CENTRAL VALLEY
FLOOD MANAGEMENT
PLANNING PROGRAM

FloodSAFE
CALIFORNIA

Management Actions Report

November 2010

STATE OF CALIFORNIA
THE NATURAL RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES

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Preface

What is the Management Actions Report?

The *Management Actions Report* is a reference document to be used in the development of the 2012 Central Valley Flood Protection Plan (CVFPP). The purpose of the report is to summarize the identification, development, and evaluation of a range of individual management actions to address identified problems and opportunities related to flood management and to contribute to CVFPP goals. The management actions presented in this report are not intended to be recommendations, but rather represent a wide array of suggested tactics, steps, or measures that could help reduce flood risk in the Sacramento-San Joaquin Valley.

How was the Management Actions Report Developed?

The *Management Actions Report* was developed with the support of a robust outreach effort to integrate study partners and interested parties in an open and structured planning process. Much of the information in the report has been compiled using existing and available sources and input from workshops and work groups composed of members of the public, representatives from numerous flood and related interest groups, and subject-matter experts. Such outreach included regional management actions work groups in five geographic regions (Upper Sacramento, Lower Sacramento, Delta, Lower San Joaquin, and Upper San Joaquin), and 15 publicly noticed workshops.

How will the Management Actions Report be Used?

The *Management Actions Report* serves as a technical foundation for CVFPP development. It provides work group participants, the general public, and California Department of Water Resources (DWR) with a set of management actions that may range from potential policy or institutional changes to operational and physical changes to the flood management system. Management actions are the "building blocks" for regional solutions and eventually systemwide solutions in the next CVFPP development phases. Characteristics of different management actions are identified and compared, including a preliminary review of potential benefits and other technical, social, economic, and environmental considerations.

Information presented in the *Management Actions Report* will also be used toward the development of a program Environmental Impact Report consistent with the California Environmental Quality Act, and will be incorporated into appropriate technical reference documents to the 2012 CVFPP.

How is the Management Actions Report Organized?

The report contains seven chapters and two appendices:

- **Chapter 1 (Introduction)** provides context for this report and background information on FloodSAFE California, the CVFPP's authority and guidance, and the 2012 CVFPP development process, including a description of the CVFPP planning areas.

- **Chapter 2 (Management Actions Development and Evaluation)** describes the process for management actions identification, development, and classification, and summarizes results of management actions evaluations.

- **Chapter 3 (Next Steps for Management Actions)** describes how the management actions will be further refined and carried forward in the planning process toward completion of the 2012 CVFPP.

- **Chapter 4 (References)** lists sources referenced in preparation of this report.

- **Chapter 5 (Acronyms and Abbreviations)** provides an acronyms and abbreviations list.

- **Chapter 6 (Program Glossary)** defines key terms used in this report and in other CVFPP products.

- **Chapter 7 (Acknowledgements)** acknowledges DWR staff, work group participants, and the consultant team.

- **Appendix A (Management Actions Descriptions)** presents the detailed descriptions of management actions and associated evaluations of social, technical, economic, and environmental considerations.

- **Appendix B (Considerations for Management Actions Applicability)** summarizes key considerations associated with the application of the identified management actions within different community settings. It also describes consideration for the integration of environmental, water supply, and other benefits into management actions that primarily focus on improving flood management.

Table of Contents

List of Tables

List of Figures

1.0 Introduction

The California Department of Water Resources (DWR) is required to prepare a sustainable,[1] integrated flood management[2] plan called the Central Valley Flood Protection Plan (CVFPP) by January 1, 2012, for adoption by the Central Valley Flood Protection Board (Board) by July 1, 2012. The CVFPP is to provide a systemwide approach to protecting lands currently protected from flooding by existing facilities of the State Plan of Flood Control[3,4] (SPFC), and will be updated every 5 years thereafter.

This *Management Actions Report* and its companion document, *Interim Progress Summary No. 2*, describe the second phase of work to develop the 2012 CVFPP. It summarizes work conducted by DWR, partner agencies, organizations, and members of the public, to identify, develop, and evaluate a wide range of management actions. A management action is an individual action to address identified problems and opportunities during Phase 1 of plan development, and to contribute to CVFPP goals, consistent with the planning principles.[5]

1.1 Background

In 2007, California passed a series of laws intended to improve flood management, including Senate Bill (SB) 5, SB 17, Assembly Bill (AB) 5,

[1] A project is considered "sustainable" when it is socially, environmentally, and financially feasible for an enduring period.

[2] Integrated flood management is an approach to flood risk that recognizes the interconnection of flood management actions within broader water resources management and land-use planning; the value of coordinating across geographic and agency boundaries; the need to evaluate opportunities and potential impacts from a system perspective; and the importance of environmental stewardship and sustainability (DWR, Draft FloodSAFE Strategic Plan, 2008).

[3] California Water Code (CWC) Section 8523 defines SPFC as the State and federal flood control works, lands, programs, plans, conditions, and mode of maintenance and operations of the Sacramento River Flood Control Project (CWC Section 8350), and of flood control projects in the Sacramento River and San Joaquin River watersheds (river basins) for which the Board or DWR has provided the assurances, and of those facilities identified in CWC Section 8361.

[4] The assurances (satisfactory to the Secretary of War) are that the State will provide, without cost to the United States, all lands, easements, and rights-of-way necessary for the completion of the project; bear the expense of necessary highway, railroad, and bridge alterations; hold and save the United States free from claims for damages resulting from construction of the works; and maintain and operate all works after completion.

[5] The CVFPP draft planning principles can be found in *Interim Progress Summary No. 1* and chapter 4 of the *Regional Conditions Report – A Working Document.*

AB 70, and AB 156. Primary authorization for the CVFPP originates in SB 5, also known as the Central Valley Flood Protection Act of 2008.[6] In addition, Propositions 1E and 84 provide both specific and general authority for related State flood management efforts. AB 162, another flood-related bill passed in 2007, required additional consideration of flood risk in local land-use planning throughout California. These bills added or amended sections in the California Government Code, Health and Safety Code, Public Resources Code, and California Water Code,[7] and included specific requirements for developing the CVFPP.

Produced in partnership with federal, tribal, local, and regional partners and other interested parties, the 2012 CVFPP will describe the existing flood risk in the Sacramento-San Joaquin Valley and recommend actions to reduce the probability and consequences of flooding. As the first edition of this long-term planning document, the 2012 CVFPP will describe a broadly supported vision for improving integrated flood management in this flood-prone region of California, and describe a framework for implementing future improvements. In addition, the 2012 CVFPP will identify potential modifications to the State-federal flood management system that should be studied further for consideration in the 2017 CVFPP update. The 2012 CVFPP will be accompanied by a program-level environmental compliance document consistent with the California Environmental Quality Act (CEQA).

1.2 FloodSAFE

Preparation of the 2012 CVFPP, its supporting documents such as this report, and its related planning work is occurring within the broader context of FloodSAFE California (FloodSAFE). FloodSAFE is DWR's ongoing initiative to improve flood management while reducing flood risks at local and regional levels.

The FloodSAFE Vision is:

> *A sustainable integrated flood management and emergency response system throughout California that improves public safety, protects and enhances environmental and cultural resources, and supports economic growth by reducing the probability of destructive floods, promoting beneficial floodplain processes, and lowering the damages caused by flooding.*

[6] More detailed information on authority and guidance is included in Chapter 1 of the draft *Regional Conditions Report – A Working Document* (DWR, April 2010).

[7] Relevant code sections are highlighted in the *2007 Flood Legislation Summary* and *2007 Flood Legislation Companion Reference*, available at http://www.water.ca.gov/legislation/.

Some of the management actions in this report may be implemented through existing programs and efforts that are also part of FloodSAFE.

1.3 CVFPP Goals

To guide development of the 2012 CVFPP, consistent with the 2007 flood legislation and the vision of FloodSAFE California, DWR applied input from its partners, such as the U.S. Army Corps of Engineers, the Board, local agencies, non-governmental organizations, and other interested parties, to develop overarching CVFPP goals to direct how the plan will address identified problems and opportunities for improving flood risk management in the Sacramento-San Joaquin Valley.

The CVFPP Primary Goal is:

- Improve Flood Risk Management

The CVFPP Supporting Goals are:

- Improve Operations and Maintenance
- Promote Ecosystem Functions
- Improve Institutional Support
- Promote Multi-Benefit Projects

Each of the management actions presented in this report can potentially contribute to at least one of these five goals.

1.4 CVFPP Planning Areas

A planning area is the geographic area taken into consideration when formulating a plan. There are two geographic areas relevant to CVFPP planning and development:

- SPFC Planning Area
- Systemwide Planning Area

Both planning areas are shown on Figure 1-1. The SPFC Planning Area is the lands currently receiving protection from facilities of the SPFC. The State's flood management responsibility is limited to the SPFC Planning Area. The SPFC Planning Area is best delineated by the Levee Flood Protection Zone (LFPZ) maps and the area protected by the only SPFC reservoir, Lake Oroville.

The Systemwide Planning Area is the geographic area that includes those lands subject to flooding under the current facilities and operation of the Sacramento-San Joaquin River Flood Management System.[8] The SPFC Planning Area is completely contained within the Systemwide Planning Area.

