California's Flood Future

Recommendations for Managing the State's Flood Risk

Attachment J:
Recommendations to Improve Flood Management in California

PUBLIC REVIEW DRAFT April 2013

California's Flood Future is provided to help inform local, State, and Federal decisions about policies and financial investments to improve public safety, foster environmental stewardship, and support economic stability

FloodSAFE CALIFORNIA

PUBLIC SAFETY ENVIRONMENTAL STEWARDSHIP ECONOMIC STABILITY

US Army Corps of Engineers ®

STATEWIDE FLOOD MANAGEMENT PLANNING PROGRAM

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PUBLIC DRAFT

Attachment J: Recommendations to Improve Flood Management in California

April 2013

STATE OF CALIFORNIA
THE NATURAL RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES

UNITED STATES ARMY CORPS OF ENGINEERS
FLOOD PLAIN MANAGEMENT SERVICES PROGRAM

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Acronyms and Abbreviations

AER	Aquatic Ecosystem Restoration
B/C	Benefit-to-Cost
BDCP	Bay Delta Conservation Plan
BMP	Best Management Practice
CalEMA	California Emergency Management Agency
CDEC	California Data Exchange Center
CEAC	County Engineers Association of California
CSMW	Coastal Sediment Management Workgroup
CVFPP	Central Valley Flood Protection Plan
CW	Civil Works
CWP	California Water Plan
Delta	Sacramento-San Joaquin Delta
DMMO	Dredged Material Management Office
DSC	Delta Stewardship Council
DWR	California Department of Water Resources
EAD	Expected Annual Damage
ER	Engineer Regulation
FCSA	feasibility cost-sharing agreement
FEAT	Flood Emergency Action Team
FEMA	Federal Emergency Management Agency
FERIS	Flood Emergency Response Information System
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
Flood Future Report	*California's Flood Future: Recommendations for Managing the State's Flood Risk Report*
FloodER	Flood Emergency Response
FPMS	Flood Plain Management Services
GIS	Geographic Information System
HMP	Hazard Mitigation Plan
HUC	Hydrologic Unit Code
IRWM	Integrated Regional Water Management
IWM	Integrated Water Management
LHMP	Local Hazard Mitigation Plan
MOU	memorandum of understanding
NAI	No Adverse Impact
NFIP	National Flood Insurance Program

Acronyms and Abbreviations

O&M	operation and maintenance
OMB	Office of Management and Budget
OMRR&R	operation, maintenance, repair, rehabilitation, and replacement
PL	Public Law
PPA	project partnership agreement
RD	Reclamation District
RFMP	Regional Flood Management Planning
SFMP	Statewide Flood Management Planning
SHMP	State Hazard Mitigation Plan
SPFC	State Plan of Flood Control
TM	technical memorandum
U.S.C.	United States Code
USACE	United States Army Corps of Engineers
WDL	Water Data Library
WRDA 86	Water Resources Development Act

1.0 Introduction

1.1 Background

California is at risk for catastrophic flooding. All 58 California counties have experienced at least one flood event with significant consequences in the last 20 years, resulting in loss of life and billions of dollars in damages. This report, *California's Flood Future: Recommendations for Managing the State's Flood Risk* (Flood Future Report), is the first product of the Statewide Flood Management Planning (SFMP) Program. The Program was developed under the FloodSAFE Initiative to expand California's flood management planning statewide. Specifically, the purpose of the SFMP Program is to make recommendations to inform flood management policies and investments in the coming decades by:

- Promoting a clear understanding of flood risks in California
- Garnering active support for partnerships at the local, tribal, State, and Federal levels[1]
- Coordinating with other California Department of Water Resources (DWR) planning efforts
- Identifying strategies and feasible next steps to better incorporate flood management into Integrated Water Management (IWM)
- Promoting an IWM approach for flood management solutions

The initial work of the SFMP Program was to collect information in support of the Flood Future Report, as well as to build unique partnerships with local flood management agencies, the County Engineers Association of California (CEAC), Federal Emergency Management Agency (FEMA), and the United States Army Corps of Engineers (USACE). Throughout the Flood Future Report, determinations about specific flood terms were made that may not represent the specific terms used by partner agencies. These are described in Textbox 1-1. A description of the Flood Future Report components, organization, and layout is provided in Appendix A.

1.2 Purpose

This technical memorandum (TM), presented as Attachment J, supplements the information presented in the Flood Future Report with a detailed description of the development of recommendations for flood management statewide. The Flood Future Report is based on information collected from local, State, Tribal, and Federal agencies, as well as from the results of the flood hazard exposure analysis. These efforts aided the development and identification of flood management opportunities and challenges. The opportunities and challenges discussed in this TM provided the foundation upon which the recommendations were created. The recommendations are intended to inform California flood management policies and investments in the coming decades and, as such, are included not only in this TM

[1]Hereafter in this document, the mention of governmental agencies is implicit to include tribal entities.

but also in the Flood Future Report. During the development of opportunities and challenges that face flood management in California, some high-level challenges were identified that are beyond the purview of the Flood Future Report effort. These high-level challenges are discussed briefly in this TM, but no recommendations are made associated with these issues. These issues are currently being addressed by other efforts.

