program components and their primary contractors for engineering design and construction shall ensure that the following measures are implemented to avoid and minimize potential effects of construction activities on water quality.

The agencies implementing program components shall file a notice of intent with the Central Valley RWQCB. Final design and construction plans shall require the implementation of standard erosion, siltation, and good housekeeping BMPs. Each contractor for a construction project shall be required to prepare a SWPPP and comply with the conditions of the NPDES general stormwater permit for construction activity. For work conducted under NPDES authorization, the SWPPP shall describe the construction activities to be conducted, BMPs that will be implemented to prevent contaminated stormwater discharges into waterways, and inspection and monitoring activities that will be conducted. Construction and post-construction monitoring shall be conducted to ensure that all erosion-control efforts are performing as designed.

Construction and post-construction monitoring shall be conducted to ensure that all erosion-control efforts are performing as designed. BMPs shall include pollution prevention measures (erosion and sediment control measures and measures to control nonstormwater discharges and hazardous spills), demonstration of compliance with all applicable RWQCB and other applicable water quality standards, local and regional erosion and sediment control standards, identification of responsible parties, detailed construction timelines, and a BMP monitoring and

maintenance schedule. BMPs are applied to meet the maximum extent practicable and best conventional technology/best available technology requirements and to address compliance with water quality standards. A construction and post-construction monitoring program shall be implemented to ensure compliance and effectiveness of BMPs.

Implementing this mitigation measure would reduce the potential impact to a less-than-significant level.

Mitigation Measure 4.5-b for Mobilization of Mercury and Other Metals Associated with Spillway Construction: Conduct Sampling Studies and Implement Site-Specific Measures in Coordination with the Central Valley RWQCB and Other Agencies, as Needed, to Ensure Compliance with Applicable Regulations.

The agencies implementing Folsom Dam spillway construction shall ensure that appropriate water quality sampling studies are conducted to determine whether mercury and other metals could be released in sediments as a result of spillway construction activity and pose a hazard to downstream aquatic life or human health. Sampling results shall be compared with established thresholds to determine whether construction activities would result in an exceedance of the thresholds. If analysis of the results shows that a threshold would be exceeded, site-specific measures shall be developed and implemented in coordination with the RWQCB and other regulatory and resource agencies, as appropriate, to ensure compliance with applicable regulations.

Implementing this mitigation measure would reduce the potential impact to a less-than-significant level.

4.6 FISHERIES AND AQUATIC RESOURCES

This section addresses common and sensitive fisheries and aquatic resources found in the lower Sacramento River, lower American River (also including Folsom Reservoir and Lake Natoma), NCC, NEMDC/Steelhead Creek (and tributaries), and Morrison Creek (and tributaries). Hydrology and water quality are addressed in Sections 4.4, “Hydrology and Hydraulics,” and 4.5, “Water Quality.” Terrestrial biological resources (i.e., plants and wildlife) are addressed in Section 4.7, “Terrestrial Biological Resources.”

4.6.1 REGULATORY SETTING

Several federal, state, and local agencies have regulatory authority or responsibility over activities that affect aquatic resources. These regulatory authorities are described in the following sections.

4.6.1.1 FEDERAL

Federal Endangered Species Act

Pursuant to the federal Endangered Species Act (ESA), the USFWS and the NMFS have authority over projects that may result in take of a federally listed species. Under the ESA, the definition of “take” is to “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.” Under federal regulation, “take” is further defined to include habitat modification or degradation where it would be expected to result in death or injury to listed wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. If the project may affect a federally listed species, either an incidental take permit, under Section 10(a) of the ESA, or a federal interagency consultation, under Section 7 of the ESA, is required. USFWS has regulatory jurisdiction over freshwater and estuarine fishes (such as delta smelt), while NMFS has jurisdiction over anadromous and marine species (such as chinook salmon and steelhead).

Sustainable Fisheries Act

In response to growing concern about the status of United States fisheries, Congress passed the Sustainable Fisheries Act of 1996 (Public Law [PL] 104-297) to amend the Magnuson-Stevens Fishery Conservation and Management Act (PL 94-265), the primary law governing marine fisheries management in the federal waters of the United States. Under the Sustainable Fisheries Act, consultation is required by NMFS on any activity that might adversely affect essential fish habitat (EFH). EFH includes those habitats that fish rely on throughout their life cycles. It encompasses habitats necessary to allow sufficient production of commercially valuable aquatic species to support a long-term sustainable fishery and contribute to a healthy ecosystem.

Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act requires federal agencies to consult with USFWS, NMFS, and state fish and wildlife resource agencies before undertaking or approving projects that control or modify surface water. The recommendations made by these agencies must be fully considered in project plans by federal agencies.

Clean Water Act, Section 404

Section 404 of the CWA requires project proponents to obtain a permit from the USACE prior to performing any activity that involves any discharge of dredged or fill material into “waters of the United States,” including wetlands. Waters of the United States include navigable waters of the United States, interstate waters, all other waters where the use or degradation or destruction of the waters could affect interstate or foreign commerce, tributaries to any of these waters, and wetlands that meet any of these criteria or that are adjacent to any of these waters or their tributaries. Many surface waters and wetlands in California meet the criteria for waters of the United States.

Clean Water Act, Section 402

CWA Section 402 regulates construction-related stormwater discharges to surface waters through the NPDES program, which is administered by the EPA. In California, the State Water Resources Control Board is authorized by the EPA to oversee the NPDES program through the RWQCBs, in this case, the Central Valley RWQCB.

Clean Water Act, Section 401

CWA Section 401(a)(1) specifies that any applicant for a federal license or permit to conduct any activity that may result in any discharge into navigable waters shall provide the federal licensing or permitting agency with a certification that any such discharge will not violate state water quality standards. The RWQCBs administer the Section 401 program with the intent of prescribing measures for projects that are necessary to avoid, minimize, and mitigate adverse impacts on water quality and ecosystems.

4.6.1.2 STATE

California Endangered Species Act

Pursuant to the California Endangered Species Act (CESA), a permit from the DFG is required for projects that could result in the take of a state-listed threatened or endangered species. Under CESA, “take” is defined as an activity that would directly or indirectly kill an individual of a species, but the definition does not include “harming” or “harassing,” as the federal ESA does. As a result, the threshold for take under CESA is higher than under the federal ESA (e.g., habitat modification is not necessarily considered take under CESA). Authorization for take of state-listed species can be obtained through a California Fish and Game Code Section 2080.1 Consistency Determination or Section 2081 Incidental Take Permit.

California Fish and Game Code Section 1602—Streambed Alteration

All diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake in California that supports wildlife resources are subject to regulation by DFG under Section 1602 of the California Fish and Game Code. Under Section 1602, it is unlawful for any person, governmental agency, or public utility to do the following without first notifying DFG: substantially divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of any river, stream, or lake, or deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake. A stream is defined as a body of water that flows at least periodically or intermittently through a bed or channel that has banks and supports fish or other aquatic life. This definition includes watercourses with a surface or subsurface flow that supports or has supported riparian vegetation. DFG’s jurisdiction within altered or artificial waterways is based on the value of those waterways to fish and wildlife. A DFG streambed alteration agreement must be obtained for any project that would result in an impact on a river, stream, or lake.

4.6.1.3 LOCAL

The *Conservation Element of the Sacramento County General Plan* (Sacramento County 1993) provides overall guidance for resource conservation in Sacramento County and includes several resource conservation goals and objectives. It includes a specific goal to preserve and protect fisheries in county waterways and describes policies and programs under four objectives:

1. Water flows monitored and maintained, when climatic conditions allow, to promote fish propagation and migration.
2. Maintenance of channelized areas to reduce detritus accumulation and increase fish populations.
3. Water quality and runoff levels maintained to provide a healthy aquatic environment for fisheries.

4. Riparian vegetation and topographic diversity maintained by stream channel and bank stabilization projects.

The *Sutter County General Plan* (Sutter County 1996) also provides overall guidance for resource conservation in Sutter County and includes several general resource conservation objectives that aim to protect significant biological resources, including habitats that support fish and wildlife species. It includes a goal to protect and enhance habitats that support fish and wildlife species and describes general policies supporting this goal.

4.6.2 ENVIRONMENTAL SETTING

Individual projects within SAFCA's proposed program of improvements could potentially affect aquatic resources within the lower Sacramento and American Rivers (including Folsom Reservoir and Lake Natoma), the NCC, NEMDC/Steelhead Creek (and tributaries), and Morrison Creek (and tributaries). The Sacramento and American Rivers, NCC, and NEMDC/Steelhead Creek provide important habitat for native anadromous and resident Central Valley fishes, including species that are listed under ESA and CESA. Because the two rivers and associated Natomas area waterways support many of the same fish species, they are discussed together in this section. Morrison Creek and its tributaries do not have hydrologic connectivity with the Sacramento River except under flood conditions; therefore, this system is discussed separately. Folsom Reservoir and Lake Natoma are both impoundments on the American River and are also discussed separately below.

Information on existing conditions was derived from other environmental documents prepared for projects in the program study area; field data collected by resource agencies and other organizations; status reviews of winter-run, spring-run, and fall-run chinook salmon, steelhead, green sturgeon, delta smelt, and Sacramento splittail; and reports describing conditions of the area fisheries and aquatic resources.

4.6.2.1 FISHERIES AND AQUATIC RESOURCES

Lower Sacramento and American Rivers, Natomas Cross Canal, and Natomas East Main Drainage Canal/Steelhead Creek

The lower Sacramento and American Rivers, the NCC, and NEMDC/Steelhead Creek provide vital fish spawning, rearing, and/or migratory habitat for a diverse assemblage of native and nonnative species (Table 4.6-1). Native species present in the lower Sacramento and American Rivers, the NCC, and/or NEMDC/Steelhead Creek can be separated into anadromous (i.e., species that spawn in fresh water after migrating as adults from marine habitat) and resident species. Native anadromous species include four runs of chinook salmon (*Oncorhynchus tshawytscha*), steelhead trout (*Oncorhynchus mykiss*), green and white sturgeon (*Acipenser medirostris* and *A. transmontanus*), and Pacific lamprey (*Lampetra tridentata*). Native resident species include delta smelt (*Hypomesus transpacificus*), Sacramento pikeminnow (*Ptychocheilus grandis*), Sacramento splittail (*Pogonichthys macrolepidotus*), Sacramento sucker (*Catostomus occidentalis*), hardhead (*Mylopharodon conocephalus*), California roach (*Lavinia symmetricus*), and rainbow trout (*O. mykiss*). Nonnative anadromous species include striped bass (*Morone saxatilis*) and American shad (*Alosa sapidissima*). Nonnative resident species include largemouth bass (*Micropterus salmoides*), smallmouth bass (*Micropterus dolomieu*), white and black crappie (*Pomoxis annularis* and *P. nigromaculatus*), channel catfish (*Ictalurus punctatus*), white catfish (*Ameiurus catus*), brown bullhead (*Ictalurus nebulosus*), bluegill (*Lepomis macrochirus*), green sunfish (*Lepomis cyanellus*), and golden shiner (*Notemigonus crysoleucas*).

Salmon and steelhead occasionally stray into the tributaries of the NEMDC/Steelhead Creek in the North Sacramento Streams Group; however, habitat in these streams is very limited and does not provide much value. Resident species include mostly nonnative warmwater species. The only exception is Dry Creek and its upper tributaries (e.g., Secret Ravine), where spawning and rearing habitat for salmon and steelhead is present.

**Table 4.6-1
Fishes Present in the Lower Sacramento and American Rivers, the NCC,
and/or the NEMDC/Steelhead Creek**

Common Name	Scientific Name	Native (N) or Introduced (I)
Sacramento River winter-run chinook salmon	<i>Oncorhynchus tshawytscha</i>	N
Central Valley spring-run chinook salmon	<i>Oncorhynchus tshawytscha</i>	N
Central Valley fall-/late fall-run chinook salmon	<i>Oncorhynchus tshawytscha</i>	N
Central Valley steelhead/rainbow trout	<i>Oncorhynchus mykiss</i>	N
Green sturgeon	<i>Acipenser medirostris</i>	N
White sturgeon	<i>Acipenser transmontanus</i>	N
Pacific lamprey	<i>Lampetra tridentata</i>	N
Delta smelt	<i>Hypomesus transpacificus</i>	N
Sacramento pikeminnow	<i>Ptychocheilus grandis</i>	N
Sacramento splittail	<i>Pogonichthys macrolepidotus</i>	N
Sacramento sucker	<i>Catostomus occidentalis</i>	N
Hardhead	<i>Mylopharodon conocephalus</i>	N
California roach	<i>Lavinia symmetricus</i>	N
Striped bass	<i>Morone saxatilis</i>	I
American shad	<i>Alosa sapidissima</i>	I
Largemouth bass	<i>Micropterus salmoides</i>	I
Smallmouth bass	<i>Micropterus dolomieu</i>	I
White crappie	<i>Pomoxis annularis</i>	I
Black crappie	<i>Pomoxis nigromaculatus</i>	I
Channel catfish	<i>Ictalurus punctatus</i>	I
White catfish	<i>Ameiurus catus</i>	I
Brown bullhead	<i>Ictalurus nebulosus</i>	I
Bluegill	<i>Lepomis macrochirus</i>	I
Green sunfish	<i>Lepomis cyanellus</i>	I
Golden shiner	<i>Notemigonus crysoleucas</i>	I

Source: Moyle 2002

The use of different areas of the lower Sacramento and American Rivers, NCC, and NEMDC/Steelhead Creek by fish species is influenced by variations in habitat conditions, each species' habitat requirements, life history timing, and daily and seasonal movements and behavior. Altered flow regimes, flood control, and bank protection efforts along the Sacramento River and tributaries have reduced available shaded riverine aquatic (SRA) habitat, sediment transport, channel migration and avulsion, and large woody debris (LWD) recruitment, and have isolated the channel from its floodplain. SRA vegetation and instream tree and shrub debris provide important riverine fish habitat along the Sacramento and American Rivers and tributaries. SRA habitat is defined as the nearshore aquatic habitat occurring at the interface between a river and adjacent woody riparian habitat. The principal attributes of this cover type are: (1) an adjacent bank composed of natural, eroding substrates supporting riparian vegetation that either overhang or protrude into the water; and (2) water that contains variable amounts of woody debris, such as leaves, logs, branches, and roots and has variable depths, velocities, and currents. Riparian habitat provides structure (through SRA habitat) and food for fish species. Shade decreases water temperatures, while low overhanging branches can provide sources of food by attracting terrestrial insects. As riparian areas mature, the vegetation sloughs off into the rivers, creating structurally complex habitat consisting of LWD that

furnishes refugia from predators, creates higher water velocities, and provides habitat for aquatic invertebrates. For these reasons, many fish species are attracted to SRA habitat.

Historically, seasonal flooding covered basins throughout the Central Valley and provided important spawning and rearing habitat for many fish species, including Sacramento splittail and juvenile chinook salmon and steelhead. Levee construction has reduced the overall amount of seasonal flooding and shallow water habitat in the Sacramento River system. In winter, however, some agricultural fields are allowed to flood during high flows (e.g., Butte Basin, Yolo Bypass, and Sutter Bypass) and are used by splittail for spawning and rearing, and by chinook salmon and steelhead for rearing.

Folsom Reservoir

Folsom Reservoir supports a “two-tiered” fishery during the period of the year when the lake becomes thermally stratified (i.e., April through November), with warmwater species using the upper, warmwater layer and coldwater species using the deeper, colder portion of the reservoir. Bass, sunfish, and catfish constitute the primary warmwater sport fisheries in Folsom Reservoir. Species-specific spawning times for the primary warmwater fishes that do not spawn in Folsom Reservoir define the months of concern during which reservoir operations could affect spawning and young-of-the-year rearing success. The reservoir’s coldwater game species include rainbow trout, kokanee salmon, and chinook salmon (SAFCA 2000). All of these fish species are resident to the landlocked reservoir.

The reservoir’s coldwater pool is not only important to the reservoir’s coldwater fish species identified above, but also to lower American River fall-run chinook salmon and steelhead. Seasonal releases from the reservoir’s coldwater pool provide thermal conditions in the lower American River that support annual in-river production of these species in the segment of river downstream from Nimbus Dam (extent of upstream anadromous fish migration). Any reduction in the reservoir’s coldwater pool reduces the volume of coldwater that is available to be released in any given year into the lower American River to benefit the river’s chinook salmon and steelhead populations. Folsom Reservoir’s annual coldwater pool volume is not sufficiently large to facilitate coldwater releases during the warmest months (i.e., July through September) to provide maximum thermal benefits to lower American River steelhead and coldwater releases during October and November that would maximally benefit fall-run chinook salmon immigration, spawning, and incubation. Consequently, optimal management of the reservoir’s coldwater pool on an annual basis is essential in order to provide the maximum thermal benefits to both fall-run chinook salmon and steelhead, within the constraints of annual coldwater pool availability (SAFCA 2000).

Lake Natoma

Lake Natoma is a regulating afterbay for Folsom Reservoir. Due to its small size (i.e., operating range of 2,800 acre-feet) and rapid turnover rate, Lake Natoma has relatively little influence on water flowing through it, with the exception of water temperature. As residence time in the lake increases during the summer months, warming of water released from Folsom Reservoir increases. Water is released from Lake Natoma into the lower American River at Nimbus Dam. The fish communities in Lake Natoma are similar to those found in Folsom Reservoir (SAFCA 2000).

South Sacramento Streams Group

Morrison Creek is a highly channelized stream with limited instream habitat and little to no streamside vegetation. Low summer flows are pumped from Morrison Creek into the Sacramento River by the City of Sacramento, and during flood conditions, Morrison Creek spills through Stone Lakes National Wildlife Refuge and through Snodgrass Slough to the Sacramento River. The pump acts as an impassable barrier to fish species in the Sacramento River except under flood conditions. There is potential for both native and nonnative warmwater fish species in Morrison Creek and tributaries. The fish community is likely representative of what would be generally found in Central Valley and Delta waterways.

4.6.2.2 SPECIAL-STATUS SPECIES

Special-status fish species are legally protected or are otherwise considered sensitive by federal, state, or local resource conservation agencies and organizations. Special-status fish species addressed in this section include:

- ▶ species listed as threatened or endangered under ESA or CESA;
- ▶ species identified by USFWS, NMFS, or DFG as species of special concern; and
- ▶ species fully protected in California under the California Fish and Game Code.

A total of 10 special-status fish species have the potential to occur in the lower Sacramento and American Rivers, NCC, and/or the NEMDC/Steelhead Creek, as described below (Table 4.6-2). Of the ten species, delta smelt, green sturgeon, Central Valley steelhead Evolutionarily Significant Unit (ESU), Sacramento River winter-run chinook salmon ESU, and Central Valley spring-run chinook salmon ESU are federally listed as endangered or threatened species. Delta smelt (threatened), Sacramento River winter-run chinook salmon ESU (endangered), and Central Valley spring-run chinook salmon ESU (threatened) are also listed under CESA. USFWS delisted Sacramento splittail from its threatened status on September 22, 2003. NMFS determined that listing is not warranted for Central Valley fall-/late fall-run chinook salmon. However, this species is still designated a species of concern by NMFS and species of special concern by DFG because of concerns about specific risk factors. The three remaining species (Pacific lamprey, California roach, and hardhead) are considered species of special concern by DFG and/or federal species of concern by NMFS or USFWS. No special-status species are known to occur in Morrison Creek, Lake Natoma, or Folsom Reservoir, except hardhead, which is found in the tributary arms of the reservoir and rivers upstream.

**Table 4.6-2
Special-Status Fish Species Potentially Occurring in the Lower Sacramento and American Rivers,
the NCC, and/or the NEMDC/Steelhead Creek**

Species	Status ¹		Habitat	Potential to Occur in the Lower Sacramento and American Rivers, NCC, and/or NEMDC/Steelhead Creek
	USFWS/ NMFS	DFG		
Central Valley fall/late fall-run chinook salmon <i>Oncorhynchus tshawytscha</i>	SC	SSC	Essential Fish Habitat designated; requires cold, freshwater streams with suitable gravel for spawning; rears in seasonally inundated floodplains, rivers, and tributaries, and in the Delta	Occurs in the lower Sacramento and American Rivers, NCC, and NEMDC/Steelhead Creek
Sacramento River winter-run chinook salmon ESU <i>Oncorhynchus tshawytscha</i>	E	E	Critical Habitat and Essential Fish Habitat designated; requires cold, freshwater streams with suitable gravel for spawning; rears in seasonally inundated floodplains, rivers, and tributaries, and in the Delta	Occurs in the Sacramento River and tributaries; adults and juveniles may stray into the American River, NCC, and NEMDC/Steelhead Creek
Central Valley spring-run chinook salmon ESU <i>Oncorhynchus tshawytscha</i>	T	T	Critical Habitat and Essential Fish Habitat designated; requires cold, freshwater streams with suitable gravel for spawning; rears in seasonally inundated floodplains, rivers, and tributaries, and in the Delta	Occurs in the Sacramento River and tributaries; adults and juveniles may stray into the American River, NCC and NEMDC/Steelhead Creek
Central Valley steelhead ESU <i>Oncorhynchus mykiss</i>	T	--	Critical Habitat designated; requires cold, freshwater streams with suitable gravel for spawning; rears in seasonally inundated floodplains, rivers, and tributaries, and in the Delta	Occurs in the lower Sacramento and American Rivers, NCC, and NEMDC/Steelhead Creek

**Table 4.6-2
Special-Status Fish Species Potentially Occurring in the Lower Sacramento and American Rivers,
the NCC, and/or the NEMDC/Steelhead Creek**

Species	Status ¹		Habitat	Potential to Occur in the Lower Sacramento and American Rivers, NCC, and/or NEMDC/Steelhead Creek
	USFWS/ NMFS	DFG		
Green sturgeon <i>Acipenser medirostris</i>	T	--	Requires cold, freshwater streams with suitable gravel for spawning; rears in seasonally inundated floodplains, rivers, tributaries, and in the Delta	Occurs in the lower Sacramento River; may occur in the lower American River, NCC, and NEMDC/Steelhead Creek
Delta smelt <i>Hypomesus transpacificus</i>	T	T	Critical Habitat designated; spawning occurs in tidally influenced freshwater wetlands and seasonally submerged uplands	Occurs in Sacramento-San Joaquin Delta most of the year and along the Sacramento River, downstream from its confluence with the American River
Sacramento splittail <i>Pogonichthys macrolepidotus</i>	DT	SSC	Spawning and juvenile rearing from winter to early summer in shallow weedy areas inundated during seasonal flooding in the lower reaches and flood bypasses of the Sacramento River, including the Yolo Bypass	Occurs in the lower Sacramento and American Rivers; may also occur in the NCC and NEMDC/Steelhead Creek
Pacific lamprey <i>Lampetra tridentata</i>	SC	--	Requires cool, freshwater streams with suitable gravel for spawning	Occurs in the lower Sacramento and American Rivers; may also occur in the NCC and NEMDC/Steelhead Creek
California roach <i>Lavinia symmetricus</i> sp.	--	SSC	Spawning occurs in pools and side pools of rivers and creeks; juveniles rear in pools of rivers and creeks	Occurs in the lower Sacramento and American Rivers; may also occur in the NCC and NEMDC/Steelhead Creek
Hardhead <i>Mylopharodon conocephalus</i>	--	SSC	Spawning occurs in pools and side pools of rivers and creeks; juveniles rear in pools of rivers and creeks, and in shallow to deeper water of lakes and reservoirs	Occurs in the lower Sacramento and American Rivers; may also occur in the NCC and NEMDC/Steelhead Creek

Notes: DFG = California Department of Fish and Game; ESU = Evolutionarily Significant Unit; NMFS = National Marine Fisheries Service; USFWS = U.S. Fish and Wildlife Service

¹ Legal Status Definitions

Federal Listing Categories (USFWS and NMFS)

E Endangered (legally protected)
T Threatened (legally protected)
DT Recently delisted from threatened status
SC Species of Concern

State Listing Categories (DFG)

E Endangered (legally protected)
T Threatened (legally protected)
FP Fully Protected (legally protected, no take allowed)
SSC Species of Special Concern (no formal protection)

Source: Data compiled by EDAW in 2006

Descriptions of the special-status species and some of the other key species supported by the lower Sacramento and American Rivers, the NCC, and the NEMDC/Steelhead Creek are provided below.

Fall-Run Chinook Salmon

Adult fall-run chinook salmon enter the Sacramento and San Joaquin River systems from July through April and spawn from October through February. During spawning, the female digs a redd (gravel nest) in which she

deposits her eggs, which are then fertilized by the male. Optimal water temperatures for egg incubation are 6.7 °C to 12.2°C (Rich 1997). Newly emerged fry remain in shallow, lower-velocity edgewater, particularly where debris congregates and makes the fish less visible to predators (DFG 1998). The duration of egg incubation and time of fry emergence depends largely on water temperature. In general, eggs hatch after a 3- to 5-month incubation period, and alevins (yolk-sac fry) remain in the gravel until their yolk-sacs are absorbed (2 to 3 weeks).

Juveniles typically rear in fresh water (in their natal streams, the Sacramento River system, and the Delta) for up to 5 months before entering the ocean. Juveniles migrate downstream during January through June. Juvenile chinook salmon prefer water depths of 0.5 to 3.3 feet and velocities of 0.26 to 1.64 feet per second (Raleigh et al. 1986). Important winter habitat for juvenile chinook salmon include flooded bars, side channels, and overbank areas with relatively low water velocities. Juvenile chinook salmon have been found to successfully rear in floodplain habitat, which routinely floods but is dry at other times. Growth rates appear to be enhanced by the conditions found in floodplain habitat.

Cover structures, space, and food are necessary components for chinook salmon rearing habitat. Suitable habitat includes areas with instream and overhead cover in the form of undercut banks; downed trees; and large, overhanging tree branches. The organic materials forming fish cover also help provide sources of food, in the form of both aquatic and terrestrial insects. Growth of juvenile chinook salmon in floodplain habitat is fast relative to growth in river habitat. Juvenile salmon have been found to have growth rates in excess of 1 millimeter (mm) per day when they rear in flooded habitat and as much as 20 mm in 2 to 3 weeks (Jones & Stokes 2001). The water temperature in floodplain habitat is typically higher than that in main channel habitats. Although increased temperature increases metabolic requirements, the productivity in flooded habitat is also increased, resulting in higher growth rates (Sommer et al. 2001). The production of drift invertebrates in the Yolo Bypass has been found to be 1 to 2 times greater than in the river (Sommer et al. 2001). Also, grasses that are flooded support invertebrates that are also a substantial source of food for rearing juveniles. Increased areas resulting from flooded habitat can also reduce the competition for food and space and potentially decrease the possible encounters with predators (Sommer et al. 2001). Juvenile chinook salmon that grow faster are likely to migrate downstream sooner, which helps to reduce the risks of predation and competition in freshwater systems.

Juvenile chinook salmon in the Sacramento River system move out of upstream spawning areas into downstream habitats in response to many factors, including inherited behavior, habitat availability, flow, competition for space and food, and water temperature. The number of juveniles that move and the timing of movement are highly variable. Storm events and the resulting high flows appear to trigger movement of substantial numbers of juvenile chinook salmon to downstream habitats. In general, juvenile abundance in the Sacramento–San Joaquin Delta (Delta) increases as flow increases (USFWS 1993).

Fall-run chinook salmon emigrate as fry and subyearlings and remain off the California coast during their ocean migration (63 Federal Register [FR] 11481, March 9, 1998).

Winter-Run Chinook Salmon

Adult winter-run chinook salmon leave the ocean and migrate through the Delta into the Sacramento River system from November through July. Salmon migrate upstream past the Red Bluff Diversion Dam (RBDD) on the Sacramento River from mid-December through July, and most of the spawning population has passed RBDD by late June.

Winter-run chinook salmon spawn from mid-April through August, and incubation continues through October. The primary spawning grounds in the Sacramento River are above RBDD. Adult winter-run chinook salmon generally do not enter the American River.

Juvenile winter-run chinook salmon rear and emigrate in the Sacramento River from July through March (Hallock and Fisher 1985). Juveniles descending the Sacramento River above RBDD from August through October and possibly November are mostly pre-smolts (smolts are juveniles that are physiologically ready to enter seawater).

and probably rear in the Sacramento River below RBDD. Juveniles have been observed in the Delta during October through December, especially during high Sacramento River discharge caused by fall and early winter storms.

Triggers for downstream movement are similar to those described above for fall-run chinook salmon. Winter-run salmon smolts may migrate through the Delta and bay to the ocean from December through as late as May (Stevens 1989). The Sacramento River channel is the main migration route through the Delta. Adult winter-run chinook salmon spend 1 to 3 years in the ocean. About 67% of the adult escapement that leaves the ocean to spawn in the Sacramento River consists of 3-year-olds, 25% consists of 2-year-olds, and 8% consists of 4-year-olds (Hallock and Fisher 1985).

Spring-Run Chinook Salmon

Spring-run chinook salmon historically were the second most abundant run of Central Valley chinook salmon (Fisher 1994). They occupied the headwaters of all major river systems in the Central Valley where there were no natural barriers. Adults returning to spawn ascended the tributaries to the upper Sacramento River, including the Pit, McCloud, and Little Sacramento Rivers. They also occupied Cottonwood, Battle, Antelope, Mill, Deer, Stony, Big Chico, and Butte Creeks, and the Feather, Yuba, American, Mokelumne, Stanislaus, Tuolumne, Merced, San Joaquin, and Kings Rivers. Spring-run chinook salmon migrated farther into headwater streams where cool, well-oxygenated water is available year-round.

Current surveys indicate that remnant, nonsustaining spring-run chinook salmon populations may be found in Cottonwood, Battle, Antelope, and Big Chico Creeks (DWR 1997). More sizable, consistent runs of naturally produced fish are found only in Mill and Deer Creeks. The Feather River Fish Hatchery sustains the spring-run population on the Feather River, but the genetic integrity of that run is questionable (DWR 1997). Estimates since 1953 on the Feather River indicate that numbers of spring-run returning to the hatchery average around 2,115, although the estimates have increased dramatically since 1990 (DFG 2006).

Historical records indicate that adult spring-run chinook salmon enter the mainstem Sacramento River in February and March and continue to their spawning streams, where they then hold in deep, cold pools until they spawn. Spring-run chinook salmon are sexually immature during their spawning migration. Some adult spring-run chinook salmon start arriving in the Feather River below the Fish Barrier Dam in June. They remain there until the fish ladder is opened in early September. Spawning and rearing requirements for spring-run chinook salmon are similar to those identified above for fall-run chinook salmon.

Spawning occurs in gravel beds in late August through October, and emergence takes place in March and April. Spring-run chinook salmon appear to emigrate at two different life stages: fry and yearlings. Fry move between February and June, while the yearling spring-run emigrate October to March, peaking in November (Cramer and Demko 1997).

Juveniles display considerable variation in stream residence and migratory behavior. Juvenile spring-run chinook salmon may leave their natal streams as fry soon after emergence or rear for several months to a year before migrating as smolts or yearlings (Yoshiyama et al. 1998). Triggers for downstream movement are similar to those described above for fall-run chinook salmon.

On March 9, 1998 (63 FR 11481), NMFS issued a proposed rule to list spring-run chinook salmon as endangered. NMFS designated the Central Valley spring-run chinook as threatened on September 16, 1999 (64 FR 50393). On February 5, 1999, the California Fish and Game Commission listed spring-run chinook salmon as threatened under CESA. Critical habitat had originally been designated for Central Valley spring-run chinook salmon by NMFS (65 FR 7764, February 16, 2000). However, following a lawsuit (*National Association of Home Builders et al. v. Donald L. Evans, Secretary of Commerce, et al.*), NMFS rescinded the listing. After further review, critical habitat for the Central Valley spring-run chinook salmon ESU was designated on August 12, 2005. Critical habitat is designated to include select waters in the Sacramento and San Joaquin River basins.

Central Valley Steelhead

Historically, steelhead spawned and reared in most of the accessible upstream reaches of Central Valley rivers, including the Sacramento and American Rivers and many of their tributaries. Compared with chinook salmon, steelhead generally migrated farther into tributaries and headwater streams where cool, well-oxygenated water is available year-round.

In the Central Valley, steelhead are now restricted to the upper Sacramento River downstream of Keswick Reservoir; the lower reaches of large tributaries downstream of impassable dams (including the American River); small, perennial tributaries of the Sacramento River mainstem; and the San Francisco Bay/Sacramento–San Joaquin Delta (Bay-Delta) system.

The upstream migration of adult steelhead in the mainstem Sacramento River historically started in July, peaked in September, and continued through February or March. Central Valley steelhead spawn mainly from January through March, but spawning has been reported from late December through April (McEwan and Jackson 1996). During spawning, the female digs a redd (gravel nest) in which she deposits her eggs, which are then fertilized by the male. Egg incubation time in the gravel is determined by water temperature, varying from approximately 19 days at an average water temperature of 15.5°C to approximately 80 days at an average temperature of 14.5°C (McEwan and Jackson 1996).

Steelhead fry usually emerge from the gravel 2 to 8 weeks after hatching, between February and May, sometimes extending into June (Barnhart 1986, Reynolds et al. 1993). Newly emerged steelhead fry move to shallow, protected areas along streambanks but move to faster, deeper areas of the river as they grow. Juvenile steelhead feed on a variety of aquatic and terrestrial insects and other small invertebrates.

Juvenile steelhead rear throughout the year and may spend from 1 to 3 years in fresh water before emigrating to the ocean. Smoltification, the physiological adaptation that juvenile salmonids undergo to tolerate saline waters, occurs in juveniles as they begin their downstream migration. Smolting steelhead generally emigrate from March to June (Barnhart 1986; Reynolds et al. 1993).

NMFS completed a status review of steelhead populations in Washington, Oregon, Idaho, and California and identified 15 ESUs in this range. On August 9, 1996, NMFS issued a proposed rule to list five of these ESUs (including the Central Valley steelhead) as endangered, and five as threatened under the ESA (61 FR 155). The Central Valley steelhead ESU was later listed as threatened (downgraded from its proposed status of endangered) (63 FR 13347, March 19, 1998), and critical habitat (which included the lower Feather and Yuba Rivers) was designated for this ESU (65 FR 7764, February 16, 2000). However, following the lawsuit referenced above (*National Association of Home Builders et al. v. Donald L. Evans, Secretary of Commerce, et al.*), NMFS rescinded the listing. After further review, critical habitat for the Central Valley steelhead ESU was designated on August 12, 2005. Critical habitat is designated to include select waters in the Sacramento and San Joaquin River basins.

Green Sturgeon

Green sturgeon has recently has been listed as threatened by NMFS (71 FR 17757, April 7, 2006). Green sturgeon are found in the lower reaches of large rivers, including the Sacramento–San Joaquin River basin, and in the Eel, Mad, Klamath, and Smith Rivers. Green sturgeon adults and juveniles are found throughout the upper Sacramento River, as indicated by observations incidental to winter-run chinook monitoring at the Red Bluff Diversion Dam in Tehama County (NMFS 2005). Green sturgeon spawn predominantly in the upper Sacramento River. They are thought to spawn every 3–5 years (Tracy 1990). Their spawning period is March to July, with a peak in mid-April to mid-June (Moyle et al. 1992). Juveniles inhabit the estuary until they are approximately 4–6 years old, when they migrate to the ocean (Kohlhorst et al. 1991). Green sturgeon is found primarily in the Sacramento River and occasionally in the Feather River.

Delta Smelt

Delta smelt are found in the Sacramento-San Joaquin Delta where, for most of the year, they are typically associated with the freshwater edge of the mixing zone, in the portion of the water column that has relatively low water velocities. The species moves inland to areas of flooded terrestrial vegetation for spawning. Spawning season varies from year to year and may occur from February to July, but mainly from April through May (Moyle 2002). The nearest known spawning area for this species is in the Yolo Bypass, to the south and west of Natomas. Delta smelt were federally listed as a threatened species in March of 1993 (58 FR 12854). Critical habitat for the species was designated in December 1994 and includes the Sacramento-San Joaquin Bay-Delta and Sacramento River up to the City of Sacramento (59 FR 65256). Delta smelt are tolerant of a wide range of salinity and typically rear in shallow, fresh or slightly brackish waters of the Estuary.

Sacramento Splittail

Recent data indicate that Sacramento splittail occur in the Sacramento River as far upstream as RBDD (Sommer et al. 1997) and that some adults spend the summer in the mainstem Sacramento River rather than returning to the estuary (Baxter 1999). The distribution and extent of spawning and rearing along the mainstem Sacramento River is unknown.

Sacramento splittail spawn over flooded terrestrial or aquatic vegetation (Moyle 2002, Wang 1986). Sacramento splittail spawn in early March and May in lower reaches of the Sacramento River (Moyle et al. 1995). Spawning has been observed to occur as early as January and to continue through July (Wang 1986). Larval splittail are commonly found in the shallow, vegetated areas where spawning occurs. Larvae eventually move into deeper, open-water habitats as they grow and become juvenile. During late winter and spring, young-of-year juvenile splittail (i.e., those less than 1 year old) are found in floodplain habitat, sloughs, rivers, and Delta channels near spawning habitat. Juvenile splittail gradually move from shallow, nearshore habitats to the deeper, open water habitats of Suisun and San Pablo Bays (Wang 1986). In areas upstream of the Delta, juvenile splittail can be expected to be present in the flood basins (i.e., Sutter and Yolo Bypasses and the Sacramento River) when these areas are flooded during the winter and spring.

In 1999, after 4 years of candidate status, the splittail was listed as threatened under the ESA (64 FR 25, March 10, 1999). Fall midwater trawl surveys indicate that juvenile splittail abundance has been highly variable from year to year, with peaks and declines coinciding with wet and dry periods, respectively, and correlated with the availability of flooded shallow-water habitat. After the listing, the State Water Contractors, the San Luis & Delta-Mendota Water Authority, and others challenged the listing, contending that it violated the ESA and the Administrative Procedures Act. On June 23, 2000, the U.S. District Court in Fresno ruled in favor of the plaintiffs and found the listing unlawful. On September 22, 2003, USFWS delisted splittail as a threatened species, indicating that habitat restoration actions implemented through the CALFED Bay-Delta Program and the Central Valley Project Improvement Act are likely to keep the splittail from becoming endangered in the foreseeable future (68 FR 55139, September 22, 2003).

Pacific Lamprey

Similar to chinook salmon and steelhead, lamprey adults migrate upstream from the ocean during the winter and spring to spawn (Moyle 2002). Spawning occurs over gravel substrates. Larval lamprey rear in sand and mud substrates, gradually moving downstream over the rearing period. Little is known about their habitat needs or population trends. Pacific lamprey is a federal species of concern.

California Roach

California roach are distributed throughout the state; however, a specific subspecies is found in the Sacramento River drainage (excluding the Pit River). California roach occupy small, warm streams with intermittent flow in mid-elevation foothills. Dense populations often occur in isolated pools. They are tolerant of high temperatures

(30°C to 35°C) and low oxygen levels, although they also can be found in cold, well-oxygenated systems; human-modified habitats; and the main channels of larger rivers (Moyle 2002). The subspecies found in the Sacramento River system is a California species of special concern.

Hardhead

Hardhead are widely distributed throughout the low- to mid-elevation streams in the main Sacramento–San Joaquin drainage, including the Sacramento River system. Undisturbed portions of larger streams at low to middle elevations are preferred by hardhead. Hardhead are able to withstand summer water temperatures above 20°C; however, they will select lower temperatures when they are available. Hardhead are fairly intolerant of low-oxygenated waters, particularly at higher water temperatures. Pools with sand-gravel substrates and slow water velocities are the preferred habitat; adult fish inhabit the lower half of the water column, while the juvenile fish remain in the shallow water closer to the stream edges. Hardhead typically feed on small invertebrates and aquatic plants at the bottom of quiet water (Moyle 2002). Hardhead is a federal species of concern, and a state species of special concern.

4.6.2.3 OTHER IMPORTANT NATIVE FISH SPECIES SUPPORTED BY THE LOWER SACRAMENTO AND AMERICAN RIVERS, THE NCC, AND THE NEMDC/STEELHEAD CREEK

Sacramento Sucker

The Sacramento sucker is widely distributed throughout the Sacramento River system. Sacramento sucker occupy waters from cold, high-velocity streams to warm, nearly stagnant sloughs. They are common at moderate elevations (600–2,000 feet). Sacramento sucker feed on algae, detritus, and benthic invertebrates. They usually spawn for the first time in their fourth or fifth years. When they cannot move upstream and end up spawning in lake habitat, they typically orient themselves near areas where spring freshets flow into the lake. They typically spawn in stream habitat on gravel riffles from late February to early June. The eggs hatch in 3 to 4 weeks, and the young typically live in the natal stream for a couple of years before moving downstream to a reservoir or large river (Moyle 2002).

Sacramento Pikeminnow

Sacramento pikeminnow occupy rivers and streams throughout the Sacramento–San Joaquin River system, mainly at elevations between 300 and 2,000 feet. Sacramento pikeminnow spawn in April and May, with eggs hatching in less than a week. Within a week of hatching, the fry are free-swimming and schooling. Adult pikeminnow may feed on other fish, including juvenile pikeminnow, chinook salmon, and steelhead, but, according to Moyle (2002), are overrated as predators on salmonid species in natural environments. They can, however, be major predators on juvenile salmon and steelhead in riverine environments modified by dams and fish ladders. Pikeminnow tend to remain in well-shaded, deep pools with sand or rock substrate and are less likely to be found in areas where there are higher numbers of introduced predator species, such as largemouth bass and other centrarchid species.

4.6.2.4 IMPORTANT NONNATIVE FISH SPECIES SUPPORTED BY THE LOWER SACRAMENTO AND AMERICAN RIVERS, THE NCC, AND THE NEMDC/STEELHEAD CREEK

Striped Bass

Striped bass are anadromous fish that have been an important part of the sport-fishing industry in the Delta. They were introduced into the Sacramento–San Joaquin estuary between 1879 and 1882 (Moyle 2002). Striped bass may move into the lower reaches of the rivers year-round but probably most often between April and June, when they spawn. The species tends to remain in deep, slow-moving water, where it has access to prey without having to expend a great deal of energy.

American Shad

American shad are an anadromous fish that have been introduced into the Central Valley and have become established as a popular sport fish. American shad enter the American River to spawn during the spring (primarily May and June) and support a seasonal fishery downstream of the dams during these months.

4.6.2.5 SENSITIVE HABITATS

Sensitive habitats include those that are of special concern to resource agencies or that are afforded specific consideration through ESA, CEQA, Section 1602 of the California Fish and Game Code, Section 404 of the CWA, or the Sustainable Fisheries Act (as amended). Sensitive habitats are of special concern because they are of high value to plants, wildlife, and fish species and have high potential to support special-status species. Sensitive habitats can also provide other important ecological functions, such as enhancing flood and erosion control and maintaining water quality.

Open water and associated riparian forest are protected under the Fish and Game Code and/or CWA. In addition to the critical habitat designations noted above, the Sacramento and American Rivers, the NCC, and the NEMDC/Steelhead Creek, including the portions adjacent to the Natomas area, have also been designated as EFH by the Pacific Fishery Management Council to protect and enhance habitat for coastal marine fish and macroinvertebrate species that support commercial fisheries. EFH is defined as waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity. Under the Pacific Coast Salmon Fisheries Management Plan (Pacific Fishery Management Council 2003), the Sacramento River has been designated as EFH for spring-, fall-, late fall- and winter-run chinook salmon and the American River, the NCC, and the NEMDC/Steelhead Creek have been designated as EFH for fall-run chinook salmon.

4.6.3 ENVIRONMENTAL IMPACTS

4.6.3.1 SIGNIFICANCE CRITERIA

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. The proposed project was determined to result in a significant effect related to fisheries and aquatic resources if it would:

- ▶ have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by DFG, USFWS, or NMFS; or
- ▶ interfere substantially with the movement of any native resident or migratory fish species.

The first threshold may be met if the project would substantially reduce or degrade the habitat of a state or federal special-status species or its prey species, potentially resulting in a reduction in special-status species abundance, or if it would substantially reduce the growth, survival, or reproductive success of a special-status fish species.

4.6.3.2 IMPACT ANALYSIS

This impact analysis focuses on construction-related effects and on temporary or permanent habitat modifications that could result from proposed physical flood control improvements and levee integrity program activities. Effects on fish were considered for populations in Folsom Reservoir, Lake Natoma, the lower American and Sacramento Rivers, the NCC, the NEMDC/Steelhead Creek and tributaries, and Morrison Creek and tributaries. The effects on fisheries that could result from modifying Folsom Dam operations under the permanent variable storage space operation were analyzed previously by SAFCA and found to be less than significant, as described in Section 4.1.3, “Operational Effects Previously Addressed by SAFCA.” These conclusions remain valid.

In addition, potentially adverse effects on spawning habitat in the lower American River caused by low-level dam releases would be addressed through adjustment of rule restrictions for dam releases. As described in *Final Environmental Assessment/Initial Study American River Watershed, California, Folsom Dam Modification Project* (USACE and The Reclamation Board 2001), previous studies have indicated that increased flows in the lower American River resulting from the use of a low-level outlet during flood conditions could damage spawning beds through localized scour. Consequently, the USACE and The Reclamation Board proposed the adoption of a rule restriction for Folsom Dam releases that would substantially reduce the frequency of flow changes that modeling shows may cause such scouring. The document found that this measure would reduce the impact to a less-than-significant level.

See Impact 4.5-b in Section 4.5, “Water Quality,” regarding mobilization of mercury and other metals during spillway construction.

IMPACT **Effects of Construction of Folsom Dam Modifications on Resident Species.** *Construction activities associated with the proposed Folsom Dam modifications could kill, injure, or alter the behavior of fishes in close proximity to borrow excavation sites and permanently modify localized habitat areas. Dewatering of stilling basin to accommodate extension work could harm or kill fish and displace others. However, these activities are unlikely to affect any special-status species and would not substantially affect any populations of fish or their prey. This impact would be less than significant.*

4.6-a

Construction of Folsom Dam modifications would include blasting and excavation for borrow in the dry below the reservoir high-water elevation. Blasting and intense vibration during borrow site excavation could result in death, injury, displacement, or behavior changes in fish near a borrow location. However, it is highly unlikely that any special-status species would be affected. Hardhead is the only special-status species known to be present in the reservoir, and this species is generally found only in the tributary arms or their upstream rivers and is unlikely to be found in the main body of the reservoir. The effects on general fish populations would be localized and very minor, given the relatively small area of effect of these activities. Borrow site development would permanently modify localized areas, increasing the average depth of the littoral habitat in the inundation zone and altering the bottom slope in these areas. Habitat changes in these areas could result in changes in fish species composition in these localized areas. Given the size of the reservoir and its fish populations, such changes are unlikely to be detectable. Expansion of the stilling basin would require dewatering and would result in the displacement of the fish that reside there and could possibly result in mortality or harm of some native fish. There are no special-status fish found in the stilling basin, and dewatering would not substantially affect any overall population. This impact would be less than significant.

IMPACT **Loss of Fish Habitat Through Increased Sedimentation, Turbidity, and Contaminants.** *Construction activities associated with the components of SAFCA's proposed program could result in increases in sediments, turbidity, and contaminants that could adversely affect fish habitats immediately adjacent to and downstream of construction activities. This potential impact would be significant.*

4.6-b

Construction activities conducted near Folsom Reservoir and associated with other program improvements, including levee and channel improvements, floodplain habitat enhancement, erosion treatments and bank stabilization, and activities associated with maintaining levee integrity, would disturb soils that could enter water bodies and result in increased turbidity and sedimentation adjacent to and downstream of the disturbed areas.

Fish population levels and survival have been linked to levels of turbidity and siltation in a watershed. Prolonged exposure to high levels of suspended sediment could create a loss of visual capability in fish, leading to a reduction in feeding and growth rates; a thickening of the gill epithelia, potentially causing the loss of respiratory function; clogging and abrasion of gill filaments; and increases in stress levels, reducing the tolerance of fish to disease and toxicants (Waters 1995).

Also, high levels of suspended sediments would cause the movement and redistribution of fish populations, and could affect physical habitat. Once suspended sediment is deposited, it could reduce water depths in pools, decreasing the water's physical carrying capacity for juvenile and adult fish (Waters 1995). Increased sediment loading could degrade food-producing habitat downstream of the project area as well. Sediment loading could interfere with photosynthesis of aquatic flora and displace aquatic fauna. Many fish are sight feeders, and turbid waters reduce the ability of these fish to locate and feed on prey. Some fish, particularly juveniles, could become disoriented and leave areas where their main food sources are located, ultimately reducing their growth rates.

Avoidance is the most common fish response to increases in turbidity and sedimentation. Fish will not occupy areas unsuitable for survival unless they have no other option. Some fish, such as bluegill and bass species, will not spawn in excessively turbid water (Bell 1991). Therefore, construction activities could cause fish habitat to become limited if high turbidity resulting from construction-related erosion were to preclude a species from occupying habitat required for specific life stages.

In addition, the potential exists for contaminants such as fuels, oils, and other petroleum products used in construction activities to be introduced into the water system directly or through surface runoff. Contaminants may be toxic to fish or may alter oxygen diffusion rates and cause acute and chronic toxicity to aquatic organisms, thereby reducing growth and survival.

Because sedimentation and increased turbidity or other contamination could degrade water and adversely affect fish habitat and fish populations, this potential impact would be significant.

IMPACT **Loss of Overhead Cover and Instream Woody Material.** *Riparian vegetation may need to be removed or cleared at waterside levee toes or berms or along channels to accommodate individual flood control improvement projects and activities to ensure levee integrity. Although bank protection activities would be designed to maintain existing vegetative cover to the extent possible, the proposed program as a whole could result in an overall loss of overhead cover that provides SRA habitat that is important to fish, including special-status species. This impact would be significant.*

4.6-c

Bank protection activities would be designed to maintain existing vegetation and instream woody material as much as possible by incorporating rock benches that serve as buffers against toe scour and shear stress while providing space for planting riparian vegetation and creating a platform to support aquatic habitat features. However, small amounts of riparian vegetation, potentially providing overhead cover for fish or contributing instream woody material to channels, may be cleared or removed from the water side of levees and channel banks during construction of various improvements on the lower American and Sacramento Rivers, the NCC, and the NEMDC/Steelhead Creek. Removal of such riparian vegetation or woody material could result in loss of SRA habitat that is important to fish, including special-status species, as a source of food, moderator of water temperatures, and source of woody debris that provides refugia from predators, variation in water velocities, and habitat for aquatic invertebrates. Overall loss of SRA habitat would represent an overall degradation of habitat and could contribute to population declines. This potential impact would be significant.

4.6.4 MITIGATION MEASURES

No mitigation is required for Impact 4.6-a (effects during Folsom Dam modifications). Mitigation is identified below for Impacts 4.6-b (habitat loss during construction) and 4.6-c (loss of overhead cover and instream woody material).

Mitigation Measure 4.6-b for Loss of Fish Habitat Through Increased Sedimentation, Turbidity, and Contaminants: Implement Standard Best Management Practices (BMPs), Prepare and Implement a SWPPP, and Comply with NPDES Permit Conditions.

This measure is the same as Mitigation Measure 4.5-a in Section 4.5, “Water Quality.” See the description in that section. Implementing this mitigation measure would reduce potential impacts on fish habitat to a less-than-significant level.

Mitigation Measure 4.6-c for Loss of Overhead Cover and Instream Woody Material: Comply with Section 1602, the federal Endangered Species Act (ESA), and the California Endangered Species Act (CESA) as Needed, and Mitigate on a No-Net-Loss Basis.

The agencies implementing program components and their primary contractors for engineering design and construction shall ensure that the following measures are implemented to avoid and minimize potential loss of overhead cover and instream woody habitat.

DFG shall be consulted regarding potential disturbance to fish habitat, including SRA habitat, as part of the process for obtaining a streambed alteration agreement, pursuant to Section 1602 of the California Fish and Game Code, for flood control improvements that could affect a channel (e.g., irrigation/drainage canal, creek, river), streambank, or water side of a levee. Affected habitats shall be replaced and/or rehabilitated to the extent feasible and practicable. If complete avoidance of identified riparian habitat is not feasible, the acreage of riparian habitat that would be removed shall be replaced or rehabilitated on a “no-net-loss” basis in accordance with DFG regulations and as specified in the streambed alteration agreement, if needed. Habitat restoration, rehabilitation, and/or replacement shall be at a location and by methods agreeable to DFG. Minimization and compensation measures adopted through the permitting process shall be implemented.

The USFWS and NMFS shall also be consulted regarding compliance with the ESA for potential effects on species under their respective jurisdictions, and DFG shall be consulted regarding compliance with CESA for potential effects on state-listed species. The implementing agency shall comply with all conditions set forth in the streambed alteration agreement and/or biological assessment/ biological opinion to protect fish and their habitat. If required, authorization for take of listed fish species under the ESA and/or CESA shall be obtained if it is determined that the proposed project could result in take of the listed species. All measures developed through informal consultation with USFWS and DFG shall be implemented, as well as any additional measures adopted through a formal permitting process, if applicable.

Implementing this mitigation measure would reduce the potential impact on fish habitat through loss of overhead cover and instream woody material to a less-than-significant level.

4.7 TERRESTRIAL BIOLOGICAL RESOURCES

This section addresses terrestrial biological resources that could be affected by implementation of the proposed program. The information presented is based on field surveys and review of existing documentation. EDAW biologists conducted multiple reconnaissance-level and focused biological surveys of the program area, particularly the Natomas area, during 2004–2006 as part of current and previous program-related studies and planning efforts.

Existing information reviewed for preparation of this section includes documents that discuss biological resources in the region, such as the previously completed environmental analyses for flood control programs and projects within the program study area discussed in Section 4.1.2, “Use of Previously Prepared Environmental Documentation in This EIR”; the Natomas Basin Habitat Conservation Plan (NBHCP) (City of Sacramento, Sutter County, and The Natomas Basin Conservancy [TNBC] 2003); and annual monitoring reports of TNBC.

4.7.1 REGULATORY SETTING

Many sensitive biological resources in California are protected and/or regulated by federal, state, and local plans, policies, regulations, and laws. The following sections provide a summary of those that may be applicable to implementation of the proposed improvements program.

4.7.1.1 FEDERAL

Federal Endangered Species Act

Pursuant to the federal Endangered Species Act (ESA), the USFWS has regulatory authority over federally listed species. Under the ESA, a permit to “take” a listed species is required for any federal action that may harm an individual of that species. Take is defined under Section 9 of the ESA as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.” Under federal regulation, take is further defined to include habitat modification or degradation where it would be expected to result in death or injury to listed wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering.

Section 7 of the ESA outlines procedures for federal interagency cooperation to conserve federally listed species and designated critical habitat. Section 7(a)(2) requires federal agencies to consult with USFWS to ensure that they are not undertaking, funding, permitting, or authorizing actions likely to jeopardize the continued existence of listed species. For projects where federal action is not involved and take of a listed species may occur, the project proponent may seek to obtain an incidental take permit under Section 10(a) of the ESA. Section 10(a) allows USFWS to permit the incidental take of listed species if such take is accompanied by a habitat conservation plan that includes components to minimize and mitigate impacts associated with the take.

Clean Water Act

Section 404 of the Clean Water Act (CWA) requires project proponents to obtain a permit from the USACE prior to performing any activity that involves any discharge of dredged or fill material into “waters of the United States,” including wetlands. Waters of the United States include navigable waters of the United States, interstate waters, all other waters where the use or degradation or destruction of the waters could affect interstate or foreign commerce, tributaries to any of these waters, and wetlands that meet any of these criteria or that are adjacent to any of these waters or their tributaries. Many surface waters and wetlands in California meet the criteria for waters of the United States.

In accordance with Section 401 of the CWA, projects that apply for a USACE permit for discharge of dredged or fill material must obtain water quality certification from the appropriate RWQCB, in this case the Central Valley RWQCB, indicating that the project will uphold state water quality standards.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) implements domestically a series of international treaties that provide for migratory bird protection. The MBTA authorizes the Secretary of the Interior to regulate the taking of migratory birds; the act provides that it shall be unlawful, except as permitted by regulations, “to pursue, take, or kill any migratory bird, or any part, nest or egg of any such bird...” (U.S. Code Title 16, Section 703). This prohibition includes both direct and indirect acts, although harassment and habitat modification are not included unless they result in direct loss of birds, nests, or eggs. The current list of species protected by the MBTA includes several hundred species and essentially includes all native birds. Permits for take of nongame migratory birds can be issued only for specific activities, such as scientific collecting, rehabilitation, propagation, education, taxidermy, and protection of human health and safety and personal property.

4.7.1.2 STATE

California Endangered Species Act

Pursuant to the California Endangered Species Act (CESA), a permit from the California Department of Fish and Game (DFG) is required for projects that could result in the take of a plant or animal species that is state listed as threatened or endangered. Under CESA, “take” is defined as an activity that would directly or indirectly kill an individual of a species, but the CESA definition of take does not include “harming” or “harassing,” as the ESA definition does. As a result, the threshold for take is higher under CESA than under the ESA. Authorization for take of state-listed species can be obtained through a California Fish and Game Code Section 2080.1 Consistency Determination or a Section 2081 Incidental Take Permit.

California Fish and Game Code Sections 3503 and 3503.5—Protection of Bird Nests and Raptors

Section 3503 of the California Fish and Game Code states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird. Section 3503.5 specifically states that it is unlawful to take, possess, or destroy any raptors (i.e., species in the orders Falconiformes and Strigiformes), including their nests or eggs. Typical violations of these codes include destruction of active nests resulting from removal of vegetation in which the nests are located. Violation of Section 3503.5 could also include failure of active raptor nests resulting from disturbance of nesting pairs by nearby project construction. This statute does not provide for the issuance of any type of incidental take permit.

California Fish and Game Code—Fully Protected Species

Protection of fully protected species is described in Sections 3511, 4700, 5050, and 5515 of the California Fish and Game Code. These statutes prohibit take or possession of fully protected species and do not provide for authorization of incidental take of fully protected species. DFG has informed nonfederal agencies and private parties that their actions must avoid take of any fully protected species.

California Fish and Game Code Section 1602—Streambed Alteration

All diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake in California that supports wildlife resources are subject to regulation by DFG under Section 1602 of the California Fish and Game Code. Under Section 1602, it is unlawful for any person, governmental agency, or public utility to do the following without first notifying DFG: substantially divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of any river, stream, or lake, or deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river,

stream, or lake. A stream is defined as a body of water that flows at least periodically or intermittently through a bed or channel that has banks and supports fish or other aquatic life. This definition includes watercourses with a surface or subsurface flow that supports or has supported riparian vegetation. DFG's jurisdiction within altered or artificial waterways is based on the value of those waterways to fish and wildlife. A DFG streambed alteration agreement must be obtained for any project that would result in an impact on a river, stream, or lake.

Porter-Cologne Water Quality Control Act—California Water Code Section 13000 et seq.

Under the Porter-Cologne Water Quality Control Act, “waters of the state” fall under the jurisdiction of the appropriate RWQCB. The RWQCB must prepare and periodically update water quality control basin plans. Each basin plan sets forth water quality standards for surface water and groundwater, as well as actions to control nonpoint and point sources of pollution to achieve and maintain these standards. Projects that affect wetlands or waters of the state must meet waste discharge requirements of the RWQCB, which may be issued in addition to a water quality certification or waiver under Section 401 of the CWA.

4.7.1.3 LOCAL

Natomas Basin Habitat Conservation Plan

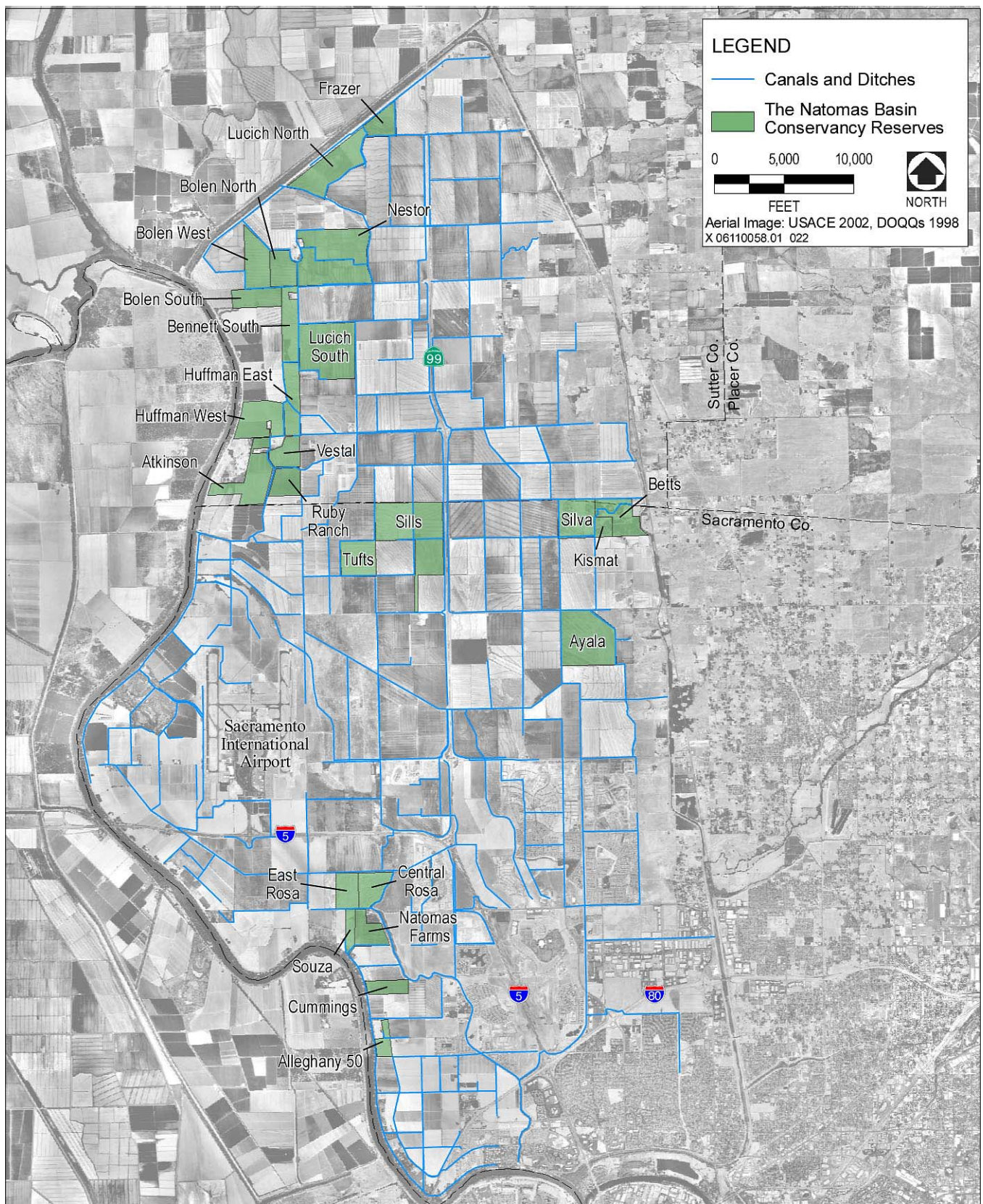
The NBHCP (City of Sacramento, Sutter County and TNBC 2003) was developed to promote biological conservation in conjunction with economic and urban development in the Natomas Basin (i.e., the Natomas area). The NBHCP establishes a multi-species conservation program to minimize and mitigate the expected loss of habitat values and incidental take of “covered species” that could result from urban development and operation and maintenance of irrigation and drainage systems. The NBHCP currently authorizes take associated with 17,500 acres of urban development in southern Sutter County and within the City and County of Sacramento. USFWS approved the NBHCP in 2003 and issued incidental take permits to the City of Sacramento and Sutter County for take of federally listed species resulting from permitted activities. Sacramento County is not a permittee under the NBHCP.

The NBHCP's reserve acquisition and management activities are implemented by TNBC, a private, nonprofit organization that began operating in 1998 and whose mission is to serve as “plan operator” of the NBHCP. TNBC receives mitigation fees paid by developers and other NBHCP participants. These funds are used to acquire, establish, enhance, monitor, and manage mitigation lands in perpetuity. As development within the Natomas area occurs, and as TNBC acquires mitigation lands, site-specific management plans are prepared, adopted, and implemented by TNBC to ensure that the objectives of the NBHCP are fulfilled. As of January 2006, nearly 4,000 acres of mitigation property had been acquired in the Natomas area (TNBC 2006). Current TNBC reserves (as of October 3, 2006) are depicted in Exhibit 4.7-1.

County and City Policies and Ordinances

Codes and policies of the counties (Sacramento, Sutter, Placer, and El Dorado) and cities within which the program area is located include various element policies that address protection of natural resources, including vegetation, sensitive species, and trees.

The Sacramento County General Plan includes policies that promote protection of marsh and riparian areas, including specification of setbacks and “no net loss” of riparian woodland or marsh acreage. It also addresses the need to conserve vernal pools and ephemeral wetlands to ensure no net loss of vernal pool acreage. Several policies specifically promote protection of native oak trees measuring 6 inches or more in diameter and native non-oaks, especially landmark trees, which are defined as trees measuring 19 inches or more in diameter (with the exception of cottonwoods). In addition, the General Plan indicates discretionary projects in areas that support oak groves should ensure there is no net loss of canopy area by preserving the main, central portions of consolidated



Source: The Nature Conservancy 2006

Natomas Basin Conservancy Mitigation Lands

Exhibit 4.7-1

groves and providing an area on-site to mitigate any canopy loss. Chapter 19.12 of Title 19 of the Sacramento County Code also addresses the protection of native oak trees within Sacramento County. This ordinance specifies that no grade cuts, fill greater than 1 foot, trenching, or irrigation systems shall be placed within the driplines of oak trees, and that grading beneath oak trees should be conducted in a manner that does not adversely affect the tree's health.

Title 12 of the Sacramento Municipal Code addresses the protection of trees within the city boundaries, including general protection of all trees on city property and specific protection of heritage trees. Heritage trees include: any tree of any species with a trunk circumference of 100 inches or more and in good health; any native oak, California buckeye, and western sycamore having a circumference of 36 inches or greater when a single trunk, or a cumulative circumference of 36 inches or greater when a multi-trunk; and any tree 36 inches in circumference or greater in a riparian zone.

The Sutter County General plan includes policies that generally address preservation of natural vegetation, including wetlands. It requires that new development mitigate for loss of federally protected wetland to achieve a "no net loss", but does not include any other specific requirements. The General Plan does not specifically address tree preservation and there is no county tree preservation ordinance.

The El Dorado County General Plan specifically addresses protection of oak woodland resources, native vegetation, and landmark trees. It requires 1:1 replacement of native oaks 6 inches in diameter or greater. The general plan also includes woodland canopy retention and replacement standards.

The Placer County General Plan identifies setbacks from streams and other sensitive habitats, a "no net loss" policy for federally and state protected wetlands, and general preservation of outstanding areas of natural vegetation oak woodlands, riparian, and vernal pools. Article 12.16 of the Placer County Code specifically addresses protection of native, landmark, and riparian zone trees and indicates replacement of removed trees may be required.

4.7.2 ENVIRONMENTAL SETTING

4.7.2.1 VEGETATION

The program study area supports a wide array of land uses and habitat types, including urban, suburban, and rural development, agricultural fields, and remnant and restored native habitat. Historically, the program study area was part of a large river and floodplain system that supported large tracts of riparian woodland and scrub, permanent freshwater marsh, and seasonal wetland. Drainage from the western slopes of the Sierra Nevada produced regular flooding along rivers and streams throughout the program study area.

The large rivers within the program study area (Sacramento and American) are now substantially confined by levees to relatively narrow corridors, in some cases with very little native vegetation between the river and the levee. This is primarily true of the Sacramento River, while the American River Parkway provides a much wider habitat corridor. The smaller creeks and streams vary from narrow incised features with little habitat to higher-quality corridors with extensive wetland vegetation (i.e., NEMDC/Steelhead Creek and NCC) and mature oak and riparian woodland (i.e., Dry Creek). The southern portion of the Natomas area is largely developed, particularly south of West Elkhorn Boulevard and east of El Centro Road. The western and northern portions, in contrast, are dominated by agricultural lands, primarily rice fields. An extensive network of irrigation and drainage ditches also traverse the Natomas area and a growing number of restored marsh habitat patches are being created, primarily in the north.

4.7.2.2 WILDLIFE

Before European settlement, the Sacramento area floodplains supported a wide diversity and large numbers of wildlife species associated with its riparian habitats, permanent and seasonal wetlands, and oak woodlands and savannas. Much of this habitat was lost after levees were built to prevent flooding along the rivers and land outside of the levees could be converted to agriculture. More recent land use conversions have been to urban development. As a result, there have been shifts in patterns of wildlife use as land uses and habitats within the program study area have changed. The abundance of species restricted to natural habitats has decreased, and in some cases particular species have ceased to be found. However, remnant native habitat along the rivers and creeks and created habitat associated with drainage and agricultural supply ditches and TNBC preserves have allowed remnant wildlife populations to persist. Although most marshes and seasonal wetlands in the program study area have been converted to agricultural and urban uses, flooded rice fields continue to attract and support migrant waterfowl. Some species also utilize pasture, harvested rice, and other croplands for foraging (City of Sacramento, Sutter County, and TNBC 2003).

4.7.2.3 SENSITIVE BIOLOGICAL RESOURCES

Sensitive biological resources addressed below include those that are afforded special protection through the CEQA, the California Fish and Game Code (including CESA), the ESA, and the CWA.

Special-Status Species

For purposes of this evaluation, special-status species are plants and animals that are legally protected or that are otherwise considered sensitive by federal, state, or local resource conservation agencies and organizations, including:

- ▶ plant and wildlife species that are listed by the ESA and/or CESA as rare, threatened, or endangered;
- ▶ plant and wildlife species considered candidates for listing or proposed for listing;
- ▶ wildlife species identified by DFG as fully protected and/or species of special concern;
- ▶ plants considered by California Native Plant Society (CNPS) to be rare, threatened, or endangered; and
- ▶ plants and animals covered by the NBHCP.

DFG applies the term “California Species of Special Concern” to animals that are not listed under the ESA or CESA but are nonetheless declining at a rate that could result in listing, or that historically existed in low numbers and currently face known threats to their persistence. Both USFWS and DFG use CNPS designations when they are considering formal species protection under the ESA and CESA, respectively.

The California Natural Diversity Database (CNDDDB) (2006) and NBHCP (City of Sacramento, Sutter County, and TNBC 2003) were used as the primary sources to identify previously reported occurrences of special-status species in the vicinity of the program study area. Although the CNDDDB is the most current and reliable tool for tracking occurrences of special-status species, it contains only those records that have been reported to DFG.

Special-Status Plants

A total of 15 special-status plants are found in the vicinity of the program study area. Potentially suitable habitat for each of these species is present within the program area; therefore, they all have potential to occur there. The regulatory status and habitat association are summarized for each species in Table 4.7-1. Each species is also discussed further below. Many of these special-status plants are covered in the NBHCP, and all except one are on either CNPS List 1B (considered rare, threatened, or endangered in California) or CNPS List 2 (considered rare, threatened, or endangered in California but more common elsewhere). In addition, seven of the plants are state and/or federally listed as threatened or endangered.

Table 4.7-1 Special-Status Plant Species with Potential to Occur in the Program Study Area			
Common Name	Scientific Name	Status	Habitat
Big-scale balsamroot	<i>Balsamorhiza macrolepis</i> var. <i>macrolepis</i>	CNPS: 1B	Chaparral; cismontane woodland; valley and foothill grassland
Pine hill ceanothus	<i>Ceanothus roderickii</i>	Federal: Endangered State: Rare CNPS: 1B	Chaparral and cismontane woodland on gabbro soils
Brandegee's clarkia	<i>Clarkia biloba</i> ssp. <i>brandegeae</i>	CNPS: 1B	Chaparral and cismontane woodland
Dwarf downingia	<i>Downingia pusilla</i>	CNPS: 2	Vernal pools and lakes
El Dorado bedstraw	<i>Galium californicum</i> ssp. <i>sierrae</i>	Federal: Endangered State: Rare CNPS: 1B	Oak woodland, with pine associates, on gabbro soils
Bogg's Lake hedge-hyssop	<i>Gratiola heterosepala</i>	CA: Endangered CNPS: 1B NBHCP: covered	Freshwater marshes and swamps; vernal pools
Rose mallow	<i>Hibiscus lasiocarpus</i>	CNPS: 2	Freshwater marshes and swamps
Delta tule pea	<i>Lathyrus jepsonii jepsonii</i>	CNPS: 1B NBHCP: covered	Freshwater and brackish marshes and sloughs
Legenere	<i>Legenere limosa</i>	CNPS: 1B NBHCP: covered	Vernal pools
Colusa grass	<i>Neostapfia colusana</i>	Federal: Threatened CA: Endangered CNPS: 1B NBHCP: covered	Vernal pools
Slender orcutt grass	<i>Orcuttia tenuis</i>	Federal: Threatened CA: Endangered CNPS: 1B NBHCP: covered	Vernal pools
Sacramento orcutt grass	<i>Orcuttia viscida</i>	Federal: Endangered CA: Endangered CNPS: 1B NBHCP: covered	Vernal pools
Sanford's arrowhead	<i>Sagittaria sanfordii</i>	CNPS: 1B NBHCP: covered	Freshwater ponds, marshes and ditches
Layne's butterweed	<i>Senecio layneae</i>	Federal: Threatened State: Rare CNPS: 1B	Chaparral on gabbro, or sometimes serpentine, soils
El Dorado mule ears	<i>Wyethia reticulata</i>	CNPS: 1B NBHCP: not covered	Chaparral on gabbro soils
California Native Plant Society (CNPS) Listing Categories: 1B Plants considered rare, threatened, or endangered in California and elsewhere 2 Plants considered rare, threatened, or endangered in California but more common elsewhere NBHCP = Natomas Basin Habitat Conservation Plan Sources: CNPS 2006; CNDDB 2006; City of Sacramento, Sutter County, and TNBC 2003; USFWS 2005			

Big-scale balsamroot is a perennial herb that occurs in chaparral, cismontane woodland, valley and foothill grassland habitats, and is sometimes restricted to serpentine soils. It is generally found in the Sacramento Valley and north-central Coast Range counties but has been documented in Placer County. Potential habitat for big-scale balsamroot within the program area is restricted to chaparral and woodland surrounding Folsom Reservoir.

Pine Hill ceanothus is federally endangered and state listed as rare. This evergreen shrub species grows only on gabbro soil in openings in chaparral. It is only known to occur in one localized area of approximately 10 known extant occurrences scattered in the Pine Hill formation of western El Dorado County (USFWS 2002a). Potential habitat for Pine Hill ceanothus within the program area is restricted to chaparral on suitable soils adjacent to the southeast portion of Folsom Reservoir.

Brandegee's clarkia is an annual herb that grows in chaparral and cismontane habitats, often in roadcuts. It is known to occur in counties within the northern Sierra Nevada foothills, including El Dorado and Placer Counties. Potential habitat for Brandegee's clarkia within the program area is restricted to chaparral and woodland surrounding Folsom Reservoir.

Dwarf downingia is an annual herb that grows in moderately moist valley and foothill grassland habitats, including a variety of vernal pool types. It generally tends to grow in pools that are inundated for relatively brief periods and have low levels of competition from other plants. Dwarf downingia grows in scattered localities in the Central Valley, San Francisco Bay Delta, and north-central Coast Ranges, including Sacramento County. Potential habitat for this species within the program study area includes vernal pools in remnant grassland patches along the eastern boundary of the Natomas area and adjacent to creeks and streams in the North Sacramento area east of Natomas; additional habitat may be present within the American River Parkway.

El Dorado bedstraw is federally listed as endangered. It is a perennial herb that occurs in oak woodlands with gabbroic soils, including sites with pine associates. It is only known to occur in the Pine Hill formation of western El Dorado County (USFWS 2002a). Potential habitat for El Dorado bedstraw within the program area is restricted to chaparral on suitable soils adjacent to the southeast portion of Folsom Reservoir.

Bogg's Lake hedge-hyssop is state-listed as an endangered species. It is an annual herb that grows in marshes and swamps, along lake and reservoir margins, in vernal pools, and in artificial habitats such as borrow pits and cattle ponds (USFWS 2005). Bogg's Lake hedge-hyssop is found throughout much of northern California, including Sacramento County, and in southern Oregon. Its primary concentration is in the Modoc Plateau, with secondary concentrations in the northeastern and southeastern Sacramento Valley. This species could be found in the relatively limited amount of potential vernal pool habitat within the program area, as well as additional areas of freshwater marsh habitat provided by irrigation/drainage ditches, restored marsh, and remnant habitat patches in the Natomas area, creeks and streams in the North Sacramento area east of Natomas, and the American River Parkway.

Rose mallow is an emergent perennial herb that grows in freshwater marshes and swamps. It is found in the central and southeastern United States and in California's Central Valley, including Sacramento County. Potential habitat for rose mallow within the program study area includes irrigation/drainage ditches, restored marsh, and remnant patches of freshwater marsh habitat in the Natomas area, creeks and streams in the North Sacramento area east of Natomas, and the American River Parkway.

Delta tule pea is a perennial herb that grows in freshwater and brackish marshes and swamps. It is endemic to California, and most populations are small. Delta tule pea primarily occurs in the Delta region of the Central Valley and in the San Francisco Bay Region. Potential habitat for this species within the program study area includes irrigation/drainage ditches, restored marsh, and remnant patches of freshwater marsh habitat in the Natomas area, creeks and streams in the North Sacramento area east of Natomas, and the American River Parkway.

Legenere is an annual herb that grows in a variety of habitats, including shallow areas of vernal pools, vernal marshes, artificial ponds, and floodplains of intermittent streams. It is found in several northern California counties, including Sacramento, with the highest concentrations in the southeastern Sacramento Valley and the Solano–Colusa vernal pool regions. Potential habitat for this species within the program study area includes vernal pools in remnant grassland patches along the eastern boundary of the Natomas area and adjacent to creeks and streams in the North Sacramento area east of Natomas; additional habitat may be present within the American River Parkway.

Colusa grass is state and federally listed as endangered. It is a native annual grass that grows in alkaline basins in the Sacramento and San Joaquin Valleys and on acidic soils of alluvial fans and stream terraces along the eastern margin of the San Joaquin Valley and into the adjacent foothills. It also grows in deep portions of vernal pools, artificial ponds, and in beds of intermittent streams. Colusa grass occurs in Merced, Solano, Stanislaus, and Yolo Counties, with the highest concentrations northeast of Merced in Merced County and east of Hickman in Stanislaus County. Potential habitat for this species within the program study area includes vernal pools in remnant grassland patches along the eastern boundary of the Natomas area and adjacent to creeks and streams in the North Sacramento area east of Natomas; additional habitat may be present within the American River Parkway.

Slender orcutt grass is state and federally listed as endangered. It is a native annual grass that typically grows in vernal pools in diverse vegetation types, ranging from grassland and oak woodland to coniferous forest. It has also been documented in other natural and artificial wetlands, including creek floodplains, stock ponds, and borrow pits. Slender orcutt grass is found in northern California counties such as Butte, Lake, Lassen, Modoc, Plumas, Sacramento, Siskiyou, and Tehama, with the highest concentrations near Dales, Tehama County, in the Northeastern Sacramento Valley Vernal Pool Region and the Modoc Plateau Vernal Pool Region (USFWS 2005). Potential habitat for this species within the program study area includes vernal pools in remnant grassland patches along the eastern boundary of the Natomas area and adjacent to creeks and streams in the North Sacramento area east of Natomas; additional habitat may be present within the American River Parkway.

Sacramento orcutt grass is state and federally listed as endangered. It is a native annual grass that grows in relatively large, deep vernal pools in blue oak woodland and annual grassland. Sacramento orcutt grass is entirely restricted to Sacramento County, and is mainly found east of Mather Field in Rancho Cordova. It is also known from Phoenix Field Ecological Reserve and Phoenix Park, just north of the American River Parkway. Potential habitat for this species within the program study area includes vernal pools in remnant grassland patches along the eastern boundary of the Natomas area and adjacent to creeks and streams in the North Sacramento area east of Natomas; additional habitat may be present within the American River Parkway.

Sanford's arrowhead is an emergent herb endemic to marshes and swamps, vegetated drainage ditches, and other shallow freshwater habitats in California. It has been extirpated from southern California and is only known from a small number of occurrences in the Central Valley. Potential habitat for Sanford's arrowhead within the program study area includes irrigation/drainage ditches, restored marsh, and remnant patches of freshwater marsh habitat in the Natomas area, creeks and streams in the North Sacramento area east of Natomas, and the American River Parkway.

Layne's butterweed is federally-listed as threatened. It is a perennial herb that grows in open rocky areas within chaparral, primarily on gabbro soil and occasionally on serpentine. Most known sites for this species are scattered in an area of western El Dorado County that includes the Pine Hill formation. A few other colonies are known from elsewhere in El Dorado County and from Tuolumne and Yuba Counties (USFWS 2002a). Potential habitat for this species within the program area is restricted to chaparral surrounding Folsom Reservoir.

El Dorado mule ears is a perennial herb that grows in open rocky areas within chaparral on gabbro soils. It is only known to occur in the Pine Hill formation of western El Dorado County (USFWS 2002a). Potential habitat for El

Dorado mule ears within the program area is restricted to chaparral on suitable soils adjacent to the southeast portion of Folsom Reservoir.

Special-Status Wildlife

A total of 29 special-status wildlife species have potential to occur in the program study area. The regulatory status, habitat association, and potential for occurrence within the program study area are summarized for each species in Table 4.7-2. Species and groups of species anticipated to occur in the program area are discussed further below.

Table 4.7-2 Special-Status Wildlife Species with Potential to Occur in the Program Study Area				
Common Name	Scientific Name	Status	Habitat	Potential for Occurrence
Invertebrates				
Valley elderberry longhorn beetle	<i>Desmocerus californicus dimorphus</i>	Fed: Threatened NBHCP: covered	Elderberry shrubs, typically in riparian habitats	Suitable habitat occurs throughout the program study area, primarily along American River (including designated Critical Habitat), Sacramento River, and at Folsom Reservoir
California linderiella	<i>Linderiella occidentalis</i>	Fed: Endangered NBHCP: covered	Vernal pools and other seasonal wetlands	A limited amount of suitable habitat is present within the program study area
Vernal pool tadpole shrimp	<i>Lepidurus packardii</i>	Fed: Endangered NBHCP: covered	Vernal pools and swales	A limited amount of suitable habitat is present within the program study area
Midvalley fairy shrimp	<i>Branchinecta meso Vallensis</i>	NBHCP: covered	Vernal pools	A limited amount of suitable habitat is present within the program study area
Vernal pool fairy shrimp	<i>Branchinecta lynchi</i>	Fed: Threatened NBHCP: covered	Vernal pools and other seasonal wetlands	A limited amount of suitable habitat is present within the program study area
Amphibians				
California tiger salamander	<i>Ambystoma californiense</i>	Fed: Threatened CA: Species of Special Concern NBHCP: covered	Vernal pools and seasonal wetlands in upland with burrows and other below-ground refuge	Suitable habitat within the program study area is very limited; there are no recent occurrences in the vicinity of the program area and the species is not thought to inhabit the region (USFWS 2004)
California red-legged frog	<i>Rana aurora draytonii</i>	Fed: Threatened CA: Species of Special	Aquatic habitats, such as creeks, streams, and	Suitable habitat within the program study area is

Table 4.7-2 Special-Status Wildlife Species with Potential to Occur in the Program Study Area				
Common Name	Scientific Name	Status	Habitat	Potential for Occurrence
		Concern	ponds	restricted to Folsom Reservoir and tributary creeks and streams
Foothill yellow-legged frog	<i>Rana boylei</i>	CA: Species of Special Concern	Foothill and mountain streams, typically with cobble substrate	Suitable habitat in the vicinity of the program study area is restricted to tributaries upstream of Folsom Reservoir
Western spadefoot	<i>Spea hammondi</i>	CA: Species of Special Concern NBHCP: covered	Vernal pools and seasonal wetlands in upland with burrows and other below-ground refuge	Suitable habitat within the program study area is very limited and no recent occurrences have been documented in the vicinity
Reptiles				
Giant garter snake	<i>Thamnophis gigas</i>	Fed: Threatened CA: Threatened NBHCP: covered	Streams, sloughs, ponds, and irrigation/drainage ditches; also require upland refugia no subject to flooding during the snake's inactive season	Natomas supports key population; suitable habitat is also present east of Natomas, but there have been occurrences documented in this area during recent surveys
Northwestern pond turtle	<i>Emys marmorata marmorata</i>	CA: Species of Special Concern NBHCP: covered	Ponds, marshes, rivers, streams, sloughs; nest in nearby uplands with suitable soils	Expected to be present in suitable habitat throughout the program study area
California horned lizard	<i>Phrynosoma coronatum frontale</i>	CA: Species of Special Concern	Open habitats, especially gravelly or sandy areas, washes, and flood plains	American River Parkway and uplands adjacent to Folsom Reservoir provide potentially suitable habitat
Birds				
White-faced ibis	<i>Plegadis chihi</i>	CA: Species of Special Concern NBHCP: covered	Forage and roost in shallow water and flooded fields; nest in freshwater marshes	Natomas provides key foraging habitat, but no nesting colonies are present in the program study area
Aleutian Canada goose	<i>Branta canadensis leucopareia</i>	NBHCP: covered	Forage in agricultural fields and roost in aquatic habitats	May be a winter visitor to the program study area, but no recent documented occurrences
Osprey	<i>Pandion haliaetus</i>	CA: Species of Special Concern	Coasts, lakes, and rivers, primarily adjacent to coniferous forest	Known to nest and forage in the program study area, primarily in vicinity of Folsom Reservoir
Bald eagle	<i>Haliaeetus leucocephalus</i>	Fed: Threatened (proposed for delisting)	Inland waters with adjacent large, old-	Expected to forage in the program study area,

Table 4.7-2 Special-Status Wildlife Species with Potential to Occur in the Program Study Area				
Common Name	Scientific Name	Status	Habitat	Potential for Occurrence
		CA: Endangered and Fully Protected	growth trees or snags	primarily in vicinity of Folsom Reservoir, but no known nesting records
White-tailed kite	<i>Elanus leucurus</i>	CA: Fully Protected	Forage in grasslands and agricultural fields; nest in isolated trees or small woodland patches	Expected to nest and/or forage in suitable habitat throughout the program study area
Northern harrier	<i>Circus cyaneus</i>	CA: Species of Special Concern	Forage and nest in grassland, agricultural fields, and marshes	Expected to nest and/or forage in suitable habitat throughout the program study area
Cooper's hawk	<i>Accipiter cooperii</i>	CA: Species of Special Concern	Forage and nest in open woodlands and woodland margins	Expected to nest and/or forage in suitable habitat throughout the program study area
Swainson's hawk	<i>Buteo swainsoni</i>	CA: Threatened NBHCP: covered	Forage in grasslands and agricultural fields; nest in open woodland or scattered trees	Known to nest and forage throughout the program study area, primarily within Natomas and along creeks and streams to the east
American peregrine falcon	<i>Falco peregrinus anatum</i>	CA: Endangered and fully protected NBHCP: covered	Forage in a variety of open habitats, particularly marshes and other wetlands	Expected to forage in the program study area but no suitable nesting habitat is present
Burrowing owl	<i>Athene cunicularia</i>	CA: Species of Special Concern NBHCP: covered	Grasslands and agricultural fields	Known to occur in eastern Natomas area and at the Sacramento International Airport
Bank swallow	<i>Riparia riparia</i>	CA: Threatened NBHCP: covered	Forage in various habitats; nest in banks or bluffs, typically adjacent to water	Could forage in undeveloped portions of the program study area and nest in river banks, but no colonies have been documented within the past 10 years
Loggerhead shrike	<i>Lanius ludovicianus</i>	CA: Species of Special Concern NBHCP: covered	Forage in grasslands and agricultural fields; nest in scattered shrubs and trees	Could nest and forage in suitable habitat throughout the program study area
Tricolored blackbird	<i>Agelaius tricolor</i>	CA: Species of Special Concern NBHCP: covered	Forage in grasslands and agricultural fields; nest in freshwater marsh, riparian scrub, and other dense shrubs and herbs	Known to nest and forage in Natomas, and could nest along Pleasant Grove Creek Canal and Steelhead Creek

Table 4.7-2 Special-Status Wildlife Species with Potential to Occur in the Program Study Area				
Common Name	Scientific Name	Status	Habitat	Potential for Occurrence
Mammals				
Pallid bat	<i>Antrozous pallidus</i>	CA: Species of Special Concern	Rocky, mountainous areas near water, open, sparsely vegetated grasslands, and desert scrub	Could forage throughout the program study area and roost in woodlands and structures at and near Folsom Reservoir
Pacific western big-eared bat	<i>Corynorhinus townsendii townsendii</i>	CA: Species of Special Concern	Desert scrub, mixed conifer, pinyon-juniper, and pine forest	Could forage throughout the program study area and roost in structures at and near Folsom Reservoir
Spotted bat	<i>Euderma maculatum</i>	CA: Species of Special Concern	Forage in variety of open habitats and roost in small cracks in steep cliffs or stony outcrops	Could forage throughout the program study area but no suitable roost sites are likely to be present
Greater western mastiff-bat	<i>Eumops perotis californicus</i>	CA: Species of Special Concern	Arid to semi-arid habitats, including woodlands, coastal scrub, grasslands, and chaparral	Could forage throughout the program study area and roost in woodlands and structures at and near Folsom Reservoir
NBHCP = Natomas Basin Habitat Conservation Plan Sources: CNDDB 2006, City of Sacramento, Sutter County and TNBC 2003				

Valley Elderberry Longhorn Beetle. The valley elderberry longhorn beetle is federally listed as threatened and is covered under the NBHCP. These beetles are patchily distributed throughout the remaining riparian forests of the Central Valley, from Redding to Bakersfield. They appear to be only locally common (i.e., found in population clusters that are not evenly distributed across the Central Valley). Although wide-ranging, the valley elderberry longhorn beetle has been thought to be in a long-term decline due to human activities that have resulted in widespread alteration and fragmentation of riparian habitats and, to a lesser extent, upland habitats that support the beetle (USFWS 1984). USFWS released a 5-year status review for the valley elderberry longhorn beetle on October 2, 2006 (USFWS 2006a). This review reported an increase in known beetle locations from 10 at the time of listing in 1980 to 190 in 2006. Because of this observed population increase and the concurrent protection and restoration of several thousand acres of riparian habitat suitable for valley elderberry longhorn beetles, the USFWS status review determined that this species is no longer in danger of extinction, and recommended that the species no longer be listed under the ESA. This recommendation is not a guarantee that the species will be delisted, however, because formal changes in the classification of listed species require a separate USFWS rulemaking process distinct from the 5-year review. If valley elderberry longhorn beetles are removed from the ESA list, it will likely be more than a year before this decision is finalized.

