

CENTRAL VALLEY FLOOD MANAGEMENT PLANNING PROGRAM



2012 Central Valley Flood Protection Plan

Operations and Maintenance Scope Definition Work Group Summary Report

DRAFT November 2009

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1.0 Introduction

Recent legislation directs the California Department of Water Resources (DWR) to prepare a Central Valley Flood Protection Plan (CVFPP) and submit it to the Central Valley Flood Protection Board (Board) by January 1, 2012. The CVFPP will document and assess current performance of the State-federal flood protection system in the Sacramento and San Joaquin valleys and make recommendations to improve integrated flood management¹ for much of the valleys (Figure 1-1). The CVFPP is subject to revisions every 5 years thereafter. The 2012 CVFPP will accomplish the following:

- Promote understanding related to integrated flood management from State, federal, local, regional, tribal and other perspectives (e.g., agriculture, urban, rural, environment, environmental justice (EJ), etc.).
- Create a broadly supported vision for improving integrated flood management in the Central Valley
- Develop new data and information that can be shared for many purposes

The Operations and Maintenance Scope Definition Work Group (OMSDWG) was formed to provide input to DWR on the scope of climate change that will be addressed in the 2012 CVFPP.

This OMSDWG Summary Report presents the outcomes of the group, including the five deliverables identified in Section 1.3, and next steps in climate change considerations for CVFPP development.

¹ Integrated flood management is 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, 2008).

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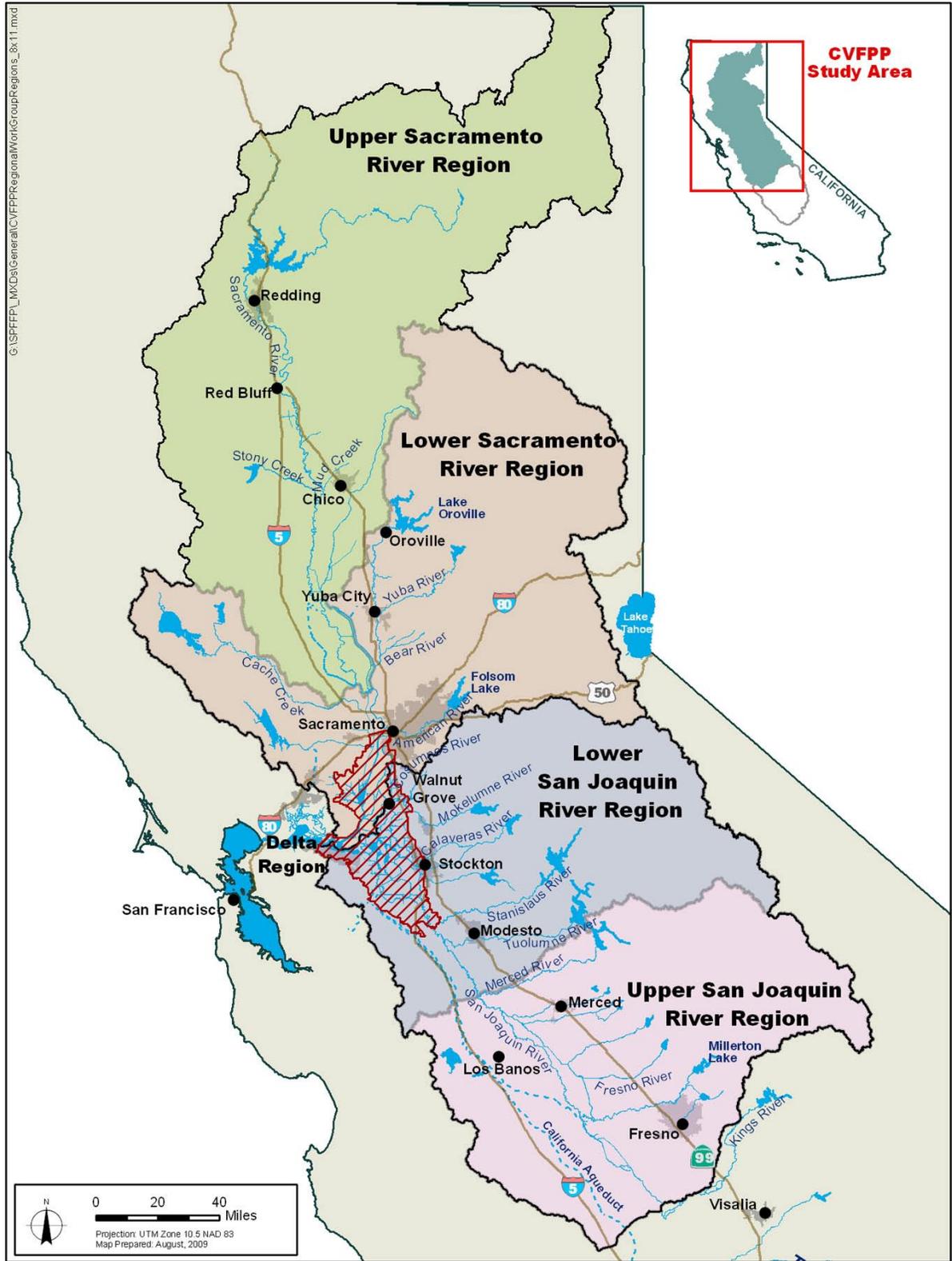


Figure 1-1. CVFPP Planning Area Regions

1.1 Work Group Roles and Responsibilities

The OMSDWG consists of DWR representatives, voluntary partners (partners), and supporting staff.

1.1.1 DWR Representatives

The following are DWR representatives serving in the OMSDWG:

- Gary Hester, Central Valley Flood Management Program Manager
- Eric McGrath, Division of Flood Management
- Michele Ng, Central Valley Flood Protection Office
- Joe Bartlett, Central Valley Flood Protection Office

1.1.2 Voluntary Partners

The work group includes the following partners from a broad range of interests and perspectives:

- Robert Acker, Merced Irrigation District
- Lewis Bair, Sacramento River West Side Levee District, Interagency Flood Management Collaborative
- John Basset, Sacramento Area Flood management Agency (SAFCA)
- Kenneth Cumming, National Oceanic and Atmospheric Administration (NOAA) Fisheries
- Paul Devereux, Reclamation District 1000 (RD1000), Interagency Flood Management Collaborative
- Russ Eckman, DWR Operations and Maintenance
- Jon Ericson, DWR Operations and Maintenance
- Diane Fales, RD1001
- Bill Hampton, Levee District 1
- Reggie Hill, Lower San Joaquin Levee District
- Tim Kerr, American River Flood Control District
- Kent Lang, RD537 and RD1600
- Kelly Moroney, U.S. Fish and Wildlife Service (USFWS)
- Dave Mraz, DWR
- Michael Rogner, River Partners
- Terry Roscoe, California Department of Fish and Game (DFG)
- Ken Ruzich, RD900
- Jim Sandner, U.S. Army Corps of Engineers (USACE)
- Susan Tatayon, The Nature Conservancy
- Ilene Wellman-Barbree, DWR Operations and Maintenance
- Steve Winkler, San Joaquin Flood Control and Water Conservation District

1.1.3 Supporting Staff

The following are supporting staff serving the OMSDWG:

- Serge Jimenez, MWH
- Craig Wallace, MWH
- Jodie Monaghan, Center for Collaborative Policy
- Heidi Hill Drum, Center for Collaborative Policy

1.2 Work Group Purpose and Scope

The purpose of the OMSDWG is to provide input on the following questions:

- Which topic areas related to operations and maintenance (O&M) could affect integrated flood management and should be addressed in the CVFPP?
- What are the existing and future problems and challenges for O&M?
- What are the measures of success for O&M practices in developing the CVFPP?

1.3 Work Group Deliverables

OMSDWG is charged with producing the deliverables listed below. The resulting written material will inform all relevant work to develop content for the CVFPP. The first direct application of the products of the OMSDWG will be in the five Regional Conditions Summary Work Groups. These deliverables are presented in Sections 2 – 6 in this Summary Report.

- **List of Key Topic Areas Related to O&M that Would Affect Flood Management** – Prepare a list with definitions of the key topic areas of O&M that would affect integrated flood management and should be covered in the 2012 CVFPP to create a successful plan. Prioritize the list into three levels of importance (critical, important, and less important).
- **List and Description of Existing Problems and Expected Future Challenges Within the CVFPP Planning Area Related to O&M** – List and describe the primary categories of existing problems and expected future challenges related to O&M within the CVFPP project area. Additional details about the identified problems and future

challenges will be developed and captured in the Regional Conditions Summary Work Groups.

- **List of Available Documents to Use as Reference Materials** – Develop a comprehensive list of available documents to use as reference material related to levee performance problems, opportunities, and standards.
- **Checklist of Operations and Maintenance Considerations** – Develop a checklist of O&M considerations that should be addressed when working on other aspects of integrated flood management within the CVFPP. This checklist may include a list of principles for considering management actions related to levee performance.
- **List of Related Operations and Maintenance Improvement Studies and Planning** – Develop a list of other O&M improvement studies and planning that the CVFPP Plan Development Team should become familiar with and coordinate with regularly.

1.4 Purpose of Summary Report

This OMSDWG Summary Report records the outcomes of the group and presents the deliverables identified above in Section 1.3. It serves as the vehicle for providing OMSDWG input to development of the Regional Conditions Summary Report (RCSR), which comprises the first four chapters of the CVFPP. This input from the OMSDWG will not become a separate section in the RCSR; rather, it will be incorporated in sections, where appropriate, similar to the input from other topic and regional work groups. The O&M information will be incorporated in all aspects of the CVFPP planning process.

OMSDWG members will be offered the opportunity to review and comment on the administrative draft RCSR to ensure the Plan Development Team incorporates their input properly.

This OMSDWG Summary Report will remain a draft document until the CVFPP is finalized, as will all interim CVFPP documents. Further development of the CVFPP may yield additional improvement to the results documented in this report.

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2.0 Key Topics Areas Related to Operations and Maintenance that Would Affect Flood Management

The OMSDWG partners were tasked with listing and defining key topic areas related to O&M that would affect the integrated flood management and should be covered in the 2012 CVFPP. The partners determined the key topic areas to be system integration, permitting, mitigation, vegetation management, communication, funding, levee inspections, levee performance, and flood emergency response plan. The partners divided topic areas into components and specific issues related to each component. Once specific issues were determined, a priority of critical, important, and less important was assigned to each. Table 2-1 details the key topics list the partners developed.

Table 2-1. Key Topics Related to O&M

Key Topic: System Integration	Specific Issue	Level of Importance (critical, important, less important)
Critical nonproject levees that protect assets critical to the State are not included in CVFPP	<ul style="list-style-type: none"> • Some nonproject levees are not only critical to system liability and operations, but they impact some project levees. The CVFPP would be shortsighted to not include them. • LMAs protect State interests but don't have adequate funding to maintain nonproject levees. Poorly maintained nonproject levees limit the effectiveness of project levees. 	<ul style="list-style-type: none"> • Critical • Critical
Levees, channels, structures, and flow are not considered part of O&M; there is no system-wide conservation/flood management planning	<ul style="list-style-type: none"> • A long-term, system-wide conservation plan would provide landscape-scale conservation of floodplain and riparian habitat and a less fragmented approach to mitigation for O&M of the flood management system. • LMAs have a poor understanding of overall requirements for O&M. 	<ul style="list-style-type: none"> • Important
Levees are evaluated individually rather than looking at the entire watershed	<ul style="list-style-type: none"> • Lack of a systemwide, watershed perspective of the Central Valley flood management system leads to piecemeal levee rehabilitation and improvements, which precludes or forecloses opportunities for integrating structural and nonstructural approaches to improving and maintaining the system. • Inspection standards require evaluation of the system; new emphasis is being placed on ensuring protected areas are notified of any levee segments not meeting inspection standards within the an overall system. • If one LMA does not maintain properly, but its neighbor does, the whole reach is compromised. 	<ul style="list-style-type: none"> • Critical
Consistent enforcement of permits required for riprap and nonproject levees	<ul style="list-style-type: none"> • Consistent enforcement is lacking for permits required for riprap and nonproject levees. 	<ul style="list-style-type: none"> • Important

Table 2-1. Key Topics Related to O&M (contd.)