1.3 Overview of TM Organization

The following sections summarize the process and results by which the recommendations in the Flood Future Report were developed. This TM is organized as follows:

- Section 1: Introduction – describes the purpose of this attachment and the SFMP Program background
- Section 2: Process – provides an overview of the process used to identify and develop the recommendations set forth in the Flood Future Report
- Section 3: Progression of Recommendations – provides a detailed review of recommendations development
- Section 4: High-Level Challenges Facing Flood Management in California – provides a review of the challenges that exist throughout the state
- Section 5: Recommendations – lists specific recommendations developed as part of the SFMP Program's Flood Future Report
- Section 6: Charting a Path Forward – describes the tools, plans, and actions necessary to achieve results
- Section 7: References – supplies a complete list of references used in researching information for this document

This TM is supported by the following technical appendices:

- Appendix A: Flood Future Report Components
- Appendix B: Compilation of Opportunities and Challenges from Local Agencies, Past Efforts, and Flood Experts
- Appendix C: Glossary

Textbox 1-1: Agencies Differ in Flood Terminology

One of the challenges in a multi-agency effort is resolving language and culture differences between agencies. Staff from both USACE and DWR who are responsible for developing this report have made a conscious choice to adopt certain terminology throughout the documents.

As an example, USACE has adopted ***flood risk management*** as the term to describe a broad flood program that encompasses planning, construction, and operation, maintenance, repair, rehabilitation, and replacement (*OMRR&R*). DWR executes a similar broad program, largely through its Flood Management Division. As a result, DWR uses the term ***flood management*** in much the same way USACE uses *flood risk management*.

Another term used throughout this document is ***100-year flood*** (or some other *x*-year flood). Although these terms are commonly used, both USACE and DWR prefer using ***1 percent chance flood*** (or a 1-in-100 chance event) to describe a flood that has a 1 percent chance of occurring in any given year. However, legislative language from 2007 directing DWR to undertake new planning using bond proceeds uses 100-year flood.

For Federally funded projects, the definition of operation and maintenance (***O&M)*** includes the local entity's financial obligation to ***OMRR&R*** of the implemented project. OMRR&R is a non-Federal responsibility when local, regional and/or State entities partner on a Federal project. DWR typically uses O&M to refer simply to operation and maintenance, although repair and rehabilitation are sometimes included depending on project specifics. References to O&M provided in this report include OMRR&R responsibilities when the project is a Federal/non-Federal partnership.

For this report, both agencies agreed that, although language and cultural differences remain, it is more important to focus on the shared responsibility of performing our flood risk management or flood management missions rather than the use of specific phrases not in each agency's respective culture. A glossary is included to help the reader understand specific terms used by flood professionals and those terms that are used to define specific agency missions.

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2.0 Recommendation Development Process

Development of the recommendations followed an iterative process that considered information gathered as part of the SFMP Program, previous studies and reports, and the expertise of flood experts from within DWR, USACE, and the SFMP consulting team. This process involved a number of different teams, including the Project Work Team, Recommendations Team, Advisory Team, Key Stakeholders, and DWR/USACE Senior Oversight Team, as shown in Figure J-1. Figure J-2 shows the different teams and their relationships to one another.

The Recommendations Team used a compiled list of opportunities and challenges identified by local agencies, recommendations from previous documents, and recommendations from flood experts to formulate a list of potential recommendations. In addition, key findings from the SFMP Program were incorporated into the draft recommendations. These findings were from the exposure to flood hazard analysis, information gathering effort, integrated water management, risk information inventory, and financial strategies attachments to the Flood Future Report. The result of this process is the list of recommendations included in Section 5, Recommendations.

