

Draft

# Supplemental Program Environmental Impact Report

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# 1.0 Introduction

The California Department of Water Resources (DWR) prepared the Central Valley Flood Protection Plan (CVFPP) (DWR, 2012a) to reflect a systemwide approach to improve integrated flood management in lands protected by the State Plan of Flood Control (SPFC). In accordance with the California Environmental Quality Act (CEQA) (Public Resources Code Section 2100 et seq.), DWR, acting as Lead Agency, prepared a Program Environmental Impact Report (PEIR) that evaluated potential impacts on the physical environment associated with a broad range of flood protection actions included in the CVFPP (DWR, 2012b). The CVFPP was adopted and the PEIR was certified on June 29, 2012.

Primary authorization for the CVFPP originates in Senate Bill 5 (SB 5), also known as the Central Valley Flood Protection Act of 2008 (Act). The Act requires that the CVFPP be updated every 5 years. To this end, DWR prepared the Draft 2017 CVFPP Update to describe proposed refinements to the adopted CVFPP (DWR, 2016a). In accordance with CEQA and the CEQA Guidelines, DWR prepared this Supplemental PEIR for the 2017 CVFPP Update. This Supplemental PEIR focuses its analysis (per CEQA Guidelines Sections 15162 and 15163) on how the 2017 CVFPP Update could result in new, significant impacts or a substantial increase in the severity of a significant impact, if there is substantially important new information relating to the CVFPP or its environmental effects, or if there are substantial changes with respect to the circumstances under which the project is undertaken. Similar to the PEIR, the impact analysis in this Supplemental PEIR takes a broad, programmatic approach to defining significant impacts and feasible mitigation measures. Implementation actions resulting from the adopted CVFPP and the 2017 CVFPP Update would require project-level environmental review and documentation for CEQA compliance.

## 1.1 CVFPP Background

As stated in the CVFPP and PEIR, the Central Valley has experienced some of California's largest and most damaging floods, and is currently vulnerable to catastrophic floods, including risk to life and property and to the State's financial stability. The Central Valley's existing flood management system has been incrementally developed through numerous individual projects over the last 150 years, and includes dams and reservoirs, levees, channels, weirs, bypasses, flood easements, flood warning systems, and other features that provide varying levels of flood protection. This system protects public safety, has prevented billions of dollars in flood damages in the Central Valley, and supports a vibrant California economy through its multiple benefits (DWR, 2012b).

Although the Central Valley flood management system has prevented billions of dollars in flood damages since its construction, substantial improvements are required so that the system meets modern needs. In addition, societal values and expectations for the flood management system have changed over time and many challenges need to be overcome to provide a more sustainable

flood system into the 21<sup>st</sup> century. Section 1.1 of the Draft 2017 CVFPP Update describes the historical setting and context of the Central Valley flood management system.

In 2008, DWR embarked on the Central Valley Flood Management Planning (CVFMP) Program, a long-term planning effort to improve integrated flood management in the Central Valley and carry out direction from the California Legislature. Several documents, including the adopted CVFPP, were prepared under the CVFMP Program to collectively meet requirements of the Act and related flood legislation passed in 2007.<sup>1</sup> The adopted CVFPP describes the State Systemwide Investment Approach (SSIA) for sustainable, integrated flood management in areas protected by SPFC facilities. The Draft 2017 CVFPP Update includes refinements to the SSIA that were identified through ongoing flood management planning and coordination with federal and local partners to improve flood protection in the Central Valley (DWR, 2016a).

## 1.2 Development of the 2017 CVFPP Update

CVFPP implementation progress has been steady, but more work remains to be done to further the vision for flood management established in 2012. In addition to on-the-ground implementation progress achieved so far, interagency collaboration has begun to address flood management policy issues highlighted in 2012, and the CVFPP planning process has advanced significantly to refine the SSIA and needed flood management improvements. Guided by the Act and necessary alignment with statewide plans, this process reflects a greater emphasis on comprehensive, multi-benefit actions that can achieve lasting and measurable outcomes rather than incremental, single-purpose flood management investments.

The 2017 CVFPP Update planning process brought together many stakeholders and flood management-related efforts in the Central Valley to converge on a common, outcome-driven vision that guides State investments. Some efforts focused on rigorous technical analysis to refine a broad array of management actions consistent with the adopted plan, while others addressed the need for more effective implementation, such as developing an Investment Strategy for identifying funding needs and mechanisms (DWR, 2016a). Development of the 2017 CVFPP Update was supported through planning efforts, including the following:

- **Draft Sacramento River and San Joaquin River Basin-Wide Feasibility Studies.** These two Basin-Wide Feasibility Studies (BWFSs) were completed to refine the scale and location of system improvements identified in the CVFPP, identify system improvements that can be further developed in ongoing or new federal cost-share feasibility studies, and inform the 2017 CVFPP Update (DWR, 2016b, 2016c).
- **Regional Flood Management Plans.** DWR funded six regionally led Regional Flood Management Plans (RFMPs) that describe local and regional flood management priorities, challenges, and potential funding mechanisms, along with site-specific improvement needs. These plans provide valuable perspectives from regional and local flood managers that help inform and align CVFPP investment strategies and implementation (Feather River Regional Partners, 2014; FloodProtect, 2014; Mid and Upper Sacramento River Flood Management

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<sup>1</sup> Section 1.1.1 of the PEIR includes additional details on the legislative basis for the CVFPP.

Plan Partners, 2014; Reclamation District 2092, 2014; San Joaquin Area Flood Control Agency, 2014; San Joaquin River Flood Control Project Agency, 2015).

- **Draft Central Valley Flood System Conservation Strategy.** The Conservation Strategy supported development of the 2017 CVFPP Update by guiding the integration and improvement of ecosystem functions associated with flood-risk-reduction actions, and providing the basis for recommending conservation actions for the SPFC (DWR, 2016d).
- **Draft CVFPP Climate Change Analyses.** Using the latest climate science and understanding, these analyses identify and evaluate potential future climatic and sea level rise (SLR) changes in the Central Valley. The climate change analyses inform quantitative estimates of plan performance of the CVFPP over time and provide flood management system managers with important information on potential effects of climate change.
- **State Plan of Flood Control Descriptive Document Update.** The 2010 State Plan of Flood Control Descriptive Document was the first inventory of the SPFC compiled in a single report (DWR, 2011b). In 2016, it was updated (DWR, 2016e).
- **Flood System Status Report Update.** The Flood System Status Report Update (DWR, 2016f) describes the current status (physical condition) of SPFC facilities as of 2016 at a systemwide level as an update to the Flood Control System Status Report developed in 2011 (DWR, 2011a).

### 1.3 Geographic Scope of CVFPP

As described in the CVFPP and PEIR, the CVFPP study area encompasses much of the Central Valley of California (DWR, 2012a, 2012b). CVFPP Figure 1-9 shows the CVFPP geographic scope, and PEIR Section 1.3.1 describes the CVFPP planning areas, which include:

- **SPFC Planning Area**—This area encompasses lands currently receiving protection from the SPFC.
- **Systemwide Planning Area (SPA)**—This area includes lands subject to flooding under the current facilities and operation of the Sacramento-San Joaquin River Flood Management System, including lands with facilities that provide substantial systemwide benefits or that protect urban areas in the Sacramento-San Joaquin Valley. The SPFC Planning Area is completely contained within the SPA. The SPA also includes lands with facilities that are not part of the SPFC, including federal and local reservoirs that have allocated flood storage.

These planning areas are illustrated on PEIR Figure 1-1. The 2017 CVFPP Update does not change these planning areas.

PEIR Section 1.3. describes the environmental impact assessment study area, which is divided into three regions for describing the environmental setting and potential environmental effects of

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implementing the CVFPP (DWR, 2012b). These three regions are shown on PEIR Figure 1-2 and described as follows:

1. **Systemwide Planning Area Plus 2-Mile Buffer and Suisun Extension (Extended SPA).** The Extended SPA generally includes a 2-mile-wide buffer around the SPA to provide the environmental context for direct and indirect impacts on areas adjacent to the SPA. Because of topographical and land use considerations, the buffer is 1 mile wide in urban areas and does not extend beyond the adjacent ridgeline along foothill waterways. The buffer is wider than 2 miles in the Suisun Marsh area so that the Extended SPA completely encompasses the hydrologically influenced areas. The Extended SPA is divided into two subregions:
  - a. Sacramento and San Joaquin Valley and Foothills—This area of the Extended SPA consists of the Sacramento and San Joaquin valleys and the surrounding foothills along several major waterways. Most of the management actions would be implemented in this area.
  - b. Delta and Suisun Marsh—This area encompasses the Sacramento–San Joaquin Delta (Delta) and portions of Suisun Marsh where upstream management actions may affect water flows or quality. At Suisun Marsh, the boundary is at the western end of Montezuma Slough.
2. **Sacramento and San Joaquin Valley Watersheds.** The Sacramento and San Joaquin Valley watersheds are the portions of the watershed upstream from the Extended SPA that may be affected by the management actions employed in these watersheds. The PEIR discusses these watersheds in less detail than the Extended SPA.
3. **Southern California/Coastal Service Areas of the Central Valley Project (CVP) and State Water Project (SWP) (SoCal/CVP/SWP service areas).** The SoCal/ CVP/SWP service areas consist of those portions of the CVP/SWP service areas that are not in the Extended SPA. These CVFP/SWP service areas are located primarily in Southern California and the Central Coast areas, and include CVP/SWP service areas in the Tulare Lake Basin. The PEIR discusses the service areas in less detail than the Extended SPA and Sacramento and San Joaquin Valley watersheds.

Because the CVFPP planning areas are the same, the Supplemental PEIR does not change the environmental impact assessment study area.

## 1.4 Public Participation in the CEQA Process

A notice of preparation (NOP) was prepared to begin the 2017 CVFPP Update Supplemental PEIR scoping process. The NOP was publicly released on March 18, 2016, to solicit guidance regarding the scope and content of the environmental information to be included in the Supplemental PEIR. An Environmental Checklist, which was prepared to provide an initial analysis of the refinements associated with the 2017 CVFPP Update (as it existed at that time), circulated with the NOP.



A public scoping meeting was held on April 8, 2016. DWR received written comments from the public and a variety of agencies before the scoping period ended on April 18, 2016. Responses to comments were provided in a Scoping Report (DWR, 2016g), which was made available for review in July 2016.

This draft Supplemental PEIR is being circulated for public and agency review, coinciding with review of the Draft 2017 CVFPP Update. Final decisions on the 2017 CVFPP Update and the Supplemental PEIR are expected in June 2017.

## 1.5 Roles of Other Entities

The CVFPP is focused on managing flood risk in areas protected by the SPFC, a State-federal flood protection system that encompasses most of the Central Valley. The Central Valley Flood Protection Board (CVFPB) has the responsibility and authority necessary to oversee future modifications to the SPFC, including approval or removal of encroachments within flood management projects, floodplains, floodways, and drainage areas of the Sacramento and San Joaquin rivers, and their tributaries and distributaries. As such, the CVFPB is a CEQA Responsible Agency and will use this Supplemental PEIR as part of its decision-making processes associated with the 2017 CVFPP Update. The CVFPB will consider adopting the 2017 CVFPP Update and this Supplemental PEIR in June 2017.

State actions are preempted by obligations to the U.S. Army Corps of Engineers (USACE) pursuant to various requirements, including assurance agreements, O&M manuals, and the federal Rivers and Harbors Act. Modifications, additions, or deletions to an existing federal flood management project requires federal participation and approval by the USACE. At a minimum, this participation includes review of environmental and related compliance documentation sufficient to meet requirements contained in the National Environmental Policy Act (NEPA) and other federal laws and regulations.

DWR is continuing to work closely with the USACE in developing the federal Central Valley Integrated Flood Management Study (CVIFMS). CVIFMS is intended to evaluate flood management improvements in the Central Valley from a federal perspective, and to provide a framework for authorization and implementation of flood risk reduction projects in the Central Valley. The Draft CVIFMS Watershed Plan was completed in November 2015, and it states that it is a companion document to the CVFPP (USACE, 2015). The Draft CVIFMS supports future partnership between USACE, DWR, the CVFPB, and other stakeholders on water resources studies that include flood risk management, ecosystem restoration, and water supply in the Sacramento River Watershed.

DWR coordinated with the USACE on the two State-led BWFSs – the Sacramento River BWFS and the San Joaquin River BWFS. A benefit of these State-led studies is the ability to inform any subsequent State-federal feasibility studies. Similarly, DWR funded regionally led efforts in

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developing the six RFMPs.<sup>2</sup> As described above, the RFMPs supported development of the 2017 CVFPP Update including investment needs and priorities.

Specific actions contemplated in the CVFPP have been refined based on ongoing USACE studies and potential projects identified by the Sacramento River and San Joaquin River BWFSs, and these refinements are included in the 2017 CVFPP Update. Improving the flood system requires a coordinated partnership of federal, State, and local agencies. DWR will continue its tradition of working closely with federal and local partners to improve flood protection in the Central Valley.

### 1.6 Uses of the PEIR and the Supplemental PEIR

When it was adopted in 2012, the primary use of the PEIR was to inform DWR, the CVFPPB, maintaining agencies, and the public about the program-level environmental effects of implementing the CVFPP. The Supplemental PEIR serves to further inform these agencies and the public about potential changes to these program-level environmental effects associated with the refinements made to the adopted CVFPP as part of the 2017 CVFPP Update. These agencies will be able to rely on the PEIR and Supplemental PEIR for future planning and feasibility studies pertinent to implementation of the SSIA. In addition, cities and counties located in the Sacramento and San Joaquin valleys will be able to rely on the PEIR and Supplemental PEIR for guidance when amending general plans and zoning ordinances.

To the extent changes are required, an updated program-level mitigation monitoring and reporting program will accompany the final Supplemental PEIR.

### 1.7 Supplemental PEIR Organization

This Supplemental PEIR is organized as follows:

- **Chapter 1.0, “Introduction,”** summarizes the background of the CVFPP and 2017 CVFPP Update and relevant legislation, development of the CVFPP and 2017 CVFPP Update, the geographic scope of the CVFPP and CVFPP Update, public participation in the CEQA process, the roles of other entities, the uses of the PEIR and Supplemental PEIR, and the organization of this Supplemental PEIR.
- **Chapter 2.0, “Program Description,”** summarizes the purpose and objectives of the CVFPP; explains the development, characteristics, and key components of the refinements proposed in the 2017 CVFPP Update; discusses the management actions that make up the CVFPP and 2017 CVFPP Update; describes how the 2017 CVFPP Update would be implemented; describes how there would be no near- or long-term reduction in water or renewable energy supplies; and identifies typical construction methods.

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<sup>2</sup> Maintaining agencies are cities, counties, districts, or other political subdivisions of the state that are authorized to maintain levees. DWR maintains levees pursuant to California Water Code (CWC) Sections 8361 and 12878, but is not considered a local maintaining agency.

- **Chapter 3.0, “Environmental Setting, Impacts, and Mitigation Measures,”** describes the resources that could be affected by implementing refinements included in the 2017 CVFPP Update. It provides supplemental information specific to environmental and regulatory settings, environmental impacts, and mitigation measures.
- **Chapter 4.0, “Cumulative Impacts,”** provides updated information regarding the effects of the 2017 CVFPP Update in combination with the effects of other past, present, and reasonably foreseeable future projects.
- **Chapter 5.0, “References,”** provides a bibliography of the sources cited in this Supplemental PEIR.
- **Chapter 6.0, “List of Preparers,”** lists the individuals who helped to prepare this Supplemental PEIR, and identifies the qualifications and affiliations of those individuals.
- **Chapter 7.0, “Abbreviations and Acronyms,”** lists the acronyms and abbreviations used in this PEIR.

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## 2.0 Program Description

The 2017 CVFPP Update refines the SSIA described in the CVFPP. The SSIA approved in the CVFPP, as modified by the 2017 CVFPP Update, is the program evaluated in this Supplemental PEIR. The program is described in detail in the public draft of the 2017 CVFPP Update. The description in this chapter is a summary of the SSIA's principal features that are relevant to the environmental analysis, with an emphasis on the refinements to the program evaluated in the PEIR. For a more comprehensive description of the program, please refer to the Draft 2017 CVFPP Update (DWR, 2016a).

### 2.1 Purpose and Objectives

The SSIA identified in the CVFPP and refined in the 2017 CVFPP Update has been identified by DWR to accomplish the primary goal, supporting goals, and statutory objectives of the CVFPP. These goals and objectives are unchanged from those reported in the PEIR Section 2.1 (DWR, 2012b).

### 2.2 Program Development

As described in the PEIR, the CVFPP was founded on over 100 years of planning and flood system improvement efforts in the Central Valley (DWR, 2012b). For the first time, the CVFPP compiled and elaborated on those efforts in a unified public document reflecting considerable public input and the requirements established by the California Legislature in SB 5.

The CVFPP was prepared in accordance with the requirements of SB 5 and adopted by the CVFPB on June 29, 2012 (DWR, 2012a). Like the CVFPP, the 2017 CVFPP Update was prepared in accordance with the requirements of the Act. The CVFPB is expected to adopt this update by July 1, 2017, after considering public review comments. As the first of a series of 5-year updates, the 2017 CVFPP Update (and future updates) documents implementation progress and informs updates to the policies, programs, and funding mechanisms that make up the plan (DWR, 2016a). Each update cycle offers an opportunity to reprioritize investments in the flood system. The CVFPP has a 30-year planning horizon and is updated on a 5-year basis, with each update looking ahead 30 years.

The CVFPP laid the foundation necessary to formulate a comprehensive and forward-looking approach to flood risk management in the Central Valley. The CVFPP:

- Defined CVFPP goals based on legislated and codified requirements
- Initiated essential studies and engagement activities to establish a direction for detailed, long-term planning

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- Provided an extensive history of Central Valley flood management and the SPFC
- Established the SSIA
- Served as the foundation for all future CVFPP planning and updates (DWR, 2012a)

CVFPP updates build upon the initial plan (and subsequent updates) by focusing on and incorporating the following from the previous 5 years:

- Significant new developments, including external events, policies, or other drivers affecting the CVFPP
- Stakeholder input, study results, and planning refinements
- Accomplishments and implementation progress

CVFPP updates will repeat key concepts from 2012 (and subsequent updates) where necessary for planning context, continuity, and convenience. Otherwise, the reader is encouraged to continue using and referring to the original CVFPP throughout the life of this long-term planning effort.

The 2017 CVFPP Update was prepared in close coordination with State, federal, and regional partners, and was guided by a robust, multi-year stakeholder engagement process. As a result, the 2017 CVFPP Update reflects input and ideas that helped refine and update the SSIA originally described in the CVFPP, and presents a diverse set of multi-benefit solutions to improve flood management in the Central Valley. DWR worked closely with the CVFPB throughout the public engagement process to link communication activities and dialogue to the State's outcome-based planning approach. Since 2012, the CVFPB has convened regular meetings that were open to the public and widely attended by representatives of State, federal, and local agencies; environmental organizations; and agricultural stakeholders. Ongoing discussions with resource and regulatory agencies; regional and local flood management entities; elected officials; members of the agricultural, environmental, and business communities; and other interested individuals have yielded important insights about flood management needs, challenges, and opportunities across the Sacramento and San Joaquin river basins. Many of these issues are reflected in the 2017 CVFPP Update recommendations, while others will continue to be discussed among stakeholders and policymakers as the CVFPP is implemented and refined in future plan updates.

