Updated Local Funding Mechanisms for Sacramento Area Flood Control Improvements

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Updated Local Funding Mechanisms for Sacramento Area Flood Control Improvements

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# Table of Contents

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ES</strong> EXECUTIVE SUMMARY</td>
<td>ES-1</td>
</tr>
<tr>
<td>1.1 Introduction</td>
<td>1-1</td>
</tr>
<tr>
<td>1.2 Summary Description of the Proposed Local Funding Mechanisms and Funded Facilities</td>
<td>1-1</td>
</tr>
<tr>
<td>1.2.1 New Assessment District</td>
<td>1-2</td>
</tr>
<tr>
<td>1.2.2 Updated Development Impact Fee</td>
<td>1-2</td>
</tr>
<tr>
<td>1.2.3 Funded Facilities</td>
<td>1-3</td>
</tr>
<tr>
<td>1.3 Type of Environmental Impact Report</td>
<td>1-6</td>
</tr>
<tr>
<td>1.4 Scope of the Subsequent Environmental Impact Report</td>
<td>1-7</td>
</tr>
<tr>
<td>1.5 Intended Uses of this Subsequent Environmental Impact Report/Agency Roles and Responsibilities</td>
<td>1-8</td>
</tr>
<tr>
<td>1.6 Documents Incorporated by Reference</td>
<td>1-9</td>
</tr>
<tr>
<td>1.7 Organization of this Subsequent Environmental Impact Report</td>
<td>1-10</td>
</tr>
<tr>
<td>1.8 Standard Terminology Used in this subsequent Environmental Impact Report</td>
<td>1-11</td>
</tr>
<tr>
<td>1.9 Public Participation and the Subsequent Environmental Impact Report Process</td>
<td>1-12</td>
</tr>
</tbody>
</table>

| 2 BACKGROUND                              | 2-1  |
| 2.1 Introduction                          | 2-1  |
| 2.1.1 Recent Flood History                | 2-1  |
| 2.1.2 Existing Local Funding Mechanisms   | 2-4  |
| 2.2 Context of Proposed funded facilities - Changes Since 2007 | 2-5  |
| 2.2.1 Natomas Levee Improvement Program   | 2-6  |
| 2.2.2 Levee Accreditation                 | 2-6  |
| 2.2.3 American and Sacramento River Erosion Control | 2-6  |
| 2.2.4 Sacramento Weir and Bypass          | 2-7  |
| 2.2.5 Levee Modernization                 | 2-7  |
| 2.2.6 Floodplain Mapping                  | 2-8  |
| 2.2.7 Inundation Damage                   | 2-8  |
| 2.3 Project Activities Evaluated in the 2007 Local Funding Mechanisms Environmental Impact Report or Other Environmental Impact Reports | 2-8  |
| 2.3.1 Folsom Dam and Reservoir            | 2-9  |
2.3.2 Natomas Basin ................................................................. 2-11
2.3.3 Lower American River ................................................... 2-13
2.3.4 North Sacramento Streams ............................................ 2-15
2.3.5 Lower Sacramento River ................................................ 2-15
2.3.6 South Sacramento Streams ............................................. 2-16
2.3.7 Levee Maintenance ......................................................... 2-17
2.3.8 Agricultural Sustainability ............................................... 2-18

3 PROJECT DESCRIPTION ..................................................................... 3-1
3.1 Project Objectives .................................................................... 3-1
3.2 Description of Program Components Evaluated in this Subsequent Environmental Impact Report .................................................... 3-2
  3.2.1 Lower Sacramento River Erosion Control ......................... 3-2
  3.2.2 Yolo and Sacramento Bypass System Improvements .......... 3-2
  3.2.3 Levee Modernization ..................................................... 3-3

4 ENVIRONMENTAL SETTING, IMPACTS, AND MITIGATION ................. 4.1-1
4.1 Approach to the Environmental Analysis ................................ 4.1-1
  4.1.1 General Approach and Level-of-Detail ............................. 4.1-1
  4.1.2 Documents Incorporated by Reference ............................ 4.1-1
  4.1.3 Summary Description of the Projects Analyzed in Prior Environmental Documents ............................................. 4.1-2
  4.1.4 Section Contents and Definition of Terms ....................... 4.1-8
4.2 Agriculture, Forestry, and Land Use ....................................... 4.2-1
  4.2.1 Regulatory Setting ...................................................... 4.2-1
  4.2.2 Environmental Setting ................................................. 4.2-7
  4.2.3 Environmental Impacts ............................................... 4.2-12
  4.2.4 Mitigation Measures ................................................... 4.2-15
  4.2.5 Conclusion .............................................................. 4.2-16
4.3 Geology and Soils ................................................................. 4.3-1
  4.3.1 Regulatory Setting ...................................................... 4.3-1
  4.3.2 Environmental Setting ................................................. 4.3-6
  4.3.3 Environmental Impacts ............................................... 4.3-9
  4.3.4 Mitigation Measures ................................................... 4.3-12
  4.3.5 Conclusion .............................................................. 4.3-12
4.4 Hydrology and Hydraulics .................................................... 4.4-1
  4.4.1 Regulatory Setting ...................................................... 4.4-1
  4.4.2 Environmental Setting ................................................. 4.4-4
  4.4.3 Environmental Impacts ............................................... 4.4-6
  4.4.4 Mitigation Measures ................................................... 4.4-8
  4.4.5 Conclusion .............................................................. 4.4-8
4.5 Water Quality .......................................................................... 4.5-1
  4.5.1 Regulatory Setting ...................................................... 4.5-1
  4.5.2 Environmental Setting ................................................. 4.5-8
  4.5.3 Environmental Impacts ............................................... 4.5-18
4.6 Fisheries and Aquatic Resources ................................................................. 4.6-1
  4.6.1 Regulatory Setting .......................................................... 4.6-1
  4.6.2 Environmental Setting .......................................................... 4.6-4
  4.6.3 Environmental Impacts .......................................................... 4.6-15
  4.6.4 Mitigation Measures .......................................................... 4.6-17
  4.6.5 Conclusion .......................................................... 4.6-19

4.7 Terrestrial Biological Resources ................................................................. 4.7-1
  4.7.1 Regulatory Setting .......................................................... 4.7-1
  4.7.2 Environmental Setting .......................................................... 4.7-5
  4.7.3 Environmental Impacts .......................................................... 4.7-15
  4.7.4 Mitigation Measures .......................................................... 4.7-21
  4.7.5 Conclusion .......................................................... 4.7-27

4.8 Cultural Resources .......................................................... 4.8-1
  4.8.1 Regulatory Setting .......................................................... 4.8-1
  4.8.2 Environmental Setting .......................................................... 4.8-9
  4.8.3 Environmental Impacts .......................................................... 4.8-13
  4.8.4 Mitigation Measures .......................................................... 4.8-15
  4.8.5 Conclusion .......................................................... 4.8-21

4.9 Paleontological Resources .......................................................... 4.9-1
  4.9.1 Regulatory Setting .......................................................... 4.9-1
  4.9.2 Environmental Setting .......................................................... 4.9-2
  4.9.3 Environmental Impacts .......................................................... 4.9-9
  4.9.4 Mitigation Measures .......................................................... 4.9-10
  4.9.5 Conclusion .......................................................... 4.9-11

4.10 Transportation and Circulation .......................................................... 4.10-1
  4.10.1 Regulatory Setting .......................................................... 4.10-1
  4.10.2 Environmental Setting .......................................................... 4.10-1
  4.10.3 Environmental Impacts .......................................................... 4.10-2
  4.10.4 Mitigation Measures .......................................................... 4.10-4
  4.10.5 Conclusion .......................................................... 4.10-5

4.11 Air Quality .......................................................... 4.11-1
  4.11.1 Regulatory Setting .......................................................... 4.11-1
  4.11.2 Environmental Setting .......................................................... 4.11-6
  4.11.3 Environmental Impacts .......................................................... 4.11-10
  4.11.4 Mitigation Measures .......................................................... 4.11-13
  4.11.5 Conclusion .......................................................... 4.11-15

4.12 Noise .......................................................... 4.12-1
  4.12.1 Regulatory Setting .......................................................... 4.12-1
  4.12.2 Environmental Setting .......................................................... 4.12-3
  4.12.3 Environmental Impacts .......................................................... 4.12-6
  4.12.4 Mitigation Measures .......................................................... 4.12-8
  4.12.5 Conclusions .......................................................... 4.12-10
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.13</td>
<td>Recreation</td>
<td>4.13-1</td>
</tr>
<tr>
<td>4.13.1</td>
<td>Regulatory Setting</td>
<td>4.13-1</td>
</tr>
<tr>
<td>4.13.2</td>
<td>Environmental Setting</td>
<td>4.13-2</td>
</tr>
<tr>
<td>4.13.3</td>
<td>Environmental Impacts</td>
<td>4.13-5</td>
</tr>
<tr>
<td>4.13.4</td>
<td>Mitigation Measures</td>
<td>4.13-6</td>
</tr>
<tr>
<td>4.13.5</td>
<td>Conclusion</td>
<td>4.13-8</td>
</tr>
<tr>
<td>4.14</td>
<td>Visual Resources</td>
<td>4.14-1</td>
</tr>
<tr>
<td>4.14.1</td>
<td>Regulatory Setting</td>
<td>4.14-1</td>
</tr>
<tr>
<td>4.14.2</td>
<td>Environmental Setting</td>
<td>4.14-4</td>
</tr>
<tr>
<td>4.14.3</td>
<td>Environmental Impacts</td>
<td>4.14-7</td>
</tr>
<tr>
<td>4.14.5</td>
<td>Conclusion</td>
<td>4.14-10</td>
</tr>
<tr>
<td>4.15</td>
<td>Utilities and Service Systems</td>
<td>4.15-1</td>
</tr>
<tr>
<td>4.15.1</td>
<td>Regulatory Setting</td>
<td>4.15-1</td>
</tr>
<tr>
<td>4.15.2</td>
<td>Environmental Setting</td>
<td>4.15-1</td>
</tr>
<tr>
<td>4.15.3</td>
<td>Environmental Impacts</td>
<td>4.15-4</td>
</tr>
<tr>
<td>4.15.4</td>
<td>Mitigation Measures</td>
<td>4.15-7</td>
</tr>
<tr>
<td>4.15.5</td>
<td>Conclusion</td>
<td>4.15-8</td>
</tr>
<tr>
<td>4.16</td>
<td>Hazards and Hazardous Materials</td>
<td>4.16-1</td>
</tr>
<tr>
<td>4.16.1</td>
<td>Regulatory Setting</td>
<td>4.16-1</td>
</tr>
<tr>
<td>4.16.2</td>
<td>Environmental Setting</td>
<td>4.16-6</td>
</tr>
<tr>
<td>4.16.3</td>
<td>Environmental Impacts</td>
<td>4.16-11</td>
</tr>
<tr>
<td>4.16.4</td>
<td>Mitigation Measures</td>
<td>4.16-16</td>
</tr>
<tr>
<td>4.16.5</td>
<td>Conclusion</td>
<td>4.16-18</td>
</tr>
<tr>
<td>4.17</td>
<td>Mineral Resources</td>
<td>4.17-1</td>
</tr>
<tr>
<td>4.17.1</td>
<td>Regulatory Setting</td>
<td>4.17-1</td>
</tr>
<tr>
<td>4.17.2</td>
<td>Environmental Setting</td>
<td>4.17-3</td>
</tr>
<tr>
<td>4.17.3</td>
<td>Environmental Impacts</td>
<td>4.17-7</td>
</tr>
<tr>
<td>4.17.4</td>
<td>Mitigation Measures</td>
<td>4.17-8</td>
</tr>
<tr>
<td>4.17.5</td>
<td>Conclusion</td>
<td>4.17-8</td>
</tr>
<tr>
<td>4.18</td>
<td>Greenhouse Gases</td>
<td>4.18-1</td>
</tr>
<tr>
<td>4.18.1</td>
<td>Regulatory Setting</td>
<td>4.18-1</td>
</tr>
<tr>
<td>4.18.2</td>
<td>Environmental Setting</td>
<td>4.18-3</td>
</tr>
<tr>
<td>4.18.3</td>
<td>Environmental Impacts</td>
<td>4.18-6</td>
</tr>
<tr>
<td>4.18.4</td>
<td>Mitigation Measures</td>
<td>4.18-9</td>
</tr>
<tr>
<td>4.18.5</td>
<td>Conclusion</td>
<td>4.18-9</td>
</tr>
<tr>
<td>5</td>
<td>Cumulative Impacts</td>
<td>5-1</td>
</tr>
<tr>
<td>5.1</td>
<td>Approach</td>
<td>5-1</td>
</tr>
<tr>
<td>5.1.1</td>
<td>CEQA Requirements</td>
<td>5-1</td>
</tr>
<tr>
<td>5.1.2</td>
<td>Approach to Analysis</td>
<td>5-1</td>
</tr>
<tr>
<td>5.2</td>
<td>Cumulative Impact Analysis</td>
<td>5-1</td>
</tr>
<tr>
<td>5.2.1</td>
<td>Geographic Scope of Effects of the Proposed Program</td>
<td>5-2</td>
</tr>
<tr>
<td>5.2.2</td>
<td>Cumulative Context</td>
<td>5-3</td>
</tr>
</tbody>
</table>
5.2.3 Resource Topics for Which Effects of the Proposed Project Would Not Be Cumulatively Considerable ........................................................................................................ 5-6
5.2.4 Analysis of Cumulative Impacts .................................................................................................................. 5-7

6 OTHER CEQA-REQUIRED SECTIONS .................................................................................................................. 6-1
6.1 Growth–Inducing Effects ........................................................................................................................................ 6-1
6.1.1 CEQA Requirements ......................................................................................................................................... 6-1
6.1.2 Growth-Inducing Effects of the Proposed Program ...................................................................................... 6-1
6.2 Significant and Unavoidable Environmental Impacts .......................................................................................... 6-3
6.3 Significant Irreversible Environmental Impacts .................................................................................................. 6-3
6.4 Energy Conservation ........................................................................................................................................... 6-3

7 ALTERNATIVES .................................................................................................................................................. 7-1
7.1 Alternatives Development ...................................................................................................................................... 7-1
7.1.1 CEQA Requirements ......................................................................................................................................... 7-1
7.1.2 Alternatives Screening ..................................................................................................................................... 7-1
7.2 Comparison of the Alternatives .......................................................................................................................... 7-3
7.2.1 Proposed Program ........................................................................................................................................... 7-3
7.2.2 No-Project Alternative .................................................................................................................................... 7-3
7.3 Environmentally Superior Alternative ................................................................................................................ 7-5

8 LIST OF PREPARERS .............................................................................................................................................. 8-1

9 REFERENCES ......................................................................................................................................................... 9-1

Appendices
A Notice of Preparation
B Final 2007 EIR on Local Funding Mechanisms for Comprehensive Flood Control Improvements for the Sacramento Area (on CD)
C Summary of Previous Documents Incorporated by Reference
D Hydrologic and Hydraulic Modeling Data

Exhibits
1-1 Existing and Updated Consolidated Capital Assessment District Boundaries ............................................... 1-4
1-2 Funded Facilities .................................................................................................................................................. 1-5
2-1 Program Area ....................................................................................................................................................... 2-3
4.5-1a Water Quality Monitoring Locations in the Northern Yolo Bypass .......................................................... 4.5-11
4.5-1b Water Quality Monitoring Locations in the Southern Yolo Bypass .......................................................... 4.5-12
4.9-1 Geologic Formations in the Program Area ................................................................................................. 4.9-5
4.12-1 Typical Noise Levels .................................................................................................................................... 4.12-4
4.16-1 Former Old Bryte Landfill ............................................................................................................................ 4.16-8
4.17-1 Natural Gas Fields in the Program Area ....................................................................................................... 4.17-5
4.18-1 2012 California Greenhouse Gas Emissions by Sector .............................................................................. 4.18-6
Tables

ES-1 Summary of Impacts and Mitigation Measures for Program-Level Analysis of Proposed Funding Mechanisms .......................................................... ES-5
4.1-1 Proposed Program Components and Environmental Review Status .......................................................... 4.1-3
4.2-1 Summary of Agricultural Land Conversion in Sacramento County, 2010–2012 .......................................................... 4.2-8
4.2-2 Summary of Agricultural Land Conversion in Solano County, 2010–2012 .......................................................... 4.2-9
4.2-3 Summary of Agricultural Land Conversion in Yolo County, 2012–2014 .......................................................... 4.2-10
4.3-1 Active Regional Faults .................................................................................................................. 4.3-8
4.4-1 Basin Characteristics .................................................................................................................. 4.4-4
4.5-1 Designated Beneficial Uses for the Yolo Bypass and the Sacramento River .......................................................... 4.5-9
4.5-2 Section 303(d)-Listed Pollutants for Tule Canal and Sacramento River .......................................................... 4.5-9
4.5-3 Water Quality Data for Sacramento Weir, Yolo Bypass, and Tule Canal .......................................................... 4.5-13
4.5-4 Water Quality Data for Agricultural Drains in the Yolo Bypass .......................................................... 4.5-14
4.5-5 Designated Beneficial Uses for the Northern Sacramento-San Joaquin Delta .......................................................... 4.5-15
4.5-6 Section 303(d)-Listed Pollutants for North Delta Waterways .......................................................... 4.5-16
4.5-7 Surface Water Quality of the Sacramento River at Garcia Bend .......................................................... 4.5-17
4.5-8 Groundwater Quality in the Sacramento River East Levee Improvements Area .......................................................... 4.5-17
4.6-1 Fishes Present in the Program Area .................................................................................................. 4.6-5
4.6-2 Special-Status Fishes that Occur in the Program Area .................................................................................. 4.6-7
4.7-1 Special-Status Plant Species with Potential to Occur in the Program Area .......................................................... 4.7-9
4.7-2 Special-Status Wildlife Species with Potential to Occur in the Program Area .......................................................... 4.7-11
4.11-1 Ambient Air Quality Standards and Attainment Designations for Sacramento County and Yolo-Solano Air Quality Management District Portion of Yolo and Solano Counties .......................................................... 4.11-2
4.12-1 Local Government Nontransportation 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 .................................................................................. 4.12-7
4.12-4 Typical Construction Equipment Vibration Levels .................................................................................. 4.12-8
4.13-1 Parks and Recreation Facilities in or Near the Program Area .......................................................... 4.13-3
4.15-1 Primary Landfills in the Program Area .................................................................................................. 4.15-3
4.17-1 California Geological Survey Mineral Land Classification System .......................................................... 4.17-4
7-1 Alternatives Comparison .................................................................................................................. 7-2
ES EXECUTIVE SUMMARY

ES.1 INTRODUCTION

This Draft Subsequent Environmental Impact Report (Draft SEIR) has been prepared to evaluate the potentially significant and significant environmental effects of the previously unevaluated activities that would be funded by the Sacramento Area Flood Control Agency (SAFCA) through proposed changes to SAFCA’s existing local funding mechanisms. Specifically SAFCA proposes to create a new consolidated capital assessment district (CCAD 2) to replace its existing consolidated capital assessment district (CCAD) and to update its existing development impact fee (DIF) program in order to 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 and related environmental mitigation and floodplain habitat restoration features. The elements of the improvement program funded by the existing CCAD were evaluated in a prior environmental impact report which was certified in 2007 prior to creation of the CCAD and DIF program. The proposed changes to these local funding mechanisms would allow an expansion of the programs to include new and changed improvements that were not previously analyzed in the 2007 EIR or subsequent EIRs. These improvements are analyzed herein at a program-level.

This SEIR has been prepared on behalf of SAFCA in accordance with the requirements of the California Environmental Quality Act (CEQA). The SEIR provides the public and responsible and trustee agencies with information about each proposed component of the program (“program component” or “funded facility”) and its potentially significant direct, indirect, and cumulative environmental effects.

ES.2 SUMMARY DESCRIPTION OF THE PROPOSED FUNDED FACILITIES

ES.2.1 NEW FUNDING MECHANISMS

SAFCA’s overall project objective is to establish funding mechanisms that are capable of providing the local share of the cost of constructing and maintaining State and Federally recommended 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:

► complete the projects necessary to provide 100-year flood protection for developed areas in Sacramento’s major floodplains as quickly as possible,
► achieve the State of California’s 200-year flood protection standard for these areas within the timeframe mandated by the Legislature, and
► improve the resiliency, robustness and structural integrity of the flood control system over time so that the system can safely contain flood events larger than a 200-year flood.

To meet the project objectives, SAFCA proposes to replace its existing consolidated capital assessment district, CCAD, with a new consolidated capital assessment district, CCAD 2, and update its existing DIF program to provide funding for the following activities and improvements including those activities and improvements not previously analyzed (shown in italics) when the CCAD and DIF program were created:

► **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 modifications to temperature shutter control facilities;
► **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 address identified foundation stability and erosion issues and allow these levees to safely contain sustained releases of up to 160,000 cubic feet per second (cfs) 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 and measures to reduce interior basin flooding by restricting or otherwise controlling flows through the gap in the Pleasant Grove Creek Canal West Levee at Sankey Road;

► **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 and channels 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]);

► **Environmental enhancement projects**—modifications to Folsom Dam’s temperature shutter control facilities and improvements to portions of the American River Parkway that would enhance floodplain and upland habitat values;

► **Levee modernization program**—a long-term urban levee and channel maintenance program, including measures to provide landside levee access and/or visibility in order 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.

► **Yolo Bypass Improvements** – improvements to increase the conveyance capacity of the Yolo Bypass, including lengthening the Sacramento Weir, setting back the Sacramento Bypass North Levee and the Yolo Bypass East Levee (between Interstate 5 and the Sacramento Bypass), removing the Old Bryte Landfill, acquiring land in the Elkhorn Basin to accommodate Bypass expansion, elevating or relocating the Sierra Northern Rail Line tracks from the Elkhorn Basin to the west side of the Yolo Bypass, enhancing riparian habitat values along the Tule Canal/Toe Drain in the Yolo Bypass, improving the Yolo Bypass West Levee (between Cache Slough and Midway Road) and implementing flood control measures in the City of Rio Vista to offset potential increases in floodwaters flowing through the lower reach of the Yolo Bypass.

The program-level analysis broadly examines the potentially significant and significant environmental effects that could result from creating the proposed new funding mechanisms, specifically the physical effects associated with the flood control improvements and related environmental mitigation and habitat enhancements (identified in the italicized language above) that these mechanisms would be used to finance.
ES.3 MAJOR CONCLUSIONS OF THE ENVIRONMENTAL ANALYSIS

ES.3.1 SUMMARY OF IMPACTS AND MITIGATION MEASURES

The proposed updated funding mechanisms could each result in significant environmental effects on several resources. The majority of the impacts would be temporary, construction-related effects that would be less than significant or would be reduced to less-than-significant levels through mitigation implementation.

Tables ES-1 and ES-2, included at the end of this “Executive Summary,” summarize the proposed updated funding mechanisms, the environmental impacts, the level of significance of each impact before mitigation, recommended mitigation measures, and the level of significance of each impact after mitigation implementation.

ES.3.2 SIGNIFICANT AND UNAVOIDABLE IMPACTS

The proposed updated funding mechanisms would result in the following significant and unavoidable impacts:

- Conversion of agricultural land to nonagricultural uses.
- Possible short term damage to scenic resources within State- or county-designated scenic highways,
- Short-term changes in scenic vistas and visual character.
- Potentially significant impacts to unique archaeological resources, Tribal Cultural Resources, and archaeological historical resources that cannot be protected and preserved (direct and cumulative).
- Significant impacts related to temporary and short-term construction noise (direct).

Where feasible mitigation exists, it has been identified to reduce these impacts; however, the mitigation would not be sufficient to reduce the impacts to a less-than-significant level.

ES.4 AREAS OF CONTROVERSY AND ISSUES TO BE RESOLVED

ES.4.1 AREAS OF CONTOUVERSY

There are no known areas of potential controversy associated with the proposed updated funding mechanisms. Access and visibility improvements as part of the levee modernization could result in loss of trees over a 30 or 40 year period, which has been an area of controversy for other levee improvement projects in the region. SAFCA has actively met with resource agencies, stakeholders, and landowners to discuss and resolve any potential areas of controversy to the extent feasible.

ES.4.2 ISSUES TO BE RESOLVED

SAFCA will need to determine whether to approve the proposed program or alternatives for implementation. The decision will be based on numerous factors besides potential environmental impacts, including the financing available, permitting requirements, and implementation schedule.

Regardless of whether the proposed program or alternatives are selected for implementation, project-level CEQA (and potentially NEPA) documentation will be required when specific project details are available for each proposed funded facility. The detailed design of project features and planning of construction will need to be coordinated with mitigation and environmental permitting requirements so that significant impacts are avoided or minimized where practicable. The methods for achieving required mitigation will need to be determined during detailed project design, and will be the responsibility of the implementing agency(ies).
ES.5 PUBLIC INVOLVEMENT AND NEXT STEPS

This SEIR will be used by the SAFCA Board when considering approval of the proposed program.

In accordance with CEQA review requirements, this SEIR is being distributed for public and agency review and comment for a 45-day period, which ends on March 16, 2016. SAFCA will hold a public meeting during the comment period, at which it will receive input from agencies and the public on the SEIR. The meeting will be held on February 18, 2016 in the Sacramento County Board of Supervisors Chambers, 700 H Street, Sacramento, California. In addition, written comments from the public and reviewing agencies will be accepted throughout the public comment period.

Following consideration of these comments, SAFCA will prepare written responses to comments on environmental issues, and prepare a Final SEIR that will describe the disposition of any significant environmental issues raised in the comments on the Draft SEIR. Written responses to each public agency’s comments must be provided to the public agency at least 10 days before the SEIR can be certified. Following this 10-day period, the SAFCA Board will consider certifying the SEIR if it is determined to be in compliance with CEQA, and will rely on the certified SEIR when considering approval of the proposed funding mechanisms. SAFCA will also prepare a Mitigation Monitoring and Reporting Program (MMRP), as required by CEQA and circulate it with the Final SEIR.

In accordance with the requirements of CEQA, if the SAFCA Board decides to approve the proposed program analyzed in this SEIR, it will make written findings with respect to each significant environmental effect identified in the SEIR. In addition, if the SAFCA Board decides to approve the proposed program, but determines that it would have significant and unavoidable adverse environmental effects, the Board will adopt a “Statement of Overriding Considerations” that explains why the benefits of the program outweigh the significant effects on the environment, based on information in the SEIR and other information in the administrative record.

At the time of project approval, the SAFCA Board must also adopt an MMRP for those measures that it has adopted and incorporated into the program in order to mitigate or avoid significant effects on the environment. Following project approval, a Notice of Determination documenting the decision will be issued.
<table>
<thead>
<tr>
<th>Resource Topic/Impact</th>
<th>Level of Significance before Mitigation</th>
<th>Mitigation Measure</th>
<th>Level of Significance after Mitigation</th>
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</thead>
<tbody>
<tr>
<td>Agriculture, Forestry and Land Use</td>
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<tr>
<td>Impact AG-1. Conversion of Agricultural Land, including Important Farmland, to Nonagricultural Uses</td>
<td>Potentially significant</td>
<td>Mitigation Measure AG-1: Implement Measures to Minimize Impacts to Agricultural Productivity and Compensate for Unavoidable Conversions of Agricultural Land to Nonagricultural Use.</td>
<td>Significant and unavoidable</td>
</tr>
<tr>
<td>Impact AG-2. Conflict with a Williamson Act Contract</td>
<td>Less than significant</td>
<td>No mitigation is required</td>
<td>Less than significant</td>
</tr>
<tr>
<td>Impact AG-3. Consistency with Adopted Policies, Land Use Designations, and Zoning Codes</td>
<td>Less than significant</td>
<td>No mitigation is required</td>
<td>Less than significant</td>
</tr>
<tr>
<td>Impact AG-1. Physically Divide an Established Community</td>
<td>Less than significant</td>
<td>No mitigation is required</td>
<td>Less than significant</td>
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<tr>
<td>Geology and Soils</td>
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<tr>
<td>Impact GEO-1. Potential Damage to Program Facilities from Seismic and Geologic Hazards</td>
<td>Less than significant</td>
<td>No mitigation is required</td>
<td>Less than significant</td>
</tr>
<tr>
<td>Impact GEO-2. Potential Temporary, Short-Term Construction-Related Erosion</td>
<td>Potentially significant</td>
<td>Mitigation Measure WQ-1: Implement Standard Best Management Practices (BMPs), Prepare and Implement a Storm Water Pollution Prevention Plan, and Comply with National Pollutant Discharge Elimination System Permit Conditions</td>
<td>Less than significant</td>
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<tr>
<td>Hydrology and Hydraulics</td>
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<tr>
<td>Impact HH-1. Hydraulic Effects of the Proposed Program</td>
<td>Less than significant</td>
<td>No mitigation is required</td>
<td>Less than significant</td>
</tr>
<tr>
<td>Resource Topic/Impact</td>
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<td><strong>Water Quality</strong></td>
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<tr>
<td>Impact WQ-1. Possible Water Quality Effects from Stormwater Runoff, Erosion, and Spills Associated with Construction</td>
<td>Potentially significant</td>
<td>Mitigation Measure WQ-1: Implement Standard Best Management Practices (BMPs), Prepare and Implement a Storm Water Pollution Prevention Plan, and Comply with National Pollutant Discharge Elimination System Permit Conditions</td>
<td>Less than significant</td>
</tr>
<tr>
<td>Impact WQ-2. Possible Effects on Groundwater or Surface Water Quality Resulting from Contact with the Water Table during Construction</td>
<td>Potentially significant</td>
<td>Mitigation Measure WQ-3: Implement Provisions for Dewatering</td>
<td>Less than significant</td>
</tr>
<tr>
<td>Impact WQ-3. Long-Term Operational Effects on Groundwater Levels Resulting from Installation of Flood Protection Components</td>
<td>Less than significant</td>
<td>No mitigation is required</td>
<td>Less than significant</td>
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<tr>
<td><strong>Fisheries and Aquatic Resources</strong></td>
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<tr>
<td>Impact BIO-F1. Possible Modifications to Aquatic Shoreline and Floodplain Habitat Used by Special-Status Fish</td>
<td>Potentially significant</td>
<td>Mitigation Measure BIO-F1: Comply with Section 1602, the Federal Endangered Species Act, and the California Endangered Species Act as Needed, and Mitigate on a No-Net-Loss Basis</td>
<td>Less than significant</td>
</tr>
<tr>
<td>Impact BIO-F2. Potential Disturbance, Injury, and Mortality of Special-Status Fishes during Construction</td>
<td>Potentially significant</td>
<td>Mitigation Measure BIO-F2: Develop and Implement Measures to Avoid and Minimize Potential for Direct Impacts</td>
<td>Less than significant</td>
</tr>
<tr>
<td>Impact BIO-F3. Possible Water Quality Degradation during and Following In-Water Construction Activities</td>
<td>Potentially significant</td>
<td>Mitigation Measure WQ-1: Implement Standard Best Management Practices (BMPs), Prepare and Implement a Storm Water Pollution Prevention Plan, and Comply with National Pollutant Discharge Elimination System Permit Conditions</td>
<td>Less than significant</td>
</tr>
<tr>
<td>Resource Topic/Impact</td>
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<tr>
<td>Terrestrial Biological Resources</td>
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<tr>
<td>Impact BIO-1. Disturbance and Loss of Sensitive Habitats, including Riparian Habitat, Protected Trees, Jurisdictional Waters of the United States, and Waters of the State</td>
<td>Potentially significant</td>
<td>Mitigation Measure BIO-1: Identify Sensitive Habitat Areas and Implement Measures to Avoid and Minimize Impacts and Compensate Unavoidable Impacts on a No-Net-Loss Basis</td>
<td>Less than significant</td>
</tr>
<tr>
<td>Impact BIO-2. Possible Loss of Special-status Plants and Loss and Degradation of Special-status Plant Habitat</td>
<td>Potentially significant</td>
<td>Mitigation Measure BIO-2: Identify Occupied Habitat and Implement Measures to Avoid and Minimize Potential Impacts and Compensate Loss of Special-status Plants, as Needed</td>
<td>Less than significant</td>
</tr>
<tr>
<td>Impact BIO-3. Possible Effects on Valley Elderberry Longhorn Beetle</td>
<td>Potentially significant</td>
<td>Mitigation Measure BIO-3: Identify Suitable Habitat and Implement Measures to Avoid and Minimize Potential Impacts and Compensate Unavoidable Impacts to Habitat, as Needed</td>
<td>Less than significant</td>
</tr>
<tr>
<td>Impact BIO-4. Possible Effects on Special-Status Vernal Pool Invertebrates</td>
<td>Less than significant</td>
<td>No mitigation is required</td>
<td>Less than significant</td>
</tr>
<tr>
<td>Impact BIO-5. Potential Disturbance or Loss of Giant Garter Snakes and Their Habitat</td>
<td>Potentially significant</td>
<td>Mitigation Measure BIO-5: Identify Suitable Habitat and Implement Measures to Avoid and Minimize Potential Impacts and Compensate Unavoidable Impacts, as Needed</td>
<td>Less than significant</td>
</tr>
<tr>
<td>Impact BIO-6. Potential Disturbance or Loss of Northwestern Pond Turtles and Their Habitat</td>
<td>Potentially significant</td>
<td>Mitigation Measure BIO-6: Identify Habitat and Implement Measures to Avoid Minimize Potential Impacts</td>
<td>Less than significant</td>
</tr>
<tr>
<td>Impact BIO-7. Possible Disturbance of Nesting Swainson’s Hawks and Potential Loss of Active Nests and Nest Trees</td>
<td>Potentially significant</td>
<td>Mitigation Measure BIO-7: Identify Habitat and Nest Locations, Minimize Potential Impacts, Monitor Active Nests during Construction, and Compensate Unavoidable Impacts, as Needed</td>
<td>Less than significant</td>
</tr>
<tr>
<td>Impact BIO-8. Possible Disturbance of Other Special-Status Nesting Birds and Possible Loss of Active Nests and Occupied Burrowing Owl Burrows</td>
<td>Potentially significant</td>
<td>Mitigation Measure BIO-8: Identify Habitat and Nest Locations, Minimize Potential Impacts, Monitor Active Nests during Construction, and Compensate Unavoidable Impacts, as Needed</td>
<td>Less than significant</td>
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</tbody>
</table>
### Table ES-1. Summary of Impacts and Mitigation Measures for Program-Level Analysis of Proposed Funding Mechanisms

<table>
<thead>
<tr>
<th>Resource Topic/Impact</th>
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<tbody>
<tr>
<td>Impact BIO-9. Possible Disturbance or Loss of Roosting Special-status Bats</td>
<td>Potentially significant</td>
<td>Mitigation Measure BIO-9: Identify Roosting Habitat and Implement Measures to Avoid and Minimize Disturbance and Loss of Roosting Habitat</td>
<td>Less than significant</td>
</tr>
<tr>
<td>Impact BIO-10. Effects on Wildlife Corridors</td>
<td>Less than significant</td>
<td>No mitigation is required</td>
<td>Less than significant</td>
</tr>
<tr>
<td><strong>Cultural Resources</strong></td>
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</tr>
<tr>
<td>Impact CR-1. Possible Damage to or Destruction of Historical Resources</td>
<td>Potentially significant</td>
<td>Mitigation Measure CR-1: Implement Procedures for Inventory and Evaluation of Historical Resources and for Eligible Resources, Implement Feasible Avoidance or Treatment Measures</td>
<td>Less than significant</td>
</tr>
<tr>
<td>Impact CR-2. Possible Damage to or Destruction of Identified or Unidentified Archaeological Resources</td>
<td>Potentially significant</td>
<td>Mitigation Measure CR-2: Implement Procedures for Inventory and Evaluation of Archaeological Resources and for Identified Cultural Resources (Including Archaeological Sites, Tribal Cultural Resources and Traditional Cultural Properties, and Cultural Landscapes), Implement Feasible Avoidance or Treatment Measures Mitigation Measure CR-3: Develop and Implement a Native American and Archaeological Monitoring Plan and Conduct Archaeological and Native American Monitoring of Sensitive Areas During Construction Mitigation Measure CR-4: Stop Work If Archaeological Materials are Discovered during Construction, Assess Significance of the Materials, and Implement Appropriate Avoidance or Treatment Measures, if Warranted</td>
<td>Significant and unavoidable</td>
</tr>
<tr>
<td>Impact CR-3. Possible Damage to or Destruction of a Tribal Cultural Resource</td>
<td>Potentially significant</td>
<td>Mitigation Measure CR-3: Develop and Implement a Native American and Archaeological Monitoring Plan and Conduct Archaeological and Native American Monitoring of Sensitive Areas During Construction Mitigation Measure CR-5: Implement Procedures for Inventory and Evaluation of Tribal Cultural Resources and Implement Avoidance and Minimization Measures to Avoid Significant Adverse Effects</td>
<td>Significant and unavoidable</td>
</tr>
</tbody>
</table>
Table ES-1. Summary of Impacts and Mitigation Measures for Program-Level Analysis of Proposed Funding Mechanisms

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</thead>
<tbody>
<tr>
<td>Impact CR-4. Possible Disturbance, Damage to, or Destruction of Human Remains</td>
<td>Potentially significant</td>
<td>Mitigation Measure CR-2: Implement Procedures for Inventory and Evaluation of Archaeological Resources and for Identified Cultural Resources (Including Archaeological Sites, Tribal Cultural Resources and Traditional Cultural Properties, and Cultural Landscapes), Implement Feasible Avoidance or Treatment Measures</td>
<td>Significant and unavoidable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mitigation Measure CR-3: Develop and Implement a Native American and Archaeological Monitoring Plan and Conduct Archaeological and Native American Monitoring of Sensitive Areas During Construction</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Mitigation Measure CR-6: Implement Procedures for Inadvertent Discovery of Human Remains, and Implement Protection Measures, If Necessary</td>
<td></td>
</tr>
<tr>
<td>Paleontological Resources</td>
<td></td>
<td>Mitigation Measure PR-1: Conduct Construction Personnel Education, Stop Work if Paleontological Resources are Discovered, Assess the Significance of the Find, and Prepare and Implement a Recovery Plan, as Required</td>
<td>Less than significant</td>
</tr>
<tr>
<td>Impact PR-1. Potential to Directly or Indirectly Destroy a Unique Paleontological Resource or Site</td>
<td>Potentially significant</td>
<td>Mitigation Measure PR-1: Conduct Construction Personnel Education, Stop Work if Paleontological Resources are Discovered, Assess the Significance of the Find, and Prepare and Implement a Recovery Plan, as Required</td>
<td>Less than significant</td>
</tr>
<tr>
<td>Transportation and Circulation</td>
<td></td>
<td>Mitigation Measure TR-1: Prepare and Implement a Traffic Management and Safety Assurance Plan, and Coordinate with Local Jurisdictions and the California Department of Transportation (Caltrans) as Needed</td>
<td>Less than significant</td>
</tr>
<tr>
<td>Impact TR-1. Temporary and Short-Term Increases in Traffic on Local and Regional Roadways during Construction</td>
<td>Significant</td>
<td>Mitigation Measure TR-1: Prepare and Implement a Traffic Management and Safety Assurance Plan, and Coordinate with Local Jurisdictions and the California Department of Transportation (Caltrans) as Needed</td>
<td>Less than significant</td>
</tr>
<tr>
<td>Impact TR-2. Possible Effects of Construction Activity on Emergency Access</td>
<td>Potentially significant</td>
<td>Mitigation Measure TR-2: Provide Pre-Notification of Construction to Emergency Service Providers, and Maintain Emergency Access or Coordinate Detours with Providers</td>
<td>Less than significant</td>
</tr>
<tr>
<td>Air Quality</td>
<td></td>
<td>Mitigation Measure AIR-1: Implement Measures and Guidelines of the Applicable Air District(s) to Reduce Construction-Generated Emissions of Air Pollutants</td>
<td>Less than significant</td>
</tr>
<tr>
<td>Impact AIR-1. Generation of Temporary and Short-Term Emissions of ROG, NOx, and PM10 during Construction</td>
<td>Potentially significant</td>
<td>Mitigation Measure AIR-1: Implement Measures and Guidelines of the Applicable Air District(s) to Reduce Construction-Generated Emissions of Air Pollutants</td>
<td>Less than significant</td>
</tr>
<tr>
<td>Resource Topic/Impact</td>
<td>Level of Significance before Mitigation</td>
<td>Mitigation Measure</td>
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</tr>
<tr>
<td>Impact AIR-2. Long-Term Changes in Emissions of ROG, NOX, and PM_{10}</td>
<td>Less than significant</td>
<td>No mitigation is required</td>
<td>Less than significant</td>
</tr>
<tr>
<td>Impact AIR-3. Exposure of Sensitive Receptors to Toxic Air Emissions</td>
<td>Potentially significant</td>
<td>Mitigation Measure AIR-2: Conduct a Health Risk Assessment (HRA) If a Potential Health Risk Exists, and Develop and Implement Mitigation in Coordination with the Applicable Air District(s)</td>
<td>Less than significant</td>
</tr>
<tr>
<td>Noise</td>
<td></td>
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<tr>
<td>Impact NOI-1. Possible Exposure to Temporary and Short-Term Generation of Short-Term Construction Noise</td>
<td>Significant</td>
<td>Mitigation Measure NOI-1: Implement Noise-Reduction Measures to Reduce Construction Noise Effects</td>
<td>Significant and unavoidable</td>
</tr>
<tr>
<td>Impact NOI-2. Possible Exposure of Sensitive Receptors to Temporary and Short-Term Generation of Excessive Groundborne Vibration or Noise</td>
<td>Significant</td>
<td>Mitigation Measure NOI-2: Implement Measures to Avoid Construction-Related Vibration Effects</td>
<td>Less than significant</td>
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<tr>
<td>Recreation</td>
<td></td>
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<tr>
<td>Impact REC-1. Possible Temporary and Short-term Changes in Recreational Opportunities during Project Construction Activities</td>
<td>Significant</td>
<td>Mitigation Measure REC-1: Prepare and Implement a Bicycle Detour Plan for all Bike Trails and On-Street Bicycle Routes, Provide Construction Period Information on Bicycle Facility Closures, and Coordinate with the City of Sacramento Department of Parks and Recreation and/or the City of Rio Vista Public Works Department to Allow Repair of Damage to Bicycle Facilities. Mitigation Measure REC-2: Prepare and Implement a Recreation Plan for all Recreation Facilities, Provide Construction Period Information on Recreation Facility Closures, and Repair Damage to Recreational Facilities</td>
<td>Less than significant</td>
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<tr>
<td>Resource Topic/Impact</td>
<td>Level of Significance before Mitigation</td>
<td>Mitigation Measure</td>
<td>Level of Significance after Mitigation</td>
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<tr>
<td><strong>Visual Resources</strong></td>
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<tr>
<td>Impact VIS-1. Possible Damage to Scenic Resources within State- or County-Designated Scenic Highways</td>
<td>Short-term significant, Long-term less than significant</td>
<td>No mitigation is available</td>
<td>Short term significant and unavoidable. Long term less than significant</td>
</tr>
<tr>
<td>Impact VIS-2. Changes in Scenic Vistas and Existing Visual Character</td>
<td>Short-term significant, Long-term less than significant</td>
<td>No mitigation is available</td>
<td>Short term significant and unavoidable. Long term less than significant</td>
</tr>
<tr>
<td><strong>Utilities and Service Systems</strong></td>
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<tr>
<td>Impact UTL-1. Potential Disruption of Irrigation Water Supply during Construction</td>
<td>Potentially significant</td>
<td>Mitigation Measure UTL-1: Coordinate with Irrigation Water Supply Users Before and During All Irrigation Infrastructure Modifications and Implement Measures to Minimize Interruptions of Supply</td>
<td>Less than significant</td>
</tr>
<tr>
<td>Impact UTL-2. Potential Disruption of Utility Service during Construction</td>
<td>Potentially significant</td>
<td>Mitigation Measure UTL-2: Verify Utility Locations, Coordinate with Affected Utility Providers, Prepare and Implement a Response Plan, and Conduct Worker Training with Respect to Accidental Utility Damage</td>
<td>Less than significant</td>
</tr>
<tr>
<td>Impact UTL-3. Temporary Increase in Solid Waste Generation</td>
<td>Less than significant</td>
<td>No mitigation is required</td>
<td>Less than significant</td>
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<tr>
<td><strong>Hazards and Hazardous Materials</strong></td>
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<tr>
<td>Impact HAZ-1. Accidental Spills of Hazardous Materials Used during Construction</td>
<td>Less than significant</td>
<td>No mitigation is required</td>
<td>Less than significant</td>
</tr>
<tr>
<td>Impact HAZ-2. Handling of Hazardous Materials within 1/4-Mile of a School during Construction</td>
<td>Less than significant</td>
<td>No mitigation is required</td>
<td>Less than significant</td>
</tr>
<tr>
<td>Resource Topic/Impact</td>
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<tr>
<td>Impact HAZ-3. Possible Exposure of People and the Environment to Existing Hazardous Materials, Including Cortese-Listed Sites</td>
<td>Potentially significant</td>
<td>Mitigation Measure HAZ-1: Characterize Existing Wastes and Remediate the Former Old Bryte Landfill</td>
<td>Less than significant</td>
</tr>
<tr>
<td>Impact HAZ-3. Possible Exposure of People and the Environment to Existing Hazardous Materials, Including Cortese-Listed Sites</td>
<td>Potentially significant</td>
<td>Mitigation Measure HAZ-2: Perform a Site-Specific HazMat Database Search and/or Phase I ESA, and Coordinate with Responsible Parties for Relocation of Storage Tanks and Groundwater Monitoring and Treatment Wells</td>
<td>Less than significant</td>
</tr>
<tr>
<td>Impact HAZ-4. Creation of Safety Hazards, Including Birdstrike, in the Vicinity of a Public or Private Airport</td>
<td>Less than significant</td>
<td>No mitigation is required</td>
<td>Less than significant</td>
</tr>
<tr>
<td>Impact HAZ-5. Possible Creation of Wildland Fire Hazards</td>
<td>Potentially significant</td>
<td>Mitigation Measure HAZ-4: Prepare and Implement a Fire Prevention Plan</td>
<td>Less than significant</td>
</tr>
<tr>
<td>Impact HAZ-6. Create a Public Health Hazard from Increased Exposure to Mosquito-Borne Diseases by Substantially Increasing the Amount of Mosquito Habitat</td>
<td>Less than significant</td>
<td>No mitigation is required</td>
<td>Less than significant</td>
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<tr>
<td>Mineral Resources</td>
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<tr>
<td>Impact MIN-1. Loss of Availability of Regionally or Locally Important Known Mineral Resources—Construction Aggregate</td>
<td>Less than significant</td>
<td>No mitigation is required</td>
<td>Less than significant</td>
</tr>
<tr>
<td>Impact MIN-2. Possible Loss of Availability of Regionally or Locally Important Mineral Resources—Natural Gas</td>
<td>Potentially significant</td>
<td>Mitigation Measure MIN-1: Finalize Specific Locations of Program Components, Determine Exact Locations of Existing Wells in Relationship to Program Components, and Fund any Necessary Closure, Destruction, or Relocation of Natural Gas Wells</td>
<td>Less than significant</td>
</tr>
<tr>
<td>Resource Topic/Impact</td>
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<td><strong>Greenhouse Gas Emissions</strong></td>
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<tr>
<td>Impact GHG-1. Temporary, Short-Term Generation of Greenhouse Gas Emissions</td>
<td>Potentially significant</td>
<td>Mitigation Measure AIR-1: Implement Measures and Guidelines of the Applicable Air District(s) to Reduce Construction-Generated Emissions of Air Pollutants Mitigation Measure GHG-1: Purchase Carbon Offset Credits to Offset Emissions</td>
<td>Less than significant</td>
</tr>
<tr>
<td>Impact GHG-2. Conflict with an Applicable Greenhouse Gas Emissions Reduction Plan</td>
<td>Less than significant</td>
<td>No mitigation is required</td>
<td>Less than significant</td>
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</tbody>
</table>
1 INTRODUCTION

1.1 PURPOSE OF THIS DOCUMENT

The California Environmental Quality Act (CEQA) (California 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 physical environment. In cases where an EIR has been certified for a project, CEQA calls for preparation of a subsequent EIR for the project if substantial changes are proposed in the project, or substantial changes occur with respect to the circumstance under which the project is undertaken, which will require major revisions to a previous EIR due to new or substantially more severe significant environmental effects, or if new information of substantial importance shows that the project would have new or substantially more severe significant environmental effects that were not discussed in the previous EIR. (State CEQA Guidelines Code of Regulations [CCR] Section 15162.1)

In 2007, the Sacramento Area Flood Control Agency (SAFCA) certified a program EIR for local funding mechanisms to support comprehensive improvements to the flood control system protecting low-lying lands in the Sacramento area situated at the confluence of the American and Sacramento Rivers (the 2007 EIR). The goals of this improvement program were: (1) to provide at least a 100-year level of flood protection as quickly as possible; (2) to achieve the State of California’s 200-year flood protection standard for these areas within the timeframe mandated by the Legislature; and (3) to improve the resiliency, robustness and structural integrity of the flood control system over time so that the system can safely contain flood events larger than a 200-year flood.

Since 2007, additional data on the condition of existing flood control facilities in the Sacramento area have been developed, more stringent Federal and State levee engineering criteria have been adopted, and opportunities for improving the flood bypass system west of Sacramento have been identified. Consequently, the scope and cost of SAFCA’s flood system improvement program have increased and the Agency is proposing to update its local funding mechanisms as necessary to support this updated program.

SAFCA has determined that the proposed changes in the scope of its improvement program that could be implemented using the proposed updated local funding mechanisms may result in new or substantially more severe significant effects on the environment than were identified in the 2007 EIR. Therefore, as the lead agency for CEQA compliance, SAFCA has prepared this subsequent EIR (SEIR) to evaluate, at a broad, program level, the significant environmental effects of the changes in the flood control projects that could be financed by the proposed updated local funding mechanisms, including new projects that were not previously addressed in the 2007 EIR. This SEIR will inform the SAFCA Board’s decision-making on the proposed, updated local funding mechanisms.

1.2 SUMMARY DESCRIPTION OF THE PROPOSED LOCAL FUNDING MECHANISMS AND FUNDED FACILITIES

Changes in Federal and State levee design standards, largely in response to Hurricane Katrina, and proposed remediation measures, are causing changes in the scope and cost of SAFCA’s flood system improvement program that were not foreseen when the local funding mechanisms to support this program – the Consolidated Capital Assessment District (CCAD) and Development Impact Fee (DIF) program - were created in 2007 and 2008, respectively. Therefore, as described below, SAFCA is proposing to update these funding mechanisms by replacing the CCAD with a new assessment district, CCAD 2, and broadening the scope of the DIF in order to adapt to the changed circumstances.

1 The State CEQA Guidelines are found at CCR, Title 14, Section 15000 et seq. (hereinafter, State CEQA Guidelines).
1.2.1 New Assessment District

As with the existing CCAD, the new assessment district would consist of properties in the developed and undeveloped areas within SAFCA’s jurisdictional boundary in Sacramento and Sutter Counties that would specially benefit from the flood system improvement program. These properties have been identified based on new floodplain mapping data developed by the California Department of Water Resources (DWR) pursuant to the requirements of the Central Valley Flood Control Improvement Act of 2008 with refinements by MBK Engineers to reflect the specific accomplishments of the improvements to be funded by CCAD 2. Exhibit 1-1 illustrates the boundaries of the existing CCAD and the boundaries proposed for CCAD 2. These data reflect a change in the standards used to model the effects of railway embankments on interior flooding patterns that have altered the extent of several of the benefit zones identified in the existing CCAD south of the American River. These existing CCAD benefit zones were identified assuming existing rail embankments would remain stable in the event of interior flooding and would thus serve as diversion structures. The new floodplain data assumes these embankments will fail when subjected to interior flooding. This change increases the number of properties that would receive special benefits from improvements to the flood control systems along the American and Sacramento Rivers.

As with the existing CCAD, assessments under CCAD 2 would be levied on each benefiting property in proportion to the flood-damage reduction benefits received by that property from the activities funded by the new district. Due to the projects funded by CCAD 2, for a relatively wide range of flood events the properties within the boundaries of CCAD 2 will escape all of the pre-project damages to structures, the contents of structures and the land comprising the property they could have otherwise suffered. The amount of this special flood damage reduction benefit will vary based on the size and use of the affected structures, and the relative size and location of the affected property. In 2007, these benefits were calculated based on depth damage curves developed by the USACE in the 1980’s as part of the initial phase of the American River Watershed Investigation. Following Hurricane Katrina, the USACE developed new depth damage curves designed to better reflect the impacts of flooding on current residential, commercial, industrial and governmental structures. These curves were used in preparing the American River Common Features Project/Natomas Post Authorization Change Report (Natomas PACR) issued by USACE in October 2010. The new assessment district would incorporate these new damage curves which are the best available data for apportioning flood damage reduction benefits among these types of structures. This would shift a slightly greater portion of the benefits generated by CCAD 2 to the residential structures in the district while slightly lessening the portion of the benefits allocated to non-residential structures.

Because of the nature of the floodplains in Sacramento and the design of the area’s flood control system, no single improvement or facility will protect all the properties in CCAD 2. Rather, because there are a number of separate and overlapping floodplains protected by separate and overlapping flood control facilities, the improvements funded by the CCAD 2 will have geographically distinct benefits. To reflect this condition, CCAD 2, like the existing CCAD, will be divided into benefit zones within which the property owners will be assessed only for the cost of the improvements that directly benefit the properties within that zone. Finally, because CCAD 2 will eliminate and replace the existing CCAD, for most property owners, the new assessment will be at a higher rate than the existing assessment, but will replace their existing assessed charges.

The activities funded by CCAD 2 would include all of the projects funded by the existing CCAD with modifications to these projects based primarily on new information developed by USACE as part of the Natomas PACR (October 2010) and the American River Watershed Common Features General Reevaluation Report (ARCF GRR) issued in December 2015. These new engineering studies have broadened the scope of the levee improvements that were described in the 2007 Final Engineers Report and increased the cost of these improvements. The new assessment district would cover the local share of these costs.

1.2.2 Updated Development Impact Fee

The DIF program applies to undeveloped properties within the areas covered by the existing CCAD that are developed for future urban use. The purpose of this program is to ensure that this development does not
substantially increase the expected damage of an uncontrolled flood. Expected damage is based on the probability of uncontrolled flooding and its resulting consequences. New development in floodplain areas has the potential to increase expected damages by increasing the consequences of uncontrolled flooding (i.e., by increasing the property subject to damage by flooding). To avoid this impact, under SAFCA’s program development fees are collected and used to reduce the probability of such flooding. During the initial phase of the DIF (2008 to 2019) this is accomplished by using the fees primarily to cover gaps in Federal and State funding, thereby ensuring that the annual probability of uncontrolled flooding is reduced to 1 in 200. The SAFCA Board is required to periodically update the DIF to reflect changes in development trends and flood system improvement plans and accomplishments. Due to a significant decline in the rate of development in the area covered by the existing CCAD over the past seven years, no update of the DIF has occurred since its inception in 2008.

The proposed update of the DIF would reflect changes in the coverage area consistent with the boundaries of the new assessment district and changes in development projections for this area to reflect current economic trends. The DIF would continue to be used (at least through 2019) to cover gaps in Federal and State funding for the projects needed to meet the State’s 200-year flood protection standard. Thereafter, under the proposed update, the DIF would be used to support improvements beyond those required for 200-year flood protection. In particular, the DIF would be used to support improvements to the regional flood bypass system west of the Sacramento area, including improvements to the Sacramento Weir and Bypass as anticipated in USACE’s ARCF GRR.

1.2.3 Funded Facilities

The new CCAD2 and updated DIF would provide financing to support the following projects (also illustrated on Exhibit 1-2), those projects (or portions of projects) not evaluated in the prior Local Funding Mechanisms program EIR certified in 2007 are listed in bold-face font:

► physical and operational improvements to Folsom Dam that would increase the dam’s low-level discharge and flood control storage capacities, and construction of a new bridge across the American River downstream of the dam;

► implementation of the USACE reformulated American River Common Features (ARCF) project, including raising portions of the American River North and South Levees, cutoff wall construction along the American River levees and the Sacramento River East Levee, closure structure construction at Mayhew Drain, and bank and levee armoring along the American River North and South Levees and the Sacramento River East Levee in the Pocket area;

► levee improvements around the Natomas Basin, including construction of adjacent levees, cutoff walls, earthen seepage berms, relief wells, and measures to reduce interior basin flooding by restricting or otherwise controlling flows through the gap in the Pleasant Grove Creek Canal West Levee at Sankey Road;

► South Sacramento Streams channel improvements, including excavating channels to increase conveyance capacity, and constructing box culverts under bridges to increase conveyance capacity, floodwalls to contain high-stream flows, and a detention basin at Southgate Park on Florin Creek;

► North Sacramento Streams flood control improvements, including constructing cutoff walls, earthen seepage berms, and relief wells along the Arcade Creek North and South Levees and the Natomas East Main Drainage Canal East Levee and rehabilitating the Magpie Creek Diversion Channel West Levee;
Exhibit 1-1. Existing and Updated Consolidated Capital Assessment District Boundaries
Exhibit 1-2.  Funded Facilities
Modifications to the temperature control shutter facilities at Folsom Dam and enhancements to wildlife habitat in the American River Parkway, including removing nonnative vegetation, restoring riparian vegetation in the upper floodplain, and creating shallow floodplain habitat;

implementation of a levee integrity program to construct bank protection improvements in order to control erosion along the American and Sacramento Rivers and their tributaries; buttress and armor levees to reduce the risk of failure; maintain flood conveyance capacity by relocating and redesigning channel obstructions and appropriately managing vegetation roughness; ensure residential, commercial, industrial, and agricultural improvements are designed to maintain structural integrity of the levee system and provide adequate space for ongoing maintenance and improvement; ensure all levees and supporting infrastructure are maintained to urban levee standards and as required by the State and USACE; and ensure that local levee maintaining agencies have adequate access to and/or visibility along the landside and waterside toes and slopes of existing levees to monitor levee conditions, conduct levee patrols and flood fights, and have appropriate resources to implement flood emergency measures when necessary;

acquisition of easements from willing sellers to retire development rights and preserve the agricultural character and incidental flood storage capacity of rural floodplains; and

widening the Sacramento and Yolo Bypasses, including lengthening the Sacramento Weir, setting back the Sacramento Bypass North Levee and the Yolo Bypass East Levee (between Interstate 5 and the Sacramento Bypass), removing the Old Bryte Landfill, acquiring land in the Elkhorn Basin to accommodate Bypass expansion, elevating or relocating the Sierra Northern Railway railroad tracks from the Elkhorn Basin to the west side of the Yolo Bypass, enhancing riparian habitat values along the Tule Canal/Toe Drain in the Yolo Bypass, improving the Yolo Bypass West Levee (between Cache Slough and Midway Road) and implementing flood control measures in the City of Rio Vista to offset potential increases in floodwaters flowing through the lower reach of the Yolo Bypass.

The SEIR will evaluate the potential environmental effects of these improvements at a broad, program-level. All proposed flood control improvements that could be implemented using the proposed updated local funding mechanisms have been or will be evaluated in detail in separate, project-level CEQA documents prior to their implementation.

1.3 TYPE OF ENVIRONMENTAL IMPACT REPORT

In cases where an EIR has been certified for a project, CEQA calls for preparation of an SEIR for the project if substantial changes are proposed in the project, or substantial changes occur with respect to the circumstance under which the project is undertaken, which will require major revisions to a previous EIR due to new or substantially more severe significant environmental effects, or if new information of substantial importance shows that the project would have new or substantially more severe significant environmental effects that were not discussed in the previous EIR. In this instance, as discussed above, due to significant changes in the engineering policies and standards affecting the flood risk reduction program evaluated in the 2007 Local Funding Mechanisms EIR, improvements not anticipated in the 2007 EIR need to be added to the program. These additional improvements would have one or more significant environmental effects not discussed in the 2007 EIR.

As in the 2007 EIR, these effects will be described and evaluated at a program-level. This is appropriate because the actions covered by this SEIR and the 2007 EIR can be characterized as one large project and are related (1) geographically; (2) as logical parts in the chain of contemplated actions; (3) in connection with issuance of rules, regulations, plans, or other general criteria to govern the conduct of a continuing program; or (4) 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. 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 program-wide
mitigation measures early in the decision-making process, when the agency has greater flexibility to deal with basic problems or cumulative impacts. State CEQA Guidelines CCR Section 15168.

1.4 SCOPE OF THE SUBSEQUENT ENVIRONMENTAL IMPACT REPORT

This SEIR describes the significant environmental effects of changes in the approved program of flood control improvements that could be implemented with funding from the proposed updated funding mechanisms, and will assess these effects at a program-level. This SEIR also evaluates the potential growth-inducing effects, and cumulative effects of the proposed flood control improvements when considered in connection with the effects of past, current, and reasonably foreseeable future projects causing related effects. (California PRC Section 21083(b)(2) and State CEQA Guidelines CCR Section 15130[a][1].)

Most of the facilities that would be implemented with support from the updated funding mechanisms were evaluated in the 2007 EIR. Some of these facilities, as well as additional projects not addressed in the 2007 EIR, also have since been evaluated at a project-level in public draft or certified CEQA documents by either SAFCA or other lead agencies. This SEIR makes appropriate use of these existing environmental documents. Relevant information from these public drafts and certified documents has been summarized and incorporated by reference (where relevant and appropriate), and information from other relevant environmental documents has been included in and informs the analysis in this SEIR.

On the basis of previous evaluations, and preliminary evaluation of components that have not been addressed in previous environmental documents, SAFCA has determined that the flood control improvements that could be funded in part through the updated funding mechanisms, and that are evaluated at a program-level in this SEIR, could have the following potentially significant and significant environmental effects:

- **Agriculture, Forestry, and Land Use.** Conversion of farmland to nonagricultural use and potential removal of heritage trees.

- **Air Quality and Greenhouse Gas Emissions.** Temporary and short-term increases in pollutant emissions and greenhouse gas emissions associated with construction activities.

- **Cultural Resources.** Disturbance of historic, archaeological, or Tribal cultural resources during construction.

- **Fisheries and Aquatic Resources.** Modification of habitats for special-status fish species; construction effects on special-status fish species or their habitats.

- **Geology, Soils, Seismicity, and Mineral Resources.** Potential impacts related to soil stability, erosion during construction, or borrow areas.

- **Hazardous Materials.** Potential introduction of contaminants into water courses as a result of construction activities and possible releases of contaminants during removal of the Old Bryte Landfill.

- **Noise and Vibration.** Temporary and short-term increases in noise levels or ground-borne vibrations near sensitive receptors during construction.

- **Paleontological Resources.** Potential disturbance or destruction of previously undiscovered fossils during construction.

- **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.
1.5 INTENDED USES OF THIS SUBSEQUENT ENVIRONMENTAL IMPACT REPORT/AGENCY ROLES AND RESPONSIBILITIES

SAFCA is the CEQA lead agency for the new assessment district and the updated DIF and has authority for approval of the facilities that would be funded in part by these mechanisms. This SEIR 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 funded facilities and by other State, regional, and local agencies, including CEQA trustee agencies, that may have an interest in resources that could be affected by the funded facilities.

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 participate in the lead agency’s CEQA consultation process and consider the lead agency’s CEQA document prior to taking action on the project. This SEIR 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.

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 the California Department of Fish and Wildlife (fish, wildlife, and plant resources), California State Parks (lands around Folsom Dam), and the California State Lands Commission (navigable waterways).

The proposed new CCAD2 and updated DIF would not require the approval of any agencies other than SAFCA. However, individual projects implemented using local financing generated through these mechanisms would require permits and authorizations from, or coordination with, numerous Federal, State, and local agencies. The following is a listing of the agencies that may have responsibility or jurisdiction over the implementation of flood system improvements and the permits or authorizations that may apply to the individual projects:

- U.S. Army Corps of Engineers: permitting under Section 404 of the Clean Water Act and Section 408 permission under Section 10 of the Rivers and Harbors Act, as well as approval of Federal project levee modifications, modifications to Folsom Dam, and construction of the bridge below Folsom Dam.

- U.S. Fish and Wildlife Service: Endangered Species Act (ESA) consultation and incidental take authorization.

- U.S. Department of the Interior, Bureau of Reclamation: approval of Folsom Dam modifications and construction of the bridge downstream of Folsom Dam.


- Federal Railroad Administration: relocation of the Sierra Northern Railway line.
► California State Water Resources Control Board, Central Valley Region (Region 5): National Pollutant Discharge Elimination System 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; possible waste discharge requirements and groundwater remediation at Old Bryte Landfill.

► California Department of Fish and Wildlife: Compliance with the California Endangered Species Act (CESA) and California Fish and Game Code Section 1602 (Streambed Alteration Agreement).

► California State Lands Commission: possible land use lease and protection of public trust resources associated with Sovereign Lands of the State, including navigable waterways.

► Central Valley Flood Protection Board and local reclamation districts: encroachment permits.


► California Public Utilities Commission: approval of relocation of Sierra Northern Railway line and oversight of possible powerline relocations.

► California Department of Transportation: possible encroachment permits.

► Sutter, Sacramento, Solano, and Yolo Counties: possible permits for compliance with the State’s Surface Mining and Reclamation Act, other possible construction authorizations/encroachment permits, and possible zoning changes.

► Feather River Air Quality Management District, Sacramento Metropolitan Air Quality Management District, and Yolo-Solano Air Quality Management District: review of effects on air quality and possible permit to construct/permit to operate.

► California Department of Resources Recycling and Recovery (CalRecycle): approval of removal and offsite disposal of Old Bryte Landfill.

► California EPA, Department of Toxic Substances Control: approval of removal and offsite disposal of Old Bryte Landfill.

► City of Sacramento: possible construction authorizations/encroachment permits.

► City of Rio Vista: possible construction authorizations/encroachment permits.

1.6 DOCUMENTS INCORPORATED BY REFERENCE

State CEQA Guidelines encourage incorporation by reference of previously analyzed and publicly circulated or generally available information (State CEQA Guidelines CCR Section 15150). CEQA requires brief citation to and summary of the referenced material as well as the public availability of this material. CEQA also requires citation of the State identification number (i.e., State Clearinghouse number) of any EIRs incorporated by reference. Much of the setting and environmental analysis information in this SEIR 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 updated project funding mechanisms. These previously prepared documents are discussed for each project activity and improvement described in Chapter 2, “Background.” This SEIR incorporates by reference information contained in the following documents:
1.7 ORGANIZATION OF THIS SUBSEQUENT ENVIRONMENTAL IMPACT REPORT

This SEIR contains the program-level analysis of the potential significant environmental effects of the facilities that could be funded by the new assessment district and updated DIF and is organized as follows:

► **Executive Summary** summarizes the funded facilities, alternatives, significant environmental effects that would result from project implementation, and mitigation measures proposed to avoid, reduce, eliminate, or mitigate those impacts.

► **Chapter 1, “Introduction,”** describes the purpose, context, and organization of the SEIR.
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 new assessment district and modified DIF program.

Chapter 4, “Environmental Setting, Impacts, and Mitigation,” describes, by environmental issue area, the existing environmental and regulatory settings; 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 funded facilities in combination with past, current, and probable future projects that could affect the same resources.

Chapter 6, “Other CEQA-Required Sections,” discusses the funded facilities’ growth-inducing impacts, significant and unavoidable impacts, and significant irreversible environmental changes.

Chapter 7, “Alternatives,” describes alternatives to the funded facilities at a level consistent with CEQA requirements.

Chapter 8, “Report Preparation,” identifies the preparers of this SEIR.

Chapter 9, “References,” contains a comprehensive listing of the sources of information used in the preparation of this SEIR, including agencies or individuals consulted.

Appendices

- Appendix A: Notice of Preparation of SEIR and Scoping Comments
- Appendix B: Final 2007 EIR on Local Funding Mechanisms for Comprehensive Flood Control Improvements for the Sacramento Area (on CD)
- Appendix C: Summary of Previous Documents Incorporated by Reference
- Appendix D: Hydrologic and Hydraulic Modeling Data

1.8 STANDARD TERMINOLOGY USED IN THIS SUBSEQUENT ENVIRONMENTAL IMPACT REPORT

The following are standard terms as used in the SEIR:

**Funded facilities**—Individual projects which would be funded by the proposed updated local funding mechanisms.

**Program 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 updated funding mechanisms.

**Program components**—Individual projects which would be funded by the proposed updated local funding mechanisms and that are analyzed in this SEIR.
**Project alternative**—Alternative means of feasibly attaining most of the basic project objectives that also would avoid or substantially lessen any significant effects of the funded facilities. CEQA requires that an SEIR describe and evaluate a “reasonable range” of project alternatives. See Chapter 7, “Alternatives.”

**Project sites**—Locations where activities associated with individual projects evaluated in this SEIR at a program-level.

**Proposed program**—A new assessment district to replace the existing CCAD and an updated DIF program, both to provide funding for the local share of funding for the activities listed in Section 1.2.3 above.

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 of resources within the area affected by the project, as demonstrated by exceeding the defined, resource-specific significance thresholds without the implementation of feasible mitigation. Where available, feasible mitigation is identified that would avoid, minimize, 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 SUBSEQUENT ENVIRONMENTAL IMPACT REPORT PROCESS**

On September 17, 2015, SAFCA issued a notice of preparation (NOP) for this SEIR and filed the NOP with the State Clearinghouse. The public comment period on the NOP ended on October 16, 2015. A scoping meeting was held on October 6, 2015, to solicit input on the scope and content of the SEIR from interested agencies, individuals, and organizations. The NOP and copies of the scoping comments provided to SAFCA are included in Appendix A.

Assembly Bill 52 (AB 52), which took effect on July 1, 2015, amends CEQA and adds new sections relating to Native American consultation and certain types of cultural resources. AB 52 requires the CEQA lead agency to begin consultation with a California Native American Tribe that is traditionally and culturally affiliated with the geographic area of the proposed program, before the determination of whether a negative declaration, mitigated negative declaration, or environmental impact report is required, if the Tribe requests the lead agency, in writing, to be informed by the lead agency through formal notification of proposed projects in that area and the Tribe thereafter requests consultation. In addition, AB 52 includes time limits for certain responses regarding consultation. SAFCA initiated AB 52 consultation by sending letters to interested Native American groups based on a list provided by the Native American Heritage Commission. These letters were sent on November 10, 2015.

In accordance with CEQA review requirements; this SEIR is being distributed for public and agency review and comment for a 45-day period, which will end on March 16, 2016. This distribution ensures that interested parties have an opportunity to express their views regarding the potentially significant and significant environmental effects of the proposed project, and to ensure that information pertinent to permits and approvals is provided to the decision makers for SAFCA and the CEQA responsible and trustee 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, and is available on SAFCA’s website at www.safca.org.
Written comments from public agencies and members of the public, including individuals and organizations, will be accepted throughout the public comment period. Comments must be received by 5:00 p.m. on March 16, 2016, at the following address, fax number, or email address:

Mr. Timothy Washburn, Director of Planning  
Sacramento Area Flood Control Agency  
1007 7th Street, 7th Floor  
Sacramento, CA 95814  
Telephone: (916) 875-7606  
Fax: (916) 874-8289  
Email: washburnt@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 Draft SEIR. Written responses to each public agency’s comments must be provided at least 10 days before the SEIR is considered for certification. Following this 10-day period, SAFCA will consider certifying the SEIR if it is determined to be in compliance with CEQA, and will rely on the certified SEIR when considering approval of the proposed project.

In accordance with the requirements of CEQA, if SAFCA decides to approve the proposed project, it will make one or more of the following written findings with respect to each significant environmental effect identified in the EIR:

► 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 EIR infeasible.

In addition, if SAFCA decides to approve the proposed project but determines that the proposed project would have significant and unavoidable adverse environmental effects, SAFCA will adopt a “Statement of Overriding Considerations” that explains why the benefits of the proposed project outweigh the significant effects on the environment, based on information in the EIR and other pertinent information in the administrative record.

At the time of project approval, SAFCA must also adopt a mitigation monitoring and reporting program for those measures that it has adopted and incorporated into the project to mitigate or avoid significant effects on the environment. The reporting and 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

2.1.1 RECENT FLOOD HISTORY

Since its inception in 1989, the Sacramento Area Flood Control Agency (SAFCA) has represented the Sacramento area’s local interests in an ongoing Federal-State-local effort to improve the area’s flood risk management system. As discussed below, this effort has been characterized by three relatively distinct periods of flood risk management activity, each triggered by a major flood event, and each marked by a heightened post-flood awareness of flood risk and an increasingly aggressive and costly response to this perceived risk that has required SAFCA to periodically update its project funding mechanisms.

1986 TO 1997

The first flood risk management period followed the record flood of 1986. The 1986 flood exceeded the magnitude of its known predecessors in duration and magnitude and combined record runoff in the main stem rivers and their tributary streams throughout the Sacramento Valley. This flood tested improvements to the flood control system in the valley that had largely been completed in the 1960s. In Sacramento, the levees along the east side of the Sacramento River in the Natomas Basin and Pocket area proved susceptible to severe through-seepage. Folsom Dam nearly ran out of reservoir storage space for incoming flood waters. For about 8 hours, dam operators were forced to raise releases from the dam to 134,000 cubic feet per second (cfs). These releases exceeded the 115,000-cfs historic design release capacity of the system by about 20 percent, and caused serious erosion in portions of the American River Parkway across from the Fairbairn Water Treatment Facility and just downstream from the River Park area. The levees along the stream channels converging at the eastern edge of the Natomas Basin came close to overtopping.

This experience produced a wave of flood system improvement activity across the Sacramento Valley. Nearly all of the levees in the Sacramento metropolitan area were rated by the U.S. Army Corps of Engineers (USACE) as inadequate to meet the National Flood Insurance Program’s (NFIP’s) minimum standards. SAFCA was created in 1989 to work with USACE, the Central Valley Flood Protection Board (CVFPB),¹ and the California Department of Water Resources (DWR) to plan and implement appropriate responses to the vulnerabilities exposed by the flood. USACE took the lead in implementing the Sacramento Urban Levee Reconstruction (Sac Urban) Project to address through-levee seepage issues along the Sacramento River East Levee. SAFCA initiated the North Area Local Project (or NALP) to raise and strengthen the levees along the lower portions of the Natomas East Main Drainage Canal (NEMDC)/Steelhead Creek, Arcade Creek, Dry/Robla Creek, and the Natomas Cross Canal South Levee. SAFCA entered into an interim agreement with the U.S. Bureau of Reclamation (Reclamation) to modify operation of (i.e., to “reoperate”) Folsom Dam and Reservoir to create more storage space for flood waters. Finally, SAFCA created the Lower American River Task Force (LARTF) and forged a consensus on the need for an environmentally sound program to protect vulnerable areas of the American River Parkway from future erosion. USACE launched the first phase of this erosion control program in Fall 1996 through the Sacramento River Bank Protection Project.

SAFCA funded the local share of the cost of these activities through two special assessment districts and a Capital Investment Equalization Fee (CIEF) implemented under the provisions of the SAFCA Act of 1990. Operations and Maintenance Assessment District No. 1, which was formed in 1991 and is still in existence, covers all of the properties in Sacramento County located within the watersheds of the American River and its tributary streams east of the Natomas Basin, plus all of the properties in Sacramento and Sutter Counties located in the Natomas Basin and just outside the Basin between the Pleasant Grove Creek Canal and the Sutter/Placer County line (see Exhibit 2-1 for streams and flood risk reduction features). This district funded SAFCA’s share of the

¹ Formerly, the California Reclamation Board.
improvements to the Sacramento River East Levee, the reoperation of Folsom Dam, and certain erosion control improvements along the American River. The North Area Local Project Capital Assessment District No. 2 (NALP District 2), which was formed in 1995 and terminated in 2007, covered all of the properties in the Natomas Basin and portions of the Dry Creek and Arcade watersheds east of the Natomas Basin. This district funded the NALP in conjunction with the CIEF development impact fees imposed on new development through the CIEF program between 1996 and 2007.

1997 TO 2005

The 1997 flood occurred over several days in late December 1996 and early January 1997, and nearly equaled the intensity of the 1986 flood. However, the flood risk reduction measures implemented prior to the 1997 flood allowed the flood control system in Sacramento to weather the event with fewer problems as compared to the 1986 event. Other segments of the flood management system in the Sacramento Valley fared less well. For example, persistent high water along the east levee of the Feather River near the town of Arboga caused the levee to fail, apparently as a result of seepage through porous materials underlying the levee foundation. Such underseepage was a known flood risk in the Sacramento Valley prior to 1997, but it was considered a risk that could be adequately addressed by levee monitoring and flood fighting on an as-needed basis. In the post-1997 period, as a result of the Feather River levee failure, USACE and DWR determined that flood system levees should be designed to prevent underseepage in urban areas. This was a major shift in engineering philosophy that considerably increased the cost and complexity of urban levee improvement efforts.

The 1997 flood also helped break the stalemate, which had prevailed since 1986, over how to increase the reservoir storage space for flood waters along the American River. After more than a decade without agreement on USACE’s proposal to build a new flood detention dam at Auburn, Congress adopted SAFCA’s proposal to modify Folsom Dam and increase the conveyance capacity of the downstream levee system. This cleared the way for a concerted Federal-State-local effort to build upon the risk reduction accomplishments in the Sacramento area during the post-1986 period. Accordingly, USACE initiated the Folsom Dam Modification Project to increase the low-level outlet capacity of the dam and enable more efficient use of the reservoir space available for flood risk reduction. USACE also initiated the American River Common Features (ARCF) Project to strengthen the levees along the Lower American River and raise them as necessary to safely handle releases from Folsom Dam of up to 160,000 cubic feet per second (cfs). USACE also initiated the South Sacramento Streams Group (SSSG) Project to protect properties in southern Sacramento County from flooding along Morrison Creek and its tributaries.

SAFCA funded the local share of the cost of these activities through the American River/South Sacramento Streams Group Assessment District (AR/SSSG District 3). This district, formed in 2000 and terminated in 2007, covered all of the properties located within the (100-year) floodplains of the American River and the lower portion of Morrison Creek and its tributaries (See Exhibit 2-1).

2005 AND POST-KATRINA PERIOD

Hurricane Katrina and the resulting 2005 flooding of New Orleans, Louisiana initiated a new round of flood risk assessment and management. Perceived deficiencies in the flood protection system that failed during the hurricane led USACE to further revise its levee design and maintenance standards, adopt stricter guidelines on levee vegetation and encroachments, and substantially increase its regulatory oversight of activities affecting the levees under its jurisdiction. Furthermore, the California State Legislature adopted the Central Valley Flood Protection Act of 2008 to establish a new 200-year flood protection standard for urban areas in the Central Valley. This act also directed DWR to update the flood control plan that guided the design and evolution of the flood protection systems in the Sacramento and San Joaquin Valleys during the first half of the 20th century. In response to this legislation, the Central Valley Flood Protection Plan (CVFPP) was developed and adopted in 2012. The CVFPP is intended to serve as a framework for a comprehensive upgrade of the flood management systems in the Central Valley. The most important structural change called for in the CVFPP is expansion of the bypass channels that, along with reservoir storage, serve as the flood system’s primary stress reduction facilities during extreme floods.
Exhibit 2-1. Program Area
The CVFPP also includes new Urban Levee Design Criteria (ULDC) to complement the State’s 200-year flood protection standard, and the Central Valley Flood System Conservation Framework to improve system-wide riverine ecosystem function, including establishment of riparian habitat and seasonal inundation of available flood plains where feasible.

 Shortly after Katrina, it became clear that the initial design of the Folsom Dam modification project was problematic. This design focused on enlarging the dam’s existing low-level outlets, placed too much risk on the contractor to be able to complete the work without interfering with dam operations, and did not adequately address long-standing dam safety compliance issues. These considerations led USACE to abandon the low-level outlet design in favor of constructing an auxiliary spillway that could achieve the desired flood operation efficiencies with a lower risk construction process and in a manner that would better address dam safety compliance. In addition, Katrina strengthened the trend toward addressing underseepage as a principal risk factor in all urban levee improvement projects in the Sacramento Valley. This meant that the accomplishments of the Sac Urban Project along the Sacramento River and the NALP elsewhere in Natomas and North Sacramento would not be sufficient to meet the State’s new flood protection standard for urban areas. Rather, the scope of the ARCF Project would need to be greatly expanded to address underseepage and other levee design vulnerabilities along the Sacramento River and in the Natomas and North Sacramento areas.

### 2.1.2 Existing Local Funding Mechanisms

It was clear to SAFCA, after Hurricane Katrina, that SAFCA’s two existing capital assessment districts and its existing CIEF program would not be adequate to provide the local share of the cost of expanding the ARCF Project. NALP District 2 was created in 1995 primarily to address levee height deficiencies in the levee systems protecting Natomas and portions of North Sacramento along the NEMDC, Dry Creek, and Arcade Creek. It had no capacity to address underseepage vulnerabilities or other identified deficiencies in the Natomas and North Sacramento areas. AR/SSSG District 3 did not anticipate the redesign of the Folsom Dam Modification Project or the need for levee improvements beyond the accomplishments of the Sac Urban Project along the Sacramento River outside Natomas. The Capital Investment Equalization Fee could not make up for these shortcomings because it applied only to undeveloped properties in NALP District 2 and functioned simply to ensure an equitable distribution of costs between developed and undeveloped properties in that district.

The urgency of addressing the need for additional local funding capacity was underscored when SAFCA’s own evaluation of the levee system around the Natomas Basin, completed in 2006, indicated that the system would likely not meet minimum Federal standards for providing at least a 100-year level of flood protection largely due to underseepage vulnerabilities. This raised the possibility that this levee system, which had been certified as adequate to meet these Federal standards in 1998, could lose this certification, thereby triggering mandatory flood insurance requirements and restrictions on new development. Shortly after this evaluation was completed in November 2006, California voters approved nearly $5 billion in general obligation bonds to address flood risk issues in the Central Valley (Proposition 1E). Historically, such State funds have been used to cover the State’s share of the cost of projects authorized by Congress and carried out by USACE. In this case, however, the legal authority to issue bonds specifically allowed the bond funds to be used to reimburse local sponsors for levee improvements undertaken in advance of any Congressional authorization. Reimbursement requires the local sponsor to work with the State to preserve the potential for State expenditures on such early implementation projects to be credited toward the State’s share of the funding for future USACE projects under applicable USACE project funding guidelines.

The need to respond quickly to the conclusions of the Natomas levee evaluation, and the opportunity to secure State funding for early project implementation created by the State bond acts, convinced SAFCA to undertake the restructuring of its project funding mechanisms without waiting for USACE to complete its general reevaluation of the ARCF Project. This approach created some risk that additional restructuring of local funding mechanisms might be required depending on the outcome of this reevaluation. Nevertheless, commencing in Fall 2006, SAFCA initiated the process of replacing its two existing capital assessment districts and its CIEF program with a single consolidated capital assessment district (CCAD) and a new development impact fee (DIF) program.
covering all of the undeveloped properties in the CCAD. The DEIR on Local Funding Mechanisms for Comprehensive Flood Control Improvements for the Sacramento Area was issued in November 2006. In April 2007, the SAFCA Board certified the FEIR, and approved the Final Engineer’s Report on the SAFCA Consolidated Capital Assessment District (April 19, 2007) after property owners had indicated their acceptance of the proposed CCAD levy in a 45-day mail ballot protest procedure. In May 2008, the Board concluded the local funding restructuring process by establishing the SAFCA DIF Program. The CCAD and the DIF Program replaced the AR/SSSG District 3, NALP District 2 and CIEF funding mechanisms.

As set forth in the EIR and the 2007 Final Engineer’s Report, the CCAD covers all properties in the 200-year floodplain of the American and Sacramento Rivers and their tributaries. The local funding needs addressed by the CCAD reflected the anticipated outcomes of USACE’s redesign of the Folsom Dam Modification Project and reevaluation of the levee system downstream of the dam. The redesign of the Folsom Dam Modification Project was assumed to include the shift to construction of a new auxiliary spillway; construction of a new bridge downstream from the dam to mitigate the loss of roadway access across the top of the dam; a plan to raise the dam by 3 feet to create additional flood storage capacity; a plan to improve the dam’s temperature control facilities; and implementation of a new variable space flood operation plan that would be based on forecast rather than just measured inflows to the dam. USACE’s reevaluation of the levee system downstream of the dam was assumed to result in an expansion of the ARCF Project to include substantial underseepage remediation efforts in Natomas, North Sacramento, and along the Sacramento River outside Natomas; substantial erosion control improvements along the American and Sacramento River channels; and some levee raising in selected reaches of the levee system. No substantial changes were assumed for the South Sacramento Streams Group Project. Anticipated costs for all of these improvements were developed, and the local share of these costs was identified and allocated across the properties comprising the CCAD in proportion to the special benefits received. To ensure an appropriate cost/benefit relationship between each project and the properties benefitting from that project, the CCAD was divided into five basic zones – Natomas, North Sacramento Streams, American River, Sacramento River, and South Sacramento Streams – with eight zones altogether accounting for overlaps among these five zones. These assessment zones were further apportioned based on benefit as measured by land use (residential, commercial, and industrial), building square footage, depth of flooding, and parcel size.

A key assumption of the CCAD program was that SAFCA would carry out an early implementation project in Natomas, leveraging available State bond funds to address the perimeter levee system’s most pressing vulnerabilities. Under applicable USACE guidelines this effort was expected to generate credits equal to the Federal share of the cost of the constructed improvements, which could later be applied to offset the non-Federal costs of completing the expanded ARCF Project in Natomas and along the American and Sacramento Rivers outside Natomas. In anticipation of such credits, SAFCA assumed that the cost of the early implementation project in Natomas would be funded in part by assessments from benefit zones outside Natomas that would be protected by the later phases of the expanded ARCF Project.

The DIF program was established in 2008 to offset potential increases in the damages that would result from uncontrolled flooding in the CCAD area (measured as “expected annual damage”) if post-project development occurred without any offsetting reduction in the annual probability of such flooding. During the first decade of the DIF program, fees on new development were to be used to cover potential gaps in State or Federal contributions toward completing the projects necessary to provide 200-year flood protection. Thereafter, once these gaps in State or Federal funding are filled, collected fees could be used to fund a variety of levee strengthening measures and/or to fund acquisition of conservation easements in lightly populated agricultural floodplains adjacent to and upstream of the CCAD area to help to preserve the rural character of these floodplains.

2.2 CONTEXT OF PROPOSED FUNDED FACILITIES – CHANGES SINCE 2007

Eight years after formation of the CCAD and seven years after creation of the DIF, USACE has completed its reevaluation of the ARCF Project and issued the ARCF GRR. This process has involved a number of policy changes and engineering outcomes not fully anticipated in the 2007 Final Engineer’s Report that have altered the
scope and sequencing of the flood risk reduction improvements covered by the CCAD and raised the local share of the cost of these improvements. The DIF was specifically created to address such local cost increases. However, this anticipated funding augmentation has failed to materialize due to the regional economic conditions that have prevailed since the 2008 economic downturn. Therefore, SAFCA is again faced with updating its project funding mechanisms to better meet its anticipated future funding needs. The policy changes and engineering outcomes that have contributed to this need to update the existing local funding mechanisms are described below, and summarized in Table 4.1-1 in Section 4.1, “Approach to the Environmental Analysis.”

2.2.1 NATOMAS LEVEE IMPROVEMENT PROGRAM

The CCAD funded effort to improve the levees protecting the Natomas basin (Natomas Levee Improvement Program or NLIP) has experienced significant changes since the CCAD was formed in 2007. Most notably, the levee footprint along the Sacramento River has been significantly expanded to accommodate USACE’s post-Katrina policy of prohibiting trees and other woody vegetation on Federal project levees, as well as new encroachment, access, and visibility requirements. In addition, the levee footprint along the east side of Natomas has been greatly extended to address more rigorous State and Federal embankment and foundation stability requirements. Finally, unanticipated delays in Federal authorization and implementation of the project have escalated project costs. Formation of the Natomas Basin Local Assessment District (NBLAD) in 2011 addressed most of the added costs. In fact, when NBLAD was formed it was thought that the Federal Government would provide virtually all of the cost of completing the project with SAFCA and the State covering their contributions using credits accumulated through investments in project construction prior to Federal authorization. However, in 2012, USACE modified its crediting provisions. As a result, no matter how much credit has been accumulated, non-Federal sponsors must provide all lands, easements, relocations, rights of way and disposal sites (LERRDs) that are needed to support the project. In order to raise its share of the cost of the remaining LERRDs, SAFCA needs to raise additional funds beyond what is available through the CCAD and NBLAD.

2.2.2 LEVEE ACCREDITATION

The levee systems outside Natomas were certified by USACE in 1998 (North Sacramento), 2004 (American River) and 2006 (Sacramento River). However, in 2013 USACE withdrew these certifications (American and Sacramento River) or allowed them to expire (North Sacramento) reflecting USACE’s effort to heighten the standards governing the National Flood Insurance Program in the aftermath of Hurricane Katrina. Faced with the risk that the areas protected by the affected levees could be mapped into the regulatory 100-year floodplain, SAFCA retained a team of engineering consultants and initiated its own levee accreditation process. This effort has involved a comprehensive evaluation of the levees, identification of actionable deficiencies, and development of a plan to correct these deficiencies as quickly as possible. Because it is anticipated that it will take USACE several years to receive Federal authorization of the ARCF General Reevaluation Report and funding for the necessary work, SAFCA is proposing to proceed in advance of Federal authorization using local funds and funds remaining in the State’s flood protection bond account. This early implementation project (referred to herein as the Levee Accreditation Project) will require financial commitments beyond what was anticipated in the CCAD.

2.2.3 AMERICAN AND SACRAMENTO RIVER EROSION CONTROL

USACE’s decision to withdraw its levee certifications has occurred in the context of a general reevaluation of the levee systems in the Sacramento area outside Natomas. This reevaluation has focused not only on the levee embankment and foundation stability issues at the heart of SAFCA’s levee accreditation effort, but also on channel erosion issues outside the scope of that effort. Historically, these erosion issues have been addressed as needed through the Sacramento River Bank Protection Program which was set up to remediate only the most severe erosion problems as they manifest themselves on a site by site basis. However, USACE is now recommending an extensive proactive erosion control program to safely contain high velocity flows in the American River channel and persistently high river stages along the Sacramento River. Under this approach, the extent of the riverbank protection work recommended by USACE for congressional authorization is far greater than what was anticipated in the CCAD.
2.2.4 SACRAMENTO WEIR AND BYPASS

As part of its reevaluation of the Sacramento area’s levee systems, USACE has evaluated the feasibility of lowering water elevations in the Sacramento River during large floods by widening the Sacramento Weir and Bypass and thereby reducing the risk of flooding in the Natomas, North Sacramento, and Pocket/Downtown areas. This measure would result in lower peak flows in the Sacramento River channel during large flood events and would thus amplify the benefits of the levee improvement projects in Natomas and the Pocket area. In fact, SAFCA pursued the concept of bypass widening in 2003, but without Federal, State and regional support the concept was not developed further. Since that time, however, spurred by the heightened perception of flood risk created by Hurricane Katrina, DWR has updated the historic flood control plan for the Sacramento Valley that was initially authorized by the Legislature in 1911. The new CVFPP, which was approved by the CVFPB in 2012, specifically calls for increasing the conveyance capacity of the flood bypass systems in the Valley including the Yolo and Sacramento Bypass Systems. Consistent with this approach, USACE and the State have concluded that widening the Sacramento Weir and Bypass would reduce water surface elevations in the Sacramento River in the Pocket area in a cost-effective manner and would avoid the need to raise substantial portions of the Sacramento River East Levee in this area.

SAFCA believes that the widening of the Sacramento Weir and Bypass could be the initial steps in a comprehensive program of flood, environmental, water, and drainage improvements to the Yolo Bypass. Accordingly, the Agency has been working with a coalition of local agencies over the past three years to reach agreement on a locally preferred approach to implementing projects in the Yolo Bypass and the floodplain corridor surrounding the bypass. This local agreement is set forth in the Lower Sacramento/Delta North Region Corridor Management Framework (CMF) which was adopted by the SAFCA Board on March 19, 2015. The CMF identifies widening the Sacramento Weir and Bypass as one of its priority projects and sets forth a number of planning and policy guidelines to govern project implementation. These guidelines include: development and institutionalization of assurances to protect local agencies and landowners from adverse project impacts; establishment of a functional governance structure for managing project implementation; creation of a sustainable funding stream for long-term operation and maintenance; preservation of existing agricultural land uses and where conversion of agricultural lands to other purposes is unavoidable, implementation of appropriate mitigation including contribution to an agricultural sustainability fund; and development of an engagement process for coordination of new projects. The multi-objective program embraced by the CMF would complement the levee improvements implemented along the American and Sacramento Rivers and their tributaries and further reduce the risk of flooding in the Sacramento area. However, this program was not contemplated either in the 2007 Final Engineer’s Report or in the initial phase of the DIF which focuses primarily on filling State and Federal funding gaps in the CCAD projects identified in the 2007 Final Engineer’s Report.

2.2.5 LEVEE MODERNIZATION

After Hurricane Katrina, USACE significantly strengthened its levee maintenance and inspection requirements. In addition, the 2012 Central Valley Flood Protection Plan (CVFPP) includes State-adopted urban levee design criteria (or ULDC) which include standards for long-term encroachment and vegetation management and landside levee access/visibility. Under these requirements cities and counties in the Central Valley have until July 2016 to adopt a plan to address the following issues:

- Encroachments that have not been permitted or interfere with operation, maintenance, or flood-fight capability must be eventually removed or permitted.

- Trees and other woody vegetation must be monitored and maintained according to levee vegetation management criteria adopted by the State which establish a “vegetation management zone” (including the landside levee slope, crown and upper 1/3 of the waterside slope) in which trees are trimmed up to 5 feet above the ground (12-foot clearance above the crown road) and thinned for visibility and access while brush, trees, and other woody vegetation less than 4 inches in diameter at breast height, weeds, or other such vegetation over 12 inches high are to be removed in an authorized manner. Trees within this vegetation
management zone that constitute an unacceptable risk to levee integrity or operation and maintenance due to age, disease or other causes must be removed.

- For levee systems that currently have development within 20 feet of the landside toe of the levee, the rights necessary to create a minimum 10-foot-wide landside clear zone or to meet visibility requirements over a 20-foot-wide landside zone must be secured. Visibility requirements are met if fencing, walls, structures, vegetative screens, and other physical obstructions that could restrict the ability to conduct inspections of the landside toe and adjacent 20 feet have been modified or removed to allow for visual inspection of the ground surface.

The plan must provide for meeting these conditions at a reasonable time in the future with up to 40 years allowed for acquisition of the requisite access/visibility rights. Although the CCAD includes a levee integrity element that addresses encroachment removal and access acquisition, the scope of these activities under the ULDC far exceeds what was anticipated in the CCAD.

### 2.2.6 Floodplain Mapping

As part of the Central Valley Flood Protection Act of 2008, the California Legislature directed the Department of Water Resources (DWR) to develop 200-year floodplain maps for all urban areas in the Central Valley. In carrying out this responsibility, DWR updated the approach to floodplain modeling that was used to create the floodplain maps that informed the CCAD. In particular, DWR reevaluated the likely impact of the several railway embankments that crisscross the floodplain in Sacramento. The floodplain map supporting the CCAD was developed in the 1980’s. It assumed that the railway embankments would act as a barrier to floodwaters escaping the levee system and thus affect the depth and extent of the flooding that would result from a levee failure. Consistent with current engineering practice, DWR assumed that railway embankments not otherwise designed to meet current urban levee design standards would fail when subjected to the hydrostatic pressure of interior flooding. This assumption has altered the extent of the floodplain area that would benefit from improving Sacramento’s levee systems by comparison to the area encompassed by the CCAD.