[8] California Water Code Section 9611

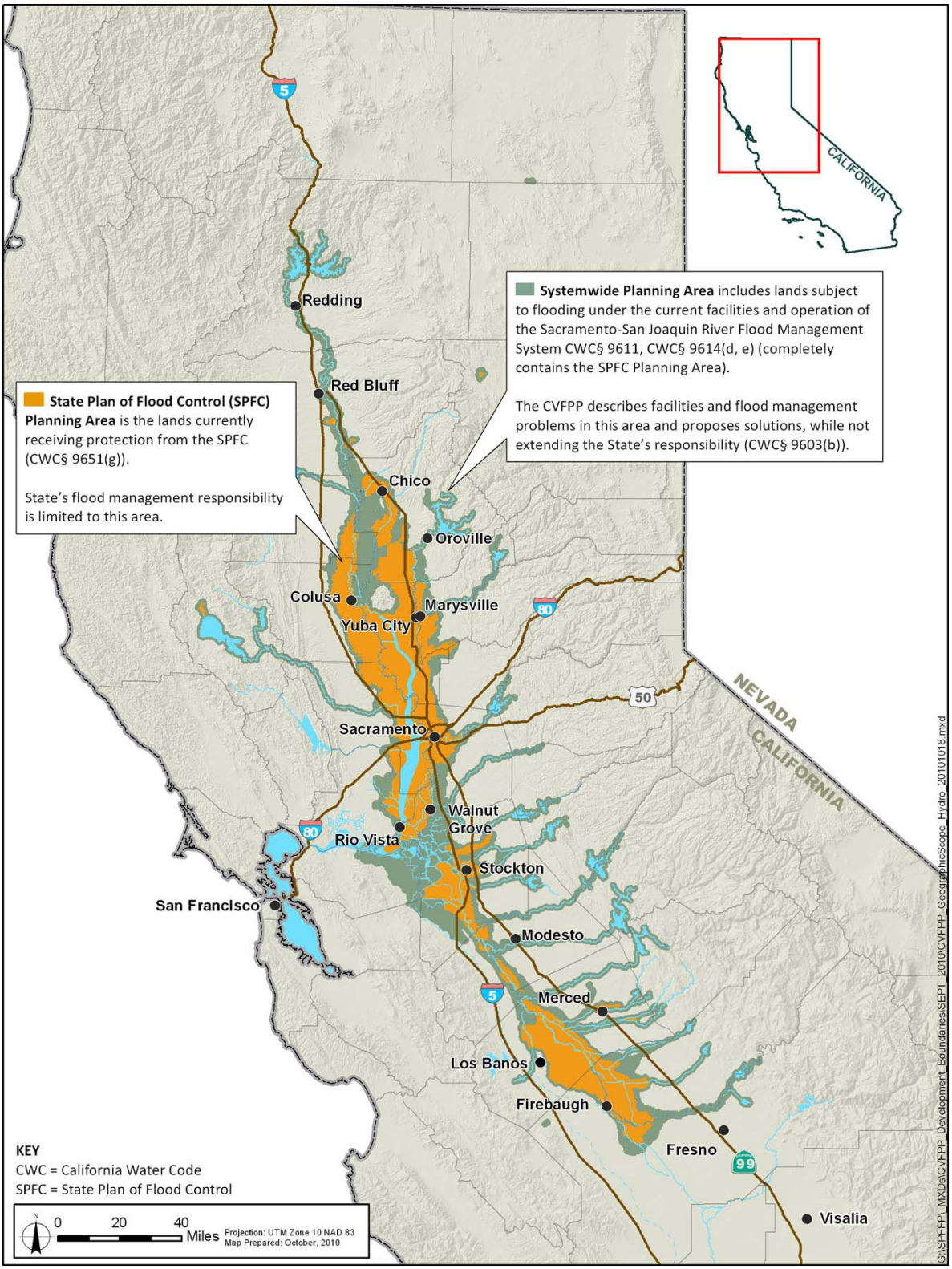

Figure 1-1. CVFPP Planning Areas

1.5 2012 CVFPP Development Process

The 2012 CVFPP is being developed using an iterative planning process completed in four phases. This planning is supported by a comprehensive communications and engagement process with partners and interested parties to solicit information, generate plan content, promote feedback, and obtain input. The four planning phases are:

- **Phase 1 (Regional Conditions)** – This phase identified problems and opportunities related to flood management in the Sacramento-San Joaquin Valley and defined goals, principles, and objectives to guide development and implementation of the 2012 CVFPP. Results from this planning phase were summarized in the *Regional Conditions Report – A Working Document*, and *Interim Progress Summary No. 1*.

- **Phase 2 (Management Actions)** – The major focus of Phase 2 is identifying, developing, and evaluating individual management actions for their contribution to CVFPP goals. Results from this phase are summarized in this *Management Actions Report* and *Interim Progress Summary No. 2*.

- **Phase 3 (Regional Solutions) –** Phase 3 will include formulating potential solution sets by region to accomplish CVFPP goals and objectives; comparing and evaluating potential regional solution sets; and refining potential regional solution sets. Results from this phase will be summarized in *Interim Progress Summary No. 3*.

- **Phase 4 (Systemwide Solutions) –** Phase 4 will include developing potential systemwide solution sets based on the regional results; comparing and evaluating potential systemwide solution sets; assessing the level of agreement; completing an environmental compliance review; and recommending the next steps for State action (priorities, timelines, and funding strategies). Results from this phase will be presented in the draft 2012 CVFPP.

The four planning phases are illustrated in the Figure 1-2.

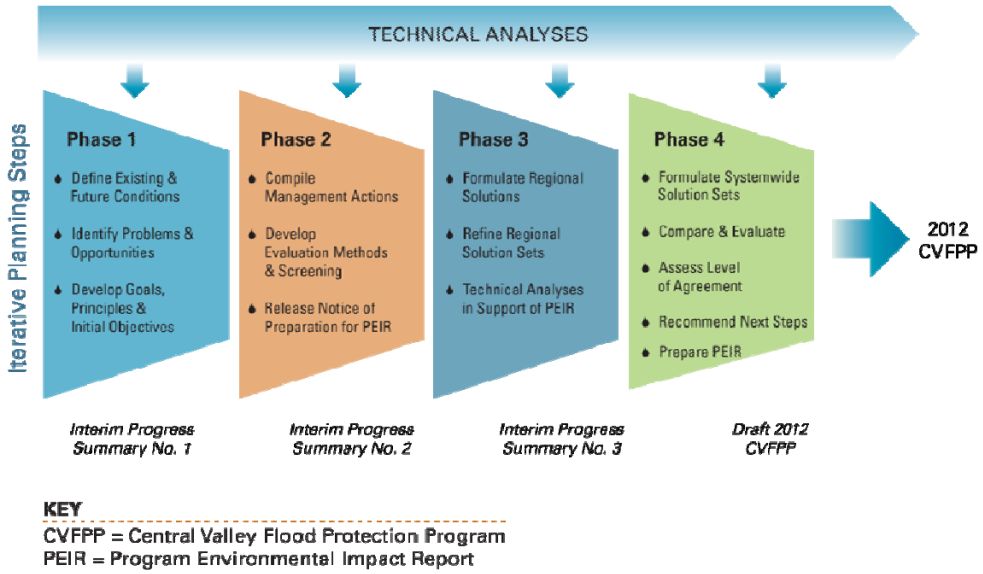

Figure 1-2. 2012 CVFPP Planning Process

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2.0 Management Actions Development and Evaluation

During Phase 2 of the 2012 CVFPP development process, DWR and its partners focused on identifying, developing, and evaluating individual management actions. A management action is a specific structural or nonstructural strategy, action, or tactic that contributes to the CVFPP goals. Management actions may range from potential policy or institutional changes to operational and physical changes to the flood management system. Management actions may address one or more CVFPP goals. They are not intended to be recommendations; rather, they represent a wide array of suggested strategies and actions that can be used to form regional solutions and systemwide solutions. All of the management actions developed during Phase 2 are broad and not location specific, and vary in their level of detail.

2.1 Identification

An initial list of management actions were identified using:

- Recommendations in previous State, federal, and regional flood risk reduction studies and programs in the Central Valley, including sources such as reports from the Sacramento and San Joaquin River Basins Comprehensive Study and California Floodplain Management Task Force.

- Technical information from ongoing FloodSAFE and Integrated Water Management efforts, as available, including information from the SPFC Descriptive Document, levee inspection reports, levee evaluations programs, DWR's Flood Projects Office, emergency response programs, and floodplain management programs.

- Input received through the CVFPP communications and engagement activities with partners, interested parties, and the public during Phases 1 and 2 of CVFPP development. Such activities during Phase 1 included meetings of the Upper Sacramento, Lower Sacramento, Upper San Joaquin, Lower San Joaquin, and Delta Regional Conditions Work Groups; Environmental Stewardship, Levee Performance, Operations and Maintenance, and Climate Change Scope Definition Work Groups; and Agricultural Stewardship Scope Definition Joint Subcommittee. During Phase 2, input was received through Regional Management

Actions Work Group meetings and 15 management actions public workshops.

To facilitate presentation and evaluation of management actions, identified actions were grouped thematically into 11 categories:

- Additional Floodplain and Reservoir Storage
- Storage Operations
- Flood Protection System Modification
- Operations and Maintenance
- Ecosystem Functions
- Floodplain Management
- Disaster Preparedness and Flood Warning
- Flood Fighting, Emergency Response, and Flood Recovery
- Policy and Regulations
- Permitting
- Finance and Revenue

2.2 Qualitative Evaluation

Each management action was qualitatively evaluated using criteria to estimate its likely contribution toward the goals of the 2012 CVFPP and to describe key social, technical, economic, and environmental considerations. The evaluation criteria also address implementation considerations of management actions in different community settings. The evaluation criteria are summarized in Table 2-1 and are described in Appendix A.

Table 2-1. Management Action Evaluation Criteria

Evaluation Criteria	Description/Key Considerations
Description	• Problem addressed by management action • Desired outcome • Methodology
Contribution to CVFPP Goals	• Goal to which the action most significantly contributes • Goal(s) to which the action can potentially contribute
Economic Considerations	• Capital cost • Annual cost to operate/maintain/repair • Flood fighting costs • Emergency response and recovery costs • Potential for cost-sharing • Effect on damage to critical public infrastructure • Effect on floodplain and economic development • Effect on State flood management responsibility
Environmental Considerations	• Potential to rehabilitate key physical processes and ecological functions • Potential for adverse environmental impacts • Permitting considerations • Opportunity to reduce adverse environmental impacts associated with operation, ongoing maintenance, and repairs of the flood management system
Social Considerations	• Public safety contributions • Potential to provide other benefits (water supply, recreation, etc.) • Likelihood of implementation (political, institutional, cultural, etc.)
Technical Considerations	• Potential for redirected hydraulic impacts • Effect on residual risk • Climate change adaptability
Community Considerations	• Key considerations for management action application in urban areas, small communities, and rural/agricultural areas settings.

Key:
CVFPP = Central Valley Flood Protection Plan

2.3 Screening and Classification

Based both on their potential to contribute to the 2012 CVFPP goals and on input from the regional work groups and public workshops, management actions were screened to identify those to be carried forward for further consideration in the planning process. Screening involved classifying management actions that will be further developed and refined to formulate regional and systemwide solution sets. Each management action is classified based on (1) scope of its application, (2) geographic extent of its effects, (3) jurisdictional authority, and (4) entities responsible for its implementation.

In terms of the scope of its application and effects, a management action can be described as:

- **Place-Based** – A management action that implements or modifies a physical feature or its operations in a certain location (e.g., bypass modifications, changes in storage operations, or floodproofing structures in the floodplain).

- **Not Place-Based** – A management action that implements or modifies a policy, regulation, process, or other institutional arrangement (e.g., building code amendments or changes to financing mechanisms and revenue generation).

Place-Based Management Actions

Depending on how a place-based management action is implemented, in terms of its scale and location, its effects could be systemwide, local, or both.

- **Actions with Systemwide Effects** – A management action that implements or modifies a physical feature or its operations in a certain location, resulting in localized and systemwide effects. For example, bypass modifications or changes in storage operations would be associated with a particular place/facility, but would potentially have both localized and systemwide effects and flood management benefits.

- **Actions with Local Effects** – A management action that implements or modifies a physical feature or its operations in a certain location, resulting in local effects. For example, floodproofing of structures in a floodplain or strengthening of a levee reach would be associated with a particular location, and would only have localized effects and flood management benefits.