The 2017 CVFPP Update also aligns with recent statewide plans. As described in Section 1.2.1 of the Draft 2017 CVFPP Update (DWR, 2016a), these plans include:

- The California Water Action Plan issued by the Governor in 2014 and updated in 2016 (California Natural Resources Agency, et al., 2016).
- The California Water Plan Update (2013a) by DWR, with progress under way for the 2018 update.
- California's Flood Future: Recommendations for Managing the State's Flood Risk by DWR (2013b), which articulates the State's higher-level priorities in flood management statewide.

Key implications of the CVFPP are listed in the PEIR, Section 2.2.2, and are unchanged (DWR, 2012b).

As with the PEIR, this Supplemental PEIR focuses on those management actions with the potential to result in environmental effects. Generally, those actions involve the construction, modification, operations, or maintenance of physical facilities. Actions that result in administrative changes are not considered, as they do not have the potential to result in environmental effects.

## 2.3 Characteristics and Key Components of the Proposed Program

### 2.3.1 Urban Flood Protection

The CVFPP includes a program to protect existing urban areas (with populations greater than 10,000) to achieve at least an urban level of flood protection (protection against a 0.5 percent chance event, or 200-year level of protection [LOP]). An urban level of flood protection could include a demonstration of adequate progress; imposed conditions; or nonstructural or structural improvements, such as levees or floodwalls that meet DWR's Urban Levee Design Criteria (2012c). In-place fixes could involve raising levees by adding earthen material or constructing floodwalls, or strengthening levees to enhance their integrity. Although urban flood protection projects are generally expected to consist of in-place fixes, the CVFPP also states that levee setbacks could be considered for projects in urban areas based on the level of adjacent development and the potential benefits.

Urban flood protection is also included in the 2017 CVFPP Update (DWR, 2016a). Specific actions contemplated in the CVFPP have been refined to reflect updates from studies such as the BWFSs and RFMPs. The current portfolio of possible actions, including refinements, is discussed in Section 2.4.

### 2.3.2 Small-Communities Flood Protection

The CVFPP includes a program to reduce flood risk in existing small communities (with populations less than 10,000), where feasible, and at a level of investment to preserve development opportunities without providing an urban level of flood protection. Additional State investment in small-community flood protection would be prioritized based on relative community flood-threat, considering factors such as population, the likelihood of flooding, proximity to the flooding source, and depth of flooding. Financial feasibility and achievement of the program objectives to promote multiple benefits would also be considered. The CVFPP identifies several structural and nonstructural actions that the State would consider implementing to protect small communities, including:

- Protecting small communities in-place using ring levees, training levees, or floodwalls when improvements do not exceed a certain predetermined cost threshold.
- Reconstructing or making improvements to adjacent SPFC levees.

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- Implementing nonstructural improvements, such as raising or elevating structures, flood proofing, land or easement purchases, relocating structures, or some combination of these when the in-place improvements described are not feasible.

Small-community flood protection is also included in the 2017 CVFPP Update (DWR, 2016a). Specific actions contemplated in the CVFPP have been refined to reflect updates from the BWFSs and RFMPs. The current portfolio of possible actions, including refinements, are discussed in Section 2.4.

### 2.3.3 Rural-Agricultural Area Flood Protection

The CVFPP indicates that levee improvements for rural-agricultural areas would not be as extensive as those for urban areas and small communities, reflecting the lower levels of development. In general, the State would consider the following options to protect rural-agricultural areas against floods:

- Repairs to SPFC levees in rural-agricultural areas would focus on maintaining the levee crown elevation and providing all-weather access roads to facilitate inspection and flood fighting.
- Levee improvements, including setbacks, may be used to resolve known performance problems (such as erosion, boils, slumps and slides, and cracks) on a prioritized basis, where justified. Projects would be evaluated that repair or reconstruct rural SPFC levees to address identified threat factors, particularly in combination with small-community protection, where economically feasible.
- Agricultural and conservation easements that preserve agriculture and prevent urban development in current agricultural areas may be purchased, when consistent with local land use plans.

Because federal engineering and design standards may result in cost-prohibitive levee repairs for many rural-agricultural areas, the State will work with rural-agricultural communities to develop applicable repair standards. The State will also evaluate what level of investments to make to preserve rural-agricultural activities that discourage incompatible development and encourage the wise use of floodplains.

The 2017 CVFPP Update also includes measures to improve flood management in rural-agricultural areas (DWR, 2016a), with additional information identified through the BWFSs and RFMPs. The current portfolio of possible actions is discussed in Section 2.4.

### 2.3.4 System Improvements

The CVFPP proposes system improvements, defined as physical actions or improvements with the potential to benefit large portions of the flood management system and improve the overall function and performance of the SPFC in managing large floods that affect urban, small community, and rural-agricultural areas. An important category of system improvement projects is bypass capacity expansion, which includes modifications to weirs, bypass systems, hydraulic structures, and easements. Bypass capacity could be increased by modifying existing weirs and bypasses.



Weirs could be modified in any of several ways, depending on their configuration, operation, and desired effect: by raising, lowering, lengthening, or automating the weir or by changing the weir sill elevation. For example, a weir crest could be raised to prevent flows from entering a storage area too early in a flood event, thereby reserving storage space for the peak of the storm. As an alternative, weirs could be lengthened to pass more flow into a bypass at the same stage, or lowered to divert flow at lower stages. Other modifications could include removing sediment or debris to improve the intended performance of a weir. Weir modifications could also be designed to provide opportunities to restore ecosystem functions and continuity or habitats on a systemwide level, and improve safety.

The capacity of existing bypasses could be increased by widening or expanding the footprint of a bypass or, in some locations, by raising its levees or berms. Existing flow control weirs that direct flood flows might need to be reconstructed, re-operated, or both, in conjunction with bypass modifications. Increasing the capacity of certain bypasses could provide opportunities to enhance habitat, recreation and public education, and agriculture.

Flood system conveyance capacity could be increased by constructing new bypasses. However, because the existing flood management system already features several large and effective bypass systems, new bypasses would likely be constructed at a smaller scale. New bypasses could be constructed to redirect damaging flood flows away from existing channels or facilities that currently lack sufficient conveyance capacity.

Weirs and other control structures could be rehabilitated with hydraulic structure upgrades. This includes rehabilitating weirs and other control structures (removing sediment that has deposited), or automating existing weirs.

System improvement projects also may include groundwater recharge and reservoir reoperation projects.

System improvements would be implemented and maintained consistent with the Conservation Strategy and the Vegetation Management Strategy (see Sections 2.3.6 and 2.3.7).

The CVFPP states that the ultimate configuration of system improvement projects would be known only after future feasibility studies have explored the potential magnitude and extent of hydraulic improvements within the system (DWR, 2012a). Since 2012, DWR has completed the Sacramento River and San Joaquin River BWFSs and recommended several system improvement projects for detailed study (DWR, 2016b, 2016c). These refined system improvements, which are identified in the 2017 CVFPP Update (DWR, 2016a), are described in Section 2.4.

### **2.3.5 Non-State Plan of Flood Control Levees**

The CVFPP identifies approximately 420 miles of private, non-SPFC levees that are closely associated with SPFC levees. Of these, approximately 120 miles work in conjunction with SPFC levees to provide protection to urban areas (DWR, 2012a). Non-SPFC levees are those (1) that abut SPFC levees, (2) whose performance may affect the performance of SPFC levees, or (3) that provide flood risk reduction benefits to areas also being protected by SPFC features. The State recognizes that for an urban area protected jointly by both SPFC and non-SPFC levees,

the legislated requirement for an urban level of flood protection (200-year or 0.5 percent annual-chance flood) requires that both types of facilities be improved.

The CVFPP (DWR, 2012a) and the 2017 CVFPP Update (DWR, 2016a) do not specify any projects on non-SPFC levees, but recognize that achieving an urban level of flood protection in some areas will require projects on both SPFC and non-SPFC levees. The CVFPP identifies the State's right to invest in these levees if studies demonstrate a systemwide benefit or otherwise determine that they should be part of the SPFC.

### **2.3.6 Integrating Ecosystem Restoration Opportunities with Flood Risk Reduction Projects**

The CVFPP includes opportunities for integrating ecosystem restoration with flood risk reduction projects. These opportunities were based on and consistent with the Conservation Framework (DWR, 2012a). The Conservation Framework identified opportunities for integrated flood management projects that, in addition to improving public safety, can enhance riparian habitats, provide connectivity of habitats, restore riparian corridors, improve fish passage, and reconnect the river and floodplains. The Conservation Framework also stated that it was the first phase of more comprehensive and integrated planning within the flood management system, which would lead to a more defined Conservation Strategy. DWR has developed the Conservation Strategy (DWR, 2016d) as a refinement to the Conservation Framework. Recognizing that the rivers and bypass channels, levees, and water control structures included in the SPFC do more than just convey floodwaters, the Conservation Strategy presents guidance, data, and tools to facilitate multi-benefit planning while improving flood protection throughout the Central Valley. It supports the CVFPP's goals and focuses on the integration and improvement of ecosystem functions within SPFC facilities, where feasible. The Conservation Strategy also provides goals and measurable objectives for monitoring and evaluating progress of conservation efforts within the SPFC. As a guidance document, the Conservation Strategy does not establish a regulatory process.

As guidance, the Conservation Strategy provides measurable objectives that represent contributions to solving ecosystem problems (in particular to recovery of native species), and that may be achievable through implementation of multi-benefit projects and O&M during the SSIA's 30-year time frame. In conjunction with 5-year updates to the CVFPP, these objectives would be reevaluated and revised as necessary, based on improvements to scientific understanding and further evaluation of opportunities for multi-benefit flood projects (DWR, 2016d).

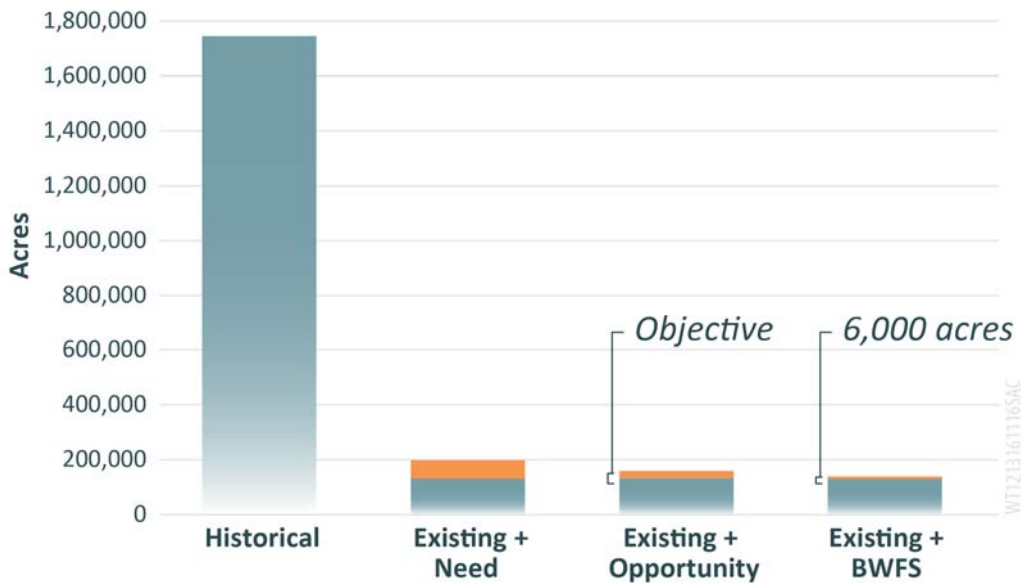
Objectives consist of one or more metrics (specific, measurable attributes, such as the acreage of riparian vegetation), and for each metric an amount of change (a magnitude of ecosystem enhancement) is identified. This evaluation of conservation needs and opportunities was conducted with input and review from a technical advisory workgroup comprised of resource agency and stakeholder representatives, reviewing best available science. Conservation Strategy Appendix L, "Measurable Objectives Development: Summary of Conservation Needs and Scale of Restoration Opportunities," documents the evaluation (DWR, 2016d).

In summary, measurable objectives arose from an analysis of historical and existing conditions, and the compilation of the opportunities (multi-purpose projects) for the SPFC to positively contribute towards these non-regulatory objectives. It is anticipated that other conservation partners

will also contribute towards meeting conservation needs, which tend to be larger than the measurable objectives. It is important to note however that if the conservation need is actually identified as smaller than the known opportunities, the objective is set to the lesser of the two.

DWR used the Conservation Strategy as guidance for formulation of multi-benefit projects proposed in the Sacramento River and San Joaquin River BWFSs. The Supplemental PEIR evaluates the habitat acres proposed in the BWFSs because they are the most current and developed expression of progress towards the measurable objectives. Specifically, the 2017 CVFPP Update and its associated refinements identified ecosystem improvement actions in the Yolo Bypass, Paradise Cut, Firebaugh, and other locations identified in the Sacramento River and San Joaquin River BWFSs that would result in approximately 6,000 acres of new riparian and wetland habitats, 4,700 acres of inundated floodplain habitat, and 5 miles of shaded riverine aquatic (SRA) habitat. These improvements would restore natural processes and support a mosaic of habitat and species (DWR, 2016a). These habitat and ecosystems considerations have been incorporated into the individual management actions described in Section 2.4. The BWFS acreages are less than the opportunities identified in the measurable objectives. In further updates to the CVFPP, other opportunities to meet the measurable objectives may be identified.

Figure 2-1 shows existing riparian and wetland habitat in comparison to a rough estimate of historical conditions; the needs, opportunities, and objectives from the Conservation Strategy (DWR, 2016d); and the expected contributions identified in the BWFSs toward meeting the objectives.



Sources: Conservation Strategy (DWR, 2016d); 2017 CVFPP Update (DWR, 2016a).

**Figure 2-1. Riparian and Wetland Habitat**

Lastly, a robust and fully funded O&M program is fundamental to the proper function of the SPFC, ensuring public safety and upholding the State’s legal assurances to maintain federal flood project features, and enabling the implementation and maintenance of multi-benefit projects.

Regulatory demands on the flood system have increased over time, and flood system managers are increasingly being tasked as resource managers with public trust responsibilities in addition to public safety responsibilities. A multi-benefit O&M program at the scale of the SPFC will require cooperation among federal, State, regional, and local partners.

### 2.3.7 Vegetation Management Strategy

The CVFPP identifies levee vegetation management practices and procedures as an important component of ongoing and proposed flood risk reduction and O&M projects. As indicated in the CVFPP, one priority aspect of the Vegetation Management Strategy (VMS) is to improve public safety by providing for levee integrity, visibility, and accessibility for inspections, maintenance, and floodfighting operations. However, these practices and procedures also must consider the fact that the levees that confine today's river systems in California are holding some of the last remnants of a once great riparian forest ecosystem that dominated the Central Valley. Many of California's fish and wildlife resources, such as Swainson's hawk, yellow-billed cuckoo, and valley elderberry longhorn beetle, evolved in this complex and diverse natural community and are listed as State or federal threatened or endangered species due to the cumulative loss of habitat along riparian corridors (DWR, 2012a).

The PEIR provides a historical account of vegetation management of Central Valley levees, including USACE maintenance manuals and agreements which allowed for trees and other vegetation to be retained on the water-side slope of levees for erosion prevention. The PEIR also details the more recent USACE vegetation policy established in 2009, requiring a zone free of woody vegetation on all levees and the adjoining ground within 15 feet of the levee on both sides. The PEIR describes DWR's objections to USACE's vegetation removal requirements and identifies a levee VMS that was included in the CVFPP. One aspect of the levee VMS involves continuing existing O&M practices to ensure that new trees do not become established on those portions of SPFC levees in a defined vegetation management zone (VMZ). The vegetation management zone consists of the landside levee slope and a 15-foot strip adjacent to the landside levee toe, the levee crown, and the waterside levee slope in a zone extending 20 feet from the levee crown. Under the levee VMS, existing trees not posing an unacceptable safety hazard are allowed to remain, but will not be replaced upon their deaths. Over time, the life-cycle management component of the VMS would result in the gradual elimination of this large, woody vegetation from the portions of SPFC levees within the vegetation management zone. The waterside levee slope area downslope from the VMZ was defined as lower waterside slope where visibility and accessibility criteria would not apply. Vegetation would experience little to no active management unless individual trees were identified as posing an unacceptable threat to levee integrity.

Since the PEIR, interagency collaboration has continued to address the issues highlighted in the CVFPP related to levee vegetation management. In adopting the CVFPP, the CVFPB directed DWR to further develop the levee VMS into a more comprehensive approach, and further directed that the approach be adaptive and responsive to the results of ongoing and future research regarding vegetation on levees, knowledge gained from levee performance during high-water events, and the need to conserve critical riparian habitat. DWR prepared an updated levee VMS (Appendix D of the Conservation Strategy [DWR, 2016d]), which includes evaluating the threat level of levee trees and taking appropriate management actions (e.g., trimming, topping, coppicing, and removal).

Many of the approaches described in the levee VMS are already being implemented, while others are under development. The levee VMS also addresses minimizing habitat losses associated with vegetation management, including evaluating strategies implementing riparian forest corridors in the vicinity of existing levees, and considering the potential for limited natural recruitment of native habitat on the waterside of levees. In response, and consistent with PEIR Mitigation Measure BIO-A-2b that references riparian corridor planning, DWR studied the spatial extent of levee vegetation occurring within the VMZ and likely to be lost over the course of VMS implementation, and determined that the VMS is likely to result in the loss of approximately 1,300 acres of riparian habitat across the extent of the SPFC VMZ (see Appendix A).

DWR is further developing and refining levee vegetation management practices by using the research findings that came out of the California Levee Vegetation Research Program (CLVRP). This partnership of policy makers, levee managers, and researchers within federal, State, and local agencies are working together to use the latest research and field expertise to inform levee management policies, improve maintenance practices, and reduce flood risk. A CLVRP work group is developing guidance that will provide DWR's levee maintainers with a structured, science-based process to manage levee vegetation on a risk-prioritized basis. DWR is also engaging with USACE during their legislatively mandated review and refinement of federal levee vegetation policy, striving to achieve compatibility between State and federal policies.

### **2.3.8 Local Planning Obligations**

The CVFPP recognizes that development behind levees is often incompatible with periodic flooding, to the detriment of public safety and floodplain ecosystems, unless special measures, such as elevating or floodproofing buildings, are implemented to limit damages. Therefore, the CVFPP broadly discourages incompatible development and encourages compatible development within floodplains. Beyond these broad policies, the CVFPP does not directly impose local planning obligations. Current law (SB 5) establishes planning and development approval obligations imposed on certain cities and counties in the CVFPP protected area, including requirements for local agencies to amend their general plans and associated zoning ordinances, and to make certain findings before granting entitlements to develop and approve certain building permits. The intent of these general plan and zoning amendments and findings was to help cities and counties better recognize the flood risk and consequences of flooding.