### 2.2.7 Inundation Damage

In the aftermath of Hurricane Katrina, USACE updated its approach to estimating the likely damage to structures that would result from uncontrolled flooding in an urban area. The new approach has been used to develop depth damage curves that estimate the relative damages that would be suffered by residential, commercial, industrial, and governmental structures at various flood depths. It was used as part of USACE’s reevaluation of the risk of flooding in the Natomas basin. The depth damage curves developed for the Natomas basin are different from the depth damage curves used to support the CCAD, which were developed in the 1980’s. The updated depth damage curves redistribute the damages that would result from uncontrolled flooding and now show that slightly greater losses (by depth and percentage of total structure value) accrue to residential structures and slightly less to commercial, industrial and governmental structures. These depth damage curves would thus alter the distribution of the benefits that would result from improving the levee system in Sacramento by comparison to the CCAD.

### 2.3 Project Activities Evaluated in the 2007 Local Funding Mechanisms Environmental Impact Report or Other Environmental Impact Reports

The project activities covered by the 2007 Local Funding Mechanisms EIR or in EIRs completed thereafter are as follows:

- Improvements to Folsom Dam and modifications to the water control manual governing flood season operations at Folsom Reservoir in Sacramento, Placer, and El Dorado Counties.
- Improvements to the perimeter levee system protecting the Natomas Basin in the City and County of Sacramento and in Sutter County.

- Improvements to the levees along the American River including floodplain habitat restoration along portions of the American River Parkway in the City and County of Sacramento.

- Improvements to the levees along the tributary streams in the North Sacramento area in the City and County of Sacramento.

- Improvements to the Sacramento River East Levee between the American River and the Town of Freeport in the City and County of Sacramento.

- Improvements to the channels and flood control facilities along Morrison Creek and its tributaries in the South Sacramento area in the City and County of Sacramento.

- Long-term maintenance activities in all of the channels and levees within SAFCA’s jurisdictional boundaries in the City and County of Sacramento and in Sutter County.

- Acquisition of open space/flowage easements and other activities related to promoting agricultural sustainability on lands in Sutter and Yolo Counties upstream and downstream of the Fremont Weir.

These project activities are summarized below.

### 2.3.1 FOLSOM DAM AND RESERVOIR

**BACKGROUND**

Folsom Dam and Reservoir, located about 25 miles east of downtown Sacramento, are part of the multipurpose Central Valley Project (CVP). This facility regulates runoff from a drainage area of approximately 1,860 square miles. It 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 the Sacramento metropolitan area. Reservoir operations are managed by Reclamation. During the flood season the reservoir is operated pursuant to a flood control diagram established by USACE. The current diagram was adopted in early 1986.

During the flood of 1986, it became clear that space reserved for flood control under this diagram was inadequate to control a 100-year flood or to provide the much higher level of flood protection considered appropriate for a heavily urbanized area like Sacramento. Accordingly USACE initiated an effort to increase the reservoir space available for flood control. This effort focused initially on construction of a new flood detention dam upstream of Folsom. In the interim, SAFCA entered into an agreement with Reclamation to increase the space available at Folsom on a situational basis depending on storage conditions in the three largest non-Federal dams in the American River watershed. This variable space arrangement (referred to as “Folsom Reoperation”) was authorized by Congress in 1996 with the proviso that it should remain in place until a comprehensive plan for flood protection in the watershed is implemented.

In the decade that followed, the USACE effort to construct a new upstream dam was replaced by a focus on modifying Folsom Dam so as to increase its low-level discharge capacity, enlarge its overall storage capacity, and improve the efficiency of the variable space storage operation. These objectives were accomplished in a series of Congressional enactments that linked improvements in flood risk reduction to resolving long standing dam safety issues at Folsom. The resulting Joint Federal Project includes construction of a new auxiliary spillway as the key element in the modification of Folsom Dam. The other elements in the authorized package of improvements are described below.
**FOLSOM DAM MODIFICATIONS**

The physical improvements to Folsom Dam include the following:

- Construct a new bridge across the American River just downstream of the dam to accommodate traffic removed from the road across the top of the dam.

- Construct a new gated auxiliary spillway south of the main dam that increases the dam’s low-level discharge capacity and allows dam operators to fully use the reservoir space and downstream channel capacity available to control very large floods in the American River watershed.

- Raise the height of the dam by about 3.5 feet and modify the dam’s three emergency spillway gates in order to increase the space available for storage of flood water above the Folsom Reservoir’s gross pool elevation.

- Modify the temperature control shutters at Folsom Dam to improve the ability of dam operators to manage the Folsom Reservoir’s cold-water pool and thereby improve conditions for the anadromous fish spawning and rearing in the Lower American River.

**FOLSOM RESERVOIR OPERATIONS**

The improvements to flood season operations at Folsom Reservoir include the following.

- Replace the current (1986) water control manual for Folsom Reservoir with a new water control manual that allows dam operators to increase the space available in the reservoir to control large floods by 50 percent (from about 400,000 acre feet to about 600,000 acre feet) based on forecasted rainfall and runoff conditions in the American River watershed.

**STATUS OF PROJECT IMPLEMENTATION**

The above physical and operational improvements to Folsom Dam and Reservoir were described and evaluated at a program-level in the 2007 Local Funding Mechanisms EIR. These improvements have also been the subject of several project-level environmental documents. Construction of the new bridge was completed in 2009. The auxiliary spillway is nearing completion and is expected to come on line during the 2016-2017 winter season. The new water control manual is the subject of an ongoing planning and environmental review process that is expected to be adopted in time to complement the completion of the auxiliary spillway construction. The dam raise project is currently being designed, and construction could commence in Spring 2017. Modifications to the temperature control facilities would be designed and the modifications implemented once the dam raise project is completed perhaps as early as 2021.

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2 Folsom Dam Safety and Flood Damage Reduction (DS/FDR) - SCH# 2006022091 (2007 FEIS/EIR) (USBR) - basis for dam raise, dam safety features, and Joint Federal Project (JFP)
Folsom DS/FDR – Prison Staging Area (2012 SEA/EIR) (USACE) – Provides a staging area for the Phase IV contractor, allows for installation of a temporary traffic light at the prison staging area entrance, allows for widening a dirt access road, and construction of drain in the stilling basin.
Folsom Modification Project – Approach Channel (2013 SEIS/EIR) (USACE) – discusses excavation and construction of the approach channel. This is considered part of Phase IV.
Folsom DS/FDR – Evening Rock Blasting (2014 SEIR) (DWR/CVFPB) – The State prepared this document to allow for excavation by blasting during the late evening hours during the summer months in the dry (June to beginning of October).
Folsom DS/FDR – Right Bank Stabilization (2015 SEA/EIR) (USACE) – discusses stabilizing a portion of the right bank directly downstream from the main dam by installing rock bolts in the slope.
2.3.2 NATOMAS BASIN

BACKGROUND

The Natomas Basin 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 and NEMDC on the east, the American River on the south, and the Sacramento River on the west. The Natomas Basin, historically an agricultural area, is the location of Sacramento International Airport and now the site of extensive development and planned new business and residential development. As discussed above, following the flood of 1986, the levee system protecting Natomas Basin was deemed inadequate to provide 100-year flood protection to the residents and businesses occupying the area due to levee through seepage and levee height deficiencies exposed by the flood. Thereafter, improvements to the levees along the Sacramento River were carried out as part of the Sacramento Urban Levee Reconstruction Project (Sac Urban Project) to address the identified levee through-seepage problems. In addition, improvements to the levees along the NEMDC and NCC were carried out as part of the NALP to address identified levee height deficiencies. As a result of these improvements, it was thought that at least a 100-year level of flood protection had been restored in Natomas.

The flood of 1997 produced flows in the Lower Sacramento and American Rivers comparable to those of the flood of 1986. Nevertheless, the levees around the Natomas Basin, improved by the NALP and the Sac Urban Project passed these flows without the significant signs of stress that occurred in 1986. However, the flood did cause failures of some levees along the Feather River and Sutter Bypass upstream of Natomas. The USACE’s post-flood assessment concluded that underseepage may have contributed to these levee failures. Because this was a newly recognized concern in the Sacramento Valley, USACE and its non-Federal partners (the State of California and SAFCA), determined that a panel of experts should be convened to review and refine USACE’s guidelines for evaluating the risk of underseepage and designing remedial measures.

USACE’s Levee Seepage Task Force completed its work in July 2003 and USACE developed new standards for evaluating the risk of underseepage. USACE, the State of California, and SAFCA subsequently collaborated in developing a plan for moving forward with the Natomas levee improvements needed to address the new standards. SAFCA initiated a levee evaluation study in June 2005, including extensive geotechnical explorations along the existing Natomas levees focused on the potential for seepage failures in large flood events 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. Based on these evaluations SAFCA developed the initial scope of NLIP in 2007. Shortly thereafter, this scope was enlarged to address new geotechnical data highlighting the risk of underseepage along the east side of the Natomas Basin and new engineering policies and standards for addressing levee encroachments, vegetation, and access issues adopted by USACE following Hurricane Katrina.

In response to these developments, the NLIP is being pursued in two phases defined by the timing of Federal authorization of the program. The early implementation phase of the program consists of the improvements carried out by SAFCA with local and State funding in advance of Federal authorization. The Federal phase of the program consists of the improvements to be carried out by USACE with a mix of local, State, and Federal funding following Congressional authorization of the program. These improvements and the status of the two phases of the project are described below.

NATOMAS LEVEE IMPROVEMENTS

The proposed funding mechanisms will be used to fund the following improvements to the perimeter levee system protecting the Natomas Basin:

- Raise 5 miles of the NCC south levee and install deep seepage cutoff walls to address identified levee height and levee embankment and foundation stability deficiencies.
Construct a new adjacent levee extending for approximately 18.3 miles along the landside of the Sacramento River East Levee between the mouth of the NCC and the Interstate 5 crossing of the American River to address current engineering standards governing levee vegetation and encroachments; set the top of the new levee approximately 3 to 5 feet above the height of the existing levee in 12-mile reach between Powerline Road and the mouth of the NCC to address identified levee height deficiencies; and install deep cutoff walls, seepage berms and relief wells along entire 18.3-mile reach to address identified levee embankment and foundation stability deficiencies.

Raise and widen approximately 3.3 miles of the Pleasant Grove Creek Canal west levee between the NCC and Sankey Road and install deep seepage cutoff walls to address identified levee height and levee embankment and foundation stability deficiencies.

Widen portions of the NEMDC West Levee between Sankey Road and SAFCA’s NEMDC Stormwater Pumping Station and install up to about 10.7 miles of seepage cutoff walls to address identified levee embankment and foundation stability deficiencies.

Install deep seepage cutoff walls along portions of the NEMDC West Levee between Northgate Boulevard and SAFCA’s NEMDC Stormwater Pumping Station to address identified levee embankment and foundation stability deficiencies.

Install deep seepage cutoff walls along approximately 1.8 miles of the American River North Levee between Interstate 5 and Northgate Boulevard and flatten the landside slope of the levee as necessary to address identified levee embankment and foundation stability deficiencies.

Improve ten drainage pumping plants and their associated drainage canal facilities along the Sacramento River East Levee, the American River North Levee, the NCC South Levee, and NEMDC West Levee to accommodate the increased height and width of these levees and meet current engineering standards for such drainage facilities in urban or urbanizing areas.

Relocate existing irrigation canals along the landside toe of the Sacramento River East Levee and relocate and reconstruct three existing irrigation pumping plants along the waterside of the levee to accommodate the increased height and width of this levee.

Acquire the lands necessary to support the above levee, irrigation, and drainage facility improvements.

Create a mosaic of woodland, managed marsh, canal, upland, and managed grassland habitats to compensate for the impacts of these levee and irrigation and drainage facility improvements on vegetation and wildlife habitats in the project area.

Modify the existing drainage infrastructure on the bufferlands north of Sacramento International Airport and along the Airport’s west runway to reduce waterfowl use of these areas and lower the risk of inflight damage to aircraft entering and exiting the Airport.

Create the drainage facilities necessary to manage stormwater runoff in the vicinity of the Sankey Road gap in the Pleasant Grove Creek Canal west levee so as to meet interior drainage requirements associated with the proposed Sutter Pointe Specific Plan Area in the Sutter County portion of the Natomas Basin.
STATUS OF PROJECT IMPLEMENTATION

The Natomas levee improvements have been the subject of several project-level environmental documents. SAFCA has largely completed the locally-funded activities, including 5 miles of the south levee of the NCC and approximately 13 miles of the east levee of the Sacramento River. Federal funding for the remaining 24 miles of levee improvements was authorized in June 2014. USACE is expected to complete this work over the next 8 to 10 years.

2.3.3 LOWER AMERICAN RIVER

BACKGROUND

The Lower American River channel extends approximately 23 miles from Lake Natoma to the confluence with the Sacramento River. The channel is confined by high ground along its upper reach. It is leveed along the lower approximately 13 miles. 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 45,000 acres and encompasses much of downtown Sacramento, including the State Capitol; California State University, Sacramento; the City of Sacramento’s 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.

The 1986 flood produced a maximum discharge from Folsom Dam of 134,000 cfs. This was considerably higher than the design discharge of 115,000 cfs for large flood events in the American River watershed and this higher flow resulted in significant erosion at two locations in the leved portion of the downstream channel. After the flood it was thought that the key to managing the risk of high flows in the future was to increase the reservoir storage capacity for flood control in the watershed by constructing a new flood detention dam upstream of Folsom Dam. This approach failed to garner public support, however, and the flood of 1997 shifted the focus of flood planning to improving Folsom Dam and upgrading the levee system along the American River. These upgrades targeted sustained flows in the river channel of up to 160,000 cfs – the maximum that could be passed through the channel without encroaching within three feet of the top of most of the levees on both sides of the river. As in Natomas, pursuit of this design was informed by the new weight being given to the risk of underseepage in the aftermath of the 1997 flood. Congressional authorization of the resulting ARCF Project was secured through a series of enactments in 1996 and 1999. USACE initiated construction of the authorized improvements in 1998.

More recently as part of its general reevaluation of the levee system along the American River, USACE has concluded that sustained high flows of up to 160,000 cfs in the channel could cause significant erosion of channel banks and threaten the stability of portions of the levee system itself. Accordingly, the ARCF GRR recommends a

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2nd Addendum to the Environmental Impact Report on the Natomas Levee Improvement Program, Landside Improvements Project – Phase 2 Project. State Clearinghouse No. 2007062016. (August 2009)
Addendum to the Environmental Impact Report on the Natomas Levee Improvement Program, Landside Improvements Program Phase 3 Landside Improvements Project. State Clearinghouse No. 2008072060. (September 2009)
Final Environmental Impact Report on the Natomas Levee Improvement Program Phase 4a Landside Improvements Project. State Clearinghouse No. 2009032097. (November 2009)
proactive erosion control program that could involve armoring of as much as 9.5 miles of the channel. These improvements along with the improvements authorized in 1996 and 1999 are described below.

**AMERICAN RIVER LEVEE IMPROVEMENTS**

The proposed funding mechanisms would be used to fund the following improvements to the levee system along the American River:

- Implement geotechnical improvements to address the threat of underseepage, including installing cutoff walls, seepage berms, and relief wells.
- Raise portions of the north and south levees of the American River to ensure that there is 3 feet of freeboard above the 160,000 cfs flow.
- Reconstruct the non-Federal levee along the south bank of the American River upstream of the Mayhew Drainage Canal.
- Construct flood control improvements on the Mayhew Drainage Canal to prevent backup of floodwater on Folsom Boulevard.
- Implement rock bank protection and launchable rock trenches along up to 11 miles of the north and south levees of the American River to prevent erosion of flood control structures during sustained high-flow events.

**STATUS OF PROJECT IMPLEMENTATION**

The above improvements were described and evaluated at a program-level in the 2007 Local Funding Mechanisms EIR. These improvements have also been the subject of several project-level environmental documents. All of the levee raising improvements have been completed including reconstruction of the non-Federal levee in the vicinity of the Mayhew Drainage Canal. The improvements to the canal itself are substantially complete as are all of the geotechnical improvements (cutoff wall construction and the like) needed to address identified underseepage vulnerabilities. Initiation of the proactive erosion control program recommended by USACE awaits Congressional approval and funding. This work could get underway in the next

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4 American River Watershed Improvements (ARWI), Feasibility Report and EIS/EIR (April 1991)
ARWI Final SIR and SEIS/EIR (Supplement to Dec ’91 Feasibility Report for ARWI) (March 1996)
EA/IS, American River (Common Features) Project, LAR Slurry Wall South Bank & LAR Flood Warning System Modification (August 1999)
EA/IS Am. River Watershed Common Features (ARCF) Project, CA - LAR Features as Modified by the Water Resources Development Act (WRDA) of 1999 (March 2002)
Final EA/IS ARCF WRDA 96.99 - Erosion Sites 10.2R, 7.0R, 6.9L, 6.4L (July 2004 or Oct./Nov. 2006)
American River Watershed LAR Common Features Mayhew Drain Closure Structure (April 2008)
Final EIR/EIS ARCF, LAR Features, Mayhew Levee (October 2006)
Final EA/IS ARCF – Pocket Area Geotechnical Reaches 2 & 9 (June 2006)
Final EA/IS ARCF WRDA 1996 Remaining Sites Phase 1 Sites R1, R5, R6, L12 (August 2009)
Final EA/IS ARCF WRDA 1996 Remaining Sites Phase 2 Sites R8, L8 (May 2010)
Final EA/IS ARCF LAR Features as Modified by WRDA 1999 Howe Avenue Levee Improvement Project (July 2011)
Final EA/IS ARCF as Modified by WRDA 1999 Jacob lane Levee Improvements Reaches A & B Element (July 2008)
Final EA/IS ARCF Jacob Lane, Reach C (June 2012)
Final EA/IS ARCF Natomas East Main Drainage Canal (June 2012)
Final EA/IS ARCF WRDA 1996 Remaining Sites R10 (June 2012)
Recirculated Final EA/IS ARCF WRDA 1996 Remaining Sites R10 (June 2012)
Final EA/IS ARCF WRDA 1996 Remaining Sites L7, L10, R3A, R7 (October 2013)
Recirculated Final EA/IS ARCF WRDA 1996 Remaining Sites L7, L10, R3A, R7 (August 2014)
3 to 5 years and be completed over more than a decade depending on the ultimate magnitude of the improvements and rate of appropriations.

2.3.4 NORTH SACRAMENTO STREAMS

BACKGROUND

The Natomas Basin was reclaimed for farming between 1912 and 1914 in part through the construction of the NEMDC which receives flows from Dry Creek and Arcade Creek and routes these flows around the Natomas Basin for discharge in low-flow to the Sacramento River and in high-flow to the American River. These streams which flow through the North Sacramento area east of Natomas are thus hydraulically connected to the American River and the floodplains associated with these streams are subject to flooding from a combination of high flows in the creeks themselves combined with high flows in the American River channel. In fact, this combination came very close to causing uncontrolled flooding in portions of the North Sacramento area during the flood of 1986. As a result, USACE’s post-1986 recommendation to increase reservoir storage along the American River included a recommendation to increase levee heights along the NEMDC and Lower Dry and Arcade Creeks. This recommendation was addressed in the 1990s through SAFCA’s construction of the NALP. As part of this project, SAFCA raised the levees along both sides of the NEMDC and Lower Arcade Creek, raised the levee along the south side of Dry Creek and constructed a new levee along the north side of Dry Creek. These improvements provided the protected areas in North Sacramento with at least a 100-year level of flood protection under the engineering policies and standards prevailing at the time of the project.

However, over the last 20 years, the evolution of engineering policies and standards that has affected other parts of the flood control system in Sacramento has also affected the levees along the lower reaches of the North Sacramento streams. In fact, recent evaluations by USACE and SAFCA indicate that portions of the levees along both sides of Arcade Creek and along the east side of the NEMDC are vulnerable to underseepage. In addition, these evaluations indicate that the diversion channel linking Magpie Creek to Dry Creek between Raley Boulevard and Dry Creek Road is inadequately designed to perform its purpose of preventing floodwaters from entering the Magpie Creek floodplain west of Raley Boulevard in large flood events. The improvements described below are intended to address these deficiencies.

NORTH SACRAMENTO STREAMS LEVEE IMPROVEMENTS

► Implement up to about 4 miles of geotechnical improvements including installing cutoff walls, seepage berms, and relief wells along portions of the Arcade Creek North and South Levees and the NEMDC East Levee to address identified vulnerabilities to the threat of levee underseepage.

► Preserve floodplain storage in the Magpie Creek floodplain upstream and downstream of Raley Boulevard, raise about 2,100 feet of the existing Magpie Creek Diversion Channel West Levee in the vicinity of Raley Boulevard; and extend the existing levee 1,000 feet to the north.

STATUS OF PROJECT IMPLEMENTATION

Improvements along the Arcade Creek North and South Levees and the NEMDC East Levee are analyzed at a project level in the Levee Accreditation Project EIR. SAFCA expects to certify the EIR and consider approval of the project in early 2016, and construction of improvements could follow in 2016 or 2017.

2.3.5 LOWER SACRAMENTO RIVER

PROJECT AREA

The east bank of the approximately 33-mile reach of the leveed Sacramento River channel within SAFCA’s jurisdictional boundaries extends from the town of Verona at the northwest corner of the Natomas Basin to the
town of Freeport along the southerly border of the City of Sacramento. The lower portion of this reach extends for about 15 miles from the mouth of the American River to Freeport and forms the westerly boundary of the Lower Sacramento River area. During flood events, most of the flows in the Sacramento-Feather River system upstream of Verona are diverted away from the Sacramento River channel and into the Yolo Bypass through the Fremont Weir. The remaining flows enter the upper portion in the lower portion of the channel adjacent to the Natomas Basin. Flows in the lower portion of the channel are heavily influenced by the operation of the Sacramento Weir and Bypass located along the west bank of the channel just upstream of the mouth of the American River. This facility is designed to convey flows in the American River channel into the Yolo Bypass so that flows in the lower portion of the Sacramento River channel are essentially the same as the flows in the upper portion of the channel.

Following the 1986 flood, the east side levee in the Lower Sacramento River area was determined to be inadequate to provide a 100-year level of flood protection to the lands protected by the levee. Therefore, the lands comprising portions of the Land Park and Pocket-Greenhaven neighborhoods were mapped into the 100-year floodplain. Improvements undertaken in the early 1990’s as part of the Sac Urban Project addressed levee through-seepage problems exposed by the flood of 1986. A decade later, responding to heightened concerns about the risk of underseepage, SAFCA constructed a series of improvements to strengthen the foundation of the levee in the Little Pocket area and in the vicinity of City of Sacramento Sump 132. Thereafter, USACE constructed minor improvements to the levee near Freeport. These improvements in combination with the reoperation of Folsom Dam were judged by USACE in 2006 to restore at least a 100-year level of flood protection to the Lower Sacramento Area.

As discussed above, subsequent changes in engineering policies and standards have caused USACE to revise this earlier judgment. Evaluations undertaken by SAFCA as part of the Levee Accreditation Project and by USACE as part of the ARCF GRR have identified vulnerabilities to underseepage affecting substantial portions of the levee. SAFCA has also identified erosion problems affecting about 3,000 feet of the levee that require remediation. These improvements are described below. In addition, USACE has identified a need to proactively address a longer term risk of erosion affecting about 9 miles of the reach and has identified levee height deficiencies in the reach that would be addressed by widening the Sacramento Weir and Bypass. These improvements are described in Section 3.2.

**LOWER SACRAMENTO RIVER LEVEE IMPROVEMENTS**

- Implement geotechnical improvements at several locations totaling approximately 6 miles of the Sacramento River East Levee between Freeport and the mouth of the American River to address identified embankment and foundation stability weaknesses and resulting seepage vulnerabilities, and to mitigate bank and levee erosion susceptibility at several additional locations along this levee totaling approximately 3,000 feet.

**STATUS OF PROJECT IMPLEMENTATION**

Improvements along the Sacramento River East Levee are analyzed at a project level in the Levee Accreditation Project EIR. SAFCA expects to certify this EIR in early 2016, and construction of improvements could follow in 2017 or 2018.

**2.3.6 SOUTH SACRAMENTO STREAMS**

**BACKGROUND**

The South Sacramento Streams basin covers part of the Morrison Creek watershed in the southern portion of the American River floodplain. Streams in the Sierra foothills southeast of Sacramento flow west, join Morrison Creek and its tributaries—including Florin Creek, Elder Creek, Unionhouse Creek, Laguna Creek, and North Fork Laguna Creek—and drain into Beach-Stone Lakes on the west interstate. 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. These high waters can 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. The elements of this SSSG Project including subsequent modifications and refinements are described below.

**SOUTHERN SACRAMENTO STREAMS GROUP LEVEE IMPROVEMENTS**

The SSSG flood control improvements consist of the following elements:

- Excavate selected reaches of Morrison Creek, Elder Creek, Florin Creek, and Unionhouse Creek to increase the channel capacity and enable the conveyance of 100-year event flood flows.
- Retrofit stream passage beneath several local bridge crossings to ensure unimpeded passage of flood flows.
- Install floodwalls at select locations along the North Beach Lake Levee to avoid impacts on existing oak trees.
- Realign portions of existing levees.
- Install box culverts at several Florin Creek crossings to increase the effective flow area and reduce head loss.
- Construct a multi-use detention basin along Florin Creek just west of Highway 99.

**STATUS OF PROJECT IMPLEMENTATION**

Most SSSG improvements have been completed. Channel improvement work and detention basin construction are continuing along Florin Creek between Highway 99 and Franklin Boulevard. This work is expected to be completed in 2017.

These improvements have also been the subject of several project-level environmental documents.

**2.3.7 LEVEE MAINTENANCE**

**BACKGROUND**

The Federal–State flood control system protecting the Sacramento metropolitan area encompasses over 100 miles of earthen levees constructed at various times over the past 150 years. These levees are the area’s last line of defense against potentially catastrophic flooding. This line of defense may be overwhelmed by river or stream flows that exceed its containment capacity or it may fail at its weakest point due to the stress of prolonged high water. The flood control system is an earthen system that has been built up over several decades with variable materials and construction techniques on river and streamside foundations of unknown soil qualities. The levees

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Florin Creek Multi-Use Basin Project Mitigated Negative Declaration (2014)
Florin Creek Project Initial Study with Intent to Adopt a Supplemental Mitigated Declaration (2014)
Environmental Assessment/Initial Study CEQA Addendum, South Sacramento County Streams Morrison Creek-Union Pacific Railroad Project (2012)
Unionhouse Creek Channel Improvements Project Mitigated Negative Declaration/Final Initial Study (2012)
Final Supplemental Environmental Assessment/Initial Study, South Sacramento County Streams Morrison Creek-Union Pacific Railroad Project (2011)
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 through appropriate levee maintenance activities has become an essential element of urban flood risk management in the post-Katrina era, and these activities are an integral part of SAFCA’s ongoing flood risk reduction program.

Levee maintenance work can include a broad range of activities extending from regular maintenance of levees and flood conveyance channels to a variety of waterside and landside levee strengthening efforts, including bank protection, levee armoring, levee toe stabilization, channel and widening, and encroachment management. These activities, which are briefly described below, would be funded in part by the proposed new funding mechanisms.

**LEVEE MAINTENANCE ACTIVITIES**

► Urban levee maintenance  
► Stream channel management  
► Flood preparedness  
► Bank protection  
► Encroachment management (including hazardous tree removal)

**STATUS OF PROJECT IMPLEMENTATION**

Levee maintenance activities are ongoing.

**2.3.8 AGRICULTURAL SUSTAINABILITY**

**BACKGROUND**

The Sacramento River Flood Control Project 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 Basin, contain nearly 200,000 residential, commercial, and industrial structures, including the Sacramento International Airport, which 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. Moreover, depending on their geographic location, these agricultural lands could serve to attenuate the risk of urban flooding.

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 one 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 attenuation is one of the flood risk management strategies that could be funded by the proposed new funding mechanisms. This strategy would be pursued through a variety of agricultural sustainability activities including acquisition of open space conservation easements from willing sellers in Sutter and Yolo Counties. These activities are described below.

**AGRICULTURAL SUSTAINABILITY ACTIVITIES**

► Agricultural easement acquisition  
► Williamson Act subvention payments  
► Levee maintenance contributions
STATUS OF PROJECT IMPLEMENTATION

In 2008, SAFCA partnered with the Sacramento Valley Conservancy, the Yolo Land Trust and the California Department of Water Resources to acquire and preserve the 2,622 acre Knaggs Ranch in Reclamation District No. 1600 covering a portion of the Elkhorn Basin in Yolo County west of Natomas. SAFCA’s contributions to the project included:

► Acquisition of an agricultural conservation easement on the property
► Commitment to cover interruptions in Williamson Act subvention payments to local agencies allocable to the property
► Levee maintenance contributions
► Flood insurance coverage for structures on the property

2.4 CONCLUSION

Policy changes and engineering outcomes not fully anticipated by the 2007 Final Engineer’s Report have altered the scope and sequencing of the flood risk reduction improvements covered by the CCAD and raised the local share of the cost of these improvements. Due to the scope of these changes and an unanticipated slowdown in new development in the region since 2007 that has reduced the projected fee revenues from the DIF, the local cost of the risk reduction program described in the 2007 Final Engineer’s Report cannot be covered by SAFCA’s existing local funding mechanisms. Therefore, SAFCA is once again faced with updating these funding mechanisms to better meet its future funding needs. This updating will need to reflect recent changes in engineering analyses affecting floodplain mapping and the apportionment of flood damage reduction benefits.

CEQA requires an evaluation of the significant environmental effects of the funded facilities that could be funded by the proposed modified funding mechanisms. Because most of these funded facilities have been or will be evaluated in separate environmental documents prior to their implementation, it is appropriate to address these environmental effects at a program-level, while taking account of analyses in related project-level environmental documents. For most of the affected funded facilities, this program-level of review has been completed through SAFCA’s certification of the 2007 Local Funding Mechanisms EIR. This SEIR summarizes the projects covered in 2007 EIR, and incorporates by reference and summarizes pertinent analyses in the project-level environmental reviews that have been completed since 2007 or are currently in circulation. In addition, this SEIR describes and evaluates the facilities to be covered by the proposed modified funding mechanisms that were not evaluated in the 2007 Local Funding Mechanisms EIR.
3 PROJECT DESCRIPTION

This chapter is organized as follows:

► Section 3.1 states the project objectives.

► Section 3.2 describes the activities evaluated in this subsequent EIR (SEIR). These activities are referred to throughout the document as the “program components,” or “funded facilities.” Please refer to Chapter 2, “Background,” and Section 4.1, “Approach to the Environmental Analysis,” for a detailed discussion of the activities that would be funded with the updated funding mechanisms that have already been the subject of program-level CEQA review.

3.1 PROJECT OBJECTIVES

SAFCA’s overall project objective is to establish funding mechanisms that are capable of providing the local share of the cost of constructing and maintaining State and Federally recommended 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. The specific project objectives are to:

► complete the projects necessary to provide 100-year flood protection for developed areas in Sacramento’s major floodplains as quickly as possible,

► achieve the State of California’s 200-year flood protection standard for these areas within the timeframe mandated by the Legislature, and

► improve the resiliency, robustness and structural integrity of the flood control system over time so that the system can safely contain flood events larger than a 200-year flood.

To meet these objectives, SAFCA proposes to create a new assessment district, CCAD 2, that reflects the updated floodplain mapping data for the Sacramento area developed by the California Department of Water Resources and refined by MBK Engineers, and new depth damage curves for residential, commercial, and industrial structures developed by the U.S. Army Corps of Engineers in the aftermath of Hurricane Katrina. CCAD 2 would replace the existing CCAD following redemption of existing CCAD bonds. It would assume existing CCAD liabilities and provide new funds to complete the approved program of improvements described in the 2007 Final Engineer’s Report with the proposed changes outlined in Chapter 2 and described in more detail below, in Section 3.2.

SAFCA also proposes to update the DIF program to expand the potential uses of DIF revenues to include support for the ongoing State/Federal/Local effort to increase the conveyance capacity of the Sacramento and Yolo Bypass Systems. As discussed in Chapter 2, these flood system improvements are expected to be part of a comprehensive flood risk reduction, environmental enhancement, and agricultural sustainability program for the Yolo Bypass to be carried out over many years. This program would lower the floodwater elevations in the Sacramento River channel in the Natomas Basin and Pocket areas, thereby reducing the residual risk of flooding in these areas and offsetting the potential for new development in these and other levee-protected areas covered by the CCAD to increase Sacramento’s exposure to flood damages.

The activities to be funded by the new CCAD and updated DIF program are described below and in Chapter 2, “Background.” Most of these activities were previously described and evaluated in the 2007 Local Funding EIR (2007 EIR) or in other EIRs completed thereafter. These previously-reviewed activities are summarized in Chapter 2, “Background,” but are not analyzed again in this SEIR. The new activities that could be funded under the proposed updated funding mechanisms (the program components or funded facilities) are described in Section 3.2, and evaluated in Chapters 4, 5, and 6 of this SEIR.
3.2 DESCRIPTION OF PROGRAM COMPONENTS EVALUATED IN THIS SUBSEQUENT ENVIRONMENTAL IMPACT REPORT

The proposed action evaluated in this SEIR is a restructuring of SAFCA’s existing local funding mechanisms to support additional improvements required to meet State and Federal flood risk management standards. This section describes the additional program components (changes in the program) that SAFCA would fund using the proposed new CCAD 2 and updated DIF program, which were not evaluated in the 2007 EIR or other EIRs. These activities are described below at a level of detail consistent with the intended use of this SEIR, which is to support SAFCA’s decision whether to update its project funding mechanisms as proposed.

### 3.2.1 LOWER SACRAMENTO RIVER EROSION CONTROL

- Implement up to about 10 miles of rock bank protection and launchable rock trenches\(^1\) along the banks of the Sacramento River East Levee between Freeport and the mouth of the American River to prevent erosion of flood control structures during sustained high flow events.

### 3.2.2 YOLO AND SACRAMENTO BYPASS SYSTEM IMPROVEMENTS

- Lengthen the existing Sacramento Weir by approximately 1,500 to 1,800 feet extending northward from the northerly end of the existing weir along the current alignment of the Sacramento River west levee.

- Construct new setback levees along (1) approximately 2 miles of the north side of the Sacramento Bypass between the lengthened Sacramento Weir and the Yolo Bypass, and (2) approximately 5 miles of the east side of the Yolo Bypass between Interstate Highway 5 (I-5) and the new Sacramento Bypass North Levee. Seasonal agricultural use of the land in the areas enclosed by the new levee setbacks would be maintained.

- Relocate water and drainage infrastructure pumps and related facilities at various locations along the existing Sacramento Bypass North Levee and the existing Yolo Bypass East Levee downstream of I-5 to appropriate locations along the new setback levee.

- Remove the Old Bryte Landfill through disposal and recycling at licensed facilities of the wastes contained in the landfill based on waste characterization results, and restore the site for potential agricultural use. Landfill contents that are not characterized as Class I hazardous waste could be disposed at the Kiefer Landfill (Sacramento County), the L and D Landfill (Sacramento County), the Yolo County Central Landfill, and the Potrero Landfill (Solano County). Hazardous waste from the Old Bryte Landfill would likely be disposed at the Buttonwillow Landfill (Kern County). Some landfill contents might be reused on-site.

- Elevate approximately 1,500 to 1,800 linear feet of the Sierra Northern Railway line along its current alignment through the widened portion of the Sacramento Bypass or alternatively relocate approximately 7 miles of the line to west side of the Yolo Bypass.

- Relocate Yolo County Road 124 to the landside toe of the new setback levees and north of extended Sacramento Weir, respectively.

- Excavate benches along the eastern edge of the Tule Canal to provide borrow material for levee construction and establish a woodland corridor along the eastern edge of the Tule Canal south of I-5.

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\(^1\) A launchable rock trench is a large trench at the waterside toe of the levee, which is filled mostly with large rocks, covered with about three feet of dirt, and revegetated with grasses, bushes, and small trees.
► Strengthen portions of the Reclamation District No. 2068 (RD 2068) levee along the west side of the Yolo Bypass between Cache Slough and Midway Road to resist increases in floodwater conveyed to the lower portion of the bypass through the widened Sacramento Weir and Bypass.

► Construct a new floodwall to protect portions of the City of Rio Vista south of State Route 4 against increases in floodwater conveyed to the lower portion of the Yolo Bypass through the widened Sacramento Weir and Bypass.

3.2.3 LEVEE MODERNIZATION

► Provide access to and/or visibility of up to 20 feet along the landside toe of the north and south levees of the American River, the east levee of the Sacramento River and the north and south levees of Arcade Creek in order to bring these levee systems into compliance with applicable State and Federal standards and allow responsible levee-maintenance personnel to conduct flood patrols and respond to signs of stress during large flood events. Based on a screening level review of the existing conditions, it is estimated that approximately 11 miles of these levee systems do not currently meet the applicable standards. As noted in Section 2.2.5, the rights necessary to secure the requisite access or visibility must be secured over the next 40 years. SAFCA is working with the City of Sacramento, the County of Sacramento and the American River Flood Control District on a plan to accomplish this objective.
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 this chapter, Sections 4.2 through 4.18, describes by resource topic the regulatory and environmental settings, the aspects of the proposed changes that may lead to significant environmental effects (“impact mechanisms”), significance criteria, and impact analysis conclusions, mitigation measures, and residual significant impacts.

4.1 APPROACH TO THE ENVIRONMENTAL ANALYSIS

4.1.1 GENERAL APPROACH AND LEVEL-OF-DETAIL

In accordance with California Code of Regulations (CCR) Section 15126.2 of the State CEQA Guidelines, this subsequent EIR (SEIR) identifies and focuses on the potentially significant and significant direct and indirect environmental effects of the proposed program, giving due consideration to both temporary, short-term, and long-term effects. Temporary and short-term effects identified in the SEIR are generally those associated with construction, and long-term effects are generally those associated with operation of flood control facilities.

PROGRAM-LEVEL ANALYSIS

As explained in Section 1.3, “Type of Environmental Impact Report,” the SEIR examines at a broad, program-level, the significant environmental effects that could result from updating SAFCA existing project funding mechanisms as proposed. The examination focuses specifically on the physical effects associated with the program of flood control improvements and related environmental mitigation and habitat enhancements that the updated funding mechanisms would be used to finance. This level of analysis is sufficient to provide SAFCA with the environmental information needed to support its decision on whether to update its project funding mechanisms.

4.1.2 DOCUMENTS INCORPORATED BY REFERENCE

State CEQA Guidelines encourage incorporation by reference of previously analyzed and publicly circulated or generally available information (State CEQA Guidelines CCR Section 15150). CEQA requires brief citation to and summary of the referenced material as well as the public availability of this material. CEQA also requires citation of the State identification number (i.e., State Clearinghouse number) of any EIRs incorporated by reference. Much of the setting and environmental analysis information in this SEIR 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 updated project funding mechanisms. These previously prepared documents are discussed for each project activity and improvement described in Chapter 2, “Background,” and are summarized in Table 4-1. This SEIR incorporates by reference information contained in the following documents:


4.1.3 SUMMARY DESCRIPTION OF THE PROJECTS ANALYZED IN PRIOR ENVIRONMENTAL DOCUMENTS

NORTH SACRAMENTO STREAMS, SACRAMENTO RIVER EAST LEVEE, LOWER AMERICAN RIVER, AND RELATED FLOOD IMPROVEMENTS PROJECT (LEVEE ACCREDITATION PROJECT)

The Levee Accreditation EIR analyzed the environmental impacts of providing system resiliency, levee modernization, and conservation along the North Sacramento Streams (Natomas East Main Drainage Canal [NEMDC]/Steelhead Creek East Levee and Arcade Creek North and South Levees), Sacramento River East Levee, and Lower American River. The Levee Accreditation EIR (State Clearinghouse No. 2014052038) was circulated for public review in 2015, and SAFCA anticipates that the Levee Accreditation EIR will be certified by SAFCA in early 2016.
<table>
<thead>
<tr>
<th>SAFCA Proposed Program Component</th>
<th>Element</th>
<th>Description</th>
<th>Change from 2007 Local Funding EIR?</th>
<th>Environmental Documents Incorporated by Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Folsom Dam Physical Improvements</strong></td>
<td>Low-Level Discharge Improvements</td>
<td>Construct gated auxiliary spillway with concrete lined approach and discharge channels and enlarge existing stilling basin</td>
<td>No change</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Surcharge Storage Improvements</td>
<td>Modify or replace existing three emergency spillway gates and construct 3.5-foot parapet wall</td>
<td>No change</td>
<td></td>
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<tr>
<td></td>
<td>Temperature Shutter Improvements</td>
<td>Modify three existing temperature shutter mechanisms and provide for automated control</td>
<td>No change</td>
<td></td>
</tr>
<tr>
<td><strong>Folsom Dam Operational Improvements</strong></td>
<td>Variable Storage Space for Flood Control</td>
<td>Implement new flood control diagram requiring variable flood storage space based on watershed conditions</td>
<td>No change</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Forecast-Based Operations</td>
<td>Implement new flood control diagram permitting conditional water storage in flood control space and advance release of stored water based on forecasted reservoir inflows</td>
<td>No change</td>
<td></td>
</tr>
<tr>
<td><strong>New Folsom Bridge</strong></td>
<td>Bridge over American River</td>
<td>Construct four-lane bridge crossing the American River below Folsom Dam</td>
<td>No change</td>
<td></td>
</tr>
<tr>
<td><strong>Common Features Levee Improvements Below Folsom Dam</strong></td>
<td>Levee-Raising</td>
<td>Raise approximately 2.5 miles of the American River North Levee by approximately 1 foot</td>
<td>No change</td>
<td></td>
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<tr>
<td></td>
<td>Under-Seepage Control</td>
<td>Construct approximately 4,300 feet of underseepage cutoff wall along the south levee of the American River</td>
<td>No change</td>
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<tr>
<td></td>
<td></td>
<td>Install cutoff wall closure structures at several road and utility crossings along both sides of the American River</td>
<td>No change</td>
<td></td>
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<tr>
<td></td>
<td>Closure Structure</td>
<td>Construct concrete closure structure at Mayhew Drain</td>
<td>No change</td>
<td></td>
</tr>
<tr>
<td><strong>Natomas Levee Improvement Program</strong></td>
<td>Erosion Control</td>
<td>Construct approximately 10 miles of bank and levee arming along the north and south levees of the American River</td>
<td>No change</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Levee-Raising</td>
<td>Raise approximately 4,300 feet of the south levee of the American River by approximately 3 feet</td>
<td>No change</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Under-Seepage Control</td>
<td>Construct approximately 7 miles of cutoff wall and/or relief wells at several locations along the Sacramento River East Levee</td>
<td>No change</td>
<td>√ √</td>
</tr>
<tr>
<td></td>
<td>Erosion Control</td>
<td>Abandoned due to selection of adjacent levee alternative</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Interior Flooding</td>
<td>Reduce interior flooding by restricting or otherwise controlling flows through gap in the PGCC Levee at Sankey Road</td>
<td>Not addressed</td>
<td></td>
</tr>
<tr>
<td><strong>South Sacramento Streams Channel Improvements</strong></td>
<td>Channel Excavation</td>
<td>Excavate approximately 9.5 miles of channel to increase conveyance capacity</td>
<td>No change</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bridge and Culvert Improvements</td>
<td>Construct 15 new concrete box culverts beneath bridge crossings to increase conveyance capacity</td>
<td>No change</td>
<td></td>
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<tr>
<td></td>
<td>Floodwall Construction</td>
<td>Construct approximately 19 miles of concrete and sheet pile floodwalls to contain high-stream flows</td>
<td>No change</td>
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<tr>
<td></td>
<td>Detention Basin Storage</td>
<td>Construct peak-flow detention basin at Southgate Park on Florin Creek</td>
<td>Not addressed</td>
<td></td>
</tr>
<tr>
<td><strong>North Sacramento Flood Control Improvements</strong></td>
<td>Under-Seepage Control</td>
<td>Conduct subsurface investigations, geotechnical analyses, retrofit levees, and drainage features to address identified through-seepage and underseepage problems</td>
<td>Construct up to 4 miles of cutoff walls, earthen seepage berms and relief wells to control underseepage along the north</td>
<td></td>
</tr>
<tr>
<td>SAFCA Proposed Program Component</td>
<td>Element</td>
<td>Description</td>
<td>Change from 2007 Local Funding EIR?</td>
<td>Environmental Documents Incorporated by Reference</td>
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<td></td>
<td>ARCF GRR Project DEIS/DEIR Levee Accreditation Project EIR NLIP 4B Project EIS/ER Sutter Point EIR Florin Creek IS/MND Analyzed in SEIR</td>
</tr>
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<tr>
<td><strong>Levee Rehabilitation</strong></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Rehabilitation the Magpie Creek Diversion Channel West Levee</td>
<td>No change</td>
<td></td>
</tr>
<tr>
<td><strong>Right-of-Way</strong></td>
<td></td>
<td>Acquire right-of-way to allow maintenance of flood control facilities</td>
<td>No change</td>
<td></td>
</tr>
<tr>
<td><strong>American River Parkway Habitat Enhancement</strong></td>
<td></td>
<td>Remove star thistle and other invasive weeds on approximately 100 acres of land in the upper floodplain of the American River Parkway</td>
<td>No change</td>
<td></td>
</tr>
<tr>
<td><strong>Upland Habitat Creation</strong></td>
<td></td>
<td>Plant and establish native riparian vegetation on approximately 180 acres of land in the upper floodplain of the American River Parkway</td>
<td>No change</td>
<td></td>
</tr>
<tr>
<td><strong>Shallow Floodplain Habitat Creation</strong></td>
<td></td>
<td>Lower shoreline bank elevations and install woody material and native plants adapted to seasonal inundation</td>
<td>No change</td>
<td></td>
</tr>
<tr>
<td><strong>Urban Levee Maintenance</strong></td>
<td></td>
<td>Ensure that all levees in the project area are maintained to an urban levee standard</td>
<td>No change</td>
<td></td>
</tr>
<tr>
<td><strong>Flood Operations</strong></td>
<td></td>
<td>Ensure that local levee maintaining agencies are able to carry out levee patrols and flood fights, as necessary, during flood events</td>
<td>No change</td>
<td></td>
</tr>
<tr>
<td><strong>Bank Protection</strong></td>
<td></td>
<td>Construct bank protection improvements as required to control erosion generated by river flows and boat wake along the American and Sacramento Rivers and their tributaries</td>
<td>No change</td>
<td></td>
</tr>
<tr>
<td><strong>Levee Strengthening</strong></td>
<td></td>
<td>Maintain the conveyance capacity of flood control channels by relocating and redesigning obstructions and appropriately managing vegetation roughness</td>
<td>No change</td>
<td></td>
</tr>
<tr>
<td><strong>Encroachment Management</strong></td>
<td></td>
<td>Implement a Corridor Management Plan in the North Sacramento Streams area</td>
<td>No change</td>
<td></td>
</tr>
<tr>
<td><strong>Easement Acquisition</strong></td>
<td></td>
<td>Acquire easements from willing sellers to retire development rights and preserve the agricultural character and incidental flood storage capacity of rural floodplains</td>
<td>No change</td>
<td></td>
</tr>
<tr>
<td><strong>Landfill Removal</strong></td>
<td></td>
<td>Remove the Old Bryte Landfill to accommodate widening of the Sacramento Bypass</td>
<td>Not addressed</td>
<td></td>
</tr>
<tr>
<td><strong>Land Acquisition</strong></td>
<td></td>
<td>Acquire lands in the Lower Elkhorn Basin as necessary to support widening of the Sacramento Bypass and a portion of the Yolo Bypass between Interstate 5 and the Sacramento Bypass</td>
<td>Not addressed</td>
<td></td>
</tr>
<tr>
<td><strong>Sacramento Weir and Bypass</strong></td>
<td></td>
<td>Setback the levee along the north side of the Sacramento Bypass up to about 1,800 feet to increase the conveyance capacity of the bypass and provide floodplain habitat</td>
<td>Not addressed</td>
<td></td>
</tr>
<tr>
<td><strong>Yolo Bypass Widening</strong></td>
<td></td>
<td>Setback the levee along the east side of the Yolo Bypass to align the landside toe with County Road 124 to increase the conveyance capacity of the bypass and provide floodplain habitat</td>
<td>Not addressed</td>
<td></td>
</tr>
<tr>
<td><strong>Rail Line Relocation</strong></td>
<td></td>
<td>Relocate the Sierra Northern Rail Line from the Elkhorn Basin to the west side of the Yolo Bypass</td>
<td>Not addressed</td>
<td></td>
</tr>
<tr>
<td><strong>Sacramento Weir Lengthening</strong></td>
<td></td>
<td>Lengthen the Sacramento Weir by approximately 1,500 to 1,800 feet to increase the flows diverted from the American and Sacramento Rivers to Sacramento Bypass</td>
<td>Not addressed</td>
<td></td>
</tr>
<tr>
<td><strong>Rio Vista Flood Protection</strong></td>
<td></td>
<td>Implement the proposed Rio Vista flood wall in compliance with Urban Levee Design Criteria to protect against inundation downstream from improved Sacramento Weir</td>
<td>Not addressed</td>
<td></td>
</tr>
<tr>
<td><strong>Levee Improvements</strong></td>
<td></td>
<td>Improve the Reclamation Districts 2068/2098-maintained levees on the western side of the Yolo Bypass to accommodate increased conveyance capacity of the bypass</td>
<td>Not addressed</td>
<td></td>
</tr>
</tbody>
</table>

Notes: ARCF GRR = American River Common Features General Re-Evaluation; NLIP = Natomas Levee Improvement Program
Source: Data compiled by SAFCA, AECOM, and GEI Consultants, Inc. 2015
The general elements analyzed in the Levee Accreditation EIR are summarized below and the environmental impacts and overall level of significance for each issue area of the Levee Accreditation EIR are summarized in Table C-1 in Appendix C.

- **North Sacramento Streams Levee Improvements**—Improve approximately 4 miles of levee along the NEMDC/Steelhead Creek East Levee and Arcade Creek North and South Levees that require substantial work to mitigate seepage, meet embankment and foundation stability requirements, and remove high-hazard encroachments and vegetation that threaten levee integrity to allow accreditation of the levees. Includes various Levee Accreditation Mitigation and Conservation Strategy (Conservation Strategy) activities. Includes implementation of all activities associated with the NEMDC/Steelhead Creek Corridor Management Plan (CMP).

- **Sacramento River East Levee Improvements**—Improve approximately 6 miles of the Sacramento River East Levee, including the Little Pocket and Pocket areas that require substantial work to address seepage and meet embankment and foundation stability requirements; mitigate approximately 3,000 feet (approximately 0.6-mile) of erosion at several sites on the Sacramento River East Levee; and remove high-hazard encroachments and vegetation that threaten levee integrity and to allow accreditation of the levee. Includes various Conservation Strategy activities.

- **American River and Beach Lake Levees High-Hazard Levee Encroachment and Vegetation Removal**—Remove high-hazard levee vegetation and vegetation that threaten levee integrity and to allow accreditation of segments of the American River North and South Levees and the Beach Lake Levee. Includes various Conservation Strategy activities.

- **Natomas East Main Drainage Canal/Steelhead Creek Corridor Management Plan (NEMDC/Steelhead Creek CMP)**—Reduce channel roughness, increases floodwater conveyance capacity, and provides essential habitat for salmon and steelhead in NEMDC/Steelhead Creek.

- **High-Hazard Levee Vegetation and Encroachment Removal**—Remove “high-hazard” levee vegetation and encroachments along portions of the NEMDC/Steelhead Creek East Levee; the Arcade Creek North and South Levees, Dry Creek North Levee, and Robla Creek South Levee; American River North and South Levees; and Sacramento River East Levee to meet the National Flood Insurance Program (NFIP) levee accreditation requirements including removal of high-hazard encroachments.

- **The Levee Accreditation Mitigation and Conservation Strategy**—Implement the Conservation Strategy to avoid, minimize, reduce, and mitigate impacts on sensitive habitats and special-status species that may be temporarily or permanently affected by the Levee Accreditation improvements.

**NATOMAS LEVEE IMPROVEMENT PROGRAM PHASE 4B LANDSIDE IMPROVEMENTS PROJECT**

The Natomas Levee Improvement Program (NLIP) Phase 4b Landside Improvements Project EIS/EIR analyzed the environmental impacts of installing cutoff walls; raising levees; constructing erosion repairs; creating and managing habitat; and upgrading, removing, or constructing drainage infrastructure along the Sacramento River East Levee, the American River North Levee, the NEMDC West Levee, the PGCC West Levee, and NCC South Levee. The NLIP Phase 4b Landside Improvements Project DEIS/DEIR (State Clearinghouse No. 2009112025) was circulated for public review and certified by SAFCA in 2010.

The general elements analyzed in the Phase 4b Landside Improvements Project EIS/EIR are summarized below and the environmental impacts and overall level of significance for each issue area of the Phase 4b Landside Improvements Project DEIS/DEIR are summarized in Table C-2 in Appendix C.
► Sacramento River—Construct an adjacent levee with flattened landside slope and cutoff walls, seepage berms, and relief wells, where required, to reduce potential underseepage and seepage through the levee and extend levee raise within Phase 4a Project footprint to address levee height requirements along the Sacramento River East Levee.

► American River—Flatten the slope and install cutoff walls in the American River North Levee from just east of Gateway Oaks Drive to Northgate Boulevard.

► NEMDC—Raise the NEMDC West Levee in place or construct an adjacent levee, flatten slopes, and install cutoff walls from Sankey Road to Elkhorn Boulevard.

► PGCC and NEMDC West Levee—Raise the levee in place or construct a raised adjacent levee and flatten slopes from Howsley Road to Sankey Road on the PGCC West Levee and install a cutoff wall, flatten the west slope, and raise the levee in place or construct an adjacent levee for approximately 500 feet on the NEMDC South Levee, south of Elkhorn Boulevard.

► PGCC and NEMDC West Levee Waterside—Construct erosion repair and rock slope protection at locations where erosion around the outfall structures penetrating the levee has been observed.

► PGCC Culvert I5—Upgrade or remove five culverts that currently drain the area east of the PGCC by passing water under the canal to drainage ditches along the landside of the PGCC West Levee. Depending on the design of the detention basins, pumping stations may be needed to discharge water out of the basins and into the PGCC. Installation of culverts under Pierce-Roberts Drain, Pleasant Grove Creek, and Curry Creek may also be needed to interconnect drainage subbasins.

► State Route (SR) 99 Natomas NCC Bridge—Construct a moveable barrier system or a stoplog gap at the south end of the SR 99 bridges to be used at high river stages to prevent overflow from reaching the landside of the NCC South Levee, modify the bridge deck connections to the supporting piers and abutments as needed to resist uplift pressure during high water stages, install additional seepage remediation consisting of seepage cutoff walls where the bridges cross the NCC South Levee.

► West Drainage Canal—Realign the West Drainage Canal to shift an approximately 1-mile portion, starting at I-5, to an alignment farther south of the Sacramento International Airport Operations Area. Modify the existing canal east of the alignment to reduce bank erosion and sloughing, decrease aquatic weed infiltration, improve RD 1000 maintenance access, and enhance giant garter snake habitat connectivity.

► Riego Road Canal (Highline Irrigation Canal) Relocation—Relocate approximately 4,000 feet of irrigation canal, approximately 250 feet of buried irrigation piping and culverts, and several irrigation turn-out structures away from the proposed levee footprint for the northern segment of the NEMDC West Levee.

► NCC South Levee Ditch—Relocate the Vestal Drain and Morrison Irrigation Canal landward to reduce underseepage potential at the NCC South Levee.

► Modifications to RD 1000 Pumping Plants—Raise and/or replace the discharge pipes for Pumping Plant Nos. 1A and 1B along the Sacramento River East Levee and Pumping Plant Nos. 6 and 8 along the NEMDC West Levee. Construct new outfall structures for Pumping Plant Nos. 6 and 8, requiring dewatering of portions of the NEMDC.

► Modifications to City of Sacramento Sump Pumps—Raise and/or replace the discharge pipes for City Sump 160, City Sump 58, and City Sump 102 (NEMDC West Levee at Gardenland Park). Construct new outfall structures, requiring dewatering of portions of the Sacramento River, the low-flow channel of the NEMDC along the waterside of the American River North Levee, and the NEMDC. Relocate pump stations as needed to accommodate the proposed levee improvements.
Habitat Creation and Management—Enhance connectivity between northern and southern populations of giant garter snake in the Natomas Basin; establish woodlands consisting of native riparian and woodland species in the vicinity of the American River Parkway; create up to 200 acres of managed marsh from Brookfield borrow site; widen and extend the Chappell Ditch south of the borrow site to enhance delivery of surface water; and improve the adjacent Chappell Drain.

Landside Vegetation Removal—Clear vegetation along the Sacramento River East Levee, American River North Levee, and NEMDC West Levee to prepare for Phase 4b Project levee and canal improvement work.

Right-of-Way Acquisition—Acquire lands within the Phase 4b Project footprint along the Sacramento River East Levee, American River North Levee, NEMDC West Levee, PGCC West Levee, and at associated borrow sites.

Encroachment Management—Remove encroachments as required to meet the criteria of USACE, Central Valley Flood Protection Board, and the Federal Emergency Management Agency.

AMERICAN RIVER COMMON FEATURES GENERAL RE-EVALUATION REPORT

The ARCF GRR DEIS/DEIR analyzed the environmental impacts of constructing bank protection and floodwalls, installing cutoff walls, raising levees, and managing levee encroachments along the Sacramento River, the American River, NEMDC, Arcade Creek, Dry/Robla Creek, and Magpie Creek. In addition, the ARCF GRR DEIS/DEIR analyzed the environmental impacts of widening the Sacramento Weir and Bypass. The ARCF GRR DEIS/DEIR (State Clearinghouse No. 2005072046) was circulated for public review in March 2015. The DEIS/DEIR comment period ended on May 18, 2015, but no date has been scheduled for consideration of public release of the FEIS, certification of an FEIR, or issuance of the Record of Decision by USACE.

The general elements analyzed in the ARCF GRR DEIS/DEIR are summarized below and the environmental impacts and overall level of significance for each issue area of the ARCF GRR DEIS/DEIR are summarized in Table C-3 of Appendix C.

American River—Construct bank protection or launchable rock trenches along the north and south American River levees from the Sacramento River upstream for approximately 12 miles.

Sacramento River—Install cutoff walls, construct bank protection, and raise approximately 1 mile of the east levee from the American River to the North Beach Lake levee and construct geotextile reinforced soil embankment levee near the town of Freeport.

NEMDC—Install cutoff walls and construct floodwalls along portions of the east levee from Dry/Robla Creek to the American River.

Arcade Creek—Install cutoff walls and raise floodwalls along the north levee and construct geotextile reinforced soil embankment levee in steep areas on the south levee between NEMDC and Marysville Boulevard.

Dry/Robla Creek—Construct floodwalls along the Dry Creek and Robla Creek Levees.

Magpie Creek Diversion Canal—Raise levees downstream of Raley Boulevard.

Magpie Creek Area—Improvements in the vicinity of Magpie Creek consist of:

• Constructing a new levee and installation of floodgates at two properties on the west side of Raley Boulevard;
• Acquiring property to create a flood detention basin, widening the Raley Boulevard/Magpie Creek Bridge and raising the elevation of the roadway, and removing the Don Julio Creek culvert on the east side of Raley Boulevard; and

• Installing a culvert beneath bike trail embankment, excavating a new channel connecting culvert to Robla Creek, and installing a stone erosion protection in new channel along the Sacramento Northern Bike Trail.

► Sacramento Weir and Bypass—Widen the Sacramento Weir and Bypass by approximately 1,500 feet north of the existing bypass, construct a new section of weir and levee, and remove the existing Sacramento Bypass North Levee.

► Waterside Vegetation Removal—Remove waterside vegetation due to erosion control measures and modifications to pumping plants along the Sacramento River East Levee, NEMDC West Levee, and PGCC West Levee.

SUTTER POINTE SPECIFIC PLAN

The Sutter Pointe Specific Plan EIR addresses controlling flows through gap in the PGCC (Pleasant Grove Creek Canal) levee at Sankey Road (the “Sankey Gap”). The Sutter Pointe Specific Plan EIR (State Clearinghouse No. 2007032157) was circulated for public review and certified by the Sutter County Board of Supervisors on June 30, 2009.

As described in the Sutter Pointe Specific Plan EIR, detention basins and pumping facilities would be constructed as part of the Sutter Pointe Specific Plan project to mitigate for displaced floodplain storage within the Sutter Pointe project site. During high-flow events, water currently flows through the Sankey Gap and is conveyed via overland flow onto a portion of the Sutter Pointe Specific Plan project site.

The Sutter Pointe Specific Plan project involves construction of flood storage basins to the north and south of Sankey Road. These facilities would absorb any increase in rain storm runoff caused by project-related changes in land use in the project area. As any such runoff recedes, these basins would drain by a combination of gravity and dewatering pumps (deployed as needed) to the existing RD 1000 drainage system.

FLORIN CREEK MULTI-USE DETENTION BASIN PROJECT

SAFCA prepared an IS/MND for a project that included construction of two detention basins (up to 8 feet in depth) and associated infrastructure. The two basins, located in Florin Creek Park, were designed to contain 32.5 acre-feet of water, and detain peak flows from a 25 to 100 year storm event on Florin Creek. During storm events, water would flow into the basins from a weir on Florin Creek. This IS/MND (State Clearinghouse No. 2014032030) was circulated for public review from March 12 through April 10, 2014. The SAFCA Board of Directors adopted the Mitigated Negative Declaration on April 17, 2014. As described in the IS/MND, all impacts would be less than significant, or could be mitigated to a less-than-significant level. Mitigation Measures were adopted for air quality, biological resources, cultural resources, greenhouse gas emissions, noise, and transportation and traffic.

4.1.4 SECTION CONTENTS AND DEFINITION OF TERMS

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

► Section 4.2, Agriculture, Forestry, 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
Section 4.17, Mineral Resources
Section 4.18, Greenhouse Gas Emissions
Sections 4.2 through 4.18 follow the same general format:

• “Regulatory Setting,” identifies the plans, policies, laws, ordinances, 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 USACE and/or the U.S. Bureau of 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, regional, and local requirements.

• “Environmental Setting,” provides an overview of the existing physical conditions in the program area at the time the Notice of Preparation (NOP) was published that could be affected by implementation of the proposed program.

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

• “Mitigation Measures,” describes the measures proposed to avoid, minimize, rectify, reduce, or compensate for significant impacts of the program, in accordance with the State CEQA Guidelines (CCR 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 SEIR must describe any feasible measures that could minimize significant adverse impacts, and the measures are to be fully enforceable through incorporation into the program (California Public Resources Code Section 21081.6[b]). Mitigation measures are not required for effects that are found to be less than significant, or beneficial.

• “Conclusion,” describes the significance of impacts after all feasible mitigation measures have been imposed, and identifies any significant impacts that would be unavoidable.

The components of the proposed program would be implemented partly by USACE and partly by SAFCA or its member agencies. Where SAFCA or one of its member agencies is the implementing agency, SAFCA shall implement or provide for implementation of 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.
TERMINOLOGY USED TO DESCRIBE IMPACTS

Impact Levels

This SEIR for this proposed program uses the following terminology to denote the significance of environmental impacts of the proposed program:

► **No impact** indicates that the demolition, construction, and operation and maintenance of the funded facilities would not have any direct or indirect effects on the physical environment. It means no change from existing conditions. This impact level does not need mitigation.

► **A less-than-significant impact** is one that would not result in a substantial or potentially substantial adverse change in the physical environment. This impact level does not require mitigation, even if feasible, under CEQA.

► **A significant impact** is defined by CEQA Section 21068 as one that would cause “a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project.” Levels of significance can vary by funded facility, based on the change in the existing physical condition. Under CEQA, mitigation measures or alternatives to the proposed project must be provided, where feasible, to reduce the magnitude of significant impacts.

► **A potentially significant impact** is one that, if it were to occur, would be considered a significant impact as described above; however, the occurrence of the impact cannot be immediately determined with certainty. For CEQA purposes, a potentially significant impact is treated as if it were a significant impact and requires that mitigation measures or alternatives to the proposed project be provided, where feasible, to reduce the magnitude of potentially significant impacts.

► **A significant and unavoidable impact** is one that would result in a substantial or potentially substantial adverse effect on the physical environment, and that could not be reduced to a less-than-significant level even with any available, feasible mitigation. A significant and unavoidable impact can also result if there are no feasible mitigation measures or alternatives available to reduce the magnitude of the impact to a less-than-significant level. Under CEQA, a project with significant and unavoidable impacts could proceed, but the lead agency would be required to prepare a “statement of overriding considerations” in accordance with State CEQA Guidelines CCR Section 15093, explaining why the lead agency would proceed with the project in spite of the potential for significant impacts.

► **A beneficial impact** is an impact that is considered to cause a positive change or improvement in the environment and for which no mitigation measures are required.

► An impact may have a level of significance that is too uncertain to be reasonably determined, which would be designated **too speculative for meaningful evaluation**, in accordance with State CEQA Guidelines CCR Section 15145. Where some degree of evidence points to the reasonable potential for a significant effect, the SEIR may explain that a determination of significance is uncertain, but is still assumed to be “potentially significant,” as described above. In other circumstances, after thorough investigation, the determination of significance may still be too speculative to be meaningful. This is an effect for which the degree of significance cannot be determined for specific reasons, such as because aspects of the impact itself are either unpredictable or the severity of consequences cannot be known at this time.

Impact Mechanisms

Impact mechanisms are aspects of the proposed changes in the program that could cause impacts, and are described for each issue area in Sections 4.2 through 4.18 and Chapters 5-7. These mechanisms for most part are
construction of the proposed funded facilities, mitigation activities, and activities related to future operations and maintenance, as described in Chapter 3, “Project Description.”

The funded facilities are expected to be completed by SAFCA or other entities in the future, and will be the subject of separate, project-level CEQA (and if warranted NEPA) clearance documents. However, for purposes of the program analysis of this SEIR, program-level environmental impacts fall into the following categories:

► **A temporary impact** would occur primarily during construction activities and could last from several days at one site to up to 2 years, the anticipated duration of construction activities for the proposed funded facilities.

► **A short-term impact** would last from the time construction ceases to within 3 years following construction.

► **A long-term impact** would last longer than 3 years following completion of construction. In some cases, a long-term effect could be considered a permanent impact.

► **A direct impact** is an impact that would be caused by an action and would occur at the same time and place as the action.

► **An indirect impact** is an impact that would be caused by an action but would occur later in time, or at another location, yet is reasonably foreseeable in the future.

In accordance with California Public Resources Code Section 21081.6(a), before the SAFCA Board can approve the proposed changes, it must first certify the SEIR, then it will adopt all feasible mitigation measures and a mitigation monitoring and reporting program (MMRP). The Board will also be required to adopt Findings identifying each significant environmental effect of the proposed project, stating whether feasible mitigation measures have been adopted, and concluding whether or not each significant impact has been mitigated to a less-than-significant level or remains significant and unavoidable. If significant and unavoidable environmental effects remain following mitigation, the Board must adopt a Statement of Overriding Considerations, which describes the benefits of the proposed changes that outweigh the environmental effects. (California Public Resources Code Section 21081.)

The following terms are also used in the impact analysis:

► **Construction** applies to activities associated with ground-disturbance, including any necessary demolition and removal of high-hazard encroachments or other existing structures.

► **No mitigation is required** is stated in the discussion of mitigation if the impact is considered minimal or less than significant and does not require mitigation.

► **No feasible mitigation measures are available** is stated in the discussion of mitigation if the impact is considered significant and unavoidable because there are no feasible mitigation measures available to reduce the magnitude of the impact to a less-than-significant level.
4.2 AGRICULTURE, FORESTRY, AND LAND USE

This section characterizes existing land uses throughout the program area. The Sacramento Area Flood Control Agency (SAFCA), which is a joint powers authority pursuant to the Joint Exercise of Power Act (California Government Code Section 65000), must consider relevant adopted Federal and State land use policies, but is not subject to land use plans, policies, and regulations adopted by cites and countries (California Government Code Section 53090). Nevertheless, relevant regional and local plans and policies are provided in this section to describe the land use planning and policy context and to describe how local agency plans and polices address resource issues in the program area.

This section also addresses agricultural and forestry resources in the program area. It describes Sacramento, Solano, and Yolo Counties’ agricultural land uses; identifies the acreages of agricultural land, including Important Farmland and Grazing Land in the three counties; and describes the factors contributing to the conversion of irrigated agricultural land to nonirrigated uses.

4.2.1 REGULATORY SETTING

FEDERAL

No Federal plans, policies, regulations, or laws related to agriculture, forestry, or land use are relevant to this analysis.

STATE

California Important Farmland Inventory System and Farmland Mitigation and Monitoring Program

The Farmland Mapping and Monitoring Program (FMMP) was established by the State of California in 1982 to continue the Important Farmland mapping efforts begun in 1975 by the U.S. Soil Conservation Service (SCS) (now called the Natural Resources Conservation Service [NRCS], under the U.S. Department of Agriculture). The intent of the SCS was to produce agricultural resource maps, based on soil quality and land use across the nation. The California Department of Conservation (DOC) sponsors the FMMP and also is responsible for establishing agricultural easements, in accordance with California Public Resources Code (PRC) Sections 10250–10255.

The DOC Important Farmland classifications—Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance—recognize the land’s suitability for agricultural production by considering physical and chemical characteristics of the soil, such as soil temperature range, depth of the groundwater table, flooding potential, rock fragment content, and rooting depth. The classifications also consider location, growing season, and moisture available to sustain high-yield crops.

The DOC FMMP maps are updated every 2 years with the use of aerial photographs, a computer mapping system, public review, and field reconnaissance. The following list provides a comprehensive description of all the categories mapped by DOC (DOC 2014:6):

- **Prime Farmland**—Land that has the best combination of physical and chemical features able to sustain long-term agricultural production. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields.

- **Farmland of Statewide Importance**—Land similar to Prime Farmland but with minor shortcomings, such as greater slopes or less ability to store soil moisture.
Unique Farmland—Land of lesser quality soils used for the production of the State’s leading agricultural cash crops. This land is usually irrigated, but may include nonirrigated orchards or vineyards as found in some climatic zones in California.

Farmland of Local Importance—Land that is of importance to the local agricultural economy, as defined by each county’s local advisory committee and adopted by its board of supervisors.

Grazing Land—Land with existing vegetation that is suitable for grazing.

Urban and Built-Up Lands—Land that is used for residential, industrial, commercial, institutional, and public utility structures and for other developed purposes.

Land Committed to Nonagricultural Use—Land that has a permanent commitment to development but has an existing land use of agricultural or grazing lands.

Other Lands—Land that does not meet the criteria of any of the previously described categories and generally includes low-density rural developments, vegetative and riparian areas not suitable for livestock grazing, confined-animal agriculture facilities, strip mines, borrow pits, and vacant and nonagricultural land surrounded on all sides by urban development.

Important Farmland is classified by DOC as Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance. Under CEQA, the designations for Prime Farmland, Farmland of Statewide Importance, and Unique Farmland are defined as “agricultural land” or “farmland” (California PRC Sections 21060.1 and 21095, and State CEQA Guidelines Appendix G).

Williamson Act

The California Land Conservation Act of 1965 (the Williamson Act) is one of the State’s primary agricultural conservation tools. Under this law, local governments can enter into contracts with private property owners to protect land (within agricultural preserves) for agricultural and open space purposes. Williamson Act contracts are required to be a minimum initial term of 10 years, and are automatically extended each year for an additional year, unless either party (landowner or the contracting city or county) notifies the other of the intent not to renew the contract. 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 is unaffected by its development potential.

The Williamson Act addresses “compatible” uses. Section 51238.1 of the California Code of Regulations (CCR), states that uses approved on contracted lands shall be consistent with all of the following principles of compatibility.

- The use will not significantly compromise the long-term productive agricultural capability of the subject contracted parcel or parcels or on other contracted lands in agricultural preserves.
- The use will not significantly displace or impair current or reasonably foreseeable agricultural operations on the subject contracted parcel or parcels or on other contracted lands in agricultural preserves.
- The use will not result in the significant removal of adjacent contracted land from agricultural or open-space use.

REGIONAL AND LOCAL

Sacramento River Parkway Plan

The Sacramento River Parkway Plan (1997) (Parkway Plan) was adopted by the City of Sacramento on October 21, 1997. The Parkway Plan is a 20-year policy guide for habitat preservation and restoration and recreational
development for lands adjacent to the Sacramento River in South Natomas, downtown Sacramento, Land Park, the Pocket area, and Freeport. The Sacramento River Parkway (Parkway) is envisioned as a major recreational and public access resource, linking to the American River Parkway. The goals of the Sacramento River Parkway Plan are to:

- recognize the multiple use aspect of the Sacramento River Parkway for recreation, habitat preservation, and flood control;
- preserve, protect, and enhance the natural and cultural resources of the Parkway;
- provide appropriate access and facilities for the enjoyment of the Parkway by present and future generations;
- create a continuous, lineal on-River Parkway with a bicycle and pedestrian trail along the Sacramento River from the city limits at Interstate Highway 80 (I-80) and Garden Highway in South Natomas to the City limits at Freeport; until such time that all of the Parkway lands are under public ownership, the goal is to provide a continuous lineal parkway on and off-River by using an Interim Bypass Trail; and
- establish development policies and implementation measures for the development of the Sacramento River Parkway.

Relevant Policies

The following policies from the Sacramento River Parkway Plan (1997) regarding land use and planning apply to the proposed program.

- **Policy G6:** The Parkway shall be protected from injurious or incompatible elements associated with adjacent land uses.
- **Policy G7:** Land adjacent to the Parkway shall be protected from injurious or incompatible elements associated with Parkway land uses.
- **Policy E4:** Close portions of the Parkway as needed to restore eroded areas.

Land Use Designations

The Sacramento River Parkway Plan (1997) identifies land use designations for both public and private property within the boundaries of the Parkway. These land use designations are intended to provide a long-range vision of the Parkway, to provide priorities for acquisition, and to plan for Sacramento River Parkway development should private property become public. The Sacramento River Parkway Plan land use designations are the main land use policy for the Parkway and regulate the types of land uses, location, and level of facility development or degree of natural resource protection within the Parkway.

The portion of the Sacramento River Parkway adjacent to the Sacramento River East Levee in the program area is designated as Nature Study, Recreation Area, and Urban and Waterfront Recreation. These land use designations are described below (City of Sacramento 1997:41, 42).

- **Nature Study.** This designation includes riparian habitat, areas suitable for riparian habitat restoration, and environmentally sensitive areas with special habitat and topographic characteristics. The Nature Study designation allows for nature study, habitat restoration, passive recreation, and trails where they will not directly impact riparian habitat.

- **Recreation Area.** This designation applies to most major parks and vehicle access areas. The Recreation Area designation allows for nature study, pedestrian use, bicycling, picnicking, field athletics, open play, and fishing.
► **Urban Waterfront Recreation.** This designation applies to areas of moderate to heavy river-related improvements, development and uses that provide opportunities for public access, commercial, and recreational activities for residents, employees, and visitors along the Sacramento River. The Urban Waterfront Recreation designation allows for bicycling, public gathering areas, walking, boating, fishing, short-term boat docking, marinas, restaurants, and other river-related commercial uses.

**Sacramento County General Plan**

Project activities proposed in unincorporated Sacramento County would be consistent with the *Sacramento County General Plan of 2005–2030* (Sacramento County 2011). The Sacramento County General Plan was adopted by the County Board of Supervisors on November 9, 2011. The Sacramento County General Plan provides an inventory of land supply within the County, and projects the amount and location of land and density, and intensity of development that will be required to accommodate future populations and economic growth through 2030. No Sacramento County General Plan goals and policies related to agriculture and land use are relevant to this analysis.

**Sacramento County General Plan Land Use Designation and Zoning**

Those portions of the program study that are located in unincorporated Sacramento County are designated by the Sacramento County General Plan as Agricultural Residential. The Sacramento County General Plan describes this land use designation as follows (Sacramento County 2011).

► **Agricultural Residential.** This designation provides for rural residential uses, such as animal husbandry, small-scale agriculture, and other limited agricultural activities. This designation is typical of established rural communities, and densities between 1 and 10 acres per unit are allowed, resulting in a development density of 2.5 to 0.25 persons per acre.

These areas are zoned by the County as A (Agricultural) and F (Flood). These zoning codes are defined as follows:

► The A zoning code is used to restrict the use of land primarily to agriculture and farming. It is also considered an open space zone. Property in this zone will be considered for reclassification when proposed for urban development that is consistent with the general plan.

► The F zoning code is used to conditionally permit specified uses along the Sacramento and American Rivers and their tributaries, and other areas subject to inundation. This is considered an open space zone.

**City of Sacramento General Plan**

Project activities proposed in the City of Sacramento would be consistent with the adopted *City of Sacramento 2035 General Plan* (City of Sacramento 2015). The City General Plan was adopted by the City Board of Supervisors on March 3, 2015. The City General Plan contains goals and policies related to land use and urban design; historic and cultural resources; economic development; housing; mobility; utilities; education, recreation, and culture; public health and safety; environmental resources; and environmental constraints. No City of Sacramento General Plan goals and policies related to agriculture and land use are relevant to this analysis. The City has a program in which it works with SAFCA and other responsible agencies to resolve floodplain restrictions.

**City of Sacramento Land Use Designation and Zoning**

Those portions of the program study that are located in the City of Sacramento are designated by the City General Plan as Parks and Recreation. These land use designation is described below (City of Sacramento 2015).
Parks and Recreation. This designation includes greenways, large developed parks, and other areas primarily used for recreation. Typically, these areas are characterized by a high degree of open area and a limited number of buildings.

These areas are zoned by the City of Sacramento as F (Flood). This zoning code is defined as follows:

- The F zoning code is used to conditionally permit specified uses along the Sacramento and American Rivers and their tributaries, and other areas subject to inundation. The F zoning code is also considered an open space zone.

Solano County General Plan

Project activities proposed in the Solano County portion of the program area would be consistent with the adopted Solano County General Plan (Solano County 2008). The County General Plan was adopted by the County Board of Supervisors on August 5, 2008 and approved by County voters on November 4, 2008. The County General Plan establishes long-term policies and provides a guide for day-to-day decision making. The goals, policies, and programs of the General Plan are intended to shape growth and development within the county and protect its agricultural and natural resources.

The following policy from the Public Health and Safety Chapter of the Solano County General Plan (2008) related to agriculture and land use is relevant to this analysis.

- **Policy HS.P-9**: Preserve open space and agricultural areas that are subject to natural flooding and are not designated for future urban growth; prohibit permanent structures in a designated floodway where such structures could increase risks to human life or restrict the carrying capacity of the floodway.

Solano County Land Use Designation and Zoning

Those portions of the program area that are located in Solano County are designated by the County General Plan as Agriculture. This land use designation is described below (Solano County 2008).

- **Agriculture.** This designation is intended to provide for areas for the practice of agriculture as the primary use, including areas that contribute to the local agricultural economy, and allows for secondary uses that support the economic viability of agriculture. This land use designation is also intended to protect agricultural areas from intrusion by nonagricultural uses and other uses that do not directly support the economic viability of agriculture.

This area is zoned by the County as A (Exclusive Agricultural). This zoning code is defined as follows:

- The A zoning code is intended to preserve agriculture throughout the county, including allowing agricultural-related support uses and protecting the viability of the family farm.

City of Rio Vista General Plan

The City of Rio Vista General Plan 2001 was adopted on July 18, 2002. Rio Vista’s General Plan incorporates “performance” policies, standards, and implementing actions that dictate levels of service, performance thresholds, and other specific indicators, including design criteria, to achieve the type of community the city is seeking (City of Rio Vista 2002). No City of Rio Vista General Plan policies related to agriculture and land use are relevant to this analysis.
City of Rio Vista Land Use Designation and Zoning

Those portions of the program area that are located in south of State Route (SR) 12 in the City of Rio Vista are designated by the City General Plan as Downtown/Waterfront. This land use designation is described below (City of Rio Vista 2002).

► Downtown/Waterfront. This designation is intended to preserve and strengthen the original downtown and historic community. The designation allows community- and regional-serving activities as well as commercial, public, employment, and higher density residential.

This area is zoned by the City as D-W (Downtown Waterfront District). This zoning code is defined as follows:

► The D-W zoning code is intended to implement the goals, policies, objectives and regulations of the Waterfront Specific Plan.

City of Rio Vista Waterfront Specific Plan

In 2007, the City developed a Waterfront Specific Plan. This plan established the framework for redevelopment of approximately 15 acres of land in downtown Rio Vista along the west bank of the Sacramento River from Main Street to SR 12. Some of the guiding principles of the plan included: connecting the City to the waterfront, incorporating mixed-use neighborhoods, providing walkable streets, and establishing an attractive public waterfront promenade and green space area. The plan acknowledged that, without adequate flood control, new development would be subject to flooding. (City of Rio Vista 2007.)

Yolo County General Plan

Project activities proposed in the Yolo County portion of the program area would be consistent with the adopted 2030 Countywide General Plan (Yolo County 2009). The County General Plan was adopted by the County Board of Supervisors on November 10, 2009. The general objective of the Yolo County General Plan is to guide decision-making in the unincorporated areas in the County toward the best use of land within the County that combines minimum efficient urbanization with the preservation of productive farm resources and open space amenities. The County General Plan contains goals and policies related to land use and community character, circulation, public facilities and services, agriculture and economic development, conservation and open space, and health and safety.

The following policy from the Conservation and Open Space Element of the Yolo County General Plan (2009) related to agriculture and land use is relevant to this analysis.

► Policy CO-1.28: Balance the needs of agriculture with recreation, flood management, and habitat, within the Yolo Bypass.

Yolo County Land Use Designation and Zoning

Those portions of the program area that are located in Yolo County are designated by the County General Plan as Agricultural. This land use designation is described below (Yolo County 2009).

► Agriculture. This designation is intended to provide a full range of cultivated agriculture, such as row crops, orchards, vineyards, dryland farming, livestock grazing, forest products, confined animal facilities, and equestrian facilities; agricultural industrial uses, such as agricultural research; and agricultural commercial uses, such as roadside stands, wineries, and farm-based tourism.

These areas are zoned by Yolo County as Agricultural Intensive (A-N) and Public Open Space (POS). These zoning codes are defined as follows:
The A-N zoning code is intended to preserve lands best suited for intensive agricultural uses typically dependent on higher quality soils, water availability, and relatively flat topography. The purpose of the zone is to promote those uses, while preventing the encroachment of nonagricultural uses. Uses in the A-N zone are primarily limited to intensive agricultural production and other activities compatible with agricultural uses.

The POS zoning code is intended to recognize major publicly-owned open space lands, major natural water bodies, agricultural buffer areas, and habitat preserves. The POS lands are characterized by passive or low management uses.

Lower Sacramento/Delta North Region: Corridor Management Framework

The Lower Sacramento/Delta North Region: Corridor Management Framework (CMF) is a policy document adopted by Yolo County, Solano County, SAFCA, the West Sacramento Area Flood Control Agency, Reclamation District No. 2068 (RD 2068), and the Solano County Water Agency. The purpose of the CMF is to promote a locally preferred approach to achieving federal, state and local policy objectives in the Yolo Bypass and the floodplain corridor surrounding the bypass. These policy objectives include the ability to (1) provide essential conveyance capacity and improve the resilience, reliability and adaptability to climate change of the flood system, (2) preserve agricultural land and promote a strong, sustainable agricultural economy; and, (3) conserve and improve functionality of aquatic and terrestrial species habitat consistent with the paramount flood management purpose of the system. To the extent that flood or habitat related activities cannot be designed to avoid impacts to agricultural productivity, the CMF calls for purchase of mitigation lands and/or creation of conservation easements at the ratio required by the host county; payment of in-lieu fees, if conservation easements are not established; development of programs and projects that directly mitigate impacts to diminished agricultural capacity and reduced economies of scale; and contribution to an Agricultural Sustainability Fund.

4.2.2 Environmental Setting

Agricultural Resources

Sacramento County

Approximately 60 percent of the Natomas Basin is in some form of developed agricultural or open space use in unincorporated areas of northern Sacramento County. Rice is the most common crop and is generally grown over large areas of contiguous land north of Elkhorn Boulevard, although the amount of land in active rice production has greatly diminished in recent years and many former rice fields are now fallow or support grain crops, such as wheat (U.S. Army Corps of Engineers [USACE] 2009:3-66).

Within the City of Sacramento, the majority of agricultural lands have been converted to nonagricultural uses. The City is mostly urbanized, with limited amounts of active commercial agricultural lands remaining that support large-scale operations. Agricultural activity is located, to a large extent, in the northwestern portion on the City, north of I-80 and west of Interstate Highway 5 (I-5), and in the southernmost portion of the City, in the vicinity of the Town of Freeport (City of Sacramento 2014).

Sacramento County Farmland Conversion

DOC estimated that Sacramento County had approximately 367,569 acres of agricultural land in 2010, of which approximately 211,745 acres were identified as Important Farmland and an estimated 155,824 acres were identified as Grazing Land (DOC 2012a). Table 4.2-1 summarizes the most recent DOC farmland conversion data, identifies the 2010 and 2012 acreages of agricultural land in Sacramento County, and shows the net change in acreage over the 2-year period. Overall, the total acreage of Important Farmland decreased by approximately 1 percent between 2010 and 2012, and the total acreage of agricultural land decreased by 0.9 percent over the 2-year period (Table 4.2-1).
DOC’s 2012 Field Report for Sacramento County identifies the factors contributing to changes in agricultural land uses during the DOC 2010–2012 farmland conversion update cycle. According to the 2012 Field Report, irrigated Important Farmland (i.e., Prime Farmland, Farmland of Statewide Importance, or Unique Farmland) was converted to Farmland of Local Importance and grazing land by leaving formerly irrigated land idle for three or more update cycles or conversion of irrigated uses to cultivation of nonirrigated grain crops. Additional Important Farmland was converted to Urban and Built-Up Land because of development of solar facilities located mainly in and around the Cities of Galt and Elk Grove and construction of residential development in the City of Elk Grove. Conversion of Important Farmland to Other Land resulted from land left idle for three or more update cycles, construction of rural residences and commercial uses, and land converted to wetlands and other natural vegetation (DOC 2012b).

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<tbody>
<tr>
<td>Prime Farmland</td>
<td>97,477</td>
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<td>Farmland of Statewide Importance</td>
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<td>Unique Farmland</td>
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<tr>
<td>Important Farmland Subtotal</td>
<td>211,745</td>
<td>209,541</td>
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<tr>
<td>Grazing Land</td>
<td>155,824</td>
<td>154,746</td>
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<tr>
<td>Agricultural Land Total</td>
<td>367,569</td>
<td>364,287</td>
<td>-3,282</td>
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Table 4.2-1. Summary of Agricultural Land Conversion in Sacramento County, 2010–2012

Based on the Sacramento County Important Farmland map, published by DOC’s Division of Land Resource Protection, the land adjacent to Sacramento River East Levee within the City of Sacramento is designated as Urban and Built-Up Land and land in the vicinity of the Town of Freeport within Sacramento County is designated as Prime Farmland (DOC 2014a).

**Solano County**

Agriculture has historically been an important industry in Solano County and a central part of the County’s identity. Agricultural lands account for more land than any other land use in the County. Agriculture also contributes to the regional economic health and prosperity, defines much of the County’s visual character, supports wildlife habitats and migration corridors, provides open space and recreational amenities for residents and visitors, and separates urban land uses defining the County’s cities. (Solano County 2008: AG-1.) The portion of the Yolo Bypass in Solano County is surrounded by agricultural lands consisting primarily of row crops.

Rio Vista has a strong orientation to the Sacramento River and to the rich agricultural lands of the Central Valley. Locally, the Montezuma Hills are farmed in a method known as “dry land farming,” producing grain and grass crops without expensive irrigation (City of Rio Vista 2002:9-6). There are no agricultural uses in the vicinity of the proposed program area.

**Solano County Farmland Conversion**

DOC estimated that Solano County had approximately 356,654 acres of agricultural land in 2010, of which approximately 147,461 acres were identified as Important Farmland and 209,193 acres were identified as Grazing Land (DOC 2012c). Table 4.2-2 summarizes the most recent DOC farmland conversion data, identifies the 2010 and 2012 acreages of agricultural land in Solano County, and shows the net change in acreage over the 2-year period. Overall, the total acreage of Important Farmland decreased by approximately 0.7 percent between 2010
and 2012, and the total acreage of agricultural land decreased by 0.02 percent over the 2-year period (Table 4.2-2).

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<tbody>
<tr>
<td>Prime Farmland</td>
<td>131,819</td>
<td>130,548</td>
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<td>Farmland of Statewide Importance</td>
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<td>Unique Farmland</td>
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<td><strong>Important Farmland Subtotal</strong></td>
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<td>Grazing Land</td>
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<td><strong>Agricultural Land Total</strong></td>
<td><strong>356,654</strong></td>
<td><strong>356,566</strong></td>
<td><strong>-88</strong></td>
<td><strong>-0.02</strong></td>
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</tbody>
</table>

Source: DOC 2012c

DOC’s 2012 Field Report for Solano County identifies the factors contributing to changes in agricultural land uses during the DOC 2010–2012 farmland conversion update cycle. According to the 2012 Field Report, irrigated Important Farmland (i.e., Prime Farmland, Farmland of Statewide Importance, or Unique Farmland) was converted to non-irrigated land uses and Other Land by leaving formerly irrigated land idle for three or more update cycles. Additional Important Farmland was converted to Urban and Built-Up Land because of development of solar facilities located mainly in and around the Cities of Vacaville and Fairfield (DOC 2012d).

Based on the Solano County Important Farmland map, published by DOC’s Division of Land Resource Protection, the majority of the Yolo Bypass in Solano County is designated as Prime Farmland, Farmland of Statewide Importance and Unique Farmland (DOC 2014b).

**Yolo County**

Agriculture has formed Yolo County’s economy and way of life since the County’s founding in 1850. Over 85 percent of County land in agriculture, including a growing number of diversified small farms (e.g., truck farms), as well as thriving livestock operations. Additionally, many farmers are implementing new models for farm operation, crop choice, and mix and marketing. The County continues to see growth in higher value crops, organic products, wine grapes and wineries, olives and specialty products such as grass fed beef (Yolo County 2009). Large tracts of agricultural land uses are located adjacent to the Sacramento Bypass and Yolo Bypass within the program area.

**Yolo County Farmland Conversion**

DOC estimated that Yolo County had approximately 368,531 acres of agricultural land in 2012, of which approximately 250,693 acres were identified as Important Farmland and 163,640 acres were identified as Grazing Land (DOC 2014c). Table 4.2-3 summarizes the most recent DOC farmland conversion data, identifies the 2012 and 2014 acreages of agricultural land in Yolo County, and shows the net change in acreage over the 2-year period. Overall, the total acreage of Important Farmland decreased by approximately 0.8 percent between 2012 and 2014, and the total acreage of agricultural land decreased by 0.1 percent over the 2-year period (Table 4.2-3).

DOC’s 2014 Field Report for Yolo County identifies the factors contributing to changes in agricultural land uses during the DOC 2012–2014 farmland conversion update cycle. According to the 2014 Field Report, irrigated Important Farmland (i.e., Prime Farmland, Farmland of Statewide Importance, or Unique Farmland) was converted to nonirrigated farmland by leaving formerly irrigated land idle for three or more update cycles or conversion of irrigated uses to cultivation of nonirrigated grain crops. Additional Important Farmland was converted to Urban and Built-Up Land because of development of solar facilities located southeast of the City of
Davis and construction of residential development mainly in the Cities of Davis and Woodland. Conversion of Important Farmland to Other Land resulted from conversion of irrigated farmland to wetlands and other protected habitat in the Yolo Bypass Wildlife Area (DOC 2014d).

Table 4.2-3. Summary of Agricultural Land Conversion in Yolo County, 2012–2014

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Prime Farmland</td>
<td>250,693</td>
<td>250,345</td>
<td>-348</td>
<td>-0.1</td>
</tr>
<tr>
<td>Farmland of Statewide Importance</td>
<td>17,298</td>
<td>18,861</td>
<td>1,563</td>
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<tr>
<td>Unique Farmland</td>
<td>42,403</td>
<td>44,604</td>
<td>2,201</td>
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<tr>
<td>Farmland of Local Importance</td>
<td>58,137</td>
<td>51,725</td>
<td>-6,412</td>
<td>-12.4</td>
</tr>
<tr>
<td><strong>Important Farmland Subtotal</strong></td>
<td><strong>368,531</strong></td>
<td><strong>365,535</strong></td>
<td><strong>-2,966</strong></td>
<td><strong>-0.8</strong></td>
</tr>
<tr>
<td>Grazing Land</td>
<td>263,640</td>
<td>266,367</td>
<td>2,727</td>
<td>0.1</td>
</tr>
<tr>
<td><strong>Agricultural Land Total</strong></td>
<td><strong>532,171</strong></td>
<td><strong>531,902</strong></td>
<td><strong>-269</strong></td>
<td><strong>-0.1</strong></td>
</tr>
</tbody>
</table>

Source: DOC 2014c

Based on the Yolo County Important Farmland map, published by DOC’s Division of Land Resource Protection, the majority Sacramento Weir, Sacramento Bypass, and Yolo Bypass is designated as Important Farmland (DOC 2014e, USACE 2015).

LAND USE

Sacramento/Yolo Bypass North of Sacramento (Elkhorn Basin)

The Sacramento Weir, Sacramento Bypass, and the Elkhorn Basin are all located in Yolo County all of which are designated by the Yolo County General Plan as Agriculture and zoned A-N (Agricultural Intensive) and Public Open Space (POS).

The Sacramento Weir is located along the west bank of the Sacramento River approximately 2 miles upstream from the confluence with the American River. The California Highway Patrol (CHP) Academy and CHP airport are located immediately adjacent to and south of the Sacramento Bypass. The land north, west, and southwest of the Sacramento Bypass consists of agricultural fields. Immediately opposite the Sacramento Bypass and the Sacramento Weir, on the east side of the river, are private residences with boat docks that line the river. Scattered rural residences are located on the west side of the river between the Sacramento Bypass and I-5, in the vicinity of the proposed new Bypass setback levees and the proposed Yolo County Road 124 relocation. Garden Highway is adjacent to the river on the east side.

A portion of the Sierra Northern Railway railroad tracks are located on top of the Sacramento Weir, on the west side of Old River Road. The Sierra Northern Railway operates the Sacramento River Train, which offers dinner excursion trips along the 16-mile “Woodland Branch Line” between Woodland and West Sacramento.

The approximately 360-acre Sacramento Bypass Wildlife Area is an important cover and feeding area for wildlife during late fall, winter, and early spring. Game birds, raptors, songbirds, and native mammals are present. The adjacent Tule Canal has white sturgeon, white catfish, and black crappie while nearby borrow pits have largemouth bass, bluegill, and white catfish. Recreational activities include fishing; wildlife viewing; bird watching; and hunting for waterfowl (when the area is flooded), ring-necked pheasant, and mourning dove. The wildlife area is administered by California Department of Fish and Wildlife (CDFW). (CDFW 2015a.)