Based on a place-based management action's scope and effects, and its relationship to the SPFC, the State could have different roles in implementing the management action in cooperation with local and federal partners.[9] The extent of State involvement would also depend on whether or not the action's outcome would become a part of the SPFC that requires assurances of non-federal cooperation to the federal government. Management actions are classified according to those roles as follows:

- **State-Led Systemwide Action** – The State, in partnership with federal, local, and regional entities, would take a leadership role in developing and implementing management actions with a systemwide scope. This would primarily involve management actions that require State

[9] Federal participation and implementation roles are determined on a project-specific basis. Additionally, the USACE's Central Valley Integrated Flood Management Study, a companion effort to the CVFPP, will evaluate the range and type of actions that may include federal participation.

authority or a high level of institutional resources to accomplish (e.g., bypass modifications or changes to storage operations).

- **State-Participated Regional Action** – The State, in partnership with federal, local, and regional entities, would support development and implementation of management actions with primary local and regional scope and effects (e.g., strengthening of a certain levee reach, or floodproofing structures in the floodplain). The State's level of involvement would vary depending on the regional or potential systemwide effects and the anticipated benefits of the action.

- **State-Guided or -Assisted Local Action** – The State would provide technical guidance and assistance for the development and implementation of locally led management actions that address one or more specific local needs (e.g., stormwater management or changes in operations to some local hydraulic structures).

Not Place-Based Management Actions

Based on State or local jurisdictional authority, management actions that modify policies, regulations, processes, or other institutional arrangements are classified as follows:

- **State-Led Action** – The State, in partnership with federal, local, and regional entities, would take a leadership role in developing and implementing management actions that are not place-based but are within State jurisdictional authority (e.g., changes to financing mechanisms and revenue generation methods, or streamlining permitting for operations and maintenance activities).

- **State-Guided or -Assisted Local Action** – The State would provide technical guidance and other assistance for development and implementation of policy/institutional management actions that are within a local jurisdiction's authority (e.g., local compliance with general plan update requirements or local building ordinances).

Figure 2-1 illustrates the classification of management actions based on their scope of application, effects, and the entities that are likely to be responsible for implementation.

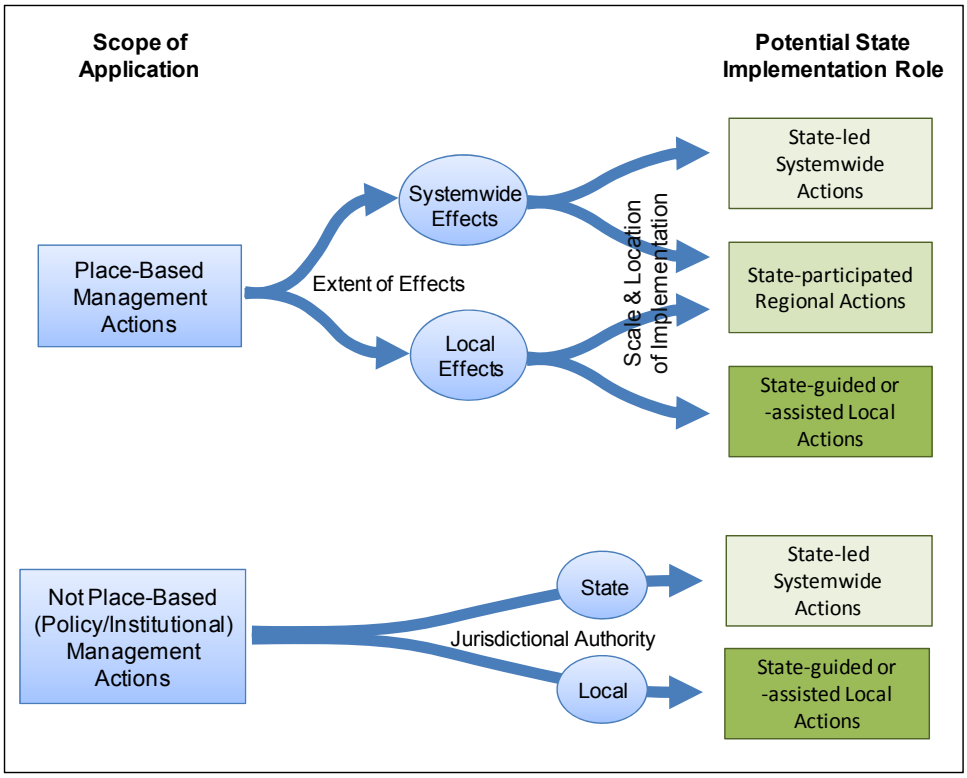

Figure 2-1. Management Action Classification

2.4 Communication and Engagement Process

Phase 2 communications and engagement activities solicited input from partners, interested parties, and the public to support management action development and evaluation. These activities included public workshops and Regional Management Actions Work Group meetings for the five CVFPP planning regions (Upper Sacramento, Lower Sacramento, Delta, Upper San Joaquin, and Lower San Joaquin). The five Regional Management Actions Work Groups each held three meetings between June and November 2010 to support development of management actions.

Two rounds of publicly noticed workshops were held between July and September 2010 to review and refine the draft management actions descriptions and evaluations.

- **Round 1 Workshops** – These 11 sessions corresponded to each of the management action categories. Round 1 workshops refined the initial management action descriptions and evaluations, and identified additional management actions for consideration. More than 400 attendees from a variety of organizations, agencies, and communities participated in this series of workshops (see Figure 2-2).

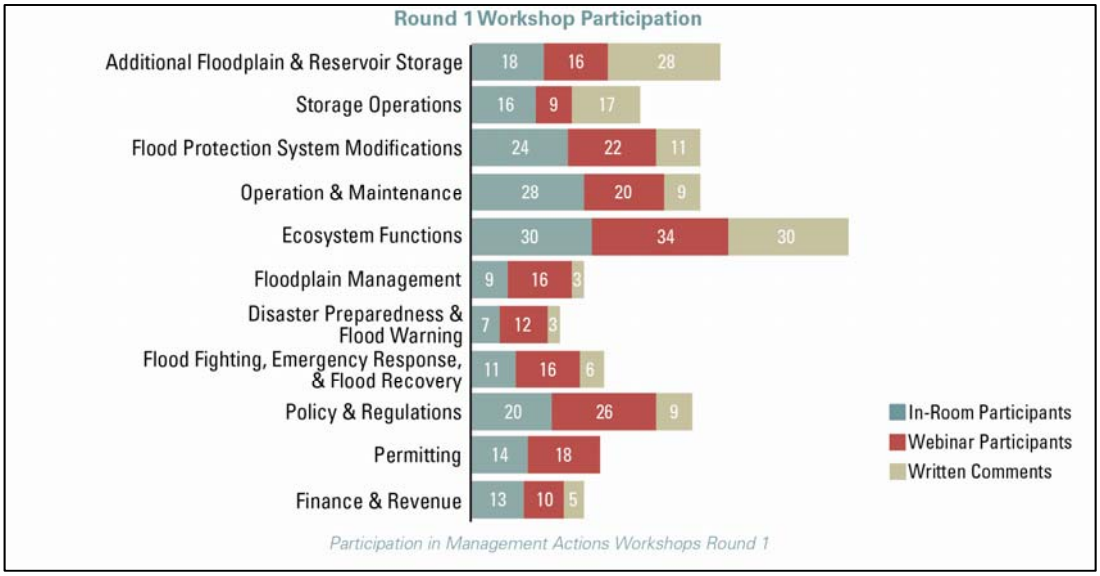

Figure 2-2. Round 1 Workshop Participation

- **Round 2 Workshops** – These four workshops focused on community application and strategic integration. Three workshops assessed the applicability of management actions to different community settings: small communities, rural/agricultural areas, and urban areas. One workshop generated considerations for integrating environmental, water supply, and other benefits into identified management actions that are primarily focused on improving flood management. More than 60 attendees from a variety of organizations, agencies, and communities participated in this series of workshops (see Figure 2-3).

Figure 2-3. Round 2 Workshop Participation

As a result of these workshops and work group meetings, the initial set of management actions (includes 82 actions) was revised and expanded to include 94 actions in total.[10]

[10] Only one management action was removed from further consideration as a result of the workshops: "Create new storage in existing reservoirs via dredging activities" (MA-005). Participants felt that reservoir dredging lacked enough interest or support to warrant further consideration as a management action.

Complete sets of handouts and material from the work group meetings and all 15 workshops can be found at http://www.water.ca.gov/cvfmp/meetings.

2.5 Management Actions Summary

A brief description was prepared for each management action to summarize its social, technical, economic, and environmental considerations as identified by DWR, work group members, and workshop participants. Highlights from these descriptions and evaluations are summarized in Table 2-2. The full descriptions appear in Appendix A to this report.

Table 2-2 lists the identified management actions (94 actions) and describes the following key characteristics for each:

- **Potential to Contribute to CVFPP Goals** – Describes the 2012 CVFPP goal to which the action most significantly contributes, and the other goal(s) to which it can potentially contribute.

- **Risk Reduction** – Describes how the action would contribute to risk reduction: by reducing the chance (probability) of flooding or by reducing damages when flooding occurs.

    - **Reduces the Chance of Flooding** – Reduces the probability that flood waters would exceed the flood management system capacity, or reduces the probability of unanticipated failure of the flood protection facilities.

    - **Reduces Damages when Flooding Occurs** – Reduces loss of life, property damages, and other economic consequences caused by flooding.

- **Type** – Describes whether the action is a structural or nonstructural action:

  - **Structural** – actions intended to modify flood patterns and rely primarily on constructed components, including such measures as levees, floodwalls, and improved channels.[11]

  - **Nonstructural** – management actions intended to reduce or eliminate susceptibility to flooding by preserving or increasing the carrying capacity of floodways.[12]

- **Scope of Action** – Describes the geographic extent of the management action application and the geographic scope of its effects and benefits.

- **Potential State Role in Implementation**– Describes the potential role of the State in implementing place-based management actions.

- **Multi-Benefit Integration Opportunities** – Describes the opportunity to integrate other benefits into management actions that are primarily focused on improving flood risk management. These other benefits include ecosystem restoration, water supply, water quality, recreation, and hydropower.