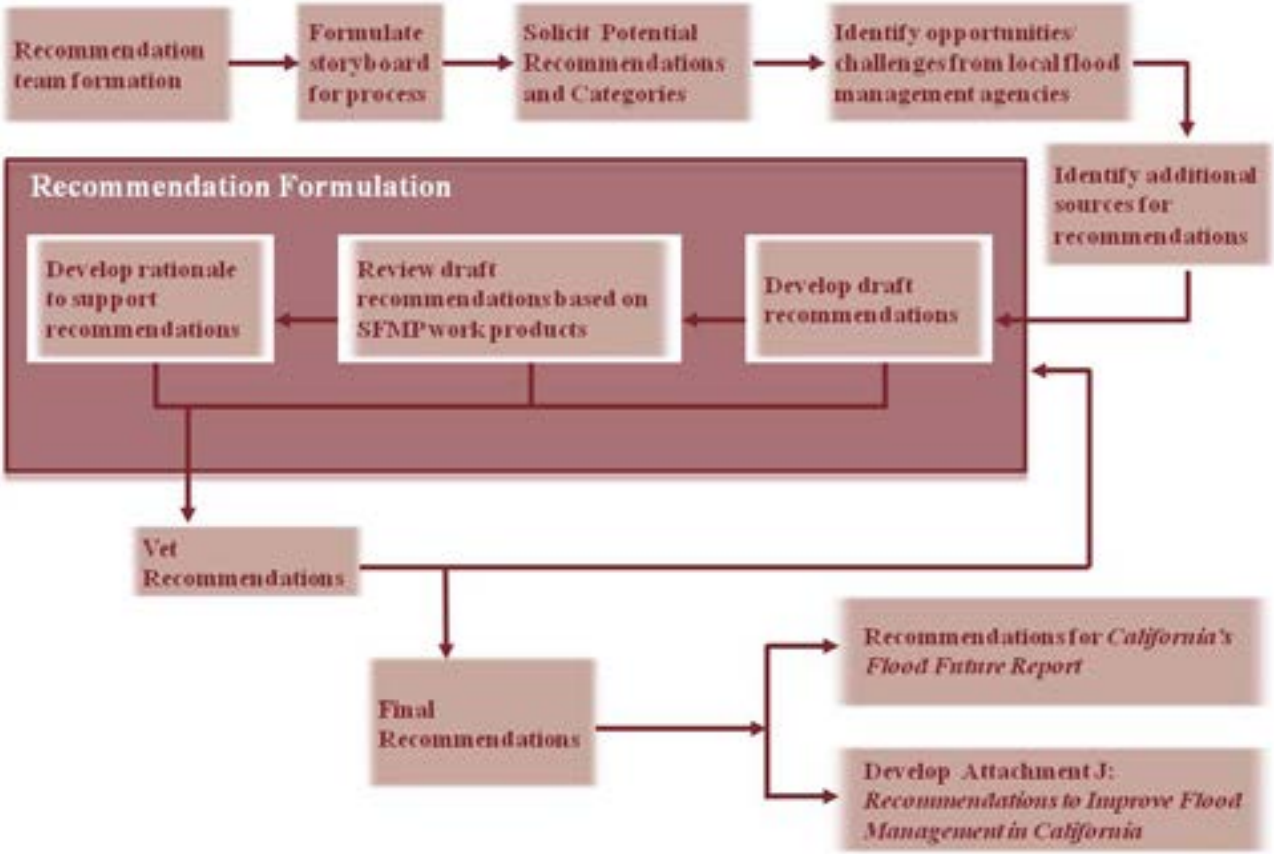


Figure J-1. Recommendations Development Process

Figure J-2. Organization of Recommendations Teams

3.0 Progression of Recommendations

3.1 Introduction

This section of the report outlines the process used to develop recommendations. The recommendations for the Flood Future Report are a consolidation of opportunities and challenges facing flood management from three sources—local agencies, existing flood management documents, and flood experts. Once the challenges and opportunities were identified, themes were used to organize the data. Finally, the recommendations were formulated, as along with a list of high-level challenges that are outside the purview of the Flood Future Report.

3.2 Opportunities and Challenges from Local Agencies

As part of the information gathering effort, 76 meetings were conducted with 142 agencies between August and October of 2011. The information gathering effort included meeting with at least one agency from each of the 58 counties in the state. Local agencies were asked a series of questions regarding a range of issues addressed in the SFMP Program, including flood management priorities, opportunities, challenges, and financial strategies. The information gathering checklist is included in Appendix G.10 of *Attachment E: Existing Conditions of Flood Management in California (Information Gathering Findings)*. Over 350 opportunities and challenges were identified from that effort. A table that compiles and presents a summary of the opportunities and challenges is included in Appendix B of this TM.

Flooding in San Diego County, California, December 2010

A review of these opportunities and challenges revealed a number of recurring themes. For example, regardless of the size or land use category, counties expressed frustration with contradictory objectives from the various multiple resource agencies while trying to comply with permit requirements on existing and proposed flood management projects. For Federally funded projects, the definition of operation and maintenance (O&M) includes the local entity's financial obligation to operate, maintain, repair, rehabilitate, and replace (OMRR&R) the implemented project. OMRR&R is a non-Federal responsibility when local, regional and/or State entities partner on a Federal project. References to O&M provided in this report include OMRR&R responsibilities when the project is a Federal/non-Federal partnership.

The following list of key topics represents a synthesis of opportunities and challenges of local agencies:

- **Coordination and alignment with and within local, State, Tribal, and Federal agencies involved in flood management need to improve**. More than 80 percent of the information gathering interviews discussed the need for improved coordination and alignment between flood management agencies. These discussions included:
  - Local agencies encouraged DWR to take a proactive approach to help communicate needs to Federal agencies.
  - Delayed permit approvals and complex permitting requirements are obstacles to flood risk reduction. Generally, agencies seemed frustrated with the lack of coordination between regulatory and resource agencies. Many agencies wait years for permits, resulting in poorly maintained projects and missed funding opportunities for new projects. The environmental regulatory process has become so costly that agencies, large and small, have been unable to:
    - Start a project because by the time the agency has enough funding to start, regulations have changed.
    - Start a project because during the processes of design and permitting, new vegetation has established (wetlands, for example), thereby changing mitigation requirements.
    - Comply or come to terms with contradicting objectives and requirements of multiple regulatory agencies (such as the Regional Water Quality Control Board, California Department of Fish and Wildlife, and USACE).
  - Flood management responsibilities are fragmented. Responsibilities for planning, administering, financing, and maintaining flood management facilities and emergency response programs are usually spread among several agencies.
    - Agency roles and responsibilities are both defined and sometimes limited by how the agency was formed—enabling legislation, charter, memorandum of understanding with other agencies, or ownership. Many agencies have funding constraints because of how they were formed.
    - The number and complexity of flood management entities and their different responsibilities result in numerous challenges for planning, funding, permitting, constructing, operating, and maintaining flood management facilities.
      - Governance issues have resulted in intra-agency and inter-agency issues about flood management, land use, and emergency management responsibilities.