The Yolo Bypass begins at the Freemont Weir, which is approximately 1.7 miles southeast of Verona, and runs south for approximately 37 miles before rejoining the Sacramento River above Rio Vista. Scattered rural
residences are located in the vicinity of the bypass. The only large area of urban development near the bypass is on the west side of West Sacramento on both sides of I-80; this development consists of industrial and commercial land uses along Enterprise Drive, West Capitol Avenue, and Riverside Parkway.

The approximately 16,600-acre Yolo Bypass Wildlife Area is owned by the State of California and operated by the CDFW. The Yolo Bypass Wildlife Area is located in southern Yolo County, approximately 3 miles east of the City of Davis, and is accessed by County Road 32A. Because of its location within the Pacific Flyway, the Yolo Bypass Wildlife Area offers unique opportunities for birdwatching. Hunting is permitted between September 1 and January 31 and game species include waterfowl (when the area is flooded), ring-necked pheasant, and mourning dove. (CDFW 2015b.)

Sacramento River East Levee

The Sacramento River East Levee is designated by the City of Sacramento General Plan as Parks and Recreation and is zoned F (Flood) in the program area, extending from approximately the U.S. Highway 50 crossing to the southern end of the Pocket area, near the junction of I-5 and Freeport Boulevard.

In the Sacramento River East Levee area, the Sacramento River Parkway has been proposed along the entire length of the levee where program-related improvements are also proposed. However, only certain portions of the Parkway have been designated for pedestrian and bicycle use and. Developed portions of the parkway accommodate pedestrians and bicyclists, and provide access to the Sacramento River. The Sacramento River Parkway currently has gaps in various segments: South Natomas (south of the Garden Highway), Old Sacramento (I Street to Capitol Mall), Broadway to Miller Park, the Little Pocket, Greenhaven/Middle Pocket, and a connection from the City’s southern tip to Freeport Boulevard. In these areas, the underlying fee ownership of the levee belongs to the property owner and the State holds a flood control easement over the levee and extending 10 feet from the landside toe for levee operation and maintenance. In such areas, there are several fences running across the levee with locked gates that hamper access. (City of Sacramento 2014.)

The Sacramento Southern Railroad operates the Excursion Train from April through September. The train departs from the Central Pacific Railroad Freight Depot in Old Sacramento (Front Street, between J and K Streets) and travels about 3 miles along the Sacramento River East Levee crown, within the Sacramento River East Levee Improvements area, to a turnaround location at Land Park where it then returns to the freight depot.

The northern portion of the Sacramento River East Levee area within the parkway consists of industrial development, the California Automobile Museum, and diesel and gasoline fuel storage tanks and associated pipelines operated by Chevron and Union 76.

Miller Park is also in the northern portion of the Sacramento River East Levee and the park includes the Sacramento Marina. A paved pedestrian/bicycle path circles around the marina, and travels through the area. The Sacramento River itself is accessible throughout the west side of Miller Park.

The “Little Pocket” area is heavily urbanized and contains residential development across the street on the east side of the levee all the way around the river bend. The Westin Hotel and Scott’s Seafood Restaurant with an associated boat dock are located on Captain’s Table Road. Several apartment complexes are located south of the Westin Hotel.

The Pocket-Greenhaven area is heavily urbanized and consists of residential land uses that are generally located along the toe of the levee. Seymour Park, which is a beltway park that includes lighted pathways and a playground; Garcia Bend Park, which includes soccer fields, tennis courts, a playground, picnic areas, and boat ramp; and Shore Park, which includes a picnic area and provides access to the Sacramento River Parkway, are located within the portion of the Sacramento River East Levee. (City of Sacramento Parks and Recreation 2009.)
Southern Yolo Bypass

The RD 2068 levee is located in the unincorporated area of Solano County, in the southern Yolo Bypass. The area adjacent to the RD 2068 levee is designated by the Solano County General Plan as Agriculture and zoned A (Exclusive Agricultural).

The RD 2068 levee is surrounded by agricultural lands consisting primarily of row crops, irrigation canals and ditches, and occasional rural residences with associated landscaping (including mature shade trees).

Rio Vista

The proposed floodwall would be constructed at the eastern edge of the City of Rio Vista. The area adjacent to the existing floodwall within the program area is designated by the City of Rio Vista General Plan as Downtown/Waterfront and is zoned D-W (Downtown Waterfront District).

In the program area, industrial land uses occur immediately south of SR 12. The City of Rio Vista Main Street Public Dock and Boat Launch is located east of Main Street at the end of Montezuma Street and provides boat launching and fishing. The City’s Waterfront Promenade is located east of Main Street and adjacent to City Hall. The Waterfront Promenade accommodates pedestrians and bicyclists and provides fishing dock, a fish cleaning station, picnic tables, BBQs, restrooms, and drinking fountains (City of Rio Vista 2015).

The former Army Reserve Base is located north to the Rio Vista Bridge at SR 12. The Montezuma Hills lie to the west and south of the City. Residential land uses, including historic neighborhoods, are located west of SR 12 along Edgewater Drive. State Route 160 (River Road) parallels the river, except for several areas where privately owned parcels have been developed in various uses. (City of Rio Vista 2002: Chapter 9.)

4.2.3 ENVIRONMENTAL IMPACTS

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, as amended. The proposed program would have a significant impact on agriculture and land use 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 impact;
► conflict with any applicable habitat conservation plan or natural community conservation plan;
► convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the FMMP of the California Resources Agency, to nonagricultural use;
► conflict with existing zoning for agricultural use or a Williamson Act contract;
► conflict with existing zoning for, or cause rezoning of, forestland (as defined in PRC Section 12220[g]), timberland (as defined by PRC Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104[g]);
► result in the loss of forestland or conversion of forestland to nonforest use; or
involve other changes in the existing environment that, because of their location or nature, could result in conversion of Farmland to nonagricultural use or conversion of forest land to nonforest use.

There are no adopted habitat community plan or natural community conservation plan that would affect the funded facilities. Therefore, no conflicts with any applicable habitat conservation plan or natural community conservation plan would occur.

The program area is not zoned as forestland, timberland, or a Timberland Production Zone. Thus, implementing the program components would not conflict with existing zoning for, or cause rezoning of, forestry resources and this impact is not evaluated further in this SEIR.

Appendix G of the State CEQA Guidelines also defines forestland as land that can support 10 percent native tree cover and woodland vegetation of any species—including hardwoods—under natural conditions, and that allows for management of one or more forest resource—including timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation—and other public benefits (California PRC 12220[g]). Within the program area, riparian habitat could satisfy the requirements of California PRC Section 12220(g). Issues associated with the loss of riparian habitat from implementation of the program components are evaluated in Section 4.7, “Terrestrial Biological Resources.”

**IMPACT ANALYSIS**

**Impact AG-1 Conversion of Agricultural Land, including Important Farmland, to Nonagricultural Uses.** There are no agricultural land uses in the program area where construction of rock bank protection and launchable rock trenches along the Sacramento River East Levee or where construction of the new floodwall in the City of Rio Vista would occur. Existing agricultural land uses would not change substantially in the areas with new setback levees in the expanded Yolo and Sacramento Bypasses. However, incorporation of currently protected farmland into the Yolo and Sacramento Bypass Systems could diminish the agricultural productivity of the affected land. In addition, establishment of a woodland corridor along the eastern edge of the Tule Canal south of Interstate 5 would preclude continued use of several hundred acres of farmland for agricultural production. Therefore, implementation of the proposed program could result in the conversion of agricultural land, including Important Farmland, to nonagricultural uses. This impact would be potentially significant.

Construction of rock bank protection and launchable rock trenches (trenches filled with large rocks, located along the waterside levee toe) along the Sacramento River East Levee would occur within the existing footprint or on the waterside of the Sacramento River East Levee, and construction of the new floodwall in Rio Vista would occur within the footprint of the existing floodwall. In addition, there are no agricultural land uses within this portion of the program area. Therefore, implementation of these project components would not result in the conversion of agricultural land, including Important Farmland, to nonagricultural uses.

Lengthening the Sacramento Weir and construction of new setback levees would occur on active agricultural land that is designated as Important Farmland (DOC 2014b, 2014c; USACE 2015). However, agricultural operations would be restored within the footprints of the existing levees, which would be removed, and would generally replace lost agricultural function in the footprint of the new setback levees. Although agricultural uses might be temporarily disrupted, and certain agricultural operations would be more or less appropriate in areas subject to seasonal inundation within the expanded bypasses, there would be no permanent discontinuation of agricultural land uses related to the construction of the setback levees. Therefore, although implementation of these program components would not convert additional agricultural land, including Important Farmland, to nonagricultural uses, the land subjected to seasonal inundation could experience diminished agricultural productivity. In addition, establishment of a woodland corridor along the eastern edge of the Tule Canal could result in conversion of several hundred acres of agricultural land to a nonagricultural use. This impact would be potentially significant.
Conflict with a Williamson Act Contract. Construction of the funded facilities would not preclude the continuation of agricultural activities on lands under Williamson Act contracts, and no conflicts with an existing Williamson Act Contract would occur. There would be no impact.

None of the land in the City of Sacramento or City of Rio Vista is held under a Williamson Act Contract. Within the Sacramento and Yolo Bypasses, most of the land in the program area is held under Williamson Act Contract. However, construction of new setbacks levees in these areas would not require cancellation of Williamson Act Contracts. In addition, CCR Section 51238.1 states that uses on parcels under Williamson Act Contracted-land cannot compromise the long-term productive agricultural capability of the parcel, displace or impair current or reasonably foreseeable agricultural operations, or result in the removal of adjacent contracted land from agricultural use. Because construction of the new setback levees would not preclude the continuation of agricultural activities on the remainder of the property or adjacent properties, no conflicts with an existing Williamson Act Contract would occur. Thus, the proposed program would not conflict with the existing Williamson Act Contract or result in the cancellation of a Williamson Act Contract. There would be no impact.

Consistency with Adopted Policies, Land Use Designations, and Zoning Codes. Implementation of the proposed program would be consistent with adopted plan land use policies, land use designations, and zoning. This impact would be less than significant.

Construction of rock bank protection and launchable rock trenches along the banks of the Sacramento River East Levee would occur within the existing levee footprint in areas designated by the City of Sacramento General Plan as Parks and Recreation and zoned F (Flood). In addition, the Sacramento River East Levee is adjacent to the Sacramento River Parkway and is designated by the Parkway Plan as Nature Study, Recreation Area, and Urban Waterfront Recreation. No City of Sacramento General Plan goals and policies related to land use are relevant to this analysis. However, construction of rock bank protection and launchable rock trenches along the levee would support Sacramento River Parkway Plan Policies G6 and G7, which are intended ensure the Sacramento River Parkway is protected from injurious or incompatible elements associated with adjacent land uses, and Policy E4, which supports closure of portions of the Parkway as needed to restore eroded areas. Levee improvements would increase the levee’s resistance to erosion, provide better overall levee stability, and provide additional flood protection for adjacent land uses. Furthermore, implementation of these program components would not permanently change or hinder recreational uses of the developed portions Sacramento River Parkway that accommodate pedestrians, bicyclists, and provide access to the Sacramento River or result in other changes in land use that would cause inconsistencies with the City of Sacramento and Sacramento River Parkway Plan land use designations for the Sacramento River East Levee. (SAFCA 2015.)

Lengthening the Sacramento Weir and construction of new setback levees within the Sacramento and Yolo Bypasses would occur on land designated by the Yolo County General Plan as Agriculture and zoned A-N (Agricultural Intensive) and Public Open Space (POS). This portion of the program area consists of agricultural fields and is in the vicinity of the Yolo Bypass Wildlife Area. As discussed in Impact AG-1, the existing agricultural land use would continue in the areas affected by new setback levees. In addition, these program components would support Policy CO-1.28 of the Yolo County General Plan that supports balancing the needs of agriculture with flood management in the Yolo Bypass. Therefore, implementation of these program components would not cause inconsistencies with the Yolo County General Plan land use designation and zoning for the Sacramento Weir, Sacramento Bypass, and Yolo Bypass.

Borrow material for construction of the setback levees would be provided by excavation of benches along the eastern edge of the Tule Canal. The Tule Canal is adjacent to the Sacramento Bypass Wildlife Area and the canal is used for fishing. The use of the canal for borrow material could temporarily prevent the recreational use of this area. After construction is complete, a woodland corridor would be established along the eastern edge south of I-5 and recreational uses could be resumed. Therefore, use of the Tule Canal for borrow material and establishment of a woodland corridor would not change the long-term overall recreational uses along the Tule Canal or within the Sacramento Bypass Wildlife Area.
The RD 2068 levee along the west side of the Yolo Bypass would be strengthened to resist increases in floodwater conveyed to the lower portion of the bypass through the widened Sacramento Weir and bypass. The area adjacent to the RD 2068 levee is designated by the Solano County General Plan as Agriculture and zoned A (Exclusive Agricultural). The RD 2068 levee is surrounded by agricultural lands consisting primarily of row crops. Strengthening the RD 2068 levee would support General Plan policy HS.P-9, that promotes preservation of agricultural areas that are subject to natural flooding. In addition, strengthening the RD 2068 levee would not change agricultural uses in the vicinity of the levee or result in other changes in land use that would cause inconsistencies with the Agriculture land use designation and A zoning code.

The area adjacent to the existing floodwall within the City of Rio Vista is designated by the City General Plan as Downtown/Waterfront and is zoned D-W (Downtown Waterfront District). Construction of the new floodwall in the City of Rio Vista would not result in inconsistencies with the City land use designation and zoning code. Rather, the new floodway would provide flood protection to the waterfront district and would be a supporting element of the Waterfront Specific Plan (Wood Rodgers 2015:2).

For the reasons discussed above, implementation of the proposed program would not conflict with adopted policies, land use designations, and zoning. Therefore, this impact would be less than significant.

Impact AG-4 Physically Divide an Established Community. Construction of the funded facilities would occur outside or along the boundaries of existing communities. Therefore, no impacts related to the physical division of communities would result from implementation the proposed program.

Construction of rock bank protection and launchable rock trenches along the banks of the Sacramento River East Levee would occur near residential areas in the vicinity of the Pocket and Little Pocket areas where residential land uses are generally located adjacent to the landside of the levee; however, construction of levee improvements would occur within the existing levee footprints. Construction of the new floodwall in Rio Vista would occur within the footprint of the existing floodwall and not affect residential neighborhoods west of Edgewater Drive. Scattered rural residences are present in the vicinity of the Sacramento and Yolo Bypasses. Construction of the new levee setbacks would not create a physical barrier within an established community. Therefore, no impacts related to the physical division of communities would result from implementation the proposed program.

4.2.4 Mitigation Measures

No mitigation is required for Impact AG-2 (conflict with a Williamson Act contract), Impact AG-3 (consistency with adopted plan policies, land use designations, and zoning codes), or Impact AG-4 (physically divide an existing community).

Mitigation is identified below for Impact AG-1 (conversion of agricultural land to nonagricultural use).

Mitigation Measure AG-1: Implement Measures to Minimize Impacts to Agricultural Productivity and Compensate for Unavoidable Conversions of Agricultural Land to Nonagricultural Use. (for Impact AG-1, Conversion of Agricultural Land, including Important Farmland, to Nonagricultural Uses).

The agency(ies) implementing program components shall implement measures to reduce impacts associated with conversion of agricultural land to nonagricultural use in accordance with local policies and ordinances. These measures may include, but are not limited to:

- purchase of mitigation lands and/or creation of conservation easements at the ratio required by the host county (i.e., 2:1 for nonprime or 3:1 for prime farmland in Yolo County), in locations satisfactory to the host county; or

- payment of in-lieu fees at a rate established by the host county, if mitigation lands or conservation easements are not purchased; or
• development of programs and projects that directly mitigate impacts to diminished agricultural capacity and reduced economies of scale; or

• contribution to an Agricultural Sustainability Fund.

**Timing:** Prior to construction activities.

**Responsibility:** The agency(ies) implementing the program component.

### 4.2.5 CONCLUSION

Impact AG-2 (conflict with a Williamson Act contract), Impact AG-3 (consistency with adopted plan policies, land use designations, and zoning codes), and Impact AG-4 (physically divide an existing community) would be less than significant. Although Mitigation Measure AG-1 would reduce impacts associated with conversion of agricultural land by acquisition of conservation easements or similar mechanisms, no new agricultural land would be created and Impact AG-1 (conversion of agricultural land to nonagricultural uses) would remain significant and unavoidable.
4.3 GEOLOGY AND SOILS

This section addresses issues related to geologic hazards, specifically seismicity and soil erosion. Long-term operational water quality effects related to erosion and hydrologic changes are discussed in Section 4.4, “Hydrology and Hydraulics” and Section 4.5, “Water Quality.”

4.3.1 REGULATORY SETTING

FEDERAL

U.S. Army Corps of Engineers’ Engineering Manuals and Technical Letters

There are a several engineering manuals (EMs) prepared by the U.S. Army Corps of Engineers (USACE) that contain guidelines for design and construction of embankments, levees, and seepage berms. The primary USACE guidance is contained in EM 1110-2-1913 Design and Construction of Levees (USACE 2000). In addition, Engineering Technical Letters (ETL) 1110-2-569, Design Guidance for Levee Underseepage (USACE 2005) and 1110-2-555, Design Guidance on Levees (USACE 1997), contain guidance that is applicable to proposed levee design and reconstruction.

Federal Emergency Management Agency

For levees to be certified by the Federal Emergency Management Agency (FEMA) as providing flood protection, evidence also must be provided that adequate design and operation and maintenance systems are in place to provide reasonable assurance that protection exists from a base flood (100-year level of flood risk reduction [0.01% AEP]). Specific requirements pertaining to amount of freeboard, closure devices, embankment protection from floods, embankment and foundation stability, settlement, interior drainage, operation plans, and maintenance plans are contained in 44 Code of Federal Regulations (CFR) Section 65.10.

Earthquake Hazards Reduction Act

In October 1977, the U.S. Congress passed the Earthquake Hazards Reduction Act to reduce the risks to life and property from future earthquakes in the United States through the establishment and maintenance of an effective earthquake hazards reduction program. To accomplish this goal, the act established the National Earthquake Hazards Reduction Program (NEHRP). This program was substantially amended in November 1990 by the National Earthquake Hazards Reduction Program Act (NEHRPA), which refined the description of agency responsibilities, program goals, and objectives.

The mission of NEHRP includes improved understanding, characterization, and prediction of hazards and vulnerabilities; improved building codes and land use practices; risk reduction through post-earthquake investigations and education; development and improvement of design and construction techniques; improved mitigation capacity; and accelerated application of research results. The NEHRPA designates FEMA as the lead Federal agency of the program and assigns several planning, coordinating, and reporting responsibilities. Other NEHRPA agencies include the National Institute of Standards and Technology, National Science Foundation, and U.S. Geological Survey (USGS).

Railroad Construction and Safety

Federal regulations governing the construction and inspection of railroad tracks are contained in CFR Title 49, Subtitle B, Chapter II, Part 213 (Track Safety Standards). These regulations govern construction of the track roadbed, geometry, structure, and inspection. The Rail and Infrastructure Integrity Division of the Federal Railroad Administration (FRA) is responsible for administering compliance with Federal standards concerning rail maintenance and bridge management. The general purpose of the Division is to prevent accidents and casualties in rail operations that result from rail and structure degradation. In addition, the Division provides
technical expertise and direction in the execution and administration of rail safety programs to ensure safety in railroad operations related to rail inspection technology, rail inspection programs, bridge inspection and maintenance, and bridge management programs. The Division also provides direction and technical advice on railroad bridge maintenance and management.

**STATE**

**Alquist-Priolo Earthquake Fault Zoning Act**

The Alquist-Priolo Earthquake Fault Zoning Act (Alquist-Priolo Act) (California Public Resources Code [PRC] Sections 2621–2630) was passed in 1972 to reduce the hazard of surface faulting to structures designed for human occupancy. The main purpose of the law is to prevent the construction of buildings used for human occupancy on the surface trace of active faults. The law addresses only the hazard of surface fault rupture and is not directed toward other earthquake hazards. The Alquist-Priolo Act requires the State Geologist to establish regulatory zones known as Earthquake Fault Zones around the surface traces of active faults and to issue appropriate maps. The maps are distributed to all affected cities, counties, and State agencies for their use in planning efforts. Before a project can be permitted in a designated Alquist-Priolo Earthquake Fault Zone, cities and counties must require a geologic investigation to demonstrate that proposed buildings would not be constructed across active faults.

**Seismic Hazards Mapping Act**

The Seismic Hazards Mapping Act of 1990 (California PRC Sections 2690–2699.6) addresses earthquake hazards from non-surface fault rupture, including liquefaction and seismically induced landslides. The act established a mapping program for areas that have the potential for liquefaction, landslide, strong ground shaking, or other earthquake and geologic hazards. The act also specifies that the lead agency for a project may 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.

**National Pollutant Discharge Elimination System and Storm Water Pollution Prevention Plans**

As discussed in detail in Section 4.5, “Water Quality,” the State Water Resources Control Board (SWRCB) and Central Valley Regional Water Quality Control Board (Central Valley RWQCB) have adopted specific National Pollutant Discharge Elimination System (NPDES) permits for a variety of activities that have the potential to discharge wastes (including sediment) to waters of the State. The SWRCB’s statewide storm water general permit for construction activity (2012-0006-DWQ) is applicable to all land-disturbing construction activities that would disturb 1 acre or more. Compliance with the NPDES permit requires submittal to the Central Valley RWQCB of notices of intent (NOI) to discharge, and implementation of storm water pollution prevention plans (SWPPPs) that include best management practices (BMPs) to minimize water quality degradation during construction activities.

**Central Valley Flood Protection Board**

The Central Valley Flood Protection Board (CVFPB) is responsible for ensuring the serviceability of levees and requires permits for any activity that may affect the capacity of the flood control system. The CVFPB cooperates with USACE to control flooding along the Sacramento and San Joaquin Rivers and tributaries, and its jurisdiction encompasses the Central Valley, including all tributaries and distributaries of the Sacramento and San Joaquin Rivers.

Within its jurisdiction, the CVFPB enforces appropriate standards for the construction, maintenance, and protection of adopted flood control plans that will best protect the public from floods. Approval by the CVFPB is required for projects or uses that encroach into rivers and waterways within flood control project areas authorized by the Federal and State government and within regulated streams adopted by the CVFPB. CVFPB levee standards are set forth in California Code of Regulations (CCR) Title 23, Division 1, Article 8, Sections 111–137.
REGIONAL AND LOCAL

Sacramento County General Plan

The following policies from the *Sacramento County General Plan of 2005-2030* Conservation, Safety, and Delta Protection Elements regarding geology and soils apply to the proposed program (Sacramento County 2011).

► **Policy SA-1:** The County shall require geotechnical reports and impose the appropriate mitigation measures for new development located in seismic and geologically sensitive areas.

► **Policy DP-10:** Maintain sites for the storage of dredged material from channels within the Delta and discourage the conversion of existing sites to other uses, as appropriate. Soil that is suitable for levee rehabilitation and raising Delta lowlands should remain within the Delta.

► **Policy DP-56:** Encourage the beneficial reuse of dredged material, as appropriate, for levee maintenance and rehabilitation, and the maintenance of instream flows. Support and advocate for the Delta Long-Term Management Strategy (LTMS).

► **Policy DP-58:** Support a minimum Delta-specific levee design standard as established by state and federal regulations.

Sacramento County Grading Ordinance

The County’s Land Grading and Erosion Control Ordinance (County Code, Title 16, Chapter 16.44) was enacted for the purpose of minimizing damage to surrounding properties and public rights-of-way; limiting degradation of the water quality of watercourses; and curbing the disruption of drainage system flow caused by the activities of clearing, grubbing, grading, filing, and excavating land. A grading plan indicating the location, implementation schedule, and maintenance schedule of all erosion and sediment control measures to be implemented along with a description of the location and methods of storage and disposal of construction materials is required. In addition, for larger projects, a geotechnical engineering report is also required.

City of Sacramento General Plan

The following policies from the *Sacramento 2035 General Plan* Environmental Constraints Element (City of Sacramento 2015) related to geology and soils apply to the proposed program.

► **EC 1.1.1 Review Standards:** The City shall regularly review and enforce all seismic and geologic safety standards and require the use of BMPs in site design and building construction methods.

► **EC 1.1.2 Geotechnical Investigations:** The City shall require geotechnical investigations to determine the potential for ground rupture, ground-shaking, and liquefaction due to seismic events, as well as expansive soils and subsidence problems on sites where these hazards are potentially present.

Solano County General Plan

The following policies from the *Solano County General Plan* Public Health and Safety Element (Solano County 2008) related to geology and soils apply to the proposed program.

► **Policy HS.P-12:** Require new development proposals in moderate or high seismic hazard areas to consider risks caused by seismic activity and to include project features that minimize these risks.
► **Policy HS.P-14:** Identify and minimize potential hazards to life and property caused by fault displacement and its impact on facilities that attract large numbers of people, are open to the general public, or provide essential community services and that are located within identified earthquake fault zones.

► **Policy HS.P-16:** Require minimum setbacks for construction along creeks between the creek bank and structure, except for farm structures that are not dwellings or places of work, based on the susceptibility of the bank to lurching caused by seismic shaking.

**Solano County Grading Ordinance**

The County’s Grading, Drainage, Land Leveling, and Erosion Control Ordinance (Solano County Code, Chapter 31) was enacted to provide the means for controlling soil erosion, sedimentation, increased rates of water runoff and related environmental damage by establishing minimum standards and providing regulations for the construction and maintenance of fills, excavations, cuts and clearing of vegetation, revegetation of cleared areas, drainage control, and the protection of exposed soil surfaces to protect downstream waterways and wetlands and to promote the safety, public health, convenience, and the general welfare of the community. The ordinance limits grading activities to the time period between April 15 and October 15 of each calendar year. An engineered erosion, sediment, and runoff control plan that indicates necessary land treatment, structural measures, and timing requirements to effectively minimize soil erosion, sedimentation, and rate of water runoff is required. In addition, a soils engineering report and an engineering geology report are also required.

**City of Rio Vista General Plan**

The following policies from the *City of Rio Vista General Plan 2001* Resource Conservation & Management and Safety & Noise Elements (City of Rio Vista Community Development Department 2002) related to geology and soils apply to the proposed program.

► **Policy 10.1.C:** The City shall require that new development be designed and constructed to preserve the following types of areas and features as open space to the maximum extent feasible:

- High erosion hazard areas
- Scenic and trail corridors
- Streams and riparian vegetation
- Wetlands
- Drainage corridors
- Other significant stands of vegetation
- Wildlife corridors
- Key hilltops
- Views of the Sacramento River
- Any areas of Federal, State, or local significance
- Sensitive Local Resource Areas

► **Policy 10.5.G:** The City shall discourage grading activities during the rainy season, unless adequately mitigated, to avoid sedimentation of drainageways and damage to riparian habitat.

► **Policy 10.5.H:** The City shall condition projects on applying pollution control measures that will restrict pollutants from entering Rio Vista’s storm drain system.

► **Policy 10.7.A:** The City shall minimize soil erosion and sedimentation by maintaining compatible land uses, suitable building designs, and appropriate construction techniques.
Policy 10.11.F: The City shall require new development to incorporate sound soil conservation practices and minimize land alterations. Land alterations within areas illustrated by Figures 10-2 and 5-3 [in the General Plan], shall comply with the following guidelines:

- Limit grading to the smallest practical area of land.
- Limit land exposure to the shortest practical amount of time.
- Use erosion and sediment control measures, including temporary vegetation sufficient to stabilize disturbed areas.
- Replant graded areas to ensure establishment of plant cover before the next rainy season.
- Create grading contours that blend with the natural contours onsite or with contours on property immediately adjacent to the area of development.
- Ensure that development near or on portions of hillsides does not cause or worsen natural hazards, such as erosion, sedimentation, increased risk of fire, or degraded water quality.
- Maintain the character and visual quality of the hillside.

Policy 11.1.B: The City shall continue to mitigate the potential impacts of geologic hazards.

Policy 11.1.C: Soil erosion and sedimentation shall be minimized by maintaining compatible land uses, suitable building designs, and appropriate construction techniques.

Policy 11.1.E: The City shall require contour grading, where feasible, and revegetation to mitigate the appearance of engineered slopes and to control erosion.

Policy 11.2.A: The City shall require that new development on hillsides use design, construction, and maintenance techniques that minimize risk to life and property from slope failure, landslides, and flooding.

Yolo County General Plan

The following policies from the Yolo County General Plan Health and Safety Element (Yolo County 2009) related to geology and soils apply to the proposed program.

Policy HS-1.1: Regulate land development to avoid unreasonable exposure to geologic hazards.

Policy HS-1.2: All development and construction proposals shall be reviewed by the County to ensure conformance to applicable building standards.

Policy HS-1.3: Require environmental documents prepared in connection with CEQA to address seismic safety issues and to provide adequate mitigation for existing and potential hazards identified.

Yolo County Standard Specifications and Details

Road construction in Yolo County is governed by the County of Yolo Improvement Standards—Section 4 Transportation Improvements (Yolo County 2008). The transportation improvement standards govern street and right-of-way widths, structural design, design speeds and minimum stopping sight distances, intersections, bus stops, sidewalks, curbs and gutters, street and safety signs, and pavement striping and markings.
ENVIRONMENTAL SETTING

GEOLOGY

Most of the program area lies 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 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 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.

The southern end of the Yolo Bypass is located in the northern portion of the Sacramento-San Joaquin Delta (Delta). Most of the sediments in the Delta were deposited between 175 million and 25 million years Before Present (B.P.) and were accumulated in marine environments. Younger deposits (25 million years B.P. to Present Day) are generally described as nonmarine. However, some of the younger deposits may have formed as marine deposits in shallow seas and estuaries. The depositional history of the Delta during the late Quaternary period (the last 1 million years) probably was controlled by several cycles related to fluctuations in regional and global climate in which each cycle consisted of a period of deposition followed by a period of nondeposition and erosion. Thus, the Delta during the late Quaternary period had stages of wetlands and floodplain creation as tidewaters rose in the valley from the west, areas of erosion when tidewaters receded, deposition of alluvial fans that were reworked by wind to create extensive sand dunes, and alluvial fan deposition from streams emanating from the adjacent mountain ranges.

From 70,000–11,700 years B.P., sea level may have been as much as 365 feet below the present level. During this time, the Delta was a fluvial and alluvial system, where fast-moving rivers deposited coarse-grained sediments in alluvial fans and channels. During the Holocene (11,700 years B.P. to Present Day), sea levels rose, flooding the San Francisco Bay and the Delta. In the initial flood stages, fine-grained silty sands and clayey silts were deposited in shallow bays. As conditions in the Delta became conducive to plant growth over time, organic sediments comprised mainly of peat began to accumulate above the silt that previously had been deposited. Once the plants became established, their growth and decay led to repeated cycles of peat deposition. The thickest deposits likely occurred at the sites of major Pleistocene-age drainage ways. Over thousands of years, the process of peat deposition led to the formation of peat islands, with river channels and sloughs around the islands. During
flood events, rivers would flow over their banks and formed natural levees of sand and silt along the edges of the islands. Many of the present-day levees in the Delta are located at the sites of these older, natural levees.

Rio Vista is located within the Montezuma Hills, which comprise a small range of low-elevation hills at the northern banks of the Delta in Solano County. Elevations of the hills range from approximately 165–180 feet above mean sea level.

Each of the geologic formations that are present within the program area are discussed in detail in Section 4.9, “Paleontological Resources,” and are shown on Exhibit 4.9-1.

**SEISMICITY**

The program area has experienced relatively low seismic activity in the past and does not contain any Alquist-Priolo Earthquake Fault Zones (California Geological Survey [CGS] 2012). The nearest known active (Holocene or Historic) fault trace to the Sacramento Bypass is located north of Esparto near Dunnigan Hills, approximately 25 miles to the northwest (Jennings and Bryant 2010). At the southern end of the program area, the Rio Vista Fault begins in the southeastern portion of Rio Vista and runs south through Sherman Island. Jennings and Bryant (2010) indicate that the Rio Vista Fault has exhibited movement during the Quaternary (i.e., the last 2.6 million years), but the exact age is undifferentiated. The Rio Vista Fault is not considered active. Numerous earthquakes of magnitude (M) 5.0 or greater have occurred on regionally active faults in the Coast Ranges, approximately 18–35 miles southwest and west of Rio Vista.

Regionally active faults, the approximate distance from the program area, projected maximum moment magnitude, and slip rate are identified in Table 4.3-1.

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 area by CGS or USGS, 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.

- **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 settle 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 generally have a 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 high magnitude 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. Subsidence and settlement may also occur from levee construction (separate from liquefaction or densification) due to both immediate settlements in granular soils and the consolidation of fine grained soils.

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.

<table>
<thead>
<tr>
<th>Fault Name</th>
<th>Approximate Distance from Program Area (miles)</th>
<th>Regional Location</th>
<th>Maximum Moment Magnitude</th>
<th>Slip Rate (mm/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Great Valley Fault Zone Segment 3</td>
<td>26 SB</td>
<td>Margin between Sacramento Valley and Coast Range</td>
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<td>1.25</td>
</tr>
<tr>
<td>Great Valley Fault Zone Segment 4</td>
<td>26 SB</td>
<td>Margin between Sacramento Valley and Coast Range</td>
<td>6.6</td>
<td>1.25</td>
</tr>
<tr>
<td>Hunting Creek-Berryessa Fault Zone</td>
<td>38 SB</td>
<td>Coast Range</td>
<td>7.1</td>
<td>6.0</td>
</tr>
<tr>
<td>Great Valley Fault Zone Segment 5</td>
<td>10 RV</td>
<td>Margin between Sacramento Valley and Coast Range</td>
<td>6.7</td>
<td>1.5</td>
</tr>
<tr>
<td>Greenville Fault Zone</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(includes Clayton and Marsh Creek Sections)</td>
<td>18 RV</td>
<td>Coast Range</td>
<td>7.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Green Valley-Concord Fault Zone</td>
<td>23 RV</td>
<td>Coast Range</td>
<td>6.8</td>
<td>5.0</td>
</tr>
<tr>
<td>Mount Diablo Blind Thrust Fault</td>
<td>26 RV</td>
<td>Coast Range</td>
<td>6.7</td>
<td>2.0</td>
</tr>
<tr>
<td>West Napa Fault</td>
<td>30 RV</td>
<td>Coast Range</td>
<td>6.7</td>
<td>1.0</td>
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<tr>
<td>Hayward–Rodgers Creek Fault Zone</td>
<td>35 RV</td>
<td>Coast Range</td>
<td>7.26</td>
<td>9.0</td>
</tr>
</tbody>
</table>

Notes: mm/yr = millimeters per year; SB = from the Sacramento Bypass; RV = from Rio Vista

SOILS

Soil Characteristics

The Sacramento, Solano, and Yolo County Soil Surveys (U.S. Natural Resources Conservation Service [NRCS] 2015) identify a variety of soil map units in the program area, as summarized below.

Soils in the vicinity of the Sacramento Weir (proposed lengthening and elevation of railroad tracks) and Sacramento Bypass (proposed setback levee) consist primarily of Lang sandy loam, Sacramento silty clay loam, and Sycamore silty clay loam. These soils originated from mixed clayey alluvium and are somewhat poorly
drained. The Lang soil is highly susceptible to wind erosion, and all three soils are moderately susceptible to water erosion. The Sacramento soil has a high shrink-swell potential, and the Sycamore soil has a moderate shrink-swell potential.

Soils in the vicinity of the proposed setback levee between the Sacramento Weir and Interstate 5 (I-5) consist primarily of Sycamore silty clay loam (described above), with smaller amounts of Tyndall very fine sandy loam and Valdez complex. The Tyndall soils are derived from alluvium weathered from sedimentary rock, whereas the Valdez soils are derived from mixed, recent (Holocene) alluvium. Both soils are poorly drained. The Tyndall soil is highly susceptible to wind erosion, and both soils are moderately susceptible to water erosion. The Valdez soil has a moderate shrink-swell potential.

Soils in the vicinity of the proposed Yolo County Road 124 relocation and the Tule Canal consist of Sacramento silty clay loam, Sacramento clay, and Sycamore complex. The parent materials and soil properties are similar to those described above in the vicinity of the Sacramento Weir and Sacramento Bypass.

Work associated with the Reclamation District (RD) 2068 levee along the west side of the Yolo Bypass (between Cache Slough and Midway Road) would take place in a variety of soil types composed primarily of clay, silty clay, and silty clay loam derived from different types of alluvium. These soils are generally somewhat poorly–poorly drained. Most of these soils are susceptible to wind erosion, and are moderately susceptible to water erosion. All of the soils have a high shrink-swell potential.

In the vicinity of the proposed floodwall in Rio Vista, the soils consist of Tujunga fine sand and Valdez silt loam. Sandy soils (such as the Tujunga series) have severe limitations for use in embankments, dikes, and levees because of seepage, piping, and lack of cohesion. The Tujunga sands originated from dredged river materials, and the Valdez silt loam originated from mixed alluvium. The Tujunga sand is excessively drained while the Valdez silt loam is poorly drained. The Tujunga sand has a high wind erosion hazard and the Valdez silt loam has a high water erosion hazard. Both soils have a low shrink-swell potential.

Construction and placement of proposed erosion control measures (i.e., rock revetment) along the banks of the Sacramento River East Levee between Freeport and the mouth of the American River could take place in the Columbia, Sailboat, Valpac, Lang, and Laugenour soil series. These soils are generally somewhat poorly drained and have a moderate wind and water erosion hazard. The Valpac soils have a moderate shrink-swell potential.

**Subsidence from Peat Oxidation**

Subsidence of land within the Delta from the oxidation of peat soils is an ongoing process. Delta islands, including Liberty Island within the Yolo Bypass, were reclaimed for agricultural use because of their fertile soils by constructing levees and drains. Substantial reclamation of Delta islands was accomplished between 1880 and 1920. Reclamation at Liberty Island occurred in 1917-1918 with the construction of levees approximately 11 feet high. Following reclamation, drained Delta lands began to subside. Subsidence, as it relates to Delta islands, refers to the falling level of the land surface that results primarily from the oxidation of peat soil. This oxidation occurs because microbes decompose organic matter in the presence of oxygen. Once the water is drained from Delta soils, the oxygen level increases. Because organic matter (from marsh plants) accounts for a large portion of the volume of peat soils, this consumption of organic matter by microbes reduces soil volume.

### 4.3.3 Environmental Impacts

Effects associated with geology and soils that could result from program-related activities were evaluated based on the locations and expected types of construction practices, NRCS soil types, CGS and USGS seismic and geologic data, and the nature of proposed operations.
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, as amended. The proposed program would have a significant effect on geology and soils if it would:

- 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;
- result in substantial soil erosion or the loss of topsoil;
- 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

Surface Fault Rupture—Because the program area is not located within an Alquist-Priolo Earthquake Fault Zone and there are no known active faults within the program area, fault ground rupture is unlikely, and therefore this issue is not addressed further in this SEIR.

Landslides—Because the program area is relatively flat, there would be no adverse impacts related to landslides, and this issue is not addressed further in this SEIR.

Soil Suitability for Septic Systems—Because the proposed program would not involve the use of wastewater disposal systems of any kind, there would be no impact related to the ability of program area soils to support the use of septic systems. Therefore, this issue is not addressed further in this SEIR.

IMPACT ANALYSIS

Impact | Potential Damage to Program Facilities from Seismic and Geologic Hazards. Construction of program facilities could result in exposure to seismic hazards such as liquefaction, and to geologic hazards such as settlement and expansion from construction in unstable soils. This impact would be less than significant.
--- | ---
GEO-1 | The Sacramento Valley has historically experienced very low levels of seismic activity. Known active faults that pose a hazard for strong seismic ground shaking are located along the margin between the western Sacramento Valley and the eastern Coast Range, and within the Coast Range itself (see Table 4.3-1). These faults are located 26–38 miles west of the Elkhorn Basin in the northern portion of the program area, and 10–35 miles west-southwest of Rio Vista in the southern portion of the program area.

The native soils where all of the program facilities would be located contain sand layers with low relative densities coinciding with a relatively high water table; thus, these soils generally have a high liquefaction potential. Furthermore, program facilities along the Sacramento River, where low-density silts and clays associated with a fluvial depositional environment are located, would also be susceptible to seismically induced settlement. In addition, a potential for differential settlement exists where low-density and unconsolidated material is encountered, such as overbank river deposits (present day and historical), that are common along the
Sacramento River. Finally, these soils are somewhat poorly–poorly drained and have a moderate to high shrink-swell potential.

Therefore, construction of all of the program facilities (including the elevated Northern Sierra Railroad tracks and County Road 124) could be subject to hazards from liquefaction and settlement, as well as construction in unstable and expansive soils.

However, all flood control facility construction or modification conducted as part of the proposed program of improvements (i.e., bypass widening, setback levees, floodwalls, and rock revetment) would be designed based on the results of detailed geotechnical engineering studies (e.g., Wood Rodgers 2015) and would be required to comply with standard engineering practices for levee design. The Central Valley Flood Protection Board’s standards are the primary State standards applicable to the proposed levee improvements; these are stated in CCR Title 23, Division 1, Article 8, Sections 111–137. The Board’s standards direct that levee design and construction be in accordance with EM 1110-2-1913 Engineering Design and Construction of Levees (USACE 2000), the primary Federal standards applicable to levee improvements. Because the design, construction, and maintenance of levee improvements must comply with the regulatory standards of USACE and CVFPB, it is assumed that the design and construction of all levee modifications would meet or exceed applicable design standards for static and dynamic stability, seismic ground shaking, liquefaction, subsidence, and seepage.

Furthermore, construction of railroads is governed by CFR Title 49, Subtitle B, Chapter II, Part 213 (Track Safety Standards), and is overseen by FRA’s Rail and Infrastructure Integrity Division. FRA is responsible for determining the appropriate railway track construction methods in order to ensure operational, freight, and passenger safety. Roadway construction in Yolo County is required to meet minimum County safety and design standards as set forth in the County of Yolo Improvement Standards—Section 4 Transportation Improvements (Yolo County 2008). Because FRA and Yolo County require appropriate design and construction methodologies to be used (including preparation of soils and geotechnical engineering studies to inform design and construction), it is assumed that the design and construction of the elevated Northern Sierra Railroad tracks and County Road 124 would meet or exceed applicable design standards for stability, seismic ground shaking, liquefaction, and subsidence.

For the reasons stated above, this impact is considered **less than significant**.

<table>
<thead>
<tr>
<th>Impact</th>
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</thead>
<tbody>
<tr>
<td>GEO-2</td>
</tr>
</tbody>
</table>

**Potential Temporary, Short-Term Construction-Related Erosion.** Ground-disturbing activities associated with construction of improvements included in the proposed program could result in substantial temporary and short-term soil erosion and loss of topsoil at construction sites. This impact would be **potentially significant**.

Program implementation would include substantial construction activity over large areas, and would include soil removal for borrow, trenching, and widening of the Sacramento Bypass, construction of new setback levees and a floodwall, grading for the relocated Yolo County Road 124 and the elevated Northern Sierra railroad tracks, and other ground-disturbing activities. Most program area soils are moderately susceptible to water erosion, and several are highly susceptible to wind erosion (NRCS 2015). Program-related earthmoving activities would result in the temporary and short-term 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. Therefore, this temporary and short-term impact could be **potentially significant**. Mitigation Measure WQ-1, described in Section 4.5, “Water Quality,” has been identified to address this impact.
4.3.4 **MITIGATION MEASURES**

Mitigation Measure WQ-1: Implement Standard Best Management Practices (BMPs), Prepare and Implement a Storm Water Pollution Prevention Plan, and Comply with National Pollutant Discharge Elimination System Permit Conditions (for Impact WQ-1, Potential Temporary, Short-Term Construction-Related Erosion).

SAFCA shall implement Mitigation Measure WQ-1, described in Section 4.5, “Water Quality.”

**Timing:** Prior to, during, and after construction activities.

**Responsibility:** The agency(ies) implementing the program component.

4.3.5 **CONCLUSION**

Impact GEO-1 (potential damage to program facilities from seismic and geologic hazards) would be less than significant. Implementing Mitigation Measure WQ-1 would reduce the potentially significant Impact GEO-2 (potential temporary, short-term construction-related erosion) to a less-than-significant level because BMPs specifically designed to control construction-related erosion would be implemented.
4.4 HYDROLOGY AND HYDRAULICS

This section addresses potential hydraulic impacts of changes to the region’s flood management infrastructure proposed as components of the program.

4.4.1 REGULATORY SETTING

FEDERAL

Historical Background

The Federal government, primarily through the U.S. Army Corps of Engineers (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, at that time lacking any specific flood control authority, 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, 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 USACE specific authority to participate with the State of California and local agencies in planning and constructing the Sacramento River Flood Control Project (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.

National Flood Insurance Program

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 National Flood Insurance Program (NFIP). Administered by the Federal Emergency Management Agency (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 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.
STATE

Historical Background

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 (now known as the Central Valley Flood Protection Board [CVFPB]) 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 CVFPB as the non-Federal sponsor responsible for managing the plan through a series of cost-sharing and administrative agreements with USACE. These agreements require CVFPB to operate and maintain the SRFCP in accordance with requirements approved by USACE. CVFPB 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 CVFPB regulatory authority over all activities affecting the levees and related facilities of the SRFCP.

During the last two decades, a combination of circumstances has focused increasing statewide attention on CVFPB’s regulatory and developmental responsibilities in connection with the SRFCP. First, many of the system’s protected floodplains have come under increasing urban growth pressure as housing costs induce more and more of the State’s residents 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 USACE. Third, the flooding of New Orleans following Hurricane Katrina 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 produced the most intense legislative dialogue on the future of the State plan of flood protection since the adoption of the SRFCP in 1911.

State Senate Bill 5

Senate Bill (SB) 5 requires the California Department of Water Resources (DWR) to implement updated requirements in the California Building Standards Code for construction in areas protected by the facilities of the Central Valley Flood Protection Plan (CVFPP) where flood depths are anticipated to exceed 3 feet for the 200-year flood event. This "urban level of flood protection" means the level of protection that is necessary to withstand flooding that has a 1-in-200 chance of occurring in any given year (0.005 AEP) using criteria consistent with, or developed by, DWR (Secretary of State 2007: Chapter 364, Section 1, 65007 [a][5][k]).

Central Valley Flood Protection Plan

The 2012 Central Valley Flood Protection Plan was a requirement of the Central Valley Flood Protection Act of 2008 (California Water Code Sections 9600-9603) that required DWR to develop a document that describes a sustainable, integrated flood management plan that proposes a long-term, systemwide investment approach in areas of the Central Valley currently receiving protection from facilities of the State Plan of Flood Control. DWR develops strategic goals, and near- and long-term actions, to conserve, manage, develop, and sustain California's watersheds and water resources, and works to prevent and respond to floods, droughts, and catastrophic events that would threaten public safety, water resources and management systems, the environment, and property. The
Central Valley Flood Management Planning (CVFMP) Program provided the structure for the successful development and adoption of the CVFPP. CVFMP is now assisting in the planning and coordination of major implementation actions of the CVFPP, including State-led Basinwide Feasibility Studies (BWFS), locally led regional flood management planning, and the Central Valley Flood System Conservation Strategy. Each of these planning efforts will be incorporated into the next update of the CVFPP, which is scheduled for 2017.

**Urban Levee Design Criteria**

California Government Code Sections 65865.5, 65962, and 66474.5 require that levees and floodwalls in the Sacramento-San Joaquin Valley provide protection against a flood that has a 1-in-200 chance of occurring in any given year. The Urban Levee Design Criteria (ULDC) prepared by DWR (DWR 2012) provides engineering criteria and guidance for civil engineers in meeting the government code requirements, and offers this same guidance to civil engineers working on levees and floodwalls anywhere in California. The ULDC also provides engineering criteria and guidance for DWR’s urban levee evaluations and participation in urban levee projects.

**California Water Code and California Code of Regulations Title 23**

CVFPB regulates construction within flood-prone areas of the Central Valley. CVFPB’s authority and procedures come from the California Water Code and Title 23 of the California Code of Regulations. These documents also provide guidance for staff and the public when determining if a permit is needed for any project that may encroach upon, improve, alter or affect adopted plans of flood control (including Federal/State flood control systems, regulated streams, and designated floodways under CVFPB’s jurisdiction). In addition to permit application requirements and standards for construction of permitted projects, the regulations also provide direction for conducting meetings, carrying out enforcement actions, meeting requirements of CEQA, and other administrative actions of CVFPB and its staff.

**REGIONAL AND LOCAL**

Local agencies have always played a key role in operating and maintaining the SRFCP. The local agency is typically a rural reclamation district 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, Reclamation District No. 1000 (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 CVFPB and USACE.

The flood control improvements previously implemented by SAFCA are described in Chapter 2, "Background." 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.

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 percent 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 meteorological and hydrologic conditions that are considered reasonably characteristic for the Sacramento River drainage basin and its subbasins 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 the ULDC standard.

### 4.4.2 ENVIRONMENTAL SETTING

#### HYDROLOGY

The program 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 percent 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>
<thead>
<tr>
<th>Basin</th>
<th>Watershed Area (square miles)</th>
<th>Flood of Record (year)</th>
<th>Unregulated Flow Record 1-Day Flow (cfs)</th>
<th>Flow per Square Mile (cfs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>American River at Fair Oaks Gage</td>
<td>1,888</td>
<td>1997</td>
<td>249,000</td>
<td>132</td>
</tr>
<tr>
<td>Sacramento River at Latitude of Verona</td>
<td>21,251</td>
<td>1997</td>
<td>624,000</td>
<td>29</td>
</tr>
<tr>
<td>Feather River at Shanghai Bend</td>
<td>5,313</td>
<td>1997</td>
<td>534,000</td>
<td>101</td>
</tr>
<tr>
<td>Sacramento River at Latitude of Sacramento</td>
<td>26,150</td>
<td>1997</td>
<td>840,000</td>
<td>32</td>
</tr>
</tbody>
</table>

cfs = cubic feet per second
Source: MBK Engineers

The American and Feather Rivers produce about 90 percent 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). Under the current design of the SRFCP, the Yolo Bypass absorbs about 70 percent of this flow at the latitude of Verona, and 80 percent at the 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 percent annual exceedance 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 area.

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 reflects 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 had to 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 mantel 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 erodible 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.

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 exceedance 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. SAFCA’s previous improvement plan and the 2007 DEIR analyzed impacts resulting from 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. However, the changes in operations and physical modifications to Folsom Dam are ongoing and effects are included in analysis for this SEIR, where relevant.

4.4.3 ENVIRONMENTAL IMPACTS

Impacts of many of the program components are analyzed in the four documents which were incorporated by reference into this SEIR (see Section 4.1.3, “Summary Description of the Projects Analyzed in Prior Environmental Documents). Additional hydraulic modeling was performed for the present analysis regarding the Sacramento Weir and Bypass Modification portions of the proposed program evaluated in this SEIR. The results of this additional analysis are described below.

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 program was determined to result in a significant effect on hydrology or hydraulics if it would:

► 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;

► 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 (including through failure of a levee or dam);

create a substantial flooding risk as a result of a seismic seiche, tsunami, or mudflow.

The proposed program includes setting back the levees along portions of the Yolo Bypass and the Sacramento Bypass in the lower portion of the Elkhorn Basin south of Interstate 5. These levee setbacks would incorporate approximately 1,700 acres of currently protected farmland into the Yolo and Sacramento Bypass systems and expose this land to periodic inundation during the flood season. This alteration of the current drainage pattern of the area would require relocation of existing agricultural support structures including drainage and irrigation infrastructure. With these relocations in place, the affected land would be returned to agricultural production. The funded facilities would not result in effects on groundwater; provide substantial additional sources of polluted runoff; or place housing or other structures, with the exception of flood control facilities, in a 100-year flood hazard area.

While a seiche in the program 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 program area. Furthermore, levee design and construction must be carried out in accordance with EM 1110-2-1913 Engineering Design and Construction of Levees (USACE 2000), which would include design for seismic seiches. No portions of the program area are in tsunami inundation areas identified by the State of California (DOC 2015), and there is no hazard of mudflow due to the low-relief topography of the program area. Therefore, these issues are not addressed further in this SEIR.

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

- whether the proposed program would cause encroachment on SRFCP design levee freeboard outside the program area; or
- whether the proposed program 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.

None of the components (e.g., funded facilities) of the proposed program would cause encroachment on SRFCP design levee freeboard outside the program area. Therefore, the first SAFCA significance criterion does not apply to this analysis, and is not addressed in this SEIR.

**IMPACT ANALYSIS**

**Impact HH-1**  
**Hydraulic Effects of the Proposed Program.** The proposed program includes: lengthening the Sacramento Weir and enlarging the Sacramento Bypass, constructing setback levees along the east side of the Yolo Bypass between Interstate 5 (I-5) and the enlarged Sacramento Bypass, strengthening the RD 2068 Levee on the west side of the Yolo Bypass, and constructing a new floodwall to protect portions of the City of Rio Vista. The effects of Sacramento Weir modifications on water surface elevations, including the water surface elevations associated with 100-, and 200-year conditions, show that hydraulic impacts downstream of the program area would be less-than-significant.

MBK Engineers (MBK) performed a hydraulic impact analysis for SAFCA to analyze the effects of the proposed program on flood risk within the program area, both upstream and downstream of the program area (See Appendix D for modeling methods and results). The analysis was performed using MBK’s 2015-03 version of the USACE Sacramento River Basin HEC-RAS model. The impacts of lengthening the Sacramento Weir and expanding the Sacramento Bypass were evaluated.
The simulations were based on the following hydrologic conditions:

- 100-year (Sacramento River) hydrology;
- 200-year (Sacramento River) hydrology; and
- Implementation of the Folsom Joint Federal Project (JFP), 3.5-foot dam raise, and improved efficiency of flood operations at Folsom Dam.

To determine whether the proposed program would cause a significant increase in the possibility of flooding and necessitate flood improvements at Rio Vista (an area that is outside the protection of the SRFCP), MBK compared 100- and 200-year water surface elevations with and without the proposed funded improvements at two locations along the Sacramento River at Rio Vista and determined that there was a decrease in the 100- and 200-year water surface elevations of 0.05-foot and 0.1-foot, respectively. Several integrated factors including expansion of the Upper Yolo Bypass, changes to the structure and efficiency of operations at Folsom Dam, and no change in the sill elevation of the Sacramento Weir, contribute to a reduction of water surface elevations throughout the system under the proposed program. The reduction of water surface elevations at Rio Vista demonstrate that the funded facility elements under the proposed program would not cause a significant increase in flooding in this area and the impact would be less-than-significant.

### 4.4.4 Mitigation Measures

No mitigation measures are required.

### 4.4.5 Conclusion

Impact HH-1 (hydraulic effects of the proposed program) would be less than significant.
4.5 WATER QUALITY

This section describes water quality and groundwater conditions and processes with the potential to be affected by implementation of the proposed program. The section analyzes temporary and short-term impacts from construction activities and long-term impacts from program implementation. The analysis addresses potential impacts from stormwater runoff, erosion, spills, and surface water or groundwater contamination.

4.5.1 REGULATORY SETTING

FEDERAL

Federal Clean Water Act

The U.S. Environmental Protection Agency (EPA) is the lead Federal agency responsible for managing water quality. The Clean Water Act (CWA) of 1972 is the primary Federal law that governs and authorizes EPA and the individual states to implement activities to control water quality. The various elements of the CWA that address water quality and are applicable to the proposed program are discussed below. Wetland protection elements administered by the U.S. Army Corps of Engineers (USACE) under Section 404 of the CWA, including permits for the discharge of dredged and/or fill material into waters of the United States, are discussed in Sections 4.6, “Fisheries and Aquatic Resources,” and 4.7, “Terrestrial Biological Resources.”

Water Quality Criteria and Standards

Under Federal law, EPA has published water quality regulations under Volume 40 of the Code of Federal Regulations (CFR). Section 303 of the CWA requires states to adopt water quality standards for all surface waters of the U.S. As defined by the CWA, water quality standards consist of two elements: (1) designated beneficial uses of the water body in question, and (2) criteria that protect the designated uses. Where multiple uses exist, water quality standards must protect the most sensitive use. EPA is the Federal agency with primary authority for implementing regulations adopted under the CWA. EPA has delegated the State of California as the authority to implement and oversee most of the programs authorized or adopted for CWA compliance through the Porter-Cologne Water Quality Control Act of 1969 (Porter-Cologne Act), described below.

National Pollutant Discharge Elimination System Permit Program

The National Pollutant Discharge Elimination System (NPDES) permit program was established by the CWA to regulate municipal and industrial discharges to surface waters of the United States. A discharge from any point source is unlawful unless the discharge is in compliance with an NPDES permit. Federal NPDES permit regulations have been established for broad categories of discharges, including point-source municipal waste discharges and nonpoint-source stormwater runoff. NPDES permits generally identify effluent and receiving water limits on allowable concentrations and/or mass emissions of pollutants contained in the discharge; prohibitions on discharges not specifically allowed under the permit; and provisions that describe required actions by the discharger, including industrial pretreatment, pollution prevention, self-monitoring, and other activities.

In November 1990, EPA published regulations establishing NPDES permit requirements for municipal and industrial stormwater discharges. Phase 1 of the permitting program applied to municipal discharges of stormwater in urban areas where the population exceeded 100,000 persons. Phase 1 also applied to stormwater discharges from a large variety of industrial activities, including general construction activity if the project would disturb more than 5 acres. Phase 2 of the NPDES stormwater permit regulations, which became effective in March 2003, required that NPDES permits be issued for construction activity for projects that disturb 1 acre or more. Phase 2 of the municipal permit system (known as the NPDES General Permit for Small Municipal Separate Storm Sewer Systems [MS4s]) required small municipal areas of less than 100,000 persons to develop stormwater management programs. The nine Regional Water Quality Control Boards (RWQCBs) in California are responsible for implementing the NPDES permit system (see additional information below).
Section 401 Water Quality Certification or Waiver

Under Section 401 of the CWA, an applicant for a Section 404 permit (to discharge dredged or fill material into waters of the U.S.) must first obtain a certificate from the appropriate State agency stating that the fill is consistent with the State’s water quality standards and criteria. In California, the authority to either grant water quality certification or waive the requirement is delegated by the State Water Resources Control Board (SWRCB) to the nine RWQCBs.

Antidegradation Policy

The Federal antidegradation policy, established in 1968, is designed to protect existing uses, water quality, and national water resources. The Federal policy directs states to adopt a Statewide policy that includes the following primary provisions:

► Existing in-stream uses and the water quality necessary to protect those uses shall be maintained and protected.

► Where existing water quality is better than necessary to support fishing and swimming conditions, that quality shall be maintained and protected unless the state finds that allowing lower water quality is necessary for important local economic or social development.

► Where high-quality waters constitute an outstanding national resource, such as waters of national and state parks, wildlife refuges, and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected.

State

In California, SWRCB has broad authority over water-quality control issues for the state. SWRCB is responsible for developing Statewide water quality policy and exercises the powers delegated to the State by the Federal government under CWA. Other state agencies with jurisdiction over water quality regulation in California include the California Department of Public Health (CDPH) for drinking-water regulations, the California Department of Pesticide Regulation, the California Department of Fish and Wildlife (CDFW), and the Office of Environmental Health Hazard Assessment (OEHHA).

Regional authority for planning, permitting, and enforcement is delegated to the nine RWQCBs. The regional boards are required to formulate and adopt Basin Plans for all areas in the region and establish water quality objectives in the plans. California water quality objectives (or “criteria” under the CWA) are found in the Basin Plans adopted by the SWRCB and each of the nine RWQCBs. The Central Valley RWQCB is responsible for the regional area in which the program area is located.

Title 22 Standards

Water quality standards are enforceable limits composed of two parts: (1) the designated beneficial uses of water, and (2) criteria (i.e. numeric or narrative limits) to protect those beneficial uses. Municipal and domestic supply (MUN) is among the “beneficial uses” as defined in Section 13050(f) of the Porter-Cologne Act, which defines them as uses of surface water and groundwater that must be protected against water quality degradation. Maximum contaminant levels (MCLs) are components of the drinking water standards adopted by the CDPH pursuant to the California Safe Drinking Water Act. California MCLs may be found in Title 22 of the California Code of Regulations (CCR), Division 4, Chapter 15, Domestic Water Quality and Monitoring. The CDPH is responsible for Title 22 of the CCR (Article 16, Section 64449) as well, which also defines secondary drinking water standards, established primarily for reasons of consumer acceptance (i.e., taste) rather than because of health issues.
California MCLs, both Primary and Secondary, are directly applicable to groundwater and surface water resources when they are specifically referenced as water quality objectives in the pertinent Basin Plan. In such cases, MCLs become enforceable limits by the SWRCB and the RWQCBs. When fully health protective, MCLs may also be used to interpret narrative water quality objectives prohibiting toxicity to humans in water designated as a source of drinking water (MUN) in the Basin Plan.

**California Toxics Rule and State Implementation Policy**

The California Toxics Rule (CTR) was issued in 2000 in response to requirements of the EPA National Toxics Rule (NTR), and establishes numeric water quality criteria for approximately 130 priority pollutant trace metals and organic compounds. The CTR criteria are regulatory criteria adopted for inland surface waters, enclosed bays, and estuaries in California that are subject CWA Section 303(c). The CTR includes criteria for the protection of aquatic life and human health. Human health criteria (water and organism based) apply to all waters with a Municipal and Domestic Water Supply Beneficial Use designation as indicated in the 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 Policy (SIP), was most recently revised and adopted by SWRCB and California EPA in 2005. It establishes provisions for translating CTR criteria, NTR criteria, and Basin Plan water quality objectives for toxic pollutants into NPDES permit effluent limits, effluent compliance determinations, monitoring for 2,3,7,8-TCDD (dioxin) and its toxic equivalents, chronic (long-term) toxicity control provisions, initiating site-specific water quality objective development, and granting of exceptions for effluent compliance. The goal of the SIP is to establish a standardized approach for the permitting of discharges of toxic effluents to inland surface waters, enclosed bays, and estuaries in a consistent fashion throughout the state.

**Porter-Cologne Water Quality Control Act**

The Porter-Cologne Act is California’s statutory authority for the protection of water quality. Under the act, the state must adopt water quality policies, plans, and objectives that protect the State’s waters for the use and enjoyment of the people. The act sets forth the obligations of the SWRCB and RWQCBs to adopt and periodically update Basin Plans. Basin Plans are the regional water quality control plans required by both the CWA and Porter-Cologne Act in which beneficial uses, water quality objectives, and implementation programs are established for each of the nine regions in California. The act also requires waste dischargers to notify the RWQCBs of their activities through the filing of reports of waste discharge (RWDs) and authorizes the SWRCB and RWQCBs to issue and enforce waste discharge requirements (WDRs), NPDES permits, Section 401 water quality certifications, or other approvals. The RWQCBs also have authority to issue waivers to RWDs and/or WDRs for broad categories of “low threat” discharge activities that have minimal potential for adverse water quality effects when implemented according to prescribed terms and conditions.

**California State Nondegradation Policy**

In 1968, as required under the Federal antidegradation policy described above, the SWRCB adopted a nondegradation policy aimed at maintaining high quality for waters in California. The nondegradation policy states that the disposal of wastes into state waters shall be regulated to achieve the highest water quality consistent with maximum benefit to the people of the State and to promote the peace, health, safety, and welfare of the people of the State. The policy provides as follows:

- Where the existing quality of water is better than required under existing water quality control plans, such quality would be maintained until it has been demonstrated that any change would be consistent with maximum benefit to the people of the state and would not unreasonably affect present and anticipated beneficial uses of such water.

- Any activity which produces waste or increases the volume or concentration of waste and which discharges to existing high-quality waters would be required to meet waste discharge requirements, which would ensure...
(1) pollution or nuisance would not occur and (2) the highest water quality consistent with the maximum benefit to the people of the state would be maintained.

**National Pollutant Discharge Elimination System Permit System and Waste Discharge Requirements for Construction**

The SWRCB’s Statewide stormwater general permit for construction activity (Order 2009-0009-DWQ as amended by Order Nos. 2010-0014-DWQ and 2012-0006-DWQ) is applicable to all construction activities that would disturb 1 acre of land or more. Construction activities subject to the general construction activity permit include clearing, grading, stockpiling, and excavation. Dischargers are required to eliminate or reduce non-stormwater discharges to storm sewer systems and other waters.

Through the NPDES and WDR process, SWRCB seeks to ensure that the construction and postconstruction conditions at a project site do not cause or contribute to direct or indirect impacts on water quality (i.e., pollution and/or hydromodification) upstream and downstream. To comply with the requirements of the Construction General Permit, developers must file a notice of intent with the SWRCB to obtain coverage under the permit; prepare a Storm Water Pollution Prevention Plan (SWPPP); and implement inspection, monitoring, and reporting requirements appropriate to the project’s risk level as specified in the SWPPP. The SWPPP includes a site map, describes construction activities and potential pollutants, and identifies Best Management Practices (BMPs) that will be employed to prevent soil erosion and discharge of other construction-related pollutants that could contaminate nearby water resources, such as petroleum products, solvents, paints, and cement.

The Central Valley RWQCB (2013) has also adopted a general NPDES permit for short-term discharges of small volumes of wastewater from certain construction-related activities (General Dewatering Permit). Permit conditions for the discharge of these types of wastewater to surface waters are specified in the General Order for Dewatering and Other Low Threat Discharges to Surface Waters (Order No. R5-2013-0074, NPDES No. CAG995001).

Discharges may be covered by the General Dewatering Permit if (1) the average dry-weather discharge does not exceed 0.25 million gallons per day or (2) the discharge does not exceed 4 months in duration. Construction dewatering, well development water, pump/well testing, and miscellaneous dewatering/low-threat discharges are among the types of discharges that may be covered by the General Dewatering Permit. The General Dewatering Permit also specifies standards for testing, monitoring, and reporting; receiving-water limitations; and discharge prohibitions.

If dewatering activities would exceed 4 months in duration, a project-specific permit from the Central Valley RWQCB is required. Furthermore, where dewatering activities would occur in areas of contaminated groundwater or intermix with contaminated soil, the permittee is required to consult with the Central Valley RWQCB to determine the specific permit terms, disposal methods, and/or the types of treatment.

**Basin Plan**

The Water Quality Control Plan for the Sacramento River Basin and the San Joaquin River Basin (Basin Plan) (Central Valley RWQCB 2011a) 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. Basin Plans are updated every 3 years by the Central Valley RWQCB in compliance with the Porter-Cologne Act.

The Basin Plan includes numerical and narrative water quality objectives for physical and chemical water quality constituents. Numerical objectives are set for temperature; dissolved oxygen; turbidity; pH (i.e., acidity); total dissolved solids; electrical conductivity; bacterial content; and various specific ions, trace metals, and synthetic organic compounds. Narrative objectives are set for parameters such as suspended solids, biostimulatory substances (e.g., nitrogen and phosphorus), oils and grease, color, taste, and aquatic toxicity. Narrative objectives are often precursors to numeric objectives. The RWQCB issues WDRs for projects that may discharge wastes to
land or water uses to ensure conformance with Basin Plan water quality objectives and implementation policies. WDRs specify terms and conditions that must be followed during the implementation and operation of a project.

**Section 303(d) Impaired Waters List**

Section 303(d) of the CWA requires each state to develop a list of water bodies that would not attain water quality objectives after point-source dischargers (municipalities and industries) implement required levels of treatment. Section 303(d) also requires states to develop a total maximum daily load (TMDL) for each listed pollutant. The TMDL is the amount of pollutants that the water body can receive and still comply with water quality objectives. The TMDL can also act as a plan to reduce loading of a specific pollutant from various sources to achieve compliance with water quality objectives. The TMDL prepared by the State must:

► allocate allowable loadings to point and nonpoint sources,
► consider background loadings and a margin of safety,
► include an analysis showing links between loading reductions and the attainment of water quality objectives, and
► account for seasonal variation in water quality in its calculations.

EPA must either approve a TMDL prepared by the State or, if it disapproves the State’s TMDL, issue its own. NPDES permit limits for listed pollutants must be consistent with the waste load allocation prescribed in the TMDL. The intent is that the problems that caused a given pollutant to be placed on the Section 303(d) list would be remediated once the TMDL is implemented. The most recent 303(d) list (i.e., the 2010 Integrated Report) was prepared by SWRCB in 2010 and adopted by EPA in 2011.

**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. Alternatively, if appropriate, applicants must obtain certification 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 requiring Federal agency approval, such as issuance of a Section 404 permit) must also comply with CWA Section 401. The Section 401 Water Quality Certification certifies that the proposed activity will not violate State water quality standards. The RWQCBs administer the Section 401 program to prescribe measures necessary to avoid, minimize, or mitigate adverse impacts of proposed projects on water quality.

**REGIONAL AND LOCAL**

**Sacramento County General Plan**

The following policies from the *Sacramento County General Plan of 2005-2030 Conservation, Hazardous Materials, and Delta Protection Elements* (Sacramento County 2011) related to water quality apply to the proposed program.

► **Policy CO-24:** Comply with the Sacramento Areawide National Pollutant Discharge Elimination System Municipal Stormwater Permit (NPDES Municipal Permit) or subsequent permits, issued by the Central Valley Regional Water Quality Control Board (Regional Board) to the County, and the Cities of Sacramento, Elk Grove, Citrus Heights, Folsom, Rancho Cordova, and Galt (collectively known as the Sacramento Stormwater Quality Partnership [SSQP]).

► **Policy CO-26:** Protect areas susceptible to erosion, natural water bodies, and natural drainage systems.
► **Policy CO-28**: Comply with other water quality regulations and NPDES permits as they apply to County projects or activities, such as the State’s Construction General Permit and Aquatic Pesticides Permit.

► **Policy CO-98**: Coordinate with Federal, state and local agencies overseeing levee and bank stabilization to investigate and, whenever possible, utilize biotechnical or nonstructural alternatives to other conventional stabilization methods.

► **Policy CO-100**: Encourage construction of structures for flood control and stormwater quality purposes using currently approved scientific methods to prevent erosion and stabilize the banks.

► **Policy HM-4**: The handling, storage, and transport of hazardous materials shall be conducted in a manner so as not to compromise public health and safety standards.

► **Policy HM-8**: Continue the effort to prevent ground water and soil contamination.

► **Policy HM-9**: Continue the effort to prevent surface water contamination.

► **Policy HM-10**: Reduce the occurrences of hazardous material accidents and the subsequent need for incident response by developing and implementing effective prevention strategies.

► **Policy DP-48**: Preserve and protect the water quality of the Delta both for designated beneficial uses.

**City of Sacramento General Plan**

The following policies from the *City of Sacramento 2035 General Plan* Environmental Resources Element (City of Sacramento 2015) related to water quality apply to the proposed program.

► **Policy ER 1.1.1 Conservation of Open Space Areas**: The City shall conserve and where feasible create or restore areas that provide important water quality benefits such as riparian corridors, buffer zones, wetlands, undeveloped open space areas, levees, and drainage canals for the purpose of protecting water resources in the city’s watershed, creeks, and the Sacramento and American Rivers.

► **Policy ER 1.1.3 Stormwater Quality**: The City shall control sources of pollutants and improve and maintain urban runoff water quality through storm water protection measures consistent with the City’s National Pollution Discharge Elimination System Permit.

► **Policy ER 1.1.7 Construction Site Impacts**: The City shall minimize disturbances of natural water bodies and natural drainage systems caused by development, implement measures to protect areas from erosion and sediment loss, and continue to require construction contractors to comply with the City’s erosion and sediment control ordinance and stormwater management and discharge control ordinance.

► **Policy ER 1.1.9 Groundwater Recharge**: The City shall protect open space areas that are currently used for recharging groundwater basins, have the potential to be used for recharge, or may accommodate floodwater or stormwater.

**Solano County General Plan**

The following policies from the *Solano County General Plan* Public Health and Safety and Resources Elements (Solano County 2008) related to water quality apply to the proposed program.

► **Policy HS.P-2**: Restore and maintain the natural functions of riparian corridors and water channels throughout the county to reduce flooding, convey stormwater flows, and improve water quality.
► **Policy HS.P-10**: Ensure that flood management policies that minimize loss of life and property also balance with environmental health considerations of the floodplain and therefore do not cause further erosion, sedimentation, or water quality problems in the floodplain area.

► **Policy RS.P-16**: The County shall ensure that development in the County occurs in a manner which minimizes impacts of earth disturbance, erosion, and water pollution.

► **Policy RS.P-28**: Protect long-term water quality in the Delta in coordination with water agencies at local, state, and Federal levels for designated beneficial uses, including agriculture, municipal, water-dependent industrial, water-contact recreation, boating and fish and wildlife habitat.

► **Policy RS.P-65**: Require the protection of natural water courses.

► **Policy RS.P-70**: Protect land surrounding valuable water sources, evaluate watersheds, and preserve open space lands to protect and improve groundwater quality, reduce polluted surface runoff, and minimize erosion.

► **Policy RS.P-71**: Ensure that land use activities and development occur in a manner that minimizes the impact of earth disturbance, erosion, and surface runoff pollutants on water quality.

► **Policy RS.P-72**: Preserve riparian vegetation along county waterways to maintain water quality.

**City of Rio Vista General Plan**

The following policies from the *City of Rio Vista General Plan 2001* Resource Conservation & Management and Safety & Noise Elements (City of Rio Vista Community Development Department 2002) related to water quality apply to the proposed program.

► **Policy 10.5.D**: The City shall ensure that natural drainage corridors and other watercourses are protected from the adverse effects of construction activities and urban runoff.

► **Policy 10.5.G**: The City shall discourage grading activities during the rainy season, unless adequately mitigated, to avoid sedimentation of drainageways and damage to riparian habitat.

► **Policy 10.5.H**: The City shall condition projects on applying pollution control measures that will restrict pollutants from entering Rio Vista’s storm drain system.

► **Policy 10.5.I**: The City shall ensure that groundwater resources are protected from contamination and overdraft.

► **Policy 10.5.M**: The City shall encourage activities that maintain and improve drinking water quality.

► **Policy 10.7.A**: The City shall minimize soil erosion and sedimentation by maintaining compatible land uses, suitable building designs, and appropriate construction techniques.

► **Policy 11.1.C**: Soil erosion and sedimentation shall be minimized by maintaining compatible land uses, suitable building designs, and appropriate construction techniques.

**Yolo County General Plan**

The following policies from the *Yolo County General Plan* Conservation and Open Space and Health and Safety Elements (Yolo County 2009) related to water quality apply to the proposed program.
► **Policy CO-2.31:** Protect wetland ecosystems by minimizing erosion and pollution from grading, especially during grading and construction projects.

► **Policy CO-5.6:** Improve and protect water quality for municipal, agricultural, and environmental uses.

► **Policy CO-5.7:** Support mercury regulations that are based on good science and reflect an appropriate balancing of sometimes competing public values including health, food chain, reclamation and restoration of Cache Creek, sustainable and economically viable Delta agriculture, necessary mineral extraction, flood control, erosion control, water quality, and habitat restoration.

► **Policy CO-5.23:** Support efforts to meet applicable water quality standards for all surface and groundwater resources.

► **Policy HS-2.7:** Manage the floodplain to improve the reliability and quality of water supplies.

### 4.5.2 ENVIRONMENTAL SETTING

The program area is located within the Sacramento Valley, which is a nearly flat alluvial plain that extends almost 180 miles from Redding in the north to the Sacramento-San Joaquin Delta (Delta) in the south. The climate in the Sacramento Valley is characterized by warm, dry summers with an almost complete absence of rain, and mild winters with relatively light rains. Streams and creeks in the program area generally drain towards the center of the valley and into the Sacramento River, which flows south into the Delta.

Activities associated with the proposed program would take place within or immediately adjacent to several waterbodies, as follows:

► west side of the Sacramento River adjacent to the Sacramento Weir,
► Sacramento Bypass,
► east side of the Yolo Bypass (south of Interstate 5 [I-5]),
► east side of the Tule Canal south of I-5,
► east side of the Sacramento River between the American River and Freeport, and
► west side of the Sacramento River in Rio Vista.

Detailed discussions related to watersheds, hydrologic and hydraulic characteristics, and floodplain designations of these waterbodies are presented in Section 4.4, “Hydrology and Hydraulics.”

### SACRAMENTO/YOLO BYPASS NORTH OF SACRAMENTO (ELKHORN BASIN)

#### Surface Water Quality

The Basin Plan (Central Valley RWQCB 2011a) 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. Designated beneficial uses for the Yolo Bypass and the Sacramento River from the Colusa Basin Drain to the I Street Bridge are listed in Table 4.5-1.

The Tule Canal does not currently have any specific designated beneficial uses attributed to it in the Basin Plan. Consequently, the Central Valley RWQCB applies the Basin Plan’s “tributary rule” and the Tule Canal is assigned the beneficial uses designated for the nearest downstream location. The Central Valley RWQCB also regulates waste discharges in undesignated streams to ensure that downstream water quality conditions and beneficial uses are not degraded. Thus, the Tule Canal is subject to regulation for the existing designated uses in its receiving waterbodies. Therefore, the Tule Canal is subject to regulation for the existing designated uses in the Sacramento River and the Delta, which are described in Table 4.5-1.
### Table 4.5-1. Designated Beneficial Uses for the Yolo Bypass and the Sacramento River

<table>
<thead>
<tr>
<th>Waterbody</th>
<th>Water Supply</th>
<th>Recreation</th>
<th>Fisheries</th>
<th>Habitat</th>
<th>Other</th>
</tr>
</thead>
</table>
| Yolo Bypass      | • Agricultural irrigation  
|                  | • Stock watering      | • Water-contact, other non-contact recreation       | • Warmwater fish habitat, migration, and spawning  
|                  |                       |                                                   | • Coldwater fish habitat and migration           | • Wildlife habitat         | • Commercial and sport fishing |
| Sacramento River | • Municipal and industrial supply  
|                  | • Agricultural irrigation | • Contact and non-contact recreation               | • Warmwater fish habitat, migration, and spawning  
|                  |                       | • Canoeing and rafting                             | • Coldwater fish habitat, migration, and spawning | • Wildlife habitat         | • Navigation                 |

Note:  

1 From the Colusa Basin Drain south to the I Street Bridge in Sacramento.  
Source: Central Valley RWQCB 2011a:Chapter II

### Table 4.5-2. Section 303(d)-Listed Pollutants for Tule Canal and Sacramento River

<table>
<thead>
<tr>
<th>Pollutant/Stressor</th>
<th>Potential Sources</th>
<th>Proposed TMDL Completion Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boron</td>
<td>Natural sources and agriculture</td>
<td>2021</td>
</tr>
<tr>
<td>E. coli</td>
<td>Agriculture, nonpoint source, and source unknown</td>
<td>2021</td>
</tr>
<tr>
<td>Fecal coliform</td>
<td>Agriculture and source unknown</td>
<td>2021</td>
</tr>
<tr>
<td>Salinity</td>
<td>Agriculture</td>
<td>2021</td>
</tr>
</tbody>
</table>

Sacramento River^1

<table>
<thead>
<tr>
<th>Pollutant/Stressor</th>
<th>Potential Sources</th>
<th>Proposed TMDL Completion Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlordane</td>
<td>Agriculture</td>
<td>2021</td>
</tr>
<tr>
<td>DDT</td>
<td>Agriculture</td>
<td>2021</td>
</tr>
<tr>
<td>Dieldrin</td>
<td>Agriculture</td>
<td>2022</td>
</tr>
<tr>
<td>Mercury</td>
<td>Resource extraction (abandoned mines)</td>
<td>2012</td>
</tr>
<tr>
<td>PCBs</td>
<td>Source unknown</td>
<td>2021</td>
</tr>
<tr>
<td>Unknown toxicity</td>
<td>Source unknown</td>
<td>2019</td>
</tr>
</tbody>
</table>

Notes: TMDL = total maximum daily load; DDT = dichlorodiphenyltrichloroethane; PCBs = polychlorinated biphenyls  
^1 From Knights Landing to the Delta.  
Sources: SWRCB and EPA 2011

Mercury, particularly methylmercury, accumulates in aquatic organisms. In the Delta, fish tissues have been found to contain elevated levels of this neurotoxin. Much of the mercury in the Delta originates from sediments contaminated by historic mining activities in the tributaries to the Delta. These tributaries still contain elevated levels of mercury as a result of mining activities and continue to contribute to the elevated levels in the Delta. In 2011, Central Valley RWQCB adopted a Delta methylmercury TMDL, which includes biological and water column objectives (Central Valley RWQCB 2011b). This TMDL applies to most of the Delta tributaries, including the Yolo Bypass, Tule Canal, and Sacramento River. The methylmercury TMDL has been set in grams per year (g/yr) and varies depending on the type of waterbody and location.
In 2005, Larry Walker and Associates performed water quality monitoring at 12 locations in the Yolo Bypass as shown in Exhibit 4.5-1. Three of those sites—Nos. 8 (Sacramento Weir), 10 (Tule Canal – Woodland R2), and 11 (Tule Canal at northeast corner of I-80)—are immediately adjacent to areas where the program-related funded facilities would be implemented (Larry Walker Associates 2005:Figure 5a). Water column samples were collected on the third week of every month for 12 consecutive months. Data for the periodic overflow from the Sacramento River at the Freumont and Sacramento Weirs, as well as the Tule Canal and other monitoring sites within the Yolo Bypass, are presented in Table 4.5-3.

Groundwater Quality

The Elkhorn Basin lies within the Sacramento Valley Groundwater Basin, Yolo Subbasin (California Department of Water Resources [DWR] 2013). Fresh water-bearing units consist of younger alluvium, older alluvium, and the Tehama Formation. The younger alluvium includes flood basin deposits, which generally provides low quantities of poor quality groundwater. However, substantial quantities of generally high-quality groundwater are produced from the recent stream channel deposits (younger alluvium) and the Tehama Formation. Groundwater from the older alluvium is variable. (DWR 2004a.)

Groundwater found within the subbasin is characterized as a sodium-magnesium, calcium-magnesium, or magnesium-bicarbonate type. The quality is considered good for both agricultural and municipal uses, even though it is hard to very hard overall (generally over 180 milligrams per liter [mg/L] of calcium carbonate [CaCO$_3$]). Total dissolved solids range from 107–1,300 parts per million (ppm). Localized impairments include elevated concentrations of boron (as high as 2–4 ppm) in groundwater along Cache Creek and in the Cache Creek Settling Basin area, increased levels of selenium present in the groundwater supplies for the City of Davis, and localized areas of nitrate contamination. (DWR 2004a.)

Southern Yolo Bypass

As discussed above, in 2005, Larry Walker Associates performed water quality monitoring at 12 locations in the Yolo Bypass. One of those sites—#7 (Z Drain – Dixon RCD)—was in close proximity to the northern end of the Reclamation District No. 2068 (RD 2068) Levee that would be strengthened as part of the proposed program (see Exhibit 4.5-1). Water quality data from the three monitoring sites involving agricultural drains, including Site #7, are presented in Table 4.5-4.

Groundwater Quality

The area in the vicinity of the RD 2068 Levee is located within the Sacramento Valley Groundwater Basin, Solano Subbasin (DWR 2013). Flood basin deposits occur along the eastern margin of the subbasin. These deposits consist primarily of silts and clays, and may be locally interbedded with stream channel deposits of the Sacramento River. In the Delta, flood basin deposits contain a high percentage of organic material (peat), and are sometimes mapped as peaty mud. The flood basin deposits have low permeability and generally yield low quantities of water to wells. Older alluvium consists of loose to moderately compacted silt, silty clay, sand, and gravel deposits in alluvial fans during the Pliocene and Pleistocene. Permeability of the older alluvium is highly variable. Wells penetrating sand and gravel lenses of the unit produce 300–1,000 gallons per minute (gpm). Adjacent to the Sacramento River, wells completed in ancestral Sacramento River stream channel deposits yield up to 4,000 gpm. Wells completed in the finer-grained portions of the older alluvium produce 50–150 gpm.
Exhibit 4.5-1a. Water Quality Monitoring Locations in the Northern Yolo Bypass

Source: Larry Walker Associates 2005
Exhibit 4.5-1b. Water Quality Monitoring Locations in the Southern Yolo Bypass

Source: Larry Walker Associates 2005
### Table 4.5-3. Water Quality Data for Sacramento Weir, Yolo Bypass, and Tule Canal

<table>
<thead>
<tr>
<th>Pollutant of Concern</th>
<th>Units</th>
<th>Threshold Criteria</th>
<th>Location Flood&lt;sup&gt;2&lt;/sup&gt;</th>
<th>In Bypass&lt;sup&gt;3&lt;/sup&gt;</th>
<th>Dry</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Average</td>
<td>Wet</td>
<td>2,266</td>
</tr>
<tr>
<td>E. coli</td>
<td>MPN/100mL</td>
<td>126</td>
<td>4,000</td>
<td>1,355</td>
<td>2,266</td>
</tr>
<tr>
<td>Fecal coliform</td>
<td>MPN/100mL</td>
<td>200</td>
<td>6,000</td>
<td>1,995</td>
<td>2,936</td>
</tr>
<tr>
<td>Total coliform</td>
<td>MPN/100mL</td>
<td>–</td>
<td>8,000</td>
<td>25,653</td>
<td>24,146</td>
</tr>
<tr>
<td>Boron</td>
<td>µg/L</td>
<td>700</td>
<td>NA</td>
<td>934</td>
<td>650</td>
</tr>
<tr>
<td>Boron, dissolved</td>
<td>µg/L</td>
<td>–</td>
<td>NA</td>
<td>818</td>
<td>610</td>
</tr>
<tr>
<td>Aluminum</td>
<td>µg/L</td>
<td>87</td>
<td>NA</td>
<td>2,575</td>
<td>2,400</td>
</tr>
<tr>
<td>Aluminum, dissolved</td>
<td>µg/L</td>
<td>–</td>
<td>NA</td>
<td>11.7</td>
<td>17.5</td>
</tr>
<tr>
<td>Chromium (III)</td>
<td>µg/L</td>
<td>340</td>
<td>NA</td>
<td>9.0</td>
<td>8.2</td>
</tr>
<tr>
<td>Chromium (III), dissolved</td>
<td>µg/L</td>
<td>395</td>
<td>NA</td>
<td>1.17</td>
<td>1.6</td>
</tr>
<tr>
<td>Copper</td>
<td>µg/L</td>
<td>18.3</td>
<td>NA</td>
<td>7.6</td>
<td>7.3</td>
</tr>
<tr>
<td>Copper, dissolved</td>
<td>µg/L</td>
<td>17.6</td>
<td>NA</td>
<td>2.77</td>
<td>2.63</td>
</tr>
<tr>
<td>Lead</td>
<td>µg/L</td>
<td>8.68</td>
<td>NA</td>
<td>1.17</td>
<td>1.18</td>
</tr>
<tr>
<td>Lead, dissolved</td>
<td>µg/L</td>
<td>5.9</td>
<td>NA</td>
<td>0.15</td>
<td>0.19</td>
</tr>
<tr>
<td>Methylmercury&lt;sup&gt;4&lt;/sup&gt;</td>
<td>ng/L</td>
<td>0.06</td>
<td>NA</td>
<td>0.33</td>
<td>0.49</td>
</tr>
<tr>
<td>Total mercury</td>
<td>ng/L</td>
<td>51</td>
<td>22</td>
<td>13.7</td>
<td>12.6</td>
</tr>
<tr>
<td>Selenium</td>
<td>µg/L</td>
<td>5</td>
<td>NA</td>
<td>0.91</td>
<td>1.13</td>
</tr>
<tr>
<td>Selenium, dissolved</td>
<td>µg/L</td>
<td>–</td>
<td>NA</td>
<td>0.98</td>
<td>1.00</td>
</tr>
<tr>
<td>Nitrate</td>
<td>mg/N-L</td>
<td>10</td>
<td>NA</td>
<td>1.72</td>
<td>0.60</td>
</tr>
<tr>
<td>Total Organic Carbon</td>
<td>mg/L</td>
<td>–</td>
<td>NA</td>
<td>7.5</td>
<td>7.5</td>
</tr>
<tr>
<td>Dissolved Organic Carbon</td>
<td>mg/L</td>
<td>–</td>
<td>NA</td>
<td>7.1</td>
<td>7.5</td>
</tr>
<tr>
<td>Electrical Conductivity (EC)</td>
<td>µmhos/cm</td>
<td>700</td>
<td>120</td>
<td>607</td>
<td>548</td>
</tr>
<tr>
<td>Total Dissolved Solids (TDS)</td>
<td>mg/L</td>
<td>450</td>
<td>NA</td>
<td>381</td>
<td>335</td>
</tr>
<tr>
<td>Total Suspended Solids (TSS)</td>
<td>mg/L</td>
<td>–</td>
<td>NA</td>
<td>58</td>
<td>62</td>
</tr>
<tr>
<td>Diuron</td>
<td>µg/L</td>
<td>10</td>
<td>NA</td>
<td>0.30</td>
<td>0.40</td>
</tr>
<tr>
<td>Methomyl</td>
<td>µg/L</td>
<td>0.52</td>
<td>NA</td>
<td>ND</td>
<td>ND</td>
</tr>
<tr>
<td>4,4'-DDE</td>
<td>µg/L</td>
<td>0.00059</td>
<td>NA</td>
<td>ND</td>
<td>ND</td>
</tr>
<tr>
<td>Chlorpyrifos</td>
<td>µg/L</td>
<td>0.009</td>
<td>NA</td>
<td>ND</td>
<td>ND</td>
</tr>
<tr>
<td>Diazanon</td>
<td>µg/L</td>
<td>0.1</td>
<td>NA</td>
<td>ND</td>
<td>ND</td>
</tr>
</tbody>
</table>

Notes: MPN = most probable number; mL = milliliter; µg/L = micrograms per liter; mg/N-L = milligrams of nitrogen per liter; ng/L = nanograms per liter; mg/L = milligrams per liter; µmhos/cm = micromhos per centimeter; 4,4'-DDE = dichlorodiphenyldichloroethylene; “-” = no threshold criteria have been identified; NA = no data available, no samples collected; ND = nondetect; gray shading represents an exceedance of the threshold criteria

<sup>1</sup> Represents averages of all data obtained
<sup>2</sup> Sporadic flood discharges over Fremont Weir (Site #1) and Sacramento Weir (Site #8)
<sup>3</sup> In-Bypass flows in Tule Canal (R-1 [Site #9], R-2 [Site #10], and I-80 [Site #11]), Yolo Basin Wildlife Area (Site #5), and the Toe Drain (east corner of Little Holland Tract, Site #12)
<sup>4</sup> The methylmercury TMDL adopted by Central Valley RWQCB in 2011 is 100 grams per year (g/yr) for tributary inputs and 103 g/yr for wetlands to the Yolo Bypass.

Source: Larry Walker Associates 2005:Table 9
Groundwater within the Solano subbasin is considered to be of generally good quality, and usable for both domestic and agricultural purposes. Chemical water types within the basin are variable and classified generally as

Table 4.5-4. Water Quality Data for Agricultural Drains in the Yolo Bypass\(^1\)

<table>
<thead>
<tr>
<th>Pollutant of Concern</th>
<th>Units</th>
<th>Threshold Criteria</th>
<th>Location</th>
<th>Location</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Average</td>
<td>Wet</td>
<td>Dry</td>
</tr>
<tr>
<td>E. coli</td>
<td>MPN/100mL</td>
<td>126</td>
<td>4,215</td>
<td>4,643</td>
<td>3,754</td>
</tr>
<tr>
<td>Fecal coliform</td>
<td>MPN/100mL</td>
<td>200</td>
<td>4,991</td>
<td>4,192</td>
<td>5,121</td>
</tr>
<tr>
<td>Total coliform</td>
<td>MPN/100mL</td>
<td>–</td>
<td>43,961</td>
<td>25,045</td>
<td>61,605</td>
</tr>
<tr>
<td>Boron</td>
<td>µg/L</td>
<td>700</td>
<td>1,347</td>
<td>1,053</td>
<td>1,494</td>
</tr>
<tr>
<td>Boron, dissolved</td>
<td>µg/L</td>
<td>–</td>
<td>1,320</td>
<td>970</td>
<td>1,495</td>
</tr>
<tr>
<td>Aluminum</td>
<td>µg/L</td>
<td>87</td>
<td>1,958</td>
<td>1,575</td>
<td>2,150</td>
</tr>
<tr>
<td>Aluminum, dissolved</td>
<td>µg/L</td>
<td>–</td>
<td>7.1</td>
<td>11.3</td>
<td>5.0</td>
</tr>
<tr>
<td>Chromium (III)</td>
<td>µg/L</td>
<td>340</td>
<td>7.3</td>
<td>5.2</td>
<td>8.4</td>
</tr>
<tr>
<td>Chromium (III), dissolved</td>
<td>µg/L</td>
<td>395</td>
<td>1.47</td>
<td>1.48</td>
<td>1.46</td>
</tr>
<tr>
<td>Copper</td>
<td>µg/L</td>
<td>18.3</td>
<td>6.6</td>
<td>6.0</td>
<td>6.9</td>
</tr>
<tr>
<td>Copper, dissolved</td>
<td>µg/L</td>
<td>17.6</td>
<td>2.62</td>
<td>2.75</td>
<td>2.55</td>
</tr>
<tr>
<td>Lead</td>
<td>µg/L</td>
<td>8.68</td>
<td>1.15</td>
<td>0.95</td>
<td>1.25</td>
</tr>
<tr>
<td>Lead, dissolved</td>
<td>µg/L</td>
<td>5.9</td>
<td>0.15</td>
<td>0.19</td>
<td>0.13</td>
</tr>
<tr>
<td>Methylmercury(^3)</td>
<td>ng/L</td>
<td>0.06</td>
<td>0.34</td>
<td>0.28</td>
<td>0.38</td>
</tr>
<tr>
<td>Total mercury</td>
<td>ng/L</td>
<td>51</td>
<td>9.4</td>
<td>6.7</td>
<td>11.7</td>
</tr>
<tr>
<td>Selenium</td>
<td>µg/L</td>
<td>5</td>
<td>2.8</td>
<td>2.6</td>
<td>2.9</td>
</tr>
<tr>
<td>Selenium, dissolved</td>
<td>µg/L</td>
<td>–</td>
<td>2.5</td>
<td>2.3</td>
<td>2.6</td>
</tr>
<tr>
<td>Nitrate</td>
<td>mg/N-L</td>
<td>10</td>
<td>0.73</td>
<td>0.41</td>
<td>0.89</td>
</tr>
<tr>
<td>Total Organic Carbon</td>
<td>mg/L</td>
<td>–</td>
<td>8.6</td>
<td>10.5</td>
<td>8.0</td>
</tr>
<tr>
<td>Dissolved Organic Carbon</td>
<td>mg/L</td>
<td>–</td>
<td>8.2</td>
<td>7.8</td>
<td>8.3</td>
</tr>
<tr>
<td>Electrical Conductivity</td>
<td>µmhos/cm</td>
<td>700</td>
<td>797</td>
<td>786</td>
<td>787</td>
</tr>
<tr>
<td>Total Dissolved Solids</td>
<td>mg/L</td>
<td>450</td>
<td>494</td>
<td>485</td>
<td>498</td>
</tr>
<tr>
<td>Total Suspended Solids</td>
<td>mg/L</td>
<td>–</td>
<td>69</td>
<td>55</td>
<td>74</td>
</tr>
<tr>
<td>Diuron</td>
<td>µg/L</td>
<td>10</td>
<td>0.32</td>
<td>0.55</td>
<td>0.17</td>
</tr>
<tr>
<td>Methomyl</td>
<td>µg/L</td>
<td>0.52</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
</tr>
<tr>
<td>4,4’-DDE</td>
<td>µg/L</td>
<td>0.00059</td>
<td>0.01</td>
<td>ND</td>
<td>0.01</td>
</tr>
<tr>
<td>Chlorpyrifos</td>
<td>µg/L</td>
<td>0.009</td>
<td>0.03</td>
<td>0.04</td>
<td>0.01</td>
</tr>
<tr>
<td>Diazanon</td>
<td>µg/L</td>
<td>0.1</td>
<td>0.03</td>
<td>0.03</td>
<td>ND</td>
</tr>
</tbody>
</table>

Notes: MPN = most probable number; mL = milliliter; µg/L = micrograms per liter; mg/N-L = milligrams of nitrogen per liter; ng/L = nanograms per liter; mg/L = milligrams per liter; µmhos/cm = micromhos per centimeter; 4,4’-DDE = dichlorodiphenyldichloroethylene; “–” = no threshold criteria have been identified; NA = no data available, no samples collected; ND = nondetect; gray shading represents an exceedance of the threshold criteria

\(^1\) Represents averages of all data obtained

\(^2\) Agricultural drains of Knights Landing Ridge Cut (Site #2), Willow Slough Bypass (Site #4), and Z Drain – Dixon RCD (Site #7)

\(^3\) The methylmercury TMDL adopted by Central Valley RWQCB in 2011 is 4.1 grams per year for agricultural drainages to the Yolo Bypass.