Valley elderberry longhorn beetles require blue elderberry shrubs for reproduction and survival and are rarely seen because they spend most of their life cycle as larvae within the stems of the shrubs. Females lay their eggs on the bark; larvae hatch and burrow into the stems. The larval stage may last 2 years, after which the larvae enter the pupal stage and transform into adults. Adults are active (feeding and mating) from March to June (USFWS 1984). It appears that in order to function as habitat for the valley elderberry longhorn beetle, host elderberry shrubs must have stems that are 1.0 inch or greater in diameter at ground level. Use of the plants by the beetle is rarely apparent. Frequently, the only exterior evidence of the shrub's use by the beetle is an exit hole created by the larva

just before the pupal stage. Field studies conducted along the Cosumnes River and in the Folsom Lake area suggest that larval galleries can be found in elderberry stems with no evidence of exit holes. The larvae either succumb before constructing an exit hole or are not far enough along in the developmental process to construct an exit hole.

There are a number of known occurrences of valley elderberry beetle within the program study area, primarily along the American River Parkway. Elderberry shrubs that could support beetles are found throughout the American River and Sacramento River corridors, as well as along creeks, canals, and other waterways and in remnant patches of native habitat elsewhere in the program study area, including areas around Folsom Reservoir. In addition, three areas along the American River, downstream of Folsom Dam, are designated as Critical Habitat for valley elderberry longhorn beetle.

Vernal Pool Invertebrates. Several invertebrate species are specially adapted to life in vernal pools and other seasonal wetland habitats for at least part of their life cycle. California linderiella, vernal pool fairy shrimp, midvalley fairy shrimp, and vernal pool tadpole shrimp are small crustaceans ($\frac{1}{2}$ –2 inches long) that are restricted to vernal pools, swales, and other seasonal pools. Eggs of these species lie dormant during most of the year in the form of cysts, which are capable of withstanding extreme environmental conditions, such as heat, cold, and prolonged dessication. The cysts hatch when the pools fill with rainwater, and the young rapidly develop into sexually mature adults. Not all of the cysts hatch with the first rainfall; some remain dormant to hatch during subsequent events or in later years.

Vernal pool invertebrates occupy a variety of seasonal aquatic habitats, from small, clear, sandstone rock pools to large, turbid, alkaline, grassland valley floor pools. They can live in wetlands ranging from small pools several square feet in area to large vernal lakes of more than 50 acres (USFWS 2005). Habitat for vernal pool invertebrates has become highly fragmented and continues to be threatened by conversion to urban and agricultural uses. Almost three-quarters of vernal pool habitat in the Central Valley was estimated to have been lost by 1997 (USFWS 2005). Potential habitat for vernal pool invertebrates within the program study area is likely to be limited to remnant grassland patches along the eastern boundary of the Natomas area. Additional habitat may be present in areas of the American River Parkway that are not subject to regular flooding.

Giant Garter Snake. The giant garter snake is federally and state listed as threatened and is a primary covered species under the NBHCP. This species formerly ranged throughout the wetlands of California's Central Valley, from Buena Vista Lake near Bakersfield in Kern County north to the vicinity of Chico in Glenn and Butte Counties (Hansen and Brode 1980). Giant garter snakes appear to have been extirpated from the San Joaquin Valley south of Mendota in Fresno County (Hansen and Brode 1980, USFWS 1999) and have suffered serious declines in other parts of their former range. The primary cause of decline, aquatic habitat loss or degradation caused by agricultural development, has been compounded by the loss of upland refugia and bankside vegetation cover (Thelander 1994).

Giant garter snakes inhabit agricultural wetlands and other waterways, such as irrigation and drainage canals, rice fields, marshes, sloughs, ponds, small lakes, low gradient streams, and adjacent uplands in the Central Valley (USFWS 1999). Rice fields and their adjacent irrigation and drainage canals serve an important role as aquatic habitat for giant garter snake. The elements and cycle of the rice field ecosystem coincides fairly closely with the biological needs of the giant garter snake. During summer, giant garter snakes use the flooded rice fields as long as their prey is present in sufficient densities. During late summer, rice fields provide important nursery areas for newborn giant garter snakes. In late summer/fall, water is drained from the rice fields and giant garter snake prey items become concentrated in the remaining pockets of standing water, which allows the snakes to gorge before their period of winter inactivity (USFWS 1999). It appears that the majority of giant garter snakes move back into the canals and ditches as the rice fields are drained, although a few may over-winter in the fallow fields where they hibernate within burrows in the small berms separating the rice checks (Hansen 1998).

Managed marsh can also provide important habitat for giant garter snake. In contrast to rice, managed marsh provides habitat year-round, and provides habitat elements to meet all of the giant garter snakes daily and seasonal needs, such as dense cover, basking sites, and refugia. In the Natomas area, managed marshes have been designed to provide habitat elements throughout the marsh, as opposed to the limited availability of the same elements in rice fields that contribute to giant garter snake use occurring primarily around the perimeter of the rice fields.

The width of uplands used by giant garter snake varies considerably. Many summer basking and refuge areas used by this snake are immediately adjacent to canals and other aquatic habitats, and they may even be located in the upper canal banks. However, giant garter snakes have also been found hibernating as far as 820 feet (250 meters) from water; therefore, in some cases, any land within this distance may be important for snake survival (Hansen 1988). The USFWS considers 200 feet as the width of upland vegetation needed to provide adequate habitat along the borders of aquatic habitat for giant garter snake (USFWS 1997).

Giant garter snake habitat within the program study area is primarily limited to the Natomas area and agricultural lands in levee-protected floodplains in Sutter County north of Natomas. Habitat is distributed throughout the Natomas area in the form of irrigation and drainage ditches. Habitat provided by rice fields and managed marsh is concentrated in the northern portion of the area, and there are scattered areas of remnant marsh habitat. Potentially suitable habitat is also present in creek and stream corridors and rice fields in the North Sacramento area east of Natomas. However, no giant garter snake occurrences have been documented in this area during extensive trapping conducted in recent years (Hansen 2005). The Sacramento and American River corridors do not provide suitable habitat for giant garter snake because this species does not inhabit large river systems and uplands between the levees are subject to regular flooding.

Other Reptiles. Northwestern pond turtle is a DFG species of special concern and is covered under the NBHCP. This species is generally associated with permanent or near-permanent aquatic habitats, such as lakes, ponds, streams, freshwater marshes, and agricultural ditches. They require still or slow-moving water with instream emergent woody debris, rocks, or similar features for basking sites. Pond turtles are highly aquatic but can venture far from water for egg-laying. Nests are typically located on unshaded upland slopes in dry substrates with clay or silt soils (Jennings and Hayes 1994). Ditches, ponds, and marshes throughout the Natomas area provide potential habitat for northwestern pond turtle. Potential breeding habitat in the basin, however, is very limited by the predominance of agriculture and development but could occur along ditches and margins of other aquatic habitat. Pond turtles are also likely to occur in suitable habitat within the American River Parkway and potentially in Folsom Reservoir.

California horned lizard is a DFG species of special concern. This species occurs in open habitats, particularly gravelly or sandy areas, washes, flood plains, wind-blown deposits, and sand dunes. Commonly occupied habitats include valley and foothill woodlands, coniferous forest, riparian, chaparral, and annual grasslands. This lizard has a relatively wide range in California, primarily concentrated in the Central coast and Coast Range regions from the San Francisco Bay Area south to northern Los Angeles, Santa Barbara, and Ventura Counties, and in the Sierra Nevada foothills. Known extant populations of California horned lizard occur in El Dorado and Placer Counties, and upland habitats surrounding Folsom Reservoir and areas along the American River could support this species.

Amphibians. California tiger salamander and western spadefoot occupy vernal and other seasonal wetland habitats. As indicated in Table 4.7-1, tiger salamander is not thought to inhabit the region in which the program study area is located. Although suitable vernal pool habitat exists from Butte County south to the Cosumnes River, no tiger salamanders have been observed in extensive surveys conducted throughout this area (USFWS 2004). Western spadefoot is also unlikely to occur within the program study area. There is one documented occurrence of this species in the vicinity of the area, but it was recorded in the late 1970s (CNDDDB 2006).

California red-legged frog is federally listed as threatened and is a DFG species of special concern. The USFWS released a recovery plan addressing this species in 2002 (USFWS 2002b), and critical habitat was designated in April 2006 (USFWS 2006b). No critical habitat or recovery plan core areas are present within the program study area. Historically, the California red-legged frog occurred in coastal mountains from Marin County south to northern Baja California, and along the floor and foothills of the Central Valley from about Shasta County south to Kern County. Currently, this species is known only from coastal areas, the northern Transverse Ranges, and isolated locations in the Sierra Nevada; it was probably extirpated from the floor of the Central Valley prior to 1960 (USFWS 2002b). California red-legged frogs are commonly found in lowlands or foothills adjacent to streams, and also inhabit humid forests, woodlands, grasslands, and streamsides with plant cover. Adults can use mammal burrows or other refuges such as moist leaf litter in riparian habitats for aestivation (Jennings and Hayes 1994). Populations of California red-legged frog have recently been documented upstream of Folsom Reservoir, along the north fork of Weber Creek and the middle fork of the American River. Folsom Reservoir and tributary creeks and streams provide potential habitat for this species, but the presence of predatory fish and fluctuating lake levels that affect vegetation communities limit the value of this habitat. Despite these limitations, an individual was documented in a small stream that flows into the southeastern portion of the reservoir in 2005 (CNDDDB 2006).

Foothill yellow-legged frog is a DFG species of special concern. This species known range includes the Coast Ranges from the Oregon border south to the Transverse Mountains in Los Angeles County, most of northern California west of the Cascade crest, and along the western flank of the Sierra south to Kern County. Foothill yellow-legged frogs inhabit foothill and mountain streams bordered by a variety of vegetation types, including riparian, coniferous forest, coastal scrub, chaparral, and meadows. They require shallow, flowing water and appear to prefer small to moderate-sized streams with at least some cobble-sized substrate (Jennings and Hayes 1994). These frogs are relatively strong swimmers and prefer faster water habitat than do other frog species in the foothills. Potential habitat for foothill yellow-legged frogs in the vicinity of the program study area is limited to suitable tributaries upstream of Folsom Reservoir. The species is not likely to occur within the program area, because the reservoir and lower reaches of tributaries do not provide suitable habitat and support exotic predatory species.

Swainson's Hawk. Swainson's hawk is state listed as threatened and is a primary covered species under the NBHCP. Historically, Swainson's hawks nested throughout lowland California. As many as 17,000 Swainson's hawk pairs may have nested in California at one time (DFG 1994). Currently, there are 700–1,000 breeding pairs in California, of which 600–900 are in the Central Valley (Estep 2003). Swainson's hawks typically are found in California only during the breeding season (March through September) and winter in Mexico and South America, although a small number of individuals have been wintering in the San Francisco Bay-Delta area for several years (City of Sacramento, Sutter County, and TNBC 2003). The Central Valley population migrates only as far south as Central Mexico. Swainson's hawks begin to arrive in the Central Valley in March. Nesting territories are usually established by April, with incubation and rearing of young taking place through June (Estep 2003).

Swainson's hawks most commonly are found in grasslands, low shrublands, and agricultural habitats that include large trees for nesting. They nest in riparian woodlands, roadside trees, trees along field borders, and isolated trees. Corridors of remnant riparian forest along drainages contain the majority of known nests in the Central Valley (England et al. 1997; Estep 1984; Schlorff and Bloom 1984). Nesting pairs frequently return to the same nest site for multiple years and decades.

Prey abundance and accessibility are the most important features determining the suitability of Swainson's hawk foraging habitat. In addition, agricultural operations (e.g., mowing, flood irrigation) have a substantial influence on the accessibility of prey and thus create important foraging opportunities for Swainson's hawk. Crops that are tall and dense enough to preclude the capture of prey do not provide suitable habitat except around field margins, but prey animals in these habitats are accessible during and soon after harvest. Swainson's hawks feed primarily on small rodents, but also consume insects and birds. Although the most important foraging habitat for Swainson's hawks lies within a 1-mile radius of each nest (City of Sacramento, Sutter County, and TNBC 2003),

Swainson's hawks have been recorded foraging up to 18.6 miles from nest sites (Estep 1989). Any habitat within the foraging distance may provide food at some time in the breeding season that is necessary for reproductive success. In a dynamic agricultural environment such as the Natomas area, the area required for Swainson's hawk foraging habitat depends on time of season, crop cycle, crop type, and discing/harvesting schedule, as these factors affect the abundance and availability of prey (City of Sacramento, Sutter County, and TNBC 2003).

The most recent survey published by TNBC (2005) documented 89 nest sites in or adjacent to the Natomas area in 2004, of which 59 were active. Most nests sites are located in the western portion of the Natomas area along the Sacramento River where large trees are available. However, Swainson's hawks nest and forage throughout the area, depending on the availability of suitable nest trees in proximity to upland foraging areas (Estep 2003). They also nest and forage along the American River and in other portions of the program study area that support suitable nest trees and foraging habitat.

Burrowing Owl. Burrowing owl is a DFG species of special concern and is covered under the NBHCP. Burrowing owls and their nests are also protected under Section 3503.5 of the California Fish and Game Code. Burrowing owls typically inhabit grasslands and other open habitats with low-lying vegetation. They are also known to nest and forage in idle agricultural fields, ruderal fields, and the edges of cultivated fields, although these areas provide lower-quality habitat than native grasslands. Burrow availability is an essential component of suitable habitat. Burrowing owls are capable of digging their own burrows in areas with soft soil, but they generally prefer to adopt those excavated by other animals, typically ground squirrels. In areas where burrows are scarce, they can use pipes, culverts, debris piles, and other artificial features.

Burrowing owl sightings within the program study area are concentrated at the Sacramento International Airport and in remnant grassland patches along the eastern boundary of the Natomas area. No systematic surveys have been conducted to determine burrowing owl distribution across the Natomas area, but nine occurrences are documented in the CNDDDB, including five since 2000 (CNDDDB 2006).

Other Nesting Birds. A number of the bird species identified in Table 4.7-1 have potential to nest within the program study area. Species associated with riparian and other woodland habitats (e.g., Cooper's hawk and white-tailed kite) are most likely to nest along the Sacramento and American Rivers and minor waterways that support suitable vegetation, as well as isolated patches of remnant woodland and suitable trees, particularly within the Natomas area. Osprey could nest in trees and other suitable structures (e.g., power poles) at Folsom Reservoir and along nearby reaches of the American River. Potential nesting habitat for tricolored blackbird is primarily limited to TNBC preserves and areas of remnant marsh habitat within the Natomas area (e.g., Prichard Lake) and along the NCC, Pleasant Grove Creek Canal, and Steelhead Creek. Bank swallows are unlikely to nest in the program study area; no nesting colonies have been documented in the past 10 years. If they are present, colonies would be restricted to banks of the Sacramento and American Rivers. Northern harriers and loggerhead shrike are anticipated to be widely distributed, particularly in open agricultural and grassland habitats of the program study area, such as are found in the Natomas and South Sacramento Streams Group (SSSG) areas and adjacent to Folsom Reservoir (loggerhead shrike).

Non-breeding Birds. Several bird species identified in Table 4.7-1 have potential to occur within the program study area as non-breeding individuals. These may include species that regularly winter in the region, pass through during migration, or nest in nearby areas (e.g., Coastal Range, Sierra Nevada foothills, etc.) and may wander into the program study area to forage. Among these non-breeding species, is bald eagle, which is federally listed as threatened but has been proposed for delisting. It is also state listed as endangered and is a fully protected species in California. Within California, breeding bald eagles are primarily restricted to Butte, Lake, Lassen, Modoc, Plumas, Shasta, Siskiyou, and Trinity Counties. They are fairly common as a local winter migrant at various inland waters in California, including Folsom Reservoir, and are occasionally observed along the American and Sacramento Rivers.

Bats. Several bats that are California species of special concern have potential to occur in the program study area. No known occurrences of these species have been documented within the program study area. However, the area provides suitable foraging habitat and could support suitable roost sites for some species.

Pallid bat ranges from western Canada to central Mexico, and is usually found in rocky, mountainous areas near water, and in desert scrub. They also occur in open, sparsely vegetated grasslands and seem to prefer to forage in open habitats. Pallid bats roost in various situations, including: warm, horizontal openings such as attics or rock cracks during the day; in the open, near foliage, at night; and buildings, caves, or cracks in rocks during hibernation (Miller 2002).

Pacific Western big-eared bat is known to occur in the coastal regions of north and central California to Washington and can be found in a variety of habitats throughout California, from moist coastal forest to dry deserts. These bats are most commonly associated with desert scrub and coniferous forest. Common roosting locations include limestone caves, lava tubes, mines, buildings and other structures. This species is extremely sensitive to disturbance of roost sites.

Spotted bats likely occur in suitable habitat throughout California. They have been documented in various habitats, ranging from arid deserts to ponderosa pine forests and marshlands, and typically forage in open areas (Pierson and Rainey 1998). Spotted bats roost in the small cracks of steep cliffs and stony outcrops.

Greater western mastiff-bat occurs from central California to central Mexico. This bat is found in arid to semi-arid habitats, including coniferous and deciduous woodlands, coastal scrub, grasslands and chaparral (Zeiner et al. 1990). Preferred roosting sites include cracks and crevices in cliffs, trees, tunnels and buildings. Day roosts in cliffs are usually in large cracks in exfoliating slabs of granite or sandstone.

Sensitive Habitats

Sensitive habitats are those that are of special concern to resource agencies or that are afforded specific consideration through CEQA, Section 1602 of the California Fish and Game Code, and/or Section 404 of the CWA, as discussed above in Section 4.7.1, “Regulatory Setting.”

The program study area supports a variety of sensitive habitats. Rivers, creeks, sloughs, canals, and irrigation/drainage ditches are anticipated to be considered waters of the United States and subject to regulation under CWA Section 404. Other permanently and/or seasonally wet habitats, such as freshwater marsh, seasonal wetlands, and vernal pools could qualify as wetlands subject to Section 404 regulation if they are adjacent or connected to waters of the United States. All of these aquatic habitats are also anticipated to qualify as waters of the state and regulation under the Porter-Cologne Water Quality Control Act. Waterways and associated riparian habitats are subject to regulation under Section 1600 et seq. of the California Fish and Game Code.

Other habitats considered sensitive by DFG include those identified as “rare and worthy of consideration” in natural communities recognized by the CNDDDB. These sensitive communities provide essential habitat to special-status species that are often restricted in distribution or decreasing throughout their range. Natural communities within the program study area that qualify as sensitive include Great Valley cottonwood riparian forest, elderberry savanna, and northern hardpan vernal pool (CNDDDB 2006).

4.7.3 ENVIRONMENTAL IMPACTS

The following impact analysis provides a program-level evaluation of the potentially significant effects on terrestrial biological resources that may result from the improvements that would be implemented using the proposed funding mechanisms. These impacts are discussed in a general manner that relates to the program as a whole. In addition, potentially significant impacts that relate to particular program elements (e.g., Natomas area levee improvements, Folsom Dam improvements, American River Parkway enhancement, long-term channel and

levee maintenance) are identified when they can be ascertained and analyzed at this time. The analysis incorporates information from environmental documents previously completed for flood control improvement programs and projects that are components of the proposed program, as described in Section 4.1.2, “Use of Previously Prepared Environmental Documentation in This EIR.”

4.7.3.1 SIGNIFICANCE CRITERIA

Thresholds for determining the significance of impacts on biological resources were based on the environmental checklist form in Appendix G of the State CEQA Guidelines. The proposed project would have a significant impact on biological resources if it would:

- ▶ have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by DFG or USFWS;
- ▶ have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in any local or regional plans, policies, or regulations, or by DFG or USFWS;
- ▶ have a substantial adverse effect on federally protected waters of the United States, including wetlands, as defined by Section 404 of the CWA (including but not limited to marshes, vernal pools, rivers, etc.) through direct removal, filling, hydrological interruption, or other means;
- ▶ interfere substantially with the movement of any native resident or migratory wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;
- ▶ conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or
- ▶ conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan.

4.7.3.2 IMPACT ANALYSIS

The effects of permanent variable storage space flood control operation on terrestrial biological resources around Folsom Reservoir and on riparian vegetation downstream on the American River were previously analyzed at a project level by SAFCA. The analysis found that the changes in flow regime would not affect any sensitive habitats at Folsom Reservoir, would not adversely affect the ability of riparian tree and shrub species to regenerate, and would not adversely affect freshwater marsh along the lower American River (SAFCA 2000). See Section 4.1.3, “Operational Effects Previously Addressed by SAFCA,” for additional discussion. Potential effects on vegetation from increased inundation associated with increased surcharge storage have been analyzed by the USACE and the California Reclamation Board (The Reclamation Board) (2001) and the USACE, SAFCA, and The Reclamation Board (2002). Both analyses concluded that the frequency and duration of extended inundation periods would be within the tolerance limits of natural vegetation communities and that no substantial increase in mortality or decrease in vigor of natural vegetation is expected to result from this program component. No substantial changes in the proposed project, no substantial changes with respect to the circumstances under which the project would be undertaken, and no new information of substantial importance implicate new significant effects on the environment or a substantial increase in the severity of previously identified significant effects. Therefore, these conclusions remain valid and are relied on in this EIR.

IMPACT **Effects on Sensitive Habitats.** *Implementation of the proposed program would result in adverse and beneficial effects to sensitive habitats, including wetlands, other waters of the United States, riparian habitats, and protected trees. The extent of such effects cannot be quantified at this time; however, the potential exists for substantial adverse effects to sensitive habitats to result. This potential impact would be significant.*

4.7-a

Sensitive habitats within the program study area include wetland, riparian, and open-water habitats that qualify for USACE jurisdiction and are protected under Section 404 of the CWA, subject to DFG jurisdiction under Section 1600 of the California Fish and Game Code, and/or considered sensitive natural communities by DFG. Trees protected by county and city policies and ordinances, including native oaks, are also considered sensitive. These habitats and trees are primarily associated with Folsom Reservoir, the American and Sacramento River corridors, other creeks and canals surrounding and east of the Natomas area, and the irrigation and drainage systems within Natomas. Smaller areas of sensitive habitat, including vernal pools, seasonal wetlands, riparian, and isolated trees grow in patches throughout the program study area, primarily the Natomas area. Oak woodlands are present in areas around Folsom Reservoir and below Folsom Dam in the Folsom Bridge construction area. These habitats would be affected by the proposed improvements in a variety of ways, ranging from permanent habitat loss to long-term habitat enhancement. Temporary and permanent habitat loss could result from a variety of potential program components, such as construction activities at Folsom Dam and dikes; relocation and/or fill of portions of ditches and/or vernal pools and seasonal wetlands adjacent to the Natomas levees to accommodate landside levee improvements; loss of riparian habitat to accommodate lower American and Sacramento River waterside levee improvements, bank stabilization, and erosion control; construction of a new bridge downstream of Folsom Dam; borrow site excavation; and riparian impacts associated with activities in the levee integrity program to preserve channel conveyance capacity. Enhancement, restoration, and preservation of sensitive habitats could result from American River Parkway floodplain improvements and acquisition of easements in rural floodplain areas upstream and directly downstream of the Fremont Weir. Although the program includes components that would result in an increase in and/or enhancement of sensitive habitats, implementation of the program could result in substantial adverse effects to sensitive habitats. This potential impact would be significant.

IMPACT **Effects on Special-Status Plants.** *Implementation of the proposed program could result in disturbance and temporary and permanent loss of habitats that are occupied by special-status plant populations. This potential impact would be significant.*

4.7-b

Fifteen special-status plant species have potential to occur in the program study area. Six of these species (dwarf downingia, Bogg's Lake hedge-hyssop, legenere, Colusa grass, slender orcutt grass, and Sacramento orcutt grass) are primarily restricted to vernal pool habitats, which are very limited within the program study area. Three additional species (rose mallow, Delta tule pea, and Sanford's arrowhead) occur along rivers, creeks, sloughs, and canals with still or slow-moving water, irrigation/drainage ditches, and remnant and restored freshwater marsh. The remaining six species (big-scale balsamroot, Pine Hill ceanothus, Brandegee's clarkia, El Dorado bedstraw, Layne's butterweed, and El Dorado mule-ears) occur in upland habitats, such as chaparral, woodland, and coniferous forest; some are restricted to particular soil types (e.g., serpentine, gabbro, etc.). As described above under Impact 4.7-a, proposed program components could result in both adverse and beneficial effects to plants that occur in aquatic habitats. Folsom Dam components could affect plants that occur in upland habitats surrounding the reservoir. Disturbance of suitable habitat for special-status plants could result in temporary loss of individual plants, but population could persist if the habitat is restored to its prior condition. Permanent loss of habitat or repeated temporary effects could result in permanent loss of special-status plant populations or portions of populations, which could have a substantial adverse effect on some species. This could include a reduction in the number of endangered, rare, or threatened species and/or restrict the range of species that have very limited distributions, such as Sacramento orcutt grass. Although the program includes components that would result in an increase and/or enhancement of special-status plant habitat in the lower American River floodway, adverse effects on these resources could still occur, particularly with respect to vernal pool and upland species. Therefore, implementation of the program could result in substantial adverse effects to special-status plants. This potential impact would be significant.

IMPACT 4.7-c *Effects on Valley Elderberry Longhorn Beetle. Implementation of the proposed program could result in adverse effects on, and potential loss of, blue elderberry shrubs occupied by valley elderberry longhorn beetles. This potential impact would be significant.*

Blue elderberry shrubs, the host plant for valley elderberry longhorn beetle larvae, are widely distributed throughout the program study area, primarily at Folsom Reservoir, along the American River and Sacramento River corridors, as well as along creeks, canals, and other waterways and in remnant patches of native habitat. There are a number of known occurrences of valley elderberry longhorn beetle along the American River, and three areas downstream of Folsom Dam are designated as Critical Habitat for the species. Various program components could require removal, trimming, or disturbance of nearby elderberry shrubs. Activities with the greatest potential to adversely affect elderberry shrubs include construction-related activity for Folsom Dam and dike modifications, construction of a new bridge downstream of Folsom Dam, bank stabilization and waterside erosion control, levee widening and berm construction, and actions associated with the levee integrity program to maintain channel conveyance capacity. At the same time, proposed floodplain and riparian habitat improvements within the American River Parkway could improve habitat conditions for elderberry shrubs and the beetles that depend on them. Although the program includes this component that enhance habitat conditions, potential loss of valley elderberry longhorn beetles resulting from implementation of program components would represent a reduction in the number of an endangered, rare, or threatened species and adverse effects to elderberry shrubs could result in a substantial adverse effect on the beetle. This would be a significant impact.

IMPACT 4.7-d *Effects on Special-Status Vernal Pool Invertebrates. Implementation of the proposed program could result in direct and indirect adverse effects to suitable habitat for special-status vernal pool invertebrates and potential loss of invertebrate populations if they are present in the affected habitats. This potential impact would be significant.*

Vernal pools and other suitable seasonal wetland habitat for California linderiella, vernal pool fairy shrimp, midvalley fairy shrimp, and vernal pool tadpole shrimp could be present in remnant grassland patches along the eastern boundary of the Natomas area, adjacent to creeks and streams east of Natomas, and in the American River Parkway. Program components could result in adverse effects on suitable habitat for vernal pool invertebrates, including direct habitat loss from levee improvements and indirect habitat loss resulting from altered hydrology. Temporary disturbance and/or degradation of habitat quality could also occur. These effects could result in temporary loss of individuals, but the population could persist if the habitat is restored to its prior condition. Adverse effects within the Natomas area could be particularly detrimental because most of the habitat for vernal pool invertebrates in this area has already been eliminated. The loss of listed vernal pool invertebrates would represent a reduction in the number of an endangered, rare, or threatened species and adverse effects to vernal pool habitats could result in a substantial adverse effect on these invertebrate species. This would be a significant impact.

IMPACT 4.7-e *Effects on Giant Garter Snake. Implementation of the proposed program is likely to result in disturbance and temporary and permanent loss of aquatic and upland habitat for giant garter snake. Program activities also have potential to result in direct take of individuals. This impact would be significant.*

Irrigation and drainage ditches, rice fields, managed marsh, and remnant marsh within Natomas provide critically important aquatic habitat to the resident population of giant garter snakes. Suitable upland adjacent to these aquatic habitats is very limited, and, in some areas, is almost exclusively provided by levee slopes and maintenance corridors. These habitats could be affected by the proposed program in a variety of ways, ranging from permanent habitat loss to long-term habitat conservation. Temporary and permanent habitat loss could result from relocation and/or fill of portions of ditches, rice fields, and managed marsh adjacent to the Natomas levees to accommodate landside levee improvements. Construction activities associated with these levee improvements could also result in direct disturbance and loss of individual giant garter snakes. In contrast to potential adverse effects, proposed preservation of rural floodplains through easement acquisition along the Sacramento River in

the northern portion of the program study area could have a beneficial effect to the overall sustainability of giant garter snake populations in the region, because the proposed easements are likely to include lands that are currently in rice production and that would be maintained in rice production. Although the program includes this habitat preservation component, loss of individual giant garter snakes would represent a reduction in the number of an endangered, rare, or threatened species and habitat loss could result in a substantial adverse effect on the species. This would be a significant impact.

IMPACT 4.7-f *Effects on Other Special-Status Reptiles and Special-Status Amphibians. Implementation of the proposed program could result in direct and indirect adverse effects to suitable habitat for northwestern pond turtle and California red-legged frog, and/or local populations of these species if they are present in the affected habitats. Additional special-status amphibian and reptile species are unlikely to occur in the program area or potential impacts are unlikely to have a substantial adverse effect. Potential impacts on northwestern pond turtle and California red-legged frog would be significant.*

Irrigation and drainage ditches, managed marsh, and remnant marsh within the Natomas area and aquatic habitat within the American River Parkway and at Folsom Reservoir function as potential feeding, breeding, and rearing habitat for northwestern pond turtles. Ditches also serve as movement corridors for northwestern pond turtle throughout the Natomas area. Suitable upland adjacent to aquatic habitats in Natomas is very limited, and, in some areas, is almost exclusively provided by levee slopes and maintenance corridors. Uplands adjacent to aquatic habitat within the American River Parkway, along some creeks and streams east of Natomas, and adjacent to Folsom Reservoir are more extensive and could support suitable nesting areas. California horned lizard is not known to occur in the program study area but potentially suitable habitat is present along portions of the American River and surrounding Folsom Reservoir.

Folsom Reservoir and upstream tributaries provide potentially suitable habitat for California red-legged frog. The value of this habitat is limited, however, by the presence of predatory fishes and bull frogs. Only one documented occurrence is known from the program study area, but it is a recent occurrence and confirms the potential for the species to occur in and near Folsom Reservoir. Foothill yellow-legged frogs are known to occur upstream of Folsom Reservoir, but no suitable habitat for them is provided by the reservoir or lower reaches of its tributaries.

The limited amount of vernal pools and other seasonal wetland habitats within the program study area are unlikely to support California tiger salamander or western spadefoot populations. Tiger salamander is not thought to occur in the region, because none have been observed in extensive surveys conducted from Butte County south to the Cosumnes River (USFWS 2004). No spadefoot occurrences have been documented in the vicinity of the program study area since the late 1970s (CNDDDB 2006). Therefore, these species are unlikely to be adversely affected by the proposed program of improvements.

Pond turtle habitat could be affected by the proposed program in a variety of ways, ranging from permanent habitat loss to long-term habitat conservation. Temporary and permanent habitat loss could result from relocation and/or fill of portions of ditches, rice fields, and managed marsh adjacent to the Natomas levees to accommodate landside levee improvements; improvements along creeks and streams east of Natomas; American River Parkway floodplain improvements; Folsom Dam improvements; and activities associated with the levee integrity program to preserve channel conveyance capacity. Construction activities associated with these program components could also result in direct disturbance and loss of individual pond turtles. Proposed acquisition of rural floodplain easements in the northern portion of the program study area and floodplain habitat improvements within the American River Parkway could have a substantial beneficial effect to northwestern pond turtle populations in the region. Although the program includes these habitat enhancement and preservation components, habitat loss elsewhere and potential direct effects on pond turtles could have a substantial adverse effect on local populations of the species. Although California horned lizard could occur in the program area and be affected by implementation of program components, effects would primarily be limited to habitat disturbance and potential for direct loss of individuals is likely to be relatively minimal. Because these lizards occur in a variety of habitats and more suitable habitat is present outside of the program study area, potential effects to habitat along the

American River and surrounding Folsom Reservoir is unlikely to have a substantial adverse effect on this species, even on a local level.

Marginal-quality habitat for California red-legged frog in Folsom Reservoir and lower reaches of its tributaries could be affected by Folsom Dam improvements and related activities. Within the reservoir, these frogs are likely to be restricted to areas of higher-quality habitat where tributary creeks and streams flow into the reservoir. Habitat elsewhere in the reservoir is of relatively low quality and is unlikely to support red-legged frogs. Therefore, direct construction activities associated with Folsom Dam improvements are unlikely to adversely affect red-legged frogs. Emergency flood retention and release could, however, adversely affect habitat in the lower reaches of tributary creek and streams. If breeding frogs are present in these areas, such fluctuations could affect eggs laid before or after inundation by flooding them in water depths that are too great or drying them out as water levels recede. Potential impacts to northwestern pond turtle and California red-legged frog would be significant.

IMPACT **Effects on Swainson's Hawk.** *Implementation of the proposed program could result in loss of active Swainson's hawk nests. Loss of nesting habitat and disturbance and temporary and permanent loss of suitable foraging habitat could also occur. This impact would be significant.*

4.7-g

The program area is within a densely populated and critical component of the Central Valley Swainson's hawk population. Nesting pairs in the Natomas area may represent as much as 10% of the Swainson's hawks that are found in the Central Valley, and additional individuals nest and forage along the American River and other areas of suitable habitat within the program study area. Suitable foraging habitat could be adversely affected by levee and floodplain improvements. These effects are likely to be temporary in nature, although there is potential for some permanent loss of foraging habitat. Removal of occupied and other suitable nest trees could result from levee improvements, bank stabilization, erosion control, and actions associated with the levee integrity program to maintain channel conveyance capacity along the Sacramento and American Rivers. Implementation of these and other program-related activities could also result in disturbance of nesting Swainson's hawks, potentially resulting in nest abandonment and loss of active nests. Potential beneficial effects to Swainson's hawk could result from enhancement, restoration, and/or preservation of nesting and foraging habitats associated with American River Parkway floodplain improvements and acquisition of easements in rural floodplain areas along the Sacramento River in the northern portion of the program study area. However, adverse effects on Swainson's hawk could include a reduction in the number of this threatened species. This would be a significant impact.

IMPACT **Effects on Other Special-Status Birds.** *Implementation of the proposed program could result in loss and disturbance of foraging and nesting habitat for special-status birds. It could also result in loss of occupied burrowing owl burrows and active nests of special-status birds and common birds that are protected under the MBTA and Fish and Game Code. This potential impact would be significant.*

4.7-h

The program area provides foraging and/or nesting habitat for a variety of special-status bird species. Implementation of the proposed program would result in temporary disturbance, and could result in relatively minor losses, of foraging habitat as a result of levee and floodplain improvements. Because these effects would be largely temporary in nature and limited to a small portion of the overall foraging habitat within the program area, this impact is unlikely to have a substantial adverse effect on any special-status birds. Many of the special-status bird species listed in Table 4.7-2 also have potential to nest in the program study area, including osprey, white-tailed kite, northern harrier, Cooper's hawk, burrowing owl, bank swallow, loggerhead shrike, and tricolored blackbird. Removal of active nests of these and other common nesting birds could also result from implementation of program-related activities. Visual or noise disturbance of active nests could result in abandonment and nest loss of various special-status birds. Destruction of burrows occupied by burrowing owls and loss of burrowing owl habitat could also result from program implementation.

Potential beneficial effects on special-status birds could result from proposed enhancement, restoration, and/or preservation of nesting and foraging habitats associated with American River Parkway floodplain improvements and acquisition of easements in rural floodplain areas along the Sacramento River in the northern portion of the program study area. Despite these potential improvements, loss of occupied burrowing owl habitat and active nests of this and other special-status birds could result in a substantial adverse effect on local populations of the affected species. Loss of active nests of common species would be inconsistent with the MBTA and a violation of Fish and Game Code, but would not constitute a significant impact under CEQA. Construction activities associated with Folsom Dam and dike modifications could result in disturbance of bald eagles wintering at the reservoir, but individuals could relocate to less disturbed portions on the eastern side of the reservoir. Potential impacts on burrowing owls and other nesting special-status birds that could result from program implementation would be significant.

IMPACT **Effects on Special-Status Bats at Folsom Dam.** *Implementation of the proposed program could result in disturbance of roosting bats, including maternity roosts. This potential impact would be significant.*
4.7-i

The program area provides foraging habitat for several special-status bat species, and woodland habitats and artificial structures within the program area could provide suitable roost sites. Implementation of program elements would have a minimal effect on the use of foraging habitat, and potential for disturbance of roost sites is relatively limited. Roosting habitat provided by woodland that would be disturbed or removed is anticipated to support relatively small numbers of bats and is unlikely to support maternity colonies. However, artificial structures, such as Folsom Dam, talus portions of earthen dikes along the edge of the reservoir, and bridges downstream of the dam could support larger numbers of bats, including maternity colonies. Alteration of these features and construction within close proximity to them could result in disturbance of roost sites, including potential abandonment. Abandonment of important roost sites, including maternity roosts, could result in a substantial adverse effect to local populations of special-status bats. This potential impact would be significant.

IMPACT **Effects on Wildlife Corridors.** *Implementation of the proposed program could result in disturbance and/or loss of habitats that serve as wildlife corridors. Wildlife corridors provided by the American River Parkway would be enhanced, adverse effects on corridors elsewhere in the program area could result. This potential impact would be significant.*
4.7-j

Riparian and other open-space habitats along the American and Sacramento Rivers, along creeks and streams surrounding and east of Natomas, and at Folsom Reservoir support valuable botanical and wildlife diversity and serve as a corridor for wildlife movement. Irrigation/drainage ditches within Natomas also serve as critical corridors for movement of aquatic species. These corridors could be affected in a variety of ways, ranging from permanent habitat loss to long-term habitat enhancement. Temporary and permanent habitat loss could result from a variety of potential program components, such as relocation and/or fill of portions of ditches adjacent to the Natomas levees to accommodate landside levee improvements; loss of riparian habitat to accommodate lower American and Sacramento River waterside levee improvements, bank stabilization, and erosion control; Folsom Dam and dike modifications; construction of a new bridge downstream of Folsom Dam; and riparian impacts associated with the levee integrity program. Enhancement, restoration, and preservation of wildlife corridors could result from American River Parkway floodplain improvements and acquisition of easements in rural floodplain areas along the Sacramento River in the northern portion of the program study area. This potential impact would be significant.

IMPACT **Consistency with the NBHCP.** *Implementation of the proposed program could have substantial adverse effects on species covered in the NBHCP. Levee improvements could also affect existing TNBC reserves. These effects could, in turn, adversely affect successful implementation of the NBHCP. This impact would be significant.*
4.7-k

The proposed program includes an assortment of potential levee improvements in the Natomas area that could affect habitat for and individuals of various species covered in the NBHCP (refer to Impacts 4.7-c through 4.7-i) and existing reserves managed by TNBC as NBHCP mitigation lands. As a result, implementation of the program could result in inconsistency with avoidance, minimization, and mitigation measures of the NBHCP; threaten the viability of populations of covered species using the Natomas area; reduce effectiveness of the NBHCP's conservation strategy; and adversely affect attainment of the goals and objectives of the NBHCP.

Implementation of potential program elements would not threaten the population viability for most species covered by the NBHCP because a relatively small amount of habitat for these species would be affected by the Natomas levee improvements, only foraging habitat would be affected, and/or effects would be largely limited to one construction season. However, potential effects for some species, such as giant garter snake, Swainson's hawk, and vernal pool plants and invertebrates could be substantial. Because of the relative scarcity of available habitat, the potential for permanent habitat loss, and/or the potential for adverse effects on breeding success, the viability of populations of these species within Natomas could be threatened by program implementation.

The NBHCP describes key components of the conservation strategy and how the components provide effective mitigation. These components are: 0.5 to 1 mitigation ratio, site-specific management plans for reserve lands, buffers within reserve lands, connectivity, foraging habitat, and minimum habitat block size requirements for reserve lands. Natomas levee improvements could encroach on existing reserves and buffers with widened levees and landside berms. This encroachment, in turn, could affect the size of the reserves and potentially jeopardize meeting the minimum size and mitigation ratio requirements and require revision of existing management plans. The proposed program could reduce the amount of foraging habitat for NBHCP-covered species, but these effects are anticipated to be primarily temporary in nature and there would be limited permanent loss of foraging habitat, because expanded levees and berms would still provide foraging habitat for many of the covered species. Aquatic habitat that provides connectivity between reserves themselves and between the reserves and agricultural lands would be adversely affected by temporary and permanent loss of such habitat to accommodate levee improvements.

The potential for implementation of project components to be inconsistent with avoidance, minimization, and mitigation measures of the NBHCP; threaten viability of populations of certain covered species; and reduce effectiveness of the NBHCP's conservation strategy could, in turn, adversely affect attainment of the goals and objectives of the NBHCP. This would be a significant impact.

4.7.4 MITIGATION MEASURES

Mitigation is identified below for Impact 4.7-a (sensitive habitats), Impact 4.7-b (special-status plants), Impact 4.7-c (valley elderberry longhorn beetle), Impact 4.7-d (special-status vernal pool invertebrates), Impact 4.7-e (giant garter snake), Impact 4.7-f (other special-status reptiles and special-status amphibians), Impact 4.7-g (Swainson's hawk), Impact 4.7-h (other special-status birds), Impact 4.7-i (special-status bats), Impact 4.7-j (wildlife corridors), and Impact 4.7-k (NBHCP consistency).

Mitigation Measure 4.7-a for Effects on Sensitive Habitats: Avoid Sensitive Habitats to the Extent Feasible, Comply with Section 404 and Section 1602 Permit Processes as Needed, and Mitigate on a No-Net-Loss Basis.

The agencies implementing program components and their primary contractors for engineering design and construction shall ensure that the following measures are implemented to avoid, minimize, and mitigate potential project effects on sensitive habitats.

Areas of sensitive habitat shall be identified and, to the extent feasible and practicable, program elements shall be designed to avoid direct effects on these areas. Before any ground-disturbing project activities begin, a qualified biologist shall map potential waters of the United States and shall identify all riparian habitat that could be affected by the given element. The mapping may be performed as part of a formal delineation of waters of the

United States for CWA Section 404 permitting, as described below. The primary engineering and construction contractors shall ensure, through coordination with the biologist, that the footprints of construction zones, borrow areas, staging areas, and access routes are designed to avoid disturbance of waters of the United States, riparian habitat, and habitats and trees protected by applicable municipal and county policies and ordinances to the extent feasible and practicable.

If there would be unavoidable effects to habitats under USACE jurisdiction, the Section 404 permitting process shall be completed and the acreage of affected jurisdictional habitat shall be replaced and/or rehabilitated. Before the initiation of any ground-disturbing project activities in areas that contain potentially jurisdictional wetlands, qualified biologists shall complete a delineation of wetlands and other waters of the United States that would be affected by the proposed project. The findings shall be documented in a detailed report and submitted to the USACE for verification as part of the formal Section 404 wetland delineation process. For all jurisdictional areas that cannot be avoided as described above, authorization shall be secured for fill of wetlands and alteration of waters of the United States from the USACE through the Section 404 permitting process before project implementation. The acreage of jurisdictional wetland affected shall be replaced on a “no-net-loss” basis in accordance with USACE regulations. Habitat restoration, rehabilitation, and/or replacement shall be at a location and by feasible methods agreeable to the USACE and consistent with the purpose and intent of applicable county and municipal policies and codes. Minimization and compensation measures adopted through the permitting process shall be implemented.

If there would be unavoidable effects to habitats under DFG jurisdiction, a streambed alteration agreement shall be obtained and affected habitats shall be replaced and/or rehabilitated. Because project implementation could result in changes to the natural flow and/or bed and bank of a waterway (e.g., irrigation/drainage canals, creeks, rivers), the project could require a Section 1602 streambed alteration agreement from DFG. If complete avoidance of identified riparian habitat is not feasible, the acreage of riparian habitat that would be removed shall be replaced or rehabilitated on a “no-net-loss” basis in accordance with DFG regulations and as specified in the streambed alteration agreement, if needed. Habitat restoration, rehabilitation, and/or replacement shall be at a location and by methods agreeable to DFG and consistent with the purpose and intent of applicable county and municipal policies and codes. Minimization and compensation measures adopted through the permitting process shall be implemented.

Implementing this mitigation measure would reduce the impact on sensitive habitats to a less-than-significant level.

Mitigation Measure 4.7-b for Effects on Special-Status Plants: Identify Habitat, Minimize Potential Impacts, and Mitigate in Consultation with U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Game (DFG) as Needed.

The agencies implementing program components and their primary contractors for engineering design and construction shall ensure that the following measures are implemented to avoid, minimize, and mitigate potential project effects on special-status plants.

Suitable habitat for special-status plants shall be identified and, to the extent feasible and practicable, project elements shall be designed to avoid direct effects on these areas. Before any ground-disturbing project activities begin, a qualified botanist shall identify potential habitat for special-status plants in areas that could be affected by the given program element. The primary engineering and construction contractors shall ensure, through coordination with the botanist, that the footprint of project features and construction zones, staging areas, and access routes are designed to avoid disturbance of potential habitat to the extent feasible and practicable.

If suitable habitat for special-status plants cannot be avoided, focused surveys shall be conducted. Before any ground-disturbing project activities begin, a qualified botanist shall conduct surveys for special-status plants in appropriate habitat within the impact area, in accordance with USFWS and/or DFG guidelines and at the

appropriate time of year when the target species would be clearly identifiable. If no special-status plants are found during focused surveys, no further action shall be required.

If special-status plant populations are found and potential effects cannot be avoided, measures shall be implemented to minimize and mitigate unavoidable effects. Before the initiation of any project activities in areas that support special-status plants, DFG and/or USFWS shall be consulted to develop appropriate measures. In Natomas, such measures may include those described in the NBHCP or alternative measures consistent with the goals and objectives of the NBHCP. Minimization measures are likely to include, but would not be limited to, fencing of habitat that can be avoided, conducting worker awareness training, and periodic biological monitoring. Compensation may include creation of off-site populations on project mitigation sites, through seed collection or transplanting; preserving and enhancing existing populations; or restoring or creating suitable habitat in sufficient quantities to compensate for the impact.

Authorization for take of listed plants under ESA and CESA shall be obtained if it is determined that implementation of a program component is likely to result in take, despite implementation of avoidance and minimization measures. All measures developed through informal consultation with USFWS and DFG shall be implemented, as well as any additional measures adopted through a formal permitting process, if applicable.

Implementing this mitigation measure would reduce the potential impact on special-status plants to a less-than-significant level.

Mitigation Measure 4.7-c for Effects on Valley Elderberry Longhorn Beetle: Identify Potential Habitat, Minimize Potential Impacts, and Mitigate in Consultation with USFWS as Needed.

The agencies implementing program components and their primary contractors for engineering design and construction shall ensure that the following measures are implemented to minimize potential project effects on valley elderberry longhorn beetles.

Areas that support elderberry shrubs shall be identified and, to the extent feasible and practicable, project elements shall be designed to avoid direct effects on these areas. Before beginning any ground-disturbing project activities, a qualified biologist shall identify areas that support elderberry shrubs and that could be affected by the given program element. The primary engineering and construction contractors shall ensure, through coordination with the biologist, that the footprint of project features and construction zones, staging areas, and access routes are designed to avoid disturbance of potential habitat to the extent feasible and practicable.

If impacts to areas supporting elderberry shrubs cannot be avoided, focused surveys shall be conducted. Before the initiation of any ground-disturbing activities, a qualified biologist shall conduct surveys for elderberry shrubs within 100 feet of the impact area, in accordance with USFWS guidelines. All elderberry shrubs with potential to be affected by project activities shall be mapped and the number of stems greater than 1 inch in diameter on each shrub that may require removal shall be counted. If no elderberry shrubs are found during focused surveys, no further action shall be required.

If potential effects to valley elderberry longhorn beetle cannot be avoided, measures shall be implemented to minimize and mitigate unavoidable effects. Before the initiation of any ground-disturbing project activities within 100 feet of elderberry shrubs that are suitable for use by valley elderberry longhorn beetles, USFWS shall be consulted to develop appropriate measures. In Natomas, such measures may include those described in the NBHCP or alternative measures consistent with the goals and objectives of the NBHCP. Minimization measures may include implementation of buffers around shrubs that would not be removed, transplanting shrubs to a conservation area, conducting worker awareness training, and periodic biological monitoring. Compensation may include planting of elderberry seedling or cuttings and associate native species.

Authorization for take of valley elderberry longhorn beetle under ESA shall be obtained if it is determined that implementation of a program component is likely to result in take, despite implementation of avoidance and

minimization measures. All measures developed through informal consultation with USFWS shall be implemented, as well as any additional measures adopted through a formal permitting process, if applicable.

Implementing this mitigation measure would reduce the potential impact on valley elderberry longhorn beetle to a less-than-significant level.

Mitigation Measure 4.7-d for Effects on Special-Status Vernal Pool Invertebrates: Identify Habitat, Minimize Potential Impacts, and Mitigate in Consultation with USFWS as Needed.

The agencies implementing program components and their primary contractors for engineering design and construction shall ensure that the following measures are implemented to avoid, minimize, and mitigate potential project effects on vernal pool invertebrates.

Suitable habitat for vernal pool invertebrates shall be identified and, to the extent feasible and practicable, project elements shall be designed to avoid direct effects on these areas. Before any ground-disturbing project activities begin, a qualified biologist shall identify potential habitat in areas that could be affected by the given program element. The primary engineering and construction contractors shall ensure, through coordination with the biologist, that the footprint of project features and construction zones, staging areas, and access routes are designed to avoid direct or indirect effects on suitable habitat for vernal pool invertebrates to the extent feasible and practicable.

If vernal pool invertebrate habitat cannot be avoided, measures shall be implemented to minimize and mitigate unavoidable effects. Before beginning any ground-disturbing project activities in such habitat, USFWS shall be consulted to identify appropriate measures to minimize and compensate for adverse effects on special-status vernal pool invertebrates. In Natomas, applicable avoidance and minimization measures may include those described in the NBHCP or alternative measures consistent with the goals and objectives of the NBHCP. Minimization measures are likely to include, but would not be limited to, fencing of habitat to be avoided, timing of ground disturbance to correspond with the dry season, conducting worker awareness training, and periodic biological monitoring. Compensation may include preservation, enhancement, and/or creation of suitable habitat in areas that currently, or could in the future, support special-status invertebrate populations.

Authorization for take of vernal pool invertebrates under ESA shall be obtained if it is determined that implementation of a program component is likely to result in take, despite implementation of avoidance and minimization measures. All measures developed through informal consultation with USFWS shall be implemented, as well as any additional measures adopted through a formal permitting process, if applicable.

Implementing this mitigation measure would reduce the potential impact on special-status vernal pool invertebrates to a less-than-significant level.

Mitigation Measure 4.7-e for Effects on Giant Garter Snake: Identify Habitat, Minimize Potential Impacts, and Mitigate in Consultation with USFWS and DFG as Needed.

The agencies implementing program components and their primary contractors for engineering design and construction shall ensure that the following measures are implemented to avoid, minimize and, mitigate potential project effects on giant garter snakes.

Giant garter snake habitat shall be identified and, to the extent feasible and practicable, project elements shall be designed to avoid direct effects on these areas. Before beginning any ground-disturbing project activities, a qualified biologist shall identify potential giant garter snake habitat in areas that could be affected by the given program element. The primary engineering and construction contractors shall ensure, through coordination with the biologist, that the footprint of project features and construction zones, staging areas, and access routes are designed to avoid disturbance of potential giant garter snake habitat to the extent feasible and practicable.

If giant garter snake habitat cannot be avoided, measures shall be implemented to minimize and mitigate unavoidable effects. Before the initiation of any ground-disturbing project activities in giant garter snake habitat, DFG and USFWS shall be consulted to identify appropriate measures to minimize and compensate for adverse effects on giant garter snake. In Natomas, applicable measures may include those described in the NBHCP or alternative measures consistent with the goals and objectives of the NBHCP. Minimization measures are likely to include, but would not be limited to, fencing of habitat that can be avoided, conducting worker awareness training, timing of dewatering and ground disturbance to correspond with the snake's active season, pre-construction surveys, and periodic biological monitoring.

Compensation for unavoidable effects on giant garter snake shall be incorporated into the engineering design process to the extent feasible and practical. For example, fill of irrigation/drainage ditches to accommodate levee improvements would likely require creation of replacement ditches to serve supply and drainage functions. These ditches would also provide a component of replacement habitat for garter snake. Additional compensation may include creation of giant garter snake habitat elsewhere in the Natomas area, such as creation of additional travel corridors to enhance connectivity between TNBC reserves in the northern and southern portions of Natomas and/or creation of additional marsh habitat and associated uplands. Preservation of existing habitat outside of Natomas may also be a viable compensation component that would enhance long-term viability of the regional giant garter snake population.

Authorization for take of giant garter snake under ESA and CESA shall be obtained if it is determined that implementation of a program component is likely to result in take, despite implementation of avoidance and minimization measures. All measures developed through informal consultation with USFWS and DFG shall be implemented, as well as any additional measures adopted through a formal permitting process, if applicable.

Implementing this mitigation measure would reduce the potential impact on giant garter snake to a less-than-significant level.

Mitigation Measure 4.7-f for Effects on Other Special-Status Reptiles and Special-Status Amphibians: Identify Habitat, Minimize Potential Impacts, and Mitigate in Consultation with USFWS and DFG as Needed.

The agencies implementing program components and their primary contractors for engineering design and construction shall ensure that the following measures are implemented to avoid and minimize potential project effects on northwestern pond turtles and California red-legged frogs.

Northwestern Pond Turtle. Suitable habitat for northwestern pond turtle shall be identified and, to the extent feasible and practicable, project elements shall be designed to avoid direct effects on these areas. Before any ground-disturbing project activities begin, a qualified biologist shall identify potential aquatic and nesting habitat in areas that could be affected by the given program element. The primary engineering and construction contractors shall ensure, through coordination with the biologist, that the footprint of project features and construction zones, staging areas, and access routes are designed to avoid direct or indirect effects on suitable habitat for northwestern pond turtle to the extent feasible and practicable.

If effects to pond turtle habitat cannot be avoided, measures shall be implemented to minimize unavoidable effects. Before beginning any project activities in such habitat, DFG shall be consulted to identify appropriate measures to minimize adverse effects on pond turtles. Such measures are likely to include, but would not be limited to, conducting surveys after dewatering of suitable aquatic habitat and moving stranded turtles to appropriate areas, installing fencing to exclude turtles from nesting in areas where ground disturbance would occur, conducting worker awareness training, and periodic biological monitoring. All measures deemed appropriate and feasible during this consultation with DFG shall be implemented.

California Red-legged Frog. Suitable habitat for California red-legged frog at and adjacent to Folsom Reservoir shall be identified and, to the extent feasible and practicable, project elements shall be designed to avoid direct effects on these areas. Before any ground-disturbing project activities begin, a qualified biologist shall identify

potential habitat in areas that could be affected by Folsom Dam and dike modifications. The primary engineering and construction contractors shall ensure, through coordination with the biologist, that the footprint of project features and construction zones, staging areas, and access routes are designed to avoid direct or indirect effects on suitable habitat for California red-legged frog to the extent feasible and practicable.

If effects to red-legged frog habitat cannot be avoided, measures shall be implemented to minimize and mitigate unavoidable effects. Before beginning any project activities in such habitat, USFWS shall be consulted to identify appropriate measures to minimize and compensate for adverse effects on California red-legged frog. Minimization measures are likely to include, but would not be limited to, fencing of habitat to be avoided, conducting worker awareness training, and periodic biological monitoring. Compensation may include preservation, enhancement, and/or creation of suitable habitat onsite or in offsite areas that currently, or could in the future, support red-legged frog populations.

Authorization for take of California red-legged frog under ESA shall be obtained if it is determined that implementation of a program component is likely to result in take, despite implementation of avoidance and minimization measures. All measures developed through informal consultation with USFWS shall be implemented, as well as any additional measures adopted through a formal permitting process, if applicable.

Implementing this mitigation measure would reduce the potential impact on northwestern pond turtle and California red-legged frog to a less-than-significant level.

Mitigation Measure 4.7-g for Effects on Swainson's Hawk: Identify Habitat and Nest Locations, Minimize Potential Impacts, Monitor Active Nests during Construction, and Mitigate in Consultation with DFG as Needed.

The agencies implementing program components and their primary contractors for engineering design and construction shall ensure that the following measures are implemented to avoid, minimize, and mitigate potential project effects on Swainson's hawk.

Swainson's hawk nesting and foraging habitat shall be identified and, to the extent feasible and practicable, project elements shall be designed to avoid direct effects on these areas. Before beginning any ground-disturbing project activities, a qualified biologist shall, in coordination with USFWS and DFG, identify known Swainson's hawk nest locations and areas of potential nesting habitat that could be affected by the given program element. The primary engineering and construction contractors shall ensure, through coordination with the biologist, that the footprint of project features and construction zones, staging areas, and access routes are designed to avoid disturbance of potential habitat to the extent feasible and practicable.

If adverse effects to Swainson's hawk habitat cannot be avoided, measures shall be implemented to minimize and mitigate unavoidable effects. Before the initiation of program elements that could result in disturbance of nesting pairs or loss of foraging and/or nesting habitat, DFG shall be consulted to identify appropriate measures to minimize and compensate for adverse effects on Swainson's hawk. In Natomas, applicable measures may include those described in the NBHCP or alternative measures consistent with the goals and objectives of the NBHCP. Minimization measures are likely to include, but would not be limited to, avoiding activities during the nesting season, pre-construction nest surveys, focusing nesting season activities to less-sensitive periods in the nesting cycle, conducting worker awareness training, and biological monitoring. Compensation may include preservation, enhancement, and/or creation of Swainson's hawk habitat within the Natomas area and/or at other appropriate locations.

Authorization for take of Swainson's hawk under CESA shall be obtained if it is determined that project implementation is likely to result in take, despite implementation of avoidance and minimization measures. All measures developed through informal consultation with DFG shall be implemented, as well as any additional measures adopted through a formal permitting process, if applicable.

Implementing this mitigation measure would reduce the potential impact on Swainson's hawk to a less-than-significant level.

Mitigation Measure 4.7-h for Effects on Special-Status Birds: Identify Habitat and Nest Locations, Minimize Potential Impacts, Monitor Active Nests during Construction, and Mitigate in Consultation with USFWS and DFG as Needed.

The agencies implementing program components and their primary contractors for engineering design and construction shall ensure that the following measures are implemented to minimize potential project effects on special-status birds.

To the extent feasible and practicable, program elements shall be designed to minimize removal of burrowing owl habitat and nesting habitat for other special-status birds. Before any ground-disturbing project activities begin, a qualified biologist shall identify potential special-status bird habitat in areas that could be affected by the given program element. The primary engineering and construction contractors shall ensure, through coordination with the biologist, that the footprint of project features and construction zones, staging areas, and access routes are designed to avoid direct or indirect effects on burrowing owl habitat and nesting habitat for other special-status species to the extent feasible and practicable. Vegetation removal and other program activities shall be timed to avoid the nesting season for special-status bird species that may be present.

Surveys shall be conducted if implementation of a program element could result in disturbance of occupied burrowing owl habitat or loss of active nests of other special-status bird species. If vegetation removal or other disturbance related to implementation of a program element is required during the nesting season, focused surveys for active nests of special-status birds shall be conducted prior to initiating such activities. A qualified biologist shall conduct preconstruction surveys to identify active nests that could be affected. The appropriate area to be surveyed and timing of the survey may vary depending on the activity and species that could be affected. Surveys for occupied burrowing owl habitat shall be conducted before any program activities are initiated at any time of year. If no active nests or occupied burrowing owl habitat are found during focused surveys, no further action regarding burrowing owls shall be required.

If adverse effects to special-status birds cannot be avoided, measures shall be implemented to minimize and mitigate unavoidable effects. Before the initiation of program elements that could result in disturbance of occupied burrowing owl habitat or nesting pairs of other special-status birds, USFWS and DFG shall be consulted to identify appropriate measures to minimize and compensate for adverse effects. In Natomas, applicable measures may include those described in the NBHCP or alternative measures consistent with the goals and objectives of the NBHCP. Minimization measures are likely to include, but not be limited to, focusing construction activities that must be conducted during the nesting season to less-sensitive periods in the nesting cycle, implementing buffers around occupied burrowing owl habitat and active nests of other special-status birds to the extent practical and feasible to limit visual and noise disturbance, relocation of burrowing owls that are within the impact area, conducting worker awareness training, and biological monitoring. Compensation may include preservation, enhancement, and/or creation of suitable habitat within the Natomas area and/or other appropriate locations. All measures deemed appropriate and feasible during this consultation with USFWS and DFG shall be implemented.

Implementing this mitigation measure would reduce the potential impact on special-status nesting birds to a less-than-significant level.

Mitigation Measure 4.7-i for Effects on Special-Status Bats at Folsom Dam: Identify Roosting Habitat, Minimize Potential Impacts, Monitor, and Implement Other Measures in Consultation with USFWS and DFG as Needed.

The agencies implementing program components and their primary contractors for engineering design and construction shall ensure that the following measures are implemented to minimize potential project effects on special-status bats:

To the extent feasible and practicable, program elements shall be designed to minimize disturbance of potential roosting habitat at Folsom Reservoir. Before any ground-disturbing project activities begin, a qualified biologist shall identify potential roosting habitat in areas that could be affected by Folsom Dam improvements and related activities. The primary engineering and construction contractors shall ensure, through coordination with the biologist that the footprint of project features and construction zones, staging areas, and access routes are designed to prevent or minimize direct or indirect effects on bat roosting habitat to the extent feasible and practicable.

Surveys shall be conducted if implementation of a program element could result in disturbance of bat roosting habitat. If vegetation removal or other disturbance related to implementation of a program element is required during the nesting season, focused surveys for active nests of special-status birds shall be conducted prior to initiating such activities. A qualified biologist shall conduct preconstruction surveys to identify active nests that could be affected. The appropriate area to be surveyed and timing of the survey may vary depending on the activity and species that could be affected.

If adverse effects to bat potential roosting habitat cannot be avoided, surveys shall be conducted to determine if potential roost sites are occupied and measures shall be implemented to minimize effects to roosting bats. Before the initiation of program elements that could result in disturbance of occupied roosts, USFWS and DFG shall be consulted to identify appropriate measures to minimize adverse effects. Such measures are likely to include, but not be limited to, focusing construction activities during the non-breeding season, installation of exclusion devices during the non-breeding season, conducting worker awareness training, and periodic biological monitoring. All measures deemed appropriate and feasible during this consultation with USFWS and DFG shall be implemented.

Implementing this mitigation measure would reduce the potential impact on special-status nesting birds to a less-than-significant level.

Mitigation Measure 4.7-j for Effects on Wildlife Corridors: Implement Mitigation Measures 4.7-a and 4.7-e.

Implementation of Mitigation Measures 4.7-a (sensitive habitats) and 4.7-e (giant garter snake) would reduce the potential impact on wildlife corridors to a less-than-significant level.

Mitigation Measure 4.7-k for Consistency with the NBHCP: Implement Mitigation Measures 4.7-a through 4.7-h.

Implementation of Mitigation Measures 4.7-a (sensitive habitats), 4.7-b (special-status plants), 4.7-c (valley elderberry longhorn beetle), 4.7-d (special-status vernal pool invertebrates), 4.7-e (giant garter snake), 4.7-f (other special-status reptiles and special-status amphibians), 4.7-g (Swainson's hawk), and 4.7-h (other special-status birds) would reduce the potential for inconsistency with the NBHCP to a less-than-significant level.

4.8 CULTURAL RESOURCES

This section includes an evaluation of the potential impacts on cultural resources that could result from project implementation. Cultural resources may include archaeological traces such as early Native American occupation sites and artifacts, historic-era buildings and structures, and places used for traditional Native American observances or places with special cultural significance. These resources can be found at many locations on the landscape, and along with prehistoric and historic human remains and associated grave-goods, are protected under various federal, state, and local statutes, including Section 106 of the National Historic Preservation Act (NHPA). Unique paleontological resources are addressed in Section 4.9, “Paleontological Resources.”

4.8.1 REGULATORY SETTING

4.8.1.1 FEDERAL

National Historic Preservation Act

Section 106 of the NHPA and its implementing regulations (36 CFR 800, as amended in 1999) require federal agencies to consider the potential effects of their proposed undertakings, or those they fund or permit, on properties that may be eligible for listing, or that are listed in, the National Register of Historic Places (NRHP), and to allow the Advisory Council on Historic Preservation the opportunity to comment on the proposed undertaking. Most, if not all, of the proposed improvements would be implemented by the USACE along with the Reclamation Board, would require permitting from the USACE or would receive federal funding. Therefore, NHPA Section 106 compliance is expected to eventually be required for all the improvements.

Section 106 Process

The implementing regulations for Section 106 of the NHPA (36 CFR Part 800) require consultation with the State Historic Preservation Officer (SHPO), Advisory Council on Historic Preservation (ACHP), federally recognized Indian tribes and other Native Americans, and interested members of the public throughout the compliance process. The four principal steps are:

1. Initiate the Section 106 process (36 CFR Part 800.3).
2. Identify historic properties, resources eligible for inclusion in the NRHP (36 CFR Part 800.4).
3. Assess the effects of the undertaking to historic properties within the area of potential effect (APE) (36 CFR Part 800.5).
4. Resolve adverse effects (36 CFR Part 800.6).

Adverse effects to historic properties are often resolved through preparation of a memorandum of agreement (MOA) or programmatic agreement (PA) developed in consultation between the federal agency, the SHPO, Indian tribes, and interested members of the public. The ACHP is also invited to participate. The agreement describes stipulations that treat historic properties to mitigate adverse effects.

National Register of Historic Places

A property may be listed in the NRHP if it meets criteria for evaluation as defined in 36 CFR 60.4:

The quality of significance in American history, architecture, archaeology, engineering and culture is present in districts, sites, buildings, structures and objects that possess integrity of location, design, setting, materials, workmanship, feeling and association and:

- (a) That are associated with events that have made a significant contribution to the broad patterns of our history; or
- (b) That are associated with the lives of persons significant in our past; or
- (c) That embody the distinctive characteristics of a type, period or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- (d) That have yielded, or may be likely to yield, information important in prehistory or history.

Rural Historic Landscapes

The rural historic landscape is one of the categories of property qualifying for listing in the NRHP as a historic site or district. For the purposes of the NRHP, a rural historic landscape is defined as a geographical area that historically has been used by people; or shaped or modified by human activity, occupancy, or intervention; and that possesses a significant concentration, linkage, or continuity of areas of land use, vegetation, buildings and structures, roads and waterways, and natural features. Rural landscapes commonly reflect the day-to-day occupational activities of people engaged in traditional work such as mining, fishing, and various types of agriculture. Often, they have developed and evolved in response to both the forces of nature and the pragmatic need to make a living. Landscapes that are small and that have no buildings or structures, such as an experimental orchard, are classified as sites. Most, however, being extensive in acreage and containing a number of buildings, sites, and structures—such as a ranch or farming community—are classified as historic districts. Large acreage and a proportionately small number of buildings and structures differentiate rural historic landscapes from other kinds of historic properties.

Distinct from designed landscapes, rural landscapes usually are not the work of a professional designer and have not been developed according to academic or professional design standards, theories, or philosophies of landscape architecture. These properties possess tangible features, called landscape characteristics, that have resulted from historic human use. In this way, they also differ from natural areas that embody important cultural values but have experienced little modification, such as sites having religious meaning for Native American groups.

Existing Section 106 Compliance Efforts

Several efforts have been undertaken to comply with, or begin compliance with, Section 106 that may be relevant to some components of the proposed project. These efforts may provide varying levels of Section 106 compliance, as well as mitigate impacts on cultural resources for the purposes of CEQA compliance. Considering the passage of time and the scope of the efforts, the applicability and utilization of each of these efforts will need to be considered at the time of Section 106 compliance and project implementation.

Reoperation of Folsom Reservoir. As described in SAFCA (2000), as part of the Interim Agreement on Reoperation of Folsom Reservoir, SAFCA and the Reclamation agreed to cooperate with the State Office of Historic Preservation to ensure compliance with NHPA Section 106. Section 106 compliance would take the form of implementing a research design that calls for the following actions with regard to the area encompassed by the interim agreement: (1) enhanced inventory of unsurveyed areas or areas not surveyed to existing standards, with emphasis on those locations with high archaeological sensitivity, those areas where project impacts would be greatest, and/or those elevation zones that are rarely accessible; (2) site evaluation, using limited subsurface excavation, surface collection, and/or backhoe trenching to determine which sites still have data potential and which do not; and (3) protection or data collection at sites with high scientific, social, or interpretive value (Waechter and Mikesell 1994). SAFCA would be responsible for funding this work.

American River Watershed Flood Control Improvements. Similarly, as part of the USACE's American River Watershed Project, a PA was executed between the USACE, the State Office of Historic Preservation, and the

ACHP regarding implementation of the American River Watershed Project, including constructing levee, channel, and related flood control improvements in the Natomas area and along lower Dry Creek. Provisions of this PA cover implementation of the specific elements of the proposed improvements that would involve the USACE as the federal lead agency. Additional signatories of the PA include Reclamation, The Reclamation Board, and SAFCA.

The PA is relevant to the present study because it directs that measures be implemented to complete the Section 106 process for federal actions expected to be carried out in connection with the American River Watershed Project. Further, it acknowledges the following: “the Project may be modified based on public input, congressional authorization, and ongoing negotiations among the primary sponsors.” As a result, those components of the proposed project that are determined to also be components of the USACE’s American River Watershed Project may be covered by the PA.

The PA includes procedures for the treatment of indirect and direct impacts of the levee improvements associated with the actions. The executed PA specifies inventory and NRHP evaluation procedures for historic properties, as well as the process for development of Historic Properties Treatment Plans. Additionally, the PA details report format and review, participation of interested parties, curation of recovered materials, and professional qualifications. Mitigation measures may include archaeological documentation, architectural and engineering documentation, and historical documentation, following standards and guidelines promulgated by the Secretary of the Interior.

Natomas Levee Improvement Program. Previous efforts to document and mitigate impacts on elements of RD 1000 may be relevant to the proposed improvements to Natomas levees. The RD 1000 area has been identified as eligible for inclusion in the NRHP as a Rural Historic Landscape District. The evaluation process was conducted both to determine the NRHP eligibility of the district and to evaluate whether the district would be significantly affected by flood control projects (levee modifications) planned and subsequently implemented by the USACE as part of the American River Watershed Project to provide a greater degree of flood protection in the Natomas area (Dames & Moore 1994). The “determination of effects” statement concluded that the USACE projects would adversely affect both contributing and non-contributing elements of the Rural Historic Landscape District by allowing for greater development to occur in the region. Mitigation measures were recommended and adopted. These consisted of Historic American Engineering Record documentation, which was prepared by Peak & Associates (1997); videotapes of historic properties; and a list of repositories where copies of the information would be made available to the public.

American Indian Religious Freedom Act

The American Indian Religious Freedom Act of 1978 is also applicable to federal undertakings. This act established “the policy of the United States to protect and preserve for American Indians their inherent right of freedom to believe, express, and exercise the traditional religions...including but not limited to access to sites, use and possession of sacred objects, and the freedom to worship through ceremonials and traditional rites (P.L. 95-431).”

4.8.1.2 STATE

California Environmental Quality Act

CEQA includes provisions that specifically address the protection of cultural resources. These protections are described below in Section 4.8.3.1, “Significance Criteria.”

California Register of Historic Resources

The California Register of Historical Resources (CRHR) includes resources listed in or formally determined eligible for listing in the National Register of Historic Places, as well as some California State Landmarks and Points of Historical Interest. Properties of local significance that have been designated under a local preservation

ordinance (local landmarks or landmark districts) or that have been identified in a local historical resources inventory may be eligible for listing in the CRHR and are presumed to be significant resources for purposes of CEQA unless a preponderance of evidence indicates otherwise (PRC Section 5024.1, 14 CCR Section 4850). The eligibility criteria for listing in the CRHR are similar to those for NRHP listing but focus on importance of the resources to California history and heritage. A cultural resource may be eligible for listing on the CRHR if it:

- 1) is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
- 2) is associated with the lives of persons important in our past;
- 3) embodies the distinctive characteristics of a type, period, region, or method of construction or represents the work of an important creative individual or possesses high artistic values; or
- 4) has yielded, or may be likely to yield, information important in prehistory or history.

Native American Heritage Commission

The Native American Heritage Commission identifies and catalogs places of special religious or social significance to Native Americans and known graves and cemeteries of Native Americans on private lands, and performs other duties regarding the preservation and accessibility of sacred sites and burials and the disposition of Native American human remains and burial items.

4.8.2 ENVIRONMENTAL SETTING

It appears that little of the Natomas Basin has been surveyed for cultural resources, except for the contributing elements of RD 1000 and some smaller surveys along the Sacramento River. The program study area historically included natural conditions that were ideal for Native American habitation. The rich riverine environment, with abundant resources and a moderate year-round climate, was heavily exploited. Known, extant occupation mound sites in the Natomas area in particular, as well as others that have been destroyed by agricultural activities, testify to prehistoric usage of the river vicinity. More recent use is readily visible in the form of extant farms and RD 1000 structures in Natomas.

4.8.2.1 PREHISTORIC SETTING

Paleo-Indian and Lower Archaic Periods

The earliest well-documented entry and spread of humans into California occurred at the beginning of the Paleo-Indian Period (10,000 to 6000 B.C.). Social units are thought to have been small and highly mobile. Known sites have been identified within the contexts of ancient pluvial lake shores and coast lines evidenced by such characteristic hunting implements as fluted projectile points and chipped stone crescent forms. Prehistoric adaptations over the ensuing centuries have been identified in the archaeological record by numerous researchers working in the area since the early 1900s, as summarized by Fredrickson (1974) and Moratto (1984). Due to its plentiful resources and temperate climate, the Central Valley was well populated prehistorically and served as the location for some of the more substantial village sites known in California.

Beardsley (1948) and Lillard, Heizer and Fenenga (1939) and others conducted numerous studies that form the core of our early understanding of upper Central Valley archaeology. Little has been found archaeologically that dates to the Paleo-Indian or the Lower Archaic (6000 to 3000 B.C.) time periods. However, archaeologists have recovered a great deal of data from sites occupied by the Middle Archaic period. The lack of sites from earlier periods may be due to high sedimentation rates, leaving the earliest sites deeply buried and inaccessible.

Middle Archaic, Upper Archaic, and Emergent Periods

During the Middle Archaic Period (3000 to 1000 B.C.), the broad regional patterns of foraging subsistence strategies gave way to more intensive procurement practices. Subsistence economies were more diversified, possibly including the introduction of acorn processing technology. Human populations were growing and occupying more diverse settings. Permanent villages that were occupied throughout the year were established, primarily along major waterways. The onset of status distinctions and other indicators of growing sociopolitical complexity mark the Upper Archaic Period (1000 B.C. to A.D. 500). Exchange systems become more complex and formalized. Evidence of regular, sustained trade between groups was seen for the first time.

Several technological and social changes characterized the Emergent Period (A.D. 500 to 1800). The bow and arrow were introduced, ultimately replacing the dart and atlatl. Territorial boundaries between groups became well established. It became increasingly common that distinctions in an individual's social status could be linked to acquired wealth. Exchange of goods between groups became more regularized with more goods, including raw materials, entering into the exchange networks. In the latter portion of this period (A.D. 1500 to 1800), exchange relations became highly regularized and sophisticated. The clamshell disk bead became a monetary unit for exchange, and increasing quantities of goods moved greater distances. Specialists arose to govern various aspects of production and exchange.

The Middle and Upper Archaic and Emergent Periods are further broken down under the Central California Taxonomic System. These three time periods are well represented in archaeological assemblages in the general vicinity of the program study area. The assemblages are discussed in detail in Bennyhoff and Fredrickson (1969) and Moratto (1984) and are summarized here.

The **Windmill Pattern (3000–500 B.C.)** of archaeological assemblages included an increased emphasis on acorn use as well as a continuation of hunting and fishing activities. Ground and polished chertstones, twined basketry, baked-clay artifacts and worked shell and bone were hallmarks of Windmill culture. Widely ranging trade patterns brought goods in from the Coast Ranges and trans-Sierran sources as well as closer trading partners. Distinctive burial practices (ventrally extended, oriented westward) identified with the Windmill Pattern also appeared in the Sierra foothills, indicating possible seasonal migration into the Sierra. Perforated chertstones were associated with some burials. Mano and metate and small mortars were used, but rare.

The **Berkeley Pattern (200 B.C.–A.D. 700)** represented a greater reliance on acorns as a food source than was seen previously. Distinctive stone and shell artifacts distinguished it from earlier or later cultural expressions. Burials were predominantly placed in a tightly flexed position and frequently included red ochre. Minimally shaped mortar and pestle technology was much more prevalent than mano/metate. Non-stemmed projectile points become more common.

The **Augustine Pattern (A.D. 700–1800)** was marked by increasing populations resulting from more intensive food procurement strategies, as well as a marked change in burial practices and increased trade activities. Intensive fishing, hunting and gathering, complex exchange systems, and a wider variety in mortuary patterns were all hallmarks of this period. Mortars and pestles were more carefully shaped, and bow-and-arrow technology was present. Fishing implements became more common, trade increased, and cremation was used for some higher status individuals.

4.8.2.2 ETHNOGRAPHIC SETTING

The program study area is situated within the lands traditionally occupied by the Nisenan, or Southern Maidu. The language of the Nisenan, which includes several dialects, is classified within the Maiduan family of the Penutian linguistic stock (Kroeber 1925). The western boundary of Nisenan territory was the western bank of the Sacramento River and the area between modern Sacramento and Marysville. In the Sacramento Valley, the triblet, consisting of a primary and a few satellite villages, served as the basic political unit (Moratto 1984). Valley

Nisenan territory was divided into three triblet areas each populated with several large villages (Wilson and Towne 1978). One important village, *Pusune*, appears to have been recorded as CA-SAC-26, near Discovery Park. Two other villages, *Wollok* and *Leuchi*, were located east of the confluence of the Feather and Sacramento Rivers, near the northwestern corner of the program study area.

Nisenan houses were domed structures covered with earth and tule or grass and measured 10–15 feet in diameter. Brush shelters were used in the summer and at temporary camps during food-gathering rounds. Larger villages often had semi-subterranean dance houses that were covered in earth and tule or brush and had a central smoke hole at the top and an east-facing entrance. Another common village structure was a granary, which was used for storing acorns (Wilson and Towne 1978).

Valley Nisenan people followed a seasonal round of food gathering, as did most California Indians. The wide variety of food resources available was exploited year round, but hunting and gathering activities were at their most intense in late summer and early fall. Food staples included acorns, buckeyes, pine nuts, hazelnuts, various roots, seeds, mushrooms, greens, berries, and herbs. Game, roasted, baked, or dried, included mule deer, elk, antelope, black bear, beaver, squirrels, rabbits, and other small animals and insects. Salmon, whitefish, sturgeon and suckers, as well as freshwater shellfish were all caught and eaten (Wilson and Towne 1978).

Euroamerican contact with the Nisenan began with infrequent excursions by Spanish explorers and Hudson Bay Company trappers traveling through the Sacramento-San Joaquin Valley in the early 1800s. In general, Nisenan lifeways remained stable for centuries until the early to middle decades of the 19th century. With the coming of Russian trappers and Spanish missionaries, cultural patterns began to be disrupted as social structures were stressed. The malaria epidemic of 1833 decimated the valley Nisenan population, killing an estimated 75% of the tribesmen. The influx of Europeans during the Gold Rush era further reduced the population due to disease and violent relations with the miners.

4.8.2.3 HISTORIC SETTING

Early Exploration

Although Russian trappers and traders associated with the Hudson's Bay Company likely traveled through the Sacramento, Sutter, and Yuba County area during earlier years, the first well-documented European exploration of the general region occurred in 1808, when Spanish explorer Gabriel Moraga led an expedition from Mission San Jose to the northern Sacramento Valley (Abeloe 1966, Gordon 1988). The earliest Euroamerican settlement coincided with the establishment of land grants by the Mexican government in the 1840s. John A. Sutter obtained the first such grant in the region in 1841. Sutter's New Helvetia Rancho encompassed lands on the east bank of the Feather and Sacramento Rivers, including portions of what is now the levee improvement program project area.

Mining

Although there are no records of large-scale mining having been conducted in or in the immediate area of the project sites, the industry had considerable indirect effects on historical developments in the region. The diggings and mines in the nearby foothills dramatically increased economic activity in the region, leading to increased prosperity and the rise of larger and more numerous support industries such as cattle ranches and farms. In addition, sediments washing into the Central Valley watercourses, such as the Bear, Feather, Sacramento, and American Rivers, had a negative impact on water quality and on the scale and frequency of seasonal flooding.

Hydraulic mining, first conducted in Nevada in 1852, was the most cost effective means of recovering gold deposits from deeply buried gravels along and near river and stream channels. In order to access these deeply buried deposits, streams of water under high pressure were used to wash away sediments and gravels. The sands and gravels were passed through sluices which separated out the placer gold. Silt and sand washed into nearby

creeks, streams, and rivers, raising watercourse beds, clogging the channels, and generally polluting the waters. Between 1849 and 1909, 195 million cubic meters of mining debris entered the channels of the American River basin (Hagwood 1981). The deposition of silt in the rivers resulted in the raising of the riverbeds and increased flooding. After 1861, catastrophic floods became more common, prompting the development of a levee system and beginning the process of land reclamation for agricultural purposes.

Construction of a railroad was a natural outgrowth of Sacramento's expansion and the need to deliver supplies to the California foothills. The railroad was completed by February of 1856. The first rail line ran to the town of Folsom, where at least 21 different wagon trains then carted goods from the train to outlying areas as far away as Carson City, Nevada. The Central Pacific Railroad (CPRR) bought the Sacramento Valley Railroad in 1865, and added its facilities to those already being built for the Transcontinental Railroad. The CPRR and its successor, the Southern Pacific Railroad, became the major industry in Sacramento after 1863. It is estimated that early in its history, the railroad employed 20–30% of salaried employees in Sacramento (Historic Environment Consultants 1998).

Agriculture and Flood Control

General

Agriculture and ranching were the primary industries in the present-day Sacramento and Sutter County region during the historic period. Regional ranching originated on the New Helvetia rancho in the early 1840s. The Gold Rush precipitated growth in agriculture and ranching, as ranchers and farmers realized handsome returns from supplying food and other goods to miners (Fryman 1996). Frequent floods, however, plagued the residents of the region and posed a significant threat to the viability of agricultural interests and further settlement.

Initial efforts at flood control were usually uncoordinated and consisted of small levees and drains constructed by individual landowners. These features proved insufficient to protect cultivated land, and much of the program study area flooded regularly (Dames & Moore 1994). In 1861, the state legislature created the State Board of Swampland Commissioners to affect reclamation of swamp and overflow lands. The State Board of Swampland Commissioners established 32 districts that attempted to enclose large areas with natural levees. Lack of cooperation among the landowners in the districts led to chronic financial crises. When the state legislature terminated the State Board of Swampland Commissioners in 1866, responsibility for swamp and overflow land fell to the individual counties. Many counties offered incentives to landowners for reclaiming agriculturally unproductive land. If a landowner could certify that they had spent at least two dollars per acre in reclamation, the county would refund the purchase price of the property to the owner. Speculators took advantage of this program and a period of opportunistic and often-irrational levee building followed (McGowan 1961, Thompson 1958).

In the early part of the 20th century, the state legislature established The Reclamation Board to exercise jurisdiction over reclamation districts and levee plans. That year, the state approved and began implementation of the Sacramento River Flood Control Project (SRFCP). The ambitious project included the construction of levees, weirs, and bypasses along the river to channel floodwaters away from population centers. Under the SRFCP, new reclamation districts were created, including RD 1000, consisting of approximately 55,000 acres in the Natomas area. RD 1000 was largely controlled by the Natomas Company, which had access to more money than an individual landowner. The Natomas Company was formed in 1851 in Sacramento County to supply water for placer mining and irrigation. It later became involved in dredging for gold and expanded its water supply business. The Natomas Company became involved in land reclamation in part as a rebuttal of criticism that farmland was being destroyed by the company's gold dredging activities (Dames & Moore 1994).

RD 1000 Rural Historic Landscape District

The infrastructure of RD 1000 was completed in the 1920s. It includes levees, drainage canals, pumps, irrigation systems, agricultural fields, and roads, as well as remnant natural features. The originally constructed features

included levees and exterior drainage canals, an interior drainage canal system, nine pumping plants, and a series of levee and interior roads, and unpaved rights-of-way between the farm fields.