Key Issues Identified by local agencies:

- ✓ Complex permitting requirements
- ✓ Flood management is fragmented
- ✓ Lack of reliable, sustained funding
- ✓ Projects are not prioritized from a systemwide or multiple-benefit perspective
- ✓ Different methodologies and inadequate data
- ✓ Public understanding of flood risk is inadequate
- ✓ Emergency preparedness and response does not always receive necessary funding in all regions of the state
- ✓ Land use decisions may not adequately prioritize public safety

- **Lack of reliable, sustained funding puts California at significant risk.** Inadequate funding for flood management O&M and improvements makes flood risk reduction difficult or impossible for many local agencies. More than 80 percent of the information gathering interviews involved discussions about the need for sustainable-projects and O&M financing. These discussions were divided into different subcategories, including:
  - DWR should take a proactive approach in helping small/rural/agricultural communities to participate in the grant application process. For example:
    - Small agencies with limited staff and small populations have large areas to cover but do not have the tax base or funding mechanism to be able to participate in or apply through the grant process.
    - Projects that are built by Federal and State/local partnerships can underestimate the true cost of operation and maintenance due the fact that costs are estimated early in the project development process. Agencies, large and small, appreciate having flood infrastructure designed and built in their communities by the Federal and state/local government, but then these agencies must take on the responsibility of maintaining those projects. Oftentimes, the local agencies do not have enough funding for O&M, resulting in many projects losing hydraulic capacity over time. In some cases, the agencies have lost their permit to maintain the facilities.
    - Permitting and funding limit the maintenance and sustainability of flood infrastructure by these agencies.
  - FEMA's new levee accreditation program has put a huge financial burden on many communities that do not have the funding mechanism to build new or to improve existing flood infrastructure. Local agencies want DWR to work with Federal agencies to develop a systematic approach to helping communities identify ways to plan for, construct, and finance these needed upgrades.
  - Local agencies want to see adjustments to the USACE benefit-to-cost (B/C) ratio analysis for rural and disadvantaged areas to include other benefits not currently captured. For example, projects impacting an area in need of protection can be engineered to assist in this protection while accomplishing their primary goals (such as construction of a road or trail along with irrigation projects).
  - Local agencies want to see a legislative change to allow flood control districts to operate as a utility with rate payers, as opposed to relying exclusively upon land-based assessments subject to Proposition 218 requirements. Agencies operate at the mercy of bond cycles and grants for funding. The result is that the average household spending for drinking water and wastewater services is four to eight times the amount spent for flood management.

- **Flood Management projects are not prioritized from a systemwide or multiple-benefit perspective.** State and Federal flood management funding has traditionally been provided to narrow-benefit local projects. More than half of the information gathering interviewees supported the need for integrated approaches to flood management issues. Several participants recommended improving Integrated Regional Water Management (IRWM) Plans and grant processes to specifically support rural communities while including these communities in regional planning and solutions. Comprehensive, regional, multipurpose approaches will better include affected communities in project planning and execution and will ensure that a broader suite of solution strategies are considered.
- **Different methodologies and inadequate data make risk assessment complex and costly to complete.** Almost one-half of the information gathering interviews involved discussions about the need to improve and implement actions and tools that would enhance flood management from an IWM perspective. These tools include increased gauging and monitoring of meteorological data for forecasting, tools to forecast sea level rise, improved hydraulic models, advanced mapping technologies, and improvements to risk assessment solutions.

Napa, California, December 2005

- **Public understanding of flood risk is inadequate.** If residents are aware that they live or work in a flood-prone area, they typically do not understand that flood management facilities do not provide 100 percent protection for public safety. One-fourth of the information gathering interviewees discussed needing assistance to increase awareness about flood exposure and residual flood risk. Local agencies encourage DWR to improve or increase IWM awareness among all agencies. IWM enables sharing the cost of projects, but some agencies are not aware of the advantages of an IWM planning approach. Some agencies are wary of IWM due to perceptions that it could result in yet more environmental restrictions, longer permitting processes, shorter windows for maintenance operations, and increased mitigation requirements.
- **Emergency preparedness and response do not always receive necessary funding in all regions of the state.** Residents depend on first responders to have the personnel, expertise, and equipment necessary to do their jobs, especially during community-wide disasters. Several information gathering interviews included discussions about the need for assistance with emergency preparedness and response. In several areas of the state, flood infrastructure is maintained or improved only after a major flood results in significant damage because of a lack of funding for adequate maintenance of existing facilities or construction of new facilities. Agencies want to see a proactive, preventive approach to flood management. In addition, some rural communities suggested that the National Flood Insurance Program (NFIP) needs modifications for nonurban areas.
- **Land use decisions might not adequately prioritize public safety.** Uninformed residents and policymakers can make decisions that put people and property at increased risk. Several information gathering interviews included discussions about the need for improved coordination and decision making for land use and development planning. In some areas of the state, flood managers are not involved in the land use planning processes.

This information was used to identify two major categories and four subcategories within which all of the opportunities and challenges fit. Most opportunities and challenges overlapped into different categories; however, at the core, the issues fit either in financing or in policy and process. Within these two categories, the opportunities and challenges fell into four subcategories—flood response, flood infrastructure maintenance, knowledge/awareness, and project and planning, as shown in Figure J-3. Within these four subcategories, several recommendation topic areas were identified, as listed in Table J-1.

Figure J-3. Initial Categories and Subcategories

Table J-1. Subcategories and Topic Areas

Subcategories	Topic Areas
Flood Response	Response Notifications Emergency permitting
Flood Infrastructure Maintenance	O&M permitting Preparedness Reservoir operations Rehabilitation
Knowledge/Awareness	Outreach/public information and education Research Monitoring/gauging of flows and other data Flood data Tool development Risk methodologies
Project and Planning	Land use planning, emergency action planning, IWM strategies, structural and nonstructural improvements Insurance Permitting Upgrade of existing infrastructure

3.3 Recommendations from Previous Documents

The Recommendations Team identified and compiled a list of recommendations from previous studies and reports on flood management. The specific past studies and reports that were reviewed for recommendations are listed in Table J-2. These recommendations were combined with the opportunities and challenges gathered from local agencies during the information gathering effort and are included in Appendix B of this attachment.