Sources: Larry Walker Associates 2005: Table 9, Central Valley RWQCB 2011b:Table A
magnesium-bicarbonate in the central and northern areas, sodium-bicarbonate in the southern and eastern areas, and calcium-magnesium or magnesium-calcium-bicarbonate around and west of Dixon. High concentrations of bicarbonate, which cause precipitation of calcium and magnesium carbonates, are found in the southern portion of the basin. Total dissolved solids (TDS) range from 250–500 ppm in the northwestern and eastern portions of the basin and are found at levels greater than 500 ppm in the central and southern areas. In general, most of the water within the subbasin is classified as hard to very hard. Chloride concentrations greater than 100 ppm and sulfate concentrations greater than 50 ppm occur in the southern areas (the MCL for both chloride and sulfate is 600 ppm.) Boron concentrations are less than 0.75 ppm except in the southern and southeastern basin where concentrations average between 0.75 and 2.0 ppm (more than 1.0 ppm will affect sensitive tree crops). Iron concentrations increase toward the eastern side of the subbasin, from less than 0.02 ppm to greater than 0.05 ppm (the MCL is 0.3 ppm) along the Sacramento River, while manganese concentrations also increase from west to east with concentrations from 0.01 ppm to over 0.1 ppm (the MCL is 0.050 ppm) found north of Rio Vista and east of the Solano/Yolo County line. Arsenic concentrations are typically between 0.02 and 0.05 ppm, with the highest concentrations found along the southeastern margin of the basin (the MCL is 0.01 ppm or 10 parts per billion [ppb]). Also, manganese (a secondary constituent) is found at concentrations above the MCL of 0.05 ppm along the Sacramento River along the eastern portion of the subbasin.

**SACRAMENTO RIVER EAST LEVEE AND RIO VISTA**

**Surface Water Quality**

The proposed Sacramento River East Levee erosion control improvements and the floodwall at Rio Vista would occur along the Sacramento River south of the I Street Bridge, which is legally within the bounds of the Delta. Surface water quality in the hydrologic region is generally good, although possible sources of contamination that can affect water quality consist of turbidity; pesticides and fertilizers from agricultural runoff; water temperature exceedances; and toxic heavy metals, such as mercury, copper, zinc, and cadmium from historic mining activities.

Designated beneficial uses for the Delta, including the Sacramento River from the I Street Bridge southward, are shown in Table 4.5-5.

CWA Section 303(d) list of impairments for the Sacramento River from Knights Landing to the Delta (which includes the Sacramento River East Levee and the Rio Vista area) are included in Table 4.5-2 (above). Impairments for the Northern Delta subarea (which includes the Sacramento River from the I Street Bridge in Sacramento southward) are shown in Table 4.5-6.

<table>
<thead>
<tr>
<th>Table 4.5-5. Designated Beneficial Uses for the Northern Sacramento-San Joaquin Delta¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waterbody</td>
</tr>
<tr>
<td>Sacramento-San Joaquin Delta</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

**Note:**

¹ Includes the Sacramento River from the I Street Bridge in downtown Sacramento southward.

Source: Central Valley RWQCB 2011a: Chapter II
Table 4.5-6. **Section 303(d)-Listed Pollutants for North Delta Waterways**

<table>
<thead>
<tr>
<th>Pollutant/Stressor</th>
<th>Potential Sources</th>
<th>Proposed TMDL Completion Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlordane</td>
<td>Agriculture</td>
<td>2011</td>
</tr>
<tr>
<td>Chloryrifos</td>
<td>Agriculture; urban runoff/storm sewers</td>
<td>TMDL adopted 2007</td>
</tr>
<tr>
<td>DDT</td>
<td>Agriculture</td>
<td>2011</td>
</tr>
<tr>
<td>Diazinon</td>
<td>Agriculture; urban runoff/storm sewers</td>
<td>TMDL adopted 2007</td>
</tr>
<tr>
<td>Dieldrin</td>
<td>Agriculture</td>
<td>2011</td>
</tr>
<tr>
<td>Group A pesticides</td>
<td>Agriculture</td>
<td>2011</td>
</tr>
<tr>
<td>Invasive Species</td>
<td>Source unknown</td>
<td>2019</td>
</tr>
<tr>
<td>Mercury</td>
<td>Resource extraction (abandoned mines)</td>
<td>2009</td>
</tr>
<tr>
<td>PCBs</td>
<td>Source unknown</td>
<td>2019</td>
</tr>
<tr>
<td>Unknown toxicity</td>
<td>Source unknown</td>
<td>2019</td>
</tr>
</tbody>
</table>

Notes: TMDL = total maximum daily load; DDT = dichlorodiphenyltrichloroethane; PCBs = polychlorinated biphenyls
Sources: SWRCB and EPA 2011

The adopted Delta TMDL for methylmercury is discussed above under the heading “Sacramento/Yolo Bypass and Sacramento River North of Sacramento (Elkhorn Basin).”

Surface water quality data for the Sacramento River at Garcia Bend (in the Pocket area) is provided in Table 4.5-7.

**Groundwater Quality**

**Sacramento River East Levee**

The Sacramento River East Levee is located within the Sacramento Valley Groundwater Basin, South American Subbasin (DWR 2013), and the Central Sacramento County Groundwater Basin (Central Basin), which have generally similar boundaries (see Section 4.4, “Hydrology and Hydraulics,” for additional details.) This discussion focuses on data from the Central Basin, because the Central Sacramento Groundwater Management Plan (Montgomery Watson Harza [MWH] 2006) contains recent quantitative information. Water quality analyses of the aquifers underlying the Central Basin has shown that groundwater found in the upper aquifer system is of higher quality than that found in the lower aquifer system (MWH 2006). This water quality differential is principally because the lower aquifer system (specifically the Mehrten Formation) contains higher concentrations of iron and manganese. The lower aquifer system also has higher concentrations of TDS, although this aquifer typically meets water quality standards as a potable water source. At depths of approximately 1,400 feet or greater (actual depth varies throughout the basin), the TDS concentration exceeds 2,000 mg/L and groundwater is considered non-potable unless treated by reverse osmosis. Water from the upper aquifer (specifically the Laguna Formation) generally does not require treatment (unless high arsenic values are encountered), other than disinfection for public drinking water systems.

Municipal wells meet all CCR Title 22 primary drinking water quality standards. A number of purveyor wells within the Central Basin exceed secondary drinking water standards for iron and manganese; many of these wells are treated to remove these constituents. Secondary standards were established for aesthetic concerns (e.g., staining of laundry and porcelain fixtures); therefore, exceedances of secondary standards do not by themselves indicate that there is a health hazard. Arsenic concentrations in some wells exceed Federal drinking water standards implemented in January 2006 of 10 micrograms per liter (µg/L). Radon also has been detected in groundwater in the greater Sacramento area, although not at levels that exceed current drinking water standards.

This description of background water quality is based on water quality data used to populate the Central Basin Data Management System (DMS) and contaminant information tracked by the Central Valley RWQCB and the...
Sacramento County Environmental Management Department (EMD), from monitoring activities between 1999 and 2003. Available water quality data are summarized in Table 4.5-8.

### Table 4.5-7. Surface Water Quality of the Sacramento River at Garcia Bend

<table>
<thead>
<tr>
<th>Water Quality Parameter</th>
<th>Average Value/Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ammonia, Dissolved</td>
<td>0.025 mg/L</td>
</tr>
<tr>
<td>Bifenthrin</td>
<td>0.002 μg/L</td>
</tr>
<tr>
<td>Dissolved Oxygen</td>
<td>7.3–11.7 mg/L</td>
</tr>
<tr>
<td>Dissolved Organic Carbon</td>
<td>2.08 mg/L</td>
</tr>
<tr>
<td>Electrical Conductivity (EC)</td>
<td>134–186 μS/cm</td>
</tr>
<tr>
<td>Esfenvalerate/Fenvalerate, Total</td>
<td>0.002 μg/L</td>
</tr>
<tr>
<td>Fenpropathrin, Total</td>
<td>0.002 μg/L</td>
</tr>
<tr>
<td>Nitrate and Nitrate, as Nitrogen (N), dissolved</td>
<td>0.12 mg/L</td>
</tr>
<tr>
<td>Nitrogen, Total</td>
<td>0.39 mg/L</td>
</tr>
<tr>
<td>Nitrogen, Total, dissolved</td>
<td>0.3 mg/L</td>
</tr>
<tr>
<td>Orthophosphate as Phosphorus (P), dissolved</td>
<td>0.026 mg/L</td>
</tr>
<tr>
<td>Permethrin, Total</td>
<td>0.019 μg/L</td>
</tr>
<tr>
<td>Pheophytin a, Particulate</td>
<td>1.62 μg/L</td>
</tr>
<tr>
<td>Phosphorus as P, Dissolved</td>
<td>0.03 mg/L</td>
</tr>
<tr>
<td>Phosphorus as P, Total</td>
<td>0.08 mg/L</td>
</tr>
<tr>
<td>pH</td>
<td>7.3–8.0</td>
</tr>
<tr>
<td>Temperature</td>
<td>48.7–71.1°F</td>
</tr>
<tr>
<td>Total Suspended Solids (TSS)</td>
<td>24–86 mg/L</td>
</tr>
<tr>
<td>Turbidity</td>
<td>4–52 NTU</td>
</tr>
</tbody>
</table>

Notes: mg/L = milligrams per liter; μS/cm = microsiemens per centimeter; μg/L = micrograms per liter; ml = milliliters; °F = degrees Fahrenheit; NTU = nephelometric turbidity units

1 Includes trace amounts of pesticides.

Source: SWRCB 2014

### Table 4.5-8. Groundwater Quality in the Sacramento River East Levee Improvements Area

<table>
<thead>
<tr>
<th>Water Quality Parameter</th>
<th>Average Value/Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Dissolved Solids</td>
<td>below secondary drinking water standards</td>
</tr>
<tr>
<td>Iron</td>
<td>200 μg/L</td>
</tr>
<tr>
<td>Manganese</td>
<td>&lt;50 μg/L</td>
</tr>
<tr>
<td>Arsenic</td>
<td>&lt;50 μg/L</td>
</tr>
</tbody>
</table>

Note: μg/L = micrograms per liter

Source: MWH 2006

### Rio Vista

The City of Rio Vista is located immediately west of the Delta. The City is located within the low rolling hills adjacent to the Montezuma Hills in the west, which transition to a relatively flat, low-lying flood plain extending to the north and east. The Sacramento River, which drains the northern half of the Central Valley, forms the boundary of the Sacramento Valley Groundwater Basin. Rio Vista lies within the Solano Subbasin of the Sacramento Valley Groundwater Basin (described above). Cross-sections of the City’s groundwater wells developed by ENGEO (2002) indicate that the deeper alluvial sediments are a complex assemblage of coarse sand
and gravel deposits, silt overbank deposits, and silt and clay-sized backwater deposits. One of the City’s groundwater wells, well number 7, is located within approximately 100 feet of the proposed floodwall at Montezuma Street. The wells beneath the downtown area, including well number 7 near the proposed floodwall, are located primarily in sands and gravels. Well number 7 was installed in June 1953 to a depth of 424 feet below the ground surface. The well is screened intermittently from a depth of 86 feet to a depth of 406 feet. Documentation and testing in 1996–1997 indicated that the well was not under the influence of the Sacramento River. (ENGEIO 2002.)

The City of Rio Vista has a total of six groundwater wells, three of which had arsenic levels at or above the MCL of 10 ppb in 2010 (City of Rio Vista 2010:7). Groundwater well quality testing in 2014 indicated that arsenic levels were just below the 10 ppb MCL, and iron and manganese exceeded the respective MCLs (City of Rio Vista 2014).

4.5.3 ENVIRONMENTAL IMPACTS

This evaluation of water quality conditions is based on professional standards and information cited throughout the section. The key effects were identified and evaluated based on the environmental characteristics of the program component and the magnitude, intensity, and duration of activities related to the construction and operation of the funded facility(ies) under the proposed program. Other sections, including “Geology and Soils,” (Section 4.3), “Hydrologic and Hydraulic Resources,” (Section 4.4), and “Hazards and Hazardous Materials,” (Section 4.16) complement the information provided herein and provide additional discussion.

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, as amended. The proposed program would have a significant effect on water quality if it would:

► violate any water quality standards or waste discharge requirements or otherwise substantially degrade water quality;

► substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site; or

► substantially deplete groundwater supplies or interfere substantially with groundwater recharge, resulting in 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).

IMPACT ANALYSIS

Impact Possible Water Quality Effects from Stormwater Runoff, Erosion, and Spills Associated with Construction. Ground-disturbing activities associated with construction of the funded facilities included in the proposed program could result in soil erosion and sedimentation in local drainages, the Tule Canal, and the Sacramento River. 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 impact would be potentially significant.

Ground-disturbing construction activities associated with levee, floodwall, and weir improvements; dredging for borrow material; and construction of the elevated Sierra Northern Railway (Sierra Northern) railroad tracks along the Sacramento Weir and the relocated Yolo County Road 124 could discharge disturbed soil, petroleum products, and other construction-related wastes (e.g., concrete, solvents) into receiving waters and 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. Construction activities would involve the use of heavy equipment, cranes, compactors, and other construction equipment that uses potentially harmful products such as fuels, lubricants, hydraulic fluids, and coolants, all of which can be toxic to fish and other aquatic organisms. The use of this equipment could be a direct source of contamination if equipment and construction practices were not properly followed. In addition, placement of rock revetment associated with erosion protection on the waterside of the levee would involve the use of a tow boat/crane along with a barge carrying the rock. The use of this equipment could be a direct source of contamination if equipment and construction practices were not properly followed. An accidental spill or inadvertent discharge from such equipment could directly affect the water quality of the river or water body in the program area, and indirectly affect regional water quality of the river or water body. 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.

Because the release of soil or other construction-related materials into water bodies adjacent to and downstream of construction areas could degrade downstream water quality, this impact could be potentially significant. Mitigation Measures WQ-1 and WQ-2, described below, have been identified to address this impact.

**IMPACT**

**WQ-2**

Possible Effects on Groundwater or Surface Water Quality Resulting from Contact with the Water Table during Construction. Installation of floodwalls and dewatering of the construction area and borrow sites (e.g., removing groundwater that may fill trenches dug for floodwall construction or other project components) could result in the release of contaminants to surface or groundwater. Therefore, this impact would be potentially significant.

Construction of proposed program elements (such as the pilings for the floodwall at Rio Vista and the elevated Sierra Northern railroad tracks) or the need for construction dewatering related to levee improvements or borrow material could bring construction-related contaminants such as oil, grease, fuels, and other hazardous materials in contact with the water table. Trenching and excavation associated with new levees, levee stabilization measures, and construction of the pilings to support floodwalls and the railroad bridge could extend to a depth that would expose the water table, creating an immediate and direct path to groundwater that could allow contaminants to enter the groundwater system and indirectly affect water quality throughout the basin.

On October 15, 2007, DWR entered into an agreement with the Central Valley RWQCB describing acceptable means of treatment and disposal of investigation-derived material (IDM), which states that IDM not containing bentonite (i.e., dry cuttings) may be spread on the landside of the levee slope at least 100 feet from any water feature, including dry ditches, wet ditches, streams, ponds, vernal pools and wetland areas.

However, because dewatering of the construction area and direct construction of proposed program elements could have an adverse effect on groundwater or surface water quality, the funded facilities under the proposed program could have a potentially significant impact. Mitigation Measure WQ-3, described below, has been identified to address this impact.

**IMPACT**

**WQ-3**

Long-Term Operational Effects on Groundwater Levels Resulting from Installation of Flood Protection Components. The proposed program does not include the installation of cutoff walls and installation of the proposed flood protection components is not expected to result in conditions that would substantially impair groundwater flow or cause a substantial drop in groundwater levels that could decrease the yield of nearby wells. Therefore, the impact is considered less-than-significant.

Construction of Yolo County Road 124 would entail the installation of several miles of paved impervious surfaces, which would restrict the flow of surface water runoff to the groundwater aquifer in those locations. However, Yolo County Road 124 already exists; therefore, the funded facilities under the proposed program
would not create substantial new impervious surfaces, but rather would relocate the existing impervious County Road 124 surface to a nearby location in the same groundwater basin. Thus, this program component would not result in a substantial decrease in groundwater recharge or a substantial decrease in local well yields.

Removal of waste materials associated with the former Old Bryte Landfill is necessary in order to ensure that water diversion from the Sacramento River through the widened Sacramento Weir and Sacramento Bypass (which would flow over the location of the current closed landfill) does not result in downstream contamination and degradation of water quality from wastes in the closed landfill. The landfill wastes would be relocated to appropriately permitted facilities (please see Section 4.15, “Utilities and Service Systems” for a detailed discussion) and, therefore, would not adversely affect water quality. Once the waste materials have been removed, the soil would continue to be exposed to surface water infiltration to the aquifer and groundwater flow. Thus, this program component would not result in a substantial decrease in groundwater recharge or a substantial decrease in the local well yields.

The setback levees planned for the east side of the northern Yolo Bypass, as well as strengthening of the existing RD 2068 Levee in the southern Yolo Bypass, would occur primarily above the ground surface. The narrow width of the levees would not substantially reduce groundwater recharge in the program area. Furthermore, seepage cutoff walls, which would entail pouring a bentonite slurry at depth below the ground surface and therefore could adversely affect groundwater flow, are not included in the proposed program.

The proposed floodwall in Rio Vista would be installed on pier foundations drilled to a depth approximately 50 feet bgs. A concrete base, which would likely be approximately 6–11 feet deep, would be installed horizontally across the piers, and the wall would be constructed upwards from this foundation (Wood Rodgers 2005). The concrete floodwall would not be deep enough to impair groundwater flow, and groundwater would still be able to flow around the deep pier foundations. Therefore, it is not anticipated that installation of the floodwall would adversely affect the groundwater levels or substantially decrease the yield for the City of Rio Vista’s well number 7, located approximately 100 feet from the planned floodwall, or any other wells in the vicinity. Similarly, construction of the elevated Sierra Northern railroad tracks across the widened Sacramento Weir would entail drilling deep pier foundations with elevated tracks placed on a bridge. Because groundwater would be able to flow around the pier foundations, a substantial decrease in groundwater recharge or a substantial decrease in the local well yields would not occur.

For the reasons listed above, a substantial decrease in groundwater recharge or a substantial decrease in local well yields from the proposed program funded facilities would not occur, and this impact would be less-than-significant.

4.5.4 Mitigation Measures

Mitigation is described below for Impact WQ-1 (stormwater runoff and spills during construction) and Impact WQ-2 (groundwater contamination during construction).

Mitigation Measure WQ-1: Implement Standard Best Management Practices (BMPs), Prepare and Implement a Storm Water Pollution Prevention Plan, and Comply with National Pollutant Discharge Elimination System Permit Conditions (for Impact WQ-1, Possible Water Quality Effects from Stormwater Runoff, Erosion, and Spills Associated with Construction).

The agency(ies) 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 agency(ies) implementing program components shall file a notice of intent (NOI) 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. The SWPPP shall include, at a minimum, the following BMPs:

- Ground disturbance shall be limited to construction areas, including necessary access routes and staging areas. The number of access routes, size of staging areas, and total area of each site-specific project activity shall be limited to the minimum necessary. When possible, existing access routes and points shall be used. All roads, staging areas, and other facilities shall be placed to avoid and limit disturbance to river and creek banks and habitat as much as possible.

- To minimize ground and vegetation disturbance during project construction, the limits of each site-specific project shall be clearly marked, including the boundaries of designated equipment staging areas; ingress and egress corridors; stockpile areas for spoils disposal, soil, and materials; and equipment exclusion zones.

- Disturbance or removal of vegetation shall not exceed the minimum necessary to complete project construction and operations.

- If vegetation removal is required within project access or staging areas, the disturbed areas shall be replanted or reseeded with native species and monitored and maintained to ensure the revegetation effort is successful. If erosion control fabrics are used in revegetated areas, they shall be slit in appropriate locations as necessary to allow for plant root growth.

- The amount of rock riprap and other materials used for bank protection shall be limited to the minimum needed for erosion protection and establishment of planting benches.

- All pesticides/herbicides used to control nonnative vegetation shall be used in accordance with label directions. Methods and materials used for herbicide application shall be in accordance with DWR’s most current guidelines on herbicide use and with laws and regulations administered by the California Department of Pesticide Regulation.

- Construction materials such as portable equipment, vehicles, and supplies, including chemicals, shall be stored at designated construction staging areas.

- Erosion control measures that minimize soil or sediment from entering waterways and wetlands shall be installed, monitored for effectiveness, and maintained throughout construction activities.

- If use of erosion control fabrics is necessary, tightly woven fiber netting (mesh size less than 0.25-inch) or similar material shall be used to minimize potential for small animals to become entangled.
Coconut coir matting is an acceptable erosion control material, but no plastic mono-filament matting shall be used. The edge of the material shall be buried in the ground to prevent animals from crawling underneath the material.

- No material shall be placed in a manner or location where it can be eroded by normal or expected high flows. Jute netting or another non-monofilament erosion control fabric shall be used to cover soil that is placed over or mixed into riprap or other revetment materials.

- Precautions to minimize turbidity/siltation shall be implemented during construction. This may require placing barriers (e.g., silt curtains) to prevent silt and/or other deleterious materials from entering downstream reaches.

- Performance of sediment and turbidity control barriers shall be inspected at least once each day during construction to ensure they are functioning properly. Should a control barrier not function effectively, it shall be immediately repaired or replaced. Additional controls shall be installed as necessary.

- Sediment shall be removed from sediment controls once the sediment has reached one-third of the exposed height of the control. Sediment collected in these devices shall be disposed of away from the collection site at designated upland disposal sites.

- Water containing mud or silt from construction activities shall be treated by filtration, or retention in a settling pond, adequate to prevent muddy water from entering live waterways.

- All disturbed soils shall undergo appropriate erosion control treatment (e.g., sterile straw mulching, seeding, planting) prior to the end of the construction season, or prior to October 15, whichever comes first.

**Timing:** Prior to, during, and after construction activities.

**Responsibility:** The agency(ies) implementing the program component.


The agency(ies) implementing the program components and their primary construction contractors shall prepare a written spill prevention and control plan (SPCP). The SPCP and all material necessary for its implementation shall be accessible on-site prior to initiation of project construction and throughout the construction period. The SPCP shall include a plan for the emergency cleanup of any spills of fuel or other material. Employees shall be provided the necessary information from the SPCP to prevent or reduce the discharge of pollutants from construction activities to waters and to use the appropriate measures should a spill occur. In the event of a spill, work shall stop immediately and CDFW, U.S. Fish and Wildlife Service, RWQCB, National Marine Fisheries Service, and USACE shall be notified within 24 hours. The SPCP shall contain, at a minimum, the following required measures to protect water quality:

- All debris, sediment, rubbish, vegetation, or other material removed from the construction areas shall be disposed of at an approved disposal site.

- All litter, debris, unused materials, equipment, and supplies that cannot reasonably be secured shall be removed daily from the project work area and deposited at an appropriate disposal or storage site.
• All work pads and construction debris shall be removed from the work area immediately upon project completion.

• Every reasonable precaution shall be exercised to protect streams and other waters from pollution with fuels, oils, and other harmful materials. Safer alternative products (such as biodegradable hydraulic fluids) shall be used where feasible.

• Petroleum products, chemicals, fresh cement, and construction by-products containing, or water contaminated by, any such materials shall not be allowed to enter flowing waters and shall be collected and transported to an authorized upland disposal area.

• Gas, oil, other petroleum products, or any other substances that could be hazardous to aquatic life and resulting from project-related activities, shall be prevented from contaminating the soil and/or entering waters of the state and/or waters of the United States.

• Construction vehicles and equipment shall be properly maintained to prevent contamination of soil or water from external grease and oil or from leaking hydraulic fluid, fuel, oil, and grease. Vehicles and equipment shall be checked daily for leaks. If leaks are found, the equipment shall be removed from the site and shall not be used until the leaks are repaired.

• Equipment shall be refueled and serviced at designated refueling and staging sites located on the crown or landside of the levee and at least 50 feet from active stream channels or other water bodies. All refueling, maintenance, and staging of equipment and vehicles shall be conducted in a location where a spill shall not drain directly toward aquatic habitat. Appropriate containment materials shall be installed to collect any discharge, and adequate materials for spill cleanup shall be maintained on-site throughout the construction period.

• All heavy equipment, vehicles, and supplies shall be stored at the designated staging areas at the end of each work period.

• Storage areas for construction material that contains hazardous or potentially toxic materials shall have an impermeable membrane between the ground and the hazardous material and shall be bermmed to prevent the discharge of pollutants to groundwater and runoff water.

• All materials placed in streams, rivers, or other waters shall be nontoxic and shall not contain coatings or treatments or consist of substances deleterious to aquatic organisms that may leach into the surrounding environment in amounts harmful to aquatic organisms.

Timing: Prior to, during, and after construction activities.

Responsibility: The agency(ies) implementing the program component.

Mitigation Measure WQ-3: Implement Provisions for Dewatering (for Impact WQ-2, Effects on Groundwater or Surface Water Quality Resulting from Contact with the Water Table during Construction).

Before discharging any dewatered effluent to surface water, the agency(ies) implementing program components and their primary construction contractors shall obtain a Low Threat Discharge and Dewatering NPDES permit, or an Individual Permit from the Central Valley RWQCB if the dewatering is not covered under the RWQCB’s NPDES Construction General Permit. The dewatering permit includes extensive water quality monitoring in order to ensure that the discharges adhere to the strict effluent and receiving water quality criteria outlined in the permit. As part of the permit, the permittee shall design and implement measures as necessary to meet the discharge limits identified in the relevant permit. For example, if dewatering is needed during the construction of piers for the floodwall, the dewatering permit...
would require treatment or proper disposal of the water prior to discharge if it is contaminated or contains a high concentration of sediment. These measures shall be selected to achieve maximum sediment removal and represent the best available technology that is economically achievable.

Implemented measures could include the retention of dewatering effluent until particulate matter has settled before it is discharged, use of infiltration areas, and other BMPs. Final selection of water quality control measures would be subject to approval by the Central Valley RWQCB. The agencies implementing program components shall verify that coverage under the appropriate NPDES permit has been obtained before allowing dewatering activities to begin. The agencies implementing program components or their authorized agent shall perform routine inspections of the construction area to verify that the water quality control measures are properly implemented and maintained. The agencies implementing program components shall notify their contractors immediately if there is a non-compliance issue and shall require compliance.

**Timing:** Prior to, during, and after construction activities.

**Responsibility:** The agency(ies) implementing the program component.

### 4.5.5 CONCLUSION

Implementing Mitigation Measures WQ-1, WQ-2, and WQ-3 would reduce the potentially significant Impact WQ-1 (possible effects on groundwater or surface water quality resulting from contact with the water table during construction) to a less-than-significant level because a SWPPP and site-specific BMPs specifically designed to reduce erosion, siltation, and pollutant transport would be implemented; and because a SPCP with measures specifically designed to prevent transport of hazardous materials to waterways and implement cleanup activities in the event of accidental spills would be implemented. Implementation of Mitigation Measures WQ-2 and WQ-3 would reduce the potentially significant Impact WQ-2 (possible effects on groundwater or surface water quality resulting from contact with the water table during construction) to a **less-than-significant** level because implementation of dewatering provisions would decrease the potential for release of these contaminants, and would provide for cleanup should these releases occur. Impact WQ-3 (long-term operational effects on groundwater levels resulting from installation of flood protection components) would be less than significant.
4.6  FISHERIES AND AQUATIC RESOURCES

This section addresses common and sensitive fisheries and aquatic resources found in the program area. 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), including wetland and riparian resources, are addressed in Section 4.7, “Terrestrial Biological Resources.”

4.6.1  REGULATORY SETTING

FEDERAL

Federal Endangered Species Act

Pursuant to the Federal Endangered Species Act (ESA) (Title 16, Section 1531 and following sections of the U.S. Code (USC) [16 USC 1531 et seq.]), the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) have regulatory authority over species listed or proposed for listing as Federally endangered or threatened and over projects that may result in take of such species. USFWS has regulatory jurisdiction over freshwater and estuarine fishes (such as delta smelt), and NMFS has jurisdiction over anadromous and marine species (such as Chinook salmon and steelhead). In general, persons subject to the ESA (including private parties) are prohibited from “taking” endangered or threatened fish species on private property. Under Section 9 of 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.” The definition of “harm” has also been interpreted to include significant habitat modification that could result in take.

Section 3(5)A of the ESA defines “critical habitat” as the specific areas within the geographical area occupied by listed species on which are found physical or biological features essential to the conservation of the species and that may require special management considerations or protection. Specific areas outside of the geographical area occupied by the species may also be included in critical habitat designations, upon a determination that such areas are essential for the conservation of the species.

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 and NMFS to ensure that they are not undertaking, funding, permitting, or authorizing actions likely to jeopardize the continued existence of listed species, or destroying or adversely modifying designated critical habitat.

For projects where Federal action is not involved and take of a listed species may occur, a project proponent may seek an incidental take permit under Section 10(a) of the ESA. Section 10(a) allows USFWS and NMFS to permit the incidental take of listed species if such take is accompanied by a habitat conservation plan (HCP) that ensures minimization and mitigation of impacts associated with the take.

Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), established procedures designed to identify, conserve, and enhance essential fish habitat (EFH) for species regulated under a Federal fisheries management plan. EFH is defined as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. The MSA requires Federal agencies to consult with NMFS on all actions, or proposed actions, authorized, funded, or undertaken by the agencies that may adversely affect EFH (MSA Section 305[b][2]). In instances where MSA and ESA issues overlap, NMFS encourages an integrated approach to consultation.
Section 404 of the Clean Water Act

Section 404 of the Clean Water Act (CWA) requires project proponents to obtain a permit from the U.S. Army Corps of Engineers (USACE) before engaging in any activity that involves discharge of dredged or fill material into habitats meeting criteria for designation as waters of the United States, including wetlands. As part of the review of a project, USACE must ensure compliance with applicable Federal laws, including EPA’s Section 404(b)(1) Guidelines. USACE regulations require that impacts on waters of the United States be avoided and minimized to the maximum extent practicable, and that unavoidable impacts be compensated (Title 33, Section 320.4[r] of the Code of Federal Regulations [33 CFR 320.4[r]). Mitigation requiring no-net-loss of functions and values of waters of the U.S., including wetlands, is typically required by USACE.

Section 401 of the Clean Water Act

Under Section 401 of the CWA, an applicant for a Section 404 permit must obtain a certificate from the appropriate state agency stating that the intended dredging or filling activity is consistent with the state’s water quality standards and criteria. In California, the State Water Resources Control Board delegates the authority to grant water quality certification to the nine Regional Water Quality Control Boards (RWQCBs).

STATE

California Endangered Species Act

The California Endangered Species Act (CESA) (California Fish and Game Code Section 2050 et seq.) directs State agencies not to approve projects that would jeopardize the continued existence of an endangered or threatened species or result in the destruction or adverse modification of habitat essential to the continued existence of a species. Furthermore, CESA states that California Department of Fish and Wildlife (CDFW), together with the project proponent (in this case, SAFCA) and any State lead agency, must develop reasonable and prudent alternatives consistent with conserving the species while maintaining the project purpose to the greatest extent possible. Under CESA, project-related impacts of the authorized take must be minimized and fully mitigated, and adequate funding must be in place to implement those mitigation measures and monitor compliance with the measures and their effectiveness. Standard requirements can include land acquisition, permanent protection and management, and/or funding in perpetuity of compensatory lands.

Under CESA, take is defined as an activity that would directly or indirectly kill an individual of a species. In contrast with the Federal ESA, the CESA definition of take does not include “harm” or “harass.” As a result, the threshold for take may be higher under CESA than under the ESA, because habitat modification is not necessarily considered take under CESA. The take of State-listed species incidental to otherwise lawful activities requires a permit, pursuant to Section 2081(b) of CESA. The State of California has the authority to issue an incidental take permit under California Fish and Game Code Section 2081, or to coordinate with USFWS and/or NMFS during the Section 10(a) process to make the Federal permit consistent with CESA.

California Fish and Game Code—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 CDFW under Section 1602 of the California Fish and Game Code. Under Section 1602, it is unlawful for any person to substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake designated by CDFW, or to use any material from the streambeds, without first notifying CDFW of such activity and obtaining a final agreement authorizing the activity. “Stream” is defined as a body of water that flows at least periodically or intermittently through a bed or channel having banks and that supports fish or other aquatic life. CDFW’s jurisdiction within altered or artificial waterways is based on the value of those waterways to fish and wildlife. A CDFW 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

The Porter-Cologne Water Quality Control Act (Porter-Cologne Act) (California Water Code Section 13000 et seq.) requires that each of the State’s nine RWQCBs prepare and periodically update basin plans for water quality control. Each basin plan sets forth water quality standards for surface water and groundwater and actions to control nonpoint and point sources of pollution to achieve and maintain these standards. Basin plans offer an opportunity to protect wetlands through the establishment of water quality objectives. The RWQCB’s jurisdiction includes Federally protected waters as well as areas that meet the definition of “waters of the State.” The RWQCB is responsible for issuing water quality certifications, pursuant to Section 401 of the CWA. The RWQCB has the discretion to take jurisdiction over areas not Federally regulated under Section 401 of the CWA, provided they meet the definition of waters of the State. Waters of the State is defined as any surface water or groundwater, including saline waters, within the State’s boundaries. Mitigation requiring no-net-loss of functions and values of waters of the State is typically required by the RWQCB.

REGIONAL AND LOCAL

Yolo County Natural Community Conservation Plan and Habitat Conservation Plan

The Yolo Habitat Conservancy (YHC), formerly the Yolo County Habitat Conservation Plan/Natural Community Conservation Plan Joint Powers Agency, is directing preparation of the Yolo Habitat Conservation Plan/Natural Communities Conservation Plan (HCP/NCCP). This HCP/NCCP provides a framework to improve conservation of natural resources, including endangered species habitat, while streamlining the permitting process for planned development, infrastructure, and maintenance activities. It will allow Yolo County, the YHC, and the Cities of Woodland, Winters, West Sacramento, and Davis, to receive incidental take permits under ESA and CESA for activities and projects they conduct and those under their jurisdiction. The Second Administrative Draft of the HCP/NCCP (Yolo County HCP/NCCP Joint Powers Authority [JPA] 2015) was issued in March 2015; the plan has not yet been adopted by participants or approved by the regulatory agencies.

Solano Habitat Conservation Plan

The Solano HCP is being developed to support issuance of an incidental take permit under Section 10(a) of the ESA, as required by the March 1999 Solano Project Contract Renewal Biological Opinion between the USFWS and the U.S. Bureau of Reclamation (Reclamation). The Solano HCP will expand the scope of the Biological Opinion and includes additional voluntary applicants, including cities (i.e., Dixon, Fairfield, Rio Vista, Suisun, Vacaville, and Vallejo) and water resources-related districts and agencies. Additional species also will be addressed, including Federally listed fish species under NMFS jurisdiction, species listed as threatened or endangered under CESA, and species recognized by groups such as CDFW as having declining or vulnerable populations, but not officially listed as threatened or endangered species. A public draft of the plan is scheduled to be issued in early 2016.

County and City General Plans

General Plans of Sacramento, Solano, and Yolo Counties and the Cities of Sacramento and Rio Vista, within which the program area is located, include various adopted elements and policies that address protection of natural resources, including fisheries and aquatic habitats.

Sacramento County General Plan. The Conservation Element of the Sacramento County 2030 General Plan (County of Sacramento 2011) includes goals to preserve and manage natural habitats and their ecological functions throughout Sacramento County and to preserve, protect, and manage the health and integrity of aquatic resources in Sacramento County. Policies are outlined for: habitat mitigation, preservation and management, protection; protection of special-status species and their habitat and land management for special-status species; protection of vernal pools, rivers and streams, riparian habitat, and floodplains; maintenance of levee protection, riparian vegetation, function, and topographic diversity by stream channel and bank stabilization; and channel
maintenance and restoration of rivers and streams, including tree removal. Fish are specifically addressed in two policies that call for protection, preservation, and restoration of migratory routes for anadromous species and protection, enhancement, and restoration of riparian, in-channel, and shaded riverine aquatic (SRA) habitat for spawning and rearing of fish species.

**Solano County General Plan.** The Solano County General Plan Resources Element (Solano County 2008) includes a number of policies focused on biological resources. General policies emphasize protection, enhancement, and management of natural habitats. Implementation measures call for development of programs to identify high-priority biological resources management areas and to site and permit mitigation banks. Preservation of marshes and other wetland, riparian, and adjacent grassland habitats is addressed in policies specifically related to marshes and the Delta.

**Yolo County General Plan.** The Yolo County General Plan (Yolo County 2009) Conservation and Open Space Element identifies several policies specifically related to fish and their habitat. These measures emphasize protection, restoration, and enhancement of habitat for sensitive fish species; cooperation with CDFW in inventorying streams with spawning and rearing habitat, evaluating those streams' existing and potential habitat value, and determining current and potential fish population levels; participation by streamside property owners in fishery enhancement projects; and protection of riparian habitats.

**City of Sacramento General Plan.** The environmental resources component of the Sacramento 2035 General Plan (City of Sacramento 2015) includes several policies related to fisheries and aquatic resources. Applicable policies focus on: conservation of open space areas along the American and Sacramento Rivers, floodways, and undevelopable floodplains; retention of plant and wildlife habitat areas where there are known sensitive resources; preservation of the ecological integrity of creek corridors, canals, and drainage ditches that support riparian resources; and preservation and protection of wetland resources, including creeks, rivers, ponds, marshes, vernal pools, and other seasonal wetlands, to the extent feasible. If wetland preservation is not feasible, the mitigation for wetland impacts shall be required in compliance with state and Federal regulations and to ensure no-net-loss of value and/or function.

**City of Rio Vista General Plan.** The City of Rio Vista General Plan 2001 (City of Rio Vista Community Development Department 2002) identifies policies and implementing actions designed to achieve the overall goal of preserving and protecting biological resources for their wildlife habitat. The policies generally support preservation and enhancement of natural habitats, but specific requirements for no-net-loss of wetlands and determination of sensitive habitat setbacks on a case-by-case basis are also included.

### 4.6.2 ENVIRONMENTAL SETTING

The program area provides important habitat for native anadromous and resident Central Valley fishes and other aquatic resources. Information presented in this section on existing conditions in the program area was derived from variety of sources, including documents and publications describing conditions of the area fisheries and aquatic resources, field data collected by resource agencies and other organizations, and status reviews of Federally listed species.

**FISHERIES AND AQUATIC RESOURCES**

Historically, seasonal flooding covered various lands adjacent to the Sacramento River and tributaries and provided important spawning and rearing habitat for many fish species. Construction of levees and flood control facilities (i.e., Fremont Weir and Sacramento Weir) has reduced the overall amount of seasonal flooding and shallow-water habitat in the Sacramento River system. However, the program area, particularly the Sacramento River and Yolo Bypass, provides important spawning, rearing, and/or migratory habitat for a diverse assemblage of native and nonnative species (Table 4.6-1).
## Table 4.6-1. Fishes Present in the Program Area

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Native (N) or Introduced (I)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green sturgeon</td>
<td><em>Acipenser medirostris</em></td>
<td>N</td>
</tr>
<tr>
<td>White sturgeon</td>
<td><em>Acipenser transmontanus</em></td>
<td>N</td>
</tr>
<tr>
<td>Sacramento sucker</td>
<td><em>Catostomus occidentalis</em></td>
<td>N</td>
</tr>
<tr>
<td>Prickly sculpin</td>
<td><em>Cottus asper</em></td>
<td>N</td>
</tr>
<tr>
<td>Pacific lamprey</td>
<td><em>Entosphenus tridentatus</em></td>
<td>N</td>
</tr>
<tr>
<td>Three-spine stickleback</td>
<td><em>Gasterosteus aculatus</em></td>
<td>N</td>
</tr>
<tr>
<td>Delta smelt</td>
<td><em>Hypomesus transpacificus</em></td>
<td>N</td>
</tr>
<tr>
<td>Tule perch</td>
<td><em>Hysterocharpus traski</em></td>
<td>N</td>
</tr>
<tr>
<td>River lamprey</td>
<td><em>Lampetra ayresi</em></td>
<td>N</td>
</tr>
<tr>
<td>Hitch</td>
<td><em>Lavinia exilicauda</em></td>
<td>N</td>
</tr>
<tr>
<td>Pacific staghorn sculpin</td>
<td><em>Leptocottus armatus</em></td>
<td>N</td>
</tr>
<tr>
<td>Hardhead</td>
<td><em>Mylopharodon conocephalus</em></td>
<td>N</td>
</tr>
<tr>
<td>Central Valley steelhead/rainbow trout</td>
<td><em>Oncorhynchus mykiss</em></td>
<td>N</td>
</tr>
<tr>
<td>Sacramento River winter-run Chinook salmon</td>
<td><em>Oncorhynchus tshawytscha</em></td>
<td>N</td>
</tr>
<tr>
<td>Central Valley spring-run Chinook salmon</td>
<td><em>Oncorhynchus tshawytscha</em></td>
<td>N</td>
</tr>
<tr>
<td>Central Valley fall-/late fall-run Chinook salmon</td>
<td><em>Oncorhynchus tshawytscha</em></td>
<td>N</td>
</tr>
<tr>
<td>Sacramento blackfish</td>
<td><em>Orthodon microlepidotus</em></td>
<td>N</td>
</tr>
<tr>
<td>Sacramento splittail</td>
<td><em>Pogonichthys macrolepidotus</em></td>
<td>N</td>
</tr>
<tr>
<td>Sacramento pikeminnow</td>
<td><em>Psychocheilus grandis</em></td>
<td>N</td>
</tr>
<tr>
<td>Speckled dace</td>
<td><em>Rhinichthys osculus</em></td>
<td>N</td>
</tr>
<tr>
<td>Longfin smelt</td>
<td><em>Spirinchus thaleichthys</em></td>
<td>N</td>
</tr>
<tr>
<td>American shad</td>
<td><em>Alosa sapidissima</em></td>
<td>I</td>
</tr>
<tr>
<td>White catfish</td>
<td><em>Ameiurus catus</em></td>
<td>I</td>
</tr>
<tr>
<td>Black bullhead</td>
<td><em>Ameiurus melas</em></td>
<td>I</td>
</tr>
<tr>
<td>Brown bullhead</td>
<td><em>Ameiurus nebulosus</em></td>
<td>I</td>
</tr>
<tr>
<td>Goldfish</td>
<td><em>Carassius auratus</em></td>
<td>I</td>
</tr>
<tr>
<td>Red shiner</td>
<td><em>Cyprinella lutrensis</em></td>
<td>I</td>
</tr>
<tr>
<td>Carp</td>
<td><em>Cyprinus carpio</em></td>
<td>I</td>
</tr>
<tr>
<td>Threadfin shad</td>
<td><em>Dorosoma petenense</em></td>
<td>I</td>
</tr>
<tr>
<td>Mosquitofish</td>
<td><em>Gambusia affinis</em></td>
<td>I</td>
</tr>
<tr>
<td>Wakasagi</td>
<td><em>Hypomesus nipponensis</em></td>
<td>I</td>
</tr>
<tr>
<td>Channel catfish</td>
<td><em>Ictalurus punctatus</em></td>
<td>I</td>
</tr>
<tr>
<td>Green sunfish</td>
<td><em>Lepomis cyanellus</em></td>
<td>I</td>
</tr>
<tr>
<td>Warmouth</td>
<td><em>Lepomis gulosus</em></td>
<td>I</td>
</tr>
<tr>
<td>Bluegill</td>
<td><em>Lepomis macrochirus</em></td>
<td>I</td>
</tr>
<tr>
<td>Redear sunfish</td>
<td><em>Lepomis macrochirus</em></td>
<td>I</td>
</tr>
<tr>
<td>Inland silverside</td>
<td><em>Menidia beryllina</em></td>
<td>I</td>
</tr>
<tr>
<td>Smallmouth bass</td>
<td><em>Micropterus dolomieui</em></td>
<td>I</td>
</tr>
<tr>
<td>Spotted bass</td>
<td><em>Micropterus punctulatus</em></td>
<td>I</td>
</tr>
<tr>
<td>Largemouth bass</td>
<td><em>Micropterus salmoides</em></td>
<td>I</td>
</tr>
<tr>
<td>Striped bass</td>
<td><em>Morone saxatilus</em></td>
<td>I</td>
</tr>
<tr>
<td>Golden shiner</td>
<td><em>Notemigonus crysoleucas</em></td>
<td>I</td>
</tr>
</tbody>
</table>
### Table 4.6-1. Fishes Present in the Program Area

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Native (N) or Introduced (I)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bigscale logperch</td>
<td><em>Percina macrolepida</em></td>
<td>I</td>
</tr>
<tr>
<td>Fathead minnow</td>
<td><em>Pimephales promelas</em></td>
<td>I</td>
</tr>
<tr>
<td>White crappie</td>
<td><em>Pomoxis annularis</em></td>
<td>I</td>
</tr>
<tr>
<td>Black crappie</td>
<td><em>Pomoxis nigromaculatus</em></td>
<td>I</td>
</tr>
<tr>
<td>Shimofuri goby</td>
<td><em>Tridentiger bifasciatus</em></td>
<td>I</td>
</tr>
</tbody>
</table>

Sources: CDFG 2008; Moyle 2002; Moyle et al 2015; Sommer et al. 2001a

Fish use of different areas of the Lower Sacramento River 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 SRA habitat, sediment transport, channel migration and avulsion, and instream woody material (IWM) 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 River. 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 river, creating structurally complex habitat consisting of IWM 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.

Throughout the Yolo Bypass, the use of different aquatic habitats by various fish species is influenced by variations in permanent habitat conditions, seasonal inundation of the floodplain, and by the habitat requirements, life history, daily and seasonal movements, and behavior of each species. Altered flow regimes, flood control, and floodwater conveyance activities along much of the Yolo Bypass have affected available habitat and ecological processes, but sampling to date has shown that the floodplain is used by at least 42 fish species, including seasonal fish and fish that are year-round residents in perennial water sources. Similar to other Delta habitats, there are more introduced species than native species in the Yolo Bypass floodplain. However, unlike other areas, the Yolo Bypass floodplain is seasonally dewatered during late spring for agricultural production. This prevents introduced fish species from establishing year-round dominance, except in perennial water sources.

In winter and spring, agricultural fields and wetland habitats throughout the Yolo Bypass often flood during high flows and are used by several native species for spawning and/or rearing. Results published by Sommer et al. (2001a) indicate this seasonal floodplain habitat provides better rearing conditions for Chinook salmon than the adjacent Sacramento River channel. Another important attribute of floodplain habitat is an enhanced food web. Sommer et al. (2001a) found that drift insects were 10 to 100 times more abundant in the floodplain than the adjacent Sacramento River channel during flood events. Although these results suggest that several habitat variables demonstrate their benefit to young salmon in the Yolo Bypass, floodplain habitat carries stranding risks. Although anadromous species are known to regularly become stranded in the bypass, the relative importance of stranding mortality is difficult to evaluate because there is currently no reliable estimate of the total number of salmon that migrate through Yolo Bypass and the larger Sacramento River and tributary system.
**SPECIAL-STATUS SPECIES**

Special-status species are fish that fall into any of the following categories:

- taxa (i.e., taxonomic categories or groups) officially listed by the State of California or the Federal government as endangered, threatened, or rare;
- taxa that are candidates for State or Federal listing as endangered or threatened;
- taxa proposed for State or Federal listing as endangered or threatened;
- taxa that meet the criteria for listing, even if not currently included on any list, as described in California Code of Regulations (CCR) Section 15380 of the State CEQA Guidelines;
- taxa identified by CDFW as species of special concern;
- species listed as Fully Protected under the California Fish and Game Code; or
- taxa afforded protection under local or regional planning documents.

Table 4.6-1 provides information on the eleven special-status fish species and taxa that occur in the program area, including their legal protection status and expected patterns of occurrence. The regulatory status and natural history of each is discussed further in the sections that follow.

<table>
<thead>
<tr>
<th>Fish Taxa</th>
<th>Legal Status</th>
<th>Occurrence in the Program Area</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Acipenser medirostris</em></td>
<td>FT SSC</td>
<td>Anadromous. Expected to occur in the Sacramento River as adults migrating upstream to their spawning habitat (between late February and late July) and as juveniles rearing and migrating to the ocean (year-round); also occur in the Yolo Bypass, primarily as adults migrating upstream.</td>
</tr>
<tr>
<td><em>Entosphenus tridentatus</em></td>
<td>SSC</td>
<td>Anadromous. Adults and rearing juveniles may be present year-round in the Sacramento River; occurs seasonally in the Yolo Bypass.</td>
</tr>
<tr>
<td><em>Hypomesus transpacificus</em></td>
<td>FT CE</td>
<td>Semi-anadromous. Adults and juveniles may be present in the Sacramento River from December–July, typically restricted to areas downstream of Isleton; occurs seasonally in the Yolo Bypass.</td>
</tr>
<tr>
<td><em>Lampetra ayresi</em></td>
<td>SSC</td>
<td>Anadromous. Distribution is not well-known, but individuals have been documented in the Sacramento River and the Yolo Bypass; adults enter the streams in the fall, and spawning is believed to occur in April and May; young remain in the freshwater streams for 3–5 years.</td>
</tr>
<tr>
<td><em>Lavinia exilicauda</em></td>
<td>SSC</td>
<td>Resident. Occurs year-round in the Sacramento River; prefer shallow habitats with smaller gravel to mud substrates. Also occurs in the Yolo Bypass.</td>
</tr>
<tr>
<td><em>Mylopharodon conocephalus</em></td>
<td>FSC SSC</td>
<td>Resident. Expected to occur year-round in the Sacramento River; adults occur in deep, clear pool and run habitats, whereas juveniles are found in shallow water and along the shoreline of stream reaches.</td>
</tr>
<tr>
<td><em>Oncorhynchus mykiss</em></td>
<td>FT CT</td>
<td>Anadromous. Expected to occur in the Sacramento River, either as adults migrating to their upstream spawning habitat (July–March) or as juveniles and smolts, rearing and migrating towards the ocean; juveniles typically spend 1–3 years in fresh water before migrating to the ocean, generally in December–August. Occurs seasonally in the Yolo Bypass.</td>
</tr>
<tr>
<td><em>Oncorhynchus tshawytscha</em></td>
<td>FT CT</td>
<td>Anadromous. Expected to occur in the Sacramento River as adults migrating upstream in March–September (peak May–June) and as juveniles and yearlings migrating downstream following the onset of the winter storm.</td>
</tr>
</tbody>
</table>
Table 4.6-2. Special-Status Fishes that Occur in the Program Area

<table>
<thead>
<tr>
<th>Fish Taxa</th>
<th>Legal Status¹</th>
<th>Occurrence in the Program Area</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Oncorhynchus tshawytscha</strong></td>
<td></td>
<td>Anadromous. Expected to occur in the Sacramento River as adults migrating upstream in December–July (peak in March) and as juveniles migrating downstream soon after fry emerge, typically beginning in August and peaking in September and October; smolts may migrate through the program area to the ocean in November–May. Occurs seasonally in the Yolo Bypass, particularly as migrating and rearing juveniles.</td>
</tr>
<tr>
<td>Sacramento River winter-run Chinook salmon</td>
<td>FE</td>
<td>Season, through March; occurs seasonally in the Yolo Bypass, particularly as migrating and rearing juveniles.</td>
</tr>
<tr>
<td>Central Valley fall-/late fall-run Chinook salmon</td>
<td>FSC</td>
<td>Anadromous. Fall-run are expected to occur in the Sacramento River and Yolo Bypass as adults migrating upstream to their spawning habitat (June–December) or as juveniles and smolts rearing and migrating to the ocean soon after emerging (December–July). Late fall-run are expected to occur in the Sacramento River as adults migrating upstream in October–April and as smolts migrating to the ocean in November–May; may occur seasonally in the Yolo Bypass.</td>
</tr>
<tr>
<td><em>Pogonichthys macrolepidotus</em></td>
<td>SSC</td>
<td>Resident. Expected to occur in wet years in the Sacramento River as adults migrating from the Delta to flooded spawning areas in February–June and as juveniles migrating from upstream spawning habitats to tidal habitat shortly after emergence; adults spawn and juveniles rear in the Yolo Bypass.</td>
</tr>
<tr>
<td><em>Spirinchus thaleichthys</em></td>
<td>FC</td>
<td>Anadromous. Typically restricted to the Delta and Sacramento River downstream of Rio Vista, but may rarely occur farther upstream in December–July, when they enter freshwater streams to spawn.</td>
</tr>
<tr>
<td>Longfin smelt</td>
<td>CT</td>
<td></td>
</tr>
</tbody>
</table>

Notes: Delta = Sacramento-San Joaquin Delta

¹ Legal Status Definitions:
- FT = Federally listed as Threatened under the Federal Endangered Species Act
- FE = Federally listed as Endangered under the Federal Endangered Species Act
- FC = Candidate for Federal Listing as Threatened or Endangered
- FSC = Federal species of special concern
- CT = State-listed as Threatened under the California Endangered Species Act
- CE = State-listed as Endangered under the California Endangered Species Act
- SSC = State species of special concern


**Green Sturgeon**

Green sturgeon (*Acipenser medirostris*) was determined by NMFS to consist of two populations: a northern and a southern distinct population segment (DPS) (68 Federal Register [FR] 4433). The southern DPS of green sturgeon was listed as threatened under the ESA on April 7, 2006 (71 FR 17757) and is a CDFW Species of Special Concern (Moyle et al. 2015). Critical habitat for the Southern DPS of North American green sturgeon was designated in October 2009 (73 FR 52084) and includes the Sacramento River (NMFS 2009b).

Green sturgeon are anadromous but are the most marine-oriented of sturgeon found in nearshore marine waters from Mexico to the Bering Sea (70 FR 17386). Little is known about movements, habitat use, and feeding habits of green sturgeon. They have been salvaged at Federal and State fish collection facilities in every month, indicating that they are present in the Delta year-round. Juveniles and adults are reported to feed on benthic invertebrates, including shrimp and amphipods, and small fish (70 FR 17386).

The southern DPS has a single spawning population in the Sacramento River (NMFS 2005). Adults typically migrate upstream into rivers between late February and late July. Spawning occurs from March–July, with peak spawning from mid-April to mid-June. Green sturgeon are believed to spawn every 3–5 years, although recent evidence indicates that spawning may be as frequent as every 2 years (70 FR 17386). Little is known about the specific spawning habitat preferences of green sturgeon. Adults are believed to broadcast their eggs in deep, fast
water over large cobble substrate where the eggs settle into the interstitial spaces (Moyle 2002). Spawning is generally associated with water temperatures at 46–57 degrees Fahrenheit (ºF). In the Central Valley, spawning occurs in the Sacramento River upstream of Hamilton City, perhaps as far upstream as Keswick Dam (Adams et al. 2002), and possibly in the Lower Feather River (Moyle 2002). Green sturgeon eggs hatch in approximately 8 days at 55ºF (Moyle 2002). Larvae begin feeding 10 days after hatching. Metamorphosis to the juvenile stage is complete within 45 days of hatching. Juveniles spend 1–4 years in fresh and estuarine waters (such as the Delta) and migrate to salt water at lengths of 12–30 inches (70 FR 17386).

**Pacific Lamprey**

Pacific Lamprey (*Entosphenus tridentatus*) is a CDFW species of special concern (Moyle et al. 2015). The Pacific lamprey was petitioned for listing by twelve conservation groups in 2003, along with three other lamprey species (Klamath-Siskiyou Wildlands Center et al. 2003), but the petition was declined by USFWS in 2004 due to insufficient evidence that listing was warranted (USFWS 2004).

Pacific Lamprey is a widely distributed anadromous species, found in river systems from central Baja, California north to the Bering Sea in Alaska (Ruiz-Campos and Gonzales-Guzman 1996, Lin et al. 2008). Historically, Pacific lamprey were generally distributed wherever salmon and steelhead occurred, and sometimes upstream of waterfalls that are impassable to anadromous salmonids. However, recent data and anecdotal accounts indicate that distribution of the Pacific lamprey has been reduced in many river systems, including the Sacramento-San Joaquin, primarily due to migratory barriers (Moyle et al. 2009).

After entering freshwater from the ocean, adult Pacific lampreys typically spend approximately 1 year in freshwater before spawning (Robinson and Bayer 2005, Clemens et al. 2009, Stillwater Sciences 2010, Lampman 2011). The adult freshwater residence period can be divided into three distinct stages: (1) initial migration from the Pacific Ocean to holding areas, approximately January until early August (Stillwater Sciences 2010, McCovey 2011, Clemens et al. 2012), (2) pre-spawning holding through the summer, and (3) secondary migration to spawn, generally in later winter or early spring (Robinson and Bayer 2005; Clemens et al. 2010, McCovey 2011). Subsequently, it is expected that adult Pacific lampreys with varying levels of sexual maturity are present in the Sacramento-San Joaquin Basin throughout the year. Spawning typically takes place from March through July, depending on water temperature and local conditions such as seasonal flow regimes (Kan 1975, Brumo et al. 2009, Gunckel et al. 2009), after which time, the adults die. Spawning occurs both in the mainstem of medium-sized rivers and smaller tributaries (Luzier et al. 2006, Brumo et al. 2009, Gunckel et al. 2009) and generally takes place in pool and run tailouts and low gradient riffles. Depending on water temperature, hatching occurs in approximately 2–3 weeks, and yolk-sac larvae, known as prolarvae, remain in redd gravels for approximately 2–3 more weeks before emerging at night as 1-inch larvae and drifting downstream to rear in depositional areas (Meeuwig et al. 2005, Brumo 2006). Pacific lamprey rear in freshwater for 4–10 years, filter-feeding on algae and detrital matter, before metamorphosing into an adult form before outmigrating to the ocean, where they grow to full size before returning to their natal streams to spawn (Pletcher 1963, Moore and Mallatt 1980, Beamish and Levings 1991, van de Wetering 1998). Pacific lampreys are thought to remain in the ocean for approximately 18–40 months before returning to freshwater as sexually immature adults, typically between late winter and early summer (Kan 1975, Beamish 1980).

**Delta Smelt**

Delta smelt (*Hypomesus transpacificus*) was Federally listed as threatened on March 5, 1993 (58 FR 12854) and critical habitat was designated on December 19, 1994 (59 FR 65256). On January 6, 2009, delta smelt was designated as endangered under CESA by the California Fish and Game Commission (CCR Title 14, Section 670.5). Critical habitat for delta smelt was designated in December 1994 (FR 59:65256) and includes the Sacramento River downstream of the American River confluence (USFWS 2003).

Delta smelt are endemic to the Sacramento-San Joaquin estuary and are found seasonally in Suisun Bay and Suisun Marsh (Moyle 2002). The species is typically found in shallow water (<10 feet) where salinity ranges from
Delta smelt abundance and geographic distribution are dependent upon freshwater outflows and the salinity of the San Francisco Estuary and Delta (Moyle 2002, Bennett 2005). Water clarity and salinity seem to be the most reliable abiotic predictors of delta smelt abundance during summer and fall (Feyrer et al. 2007, Nobriga et al. 2008). In the Sacramento River, they have been documented upstream to the City of Sacramento (RM 60), but they are typically restricted to the Delta and the Lower Sacramento River downstream of river mile (RM) 20 (Moyle 2002, USFWS 1996). During periods of high river outflow, delta smelt distribution extends from the Lower Sacramento River into Suisun Bay, whereas during low-flow periods they occur farther upstream, concentrating in the upper Delta and Lower Sacramento River (Moyle 2002). Delta smelt have relatively low fecundity and most live for 1 year (Moyle 2002). They feed on planktonic copepods, cladocerans, amphipods, and insect larva (Moyle 2002).

River Lamprey

River lamprey (Lampetra ayresii) is a CDFW Species of Special Concern (Moyle et al, 2015). The Sacramento and San Joaquin basins are at the southern edge of their range (Moyle et al. 2009). Little is known regarding their abundance and distribution within California; they seem to be primarily associated with the lower portions of certain large river systems and most records for the state are from the lower Sacramento-San Joaquin system (Moyle et al. 1989, Moyle 2002).

River lampreys are a small parasitic anadromous species. Adult river lampreys migrate from the Pacific Ocean into spawning areas in fall and spawn from February through May (Moyle 2002) at temperatures of about 55–56°F (Wang 1986). Adults of both sexes construct nests in gravel at the upstream end of riffles (Beamish and Youson 1987, Moyle 2002). Eggs are deposited and fertilized in these depressions, after which the adults typically die, similar to other lamprey species. The eggs hatch in 2–3 weeks and then drift to areas of low water velocity and fine sediments, where they remain burrowed for approximately 3–5 years (Moyle 2002). Like other lampreys, river lamprey larvae (ammocoetes) filter-feed on algae and detrital matter in silt and sand substrates (Pletcher 1963, Moore and Potter 1976). Good water quality and temperatures not exceeding 77°F are believed necessary for their survival (Moyle 2002). Their metamorphosis into adults begins in July (Beamish 1980) and is not complete for about 9–10 months, until around April of the following spring, when the esophagus opens and adults are able to osmoregulate (Beamish and Youson 1987, Moyle 2002). During this time, they are believed to live in deep waters of the river channel. Just prior to the completion of metamorphosis, the juvenile lampreys (macropthalmia) congregate immediately upstream of salt water and enter the estuary or ocean from May to July (Beamish and Youson 1987). Adults spend 3–4 months in salt water, remaining close to shore and growing to lengths of about 10 inches. In the estuary or ocean, river lampreys are obligate parasites, typically killing their host in the process of feeding. They most commonly parasitize small fish, feeding near the surface on smelt,
herring, and mid-size salmonids (Beamish 1980, Beamish and Neville 1995). In fall, adults migrating back upstream into spawning areas and cease to feed. Fidelity to the streams in which they were spawned remains unknown.

Sacramento Hitch

Sacramento hitch (*Lavinia exilicauda exilicauda*) is designated as a CDFW Species of Special Concern (Moyle et al. 2015). Hitch were once found throughout the Sacramento and San Joaquin valleys in low elevation streams and rivers, as well as in the Delta, but today they are absent from the San Joaquin River and the lower reaches of its tributaries. In the Sacramento River, hitch appear to be spread across much of their native range, up to and including Shasta Reservoir, but in scattered populations (Moyle 2002). Sacramento hitch are also present in some of the larger tributaries to the San Francisco Estuary (Leidy 2007) and in a few sloughs in the Delta.

Sacramento hitch inhabit warm, lowland, waters including clear streams, turbid sloughs, lakes and reservoirs. In streams they are generally found in pools or runs among aquatic vegetation, although small individuals will also use riffles. Sacramento hitch prefer shallow (< 1 m deep) stream habitats with smaller gravel to mud substrates. Hitch have high temperature tolerances and can tolerate low salinities, up to 9 ppt (Moyle 2002, Leidy 2007). Spawning takes place over gravel riffles, at temperatures ranging from 14 to 26°C, but spawning on vegetation can also take place (Moyle 2002). When floodplains are available, hitch will use them for rearing, although juveniles can become stranded once floodwaters recede (Moyle et al. 2007). Fertilized eggs sink into gravel interstices, and hatching takes place in 3–7 days at 15–22°C. Larvae become free-swimming in 3–4 days. Young-of-year hitch spend the next 2 months shoaling in shallow water or staying close to beds of aquatic plants, especially among emergent tules, before moving out into more open water.

Hardhead

Hardhead (*Mylopharodon conocephalus*) is designated as a CDFW Species of Special Concern (Moyle et al. 2015). This species has a wide distribution in the Sacramento and San Joaquin River drainages where they typically inhabit undisturbed areas of larger low- to mid-elevation streams (Moyle and Daniels 1982, Mayden et al. 1991; both as cited in Moyle 2002). They are also found in the mainstem Sacramento River at low elevations and in its tributaries to about 5,000 feet. Hardhead prefer clear, deep pools and runs with slow velocities, sand-gravel-boulder substrates, and low turbidities (Alley 1977; Cooper 1983; Moyle and Baltz 1985; Mayden et al. 1991; all as cited in Moyle 2002). They typically occur in streams where summer temperatures exceed 68ºF (Moyle 2002). They appear to have very restricted microhabitat preferences, being found in large, warm streams that contain deep, rock-bottomed pools (Moyle and Daniels 1982). Juveniles are found in pools and shallower areas of these same stream reaches (Moyle and Daniels 1982).

Hardhead reach sexual maturity in their third year (Moyle 2002). Spawning of hardhead occurs primarily in April and May (Grant and Maslin 1997; as cited in Moyle 2002), but may extend into August in some foothill streams (Wang 1986). Adult fish from larger rivers or reservoirs may undertake upstream spawning migrations into tributaries to spawn. Others may move only a short distance from a home pool upstream or downstream to spawn (Grant and Maslin 1997). Although spawning activity has not been observed, hardhead are thought to spawn over gravel in riffles, runs, or the heads of pools (Moyle 2002). Larval and post-larval fish likely remain along the edges of streams in dense cover and move into deeper habitats as they grow (Moyle 2002). Juvenile hardhead rear in shallow backwater areas (Moyle 2002).

Central Valley Steelhead

The Central Valley steelhead (*Oncorhynchus mykiss*) DPS was Federally listed as threatened on March 19, 1998 (63 FR 13347) and reaffirmed in the NMFS final listing determination on January 5, 2006 (71 FR 834). Critical habitat for Central Valley steelhead was designated on September 2, 2005 (70 FR 52488) and includes all river reaches accessible to steelhead in the Sacramento and San Joaquin Rivers and their tributaries, including the Sacramento River.
Central Valley steelhead ranged throughout the tributaries of the Sacramento and San Joaquin Rivers prior to the dam construction, water development, and watershed perturbation of the 19th and 20th centuries. Wild stocks are now mostly confined to the upper Sacramento River downstream of Keswick Dam; upper Sacramento River tributaries such as Deer, Mill, and Antelope Creeks; and the Yuba River downstream of Englebright Dam. The abundance of naturally reproducing Central Valley steelhead, as measured by the number of adults returning to spawn, is largely unknown. Recent annual estimates of adults spawning upstream of Red Bluff Diversion Dam are less than 2,000 fish (71 FR 834).

Steelhead have one of the most complex life histories of any salmonid species, exhibiting both anadromous and freshwater resident life histories. Freshwater residents of the species are referred to as rainbow trout, and those exhibiting an anadromous life history are called steelhead. Steelhead exhibit a highly variable life-history pattern throughout their range, but are broadly categorized into winter and summer reproductive ecotypes. Winter steelhead is the most widespread reproductive ecotype and the only type currently present in Central Valley streams (McEwan and Jackson 1996). They become sexually mature in the ocean, enter spawning streams in summer, fall, or winter, and spawn later in winter or late spring (Meehan and Bjornn 1991, Behnke 1992). Adult steelhead typically begin their upstream migration into Central Valley streams between August and April (Williams 2006, NMFS 2009a), and migration peaks in September, continuing through February or March (Hallock et al. 1961, as cited in McEwan and Jackson 1996). Spawning occurs primarily in January–March, but may begin as early as late December and may extend through April (Hallock 1987). Individual steelhead may spawn more than once, returning to the ocean between each spawning migration (NMFS 2014).

Juvenile steelhead (parr) may rear in freshwater for 1–3 years before migrating to the Pacific Ocean as smolts (McEwan and Jackson 1996). Juvenile steelhead occupy a wide range of habitats, preferring deep pools as well as higher-velocity rapid and cascade habitats (Bisson et al. 1982 and 1988, as cited in Friant Water Users Authority [FWUA] and Natural Resources Defense Council [NRDC] 2002). The time that parr spend in freshwater appears to be related to growth rate, with larger, faster-growing members of a cohort smolting earlier (Peven et al. 1994, as cited in FWUA and NRDC 2002). Juvenile migration to the ocean generally occurs from December–August, peaking in January to May (McEwan 2001). The importance of main channel and floodplain habitats to steelhead in the Lower Sacramento River and North Delta is not well understood. Steelhead smolts have been found in the Yolo Bypass during the period of winter and spring inundation (Sommer et al. 2001a), but the importance of this and other floodplain areas in the Lower Sacramento River and North Delta is not yet clear.

**Central Valley Spring-Run Chinook Salmon**

The Central Valley spring-run Chinook salmon (*Oncorhynchus tshawytscha*) ESU was Federally listed as threatened on September 16, 1999 (64 FR 50394) and reaffirmed in the NMFS final listing determination issued on June 28, 2005 (70 CFR 37160). Critical habitat for Central Valley spring-run Chinook salmon was designated by NMFS on September 2, 2005 (70 FR 52488) and includes the San Francisco Bay-Delta estuary, mainstem Sacramento River upstream to Keswick Dam, and most of the Sacramento Valley’s perennial tributaries with established spring salmon runs. EFH within the Sacramento River includes juvenile rearing, juvenile migration corridors, and adult migration corridors.

Adult Central Valley spring-run Chinook salmon enter the mainstem Sacramento River in March–September, with the peak upstream migration occurring in May–June (Yoshiyama et al. 1998). They are sexually immature during upstream migration, and adults hold in deep, cold pools near spawning habitat until sexually mature; spawning commences in late summer and fall. Central Valley spring-run Chinook salmon spawn in the upper reaches of the mainstem Sacramento River and tributary streams (Myers et al. 1998, NMFS 2014), with the largest tributary runs occurring in Butte, Deer, and Mill Creeks (Yoshiyama et al. 1998). Spawning typically begins in late August and may continue through October. Juveniles emerge in November and December in most locations, but may emerge later when water temperature is cooler. Newly emerged fry remain in shallow, low-velocity edge water (CDFG 1998).
Juvenile Central Valley spring-run Chinook salmon have highly variable rearing and outmigration patterns, with juveniles rearing for between 3 and 15 months before outmigrating to the ocean (Fisher 1994). Rearing takes place in their natal streams, the mainstem of the Sacramento River, inundated floodplains (including the Sutter and Yolo Bypasses), and the Delta. Based on observations in Butte Creek and the Sacramento River, young-of-year juveniles typically migrate from November–May. Yearling Central Valley spring-run Chinook salmon migrate in October–March, with peak migration in November (S. P. Cramer and Associates 1995, Hill and Webber 1999). Downstream migration of yearlings typically coincides with the onset of the winter storm season, and migration may continue through March (CDFG 1998). Scale analyses indicate that most returning adults (>90 percent) have emigrated as sub-yearlings (Myers et al. 1998).

Sacramento River Winter-Run Chinook Salmon

The Sacramento River winter-run Chinook salmon ESU was listed as endangered under CESA and threatened under the ESA in 1989 (54 FR 32085). NMFS subsequently upgraded the Federal listing to endangered in 1994 (59 FR 440) after several years of low escapements, and this status was reaffirmed on June 28, 2005 (70 FR 37160). NMFS designated critical habitat for Sacramento River winter-run Chinook salmon in 1993 (58 FR 33212). The critical habitat designation includes the Sacramento-San Joaquin Delta and the Sacramento River within all accessible reaches. EFH within the Sacramento River includes juvenile rearing, juvenile migration corridors, and adult migration corridors.

After spending 1–3 years in the Pacific Ocean, adult Sacramento River winter-run Chinook salmon leave the ocean and migrate through the Delta into the Sacramento River from December–July, with peak migration in March (Moyle 2002). Adults spawn from mid-April through August (Moyle 2002), and egg incubation continues through October. The primary spawning habitat in the Sacramento River is above Red Bluff Diversion Dam at RM 243, although spawning has been observed downstream as far as RM 218 (NMFS 2001). Spawning success below the Red Bluff Diversion Dam may be limited primarily by warm water temperatures (Hallock and Fisher 1985, Yoshiyama et al. 1998).

Downstream movement of juvenile Sacramento River winter-run Chinook salmon begins in August soon after fry emerge. The peak abundance of juveniles moving downstream occurs at Red Bluff in September and October (Vogel and Marine 1991). Juvenile Chinook salmon move downstream from spawning areas in response to many factors, which may include inherited behavior, habitat availability, flow, competition for space and food, and water temperature. The number and timing of juvenile movements is highly variable. Storm events and the resulting high flow and turbidity appear to trigger downstream movement of substantial numbers of juvenile Chinook salmon. The Sacramento River channel is the main migration route for winter-run juveniles; however, the Sutter and Yolo Bypasses also provide significant outmigration passage during higher flow events. Sacramento River winter-run Chinook salmon smolts (i.e., juveniles that are physiologically ready to enter seawater) may migrate through the Delta and San Francisco Bay to the Pacific Ocean from November–May (Yoshiyama et al. 1998). In general, juvenile abundance in the Delta increases in response to increased Sacramento River flow (Brandeis and McLain 2001). During winter in the Sacramento-San Joaquin system, juveniles rear on seasonally inundated floodplains. Sommer et al. (2001b) found higher growth and survival rates of juvenile Chinook salmon that reared on the Yolo Bypass floodplain compared with those that reared in the mainstem Sacramento River.

Central Valley Fall/Late Fall-Run Chinook Salmon

Central Valley fall- and late fall-run Chinook salmon are classified by NMFS as a Species of Concern (69 FR 19975) and designated as a CDFW Species of Special Concern (Moyle et al. 2015). EFH is present for fall-run salmon within the Sacramento River, including juvenile rearing, juvenile migration corridors, and adult migration corridors. EFH is present for fall-run Chinook salmon within the Sacramento and American Rivers, and for late fall-run within the Sacramento River, including juvenile rearing, juvenile migration corridors, and adult migration corridors.
Adult Central Valley fall-run Chinook salmon migrate into the Sacramento River and its tributaries in June–December in mature condition and spawn in late September–December, soon after arriving at their spawning grounds (Yoshiyama et al. 1998). The spawning peak occurs in October and November. Emergence occurs in December–March, and juveniles migrate downstream through the Delta and out to the ocean soon after emerging, rearing in fresh water for only a few months. Smolt outmigration typically occurs in March–July (Yoshiyama et al. 1998).

Late Central Valley fall-run Chinook salmon migrate upstream before they are sexually mature and hold near the spawning grounds for 1–3 months before spawning. Upstream migration takes place in October–April and spawning occurs in late January–April, with peak spawning in February and March (Yoshiyama et al. 1998). Fry emerge from redds in April–June. juvenile Central Valley late fall-run Chinook salmon rear in their natal stream during summer and remain throughout the year in some streams. Juveniles rearing in off-channel habitats were found to grow at a higher rate than those in main-channel habitats (Limm and Marchetti 2003). Smolt outmigration can occur from November–May (Yoshiyama et al. 1998).

Sacramento Splittail

Sacramento splittail (Pogonichthys macrolepidotus) was previously listed under the Federal ESA as a threatened species but was delisted in 2003 (FR 68 55140). It is currently designated as a CDFW Species of Special Concern. Sacramento splittail are hardy cyprinid minnows capable of tolerating high salinities (<20 ppt) and low levels of dissolved oxygen (<1.0 milligrams/liter) (Young and Cech 1996). Adults move upstream from late November to late January, foraging in flooded areas along the main rivers, bypasses, and tidal freshwater marsh areas of Montezuma and Suisun Sloughs and in San Pablo Bay before the onset of spawning (Moyle et al. 2004). Feeding in flooded riparian areas before spawning may contribute to spawning success and adult survival after spawning (Moyle et al. 2004). Sacramento splittail migration appears closely tied to river outflow. In wet years with increased river flow, adults will move long distances upstream to spawn, allowing juvenile rearing in upstream habitats. The upstream migration is smaller during dry years, although larvae and juveniles are often found upstream of Sacramento to Colusa or Ord Bend on the Sacramento River (Moyle et al. 2004). Sacramento splittail are thought to be fractional spawners, with individuals spawning over a protracted period, often for as long as several months (Wang 1991). Spawning typically occurs on inundated floodplains in February–June, with peak spawning in March and April. The eggs adhere to vegetation until hatching (Moyle 2002).

After emergence, most larval Sacramento splittail remain in flooded riparian areas for 10–14 days, most likely feeding among submerged vegetation before moving off floodplains into deeper water as they become stronger swimmers (Sommer et al. 1997, Wang 1986; both as cited in Moyle 2002). Although juvenile Sacramento splittail are known to rear in upstream areas for a year or more (Baxter 1999, as cited in Moyle et al. 2004), most move to shallow, productive bay and estuarine waters after only a few weeks (from April to August), often in response to flow pulses (Moyle et al. 2004). Juvenile splittail are found in off-channel and backwater habitat rather than main channel habitats in both upstream and in intertidal areas (Feyrer et al. 2005).

Longfin Smelt

Longfin smelt (Spirinchus thaleichthys) is State-listed as threatened. USFWS denied a petition for Federal listing because the population in California (and specifically San Francisco Bay) was not believed to be sufficiently genetically isolated from other populations (74 FR 16169). Longfin smelt are an anadromous fish that spawn in the Delta. They are locally found in Suisun, San Pablo, and San Francisco Bays, as well as the waters immediately outside of the Golden Gate. Though these smelt may range farther upstream, they are generally limited to waters downstream of Rio Vista. Longfin smelt typically spawn at 2 years old but some females may spawn in their third year of life. The majority of spawning occurs in February–April. Spawning occurs over a variety of substrates, including sand, gravel, rocks, and plants. Newly hatched larvae migrate downstream towards rearing habitat near RM 20, the upstream extent of the salt and freshwater mixing zone (X2). As they mature, juvenile longfin smelt will migrate farther downstream into Suisun, San Pablo, and San Francisco Bays. The primary food source of...
longfin smelt are opossum shrimp (*Neomysis* spp.), but smaller individuals feed heavily on copepods (Moyle 2002, as cited in Baxter et al. 2008).

**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 fish and aquatic resources 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 California Fish and Game Code and/or CWA. Areas designated as critical habitat for green sturgeon, delta smelt, Central Valley steelhead, and spring- and winter-run Chinook salmon are protected under the Federal ESA, and additional habitat that supports or could support Federally listed species may also be protected under the Federal ESA. In addition, the Sacramento River has been designated as EFH for spring-, fall-, late fall- and winter-run Chinook salmon.

**4.6.3 ENVIRONMENTAL IMPACTS**

**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, as amended. The proposed program would have a significant impact on fisheries and aquatic 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 CDFW;

► adversely modify designated critical habitat for any Federally listed species;

► interfere substantially with the movement of any native resident or migratory fish species;

► substantially diminish habitat for any fish life stage, or result in displacement of spawning fish such that year-class strength is substantially reduced, or involve production and discharge of materials that pose a hazard to fish species; or

► conflict with any local policies or ordinances protecting biological resources, such as provisions of an adopted HCP), NCCP, or other approved local, regional, or State habitat conservation plan.

Impacts related to riparian habitats and wetlands are discussed in Section 4.7, “Terrestrial Biological Resources.”

**ISSUES AND POTENTIAL IMPACTS NOT DISCUSSED FURTHER IN THIS SEIR**

Portions of the program area are within planning areas for the Yolo HCP/NCCP and Solano HCP. These conservation plans are at different stages of development, but neither of them has been adopted and approved by the USFWS or CDFW. Therefore, consistency of the proposed funding mechanism with these conservation plans is not required to be analyzed under CEQA, and therefore, such analysis is not included in this SEIR.
IMPACT ANALYSIS

Impact BIO-F1 Modifications to Aquatic Shoreline and Floodplain Habitat Used by Special-Status Fish.

Implementation of the proposed program would alter shoreline and floodplain habitat, potentially resulting in permanent loss of some habitat. Habitat enhancement and creation would also occur, but the extent of adverse and beneficial effects cannot be quantified at this time. Therefore, the potential exists for substantial adverse effects to special-status fish habitat to result. This impact would be potentially significant.

The east bank of the Sacramento River supports habitat for special-status fish. Constructing bank protection and launchable rock trenches would likely alter shoreline habitat by removing existing riparian and aquatic vegetation, IWM, and bank material. Removal of such habitat would result in loss of SRA habitat that could be important 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. This could reduce suitability of the shoreline habitat for special-status fish, including as foraging and rearing by juvenile fishes. Constructing setback levees along the expanded Sacramento and Yolo Bypasses, strengthening portions of the Reclamation District No. 2068 (RD 2068) Levee along the west side of the Yolo Bypass, and constructing a new floodwall to protect portions of the City of Rio Vista south of State Route 84 are anticipated to result in limited direct disturbance, but some removal of riparian vegetation, potentially including shoreline and floodplain SRA habitat could occur. Bank protection and launchable rock trenches would likely incorporate habitat enhancement components that would partially compensate for the adverse effects, such as planting of herbaceous and woody vegetation that would result in long-term bank shading and increasing the availability (habitat area) and quality (shallow water and instream cover) of nearshore aquatic and SRA habitat. IWM (including large woody debris) may also be incorporated to develop aquatic habitat, with the intent to provide slow-moving water and cover from predators for anadromous fish species. Establishing a woodland corridor along the eastern edge of the Tule Canal may also increase SRA habitat within potential floodplain rearing habitat of the Yolo Bypass. Because the activities that could be funded through the proposed program are in the early planning stages, the extent of adverse and beneficial impacts cannot be quantified at this time and it would be speculative to do so. Although the program includes activities that would result in an increase in and/or enhancement of fish habitat, implementation of the program could result in substantial adverse effects to Sacramento River shoreline habitat that could contribute to declines in special-status fish populations. In addition, though some habitat replacement or enhancement features may immediately provide habitat (e.g., IWM placement), others would gradually provide habitat over the course of several years (e.g., riparian revegetation). Overall loss of SRA habitat and other features important to special-status fish could have a substantial adverse effect on fish populations. This impact would be potentially significant. Mitigation Measure BIO-F1, described below, has been identified to address this impact.

Impact BIO-F2 Potential Disturbance, Injury, and Mortality of Special-Status Fishes during Construction.

Constructing bank protection and launchable rock trenches could result in disturbance, displacement, injury, or death of special-status fishes in the Sacramento River during in-water work periods. This impact would be potentially significant.

Constructing bank protection and launchable rock trenches along the Sacramento River East Levee could result in temporary direct impacts to special-status fishes during in-water work periods. Activities in the Yolo Bypass would occur outside of the flood season, and in-water work is not anticipated to be required. In-water construction along the Sacramento River may displace adult and juvenile fish present in and near the work areas or disrupt essential behaviors such as foraging and migration. Construction activities also could also displace fish from cover or cause disorientation, increasing their susceptibility to mortality by predation. Direct impacts may include mortality or injury of individuals present during construction due to movement of heavy equipment, construction noise, and bank material excavation. Injury or mortality of individual fish could result from falling debris, crushing by equipment or loose material, or stranding in dewatered areas. These impacts would be potentially significant. Mitigation Measure BIO-F2, described below, has been identified to address this impact.
4.6.4 MITIGATION MEASURES

Mitigation is identified below for Impacts BIO-F1 (aquatic shoreline and floodplain habitat modifications), BIO-F2 (disturbance, injury, and mortality) and BIO-F3 (water quality degradation).

Mitigation Measure BIO-F1: Comply with Section 1602, the Federal Endangered Species Act, and the California Endangered Species Act as Needed, and Mitigate on a No-Net-Loss Basis (for Impact BIO-F1, Possible Modifications to Aquatic Shoreline and Floodplain Habitat Used by Special-Status Fish).

The agency(ies) implementing program components shall implement the following measures to avoid, minimize, and, if necessary, compensate for modifications to aquatic shoreline and floodplain habitat for special-status fish.

CDFW 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 program activities that could affect a channel (e.g., irrigation/drainage canal, creek, river), streambank, or waterside of a levee. Affected habitats shall be replaced and/or rehabilitated on a “no-net-loss” basis in accordance with CDFW regulations and as specified in the streambed alteration agreement, if applicable. Habitat restoration, rehabilitation, and/or replacement shall be at a location and by methods agreeable to CDFW. Minimization and compensation measures adopted through the permitting process shall be implemented.

The USFWS and NMFS shall be consulted regarding compliance with the Federal ESA for potential effects on species under their respective jurisdictions, and CDFW shall be consulted regarding compliance with CESA for potential effects on State-listed species. Appropriate measures shall be developed in consultation with the agencies and implemented to minimize and potentially compensate...
unavoidable effects on special-status fish species. Authorization for take of listed fish species under the Federal ESA and/or CESA shall be obtained if it is determined that the future proposed funded facility(ies) under the proposed program could result in take of the listed species. All measures developed through informal consultation with USFWS, NMFS, and CDFW shall be implemented, as well as any additional measures adopted through a formal permitting process, if applicable.

If applicable, an appropriate and feasible mitigation plan to compensate for habitat modifications shall be developed and provided to NMFS and, as necessary, USFWS and CDFW for approval. Compensation may include preserving, enhancing, and/or creating fish habitat at an on- or off-site location. Appropriate mitigation ratios will be determined in coordination with the resource agencies but would ensure “no-net-loss” of habitat. If habitat creation is proposed, the mitigation plan shall include methods for implementation, success criteria, monitoring and reporting protocols, and contingency measures to be implemented if the initial mitigation fails. Alternatively, purchasing credits at an agency-approved mitigation bank may be identified as appropriate mitigation.

**Timing:** Prior to, during, and after construction activities.

**Responsibility:** The agency(ies) implementing the program component.

**Mitigation Measure BIO-F2: Develop and Implement Measures to Avoid and Minimize Potential for Direct Impacts** (for Impact BIO-F2, Potential Disturbance, Injury, and Mortality of Special-Status Fishes during Construction).

The agency(ies) implementing program components shall implement the following measures to avoid and minimize disturbance, injury, and mortality of special-status fish.

Implement Mitigation BIO-F1 for Modifications to Aquatic Shoreline and Floodplain Habitat Used by Special-Status Fish.

Consultation with USFWS, NMFS, and CDFW shall include development of measures to avoid and minimize direct effects on individuals of listed fish species. Such measures are likely to include, but will not be limited to, conducting in-water construction during in-water work windows designed to avoid impacts to critical life stages (typically from June through October) and installing screens on any construction-related water pump intakes located on waterways with special-status fish, in accordance with current agency screening specifications.

**Timing:** Prior to, during, and after construction activities.

**Responsibility:** The agency(ies) implementing the program component.

**Mitigation Measure BIO-F3: Implement Standard Best Management Practices (BMPs), Prepare and Implement a Storm Water Pollution Prevention Plan, and Comply with National Pollutant Discharge Elimination System Permit Conditions** (Implement Mitigation Measure WQ-1 for Impact BIO-F3, Possible Water Quality Degradation during and Following In-Water Construction Activities).

The agency(ies) implementing program components shall implement Mitigation Measure WQ-1, described in Section 4.5, “Water Quality,” to avoid and minimize water quality degradation.

**Timing:** Prior to, during, and after construction activities.
Responsibility: The agency(ies) implementing the program component.

4.6.5 CONCLUSION

Implementing Mitigation Measure BIO-F1 would reduce the potentially significant Impact BIO-F1 (modifications to aquatic shoreline and floodplain habitat used by special-status fish) because impact avoidance and minimization measures would be identified and implemented in consultation with CDFW, NMFS, and/or USFWS; compensation would be provided, as necessary, for unavoidable impacts on Federally and/or state-listed fish species; and authorization for take of listed fish would be obtained as necessary. Implementing Mitigation Measure BIO-F2 would reduce the potentially significant Impact BIO-F2 (disturbance, injury, and mortality of special-status fishes during construction) to a less-than-significant level because impact avoidance and minimization measures would be identified and implemented in consultation with CDFW, NMFS, and/or USFWS; compensation would be provided, as necessary, for unavoidable impacts on Federally and/or state-listed fish species; and authorization for take of listed fish would be obtained as necessary. Implementing Mitigation Measure BIO-F3 would reduce the potentially significant Impact BIO-F3 (water quality degradation during and following in-water construction activities) to a less-than-significant level because a Storm Water Pollution Prevention Plan and site-specific BMPs specifically designed to reduce erosion, siltation, and pollutant transport would be implemented; and because a spill prevention and control plan with measures specifically designed to prevent transport of hazardous materials to waterways and implement cleanup activities in the event of accidental spills would be implemented.
4.7 TERRESTRIAL BIOLOGICAL RESOURCES

This section addresses terrestrial biological resources, including vegetation and wildlife, known or with potential to occur in the program area. This section also addresses sensitive habitats, including wetland and riparian resources. Information pertaining to fisheries resources is addressed in Section 4.6, “Fisheries and Aquatic Resources.”

4.7.1 REGULATORY SETTING

FEDERAL

Federal Endangered Species Act

Pursuant to the Federal Endangered Species Act (ESA) (Title 16, Section 1531 and following sections of the U.S. Code (USC) [16 USC 1531 et seq.]), the U.S. Fish and Wildlife Service (USFWS) has regulatory authority over species listed or proposed for listing as Federally endangered or threatened. USFWS and National Marine Fisheries Service (NMFS) have authority over projects that may result in take of a species listed as threatened or endangered under the ESA (i.e., a Federally-listed species). In general, persons subject to the ESA (including private parties) are prohibited from “taking” endangered or threatened fish and wildlife species on private property, and from taking endangered or threatened plants in areas under Federal jurisdiction or in violation of State law. Under Section 9 of 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.” USFWS has also interpreted the definition of “harm” to include significant habitat modification that could result in take.

The take prohibition of ESA Section 9 applies only to listed species of fish and wildlife. Section 9(a)(2)(B) describes Federal protection for endangered plants. In general, the ESA does not protect listed plants located on non-Federal land (i.e., areas not under Federal jurisdiction), unless such species are already protected by State law.

Section 3(5)A of the ESA defines “critical habitat” as the specific areas within the geographical area occupied by listed species on which are found physical or biological features essential to the conservation of the species and that may require special management considerations or protection. Specific areas outside of the geographical area occupied by the species may also be included in critical habitat designations, upon a determination that such areas are essential for the conservation of the species.

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, or destroying or adversely modifying designated critical habitat.

For projects where Federal action is not involved and take of a listed species may occur, a project proponent may seek 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 (HCP) that ensures minimization and mitigation of impacts associated with the take.

Section 404 of the Clean Water Act

Section 404 of the Clean Water Act (CWA) requires project proponents to obtain a permit from the U.S. Army Corps of Engineers (USACE) before engaging in any activity that involves discharge of dredged or fill material into habitats meeting criteria for designation as waters of the United States, including wetlands. As part of the review of a project, USACE must ensure compliance with applicable Federal laws, including EPA’s Section 404(b)(1) Guidelines. USACE regulations require that impacts on waters of the United States be avoided and minimized to the maximum extent practicable, and that unavoidable impacts be compensated (Title 33, Section
320.4[r] of the Code of Federal Regulations (CFR) [33 CFR 320.4[r]). Mitigation requiring no-net-loss of functions and values of waters of the U.S., including wetlands, is typically required by USACE.

**Section 401 of the Clean Water Act**

Under Section 401 of the CWA, an applicant for a Section 404 permit must obtain a certificate from the appropriate state agency stating that the intended dredging or filling activity is consistent with the state’s water quality standards and criteria. In California, the State Water Resources Control Board delegates the authority to grant water quality certification to the nine Regional Water Quality Control Boards (RWQCBs).

**Migratory Bird Treaty Act**

The Migratory Bird Treaty Act (MBTA) (16 USC 703 et seq.), first enacted in 1918, provides for protection of international migratory birds. The MBTA makes it unlawful, except as permitted by regulations, to pursue, take, or kill any migratory bird, or any part, nest or egg of any such bird. 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 can be found in 50 CFR 10.13. The list includes nearly all birds native to the United States.

**STATE**

**California Endangered Species Act**

The California Endangered Species Act (CESA) (California Fish and Game Code Section 2050 et seq.) directs State agencies not to approve projects that would jeopardize the continued existence of an endangered or threatened species or result in the destruction or adverse modification of habitat essential to the continued existence of a species. Furthermore, CESA states that California Department of Fish and Wildlife (CDFW), together with the project proponent (in this case, Sacramento Area Flood Control Agency [SAFCA]) and any State lead agency, must develop reasonable and prudent alternatives consistent with conserving the species while maintaining the project purpose to the greatest extent possible.

Under CESA, “take” is defined as an activity that would directly or indirectly kill an individual of a species. In contrast with the Federal ESA, the CESA definition of take does not include “harm” or “harass.” As a result, the threshold for take may be higher under CESA than under the ESA, because habitat modification is not necessarily considered take under CESA. The take of State-listed species incidental to otherwise lawful activities requires a permit, pursuant to Section 2081(b) of CESA. The State of California has the authority to issue an incidental take permit under California Fish and Game Code Section 2081, or to coordinate with USFWS during the Section 10(a) process to make the Federal permit consistent with CESA. Under CESA, project-related impacts of the authorized take must be minimized and fully mitigated, and adequate funding must be in place to implement those mitigation measures and monitor compliance with the measures and their effectiveness. Standard requirements can include land acquisition, permanent protection and management, and/or funding in perpetuity of compensatory lands.

As under Federal law, listed plants have considerably less protection than fish and wildlife under State law. The California Native Plant Protection Act (California Fish and Game Code Section 19000 et seq.) allows landowners to take listed plant species from, among other places, a canal, lateral ditch, building site, or road, or other right-of-way, provided that the owner first notifies CDFW and gives the agency at least 10 days to come and retrieve (and presumably replant) the plants before they are plowed under or otherwise destroyed.

**California Fish and Game Code—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 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 as a result of tree removal and human disturbance causing failure of nesting attempts, resulting in loss of eggs and/or young.

**California Fish and Game Code—Fully Protected Species**

Four sections of the California Fish and Game Code—Sections 3511, 4700, 5050, and 5515—list 37 fully protected species. These statutes prohibit take or possession of fully protected species. CDFW is unable to authorize incidental take of fully-protected species and has informed non-Federal agencies and private parties that take of all fully protected species must be avoided when implementing projects.

**California Fish and Game Code—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 CDFW under Section 1602 of the California Fish and Game Code. Under Section 1602, it is unlawful for any person to substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake designated by CDFW, or to use any material from the streambeds, without first notifying CDFW of such activity and obtaining a final agreement authorizing the activity.