In 2014, DWR published the “Addendum to Implementing California Flood Legislation into Local Land Use Planning: A Handbook for Local Communities.” and the “Guidance on General Plan Amendments for Addressing Flood Risks” (DWR, 2014a, 2014b). The purpose of these reports is to provide technical assistance to cities and counties related to their compliance requirements to amend their General Plans and ordinances. DWR continues to provide technical assistance to communities on meeting the Urban Level of Flood Protection government code requirements when requested.

The planning and development approval obligations identified in the CVFPP (DWR, 2012a) are also included in the 2017 CVFPP Update (DWR, 2016a). This component is essentially unchanged.

## 2.4 Management Actions

Management actions are building blocks that can be combined in different ways to form systemwide solutions that collectively address program objectives. The management actions included in the CVFPP consist of one or more individual actions that fall within the two categories of near- and long-term management actions. The CVFPP states that additional feasibility studies, design activities, and environmental review would be needed before any of the physical elements of the program could be implemented (DWR, 2012a). To this end, the six RFMPs, the two BWFSs, and the Conservation Strategy have been developed since the CVFPP was adopted in 2012. Together, these efforts inform and refine the potential management actions identified in the 2017 CVFPP Update.

The 2017 CVFPP Update also identifies phased implementation of CVFPP actions and their associated investments over a 30-year planning horizon, and specifies whether potential management actions require a one-time investment or require ongoing, annual investment. Phasing implementation is intended to balance economic risk and reward on Central Valley floodplains and reduce the number of lives lost or injured from flooding. In general, actions are grouped into three, 10-year phasing categories based near-, mid-, and long-term implementation (DWR, 2016a). Future CVFPP updates will refine investment timing as priorities and conditions change during CVFPP implementation.

Consistent with the PEIR, individual management actions evaluated in this Supplemental PEIR are discussed in three categories: conveyance-related actions, storage-related actions, and other actions. The management actions in these categories represent the range of individual strategies that could be used to accomplish the program goals and objectives.

### 2.4.1 Conveyance-Related Management Actions

The PEIR identifies conveyance-related management actions as actions that could improve or restore the overall flood conveyance capacity of the flood system; and identifies general categories, including in-place levee reconstruction, erosion repairs, floodway widening, and weir and bypass modification (DWR, 2012b). The CVFPP and PEIR identified potential improvements to weirs and bypasses, including improvements to Yolo Bypass and Paradise Cut. Both of these projects have been refined in the BWFS, and are included as potential projects in the 2017 CVFPP Update. These projects and other conveyance-related actions included in the 2017 CVFPP Update are described in this section. In addition to these specific projects, the general categories of conveyance-related management actions described in the PEIR continue to apply.

- The Sacramento River BWFS identified the following features of the Yolo Bypass recommended option (DWR, 2016b):
  - A 1.5-mile expansion of Upper Elkhorn Basin, with a corresponding expansion of Fremont Weir
  - A 3,500-foot levee setback along the Lower Elkhorn Basin
  - A 1,500-foot expansion of Sacramento Weir and a corresponding 1,500-foot expansion of the Sacramento Bypass

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- Measures to extend the useful life of the Cache Creek Settling Basin and address concerns regarding mercury in its sediment
- Levee setbacks (4,000 feet) on the western side of the Willow Slough Bypass north of Willow Slough and south of Interstate (I)-80
- Levee setbacks (5,000 feet) on the western side of the Putah Creek Bypass north of Putah Creek
- A gated weir to tie into the Deep Water Ship Channel (DWSC)
- Degradation of remaining step-levee segments in the lower bypass
- Levee setback south of Reclamation District (RD) 2068 to Rio Vista
- Degradation of portions of the Prospect Island western levee
- Degradation of portions of the Lower Egbert Tract (RD 2084) levees
- Potential participation in flood protection improvements for Rio Vista to address potential hydraulic impacts of Yolo Bypass capacity improvements
- Various fix-in-place levee improvements to ensure 6 feet of freeboard over 1997 110 percent water surface elevations (WSELs)
- The Yolo Bypass improvements include ecosystem opportunities that have been identified in the BWFS and following guidance from the Conservation Strategy:
  - o Inclusion of up to 2,400 acres of marsh in Little Egbert Tract
  - o Ecosystem improvements that include up to 2,408 acres of riparian habitat and up to 1,143 acres of marsh habitat
  - o Inundated floodplain expected annual habitat for a 2-year return interval of up to 3,992 acres
  - o SRA cover increase of up to 1.6 miles
- Levee improvements to fix remaining geotechnical inadequacies for urban areas unaddressed in the future baseline condition, and known critical geotechnical deficiencies for rural and small communities
- The San Joaquin River BWFS recommended option includes the Paradise Cut Bypass Expansion, which would include a combination of a new secondary upstream weir, 4,000 to 7,000 feet of left bank setback levees on Paradise Cut, downstream levee improvements, as well as base case improvements implemented by the River Islands land development project. As described, the project would remove revetment and restore SRA habitat along the degraded San Joaquin River levee, and restore the southern portion of the current in-channel

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bar for floodplain rearing habitat. Most of the land within the setback area would be kept in agricultural production. Ecosystem improvements following guidance from the Conservation Strategy would increase riparian and wetland habitat by about 500 acres and would benefit a wide variety of endangered species (DWR, 2016c).

The CVFPP does not include a specific recommendation for the Feather River-Sutter Basin bypass system (DWR, 2012a). Similarly, the 2017 CVFPP Update does not identify a preferred option from the range of analyzed Feather River-Sutter Bypass options (DWR, 2016a). It is anticipated that more specific Feather River-Sutter Bypass flood management improvements would not be recommended before 2030, after the Yolo Bypass improvements are implemented.

Section 2.4.3, Other Management Actions, describes other conveyance-related management actions that are included in the urban, small community, and rural programs.

### 2.4.2 Storage-Related Management Actions

The PEIR states that storage-related management actions are actions that could be implemented by increasing reservoir and floodplain storage capacity, and changing the flood management operations of existing reservoirs (DWR, 2012b). These actions have been further studied in the Sacramento River and San Joaquin River BWFSs (DWR, 2016b, 2016c), and are included as potential projects in the 2017 CVFPP Update (DWR, 2016a). This component is essentially unchanged.

#### ***Reservoir and Floodplain Storage***

Increased flood storage may reduce the need for some types of downstream actions, such as levee improvements, and can offset the hydraulic effects of system improvements on downstream reaches. Additional flood storage can also provide greater flexibility in accommodating future hydrologic changes, including climate change, and provide greater system resiliency (similar to that provided by freeboard on levees) in the face of changing downstream conditions.

Expanding reservoir storage capacity is included in the CVFPP, which referenced one authorized project: the Joint Federal Project for Folsom Dam. This project, which will modify the spillway and slightly raise the dam for emergency flood storage, is under way and is included in the 2017 CVFPP Update.

The CVFPP states that, as part of future feasibility studies, the State may consider partnering with other willing agencies on expanding existing reservoir storage (DWR, 2012a). Similarly, the 2017 CVFPP Update states that DWR may study reservoir storage opportunities, but no specific recommendations are included. Potential operational changes to existing reservoirs are discussed below.

The CVFPP includes floodplain storage projects that would capture flood flows to reduce downstream peak stages, but did not identify any specific projects (DWR, 2012a). Based on the San Joaquin River BWFS (DWR, 2016c), two potential projects are included in the 2017 CVFPP



Update. Both would be located along the San Joaquin River in rural Stanislaus County, and have multi-benefit potential, including strong ecosystem benefits, as follows (DWR, 2016a):

- Dos Rios/Hidden Valley Ranch Transitory Storage, which would provide approximately 5.6 TAF of new floodplain storage on approximately 1,000 acres, including 700 acres of riparian and marsh habitat and large recreational benefits.
- Three Amigos Transitory Storage, which would provide approximately 13.4 TAF of new floodplain storage on approximately 1,934 acres, including more than 150 acres of riparian and marsh habitat in the San Joaquin National Wildlife Refuge (NWR) and large recreational benefits.

The 2017 CVFPP Update also includes potential groundwater recharge opportunities associated with two projects – Madera Ranch Recharge Project and Western Madera and Merced County Subsidence Solution (DWR, 2016a).

### ***Reservoir Operations***

Reservoir operations play an important role in flood operations in the Central Valley. The CVFPP included two approaches to reservoir reoperation. The Forecast-Coordinated Operations (F-CO) program would coordinate flood releases from the reservoirs located on various tributaries of a major river to manage the use of downstream channel capacity and total available flood storage space in the system. The management process and partnerships formed under the F-CO Program development could provide substantial flood control benefits.

The Forecast-Informed Operations (F-IO) program would involve using improved long-term forecasts of runoff and operating within the parameters of an existing flood control diagram.<sup>3</sup> To proactively manage reservoirs by using a more flexible flood control diagram, managers would have to conduct extensive studies of the most feasible diagram, complete environmental documentation for changing reservoir operations, and obtain congressional approval for a new dynamic flood control diagram (DWR, 2012a).

F-CO and F-IO are included in the 2017 CVFPP Update (DWR, 2016a). The San Joaquin River BWFS identified the need for improved operations at multiple storage facilities in the San Joaquin Basin (DWR, 2016c):

- F-IO release of 50 to 100 thousand acre-feet (TAF) from Don Pedro Dam on the Tuolumne River prior to a flood event (known as pre-release)
- Increase of the objective release from Don Pedro Dam from 9,000 to 25,000 cubic feet per second (cfs)
- Reservoir management in the Calaveras River Watershed to create approximately 42 TAF of additional storage, which could be achieved by conjunctive use or reservoir reoperation

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<sup>3</sup> The term Forecast-Based Operations (F-BO) was used in the CVFPP instead of F-IO. The terms are equivalent.

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The Sacramento River BWFS discussed potential benefits provided by a New Bullards Bar Lower Level Outlet (DWR, 2016b).

### 2.4.3 Other Management Actions

The CVFPP identifies other management actions as actions that do not fall into the conveyance- or storage-related categories described. These other management actions are summarized in this section.

#### ***Urban Flood Protection***

As described in Section 2.3.1, SB 5 requires existing, large, urban areas to achieve at least a 200-year LOP by 2025 in order to continue development. The CVFPP states that DWR will evaluate and participate in projects in the following urban areas: Chico, Yuba City/Marysville, Sacramento, Woodland/Davis, Merced, and Stockton. For each of these areas, the CVFPP lists the types of urban flood protection projects under consideration, and also states that DWR may consider participating in projects in other urban areas that are protected by non-SPFC levees (DWR, 2012a).

The 2017 CVFPP Update lists the current feasibility studies and construction projects that are pending or under way in these urban areas. The updated information is based on implementation progress during the last 5 years and the BWFS-recommended actions. The six urban areas listed are carried forward into the 2017 CVFPP Update (DWR, 2016a), and the San Joaquin River BWFS (DWR, 2016c) provides additional detail for the following projects:

- **Stockton Improvements.** Floodwalls would be included in the Stockton urban area for a 200-year event that accounts for projected climate change. Closure structures at the mouth of Smith Canal and 14-Mile Slough are also included to prevent Delta backwater flooding.
- **Mormon Channel Bypass.** This element includes a control structure and channel improvements to divert up to 1,200 cfs from the upstream end of the Stockton Diverting Canal to the Mormon Channel to add resiliency against projected climate change by reducing flows in the Stockton Diverting Canal and Old Calaveras River.
- **RD 17 Levee Improvements.** This includes a new levee structure (“cross levee”) within RD 17 and a small setback levee near the Old River and San Joaquin River confluence (River Mile [RM] 52). This option would also include levee raises and geotechnical improvements. The RM 52 multi-benefit setback levee would provide an additional 130 acres of ecosystem habitat.
- **Merced Urban Improvements.** This includes support for a 200-year LOP for the Merced urban area, but does not include specific actions or improvements at this time.

Collectively, the 2017 CVFPP Update refers to these projects as the Urban Portfolio.

#### ***Small-Community Flood Protection***

As described in Section 2.3.2, the CVFPP includes a program to protect existing small communities; in some cases, sufficient to achieve at least a 100-year LOP. The CVFPP estimates that 15 small communities would receive 100-year flood protection from about 80 miles of levee

improvements or new levee construction. Another five small communities would receive 100-year flood protection, at minimum, through implementation of other urban and system improvements included in the SSIA. Seven small communities would receive flood protection through floodplain management actions, such as flood proofing or raising structures (DWR, 2012a).

The 2017 CVFPP Update includes the continued implementation of programs designed to provide flood protection to small communities (DWR, 2016a). In addition, the San Joaquin River BWFS provides additional detail for one new project (DWR, 2016c):

- **Firebaugh Small Community Improvements.** This element would include multi-benefit levee improvements along the San Joaquin River, including fix-in-place levee improvements, levee raises, new levees, and strategic setback levees to provide a 100-year LOP for Firebaugh and the adjacent Eastside Acres development. This element would also provide 623 acres of riparian and marsh habitat and additional recreational benefits, including a recreational trail system consistent with the 2030 Firebaugh General Plan (Collins & Schoettler et al., 2014).

Collectively, the 2017 CVFPP Update refers to these projects as the Small Communities Portfolio.

### ***Rural-Agricultural Area Flood Protection***

As described in Section 2.3.2, the CVFPP includes a program to improve protection for rural-agricultural areas and describes the typical categories of projects to support. With regard to SPFC levees, the CVFPP does not include specific projects in rural-agricultural areas (DWR, 2012a). Similarly, the 2017 CVFPP Update focuses on the typical categories of rural capital projects; specifically, levee upgrades, improvements to channels and hydraulic structures, new or upgraded retention and detention basins, deferred maintenance, levee setbacks, small bypass modifications, and floodplain storage projects. In addition, the 2017 CVFPP Update (DWR, 2016a) also includes potential projects described in the BWFS, as follows:

- **RM 60-65 Setback Levee.** The San Joaquin River right bank levees at RM 60-65 have many inadequacies and have performed poorly in historical flood events. An alternative to fix-in-place levee improvements is construction of an approximately 800-acre right bank setback levee to achieve a 50-year LOP and to address known levee seepage, stability, and geometry problems. Land in the setback area would stay in agricultural production but would be inundated more frequently through the purchase of flowage easements.
- **Hydraulic Structure Upgrades.** The San Joaquin River and Chowchilla Canal Bypass control structures would be improved with critical structural rehabilitation to proactively prevent catastrophic failure of these structures during large flood events.
- **Eastside Bypass Subsidence Improvements.** This element includes either levee raises or flowage easements at the Eastside Bypass. Because of uncertainties with future subsidence, future uncertainty with San Joaquin River Restoration Program (SJRRP) implementation, and similar costs across the levee raising and flowage easements option, both are included as potential options.

Collectively, the 2017 CVFPP Update refers to these projects as the Rural Portfolio.

### **Conservation Elements**

Consistent with the Conservation Strategy, conservation elements would be integrated into many management actions to improve the sustainability of the flood management system and the ecosystem benefits it provides. Conservation elements would include management actions such as bypass expansions containing habitat, multi-benefit urban and rural-agricultural flood protection projects, fish passage projects, and biotechnical bank protection projects. Examples of integrating conservation elements into SPFC modification projects include designing setback levees to provide environmental benefits, lowering floodway elevations to provide more frequent and sustained inundation of lower floodplain surfaces, modifying floodways to provide greater topographic and hydrologic diversity, developing advanced mitigation programs, incorporating corridor management planning to improve flood management and ecological conditions, and restoring natural river processes.

Bypass expansion could substantially increase the overall area of frequently activated floodplain that would support riparian, SRA, and wetland habitats while also providing a continuous corridor of these habitats. Based on the BWFSs, the 2017 CVFPP Update includes management actions with more than 6,000 acres of new habitats that could be created within the flood management system. This estimate could vary based on many factors including land availability and affordability, and available funding; however, the estimate is considered the best reasonably available forecast for purposes of the analysis in this Supplemental PEIR.<sup>4</sup>

## **2.5 Implementation of the Proposed Program**

Adoption of the 2017 CVFPP Update by the CVFPB would not lead directly to construction of improvements or implementation of other elements of the program. The 2017 CVFPP Update would guide a variety of follow-on studies and planning efforts, environmental reviews, changes to policies and guidance, and other implementation actions (e.g., development of financing strategies and funding sources), some of which are currently in progress. The State's implementation role in these actions varies, and may include leadership in planning and construction, financial assistance, technical support, O&M, and regulation. Based on the information in the 2017 CVFPP Update, it is expected that DWR and the CVFPB would participate in follow-on feasibility studies; that the CVFPB would act within its existing regulatory, planning, and project implementation capacities; and that State agencies would change policies, guidance, or regulations related to flood management as necessary. Other non-State entities may also participate in implementing the program. For example, modifying the SPFC would require participation by USACE, the CVFPB, and local, nonfederal project sponsors (DWR, 2016a).

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<sup>4</sup> The PEIR assumed 10,000 acres of new habitat. The current estimate of 6,000 acres does not include potential new habitat areas in the Feather River-Sutter Bypass system (currently undefined).

### 2.5.1 Implementation in Accordance with Applicable Laws and Regulations

As stated in the PEIR (DWR, 2012b), implementation of the program would be undertaken in compliance with all applicable laws and regulations, and the adoption and approval of the program is conditioned on such compliance. Numerous State and federal laws, regulations, and executive orders would be considered: CEQA, NEPA, the Fish and Wildlife Coordination Act, the Clean Air and Clean Water acts, the California and federal Endangered Species acts, the National Historic Preservation Act (NHPA), and other applicable laws and regulations. The specific permits and authorizations that would be required for future projects will vary, depending upon the nature and location of the actions involved.

Possible permits and authorizations required for future projects with implementation of the CVFPP are summarized in the PEIR, Table 2-2 (DWR, 2012b). All items listed in the PEIR's Table 2-2 still apply, and one new administrative requirement has been added since adoption of the PEIR, as follows:

- **Assembly Bill (AB) 52.** AB 52 became effective in July 2015, establishing a meaningful consultation process with California Native American Tribes (both federally and nonfederally recognized) and requiring that impacts on tribal cultural resources (TCRs) identified during consultation be addressed during CEQA review. As defined in Public Resources Code Section 21074, a TCR is a site, feature, place, cultural landscape, sacred place, or object with cultural value to a California Native American Tribe that is either on, or eligible for inclusion in the California Register of Historical Resources; or a local historic register; or is a resource that the lead agency, at its discretion and supported by substantial evidence, determines should be treated as a TCR.

Information on DWR's implementation of AB 52 for the 2017 CVFPP Update can be found in Section 3.2, Cultural and Historic Resources.

### 2.5.2 Funding Plan for Implementing the Program

As stated in the PEIR (DWR, 2012b), DWR is required to prepare a funding plan for the CVFPP. Based on information known at the time, the PEIR stated that CVFPP implementation would require an investment of \$14 to \$17 billion over 20 years. A mix of federal, State, and local funds would be needed, and funding sources would vary according to the type of project or program, beneficiaries, availability of funds, urgency, and other factors (DWR, 2012b).

Current CVFPP cost information for capital projects and ongoing improvements is discussed in the 2017 CVFPP Update, Section 4. Implementation of the 2017 refined SSIA portfolio of improvements is estimated to cost approximately \$17 to \$21 billion over the next 30 years (DWR, 2016a). Section 4 of the 2017 CVFPP Update also includes information regarding plan funding and implementation.