RD 1000 has been previously evaluated as a Rural Historic Landscape District on behalf of the USACE, and was found eligible for NRHP and CRHR listing (Dames & Moore 1994). Dames & Moore determined that RD 1000 appears to be eligible for listing as a Rural Historic Landscape District at the state level of significance for the period from 1911 to 1939 under Criterion A, with the area of significance listed as reclamation and the historical context listed as the flood control and reclamation of the Sacramento River basin within the SRFCP as an important part of the history of reclamation and flood control. The district retains much of its historic integrity, including location design, setting, materials, workmanship, feeling, and association. The contributing and non-contributing elements of the district were defined as part of this effort. Contributing elements were described as follows:

- ▶ **Drainage System:** East Levee, River Levee, Cross Canal Levee; Natomas East Main Drainage Canal; Cross Canal; Pleasant Grove Canal; Pumping Plants No. 1-A, 2, and 3; and the drainage ditches within the areas of contributing large scale land patterns.
- ▶ **Road System:** Garden Highway from Orchard Lane north to the Cross Canal; East Levee/Natomas Road; Sankey Road; Riego Road; Elverta Road; Elkhorn Boulevard from Garden Highway to the western boundary of the Sacramento Airport; Del Paso Road from Powerline Road to its intersection with I-5; San Juan Road from Garden Highway to its intersection with I-5; Powerline Road; El Centro Road from north of I-80 to its intersection with Bayou Way; and the right-of-way roads within fields in the areas of contributing large scale land patterns.
- ▶ **Large-Scale Land Patterns:** Land area that is comprised of open fields formed by the intersection of the canals and roads in the area bounded as follows: west of the East Levee; west of Sorrento Road; north of Del Paso Road between the East Levee and I-5, west of I-5 from its intersection with Del Paso Road to its intersection with I-80; north of I-80 from its intersection with I-5 to the River Levee; east of the River Levee; and south of the Cross Canal Levee.

Non-contributing resources include parts of the drainage system (some pumping plants and associated branch canals); parts of the road system, some large scale land patterns (the area bounded by Sorrento Road to the east levee, south of Del Paso Road between I-5 and the east levee, south of I-80, and the Sacramento International Airport); and some land uses, vegetation, boundary demarcations, buildings, and structures such as those more closely associated with agriculture than reclamation, municipal structures, commercial structures, and electric power lines.

4.8.3 ENVIRONMENTAL IMPACTS

Impacts of changes in Folsom Dam operations on cultural resources at Folsom Reservoir were evaluated by SAFCA in *Program Environmental Impact Report on Flood Control Improvements Along the Mainstem of the American River* (SAFCA 2000). These impacts are summarized in Section 4.1.3, “Operational Effects Previously Addressed by SAFCA.” These conclusions remain valid. The mitigation measures identified in that EIR have been adopted and incorporated into the project by SAFCA and have been, or will be, implemented as described. No substantial changes in the proposed project, no substantial changes with respect to the circumstances under which the project would be undertaken, and no new information of substantial importance implicate new significant effects on the environment with respect to this issue area.

4.8.3.1 SIGNIFICANCE CRITERIA

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. The proposed project was determined to result in a significant effect on cultural resources if it would:

- ▶ cause a substantial adverse change in the significance of a unique archaeological resource as defined in Public Resources Code Section 21083.2 or a historical resource as defined in Public Resources Code Section 21084.1 (see also Section 15064.5 of the State CEQA Guidelines), or
- ▶ disturb any human remains, including those interred outside of formal cemeteries.

A unique archaeological resource, as defined in Public Resources Code Section 21083.2 is an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

- (1) Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information;
- (2) Has a special and particular quality such as being the oldest of its type or the best available example of its type;
- (3) Is directly associated with a scientifically recognized important prehistoric or historic event or person.

Section 15064.5 generally defines historical resources as (1) a resource listed in, or determined to be eligible by the State Historical Resources Commission for listing in, the CRHR; (2) a resource included in a local register of historical resources or identified as significant in a historical resource survey; and (3) any other object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant provided the lead agency's determination is supported by substantial evidence. A substantial adverse change in the significance of a historical resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of the historical resource would be materially impaired.

The criteria used for determining the whether a cultural resource may be eligible for listing on the CRHR are presented in Section 4.8.1.2.

4.8.3.2 IMPACT ANALYSIS

IMPACT 4.8-a *Construction Effects on Known Prehistoric and Historic Cultural Resource Sites. Numerous prehistoric and historic cultural resource sites are known to be present in the vicinity of the flood control system in the program study area. Resources that may be of archaeological or historical significance that are associated with these sites could be substantially adversely affected by project construction activities. This potential impact would be significant.*

Previous investigations have identified numerous sites of prehistoric and historic resources within the Natomas area, along the lower American and Sacramento Rivers, and at Folsom Reservoir. The extent of previous investigation and documentation of these sites is highly variable, and the boundaries of buried prehistoric sites for which there is no surface evidence are often uncertain. For example, a records search for the Natomas area conducted at the files maintained by the Northeast and North Central Information Centers of the California Historical Research Information System identified two suspected prehistoric village locations east of the confluence of the Feather and Sacramento Rivers north of the program study area, 24 known historic resources

(three of which also have a prehistoric component), and nine prehistoric sites, one of which is listed on the NRHP and CRHR.

Most of the previously documented sites have not been listed on the CRHR or the NRHP or evaluated for eligibility; nevertheless, many of these resources may be unique archaeological resources as defined in State CEQA Guidelines Section 15064.5. Individual improvement projects—for example improvements involving excavation, removal of aging structures from the water or land side of levees, and modification of agricultural drainage features—would have the potential to cause a substantial adverse change in the significance of a unique archaeological resource or a historical resource, including some resources that are listed on the NRHP or CRHR (e.g., the Walnut Grove branch railroad, which may be affected by Sacramento River levee raising). This potential impact would be significant.

IMPACT 4.8-b *Changes to Elements of RD 1000. The RD 1000 area has been identified as eligible for inclusion in the NRHP as a Rural Historic Landscape District. The proposed project would alter contributing elements of the district. Mitigation has been implemented by the USACE to compensate for the loss of integrity of the contributing elements of the district that would result from previous USACE flood control projects. SAFCA's proposed project would also alter elements of the drainage system that are contributing elements. While the loss of the integrity of the contributing elements may have already been addressed and mitigated through previous flood control projects implemented by the USACE, further impacts to the same or other contributing elements of RD 1000 may result from the proposed project. This potential impact would be significant.*

As previously described, an evaluation of RD 1000 was conducted both to determine the NRHP eligibility of the district and to evaluate whether the district would be significantly affected by flood control projects (levee modifications) planned and subsequently implemented by the USACE as part of the American River Watershed Project to provide a greater degree of flood protection in the Natomas area. The “determination of effects” statement concluded that the USACE projects would adversely affect both contributing and non-contributing elements of the Rural Historic Landscape District by allowing for greater development to occur in the region. Mitigation measures were adopted and incorporated into the project. These consisted of Historic American Engineering Record documentation, which was prepared by Peak & Associates (1997); videotapes of historic properties; and a list of repositories where copies of the information would be made available to the public.

SAFCA’s proposed project would also alter elements of the drainage system (levees and ditches/canals) that are contributing elements of the Rural Historic Landscape District. Although the loss of the integrity of the contributing elements has already been addressed and mitigated, to some extent, as a part of previous USACE flood control projects, further impacts to the same contributing elements of RD 1000 or residual values that may not have been fully evaluated or mitigated may occur. Project-specific evaluations would need to be carried out to determine the likelihood and extent of potential impacts when additional projects are proposed. This potential impact would be significant.

Potential impacts on historic resources that are not contributing elements of the RD 1000 Rural Historic Landscape District are addressed under Impact 4.8-a.

IMPACT 4.8-c *Damage or Destruction of Previously Undiscovered Cultural Resources. Previously unknown cultural resources of archaeological or historical significance could be present in areas that would be subject to construction disturbance and could be damaged by construction. This potential impact would be significant.*

Sacramento Valley floodplains are known to have experienced a high degree of prehistoric occupation and use. Prehistoric occupation sites frequently took the form of mounds raised above the natural ground surface, but many of these have been destroyed by modern agricultural cultivation of fields, and the remains of these sites are no longer visible above ground. Additionally, frequent flooding of the American River Basin could easily have buried earlier or smaller occupation sites that would not be visible except during deeper ground-disturbing activities.

Construction efforts for individual improvements could encounter previously unknown cultural resources that could be damaged by construction activity, particularly earthmoving activities such as borrow excavation or grading. Cultural resources that are encountered during construction may meet the definition of a unique archaeological resource or a historical resource in Section 15064.5 of the State CEQA Guidelines. Construction activity may damage such resources sufficiently to cause a substantial adverse change in their significance. This potential impact would be significant.

IMPACT 4.8-d **Discovery of Human Remains during Construction.** *Buried human remains could be encountered during construction associated with the individual flood control projects, causing damage to or destruction of such remains. This potential impact would be significant.*

Prehistoric human remains have been found at several known prehistoric sites in the program study area. It is possible that previously unknown buried human remains could be unearthed and damaged or destroyed during excavation activities associated with the construction of the individual improvement projects, such as grading and excavation of borrow areas. Damage to or destruction of human remains would be a significant impact.

4.8.4 MITIGATION MEASURES

Mitigation is described below for Impact 4.8-a (effects on documented sites), Impact 4.8-b (changes to elements of RD 1000), Impact 4.8-c (damage of previously unknown resources), and Impact 4.8-d (discovery of human remains).

Mitigation Measure 4.8-a for Construction Effects on Known Prehistoric and Historic Cultural Resource Sites: Avoid Resources to the Extent Feasible, and Conduct Resource Documentation and Data Recovery as Needed.

The agencies implementing program components and their primary construction contractors shall ensure that the following measures are implemented to address potentially significant impacts on known cultural resources.

Prehistoric Resources: If ground disturbance would be required in the vicinity of a known prehistoric resource, a qualified professional archaeologist shall establish the boundaries of the resource before the commencement of any ground disturbance. If feasible, the project activities shall be designed to prevent disturbance of the resource. If, in the judgment of the archaeologist, project activities could disturb the resource, the archaeologist shall prepare and implement a research design and treatment plan for prehistoric archaeological resources and, before any construction-related ground disturbance begins in the vicinity of the resource, shall carry out a testing program based on the plan to determine whether the resource may meet the definition of a unique archaeological resource or a historical resource in Section 15064.5 of the State CEQA Guidelines. If the construction activity is part of a federal undertaking, all actions shall be conducted in compliance with Section 106 of the NHPA.

If the resource is determined to be ineligible for listing on the CRHR and the NRHP and is determined not meet the definition of a unique archaeological resource or a historical resource as indicated above, no further mitigation shall be required. If the resource is found to potentially meet the definition of a unique archaeological resource or a historical resource, the archaeologist shall recommend additional actions deemed necessary for the protection and documentation of the resource, as appropriate. Such actions may include additional testing, data recovery, recordation, and site monitoring during construction to minimize disturbance. The agency implementing the construction activity shall ensure that required protection actions are implemented before construction begins at the site. If artifacts are recovered from significant resources, they shall be housed at a qualified curation facility. The results of the identification, evaluation, and/or data recovery program shall be presented in a professional report that details all methods and findings, evaluates the nature and significance of the resources, analyzes and interprets the results, and distributes this information to the appropriate repositories.

Historic Resources: If construction activity would be conducted in the vicinity of a known or potential historical architectural or archaeological resource, a qualified historical archaeologist or architectural historian as

appropriate shall evaluate the integrity of the resource, determine whether the resource may be a unique archaeological resource or a historical resource as defined in Section 15064.5, and determine whether the resource or its immediate surroundings would be altered by the activity such that its significance would be materially impaired. The investigation shall be conducted before project construction begins at the site. If the resource is determined to be ineligible or would not be materially affected by the project, no further mitigation shall be required before construction may commence.

If the resource is found to be a unique archaeological resource or a historical resource as defined in Section 15064.5, the archaeologist or architectural historian shall recommend additional actions deemed necessary for the preservation or documentation of the resource. Such actions may include testing for subsurface features, additional background research, additional resource documentation, avoidance of the resource, and monitoring of construction activity to ensure that any effects are minimized. The implementing agency shall ensure that necessary protection actions are implemented before construction begins at the site. If artifacts are recovered from significant resources, they shall be housed at a qualified curation facility. The results of the identification, evaluation, and/or documentation program shall be presented in a professional report that details all methods and findings, evaluates the nature and significance of the resources, analyzes and interprets the results, and distributes this information to the appropriate repositories.

Implementing this mitigation would reduce this impact to a less-than-significant level.

Mitigation Measure 4.8-b for Changes to Elements of the RD 1000 Rural Historic Landscape District: Document Alterations Made to Any Contributing Resources and Distribute the Information to the Appropriate Repositories.

The agencies implementing program components and their primary construction contractors shall ensure that the following measures are implemented to address potentially significant impacts on the RD 1000 Rural Historic Landscape District.

As previously described, some mitigation for previous impacts to the RD 1000 Rural Historic Landscape District has been implemented. Additional impacts to contributing elements of the Rural Historic Landscape District shall be mitigated in a manner consistent with previous mitigation efforts.

Consistent with previous mitigation efforts for this impact, a qualified professional archaeologist or architectural historian shall document the alterations made to any of the contributing resources and distribute the information to the appropriate repositories. The documentation shall include Historic American Engineering Record documentation, videotapes of historic properties, and a list of repositories where copies of the information would be made available to the public.

Implementation of this mitigation measure would reduce the impact to a less-than-significant level.

Mitigation Measure 4.8-c for Damage or Destruction of Previously Undiscovered Cultural Resources: Suspend Potentially Damaging Activity, Investigate Resources, Avoid to the Extent Feasible, and Conduct Resource Documentation and Data Recovery as Needed.

The agencies implementing program components and their primary contractors for engineering design and construction shall ensure that the following measures are implemented to reduce the potential for previously undiscovered cultural resources to be encountered and damaged during project construction activities.

A qualified archaeologist shall conduct standard cultural resource investigation practices during the planning phase of all individual improvement projects to identify the potential for previously unknown cultural resources to be present at the project site(s); these practices shall include a records search pertaining to the specific project site(s) from the appropriate Information Center in the California Historical Resource Information System, a survey of all accessible portions of the project site(s), and documentation and significance evaluation of any resources that are found during the survey.

Before the commencement of construction, a qualified professional archaeologist shall give a presentation to all construction personnel regarding the likelihood and type of resources that might be found during construction operations associated with the individual flood control projects, and measures that shall be taken in the event that potential archaeological or historical resources are found during construction.

If unrecorded cultural resources (e.g., unusual amounts of shell, animal bone, bottle glass, ceramics, structure/building remains, etc.) are encountered during the site survey or during construction activity, all ground-disturbing activities shall be restricted within a 100-foot radius of the find or a distance determined by a qualified professional archaeologist to be appropriate based on the potential for disturbance of additional cultural resource materials. A qualified archaeologist shall identify the materials, determine their potential to meet the definition of a unique archaeological resource or a historical resource in Section 15064.5, and formulate appropriate measures for their treatment, which shall be implemented by the agency implementing the project. Potential treatment methods for significant and potentially significant resources may include, but would not be limited to, no action (i.e., resources determined not to be significant), avoidance of the resource through changes in construction methods or project design, and implementation of a program of testing and data recovery, in accordance with all applicable federal and state requirements.

For unique archaeological resources and archaeological historical resources, the preferred mitigation is preservation in place of as much of the resource as possible, where feasible, through project modification or protective measures. In many cases, archaeological data recovery can mitigate impacts that cannot be avoided. However, construction activities may encounter unique archaeological resources and archaeological historical resources that cannot be protected or recovered and for which adequate data recovery may not be feasible. For example, resources encountered during excavation through a levee for construction of a cutoff wall are likely to be unrecoverable. Because of the possibility that such resources may be encountered and may be significantly affected by the proposed project, this impact is considered significant and unavoidable.

Mitigation Measure 4.8-d for Discovery of Human Remains during Construction: Suspend Potentially Damaging Activity, Notify the Coroner and Most Likely Descendant (MLD), and Implement Appropriate Treatment of Remains.

The agencies implementing program components and their primary construction contractors shall ensure that the following measures are implemented to address the discovery of human remains during construction.

If human remains are uncovered during ground-disturbing activities, all ground-disturbing activities shall be immediately suspended within a 100-foot radius of the find or a distance determined by a qualified professional archaeologist to be appropriate based on the potential for disturbance of additional remains, the lead agency or its designated representative shall be notified. The implementing agency shall immediately notify the county coroner and a qualified professional archaeologist. The coroner shall examine all discoveries of human remains within 48 hours of receiving notice of the discovery (Health and Safety Code Section 7050.5[b]). If the coroner determines that the remains are those of a Native American, he or she shall contact the Native American Heritage Commission (NAHC) by telephone within 24 hours of making that determination (Health and Safety Code Section 7050[c]). In accordance with California Public Resources Code Section 5097.9, the implementing agency or its appointed representative and the professional archaeologist shall contact the MLD, as determined by the NAHC, regarding the remains. The MLD, in cooperation with the lead agency and the property owner, if applicable, shall determine the ultimate disposition of the remains. Ground disturbance shall not be recommenced in the area of suspended activity without authorization from the archaeologist.

Implementing this mitigation would reduce the impact to a less-than-significant level.

4.9 PALEONTOLOGICAL RESOURCES

Paleontological resources (fossils) are the remains or traces of prehistoric animals and plants that are 10,000 years old or older. This section assesses the potential for earthmoving activities associated with the proposed project to affect scientifically important fossil remains.

4.9.1 REGULATORY SETTING

No federal, state, or local plans, policies, or laws related to paleontological resources are relevant to this analysis.

4.9.2 ENVIRONMENTAL SETTING

4.9.2.1 REGIONAL GEOLOGY

As discussed in Section 4.3, “Geology and Soils,” the project area is located in the Sacramento Valley portion of the Great Valley Geomorphic Province and the transition between the valley and the Sierra foothills. The Great Valley is composed of thousands of feet of sedimentary deposits that have undergone periods of subsidence and uplift over millions of years. During the Jurassic and Cretaceous periods of the Mesozoic era, the Great Valley existed in the form of an ancient ocean. By the end of the Mesozoic, the northern portion of the Great Valley began to fill with sediment as tectonic forces caused uplift of the basin. By the time of the Miocene epoch, approximately 24 million years ago, sediments deposited in the Sacramento Valley were mostly of terrestrial origin.

Most of the surface of the Great Valley is covered with Recent (Holocene, i.e., 10,000 years Before Present [BP] to present day) and Pleistocene (i.e., 10,000–1,800,000 years BP) alluvium. This alluvium is composed of sediments from the Sierra Nevada to the east and the Coast Range to the west that were carried by water and deposited on the valley floor. Siltstone, claystone, and sandstone are the primary types of sedimentary deposits.

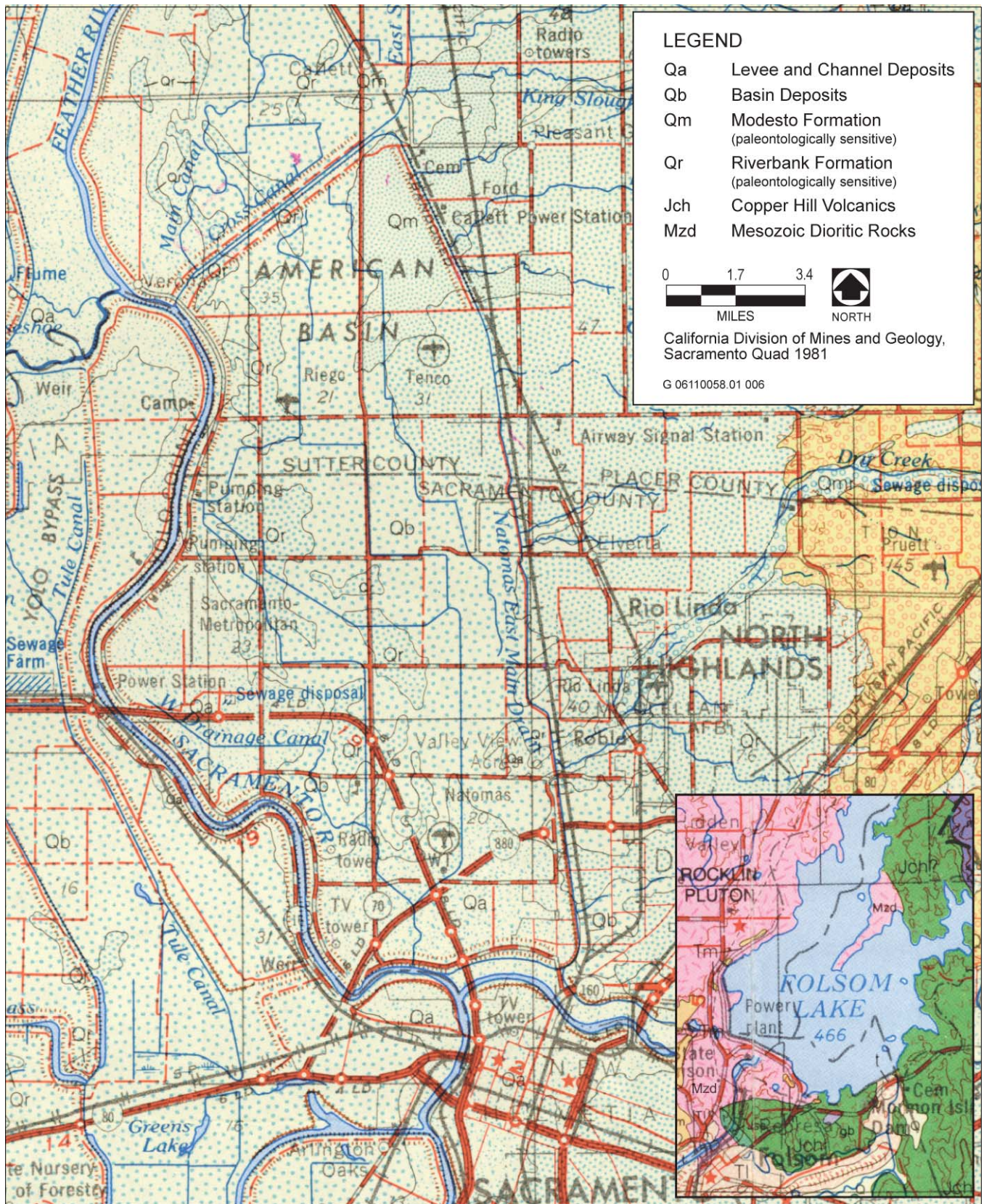
4.9.2.2 PALEONTOLOGICAL RESOURCES BY ROCK UNIT

Rocklin Pluton

The predominant rock formation at the Folsom Dam site, the bridge construction site, and on the west side of Folsom Reservoir is a group of Mesozoic (144 to 206 million years BP) dioritic rocks known as the Rocklin Pluton (Wagner et al. 1987). Plutonic rocks crystallized at great depths beneath the earth’s surface from many different batches of magma. The eastern half of Folsom Reservoir is bordered by Mesozoic metamorphic rocks known as Copper Hills Volcanics, which represents ancient chains of volcanic islands and the associated sea floor sediments that were buried, squeezed, and heated to form metasedimentary and metavolcanic (metamorphosed volcanic) rocks. Exhibit 4.9-1 shows the distribution of these formations. Because of the geologic processes involved as these rocks were formed (high temperature and pressure at great depth), they do not contain fossils.

Holocene Alluvium

Sediments adjacent to the Sacramento and American Rivers are composed of Recent (Holocene) (10,000 years BP and younger) alluvial flood plain deposits (Wagner et al. 1987). In general, these deposits consist primarily of unconsolidated sand and silt. Holocene alluvial deposits overlie an older alluvial fan system composed of Pleistocene-age sediments. Construction activities that would occur within alluvial flood plain or basin deposits would be located within Holocene (10,000 years BP and younger) sediments. By definition, sediments associated with Holocene-age alluvium are too young to contain paleontologically sensitive resources.



Rock Formations in the Folsom Dam, Natomas, and North Sacramento Areas

Exhibit 4.9-1

Riverbank and Modesto Formations

Piper et al. (1939) were the first to publish detailed geologic maps in the southern Sacramento/northern San Joaquin Valley areas, and they designated the older alluvial Pleistocene deposits as the Victor Formation. However, Davis and Hall (1959) proposed a subdivision of the Victor Formation into the Turlock Lake (oldest), Riverbank (middle), and Modesto (youngest) formations. Marchand and Allwardt (1981) proposed that the name Victor Formation be abandoned and that the Turlock Lake, Riverbank, and Modesto Formations be adopted as formal nomenclature for Quaternary deposits in the Sacramento and San Joaquin Valleys. Most later researchers have followed this recommendation.

In the Sacramento Valley, the Modesto Formation forms alluvial terraces, and some alluvial fans and abandoned channel ridges, of the Sacramento River and can be divided into upper and lower members. The upper member is composed primarily of unconsolidated, unweathered, coarse sand and sandy silt. The age of this member has been placed at approximately 12,000 to 26,000 years BP (Atwater cited in Helley and Harwood 1985). The lower member of the Modesto Formation is composed of consolidated, slightly weathered, well-sorted silt and fine sand, silty sand, and sandy silt. Age estimates for the lower member range from 29,000 to 42,000 year BP (Marchand and Allwardt 1981, cited in Helley and Harwood 1985).

Sediments in the Riverbank Formation consist of weathered reddish gravel, sand, and silt that form alluvial terraces and fans. In the Sacramento Valley, this formation tends toward soil-profile developments that are more easily distinguishable from the Modesto Formation (Helley and Harwood 1985). The Riverbank Formation is Pleistocene in age (Wagner et al. 1987), but is considerably older than the Modesto Formation; estimates place the age of the Riverbank between 130,000 and 450,000 years BP (Helley and Harwood 1985). The Riverbank forms alluvial fans and terraces of the Sacramento River. The Riverbank fans and terraces are higher in elevation and generally have a more striking topography than those formed by the Modesto Formation.

Remains of land mammals have been found at a number of localities in alluvial deposits referable to the Riverbank and Modesto Formation. Jefferson (1991a, 1991b) compiled a database of California Late Pleistocene vertebrate fossils from published records, technical reports, unpublished manuscripts, information from colleagues, and inspection of museum paleontological collections at more than 40 public and private institutions. Jefferson lists three nearby sites in Sutter County that have yielded Rancholabrean vertebrate fossils recovered from Pleistocene-age sediments. In addition, the University of California, Berkeley Museum of Paleontology (UCMP) Database lists several localities in the program study area where fossils were recovered from sediments referable to the Riverbank or Modesto Formations.

There are at least eight recorded Rancholabrean-age vertebrate fossils sites from the Riverbank Formation in the City of Sacramento (Hilton et al. 2000, UCMP 2006, Kolber 2004). These sites have yielded remains of mammoth, bison, coyote, horse, camel, antelope, several types of reptiles, and Harlan's ground sloth.

Fossil specimens from the Riverbank and Modesto Formations have been reported by Marchand and Allwardt (1981) near their type localities in the City of Riverbank and Modesto, respectively. Other locations are also known throughout the northern and Central Valley (UCMP 2006). For example, there are several sites approximately 20–30 miles away in Yolo County, near the cities of Davis and Woodland, that have yielded Rancholabrean-age rodents, snakes, horses, antelope, Harlan's ground sloth, mammoth, and saber-toothed tiger from sediments referable to the Riverbank or Modesto Formations (Hay 1927, UCMP 2006).

As shown in Exhibit 4.9-1, the Natomas area and areas to the north and east of Natomas contain areas of both the Modesto Formation and the Riverbank Formation.

4.9.3 ENVIRONMENTAL IMPACTS

Geologic maps and reports covering the geology of the program study area were reviewed to determine the exposed rock units and to delineate their respective aerial distributions in areas in the program study area where construction-related excavation may occur. The review focused on the Folsom Dam and Reservoir area, the Natomas area, and areas north and east of Natomas area, including the North Sacramento area, because these are the areas where excavation related to program improvements is most likely to be conducted. Individual project sites that may be excavated for cutoff wall installation adjacent to the Sacramento and American River channels are not situated on paleontologically sensitive rock units, as noted above under “Holocene Alluvium.” Because impacts are evaluated in this EIR at a program level and the locations of all specific project sites (e.g., borrow areas) are not known, a site-specific field visit was not conducted, and a site-specific paleontological database review was not performed for this analysis.

4.9.3.1 SIGNIFICANCE CRITERIA

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. The proposed project was considered to have a significant effect on paleontological resources if it would:

- ▶ destroy a unique paleontological resource or site.

The Society of Vertebrate Paleontology (SVP), a national scientific organization of professional vertebrate paleontologists, has established standard guidelines that outline professional practices for the conduct of paleontological resource assessments and surveys, monitoring and mitigation, data and fossil recovery, sampling procedures, specimen preparation, analysis, and curation. The SVP (1995) established three categories of sensitivity for paleontological resources—high, low, and undetermined—as described below:

- ▶ **High sensitivity.** Areas where fossils have been previously found are considered to have a high sensitivity and a high potential to produce fossils. In areas of high sensitivity that are likely to yield unique paleontological resources, full-time monitoring is typically recommended during any project ground disturbance.
- ▶ **Low sensitivity.** Areas that are not sedimentary in origin and that have not been known to produce fossils in the past typically are considered to have low sensitivity and monitoring is usually not needed during project construction.
- ▶ **Undetermined sensitivity.** Areas or rock formations that have not had any previous paleontological resource surveys or fossil finds are considered undetermined until surveys and mapping are performed to determine their sensitivity. After reconnaissance surveys, observation of exposed cuts, and possibly subsurface testing, a qualified paleontologist can determine whether the area should be categorized as having a high or low sensitivity.

A paleontologically important rock unit is one that: 1) has a high potential paleontological productivity rating, and 2) is known to have produced unique, scientifically important fossils. The potential paleontological productivity rating of a rock unit exposed at a project site refers to the abundance/densities of fossil specimens and/or previously recorded fossil sites in exposures of the unit in and near the project site. Exposures of a specific rock unit at the project site are most likely to yield fossil remains representing particular species in quantities or densities similar to those previously recorded from the unit in and near the project site.

An individual vertebrate fossil specimen may be considered unique or significant if it is identifiable and well preserved, and it meets one of the following criteria:

- ▶ a type specimen (i.e., the individual from which a species or subspecies has been described);
- ▶ a member of a rare species;
- ▶ a species that is part of a diverse assemblage (i.e., a site where more than one fossil has been discovered) wherein other species are also identifiable, and important information regarding life history of individuals can be drawn;
- ▶ a skeletal element different from, or a specimen more complete than, those now available for its species; or
- ▶ a complete specimen (i.e., all or substantially all of the entire skeleton is present).

For example, identifiable vertebrate marine and terrestrial fossils are generally considered scientifically important because they are relatively rare. The value or importance of different fossil groups varies, depending on the age and depositional environment of the rock unit that contains the fossils, their rarity, the extent to which they have already been identified and documented, and the ability to recover similar materials under more controlled conditions such as part of a research project. Marine invertebrates are generally common, well developed, and well documented. They would generally not be considered a unique paleontological resource.

4.9.3.2 IMPACT ANALYSIS

IMPACT 4.9-a Disturbance of Unknown Unique Paleontological Resources during Earthmoving Activities. *Portions of the program study area are underlain by the Riverbank and Modesto Formations, which are paleontologically sensitive rock formations. Construction activities in the Riverbank or Modesto Formations could damage unknown subsurface unique paleontological resources. This potential impact would be significant.*

By definition, sediments associated with Holocene-age alluvium are too young to contain paleontologically sensitive resources, and the geologic conditions associated with their formation preclude the Rocklin Pluton and Copper Hill Volcanics from containing fossils. Therefore, earthmoving activities in any of these sediments would result in no impacts on paleontological resources.

However, the discovery of Pleistocene vertebrate fossil remains in sediments referable to the Riverbank and Modesto Formations from Sutter County, Sacramento County, as well as Davis, Woodland, and numerous other areas throughout the Central Valley, suggests there is a potential for uncovering additional similar fossil remains during construction-related excavation within portions of the program study area, including portions of Natomas, the North Sacramento area, and areas north and east of Natomas.

Because of the number of recorded fossil sites in the Riverbank and Modesto Formations within the Central Valley, they are both considered paleontologically sensitive rock formations under SVP criteria. Certain construction activities in the Riverbank or Modesto Formations, such as enhancing levee embankments or forming berms on top of the existing ground surface, would not cause adverse impacts on resources because Pleistocene-age fossils would not be encountered until approximately 10 feet below ground surface. However, excavations deeper than 10 feet (e.g., for borrow excavation and for the installation of relief wells) in the Riverbank or Modesto Formations have the potential to encounter and possibly damage unique paleontological resources. This potential impact would be significant.

4.9.4 MITIGATION MEASURES

Mitigation Measure 4.9-a for Disturbance of Unknown Unique Paleontological Resources during Earthmoving Activities: Conduct Construction Personnel Training and, If Paleontological Resources Are Found, Cease Work in the Vicinity of the Find and Implement Mitigation in Coordination with a Professional Paleontologist.

The agencies implementing program components and their primary contractors for engineering design and construction shall ensure that the following measures are implemented to avoid and minimize potential effects of construction activities on unique paleontological resources or sites.

Before the start of construction activities in the Riverbank or Modesto Formations, construction personnel involved with earthmoving activities shall be informed of the possibility of encountering fossils, the appearance and types of fossils likely to be seen during construction activities, and proper notification procedures should fossils be encountered. This worker training may either be prepared and presented by an experienced field archaeologist at the same time as construction worker education on cultural resources or prepared and presented separately by a qualified paleontologist.

If paleontological resources are discovered during earthmoving activities, the construction crew shall immediately cease work in the vicinity of the find. The lead agency shall retain a qualified paleontologist to evaluate the resource and prepare a proposed mitigation plan in accordance with SVP guidelines (1995). The proposed mitigation plan may include a field survey, construction monitoring, sampling and data recovery procedures, museum storage coordination for any specimen recovered, and a report of findings. Recommendations determined by the lead agency to be necessary and feasible shall be implemented before construction activities can resume at the site where the paleontological resources were discovered.

Implementing this mitigation measure would reduce potential impacts to unknown unique paleontological resources to a less-than-significant level.

4.10 TRANSPORTATION AND CIRCULATION

This section describes the traffic and circulation characteristics of the major transportation corridors in the program study area, and analyzes the potential impacts of the proposed project on traffic circulation and transportation systems, emergency vehicle access, and construction traffic hazards.

4.10.1 REGULATORY SETTING

4.10.1.1 FEDERAL AND STATE

Federal highway standards are implemented in California by the California Department of Transportation (Caltrans), which is responsible for planning, designing, constructing, operating, and maintaining all state-owned roadways in the program study area. Caltrans enforces various policies and regulations related to the modification of, or encroachment on, state-owned roadways.

4.10.1.2 LOCAL

The general plans for Sacramento, Sutter, Placer, and El Dorado Counties and for the Cities of Sacramento and Folsom identify estimated future travel demand and present goals, policies, and implementation programs for transportation systems and facilities within those jurisdictions and their spheres of influence. The focus of these goals and policies is long-term development and design of transportation facilities, improvements to existing roadways, interagency coordination, and encouragement of alternative transportation.

Encroachments in county or city road rights-of-way are subject to encroachment permits and the provision of temporary traffic control systems as required by the public works departments of the respective jurisdictions.

4.10.2 ENVIRONMENTAL SETTING

4.10.2.1 FOLSOM DAM AND RESERVOIR AREA

The major local roadways that would serve as transportation routes for the hauling of construction materials related to Folsom Dam and Folsom Bridge improvements are State Route (SR) 50, Folsom Boulevard, Auburn-Folsom Road, Douglas Boulevard, Blue Ravine Road, East Natoma Street, Green Valley Road, Sierra College Boulevard, Eureka Road, East Bidwell Street, Oak Avenue Parkway, and Greenback Lane. Following are the main attributes of these roadways:

- ▶ SR 50 is a six-lane freeway through the program study area that connects the Sacramento area with El Dorado County.
- ▶ Folsom Boulevard: north-south access between Auburn and Folsom; varies from six-lane divided to four-lane divided roadway.
- ▶ Auburn-Folsom Road: north-south access between Auburn and Folsom; varies from four-lane divided to undivided roadway, then to undivided two-lane roadway.
- ▶ Douglas Boulevard: east-west between Sierra College Boulevard and Auburn-Folsom Road; divided roadway with two lanes in each direction narrowing in the east to two-lane undivided roadway.
- ▶ Blue Ravine Road: east-west roadway connecting Folsom Boulevard to East Natoma Street; varies from three lanes to two lanes in each direction and in the east, varies between one-lane and two-lane configurations.

- ▶ East Natoma Street: east-west roadway between Fargo Way and Green Valley Road/Blue Ravine Road; two-lane undivided roadway increasing at Folsom Dam Road to three-lane road.
- ▶ Green Valley Road: east-west from East Natoma/Blue Ravine Road and continuing east into El Dorado County; two-lane undivided roadway in the program study area.
- ▶ Sierra College Boulevard: north-south from Hazel Avenue and Old Auburn Road to Interstate 80 (I-80) and the Caperton Reservoir; four-lane divided roadway reducing to a three-lane divided roadway then a two-lane undivided roadway.
- ▶ Eureka Road: north-south, from the intersection of Eureka Road and Douglas Boulevard to I-80 in the Folsom Dam area; six lanes, changing from undivided to divided, with marked bicycle lanes on both sides.
- ▶ East Bidwell Street: north-south connecting SR 50 and Folsom; varies between four and six divided lanes in the Folsom Dam area, with a marked bicycle lane along some sections.
- ▶ Oak Avenue Parkway: between East Bidwell Street and Blue Ravine Road; six-lane divided roadway.
- ▶ Greenback Lane: predominantly east-west, connecting Folsom with I-80 and points west; four-lane, divided roadway with center left turn lanes and with marked bicycle facilities from Auburn-Folsom Road to Madison Avenue.

In addition to the local roadway access routes, construction materials, such as sand, are expected to be hauled to the Folsom Dam construction sites from Marysville, approximately 50 miles northwest of the Folsom Reservoir area. Roadways that would potentially be affected include Hammonton-Smartville Road, North Beale Road, Feather River Boulevard, SR 70, SR 65, and I-80.

4.10.2.2 LOWER AMERICAN AND SACRAMENTO RIVERS AND SOUTH SACRAMENTO STREAMS GROUP AREA

Because the lower American and Sacramento Rivers are bordered by metropolitan Sacramento, any of the major roadways and numerous residential streets throughout the Sacramento area could be subject to construction-related traffic impacts during the completion of proposed Common Features improvements and activities conducted as part of the levee integrity program.

The primary roadways that would most likely be used to access most of the improvement project sites in the program study area are I-5, SR 50, Folsom Boulevard, Fair Oaks Boulevard, Watt Avenue, Howe Avenue, Riverside Boulevard, Highway 160 (Freeport Boulevard), Florin Road, and Pocket Road. These are all heavily traveled roadways, some of which experience severe congestion at times in some areas.

I-5 and Freeport Boulevard are the main roadways providing access to the SSSG area.

4.10.2.3 NATOMAS AREA

The main routes for construction traffic in Natomas would be SR 99/70, Garden Highway, Power Line Road, Riego Road, and Sankey Road.

SR 99/70 is a north-south highway, is the primary regional transportation corridor through the Natomas area. Garden Highway is a two-lane highway that extends north-south on top of the Sacramento River east levee through the rural Sutter County and Sacramento County portions of the Natomas area and east-west along the levee in the City of Sacramento. Power Line Road is a north-south two-lane rural roadway that parallels SR

99/70, providing an alternate north-south route to Garden Highway and SR 99/70 south of Sankey Road. Riego and Sankey Roads are two-lane east-west rural roadways. Additional site access in Natomas would be via farm roads and levee inspection roads.

4.10.2.4 NORTH SACRAMENTO AREA

The main roadways providing access to the North Sacramento area are I-80, Norwood Avenue, Elkhorn Boulevard, Del Paso Road, and Rio Linda Boulevard. These roadways vary from rural to suburban to urban in the program study area. Construction traffic would also need to use local residential streets in the North Sacramento area.

4.10.3 ENVIRONMENTAL IMPACTS

Traffic effects that would be associated with almost all of the proposed improvements would be generated by construction activities. Operational trips would be negligible. An exception is the Folsom Bridge project, which would result in changes in traffic patterns.

4.10.3.1 SIGNIFICANCE CRITERIA

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. The proposed project was determined to result in a significant effect on transportation and circulation if it would:

- ▶ cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system;
- ▶ exceed, either individually or cumulatively, a level-of-service standard established by the county congestion management agency for designated roads or highways;
- ▶ result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks;
- ▶ substantially increase hazards due to a design feature or incompatible uses;
- ▶ result in inadequate emergency access;
- ▶ result in inadequate parking capacity; or
- ▶ conflict with adopted policies, plans, or programs supporting alternative transportation.

Although some of the proposed levee improvements would take place near the Sacramento International and Sacramento Executive Airports and Rio Linda Airport, the proposed improvements in these areas would be restricted to levee improvements and related construction activity, and implementation of the proposed project would not alter traffic patterns or result in substantial safety risks associated with airport operations.

Individual projects would not include any permanent changes to roadways or other transportation systems or introduce new uses to transportation systems, and therefore would not result in any design features or incompatible uses that would present hazards to transportation systems. The proposed project would not entail any uses requiring permanent parking capacity. Because the proposed improvements would only temporarily affect roadways and trail systems (see Section 4.13, "Recreation," regarding recreational trails, including bicycle trails), the proposed project would not directly or indirectly eliminate alternative transportation corridors or

facilities (e.g., bike paths, lanes, bus turnouts, etc.). In addition, the proposed project would not include changes in policies or programs that support alternative transportation. Therefore, the proposed project would not conflict with adopted policies, plans, or programs supporting alternative transportation.

With regard to the first significance criterion, the following screening criterion is recommended by the Institute of Transportation Engineers (1989) for assessing the effects of development projects that create permanent traffic increases: “In lieu of other locally preferred thresholds, a traffic access/impact study should be conducted whenever a proposed development will generate 100 or more added (new peak direction trips to or from the site during the adjacent roadway’s peak hours or the development’s peak hours.” For construction projects that create temporary traffic increases, this criterion is considered conservative. However, it is intended to assess the effect of a traffic mix consisting primarily of automobiles and light trucks. To account for the large percentage of heavy trucks associated with a typical construction project, the threshold level is reduced to 50 or more new peak-direction trips. Consequently, a construction project would be considered to have a significant impact on traffic (i.e., would be considered to cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system) if the project would result in 50 or more new truck trips during the a.m. or p.m. peak hour.

4.10.3.2 IMPACT ANALYSIS

IMPACT 4.10-a	Long-Term Traffic Effects Associated with the Operation of the Proposed Folsom Bridge. <i>Operation of the proposed Folsom Bridge would result in degradation of LOS on some roadway segments, the new bridge segment, and at some intersections in the project area. Additionally, the proposed bridge would result in additional cut-through traffic to residential streets. This impact would be significant.</i>
Operation of the proposed Folsom Bridge would result in permanent traffic effects in the project area, including deterioration or worsening of 2007 and 2025 roadway segment and intersection level of service (LOS) and unacceptable LOS on the new bridge segment (U.S. Army Corps of Engineers and City of Folsom 2006). The proposed bridge is also expected to increase the cut-through traffic on Oak Hill Drive in Placer County and Briggs Ranch Drive in Folsom under 2007 conditions. This cut-through traffic would result because of limited capacity on Auburn-Folsom Road between Oak Hill Drive and Fuller Drive, which is not planned to be widened to four lanes until after 2007. However, because the road is expected to be widened before 2025, no-cut through traffic is projected on Oak Hill Drive under 2025 conditions. The East Natoma Street/Briggs Ranch Drive intersection would be reconfigured as part of the proposed Folsom Bridge project to minimize cut-through traffic problems. (U.S. Army Corps of Engineers and City of Folsom 2006.) However, because implementation of the Folsom Bridge project would result in unacceptable LOS at some locations, this impact would be significant.	
IMPACT 4.10-b	Increases in Traffic on Local and Regional Roadways during Construction. <i>During the construction period for individual improvement projects, haul truck trips and construction worker commute trips would increase traffic on regional roadways and highways and in the vicinity of project sites and, along the lower American and Sacramento Rivers, in the SSSG area, and in the North Sacramento area, on residential streets. Construction activity, construction traffic, and the presence of construction equipment could increase traffic congestion on some roadways and create hazardous traffic conditions. In addition, some highway and lane closures would be necessary for Natomas area improvements, potentially leading to traffic delays. This impact would be significant.</i>

Construction of many of the individual improvement projects and activities would involve the import of substantial amounts of construction equipment and borrow and other construction materials (e.g., aggregate, cement, bentonite for cutoff walls) and the off-site hauling of spoils from the sites. Construction activities would typically be dispersed among multiple sites (e.g., construction sites, staging areas, borrow areas), particularly for the largest projects, such as the Folsom Dam modifications. Construction traffic would converge on the individual

project sites and could substantially affect local traffic at site ingress and egress points but could also substantially affect traffic flow on regional roadways and highways in the vicinity of the individual project sites. Construction traffic and construction activities may also temporarily interfere with the use of bicycle lanes in some locations.

Some of the individual flood control projects (e.g., the Folsom Dam improvements and bridge construction downstream of Folsom Dam) would be very large in scope and would have long durations. The Folsom Dam modifications and the Folsom Bridge project, in particular, would require large work forces, an extended construction duration (at least 5 years for the Folsom Dam modifications and 1.5 to 2 years for bridge construction), and substantial amounts of materials and equipment, all resulting in high volumes of construction-related trips and the potential for extended periods of traffic disruption on regional roadways and highways.

In addition, portions of some roadways, such as Garden Highway, would need to be temporarily closed during some levee improvements. Traffic would need to be detoured to nearby roadways, increasing traffic on those roadways and potentially leading to congestion. During construction of improvements on a portion of the Natomas Cross Canal, lane closures on SR 99/70 are expected to be required over at least two weekends, also likely leading to traffic delays and potential congestion on this roadway.

During project construction, trucks and workers entering and exiting individual construction sites could also temporarily increase traffic hazards, depending on the locations of the ingress and egress points. At times, the presence of slow-moving trucks entering or exiting the individual construction sites could pose hazards to other vehicles on affected roadways, in addition to interfering with traffic flow. In addition, trucks and other vehicles could track mud and gravel onto the local roadways, also posing a driving hazard.

Because construction activities could cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system and because construction traffic could result in traffic hazards, this impact would be significant.

IMPACT **Effects of Construction Activity on Emergency Access.** *Temporary road closures and the presence of large numbers of slow-moving haul trucks on some roadways during construction periods could hinder emergency access. This potential impact would be significant.*
4.10-c

Construction activities could temporarily disrupt transportation and circulation patterns in the vicinity of work zones near the individual construction sites. Temporary road closures and partial road closures could also cause traffic congestion and delays. These conditions could impair emergency access in some locations and increase some emergency response times. This potential impact would be significant.

4.10.4 MITIGATION MEASURES

Mitigation is described below for Impact 4.10-a (long-term traffic effects associated with Folsom Bridge), Impact 4.10-b (construction traffic on local and regional roadways), and Impact 4.10-c (effects on emergency access).

Mitigation Measure 4.10-a for Long-Term Traffic Effects Associated with the Operation of the Proposed Folsom Bridge: Implement Operational and Physical Improvements to the Roadway System to Minimize Long-Term Traffic Effects.

As reported by the USACE and the City of Folsom (2006), mitigating the significant traffic effects of the proposed Folsom Bridge project would require operational and physical improvements to the roadway system. If implemented, these improvements could reduce the effects of project implementation to a less-than-significant level. However, the feasibility of implementing these improvements is uncertain because the USACE and the City of Folsom, the agencies that would implement this project, do not have jurisdiction to make the necessary

roadway improvements; funding for the required improvements cannot be reasonably expected; acquiring and using the necessary right-of-way would include disruption, displacement, or destruction of businesses, sensitive plants, or animal species and potential adverse effects on residential streets in Folsom.

Because of the uncertain feasibility of implementing mitigation to reduce the impacts, the USACE and the City of Folsom concluded that the adverse traffic effects would likely remain significant, although, overall, the project alternatives would benefit the project area by providing additional roadway/bridge lanes to help accommodate traffic volumes and movement over the American River in the rapidly growing Folsom area. This impact would be significant and unavoidable.

Mitigation Measure 4.10-b for Increases in Traffic on Local and Regional Roadways during Construction: Prepare and Implement a Traffic Management and Safety Assurance Plan, and Coordinate with Local Jurisdictions and the California Department of Transportation (Caltrans) as Needed.

The environmental review processes for individual program improvements shall determine whether a potential impact would be associated with construction-related traffic. If a potentially significant impact could occur, the agencies implementing program components and their primary contractors for engineering design and construction shall ensure that the following measures are implemented to avoid and minimize potential traffic congestion impacts and traffic hazards caused by construction activities.

- a) The construction contractor shall prepare and implement a traffic management and safety assurance plan for roadways and intersections in project-related construction zones. The plan shall include provisions specifying the steps to be taken to maintain public safety during all phases of construction and shall be coordinated with the jurisdictions in which traffic effects may be significant. The plan shall include the following elements:
 1. Conduct worker training regarding high-collision intersections and areas along haul routes of special sensitivity (residential areas, narrow roadways, routes near education centers).
 2. Use public notices before and during construction to inform the public of anticipated haul routes and the potential presence of slow-moving vehicles in construction zones, where needed to reduce potential traffic hazards, and encourage the use of alternative routes by the general public.
 3. Post advanced warning of construction activities for any affected roadways that would be closed or major roadways where lane closures would occur in the local newspaper(s), distribute information to potentially affected residents, and/or coordinate with the local jurisdictions to post such warnings in highly visible locations near the affected roadways.
 4. Temporarily relocate bicycle routes to improve safety if possible, and inform the public of such changes.
 5. Where construction zones are adjacent to public roadways, to the extent feasible, limit the construction work zone to a width that, at a minimum, maintains alternate one-way traffic flow past the zone.
 6. Place and maintain barriers and install traffic control devices necessary for safety, as specified in Caltrans' Traffic Controls for Construction and Maintenance Work Zones and in accordance with the guidance provided by the affected local jurisdictions.
 7. Provide flagger control at construction zones to manage traffic control and flows as necessary.
 8. Limit the accumulation of project-generated mud or dirt on roadways adjacent to construction areas to the extent practicable and feasible.

- b) If construction of proposed improvements would result in the addition of traffic (especially slow-moving traffic) on a state highway, the implementing agency shall coordinate with Caltrans to develop an appropriate traffic management plan that includes a description of the proposed traffic patterns in and out of the construction site(s) and locations for truck routes. The plan shall be submitted to Caltrans for review before the initiation of construction-related activity that could adversely affect traffic on state roadways.

Implementation of these measures would reduce temporary traffic congestion and potential safety hazards associated with many construction projects to a less-than-significant level. However, the schedule of most of the proposed improvement projects would be governed by weather conditions and the terms of permits for work in sensitive habitats or the habitats of protected species, and it may be infeasible to limit impacts on local traffic and circulation to a less-than-significant level in some cases. In addition, where traffic needs to be rerouted around construction zones, it cannot be predicted with certainty that substantial increases in traffic on roadways to which the local traffic has been displaced. Therefore, it is not certain that the proposed project would not result in substantial increases in traffic in relation to the existing traffic load and capacity of the street system, and this impact is considered significant and unavoidable.

Mitigation Measure 4.10-c for Effects of Construction Activity on Emergency Access: Provide Pre-Notification of Construction to Emergency Service Providers, and Maintain Emergency Access or Coordinate Detours with Providers.

The agencies implementing program components and their primary contractors for engineering design and construction shall ensure that the following measures are implemented to reduce the potential for adverse effects of construction activity on emergency vehicle access.

- a) The implementing agency shall provide pre-notification of construction activity to local police, fire, and emergency service providers of the timing, location, and duration of construction activities that could affect the movement of emergency vehicles on local roadways.
- b) To the extent feasible, access for emergency vehicles shall be maintained through construction zones at all times. If through-passage cannot be ensured for emergency service vehicles, appropriate detours shall be coordinated with the emergency service providers in advance of road closures.

Implementing these measures would reduce the potential impairment of emergency access to a less-than-significant level.

4.11 AIR QUALITY

4.11.1 REGULATORY SETTING

Air quality within the program study area is regulated by the EPA, California Air Resources Board (ARB), and local air districts. Each of these agencies develops rules, regulations, policies, and/or goals to comply with applicable legislation. Although EPA regulations may not be superseded, both state and local regulations may be more stringent than EPA regulations. The following air quality regulations focus primarily on ozone, carbon monoxide (CO), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), particulate matter (PM), and lead. Because these are the most prevalent air pollutants known to be deleterious to human health and extensive health-effects criteria documents are available, these pollutants are commonly referred to as “criteria air pollutants.”

4.11.1.1 FEDERAL

At the federal level, EPA has been charged with implementing national air quality programs. EPA’s air quality mandates are drawn primarily from the federal Clean Air Act (CAA), which was enacted in 1970. The most recent major amendments made by Congress were in 1990.

The CAA required EPA to establish national ambient air quality standards (NAAQS). As shown in Table 4.11-1, EPA has established primary and secondary NAAQS for the following criteria air pollutants: ozone, respirable particulate matter (PM₁₀), fine particulate matter (PM_{2.5}), CO, NO₂, SO₂, and lead. The primary standards protect the public health and the secondary standards protect public welfare. The CAA also required each state to prepare an air quality control plan referred to as a State Implementation Plan (SIP). The federal Clean Air Act Amendments of 1990 (CAAA) added requirements for states with nonattainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIP is modified periodically to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins as reported by their jurisdictional agencies. EPA reviews all state SIPs to determine conformity with the mandates of the CAA and its amendments, and to determine whether implementation will achieve air quality goals. If EPA determines that a SIP is inadequate, a Federal Implementation Plan (FIP) that imposes additional control measures may be prepared for the nonattainment area. Failure to submit an approvable SIP or to implement the plan within the mandated time frame may result in application of sanctions to transportation funding and stationary air pollution sources in the air basin.

4.11.1.2 STATE

ARB is the agency responsible for coordination and oversight of state and local air pollution control programs in California and for implementing the California Clean Air Act (CCAA). The CCAA, which was adopted in 1988, required ARB to establish California ambient air quality standards (CAAQS) (Table 4.11-1). ARB has established CAAQS for sulfates, hydrogen sulfide, vinyl chloride, visibility-reducing particulate matter, and the above-mentioned criteria air pollutants. In most cases the CAAQS are more stringent than the NAAQS. Differences in the standards are generally explained by the health effects studies considered during the standard-setting process and the interpretation of the studies. In addition, the CAAQS incorporate a margin of safety to protect sensitive individuals.

The CCAA requires that all local air districts in the state endeavor to achieve and maintain the CAAQS by the earliest practical date. The act specifies that local air districts should focus particular attention on reducing the emissions from transportation and areawide emission sources, and provides districts with the authority to regulate indirect sources.

**Table 4.11-1
Ambient Air Quality Standards and Attainment Designations
for Southern Sutter, Sacramento, Western Placer, and El Dorado Counties**

Pollutant	Averaging Time	California Standards		National Standards ^a		
		Standards ^{b,c}	Attainment Status ^{d,j}	Primary ^{c,e}	Secondary ^{c,f}	Attainment Status ^{g,i}
Ozone	1-hour	0.09 ppm (180 µg/m ³)	N (Serious)	– ^h	Same as Primary Standard	– ^h
	8-hour	0.07 ppm (137 µg/m ³)		0.08 ppm (157 µg/m ³)		N
Respirable Particulate Matter (PM ₁₀)	Annual Arithmetic Mean	20 µg/m ³	N	– ^h	Same as Primary Standard	U, N, U, U
	24-hour	50 µg/m ³		150 µg/m ³		
Fine Particulate Matter (PM _{2.5})	Annual Arithmetic Mean	12 µg/m ³	U, N, N, U	15 µg/m ³	Same as Primary Standard	U/A
	24-hour	–	–	35 µg/m ³		
Carbon Monoxide (CO)	1-hour	20 ppm (23 mg/m ³)	A, A, A, U	35 ppm (40 mg/m ³)	–	U/A
	8-hour	9 ppm (10 mg/m ³)		9 ppm (10 mg/m ³)		
Nitrogen Dioxide (NO ₂)	Annual Arithmetic Mean	–	–	0.053 ppm (100 µg/m ³)	Same as Primary Standard	U/A
	1-hour	0.25 ppm (470 µg/m ³)	A	–		–
Sulfur Dioxide (SO ₂)	Annual Arithmetic Mean	–	–	0.030 ppm (80 µg/m ³)	–	U
	24-hour	0.04 ppm (105 µg/m ³)	A	0.14 ppm (365 µg/m ³)	–	
	3-hour	–	–	–	0.5 ppm (1300 µg/m ³)	–
	1-hour	0.25 ppm (655 µg/m ³)	A	–	–	
Lead ⁱ	30-day Average	1.5 µg/m ³	A	–	–	–
	Calendar Quarter	–	–	1.5 µg/m ³	Same as Primary Standard	

Table 4.11-1
Ambient Air Quality Standards and Attainment Designations
for Southern Sutter, Sacramento, Western Placer, and El Dorado Counties

Pollutant	Averaging Time	California Standards	Attainment Status ^{d,j}	National Standards ^a		
		Standards ^{b,c}		Primary ^{c,e}	Secondary ^{c,f}	Attainment Status ^{g,i}
Sulfates	24-hour	25 µg/m ³	A			
Hydrogen Sulfide	1-hour	0.03 ppm (42 µg/m ³)	U			
Vinyl Chloride ⁱ	24-hour	0.01 ppm (26 µg/m ³)	U/A			
Visibility-Reducing Particle Matter	8-hour	Extinction coefficient of 0.23 per kilometer —visibility of 10 miles or more (0.07—30 miles or more for Lake Tahoe) because of particles when the relative humidity is less than 70%.	U			

**No
National
Standards**

Notes: µg/m³ = micrograms per cubic meter; mg/m³ = milligrams per cubic meter; ppm = parts per million

^a National standards (other than ozone, particulate matter (PM), and those based on annual averages or annual arithmetic means) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. The respirable particulate matter (PM₁₀) 24-hour standard is attained when 99% of the daily concentrations, averaged over 3 years, are equal to or less than the standard. The fine particulate matter (PM_{2.5}) 24-hour standard is attained when 98% of the daily concentrations, averaged over 3 years, are equal to or less than the standard.

^b California standards for ozone, carbon monoxide (CO) (except Lake Tahoe), sulfur dioxide (SO₂) (1- and 24-hour), nitrogen dioxide (NO₂), PM, and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

^c Concentration expressed first in units in which it was promulgated (i.e., ppm or µg/m³). Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

^d Unclassified (U): A pollutant is designated unclassified if the data are incomplete and do not support a designation of attainment or nonattainment.

Attainment (A): A pollutant is designated attainment if the state standard for that pollutant was not violated at any site in the area during a 3-year period.

Nonattainment (N): A pollutant is designated nonattainment if there was at least one violation of a state standard for that pollutant in the area.

Nonattainment/Transitional (NT): A subcategory of the nonattainment designation. An area is designated nonattainment/transitional to signify that the area is close to attaining the standard for that pollutant.

^e National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.

^f National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

^g Nonattainment (N): Any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the national primary or secondary ambient air quality standard for the pollutant.

Attainment (A): Any area that meets the national primary or secondary ambient air quality standard for the pollutant.

Unclassifiable (U): Any area that cannot be classified on the basis of available information as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant.

^h The national 1-hour ozone standard was revoked on June 15, 2005. The national annual PM₁₀ standard was revoked in 2006.

ⁱ The California Air Resources Board has identified lead and vinyl chloride as toxic air contaminants with no threshold of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

^j California designations separated by comma if different for each county, and listed in the following order: Southern Sutter, Sacramento, Western Placer, and El Dorado Counties.

Sources: California Air Resources Board 2006a; EPA 2006a, 2006b

Other ARB responsibilities include overseeing local air district compliance with California and federal laws; approving local air quality attainment plans (AQAPs); submitting SIPs to EPA; monitoring air quality; determining and updating area designations and maps; and setting emissions standards for new mobile sources, consumer products, small utility engines, off-road vehicles, and fuels.

4.11.1.3 LOCAL

Most of the program study area is in Sacramento County, where air quality is managed by Sacramento Metropolitan Air Quality Management District (SMAQMD). The other air districts that have jurisdiction in the program study area are the Feather River Air Quality Management District (FRAQMD), which manages air quality conditions and regulations in Sutter and Yuba Counties; the El Dorado County Air Quality Management District (EDCAQMD); and the Placer County Air Pollution Control District (PCAPCD).

The local AQMDs and APCDs attain and maintain air quality conditions in the program study area through a comprehensive program of planning, regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues. The clean air strategy of the air districts includes the preparation of plans and programs for the attainment of ambient air quality standards, adoption and enforcement of rules and regulations, and issuance of permits for stationary sources. The air districts also inspect stationary sources, respond to citizen complaints, monitor ambient air quality and meteorological conditions, and implement other programs and regulations required by the CAA, CAAA, and the CCAA.

In an attempt to achieve the NAAQS and CAAQS and maintain healthful air quality throughout the air basin, the local air districts have jointly prepared and adopted AQAPs and reports. The most recent AQAP, completed in 2003, addresses (1) air quality modeling to identify the reductions needed and design effective emissions reduction strategies, (2) comprehensive emission reduction programs that take advantage of zero and near-zero emission technologies, and (3) the impacts of pollutant transport in the demonstration of attainment.

The air districts also publish CEQA guidance documents and recently have provided CEQA planning guidance on their respective web sites to assist with identification of significant adverse air quality impacts and suggest amenities that will reduce potential project emissions early in the planning process. Because stationary sources such as industrial facilities are separately regulated, the guidelines focus on transportation and land use control measures to reduce emissions to achieve and maintain state and federal health-based air quality standards.

All projects are subject to AQMD and APCD rules and regulations in effect at the time of construction. Specific rules applicable to the proposed project may involve visible emissions, fugitive dust, architectural coatings, and general permit requirements.

4.11.1.4 TOXIC AIR CONTAMINANTS

Air quality regulations also focus on toxic air contaminants (TACs), or in federal parlance, hazardous air pollutants (HAPs). A TAC is defined as an air pollutant that may cause or contribute to an increase in levels of mortality or serious illness, or that may pose a hazard to human health. TACs are usually present in minute quantities in the ambient air; however, their high toxicity or health risk may pose a threat to public health even at low concentrations. In general, for those TACs that may cause cancer, there is no concentration that does not present some risk. In other words, there is no safe level of exposure below which adverse health impacts may not be expected to occur; however, thresholds are designed to limit potential risk to an extremely low or acceptable level. This contrasts with the criteria air pollutants, for which acceptable levels of exposure can be determined and for which the ambient standards have been established (Table 4.11-1). EPA and ARB regulate HAPs and TACs, respectively, through statutes and regulations that generally require the use of the maximum or best available control technology for toxics (MACT and BACT) to limit emissions. These statutes and regulations, in conjunction with additional rules set forth by local air districts, establish the regulatory framework for TACs.

Federal Hazardous Air Pollutant Programs

EPA has programs for identifying and regulating HAPs. Title III of the CAAA directed EPA to promulgate national emissions standards for HAPs (NESHAP). The NESHAP for major sources of HAPs may differ from the standards for area sources. Major sources are defined as stationary sources with potential to emit more than 10 tons per year (TPY) of any HAP or more than 25 TPY of any combination of HAPs; all other sources are considered area sources. The emissions standards are to be promulgated in two phases. In the first phase (1992–2000), EPA developed technology-based emission standards designed to produce the maximum emission reduction achievable. These standards are generally referred to as requiring MACT. For area sources, the standards may be different, based on generally available control technology. In the second phase (2001–2008), EPA is required to promulgate health risk-based emissions standards where deemed necessary to address risks remaining after implementation of the technology-based NESHAP standards.

The CAAA also required EPA to promulgate vehicle or fuel standards containing reasonable requirements that control toxic emissions for, at a minimum, emissions of benzene and formaldehyde. Performance criteria were established to limit mobile-source emissions of toxics, including benzene, formaldehyde, and 1,3-butadiene. In addition, Section 219 of the CAAA required the use of reformulated gasoline in selected areas with the most severe ozone nonattainment conditions to further reduce mobile-source emissions.

State and Local Toxic Air Contaminant Programs

The State of California regulates TACs primarily through the Tanner Air Toxics Act (Assembly Bill [AB] 1807 [1983]) and the Air Toxics Hot Spots Information and Assessment Act (AB 2588 [1987]). The Tanner Act sets forth a formal procedure for ARB to designate substances as TACs. Research, public participation, and scientific peer review must occur before ARB can designate a substance as a TAC. To date, ARB has identified more than 21 TACs and has adopted EPA's list of HAPs as TACs. Most recently, diesel PM was added to the ARB list of TACs.

Once a TAC is identified, ARB adopts an Airborne Toxics Control Measure for sources that emit that particular TAC. If there is a safe threshold for a substance at which there is no toxic effect, the control measure must reduce exposure below that threshold. If there is no safe threshold, the measure must incorporate BACT to minimize emissions.

The Hot Spots Act requires that existing facilities that emit toxic substances above a specified level prepare a toxic-emission inventory, prepare a risk assessment if emissions are significant, notify the public of significant risk levels, and prepare and implement risk reduction measures.

ARB has adopted diesel exhaust control measures and more stringent emission standards for various on-road mobile sources of emissions, including transit buses, and off-road diesel equipment (e.g., tractors, generators). In February 2000, ARB adopted a new public-transit bus fleet rule and emission standards for new urban buses. These new rules and standards provide for:

- ▶ more stringent emission standards for some new urban bus engines, beginning with 2002 model year engines;
- ▶ zero-emission bus demonstration and purchase requirements applicable to transit agencies; and
- ▶ reporting requirements with which transit agencies must demonstrate compliance with the urban-transit bus-fleet rule.

Upcoming milestones include the low-sulfur diesel-fuel requirement, and tighter emission standards for heavy-duty diesel trucks (2007) and off-road diesel equipment (2011) nationwide.

Over time, the replacement of older vehicles will result in a vehicle fleet that produces substantially fewer TACs than under current conditions. Mobile-source emissions of TACs (e.g., benzene, 1,3-butadiene, diesel PM) have been reduced significantly over the last decade, and will be reduced further in California through a progression of regulatory measures (e.g., Low-Emission Vehicle [LEV]/Clean Fuels and Phase II reformulated gasoline regulations) and control technologies. With implementation of ARB's Risk Reduction Plan, it is expected that diesel PM concentrations will be reduced by 75% in 2010 and 85% in 2020 from the estimated year 2000 level. Adopted regulations are also expected to continue to reduce emissions of formaldehyde from cars and light-duty trucks. As emissions are reduced, it is expected that risks associated with exposure to the emissions will also be reduced.

ARB recently published *Air Quality and Land Use Handbook: A Community Health Perspective* (ARB 2005), which provides guidance concerning land use compatibility with sources of TAC emissions. While not a law or adopted policy, the handbook offers recommendations for the siting of sensitive receptors near uses associated with TACs, such as freeways and high-traffic roads, commercial distribution centers, rail yards, ports, refineries, dry cleaners, gasoline stations, and industrial facilities to help keep children and other sensitive populations out of harm's way.

4.11.1.5 CONTROL OF AIRBORNE ASBESTOS

The Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying, and Surface Mining Operations (17 CCR Section 93105) contains requirements for construction operations that would disturb any portion of an area that is located in a geographic ultramafic rock unit or that has naturally occurring asbestos, serpentine, or ultramafic rock. Where a construction or grading operation would disturb more than 1 acre of such an area, an Asbestos Dust Mitigation Plan must be submitted to the applicable air quality management district or air pollution control district before the start of construction and must be maintained throughout the operation. For an exemption to be obtained, a registered geologist must conduct a geologic evaluation of the property and determine that no serpentine or ultramafic rock is likely to be found in the area to be disturbed. The air pollution control officer may then grant or deny the exemption.

4.11.2 ENVIRONMENTAL SETTING

The program study area is located within the southern portion of the Sacramento Valley Air Basin (SVAB), which also includes all of Butte, Colusa, Glenn, Sacramento, Shasta, Sutter, Tehama, Yolo, and Yuba Counties, the western portion of Placer County, and the eastern portion of Solano County. In addition, some activities associated with Folsom Dam modifications are also located in the westernmost portion of El Dorado County, which is part of the Mountain Counties Air Basin; however, the setting described below is representative of the location in El Dorado County where the program lies.

4.11.2.1 FACTORS AFFECTING POLLUTANT CONCENTRATIONS

The ambient concentrations of air pollutant emissions are determined by the amount of emissions released by pollutant sources and the ability of the atmosphere to transport and dilute such emissions. Natural factors that affect transport and dilution include terrain, wind, atmospheric stability, and the presence of sunlight. Therefore, existing air quality conditions in the program study area are determined by such natural factors as topography, meteorology, and climate, in addition to the amount of emissions released by existing air pollutant sources, as discussed separately below.

Topography, Climate, and Meteorology

The SVAB is relatively flat, bordered by mountains to the east, west, and north. Air flows into the SVAB through the Carquinez Strait, the only breach in the western mountain barrier, and moves across the Sacramento–San Joaquin River Delta, bringing with it pollutants from the heavily populated San Francisco Bay Area. The climate

is characterized by hot, dry summers and cool, rainy winters. Periods of dense and persistent low-level fog that are most prevalent between storms are characteristic of SVAB winter weather. From May to October, the region's intense heat and sunlight yield high ozone concentrations. Summer inversions are strong and frequent, but are less troublesome than those that occur in the fall. Autumn inversions, formed by warm air subsiding in a region of high pressure, have accompanying light winds that do not provide adequate dispersion of air pollutants.

Most precipitation in the area results from air masses that move in from the Pacific Ocean during the winter months. These storms usually move from the west or northwest. More than half the total annual precipitation falls during the winter rainy season (November–March); the average winter temperature is a moderate 49 degrees Fahrenheit (°F). During the summer, daily temperatures range from 50°F to more than 100°F. The inland location and surrounding mountains shelter the area from much of the ocean breezes that keep the coastal regions moderate in temperature.

Regional flow patterns affect air quality patterns by moving pollutants downwind of sources. Localized meteorological conditions, such as moderate winds, disperse pollutants and reduce pollutant concentrations. An inversion layer develops when a layer of warm air traps cooler air close to the ground. Such temperature inversions hamper dispersion by creating a ceiling over the area and trapping air pollutants near the ground. During summer mornings and afternoons, these inversions are present over the program study area. During summer's longer daylight hours, plentiful sunshine provides the energy needed to fuel photochemical reactions between reactive organic gases (ROG) and oxides of nitrogen (NO_x), which results in ozone formation.

In the winter, temperature inversions dominate during the night and early morning hours, but frequently dissipate by afternoon. The greatest pollution problems during this time of year are from CO and NO_x. High CO concentrations occur on winter days with strong surface inversions and light winds. CO transport is extremely limited.

Local meteorology of the program study area is represented by measurements recorded at the Sacramento station. The normal annual precipitation, which occurs primarily from November through March, is approximately 18 inches. January temperatures range from a normal minimum of 38°F to a normal maximum of 53°F. July temperatures range from a normal minimum of 58°F to a normal maximum of 93°F (National Oceanic and Atmospheric Administration 1992). The predominant wind direction and speed is from the south-southwest at 10 mph (ARB 1994).

Atmospheric Stability and Inversions

Stability describes the resistance of the atmosphere to vertical motion. The stability of the atmosphere depends on the vertical distribution of temperature. When the temperature decreases vertically at 10°C per 1,000 meters, the atmosphere is considered “neutral.” When the change in temperature is greater than 10°C per 1,000 meters, the atmosphere is considered “unstable.” When the change is less than 10°C per 1,000 meters, the atmosphere is termed “stable.” In the SVAB, categories range from “extremely unstable” conditions, which are present in spring and summer, through “neutral” to “stable” conditions, which are both present in fall and winter. Unstable conditions occur during daytime, when solar heating warms the lower atmospheric layers sufficiently. Under “extremely unstable” conditions, large fluctuations in horizontal wind direction are coupled with large mixing depths, which are the vertical depths available for diluting air pollution near the ground. As solar heating decreases, fluctuations in wind direction and the vertical mixing depth become less pronounced, resulting in “neutral” to “stable” conditions. Under the most stable conditions, which are present in the SVAB in fall and winter, air pollution emitted into the atmosphere will travel downwind with poor dispersion. The dispersive power of the atmosphere decreases with progression through the categories from extremely unstable to stable.

An inversion is a layer of warmer air over a layer of cooler air. Inversions influence the mixing depth of the atmosphere, thus significantly affecting air quality conditions. The SVAB experiences two types of inversions that affect air quality. The first type of inversion layer contributes to photochemical smog problems by confining

pollution to a shallow layer near the ground. This type occurs in summer, when sinking air near the ground forms a “lid” over the region. The second type of inversion occurs when the air near the ground cools while the air aloft remains warm. This type of inversion occurs during winter nights and can cause localized air pollution “hot spots” near emission sources because of poor dispersion. The shallow surface-based inversions are present in the morning, but are often broken by daytime heating of the air layers near the ground.

4.11.2.2 AMBIENT AIR QUALITY IN THE PROGRAM STUDY AREA

Ozone

Ozone is a photochemical oxidant and the primary component of smog. Ozone, typically associated with poor air quality, is not emitted directly into the air, but is formed through a series of chemical reactions between ROG and NO_x in the presence of sunlight. Motor vehicles and stationary (industrial) sources are major sources of emission of both ROG and NO_x, which are also referred to as ozone precursors.

Ozone located in the upper atmosphere (stratosphere) acts in a beneficial manner by shielding the earth from harmful ultraviolet radiation that is emitted by the sun. However, ozone in the lower atmosphere (troposphere) is a major health and environmental concern. Because sunlight and heat serve as catalysts for the reactions between ozone precursors, peak ozone concentrations typically occur during summer in the northern hemisphere (EPA 2006a). In general, ozone concentrations over or near urban and rural areas reflect an interplay of emissions of ozone precursors, transport meteorology, and atmospheric chemistry (Godish 1991).

The adverse health effects associated with exposure to ozone pertain primarily to the respiratory system. Scientific evidence indicates that ambient levels of ozone can affect not only sensitive receptors, such as asthmatics and children, but healthy adults as well. Exposure to ambient levels of ozone ranging from 0.10 to 0.40 part per million (ppm) for 1–2 hours has been found to significantly alter lung functions by increasing respiratory rates and pulmonary resistance, decreasing tidal volumes, and impairing respiratory mechanics. Ambient levels of ozone above 0.12 ppm are linked to such symptoms as throat dryness, chest tightness, shortness of breath, headache, and nausea. In addition to these adverse health effects, some evidence also relates ozone exposure to an increase in susceptibility to respiratory infections (Godish 1991). Ozone causes substantial damage to leaf tissues of crops and natural vegetation and damages many materials by acting as a chemical oxidizing agent (Feather River Air Quality Management District 1998).

Emissions of ozone precursors in the program study area have decreased in recent years and are projected to continue to decline in the future. On-road motor vehicles and other mobile sources are by far the largest contributors. More stringent mobile-source emission standards, cleaner burning fuels, and new rules for industrial operations have largely contributed to the decline in emissions trends. However, peak ozone values have not declined as quickly in the program study area over the last several years as they have in other urban areas. This is because the urbanized areas of the Central Valley are identified as both transport contributors and receptors for these pollutants. Nevertheless, ozone concentrations have been declining in the program study area because of the decrease in precursor emissions.

Particulate Matter

Health concerns associated with suspended particles focus on those particles small enough to reach the lungs when inhaled. Few particles larger than 10 micrometers in diameter reach the lungs. Therefore, respirable particulate matter is considered to consist of particles with an aerodynamic diameter of 10 micrometers or less, referred to as PM₁₀. PM₁₀ consists of particulates directly emitted into the air, such as fugitive dust, soot, and smoke from mobile and stationary sources, construction operations, fires, and natural windblown dust, and particulates formed in the atmosphere by condensation and/or transformation of SO₂ and ROG (EPA 2006a). Major sources of PM₁₀ are the combustion of wood, diesel, and other fuels; industrial processes; and ground-disturbing activities such as construction and agricultural operations.

Ambient PM₁₀ standards are designed to prevent respiratory disease and protect visibility. The adverse health effects associated with PM₁₀ depend on the specific composition of the particulate matter. For example, health effects may be associated with metals, polycyclic aromatic hydrocarbons, and other toxic substances adsorbed onto fine particulates (the piggybacking effect), or with fine dust particles of silica or asbestos. Generally, adverse health effects associated with PM₁₀ may result from both short-term and long-term exposure to elevated PM₁₀ concentrations and may include breathing and respiratory symptoms, aggravation of existing respiratory and cardiovascular diseases, alterations in the body's immune system, carcinogenesis, and premature death (EPA 2006a).

Finer particles having an aerodynamic diameter of 2.5 micrometers or less are referred to as PM_{2.5}. PM_{2.5} poses an increased health risk because these particles can deposit deep in the lungs and contain substances that are particularly harmful to human health.

Direct emissions of PM₁₀ and PM_{2.5} have increased in recent years and are projected to continue increasing in the near future. Emissions are dominated by contributions from areawide sources, primarily fugitive dust from both paved and unpaved roads, fugitive dust from construction and demolition, and particulates from residential fuel combustion.

Carbon Monoxide

Carbon monoxide is a colorless, odorless, and poisonous gas produced by incomplete burning of carbon in fuels, primarily from mobile (transportation) sources of pollution. Approximately three-fourths of the nationwide CO emissions are estimated to be from mobile (transportation) sources; the remaining CO emissions are associated with wood-burning stoves, incinerators, and industrial sources. Peak CO levels are generally found near areas with high concentrations of mobile (transportation) sources and occur typically during calm conditions in the winter months.

CO enters the bloodstream through the lungs by combining with hemoglobin, which normally supplies oxygen to the cells. However, CO combines with hemoglobin much more readily than oxygen does, resulting in a drastic reduction in the amount of oxygen available to the cells. Adverse health effects associated with exposure to CO concentrations include such symptoms as dizziness, headaches, slow reflexes, and fatigue. CO exposure is especially harmful to individuals who suffer from cardiovascular and respiratory diseases (EPA 2006a).

Nitrogen Dioxide

Nitrogen dioxide is a brownish, highly reactive gas that is present in all urban environments. The major human-made sources of NO₂ are combustion devices, such as boilers, gas turbines, and mobile and stationary reciprocating internal-combustion engines. Combustion devices emit primarily nitric oxide (NO), which reacts through oxidation in the atmosphere to form NO₂ (EPA 2006a). The combined emissions of NO and NO₂ are referred to as NO_x, which are reported as equivalent NO₂. Because NO₂ is formed and depleted by reactions associated with photochemical smog (ozone), the NO₂ concentration in a particular geographical area may not be representative of the local NO_x emission sources.

Inhalation is the most common route of exposure to NO₂. Because NO₂ has relatively low solubility in water, the principal site of toxicity is in the lower respiratory tract. The severity of the adverse health effects depends primarily on the concentration inhaled rather than the duration of exposure. An individual may experience a variety of acute symptoms, including coughing, difficulty with breathing, vomiting, headache, and eye irritation, during or shortly after exposure. After approximately 4–12 hours an exposed individual may experience chemical pneumonitis or pulmonary edema with breathing abnormalities, cough, cyanosis, chest pain, and rapid heartbeat. Severe, symptomatic NO₂ intoxication after acute exposure has been linked on occasion with prolonged respiratory impairment with such symptoms as chronic bronchitis and decreased lung functions.

Sulfur Dioxide

Sulfur dioxide is produced by such stationary sources as coal and oil combustion, steel mills, refineries, and pulp and paper mills. The major adverse health effects associated with SO₂ exposure pertain to the upper respiratory tract. SO₂ is a respiratory irritant with constriction of the bronchioles occurring with inhalation of SO₂ at 5 ppm or more. On contact with the moist mucous membranes, SO₂ produces sulfurous acid, which is a direct irritant. Concentration rather than duration of the exposure is an important determinant of respiratory effects. Exposure to high SO₂ concentrations may result in edema of the lungs or glottis and respiratory paralysis.

Lead

Lead is a metal found naturally in the environment as well as in manufactured products. The major sources of lead emissions have historically been mobile and industrial sources. As a result of the phase-out of leaded gasoline (discussed in detail below), metal processing is currently the primary source of lead emissions. The highest levels of lead in air are generally found near lead smelters. Other stationary sources are waste incinerators, utilities, and lead-acid battery manufacturers.

Twenty years ago, mobile sources were the main contributor to ambient lead concentrations in the air. In the early 1970s, EPA set national regulations to gradually reduce the lead content in gasoline. In 1975, unleaded gasoline was introduced for motor vehicles equipped with catalytic converters. EPA banned the use of leaded gasoline in highway vehicles in December 1995 (EPA 2006a).

As a result of EPA's regulatory efforts to remove lead from gasoline, emissions of lead from the transportation sector have declined dramatically (by 95% between 1980 and 1999), and levels of lead in the air decreased by 94% between 1980 and 1999. Transportation sources, primarily airplanes, now contribute only 13% of lead emissions. A recent National Health and Nutrition Examination Survey reported a 78% decrease in the levels of lead in people's blood between 1976 and 1991. This dramatic decline can be attributed to the move from leaded to unleaded gasoline (EPA 2006a).

The decrease in lead emissions and ambient lead concentrations over the past 25 years is California's most dramatic success story with regard to air quality management. The rapid decrease in lead concentrations can be attributed primarily to phasing out the lead in gasoline. This phase-out began during the 1970s, and subsequent ARB regulations have virtually eliminated all lead from gasoline now sold in California. All areas of the state are currently designated as attainment for the state lead standard (EPA does not designate areas for the national lead standard). Although the ambient lead standards are no longer violated, lead emissions from stationary sources still pose "hot spot" problems in some areas. As a result, ARB identified lead as a TAC.

Attainment Status

Both ARB and EPA use monitoring data to designate areas according to attainment status for criteria air pollutants established by the agencies. The purpose of these designations is to identify those areas with air quality problems and thereby initiate planning efforts for improvement. The three basic designation categories are nonattainment, attainment, and unclassified. Unclassified is used in an area that cannot be classified on the basis of available information as meeting or not meeting the standards. In addition, the California designations include a subcategory of the nonattainment designation, called nonattainment-transitional. The nonattainment-transitional designation is given to nonattainment areas that are progressing and nearing attainment. The state and national attainment status designations for the program area are presented in Table 4.11-1.

4.11.3 ENVIRONMENTAL IMPACTS

The air pollutant emissions that would be associated with almost all of the proposed improvements would be generated by construction activities. An exception is the Folsom Bridge project, which would contribute to vehicular emissions following construction due to changes in traffic patterns. Construction emissions are

described as “short-term” or temporary in duration. These short-term emissions, especially PM₁₀, have the potential to represent a significant air quality impact.

Fugitive dust emissions are associated primarily with site preparation and excavation, and vary as a function of factors such as soil silt content, soil moisture, wind speed, acreage of disturbance area, and vehicle miles traveled on-site and off-site. ROG and NO_x emissions are associated primarily with gas and diesel equipment exhaust and the application of architectural coatings. CO emissions are a direct function of vehicle idling time and, thus, traffic flow conditions.

4.11.3.1 SIGNIFICANCE CRITERIA

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. The proposed project was determined to result in a significant air quality effect if it would:

- ▶ conflict with or obstruct implementation of the applicable air quality plan,
- ▶ violate any air quality standard or contribute substantially to an existing or projected air quality violation,
- ▶ result in a cumulatively considerable net increase of air criteria air pollutant for which the project region is nonattainment under any applicable federal or state ambient air quality standards (including releasing emissions which exceed quantitative thresholds for ozone precursors),
- ▶ expose sensitive receptors to substantial pollutant concentrations, or
- ▶ create objectionable odors affecting a substantial number of people.

In addition, based on professional practice, the proposed project was determined to result in a significant air quality effect if it would:

- ▶ result in exposure of sensitive receptors to excessive concentrations of toxic air emissions (a risk exposure level of 10 excess cancer cases in one million people).

As stated in Appendix G, the significance of criteria established by the applicable AQMD or APCD may be relied upon to make the above determinations. Thus, the appropriate district-recommended emission thresholds as published in their respective CEQA guidance documents shall also apply to individual projects under their jurisdiction. For example, projects in Sacramento County that generate short-term emissions (construction) in excess of 85 lb/day of NO_x or long-term operational (regional) emissions of 65 lb/day of ROG or NO_x would be expected to result in, or substantially contribute to, a violation of the AAQS (Table 4.11-1), and thus, result in a significant impact.

Project implementation would not result in any major sources of odor, and the project would not involve operation of any of the common types of facilities that are known to produce odors (e.g., landfill, coffee roaster, wastewater treatment facility). In addition, odors associated with diesel exhaust from the use of on-site construction equipment would be intermittent and temporary, and would dissipate rapidly from the source with an increase in distance. Thus, project implementation would not expose sensitive receptors to odorous emissions, and odor effects are not discussed further in this EIR.

4.11.3.2 IMPACT ANALYSIS

IMPACT 4.11-a Temporary Emissions of ROG, NO_x, and PM₁₀ during Construction. *Daily unmitigated emissions of ROG, NO_x, and PM₁₀ for some of the proposed improvements may exceed air district-recommended significance thresholds. Therefore, project construction could result in or substantially contribute to an existing or projected air quality violation of the CAAQS. This impact would be considered significant.*

Emissions associated with construction activities are described as “short term” or temporary. Construction emissions have the potential to result in significant impacts on air quality, especially on PM₁₀ levels. Fugitive PM₁₀ emissions are associated primarily with site preparation and earthmoving activities, and vary as a function of factors such as soil silt content, soil moisture, wind speed, acreage of disturbance area, and vehicle miles traveled on paved and unpaved roads. Ozone precursor emissions of ROG and NO_x are associated primarily with construction equipment exhaust and asphalt paving.

Construction activities associated with dam improvements, bridge construction, levee improvements, and floodplain habitat enhancement would result in the temporary generation of ROG, NO_x, and PM₁₀ emissions from excavation, vegetation clearing, grading, cut-fill, motor vehicle exhaust associated with construction equipment, construction employee commute trips, material transport (especially on unpaved surfaces), and other construction activities.

Construction activities for proposed improvements are expected to result in maximum unmitigated daily emissions in excess of the various applicable district thresholds of ROG, NO_x and PM₁₀. Unmitigated NO_x emissions, in particular, often exceed district thresholds when multiple pieces of construction equipment would be operated simultaneously, and PM₁₀ emissions can be very high when large quantities of soil are being excavated, transported, and placed. In addition, different improvement projects may be conducted simultaneously. Finally, because of the nonattainment status of the program area for ozone and PM₁₀, such emissions could be considered significant because they contribute to concentrations that exceed the CAAQS or the NAAQS. This impact would be significant.

IMPACT 4.11-b Long-Term Changes in Emissions of ROG, NO_x, and PM₁₀. *Long-term (i.e., operational) criteria air pollutant emissions associated with implementation of the proposed project would not result in or substantially contribute to an existing or projected air quality violation of the CAAQS. This impact would be less than significant.*

Long-term contributions of the proposed improvements to regional concentrations of ROG, NO_x, and PM₁₀ from mobile-, stationary-, or area-source emissions would be minor. The levee integrity program would include an increase in levee monitoring and maintenance activities, which would involve a very small number of associated vehicle trips. The additional vehicle trips and use of equipment (e.g., mowers) for levee maintenance would add only a negligible amount to the total amount of regional vehicle trips and equipment use.

Furthermore, project implementation would not result in the operation of any new major stationary emission sources. However, concrete batch plants and materials processing plants would be operated for several years in association with the construction of Folsom Dam modifications. Because of the duration of their operation, these plants would be regulated as stationary sources, and would be subject to BACT requirements and emissions limitations by the applicable air district(s). Therefore, standard operating conditions for these facilities would be controlled and emissions are expected to be below the applicable thresholds.