Key Topic: Permitting	Specific Issue	Level of Importance (critical, important, less important)
Multiple agencies (DWR, DFG, USFWS, NMFS, county, etc.) issue individual permits, creating a costly and time-consuming process	<ul style="list-style-type: none"> • Permits cannot be obtained in a timely and affordable manner. • There is no one-stop shop for obtaining a permit. • Each levee repair requires an individual specific permit; impacts are to entire flood system. 	<ul style="list-style-type: none"> • Critical • Critical • Critical
Permit requirements are inconsistent across agencies	<ul style="list-style-type: none"> • Conflicting mandates affect cost of project. • Conflicting mandates include the following: <ul style="list-style-type: none"> • Vegetation on levees • Fish habitat requirements • Water quality • Different work windows (tied to biological terms and conditions; construction opportunities do not necessarily coincide with biological work windows requirements) • ESA requirements • Weather • Water heights • Known problems 	<ul style="list-style-type: none"> • Critical • Critical
Conflicting terms and conditions exist	<ul style="list-style-type: none"> • Terms and conditions from one agency do not necessarily match those from another agency. Sometimes there is a direct conflict. 	<ul style="list-style-type: none"> • Important
Permit requirements are not always clearly defined (e.g., mitigation)	<ul style="list-style-type: none"> • Programmatic biological opinions are needed that will quantify mitigation requirements for impacts. 	<ul style="list-style-type: none"> • Important
No State or federal programmatic permits granting blanket authority for routine maintenance (erosion repairs, sediment removal, rodent management, vegetation management)	<ul style="list-style-type: none"> • There is no general permit that over a time period of multiple years, clearly delineates what can be done and when. • There is no general permit that over a time period of multiple years, clearly delineates long-term mitigation. • Maintenance was formerly exempt. Now, each agency must be consulted and projects adjusted to satisfy individual needs for each agency. Clear guidelines are needed on what can and cannot be done. 	<ul style="list-style-type: none"> • Critical • Critical • Critical
No State or federal programmatic permit for essential or critical repairs	<ul style="list-style-type: none"> • Nationwide regulatory permits need review and revision to more closely represent the needs of O&M, as required in the O&M manuals. 	<ul style="list-style-type: none"> • Critical
Current USACE nationwide 404 permit for levee stability is too restrictive	<ul style="list-style-type: none"> • The criterion that “The activity will not exceed an average of 1 cubic yard per running foot placed along the bank below the plane of the ordinary high water mark or the high tide line” restricts RDs from being able to make larger repairs. 	<ul style="list-style-type: none"> • Important

Table 2-1. Key Topics Related to O&M (contd.)

Key Topic: Mitigation	Specific Issue	Level of Importance (critical, important, less important)
Mitigation is required for specific levee actions; habitat restoration across the entire system is not considered	<ul style="list-style-type: none"> • Mitigation becomes piecemeal approach vs. system-wide vision of land use. • Habitat restoration is not included proactively – but as individual project-by-project mitigation. • There is no set of criteria that allows consistent inclusion and valuation of habitat. 	<ul style="list-style-type: none"> • Important • Important • Important
Current system penalizes those with habitat by requiring greater mitigation to do a project	<ul style="list-style-type: none"> • Districts and LMAs have allowed vegetation to encroach beyond the requirements and, when vegetation is removed, mitigation is required, which creates even greater expense to the maintaining agency. • Some LMAs feel that they are required to mitigate for mitigation. • If maintenance is neglected, or not needed on a site for several years, vegetation such as trees and shrubs will grow. Once maintenance is performed, the vegetation is considered habitat and very costly to remove and replace. 	<ul style="list-style-type: none"> • Critical
Current system requires LMAs to mitigate for mitigation over time	<ul style="list-style-type: none"> • Not all agencies recognize that the NEPA review, consultations, and mitigations should be for life of the project. • Perceived disconnect with implementation (USFWS, NMFS, etc.) • Same issue with State agencies not recognizing CEQA mitigations over time. 	<ul style="list-style-type: none"> • Important
ESA consultations are not clearly understood	<ul style="list-style-type: none"> • Section 7 consultations (federal) • Section 10 (State and local) 	<ul style="list-style-type: none"> • Important
Types of mitigation need to be reviewed (native grass plantings have not done well on repair sites)	<ul style="list-style-type: none"> • Regulatory agencies want 3 – 5 year maintenance plan to guarantee success; costs will be high for mitigation that has little chance for success. • Mitigation design needs to be reviewed. 	<ul style="list-style-type: none"> • Important
On-site mitigation	<ul style="list-style-type: none"> • Mitigation should only be done on site if the site is suitable. • Off-site work does not enhance the repair site. 	<ul style="list-style-type: none"> • Important

Table 2-1. Key Topics Related to O&M (contd.)

Key Topic: Vegetation Management	Specific Issue	Level of Importance (critical, important, less important)
Policy is inconsistent among regulatory agencies, including reduction of conflicting requirements regarding construction materials, etc.	<ul style="list-style-type: none"> • Conflicting mandates directly affect funding. • If USACE does not allow regional vegetation variances, maintaining agencies may not qualify for Public Law 84-99 and other funding. • USACE regulatory and USACE engineering need to coordinate their requirements. USACE regulatory works with USFWS, which wants vegetation, while USACE engineering does not. 	<ul style="list-style-type: none"> • Critical
Habitat benefits are determined based on isolated detrimental vegetation, not system-wide habitat resources	<ul style="list-style-type: none"> • Who decides how much snake habitat is worth? Who decides mitigation replacement ratios? Seems arbitrary. 	<ul style="list-style-type: none"> • Important
Maintenance requirements are inconsistent with habitat needs	<ul style="list-style-type: none"> • National policy is inconsistent with local needs. Maintenance needs to be more adaptable and ecologically sound. 	<ul style="list-style-type: none"> • Important
Workable management plan is lacking	<ul style="list-style-type: none"> • Forces no new habitat to be allowed to get established. 	<ul style="list-style-type: none"> • Important
Key Topic: Communication	Specific Issue	Level of Importance (critical, important, less important)
USACE, DWR, and DFG have conflicting requirements	<ul style="list-style-type: none"> • Comprehensive set of guidelines conflict, causing LMA costs to rise. • It is difficult to comply with all agencies' requirements, especially when they conflict. 	<ul style="list-style-type: none"> • Critical
Board framework to deal with vegetation on levees is uncertain	<ul style="list-style-type: none"> • LMAs, LMDs, and DWR have a responsibility to maintain levees to certain standards to maintain eligibility for Public Law 84-99. 	<ul style="list-style-type: none"> • Critical
DWR's small erosion repair program	<ul style="list-style-type: none"> • Local RDs are not included in DWR's small erosion repair program. 	<ul style="list-style-type: none"> • Less Important
Key Topic: Funding	Specific Issue	Level of Importance (critical, important, less important)
Funding is inadequate, particularly for rural RDs; benefitting users are not necessarily paying for levee maintenance	<ul style="list-style-type: none"> • Results in deferred maintenance. • Levee districts operate in the State's interests – but the State views funding as a benevolent act. • Beneficiaries of the levee system extend far beyond local districts, but the costs of maintenance are born primarily within the districts. 	<ul style="list-style-type: none"> • Critical
Mandates are unfunded; regulatory agencies do not accept fiscal responsibility for the impacts of their decisions	<ul style="list-style-type: none"> • Not enough money to do basic O&M. • If an agency changes policies or requirements, funding needs to be provided to implement the changes. 	<ul style="list-style-type: none"> • Critical

Table 2-1. Key Topics Related to O&M (contd.)

There is no comprehensive, adequately funded bank erosion/bank protection program	<ul style="list-style-type: none"> • There is disagreement about who is responsible for bank protection (shared responsibility). • No support exists for active erosion that is ongoing. A mechanism is needed to fund, design, and permit bank protection and erosion repair. 	• Critical
There is disconnect between State budget cycle and work windows	<ul style="list-style-type: none"> • Once State authorizes money, construction work window is often gone 	• Critical
Furloughs and budget cuts have occurred	<ul style="list-style-type: none"> • Results in deferred maintenance • Reduces ability to keep up with O&M 	• Important
There is no sustainable funding source that is readily available to fund O&M on an ongoing basis.	<ul style="list-style-type: none"> • Amount of funding to be set aside for O&M each fiscal year, which makes planning difficult. • Funding is unavailable at State or local level. 	• Critical
LMAs front repair costs hoping for reimbursement from Subventions Fund	<ul style="list-style-type: none"> • RDs are often required to borrow money to pay for repairs. Reimbursement does not include interest costs on borrowed funds. • There is no reliable funding stream for reimbursement. 	• Important
Ability of LMAs to generate funds is limited	<ul style="list-style-type: none"> • Proposition 218 needs voter approval of assessments. • Smaller RDs do not have money, staff, or expertise to mount an assessment campaign and election. 	• Critical
There is lack of adherence to regulatory timelines by State and federal agencies	<ul style="list-style-type: none"> • Resource agencies have backlogs that keep them from processing permits in a timely manner, which keeps LMAs from conducting needed O&M or repairs before flood season. 	• Important
Key Topic: Levee Inspections	Specific Issue	Level of Importance (critical, important, less important)
Conflicting inspection results exist between State and federal inspectors	<ul style="list-style-type: none"> • State has adopted different standards for O&M requirements when it has provided assurances to the federal government to comply with federal requirements. This creates confusion for local districts and regulating agencies. 	• Important
Results differ between State inspectors	<ul style="list-style-type: none"> • Criteria seem arbitrary. • There is no general understanding of criteria. • State “weighs” deficiencies on both the water side and the land side. The result can be greater than 100% deficiencies. 	• Important
No local involvement exists with effort underway to coordinate State and federal inspection criteria	<ul style="list-style-type: none"> • State needs to ensure locals have input if completed project is transferred to local district for O&M. 	• Important
New inspection standards are not clearly communicated	<ul style="list-style-type: none"> • There is lack of knowledge by local districts of the historical requirements for O&M. Standards have remained virtually the same for 75+ years. 	• Critical
No clear agreement exists on differences between maintenance deficiencies and levee integrity	<ul style="list-style-type: none"> • Maintenance activities vs. integrity issues • USACE holds maintaining agencies to a standard that it could not meet itself because of latent systems deficiencies. 	• Critical

Table 2-1. Key Topics Related to O&M (contd.)