## 2.6 No Near- or Long-Term Reduction in Water or Renewable Electricity Deliveries

The CVFPP includes changes to the flood management operations of existing reservoirs, and these changes could result in incidental, indirect effects on the delivery of water, renewable electricity (hydropower), or both (DWR, 2012a). PEIR Section 2.6 states that these effects would most likely be beneficial (DWR, 2012b). In addition, any near-term reductions in the availability of water and renewable electricity are anticipated to be minimal and well within the capacity of the entities receiving these resources to respond to minor supply fluctuations. The SSIA also includes a commitment to no long-term reduction in water deliveries or renewable electricity. For these reasons, the PEIR concluded that no potential existed for a significant impact on water supply deliveries or hydroelectric power production (DWR, 2012b).

The 2017 CVFPP Update does not propose any additional reservoir operational changes over and above what was included in the CVFPP (DWR, 2016a). Refinements as part of the 2017 CVFPP Update process continue to support the determination that changes in water supply and renewable electricity would mostly likely be beneficial, and that any near-term reductions are likely to be minimal. Therefore, the PEIR's conclusions regarding reductions in water and renewable energy deliveries still apply.

## 2.7 Typical Construction Activities and Methods

Implementation of the SSIA will involve construction activities, which would cause most of the environmental impacts considered in the PEIR. The PEIR includes a general description of typical construction activities (PEIR, Section 2.7), with an understanding that specific construction activities will vary based on the unique characteristics of each individual project (DWR, 2016b). There are no changes to the general construction activities described in the PEIR.

## 3.0 Environmental Setting, Impacts, and Mitigation Measures

PEIR Chapter 3 describes the existing conditions in the study area, analyzes environmental impacts, and presents mitigation measures for significant and potentially significant impacts. The SSIA refinements included in the 2017 CVFPP Update would not result in new significant impacts or change the severity of impacts previously identified in the PEIR. For this reason, the PEIR analysis adequately covers the 2017 CVFPP Update's SSIA refinements.

For some resources, there is new information that was not known when the PEIR was prepared. The new information and affected resources are:

- New information resulting from the DWR Agricultural Lands Stewardship Working Group. Although no new or greater farmland impacts are identified, the range of farmland mitigation options listed in PEIR Section 3.2, Agricultural and Forestry Resources, should be updated.
- New information documenting both the extent of riparian habitat impacts from the VMS and the extent of expected riparian habitat enhancement, restoration, and creation documented in the BWFSs. This new information should be reflected in the analysis of potential impacts on riparian habitat in PEIR Section 3.5, Biological Resources – Aquatic, and PEIR Section 3.6, Biological Resources – Terrestrial.
- New species information for giant garter snake, yellow-billed cuckoo, and tricolored blackbird. This new information requires updates throughout PEIR Section 3.6, Biological Resources – Terrestrial.
- AB 52 requirements to consider impacts on TCRs and the adoption of DWR's Tribal Engagement Policy (DWR, 2016h). This new information requires updates throughout PEIR Section 3.8, Cultural and Historic Resources.
- Adoption of the Sustainable Groundwater Management Act (SGMA). Although no new or greater groundwater impacts are identified, this new information requires an update to the regulatory setting of PEIR Section 3.11, Groundwater Resources.

A preliminary review of the potential for the 2017 CVFPP Update to require changes to the PEIR was conducted during the scoping phase of the project, as documented in an Environmental Checklist that was circulated for review as part of the NOP process (see Section 1.4, Public Participation in the CEQA Process). The checklist responses reflected what was known about the 2017 CVFPP Update in early 2016. Primarily, these expected updates were based on an assumption that the Conservation Strategy would result in greater impacts on farmland and associated impacts on land uses and socioeconomic conditions. Based on the current draft Conservation Strategy and the habitat features included in the BWFSs, it was determined that the potential adverse impacts are still within the range of impacts evaluated in the PEIR; therefore,

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no updates are needed. In addition, some of the items listed above were not identified in early 2016 as requiring an update to the PEIR but were subsequently determined to be necessary.

As defined in CEQA Guidelines (California Code of Regulations [CCR], Sections 15162 and 15163), the new information discussed in this chapter is not substantially important and does not result in a new or substantially more severe significant effect. So that the PEIR continues to adequately describe the environmental impacts of the CVFPP (as modified by the 2017 CVFPP Update), minor changes and additions to the PEIR text are needed. The updates in this chapter are presented as errata to the PEIR – additions to the PEIR text are underlined, and deletions are marked in ~~strikeout~~. PEIR text to remain unchanged is presented in light gray text.<sup>5</sup>

Also, for these reasons, no new alternatives have been identified, nor are there other factors that would make the prior alternatives worthy of reconsideration. The analysis updates discussed in this chapter are presented in terms of the SSIA alternative, which was the preferred alternative identified at the conclusion of the PEIR review in 2012.

### 3.1 Agricultural and Forestry Resources

The following changes are made to PEIR Section 3.2, Agricultural and Forestry Resources.

- Update to the conclusion statement for PEIR Impact AG-1 to reflect a greater range of potential mitigation strategies.

Implementing Mitigation Measures AG-1a (NTMA), AG-1b (NTMA), and AG-1c (NTMA) would substantially lessen significant impacts associated with conversion of agricultural land uses, including lands classified as Important Farmland. In addition, other measures may be available to further lessen the significant impacts; for example, the DWR Agricultural Lands Stewardship Workgroup has developed 36 strategies for farmland impact avoidance, minimization, and mitigation. These measures will be reviewed and considered as appropriate. However, until the case-by-case analysis for each project is complete, it is not possible to conclude that all potentially significant impacts could and would be mitigated. Consequently, Impact AG-1 (NTMA) would be potentially significant and unavoidable.

### 3.2 Biological Resources – Aquatic

The following changes are made to PEIR Section 3.5, Biological Resources – Terrestrial.

- Update to PEIR Impact BIO-A-2 and Mitigation Measures BIO-A-2a and BIO-A-2b in response to new information regarding the extent of riparian habitat impacts under the current VMS.

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<sup>5</sup> Note that some of the PEIR text refers to NTMA and LTMA, which stand for Near-Term Management Actions and Long-Term Management Actions. Those terms are not used in this Supplemental PEIR, but are preserved in the existing PEIR text in this section as legacy acronyms.



### 3.0 Environmental Setting, Impacts, and Mitigation Measures

Impact BIO-A-2 (NTMA): Effects on Special-Status Fish, Fish Movement, Nursery Ground Usage, Riparian Habitat, Designated Critical Habitat, and Essential Fish Habitat Caused by Loss of Overhead Cover and Instream Woody Material as Part of the Vegetation Management Strategy

Implementing the VMS (as described in Section 2.4.3, “Other Near-Term Management Actions,” in Chapter 2.0, “Program Description”) would result in a gradual reduction of existing riparian habitats in some locations on and along existing levees, as dead or diseased trees are removed and not replaced by either natural recruitment or planting. Trees and other woody vegetation would be removed over an extended period—and eventually eliminated entirely—from the designated vegetation management zone, an area typically extending 15 feet beyond the landside levee toe to 20 feet below the waterside levee crown. Immature trees and woody vegetation would be removed, existing mature trees either would be lost eventually to natural mortality or would be removed if they posed an unacceptable threat, and new trees and woody vegetation would not be reestablished. However, vegetation would generally be retained on the water side of levees more than 20 feet below the levee crown. Loss of levee vegetation is expected to occur on approximately 1,300 acres within the levee VMZ (see Appendix A).

Specifically, under the VMS, immature trees and woody vegetation in the vegetation management zone that measure less than 4 inches in diameter at breast height (dbh) would be removed in an authorized manner as part of levee maintenance. Larger trees and woody vegetation greater than 4 inches dbh would be subject to a long-term life-cycle management (LCM) plan to be implemented by levee maintenance agencies. These larger trees would be allowed to live out their normal life cycles if they do not pose an unacceptable threat, but would not be replaced in the vegetation management zone after their death or removal. (The LCM plan allows the immediate removal of trees that pose an unacceptable threat.) Removal of woody vegetation in both size categories would be conducted in consultation with the appropriate resource agencies.

Over time, a net loss in the extent and quality of riparian habitat would occur in the vegetation management zone on existing levees as the lost vegetation is not replaced. Vegetation less than 4 inches dbh would be removed relatively quickly after plan adoption. Larger riparian vegetation (e.g., mature cottonwoods and black willows) is expected to gradually decline, and the vegetation management zone would ultimately consist almost exclusively of smaller, nonwoody vegetation. Overhanging vegetation, most often from large trees, provide stream shade, which is a component of shaded riverine aquatic habitat.

The effects of vegetation removal under the VMS would vary substantially depending on the existing conditions along a particular levee segment:

- In locations where little to no woody vegetation grows in the vegetation management zone, and existing levee maintenance practices prevent this vegetation from establishing, the VMS would result in little change from existing conditions.
- If the ordinary water level approaches the waterside edge of the vegetation management zone, and the only woody riparian vegetation on the waterside of the levee is a thin strip

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in the management zone (20 feet or less below the crown), much of the woody riparian vegetation on this side of the levee could be removed over time.

- If woody riparian vegetation grows on the levee's waterside both in and below the vegetation management zone, riparian vegetation would be lost in the management zone but retained below it. As a result, the strip of waterside riparian habitat would be thinner than under existing conditions.
- In situations where woody riparian vegetation grows on both sides of a levee, and with some vegetation in the vegetation management zone, the current nonriparian corridor between the landside and waterside riparian vegetation (likely a levee crown patrol road and portions of the levee slope) would become wider as vegetation in the management zone on both sides of the levee moves toward an increased amount of smaller and nonwoody vegetation.

Numerous other vegetation removal scenarios could be described here. However, the key point is that as the VMS is implemented, adverse effects on riparian vegetation and associated aquatic resources could range from minimal to substantial, depending on factors such as location, amount, and quality of vegetation affected; its proximity to water; and the continuity with other riparian vegetation. Where adverse effects are found, they would result primarily from one of three scenarios:

1. Thin strips of riparian vegetation that grow entirely within the vegetation management zone would be substantially or entirely removed.
2. Riparian vegetation grows both inside and outside of the vegetation management zone, and habitat in the management zone ultimately would be removed. As a result, thinner corridors of riparian habitat would remain outside of the management zone.
3. Woody riparian habitat exists on both sides of the levee, separated by a nonriparian zone along the levee (likely, at a minimum, along a crown patrol road). If some riparian habitat occurs within the vegetation management zone, this habitat would be removed over time, causing the nonriparian zone between the landside and waterside habitat to become wider. However, this mechanism would be very unlikely to affect aquatic resources, and potential adverse effects would typically be limited to terrestrial biological resources. (See Section 3.6, "Biological Resources—Terrestrial.")

However, a component of both the VMS and the CVFPP Conservation ~~Framework~~ **Strategy** is also the enhancement of existing riparian habitats and restoration and creation of riparian habitat at various locations. Riparian forest corridors would be established, as appropriate, in areas outside the vegetation management zone along both the waterside and landside of existing levees. The greatest opportunities to increase the extent of riparian vegetation would be on the landside because of space limitations often found between levees and the water bodies they are designed to contain. It is most likely that restoration and creation of riparian forest corridors would be in proximity to levees in rural areas where undeveloped land is available and human disturbance would be minimized. Conservation Strategy objectives for riparian habitat enhancement, restoration, and creation are integrated into the 2017 CVFPP Update and the Sacramento River and San Joaquin River BWFSs. At this time, the

### 3.0 Environmental Setting, Impacts, and Mitigation Measures

management actions are expected to result in the enhancement, restoration, and creation of 3,500 acres of new riparian habitat.

The VMS would also inform the design of new setback levees by recommending an expanded floodway that would accommodate both vegetation and water conveyance. Under this approach, woody vegetation may be permitted on the waterside slopes and berms of new levees where a specifically designed waterside planting berm is incorporated into the levee design. In some cases, woody vegetation provides environmental and engineering benefits to levee integrity (e.g., erosion protection, soil reinforcement, sediment recruitment). In these cases, the vegetation could remain on existing levees that are repaired or improved, particularly where the levee prism is widened or a root or seepage barrier is installed. With these efforts, existing riparian habitat could be retained or expanded along levees at some locations.

The combined elements of the VMS ~~would result in the removal~~ could, eventually, result in the loss of riparian vegetation in some areas (totaling approximately 1,300 acres) and the enhancement, restoration, or creation of riparian vegetation in other areas (approximately 3,500 acres are currently identified). The final result would be a gradual change in the location of riparian vegetation, with habitat lost in some areas but gained in other areas. There is the potential that ultimately a net gain in riparian vegetation could result. The recovery and restoration of native habitats is a supporting goal of the CVFPP, and increasing and improving the quantity, diversity, quality, and connectivity of riverine habitats (including riparian habitat) is a goal of the Conservation Framework Strategy. However, there is currently insufficient detail in these plans to ensure that, in all time periods and in all areas, there would be a balance between habitat losses and gains, resulting in no net overall loss in the extent and quality of riparian vegetation in the program area relative to existing conditions.

With the CVFPP Conservation Framework Strategy, planting riparian vegetation below the vegetation management zone could enhance existing riparian habitats and result in restoration or creation of additional riparian habitat at various locations. A portion of the affected riparian habitat—both the gains (below the vegetation management zone) and the losses (in and below the vegetation management zone, if a matter of public safety)—may qualify as shaded riverine aquatic habitat. This is an important habitat component for aquatic species, including special-status fish species. Shaded riverine aquatic habitat is also considered part of the critical habitat and EFH particularly for salmonid species.

The effect of implementing the VMS (i.e., LCM) would be gradual for woody vegetation greater than 4 inches dbh. Therefore, the rate at which these habitat components would be enhanced, restored, and created under the CVFPP Conservation Framework Strategy could match or exceed the rate of potential habitat loss associated with the VMS. Ultimately, habitat improvements resulting from implementation of the Conservation Framework would likely exceed losses resulting from implementation of the VMS on a net basis. The final outcome would be a gradual change in the locations of riparian/shaded riverine aquatic vegetation as habitat is lost in some areas but gained in other areas.

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It cannot be assured that habitat gains generated by the CVFPP Conservation Framework Strategy would always exceed losses at a specific location. If vegetation removal were required in a general area that currently has a high volume of riparian vegetation, the removal and offsite mitigation would have less of an effect on the overall system because changes in overall conditions in the area would be small. However, if vegetation were removed in an area where minimal riparian vegetation is available, this removal—even with offsite mitigation—would have a greater effect on the fisheries. The effect would be greater because it is more likely that connectivity between patches of riparian habitat could be limited and long stretches of river shoreline would have little to no riparian vegetation. Although clearly not every levee segment in the SPFC contains riparian vegetation that functions as SRA habitat, it is reasonable to assume that there would be some areas where SRA currently exists along relatively long river reaches where this habitat would be removed. Therefore, implementation of the VMS could have, at least in some areas, a substantial adverse effect on riparian vegetation that functions as SRA habitat.

Because overhead cover and IWM (and thus shaded riverine aquatic habitat) would be lost as a result of implementation of the VMS along the banks and levees, this impact would be **potentially significant**.

Mitigation Measure BIO-A-2a (NTMA): Secure Applicable State and/or Federal Permits and Implement Permit Requirements

Not all measures listed below may be applicable to each management action. Rather, these measures serve as an overlying mitigation framework to be used for specific management actions. The applicability of measures listed below would vary based on the lead agency, location, timing, and nature of each management action.

The project proponent will ensure that the following measures are implemented to reduce the effects of repairing, reconstructing, and improving levees on trees within stream zones, shaded riverine aquatic habitat, IWM, listed fish species, and designated critical habitat:

- A Section 1602 streambed alteration agreement will be obtained from DFG before any trees are removed from a stream zone that is under DFG jurisdiction unless the activity is implemented by USACE. The project proponent will comply with all terms and conditions of the streambed alteration agreement, including measures to protect habitat or to restore, replace, or rehabilitate any habitat.
- The project proponent will consult or coordinate with USFWS and NMFS as required under the federal ESA, and with DFG as required under the CESA, regarding potential impacts on listed fish species, including the loss of habitat. The project proponent will implement any additional measures developed through the ESA and CESA consultation processes, including the conditions of Section 7 biological opinions, Section 10 HCPs, and Section 2081 permits.

Where an existing approved HCP, NCCP, or similar plan covers an NTMA and provides for compliance with applicable State or federal regulations, the project proponent may participate in and comply with the terms of such a plan to achieve the permit compliance

### 3.0 Environmental Setting, Impacts, and Mitigation Measures

measures listed above. Any mitigation plantings in the floodway will not be permitted if they would result in substantial increases in flood stage elevations, or alter flows in a manner that would have a substantial adverse effect on the opposite bank.

Mitigation Measure BIO-A-2b (NTMA): Ensure Full Compensation for Losses of Riparian Habitat Functions and Values Caused by Implementing the Vegetation Management Strategy Along Levees

DWR will coordinate with the Board and levee maintenance agencies tasked with implementing the VMS to develop and implement a plan to record data on riparian vegetation lost or removed due to implementation of the VMS, and to ensure adequate compensation for losses of riparian habitat functions and values. Although this mitigation measure is written as if a single plan is prepared, multiple plans addressing individual regions, watersheds, river corridors, or other geographic subdivisions are also acceptable.

The plan will be completed and suitable for implementation before the start of riparian habitat removal under the VMS. The plan will include mechanisms to, at a minimum, record and track the acreage, type, and location of riparian habitat to be removed through implementation of the VMS or lost over time through LCM.

The plan will also address compensation for the loss and degradation of riparian habitat through the enhancement, restoration, or creation of riparian habitat in other locations. Assessment of the value of lost or degraded habitat and of compensation habitat will take into account issues such as the differing functions of waterside and landside riparian habitat, continuity and connectivity of habitat, types of riparian habitat removed vs. type of compensation habitat (e.g., riparian scrub vs. cottonwood riparian forest), and ability of habitat to support special-status species. DWR will track habitat compensation efforts and only authorize implementation of vegetation removal under the VMS at a rate and in locations consistent with the volume and type of compensation habitat that has been established. This habitat compensation tracking program will be included in the program MMRP prepared to support this PEIR.

The plan must, at a minimum, meet the following basic performance standard:

- Authorized losses of habitat do not exceed the function and value of available compensation habitat.

DWR will coordinate with USFWS, NMFS, and DFG during preparation and implementation of the plan to incorporate into the plan appropriate compensation for effects on special-status species from vegetation management along the levee system.

Various mechanisms may be employed to provide compensation habitat under the plan, as long as the performance standard identified above is met. The mechanisms include but are not limited to the following:

- Implementation of the CVFPP Conservation Strategy Framework
- Participation in existing NCCPs, HCPs, or other conservation plans

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- Purchase of habitat credits at an established mitigation bank
- Habitat restoration implemented by a levee maintenance agency or other entity

Any mitigation plantings in the floodway will not be permitted if they would result in substantial increases in flood stage elevations, or alter flows in a manner that would have a substantial adverse effect on the opposite bank.