Long-term increases in vehicle emissions are associated with the operation of the proposed Folsom Bridge. However, the impact analysis conducted for this project shows that future emissions (2007 and 2025) would be well below the applicable (SMAQMD) thresholds and that the emissions are expected to reduce over time (i.e., between 2007 and 2025) as a result of improved technology, despite an increase in vehicle trips (U.S. Army Corps of Engineers and City of Folsom 2006). Specifically, implementation of the Folsom Bridge project would result in on-road operational daily emissions estimated at 1,274 lb/day of ROG, 6,145 lb/day of NO_x, and 182 lb/day of

PM₁₀ in 2007. In 2025, operational emissions would be reduced to 297 lb/day of ROG, 1,443 lb/day of NO_x, and 234 lb/day of PM₁₀. (U.S. Army Corps of Engineers and City of Folsom 2006.)

Impacts to long-term air quality attributable to the proposed program would be less than significant.

IMPACT **Exposure of Sensitive Receptors to Toxic Air Emissions.** *Some of the proposed improvements could*
4.11-c *expose sensitive receptors to substantial levels of toxic air contaminants (TAC). This impact would be*
 significant.

Construction of the proposed improvements would result in short-term diesel exhaust emissions from on-site heavy duty equipment. Particulate exhaust emissions from diesel-fueled engines (diesel PM) were identified as a toxic air contaminant (TAC) by the ARB in 1998. Construction of improvements would result in the generation of diesel PM emissions from the use of off-road diesel equipment required for site grading and excavation, paving, and other construction activities. As described previously, the dose to which the receptors are exposed (a function of concentration and duration of exposure) is the primary factor used to determine health risk (i.e., potential exposure to TAC emission levels that exceed applicable standards). According to the Office of Environmental Health Hazard Assessment (OEHHA), health risk assessments, which determine the exposure of sensitive receptors to TAC emissions, should be based on a 70-year exposure period; however, such assessments should be limited to the period/duration of activities associated with the project (Salinas, pers. comm., 2004).

Construction activities associated with some of the proposed improvements, particularly aspects of Folsom Dam modifications and levee improvements that may be conducted close to residential areas, have the potential to result in the exposure of sensitive receptors to levels that exceed applicable standards. This impact would be significant.

IMPACT **Exposure to Airborne Asbestos.** *Naturally occurring asbestos present in some geologic formations at Folsom*
4.11-d *Reservoir could be released during construction activity and expose workers and other individuals to health*
 risks. This potential impact would be significant.

Naturally occurring asbestos may be present in geologic formations in the southern portion of Folsom Reservoir (areas of ultramafic rock in the Copper Hills Volcanics geologic unit) where borrow or other construction activity may take place. Construction disturbance of naturally occurring asbestos could expose construction workers and other individuals in the area to levels of asbestos that could pose a health risk. This would be a significant impact.

4.11.4 MITIGATION MEASURES

No mitigation is required for Impacts 4.11-b (long-term emissions). Mitigation is identified below for Impact 4.11-a (construction emissions), Impact 4.11-c (toxic air contaminants), and Impact 4.11-d (asbestos exposure).

Mitigation Measure 4.11-a for Temporary Emissions of ROG, NO_x, and PM₁₀ during Construction: Implement Measures and Guidelines of the Applicable Air District(s) to Reduce Construction-Generated Emissions of Air Pollutants.

The agencies implementing program components and their primary contractors for engineering design and construction shall ensure that the following measures are implemented to reduce emissions of ROG, NO_x, and PM₁₀ during construction.

All feasible, current mitigation measures and guidelines of the applicable air district(s) shall be included in project plans and construction specifications. Implementation of program improvements shall adhere to these measures and comply with all applicable rules and regulations of the applicable air district(s). The measures shall include

directives for construction vehicle emissions limits, equipment maintenance, and the use of electric equipment in place of internal-combustion equipment where feasible.

- a) Because most of the program improvements would be in Sacramento County, the following Sacramento Metropolitan Air Quality Management District (SMAQMD) measures, or future refinements of these measures, are likely to be required as mitigation for many of the individual improvement projects (SMAQMD 2004, SMAQMD 2006):
1. The project applicant(s) shall pay into SMAQMD's off-site construction mitigation fund to mitigate construction-generated emissions of NO_x that exceed SMAQMD's daily emission threshold of 85 lb/day. The specific fee amounts shall be calculated when the construction emissions can be more accurately determined. This calculation would occur when an alternative has been selected, the project has been approved, and improvement plans have been prepared. Calculation of fees associated with subsequent improvement plans/project phases shall be conducted at the time of their preparation. The applicable fee rate shall be determined, and total fee calculated based upon the fee rate in effect at the time the document is prepared. The determination of the final mitigation fee shall be conducted in coordination with SMAQMD before any demolition or ground disturbance occurs for any project phase.
 2. Calculation of and payment of the fee for all subsequent project phases shall also be included in the Mitigation Monitoring and Reporting Program for the project.
 3. The project applicant(s) for all project phases shall reduce NO_x and visible emissions from heavy-duty diesel equipment by implementing the following measures:
 - A plan shall be developed, in consultation with SMAQMD, demonstrating that the heavy-duty (>50 hp), off-road vehicles to be used in the construction project (including owned, leased, and subcontractor vehicles) will achieve a projectwide fleet-average 20% NO_x reduction and 45% particulate reduction compared to the most recent ARB fleet average at the time of construction. Acceptable options for reducing emissions include the use of late-model engines, low-emission diesel products, alternative fuels, particulate-matter traps, engine retrofit technology, after-treatment products, and/or such other options as become available.
 - A comprehensive inventory of all off-road construction equipment equal to or greater than 50 hp that will be used for an aggregate of 40 or more hours during any portion of project construction shall be submitted to SMAQMD. The inventory shall be updated and submitted monthly throughout the duration of the project, except that an inventory shall not be required for any 30-day period in which no construction operations occur. At least 48 hours before heavy-duty off-road equipment is used, the project applicant(s) shall provide SMAQMD with the anticipated construction timeline, including the start date, and the name and phone number of the project manager and on-site foreman.
 4. Emissions from off-road, diesel-powered equipment used on the project site shall not exceed 40% opacity for more than 3 minutes in any 1 hour. Any equipment found to exceed 40% opacity (or Ringlemann 2.0) shall be repaired immediately, and SMAQMD shall be notified of noncompliant equipment within 48 hours of identification. A visual survey of all in-operation equipment shall be made at least weekly. A monthly summary of visual survey results shall be submitted to SMAQMD throughout the duration of the construction project, except that the monthly summary shall not be required for any 30-day period in which no construction operations occur. The monthly summary shall include the quantity and type of vehicles surveyed, as well as the dates of each survey. SMAQMD and/or other officials may conduct periodic site inspections to determine compliance.
- b) Additional measures shall be implemented to reduce construction dust emissions in all air districts, which may include the following dust control measures:

1. Suspend all grading operations when fugitive dusts exceed district rules and ensure that dust is not causing a nuisance beyond the property line of the project.
 2. No open burning of removed vegetation. Vegetative material should be chipped on site or delivered to waste-to-energy facilities.
 3. Unpaved areas subject to vehicle traffic, including employee parking areas and equipment staging areas, must be stabilized by being kept wet, treated with a chemical dust suppressant or soil binders, or covered.
 4. Apply approved chemical soil stabilizers according to manufacturers' specifications, to all-inactive construction areas (previously graded areas that remain inactive for 96 hours).
 5. The track-out of bulk material onto public paved roadways as a result of operations, or erosion, shall be minimized by the use of track-out and erosion control, minimization, and preventative measures, and removed within one hour from adjacent streets such material any time track-out extends for a cumulative distance of greater than 50 feet onto any paved public road during active operations.
 6. All visible roadway dust tracked-out upon public paved roadways as a result of active operations shall be removed at the conclusion of each work day when active operations cease, or every twenty-four (24) hours for continuous operations. Wet sweeping or a vacuum device equipped with a HEPA filter shall be used for roadway dust removal.
 7. Limit vehicle speeds on unpaved roadways to 15 miles per hour.
 8. An operational water truck shall be on-site at all times. Water shall be applied to control dust as need to prevent dust impacts off-site.
- c) Additional measures shall be implemented to reduce construction exhaust emissions in all air districts. These measures may include the following:
1. Use low-sulfur fuel for stationary construction equipment.
 2. Use existing power sources or clean fuel generators rather than temporary power generators to the extent feasible.
 3. Use low-emission on-site stationary equipment..
 4. Minimize idling time to 10 minutes for all heavy-duty equipment.

Depending on the intensity of construction operations for a given project, taken in combination with the nonattainment status of the program area, the mitigation measures implemented to reduce emissions may not be sufficient to reduce emissions below the applicable thresholds. Therefore, although implementation of the applicable measures would reduce air quality impacts, the impacts may remain significant and unavoidable for some improvement projects, both on an individual and a cumulative basis.

Mitigation Measure 4.11-c for Exposure of Sensitive Receptors to Toxic Air Emissions: Conduct a Health Risk Assessment (HRA) If a Potential Health Risk Exists, and Develop and Implement Mitigation in Coordination with the Air District(s).

The agencies implementing program components shall ensure that the following measures are implemented to reduce the potential for exposure of sensitive receptors to toxic air emissions.

The environmental review processes for individual program improvements shall determine whether a potential impact exists associated with mobile- or stationary-source toxic air emissions. If a potential health risk exists, a health risk assessment (HRA) shall be conducted to determine the risk exposure level at nearby receptors. Where sensitive receptors may be exposed to unacceptable levels of TACs, site-specific mitigation measures, developed in coordination with the appropriate air district(s), shall be implemented.

Measures may include requiring equipment to be shut off when not in use, prohibiting heavy trucks from idling for extended periods, and providing public notification of risk levels. Applicable measures shall be included in project plans and construction specifications.

Implementing this mitigation would reduce the impact to a less-than-significant level.

Mitigation Measure 4.11-d for Exposure to Airborne Asbestos: Prepare a Geologic Site Characterization Report and Implement Appropriate Measures in Coordination with the Applicable Air District(s).

The agencies implementing program components shall ensure that the following measures are implemented to reduce the potential for exposure of sensitive receptors to airborne asbestos.

For construction activity in the Folsom Dam and Reservoir area that could be conducted in areas that contain ultramafic and Copper Hill Volcanics rocks, a geologic site characterization report shall be prepared by a California Registered Geologist to identify areas of these materials that could be disturbed by construction activity, potentially releasing harmful levels of asbestos. The report shall be submitted to and approved by the applicable air district. If the report concludes that any risk of asbestos exposure would be less than significant and the air pollution control officer grants an exemption from further action, no further measure would be required. If the air pollution control officer does not grant an exemption or the report concludes that a high risk of exposure could result from construction activity, an Asbestos Dust Mitigation Plan shall be prepared and submitted for approval to the appropriate air district before the beginning of construction activity in the pertinent area. The plan, as approved by the applicable air district, shall be implemented throughout the course of project construction to reduce the potential for exposure to asbestos to acceptable levels.

Implementing this mitigation measure would reduce the potential impact to a less-than-significant level.

4.12 NOISE

This section describes regulations that apply to noise, noise-sensitive land uses and existing noise sources in the program study area, and potential noise impacts on the human environment from project construction and operation. Noise-related effects on wildlife are addressed in Section 4.7, “Terrestrial Biological Resources.” Noise-sensitive land uses generally include those uses for which exposure to noise would result in significant adverse effects, as well as uses where quiet is an essential element of the intended purpose of the land uses. Noise-sensitive uses include residences, schools, hospitals, community centers, etc. Noise effects are evaluated according to the standards of the jurisdiction in which they are generated, regardless of where they are perceived.

Sound levels are represented throughout this section in terms of an “A-weighted” decibel (dBA) scale. The dBA scale is an expression of sound pressure levels in logarithmic units called decibels (dB) that discriminates among (i.e., “weights”) sound frequencies in a manner approximating the sensitivity of the human ear. Section 4.12.2.1, “Sound and the Human Ear,” provides an overview of acoustic fundamentals, including definitions of noise terminology used in this section and an explanation of the dBA scale.

4.12.1 REGULATORY SETTING

4.12.1.1 FEDERAL

The Federal Highway Administration, the Federal Aviation Administration, and the Department of Housing and Urban Development have adopted standards for noise levels in relation to highway projects, aircraft, and federally funded housing, respectively. None of these standards are relevant to this study.

4.12.1.2 STATE

The State of California has adopted noise standards in areas of regulation not preempted by the federal government. These standards apply to noise from motor vehicles and freeways as it affects classrooms, sound transmission control and occupational noise control, and noise insulation. In addition, the Governor’s Office of Planning and Research has developed the *State of California General Plan Guidelines*, which includes land use compatibility guidelines for community noise environments to assist local agencies in their preparation of general plan noise elements (State of California 2003). None of these standards are directly relevant to this study.

4.12.1.3 LOCAL JURISDICTIONS

Construction of the improvements in SAFCA’s proposed program could affect noise-sensitive land uses in the following jurisdictions:

- ▶ Counties: Sutter, Sacramento, Placer, and El Dorado.
- ▶ Communities: Cities of Sacramento, Folsom, Roseville, Lincoln, Rocklin, and Marysville, and communities of Wheatland and Granite Bay.

Most jurisdictions have adopted standards for both transportation and non-transportation noise sources in the noise elements of their general plans. Presented below is a summary of the applicable noise standards for this project.

A project could have a significant effect on the environment if it conflicts with the applicable adopted noise standards, substantially increases the ambient noise levels for adjacent areas, or causes adverse noise impacts for sensitive receptors, such as residences and schools. All jurisdictions where project-related construction vehicle traffic would occur have adopted local ordinances regulating noise levels in order to minimize impacts on sensitive land uses. These local standards have been established for both non-transportation and transportation

noise sources. Table 4.12-1 lists the non-transportation noise standards in the relevant jurisdictions, and Table 4.12-2 lists the transportation noise standards in those jurisdictions where the project may involve trucks hauling materials.

Table 4.12-1 Local Government Non-Transportation Noise Standards (dBA)						
Noise Element Jurisdiction /Land Use Category	Maximum Allowable Exterior Noise Levels					
	Daytime 7 a.m. – 7 p.m.		Evening 7 p.m. – 10 p.m.		Nighttime 10 p.m. – 7 a.m.	
	Hourly		Hourly		Hourly	
Sacramento County Residential Areas	L ₅₀	L _{max}	L ₅₀	L _{max}	L ₅₀	L _{max}
	50	70	50	70	45	65
	Construction noise is exempt from the Sacramento County noise regulations provided that construction does not take place before 7 a.m. or after 7 p.m. Monday through Saturday.					
City of Sacramento Residential Areas	Exterior -L _{dn} /CNEL			Interior - L _{dn} /CNEL		
	60			45		
	Construction noise is exempt from the City of Sacramento noise regulations provided that construction does not take place before 7 a.m. or after 6 p.m. Monday through Saturday, and before 9 a.m. or after 6 p.m. on Sunday.					
City of Folsom	Construction noise is exempt from the City of Folsom noise regulations provided that construction does not take place before 7 a.m. or after 6 p.m. during weekdays and before 8 a.m. or after 5 p.m. on weekends.					
El Dorado County ¹	Hourly		Hourly		Hourly	
	L _{eq}	L _{max}	L _{eq}	L _{max}	L _{eq}	L _{max}
	Residential areas (Community Areas)	55	75	50	65	45
Residential Areas (Rural Regions)	50	60	45	55	40	50
Commercial areas (Community Areas)	70	90	65	75	65	75
Commercial areas (Rural Regions)	65	75	60	70	60	70
Open Space, Natural Resource (Rural Regions)	65	75	60	70	60	70
Placer County ² including Granite Bay Community	Residential	L _{dn}				
	Residential Areas Adjacent to Industrial	50				
	General Commercial	60				
	Heavy Commercial/Industrial Park	70				
	Recreation & Forestry	75				
	All land uses interior allowable noise level	70				
		45				
Sutter County	Hourly		Hourly		Hourly	
	L _{eq}	L _{max}	L _{eq}	L _{max}	L _{eq}	L _{max}
	50	70	50	70	45	65
Sources:						
City of Sacramento General Plan Noise Element (January 1988)						
County of Sacramento General Plan Noise Element (December 1993, amended 1998)						
City of Folsom Municipal Code, Chapter 8.42 Noise Control						
El Dorado County General Plan, Public Health, Safety and Noise Element (July 2004)						
Placer County General Plan Update, Section 9 Noise (August 1994)						
Granite Bay Community Plan Noise Element (Amended 1996)						
County of Sutter General Plan 2015 Policy Document, Noise Element (November 25, 1996)						
Notes:						
¹ Non-transportation construction noise standards.						
² Single-event impulsive noise levels produced by blasting shall not exceed a peak linear overpressure of 122 dB, or a C-weighted Sound Exposure Level (SEL) of 98 dBC. The cumulative noise level from blasting shall not exceed 60 dB LC _{dn} or CNELC on any given day.						

Table 4.12-2 Local Government Transportation Noise Standards (dBA)		
Noise Element Jurisdiction /Land Use Category	Maximum Allowable Noise Levels	
	Exterior -L _{dn} /CNEL ¹	Interior - L _{dn} /CNEL
City of Sacramento and Sacramento County		
Residential areas	60	45
City of Folsom		
Residential areas including single- or multiple-family residence, school, church, hospital or public library)	60	45
El Dorado County, Placer County, and Granite Bay Community⁴		
Residential areas		
Commercial areas	60	45
Other sensitive areas – Parks	--	--
Other sensitive areas – hospitals, nursing homes, churches, transient lodging	70	--
	60	45
City of Roseville⁴		
Residential areas	60	45
Commercial areas – office buildings	65	--
Other sensitive areas – parks	70	--
Other sensitive areas – hospitals, nursing homes, churches, transient lodging	60	45
City of Rocklin⁴		
Residential areas	60	45
Commercial areas – office buildings	--	--
Other sensitive areas – playground and parks	70	--
Hospitals and nursing homes	60	45
Non-commercial places of public assembly	60	--
City of Marysville²		
City of Wheatland and Sutter County⁴		
Residential areas	60	45
Commercial areas – office buildings	--	--
Other sensitive areas – playground and parks	70	--
Other sensitive areas – hospitals, nursing homes, churches, transient lodging	60	45
City of Lincoln³		
Sources:		
City of Sacramento General Plan Noise Element (January 1988)		
County of Sacramento General Plan Noise Element (December 1993, amended 1998)		
City of Folsom Municipal Code, Chapter 8.42 Noise Control		
El Dorado County General Plan, Public Health, Safety and Noise Element (July 2004)		
Placer County General Plan Update, Section 9 Noise (August 1994)		
Granite Bay Community Plan Noise Element (Amended 1996)		
City of Roseville General Plan (1992, updated 2003)		
City of Rocklin Draft General Plan, Noise Element (March 2005)		
Marysville General Plan (August 1985)		
City of Wheatland General Plan Update, Chapter 4.11 Noise (December 2005)		
City of Lincoln General Plan, Noise Element (1988)		
County of Sutter General Plan 2015 Policy Document, Noise Element (November 25, 1996)		
Notes:		
¹ The jurisdictions with standards for transportation noise impacts have adopted a maximum L _{dn} /CNEL noise limit of 60 dBA for residential land uses, with a potential allowable L _{dn} /CNEL exceedance level 65 dBA, if 60 dBA is not practicable in a situation given the application of the best-available noise reduction measures.		
² From General Plan 1985 Noise Goals and Policies: "To examine any new source of noise projected at or above 70 dB at 50 feet for compatibility with existing or projected planned neighboring land uses prior to the granting of a rezoning or building permit.		
³ There is no numeric noise standard.		
⁴ Interior spaces worst-case one hour Leq noise standards of 35–45 dBA have been adopted for theaters, auditoriums, music halls, churches, meeting halls, office buildings, schools, libraries and museums.		

Construction noise may affect several jurisdictions (City of Sacramento, Folsom, Granite Bay, and unincorporated areas of Sacramento, Sutter, El Dorado, and Placer Counties). These jurisdictions either have non-transportation noise standards based on time of day and land use sensitivity or provide exemptions for construction as long as those activities occur during the daytime. Residential areas are considered the most noise-sensitive land use, and the most restrictive noise standards apply. However, El Dorado and Placer Counties have also adopted noise standards for other land uses such as commercial areas and open space. All of the jurisdictions, except for Sutter and Placer Counties and the City of Folsom, have established maximum allowable exterior 1-hour noise limits for both daytime and nighttime hours. Placer County is the only jurisdiction that has adopted noise standards specific to non-transportation construction activities. These noise standards are based on maximum allowable L_{dn} noise levels. Furthermore, it is the only jurisdiction with a blasting noise standard, which states that blasting shall not exceed a peak linear overpressure of 122 dB, or a C-weighted Sound Exposure Level (SEL) of 98 dBC. The City of Folsom Noise Element exempts construction activities provided that construction does not take place before 7:00 a.m. or after 6:00 p.m. during weekdays and before 8 a.m. or after 5 p.m. on weekends.

Noise generated by transportation sources is also regulated according to land use. All the jurisdictions with standards for transportation noise impacts have adopted a maximum L_{dn} /CNEL noise limit of 60 dBA for residential land uses, with a potential allowable L_{dn} /CNEL exceedance level of 65 dBA, if 60 dBA is not practicable in a situation given the application of the best-available noise reduction measures. Many of the jurisdictions have adopted a maximum L_{dn} /CNEL noise limit of 70 dBA for playgrounds and parks.

4.12.2 ENVIRONMENTAL SETTING

4.12.2.1 SOUND AND THE HUMAN EAR

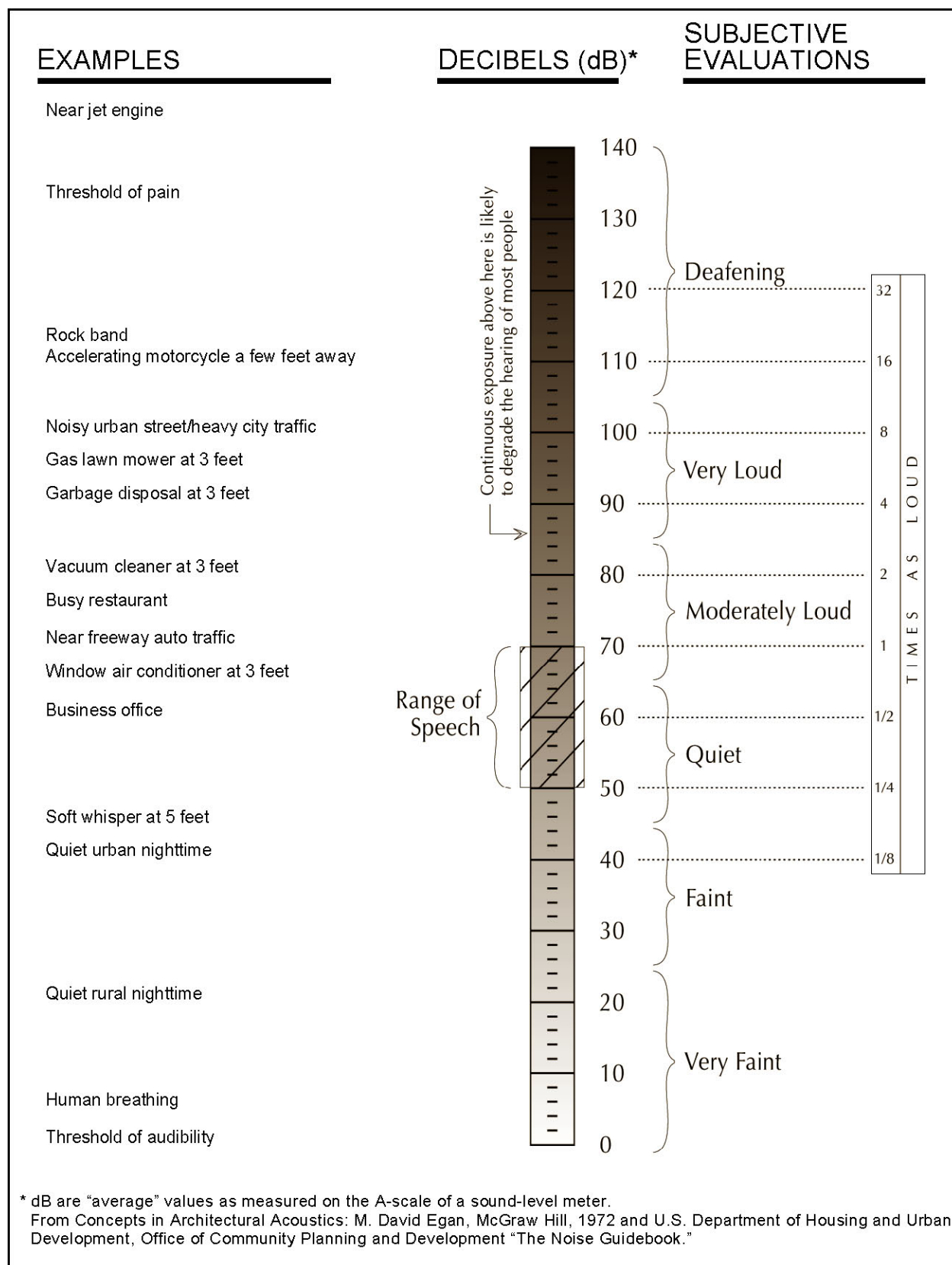
Noise is generally defined as sound that is loud, disagreeable, or unexpected. Sound, as described in more detail below, is mechanical energy transmitted in the form of a wave due to a disturbance or vibration. Due to the ability of the human ear to detect a wide range of sound pressure fluctuations, sound pressure levels are expressed in logarithmic units called dB. The sound pressure level in decibels is calculated by taking the log of the ratio between the actual sound pressure and the reference sound pressure squared. The reference sound pressure is considered the absolute hearing threshold (California Department of Transportation 1998).

Because the human ear is not equally sensitive to all sound frequencies, a specific frequency-dependent rating scale was devised to relate noise to human sensitivity. A dBA scale performs this compensation by discriminating against frequencies in a manner approximating the sensitivity of the human ear. The basis for compensation is the faintest sound audible to the average ear at the frequency of maximum sensitivity. This dBA scale has been adopted by most authorities for the purpose of regulating environmental noise. Typical indoor and outdoor noise levels are presented in Exhibit 4.12-1.

Because the decibel scale is logarithmic, sound levels measured in decibels are not additive. For example, a 65-dBA source of sound, such as a truck, when joined by another 65-dBA source results in sound amplitude of 68 dBA, not 130 dBA (i.e., doubling the source strength increases the sound pressure by 3 dBA). Amplitude is interpreted by the ear as corresponding to different degrees of loudness. Laboratory measurements correlate a 10-dBA increase in amplitude with a perceived doubling of loudness and establish a 3-dBA change in amplitude as the minimum difference perceptible to the average person (California Department of Transportation 1998).

Sound Propagation

As sound (or noise) propagates from the source to the receptor, the attenuation, or manner of noise reduction in relation to distance, depends on surface characteristics, atmospheric conditions, and the presence of physical barriers. The inverse square law describes the attenuation due to the pattern in which sound travels from the source to the receptor. Sound travels uniformly outward from a point source in a spherical pattern with an attenuation rate of 6 dBA per doubling of distance (dBA/DD). However, from a line source (e.g., a road), sound



Typical Noise Levels

Exhibit 4.12-1

travels uniformly outward in a cylindrical pattern with an attenuation rate of 3 dBA/DD. The surface characteristics between the source and the receptor may result in additional sound absorption and/or reflection. Atmospheric conditions such as wind speed, temperature, and humidity may affect noise levels.

Furthermore, the presence of a barrier between the source and the receptor may also attenuate noise levels. The actual amount of attenuation depends on the barrier size and frequency of the noise. A noise barrier may be any natural or human-made feature such as a hill, tree, building, wall, or berm (California Department of Transportation 1998).

Noise Descriptors

The selection of a proper noise descriptor for a specific source depends on the spatial and temporal distribution, duration, and fluctuation of the noise. The noise descriptors most often encountered when dealing with traffic, community, and environmental noise are defined below (California Department of Transportation 1998, Lipscomb and Taylor 1978).

- ▶ **L_{max} (Maximum Noise Level):** The maximum instantaneous noise level during a specific period of time. The L_{max} may also be referred to as the “peak (noise) level.”
- ▶ **L_{min} (Minimum Noise Level):** The minimum instantaneous noise level during a specific period of time.
- ▶ **L_X (Statistical Descriptor):** The noise level exceeded X percent of a specific period of time.
- ▶ **L_{eq} (Equivalent Noise Level):** The energy mean (average) noise level. The instantaneous noise levels during a specific period of time in dBA are converted to relative energy values. From the sum of the relative energy values, an average energy value is calculated, which is then converted back to dBA to determine the L_{eq}.
- ▶ **L_{dn} (Day-Night Noise Level):** The 24-hour L_{eq} with a 10-dBA “penalty” for the noise-sensitive hours between 10:00 p.m. and 7:00 a.m. The L_{dn} is intended to account for the fact that noise during this specific period of time is a potential source of disturbance with respect to normal sleeping hours.
- ▶ **CNEL (Community Noise Equivalent Level):** The CNEL is similar to the L_{dn} described above, but with an additional 5-dBA “penalty” for the noise-sensitive hours between 7:00 p.m. to 10:00 p.m., which are typically reserved for relaxation, conversation, reading, and television. If the same 24-hour noise data are used, the CNEL is typically approximately 0.5 dBA higher than the L_{dn}.

4.12.2.2 EXISTING NOISE CONDITIONS AND NOISE SENSITIVE LAND USES IN THE PROGRAM STUDY AREA

Folsom Dam Area

The Folsom Dam area is a unique land use and noise environment. The southern portion of the area is relatively urban, with constant noise generated from the Folsom Prison shooting range and traffic along busy arterial roadways. The area transitions to a more rural character to the north and east where there is less human activity. Therefore, background noise levels are higher at the southern portion of Folsom Lake and trend lower as one heads north and east. In addition, seasonal variations exist because the lake is an active site for recreational boating and jet and water skiing activities during the summer, which tends to increase ambient noise levels. During the winter months, human and recreational activity is less; therefore, ambient noise levels tend to be lower.

Lower American River Area

Existing noise sources along the lower American and Sacramento Rivers include traffic on area roadways and highways. The most substantial roadway traffic sources within the area arise from vehicle traffic along I-5 and

I-80, Highway 50, and SR 99. Other noise sources in the area include aircraft flyovers, railroad operations, and noise generated from commercial and residential land uses. Additionally, because the Sacramento and American Rivers provide numerous recreational opportunities, noise levels are typically high along these river channels in the warmer months.

Natomas Area

Vehicle and aircraft traffic and agricultural operations are the primary noise sources in the Natomas area. The major roadways in the area are Garden Highway, Arden Garden Connector, Power Line Road, SR 70 and 99, Highway 160, I-5, and I-80. Additionally, Sacramento International Airport is located north of I-5 and south of Elverta Road in Natomas.

South Sacramento Streams Group Area

Existing noise sources in the area include traffic on area roadways, aircraft flyovers, railroad operations, machinery and activities associated with commercial and industrial uses, and miscellaneous sources within residential communities. The most substantial roadway traffic source within the area is vehicle traffic along I-5, SR 99, and Highway 160. Major east-west arterials in the area include Florin and Mack Roads; major north-south arterials include Franklin Boulevard and Center Parkway. In addition, two major north-south rail lines cross the area: the Union Pacific Railroad (UPRR), which cuts through approximately the middle of the area, and the Southern Pacific Railroad approximately 2 miles east of the area. Smaller roadways and stationary sources have a localized influence on the noise environment. (SAFCA 2004.)

North Sacramento

Noise sources in the North Sacramento area include vehicular traffic along Elkhorn and Rio Linda Boulevards; rail traffic along the UPRR tracks; and air traffic at the Rio Linda Airport and McClellan Air Force Base (AFB). The area's noise-sensitive land uses include several residential neighborhoods and schools.

4.12.3 ENVIRONMENTAL IMPACTS

4.12.3.1 SIGNIFICANCE CRITERIA

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. The proposed project was determined to result in a significant effect on the noise environment if it would:

- ▶ expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- ▶ expose persons to or generate excessive groundborne vibration or groundborne noise levels;
- ▶ result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;
- ▶ result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project;
- ▶ for a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels; or

- for a project within the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels.

Only one of the proposed improvements, the Folsom Bridge project, would have a long-term effect (i.e., following the end of construction) on noise levels at sensitive receptors. Therefore, this analysis concentrates on construction-related noise effects, and summarizes the prior environmental analysis of the potential long-term significant noise impact that would result from the completion of the proposed Folsom Bridge.

4.12.3.2 IMPACT ANALYSIS

IMPACT 4.12-a **Generation of Short-Term Construction Noise.** *Construction activities associated with the proposed improvements could generate noise levels that exceed the local jurisdictions' significance thresholds at nearby sensitive receptors if construction activities were carried out during noise-sensitive hours, causing sleep disturbance and/or annoyance. This impact would be significant.*

Construction activities would generally involve site grading, clearing, excavation, earth movement, stockpiling, and material hauling. These construction activities would generate temporary and intermittent noise at or near the individual project construction sites. Noise levels would fluctuate depending on the particular type, number, and duration of use of various pieces of construction equipment. On-site equipment required for dam modification, bridge construction, and levee improvement activities is anticipated to include excavators, backhoes, bulldozers, scrapers, rollers, graders, loaders, haul trucks, water trucks, pile drivers, jackhammers, and cranes. Certain types of construction equipment, such as pile drivers, generate impulsive noise, which can be particularly annoying. Some blasting for spillway construction and borrow site excavation would also be conducted periodically at Folsom Dam and Reservoir. In addition, construction-related haul trips would raise ambient noise levels along haul routes depending on the number of haul trips and the types of vehicles used. Depending on the operations conducted, individual equipment noise levels could range from 79 to 101 dBA at 50 feet, as indicated in Table 4.12-3.

Table 4.12-3 Typical Construction Equipment Noise Levels		
Type of Equipment	Noise Level in dBA at 50 feet ^b	
	Without Feasible Noise Control	With Feasible Noise Control ^a
Pile Driver	101	95
Dozer or Tractor	80	75
Excavator	88	80
Scraper	88	80
Front-end Loader	79	75
Backhoe	85	75
Grader	85	75
Crane	83	75
Truck	91	75

^a Feasible noise control includes the use of intake mufflers, exhaust mufflers, and engine shrouds in accordance with manufacturer's specifications.
^b Estimates correspond to a distance of 50 feet from the noisiest piece of equipment and 200 feet from the other equipment.
Sources: EPA 1971

Noise-sensitive land uses (in this case, primarily residential uses) are located throughout the program study area, sometimes within 50–100 feet of the river/stream channels, levee areas, and other sites where construction would occur. In some cases, residences are located closer than to project construction areas.

In most cases, construction noise would be short term, and impacts would generally be less than significant. However, sustained construction noises could result in significant adverse impacts on residents, recreationists, and other noise-sensitive groups, depending on where individual projects are constructed and their proximity to noise-sensitive land uses. Additionally, if project construction activities would result in noise levels that exceed the applicable standards of local jurisdictions at nearby sensitive receptors, noise impacts would be significant.

The following types of potentially significant adverse noise impacts could be associated with the proposed project:

- ▶ increased impulsive noise associated with blasting operations during dam improvements;
- ▶ increased noise levels associated with heavy-duty equipment operation during construction; and
- ▶ increased noise from construction traffic along major access and haul routes, and increased vehicle traffic associated with the construction labor force.

Because construction of the proposed improvements could result in noise levels that exceed the applicable standards, resulting in increased annoyance and/or sleep disruption to occupants of residential dwellings and other sensitive receptors, this impact would be significant.

IMPACT 4.12-b Exposure of Sensitive Receptors to or Generation of Excessive Groundborne Vibration or Noise. *Construction activities associated with the proposed flood control improvements could have the potential to result in generation of excessive groundborne vibration or groundborne noise levels at 25 feet from the source equipment. It is possible that structural or architectural damage, and/or annoyance or sleep disruption, could occur as a result of the associated groundborne vibration levels. This potential impact would be significant.*

Construction activities have the potential to result in varying degrees of temporary ground vibration, depending on the specific construction equipment used and operations involved. Vibration generated by construction equipment spreads through the ground and diminishes in magnitude with increases in distance. Table 4.12-4 displays vibration levels for typical construction equipment.

Table 4.12-4			
Typical Construction Equipment Vibration Levels			
Equipment		PPV at 25 feet (in/sec) ¹	Approximate Lv at 25 feet ²
Pile driver (impact)	Upper range	1.518	112
	Typical	0.644	104
Pile driver (sonic)	Upper range	0.734	105
	Typical	0.170	93
Large bulldozer		0.089	87
Caisson drilling		0.089	87
Trucks		0.076	86
Jackhammer		0.035	79
Small bulldozer		0.003	58
1 Where PPV is the peak particle velocity			
2 Where Lv is the velocity level in decibels (VdB) and based on the root mean square (RMS) velocity amplitude.			
Source: Federal Transit Administration 2006			

As discussed above, on-site construction equipment for Folsom Dam modification, Folsom Bridge construction, and levee improvements would include bulldozers, graders, tractors, loaders, backhoes, cranes, forklifts, pavers, rollers, trucks, pile drivers, jackhammers, and other miscellaneous construction equipment. According to the

Federal Transit Administration (FTA), vibration levels associated with the use of such equipment could reach as high as approximately 1.518 inches per second (in/sec) peak particle velocity (PPV) and 112 vibration decibels (VdB referenced to 1 microinch per second [μ in/sec] and based on the root mean square (RMS) velocity amplitude) at 25 feet, as shown in Table 4.12-4. Using FTA's recommended procedure for applying a propagation adjustment to these reference levels, predicted worst-case vibration levels would exceed 0.2 in/sec PPV (Caltrans recommended standard with respect to the prevention of structural damage for normal buildings) within 100 feet and 80 VdB (FTA maximum acceptable vibration standard with respect to human annoyance for residential uses) within 1,000 feet of vibration-sensitive receptors, associated with the use of an impact pile driver. Existing vibration-sensitive receptors (e.g., schools, residences) could possibly be within these recommended distances from construction sites. Some known receptors are within 50–100 feet of some construction sites.

Thus, short-term project-generated construction source vibration levels could exceed Caltrans' recommended standard of 0.2 in/sec PPV with respect to the prevention of structural damage for normal buildings and the FTA maximum acceptable vibration standard of 80 velocity decibels (VdB) with respect to human response for residential uses (i.e., annoyance) at vibration-sensitive land uses. As a result, this potential impact would be significant.

IMPACT **Exposure of Residents to Increased Traffic Noise Levels.** *For some residences adjacent to the proposed*
4.12-c *Folsom Bridge site, future traffic levels are expected to raise noise levels above the local significance*
 thresholds for long-term noise. This impact would be significant.

American River Watershed Project Post Authorization Decision Document, Folsom Dam Raise, Folsom Bridge, Final Supplemental Environmental Impact Statement/Environmental Impact Report (USACE and City of Folsom 2006) describes the analysis of impacts of future traffic levels associated with Folsom Bridge on local residences. This analysis concludes that future noise levels from traffic would be above the acceptable local thresholds for portions of one existing apartment complex, Lake Pointe Apartments. Future (2025) peak-hour traffic noise levels at exterior activity areas of the Lake Pointe Apartments closest to Folsom-Auburn Road would range between 67 and 60 dBA. At apartment units located on the southern end of the complex, future noise levels would be kept to less-than-significant levels. For units located in the interior of the complex and at nearby Reclamation facilities, future noise levels would increase by well over 10 dBA from existing 2004 levels without mitigation. This impact would be significant.

4.12.4 MITIGATION MEASURES

Mitigation Measure 4.12-a for Generation of Short-Term Construction Noise: Implement Noise-Reduction Measures to Reduce Construction Noise Effects.

The agencies implementing program components and their primary contractors for engineering design and construction shall ensure that the following measures are implemented to avoid significant noise-related effects during construction.

Project-specific noise analysis shall be performed to determine the potential for construction-generated noise to affect sensitive receptors. Specific noise-reduction measures shall be implemented for each individual project that are consistent with the noise-reduction requirements of the project depending on the type of construction activity involved and proximity of sensitive receptors. The following mitigation strategies shall be implemented as applicable:

- ▶ Use electrically powered equipment instead of internal combustion equipment where practicable and feasible.
- ▶ Establish and enforce construction site and haul road speed limits.
- ▶ Restrict the use of bells, whistles, alarms, and horns to safety warning purposes.

- ▶ Equip all construction equipment with noise-reduction devices such as mufflers to minimize construction noise and operate all internal combustion engines with exhaust and intake silencers.
- ▶ Prior to construction within 1,000 feet of residences, provide written notification to the potentially affected residents, identifying the type, duration, and frequency of construction activities. Notification materials shall also identify a mechanism for residents to register complaints with the appropriate jurisdiction if construction noise levels are overly intrusive or construction occurs outside the permitted hours.
- ▶ Locate fixed construction equipment (e.g., compressors and generators), construction staging and stockpiling areas, and construction vehicle routes as far as feasible from noise-sensitive receptors.
- ▶ Where feasible and particularly in locations subject to prolonged construction, use noise-attenuating buffers such as structures, truck trailers, or soil piles between noise generation sources and sensitive receptors.

Implementing the applicable measures would reduce potential noise impacts to a less-than-significant level. However, the timing and site-specific conditions for the different improvement projects at the time of their implementation are currently unknown; therefore, the feasibility of implementing these measures for all individual improvement projects cannot be assured. In addition, the schedule of most of the proposed improvement projects would be governed by weather conditions and the terms of permits for work in sensitive habitats or the habitats of protected species, and it may be infeasible to limit construction to less noise-sensitive hours in some cases. For these reasons, it is not known whether noise impacts can in all cases be reduced to a less-than-significant level, and this impact may remain significant and unavoidable.

Mitigation Measure 4.12-b for Exposure of Sensitive Receptors to or Generation of Excessive Groundborne Vibration or Noise: Implement Measures to Avoid Construction-Related Vibration Effects.

The agencies implementing program components and their primary contractors for engineering design and construction shall ensure that the following measures are implemented to avoid significant vibration-related effects during construction.

The following groundborne vibration-reduction measures shall be implemented for each individual project consistent with the project-specific conditions, including proximity of sensitive receptors and structures and type of construction activity involved. The following mitigation strategies shall be implemented as applicable:

- ▶ Stationary vibration-production equipment shall be placed as far as practicable from residential structures.
- ▶ Project construction specifications shall require the contractor to limit vibrations to less than 0.2 inch per second within 75 feet at any building.
- ▶ Vibration monitoring equipment shall be placed at the property line adjacent to large equipment and, with owner approval, at the back of the residential structures adjacent to the large equipment.
- ▶ A voluntary pre- and post-construction survey shall be conducted to assess potential architectural damage from levee construction vibration at each residence within 75 feet of construction. The survey shall include visual inspection of the structures that could be affected, documentation of structures by means of photographs and video. This documentation shall be reviewed with the individual owners prior to any construction activities. Post-construction monitoring of structures shall be performed to identify (and repair, if necessary) damage, if any, from construction vibrations. Any damage shall be documented with photographs and video. This documentation shall be reviewed with the individual property owners.

These measures would reduce short-term project-generated construction source vibration levels to below Caltrans' recommended standard of 0.2 in/sec PPV with respect to the prevention of structural damage for normal buildings and the FTA maximum acceptable vibration standard of 80 VdB with respect to human response for residential

uses (i.e., annoyance) at vibration-sensitive land uses. Implementing the applicable measures would reduce potential impacts of groundborne vibration and noise to a less-than-significant level.

Mitigation Measure 4.12-c for Exposure of Residents to Increased Traffic Noise Levels: Construct a Soundwall as Part of the Folsom Bridge Project to Reduce Long-Term Traffic Noise Effects.

The USACE and the City of Folsom have adopted and incorporated into the project the following mitigation measure, which is set forth in full in Appendix B to this EIR. The Folsom Bridge project will include the construction of a soundwall as mitigation to reduce the long-term noise effect associated with Folsom Bridge traffic on local residences. The USACE and City have determined that implementation of this measure will reduce long-term noise impacts to a less-than-significant level (USACE and City of Folsom 2006).

4.13 RECREATION

This section addresses potential effects of the proposed project on recreational facilities and activities in the program study area. Noise effects of the proposed project are addressed in Section 4.12, “Noise.” Effects on aesthetic resources are addressed in Section 4.14, “Visual Resources.”

4.13.1 REGULATORY SETTING

The regulatory guidance that pertains to recreation areas in the program study area consists of the National Wild and Scenic Rivers Act; the California Wild and Scenic Rivers Act; and the Urban American River Parkway Preservation Act, which incorporates the American River Parkway Plan as the applicable policy guidance for protection of parkway resources. These acts are summarized below. In addition, there are numerous policy documents that describe the goals, amenities, future development plans, and operations and maintenance programs for individual parks within the program study area. The major planning documents that are relevant to recreational amenities in the program study area are discussed in section 4.13.2, “Environmental Setting.”

4.13.1.1 WILD AND SCENIC RIVERS ACTS

The National Wild and Scenic Rivers Act of 1968 was enacted to preserve selected rivers or sections of rivers in their free-flowing condition to protect the quality of the river waters and to fulfill other national conservation purposes. The California Wild and Scenic Rivers Act of 1972 was enacted to preserve certain rivers that possess extraordinary scenic, recreational, fishery, or wildlife values in their free-flowing condition, together with their immediate environment, for the benefit and enjoyment of the people of the state. The lower American River has been designated as a component of both the federal and state Wild and Scenic Rivers systems. The river is designated as “recreational” rather than “wild” or “scenic” because of the degree of modification of its shoreline from natural conditions and the level of public accessibility. Both acts require that public agencies exercise their existing powers in a manner consistent with the policies and provisions of the act. Generally, projects would not conflict with the Wild and Scenic Rivers designations if they would not adversely affect the resources for which the river was designated or adversely affect the river’s “free-flowing” status.

4.13.1.2 URBAN AMERICAN RIVER PARKWAY PRESERVATION ACT AND AMERICAN RIVER PARKWAY PLAN

Recognizing that the American River Parkway contributes to the quality of life in the City and County of Sacramento, enhances the image of the city and county as desirable places to live, provides for the health and safety of the community, and contributes to the economic well-being of the community, the California Legislature in 1985 passed the Urban American River Parkway Preservation Act. The act incorporated the American River Parkway Plan as the planning mechanism to provide policy guidance and coordination between agencies in protecting the natural resources of the parkway. The act states that actions of state and local agencies with regard to land use decisions shall be consistent with the parkway plan.

The first American River Parkway Plan was produced in 1962. The plan was revised in 1968 and again in 1976, with significant public input. The plan calls for evaluation and revision, if necessary, every 5 years. The current version of the American River Parkway Plan was adopted in 1985 by the Sacramento County Board of Supervisors, the Sacramento City Council, and the California Legislature. The plan goals and policies that may be relevant to the proposed project area listed in Section 4.2, “Agriculture and Land Use.” Preservation and protection of recreational resources of the parkway are among the basic goals of the plan. The policies establish that the purpose and need for a project affecting the parkway must be approved by the Sacramento County Board of Supervisors.

The Urban American River Parkway Preservation Act requires that actions of state and local agencies with regard to land use decisions must be consistent with the parkway plan. This requirement, however, is subject to the

provision that the act is not to be construed to impair the authority and responsibilities of state or local public agencies in maintaining and operating the flood control channel, levees, and pump stations, except that these operations, “as nearly as practicable,” must be consistent with the parkway plan (Public Resources Code Section 5842[b]).

4.13.2 ENVIRONMENTAL SETTING

Numerous parks, trails, and waterways, and other recreational resources offering both land- and water-based opportunities are located in the program study area. The following sections describe the major recreation areas and uses adjacent to flood control facilities.

4.13.2.1 FOLSOM DAM AND RESERVOIR AREA

The lands around Folsom Reservoir are owned by the Reclamation and DPR. The Reclamation lands are leased to DPR under a 1956 lease agreement, and Reclamation has a long-term agreement with DPR to provide for the management of these lands and associated facilities as part of the Folsom Lake State Recreation Area (FLSRA), which encompasses Folsom Reservoir, Lake Natoma, and the lowest reaches of the north and south forks of the American River. The Folsom State Recreation Area General Plan, developed by DPR, guides land use activities in the FLSRA. The overall goal of the general plan is to provide open space and improved recreation opportunities. Among the more specific goals are providing recreation uses compatible with the area’s natural values.

The FLSRA is the most frequently used State Recreation Areas in California, with more than 1.5 million visitors in 2000. The FLSRA offers opportunities for hiking, biking, running, camping, picnicking, horseback riding, water-skiing, boating, and fishing. Sportfishing species include trout, catfish, big and small mouth bass, and perch. For cyclists, there is a 32-mile long bicycle path that connects Folsom Reservoir with many Sacramento County parks before reaching Old Sacramento. Lake Natoma is popular for crew races, sailing, kayaking, and other aquatic sports. (California State Parks 2006.)

When full, Folsom Reservoir has 75 miles of shoreline and a surface area of 11,450 acres at an elevation of 466 feet above mean sea level (msl). The reservoir offers eight boat ramps at five different use areas around the lake. The water surface elevation in Folsom Reservoir directly affects the availability of boat ramps, beaches, berth sites, and other facilities that depend largely on water depth or surface area. The Folsom Lake Marina is the only marina facility in the FLSRA. Annual attendance in 2000 was 66,856 visitors. On the east side of the lake, at Brown’s Ravine, the facility includes 685 wet slips and 175 dry storage slips.

The two most popular day use facilities in the FLSRA are Granite Bay and Beal’s Point. Annual attendance at these areas in 2000 was 507,712 visitors and 219,986 visitors, respectively. Both areas have guarded swim beaches, related concessions, and grassy picnic areas. Granite Bay includes the North Granite area, which is popular for fishing, horseback riding, and hiking. The paved multi-use Lake Natoma Trail connects Folsom Reservoir and Nimbus Dam, and the unpaved multi-use Granite Bay Trail connects Beal’s Point to other facilities along Folsom Reservoir. Folsom Point is the most popular day use area on the eastern shore of Folsom Lake. Annual attendance in 2000 was 112,120 visitors. The area includes picnic facilities and the largest formal boat launch facilities on the east side of the lake.

4.13.2.2 AMERICAN RIVER PARKWAY AND LOWER AMERICAN RIVER

The American River Parkway is a 6,000-acre open space corridor that extends between Nimbus Dam and the confluence of the American and Sacramento Rivers (Exhibit 3-3). The parkway is managed by the Sacramento County Parks and Recreation Department in accordance with the American River Parkway Plan (see Section 4.13.1.2) and is recognized as one of the nation’s premier urban parkways. It includes 14 county parks that support a variety of activities. The nearby Jedediah Smith National Recreation Trail provides bicycling, hiking, and horseback riding opportunities that stretch from Discovery Park to the FLSRA.

The lower American River is a major site for recreational boating (rafting, kayaking, and canoeing), fishing, swimming, and wading. Both shoreline and boat fishing take place along the river for salmon, steelhead, and shad. Swimming and wading are popular activities at some locations along the river.

Total annual use of the parkway in 1996 was estimated at 5.5 million visitors. Water-dependent activities accounted for an estimated 32% of total annual use. Boating, particularly rafting, is the most popular water-dependent activity on the river, followed by fishing and swimming. (U.S. Army Corps of Engineers, SAFCA, and California Reclamation Board 2002.)

Discovery Park, managed by the City of Sacramento, is located just east of Interstate 5 on the north side of the American River at the confluence of the American and Sacramento Rivers. The 160-acre park offers a boat launch, fishing, softball fields, archery, a picnic area, and access to the 32-mile Jedediah Smith Bike Trail.

4.13.2.3 SACRAMENTO RIVER

The Sacramento River is a popular location for water-related recreation. Recreational boating is one of the primary uses of the Sacramento River in the program study area, and there are several marinas and boat-launch facilities along the east bank of the river with adjacent parks. The largest is the Sacramento Marina, a public facility owned by the City of Sacramento and operated under a concessionaire agreement with a private contractor. Others, in the Natomas area, are privately owned and operated. Land-based activities such as camping, picnicking, hiking, and shoreline fishing also occur along the Sacramento River in the program study area.

The Sacramento River Parkway is a trail that runs along the Sacramento River levee from below the Business Loop of I-80 in the north through the Land Park area and along the levee in parts of the Pocket area. The City of Sacramento plans to expand the parkway along the length of the riverfront through these areas. The Sacramento River Greenway, a 30-mile-long trail from Interstate 5 (I-5) in the north to Freeport in the south, has been proposed and studied but has not yet been developed. The greenway would be a continuous public trail connecting neighborhoods and providing access to the Sacramento River. The greenway concept is described in the Sacramento River Greenway Plan, a regional resource management plan that was initiated by the State Lands Commission, through a memorandum of understanding with the City of Sacramento and the Counties of Sacramento and Yolo. The general goals of the plan are to preserve, protect, enhance, and restore the riparian corridor of the river and its associated ecosystems, and to design a system of controlled public access for active and passive recreational uses related to the river.

4.13.2.4 NATOMAS AREA

Several private marinas are located along the Sacramento River in the Natomas area. The 37-acre Sand Cove Park on the Sacramento River offers swimming and bank-fishing opportunities.

4.13.2.5 NORTH SACRAMENTO

The Dry Creek Parkway is a 6-mile-long corridor managed by Sacramento County that extends from just below the Sacramento/Placer County to the Sacramento city limit. It includes a golf course, horse trails, picnic facilities, fishing, soccer fields, and hiking trails. The Dry Creek Parkway Recreation Master Plan contains planning framework for future development and management of the parkway.

The Ueda Parkway is a series of bicycle, equestrian, and pedestrian trails between the American River Parkway and the Dry Creek Parkway. The Ueda Parkway extends on and adjacent to the levees along parts of the NEMDC/Steelhead Creek, Robla Creek, and Arcade Creek.

4.13.3 ENVIRONMENTAL IMPACTS

4.13.3.1 SIGNIFICANCE CRITERIA

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines and professional standards and practices. The proposed project was determined to result in a significant effect on recreational resources if:

- ▶ the use of existing neighborhood and regional parks or other recreational facilities would be increased such that substantial physical deterioration of the facility would occur or be accelerated,
- ▶ it would include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment,
- ▶ changes in river flows or reservoir surface elevations would result in substantial changes in recreation opportunities, or
- ▶ construction would result in a substantial long-term disruption of any institutionally recognized recreational activities.

The following additional criteria were used to evaluate the significance of construction-related impacts. Construction-related impacts on recreation were considered significant if construction activities would:

- ▶ conflict with established recreational uses of the area;
- ▶ cause a reduction in or limit the availability of recreational facilities expressed as a reduction in visitor days;
- ▶ cause a substantial loss of expected recreation opportunities; or
- ▶ conflict with relevant plans, policies, or laws.

The proposed project would not include recreational facilities or require the construction or expansion of recreational facilities. Operational effects related to water levels (i.e., changes in river flows and reservoir levels) were previously addressed by SAFCA in *Draft Program Environmental Impact Report on Flood Control Improvements Along the Mainstem of the American River* (SAFCA 2000) and were found to be less than significant. These conclusions remain valid. See Section 4.1.3, “Operational Effects Previously Addressed by SAFCA,” for a summary of these operational effects.

The following section addresses the shorter-term impacts of the proposed project that would be associated with construction and levee integrity activities and long-term effects related to modifications of the footprint of flood control features.

4.13.3.2 IMPACT ANALYSIS

IMPACT 4.13-a	Effects on Recreational Opportunities at Folsom Reservoir Resulting from Construction of Dam Modifications. <i>Implementation of the proposed project would restrict recreational uses of several facilities at Folsom Reservoir while construction or maintenance activities are ongoing, potentially causing a substantial loss of expected recreation opportunities during an extended construction period. This impact would be significant.</i>

Construction activity at Folsom Dam and Reservoir would temporarily affect access to several recreation facilities at Folsom Reservoir, particularly those closest to the dam, or disturb recreational users in the FLSRA. Areas at

Granite Bay, Beal's Point, and Folsom Point are expected to be used as staging areas during parts of the Folsom Dam modification activities. Areas on the east and west sides of the shoreline near the dam are potential sources of borrow for construction. Construction activities could affect recreation through partial or full closure of some facilities to accommodate construction staging or borrow extraction, disturbance and traffic delays associated with increased truck traffic, impeded access to shore facilities, and restricted access to trails. Different facilities would be affected to varying degrees. Construction activity may substantially affect recreational uses at Granite Bay and Beal's Point for more than one peak recreation season, and all recreational use of Folsom Point is expected to be interrupted for a 5-year period while construction is ongoing. The substantial long-term disruption of recreational uses of recreation facilities at Folsom Reservoir would be a significant impact.

IMPACT 4.13-b **Permanent Encroachment on American River Parkway Land.** *The proposed project would include flood control improvements that would permanently encroach on American River Parkway land and could affect recreational uses. This impact would be significant.*

Individual flood control improvements along the lower American River could encroach on American River Parkway land and cause permanent loss of recreational and natural resource values, in conflict with established recreational uses of the area. Reconstruction of the levee upstream of the Mayhew Drain, for example, would entail converting several acres of parkway land to new levee or floodwall to improve flood protection. Because this impact could conflict with established recreational uses of the area and may cause a substantial loss of expected recreation opportunities in this local area, this impact would be significant.

IMPACT 4.13-c **Permanent In-Water Channel Hazards.** *The proposed project would include bank protection projects that would incorporate permanent channel features that could pose hazards to recreational users and conflict with established recreational uses of these areas. This impact would be significant.*

Bank protection projects on the American and Sacramento Rivers to address erosion would include features that have the potential to cause hazards for recreational users in near-shore areas where these improvements would be implemented. These features include the use of riprap (i.e., rock) for bank stabilization that can entrap waders' feet and the incorporation of woody debris for fish habitat enhancement that may be hazardous to swimmers, boaters, and those using canoes. Hazards associated with the placement of large woody debris are most likely to occur when the material is placed facing upstream, around a hard point or any area where flows are redirected, and in areas where it is difficult to see. The introduction of recreational hazards could restrict shoreline recreational uses and could conflict with established recreational uses of these areas. This impact would be significant.

IMPACT 4.13-d **Effects on Recreational Opportunities in and Adjacent to Program Area Waterways during Construction and Levee Integrity Program Activities.** *Implementation of the proposed project would restrict recreational uses of some trails and parkways and could affect water-dependent recreational activities while construction or maintenance activities are ongoing. This impact would be significant.*

Water-dependent recreational activities, such as boating, rafting, water-skiing, and fishing, could be restricted in some areas where bank protection projects are taking place at presently known erosion sites on the Sacramento River or at future erosion sites on the American and Sacramento Rivers. Barges present at bank protection sites for waterside construction staging would restrict local use of the riverbank in construction areas. However, these construction activities and the presence of barges would not restrict recreational activities in the major part of the channel. Such waterside disturbance would be temporary, and recreational users of the channels could adapt to such disturbance by using other nearby areas that provide similar recreational opportunities.

Construction of some of the proposed flood control improvements and maintenance activities associated with the levee integrity program are likely to require temporary closures of recreational trails and temporarily disrupt or disturb recreational uses such as wildlife-viewing, cycling, hiking, picnicking, fishing, and other activities along

the Sacramento River east levee, within the American River Parkway, and in the Dry Creek and Ueda Parkways. Access to riverfront parks and marinas could also be temporarily restricted as a result of urban levee maintenance, flood operation, bank protection, and levee strengthening activities that would be conducted as part of the levee integrity program. In addition, the levee integrity program would also include encroachment management, which could involve the redesign and modification of recreation-related facilities on the water side of levees that inappropriately constrain flood operations, hinder adequate levee and bank inspection and maintenance activities, or otherwise compromise flood safety.

Although construction activities would be temporarily, usually taking place in one construction season, closure or restricted access to these established recreation facilities, such as trails and parkways, could conflict with established recreational uses of the area, cause a reduction in visitor days, and cause a substantial loss of expected recreation opportunities. This impact would be significant.

IMPACT 4.13-e **Inconsistency with Relevant Plan, Policies, and Laws.** *The proposed project would not substantially reduce long-term recreation opportunities or recreational amenities in conflict with plans and policies in effect in the program study area, and would not affect the free-flowing condition of the lower American River. This potential impact would be less than significant.*

The proposed project would not substantially reduce recreation opportunities or the overall protection of natural and recreational resources at the FLSRA; along the American River Parkway; in the Sacramento River, Dry Creek, or Ueda Parkways; or in other recreational facilities in the program study area. Construction that would result in the short-term disruption of recreation activities would be fully mitigated. Implementation of the proposed project would not affect the free-flowing condition or recreational values of the lower American River. This potential impact would be less than significant.

4.13.4 MITIGATION MEASURES

No mitigation is required for Impact 4.13-e. Mitigation is described below for Impacts 4.13-a (construction effects at Folsom Reservoir), Impact 4.13-b (permanent encroachment on American River Parkway land), Impact 4.13-c (introduction of recreation hazards in channels), and Impact 4.13-d (construction effects on program area waterways).

Mitigation Measure 4.13-a for Effects on Recreational Opportunities at Folsom Reservoir Resulting from Construction of Dam Modifications: Implement Measures to Minimize Effects on Recreational Opportunities at Folsom Reservoir.

The agencies implementing program components at Folsom Dam and Reservoir and their primary contractors for engineering design and construction shall ensure that the following measures are implemented to minimize potential impacts on recreation activities.

The following measures shall be incorporated into project plans:

- ▶ Signage and public announcements shall be posted before the beginning of construction and maintained throughout the construction period to inform the public of construction activities and facility closures.
- ▶ Staging areas shall be sited as far from recreation facilities as possible.
- ▶ Entrance stations to significantly affected recreation areas shall be reconfigured prior to the beginning of construction to reduce public waiting time.
- ▶ Construction activities shall be scheduled to accommodate recreational uses and special events to the extent feasible.

- ▶ Public roads near the reservoir where public and construction traffic will mix shall be controlled by flaggers.
- ▶ Suitable detours for trails shall be established where use would be interrupted by construction, and public service announcements to inform the public of route changes shall be distributed and posted.
- ▶ All recreation facilities damaged during construction shall be repaired or replaced in kind following construction.
- ▶ Damaged beach areas used as borrow sites shall be recontoured, if necessary, to make them available for recreation uses following construction use.
- ▶ Following construction, staging areas shall be developed as improved recreation sites, in cooperation with DPR, as appropriate.

Although implementing these measures would reduce construction-period impacts on recreation and would ensure that post-construction impacts are reduced to a less-than-significant level, the long-term interruption of recreational uses at Folsom Point during the construction period would potentially cause a reduction of visitor days both through direct effects on Folsom Point and by contributing to overcrowding of other boating and recreational facilities at Folsom Reservoir through the displacement of recreational uses from Folsom Point. Because construction activities could cause a substantial loss of expected recreation opportunities for the anticipated 5-year duration of construction activities, this impact would remain significant and unavoidable.

Mitigation Measure 4.13-b for Permanent Encroachment on American River Parkway Land: Pay Fee to the Sacramento County Parks Habitat Restoration Program (HRP) or a Comparable Program as Directed by Sacramento County to Compensate for Losses of American River Parkway Land.

The agencies implementing program components shall ensure that the following measures are implemented to compensate for any losses of American River Parkway land as a result of flood control components.

The implementing agency shall pay a fee to the Sacramento County Parks HRP or a comparable program as directed by Sacramento County to purchase private in-holdings in the parkway, open space, or undeveloped property adjacent to the parkway. The exact property location, schedule, and size of the acquisition would depend on willing sellers and other available funds. HRP fees cannot be used for operation, maintenance, administration, or other costs not involving the purchase of new parklands from willing sellers.

Implementing this mitigation measure would reduce permanent impacts on recreational uses of the American River Parkway to a less-than-significant level.

Mitigation Measure 4.13-c for Permanent In-Water Channel Hazards: Incorporate Design Features to Avoid the Introduction of Significant Hazards to Recreationists at Bank Protection Sites.

The agencies implementing program components shall ensure that the following measures are implemented to avoid the introduction of significant hazards to near-shore channel recreational areas:

- a) Riprap that will be submerged at bank protection sites shall be of relatively uniform gradation in rock sizes and shall be placed to prevent the presence of large voids where waders' feet may become caught.
- b) Project design shall preclude the presence of vertical berms.
- c) The local approach visibility of large woody debris shall be ensured and will incorporate the use of natural indicators, such as a partially emergent portion of the material, or vegetation on a low berm, to provide a visual warning of the presence of the presence of shallowly submerged hardscape. In addition, large woody

debris incorporated into bank protection sites shall be placed facing downstream or in the form of rootwads to deflect watercraft and reduce the risk of entrapment.

Implementing these measures would ensure that bank protection features do not increase significant hazards and conflict with established recreational uses of these areas, and would reduce the impact to a less-than-significant level.

Mitigation Measure 4.13-d for Effects on Recreational Opportunities in and Adjacent to Program Area Waterways during Construction and Levee Integrity Program Activities: Prepare and Implement Plans to Manage Recreational Traffic, and Notify the Public of Access Restrictions.

The agencies implementing program components and their primary contractors for engineering design and construction shall ensure that the following measures are implemented to minimize potential impacts on recreation activities along program area waterways during construction.

Where recreational trail use would be disrupted by construction activities or levee integrity program activities, the implementing agency shall prepare and implement plans for managing recreational traffic that would be impeded by those activities. The plans shall include descriptions of necessary detours. The plans shall be coordinated with the Parks and Recreation Department of the City or County of Sacramento, as appropriate, and shall be provided to private operators of recreation facilities near areas of project activity. The plans shall be publicized through newspaper notices, mailings to residences in potentially affected neighborhoods, notices to recreational user groups, and on-site signage prior to the beginning of construction and periodically during construction, and shall include information on the expected duration and nature of access restrictions.

Implementation of this mitigation measures would alert recreational users to access and use restrictions and enable them to adapt to the use of other park, trail, and other recreational amenities, and would reduce the impact to a less-than-significant level.

4.14 VISUAL RESOURCES

This section focuses on visual resources that may be affected by implementation of the proposed project. Effects on recreation are addressed in Section 4.13, “Recreation.” Section 4.8, “Cultural Resources,” addresses the designation of a portion of the program study area as a Rural Historic Landscape District and the effects of the proposed project on the landscape elements and structures contributing to that designation.

4.14.1 REGULATORY SETTING

The regulatory guidance that pertains to visual resources along the lower American River in the program study area consists of the National Wild and Scenic Rivers Act; the California Wild and Scenic Rivers Act; and the Urban American River Parkway Preservation Act, which incorporates the American River Parkway Plan as the applicable policy guidance for protection of parkway resources. These acts are summarized in Section 4.13, “Recreation.”

4.14.1.1 FEDERAL AND STATE

California’s Scenic Highway Program was created by the California Legislature in 1963. Its purpose is to preserve and protect scenic highway corridors from change that would diminish the aesthetic value of lands adjacent to highways. A highway may be designated “scenic” depending on how much of the natural landscape travelers can see, the scenic quality of the landscape, and the extent to which development intrudes on travelers’ enjoyment of the view. (California Department of Transportation 2003.)

4.14.1.2 LOCAL

The Conservation Element of the Sacramento County General Plan contains several policies concerning flood channels, streamcourses, and waterways. To preserve the natural characteristics of these areas, county policies call for riparian vegetation maintenance, buffer zones adjacent to stream corridors containing riparian vegetation, and unlined watercourses. Policy CO-107 requires that topographic diversity and variation be retained when channels are realigned or modified, including maintaining meandering characteristics, varied berm width, and naturalized side slope (Sacramento County 1993).

The City of Sacramento General Plan contains policies that call for the preservation of riparian woodlands and grasslands along waterways in Sacramento, and the establishment of standards for water-related open space to enhance the visual characteristics of area water resources (City of Sacramento 1988).

The Visual Resources section of the Land Use Element of the Sutter County General Plan (Sutter County 1996) has as its general goal: “To preserve and protect the visual and scenic resources of the area.” There are no Sutter County regulations that pertain specifically to visual resources in the Natomas area of the county.

Placer County does not have a visual resources (or similar) element in its general plan.

The Conservation and Open Space Element of the El Dorado County General Plan contains the following primary goal: “Conserve open space land for the continuation of the county’s rural character, commercial agriculture, forestry and other productive uses, the enjoyment of scenic beauty and recreation, the protection of natural resources, for protection from natural hazards, and for wildlife habitat” (El Dorado County 2004). There are no El Dorado County General Plan policies that are relevant to this analysis.

4.14.2 ENVIRONMENTAL SETTING

4.14.2.1 FOLSOM DAM AND RESERVOIR AREA

The most significant visual resources of the Folsom Dam and Reservoir area are panoramic views. These include views across the reservoir, views from the reservoir, and views out over the surrounding nonpark landscape. Because of the varied topography and length of shoreline at Folsom Reservoir, there are numerous points from which to enjoy the visual resources of the local area and the region. In addition to vista points, several frequently visited viewing areas along the reservoir shoreline provide views of the area, and several private residences have views of the reservoir and its surroundings.

East-facing views from the western shores of Folsom Reservoir include the reservoir surface in the foreground with the regionally characteristic landscape of rolling hills, open grasslands, and scattered oak and gray pine woodlands on the peninsula. Views north from Folsom Dam provide a view of Folsom Reservoir framed by foothills. The rugged peninsula separating the North and South Forks of the American River at Folsom Reservoir is visible from many parts of the park and contributes to a sense of undeveloped countryside due to the limited development. However, seasonal fluctuation in water levels results in considerable impacts on the visual quality of Folsom Reservoir. The water surface elevation varies substantially each recreation season (Memorial Day to Labor Day)—up to about 70 feet in normal years—leaving much of the exposed shoreline devoid of vegetation. The relatively gradual slope to the reservoir bottom results in a greater area of exposed shoreline with lower water levels, resulting in the “bathtub ring” effect common to California reservoirs. Views of the reservoir vary from expanses of blue water during wet winters and spring to large expanses of barren, muddy shoreline during dry summers and fall.

In addition to the natural features of the area surrounding the reservoir, the FLSRA contains many built features, including the concrete dam, which is more than 1,400 feet long and 340 feet high, associated earthen dikes, and recreational facilities.

Views of the Folsom Dam bridge area consist mainly of urban features with occasional views of Folsom Reservoir. The quality and sensitivity of views are low.

4.14.2.2 LOWER AMERICAN AND SACRAMENTO RIVERS

The lower American and Sacramento Rivers flow through the urban Sacramento area. The American River corridor has a variety of visual components that include steep bluffs, terraces, islands, backwater areas, and riparian vegetation. High, steep natural banks confine the upper portions of the river; downstream of Goethe Park, the river is confined by levees. In some portions of the leveed corridor, the north levee is set back substantially from the river channel. In many places, the southern levee is very close to, or is a part of, the riverbank, and the remnant floodplain is very narrow. The character of the landscape between the levees is predominantly natural. Views are dominated by the river and by diverse riparian woodlands and grasslands. Views from the channel of the urban land uses on the land side of the levees are largely screened by the levees and taller vegetation. The natural character of the lower American River corridor contrasts vividly with the surrounding urban setting. Several bridges cross the river corridor, linking the urban setting to the river.

Below Folsom Dam, the vegetation within the American River corridor gradually changes from species typical of the lower foothills to those of the valley floor and represents a rich and diverse mosaic. The valley-floor vegetation community is characterized by a diverse mix of deciduous trees, including cottonwood, willow, valley oak, alder, box elder, Oregon ash, and sycamore. In the lower 12 miles of the American River Parkway, vegetation is confined to a narrow band between the river the levees and constitutes a significant visual feature. A diverse wildlife community is present along the lower American River, including many bird species, several fish species, small mammals, and deer. The meandering riverbed also contributes to the natural visual character of the lower American River. In general, high-quality views along the lower American River are characterized by

abundant, dense riparian vegetation, a natural riverbank appearance, and minimal visibility of urban infrastructure. Low-quality views in some locations result from damaged riparian vegetation, garbage and structural debris, riprap and channelized appearance of some reaches, and/or some highly visible urban infrastructure. Because it is heavily used, the parkway is a visually sensitive resource; any degradation of the visual quality of the area would affect many parkway users.

The area near the confluence of the American and Sacramento rivers is a predominantly urbanized and industrial area of the city. This area is dominated by highway commercial, industrial, and mixed residential uses.

The Sacramento River flows through the core of the urban Sacramento area and separates the city of Sacramento from the city of West Sacramento. In many areas, the levees and maintenance roads provide recreational opportunities for local residents. As the Sacramento River flows toward the Delta, more rural and agricultural elements become part of the overall system, offering a greater variety of visual experiences, including terraces and benches, backwater areas, and riparian vegetation. The natural environment is a refreshing contrast to the urban development of the surrounding Sacramento area. Highway 160 in the south Sacramento area is a state-designated scenic highway from the Contra Costa County line to the southern city limits of Sacramento.

The town of Freeport is a rural community located on the east bank of the Sacramento River on Highway 160. In general, the community consists of the Bartley-Cavanaugh Golf Course, limited commercial development (i.e., bait and tackle shops, restaurant, grocery store), and agricultural residences.

4.14.2.3 SOUTH SACRAMENTO STREAMS GROUP

Much of the SSSG area includes residential neighborhoods and commercial businesses. There are some limited views of agricultural land in the downstream portion of the Morrison Creek area. Concrete conveyances contribute to the urbanized character in the SSSG area. Upper Morrison Creek and upper Unionhouse Creek have a channelized and manmade appearance with some vegetation along the banks in limited areas. The lower basin is less developed than the upper basin and can be characterized as rural; in general, the waterways in this area tend to have a more natural appearance. From I-5 and Highway 160 looking east, motorists have extensive immediate and mid-distance views of the agricultural land and more distant views of residential areas in the lower basin; however, the creeks are not noticeable from either I-5 or Highway 160.

4.14.2.4 NATOMAS AREA

Most of the western portion of the Natomas area is rural, and views of the area are dominated by the Sacramento River and associated levee system, localized drainage courses, and the expansive valley floor. The land is flat and planted in open row or field crops. Primary crops are rice, wheat, beans, tomatoes, and various types of hay. Scattered rural residences and farm buildings are present in the landscape. Garden Highway runs along the top of the Sacramento River east levee through the length of Natomas. Recreationists traveling on the Garden Highway are the main sensitive viewer groups with views of this area.

In the southern portion of Natomas along the Sacramento River up to the I-80 crossing of the river, Garden Highway continues east along the top of the levee. Commercial buildings, restaurants, and some residential housing are located on the water side of the levee. Residential housing is also located on the land side of the levee. From the roadway, intermittent views of the Sacramento River are possible through the trees of the water side of the levee. The right (west) Sacramento River levee obstructs most views of the levee area from rural Yolo County to the west. Therefore, most individuals viewing the levee area from the west are boaters and other recreationists along the Sacramento River. From the Sacramento River channel, views to the east are dominated by the river channel and the existing left (east) Sacramento River levee, which blocks ground-level views of land on the landside of the levee.

Recreationists are generally considered a sensitive viewer group, but because the number of recreationists in this area is low, the sensitivity of views is considered low. Overall, area views are of low to moderate aesthetic value.

4.14.2.5 NORTH SACRAMENTO

The existing visual setting of the North Sacramento area is characteristic of a developing rural-agricultural community. Distant views of agricultural, open space, and undeveloped lands are present to the west, while a more urbanized environment (e.g., residential and commercial land uses) is visible to the east. The generally flat topography of the area accommodates a variety of agricultural lands (e.g., rice and dry grains, pastures, orchards, vineyards, row and truck crops), uncultivated and natural vegetation communities, as well as suburban residential and commercial development. Wooded riparian sites generally occur along the borders of drainage canals and often are associated with narrow strips of emergent wetland vegetation. These areas support a diverse assemblage of wildlife. Significant development, including large-scale offices, dense residential development, and commercial businesses, has occurred and is visible in the adjacent southern Natomas area.

4.14.3 ENVIRONMENTAL IMPACTS

The aesthetic quality of an area is determined through the variety and contrasts of the area's visual features, the character of those features, and the scope and scale of the scene. Both natural and created features in a landscape contribute to its perceived visual quality. Landscape characteristics influencing visual quality include geologic, hydrologic, botanical, wildlife, recreation, and urban features. The aesthetic quality of an area depends on the relationships between its features and their importance in the overall view. Viewer sensitivity is an important consideration and is a function of several factors, including:

- ▶ visibility of the landscape,
- ▶ proximity of viewers to the visual resources,
- ▶ frequency and duration of views,
- ▶ number of viewers,
- ▶ types of individuals and groups of viewers, and
- ▶ viewers' expectations.

The sensitivity of a view of the landscape is also determined by the extent of the public's concern for a particular view. Areas of high visual sensitivity are highly visible to the general public. Scenic highways, tourist routes, and recreation areas are considered more visually sensitive than more urbanized locations. A determination that a potential visual impact is significant would be based on a change in visual character as determined by the obstruction of a public view, creation of an aesthetically offensive public view, or adverse changes to objects in a viewshed having aesthetic significance. A viewer's distance from landscape elements plays an important role in the determination of an area's visual quality. Landscape elements are considered higher or lower in visual importance based on their position relative to the viewer. Generally, the closer a resource is to the viewer, the more dominant, and therefore visually important, it is to the viewer.

4.14.3.1 SIGNIFICANCE CRITERIA

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. The proposed project would result in a significant effect on visual resources if it would:

- ▶ have a substantial adverse effect on a scenic vista;
- ▶ substantially damage scenic resources, including but not limited to trees, rock outcrops, and historic buildings, within a state scenic highway;

- ▶ substantially degrade the existing visual character or quality of the site and its surroundings; or
- ▶ create a new source of substantial light or glare that would adversely affect day or nighttime views in the area.

None of the proposed improvements are expected to introduce new sources of light or glare into viewsheds; therefore, this issue is not discussed further in this EIR.

4.14.3.2 IMPACT ANALYSIS

Operational effects on visual resources related to water levels (i.e., changes in reservoir levels) were previously addressed by SAFCA in *Draft Program Environmental Impact Report on Flood Control Improvements Along the Mainstem of the American River* (SAFCA 2000) and were found to be less than significant. These conclusions remain valid. See Section 4.1.3, “Operational Effects Previously Addressed by SAFCA,” for a summary of these operational effects.

IMPACT 4.14-a Changes in Scenic Vistas and Existing Visual Character of the Folsom Dam and Reservoir Area during Construction. *Construction activity at Folsom Dam and Reservoir could temporarily reduce the aesthetic qualities of the Folsom Dam and Reservoir area by introducing earthmoving equipment and other construction equipment, materials, and work crews into the views. While all changes would be temporary while construction is ongoing and most construction activities would be distant and/or shielded from most viewers, views from Beal's Point and some residential developments would be substantially degraded during the extended construction period. This impact would be significant.*

The urban character and low quality of views in the Folsom Bridge area would not be substantially changed by bridge construction, either toward the bridge or from the bridge. Therefore, Folsom Bridge construction would not have a significant effect on visual resources.

Construction activity associated with Folsom Dam modifications would adversely affect views from Beal’s Point and views of Beal’s Point, which is expected to be used as a borrow area and construction staging area with concrete processing facilities for 5 years. The processing facilities would be present and operational during most months of the year and would be within the middleground views from Beal’s Point Beach and from a few private residential developments that have homes with reservoir views. Specifically, homes with reservoir views on Mooney Ridge would have foreground and middleground views of the potential borrow area and processing facilities. For these homes with reservoir views, visual impacts on foreground views would be significant during the construction period. This impact would be significant.

IMPACT 4.14-b Changes in Scenic Vistas and Existing Visual Character of the Levee and Channel Improvement Areas during Construction. *Project construction activities associated with the individual flood control projects could temporarily reduce the aesthetic qualities of the program study area by introducing earthmoving equipment and other construction equipment, materials, and work crews into the views. However, all changes would be temporary while construction is ongoing, and most construction activities would be distant and/or shielded from most viewers. For these reasons, this impact would be less than significant.*

Construction of the individual improvement projects and levee integrity program activities would occur at various locations throughout the program study area, in a range of settings and at a range of distances from sensitive viewer groups such as residents and recreationists. Typical heavy construction equipment at individual levee and habitat improvement sites may temporarily diminish the quality of views for sensitive viewers. The presence and movement of heavy construction equipment and potential construction-related generation of dust could temporarily degrade the existing visual character and/or quality of the individual improvement project sites. Staging areas necessary for the work effort, including temporary facilities for construction workers, would affect some views of residents, workers, recreationists, and motorists. Views of the individual construction sites from nearby roadways and highways would most likely generally be brief and long distance.

Equipment staging areas may be temporarily lit for security reasons during the construction periods, and portions of construction sites would need to be lit if construction work needs to be conducted at night. To the extent practical, all exterior lighting of construction activities would be located and directed so that it is concealed to the extent practicable when viewed from nearby residences. Views of the construction sites from nearby roadways and highways would generally be brief, and construction would be short-term and temporary.

Portions of the program study area, especially along the region's waterways (e.g., Sacramento and American Rivers), are regarded as significant aesthetic resources in the Sacramento area. It is not known at this phase of project planning the location, duration, timing, and extent of construction activities at each of the individual improvement sites, and it is therefore difficult to estimate the magnitude of changes to and disruption of views of the scenic landscape associated with project construction activities. However, because of the temporary and relatively short-term nature of the levee improvement activities and the levee integrity program activities (individual improvement projects would generally be completed in one construction season), construction-related changes in views would not be considered substantial. Therefore, this potential impact would be less than significant.

IMPACT 4.14-c	Long-Term Changes in Scenic Vistas, Scenic Resources, and Existing Visual Character of the Program Study Area. <i>Individual levee and channel improvements could include levee features and the permanent removal of trees or other elements of viewsheds that may adversely affect the scenic qualities of individual sites in the program study area. These changes could result in substantial adverse effects on scenic vistas, scenic resources, or the visual character or quality of these sites. This potential impact would be significant.</i>

Permanent changes to the Folsom Dam facilities would not substantially alter the character or quality of views of the dam and reservoir area. Beal's Point would be restored following completion of construction and its visual qualities and recreational amenities would be enhanced. The character and low quality of views in the Folsom Bridge area would not be substantially changed by bridge construction. Therefore, the proposed project would have no permanent significant effect on visual resources in the Folsom Dam and Reservoir area.

Most sites of levee and channel improvements included in the proposed project would generally be restored to their pre-construction or comparable conditions in terms of their aesthetic characteristics. Disturbed areas such as staging areas would be restored, and modified or disturbed levee slopes and new or modified berms would be vegetated. Borrow sites in rural or natural settings would be revegetated with native grass mix or with other vegetation selected to enhance habitat characteristics.

Where levees affect scenic resources, because of their height, they are a dominant feature in the viewshed. Where levee raises are needed, the changes in levee height are not likely to be great enough to substantially degrade or otherwise change the character of views in most locations. However, concrete floodwalls would also be installed in some locations where levee crown raises are not possible because of the proximity of residences. A floodwall would rise above the crown of the levee, adding to the unnatural appearance of the levee and degrading views from nearby residences. In addition, rock revetment may be installed as erosion protection on some slopes, resulting in barren-appearing slopes. Views could be substantially altered, and this effect could be significant where such changes are visible to the public, including recreationists and residents. Further, large trees and other vegetative features that add to the quality and character of local views or vistas may require removal to ensure levee integrity. The loss of large trees and other significant vegetative features could represent a substantial adverse change to the views. In addition, scenic resources along Highway 160, a state-designated highway, could be substantially altered by levee integrity program activities.

No substantial permanent changes to visual resources along the American River Parkway would occur with project implementation. Consistent with policies and standards provided in the American River Parkway Plan (described in Section 4.13, "Recreation"), revegetation along the levees in this area would be conducted in a manner that minimizes damage to native plants, riparian vegetation, and wildlife, and maintains a naturalistic appearance. Engineered rock and riprap would not be used as erosion control methods unless slope, current, and

vegetation conditions would provide sufficient vegetative screening. Impacts on the American River Parkway's recreational opportunities, including mitigation, are discussed in Section 4.13, "Recreation."

Because the likelihood exists that the proposed project would have a substantial adverse effect on scenic vistas or substantially degrade the existing visual character or quality of individual sites, this impact would be significant.

4.14.4 MITIGATION MEASURES

No mitigation is required for Impact 4.14-b (visual changes in levee and channel areas during construction). There is no mitigation available to reduce Impact 4.14-a (visual changes in Folsom Dam and Reservoir area during construction) to a less-than-significant level, and this impact would therefore be significant and unavoidable. Mitigation is described to reduce Impact 4.14-c (long-term visual changes); however, impacts on scenic vistas and the visual character of individual improvement sites may remain substantial, and this impact would be significant and unavoidable.

Mitigation Measure 4.14-c for Long-Term Changes in Scenic Vistas, Scenic Resources, and Existing Visual Character of the Program Study Area: Implement Measures to Minimize Degradation of Scenic Resources to the Extent Feasible, Consistent with Levee Integrity Requirements.

The agencies implementing program components and their primary contractors for engineering design and construction shall ensure that the following measures are implemented to avoid and minimize potential impacts to visual resources in the program study area. These measures are intended to blend project features with the surrounding landscape, to the extent feasible.

- ▶ Minimize vegetation removal to the extent possible. Avoid removal of large trees and mature vegetation where possible, consistent with levee integrity requirements.
- ▶ To the extent possible, revegetate levee slopes that have been modified or otherwise disturbed by flood control activities. Revegetation should provide for a natural appearance wherever possible while remaining compatible with the requirements for levee inspection and maintenance.
- ▶ Plant trees and shrubs or allow them to naturally reestablish over time to screen degraded views, consistent with the limitations required to maintain access to flood control facilities for inspection, maintenance, and repair.
- ▶ Screen floodwalls to the extent possible with soil and vegetation.
- ▶ Select native grass mixes that are similar to the existing vegetation communities, while maintaining levee integrity.

Implementing this mitigation measure would help reduce impacts to visual resources in the program study area, but may not reduce impacts to a less-than-significant level. Therefore, this impact would be significant and unavoidable.

4.15 UTILITIES AND SERVICE SYSTEMS

This section addresses the following public utilities and service systems: water and wastewater, drainage, solid waste, electrical and natural gas, telephone and cable, and fire and police protection services. Utilities and public services issues include areas where construction activities related to the project would affect acceptable levels of service.

4.15.1 REGULATORY SETTING

No federal, state, or local plans, policies, regulations, or laws related to utilities and service systems are relevant to this analysis.

4.15.2 ENVIRONMENTAL SETTING

Existing utility infrastructure, including underground natural gas pipelines, underground and overhead electrical distribution lines, aerial and underground telephone lines, and underground cable television lines, could be located near or at the individual flood control project sites. Water supply and drainage facilities and infrastructure at the individual project sites could consist of storm drain outfalls, sanitary sewer lines, water pipelines, water intake structures, drainage laterals and ditches, wells, irrigation lines, and other facilities. These features could be directly or indirectly affected by excavation during construction of individual flood control projects. The primary utility service providers in the program study area are discussed below. Utility providers are identified, as appropriate, for the Folsom Dam and Reservoir area, although there are no public utilities in much of this area.

Water Supply and Drainage

The San Juan Water District and the City of Folsom provide water service for portions of the Folsom Dam and Reservoir area.

The City of Sacramento provides domestic water service within the city limits. Domestic water is provided by combination of surface water and groundwater sources. The City of Sacramento provides stormwater and drainage conveyance facilities through storm drain inlets, drainage pipelines, canals, ditches, pump stations, and detention basins. (City of Sacramento 2006.)

The Sacramento County Water Agency provides municipal and industrial water service within Sacramento County, although much of the Natomas area presently receives only agricultural and irrigation water service supplied by the Natomas Central Mutual Water Company (NMWC), a private purveyor of irrigation water to farmlands. (Sacramento County Local Agency Formation Commission [LAFCo] 2006.) NMWC provides water to more than 33,200 acres of land through pipelines, pumps, and more than 50 miles of canals. The NMWC service area is bordered on the west by the Sacramento River and stretches into Sutter County to the north. (NMWC 2006.)

Drainage systems for the Natomas area are maintained by RD 1000. RD 1000 operates and maintains a drainage system consisting of 30 miles of main drainage canals, approximately 150 miles of drainage ditches, and seven main pumping stations. The drainage system collects stormwater and drainage, and delivers them to the pumping plants for disposal in the Sacramento River. (RD 1000 2006.)