[11] California Water Code Section 79068(b)
[12] California Water Code Section 79068(a)

Table 2-2. Management Actions Summary Table

Category	Management Action	Potential to Contribute to CVFPP Goals					Risk Reduction		Type		Scope of Action			Potential State Role in Implementation			Multi-Benefit Integration Opportunities				
		Improve Flood Risk Management	Improve Operations & Maintenance	Promote Ecosystem Functions	Improve Institutional Support	Promote Multi-Benefit Projects	Reduces the Chance of Flooding	Reduces Damages when Flooding Occurs	Structural	Nonstructural	Place-Based with Systemwide Effects	Place-Based with Local Effects	Not Place-Based	State-Led Systemwide Actions	State-Participated Regional Actions	State-Guided or -Assisted Local Actions	Ecosystem Restoration	Water Supply	Water Quality	Recreation	Hydropower
Additional Floodplain and Reservoir Storage	Enlarge existing transitory floodplain storage	■		■		■	●		●		●	●		●	●		●	●		●	
	Construct new transitory floodplain storage	■		■		■	●		●		●	●		●	●		●	●		●	
	Increase on-stream flood storage capacity by building new storage facilities	■				■	●		●		●	●		●	●			●		●	●
	Update/modify/replace existing flood storage facilities	■				■	●		●		●	●		●	●			●		●	●
	Increase flood control allocation by expanding existing, on-stream reservoirs	■				■	●		●		●	●		●	●			●		●	●
	Increase foothill and upper watershed storage	■				■	●		●		●	●		●	●			●		●	●
	Increase flood control allocation by using spillway surcharge	■				■	●			●	●	●		●	●			●		●	●
	Increase flood control allocation by expanding existing, or building, new off-stream storage	■				■	●		●		●	●		●	●			●		●	●

Table 2-2. Management Actions Summary Table (cont.)

Category	Management Action	Potential to Contribute to CVFPP Goals					Risk Reduction		Type		Scope of Action			Potential State Role in Implementation			Multi-Benefit Integration Opportunities				
		Improve Flood Risk Management	Improve Operations & Maintenance	Promote Ecosystem Functions	Improve Institutional Support	Promote Multi-Benefit Projects	Reduces the Chance of Flooding	Reduces Damages when Flooding Occurs	Structural	Nonstructural	Place-Based with Systemwide Effects	Place-Based with Local Effects	Not Place-Based	State-Led Systemwide Actions	State-Participated Regional Actions	State-Guided or - Assisted Local Actions	Ecosystem Restoration	Water Supply	Water Quality	Recreation	Hydropower
Storage Operations	Establish partnerships to coordinate flood management structure operations	■	■	■		■	●			●	●	●		●	●		●	●		●	●
	Increase flood management flexibility through modifications to the magnitude/timing of flood reservations in reservoirs	■		■		■	●			●	●	●		●	●		●	●		●	●
	Increase flood management flexibility through modifications to objective release schedules at flood management reservoirs	■		■		■	●			●	●	●		●	●		●	●		●	●
	Increase flood management flexibility by implementing conjunctive use programs at flood management reservoirs	■				■	●			●	●	●		●	●	●	●	●		●	●
	Implement advanced weather forecast-based operations to increase reservoir management flexibility	■	■		■	■	●			●	●	●		●	●			●			●
Flood Protection System Modification	Improve conveyance by addressing flow constrictions	■	■	■			●			●	●	●		●	●		●				
	Increase capacity of existing bypasses	■		■		■	●		●		●	●		●	●		●	●			
	Modify existing weirs, overflows, or relief structures to improve flood system performance	■	■	■			●		●		●	●		●	●		●				
	Construct new bypasses to improve flood system performance	■	■	■		■	●		●		●	●		●	●		●	●			
	Construct new levees to provide flood protection to additional areas potentially affected by flooding	■					●		●			●			●	●					
	Raise levees to improve flood system performance	■					●		●			●			●	●					

Table 2-2. Management Actions Summary Table (cont.)

Category	Management Action	Potential to Contribute to CVFPP Goals					Risk Reduction		Type		Scope of Action			Potential State Role in Implementation			Multi-Benefit Integration Opportunities				
		Improve Flood Risk Management	Improve Operations & Maintenance	Promote Ecosystem Functions	Improve Institutional Support	Promote Multi-Benefit Projects	Reduces the Chance of Flooding	Reduces Damages when Flooding Occurs	Structural	Nonstructural	Place-Based with Systemwide Effects	Place-Based with Local Effects	Not Place-Based	State-Led Systemwide Actions	State-Participated Regional Actions	State-Guided or - Assisted Local Actions	Ecosystem Restoration	Water Supply	Water Quality	Recreation	Hydropower
Flood Protection System Modification (cont.)	Construct setback levees	■	■	■		■	●		●	●	●	●		●	●	●	●			●	
	Construct ring levees	■					●		●			●			●	●					
	Improve structural performance and resilience of existing levees	■	■				●		●			●			●	●					
	Construct closure structures	■	■				●		●			●			●	●					
	Remove and/or deauthorize disconnected, redundant, and nonfunctional facilities of the SPFC		■	■					●		●	●		●			●				

Table 2-2. Management Actions Summary Table (cont.)

Category	Management Action	Potential to Contribute to CVFPP Goals					Risk Reduction		Type		Scope of Action			Potential State Role in Implementation			Multi-Benefit Integration Opportunities				
		Improve Flood Risk Management	Improve Operations & Maintenance	Promote Ecosystem Functions	Improve Institutional Support	Promote Multi-Benefit Projects	Reduces the Chance of Flooding	Reduces Damages when Flooding Occurs	Structural	Nonstructural	Place-Based with Systemwide Effects	Place-Based with Local Effects	Not Place-Based	State-Led Systemwide Actions	State-Participated Regional Actions	State-Guided or - Assisted Local Actions	Ecosystem Restoration	Water Supply	Water Quality	Recreation	Hydropower
Operations and Maintenance	Restore channel form and function to improve O&M and facilitate flood damage reduction.	■	■			■	●			●		●		●	●	●	●				
	Perform clearing and snagging within channels.	■	■				●			●		●		●	●	●				●	
	Perform dredging to remove sediment from channels.	■	■				●			●		●		●	●	●					
	Reuse excess materials derived from channel maintenance.		■		■	■				●		●		●	●	●					
	Develop regional channel vegetation management plans.	■	■	■		■	●			●			●	●			●				
	Develop an improved encroachment management program endorsed by the State.	■	■		■		●			●			●	●							
	Improve administration and oversight of levee penetrations.	■	■				●			●			●	●							
	Improve interior drainage.	■	■				●			●		●				●					
	Protect vulnerable levees and banks through stabilization and erosion repairs.	■	■				●		●			●		●	●	●					

Table 2-2. Management Actions Summary Table (cont.)

Category	Management Action	Potential to Contribute to CVFPP Goals					Risk Reduction		Type		Scope of Action			Potential State Role in Implementation			Multi-Benefit Integration Opportunities				
		Improve Flood Risk Management	Improve Operations & Maintenance	Promote Ecosystem Functions	Improve Institutional Support	Promote Multi-Benefit Projects	Reduces the Chance of Flooding	Reduces Damages when Flooding Occurs	Structural	Nonstructural	Place-Based with Systemwide Effects	Place-Based with Local Effects	Not Place-Based	State-Led Systemwide Actions	State-Participated Regional Actions	State-Guided or - Assisted Local Actions	Ecosystem Restoration	Water Supply	Water Quality	Recreation	Hydropower
Operations and Maintenance (cont.)	Revise O&M manuals to be consistent with new and current policies that support multi-benefits of the flood system.	■	■	■		■	●			●			●	●			●				
	Effectively maintain, operate, and rehabilitate closure structures.	■	■				●			●		●			●	●					
	Develop and/or implement structure rehabilitation and repair program.	■	■		■		●			●	●	●		●	●						
	Develop a long-term sustainable and implementable Levee Vegetation Management Strategy	■	■	■		■	●			●			●	●			●				
Ecosystem Functions	Manage runoff through watershed management	■	■	■		■	●			●		●			●	●	●	●	●		
	Remove unnatural hard points within and along channels	■		■			●			●		●			●	●	●				
	Develop hazardous waste and materials management protocols to identify, contain, and remediate potential water quality hazards within floodplains	■		■		■		●		●			●	●		●	●		●		
	Operate reservoirs with flood reservation space to more closely approximate natural flow regimes		■	■						●	●	●		●	●		●				
	Reduce the incidence of invasive species in the flood management system	■	■	■	■		●			●		●		●	●	●	●				
	Remove barriers to fish passage	■		■		■	●			●	●	●		●	●	●	●			●	

Table 2-2. Management Actions Summary Table (cont.)

Category	Management Action	Potential to Contribute to CVFPP Goals					Risk Reduction		Type		Scope of Action			Potential State Role in Implementation			Multi-Benefit Integration Opportunities				
		Improve Flood Risk Management	Improve Operations & Maintenance	Promote Ecosystem Functions	Improve Institutional Support	Promote Multi-Benefit Projects	Reduces the Chance of Flooding	Reduces Damages when Flooding Occurs	Structural	Nonstructural	Place-Based with Systemwide Effects	Place-Based with Local Effects	Not Place-Based	State-Led Systemwide Actions	State-Participated Regional Actions	State-Guided or - Assisted Local Actions	Ecosystem Restoration	Water Supply	Water Quality	Recreation	Hydropower
Ecosystem Functions (cont.)	Setback levees to connect rivers to floodplains	■	■	■		■	●		●	●	●	●		●	●	●	●			●	
	Restore channel alignment (i.e., conduct de-channelization)	■	■	■		■	●			●	●	●		●	●	●	●				
	Encourage natural physical geomorphic processes, including channel migration and sediment transport	■	■	■		■	●			●	●	●		●	●	●	●				
	Improve the quality, quantity, and connectivity of wetland, riparian, woodland, grassland, and other native habitat communities	■	■	■		■	●			●	●	●		●	●	●	●		●	●	
Floodplain Management	Reduce flood damages through acquisitions, easements, and private conservation programs	■	■	■		■	●	●		●	●	●		●	●	●	●	●		●	
	Manage municipal stormwater to provide regional or systemwide flood benefits	■				■	●			●		●			●	●			●		
	Coordinate and streamline floodplain mapping to improve consistency of floodplain delineation and assessment of flood risk	■			■			●		●			●	●		●					
	Increase flood risk awareness through outreach and education	■			■			●		●			●	●		●					
	Provide technical procedural assistance to local agencies for flood mitigation compliance and grant application assistance	■			■		●	●		●			●	●							
	Assist in development of local flood management plan updates and provide procedural and technical support for implementation	■			■			●		●			●	●							

Table 2-2. Management Actions Summary Table (cont.)