“Stream” is defined as a body of water that flows at least periodically or intermittently through a bed or channel having banks and that supports fish or other aquatic life. CDFW’s jurisdiction within altered or artificial waterways is based on the value of those waterways to fish and wildlife. A CDFW 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**

The Porter-Cologne Water Quality Control Act (Porter-Cologne Act) (California Water Code Section 13000 et seq.) requires that each of the State’s nine RWQCBs prepare and periodically update basin plans for water quality control. Each basin plan sets forth water quality standards for surface water and groundwater and actions to control nonpoint and point sources of pollution to achieve and maintain these standards. Basin plans offer an opportunity to protect wetlands through the establishment of water quality objectives. The RWQCB’s jurisdiction includes Federally-protected waters as well as areas that meet the definition of “waters of the State.” The RWQCB is responsible for issuing water quality certifications, pursuant to Section 401 of the CWA. The RWQCB has the discretion to take jurisdiction over areas not Federally-regulated under Section 401 of the CWA, provided they meet the definition of waters of the State. Waters of the State is defined as any surface water or groundwater, including saline waters, within the State’s boundaries. Mitigation requiring no-net-loss of functions and values of waters of the State is typically required by the RWQCB.

**REGIONAL AND LOCAL**

**Yolo County Natural Community Conservation Plan and Habitat Conservation Plan**

The Yolo Habitat Conservancy (YHC), formerly the Yolo County Habitat Conservation Plan/Natural Community Conservation Plan Joint Powers Agency, is directing preparation of the Yolo Habitat Conservation Plan/Natural Communities Conservation Plan (HCP/NCCP). This HCP/NCCP provides a framework to improve conservation of natural resources, including endangered species habitat, while streamlining the permitting process for planned development, infrastructure, and maintenance activities. It will allow Yolo County, the YHC, and the Cities of Woodland, Winters, West Sacramento, and Davis, to receive incidental take permits under ESA and CESA for activities and projects they conduct and those under their jurisdiction. The Second Administrative Draft of the HCP/NCCP (Yolo County HCP/NCCP Joint Powers Authority [JPA] 2015) was issued in March 2015; the plan has not yet been adopted by participants or approved by the regulatory agencies.
Solano Habitat Conservation Plan

The Solano HCP is being developed to support issuance of an incidental take permit under Section 10(a) of the ESA, as required by the March 1999 Solano Project Contract Renewal Biological Opinion between the USFWS and the U.S. Bureau of Reclamation (Reclamation). The Solano HCP will expand the scope of the Biological Opinion and includes additional voluntary applicants, including cities (i.e., Dixon, Fairfield, Rio Vista, Suisun, Vacaville, and Vallejo) and water resources-related districts and agencies. Additional species also will be addressed, including Federally-listed fish species under NMFS jurisdiction, species listed as threatened or endangered under CESA, and species recognized by groups such as CDFW and the California Native Plant Society (CNPS) as having declining or vulnerable populations, but not officially listed as threatened or endangered species. A public draft of the plan is scheduled to be issued in early 2016.

County and City Policies and Ordinances

Codes and policies of Sacramento, Solano, and Yolo Counties and the Cities of Sacramento and Rio Vista, within which the program area is located, include various adopted element policies that address protection of natural resources, including vegetation, sensitive species, wetlands, and trees.

Sacramento County General Plan

The Conservation Element of the Sacramento County 2030 General Plan (County of Sacramento 2011) identifies a number of goals and policies regarding terrestrial biological resources. The Conservation Element 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 and large native non-oaks, especially landmark trees. The Conservation Element directs that mitigation should occur for any loss or modification of vernal pools, wetlands, riparian woodlands, native vegetative habitat, and special-status species habitats, and that these mitigation sites should be permanently protected and managed. In addition, 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 groves and providing an on-site area to mitigate any canopy loss.

Sacramento County Tree Preservation and Protection Ordinance

Chapter 19.12 of Title 19 of the Sacramento County Code (County of Sacramento 2015) addresses 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.

Solano County General Plan

The Solano County General Plan Resources Element (Solano County 2008) includes a number of policies regarding terrestrial biological resources. General policies emphasize protection, enhancement, and management of natural habitats, plant and animal communities, and wildlife corridors. Implementation measures call for development and adoption of ordinances to address specific resources, such as oak woodlands and heritage trees, as well as development of programs to identify high-priority biological resources management areas and to site and permit mitigation banks. Preservation of marshes and other wetland, riparian, and adjacent grassland habitats is addressed in policies specifically related to marshes and the Delta.

Yolo County General Plan

The Yolo County General Plan (Yolo County 2009) Conservation and Open Space Element identifies many policies and a number of implementation actions designed to support the overall goal of protecting and enhancing biological resources through the conservation, maintenance, and restoration of key habitat areas and
corresponding connections that represent the diverse geography, topography, biological communities, and ecological integrity of the County’s landscape. Some policies generally address biological resource protection, while others identify specific measures related to particular species and habitats, including vernal pool, wetlands, oak woodlands, and special soils.

Yolo County Swainson’s Hawk Mitigation Fee Program

This mitigation fee program is implemented on behalf of Yolo County and the Cities of Davis, Woodland, Winters, and West Sacramento. The program uses mitigation fees to acquire conservation easements that protect Swainson’s hawk habitat. It is an interim program that is dependent upon completion of the Yolo County NCCP/HCP, is limited to providing mitigation for impacts to foraging habitat, and does not authorize incidental take of Swainson’s hawks. Applications for development of open land within the NCCP/HCP planning area are reviewed and acreage-based mitigation fees are collected to compensate for development of the lands. The mitigation fees are designed to be sufficient to fund the acquisition, enhancement, and long-term management of 1 acre of Swainson’s hawk foraging habitat for every 1 acre of foraging habitat that is lost to urban development.

City of Sacramento General Plan

The environmental resources component of the Sacramento 2035 General Plan (City of Sacramento 2015) includes a biological resources goal to protect and enhance open space, natural areas, and significant wildlife and vegetation in the City as integral parts of a sustainable environment within a larger regional ecosystem. Seventeen policies are identified in support of this goal, including those addressing natural resource preservation and open space conservation and protection of sensitive habitats and wildlife corridors.

City of Sacramento Tree Ordinances

Title 12 of the Sacramento City Code (City of Sacramento 2015) addresses the protection of trees within the City boundaries, including general protection of all trees on City property (Chapter 12.56, “Trees Generally”) and specific protection of heritage trees (Chapter 12.64, “Heritage Trees”).

City of Rio Vista General Plan

The City of Rio Vista General Plan 2001 (City of Rio Vista Community Development Department 2002) identifies policies and implementing actions designed to achieve the overall goal of preserving and protecting biological resources for their wildlife habitat. The policies generally support preservation and enhancement of natural habitats, but specific requirements for no-net-loss of wetlands and determination of sensitive habitat setbacks on a case-by-case basis are also included.

4.7.2 ENVIRONMENTAL SETTING

LAND COVER AND VEGETATION

Historically, the program 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. Although the area has been substantially altered and the Sacramento River is now confined to a very narrow leveed corridor, the study area still supports a wide array of natural habitat types, particularly in the Sacramento and Yolo Bypasses.

Annual Grassland

Annual grasslands occur in all portions of the program area, such as woodland openings along the Sacramento River East Levee, in the Yolo and Sacramento Bypasses, at the Old Bryte Landfill, and along levees and water supply/drainage systems. Within the study area, this habitat is likely dominated or codominated by nonnative wild oat (Avena fatua) or perennial rye grass (Festuca perenne), with a mix of other nonnative herbs. Johnson grass
(Sorghum halepense), prickly sow thistle (Sonchus asper ssp. asper), and occasional patches of yellow star-thistle (Centaurea solstitialis) and perennial pepperweed (Lepidium latifolium) are also typically found within this cover type. Native plants found in the grassland areas may include California poppy (Eschscholzia californica), mugwort (Artemisia douglasiana), horseweed (Erigeron canadensis), and common scouring rush (Equisetum hyemale). Perennial grasses, such as purple needlegrass (Nassella pulchra) and Idaho fescue (F. idahoensis), may be present in moist, lightly grazed, or relic prairie areas in the Yolo Bypass. In this vegetation type, wild oat or perennial rye grass has greater than 50 percent relative cover. Annual grassland vegetation can reach more than 4 feet tall, but in many portions of the program area (e.g., along levee slopes) it is regularly mowed.

**Cropland**

Agricultural land in the program area occurs in the Yolo Bypass and the proposed Yolo and Sacramento Bypass setback areas. These areas support rice fields, row crops, grassy fields recently tilled or harvested, and fallow fields. Scattered native trees and shrubs, such as valley oak (Quercus lobata), Fremont cottonwood (Populus fremontii), and black walnut (Juglans nigra and hybrids) may be present along agricultural field boundaries.

**Freshwater Emergent Wetland**

Freshwater emergent is likely present in remnant wetland areas and along irrigation and drainage features in the Sacramento and Yolo bypass and proposed setback areas. Small, narrow patches of freshwater emergent wetland may also occur along the Sacramento River, in the vicinity of both Sacramento and Rio Vista. These wetlands are characterized by erect, rooted herbaceous hydrophytes, where the dominant vegetation is generally perennial monocots, such as bulrush (Schoenoplectus acutus; also known as tule), or cattails (Typha sp.). All emergent wetlands are flooded frequently, enough so that the roots of the vegetation prosper in an anaerobic environment. The upper margins of freshwater emergent wetlands are typically characterized by saturated or periodically flooded soils that support several moist soil plant species including pale spike rush (Eleocharis macrostachya), common rush (Juncus effuse), Baltic rush (J. balticus), tall flatsedge (Cyperus erogrostis), and on more alkali sites, saltgrass (Distichlis spicata).

**Riverine**

Riverine habitat includes natural river and creek channels, such as the Sacramento River. This habitat is characterized by open water with little or no vegetation, although riparian and emergent wetland vegetation may be present along the river edges.

**Valley Foothill Riparian**

Valley foothill riparian forest communities are found on floodplains, along low-gradient rivers and perennial or intermittent streams, and in alluvial fans where shallow groundwater is present. Shrubby thicket-type valley foothill riparian communities are common along levees, channel margins, seasonal streams, disturbed riparian corridors, and riprapped portions of river channels. In the program area, valley foothill riparian habitats vary from shrubby thickets to mature riparian forests and occur along the Sacramento River East Levee and American River South Levee, and to a lesser extent in the Sacramento and Yolo Bypasses. The typical valley foothill riparian forest community in the program area is dominated by Fremont cottonwood, with box elder (Acer negundo), Oregon ash (Fraxinus latifolia), black walnut, Western sycamore (Platanus racemosa), valley oak, black willow (Salix goodingii) and smaller willow species (S. laevigata, S. lasiolepis, S. lucida ssp. lasiandra) as codominants. In this vegetation type, Fremont cottonwood may have more than 50 percent relative cover, greater than 5 percent absolute cover, or greater than 30 percent relative cover if willows are codominant in the tree layer. Trees are less than approximately 80 feet tall and the canopy is continuous to open. Shrubby thicket-type valley and foothill riparian habitats in the program area may be intermittent to open and dominated by sandbar willow (S. exigua) and nonnative Himalayan blackberry (Rubus armeniacus [discolor]). The herbaceous layer in riparian habitats of the program area includes mugwort, common scouring rush, California tule pea (Lathyrus jepsonii var.
californicus), Bermuda grass (Cynodon dactylon), bentgrass (Agrostis sp.), vetch (Vicia sp.), and white sweet clover (Melilotus alba).

**Valley Oak Woodland**

Valley oak woodland stands are typically found on the higher portions of the floodplain than valley foothill riparian forest. Within the program area, this community is most prevalent along the Sacramento River East Levee and American River South Levee. Small isolated patches of valley oak woodland may also occur in the Yolo Bypass. Valley oak woodland is dominated by valley oak, with box elder, white alder (Alnus rhombifolia), Oregon ash, black walnut, interior live oak (Quercus wislizeni), Fremont cottonwood, black willow, and smaller willow species as codominants. Trees are less than 100 feet tall and the canopy is open to continuous. Shrubs are common to occasional and include California grape (Vitis californica), Himalayan blackberry, and blue elderberry (Sambucus nigra ssp. cerulea). In this vegetation type, valley oak may have greater than 50 percent relative cover in the tree canopy; greater than 30 percent relative cover when other tree species, such as interior live oak or arroyo willow, are present; or greater than 35 percent cover in the tree canopy with box elder, white alder, Oregon ash, Fremont cottonwood, or western sycamore present.

**Seasonal Wetlands/Vernal Pools**

Seasonal wetlands are herbaceous wetlands that generally occur in topographically low areas and are subject to inundation during the winter months. Within the program area, these wetlands are likely limited to the Sacramento and Yolo Bypasses. Seasonal wetlands are generally dominated by wetland generalist plant species during the winter and spring months, but dominant vegetation may transition to species that are characteristic of surrounding upland habitat as the drying-down process occurs. Species likely to occur in seasonal wetlands in the program areas include Mediterranean barley (Hordeum marinum ssp. gussoneanum), Italian ryegrass (Lolium multiflorum), tall flatsedge, water pepper (Persicaria hydropiperoides), alkali mallow (Malvella leprosa), hyssop loosestrife (Lythrum hyssopifolia), common knotweed (Polygonum arenastrum), rough cocklebur (Xanthium strumarium), and spiny cocklebur (Xanthium spinosum).

Vernal pools are seasonal wetlands found in small depressions in the landscape that collect seasonal rains to support a specialized collection of plant and animal species characteristic of this particular habitat. Typically, semi-impermeable soil underlies most vernal pools and restricts downward percolation of collected rain water. Several vernal pool complexes occur in the southern portion of the Yolo Bypass, within and adjacent to the Tule Ranch Unit of the Yolo Bypass Wildlife Area, east of the Yolo Bypass West Levee. Many plants found in vernal pools are endemic (found only in these habitats) and have adapted to survive partially submerged conditions. These conditions have kept the nonnative grasses that comprise much of the Valley’s grazing lands from invading or at least dominating the pools. Thus, vernal pools are generally small pockets of mostly native vegetation surrounded by mostly nonnative grass species.

**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 was 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 area have changed. The abundance of species restricted to natural habitats has decreased, and in some cases particular species are no longer present. However, the remnant native habitats along the Sacramento and American Rivers have allowed populations of some wildlife species that depend on these habitats to persist. The program area now provides habitat for many common birds and other wildlife species that are able to use the generally narrow corridors of remnant riparian vegetation, as well as seasonal and year-round habitat for several sensitive and rare species. The Yolo Bypass, in contrast, is a wide corridor of open agricultural and wetlands
habitats capable of supporting large populations of various species suited to seasonally available aquatic habitats, as well as resident populations of species able to thrive in agricultural environments.

**SENSITIVE BIOLOGICAL RESOURCES**

Sensitive biological resources addressed in this section include those that are afforded consideration or protection under CEQA, the California Fish and Game Code, CESA, ESA, CWA, and/or Porter-Cologne Act.

**Special-Status Species**

Special-status species are plants and animals that fall into any of the following categories:

- species officially listed by the State of California or the Federal government as endangered, threatened, or rare;
- candidate species for State or Federal listing as endangered or threatened;
- species proposed for State or Federal listing as endangered or threatened;
- taxa (i.e., taxonomic categories or groups) that meet the criteria for listing, even if not currently included on any list, as described in CCR Section 15380 of the State CEQA Guidelines;
- wildlife species identified by CDFW as species of special concern and plant taxa considered by CDFW to be “rare, threatened, or endangered in California”;
- species listed as Fully Protected under the California Fish and Game Code; or
- species afforded protection under local or regional planning documents.

Plant taxa are assigned by CDFW to one of the following six California Rare Plant Ranks (CRPRs):

- CRPR 1A—Plants presumed to be extinct in California;
- CRPR 1B—Plants that are rare, threatened, or endangered in California and elsewhere;
- CRPR 2A—Plants that are presumed extirpated in California, but are more common elsewhere;
- CRPR 2B—Plants that are rare, threatened, or endangered in California but more common elsewhere;
- CRPR 3—Plants about which more information is needed (a review list); or
- CRPR 4—Plants of limited distribution (a watch list).

All plants with a CRPR are considered “special plants” by CDFW. The term “special plants” is a broad term used by CDFW to refer to all of the plant taxa inventoried in the California Natural Diversity Database (CNDDB), regardless of their legal or protection status. Plants ranked as CRPR 1A, 1B, 2A or 2B may qualify as endangered, rare, or threatened species within the definition presented in CCR Section 15380 of the State CEQA Guidelines. CDFW recommends that CRPR 1A, 1B, 2A and 2B species be addressed in CEQA projects. In general, CRPR 3 and 4 species do not meet the definition of endangered, rare, or threatened pursuant to State CEQA Guidelines CCR Section 15380. CDFW applies the term “California species of special concern” to wildlife species that are not listed under the ESA or CESA but that are nonetheless declining at a rate that could result in listing, or that historically occurred in low numbers and are subject to current known threats to their persistence.

CNDDB (CDFW 2015), CNPS Online Inventory of Rare and Endangered Plants (CNPS 2015), and local conservation planning documents were used as the primary sources to identify previously reported occurrences of special-status species in the vicinity of the program area. Although the CNDDB is the most current and reliable tool for tracking occurrences of special-status species, it contains only those records that have been reported to CDFW. The *Yolo Habitat Conservation Plan/Natural Community Conservation Plan* (Yolo County HCP/NCCP JPA 2015), *Yolo Bypass Wildlife Area Land Management Plan* (California Department of Fish and Game [CDFG])
Species addressed in this section were identified based on CNDDB occurrence records, conservation planning information, current species range, and current habitat conditions. Species were eliminated from consideration if the program area is outside the species’ current geographic or elevation range, the habitats required by the species do not occur or are not suitable for the species in the program area (e.g., special soil types, alkaline grassland), and/or the species does not meet the definition of special-status, as described above. In addition, several bird species designated by CDFW as species of special concern that only have potential to occur in the program areas very occasionally, do not breed in the vicinity, and were determined to have no potential to be adversely affected by the proposed program were also eliminated from further consideration. Tables 4.7-1 and 4.7-2 respectively describe the potential for occurrence of special-status plant and wildlife species considered in this section.

**Special-Status Plants**

Table 4.7-1 provides information on each special-status plant species’ legal protection status, habitat requirements, blooming period, and potential to occur in the program area. Information on habitat requirements and elevation range are from The Jepson Manual: Vascular Plants of California, second edition (Baldwin et al. 2012) and CNPS and CNDDB plant occurrence records (CDFW 2015, CNPS 2015).

<table>
<thead>
<tr>
<th>Species Name</th>
<th>Legal Status</th>
<th>Habitat, Elevation Range, and Blooming Period</th>
<th>Potential to Occur in Program Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alkali milk-vetch <em>Astragalus tener</em> var. tener</td>
<td>CRPR 1B.2</td>
<td>Playas, vernal pools, alkali flats, and flooded lands in valley and foothill grassland, from 0 to 200 feet in elevation. Blooms March–June.</td>
<td>Known to occur in the Tule Ranch Unit of the Yolo Bypass Wildlife Area, and could occur elsewhere in the Yolo Bypass where suitable habitat is present.</td>
</tr>
<tr>
<td>Ferris’ milk-vetch <em>Astragalus tener</em> var. <em>ferrisiae</em></td>
<td>CRPR 1B.1</td>
<td>Mesic meadows and seeps, freshwater marsh, drainage borders, and fallow rice fields; usually in dry, adobe soil, from 10 to 250 feet in elevation. Blooms April–May.</td>
<td>Known to occur in the Tule Ranch Unit of the Yolo Bypass Wildlife Area; could occur elsewhere in the Yolo Bypass and in the Sacramento Bypass, where suitable habitat is present.</td>
</tr>
<tr>
<td>Watershield <em>Brasenia schreberi</em></td>
<td>CRPR 2B.3</td>
<td>Freshwater ponds, marshes, and swamps, often in association with duckweed (<em>Lemna</em> spp.), from 100 to 7,200 feet in elevation. Blooms April–October.</td>
<td>Could occur in the Sacramento and Yolo Bypasses.</td>
</tr>
<tr>
<td>Bristly sedge <em>Carex comosa</em></td>
<td>CRPR 2B.1</td>
<td>Coastal prairie, marshes and swamps, and valley and foothill grassland; generally on lake margins and along ditches, sloughs, and freshwater marsh, from 0 to 2,000 feet in elevation. Blooms May–September.</td>
<td>Could occur in the Sacramento and Yolo Bypasses.</td>
</tr>
<tr>
<td>Bolander’s water hemlock <em>Cicuta maculata</em> var. <em>bolanderi</em></td>
<td>CRPR 2B.1</td>
<td>Coastal, freshwater, or brackish marshes and swamps, from 0 to 650 feet in elevation. Blooms July–September.</td>
<td>Could occur in the Sacramento and Yolo Bypasses.</td>
</tr>
<tr>
<td>Dwarf downingia <em>Downingia pusilla</em></td>
<td>CRPR 2B.2</td>
<td>Vernal pools and similar seasonal wetlands in valley and foothill grassland, from 3 to 1,500 feet in elevation. Blooms March–May.</td>
<td>Could occur in the Yolo Bypass.</td>
</tr>
<tr>
<td>Species Name</td>
<td>Legal Status1</td>
<td>Habitat, Elevation Range, and Blooming Period</td>
<td>Potential to Occur in Program Area</td>
</tr>
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</tr>
<tr>
<td>San Joaquin spearscale</td>
<td>Etriplex joaquiniana</td>
<td>Alkali meadow, chenopod scrub, and seeps in valley and foothill grassland, often in seasonal alkali wetlands or alkali sink scrub, from 5 to 2,750 feet in elevation. Blooms April–October.</td>
<td>Known to occur in the Tule Ranch Unit of the Yolo Bypass Wildlife Area, and could occur elsewhere in the Yolo Bypass where suitable habitat is present.</td>
</tr>
<tr>
<td>Boggs Lake hedge-hyssop</td>
<td>Gratiola heterosepala</td>
<td>CE; CRPR 1B.2 Lake margins and vernal pools, typically in clay soils, from 30 to 7,800 feet in elevation. Blooms April–October.</td>
<td>Could occur in the Yolo Bypass.</td>
</tr>
<tr>
<td>Woolly rose-mallow</td>
<td>Hibiscus lasiocarpus var. occidentalis</td>
<td>CRPR 1B.2 Freshwater marshes and swamps, typically on wetted river banks and low peat islands in sloughs; also recorded in riprap on levee slopes; occurs from 0 to 400 feet in elevation. Blooms June–November.</td>
<td>Known to occur at south end of the Yolo Bypass; could occur elsewhere in the Yolo Bypass, as well as in the Sacramento Bypass, proposed setback areas, and along the Sacramento River.</td>
</tr>
<tr>
<td>Delta tule pea</td>
<td>Lathyrus jepponii var. jepponii</td>
<td>CRPR 1B.2 Generally restricted to freshwater and brackish marshes of the Delta, but also recorded in riprap on levee slopes; from 0 to 15 feet in elevation. Blooms May–July (rarely into September).</td>
<td>Known to occur near the south end of the Yolo Bypass; could also occur along the Sacramento River East Levee and near Rio Vista.</td>
</tr>
<tr>
<td>Legenere limosa</td>
<td>CRPR 1B.1</td>
<td>Vernal pools, from 3 to 2,900 feet in elevation. Blooms April–June.</td>
<td>Could occur in the Yolo Bypass.</td>
</tr>
<tr>
<td>Heckard’s peppergrass</td>
<td>Lepidium latipes var. heckardii</td>
<td>CRPR 1B.2 Edges of vernal pools in valley and foothill grassland, typically in alkaline soils from 7 to 660 feet in elevation. Blooms March–May.</td>
<td>Known to occur in the Tule Ranch Unit of the Yolo Bypass Wildlife Area, and could occur elsewhere in the Yolo Bypass where suitable habitat is present.</td>
</tr>
<tr>
<td>Mason’s lilaeopsis</td>
<td>Lilaeopsis masonii</td>
<td>CR; CRPR 1B.1 Freshwater and brackish marshes, riparian scrub; typically occurs on bare depositional soils in tidal zones of the Delta, from 0 to 33 feet in elevation. Blooms April–November.</td>
<td>Known to occur at south end of the Yolo Bypass and near Rio Vista; could also occur along the Sacramento River East Levee.</td>
</tr>
<tr>
<td>Delta mudwort</td>
<td>Limosella australis</td>
<td>CRPR 2B.1 Riparian scrub, freshwater marsh, brackish marsh; typically occurs on intertidal mud banks of the Delta, in marshy or scrubby riparian associations, from 0 to 10 feet in elevation. Blooms April–November.</td>
<td>Known to occur at south end of the Yolo Bypass and near Rio Vista; could also occur along the Sacramento River East Levee.</td>
</tr>
<tr>
<td>Baker’s navarretia</td>
<td>Navarretia myersii ssp. bakeri</td>
<td>CRPR 1B.1 Vernal pools, swales, meadows and seeps in woodland and grassland, typically in adobe or alkaline soils from 15 to 5,700 feet in elevation. Blooms April–July.</td>
<td>Known to occur in the Tule Ranch Unit of the Yolo Bypass Wildlife Area, and could occur elsewhere in the Yolo Bypass where suitable habitat is present.</td>
</tr>
<tr>
<td>Bearded popcorn flower</td>
<td>Plagiobothrys hystriculus</td>
<td>CRPR 1B.1 Vernal swales and vernal pool margins in mesic grassland, from 0 to 900 feet. Blooms April–May.</td>
<td>Known to occur in the Tule Ranch Unit of the Yolo Bypass Wildlife Area, and could occur elsewhere in the Yolo Bypass where suitable habitat is present.</td>
</tr>
<tr>
<td>Sanford’s arrowhead</td>
<td>Sagittaria sanfordii</td>
<td>CRPR 1B.2 Shallow freshwater marshes and swamps; typically occurs in standing or slow-moving freshwater ponds, marshes, ditches, and sloughs from 0 to 2,000 feet in elevation. Blooms May–October.</td>
<td>Known to occur near Rio Vista; could also occur in the Yolo and Sacramento Bypasses.</td>
</tr>
</tbody>
</table>
Table 4.7-1 Special-Status Plant Species with Potential to Occur in the Program Area

<table>
<thead>
<tr>
<th>Species Name</th>
<th>Legal Status1</th>
<th>Habitat, Elevation Range, and Blooming Period</th>
<th>Potential to Occur in Program Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Side-flowering skullcap Scutellaria lateriflora</td>
<td>CRPR 2B.2</td>
<td>Meadows and seeps, marshes and swamps, typically in wet meadows and marshes in the Delta; also recorded on floating logs and pilings in river and slough channels; occurs from 0 to 1,600 feet in elevation. Blooms May–September.</td>
<td>Could occur in the Yolo and Sacramento Bypasses, and along the Sacramento River.</td>
</tr>
<tr>
<td>Suisun Marsh aster Symphyotrichum lentum</td>
<td>CRPR 1B.2</td>
<td>Brackish and freshwater marshes and swamps in the Delta; often occurs along edges of rivers and sloughs, and also recorded in riprap on levee slopes and pilings in river and slough channels; occurs from 0 to 10 feet in elevation. Blooms May–November.</td>
<td>Known to occur in the Yolo Bypass and near Rio Vista; also could occur along the Sacramento River East Levee.</td>
</tr>
<tr>
<td>Saline clover Trifolium hydrophilum</td>
<td>CRPR 1B.2</td>
<td>Marshes and swamps, vernal pools in valley and foothill grassland; typically in mesic places with alkaline soils, from 0 to 984 feet in elevation. Blooms April–June.</td>
<td>Known to occur in the Tule Ranch Unit of the Yolo Bypass Wildlife Area, and could occur elsewhere in the Yolo Bypass and in the Sacramento Bypass, where suitable habitat is present.</td>
</tr>
</tbody>
</table>

Notes: CRPR = California Rare Plant Rank; Delta = Sacramento–San Joaquin Delta

1 Legal Status Definitions:
CE State-listed as Endangered under the California Endangered Species Act.
CR State status of Rare (legally protected).
California Rare Plant Ranks:
1B Plant species considered rare or endangered in California and elsewhere (but not legally protected under the Federal or California Endangered Species Acts).
2B Plant species considered rare or endangered in California but more common elsewhere (but not legally protected under the Federal or California Endangered Species Acts).
California Rare Plant Rank Extensions:
.1 Seriously endangered in California (greater than 80 percent of occurrences are threatened and/or have a high degree and immediacy of threat).
.2 Fairly endangered in California (20 to 80 percent of occurrences are threatened and/or have a moderate degree and immediacy of threat).
.3 Not very endangered in California.

Special-Status Wildlife

Table 4.7-2 provides information on each special-status wildlife species’ legal protection status, habitat associations, and potential to occur in the program area.

Table 4.7-2 Special-Status Wildlife Species with Potential to Occur in the Program Area

<table>
<thead>
<tr>
<th>Species Name</th>
<th>Legal Status1</th>
<th>Habitat Associations</th>
<th>Potential to Occur in Program Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Invertebrates</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conservancy fairy shrimp Branchinecta conservatio</td>
<td>FE</td>
<td>Vernal pools and other seasonal wetlands, typically large, deep, and turbid.</td>
<td>Known to occur in the Tule Ranch Unit of the Yolo Bypass Wildlife Area, and could occur elsewhere in the bypass where suitable habitat is present.</td>
</tr>
<tr>
<td>Vernal pool fairy shrimp Branchinecta lynchi</td>
<td>FT</td>
<td>Vernal pools and other seasonal wetlands, typically small but including a wide range of sizes.</td>
<td>Known to occur in the Tule Ranch Unit of the Yolo Bypass Wildlife Area and farther south in the bypass; could occur elsewhere in the bypass where suitable habitat is present.</td>
</tr>
<tr>
<td>Species Name</td>
<td>Legal Status¹</td>
<td>Habitat Associations</td>
<td>Potential to Occur in Program Area</td>
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</tr>
<tr>
<td><strong>Vernal pool tadpole shrimp</strong> &lt;br&gt; <em>Lepidurus packardi</em></td>
<td>FT</td>
<td>Vernal pools and other seasonal wetlands of various sizes; typically medium to large pools with relatively long inundation period.</td>
<td>Known to occur in the Tule Ranch Unit of the Yolo Bypass Wildlife Area, and could occur elsewhere in the bypass where suitable habitat is present.</td>
</tr>
<tr>
<td><strong>Valley elderberry longhorn beetle</strong> &lt;br&gt; <em>Desmocerus californicus dimorphus</em></td>
<td>FT</td>
<td>Closely associated with blue elderberry (<em>Sambucus</em> sp.), which is an obligate host for the beetle larvae.</td>
<td>Known to occur along the Sacramento and American Rivers; could occur in the Sacramento and Yolo Bypasses and near Rio Vista.</td>
</tr>
<tr>
<td><strong>Reptiles</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Giant garter snake &lt;br&gt; <em>Thamnophis gigas</em></td>
<td>FT, CT</td>
<td>Open water associated with marshes, sloughs, and irrigation/drainage ditches within the Central Valley; requires emergent herbaceous wetland vegetation for escape and foraging habitat, grassy banks and openings in waterside vegetation for basking, and higher elevation upland habitat for cover and refuge from flooding.</td>
<td>Known to occur in Tule Canal and elsewhere in the Yolo Bypass; also could occur in the Sacramento Bypass and the proposed setback areas.</td>
</tr>
<tr>
<td>Northwestern pond turtle &lt;br&gt; <em>Actinemys marmorata</em></td>
<td>SSC</td>
<td>Permanent or nearly permanent water bodies with abundant vegetation and rocky or muddy bottoms in a variety of habitat types; also require basking sites such as logs, rocks, cattail mats, and exposed banks.</td>
<td>Known to occur along the Sacramento River East Levee and in the Yolo Bypass; also could occur in the Sacramento Bypass and the proposed setback areas.</td>
</tr>
<tr>
<td><strong>Birds</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Western snowy plover &lt;br&gt; <em>Charadrius alexandrinus nivosus</em></td>
<td>FT</td>
<td>Primarily a coastal species, but scattered inland breeding populations exist.</td>
<td>Migrant individuals are known to occur occasionally in the region and pairs have nested several times historically in the Yolo Bypass Wildlife Area.</td>
</tr>
<tr>
<td>Greater sandhill crane &lt;br&gt; <em>Grus canadensis tabida</em></td>
<td>CT</td>
<td>Grasslands, moist croplands with stubble, and open, emergent wetlands.</td>
<td>Regularly occurs in the Yolo Bypass during winter and could occur in the Sacramento Bypass and proposed setback areas.</td>
</tr>
<tr>
<td>Western yellow-billed cuckoo &lt;br&gt; <em>Coccyzus americanus occidentalis</em></td>
<td>FT, CE</td>
<td>Nests and typically forages in riparian forest with dense deciduous trees and shrubs.</td>
<td>Migrant individuals have been recorded recently at the northern end of the Yolo Bypass; could also occur during migration elsewhere in the Yolo and in the Sacramento Bypasses.</td>
</tr>
<tr>
<td>Burrowing owl &lt;br&gt; <em>Athene cunicularia</em></td>
<td>SSC</td>
<td>Nests and forages in grasslands, agricultural lands, open shrublands, and open woodlands with natural or artificial burrows or friable soils.</td>
<td>Known to occur in the Yolo Bypass and near Rio Vista; could occur elsewhere in the Yolo and in the Sacramento Bypasses and proposed setback areas.</td>
</tr>
<tr>
<td>Short-eared owl &lt;br&gt; <em>Asio flammeus</em></td>
<td>SSC</td>
<td>Nests and forages in open habitats including marshes, grasslands, shrublands, and agricultural fields.</td>
<td>Known to occur in the Yolo Bypass Wildlife Area, and is thought to occasionally nest there.</td>
</tr>
</tbody>
</table>
### Table 4.7-2 Special-Status Wildlife Species with Potential to Occur in the Program Area

<table>
<thead>
<tr>
<th>Species Name</th>
<th>Legal Status</th>
<th>Habitat Associations</th>
<th>Potential to Occur in Program Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>White-tailed kite <em>Elanus leucurus</em></td>
<td>FP</td>
<td>Nests in woodlands and isolated trees and forages in grasslands, pasture, and agricultural fields.</td>
<td>Known to nest along the Sacramento and American Rivers and west of the Yolo Bypass; could nest throughout the program area.</td>
</tr>
<tr>
<td>Swainson’s hawk <em>Buteo swainsoni</em></td>
<td>ST</td>
<td>Nests in woodlands and scattered trees and forages in grasslands and agricultural fields.</td>
<td>Known to nest in many locations throughout the program area.</td>
</tr>
<tr>
<td>Bank swallow <em>Riparia</em></td>
<td>ST</td>
<td>Forages in a variety of habitats and nests in vertical banks or bluffs of suitable soil, typically adjacent to water.</td>
<td>Migrants and breeding individuals could forage in the program area, but nest colonies are unlikely to occur in the program area.</td>
</tr>
<tr>
<td>Northern harrier <em>Circus cyaneus</em></td>
<td>SSC</td>
<td>Nests and forages in grasslands, agricultural fields, and marshes.</td>
<td>Known to nest in the Yolo Bypass Wildlife Area; could nest elsewhere in the Yolo and in the Sacramento Bypasses and proposed setback areas.</td>
</tr>
<tr>
<td>Purple martin <em>Progne subis</em></td>
<td>SSC</td>
<td>Nests in bridges in the Sacramento urban area and forages in adjacent open habitats.</td>
<td>Migrants and individuals from nest colonies in the urban Sacramento area could forage in the program area, but nest colonies are unlikely to occur in the program area.</td>
</tr>
<tr>
<td>Loggerhead shrike <em>Lanius ludovicianus</em></td>
<td>SSC</td>
<td>Forages and nests in grasslands, shrublands, and open woodlands;</td>
<td>Known to nest in the Yolo Bypass Wildlife Area; could nest elsewhere in the Yolo and in the Sacramento Bypasses.</td>
</tr>
<tr>
<td>Least Bell’s vireo <em>Vireo bellii pusillus</em></td>
<td>FE CE</td>
<td>Typically occurs in structurally diverse riparian habitat with dense shrub layer.</td>
<td>Extirpated from most of the Central Valley, but has recently been documented attempting to nest in the Los Rios Farms portion of the Yolo Bypass Wildlife Area.</td>
</tr>
<tr>
<td>Grasshopper sparrow <em>Ammodramus savannarum</em></td>
<td>SSC</td>
<td>Nests and forages in grasslands, with a mix of grasses, forbs, and scattered shrubs, on rolling hills and lowland plains.</td>
<td>Known to occur and presumed to nest in the Tule Ranch Unit of the Yolo Bypass Wildlife Area; could occur elsewhere in the Yolo Bypass where suitable habitat is present.</td>
</tr>
<tr>
<td>Song sparrow (&quot;Modesto&quot; population) <em>Melospiza melodia</em></td>
<td>SSC</td>
<td>Nests and forages in emergent freshwater marsh and riparian scrub and woodland.</td>
<td>Known to occur in the Yolo Bypass and near the Sacramento River East Levee and Rio Vista; also could occur in the Sacramento Bypass and proposed setback areas.</td>
</tr>
<tr>
<td>Tricolored blackbird <em>Agelaius tricolor</em></td>
<td>SSC</td>
<td>Nests in freshwater marsh, riparian scrub, grain crops, and other dense, low vegetation and forages in grasslands and agricultural fields.</td>
<td>Has nested recently in the Tule Ranch Unit of the Yolo Bypass Wildlife Area and west of the northern Yolo Bypass; could nest elsewhere in the bypass.</td>
</tr>
</tbody>
</table>

### Mammals

<table>
<thead>
<tr>
<th>Species Name</th>
<th>Legal Status</th>
<th>Habitat Associations</th>
<th>Potential to Occur in Program Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pallid bat <em>Antrozous pallidus</em></td>
<td>SSC</td>
<td>Occurs in a wide variety of habitats and roosts in tree cavities and caves, as well as artificial sites (e.g., bridges and buildings).</td>
<td>Several historic and recent occurrences are known from Sacramento and Yolo Counties; unlikely to breed in the program area but could forage throughout the program area and roost where suitable habitat is present.</td>
</tr>
</tbody>
</table>
Table 4.7-2  Special-Status Wildlife Species with Potential to Occur in the Program Area

<table>
<thead>
<tr>
<th>Species Name</th>
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<th>Habitat Associations</th>
<th>Potential to Occur in Program Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Western red bat <em>Lasiurus blossevillii</em></td>
<td>SSC</td>
<td>Roosts solitarily in foliage of mature trees associated with woodland borders, rivers, and walnut orchards, especially in mature riparian corridors more than 50-meters-wide (about 16.5 feet wide).</td>
<td>Numerous historic and recent occurrences are known from Sacramento County; unlikely to breed in the program area but could forage throughout the program and roost where suitable habitat is present.</td>
</tr>
<tr>
<td>American badger <em>Taxidea taxus</em></td>
<td>SSC</td>
<td>Arid, open grassland, shrubland, and woodland with soils suitable for burrowing.</td>
<td>Several historic and more recent occurrences are known from Sacramento County; could occur in the Yolo Bypass.</td>
</tr>
</tbody>
</table>

1 Legal Status Definitions:
FT = Federally listed as Threatened under the Federal Endangered Species Act.
FE = Federally listed as Endangered under the Federal Endangered Species Act.
CT = State-listed as Threatened under the California Endangered Species Act.
CE = State-listed as Endangered under the California Endangered Species Act.
FP = State fully protected.
SSC = State species of special concern.

Sources: CDFG 2008, CDFW 2015, County of Sacramento et al. 2010, Hampton 2014, Yolo County HCP/NCCP JPA 2013

Sensitive Habitats

Sensitive habitats include those that are of special concern to resource agencies or are afforded specific consideration through CEQA, Section 1602 of the California Fish and Game Code, Section 404 of the CWA, and the Porter-Cologne Act, as discussed in Section 4.7.1, “Regulatory Setting.” Sensitive natural habitat may be of special concern to these agencies for a variety of reasons, including their locally or regionally declining status, or because they provide important habitat to common and special-status species.

Sensitive Natural Communities

CDFW maintains a list of terrestrial natural communities that are native to California, the List of Vegetation Alliances and Associations (CDFG 2010). Within that list, CDFW identifies natural communities of special concern (NCSC), which they define as those that are considered to be highly imperiled. NCSC are ranked as vulnerable, imperiled, or critically imperiled; CDFW’s natural-community rarity rankings follow NatureServe’s 2009 NatureServe Conservation Status Assessments: Methodology for Assigning Ranks (Faber-Langendoen et al. 2012), in which all alliances are listed with a global and State rank, which range from secure to critically imperiled. Occurrences of NCSC are included in the CNDDB; however, no new occurrences have been added to the CNDDB since the mid-1990s. Vegetation types within the program area that rank as NCSC include valley foothill riparian and valley oak woodland. A description of each of these communities is provided under the “Vegetation and Land Cover” subsection above.

Riparian habitats are also considered sensitive habitats and are regulated under Section 1602 of the California Fish and Game Code. Within the program area, these include valley foothill riparian, freshwater emergent wetland, riverine, and vernal pool habitat. Some riparian habitats may be regulated under Section 1602 of the California Fish and Game Code despite the fact that they are dominated by invasive species, such as valley foothill riparian dominated by introduced black walnut. A description of each community that may qualify for protection under Section 1602 is provided under the “Vegetation and Land Cover” subsection above.
Waters of the United States and Waters of the State

Although a jurisdictional wetland delineation has not been conducted in the program area, valley foothill riparian, seasonal wetlands and vernal pools, freshwater emergent wetland, and riverine areas are likely potential jurisdictional waters of the United States. These features are also likely considered waters of the State, subject to regulation by the Central Valley RWQCB.

Protected Trees

 Portions of the program area are located in Sacramento County and the City of Sacramento. The Sacramento County Tree Preservation Ordinance protects valley oak, interior live oak, blue oak, and Oracle oak, as well as heritage oak trees (i.e., a California oak tree with a diameter at breast height of 60 inches or greater) and landmark trees (i.e., especially prominent or stately trees). Policy CO-138 in the Sacramento County General Plan (Sacramento County 2011) also calls for protection and preservation of non-oak native trees along riparian areas if used as nest trees by Swainson’s hawk, as well as native oak trees measuring a minimum of 6 inches in diameter or 10 inches aggregate for multi-trunk trees at 4.5 feet above ground. Many native oak trees, native riparian trees, and potential landmark trees are present within the program area, particularly along the Sacramento River East Levee. Yolo County, Solano County, and the City of Rio Vista do not currently have adopted tree protection ordinances.

4.7.3 ENVIRONMENTAL IMPACTS

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, as amended. The proposed program 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 CDFW or USFWS;

► have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by CDFW 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 through direct removal, filling, hydrological interruption, or other means;

► interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of nursery sites by native wildlife;

► conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance;

► conflict with the provisions of an adopted HCP, NCCP, or other approved local, regional, or State HCP; or

► substantially reduce the habitat of a fish or wildlife species; cause a fish or wildlife population to drop below self-sustaining levels; threaten to eliminate a plant or animal community; or substantially reduce the number or restrict the range of an endangered, rare, or threatened species.

ISSUES AND POTENTIAL IMPACTS NOT DISCUSSED FURTHER IN THIS SEIR

Implementation of the program activities (funded facilities) could adversely affect migratory birds through disturbance during the breeding season and removal of active nests; loss of active nests would be inconsistent...
with the MBTA. However, the list of migratory birds includes many common species not otherwise protected under Federal, State, regional, or local laws. Loss of active nests of such species would not substantially reduce their abundance or cause any species to drop below self-sustaining levels. Therefore, potential adverse effects on common migratory birds would not alone constitute a significant impact under CEQA, and this issue is not addressed further in this analysis. However, MBTA concerns would be addressed by the implementing agency(ies) receiving funding from the new funding mechanism for the funded facilities. MTBA concerns would be addressed in separate, project-level CEQA (and where warranted NEPA) compliance documents by implementing preconstruction surveys and appropriate avoidance measures.

 Portions of the program area are within planning areas for the Yolo HCP/NCCP and Solano HCP. These conservation plans are at different stages of development, but neither of them has been adopted and approved by the USFWS or CDFW Following adoption of one or both of these documents, future program components will be subject to compliance with the Yolo HCP/NCCP and/or Solano HCP. However, since these plans have not been adopted at the time of preparation of this SEIR, consistency with these conservation plans is not required to be analyzed under CEQA.

**IMPACT ANALYSIS**

**Impact**

**BIO-1**

**Disturbance and Loss of Sensitive Habitats, including Riparian Habitat, Protected Trees,**

**Jurisdictional Waters of the United States, and Waters of the State.** Implementation of the proposed program would result in adverse and beneficial effects to sensitive habitats, including wetlands and other waters of the United States/State and riparian habitats. 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 impact would be potentially significant.

Sensitive habitats within the program area include riparian, wetland, and other open-water habitats that qualify for USACE jurisdiction and are protected under Section 404 of the CWA, subject to CDFW jurisdiction under Section 1602 of the California Fish and Game Code, and/or considered sensitive natural communities by CDFW. Trees protected by County and City policies and ordinances, including native oaks, are also considered sensitive. A very narrow but relatively continuous corridor of riparian habitat, including protected trees, is present along the Sacramento River East Levee between Freeport and the mouth of the American River. This vegetation and the open-water habitat of the Sacramento River could be affected by constructing bank protection and launchable rock trenches. Access and easements along the landside levee toe associated with Levee Modernization could also result in the loss of trees, including protected trees. Permanent loss of some riparian habitat and protected trees along the river may be unavoidable, but impacts on open-water habitat would primarily be temporary. In addition, design of the features would likely incorporate habitat enhancement components, including tree planting, to partially compensate for the adverse effects. Lengthening the Sacramento Weir, constructing setback levees along the expanded Sacramento and Yolo Bypasses, and relocating water and drainage infrastructure pumps and related facilities would likely require removal of a small amount of riparian vegetation and could require fill of small areas of jurisdictional waters. However, the associated borrow excavation and woodland creation along Tule Canal would result in a long-term increase in sensitive habitat. Strengthening portions of the RD 2068 levee along the west side of the Yolo Bypass between Cache Slough and Midway Road and constructing a new floodwall to protect portions of the City of Rio Vista south of State Route 4 could require removal of small amounts of riparian vegetation and fill and/or temporary disturbance of wetland and other open-water habitats, depending on the methods and location of such improvements. If physical disturbance is necessary to implement access/visibility requirements landside of the Sacramento River East Levee and American River South Levee, such disturbance is most likely to affect ornamental vegetation and physical features associated with residences and other urban land uses, and potential for adverse effects on sensitive habitats is anticipated to be minimal. Because the activities that could be funded through the proposed program are in the early planning stages and could extend over a period of years to decades, the extent of adverse and beneficial impacts cannot be quantified at this time. Although the program includes activities 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 impact would
be potentially significant. Mitigation Measure BIO-1, described below, has been identified to address this impact.

**Impact BIO-2** Possible Loss of Special-status Plants and Loss and Degradation of Special-status Plant Habitat. *Implementation of the proposed program could result in disturbance and temporary and permanent loss and/or degradation of habitats that are occupied by special-status plant populations. This impact would be potentially significant.*

Twenty special-status plant species have potential to occur in the program area, all of which occur in aquatic habitats. Species that are primarily restricted to vernal pools and similar seasonal wetlands are unlikely to be directly affected because no suitable habitat for them is anticipated to occur within the footprint of any program-related activities. Vernal pools are present in the southern portion of the Yolo Bypass, primarily along the western side of the bypass. These habitats could be indirectly affected by increases in floodwater conveyed to the Yolo Bypass as a result of lengthening the Sacramento Weir. However, the increased flows would be spread over a very large area by the time they reach areas of suitable habitat and are not anticipated to be substantial enough to alter key habitat characteristics (e.g., hydrology and topography) and/or physically affect the plants. Species that could occur in less-specialized aquatic habitats, such as along the Sacramento River and Delta channels and in canals and freshwater marsh habitats of the Yolo and Sacramento Bypasses and proposed setback areas, could be directly affected by program activities. Activities associated with constructing bank protection and launchable rock trenches along the Sacramento River East Levee, constructing setback levees to expand the Sacramento and Yolo Bypasses, relocating water and drainage infrastructure pumps and related facilities, excavating benches along Tule Canal, strengthening the Yolo Bypass West Levee, and/or constructing a flood wall at Rio Vista would likely disturb suitable habitat for special-status plants and could result in direct loss of plants, if present. In addition, program activities could result in erosion, sedimentation, introduction of invasive species or noxious weeds not currently present, and other indirect adverse effects that could render the habitat unsuitable for special-status plants and result in the eventual loss of populations that may be present. Populations could persist if the habitat is restored to its prior condition, but permanent habitat loss or degradation could result in permanent loss of special-status plant populations or portions of populations, which could have a substantial adverse effect on some species. Because the activities that could be funded through the proposed program are in the early planning stages, the extent of adverse and beneficial impacts cannot be quantified at this time. Although the program includes activities that could result in an increase in and/or enhancement of elderberry habitat, adverse effects to elderberry shrubs could result in loss of valley elderberry...
beetle, a Federally threatened species. This would be a potentially significant impact. Mitigation Measure BIO-3, described below, has been identified to address this impact.

**Impact BIO-4**  
**Possible Effects on Special-Status Vernal Pool Invertebrates.** Implementation of the proposed program would not result in direct adverse effects to suitable habitat for special-status vernal pool invertebrates. Potential indirect impacts are not anticipated to affect habitat suitable or result in loss of invertebrate populations. This impact would be less-than-significant.

Vernal pools and other suitable seasonal wetland habitat suitable for Conservancy fairy shrimp, vernal pool fairy shrimp, and vernal pool tadpole shrimp is present in the Yolo Bypass. These invertebrates are unlikely to be directly affected by the proposed program, because no suitable habitat for them is anticipated to occur within the footprint of any program activities. Vernal pools and seasonal wetlands that support Federally-listed invertebrates are present in the southern portion of the Yolo Bypass, primarily along the western side of the bypass. These habitats could be indirectly affected by increases in floodwater conveyed to the Yolo Bypass as a result of lengthening the Sacramento Weir. However, the increases flows would be spread over a very large area by the time they reach areas of suitable habitat and are not anticipated to be substantial enough to alter key habitat characteristics (e.g., hydrology and topography) or substantially degrade habitat quality. Therefore, increased flood flows in the Yolo Bypass are unlikely to have substantial adverse effects on suitable habitat for Federally-listed vernal pool invertebrates. This would be a less-than-significant impact.

**Impact BIO-5**  
**Potential Disturbance or Loss of Giant Garter Snakes and Their Habitat.** Implementation of the proposed program is likely to result in direct and indirect adverse effects to suitable aquatic habitat for giant garter snake and disturbance of suitable upland habitat. Program activities also have potential to result in direct take of individuals. This impact would be potentially significant.

Canals, rice fields, managed marsh, and remnant marsh within the Yolo and Sacramento Bypasses provide important aquatic habitat for the Elkhorn Basin giant garter snake population. There are many known occurrences of giant garter snake in this area, including in Tule Canal, and additional suitable aquatic habitat is present east of the bypass, in the proposed setback area. The species is also known to occur farther south in the bypass, in the Yolo Bypass Wildlife Area. Suitable upland habitat is very limited in the region, and, in some areas, is almost exclusively provided by levee slopes, maintenance corridors, and canal banks. Temporary and permanent habitat impacts could result from constructing setback levees to expand the Sacramento and Yolo Bypasses, relocating water and drainage infrastructure pumps and related facilities, excavating benches along Tule Canal and creating woodland habitat along the eastern edge of the canal, and strengthening the Yolo Bypass West Levee. Program activities that require dewatering of suitable aquatic habitat could result in displacement of giant garter snakes, and ground-disturbing activities in uplands adjacent to suitable aquatic habitat could degrade water quality of aquatic habitat and/or result in direct injury or death of individuals if the habitat is used for basking, hibernating, or aestivating. Snakes also could be displaced or disturbed by construction noise and vibrations, which could adversely affect their ability to conduct essential life history functions, such as dispersal, movement, or foraging, and could result in increased competition for food and space and vulnerability to predation. In addition, overwintering individuals could be affected if increases in floodwater conveyed to the Yolo Bypass are substantial enough to inundate habitats south of the Sacramento Bypass that typically provide upland refuge. Because the activities that could be funded through the proposed program are in the early planning stages, the extent of adverse impacts cannot be quantified at this time, but loss of individual giant garter snakes would represent a reduction in the number of a threatened species and could result in a substantial adverse effect on the local population. This would be a significant impact. Mitigation Measure BIO-5, described below, has been identified to address this impact.
Impact  BIO-6  
Potential Disturbance or Loss of Northwestern Pond Turtles and Their Habitat. Implementation of the proposed program could result in direct and indirect adverse effects to suitable habitat for northwestern pond turtle and/or local populations of this species if they are present in the affected habitats. This impact would be potentially significant.

Canals, managed marsh, and remnant marsh within the Sacramento and Yolo Bypasses and the proposed setback areas provide suitable aquatic habitat for northwestern pond turtle. Suitable upland nesting habitat is also present in the Sacramento Bypass and adjacent and farther south portions of the Yolo Bypass, particularly in the Yolo Bypass Wildlife Area. Temporary and permanent habitat impacts could result from constructing bank protection and launcheable rock trenches along the Sacramento River East Levee, constructing setback levees to expand the Sacramento and Yolo Bypasses, relocating water and drainage infrastructure pumps and related facilities, excavating benches along Tule Canal and creating woodland habitat along the eastern edge of the canal, and strengthening the Yolo Bypass West Levee. Program activities that require dewatering of suitable aquatic habitat could result in stranding and displacement of northwestern pond turtles, and ground-disturbing activities in uplands adjacent to suitable aquatic habitat could degrade water quality of aquatic habitat and/or result in direct injury or death of turtles if the habitat is used for basking, hibernating, or nesting. Turtles also could be displaced or disturbed by construction noise and vibrations, which could adversely affect their ability to conduct essential life history functions, such as dispersal, movement, or foraging, and could result in increased competition for food and space and vulnerability to predation. Because the activities that could be funded through the proposed program are in the early planning stages, the extent of adverse impacts cannot be quantified at this time, but loss of pond turtle individuals could have a substantial adverse effect on local populations of the species. This impact would be potentially significant. Mitigation Measure BIO-6, described below, has been identified to address this impact.

Impact  BIO-7  
Possible Disturbance of Nesting Swainson’s Hawks and Potential Loss of Active Nests and Nest Trees. Implementation of the proposed program could result in loss of active Swainson’s hawk nests. Loss of nesting habitat and disturbance of suitable foraging habitat could also occur. This impact would be potentially significant.

The program area is within a densely populated and critical component of the Central Valley Swainson’s hawk population, and pairs are known to nest in all portions of the area. Constructing bank protection and launcheable rock trenches along the Sacramento River could require removal of trees that provide suitable nest sites. Although the likelihood is low, active nests could be located in trees designated for removal, potentially resulting in direct destruction of an active nest and loss of the eggs or young present in the nest. Greater potential for adverse effects on Swainson’s hawk would result from disturbance of active nests that could be present near any of the program activities. Disturbance of nesting pairs of sufficient magnitude could result in nest abandonment, a reduction in the level of care provided by adults (e.g., duration of brooding, frequency of feeding), or premature fledging of young. Disturbance of suitable foraging habitat is anticipated to be relatively restricted in area and primarily limited to the construction period; therefore it is unlikely to have a substantial adverse effect on foraging behavior. Establishing woodland along the eastern edge of Tule Canal would likely result in a long-term increase in suitable nesting habitat which could have an overall beneficial effect on Swainson’s hawks in that area. Because the activities that could be funded through the proposed program are in the early planning stages, the extent of adverse and beneficial impacts cannot be quantified at this time. Although the program includes components that could result in an increase in the amount of suitable nesting habitat, adverse effects on Swainson’s hawk nesting habitat and active nests could result in a reduction in the number of this threatened species. This would be a potentially significant impact. Mitigation Measure BIO-7, described below, has been identified to address this impact.
Impact BIO-8 Possible Disturbance of Other Special-Status Nesting Birds and Possible Loss of Active Nests and Occupied Burrowing Owl Burrows. Implementation of the proposed program could result in loss of occupied burrowing owl burrows and active nests of other special-status birds. This impact would be potentially significant.

Most of the special-status bird species with potential to occur in the program area are unlikely to be adversely affected by any of the program activities. Species such as western yellow-billed cuckoo and least Bell’s vireo have potential to occur very occasionally, but riparian vegetation in the program area does not provide suitable nesting habitat and alternative foraging habitat of equal or greater value is available in immediately adjacent areas and elsewhere in the vicinity. Other species could forage or roost in or adjacent to the program area, but program activities are unlikely to disrupt overall foraging behaviors or result in decreased foraging opportunities for these species. Special-status birds with potential to be adversely affected by project activities include those that could nest in close proximity to program activities: white-tailed kite, northern harrier, burrowing owl, loggerhead shrike, song sparrow, and tricolored blackbird. All program activities have some potential to directly disturb suitable nesting habitat of one or more of these species. Although the likelihood is low, active nests and occupied burrowing owl burrows could be located in habitat designated for removal and/or other direct disturbance, potentially resulting in direct destruction of an active nest or occupied burrow and loss of eggs, young, or adults present the nest or burrow. Greater potential for adverse effects would result from disturbance of active nests present near program activities. Disturbance of nesting pairs of sufficient magnitude could result in nest abandonment, a reduction in the level of care provided by adults (e.g., duration of brooding, frequency of feeding), or premature fledging of young. Establishing woodland along the eastern edge of Tule Canal is likely to result in a long-term increase in suitable nesting habitat for some species and could have an overall beneficial effect. Because the activities that could be funded through the proposed program are in the early planning stages, the extent of adverse and beneficial impacts cannot be quantified at this time. Although the program includes components that could result in an increase in the amount of suitable nesting habitat for some species, loss of individuals could result in a reduction in the local population size of species. This would be a potentially significant impact. Mitigation Measure BIO-8, described below, has been identified to address this impact.

Impact BIO-9 Possible Disturbance or Loss of Roosting Special-status Bats. Implementation of the proposed program could result in disturbance of roosting bats, including maternity roosts. This impact would be potentially significant.

The program area provides foraging habitat for several special-status bat species, but implementing program activities would not disrupt foraging behaviors. Riparian forest and oak woodland habitats along the Sacramento River East Levee have potential to provide suitable roosting habitat, and constructing bank protection and launchable rock trenches could result in removal of roost sites. Although the likelihood is low, it is possible this habitat would support a maternity colony, and removal of a maternity colony could result in loss of a large number of individuals. Construction activities could also disturb nearby roost sites, and disturbance of sufficient magnitude could result in roost abandonment. Direct loss or abandonment of important roost sites could result in a substantial adverse effect to local populations of special-status bats. This impact would be potentially significant. Mitigation Measure BIO-1, described below, has been identified to address this impact.

Impact BIO-10 Effects on Wildlife Corridors. Implementation of the proposed program would result in disturbance of habitats that serve as wildlife corridors, but only a portion of the habitat would be affected and corridors suitable for wildlife movement would persist. This impact would be less than significant.

Riparian and other open-space habitats along the Sacramento River East Levee and Yolo and Sacramento Bypasses serve as corridors for wildlife movement. Canals in the bypass areas and the associated proposed setback areas also provide corridors for movement of aquatic species. Although implementing the program activities would result in some level of disturbance along these corridors, effects would be temporary and generally limited to one side of the terrestrial corridors. Travel through narrow aquatic corridors may be temporarily disrupted, but the canal systems in the region are extensive and provide alternative movement.
corridors in close proximity. Therefore, wildlife would be able to continue to move through the narrow woodland corridor along the Sacramento River and through terrestrial and aquatic habitats of the Sacramento and Yolo Bypasses. Consequently, implementation of program activities is not anticipated to substantially interfere with terrestrial wildlife movement or use of migration corridors. This impact would be less than significant.

### 4.7.4 Mitigation Measures

Mitigation is identified below for Impact BIO-1 (sensitive habitats), Impact BIO-2 (special-status plants), Impact BIO-3 (valley elderberry longhorn beetle), Impact BIO-5 (giant garter snake), Impact BIO-6 (northwestern pond turtle), Impact BIO-7 (Swainson’s hawk), Impact BIO-8 (other special-status birds), and Impact BIO-9 (special-status bats).

**Mitigation Measure BIO-1: Identify Sensitive Habitat Areas and Implement Measures to Avoid and Minimize Impacts and Compensate Unavoidable Impacts on a No-Net-Loss Basis** (for Impact BIO-1, Disturbance and Loss of Sensitive Habitats, including Riparian Habitat, Protected Trees, Jurisdictional Waters of the United States, and Waters of the State).

To avoid, minimize, and, if necessary, compensate for the direct fill of waters of the United States and waters of the State and loss of riparian habitat and protected trees, the agency(ies) implementing program components shall implement the measures summarized below.

Areas of sensitive habitat shall be identified and, to the extent feasible and practicable, program activities shall be designed to avoid direct effects on these areas. Before any ground-disturbing activities begin, a qualified biologist shall map potential waters of the United States and shall identify all riparian habitat that could be affected. 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. For program activities within the City of Sacramento and/or Sacramento County, a survey of trees protected by applicable policies and ordinances shall also be conducted by a qualified biologist. 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 trees protected by applicable municipal and county policies and ordinances to the extent feasible and practicable.

If sensitive habitats cannot be avoided during project construction, an appropriate and feasible mitigation plan to compensate for loss of these habitats shall be developed and provided to the appropriate regulatory agencies for approval. The plan shall detail appropriate compensation measures determined through consultation with the respective regulatory agencies, methods for implementation, success criteria, monitoring and reporting protocols, and contingency measures to be implemented if the initial mitigation fails. The plan shall be developed in consultation with and approved by the appropriate regulatory agencies before construction activities begin in areas containing sensitive habitats.

If it is determined that implementation of a funded facility would result in direct impacts to sensitive habitats, despite implementation of avoidance and minimization measures, compliance with the following applicable regulatory permitting processes shall be obtained. All measures developed through consultation with the respective regulatory agencies shall be implemented, to mitigate adverse effects.

- **Section 404:** A qualified biologist shall complete a delineation of wetlands and other waters of the United States that would be affected. 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, 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. 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.

- **Section 401:** Water quality certification pursuant to Section 401 of the CWA shall be obtained from the Central Valley RWQCB and affected habitats shall be replaced and/or rehabilitated. A report of waste discharge shall be filed with the Central Valley RWQCB and all waste discharge requirements prescribed by the Central Valley RWQCB, pursuant to the Porter-Cologne Act, shall be complied with before starting construction in any areas containing waters of the State that are not also waters of United States.

- **Section 1602:** A streambed alteration agreement shall be obtained from CDFW and affected habitats shall be replaced and/or rehabilitated. The acreage of riparian habitat that would be removed shall be replaced or rehabilitated on a “no-net-loss” basis in accordance with CDFW regulations and as specified in the streambed alteration agreement, if applicable. Habitat restoration, rehabilitation, and/or replacement shall be at a location and by methods agreeable to CDFW and consistent with the purpose and intent of applicable county and municipal policies and codes.

**Timing:** Prior to, during, and after construction activities.

**Responsibility:** The agency(ies) implementing the program component.

**Mitigation Measure BIO-2: Identify Occupied Habitat and Implement Measures to Avoid and Minimize Potential Impacts and Compensate Loss of Special-status Plants, as Needed** (for BIO-2, Possible Loss of Special-status Plants and Loss and Degradation of Special-status Plant Habitat).

To avoid, minimize, and, if necessary, compensate for direct loss of special-status plants, the agency(ies) implementing program components shall implement the measures described below.

Suitable habitat for special-status plants 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 program activities begin, a qualified botanist shall identify potential habitat for special-status plants in areas that could be affected. 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 CDFW 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 habitat occupied by special-status plants cannot be avoided during project construction, an appropriate and feasible mitigation plan shall be developed and provided to CDFW for approval. The plan shall detail appropriate measures determined through consultation with CDFW, which may include salvaging and transplanting individual plants, collecting the seeds of affected plants, and collecting and translocating seed- and rhizome-containing mud. If necessary, compensation may include preserving in perpetuity other known populations of these species in the project vicinity at ratios of or greater than 1-to-1. The plan shall be developed in consultation with and approved by CDFW before construction activities begin in areas containing special-status plant species.
Timing: Prior to, during, and after construction activities.

Responsibility: The agency(ies) implementing the program component.

Mitigation Measure BIO-3: Identify Suitable Habitat and Implement Measures to Avoid and Minimize Potential Impacts and Compensate Unavoidable Impacts to Habitat, as Needed (for Impact BIO-3, Possible Effects on Valley Elderberry Longhorn Beetle).

To avoid, minimize, and, if necessary, compensate for potential adverse effects on valley elderberry longhorn beetle, the agency(ies) implementing program components shall implement the measures described below.

Areas that support elderberry shrubs shall be identified and, to the extent feasible and practicable, program activities shall be designed to avoid direct effects on these areas. Before beginning any ground-disturbing program activities, a qualified biologist shall identify areas that support elderberry shrubs and that could be affected by program 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 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 any program activities begin, 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 1 inch in diameter or greater on each shrub that may require removal shall be counted and examined for beetle exit holes.

USFWS shall be consulted to identify appropriate measures, including appropriate measures from standard USFWS guidelines, if any elderberry shrubs with stems 1 inch in diameter or greater could be adversely affected. Minimization measures may include implementing buffers around shrubs that would not be removed, conducting worker awareness training, and periodic biological monitoring. If direct impacts on elderberry shrubs cannot be avoided, an appropriate and feasible mitigation plan shall be developed and provided to USFWS for approval. At a minimum, the plan shall describe requirements for transplanting shrubs; specify the number of replacement elderberry shrubs and associated native plants to be established (at a ratio ranging from 1:1 to 1:6, depending on stem size and presence of beetle exit holes) and associated success criteria; specify remedial measures to be undertaken if survival success criteria are not met; and describe short- and long-term maintenance and management to ensure that the appropriate habitat conditions are provided.

Authorization for take of valley elderberry longhorn beetle under ESA shall be obtained if it is determined that program activities 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.

Timing: Prior to, during, and after construction activities.

Responsibility: The agency(ies) implementing the program component.
Mitigation Measure BIO-5: Identify Suitable Habitat and Implement Measures to Avoid and Minimize Potential Impacts and Compensate Unavoidable Impacts, as Needed (for Impact BIO-5, Possible Effects on Giant Garter Snake).

To avoid, minimize, and, if necessary, compensate for potential adverse effects on giant garter snake, the agency(ies) implementing program components shall implement the following measures:

Giant garter snake habitat shall be identified and, to the extent feasible and practicable, program activities shall be designed to avoid direct effects on these areas. Before beginning any ground-disturbing program activities, a qualified biologist shall identify potential giant garter snake habitat in areas that could be affected. 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 potentially compensate unavoidable effects. Before any ground-disturbing program activities begin in giant garter snake habitat, CDFW and USFWS shall be consulted to identify appropriate measures to minimize potential for adverse effects on giant garter snake. Minimization measures are likely to include, but would not be limited to, temporary 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, preconstruction surveys, and periodic biological monitoring.

If applicable, an appropriate and feasible mitigation plan to compensate for potential disturbance, displacement, injury, or death individuals shall be developed and provided to USFWS and, as necessary, CDFW for approval. Compensation for direct impacts may include preserving, enhancing, and/or creating giant garter snake habitat at an on- or off-site location. Appropriate mitigation ratios would be determined in coordination with USFWS and CDFW; ratios typically required depend on the duration of the impact and may range from 1 to 3 acres of replacement habitat for every 1 acre of habitat affected. If habitat creation is proposed, the mitigation plan shall include methods for implementation, success criteria, monitoring and reporting protocols, and contingency measures to be implemented if the initial mitigation fails. Alternatively, purchasing credits at a USFWS-approved mitigation bank may be identified as appropriate mitigation.

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

Timing: Prior to, during, and after construction activities.

Responsibility: The agency(ies) implementing the program component.

Mitigation Measure BIO-6: Identify Habitat and Implement Measures to Avoid and Minimize Potential Impacts (for Impact BIO-6, Possible Effects on Northwestern Pond Turtle).

To avoid and minimize potential adverse effects on northwestern pond turtle during project construction, the agency(ies) implementing program components shall implement the measures described below.

Suitable habitat for northwestern pond turtle 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

Timing:

Responsibility:
program activities begin, a qualified biologist shall identify potential aquatic and nesting habitat in areas that could be affected. 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, appropriate measures to minimize adverse effects on pond turtles shall be identified. 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 (turtles shall only be handled by a qualified biologist authorized by CDFW), conducting preconstruction surveys of uplands adjacent to suitable aquatic habitat, minimizing disturbance of potential nesting habitat during the nesting season, installing fencing to exclude turtles from nesting in areas where ground disturbance would occur, conducting worker awareness training, and periodic biological monitoring.

**Timing:** Prior to and during construction activities.

**Responsibility:** The agency(ies) implementing the program component.

**Mitigation Measure BIO-7: Identify Habitat and Nest Locations, Minimize Potential Impacts, Monitor Active Nests during Construction, and Compensate Unavoidable Impacts, as Needed** (for Impact BIO-7, Possible Effects on Swainson’s Hawk).

To avoid and minimize potential adverse effects on nesting Swainson’s hawks during project construction and, if necessary, compensate for unavoidable effects, the agency(ies) implementing program components shall implement the measures described below.

Swainson’s hawk nesting habitat shall be identified and, to the extent feasible and practicable, program elements shall be designed to avoid direct effects on these areas. Before beginning any ground-disturbing program activities, a qualified biologist shall identify known Swainson’s hawk nest locations and areas of potential nesting habitat that could be affected. 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.

Surveys shall be conducted if implementation of program activities could result in disturbance of active Swainson’s hawk nests. If vegetation removal or other disturbance related to program activities is required during the nesting season, focused surveys for active Swainson’s hawk nests shall be conducted by a qualified biologist before initiating such activities. The appropriate area to be surveyed and timing of the survey may vary depending on the activity.

Before beginning program activities that could result in disturbance of nesting pairs or loss of nesting habitat, CDFW shall be consulted to identify appropriate measures to minimize and potentially compensate adverse effects on Swainson’s hawk. Minimization measures are likely to include, but would not be limited to, avoiding activities during the nesting season, and/or focusing nesting season activities to less-sensitive periods in the nesting cycle, implementing protective buffers around and monitoring active nests, conducting worker awareness training, and periodic biological monitoring. Compensation may include preservation, enhancement, and/or creation of Swainson’s hawk habitat within the program area and/or at other appropriate locations.
Authorization for take of Swainson’s hawk under CESA shall be obtained if it is determined that program activities are likely to result in take, despite implementation of avoidance and minimization measures. All measures developed through informal consultation with CDFW shall be implemented, as well as any additional measures adopted through a formal permitting process, if applicable.

**Timing:** Prior to, during, and after construction activities.

**Responsibility:** The agency(ies) implementing the program component.

**Mitigation Measure BIO-8: Identify Habitat and Nest Locations, Minimize Potential Impacts, Monitor Active Nests during Construction, and Compensate Unavoidable Impacts, as Needed (for Impact BIO-8, Possible Effects on Special-Status Birds).**

To avoid and minimize potential adverse effects on burrowing owls and nesting special-status birds, the agency(ies) implementing program components shall implement the measures described below.

To the extent feasible and practicable, program activities shall be designed to minimize removal of burrowing owl habitat and nesting habitat for other special-status birds. Before any program activities begin, a qualified biologist shall identify potential special-status bird habitat in areas that could be affected. The primary engineering and construction contractors shall ensure, through coordination with the biologist, that the footprint of program 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 program activities 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 program activities is required during the nesting season, focused surveys for active nests of special-status birds shall be conducted by a qualified biologist before initiating such activities. 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 shall be required.

Before beginning program activities that could result in disturbance of occupied burrowing owl habitat or nesting pairs of other special-status birds, CDFW shall be consulted to identify appropriate measures to minimize and potentially compensate for adverse effects. 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, relocating burrowing owls that are within the impact area, conducting worker awareness training, and biological monitoring. Compensation for impacts on burrowing owls may include preservation, enhancement, and/or creation of suitable habitat onsite and/or other appropriate locations. All measures deemed appropriate and feasible during this consultation with CDFW shall be implemented.

**Timing:** Prior to, during, and after construction activities.

**Responsibility:** The agency(ies) implementing the program component.
Mitigation Measure BIO-9: Identify Roosting Habitat and Implement Measures to Avoid and Minimize Disturbance and Loss of Roosting Habitat (for Impact BIO-9, Possible Effects on Special-Status Bats).

To avoid and minimize potential disturbance or loss of roosting special-status bats, the agency(ies) implementing program components shall implement the following measures.

To the extent feasible and practicable, program elements shall be designed to minimize disturbance of potential roosting habitat along the Sacramento River East Levee. Before any ground-disturbing program activities begin, a qualified biologist shall identify potential roosting habitat in areas that could be affected by construction bank protection and launchable trenches along the east side of the Sacramento River. 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 program activities along the Sacramento River East Levee could result in disturbance of maternity roosting habitat. If vegetation removal or other disturbance is required during the pupping season, focused surveys for maternity roost sites shall be conducted by a qualified biologist before initiating such activities. If a special-status bat maternity roost is found, a qualified biologist shall identify appropriate measures to minimize adverse effects. Such measures are likely to include, but not be limited to, focusing construction activities that must be conducted during the pupping season to less-sensitive periods in the pupping cycle, implementing protective buffers around active maternity roosts, conducting worker awareness training, and periodic biological monitoring.

**Timing:** Prior to and during construction activities.

**Responsibility:** The agency(ies) implementing the program component.

### 4.7.5 CONCLUSION

Implementing Mitigation Measure BIO-1 would reduce the potentially significant Impact BIO-1 (disturbance and loss of sensitive habitats) to a less-than-significant level because sensitive habitats would be avoided to the extent feasible and practicable, a mitigation plan would be developed for unavoidable impacts, and compliance with applicable regulatory permitting processes would be obtained.

Mitigation Measure BIO-2 would reduce the potentially significant Impact BIO-2 (loss of special-status plants and degradation of special-status plant habitat) to a less-than-significant level because suitable habitat for special-status plants would be avoided to the extent feasible and practicable, focused surveys for special-status plants would be conducted in areas of suitable habitat that cannot be avoided, and a mitigation plan would be developed and implemented for unavoidable impacts on special-status plants.

Mitigation Measure BIO-3 would reduce the potentially significant Impact BIO-3 (effects on valley elderberry longhorn beetle) to a less-than-significant level because areas that support elderberry shrubs would be avoided to the extent feasible and practicable, focused surveys of elderberry shrubs would be conducted in areas that cannot be avoided, impact avoidance and minimization measures would be identified and implemented in consultation with USFWS, a mitigation plan would be developed and implemented if elderberry shrub removal is required, and authorization for take of valley elderberry longhorn beetle would be obtained as necessary.

Mitigation Measure BIO-5 would reduce the potentially significant Impact BIO-5 (disturbance or loss of giant garter snakes and their habitat) to a less-than-significant level because areas of suitable giant garter snake habitat would be avoided to the extent feasible and practicable, impact avoidance and minimization measures would be
identified and implemented in consultation with USFWS, a mitigation plan would be developed and implemented for unavoidable impacts on giant garter snakes, and authorization for take of giant garter snake would be obtained as necessary.

Mitigation Measure BIO-6 would reduce the potentially significant Impact BIO-6 (disturbance or loss of northwestern pond turtles and their habitat) to a **less-than-significant** level because areas of suitable pond turtle habitat would be avoided to the extent feasible and practicable and impact avoidance and minimization measures would be identified and implemented for habitat that cannot be avoided.

Mitigation Measure BIO-7 would reduce the potentially significant Impact BIO-7 (disturbance of nesting Swainson’s hawks and loss of active nests and nest trees) to a **less-than-significant** level because nesting habitat would be avoided to the extent feasible and practicable, focused surveys for active Swainson’s hawk nests would be conducted, impact avoidance and minimization measures would be identified and implemented in consultation with CDFW for any active nests, and take authorization would be obtained and compensatory mitigation provided as necessary.

Mitigation Measure BIO-8 would reduce the potentially significant Impact BIO-8 (disturbance of other special-status nesting birds and loss of active nests and occupied burrowing owl burrows) to a **less-than-significant** level because nesting habitat and burrowing owl habitat would be avoided to the extent feasible and practicable, focused surveys for active nests and occupied burrows would be conducted, impact avoidance and minimization measures would be identified and implemented in consultation with CDFW for any active nests and occupied burrows, and compensatory mitigation for burrowing owl impacts would be provided as necessary.

Mitigation Measure BIO-9 would reduce the potentially significant Impact BIO-9 (disturbance or loss of roosting special-status bats) to a **less-than-significant** level because suitable roosting habitat would be avoided to the extent feasible and practicable, focused surveys for maternity roosts would be conducted in areas of suitable habitat that cannot be avoided, and impact avoidance and minimization measures would be identified and implemented for active maternity roosts.

Impacts BIO-4 (effects on special-status vernal pool invertebrates) and BIO-10 (effects on wildlife corridors) would be **less-than-significant**.
4.8 CULTURAL RESOURCES

This section contains an evaluation of the potential impacts on cultural resources that could result from implementation of components of the proposed program (projects or funded facilities). Cultural resources may include archaeological remains such as Native American sanctified cemeteries, shrines, sacred sites, occupation sites and artifacts, tribal cultural resources, historic-era (50 years old or older) archaeological sites, and buildings and structures. These resources can be found at many locations, such as underground, and on the landscape, and along with prehistoric and historic human remains and associated grave-goods, must be considered and treated pursuant to the requirements of various Federal, State, and local statutes, including California Health and Safety Code, Public Resource Code, CEQA and Section 106 of the National Historic Preservation Act (NHPA). Paleontological resources are addressed in Section 4.9, “Paleontological Resources.”

4.8.1 REGULATORY SETTING

FEDERAL

National Historic Preservation Act

Section 106 of the NHPA and its implementing regulations (36 Code of Federal Regulations [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 (ACHP) the opportunity to comment on the proposed undertaking. Individual projects that may be funded under the proposed program may require permission under Section 408 (33 United States Code [USC] 408), by the U.S. Army Corps of Engineers (USACE), or a Department of the Army Permit under Section 404 of the Clean Water Act from USACE. Funded projects could also receive Federal funding. Therefore, NHPA Section 106 compliance is anticipated to be required for all the program components when they are proposed for approval. If required, National Environmental Policy Act (NEPA) compliance will be completed separately for those projects when project-level details are available and specific projects are proposed.

The implementing regulations for Section 106 require consultation with the State Historic Preservation Officer (SHPO), ACHP, Federally recognized Native American tribes and other Native Americans, and interested members of the public throughout the Section 106 compliance process. The four principal steps are:

1. Initiate the Section 106 process (36 CFR Part 800.3).
2. Identify historic properties (cultural resources that are eligible for inclusion in the NRHP) (36 CFR Part 800.4).
3. Assess the effects of the undertaking on historic properties within the area of potential effects (APE) (36 CFR Part 800.5).
4. Resolve adverse effects (36 CFR Part 800.6).

Adverse effects on 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, local agencies, Native American tribes, and interested members of the public. The ACHP is also invited to participate. The agreements describe “stipulations” that treat historic properties to mitigate adverse effects.
National Register of Historic Places

A property may be listed in the National Register of Historic Places (NRHP) if it meets one or more of the criteria for evaluation as defined in 36 CFR 60.4 and as described below.

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.

Various Federal publications provide guidance on identifying and evaluating cultural resources including National Register Bulletin 30 (Guidelines for Evaluating and Documenting Rural Historic Landscapes), Bulletin 36 (Guidelines for Evaluating and Registering Archaeological Properties), Bulletin 38 (Guidelines for Evaluating and Documenting Traditional Cultural Properties); National Park Service Preservation Brief 36 (Protecting Cultural Landscapes: Planning, Treatment and Management of Historic Landscapes); and the Advisory Council on Historic Preservation’s (ACHP) Native American Traditional Cultural Landscapes Action Plan.

American Indian Religious Freedom Act and Executive Order 13007

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 (Public Law [PL] 95-431).”

Executive Order 13007 directs federal agencies to (1) accommodate access to and ceremonial use of Indian sacred sites on federal lands by Indian religious practitioners and (2) avoid adversely affecting the physical integrity of such sacred sites. Where appropriate, federal agencies shall maintain the confidentiality of sacred sites.

STATE

California Environmental Quality Act

CEQA includes provisions that specifically address the consideration and treatment of cultural resources. These requirements are described below under the heading “Significance Criteria.” CEQA states that if a project would have significant impacts on important cultural resources, then alternative plans or mitigation measures must be considered. However, only significant cultural resources (termed “historical resources”) need to be addressed. CEQA defines an historical resource as “a resource listed in, or determined to be eligible for listing in, the California Register of Historical Resources” (CRHR) (California Public Resources Code [PRC] Section 21084.1). Since 2007, when the Local Funding Mechanisms Program DEIR was certified, additional data on the current condition of existing flood control facilities in the Sacramento area have been developed, more stringent Federal
and State levee engineering criteria have been adopted, and opportunities for improving the flood bypass system west of Sacramento have been identified. Consequently, the scope and cost of SAFCA’s flood system improvement program have increased, and the Agency is proposing to update its local funding mechanisms as necessary to support this program. Also since the 2007 Program DEIR was certified, CEQA has been amended to include a requirement to consult with Native Americans and to analyze impacts on Tribal Cultural Resources in accordance with Assembly Bill 52 (discussed below). Consequently, this Subsequent Program DEIR cultural resources impact analysis addresses the changed circumstances of flood control and includes a program level analysis of impacts on Tribal Cultural Resources.

**California Register of Historic Resources**

The CRHR includes resources listed in or formally determined to be eligible for listing in the NRHP, 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 (California PRC Section 5024.1, 14 California Code of Regulations [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.

Under State CEQA Guidelines (CCR Section 15064.5), any object, building, structure, site, area, place, record, or manuscript may be considered to be an historical resource, provided the lead agency’s determination is supported by substantial evidence in light of the whole record.

As used in California PRC Section 21083.2(g)(1)-(3), the term “unique archaeological resource” refers to 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, or
3. is directly associated with a scientifically recognized important prehistoric or historic event or person.

In addition to meeting one or more of the above criteria, resources eligible for listing in the CRHR must retain enough of their historic character or appearance to be recognizable as historical resources and to convey the reasons for their significance. Integrity is evaluated with regard to the retention of location, design, setting, materials, workmanship, feeling, and association (Office of Historic Preservation 1999:69–70).
Assembly Bill 52 and Tribal Cultural Resources

Assembly Bill 52 (AB 52), which took effect on July 1, 2015, amends CEQA and adds new sections relating to Native American consultation and certain types of cultural resources. AB 52 establishes a new category, named Tribal Cultural Resources, and states that a project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource may have a significant effect on the environment. AB 52 requires the CEQA lead agency to begin consultation with a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed program, before the determination of whether a negative declaration, mitigated negative declaration, or environmental impact report is required, if the tribe requests the lead agency, in writing, to be informed by the lead agency through formal notification of proposed projects in that geographic area and the tribe thereafter requests consultation. Tribal Cultural Resources are defined in California PRC Section 21074 as the following:

- (a)(1) Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either of the following:
  - Included or determined to be eligible for inclusion in the CRHR.
  - Included in a local register of historical resources as defined in Subdivision (k) of California PRC Section 5020.1.

- (a)(2) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in Subdivision (c) of California PRC Section 5024.1 (CRHR eligibility criteria). In applying the criteria, the lead agency shall consider the significance of the resource to a California Native American tribe.

- (b) A cultural landscape that meets the criteria of Subdivision (a) is a tribal cultural resource to the extent that the landscape is geographically defined in terms of the size and scope of the landscape.

- (c) A historical resource described in California PRC Section 21084.1, a unique archaeological resource as defined in Subdivision (g) of California PRC Section 21083.2, or a “non-unique archaeological resource” as defined in Subdivision (h) of California PRC Section 21083.2 may also be a tribal cultural resource if it conforms with the criteria of Subdivision (a).

Section 21084.3 has been added to the PRC and states that “public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource.”

Native American Heritage Commission and Public Resources Code

California PRC Sections 5097.91–5097.94 created the nine-member Native American Heritage Commission (NAHC). The NAHC identifies and catalogs places of special religious or social significance to Native Americans and known graves and cemeteries of Native Americans on private lands, identifies the Native American group most likely descended from those Native Americans who may be interred on the project property, makes recommendations related to Native American sacred places that are located on private lands for acquisition by the State or other public agencies for the purpose of facilitating or assuring access thereto by Native Americans, assists Native Americans in obtaining appropriate access to sacred places that are located on public lands for ceremonial or spiritual activities, 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. The commission has the following powers and duties:

(a) To identify and catalog places of special religious or social significance to Native Americans, and known graves and cemeteries of Native Americans on private lands. The identification and cataloguing of known graves and cemeteries shall be completed on or before January 1, 1984. The commission shall notify landowners on whose property such graves and cemeteries are
determined to exist, and shall identify the Native American group most likely descended from those Native Americans who may be interred on the property.

(b) To make recommendations relative to Native American sacred places that are located on private lands, are inaccessible to Native Americans, and have cultural significance to Native Americans for acquisition by the state or other public agencies for the purpose of facilitating or assuring access thereto by Native Americans.

(c) To make recommendations to the Legislature relative to procedures that will voluntarily encourage private property owners to preserve and protect sacred places in a natural state and to allow appropriate access to Native American religionists for ceremonial or spiritual activities.

(d) To appoint necessary clerical staff.

(e) To accept grants or donations, real or in kind, to carry out the purposes of this chapter and the California Native American Graves Protection and Repatriation Act of 2001 (Chapter 5 [commencing with Section 8010] of Part 2 of Division 7 of the Health and Safety Code).

(f) To make recommendations to the Director of Parks and Recreation and the California Arts Council relative to the California State Indian Museum and other Indian matters touched upon by department programs.

(g) To bring an action to prevent severe and irreparable damage to, or assure appropriate access for Native Americans to, a Native American sanctified cemetery, place of worship, religious or ceremonial site, or sacred shrine located on public property, pursuant to Section 5097.97. If the court finds that severe and irreparable damage will occur or that appropriate access will be denied, and appropriate mitigation measures are not available, it shall issue an injunction, unless it finds, on clear and convincing evidence, that the public interest and necessity require otherwise. The Attorney General shall represent the commission and the state in litigation concerning affairs of the commission, unless the Attorney General has determined to represent the agency against whom the commission’s action is directed, in which case the commission shall be authorized to employ other counsel. In an action to enforce this subdivision the commission shall introduce evidence showing that a cemetery, place, site, or shrine has been historically regarded as a sacred or sanctified place by Native American people and represents a place of unique historical and cultural significance to an Indian tribe or community.

(h) To request and utilize the advice and service of all federal, state, local, and regional agencies, including for purposes of carrying out the California Native American Graves Protection and Repatriation Act of 2001 (Chapter 5 [commencing with Section 8010] of Part 2 of Division 7 of the Health and Safety Code).

(i) To assist Native Americans in obtaining appropriate access to sacred places that are located on public lands for ceremonial or spiritual activities.

(j) To assist state agencies in any negotiations with agencies of the federal government for the protection of Native American sacred places that are located on federal lands.

(k) (1) To mediate, upon application of either of the parties, disputes arising between landowners and known descendants relating to the treatment and disposition of Native American human burials, skeletal remains, and items associated with Native American burials.
(k) (2) The agreements shall provide protection to Native American human burials and skeletal remains from vandalism and inadvertent destruction and provide for sensitive treatment and disposition of Native American burials, skeletal remains, and associated grave goods consistent with the planned use of, or the approved project on, the land.

(l) To assist interested landowners in developing agreements with appropriate Native American groups for treating or disposing, with appropriate dignity, of the human remains and any items associated with Native American burials.

(m) To provide each California Native American tribe, as defined in Section 21073, on or before July 1, 2016, with a list of all public agencies that may be a lead agency pursuant to Division 13 (commencing with Section 21000) within the geographic area with which the tribe is traditionally and culturally affiliated, the contact information of those public agencies, and information on how the tribe may request the public agency to notify the tribe of projects within the jurisdiction of those public agencies for the purposes of requesting consultation pursuant to Section 21080.3.1.

(n) (1) To assume the powers and duties of the former Repatriation Oversight Commission and meet, when necessary and at least quarterly, to perform the following duties:

(A) Order the repatriation of human remains and cultural items in accordance with the act.

(B) Establish mediation procedures and, upon the application of the parties involved, mediate disputes among tribes and museums and agencies relating to the disposition of human remains and cultural items. The commission shall have the power of subpoena for purposes of discovery and may impose civil penalties against any agency or museum that intentionally or willfully fails to comply with the act. Members of the commission and commission staff shall receive training in mediation for purposes of this subparagraph. The commission may delegate its responsibility to mediate disputes to a certified mediator or commission staff.

(C) Establish and maintain an Internet Web site for communication among tribes and museums and agencies.

(D) Upon the request of tribes or museums and agencies, analyze and make decisions regarding providing financial assistance to aid in specific repatriation activities.

(E) Make recommendations to the Legislature to assist tribes in obtaining the dedication of appropriate state lands for the purposes of reinterment of human remains and cultural items.

(F) (i) Prepare and submit to the Legislature an annual report detailing commission activities, disbursement of funds, and dispute resolutions relating to the repatriation activities under the act.

(F) (ii) A report submitted to the Legislature pursuant to this subparagraph shall be submitted in compliance with Section 9795 of the Government Code.

(G) Refer any known noncompliance with the federal Native American Graves Protection and Repatriation Act (25 U.S.C. Sec. 3001 et seq.) to the United States Attorney General and the Secretary of the Interior.

(H) Impose administrative civil penalties pursuant to Section 8029 of the Health and Safety Code against an agency or museum that is determined by the commission to have violated the act.
(1) Establish those rules and regulations the commission determines to be necessary for the administration of the act.

(2) For purposes of this subdivision, the following terms have the following meanings:

(A) “Act” means the California Native American Graves Protection and Repatriation Act (Chapter 5 (commencing with Section 8010) of Part 2 of Division 7 of the Health and Safety Code).

(B) “Tribe” means a “California Indian tribe” as that term is used in the act.

Section 5097.97 of the PRC further states:

In the event that any Native American organization, tribe, group, or individual advises the commission that a proposed action by a public agency may cause severe or irreparable damage to a Native American sanctified cemetery, place of worship, religious or ceremonial site, or sacred shrine located on public property, or may bar appropriate access thereto by Native Americans, the commission shall conduct an investigation as to the effect of the proposed action. Where the commission finds, after a public hearing, that the proposed action would result in such damage or interference, the commission may recommend mitigation measures for consideration by the public agency proposing to take such action. If the public agency fails to accept the mitigation measures, and if the commission finds that the proposed action would do severe and irreparable damage to a Native American sanctified cemetery, place of worship, religious or ceremonial site, or sacred shrine located on public property, the commission may ask the Attorney General to take appropriate legal action pursuant to subdivision (g) of Section 5097.94.

Regulatory Requirements Related to Human Remains

Guidelines for implementation of CEQA (CCR Section 15064.5 (d) (e) ) specifies the procedures that shall be implemented if Native American human remains are known to exist or if there is probable likelihood of their existence in a proposed project area (PRC 5097.98); cites the prohibition on disinterring or otherwise disturbing human remains (Health and Safety Code 7050.5); and specifies the procedures that shall be followed in the event of the accidental discovery or recognition of human remains during implementation of a project (PRC 5097.98).

Section 5097.98 of the PRC states:

Whenever the commission receives notification of a discovery of Native American human remains from a county coroner pursuant to subdivision (c) of Section 7050.5 (see below) of the Health and Safety Code, it shall immediately notify those persons it believes to be most likely descended from the deceased Native American. The descendants may, with the permission of the owner of the land, or his or her authorized representative, inspect the site of the discovery of the Native American human remains and may recommend to the owner or the person responsible for the excavation work means for treatment or disposition, with appropriate dignity, of the human remains and any associated grave goods. The descendants shall complete their inspection and make recommendations or preferences for treatment within 48 hours of being granted access to the site. (b) Upon the discovery of Native American remains, the landowner shall ensure that the immediate vicinity, according to generally accepted cultural or archaeological standards or practices, where the Native American human remains are located, is not damaged or disturbed by further development activity until the landowner has discussed and conferred, as prescribed in this section, with the most likely descendants regarding their recommendations, if applicable, taking into account the possibility of multiple human remains. The landowner shall discuss and confer with the descendants all reasonable options regarding the descendants' preferences for
treatment. (1) The descendants' preferences for treatment may include the following: (A) The nondestructive removal and analysis of human remains and items associated with Native American human remains. (B) Preservation of Native American human remains and associated items in place. (C) Relinquishment of Native American human remains and associated items to the descendants for treatment. (D) Other culturally appropriate treatment. (2) The parties may also mutually agree to extend discussions, taking into account the possibility that additional or multiple Native American human remains, as defined in this section, are located in the project area, providing a basis for additional treatment measures. (c) For the purposes of this section, “conferral” or “discuss and confer” means the meaningful and timely discussion and careful consideration of the views of each party, in a manner that is cognizant of all parties' cultural values, and where feasible, seeking agreement. Each party shall recognize the other's needs and concerns for confidentiality of information provided to the other. (d)(1) Human remains of a Native American may be an inhumation or cremation, and in any state of decomposition or skeletal completeness. (2) Any items associated with the human remains that are placed or buried with the Native American human remains are to be treated in the same manner as the remains, but do not by themselves constitute human remains. (e) Whenever the commission is unable to identify a descendant, or the descendants identified fail to make a recommendation, or the landowner or his or her authorized representative rejects the recommendation of the descendants and the mediation provided for in subdivision (k) of Section 5097.94, if invoked, fails to provide measures acceptable to the landowner, the landowner or his or her authorized representative shall reinter the human remains and items associated with Native American human remains with appropriate dignity on the property in a location not subject to further and future subsurface disturbance. To protect these sites, the landowner shall do one or more of the following: (1) Record the site with the commission or the appropriate Information Center. (2) Utilize an open-space or conservation zoning designation or easement. (3) Record a document with the county in which the property is located. The document shall be titled “Notice of Reinterment of Native American Remains” and shall include a legal description of the property, the name of the owner of the property, and the owner's acknowledged signature, in addition to any other information required by this section. The document shall be indexed as a notice under the name of the owner. (f) Upon the discovery of multiple Native American human remains during a ground disturbing land development activity, the landowner may agree that additional conferral with the descendants is necessary to consider culturally appropriate treatment of multiple Native American human remains. Culturally appropriate treatment of the discovery may be ascertained from a review of the site utilizing cultural and archaeological standards. Where the parties are unable to agree on the appropriate treatment measures the human remains and items associated and buried with Native American human remains shall be reinterred with appropriate dignity, pursuant to subdivision (e).

Section 750.5 of the Health and Safety Code states:

(a) Every person who knowingly mutilates or disinters, wantonly disturbs, or willfully removes any human remains in or from any location other than a dedicated cemetery without authority of law is guilty of a misdemeanor, except as provided in Section 5097.99 of the Public Resources Code. The provisions of this subdivision shall not apply to any person carrying out an agreement developed pursuant to subdivision (l) of Section 5097.94 of the Public Resources Code or to any person authorized to implement Section 5097.98 of the Public Resources Code.