In many cases, implementing Mitigation Measures BIO-A-2a (NTMA), and BIO-A-2b (NTMA) related to implementation of the VMS would reduce impacts to an overall less-than-significant level and even sometimes to a beneficial level. The extent, type, function, and values of any riparian habitat removed would be fully compensated for by enhancing, restoring, or creating riparian habitat elsewhere. However, removing riparian habitat in some locations and enhancing, restoring, or creating habitat elsewhere would result in overall relocation of riparian habitat within the Extended SPA. It is possible that although some stream or river reaches may benefit from compensatory habitat, habitat values in other stream or river reaches could be substantially reduced, adversely affecting special-status fish species that must move through these river reaches. Potential adverse effects include increased predation risk, increased water temperatures, and reduced food availability. In addition, planting vegetation in the floodway may not be authorized by the Board, USACE, or other agencies if the vegetation would impede flood flows sufficiently that a rise in water surface elevation would cause a significant increase in risk to public safety. Therefore, it cannot be assured that in all instances fisheries impacts would be mitigated to a less-than-significant level. Therefore, Impact BIO-A-2 (NTMA) would be potentially significant and unavoidable.

### 3.3 Biological Resources – Terrestrial

The following changes are made to PEIR Section 3.6, Biological Resources – Terrestrial:

- Update to PEIR Table 3.6-4 to reflect the changed listing status of western yellow-billed cuckoo and tricolored blackbird.

**Table 3.6-4. Sensitive Wildlife Species of Riparian and Wetland Communities in the Sacramento and San Joaquin Valley and Foothills**

Species	Status <sup>1</sup>	Habitat Description
<b>Birds</b>		
Tricolored blackbird <i>Agelaius tricolor</i>	<del>SC</del> <u>CC</u>	<i>Foraging:</i> On ground in croplands, grassy fields, flooded land, and along edges of ponds. <i>Nesting:</i> Dense cattails, tules, or thickets near freshwater.
Western yellow-billed cuckoo <i>Coccyzus americanus Occidentalis</i>	<del>FC</del> CE	<i>Nesting:</i> Extensive deciduous riparian thickets or forests with dense, low-level or understory foliage adjacent to slow-moving watercourses, backwaters, or seeps. Willow is almost always a dominant component of the vegetation. In the Sacramento Valley, also utilizes adjacent walnut orchards.

<sup>1</sup> Status Definitions:

FC = federal candidate for listing

FE = federally listed as endangered

### 3.0 Environmental Setting, Impacts, and Mitigation Measures

**Table 3.6-4. Sensitive Wildlife Species of Riparian and Wetland Communities in the Sacramento and San Joaquin Valley and Foothills**

Species	Status <sup>1</sup>	Habitat Description
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FT = federally listed as threatened  
CC = California candidate for listing  
 CE = California listed as endangered  
 CT = California listed as threatened  
 FP = California fully protected  
 CSC = California species of special concern

- Update to PEIR Section 3.6.1, Environmental Setting, to update the giant garter snake species description based on new information about life history and behavior.

*Giant Garter Snake* The giant garter snake (*Thamnophis gigas*) is federally and State listed as threatened. The giant garter snake historically occurred throughout California’s Central Valley, but the species’ current range is confined to the Sacramento Valley, and isolated sites in the San Joaquin Valley, and, potentially, in the Delta (Hansen and Brode 1980; USFWS 2006b). Many of the populations of giant garter snake in the northern part of the state range from Stockton (San Joaquin County) to Chico (Butte County) are relatively stable; however, the southernmost populations at the Mendota Wildlife Area (Fresno County) and the Grassland Wetlands (Merced County) are small, fragmented, unstable, and probably decreasing (USFWS 2006b). No sightings of giant garter snakes south of the Mendota Wildlife Area, within the historic range of the species, have occurred since the time of listing (Hansen 2002).

The giant garter snake is a large (up to 5 feet long), aquatic snake. It inhabits sloughs, low-gradient streams, marshes, ponds, agricultural wetlands (e.g., rice fields), irrigation canals and drainage ditches, and adjacent uplands. It feeds primarily on small fish, tadpoles, and frogs. Despite their aquatic habitats, giant garter snakes also make extensive use of adjacent terrestrial habitats during the inactive season, primarily during brumation (Halstead et al., 2015). Snakes use emergent vegetation and crevasses and burrows in adjacent uplands for cover (USFWS 2006b). They also use adjacent uplands for foraging, basking, refuge from flood waters, and hibernation. Giant garter snakes may hibernate up to 800 feet from water, and along waterways, they may move considerable distances (e.g., up to 2 miles in a single day) (Hansen 1988; USFWS 2006b). Giant garter snakes are less active or dormant from October until April, when they emerge to breed and forage (Wylie et al. 1997). Under most conditions, giant garter snakes are found within 33 feet of water; however, in some instances they can be found more than 66 feet from water (Halstead et al., 2015).

Giant garter snakes are vulnerable to predation from both native species (e.g., raccoons, egrets, and herons) and nonnative species (e.g., bullfrogs, feral cats) (58 *Federal Register* (FR) 54053–54065, October 20, 1993; Carpenter et al. 2002). Predation may be the reason that giant garter snakes tend to be absent from larger rivers that support predatory fish (Hansen 1980). They are also affected by parasites and contaminants. Giant garter snake is threatened primarily by habitat conversion, fragmentation, and degradation resulting from urban development (58 FR 54053–54065, October 20, 1993; Dickert 2005). (Human disturbance contributes to habitat degradation because giant garter snakes are diurnal

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predators that are disturbed by human activities.) It is also threatened by incompatible agricultural practices such as intensive vegetation control along canal banks and changes in crop composition.

- Update to PEIR Section 3.6.1, Environmental Setting, to update the western yellow-billed cuckoo species description based on the changed federal designation.

*Western Yellow-Billed Cuckoo* The western yellow-billed cuckoo (*Coccyzus americanus occidentalis*) is federally listed as a candidate-threatened species for federal listing and is State listed as endangered. Yellow-billed cuckoo breeds throughout much of North America and winters in South America (Hughes 1999). The California breeding range of western yellow-billed cuckoo is restricted to the Sacramento Valley, the South Fork of the Kern River, the lower Colorado River Valley, and sometimes the Prado Basin in Riverside and San Bernardino counties (Gaines and Laymon 1984). In 2014, designation of critical habitat was proposed for western yellow-billed cuckoo throughout its range (79 FR 71373–71375, December 2, 2014). At this time, a final designation of critical habitat has not been adopted.

Yellow-billed cuckoos are occasional brood parasites; they will lay eggs in nests of other cuckoos or in nests of other species. In the western United States, yellow-billed cuckoos breed in broad, well-developed, low elevation riparian woodlands composed primarily of mature cottonwoods (*Populus* spp.) and willows (*Salix* spp.). Typical nest sites in California have moderately high canopy closure and low total ground cover, and are close to water (Laymon and Halterman 1987). In spring, yellow-billed cuckoos arrive in California from late May to until late June.

In California, yellow-billed cuckoo is threatened by the loss or degradation of suitable large tracts of riparian habitat, pesticide poisoning, and possibly also reduced prey abundance resulting from widespread application of pesticides (Gaines and Laymon 1984). Conservation projects of the CVP have preserved habitat for yellow-billed cuckoo (DFG 2005). This species also has been included in habitat conservation and multispecies conservation planning efforts in Southern California. These efforts have focused on conserving suitable breeding habitat by preserving and restoring large patches of riparian vegetation.

- Update to Mitigation Measures BIO-T-3a and BIO-T-3b based on new information with respect to giant garter snake and its use of adjacent terrestrial habitat.

Mitigation Measure BIO-T-3a (NTMA): Conduct Focused Surveys for Special-Status Plants and Wildlife, and Avoid Impacts

Not all measures listed below may be applicable to each management action. Rather, these measures serve as an overlying mitigation framework to be used for specific management actions. The applicability of measures listed below would vary based on the lead agency, location, timing, and nature of each management action.

The project proponent will verify whether species survey and avoidance protocols have been established for species that might be affected by the specific project, or will coordinate with



### 3.0 Environmental Setting, Impacts, and Mitigation Measures

the appropriate regulatory agency (e.g., USFWS or DFG) to determine an acceptable alternative method for surveying and avoiding effects on a species. To avoid effects of proposed construction activities on special-status plants and wildlife, the project proponent will ensure that the following measures are implemented before commencement of ground-disturbing activities. Where measures below call for field surveys, the project proponent may rely on previous surveys that were conducted for the project area if these surveys meet the applicable agency guidelines. If avoidance consistent with these measures cannot be achieved, the project proponent will implement the minimization and compensation measures included in Mitigation Measure BIO-T-3b described below. Where surveys for special-status species may be necessary, the project proponent may be able to rely on previous surveys that were conducted for the project area if these surveys meet the applicable agency guidelines.

- The CNNDDB will be searched to determine whether any records describe species observations and indicate the presence of habitat for those species in or near the project area. These habitats and species occurrences will be identified, mapped, and quantified as deemed appropriate. The project proponent, assisted by the primary engineering and construction contractors, will coordinate with a qualified biologist to ensure that disturbance of sensitive communities, habitats, and species is minimized during construction to the extent feasible. In consultation with USFWS and DFG, the project proponent will develop measures to minimize and, where appropriate, compensate for construction-related effects on sensitive habitats and special-status species.
- A qualified botanist will conduct surveys for special-status plants (as listed in Table 3.6-3) with potential to occur in appropriate habitat within the project area. The surveys will follow applicable guidelines established by USFWS and/or DFG, and will be conducted at the appropriate time of year when the target species would be clearly identifiable. If no special-status plants have the potential to occur in the project area or none are found during focused surveys, no further action is required. If special-status plants are found, areas of occupied habitat will be identified. The construction contractor will avoid these areas where feasible. Temporary fencing will be installed to protect all occupied habitat that is located adjacent to construction areas but can be avoided.
- A qualified biologist will conduct a survey in areas where elderberry shrubs could occur within 100 feet of construction and inundation areas. Surveys and stem counts will follow the USFWS conservation guidelines for the valley elderberry longhorn beetle (USFWS 1999). If elderberry shrubs are found, the project proponent will implement avoidance measures that are consistent with the USFWS conservation guidelines for this species (USFWS 1999). Where feasible, effects will be avoided by establishing and maintaining a 100-foot-wide buffer around elderberry plants. Where a 100-foot buffer is not feasible, effects may be minimized by providing a minimum setback, with a buffer around elderberry plants measuring at least 20 feet wide.
- Protocol surveys of all potential nesting trees and habitat in the area will be completed during the raptor nesting season (generally February 15–September 15 but may be adjusted for individual species), particularly if any construction activity is to occur during that season. Potential nesting trees and other nesting habitats (e.g., grasslands for northern harriers and burrowing owls) that are within one-half mile of proposed activity will be

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surveyed. To avoid the loss of active raptor nests, if the project proponent elects to remove trees suitable for nesting, the trees will be removed during the non-nesting season (generally between September 15 and February 15), to the extent practicable. Where feasible and depending on the species (particularly for Swainson's hawk), construction activities within one-quarter mile of active nests will be avoided during the raptor nesting season. Other nesting raptors may tolerate a much smaller buffer (e.g., one tenth mile).

- Surveys for other special-status wildlife listed in Table 3.6-4 with potential to occur in the project area will be conducted by a qualified biologist at the appropriate time of year when the target species would be clearly identifiable. Not all wildlife species require surveys because their presence may be assumed based on habitat components and known locality records, or they clearly will not be present in the area. USFWS and DFG will be consulted to determine for which species surveys should be conducted; appropriate species protocols will be followed. Occupied and potentially suitable habitat will be avoided where feasible by installing temporary exclusionary fencing.
- If potentially suitable aquatic habitat for giant garter snake is identified in or within 200 feet of disturbance areas by a qualified biologist, DWR will establish a 200-foot, a buffer area of 200 feet will be established around the aquatic habitat, where feasible. These buffers will be indicated by marked in the field with guidance from a qualified biologist using temporary fencing, high-visibility flagging, or other equally effective means for clearly delineating the buffers. Disturbance activities will not occur within the buffer, and workers will avoid entering the buffer at all times. If avoidance buffers are observed, no other mitigation measures for impacts on giant garter snakes will be required. If work must occur within 200 feet of potentially suitable habitat, DWR will implement mitigation measures included in Mitigation Measure BIO-T-3b, as determined to be necessary by a qualified biologist.
- If nesting areas for pond turtles are identified, a buffer area of 300 feet will be established between the nesting site and nearby wetlands, where feasible. (The nesting site may be adjacent to wetlands or extend up to 400 feet away from wetland areas in uplands.) These buffers will be indicated by temporary fencing if construction has begun or will be established before nesting periods are ended (the period from egg laying to emergence of hatchlings is normally April to November).
- Preconstruction surveys for special-status bat species will be conducted to determine the presence of roosts. When colonial roosting sites located in trees or structures must be removed, removal will occur outside of the nursery and/or hibernation seasons. Unless otherwise approved by DFG, such removal will occur during dusk and/or evening hours after bats have left the roosting site. When hibernation sites are identified on the project site, nursery and hibernation sites will be sealed before the hibernation season (November–March). Additional measures, such as monitoring and onsite mitigation roosts, will be implemented, as feasible (see H.T. Harvey & Associates 2004).

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- Participation in and compliance with an existing approved HCP, NCCP, or similar plan applicable to an NTMA may replace the specific survey and avoidance actions listed above if all of the following conditions are met:
  - The existing, approved HCP, NCCP, or similar plan is applicable to the NTMA.
  - The NTMA is within the permit area.
  - The NTMA is a covered activity under the existing plan.
  - The plan addresses methods to identify, avoid, minimize, and compensate for effects on special-status species.

Mitigation Measure BIO-T-3b (NTMA): If Avoiding Construction-Related Effects on Special-Status Plants and Wildlife is Infeasible, Minimize and, Where Appropriate, Compensate for Effects on Special-Status Species and Loss of Habitat.

If the focused surveys described above in Mitigation Measure BIO-T-3a have been completed and avoiding effects on special-status species is infeasible, the project proponent will coordinate with the appropriate regulatory agency (e.g., USFWS or DFG) to determine acceptable methods for minimizing or compensating for effects on a species. Various minimization and compensation measures are described below. The CVFPP Conservation Strategy Framework may be a suitable source of compensation habitat. The project proponent will ensure that the following measures are implemented to minimize and compensate for effects of proposed levee improvements on special-status plants and wildlife:

- If special-status plants cannot be avoided, the project proponent will coordinate with USFWS and/or DFG (depending on which agency has jurisdiction over the particular species) to determine appropriate minimization and compensation measures. Some local plans and policies, if applicable to the project being implemented, may require that the project proponent completely avoid effects on a special-status plant species or pay a fee to mitigate impacts. Where feasible and applicable, the project proponent will consult and/or coordinate with local agencies on these plans and policies. In some instances, sensitive plants may be relocated to an area approved by DFG or USFWS.
- If ground-disturbing activities are to occur within 20 feet of the dripline of an elderberry shrub, minimization and compensation measures consistent with the USFWS conservation guidelines (USFWS 1999) will be implemented. These measures include transplanting elderberry shrubs and planting compensatory elderberry seedlings and associated native plantings.
- If an active raptor nest is found, a biologist, in coordination with DFG, will determine an appropriate buffer that minimizes the potential for disturbing the nest. Setbacks will be marked by brightly colored temporary fencing. Based on the coordination with DFG, no construction activities will begin in the buffer area until a qualified biologist has confirmed that the nest is no longer active or that the birds are not dependent on it. A qualified biologist will monitor construction to ensure that project activities will not

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substantially adversely affect the nesting pair or their young. The size of the buffer may vary, depending on the nest location, nest stage, construction activity, and monitoring results. If establishing the buffer becomes infeasible or construction activities result in an unanticipated nest disturbance, DFG will be consulted to determine the appropriate course of action.

- Minimization and compensation measures for other special-status wildlife species will be developed in consultation with DFG and/or USFWS. DFG and USFWS provide standardized minimization measures for several species; for example, the giant garter snake has specific minimization measures, such as restrictions on the construction season, and a requirements for biological surveys and monitoring, **exclusionary fencing, permitted capture and relocation, aquatic habitat dewatering, and restoration.**
- Participation in and compliance with an existing approved HCP, NCCP, or similar plan applicable to an NTMA may replace the specific minimization and compensation actions listed above if all of the following conditions are met:
  - The existing approved HCP, NCCP, or similar plan is applicable to the NTMA.
  - The NTMA is within the permit area.
  - The NTMA is a covered activity under the existing plan.
  - The plan addresses methods to identify, avoid, minimize, and compensate for effects on special-status species.

All construction-related activities will be subject to all applicable permitting requirements. The mitigation measures described above, when combined with applicable permit requirements, must, at a minimum, meet the following basic performance standard:

- Authorized losses of habitat will not exceed the function and value of available compensation habitat.

DWR will also track these habitat compensation efforts as part of the MMRP for this PEIR. These measures will be designed to ensure that construction activities will not result in a substantial reduction in the population size or range of any special-status plants or wildlife.

- Proposed update to Impact BIO-T-7 and Mitigation Measures BIO-T-7a and BIO-T-7b in response to new information regarding the extent of riparian habitat impacts under the current VMS.

Impact BIO-T-7 (NTMA): Effects of the Vegetation Management Strategy on Sensitive Natural Communities and Habitats, Special-Status Plants and Wildlife, and Wildlife Movement

Implementing the VMS would result in a gradual reduction of existing riparian habitats in some locations on and along existing levees, as dead or diseased trees are removed and not replaced by either natural recruitment or planting. Trees and other woody vegetation would

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be removed over an extended period—and eventually eliminated entirely—from the designated vegetation management zone, an area typically extending 15 feet beyond the landside levee toe to 20 feet below the waterside levee crown. Immature trees and woody vegetation would be removed, existing mature trees either would be lost eventually to natural mortality or would be removed if they posed an unacceptable threat, and new trees and woody vegetation would not be reestablished. However, vegetation would generally be retained on the water side of levees more than 20 feet below the levee crown. Loss of vegetation is expected to occur on approximately 1,300 acres within the levee VMZ (see Appendix A).

Specifically, under the VMS, immature trees and woody vegetation in the vegetation management zone that measure less than 4 inches in diameter at breast height (dbh) would be removed in an authorized manner as part of levee maintenance. Larger trees and woody vegetation greater than 4 inches dbh would be subject to a long-term life-cycle management (LCM) plan to be implemented by levee maintenance agencies. These larger trees would be allowed to live out their normal life cycles if they do not pose an unacceptable threat, but would not be replaced in the vegetation management zone after their death or removal. (The LCM plan allows the immediate removal of trees that pose an unacceptable threat.) Removal of woody vegetation in both size categories would be conducted in consultation with the appropriate resource agencies.

Over time, a net loss in the extent and quality of riparian habitat would occur in the vegetation management zone on existing levees as the lost vegetation is not replaced. Vegetation less than 4 inches in diameter would be removed relatively quickly after plan adoption. Larger riparian vegetation (e.g., mature cottonwoods and black willows) is expected to gradually decline, and the vegetation management zone would ultimately consist almost exclusively of smaller, nonwoody vegetation.