Category	Management Action	Potential to Contribute to CVFPP Goals					Risk Reduction		Type		Scope of Action			Potential State Role in Implementation			Multi-Benefit Integration Opportunities				
		Improve Flood Risk Management	Improve Operations & Maintenance	Promote Ecosystem Functions	Improve Institutional Support	Promote Multi-Benefit Projects	Reduces the Chance of Flooding	Reduces Damages when Flooding Occurs	Structural	Nonstructural	Place-Based with Systemwide Effects	Place-Based with Local Effects	Not Place-Based	State-Led Systemwide Actions	State-Participated Regional Actions	State-Guided or - Assisted Local Actions	Ecosystem Restoration	Water Supply	Water Quality	Recreation	Hydropower
Floodplain Management (cont.)	Facilitate increased awareness of and participation in the Community Rating System insurance-rate adjusting program	■			■			●		●			●	●		●					
	Develop mandatory flood insurance programs that are more consistent with the area's risk of flooding	■			■			●		●			●	●							
	Increase public understanding of FEMA maps and policies	■			■			●		●			●	●		●					
	Develop a State program and framework to reduce or eliminate subsidies for repetitive loss properties in flood-prone areas	■			■			●		●			●	●							
	Construct training levees or levees that subdivide larger basins	■	■					●	●			●			●	●					
	Use floodproofing measures	■						●	●	●		●			●	●					
	Improve awareness of floodplain function through outreach and education	■		■	■			●		●			●	●		●	●			●	
Disaster Preparedness and Flood Warning	Coordinate flood response planning and clarify roles and responsibilities related to flood preparedness and emergency response	■			■			●		●			●	●		●					
	Improve communication and public awareness of emergency response procedures and terminology	■			■			●		●			●	●		●					
	Establish standard flood warning systems and procedures	■			■			●		●			●	●		●					
	Improve stream gage network for forecasting purposes	■			■		●	●		●			●	●		●					
	Create systemwide levee instrumentation for early warning systems	■	■		■		●	●		●			●	●		●					

Table 2-2. Management Actions Summary Table (cont.)

Category	Management Action	Potential to Contribute to CVFPP Goals					Risk Reduction		Type		Scope of Action			Potential State Role in Implementation			Multi-Benefit Integration Opportunities				
		Improve Flood Risk Management	Improve Operations & Maintenance	Promote Ecosystem Functions	Improve Institutional Support	Promote Multi-Benefit Projects	Reduces the Chance of Flooding	Reduces Damages when Flooding Occurs	Structural	Nonstructural	Place-Based with Systemwide Effects	Place-Based with Local Effects	Not Place-Based	State-Led Systemwide Actions	State-Participated Regional Actions	State-Guided or -Assisted Local Actions	Ecosystem Restoration	Water Supply	Water Quality	Recreation	Hydropower
Flood Fighting, Emergency Response and Flood Recovery	Protect critical infrastructure corridors from floodwaters	■			■			●		●	●	●			●	●					
	Expand the State's assistance to maintaining agencies during flood emergencies	■			■			●		●			●	●							
	Facilitate improved evacuation planning	■			■			●		●			●	●		●					
	Develop a post-flood recovery plan for the Central Valley and Delta to improve the coordination and efficiency of post-flood assistance	■	■		■			●		●			●	●		●					
	Streamline the post-flood permitting process for flood system repairs	■	■		■			●		●			●	●							
	Purchase and pre-position flood fighting materials/tools in preparation for a flood event	■	■		■			●		●		●		●	●	●					
	Integrate environmental compliance and mitigation into the flood fight		■	■	■					●			●	●		●	●		●		
Policy and Regulations	Encourage compatible land uses with flood management system and floodplain function	■	■	■	■	■		●		●			●			●	●	●	●	●	
	Establish clear triggers or policy for updating flood management-related General Plan elements and other local flood management plan(s)	■	■	■	■	■		●		●			●	●		●	●			●	
	Update State's designated floodway program	■	■		■	■	●	●		●			●	●						●	
	Use Building Standards Code amendments to reduce consequence of flooding	■			■			●		●			●	●		●					

Table 2-2. Management Actions Summary Table (cont.)

Category	Management Action	Potential to Contribute to CVFPP Goals					Risk Reduction		Type		Scope of Action			Potential State Role in Implementation			Multi-Benefit Integration Opportunities				
		Improve Flood Risk Management	Improve Operations & Maintenance	Promote Ecosystem Functions	Improve Institutional Support	Promote Multi-Benefit Projects	Reduces the Chance of Flooding	Reduces Damages when Flooding Occurs	Structural	Nonstructural	Place-Based with Systemwide Effects	Place-Based with Local Effects	Not Place-Based	State-Led Systemwide Actions	State-Participated Regional Actions	State-Guided or - Assisted Local Actions	Ecosystem Restoration	Water Supply	Water Quality	Recreation	Hydropower
Policy and Regulations (cont.)	Update the State's floodplain management policy	■			■			●		●			●	●							
	Encourage multi-jurisdictional and regional partnerships on flood planning and improve agency coordination on flood management activities, including O&M, repair, and restoration	■	■	■	■	■	●	●		●			●			●	●				
	Develop and implement State criteria and processes for urban flood protection	■	■		■		●			●			●	●		●					
	Develop and implement flood protection criteria outside urban areas	■			■		●			●			●	●		●					
	Update State Title 23 standards	■	■	■	■		●	●		●			●	●							
	Clarify flood management responsibilities for all local, regional, State, and federal agencies	■	■		■		●	●		●			●	●							
Permitting	Develop regional and river-corridor conservation plans, or expand existing regional conservation plans (e.g., regional Habitat Conservation Plans and Natural Community Conservation Plans) to provide a more efficient and effective regulatory approval process for flood projects		■	■	■	■				●			●	●		●	●				
	Develop regional advanced mitigation strategies and promote networks of both public and private mitigation banks to meet the needs of flood and other public infrastructure projects	■	■	■	■	■				●			●	●		●	●				

Table 2-2. Management Actions Summary Table (cont.)

Category	Management Action	Potential to Contribute to CVFPP Goals					Risk Reduction		Type		Scope of Action			Potential State Role in Implementation			Multi-Benefit Integration Opportunities				
		Improve Flood Risk Management	Improve Operations & Maintenance	Promote Ecosystem Functions	Improve Institutional Support	Promote Multi-Benefit Projects	Reduces the Chance of Flooding	Reduces Damages when Flooding Occurs	Structural	Nonstructural	Place-Based with Systemwide Effects	Place-Based with Local Effects	Not Place-Based	State-Led Systemwide Actions	State-Participated Regional Actions	State-Guided or - Assisted Local Actions	Ecosystem Restoration	Water Supply	Water Quality	Recreation	Hydropower
Permitting (cont.)	Develop proactive integrated regulatory compliance strategies that streamline permitting activities	■	■	■	■	■				●			●	●		●	●				
	Establish memoranda of understanding and/or management agreements between agencies to integrate the needs to be served by the flood control system		■	■	■	■				●			●	●		●	●				
	Provide technical assistance and education on environmental permits		■		■					●			●	●		●	●				
	Develop and implement Corridor Management Strategy	■	■	■	■	■	●			●			●	●		●	●				
Finance and Revenue	Maximize funding for flood management projects by leveraging federal funding				■					●			●	●		●					
	Leverage funding from multiple projects to improve cost-effectiveness and efficiency of flood management projects				■					●			●	●		●					
	Develop funding mechanism for O&M and new flood management improvements		■		■					●			●	●		●					
	Establish a methodology for evaluating benefits and costs on a systemwide basis to support economic justification for projects in all community settings				■					●			●	●		●					

Table 2-2. Management Actions Summary Table (cont.)

Category	Management Action	Potential to Contribute to CVFPP Goals					Risk Reduction		Type		Scope of Action			Potential State Role in Implementation			Multi-Benefit Integration Opportunities				
		Improve Flood Risk Management	Improve Operations & Maintenance	Promote Ecosystem Functions	Improve Institutional Support	Promote Multi-Benefit Projects	Reduces the Chance of Flooding	Reduces Damages when Flooding Occurs	Structural	Nonstructural	Place-Based with Systemwide Effects	Place-Based with Local Effects	Not Place-Based	State-Led Systemwide Actions	State-Participated Regional Actions	State-Guided or - Assisted Local Actions	Ecosystem Restoration	Water Supply	Water Quality	Recreation	Hydropower
Finance and Revenue (cont.)	Create a shared strategic pooled money account that pre-funds avoidance/mitigation solutions for O&M impacts on current and future flood facilities		■		■					●			●	●		●					
	Create a strategic pooled money account that provides funds for land stewardship activities at current and future flood-related mitigation areas in perpetuity		■	■	■					●			●	●		●	●				

Contribution to CVFPP Goals:

■ = significant contribution

■ = potential contribution

Blank = not applicable

Other Fields:

● = applies

Blank = not applicable

Key:

CVFPP = Central Valley Flood Protection Plan

FEMA = Federal Emergency Management Agency

O&M = Operations and Maintenance

SPFC = State Plan of Flood Control

Table 2-3 describes the potential linkages between management actions that are required to maximize benefits or support implementation. For each management action category/subcategory, it lists other management action categories/subcategories that may be required to maximize potential benefits or alleviate some implementation challenges. This table was developed based on input generated from the community and integration workshops, which appears in Appendix B.

Table 2-3. Linkage between Management Actions Required to Maximize Benefits and/or Support Implementation

Management Action Category/Subcategory		Links to Maximize Potential Benefits and/or Alleviate Implementation Challenges
Additional Storage	Floodplain (transitory) Storage	Storage Operations
		System Modifications – Bypasses
		System Modifications – Levees/Floodwalls/Hydraulic Structures
		System Modifications – Setback Levees
		System Modifications – Ring Levees
		Operations and Maintenance – Vegetation Management
		Ecosystem Functions
		Floodplain Management – Floodproofing
		Floodplain Management – Easements/Acquisition
		Policy and Regulations
		Permitting
		Finance and Revenue
	Reservoir Storage	Storage Operations
		System Modifications – Levees/Floodwalls/Hydraulic Structures
		Operations and Maintenance – Reduce Flow Constrictions
		Policy and Regulations
		Permitting
		Finance and Revenue
Storage Operations		System Modifications – Levees/Floodwalls/Hydraulic Structures
		Operations and Maintenance – Reduce Flow Constrictions
		Policy and Regulations
		Permitting
		Finance and Revenue

Table 2-3. Linkage between Management Actions Required to Maximize Benefits and/or Support Implementation (cont.)

Management Action Category/ Subcategory		Links to Maximize Potential Benefits and/or Alleviate Implementation Challenges
System Modifications	Bypasses	System Modifications – Levees/Floodwalls/Hydraulic Structures
		System Modifications – Setback Levees
		Operations and Maintenance – Vegetation Management
		Operations and Maintenance – Reduce Flow Constrictions
		Operations and Maintenance – Dredging and Clearing
		Ecosystem Functions
		Floodplain Management – Easements/Acquisitions
		Policy and Regulations
		Permitting
		Finance and Revenue
	Levees/ Floodwalls/ Hydraulic Structures	Operations and Maintenance – Dredging and Clearing
		Floodplain Management – Easements/Acquisitions
		Policy and Regulations
		Permitting
		Finance and Revenue
	Setback Levees	Operations and Maintenance – Vegetation Management
		Operations and Maintenance – Dredging and Clearing
		Ecosystem Functions
		Floodplain Management – Easements/Acquisitions
		Policy and Regulations
		Permitting
		Finance and Revenue
	Ring Levees	Operations and Maintenance – Vegetation Management
		Floodplain Management – Floodproofing
		Floodplain Management – Easements/Acquisitions
		Floodplain Management – Risk Awareness/Insurance
		Disaster Preparedness and Flood Warning
		Flood Fighting, Emergency Response and Flood Recovery
		Policy and Regulations
		Permitting
		Finance and Revenue

Table 2-3. Linkage between Management Actions Required to Maximize Benefits and/or Support Implementation (cont.)