Wastewater

Septic systems are used for wastewater disposal in most of the Folsom Dam and Reservoir area. Some sewer lines are present in select portions of this area. Sacramento Regional County Sanitation District provides regional sewage services in the unincorporated areas of Sacramento County. The City of Sacramento is responsible for

providing and maintaining sewer services in incorporated Sacramento. There are no sewer lines in the Natomas area; residences and businesses rely on septic systems for wastewater disposal.

Solid Waste

The primary landfills in the program study area that could be used for waste disposal during construction of the individual improvement projects are listed in Table 4.15-1. Several additional small facilities exist near program study area but are unlikely to have sufficient capacity to accommodate project needs.

Table 4.15-1 Primary Landfills in the Program Study Area		
Facility (County)	Location	Capacity
Kiefer Landfill (Sacramento County)	12701 Kiefer Boulevard Sloughhouse, CA 95683	Constructed capacity through April 2009; Permitted capacity through 2035
Union Mine Disposal Site (El Dorado County)	5700 Union Mine Road El Dorado, CA 95623	Maximum Permitted Capacity: 195,000 cubic yards
Western Regional Landfill (Placer County)	3195 Athens Road Ap #17-060-02 Lincoln, CA 95648	Maximum Permitted Capacity: 36,350,000 cubic yards Remaining Capacity (as of June 30, 2005): 29,093,819 cubic yards
Notes: There are no landfills in Sutter County Source: Goodrich, pers. comm., 2006; Integrated Waste Management Board 2006		

Electrical and Natural Gas Service

The Sacramento Municipal Utility District (SMUD), Western Area Power Administration (WAPA), and PG&E provide electrical services for portions of the Folsom Dam and Reservoir area. There are no known natural gas facilities in the Folsom Dam and Reservoir area.

SMUD provides electrical service to customers generally within the City of Sacramento, and natural gas is provided by PG&E. PG&E provides electrical and natural gas services in most of Sacramento and Sutter Counties. In Sutter County, natural gas service is provided only to the urbanized areas of Yuba City and Live Oak, and to the community of Nicolaus. (Sutter County 1996.)

Telephone and Cable

Telecommunication service in the program study area is provided by multiple providers, including AT&T, Sprint, Comcast, SBC Communications, and Surewest.

Fire and Police Protection

The City of Folsom Fire Department and the City of Folsom Police Department provide fire and police protection, respectively, for the city of Folsom, including the Folsom Dam and Reservoir area.

The City of Sacramento Fire Department provides fire protection services to the city of Sacramento, and police protection services are provided by the City of Sacramento Police Department. (EIP Associates and Mintier & Associates 2005.)

The Sutter County Fire Department and the Sutter County Sheriff's Department provide fire and police protection, respectively, for Sutter County. The Natomas Fire Protection District provides fire protection for the

Natomas area by contract with the City of Sacramento Fire Department (Sacramento County LAFCo 2006). The unincorporated areas of Sacramento County are under the jurisdiction of the Sacramento County Sheriff's Department (Sacramento County Sheriff 2006).

4.15.3 ENVIRONMENTAL IMPACTS

This evaluation is based on a review of EIRs prepared for other projects in the program study area, local general plans, and consultation with personnel from public works agencies.

4.15.3.1 SIGNIFICANCE CRITERIA

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. The proposed project would result in a significant effect on utilities and service systems if it would:

- ▶ exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board;
- ▶ require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects;
- ▶ exceed water supplies available to service the project from existing entitlements and resources, such that new or expanded entitlements would be needed; or
- ▶ result in a determination by the wastewater treatment provider which serves or may serve the project that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments;
- ▶ generate waste materials that would exceed the permitted capacity of local landfills or fail to comply with federal, state, and local statutes and regulations related to solid waste; or
- ▶ result in substantial adverse physical impact associated with the provision of new or altered governmental facilities in order to maintain acceptable service ratios, response times, or other performance objectives for public services such as fire protection, police protection, schools, or parks.

In addition, the proposed project was determined to have a significant effect on utilities and service systems if it would:

- ▶ physically interfere with a service provider's ability to continue to provide an existing level of service that meets established standards for the program study area.

The proposed project would not involve any substantial changes in land use, except that some flood control facilities would be expanded onto small areas of agricultural land, and some agricultural ditch and canal systems would be realigned. The project therefore would have no direct effect on long-term demand for public services, including fire and police protection, schools, parks, and other public facilities, that would necessitate the construction of new or altered government service facilities. Similarly, the project would not result in demand for increased natural gas facilities, electrical transmission lines, communication systems, water infrastructure, sewer lines, or solid-waste services beyond their current capacity. Temporary water supply for construction would be provided by local wells. Therefore, increased demand for these services and utilities is not addressed further in this EIR. Effects of the project on drainage systems are addressed in Section 4.4, "Hydrology and Hydraulics."

Section 4.10, "Transportation and Circulation," addresses the potential of the proposed project to temporarily affect emergency response times and access during construction. The proposed project would not have an effect

on emergency service performance objectives during construction such that additional services and new facilities would be required.

4.15.3.2 IMPACT ANALYSIS

IMPACT 4.15-a **Potential Damage of Utility Infrastructure and Disruption of Service during Construction.** *Project construction activity could require the relocation of or damage existing utility infrastructure at project sites, including underground and overhead electrical distribution lines, aerial and underground telephone lines, underground natural gas pipelines, and underground cable television lines, and could cause substantial service interruptions. This potential impact would be significant.*

Construction activity at Folsom Dam could necessitate the relocation of utility infrastructure, which could result in potential service disruptions. Existing utility infrastructure, including underground and overhead electrical distribution lines, aerial and underground telephone lines, underground natural gas pipelines, and underground cable television lines could be located at the individual improvement project sites. Other utility infrastructure would include transmission towers and wooden power poles that support the aboveground lines. Water supply and drainage facilities and infrastructure at the individual project sites could consist of storm drain outfalls, sanitary sewer lines, water pipelines, water intake structures, drainage laterals and ditches, wells, irrigation lines, and other facilities.

Utility infrastructure could require significant physical activities to repair, relocate, or replace depending on specific construction activities occurring at each of the individual project sites. For example, trenching for cutoff walls could pass through existing buried infrastructure in the levee embankment, requiring repair, replacement, or relocation of this infrastructure to continue service. If stability berms were installed over existing utility infrastructure, these facilities would require relocation to continue service.

In addition, project construction could require existing utilities to be temporarily taken off-line or could cause accidental damage to both identified and unidentified public utility infrastructure, resulting in temporary disruptions to service.

Because the potential exists for project implementation to interfere with utility infrastructure and affect service providers' ability to continue to provide a level of service that meets established standards for the program study area, this potential impact would be significant.

IMPACT 4.15-b **Increases in Solid Waste Generation.** *Project construction would not generate construction waste materials that would exceed the capacity of local landfills or fail to comply with solid waste statutes and regulations. This impact would be less than significant.*

There would be no long-term generation of solid waste associated with the proposed project. Construction of individual improvement projects would generate excess spoil material, which would be hauled off-site from the project locations to a suitable disposal location in accordance with all applicable laws. The locations of the landfills used for disposal of spoil material and other construction-related waste would be determined by the various construction contractors for the individual flood control projects at the time of construction activity based on capacity, type of waste, and other factors. Only those landfills determined to have the ability to accommodate the construction disposal needs of the individual flood control projects would be used. It can be reasonably assumed that construction activities associated with the individual flood control projects would not exceed the capacity of these landfills. This impact would be less than significant.

4.15.4 MITIGATION MEASURES

No mitigation is required for Impact 4.15-b (solid waste). Mitigation is described below for Impact 4.15-a (utility damage and service disruptions).

Mitigation Measure 4.15-a for Potential Damage of Utility Infrastructure and Disruption of Service during Construction: Verify Utility Locations, Coordinate with Utility Providers, and Prepare a Response Plan and Conduct Worker Training with Respect to Accidental Utility Damage.

The agencies implementing program components and their primary contractors for engineering design and construction shall ensure that the following measures are implemented to avoid and minimize potential damage to utility infrastructure and service disruptions during construction activities.

- a) Obtain utility excavation or encroachment permits as necessary before initiating any work with the potential to affect utility lines, and include all necessary permit terms in construction contract specifications.
- b) Before the start of construction, coordinate with applicable utility providers and other relevant agencies before construction to locate existing utilities. Avoid the relocation of utilities whenever possible. Provide notification of any potential interruptions in services to the appropriate agencies.
- c) Before the start of construction, verify utility locations through field surveys and the use of the Underground Service Alert services. Any buried utility lines shall be clearly marked in the area of construction in advance of any earthmoving activities.
- d) Before the start of construction, prepare a response plan to address potential accidental damage to a utility line. The plan shall identify chain of command rules for notification of authorities and appropriate actions and responsibilities to ensure the safety of the public and workers. Worker education training in response to such situations shall be conducted by the contractor.
- e) Stage utility relocations to minimize interruptions in service.

Implementing this mitigation measure would help ensure that existing utilities are not damaged and it would reduce the potential for utility disruption to a less-than-significant level.

4.16 HAZARDS AND HAZARDOUS MATERIALS

This section addresses potential sources of hazards and risks associated with hazardous materials that may be associated with implementation of the proposed project. The potential contamination of surface water or groundwater by spills of hazardous construction materials is addressed in Section 4.5, “Water Quality.” Potential exposure of construction personnel to naturally occurring asbestos is addressed in Section 4.10, “Air Quality.” Potential risks of project design features to recreational users are addressed in Section 4.13, “Recreation.” Section 4.10, “Transportation and Circulation,” addresses the potential for construction activities and construction-related traffic to result in traffic hazards.

4.16.1 REGULATORY SETTING

4.16.1.1 FEDERAL

Hazardous Materials Handling

At the federal level, the principal agency regulating the generation, transport, and disposal of hazardous substances is the EPA, under the authority of the Resource Conservation and Recovery Act (RCRA). The RCRA established an all-encompassing federal regulatory program for hazardous substances that is administered by EPA. Under the RCRA, EPA regulates the generation, transportation, treatment, storage, and disposal of hazardous substances. The RCRA was amended in 1984 by the Hazardous and Solid Waste Amendments of 1984, which specifically prohibits the use of certain techniques for the disposal of various hazardous substances. The Federal Emergency Planning and Community Right to Know Act of 1986 imposes hazardous materials planning requirements to help protect local communities in the event of accidental release.

Worker Safety Requirements

The U.S. Department of Labor Occupational Safety & Health Administration (OSHA) is responsible at the federal level for ensuring worker safety. OSHA sets federal standards for implementation of workplace training, exposure limits, and safety procedures for the handling of hazardous substances (as well as other hazards). OSHA also establishes criteria by which each state can implement its own health and safety program.

4.16.1.2 STATE

Hazardous Materials Handling

Several state agencies regulate the transportation and use of hazardous materials to minimize potential risks to public health and safety. The California Environmental Protection Agency (Cal-EPA) and the Office of Emergency Services (OES) establish rules governing the use of hazardous substances in California. Within Cal-EPA, the California Department of Toxic Substance Control has primary responsibility, with delegation of enforcement to local jurisdictions, for regulating the generation, transport, and disposal of hazardous substances under the authority of the Hazardous Waste Control Law (HWCL). Regulations implementing the HWCL list hazardous chemicals and common substances that may be hazardous; establish criteria for identifying, packaging, and labeling hazardous substances; prescribe management of hazardous substances; establish permit requirements for hazardous substances treatment, storage, disposal, and transportation; and identify hazardous substances prohibited from landfills.

Worker Safety Requirements

The California Occupational Safety and Health Administration (Cal-OSHA) assumes primary responsibility for developing and enforcing workplace safety regulations within California. Cal-OSHA regulations pertaining to the use of hazardous materials at workplaces, as detailed in CCR Title 8, include requirements for safety training,

availability of safety equipment, accident and illness prevention programs, hazardous substance exposure warnings, and emergency action and fire prevention plan preparation. Cal-OSHA enforces hazard communication program regulations that contain training and information requirements, including procedures for identifying and labeling hazardous substances, communicating hazard information related to hazardous substances and their handling, and preparing health and safety plans to protect workers and employees at hazardous waste sites. The hazard communication program requires that Material Safety Data Sheets be available to employees and that employee information and training programs be documented.

Hazardous Materials Transport

State agencies with primary responsibility for enforcing federal and state regulations and responding to hazardous materials transportation emergencies are the California Highway Patrol (CHP) and the Caltrans. Together, these agencies determine container types used and license hazardous waste haulers for hazardous waste transportation on public roads.

4.16.1.3 LOCAL

The Sacramento County Environmental Management Department (EMD), Hazardous Materials Division is the lead regulatory agency and is responsible for a variety of tasks related to the storage, handling, and management of hazardous materials. The Sacramento County EMD is one of three local agencies that has a 24-hour hazardous materials incident response team and responds to incidents involving chemical releases, as well as any other hazardous materials situations. (Sacramento County 1993.)

The Environmental Health Services Department of Sutter County regulates the use, storage, and disposal of hazardous substances by issuing permits, monitoring regulatory compliance, and other enforcement activities. (Sutter County 1996.)

4.16.2 ENVIRONMENTAL SETTING

4.16.2.1 DEFINITIONS OF TERMS

For purposes of this section, the term “hazardous materials” refers to both hazardous substances and hazardous wastes. A “hazardous material” is defined in the Code of Federal Regulations (CFR) as “a substance or material that...is capable of posing an unreasonable risk to health, safety, and property when transported in commerce” (49 CFR 171.8). California Health and Safety Code Section 25501 defines a hazardous material as follows:

“Hazardous material” means any material that, because of its quantity, concentration, or physical, or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. “Hazardous materials” include, but are not limited to, hazardous substances, hazardous waste, and any material which a handler or the administering agency has a reasonable basis for believing that it would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment.

“Hazardous wastes” are defined in California Health and Safety Code Section 25141(b) as wastes that:

... because of their quantity, concentration, or physical, chemical, or infectious characteristics, [may either] cause, or significantly contribute to an increase in mortality or an increase in serious illness[, or] pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

4.16.2.2 POTENTIAL SOURCES OF HAZARDOUS MATERIALS

The individual improvement sites would be located in urban, suburban, and rural areas, as well as at Folsom Lake State Recreation Area. Potential sources of hazardous materials and waste may exist in the urbanized as well as agricultural portions of the levee areas at the improvement project sites. Hazardous materials uses in the levee areas at the project sites or at potential borrow sites could have resulted in soil contamination. Hazardous materials may be present at project sites in a variety of common contexts, including the following:

- ▶ petroleum hydrocarbons;
- ▶ pesticides, herbicides, and fertilizers;
- ▶ contaminated debris;
- ▶ lead;
- ▶ wastewater;
- ▶ pits, ponds, or lagoons;
- ▶ fill, dirt, depressions, and mounds;
- ▶ underground storage tanks;
- ▶ stormwater runoff structures; and
- ▶ transformers that may contain polychlorinated biphenyls (PCBs).

4.16.2.3 WILDFIRES

In addition to hazardous materials, wildfires also pose a threat to both persons and property in many areas of California. Wildland fires are a particularly dangerous hazard to development located in forest and shrub areas. The severity of wildland fires is influenced by four primary factors: vegetation, climate, slope, and people. The California Department of Forestry and Fire Protection (CDF) has developed a fire hazard severity scale, which considers vegetation, climate, and slope to evaluate the level of wildfire hazard in all lands where CDF has jurisdiction. CDF designates three levels of Fire Hazard Severity Zones (Moderate, High, and Very High) to indicate the severity of fire hazard in a particular geographical area (CDF 2001).

4.16.3 ENVIRONMENTAL IMPACTS

4.16.3.1 SIGNIFICANCE CRITERIA

The criteria for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. The proposed project was determined to result in a significant effect related to hazards if it would:

- ▶ create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials or through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment;
- ▶ emit hazardous emissions or involve the handling of hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school;
- ▶ be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, create a significant hazard to the public or the environment;
- ▶ result in a safety hazard for people residing or working in a project area that is located within 2 miles of a public airport or public use airport, or
- ▶ expose people or structures to a significant risk of loss, injury, or death from wildland fires.

The proposed project would involve the incidental transport and use of common construction materials such as oils, lubricants, and gasoline, and the use of materials specific to levee improvement, such as bentonite used in slurry mixtures for seepage cutoff walls, that could pose a public health or environmental hazard if inadvertently released into the environment, but would not involve routine or long-term transport of such materials. None of the proposed improvements are anticipated to involve the use of acutely hazardous materials, and construction activities are not expected to use materials that could result in hazardous emissions that could be dispersed at dangerous levels beyond the project site.

Although some of the individual improvement projects in the Natomas and South Sacramento Streams Group areas could be located within the Influence Area of Sacramento International Airport and Sacramento Executive Airport, they would not affect airport operations or introduce any safety hazard that may affect people residing or working in the vicinity of either airport.

4.16.3.2 IMPACT ANALYSIS

IMPACT 4.16-a **Spills of Hazardous Materials during Construction.** *Construction of the proposed improvements would involve the storage, use, and transport of hazardous materials during construction activities. Compliance with federal, state, and local hazardous materials regulations would ensure that no significant hazards to the public would result. This impact would be less than significant.*

The proposed project would not entail any unusual risks associated with the transport and handling of hazardous materials. Construction and maintenance activities would use potentially hazardous materials, such as fuels (gasoline and diesel), oils and lubricants, and cleaners (which could include solvents and corrosives in addition to soaps and detergents) that are commonly used in construction projects. Bentonite would be used where slurry cutoff walls are being constructed to remediate levee seepage conditions. Construction contractors would be required to use, store, and transport hazardous materials in compliance with federal, state, and local regulations during project construction. Risks to water quality associated with incidental releases of these materials on project sites are addressed in Section 4.5, “Water Quality.”

Compliance with the applicable regulations would reduce the potential for accidental release of hazardous materials during their transport and during construction of the proposed project. Consequently, the risk of significant hazards associated with the transport, use, and disposal of these materials is low. This impact would be less than significant.

IMPACT 4.16-b **Exposure to Hazardous Materials Encountered at Project Sites.** *Hazardous materials could potentially be present at project sites for proposed improvements. Excavation and construction activities at or near areas of previously unrecorded soil and/or groundwater contamination could result in the exposure of workers, the public, and the environment to hazardous materials. This potential impact would be significant.*

The environmental review for all individual improvement projects would include hazardous materials records searches and Phase I Environmental Site Assessments performed by qualified specialists for any areas that would be disturbed during construction that have not been previously investigated for the presence of hazardous materials, or that were previously determined not to contain hazardous materials but that could have been contaminated subsequent to that determination. The project design phase would include appropriate measures to design the project to prevent disturbance of any known potential hazards or to remediate their presence (i.e., clean up contaminated sites). Despite these measures, however, previously unknown hazardous materials could be present at individual improvement project sites, including potential borrow sites. Excavation and construction activities at or near areas of currently unrecorded soil and/or groundwater contamination could result in the exposure of construction workers, the general public, and the environment to hazardous materials such as petroleum hydrocarbons, pesticides, herbicides, fertilizers, contaminated debris, or elevated levels of other

chemicals that could be hazardous. Because the potential exists for exposure to previously unknown hazardous materials during construction activities, this potential impact would be significant.

IMPACT **Exposure to Wildland Fires.** *Construction activities could result in the ignition and spread of wildland fires.*
4.16-c *This potential impact would be significant.*

The proposed project components would be implemented in various locations with natural settings where physical and weather conditions may combine to lead to a high risk of fire hazard. Construction equipment or construction practices could ignite fires that may expose people or structures to a significant risk of loss, injury, or death under some circumstances. This potential impact would be significant.

4.16.4 MITIGATION MEASURES

Mitigation is not required for Impact 4.16-a (hazardous materials spills). Mitigation is described below for Impact 4.16-b (hazardous materials encountered on project sites) and Impact 4.16-c (wildland fires).

Mitigation Measure 4.16-b for Exposure to Hazardous Materials Encountered at Project Sites: Prepare a Worker Health and Safety Plan, and Implement Appropriate Measures to Minimize Potential Exposure to Hazardous Materials.

The agencies implementing program components and their primary contractors for engineering design and construction shall ensure that the following measures are implemented to minimize the potential for exposure to hazardous materials during construction.

If, during site preparation and construction activities, previous undiscovered or unknown evidence of hazardous materials contamination is observed or suspected through either obvious or implied measures (i.e., stained or odorous soil), construction activities shall immediately cease in the area of the find. A qualified hazardous materials specialist shall assess the project site and collect and analyze soil samples, if needed, from the construction site. If contaminants are identified in the samples, the implementing agency or its primary construction contractor shall implement measures in accordance with federal and state regulations prior to the commencement of construction activities.

A worker health and safety plan shall be prepared before the start of construction activities that identifies, at a minimum, all contaminants that could be encountered during construction activity; all appropriate worker, public health, and environmental protection equipment and procedures to be used during project activities; emergency response procedures; the most direct route to the nearest hospitals; and a Site Safety Officer. The plan shall describe actions to be taken should hazardous materials be encountered on-site, including protocols for handling hazardous materials and preventing their spread and emergency procedures to be taken.

Implementation of this mitigation measure would reduce the impact to a less-than-significant level.

Mitigation Measure 4.16-c for Exposure to Wildland Fires: Prepare and Implement a Fire Management Plan to Minimize Potential for Wildland Fires.

The agencies implementing program components and their primary contractors for engineering design and construction shall ensure that the following measures are implemented to minimize the potential for wildland fires.

For projects that would be implemented in areas where a risk of fire hazard exists (e.g., sites in areas considered by CDF to have a moderate to very high level of severity of fire hazard, sites that contain or are adjacent to areas of dry grass or brush), a fire management plan shall be prepared and implemented in coordination with the appropriate emergency service and/or fire-suppression agencies of the applicable local or state jurisdictions before the beginning of any construction activities. The plan shall describe fire prevention and response methods,

including fire precaution, fire pre-suppression, and suppression measures that are consistent with the policies and standards of the affected jurisdictions. All materials and equipment required for implementation of the plan shall be maintained on-site. All construction personnel shall be made familiar with the contents of the plan before the beginning of any construction activity.

Implementation of this measure would reduce the impact to a less-than-significant level.

5 CUMULATIVE IMPACTS

5.1 APPROACH

5.1.1 CEQA REQUIREMENTS

Section 21083 of the Public Resources Code requires that an EIR discuss impacts of a project when the project's incremental effect is "cumulatively considerable." According to Section 21083, "'cumulatively considerable' means that the incremental effects of an individual project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects" (see also State CEQA Guidelines Section 15130[a][1]–[3]). Sections 15355 and 15130 indicate that cumulative impacts are to be analyzed in the context of "closely related" projects and projects "causing related impacts."

Pursuant to Section 15130(b) of the State CEQA Guidelines,

[t]he discussion of cumulative impacts shall reflect the severity of the impacts and their likelihood of occurrence, but the discussion need not provide as great detail as is provided for the effects attributable to the project alone. The discussion should be guided by standards of practicality and reasonableness, and should focus on the cumulative impact to which the identified other projects contribute rather than the attributes of other projects which do not contribute to the cumulative impact.

If an incremental effect is not considered cumulatively considerable, the EIR must briefly describe the basis for the conclusion that the incremental effect is not cumulatively considerable.

5.1.2 APPROACH TO ANALYSIS

The proposed project would involve the implementation of numerous improvement projects throughout the program study area over many years (see Chapter 3, "Project Description"). As appropriate for a proposed project of this scope and in accordance with State CEQA Guidelines Section 15130(b)(1)(B), this EIR analyzes the proposed project's contributions to cumulative impacts based on a summary of projections contained in relevant planning documents. Summaries of relevant planning documents are provided in Section 5.3.3.

5.2 CUMULATIVE OPERATIONAL EFFECTS THAT WERE ANALYZED PREVIOUSLY

SAFCA analyzed the cumulative operational effects of variable storage space operation in its *Program Environmental Impact Report on Flood Control Improvements Along the Mainstem of the American River* (SAFCA 2000). Potential cumulative impacts in the areas of water supply, hydropower, recreation, riparian vegetation, wetlands and wildlife, fisheries and aquatic habitat, cultural resources, and hydraulics were addressed. The information regarding cumulative conditions was obtained from the Water Forum Proposal Final EIR (City of Sacramento and County of Sacramento 1999). The Water Forum's cumulative impact analysis reflects estimated future water demand and anticipated changes to water project operations, and also assumed that future flood control operations at Folsom Dam would be governed by the interim variable space flood control diagram (allowing for variable flood control storage space between 400 and 670 TAF) (see Section 2.9, "Folsom Dam Reoperation"). Modeling runs were performed for the 2000 EIR analysis to account for the proposed operation, which would allow for variable flood control storage space between 400 and 600 TAF. Resulting reservoir elevations and flows in the lower American River were compared with the current conditions scenario and were used to perform temperature model runs and evaluate effects on fisheries.

No substantial changes in the proposed project, no substantial changes with respect to the circumstances under which the project would be undertaken, and no new information of substantial importance implicate new significant effects on the environment or a substantial increase in the severity of previously identified significant effects with respect to the issue areas addressed in SAFCA (2000). The analysis of hydraulic impacts has been updated for this EIR, however, to reflect additional levee raises and levee strengthening in the modeling of effects of the proposed project. The conclusions for water supply, hydropower, recreation, riparian vegetation, wetlands and wildlife, fisheries and aquatic habitat, and cultural resources remain valid and are relied on in this EIR. The impact analysis and conclusions are summarized below for these topics.

- ▶ **Water supply and hydropower:** The modeling results indicated that water deliveries would be the same under current and cumulative conditions and that incremental impacts of the modified operations on hydropower would be less under the future cumulative scenario than under current conditions. The local hydropower impacts would be mitigated by SAFCA's purchases of power to compensate for power losses. Impacts on water supply and hydropower would not be cumulatively considerable.
- ▶ **Recreation:** Under cumulative conditions, Folsom Reservoir elevations would be lower by an average of 0.4 foot under cumulative conditions, an additional 0.1-foot reduction in water surface elevation from the current condition scenario. However, even with the reduction, the elevation would be above the significance threshold elevation, and cumulative impacts on recreation are therefore considered less than significant.
- ▶ **Riparian habitat, wetlands, and wildlife:** Changes in river flows and stages would be very small, and the changes would be the same under the cumulative condition as under the current condition. Cumulative impacts on vegetation and wildlife would be less than significant under cumulative conditions as they would under the current conditions scenario.
- ▶ **Fisheries and aquatic habitat:** Changes in water surface elevation at Folsom Reservoir would have a negligible effect on reservoir fish habitat. Fish habitat conditions in Lake Natoma and fish production at the Nimbus Hatchery would not be adversely affected by the proposed project under cumulative conditions because water temperatures would be slightly more favorable. Infrequent flow reductions would occur in the lower American River in some months of some years, but are not expected to adversely affect spawning or rearing conditions for steelhead or fall-run Chinook salmon. Temperature conditions in the lower American River would be improved for these species. Effects on these species would not be cumulatively considerable. The analysis of cumulative impacts on splittail shows essentially the same results as identified for the current condition scenario. SAFCA previously adopted measures to increase the extent and quality of the riparian habitat available for splittail spawning under low-flow conditions in the lower American River, thus avoiding any significant impacts on splittail. SAFCA's incremental contribution to cumulative impacts on splittail would not be significant.
- ▶ **Cultural resources:** Cumulative impacts on cultural resources would be less than the impacts reported for the proposed project because the reservoir water surface elevation would fall less frequently within the zone at which cultural resources could be exposed to damage. However, these impacts are being addressed through the mitigation that SAFCA previously adopted (see Appendix B).

5.3 CUMULATIVE IMPACT ANALYSIS

This section is organized as follows:

- ▶ Section 5.3.1 describes the geographic area associated with effects for each resource topic.
- ▶ Section 5.3.2 discusses resource topics for which effects would not be considered cumulatively considerable because

- cumulative effects would be beneficial (hydraulics), or
 - the effect of the proposed project would not be added to the effect of other projects (i.e., no cumulative impact would occur), or the impacts of the proposed project would be too minor or localized to be cumulatively considerable (geology and soils, hydrology, paleontological resources, noise, recreation, utilities and service systems, and hazards and hazardous materials).
- ▶ Section 5.3.3 describes the planning projections that provide the context for the analysis of cumulative impacts for the remaining resource topics.
 - ▶ Section 5.3.4 describes cumulative impacts associated with the remaining resource topics (agriculture, water quality, fisheries and aquatic resources, terrestrial biological resources, cultural resources, transportation and circulation, air quality, and visual resources).

5.3.1 GEOGRAPHIC SCOPE OF EFFECTS OF THE PROPOSED PROJECT

The State CEQA Guidelines state that lead agencies “should define the geographic scope of the area affected by the cumulative effect” (Section 15130[b][3]). The geographic scope of the area affected by the proposed project is as follows for each of the resource topics addressed in this EIR:

- ▶ Agriculture—Natomas area, with regional implications
- ▶ Land use—Not applicable: because the only potential direct and indirect land use impacts of the proposed project relate to possible inconsistency with land use plans and policies, and the proposed project would be consistent with applicable land use plans and policies. Therefore, land use is not addressed further in this cumulative impact analysis
- ▶ Geology and soils—local (individual improvement project sites)
- ▶ Hydrology—local (drainage systems affected by individual improvement projects)
- ▶ Hydraulics—American and Sacramento River systems (including tributaries)
- ▶ Water quality—local (individual improvement project sites), with implications for the American and Sacramento River systems
- ▶ Fisheries and aquatic resources—local (habitat at individual improvement project sites), regional (American and Sacramento River systems)
- ▶ Terrestrial biological resources—local and regional
- ▶ Cultural resources—local and regional
- ▶ Paleontological resources—local (individual improvement project sites)
- ▶ Transportation and circulation—local roadways and regional transportation network
- ▶ Air quality—regional (Northern Sacramento Valley Air Basin [NSVAB])
- ▶ Noise—immediate vicinity of the individual improvement project sites
- ▶ Recreation—local (individual improvement project sites)

- ▶ Visual resources—local (individual improvement project sites)
- ▶ Utilities and service systems—local service areas
- ▶ Hazards and hazardous materials—local (individual improvement project sites)

5.3.2 RESOURCE TOPICS FOR WHICH EFFECTS OF THE PROPOSED PROJECT WOULD NOT BE CUMULATIVELY CONSIDERABLE

5.3.2.1 HYDRAULICS

The hydraulic impact analysis presented in Appendix C and summarized in Section 4.4, “Hydrology and Hydraulics,” is cumulative in nature because it is based on modeling that incorporates the combined effects of all components of the proposed project (Folsom Dam modifications, Folsom Dam and Reservoir reoperation, and levee improvements) and evaluates the effects of all components on systemwide hydraulics under future 100- and 200-year hydrologic conditions. The model results show that the effects of the proposed project would be beneficial. Levee failures would be reduced with implementation of the proposed project, and water surface elevations would be essentially unchanged by the proposed project or would be lower upstream of, downstream of, and within the program study area in all the locations evaluated. The contribution of the proposed project to cumulative hydraulic conditions would be beneficial.

5.3.2.2 POTENTIALLY SIGNIFICANT IMPACTS THAT WOULD NOT BE CUMULATIVELY CONSIDERABLE

For the following resource topics, the proposed project is not expected to make a cumulatively considerable contribution to an impact because it is expected that the effects of the proposed project would not be added to the effects of other projects (i.e., no cumulative impact is expected to occur), or because the contribution of the proposed project to any potential cumulative impact would be very minor:

- ▶ **Geology and soils:** Grading and other earthmoving activities could result in temporary, localized soil erosion and topsoil loss. These effects would be site specific, particularly with implementation of construction best management practices (Mitigation Measure 4.3-a), and any residual effects are not expected to be additive with the effects of any other activities; therefore, no cumulative impact would occur.
- ▶ **Hydrology:** The widening of levees and construction of landside berms in the Natomas area could interfere with drainage systems and alter surface drainage. Project design would incorporate measures to prevent a significant drainage disruption or alteration in runoff patterns (Mitigation Measure 4.5-b), and any effects would be limited to the vicinity of a project site; therefore, there would be no cumulative impact.
- ▶ **Paleontological resources:** Earthmoving activities could damage unknown unique paleontological resources, but potential damage would be limited by implementation of Mitigation Measure 4.9-a, and would be limited to individual resources in discrete locations. Therefore, there would be no cumulative impact.
- ▶ **Noise:** Potential long-term noise effects (near the proposed Folsom Bridge) would be reduced to a less-than-significant level through installation of a sound wall (Mitigation Measure 4.12-c), and are not expected to combine with the effects of other projects (USACE and City of Folsom 2006). Therefore, the proposed project would not make a cumulatively considerable contribution to any impact. Some direct construction noise effects may be significant and unavoidable, but because they would be localized, intermittent, and temporary, these incremental effects would not be cumulatively significant.
- ▶ **Recreation:** Construction of Folsom Dam modifications would cause significant and unavoidable direct and indirect impacts on recreation by temporarily closing some boating facilities and leading to the temporary

overcrowding of others; however, no other projects would contribute similar effects. Therefore, no cumulative impact would occur. Effects of levee repair and strengthening and of erosion control activities would be limited to localized areas within the Sacramento area, which has an abundance of water-dependent and water-enhanced recreation opportunities, and temporary construction effects and minor permanent impacts would be minimized through replacement of parkway land (Mitigation Measure 4.13-b), design modifications (Mitigation Measure 4.13-c), and coordination with the public and recreation agencies (Mitigation Measure 4.13-d), ensuring that any residual effects would not be cumulatively considerable.

- ▶ **Utilities and service systems:** Construction may damage utility infrastructure, resulting in temporary disruptions to service. Consultation with potential service providers and appropriate protection measures (Mitigation Measure 5.16-a) would minimize the possibility that any significant effect would occur. Furthermore, any such incidents would be isolated and would not contribute to a cumulative impact.
- ▶ **Hazards and hazardous materials:** Mitigation would be implemented to minimize the potential for exposure of people or the environment to hazardous materials encountered during construction activity (Mitigation Measure 4.16-a). If hazardous materials are encountered, effects would be localized and would not be expected to be additive with the effects of other actions. Therefore, no cumulative impact would occur.

5.3.3 DEVELOPMENT TRENDS AND PROJECTIONS

The analysis below focuses on the following remaining resource areas: agriculture, water quality, fisheries and aquatic resources, terrestrial biological resources, cultural resources, transportation and circulation, and air quality. These are all resource areas in which effects may make a cumulatively considerable contribution to impacts on a regional scale. While general trends for Sacramento are described in this section, the discussion of land use planning and projected changes in land use focuses on the Natomas area because this is the area of greatest projected urban growth and, therefore, the area with greatest potential for loss conversion of important farmland to non-agricultural uses and loss of special-status species habitat.

5.3.3.1 POPULATION TRENDS IN THE SACRAMENTO AREA

According to the 2000 U.S. Census Bureau, Sacramento County had a resident population of 1,223,499 persons. Population projections for the county are 1,725,710 by 2025, representing a gain of approximately 502,211 new residents by 2025 and an increase of slightly more than 29%. (Sacramento Area Council of Governments [SACOG] 2005.)

Sutter County had a resident population of 78,930 in 2000. By 2025, the population of Sutter County is projected to reach approximately 137,108 persons. This would be approximately 58,178 new residents and an increase of 42%. (SACOG 2005.)

Sacramento and Sutter Counties and the cities within these counties are facing numerous regional growth issues pertaining to air quality degradation, traffic generation, biological habitat loss, loss of farmland, and other environmental changes related to urban development.

5.3.3.2 TRENDS IN AGRICULTURAL LAND CONVERSION

Information on agricultural land conversion in Sacramento and Sutter Counties was obtained from the Farmland Mapping and Monitoring Program (FMMP) of the California Department of Conservation. These data are the most complete available on this topic and encompass the land use conversions attributable to all development projects.

Table 5-1 shows the recent data compiled by the FMMP on land use conversions involving Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance (“Important Farmland”) in Sacramento and Sutter Counties.

Table 5-1		
Land Use Conversions Involving Important Farmland		
Changes in Important Farmland	Sutter County (Acres)	Sacramento County (Acres)
Total Acreage of Important Farmland Inventoried		
1992	308,518	239,536
1994	307,857 – 307,935*	238,983 – 239,064 ¹
1996	306,865 – 306,864*	237,104 – 237,175 ¹
1998	306,144 – 306,167*	236,940 – 236,943 ¹
2000	301,291	234,120
2002	295,696	226,476
2004	293,429	NA ²
Total Losses and Gains of Important Farmland		
1992–1994	-1,293 + 632 = 661 net loss	-1,986 + 1,433 = 553 net loss
1994–1996	-1,341 + 271 = 1,070 net loss	- 4,535 + 2,575 = 1,960 net loss
1996–1998	-1,579 + 859 = 720 net loss	- 16,773 + 16,538 = 235 net loss
1998–2000	-7,491 + 2,615 = 4,876 net loss	- 15,163 + 12,340 = 2,823 net loss
2000–2002	-6,905 + 1,425 = 5,480 net loss	-9,338 + 7,883 = 1,455 net loss
2002–2004	-2,945 + 703 = 2,242 net loss	NA ²
Amount of Important Farmland Converted to Urban and Built-Up Land		
1992–1994	338	772
1994–1996	166	1,478
1996–1998	54	1,766
1998–2000	547	3,473
2000–2002	649	1,335
2002–2004	388	NA ²
¹ Total number of acres inventoried for these years differs between Farmland Mapping and Monitoring Program reports because of changes in mapping methods. ² The Sacramento County Important Farmland Mapping for 2002-2004 for Sacramento County is currently in progress. Sources: California Department of Conservation 1996a, 1996b, 1998a, 1998b, 2000, 2002a, 2002b, 2004a, 2004b, 2006		

As indicated by a comparison between the net totals for acreage changes and the total changes in acreage attributable to conversion to urban and built-up land, most of the reported conversions of Important Farmland are to FMMP land use categories other than “urban and built-up land.” These other areas include “grazing land” and “other land.” The majority of the acreage converted to “grazing land” was agricultural land being fallowed. “Other land” may include uses such as feedlots and other rural uses, low-density rural residential, government lands, and road systems. Gains in Important Farmland in this region are often the result of “grazing land” and “other land” being converted to vineyard use.

5.3.3.3 LAND USE PLANS

Most of the undeveloped lands in the program study area, where future development would occur, are in the Natomas area. These lands have been identified in the City and County of Sacramento and Sutter County general plans and additional planning policy documents described below as the areas most suitable for urban growth.

North Natomas Community Plan

The approximately 9,038-acre North Natomas Community Plan (NNCP) area is designated in the City of Sacramento’s general plan as the city’s major growth area for new housing and employment opportunities (City of Sacramento 1996). The NNCP area is bounded by Elkhorn Boulevard to the north, Interstate 80 to the south, the Natomas East Main Drainage Canal to the east, and the Natomas West Drainage Canal and SR 99 to the west.

Within this area, the City of Sacramento envisions the development of urban land uses consisting of residential, employment, commercial, and civic land uses that would be interdependent on local transit service and transit routes, including light rail. In 2000, the estimated population of the North Natomas area of Sacramento County was 1,082 people occupying 416 housing units (SACOG 2002). At buildout (year 2016), the NNCP estimates a population of 66,495 in the NNCP area occupying approximately 9,038 acres (City of Sacramento 1996). As of September 14, 2005, the City of Sacramento had approved 12,162 lots for development of residential, commercial, and industrial land uses; 10,801 building permits; 11,599 single-family residential special permits; and 6,003 multifamily residential special permits for this area (City of Sacramento 2005). SACOG estimates there were 14,865 persons living in the NNCP area and 5,368 housing units in the area in 2005, and projects that 45,040 persons will occupy 17,230 housing units in the NNCP area in 2025 (SACOG 2005).

The environmental consequences of buildout of the NNCP were addressed in the 1986 NNCP EIR (certified by the Sacramento City Council in May 1986) as well as the 1993 Supplement to the 1986 NNCP EIR. Development within the NNCP started in 1999. There are several development projects that have been approved in the North Natomas community. Some of these projects are fully built-out and occupied, while others are still in development phases. These projects include the Westborough project, Cambay West, Natomas Crossing, Natomas Town Center, Panhandle, and Natomas Creek. The development projects in the North Natomas community that have been approved but are yet to be fully built out have been identified and anticipated by the NNCP and the associated environmental review documents. The 1993 NNCP Supplement found that despite incorporation of feasible mitigation into the NNCP, NNCP buildout would result in significant and unavoidable impacts related to agriculture; traffic; air quality; species habitat, including Swainson's hawk foraging habitat; noise; drainage, groundwater, and water quality; and flooding potential (City of Sacramento 1994).

Natomas Joint Vision Plan

The City/County North Natomas Joint Vision Plan (Joint Vision) is a long-term agreement between the City and County of Sacramento to collaboratively manage growth and preservation of open space and habitat in the 10,000-acre portion of unincorporated Natomas in Sacramento County. The area is north of the City of Sacramento and generally bounded by Sutter County on the north, the Sacramento River on the west, and the Natomas East Main Drainage Canal (NEMDC) on the east. Approximately 28% of this area is developed, with Sacramento County designating most of the remaining area as agricultural cropland. (City of Sacramento 2005.)

The Joint Vision anticipates that a substantial portion of the Natomas area will become urbanized. Both jurisdictions determined that it would be mutually beneficial to cooperatively plan for the urbanization of the area in accordance with the SACOG Blueprint Smart Growth principles (discussed below), and agreed to work to protect the Sacramento International Airport. (City of Sacramento 2006.)

The land use plan has not been developed, but general concepts have been considered. In general, the preferred land use scenario for the Joint Vision area consists of a mixture of residential densities, an industrial park adjacent to the eastern edge of the Sacramento International Airport, and open spaces in the northern extent separating development from the Sutter County boundary. The 577-acre Greenbriar project site is within the Joint Vision area. This proposed project, currently under environmental review by the City of Sacramento, would include the development of almost 3,500 residential units and more than 27 acres of commercial land uses on currently undeveloped, agricultural land that has been historically rotated between rice, alfalfa, wheat, and row crops.

Sacramento Area Council of Governments Sacramento Region Blueprint

Regional infrastructure planning reflects these growth plans. In December 2004, SACOG, representing the Counties of El Dorado, Placer, Sacramento, Sutter, Yolo, and Yuba and their 22 constituent cities, adopted the "Preferred Blueprint Scenario" to guide land use and transportation choices over the next 50 years based on the assumption that the region's population will grow from its current population of 2 million to include more than 3.8 million people. The Blueprint project was initiated in 2002 to study future land use patterns and their potential

effects on the region's transportation system, air quality, housing, open space, and other resources. Through a series of Blueprint workshops, an alternative to current growth patterns was developed that integrates smart growth concepts such as higher-density, mixed-use developments and reinvestment in existing developed areas. The Preferred Blueprint Scenario assumes certain levels and locations of both "reinvestment" (i.e., additional development on already-built parcels) and greenfield development (i.e., large-scale development on vacant land), including extensive development in the Natomas area. The Preferred Blueprint Scenario will become part of SACOG's long-range transportation plan for the six-county region. It also will serve as a framework to guide local government in growth and transportation planning through 2050. The Blueprint is discussed in more detail in Section 6.1.2, "Growth-Inducing Effects of the Proposed Project." (SACOG and Valley Vision 2005.)

South Sutter County Specific Plan and Sutter County Measure M

In 1996, the Sutter County Board of Supervisors identified a 10,500-acre South Sutter County Industrial/Commercial Reserve in the Sutter County General Plan. This general plan designation, known as SSCI/C Reserve, is located in south Sutter County, adjacent to the Sacramento County boundary. In 2000, the Sutter County Board of Supervisors further identified, within the SSCI/C Reserve designation, a 3,500-acre area for development of a specific plan. Because of the close proximity to major transportation corridors, metropolitan areas and the Sacramento International Airport, the Board of Supervisors determined that large-scale industrial and commercial development is appropriate for this area of the county. Sutter County began development of the 3,500-acre specific plan area in 2004.

Sutter County voters in 2004 passed Measure M, an advisory measure intended to provide the Sutter County Board of Supervisors with an indication of public sentiment regarding the types and level of development in the 7,500-acre area of the South Sutter County Industrial/Commercial Reserve in the northern part of Natomas. The southern boundary of the Measure M area forms the Sutter/Sacramento county line. The vote did not approve any specific development proposals, but did provide guidance on how development may be viewed in the future. Measure M parameters for the South Sutter area are:

- ▶ at least 3,600 acres for commercial/industrial development;
- ▶ at least 1,000 acres for schools, parks, other public uses, and retail; and
- ▶ no more than 2,900 acres for residential development, with a population cap of 39,000.

In July 2006, the Sutter Pointe Specific Plan application was submitted for review by Sutter County. The Sutter Pointe project area would consist of 7,500 acres of the 10,500-acre Sutter County SSCI/C as designated in the 1996 General Plan. The specific plan application is under review by Sutter County. (Sutter County Planning Services 2006.)

Natomas Basin Habitat Conservation Plan

The NBHCP (City of Sacramento, Sutter County, and The Natomas Basin Conservancy 2003) was developed to promote biological conservation in conjunction with expected economic and urban development in the Natomas area. The NBHCP establishes a multi-species conservation program to minimize and mitigate the expected loss of habitat values and incidental take of "covered species" that could result from urban development and operation and maintenance of irrigation and drainage systems in the Natomas area. The NBHCP currently authorizes take associated with 17,500 acres of urban development in southern Sutter County and within the City and County of Sacramento. USFWS approved the NBHCP in 2003.

The NBHCP's reserve acquisition and management activities are implemented by TNBC, a private, nonprofit organization that began operating in 1998 and whose mission is to serve as "plan operator" of the NBHCP. TNBC receives mitigation fees paid by developers and other NBHCP participants. These funds are used to acquire, establish, enhance, monitor, and manage mitigation lands in perpetuity. As development within the Natomas area

occurs, and as TNBC acquires mitigation lands, site-specific management plans are prepared, adopted, and implemented by TNBC to ensure that the objectives of the NBHCP are fulfilled. As of January 2006, nearly 4,000 acres of mitigation property had been acquired in the Natomas area (TNBC 2006). The giant garter snake and Swainson's hawk are the NBHCP's primary focus; however, habitat improvements in the Natomas area are expected to benefit other listed species, such as burrowing owls, tricolored blackbirds, white-faced ibis, greater sandhill cranes, vernal pool fairy shrimp, and valley elderberry longhorn beetle.

5.3.4 ANALYSIS OF CUMULATIVE IMPACTS

5.3.4.1 AGRICULTURE AND LAND USE

Implementation of SAFCA's proposed project, particularly levee improvements in the Natomas area that would involve widening levee and berm footprints and would lead to the need to realign ditches and canals, would convert Prime Farmland and Farmland of Statewide Importance to non-agricultural uses. Although, to the extent feasible, SAFCA would incorporate the measures described in Mitigation Measure 4.2-b into the project design to retain agricultural uses on lands acquired for flood control purposes, approximately 500 acres may be converted to non-agricultural uses as a result of implementation of the proposed project.

The Natomas area has already experienced the conversion of a substantial area of agricultural land, much of it Prime Farmland and other categories of Important Farmland, to residential and commercial development. As noted in the descriptions of land use planning documents in Section 5.3.3, the Natomas area is the focus of much of the growth planning in the Sacramento area, in both Sacramento County and Sutter County, and significant losses of Important Farmland to urban development are expected to continue in this area. These losses would continue an overall trend of net loss of Important Farmland that has been documented in Sacramento and Sutter Counties for each consecutive 2-year interval of mapping by the Department of Conservation from 1992–2004 (see Table 5-1).

In combination with the conversions of Important Farmland associated with past, current, and future projects, particularly in the Natomas area, the contribution of SAFCA's proposed project would be cumulatively considerable. Implementation of Mitigation Measure 4.2-b would reduce the proposed project's contributions to this cumulative impact, but not to a less-than-significant level. Therefore, the contribution of the proposed project to cumulative conversion of Important Farmland to non-agricultural uses would be **significant and unavoidable**.

5.3.4.2 FISHERIES AND AQUATIC RESOURCES

Individual improvement projects in SAFCA's proposed program have the potential to temporarily degrade fish habitat during construction activity through the direct release of soil and construction materials into water bodies or the indirect release of contaminants into water bodies through runoff. The implementation of best management practices and adherence to the conditions of a stormwater pollution prevention plan (Mitigation measure 4.5-b) would ensure that the requirements of the Clean Water Act and Porter-Cologne Water Quality Control Act are met, and would minimize the potential for such effects. Other projects, including the extensive array of development projects anticipated in the Natomas area, would have a similar potential to release materials into water courses that support fish. It is assumed that these other projects would be required to implement similar measures to prevent impacts. Given the temporary nature of any impacts and the protections afforded by regulatory programs under the Clean Water Act and Porter-Cologne Water Quality Control Act, any degradation of surface waters by construction activities of the proposed program and other projects would be minimized. Consequently, the effects of project construction on fish habitat are not expected to constitute a cumulatively considerable contribution to an impact on fish habitat or aquatic species.

SAFCA's proposed program would include implementing waterside levee improvements (e.g., implementing erosion protection treatments) that could result in the loss of overhead cover and instream woody material. These components of SRA habitat are important to listed salmonids and other fish species. Losses of overhead cover and

instream woody material over time are considered to be an important contributing factor in the habitat decline of native fish species. Several CALFED Ecosystem Restoration programs are aimed at reversing historical degradation of SRA habitat and improving the integrity of riverine and riparian ecosystems to support the recovery of special-status fish populations in the Sacramento River. These include Sacramento River Floodplain Acquisition and Riparian Restoration (three projects); Floodplain Acquisition, Management, and Monitoring on the Sacramento River; and Riparian Habitat Restoration on the Sacramento River—Verona to Collinsville, projects that are all aimed at improving fisheries, riparian habitat, and stream channel and floodplain functions in recognition of historical habitat and species declines and continuing threats to channel habitat from factors such as floodplain development and bank modifications for flood control.

Implementation of Mitigation Measure 4.5-c would ensure that restoration, rehabilitation, and/or replacement of any affected channel habitat such that the proposed project would result in no net loss of SRA habitat. Implementing this mitigation would ensure that effects of the proposed project on aquatic habitat would not be cumulatively considerable.

The project's contributions to cumulative impacts on fisheries and aquatic habitat would be **less than significant**.

5.3.4.3 TERRESTRIAL BIOLOGICAL RESOURCES

Implementation of SAFCA's proposed program has the potential to contribute to the loss or degradation of sensitive habitats and to adversely affect special-status species (special-status plants, Swainson's hawks, burrowing owls, other nesting raptors, giant garter snakes, valley elderberry longhorn beetle host plants, and others). Most potential effects of the proposed project related to wildlife would be associated with construction disturbances of wildlife and their habitats, but permanent loss of habitat would also result from some of the individual improvements. These effects could contribute to species declines and losses of habitat that have led to the need to protect these species under the ESA and the CESA. Similar potential for adverse effects on special-status species and their habitats will be associated with the substantial urban growth expected in the Sacramento area, particularly in the Natomas area, which will continue to reduce suitable habitat and nest sites.

Implementation of the mitigation measures in Section 4.7, "Terrestrial Biological Resources," would ensure that the effects of the proposed program are reduced or avoided in accordance with the requirements of the ESA and CESA and other regulatory programs that protect habitats, such as Section 1602 of the California Fish and Game Code. In addition, Mitigation Measure 4.2-b requires that, to the extent feasible, joint mitigation is pursued to use lands acquired for flood control purposes as mitigation land for NBHCP programs, ensuring not only that agricultural land conversion is minimized but that flood control land is made available as habitat to the extent feasible. Furthermore, SAFCA's acquisition of easements on rural floodplain lands upstream of the program study area as part of the proposed project would ensure that these lands remain in agricultural use and do not become developed. This action would also ensure the retention of their value as habitat for a variety of species, when the Natomas area is undergoing urbanization. Mitigation Measure 4.2-b also reinforces this commitment to preserving open space outside of Natomas in nearby floodplains by requiring the acquisition of rural floodplain easements as compensation for the conversion of agricultural land to flood control uses in Natomas.

Finally, as stated in Mitigation Measure 4.7-e, SAFCA will likely need to create replacement habitat for giant garter snake where existing ditches and canals in the Natomas area would need to be filled to accommodate levee improvements. This action could be used as an opportunity to create improved habitat within the new ditches and canals or enhance habitat in additional ways such as providing travel corridors, enhancing the connectivity between TNBC reserves in the northern and southern portions of Natomas, and/or facilitating the creation of additional marsh habitat and associated uplands.

Because SAFCA would implement avoidance and compensation measures in accordance with the requirements of the ESA, CESA, and Section 1602 and would include additional habitat protection and enhancement components

in its proposed project, the project's contributions to impacts on terrestrial species would not be cumulatively considerable. This cumulative impact would be **less than significant**.

5.3.4.4 CULTURAL RESOURCES

Prehistoric human habitation sites are common in riverbank and floodplain areas, and burial sites are often encountered in the course of ground-disturbing activities. It is likely that known or unknown archaeological resources could be disturbed and cultural resources damaged or destroyed during construction activities for the proposed project. Significant and unavoidable losses of a unique archaeological resource as defined in Public Resources Code Section 21083.2 could occur where excavations encounter archaeological deposits that cannot be removed or recovered (e.g., under levees). Historic resources could also be damaged or require removal from areas near flood control facilities under levee integrity program activities. If these resources would meet the definition of historical resources as defined in Public Resources Code Section 21084.1, their modification or destruction would be considered significant. Although mitigation would be implemented to reduce effects on potentially significant cultural resources, significant impacts, particularly on archaeological resources, may still occur. Losses of archaeological resources would add to a historical trend in the loss of these resources as artifacts of cultural significance and as objects of research importance. For these reasons, the proposed project has the potential to make a cumulatively considerable impact on cultural resources. The contribution of the proposed project to cumulative impacts on cultural resources would be **significant and unavoidable**.

5.3.4.5 TRANSPORTATION AND CIRCULATION

Effects of construction activities on emergency access would be site specific, intermittent, and temporary, and are not expected to be cumulatively considerable.

Construction activities related to levee and channel improvement projects would temporarily increase traffic levels on local and regional roadways, sometimes substantially. Mitigation would be implemented to reduce effects to the extent feasible, but the proposed project may still result in substantial temporary increases in traffic in relation to the existing traffic load and capacity of the street system. The proposed project's significant temporary effects on traffic circulation could compound impacts of increased regional short-term (construction-related) and long-term traffic increases associated with new development. However, because of the short-term, intermittent nature of traffic impacts that would be associated with the proposed improvement projects at levee and channel sites, these impacts likely would not be cumulatively considerable. The cumulative impact would be **less than significant**.

In the Folsom Dam and Reservoir area, construction traffic would interfere with local traffic patterns for several years while the Folsom Dam modifications and Folsom Bridge are being constructed. In combination with other incremental short-term and long-term regional traffic increases, these temporary but long-term disruptions of construction activity could be cumulatively considerable. Mitigation would be implemented to the extent feasible, as described in Section 4.10, "Transportation and Circulation," but significant impacts are likely to remain. Therefore, the contribution of the proposed project to transportation and circulation impacts during construction in the Folsom Dam and Reservoir area would be **significant and unavoidable**.

The Folsom Bridge project, combined with other area transportation projects, is anticipated to accommodate projected traffic volumes over the long term and contribute to the regional transportation system continuity. However, over the short term, there would be insufficient roadway/bridge lanes to accommodate traffic movement in the rapidly growing Folsom area. The proposed project's contribution to operational impacts would be cumulatively considerable, and this cumulative impact would be **significant and unavoidable**.

5.3.4.6 AIR QUALITY

The regional context for air quality emissions is the SVAB. Past development in the Sacramento Valley Air Basin, combined with meteorological conditions, has resulted in significant cumulative impacts on air quality. The SVAB is in non-attainment status for ozone and small particulate matter (less than 10 microns in diameter, or PM₁₀). The SMAQMD has established a significance threshold of 85 lbs/day for NO_x, an ozone precursor, during construction. For PM₁₀, SMAQMD defines a substantial contribution as any project that would add a concentration of 2.5 micrograms (µg) per cubic meter. Modeling by the SMAQMD has shown that projects that generally disturb more than 15 acres in any one day, even when fully mitigated by the use of dust control, could add 2.5 µg per cubic meter of PM₁₀ to sensitive receptors near a project site. (SMAQMD 2006.)

The proposed project would result in significant and unavoidable construction-related air quality impacts associated with generation of NO_x and PM₁₀, even with implementation of mitigation measures identified in Section 4.11, "Air Quality." Other medium-sized and large projects, such as the anticipated developments in the Natomas area, would similarly contribute substantially to air quality impacts. Given the large scale of development that is expected in Natomas alone, as well as the nonattainment status of the SVAB for ozone and PM₁₀, cumulative construction-related air quality impacts are expected to be significant and unavoidable. The proposed project would make a cumulatively considerable contribution to this **significant and unavoidable** cumulative air quality impact.

Potential exposure to naturally occurring asbestos that may be released during construction activity for the Folsom Dam modifications would be site specific and also would be minimized through implementation of Mitigation Measure 4.11-d. The potential contribution of the proposed project to an asbestos impact would not be cumulatively considerable. This impact would be **less than significant**.

While there is a potential for exposure of sensitive receptors, particularly residents living near construction areas, to intermittent and temporary toxic air emissions, implementation of Mitigation Measure 4.11-c would ensure that exposure would be minimized. The contribution of the proposed project to toxic air emission impacts is not expected to be cumulatively considerable. This impact would be **less than significant**.

The project-level evaluation of the Folsom Bridge project (USACE and City of Folsom 2006) concluded that operational emissions associated with changes in regional vehicle travel would be below significance thresholds and would not be cumulatively considerable. Cumulative operational emissions would be **less than significant**.

5.3.4.7 VISUAL RESOURCES

Levee improvements in the Natomas area would include the removal of trees, other vegetation, and possibly agricultural structures where the levee toe needs to be widened or a berm would be constructed. Bank protection and long-term levee integrity program actions in this area could also require the removal of vegetation and other features that currently add to the rural and riverine character of views in the area. These changes would contribute to the substantial degradation of scenic resources in Natomas that are expected to result as the area's visual character changes from rural agricultural landscape to urban/suburban setting. The proposed project's contributions to changes to the visual character and scenic resources of Natomas may be cumulatively considerable. Implementing Mitigation Measure 4.14-c would reduce the contributions of the proposed project but may not reduce effects to a less-than-significant level. Therefore, this impact would be **significant and unavoidable**.

6 OTHER CEQA-REQUIRED SECTIONS

This chapter includes the following requirements of CEQA that are not addressed elsewhere in this EIR: growth-inducing effects of the proposed project, significant and unavoidable environmental impacts, and significant irreversible environmental impacts.

6.1 GROWTH-INDUCING EFFECTS

6.1.1 CEQA REQUIREMENTS

CEQA requires that an EIR evaluate the growth-inducing impacts of a proposed project (Section 21100[b][5]). Growth-inducing impacts are described in pertinent part in Section 15126.2(d) of the State CEQA Guidelines as follows:

[T]he ways in which a proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth.... Increases in the population may tax existing community service facilities, requiring construction of new facilities that could cause significant environmental effects.... [In addition,] the characteristics of some projects...may encourage and facilitate other activities that could significantly affect the environment, either individually or cumulatively. It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment.

Direct growth inducement would result if a project, for example, involved the construction of new housing. Indirect growth inducement would result if a project established substantial new permanent employment opportunities that created a demand for additional housing and services, or removed an obstacle to housing development.

Growth inducement itself is not an environmental effect, but it may lead to environmental effects. For example, if substantial growth inducement occurs, it may result in secondary environmental effects, such as increased demand on community and public services and infrastructure, increased traffic and noise, degradation of air or water quality, degradation or loss of plant or animal habitats, or conversion of agricultural and open-space land to urban uses. However, if the induced growth is consistent with or provided for by the adopted land use plans and growth management plans and policies for the area affected (e.g., city and county general plans, specific plans, transportation management plans), those plans may ensure that these impacts are either less than significant or mitigated to a less-than-significant level. Local land use plans provide for land use development patterns and growth policies that encourage orderly urban development supported by adequate urban public services such as water supply, roadway infrastructure, sewer services, and solid waste services. A project that would induce “disorderly” growth (i.e., growth that would conflict with the local land use plans) could indirectly cause additional adverse environmental impacts and other public service impacts.

6.1.2 GROWTH-INDUCING EFFECTS OF THE PROPOSED PROJECT

It is important to note that SAFCA is not charged with the responsibility of weighing and balancing the benefits and burdens of growth in the program study area because SAFCA has no authority either to permit development in the program study area or to impose conditions on the development that is permitted. SAFCA represents the land use agencies that have such authority; however, this representation extends only to regional flood control matters, because SAFCA, as a joint powers agency, is limited to exercising powers common to all of its constituent members, including RD 1000 and American River Flood Control District, neither of which has any land use planning authority.

Within the program study area, development and growth are controlled by the local governments of the Cities of Sacramento and Folsom and the Counties of Sacramento, Sutter, El Dorado, and Placer. Each of these agencies has adopted a general plan consistent with state law. The general plan provides an overall framework for growth and development within the jurisdiction of each agency. Growth and development are also directly affected by local, regional, and national economic conditions.

The proposed project would reduce flood risk in the Sacramento metropolitan area (Sacramento) in Sacramento and Sutter Counties through the implementation of various levee and dam improvements and improved Folsom Dam operations. The specific objectives of the proposed project are to (1) complete the projects necessary to provide 100-year flood protection for developed areas in Sacramento's major floodplains as quickly as possible, (2) provide urban-standard ("200-year") flood protection for developed areas in Sacramento's major floodplains over time, and (3) ensure that new development in the undeveloped areas of Sacramento's major floodplains does not substantially increase the expected damage of an uncontrolled flood.

Because the proposed project would not involve the construction of housing, it would not be directly growth inducing. Construction activities associated with the proposed project would generate short-term employment, but it is anticipated that the construction jobs would be filled using the existing local employment pool and the proposed project would not directly result in a population increase.

In general, the proposed project would accommodate growth currently planned for undeveloped lands in the program study area, most of which are in the Natomas area, that would achieve "200-year," urban-standard flood protection as a result of implementation of the proposed project. These lands have been identified in the City and County of Sacramento general plans and additional planning policy documents described below as the areas most suitable for urban growth. The approximately 9,038-acre North Natomas Community Plan (NNCP) area is designated in the City of Sacramento's general plan as the city's major growth area for new housing and employment opportunities (City of Sacramento 1996). In 2000, the estimated population of the North Natomas area of Sacramento County was 1,082 people occupying 416 housing units (SACOG 2002). At buildout (year 2016), the NNCP estimates a population of 66,495 in the NNCP area occupying approximately 9,038 acres (City of Sacramento 1996). As of September 14, 2005, the City of Sacramento had approved 12,162 lots for development of residential, commercial, and industrial land uses; 10,801 building permits; 11,599 single-family residential special permits; and 6,003 multifamily residential special permits for this area (City of Sacramento 2005). SACOG estimates there were 14,865 persons living in the NNCP area and 5,368 housing units in the area in 2005, and projects that 45,040 persons will occupy 17,230 housing units in the NCCP area in 2025 (SACOG 2005).

The environmental consequences of buildout of the NNCP were addressed in the 1986 NNCP EIR (certified by the Sacramento City Council in May 1986) as well as the 1993 Supplement to the 1986 NNCP EIR. Development within the NNCP started in 1999. The more than 9,000 acres of the NNCP area were historically used for agriculture. While other long-term consequences of NNCP buildout would be mitigated by measures incorporated into the individual NCCP area projects, including measures to ensure consistency of development with the Natomas Basin Habitat Conservation Plan, loss of important farmland will remain a significant and unavoidable environmental impact of this growth. In addition, the 1986 NNCP EIR and the 1993 NNCP EIR Supplement found that the development of the NNCP area would itself have growth-inducing effects on the adjacent areas surrounding the NNCP area, likely leading to the conversion of additional agricultural land to urban uses (City of Sacramento 1993). There is existing, substantial pressure to develop the northern portion of Natomas. Recent proposals have included developing the area and using revenues from development to help fund a new sports arena. This proposal did not result in formal application to the City or County of Sacramento but suggests that interest in the area is high.

Another indicator of anticipated future growth of the Natomas area is the City/County North Natomas Joint Vision Plan (Joint Vision). The Joint Vision is a long-term agreement between the City and County of Sacramento to collaboratively manage growth and preservation of open space and habitat in the 10,000-acre

portion of unincorporated Natomas in Sacramento County. The Joint Vision anticipates that a substantial portion of the Natomas area will become urbanized. Both jurisdictions determined that it would be mutually beneficial to cooperatively plan for the urbanization of the area in accordance with smart growth principles. Concepts for development include a mixture of residential densities, an industrial park, and open spaces throughout, particularly in the northern part of Natomas in order to separate development from the Sutter County boundary. To date, no land use plans have been adopted.

Finally, in addition to the NNCP and the Joint Vision, Sutter County voters in 2004 passed Measure M, an advisory measure intended to provide the Sutter County Board of Supervisors with an indication of public sentiment regarding the types and level of development in the 7,500-acre area of the South Sutter County Industrial/Commercial Reserve in the northern part of Natomas. The southern boundary of the Measure M area forms the Sutter/Sacramento county line. Measure M did not approve any specific development proposals, but provides guidance for future development in the form of the following parameters for the South Sutter area:

- ▶ at least 3,600 acres for commercial/industrial development;
- ▶ at least 1,000 acres for schools, parks, other public uses, and retail; and
- ▶ no more than 2,900 acres for residential development, with a population cap of 39,000.

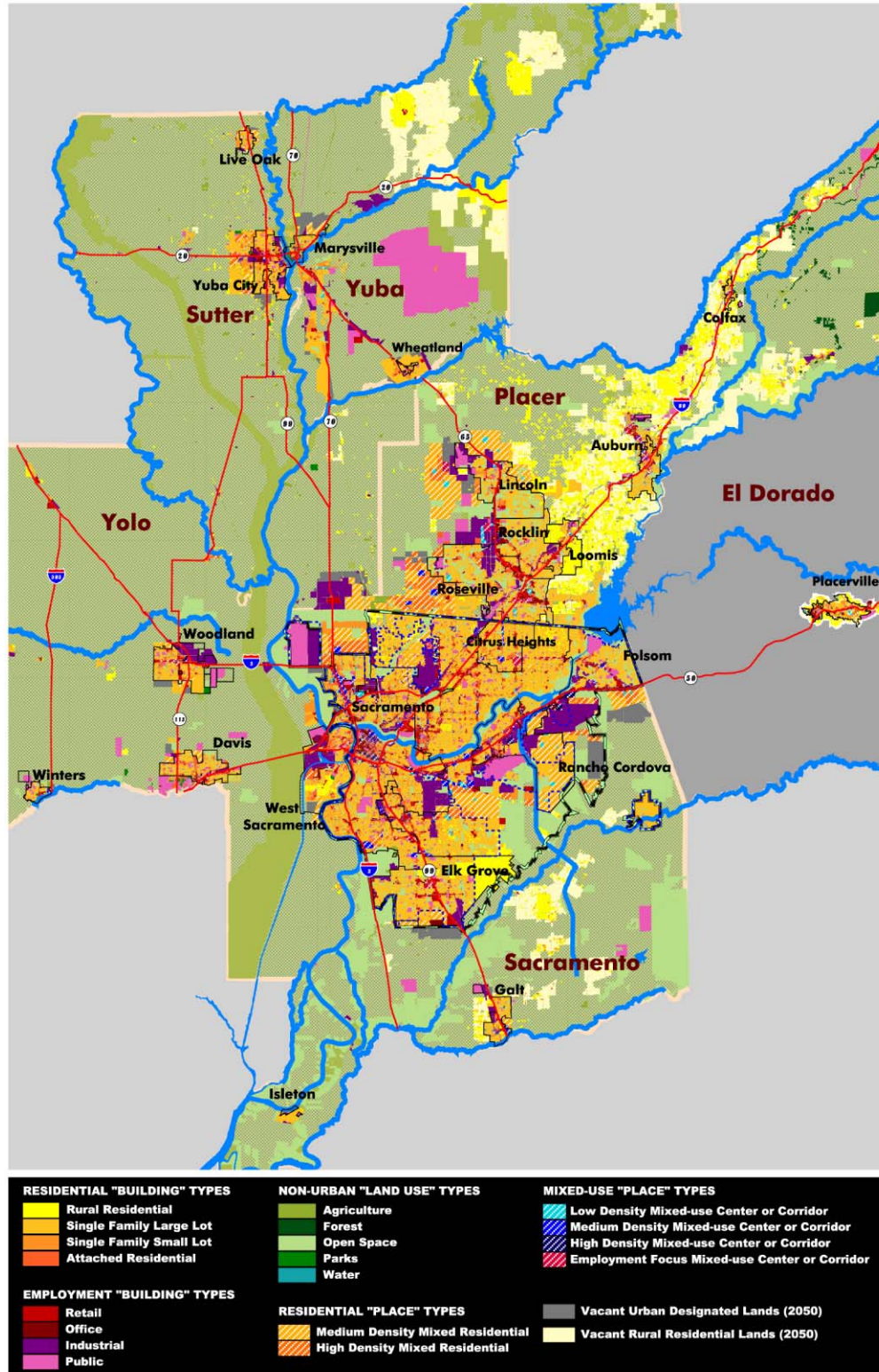
Regional infrastructure planning reflects these growth plans. In December 2004, SACOG, representing the Counties of El Dorado, Placer, Sacramento, Sutter, Yolo, and Yuba and their 22 constituent cities, adopted the “Preferred Blueprint Scenario” (<http://www.sacregionblueprint.org/sacregionblueprint/home.cfm>) to guide land use and transportation choices over the next 50 years as the region’s population grows from its current population of 2 million to include more than 3.8 million people. The Blueprint project was initiated in 2002 to study future land use patterns and their potential effects on the region’s transportation system, air quality, housing, open space, and other resources.

The study found that continuing the recent practice of building large-lot, low-density housing would consume another 660 square miles of undeveloped land. Residents would face longer commutes, more vehicle trips, dirtier air, and a growing disconnect between where they live and where they work.

Through a series of Blueprint workshops at the neighborhood, city, county, and regional level, more than 5,000 residents, elected officials, business leaders, and environmental interests helped craft an alternative vision that integrates smart growth concepts such as higher-density, mixed-use developments and reinvestment in existing developed areas. The Preferred Blueprint Scenario assumes certain levels and locations of both “reinvestment” (i.e., additional development on already-built parcels) and greenfield development (i.e., large-scale development on vacant land), including development on the land in the Natomas area that would be protected by the proposed project as discussed above (Exhibit 6-1). An analysis of this scenario showed that following smart growth principles would shorten future commute times, reduce traffic congestion, lessen dependence on automobiles and provide for housing choices that more closely align with the needs of an aging population.

The Preferred Blueprint Scenario will become part of SACOG’s long-range transportation plan for the six-county region. It also will serve as a framework to guide local government in growth and transportation planning through 2050.

Based on the information presented above, there is substantial evidence that the proposed project would accommodate planned regional growth in a manner that would be consistent with emerging smart growth principles. Accordingly, it is reasonable to assume that this growth will proceed with or without implementation of the proposed project. In the absence of SAFCA’s proposed improvements, the Natomas area may be mapped back into the federally regulated 100-year floodplain. However, developments would likely provide their own 100-year flood protection through measures such as the construction of ring levees around the developments. Thus, the proposed project, while accommodating planned regional growth, is not growth inducing itself.



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Source: SACOG 2006

Preferred Blueprint Scenario Map

Exhibit 6-1

6.2 SIGNIFICANT AND UNAVOIDABLE ENVIRONMENTAL IMPACTS

CEQA Section 21100(b)(2)(A) provides that an EIR shall include a detailed statement setting forth “any significant effect on the environment that cannot be avoided if the project is implemented.” Chapter 4, “Environmental Setting, Impacts, and Mitigation,” provides a detailed analysis of all potential significant environmental impacts of the project, feasible mitigation measures that could reduce or avoid the project’s significant impacts, and whether these mitigation measures would reduce these impacts to less-than-significant levels. Chapter 5, “Cumulative Impacts,” identifies the significant cumulative impacts of the project. If a specific impact cannot be reduced to a less-than-significant level, it is considered a significant and unavoidable impact. The proposed project would have the following significant and unavoidable environmental impacts:

- ▶ Conversion of Important Farmland to Nonagricultural Uses (direct and cumulative)
- ▶ Damage or Destruction of Previously Unidentified Cultural Resources During Construction (direct and cumulative)
- ▶ Long-Term Traffic Effects Associated with the Operation of the Proposed Folsom Bridge (direct and cumulative)
- ▶ Increases in Traffic on Local and Regional Roadways during Construction (direct, and cumulative for the Folsom Dam modification component)
- ▶ Temporary Emissions of ROG, NOX, and PM10 during Construction (direct and cumulative)
- ▶ Generation of Short-Term Construction Noise (direct)
- ▶ Effects on Recreational Opportunities at Folsom Reservoir Resulting from Construction of Dam Modifications (direct)
- ▶ Changes in Scenic Vistas and Existing Visual Character of the Folsom Dam and Reservoir Area during Construction (direct)
- ▶ Long-Term Changes in Scenic Vistas, Scenic Resources, and Existing Visual Character of the Program Study Area (direct, and cumulative for Natomas)

6.3 SIGNIFICANT IRREVERSIBLE ENVIRONMENTAL IMPACTS

The State CEQA Guidelines require a discussion of the significant irreversible environmental changes which would be involved in the project should it be implemented.

The irreversible environmental impacts or (irreversible and irretrievable commitment of resources) is the permanent loss of resources for future or alternative purposes. Irreversible and irretrievable resources are those that cannot be recovered or recycled, or those that are consumed or reduced to unrecoverable forms. The proposed project would result in the irreversible and irretrievable commitment of energy and material resources during project construction, operation, and maintenance, including the following:

- ▶ construction materials, including such resources as rocks, wood, soil, and concrete;
- ▶ land area committed to new/expanded project facilities; and
- ▶ energy expended in the form of electricity, gasoline, diesel fuel, and oil for equipment and transportation vehicles that would be needed for project construction, operation, and maintenance.

The use of these nonrenewable resources is expected to account for a minimal portion of the region's resources and would not affect the availability of these resources for other needs within the region. To the extent feasible, the acquisition of soil for levee improvements would be coordinated with other construction and habitat enhancement activities that result in excess soil that must be disposed of.

Additionally, implementation of the proposed project would result in the irreversible and irretrievable loss of agricultural land and could result in an irreversible and irretrievable loss of archaeological resources, as detailed in Section 4.2, "Agriculture and Land Use," and Section 4.8, "Cultural Resources," respectively.

7 ALTERNATIVES

7.1 ALTERNATIVES DEVELOPMENT

7.1.1 CEQA REQUIREMENTS

Section 15126.6[a] of the State CEQA Guidelines requires that an EIR (1) describe a range of reasonable alternatives to a proposed project, or to the location of the project, that would feasibly attain most of the basic project objectives but would avoid or substantially lessen any of the significant effects of the project and (2) evaluate the comparative merits of the alternatives. An EIR need not consider every conceivable alternative to a proposed project but must consider a reasonable range of potentially feasible alternatives that will foster informed decision making and public participation.

The range of alternatives required to be evaluated in an EIR is governed by a “rule of reason” that requires the EIR to set forth only those alternatives necessary to permit a reasoned choice. The EIR need examine in detail only those alternatives that the lead agency determines could feasibly attain most of the basic project objectives, taking into account factors that include site suitability; economic viability; availability of infrastructure; general plan consistency; other plans or regulatory limitations; jurisdictional boundaries; and whether the proponent can reasonably acquire, control or otherwise have access to the alternative site (State CEQA Guidelines Section 15126.6[f]). CEQA does not require the alternatives to be evaluated at the same level of detail as the proposed project.

The State CEQA Guidelines recommend that an EIR should briefly describe the rationale for selecting the alternatives to be discussed, identify any alternatives that were considered by the lead agency but were rejected as infeasible, and briefly explain the reasons underlying the lead agency’s determination (State CEQA Guidelines Section 15126.6[c]).

An EIR must also evaluate a “no-project” alternative, which represents “what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services.” (State CEQA Guidelines Section 15126.6[e][2]).

The following are the significant environmental impacts of the program that the alternatives seek to eliminate or reduce:

- ▶ Conversion of Important Farmland to Nonagricultural Uses
- ▶ Damage or Destruction of Previously Unidentified Cultural Resources During Construction
- ▶ Long-Term Traffic Effects Associated with the Operation of the Proposed Folsom Bridge
- ▶ Increases in Traffic on Local and Regional Roadways during Construction
- ▶ Temporary Emissions of ROG, NO_x, and PM₁₀ during Construction
- ▶ Generation of Short-Term Construction Noise
- ▶ Effects on Recreational Opportunities at Folsom Reservoir Resulting from Construction of Dam Modifications
- ▶ Changes in Scenic Vistas and Existing Visual Character of the Folsom Dam and Reservoir Area during Construction

- ▶ Long-Term Changes in Scenic Vistas, Scenic Resources, and Existing Visual Character of the Program Study Area

7.1.2 ALTERNATIVES SCREENING

7.1.2.1 PROJECT OBJECTIVES

The overall project objective is to create new funding mechanisms for the local share of the cost of constructing and maintaining flood control improvements and related environmental mitigation and habitat enhancements along the lower American and Sacramento Rivers and their tributaries in the Sacramento metropolitan area (Sacramento). The specific project objectives are to (1) complete the projects necessary to provide 100-year flood protection for developed areas in Sacramento's major floodplains as quickly as possible, (2) provide urban-standard ("200-year") flood protection for developed areas in Sacramento's major floodplains over time, and (3) ensure that new development in the undeveloped areas of Sacramento's major floodplains does not substantially increase the expected damage of an uncontrolled flood.

7.1.2.2 ALTERNATIVES EVALUATED

The following project alternatives are evaluated in Section 7.2, "Comparison of the Alternatives," below:

- ▶ **No Project (Alternative 1).** Under this alternative, SAFCA would not create new funding mechanisms. Therefore, none of the flood control improvements or related habitat enhancements described in Chapter 3 would be implemented, except those that would receive the local funding share through SAFCA's existing capital assessment districts. Funding provided through these existing assessment districts would allow for the completion of ongoing efforts to provide at least a 100-year level of protection to the lower American River and SSSG areas only.
- ▶ **No New Public Funding; Private Levees in Natomas (Alternative 2).** This alternative would be the same as Alternative 1, but in addition it is assumed that some of the new developments planned for the Natomas area would separately fund individual flood protection improvements in the form of privately financed compartment levees that would protect only the new developments.
- ▶ **Natomas 100-Year Protection (Alternative 3).** Under this alternative, SAFCA would create a new assessment district to provide only 100-year flood protection to the Natomas area, and would use funding raised through existing Capital Assessment District Number 3 to provide the local share of the cost of completing improvements to provide 100-year flood protection to the lower American River and SSSG areas. Additional improvements to achieve "200-year," urban-standard flood protection would not be funded or implemented. Thus, this alternative represents both an alternative to the proposed funding mechanisms and a reduced project footprint.
- ▶ **Reduced Natomas Levee Perimeter (Alternative 4).** Under this alternative, SAFCA would create the proposed new funding mechanisms to fund the improvements described in Chapter 3 to achieve "200-year" urban-standard flood protection in the four benefit areas; however, in the Natomas area, the design of the program would be altered to include a new levee across the Natomas area in lieu of improving the south levee of the NCC and the upper reach of the east levee of the Sacramento River. This alternative would provide for a reduced project footprint and modified funding mechanisms by excluding the undeveloped areas north of this new levee from the new assessment district and development fee program and from the improvements provided by SAFCA's program.

Table 7-1 on pages 7-13 and 7-14 provides a brief description of each of the alternatives evaluated and identifies whether the alternative meets the project objectives.

7.1.2.3 ALTERNATIVES CONSIDERED BUT REJECTED FROM FURTHER CONSIDERATION

The following alternatives were considered but rejected as infeasible for the reasons expressed below.

- ▶ **Increased Yolo Bypass Conveyance Capacity.** Under this alternative, SAFCA would augment its proposed “200-year” urban-standard flood protection program by funding improvements designed to increase the conveyance capacity of the Yolo Bypass and lower peak flood water surface elevations in the channels upstream and immediately downstream of the Fremont Weir, including the lower Sacramento River channel around the upper portion of the Natomas area. These measures could substitute for raising the east levee of the Sacramento River and the south levee of the NCC as described in Chapter 3, and could also substitute for preserving rural floodplains upstream and immediately downstream of the Fremont Weir.

This alternative could achieve SAFCA’s specific flood protection and expected damage avoidance objectives. However, the Yolo Bypass improvements would have a significantly larger footprint and would be much more costly to construct, operate, and maintain than the improvements that they would replace in SAFCA’s proposed program. Moreover, it would be difficult to phase the Yolo Bypass improvements in a manner that would make them amenable to the structure of the development fee program, given the magnitude of the project and the incremental nature of fee collection. Finally, because the Yolo Bypass improvements would be located entirely in jurisdictions that are not members of SAFCA—Yolo and Solano Counties and the City of West Sacramento—it would be very difficult for SAFCA to manage the design, permitting, and mitigation issues that would be associated with this alternative. Given SAFCA’s inability to implement this alternative, it has been eliminated from further consideration.

- ▶ **Auburn Dam.** Under this alternative, additional flood storage capacity would be created along the American River through the construction of a dam downstream of the confluence of the north and middle forks of the river near the city of Auburn. Auburn Dam construction and operation could be substituted for the improvements to Folsom Dam and for many of the improvements to the levee system below the dam that are included in SAFCA’s proposed flood protection program, including raising the American River north levee, constructing a closure structure across the Mayhew Drain and providing water and landside armoring to the levees on both sides of the American River. However, the Natomas area improvements described in Chapter 3 would still be implemented.

The Auburn Dam has the potential to meet the project objectives in the lower American River area through substitution for the improvements to Folsom Dam and for many of the improvements to the levee system below the dam that are included in SAFCA’s proposed flood protection program. However, the Auburn Dam would have no substantial effect on the risk of flooding in the Natomas area. Accordingly, this alternative also would include the same Natomas levee improvements as the proposed program.

SAFCA has twice attempted to secure federal and state authorization for a flood detention dam at the Auburn site. The first attempt was in 1992, when this alternative was removed from the Water Resources Development Act of 1992 by a majority vote of the members of the U.S. House of Representatives (House); the second was in 1996, when this alternative failed to win House support for inclusion in the Water Resources Development Act of 1996. Since that time, it has become clear that the project objectives can be achieved more quickly, with greater certainty, and with less cost through modifications to Folsom Dam and the downstream levee system. This alternative was, therefore, eliminated from further consideration.

- ▶ **Setback Levee.** In early 2006 SAFCA issued a Draft Report on the Natomas Levee Evaluation Program (NLEP). The program was initiated in June 2005 to determine the improvements needed to bring the Natomas area to a 200-year level of flood protection. The report summarized the preliminary findings and conclusions set forth in the detailed engineering and geotechnical analyses that were conducted as part of the NLEP. The draft report considered the possibility of addressing identified problems in the upper 5 miles of the east levee of the Sacramento River through construction of a new secondary levee set back about 1,000 feet from the

existing levee. Under this alternative, the existing levee would continue to confine the river channel and serve as a local roadway along the Garden Highway. The new levee would eliminate the uncertainties associated with refurbishing the existing levee, avoid ongoing erosion problems, and ensure safe containment of the 200-year flood if the existing levee were to fail. However, it was determined that this setback levee could alter the hydraulic performance of the Freemont Weir, causing more water to enter the Sacramento River channel, and thereby increasing the risk of flooding along this channel. A setback levee would also potentially result in the eventual abandonment of the Garden Highway, eliminating access to several residences. In addition, the setback levee would be located north of the Sacramento International Airport and in the approach/departure zone for the airport. The area between the setback levee and the original levee would periodically contain standing water that could attract waterfowl, which could interfere with airport operations. Finally, due to the volume of select borrow material that would be required to construct the setback levee, construction of such a levee was determined to be significantly more costly than the other options for raising and strengthening this portion of the levee system. This alternative was therefore withdrawn from further consideration.

7.2 COMPARISON OF THE ALTERNATIVES

7.2.1 PROPOSED PROJECT

See Chapters 3 and 4 for a description of the proposed project and an analysis of its significant impacts, respectively. Table 7-2, at the end of this chapter, provides a matrix that compares the levels of environmental impacts of the alternatives with those of the proposed project.

7.2.2 ALTERNATIVE 1 – NO PROJECT

7.2.2.1 DESCRIPTION

Under this alternative, SAFCA would not create new funding mechanisms and would not provide “200-year” urban-standard flood protection to Sacramento. Funding through Capital Assessment District Number 3 would permit SAFCA to provide the local share of the cost of continuing the variable storage space operation at Folsom Dam, improving the dam’s cold water pool operation, and completing federally authorized improvements to the levees along the lower American River and the channels along Morrison Creek and its tributaries in South Sacramento. These improvements would be sufficient to provide a 100-year level of flood protection to the lower American River and SSSG areas.

There would be insufficient funding to provide SAFCA’s share of the cost of modifying Folsom Dam to improve flood control operations, constructing a new bridge across the American River downstream of the dam, constructing floodplain habitat enhancements in the American River Parkway, or further strengthening the levee system around Sacramento. Reclamation would construct the modifications to Folsom Dam that area necessary to meet federal dam safety standards, including excavation of new auxiliary spillway with an earthen fuse plug, but no effort would be made to improve the dam’s low-level discharge or surcharge storage capacities for flood control. Although the City of Folsom is the nonfederal sponsor of the Folsom Bridge Project, without a nonfederal flood control contribution, it is unlikely that this project would proceed.

Funding through existing Capital Assessment District Number 2 would permit SAFCA to address some deficiencies in the levee system in the North Sacramento area and the southeastern portion of the Natomas area; however there would be no funding to address deficiencies in the levees along the east bank of the Sacramento River and the south bank of the NCC. These levees would be decertified for FEMA purposes, and the Natomas area would be mapped into the federally regulated 100-year floodplain.

Federal floodplain regulations would prevent the Natomas area from absorbing new development as currently anticipated in the regional blueprint for future (2030) growth adopted by the Sacramento Area Council of

Governments (Sacramento Area Council of Governments and Valley Vision 2006). As a result, up to 60,000 dwelling units and associated commercial and industrial developments would be redirected to other areas in the region over the next two decades. During this period, new development would be able to proceed in the lower American River area. However, the scale of this development, currently estimated to be up to 40,000 new dwelling units and associated commercial and industrial developments, could be affected by the redirection of growth away from the Natomas area.

7.2.2.2 COMPARATIVE ENVIRONMENTAL EFFECTS

Implementation of Alternative 1 would result in the elimination of the following significant environmental effects of the project because of the inability to contribute to the funding of the Folsom Dam modifications, Folsom Bridge, and Natomas levee improvements:

- ▶ Conversion of Important Farmland to Nonagricultural Uses
- ▶ Long-Term Traffic Effects Associated with the Operation of the Proposed Folsom Bridge
- ▶ Effects on Recreational Opportunities at Folsom Reservoir Resulting from Construction of Dam Modifications
- ▶ Changes in Scenic Vistas and Existing Visual Character of the Folsom Dam and Reservoir Area during Construction

In addition, because of the overall reduction in levels of construction, the following significant effects would be reduced, although not to less-than-significant levels:

- ▶ Damage or Destruction of Previously Unidentified Cultural Resources During Construction
- ▶ Generation of Short-Term Construction Noise
- ▶ Increases in Traffic on Local and Regional Roadways during Construction
- ▶ Temporary Emissions of ROG, NO_x, and PM₁₀ during Construction
- ▶ Long-Term Changes in Scenic Vistas, Scenic Resources, and Existing Visual Character of the Program Study Area

Other potential environmental effects, such as impacts on biological resources, would be similar to the proposed project, although the potential for the effects would be reduced because of the reduction in the level of project activities and footprint areas. Mitigation identified for the proposed project could reduce these impacts to less-than-significant levels (see Table 7-2 at the end of this chapter).