(b) In the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains until the coroner of the county in which the human remains are discovered has determined, in accordance with Chapter 10 (commencing with
Section 27460) of Part 3 of Division 2 of Title 3 of the Government Code, that the remains are not subject to the provisions of Section 27491 of the Government Code or any other related provisions of law concerning investigation of the circumstances, manner and cause of any death, and the recommendations concerning the treatment and disposition of the human remains have been made to the person responsible for the excavation, or to his or her authorized representative, in the manner provided in Section 5097.98 of the Public Resources Code. The coroner shall make his or her determination within two working days from the time the person responsible for the excavation, or his or her authorized representative, notifies the coroner of the discovery or recognition of the human remains.

(c) If the coroner determines that the remains are not subject to his or her authority and if the coroner recognizes the human remains to be those of a Native American, or has reason to believe that they are those of a Native American, he or she shall contact, by telephone within 24 hours, the Native American Heritage Commission.

4.8.2 ENVIRONMENTAL SETTING

The following prehistoric setting is a summary of the current understanding of the prehistory of the project area from an archaeological point of view, based on archaeological data, ethnographic data, historical accounts, and interpretations made by anthropologists, ethnographers, historians, and archaeologists. The sources of the information and interpretations are cited.

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 (10,000–6000 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 that are known in California.

Beardsley (1948), Lillard, Heizer, and Fenenga (1939), and others have conducted numerous studies that form the core of our early understanding of upper Central Valley archaeology. Few archaeological materials dating to the Paleo-Indian or the Lower Archaic (6000–3000 B.C.) time periods have been found. However, archaeologists have recovered a great deal of data from sites occupied by the later Middle Archaic period (described below). 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 (3000–1000 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.–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. 500–1800). 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. 1500–1800), 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 area. The assemblages are discussed in detail in Bennyhoff and Fredrickson (1969) and Moratto (1984) and are summarized here.

The Windmiller 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 charmstones, twined basketry, baked-clay artifacts and worked shell and bone were hallmarks of Windmiller 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 Windmiller Pattern also appeared in the Sierra Nevada foothills, indicating possible seasonal migration into the Sierra Nevada. Perforated charmstones were associated with some burials. Mano and metate and small mortars were used, but were 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.

The information presented above provides a context in which resources that may be identified in program component projects can be understood in terms of temporal placement and material cultural.

**Ethnographic Setting**

The program area is situated within the lands traditionally occupied by the Nisenan, or Southern Maidu, and the Plains Miwok.

**Nisenan**

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 day Sacramento and Marysville. In the Sacramento Valley, the tribelet, consisting of a primary and a few satellite villages, served as the basic political unit (Moratto 1984). Valley Nisenan territory was divided into three tribelet areas each populated with several large villages (Wilson and Towne 1978). One important village, Pusune, appears to have been recorded as site CA-SAC-26, near
Discovery Park in Sacramento. Two other villages, Wollok and Leuchi, were located east of the confluence of the Feather and Sacramento Rivers.

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 percent of the tribesmen. The influx of Europeans during the Gold Rush-era further reduced the population due to disease and violent confrontations with the miners. Today, the Nisenan are a thriving and prominent Native American group.

**Miwok**

Part of the larger Eastern Miwok group, the Plains Miwok occupied the lower Sacramento River Valley from the area north of the Cosumnes River south to the Lower San Joaquin River drainage. This territory is roughly bounded by Sacramento on the north and Stockton to the south, although the northern boundary may not have been as firm as indicated in the ethnographic literature; archaeological evidence along the Cosumnes River suggests that the Nisenan may have displaced the Miwok in this region just prior to the Emergent Period (Deis 1994; Grantham 1993).

Although the various Eastern Miwok subgroups shared a common language and cultural background, they consisted of a number of separate and politically independent tribelets. Each tribelet consisted of a number of permanently inhabited and seasonally occupied places (Levy 1978).

Similar to other California Native Americans, the Miwok used a wide variety of animal and plant species for subsistence. Of the plant species, the valley oak was the most valued, with buckeye, laurel, and hazelnut also used. Wild oats and balsam root, several species of edible roots, greens such as wild pea and miner’s lettuce, berries, and a number of different mushroom varieties were consumed. Tule elk and pronghorn antelope were the most important faunal species for food, hides, bone, and other useful materials. Rabbits were hunted in summer and various waterfowl and fish, especially salmon, were also important food sources for the Valley Miwok (Levy 1978).

Similar to the experience of the Nisenan, the eastern Miwok population and traditional lifeways were devastated by the effects of introduced diseases and violent conflicts and by the late 19th century the Miwok were economically, socially, and politically marginalized. In recent times the Miwok have reemerged as a growing native community in California.
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 SAFCA’s program area.

Mining

Although there are no records of large-scale mining having been conducted in or in the immediate area of the funded facilities, 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 an adverse effect on water quality and on the scale and frequency of seasonal flooding, and likely resulted in impacts on cultural resources from changes in the scale and frequency of 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. 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 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 percent of salaried employees in Sacramento (Historic Environment Consultants 1998).

Agriculture and Flood Control

Agriculture and ranching were the primary industries in the Sacramento 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 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.

In many locations throughout the region, Native American cultural sites were impacted by flood control measures. In some locations, village and burial sites located on high ground along the edge of waterways were incorporated into levees. In other locations, village and burial sites were used as fill material in the construction of levees. In both cases, the result is that cultural resources and sacred items may still be contained within some levees.

4.8.3 ENVIRONMENTAL IMPACTS

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, as amended. The Appendix G checklist for cultural resources is currently being revised to address the AB 52 requirements addressing tribal cultural resources. For this analysis, the current Appendix G checklist was used as a template, with tribal cultural resources added as a new checklist question in the same format as the other resource questions. The proposed program would have a significant impact on a cultural resource 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;
- cause a substantial adverse change in the significance of a historical resource as defined in Public Resources Code Section 21084.1;
- cause a substantial adverse change in the significance of a tribal cultural resource as defined in Public Resources Code Section 21074; or
- disturb any human remains, including those interred outside of formal cemeteries.

CEQA defines a significant effect as one with the potential to cause a substantial adverse change in the significance of an historical resource, unique archaeological resource, or tribal cultural resource. Substantial adverse change in the significance of a resource means the physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of the resource would be materially impaired. The significance of an historical resource is materially impaired when a proposed project results in demolition or material alteration in an adverse manner of those physical characteristics of a resource that:

- convey its historical significance and that justify its inclusion in, or eligibility for inclusion in, the CRHR;
account for its inclusion in a local register of historical resources pursuant to PRC 5020.1(k) or its identification in an historical resources survey meeting the requirements of PRC 5024.1(g), unless the public agency reviewing the effects of the project establishes by a preponderance of evidence that the resource is not historically or culturally significant; or

- convey its historical significance and that justify its eligibility for inclusion in the CRHR, as determined by a lead agency for purposes of CEQA.

**IMPACT ANALYSIS**

**IMPACT CR-1 Possible Damage to or Destruction of Historical Resources.** *Construction of funded facilities could affect historic buildings, structures, historical archaeological sites, and linear features. This impact would be potentially significant.*

Numerous known historic period buildings, structures, historical archaeological deposits, and linear features such as levees, canals, and railroads are present in the program area. Construction and land-altering actions to improve levees, removal or relocation of structures, construction and relocation of roads, and inundation due to the funded facilities, have the potential to affect historic buildings, structures, historical archaeological sites, and linear features that have been identified during subsequent site-specific project-level CEQA documentation (which will be identified through research and field surveys, as part of separate, project-level and site-specific CEQA documentation when specific projects are proposed). Construction and land-altering actions may cause the removal or alteration of those physical characteristics of an eligible property that conveys its historical significance.

It is also possible that construction of new structures associated with the levees and canals, in the immediate viewshed of historic buildings would occur. Alterations to the general setting of resources eligible for listing in the NRHP and CRHR are also potential impacts. Both direct and indirect effects on historic buildings or structures and direct effects on historical archaeological resources have the potential to compromise the character-defining features of those resources. Such an effect would constitute a substantial change that would adversely alter the character-defining features that convey its significance and qualify it for inclusion in the CRHR or NRHP. Therefore, this impact would be **potentially significant**. Mitigation Measure CR-1, described below, has been identified to address this potentially significant impact.

**IMPACT CR-2 Possible Damage to or Destruction of Identified or Unidentified Archaeological Resources.** *Construction of funded facilities could affect archaeological resources. This impact would be potentially significant.*

Construction of or improvements to levees or other flood control structures, relocation of railroad alignments, and other actions that include ground-disturbing activities have the potential to damage or destroy prehistoric (Native American) archaeological sites. Previous studies conducted to identify prehistoric archaeological sites and areas of particular sensitivity for unidentified archaeological resources in the program area indicate that there are numerous recorded prehistoric archaeological sites, including sites with Native American villages, burials and ceremonial areas. The number, location, and condition of archaeological sites in the program area cannot be known until detailed field surveys, Native American consultation, and other inventory methods are completed, which will be completed as part of separate, project-specific and site-specific CEQA documentation when specific projects are proposed. However, existing information is sufficient to conclude that prehistoric archaeological sites could be directly and indirectly affected by construction activities. Disturbance of archaeological resources would compromise the physical integrity, information potential, and Native American value of any archaeological deposits. Such an effect on an historic property would constitute a substantial change that would adversely alter the physical characteristics of a resource that conveys its significance and qualify it for inclusion in the CRHR or...
Tribal Cultural Resources include sites, features, places, cultural landscapes, traditional cultural properties (of Native American origin), sacred places, and objects with cultural value to a California Native American tribe. An historical resource as defined in California PRC 21084.1, a unique archaeological resource as defined in California PRC 21083.2, and a non-unique archaeological resource as defined in California PRC 21083.2 (h) may also all be tribal cultural resources. It is likely that tribal cultural resources, including sanctified cemeteries, shrines, sacred sites, and traditional cultural properties, are present within the program area. The number, location, and condition of tribal cultural resources in the program area cannot be known until site-specific footprints for individual program components are determined, and Native American consultation and other inventory methods are completed. However, existing information, including sensitivity maps that have been provided by a culturally affiliated tribe, is sufficient to conclude that it is likely that tribal cultural resources could be directly or indirectly affected by construction activities. Disturbance of tribal cultural resources could compromise the physical integrity, setting, and Native American value of these resources. Such an effect on a tribal cultural resource would constitute a substantial change that would adversely alter the physical characteristics of a resource that convey its significance and qualify it for inclusion in the CRHR. Therefore, this impact would be potentially significant. Mitigation Measures CR-3 and CR-5, described below, have been identified to address this potentially significant impact.

**IMPACT CR-4 Possible Disturbance, Damage to, or Destruction of Human Remains.** Construction of funded facilities could disturb human remains. This impact would be potentially significant.

Prehistoric human remains have been found at several known prehistoric sites and other locations within the geographic area encompassing the program area. Similarly, historic era human burials are known to exist in the program area, both in cemeteries and smaller private plots. It is possible that previously unknown buried human remains could be unearthed and damaged or destroyed during excavation activities. Therefore, this impact would be potentially significant. Mitigation Measures CR-2, CR-3, and CR-6, described below, have been identified to address this potentially significant impact.

### 4.8.4 Mitigation Measures

**Mitigation Measure CR-1: Implement Procedures for Inventory and Evaluation of Historical Resources and for Eligible Resources, Implement Feasible Avoidance or Treatment Measures (for Impact CR-1, Possible Damage to or Destruction of Historic Resources).**

The agency implementing an individual program component shall inventory and evaluate historic-period resources in the project area, including elements of the built environment. At a minimum, the inventory shall include records searches at the applicable Information Center of the California Historical Resources Information System; a field reconnaissance of the program area conducted by a historian or architectural historian who meets the Secretary of the Interior’s Professional Qualification Standards in History. Resource recording procedures shall be implemented consistent with California Department of Parks and Recreation (DPR) 523 forms requirements; and reporting requirements. All identified historic-period resources shall be recorded on DPR 523 forms.

Each historic-period resource identified in the program area shall be evaluated for eligibility for listing on the CRHR and the NRHP by a qualified historian or architectural historian. The results of the
identification, evaluation, and/or documentation of historical resources shall be presented in a professional report that details all methods and findings, evaluates significance of the resources (CRHR and NRHP eligibility), analyzes and interprets the results, and distributes this information to the appropriate repositories.

For each historic-period resource which is found to be eligible for listing on the CRHR or NRHP, a determination of project effects on that resource will be made consistent with the “Significance Criteria” presented above in this section. Avoidance through project redesign is the preferred mitigation measure for resources that appear to be eligible for listing in the NRHP or CRHR, but if avoidance is not feasible, other feasible mitigation shall be identified. Such treatment measures may include detailed documentation of the resource; visual and/or auditory screening of indirect effects on historic landscapes, buildings, and public interpretation of the resource.

Timing: During project-specific environmental review.

Responsibility: The agency(ies) implementing the program component.

Mitigation Measure CR-2: Implement Procedures for Inventory and Evaluation of Archaeological Resources, Implement Feasible Avoidance or Treatment Measures (for Impact CR-2, Possible Damage to or Destruction of Identified or Unidentified Archaeological Resources and Impact CR-4, Possible Damage to or Destruction of Human Remains).

The agency implementing an individual program component shall inventory and evaluate prehistoric and historic archaeological resources in the program area. At a minimum, the inventory shall include records searches at the applicable Information Center of the California Historical Resources Information System; and a pedestrian archaeological survey of undeveloped and unpaved areas; and subsurface archaeological investigations if needed to identify buried archaeological deposits. If the resource is Native American in origin, additional Native American consultation, other ethnographic research, and a search of the NAHC Sacred Lands Database shall be conducted. If the cultural resource is of an ethnographic group other than Native American, historic societies, ethnographic societies, and historic archival research shall be conducted. Additional non-invasive methods may also be warranted and should be determined in consultation with all consulting parties. Resource recording procedures shall be implemented consistent with DPR 523 forms requirements; and reporting requirements.

The cultural resources inventory shall be conducted under the direct supervision of cultural resources specialists meeting the Secretary of the Interior’s Professional Qualification Standards for the applicable field. All identified cultural resources shall be recorded on DPR 523 forms, and the location of each archaeological resource shall be recorded using a Global Positioning System device.

Following completion of the cultural resources inventory, an inventory report shall be prepared by qualified cultural resources specialists that describes the cultural setting of the program area; the methods used in the investigation; all identified cultural resources, including archaeological sites, tribal cultural resources, traditional cultural properties (intangible resources of significance to Native American tribe, other ethnographic group, or a local community), and cultural landscapes; and recommendations for further investigations, avoidance or other management actions. Each cultural resource identified in the component program area shall be evaluated for eligibility for listing on the CRHR and NRHP. Tribal cultural resources shall be evaluated in consultation with culturally affiliated tribes and the views of consulting tribes shall be included in the report. The cultural resources inventory report shall meet the documentation standards as described in 36 CFR 800.11 and shall be prepared by individuals meeting the Secretary of the Interior’s Professional Qualifications Standards (48 Federal Register 44738–44739).
If ground-disturbance would be required in the vicinity of a known Native American archaeological resource, a qualified professional archaeologist in consultation with culturally affiliated Native Americans 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 on tribal representative, project activities could disturb the resource, the archaeologist in consultation with tribal representatives and other qualified professionals shall prepare and implement a research design and treatment plan for archaeological resources and, before any construction-related ground-disturbance begins in the vicinity of the resource, shall carry out a testing program, as appropriate, based on the plan to determine whether the resource may meet the definition of a unique archaeological resource or an historical resource. If the construction activity is part of a Federal undertaking, all actions shall be conducted in compliance with Section 106 of the NHPA as well as state laws.

If the resource is determined to be ineligible for listing on the CRHR and the NRHP and is determined not to meet the definition of a unique archaeological resource, and is not an historical resource, no further mitigation shall be required. If the resource is found to potentially meet the definition of a unique archaeological resource or an historical resource and is of Native American origin, the archaeologist and consulting Native American tribes shall recommend additional actions determined to be necessary for the protection and documentation of the resource, as appropriate.

Avoidance and preservation-in-place is the preferred manner of mitigating impacts to cultural resources and may be accomplished by several means, including planning construction to avoid archaeological sites; incorporation of sites within parks, greenspace, or other open space; covering archaeological sites; deeding a site into a permanent conservation easement; or other preservation and protection methods agreeable to consulting parties and regulatory authorities with jurisdiction over the activity. Recommendations for avoidance of cultural resources of Native American origin will be reviewed by the lead CEQA agency, culturally affiliated Native American tribes, and the appropriate agencies in light of factors such as costs, logistics, technological feasibility, design, technology, and social, cultural, and environmental considerations and the extent to which avoidance is consistent with project objectives. Recommendations for avoidance of cultural resources that are not of Native American origin will be reviewed by the lead CEQA agency and other appropriate agencies. Avoidance and design alternatives may include realignment within the program area to avoid cultural resources, modification of the design to eliminate or reduce impacts to cultural resources, or modification or realignment to avoid highly significant features within a cultural resource. For resources that are of Native American origin, culturally affiliated Native American tribes shall be invited to review and comment on these analyses and shall have the opportunity to meet with the lead CEQA agency and its representatives who have technical expertise to identify and recommend feasible avoidance and design alternatives, so that appropriate and feasible avoidance and design alternatives can be identified.

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 that are of Native American origin, their disposition shall be determined in consultation with Native Americans and consulting State and Federal agencies. If artifacts are recovered from significant resources that are not of Native American origin, their disposition shall be determined in consultation with consulting State and Federal agencies. 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.

**Timing:** During project-specific environmental review.
Responsibility: The agency(ies) implementing the program component.

Mitigation Measure CR-3: Develop and Implement a Native American and Archaeological Monitoring Plan and Conduct Archaeological and Native American Monitoring of Sensitive Areas During Construction (for Impact CR-2, Possible Damage to or Destruction of Identified or Unidentified Archaeological Resources; Impact CR-3, Possible Damage to or Destruction of a Tribal Cultural Resource; and Impact CR-4, Possible Disturbance, Damage to, or Destruction of Human Remains).

If the results of the inventory of cultural resources, including the results of Native American consultation, in a program component project area indicates that portions of or all of a program area are sensitive for the presence of buried or otherwise obscured or unidentified cultural resources of any kind (Native and non-Native American), or tribal cultural resources (including Native American burials), a Native American and archaeological monitoring plan shall be developed and implemented in consultation with culturally affiliated tribes. The monitoring plan shall specify under what conditions monitoring will be conducted, the methods of monitoring, the conditions under which construction work may be stopped or slowed, the conditions under which construction work may be resumed, the roles and authority of monitors, communication protocols, and reporting requirements. Archaeological monitoring shall be conducted by or under the supervision of an archaeologist who meets the Secretary of the Interior’s Professional Qualification Standards for Archaeology. Native American monitoring shall be conducted by a Monitor or Representative of a California Native American Tribe that is traditionally and culturally affiliated with the geographic area of the project.

Timing: During construction activities.

Responsibility: The agency(ies) implementing the program component.

Mitigation Measure CR-4: Stop Work If Archaeological Materials are Discovered during Construction, Assess Significance of the Materials, and Implement Appropriate Avoidance or Treatment Measures, if Warranted (for Impact CR-2, Possible Damage to or Destruction of Identified or Unidentified Archaeological Resources).

If archaeological materials are inadvertently discovered during ground-disturbing activities, the agency implementing the program component shall ensure that work is stopped within 100 feet of the find, and a qualified archaeologist shall be retained to assess the significance of the find and develop appropriate treatment measures in cooperation with consulting parties, including culturally affiliated Native American Tribes if the find is a Native American archaeological site. Treatment measures typically include developing avoidance strategies or mitigating impacts through data recovery programs, such as excavation or detailed documentation, alternative mitigation, and, for sites of Native American origin, mitigation informed through tribal consultation. The appropriate treatment depends on the situation of the discovery and the views of consulting parties. Some Tribes consider data recovery programs to cause substantial adverse changes to unique historical, archaeological and tribal cultural resources; therefore, data recovery is not always the best option for mitigation.

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 construction activities:

- Before the commencement of construction, a qualified professional archaeologist and a tribal monitor or representative shall give a presentation to all construction personnel regarding the likelihood and
type of Native American and non-Native American 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) 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 in consultation with a tribal representative to be appropriate based on the potential for disturbance of additional cultural resource materials. A qualified archaeologist, in consultation with a monitor or representative from a culturally affiliated Native American Tribe, shall identify the materials, determine their potential to meet the definition of a unique archaeological resource or a historical resource, 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, implementation of protection and management measures, alternative mitigation (such as funding a cultural resources program or off-site cultural resources facility), and/or 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 some cases, archaeological data recovery can mitigate impacts that cannot be avoided.

**Timing:** During construction activities.

**Responsibility:** The agency(ies) implementing the program component.

**Mitigation Measure CR-5: Implement Procedures for Inventory and Evaluation of Tribal Cultural Resources and Implement Avoidance and Minimization Measures to Avoid Significant Adverse Effects (for Impact CR-3, Possible Damage to or Destruction of a Tribal Cultural Resource).**

California Native American Tribes that are traditionally and culturally affiliated with the geographic area in which a program component is located may have expertise concerning their tribal cultural resources (California PRC Section 21080.3.1) and shall be consulted concerning the proposed project, the kind of environmental review required, tribal cultural resources that may be impacted, and measures to avoid or minimize impacts. In accordance with California PRC Section 21084.3 public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource. If the implementing agency determines that the project may cause a substantial adverse change to a tribal cultural resource, and measures are not otherwise identified in the consultation process, the following are examples of mitigation measures that, if feasible, that may be considered to avoid or minimize significant adverse impacts:

1. Avoidance and preservation of the resources in place, including, but not limited to, planning and construction to avoid the resources and protect the cultural and natural context, or planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria.

2. Treating the resource with culturally appropriate dignity taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:
a) Protecting the cultural character and integrity of the resource.

b) Protecting the traditional use of the resource.

c) Protecting the confidentiality of the resource.

3. Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or using the resources or places.

4. Protecting the resource.

As a part of the consultation, the parties may propose mitigation measures, including, but not limited to, those recommended in Section 21084.3 (listed above), capable of avoiding or substantially lessening potential significant impacts to a tribal cultural resource or alternatives that would avoid significant impacts to a tribal cultural resource. If the California Native American tribe requests consultation regarding alternatives to the project, recommended mitigation measures, or significant effects, the consultation shall include those topics. The consultation may include discussion concerning the type of environmental review necessary, the significance of tribal cultural resources, the significance of the project’s impacts on the tribal cultural resources, and, if necessary, project alternatives or the appropriate measures for preservation or mitigation.

Any information, including, but not limited to, the location, description, and use of the tribal cultural resources, that is submitted by a California Native American tribe during the environmental review process shall not be included in the environmental document or otherwise disclosed by the lead agency or any other public agency to the public without the prior consent of the tribe that provided the information. If the lead agency publishes any information submitted by a California Native American tribe during the consultation or environmental review process, that information shall be published in a confidential appendix to the environmental document unless the tribe that provided the information consents, in writing, to the disclosure of some or all of the information to the public. The confidential information, may, however, be exchanged between public agencies that have lawful jurisdiction over the preparation of the environmental document.

Timing: During project-specific environmental review.

Responsibility: The agency(ies) implementing the program component.

Mitigation Measure CR-6: Implement Procedures for Inadvertent Discovery of Human Remains, and Implement Protection Measures, If Necessary
(for Impact CR-4, Possible Disturbance, Damage to, or Destruction of Human Remains).

In accordance with the California Health and Safety Code, if human remains are discovered on non-federal land during ground-disturbing activities, the agency implementing the program component shall immediately halt potentially damaging excavation in the area of the burial and notify the Coroner in the county of which the discovery was made and retain the services of a professional archaeologist to determine the nature of the remains. The coroner is required to examine all discoveries of human remains within 48 hours of receiving notice of a discovery on private or State lands (California Health and Safety Code Section 7050.5[b]).

If the coroner determines that the remains are those of a Native American, he or she must contact the NAHC by phone within 24 hours of making that determination (California Health and Safety Code
Upon the discovery of Native American remains, the agency implementing the program component shall require that all construction work must stop within 100 feet of the discovery until consultation with the MLD has taken place. The MLD shall have 48 hours to complete a site inspection and make recommendations after being granted access to the site. A range of possible treatments for the remains, including nondestructive removal and analysis, preservation in place, relinquishment of the remains and associated items to the descendants, or other culturally appropriate treatment may be discussed. California PRC Section 5097.98(b)(2) suggests that the concerned parties may mutually agree to extend discussions beyond the initial 48 hours to allow for the discovery of additional remains. The following is a list of site protection measures that the agency implementing the program component shall employ:

1. Record the site with the NAHC or the appropriate Information Center.
2. Record a document with the county in which the property is located.

The agency implementing the program component or that agency’s authorized representative shall rebury the Native American human remains and associated grave goods with appropriate dignity on the property in a location not subject to further subsurface disturbance if the NAHC is unable to identify a MLD, or if the MLD fails to make a recommendation within 48 hours after being granted access to the site. The agency implementing the program component or that agency’s authorized representative may also reinert the remains in a location not subject to further disturbance if he or she rejects the recommendation of the MLD and mediation by the NAHC fails to provide measures acceptable to the agency. The agency implementing the program component shall implement measures for the protection of the burial remains. Construction work in the vicinity of the burials shall not resume until the mitigation is completed.

If the human remains are of historic age and are determined to be not of Native American origin, the agency shall follow the provisions of the Health and Safety Code Section 7000 (et seq.) regarding the disinterment and removal of non-Native American human remains.

**Timing:** During construction activities.

**Responsibility:** The agency(ies) implementing the program component.

### 4.8.5 CONCLUSION

Mitigation Measure CR-1 would reduce Impact CR-1 (possible damage to or destruction of historical resources) to a less-than-significant level by requiring inventory, and avoidance or treatment strategies for identified resources. Impact CR-2 (possible damage to or destruction of identified or unidentified archaeological resources) would remain significant and unavoidable. Although Mitigation Measures CR-2, CR-3, and CR-4 would reduce this impact, the extent of damage to or destruction of presently-unidentified resources could remain significant despite all feasible monitoring, inventory, avoidance, and treatment measures. Impact CR-3 (possible damage to...
or destruction of a tribal cultural resource) would remain significant and unavoidable. Although Mitigation Measures CR-3 and CR-5 would reduce this impact, the extent of damage to or destruction of tribal cultural resources could remain significant despite all feasible monitoring, inventory, avoidance, and treatment measures. Impact CR-4 (possible disturbance, damage to, or destruction of human remains) would remain significant and unavoidable. Although Mitigation Measures CR-2, CR-3, and CR-6 would reduce this impact, human remains could be damaged or disturbed despite all feasible monitoring, inventory, and avoidance or treatment measures.
4.9 PALEONTOLOGICAL RESOURCES

Paleontological resources are fossils—the remains of prehistoric plants and animals—which are important scientific and educational resources because of their usefulness in: (1) documenting the presence and evolutionary history of particular groups of extinct and extant organisms; (2) reconstructing the environments in which these organisms lived; and (3) determining the relative ages of the strata in which they occur and the geologic events that resulted in the deposition of the sediments that formed these strata. Unique paleontological resources are the remains or traces of prehistoric animals and plants that are 11,700 years old or older. This section provides a description of rock formations where earthmoving activities could occur, a discussion of the types of fossils that have been recovered from other recorded localities within the same rock formations, and a determination of the paleontological sensitivity of those formations.

4.9.1 REGULATORY SETTING

FEDERAL

No Federal plans, policies, or laws related to paleontological resources are relevant to this analysis.

STATE

No State plans, policies, or laws related to paleontological resources are relevant to this analysis.

REGIONAL AND LOCAL

Professional Paleontological Standards

The Society of Vertebrate Paleontology ([SVP] 1995, 1996), a national scientific organization of professional vertebrate paleontologists, has established standard guidelines that outline acceptable professional practices in the conduct of paleontological resource assessments and surveys, monitoring and mitigation, data and fossil recovery, sampling procedures, specimen preparation, analysis, and curation. Most practicing professional paleontologists in the nation adhere to SVP assessment, mitigation, and monitoring requirements, as specifically spelled out in its standard guidelines.

Sacramento County General Plan

The following policies from the Sacramento County General Plan of 2005-2030 Conservation Element (Sacramento County 2011) regarding paleontological resources apply to the proposed program.

► Policy CO-161. As a condition of approval for discretionary projects, require appropriate mitigation to reduce potential impacts where development could adversely affect paleontological resources.

► Policy CO-162. Projects located within areas known to be sensitive for paleontological resources should be monitored to ensure proper treatment of resources and to ensure crews follow proper reporting, safeguards and procedures.

► Policy CO-163. Require that a certified geologist or paleoresources consultant determine appropriate protection measures when resources are discovered during the course of development and land altering activities.

City of Sacramento General Plan

There are no policies from the City of Sacramento 2035 General Plan Historic and Cultural Resources Element (City of Sacramento 2015) related to paleontological resources that apply to the proposed program.
Solano County General Plan

There are no policies from the Solano County General Plan Resources Element (Solano County 2008) related to paleontological resources that apply to the proposed program.

City of Rio Vista General Plan

There are no policies from the City of Rio Vista General Plan 2001 (City of Rio Vista Community Development Department 2002) related to paleontological resources that apply to the proposed program.

Yolo County General Plan

The following policies and actions from the Yolo County General Plan Open Space and Conservation Element (Yolo County 2009) related to paleontological resources apply to the proposed program.

► Policy CO-4.1. Identify and safeguard important cultural resources.

► Action CO-A63. Require cultural resources inventories of all new development projects in areas where a preliminary site survey indicates a medium or high potential for archaeological, historical, or paleontological resources. In addition, require a mitigation plan to protect the resource before the issuance of permits. Mitigation may include:
  • Having a qualified archaeologist or paleontologist present during initial grading or trenching;
  • Redesign of the project to avoid historic or paleontological resources;
  • Capping the site with a layer of fill; and/or
  • Excavation and removal of the historical or paleontological resources and curation in an appropriate facility under the direction of a qualified professional.

4.9.2 ENVIRONMENTAL SETTING

REGIONAL GEOLOGY

As discussed in Section 4.3, “Geology and Soils,” the program area is located in the Sacramento Valley portion of the Great Valley Geomorphic Province. 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 Holocene (i.e., 11,700 years Before Present [B.P.] to present day) and Pleistocene (i.e., 2.6 million–11,700 years B.P.) 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.

The southern end of the Yolo Bypass lies with the northern portion of the Sacramento-San Joaquin Delta (Delta). Most of the sediments in the Delta were deposited between 175 million and 25 million years B.P. and were accumulated in marine environments. Younger deposits (25 million years B.P. to recent) are generally described as nonmarine; however, some of the younger deposits may have formed as marine deposits in shallow seas and estuaries. The depositional history of the Delta during the late Quaternary period (the last 1 million years)
probably was controlled by several cycles related to fluctuations in regional and global climate in which each
cycle consisted of a period of deposition followed by a period of nondeposition and erosion. Thus, the Delta
during the late Quaternary period had stages of wetlands and floodplain creation as tidewaters rose in the valley
from the west, areas of erosion when tidewaters receded, deposition of alluvial fans that were reworked by wind
to create extensive sand dunes, and alluvial fan deposition from streams emanating from the adjacent mountain
ranges.

Rio Vista, at the southern end of the program area, lies within the Montezuma Hills, which comprise a small
range of low-elevation hills at the northern banks of the Delta in Solano County. Elevations range from
approximately 165–180 feet above mean sea level. The Montezuma Hills are composed of Pleistocene-age
sediments known as the Montezuma Formation.

Based on a review of regional geologic mapping prepared by Wagner et al. 1987 (Exhibit 4.9-1), earthmoving
activities in the program area would occur in the geologic formations discussed below.

► **Alluvium.** Holocene-age, poorly sorted, stream and basin deposits, clay to boulder size. Unweathered gravel,
sand, and silt deposited by present-day stream and river systems that drain the Coast Ranges, Klamath
Mountains, and Sierra Nevada. These deposits form broad alluvial fans of low surface relief along the western
and southwestern side of the valley.

► **Levee and Channel Deposits.** Holocene-age deposits of active stream channels and their natural levees, as
well as adjacent broad alluvial fans.

► **Basin Deposits.** Holocene-age fine-grained deposits of silt and clay in flood basins between modern
watercourses (locally includes marsh deposits).

► **Intertidal Deposits.** Holocene-age soft mud and peat deposited in marshes, swamps, and adjacent waterways.

► **Older Alluvium.** Pleistocene-age dissected alluvial deposits. Applies to the Modesto, Riverbank, Turlock
Lake, and Red Bluff Formations (Helley and Harwood 1985:10). Mainly forms fans and terraces that grade to
low plains and basins towards the center of the valley and grading to colluvium along the foothills
surrounding the valley. Consists of tan, brown, gray, black, and red gravels, sands, silts, and clays that
lithologically reflect local source areas.

- In the Sacramento Valley, the Modesto Formation forms alluvial terraces, and some alluvial fans and
  abandoned channel ridges, of major rivers such as the Sacramento and American 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 B.P. (Helley and Harwood 1985:10). 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 B.P. (Marchand and Allwardt 1981).

- 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. The Riverbank
Formation is Pleistocene in age, but is considerably older than the Modesto Formation; estimates place
the age of the Riverbank between 130,000 and 450,000 years B.P. The Riverbank forms alluvial fans and
terraces of major rivers such as the Sacramento and American. The Riverbank fans and terraces are higher
in elevation and generally have a more striking topography than those formed by the Modesto Formation.
(Helley and Harwood 1985:11.)

- The Red Bluff Formation is best preserved in the northern part of the valley from Redding to south of
  Orland Buttes on the west and south to Chico on the east; it also occurs along the southwest side of the
valley where its character is less clear. Helley and Harwood (1985:11) indicate that the scattered cappings of the Arroyo Seco Gravel in the Sacramento area and also the half dozen or so scattered gravel remnants south of Woodland between Cache and Putah Creeks may actually be the Red Bluff Formation. Estimates place the age of the Red Bluff Formation between 450,000 and 630,000 years B.P. (Helley and Harwood 1985:11–12).

- Sediments of the Turlock Lake Formation consist of deeply weathered and dissected arkosic gravels with minor resistant metamorphic rock fragments and quartz pebbles; sand and silt are present along the south and east sides of the Sacramento Valley. The upper part of the Turlock Lake is probably correlative with the Red Bluff because there is overlap in the age range of the units. The Turlock Lake mapped in the Sacramento Valley probably correlates with the lower part of the Turlock Lake of the San Joaquin Valley since it overlies the Laguna Formation and is truncated by the Red Bluff Formation. Therefore, the age of the Turlock Lake Formation likely ranges from 630,000 to 1 million years B.P. (Helley and Harwood 1985:11–12).

- **Montezuma Formation.** Early Pleistocene (approximately 1.8–2.5 million years B.P.) consisting primarily of poorly stratified, slightly consolidated, clayey sand and pebbly sand; locally contains calcareous lenses (i.e., sediments containing calcium carbonate that have been deposited in shallow water, near land, by marine organisms).

- **Mehrten Formation.** Pliocene–Miocene age (approximately 9 million years B.P.) consisting predominantly of lahar (volcanic mudflow) deposits with occasional beds of volcanic ash. The Mehrten Formation also contains lenticular deposits of weakly to strongly cemented, well rounded, andesitic boulders, cobbles, and gravels in a fine- to medium-grained andesitic sandstone matrix (Helley and Harwood 1985:17).

**PALEONTOLOGICAL RESOURCE ASSESSMENT CRITERIA**

The potential paleontological importance of the program area can be assessed by identifying the paleontological importance of rock formations that are exposed there. Because the distribution of a rock unit can be more easily delineated using topographic maps, this method is conducive to determining the parts of the program area that are of higher and lower sensitivity for paleontological resources.

A paleontologically sensitive rock formation is one that is rated high for potential paleontological productivity and is known to have produced unique, scientifically important fossils. The potential paleontological productivity rating of a rock formation exposed in a program area refers to the abundance and densities of fossil specimens, previously recorded fossil sites, or both in exposures of the same rock formation in other locations. Exposures of a specific rock formation in the program area are most likely to yield fossil remains representing particular species in quantities or densities similar to those previously recorded from the formation in other locations. Therefore, the paleontological sensitivity determination of a rock formation is based primarily on the types and numbers of fossils that have been previously recorded from that rock formation (i.e., the paleontological productivity).

The following tasks were completed to establish the paleontological sensitivity of each rock formation exposed in or likely to be encountered at depth by earthmoving activities in the program area:

- The potential paleontological productivity of each rock formation was assessed, based on the density of fossil remains previously documented within each formation.

- The potential of a rock formation exposed in the program area to contain a unique paleontological resource was considered.
Exhibit 4.9-1. Geologic Formations in the Program Area

Source: Wagner et al. 1987
In its standard guidelines for assessment and mitigation of adverse impacts on paleontological resources, SVP (1995) established three categories of sensitivity for paleontological resources: high, low, and undetermined. Areas where fossils have been previously found are considered to have a high sensitivity and a high potential to produce fossils. 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. Areas that have not had any previous paleontological resource surveys or fossil finds are considered to be of undetermined sensitivity 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 high or low sensitivity. In keeping with the SVP’s (1995) significance criteria, all vertebrate fossils are generally categorized as being of potentially significant scientific value.

**PALEONTOLOGICAL RESOURCES INVENTORY**

To develop a baseline paleontological resource inventory of the study area and to establish the paleontological sensitivity of each geologic formation present within the study area, background research was conducted and each geologic formation exposed within, or likely to be encountered at depth within the study area was assigned a paleontological sensitivity rating based on the number of previously recorded fossil sites from that formation and the scientific importance of the fossil remains recorded. These methods are consistent with SVP (1995) guidelines for assessing the importance of paleontological resources.

Geologic maps and available published geological and paleontological literature covering the stratigraphy and surficial geology of the study area were reviewed to determine the exposed and subsurface rock formations, to assess the potential paleontological productivity of each rock formation, and to delineate their respective areal distribution in the study area. The number and location of previously recorded fossil sites from rock formations exposed within the study area and the types of fossil remains each rock formation has produced were evaluated based on published geological and paleontological literature.

The literature review was supplemented by a records search from the University of California, Berkeley Museum of Paleontology (UCMP) on October 12, 2015.

**PALEONTOLOGICAL RESOURCES ASSESSMENT BY ROCK UNIT**

**Holocene Deposits**

The Alluvium, Levee and Channel deposits, Basin deposits, and Intertidal deposits are all are of Holocene age. By definition, in order to be considered a unique paleontological resource, a fossil must be more than 11,700 years old. Holocene deposits contain only the remains of extant, modern taxa (if any resources are present), which are not considered “unique” paleontological resources. Therefore, these formations are considered to be of low paleontological sensitivity.

**Older Alluvium**

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 Modesto (youngest), Riverbank (middle), and Turlock Lake (oldest) Formations. Marchand and Allwardt (1981) proposed that the name Victor Formation be abandoned and that the Modesto, Riverbank, and Turlock Lake Formations be adopted as formal nomenclature for Quaternary deposits in the Sacramento and San Joaquin Valleys. Most later researchers have followed this recommendation. (For purposes of this evaluation, the term “Older alluvium” is assumed to refer to either the Modesto, Riverbank, Red Bluff, or Turlock Lake Formations in the program area, as derived from older geologic mapping where these formations were not distinguished.) Remains of land mammals have been found at a number of localities in alluvial deposits referable to the Riverbank and Modesto Formations. 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 22 localities in Sacramento, Solano, and Yolo counties (as well as numerous other localities throughout the Central Valley) that have yielded Rancholabrean vertebrate fossils recovered from Pleistocene-age sediments.

Jefferson (1991a, b) lists six fossil localities in Sacramento referable to the Riverbank Formation. For example, the Teichert Gravel Pit, approximately 14 miles east of the program area along State Route (SR)16, yielded specimens of broad-footed mole, Harlan’s ground sloth, rabbit, California ground squirrel, Botta’s pocket gopher, pocket mouse, groove-toothed harvest mouse, woodrat, vole, coyote, dire wolf, mammoth, horse, western camel, deer, bison, fish (carps and minnows), frog, snake, Pacific pond turtle, and the family Anatidae (ducks, geese, and swans).

At least nine recorded Rancholabrean-age vertebrate fossil sites from the Riverbank Formation have been recorded in Sacramento County. Pleistocene-age mammoth remains were discovered on July 2, 2004, during excavation of a Sacramento Metropolitan Utility District trench in Elk Grove (Kolber 2004). Mammoth remains recovered from that site consisted of a tusk, ribs, teeth, and portions of a shoulder blade. UCMP locality V-74086, in south Sacramento at Ehrhardt Avenue, also contained fossilized Rancholabrean-age mammoth remains. The other UCMP sites in Sacramento—localities V-6747, V-6846, V-68141, V-69129, and V-75126—contained remains of Rancholabrean-age bison, camel, coyote, horse, Harlan’s ground sloth, mammoth, woodrat, fish, mole, snake, and gopher. Pleistocene-age fossils were recovered from the Riverbank Formation at the ARCO Arena (now called Sleep Train Arena) site (Hilton et al. 2000); those fossils included remains of Harlan’s ground sloth, bison, coyote, horse, camel, squirrel, antelope or deer, and mammoth. Furthermore, San Diego Society of Natural History locality 0663 (Jefferson 1991b:62) included fossil specimens of Rancholabrean-age horse and camel recovered from Pleistocene-age sediments in Sacramento.

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 Central Valley (UCMP 2015). 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 2015).

Two vertebrate fossil specimens from a Pleistocene-age horse were recovered from the Red Bluff Formation at a locality near Woodland (UCMP 2015).

Vertebrate fossils have been recovered from the Turlock Lake Formation in the Central Valley. The most important locality from the Turlock Lake Formation is the Fairmead Landfill site, near Chowchilla, which has yielded more than 13,000 Pleistocene-age specimens from 35 species, including mammoth, ground sloth, bear, sabertooth cat, wolf, deer, camel, horse, antelope, rodents, birds, reptiles, and plants (Dundas et al. 1996). Excavations for the California Department of Transportation’s Fresno SR 180 West Freeway project uncovered fossil specimens from a Pleistocene-age camel in sediments of the Turlock Lake Formation in Fresno County (Hansen 2008). Hay (1927) reported specimens of horses, camel, and mammoth from sediments that Piper et al. (1939) interpreted as probably equivalent to the Turlock Lake Formation.

Because of the high number of vertebrate fossils recovered from Older alluvium throughout the Central Valley, the Older alluvium is considered to be of high paleontological sensitivity.

Montezuma Formation

A search of the UCMP (2015) database indicates that vertebrate fossils have been recovered from 19 different localities within the Montezuma Formation, in Contra Costa, Yolo, and Solano Counties. Most of these localities are in the San Francisco Bay Area. However, UCMP locality V-5510 within the Montezuma Hills (near Rio Vista), yielded 12 specimens of Pleistocene-age horse, camel, deer, and Eutheria. In addition, several fossil
specimens of mammoth, and Harlan’s ground sloth were recovered from UCMP localities V-69182, V-69183, and V-69184 in the vicinity of Putah Creek (west of the Yolo Bypass). Because of the number of vertebrate fossils that have been recovered from the Montezuma Formation, it is considered to be of high paleontological sensitivity.

**Mehrten Formation**

Vertebrate mammal and plant fossils have been reported from the Mehrten Formation throughout the Sierra Nevada foothills and the eastern margin of the Central Valley. The closest recorded vertebrate fossil locality within the Mehrten Formation (V-76050) is near Camanche Reservoir, approximately 23 miles south of the planning area, where a specimen of *Pliohippus* (horse) was recovered. Other vertebrate fossils have been recovered from the Mehrten Formation from over 40 locations in Calaveras, San Joaquin, Stanislaus, Tuolumne, and Merced Counties (UCMP 2015). In addition, several specimens of plant fossils have been recovered locally from the Mehrten Formation in Granite Bay, Roseville, and Rocklin (Sierra College Natural History Museum 2011). Because of the large number of vertebrate fossils that have been recovered from the Mehrten Formation, it is considered to be of high paleontological sensitivity.

**4.9.3 ENVIRONMENTAL IMPACTS**

**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, as amended. The proposed program would have a significant effect on paleontological resources if it would:

- destroy a unique paleontological resource or site.

For the purposes of this analysis, a unique resource or site is one that is considered significant under the following professional paleontological standards.

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).

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 for a research project). Marine invertebrates are generally common; the fossil record is well developed and well documented, and they would generally not be considered a unique paleontological resource. 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.

**IMPACT ANALYSIS**

| Impact PR-1 | Potential to Directly or Indirectly Destroy a Unique Paleontological Resource or Site. Portions of the program area are underlain by Older alluvium, as well as the Mehrten and Montezuma Formations, which are considered to be paleontologically sensitive. Therefore, earthmoving activities within these formations could damage unknown subsurface unique paleontological resources. This impact would be potentially significant. |

The Alluvium, Levee and Channel deposits, Basin deposits, and Intertidal deposits are all are of Holocene age. By definition, in order to be considered a unique paleontological resource, a fossil must be more than 11,700 years old. Holocene deposits contain only the remains of extant, modern taxa (if any resources are present), which are not considered “unique” paleontological resources. Therefore, these formations are considered to be of low paleontological sensitivity, and earthmoving activities in any of these sediments would result in no impacts on paleontological resources.

However, the discovery of numerous vertebrate fossil remains in sediments referable to the Older alluvium and the Montezuma and Mehrten Formations in Sacramento, Yolo, and Solano Counties, as well as other areas throughout the Central Valley, indicates that these formations are paleontologically sensitive. Thus, there is a potential for uncovering additional similar fossil remains during construction-related excavation within the program area. The Older alluvium (which may consist of the Modesto, Riverbank, Red Bluff, or Turlock Lake Formations), Montezuma Formation, and Mehrten Formation underlie the Holocene-age deposits throughout the program area. Therefore, depending on the depth of excavation for program components such as bypass widening, construction of new setback levees, and the new floodwall in Rio Vista, paleontologically sensitive rock formations could be encountered. Program-related earthmoving activities in these formations have the potential to encounter and possibly damage unique paleontological resources. This impact could be potentially significant.

**4.9.4 MITIGATION MEASURES**

**Mitigation Measure PR-1: Conduct Construction Personnel Education, Stop Work if Paleontological Resources are Discovered, Assess the Significance of the Find, and Prepare and Implement a Recovery Plan, as Required** (for Impact PR-1, Potential to Directly or Indirectly Destroy a Unique Paleontological Resource or Site).

To minimize the potential for destruction of or damage to potentially unique, scientifically important paleontological resources during earthmoving activities, the agencies implementing program components shall do the following:

- Before the start of construction activities in the program area, construction personnel involved with earthmoving activities (including the site superintendent) 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 notify the agencies implementing program components and shall immediately cease work in the vicinity of the find. The agencies implementing program components shall retain a qualified paleontologist to evaluate the resource and prepare a recovery plan in accordance with SVP.
Guidelines (1996). The recovery plan may include, but is not limited to, a field survey, construction monitoring, sampling and data recovery procedures, museum storage coordination for any specimen recovered, and a report of findings. Recommendations in the recovery plan that are determined by the agencies implementing program components to be necessary and feasible shall be implemented before construction activities can resume at the site where the paleontological resources were discovered.

**Timing:**

Before and during construction activities.

**Responsibility:**

The agency(ies) implementing the program component.

### 4.9.5 Conclusion

Implementing Mitigation Measure PR-1 would reduce potentially significant Impact PR-1 (potential to directly or indirectly destroy a unique paleontological resource or site) to a less-than-significant level because construction workers would be alerted to the possibility of encountering paleontological resources and, in the event that resources were discovered, fossil specimens would be recovered and recorded and would undergo appropriate curation.
4.10 TRANSPORTATION AND CIRCULATION

This section describes the traffic and circulation characteristics of the major transportation corridors in the program area, and analyzes the potential impacts of the proposed program on traffic circulation and transportation systems, emergency vehicle access, and construction traffic hazards.

4.10.1 REGULATORY SETTING

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 area. Caltrans enforces various policies and regulations related to the modification of, or encroachment on, State-owned roadways.

REGIONAL AND LOCAL

The general plans for Sacramento, Solano, and Yolo Counties and for the Cities of Sacramento and Rio Vista identify estimated future travel demand and present goals, policies, and implementation programs for transportation systems and facilities within the planning areas for those jurisdictions. 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.

Yolo County Department of Public Works Improvement Standards govern the design and construction of county improvements, including new roadways.

The City of Sacramento and Sacramento County maintain Emergency Evacuation Plans as attachments to their Emergency Operations Plans. These plans identify evacuation procedures and responsibilities, and also evacuation routes in the event of an emergency, including a flood emergency (City of Sacramento 2008, Sacramento County 2008).

4.10.2 ENVIRONMENTAL SETTING

YOLO AND SACRAMENTO BYPASS AREA

The primary roadways that would serve as transportation routes for the hauling of construction materials related to the improvements to the Yolo and Sacramento Bypasses include Interstate 5 (I-5), and a number of two-lane local rural roadways, including Yolo County Road 124 and Old River Road. I-5 is a four-lane freeway in the vicinity of the Yolo Bypass.

SACRAMENTO RIVER EAST LEVEE AREA

Because the portion of the Sacramento River from the confluence with the American to Freeport is part of 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 funded facilities.

The primary roadways that would most likely be used to access most of the funded facilities are I-5, Riverside Boulevard, State Route (SR) 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.
**RIO VISTA AREA**

The main route for construction traffic to access funded facilities in Rio Vista would be SR 12. SR 84 and SR 160, as well as local roadways in Rio Vista, could also be affected.

### 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.

#### 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 program would have a significant effect on transportation and circulation if it would:

- conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation;

- conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards 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 or impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; or

- conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.

Although some of the proposed levee improvements would take place near the Sacramento International Airport, the Sacramento Executive Airport, Rio Vista Airport, the California Highway Patrol Academy Airport, and the Borges-Clarksburg Airport. The proposed improvements (funded facilities) in these areas would be restricted to levee improvements and related construction activity, and implementation of the program components would not alter traffic patterns or result in substantial safety risks associated with airport operations. Potential impacts related to birdstrike hazards are described in Section 4.16, “Hazards and Hazardous Materials.”

Individual program components would include permanent changes to County Road 124; however, the design for the new roadway would be required to adhere to Yolo County’s improvement standards for roadways, which would not permit introduction of new hazards related to design features. Potential hazards related to construction are discussed in Impact TR-1.

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 program would not directly or indirectly eliminate alternative transportation corridors or facilities (e.g., bike paths, lanes, bus turnouts). In addition, the proposed program would not include changes in policies or programs that support alternative transportation. Therefore, the proposed program 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.

**Impact Analysis**

**Impact TR-1**

**Temporary and Short-Term Increases in Traffic on Local and Regional Roadways during Construction.** During the construction period for individual program components, haul truck trips and construction worker commute trips would increase traffic on regional roadways and highways and in the vicinity of funded facility project sites and, in the Sacramento River East Levee 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 Yolo Bypass improvements, potentially leading to traffic delays. This impact would be significant.

Construction of the individual program components and activities from implementation of the funded facilities would involve the import of substantial amounts of construction equipment and borrow and other construction materials (e.g., aggregate) 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). 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.

In addition, portions of some roadways, such as County Road 124 in Yolo County, would 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, 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 a temporary and short-term 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. Mitigation Measure TR-1, described below, has been identified to address this impact.
Impact TR-2 Possible Effects of Construction Activity on Emergency Access. Temporary and short-term road closures and the presence of large numbers of slow-moving haul trucks on some roadways during construction periods could hinder emergency access. This impact would be potentially significant.

Construction activities could temporarily disrupt transportation and circulation patterns in the vicinity of work zones near the individual construction sites. Temporary and short-term road closures and partial road closures could also cause traffic congestion and delays. These conditions could impair emergency access and evacuation routes in some locations and increase some emergency response times. This impact would be potentially significant. Mitigation Measure TR-2, described below, has been identified to address this impact.

4.10.4 MITIGATION MEASURES

Mitigation is described below for Impact TR-1 (construction traffic on local and regional roadways) and Impact TR-2 (effects on emergency access).

Mitigation Measure TR-1: Prepare and Implement a Traffic Management and Safety Assurance Plan, and Coordinate with Local Jurisdictions and the California Department of Transportation (Caltrans) as Needed (for Impact TR-1, Temporary and Short-Term Increases in Traffic on Local and Regional Roadways during Construction).

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 agency(ies) 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:

- Conduct worker training regarding high-collision intersections and areas along haul routes of special sensitivity (residential areas, narrow roadways, routes near education centers).

- 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.

- 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.

- Temporarily relocate bicycle routes to improve safety if possible, and inform the public of such changes.

- 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.
• 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.

• Provide flagger control at construction zones to manage traffic control and flows as necessary.

• 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.

**Timing:** Prior to and during construction activities.

**Responsibility:** The agency(ies) implementing the program component.


The agency(ies) 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(ies) 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.

**Timing:** Prior to and during construction activities.

**Responsibility:** The agency(ies) implementing the program component.

### 4.10.5 CONCLUSION

There would be no long-term traffic or transportation impacts. Implementation of these Mitigation Measure TR-1 would reduce significant Impact TR-1 (temporary and short-term increases in traffic on local and regional roadways during construction) to a less-than-significant level by requiring traffic management plans and coordination with local agencies to minimize delays and effects on transportation access. Implementing Mitigation Measure TR-2 would reduce the potentially significant Impact TR-2 (possible effects of construction activity on emergency access) to a less-than-significant level because agencies would alert emergency services providers of activities prior to beginning construction, and maintain access or identify detours.
4.11 AIR QUALITY

This section addresses issues related to air quality. Issues related to greenhouse gas emissions are discussed in Section 4.18, “Greenhouse Gas Emissions.”

4.11.1 REGULATORY SETTING

Air quality within the program area is regulated by the U.S. Environmental Protection Agency (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. While EPA regulations must be followed, State and local regulations generally 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. These are the most prevalent air pollutants known to be deleterious to human health and extensive health-effects criteria documents are available, and are the “criteria air pollutants” regulated by the Federal Clean Air Act.

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 requires 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 (PM₂.₅), CO, NO₂, SO₂, and lead. The primary standards protect the public health and the secondary standards protect public welfare. The CAA also requires 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 (CAA) added requirements for states with nonattainment areas (i.e., areas that are not in attainment of one or more of the NAAQS) 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.

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>
<thead>
<tr>
<th>Pollutant</th>
<th>Averaging Time</th>
<th>California Standards</th>
<th>National Standards&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Standards&lt;sup&gt;b,c&lt;/sup&gt;</td>
<td>Attainment Status&lt;sup&gt;d,i&lt;/sup&gt;</td>
</tr>
<tr>
<td>Oxygen</td>
<td>1-hour</td>
<td>0.09 ppm (180 μg/m³)</td>
<td>N (Serious)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.07 ppm (137 μg/m³)</td>
<td></td>
</tr>
<tr>
<td>Respirable Particulate Matter (PM&lt;sub&gt;10&lt;/sub&gt;)</td>
<td>8-hour</td>
<td>0.09 ppm (180 μg/m³)</td>
<td>N (Serious)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.07 ppm (137 μg/m³)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Annual Arithmetic Mean</td>
<td>20 μg/m³</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>24-hour</td>
<td>50 μg/m³</td>
<td></td>
</tr>
<tr>
<td>Fine Particulate Matter (PM&lt;sub&gt;2.5&lt;/sub&gt;)</td>
<td>24-hour</td>
<td>12 μg/m³</td>
<td>N, U</td>
</tr>
<tr>
<td></td>
<td>Annual Arithmetic Mean</td>
<td>12 μg/m³</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>24-hour</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Carbon Monoxide (CO)</td>
<td>1-hour</td>
<td>20 ppm (23 mg/m³)</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>8-hour</td>
<td>9 ppm (10 mg/m³)</td>
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<tr>
<td></td>
<td>Annual Arithmetic Mean</td>
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<td></td>
<td>1-hour</td>
<td>0.18 ppm (339 μg/m³)</td>
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<tr>
<td></td>
<td>Annual Arithmetic Mean</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>24-hour</td>
<td>0.04 ppm (105 μg/m³)</td>
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</tr>
<tr>
<td>Sulfur Dioxide (SO&lt;sub&gt;2&lt;/sub&gt;)</td>
<td>3-hour</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>1-hour</td>
<td>0.25 ppm (655 μg/m³)</td>
<td>A</td>
</tr>
<tr>
<td>Lead&lt;sup&gt;i&lt;/sup&gt;</td>
<td>30-day Average</td>
<td>1.5 μg/m³</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>Calendar Quarter</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Pollutant</td>
<td>Averaging Time</td>
<td>California Standards</td>
<td>Attainment Status</td>
</tr>
<tr>
<td>----------------------------</td>
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</tr>
<tr>
<td>Sulfates</td>
<td>24-hour</td>
<td>25 μg/m³</td>
<td>A</td>
</tr>
<tr>
<td>Hydrogen Sulfide</td>
<td>1-hour</td>
<td>0.03 ppm (42 μg/m³)</td>
<td>U</td>
</tr>
<tr>
<td>Vinyl Chloride i</td>
<td>24-hour</td>
<td>0.01 ppm (26 μg/m³)</td>
<td>U/A</td>
</tr>
<tr>
<td>Visibility-Reducing Particle Matter</td>
<td>8-hour</td>
<td>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 percent</td>
<td>U</td>
</tr>
</tbody>
</table>

Notes: μg/m³ = micrograms per cubic meter; mg/m³ = milligrams per cubic meter; ppm = parts per million

- 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 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard. The fine particulate matter (PM2.5) 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard.
- 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.
- 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.
- 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.

Sources: ARB 2014; SMAQMD 2013
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.

**REGIONAL AND LOCAL**

Most of the program area is in Sacramento County, where air quality is under the jurisdiction of the Sacramento Metropolitan Air Quality Management District (SMAQMD). The other air district that has jurisdiction in the program area is Yolo-Solano Air Quality Management District (YSAQMD).

The local AQMDs attain and maintain air quality conditions in the program 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 recently adopted AQAP for Sacramento Federal Ozone Nonattainment Area (SFNA), which was completed in 2006 in response to the 8-hour ozone standard, 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 in order 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 funded facilities may involve visible emissions, fugitive dust, architectural coatings, and general permit requirements.

SMAQMD operates an off-site construction mitigation fee program. If the projected construction related emissions for a project are not reduced to SMAQMD’s threshold of significance (85 pounds per day of NOX) by the application of the standard on-site construction mitigation for off-road equipment and requiring newer model year engines in haul trucks then an off-site construction mitigation fee should be applied to emissions still above 85 pounds (inclusive of emissions from both off-road equipment and on-road haul trucks).

This fee is used by the District to fund emission reduction programs in the air basin. One program example is the District’s Heavy Duty Incentive Program through which select owners of heavy duty equipment in Sacramento County can repower or retrofit their old engines with cleaner engines or technologies. The fee calculation takes into account the excess construction emissions, the number of days those emissions occur, the cost to reduce emissions, and the administrative cost for SMAQMD to run the mitigation program. The fee rate is based on the cost effectiveness formula established in California’s Carl Moyer Incentive Program, and is adjusted annually July 1st.
TOXIC AIR CONTAMINANTS

Air quality regulations also focus on toxic air contaminants (TACs) or, in Federal terminology, 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 percent in 2010 and 85 percent 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 regulatory 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.

### 4.11.2 ENVIRONMENTAL SETTING

The program 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.

**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 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 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 (NOX), 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 NOX. High CO concentrations occur on winter days with strong surface inversions and light winds. CO transport is extremely limited.

Local meteorology of the program 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.

**Ambient Air Quality in the Program 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 NOX in the presence of sunlight. Motor vehicles and stationary (industrial) sources are major sources of emission of both ROG and NOX, 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 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 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 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 PM\textsubscript{10} may result from both short-term and long-term exposure to elevated PM\textsubscript{10} 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\textsubscript{2.5}. PM\textsubscript{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 PM\textsubscript{10} and PM\textsubscript{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 3/4 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 NO\textsubscript{2} 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 NO\textsubscript{2} (EPA 2006a). The combined emissions of NO and NO\textsubscript{2} are referred to as NO\textsubscript{X}, which are reported as equivalent NO\textsubscript{2}. Because NO\textsubscript{2} is formed and depleted by reactions associated with photochemical smog (ozone), the NO\textsubscript{2} concentration in a particular geographical area may not be representative of the local NO\textsubscript{X} emission sources.

Inhalation is the most common route of exposure to NO\textsubscript{2}. Because NO\textsubscript{2} 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 NO\textsubscript{2} 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 SO\textsubscript{2} exposure pertain to the upper respiratory tract. SO\textsubscript{2} is a respiratory irritant with constriction of the bronchioles occurring with inhalation of SO\textsubscript{2} at 5 ppm or more. On contact with the moist mucous membranes, SO\textsubscript{2} 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 SO\textsubscript{2} 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 percent between 1980 and 1999), and levels of lead in the air decreased by 94 percent between 1980 and 1999. Transportation sources, primarily airplanes, now contribute only 13 percent of lead emissions. A recent National Health and Nutrition Examination Survey reported a 78 percent 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. Construction emissions are described as “short-term” or temporary in duration. These short-term emissions, especially PM_{10}, 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\textsubscript{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.
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, as amended. The proposed program would have a significant impact on air quality 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 program would have a significant air quality impact 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).

Based on Appendix G of the State CEQA Guidelines, the significance of criteria established by the applicable AQMD 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. Projects in Sacramento County that generate temporary, short-term emissions (construction) in excess of 85 lb/day of NOX or long-term operational (regional) emissions of 65 lb/day of ROG or NOX 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.

Objectionable Odors—Implementation of the funded facilities would not result in any major sources of odor in proximity to populated areas. Although excavation would occur at the Old Bryte Landfill site, the landfill is more than a mile from the nearest occupied structure. The program components 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, implementation of program components would not expose sensitive receptors to odorous emissions, and odor effects are not discussed further in this SEIR.

IMPACT ANALYSIS

<table>
<thead>
<tr>
<th>Impact</th>
<th>Generation of Temporary and Short-Term Emissions of ROG, NOX, and PM10 during Construction.</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIR-1</td>
<td>Daily unmitigated emissions of ROG, NOX, PM_{10}, and PM_{2.5} for some of the program components may exceed applicable air district-recommended significance thresholds. Therefore, program construction could result in or substantially contribute to an existing or projected air quality violation of the CAAQS. This impact would be considered potentially significant.</td>
</tr>
</tbody>
</table>

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 with respect to PM_{10} and PM_{2.5} fugitive dust emissions. Fugitive PM dust 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 NOx are associated primarily with construction equipment, haul truck, and construction worker exhaust and asphalt paving.

Construction activities associated with Lower Sacramento River Erosion Control, Yolo-Sacramento Bypass System Improvements, and Levee Modernization improvements would result in the temporary and short-term generation of ROG, NOx, PM10, and PM2.5 emissions from excavation, earthmoving activities, vegetation clearing, grading, cut/fill, asphalt paving, construction equipment use, construction employee commute trips, material transport (especially on unpaved surfaces), and other construction activities.

At the time of this writing, the exact schedule and construction parameters for the Lower Sacramento River Erosion Control, Yolo-Sacramento Bypass System Improvements, and Levee Modernization improvements have not yet been determined. Therefore, performing project-specific air quality modeling for each individual component would be speculative. However, several other SAFCA projects with similar improvement components (e.g., levee construction, cut/fill operations, levee improvements) have been modeled and evaluated under separate CEQA and NEPA compliance documents in the past with project-specific information. As shown in Tables 4.13-1 and 4.13-2 of the NLIP Phase 3 Landside Improvements Project EIS/EIR, Table 3.8-2 of the NLIP Landside Improvements SEIR, and Tables 4.11-1 and 4.11-2 of the NLIP Phase 4a Landside Improvements Project EIS/EIR, temporary and short-term construction-related emissions associated with similar activities would generate daily ozone precursor and PM10 emissions that exceed SMAQMD thresholds of significance. In addition, the daily emission levels in these previous examples, if occurring throughout the year, would result in emissions levels that also exceed YSAQMD thresholds of significance (i.e., 10 tons per year of ROG and NOx and 80 pounds per day of PM10). Thus, considering that the proposed Lower Sacramento River Erosion Control, Yolo-Sacramento Bypass System Improvements, and Levee Modernization improvements would be similar in nature to the aforementioned projects, it is anticipated that temporary and short-term construction-related emissions would exceed the applicable thresholds of significance (e.g., SMAQMD and YSAQMD). 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 potentially significant. Mitigation Measure AIR-1, described below, has been identified to address this impact.

**Impact AIR-2**

Long-Term Changes in Emissions of ROG, NOx, and PM10. Long-term (i.e., operational) criteria air pollutant emissions associated with implementation of the program components 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 program components to regional concentrations of ROG, NOx, 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 estimated to be less than 10 trips per year to any given portion of the levee. Hence, 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, or commercial or other land uses that would generate a substantial number of vehicle trips. Therefore, following construction of the Lower Sacramento River Erosion Control, Yolo-Sacramento Bypass System Improvements, and Levee Modernization improvements, the proposed program would not generate long-term air quality emissions that would exceed any applicable thresholds of significance. This impact would be less-than-significant.
**Impact AIR-3**  Exposure of Sensitive Receptors to Toxic Air Emissions. Some of the program components could expose sensitive receptors to substantial levels of TACs. This impact would be potentially significant.

Construction of the program components would result in temporary and short-term diesel exhaust emissions from on-site heavy duty equipment. Particulate exhaust emissions from diesel-fueled engines (diesel PM) were identified as a TAC by the ARB in 1998. Construction of funded facilities would result in the generation of diesel PM emissions from the use of off-road diesel equipment required for site grading and excavation, earthmoving, 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., whether potential exposure to TAC emission levels 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 30-year exposure period (Salinas, pers. comm., 2004).

All construction activities associated with the proposed program would be temporary and short-term in nature and likely would be a small fraction of the 30-year exposure period required for health risk assessments. Furthermore, construction of the majority of the program components would occur in rural areas where sensitive receptors would be more than 500 feet from construction areas. However, some activities, such as the Rio Vista flood wall construction, would likely occur proximate to (i.e., within 500 feet of) sensitive receptors.

As discussed above, the exact construction activities that would affect TAC emissions, including construction equipment to be used, hours of operation per day, cut/fill volumes, and material delivery trucks have not yet been determined at the time of this analysis and would be considered speculative. Therefore, because some activities could occur proximate to sensitive receptors, and the exact nature of construction activities is not known, it is possible that construction activities could exposure sensitive receptors to substantial TAC pollutant concentrations that exceed the applicable SMAQMD and YSAQMD thresholds of significance. This impact would be potentially significant. Mitigation Measure AIR-2, described below, has been identified to address this impact.

### 4.11.4 Mitigation Measures

No mitigation is required for Impact AIR-2 (long-term emissions). Mitigation is identified below for Impact AIR-1 (construction emissions) and Impact AIR-3 (toxic air contaminants).

**Mitigation Measure AIR-1: Implement Measures and Guidelines of the Applicable Air District(s) to Reduce Construction-Generated Emissions of Air Pollutants** (for Impact AIR-1, Generation of Temporary and Short-Term Emissions of ROG, NOX, PM\(_{10}\), and PM\(_{2.5}\) during Construction).

The agency(ies) implementing program components and their primary contractor(s) for engineering design and construction shall ensure that the following measures are implemented to reduce emissions of ROG, NO\(_X\), PM\(_{10}\), and PM\(_{2.5}\) 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 components 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. At the time of this analysis, all projects occurring within Sacramento County would be required to implement SMAQMD Basic Construction Emission Control Practices as well as comply with SMAQMD Rule 401 (Ringelmann Chart/Opacity), Rule 402 (Nuisance), and Rule 403 (Nuisance) among others. In Yolo and Solano Counties, future project components would be required to comply with YSAQMD’s Rule 2.5 (Nuisance) to minimize fugitive dust emissions.

a) Based on the result of future project-level CEQA analysis and air quality modeling, if construction emissions within SMAQMD’s jurisdiction are determined to exceed the SMAQMD thresholds of significance with implementation of SMAQMD Basic Construction Emission Control Practices, additional on-site mitigation
measures shall be implemented to further reduce construction emissions. These measures include, but are not limited to:

1. SMAQMD Enhanced Exhaust Control Practices.

2. SMAQMD Enhanced Fugitive PM Dust Control Practices.

b) Based on the result of future project-level CEQA analysis and air quality modeling, if construction emissions within SMAQMD’s jurisdiction are determined to exceed the SMAQMD thresholds of significance, the project applicant shall pay SMAQMD an off-site mitigation fee to reduce impacts to a less-than-significant level. 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 CEQA document is prepared. The following SMAQMD-prescribed steps shall be taken in the case that on-site mitigation is unable to reduce emissions to a less-than-significant level.

1. The project applicant(s) shall pay into SMAQMD’s off-site construction mitigation fund to further mitigate construction-generated emissions of NOX that exceed SMAQMD’s daily emission threshold of 85 lb/day. The calculation of daily NOX emissions shall be based on the cost to reduce 1 ton of NOX at the time the document is prepared (currently, $18,030 per ton). 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 NOX 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 project wide fleet-average 20 percent NOX 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.

**Timing:** Prior to, during, and after construction activities.

**Responsibility:** The agency(ies) implementing the program component.
Mitigation Measure AIR-2: Conduct a Health Risk Assessment (HRA) If a Potential Health Risk Exists, and Develop and Implement Mitigation in Coordination with the Applicable Air District(s) (for Impact AIR-3, Exposure of Sensitive Receptors to Toxic Air Emissions).

The agency(ies) implementing program components shall ensure that the following measures are implemented to reduce the potential for exposure of sensitive receptors to TACs.

Future project-level CEQA analysis shall include analysis to determine whether a potential impact exists associated with construction-related emissions of TAC. This analysis shall be conducted in accordance with the standards of the air district which has jurisdiction over the program component. If a potential health risk exists, an HRA shall be conducted to determine the risk exposure level at nearby receptors. The HRA should incorporate the applicable on-site emission reduction measures in Mitigation Measure AIR-1. Where sensitive receptors may be exposed to unacceptable levels of TACs, additional 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, and prohibiting heavy trucks from idling for extended periods. Applicable measures shall be included in project plans and construction specifications.

**Timing:** Prior to, during, and after construction activities.

**Responsibility:** The agency(ies) implementing the program component.

### 4.11.5 Conclusion

Implementing Mitigation Measure AIR-1 would reduce potentially significant Impact AIR-1 (generation of temporary and short-term emissions of ROG, NOX, and PM10 during construction) to a less-than-significant level through on-site mitigation or payment of an off-site mitigation fee to an established program. Impact AIR-2 (long-term changes in emissions of ROG, NOX, and PM10) would be less-than-significant. Implementing Mitigation Measure AIR-2 would reduce Impact AIR-3 (exposure of sensitive receptors to toxic air emissions) to a less-than-significant level through requirements for future project-level analysis and Health Risk Assessments if warranted by project-specific emissions data.
4.12 NOISE

This section describes regulations that apply to noise, noise-sensitive land uses and existing noise sources in the program area, and potential noise impacts on the human environment from construction and operation of program components. 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, and community centers. 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.

4.12.1 REGULATORY SETTING

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.

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.

REGIONAL AND LOCAL

Construction of the improvements in SAFCA’s proposed program could affect noise-sensitive land uses in the following jurisdictions:

- Counties: Sacramento, Solano, and Yolo.
- Cities: Sacramento and Rio Vista.

Most jurisdictions have adopted standards for both transportation and nontransportation noise sources in the noise elements of their general plans. Presented below is a summary of the applicable noise standards for the funded facilities.

Most of the jurisdictions where construction vehicle traffic would occur have adopted local ordinances regulating construction noise levels within specified hours in order to minimize impacts on sensitive land uses. These local standards have been established for both nontransportation and transportation noise sources. Table 4.12-1 lists the nontransportation noise standards in the relevant jurisdictions, and Table 4.12-2 lists the transportation noise standards in those jurisdictions where program components may involve trucks hauling materials.
### Table 4.12-1. Local Government Nontransportation Noise Standards (dBA)

<table>
<thead>
<tr>
<th>Noise Element Jurisdiction/ Land Use Category</th>
<th>Maximum Allowable Exterior Noise Levels</th>
<th>Daytime 7 a.m. – 10 p.m.</th>
<th>Nighttime 10 p.m. – 7 a.m.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L50</td>
<td>Lmax</td>
<td>L50</td>
</tr>
<tr>
<td>Sacramento County  Residential Areas</td>
<td>50</td>
<td>70</td>
<td>45</td>
</tr>
<tr>
<td>City of Sacramento  Residential Areas</td>
<td>60</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>Solano County  Residential Areas</td>
<td>60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>City of Rio Vista  Residential Areas</td>
<td>Rural 50</td>
<td>Suburban 55</td>
<td>Urban 60</td>
</tr>
</tbody>
</table>

Section 6.68.090(e), Exemptions, exempts from the noise ordinance standards those noise sources due to the construction, repair, remodeling, demolition, paving, or grading of any real property between the hours of 6 a.m. and 8 p.m. on weekdays, and between 7 a.m. and 8 p.m. on Saturdays and Sundays.

Section 8.68.080(d), Exemptions, exempts from the City of Sacramento noise regulations noise sources due to the erection (including excavation), demolition, alteration or repair of any building or structure, 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. However, the operation of an internal combustion engine is only exempt if equipped with suitable exhaust and intake silencers which are in good working order. The director of building inspections, may permit work to be done during the hours not exempt in the case of urgent necessity and in the interest of public health and welfare for a period not to exceed three days.

Solano County does not have a noise ordinance. The Solano County General Plan establishes acceptable noise levels for various land uses.

Construction noise is exempt from the City’s General Plan noise standards (Policy 11.15.B). The City’s General Plan limits construction activity to the period between 7 a.m. and 5 p.m. unless an exemption is obtained from the City to cover special circumstances (Policy 11.15.C). All internal combustion engines used in conjunction with construction must be muffled according to the equipment manufacturer’s requirement (Policy 11.15.D).

Notes: dBA = A-weighted decibel; Lmax = Maximum Noise Level; Ldn = Day-Night Noise Level; CNEL = Community Noise Equivalent Level
Yolo County has not established nontransportation noise standards, but proposes use of noise control mechanisms to maintain exterior levels of 60 dBA or less for new discretionary development.
Sources: City of Sacramento General Plan Environmental Constraints Element (2015)
County of Sacramento General Plan Noise Element (December 1993, amended 2011)
County of Yolo 2030 Countywide General Plan Health and Safety Element (2009)
County of Solano General Plan Health and Safety Element (2015)

Construction noise may affect several jurisdictions (Cities of Sacramento and Rio Vista and unincorporated areas of Sacramento, Solano, and Yolo Counties). These jurisdictions either have nontransportation 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. All of the jurisdictions have established maximum allowable exterior 1-hour noise limits for both daytime and nighttime hours.

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 Ldn/CNEL noise limit of 60 to 65 dBA for residential land uses.
Table 4.12-2. Local Government Transportation Noise Standards (dBA)

<table>
<thead>
<tr>
<th>Noise Element Jurisdiction/Land Use Category</th>
<th>Maximum Allowable Noise Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Sacramento, City of Rio Vista</td>
<td></td>
</tr>
<tr>
<td>Residential areas</td>
<td>Exterior - Ldn/CNEL(^1)</td>
</tr>
<tr>
<td></td>
<td>60</td>
</tr>
<tr>
<td>Solano County, Sacramento County</td>
<td></td>
</tr>
<tr>
<td>Residential areas</td>
<td>65</td>
</tr>
</tbody>
</table>

Notes: dBA = A-weighted decibel; Ldn = Day-Night Noise Level; CNEL = Community Noise Equivalent Level
Yolo County has not established transportation noise standards.
Sources:
City of Sacramento General Plan Environmental Constraints Element (2015)
County of Sacramento General Plan Noise Element (December 1993, amended 2011)
County of Yolo 2030 Countywide General Plan Health and Safety Element (2009)
County of Solano General Plan Health and Safety Element (2015)

4.12.2 ENVIRONMENTAL SETTING

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 [Caltrans] 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 (Caltrans 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 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.
**Exhibit 4.12-1. Typical Noise Levels**

<table>
<thead>
<tr>
<th>EXAMPLES</th>
<th>DECIBELS (dB)*</th>
<th>SUBJECTIVE EVALUATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Near jet engine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Threshold of pain</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rock band</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accelerating motorcycle a few feet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Noisy urban street/heavy city traffic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gas lawn mower at 3 feet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Garbage disposal at 3 feet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vacuum cleaner at 3 feet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Busy restaurant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Near freeway auto traffic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Window air conditioner at 3 feet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business office</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soft whisper at 5 feet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quiet urban nighttime</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quiet rural nighttime</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human breathing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Threshold of audibility</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* dB are "average" values as measured on the A-scale of a sound-level meter.


Source GEI Consultants, Inc. 2015
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 (Caltrans 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 (Caltrans 1998, Lipscomb and Taylor 1978).

- **L\text{max} (Maximum Noise Level):** The maximum instantaneous noise level during a specific period of time. The \( L_{\text{max}} \) may also be referred to as the “peak (noise) level.”

- **L\text{min} (Minimum Noise Level):** The minimum instantaneous noise level during a specific period of time.

- **L\text{X} (Statistical Descriptor):** The noise level exceeded X percent of a specific period of time.

- **L\text{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 \( L_{\text{eq}} \).

- **L\text{dn} (Day-Night Noise Level):** The 24-hour \( L_{\text{eq}} \) with a 10-dBA “penalty” for the noise-sensitive hours between 10:00 p.m. and 7:00 a.m. The \( L_{\text{dn}} \) 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 \( L_{\text{dn}} \) 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 \( L_{\text{dn}} \).

**EXISTING NOISE CONDITIONS AND NOISE SENSITIVE LAND USES IN THE PROGRAM AREA**

**Sacramento and Yolo Bypass Area**

Existing noise sources in the area include traffic, agricultural activities, aircraft flyovers, railroad operations, machinery and activities associated with commercial and industrial uses. The most substantial roadway traffic source within the area is vehicle traffic along Interstate 5 (I-5). Smaller roadways and stationary sources have a localized influence on the noise environment.

**Sacramento River Area**

Existing noise sources along the Sacramento River East Levee include traffic on area roadways and highways. The most substantial roadway traffic sources within the area arise from vehicle traffic along I-5 and U.S. Highway 50. Other noise sources in the area include aircraft flyovers, railroad operations, and noise generated from commercial and residential land uses. Additionally, because the Sacramento River provides numerous recreational opportunities, noise levels are typically high along these river channels in the warmer months.

**Rio Vista Area**

Vehicle traffic is the primary noise sources in the Rio Vista area. The major roadways in the area are State Route (SR) 12, SR 84, and SR 160. Other noise sources in the area include aircraft flyovers, railroad operations, and noise generated from commercial and residential land uses.
4.12.3 **ENVIRONMENTAL IMPACTS**

**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 program 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.

In addition, a program component 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.

None of the funded facilities would have a long-term or permanent effect (i.e., following the end of construction) on noise levels at sensitive receptors, nor would the funded facilities expose people to airport noise. Therefore, this analysis concentrates on construction-related noise effects.

**IMPACT ANALYSIS**

<table>
<thead>
<tr>
<th>Impact</th>
<th>Possible Exposure to Temporary and Short-Term Generation of Short-Term Construction Noise.</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOI-1</td>
<td>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 potentially significant.</td>
</tr>
</tbody>
</table>

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 construction sites for individual program components. 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 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. 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

<table>
<thead>
<tr>
<th>Type of Equipment</th>
<th>Noise Level in dBA at 50 feet&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Without Feasible Noise Control</th>
<th>With Feasible Noise Control&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pile Driver</td>
<td>101</td>
<td>95</td>
<td></td>
</tr>
<tr>
<td>Dozer or Tractor</td>
<td>80</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>Excavator</td>
<td>88</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>Scraper</td>
<td>88</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>Front-end Loader</td>
<td>79</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>Backhoe</td>
<td>85</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>Grader</td>
<td>85</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>Crane</td>
<td>83</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>Truck</td>
<td>91</td>
<td>75</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**

<sup>a</sup> Estimates correspond to a distance of 50 feet from the noisiest piece of equipment and 200 feet from the other equipment.

<sup>b</sup> Feasible noise control includes the use of intake mufflers, exhaust mufflers, and engine shrouds in accordance with manufacturer’s specifications. Source: EPA 1971

Noise-sensitive land uses (in this case, primarily residential uses) are located throughout the program area, sometimes within 50–100 feet of river/stream channels, levee areas, and other sites where construction would occur.

In most cases, construction noise would be temporary and short term, and impacts would generally be less-than-significant. However, sustained construction noise could result in significant adverse impacts on residents, recreationists, and other noise-sensitive groups, depending on where individual program components are constructed and their proximity to noise-sensitive land uses. Additionally, if construction activities result in noise levels that exceed the applicable standards of local jurisdictions at nearby sensitive receptors, noise impacts would be considered significant. If construction activities were to occur outside the hours exempted by the various jurisdictions (see Table 4.12-1), noise impacts also would be considered significant.

The following types of potentially significant adverse noise impacts could be associated with the proposed program:

- 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 vehicular traffic associated with the construction labor force.

Because construction of the proposed program components could result in noise levels that exceed the applicable standards, resulting in increased annoyance to occupants of residential dwellings and other sensitive receptors, this temporary and short-term construction impact would be potentially significant. Mitigation Measure NOI-1, described below, has been identified to address this impact.

**Impact NOI-2** Possible Exposure of Sensitive Receptors to Temporary and Short-Term Generation of Excessive Groundborne Vibration or Groundborne Noise. Construction activities associated with the proposed flood control improvements could have the potential to result in generation of temporary and short-term 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 impact would be potentially significant.
Construction activities have the potential to result in varying degrees of temporary and short-term 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>
<thead>
<tr>
<th>Table 4.12-4. Typical Construction Equipment Vibration Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Equipment</strong></td>
</tr>
<tr>
<td>-------------------------------------</td>
</tr>
<tr>
<td>Pile driver (impact)</td>
</tr>
<tr>
<td>Upper range</td>
</tr>
<tr>
<td>Typical</td>
</tr>
<tr>
<td>Pile driver (sonic)</td>
</tr>
<tr>
<td>Upper range</td>
</tr>
<tr>
<td>Typical</td>
</tr>
<tr>
<td>Large bulldozer</td>
</tr>
<tr>
<td>Trucks</td>
</tr>
<tr>
<td>Jackhammer</td>
</tr>
<tr>
<td>Small bulldozer</td>
</tr>
</tbody>
</table>

Notes:
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 (FTA) 2006

As discussed above, on-site construction equipment for levee improvements would include bulldozers, graders, tractors, loaders, backhoes, cranes, forklifts, pavers, rollers, trucks, pile drivers, jackhammers, and other miscellaneous construction equipment. According to 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 [μin/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, temporary, short-term 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 annoyance for residential uses (i.e., annoyance) at vibration-sensitive land uses. As a result, this temporary and short-term impact would be potentially significant. Mitigation Measure NOI-2, described below, has been identified to address this impact.

### 4.12.4 Mitigation Measures

Mitigation is described below for Impact NOI-1 (temporary and short-term construction noise), and Impact NOI-2 (temporary and short-term exposure to vibration).
Mitigation Measure NOI-1: Implement Noise-Reduction Measures to Reduce Construction Noise Effects (for Impact NOI-1, Possible Generation of Temporary and Short-Term Construction Noise).

The agency(ies) 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 (funded facility) that are consistent with the noise-reduction requirements of the project depending on the applicable local noise ordinance(s), 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.

Timing: Prior to and during construction activities.

Responsibility: The agency(ies) implementing the program component.

Mitigation Measure NOI-2: Implement Measures to Avoid Construction-Related Vibration Effects (for Impact NOI-2, Possible Temporary and Short-term Exposure of Sensitive Receptors to Excessive Groundborne Vibration or Noise).

The agency(ies) 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 (funded facility) 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, video, and a level survey of the ground floor of structures. This documentation shall be reviewed with the individual owners prior to any construction activities. Affected property owners shall be notified at least 48 hours prior to the visual inspections. Post-construction monitoring of structures shall be performed to identify (and repair, if necessary) all 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.

**Timing:** Prior to and during construction activities.

**Responsibility:** The agency(ies) implementing the program component.

### 4.12.5 Conclusions

Mitigation Measure NOI-2 would reduce temporary and short-term construction source vibration levels to a less-than-significant level. Although implementing Mitigation Measure NOI-1 would reduce potential construction-related noise impacts, the timing and site-specific conditions for the different program components at the time of their implementation are currently unknown; therefore, the feasibility of implementing these measures for all individual program components cannot be assured. In addition, the schedule of most of the proposed program components 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, therefore, this impact may remain **significant and unavoidable.**
4.13 RECREATION

This section characterizes existing parks and recreation facilities in the program area and describes the extent to which these facilities would be affected by implementation of the proposed program.

4.13.1 REGULATORY SETTING

FEDERAL

No Federal plans, policies, regulations, or laws related to recreation resources are relevant to this analysis.

STATE

No State plans, policies, regulations, or laws related to recreation resources are relevant to this analysis.

REGIONAL AND LOCAL

Sacramento River Parkway Plan

The Sacramento River Parkway Plan (1997) was adopted by the City of Sacramento on October 21, 1997. The Sacramento River Parkway Plan is a 20-year policy guide for habitat preservation and restoration and recreational development for lands adjacent to the Sacramento River in South Natomas, Downtown Sacramento, Land Park, the Pocket area, and Freeport. The Sacramento River Parkway is envisioned as a major recreational and public access resource, linking to the American River Parkway.

The following policies from the Sacramento River Parkway Plan (1997) regarding recreation resources apply to the proposed project.

► **Policy G5:** The Parkway is primarily a recreational, open space, educational, and water-oriented resource.

► **Policy R4:** All recreational development including trails, signs, structures, and fences shall be constructed to prevent erosion, protect the structural integrity of the levee, and blend harmoniously with the surrounding landscape.

2010 Sacramento City/County Bikeway Master Plan

The 2010 Sacramento City/County Bikeway Master Plan (Bikeway Plan) (City of Sacramento 2011) was adopted in 1993 by the County and in 1995 by the City and was last updated in March 2011. The Bikeway Plan accounts for all of Sacramento County, consisting of approximately 997 square miles and approximately 3,887 miles of public roads. The Bikeway Plan is an effort to coordinate and develop a bikeway system that will serve the recreational and transportation needs of the public. The following objectives are identified in the Bikeway Plan.

► **Coordination Objective:** Develop and maintain a coordinated approach by the City/County and other agencies to implement the plan as funding becomes available or as development occurs.

► **Safety and Security Objective:** Achieve the highest possible level of safety and security for cyclists.

► **Design Objective:** Provide adequate design consideration for bicycle facilities in all development plans and programs.

► **Maintenance Objective:** Develop a comprehensive bikeway maintenance program.
Aesthetics Objective: Develop a bikeway system which incorporates aesthetics and historical characteristics of the Sacramento area.

City of Sacramento Parks and Recreation Master Plan 2005–2010

The City Parks and Recreation Department prepared the City of Sacramento Parks and Recreation Master Plan 2005-2010 Technical Update, which was adopted by the City Council on December 7, 2004, and was last updated on April 21, 2009. The following policies from the Parks and Recreation Master Plan regarding recreation apply to the proposed program.

- **Policy 10.1**: Enhance, restore, and protect existing natural resources including rivers, lakes/ponds, creeks, native vegetation, wildlife corridors, and sensitive habitats; ensure compatible park and recreation uses adjacent to natural resources.

- **Policy 10.8**: Participate in partnerships for the planning, protection, development, and enhancement of the American River, Sacramento River, and other water corridors and open space areas.

- **Policy 11.5**: Support development of integrated management approaches and plans for water corridors that meet multiple goals such as natural resource protection, sustainability, security, flood control, and maintenance.

- **Policy 12.11**: Develop parks, trails, and other recreational amenities in a manner that is consistent with flood protection goals.

- **Policy 18.6**: Ensure trails on levees are consistent with flood protection goals.

Sacramento County General Plan

No Sacramento County General Plan policies related to recreation resources are relevant to this analysis.

City of Sacramento General Plan

No City of Sacramento General Plan policies related to recreation resources are relevant to this analysis.

Solano County General Plan

No Solano County General Plan policies related to recreation resources are relevant to this analysis.

City of Rio Vista

No City of Rio Vista General Plan policies related to recreation resources are relevant to this analysis.

Yolo County General Plan

No Yolo County General Plan policies related to recreation resources are relevant to this analysis.

4.13.2 ENVIRONMENTAL SETTING

City of Sacramento

Sacramento River Parkway

In the program area, the Sacramento River Parkway runs along the entire length of the Sacramento River East Levee. Some officially designated segments are developed with bike path facilities to accommodate pedestrians.
and bicyclists, and provide access to the Sacramento River. Where trail segments have not been officially
designated or constructed, those portions of the levee crown which are open to public access are informally used
as a pedestrian/bicycle path in the program area.

The Sacramento River Parkway currently has gaps in various segments: South Natomas (south of Garden
Highway), Old Sacramento (I Street to Capitol Mall), Broadway to Miller Park, the Little Pocket, Greenhaven/
Middle Pocket, and a connection from the City’s southern tip to Freeport Boulevard. In these areas, the
underlying fee ownership of the levee belongs to the property owner and the State holds a flood control easement
over the levee and extending 10 feet from the landside toe for levee operation and maintenance. In such areas,
there are several fences running across the levee with locked gates to prevent access. (City of Sacramento 2014.)

Bicycle Facilities

Bicycle trails and paths are located throughout the program area. The approximately 4.8-mile Pocket Canal
Parkway bike trail is a Class I (off-street) trail that begins at the southern end of Pocket Road. The bike trail
travels north and adjacent to the Pocket Canal where it intersects with Seymour Park (also known as the Ellsworth
C. Zacharias Park) at Princeville Circle.

In addition to the Sacramento River Parkway bike path and Pocket Canal Parkway bike trail mentioned above,
designated Class II (on-street) and Class III (on-street) (i.e., on street rights-of-way recommended for bicycle
travel that also provides for shared-use with motor vehicles or pedestrian traffic) bicycle facilities currently exist
throughout the Little Pocket and Pocket residential areas.

City of Sacramento Parks and Recreation Facilities

As shown on Table 4.13-1, the Sacramento River Parkway provides access to Chicory Bend Park, Garcia Bend
Park, Miller Park, North Point Way River Access, Seymour Park (also known as the Ellsworth C. Zacharias
Park), and Shore Park in the program area (City of Sacramento Department of Parks and Recreation 2009).

<table>
<thead>
<tr>
<th>Facility</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chicory Bend Park 797 Seamas Avenue</td>
<td>10.5-acre nature area; there are no facilities or other amenities.</td>
</tr>
<tr>
<td>Garcia Bend Park 7654 Pocket Road</td>
<td>18.9-acre park with a boat launch, four group picnic areas, three soccer fields, tennis courts, and playgrounds.</td>
</tr>
<tr>
<td>Miller Regional Park 2710 Ramp Way</td>
<td>40.3-acre park with group picnic areas and provides access to the Sacramento River.</td>
</tr>
<tr>
<td>North Point Way River Access</td>
<td>1.2-acre park that provides access to the Sacramento River; there are no facilities or other amenities.</td>
</tr>
<tr>
<td>Seymour Park (also known as the Ellsworth C. Zacharias Park) 845 Florin Road</td>
<td>57.5-acre greenbelt park with lighted pathways and playground equipment; the park extends from Clipper Way and Riverside Boulevard south to Princeville Circle. Connects to the Pocket Canal Parkway.</td>
</tr>
<tr>
<td>Shore Park 7996 Pocket Road</td>
<td>2.5-acre park with one picnic area and provides access to the Sacramento River Parkway and Sacramento River.</td>
</tr>
</tbody>
</table>

Source: City of Sacramento Department of Parks and Recreation 2009

Excursion Train

California State Parks operates the Sacramento Southern Railroad Excursion Train along the Sacramento River
East Levee crown. The train departs from the Central Pacific Railroad Freight Depot in Old Sacramento (Front
Street, between J and K Streets) and travels about 3 miles along the levee crown to a turnaround location at Land Park where it then returns to the freight depot.

The Excursion Train runs Saturdays and Sundays from April through September, the Spookomotive Train runs throughout October, the Veteran’s Day Train runs in November, and the Polar Express Train runs throughout December. The excursion train operates 53 days annually, with a total of 534 round trips, and attracts nearly 80,000 riders. (California State Railroad Museum 2014.)

**Sacramento Bypass**

The approximately 360-acre Sacramento Bypass Wildlife Area is an important cover and feeding area for wildlife during late fall, winter, and early spring. Vegetation varies throughout the area from mature cottonwood trees, willows and valley oaks in some locations to a sparsely-covered sandy soil area on the eastern end. Game birds, raptors, songbirds, and native mammals are present. The adjacent Tule Canal has white sturgeon, white catfish, and black crappie while nearby borrow pits have largemouth bass, bluegill, and white catfish. Recreational activities include fishing; wildlife viewing; bird watching; and hunting for waterfowl (when the area is flooded), ring-necked pheasant, and mourning dove. The wildlife area is administered by CDFW. (CDFW 2015a.)

Access is gained at numerous points from County Roads 126 or 127. There is a gate across County Road 127 and vehicles are not allowed on the levee road. County Road 126 is paved for 1 mile before encountering a gate, restricting further vehicle access along the levee. Access is limited to foot traffic within the Sacramento Bypass Wildlife Refuge and along levee roads. (CDFW 2015a.)

**Sacramento River Train**

A portion of the Sierra Northern Railway railroad tracks are located on top of the Sacramento Weir, on the west side of Old River Road. The Sierra Northern Railway operates the Sacramento River Train, which offers dinner excursion trips along the 16-mile “Woodland Branch Line” between Woodland and West Sacramento. The excursion ride begins at North Harbor Boulevard in West Sacramento, immediately north of the Interstate 80 bridge overcrossing (across the river from Sand Cove Park), and travels north at slow speeds along the Sacramento River, through the Sacramento Bypass and across the Sacramento Weir, then through the Yolo Bypass north to the Fremont bridge (north of Interstate 5), where it turns west towards Woodland. (Sierra Northern 2015.)

**Yolo Bypass**

The approximately 16,600-acre Yolo Bypass Wildlife Area is owned by the State of California and operated by the CDFW. The Yolo Bypass Wildlife Area is located in southern Yolo County, approximately 3 miles east of the City of Davis, and is accessed by County Road 32A. Because of its location within the Pacific Flyway, the Yolo Bypass Wildlife Area offers unique opportunities for birdwatching. Hunting is permitted between September 1 and January 31, and game species include waterfowl (when the area is flooded), ring necked pheasant, and mourning dove. (CDFW 2015b.)

**City of Rio Vista**

In the program area, the City of Rio Vista the Main Street Public Dock and Boat Launch is located east of Main Street at the end of Montezuma Street and provides boat launching and fishing.

The City’s Waterfront Promenade is located east of Main Street and adjacent to City Hall. The Waterfront Promenade accommodates pedestrians and bicyclists and provides fishing dock, a fish cleaning station, picnic tables, BBQs, restrooms, and drinking fountains (City of Rio Vista 2015).
4.13.3 ENVIRONMENTAL IMPACTS

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 program would have a significant impact on recreation 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; 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:

- substantially restrict or reduce the availability, access, or quality of existing recreational opportunities in the project study area.

The proposed program does not involve any new housing or offices that would generate new residents or workers who would increase the use of existing recreational facilities. Therefore, the proposed program would not affect existing recreational facilities such that substantial physical deterioration of any facilities would occur or be accelerated or result in the construction or expansion of existing recreational facilities. Therefore, these impacts are not evaluated further in this SEIR.