Management Action Category/ Subcategory		Links to Maximize Potential Benefits and/or Alleviate Implementation Challenges
Operations and Maintenance	Vegetation Management	Operations and Maintenance – Reduce Flow Constrictions
		Operations and Maintenance – Dredging and Clearing
		Operations and Maintenance – Inspections/Encroachments/Penetrations
		Ecosystem Functions
		Flood Fighting, Emergency Response and Flood Recovery
		Policy and Regulations
		Permitting
		Finance and Revenue
	Reduce Flow Constrictions	Operations and Maintenance – Dredging and Clearing
		Ecosystem Functions
		Policy and Regulations
		Permitting
		Finance and Revenue
	Dredging and Clearing	Ecosystem Functions
		Policy and Regulations
		Permitting
		Finance and Revenue
	Inspections/ Encroachments/ Penetrations	Disaster Preparedness and Flood Warning
		Flood Fighting, Emergency Response, and Flood Recovery
		Policy and Regulations
		Permitting
		Finance and Revenue
Ecosystem Functions		Policy and Regulations
		Permitting
		Finance and Revenue

Table 2-3. Linkage between Management Actions Required to Maximize Benefits and/or Support Implementation (cont.)

Management Action Category/ Subcategory		Links to Maximize Potential Benefits and/or Alleviate Implementation Challenges
Floodplain Management	Floodproofing	Floodplain Management – Risk Awareness/Insurance
		Disaster Preparedness and Flood Warning
		Flood Fighting, Emergency Response, and Flood Recovery
		Policy and Regulations
		Permitting
		Finance and Revenue
	Easements/ Acquisitions	Policy and Regulations
		Permitting
		Finance and Revenue
	Risk awareness/ Insurance	Disaster Preparedness and Flood Warning
		Flood Fighting, Emergency Response, and Flood Recovery
		Policy and Regulations
		Finance and Revenue
Disaster Preparedness and Flood Warning		Flood Fighting, Emergency Response, and Flood Recovery
		Policy and Regulations
		Permitting
		Finance and Revenue
Flood Fighting, Emergency Response, and Flood Recovery		Policy and Regulations
		Permitting
		Finance and Revenue
Policy and Regulations		Permitting
		Finance and Revenue
Permitting		Finance and Revenue

3.0 Next Steps for Management Actions

The next phases of CVFPP development – Phases 3 and 4 – will focus on developing regional and systemwide solution sets, respectively. This chapter describes the next steps in developing management actions and combining them to support formulation of regional and systemwide solutions to achieve CVFPP goals and objectives.

3.1 Further Development and Refinement

Data, technical analyses, and continued input from plan development partners are critical elements for further developing and refining the management actions presented in this document. The conceptual nature of management actions at this stage of CVFPP development calls for additional technical details that will help to identify where and how actions can be applied within the Systemwide Planning Area to achieve CVFPP goals. At the same time, work groups and partner agencies will provide important guidance and knowledge needed to determine local and regional applicability of management actions.

The approaches for further refining and analyzing management actions will differ depending on an action's scope and the extent of its effects:

- **Place-Based Management Actions with Systemwide Effects** – DWR may conduct technical analyses using available topographic, hydrologic, hydraulic, and other mapping information to identify opportunities to implement these types of actions in the SPFC and Systemwide planning areas. Such analyses would help identify potential locations for certain actions and their potential magnitude and scale, as well as the likely effects or outcomes associated with each. Management actions considered for these types of technical analyses may include those related to:

  - Reservoir storage expansion and operations modification
  - Transitory storage expansion
  - Bypass expansion
  - Floodway expansion
  - Habitat restoration

- **Place-Based Management Actions with Local Effects** – DWR may conduct technical analyses using available population, land use, floodplain extent and depth, and other mapping information to evaluate the level of flood risk experienced by different areas within the SPFC Planning Area and determine the management actions that could be used to reduce these risks. The process will include delineation of subregions within the SPFC Planning Area with common protection facilities and flooding mechanisms. Each subregion's characteristics that affect which management actions are suitable for application will likely be assessed, including:

  - Flooding mechanism
  - Flood depth and frequency
  - Performance of existing flood protection facilities
  - Population at risk
  - Property and infrastructure at risk
  - Habitat restoration opportunities

- **Not Place-Based Management Actions** – DWR may convene topic-specific work groups and workshops to solicit input from subject-matter experts, partners, interested parties, and the public related to specific implementation details for management actions that would modify policies, regulations, or institutional processes. Types of actions targeted for additional development may include:

  - Flood insurance reform
  - Designated floodway update
  - Financing structure
  - Regional permitting processes
  - Criteria for levels of protection in urban and other areas

3.2 Regional and Systemwide Solution Sets

Work planned for Phases 3 and 4 of CVFPP development will produce an array of solution sets incorporating various combinations of management actions for inclusion in the 2012 CVFPP. During Phase 3, the management actions will be combined on a regional basis. In Phase 4, the regional solution sets will be integrated and refined to form comprehensive, systemwide solution sets.

An array of solution sets will be developed to capture a broad range of potential flood management actions and approaches. Each solution set will have a different focus or approach for addressing problems and opportunities, and will be populated with different combinations of management actions. These solution sets are intended to represent bookends of the possible range of benefits, costs, and impacts. Findings from the evaluation and comparison of solution sets will be presented in the 2012 CVFPP to:

- Inform the Board, its partners, and local decision-makers of the merits of different approaches.

- Help formulate State priorities and decision-making criteria related to future flood management improvements for inclusion in an implementation framework for the CVFPP.

- Suggest actions that would be common to any flood management approach for immediate implementation following adoption of the 2012 CVFPP.

- Identify actions that show potential to provide significant systemwide flood benefits (such as new or modified bypasses) for detailed (feasibility level) study by DWR between 2012 and the 2017 CVFPP update.

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4.0 References

The references shown below apply to the full *Management Actions Report* and its appendices. Many of these sources or materials were identified by Phase 1 and Phase 2 work group members or Phase 2 workshop participants in support of specific management actions that have been identified.

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5.0 Acronyms and Abbreviations

AB	Assembly Bill
Board	Central Valley Flood Protection Board (formerly the Reclamation Board)
CEQA	California Environmental Quality Act
CVFED	Central Valley Floodplain Evaluation and Delineation
CVFPP	Central Valley Flood Protection Plan
CWC	California Water Code
DWR	California Department of Water Resources
FloodSAFE	FloodSAFE California
LFPZ	Levee Flood Protection Zone
MAR	Management Actions Report
SB	Senate Bill
SPFC	State Plan of Flood Control

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6.0 Program Glossary

100-year flood event The flood having a 1-in-100 (1 percent) chance of being equaled or exceeded in any given year. A structure located within a special flood hazard area shown on a National Flood Insurance Program map has a 26% chance of suffering flood damage during the term of a 30 year mortgage.

(Federal Emergency Management Agency, http://www.fema.gov/, accessed June 2009).

200-year floodplain An area that has a 1-in-200 (0.5 percent) chance of flooding in any given year, based on hydrological modeling and other engineering criteria accepted by the Department of Water Resources.

California Government Code Section 65300.2(a)

200-year flood event A flood event with a 1-in-200 (0.5 percent) chance of being equaled or exceeded in any given year.

500-year floodplain An area that has a 1-in-500 (0.2 percent) chance of flooding in any given year, based on hydrological modeling and other engineering criteria accepted by the Department of Water Resources.

agricultural stewardship A public and private commitment to manage and preserve the resources and the conditions necessary for a robust and sustainable agricultural industry in California.

adaptive management A scientific approach to resource management that rigorously combines management, monitoring and research to effectively manage complex ecosystems in the face of uncertainty. Adaptive management tackles uncertainty about the system head-on by identifying clear objectives, developing conceptual models of the system, identifying areas of uncertainty and alternative hypotheses, testing critical assumptions, monitoring to provide feedback about the system and actions, learning from the system as actions are taken to manage it, and incorporating what is learned into future actions.

U.S. Geological Survey
Designing Monitoring Programs in an Adaptive Management Context for Regional Multiple Species Conservation Plans

anadromous fish Fish that spend a part of their life cycle in the sea and return to freshwater to spawn.

annual pass rate The percentage (on an annual basis) of levees that pass inspections according to Federal and State levee standards (e.g., maintenance, encroachment, etc.).

beneficiary Partners, interested parties and the general public who receive benefit from a flood management project.

Central Valley Flood Protection Board The Central Valley Flood Protection Board (formerly The Reclamation Board) was created by the California Legislature in 1911 to carry out a comprehensive flood control plan for the Sacramento and San Joaquin Rivers. The Board has jurisdiction throughout the Sacramento-San Joaquin Valley, which is synonymous with the drainage basins of the Central Valley and includes the Sacramento-San Joaquin Drainage District.

Central Valley Flood Management Planning Program (CVFMP) The CVFMP is one program within FloodSAFE California, a multi-year initiative led and managed by the California Department of Water Resources. Primary products of the CVFMP Program are the State Plan of Flood Control Descriptive Document, the State Plan of Flood Control History Document, the Flood Control System Status Report, and the Central Valley Flood Protection Plan (CVFPP).

Central Valley Flood Protection Plan The CVFPP is a State plan that will describe the challenges, opportunities, and a vision for improving integrated flood management in the Central Valley. The CVFPP will document the current and future risks associated with flooding and recommend improvements to the State-federal flood protection system to reduce the occurrence of major flooding and the consequence of flood damage that could result. The plan will be submitted to the Central Valley Flood Protection Board by January 1, 2012, for adoption by the following July, and will be updated every five years.

Central Valley Floodplain Evaluation and Delineation Program The CVFED is one program within FloodSAFE California, a multi-year initiative led and managed by the California Department of Water Resources. The purpose of the CVFED Program is to provide the building blocks in terms of standards, methodologies, and tools needed for floodplain assessments for FloodSAFE programs consistent with U.S. Army Corps of Engineers and Federal Emergency Management Agency assessment needs. The primary products of the CVFED Program are the topography, hydraulic models, and multiple floodplain delineations associated with the State Plan of Flood Control.

conveyance capacity The maximum rate of flowing water, usually expressed in cubic feet per second (cfs), that a river, canal, or bypass can receive without exceeding a threshold value such as flood stage, or the freeboard distance from the top of a levee.

CVFMP Forum Valley-wide or regional conference-style public meetings with presentations, workshops, panel discussions, and information booths. These forums are the primary venue for engaging a wide array of interests in discussing draft plan content and

gauging agreement, and fostering information-sharing about regional and system-wide flood management challenges and potential solutions. Related FloodSAFE projects and programs will also use CVFMP Forums to engage interested parties efficiently.