The recommendations from these past efforts included several different themes that were relevant to the SFMP effort and some that were too specific for the statewide effort. For example, some of the past efforts were focused on a single type of flooding (e.g., *Findings and Recommendations Report* by the Alluvial Fan Task Force [2010]) or were developed for a specific geographic area (e.g., *A Blueprint for Change –Sharing the Challenge: Floodplain Management into the 21st Century*, which addresses issues in the Upper Mississippi River Basin, by the Interagency Floodplain Management Review Committee [1994]). Examples of the relevant recommendations from these documents are provided below:

- Local, State, and Federal agencies should consider the risk to life and property from reasonably foreseeable floods when making their land use and floodplain management decisions. To accomplish this objective, decision makers need better information and improved tools. In addition, better tools are needed to comply with the FEMA NFIP.
- Local, State, and Federal agencies should implement multi-objective floodplain management on a watershed basis. Where feasible, projects should provide

adequate protection for natural, recreational, residential, business, economic, agricultural, and cultural resources, as well as for water quality and supply.

- Improve the effectiveness of emergency response programs.
- Examine existing flood insurance requirements and consider the creation of a "California Flood Insurance Fund," a sustainable State insurance fund to compensate property owners for flood damage.
- Change the operating rules of removing reservoirs to incorporate and reflect modern forecasting capabilities.
- Communicate to the public and each property owner in the floodplain the specific risks of occupying areas at risk for flooding, and provide steps that property owners can take to reduce their exposure to flood damages.
- To focus attention on comprehensive evaluation of all Federal water project and program effects, the President should immediately establish environmental quality and national economic development as co-equal objectives of planning conducted under the Principles and Guidelines. Principles and Guidelines should be revised to accommodate the new objectives and to ensure full consideration of nonstructural alternatives.

Table J-2. List of Resources

Resource	Summary
DWR. *California Flood Management: An Evaluation of Flood Damage Prevention Programs.* Bulletin 199. September 1980.	Document examines the California Flood Damage Prevention Programs, makes recommendations, and examines policies and criteria for flood management policy in California. Examines historical floods, including frequency and magnitude, as well as existing management systems. Includes a region-by-region aerial assessment of flood damage prevention in California.
Interagency Floodplain Management Review Committee. *A Blueprint for Change –Sharing the Challenge: Floodplain Management into the 21st Century.* Submitted to the Administration Floodplain Management Task Force. June 1994.	A national context of floodplain management strategies, examining what is currently being used, as well as successes and failures from human intervention. Looking at the future of floodplain management and how to organize for future success. Specific information on the Upper Mississippi River Basin.
California Flood Emergency Action Team. *Final Report.* June 1997.	Report from the Governor's Flood Emergency Action Team (FEAT) that makes recommendations as a result of examining the flood events of early 1997 and from input received from local citizens through FEAT advisory workshops.
Association of State Floodplain Managers. *NAI-No Adverse Impact Floodplain Management Report.* March 10, 2008.	Examines flooding issues nationwide and discusses the No Adverse Impact (NAI) Principles, which give communities a way to promote responsible floodplain development through community-based decision making. Promotes the use of NAI Floodplain Management.
California Floodplain Management Task Force. *Final Recommendations Report.* December 2002.	Report from task force that examines floodplain management in the state, examines a reasonably foreseeable flood to create a better understanding and reduce the risks of such reasonably foreseeable flooding. Looks at multi-objective management approach, local assistance, and funding.
USACE, Sacramento District. *Sacramento and San Joaquin River Basins Comprehensive Study.* 2002.	Details a USACE plan to define a process for developing future projects in the Central Valley area. Serves as guidance for improvements to flood management and ecosystem restoration in the Sacramento River and San Joaquin River basins.

Table J-2. List of Resources

Resource	Summary
DWR. *Flood Warnings: Responding to California's Flood Crisis*. January 2005.	Documents flood management in California's Central Valley, including the challenges, risks of levee failures, concerns for the Sacramento-San Joaquin Delta (Delta), growing risk of flood damage and loss of life, and funding. Recommended strategies are given in response to the flood management crisis.
Interagency Performance Evaluation Task Force, USACE. *Draft Final Report of the Interagency Performance Evaluation Task Force Performance Evaluation of the New Orleans and Southeast Louisiana Hurricane Protection System*. June 1, 2006.	A performance evaluation of the New Orleans and Southeast Louisiana hurricane protection system during Hurricane Katrina, with the goal of understanding what happened during Katrina and why.
Independent Review Panel. *A California Challenge—Flooding in the Central Valley*. Prepared for the DWR, State of California. October 15, 2007.	A report that examined flood management in the Central Valley, looking at vulnerability of flood-prone areas, future risks, and current floodplain management strategies. The report assessed the history of flooding and made a series of recommendations.
CEAC Statewide Flood Control Needs Assessment Team. *Results of Interviews to Gather Information to Scope the Flood Control Needs Assessment Memorandum*. April 2, 2008.	Results from a series of interviews about what local agencies would like to see in a statewide assessment. Also, discussed qualitatively the extent to which existing capital budgets and project plans incorporate a comprehensive assessment of flood management needs and the extent to which plans identify projects and other solutions to satisfy those needs.
Blue Ribbon Task Force. *Delta Vision Strategic Plan*. October 2008.	Report from the Delta Vision Blue Ribbon Task Force that created a vision to repair the ecological damage to the Delta and a strategic plan that is designed to sustain the Delta while ensuring reliable water supply to the majority of California. Includes a series of goals and strategies.
California Water Plan (CWP) Update 2009. Volume 2, Chapter 28, Flood Risk Management, "Connections to Other Resource Management Strategies." 2009.	2009 update to the CWP that looked at areas to improve flood management in the state. Flood Management grouped into three categories—(1) Structural Approaches, (2) Land Use Management, and (3) Disaster Preparedness, Response, and Recovery. Examines costs and benefits of different flood management strategies.
Associated Programme on Flood Management / World Meteorological Organization / Global Water Partnership. "Integrated Flood Management Concept Paper." 2009.	Report examines IWM and defines the concept and elements. Discusses putting IWM into practice. Considers floods and the development process, traditional flood management options, and challenges.
Alluvial Fan Task Force. *Findings and Recommendations Report*. July 2010.	Report examines alluvial fans and the specific flooding risks and hazards associated with them. Recommendations are made to help understand and manage floods in these unique areas.
DWR. *2012 Central Valley Flood Management Plan*. December 2011.	Guidance document to help California in flood management along the Sacramento and San Joaquin River system. The Plan proposes a systemwide investment approach for sustainable IWM in areas currently protected by facilities of the State Plan of Flood Control (SPFC).