Design deficiencies are sometimes treated as a maintenance deficiency	<ul style="list-style-type: none"> Education is needed on legal definition of design deficiencies so that everyone understands what can be classified as a design deficiency according to federal requirements. 	<ul style="list-style-type: none"> Important
Key Topic: Levee Performance	Specific Issue	Level of Importance (critical, important, less important)
Channel maintenance impacts levee performance (e.g., lack of dredging, sediment build-up, debris build-up, etc.)	<ul style="list-style-type: none"> Channels are not being maintained consistently by DWR and others (sometimes no designated responsible party). Responsible agencies not understood for channel maintenance. Channel impacts may cause levees to fail inspections. LMAs at mercy of channel maintainers. 	<ul style="list-style-type: none"> Critical
Conflict exists between channel maintenance and habitat	<ul style="list-style-type: none"> Debris to an LMA can be habitat to a fish. Large woody debris is considered prime habitat, but depending on the location, may cause a reduction in capacity and create eddies that cause erosion. Original design does not always match current wildlife and habitat values. 	<ul style="list-style-type: none"> Important
Hydraulic data are insufficient to adequately support channel maintenance	<ul style="list-style-type: none"> Project baseline needs to be defined. Data are required to obtain permits for clearing. The 1957 design profile that USACE requires LMA maintain needs to be refined. 	<ul style="list-style-type: none"> Critical
Uncertainty exists on bank protection	<ul style="list-style-type: none"> Responsibility for bank protection has not been clearly agreed to 	<ul style="list-style-type: none"> Important
No agreement exists on how (or who will) to deal with beavers	<ul style="list-style-type: none"> No agreement as to whether it is an issue for DFG, DWR, channel maintainers, or local RD. 	<ul style="list-style-type: none"> Important
Key Topic: Flood Emergency Response	Specific Issue	Level of Importance (critical, important, less important)
Flood Emergency Response Plan	<ul style="list-style-type: none"> Clear plan is needed outlining roles and responsibilities for LMAs, State, and USACE. Clear set of operating procedures and handoff mechanisms are needed during a flood event. 	<ul style="list-style-type: none"> Critical

Key:

CEQA = California Environmental Quality Act
 CVFPP = Central Valley Flood Protection Plan
 DFG = California Department of Fish and Game
 DWR = California Department of Water Resources
 ESA = Endangered Species Act
 LMA = Levee Maintaining Agency

LMD = Levee Maintenance District
 NEPA = National Environmental Policy Act
 NMFS = National Marine Fisheries Service
 O&M = operations and maintenance
 RD = Reclamation District
 USACE = U.S. Army Corps of Engineers
 USFWS = U.S. Fish and Wildlife Service

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3.0 List and Description of Existing Problems and Expected Future Challenges Within CVFPP Planning Area Related to O&M

The CVFPP study area is the Sacramento and San Joaquin valleys. One of the major steps in planning is to identify the existing problems, and future challenges that planning efforts would focus on. Regional Conditions Work Groups are currently engaging in this planning step, while relying on the OMSDWG to identify problems and future challenges related to O&M.

In the current context, this section identifies the following:

- Problems that have already resulted in adverse effects
- Future challenges that are expected to result in adverse effects in the future

3.1 Existing Problems

The following categories were used to organize the existing problem statements developed in OMSDWG.

- Permitting
- Funding
- Lack of clear and consistent requirements
- Lack of a system-wide approach
- Confined work windows
- Lack of agency adherence to schedule requirements
- Encroachments

3.1.1 Permitting

- The process is time consuming.

- The process is too costly.
- There are conflicting terms and conditions.
- There is no Federal or State programmatic permit for essential or critical repairs.
- There is no existing mechanism or forum for resolving the above issues.

3.1.2 Funding

- There is inadequate funding for a bank erosion/bank protection program.
- There are unfunded mandates.
- A disconnect exists between the State budget cycle and work windows.
- Furloughs and budget cuts create additional O&M problems.
- There is no sustainable funding source for O&M on an ongoing basis.
- Reimbursement does not include interest costs on borrowed funds.
- Propositions 218 and 13 require voter approval of assessments.
- Local agency funding is inadequate to protect public interests.

3.1.3 Lack of Clear and Consistent Requirements

- There are conflicting inspection results among State and federal inspectors; the application of rules and regulations varies depending on the inspector.
- Requirements are inconsistent across agencies.
- No clear agreement exists on the differences between maintenance deficiencies and levee integrity.
- There is a failure to comply with O&M requirements when standards are known.
- Evolving standards and interpretations lead to a lack of agreement on who is responsible for erosion within the floodway.

3.0 List and Description of Existing Problems and Expected Future Challenges within the CVFPP Project Area Related to O&M

3.1.4 Lack of System-Wide Approach

- No system-wide conservation/flood management planning is occurring.
- Levees are evaluated individually rather than looking at the entire flood protection system.
- Critical nonproject levees that protect assets critical to the State are not included in the CVFPP.
- Mitigation is currently required for specific levee actions on a piecemeal basis; this approach lacks a system-wide strategy for habitat restoration.

3.1.5 Confined Work Windows

- There is a conflict between levee maintenance and various work windows, including environmental constraints and agricultural operations.
 - ESA/species
 - Flow/reservoir operations
 - Water quality
 - Temperature
 - Precipitation
 - Farming operations
 - Funding
 - Equipment available
 - Acquisition of permits

3.1.6 Lack of Agency Adherence to Schedule Requirements

- Regulatory agencies are understaffed.
- Regulatory agencies don't always meet deadlines that the laws specify.
- Agencies are reluctant to use provisions under the Endangered Species Act (ESA) to establish Habitat Conservation Plans (HCP) for long-term maintenance.

3.1.7 Vegetation Impacts and Requirements

- Some types of vegetation can obscure visibility for inspection, or can prevent access for flood fighting.
- Vegetation can hide potential issues until they become major concerns.
- Inconsistent policies among regulatory agencies prevent effective vegetation management and cause expenditures of funds that could be used for more pressing issues.

3.1.8 Encroachments

- Existing encroachments should be reviewed in light of current standards.
 - Encroachments limit the ability to inspect, flood fight, maintain and restore levees

3.2 Future Challenges

The following categories were used to organize the future challenge statements developed in the OMSDWG.

- Confined work windows
- Improving coordination
- Ownership
- Communication
- Funding
- Vegetation management
- Climate change
- Permitting
- Encroachments
- Other future challenges

3.0 List and Description of Existing Problems and Expected Future Challenges within the CVFPP Project Area Related to O&M

3.2.1 Confined Work Windows

- Various work windows need to be understood and coordinated to avoid the following:
 - ESA/species
 - Flow/reservoir operations
 - Water quality
 - Temperature
 - Precipitation
 - Farming operations
 - Funding
 - Equipment available
 - Acquisition of permits
- More work exists than time to do within work windows.
- Flexibility is lacking.
- Societal goals should be accommodated:
 - Public safety
 - Habitat goals and values
 - Water quality objectives
- A proactive approach to O&M vs. reaction to emergencies should be developed.
- Windows should be added for new listed species.

3.2.2 Improving Coordination

- Coordination should be improved through various methods:
 - Personnel exchange (interagency personnel agreements)
 - Written agreements

- Standing forums for addressing changing standards and conditions
- Conflicting goals exists between State and federal regarding levels of flood protection (e.g., 200-year vs. 100-year)

3.2.3 Ownership

- Lack of clear ownership/rights of levee (easements) and adjacent land make maintenance complex due to:
 - Access
 - Funding
 - Liability
 - Coordination of permits
- Superior rights for access/easements for flood control system (e.g., Pacific Gas and Electric Company (PG&E), railroads).
- Counties must include RDs, DWR, and USACE in land use permitting process.

3.2.4 Communication

- Public should be educated regarding challenges of balancing the environment, flood control system, and associated costs.
- Development community is not sharing long-term commitment for O&M (including funding).
- Levee maintenance and repair needs to be defined as public safety matter (i.e., consequences of safety if budgets are cut).
- Responsible agency is needed to execute communication plan.

3.2.5 Funding

- Public needs to be made aware of monetary needs and need for assessment and the consequences of not doing maintenance.
- Funding should be obtained for nonproject levees (outside the Sacramento-San Joaquin Delta (Delta))
- Keeping up with O&M in light of budget cuts and furloughs.

3.0 List and Description of Existing Problems and Expected Future Challenges within the CVFPP Project Area Related to O&M

- Funding should be dependable, and sustainable. The beneficiary should pay (direct and indirect).
- Funding mechanisms need to be developed that don't require two-thirds voter approval (being added to Proposition 218 exceptions list).

3.2.6 Vegetation Management

- Results of local, State, and USACE research on vegetation management should be implemented.
 - If an inspection finds vegetation to be beneficial then the inspection policy should be modified.
- The status of elderberries and oak trees should be defined.

3.2.7 Climate Change

- Freeboard in tidal zones should be maintained.
- There is a need for more maintenance and repairs because of more frequent and extreme events.
- Compromise between reservoir reoperation, hydropower, habitat, and water supply and flood control interests should be reached to minimize impacts on the levee system.

3.2.8 Permitting

- A streamlined permitting process should be created.
- A consistent and apolitical process to issue permits should be established.
- A statewide/nationwide general permit for O&M needs to be designed.
- Cumulative impacts of permits system-wide should be evaluated.

3.2.9 Encroachments

- What is enforceable needs to be determined.
 - Who enforces and who is ultimate decision-maker.
- Encroachment permits need to be viewed as temporary allowances and not property rights.

- Clear enforcement authority should be established to remove encroachments.
- Legislative mandate is lacking for buffer zones for flood control structures (e.g., setback structures from toe of levee).
 - Buffer zones should be created in which no building is allowed.
- Cumulative impacts of encroachment should be determined.
- Local, State, and federal level interests need to commit to resolve legal and illegal encroachments that compromise public safety in the levee system and channels.

3.2.10 Other Future Challenges

- Consistent and sustainable plan
- No system-wide approach to mitigation that would allow more flexibility for work windows
- Impact of future ESA listings
- Creation of a system-wide conservation strategy for the entire flood protection system (with funding)
- Maintaining Public Law 84-99 eligibility (erosion, vegetation, maintenance will exclude Levee Maintaining Agencies (LMA) from eligibility)
- Reevaluation of current flood control system with current knowledge
- Risk sharing
 - Those living behind a levee pay for individual flood insurance to cover residual flood risk
- Incorporation of critical nonproject levees into flood control system
- Evaluation of pumps and pipes that penetrate levees
- Removal of O&M responsibility from nonfunctional project levee (i.e., deauthorize levee) bank protection

4.0 List of Available Documents to Use as Reference Materials

4.1 Purpose of the Reference List

In this section, OMSDWG partners reviewed and updated a list of previously provided material to create a comprehensive list of available documents to use as reference material related to O&M problems, opportunities, and standards. The original list was compiled by the Central Valley Flood Management Planning Program (CVFMP) technical team for the RCSR. The OMSDWG partners shortened the list and suggested how each reference should be used based on criteria similar to those of the regional groups. A reference was categorized as a “Must” if it was determined to be extremely important and essential to the process. A reference was categorized as “Good” if it was determined to have particularly useful information. Last, the reference was included as “Use” if parts were considered useful, but some information may not have been applicable. Documents that did not meet at least these criteria were removed from the list.

Once the references were categorized by importance level, the documents were then sorted by reference type; authorization, policy, manual, research, historical, or environmental, to make navigating the large list more manageable.

4.2 List of Available Documents

Table 4-1. List of Available References

Reference	Category	Responsible Entity
Authorization		
1. U.S. Congress. 1955. Public Law 327. House Report 6066. August 9.	GOOD	U.S. Congress
2. U.S. Congress. 1962. River and Harbor Act of 1962. Public Law 87-874. House Report 13273. October 23.	GOOD	U.S. Congress
Policy		
1. ASFPM and NAFSMA. 2006. Joint Recommendations on Levee Policy Developed by the ASFPM and NAFSMA. Flood Risk Policy Summit of December 2006.	GOOD	ASFPM and NAFSMA
2. Reclamation Board. 1981. Resolution No. 81-33 Resolution of the Reclamation Board Adopted Oct 16, 1981, Delegating Encroachment Control on the Stanislaus River to USACE of Engineers and Authorizing the General Manager to Give Final Assurances to USACE of Engineers Regarding the Stanislaus River.	GOOD	Reclamation Board
3. City of Sacramento General Plan to 2030. 2009. March.	USE	City of Sacramento
4. Solano County General Plan. 2008. Planning for a Sustainable Solano County. December.	GOOD	Solano County
5. USACE and Reclamation Board. 1953. Memorandum of Understanding Respecting the Sacramento River Flood Control Project. November 30.	GOOD	USACE and Reclamation Board
6. U.S. Congress. 1944. Flood Control Act of 1944. Public Law 534.	GOOD	U.S. Congress
7. U.S. Congress. 1986. Water Resources Development Act of 1986. Public Law 99-662.	GOOD	U.S. Congress
8. U.S. Congress. 1990. Water Resources Development Act of 1990. Public Law 101-640.	GOOD	U.S. Congress
9. U.S. Congress. 1996. Water Resources Development Act of 1996. Public Law 104-303.	GOOD	U.S. Congress
10. U.S. Congress. 1999. Water Resources Development Act of 1999. Public Law 106-53.	GOOD	U.S. Congress
11. U.S. Congress. 2000. Water Resources Development Act of 2000. Public Law 106-541.	GOOD	U.S. Congress
12. U.S. Congress. 2007. Water Resources Development Act of 2007. Public Law 110-114.	GOOD	U.S. Congress

Table 4-1. List of Available References (contd.)