The effects of vegetation removal under the VMS would vary substantially depending on the existing conditions along a particular levee segment:

- In locations where little to no woody vegetation grows in the vegetation management zone, and existing levee maintenance practices prevent this vegetation from establishing, the VMS would result in little change from existing conditions.
- If the ordinary water level approaches the waterside edge of the vegetation management zone, and the only woody riparian vegetation on the waterside of the levee is a thin strip in the management zone (20 feet or less below the crown), much of the woody riparian vegetation on this side of the levee would be removed over time.
- If woody riparian vegetation grows on the levee's waterside both in and below the vegetation management zone, riparian vegetation would be lost in the management zone but retained below it. As a result, the strip of waterside riparian habitat would be thinner than under existing conditions.
- In situations where woody riparian vegetation grows on both sides of a levee, and with some vegetation in the vegetation management zone, the current nonriparian corridor

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between the landside and waterside riparian vegetation (likely a levee crown patrol road and portions of the levee slope) would become wider as vegetation in the management zone on both sides of the levee moves toward more of the smaller and nonwoody vegetation.

Numerous other vegetation removal scenarios could be described here. However, the key point is that as the VMS is implemented, adverse effects on riparian vegetation and associated terrestrial resources could range from minimal to substantial, depending on factors such as the location, amount, and quality of vegetation affected; its proximity to water; and the continuity with other riparian vegetation. Where adverse effects are found, they would result primarily from one of three scenarios:

1. Thin strips of riparian vegetation that grow entirely within the vegetation management zone would be substantially or entirely removed.
2. Riparian vegetation grows both inside and outside of the vegetation management zone, and habitat in the management zone ultimately would be removed. As a result, thinner corridors of riparian habitat would remain outside of the management zone.
3. Woody riparian habitat exists on both sides of the levee, separated by a nonriparian zone along the levee (likely, at a minimum, along a crown patrol road). If some riparian habitat occurs within the vegetation management zone, this habitat would be removed over time, causing the nonriparian zone between the landside and waterside habitat to become wider.

The effects of these losses of riparian vegetation on terrestrial biological resources would be similar to those already described in Impact BIO-T-1 (NTMA), “Construction-Related Effects of NTMAs on Sensitive Natural Communities and Habitats”; Impact BIO-T-3 (NTMA), “Construction-Related Effects of NTMAs on Special-Status Plants and Wildlife”; and Impact BIO-T-4 (NTMA), “Construction-Related Effects of NTMAs on Wildlife Movement.” However, where construction activities would cause riparian vegetation to be lost relatively rapidly as described in these impacts, implementing the VMS would typically result in the near-term removal of smaller woody vegetation (to the extent that current routine levee maintenance operations do not already prevent this class of vegetation from being present) and a gradual reduction over time in the density and extent of larger woody vegetation.

As described in Impact BIO-T-3 (NTMA), numerous special-status wildlife species may be affected by degradation or loss of riparian vegetation: valley elderberry longhorn beetle, western pond turtle, giant garter snake, five frog species, 18 bird species (such as Swainson’s hawk, western yellow-billed cuckoo, and least Bell’s vireo), riparian woodrat, riparian brush rabbit, and four bat species.

Beyond the effects of potential direct loss of occupied habitat for these species, the degradation, removal, or corridor narrowing of riparian habitat could result in habitat fragmentation and loss or degradation of primary movement corridors for many special-status and non-special-status wildlife species. As described above, in some locations the separation between landside and waterside riparian habitat would expand. Where this change would occur, species closely associated with dense riparian vegetation, such as riparian

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woodrat or riparian brush rabbit, may no longer cross the nonriparian area and may be prevented from using substantial portions of available riparian habitat. In addition, the predation risk for these species increases as the nonriparian area becomes wider, resulting in increased mortality.

A component of both the VMS and the CVFPP Conservation Framework Strategy is the enhancement of existing riparian habitats and restoration and creation of riparian habitat in various locations. Riparian forest corridors would be established, as appropriate, in areas outside the vegetation management zone along both the waterside and landside of existing levees. The greatest opportunities to increase the extent of riparian vegetation would be on the landside because of space limitations often found between levees and the water bodies they are designed to contain. It is most likely that restoration and creation of riparian forest corridors would be in proximity to levees in rural areas where undeveloped land is available and human disturbance would be minimized. Conservation Strategy objectives for riparian habitat enhancement, restoration, and creation are integrated into the 2017 CVFPP Update and the Sacramento River and San Joaquin River BWFSs. At this time, the management actions are expected to result in the enhancement, restoration, and creation of 3,500 acres of new riparian habitat.

The VMS would also inform the design of new setback levees by recommending an expanded floodway that would accommodate both vegetation and water conveyance. Under this approach, woody vegetation may be permitted on the waterside slopes and berms of new levees where a specifically designed waterside planting berm is incorporated into the levee design. In some cases woody vegetation provides environmental and engineering benefits to levee integrity (e.g., erosion protection, soil reinforcement, sediment recruitment). In these cases, the vegetation could remain on existing levees that are repaired or improved, particularly where the levee prism is widened or a root or seepage barrier is installed. With these efforts, existing riparian habitat would be retained or expanded along levees where feasible.

The combined elements of the VMS ~~would result in the removal~~ could, eventually, result in the loss of riparian vegetation in some areas (totaling approximately 1,300 acres) and the enhancement, restoration, or creation of riparian vegetation in other areas (approximately 1,300 acres are currently identified). The final result would be a gradual change in the location of riparian vegetation, with habitat lost in some areas but gained in other areas. There is the potential that ultimately a net gain in riparian vegetation could result; the recovery and restoration of native habitats is a supporting goal of the CVFPP, and increasing and improving the quantity, diversity, quality, and connectivity of riverine habitats (including riparian habitat) is a goal of the Conservation Framework Strategy. However, there is currently insufficient detail in these plans to ensure that, in all time periods and in all areas, there would be a balance between habitat losses and gains, resulting in no net overall loss in the extent and quality of riparian vegetation in the program area relative to existing conditions.

In addition, the values provided to water-dependent terrestrial wildlife species (e.g., western pond turtle, special-status frog species) by waterside riparian habitat differ substantially from those provided by riparian habitat on the landside of the levee. Because the ability to provide

waterside riparian habitat is often complicated by space limitations, it is unknown whether a balance would exist in all time periods between losses and gains of waterside riparian habitat.

Changes in the locations of available riparian habitat over time can also result in the disruption of movement corridors where riparian habitat is lost in one location but compensated for in another location that may be less critical to wildlife movement.

Also, for species with very limited ranges, such as riparian brush rabbit, losses of riparian habitat at the edge of the known distribution of the species could restrict the species' range.

Because implementing the VMS could result in substantial adverse effects on sensitive habitats, special-status species, and wildlife movement corridors, this impact would be **potentially significant**.

**Mitigation Measure BIO-T-7a (NTMA): Implement Applicable Elements of Mitigation Measures BIO-T-1a (NTMA), BIO-T-3a (NTMA), BIO-T-3b (NTMA), and BIO-T-3c (NTMA) to Minimize Impacts during Vegetation Removal**

Implementing this mitigation measure would reduce elements of Impact BIO-T-7 (NTMA). In particular, this measure includes actions that would avoid and minimize impacts on sensitive biological resources caused by direct removal of woody vegetation as part of the VMS. For example, where mature trees must be removed, elements of Mitigation Measure BIO-T-3a (NTMA) would minimize adverse effects on nesting raptors and special-status bat roost sites because trees that might support these resources would be identified and guidance regarding timing of tree removal would be implemented to minimize adverse effects. However, these measures that compose Mitigation Measure BIO-T-7a (NTMA) do not ensure the full replacement of riparian habitat functions and values to compensate for losses of riparian vegetation associated with implementation of the VMS. Therefore, this mitigation measure would not reduce the entirety of the impact to a less-than-significant level. Also see Mitigation Measure BIO-T-7b below.

**Mitigation Measure BIO-T-7b (NTMA): Implement Mitigation Measure BIO-A-2b (NTMA), “Ensure Full Compensation for Losses of Riparian Habitat Functions and Values Caused by Implementing the Vegetation Management Strategy Along Levees”**

In many cases, implementing Mitigation Measure BIO-A-2b (NTMA) and meeting the performance criteria in the measure for riparian vegetation compensation would reduce impacts associated with the removal of riparian vegetation to an overall less-than-significant level. The extent, type, quality, and function of any riparian habitat removed would be fully compensated for through the enhancement, restoration, and creation of riparian habitat elsewhere. However, removing riparian habitat in some locations and enhancing, restoring, or creating habitat elsewhere would result in overall relocation of riparian habitat within the Extended SPA. It is possible that although some areas may benefit from compensatory habitat, habitat values in other locations could be substantially reduced. It cannot be assured that wildlife movement corridors can be maintained in all instances or that relocation of riparian habitat would not restrict the range of some species. In addition, planting vegetation in the floodway may not be authorized by the Board, USACE, or other agencies if the



vegetation would impede flood flows sufficiently that a rise in water surface elevation would cause a significant increase in risk to public safety. Therefore, it cannot be assured that in all instances impacts on sensitive terrestrial biological resources would be mitigated to a less-than-significant level. Therefore, Impact BIO-T-7 (NTMA) would be **potentially significant and unavoidable**.

## 3.4 Cultural and Historic Resources

The following changes are made to PEIR Section 3.8, Cultural and Historic Resources.

- Update to PEIR Section 3.8.1, Environmental Setting, to add *tribal cultural resources* to the definitions.

### Definitions

*Cultural resources* are sites, buildings, structures, objects, and districts that may have traditional or cultural value for the historical significance they possess or convey. Cultural resources include but are not limited to the following types of resources: prehistoric and historic-era archaeological deposits; historic-era features, such as roadways and railroad tracks; buildings and structures of architectural significance; and places that are important for maintaining a community's identity or culture (i.e., traditions, beliefs, lifeways, social institutions).

*Historical resources* are those cultural resources that are determined eligible for listing in the California Register of Historical Resources (CRHR) pursuant to Public Resources Code (PRC) Section 5024.1.

*Historic properties* are cultural resources that are found eligible for inclusion in the National Register of Historic Places (NRHP) by meeting the criteria outlined in Title 36, Section 60.4 of the Code of Federal Regulations (CFR) (36 CFR 60.4).

*Traditional cultural properties (TCPs)* are a subset of historic properties. These resources have been found eligible for listing in the NRHP "because of [their] association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community" (Parker and King 1998).

Tribal Cultural Resources (TCRs) as defined by PRC Section 21074 are either (1) sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American Tribe that is either on or eligible for inclusion in the CRHR or a local historic register; or (2) the lead agency, at its discretion and supported by substantial evidence, chooses to treat the resource as a TCR. Additionally, a cultural landscape may also qualify as a TCR if it meets the criteria to be eligible for inclusion in the CRHR and is geographically defined in terms of the size and scope of the landscape. Other historical resources (as described in PRC 21084.1), a unique archaeological resource (as defined in

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PRC 21083.2(g)), or nonunique archaeological resources (as described in PRC 21083.2(h)) may also be TCRs if they conform to the criteria to be eligible for inclusion in the CRHR.

Generally, for a cultural resource to be considered a historical resource (or a historic property), it must be at least 50 years old. However, properties less than 50 years of age that are of exceptional importance or are contributors to a district can also be included in the NRHP. For example, in California, the Oroville Dam and hydroelectric facilities are less than 50 years of age, but they have been determined eligible for the NRHP because of their importance as part of the SWP. See Section 3.8.2, “Regulatory Setting,” for further description of the NRHP and CRHR.

- Update to PEIR Section 3.8.2, Regulatory Setting, to add AB 52 and DWR’s Tribal Engagement Policy to the discussion of applicable State regulations.

State

**California Environmental Quality Act Statute and Guidelines.** CEQA and the CEQA Guidelines include procedures for identifying, analyzing, and disclosing potential adverse impacts on cultural resources, which include all resources listed in or formally determined eligible for listing in the NRHP, the CRHR, or local registers.

*Section 21083.2* CEQA Section 21083.2 defines a “unique archaeological resource” as “an archaeological artifact, object, or site” that meets the following criteria:

1. Contains information needed to answer important scientific 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 best available example of its type
3. Is directly associated with a scientifically recognized important prehistoric or historic event or person

Section 21083.2 also requires the lead agency to consider the effects of a project on these resources. If it is demonstrated that a project will affect a unique archaeological resource, treatment to preserve the site may be required. Such treatments may include but are not limited to:

1. Planning construction to avoid archaeological sites
2. Deeding archaeological sites into permanent conservation easements
3. Capping or covering archaeological sites with a layer of soil before building on the sites
4. Planning parks, green space, or other open space to incorporate archaeological sites

If a unique archaeological site cannot be avoided, mitigation, which may involve excavation, is required.

*Section 15064.5* Section 15064.5 of the CEQA Guidelines further requires that the lead agency mitigate substantial adverse changes to resources listed on the CRHR or local

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registers, and coordinate with the Native American Heritage Commission (NAHC) if Native American human remains are identified as a result of a project. A substantial adverse change is defined as “physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired.” Treatment and mitigation measures are further discussed under Section 15126.4(b). Section 15064.5 also reiterates the need to contact NAHC if human remains are found pursuant to PRC Section 5024.1, as stated below.

Assembly Bill 52. Assembly Bill 52 (AB 52), effective on July 1, 2015, amends CEQA and adds new sections relating to Native American consultation and certain types of cultural resources, Tribal Cultural Resources (TCRs). See definition of TCRs in PRC Section 21074 and above. AB 52 provides that a project with an effect that may cause a substantial adverse change in the significance of a TCR may have a significant effect on the environment. AB 52 requires the lead agency to begin consultation with a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project 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 subsequently requests consultation. PRC Section 21084.3 states that “public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource.”

Department of Water Resources Tribal Engagement Policy. Effective March 8, 2016, DWR adopted the Tribal Engagement Policy to strengthen DWR’s commitment to improving communication, collaboration, and consultation with California Native American Tribes, (DWR, 2016h). Consistent with Executive Order B-10-11, the California Natural Resources Agency Tribal Consultation Policy, and AB 52, the Tribal Engagement Policy includes the following policy principles to achieve early and meaningful tribal engagement with California Native American Tribes:

- Establish meaningful dialogue between DWR and California Tribes early in planning for CEQA projects to ensure that DWR’s tribal outreach efforts are consistent with mandated tribal consultation policies, and to ensure that California Tribes know how information from consultation affected DWR’s decision-making process;
- Establish guidelines to share information between DWR and California Tribes, while protecting their confidential information to the fullest extent of the law;
- Consult with California Tribes to identify and protect TCRs where feasible, and to develop treatment and mitigation plans to mitigate for impacts on tribal cultural resources and cultural places;
- Develop criteria in communication plans and grant funding decisions for all applicable DWR programs that will facilitate tribal participation;
- Provide cultural competency training for DWR executives, managers, supervisors, and staff on tribal engagement and consultation practices;

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- Recognize that California Tribes have distinct cultural, spiritual, environmental, economic, public health interests, and traditional ecological knowledge about California's natural resources;
- Enable California Tribes to manage and act as caretakers of TCRs.
- Update to PEIR Section 3.8.3, Analysis Methods and Thresholds of Significance, to include recent updates to the CEQA Guidelines, Appendix G regarding tribal cultural resources.

### Thresholds of Significance

The following applicable thresholds of significance have been used to determine whether implementing the proposed program would result in a significant impact. These thresholds of significance are based on the questions posed in Appendix G of the CEQA Guidelines, as amended. A cultural resource impact is considered significant if implementation of the proposed program would do any of the following when compared against existing conditions:

- Result in a substantial adverse change in the significance of a historical resource as defined in Section 15064.5 of the CEQA Guidelines
- Result in a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5 of the CEQA Guidelines
- Disturb any human remains, including those interred outside of ~~formal~~-dedicated cemeteries

Additionally, a TCR impact is considered significant if implementation of the proposed program would result in a substantially adverse change in the significance of a TCR (as defined in PRC Section 21074 and above) when compared against existing conditions:

- Listed as eligible for listing in the CRHR, or in a local register of historical resources as defined in PRC Section 5020.1(k), or
- 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 PRC Section 5024.1. In applying the criteria set forth in subdivision (c) of PRC Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American Tribe.
- Update to PEIR Section 3.8.4, Environmental Impacts and Mitigation Measures for NTMAs, to add the analysis of impacts on TCRs, the implementation of cultural resource awareness and sensitivity training.

Impact CUL-4 (NTMA): Potential Damage or Disturbance to Traditional Cultural Properties/Tribal Cultural Resources during Ground Disturbance or Other Construction-Related Activities

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Traditional cultural properties (TCPs) are cultural resources with tangible locations that are important to the cultural continuity and longevity of a community, have been important to the community for more than 50 years, and meet the criteria for eligibility for listing in the NRHP and CRHR. Although most TCPs in California are associated with Native American communities, they are not exclusively so. TCPs can be archaeological or built-environment resources, or they can be features of the natural landscape. TCPs are often locations on the landscape that have sacred or other special meaning to Native American communities. Cultivating and harvesting plants for traditional medicines and foods, and for uses such as basketry, remain important activities to Native American communities.

Some of the areas where such plants grow, which are often located adjacent to rivers and streams, may qualify as TCPs.

TCRs can be a site, feature, place, cultural landscape, sacred place, or object with cultural value to a California Native American Tribe that is either on, or eligible for inclusion in, the CRHR or a local historic register, or is a resource that the lead agency, at its discretion and supported by substantial evidence, determines should be treated as a TCR.

Pursuant to AB 52 and DWR's Tribal Engagement Policy, DWR has initiated Native American outreach with the United Auburn Indian Community, Yocha Dehe Wintun Community, the Wilton Rancheria, the Ione Band of Miwok Indians, and the Shingle Springs Band of Miwok Indians. Consultative meetings were held with the Native American Tribes from October 2016 through December 2016 during the development of the 2017 CVFPP Update to receive feedback regarding potential impacts on tribal resources. At this time, no specific TCRs have been identified. Interested tribes have submitted general information about avoiding, minimizing, and mitigating impacts on TCRs and will continue to consult with DWR. Based on consultation activities to date, DWR is proposing updates to PEIR mitigation measures. PEIR Mitigation Measures CUL-4a and CUL-4b, prepared to address TCP impacts, have been expanded. In addition, DWR is adding a new Mitigation Measure CUL-4c to establish cultural resource awareness and sensitivity training.

Ground-disturbing construction activities or the demolition or modification of the built environment associated with NTMA projects could cause a significant adverse change to TCP/TCRs. Therefore, this impact would be **potentially significant**.

Mitigation Measure CUL-4a (NTMA): Conduct Cultural Resources Studies and Avoid Effects on TCP/TCRs

In areas potentially containing ~~traditional cultural properties~~ TCPs or TCRs, an ethnographer or archaeologist who meets the Secretary of the Interior's standards as a professional cultural resource specialist will consult with appropriate populations (Native Americans or otherwise) before approval of any project and identify the presence of any TCP/TCRs at the project location. Native American TCP/TCRs may be identified by an ethnographer who has worked intensively with community members (often, but not always, elders) possessed of considerable knowledge about places important to the community. Efforts to identify TCP/TCRs may include the engagement of tribal monitors. Should TCP/TCRs be identified in the project area, they will be avoided by project redesign or project relocation, if feasible.

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As an example, the proposed location of a water-monitoring device may be moved to another, still appropriate, place along a stream bed to avoid a section of the creek bank that is a TCP/TCR for medicinal plants, thereby avoiding a substantial adverse change to the resource.