7.2.2.3 FEASIBILITY

Although property owners in the lower American River area would be slightly better protected than their neighbors in the Natomas area, the project objectives would not be achieved by Alternative 1. Instead, flood protection levels in the Natomas area would fall below the minimum 100-year flood protection requirements of the NFIP. These minimum requirements would be met in the lower American River area, but there would be a substantial increase in expected flood damages from floods with a frequency of greater than 1% per year because of the anticipated high levels of new development in the floodplain without a corresponding reduction in flood risk.

7.2.3 ALTERNATIVE 2 – NO NEW PUBLIC FUNDING; PRIVATE LEVEES IN NATOMAS

7.2.3.1 DESCRIPTION

This alternative would include the same publicly financed improvements as Alternative 1, SAFCA would not create new funding mechanisms and would not provide “200-year” urban-standard flood protection to Sacramento. Funding through existing Capital Assessment District Number 3 would permit SAFCA to fund the local share of the cost of continuing the variable space storage operation at Folsom Dam and improving the levees protecting the lower American River and SSSG areas, thus ensuring that these areas would be provided with at least a 100-year level of flood protection. Reclamation would implement dam safety improvements to Folsom Dam, but the dam’s low-level discharge and surcharge storage capacities would not be increased to provide additional flood storage capability, and the Folsom Bridge project would not be constructed. SAFCA would be unable to fund the improvements needed to address identified deficiencies in the levees around the Natomas area. Without these improvements, these levees would not meet minimum NFIP requirements, and the Natomas area would once again be mapped into a federally regulated 100-year floodplain.

Without certified levees around the perimeter of the Natomas area, some of the new developments being planned for this area may choose to separately fund individual flood protection in the form of private compartment levees that would protect only the new developments. These levees would be more costly to construct than participating in the proposed funding mechanisms, but would provide the affected developments with at least a 100-year level of flood protection. Assuming the protected areas could meet the minimum requirements of the NFIP, they would obtain relief from federal regulations through revisions to the Natomas area’s floodplain map. Constructing compartment levees would thus reduce the amount of redirected regional growth by comparison to Alternative 1.

7.2.3.2 COMPARATIVE ENVIRONMENTAL EFFECTS

Implementation of Alternative 2 would result in the elimination of the following significant environmental effects of the project because of the inability to contribute to funding of the Folsom Dam modifications and Folsom Bridge:

- ▶ Long-Term Traffic Effects Associated with the Operation of the Proposed Folsom Bridge
- ▶ Effects on Recreational Opportunities at Folsom Reservoir Resulting from Construction of Dam Modifications.
- ▶ Changes in Scenic Vistas and Existing Visual Character of the Folsom Dam and Reservoir Area during Construction

Because of the assumption that residential and other development in the Natomas area would continue in a piecemeal fashion, many of the other significant effects identified for the project would still occur:

- ▶ Conversion of Important Farmland to Nonagricultural Uses
- ▶ Damage or Destruction of Previously Unidentified Cultural Resources During Construction Generation of Short-Term Construction Noise
- ▶ Increases in Traffic on Local and Regional Roadways during Construction
- ▶ Temporary Emissions of ROG, NO_x, and PM₁₀ during Construction

It is also anticipated that the following significant impact could be increased by development protected by compartment levees:

- ▶ Long-Term Changes in Scenic Vistas, Scenic Resources, and Existing Visual Character of the Program Study Area

Other potential environmental effects, such as impacts on biological resources, would be similar to the impacts of the proposed project, because of the location and assumed level of development. Mitigation identified for the proposed project could reduce these impacts to less-than-significant levels (see Table 7-2 at the end of this chapter).

7.2.3.3 FEASIBILITY

Under this alternative, flood protection for existing development in the Natomas area would fall below the minimum 100-year flood protection requirements of the NFIP, and the project objective of providing “200-year” urban-standard flood protection to developed areas in the Natomas and lower American River areas would not be achieved. As with Alternative 1, there would be a substantial increase in expected flood damages based on the high levels of new development in these areas without a corresponding reduction in flood risk.

7.2.4 ALTERNATIVE 3 – NATOMAS 100-YEAR PROTECTION

7.2.4.1 DESCRIPTION

Under this alternative, SAFCA would eliminate existing Capital Assessment District Number 2 and create a new assessment district to provide 100-year flood protection to the Natomas area. This would reduce the extent of the proposed improvements for this area by about 40%. Existing Capital Assessment District Number 3 would raise the local share of the cost of completing the projects necessary to provide 100-year flood protection to the lower American River and SSSG areas. As described for Alternative 1, Reclamation would implement dam safety improvements to Folsom Dam, but federally authorized modifications to improve the dam’s low-level discharge and surcharge storage capacities for flood control would not be constructed, and the USACE would not construct a new bridge below the dam or implement floodplain enhancements in the American River Parkway.

7.2.4.2 COMPARATIVE ENVIRONMENTAL EFFECTS

This alternative would result in much less construction activity than the proposed SAFCA program and, therefore, fewer environmental impacts in comparison with existing conditions. There would be less agricultural land converted to nonagricultural uses as a result of the expansion of levee footprints and berm construction, while the preservation of upstream agricultural lands as part of the rural floodplain preservation program may be the same.

Implementation of Alternative 3 would result in the elimination of the following significant environmental effects of the project because of the inability to fund Folsom Dam modifications and Folsom Bridge:

- ▶ Long-Term Traffic Effects Associated with the Operation of the Proposed Folsom Bridge
- ▶ Effects on Recreational Opportunities at Folsom Reservoir Resulting from Construction of Dam Modifications
- ▶ Changes in Scenic Vistas and Existing Visual Character of the Folsom Dam and Reservoir Area during Construction

In addition, because of the overall reduction in levels of construction, the following significant effects would be reduced, although not to less-than-significant levels:

- ▶ Conversion of Important Farmland to Nonagricultural Uses

- ▶ Damage or Destruction of Previously Unidentified Cultural Resources During Construction Generation of Short-Term Construction Noise
- ▶ Increases in Traffic on Local and Regional Roadways during Construction
- ▶ Temporary Emissions of ROG, NO_x, and PM₁₀ during Construction
- ▶ Long-Term Changes in Scenic Vistas, Scenic Resources, and Existing Visual Character of the Program Study Area

Other potential environmental effects, such as impacts to biological resources, would be similar to effects of the proposed project, although the potential for the effects would be reduced because of the reduction in the level of project activities. Mitigation identified for the proposed project could reduce these impacts to less-than-significant levels (see Table 7-2 at the end of this chapter). The overall environmental effects resulting from the implementation of Alternative 3 would be similar to those of Alternative 1 (No Project).

7.2.4.3 FEASIBILITY

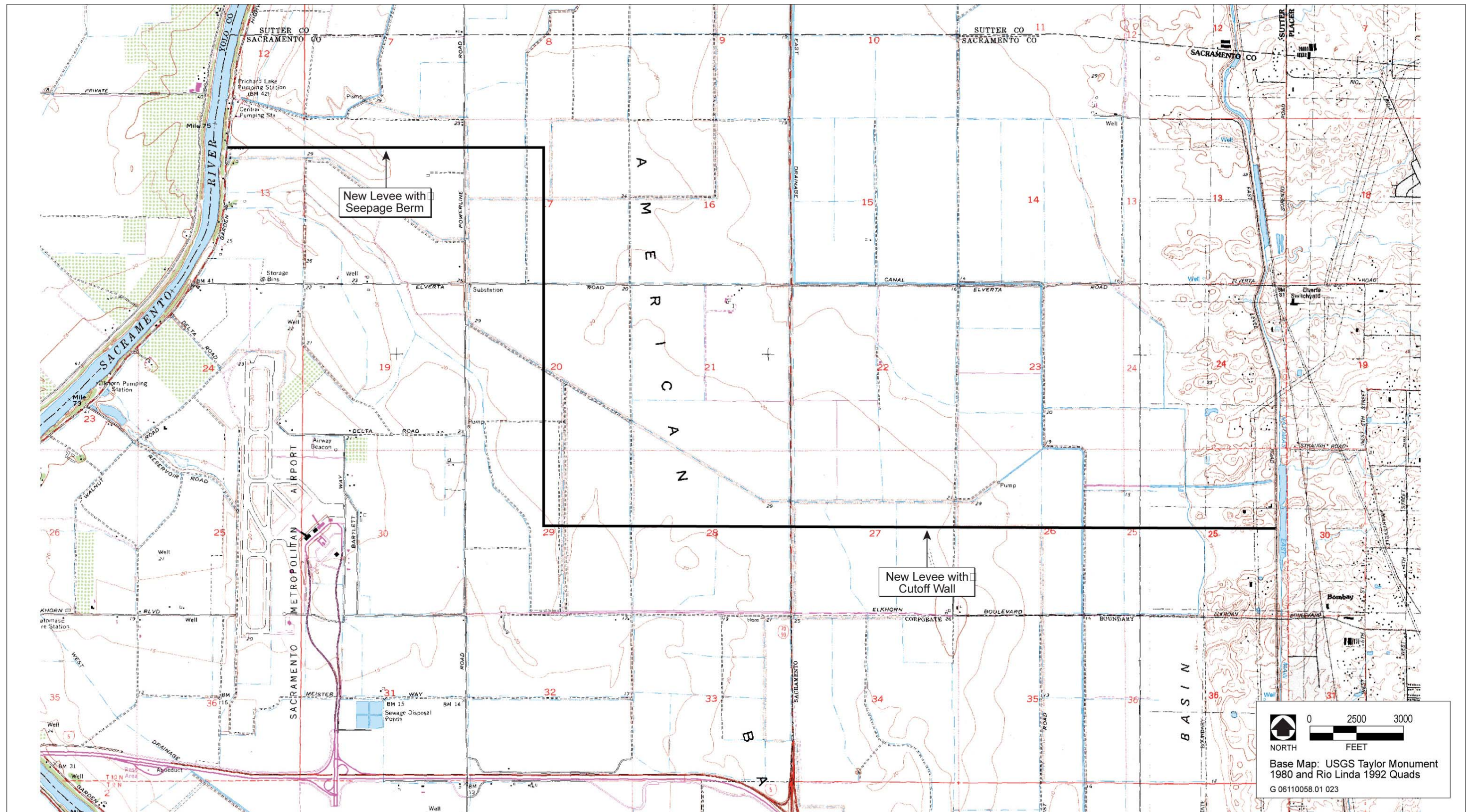
This alternative would achieve the project objective of completing the projects necessary to provide 100-year flood protection for developed areas in Sacramento's major floodplains as quickly as possible; however, it would not achieve the objective of providing "200-year" urban-standard flood protection for developed areas in Sacramento's major floodplains, and Sacramento would continue to be one of the most at-risk urban floodplains in America. Because this alternative would achieve the minimum requirements of the NFIP, new development would proceed as planned in Sacramento's major floodplains. As under Alternatives 1 and 2, there would be a substantial increase in expected flood damages based on the high levels of new urban development in these areas without a corresponding reduction in flood risk.

7.2.5 ALTERNATIVE 4 – REDUCED NATOMAS LEVEE PERIMETER

7.2.5.1 DESCRIPTION

Under this alternative, SAFCA would create the proposed new funding mechanisms; however, the design of the proposed "200-year" urban-standard flood protection program would be altered to include a new levee across the Natomas area in lieu of improving the south levee of the NCC and the upper reach of the east levee of the Sacramento River. The new levee would be constructed across most of the Natomas area about 500 feet north of Elkhorn Boulevard to protect existing developed areas in the City of Sacramento. In order to protect Sacramento International Airport, the new levee would turn north before reaching Powerline Road and then turn west to connect to the Sacramento River just downstream of Reclamation District (RD) 1000's Prichard Lake pumping facility (Exhibit 7-1). The undeveloped areas north of this new levee in Sacramento and Sutter Counties would not be included in the new assessment district or development fee program.

The new levee would be about 25 feet high and for most of its length would have a 30-foot top width and 5 vertical to 1 horizontal (5V:1H) slopes. This cross section would be enlarged to accommodate north-south road crossings at SR 99 near Elkhorn Boulevard and Powerline Road north of Elverta Road, and an east-west crossing at Elverta Road near Powerline Road. At these road crossings, the levee footprint would be expanded to encompass a 200-foot top width and 50:1 slopes, creating a 2% grade for the affected roadways. In order to contain underseepage, the levee would be constructed with a deep cutoff wall and, possibly in the reaches along Powerline Road and north of the airport, a seepage berm. The new levee would cover a distance of about 8 miles. Its construction would require 6 to 10 million cubic yards of material and its footprint would cover 435 to 735 acres of land depending on whether a seepage berm is employed to contain underseepage.



Source: EDAW 2006

Conceptual Natomas Cross Levee Alignment

Exhibit 7-1

Although the new levee would not intersect any of the major drainage and irrigation facilities that currently exist in the Natomas area, modifications to smaller facilities would be needed to accommodate the new levee.

The new levee would leave about half of Natomas outside of the “200-year” urban-standard levee perimeter, including all of the Natomas area in Sutter County. Landowners throughout this area could seek compensation for redirected flood impacts created by the operation of the new levee. As under Alternative 2, it is assumed that development currently being planned for portions of this area would proceed through separate funding of compartment levees or improving the existing perimeter levees north of the new cross levee alignment.

7.2.5.2 COMPARATIVE ENVIRONMENTAL EFFECTS

The new Natomas levee would have greater impacts on agricultural land; would result in a higher construction-related generation of air pollutants; would significantly affect existing utilities and service systems; and could increase effects on sensitive species and habitats, reduce opportunities to provide connectivity between sensitive habitat areas, and conflict with or make it difficult to achieve the goals of the Natomas Basin Habitat Conservation Plan.

Implementation of Alternative 4 would result in the same following significant environmental impacts that would result from implementation of the proposed project, but the impacts would be increased because of the increased project footprint, and the substantial increase in borrow materials and related haul trips:

- ▶ Conversion of Important Farmland to Nonagricultural Uses
- ▶ Damage or Destruction of Previously Unidentified Cultural Resources During Construction
- ▶ Long-Term Traffic Effects Associated with the Operation of the Proposed Folsom Bridge
- ▶ Increases in Traffic on Local and Regional Roadways during Construction
- ▶ Temporary Emissions of ROG, NO_x, and PM₁₀ during Construction
- ▶ Generation of Short-Term Construction Noise
- ▶ Effects on Recreational Opportunities at Folsom Reservoir Resulting from Construction of Dam Modifications
- ▶ Changes in Scenic Vistas and Existing Visual Character of the Folsom Dam and Reservoir Area during Construction
- ▶ Long-Term Changes in Scenic Vistas, Scenic Resources, and Existing Visual Character of the Program Study Area

The overall environmental effects resulting from implementation of Alternative 4 would be greater than those of the proposed project (see Table 7-2 at the end of this chapter). In addition, there would be the potential for Alternative 4 to be in conflict with the Natomas Basin HCP and to greatly increase the impacts and mitigation required for biological resources.

7.2.5.3 FEASIBILITY

This alternative would achieve SAFCA’s objectives of completing the projects necessary to provide 100-year flood protection for developed areas in Sacramento’s major floodplains as quickly as possible, and providing urban-standard (“200-year”) flood protection for developed areas in Sacramento’s major floodplains over time. However, the new Natomas levee would have a substantially larger footprint than the portion of SAFCA’s

proposed flood protection program in the Natomas area that it would replace. As a result, this alternative would significantly increase the cost of protecting development in the Natomas area. Moreover, the new levee would require modification of ongoing operation and maintenance activities affecting the existing perimeter levee system and RD 1000's interior drainage facilities, and this alternative could be perceived to adversely affect property values in the undeveloped areas north of the levee. Under the provisions of SAFCA's Joint Exercise of Powers Agreement, the construction and/or acquisition of a new levee within the boundaries of RD 1000 is expressly subject to a veto by the Board of Directors of RD 1000. In the past, RD 1000 has indicated its opposition to constructing a new levee across the Natomas area. It is unclear whether this alternative would provide sufficient benefits in comparison to the proposed flood protection program to avoid a veto by RD 1000.

7.3 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

An EIR must identify the "environmentally superior alternative" among the alternatives evaluated. If the environmentally superior alternative is the no-project alternative, Section 15126.6(e)(2) of the State CEQA Guidelines requires that the EIR identify an environmentally superior alternative among the other alternatives. The environmentally superior alternative is Alternative 3 (Natomas 100-Year Protection) because it would have fewer impacts or potential impacts on all environmental resource areas than the proposed project and Alternative 3.

**Table 7-1
Alternatives Comparison**

Alternative	Does the Alternative Achieve Objective 1 (complete projects necessary for 100-year protection for developed areas)?	Does the Alternative Achieve Objective 2 (provide 200-year protection for developed areas)?	Does the Alternative Achieve Objective 3 (new development does not substantially increase expected damage)?	Summary Description/Comparison to Proposed Project
Proposed Project	Yes	Yes	Yes	► Funding provided through a new assessment district and a development fee program to fund the local cost of improvements to meet the project objectives for all major floodplain areas in SAFCA's jurisdiction.
Alternative 1 No Project	Partially (Existing Natomas development would remain without 100-year protection.)	No	No	► Only the lower American River LAR and SSSG improvements funded through Capital Assessment District 3 would go forward. ► Fewer direct impacts from construction of flood control improvements than under proposed project, but redirected regional growth would result.
Alternative 2 No New Public Funding; Private Levees in Natomas	Partially (Existing Natomas development would remain without 100-year protection.)	No (Development-funded improvements could provide some currently undeveloped areas in Natomas with 200-year protection.)	No	► SAFCA would go forward only with the LAR and SSSG improvements funded through Capital Assessment District 3. Privately funded Natomas levee improvements would be provided by new developments. ► Fewer direct impacts from construction of flood control improvements outside Natomas than under proposed project; Natomas construction impacts likely greater than those of proposed improvements. Also, possibly some redirected regional growth.
Alternative 3 Natomas 100-Year Protection	Yes	No	No	► Improvements to achieve 100-year protection would be provided through new assessment district for Natomas and through Capital Assessment District 3 for LAR and SSSG areas. ► Fewer direct impacts from construction of improvements than under proposed project.

**Table 7-1
Alternatives Comparison**

Alternative	Does the Alternative Achieve Objective 1 (complete projects necessary for 100-year protection for developed areas)?	Does the Alternative Achieve Objective 2 (provide 200-year protection for developed areas)?	Does the Alternative Achieve Objective 3 (new development does not substantially increase expected damage)?	Summary Description/Comparison to Proposed Project
Alternative 4 Reduced Natomas Levee Perimeter	Yes (Existing developed areas would be protected. Development-funded improvements could provide some currently undeveloped areas in the northern, rural portion of Natomas with 100-year protection.)	Yes (Existing developed areas would be protected. Development-funded improvements could provide some currently undeveloped areas in the northern, rural portion of Natomas with 200-year protection.)	No (unlikely)	▶ New levee would be constructed across Natomas; funding mechanisms would be used to fund 200-year protection for urban areas of Natomas. Specific undeveloped areas could be protected up to 200-year level through new developments. ▶ Greater impacts than under proposed project. ▶ New levee would increase the cost of protecting the entire Natomas area; could interfere with ongoing operation and maintenance of the existing perimeter levee system and RD 1000's interior drainage facilities; could be perceived to adversely affect property values in the northern, undeveloped portion of Natomas; and could be vetoed by RD 1000 Board.
Notes: LAR = lower American River SSSG = South Sacramento Streams Group				

**Table 7-2
Comparison Matrix of the Environmental Impacts of Project Alternatives**

Environmental Issue Area/Impact	Proposed Project	Alt. 1 No Project	Alt. 2 No New Public Funding; Private Levees in Natomas	Alt. 3 Natomas 100-Year Protection	Alt. 4 Reduced Natomas Levee Perimeter
Agriculture and Land Use					
Impact 4.2-a. Conflicts with Land Use Plans and Policies	LTS	LTS	LTS	LTS	PS
Impact 4.2-b. Conversion of Important Farmland to Nonagricultural Uses	SU	LTS	SU	SU(-)	SU(+)
Geology and Soils					
Impact 4.3-a. Potential Temporary, Short-Term Construction-Related Erosion	PS	PS(-)	PS	PS(-)	PS(+)
Hydrology and Hydraulics					
Impact 4.4-a. Hydraulic Effects of the Proposed Improvement Program	LTS	NA	NA	NA	NA
Impact 4.4-b. Disruption of Local Drainage Systems	PS	LTS	PS	PS(-)	PS
Water Quality					
Impact 4.5-a. Temporary Water Quality Effects from Stormwater and Erosion Runoff Associated with Construction	PS	PS(-)	PS	PS(-)	PS(+)
Impact 4.5-b. Mobilization of Mercury and Other Metals Associated with Spillway Construction	PS	NA	NA	NA	PS
Fisheries and Aquatic Resources					
Impact 4.6-a. Effects of Construction of Folsom Dam Modifications on Resident Species	LTS	NA	NA	NA	LTS
Impact 4.6-b. Loss of Fish Habitat Through Increased Sedimentation, Turbidity and Contaminants	PS	PS(-)	PS	PS(-)	PS
Impact 4.6-c. Loss of Overhead Cover and Instream Woody Material.	PS	PS(-)	PS	PS(-)	PS
Terrestrial Biological Resources					
Impact 4.7-a. Effects on Sensitive Habitats	PS	PS(-)	PS	PS(-)	PS(+)
Impact 4.7-b. Effects on Special-Status Plants	PS	PS(-)	PS	PS(-)	PS(+)
Impact 4.7-c. Effects on Valley Elderberry Longhorn Beetle	PS	PS(-)	PS	PS(-)	PS(+)
Impact 4.7-d. Effects on Special-Status Vernal Pool Invertebrates	PS	PS(-)	PS	PS(-)	PS(+)
Impact 4.7-e. Effects on Giant Garter Snake	PS	PS(-)	PS	PS(-)	PS(+)
Impact 4.7-f. Effects on other Special-Status Reptiles and Amphibians	PS	PS(-)	PS	PS(-)	PS(+)
Impact 4.7-g. Effects on Swainson's Hawk	PS	PS(-)	PS	PS(-)	PS(+)
Impact 4.7-h. Effects on Other Special-Status Birds	PS	PS(-)	PS	PS(-)	PS(+)
Impact 4.7-i. Effects on Special Status Bats	PS	LTS	LTS	LTS	PS

**Table 7-2
Comparison Matrix of the Environmental Impacts of Project Alternatives**

Environmental Issue Area/Impact	Proposed Project	Alt. 1 No Project	Alt. 2 No New Public Funding; Private Levees in Natomas	Alt. 3 Natomas 100-Year Protection	Alt. 4 Reduced Natomas Levee Perimeter
Impact 4.7-j. Effects on Wildlife Corridors	PS	PS(-)	PS	PS(-)	PS(+)
Impact 4.7-k. Consistency with the NBHCP	PS	PS(-)	PS	PS(-)	PS(+)
Cultural Resources					
Impact 4.8-a. Construction Effects on Documented Prehistoric and Historic Cultural Resource Sites	PS	PS(-)	PS	PS(-)	PS(+)
Impact 4.8-b. Changes to Elements of RD 1000	PS	NA	PS(+)	PS	PS(+)
Impact 4.8-c. Damage or Destruction of Previously Unidentified Resources During Construction	SU	SU(-)	SU	SU(-)	SU(+)
Impact 4.8-d. Discovery of Human Remains during Construction	PS	PS(-)	PS	PS(-)	PS(+)
Paleontological Resources					
Impact 4.9-a. Disturbance of Unknown Paleontological Resources during Earth-Moving Activities.	PS	LTS	PS	PS(-)	PS(+)
Transportation and Circulation					
Impact 4.10-a. Long-Term Traffic Effects Associated with the Operation of the Proposed Folsom Bridge	SU	NA	NA	NA	SU
Impact 4.10-b. Increases in Traffic on Local and Regional Roadways during Construction	SU	PS	SU(-)	PS	SU(+)
Impact 4.10-c. Effects of Construction Activity on Emergency Access	PS	PS(-)	PS	PS(-)	PS(+)
Air Quality					
Impact 4.11-a. Temporary Emissions of ROG, NOX, and PM10 during Construction	SU	SU(-)	SU	SU(-)	SU(+)
Impact 4.11-b. Long-Term Changes in Emissions of ROG, NO _x , and PM ₁₀	LTS	LTS	LTS	LTS	LTS
Impact 4.11-c. Exposure of Sensitive Receptors to Toxic Air Emissions	PS	PS(-)	PS	PS(-)	PS
Impact 4.11-d. Exposure to Airborne Asbestos	PS	NA	NA	NA	PS
Noise					
Impact 4.12-a. Generation of Short-Term Construction Noise	SU	SU(-)	SU	SU(-)	SU(+)
Impact 4.12-b. Exposure of Sensitive Receptors to or Generation of Excessive Groundborne Vibration or Noise.	PS	PS(-)	PS	PS(-)	PS(+)
Impact 4.12-c. Exposure of Residents to Increased Traffic Noise Levels.	PS	NA	NA	NA	PS

**Table 7-2
Comparison Matrix of the Environmental Impacts of Project Alternatives**

Environmental Issue Area/Impact	Proposed Project	Alt. 1 No Project	Alt. 2 No New Public Funding; Private Levees in Natomas	Alt. 3 Natomas 100-Year Protection	Alt. 4 Reduced Natomas Levee Perimeter
Recreation					
Impact 4.13-a. Effects on Recreational Opportunities at Folsom Reservoir Resulting from Construction of Dam Modifications	SU	NA	NA	NA	SU
Impact 4.13-b. Permanent Encroachment on American River Parkway Land	PS	PS	PS	PS	PS
Impact 4.13-c. Permanent In-Water Channel Hazards	PS	PS(-)	PS	PS(-)	PS
Impact 4.13-d. Effects on Recreational Opportunities in and Adjacent to Program Area Waterways during Construction and Levee Integrity Program Activities	PS	PS(-)	PS(-)	PS	PS
Impact 4. 4.13-e. Inconsistency with Relevant Plan, Policies, and Laws	LTS	LTS	LTS	LTS	LTS
Visual Resources					
Impact 4.14-a. Changes in Scenic Vistas and Existing Visual Character of the Folsom Dam and Reservoir Area during Construction	SU	NA	NA	NA	SU
Impact 4.14-b. Changes in Scenic Vistas and Existing Visual Character of the Levee and Channel Improvement Areas during Construction	LTS	LTS	LTS	LTS	LTS
Impact 14-c. Long-Term Changes in Scenic Vistas, Scenic Resources, and Existing Visual Character of the Program Study Area	SU	SU(-)	SU(+)	SU(-)	SU(+)
Utilities and Service Systems					
Impact 4.15-a. Potential Damage of Utility Infrastructure and Disruption of Service during Construction	PS	PS(-)	PS	PS(-)	PS(+)
Impact 4.15-b. Increases in Solid Waste Generation	LTS	LTS	LTS	LTS	LTS
Hazards and Hazardous Materials					
Impact 4.16-a. Spills of Hazardous Materials during Construction	LTS	LTS	LTS	LTS	LTS
Impact 4.16-b. Exposure to Hazardous Materials Encountered at Project Sites	PS	PS(-)	PS	PS(-)	PS
Impact 4.16-c. Exposure to Wildland Fires	PS	PS(-)	PS	PS(-)	PS
Key: LTS = Less than significant PS = Potentially significant but can be mitigated to less than significant SU = Significant and unavoidable (+) = Impact greater than impact of the proposed project (-) = Impact less than impact of the proposed project NA = Not applicable (no impact)					

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None

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APPENDIX A

Notice of Preparation and Scoping Comments



NOTICE OF PREPARATION

To: Agencies and Interested Parties

From: Sacramento Area Flood Control Agency

Date: July 21, 2006

Subject: **Notice of Preparation of a Combined Program Environmental Impact Report (EIR) on a Funding Mechanism for Comprehensive Sacramento Area Flood Protection and Project EIR on Natomas Cross Canal South Levee Phase 1 Improvements and**
Announcement of a Public Scoping Meeting on August 2, 2006

SAFCA will be the lead agency and will prepare an environmental impact report (EIR) for the project identified below. SAFCA needs to know the views of each responsible and trustee agency, and each involved federal agency, as to the scope and content of the environmental information that is germane to the agency's statutory responsibilities in connection with the proposed project. SAFCA also invites the views of the public as to the scope and content of the EIR.

INTRODUCTION

The California Environmental Quality Act (CEQA) specifies that a public agency must prepare an EIR on any project that it proposes to carry out or approve that may have a significant direct or indirect effect on the environment. SAFCA is proposing to create a new funding mechanism that would provide the local share of the cost of comprehensive flood control improvements necessary to provide urban-standard ("200-year") flood protection for the Sacramento area. SAFCA has determined that flood control improvements that could be implemented using this funding may result in significant effects on the environment. Therefore, acting as the lead agency for CEQA compliance, SAFCA will prepare an EIR that evaluates at a broad, program level the significant environmental effects of the flood control projects that could be financed by the proposed funding mechanism. In addition, the EIR will evaluate the initial project that SAFCA proposes to implement under the proposed flood control improvement program, using this financing mechanism. The proposed project consists of improvements to the westerly 12,500 feet of the Natomas Cross Canal (NCC) south levee.

PURPOSE OF THE NOTICE OF PREPARATION

The purposes of this notice are to:

1. Provide background information; briefly describe the proposed funding mechanism and the range of flood control improvements it could fund, including the proposed NCC levee improvements; and summarize the probable environmental effects of these proposals.
2. Announce a public scoping meeting to facilitate public input and to be held at 6:00 p.m. on August 2, 2006, at the Sacramento County Board of Supervisors Chambers, Hearing Room One, 700 H Street, Sacramento, California.

3. Solicit input by August 22, 2006, from public agencies, and interested organizations and individuals, about the content and scope of the EIR, including alternatives to be considered, potentially significant environmental effects on the environment to be addressed, and identification of responsible and/or trustee agencies.

PROJECT DESCRIPTION

SAFCA will use the EIR as a basis for deciding whether to create a new funding mechanism to ensure the local share of funding to provide the Sacramento area with an urban standard of flood protection (i.e., 200-year or greater level of flood protection, which means protection from a flood that has an annual risk of occurrence of 0.5% or less). The funding mechanism would fund the completion of the previously approved projects and modifications to those projects as follows:

- ▶ improvements to Folsom Dam that would increase the dam's low-level discharge and flood control storage capacities (i.e., Folsom Dam raise, auxiliary spillway, and/or outlet modifications);
- ▶ construction of a new bridge across the American River downstream of the dam;
- ▶ improvements to the American and Sacramento River levee systems that would allow this system to safely contain sustained releases up to 160,000 cubic feet per second from Folsom Dam;
- ▶ improvements to the levees around the Natomas Basin, including erosion treatments, levee raising, and a combination of deep slurry walls, earthen berms, relief wells, and potentially a setback or backup levee on the Sacramento River east levee;
- ▶ improvements to the levees along Morrison Creek and its tributaries (i.e., the "South Sacramento Streams Group");
- ▶ improvements to the levees along the Natomas East Main Drainage Canal (also called Steelhead Creek) and its tributaries; and
- ▶ a long-term extraordinary maintenance program to address erosion in the Sacramento and American River channels and other extraordinary maintenance needs.

These flood control improvements would be implemented in Sacramento, Sutter, and Placer Counties, as shown in attached Exhibit 1. The EIR will evaluate these improvements at a broad, program level. As the specific improvements are proposed for implementation, they will need to be evaluated in detail in project-level CEQA documents.

To make it possible for a first phase of construction in the Natomas Basin to proceed in 2007, the EIR will also include a project-specific analysis of the environmental effects of improvements to the westerly 12,500 feet of the south levee of the NCC to remediate through-seepage and underseepage conditions. The following proposed levee improvements will be evaluated:

- ▶ NCC Reach 1—landside earthen berm 80–100 feet wide and slurry cutoff wall;
- ▶ NCC Reach 2—slurry cutoff wall, relief wells, and ditch relocation; and
- ▶ NCC Reach 3—slurry cutoff wall or ditch relocation.

Exhibit 2 illustrates the project reaches.

PROBABLE ENVIRONMENTAL EFFECTS

The EIR will describe the significant environmental effects of the program of flood control improvements that could be implemented with funding from the new funding mechanism, and the significant environmental effects of the improvements that are proposed for the NCC south levee. The EIR will also evaluate growth-inducing effects and cumulative effects of the proposed flood control improvements when considered in conjunction with other related past, present, and reasonably foreseeable future projects.

On the basis of preliminary evaluation, SAFCA has determined that the flood control improvements that could be funded in part through the new funding mechanism and will be evaluated at a program level in the EIR could have the following significant environmental effects:

- ▶ **Agriculture and Land Use.** Conversion of farmland to non-agricultural use.
- ▶ **Air Quality.** Temporary increases in pollutant emissions associated with construction activities.
- ▶ **Cultural Resources.** Disturbance of historic or archaeological resources during construction.
- ▶ **Fisheries and Aquatic Resources.** Construction effects on special-status fish species or their habitats; modification of habitat at erosion treatment sites.
- ▶ **Hazardous Materials.** Potential introduction of contaminants into water courses as a result of construction activities.
- ▶ **Noise.** Temporary increases in noise levels near sensitive receptors during construction.
- ▶ **Paleontological Resources.** Potential disturbance or destruction of previously undiscovered fossils.
- ▶ **Recreation.** Disturbance of land- and water-based recreational activities in areas adjacent to construction.
- ▶ **Terrestrial Biological Resources.** Disturbance or loss of riparian vegetation, jurisdictional wetlands, or other sensitive natural communities or special-status species habitats; construction disturbance or take of special-status terrestrial species.
- ▶ **Transportation and Circulation.** Temporary disruption of traffic circulation during construction; improvement of traffic circulation near Folsom Dam.
- ▶ **Utilities and Service Systems.** Potential disruption of service and need for the relocation of utilities.
- ▶ **Visual Resources.** Temporary and long-term changes in scenic views or visual character of project sites.
- ▶ **Water Resources and River Geomorphology.** Temporary effects on water quality during construction; long-term local drainage effects; downstream hydraulic effects on the Sacramento River.

On the basis of preliminary evaluation, SAFCA has determined that the potential NCC levee improvements that will be evaluated in the EIR at a project level could have the following significant environmental effects:

- ▶ **Agriculture.** Potential conversion of a small amount of farmland to flood control uses.
- ▶ **Air Quality.** Temporary increases in pollutant emissions associated with construction activities.
- ▶ **Cultural Resources.** Disturbance of unknown archaeological resources during construction.
- ▶ **Fisheries and Aquatic Resources.** Temporary effects on special-status fish species or their habitats caused by construction activities.
- ▶ **Terrestrial Biological Resources.** Disturbance or loss of riparian vegetation, jurisdictional wetlands, or other sensitive natural communities or special-status species habitats; construction disturbance or take of special-status terrestrial species.
- ▶ **Visual Resources.** Temporary changes in scenic views or visual character of project sites.
- ▶ **Water Resources and River Geomorphology.** Temporary effects on water quality during construction.

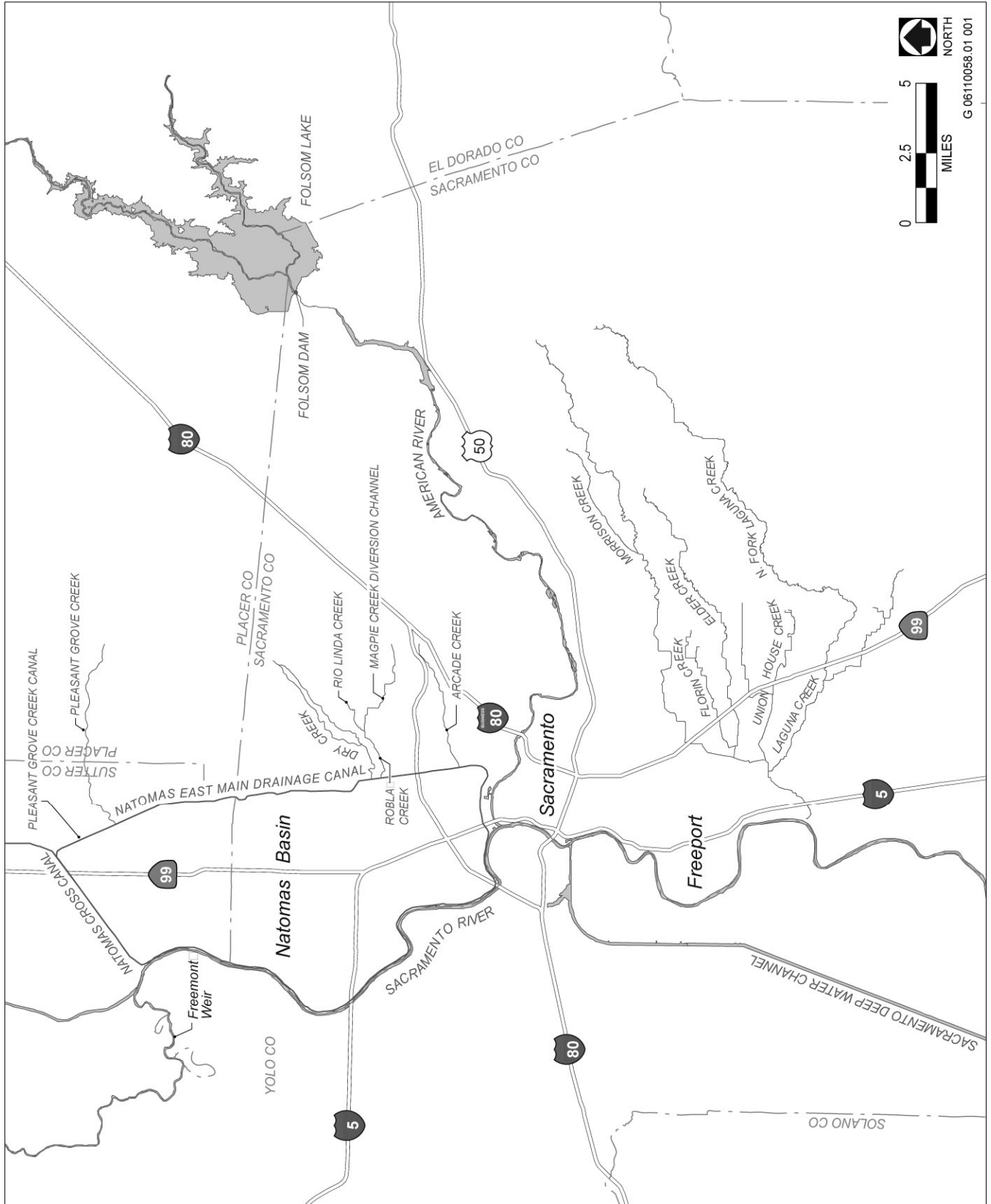
SCOPING MEETING

A public scoping meeting will be held, as discussed above under “Purpose of the Notice of Preparation.” The objectives of the meeting are to brief interested parties on the proposed project, and obtain the views of agency representatives and the public on the scope and content of the Draft EIR, including the alternatives to be addressed and the potentially significant environmental impacts.

PROVIDING SCOPING COMMENTS

Interested parties may provide written or oral comments on the desired content and scope of the environmental information in the draft EIR at the scoping meeting or may provide written comments directly to SAFCA. Because of time limits mandated by state law, **written comments must be provided to SAFCA at the earliest possible date, but no later than 5 p.m. on August 22, 2006.** Agencies that will need to use the EIR when considering permits or other approvals for the proposed project should provide SAFCA with the name of a contact person. Comments provided by e-mail should include the name and address of the sender. Please send all written comments to:

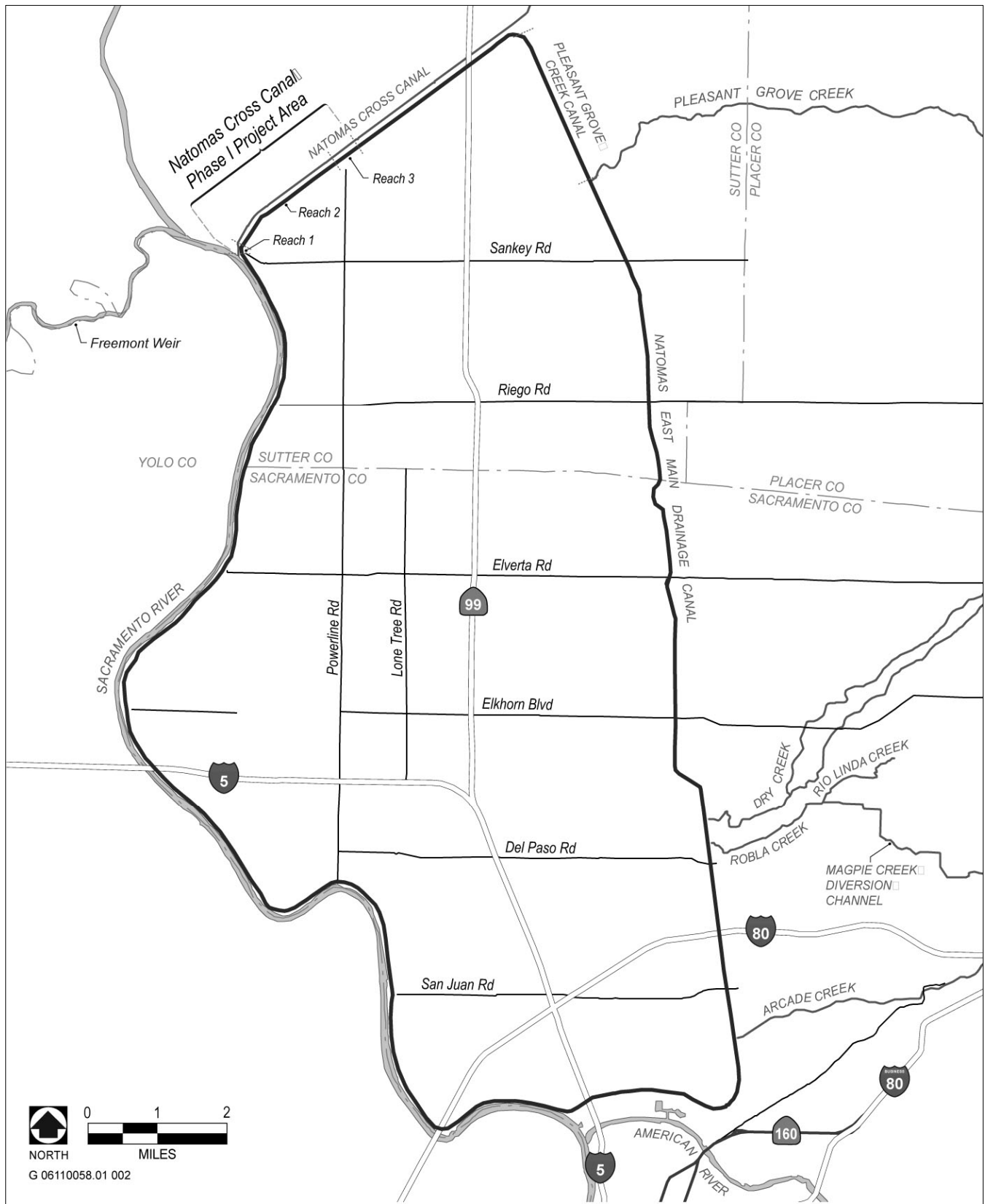
Mr. Timothy Washburn, Agency Counsel
Sacramento Area Flood Control Agency
1007 Seventh Street, 7th Floor
Sacramento, CA 95814
Telephone: (916) 874-7606
Fax: (916) 874-8289
E-mail: washburnt@saccounty.net



Source: CaSil; EDAW 2006

Project Area for Comprehensive Sacramento Area Flood Protection

Exhibit 1



Source: CaSil; EDAW 2006

Project Area for Natomas Cross Canal South Levee Phase I Improvements

Exhibit 2

DEPARTMENT OF WATER RESOURCES

1416 NINTH STREET, P.O. BOX 942836
SACRAMENTO, CA 942360001
(916) 653-5791



SEP 01 2006 SEP 5 PM 4:20

SEP 1 2006

Tim Washburn
Sacramento Area Flood Control Agency
1007 7th Street, 7th Floor
Sacramento, California 95814

Funding Mechanism for Comprehensive Sacramento Area Flood Protection and
Natomas Cross Canal South Levee Phase I Improvements Project
State Clearinghouse (SCH) Number: 2006072098

The project corresponding to the subject SCH identification number has come to our attention. The limited project description suggests a potential encroachment on an Adopted Plan of Flood Control. If indeed your project encroaches on an adopted food control plan, you will need to obtain an encroachment permit from the Reclamation Board prior to initiating any activities. The enclosed Fact Sheet explains the permitting process. Please note that the permitting process may take as much as 45 to 60 days to process. Also note that a condition of the permit requires the securing all of the appropriate additional permits before initiating work. This information is provided so that you may plan accordingly.

If after careful evaluation, it is your assessment that your project is not within the authority of the Reclamation Board, you may disregard this notice. For further information, please contact me at (916) 574-1249.

Sincerely,

A handwritten signature in black ink that reads 'Al Vargas'.

Al Vargas
Staff Environmental Scientist
Floodway Protection Section

cc: Governor's Office of Planning and Research
State Clearinghouse
1400 Tenth Street, Room 121
Sacramento, CA 95814

Enclosure

Fact Sheet

Reclamation Board Encroachment Permit Application Process

Authority

State law (Water Code Sections 8534, 8608, 8609, and 8710 – 8723) tasks the Reclamation Board with enforcing appropriate standards for the construction, maintenance, and protection of adopted flood control plans. Regulations implementing these directives are found in California Code of Regulations (CCR) Title 23, Division 1.

Reclamation Board Jurisdiction

The adopted plan of flood control under the jurisdiction and authority of the Reclamation Board includes the Sacramento and San Joaquin Rivers and their tributaries and distributaries and the designated floodways.

Streams regulated by the Reclamation Board can be found in Title 23 Section 112. Information on designated floodways can be found on the Reclamation Board's website at http://recbd.ca.gov/designated_floodway/ and CCR Title 23 Sections 101 - 107.

Regulatory Process

The Reclamation Board ensures the integrity of the flood control system through a permit process (Water Code Section 8710). A permit must be obtained prior to initiating any activity, including excavation and construction, removal or planting of landscaping within floodways, levees, and 10 feet landward of the landside levee toes. Additionally, activities located outside of the adopted plan of flood control but which may foreseeable interfere with the functioning or operation of the plan of flood control is also subject to a permit of the Reclamation Board [CCR Title 23 Section 6(c)].

Details regarding the permitting process and the regulations can be found on the Reclamation Board's website at <http://recbd.ca.gov/> under "Frequently Asked Questions" and "Regulations," respectively. The application form and the accompanying environmental questionnaire can be found on the Reclamation Board's website at <http://recbd.ca.gov/forms.cfm>.

Application Review Process

Applications when deemed complete will undergo technical and environmental review by Reclamation Board and/or Department of Water Resources staff.

Technical Review

A technical review is conducted of the application to ensure consistency with the regulatory standards designed to ensure the function and structural integrity of the adopted plan of flood control for the protection of public welfare and safety. Standards and permitted uses of designated floodways are found in CCR Title 23 Sections 107 and Article 8 (Sections 111 to 137). The permit contains 12 standard conditions and additional special conditions may be placed on the permit as the situation warrants. Special conditions, for example, may include mitigation for the hydraulic impacts of the project by reducing or eliminating the

additional flood risk to third parties that may be caused by the project.

Additional information may be requested in support of the technical review of your application pursuant to CCR Title 23 Section 8(b)(4). This information may include but not be limited to geotechnical exploration, soil testing, hydraulic or sediment transport studies, and other analyses may be required at any time prior to a determination on the application.

Environmental Review

A determination on an encroachment application is a discretionary action by the Reclamation Board and its staff and subject to the provisions of the California Environmental Quality Act (CEQA) (Public Resources Code 21000 et seq.). Additional environmental considerations are placed on the issuance of the encroachment permit by Water Code Section 8608 and the corresponding implementing regulations (California Code of Regulations – CCR Title 23 Sections 10 and 16).

In most cases, the Reclamation Board will be assuming the role of a “responsible agency” within the meaning of CEQA. In these situations, the application must include a certified CEQA document by the “lead agency” [CCR Title 23 Section 8(b)(2)]. We emphasize that such a document must include within its project description and environmental assessment the activities for which are being considered under the permit.

Encroachment applications will also undergo a review by an interagency Environmental Review Committee (ERC) pursuant to CCR Title 23 Section 10. Review of your application will be facilitated by providing as much additional environmental information as pertinent and available to the applicant at the time of submission of the encroachment application.

These additional documentations may include the following documentation:

- California Department of Fish and Game Streambed Alteration Notification (<http://www.dfg.ca.gov/1600/>),
- Clean Water Act Section 404 applications, and Rivers and Harbors Section 10 application (US Army Corp of Engineers),
- Clean Water Act Section 401 Water Quality Certification, and
- corresponding determinations by the respective regulatory agencies to the aforementioned applications, including Biological Opinions, if available at the time of submission of your application.

The submission of this information, if pertinent to your application, will expedite review and prevent overlapping requirements. This information should be made available as a supplement to your application as it becomes available. Transmittal information should reference the application number provided by the Reclamation Board.

In some limited situations, such as for minor projects, there may be no other agency with approval authority over the project, other than the encroachment permit by Reclamation Board. In these limited instances, the Reclamation Board may choose to serve as the "lead agency" within the meaning of CEQA and in most cases the projects are of such a nature that a categorical or statutory exemption will apply. The Reclamation Board cannot invest staff resources to prepare complex environmental documentation.

Additional information may be requested in support of the environmental review of your application pursuant to CCR Title 23 Section 8(b)(4). This information may include biological surveys or other environmental surveys and may be required at anytime prior to a determination on the application.



Department of Energy
Western Area Power Administration
Sierra Nevada Customer Service Region
114 Parkshore Drive
Folsom, California 95630-4710

SAF-CR-06 AUG 18 AM 9:24

AUG 17 2006

Timothy Washburn, Esq.
Agency Counsel
Sacramento Area Flood Control Agency
1007 Seventh Street, 7th Floor
Sacramento, CA 95814

Dear Mr. Washburn:

Thank you for the opportunity to comment on the Sacramento Area Flood Protection and Project Environmental Impact Report. The United States Department of Energy, Western Area Power Administration (Western), does not have any objections to the proposed use of Western's Elverta-Hurley 230-kilovolt transmission line easement provided the project does not interfere with our easement rights and are in accordance with our general guidelines. The developers should obtain license agreements from Western prior to construction. Please have the developer submit the project specific improvement plans to Western for review and approval prior to construction.

Enclosed is a copy of Western's general guidelines for the use of the easement area. If you have any questions, please contact Ms. Susan Sinclair at (916) 353-4600.

Sincerely,

A handwritten signature in cursive script that reads "Heidi R. Miller".

Heidi R. Miller
Realty Officer

Enclosure

**WESTERN AREA POWER ADMINISTRATION
GENERAL GUIDELINES CONCERNING THE USE OF
ELECTRIC TRANSMISSION LINE RIGHTS-OF-WAY**

RE: Elverta-Hurley 1 & 2 230-kV Transmission Lines

Western Area Power Administration (Western) owns a 200-foot easement along the length of the referenced transmission line. Western's rights within the easement include the right to construct, reconstruct, operate, maintain, and patrol the transmission line.

Rights usually reserved to the landowner include the right to cultivate, occupy, and use the land for any purpose that does not conflict with Western's use of its easement. To avoid potential conflicts, it is Western's policy to review all proposed uses within the transmission line easement. We consider (1) Safety of the public, (2) Safety of our Employees, (3) Restrictions covered in the easement, (4) Western's maintenance requirements, and (5) Protection of the transmission line structures and (6) Road or street crossings.

The outline below lists the considerations covered in the review. Please note that some items may overlap. This outline has been prepared only as a guide; each right-of-way encroachment is evaluated on an individual basis.

1. Safety Of The Public

- A. Approval depends, to a large extent, on the type and purpose of the development. Western takes our obligation to public safety very seriously. To insure our obligation, any use of the easement that will endanger the public will not be allowed or strongly discouraged (e.g., kite flying is prohibited).
- B. Metal fences must be grounded in accordance with applicable safety codes.
- C. Lighting standards shall not exceed a maximum height of 15 feet and not placed directly under the conductors (wires). All lighting standards must be grounded.
- D. All vegetation on the easement shall not exceed a maximum height of 12 feet at maturity.
- E. Structures are not allowed on the easement. Structures include, but are not limited to, buildings, sheds, swimming pools, basketball courts, tennis courts, gazebos, etc.
- F. No ground elevation changes are allowed which would reduce the ground to conductor clearance below 30 feet.

2. Safety Of Our Employees

Vegetation and encroachments into our right-of-way requires our crews to take action, which places them at risk. Therefore, any vegetation or encroachments that present a risk to our employees will not be allowed.

3. Restrictions Covered In The Easement

The easement prohibits the following: (1) any use that will interfere with or damage the equipment of the United States, (2) digging or drilling of a well, (3) erecting buildings or structures, (4) placing or piling up material within the easement boundaries. The easement gives Western the right to remove trees, brush or other objects interfering with the safe operation and maintenance of the line.

4. Maintenance Requirements

- A. Berms shall not be placed next to the base of the transmission line tower.
- B. Any proposed improvements to the easement (including grading, parking lot, lighting, landscaping, fences, etc.), must be reviewed by Western to assure that they will not interfere with the safe operation and maintenance of the transmission line.
- C. A 14-foot gate is required in any fences that cut off access along our easement.
- D. Thirty (30) feet of unobstructed access is to be maintained around towers.

5. Protection Of The Transmission Line Structure (Towers, Guy Wires, etc.)

- A. If the proposed use increases the possibility of a motor vehicle hitting the transmission line structure, an appropriate guard rail shall be installed to protect the structure (e.g., parking lots or roads).
- B. Trench digging, which would weaken or damage the structure, is prohibited.
- C. No ground elevation changes are allowed within 20 feet of the structure, and in no case shall the conductor to ground clearance be reduced below code limitation.

6. Roads Or Street Crossings

Western's policy is to have roads or streets cross the easement at right angles, or as nearly at right angles as possible, so that a minimum area of the road or street lies within the transmission line easement.

Requests for permission to use the transmission line right-of-way should be submitted to: Western Area Power Administration, Sierra Nevada Regional Office, Attn: Realty Officer, 114 Parkshore Drive, Folsom, CA 95630.

TRUSTEES
ROBERT SCHEIBER
ROY C. OSTERLI II
JAMES SPANGLER
JOHN TARESH
JAMES HUDSON

OFFICE OF

OFFICERS
ROBERT SCHEIBER, PRESIDENT
ROY C. OSTERLI II, VICE PRESIDENT
DIANE FALES, SECRETARY/ MANAGER

BOARD OF TRUSTEES
RECLAMATION DISTRICT No. 1001
1959 CORNELIUS AVENUE
RIOOSO, CALIFORNIA 95674
530 656-2318 or 530 633-2586
FAX 530 656-2165
EMAIL: rd1001@syix.com

SAT-09:06 AUG 23 AM 9:04

August 21, 2006

Sacramento Area Flood Control Agency
Mr. Timothy Washburn, Agency Counsel
1007 Seventh Street, 7th Floor
Sacramento, CA 95814

Re: Notice of Preparation of a Combined Program Environmental Impact Report (EIR)
on Natomas Cross Canal South Levee Phase 1 Improvements

Dear Mr. Washburn:

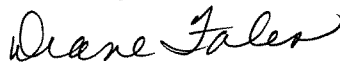
Thank you for the opportunity to comment on the Notice of Preparation of a Combined Program EIR for the South Levee of the Natomas Cross Canal- Phase 1 Improvements.

It is the concern of Reclamation District 1001 that the EIR addresses how Phase I will effect the North Levee of the Natomas Cross Canal. Specifically the following:

- (1) That the proposed levee improvements do not result in an adverse effect on RD 1001's flood control facilities.
- (2) That the EIR take into consideration the potential effects to RD 1001.
- (3) At any time, large flood events can cause failure on either or both sides and relieve the impact on the other district. With only one side reinforced, the other side will always take the full impact and the possibility of flooding the unprotected district will increase.
- (4) Should an increase in height to one side of the levee system be proposed, it may increase the chances of flooding for the unimproved areas.

If you have any questions or comments, you may contact Diane Fales of this office.

Yours truly,



Diane Fales
Secretary/Manager

cc: Larry Combs, Administrator, County of Sutter
df

APPENDIX B

Mitigation Incorporated into Proposed Improvements
Covered in Previous Environmental Documents

Table B-1 Summary of Impacts and Mitigation Measures Incorporated by Reference		
Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
FLOOD CONTROL IMPROVEMENTS ALONG THE MAINSTEM OF THE AMERICAN RIVER VOLUME I DRAFT PEIR (SAFCA 2000)		
WATER QUALITY		
Potential discharge of hazardous materials and siltation to lower American River during construction of river outlets and discharge of bentonite to Folsom Reservoir during installation of impervious cores, wing dams, and dikes.	4.4-1. Implement erosion control measure. 4.4-2. Land dispose of construction waters. 4.4-3. Apply BMP's during slurry wall construction.	LS
Increased erosion and stormwater runoff to the American River during levee equalization.	4.4-4. Implement standard erosion and siltation BMP's during construction and revegetate levee slopes.	LS
VEGETATION		
Temporary disturbance and permanent removal of riparian woodland and forest during levee equalization.	4.6-1. Compensate for loss of riparian woodland and forest.	LS
Temporary removal or damage to riparian habitat during levee equalization.	4.6-2. Avoid and/or compensate for loss of riparian habitat.	LS
WILDLIFE		
<i>Lower American River</i>		
Temporary disturbance and permanent removal of riparian woodland and forest wildlife habitat during levee equalization.	4.7-1. Compensate for loss of riparian wildlife habitat.	LS
Loss of riparian wildlife habitat during levee equalization.	4.7-2. Compensate for or avoid loss of riparian wildlife habitat.	LS
Removal of elderberry shrubs and elimination of Valley Elderberry Longhorn Beetle habitat.	4.7-3. Prepare and implement a Valley Elderberry Longhorn Beetle Compensation Plan.	LS
RECREATION		
<i>Lower American River</i>		
Temporary disruption of water-enhanced recreation opportunities during levee equalization.	4.8-1. Prepare trail user detour plans.	LS

Table B-1 Summary of Impacts and Mitigation Measures Incorporated by Reference		
Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
VISUAL RESOURCES		
<i>Lower American River</i>		
Construction of pump facility at Mayhew Drain.	4.9-1. Construction of a landscape buffer to screen views of the pump facility.	LS
AIR QUALITY		
Temporary NO _x emissions would substantially affect air quality under levee equalization and Folsom Dam modifications.	4.11-1. Include air quality mitigation measures as part of the proposed program's construction management plan. Measures will include requirements for construction vehicle emissions, equipment maintenance, and use of electric equipment where feasible.	LS
Temporary PM ₁₀ emissions would not substantially affect air quality under levee equalization and Folsom Dam modifications.	SMAQMD requires the inclusion of PM ₁₀ control measures as part of Proposed Action's construction management plan.	LS
TRAFFIC AND CIRCULATION		
Temporary increase in traffic volumes would substantially affect traffic and circulation under levee equalization and Folsom Dam modifications.	4.19-1. Limit haul truck trips to non-peak commute hours.	LS
Temporary increases in traffic volumes would substantially affect traffic safety under levee equalization and Folsom Dam modifications.	4.10-2. Prepare and implement a Construction Management Plan which should include provisions specifying the steps that will be taken to maintain public safety during all phases of construction.	LS
Temporary closures of Folsom Dam Road would substantially affect traffic circulation patterns and traffic delays under Folsom Dam modifications.	4.10-3. Prepare and implement a Folsom Dam Road closure notification plan.	LS
NOISE		
<i>Lower American River</i>		
Temporary noise increases would substantially increase ambient noise levels under levee equalization.	4.13-1. Develop and implement a noise abatement program for the Campus Commons and Mayhew Drain levee equalization projects. Noise abatement program	LS

Table B-1 Summary of Impacts and Mitigation Measures Incorporated by Reference		
Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
	should require limited construction hours, appropriate equipment mufflers and buffers, and advance notice to residences.	
CULTURAL RESOURCES		
<i>Folsom Dam</i>		
Modification to Folsom Dam could substantially affect cultural resources.	4.15-1. Comply with Section 106 of the NHPA through the Programmatic Agreement.	LS
Modification to levees could substantially affect cultural resources under levee equalization.	4.15-1. Comply with Section 106 of the NHPA through the Programmatic Agreement.	LS
<i>Folsom Reservoir</i>		
Water level fluctuations between 380 and 430 feet would substantially affect cultural resources under reoperation.	4.15-2. Comply with Research Design to guide future inventory, evaluation, data recovery, and/or protection of archaeological resources that may be affected by reoperation.	LS
Exposure of cultural resources under reoperation.	4.15-2. Comply with Research Design to guide future inventory, evaluation, data recovery, and/or protection of archaeological resources that may be affected by reoperation.	LS
PUBLIC SAFETY AND UTILITIES		
<i>Lower American River</i>		
Excavation could substantially affect utility services under levee equalization.	4.16-1. Ensure that utility infrastructure components are not damaged or removed from service as a result of construction activities. Before beginning construction, all utilities that cross over or under affected levees will be identified and accommodated in design.	LS
Construction equipment could substantially affect fire hazards.	4.16-2. Implement a fire control plan before construction is initiated.	LS
Construction activities could substantially affect public health and safety if activities result in a hazardous material spill.	4.16-3. Implement a hazardous materials management plan before construction begins.	LS
Construction activities could substantially affect public health	4.16-4. Conduct environmental site assessments for all construction sites before	LS

Table B-1 Summary of Impacts and Mitigation Measures Incorporated by Reference		
Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
and safety if activities result in the disturbance of unknown hazardous materials at construction sites.	construction begins.	
SOUTH SACRAMENTO STREAMS PROJECT FINAL EIR (SAFCA 2005)		
LAND USE AND AGRICULTURE		
4.2.1. The Proposed Project would not result in the conversion of economically viable Prime Farmland, Unique Farmland, and Farmland of Statewide Importance (Farmland) as depicted on the maps prepared pursuant to the Farmland Mapping and Monitoring Program. (Displaced farmland would occur from previously adopted project elements, not part of Proposed Project.)	Although no mitigation is required, SAFCA shall acquire 9.7 acres of farmland, designated as Prime, Unique, or Farmlands of Statewide Significance, through fee title, easement, or other deeded restriction and shall assure that this land is maintained in commercial agricultural production in perpetuity to further address impacts to farmlands with the previously approved project, though not to fully mitigate, the displacement of designated farmland.	LS
PUBLIC SERVICES AND UTILITIES		
4.4.4. Other Public Utilities – Installation of flood control improvements has the potential to conflict with proposed implementation of the Sacramento Regional Transit South Sacramento Corridor Phase 2 Light Rail Transit system, Freeport Regional Water Project, City of Sacramento 20-inch water pipeline located along Cosumnes River Boulevard, and the Cosumnes River Boulevard Widening and Extension Project.	Coordination shall be implemented during the course of constructing the proposed flood control improvements with representatives of other projects that may be occurring simultaneously with the proposed project. Where potential conflicts are identified, mutually agreeable measures will be taken to avoid or minimize adverse consequences on either project's implementation or features.	LS
TRANSPORTATION AND CIRCULATION		
4.5.1. Construction of the Proposed Project would increase the number of daily vehicle trips and potentially reduce the available width of affected roadways, thereby resulting in short-term and potentially significant traffic delays for vehicles traveling past the construction zones.	Applicable to Stockton Boulevard, Florin Road, Meadowview/Mack Road, I-5, and SR 99 bridge crossings: Delivery of materials to construction sites, which would impede vehicle movement along these roadways shall not be allowed during the morning and afternoon peak hours of roadway travel. Specifically, truck deliveries would not be allowed between 6:00 a.m. and 10:00 a.m. and between 3:00 p.m. and 7:00 p.m., Monday through Friday.	LS

**Table B-1
 Summary of Impacts and Mitigation Measures Incorporated by Reference**

Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
	Applicable to Stockton Boulevard, Florin Road, Meadowview/ Mack Road, I-5, and SR 99 bridge crossings: Delivery or pick up of equipment at construction sites, which would impede vehicle movement along these roadways, shall not be allowed during the morning and afternoon peak hours of roadway travel. Specifically, truck deliveries or pick ups would not be allowed between 6:00 a.m. and 10:00 a.m. and between 3:00 p.m. and 7:00 p.m., Monday through Friday. Applicable to Stockton Boulevard, Florin Road, Meadowview/Mack Road, I-5, and SR 99 bridge crossings: Construction equipment shall not be allowed to be moved into or out of stream channels where it would impede vehicle movement along these roadways during the morning and afternoon peak hours of roadway travel. Specifically, construction equipment would not be allowed to be moved into or out of stream channels between 6:00 a.m. and 10:00 a.m. and between 3:00 p.m. and 7:00 p.m., Monday through Friday. Applicable to Stockton Boulevard, Florin Road, Meadowview/Mack Road, I-5, and SR 99 bridge crossings: Construction vehicles would not be permitted to block any travel lanes. Applicable to all construction locations: Construction zones along roadways would be posed to notify approaching motorists or trucks entering and exiting roadside construction sites and to reduce speeds through the construction zone. Applicable to all construction locations: If there are trucks or equipment which would need time to maneuver into or out of construction sites and could affect traffic, flag holders would be stationed to slow or stop approaching vehicles to avoid conflicts with construction vehicles or equipment. Prior to approval of levee improvement plans and specifications for the North Beach Lake levee, plans and specifications will be submitted to Caltrans for their review and comment on the effects to SR 99, SR 160 and I-5. Prior to construction along the levee, an encroachment permit will be obtained from Caltrans for construction activities within I-5, SR 99, and SR 160 rights-of-way. As part of the permit process, the following items would be incorporated into the encroachment permit:	

Table B-1
Summary of Impacts and Mitigation Measures Incorporated by Reference

Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
	Development of a traffic control plan to implement traffic controls including signage, partial lane closures, and restrictions of peak period construction. Development of access point(s) plans and specifications for the movement of construction traffic and equipment onto and off SR 160. These plans and specifications would include the number and design of access points to ensure safety. If access point(s) are not already permitted, appropriate encroachment permits would be obtained from Caltrans.	
4.5.3. The Proposed Project could temporarily affect roadway safety and emergency access during construction.	Implement Mitigation Measures 4.5.1a, 4.5.1b, 4.5.1c, 4.5.1d, 4.5.1e and 4.5.1f.	LS
4.5.4. Construction activities would place a temporary increase on demand for parking within the project area.	On-street parking for construction workers would be prohibited for construction sites with more than twelve workers. Off-street parking would be identified and provided to the construction workers and their vehicles and transport trucks. Preferred parking would be located close enough to walk; however, if nearby off-street parking is not available farther off-street parking would be provided with a shuttle van to transport workers to construction sites.	LS
4.5.5. Implementation of the Proposed Project would not create transportation hazards or be incompatible with existing transportation systems. However, construction along the UPRR could conflict with existing rail service.	Prepare railroad crossing plans identifying measures to protect the railroad line from damage and ensure that the crossings would not disrupt normal UPRR operations. Prepare and implement a railroad crossing plan to ensure the safety of construction workers and UPRR operations. The railroad crossing plan would include a statement ensuring that any damage to the UPRR right-of-way would be repaired by the construction contractor to pre-project conditions.	LS
4.5.6. Construction of the Proposed Project could adversely affect the local traffic circulation system by damaging designated haul routes used by construction vehicles to access the project work site(s).	Prior to construction activities, a pre-project survey of project roadways would be done by the construction contractor in coordination with the City or County to determine existing roadway conditions.	LS

Table B-1 Summary of Impacts and Mitigation Measures Incorporated by Reference		
Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
	A post-project survey of project roadways would be done by the construction contractor in coordination with the City or County to determine if any damage has occurred from construction activities. If so, the contractor would be responsible for repairing the damage to the satisfaction of the City or County.	
HYDROLOGY AND WATER QUALITY		
4.6.1. Water Quality – Construction of the Proposed Project could result in increased erosion and sedimentation of local waterways, thereby potentially violating water quality standards for the affected waterways and the Sacramento River. Additionally, release of fuels or other hazardous materials associated with construction equipment could impact surface and groundwater quality.	All construction plans shall include the preparation of a grading and erosion control plan in addition to the Stormwater Pollution Prevention Plan (SWPPP) to address potential erosion during construction. This requirement will be integrated with the project SWPPP, provided that it meets the requirements of both the USACE and the RWQCB. Construction contractors shall implement BMPs to provide effective erosion and sediment control. These BMPs shall be selected to achieve maximum sediment removal and represent the best available technology that is economically available. Performance and effectiveness of these BMPs shall be determined either by visual means where applicable (i.e., observation of above-normal sediment release), or by actual water sampling in cases where verification of contaminant reduction or elimination, (inadvertent petroleum release) is required to determine adequacy of the measure. BMPs to be implemented as part of this mitigation measure shall include, but are not limited to, the following measures: Inspect and maintain all storm drains and catch basins. Properly dispose of oil or liquid wastes. Fuel and maintain vehicles in specific areas which are designed to capture spillage. Inspect and maintain vehicles and equipment to prevent dripping of oil and other fluids. Avoid grading and excavation in the rainy season. Construction would take place between April and November. If rains are likely during this construction period	LS

**Table B-1
Summary of Impacts and Mitigation Measures Incorporated by Reference**

Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
	(November rains are likely), temporary erosion control measures would be implemented such as berms, silt fences, stacked hay bales, and other protective measures. Train construction personnel regarding stormwater pollution prevention practices. Other BMPs that would be implemented include: All temporary access ramps leading into stream channels would be completely removed at the end of construction and prior to the beginning of the rainy season. Disturbed embankments would be stabilized and revegetated. Bridge retrofit construction work would include an embankment stabilization and revegetation plan. Stabilization would use protective rock shields around bridge pilings and where erosion could be severe during high streamflows. All in-channel areas disturbed by construction activity would be stabilized and revegetated prior to the start of the rainy season. Areas of soil compaction would be loosened and seeded with annual grasses.	
BIOLOGICAL RESOURCES		
4.7.1. Construction of the Proposed Project would result in the loss and temporary disturbance of federally protected wetlands as defined by Section 404 of the CWA.	Similar to the mitigation measure adopted for loss of wetlands in the 1998 EIR, any loss of additional wetlands shall be compensated to the degree needed to replace the functional values supported by this habitat. According to the Habitat Evaluation Procedure (HEP) analysis performed in 1998, the total compensation acreage equals about 1.16 acres (0.71 acre of seasonal wetland, 0.23 acre of emergent marsh, and 0.19 acre of riparian scrub-shrub). The proposed design refinements may result in the loss of additional wetlands. These additional wetlands will be replaced in a manner similar to the 1998 EIR. Suitable off-site mitigation land acquisition or mitigation bank purchase would adequately compensate for impacts associated with project implementation. Potential impacts to waters of the U.S. that may occur from project construction shall be minimized by implementing BMPs outlined in Mitigation Measure 4.6.1a and 4.6.1b, as in the 1998 EIR.	LS

**Table B-1
 Summary of Impacts and Mitigation Measures Incorporated by Reference**

Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
4.7.2. Construction of the Proposed Project could result in potential adverse impacts to special-status species as defined in this section.	USFWS developed new mitigation guidelines in 1999. These guidelines include identifying the locations of all potential VELB habitats within 100 feet of the project site and implementing feasible measures to avoid direct and indirect impacts during the construction of flood control improvements. In the event that identified shrubs cannot be avoided, consultation with the USFWS shall be initiated to determine mitigation and compensation requirements as described in the USFWS (1999) VELB guidelines. These measures include pre-construction surveys, avoidance within 100 feet of the dripline of elderberry shrubs containing stems measuring 1.0 inch or greater in diameter at ground level, restoration of any damage to the buffer area, transplanting shrubs that cannot be avoided, and replacement of damaged shrubs at a ratio ranging from 1:1 to 8:1. For construction of the proposed design refinements that will occur between March 15 and September 15, preconstruction surveys shall be conducted in suitable nesting habitat within ½ mile of the project site for Swainson’s hawk, within 1,000 feet of the project site for tree-nesting raptors and northern harriers, and within 500 feet of the project site for burrowing owls, similar to the 1998 EIR. Surveys shall conform to the Swainson’s Hawk Technical Advisory Committee (2000) guidelines and DFG burrowing owl recommendations. Burrowing owl surveys shall be conducted in both the breeding (April 15 to July 17) and non-breeding (December 1 to January 31) seasons. If nesting raptors are recorded within their respective buffers, DFG will be consulted regarding suitable measures to avoid impacting breeding effort. Measures may include, but are not limited to: Maintaining a 500 foot buffer around each active raptor nest; no construction activities shall be permitted within this buffer except as allowed through consultation with DFG. This buffer may be reduced in consultation with DFG. Depending on conditions specific to each nest, and the relative location and rate of construction activities, it may be feasible for construction to occur as planned within the buffer without impacting the breeding effort. In this case (to be determined in consultation with DFG), the nest(s) shall be monitored by a qualified biologist during construction within the buffer. If, in the professional opinion of the monitor, the project would impact the nest, the biologist shall immediately inform the	LS

**Table B-1
Summary of Impacts and Mitigation Measures Incorporated by Reference**

Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
	construction manager and DFG. The construction manager shall stop construction activities within the buffer until either the nest is no longer active or the project receives approval to continue from DFG. For construction of the proposed design refinements between March 15 and August 1, at least two preconstruction surveys (separated by at last 2 weeks) for tricolored blackbird colonies shall be conducted in suitable habitat by a qualified biologist. These surveys shall be completed within 30 days prior to construction. If a colony is identified in or within 500 feet of the project area, DFG will be consulted regarding suitable measures to avoid impacting breeding effort. Measures may include, but are not limited to: Maintaining a 500-foot buffer around each colony; no construction activities shall be permitted within this buffer except as allowed through consultation with DFG. This buffer may be reduced in consultation with DFG. Depending on conditions specific to each colony, and the relative location and rate of construction activities, it may be feasible for construction to occur as planned within the buffer without impacting the breeding effort. In this case (to be determined in consultation with DFG), the colony shall be monitored by a qualified biologist during construction within the buffer. If, in the professional opinion of the monitor, the project would impact the colony, the biologist shall immediately inform the construction manager and DFG. The construction manager shall stop construction activities within the buffer until either the colony is no longer active or the project receives approval to continue from DFG. To avoid the removal of active nests and eggs during the nesting season, vegetation removal shall be scheduled to occur outside of the nesting season of March 1 to September 1. If vegetation removal must occur during the nesting season, a pre-construction clearance survey shall be conducted within 30 days of construction in the areas where vegetation is proposed to be removed. If no active nests are detected, construction may proceed. If active nests are detected, 20-foot avoidance zones shall be established to avoid disturbance. If avoidance is not possible, DFG will be contacted.	

Table B-1 Summary of Impacts and Mitigation Measures Incorporated by Reference		
Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
	Vernal pool habitat shall be avoided to the extent possible within the establishment of a 250 foot buffer. The vernal pool and the buffer area shall be fenced prior to construction activities. Fencing shall remain in place until after all construction activities have ceased. If avoidance within 250 feet is not possible, consultation with USFWS shall be conducted to determine appropriate mitigation measures for any direct and indirect impacts that may occur due to the Project. These measures shall include, but not be limited to, preservation of vernal pool habitat for habitat affected at a ratio of 2:1 at an off-site, USFWS-approved location, or other appropriate mitigation as determined by USFWS. To minimize incidental take of the Federally listed giant garter snake, compliance with the terms and conditions and reasonable and prudent measures identified in the 2002 Biological Opinion is required. The USACE would also compensate for the permanent loss of an additional 0.06 acres of upland giant garter snake habitat through the purchase of credits at a USFWS-approved mitigation bank at a ratio of 3:1. Construction in aquatic habitat or upland habitat within 200 feet of the streams shall conform to USFWS guidelines, including the requirement that construction be limited to the period between May 1 and October 1, the active period for giant garter snake. Construction within the area may be subject to additional conditions, such as pre-construction surveys, worker training, and habitat protection as determined appropriate by the USFWS. Prior to construction in aquatic habitat, the crews shall receive giant garter snake and western pond turtle awareness training, as in the 1998 EIR. This training shall include, at a minimum, a description of giant garter snake and western pond turtle, their habitat requirements, and a photograph or illustration of the species so that crews can recognize the species. In the event that either species is present in the construction area, a qualified biologist holding necessary permits shall be retained to remove them from the construction area.	