None of the proposed program components includes recreational facilities, or would require the construction or expansion of recreational facilities. Therefore, these impacts are not evaluated further in this SEIR.

Construction of individual program components, such as implementing rock bank protection and launchable rock trenches along the Sacramento River, bypass widening, and constructing of new setback levees and the new floodwall in Rio Vista would not permanently disrupt recreational activities. Therefore, no impacts related to the substantial long-term disruption of the availability, access or quality of any institutionally recognized recreational activities would result from implementation the proposed project. Therefore, these impacts are not evaluated further in this SEIR.

IMPACT ANALYSIS

Impact REC-1 Temporary and Short-term Changes in Recreational Opportunities during Project Construction Activities. Construction of individual program components, such as implementing rock bank protection and launchable rock trenches along the Sacramento River, bypass widening, and constructing of new setback levees and the new floodwall in Rio Vista, could result in temporary and short-term changes in recreational opportunities during project construction activities. This impact could be significant.

Construction of individual program components, such as implementing rock bank protection and launchable rock trenches along the Sacramento River, bypass widening, and constructing of new setback levees and the new floodwall in Rio Vista, could result in temporary and short-term changes in recreational opportunities during project construction activities.
In the program area, the Sacramento River Parkway runs along the entire length of the levee where individual program components are proposed, and developed portions of the Parkway accommodate pedestrians and bicyclists, and provide access to the Sacramento River. Even some portions of the levee crown where trail segments have not been officially designated or constructed are informally used for pedestrian or bicycle recreation.

Individual program components could be adjacent to or in close proximity to City of Sacramento parks and recreational facilities, including Miller Regional Park, Chicory Bend Park Seymour Park (also known as the Ellsworth C. Zacharias Park), and Shore Park. As discussed in the Levee Accreditation EIR and ARCF GRR DEIS/DEIR, Miller Regional Park and Garcia Bend Park may potentially be used as construction staging areas resulting in closure during construction until the staging areas are removed and any necessary park repairs and restoration work is completed (SAFCA 2015:4.16-14; USACE and CVFPP 2015:237). In addition, construction of individual program components could require temporary and short-term closure of the Sacramento Southern Railroad Excursion Train (SAFCA 2015:4.16-14).

For other nearby recreational facilities, the quality of recreational opportunities could potentially be substantially reduced in the project vicinity as a result of noise, dust, traffic, and visual disturbance from construction activities. Construction impacts would be temporary in nature, but the degradation of the quality of recreational experiences is expected to last for up to three construction seasons for individual project components. Recreationalists may use nearby recreational facilities in the vicinity of individual program components that provide similar amenities, such as Bahnfleth Park, Charter Pointe Park, and Renfree Park and boat launch ramps at Discovery Park, Verona, and Elkhorn.

Construction of individual program components associated with the Sacramento Weir and Bypass and Yolo Bypass would have possible temporary and short-term effects on recreational use. During relocation of Yolo County Road 124, lengthening of the Sacramento Weir, excavation of benches along the eastern edge of the Tule Canal, and construction of setback levees, access would be restricted and certain areas would be closed to the public. Activities such as bird watching, fishing, walking, running, and jogging along the Sacramento Bypass levee crown and nearby roads would be restricted. Construction activities could potentially overlap with hunting season in the Sacramento Bypass Wildlife Area and Yolo Bypass Wildlife Area, restricting hunting activities for a limited period of time. In addition, there may be temporary closures and relocation of the Yolo Shortline Railroad that could affect the Sacramento River Train operation (USACE and CVFPP 2015:238).

Construction on the new floodwall to protect portions of the City of Rio Vista south of SR 12 would require temporary closure of the Main Street Public Dock and Boat Launch and the Waterfront Promenade resulting in short-term effects on recreational use (Wood Rodgers 2015:16).

For the reasons described above, project construction activities could result in temporary closure of bicycle trails and recreational facilities, potentially damage recreational facilities, and result in temporary diminishment of recreational experiences at nearby parks during construction. Therefore, this impact could be significant. Mitigation Measures REC-1 and REC-2, described below, have been identified to address this impact.

### 4.13.4 Mitigation Measures

Mitigation is described below for Impact REC-1 (temporary and short-term changes in recreational opportunities).

**Mitigation Measure REC-1**: Prepare and Implement a Bicycle Detour Plan for all Bike Trails and On-Street Bicycle Routes, Provide Construction Period Information on Bicycle Facility Closures, and Coordinate with the City of Sacramento Department of Parks and Recreation and/or the City of Rio Vista Public Works
Department to Allow Repair of Damage to Bicycle Facilities (for Impact REC-1, Possible Temporary and Short-term Changes in Recreational Opportunities during Project Construction Activities).

The agencies implementing program components and their primary contractors for engineering design and construction shall implement the following measures to reduce temporary, short-term construction impacts on bicycle facilities in the program area:

- Prepare a bicycle detour plan for all bike trails, including those located on the Sacramento River Parkway and the City of Rio Vista Waterfront Promenade and on-street bicycle routes in consultation with the City of Sacramento Department of Parks and Recreation and/or the City of Rio Vista Public Works Department at least 10 days before the start of construction activities, as applicable. The detour plan shall include posted signs at major entry points for bicycle trails clearly indicating closure routes, roadway markings to designate temporary bike lanes, information signs to notify motorists to share the road with bicyclists, and a contact number to call for questions or concerns.

- Maintain and implement the detour plan throughout the construction period and during all construction seasons.

- Provide public information through the media and on relevant agency and/or park agency Web site(s) regarding detours and alternative access routes to bicycle facilities affected by construction of individual program components.

- Coordinate with the City of Sacramento Department of Parks and Recreation to make available information to the public regarding closure of bicycle facilities and detours at least 10 days before the start of construction activities

- Continue to provide public information regarding closure of bicycle facilities and detours throughout the construction period.

- Upon completion of levee improvements, coordinate with the City of Sacramento Department of Parks and Recreation for the city to restore access and repair any construction-related damage to bicycle facilities to preproject conditions.

Timing: Prior to, during, and after construction activities.

Responsibility: The agency(ies) implementing the program component.

Mitigation Measure REC-2: Prepare and Implement a Recreation Plan for all Recreation Facilities, Provide Construction Period Information on Recreation Facility Closures, and Repair Damage to Recreational Facilities (for Impact REC-1, Possible Temporary and Short-term Changes in Recreational Opportunities during Project Construction Activities).

The agency(ies) implementing program components and their primary contractors for engineering design and construction shall implement the following measures to reduce temporary, short-term construction impacts on recreation facilities in the program area:

- Prepare a construction-period recreation plan for all affected recreation facilities in consultation with the City of Sacramento Department of Parks and Recreation and/or the City of Rio Vista Public Works Department. The recreation plan shall include posted signs at major entry points for parks and recreation facilities, boat launch ramps at Miller Park and Garcia Bend Park in the City of Sacramento and the Main Street Public Dock and Boat Launch in the City of Rio Vista clearly indicating closures and estimated duration of closures, information signs to notify the public of alternate parks and recreation sites and boat launch ramps, and a contact number to call for questions or concerns. The
agencies implementing program components and their primary contractors for engineering design and construction shall maintain and implement the recreation plan throughout the construction period and during all construction seasons.

- Coordinate with the City of Sacramento Department of Parks and Recreation and/or City of Rio Vista Public Works Department at least 30 days before the start of construction activities to allow for the City of Sacramento and/or City of Rio Vista to relocate activities that occur in affected parks and provide alternate access points to recreation facilities along Sacramento River.

- Provide public information through the media and on the agency(ies) Web site and/or the agency(ies)’ implementing program components Web site(s) regarding parks and recreation facilities and boat launch ramps affected by project construction at least 30 days before the start of construction activities.

- Coordinate with the City of Sacramento Department of Parks and Recreation, City of Rio Vista Public Works Department, and/or California Department of Fish and Wildlife after completion of individual program components for the agencies to restore access and repair any construction-related damage to parks and recreation facilities to preproject conditions.

- Notify and coordinate with the California State Parks at least 30 days before the start of construction activities to allow for possible rerouting or rescheduling of the Excursion Train. Upon completion of individual program components, coordinate with the California State Parks to repair any construction-related damage to preproject conditions.

- Notify and coordinate with Sierra Northern Railway at least 30 days before the start of construction activities to allow for possible rerouting or rescheduling of the Sacramento River Train. Upon completion of individual program components, coordinate with Sierra Northern Railway to repair any construction-related damage to preproject conditions.

**Timing:** Prior to and during construction activities.

**Responsibility:** The agency(ies) implementing the program component.

### 4.13.5 Conclusion

Implementation of Mitigation Measures REC-1 and REC-2 would reduce Impact REC-1 (temporary and short-term changes in recreational opportunities during project construction activities) to a less-than-significant level. Mitigation Measure REC-1 would require preparation and implementation of a bicycle detour plan, providing public information regarding detours and alternative access routes to bicycle facilities, and repairing or reconstructing construction-related damage. Mitigation Measure REC-2 would require preparation and implementation of recreation plans during the construction period and providing public information regarding alternative access routes to public recreational facilities.
4.14 VISUAL RESOURCES

This section addresses visual resources that may be affected by implementation of the proposed program.

4.14.1 REGULATORY SETTING

FEDERAL

No Federal plans, policies, regulations, or laws related to visual resources apply to the proposed program.

STATE

California Scenic Highway Program

The California Department of Transportation (Caltrans) manages the California Scenic Highway Program. The goal of the program is to preserve and protect scenic highway corridors from changes that would affect the aesthetic value of the land adjacent to designated highways. River Road (State Route [SR] 160) is a State-designated scenic highway that runs along the east side of the Sacramento River from the southern City of Sacramento boundary (near the Town of Freeport) south to Contra Costa County (Caltrans 2011).

REGIONAL AND LOCAL

Sacramento County General Plan

Garden Highway (north of the City of Sacramento paralleling the east side of the Sacramento River), and River Road (SR 160) from the Town of Freeport south to Contra Costa County paralleling the east side of the Sacramento River, are both Sacramento County-designated scenic highways (Sacramento County 2011:Circulation Element).

The Sacramento County General Plan of 2005-2030 Circulation Element notes that the Sacramento River is protected within Sacramento County by scenic corridors that extend 500 feet to each side of the river (as measured from the middle of the channel), or by a minimum of a corridor that extends 300 feet from the edge of the river. The Garden Highway scenic corridor extends to the middle of the Sacramento River on the river side and 500 feet on the landward side. Freeways in Sacramento County are protected by scenic corridors that extend 660 feet to each side beyond the right-of-way. (Sacramento County 2011:Circulation Element).

The following objectives and policies from the Sacramento County General Plan of 2005-2030 Circulation Element (Sacramento County 2011) related to visual resources apply to the proposed program.

► **Objective:** To retain designation of the River Road (State Route 160) as an Official State and County Scenic Highway and to preserve and enhance its scenic qualities.

► **Objective:** To take necessary steps to preserve and enhance the scenic qualities of the Garden Highway.

► **Policy CI-55:** Encourage in coordination with the Delta Citizens Municipal Advisory Council, the Department of Water Resources, the State Reclamation Board, and the U.S. Army Corps of Engineers to determine how the present strict requirements for levee stripping and burning can be revised to take into account aesthetic and environmental considerations, and including consideration of enhancement and replanting of levees.

► **Policy CI-56:** Encourage the State Reclamation Board and the U.S. Army Corps of Engineers to riprap on levees no higher than the average annual high water level.
City of Sacramento General Plan

The following policies from the *Sacramento 2035 General Plan* Environmental Resources Element (City of Sacramento 2015) related to visual resources apply to the proposed program.

- **Policy ER 7.1.1: Protect Scenic Views.** The City shall avoid or reduce substantial adverse effects of new development on views from public places to the Sacramento and American Rivers and adjacent greenways, landmarks, and the State Capitol along Capitol Mall.

Solano County General Plan

The following policies from the *Solano County General Plan* Public Health and Safety and Resources Elements (Solano County 2008b) related to visual resources apply to the proposed program.

- **Policy HS.P-24:** Seek an appropriate balance between preventing and fighting fires and retaining the County’s valuable visual and natural resources.
- **Policy RS.P-35:** Protect the unique scenic features of Solano County, particularly hills, ridgelines, wetlands, and water bodies.
- **Policy RS.P-37:** Protect the visual character of designated scenic roadways.

City of Rio Vista General Plan

The following policies from the *City of Rio Vista General Plan 2001* Community Character & Design, Open Space & Recreation, and Resource Conservation & Management Elements (City of Rio Vista Community Development Department 2002) related to visual resources apply to the proposed program.

- **Policy 5.1.C:** The City shall protect key hilltops, valleys, and watercourses from mass grading.
- **Policy 9.1.C:** The City shall enhance the Sacramento River and its waterfront as a scenic resource consistent with water-oriented recreation.
- **Policy 9.3.D:** Land development shall allow sufficient right-of-way along designated trails to ensure that scenic and aesthetic qualities of the corridor are maintained.
- **Policy 9.4.A:** The City shall provide open space protection for areas of natural resource and scenic value, including wetlands, riparian corridors, floodplains, woodlands, and hillsides.
- **Policy 9.4.B:** New development shall be designed and constructed to preserve hillsides, scenic and trail corridors, streams and streamside vegetation, wetlands, wildlife corridors, and any other areas of special ecological significance.
- **Policy 10.5.C:** The City shall require that natural drainage corridors are integrated into new development in such a way that they are accessible to the public and serve as a positive amenity to the community.

Yolo County General Plan

Old River Road, from Yolo County Road 107 (near the Fremont Weir) south to West Sacramento (at the southern end of the Sacramento Weir), is a Yolo County-designated scenic highway (LSA Associates 2009).

The following policies from the *Yolo County 2030 Countywide General Plan* Land Use and Community Character Element (Yolo County 2009) regarding aesthetics apply to the proposed program.
► **Policy CC-1.2:** Preserve and enhance the rural landscape as an important scenic feature of the County.

► **Policy CC-1.12:** Preserve and enhance the scenic quality of the County’s rural roadway system. Prohibit projects and activities that would obscure, detract from, or negatively affect the quality of views from designated scenic roadways or scenic highways.

► **Policy CC-1.15:** The following features shall be protected and preserved along designated scenic roadways and routes, except where there are health and safety concerns:

  * Trees and other natural or unique vegetation
  * Landforms and natural or unique features
  * Views and vistas
  * Historic structures (where feasible), including buildings, bridges and signs

► **Policy CC-1.16:** The following features shall be stringently regulated along designated scenic roadways and routes with the intent of preserving and protecting the scenic qualities of the roadway or route:

  * Signage
  * Architectural design of adjoining structures
  * Construction, repair and maintenance operations
  * Landscaping
  * Litter control
  * Water quality
  * Power poles, towers, above-ground wire lines, wind power and
  * Solar power devices and antennae

► **Policy CC-1.17:** Existing trees and vegetation and natural landforms along scenic roadways and routes shall be retained to the greatest feasible extent. Landscaping shall be required to enhance scenic qualities and/or screen unsightly views and shall emphasize the use of native plants and habitat restoration to the extent possible. Removal of trees, particularly those with scenic and/or historic value, shall be generally prohibited along the roadway or route.

**Recreational Plans**

The **Sacramento River Parkway Plan** (City of Sacramento 1997) (Parkway) is intended to help guide adjacent land uses, provide for recreational activities, and preserve the existing scenic and natural values along the river corridor. The plan contains policies that apply to visual aspects of residential and commercial development within and adjacent to the Parkway as part of the effort to preserve the scenic quality of the Parkway. Although there are no policies that would apply specifically to visual aspects of work associated with the proposed program, the levees and associated vegetation form a part of the visual character of the Parkway, which the Parkway was established (in part) to protect. The Parkway also provides pedestrian and bicycle connectivity to other trail networks and communities in the Sacramento area (see Section 4.2, “Agriculture, Forestry, and Land Use” and Section 4.13, “Recreation” for additional details).

The **Yolo Bypass Wildlife Area Land Management Plan** (California Department of Fish and Game and Yolo Basin Foundation 2008) guides activities within the wildlife area, which encompasses more than 17,000 acres within the Yolo Bypass, primarily south of Interstate 80 (I-80). The wildlife area provides hunting, birdwatching, hiking, as well as educational and other recreational opportunities. The wildlife area is managed by the California Department of Fish and Wildlife (CDFW) for flood control, wildlife and habitat, and recreation and education uses.
4.14.2 ENVIRONMENTAL SETTING

SACRAMENTO/YOLO BYPASS NORTH OF SACRAMENTO (ELKHORN BASIN)

The Sacramento Weir, Sacramento Bypass, and the Elkhorn Basin are all located in Yolo County. The Sacramento Weir is located along the west bank of the Sacramento River approximately 2 miles upstream from the confluence with the American River. The weir is 1,920 feet long and consists of 48 gates that divert Sacramento and American River floodwaters to the west down the approximately 1.75-mile-long Sacramento Bypass to the Yolo Bypass. Each gate has 38 vertical wooden planks (4 inches thick by 1-foot wide by 6-feet-long), hinged at the bottom and retained at the top by a hollow metal beam. Each gate is approximately 40-feet-long, with a concrete abutment that rises several feet above the water level on either side of each gate. The California Highway Patrol (CHP) Academy and CHP Airport are located immediately adjacent to and south of the Sacramento Bypass, but do not have views of bypass itself due the height of the elevated levee on the south side of the bypass. The land north, west, and southwest of the Sacramento Bypass consists of flat agricultural fields. Immediately opposite the Sacramento Bypass and the Sacramento Weir, on the east side of the river, are private residences with boat docks that line the river. These residents have unobstructed views of the Sacramento Weir and the Sacramento Bypass, and therefore work associated with extending the weir and the bypass would be clearly visible. Scattered rural residences are located on the west side of the river between the Sacramento Bypass and Interstate 5 (I-5), in the vicinity of the proposed new setback levees and the proposed Yolo County Road 124 relocation. Garden Highway (a Sacramento County-designated scenic highway) is adjacent to the river on the east side. Motorists traveling on Garden Highway have intermittent views (blocked to some extent by trees and residences) of the river and the bypass and weir. Old River Road, on the west side of the river from the southern end of the Sacramento Weir and the Sacramento Bypass north to the Fremont Weir, is a Yolo County-designated scenic highway. Motorists traveling on the southern end of Old River Road have unobstructed views of the Sacramento Weir, the Sacramento Bypass, and of the Sacramento River. Motorists traveling along the northern portion of Old River Road would also have views of the northern portion of the proposed new setback levee, which would also be clearly visible to motorists traveling on I-5. Boaters and fisherman on the Sacramento River have unobstructed views of the Sacramento Weir and the Sacramento Bypass.

A portion of the Sierra Northern Railway railroad tracks are located on top of the Sacramento Weir, on the west side of Old River Road. The Sierra Northern Railway operates the Sacramento River Train, which offers dinner excursion trips along the approximately 16-mile “Woodland Branch Line” between Woodland and West Sacramento. The excursion ride begins at North Harbor Boulevard in West Sacramento, immediately north of the I-80 bridge overcrossing (across the river from Sand Cove Park), and travels north at slow speeds along the Sacramento River, across the Sacramento Bypass on the Sacramento Weir, then through the Yolo Bypass north to the Fremont Bridge (north of I-5), where it turns west towards Woodland. Work associated with program components in the Elkhorn Basin would be visible to excursion train passengers.

The approximately 360-acre Sacramento Bypass Wildlife Area is an important cover and feeding area for wildlife during late fall, winter, and early spring. Vegetation varies throughout the area from mature cottonwood trees, willows and valley oaks in some locations to a sparsely-covered sandy soil area on the eastern end. Game birds, raptors, songbirds, and native mammals are present. The adjacent Tule Canal has white sturgeon, white catfish, and black crappie while nearby borrow pits have largemouth bass, bluegill, and white catfish. Recreational activities include fishing; wildlife viewing; birdwatching; and hunting for waterfowl (when the area is flooded), ring-necked pheasant, and mourning dove. The wildlife area is administered by CDFW. During the summer months, vegetation is dry and brown (with the exception of scattered trees), and the land is flat, with no water. However, during the winter and spring months, views consist of water and scattered trees within the bypass, green riparian vegetation, tall trees along the Sacramento River to the east, and the surrounding flat agricultural lands consisting of row crops. The Sacramento Weir is clearly visible on the east side of the Sacramento Bypass.

The Yolo Bypass begins at the Fremont Weir, which is approximately 1.7 miles southeast of Verona, and runs south for approximately 37 miles before rejoining the Sacramento River above Rio Vista. Scattered rural residences are located in the vicinity of the bypass. The only large area of urban development near the bypass is
on the western edge of West Sacramento on both sides of I-80; this development consists of industrial and commercial land uses in three distinct areas; along Enterprise Drive south of I-80, along West Capitol Avenue, north of I-80, and along Riverside Parkway west of I-80 at Reed Avenue. Other than these urbanized areas in West Sacramento, the land within and adjacent to the northern Yolo Bypass consists of expansive views of rural agricultural land interspersed with occasional tall trees and stands of riparian vegetation.

I-80 and I-5 cross over the northern Yolo Bypass on elevated bridges in an east-west direction, affording motorists unlimited views of the rural agricultural land within the bypass to the north and south. Several smaller local roadways travel into the Yolo Bypass throughout its length.

The Yolo Bypass Wildlife Area encompasses more than 17,000 acres within the bypass southwest of West Sacramento; this area provides hunting, hiking, wildlife viewing, and other recreational and educational opportunities. Because of its location within the Pacific Flyway, the Yolo Bypass Wildlife Area offers unique opportunities for birdwatching. The land within the wildlife area consists of flat agricultural fields interspersed with tall trees and stands of riparian vegetation. The wildlife area is managed primarily for flood control and wildlife habitat, in addition to recreational and educational uses. Motorists traveling on I-80 over the Yolo Causeway have expansive scenic views of the wildlife area to the south, and several small local roads provide access into the wildlife area itself. The downtown Sacramento City skyline is a prominent feature from many vantage points within this area. The Sacramento Bypass is barely visible in the background to motorists traveling eastbound on I-80 over the Yolo Causeway; views are generally blocked by intervening vegetation and elevated railroad tracks to the north/northeast. Vegetation at the western end of the Sacramento Bypass and along the adjacent Tule Canal is visible in the background (approximately 1 mile) from the northeastern corner of the Causeway Unit of the Yolo Bypass Wildlife Area.

**SACRAMENTO RIVER EAST LEVEE**

The Sacramento River flows through the core of the Sacramento urban 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 Sacramento-San Joaquin Delta (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 northern portion of the Sacramento River East Levee (near Broadway and the Pioneer Bridge) consists of industrial development, including large human made structures (such as tall white fuel storage tanks), buildings, trains, and other elements associated with industrial development. However, Miller Park is also in the northern portion of the Sacramento River East Levee. A paved pedestrian/bicycle path circles around the marina and provides scenic views of the Sacramento River on the west side. The Sacramento River itself is accessible throughout the west side of the park. Miller Park has been planted with turf grass and contains numerous mature shade trees. Picnic tables are located on the west side of the park near the river. Miller Park is well landscaped and maintained, and it provides a sense of visual relief from the intensive nature of surrounding urban and industrial development. If erosion control work were to occur along the river in this area, it would be clearly visible to recreationists at Miller Park as well as boaters and fisherman on the Sacramento River.

The Sacramento River Parkway begins at the I-80 overcrossing in South Natomas, at Sand Cove Park. The southern end of the Sacramento Weir and the Sacramento Bypass are located approximately 0.5-mile northwest of Sand Cove Park. However, due to intervening vegetation and the westerly bend in the Sacramento River just north of the park, the weir and bypass are not visible to recreationists at the park.

The Sacramento Southern Railroad Excursion Train departs from the Central Pacific Railroad Freight Depot in Old Sacramento (on Front Street, between J and K Streets) and travels about 3 miles along the Sacramento River East Levee crown to a turnaround location at Land Park where it then returns to the freight depot. Views of the surrounding area from the excursion train are similar to those described above, and any erosion control work along the river would be visible to excursion train passengers.
Views of the Sacramento River East Levee waterside from I-5 are blocked by the elevated levee, and therefore proposed erosion control work along the Sacramento River East Levee would not be visible to motorists traveling on I-5.

Most of the Sacramento River East Levee is along the western fringe of the Little Pocket and Pocket areas. These areas are heavily urbanized and contain residential development across the street on the east (land) side of the levee, southward nearly to Freeport. Second-story levels of homes, apartments, condominiums, and hotels in the Little Pocket and Pocket areas have views of the Sacramento River and associated vegetation, including mature shade trees. Where the Sacramento River Parkway bike path has been officially designated and constructed, the levee crown is used by recreationists. Views from the crown consist of scenic views of the Sacramento River, native trees and riparian vegetation, landscape trees, and partial views of the backyards of residences. Furthermore, the Little Pocket and Pocket areas contains numerous parks adjacent to the levee (e.g., Bahnfleth Park, Seymour Park, Ellsworth C. Zacharias Park, Garcia Bend Park, Pocket Canal Parkway, and Shore Park).


**SOUTHERN YOLO BYPASS**

The Reclamation District No. 2068 (RD 2068) levee is located in the unincorporated area of Solano County, in the southern Yolo Bypass. Agricultural landscapes, the Delta and marshlands, are the primary aesthetic resources in this portion of southeastern Solano County. Prominent scenic resources in this area include marshlands and Delta waters located to the south and southeast, the Coast Range extending in a north–south direction north and west of Fairfield, and expanses of agricultural lands.

The RD 2068 Levee is located in a topographically flat area surrounded for many miles by agricultural lands consisting primarily of row crops, irrigation canals and ditches, and occasional rural residences with associated landscaping (including mature shade trees). Agriculture has historically been an important industry in Solano County and within the Yolo Bypass. Agricultural lands account for more land than any other land use, which in turn defines much of the area’s visual character, supports wildlife habitats and migration corridors within the Yolo Bypass, and provides open space and recreational amenities for residents and visitors. Views in the vicinity of the RD 2068 Levee consist of flat agricultural land planted in row crops; scattered rural residences, barns, and outbuildings with associated landscape trees; livestock; water in irrigation ditches and canals; and overhead power lines.

Solano County contains extensive marshlands critical to the health and vitality of the estuary ecosystem in the San Francisco Bay/Delta (Bay-Delta) area, including Liberty Island at the southern end of the Yolo Bypass. In the early 1900s, Liberty Island was leveed, drained, and managed as a privately owned agricultural operation. However, most of the island is now under water and has been acquired by CDFW for use as an ecological reserve. Liberty Island is managed primarily for flood control, as well as wetland habitat and fishery conservation. Public uses within the ecological reserve (approximately the southern 2/3 of the island) include hunting of waterfowl (along with moorhens, pheasants, doves, and rabbits), fishing (for striped bass and white sturgeon), boating, and wildlife viewing.

The Coast Range is the most prominent background visual resource throughout the area because of its unique geography. The topography in the southern Yolo Bypass is flat, which allows the Coast Range to stand out visually in the background of most views. The Coast Range is clearly visible to the west from the agricultural land surrounding the RD 2068 Levee. Oak woodlands and grasslands stretch over the hillsides in the Coast Range, which are primarily undeveloped. In particular, the majority of ridgelines created by the Coast Range are currently in their natural form. (Solano County 2008a.)
Rio Vista

The proposed floodwall would be constructed at the eastern edge of the City of Rio Vista. The City has a strong orientation to the Sacramento River and to the rich agricultural lands of the Central Valley. Locally, the Montezuma Hills are farmed in a method known as “dry land farming,” producing grain and grass crops without expensive irrigation. The City’s location on the Sacramento River historically allowed for steady trade with the supply barges that moved up and down the river. Today, the riverfront is devoted to service craft (dredgers and shoreline maintenance operations), a few commercial fishermen and, primarily, pleasure craft.

The Montezuma Hills lie to the west and south of the City; these landforms create the hilly topography of the historic neighborhoods and the later neighborhoods that extend from the water tank to SR 12. The rolling terrain levels out gradually toward SR 12 and Church/Amerada Roads. A more abrupt shift in elevation occurs over a 1–mile stretch north of SR 12 and east of Church Road but is more pronounced on the south side of SR 12. The Montezuma Hills are the most significant topographic feature of the Rio Vista area.

The Sacramento River is a major presence in the City from the former Army Reserve Base north to the Rio Vista Bridge at SR 12. The City boat launch is located adjacent to City Hall at Main Street; a fishing access park and pier are located adjacent to the bridge. Public access and enjoyment of the riverfront is provided at the former Army Reserve Base site and in the area between Main Street and the SR 12 Bridge. SR 84 parallels the river, except for several areas where privately owned parcels have been developed in various uses. (City of Rio Vista 2002: Chapter 9.)

Motorists traveling across the SR 12 Bridge have expansive, unobstructed southerly views of the Sacramento River and the City’s waterfront area along the west side of the river. Construction associated with the floodwall would be clearly visible to motorists traveling the SR 12 Bridge as well as local streets that dead-end at the waterfront. The Waterfront Park and a fishing pier are adjacent to and south of the SR 12 Bridge; these amenities would require closure during work on the floodwall. South Front Street parallels the river in a north-south direction. From the SR 12 Bridge south to Montezuma Street, the land uses along South Front Street consist primarily of light industrial, commercial, and office (although a few scattered residences are located in this area). Buildings on both sides of South Front Street have unobstructed views of the Sacramento River and construction of the proposed floodwall would be clearly visible. From Montezuma Street southward along both sides of South Front Street, residential housing is the prevailing land use. Residents in the vicinity of the intersection of Montezuma and South Front Streets, as well as the northern end of Edgewater Drive, would have clear views of floodwall construction. In addition, residents on streets to the west of South Front Street (i.e., Logan Street, Sacramento Street, and Montezuma Street) would also have views of construction. Once construction was completed, all of these areas would have views of the elevated floodwall itself. Views of construction and the completed floodwall would be visible in the background (approximately 3/4 mile) northwest of the Duck Island RV Park, on the east side of the Sacramento River. Although SR 160, on the east side of the Sacramento River across from the proposed floodwall is State-designated scenic highway, views of construction and the completed floodwall would generally be blocked by a line of tall trees between SR 160 and the east bank of the Sacramento River.

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 scenery. 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 and types of viewers, and
- viewer 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.

**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, as amended. The proposed program would have a significant effect on visual resources if it would:

- substantially damage scenic resources, including but not limited to trees, rock outcrops, and historic buildings, within a state scenic highway;
- have a substantial adverse effect on a scenic vista;
- 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 would include buildings or other facilities that would require lighting, and therefore no new long-term sources of light or glare would be introduced into viewsheds. Furthermore, all construction work would be conducted during the daylight hours. Thus, there would be no impact and new sources of light or glare are not addressed further in this SEIR.

**IMPACT ANALYSIS**

**IMPACT VIS-1 Possible Damage to Scenic Resources within State- or County-Designated Scenic Highways.** Views of construction crews and equipment would be intermittent (blocked by intervening topography and vegetation) from most County and State-designated scenic highways. Furthermore, construction of the proposed improvements would be short-term and temporary in nature, and the completed improvements would be characteristic with the existing flood control structures already present along the Sacramento River and within the viewsheds throughout the program area. Therefore, this impact would be *less than significant* for most of the program area. However, a portion of Old River Road along the west bank of the Sacramento River, which is a Yolo County-designated scenic highway, would require closure during construction of the lengthened Sacramento Weir. This impact would be *significant* in the short term during construction activities. Once the Sacramento Weir lengthening was complete, this program element would result in a *less-than-significant* long-term impact.

Old River Road, from Yolo County Road 107 (near the Fremont Weir) south to West Sacramento (at the southern end of the Sacramento Weir), is a Yolo County-designated scenic highway (LSA Associates 2009). The portion of Old River Road that is currently located where the Sacramento Weir would be extended (north of the existing weir) would have to be closed during construction. Because this scenic highway would be unavailable during construction activities, this would be a *significant* temporary impact. Once construction of the extended weir was
completed, this segment of Old River Road would be reopened and would be located on top of the lengthened weir. The new setback levee to the east and the widened Sacramento Bypass would be consistent with the existing scenic viewed and visual quality of the surrounding area, and would be similar to the existing flood control structures that are already present. Therefore, in the long term, the proposed program would not result in damage to scenic resources associated with Yolo County-designated Old River Road, and the long term impact would be less than significant.

Garden Highway, north of the City of Sacramento paralleling the east side of the Sacramento River, is a Sacramento County-designated scenic highway (Sacramento County 2011:Circulation Element). Motorists traveling on Garden Highway have intermittent views (i.e., partially blocked by trees and residences) of the Sacramento Bypass and Sacramento Weir on the west side of the Sacramento River, along with the area where the proposed setback levee would be constructed between the extended weir and the Yolo Bypass, and the new section of elevated railroad tracks across the extended weir. The Garden Highway scenic corridor extends to the middle of the Sacramento River on the river side and 500 feet on the landward side (Sacramento County 2011:Circulation Element). The proposed work associated with the Sacramento Bypass, Sacramento Weir, and the new setback levee between the lengthened weir and the Yolo Bypass would occur on the west side of the river in Yolo County, and therefore would be outside of the Sacramento County-designated Garden Highway scenic corridor. Construction crews and equipment in the vicinity of these proposed improvements, if visible from Garden Highway, would be temporary and short-term in nature. Furthermore, the proposed improvements would be similar in nature to existing flood control facilities already located along the Sacramento River. Therefore, the proposed program would not result in damage to scenic resources associated with Sacramento County-designated Garden Highway, and this impact would be less-than-significant.

Freeways in Sacramento County are protected by scenic corridors that extend 660 feet to each side beyond the right-of-way (Sacramento County 2011:Circulation Element). The proposed work associated with the Sacramento Bypass and Sacramento Weir would occur on the west side of the river in Yolo County, and therefore would be outside of the Sacramento County-designated scenic corridor associated with I-80. Construction crews and equipment in the vicinity of these proposed improvements would be briefly visible in the background viewed at a distance of 1/2-mile to the north to motorists traveling across the I-80 Bridge over the Sacramento River at Sand Cove Park; however, such views would be temporary and short-term in nature. Furthermore, the proposed improvements would be similar in nature to existing flood control facilities already located along the Sacramento River.

SR 160, in Sacramento County, is a State- and County-designated scenic highway (Caltrans 2011 and Sacramento County 2011:Circulation Element). SR 160 begins at the Town of Freeport and runs southward (to Contra Costa County) adjacent to the Sacramento River. If erosion control activities were to occur in the vicinity of Freeport, construction crews and equipment could be visible from SR 160. However, the rock revetment work would occur on the waterside of the levee, and given the height of the elevated levee and the intervening tall trees, views would be intermittent at best, and may not be visible at all. Any construction crews and equipment in the vicinity of the northern end of SR 160 near Freeport, if visible from the roadway, would be temporary and short-term in nature. The rock revetment, once emplaced, would not be visible from SR 160. Therefore, installation of the proposed erosion control along the Sacramento River East Levee, if it occurred in the vicinity of the northern end of SR 160, would not result in damage to scenic resources within the State- or County-designated portion of SR 160, and this impact would be less-than-significant.

The City of Rio Vista, located in the southeasternmost portion of Solano County, is partially visible from SR 160 to southbound drivers (looking across the Sacramento River to the west side). For northbound drivers, views of Rio Vista are intermittent, and are generally blocked by tall trees. Caltrans has identified agricultural areas and small towns viewable from SR 160 as scenic resources. For the purposes of this analysis, Rio Vista is characterized as a “small town.” Views of construction and the completed floodwall would be intermittent, would generally be blocked by a line of tall trees between SR 160 and the east bank of the Sacramento River, and would be visible only in the distance (i.e., approximately 0.65-mile west of SR 160). Furthermore, the portion of SR 160 that is immediately across the river from (directly east of) the proposed floodwall swings in a wide curve away
from the river to accommodate the SR 12 Bridge crossing. Due to the intervening height of the levee along the
east bank of the river in this location and the tall trees adjacent to this levee, neither proposed floodwall
construction nor the completed floodwall itself would be visible to motorists along this approximately 0.80-mile
section of SR 160. The floodwall, when completed, would look like most of the other levees already present along
the Sacramento River. A pedestrian promenade with landscape trees would be installed adjacent to the floodwall.
Viewed from this distance (0.65-mile), and from the opposite (east) bank of the river, the floodwall would not
substantially change the existing scenic view, particularly given that landscape trees would be planted adjacent to
the floodwall. Therefore, installation of the proposed floodwall at Rio Vista would not result in damage to scenic
resources within the State- or County-designated portion of SR 160, and this impact would be less-than-
significant.

**IMPACT VIS-2**

**Changes in Scenic Vistas and Existing Visual Character.** Placement of rock revetment and rock stability
berms on the waterside of the Sacramento River East Levee would be inconsistent with the existing visual
character, and would stand out in the landscape as a visually detracting element for recreationists on the
Sacramento River and on the adjacent levee crowns in the short-term. Therefore, this proposed component
would result in temporary, short-term significant impacts for the Sacramento River East Levee area.
Changes in scenic vistas and existing visual character during construction activities would be short-term and
temporary in nature and would only occur for short periods of time as construction crews and
equipment move along the levees and other proposed work areas. This temporary, short-term impact would
be less than significant throughout the program area. Because program levees, staging areas, erosion
repair, and borrow sites would be returned to their original preproject condition and reseeded with native
vegetation, the program components would have less-than-significant long term impacts throughout the
program area.

The visual character and quality throughout the program area is high. As previously discussed in detail in the
“Environmental Setting,” the program area contains high-quality visual character and scenic vistas of rural
agricultural land, the Sacramento River, and throughout the Yolo Bypass, from residential development along
portions of Garden Highway, the Little Pocket, and Pocket areas, and the Rio Vista waterfront area. Sensitive
viewer groups consisting of residents and recreationists would have views of construction crews and equipment,
as well as completed, operational program facilities. Typical heavy construction equipment at individual program
sites and staging area may temporarily diminish the quality of views for sensitive viewers. However, short-term
changes in scenic vistas and existing visual character during construction would be temporary in nature and would
only occur for short periods of time as construction crews and equipment move along the levees and other
proposed work areas. Staging areas and borrow sites would be returned to their original preproject condition, and
these facilities and the levees would be reseeded with native vegetation. Construction of the proposed setback
levees would be consistent with the existing visual character, which already includes flood control levees.
Strengthening the RD 2068 Levee would not substantially change the appearance of the existing levee.
Lengthening the Sacramento Weir and widening the Sacramento Bypass would result in a visual quality similar to
existing conditions since both of these facilities are already present. Elevating the Northern Sierra Railroad tracks
over the extended weir would be consistent with the existing elevated tracks that are already present over the
Sacramento Weir. The relocated Yolo County Road 124 would appear visually in the landscape similar to existing
Road 124, and would be relocated in the same rural agricultural area of the northern Yolo Bypass. Construction
crews and work at the western end of the Sacramento Bypass, the Bryte Landfill, and the Tule Canal would not be
visible to motorists traveling on I-80 either within West Sacramento or over the Yolo Causeway because the
intervening distance, topography, vegetation, and structures. Therefore, impacts related to changes in scenic vistas
and existing visual character for these program components would be less than significant.

Work along the Sacramento River East Levee would consist of erosion repair sites on the waterside of the levee.
At these sites, techniques would consist of either a rock berm placed at the toe of the slope in combination with
soil fill to reestablish the riverbank slope, or emplacement of rock revetment for protection of the levee toe.
Proposed erosion repair work along the river would be clearly visible to all of the homes, apartments,
condominiums, restaurants, and hotels that are located adjacent to levee work areas throughout the Little Pocket
and Pocket areas. In addition, construction traffic would be visible to residents along local roadways, including
heavy-duty haul trucks along roadways that are transporting rock revetment materials to the work areas. Construction staging areas would also be clearly visible to immediately adjacent residential and commercial buildings. Segments of the Sacramento River Parkway bike path may need to be temporarily closed if construction work occurred within those areas. All of the erosion repair work on the waterside of the levee would be clearly visible to boaters and fisherman on the Sacramento River. Recreationists using parks adjacent the levees would have views of any construction activities and/or construction equipment and personnel at staging areas in or adjacent to the parks.

During the winter and spring months, none of the rock would be visible above the water line. During the summer and fall months, when the water levels are lower, some rock would be visible at the highest portion of each erosion repair site. However, at the top of the rock berm, a trench would be excavated and filled with soil and plants (such as tules) and large woody debris. In addition, above the rock berm, both willow pole cuttings and potted plants would be transplanted into the side of the levee at the erosion repair sites. It would take time for the newly planted vegetation to grow and become established. Therefore, in the short term, during the late summer and fall months when the water levels are low and before the vegetation has grown in, the rock along the waterside of the levee would be visible to boaters and fisherman, and would be partially visible to recreationists on the pedestrian/bicycle path on both the east and west sides of the Sacramento River. Views of large areas of boulder-sized angular rocks for erosion control would not be consistent with the existing natural setting on the waterside of the levee and would stand out in the landscape; this would have an adverse effect on scenic vistas in the areas where the rock berms/revetments are placed in the short term during the later summer and fall, before the associated vegetation has become established. Thus, this proposed improvement would have a short-term significant impact. In the long term, after the vegetation has become established, most of the rock would be screened by vegetation during the late summer and fall months (when water levels are low), and therefore this proposed improvement would have a long-term less-than-significant impact.

Construction of the proposed floodwall in Rio Vista would change the visual character and scenic vistas from businesses and nearby residences in the vicinity of South Front Street and associated side streets between the SR 12 Bridge in the north and Montezuma Street in the south. In this area, the elevated height of the floodwall, which would range from 14–20 feet above the ground surface, would block views of the Sacramento River from the ground floors of local businesses, residents on adjacent streets, and motorists on adjacent roadways. However, the City of Rio Vista prepared a Waterfront Specific Plan (City of Rio Vista 2007) to “…direct public and private investment to attract residents, businesses, and visitors to the city’s historic and unique setting along the river’s edge. New homes, shops, offices, and gathering places would face the public promenade [along the top of the floodwall] and Sacramento River, inviting residents and visitors to experience the river and feel a connection to the historic basis for settlement in Rio Vista.” Front Street, between SR 12 and Main Street, would be redeveloped with new residential, commercial, and workplace development, including multi-story buildings that would have views of the Sacramento River from the upper floors, along with a landscaped greenbelt area. The Specific Plan noted that benefits from development of the waterfront area would extend both to lands within the area as well as to residents and businesses throughout the City. Section 3.2, “Flood Control,” of the Specific Plan states:

Flood Control along the Sacramento River is a critical implementing action that addresses a key infrastructure component in the Waterfront District. The Waterfront Specific Plan proposes a vertical flood wall, 1,900 lineal feet long. Currently, flooding occurs along the shoreline, and within several hundred feet inland, and is frequent enough to warrant flood control as a primary implementation action of the Specific Plan. Without flood control, new development will be subject to flooding. Flood control is critical to access and development within the Waterfront District, and is an important first step in redevelopment.

A key component of the Specific Plan is construction of a pedestrian promenade, consisting of a paved, approximately 20-foot-wide pedestrian walkway adjacent to, and at the same or similar height as, the proposed floodwall. The promenade would include streetlights, decorative railing, landscape trees, decorative benches, bicycle racks, and trash receptacles (City of Rio Vista 2007:Section 3). The Pre-Feasibility Study for Rio Vista Flood Protection (Wood Rodgers 2005) includes design and engineering options and recommendations for both
the floodwall and the associated promenade. In 2011, the City of Rio Vista prepared and Initial Study and adopted a Mitigated Negative Declaration for the Rio Vista Floodwall and Public Access Project (City of Rio Vista 2011). The project included preliminary designs for the floodwall and the associated promenade to be located along the Sacramento River from the SR 12 Bridge to Main Street, and was one of the follow-up steps to the recommendations contained in the Specific Plan. The IS/MND determined that impacts related to visual resources from construction of the floodwall would be less-than-significant.

Because the floodwall was included as part of the City’s Waterfront Specific Plan, which envisions (1) redevelopment of the Rio Vista area within the viewshed of the floodwall to provide a visually attractive residential and commercial area with new landscaping, a greenbelt, and multi-story buildings with river views from the upper floors, and (2) construction of a pedestrian promenade on top of the floodwall that would provide scenic views of and public access to the Sacramento River, the impact related to changes in scenic vistas and existing visual character for this program component would be less than significant.

4.14.4 MITIGATION MEASURES

There is no feasible mitigation available to reduce Impact VIS-1 to a less-than-significant level in the short term along Old River Road where closure would be required during program construction activities. There is no feasible mitigation available to reduce Impact VIS-2 to a less-than-significant level in the short term in the areas where rock revetment would be placed along the Sacramento River East Levee.

4.14.5 CONCLUSION

As discussed in Impact VIS-1, no feasible mitigation is available to reduce the significant impact associated with short-term adverse changes to scenic resources necessitated by closure of Old River Road (a County-designated scenic highway) to a less-than-significant level. Therefore, this impact would remain significant and unavoidable in the short-term until Old River Road was relocated on top of the extended Sacramento Weir and reopened for public use.

As discussed in Impact VIS-2, no feasible mitigation is available to reduce the significant impact associated with short-term, adverse changes to scenic vistas and visual character from placement of rock revetment along the Sacramento River East Levee to a less-than-significant level. Therefore, this impact would remain significant and unavoidable in the short-term until the vegetative plantings associated with the erosion control berms become full grown.

The long-term, permanent impacts related to degradation of scenic resources within a State- or County-designated scenic highway, and degradation of scenic vistas and visual character from all other program-related elements, would be less-than-significant.
4.15 UTILITIES AND SERVICE SYSTEMS

This section addresses existing utilities, including water supply and treatment; wastewater collection, conveyance, and treatment; stormwater drainage systems; and electrical, natural gas, and communications infrastructure; and public services, including fire and law enforcement. Section 4.4, “Hydrology and Hydraulics” addresses existing drainage patterns and alteration of stormwater drainage systems.

4.15.1 REGULATORY SETTING

No Federal, State, regional, or local plans, policies, regulations, or laws related to utilities and service systems are relevant to this analysis.

4.15.2 ENVIRONMENTAL SETTING

Water Supply

The Sacramento County Water Agency is responsible for providing water supply service primarily in the urbanizing portion of unincorporated Sacramento County, between the American and Cosumnes Rivers, in the American River South basin (U.S. Army Corps of Engineers [USACE] and Central Valley Flood Protection Board [CVFPP] 2015). Agricultural and irrigation water service is supplied to the northern portion of the County adjacent to the Sacramento River receive supplied by the Natomas Central Mutual Water Company, a private purveyor of irrigation water to farmlands.

Solano County has a number of water providers, districts, and sources. Solano County Water Agency delivers untreated water from the Solano Project and the North Bay Aqueduct. The Solano County Water Agency provides water for municipal, industrial, and agricultural uses in Fairfield, Suisun City, Vacaville, Vallejo, Benicia, the Solano Irrigation District, and Maine Prairie Water District service areas, UC Davis, and the California State Prison in Solano County. Agricultural users in the Solano Irrigation District service area use surface water and groundwater; those in the Maine Prairie Water District service area and Reclamation District No. 2068 (RD 2068) use surface water only. Other water sources in the unincorporated County are the Rural North Vacaville Water District, the City of Vallejo, Suisun-Solano Water Authority, and private and community wells. Additionally, some wastewater from the Fairfield/Suisun area is recycled and used for agricultural purposes. (Solano County 2008:PF-7.)

Potable water supplies in the unincorporated areas of Yolo County are provided by groundwater pumped from the South Sacramento River Subbasin. Yolo County has six major water districts and five reclamation districts that focus primarily on the delivery of irrigation water for agricultural purposes. The program area is located within the North Delta Water Agency and Colusa Dain Mutual Water Company water districts and Reclamation Districts No. 1000 and 2068. (Yolo County 2009:CO-69.)

Water supply is provided by the City of Sacramento from a combination of surface water from the American and Sacramento Rivers and groundwater pumped from the North and South American Subbasins. The City’s water distribution system consists of a pipeline network in which surface water and groundwater are mixed and treated at the Sacramento River Water Treatment Plant and Fairbairn Water Treatment Plant.

Water supply in the City of Rio Vista’s consists of a series of groundwater wells with treatment occurring at the well head. Supplemental water sources include the Sacramento River and the North Bay Aqueduct through an agreement with the Solano Water Authority. (City of Rio Vista 2002:12-8.)

Wastewater

The Sacramento Area Sewer District (SASD) (formerly County Services District 1) provides wastewater collection and conveyance to the urbanized, unincorporated areas of Sacramento County and the Sacramento
Regional County Sanitation District (SRCSD) is responsible for collection by interceptors (sanitary sewers that are designed to carry flows in excess of 10 million gallons per day) and for wastewater treatment in Sacramento County. Wastewater generated in the City and County is ultimately conveyed to the Sacramento Regional Wastewater Treatment Plant near the community of Freeport for treatment via SRCSD regional conveyance facilities (Sacramento County 2014).

The majority of wastewater treatment in the unincorporated areas of Solano and Yolo Counties is provided by private on-site septic systems (Solano County 2008:PF-15; Yolo County 2009:PF-3).

The City of Sacramento Department of Utilities provides wastewater collection and conveyance to approximately 2/3 of the area within the City limits that is not served by the combined sewer system (CSS), while the SASD provides wastewater collection to the remaining portions of the City (City of Sacramento 2014:4-1). The City of Sacramento’s CSS consists of Sumps 1/1A, Sumps 2/2A, the Pioneer Reservoir Treatment Plant, and the Combined Wastewater Treatment Plant (CWTP). (City of Sacramento 2014:4-2.)

The City of Rio Vista’s wastewater collection, conveyance, and treatment facilities consist of a series of gravity-fed and pressurized lines and lift stations that connect to the Beach Drive treatment plant and the Trilogy Treatment Plant (City of Rio Vista 2002:12-9)

**Stormwater Drainage**

To control flooding in Sacramento County, there is an extensive system of dams, levees, overflow weirs, drainage pumping plants and flood control bypass channels strategically located on the Sacramento and American Rivers and various creeks. The Sacramento River Flood Control System consists of the Fremont Weir, Sacramento Weir, Yolo Bypass Channel, and levees along the Sacramento River, Lower American River, Natomas East Main Drain, Arcade Creek, Natomas Cross Channel, and the Sacramento Bypass Channels (Sacramento County 2014).

The unincorporated areas of Solano County rely on gravity to drain excess surface waters to nearby natural watercourses (Solano County 2008:PF-25).

Drainage facilities in the unincorporated areas of Yolo County are limited. On-site ditches that convey water to existing roadside ditches are used by most agricultural land uses (Yolo County 2009:PF-11).

Stormwater runoff within the City of Sacramento flows into either the City’s CSS (described above) or into individual drainage pumps stations located throughout the City. Drainage from most of these basins flows to local rivers or creeks or drainage channels through pumping and eventually drain into the Sacramento and American Rivers. (City of Sacramento 2014:4-11.)

Stormwater runoff in the City of Rio Vista collects along intermittent, normally dry stream courses that extend in a northeasterly direction from the Montezuma Hills. In the immediate vicinity of Rio Vista, Industrial Creek provides natural drainage for the northern portion of the City. The City’s storm drains collect stormwater runoff from impervious surfaces throughout the City. The storm flows from both natural watercourses and the City’s system discharge into the Sacramento River (City of Rio Vista 2002:11-10).

**Solid Waste**

The primary landfills in the program 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 area but are unlikely to have sufficient capacity to accommodate the proposed program.
### Table 4.15-1. Primary Landfills in the Program Area

<table>
<thead>
<tr>
<th>Facility (County)</th>
<th>Location</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buttonwillow Landfill1 (Kern County)</td>
<td>2500 West Lokern Road Buttonwillow, CA 93206</td>
<td>Maximum permitted capacity: 950,000 cubic yards Remaining capacity: Not available Closure date: January 1, 2040</td>
</tr>
<tr>
<td>Kiefer Landfill1 (Sacramento County)</td>
<td>12701 Kiefer Boulevard Sloughhouse, CA 95683</td>
<td>Maximum permitted capacity: 117.4 million cubic yards Remaining capacity: 112.9 million cubic yards Closure date: January 1, 2064</td>
</tr>
<tr>
<td>L and D Landfill1 (Sacramento County)</td>
<td>8635 Fruitridge Road Sacramento, CA 95826</td>
<td>Maximum permitted capacity: 6.0 million cubic yards Remaining capacity: 4.1 million cubic yards Closure date: January 1, 2023</td>
</tr>
<tr>
<td>Potrero Landfill2 (Solano County)</td>
<td>3675 Potrero Hills Lane Suisun City, CA 94585</td>
<td>Maximum permitted capacity: 83.1 million cubic yards Remaining capacity: 13.9 million cubic yards Closure date: February 14, 2048</td>
</tr>
<tr>
<td>Yolo County Central Landfill (Yolo County)</td>
<td>County Road 28 and County Road 104 Davis, CA 95616</td>
<td>Maximum permitted capacity: 49.0 million cubic yards Remaining capacity: 23.7 million cubic yards Closure date: January 1, 2080</td>
</tr>
</tbody>
</table>

**Notes:**
1. The Buttonwillow Landfill is classified as a Class I solid waste landfill facility that is permitted to accept hazardous waste.
2. Solid waste collected from the City of Sacramento is transported and disposed of at either the Kiefer Landfill or the L and D Landfill.
3. Solid waste collected from the City of Rio Vista is transported and disposed of at the Potrero Landfill.

**Sources:** CalRecycle 2015a, 2015b, 2015c, 2015d, 2015e; Clean Harbors Environmental Services 2013

### Electrical and Natural Gas Service

The Sacramento Municipal Utility District (SMUD) provides electrical service and Pacific Gas and Electric Company (PG&E) provides natural gas service to customers generally within the incorporated and unincorporated areas of Sacramento County.

PG&E provides both electrical and natural gas services to incorporated and unincorporated areas of Solano and Yolo Counties.

### Communications

Telephone, cable television, and other communications services are provided to customers in the program area by a variety of private companies including Sprint, AT&T, Comcast, Frontier Communications, Wave Broadband, and Consolidated Communications.

### Fire Protection

The Sacramento Metropolitan Fire District (SMFD) provides fire protection services to unincorporated areas of Sacramento County, to the cities of Rancho Cordova and Citrus Heights, and to portions of Placer County.

Fire protection services, including on-call responders for wildland, residential, commercial, and vehicle fires are provided in Solano County are provided by the California Department of Forestry and Fire Protection (CAL FIRE) and through the following individual fire protection districts (FPDs) serve the unincorporated portion of Solano County: Gordon Valley Fire Station, Cordelia FPD, Dixon FPD (under contract with City of Dixon Fire
Fire protection services, including rescue, emergency medical services, hazardous material response, are provided by a large number of fire districts and the Rumsey Tribe within the unincorporated areas of Yolo County. The program area is located within the Clarksburg FPD, Elkhorn FPD, East Davis FPD, and No-Man’s Land FPD service areas (Yolo County 2009:PF-21).

Fire protection services are provided to the City of Sacramento by the Sacramento Fire Department (SFD). The SFD provides fire protection services to the entire City and three contract areas within unincorporated Sacramento County (City of Sacramento 2014:5-13).

The Rio Vista Fire Department provides fire protection services the City of Rio Vista, including the airport, and contracts with the Delta Fire Protection District to extend emergency services coverage to the Sacramento-San Joaquin Delta (Delta) communities (City of Rio Vista 2002:11-14).

**Law Enforcement**

The Sacramento County Sheriff’s Department provides specialized law enforcement services to both the incorporated and unincorporated areas of Sacramento County. Services are generally provided through patrol units consisting of a patrol car and deputy sheriff.

The Solano County Sheriff provides law enforcement services to the unincorporated areas of Solano County. The sheriff is responsible for safety patrol services, dispatch of safety personnel, holding custody of adult law offenders, operation of the jail and security at court facilities (Solano County 2008:PF-31).

Law enforcement services in unincorporated areas of Yolo County are provided by the County Sheriff–Coroner. This department patrols the County, administers the County Jail and work program, provides animal control services, and serves as the County Coroner (Yolo County 2009:PF-17).

The City of Sacramento Police Department is principally responsible for providing police protection services in the City of Sacramento. In addition, the Sacramento County Sheriff’s Department, California Highway Patrol, and Regional Transit Police Department support the Sacramento Police Department to provide law enforcement services in the greater Sacramento area (City of Sacramento 2014:5-1).

The City of Rio Vista Police Department (RVPD) provides law enforcement services to the city. Because the City is located in close proximity to Sacramento County and Yolo County, RVPD participates in mutual aid agreements with these counties and periodically operates outside of the City limits. The RVPD also contracts with Contra Costa County for police dispatch services (City of Rio Vista 2002:11-13).

### 4.15.3 **Environmental Impacts**

**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, as amended. The proposed program would have a significant impact on utilities and public services 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;
► require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects;

► require new or expanded water supply entitlements;

► 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 permitted capacity of local landfills;

► result in the project not complying with federal, state, and local statutes and regulations related to solid waste; or

► result in substantial adverse physical impacts associated with the provision of new or physically 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 program would have a significant effect on utilities and public services 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 area; or

► result in the need for new systems or substantial alterations to electrical, natural gas, or communications infrastructure, the construction or operation of which would have significant impacts.

The funded facilities would not include any new housing, businesses, or other development that would increase demand for natural gas facilities, electrical transmission lines, communication systems, water supply infrastructure, or sewer lines beyond their current capacity. In addition, the funded facilities would not require new public water supplies or result in the expansion of existing or construction of new public water, wastewater, or storm drainage facilities. Therefore, these impacts are not evaluated further in this SEIR.

The funded facilities would not include any new housing, businesses, or other development that would increase demand for public services, including fire protection, law enforcement, schools, parks, or other public facilities, thus necessitating the construction of new or expansion of existing public facilities. Therefore, these impacts are not evaluated further in this SEIR. Section 4.10, “Transportation and Circulation,” addresses the potential of the program to temporarily affect emergency response times and access during construction.

**IMPACT ANALYSIS**

**Impact UTL-1**

**Potential Disruption of Irrigation Water Supply during Construction.** Construction of individual program components would require relocation of irrigation infrastructure that results in the potential disruption of irrigation water supply. Given the potential extent and intensity of construction activities, it is possible that these activities could impede the repair of damaged infrastructure or cause a delay in the provision of irrigation supply. This impact could be **potentially significant**.

Implementation of the proposed program could potentially disrupt irrigation water supplies in the program area. Construction of individual program components would require relocation of irrigation infrastructure at various locations along the existing Sacramento Bypass North Levee and the existing Yolo Bypass East Levee downstream of Interstate 5 to appropriate locations along the new setback levee.

Substantial temporary interruptions of irrigation water supply could occur if irrigation infrastructure is damaged or otherwise rendered inoperable at a time when it is needed (e.g., reconnections to water supply sources are not
completed by the time crop irrigation must begin). Given the potential extent and intensity of construction activities, it is possible that these activities could impede the repair of damaged infrastructure or cause a delay in the provision of irrigation supply. This impact could be potentially significant. Mitigation Measure UTL-1, described below, has been identified to address this impact.

**Impact**

**UTL-2 Potential Disruption of Utility Service during Construction.** Construction of individual program components could encroach upon multiple types of utility infrastructure and facilities. Although steps would be taken to minimize potential impacts to utilities, construction activities could inadvertently damage identified and unidentified utility equipment and facilities. In addition, required relocation of existing utilities could result in interruptions in service. Furthermore, the extent and intensity of construction activities could affect service providers’ abilities to quickly repair damage and/or restore interrupted service. Therefore, this impact could be potentially significant. Mitigation Measure UTL-2, described below, has been identified to address this impact.

Implementation of the proposed program could potentially encroach upon multiple types of utility equipment and facilities, leading to disruption in service. Existing utility infrastructure could include water intake facilities, storm drainage outfalls, gas mains, as well as underground and overhead electrical distribution lines, aerial and underground telephone lines, and underground cable television lines.

Construction of individual program components, such as implementing rock bank protection and launchable rock trenches along the Sacramento River, bypass widening, and constructing of new setback levees and the new floodwall in Rio Vista, could affect the utilities described above resulting in removal or relocation of those utilities prior to construction. Coordination would be required with the utility owners/providers in advance of construction to identify infrastructure locations and appropriate protection measures, and temporary bypasses may be required for some.

Although steps would be taken to minimize potential impacts to utilities, construction activities, including grading and excavation, could inadvertently damage identified and unidentified utility equipment and facilities. In addition, required relocation of existing utilities could result in interruptions in service. Furthermore, the extent and intensity of construction activities could affect service providers’ abilities to quickly repair damage and/or restore interrupted service. This impact could be potentially significant. Mitigation Measure UTL-2, described below, has been identified to address this impact.

**Impact**

**UTL-3 Temporary Increase in Solid Waste Generation.** Operation of the funded facilities would involve only periodic inspection and maintenance activities and would not result in short- or long-term solid waste generation. Construction of individual program components would temporarily increase solid waste generation in the program area. Only those landfills determined to have the ability to accommodate the construction disposal needs of the individual program components would be used for solid waste disposal. This impact would be less than significant.

Operation of the funded facilities would involve only periodic inspection and maintenance activities and would not result in short- or long-term solid waste generation. Construction of individual program components would temporarily increase solid waste generation in the program area. Sources of organic waste related to construction activities, such as bypass widening and construction of new setback levees and the new floodwall in Rio Vista, could include organic soils, cleared vegetation, trees, roots, and grass. Other non-organic solid waste materials could include irrigation systems, asphalt, concrete, pipes, and gravel.

Organic and non-organic waste would be disposed of at an appropriate location. Hazardous materials, including those encountered during removal of the Old Bryte Landfill, would be disposed of in accordance with regulatory standards (see Section 4.16, “Hazards and Hazardous Materials”). The location of the landfill used for disposal of spoil material and other construction-related waste would be determined by the construction contractor 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 program components would be
used for solid waste disposal. These landfills could include the Kiefer Landfill, the L and D Landfill, the Yolo County Central Landfill, and the Potrero Landfill. Hazardous solid waste from the Old Bryte Landfill would likely be disposed of at the Buttonwillow Landfill. As shown on Table 4.15-1, these landfills have sufficient long-term permitted capacity to accommodate construction-relate waste generated by individual program components. Hazardous waste will be characterized prior to disposal, and capacity identified at the Buttonwillow Landfill (or another facility if necessary) based on the nature of the waste. Therefore, the proposed program would not generate waste materials that would exceed permitted capacity of landfills. This impact would be less than significant.

4.15.4 MITIGATION MEASURES

No mitigation is required for Impact UTL-3 (solid waste). Mitigation is described below for Impact UTL-1 (irrigation water supply disruptions) and Impact UTL-2 (utility service disruptions).

**Mitigation Measure UTL-1: Coordinate with Irrigation Water Supply Users Before and During All Irrigation Infrastructure Modifications and Implement Measures to Minimize Interruptions of Supply** (for Impact UTL-1, Potential Disruption of Irrigation Water Supply during Construction).

The agencies implementing program components and their primary contractors for engineering design and construction shall ensure that the following measures are implemented before construction begins to minimize the potential for irrigation water supply interruptions during construction:

- Coordinate the timing of all modifications to irrigation supply infrastructure with the affected infrastructure owners and water supply users.
- Include detailed scheduling of the phases of modifications/replacement of existing irrigation infrastructure components in project design and in construction plans and specifications.
- Plan and complete modifications of irrigation infrastructure for the nonirrigation season to the extent feasible.
- Make provisions for alternative water supply, if necessary, when modification/replacement of irrigation infrastructure must be conducted during a period when it would otherwise be in normal use by an irrigator.
- As may be appropriate based on existing land and water rights, ensure either that (1) users of irrigation water supply do not, as a result of physical interference associated with the project, experience a substantial interruption in irrigation supply when such supply is needed for normal, planned farming operations (i.e., a decrease in level of service in comparison with the existing level of service); or (2) users of irrigation water supply that experience a substantial decrease in an existing level of service that meets the established standards for the project area are compensated for losses associated with the reduction in level of service.

**Timing:** Before and during construction activities.

**Responsibility:** The agency(ies) implementing the program component.


The agencies implementing program components and their primary contractors for engineering design and construction shall require the following measures are implemented before construction begins to...
avoid and minimize potential damage to utilities, infrastructure, and service disruptions during construction:

- Coordinate with applicable utility and service providers to implement orderly relocation of utilities that need to be removed or relocated.
- Provide notification of any potential interruptions in service to the appropriate agencies and affected landowners.
- Verify through field surveys and the use of the Underground Service Alert services the locations of buried utilities in the program area, including natural gas, petroleum, and sewer pipelines. Any buried utility lines shall be clearly marked in the area of construction (e.g., in the field) and on the construction specifications in advance of any earthmoving activities.
- Prepare and implement an emergency response plan that addresses potential accidental damage to a utility line. The emergency response plan shall identify chain-of-command rules for notification of authorities and appropriate actions and responsibilities regarding the safety of the public and workers. A component of the emergency response plan will include worker education training in response to such situations.
- Stage utility relocations during construction to minimize interruptions in service.

**Timing:** Before and during construction activities.

**Responsibility:** The agency(ies) implementing the program component.

### 4.15.5 Conclusion

Implementation of Mitigation Measure UTL-1 would reduce the potentially significant Impact UTL-1 associated with disruption of irrigation supply to a less-than-significant level because the agencies implementing program components and their primary contractors for engineering design and construction would coordinate with water supply providers and consumers to minimize interruptions, would conduct work during the nonirrigation season whenever feasible, and would ensure that essential water supply necessary during the irrigation season is provided by an alternative supply if an interruption is unavoidable. Implementation of Mitigation Measure UTL-2 would reduce the potentially significant Impact UTL-2 associated with disruption of utility service to a less-than-significant level because agencies implementing program components and their primary contractors for engineering design and construction would coordinate with utility service providers and consumers to minimize utility interruptions and inadvertent damage to unknown buried utilities to the maximum extent feasible, and a response plan to address service interruptions would be prepared and implemented. Impact UTL-3 would be less than significant; therefore, no mitigation would be required for this impact.
4.16 HAZARDS AND HAZARDOUS MATERIALS

This section addresses potential sources of hazards and risks associated with hazardous materials that may occur from implementation of the proposed program. This section addresses hazards to human health and the environment from the use of hazardous materials and the potential for accidental spills of such materials during construction activities, potential for construction in known hazardous materials sites, handling of hazardous materials in close proximity to schools, transmission of vector-borne diseases, and exposure to wildfires.

Seismic and other geologic hazards are addressed in Section 4.3, “Geology and Soils.” Flooding hazards are addressed in Section 4.4, “Hydrology and Hydraulics.” Traffic hazards are addressed in Section 4.10, “Transportation and Circulation.”

4.16.1 REGULATORY SETTING

FEDERAL

Hazardous Materials Handling

At the Federal level, the principal agency regulating the generation, transport, and disposal of hazardous waste is the U.S. Environmental Protection Agency (EPA), under the authority of the Resource Conservation and Recovery Act (RCRA). The RCRA established an all-encompassing Federal regulatory program for hazardous waste that is administered by EPA. Under the RCRA, EPA regulates the generation, transportation, treatment, storage, and disposal of hazardous waste. 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 waste. 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. These regulations apply to hazardous materials handling that would occur during project-related construction activities, for the protection of human health and the environment.

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. These regulations apply to the protection of human health during project-related construction activities.

Superfund Amendments and Reauthorization Act

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) created the Superfund hazardous substance cleanup program (Public Law [PL] 96-510, enacted December 11, 1980). It was enlarged and reauthorized by the Superfund Amendments and Reauthorization Act of 1986 (SARA, PL 99-499). As part of CERCLA and SARA, EPA compiles a list of national priorities among the known releases or threatened releases of hazardous substances, pollutants, or contaminants throughout the United States and its territories, known as the National Priorities List (NPL). These locations are commonly referred to as “Superfund sites.” CERCLA also includes the creation of a trust fund and to provide Federal authority for releases or threatened release of hazardous substance that could endanger public health or the environment.
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 (CalEPA) and the Office of Emergency Services (OES) establish rules governing the use of hazardous substances in California. Within CalEPA, the California Department of Toxic Substance Control (DTSC) 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. These regulations apply to the protection of human health and the environment during project-related construction activities.

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 California Code of Regulations (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 materials, communicating hazard information related to hazardous materials 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. These regulations apply to the protection of human health during project-related construction activities.

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 California Department of Transportation (Caltrans). Together, these agencies determine container types used and license hazardous waste haulers for hazardous waste transportation on public roads. These regulations apply to the transport of hazardous materials that would occur during project-related construction activities.

California Government Code Section 65962.5 (Cortese List)

The provisions of California Government Code Section 65962.5 are commonly referred to as the “Cortese List” (after the legislator who authored the legislation that enacted it). The Cortese List is a planning document used by the State and local agencies to comply with CEQA requirements in providing information about the location of hazardous materials release sites. California Government Code Section 65962.5 requires CalEPA to develop an updated Cortese List annually, at minimum. DTSC and the State Water Resources Control Board (SWRCB) are responsible for a portion of the information contained in the Cortese List. Other California state and local government agencies are required to provide additional hazardous material release information for the Cortese List. CEQA requires an evaluation as to whether or not a project would be located on a hazardous materials site that is included on the Cortese List; the results of Cortese List database searches are discussed below in the “Environmental Setting” section.
Hazard Materials in the Vicinity of School Sites

Sensitive receptors are people who are considered to have a substantially increased sensitivity or rate of exposure to contaminants. Because of this increased sensitivity, special consideration must be given to projects located near sensitive receptors. CEQA specifically establishes that special consideration must be given to projects located near schools (i.e., within 1/4 mile) when considering hazards and hazardous materials (California Public Resources Code [PRC] Section 21151.4). This consideration allows for careful examination and disclosure of potential health effects on children associated with exposure to hazardous materials, wastes, and substances.

Fire Hazard Severity Zones

California PRC Sections 4201-4204 and California Government Code Sections 51175-51189 require identification of fire hazard severity zones within the State of California. Fire hazard severity zones are measured qualitatively, based on: vegetation, topography, weather, crown fire potential (a fire’s tendency to burn upwards into trees and tall brush), and ember production and movement within the area of question. Fire prevention areas considered to be under State jurisdiction are referred to as “state responsibility areas.” In state responsibility areas, the California Department of Forestry and Fire Protection (CAL FIRE) is required to delineate three hazard ranges: moderate, high, and very high. CAL FIRE is also required to delineate “local responsibility areas,” which are under the jurisdiction of local entities (e.g., cities, counties); in local responsibility areas, only very high fire hazard severity zones are delineated. CEQA requires that environmental analyses consider the potential exposure of people and structures to wildland fire hazards.

Airport Safety Hazards

Airport safety areas are established to minimize the number of people exposed to aircraft crash hazards, by placing restrictions on land uses in various safety areas. The Sacramento Area Council of Governments (SACOG) has prepared airport land use compatibility plans for the Sacramento International Airport (SMF) (near Elkhorn Basin) and the Borges-Clarksburg Airport and Sacramento Executive Airport (near the Sacramento River East Levee). The Solano County Airport Land Use Commission has prepared an Airport Land Use Compatibility Plan for the Rio Vista Airport (near the proposed floodwall in Rio Vista). These plans designate three safety areas: the clear zone, the approach-departure zone, and the overflight zone. The clear zone is near the end of the runway and is the most restrictive. The approach-departure zone is located under the takeoff and landing slopes and is less restrictive. The overflight zone is the area underneath the general aircraft traffic pattern; it commonly extends as a radius of approximately 5,000 feet from the runway and encompasses a circular area in all directions. The actual dimensions of these safety areas at each airport take into account Federal Aviation Administration (FAA) safety zone dimensions along with historical aircraft accident data. In addition, Part 77 of the Federal Aviation Regulations, “Objects Affecting Navigable Airspace,” regulates the height and placement of new structures within the three airport safety zones. Finally, airport land use plans generally recognize that certain safety hazards to aircraft and airport operations may occur where a land use would:

- attract large concentrations of birds within approach/climb out areas,
- produce smoke or flashing lights,
- reflect light or generate electronic interference, or
- use or store large quantities of flammable materials.

CEQA requires that environmental analyses consider the potential exposure of people, structures, and aircraft to safety hazards.
REGIONAL AND LOCAL

Hazardous Material Storage, Handling, and Management

The Sacramento County Environmental Management Department (EMD) is the lead local regulatory agency (i.e., Certified Unified Program Agency [CUPA]) for Sacramento County and is responsible for a variety of tasks related to the storage, handling, and management of hazardous materials. The Sacramento County EMD 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 EMD regulates storage and handling of hazardous materials that would be used during project-related construction activities.

The Sutter and Yolo County Environmental Health Services Departments are the CUPAs for Sutter and Yolo Counties, respectively. These departments regulate the use, storage, and disposal of hazardous substances by issuing permits, monitoring regulatory compliance, and other enforcement activities.

Sacramento County General Plan

The following policies from the *Sacramento County General Plan of 2005-2030 Hazardous Materials, Delta Protection, and Safety Elements* (Sacramento County 2011) regarding hazards and hazardous materials apply to the proposed program.

- **Policy HM-4:** The handling, storage, and transport of hazardous materials shall be conducted in a manner so as not to compromise public health and safety standards.
- **Policy HM-8:** Continue the effort to prevent ground water and soil contamination.
- **Policy HM-9:** Continue the effort to prevent surface water contamination.
- **Policy HM-10:** Reduce the occurrences of hazardous material accidents and the subsequent need for incident response by developing and implementing effective prevention strategies.
- **Policy HM-11:** Protect residents and sensitive facilities from incidents which may occur during the transport of hazardous materials in the County.
- **Policy DP-34:** Support the design, construction, and management of any flooding program to provide seasonal wildlife and aquatic habitat on agricultural lands, duck club lands and additional seasonal and tidal wetlands, which shall incorporate "best management practices" to minimize vectors including mosquito breeding opportunities, and shall be coordinated with the local vector control districts. (Each of the four vector control districts in the Delta provides specific wetland/mosquito management criteria to landowners within their district.)
- **Policy SA-24:** The County shall require, unless it is deemed infeasible to do so, the use of both natural and mechanical vegetation control in lieu of burning or the use of chemicals in areas where hazards from natural cover must be eliminated, such as levees and vacant lots.

City of Sacramento General Plan

The following policies from the *City of Sacramento 2035 General Plan* Public Health and Safety Element (City of Sacramento 2015) related to hazards and hazardous materials apply to the proposed program.

- **PHS 3.1.1 Investigate Sites for Contamination.** The City shall ensure buildings and sites are investigated for the presence of hazardous materials and/or waste contamination before development for which City discretionary approval is required. The City shall ensure appropriate measures are taken to protect the health and safety of all possible users and adjacent properties.
► **PHS 3.1.2 Hazardous Material Contamination Management Plan.** The City shall require that property owners of known contaminated sites work with Sacramento County, the State, and/or Federal agencies to develop and implement a plan to investigate and manage sites that contain or have the potential to contain hazardous materials contamination that may present an adverse human health or environmental risk.

► **PHS 5.1.10 Pest/Vector Management.** The City shall coordinate with appropriate agencies (e.g., Sacramento-Yolo Mosquito and Vector Management District) to support pest/vector management strategies (e.g., mosquito control), require drainage of untreated pools and other water features in homes and businesses that are vacant or in sale proceedings, and enhance public awareness of vector control.

► **PHS 5.1.11 Integrated Pest Management.** The City shall continue development and implementation of the City’s Integrated Pest Management (IPM) program at City facilities.

**Solano County General Plan**

The following policies and actions from the *Solano County General Plan* Public Health and Safety Element (Solano County 2008) related to hazards and hazardous materials apply to the proposed program.

► **Policy HS.P-23:** Work with fire districts or other agencies and property owners to coordinate efforts to prevent wildfires and grassfires through fire protection measures such as consolidation of efforts to abate fuel buildup, access to firefighting equipment, and provision of water service.

► **Policy HS.P-26:** Minimize the risks associated with transporting, storing, and using hazardous materials through methods that include careful land use planning and coordination with appropriate federal, state, or County agencies.

► **Policy HS.P-33:** Plan and designate evacuation and aid routes. Work to create a comprehensive circulation system that is effective in allowing emergency access to and from all parts of the county and which provides alternative routes during unexpected events such as flooding, fires, or hazardous materials accidents that require evacuation.

► **Policy HS.P-38:** Integrate public health concerns into land use planning and decision making.

**City of Rio Vista General Plan**

The following policies from the *City of Rio Vista General Plan 2001* Safety & Noise Element (City of Rio Vista Community Development Department 2002) related to hazards and hazardous materials apply to the proposed program.

► **Policy 11.6.D:** The City shall ensure the proper use, storage, and disposal of toxic chemicals to the greatest extent feasible.

► **Policy 11.11.A:** The City shall require that development projects in the vicinity of the Rio Vista Airport consider all applicable safety policies, City standards, and land use compatibility guidelines.

**Yolo County General Plan**

The following policies and actions from the *Yolo County General Plan* Health and Safety and Public Facilities and Services Elements (Yolo County 2009) related to hazards and hazardous materials apply to the proposed program.

► **Action HS-A35.** Develop emergency response plans and systems for floodplain evacuation and flood emergency management. Educate the public regarding these plans.
► **Policy HS-3.1.** Manage the development review process to protect people, structures, and personal property from unreasonable risk from wildland fires.

► **Action HS-A39.** Require the design and construction of new roadways and driveways in fire hazard areas to be of sufficient width, radius, and grade to facilitate access by fire-fighting apparatus.

► **Policy HS-4.1.** Minimize exposure to the harmful effects of hazardous materials and waste.

► **Action HS-A47.** New development and redevelopment in areas previously used for agricultural, commercial, or industrial uses shall ensure that soils, groundwater, and buildings affected by hazardous material releases from prior land uses, as well as lead paint and/or asbestos potentially present in building materials, will not have the potential to affect the environment or health and safety of future property owners or users, and any affected areas shall be properly abated. A Phase I Environmental Site Assessment (ESA) to American Society for Testing and Materials (ASTM) standards shall be required where appropriate and a Phase II ESA may be required in certain circumstances based on the recommendations/results of the Phase I. Where the Phase I report has identified agricultural cultivation prior to the 1980s, a shallow soil investigation shall be performed at the property in accordance with DTSC guidance for sampling agricultural properties.

► **Policy HS-5.1.** Ensure that land uses within the vicinity of airports are compatible with airport restrictions and operations.

► **Policy HS-5.2.** Ensure that new development near commercial and public use airports is consistent with setbacks, height, and land use restrictions as determined by the Federal Aviation Administration and the Sacramento Area Council of Governments Airport Land Use Commission. Ensure that development proximate to private airstrips addresses compatibility issues.

► **Policy PF.P-8.** Notify the appropriate agencies (e.g., school districts, public safety, water) of new development applications within their service area early in the review process to allow sufficient time to assess impacts on facilities.

### 4.16.2 ENVIRONMENTAL SETTING

**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.
“Hazardous substances” are defined in 14 U.S. Code Section 9601(14) as:

(A) any substance designated pursuant to section 1321(b)(2)(A) of Title 33, (B) any element, compound, mixture, solution, or substance designated pursuant to section 9602 of this title, (C) any hazardous waste having the characteristics identified under or listed pursuant to section 3001 of the Solid Waste Disposal Act [42 U.S.C.A. § 6921] (but not including any waste the regulation of which under the Solid Waste Disposal Act [42 U.S.C.A. § 6901 et seq.] has been suspended by Act of Congress), (D) any toxic pollutant listed under section 1317(a) of Title 33, (E) any hazardous air pollutant listed under section 112 of the Clean Air Act [42 U.S.C.A. § 7412], and (F) any imminently hazardous chemical substance or mixture with respect to which the Administrator has taken action pursuant to section 2606 of Title 15. The term does not include petroleum, including crude oil or any fraction thereof which is not otherwise specifically listed or designated as a hazardous substance under subparagraphs (A) through (F) of this paragraph, and the term does not include natural gas, natural gas liquids, liquefied natural gas, or synthetic gas usable for fuel (or mixtures of natural gas and such synthetic gas).

SACRAMENTO/YOLO BYPASS NORTH OF SACRAMENTO (ELKHORN BASIN)

Former Old Bryte Landfill

The former Old Bryte Landfill is located at 50035 County Road 126 in West Sacramento, immediately adjacent to the northwestern end of the Sacramento Bypass (see Exhibit 4.16-1). Use of the site as a landfill was terminated in 1974. EPA determined that the landfill should not be listed on the NPL, that no further Federal action was required, and in 2013 archived the landfill site on its database (EPA 2013). However, the landfill has been the subject of numerous Yolo County Environmental Health Department violations, cleanup and abatement orders, and Central Valley Regional Water Quality Control Board (RWQCB) review (DTSC 2015, SWRCB 2015, Weston Solutions, Inc. 2012). The summary provided below was obtained from the Preliminary Assessment Report, Old Bryte Landfill, West Sacramento, California prepared by Weston Solutions, Inc. (2012).

In the 1940s, the approximately 17-acre site was leased to Fred Albericci of Albericci Garbage Service (AGS). AGS was a private garbage service operating in east Yolo County and serving the Communities of Bryte, Broderick, West Sacramento, and the surrounding area. At some point, garbage disposal functions were assumed by the West Sacramento Sanitation District, which later consolidated into the East Yolo County Community Services District and then the City of West Sacramento once it was incorporated. The landfill accepted domestic, municipal, and commercial waste. Wastes were piled, burned, and then leveled. Use of the site as a landfill was terminated in 1974. Sometime after 1974, the property was leased to Clifford Rose for use as a cardboard recycling storage facility. Mr. Rose later abandoned the site, leaving a substantial amount of trash, mostly consisting of cardboard and wooden pallets.

In September 1987, the California Integrated Waste Management Board (CIWMB) conducted methane gas testing at the site. No indication of methane gas generation was found, and the CIWMB subsequently determined that there was no methane gas hazard.

During a 2001 site investigation conducted by CIWMB, scattered metallic debris, piles of demolition waste, agricultural metallic products, and household wastes were observed throughout the site. Broken glass was visible under the grassy vegetation and evidence of burning was present. In addition, several empty 55-gallon drums were observed scattered throughout the site. As part of the 2001 CIWMB investigation, a total of 28 trenches were dug and waste was collected and analyzed from depths of 2.5–13.0 feet. Trench logs indicated an overall waste depth from ground surface to 13 feet with an average waste depth ranging from 5.9–7.2 feet. CIWMB determined that approximately 127,000 cubic yards of burn ash and waste are present.
Lead was detected in all samples collected from the site at concentrations ranging from 13 milligrams per kilogram (mg/kg) to 22,000 mg/kg. The average lead concentration of 4,285 mg/kg exceeded the Total Threshold Limit Concentration (TTLC) of 1,000 mg/kg. The average Waste Extraction Test (WET) concentration for lead of 64 milligrams per liter (mg/L) exceeded the Soluble Threshold Limit Concentration (STLC) of 5.0 mg/L. Zinc was detected in one soil sample at 17,000 mg/kg, exceeding the TTLC of 5,000 mg/kg. Polychlorinated biphenyls (PCBs) were detected in five soil samples ranging from 0.50–0.98 mg/kg. Dioxins were detected in one soil sample at 0.14 mg/kg. (TTLC and STLC are used for hazardous waste characterization under California State regulations.)

The CIWMB also concluded that the burn ash material would likely be classified as a California hazardous waste if it were to be excavated for disposal.

Four on-site monitoring wells were installed in 1990, and it was subsequently determined that the site did not pose a threat of contamination to either surface water or groundwater.

The CIWMB recommended that a cover be placed on the site to meet State minimum standards and to prevent exposure to the public and the environment. Since that recommendation was made, the soil cover was emplaced. However, the CIWMD’s recommendation was based on the fact that the existing levees on the south and west sides of the former landfill ensured that water diverted through the Sacramento Bypass would not reach the landfill and therefore would not result in mobilization of contaminants.
Other Hazardous Material Sites

A search was performed by AECOM of the GeoTracker database, which is a groundwater information management system that is maintained by SWRCB. Data relating to leaking underground storage tanks and other cleanup activities are part of the information that SWRCB is required to maintain under California PRC Section 65962.5 (i.e., the “Cortese List”). AECOM also performed a search of the Hazardous Waste and Substances Site List (i.e., the EnviroStor database), which is maintained by DTSC as part of the requirements of California PRC Section 65962.5. EnviroStor (DTSC 2015) and GeoTracker (SWRCB 2015) database search results indicate there are no open, active known hazardous materials sites within 1/4-mile of proposed funded facilities in the Elkhorn Basin, nor are there any closed cases of residual contamination that would potentially be mobilized by program activities.

Schools

There are no schools within 1/4-mile of any funded facilities proposed within the Elkhorn Basin.

Airports and Airstrips

SMF is located northeast of Interstate 5 (I-5). Depending on the exact location of the proposed new setback levee, it would be located approximately 3.0–3.5 miles southwest of the southern end of the airport. The proposed levee setback would be located within the outermost airport safety zone related to the required FAA notification if tall structures would be constructed (SACOG 2013). The northern edge of the widened Sacramento Bypass would be located approximately 5 miles south of the airport. The proposed woodland corridor along the east side of the Tule Canal (south of I-5) would be approximately 2.5 miles southwest of the southern end of the airport.

The CHP Academy Airport is located adjacent to the southern edge of the Sacramento Bypass (north of 3500 Reed Avenue) in West Sacramento. The airport is privately operated and contains two paved runways that are 1,400- and 1,200-feet-long, respectively. There are two aircraft and one helicopter based at the field. (AirNav 2015.)

Wildland Fire Hazards

The Elkhorn Basin, within the northern Yolo Bypass, consists of agricultural land used for row crops and livestock grazing, with scattered rural residences and associated landscaping. According to CAL FIRE, the Elkhorn Basin is within a local responsibility area, and most of the Elkhorn Basin is unzoned (i.e., does not contain very high, high, or moderate fire hazards). The Sacramento Bypass and the northern portion of the Tule Canal have been zoned as moderate fire hazard severity zones (CAL FIRE 2007a).

SACRAMENTO RIVER EAST LEVEE

Known Hazardous Material Sites

EnviroStor (DTSC 2015) and GeoTracker (SWRCB 2015) database search results indicate there are several open, active known hazardous materials sites within 1/4-mile of the Sacramento River East Levee (SAFCA 2015:4.11-9). All of these sites consist of spills of petroleum products that resulted in contamination of soil, groundwater, or both; all but one of the sites are in the remedial action phase.

Schools

The Leataata Floyd Elementary School and the adjacent Arthur J. Benjamin Health Professions High School, at 401 and 451 McClatchy Way, respectively, are located approximately 1,200 feet southeast of the northern portion of the Sacramento River East Levee. The Genevieve Didion Elementary School, at 6490 Harmon Drive, is located approximately 1,200 feet southwest of the Sacramento River East Levee in the Pocket area.
Airports and Airstrips

Sacramento Executive Airport is located approximately 1.3 miles east of the Sacramento River East Levee. The airport experienced an operation rate of approximately 252 flights per day (approximately 3,024 flights per year) for the 12-month period ending in October 2013. The airport is publicly owned by the City of Sacramento and has three paved runways (5,503-feet-long by 150-feet-wide; 3,837-feet-long by 100-feet-wide; and 3,505-feet-long by 150-feet-wide) along with a helipad. (AirNav 2014.) The Sacramento River East Levee is not located within or adjacent to any of the airport safety zones. (SACOG 1999:39.)

The Borges-Clarksburg Airport is located approximately 1.3 miles southwest of the southern end of the Sacramento River East Levee area (at Freeport). The airport experienced an operation rate of approximately 3,000 flights in 2001 (GCR, Inc. 2014). The airport is privately operated and has one runway with a turf surface measuring 2,360-feet-long by 70-feet-wide. The Sacramento River East Levee is not located within or adjacent to any of the airport safety zones. (SACOG 1994:3, 21.)

Wildland Fire Hazards

The proposed erosion control improvements along the Sacramento River East Levee would be located within a generally developed and urbanized area. However, riparian vegetation is present within the levees along the Sacramento River. According to CAL FIRE, the Sacramento River East Levee is within a local responsibility area, and is not within or adjacent to a very high fire hazard severity zone (CAL FIRE 2008).

Southern Yolo Bypass (Reclamation District 2068 Levee)

Known Hazardous Material Sites

EnviroStor (DTSC 2015) and GeoTracker (SWRCB 2015) database search results indicate there are no open, active known hazardous materials sites within 1/4-mile of the work proposed on the RD 2068 Levee, nor are there any closed cases of residual contamination that would potentially be mobilized by program activities.

Schools

There are no schools within 1/4-mile of the work proposed on the RD 2068 Levee.

Airports and Airstrips

There are no airports or airstrips within 3 miles of the work proposed on the RD 2068 Levee. The closest available landing strip is located at the Maine Prairie Airport (privately owned), approximately 7 miles west of the RD 2068 Levee, near Dixon.

Wildland Fire Hazards

The RD 2068 Levee is located within the southern Yolo Bypass, which consists of agricultural land used for row crops and livestock grazing, with scattered rural residences and associated landscaping. According to CAL FIRE, the southern Yolo Bypass is within a local responsibility area that is unzoned (i.e., does not contain very high, high, or moderate fire hazards) (CAL FIRE 2007b).

Rio Vista

Known Hazardous Material Sites

EnviroStor (DTSC 2015) and GeoTracker (SWRCB 2015) database search results indicate there are three open, active hazardous known material sites within 1/4-mile of the proposed floodwall. Two of three sites involved leaking underground storage tanks, the third is a former petroleum product distribution facility, which resulted in
contamination of soil and groundwater. Contaminants consist of petroleum-based fuels and oils, and volatile organic compounds. In addition, several monitoring wells associated with two of the three sites appear to be located either within or immediately adjacent to the location where the proposed floodwall would be constructed.

Schools

The Riverview Middle School, located at 525 South 2nd Street, is approximately 0.28 mile southwest of the southern end of the proposed floodwall in Rio Vista.

Airports and Airstrips

The Rio Vista Municipal Airport is located approximately 2.3 miles northwest of the northern end of the proposed floodwall. The airport is owned and operated by the City of Rio Vista. The airport has a paved 4,200-foot-long, 75-foot-wide primary runway; a paved 2,200-foot-long, 60-foot-wide general aviation runway; and a helipad. There are 47 aircraft based at the field. In 2014, aircraft operations averaged 96 per day. (AirNav 2015b.) The proposed floodwall would not be located within or adjacent to any of the airport safety zones (Solano County ALUC 1988: 16b.)

Wildland Fire Hazards

According to CAL FIRE, the southern Yolo Bypass is within a local responsibility area that is unzoned (i.e., does not contain very high, high, or moderate fire hazards) (CAL FIRE 2007b). The proposed floodwall would be located within a highly developed, urbanized area of the City of Rio Vista. The wildland fire hazard is low.

4.16.3 ENVIRONMENTAL IMPACTS

The assessment of impacts related to hazards and hazardous materials considered the locations, duration, and types of project-related activities that could occur from the proposed funded facilities in relation to known hazardous materials sites (derived from databases maintained by DTSC, SWRCB, and EPA); airport land use compatibility plans prepared by SACOG; school district location maps; and CAL FIRE data.

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, as amended. The proposed program would have a significant impact on hazards and hazardous materials if it would:

► create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment or through the routine transport, use, or disposal of hazardous materials;

► emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school;

► be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would 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;

► expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or residences are intermixed with wildlands.
In addition to the significance thresholds above from the State CEQA Guidelines, the proposed program would also have a significant impact on hazards and hazardous materials if implementation of the proposed program would:

- create a public health hazard from increased exposure to mosquito-borne diseases by substantially increasing the amount of mosquito habitat.

**Routine Transport, Use, or Disposal of Hazardous Materials**—The construction of the funded facilities would involve the incidental transport and use of common construction materials such as fuels, oils, and lubricants. However, the proposed program would not involve routine or long-term transport of such materials. None of the funded facilities would involve the use of acutely hazardous materials. Therefore, no impact would occur and this issue is not evaluated further in the SEIR.

Potential impacts related to emergency access are addressed in Section 4.10, “Transportation and Circulation.”

**IMPACT ANALYSIS**

**IMPACT**

**HAZ-1** Accidental Spills of Hazardous Materials Used during Construction. *Construction of the individual program components (funded facilities) would involve the storage, use, and transport of hazardous materials such as fuels, oils, and lubricants during construction. Federal, State, and local hazardous materials regulations have been specifically designed to reduce the risk of accidental spills to the maximum extent practicable. Therefore, this impact would be less-than-significant.*

The funded facilities would not involve any unusual risks associated with the transport and handling of hazardous materials. Construction and maintenance activities would use minor amounts of 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. 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 are addressed in Section 4.5, “Water Quality.”)

Federal, State, and local regulations have been specifically designed to reduce the potential for accidental release of hazardous materials to the maximum extent practicable. Consequently, the risk of accidental spills of hazardous materials used during construction activities is low. Therefore, construction of funded facilities would have a less-than-significant impact.

**IMPACT**

**HAZ-2** Handling of Hazardous Materials within 1/4-Mile of a School during Construction. *Construction of the funded facilities would involve the use of small quantities of hazards materials such as fuels, oils, and lubricants for construction equipment. However, acutely hazardous materials would not be used, and the small quantities of materials used during construction would not represent a hazard to pupils or employees at schools in the vicinity of funded facilities. Therefore, this impact would be less-than-significant.*

Under California PRC Section 21151.4, unless certain conditions are first met, EIRs, including SEIRs, or Mitigated Negative Declarations may not be certified or adopted for projects within 1/4-mile of schools that would involve constructing or altering facilities that meet any of the following criteria:

- might reasonably be anticipated to emit hazardous air emissions,

- would handle an extremely hazardous substance or a mixture containing extremely hazardous substances in a quantity equal to or greater than the State threshold quantity specified in Section 25532(j) of the Health and Safety Code, or

- may pose a health or safety hazard to persons who would attend or would be employed at the school.
The Leataata Floyd Elementary School and the adjacent Arthur J. Benjamin Health Professions High School, at 401 and 451 McClatchy Way, respectively, are located approximately 1,200 feet southeast of the northern portion of the Sacramento River East Levee. The Genevieve Didion Elementary School, at 6490 Harmon Drive, is located approximately 1,200 feet southwest of the Sacramento River East Levee in the Pocket area. In addition, the Riverview Middle School, located at 525 South 2nd Street, is approximately 0.28-mile southwest of the southern end of the proposed floodwall in Rio Vista.

Small quantities of hazardous materials such as fuels, oils, and lubricants would be used in construction equipment for the funded facilities. However, none of these materials are classified as acutely hazardous. Construction contractors would be required to use, store, and transport hazardous materials in compliance with Federal, State, and local regulations during project construction. The use of these materials during construction would not represent a safety hazard for persons who would attend or be employed in any of the above-listed schools. Furthermore, given the temporary nature and short duration of each construction segment as each of the individual program components are implemented, the proposed funded facilities are not expected to result in hazardous air emissions (i.e., toxic air contaminants [TACs]) in excess of screening levels. (For a detailed discussion and evaluation of TAC impacts, see Section 4.11, “Air Quality.”) Therefore, construction of the funded facilities would have a **less-than-significant** impact.