Reference	Category	Responsible Entity
13. USACE. 1957. Supplement to the Memorandum of Understanding Respecting the Sacramento River Flood Control Project. November 30.	MUST	USACE and Reclamation Board
14. USACE. 1958. Supplement to the Memorandum of Understanding Respecting the Sacramento River Flood Control Project. June 9.	MUST	USACE and Reclamation Board
15. Yolo County. 2009. 2030 Countywide General Plan. June 10.	GOOD	Yolo County
16. California's Central Valley Flood System Improvement Framework.	MUST	CVFPB
17. ER 500-1-1 Emergency Management of Army and other resources.	MUST	USACE
18. EP 500-1-1 Emergency Management of Army and other Resources, Civil Emergency Management Program.	MUST	USACE
19. U.S. Army Corps of Engineers Institute for Water Resources. 2008. Revised Final Independent Peer Review Report for U.S. Army Corps of Engineers Vegetation Policy for Local Flood Damage Reduction Systems. December 9.	MUST	USACE
Manual		
1. USACE. 1955. Sacramento District. Standard Operation and Maintenance Manual for the Sacramento River Flood Control Project. Revised May.	MUST	USACE and Reclamation Board
2. USACE. 1959. Sacramento District. Standard Operation and Maintenance Manual for the Lower San Joaquin River and Tributaries Project, California. April.	MUST	USACE and Reclamation Board
3. USACE. 1970. Los Banos Detention Dam Water Control Manual.	GOOD	USACE
4. USACE. 1970. Oroville Dam Water Control Manual.	GOOD	USACE
5. USACE. 1972. Don Pedro Dam Water Control Manual.	GOOD	USACE
6. USACE. 1972. New Bullards Bar Dam Water Control Manual.	GOOD	USACE
7. USACE. 1977. Indian Valley Dam Water Control Manual.	GOOD	USACE
8. USACE. 1977. Shasta Dam Water Control Manual.	GOOD	USACE
9. USACE. 1978. Folsom Dam Water Control Manual.	GOOD	USACE
10. USACE. 1980. Friant Dam Water Control Manual.	GOOD	USACE
11. USACE. 1980. New Melones Dam Water Control Manual.	GOOD	USACE
12. USACE. 1981. Camanche Dam Water Control Manual.	GOOD	USACE
13. USACE. 1981. New Exchequer Dam Water Control Manual.	GOOD	USACE
14. USACE. 1983. New Hogan Bar Dam Water Control Manual.	GOOD	USACE
15. USACE. 1994. Redbank/Fancher Dam Water Control Manual.	GOOD	USACE

Table 4-1. List of Available References (contd.)

Reference	Category	Responsible Entity
16. USACE. 2004. Farmington Dam Water Control Manual.	GOOD	USACE
17. USACE. 2004. Hidden Dam Water Control Manual.	GOOD	USACE
18. USACE. 2006. Buchanan Dam Water Control Manual.	GOOD	USACE
19. USACE. 1987. Black Butte Dam Water Control Manual.	GOOD	USACE
20. USACE. Miscellaneous Operation and Maintenance Manuals.	MUST	USACE
21. Levee Owner's Manual for Non-Federal Flood Control Works.	MUST	USACE
22. SAC000 – Standard Operation and Maintenance Manual for Sacramento River Flood Control Project.	MUST	DWR
23. SAC000A – Sacramento Urban Mitigation Area, Addendum to the Standard Manual for the Sacramento Flood Control Project.	MUST	DWR
24. SAC001 – East Levee of the Sacramento River, at Missouri Bend, from Mile 96.4 to Mile 97.5, Approximately 37 Miles Upstream from Sacramento, California.	MUST	DWR
25. SAC002 – Unit No. 2 East Levee of Sacramento River Moulton Weir to Princeton-Butte City Road. Approximately 100 Miles Upstream from Sacramento, California.	MUST	DWR
26. SAC003 – West Levee of Yolo Bypass Between Sacramento Northern RR and a Point 3.9 Miles Southerly from Willow Slough, Approximately 10 Miles Northwesterly from Sacramento, California.	MUST	DWR
27. SAC005 – Bear River Levee System Constructed in Vicinity of Rio Oso, Sutter County, California, Approximately 28 Miles Northerly of Sacramento, California.	MUST	DWR
28. SAC006 – West Levee, Sacramento River, Colusa to Packers.	MUST	DWR
29. SAC007 – West Levee Sacramento River and South Levee Sycamore Slough at Knights Landing, California.	MUST	DWR
30. SAC009 – West Levee of the Sacramento River, at Brytes Bend, California.	MUST	DWR
31. SAC010 – East Levee of the Sacramento River Between Meridian Bridge and Tisdale Weir, California.	MUST	DWR
32. SAC011 – East Levee of the Sacramento River, Isleton Bridge to Walnut Grove, California.	MUST	DWR
33. SAC012 – East Levee Sacramento River Part "A" – Mile 92.6 to Mile 94.5, Part "B" – Mile 99.3 to Mile 101.2 and Part "C" – Mile 110.8 to Mile 111.5 Between Tisdale Weir and Knights Landing, California.	MUST	DWR

Table 4-1. List of Available References (Contd.)

Reference	Category	Responsible Entity
34. SAC013 – West Levee of the Feather River, Opposite Rio Bonito Station, Upstream 3.5 miles.	MUST	DWR
35. SAC014 – East Levee of Miner and Cache Sloughs on Ryer Island near Rio Vista, California.	MUST	DWR
36. SAC017 – North Levee of the Yuba River, Upstream 1.8 Miles from Marysville, California.	MUST	DWR
37. SAC101 – RD No. 341.	MUST	DWR
38. SAC102 – East Levee of Sacramento River from Isleton to Three Mile Slough and Northerly Levee of Three Mile Slough from Sacramento River to San Joaquin River.	MUST	DWR
39. SAC103 – Both Levees of Georgiana Slough and East Levee of Sacramento River from Walnut Grove to Isleton.	MUST	DWR
40. SAC104 – Levees Around Grand Island RD No. 3.	MUST	DWR
41. SAC105 – Levees Around Ryer Island RD No. 501.	MUST	DWR
42. SAC106 – South Levee of Lindsey Slough and West Levee of Yolo Bypass from Lindsay Slough to Watson Hollow and North Levee of Watson Hollow Drain.	MUST	DWR
43. SAC107 – Levees Around Hastings Tract RD No. 2060.	MUST	DWR
44. SAC108 – Levees Around Peters Tract.	MUST	DWR
45. SAC109 – West Levee of Yolo Bypass and East Levee of Cache Slough.	MUST	DWR
46. SAC110 – Levees Around Sutter Island RD No. 349.	MUST	DWR
47. SAC111 – East Levee of Sacramento River from Freeport to Walnut Grove.	MUST	DWR
48. SAC112 – Levee Around Merritt Island.	MUST	DWR
49. SAC113 – East Levee of Yolo Bypass, North Levee of Miner Slough, West Levees of Sutter Slough, Elkhorn Slough, and Sacramento River, All Bordering RD No. 999.	MUST	DWR
50. SAC114 – West Levee of Sacramento River from North Boundary of RD No. 0765 to South Boundary of RD No. 0307.	MUST	DWR
51. SAC115 – East Levee of Sacramento River from Sutterville Road to North Boundary of RD No. 744.	MUST	DWR
52. SAC116 – West Levee of Sacramento River from Sacramento Weir to Mile 51.2 and South Levee of Sacramento Bypass and East Levee of Yolo Bypass from Sacramento Bypass to South Boundary of RD 900.	MUST	DWR

Table 4-1. List of Available References (contd.)

Reference	Category	Responsible Entity
53. SAC117 – East Levee Sacramento River Through the City of Sacramento from Tower Bridge to Sutterville Road.	MUST	DWR
54. SAC118.1 – East Levee of Sacramento River from American River to Tower Bridge and South Levee of American River from Mayhews Downstream to Sacramento River.	MUST	DWR
55. SAC118.1A – Sacramento River Flood Control Project Unit 118 Part No. 2, Vegetation on Mitigation Sites. East Levee of Sacramento River from American River to Tower Bridge and South Levee of American River from Mayhews Downstream to Sacramento River.	MUST	DWR
56. SAC118.2 – North Levee of American River, East Levee of Natomas Canal, Both Levees of Arcade Creek and Magpie Creek Diversion Channel.	MUST	DWR
57. SAC119 – Putah Creek Channel and Levees, and West Levee of Yolo Bypass from Yolo Causeway, Downstream 3 Miles.	MUST	DWR
58. SAC120 – Relocated Willow Slough Channel and Levees, and West Levee Yolo Bypass from Mouth of Relocated Willow Slough to Yolo Causeway.	MUST	DWR
59. SAC121 – Right Levee of Yolo Bypass from Willow Slough Bypass to Woodland Road RD No. 2035.	MUST	DWR
60. SAC122.1 – West Levee of Sacramento River from Mile 70.8 to Sacramento Weir, North Levee of Sacramento Bypass and East Levee of Yolo Bypass from Woodland Highway to Sacramento Bypass.	MUST	DWR
61. SAC123 – West Levee Sacramento River from East End Fremont Weir to Mile 70.8, and East Levee Yolo Bypass from East End Fremont Weir to Woodland Highway (levees of RD No. 1600).	MUST	DWR
62. SAC124 – North Levee of the American River from Natomas East Canal to the Sacramento River, and East Levee of the Sacramento River from Natomas Cross Canal to American River.	MUST	DWR
63. SAC124.2 – Unit No. 124 North Levee of American River from Natomas East Canal to the Sacramento River, and East Levee of the Sacramento River from Natomas Cross Canal to American River, Part No. 2 for Vegetation on Mitigation Sites.	MUST	DWR
64. SAC125 – Back Levee of RD No. 1000.	MUST	DWR
65. SAC126 – Cache Creek Levees and Settling Basin, Yolo Bypass to High Ground.	MUST	DWR
66. SAC127 – Levees of Knights Landing Ridge Cut and Sacramento River and Yolo Bypass Levees of RDs No. 730 and 819 and South Levee of Sycamore Slough.	MUST	DWR

Table 4-1. List of Available References (contd.)