**Table B-1
Summary of Impacts and Mitigation Measures Incorporated by Reference**

Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
AIR QUALITY		
4.8.1. Project construction would result in exhaust emissions of NO _x that exceed SMAQMD significance thresholds for construction activities.	The following measures would reduce NO_x emissions from off road diesel-powered equipment: Implement measures, approved by SMAQMD, demonstrating that the heavy-duty (greater than 50 horsepower) off-road vehicles to be used during project construction, including owned, leased, and subcontractor vehicles, shall achieve a project-wide fleet-average 20 percent NO_x reduction and 45 percent particulate reduction as compared to the most recent CARB fleet average at the time of construction. Submit to SMAQMD an offsite mitigation fee of \$13,600/ton enabling SMAQMD to implement local programs capable of reducing emissions of NO_x in Sacramento County. The fee amount would be based on the tonnage of Project NO_x emission exceeding the allowable 85 lbs/day limit. Submit to SMAQMD a comprehensive inventory of all off-road construction equipment, equal to or greater than 50 horsepower, that would be used an aggregate of 40 or more hours during any portion of the construction project. The inventory shall include the horsepower rating, engine production year, and projected hours of use or fuel through-put for each piece of equipment. The inventory shall be updated and submitted monthly throughout the duration of the project, except that an inventory shall not be required for any 30-day period in which there is no construction activity. At least 48 hours prior to the use of subject heavy-duty off-road equipment, the project representative shall provide SMAQMD with the anticipated construction timeline, including start date, and name and phone number of the project manager and on-site foreman. The following measure would control visible emissions from off-road diesel-powered equipment: The project contractor(s) shall be required to ensure that emissions from all off-road diesel powered equipment used on the project site do not exceed 40 percent opacity for more than 3 minutes in any 1 hour. Any equipment found to exceed 40 percent	LS

**Table B-1
Summary of Impacts and Mitigation Measures Incorporated by Reference**

Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
	(or Ringelmann 2.0) shall be repaired immediately, and SMAQMD shall be notified with 48 hours of identification of non-compliant equipment. A visual survey of all in-operation equipment shall be made at least weekly, and a monthly summary of the visual survey results shall be submitted throughout the duration of the project, except that the monthly summary report shall not be required for any 30-day period in which no construction activity occurs. The monthly summary shall include the quantity and type of vehicles surveyed, as well as the dates of each survey. SMAQMD and/or other officials may conduct periodic site inspections to determine compliance. Nothing in this measure would supercede other SMAQMD or State rules or regulations.	
4.8.2. Project construction would result in significant emissions of PM-10, particularly as fugitive dust.	The construction contractor(s) shall be required to implement the following dust control measures: Keep soil moist at all times. Keep stockpiles of sand, soil, and similar materials moist or surrounded by windbreaks. Cover trucks hauling dirt and debris off site to reduce spillage onto paved surfaces or maintain two feet of freeboard space on haul trucks. Use emulsified diesel or diesel catalysts on applicable heavy duty diesel construction equipment. Apply non-toxic chemical soil stabilizers to all inactive construction areas (previously graded areas inactive for 10 days or more). Suspend all excavating and grading operations when wind speeds (as instantaneous gusts) exceed 25 miles per hour. Sweep streets once a day if visible soil materials are carried to adjacent streets. Install wheel washers where vehicles enter and exit unpaved roads onto paved roads, or wash off trucks and any equipment leaving the site each trip. Traffic speeds on all unpaved roads to be reduced to 15 miles per hour or less.	LS

**Table B-1
Summary of Impacts and Mitigation Measures Incorporated by Reference**

Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
NOISE		
4.9.1. Construction activities associated with the proposed flood control improvements would generate noise levels in excess of applicable land standards.	Construction equipment shall be outfitted and maintained with noise-reduction devices such as mufflers to minimize construction noise. All internal combustion engines shall be operated with exhaust and intake silencers. To minimize noise effects on nearby residents during noise-sensitive periods and to ensure consistency with the construction hourly limits set forth in the City and County of Sacramento Noise Ordinances, construction activities shall be restricted to between the hours of 7:00 a.m. and 6:00 p.m., Monday through Saturday, and between 9:00 a.m. and 6:00 p.m. on Sundays. Prior to construction at each site near residences, written notification to potentially affected residents shall be provided, identifying the type, duration, and frequency of construction activities. Notification materials shall also identify a mechanism for residents to register complaints with the County or City if construction noise levels are overly intrusive or construction occurs outside the required hours. Where feasible and particularly in locations subject to prolonged construction (e.g., borrow sites or the detention basin), noise-generating construction equipment shall be shielded from nearby residences by noise-attenuating buffers such as structures or truck trailers or by placement of soil piles between the receptor and noise-generating activity. Project construction contractor(s) shall locate fixed construction equipment (e.g., compressors and generators) and construction staging areas as far as possible from noise-sensitive receptors.	SU
4.9.2. Construction activities associated with the proposed flood protection measures could result in damage to nearby residential buildings or backyard structures due to excessive construction vibration.	At the time in which final construction design details are known, a qualified vibration consultant shall determine the need for and the extent of vibration monitoring during project construction. Undertake a pre-construction survey or a detailed “crack survey” before the start of construction sheetpile driving activities within 100 feet of existing buildings/structures. The survey may be done by photographs, video tape, or visual	LS

Table B-1 Summary of Impacts and Mitigation Measures Incorporated by Reference		
Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
	inventory, and shall include inside as well as outside locations of nearby residences. All existing cracks in walls, floors, driveways, etc. shall be documented with sufficient detail for comparison after construction to determine whether actual vibration damage has occurred. If damage to building/structures is found to have occurred as a result of project construction vibrations, implement a damage repair/compensation program in consultation with affected parties.	
HAZARDOUS MATERIALS		
4.10.1. Construction of the Proposed Project could result in the exposure of individuals to contaminated soil and/or groundwater.	Prior to construction, the project borrow sites shall be sampled to determine the presence, levels and types of pesticide residue that may be present in the soil. The borrow sites shall also be sampled for other types of hazardous materials that may be present in the soil. The material shall be evaluated for exposure risk for construction workers and the public. Prior to construction, soil adjacent to the historic railroad alignment near the North Beach Lake levee shall be sampled and analyzed for petroleum hydrocarbons, pesticides, herbicides, and heavy metals. If hazardous materials are found remediation and proper disposal of the contaminated material shall be initiated, and the railroad and appropriate state and local agencies notified. Remediation shall be completed before construction would proceed in the area. Prior to construction, the utilities near the treatment plant shall be surveyed. An evaluation of the potential for contamination, identification and implementation of worker safety measures shall be completed prior to any construction activities. Prior to construction, a site specific health and safety plan shall be prepared by a qualified health and safety professional. The plan shall include measures to reduce the risk for worker exposure and contamination during construction. A worker awareness program shall be developed and implemented to educate the workers on worker safety measures, other provisions of the health and safety plan, and the correct procedures if exposure or contamination occurs. The health and safety plan will include appropriate coordination with treatment plant and other city and county health and safety personnel.	LS

**Table B-1
Summary of Impacts and Mitigation Measures Incorporated by Reference**

Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
	The health and safety plan will include a plan for the discovery of unidentified hazardous substances. The plan shall include appropriate testing, remediation, and worker safety measures. This plan will be coordinated with appropriate local health and safety personnel. The health and safety plan shall include emergency procedures that would be implemented in case of an emergency at the treatment plant during construction. The health and safety plan shall include appropriate coordination with treatment plant and other city and county health and safety personnel.	
CULTURAL RESOURCES		
4.11.1. Implementation of the Proposed Project may affect unknown, potentially significant archeological resources.	If any historic or prehistoric find is determined to be significant by a qualified archaeologist, consultation shall occur to determine an appropriate course of action. All significant cultural materials recovered shall be subject to scientific analysis, professional museum curation, and a report prepared by a qualified archaeologist according to current professional standards in accordance with CEQA Guidelines Section 15064.5 (f).	LS
4.11.2. The implementation of the Proposed Project may adversely affect previously undocumented paleontological resources.	Implement Mitigation Measure 4.11.1.	LS
4.11.3. The implementation of the Proposed Project may adversely impact human burials or remains.	In the event of the discovery of human remains, CEQA Guidelines 15064.5 (e)(1) shall be followed, including: (1) There shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent human remains until: (2) The coroner of the county in which the remains are discovered must be contacted to verify that the remains are human, that no investigation of the cause of death as required, and (2a) If the coroner determines the remains to be Native American: 1. The coroner shall contact the Native American Heritage Commission within 24 hours.	LS

Table B-1 Summary of Impacts and Mitigation Measures Incorporated by Reference		
Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
	- The Native American Heritage Commission shall identify the person or persons it believes to be the most likely descended from the deceased Native American. - The most likely descendent may make recommendations to the landowner or the person responsible for the excavation work, for means of treating or disposing of, with appropriate dignity, the human remains and any associated grave goods as provided in Public Resources Code Section 5097.98.	
SOUTH SACRAMENTO COUNTY STREAMS PROJECT, CAMRAY BORROW SITE AND ADDITIONAL ASPECTS OF LEVEE WORK ON NORTH BEACH LAKE LEVEE FINAL SUPPLEMENTAL EIR/EA (SAFCA 2001)		
AGRICULTURAL RESOURCES		
4.1-1. Conversion of Farmland. Excavation of fill material from the Camray site would result in a temporary elimination of 45.5 acres of Prime Farmland. After restoration, most of the site would be returned to agricultural production; however, 2.5 acres around the perimeter of the site would be permanently converted. This is a significant impact to agricultural resources	No mitigation measures are available to reduce this impact to a less-than-significant level.	SU
AIR QUALITY		
4.2-1. Short-term Increase in Construction-Generated Pollutants. Emissions of NO _x and PM ₁₀ would exceed the SMAQMD significance thresholds of 85 and 275 lbs/day. As a result, the proposed project would be considered to have a significant short-term impact on regional air quality.	The following measures will be implemented, as recommended by the SMAQMD, to reduce combustion emissions related to construction: - Engine timing on diesel-powered equipment shall be retarded to reduce NO_x emissions; - Grading and construction equipment shall be shut down when not in use; - Contractor shall develop a comprehensive construction activity management plan to minimize pieces of construction equipment operating and the extent of the site area worked during any given day;	SU

**Table B-1
Summary of Impacts and Mitigation Measures Incorporated by Reference**

Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
	- Contractor shall ensure that construction equipment and maintenance vehicles are properly maintained and direct-injection diesel engines or gasoline-powered engines are used where feasible; and - Vehicles shall be fitted with emission reduction equipment where feasible. The following mitigation measure will be implemented, as recommended by the SMAQMD, to reduce PM₁₀ emissions related to construction: - Sprinkle all construction areas with water at least twice daily during excavation and other ground disturbing activities; - Keep stockpiles of sand, soil, and similar materials moist or surrounded by windbreaks; - Cover trucks hauling dirt and debris off the side to reduce spillage onto paved surfaces; - Maintain at least 2 feet of freeboard on all haul trucks; - Post signs that limit vehicle speeds on unpaved roads and over disturbed soils to 10 miles per hour only at the Camray Borrow Site during construction; and - Wash all truck tires before leaving project site and entering paved roads. The following mitigation measures will be implemented, as recommended by the SMAQMD, to minimize onsite construction equipment emissions, including emissions of diesel particulate: - The prime contractor shall provide a plan for approval by USACE and SMAQMD demonstrating that the heavy-duty (>50 horse power) Construction equipment and vehicles to be used in the construction project, and operated by either the prime contractor or any subcontractor, will achieve a fleet-averaged 20 percent NO_x reduction and 45 percent particulate reduction compared to the most recent CARB fleet average; and - The prime contractor shall submit to USACE and SMAQMD a comprehensive inventory of all construction equipment, equal to or greater than 50 horsepower, that will be used an aggregate of 40 or more hours during the construction project. The inventory shall include the horsepower rating, engine production year, and hours of use or fuel throughout for each piece of equipment. The inventory shall be updated and submitted monthly throughout the duration of	

**Table B-1
Summary of Impacts and Mitigation Measures Incorporated by Reference**

Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
	the project, except that an inventory shall not be required for any 30-day period in which no construction activity occurs. The prime contractor shall ensure that emissions from all diesel powered equipment used on the project site do not exceed 40 percent opacity for more than three minutes in any one hour. Any equipment found to exceed 40 percent opacity shall be required to stop immediately, and USACE and SMAQMD shall be notified within 48 hours of identification of non-compliant equipment. A visual survey of all in-operation equipment shall be made at least weekly, and a monthly summary of the visual survey results shall be submitted throughout the duration of the project, except that the monthly summary shall not be required for any 30-day period in which no construction activity occurs. The monthly summary shall include the quantity and type of vehicles surveyed as well as the dates of each survey. The SMAQMD and/or other officials may conduct periodic site inspections to determine compliance. Nothing in this section shall supercede other SMAQMD or state rules or regulations.	
BIOLOGICAL RESOURCES		
4.3-1. Potential impacts to giant garter snake habitat along Morrison Creek. The hauling of borrow material from the Camray site to the North Beach Lake Levee construction site east of Interstate 5 would result in vehicular traffic in the Morrison Creek floodplain and could therefore result in impacts to the giant garter snake. This impact is considered significant.	The following mitigation measures have been developed in coordination with the Programmatic formal consultation for USACE 404 permitted projects with relatively small effects on the Giant Garter Snake within Butte, Colusa, Glenn, Fresno, Merced, Sacramento, San Joaquin, Solano, Stanislaus, Sutter and Yolo counties, California (USFWS 1997) and are consistent with those identified in the FEIR/FEIS. - Limit all activities in the Morrison Creek Floodplain and the adjacent uplands to the construction window between May 1 and October 1 of the same calendar year. This will ensure that all work is conducted within the active season of the Giant Garter Snake and that no repeated disturbance will occur during the breeding season in subsequent years. - Limit the disturbance area to the minimum amount possible. All traffic will be restricted to the existing dirt road traversing the floodplain of Morrison Creek. If the road needs improvement to allow for the passage of larger trucks, the	LS

**Table B-1
Summary of Impacts and Mitigation Measures Incorporated by Reference**

Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
	improvements will be limited to the minimum amount possible (20' maximum road width) and all materials, such as gravel, placed on the surface of the existing road will be removed immediately following project implementation during the same calendar year and the area will be allowed to return naturally to its preconstruction condition. This will ensure a no-net-loss of potential Giant Garter Snake habitat. • Prior to construction, the speed limit will be restricted to 15 mph in areas identified as Giant Garter Snake habitat to minimize the chances of vehicles from running over basking snakes. Twenty-four hours prior to any hauling of fill material on the dirt road within the Morrison Creek floodplain, the area will be surveyed for Giant Garter Snake by a qualified biologist. Surveys of the project area will be repeated if a laps in construction activity of two weeks or greater has occurred. If a snake is encountered during construction, activities shall cease until appropriate corrective measures have been completed or it has been determined that the snake will not be harmed. Reports of sightings and any incidental take will be reported immediately to the USFWS by telephone at (916) 414-6600. All Construction personnel will receive USFWS-approved worker environmental awareness training to instruct them to recognize Giant Garter Snake and its habitat. Implementation of the outlined avoidance measures would mitigate potential impacts to Giant Garter Snake to a less-than-significant level. In addition, use of the Camray site as a borrow site will facilitate the conversion of the site to a wetland restoration site at a later time if funding for such conversion should become available. The site would then likely be returned to a mix of upland and wetland habitats. Therefore, the use of the site as a borrow site for the construction of North Beach Lake levee would result in a net gain of Giant Garter Snake habitat along Morrison Creek in the long run. Use of the Camray site as a borrow site will facilitate the conversion of the site to a mitigation site at a later time if funding for such conversion should become	

Table B-1
Summary of Impacts and Mitigation Measures Incorporated by Reference

Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
4.3-2. Potential disturbance of nesting Swainson's hawks and other nesting raptors. Extraction of borrow material from the Camray site and hauling along the proposed route could result in disturbance to nesting raptors along Morrison Creek and on the SRWTP Bufferlands property. Construction of the North Beach Lake levee could also result in potential disturbance to a pair of nesting kites recently discovered along Unionhouse Creek. This impact is considered significant.	available. The site would then likely be returned to a mix of upland and wetland habitats. Therefore, it is assumed that use of the site as a borrow site for the construction of North Beach Lake Levee may result in a net gain of Giant Garter Snake habitat in the Morrison Creek floodplain in the long run. The following mitigation measures and would reduce impacts to Swainson's hawk and other nesting raptors to a less-than-significant level. Swainson's hawk • Prior to project construction, it will be determined whether any construction is proposed during the Swainson's hawk nesting season (March 1 to September 15). • If no construction will occur during the Swainson's hawk nesting season, no further mitigation will be necessary. • Prior to project construction that will occur during the nesting season, surveys shall be conducted for active Swainson's hawk nests within 0.25 mile of the proposed construction area. Surveys shall be conducted at the beginning of the nesting season (April 15–30), or 30 days or less prior to the onset of construction if it is scheduled to commence prior to April 30 • If construction is planned within 0.25 mile of an active nest, the nest site shall be identified with a marker and mapped on a USGS topographic quad map. All identified nests shall be revisited during the post-hatching (June 1–30) and fledging periods (July 1–31) to determine the outcome of the nest. A visible exclusion zone shall be established around the portion of the construction area that occurs within 0.25 mile of the nest tree. No project construction activity shall commence within the exclusion zone between March 1 and September 15. • All active and historic (those used during the previous 5 years) Swainson's hawk nest trees within the project area shall be preserved during implementation of the proposed project. No construction shall occur within 100 feet of a historic nest tree. A visible 100-foot exclusion zone shall be established around any historic nest tree located within 150 feet of a designated construction area. Other nesting raptors • Prior to project construction, it shall be determined whether any construction or tree removal is proposed during the raptor nesting season (February 1 to August 31).	LS

**Table B-1
Summary of Impacts and Mitigation Measures Incorporated by Reference**

Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
	• If no construction or tree removal shall occur during the raptor nesting season, no further mitigation shall be necessary. • If construction or tree removal is proposed during the raptor nesting season, a focused survey for previously observed and new raptor nests shall be conducted by a qualified biologist during the nesting season to identify active nests within 500 feet of the project area. The survey shall be conducted no less than 14 days and no more than 30 days prior to the beginning of construction or tree removal. • If nesting raptors are found during the focused survey, no construction or tree removal shall occur within 500 feet of an active nest until the young have fledged (as determined by a qualified biologist).	
4.3-3. Potential Impact to VELB resulting from use of the Camray borrow site, hauling of fill material, and construction of the North Beach Lake Levee. The proposed project could result in indirect effects on elderberry shrubs present on the Camray site, along the proposed haul route and along several segments of the North Beach Lake Levee. This impact is considered significant.	Protection of VELB at the Camray site, along the haul route, and along the North Beach Lake Levee. A VELB protection and mitigation protocol for the South Sacramento County Streams Project, including the Camray Borrow Site, will be implemented, based on currently being developed by the USACE in coordination with the USFWS. A draft version of the plan is included in Appendix G of this report. Implementation of this plan is expected to mitigate potential impacts to VELB to a less-than-significant level.	LS
CULTURAL RESOURCES		
4.4-1. Disturbance of Archaeological Resources. Construction activities associated with the proposed project would not occur around known archaeological sites. No resources listed on or eligible to the National or California Register of Historic Places are known on the site. However, buried and previously undiscovered archaeological resources may be encountered during construction, which is considered a potentially significant effect.	• Prior to construction USACE will consult with SHPO and the appropriate Native American representative, in compliance with Section 106 and 36 CFR 800. • If significant archaeological, historical, or paleontological resources, or any human remains are discovered, or otherwise observed during project grading and construction operations, work will cease immediately and a qualified archaeologist will be brought to the site for an assessment of the resources. The archaeologist will coordinate with the Sacramento Area Flood Control Agency to determine appropriate mitigation. Such measures may include avoidance, removal, and preservation, and/or recordation in accordance with accepted professional archaeological practice. • In the even that human remains are discovered, the County Coroner will be contacted in accordance with Section 7050.5 of the State Health and Safety	LS

Table B-1
Summary of Impacts and Mitigation Measures Incorporated by Reference

Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
	Code. As cited in §15064.5 of the State CEQA Guidelines, if the coroner determines that remains represent Native American interment, the Native American Heritage Commission in Sacramento will be consulted to identify the most likely descendants and the appropriate disposition of the remains. Consultation with descendants will occur as directed by the Commission.	
GEOLOGY AND SOILS		
4.5-1. Potential for Soil Erosion. Project construction and grading activities at the project site would involve substantial ground disturbance, requiring the removal and replacement of topsoil and excavation of fill material resulting in a potential to increase soil erosion. This would be considered a potentially significant impact.	Erosion Control Measures through an NPDES Permit. An erosion control plan will be prepared for the proposed project in order to satisfy the requirements of the State of California's General Permit for Discharges of Storm Water Runoff Associated with Construction Activity (General Storm Water Permit). Such requirements include submittal of a notice of intent (NOI) to comply with the terms of the General Storm Water Permit to the State Water Resources Control Board (SWRCB) and preparation of a stormwater pollution prevention plan (SWPPP). Best Management Plans (BMP's) for erosion control, as set forth in the SWPPP and further defined by the selected contractor, will be implemented by the contractor and may include, but are not limited to, the careful use of grading management techniques, settling basins, silt fences, netting, and revegetation. In addition, internal drainage will be established and maintained on the project site during construction activities to prevent water within the project boundary from exiting the site.	LS
NOISE		
4.6-1. Short-term Increases in Ambient Noise Levels – Borrow Site 1. Because predicted noise levels would result in a noticeable and substantial increase in both exterior and interior ambient noise levels at nearby noise-sensitive receptors, the excavation of material from Borrow Site 1 would have a significant noise impact to nearby noise-sensitive receptors as determined by CEQA significance criteria. Under USACE, implementation of NEPA, the noise impact would be less than significant, because it has a short-term duration.	Construction Noise Controls The following mitigation measures have been incorporated into the proposed project to minimize disruption to noise-sensitive receptors located in the vicinity of the borrow sites: Construction equipment shall be equipped and maintained with noise-reduction devices, such as mufflers, in accordance with manufacturers' specifications. To the extent feasible, all internal combustion engines shall be operated with exhaust and intake silencers.	SU

Table B-1 Summary of Impacts and Mitigation Measures Incorporated by Reference		
Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
4.6-2. Short-term Increases in Ambient Noise – Borrow Site 2. Because construction-generated noise would result in a noticeable and substantial increase in exterior ambient noise levels at nearby noise-sensitive receptors, the excavation of material from Borrow Site 2 would be a significant noise impact to nearby noise-sensitive receptors, as determined by CEQA significance criteria. Under USACE interpretation of NEPA, the noise impact would be less than significant, because it has a short-term duration.	- Noise-sensitive land uses located within 500 feet of the borrow site shall be shielded from noise-generating activities by use of temporary noise barriers or by placement of soil piles between the receptor and the noise-generating activity. - To the extent feasible, noise-generating construction activities shall be limited to the hours between 7:00 am and 6:00 p.m. on weekdays and 8:00 a.m. to 5:00 p.m. on weekends.	
4.6-3. Short-term Increases in Ambient Noise – Camray Borrow Site. Because predicted noise levels would result in a noticeable and substantial increase in both exterior and interior ambient noise levels at nearby noise-sensitive receptors, the excavation of material from the proposed Camray Borrow Site would be a significant noise impact to nearby noise-sensitive receptors, as determined by CEQA significance criteria. Under USACE implementation of NEPA, the noise impact would be less than significant, because it has a short-term duration.	Prior to construction at each site near noise-sensitive receptors, the City or County (depending on the jurisdiction within which the receptor is located) shall provide written notification to potentially affected receptors, identifying the type, duration, and frequency of construction activities. Notification materials would also identify a mechanism for residents to register complaints with the City or County if construction noise levels are overly intrusive or construction occurs outside the required hours. The City or County would then take corrective action.	
EA FOR THE SOUTH SACRAMENTO COUNTY STREAMS PROJECT DESIGN REFINEMENTS (USACE 2004)		
RECREATION		
This section describes the effects of the proposed alternatives on existing and planned recreation facilities and opportunities in the project area. The effects of the alternatives are considered to be significant if they permanently reduce the quality, quantity, or use of recreational facilities in the project area.	4.1.3. In order to compensate for the recreational loss of bike trail along Florin Creek, approximately 4,000 feet of bike trail would be reconstructed. The traffic management plan discussed in Section 4.2.3 would also include measures to minimize the temporary effects and ensure the safety of the users of the bike trail.	LS
TRANSPORTATION		
The effects of construction on traffic and circulation are considered to be significant, requiring mitigation, if the work would result in any of the following:	4.2.3. The Corps and non-Federal sponsor would implement the mitigation measures proposed in the 1998 EIS/EIR to reduce effects to traffic caused by trip generation resulting from project construction to less than significant. In general, these	LS

**Table B-1
 Summary of Impacts and Mitigation Measures Incorporated by Reference**

Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
• Cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system. • Cause a substantial deterioration of the roadway surface due to construction activities. • Substantially increase the traffic delay experienced by drivers. • Substantially alter present patterns of circulation or movement. • Cause traffic hazards to pedestrians or operators of motor vehicles or bicycles. In addition, the City further defines effects to traffic as significant if: • The project will generate more than 100 new trips during the peak traffic hours of the adjacent roadways (a.m., p.m., or midday). New trips are defined as trips expected for proposed use – trips already going to the site. • The project will generate more than 50 new peak hour trips on a main access route to the site that is currently operating at an unacceptable Level of Service. • The project could substantially change the offsite transportation system (including facilities for vehicles, buses, light rail, pedestrians, and bikes) or connections to it.	mitigation measures include restrictions on delivery of materials and movement of construction equipment during the morning and afternoon peak hours of roadway travel. Also, flaggers would be stationed to slow or stop approaching vehicles to avoid conflicts with construction vehicles or equipment. Finally, on-street parking would be limited for construction workers, and adequate off-street parking would be provided for construction workers. As part of encroachment permit requirements, the Corps and the non-Federal sponsor would coordinate with the City, County, and Caltrans to develop a traffic management plan that would recommend measures to minimize the temporary effect to traffic flows on city, county, and State roadways caused by any project construction traffic, as well as any temporary lane and road closures. The traffic management plan would include specific plans for retrofitting activities at individual bridges, minimizing the amount of time lanes would be closed and providing appropriate detours as needed to reduce the level of effect to traffic to less than significant. All traffic effects would be short term and temporary.	
AIR QUALITY		
The Substantial Contribution Threshold has also been revised by SMAQMD, as follows: “A project is considered to contribute substantially to an existing or projected violation of a CAAQS (California Ambient Air Quality Standard) if it emits pollutants at a level equal to or greater than five (5) percent of the CAAQS (refer to Table 4: Ambient Air Quality Standards).”	4.33. The 2002 analysis factored in control measures that would be implemented during construction to lower project emission levels, as follows: Reducing NO_x Emissions from Off-Road Diesel Powered Equipment • The project would provide a plan for approval by SMAQMD demonstrating that the heavy-duty (greater than 50 horsepower) off-road vehicles to be used in the construction project, including owned, leased, and subcontractor vehicles, would achieve a project-wide fleet-average 20 percent NO_x reduction and 45 percent particulate reduction as compared to the most recent CARB fleet average at time of construction.	LS

**Table B-1
Summary of Impacts and Mitigation Measures Incorporated by Reference**

Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
	- The project representative would submit to SMAQMD a comprehensive inventory of all off-road construction equipment, equal to or greater than 50 horsepower, that would be used an aggregate of 40 or more hours during any portion of the construction project. The inventory would include the horsepower rating, engine production year, and projected hours of use or fuel throughput for each piece of equipment. The inventory would be updated and submitted monthly throughout the duration of the project, except that an inventory would not be required for any 30-day period in which there is no construction activity. At least 48 hours prior to the use of subject heavy-duty off-road equipment, the project representative would provide SMAQMD with the anticipated construction timeline, including start date, and name and phone number of the project manager and onsite foreman. Controlling Visible Emissions from Off-Road Diesel Powered Equipment - The project would ensure that emissions from all off-road diesel powered equipment used on the project site do not exceed 40 percent opacity for more than 3 minutes in any 1 hour. Any equipment found to exceed 40 percent opacity (or Ringelmann 2.0) would be repaired immediately, and SMAQMD would be notified within 48 hours of identification of non-compliant equipment. A visual survey of all in-operation equipment would be made at least weekly, and a monthly summary of the visual, survey results would be submitted throughout the duration of the project, except that the monthly summary would not be required for any 30-day period in which no construction activity occurs. The monthly summary would include the quantity and type of vehicles surveyed, as well as the dates of each survey. The SMAQMD and/or other officials may conduct periodic site inspections to determine compliance. Nothing in this section would supercede other SMAQMD or State rules or regulations. Controlling PM₁₀ Emissions - Apply non-toxic chemical soil stabilizers to all inactive construction areas (previously graded areas inactive for 10 days or more). - Replace ground cover in disturbed areas as quickly as possible. - Enclose, cover, water twice daily, or apply non-toxic soil binders to exposed stock piles with 5 percent or greater silt content.	

**Table B-1
Summary of Impacts and Mitigation Measures Incorporated by Reference**

Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
	- Water active sites at least twice daily. - Suspend all excavating and grading operations when wind speeds (as instantaneous gusts) exceed 25 miles per hour. - Monitor for particulate emissions according to District-specified procedures. - All trucks hauling dirt, sand, soil, or other loose materials are to be covered, or should maintain at least 2 feet of freeboard. - Sweep streets once a day if visible soil materials are carried to adjacent streets. - Install wheel washers where vehicles enter and exit unpaved roads onto paved roads, or wash off trucks and any equipment leaving the site each trip. - Apply water three times daily, or apply non-toxic soil stabilizers to all unpaved parking or staging areas or unpaved road surfaces. - Traffic speeds on all unpaved roads to be reduced to 15 miles per hour or less.	
WATER RESOURCES AND QUALITY		
This section identifies and evaluates potential effects of the proposed design refinements on water resources and quality in the project area. An effect would be considered significant if it would result in the permanent loss of a surface or groundwater source, or interfere with existing beneficial uses or water rights. In addition, an effect on water quality would be considered to be significant if it would substantially degrade water quality, contaminate a public water supply, or substantially degrade or deplete ground-water resources or interfere with ground-water recharge.	4.4.3. In Morrison Creek and its tributaries, channel excavation, bridge retrofiting, and construction of drop structures and box culverts would be regulated under the Clean Water Act Section 404 and 401 programs. Under the Section 404 program, the construction activities would be regulated under the terms and conditions of a Nationwide Permit 25 for Structural Discharges and a Nationwide Permit 33 for Temporary Construction, Access, and Dewatering. Use of Nationwide Permits 25 and 33 requires application to the Central Valley Regional Water Quality Control Board for a Water Quality Certification to comply with Section 401 of the Clean Water Act. To comply with Section 402 of the Clean Water Act, a National Pollutant Discharge Elimination System (NPDES) permit must be obtained from the Central Valley Regional Water Quality Control Board. Because the proposed construction activities would disturb more than 5 acres, the applicable permit is the General Permit for Discharges of Storm Water Associated with Construction Activity, known as a Construction General Permit. This permit requires the development and implementation of a Storm Water Pollution Prevention Plan, which must list best management practices that the contractor would use to control storm water runoff and reduce erosion and sedimentation. A Sediment Monitoring Plan is also required	LS

**Table B-1
 Summary of Impacts and Mitigation Measures Incorporated by Reference**

Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
	because the construction activities would discharge into Morrison Creek, a water body with impaired or limited water quality as listed under Clean Water Act Section 303(d). Although the project alternatives are not anticipated to have a significant effect on water resources and quality in the project area, the best management practices and measures discussed below would be implemented to ensure that effects to water quality are minimal. The following best manage practices would be implemented: • Properly dispose of oil or liquid wastes. • Fuel and maintain vehicles in specified areas outside of creek channels that are designed to capture any spills. • Inspect and maintain vehicles and equipment daily to prevent dripping of oil and other fluids. • If rains are forecast during the construction period, implement temporary erosion control measures such as berms, silt fences, stacked hale bales, and other erosion prevention measures. • Train construction personnel in stormwater pollution prevention practices. • Prior to the start of the rainy season, stabilize and revegetate all areas disturbed by construction activity. Areas of soil compaction would be loosened and seeded with annual grasses. In addition, channel sections under construction would be dewatered by installing temporary cofferdams and by diverting streamflow through a culvert and around the channel section to be excavated. Most of the project channels have a concrete-lined low-flow channel. When construction is completed, the cofferdam would be removed, and flow would enter the new low-flow channel. The concrete lining the low-flow channel would be allowed the appropriate time to cure before flow is returned to the creek channel.	
VEGETATION AND WILDLIFE		
An effect on vegetation wildlife would be considered to be significant if it would result in the permanent loss or degradation of native vegetation, or loss of resident or migratory	4.5.3. The effects of the proposed design refinements on annual grassland would be temporary. All areas affected would be reseeded and allowed to revert to annual grassland vegetation. Since some of the effects are associated with widening the	LS

Table B-1 Summary of Impacts and Mitigation Measures Incorporated by Reference		
Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
wildlife species and/or their habitat.	channel, including the bottom of the channel, habitat in the bottom of the channel would be increased because portions of the widened channel would not have a concrete lining. Since there would be no net loss of acreage, there would be a rapid replacement of cover, and habitat value would be increased, no additional mitigation would be required to compensate for the temporary loss of annual grassland habitat.	
SPECIAL STATUS SPECIES		
Endangered and threatened species and other special status species may be adversely affected by the loss of habitat and disturbances associated with the design refinements. In addition, several habitats of potential value to endangered and threatened species would be affected by the design refinements. These habitats include riparian scrub and emergent marsh. Any project action that would affect the continued existence of an endangered or threatened species or a species of special concern is considered to be a significant adverse affect.	4.6.3. To minimize incidental take of the Federally listed giant garter snake, the Corps and the non-Federal sponsor would ensure implementation of the respective terms and conditions and reasonable and prudent measures identified in the amended Biological Opinion (Appendix C). The Corps also recommends compensation for the permanent loss of 0.06 acre upland giant garter snake habitat through the purchase of credits at a USFWS-approved mitigation bank at a ratio of 3 to 1. Mitigation measures identified in the 1998 EIS/EIR would be sufficient to address any potential new effects to the Swainson's hawk and Sanford's arrowhead. In addition the 1998 mitigation proposed for burrowing owl, strategic breaching of the south Unionhouse Creek levee between UPRR and Franklin Boulevard to avoid existing burrowing owl burrows would also minimize potential for affecting owls.	LS
CULTURAL RESOURCES		
An effect on cultural resources would be considered to be significant if it diminishes the integrity of the resource's location, design, setting, materials, workmanship, feeling, or association.	4.7.3. Since the proposed design refinements are not expected to affect any cultural resources in the expanded APE, no mitigation measures would be required. In the event previously unidentified cultural resources are discovered, work would be halted and a Corps archaeologist would be notified for further assessment. The State Historic Preservation Officer (SHPO) would then be notified, as appropriate.	LS

Table B-1 Summary of Impacts and Mitigation Measures Incorporated by Reference		
Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
AMERICAN RIVER WATERSHED LONG-TERM STUDY, FINAL SUPPLEMENTAL PLAN FORMULATION REPORT/ENVIRONMENTAL IMPACT STATEMENT/ENVIRONMENTAL IMPACT REPORT (USACE AND RECLAMATION BOARD 2002)		
GEOLOGY, SEISMICITY AND SOILS		
Construction-related effects:		
Cause substantial soil erosion and/or the loss of topsoil as a result of ground-disturbing activities associated with the construction of flood control improvements along the Lower American River and the Yolo and Sacramento Bypasses.	WQ-1. Implement pollution prevention measures. WQ-2. Implement erosion control measures.	LS
Cause substantial soil erosion and/or the loss of topsoil as a result of ground-disturbing activities associated with the modification of the L. L. Anderson Dam spillway; construction of flood control improvements at Folsom Reservoir; and the floodplain ecosystem alternatives.	WQ-2. Implement erosion control measures.	LS
RECREATION		
Disrupt recreation activities on a segment of the American River Bike Trail located between Negro Bar and Beals Point as a result of activities associated with the construction of temporary access roads and bridges.	R-1. Provide notification of trail and road closures and establish alternative access routes. R-2. Ensure the segment of the American River Bike Trail between Beals Point and Negro Bar is reestablished.	LS
Disrupt recreation activities between Beals Point and Beeks Bight as a result of construction activities associated with increasing the height of dikes near the west shore of Folsom Reservoir.	R-3. Provide notification of trail and road closures and establish alternative access routes.	S
Disrupt recreation activities on the American River Bike Trail as a result of transporting borrow material from the Mississippi Bar borrow site to the barge loading site at Willow Creek, and from Willow Creek to Folsom Boulevard.	R-4. Provide notification of trail closure, establish alternative trail routes, and signalize or flag intersection of the bike trail and haul road.	LS

**Table B-1
Summary of Impacts and Mitigation Measures Incorporated by Reference**

Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
Disrupt recreation activities on the American River Parkway trail system as a result of construction activities associated with the modification of existing drainage and pumping facilities along the Lower American River.	R-5. Provide notification of trail and road closures and establish alternative access routes within the Parkway.	LS
Disrupt recreation activities along the Lower American River as a result of activities associates with the construction of a floodwall near the Nimbus fish hatchery.	R-5. Provide notification of trail and road closures and establish alternative access routes within the Parkway.	LS
Reduce the number of available parking spaces at Goethe Park, Ancil Hoffman Park, Old Fair Oaks Bridge, and Nimbus Fish Hatchery during the construction of flood control improvements along the Lower American River.	R-6. Provide notification of parking lot closures and identify alternative parking areas located nearest the affected area.	S
FISHERIES		
Construction-related effects:		
Affect fish and fish habitat in Folsom Reservoir as a result of sediment, fuels, and lubricants being discharged during the construction of flood control improvements at Folsom Reservoir and the fisheries ecosystem restoration alternative.	WQ-1. Implement pollution prevention measures. WQ-2. Implement erosion control measures.	LS
Affect fish and fish habitat in Lake Natoma as a result of sediment, fuels, and lubricants being discharged during the operation of the Mississippi Bar borrow site.	WQ-1. Implement pollution prevention measures.	LS
Affect fish and fish habitat downstream of Folsom Dam as a result of activities associated with the construction of a new outlet and modification of the spillway stilling basin.	WQ-1. Implement pollution prevention measures.	LS
Affect fish and fish habitat in the Lower American River as a result of sediment, fuels, and lubricants being discharged into the river during the construction of flood control improvements along the Lower American River and the	WQ-1. Implement pollution prevention measures. WQ-2. Implement erosion control measures.	LS

Table B-1 Summary of Impacts and Mitigation Measures Incorporated by Reference		
Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
ecosystem restoration alternative.		
Affect fish habitat in the Yolo and Sacramento Bypasses, the Sacramento River, and the Delta Sloughs as a result of sediment, fuels, and lubricants being discharged to surface waters during the construction of flood control improvements.	WQ-1. Implement pollution prevention measures. WQ-2. Implement erosion control measures.	LS
VEGETATION		
Construction-related effects:		
Loss of oak woodland and oak pine woodland at Folsom Reservoir as a result of construction of flood control improvements at Folsom Reservoir.	V-1. Compensate for loss of 4.8 acres of oak and pine-oak woodland. V-3. Compensate for loss of 29.8 acres of oak and pine woodland. V-5. Compensate for loss of 6.7 acres of oak and pine woodland. V-7. Compensate for loss of 25.3 acres of oak and pine woodland.	LS
Affect jurisdictional waters of the United States and associated riparian and wetland vegetation communities as a result of activities associated with the construction of flood control improvements at Folsom Reservoir.	V-2. Compensate for loss of 1.3 acres of riparian woodland. V-4. Compensate for loss of 10.3 acres of riparian woodland. V-6. Compensate for loss of 23.2 acres of riparian woodland. V-8. Compensate for loss of 48.2 acres of riparian woodland.	LS
WILDLIFE		
Construction-related effects:		
Temporarily disturb nesting raptors in the vicinity of French Meadows Reservoir as a result of construction activities associated with the modification of the L. L. Anderson Dam spillway.	W-1. Conduct preconstruction raptor survey at L. L. Anderson Dam.	LS
Temporarily disturb nesting raptors in the vicinity of Folsom Reservoir as a result of construction activities associated with raising wing dams and dikes at Folsom Reservoir.	W-2. Conduct preconstruction raptor survey in the vicinity of Folsom Reservoir, wing dams, and dikes.	LS
Cause the removal of elderberry shrubs from Folsom	W-3. Compensate for loss of elderberry shrubs, which provides habitat for the listed	LS

Table B-1 Summary of Impacts and Mitigation Measures Incorporated by Reference		
Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
Reservoir as a result of activities associated with raising wing dams and dikes, the construction of a temporary bridge, and the operation of borrow sites at Folsom Reservoir.	species, Valley Elderberry Longhorn Beetle (VELB).	
Temporarily disturb nesting raptors as a result of activities associated with the construction of flood control improvements along the Lower American River and the Yolo and Sacramento Bypasses.	W-2. Conduct preconstruction survey for Swainson’s hawk.	LS
Affect potential VELB habitat as a result of activities associated with the construction of flood control improvements along the Lower American River and the Yolo and Sacramento Bypasses.	W-3. Compensate for loss of elderberry shrubs, which provides habitat for the listed species, VELB.	LS
Increase the mortality of burrowing owls as a result of activities associated with the construction of flood control improvements along the Lower American River and the Yolo and Sacramento Bypasses.	W-4. Conduct burrowing owl surveys.	LS
Affect giant garter snakes and their habitat as a result of activities associated with the construction of flood control improvements along the Yolo and Sacramento Bypasses.	W-5. Based on consultation with USFWS, avoid and minimize loss of giant garter snake habitat.	LS
Affect cliff swallows as a result of construction activities associated with bridge and railroad trestle modifications along the Lower American River.	W-6. Examine bridges for use by cliff swallows.	LS
Affect nesting colonies of bank swallows as a result of activities associated with the construction of flood control improvements along the Lower American River.	W-7. Conduct preconstruction bank swallow surveys.	LS
Affect nesting raptors along the Lower American River as a result of activities associated with the construction of the floodplain ecosystem restoration alternatives along the Lower American River.	W-1. Conduct preconstruction raptor survey. W-3. Conduct preconstruction survey for Swainson’s hawk.	LS

Table B-1 Summary of Impacts and Mitigation Measures Incorporated by Reference		
Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
Affect nesting colonies of bank swallows along the Lower American River as a result of activities associated with the construction of the floodplain ecosystem restoration alternatives along the Lower American River.	W-7. Conduct preconstruction bank swallow surveys.	LS
WATER QUALITY		
Construction-related effect:		
Impair water quality in the Middle Fork of the American River with sediment derived from ground-disturbing activities associated with the modification of the L. L. Anderson Dam spillway; impair water quality in Folsom Reservoir and the Lower American River with sediment derived from ground-disturbing activities associated with the construction of flood control improvements at Folsom Reservoir; and the ecosystem restoration alternatives.	WQ-1. Implement pollution prevention measures.	LS
Impair water quality in Folsom Reservoir and the Lower American River with sediment derived from ground-disturbing activities associated with the construction of a new outlet at Folsom Dam and the fisheries ecosystem restoration alternatives.	WQ-1. Implement pollution prevention measures.	LS
Impair water quality at Folsom Reservoir and Lake Natoma with sediment derived from the excavation and transport of dredge materials from the Mississippi Bar borrow site.	WQ-1. Implement pollution prevention measures.	LS
Impair water quality in the Lower American River, Yolo and Sacramento Bypasses, and along the Delta sloughs with sediment derived from ground-disturbing activities associated with the construction of flood control improvements along the Lower American River.	WQ-1. Implement pollution prevention measures. WQ-2. Implement erosion control measures.	LS

Table B-1
Summary of Impacts and Mitigation Measures Incorporated by Reference

Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
CULTURAL RESOURCES		
Construction-related effects:		
Affect undiscovered cultural resources in the vicinity of French Meadows Reservoir as a result of activities associated with the modification of the L. L. Anderson Dam spillway; and affect undiscovered cultural resources at Folsom Reservoir as a result of activities associated with the construction of flood control improvements at Folsom Reservoir.	C-1. Implement a Programmatic Agreement among the U.S. Army Corps of Engineers, U.S. Bureau of Reclamation, California State Historic Preservation Officer, and the Advisory Council on Historic Preservation regarding implementation of the American River Watershed Project.	LS
Affect buried cultural resources in the vicinity of French Meadows Reservoir as a result of construction activities associated with the modification of the L. L. Anderson Dam spillway; and affect buried cultural resources at Folsom Reservoir as a result of ground-disturbing activities associated with the construction of flood control improvements at Folsom Reservoir.	C-2. Stop work in case of discovery of cultural resources.	LS
Affect potentially significant historic structures at Folsom Reservoir as a result of activities associated with the construction of flood control improvements at Folsom Reservoir.	C-1. Implement a Programmatic Agreement among the U.S. Army Corps of Engineers, U.S. Bureau of Reclamation, California State Historic Preservation Officer, and the Advisory Council on Historic Preservation regarding implementation of the American River Watershed Project. C-3: Evaluate properties for eligibility for listing in the CRHR.	LS
Affect potentially significant historic structures associated with Folsom Dam as a result of construction activities conducted during the construction of a new outlet at Folsom Dam.	C-3. Evaluate properties for eligibility for listing in the CRHR.	LS
Affect undiscovered cultural resources at Mississippi Bar as a result of using Mississippi Bar as a borrow site.	C-1. Implement a Programmatic Agreement among the U.S. Army Corps of Engineers, U.S. Bureau of Reclamation, California State Historic Preservation Officer, and the Advisory Council on Historic Preservation regarding implementation of the American River Watershed Project.	LS

Table B-1
Summary of Impacts and Mitigation Measures Incorporated by Reference

Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
Affect buried cultural resources at Mississippi Bar as a result of ground-disturbing activities associated with using Mississippi Bar as a borrow site.	C-2. Stop work in case of discovery of cultural resources.	LS
Affect known cultural resources along the Lower American River as a result of activities associated with the construction of flood control improvements along the Lower American River.	C-1. Implement a Programmatic Agreement among the U.S. Army Corps of Engineers, U.S. Bureau of Reclamation, California State Historic Preservation Officer, and the Advisory Council on Historic Preservation regarding implementation of the American River Watershed Project. C-3. Evaluate properties for eligibility for listing in the CRHR.	LS
Affect undiscovered or buried cultural resources along the Lower American River as a result of ground-disturbing activities associated with the construction of flood control improvements along the Lower American River and floodplain ecosystem restoration alternatives; and affect undiscovered cultural resources in the Yolo and Sacramento Bypasses as a result of construction activities associated with the modification of the Sacramento Weir, Yolo Bypass, Sacramento Bypass, and levees in the Delta.	C-1. Implement a Programmatic Agreement.	LS
Affect historic structures along the Lower American River as a result of construction activities associated with the modification of a Union Pacific Railroad (UPRR) trestle.	C-1. Implement a Programmatic Agreement. C-3. Evaluate properties for eligibility for listing in the CRHR.	LS
Affect potentially significant or NRHP-listed cultural resources in the Yolo Bypass as a result of construction activities associated with the modification of levees in the Yolo Bypass.	C-1. Implement a Programmatic Agreement.	LS
Operation-related effects:		
Affect undiscovered cultural resources in the inundation zone of Folsom Reservoir as a result of fluctuating reservoir levels and human activities.	C-1. Implement a Programmatic Agreement.	LS

Table B-1 Summary of Impacts and Mitigation Measures Incorporated by Reference		
Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
TRAFFIC AND CIRCULATION		
Construction-related effects:		
Affect traffic safety on roadways around Folsom Reservoir as a result of sight distance problems created by slow-moving trucks involved with the modification of Folsom Dam and associated wing dams and dikes.	T-1. Prepare and implement a traffic safety plan.	LS
Affect traffic and circulation on Folsom-Auburn Road as the result of constructing a new signalized intersection at the intersection of Folsom-Auburn Road and the northern approach road to the temporary construction bridge.	T-2. Conduct operational analysis and ensure signals are timed correctly.	LS
Affect roadway safety as a result of trips generated by employees and equipment involved with the construction of flood control improvements along the Lower American River, the Yolo and Sacramento Bypasses, the Sacramento River, and the Delta sloughs.	T-1. Prepare and implement a traffic safety plan.	LS
Adversely affect traffic safety on local roadways as a result of sight distance problems created by slow-moving trucks involve with the construction of the floodplain ecosystem restoration alternatives along the Lower American River.	T-1. Prepare and implement a traffic safety plan.	LS
AIR QUALITY		
Construction-related effects:		
Reduce air quality by exceeding emission standards for ROG and NO _x during the construction of flood control improvements at Folsom Reservoir.	AQ-1. Incorporate and Implement Air Quality Measures for NO _x in the Construction Management Plan. AQ-2. Purchase NO _x Emission Credits.	S/LS
Reduce air quality by exceeding emission standards for ROG, NO _x CO, and PM ₁₀ during construction of flood control improvements at Folsom Reservoir.	AQ-1. Incorporate and Implement Air Quality Measures for NO _x in the Construction Management Plan. AQ-2. Purchase NO _x Emission Credits.	S/LS

Table B-1 Summary of Impacts and Mitigation Measures Incorporated by Reference		
Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
Reduce air quality by exceeding emission standards for ROG, NO_x CO, and PM₁₀ during construction of flood control improvements along the Lower American River and the Yolo and Sacramento Bypasses. Impair air quality by exceeding emission standards for NO_x and PM₁₀ during the construction of the floodplain ecosystem restoration alternatives along the Lower American River.	AQ-3. Incorporate and Implement Air Quality Measures for PM₁₀ in the Construction Management Plan. AQ-1. Incorporate and Implement Air Quality Measures for NO_x in the Construction Management Plan. AQ-2. Purchase NO_x Emission Credits. AQ-3. Incorporate and Implement Air Quality Measures for PM₁₀ in the Construction Management Plan. AQ-1. Incorporate and Implement Air Quality Measures for NO_x in the Construction Management Plan. AQ-2. Purchase NO_x Emission Credits. AQ-3. Incorporate and Implement Air Quality Measures for PM₁₀ in the Construction Management Plan.	S/LS LS
NOISE		
Construction-related effects:		
Temporarily increase noise levels at Folsom Reservoir as a result of activities associated with the construction of a temporary construction bridge and roadway near Folsom Dam and with the modifications of Dikes 1, 2, 3, 7, and 8.	N-1. Develop and implement Noise Abatement Program.	S
Temporarily increase noise levels at an apartment complex near Folsom Reservoir as a result of diverting traffic onto the temporary construction bridge and roadway near Folsom Dam.	N-2. Construct a sound wall between the temporary roadway and the apartment complex.	S
Temporarily increase noise levels in the vicinity of Lake Natoma as a result of excavation and hauling activities at the Mississippi Bar borrow.	N-1. Develop and implement Noise Abatement Program.	S
Temporarily increase noise levels as a result of construction activities associated with the modification of levees, floodwalls, pumping stations, and utilities along the Lower	N-1. Develop and implement Noise Abatement Program.	S

Table B-1 Summary of Impacts and Mitigation Measures Incorporated by Reference		
Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
American River. Temporarily increase noise levels as a result of construction activities associated with the modification of bridges along the Lower American River.	N-1. Develop and implement Noise Abatement Program.	S
VISUAL RESOURCES		
Construction-related effects: Change the character or quality of visual resources along the Lower American River as a result of activities associated with the construction and modification of levees.	VR-1. Levees modified or disturbed as a result of flood control activities shall be revegetated to the greatest extent possible.	LS
Change the character and quality of visual resources in the Garden Highway corridor as a result of construction on the landside stability berm on the north levee between the NEMDC and the Sacramento River.	VR-1. Levees modified or disturbed as a result of flood control activities shall be revegetated to the greatest extent possible.	S
PUBLIC HEALTH AND SAFETY		
Construction-related effects: Adversely affect construction worker and public safety as a result of accidental hazardous material spills, uncovering hazardous wastes, and increased wildfire risk from construction operations associated with the construction of the floodplain ecosystem restoration alternatives.	PSF-1. Prepare and implement a public safety management plan. PSF-2. Implement a hazardous materials management plan. PSF-3. Prepare and implement a fire management plan. PSF-4. Conduct environmental site assessments at all construction sites before beginning construction.	LS
Adversely affect construction worker and public safety as a result of accidental hazardous material spills from construction operations associated with the construction of the fisheries ecosystem restoration alternatives.	PSF-1. Prepare and implement a public safety management plan. PSF-2. Implement a hazardous materials management plan. PSF-4. Conduct environmental site assessments at all construction sites before beginning construction.	LS
Affect public safety at French Meadows Reservoir as a result of potential use conflicts between recreation activities and construction activities associated with the modification	PSF-1. Prepare and implement a public safety management plan.	LS

Table B-1 Summary of Impacts and Mitigation Measures Incorporated by Reference		
Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
of the L. L. Anderson Dam spillway.		
Affect public safety at French Meadows Reservoir as a result of accidental hazardous material spills from construction operations associated with the modification of the L. L. Anderson Dam spillway.	PSF-2. Implement a hazardous materials management plan.	LS
Increase the potential for wildfire in the vicinity of French Meadows Reservoir as a result of operating heavy equipment during the modification of the L. L. Anderson Dam spillway.	PSF-3. Prepare and implement a fire management plan.	LS
Affect public safety at Folsom Reservoir as a result of potential use conflicts between recreation activities and construction activities associated with the construction of flood control improvements at Folsom Reservoir.	PSF-1. Prepare and implement a public safety management plan.	LS
Affect public safety at Folsom Reservoir as a result of accidental hazardous material spills from construction operations associated with the construction of flood control improvements at Folsom Reservoir.	PSF-2. Implement a hazardous materials management plan.	LS
Increase the potential for wildfire in the vicinity of Folsom Reservoir as a result of operating heavy equipment during the construction of flood control improvements at Folsom Reservoir.	PSF-3. Prepare and implement a fire management plan.	LS
STREAMBANK PROTECTION FOR THE LOWER AMERICAN RIVER FINAL EIR AND SUPPLEMENTAL EIS FOR THE SACRAMENTO RIVER BANK PROJECTION PROJECT (USACE 1998)		
HYDRAULIC EFFECTS, STREAMBANK STABILITY, AND FLOOD CONTROL		
Two criteria were used to judge impact significance on flood conveyance and public safety. The first criterion is whether with-project condition water-surface elevations at the authorized design flow for this river reach can be passed at or	Some of the bank protection alternatives involve experimental use of fabric-covered soil on the low-berm surface, or fabric encapsulated soil on the embankment slope as temporary means to stabilize soils incorporated into the bank protection for mitigation purposes.	LS

Table B-1 Summary of Impacts and Mitigation Measures Incorporated by Reference		
Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
below the authorized design stage. The second criterion used to judge the significance of project impacts on flood conveyance and public safety is whether the net post project risk of levee failure – considering both the beneficial effect of protecting the levee from bank erosion and accepting the consequence of inducing an incidental increase in water surface elevation during floods – is maintained or reduced relative to either current conditions or future without project conditions.	Failure of the mitigation structures would not pose a threat to flood control, but would require that mitigation of project impacts be shifted to offsite locations if means of successfully repairing or stabilizing onsite mitigation features could not be developed.	
TERRESTRIAL ECOSYSTEMS		
The Corps determined that for this analysis an alternative would be considered to have a significant adverse impact if it would: • Decrease wildlife values associated with riparian habitats over the life of the project in comparison with the no-action baseline condition. • Result in the permanent loss of elderberry shrubs (critical habitat for the VELB). • Result in the permanent loss of occupied special-status species habitat or direct mortality of special-status species.	Valley Elderberry Longhorn Beetle The Corps will require the contractor to make elderberry shrubs on the high berm in the vicinity of access ramp locations, adjacent to the landward extent of construction, along the upstream egress route from Site 4, to ensure maximum avoidance. Clearing along the upstream egress route from Site 4 should be performed to minimize disturbance to existing vegetation. The Corps will conduct postconstruction surveys of elderberry shrubs to determine how many elderberry shrubs were lost or damaged as a result of project construction. Data Collected during preconstruction VELB surveys would be used to determine the level of impacts (i.e., the number of elderberry shrubs, the number of stems greater than 1 inch in diameter, and the number of stems with VELB exit holes) as described in the USFWS September 19, 1996 Mitigation Guidelines for the VELB. The Corps will notify the USFWS of any impacts on VELB habitat and will identify mitigation requirements in consultation with USFWS. The Corps and USFWS are presently in the process of formal consultation regarding the expected impacts at Site 1, and project revegetation plans will reflect the result of this consultation. Swainson's Hawk, Cooper's Hawk, and White-Tailed Kite The Corps will conduct preconstruction surveys prior to construction seasons to determine whether Swainson's hawks, Cooper's hawks, or white-tailed kites have occupied the project sites or vicinities. If these species are located and have initiated breeding activity, the Reclamation Board would consult with DFG to identify and	LS

Table B-1 Summary of Impacts and Mitigation Measures Incorporated by Reference		
Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
	implement impact-avoidance actions. Bank Swallow The Corps will conduct preconstruction surveys prior to each construction season to determine whether bank swallows have occupied the site or adjacent sites. If indicators of occupation are found, the Corps will consult with DFG to identify and implement impact-avoidance actions.	
AQUATIC ECOSYSTEMS		
Adverse impacts on aquatic resources are considered significant if they would: • Directly or indirectly reduce the growth of , survival, or reproductive success of individuals of species listed or proposed for listing as threatened or endangered under the federal Endangered Species Act; • Directly or indirectly reduce the growth, survival, or reproductive success of substantial populations of federal candidate species, state-listed endangered or threatened species or species of special concern, or regionally important commercial or game species; • Substantially reduce the quality and quantity of important habitat or access to such habitat for these species; or • Compared to the no-action baseline, result in a substantial net loss of AAHUs of SRA cover over the project life, as simulated by HEP analysis.	Water Quality measures to reduce potential construction impacts to less-than-significant levels are described under “River Water Quality” below and include: • Complying with turbidity monitoring and exceedance thresholds established in the SRBPP water quality certification waiver agreement with the RWQCB, • Ensuring adequate safeguards to prevent or rapidly remediate spills of toxic substances into the American River or adjoining waters, and • Preparing an erosion-control plan addressing river-stage events, stormwater outfall, and local runoff. Mitigation of SRA Cover Impacts Impacts on SRA cover values under some alternatives would require offsite compensation actions along the American River. Several approaches to creating compensating habitat values have been identified for mitigation impacts of bank protection actions at present or future sites. These options include: • Revegetating suitable existing revetment having little vegetative cover, especially in the longer, sparsely vegetated reaches; • Planting to enhance-colonization of aggrading bank deposits;	LS

Table B-1 Summary of Impacts and Mitigation Measures Incorporated by Reference		
Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
	- Revegetating certain areas damaged by the Folsom Dam gate-failure release or during the 1997 flood; - Constructing low benches or berms along the shoreline to create floodplain habitat where significant existing vegetation is not present; - Developing complex side-channel habitat nodes; - Restoring aggregate mining areas to improve aquatic habitat quality; and - Evaluating the use of spur dikes along the lower American River as a means of reducing the use of continuous revetment and preserving or enhancing habitat values.	
RECREATION QUALITY AND SAFETY		
Adverse impacts on recreation quality were considered significant if the project would result in any of the following: - Decrease in or elimination of recreation opportunities; - Inconsistency with the federal Wild and Scenic Rivers Act; - Inconsistency with the state Wild and Scenic Rivers Act; or inconsistency with the Urban American River Parkway Preservation Act (embodying the American River Parkway Plan). Adverse impacts on recreation safety were considered significant if the project would create: - Irregular currents or in-water hazards that could trap or snag and drown persons in the water or capsize watercraft during expected use periods, - Barriers to river egress, or - Abrupt steep slopes or submerged dropoffs that could cause bank users or waders to loose footing.	Beyond the pedestrian/ bicyclist traffic management plans, no additional mitigation measures for impacts on recreation resource are needed for action at Sites 1, 2, and 4.	LS
VISUAL CHARACTER		
Under CEQA, a project will normally have a significant effect on the environment if it will conflict with adopted environmental plans and goals of the community where it is located or have a substantial, demonstrable negative aesthetic	Planned revegetation is the key to ameliorating visual impacts. Revegetation can minimize visual impacts by maximizing plant diversity, varying planting densities, creating meandering transitions, and clustering specific plant species. To reduce adverse changes from lower American River bank protection in future projects,	LS

**Table B-1
Summary of Impacts and Mitigation Measures Incorporated by Reference**

Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
effect. In addition, visual impacts of project elements should be considered significant if they would: - Substantially reduce the visual quality of existing views from identified important public vistas (e.g., roadways, paths, or bridges), or - Substantially alter existing views by the introduction of landscape elements visually incongruous with river character in terms of form, line, color, or texture that negatively affect vividness, intactness, or unity of important and sensitive views.	additional design and engineering of morphologic variation in embankments, berm, and shorelines should be undertaken. Whenever feasible, visual impacts should be reduced by substitution of cobbles for riprap stone and minimization of cobble and rock sizes.	
CONSTRUCTION TRAFFIC, AIR QUALITY, NOISE, AND VIBRATION		
Construction-related traffic would be considered significant if the project would cause a substantial increase in traffic volume. Generation of fewer than 100 trips per hour by a project indicates less than a substantial increase and therefore a less-than-significant traffic impact. Traffic safety impacts were considered potentially significant if current human use patterns indicate that conflicts might develop between truck traffic and human use in areas beyond the public road system (i.e., on levee roads or near or at construction sites.)	Potentially significant impacts on traffic safety could be reduced to less-than-significant levels through implementation of several measures: - Avoiding use of public parks for construction access purposes whenever feasible, implemented through construction contract provisions. Construction traffic should enter and leave the sites through public utility lands wherever possible and conflicts with utilities do not result. - Closing the levee roads at the project sites to public pedestrian use during the construction seasons. Closure signage would be extensive; the construction sites would be clearly delineated and fenced. The Corps would specify these closures and signage. At sites near residential neighborhoods, SAFCA would undertake a program of public communication to make residents aware of impending activities and to enlist their support in ensuring public safety. - Controlling haul-truck speeds by monitoring and onsite enforcement, establishing penalties to the contractor for not maintaining speed restrictions, and holding safety training meetings for truck drivers as warranted. - Including onsite travel routes as contract stipulations. - Implementing a program of public education in adjacent neighborhoods to describe the project, its probable impacts, and its benefit; area closures and other measures taken to reduce safety impacts; special hazards to children; and a complaint response system to be established. Support of neighboring residents in promoting public safety would be sought.	LS

Table B-1
Summary of Impacts and Mitigation Measures Incorporated by Reference

Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
Construction of the bank protection would result in pollutant emissions from trucks hauling material to the sites and construction equipment operating at the sites. It would also result in dust emissions from hauling and handling of soil and rock materials, wind erosion of disturbed and created ground, and vehicle travel on unpaved roads. Construction of the bank protection could cause a substantial quantity of dust to be emitted into the atmosphere. Truck and construction equipment exhaust would contribute to the region's ozone and PM ₁₀ levels.	- Employing traffic controllers at sites of potentially significant traffic conflicts, such as where haul trucks require egress from or access the public road system at congested sites, or where haul routes intersect designated pedestrian/bicycle/equestrian trails. The best available control technology to reduce pollutant emissions should be used, enforced by a construction contract provision, to reduce potential air quality impacts to less-than-significant levels as follows: - Construction equipment operating on the site and trucks used for hauling material from off site should be properly equipped with required emission control devices operating properly to minimize exhaust pollutant emissions. - Trucks hauling construction materials should be covered or the material sufficiently wetted if needed to eliminate visible dust emissions. - No burning of waste material or cleared vegetation would occur. - Watering or a long-duration dust palliative, such as sodium lignosulfonate, should be used to minimize dust emissions from the unpaved haul roads and levee roads. It should be reapplied as needed to eliminate visible dust emissions. - Haul-truck speed should be limited to a maximum of 16 kilometers per hour (kph) on levee roads adjacent to residences, 24 kph on unimproved roads on the high berm in residential areas, and 40 kph on other levee and high-berm roads to minimize vibration, dust emissions, and rock throw. - All disturbed soil areas or constructed soil bodies should be wetted sufficiently to be kept damp at all times during construction hours to eliminate visible dust emissions. These mitigation measures would substantially reduce pollutant emissions from the construction site. Because of this reduction, and the temporary nature of the emissions, the air quality impacts of construction should be less than significant.	LS
Implementation of the project would increase noise and vibration levels in noise-sensitive areas along project access routes and at project sites. Residents of the areas adjacent to the levees at construction sites and nearby recreationists would experience increased noise and vibration levels from both haul trucks and onsite construction equipment.	To mitigate noise impacts, the construction contractor would be required to prepare an environmental protection plan including a noise-control section describing noise controls to be provided as required in the Corps' manual EM 385- 1 - 1, "Safety and Health Requirements Manual". This plan would require the following: limiting haul-truck and other vehicle speeds on haul routes as previously described;	LS

**Table B-1
Summary of Impacts and Mitigation Measures Incorporated by Reference**

Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
	• using the levee and any material stockpiles to shield residents from construction noise whenever possible, implemented through worker training; • equipping construction equipment with mufflers equivalent to original equipment manufacture; • stipulating locations of staging areas in the contracts; and • limiting hours of construction in conformance with the City of Sacramento noise ordinance (construction may take place only between the hours of 7:00 a.m. and 6:00 p.m. Monday through Saturday and 9:00 a.m. and 6:00 p.m. on Sundays). Maximum noise and vibration levels would be monitored and limited through contract provisions as well. These mitigation measures would reduce potentially significant noise impacts to less-than-significant levels.	
RIVER WATER QUALITY		
Adverse impacts on water quality would be considered significant if the project would result in any the following: • inability of a public water supplier to provide adequate treatment; • alteration of surface water temperature, dissolved oxygen, or turbidity that substantially diminishes the value of habitat for fish or wildlife; • a release (either directly or indirectly) of a hazardous, toxic, or radioactive waste into the river; or • an exceedance or violation of water quality standards or objectives, or impairment of beneficial uses, as outlined in the RWQCB's Basin Plan.	All sites and alternatives would require similar mitigation measures to protect water quality during construction. The Corps has developed environmental specifications for this purpose. The construction contractor is required by the Corps to develop an environmental protection plan as part of the contract, subject to Corps approval. These elements must be included in the plan: • a time schedule that outlines the approximate time of expected or possible short-term turbidity-generating activities and • a contamination-prevention plan, a contaminant- cleanup plan, and an erosion control plan. The latter should address possible increases during construction of river stage, storm outfall discharges, and onsite runoff. The contractor would then be required to do the following: • Meet with representatives of the Corps to develop understandings relative to compliance and administration of the plan. • Provide notice to the Corps prior to any construction activity that may cause	LS

**Table B-1
Summary of Impacts and Mitigation Measures Incorporated by Reference**

Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
	turbidity. - Oversee all activities, including those of subcontractors, to ensure compliance with the intent and details of the plan. - Ensure that all personnel working on the job are familiar with the environmental protection specifications of the plan. - Ensure that construction activity does not cause visible oil, grease, scum, or foam. - Monitor turbidity and settleable solids at least daily and turbidity every 2 hours when a turbidity plume is visible. The contractor must limit turbidity increases to 25 NTU above background conditions and settleable solids to 0.3 mill above background conditions at a point 90 meters downstream of the plume source and 1.5 meters from the bank; if turbidity limits are exceeded, the contractor must slow the rate of toe-trench excavation (or rock placement) or use other means to comply with the requirements. Upon notice from the contractor of impending turbidity-generating activities, the Corps will notify the supervising engineer of the City of Sacramento's Department of Utilities, Engineering Services. The above requirements would reduce potential water quality impacts to less-than-significant levels.	
CULTURAL RESOURCES		
Under federal regulations, significant impacts can occur when prehistoric or historic archeological sites, structures, or objects listed in or eligible for listing in the NRHP are subjected to the following effects: - physical destruction or alteration of all or part of the property; - isolation of the property from the property's setting or alteration of the property's setting when that character contributes to the property's qualification for listing in the NRHP; - introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting; - neglect of a property resulting in its deterioration or	If buried cultural resources, such as chipped or ground stone, historic debris, building foundations, or human bone, are discovered during ground disturbing activities, work would stop in that area and the Corps would be notified at once. Upon notification, the Corps would secure the site and ensure that no construction activities occur on the affected portion of the project site until a qualified archaeologist could assess the significance of the find and, if necessary, develop appropriate treatment measures, in accordance with implementing regulations (36 CFR Part 800.1 1) of the NEPA.	LS

Table B-1 Summary of Impacts and Mitigation Measures Incorporated by Reference		
Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
destruction; and transfer, lease, or sale of the property (36 CFR 800.9).		
FINAL EA/IS AMERICAN RIVER WATERSHED, CALIFORNIA FOLSOM DAM MODIFICATION PROJECT (USACE 2001)		
FISHERIES		
Concerns were raised that increased flows in the lower American River under the Proposed Action may damage existing spawning beds through localized scour.	Outflows from Folsom Dam above 25,000 cubic feet per second (cfs) will be limited to 60 percent of the forecasted inflow. Maximum flood releases would be made once the actual or forecast inflow exceeds 150,000 cfs. With this rule restriction, Folsom outflow would remain at or below historic levels for the range of flows between the 2.5- and 10-year flood event without restricting outflows during larger floods. The potential for spawning gravel impacts due to outlet modifications would thus be avoided.	LS
TRANSPORTATION		
Significant impacts as a result of closing Folsom Dam Road were not identified. However, the Lead Agencies and the City of Folsom Public Works Department have discussed several options for minimizing the impacts of the project on traffic congestion in old town Folsom. As a result of these discussions, the Corps will work with the U.S. Bureau of Reclamation to improve the communication program designed to inform motorists about road closures, including participating in the installation of temporary changeable message signs. In addition, weekend closures of Folsom Dam Road will be scheduled to occur outside of the primary recreation season at Folsom Lake to the extent possible. <u>Traffic Safety:</u> The potential for vehicle conflicts at the construction access road south of Folsom Dam also exists. The following mitigation measure will be implemented to minimize the potential for vehicle conflicts at the construction access road south of Folsom Dam.	A temporary signal will be provided at the intersection of Folsom Dam Road and the access road on the south side of the dam. The signal would allow construction vehicles to make left turns safely onto Folsom Dam Road. The temporary signal would be designed so that it would be actuated when a vehicle using the access road was ready to make a left turn onto Folsom Dam Road. In planning for the temporary signal, a review of the design features of the intersection and the roadway approaches will be performed to determine the proper placement of the signal. In addition, efforts will be made to separate construction traffic from through traffic by installing a temporary left-turn lane or using a portion of the overlook parking area to assist in turning movements onto the south access road.	LS

Table B-1 Summary of Impacts and Mitigation Measures Incorporated by Reference		
Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
AIR QUALITY		
Significant air quality impacts have not been identified, but impacts are of concern because the project area is classified as a nonattainment area for ozone and PM ₁₀ .	Best Management Practices (BMP's) will be implemented for ozone and PM₁₀ to help protect ambient air quality conditions. The BMP's recommended for this project are as follows: • The contractor will perform routine tuning and maintenance of construction equipment to ensure that the equipment is in proper running order. • The contractor will monitor dust conditions along access roads and within the construction area to ensure that the generation of fugitive dust is minimized. Specific measures include the periodic application of water to disturbed areas, at least two times per day during hot weather and suspension of soil-disturbing activities during periods with winds over 25 miles per hour.	LS
WATER QUALITY		
A potentially significant effect would be the construction-related degradation of water quality from outlet modification.	Best management practices will be instituted, and a monitoring program and weekly reports will be prepared to ensure that water quality requirements are met. The following BMP's will be implemented: • The Lead Agencies will consult with the U.S. Bureau of Reclamation to ensure that dredging activities on the upstream face of Folsom Dam occur during periods of low outflow (both through the river outlets and through the penstocks) and that the penstock shutters are configured in a manner that minimizes the entrainment of suspended sediment. • Appropriate controls will be used during dredging to reduce sediment resuspension and limit the potential for resuspended sediments to be transported to areas outside of the localized construction area or to be discharged into the river downstream of Folsom Dam. Control measures may include suction dredging or the use of environmentally friendly clamshell dredge technology. • Monitoring of downstream water quality will be required during sediment dredging, both downstream of Folsom Dam and in the vicinity of the penstocks and urban water intake. Turbidity, an indicator of the concentration of suspended sediment in the water column, will be monitored in accordance with	LS

**Table B-1
Summary of Impacts and Mitigation Measures Incorporated by Reference**

Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
	the water quality objectives of the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins. Exceedance of the water quality objectives will require additional sediment controls as determined by the Corps and Reclamation Board in consultation with the Regional Water Quality Control Board, U.S. Bureau of Reclamation, Western Area Power Administration, San Juan Water District, City of Folsom, and the City of Roseville. • The use of water in construction will be limited to the quantities necessary to give sufficient dust and wind erosion control. Construction water that runs off the work site will be prohibited. • Sediment control methods will be used in the interior of the dam to limit the discharge of construction materials into the interior drainage system of the dam. Best Management practices could include the use of silt fences or other barriers at drainage inlets. • Equipment storage, cleaning, fueling, and maintenance areas will be located and maintained in a manner to prevent any contaminants from adversely affecting the quality of storm water runoff. • Absorbent pads will be placed to catch all leaks from equipment parked overnight. • Major equipment cleaning and maintenance will not be conducted within the construction area at the face of the dam or near the stilling basin. • All stationary fuel tanks will be surrounded by a protective berm of sufficient size to contain any spill from the tank. • All spills will be cleaned up immediately as set forth in the environmental plan in the construction specifications. • Construction equipment will be stored in areas outside the natural surface drainage patterns and away from areas where stormwater could pool and percolate to ground water.	

**Table B-1
Summary of Impacts and Mitigation Measures Incorporated by Reference**

Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
EA/IS AND FONSI FOR THE AMERICAN RIVER WATERSHED COMMON FEATURES PROJECT LOWER AMERICAN RIVER FEATURES AS MODIFIED BY THE WATER RESOURCES DEVELOPMENT ACT OF 1999 (USACE AND THE RECLAMATION BOARD 2002)		
ESTHETIC RESOURCES		
A proposed project would have a significant effect on the environment if it would have a substantial, demonstrable adverse esthetic effect. In addition, visual effects of project elements would be considered significant if they would: - Substantially reduce the visual quality of existing views from identified important public vistas (roadways, paths, or bridges), or - Substantially alter existing views by the introduction of landscape elements visually incongruous with river character in terms of form, line, color, or texture that adversely affects vividness, intactness, or unity of important and sensitive views.	After construction is complete, a joint effort would be made by the Corps and SAFCA to complete an enhanced revegetation plan. The revegetation of the staging area is just an enhanced revegetation effort. Normally, this includes a native grass seed mixture. The revegetation of the staging area would consist of grasses plus wild roses, oak trees, a few fast-growing sycamores, and other understory vegetation. This would aid in the screening of the newly constructed levee. The staging area would be an active site for equipment during construction. The staging area would be revegetated after completion of construction activities. To ensure a high success rate for plant establishment, a 5-year monitoring plan would be in place for the vegetation.	LS
TRAFFIC		
Effects on traffic and circulation were considered significant if the action would (1) cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the roadway system or (2) create a substantial safety risk.	3.3.3. The following best management practices would be implemented to reduce construction traffic conflicts and ensure public safety in the areas where construction traffic is near levee access routes. Implementing these measures would reduce the potential effects to less than significant. - Contractors would provide advanced notification of construction, including proposed work and construction times, to nearby residents and the California State University, Sacramento. - Contractors would avoid hauling on public roads during weekday peak traffic periods, such as 6:30 a.m. to 9:30 a.m. and 3:30 p.m. to 6:30 p.m., especially in developed areas. If this is not feasible, contractors would prepare traffic engineering studies to include peak-hour capacity calculations at affected intersections along haul routes, demonstrating that acceptable levels of service would be maintained. Otherwise, the contractor would have to revise the routes to meet acceptable service levels. - Construction zones along the proposed action sites would be posted to notify	LS

Table B-1
Summary of Impacts and Mitigation Measures Incorporated by Reference

Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
	approaching motorists and pedestrians of construction equipment and reduce speeds at surface streets where construction access is required. • If trucks or equipment need to maneuver into or out of the construction sites, flaggers would be stationed to slow or stop approaching vehicles to avoid conflicts with construction vehicles and trucks. • Reduction in speed limits, where trucks need to access construction sites through residential areas, would be strictly enforced. • Contractors would submit a wildfire prevention plan that would include requiring spark arresters on all vehicles within the area of potential fire hazard. The plan would refer to the Corps' Safety and Health Requirements under 1505 General Requirements, which includes best management requirements for dust control, noise prevention/abatement, storm water pollution prevention, and construction hours	
NOISE		
The significance criteria used to evaluate anticipated noise conditions are based on project-related incremental noise increases at the construction sites. An increase in noise of 3 decibels or less is typically not perceptible, while a 5-decibel increase is usually perceived as being distinctly perceptible.	3.4.3. The following measures would be implemented to reduce the project's short-term construction-related effects on noise and sensitive land uses and receptors. • During weekdays, the contractor would not begin work in residential areas earlier than 6:30 a.m. and would not work later than 8:00 p.m. On Saturdays, the contractor's construction hours would not begin earlier than 7:00 a.m. and would not end later than 8:00 a.m. and would not end later than 6:00 p.m. • Mufflers would be kept operable and effective on all construction equipment, generators, and vehicles. All internal combustion engines would be operated with exhaust and intake silencers. Wherever possible, noise-generating construction equipment would be shielded from nearby residences by noise-attenuating buffers such as structures or truck trailers. • Prior to construction within 1,000 feet of residences, written notice will be provided to potentially affected residences, identifying the type, duration, and frequency of construction activities. Notification materials would also identify a mechanism for residents to register complaints if construction noise levels are overly intrusive or construction occurs outside the required hours. • During construction, activity noise and associated vibrations would be monitored to ensure reduction in noise levels from construction equipment	LS

**Table B-1
Summary of Impacts and Mitigation Measures Incorporated by Reference**

Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
RECREATION		
Effects to recreational resources are considered significant if construction would cause substantial long-term disruption of an existing recreational activity.	3.5.3. The following measures would be implemented to reduce the effects of the proposed action on the American River Parkway. • Prior to initiation of construction, the Corps and the Board would continue to coordinate with Sacramento County and the California Department of Parks and Recreation prior to initiation of construction, regarding potential short-term effects to use of the various recreation trails along the lower American River. • If portions of the bike trail between Howe Avenue and Northrop Avenue need to be closed, the contractor would provide a street detour route.	LS
VEGETATION AND WILDLIFE		
Effects were considered to be significant if construction of the project would substantially interfere with the movement of any resident or migratory wildlife species, substantially diminish habitat for wildlife, or involve the disposal of material which could pose a hazard to wildlife or plant populations.	3.6.3. Grassland areas that are disturbed by temporary construction (including levee side slopes, easement areas, and access routes) would be revegetated with appropriate native grass species, including oak trees. The Corps has met the intent of the County's oak tree preservation ordinance in regards to the transplantation and replacement of oak trees. See Section 2.2.1 Left Bank Levee Raising near Mayhew Drain. The loss of approximately 2.7 acres of riparian habitat and scattered individual trees would be replaced in approximately 2.7 acres of riparian habitat and scattered individual trees would be replaced in conjunction with plantings for the valley elderberry longhorn beetle as described in Section 3.7.3. After construction, the levee side slopes and waterside easement areas will be seeded with grass or other low-lying vegetation. The Corps is not considering planting shrubs directly on the landside easement. Title 23 of the California Water Code, Waters Division 1 – Section 131 (the State regulation governing project levees) states: "Suitable vegetation, if properly maintained, is permitted within an adopted plan of flood control. However, most shrubs and brushes do not allow for maintenance access and visibility. The normal vegetation is a mixture of grass or other low-lying vegetation. (It) must not interfere with the integrity of the adopted plan of flood control, or interfere with maintenance, inspection, and flood fight procedures." Lists of suitable vegetation types appear in that document.	LS

Table B-1 Summary of Impacts and Mitigation Measures Incorporated by Reference		
Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
SPECIAL STATUS SPECIES		
An alternative would be considered to have a significant effect on special status species if it would result in a take of a special status species or have an adverse effect on a species' designated critical habitat.	3.7.3. Compensation for the effects to the beetle would be provided in accordance with the USFWS' July 9, 1999, mitigation guidelines, which indicate that all elderberry shrubs with one or more stems measuring 1.0 inch or greater in diameter at ground level must be transplanted to a conservation area of at least 1,800 square feet per each elderberry transplanted. In addition, as many as 5 additional elderberry plantings, which include cuttings or seedlings, can be planted within the 1,800-square foot transplant area. Based on these guidelines, the mitigation area needs to be at least 21 acres. The compensation area would accommodate the approximately 29 elderberry transplants, at least 2,555 elderberry seedlings plus associated native plants. The proposed action reduces the original project footprint and, thus, the impacts to elderberry shrubs. Final figures would be determined prior to the initiation of construction. A buffer zone of 100 feet from trail facilities will be used when transplanting elderberry shrubs. <u>Mitigation Site Locations</u> Three possible conservation areas, also known as Mitigation Sites A through C, have been identified and are all located within the lower American River area. These sites are shown on Plates 1 and 2. Mitigation site A is located near Cal Expo, west of Business 80. This is a large open field with scattered clumps of elderberry and oak trees. Site B is a portion of a 260-acre field that is planted with winter wheat. Acquisition of a portion of this site would allow extension of the oaks and elderberry shrubs found along the bike trail. Site C is an open field near Rancho Cordova High School. This site could be extended on the west side of the bike trail where large patches of star thistle are found on both sides of the equestrian trail. In addition to these three sites, there may also be a location near Bushy Lake suitable for elderberry and riparian planting.	LS
AIR QUALITY		
An alternative would be considered to have a significant effect on air quality if it would violate any ambient air quality standard, contribute on a long-term basis to an existing or projected air quality violation, expose sensitive receptors to	3.8.3. The best available control technology, which would be enforced by a construction contract, as well as purchased air credits from local air districts, would be used to reduce pollutant emissions to less than significant. Detailed mitigation measures are listed below:	LS

Table B-1 Summary of Impacts and Mitigation Measures Incorporated by Reference		
Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
substantial pollutant concentrations, or not conform to applicable Federal standards.	- Construction equipment operating on the site and trucks used for hauling materials to and from the construction site would be equipped with required emission control devised to minimize exhaust pollutant emissions. - Emissions would be reduced by requiring the use of 1996 or later off-road construction equipment for 20 percent of the equipment. This newer equipment is assumed to have 25 percent lower emissions as compared to pre-1996 equipment. Additionally, emission reduction could be obtained by phasing construction and requiring the use of low emission diesel fuel such as Lubrizol. - Trucks hauling construction materials would be covered or the material sufficiently watered down if needed to eliminate visible dust emissions. - Waste material or cleared vegetation would not be burned. - Watering or a long-duration dust palliative such as sodium lignosulfonate would be used to minimize dust emissions from the unpaved haul roads and levee roads. The palliative would be reapplied as needed to eliminate visible dust emissions. - Soil-disturbing activities would be suspended during periods with winds over 25 miles per hour. - The amount of material actively worked and the amount of material stockpiled would be minimized. - Haul truck speed would be limited to a maximum of 10 mph on levee roads adjacent to residences, 15 mph on unimproved roads in residential areas, and 25 mph on other levee roads to minimize vibration, dust emissions, and rock throw. - Paved streets adjacent to the project areas would be swept or washed at least once a day to remove accumulated dust. - The Lead Agencies would purchase emissions credits from the SMAQMD (or other local entity offering such credits for sale). The amount of credits purchased would be sufficient to reduce project nitrogen oxides levels to below the SMAQMD CEQA thresholds.	

Table B-1 Summary of Impacts and Mitigation Measures Incorporated by Reference		
Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
FINAL EIS/EIR AMERICAN RIVER COMMON FEATURES, LOWER AMERICAN RIVER FEATURES MAYHEW LEVEE, SACRAMENTO COUNTY (USACE AND THE RECLAMATION BOARD 2005)		
TOPOGRAPHY AND SOILS		
Short-term soils disturbance during construction.	Use best management practices to minimize erosion and loss of soil.	LS
SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE		
Short-term disruption in ease of residential access during construction.	Implement measures in Traffic Management Plan to minimize disruption.	LS
RECREATION		
Short-term disruption in access to and use of Gristmill Park and American River.	Post directional signs to other access points. Restore access and use after construction.	LS
Disruption in residential backyard access to Parkway along floodwall.	Pay HRP fees to County Parks.	
Conversion of 4.41 acres of Parkway to new levee and floodwall for flood protection.		SU
ESTHETICS AND VISUAL RESOURCES		
Substantial short-term disruption in character of local viewshed due to construction equipment, trucks, and activities. Degradation in quality of local viewshed due to removal of large trees and shrubs.	Remove equipment and trucks after construction. Transplant elderberry shrubs and large trees, when possible, to the open space within the Mayhew Floodplain. Reseed disturbed areas.	SU
Substantial disruption in character of local viewshed due to higher levee and presence of floodwall. Increase in area for graffiti.	Plant or naturally reestablish trees and shrubs over time. Screen bottom 5 feet of floodwall on waterside and landside with soil and native grasses.	SU
TRAFFIC AND CIRCULATION		
Substantial short-term increase in traffic on residential streets.	Implement measures in Traffic Management Plan to minimize traffic congestion and	SU

Table B-1 Summary of Impacts and Mitigation Measures Incorporated by Reference		
Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
Truck traffic inconsistent with types of residential traffic. Possible disruptions in traffic flow or public safety issues at intersections of Mira Del Rio Drive or Butterfield Way and Folsom Boulevard.	delays, and ensure public safety.	
NOISE		
Substantial short-term increase in ambient noise levels and exposure of persons to noise levels in excess of County standards. Increase in vibration in occupied buildings within 75 feet of slurry wall installation.	Implement equipment and scheduling measures to reduce levels and duration of noise. (Note: County exempts construction from standards during specific hours.) Vibration limited through construction specifications and vibration monitoring.	SU
AIR QUALITY		
The PM ₁₀ effects during construction considered significant since maximum disturbed area exceeds 5 acres on any given day. NO _x emissions meet Federal threshold, but exceed SMAQMD threshold.	Implement measures to reduce PM ₁₀ and NO _x emissions, and acquire emission offsets for NO _x .	LS
VEGETATION AND WILDLIFE		
Removal of 4.41 acres of riparian oak woodland and grassland habitat in construction footprint.	Compensate at 1.63:1 for removal of 4.41 acres, for a total of 7.20 acres. Transplant existing oak trees within 5-acre area in the Mayhew flood plain. Plant replacement oak trees within 5-acre area or one of four potential offsite mitigation sites.	LS
SPECIAL STATUS SPECIES		
Remove 116 elderberry shrubs from construction footprint (direct effects on beetle).	Transplant as many of 116 elderberry shrubs as possible and associated native plants to 5-acre area in Gristmill Park. Plant additional elderberry seedlings and associated native plants within offsite mitigation site(s).	LS
CULTURAL RESOURCES		
No historical or Native American cultural properties within the area of potential effects. Potential damage to previously	Archaeologist monitor all ground-disturbing activities during construction.	LS

Table B-1 Summary of Impacts and Mitigation Measures Incorporated by Reference		
Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
identified buried archaeological and or human remains.		
HAZARDOUS, TOXIC, AND RADIOLOGICAL WASTE		
Accidental sparks from construction equipment may ignite vegetation.	Clear construction staging areas of potential fire fuels and install spark arrestors to all appropriate construction equipment.	LS
FINAL EA/IS AMERICAN RIVER COMMON FEATURES POCKET AREA GEOTECHNICAL REACHES 2 AND 9 (USACE AND THE RECLAMATION BOARD 2006)		
SPECIAL STATUS SPECIES		
An alternative would be considered to have a significant effect on special status species if it would (1) result in the take of a Federally or State-listed threatened or endangered species, (2) adversely affect designated critical habitat, or (3) substantially affect any other special status species, including degradation of its habitat to the degree of jeopardizing the continued existence of the species or critical habitat.	Reach 2 <u>Valley Elderberry Longhorn Beetle</u>. To avoid adverse effects on the elderberry shrubs located near the project area, the following measures taken from the FWS's "Conservation Guidelines for the Valley Elderberry Longhorn Beetle," July 1999, are proposed in consultation with the FWS. Consultation with the FWS will be completed prior to initiation of any construction. - A minimum setback of 20 feet from the dripline of the elderberry bushes would be established. This area would be fenced and flagged to be avoided during construction activities. - Contractors would be briefed on the need to avoid damaging the elderberry plants and the possible penalties for not complying with these requirements. - Signs would be erected every 50 feet along the edge of the avoidance area with the following information: "This area is habitat of the valley elderberry longhorn beetle, a threatened species, and must not be disturbed. This species is protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines, and imprisonment." The signs should be readable from a distance of 20 feet and would be maintained for the duration of the construction. - Work crews would be instructed about the status of the beetle and the need to protect its elderberry host plant.	LS

Table B-1
Summary of Impacts and Mitigation Measures Incorporated by Reference

Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
	<u>Swainson's Hawk</u>. Although a pair of Swainson's Hawk were sighted within the project reach during the April 7 survey, evidence of an inhabited nest were inconclusive. However, another survey would be conducted just prior to initiation of construction activities. If the survey determines that a nesting pair is present or that a hatched fledgling occupies a nest, the Corps would coordinate with the State Department of Fish and Game, and the proper avoidance and minimization measures would be implemented. <u>Reach 9</u> <u>Valley Elderberry Longhorn Beetle</u>. The 11 elderberry shrubs at Reach 9 were transplanted by SAFCA under a separate CEQA action. <u>Swainson's Hawk</u>. Although a pair of Swainson's hawks was sighted within the ½-mile buffer zone of Reach 9 during the April 6 survey, evidence of an inhabited nest was inconclusive. However, another survey will be conducted just prior to initiation of construction. If the survey determines that a nesting pair is present or that a hatched fledgling occupies a nest, the Corps would coordinate with the State Department of Fish and Game, and the proper avoidance and minimization measures would be implemented.	
AIR QUALITY		
An alternative would be considered to have a significant effect on air quality if it would (1) violate any ambient air quality standard, (2) contribute on a long-term basis to an existing or projected air quality violation, (3) expose sensitive species or humans to substantial pollutant concentrations, or (4) not conform to applicable Federal and State standards, and local thresholds on a long-term basis.	Implementation of the best management practices listed below would reduce air emissions and ensure that the project emissions would remain at less-than-significant levels. Since there would be no significant effects on air quality, no mitigation would be required. • Maintain properly functioning emission control devices on all vehicles and equipment. • Use diesel-fueled equipment manufactured in 2003 or later, or retrofit equipment manufactured prior to 2003 with diesel oxidation catalysts. • During construction, implement at all appropriate dust control measures, such as tarps or covers on dirt piles, in a timely and effective manner. • Periodically water all construction areas having vehicle traffic, including unpaved areas, to reduce generation of dust. Application of water would not be excessive or result in runoff into storm drains.	LS

**Table B-1
Summary of Impacts and Mitigation Measures Incorporated by Reference**

Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
	- Suspend all grading, earth moving, or excavation activities when winds exceed 20 miles per hour. - Water or cover all material transported offsite to prevent generation of dust. - Sweep paved streets adjacent to construction sites, as necessary, at the end of each day to remove excessive accumulations of soil or dust. - Cover all trucks hauling dirt, sand, soil, or other loose material, or maintain at least 2 feet of freeboard (minimum vertical distance between top of the load and top of the trailer) in accordance with the requirements of California Vehicle Code Section 23114. This provision would be enforced by local law enforcement agencies. - Revegetate or pave areas cleared by construction in a timely manner to control fugitive dust.	
WATER RESOURCES & QUALITY		
An alternative would be considered to have a significant effect on water resources if it would (1) result in the loss of a surface or groundwater source or (2) interfere with existing beneficial uses or water rights. An alternative would be considered to have a significant effect on water quality if it would (1) substantially degrade water quality, (2) contaminate a public water supply, substantially degrade or deplete ground-water resources or interfere with ground-water concentration.	The contractor would be required to obtain a NPDES permit from the RWQCB, Central Valley Region, since the project would disturb 1 or more acres of land and involve possible storm water discharges to surface waters. As part of the permit, the contractor would be required to prepare a Storm Water Pollution Prevention Plan (SWPPP) identifying best management practices to be used to avoid or minimize any adverse effects of construction on surface waters. Implementation of the following best management practices would ensure that the effects on water quality would remain at less-than-significant levels. Since there would be no significant effects on water quality, no mitigation would be required. - Prepare a spill control plan and a SWPPP prior to initiation of construction activities. The SWPPP would be developed in accordance with guidance from the CRWQCB, Central Valley Region. These plans would also be reviewed and approved by the Corps. - Implement appropriate measures to prevent any debris, soil, rock, or other construction activities from getting into the water. Install silt fencing and hay bales along the 10-foot setback and at the base of the stockpile on the waterside bench at Reach2; install silt fencing on both waterside and landside slopes within 10 feet of the degrade limit at Reach 9. Use a water truck or other appropriate measures to control dust on the haul road and stockpiles.	LS

**Table B-1
Summary of Impacts and Mitigation Measures Incorporated by Reference**

Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
	• Properly dispose of oil or liquid wastes. • Fuel and maintain vehicles in specified areas that are designed to capture spills. • Inspect and maintain vehicles and equipment to prevent dripping of oil and other fluids. • Schedule construction to avoid as much of the rainy season as possible. Ground disturbance activities would not begin until mid-to late summer to minimize the risk of soil erosion and runoff. If rains are forecast during the construction period, erosion control measures would be implemented as described in the CRWQCB Erosion and Sediment Control Field Manual. • Train construction personnel in stormwater pollution prevention practices. • Revegetate areas cleared by construction in a timely manner to control erosion. Since no significant adverse affects to groundwater resources are anticipated, no additional mitigation is required.	
TRAFFIC AND CIRCULATION		
An alternative would be considered to have a significant effect on traffic if it would cause an increase in traffic that is substantial in relation to the existing load and capacity of a roadway, an increase in safety hazards on area roadways, or cause substantial deterioration of the physical conditions of area roadways.	Since there would be no significant effects on traffic and circulation, no mitigation would be required. However, the contractor would be required to develop a Traffic Management Plan, which would be coordinated and approved by the City of Sacramento and Caltrans prior to construction. This plan would require implementation of the following types of measures to reduce any adverse effects on traffic and ensure public safety: • Do not permit construction vehicles to block any roadways or private driveways. • Provide access for emergency vehicles at all times. • Select haul routes to avoid schools, parks, and high pedestrian use areas, when possible. Crossing guards would be provided when truck trips coincide with school hours and when haul routes cross student travel paths. • Obey all speed limits, traffic laws, and transportation regulations during construction. • Use signs and flaggers, as needed, to alert motorists, bicyclists, and pedestrians to avoid conflicts with construction vehicles or equipment. • Use different streets for truck entering and exiting. • Use temporary traffic lights operated by the contractor during movement of	LS

Table B-1 Summary of Impacts and Mitigation Measures Incorporated by Reference		
Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
	equipment and vehicles. Implementation of these measures would ensure public safety and that traffic flow and patterns in the project area would experience minimal disruption. No other mitigation would be necessary.	
NOISE		
An alternative would be considered to have a significant effect on noise if it would substantially increase the ambient noise levels for adjoining areas. The significance of short-term noise effects is evaluated with reference to existing noise levels, the duration of the noise, and the number of sensitive receptors affected.	Since there would be significant effects on noise, no mitigation would be required. However, best management practices would be used to reduce noise levels and minimize effects on residents and students during construction. These practices would include mufflers on all construction equipment, generators, and vehicles. Whenever possible, noise-generating construction equipment would be shielded from nearby residences by noise-attenuating buffers such as trees.	LS
CULTURAL RESOURCES		
An alternative would be considered to have a significant adverse effect on cultural resources if it diminishes the integrity of the resource's location, design, setting, materials, workmanship, feeling, or association. Types of effects include physical destruction, damage, or alteration; isolation or alteration of the character of the setting; introduction of elements that are out of character; neglect; and transfer, lease, or sale.	The principle element of the mitigation plan is to restore the Walnut Grove Branch Line Railroad to a pristine working condition to allow the railroad to regain its operational status. The levee would be rebuilt and the railroad alignment reconstructed so that the integrity of location, setting, design, workmanship, and feeling would be retained. Since the railroad has undergone annual and regular maintenance by the California State Railroad Museum, the integrity of materials does not affect the property's eligibility, and the replacement of the railroad and associated materials would not be an adverse effect. Overall, this allows the Corps to fully mitigate adverse effects to a level of no significance. The project would have no effect on any other known prehistoric or historic resources. The possibility exists that potentially significant unidentified cultural remains could be encountered during project construction. If buried or otherwise obscured cultural resources are encountered during construction, activities in the area of the find would be halted, and a qualified archaeologist would be consulted immediately to evaluate the find. Should any potentially significant cultural resources be discovered, compliance with 36 CFR 800.13(b), "Discoveries without prior planning," would be implemented. Data recovery or other mitigation measures might be necessary to mitigate adverse	LS

Table B-1 Summary of Impacts and Mitigation Measures Incorporated by Reference		
Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
	effects to significant properties. Implementation of Mitigation Measure CUL-MM-1, Compliance With National Historic Preservation Act of 1966, Historic and Archaeological Resources Protection Act, and Protection of Historic Properties, would reduce this effect to a less-than-significant level.	
HAZARDOUS AND TOXIC WASTE		
The effect of those substances identified as potentially hazardous by CERCLA; the Resource, Conservation, and Recovery Act; and/or 40 CFR Parts 260 through 270 would be considered to be significant if they would (1) expose workers to hazardous substances in excess of OSHA standards, or (2) contaminate the physical environment, thereby posing a hazard to humans, animals, or plant populations, by exceeding Federal exposure, threshold, or cleanup limits.	Identification, characterization, segregation, transportation, and disposal of all hazardous wastes would be conducted in accordance with all applicable Federal, State, and local regulations to ensure safety to workers and the public against exposure and contamination.	LS
FINAL SUPPLEMENTAL EIS/EIR AMERICAN RIVER WATERSHED PROJECT POST AUTHORIZATION DECISION DOCUMENT, FOLSOM DAM RAISE, FOLSOM BRIDGE (USACE AND CITY OF FOLSOM 2006)		
GEOLOGY, SEISMICITY, & SOILS		
Temporary soil disturbance in the area during construction.	Use best management practices to minimize the loss of soil.	LS
FACILITIES & PUBLIC UTILITIES		
Disruption in access to dam for Reclamation maintenance.	Provide access road and schedule construction to maintain access to dam.	LS
Relocation of Reclamation, ARWEC, and State Parks facilities and functions. Temporary effects to staff during relocations.	Minimize effects to staff through advance planning and coordination.	
Relocation of 10 wooden poles and up to 7 SMUD power poles.	Utility relocations would be staged so there would be no loss of power.	LS
RECREATION		
Disruption in access to existing Class I bike trail at Briggs Ranch Road/East Natoma Street; American River bike trail; and bike trail near ARWEC and State Parks offices.	Use best management practices to minimize disruption and ensure bicyclist/pedestrian safety.	LS