CVFPP Work Group Place-based (e.g. regional) and subject-based (e.g. topic) work groups chartered to develop content and content recommendations for the CVFPP. Work groups are integral parts for developing a broadly-supported CVFPP that reflects the State, federal, tribal, local, regional perspectives, and subject-matter expertise.

design discharge (flow) The rate of flowing water, usually measured in cubic feet per second (cfs) associated with the water surface profile or water level for which a flood management project was designed.

design flood Means the selected flood against which protection is provided, or eventually will be provided, by means of flood protective or control works. When a federal survey has been authorized the design flood will be determined by the appropriate federal agency and in all other cases it will be determined by the responsible local agency. It is the basis for design and operation of a particular project after full consideration of flood characteristics, frequencies, and potentials and economic and other practical considerations.

California Water Code Section 8402(e)

design standard Minimum acceptable requirements for designed construction of flood management facilities (levees, control structures, etc.) when the infrastructure was constructed. Design standards can change over time due to the improved understanding of risk factors; the additions and changes in regulations and law; and social values and benefit considerations. In some cases, design standards today are different then when much of the SPFC facilities were constructed.

designated floodway Means the channel of a stream and that portion of the adjoining flood plain required to reasonably provide for the construction of a project for passage of the design flood including the lands necessary for construction of project levees.

California Water Code Section 8402(f)

developed area An area of a community that is:

A. A primarily urbanized, built-up area that is a minimum of 20 contiguous acres, has basic urban infrastructure, including roads, utilities, communications, and public facilities, to sustain industrial, residential, and commercial activities, and

   1. Within which 75 percent or more of the parcels, tracts, or lots contain commercial, industrial, or residential structures or uses; or

   2. Is a single parcel, tract, or lot in which 75 percent of the area contains existing commercial or industrial structures or uses; or

   3. Is a subdivision developed at a density of at least two residential structures per acre within which 75 percent or more of the lots contain existing residential structures at the time the designation is adopted.

B. Undeveloped parcels, tracts, or lots, the combination of which is less than 20 acres and contiguous on at least 3 sides to areas meeting the criteria of paragraph (a) at the time the designation is adopted.

C. A subdivision that is a minimum of 20 contiguous acres that has obtained all necessary government approvals, provided that the actual “start of construction” of structures has occurred on at least 10 percent of the lots or remaining lots of a subdivision or 10 percent of the maximum building coverage or remaining building coverage allowed for a single lot subdivision at the time the designation is adopted and construction of structures is underway. Residential subdivisions must meet

the density criteria in paragraph (a)(3). (Section 59.1 of Title 44 of the Code of Federal regulations)

California Government Code Section 65007 (c)

ecosystem An ecosystem consists of all the organisms in a given area interacting with the physical environment. The biotic and physical components in an ecosystem are interdependent, frequently with complex feedback loops. The physical components that sustain the biota of an ecosystem include but may not be limited to the soil or substrate, topographic relief and aspect, the atmosphere, weather and climate, hydrology, geomorphic processes, the nutrient regime, and the salinity regime.

ecosystem rehabilitation A practice where an ecosystem, that has been degraded or disturbed by a specific human action, is changed to an improved state that is not necessarily the pre-action "natural" state but is defined by providing the basic hydrogeomorphic and ecological processes that support a functioning ecosystem.

ecosystem restoration A practice where an ecosystem, that has been degraded or disturbed by a specific human action or natural process, is restored to mimic, as closely as possible through the restoration of critical natural processes, conditions which would occur in an area in the absence of human changes to the landscape and hydrology.

ecosystem services Ecosystem services emanate from a functioning ecosystem and are the beneficial outcomes for the natural environment or for people that result from ecosystem functions. Some examples of ecosystem services are support of the food chain, harvesting of animals or plants, clean water, or scenic views. In order for an ecosystem to provide services to humans, some interaction with, or at least some appreciation by, humans is required.

DFG, California Wildlife Action Plan, 2004

encroachment Any obstruction or physical intrusion by construction of works or devices, planting or removal of vegetation, or by whatever means for any purpose,

into any of the following: (1) any flood control project works; (2) the waterway area of the project; (3) the area covered by an adopted plan of flood control; or (4) any area outside the above limits, if the encroachment could affect any of the above."

California Code of Regulations Title 23: Section 12899(b)

environmental stewardship A commitment to responsibly manage and protect natural resources (water, air, land, plants and animals), and ecosystems in a functional and sustainable manner that ensures they are available for future generations.

California Department of Water Resources Policy Paper: Environmental Stewardship DRAFT 2000-03-25

essential public facilities Public facilities include, but not limited to, hospitals and health care facilities, emergency shelters, fire stations, emergency command centers, and emergency communications facilities.

California Government Code Section 65302

feasible Capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors.

California Water Code Section 8307

FloodSAFE California DWR's multi-faceted initiative launched in 2006 to improve public safety through integrated flood management and reduce potential flood damages in the state's highest risk areas. Although led at the state level and initially funded by proposition 1E and 84 bond money, FloodSAFE implementation relies on the cooperation and assistance of federal partners, Tribal entities, local sponsors and other stakeholders. The FloodSAFE vision is a sustainable integrated flood management and emergency response system throughout California that improves public safety, protects and enhances environmental and cultural resources, and supports economic growth by reducing the probability of destructive floods, promoting beneficial floodplain processes, and lowering the damages caused by flooding.

DWR, Draft FloodSAFE Strategic Plan, June 2008.

flood basin A bowl-shaped, natural landform that historically or presently receives and retains floodwaters, or an engineered floodwater detention basin, excavated below grade or surrounded by levees.

flood bypass An engineered wide and shallow channel or confined floodplain, usually flanked by levees, that receives flood waters to reduce the amount of flow in a river or stream.

flood corridor A passage way for flood flows including but not limited to bypass systems, channels, levee systems, floodplain easements, culverts, floodwalls, or a combination thereof.

Flood Control System Status Report A report that will provide an assessment of the status of the facilities included in the State Plan of Flood Control (SPFC) Descriptive Document, identify deficiencies, and make recommendations for improvement. This report will be revised as needed.

flood damages All damages caused by a flood including physical damage, loss of life, and economic damage.

DWR, Draft FloodSAFE Strategic Plan, June 2008

flood hazard zone An area subject to flooding that is delineated as either a special hazard area or an area of moderate hazard on an official flood insurance rate map issued by the Federal Emergency Management Agency. The identification of flood hazard zones does not imply that areas outside the flood hazard zones, or uses permitted within flood hazard zones, will be free from flooding or flood damage.

California Government Code Section 65007(d)

flood management The use of comprehensive methods to manage flood flows, providing multiple benefits in addition to protecting people and property.

DWR, Draft FloodSAFE Strategic Plan, June 2008

flood management system Refers the structural elements to employed to convey flood flows within the CVFPP Planning Area, including facilities of the State Plan of Flood Control, flood control reservoirs, and non-project levees.

flood prone areas Areas are subject to flooding.

flood protection Methods or structural measures used to mitigate flooding or reduce flooding hazards and risks.

Delta Protection Commission, Management Plan Update Compiled Draft Management Plan Glossary November 2009

flood risk The probability of flooding combined with negative outcomes that could result when flooding occurs.

floodplain An area adjacent to a stream or river that experiences occasional or periodic flooding.

DWR, Draft FloodSAFE Strategic Plan, June 2008

floodplain management A decision-making process whose goal is to achieve appropriate use of the nation's floodplains. Appropriate use is any activity or set of activities that is compatible with the risk to natural resources and human resources. The operation of an overall program of corrective and preventive measures for reducing flood damage, including but not limited to watershed management, emergency preparedness plans, flood control works, and floodplain management regulations.

A Blueprint for Change, Sharing the Challenge: Floodplain ManagementInto the 21st Century, Report of the Interagency Floodplain Management Review Committee to the Administration Floodplain Management Task Force, Washington, D.C., June 1994

floodway, state-designated The channel of a stream and that portion of the adjoining flood plain required to reasonably provide for the construction of a project for passage of the design flood including the lands necessary for construction of project levee that are regulated by the Central Valley Protection Board.

freeboard A factor of safety usually expressed in feet above a flood level for purposes of floodplain management. "Freeboard" tends to compensate for the many unknown factors that could contribute to flood heights greater than the height calculated for a selected size flood and floodway conditions, such as wave action, bridge openings, and the hydrological effect of urbanization of the watershed.

http://www.fema.gov/plan/prevent/floodplain/nfipkeywords/freeboard.shtm

geomorphology, fluvial Geomorphology is the study of the characteristics, origins, and development of landforms. Fluvial geomorphology is the study of landforms and channel types created by flowing water and the transport of rocks and sediment by water flow.

goals In the planning process for the CVFPP, goals describe "what" the CVFPP will accomplish. Goals are the broad and enduring values, and direction or desired conditions we want to achieve, without prescribing or suggesting specific actions to achieve them.

CVFPP Interim Progress Summary No. 1 April 2010

headcut erosion A headcut is the sudden change in elevation or knickpoint at the leading edge of a gully.

U.S. Department of Agriculture, Agricultural Research Service

integrated flood management An approach to dealing with flood risk that recognizes the interconnection of flood management actions within broader water resources management and land use planning; the value of coordinating across geographic and agency boundaries; the need to evaluate opportunities and potential impacts from a system perspective; and the importance of environmental stewardship and sustainability.

DWR, Draft FloodSAFE Strategic Plan, June 2008

interest-based group A collection of individuals and/or organizations with common interests in the activities and actions anticipated by the CVFPP.

local jurisdiction Means a city, city and county, or county.

legacy community A rural community that is registered as a Historic District by either a state or federal entity.

Levee Flood Protection Zone An area that is protected, as determined by the Central Valley Flood Protection Board or the Department of Water Resources, by a levee that is part of the facilities of the State Plan of Flood Control, as defined under Section 5096.805 of the Public Resources Code.

California Government Code Section 65300.2(b)

Local Maintaining Agencies Local Maintaining Agency means any city, county, district or other political subdivision of the state which is authorized to maintain levees. The California Department of Water Resources maintains levees pursuant to California Water Code Sections 8361 and 12878, but is not considered a Local Maintaining Agency.

Moderate Flood Hazard Area Flood hazard area, as identified on the Flood Insurance Rate Map (FIRM), labeled Zone B or Zone X (shaded), are the areas between the limits of the base flood and the 0.2% annual chance or a 500-year flood.