Reference	Category	Responsible Entity
67. SAC128 – East Levee of Sacramento River from Sutter Bypass to Tisdale Weir, All Within RD No. 1500 (Mile 84.5 to 118.5).	MUST	DWR
68. SAC129 – South Levee of Tisdale Bypass from the East Levee Sacramento River to the West Levee of Sutter Bypass, and West Levee Sutter Bypass Downstream to East Levee of Sacramento River.	MUST	DWR
69. SAC130 – West Levee of Sacramento River from Sycamore Slough to Wilkins Slough (Mile 89.9 to Mile 117.8).	MUST	DWR
70. SAC131 – West Levee of Sacramento River from Wilkins Slough to Colusa (Mile 117.8 to Mile 143.5).	MUST	DWR
71. SAC132 – Back Levees of RD No. 108.	MUST	DWR
72. SAC132.1 – Unit No. 132 Part 1 for Native Grass and Stone Biotechnical Levee Protection, Back Levees of RD No. 108.	MUST	DWR
73. SAC133 – East Levee of Sacramento River from Winship School to Tisdale Bypass, North Levee of Tisdale Bypass, and West Levee of Sutter Bypass from Long Bridge to Tisdale Bypass.	MUST	DWR
74. SAC134 – Levees of RD No. 70, East Levee of Sacramento River from Butte Slough Outfall Gates to Winship School, and West Levee of Sutter Bypass from Butte Slough Outfall Gates to Long Bridge.	MUST	DWR
75. SAC135 – East Levee of Sutter Bypass from the Sutter Buttes Southerly to its Junction with the Feather River, and the East and West Levees of Wadsworth Canal and Levees of Intercepting Canals.	MUST	DWR
76. SAC136 – East Levee of Sacramento River from Butte Slough Outfall Gates to the Princeton-Afton Road (Mile 138.3 to Mile 164.4).	MUST	DWR
77. SAC137 – West Levee of Sacramento River from North End of Princeton Warehouse to Colusa Bridge.	MUST	DWR
78. SAC138 – East Levee of Sacramento River from Parrott Grant Line to Princeton-Afton Road.	MUST	DWR
79. SAC139 – West Levee of Sacramento River from North Boundary of Levee District No. 2 to North End of Princeton Warehouse.	MUST	DWR
80. SAC140 – West Levee of Sacramento River in Levee District No. 1 (Mile 170.5 to Mile 184.7).	MUST	DWR
81. SAC141.1 – Sacramento River Flood Control Project Unit No. 141 – Part No. 1 East Levee of Feather River from Bear River to Natomas Cross Canal, South Levee of Bear River, and Both Levees of Yankee Slough.	MUST	DWR

Table 4-1. List of Available References (contd.)

Reference	Category	Responsible Entity
82. SAC141.2 – Sacramento River Flood Control Project Unit No. 141 – Part No. 2, East Levee of Feather River and South Levee of Bear River.	MUST	DWR
83. SAC142 – Sacramento River Flood Control Project Unit No. 142, Back Levee of RD No. 1001.	MUST	DWR
84. SAC143 – Supplement to Standard Operation and Maintenance Manual, Sacramento River Flood Control Project No. 143, West Levee of Feather River from North Boundary of RD No. 823 to East Levee of Sutter Bypass.	MUST	DWR
85. SAC144 – Sacramento River Flood Control Project Unit No. 144, West Levee of Feather River from North Boundary of Levee District No. 1 to North Boundary of RD No. 823.	MUST	DWR
86. SAC145 – Sacramento River Flood Control Project Unit No. 145 – Part No. 1, East Levee of Feather River, South Levee of Yuba River, Both Levees of WPRR Intercepting Channel, West Levee of South Dry Creek, and North Levee of Bear River.	MUST	DWR
87. SAC146 – Supplement to Standard Operation and Maintenance Manual, Sacramento River Flood Control Project No. 146, North Levee of Bear River and South Levee of South Dry Creek RD No. 817, and Vicinity of Wheatland.	MUST	DWR
88. SAC147 – Supplement to Standard Operation and Maintenance Manual, Sacramento River Flood Control Project No. 147, Levee Around the City of Marysville and North Levee of Yuba River to a Point 1.8 Miles Upstream from Marysville.	MUST	DWR
89. SAC148 – Supplement to Standard Operation and Maintenance Manual, Sacramento River Flood Control Project Unit No. 148, West Levee of the Feather River from North Boundary of RD No. 777 to North Boundary of Levee District No. 1.	MUST	DWR
90. SAC149 – South Levee of Yuba River Maintenance Area No. 8.	MUST	DWR
91. SAC151 – Supplement to Standard Operation and Maintenance Manual, Sacramento River Flood Control Project Unit No. 151, East Levee of Feather River from Honcut Creek to Marysville, South Levee of Honcut Creek, and East Levee of RD No. 10.	MUST	DWR
92. SAC152 – West Levee of Feather River from North Boundary of RD No. 777 to the Western Canal Intake (Levee of Drainage District No. 1).	MUST	DWR
93. SAC153 – Supplement to Standard Operation and Maintenance Manual, Sacramento River Flood Control Project Unit No. 153, Lower Butte Creek Channel Improvement, Colusa, Glenn, and Butte Counties, California.	MUST	DWR

Table 4-1. List of Available References (contd.)

Reference	Category	Responsible Entity
94. SAC154 – Moulton Weir and Training Levee, Sacramento River, California.	MUST	DWR
95. SAC155 – Colusa Weir and Training Levees, Sacramento River, California.	MUST	DWR
96. SAC156 – Tisdale Weir and Bypass, Sacramento River, California.	MUST	DWR
97. SAC157 – Fremont Weir, Sacramento River, California.	MUST	DWR
98. SAC158 – Sacramento Weir, Sacramento River, California.	MUST	DWR
99. SAC159 – Pumping Plants No. 1, 2, and 3, Sutter Bypass.	MUST	DWR
100.SAC160 – Sutter-Butte Canal Headgate.	MUST	DWR
101.SAC161 – Butte Slough Outfall Gates.	MUST	DWR
102.SAC162 – Knights Landing Outfall Gates, Sacramento River, California.	MUST	DWR
103.SAC165 – Cleared Floodways.	MUST	DWR
104.SAC501 – Nelson Bend Modification Project Feather River – Sutter County (prepared by DWR).	MUST	DWR
105.SAC502 – Colusa Weir Bypass and Sediment Basin Operation and Maintenance Manual (prepared by Reclamation Board).	MUST	DWR
106.SAC503 – Operation and Maintenance Manual, Ash and Dry Creeks at Adin, Modoc County, California, Cleared Floodway.	MUST	DWR
107.SAC504 – Operation And Maintenance Manual For Chico and Mud Creeks and Sandy Gulch Sacramento River And Major And Minor Tributaries Project, California.	MUST	DWR
108.SAC505 – West Levee and Drain Cache Creek Settling Basin (prepared by DWR).	MUST	DWR
109.SAC506.1 – Middle Creek – Part No. 1, Pumping Plant Middle Creek Project, California.	MUST	DWR
110.SAC506.2 – Middle Creek – Part No. 2, Levees and Channel Improvement, Middle Creek Project, California.	MUST	DWR
111.SAC506.3 – Middle Creek – Part No. 3, Levees and Channel Improvement, Middle Creek Project, California.	MUST	DWR
112.SAC508 – Operations and Maintenance Manual for North Fork Feather River Project, Channel Improvement and Levee Construction Near Chester, Plumas County, California.	MUST	DWR
113.SAC509 – Deer Creek, Tehama County, California.	MUST	DWR

Table 4-1. List of Available References (contd.)

Reference	Category	Responsible Entity
114.SAC510 – Sacramento River and Major and Minor Tributaries Project, California Operation And Maintenance Manual for Elder Creek from Sacramento River to High Ground.	MUST	DWR
115.SAC511 – McClure Creek – Tehama County, California.	MUST	DWR
116.SAC512 – Sacramento River, Chico Landing to Red Bluff Project Bank Protection.	MUST	DWR
117.SAC513 – Salt Creek Tehama County, California Cleared Floodway.	MUST	DWR
118.SAC514 – Fairfield Vicinity Streams Project, Construction Phases I and II, Solano County, California.	MUST	DWR
119.SAC515 – Upper Butte Creek – Part No. 1, from Highway No. 99E Downstream 8.7 Miles.	MUST	DWR
120.SAC516 – Upper Butte Creek – Part No. 2, from Little Chico Creek Diversion Structure Downstream 9.3 Miles	MUST	DWR
121.SAC517 – American River – Part No. 1, Levee Construction from Carmichael Bluffs Downstream 8.3 Miles.	MUST	DWR
122.SAC517.3 – Supplement to Standard Operation and Maintenance Manual, Sacramento River Flood Control Project, American River Flood Control Project Part No. 3, for Vegetation on Mitigation Sites, Carmichael Bluffs, Downstream 8.3 miles (supplement to operations and maintenance manual SAC517).	MUST	DWR
123.SAC518 – American River Levee Project, California Right Bank – State Fair Grounds to Carmichael Bluffs, Pumping Plants No. 1 and 2.	MUST	DWR
124.SAC519 – Cherokee Canal from Lower Butte Basin to High Ground.	MUST	DWR
125.SAC520 – Emergency Levee Construction on the Left Bank Sacramento River Near Clear Creek (prepared by Reclamation Board).	MUST	DWR
126.SAC521 – Supplement to the Standard Operation and Maintenance Manual, Sacramento River Flood Control Project for the Yolo Basin Wetlands Project Modification Works.	MUST	DWR
127.SJR000 – Standard Operation and Maintenance Manual for the Lower San Joaquin River Levees, Lower San Joaquin River and Tributaries Project, California.	MUST	DWR
128.SJR001 – Right Bank Levee of San Joaquin River and French Camp Slough Within RD No. 404.	MUST	DWR

Table 4-1. List of Available References (contd.)

Reference	Category	Responsible Entity
129.SJR002 – Supplement to Standard Operation and Maintenance Manual, Lower San Joaquin River and Tributaries Project, California, Unit No.2, Right Bank Levee of San Joaquin River and Left Bank of French Camp Slough Within RD No. 17.	MUST	DWR
130.SJR003 – Supplement to Standard Operation and Maintenance Manual, Lower San Joaquin River and Tributaries Project, California, Unit No.3, North Levee of Stanislaus River and East Levee of San Joaquin River Within RDsNo. 2064, 2075, 2094, and 2096.	MUST	DWR
131.SJR003A – Supplement to Standard Operation and Maintenance Manual, Lower San Joaquin River and Tributaries Project, California, Unit No. 3-A, Wetherbee Lake Pumping Plant and Navigation Gate.	MUST	DWR
132.SJR004 – Supplement to Standard Operation and Maintenance Manual, Lower San Joaquin River and Tributaries Project, California, Unit No.4, East Levee of San Joaquin River Within RD No. 2031.	MUST	DWR
133.SJR005 – Supplement to Standard Operation and Maintenance Manual, Lower San Joaquin River and Tributaries Project, California, Unit No.5, East Levee of the San Joaquin River Within RD No. 2092.	MUST	DWR
134.SJR006 – Supplement to Standard Operation and Maintenance Manual, Lower San Joaquin River and Tributaries Project, California, Unit No.6, East Levee of the San Joaquin River in RDs No. 2063 and 2091.	MUST	DWR
135.SJR006A – Supplement to Standard Operation and Maintenance Manual, Lower San Joaquin River and Tributaries Project, California, Unit No.6-A, Lower San Joaquin River Pumping Plant.	MUST	DWR
136.SJR007 – Supplement to Standard Operation and Maintenance Manual, Lower San Joaquin River and Tributaries Project, California, Unit No.7, West Levee of San Joaquin River and North Levee of Old River, RDs No. 524 and 544.	MUST	DWR
137.SJR008 – Right Banks of Old River and Salmon Slough Within RDs No. 1 and 2089.	MUST	DWR
138.SJR009 – Levees Around RD No. 2062 and San Joaquin County Flood Control District Area No. 2.	MUST	DWR
139.SJR010 – West Levee of Paradise Cut RD No. 2058 and San Joaquin County Flood Control District, Area No. 2.	MUST	DWR
140.SJR011 – West Levee of San Joaquin River from Durham Bridge to Paradise Dam Within RD Nos. 2085 and 2095.	MUST	DWR

Table 4-1. List of Available References (Contd.)