Where avoidance is implemented and no further mitigation is required, implementing this mitigation measure would reduce Impact CUL-4 (NTMA) to a less-than-significant level. However, if avoidance is not feasible, see Mitigation Measure CUL-4b (NTMA) below.

Mitigation Measure CUL-4b (NTMA): Consult with Native American Communities and Implement Appropriate Measures to Mitigate Effects on TCP/TCRs

~~Effects to TCPs are expected to be rare occurrences. However, where~~ Where an identified TCP/TCR cannot be fully avoided by a proposed project, the project proponent will engage in early, meaningful consultation with Native American communities, consistent with AB 52 and DWR's Tribal Engagement Policy~~as identified by the Native American Heritage Commission~~, to identify ways to mitigate impacts on TCP/TCRs. This may include the engagement of tribal monitors. An example of a mitigation measure that may be implemented would be ~~For example,~~ if TCP/TCR locations that presently support plant species cultivated and harvested by Native American communities for traditional medicines and foods, or for uses such as basketry, are slated for destruction to make way for planned construction, the project proponent may work with the Native American community associated with the TCP/TCR to identify other nearby locations that can support these same plants. The project proponent can then take steps to enhance existing plant populations at those locations or provide materials and labor to cultivate new plants, with assistance from the Native American community.

Working with local Native American communities to develop interpretive programs is another measure to mitigate impacts on TCP/TCRs. Programs may include developing signage, constructing visitor centers describing locations that have sacred or other special meaning to Native Americans, developing and implementing management plans for important cultural resources, or establishing conservation easements to protect culturally important places.

For each subsequent project, DWR will follow the consultation processes described in Public Resources Code Sections 21080.3.1 and 21080.3.2 for Native American Tribes that request notice and consultation under AB 52. These include:

- DWR will maintain a notification list of tribal contacts.
- DWR will notify tribal contacts within 14 days from deciding to pursue a project.
- Tribes may respond to the notifications in writing within 30 days and request consultation on the project.
- DWR will begin consultation with the tribe within 30 days of receiving the tribe's written request.

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- Consultation will end when DWR and the interested tribe(s) agree to measures to mitigate or avoid a significant effect on a TCR, or a party acting in good faith and after a reasonable effort, concludes that a mutual agreement cannot be reached.

#### **Mitigation Measure CUL-4c: Cultural Resource Awareness and Sensitivity Training**

Only personnel who have received cultural resource awareness and sensitivity training will be allowed to enter areas potentially containing TCPs or TCRs. Training will include a presentation developed in coordination with affiliated tribal representatives. Topics may include the potential presence and type of Native American and non-Native American resources that might be found during operations associated with the individual flood control projects, and necessary reporting protocols. Written materials will be provided to personnel as appropriate.

Implementing Mitigation Measure CUL-4a (NTMA) and a suite of measures as necessary in Mitigation Measure CUL-4b (NTMA) and CUL-4c (NTMA) would reduce Impact CUL-4 (NTMA) to a less-than-significant level in most cases, but may not necessarily reduce impacts on some categories of TCP/TCRs. For example, a tribe's sacred site that is regularly visited for ceremonies could be destroyed during levee construction. In this situation, the direct impacts of the action cannot be fully mitigated even though some form of mitigation may be negotiated with the tribe to ameliorate the action. In such instances, Impact CUL-4 (NTMA) would be **potentially significant and unavoidable**.

- Update to PEIR Section 3.8.5, Environmental Impacts, Mitigation Measures, and Mitigation Strategies for LTMA, to add the analysis of impacts on TCRs.

Impact CUL-4 (LTMA): Potential Damage or Disturbance to Traditional Cultural Properties/Tribal Cultural Resources during Ground Disturbance or Other Construction-Related Activities

Where the LTMA would continue activities included in the NTMA, this impact would be the same as Impact CUL-4 (NTMA). However, the LTMA also include activities of greater scope, which could result in greater direct effects on TCP/TCRs. Those activities could involve constructing flood bypasses and restoring and realigning stream channels. This impact would be potentially significant.

Mitigation Measure CUL-4a (LTMA): Implement Mitigation Measure CUL-4a (NTMA)

Where avoidance is implemented and no further mitigation is required, implementing this mitigation measure would reduce Impact CUL-4 (LTMA) to a less-than-significant level. However, if avoidance is not feasible, see Mitigation Measure CUL-4b (LTMA) below.

Mitigation Measure CUL-4b (LTMA): Implement Mitigation Measure CUL-4b (NTMA)

Implementing Mitigation Measure CUL-4a (LTMA) and a suite of measures as necessary in Mitigation Measure CUL-4b (LTMA) would reduce Impact CUL-4 (LTMA) to a less-than-significant level in most cases, but would not necessarily reduce impacts on some categories of TCP/TCRs. In such instances, Impact CUL-4 (LTMA) would be potentially significant and unavoidable.

## 3.5 Groundwater Resources

The following changes are made to PEIR Section 3.11, Groundwater Resources.

- Update to PEIR Section 3.8.2, Regulatory Setting, to add the Sustainable Groundwater Management Act to the discussion of applicable State regulations.

### **State**

**Porter-Cologne Water Quality Control Act.** Regulations included in the Porter-Cologne Water Quality Control Act (Porter-Cologne Act) (California Water Code, Section 13000 et seq.) are described in Subsection 3.5.2, “Regulatory Setting,” in Section 3.5, “Biological Resources—Aquatic.” Implementing the proposed program activities would not likely result in discharges of wastewater that could affect waters of the State, including groundwater. However, as a State regulation, the proposed program would comply with the Porter-Cologne Act, and DWR would file a report of discharge, if necessary.

**Groundwater Management Act and Senate Bill 1938.** Assembly Bill 3030 (1992), known as the Groundwater Management Act (California Water Code, Section 10750 et seq.), provides a systematic procedure for local agencies to develop a groundwater management plan for groundwater basins defined in DWR Bulletin 118. Senate Bill 1938, signed into law in 2002, amended the Water Code and the provisions of Assembly Bill 3030. This law requires any public agency seeking State funds administered through DWR for construction of groundwater or groundwater quality projects to prepare and implement a groundwater management plan with certain specified components. The public agency must establish basin management objectives, prepare a plan to involve other local agencies in a cooperative planning effort, and adopt monitoring protocols that promote efficient and effective groundwater management. These requirements still apply if the agency has already adopted a groundwater management plan or if its service area does not overlie groundwater basins identified in Bulletin 118 and its updates.

A groundwater management plan may provide details about the following components (California Water Code, Section 10753.8 et seq.):

- Controlling intrusion by saline water
- Identifying and managing wellhead protection areas and recharge areas
- Regulating the migration of contaminated groundwater
- Administering a well abandonment and well destruction program
- Mitigating overdraft conditions
- Replenishing groundwater extracted by water producers
- Monitoring groundwater levels and storage
- Facilitating conjunctive-use operations
- Identifying well construction policies
- Cleaning up local groundwater contamination
- Implementing recharge, storage, conservation, water recycling, and extraction projects
- Developing relationships with State and federal regulatory agencies



### 3.0 Environmental Setting, Impacts, and Mitigation Measures

- Reviewing land use plans and coordinating with land use planning agencies to assess activities that create a reasonable risk of groundwater contamination

Once a groundwater management plan is adopted, rules and regulations must be adopted to implement the program called for in the plan. Groundwater management plans can be found online through DWR's Integrated Water Resources Information System Web site (DWR 2011).

**Sustainable Groundwater Management Act (SGMA)** In September 2014, the SGMA was enacted. SGMA establishes a new structure for locally managing California's groundwater in addition to existing groundwater management provisions established by AB 3030 (1992), SB 1938 (2002), and AB 359 (2011), as well as SBX7 6 (2009).

SGMA includes the following key elements:

- Provides for the establishment of a Groundwater Sustainability Agency (GSA) by one or more local agencies overlying a designated groundwater basin or sub-basin identified in DWR Bulletin 118-03
- Requires all DWR Bulletin 118 groundwater basins found to be of "high" or "medium" priorities to prepare Groundwater Sustainability Plans (GSPs)
- Provides for the proposed revisions, by local agencies, to the boundaries of a DWR Bulletin 118 basin, including the establishment of new sub-basins
- Provides authority for DWR to adopt regulations for the development of GSPs, and review the GSPs for compliance every 5 years
- Requires DWR to establish best management practices and technical measures for GSAs to develop and implement GSPs
- Provides regulatory authority to the State Water Resources Control Board (SWRCB) for developing and implementing interim GSPs under certain circumstances (such as lack of compliance with development of GSPs by GSAs)

The SGMA defines sustainable groundwater management as "the management and use of groundwater in a manner that can be maintained during the planning and implementation horizon without causing undesirable results." Undesirable results are defined as any of the following effects:

- Chronic lowering of groundwater levels
- Significant and unreasonable reduction of groundwater storage
- Significant and unreasonable seawater intrusion
- Significant and unreasonable degraded water quality, including the migration of contaminant plumes that impair water supplies

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- Significant and unreasonable land subsidence that substantially interferes with surface land uses
- Depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water

Based on basin priority definitions defined by DWR’s California Statewide Groundwater Elevation Monitoring (CASGEM) program in June 2014 and confirmed in January 2015, SGMA requires the formation of GSPs by 2020 or 2022. GSPs for medium- and high-priority basins identified as subject to critical conditions of overdraft are required by 2020. All other high- and medium-priority basins must complete a GSP by 2022. Sustainable groundwater operations must be achieved within 20 years following completion of the GSPs.

**Area-of-Origin Statute Limitations.** Section 1220 of the California Water Code prohibits pumping groundwater for export from within the combined Sacramento and Delta–Central Sierra basins, as defined in DWR Bulletin 160-74, unless the pumping complies with a groundwater management plan that is adopted by the ordinance.

**Water Rights.** The State Watermaster Program’s main purpose is to ensure that water is allocated according to established water rights (riparian, appropriative, or groundwater), as determined by court adjudications or agreements by an unbiased, qualified person, thereby reducing water rights court litigation, civil lawsuits, and law enforcement workload. Some groundwater rights in California have been settled by the courts after landowners or other parties have appealed to the courts to settle disputes over how much groundwater can rightfully be extracted. In these “adjudicated groundwater basins,” the courts have determined an equitable distribution of water that will be available for extraction each year. In adjudicated groundwater basins, the courts typically appoint a watermaster to administer the court judgment. Counties have also enacted laws to prevent wells developed on one property from interfering with the use of adjacent wells.

**Groundwater Quality and Supply.** The State requires counties to enact regulations covering well design to protect groundwater quality from surface contamination, and to properly construct and develop wells for domestic use. The Groundwater Management Act (California Water Code, Part 2.75, starting with Section 10750) provides a systematic procedure for groundwater management planning at the county and city levels.

**Other Existing Management Policies.** Existing law regarding groundwater is controlled by jurisdictional decisions. The California Water Code provides limited authority over groundwater use by allowing the formation of special districts (or water agencies) through general or special legislation. DWR identifies nine groundwater management agencies formed by special legislation (DWR 1994), none of which are located in the Central Valley.

**Local Identification of Potential Groundwater Recharge Areas.** The 2007 flood legislation, in Government Code Section 65302 as amended by AB 162, directs cities and counties to identify in the conservation elements of their general plans those rivers, creeks, streams, flood corridors, riparian habitats and land that may accommodate floodwater for purposes of groundwater recharge and stormwater management, upon the next revision of their general plan housing element.

## 4.0 Cumulative Impacts

PEIR Section 4 describes the cumulative impacts analysis that was conducted for the CVFPP. Consistent with the CEQA Guidelines (14 CCR Section 15130(a)), the discussion of cumulative impacts in the PEIR focused on significant and potentially significant cumulative impacts. Cumulative impacts are defined in the CEQA Guidelines (14 CCR Section 15355) as “two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts.” A cumulative impact occurs from “the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable future projects” (14 CCR Section 15355(b)). For a detailed description of CEQA requirements, refer to PEIR Section 4.1.

As described in PEIR Section 4.2, the approach and geographic scope of the cumulative effects evaluation vary depending on the resource area being analyzed. There are no changes to the geographic scope of the cumulative analysis in this Supplemental PEIR. Refer to PEIR Table 4.2-1 for a list of the geographic area considered for each resource area.

Many past and present projects and activities have occurred and are occurring in the study area. For a list of the major past and present projects considered in the cumulative impact analysis, refer to PEIR Section 4.3.1. The effects of these past and present projects and activities have strongly influenced existing conditions, and some past projects are still affecting resources. Past and present projects and activities have contributed on a cumulative basis to the existing environment within the study area via various mechanisms, such as the following:

- Population growth and associated development of socioeconomic resources and infrastructure
- Conversion of natural vegetation to agricultural and developed land uses, and subsequent conversion or restoration of some agricultural lands to developed or natural lands
- Alteration of riverine hydrologic and geomorphic processes by flood management, water supply management, mining activities, and other activities
- Introduction of nonnative plant and animal species

Determining the significance of a project’s cumulative impacts is a two-step process. First, the lead agency must examine the combined effects of past, present, and probable future projects to determine whether a significant cumulative impact would occur. Second, the lead agency must determine whether the project’s incremental contribution to any significant cumulative impact is cumulatively considerable. “Cumulatively considerable” means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.

As described in PEIR Section 4.3.2, the cumulative impact analysis for the CVFPP combined a list approach and a plan approach to generate the most reliable assessment of future conditions

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possible. This approach is carried forward in the Supplemental PEIR and the lists of plans and projects from PEIR Section 4.3.2 have been updated. These updates, as shown below, are minor (i.e., plan updates and changes in project status) and do not result in significantly new or different cumulative impacts to consider. Similarly, as described in Section 3 of this Supplemental PEIR, the SSIA refinements included in the 2017 CVFPP Update would not result in new significant impacts or change the severity of impacts previously identified in the PEIR. Therefore, it was determined that no updates are needed to the cumulative impact analysis in Section 4.4.2 of the PEIR.

As described above, updates were made to PEIR Section 4.3.2, Reasonably Foreseeable Future Projects, under the headers “Plans Describing Conditions Contributing to Cumulative Effects” and “List of Reasonably Foreseeable Probable Future Projects.” The updates are presented below as errata to the PEIR – additions to the PEIR text are underlined, and deletions are marked in ~~strikeout~~.

Numerous statewide, regional, and local plans were considered in the CVFPP cumulative analysis in the PEIR. The plans listed below relate, on a regional or statewide level, to issues such as air quality, transportation, habitat preservation, and water. The list of plans describing conditions contributing to cumulative effects was updated for the Supplemental PEIR, as follows:

- California Water Plan Update ~~2009~~ 2013 (DWR, ~~2009~~ 2013a)
- The Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board: Central Valley Region, the Sacramento River Basin and San Joaquin River Basin (Central Valley RWQCB, ~~2009~~ 2016)
- The East Bay Municipal Utility District’s WSMP 2040: Water Supply Management Program 2040 (EBMUD, ~~2009~~ 2012)
- The California Air Resources Board’s Climate Change Scoping Plan: A Framework for Change (CARB ~~2008~~ 2014)
- PM<sub>10</sub> Implementation/Maintenance Plan and Redesignation ~~Request~~ for Sacramento County (SMAQMD ~~2010~~ 2013)
- Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan (EDCAQMD et al., 2008)
- The San Joaquin Valley Air Pollution Control District’s 2007 Ozone Plan (SJVAPCD, 2007a)
- The San Joaquin Valley Air Pollution Control District’s ~~Extreme Ozone Attainment Demonstration Plan~~ 2013 Plan for the Revoked 1-Hour Ozone Standard (SJVAPCD, ~~2004~~ 2013)
- The San Joaquin Valley Air Pollution Control District’s 2016 Plan for the 2008 8-Hour Ozone Standard (SJVAPCD, 2016)

- The San Joaquin Valley Air Pollution Control District's 2007 PM10 Maintenance Plan and ~~Request for Redesignation~~ (SJVAPCD, 2007b)
- The San Joaquin Valley Air Pollution Control District's San Joaquin Valley ~~2008-2015~~ PM2.5 Plan (SJVAPCD, ~~2008-2015~~)
- Raising the Roof: California Development Projections and Constraints, 1997–2020. Statewide Housing Plan Update (California Department of Housing and Community Development, 2000)
- California Transportation Plan ~~2025-2040~~ (Caltrans,~~2006~~ 2016)
- Butte County 2016 Regional Transportation Plan/Sustainable Communities Strategy ~~2008–2035~~ (BCAG, ~~2008~~ 2016)
- The Sacramento Area Council of Governments' 2016 Metropolitan Transportation Plan/Sustainable Communities Strategy for ~~2035~~ 2036 (SACOG,~~2011~~ 2016)
- The San Joaquin Council of Governments' ~~2011~~ 2014 Regional Transportation Plan/Sustainable Communities Strategy (SJCOG,~~2011~~ 2014)
- The Stanislaus Council of Governments' ~~2011~~ 2014 Regional Transportation Plan/Sustainable Communities Strategy (STANCOG,~~2011~~ 2014)
- The Merced County Association of Governments' ~~2012~~ 2016 Regional Transportation Improvement Program (MCAG,~~2011~~ 2016)
- Madera County ~~2011~~ 2014 Regional Transportation Plan (Madera County,~~2011~~ 2014)
- ~~Fresno Council of Governments~~ The Council of Fresno County Governments' ~~2011~~ 2014 Regional Transportation Plan/Sustainable Communities Strategy (Fresno Council of Governments~~Council of Fresno County Governments,2010~~ 2014)
- Natomas Basin Habitat Conservation Plan (City of Sacramento et al., 2003)
- East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan (East Contra Costa County HCPA, 2006)
- San Joaquin County Multi-Species Habitat Conservation and Open Space Plan (San Joaquin County, 2000)
- ~~Bay Delta Conservation Plan (Reclamation et al. 2012)~~
- California Water Fix (California Natural Resources Agency, 2016a)
- California EcoRestore (California Natural Resources Agency, 2016b)
- The Delta Stewardship Council's Delta Plan (Delta Stewardship Council,~~2011~~ 2013)

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- The Delta Protection Commission’s Land Use and Resource Management Plan for the Primary Zone of the Delta (DPC, 2010)
- The Delta Protection Commission’s Economic Sustainability Plan for the Sacramento–San Joaquin Delta (DPC, ~~2011~~2012)
- The Sacramento–San Joaquin Delta Conservancy’s ~~Interim~~ 2012 Strategic Plan (Delta Conservancy, ~~2011~~ 2012)
- ~~Yolo Natural Heritage Program Plan Document~~ Yolo Habitat Conservation Plan and Natural Community Conservation Plan (Yolo County HCP/NCCP JPA, ~~2011~~2015)
- Butte Regional Conservation Plan (BCAG, ~~2011~~ 2015)

In addition to statewide, regional, and local plans and statewide development data, reasonably foreseeable future flood management and water supply management projects in the extended systemwide planning area were included in the PEIR cumulative impacts analysis. As described in Section 4.3.2 of the PEIR, these projects were considered individually because their effects are more closely related to those of the CVFPP than other projects, and the list does not include any projects that are included in the CVFPP. For more detail regarding the evaluation criteria used for inclusion in the cumulative impacts analysis, refer to Section 4.3.2 of the PEIR. The list of reasonably foreseeable probable future projects has been updated for the Supplemental PEIR, as follows:

- Yuba River Basin Project
- Shasta Lake Water Resources Investigation
- North of Delta Off-Stream Storage (Sites Reservoir)
- Los Vaqueros Reservoir Expansion
- Arroyo Pasajero Flood Related Improvements (CVP/SWP)
- San Joaquin River Salinity Management Plan
- Cosgrove Creek Flood Control Project
- San Joaquin River Restoration Program
- North Delta Flood Control and Ecosystem Restoration Project
- Dutch Slough Tidal Restoration Project
- Franks Tract Project
- Delta-Mendota Canal/California Aqueduct Intertie Project
- Delta Water Supply Project
- Hetch Hetchy Seismic Upgrade Project
- North Bay Aqueduct Alternative Intake Project
- ~~BDCP~~ California WaterFix/California EcoRestore/Delta Plan
- Suisun Marsh Management, Preservation, and Restoration Plan
- Environmental Permitting for Operations and Maintenance Project

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## 6.0 List of Preparers

Name	Qualifications	Background/Expertise	Participation
<b>Lead CEQA Agency: California Department of Water Resources</b>			
Michele Ng	B.S., Civil Engineering 29 years of experience	Water Resource Planning	CVFPP/Supplemental PEIR Document Coordination Lead, Water Resource Planning
Terri Gaines	B.A., Social Ecology and Environmental Planning; graduate studies in Watershed Management 30 years of experience	Habitat Restoration, Conservation Planning, Wetlands	Habitat Restoration and Conservation
Laurence Kerckhoff	J.D. 17 years of experience	Environmental Law and Litigation	Environmental Law, CEQA Compliance
Mike Roberts	B.S., Natural Resources Management; M.S., Hydrology and Water Resources Science 25 years of experience	Habitat Restoration, Conservation Planning	Habitat Restoration and Conservation
Anthony Deus	B.S., Civil Engineering 8 years of experience Registered Civil Engineer (CA)	Water Resources Planning, Geotechnical Engineering, Civil Design & Construction	Water Resource Planning
Wendy Wang	B.S., Civil and Environmental Engineering 4 years of experience	Water Resources Planning	Water Resource Planning
Kristin Ford	B.A., Environmental Studies 11 years of experience	Water Resources Planning, CEQA Compliance	Environmental Scientist
Scott Kranhold	B.A., Geography 28 years of experience in consulting and state service	Water Resources Planning, Environmental Permitting and Compliance	Senior Environmental Scientist
Shelly Amrhein	B.S., Biological Sciences 15 years of experience	Water Resources Planning	Biologist
<b>DWR Outside Counsel</b>			
Alan Waltner	J.D. 38 years of experience	Environmental Law and Litigation	Environmental Law, CEQA Compliance
<b>Central Valley Flood Protection Board</b>			
Ruth Darling	B.S., Biology 11 years of experience	Biological Resources	CVFPB Coordination
<b>Primary Consultant: CH2M</b>			
Matthew Franck	B.S., Environmental Policy Analysis and Planning 24 years of experience	CEQA/NEPA Compliance, Land Use Planning, Water Infrastructure/Resources Management	Project Manager, CEQA Compliance
Matthew Gordon	B.A., Environmental Analysis and Design; M.S., Environmental Planning and Policy 18 years of experience	CEQA/NEPA Compliance	Planner, CEQA Compliance

## Supplemental Program Environmental Impact Report

Name	Qualifications	Background/Expertise	Participation
Mitch Swanson	B.S. and M.S., Earth Sciences, Geological and Earth Sciences/Geosciences 32 years of experience	Hydrology, Geomorphology, Stream Restoration	Hydrologist
Jeremy Thomas	B.A., Environmental Studies; MLA, Environmental Planning 17 years of experience	Water and Hydrology Resources	Water Science and Hydrologist
Catherine Burrell	B.A., Physical Geography and Resource Planning; M.C.R.P., City and Regional Planning (Environmental Planning) 12 years of experience	CEQA/NEPA Compliance, Cumulative Impacts	Planner
Yassaman Sarvian	B.S., Environmental Policy Analysis and Planning 3 years of experience	CEQA/NEPA Compliance, Cultural Resources	Planner
Cinamon Vann	B.A., Government/Journalism; M.S., Marine Affairs and Policy 27 years of experience	Technical Editing	Lead Editor
Felicia Rubright	B.S., Telecommunications; M.S., Technical Communications Management 22 years of experience	Technical Editing	Editor
Meagan Thompson	B.A., English 10 years of experience	Technical Editing/Document Processing	Document Publisher

## 7.0 Acronyms and Abbreviations

AB .....	Assembly Bill
Act .....	Central Valley Flood Protection Act of 2008, Senate Bill 5
Basin Plan.....	Water Quality Control Plan for the Sacramento River Basin and San Joaquin River Basin
BCAG.....	Butte County Association of Governments
BWFS .....	Basin-Wide Feasibility Study
Caltrans.....	California Department of Transportation
CARB .....	California Air Resources Board
CASGEM .....	California Statewide Groundwater Elevation Monitoring
CCR .....	California Code of Regulations
Central Valley RWQCB .....	Central Valley Regional Water Quality Control Board
CEQA.....	California Environmental Quality Act
CFR .....	Code of Federal Regulations
cfs .....	cubic foot per second
CLVRP .....	California Levee Vegetation Research Program
CRHR .....	California Register of Historical Resources
CVFPB .....	Central Valley Flood Protection Board
CVFMP .....	Central Valley Flood Management Planning
CVFPP .....	Central Valley Flood Protection Plan
CVIFMS .....	Central Valley Integrated Flood Management Study
CVP .....	Central Valley Project
CWC .....	California Water Code
Delta .....	Sacramento–San Joaquin Delta
Delta Conservancy.....	Sacramento–San Joaquin Delta Conservancy
DPC .....	Delta Protection Commission
DWR .....	California Department of Water Resources
DWSC .....	Deep Water Ship Canal
EBMUD .....	East Bay Municipal Utility District
EDCAQMD.....	El Dorado County Air Quality Management District
EIA .....	environmental impact assessment
Extended SPA .....	Systemwide Planning Area Plus 2-Mile Buffer and Suisun Extension

## Supplemental Program Environmental Impact Report

F-BO	Forecast-Based Operations
F-CO	Forecast-Coordinated Operations
FCSSR	Flood Control System Status Report
F-IO	Forecast-Informed Operations
FR	Federal Register
FSSR	Flood System Status Report
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
HCD	California Department of Housing and Community Development
HCP/NCCP	Habitat Conservation Plan/Natural Communities Conservation Plan
HCPA	East Contra Costa County Habitat Conservation Plan Association.
I	interstate
JPA	Joint Powers Agency
LOP	level of protection
LVMS	Levee Vegetation Management Strategy
MCAG	Merced Council of Governments
NAHC	Native American Heritage Commission
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NOP	notice of preparation
NWR	National Wildlife Refuge
O&M	operations and maintenance
OMRR&R	operations, maintenance, repair, rehabilitation, and replacement
PEIR	Program Environmental Impact Report
Porter-Cologne Act	Porter-Cologne Water Quality Control Act
PRC	Public Resources Code
RD	Reclamation District
RFMP	Regional Flood Management Plan
RM	River Mile
SACOG	Sacramento Area Council of Governments
SB 5	Senate Bill 5, Central Valley Flood Protection Act of 2008
SGMA	Sustainable Groundwater Management Act



## 7.0 Acronyms and Abbreviations

SJCOG.....	San Joaquin Council of Governments
SJRRP .....	San Joaquin River Restoration Program
SJVAPCD .....	San Joaquin Valley Air Pollution Control District
SLR .....	sea-level rise
SMAQMD.....	Sacramento Metropolitan Air Quality District
SoCal/CVP/SWP service areas	. Southern California/Coastal Service Areas of the Central Valley Project and State Water Project
SPA .....	Systemwide Planning Area
SPFC .....	State Plan of Flood Control
SRA .....	shaded riverine aquatic
SSIA .....	State Systemwide Investment Approach
STANCOG .....	Stanislaus Council of Governments
SWP .....	State Water Project
SWRCB .....	State Water Resources Control Board
TAF .....	thousand acre-feet
TCP .....	traditional cultural properties
TCR .....	tribal cultural resource
TM .....	technical memorandum
U.S.....	United States
USACE .....	U.S. Army Corps of Engineers
VSM .....	Vegetation Management Strategy
VMZ .....	vegetation management zone
WSEL .....	water surface elevation
WSMP.....	Water Supply Management Program

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**Appendix A**  
**Analysis of Vegetation Management Zone**  
**Implementation Technical Memorandum**

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# **Analysis of Vegetation Management Zone Implementation Technical Memorandum**

**December 2016**

**Riparian Vegetation Management on Levees Technical Memorandum**

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## ***This Document Prepared by:***

### **Management Review**

Stacy Cepello  
*DWR*  
*Program Manager*

### **Preparation Team**

Mike Roberts  
*DWR*  
*Program Manager*  
Debra Bishop  
*H.T. Harvey & Associates*  
*Senior Restoration*  
*Ecologist*  
Matt Wacker  
*H.T. Harvey & Associates*  
*Associate Ecologist*  
Ellen Pimentel  
*H.T. Harvey & Associates*  
*Plant Ecologist*  
Jim Merk  
*H.T. Harvey & Associates*  
*Senior Technical Editor*

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# 1.0 Introduction

This technical memorandum provides an overview of the methodology used to develop an estimate of potential riparian vegetation loss related to implementing the Vegetation Management Strategy (VMS) described in the 2017 Central Valley Flood Protection Plan Update (2017 CVFPP Update). More specifically, it describes the data used in the analysis, analysis methods, and results of the analysis expressed as acres of anticipated long-term die-off of woody vegetation from the Vegetation Management Zone (VMZ) on levees that are a component of the State Plan of Flood Control (SPFC). The memorandum was developed in partial fulfillment of mitigation measures described in the 2012 program environmental impact report (EIR), and to inform the impact analysis made in the supplemental program environmental impact report (SPEIR) for the 2017 CVFPP Update. Because the analysis was conducted to support program-level, strategic, and regional-scale planning for conservation and flood management, the data sources, methods, and conclusions described in this memorandum are not appropriate for, and should not be used for, project-specific planning and design.

## 2.0 Data Sources

### 2.1 Fine-Scale Riparian Vegetation Layer

The Central Valley Riparian and Sacramento Valley (DS-1000) vegetation layer is a fine-scale vegetation layer created in 2013 to support the CVFPP planning process (GIC at CSU Chico 2013). The mapping area includes the main-stem rivers and major tributaries in the Systemwide Planning Area (SPA), along with streams from the Kings River north to the town of Red Bluff and streams north of the U.S. Department of Agriculture Great Valley Ecological Section along the main stem of the Sacramento River to Keswick Dam. The dataset combines mapping done in the western Sacramento Valley with medium-scale vegetation mapping in the SPA and eastern Sacramento Valley created for the 2012 CVFPP (GIC at CSU Chico 2011).

The medium-scale vegetation layer originally was mapped at the Group level and was further refined (when possible) to the Alliance level as defined in *A Manual of California Vegetation* (Sawyer et al. 2009) for inclusion in the fine-scale vegetation layer. This dataset meets the National Vegetation Classification Standard and California Vegetation Classification and Mapping Standards as of 2013, both of which have since been updated (CDFW VegCAMP 2015, USNVC 2016). Vegetation is mapped to the Alliance level (or in some cases to the Group or

## Riparian Vegetation Management on Levees Technical Memorandum

Macrogroup level when the Alliance level could not be determined from photointerpretation) with a 1-acre minimum mapping unit (MMU).

Polygons are also attributed with total bird's-eye cover (i.e., what can be seen on the aerial photograph image, excluding understory layers when covered by an overstory layer) of trees, shrubs, and herbs. Mapping was completed from interpretation of the National Agricultural Inventory Program's (NAIP's) 2009 (NAIP 2009) aerial imagery. Polygons were hand-digitized at a scale of 1:2,000 with a minimum average width of 10 meters per polygon.

The dataset was assessed for accuracy by California Department of Fish and Wildlife Vegetation Classification and Mapping Program (CDFW VegCAMP and GIC at CSU Chico 2013). Overall, users' accuracy of the map was 88%, and producers' accuracy was 87%, exceeding the Federal Geographic Data Committee's standard for such maps of 80% (FGDC 2008). This accuracy level is sufficient for regional planning.

This dataset represents the baseline condition of vegetation communities in the Central Valley as of 2009. More information on this dataset can be found at <https://catalog.data.gov/dataset/vegetation-central-valley-riparian-and-sacramento-valley-ds1000>. Attachment A includes the full metadata for this dataset.

## 2.2 Delta Vegetation Layer

The Delta Vegetation and Land Use (DS-292) vegetation layer is a map of vegetation in the Legal Delta portion of the Sacramento–San Joaquin Delta (Delta) area (CDFW VegCAMP 2011).

This dataset meets the National Vegetation Classification Standard and California Vegetation Classification and Mapping Standards as of 2011, both of which have since been updated (CDFW VegCAMP 2015, USNVC 2016). Vegetation is mapped from a sub-Alliance to super-Alliance level derived from field data collected in summer and fall 2005 by the California Department of Fish and Wildlife Vegetation Classification and Mapping Program, using the California Native Plant Society Rapid Assessment Protocol (CDFG 2007). Mapping was completed using heads-up digitizing conducted by Aerial Information Services. Base imagery was U.S. Geological Survey high-resolution orthoimagery at 1-foot resolution from spring 2002, with additional marginal areas supplemented with NAIP 1-meter resolution photography from summer 2005. In addition to vegetation type, each polygon was attributed by height, primary stratum cover (density), and site quality. Minimum widths for vegetation polygons are 10 meters, and the MMU is 1–2 acres, depending on the vegetation type. Vegetation features were occasionally mapped below the MMU, when they were so distinct or important compared to the surroundings that omitting them would have distorted the representation of that area.

This dataset represents the baseline condition of vegetation in the Delta as of 2002 or 2005 (depending on the aerial imagery used). More information on this dataset can be found at

<https://catalog.data.gov/dataset/delta-vegetation-and-land-use-ds29205ccd>. Attachment B includes the full metadata for this dataset.

## 2.3 Levee Anatomy

The Levee Anatomy layer depicts levee footprints created using high-resolution Light Detection and Ranging (LiDAR) imagery (DWR 2015). As part of the SPFC Delta Anatomy Mapping Project, levee anatomies were delineated using slope grids built from available LiDAR data points. Thresholds were identified that capture the levee crown, levee landside slope, and levee waterside slope. Visual interpretations of slope thresholds were used in conjunction with heads-up digitizing to maintain smooth boundaries at a scale of 1:550. The levee crown was delineated as the levee's elevational peak; the levee waterside slope extended to the levee's toe, the waterside edge, or 50 feet from the crown, whichever came first; the levee landside slope was delineated as the levee section opposite the levee waterside slope section (as long as it does not also face a water body) and always extended from the levee crown to the levee toe, regardless of the length from the crown. In addition to the standard anatomy, 15-foot buffers were created at both the landside and waterside levee toes. On the waterside, this buffer was trimmed, if needed, to the water's edge as defined by California Department of Water Resources hydrologic and water body breaklines dataset. The waterside slope was further delineated by creating a 20-foot buffer from the edge levee crown down the slope of the levee.

Accuracy was assessed for this dataset as a minimum of +/- 3 feet.

This dataset depicts the levee anatomy at the time of the Central Valley Flood Evaluation and Delineation Program LiDAR survey and the Delta LiDAR survey flown in 2007. Attachment C includes the full metadata for this dataset.

# 3.0 Data Analysis

## 3.1 Methods

The Levee Anatomy layer was used to delineate the DWR vegetation management zone (VMZ) as defined in the VMS, where:

- Levee crown VMZ = levee crown
- Landside VMZ = levee landside slope and 15-foot buffer
- Waterside VMZ = 20-foot buffer on levee waterside slope lineally from levee crown edge

Using ArcGIS version 10.X, acreages of woody riparian vegetation types were tabulated for each VMZ or portion of the VMZ (i.e., levee crown, landside slope, landside buffer, and waterside slope as delineated in the Levee Anatomy layer). These acreages were calculated by using GIS to

## Riparian Vegetation Management on Levees Technical Memorandum

intersect the Levee Anatomy layer with the fine-scale riparian and Delta vegetation layers and calculating the acreages of the resultant polygons. These acreages were converted to an Excel file to tabulate vegetation types by region.

Woody riparian vegetation types were chosen from each vegetation dataset using a crosswalk table (Attachment D). Woody riparian vegetation types are those vegetation types that correspond to Oak Woodland, Riparian Forest, Riparian Scrub, and Woodland.

### 3.2 Results

Results are tabulated separately for the Sacramento Basin and the San Joaquin Basin (Table 1). A total of 1,296 acres of woody riparian vegetation would be lost from the VMZ of the SPFC across both basins, with approximately two-thirds of that acreage in the Sacramento Basin. This loss would take place over a long timeframe, estimated on the order of decades, as the CVFPP VMS is implemented. Note that the crown of a single tree may overlap in any number of levee anatomy categories. For example, a single tree canopy may occur both within a levee slope as well as occurring above the levee crown.

**Table 1. Acres of Riparian Habitat Lost through the Vegetation Management Strategy**

<b>Basin</b>	<b>Levee Crown</b>	<b>Levee Landside Slope</b>	<b>Levee Landside Buffer</b>	<b>Levee Waterside Slope</b>	<b>Total</b>
Sacramento Basin	240	288	103	293	<b>924</b>
San Joaquin Basin	88	72	38	174	<b>372</b>
<b>Total</b>	<b>328</b>	<b>360</b>	<b>141</b>	<b>467</b>	<b>1,296</b>

Note: Riparian vegetation includes Woodland, Riparian Scrub, Riparian Forest, and Oak Woodland vegetation types.  
Sources: CDFW VegCAMP 2011, GIC at CSU Chico 2013, DWR 2015.

### 3.3 Caveats

As stated in the “Introduction” section, this analysis was conducted to support program-level, strategic, and regional-scale planning for conservation and flood management, and the data sources, methods, and conclusions described in this memorandum are not appropriate for, and should not be used for, project-specific planning and design. Riparian vegetation may grow in small patches and, because of their small size, some patches of riparian vegetation may have been mapped as part of adjoining vegetation types. The Levee Anatomy features are narrow and often located at these transition zones of adjoining vegetation types (e.g., agricultural crops and riparian). Because of these limitations, the acreage of riparian vegetation potentially affected in any portion of the levee anatomy will require field verification for any project specific actions.

## 4.0 Conclusion

Implementation of the VMS described in the 2017 CVFPP could, eventually, result in the loss of approximately 1,296 acres of riparian vegetation from the DWR VMZ.). These anticipated losses of riparian vegetation may be offset by riparian corridors under consideration in other CVFPP planning efforts such as the Basin-wide Feasibility studies, or other multi-purpose project implementation efforts.

These estimates of eventual habitat loss from the VMZ are based on the best available data, and do not include considerations of channel vegetation management policies or any other operations and maintenance activities.

The data sources applied to this analysis may be used to further help inform vegetation management planning efforts called for in the 2012 PEIR.

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