Federal Emergency Management Agency, http://www.fema.gov/, accessed June 2009

natural floodplain processes Processes in a floodplain existing in or produced by nature (rather than by the intent of human beings) e.g. periodic flooding and accompanying deposition of sediment in a floodplain.

natural processes Processes existing in or produced by nature (rather than by the intent of human beings) e.g. dynamic hydrologic, geomorphic, and biological processes.

neotropical migratory bird Refers to migratory birds from the neotropic ecozone that includes the Mexican lowlands, Central and South America, the Caribbean islands and southern Florida.

non-project levee Any levee that is not part of the State Plan of Flood Control (WC 9602(c)) or other State-federal flood protection facilities. Non- Project levees are typically privately owned or under the authority of a local levee district.1

nonstructural improvement Are projects that are intended to reduce or eliminate susceptibility to flooding by preserving or increasing the flood-carrying capacity of floodways, and include such measures as levees, setback levees, floodproofing structures, and zoning, designating or acquiring flood prone areas.

California Water Code Section 79068(a)

non-urbanized area A developed area or an area outside a developed area in which there are fewer than 10,000 residents.

California Government Code 65007(e)

objective Collectively, objectives are intended to define the overall accomplishments of the 2012 CVFPP. The objectives are not specific actions to achieve the goals, but rather quantitative overall measures of success of the plan.

CVFPP Interim Progress Summary No. 1 April 2010

objective flow Pertains to flows in specific reaches of a river based on local conditions, and are established through coordination with local entities. An objective flow is intended to reflect non-damaging conditions. These conditions may include levee stability and seepage, riparian growth, and adjacent land uses.

Post-Flood Assessment Sacramento and San Joaquin River Basins Comprehensive Study May 2004, U.S. Army Corps of Engineers

objective release The maximum allowable, non-flood damaging outflow from a dam as specified in the facility's Water Control Plan. Operators manage releases to maintain flood management space at the same time considering downstream conditions. These considerations may include levee seepage, erosion, and/or strength, and channel capacity. Additionally, the operators consider the impact of flow fluctuations on fish spawning habitat.

Post-Flood Assessment Sacramento and San Joaquin River Basins Comprehensive Study May 2004, U.S. Army Corps of Engineers

operations and maintenance Refers to the effort that must be expended to keep project facilities in good working condition so they continue to operate as designed – wear and tear on facilities that are not adequately maintained can reduce their capacity or make them more vulnerable to failure.

project levee Any levee that is part of the facilities of the State Plan of Flood Control.

California Water Code 9602 (c)

partner Individuals, organizations and/or agencies with direct responsibilities for activities and actions anticipated by the CVFPP.

principle While goals provide direction on "what" the CVFPP will accomplish, planning principles provide guidance on "how" the CVFPP will be developed and implemented, consistent with the FloodSAFE guiding principles. Initial planning principles for the CVFPP have been grouped into three broad categories: Flood Risk Management, Environmental Stewardship, and Integration and Coordination.

CVFPP Interim Progress Summary No. 1 April 2010

public agency Any city, city and county, county, or district organized, existing, and acting pursuant to the laws of this state.

California Water Code Section 8402(d)

public safety Involves the prevention of and protection from events that could endanger the safety of the general public from significant danger, injury/harm, or damage, such as natural and man-made disasters.

public safety infrastructure Means public safety infrastructure necessary to respond to a flood emergency, including, but not limited to, street and highway evacuation routes, medical care facilities, and public utilities necessary for public health and safety, including drinking water and wastewater treatment facilities.

California Water Code Section 12646 (d)

rehabilitation To restore a facility or system (either natural or manmade) to its former condition.

repair Activities necessary to maintain the functionality of flood management systems that have deteriorated over time and/or do not meet current design standards.

residual risk Residual risk is the portion of flood risk that remains after a flood control structure or works has been built. Risk remains because the likelihood of the completed works' design could be surpassed by a intensity of a flood event, resulting in structural failure.

Adapted from: Flood Risk Management: Federal Role in Infrastructure Congressional Research Service, The Library of Congress October. 26, 2005

restrictive zone Means the portion of the natural floodway between the limits of the designated floodway and the limits of the flood plain where inundation may occur but where depths and velocities are generally low.

California Water Code Section 8402(g)

restore/restoration The implementation of an action(s) to reestablish or put back something that once existed, but is no longer there, to its original condition.

ring levees Levees that completely encircle or "ring" an area subject to inundation from all directions.

U.S. Army Corps of Engineers Design and Construction of Levees, EM 1110-2-1913

riparian area Riparian areas are transitional between terrestrial and aquatic ecosystems and are distinguished by gradients in biophysical conditions, ecological processes, and biota. They are areas through which surface and subsurface hydrology connect water bodies with their adjacent uplands. They include those portions of terrestrial ecosystems that significantly influence exchanges of energy and matter with aquatic ecosystems (i.e., a zone of influence). Riparian areas are adjacent to perennial, intermittent, and ephemeral streams, lakes, and estuarine-marine shorelines.

rural community A city, town, or settlement outside of urban and urbanizing areas with expected population less than 10,000 within the next ten years.

Sacramento-San Joaquin Drainage (SSJD) District Comprises more than 1.9 million acres in the Central Valley generally along and adjacent to the Sacramento and San Joaquin rivers. SSJD District was created in 1913 by the California Legislature to allow survey work and the collection of data of the San Joaquin and Sacramento rivers and tributaries to prepare a report to the Central Valley Flood Protection Board to further the Board's plans for controlling the floodwaters of the rivers, improve and preserve navigation, and the reclamation and protection of the lands that are susceptible to overflow from those

rivers and their tributaries. The District's management and control is vested in the Central Valley Flood Protection Board, and according to the Statute, the District can "acquire, own, hold, use, and enjoy any and all properties necessary for the purposes of the District."

Central Valley Flood Protection Board, http://www.cvfpb.ca.gov/, accessed June 2009

Sacramento-San Joaquin River Flood Management System The Sacramento-San Joaquin River Flood Management System comprises all of the following: (a) The facilities of the State Plan of Flood Control as that plan may be amended by the Central Valley Flood Protection Board; (b) Any existing dam, levee, or other flood management facility that is not part of the State Plan of Flood Control if the board determines, upon recommendation of the department, that the facility does one or more of the following: (1) Provides significant systemwide benefits for managing flood risks within the Sacramento-San Joaquin Valley. (2) Includes project levees that protect a contiguous urban area of 10,000 or more residents within the Sacramento-San Joaquin Valley.

California Water Code Sections 9602 and 9611

Sacramento-San Joaquin Valley Lands in the bed or along or near the banks of the Sacramento River or San Joaquin River, or their tributaries or connected therewith, or upon any land adjacent thereto, or within the overflow basins thereof, or upon land susceptible to overflow there from. The Sacramento-San Joaquin Valley does not include lands lying within the Tulare Lake basin, including the Kings River.

California Government Code Section 65007(g)

safe harbor agreements Safe Harbor Agreements encourage landowners to voluntarily enhance and maintain habitat for listed species on their properties by providing assurances that the regulatory agency will not impose additional restrictions because of their voluntary conservation actions. The regulatory agency authorizes incidental-take coverage for routine and ongoing activities on the property. This assures the landowner that they will be able to continue their routine and ongoing activities, despite the presence of listed species. In addition, the regulatory agency authorizes the landowner to return the property to pre-agreement conditions (baseline conditions). In other words, a landowner can create habitat for a listed species, and then remove the created habitat at the end of the Agreement if they choose to do so. Safe Harbor Agreements cannot authorize incidental take for a landowner to go below baseline conditions.

Adapted from: U.S. Fish and Wildlife Service, Sacramento Office
http://www.fws.gov/sacramento/partnerships/safe_harbor.htm

shaded riverine aquatic cover A nearshore aquatic area occurring at the interface between a river (or stream) and adjacent woody riparian habitat.

Special Flood Hazard Area Flood hazard area identified on the Flood Insurance Rate Map (FIRM) defined as the area that will be inundated by the flood event having a 1% chance of being equaled or exceeded in any given year. The 1% annual chance flood is also referred to as the base flood or 100-year flood. SFHAs are labeled as Zone A, Zone AO, Zone AH, Zones A1-A30, Zone AE, Zone A99, Zone AR, Zone AR/AE, Zone AR/AO, Zone AR/A1-A30, Zone AR/A, Zone V, Zone VE, and Zones V1-V30.

Federal Emergency Management Agency,
http://www.fema.gov/, accessed June 2009

State Plan of Flood Control Means the state and federal flood control works, lands, programs, plans, policies, conditions, and mode of maintenance and operations of the Sacramento River Flood Control Project Described in Section 8350 of the California Water Code (CWC), and of flood control projects in the Sacramento River and San Joaquin River watersheds authorized pursuant to Article 2 (commencing with Section 12648) of Chapter 2 of Part 6 of Division 6 for which the Board or the Department has provided the assurances of nonfederal cooperation to the United States, and those facilities identified in CWC Section 8361.

California Water Code Section 9110 (f)

State Plan of Flood Control Planning Area The State Plan of Flood Control (SPFC) Planning Area is the geographic area that includes the lands currently receiving flood damage reduction benefits from the SPFC. The SPFC Planning Area is completely contained within the Systemwide Planning Area.

structural improvements Are projects that are intended to modify flood patterns and rely primarily on constructed components and include such measures as levees, floodwalls, and improved channels.

California Water Code Section 79068(b)

sustainability A project is “sustainable” when it is socially, environmentally, and financially feasible for an enduring period.

system Refers to the Sacramento-San Joaquin River Flood Management System, as described in Section 9611 of the California Water Code.

systemwide Referring to the scale of an entire system, e.g. the flood management system within Sacramento-San Joaquin River Flood Management System.

Systemwide Planning Area The Systemwide Planning Area (SPA) is the geographic area that encompasses lands receiving flood damage reduction benefits from the existing facilities and operation of the Sacramento-San Joaquin River Flood Management System.

transitory storage The temporary and periodic storage of peak flood flows from adjacent rivers or waterways through the modification of certain floodplain areas acquired through easement or fee title.

Tulare Lake Basin Refers to the Tulare Lake Hydrologic Region as defined in the California Water plan Update 2009, prepared by the Department of Water Resources pursuant to Chapter 1 (commencing with Section 10004) of Part 1.5 of Division 6 of the Water Code.

California Government Code Section 65007(i)

upgrade of a project levee Installing a levee underseepage control system, increasing the height or bulk of a levee, installing a slurry wall or sheet pile into the levee, rebuilding a levee because of internal geotechnical flaws, or adding a stability berm. Notwithstanding the above definition, an upgrade of a project levee does not include any action undertaken on an emergency basis.

California Water Code Section 9651(h)

urban area A developed area in which there are 10,000 residents or more.

California Government Code Section 65007 (j)

urbanizing area A developed area or an area outside a developed area that is planned or anticipated to have 10,000 residents or more within the next 10 years.

California Government Code Section 65007 (k)

urban level of flood protection Level of protection that is necessary to withstand flooding that has a 1-in-200 chance of occurring in any given year using criteria consistent with, or developed by, the Department of Water Resources.

California Government Code Section 65007(l) and Water Code Section 9602(i)

7.0 Acknowledgements

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