Reference	Category	Responsible Entity
141.SJR012 – West Levee of San Joaquin River from Opposite Mouth of Tuolumne River Downstream to Stanislaus County Line Within RDs No. 2099, 2100, 2101 and 2102.	MUST	DWR
142.SJR013 – West Levee of the San Joaquin River in RD No. 1602.	MUST	DWR
143.SJR601 – Lower San Joaquin River Flood Control Project, Operation and Maintenance Manual for Levees, Irrigation and Drainage Structures, Channels and Miscellaneous Facilities, Part 1 (prepared by Reclamation Board) – Addenda to SJR000.	MUST	DWR
144.SJR601A – Lower San Joaquin River Flood Control Project – Part 2, Mariposa and Eastside Bypass Automatic Control Structures and Appurtenances (prepared by Reclamation Board).	MUST	DWR
145.SJR601B – Lower San Joaquin River Flood Control Project Part 3 – San Joaquin River and Chowchilla Canal Bypass Automatic Control Structures and Appurtenances (prepared By Reclamation Board).	MUST	DWR
146.SJR603 – Fresno County Stream Group, Maintenance Manual, Big Cry Creek Reservoir and Diversion.	MUST	DWR
147.SJR605 – Operation and Maintenance Manual for Chowchilla River, Ash and Berenda Sloughs Channel Improvement and Levee Construction, Buchanan Dam and H.V. Eastman Lake Project, Madera, Merced, and Mariposa Counties, California.	MUST	DWR
148.SJR606 – Operation and Maintenance Manual for Fresno River, Channel Improvement and Levee Construction, Hidden Dam and Hensley Lake Project, Madera County, California.	MUST	DWR
149.SJR607 – Operation and Maintenance Manual for Channels and Levees of the Merced County Stream Group.	MUST	DWR
150.SJR607A – Castle Dam and Reservoir Merced County Streams Group, Merced County, California.	MUST	DWR
151.SJR611.1 – Mormon Slough Project San Joaquin County, California, Part No. 1, Levees and Channels, San Joaquin River to Bellota.	MUST	DWR
152.SJR611.2 – Mormon Slough Project Part 2, Pumping Plants.	MUST	DWR
153.SJR612.1 – Bear Creek Project San Joaquin County, California, Part No. 1 – from Disappointment Slough Upstream to U.S. Highway No.99.	MUST	DWR
154.SJR612.2 – Bear Creek Project San Joaquin County, California, Part No. 2 – from Highway No. 99 Upstream to High Ground.	MUST	DWR

Table 4-1. List of Available References (Contd.)

Reference	Category	Responsible Entity
155.SJR613B – Duck Creek Diversion A Unit of Farmington Reservoir Project (Littlejohn Creek and Calaveras River Stream Groups).	MUST	DWR
156.SJR613C – Littlejohn Creek Channels A Unit of the Farmington Reservoir Project.	MUST	DWR
157.SJR614 – New Melones Lake Project Stanislaus River Between Goodwin Dam and the San Joaquin River.	MUST	DWR
Research		
1. USACE. 2008. Field Reconnaissance Report of Bank Erosion Sites and Site Priority Ranking. Sacramento River Flood Control Project Levees, Tributaries, and Distributaries. Sacramento River Bank Protection Project. December 18.	MUST	USACE
2. dwr. 2008. Inspection Report of the Central Valley State-Federal Flood Protection System.	MUST	DWR
3. California Data Exchange Center (CDEC) Web site.	MUST	CDEC
4. DWR. 2009. Levee Repair – Levee Evaluation Program. http://www.water.ca.gov/levees/history/ . Accessed March 9, 2009.	MUST	DWR
5. PPIC. 2008. Comparing Futures for the Sacramento-San Joaquin Delta.	MUST	PPIC
6. DWR. 1995. San Joaquin River Management Plan. February.	GOOD	DWR
7. DWR. 2008. Detailed Levee Inspection, Channel Inspection, and Structure Inspection Reports – 2008.	MUST	DWR
8. DWR. 2002. Technical Studies Documentation. Appendix C. Reservoir Operations Modeling, Existing Design Operations and Reoperation Analyses. Sacramento District. December.	GOOD	DWR
9. DWR. 2003. Division of Flood Management. Flood Fighting Methods. Revised August.	GOOD	DWR
10. DWR. 2005. White Paper. Flood Warnings: Responding to California's Flood Crisis. January.	MUST	DWR
11. DWR. 2008. Division of Flood Management Hydrology and Flood Operations Office. Flood Project Integrity and Inspection Branch. AB156 Local Agency Report 2008 for Project Levees of the State Plan of Flood Control. December 31.	MUST	DWR
12. DWR. 2008. Division of Flood Management. 2007 Inspection Report of the Flood Control Project Maintenance and Repair. June.	MUST	DWR
13. DWR. 2009. Levee Repair – Levee Evaluation Program. http://www.water.ca.gov/levees/evaluation/ . Accessed March 4, 2009.	MUST	DWR

Table 4-1. List of Available References (Contd.)

Reference	Category	Responsible Entity
14. DWR. 2009. California Levee Database. http://www.water.ca.gov/floodmgmt/lrafmo/fmb/fes/levee_database.cfm . Accessed March 5, 2009.	MUST	DWR
15. Ellis, Tom. 2008. Flood Control: Flowage Easements for the Sutter Bypass. Available at http://www.familywateralliance.com/flood_sutterbypass.html . Accessed November 6, 2008.	GOOD	Family Water Alliance
16. Independent Review Panel to DWR. 2007. A California Challenge - Flooding in the Central Valley, A Report from an Independent Review Panel to the Department of Water Resources, State of California. October 15.	MUST	DWR
17. Interagency Levee Policy Review Committee. 2006. The National Levee Challenge: Levees and the FEMA Map Modernization Initiative. September.	MUST	FEMA
18. National Heritage Institute. 2002. Subsidied Island Restoration Design in the Sacramento-San Joaquin Delta: A Solution for Levee Fragility and Water Supply Vulnerability in the Delta. February.	GOOD	National Heritage Institute
19. Reclamation. 2004. Upper San Joaquin River Basin Storage Investigation Phase I Report.	GOOD	Reclamation
20. TRLIA. 2008. Feather River Levee Improvement Projects. http://www.featherriversetbacklevee.com .	GOOD	TRLIA
21. TNC. 2002. Hydraulic Modeling and Geomorphic Analysis of Sacramento River, RM 184 to RM 194, Glenn and Butte Counties, California.	GOOD	TNC
22. USACE and Reclamation Board. 1991. American River Watershed Investigation California, Feasibility Report. December.	GOOD	USACE and Reclamation Board
23. USACE. 2002. Hydrologic Engineering Center, Conjunctive Use for Flood Protection, Provisional Draft. Davis, California.	GOOD	USACE
24. U.S. Water Resources Council. 1983. Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies, 10 March.	MUST	U.S. Water Resources Council
25. USACE and Reclamation Board. 2001. Sacramento and San Joaquin River Basin Comprehensive Study Channel Capacity Analysis for the San Joaquin River Systems.	GOOD	USACE and Reclamation Board
26. USACE and Reclamation Board. 2001. Feasibility Study Conference #2 Documentation, Milestone F-4 In-Progress Review. October.	USE	USACE and Reclamation Board
27. USACE and Reclamation Board. 2001. Sacramento and San Joaquin River Basins, Comprehensive Study, Milestone F-4 In-Progress Review, Appendix C (Reservoir Operations Modeling). October.	USE	USACE and Reclamation Board

Table 4-1. List of Available References (Contd.)

Reference	Category	Responsible Entity
28. USACE and Reclamation Board. 2001. Sacramento and San Joaquin River Basins, Comprehensive Study, Milestone F-4 In-Progress Review, Appendix D (Hydraulic Technical Documentation). October.	USE	USACE and Reclamation Board
29. USACE and Reclamation Board. 2002. Existing Hydrodynamic Conditions in the Delta During Floods, Appendices A, B, C – Summary of DSM2 Simulation Results for 1997 Flood, California Department of Water Resources, Prepared for the U.S. Army Corps of Engineers, Sacramento and San Joaquin River Basins Comprehensive Study, California, by Montgomery Watson Harza, Sacramento, California. March.	GOOD	USACE and Reclamation Board.
30. USACE and Reclamation Board. 2002. Sacramento and San Joaquin River Basins California Comprehensive Study, Interim Report.	GOOD	USACE and Reclamation Board
31. USACE and Reclamation Board. 2002. Sacramento and San Joaquin River Comprehensive Study-Setback Levees. April.	GOOD	USACE and Reclamation Board
32. USACE and Reclamation Board. 2002. Sacramento-San Joaquin River Basins Comprehensive Study, Technical Studies Documentation, Appendix A – Information Papers. December.	USE	USACE and Reclamation Board
33. USACE and Reclamation Board. 2002. Sacramento-San Joaquin River Basins Comprehensive Study, Technical Studies Documentation, Appendix C – Reservoir Operations Modeling. December.	USE	USACE and Reclamation Board
34. USACE and Reclamation Board. 2002. Sacramento-San Joaquin River Basins Comprehensive Study, Technical Studies Documentation, Appendix D – Hydraulic Technical Documentation. December.	USE	USACE and Reclamation Board
35. USACE and Reclamation Board. 2002. Sacramento-San Joaquin River Basins Comprehensive Study, Technical Studies Documentation, Appendix E – Risk Analysis. December.	USE	USACE and Reclamation Board
36. USACE and Reclamation Board. 2002. Sacramento-San Joaquin River Basins Comprehensive Study, Technical Studies Documentation, Appendix F – Economics Technical Documentation. December.	USE	USACE and Reclamation Board
37. USACE and Reclamation Board. 2002. Sacramento-San Joaquin River Basins Comprehensive Study, Technical Studies Documentation. December.	USE	USACE and Reclamation Board
38. USACE. 1969. Confirmation of Project Design Capacities for the Sacramento River Flood Control Project, Additional Data on Project Flow Lines and Corresponding Capacities. May 16.	GOOD	USACE

Table 4-1. List of Available References (Contd.)

Reference	Category	Responsible Entity
39. USACE, YCWA, DWR, and NOAA. 2008. Forecast-Coordinated Operations of Lake Oroville and New Bullards Bar Reservoir for Managing Major Flood Events. January.	GOOD	USACE, YCWA, DWR, NOAA
40. USACE. 2000. Geomorphic and Sediment Baseline Evaluation of the San Joaquin River from the Delta to the Confluence with the Merced River and Major Tributaries, Prepared for the U.S. Army Corps of Engineers, Sacramento and San Joaquin River Basins Comprehensive Study, California.	GOOD	USACE
41. USACE. 1988. Sacramento River Flood Control System Evaluation Initial Appraisal Report – Sacramento Urban Area. May.	USE	USACE
42. USACE. 1993. Sacramento River Flood Control System Evaluation Initial Appraisal Report – Lower Sacramento Area. October.	USE	USACE
43. USACE. 2007. Post Authorization Change Report. American River Watershed Project. Folsom Dam Modification and Folsom Dam Raise Projects. February.	GOOD	USACE
44. USGS. 1977. Magnitude and Frequency of Floods in California. Water-Resources Investigations 77-21.	USE	DWR
45. Gray, Donald H. 2008. Woody Vegetation and Levee Stability. July.	USE	ASCE
Historical		
1. Cal. App. 3d Dist. 2003. <i>Paterno v. State of California</i> , 113 Cal. App. 4th 998.	MUST	DWR
2. CDC. 1910. Report of California Debris Commission with Regard to Affording Relief from Floods in the Sacramento Valley and the Adjacent San Joaquin Valley, California.	GOOD	CDC
3. California Department of Public Works. 1946. Views and Recommendations of State of California on Proposed Chief of Engineers, U.S. Army, Comprehensive Flood Control Survey Report on Sacramento-San Joaquin Basin Streams, California. April.	USE	California Department of Public Works
4. California Disaster Office. The Great Flood of 1955. 1956.	GOOD	California Disaster Office
5. Morgan, Scott. 2008. Property Rights in the Eastside Bypass Held by the Sacramento and San Joaquin Drainage District. Memorandum from Scott Morgan to Paula Landis. November 19.	GOOD	DWR
6. Mount, Jeffery F. 1995. California Rivers and Streams: The Conflict Between Fluvial Process and Land Use.	GOOD	UC Davis
7. NASFM. 2007. Association of State Floodplain Managers, National Flood Policy Challenges, Levees: The Double-edged Sword. April.	GOOD	NAFSM

Table 4-1. List of Available References (Contd.)