3.4 Recommendations from Flood Experts

Another source of recommendations was flood experts, including representatives from DWR (FloodSAFE Environmental Stewardship and Statewide Resources Office, Division of Statewide Integrated Water Management, and the Division of Flood Management), USACE (South Pacific Division, along with Los Angeles, Sacramento, and San Francisco Districts), as well as others. These flood experts were asked to provide the top 10 recommendations for the Flood Future Report. More than 40 flood experts were contacted, covering a spectrum of specialties, including economics, flood management, environmental restoration, and planning. A sample of their responses is provided in Table J-3 and the complete list of responses is provided in Appendix B to this document.

Table J-3. Sample of Recommendations from Flood Experts

Sample Recommendations
Continue to promote wise building practices and wise land use, consistent with Urban Level of Protection criteria to minimize future risk.
Provide adequate and sustainable funding for O&M, repair, rehabilitation, and replacement of existing facilities. Only with this funding can we be sure that we will not experience further degradation of performance of existing system features and a corresponding increase of flood risk.
Enhance systems for—then ensure adequate and sustainable funding for—managing residual risk through emergency response regardless of other actions taken or measures implemented. This will include expanding the system for weather and water data collection and sharing throughout California, enhancing flood forecasting in cooperation with the National Weather Service, improving real-time communication about flooding, developing and updating flood emergency response systems, and so on. With a more effective flood response system, exposure of people and property can be reduced, and residual risk can be managed.
Ensure/maintain capacity of existing channels, removing debris, sediment, and other obstructions to the extent possible. Loss of capacity is a critical problem throughout the state, one for which engineered solutions are well known but for which funding is not consistently available.
Take action to ensure that ratings (stage-flow relationships) are current at key locations, particularly if those locations are critical control points for issuing flood warnings or for decision making at reservoir operations.
Revisit, revise, and update reservoir water control manuals, considering opportunities for better use of real-time data and forecast-based operations versus static rule curves.
Restrict land use of the dairy (cattle/confined-animals) industry, requiring a plan for relocation of animals and milking facilities that are in the floodplain. This is a health and safety issue regarding disposal of animal carcasses.
Provide locals with funding for studies, designs, and construction through grant programs. The programs should be structured to have a reasonable standard for benefits and should rely on local agencies for planning, design, right-of-way acquisition, O&M, repair, rehabilitation, and replacement.
Design/deploy/maintain a warning system for levee integrity, with sensors to detect changes in levees that indicate impending failure. Couple that with enhanced emergency response systems to decrease exposure and flood risk.
Act to expedite permitting for flood management measures. This includes State permitting by the Central Valley Flood Protection Board, as well as Federal permitting that might be required under Section 408, and other resource-related permits.
Address costs of implementing the Endangered Species Act of 1973 and other environmental compliance measures.
Address inability of the Federal government to provide adequate funding to progress studies, construction, and maintenance.
Use recommendations from the Central Valley Flood Protection Plan (CVFPP) as a starting point for recommendations.
Develop a statewide and regional systems approach to projects similar to the Everglades Project – need financing and policy changes.
Form regional working groups for Flood Management.
Update FEMA NFIP insurance criteria to better align with USACE.
Perform a gap analysis for high-risk areas.
Develop special sales tax for high-risk areas.
Require that all new developments comply with applicable Building Code requirements.

3.5 Consolidation of Opportunities and Challenges

Once the opportunities and challenges from local agencies, past reports and studies, and flood experts were consolidated into a single list, the following themes were identified:

- Regional flood risk assessments are needed to understand flood risk.
- Public and policymaker awareness about flood risks needs to improve to facilitate informed decisions.
- Flood emergency preparedness, response, and recovery programs need support to reduce flood impacts.
- Land use planning practices should be encouraged to reduce the consequences of flooding.
- Implement a regional integrated multi-objective approach that promotes achievement of the goals in the Flood Future Report.
- Flood management should be conducted from regional, systemwide, and statewide perspectives to maximize resources.
- Public agency alignment should be facilitated to improve flood management planning, policies, and investments.
- Infrastructure improvements and other innovations should be conducted by flood and water management agencies.
- Sufficient and stable funding mechanisms are needed to reduce risk.
- High-level challenges should be addressed to improve agency collaboration and improve sustainable funding.