### IMPACT

**HAZ-3**

Possible Exposure of People and the Environment to Existing Hazardous Materials, Including Cortese-Listed Sites. Program-related activities would occur within known hazardous material contamination sites including the Old Bryte Landfill. The proposed floodwall in Rio Vista would be constructed within or immediately adjacent to existing groundwater remediation and/or monitoring wells from at least two Cortese-listed sites. In addition, other unknown hazards such as above or underground storage tanks associated with agricultural activities in the Yolo Bypass could be encountered during construction activities. Therefore, this impact would be **potentially significant**.

The former Old Bryte Landfill is included on the Cortese list as a known hazardous materials site. Because the Sacramento Bypass would be widened, water diverted during flood stages would flow over and through the former Old Bryte Landfill site once the landfill is removed. Known hazardous materials at this site include, but may not be limited to, the following (Weston Solutions, Inc. 2012):

- landfill materials consisting of domestic, municipal, and commercial waste;
- lead, zinc, dioxins, and PCBs; and
- burn ash.

In July 2015, DTSC approved a work plan for the former landfill site prepared by Geosyntec Consultants (2015) and submitted on behalf of SAFCA, which includes collection and analysis of samples from the site to more accurately delineate the landfill area and assess the ratio of soil/ash to solid waste, total and soluble lead concentrations in soil/ash, and further characterize discrete materials as necessary. The results will be used to develop a strategy for managing and/or disposing of the waste.

Results of the EnviroStor (DTSC 2015) and GeoTracker (SWRCB 2015) database searches performed by AECOM indicated that several known hazardous material sites are present within 1/4-mile of proposed program components (funded facilities) along the Sacramento River East Levee and the proposed floodwall in Rio Vista. In particular, it appears that several groundwater remediation and/or monitoring wells from two Cortese-listed sites may be located within or immediately adjacent to the footprint of the proposed Rio Vista floodwall.

Finally, land uses in the Yolo Bypass consist primarily of farming activities, including row crops and livestock grazing. Agricultural operations frequently include permitted above or underground storage tanks for fertilizers, pesticides, and oil and fuel associated with farm machinery. Because the exact location of levee improvements within the Yolo Bypass is unknown at the present time, storage tanks with hazardous materials may be present at
the locations where funded facilities would be constructed. There is also a possibility that, given the regional history of agricultural operations over the last 100 years, spills of agriculturally related hazardous materials may have occurred in locations where future project-related work would occur under the proposed program.

Construction of funded facilities could expose people and the environment to existing hazardous materials, including construction within and adjacent to Cortese-listed sites. Therefore, construction of the funded facilities would have a **potentially significant** impact. Mitigation Measures HAZ-1, HAZ-2, and HAZ-3, described below, have been identified to address this impact.

### IMPACT HAZ-4

**Creation of Safety Hazards, Including Birdstrike, in the Vicinity of a Public or Private Airport.**

*Increasing the size of the Sacramento and Yolo Bypasses is not anticipated to result in creation of wetlands or other habitats likely to attract increased numbers of waterfowl and other species that could lead to an increased wildlife strike hazard at the CHP Academy Airport. Therefore, this impact would be less-than-significant. There would be no impact for the other funded facilities because they do not include activities that would affect airport safety.*

The proposed funded facilities would not involve construction of any tall buildings or other structures that could interfere with flight patterns or affect operations at regional or local airports or airstrips.

The southern side of the Sacramento Bypass is immediately adjacent to the CHP Academy Airport, and the Sacramento River is immediately adjacent to the eastern side of the airport. Lengthening the Sacramento Weir would effectively double the size of the Sacramento Bypass (i.e., from approximately 360 acres to approximately 720 acres). The Sacramento Bypass Wildlife Area is an important cover and feeding area for wildlife—including waterfowl, game birds, raptors, songbirds, and/or native mammals—depending on the time of year and habitat conditions.

In addition, the proposed program includes expansion of the Yolo Bypass and creation of a woodland corridor along the eastern edge of the Tule Canal south of I-5. The expanded Yolo Bypass and woodland corridor would provide habitat for similar species as the Sacramento Bypass.

Birds can be ingested into the engines of aircraft, or make contact with aircraft propellers, which is termed a “strike” hazard. Waterfowl (30 percent), gulls (22 percent), raptors (20 percent), and pigeons/doves (7 percent) represented 79 percent of the reported bird strikes causing damage to U.S. civil aircraft between 1990 and 2012 (Bird Strike Committee USA 2014). The FAA is responsible for enforcing 14 CFR Part 139, which prescribes rules regarding operation of airports used by aircraft with seating capacity of more than 30 passengers. An ecological study must be prepared and submitted to FAA when multiple birds or other wildlife are struck by aircraft or ingested into aircraft engines, or when the number of birds or other wildlife present in an airport flight pattern is sufficient to result in such hazards. FAA determines whether a Wildlife Hazard Management Plan is needed. The FAA Advisory Circular *Hazardous Wildlife Attractants on or Near Airports* (2007) provides guidance on where to locate certain land uses that have the potential to attract hazardous wildlife to or near public-use airports. FAA recommends maintaining the following separations when siting water-related land uses that may attract hazardous wildlife (FAA 2007):

- 5,000 feet from airports serving piston-powered aircraft;
- 10,000 feet from airports serving turbine-powered aircraft; and
- 5 statute miles from airports where the wildlife attractant may cause hazardous wildlife movement into or across the approach or departure airspace.

Expanding the Sacramento and Yolo Bypasses is unlikely to result in an increase in the number of wildlife species or individuals that pose a strike hazard. Existing agricultural uses in areas that would be incorporated into the expanded bypasses are anticipated to continue. Although an expanded area could be seasonally flooded during
periods of high flow along the Sacramento River, the majority of the agricultural lands that would be incorporated into the expanded bypasses are rice fields, which currently inundate seasonally and provide attractive habitat for waterfowl and other hazardous species under existing conditions. Expansion of the Yolo Bypass would increase the bypass area within 5 miles of SMF by approximately 800 acres, but the existing bypass in this area currently totals over 11,000 acres. The Sacramento Bypass would increase by approximately 400 acres, some of which would be within 5,000 feet of the CHP Academy Airport, but none of which would be within 5 miles of SMF. The CHP Academy is currently bordered by hundreds of acres of seasonally inundated habitat in the existing Sacramento Bypass to the north and extensive rice fields and the Yolo Bypass to the west. Similarly, SMF is currently surrounded by many thousands of acres of agricultural and wetland habitats that provide attractive habitat for hazardous wildlife. Because the landscape currently supports extensive areas of habitat attractive to species that pose a high strike risk, the approximately 1,300-acre increase in the Sacramento and Yolo Bypass areas that would result from construction of the proposed funded facilities is small in relation to the amount of existing habitat; much of this area is already used for seasonally inundated rice fields, and the increase in size of the Sacramento and Yolo Bypasses is therefore unlikely to substantially increase populations of hazardous species in the region or movement of hazardous wildlife into or across the approach or departure airspace.

Creation of the woodland corridor along the east side of Tule Canal would change habitat conditions and increase the amount of suitable nesting habitat for some hazardous species, including raptors. However, raptor nesting habitat is already present in the Sacramento Bypass, much closer to the CHP Academy Airport, and the new habitat would be over 5,000 feet from the CHP Academy Airport at its nearest point. The woodland corridor would be approximately 2.5 miles southwest of SMF at its closest point, but high quality riparian habitat that currently supports nesting raptors is present along the Sacramento River, much closer to SMF. In addition, the region currently provides extensive areas of suitable raptor foraging habitat, including immediately adjacent to SMF. Therefore, although woodland creation would increase the amount of suitable nesting habitat within 5 miles of SMF, and potentially the number of nesting raptors, it is not anticipated to substantially increase the number of raptors that occur in the area or movement of hazardous wildlife into or across the approach or departure airspace.

Therefore, widening of the Sacramento and Yolo Bypasses and creation of a woodland corridor along Tule Canal are not anticipated to increase the birdstrike hazard at the CHP Academy Airport or SMF, and these funded facility components of the proposed program would have a less-than-significant impact.

| IMPACT     | Possible Creation of Wildland Fire Hazards. Construction activities could result in the ignition and spread of wildland fires from accidental discharge of sparks in vegetated areas. This impact would be potentially significant. |

The proposed funded facilities 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. Although CAL FIRE (2007, 2008) has determined that the areas where future project-related activities would occur are not within a very high fire hazard severity zone, vegetation is present in most areas where work would occur. In some areas where nonnative, invasive vegetation has become established, dense thickets of understory shrubs are present. Most of the future project-related work would likely occur during the summer and fall months when hot and dry conditions would enable rapid spread of fires. Construction equipment can emit sparks that could ignite fires, thereby possibly exposing people or structures to a significant risk of loss, injury, or death. Therefore, the proposed funded facilities would have a potentially significant impact. Mitigation Measure HAZ-4, described below, has been identified to address this impact.
**IMPACT**  
HAZ-6  
Create a Public Health Hazard from Increased Exposure to Mosquito-Borne Diseases by Substantially Increasing the Amount of Mosquito Habitat. Widening the Sacramento Weir would double the size of the Sacramento Bypass, thereby increasing the potential for additional mosquito breeding habitat. However, water is retained in the bypass only during the winter months when mosquito activity is very low, and best management practices would be implemented to reduce mosquito populations. Therefore, this program component would have a *less-than-significant* impact. There would be *no impact* from implementing the other program components because these funded facilities would have no effect on mosquito habitat.

Most of the proposed funded facilities would not change the existing mosquito habitat that is present in the region and therefore would have *no impact*.

Lengthening the Sacramento Weir would effectively double the size of the Sacramento Bypass (i.e., from approximately 360 acres to approximately 720 acres). Although this could result in an increase in mosquito breeding habitat, water only flows through the bypass during the winter months of a high rainfall year. Because of the hot, dry climate in the Sacramento Valley, water is generally not retained in the bypass from late spring into summer, which are the months when mosquitoes are most actively breeding. The land that would be included in the Sacramento Bypass in the future is currently used for agricultural activities, and those agricultural activities would continue in the future. Furthermore, the agency(ies) implementing program components would coordinate with the Sacramento-Yolo Mosquito and Vector Control District to implement best management practices for mosquito control such as those contained in the *Mosquito Reduction Practices Best Management Manual* (Sacramento-Yolo Mosquito and Vector Control District 2008). Therefore, this impact is considered *less-than-significant*.

### 4.16.4 MITIGATION MEASURES

**Mitigation Measure HAZ-1: Characterize Existing Wastes and RemEDIATE the Former Old Bryte Landfill** (for Impact HAZ-1, Possible Exposure of People and the Environment to Existing Hazardous Materials, Including Cortese-Listed Sites).

The agency(ies) implementing program components shall implement the following measures:

- Complete the necessary steps to characterize the existing wastes at the Old Bryte Landfill and submit necessary reports and remedial action plans for approval to DTSC and any other required agency (e.g., Central Valley RWQCB, Yolo County Department of Environmental Health).

- Perform all necessary activities to remediate the Old Bryte Landfill as required by DTSC and any other regulatory agency. Remediation may include, but is not limited to, removal of soil, landfill debris, and burn ash; and removal of contaminants from groundwater. Remediation shall be performed to a level sufficient for DTSC (and other regulatory agencies such as Central Valley RWQCB as necessary) to make a determination that allowing floodwaters to flow over the site through the widened Sacramento Bypass would not result in environmental contamination. Hazardous materials shall be remediated to a level that is fully protective of human health (including drinking water and agricultural water supply), as well as the health of other mammals and aquatic life, to levels required by DTSC. All required reports documenting that remediation has been completed shall be submitted to DTSC and other regulatory agencies as necessary.

- Construction of the new Sacramento Bypass setback levee (adjacent to the landfill) shall not begin until the Old Bryte Landfill has been remediated and a landfill closure order has been issued by DTSC.

**Timing:** Prior to construction activities.
Responsibility: The agency(ies) implementing the program component.

Mitigation Measure HAZ-2: Perform a Site-Specific HazMat Database Search and/or Phase I ESA, and Coordinate with Responsible Parties for Relocation of Storage Tanks and Groundwater Monitoring and Treatment Wells (for Impact HAZ-1, Possible Exposure of People and the Environment to Existing Hazardous Materials, Including Cortese-Listed Sites).

The agency(ies) implementing program components shall implement the following measures:

- Prior to the start of construction activities at any program component location, a site-specific search of relevant hazardous materials databases, including local government listings of permitted aboveground and underground storage tanks and SWRCB listings of groundwater treatment and monitoring wells shall be performed. This search may be performed as part of a site-specific Phase I ESA.

- Coordinate with affected landowners to relocate storage tanks and groundwater treatment and/or monitoring wells if such facilities are located within the footprint of the program component, or the alignment of the proposed funded facility shall be adjusted to avoid adverse impacts to these existing facilities. Any further investigations or remedial activities recommended in the ESAs shall be completed prior to the start of construction activities prior to start of construction on sites containing known storage tanks and groundwater wells.

Timing: Prior to construction activities.

Responsibility: The agency(ies) implementing the program component.


The agency(ies) implementing program components shall implement the following measures:

- If, during site preparation and construction activities, evidence of hazardous materials contamination is observed or suspected through either obvious or implied measures (i.e., stained or odorous soil or groundwater), construction activities shall immediately cease in the area of the find. A qualified hazardous materials specialist shall assess the site and collect and analyze soil and/or groundwater samples, if needed. If contaminants are identified in the samples, the agency(ies) implementing the program component shall employ measures, or coordinate with the landowner or other responsible party to employ measures, in accordance with Federal and State regulations before construction activities can resume at the site.

- A worker health and safety plan shall be prepared before the start of construction activities that identifies, at a minimum, the potential types of 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 during construction, including protocols for handling hazardous materials and preventing their spread, and emergency notification procedures to local and/or state regulatory agencies.

Timing: Prior to site-specific design and construction activities.

Responsibility: The agency(ies) implementing the program component.
Mitigation Measure HAZ-4: Prepare and Implement a Fire Prevention Plan (for Impact HAZ-5, Possible Exposure to Wildland Fires).

The agency(ies) implementing program components shall prepare and implement a fire prevention plan in coordination with the appropriate emergency service and/or fire suppression agencies of the applicable local or State jurisdictions before the start of any construction activities. The plan shall describe fire prevention and response methods, including fire precaution, requirements for spark arrestors on equipment, and suppression measures that are consistent with the policies and standards of the affected jurisdictions. When heavy equipment is used for construction during the dry season, a water truck shall be maintained on the construction site. Materials and equipment required for implementation of the plan shall be available on the construction site. Training shall be provided to all construction personnel regarding fire safety, and all personnel shall be made familiar with the contents of the plan before the start of construction activities.

Timing: Prior to and during construction activities.

Responsibility: The agency(ies) implementing the program component.

4.16.5 CONCLUSION

Impact HAZ-1 (accidental spills of hazardous materials used during construction), Impact HAZ-2 (handling of hazardous materials within 1/4-mile of a school during construction), Impact HAZ-4 (creation of safety hazards, including birdstrike, in the vicinity of a public or private airport), and Impact HAZ-6 (create a public health hazard from increased exposure to mosquito-borne diseases by substantially increasing the amount of mosquito habitat) would be less-than-significant.

Implementing Mitigation Measures HAZ-1, HAZ-2, and HAZ-3 would reduce significant Impact HAZ-3 (possible exposure of people and the environment to existing hazardous materials, including Cortese-listed sites) to a less-than-significant level because the Old Bryte Landfill would be remediated to the satisfaction of DTSC prior to start of construction activities associated with the Sacramento Bypass Levee, and site-specific Phase I ESAs or database searches would be performed to determine whether project components would be placed in locations of other known hazardous materials. If so, the agencies implementing program components would coordinate with affected landowners and the owners/agencies responsible for operation of groundwater remediation/monitoring wells to either relocate such wells or modify the project-specific design to avoid adverse environmental impacts.

Implementing Mitigation Measure HAZ-4 would reduce potentially significant Impact HAZ-5 (possible creation of wildland fire hazards) to a less-than-significant level because a fire prevention plan would be prepared and implemented.
4.17 MINERAL RESOURCES

This section provides a discussion of the mineral land classifications established by the California Geological Survey (CGS) and an assessment of the potential that regionally or locally important mineral resources could be made unavailable for future resource extraction as a result of program implementation.

4.17.1 REGULATORY SETTING

FEDERAL

No Federal plans, policies, regulations, or laws related to mineral resources apply to the proposed program.

STATE

California Surface Mining and Reclamation Act

The Surface Mining and Reclamation Act of 1975 (California Public Resources Code Section 2710 et seq.) (SMARA) addresses surface mining of minerals and requires the prevention of adverse environmental effects caused by mining, the reclamation of mined lands for alternative uses, and the elimination of hazards to public health and safety from the effects of mining activities. 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. 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.

REGIONAL AND LOCAL

Sacramento County General Plan

The following policies from the Sacramento County General Plan of 2005-2030 Conservation Element (Sacramento County 2011) regarding mineral resources apply to the proposed program.

► **Policy CO-40:** Extractive uses and associated processing uses and facilities shall maintain adequate minimum setbacks to protect adjoining land uses.

► **Policy CO-44:** Due to the predicted shortages of aggregates in Sacramento County, mining of mineral resources within the Urban Services Boundary (USB) is encouraged, where consistent with Habitat Conservation Plans or other County initiated conservation programs and where such mining does not preclude successful completion of these plans, to avoid the potential loss of these mineral resources as a result of potential urban development. This policy is not intended to preclude mining outside the USB.

► **Policy CO-45:** To the maximum extent possible, all base material utilized in County and private road construction shall be composed of recycled asphalt concrete and roadway base material.

Sacramento County Zoning Code Title II, Article 4, Surface Mining

Sacramento County has adopted its own SMARA ordinance, which is modeled after the State’s SMARA guidelines (see above). Sacramento County’s SMARA ordinance is designed to protect mineral resources from
incompatible land uses, to manage the mineral resources, to assure Sacramento County of an adequate supply of these resources with due consideration for the environment, and to provide for the restoration of mined lands for future use. A Conditional Use Permit is required and a reclamation plan must be prepared and approved by the county.

City of Sacramento General Plan

The following policies from the *Sacramento 2035 General Plan* Environmental Resources Element (City of Sacramento 2015) related to mineral resources apply to the proposed program.

► **Policy ER 5.1.1 Mineral Resource Zones:** The City shall protect lands designated MRZ-2, as mapped by the California Geological Survey, and continue to regulate activities consistent with the Surface Mining and Reclamation Act, mineral land classification information, and the California Environmental Quality Act.

► **Policy ER 5.1.3 Ongoing Extraction Activities:** The City shall continue to support ongoing environmentally sensitive mineral extraction activities within the city until these resources are depleted or extraction is no longer economically viable.

Solano County General Plan

The following policies from the *Solano County General Plan* Resources Element (Solano County 2008) related to mineral resources apply to the proposed program.

► **Policy RS.P-33:** The County shall preserve, for future use, areas with important mineral resources by preventing residential, commercial, and industrial development that would be incompatible with mining practices to the extent feasible.

► **Policy RS.P-34:** Ensure that mineral extraction operations are performed in a manner compatible with land uses on the site and surrounding area and do not adversely affect the environment. At the end of such operations, ensure that the site is restored to conform with Surface Mining and Reclamation Act requirements and to a use compatible with surrounding land uses.

Solano County Municipal Code Chapter 29, Surface Mining and Reclamation

Solano County has also adopted its own SMARA ordinance, which is modeled after the state’s SMARA guidelines (see above). Solano County’s SMARA ordinance is designed to provide for the extraction of minerals and the reclamation of mined lands to ensure the continued economic well-being of the county and to the needs of society, and to prevent or minimize adverse effects on the environment and to protect the public health and safety. The ordinance requires that a Conditional Use Permit be obtained and a reclamation plan be prepared and approved by the county, including assurances of funding to implement and complete the proposed reclamation plan.

City of Rio Vista General Plan

The following policies from the *City of Rio Vista General Plan 2001* (City of Rio Vista Community Development Department 2002) related to mineral resources apply to the proposed program.

► **Policy 10.1.C:** The City shall require that new development be designed and constructed to preserve the following types of areas and features as open space to the maximum extent feasible:

- High erosion hazard areas
- Scenic and trail corridors
- Streams and riparian vegetation
• Wetlands
• Drainage corridors
• Other significant stands of vegetation
• Wildlife corridors
• Key hilltops
• Views of the Sacramento River
• Any areas of Federal, state or local significance [including State or locally designated sources of important mineral resources such as natural gas reserves]
• Sensitive Local Resource Areas shown in [General Plan] Figure 10-2

► **Policy 10.3.A:** The City shall ensure that agricultural operations, natural resource protection [including natural gas reserves], water-related recreation, and public facility uses shall remain the only allowable uses in the Delta Primary Zone.

**Yolo County Municipal Code Title 10, Surface Mining and Reclamation**

Yolo County’s ordinances related to surface mining (Title 10, Chapters 3, 4, 5, and 8) contain different provisions depending on whether the mining activity would be located in- or off-channel. In both cases, however, the ordinances require that a Conditional Use Permit be obtained and a reclamation plan be prepared and approved by the County, including assurances of funding to implement and complete the proposed reclamation plan.

**Yolo County General Plan**

The following policies from the *Yolo County General Plan Conservation and Open Space Element* (Yolo County 2009) related to mineral resources apply to the proposed program.

► **Policy CO-3.1:** Encourage the production and conservation of mineral resources, balanced by the consideration of important social values, including recreation, water, wildlife, agriculture, aesthetics, flood control, and other environmental factors.

► **Policy CO-3.3:** Encourage the extraction of natural gas where compatible with both on-site and surrounding land uses, and when performed in a manner that does not adversely affect the environment.

**4.17.2 ENVIRONMENTAL SETTING**

**Construction Aggregate**

Under SMARA, the State Mining and Geology Board may designate certain mineral deposits as being regionally significant to satisfy future needs. The Board’s decision to designate an area is based on a classification report prepared by CGS and on input from agencies and the public. The Sacramento Weir, Sacramento Bypass, a portion of the Tule Canal, and the Sacramento River East Levee lie within the designated Sacramento-Fairfield Production-Consumption Region for Portland cement concrete aggregate, which includes all designated lands within the marketing area of the active aggregate operations supplying the Sacramento-Fairfield urban center (Dupras 1988). The Rio Vista area and most of the Yolo Bypass are not included within a mineral land classification study (CGS 2015).

In compliance with SMARA, CGS has established the classification system shown in Table 4.17-1 to denote both the location and significance of key extractive resources.

Active construction aggregate (i.e., sand and gravel) production areas in the region are located primarily along Cache Creek in the Woodland area, along Putah Creek in the Davis area, and in ancestral channels of the American River in southeastern Sacramento County and the City of Rancho Cordova (Dupras 1988, 1999).
Proposed program activities would not take place in any area classified as MRZ-2 (areas where significant mineral deposits are known or are likely to be present).

<table>
<thead>
<tr>
<th>Classification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRZ-1</td>
<td>Areas where adequate information indicates that no significant mineral deposits are present or where it is judged that little likelihood exists for their presence</td>
</tr>
<tr>
<td>MRZ-1</td>
<td>Areas of mined out PCC-grade aggregate resources</td>
</tr>
<tr>
<td>MRZ-2</td>
<td>Areas where adequate information indicates that significant mineral deposits are present or where it is judged that a high likelihood exists for their presence</td>
</tr>
<tr>
<td>MRZ-3</td>
<td>Areas containing mineral deposits, the significance of which cannot be evaluated from available data</td>
</tr>
<tr>
<td>MRZ-4</td>
<td>Areas where available data is inadequate for assignment to any other mineral resource zone</td>
</tr>
</tbody>
</table>

Table 4.17-1. California Geological Survey Mineral Land Classification System

Note: MRZ = Mineral Resource Zone; PCC = Portland Cement Concrete
Source: Dupras 1988

Natural Gas

As shown in Exhibit 4.17-1, numerous natural gas fields are scattered throughout the program area. In 1887, the City of Stockton granted the California Well Company the right to lay pipelines throughout the City and distribute natural gas; thus, Stockton became the first California city to be supplied with natural gas. The first intensive effort to find nonassociated gas (i.e., produced from gas fields, not associated with oil) accumulations occurred in the latter half of the 1930s. In 1936, McDonald Island Gas field in San Joaquin County and the Rio Vista Gas field in Sacramento, Solano, and Contra Costa Counties were discovered. Gas exploration increased appreciably during the 1940s, and assumed even greater proportions in the 1950s. In the 1950s, more than 30 gas fields were discovered, most of them in the Sacramento Valley. The search for gas continued throughout the 1970s, and 44 additional gas fields were discovered from 1970 to 1980; again, primarily in the Sacramento Valley. (DOGGR 1993.)

Prior to the 1940s, there was a natural gas surplus in California. Since that time, the situation has changed to one of inadequate supply because of growth in population and industry. Thus, California must import gas every year. Natural gas production in California has decreased since the turn of the century, from approximately 1,018 million cubic feet per day (MMcf/day) in 2001 to approximately 613 MMcf/day in 2013 (California Energy Commission [CEC] 2015). Overall, the natural gas supplies in California currently meet approximately 11 percent of the State’s demand (CEC 2015). As of 2009, there were 25 natural gas fields operating in Yolo County, approximately half of which are located in the Yolo Bypass (Yolo County 2009). Additional gas fields are located in Solano County, including the Rio Vista Gas Field (which is the largest in California), as well as Sacramento County. Natural gas production is an important part of the economic base for both Yolo and Solano County.
Exhibit 4.17-1. Natural Gas Fields in the Program Area

Source: California Division of Oil, Gas, and Geothermal Resources (DOGGR) 2007
4.17.3 ENVIRONMENTAL IMPACTS

The analysis of potential impacts on mineral resources was based on a review of mineral land classification studies and geologic maps prepared by CGS, as well as a review of local general plans for Sacramento, Solano, and Yolo Counties.

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, as amended. The proposed program would have a significant effect on mineral resources if it would:

- result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state; or
- result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan.

IMPACT ANALYSIS

| Impact | Loss of Availability of Regionally or Locally Important Known Mineral Resources—Construction Aggregate. None of the proposed program components are located within a regionally or locally designated important mineral resource extraction zone (i.e., an area classified by CGS as MRZ-2). In addition, the use of mineral resources for levee setbacks and road base would be an appropriate use of any aggregate mineral resources that may be present. Therefore, this impact would be less than significant. |

Activities associated with construction of levee setbacks between the Sacramento Weir and Interstate 5, widening the Sacramento Weir and Sacramento Bypass, relocating Yolo County Road 124, remediating the Old Bryte Landfill, excavating borrow material from the Tule Canal, and strengthening the Reclamation District No. 2068 Levee south of Midway Road would take place within areas that have not been included in a mineral land classification study. However, there are no known mining or mineral producers within these areas (Larosse, et al. 1999). The south side of the Sacramento Weir and the Sacramento Bypass, and the Sacramento River East Levee, are located in areas classified by CGS as MRZ-1—areas where adequate information indicates that no significant mineral deposits are present or where it is judged that little likelihood exists for their presence (Dupras 1999: Plate 3). There is one known active mineral producer at the southern end of the program area—the Asta Sand Pit operated by Asta Construction—at the northeastern end of Rio Vista, approximately 0.5-mile north of the State Route (SR) 12 Bridge (Larosse, et al. 1999, Solano County 2008: Figure RS-4). However, proposed program activities would occur to the south of the Asta Sand Pit.

Furthermore, proposed program activities would not occur within a locally designated important construction aggregate site (City of Sacramento 2015, Sacramento County 2011, Solano County 2008, and Yolo County 2009).

As discussed in Chapter 3, “Project Description,” borrow material would be obtained from the eastern side of the Tule Canal for blending with soils excavated from the levees to make the excavated soils suitable for reuse in levee reconstruction. The suitability and available quantities of borrow material from the Tule Canal would be investigated further and confirmed as part of project design. The agencies implementing program components prefer to maximize the use of on-site excavated soils by blending with imported material from borrow sites, thereby reducing the overall amount of imported borrow material. If future investigations demonstrate the need for additional supplemental borrow sites, there are sites throughout the program area that have been used or are bring used for ongoing levee improvement projects. Finding and importing material from these sites would be the responsibility of the construction contractor. The environmental requirements and mitigation requirements for the funded facilities would be applied to the borrow operation and the contractor’s hauling operations from other sites.

Updated Local Funding Mechanisms Subsequent Program DEIR
Sacramento Area Flood Control Agency

GEI Consultants, Inc.  
Mineral Resources

4.17-7
through the contract documents and technical specifications for the project. Necessary aggregate base and rock revetment material would be obtained from a commercial, permitted sand and gravel operation, most likely in the Sacramento area.

In the event that any borrow site activity is determined to be subject to SMARA requirements, the agencies implementing program components would be required to secure the required SMARA permit and implement the conditions contained therein as administered and issued by Sacramento, Solano, or Yolo County. Furthermore, the use of mineral resources for levee reconstruction and road base would be an appropriate use of any aggregate mineral resources that may be present.

Therefore, this impact is considered less than significant.

**Impact MIN-2**
Possible Loss of Availability of Regionally or Locally Important Mineral Resources—Natural Gas.
Natural gas well fields and individual gas wells are located throughout the program area. Therefore, construction of program components could result in loss of use of existing natural gas wells, and this impact would be potentially significant.

As shown in Exhibit 4.17-1, numerous natural gas fields are located throughout the program area in Sacramento, Yolo, and Solano Counties (DOGGR 2007), along with thousands of individual wells (DOGGR 2009, 2010). Natural gas is identified as an important resource in the City of Rio Vista (2002), Solano County (2008), and Yolo County (2009) General Plans. There is a potential that any or all of the funded facilities could occur within natural gas field boundaries where existing natural gas wells are located. Therefore, program implementation could result in loss of access to existing natural gas wells, and this impact is considered potentially significant.

### 4.17.4 Mitigation Measures

**Mitigation Measure MIN-1:** Finalize Specific Locations of Program Components, Determine Exact Locations of Existing Wells in Relationship to Program Components, and Fund any Necessary Closure, Destruction, or Relocation of Natural Gas Wells (for Impact MIN-2, Loss of Availability of Regionally or Locally Important Mineral Resources—Natural Gas).

After the exact locations of each of the program components have been finalized, but before the start of construction activities, the agencies implementing program components shall consult the California DOGRR to determine whether any natural gas wells are present at the locations where proposed funded facilities would be constructed. If no wells are present, then no further mitigation is required. If wells are present, the agencies implementing program components shall consult with the owners of such wells to make arrangements for continued well access. If it is necessary to close, relocate, or destroy any active or inactive wells in order to implement proposed funded facilities, the agencies implementing program components shall pay for the cost of such activities.

**Timing:** Prior to and during construction activities.

**Responsibility:** The agency(ies) implementing the program component.

### 4.17.5 Conclusion

Impact MIN-1 would be less than significant; no mitigation measures would be required. Implementing Mitigation Measure MIN-1 would reduce potentially significant Impact MIN-2 from the possible loss of access to natural gas wells to a less-than-significant level, because funding would be provided to close, destroy, and relocate existing natural gas wells (if necessary), and because the narrow width of the levee setback and floodwall prisms would not preclude any mining operator from drilling new wells to obtain natural gas in the future.
4.18 GREENHOUSE GASES

This section addresses issues related to greenhouse gas emissions. Issues related to other air emissions are discussed in Section 4.11, “Air Quality.”

4.18.1 REGULATORY SETTING

FEDERAL

The U.S. Environmental Protection Agency (EPA) is the Federal agency responsible for implementing the Federal Clean Air Act (CAA). On April 2, 2007, the U.S. Supreme Court held that the EPA must consider regulation of motor vehicle greenhouse gas (GHG) emissions. In Massachusetts v. Environmental Protection Agency et al., 12 states and cities (including California) along with several environmental organizations sued to require EPA to regulate GHGs as pollutants under the CAA (127 S. Ct. 1438 [2007]). The Supreme Court ruled that GHGs fit within the CAA’s definition of a pollutant and that EPA had the authority to regulate GHGs.

U.S. Environmental Protection Agency “Endangerment” and “Cause or Contribute” Findings

On December 7, 2009, the EPA Administrator signed two distinct findings regarding GHGs under Section 202(a) of the CAA:

► Endangerment Finding: The current and projected concentrations of the six key GHGs—carbon dioxide (CO₂), methane, nitrous oxide, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆)—in the atmosphere threaten the public health and welfare of current and future generations.

► Cause or Contribute Finding: The combined emissions of these GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG pollution that threatens public health and welfare.

Mandatory Greenhouse Gas Reporting Rule

On September 22, 2009, EPA released its final Greenhouse Gas Reporting Rule (Reporting Rule). The Reporting Rule is a response to the fiscal year 2008 Consolidated Appropriations Act (House of Representatives Bill 2764; Public Law 110-161), which required EPA to develop “…mandatory reporting of GHGs above appropriate thresholds in all sectors of the economy….” The Reporting Rule applies to most entities that emit 25,000 metric tons (MT) of CO₂-equivalents (CO₂e) or more per year. Since 2010, facility owners have been required to submit an annual GHG emissions report with detailed calculations of the facility’s GHG emissions. The Reporting Rule also mandates compliance with recordkeeping and administrative requirements to enable EPA to verify annual GHG emissions reports.

STATE

The legal framework for GHG emission reductions has come about through Executive Orders, legislation, and regulations. The major components of California’s climate change initiative are reviewed below.

Executive Order S-3-05

Executive Order S-3-05, issued in recognition of California’s vulnerability to the effects of climate change, set forth the following target dates by which Statewide GHG emissions would be progressively reduced: by 2010, reduce GHG emissions to 2000 levels; by 2020, reduce GHG emissions to 1990 levels; and by 2050, reduce GHG emissions to 80 percent below 1990 levels.
Assembly Bill 32

In 2006, the California Legislature passed Assembly Bill (AB) 32 (California Health and Safety Code Section 38500 et seq.), also known as the Global Warming Solutions Act. Under AB 32, the California Air Resources Board (ARB) must design and implement feasible and cost-effective emissions limits, regulations, and other measures, to reduce Statewide GHG emissions to 1990 levels by 2020. This reduction will be accomplished through an enforceable statewide cap on GHG emissions (i.e., cap-and-trade program) that was phased in starting in January 1, 2012 with enforceable compliance obligation beginning with the 2013 GHG emissions. To effectively implement the cap, AB 32 directs ARB to develop and implement regulations to reduce Statewide GHG emissions from stationary sources. AB 32 specifies that regulations adopted in response to AB 1493 should be used to address GHG emissions from vehicles. However, AB 32 also includes language stating that if the AB 1493 regulations cannot be implemented, then ARB should develop new regulations to control vehicle GHG emissions under the authorization of AB 32.

AB 32 requires that ARB adopt a quantified cap on GHG emissions representing 1990 emissions levels and disclose how it arrives at the cap; institute a schedule to meet the emissions cap; and develop tracking, reporting, and enforcement mechanisms to ensure that the State achieves the reductions in GHG emissions necessary to meet the cap. AB 32 also includes guidance to institute emissions reductions in an economically efficient manner and conditions to ensure that businesses and consumers are not unfairly affected by the reductions.

Climate Change Scoping Plan

Pursuant to AB 32, ARB adopted the Climate Change Scoping Plan (Scoping Plan) in December 2008, outlining measures to meet the 2020 GHG reduction goals. To meet these goals, California must reduce its GHG emissions by 30 percent below projected 2020 business-as-usual emissions levels, or about 15 percent from today’s levels (i.e., levels as of 2005). The Scoping Plan recommends measures that are worth studying further, and that the State of California may implement, such as new fuel regulations. It estimates that a reduction of 174 million metric tons (MMT) of CO2e (about 191 million U.S. tons) from the transportation, energy, agriculture, forestry, and other sources could be achieved should the State implement all of the measures in the Scoping Plan. The Scoping Plan relies on the requirements of Senate Bill (SB) 375 (discussed below) to implement the carbon emission reductions anticipated from land use decisions.

ARB is required to update the Scoping Plan at least once every 5 years to evaluate progress and develop future inventories that may guide this process. ARB approved the First Update to the Climate Change Scoping Plan: Building on the Framework in June 2014 (ARB 2014a). The Scoping Plan update includes a status of the 2008 Scoping Plan measures and other State, Federal, regional, and local efforts to reduce GHG emissions in California from 2008 to 2013 with respect to the 2020 GHG reduction target. The Scoping Plan Update determined that the State is on schedule to achieve the 2020 target; however, an accelerated reduction in GHG emissions is required to achieve the 2050 reduction target.

Executive Order S-1-07

Executive Order S-1-07 acknowledges that the transportation sector is the main source of GHG emissions in California. The order established a goal of reducing the carbon intensity of transportation fuels sold in California by a minimum of 10 percent by 2020. It also directed ARB to determine whether this Low Carbon Fuel Standard could be adopted as a discrete, early-action measure after meeting the mandates in AB 32. ARB adopted the Low Carbon Fuel Standard on April 23, 2009.

Senate Bill 97

Senate Bill (SB) 97, enacted in August 2007, recognizes climate change as a prominent environmental issue that requires analysis under CEQA. On December 30, 2009, the Natural Resources Agency adopted amendments to the State CEQA Guidelines, as required by SB 97. These State CEQA Guidelines amendments provide guidance
to public agencies regarding the analysis and mitigation of the effects of GHG emissions in draft CEQA documents. The amendments became effective March 18, 2010.

**Senate Bills 1078 and 107 and Executive Orders S-14-08 and S-21-09**

SB 1078 (Chapter 516, Statutes of 2002) required retail sellers of electricity, including investor-owned utilities and community choice aggregators, to provide at least 20 percent of their supply from renewable sources by 2017. SB 107 (Chapter 464, Statutes of 2006) changed the target date to 2010. In February 2014, the California Public Utilities Commission (CPUC) reported that California’s three largest investor-owned utilities (IOUs) (i.e., Pacific Gas and Electric Company, Southern California Edison, and San Diego Gas and Electric Company) collectively provided 22.7 percent of their 2013 retail electricity sales using renewable sources and are continuing progress toward future 2020 requirements (CPUC 2014).

Executive Order S-14-08 expanded the State’s Renewable Portfolio Standard to 33 percent renewable power by 2020. Executive Order S-21-09 directs ARB under its AB 32 authority to enact regulations to help the State meet its Renewable Portfolio Standard goal of 33 percent renewable energy by 2020.

The 33 percent-by-2020 goal and requirements were codified in April 2011 with SB X1-2. This new Renewable Portfolio Standard applies to all electricity retailers in the State, including publicly owned utilities, investor-owned utilities, electricity service providers, and community choice aggregators. Consequently, the Sacramento Municipal Utility District, which would be the electricity provider for the proposed program, must meet the 33 percent goal by 2020.

**REGIONAL AND LOCAL**

**Sacramento Metropolitan Air Quality Management District**

The Sacramento Metropolitan Air Quality Management District (SMAQMD) regulates local air quality and air quality sources in the program area. In the CEQA Guide to Air Quality Assessment, SMAQMD includes a GHG chapter that discusses the recommended approach to evaluating GHG emissions. SMAQMD states that GHG emissions should first be evaluated and addressed on a program-level if possible. For project-level analyses, SMAQMD also includes a list of analysis expectations and methodologies for CEQA analyses. In addition, in November 2014, SMAQMD adopted GHG thresholds of significance that are discussed further in the “Significance Criteria,” subsection below.

**Yolo-Solano Air Quality Management District**

At the time of this writing, the Yolo-Solano Air Quality Management District (YSAQMD) has not developed formal guidance for evaluating or determining significance of GHG emissions. However, YSAQMD recommends that GHG emissions be evaluated in CEQA analyses and that analyses use guidance from California Air Pollution Control Officers Association and the Attorney General’s Office.

**4.18.2 ENVIRONMENTAL SETTING**

GHGs play a critical role in determining the earth’s surface temperature. A portion of the solar radiation that enters the earth’s atmosphere is absorbed by the earth’s surface, and a smaller portion of this radiation is reflected back toward space. This infrared radiation (i.e., thermal heat) is absorbed by GHGs within the earth’s atmosphere. As a result, infrared radiation released from the earth that otherwise would have escaped back into space is instead “trapped,” resulting in a warming of the atmosphere. This phenomenon, known as the “greenhouse effect,” is responsible for maintaining a habitable climate on the earth.

GHGs are present in the atmosphere naturally, are released by natural and anthropogenic (human-caused) sources, and are formed from secondary reactions taking place in the atmosphere. Natural sources of GHGs include the
respiration of humans, animals and plants; decomposition of organic matter; volcanic activity; and evaporation from the oceans. Anthropogenic sources include the combustion of fossil fuels by stationary and mobile sources, waste treatment, and agricultural processes. The following GHGs are widely accepted as the principal contributors to human-induced global climate change:

- CO₂,
- methane,
- nitrous oxide,
- HFCs,
- PFCs,
- sulfur hexafluoride, and
- nitrogen trifluoride.¹

Natural sources of CO₂ include decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungus; and evaporation from oceans; anthropogenic sources include burning of coal, oil, natural gas, and wood. Methane is the main component of natural gas and is associated with agricultural practices and landfills. Nitrous oxide is a colorless GHG that results from industrial processes, vehicle emissions, and agricultural practices. HFCs are synthetic chemicals used as a substitute for chlorofluorocarbons in automobile air conditioners and refrigerants. PFCs are produced as a byproduct of various industrial processes associated with aluminum production and the manufacturing of semiconductors. Sulfur hexafluoride is an inorganic, odorless, colorless, nontoxic, nonflammable GHG used for insulation in electric power transmission and distribution equipment and in semiconductor manufacturing. Nitrogen trifluoride is used in the electronics industry during the manufacturing of consumer items, including photovoltaic solar panels and liquid-crystal-display (LCD) television screens.

Global warming potential (GWP) is a concept developed to compare the ability of each GHG to trap heat in the atmosphere relative to CO₂. The GWP of a GHG is based on several factors, including the relative effectiveness of a gas to absorb infrared radiation and the gas’ “atmospheric lifetime” (i.e., the length of time that the gas remains in the atmosphere). The reference gas for GWP is CO₂, which has a GWP of 1. The GWPs of other GHG pollutants are then determined relative to CO₂, and total emissions can be described using “CO₂ equivalent” (CO₂e). For example, the other main GHGs that have been attributed to human activity include methane, which has a GWP of 28, and nitrous oxide, which has a GWP of 265 (Intergovernmental Panel on Climate Change [IPCC] 2013). Thus, 1 ton of methane has the same contribution to the greenhouse effect as approximately 28 tons of CO₂. GHGs with lower emission rates than CO₂ may still contribute to climate change because they are more effective at absorbing outgoing infrared radiation than CO₂ (i.e., they have a high GWP).

**Climate Change Trends**

Warming of the climate system is now considered to be unequivocal, with global surface temperature increasing approximately 1.53 degrees Fahrenheit (°F) over the last 140 years (IPCC 2013). The causes of this warming have been identified as both natural processes and human actions. The IPCC concluded that variations in natural phenomena, such as solar radiation and volcanoes, produced most of the warming from preindustrial times to 1950 and had a small cooling effect afterward. However, since 1950, increasing GHG concentrations resulting from human activity, such as fossil fuel burning and deforestation, have been determined with 95 percent certainty to be responsible for most of the observed temperature increase (IPCC 2013).

**Climate Change Effects**

During the same period when increased global warming has occurred, many other changes have occurred or are predicted to occur in other natural systems. Sea levels have risen; precipitation patterns throughout the world have shifted, with some areas becoming wetter and others drier; snowlines can rise, resulting in changes to the snowpack, runoff, and water storage; increased drought and wildfire risks; and numerous other conditions have

¹ Nitrogen trifluoride is recognized by the State of California as a GHG (California Health and Safety Code Section 38505[g]).
been observed. Although it is difficult to prove a definitive cause-and-effect relationship between global warming and other observed changes to natural systems, there is a high-level of confidence in the scientific community that these changes are a direct result of increased global temperatures caused by the increased presence of GHGs in the atmosphere (IPCC 2013).

According to the City of Sacramento Climate Action Plan (City of Sacramento 2012), climate change is expected to affect the Sacramento region in the following ways:

► variable precipitation patterns, with the possibility of reduced average rainfall;
► reduced snowpack and snowline at higher elevations;
► earlier, hotter, more frequent, and longer heat waves;
► more frequent and extreme storm events and associated flood risk;
► diminished air quality;
► levee failure induced by sea level rise, leading to critical infrastructure damage in the Sacramento–San Joaquin Delta (Delta);
► increased pressure on water supplies and diminished water quality;
► increased climate-related illnesses (from factors such as extreme heat, air quality, and disease-bearing vectors);
► loss of natural habitat and agricultural productivity; and
► compromised energy supply and security.

**Greenhouse Gas Emission Sources**

GHG emissions contributing to global climate change are attributable in large part to human activities. To account for and regulate GHG emissions, sources of GHG emissions are grouped into emission categories. ARB identifies the following categories, which account for most anthropogenic GHG emissions generated in California:

► **Transportation**: On-road motor vehicles, recreational vehicles, aviation, ships, and rail.
► **Electric Power**: Use and production of electrical energy.
► **Industrial**: Mainly stationary sources (e.g., boilers and engines) associated with process emissions.
► **Commercial and Residential**: Area sources, such as landscape maintenance equipment, fireplaces, and consumption of natural gas for space and water heating.
► **Agriculture**: Agricultural sources that include off-road farm equipment; irrigation pumps; crop residue burning (CO$_2$); and emissions from flooded soils, livestock waste, crop residue decomposition, and fertilizer volatilization (methane and nitrous oxide).
► **High-GWP Gases**: Refrigerants for stationary- and mobile-source air conditioning and refrigeration, electrical insulation (e.g., sulfur hexafluoride), and various consumer products that use pressurized containers.
► **Recycling and Waste**: Waste management facilities and landfills, primarily CO$_2$ emissions from combustion and methane from landfills and wastewater treatment.
ARB periodically performs an inventory of annual emissions of the major GHGs. As shown in Exhibit 4.10-1, California produced 458 MMT of CO₂e in 2012 (ARB 2014b). Combustion of fossil fuels in the transportation category was the single largest source of California’s GHG emissions in 2012, accounting for 37 percent of total GHG emissions in the State. The transportation category was followed by the industrial category, which accounts for 22 percent of total GHG emissions in California, and the electric power category (including in- and out-of-State sources), which accounts for 21 percent of the State’s total GHG emissions.

![Exhibit 4.18-1. 2012 California Greenhouse Gas Emissions by Sector](source: ARB 2014b)

### 4.18.3 ENVIRONMENTAL IMPACTS

Emissions of GHGs have the potential to adversely affect the environment because such emissions contribute cumulatively to global climate change. The proper context for addressing this issue in this SEIR is in the assessment of cumulative impacts. That is because while it is unlikely that a single project would contribute significantly to climate change, cumulative emissions from many projects could affect global GHG concentrations and the climate system. Unlike the locations of criteria air pollutants and toxic air contaminants (TACs), which are pollutants of localized or regional concern, the specific location of GHG emissions is of limited concern. Rather, the total amount and types of global GHG emissions have the most substantial effect on climate change. The primary source of GHG emissions associated with the proposed program would be construction activities. Construction emissions are “short-term” or temporary in duration. Nevertheless, as described above, because of the long lifetime of GHG emissions, it is the total amount of GHG emissions generated that ultimately affects the environment.
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, as amended. The proposed program would have a significant impact on GHGs if it would:

► generate greenhouse gas emissions, either directly, indirectly, that may have a significant impact on the environment; or

► conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

Based on Appendix G, the significance criteria established by the applicable air quality management district may be relied on to make the above determinations. In November 2014, SMAQMD adopted thresholds of significance for stationary sources, and the construction and operational emissions of land use development projects (SMAQMD 2015). SMAQMD GHG thresholds of significance recommend that a proposed program’s GHG emissions be considered significant if:

► the annual construction-related emissions of a land use development project exceed 1,100 MT CO₂e/yr (SMAQMD 2015);

► the annual operational emissions of a land use development project exceed 1,100 MT CO₂e/yr (SMAQMD 2015); or

► the annual emissions of a stationary source exceed 10,000 MT CO₂e/yr (SMAQMD 2015).

Because the proposed program would only include short-term, temporary construction emissions, SMAQMD’s annual construction threshold of significance (i.e., 1,100 MT CO₂e) would be the applicable threshold of significance. Therefore, if annual construction-related GHG emissions would exceed 1,100 MT CO₂e in any year of construction, the proposed program’s construction emissions would be considered significant.

At the time of this analysis, YSAQMD has not developed a quantitative threshold of significance for evaluating construction-related GHG emissions. Therefore, future project-level analyses conducted for project components occurring under YSAQMD jurisdiction should consult with YSAQMD for appropriate thresholds of significance to evaluate projects, when those separate CEQA documents are prepared.

For the purposes of this analysis, compliance with the SMAQMD or YSAQMD thresholds for GHG emissions are considered to indicate compliance with State GHG reduction targets for 2020 and 2050, since the thresholds adopted by these local agencies will be developed based on the State targets.

IMPACT ANALYSIS

Impact GHG-1  Temporary, Short-Term Generation of Greenhouse Gas Emissions. Construction activities associated with individual program components would generate annual GHG emissions that could exceed the SMAQMD or YSAQMD thresholds of significance. Therefore, this impact would be potentially significant.

During construction of individual program components, exhaust-related GHG emissions would be generated by sources such as heavy-duty off-road equipment, material haul trucks, and worker-commute vehicles. Construction-related GHG emissions would only last for the duration of construction activities and would cease following completion of the program component. However, unlike air quality emissions that are evaluated on a localized and regional basis with respect to ambient air quality standards, because of the long atmospheric lifetimes of GHG emissions, they have an effect on a global basis. Therefore, although construction activities and subsequent GHG emissions would be temporary and short-term, because of the atmospheric lifetimes of GHG emissions, they would have a significant impact on the environment.
emissions and their long-term ability to continue contributing to the climate change, the total amount of GHG emissions from a project are considered.

At the time of this writing, the exact schedule and construction parameters for the Lower Sacramento River Erosion Control, Yolo-Sacramento Bypass System Improvements, and Levee Modernization improvements have not yet been determined. Therefore, performing project-specific air quality modeling for each individual program component would be speculative. However, several other levee improvement projects with similar components (e.g., levee construction, cut/fill operations) have been modeled and evaluated under CEQA and NEPA in the past with project-specific information. The SAFCA North Sacramento Streams, Sacramento River East Levee, Lower American River, and Related Flood Improvements Project DEIR concluded that construction-related GHG emissions associated with similar construction activities would generate annual GHG emissions that exceed SMAQMD’s construction threshold of significance. Thus, considering that the funded facilities would be similar in nature to the aforementioned project, and that more than one of the proposed program components could potentially occur simultaneously in the same year, construction-related emissions could exceed the applicable thresholds of significance (e.g., SMAQMD and YSAQMD). This temporary and short-term impact would be potentially significant. Mitigation Measure GHG-1 and Mitigation Measure AIR-1, described in Section 4.11, “Air Quality,” have been identified to address this impact.

Impact GHG-2  **Conflict with an Applicable Greenhouse Gas Emissions Reduction Plan.** The intent of the proposed program is to upgrade and improve existing flood protection infrastructure in Sacramento, Yolo, and Solano Counties, which would protect and prevent against potential adverse climate change impacts. This is consistent with the goals of the updated AB 32 Scoping Plan and 2009 California Statewide Adaptation Strategy to avoid detrimental impacts of climate change. Therefore, this impact would be less than significant.

Although implementation of the individual program components would cause temporary and short-term construction-related GHG emissions, the intent, purpose and function of the proposed program aligns with the goals of the AB 32 Scoping Plan to protect against the detrimental effects of climate change. The setback levee construction, flood wall construction, erosion control, levee modification, and levee strengthening (among other funded facilities) would provide improved flood protection to existing urbanized areas as well as to future urbanized areas identified in local general plans. These urbanized areas would accommodate California’s existing and future residents, and are the locations in which various land use planning and transportation-related strategies consistent with SB 375 and applicable sustainable community strategies (SCS) will be implemented. These strategies are designed to reduce long-term operational emissions. Therefore, the proposed facilities would ensure 200-year flood protection for areas that would part of California’s ability to achieve the GHG reductions for AB 32. The area’s residents and businesses would be susceptible to the effects of climate change, primarily flood events, without proper upgrades and improvements to the existing levee structures.

Although the 2009 California Statewide Adaptation Strategy (2009 CAS)\(^2\) is not necessarily a GHG emission reduction plan, it provides the structure for how the State plans to combat the detrimental effects of and major threats from climate change. The climate change impact assessment contained in the 2009 CAS identified floods (among heat waves, wildfires, and droughts) as likely being one of the earliest climate change impacts experienced in California (California Natural Resource Association [CNRA] 2009). The Updated AB 32 Scoping Plan (Scoping Plan) cites the need to “reinforce and buffer our State from the increasing impacts of climate change, including drought, flood, and forest fires” (ARB 2014a). The Scoping Plan also acknowledges that potential floods could threaten freshwater supplies in the Delta. The existing levee structures throughout the State not only protect areas such as the City of Sacramento but also “critical infrastructure such as roads and highways” (ARB 2014a). Therefore, in addition to reducing GHG emissions, which is the primary goal of the Scoping Plan, it is also critical to implement actions and projects that would prevent, avoid, and minimize the detrimental impacts of climate change. These types of projects would protect existing and future populations, infrastructure, infrastructure, infrastructure.

\(^2\) The 2009 California Statewide Adaptation Strategy is currently in the process of being updated. However, at the time of this writing, the new 2013 update to the California Statewide Adaptation Strategy has not yet been formally adopted.
and resources, but would also help avoid rebuild and repair expenditures, losses and disruptions to economic activities, and reduction in the quality of life of local residents in the case that a flood event impacted the region. Emergency response activities and rebuilding efforts would generate substantial GHG emissions resulting from construction equipment, debris haul trucks, and emergency and evacuation vehicles that could be avoided or minimized through climate adaptation actions such as the proposed program. Therefore, although the proposed program is not a GHG reduction strategy and is not a land use development project that would more efficiently support populations and businesses, it would guard against the detrimental impacts of climate change and would proactively prevent future GHG emissions associated with climate change disaster response activities.

Considering the information above, the proposed program would be consistent with the goals of the 2009 CAS and Scoping Plan to protect against the detrimental effects of climate change without impeding current economic growth. Therefore, intent and purpose of the proposed program would not conflict with the Scoping Plan or 2009 CAS. This impact would be less than significant.

### 4.18.4 Mitigation Measures

No mitigation is required for Impact GHG-2 (conflict with GHG reduction Plan).

**Mitigation Measure AIR-1:** Implement Measures and Guidelines of the Applicable Air District(s) to Reduce Construction-Generated Emissions of Air Pollutants (for Impact AIR-1, Temporary, Short-Term Generation of Greenhouse Gas Emissions during Construction).

Mitigation Measure AIR-1 is presented in Section 4.11, “Air Quality.” Please see the description in that section.

**Mitigation Measure GHG-1:** Purchase Carbon Offset Credits to Offset Emissions (for Impact GHG-1, Temporary, Short-Term Generation of Greenhouse Gas Emissions during Construction).

Based on the result of future project-level CEQA analysis and air quality modeling for the specific funded facilities, if it is determined that implementation of Mitigation Measure AIR-1 would not reduce the funded facility’s construction emissions to a level that would be below applicable thresholds of significance, the agency(ies) implementing the program component shall purchase carbon offset credits to offset the proposed program component’s emissions. The amount of total emissions to be offset shall be verified with the applicable air district (SMAQMD or YSAQMD) prior to purchasing offsets. Carbon offset credits shall be purchased from programs that have been approved by ARB and/or the applicable air district. Carbon offset credits will be purchased to reduce annual construction emissions to a less-than-significant level based on the applicable threshold of significance, if necessary.

**Timing:** Before construction activities.

**Responsibility:** The agency(ies) implementing the program component.

### 4.18.5 Conclusion

Impact GHG-2 would be less than significant. With implementation of Mitigation Measures AIR-1 and GHG-1, temporary and short-term construction-related GHG emissions (evaluated in Impact GHG-1) would be reduced through construction emissions reductions and the purchase of carbon offset credits. However, depending on the timing and potential overlap of construction activities for different program components, it is possible that sufficient carbon offset credits would not be available for purchase at the time of construction for all program components. Therefore, Impact GHG-1 would remain significant and unavoidable.
5 CUMULATIVE IMPACTS

5.1 APPROACH

5.1.1 CEQA REQUIREMENTS

Section 21083 of the California 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 California Code of Regulations [CCR] Section 15130[a][1]–[3]). CCR 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 CCR Section 15130(b) of the State CEQA Guidelines,

[the 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, and in this case, the SEIR, must briefly describe the basis for the conclusion that the incremental effect is not cumulatively considerable.

5.1.2 APPROACH TO ANALYSIS

The proposed program would involve the implementation of numerous improvement projects throughout the program area over many years (see Chapter 2, “Background,” and Chapter 3, “Project Description”). As appropriate for a proposed program of this scope and in accordance with State CEQA Guidelines CCR Section 15130(b)(1)(B), this SEIR analyzes the proposed program’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 5.2.3. Because of the size and geographic scope of the program analyzed in this document, the program-level analysis provided in the topic sections of Chapter 4 is also inherently cumulative in nature.

5.2 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 program would not be added to the effect of other projects (i.e., no cumulative impact would occur), or the impacts of the proposed program would be too minor or too 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).

5.2.1 Geographic Scope of Effects of the Proposed Program

The State CEQA Guidelines state that lead agencies “should define the geographic scope of the area affected by the cumulative effect” (CCR Section 15130[b][3]). The geographic scope of the area affected by the proposed program is as follows for each of the topics addressed in this SEIR:

- Agriculture, Forestry Resources, and Land Use—local and regional (individual program component sites)
- Air quality—regional (Sacramento Federal Ozone Nonattainment Area [includes Sacramento and Yolo Counties, the western portion of El Dorado County, and portions of Placer and Solano Counties])
- Biological resources (fisheries)—local (habitat at individual program component sites), and regional (American and Sacramento River systems)
- Biological resources (terrestrial)—local and regional
- Biological resources (vegetation)—local and regional
- Cultural resources—local and regional
- Geology, soils, and paleontological resources—local (individual program component sites), and regional (Sacramento Valley for paleontological resources)
- Greenhouse gas emissions—local, regional, and global
- Hazards and hazardous materials—local (individual program component sites) and nearby construction projects
- Hydrology, hydraulics, and water quality—local (drainage systems affected at and downstream of individual program component sites) and regional (American and Sacramento River systems)
- Mineral resources—local (individual program component sites) and the Sacramento-Fairfield Production Consumption Region
- Noise—local (immediate vicinity of the individual program component sites)
- Public services—local service areas
- Recreation—local (individual program component sites)
- Transportation and traffic—local (roadways and regional transportation network)
- Utilities and service systems—local service areas
- Visual Resources—local (individual program component sites)
5.2.2 CUMULATIVE CONTEXT

This section provides a broad overview of land use and growth in the region affected by the proposed program. It sets the cumulative context upon which the proposed program would interact with past, present, and probable future projects in the Sacramento region.

SACRAMENTO AREA COUNCIL OF GOVERNMENTS SACRAMENTO REGION BLUEPRINT

The Sacramento Area Council of Governments (SACOG) Sacramento Region Blueprint depicts a way for the region to grow through the year 2050 as the current population of 2 million increases to more than 3.8 million, the number of jobs increases from 921,000 to 1.9 million, and the amount of housing increases from 713,000 to 1.5 million units. In December 2004, the SACOG Board of Directors adopted the Preferred Blueprint Scenario, a vision for growth that promotes compact, mixed-use development and more transit choices as an alternative to low-density development. The Preferred Blueprint Scenario predicts that undertaking a realistic long-term planning process will result in long-term environmental benefits and avoidance of adverse impacts; these benefits are intended to minimize the extent of the inevitable physical expansion of the overall regional urban area. As a result, natural resources that might be lost under a traditional approach would be protected because less land would be required for urban uses and less agricultural land would be converted. In addition, the Preferred Blueprint Scenario predicts less time per person devoted to travel, fewer car trips, and fewer miles traveled to work and local businesses. The reduction in traffic compared with what would occur under traditional patterns would lead to long-term reductions in air quality emissions in the region by reducing the amounts of vehicular carbon monoxide (CO) and particulate matter that would otherwise be emitted under traditional, lower density development patterns. (SACOG and Valley Vision 2004b.)

Although it is only advisory, the Blueprint provides policy guidance in the Sacramento region for long-term regional land use and transportation planning. A number of jurisdictions either are adopting the Blueprint concepts or are considering and encouraging projects consistent with the Blueprint.

SACRAMENTO COUNTY

Sacramento County encompasses approximately 775 square miles in the middle of the approximately 400-mile-long Central Valley, which is California's prime agricultural region. Sacramento County is bordered by Contra Costa and San Joaquin Counties on the south, Amador and El Dorado Counties on the east, Placer and Sutter Counties on the north, and Yolo and Solano Counties on the west. Sacramento County extends from the low Sacramento-San Joaquin Delta (Delta) lands between the Sacramento and San Joaquin Rivers north to about 10 miles beyond the State Capitol and east to the foothills of the Sierra Nevada. Both recreational boating and maritime commerce in Sacramento County have access to the San Francisco Bay via the Sacramento River. Sacramento County lies at the geographic center of the region and spans both agricultural land uses as well as the most urbanized areas of the region. The geographic boundaries of Sacramento County include seven incorporated cities: Sacramento, Folsom, Rancho Cordova, Citrus Heights, Elk Grove, Galt, and Isleton.

The highest densities of employment and residential uses are located in the urban core of the City of Sacramento. Two of the three regional employment centers are located in Sacramento County, one in downtown Sacramento and the more recent along U.S. Highway 50 (U.S. 50) in the Cities of Rancho Cordova and Folsom. Land uses north of the American River are primarily suburban residential with concentrations of commercial and employment uses along major transportation routes. The southern end of the region (e.g., south Sacramento, the unincorporated Vineyard community, and the Cities of Elk Grove and Galt) is predominantly residential, with the latter three areas at fairly low suburban to rural densities. The Cosumnes River floodplain and existing agricultural operations separate the Cities of Elk Grove and Galt. The southeast County (outside of existing cities and the County Urban Services Boundary [USB]) is in agricultural use with pockets of rural residential communities.
Growth in Sacramento County is occurring and is projected to occur primarily in the Cities of Elk Grove, Rancho Cordova, and Folsom (south of U.S. 50), in the community of Natomas, and in new growth areas along Jackson Highway where land is available within the County’s designated USB.

New residential development is expected to result from buildout of vacant and underutilized parcels; planned communities, including Elverta, East Antelope, Vineyard Springs, North Vineyard Station, and Florin Vineyard Gap; mixed-uses in commercial corridors; and the West of Watt, East on Jackson Highway Corridor, and Grant Line East New Growth Areas. Approximately 113,000 housing units could be developed from buildout of these areas (Sacramento County 2009:2-12).

According to the SACOG Sacramento Region Blueprint, the unincorporated portion of Sacramento County will grow by nearly 100,000 new jobs and 100,000 new housing units by 2030 (Sacramento County 2009:2-9). Accommodating the projected employment and the new residents will not only require more housing, but will also necessitate additional jobs, stores, human services, transportation system capacity, public facilities, and municipal and Countywide services. The County population grew from 1,041,219 in 1990 to 1,223,499 in 2000 (U.S. Census Bureau 2000b), and the population of the County as of January 1, 2015, was estimated to be 1,470,912 (California Department of Finance [DOF] 2015).

Although it does not establish “buildout targets,” the SACOG Blueprint Preferred Scenario anticipates an additional 24,400 households and 31,700 jobs in Folsom between 2000 and 2050 (SACOG and Valley Vision 2004c). With regard to the Folsom South of U.S. 50 Specific Plan project, the SACOG Blueprint Preferred Scenario anticipates approximately 12,000 households and 7,500 jobs would be generated by development of the specific plan area (SPA) (City of Folsom 2007). The Blueprint assumes the City of Folsom would have a population of 105,000 by 2050 and most of this growth would be located on vacant land within the current City boundaries and within the SPA. Further, the Blueprint anticipates the SPA would provide open space consistent with city policies and would be developed primarily with housing in similar amounts of detached and attached single-family units, rowhouses, townhomes, condominiums, and apartments to provide housing opportunities for the city’s growing employment centers.

**CITY OF SACRAMENTO**

The City of Sacramento is located approximately 80 miles east of San Francisco and 85 miles west of Lake Tahoe in the Central Valley. The City is located at the northern end of the Delta and the confluence of the Sacramento and American Rivers. Sacramento is the capital of the State of California and is the largest incorporated city in Sacramento County. (City of Sacramento 2014:2-1.)

Sacramento is a major transportation hub, the point of intersection of major highway and rail transportation routes that connect Sacramento to the San Francisco Bay area to the west, the Sierra Nevada range and State of Nevada to the east, City of Los Angeles to the south, and the State of Oregon to the north. The City is crossed by three major freeways: Interstate 5 (I-5), which traverses the state from north to south; Interstate 80 (I-80), which is an important cross-country, interstate highway that also provides an east-west connection between San Francisco and Reno; and U.S. 50, which provides a connection from Sacramento to South Lake Tahoe and points farther east. The Union Pacific Railroad also transsects the City providing rail connections to the rest of the western portion of the State. (City of Sacramento 2014:2-1.)

Sacramento is substantially developed with urban uses. New development is expected in several Priority Investment Areas (City of Sacramento 2014:2-64):

- Arden Fair Area, which includes Swanston Station, Arden Fair, Point West, and Cal Expo;
- Central City, which includes the Docks, Central Business District, R Street, Central City Corridors, Railyards, and River District;
65th North Area, which includes the 65th Street Light Rail Station, University Village, Granite Park, and Florin Road, and

Delta Shores, at I-5 and Cosumnes River Boulevard.

Additional development is expected to result from buildout of vacant and underutilized parcels and planned communities, such as including the Panhandle, Greenbriar, and McClellan/Parker Homes.

The City of Sacramento and Sacramento County have experienced population growth in the recent past, and this growth is forecasted to continue. DOF estimates that the City of Sacramento’s total estimated population increased from 407,018 in 2000 to an estimated 466,488 in 2010, a 1 percent increase over the 10-year period (City of Sacramento 2013). As of January 1, 2015, the City’s total estimated population was 480,105 (DOF 2015). The City is expected to reach a total estimated population of 640,381 by 2035 (City of Sacramento 2013). This represents an increase of approximately 38 percent over the 2010 estimated population. Most of this population growth is anticipated to occur in North Natomas and the Central City, while Land Park and South Natomas are expected to have the lowest population growth rates.

SOLANO COUNTY

Solano County encompasses 910 square miles; 830 square miles of land and 80 square miles of water. The western quarter of the County extends into the Coast Range foothills and is bounded by San Pablo Bay. The remainder of the County is part of the Central Valley. Other significant features include the Suisun Marsh, which has an area of more than 30 square miles, and the Napa Sonoma Marsh area, with an area of more than 60 square miles, a portion of which is in Solano County. Solano County lies at a nexus of major regional and national highway corridors (I-80, Interstate 505 [I-505], Interstate 680, Interstate 780, State Route [SR] 12, SR 37) connecting the San Francisco Bay Area with other areas. The Solano County roadway system is constrained and influenced by prominent geographic features in the County such as water bodies and the Coast Range. These barriers restrict route options when entering and exiting the County. Solano County’s economy is based on agriculture and industry. Additionally, Travis Air Force Base is the County’s largest employer, providing 14,000 jobs. Solano County is expected to grow in population due to its proximity and increasingly popularity as a bedroom community for the San Francisco Bay Area and Sacramento (Solano County 2008a).

Approximately 128 square miles of the County, or 14 percent of the total land area, lies within seven incorporated cities: Benicia, Dixon, Fairfield, Rio Vista, Suisun City, Vacaville, and Vallejo. The unincorporated area of the County is approximately 773 square miles. Because of Solano County’s commitment to focus development within urban areas, 95 percent of the County’s population (394,542 residents) lives in incorporated cities. In 2000, only 19,322 of Solano County’s residents lived in the unincorporated area. Rural residential development has since been concentrated in the area north of Vacaville in the English Hills, Allendale and Olive School areas, along Leisure Town Road east of Vacaville, in the Tolenas area of unincorporated Suisun City, and the Green Valley area north of Fairfield. A small amount of the unincorporated County’s residential land is used for urban density residential single-family and multifamily development located in unincorporated areas in Vallejo. About 20 percent of the unincorporated land area in Solano County is some type of undeveloped natural resource land. This includes marsh and watershed lands in the southern and western portions of the County comprising 101,307 acres. Over 329,000 acres of land are in agricultural use, comprising approximately 70 percent of the unincorporated land area. Agricultural land is concentrated in the eastern portion of the County and in smaller areas scattered throughout the County (Solano County 2008b).

According to the Association of Bay Area Governments’ projections, (2010-2040), the population of Solano County is expected to increase 23 percent by 2040. Unincorporated areas are expected to grow by 31 percent. The County has historically required that development requiring water and sewer service be incorporated within one of the County’s cities. Based on this policy, most residential, commercial and industrial development in the County has been in incorporated areas. Additionally, 62 percent of the County’s agricultural land is protected under Williamson Act contracts. However, future growth projections detailed in the 2008 Draft General Plan may
result in additional housing; development of agriculture-related, commercial, and industrial land uses; and
development of public services and infrastructure within the unincorporated County area (Solano County 2008a).

**YOLO COUNTY**

YOLO County encompasses approximately 1,021 square miles within the agriculturally rich Central Valley and Delta regions of California. It is located west of Sacramento County and northeast of Solano and Napa Counties, directly between the rapidly growing regions of Sacramento and the San Francisco Bay Area. Sacramento International Airport, Capitol Corridor train, Port of Sacramento, and I-5, I-80, and I-505, allow easy access to the surrounding region. Yolo County has experienced, and will continue to experience, pressure to provide additional residential, commercial and industrial development opportunities in the region. The County’s economy is primarily based on agriculture. Yolo County has led the State in agricultural preservation practices for the last several decades, primarily by directing growth into the incorporated cities where services are available and where development can occur more efficiently (Yolo County 2009a).

The County’s major population centers include Davis, West Sacramento, Winters, and Woodland. Woodland is the County seat, and is located in the central/eastern portion of the County. Davis is the largest city in the County and is located in the southern portion of the County. West Sacramento is the third largest city in the County and is located in the eastern County. Winters, located at the southwest corner of the County, is the smallest city in the County (Yolo County 2009b). In 2008, the County’s 653,549 acres were home to 199,066 people of which 22 percent live in unincorporated towns, community areas, the UC Davis campus, and farms. The remaining 88 percent are concentrated in the four incorporated cities: Davis, West Sacramento, Winters, and Woodland. Yolo County contained 73,138 housing units, also with the majority (90 percent) concentrated within Davis, West Sacramento, Winters, and Woodland (Yolo County 2009b).

According to SACOG projections (2008-2035), the population of unincorporated Yolo County and the County as a whole are anticipated to grow by an average of 1.4 percent annually. Growth in the unincorporated County is not expected to occur evenly across communities, with higher growth rates projected for the Cities of West Sacramento and Winters and lower growth rates projected for the Cities of Davis and Woodland, and for the unincorporated communities of Clarksburg and Dunnigan-Knights Landing. By 2020, SACOG projects a total population of just under 30,000 for the unincorporated County, and nearly 225,000 Countywide (Yolo County 2009a).

Due to the Yolo County General Plan’s strict land use policies and strong focus on protecting agricultural and open space resources, 92 percent of land within Yolo County is off-limits to residential, commercial, and industrial development uses. Additionally, 67 percent of the unincorporated area of the County is protected under Williamson Act contracts to provide further long-term protection of these lands. The largest areas of designated open space are the U.S. Bureau of Land Management lands in the Cache Creek Natural Area and California Department of Fish and Wildlife lands and other State-owned lands within the Yolo Bypass. Future residential or commercial growth will be directed to urban infill and buildout of vacant and underutilized parcels in existing incorporated cities and towns (Yolo County 2009a, Yolo County 2009b).

**5.2.3 RESOURCE TOPICS FOR WHICH EFFECTS OF THE PROPOSED PROJECT WOULD NOT BE CUMULATIVELY CONSIDERABLE**

For the following resource topics, the proposed program is not expected to make a cumulatively considerable contribution to an impact because it is expected that the effects of the proposed program would be beneficial, would be localized and would not be added to the effects of other projects (i.e., the effects would not be cumulative), or because the contribution of the proposed program to any potential cumulative impact would be very minor:

- **Geology and soils:** Construction 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.
practices, and any residual effects are not expected to be additive with the effects of any other activities; therefore, no cumulative impact would occur.

- **Hydrology and hydraulics:** Model results show that the effects of the proposed program would be beneficial and would reduce water surface elevations under future 100- and 200-year hydrologic conditions in the vicinity of Rio Vista; therefore, no cumulative impact would occur.

- **Mineral resources:** Program components would not affect any locally or State-designated mineral resources. Although some program components could result in the closure, destruction, or relocation of natural gas wells in the Rio Vista gas field, implementing Mitigation Measure MIN-1 would reduce effects on gas wells. Residual effects are not expected to be additive with the effects of any other activities; therefore, no cumulative impact would occur.

- **Paleontological resources:** Earthmoving activities could damage unknown unique paleontological resources, but potential damage would be reduced to a less-than-significant level by implementation of Mitigation Measure PAL-1 and would be limited to individual resources in discrete locations. Therefore, there would be no cumulative impact.

- **Noise:** Direct construction noise effects may be significant and unavoidable, but because they would be localized, intermittent, and temporary, these individual program component effects would not be cumulatively significant.

- **Recreation:** Construction individual program components could result in temporary or short term closure of some boating or recreation facilities. However, there would be no long-term effects, and 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.

- **Utilities and service systems:** Construction may damage utility infrastructure, resulting in temporary and short-term disruptions to service. Consultation with potential service providers and appropriate protection measures 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.

### 5.2.4 **Analysis of Cumulative Impacts**

#### Agriculture, Forestry, and Land Use

Implementation of SAFCA’s proposed program, particularly expansion of the Yolo and Sacramento Bypasses, would convert Prime Farmland and Farmland of Statewide Importance to non-agricultural uses. However, the amount of land occupied by existing levees that could be returned to agricultural use would be similar to the amount of existing agricultural land that would be converted. Although conversion of farmland is a cumulatively significant impact in the region and State, the program’s contribution to this impact would not be considerable. Land use compatibility impacts are inherently local, and there would be no significant cumulative impact related to consistency with adopted policies, land use designations, and zoning codes. The program’s cumulative impacts would be less than significant.

#### 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 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 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 temporary loss of overhead cover and instream woody material. These components of shaded riverine aquatic (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. Implementation of Mitigation Measure BIO-F1 would ensure that restoration, rehabilitation, and/or replacement of any affected channel habitat. Implementing this mitigation would ensure that effects of the proposed program on aquatic habitat would not be cumulatively considerable.

The proposed program’s contributions to cumulative impacts on fisheries and aquatic habitat would be less-than-significant.

**TERRESTRIAL BIOLOGICAL RESOURCES**

Implementation of SAFCA’s proposed program has the potential to contribute to the loss or degradation of sensitive habitats (including riparian habitat), the loss of protected trees, 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 program related to wildlife would be associated with construction disturbances of wildlife and their habitats, but permanent loss of habitat could also result from some of the individual program components. These effects could contribute to species declines and losses of habitat that have led to the need to protect these species under the Federal Endangered Species Act (ESA) and the California Endangered Species Act (CESA). Similar potential for adverse effects on special-status species and their habitats would be associated with the substantial urban growth expected in the Sacramento area, particularly in the Natomas area, which would 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. Because the implementing agency(ies) 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 program, the contributions to impacts on terrestrial species would not be cumulatively considerable. This cumulative impact would be less-than-significant.

**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 program components. Significant and unavoidable loss of a unique archaeological resource as defined in California Public Resources Code Section 21083.2 or of Tribal Cultural Resources could occur where excavations encounter resources 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 California Public Resources Code Section 21084.1, their modification or destruction would be considered significant. Although mitigation would be

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GEI Consultants, Inc.  Updated Local Funding Mechanisms Subsequent Program DEIR
Cumulative Impacts  5-8  Sacramento Area Flood Control Agency
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 program has the potential to make a cumulatively considerable impact on cultural resources. The contribution of the proposed program to cumulative impacts on cultural resources would be significant and unavoidable.

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 program components 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 program’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 program components, these impacts likely would not be cumulatively considerable. The cumulative impact would be less-than-significant.

AIR QUALITY

The regional context for air quality emissions is the Sacramento Valley air Basin (SVAB). Past development in the SVAB, 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 proposed program would result in significant and unavoidable construction-related air quality impacts associated with generation of NOX (ozone precursors) and PM10, even with implementation of mitigation measures identified in Section 4.11, “Air Quality.” Other medium-sized and large projects would similarly contribute substantially to air quality impacts. Given 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 program would make a cumulatively considerable contribution to this significant and unavoidable cumulative air quality impact.

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 AIR-3, by the implementing agency(ies) would ensure that exposure would be minimized. The contribution of the proposed program to toxic air emission impacts is not expected to be cumulatively considerable. This impact would be less-than-significant.

HAZARDS AND HAZARDOUS MATERIALS

There is a significant cumulative effect related to birdstrikes due to the large areas of open water near the Sacramento International Airport during winter months, including rice fields, detention basins, canals, rivers, and bypasses. The widening of the Sacramento and Yolo Bypasses in the Elkhorn basin would increase the area inundated by flood control infrastructure, but since most of the area inundated is currently occupied by rice fields that are already attractive habitat for hazardous wildlife, the increase in hazardous wildlife population and associated birdstrike is not expected to make a considerable contribution to this significant cumulative effect.

Although construction activities would have a potentially significant impact related to wildfire, the program components are located in areas of low or moderate wildfire risk. Program components could affect some specific
areas of vegetation or undergrowth, but the risk of these local effects on vegetation causing or worsening a larger local or regional wildfire is low. The program contribution to the significant regional impact related to wildfire would not be cumulatively considerable.

Mitigation would be implemented by the implementing agency(s) to minimize the potential for exposure of people or the environment to hazardous materials encountered during construction activity (Mitigation Measures HAZ-1, HAZ-2, and HAZ-3). 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.

**GREENHOUSE GAS EMISSIONS**

Climate change as related to greenhouse gas (GHG) emissions is an inherently cumulative condition because it is global. Although significance thresholds can be and have been developed by air districts, State regulatory agencies or Federal regulatory agencies, these thresholds and their related goals are designed to affect change at a global level through local actions. Therefore, the analysis presented in Section 4.18, “Greenhouse Gas Emissions,” includes the analysis of both the proposed program and cumulative impacts. As stated in Section 4.18, implementation of Mitigation Measures AIR-1 and GHG-1, and the proposed program’s consistency with statewide climate change adaptation strategies, would reduce the program’s impact; however, because of uncertainties regarding the timing and potential overlap of construction of the various program components, sufficient carbon offset credits may not be available at the time of construction. Therefore, SAFCA has conservatively assumed that the proposed program would have a significant and unavoidable cumulative impact related to GHG emissions.

**VISUAL RESOURCES**

The proposed program would include construction activities and installation of waterside erosion control that would have temporary and short term negative effects on visual character and scenic resources within scenic highways. Because long-term visual and scenic character of the program component sites would be similar to the existing condition, there would be a less-than-significant long term impact. Because the program’s long-term visual impact would be minimal, the program would not contribute to significant cumulative visual impacts. Therefore, this impact would be less than significant.
6 OTHER CEQA-REQUIRED SECTIONS

This chapter includes the following requirements of CEQA that are not addressed elsewhere in this SEIR: growth-inducing effects of the proposed program, significant and unavoidable environmental impacts, significant irreversible environmental impacts, and energy conservation.

6.1 GROWTH–INDUCING EFFECTS

6.1.1 CEQA REQUIREMENTS

CEQA requires that an EIR, including SEIRs, evaluate the growth-inducing impacts of a proposed project (in this case the proposed program) (Section 21100[b][5]). Growth-inducing impacts are described in pertinent part in California Code of Regulations 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 reduced 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 adopted 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 PROGRAM

SAFCA is not charged with the responsibility of weighing and balancing the benefits and burdens of growth in the program area. SAFCA has no authority either to permit development in the program area or to impose conditions on the development that is permitted by local land use agencies. Although SAFCA member agencies represent some of the land use agencies that have such authority, SAFCA’s jurisdiction extends only to regional flood control matters. SAFCA, as a joint powers authority pursuant to the Joint Exercise of Power Act (California Government Code Section 65000), is limited to exercising powers common to all of its constituent members, which does not include land use planning authority.
Within the program area, development and growth are controlled by the local governments of the Cities of Sacramento and Rio Vista and the Counties of Sacramento, Solano, Sutter, and Yolo. Consistent with State law, each of these agencies has adopted a general plan. 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 program would reduce flood risk in the Sacramento metropolitan area (Sacramento) in Sacramento and Sutter Counties through the implementation of various levee improvements and widening of the Sacramento and Yolo Bypasses. The specific objectives of the proposed program are to (1) complete the projects necessary (e.g., funded facilities) to provide 100-year flood protection for the developed areas in Sacramento’s major floodplains as quickly as possible, (2) provide an urban level of flood protection (“200-year” flood protection) for these developed areas within the timeframes established by the State Legislature under the Central Valley Flood Protection Act of 2008, and (3) increase the resiliency and robustness of the levee systems protecting the Sacramento area to provide a greater than 200-year level of flood protection over time in a manner that ensures 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 program would not involve the construction of housing, it would not be directly growth-inducing. Construction activities associated with the proposed program would generate temporary and short-term employment, but it is anticipated that the construction jobs would be filled using the existing local employment pool and the proposed program would not directly result in a population increase.

Regional infrastructure planning reflects the growth plans of the affected cities and counties. In December 2004, the Sacramento Area County of Governments (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). 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 informed SACOG’s long-range transportation plan for the six-county region, the 2012 Metropolitan Transportation Plan – Sustainable Communities Strategy. It 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 program 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 program. In the absence of SAFCA’s proposed funded facilities, individual developments would likely provide their own flood protection through measures such as the construction of ring levees around the
developments. Thus, the proposed program, while accommodating planned regional growth, is not growth-inducing itself.

6.2 SIGNIFICANT AND UNAVOIDABLE ENVIRONMENTAL IMPACTS

CEQA Section 21100(b)(2)(A) provides that an EIR (or SEIR) 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 potentially significant and significant environmental impacts of the proposed program, feasible mitigation measures that could reduce or avoid the proposed program’s potentially significant and significant impacts, and whether these mitigation measures would avoid, mitigate, compensate, or reduce these impacts to less-than-significant levels. Chapter 5, “Cumulative Impacts,” identifies the significant cumulative impacts of the proposed program. If a specific impact cannot be reduced to a less-than-significant level, it is considered a significant and unavoidable impact. The proposed program would have the following significant and unavoidable environmental impacts:

- Potentially significant impacts to archaeological historical resources and unique archaeological resources, Tribal Cultural Resources, and human remains that cannot be protected and preserved (cumulative).

- Significant impacts related to temporary and short-term construction noise.

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 program would result in the irreversible and irretrievable commitment of energy and material resources during construction, operation, and maintenance, including the following:

- construction materials, including such resources as rocks, wood, soil, and concrete;
- land area committed to new/expanded funded facilities; and
- energy expended in the form of electricity, gasoline, diesel fuel, and oil for equipment and transportation vehicles that would be needed for 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.

Additionally, implementation of the proposed program could result in the irreversible and irretrievable loss of unique archaeological resources, tribal cultural resources and archeological historical resources, as detailed in Section 4.8, “Cultural Resources.”

6.4 ENERGY CONSERVATION

In order to assure that energy implications are considered in project decisions, the CEQA and the CEQA Guidelines require that EIRs include a discussion of the potential energy impacts of proposed projects, with particular emphasis on avoiding or reducing inefficient, wasteful, and unnecessary consumption of energy. A project’s cost-effectiveness may be determined more by energy efficiency than initial dollar costs.
In the case of the proposed program, long term operational energy consumption would be minimal, generally related to fuel and energy use for levee maintenance activities and mechanical operation of the Sacramento Weir. Because most of the program components include construction of new flood control facilities and improvements to existing flood control facilities, energy consumption associated with the proposed program would be construction-related.

Detailed, project-level information about the construction of the various program components has not yet been developed by SAFCA and the various implementing agencies. Until these details are available, determinations of the energy and fuel requirements associated with program construction would be speculative. As SAFCA and the implementing agencies conduct project-level CEQA review of individual program components, the project-specific energy consumption associated with construction, maintenance and operation will be evaluated.
7 ALTERNATIVES

7.1 ALTERNATIVES DEVELOPMENT

7.1.1 CEQA REQUIREMENTS

California Code of Regulations (CCR) 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 CCR 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 CCR 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 CCR Section 15126.6[e][2]).

The following are the significant environmental impacts of the proposed program that the alternatives seek to eliminate or reduce:

- Potentially significant impacts to unique archaeological resources, Tribal Cultural Resources, and archaeological historical resources that cannot be protected and preserved.
- Significant impacts related to temporary and short-term construction noise.

7.1.2 ALTERNATIVES SCREENING

PROJECT OBJECTIVES

The overall project objective is to establish funding mechanisms capable of providing the local share of the cost of constructing and maintaining State and Federally-recommended 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 the developed areas in Sacramento’s major floodplains as quickly as possible, (2) provide an urban level of flood protection (“200-year” flood protection) for these developed areas within the timeframes established by the State Legislature under the Central Valley Flood Protection Act of 2008, and (3) increase the resiliency and robustness of the levee systems protecting the
Sacramento area so as to provide a greater than 200-year level of flood protection over time in a manner that ensures that new development in the undeveloped areas of Sacramento’s major floodplains does not substantially increase the expected damage of an uncontrolled flood.

**ALTERNATIVES EVALUATED**

The proposed program would establish financing mechanisms capable of supporting Federally-recommended flood protection improvements throughout the Sacramento region. Program alternatives might include different funding mechanisms than those proposed, but using different mechanisms would not affect the environmental impacts that would result from implementing the proposed program. The No-Project Alternative is the only alternative evaluated in this SEIR, although additional alternatives were evaluated in the 2007 EIR. Because the No-Project Alternative would include implementation of only those improvements that could be funded by SAFCA’s existing capital assessment district and DIF program, it also represents a reduced project. Under the No-Project Alternative, SAFCA would not establish the proposed funding mechanisms. Therefore, none of the proposed new flood control improvements or related habitat enhancements described in Chapter 3, “Project Description,” would be implemented. SAFCA would implement only those portions of the program that could be supported by SAFCA’s existing capital assessment district and DIF program, as described in Chapter 2, “Background.” There were no additional alternatives considered and rejected beyond those described in the 2007 EIR.

Table 7-1 provides a brief description for each of the alternatives evaluated and identifies whether the alternative meets the project objectives.

<table>
<thead>
<tr>
<th>Table 7-1. Alternatives Comparison</th>
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<tbody>
<tr>
<td><strong>Proposed Program</strong></td>
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<tr>
<td>Does the Alternative Achieve Objective 1 (complete projects necessary for 100-year protection for developed areas)?</td>
</tr>
<tr>
<td>Does the Alternative Achieve Objective 2 (provide 200-year protection for developed areas)?</td>
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<tr>
<td>Does the Alternative Achieve Objective 3 (new development does not substantially increase expected damage)?</td>
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<tr>
<td>Summary Description/Comparison to Proposed Program</td>
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</table>
7.2 COMPARISON OF THE ALTERNATIVES

7.2.1 PROPOSED PROGRAM

See Chapters 3 and 4 of this SEIR for a description of the proposed program and an analysis of its significant impacts, respectively. Table 7-2 provides a matrix that compares the levels of environmental impacts of the proposed program and No-Project Alternative.

7.2.2 NO-PROJECT ALTERNATIVE

DESCRIPTION

Under this alternative, SAFCA would not establish the proposed funding mechanisms and would not be able to provide the local cost-share that is needed to implement Federally-recommended improvements to the flood control system protecting the Sacramento area. There would be sufficient funding from SAFCA’s existing capital assessment district and DIF program to provide SAFCA’s share of the cost of modifying Folsom Dam; constructing a new bridge across the American River downstream of the dam; implementing a new water control manual for Folsom Dam; completing Federally authorized levee improvements along the Lower American River; and completing the non-Federal phase of the Natomas Levee Improvement Program. However, without the proposed changes to SAFCA’s existing funding mechanisms, SAFCA would not have the financial capacity to support the Federal phase of the Natomas Levee Improvement Program, the levee improvements recommended by USACE in the North Sacramento area and along the American and Sacramento Rivers, or the improvements recommended by USACE to the Sacramento Weir and Bypass.

Without these Federally supported improvements, identified deficiencies in the levee system protecting the Sacramento area would not be addressed. This would leave the Natomas Basin and portions of North Sacramento, the downtown area and the Pocket area with less than 100-year level of flood protection. New development in these areas would not be possible and existing property owners would be required to maintain high cost flood insurance.

COMPARATIVE ENVIRONMENTAL EFFECTS

Implementation of the No-Project Alternative would result in the elimination of a potentially significant environmental effect (reduced to a less-than-significant level with mitigation) related to the loss of availability of natural gas resources because no funded facilities would be developed in the Yolo Bypass or the City of Rio Vista.

In addition, because of the overall reduction in levels of construction and the reduction in the level of project activities and footprint areas (including removal of the widening of the Yolo and Sacramento Bypasses and the Sacramento Weir) the following significant and potentially significant effects would be reduced, although the significance conclusions would not differ from those of the proposed program:

► Potential Temporary, Short-Term Construction-Related Erosion

► Possible Temporary and Short-Term Water Quality Effects from Stormwater Runoff, Erosion, and Spills Associated with Construction

► Possible Temporary and Short-Term Effects on Groundwater or Surface Water Quality Resulting from Contact with the Water Table during Construction

► Possible Modifications to Aquatic Shoreline and Floodplain Habitat Used by Special-Status Fish
Potential Disturbance, Injury, and Mortality of Special-Status Fishes during Construction

Possible Water Quality Degradation during and Following In-Water Construction Activities

Disturbance and Loss of Sensitive Habitats, including Riparian Habitat, Protected Trees, Jurisdictional Waters of the United States, and Waters of the State

Possible Loss of Special-status Plants and Loss and Degradation of Special-status Plant Habitat

Possible Effects on Valley Elderberry Longhorn Beetle

Potential Disturbance or Loss of Giant Garter Snakes and Their Habitat

Potential Disturbance or Loss of Northwestern Pond Turtles and Their Habitat

Possible Disturbance of Nesting Swainson’s Hawks and Potential Loss of Active Nests and Nest Trees

Possible Disturbance of Other Special-Status Nesting Birds and Possible Loss of Active Nests and Occupied Burrowing Owl Burrows

Possible Disturbance or Loss of Roosting Special-status Bats

Possible Damage to or Destruction of Historical Resources

Possible Damage to or Destruction of Identified or Unidentified Archaeological Resources

Possible Damage to or Destruction of a Tribal Cultural Resource

Possible Disturbance, Damage to, or Destruction of Human Remains

Potential to Directly or Indirectly Destroy a Unique Paleontological Resource or Site

Temporary and Short-Term Increases in Traffic on Local and Regional Roadways during Construction

Possible Effects of Construction Activity on Emergency Access

Generation of Temporary and Short-Term Emissions of ROG, NOₓ, and PM₁₀ during Construction

Exposure of Sensitive Receptors to Toxic Air Emissions

Possible Exposure to Temporary and Short-Term Generation of Short-Term Construction Noise

Possible Exposure of Sensitive Receptors to Temporary and Short-Term Generation of Excessive Groundborne Vibration or Noise

Possible Temporary and Short-term Changes in Recreational Opportunities during Project Construction Activities

Possible Damage to Scenic Resources within State- or County-Designated Scenic Highways

Changes in Scenic Vistas and Existing Visual Character

Potential Disruption of Irrigation Water Supply during Construction
Potential Disruption of Utility Service during Construction

Possible Exposure of People and the Environment to Existing Hazardous Materials, Including Cortese-Listed Sites

Possible Creation of Wildland Fire Hazards

Temporary, Short-Term Generation of Greenhouse Gas Emissions

**FEASIBILITY**

The following project objective would not be achieved by Alternative 1 because SAFCA could not achieve 200-year flood protection for the Sacramento region:

- provide urban-standard (“200-year”) flood protection for developed areas in Sacramento’s major floodplains over time.

**7.3 ENVIRONMENTALLY SUPERIOR ALTERNATIVE**

An EIR must identify the “environmentally superior alternative” among the alternatives evaluated. The No-Project alternative is the environmentally superior alternative because it would result in the elimination of a potentially significant environmental effect (reduced to a less-than-significant level with mitigation) related to the loss of availability of natural gas resources. If the environmentally superior alternative is the no-project alternative, CCR Section 15126.6(e)(2) of the State CEQA Guidelines requires that the EIR identify an environmentally superior alternative among the other alternatives. No additional action alternatives were considered beyond those identified in the original 2007 EIR.
LIST OF PREPARERS

Following is a list of the individuals who prepared sections of the SEIR, provided significant background materials, or participated in preparing the SEIR.

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Erica Bishop ......................... Hydrology and Hydraulics, Cumulative Impacts
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Wendy Copeland ......................... Paleontological Resources; Geology and Soils; Hazards and Hazardous Materials; Water Quality; Visual Resources
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George Lu ............................... Air Quality; GHG Emissions
Nick Mitrovich ......................... Approach to Analysis
Brian Perry ......................... Graphics
Charisse Case ......................... Word Processing
CHAPTER 1, INTRODUCTION

None

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CHAPTER 3, PROJECT DESCRIPTION

None

CHAPTER 4, ENVIRONMENTAL SETTING, IMPACTS, AND MITIGATION

Section 4.1, Approach to the Environmental Analysis


**Section 4.2, Agriculture and Land Use**


Section 4.3, Geology and Soils


**Section 4.4, Hydrology and Hydraulics**


DOC. See California Department of Conservation.

DWR. See California Department of Water Resources.

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DFG. See California Department of Fish and Game.


USFWS. See U.S. Fish and Wildlife Service.


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**Section 4.9, Paleontological Resources**


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**Section 4.10, Transportation and Circulation**


**Section 4.11, Air Quality**

ARB. *See* California Air Resources Board.


SMAQMD. *See* Sacramento Metropolitan Air Quality Management District

**Section 4.12, Noise**

Section 4.13, Recreation


Section 4.14, Visual Resources


Caltrans. See California Department of Transportation.


SAFCA. *See* Sacramento Area Flood Control Agency.


**Section 4.15, Utilities and Service Systems**


CalRecycle. *See* California Department of Resources Recycling and Recovery.


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FAA. See Federal Aviation Administration.


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CEC. See California Energy Commission.


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DOGGR. See California Division of Oil, Gas, and Geothermal Resources.


Solano County. 2008 (August). *Solano County General Plan*. Available:  

Section 4.18, Greenhouse Gas Emissions

ARB. See California Air Resources Board.


CNRA. See California Natural Resources Agency.

CPUC. See California Public Utilities Commission.


IPCC. See Intergovernmental Panel on Climate Change.


SMAQMD. See Sacramento Metropolitan Air Quality Management District.

CHAPTER 5, CUMULATIVE IMPACTS


DOF. See California Department of Finance.

SACOG. See Sacramento Area Council of Governments.


**CHAPTER 6, OTHER CEQA-REQUIRED SECTIONS**

None

**CHAPTER 7, ALTERNATIVES**

None