Reference	Category	Responsible Entity
8. O'Neill, Karen M. 2006. Levee Troubles: The Cost of Making the Sacramento Valley into an Agricultural Giant. Sacramento History: Journal of the Sacramento County Historical Society, Volume VI, No. 1-4.	GOOD	Sacramento County Historical Society
9. San Joaquin County Public Works. 2009. San Joaquin County Flood Management Perspectives. FMA Luncheon. February 26.	GOOD	SJAFCA
10. SWRCB, Central Valley and San Francisco Bay Regional Quality Control Boards. 2008. Strategic Workplan for Activities in the San Francisco Bay/Sacramento-San Joaquin Delta Estuary. July.	GOOD	SWRCB, CVRWQCB, SBRWQCB
11. Board. 1955. Board Meeting Minutes, San Joaquin River Flood Control Project Upper Project – From Friant Dam to Mouth of Merced River – (on calendar for hearing on Revised Substitute Plan, as advertised). December 12.	GOOD	Reclamation Board
12. USACE. 2004. Sacramento District History (1929 – 2004).	USE	USACE
13. Reclamation. 1949. Central Valley Basin – A Comprehensive Departmental Report on the Development of the Water and Related Resources of the Central Valley Basin, and Comments from the State of California and Federal Agencies. August.	GOOD	Reclamation
14. DOJ. 1999. Supreme Court of the United States. No. 99-859. <i>Central Green Co., Petitioner v. United States of America</i> . Brief for the United States.	GOOD	DOJ
15. USACE. 1960. Review by State of California of Report of the Chief of Engineers, Department of the Army, on Review Report on Bank Protection and Channel Maintenance, Sacramento River Flood Control Project, California.	USE	USACE
16. USACE. 1978. Maps, River and Harbor, Flood Control and California Debris Commission. Sacramento District, Civil Works Projects.	GOOD	USACE
17. USACE. 1999. Post-Flood Assessment for 1983, 1986, 1995, and 1997, Central Valley, California. Sacramento District.	GOOD	USACE
18. Wright, James M. 2000. The Nation's Response to Flood Disasters: A Historical Account. A Report by the Association of State Floodplain Managers. April.	GOOD	Association of State Floodplain Managers
Environmental		
1. Bolton, S., Shellberg, J. 2001. Ecological Issues in Floodplains and Riparian Corridors. July.	GOOD	University of Washington, Center for Streamside Studies
2. Moise and Hendrickson. 2002. Riparian Vegetation of the San Joaquin River. May.	GOOD	DWR

Table 4-1. List of Available References (Contd.)

Reference	Category	Responsible Entity
3. Reclamation Board. 1988. Interim Guide for Vegetation on Flood Control Levees Under Reclamation Board Authority, State of California Resources Agency, Sacramento, California.	MUST	Reclamation Board
4. DWR. 2009. Reference List. Stream Restoration Information.	GOOD	DWR
5. USFWS. 1995. Sacramento-San Joaquin Delta Native Fishes Recovery Plan. Portland, Oregon.	GOOD	USFWS
6. SAFCA. 2008. South Sacramento County Streams Project – Unionhouse Creek Channel Upgrades. Draft EA/IS. October.	GOOD	USACE and SAFCA
7. SAFCA. 2009. Natomas Levee Improvement Program. Draft EIS/EIR for Phase 3 Landside Improvements Project. February.	GOOD	SAFCA
8. USACE. 1999. EM 1110-2-301, Engineering and Design Guidelines for Landscape Planting and Vegetation Management at Floodwalls, Levees, and Embankment Dams, Washington, D.C.	MUST	USACE
9. USACE. 1998. Proposed Sacramento District Policy – 11 April 1998 Version – Vegetation on Levees and Berms, Flood Control Projects, Sacramento District, Sacramento, California.	GOOD	USACE
10. USACE. 2007. Draft Final White Paper, Treatment of Vegetation Within Local Flood-Damage-Reduction Systems. April.	MUST	USACE
11. USACE. 2009. Draft EA/IS for Levee Repair of 25 Erosion Sites: Sacramento River Bank Protection Project. April.	GOOD	USACE
12. USACE and Reclamation Board. 2002. Sacramento and San Joaquin River Comprehensive Study – Vegetation and Flood Management. April.	GOOD	USACE and Reclamation Board
13. USACE and Reclamation Board. 2002. Sacramento-San Joaquin River Basins Comprehensive Study, Technical Studies Documentation, Appendix G – Ecosystem Functions Model. December.	USE	USACE and Reclamation Board
14. USACE and Reclamation Board. 2008. Draft Erosion Repairs of 13 Bank Protection Sites, 2008 and 2009. Sacramento River Bank Protection Project. May 7.	GOOD	USACE and Reclamation Board
15. USACE. 2007. Treatment of Vegetation Within Local Flood Damage Reduction Systems. Draft White Paper. April.	MUST	USACE
16. USDA. 2000. Channel Vegetation. Natural Resources Conservation Service, Field Office Technical Guide, Section IV: Practice Standards and Specifications: Standard MT322.	GOOD	USDA

Table 4-1. List of Available References (Contd.)

Reference	Category	Responsible Entity
17. USACE. 2009. ETL 1110-2-571 Guidelines for Landscape Planting and Vegetation Management at Levee, Flood walls, Embankment Dams, and Appurtenant Structures, April 10.	MUST	USACE

Key:

AB = Assembly Bill
 ASCE = American Society of Civil Engineers
 ASFPM = Association of State Floodplain Managers
 CDC = California Debris Commission
 CDEC = California Data Exchange Center
 CVFPB = Central Valley Flood Protection Board
 CVRWQCB = Central Valley Regional Water Quality Control Board
 DOJ = U.S. Department of Justice
 DSM2 = Delta Simulation Model
 DWR = California Department of Water Resources
 EA = Environmental Assessment
 EIR = Environmental Impact Report
 EIS = Environmental Impact Statement
 EM = Engineering Manual
 ER = Engineering Regulation
 ETL = Engineering Technical Letter
 FEMA = Federal Emergency Management Agency
 FMA = Floodplain Management Association
 IS = Initial Study

NAFSMA = National Association of Flood and Stormwater Management Agencies
 No. = number
 NOAA = National Oceanic and Atmospheric Administration
 PPIC = Public Policy Institute of California
 RD = Reclamation District
 Reclamation = U.S. Department of the Interior, Bureau of Reclamation
 RM = river mile
 RR = Railroad
 SAFCA = Sacramento Area Flood Control Agency
 SBRWQCB = San Francisco Bay Regional Water Quality Control Board
 SJAFCA = San Joaquin Area Flood Control Agency
 SWRCB = State Water Resources Control Board
 TNC = The Nature Conservancy
 TRLIA = Three Rivers Levee Improvement Authority
 UC = University of California
 USACE = U.S. Army Corps of Engineers
 USDA = U.S. Department of Agriculture
 USFWS = U.S. Fish and Wildlife Service
 USGS = U.S. Geological Survey
 WPRR = Western Pacific Railroad
 YCWA = Yuba County Water Agency

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5.0 Checklist of O&M Considerations

5.1 Purpose of the Checklist

The purpose of the checklist of O&M considerations is to list considerations that should be addressed when working on other aspects of integrated flood management within the CVFPP. The checklist focuses on performance-based criteria for the future of O&M practices, and will be used to determine if the 2012 plan achieved the planned goals.

5.2 Checklist of O&M Considerations for 2012 CVFPP

- Outlines broadly supported framework and design for a sustainable and adequate funding stream for entire flood control system to implement CVFPP.
- Describes a long term watershed-based strategy to replace project-by-project mitigation, and provides for regional advanced mitigation.
- Provides for State ownership of necessary easements and rights-of-way for O&M of flood control infrastructure.
- Provides for the State to advocate and participate in a phased approach to complying with Public Law 84-99 eligibility, and describes a process or program for implementing a phased disenrollment if Public Law 84-99 eligibility is lost.
- Incorporates a streamlined permit process similar to the Joint Aquatic Resource Permit Application (JARPA) process in the State of Washington.
- Develops an alternative to the need for continuing variance to USACE national levee standards (allows use of vegetation framework).
- Provides for State-initiated Programmatic Section 10 consultation under the ESA so that an HCP is in place for efficient execution of O&M activities throughout the flood control system.

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- Provides for State to evaluate cumulative impacts of permitted encroachments to ensure flood risk is not increased as a result of excessive permitted encroachments.
- Long-term strategy to incorporate habitat values into the design of flood control systems so that flood control structures such as levees can be designed in accordance with standard engineering principles that limit most vegetation on the structures.
- Provides for easy access to O&M manuals and other documents needed to properly conduct O&M of system, particularly inspection standards for the various components of the flood control system.
- Provides for frequent communication with landowners who have flood control easements on their property to ensure continued emphasis on flood risk issues, and stress the importance of keeping flood control structures like levees from being compromised by illegal encroachments.
- Identifies feasible/reasonable opportunities for setback levees that would allow for better flood conveyance, river processes, and habitat restoration/development (ideal for system-wide mitigation/conservation areas).
- Develops a plan for legislation that allows for long-term maintenance funding of the Flood Control Project, with those who benefit most (both directly and indirectly) paying proportionately for benefits they receive. This includes water users who benefit from water conveyance in the system and developments in the historic floodplain.
- Includes principles for reducing conflicts among flood system maintenance, water supply, water quality, and habitat preservation goals. Describes a program or process for reducing the burden of complying with environmental regulations related to flood system maintenance.
- Clearly describes the difference between maintenance deficiency and levee integrity problems.
- Describes the factors affecting maintenance work windows, including water quality and flow requirements, reservoir operations, threatened and endangered species, farming operations, equipment availability, and funding.
- Lists and summarizes laws and policies affecting flood maintenance.

5.0 Check List of Operations and Maintenance Considerations

- Reduces conflict among flood protection, water supply, agriculture, environmental, and hydropower needs.

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6.0 List of Related O&M Improvement Studies and Planning

The OMSDWG partners reviewed and updated a list of previously compiled O&M activities to develop a comprehensive list of other O&M studies and planning that the CVFPP Plan Development Team should become familiar with and coordinate with regularly. Improvement studies and planning were sorted into three categories: investigation/study, design/construction, and general O&M.