Table B-1 Summary of Impacts and Mitigation Measures Incorporated by Reference		
Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
TRAFFIC & CIRCULATION		
Deterioration or worsening of 2007 and 2025 roadway segment LOS.	Make physical and operational improvements to roadway segments and intersections.	S
Deterioration or worsening of 2007 and 2025 intersection LOS.		
Adding cut-through traffic to residential streets.		
VEGETATION & WILDLIFE		
Loss of 33.87 acres of oak woodland, 5.46 acres of riparian, and 2.51 acres of seasonal wetland.	Provide the following mitigation: 51.67 acres of oak woodland, 5.80 acres of riparian, and 2.51 acres of seasonal wetland.	LS
SPECIAL STATUS SPECIES		
White-tailed kite and purple martin could be temporarily disturbed.	Surveys would be done prior to construction to determine the presence of nesting raptors and other birds. Specific avoidance measures would be implemented, if needed.	LS
About 154 elderberry shrubs would be affected.	Provide the following mitigation: transplant elderberry shrubs and plant 1,484 elderberry seedlings and 2,586 associated native seedlings on 16.82 acres.	LS
WATER RESOURCES & QUALITY		
No effects on surface or ground water quality or ground water supplies. No in-water construction. No in-water work, but potential for spills.	Best management practices to prevent spills into the river. Comply with CWA Section 404 and 401, and NPDES. No mitigation required.	LS
Loss of 2.51 acres of jurisdictional wetlands.	Provide 2.51 acres of seasonal wetland mitigation.	LS
AIR QUALITY		
Increases in ROG, NO _x and PM ₁₀ emissions during construction, as well as ozone precursors, PM ₁₀ , and CO during operation, would exceed Federal and/or SMAQMD standards.	Implement mitigation measures to (1) reduce NO _x emissions and control visible emissions from off-road diesel powered equipment and (2) minimize generation of PM ₁₀ dust. Pay fee to SMAQMD offset NO _x emissions during construction.	LS

Table B-1 Summary of Impacts and Mitigation Measures Incorporated by Reference		
Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
NOISE		
Increases in noise levels due to use of equipment during construction would exceed Federal and/or City of Folsom noise standards.	Construction activities limited to daytime hours when exempt from standards. Implement best management practices to reduce noise.	LS
Increase in noise levels at adjacent apartments due to traffic on adjacent roadway.	Construction soundwalls between roadway and apartments.	LS
ESTHETICS AND VISUAL RESOURCES		
New soundwall near the apartments would change the current viewshed for residents.	Landscape plantings would be planted along the soundwall.	LS
HAZARDOUS, TOXIS, & RADIOLOGICAL WASTE		
No HTRW sites within the immediate project area. No effect on HTRW sites. Potential for a public hazard if hazardous materials are accidentally spilled or released into the environment during construction.	Prior to construction, a hazardous materials management plan would be developed and implemented. No mitigation required.	LS
FINAL DETAILED PROJECT REPORT AND FINAL EIS/EIR (USACE AND CITY OF SACRAMENTO 1996)		
PUBLIC SERVICES		
A significant impact would occur to water supply, wastewater, police and fire, and utilities if underground piping systems and/or above ground poles/lines are at risk of being damaged during construction activities of the preferred alternative or alternatives. In addition, a significant impact to police and fire would occur if an emergency response roadway is closed during construction activities.		
4.7.1(b). Preferred Project Alternative (PPA): Channel and Levee Plan (46.8 feet elevation at top of the levee) and Alternative B (AB): Channel and Levee Plan (45.8 feet elevation at top of the levee).	4.7.1(c). Public Services Mitigation for Preferred Project Alternative (PPA) and Alternative B (AB): Channel and Levee Plans. The following mitigation measures are recommended to reduce the significant impacts to a level of insignificance: 1 <u>Water Wells and Lines and Gas Mains on Dry Creek Road.</u> Employ	LS

**Table B-1
 Summary of Impacts and Mitigation Measures Incorporated by Reference**

Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
	construction practices developed through coordination with the City’s Utilities Department and PG&E. These design and construction practices shall be developed prior to any excavation activities and signed-off by the City and PG&E. Although no City water wells will be directly affected by the project, before and after testing of water wells near the project site shall be undertaken to ensure no surface water migrates to the well source. 2 <u>Fire and Police Service Response Time during Construction.</u> The significant impacts on fire and police access during construction will be reduced to a less than significant level by providing detours of adequate size and strength to handle emergency vehicles. The detours will need to be well marked and lighted. Final location and design of the detours will be coordinated with and signed-off by the City’s Fire and Police Departments and Public Works Department. 3 <u>Electrical Distribution Impacts.</u> If the preferred alternative or Alternative B is approved, the electrical and telephone lines and the poles on which they are connected as well as the transformers, will be displaced. To reduce this significant impact to a less than significant level, there are two alternative mitigation measures: 1) Make all feasible efforts to inform residents several weeks or a month in advance but no less than one week in advance of the time and duration that the service will cease, and 2) relocate or replace power poles.	
TRANSPORTATION		
A significant impact would occur if the roadbed deterioration resulting from construction activities is above the design level. A significant traffic impact would occur if construction traffic would deteriorate the level of service (LOS) to an unacceptable level as defined by the City of Sacramento. The City of Sacramento has identified LOS C as the threshold condition for intersections. A significant short-term bus impact would occur if service is interrupted by construction activities, or if replaced/reconstructed roadways did not provide adequate ROW for bus service. In addition, a significant bikeway impact		LS

Table B-1 Summary of Impacts and Mitigation Measures Incorporated by Reference		
Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
would occur if replaced/reconstructed roadways/bridges did not provide adequate ROW for those planned facilities.		
4.8.1. Direct Transportation Impacts: 4.8.1 (b). Preferred Project: Channel and Levee Plan (46.8 feet elevation at top of levee) and Alternative B (AB): Channel and Levee Plan (45.8 feel elevation at top of levee).	4.8.1(d). Transportation Mitigation for All Structural Project Alternatives. The following mitigation measures are recommended to reduce the magnitude of impacts. Residents will experience temporary traffic delays. The impact will therefore be reduced but not to a less-than-significant level: 1. Construction work should be avoided during the weekday peak traffic periods, especially along Raley Boulevard and Marysville Boulevard for the proposed project and along Raley Boulevard for Alternatives B-D. If this is not feasible, the contractors shall prepare a traffic engineering study that includes peak-hour capacity calculations at impacted intersections demonstrating acceptable levels of service will be maintained. This plan shall be approved by the city of Sacramento's Public Works Department and Regional Transit. 2. Bridge reconstruction at Dry Creek Road and Raley Boulevard shall be phased so that at least one bridge and roadway is open at all times. 3. Local residents and Regional Transit shall be notified of impacted roadways prior to commencement of construction activities. The notice shall indicate those roadways to be impacted, duration of construction activities, and available alternate routes. 4. The contractors shall prepare a transportation plan with information on haul routes and the number of trucks per day, as well as a traffic engineering analysis indicating that potential impacted sections have adequate turning radii for oversized vehicles. This plan shall be approved by the City of Sacramento's Public Works Department and Regional Transit prior to construction. This will assure that impacted intersections will be avoided to the extent feasible. 5. Contractors shall repair, to appropriate standards determined by the City of Sacramento's Public Works Department, all roadbed surfaces damaged during construction.	LS
AIR QUALITY		
CEQA states that a project will normally have a significant effect on the environment if it will "...contribute substantially to an existing or projected air quality violation...". For direct		

**Table B-1
Summary of Impacts and Mitigation Measures Incorporated by Reference**

Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
impacts, the normal activities involved with project development would increase the amount of PM-10 ROG, NO_x and CO in the air. 4.9.1. Direct Air Quality Impacts: 4.9.1(b). Preferred Project Alternative (PPA): Channel and Levee Plan (46.8 feet elevation at top of levee) and Alternative B(AB): Channel and Levee Plan (45.8 feet elevation at top of levee).	4.9.1(c). Mitigation for Direct Air Quality Impacts: The following mitigation measures are recommended to reduce the impacts associated with generation of PM₁₀ resulting from construction activities. Implementation of all of the measure listed below will result in approximately 310 pounds per day reduction of PM₁₀ with the PPA and AB and 332 pounds per day of PM₁₀ for AC and AD. The significance threshold for PM₁₀ is 275 pounds per day, therefore the level of significance for PM₁₀ emissions will be reduced for all alternatives, but not to a less than significant level. 1 Water all unpaved construction areas at least twice per day during demolition and excavation to reduce dust emissions. Additional watering should be carried out on hot or windy days. Water twice daily or cover stockpiles of sand, soil, and similar materials with a tarp. 2 Cover trucks hauling dirt and debris to reduce spillage onto paved surfaces. 3 Increase the frequency of City street cleaning along streets in the vicinity of the construction site. 4 Work should be restricted or banned on days of high winds (>30 mph) or when air quality violations are expected (as determined by the SMAQMD). 5 On-site vehicle speed on unpaved surfaces shall be limited to 15 miles per hour. 6 Require construction contractors to designate a person or persons to oversee the dust abatement program and to order increased watering, as necessary. 7 Revegetation of construction areas and staging areas shall take place immediately following completion of each project component. 8 Although NO_x construction period emissions fall below the established level of significance, the following <u>suggested</u> mitigation measures may be employed: a. suspension of construction equipment operations during second stage smog alerts; b. monitoring to reduce on site truck idling times; and, c. traffic management procedures to reduce congestion and emissions. 9 In order to reduce construction period CO emissions, congestion management procedures outline in Mitigation Measure 4.8.1 (d) of the Transportation Section shall also be implemented.	SU

Table B-1 Summary of Impacts and Mitigation Measures Incorporated by Reference		
Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
4.9.2. Cumulative Air Quality Impacts: 4.9.2(b). Preferred Project Alternative (PPA) and all Other Alternatives: Cumulative air quality impacts in the study area based on the buildout of the North Sacramento Community Plan (NSCP) area is expected to increase ROGs from 2,703 pounds per day to 4,982 pounds per day. The increase of NO_x will be from 2,232 pounds per day to 2,756 pounds per day. These numbers represent an increase of 84% and 23% for ROGs and NO_x, respectively. These increases represent a significant impact.	4.9.2(c). Mitigation for Cumulative Air Quality Impacts. None available for cumulative impacts. To reduce the project's contribution to cumulative impacts incorporate the project specific air quality mitigation included in Section 4.9.1. The City Council has found that the ozone precursor emissions associated with the buildout of the North Sacramento area represents a significant air quality impact. The Sacramento City Council adopted goals and policies in the 1986–2006 Sacramento General Plan Update (SGPU) that reduces but does not eliminate the significant air quality impacts. These adopted goals and policies are found within the Circulation Element of the SGPU. As projects are proposed, they will be required to be consistent with these goals and policies. This will reduce the air quality impact but not to a less than significant level.	SU
NOISE		
The potential noise levels resulting from construction activities (e.g., heavy truck use, digging equipment, etc.) were measured against applicable goals, policies, and ordinance provisions to determine if a significant impact would result. 4.10.1. Direct Impacts of Construction Related Noise: 4.10.1(b). Preferred Project Alternative (PPA): Channel and Levee Plan (46.8 feet elevation at top of levee) and Alternative B (45.8 feet elevation at top of levee).	4.10.1(e). Mitigation for Construction Noise Impacts. The following mitigation measures are recommended to reduce the short-term direct noise impacts of the proposed project below a level of significance: 1 Construction activities north of Vinci Avenue shall occur only between the hours of 7:00 a.m. and 7:00 p.m., Monday through Saturday. Construction equipment maintenance and servicing shall be confined to the same hours. This condition shall be placed on any grading permits. 2 Mufflers shall be provided for all heavy construction equipment and all stationary noise sources. Stationary noise sources shall be located at least 300 feet from occupied residences or contractors shall be required to provide appropriate noise reducing engine housing enclosures. 3 Equipment warm up areas, water tanks, and equipment storage areas shall be placed in a central area as far away from existing residences as is feasible. 4 Where practicable, truck routing should be avoided near residential units.	LS

**Table B-1
Summary of Impacts and Mitigation Measures Incorporated by Reference**

Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
HYDROLOGY		
For purposes of this EIS/EIR, a drainage/flooding impact is considered significant if proposed Magpie Creek flood improvements result in any of the following: 1) flooding in areas not previously subject to flooding, 2) increase the base flood elevation in developed areas already subject to flooding which would increase flood risk to buildings or persons, or 3) cause or increase encroachment into design levee freeboard.		
4.11.1. Direct Hydrology Impacts – Flood Risk: 4.11.2(b). Preferred Project Alternative (PPA): Channel and Levee Plan (46.8 feet at top of the levee) and Alternative B (AB): Channel and Levee Plan (45.8 feet elevation at top of levee).	4.11.2(c). Mitigation Secondary Flood and Hydrological Impacts (Backwater Flooding and Interior Flooding) for Preferred Project Alternative and Alternative B. The following mitigation measures are recommended to reduce the significant impacts to a level of insignificance: 1 <u>Channel Maintenance</u> – To mitigate the potential impacts resulting from sediment and vegetative accumulation, a maintenance program shall be developed, funded and implemented by the party responsible for O&M activities prior to completion of the flood control improvements. Features to be included within the program shall include inspection techniques and determining factors requiring dredging, testing and disposal of materials. This shall be done for the preferred project and alternatives. 2 <u>Interior Drainage</u> – These lands will either need to be purchased by the project applicants, or future developers will need to assure that development within these areas will be protected from flood waters while at the same time not resulting in a significant flood impact based on the standards of significance identified in this document.	LS
4.11.3. Channel Stability/Sediment Transport Analysis: 4.11.3(b). Preferred Project Alternative (PPA): Channel and Levee Plan (46.8 feet elevation at top of the levee) and Alternative B (AB): Channel and Levee Plan (45.8 feet elevation at top of levee).	4.11.3(d). Mitigation Channel Stability/Sediment Transport Analysis – All Structural Alternatives. A maintenance program shall be developed and implemented by the party responsible for operation and maintenance activities prior to completion of the flood control improvements. Features to be included within the program shall include inspection techniques and determining factors requiring dredging, testing and disposal of materials.	LS

Table B-1 Summary of Impacts and Mitigation Measures Incorporated by Reference		
Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
WATER QUALITY		
For the purpose of this EIS/EIR, an impact is considered significant if the preferred alternative or the alternatives could: - Expose persons or structures to flood hazards by being located within the 100-year flood plain as defined by the Federal Emergency Management Agency; - Result in substantial changes in absorption rates, drainage patterns, or the rate and amount of surface runoff which cause existing drainage capacity to be exceeded; - Substantially degrade surface water quality, and violate any water quality objectives set by the SWRCB as part of the ISWP, due to increases in sediments and other contaminants generated by construction and/or operation activities.		
4.12.1. Impacts from Erosion and Turbidity: 4.12.1(b). Preferred Project Alternative (PPA): Channel and Levee Plan (46.8 feet elevation at top of the levee) and Alternative B (AB): Channel and Levee Plan (45.8 feet elevation at top of levee).	4.12.1(d). Mitigation Erosion and Turbidity for all Structural Alternatives. A General Construction Activity Stormwater Permit will be required. The local project sponsors will be responsible for obtaining and complying with the conditions of the permit designed to reduce erosion and water quality effects. The following mitigation measures will reduce the significant impacts below a level of significance for the preferred project alternative (PPA) and Alternatives B-D. Prepare and implement a Stormwater Pollution and Prevention Plan (SWPPP) and an Erosion and Sediment Control Plan to reduce the potential for turbidity impacts during and immediately following construction activities. - All exposed soils shall be revegetated and stabilized as soon as possible following construction. Reseeding and mulching work shall be completed by October 1 of any year following grading. If erosion control practices are not installed October 1 of any year following grading, exposed soil may require additional treatment following seasonal rains and subsequent erosion. - The use of small sediment catchment basins or traps to prevent sediment from being transported over construction sites should be considered in areas where exposed soils are present within 10 feet of Magpie Creek, Don Julio Creek, Robla Creek or Magpie Creek Diversion Channel. Types of sediment traps to be considered include filter berms, straw base barriers, filter inlets, vegetative filter	LS

Table B-1 Summary of Impacts and Mitigation Measures Incorporated by Reference		
Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
4.12.2. Accidental Hazardous Materials Release: 4.12.2(b). Preferred Project Alternative (PPA): Channel and Levee Plan (46.8 feet elevation at top of the levee) and Alternative B (AB): Channel and Levee Plan (45.8 feet elevation at top of levee).	strips, and culvert risers. • The plan should include details regarding seed material, fertilizer and mulching. The seed material should include native plan species and be approved by a revegetative specialist or an erosion control specialist. • Following demolition and reconstruction of the Raley Boulevard and Dry Creek Road bridges and the demolition of Vinci Road bridge, the contractor shall conduct a comprehensive clean-up program to remove all unnatural materials in the channel resulting from construction activities. • Sediment barriers shall be installed immediately downstream from the Dry Creek Road, Vinci Road and Raley Boulevard Bridge crossings to reduce potential turbidity impacts. These sediment barriers shall be periodically maintained (by removing accumulated silt) to ensure adequate performance. 4.12.2 (d). Mitigation Accidental hazardous Materials Release. The following mitigation measures will reduce the significant impacts below a level of significance for the Preferred Project Alternative and Alternatives B-D (the following measures are reproduced from the Final Environmental Impact Report-Volume I for the Revised Natomas Area Flood Control Improvement Project): 1 Enforce strict on-site handling rules to keep construction and maintenance materials out of receiving waters. Such rules shall include but not be limited to: a. Store all reserve fuel supplies only within the confines of a designated construction staging area. b. Equipment refueling activities shall take place only within designated areas within construction staging areas. c. Construction vehicles shall be inspected daily for leaks. 2 Prepare a spill prevention and countermeasure plan. 3 Dispose of excavated material away from water sources. 4 The construction staging areas shall be designed to contain surface runoff so that contaminants such as oil, grease or fuel products do not drain toward receiving waters. If heavy-duty construction equipment is stored overnight on the top of levees, drip pans shall be placed beneath the machinery engine block and hydraulic systems. 5 Construction shall be carried out in the compliance with the California State Water Resources Control Board’s General Permit for Construction Activities.	LS

**Table B-1
Summary of Impacts and Mitigation Measures Incorporated by Reference**

Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
4.12.4. Water Quality Impacts Resulting from Construction Period Dewatering Activities: 4.12.4(b). All Structural Alternatives (Preferred Project Alternative (PPA), and Alternatives B, C, and D).	4.12.4(c). The following mitigation measure is recommended to reduce the impact of the ground water discharges to a less than significant level. 1 In the event that construction activities require dewatering of the site or groundwater discharge, the applicant shall provide evidence of an approved Groundwater Discharge Permit from the City Utility Department in accordance with City Council Resolution Number 92-439.	LS
BIOLOGICAL HABITATS		
In accordance with Appendix G of CEQA Guidelines, impacts to biological resources are considered significant if one or more of the following conditions result from implementation of the project.		
a. Conflict with adopted environmental plans and goals of the community where it is located; b. Substantially affect a rare or endangered species of animal or plant or the habitat of the species, c. Interfere substantially with the movement of any resident or migratory fish or wildlife species.		
4.13.4. Impacts to Wetland Habitats (Riparian Scrub-Shrub, Emergent Marsh and Seasonal Wetlands): 4.13.4(b). Preferred Project Alternative (PPA): Channel and Levee Plan (46.8 feet elevation at top of the levee) and Alternative B (AB): Channel and Levee Plan (45.8 feet elevation at top of the levee).	4.13.4(e). Mitigation for Wetland Habitats Impacts. A Wildlife Habitat Compensation Plan is being developed by the Corps with the cooperation of the non-Federal sponsor and the AFB, and in coordination with the USFWS. The Corps, the non-Federal sponsor, the AFB, and USFWS must reach agreement on the elements of the plan before construction begins. <u>Compensation Acreages.</u> Compensation for 20.20 acres of emergent marsh , riparian scrub-shrub and seasonal wetland habitat losses (13.53 off base and 6.67 on base) as a result of the Project will be provided to the maximum extent practicable through a combination of habitat creation/restoration and preservation of 42.09 acres (25.93 acres for off base impacts and 16.16 for on base impacts).	LS
4.13.5. Impacts to Upland/Herbaceous Grasslands: 4.13.5(b). Preferred Project Alternative (PPA): Channel and Levee Plan (46.8 feet elevation at top of the levee) and	4.13.5(e). Mitigation to Upland and Herbaceous Grasslands. The following mitigation measures will reduce the significant impacts to a less-than-significant level:	LS

Table B-1 Summary of Impacts and Mitigation Measures Incorporated by Reference		
Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
Alternative B (AB): Channel and Levee Plan (45.8 feet elevation at top of the levee).	(1) To minimize the impact to upland/herbaceous grasslands during construction, protective fencing will be installed to define the perimeter of staging and construction areas prior to beginning work on-site and remain in place until construction is completed. Within the construction right-of-way, grasslands within 50 feet of seasonal wetlands shall not be disturbed and shall be protected by fencing. Uplands within 15 feet of significant trees or shrub (i.e., greater than 4 inches in diameter at breast height or trees, or at the base for shrubs) shall be protected by temporary fencing during the construction period. (2) To facilitate regrowth, all distributed upland areas, except for areas of the newly created channel bottom which could support marsh, should be reseeded with native forbs and grasses.	
SPECIAL STATUS SPECIES		
In accordance with Appendix G of the CEQA Guideline, impacts to biological resources are considered significant implementation of the project will “Substantially affect a rare or endangered species of animal or plant or the habitat of the species.”		
4.14.2. Impacts to Sensitive Animal Species: 4.14.2(b). Preferred Project Alternative (PPA): Channel and Levee Plan (46.8 feet elevation at top of the levee) and Alternative B (AB): Channel and Levee Plan (45.8 feet elevation at top of the levee).	4.14.2(e). Mitigation for Animal Species. The following mitigations are required to reduce impacts to a less-than-significant level: Swainson’s Hawk. To mitigate impacts to the Swainson’s hawk resulting from the temporary loss of foraging habitat the following measure is recommended. After consultation with DFG, if potential Swainson’s hawk foraging habitat will be disturbed by construction activities shall be reseeded replanted with forage-compatible vegetation. Fairy Shrimp. A Biological Opinion is completed by the USFWS under Section 7 of the Endangered Species Act on September 20, 1995. Pursuant to section 7 of the Endangered Species Act, the USFWS, the Corps and the non-Federal sponsor will ensure that the project will not jeopardize the continued existence of the species. Giant Garter Snake. Based on available information and the fact that Magpie Creek Study Area is outside of current known areas or sighting, the Service determined that consultation is not necessary at this time. Prior to construction, surveys of affected reaches within the known range of the giant garter snake shall be	LS

Table B-1
Summary of Impacts and Mitigation Measures Incorporated by Reference

Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
4.14.3. Impacts to Sensitive Plant Species: 4.14.3(b). Preferred Project Alternative (PPA): Channel and Levee Plan (46.8 feet elevation at top of the levee) and Alternative B (AB): Channel and Levee Plan (45.8 feet elevation at top of the levee).	conducted to identify Giant Garter Snake habitat and potential hibernacula. If found, no grading, excavating, or filling may take place in or within 30 feet of existing habitat where Giant Garter Snake have been observed between October 1 and May 1 unless authorized by the DFG. Burrowing Owl. Prior to construction, surveys of affected reaches and staging areas within the known range of the burrowing owl shall be conducted to identify potentially occupied nest sites. If found, no grading, excavating, or filling may take place in or within 30 feet of existing nest sites where burrowing owl have been observed unless authorized by the DFG. 4.14.3(e). Mitigation for Plant Species The following mitigation measures are required to reduce impacts to a less-than-significant level. (1) Avoidance of the vernal pool and wetland where the Legenere (<i>Legenere lirnosa</i>) occurs will be given priority. If these features cannot be avoided the following measure shall be implemented. (2) A rare plant mitigation plan shall be prepared in consultation with DFG. This plan shall include habitat design criteria aimed at mimicking conditions present in the pools where legenere occurs; a monitoring program that tracks the development and maturation of the mitigation habitat, and a contingency plan in the event that the mitigation plan is failing and remedial actions are necessary. The rare plant mitigation plan shall be based on surveys completed to date by Environmental Science Associates. No Section 7 consultation with the USFWS is currently required for incidental take of Legenere due to the proposed project since this plant is only a candidate species for Federal listing (ESA 1994). (3) Replacement of the two Valley Oaks shall take place with consultation with the City arborist as to the size, ratios, method and location for replacement.	LS
CULTURAL RESOURCES		
In accordance with CEQA, Appendix K, significant impacts on cultural resources are based on the following criteria: • Association with an event or person of recognized significance in California or American History, • Association with an event or person of recognized scientific importance in prehistory,		

Table B-1 Summary of Impacts and Mitigation Measures Incorporated by Reference		
Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
- Can provide information which is both of demonstrable public interest and useful in addressing scientifically consequential and reasonable or archaeological research questions, - Has a special or particular quality such as the oldest, best example, largest, or last surviving example of its kind, - Is at least one hundred years old and possesses substantial stratigraphic integrity, or - Involves important research questions that historical research has shown can be answered only with archaeological questions.	4.15.1. Impacts to Historical and Cultural Resources: 4.15.1(b). Preferred Project Alternative (PPA): Channel and Levee Plan (46.8 feet elevation at top of the levee) and Alternative B (AB): Channel and Levee Plan (45.8 feet elevation at top of the levee).	S
RISK POTENTIAL FOR HAZARDOUS AND TOXIC MATERIALS		
In accordance with the CEQA Guidelines, accepted professional standards and/or local plans and policies, impacts to the environment are considered significant if one or more of the following conditions result from implementation of the project: Create a potential public health hazard or involve the use, production, or disposal of materials which pose a hazard to people, animal, or plant populations in the affected area.		

4.15.1(e). Mitigation for Cultural Resources. The following mitigation measures are recommended to reduce the potentially significant impact below to a level of significance:

- (1) prior to construction, a qualified archaeologist shall be retained to review the site and excavation program and develop procedures for review and protection of any cultural resources unearthed. In addition, the archaeologist shall consult with local native American groups prior to start of construction.
- (2) If a site is disturbed during excavation, the excavation in that immediate area will be stopped until a qualified archaeologist reviews the site. Recommendations will be made as to whether to continue with the project, or to cease excavation until additional cultural resources studies can be conducted. The City, Corps, AFB, and ARFCD will adhere to the recommendation of the archaeologist.

**Table B-1
Summary of Impacts and Mitigation Measures Incorporated by Reference**

Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
- Result in unsafe conditions for employees, residents, or surrounding neighborhoods. - Result in non-compliance with applicable laws regarding handling of hazardous waste materials. - Expose people to potential health hazards. 4.16.1. Off-Base Hazardous Materials Risks: 4.16.1(b). Preferred Project Alternative (PPA): Channel and Levee Plan (46.8 feet elevation at top of the levee) and Alternative B (AB): Channel and Levee Plan (45.8 feet elevation at top of the levee).	4.16.1(e). Mitigation for Hazardous and Toxic Materials. For the PA and Alternatives AB and AC the following mitigation measures are required to reduce the risk: (1) A pre-construction site survey of the project area shall be conducted to identify areas of contamination or evidence of adverse environmental effect. Any fish kills or other causes of concern located in the area subject to construction shall be investigated to identify the source and extent of possible contamination. (2) Prior to start of construction, all unnatural debris, including but not limited to, the litter, refrigerators, and old drums mentioned in this chapter within the improvement right-of-ways shall be collected and disposed of properly. (3) In all instances where abandoned storage containers are removed, the soils beneath and in the vicinity of the container or auto shall be tested for signs of contamination. (4) If stained soil or other indications of potentially contaminated materials are observed within the project area construction operations in that area shall be stopped immediately. The suspect soil or liquids shall then be tested by a qualified environmental professional. Should the soil or liquid test results determine that the contamination is locally isolated, the contamination shall be collected and disposed of appropriately. If a determination concerning the extent of contamination cannot be made based on the preliminary testing a complete Phase 2 Site Investigation, including subsurface sampling to evaluate the magnitude of contamination, shall be performed. Clean up shall be performed in accordance with the recommendations of the site investigation. (5) Sampling of soils to be disturbed in construction areas shall take place prior to start of construction (if stream sediment is to be excavated and used for levee improvements, the results of the sampling and analysis shall be provided to the RWQCB for review). If contaminants are discovered at levels that exceed	LS

Table B-1 Summary of Impacts and Mitigation Measures Incorporated by Reference		
Environmental Impact	Mitigation Measure	Level of Significance After Mitigation
4.16.2. On-Base Hazardous Materials Risk: 4.16.2(b). Preferred Project Alternative (PPA): Channel and Levee Plan (46.8 feet elevation at top of the levee) and Alternative B (AB): Channel and Levee Plan (45.8 feet elevation at top of the levee). LS = Less than Significant S = Significant SU = Significant and Unavoidable	acceptable thresholds, then remediation will be required under the state and federal hazardous waste control laws and regulations. For the detention basin alternatives (AC and AD), soil samples shall be taken at a depth below the level of excavation for the detention basin. (6) Refer to Air Quality discussion for measures to reduce fugitive dust in construction and staging areas. (7) Excavated stream sediments used in levee construction shall be encapsulated with imported fill and placed such that it is not likely to erode. 4.16.2(e). Mitigation . See Mitigation for 4.16.1 above.	LS

APPENDIX C

Hydraulic Modeling Results

SAFCA Hydraulic Impact Analysis

CEQA Analysis

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SAFCA Hydraulic Impact Analysis

CEQA Analysis

Introduction

The MBK version of the Sacramento River UNET hydraulic simulation model that was originally developed by the USACE for the Sacramento-San Joaquin River Basins Comprehensive Study (Comp Study) was used to analyze the hydraulic impacts of the following proposed project components:

- Modified flood space in Folsom Lake.
- Addition of new spillway with six auxiliary submerged tainter gates for improved flood release capacity from Folsom Dam (Folsom Modification Project).
- American River levees raised, strengthened, and protected from erosion to pass 160,000 cfs with three feet of freeboard.
- Sacramento River east levee between Natomas Cross Canal and American River raised to pass the 200-year discharge with three feet of freeboard.
- Natomas Cross Canal south levee raised to pass the 200-year discharge with three feet of freeboard.

Hydrology

The analysis used the Sacramento Centering¹ hydrologic inputs developed by the USACE for the Comp Study UNET model. Four hydrologic conditions were simulated:

1. 100 year
2. 200 year
3. 200 year with concurrent 200 year Folsom Dam release (200+ year)

The Folsom Dam releases in the Comp Study hydrologic data sets were replaced with current flood routings produced in August 2006 by the USACE². The peak Folsom Dam releases that were used in the analysis are summarized in Table 1.

¹ The Sacramento Centering hydrology represents a system-wide storm that produces the n-year frequency discharge in the Sacramento River at the latitude of Sacramento. The studies performed herein used hydrologic input data from the HEC-DSS file SACINFLO.DSS, dated 5/14/2002, developed by USACE for use with the Sacramento River UNET model.

² The flood routings are from the following USACE spreadsheet files:
Current Conditions – “01 Folsom 2006-08-17 R000_800CF.xls”
Future Conditions – “09 Folsom 2006-08-17 R060_800FM_Dynamic_SURe.xls”

Table 1.

Hydrologic Condition	Corresponding Folsom Dam Release Frequency	Folsom Dam Release Peak Flow (cfs)	
		Current Conditions	Future Conditions
100 year	80 year	145,000	115,000
200 year	160 year	300,000	160,000
200+ year	200 year	398,000	160,000

Levee Performance

The Design Flows of the Sacramento River Flood Control Project (SRFCP) are not changed by any of the project modifications analyzed herein. In addition the project modifications analyzed herein do not affect the hydraulic capacity (channel roughness, channel obstructions, etc) of the floodways of the American or Sacramento Rivers. None of the levees analyzed in this report would be overtopped by the design flows for the SRFCP. Therefore, the design capacity of the system as defined by USACE³ is not impacted by the SAFCA area projects analyzed in this document. This document addresses possible impacts of project facilities at the 100-year & 200-year flood levels.

For this CEQA analysis, levees were assumed to fail when overtopped. Levees were allowed to surcharge 0.5 feet before failing. A levee breach bottom width of 500 feet was assumed for breaches on the major waterways (Sacramento River, American River, Feather River, Sutter Bypass and Yolo Bypass); a levee breach bottom width of 200 feet was assumed for all other waterways. Breaches were assumed to reach their final width in 2 hours.

Results

The Current and Future peak water surface elevations and corresponding changes in water surface elevation are summarized for selected locations in Table 2. Profile plots comparing the Current and Future maximum water surface elevations are provided in Figures 1 through 9. At all locations the peak water surface under Future conditions is essentially unchanged from, or lower than, that under Current conditions. At some locations the simulation results show an increase of less than 0.1 feet in the peak water surface elevation and in other locations a significant reduction for the extreme flood events. The very small calculated increases in water level are the result of the changed operation of Folsom Dam that results from the Folsom Modification Project. In addition to the changes to the water surface elevations in the river channels, there was also a reduction in the number of levee failures along the American River for the 200 year and 200+ year simulations, as shown in Table 3. There are seven levee failures along the American River for the 200 year event and fourteen for the 200+ year event for the current condition simulations. In the Future condition simulations there are no levee failures on the American River. The proposed increase in storage and increased efficiency in operation of

³ USACE, Sacramento River Flood Control Project, California, Levee and Channel Profiles, 15 March 1957

Folsom Dam offset the impacts of the reduction in levees failures such that there is no substantial increase in downstream flood stages during extreme flood events.

Peak flows at key locations are provided in Table 4.

The UNET simulation model computes average cross-sectional velocities at each cross-section in the model. The maximum average cross-sectional velocities and potential impacts of Future conditions projects are provided in Table 5 for several locations. Note Velocities are reduced because of the Folsom Dam improved operations.

Conclusion

The proposed levee improvements and dam improvements do not adversely impact the Sacramento River Flood Control Project upstream, downstream or within the project's reaches.

Table 2
Compare Water Surface Elevations

River	Location	Comp Study RM	100 year			200 year			200+ year		
			Peak Water Surface Elevation (ft NGVD29)			Peak Water Surface Elevation (ft NGVD29)			Peak Water Surface Elevation (ft NGVD29)		
			Current	Future	Change (ft)	Current	Future	Change (ft)	Current	Future	Change (ft)
Sacramento River	Fremont Weir, west end	84.75	40.14	40.21	0.07	41.08	41.09	0.01	41.09	41.09	0.00
	Fremont Weir, east end	82.25	40.04	40.11	0.07	41.00	41.01	0.01	41.02	41.02	0.00
	Verona Gage	78.75	40.27	40.32	0.05	40.55	40.58	0.03	40.63	40.58	-0.05
	Sacramento Weir	63.82	31.61	30.83	-0.78	32.60	32.50	-0.10	33.56	32.50	-1.06
	American River	60.6	32.15	31.37	-0.78	33.16	32.99	-0.17	34.15	32.99	-1.16
	I St. Gage	59.75	31.82	31.06	-0.76	32.80	32.66	-0.14	33.80	32.66	-1.14
	Freeport Bridge	46.432	25.44	24.83	-0.61	26.44	26.33	-0.11	27.28	26.34	-0.94
American River	Mayhew Drain	10.61	52.91	49.56	-3.35	59.42	54.47	-4.95	59.29	54.47	-4.82
	Howe Ave.	7.631	46.19	43.31	-2.88	51.04	47.58	-3.46	50.96	47.58	-3.38
	H St.	6.471	43.12	40.76	-2.36	46.75	44.30	-2.45	46.69	44.30	-2.39
	Hwy. 160	2.04	35.34	33.75	-1.59	37.64	36.45	-1.19	37.87	36.46	-1.41
Yolo Bypass	Woodland Gage	51.1	32.61	32.54	-0.07	33.41	33.46	0.05	33.50	33.47	-0.03
	Sacramento Bypass	44.65	29.03	28.82	-0.21	29.72	29.81	0.09	30.00	29.82	-0.18
	Lisbon Gage	36.2	25.44	25.27	-0.17	26.07	26.13	0.06	26.26	26.14	-0.12
Natomas Cross Canal	Mouth	5.242	40.53	40.59	0.06	41.06	41.08	0.02	41.11	41.08	-0.03
NEMDC	Northgate Blvd (American River)	1.753	32.65	31.73	-0.92	34.41	33.51	-0.90	35.57	33.51	-2.06

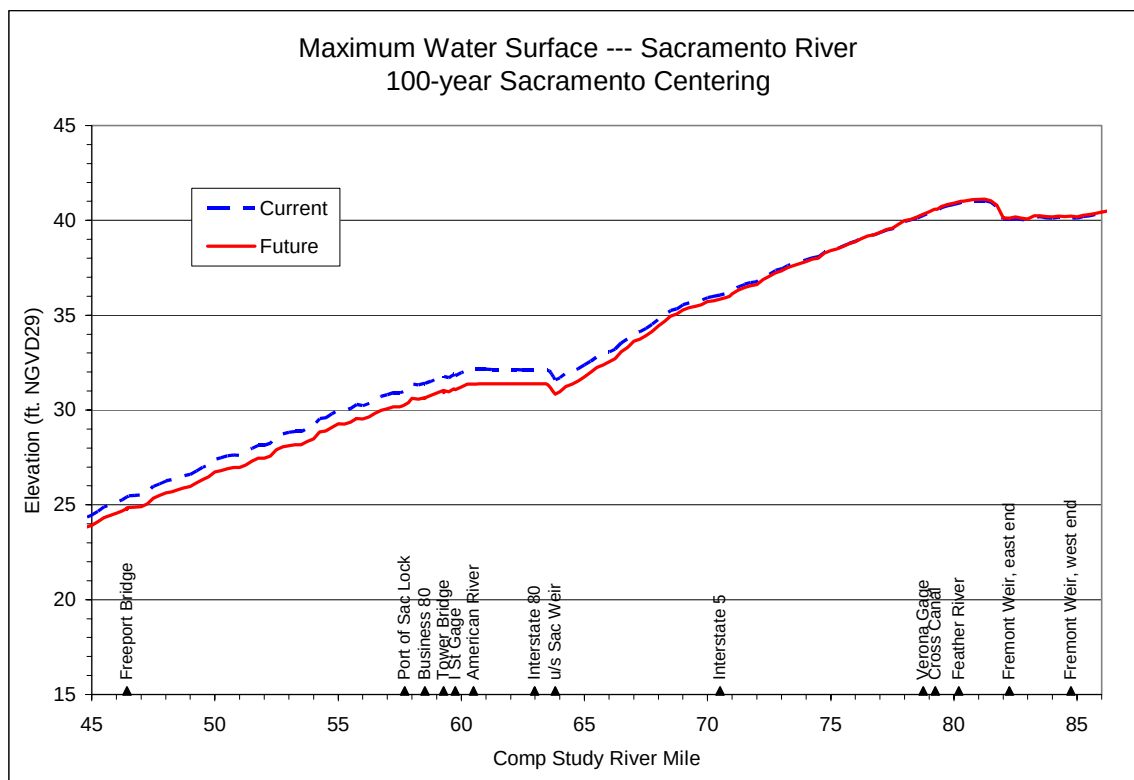


Figure 1.

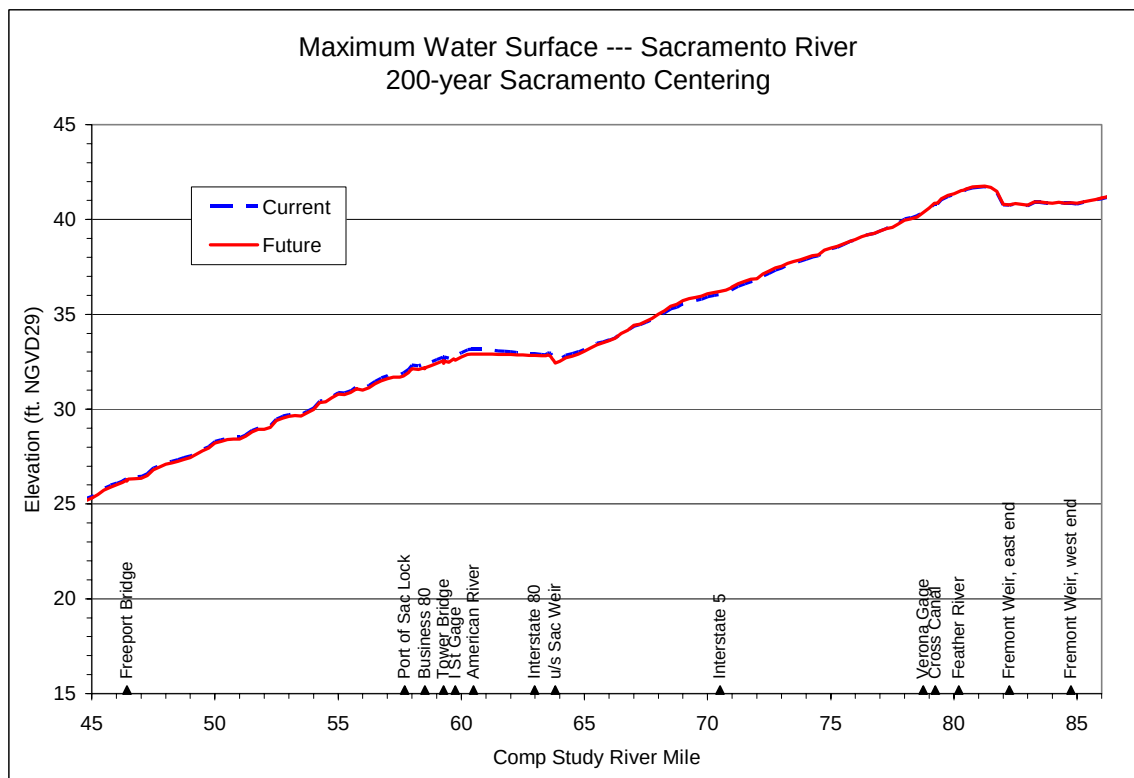


Figure 2.

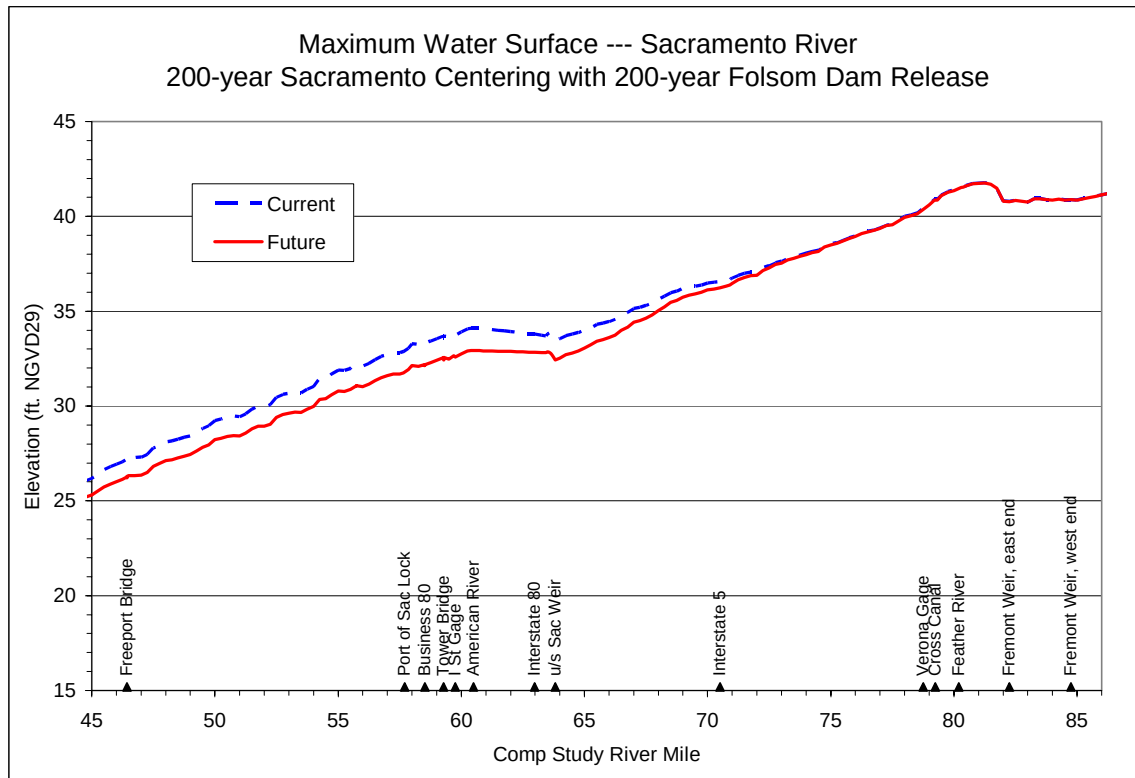


Figure 3.

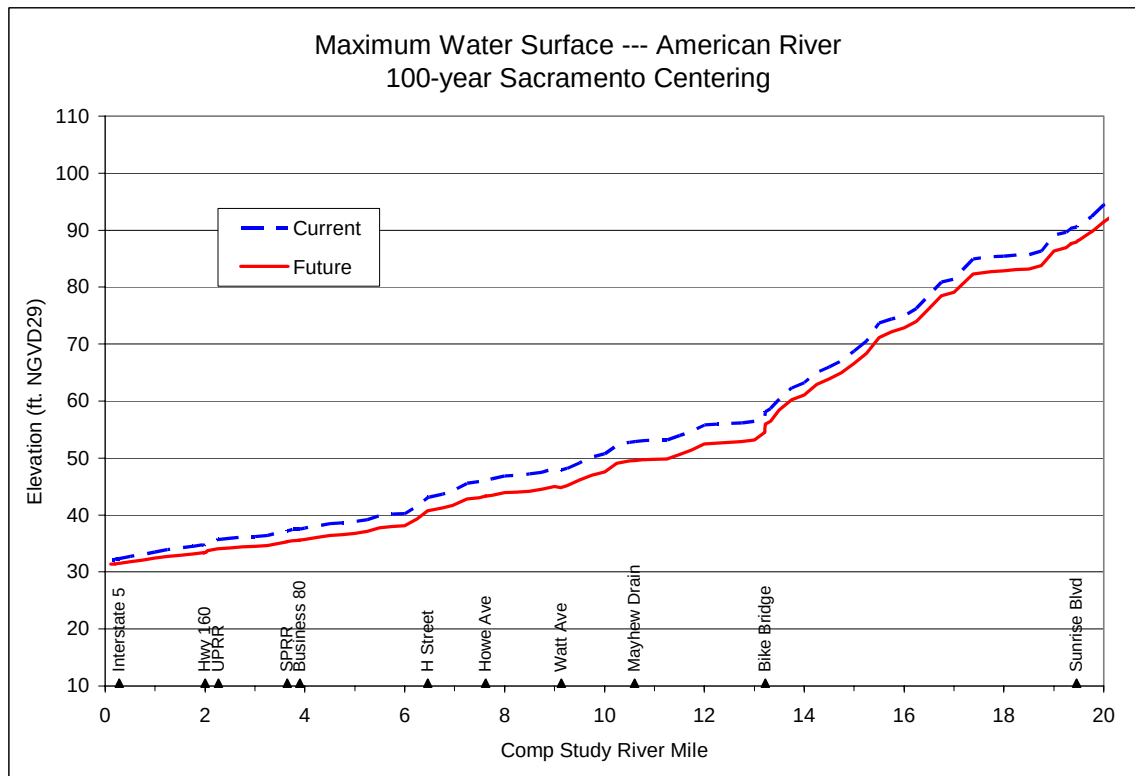


Figure 4.

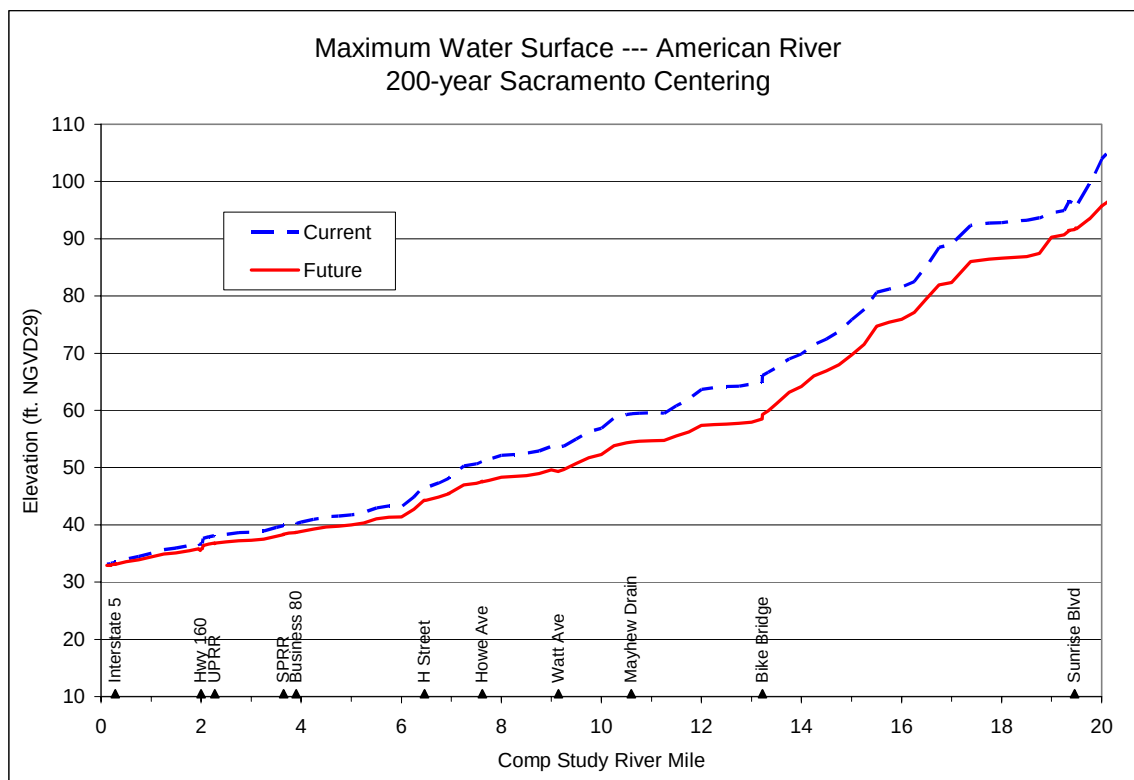


Figure 5.

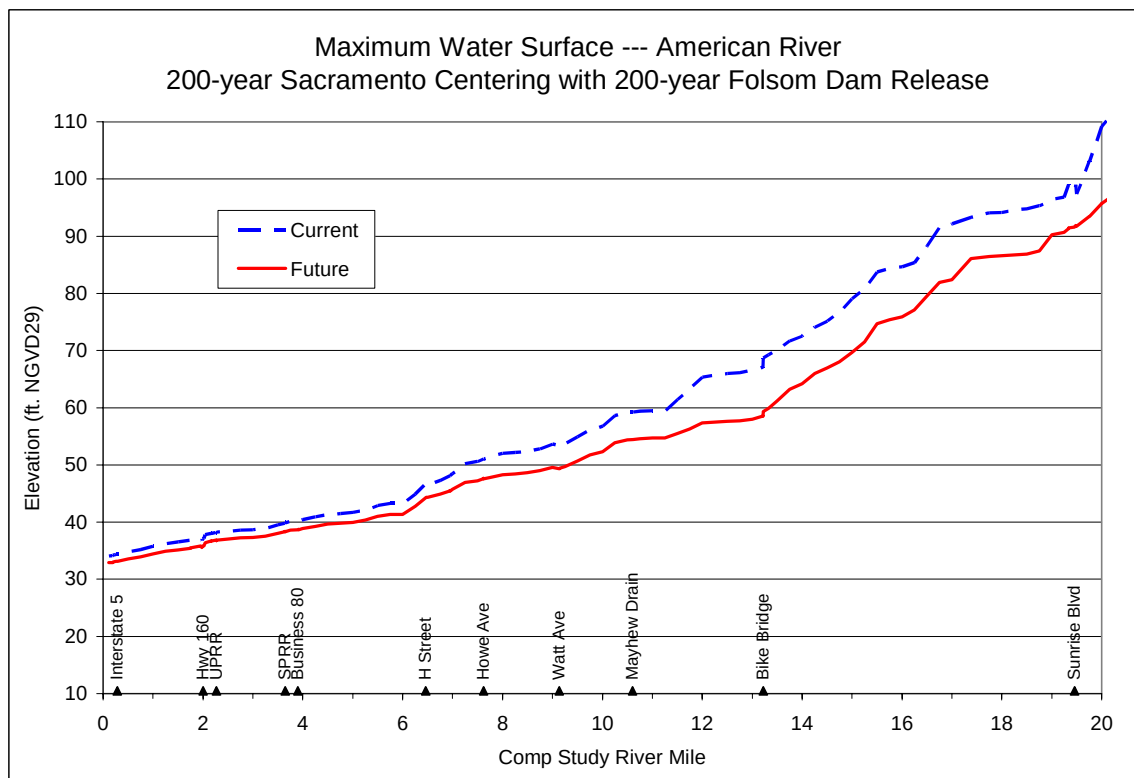


Figure 6.

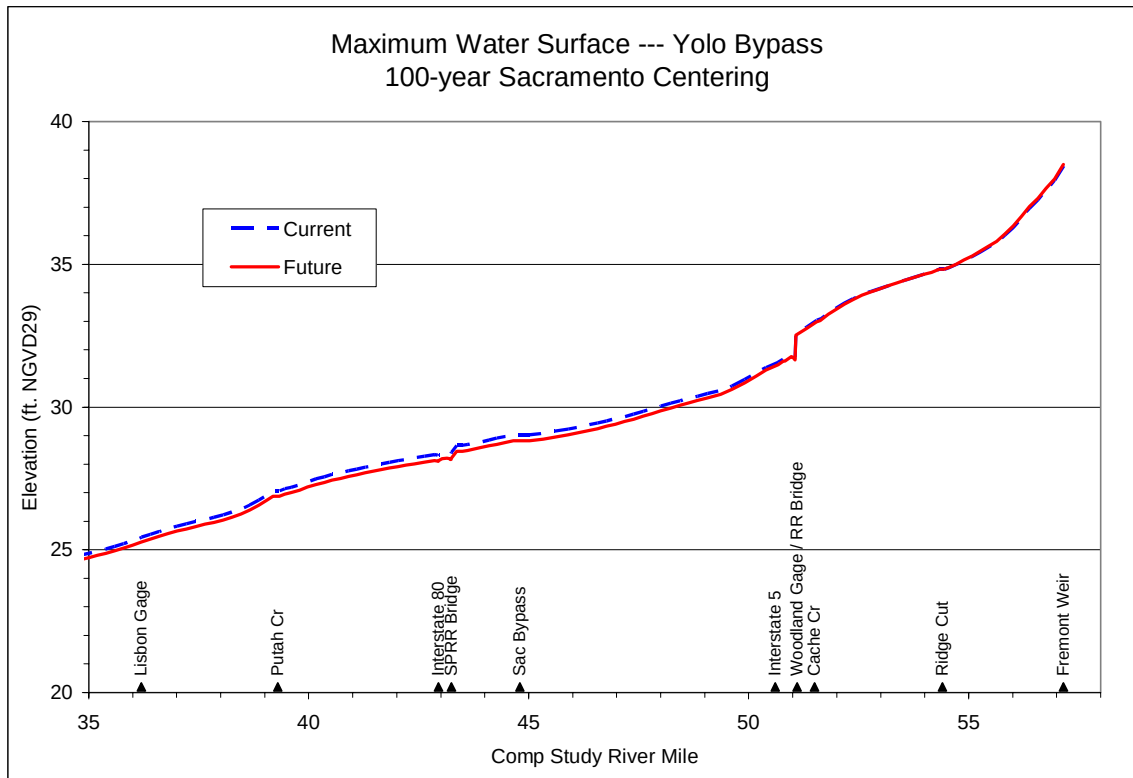


Figure 7.

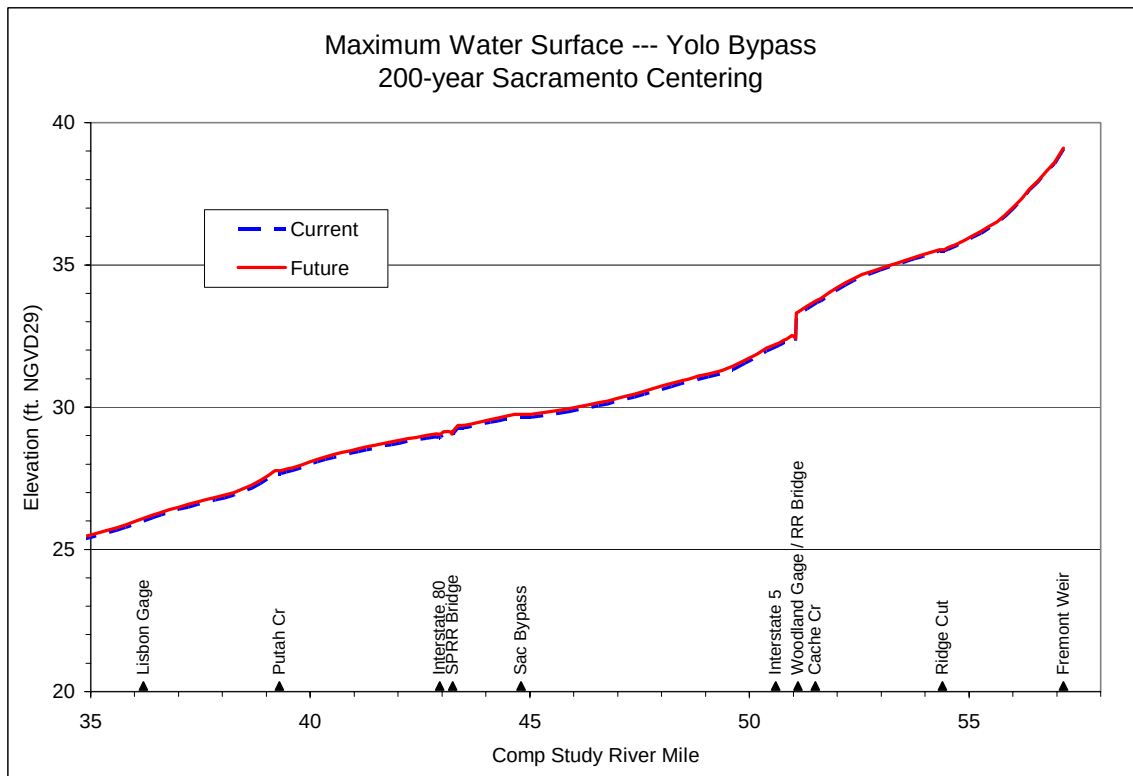


Figure 8.

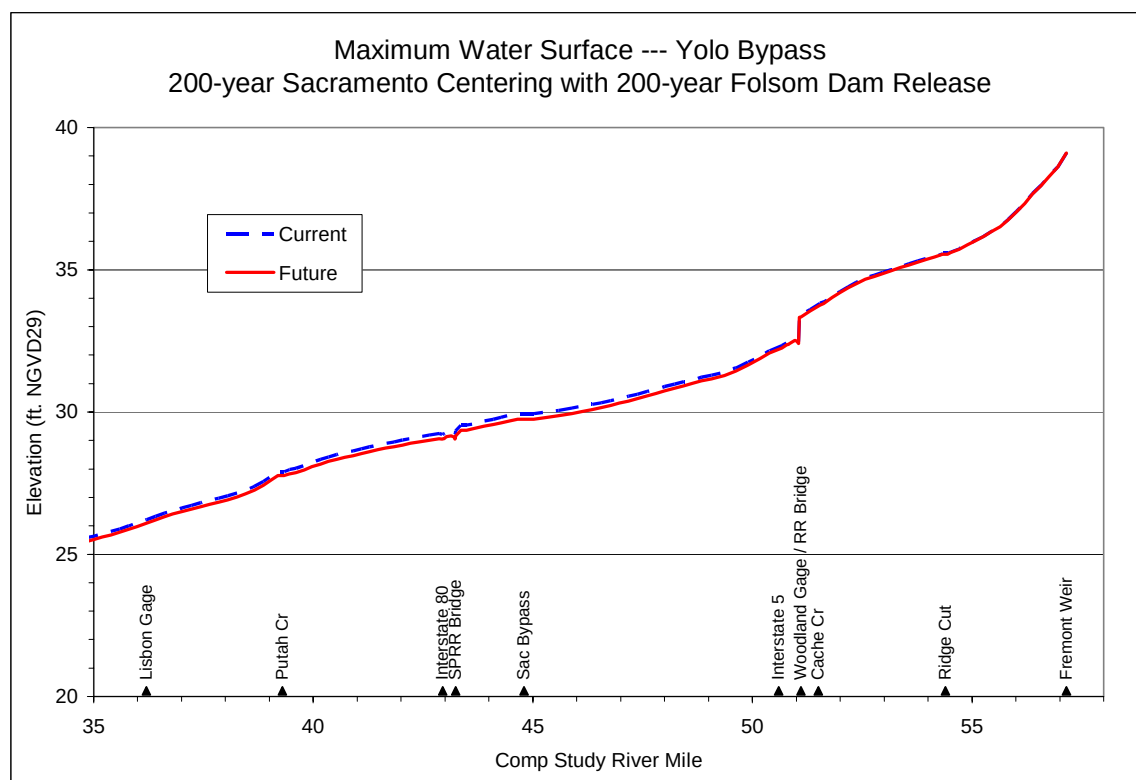


Figure 9.

Table 3
Summary of Levee Breaches

River (Model Reach)	Comp Study River Mile	Side (looking down-stream)	100 year		200 year		200+ year	
			Current	Future	Current	Future	Current	Future
Wadsworth Canal (19)	2.98	left	flood	flood	flood	flood	flood	flood
Sutter Bypass (20)	84.14	right			flood	flood	flood	flood
Sutter Bypass (20)	78.72	right			relief	relief	relief	relief
Sacramento R. (21)	92.25	left			flood	flood	flood	flood
Jack Slough (25)	5.5	right			flood	flood	flood	flood
Yuba R. (27)	6.75	left			flood	flood	flood	flood
UP Intercept (32)	4.5	left			flood	flood	flood	flood
Sacramento R. (57)	76.5	right	flood	flood	flood	flood	flood	flood
NEMDC (58)	4.016	left			relief		relief	
American R. (60)	12	right			flood		flood	
American R. (60)	11.25	left			flood		flood	
American R. (60)	11	left			flood		flood	
American R. (60)	10.75	left			flood		flood	
American R. (60)	10.61	right			flood		flood	
American R. (60)	9.5	right			flood		flood	
American R. (60)	8	left			flood		flood	
American R. (60)	7.5	left			flood		flood	
American R. (60)	7.25	right			flood		flood	
American R. (60)	6.5	right			flood		flood	
American R. (60)	6	right					relief	
Haas Slough (82)	0.5	right			flood	flood	flood	flood
Cache Slough (85)	21.25	right			flood	flood	flood	flood
Lindsey Slough (86)	23.25	right			relief	relief	relief	relief
Lindsey Slough (86)	21.5	right			relief	relief	relief	relief

Table 4
Peak Flows (1,000 cfs)

Location	100 year		200 year		200+ year	
	Current	Future	Current	Future	Current	Future
Sacramento River						
near Verona	143.4	145.8	154.8	153.8	152.9	153.8
at I Street	133.0	127.0	146.6	136.5	146.8	136.5
American River						
at H Street	145.0	115.1	208.9	160.0	207.4	160.0
Sacramento Bypass	120.4	101.3	140.6	129.4	153.0	130.5
Yolo Bypass						
at Woodland Gage	399.6	404.0	440.4	440.3	439.0	440.3
at Lisbon Gage	517.5	502.7	563.2	569.6	582.3	569.7

Table 5
Maximum Average Cross-Sectional Velocity (feet per second)

River	Location	Comp Study River Mile	100 year			200 year			200+ year		
			Current	Future	Change	Current	Future	Change	Current	Future	Change
Sacramento River	Verona Gage	78.75	6.3	6.4	0.1	6.6	6.5	-0.1	6.5	6.5	0
	I St. Gage	59.75	5.4	5.2	-0.2	5.8	5.5	-0.3	5.8	5.5	-0.3
	Freeport Bridge	46.432	4.8	4.7	-0.1	5	4.8	-0.2	5	4.8	-0.2
Yolo Bypass	Woodland Gage	51.1	3.8	3.8	0	3.8	3.8	0	3.8	3.8	0
	Lisbon Gage	36.2	1.7	1.7	0	1.8	1.8	0	1.8	1.8	0
American River	Mayhew Drain	10.61	3.9	3.5	-0.4	5.6	4.0	-1.6	6.0	4.0	-2.0
	Watt Ave.	9.146	7.5	6.8	-0.7	10.6	7.8	-2.8	11.4	7.8	-3.6
	Howe Ave.	7.631	7.0	6.3	-0.7	9.4	7.4	-2.0	10.7	7.4	-3.3
	Guy West Br.	6.951	10.0	8.8	-1.2	13.1	10.5	-2.6	13.0	10.5	-2.5
	H St.	6.471	9.2	8.0	-1.2	11.7	9.8	-1.9	11.7	9.8	-1.9
	Bus. 80	3.913	4.1	3.6	-0.5	5.0	4.3	-0.7	4.9	4.3	-0.6
	SPRR	3.65	4.5	4.1	-0.4	5.3	4.7	-0.6	5.3	4.7	-0.6
	UPRR	2.271	5.3	4.4	-0.9	6.7	5.7	-1.0	6.6	5.7	-0.9
	Hwy. 160	2.04	5.7	5.1	-0.6	6.6	5.9	-0.7	6.6	5.9	-0.7

APPENDIX D

SAFCA Legislative Framework for
Flood Control and Flood Risk Management in the Sacramento Valley –
Endorsed by Sacramento Area Council of Governments, April 2006

SAFCA
LEGISLATIVE FRAMEWORK FOR FLOOD CONTROL AND
FLOOD RISK MANAGEMENT IN THE SACRAMENTO VALLEY
(Endorsed by SACOG - 4/20/06)

I. BACKGROUND

California is confronting the serious and complex challenge of reducing the risk of flooding and its associated liabilities during a period of rapid growth and development. This challenge is particularly pressing in the Sacramento Valley, where the State of California (State) and many cities, counties and local flood management agencies are confronting an unprecedented confluence of legal, historical, regulatory and fiscal conditions, including:

- The devastation of Hurricane Katrina along the Gulf Coast and in the City of New Orleans, which has underscored the vulnerability of urban developments in protected floodplains;
- The recent appellate decision Paterno v. State of California, which has greatly expanded California's common law of inverse condemnation and held the State liable for damages resulting from the failure of a federal project levee in Yuba County;
- The challenge of the State and local levee maintaining agencies to address design deficiencies in the aging system of levees, weirs, bypass channels, and reservoirs that comprises the federal Sacramento River Flood Control Project (SRFCP);
- Increasing urbanization behind portions of the federal levee system that have not been systematically evaluated for their performance and reliability; and
- Ongoing regulatory and fiscal constraints on the ability of the State and its local governmental partners to operate and maintain the system.

In response to these circumstances, the Legislature is urgently considering the steps that should be taken to reduce the risk of flooding and limit the State's liability for flood damages. Toward this end, this paper suggests that it would be wise to focus on the Sacramento Valley where the flood risks are most acute and the opportunities for risk reduction are most robust. The paper outlines the elements of a flood risk management plan for the SRFCP that recognizes the special demands imposed on the SRFCP by urban development; emphasizes the need for both structural and non-structural approaches to flood risk management; and identifies the elements of a financing strategy for achieving and maintaining the goals and objectives of the plan. The paper is intended to serve as a framework for shaping the legislation that is likely to be enacted this year on flood management issues in the Central Valley.

II. LEGISLATIVE FRAMEWORK

A. Identify the Elements of the State's Flood Risk Management Plan for the Sacramento Valley

The legislation should direct Department of Water Resources (DWR) to explicitly identify the fundamental documents that explain the development of the SRFCP. These documents should be used to create a single comprehensive description of the plan that identifies the State's expectations for the SRFCP. These expectations should be framed in the following manner:

- At its inception, the main purpose of the SRFCP was to reduce the risk of flooding on agricultural lands within the floodplains of the Sacramento River and its tributaries. Toward this end, SRFCP levees were designed to contain flows and water surface elevations roughly based on an evaluation of 1907 and 1909 floods. (referred to as the "1957 profile") with a relatively low risk of failure. The design was based on a minimum levee cross section and minimum freeboard above the design flood water surface profile. Levees meeting this minimum standard provide adequate protection to support agricultural/rural land uses but retain a residual risk that is not compatible with urban development.
- Several SRFCP protected floodplains are experiencing substantial urban development. These floodplains should be specifically designated as urban development areas and should be required to meet an urban levee standard that exceeds both the minimum requirements of the National Flood Insurance Program and the minimum non-urban design criteria of the SRFCP.
- The SRFCP's non-urban areas contain numerous small communities that are subject to substantial damage in the event of uncontrolled flooding. One of the long-term objectives of the State's flood control and flood risk management plan should be to enclose these communities within perimeter levees that at least meet the minimum requirements of the National Flood Insurance Program so as to preserve the economic viability of these communities.
- The residual risk of flooding in the urban and non-urban areas protected by SRFCP levees should be addressed by requiring the responsible cities and counties to develop and maintain effective emergency response programs and capabilities, and by requiring property owners in these areas to maintain flood insurance obtained through the National Flood Insurance Program. This insurance requirement should be considered a non-structural element of the State's plan.

B. Identify the Urban and Non-Urban Levees Comprising the SRFCP

Based on the above expectations, and as part of the description of the State plan, the legislation should direct DWR to identify the urban and non-urban levees comprising the SRFCP. The urban levees should be those that are protecting the portions of the Sacramento Valley that contain substantial urban developments such as: Sacramento, including Natomas; West Sacramento, including Southport; Woodland; Marysville, including Reclamation District 784; and the cities of Yuba City and Live Oak in Sutter County. The SRFCP levees protecting the areas of the Sacramento Valley that do not contain such developments should be identified as non-urban levees.

C. Establish a Minimum Design Standard for the SRFCP's Non-Urban Levees

The legislation should direct DWR to develop an appropriate minimum design standard for the SRFCP's non-urban levees. This standard should be similar to the existing SRFCP design standards but with an additional underseepage criterion that is less stringent than the urban area requirement.

D. Develop a Capital Improvement and Maintenance Program to Address Design Deficiencies in the SRFCP's Non-Urban Levees, Including Systemic Erosion and Sedimentation

Based on the minimum design standard, the legislation should direct DWR to complete a comprehensive evaluation of the SRFCP's non-urban levees, identify any design deficiencies, including systemic erosion and sedimentation and develop a capital improvement program to address these deficiencies, including systemic erosion and sedimentation. The legislation should anticipate that the actions needed to address systemic erosion and sedimentation will be carried out through a reauthorization of the Sacramento River Bank Protection Project and an expansion of the State's levee and channel maintenance program under Water Code Section 8361. The objectives of these programs should be to (1) improve the reliability of the non-urban levees consistent with the design of the SRFCP and (2) enhance the fish and wildlife habitat value of the river and stream channels confined by these levees.

E. Ensure that Non-Urban Levees are Properly Maintained

The legislation should seek to improve the maintenance of the SRFCP's non-urban levees by:

- Expanding the State's maintenance responsibilities to include the levees of the Sutter Bypass and the Yolo Bypass.

- Directing DWR to establish clear guidelines for non-urban levee maintenance based on the adopted minimum design standard for the SRFCP's non-urban levees.
- Requiring local districts to prepare regular reports (every two years) to the Reclamation Board on the condition of their levees.
- Directing DWR to work with the appropriate state and federal regulatory agencies to establish a habitat enhancement program for fish and wildlife habitat values, including mitigation banking, that will facilitate the permitting process for levee improvement and maintenance activities.
- Revamping the State's power to ensure compliance with the non-urban levee maintenance guidelines by providing financial assistance to cooperating local districts and streamlining the Reclamation Board's enforcement procedures.

F. Identify the Small Communities Occupying the SRFCP's Non-Urban Areas and Establish Policies and Design Standards for Protecting These Communities Over Time

The legislation should seek to limit the potential for inverse condemnation liability by directing DWR to identify the small communities occupying the SRFCP's non-urban areas and to develop appropriate policies and design standards for protecting these communities over time. The State's long-term goal should be to enclose these communities within perimeter levees that at least meet the minimum design standards of the National Flood Insurance Program and contribute to preserving the economic viability of the affected communities.

G. Establish Design Standards for the SRFCP's Urban Levees and Guidelines for Urban Development of SRFCP Protected Floodplains

The legislation should seek to limit new sources of inverse condemnation liability by imposing stricter requirements on urban development in floodplains protected by the SRFCP based on designating these floodplains as hazard zones for such development. Urbanization would be allowed in these zones only if the responsible land use agency prepares a flood risk management plan that addresses the following issues.

1. Require the SRFCP's Urban Levees to Safely Contain the Flows and Water Surface Elevations Produced by an Urban Standard Flood (USF)

The legislation should direct DWR to develop guidelines for urban standard flood protection. These guidelines should establish a water surface profile for the SRFCP "urban standard flood" derived from estimates, developed in connection with the Sacramento-San Joaquin River Basins Comprehensive Study, of the water surface elevations produced by a 200-year flood. Based

on this urban standard flood profile, the guidelines should identify appropriate levee freeboard, stability, underseepage, and erosion standards. Local land use agencies desiring to proceed with urban development in an SRFCP protected floodplain would be required to indicate, as part of their adopted risk management plan, how this new State standard will be achieved over time. Assuming the process for developing the engineering, environmental, and financial elements of the plan and its expected implementation timeline are reasonable and feasible, local agencies would be permitted to proceed with development based on meeting applicable National Flood Insurance Program requirements during the time period when the local jurisdiction is working to achieve urban standard flood protection.

2. Complete a Comprehensive Evaluation of the Levees Protecting the Urbanizing Areas

The local risk management plan should provide reasonably current data that are sufficient in scope to demonstrate how the levees protecting the urbanizing floodplain will meet existing National Flood Insurance Program requirements while the local entity is working to meet the State's more rigorous urban standard flood requirements. These data should be a product of a comprehensive evaluation of the affected levees that addresses all applicable levee freeboard, stability, underseepage and erosion standards, including the geotechnical guidelines of the Corps, Sacramento District Standard Operating Procedure: Geotechnical Levee Practice (August 2004). This evaluation should also serve as the basis for identifying the steps needed to achieve urban standard flood protection.

3. Ensure that SRFCP Levees Protecting Urban Development are Maintained in Accordance with Urban Standards

The legislation should direct DWR to clarify the guidelines applicable to maintenance of SRFCP levees protecting urban development. These guidelines should address all aspects of urban levee maintenance, including seepage evaluation and erosion control and should include provisions to enhance fish and wildlife habitat values in the affected river and stream channels.

4. Ensure that Urban Development in SRFCP protected floodplains does not Increase the Peak Flow of Stormwater Discharged from the District When River Flows Equal or Exceed the Design of the SRFCP

Since urban development has the potential to alter the infiltration capacity of agricultural land and change the drainage patterns of the protected floodplain, the local risk management plan should also indicate how the urbanizing area will be designed to ensure that there is no net increase in the peak flow of stormwater discharged from the floodplain when flows in the SRFCP system equal or exceed the design of the system.

5. **Require Local Agencies to Develop a Flood Emergency Response Plan, including Floodplain Evacuation**

Most SRFCP protected floodplains are subject to deep flooding in the event of a levee failure. In order to prevent unnecessary injuries and loss of life in such an event, the local risk management plan should contain appropriate provisions addressing the location and design of critical health and public safety facilities, and plans for emergency response and floodplain evacuation.

H. Update the Guidelines Governing the State's Regulation of the SRFCP's Urban and Non-Urban Floodways

The legislation should direct DWR to work with the Reclamation Board to update the guidelines governing the State's regulation of the SRFCP's urban and non-urban floodways consistent with the State plan. The updated guidelines should identify goals and policies for sound floodplain management, flood conveyance, erosion control, levee stability and levee maintenance, including guidelines for riparian habitat, public recreation, and riverfront development as floodway encroachments. This effort should take advantage of the accomplishments of the Sacramento River Planning Forum.

I. Continue to Invest in the Capital Improvements Necessary to Reduce the Risk of Flooding in the Urban Areas Protected by the SRFCP

Since the flood of 1986, the State and federal governments have made substantial investments in improvements to the SRFCP that will reduce the risk of flooding in the urban areas protected by the SRFCP. This effort is being carried out in partnership with local agencies supporting development in these areas. The legislation should reaffirm the State's commitment to sponsor the SRFCP improvement projects that are needed to provide urban standard flood protection to the urbanizing areas of the Sacramento Valley.

J. Ensure that Occupants of Areas Protected by the SRFCP have Adequate Notice of the Risk of Flooding in their Area

Consistent with applicable real estate disclosure requirements, the legislation should declare that the risk of flooding to structures located in SRFCP protected floodplains and their contents is a material fact to be disclosed in all real estate transactions involving property in these areas, whether urban or non-urban. In addition, the legislation should require cities and counties to cooperate with local flood management districts in providing occupants of SRFCP protected floodplains with regular notice (at least annually) regarding the risk of flooding in their area as well as any progress which has been made in reducing that risk.

K. Preserve Agricultural Open Space in the Areas Upstream and Immediately Downstream of the Fremont Weir

The State plan should encourage the preservation of agricultural open space in the areas upstream and immediately downstream of the Fremont Weir, which are likely to absorb some of the impact of extreme flood events that exceed the conveyance capacity of non-urban levees. This could be accomplished through the acquisition of flowage/conservation easements, augmented by a complementary habitat enhancement program on the affected lands that is consistent with adopted regional Habitat Conservation Plans and Natural Community Conservation Plans where applicable.

L. Require all Property Owners in Areas Protected by SRFCP Levees to Carry Flood Insurance

Flood insurance obtained through the federally backed NFIP is the most reasonable mechanism for equitably distributing the relatively low risk but potentially catastrophic consequences of flooding in the areas protected by the SRFCP. Accordingly, the legislation should require all property owners in SRFCP protected floodplains to maintain NFIP flood insurance policies covering the estimated replacement value of all structures and contents with a replacement value in excess of \$50,000. This flood insurance requirement should be viewed as a key non-structural element of the State's plan and the legislation should direct DWR to develop an appropriate plan for enforcing this requirement. This could be accomplished by:

- Including notice of this requirement in the annual notice of flood risk issued by local districts to property owner in SRFCP protected floodplains,
- Directing insurance companies to notify these property owners regarding the flood insurance requirement in connection with any other insurance transaction affecting the property, and
- Requiring banks and mortgage companies doing business in California to ensure that any mortgage issued on property in a SRFCP floodplain is backed by NFIP flood insurance.

The premiums paid for such policies would vary depending on risk of damage, structure value, and degree of coverage. In order to reduce the resulting cost burden on property owners in the non-urban areas, the legislation should provide appropriate mechanisms to offset this cost.

M. Update the National Flood Insurance Program (NFIP) Maps Covering the Floodplains Protected by the SRFCP

It is widely recognized that the NFIP flood insurance maps that currently govern development and flood insurance requirements in the floodplains protected by the SRFCP are outdated. The legislation should direct DWR to

proceed expeditiously to update these maps based on the best available hydrologic, hydraulic, geotechnical, and maintenance information.

N. Clarify the Standards for Inter-Governmental Liability for Flood Damage Claims in Areas Protected by the SRFCP and Provide the Tools Necessary to Manage this Liability

Governmental liability for flood damages in areas protected by the SRFCP is based on common law principles of inverse condemnation. Under these principles, California courts have held government liable when a flood control project, as designed, constructed, operated, and maintained, exposes a landowner to an unreasonable risk of harm. Where the government is found to be liable, the extent of the damages depends on the extent of the development in the protected area. This approach has created two problems that should be addressed by the legislation. First, in determining what constitutes an “unreasonable risk of harm” courts have cited an increasingly unwieldy list of criteria that tends to confuse rather than clarify governmental and landowner responsibilities. Second, because the responsibilities for SRFCP design, SRFCP maintenance and protected area land use are distributed among different levels of government, it is difficult to develop an effective risk management program. The legislation should address these problems by clarifying the statutory grounds for holding government liable for flood damage claims in areas protected by the SRFCP and providing the affected governmental agencies with the tools necessary to manage this liability.

The legislation should indicate that the considerations for determining whether property owners may hold the government liable for flood damages in a SRFCP floodplain are:

- Whether the damages resulted from a reasonably foreseeable structural or operational deficiency in the flood control project that the government had a reasonable opportunity to correct;
- Whether the government made a reasonable effort to ensure that the affected property owners were made aware of the risks associated with owning property in a protected floodplain; and
- Whether the government provided reasonable mechanisms for equitably distributing the financial risks borne by the property owners due to the potential for flooding.

With respect to providing the tools necessary to manage this liability, as discussed above, the legislation should:

- Direct DWR to develop appropriate design standards for SRFCP facilities that distinguish between the flood protection needs of urban and rural areas and allow the affected governmental agencies to identify structural and operational deficiencies;

- Outline a comprehensive flood risk management plan tied to these design standards that promotes appropriate land-use planning in SRFCP protected floodplains and augments the structural protections provided to property owners in these floodplains with a mandatory flood insurance requirement; and
- Create a financing plan for the SRFCP that provides the capital needed to achieve the adopted design standards for SRFCP facilities and the ongoing funding needed to operate and maintain these facilities.

The legislation should not attempt to address the problem of governmental liability for flood damages by altering the current scheme of inter-governmental indemnification that has grown up in connection with the SRFCP. Under this scheme, by agreement with the Federal Government, the State has accepted responsibility for operating and maintaining SRFCP levees and related facilities and for holding the Federal Government harmless for any damages associated with these facilities. The State has in turn entered into a series of agreements with local levee maintenance and flood management agencies pursuant to which these agencies have agreed to carry out the State's operation and maintenance responsibilities and to hold the State harmless for any damages associated with these facilities.

Local agencies which control land use in SRFCP floodplains have no contractual basis for holding the State harmless for flood damages because they do not control the operation and maintenance of SRFCP facilities. It would be inappropriate to abandon this historically fruitful separation of functions. Rather, as discussed above, the relationship between land use and the potential scope of flood damages should be managed by establishing reasonable standards governing land use in SRFCP protected floodplains.

O. Amend the State Constitution to Exempt Local Property Assessments for SRFCP Levee Maintenance and Improvement from the Voting Requirements of Proposition 218

The passage of Proposition 218, which amended the State Constitution by popular initiative, has made it very difficult for local flood management agencies in urban and non-urban areas protected by SRFCP levees to raise the funds needed to improve and maintain these levees. The Legislature should support efforts to include local assessments for SRFCP levee maintenance and improvement activities on the list of fees and charges that are exempt from any voting requirements under Proposition 218. This would substantially increase the authority of local districts to address their levee maintenance and improvement needs and reduce the risk of flood damages and claims against the State and local government.

III. FINANCIAL CONSIDERATIONS

The actions called for in the proposed legislation would require a significant increase in funding for technical studies; improvements to SRFCP facilities; more extensive levee maintenance, inspection and oversight activities; emergency preparedness; flood insurance and easement acquisition. The legislation should provide appropriate mechanisms for meeting these needs as discussed below.

A. State Infrastructure Bonds

The Legislature is currently considering asking California voters to approve the issuance of infrastructure bonds to finance flood control and other water resource related activities. As set forth in AB 1839 and SB 1166, these would be designated as the “2006 Bond” and “2010 Bond”. The 2006 bond authorizes \$540 million in spending for improvements and activities related to the SRFCP and to the state plan of flood protection in the San Joaquin Valley. The 2010 Bond authorizes an additional \$600 million for these purposes. In their present form, AB 1839 and SB 1166 call for these funds to be expended for certain designated purposes with certain local-State cost-sharing arrangements. Although the language of these bills appears to anticipate revision of the standards governing the State plan for flood protection, portions of the bills need to be revised to strengthen the linkage between the bills’ designated purposes and the achievement of these standards. In particular, the bills should be crafted to serve the state’s interest in facilitating urban standard protection for the urbanizing areas of the SRFCP while ensuring that deficiencies in the system’s non-urban levees, determined by reference to the adopted design standard for these levees, are remedied over time.

B. SRFCP Benefit Assessment District

At the outset of the 2005 legislative year, the Legislature considered a proposal to create a new benefit assessment district covering all of the property within the drainage area of the Central Valley. This proposal was part of a larger package of flood control and flood risk reduction measures contained in AB 1665 that failed to generate enough support to become law despite last minute efforts to gut the main provisions of the bill including the assessment district. AB 1665 is likely to be revised and resubmitted for consideration in the current session. If the bill calls for a benefit assessment district, the scope of the district should be limited to property owners in the Sacramento Valley who benefit from the protection of the SRFCP. Such a district could provide funding for the following purposes: (1) satisfying the local cost-sharing requirements of the infrastructure Bonds, (2) improving the SRFCP’s urban and non-urban levees consistent with the design standards established by the State’s plan, (3) protecting the small communities exposed to flooding in the SRFCP’s non-urban areas, (4) initiating a flood insurance offset program in the rural areas protected by the

SRFCP, (5) acquiring flowage/conservation easements to create overflow areas that also preserve prime farmland and its associated habitat value in rural areas upstream of the Fremont Weir, (6) providing support for funding forecast-based reservoir operations, and (7) building a reserve fund for flood emergencies. The district would be formed by the State.

Property owners would be assessed on an annual basis using assessment principles already authorized by the California Water Code for flood control activities. Under these principles, property owners in protected urban floodplains would provide the bulk of the assessment district's revenue. Property owners in protected non-urban floodplains would be assessed at substantially lower rates. In addition, in order to increase the funds available to the district for acquiring flowage/conservation easements and pursuing the other purposes outlined above, development impact fees could be imposed on all new development in the district that converts agricultural and habitat land to urban use.

C. Federal Participation

Over the next ten to fifteen years, the Federal Government is expected to make significant contributions to funding the federal share of the cost of modifying Folsom Dam and completing federally authorized levee improvements around the Sacramento area so as to provide this area, which contains more than 60 percent of the damageable property value in SRFCP protected floodplains, with urban standard flood protection. Additional federal contributions will also be needed to cover the federal share of the cost of authorized federal projects aimed at providing urban standard protection to urbanizing areas in Yuba and Yolo Counties. Because of the magnitude of these efforts, the demand for federal financial assistance is likely to exceed historic federal funding capabilities. Accordingly, the legislation should expressly permit the State and its local partners to negotiate cost-sharing agreements with the Army Corps of Engineers that contain appropriate credit/reimbursement provisions and anticipate substantial upfront expenditures by the non-federal interests to initiate SRFCP facility improvements. The Federal Government would provide additional funding for completing this work and would reimburse the State for expenditures in excess of the mandated non-federal share. These reimbursements could be used to create a reserve fund and augment the funding available for levee design deficiency and channel maintenance work.

In addition, the legislation should call upon the Federal Government to reauthorize the Sacramento River Bank Protection Program. The purpose of this federal program would be to enhance fish and aquatic habitat values in the SRFCP's streams and channels so as to complement the State's design deficiency/channel maintenance program.

D. Support from State Water Project and Central Valley Project Beneficiaries

The channel and bank improvements needed to maintain the stability of SRFCP levees could be funded in part by the beneficiaries of the State Water Project (SWP) and the Central Valley Project (CVP) based on the adverse impacts of these projects on the integrity of these levees. These projects have helped to create a new flow regime in the main stem rivers that produces consistently lower spring and higher summer flows geared to the demands of urban and agricultural water customers. This altered flow regime in turn supports a growing use of the rivers for recreation, including boating activities that contribute to the destabilization of SRFCP levees by generating persistent wake driven waves that act as a chronic source of bank and levee erosion. The effort needed to address this chronic erosion is thus attributable in part to the SWP and CVP. The legislation should direct DWR to develop recommendations as to how the beneficiaries of these projects could contribute to this effort.

E. Support from Boaters Using the Waterways of the Delta and the SRFCP

The use of SRFCP waterways for boating and related recreation is a benefit provided in part by the operation of the SWP and CVP and the Delta and SRFCP levee systems. Because of the detrimental impact of boat wakes on these systems, it is reasonable to expect boaters to contribute to the cost of the channel and bank improvements needed to maintain these systems. Accordingly, the legislation should direct DWR to consider developing a program under which users of the waterways of the SRFCP contribute to the maintenance costs associated with boating impacts.