Table 6-1. List of O&M Studies and Planning

Investigation/Study	Responsible Entity
1. Amador Dry Creek Watershed Assessment Implementation and Management Plan	Amador Dry Creek Watershed Council
2. American River Common Features General Reevaluation Report	USACE
3. Bay-Delta Conservation Plan (BDGP)	SWRCB, USACE, other state/local agencies
4. Calaveras River Habitat Conservation Plan	SEWD, CCWD
5. Calaveras River Watershed Implementation Plan	UMRWC
6. Caltrans Highways Hydraulic Impact Assessment Program	Yolo County Flood Control and Water Conservation District
7. Central Valley Integrated Flood Management Study	DWR/USACE
8. Cities-County Storm Drainage Criteria Update Program	Yolo County Flood Control and Water Conservation District
9. Clear Lake Operations Evaluation Program	Yolo County Flood Control and Water Conservation District, City of Woodland, Yolo County
10. County Roads Hydraulic Capacity Assessment Program	Yolo County Flood Control and Water Conservation District
11. Creation of Flood Management Division or Separate Entity	Yolo County Flood Control and Water Conservation District, City of Woodland, Yolo County
12. Delta Habitat Conservation and Conveyance Program	DWR
13. Delta Islands and Levees Feasibility Study	USACE
14. Delta Levees Maintenance Subventions Program	DWR/CVFPB
15. Delta Long-Term Management Strategy	USACE
16. Delta Risk Management Strategy (DRMS)	DWR
17. Delta Vision	DWR
18. Enlarge Pardee Reservoir	AWA, EBMUD, CCWD, San Joaquin County
19. Flood Emergency Preparedness and Hazard Classification Program	Yolo County Flood Control and Water Conservation District, City of Woodland, Yolo County
20. FloodSAFE California	DWR
21. Floodway Corridor Program	DWR
22. Forecast-Coordinated Operations	Yuba County Water Agency
23. Hidden Dam	USACE
24. IRWMP	CBDD
25. Levee Flood Protection Zones	DWR
26. Levee System Integrity Program	CALFED

Table 6-1. List of O&M Studies and Planning (contd.)

Investigation/Study	Responsible Entity
27. Local Levees Assistance Program	DWR
28. Lower Cache Creek – Yolo County, Woodland Area Feasibility Study	DWR/USACE
29. Lower Deer Creek Restoration and Flood Management	The Deer Creek Watershed Conservancy
30. Lower San Joaquin River Feasibility Study	DWR/USACE/SJAFCA
31. Merced County Streams General Reevaluation Report	USACE
32. Mokelumne/Amador/Calaveras (MAC) IRWMP	Upper Mokelumne River Watershed Authority
33. Off-Stream Storage on Cosumnes, Mokelumne, and Calaveras Rivers	Amador Water Agency
34. Operational Criteria and Plan Biological Opinion	USFWS
35. Orestimba Creek Feasibility Study	USACE
36. RD 900 and West Sacramento MOU on Storm Water Detention and Raw Water Supply	City of West Sacramento, Yolo County
37. Sacramento and San Joaquin River Basins Comprehensive Study	USACE/Reclamation Board
38. Sacramento River Flood Control Project, Mid-Valley Area, Phase III Limited Reevaluation Report	USACE
39. Sacramento Valley IRWMP	NCWA
40. San Joaquin County Multi-Species Habitat Conservation and Open Space Plan	San Joaquin Council of Governments
41. San Joaquin River Restoration Program	Reclamation
42. Small Sloughs and Creeks Invasive Vegetation Removal Program	Yolo County FCWCD
43. Stanislaus-Tuolumne IRWMP	CCWD
44. Surface Storage Investigations	CALFED
45. Sutter County Feasibility Study	USACE/Reclamation Board/ Sutter County
46. Upper Feather River IRWMP	Plumas County FCWCD
47. Upper Mokelumne River Watershed Management Plan	UMRWC
48. Watershed Management Program	Yolo County Flood Control and Water Conservation District
49. West Sacramento General Reevaluation Report	USACE
50. Wheatland Flood Protection Improvement	RD No. 2103, RD No. 817
51. Yolo and Tisdale Bypasses Sediment Removal Program	Yolo Bypass Working Group
52. Yuba County IRWMP	YCIRWMP Group

Table 6-1. List of O&M Studies and Planning (contd.)

Investigation/Study	Responsible Entity
53. Yuba River Basin General Reevaluation Report	USACE
54. Yuba-Bear Levee Improvement	Three Rivers Levee Improvement Authority
55. Black Rascal Creek dam above Yosemite Avenue	County of Merced/Merced Streams Group
Design/Construction	Responsible Entity
1. American River Common Features Project	USACE
2. Arroyo Pasajero Flood Control	WWD
3. Bear River Reservoir Expansion Project	Amador Water Agency
4. Bear River Setback Levee	USACE/TRLIA
5. Bear-Feather Levee Setback	Three Rivers Levee Improvement Authority
6. Broad Street Storm Drain Diversion	City of Sutter Creek
7. Buckeye Creek Erosion/Flood Management Project	Dunnigan Water District
8. Cache Creek Flood Management Integrated Project	Yolo County FCWCD, City of Woodland, Yolo County
9. Cache Creek Off-Channel Detention Basin Projects	Yolo County FCWCD, City of Woodland, Yolo County
10. California State Water Project	DWR
11. City of Winters Storm Drainage Diversion to Putah Creek Project	Lower Putah Creek Coordinating Committee
12. Clarksburg Levee Improvement Project	City of West Sacramento, Yolo County
13. Colgate Powerhouse Tailwater Depression	Yuba County Water Agency
14. Cosgrove Creek Project	CCWD
15. Current River Management Section River and Floodplain Projects	DWR/DPLA
16. Deep Water Ship Channel Navigation Levee Repair	City of West Sacramento, Yolo County
17. Delta Levees Special Flood Control Projects	DWR
18. Design of Recharge/Detention Basins	Colusa Basin Drainage District
19. Dry Creek Bank Stabilization Project	Lower Putah Creek Coordinating Committee
20. Dunnigan Area Storm Drainage/Flood Management Project	Dunnigan Water District
21. DWR Levee Repairs Program	DWR
22. Esparto Storm Drainage/Flood Management Project	Yolo County FCWCD
23. Feather River Setback Levee at Star Bend	USACE/TRLIA
24. Folsom Dam Raise Project, Bridge Element	USACE/City of Folsom

Table 6-1. List of O&M Studies and Planning (Contd.)

Design/Construction	Responsible Entity
25. Folsom Dam Safety and Flood Damage Reduction Project	USACE/Reclamation/SAFCA
26. Huff's Corner Levee Repair Project	Yolo County FCWCD, City of Woodland, Yolo County
27. Jackson Creek Enhancement Project	City of Jackson
28. Jackson Creek Watershed Project	PHAW, UMRWC
29. Knights Landing Levee Improvement Project	City of West Sacramento, Yolo County
30. Knights Landing Storm Drainage/Flood Management Project	Yolo County FCWCD
31. Mace Boulevard Bridge Improvement Project	Lower Putah Creek Coordinating Committee
32. Madison Storm Drainage/Flood Management Project	Yolo County FCWCD
33. Mayhew Levee Improvement Project	SAFCA
34. Natomas Levee Improvement Program Phase 3 Landside Improvement Project	SAFCA
35. New Bullards Bar Reservoir Outlet Capacity Increase	Yuba County Water Agency
36. Putah Creek Bank Stabilization Project	Lower Putah Creek Coordinating Committee
37. Putah Creek Diversion Dam Vegetation Removal Project	Lower Putah Creek Coordinating Committee
38. Reconciliation of Cache Creek Settling Basin Future Modifications and "Original" South Levee Project	Yolo County FCWCD, City of Woodland, Yolo County
39. Sacramento River (West Bank) Integrated Project	City of West Sacramento, Yolo County
40. Sacramento River Bank Protection Project – Phase III	USACE/CVFPB/SAFCA
41. South Sacramento County Streams Project	USACE/SAFCA/CVFPB
42. Sutter Bypass Vegetation Removal Project	
43. Sutter Slough Erosion Control and Pumping Infrastructure Improvement Project	
44. TRLIA – Feather River Setback Levee	USACE/TRLIA
45. Upper North Fork Feather River Hydroelectric Project	PG&E
46. West Sacramento Levee Improvements	West Sacramento Area Flood Control Agency
47. Willow Slough Levee Improvement Project	Yolo County FCWCD
48. Woodland Area Flood Management Project	Yolo County FCWCD, City of Woodland, Yolo County
49. Yolo Bypass 2-D Hydraulic Modeling Project	Yolo Bypass Working Group
50. Yolo Bypass Integrated Project	Yolo Bypass Working Group

Table 6-1. List of O&M Studies and Planning (contd.)

Design/Construction	Responsible Entity
51. Yuba City Stormwater Quality Improvement Project	Yuba City
52. J-levee USACE Project to construct a setback levee and restore riparian habitat in the Hamilton City Area RM 193-201	CALFED
53. M&T Pumping Plant Protection Project RM 193	CALFED
54. Llano Seco Riparian Sanctuary PCGID-Pov Irrigation District Project RM 178	CALFED
Operations/Maintenance	Responsible Entity
1. Ongoing Levee Maintenance and Critical Repair Program	City of West Sacramento, Yolo County
2. Sacramento Bypass-Yolo Bypass Levee Repair	City of West Sacramento, Yolo County
3. Sacramento River Levee Rehabilitation Project (Merritt Island)	City of West Sacramento, Yolo County
4. Sacramento River Levee Rehabilitation Project (RM 69.9 RD No. 827)	City of West Sacramento, Yolo County
5. Sacramento River Levee Rehabilitation Project (West Sacramento)	City of West Sacramento, Yolo County
6. Sacramento River Levee Repair	City of West Sacramento, Yolo County
7. Sacramento River West Bank Levee Integrity Program	City of West Sacramento, Yolo County
8. West Sacramento Levee Monitoring and Maintenance Program	City of West Sacramento, Yolo County
9. West Sacramento South Cross Levee Repair	City of West Sacramento, Yolo County

Key:

AWA = Amador Water Agency
 BDCP = Bay-Delta Conservation Plan
 CALFED = CALFED Bay-Delta program
 CBDD = Colusa Basin Drainage District
 CCWD = Contra Costa Water District
 CVFPB = Central Valley Flood Protection Board
 DPLA = Division of Planning and Local Assistance
 DRMS = Delta Risk Management Study
 DWR = California Department of Water Resources
 EBMUD = East Bay Municipal Utility District
 FCWCD = Flood Control and Water Conservation District
 IRWMP = Integrated Regional Water Management Plan
 M&T = M&T Ranch
 MOU = Memorandum of Understanding
 NCWA = Northern California Water Association

PCGID = Princeton-Codora-Glenn Irrigation District
 PG&E = Pacific Gas and Electric Company
 PHAW = Protect the Historic Amador Waterways
 RD = Reclamation District
 Reclamation = U.S. Department of the Interior, Bureau of Reclamation
 RM = River Mile
 SAFCA = Sacramento Area Flood Control Agency
 SEWD = Stockton East Water District
 SJAFCA = San Joaquin Area Flood Control Agency
 SWRCB = State Water Resources Control Board
 TRLIA = Three Rivers levee Improvement Authority
 UMRWC = Upper Merced River Watershed Council
 USACE = U.S. Army Corps of Engineers
 USFWS = U.S. Fish and Wildlife Service
 WWD = Westlands Water District
 YCIRWMPM = Yolo County Integrated Regional Water Management Plan

7.0 Acronyms and Abbreviations

Board	Central Valley Flood Protection Board
CVFMP	Central Valley Flood management Planning Program
CVFPP	Central Valley Flood Protection Plan
Delta.....	Sacramento-San Joaquin Delta
DFG	California Department of Fish and Game
DWR	California Department of Water Resources
EJ.....	environmental justice
ESA.....	Endangered Species Act
HCP	Habitat Conservation Plan
JARPA	Joint Aquatic Resource Permit Application
LMA.....	Levee Maintaining Agency
NOAA.....	National Oceanic and Atmospheric Administration
O&M.....	operations and maintenance
OMSDWG	Operations and Maintenance Scope Definition Work Group
PG&E	Pacific Gas and Electric Company
RCSR.....	Regional Conditions Summary Report
RD.....	Reclamation District
SAFCA	Sacramento Area Flood Control Agency
USACE.....	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service

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