The Project Work Team used these themes to classify all of the opportunities and challenges, as well as to identify a list of potential actions under each theme. The Recommendations Team then reviewed and refined the list of themes and potential actions. These themes evolved into draft recommendations and potential actions, which were reviewed and refined by the Advisory Team and the Senior Oversight Committee multiple times prior to being finalized. The final recommendations are included in Section 5.

4.0 High-Level Challenges Facing Flood Management

Some long-range issues exist for which both DWR and USACE are working to find solutions. Although they are outside the scope of the Flood Future Report, these issues should be acknowledged because they were identified as key concerns during the information gathering effort. The high-level challenges discussed below, along with a summary of the current status of the issues, include:

- Sacramento – San Joaquin River Delta
- Federal Disaster Relief Policies
- Federal Credit for Non-Federal In-kind Contributions
- Federal Budgeting Process
- NFIP Modernization

4.1 Sacramento-San Joaquin River Delta

The Sacramento-San Joaquin River Delta and Suisun Marsh are at the confluence of the Sacramento River and San Joaquin River basins, which drain about 40 percent of California. The Delta is a unique place defined by its ecological value as the transitional ecosystem from fresh to salt water and by its extensive levee system. The Delta consists of approximately 70 major islands and tracts encompassing about 700,000 acres located behind levees. Virtually all assets and attributes of the Delta are dependent upon this levee system. Levees reduce flood risk to land areas near and below sea level and provide for a network of channels that direct movement of water across the Delta. The State of California has significant interest in the benefits provided by Delta levees, which have been legislated in the California Water Code (Section 12981, for example). The Suisun Marsh is a similar wetlands area immediately downstream from the Delta, encompassing an additional 50,000 acres (see Figure J-4).

Upper Jones Tract Levee Break, June 2004

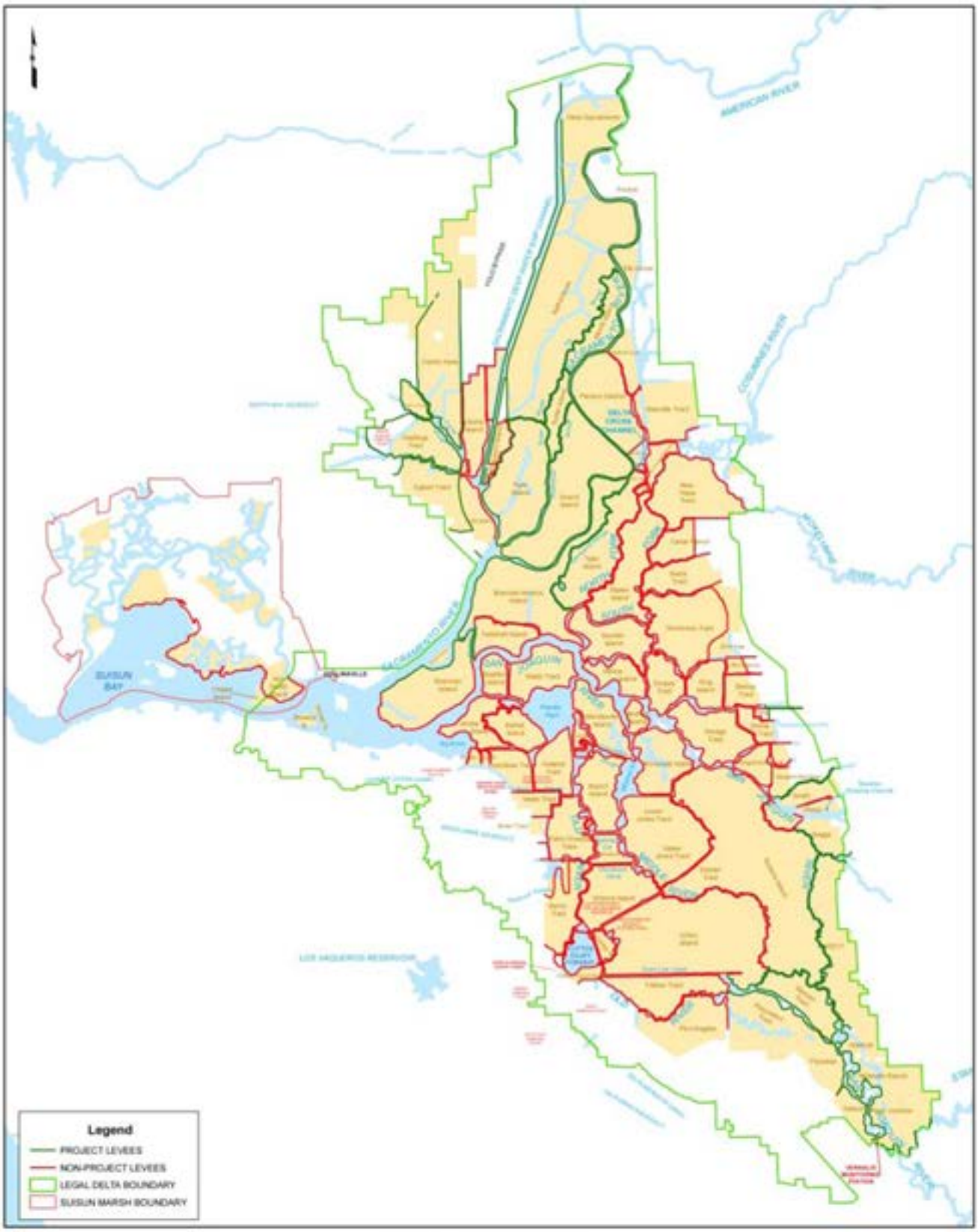


Figure J-4. Delta and Suisun Marsh – Project and Nonproject Levees

The Delta is unique, not only as a levee system but also as an influence on existing DWR flood management programs. Consider the following:

- The Delta region has the largest watershed of all regions reported in the Flood Future Report.
- Levees protect areas that are primarily below sea level. Much of the land in the Delta is at or below sea level, and its levees continuously protect Delta islands and tracts from inundation. Unlike upland levees that need only to provide protection from significant rises in river depth as a result of heavy storms or snowmelt, Delta levees are under continual stress that is further exacerbated with higher river flows, higher tides, and strong wind events. The deep floodplains of the Delta are a concern to Delta residents but also can create large logistical problems for recovery from flooding. When most upland levees outside the Delta fail, inundation of protected areas normally will drain naturally by gravity or with minor intervention within days or weeks as river levels subside; however, in the Delta, inundation will continue indefinitely without proactive and expensive action to close levee breaches and pump the islands dry. This will be further exacerbated by the effects of climate change.
- Delta levees normally have water against them and act as dams even though California Water Code 6004.c states that the levees shall not be considered to be dams. The levees are acting as dams most of the time rather than as typical levees, which hold back water only infrequently.
- Delta levees experience high water more frequently than upstream levees. For example, in upland sites outside the Delta, rivers generally must rise more than 20 feet to move into flood stage. However, it is not unusual for the normal stage of the west Delta to be less than 10 feet below flood stage, or for high tide and wind to send waves over the crest of the levee.
- Delta levees provide protection for localized areas, but the levees also function as a network. Levees reduce the chance of localized flooding to buildings, equipment, agricultural resources, and critical infrastructure (such as highways and railroads). Also, the network of levees supports channels that convey water supplies and maintains the configuration of the Delta. This same interconnectivity could result in a chain reaction of levee failures.
- The quality of water and export water from the Delta is vulnerable to failure of levees. The failure of Delta levees can degrade water quality because of saltwater intrusion, which could result from the failure, making the water nearly useless for in-Delta agricultural and for municipal water supply and export. For example, a levee failure in 1972, which occurred during a time when the system was most vulnerable, shut down the export water system for about 2 weeks. Clearing the salt from the Delta as a result of this levee failure required the release of more than half a million acre-feet of water from storage. The loss of freshwater supply threatens livelihoods and the State economy. The economic losses

resulting from a major earthquake that causes multiple failures of levees could be measured in the tens of billions of dollars.

- Recovery of flooded islands is costly. Closing Delta levee breaches and dewatering inundated areas are potentially very expensive. The actual cost of recovery is dependent on conditions existing at the time and on the method of repair. Repairing the breach and dewatering the island following the 2004 failure of the Jones Tract levee cost the State more than $100 million.
- Delta levees preserve opportunities for major planning processes. Currently, two major planning efforts for the Delta are in process and not yet concluded. The Bay Delta Conservation Plan (BDCP) and the Delta Stewardship Council (DSC) Delta Plan are both considering comprehensive and multi-faceted approaches to make the Delta more sustainable for water supply and the ecosystem. BDCP is now in its seventh year, and the Delta Plan effort is entering its fourth year. Both efforts are guided by the Sacramento-San Joaquin Delta Reform Act of 2009, a legislatively adopted doctrine of the "co-equal goals" of reliable water supply and a healthy Delta ecosystem (California Water Code § 85054). Additionally, this Act legislatively mandated the DSC to adopt a legally enforceable Delta Plan. In the context of these two substantial efforts in the Delta, this SFMP evaluation will provide only characterization and will not attempt to analyze issues that these two efforts are currently engaging.
- Delta levees provide a home for many wildlife and habitat species. The Delta, in its current configuration, provides an ecosystem for more than 500 species, including several rare and endangered species. The Delta levees preserve the in-channel islands that are the last remnant of the historical marsh that was typical of the Delta and the Central Valley adjacent to the rivers of 150 years ago. Remaining habitats on the levees, on the in-channel islands, and on many of the Delta's agricultural islands support avian species that use the Pacific Flyway and several special-status species. Further, preservation of existing habitats and islands for development of future habitats are critical to the success of the BDCP and the interests of the DSC.
- The Delta was built by a public-private partnership. The Delta was reclaimed by reclamation districts (RDs) (public agencies representing the interests of the owners of the Delta islands) that build and maintain the current levee system. These RDs continue to maintain levees to protect assets on the islands and preserve the extended benefits of the system. Many of the assets are of significant State interest. Because the levees are now part of the infrastructure that conveys water across the Delta to the export pumps, the California Legislature provided for the State to share in the costs of maintenance and improvement of the levees in the 1973 Delta Levee Maintenance Act (Way Bill). Since 1973, the State has contributed funds to pay more than 50 percent of the costs for qualifying

maintenance and improvement of the Delta levee system, although other costs associated with levees do not qualify for reimbursement.

- A flooded island could affect adjoining islands. Historical meandering channels throughout the Delta and buried sand layers provide potential seepage pathways; thus, when one island floods, the increased seepage pressures might affect the stability of levees on adjoining islands. Maintenance on islands adjoining a flooded island could also increase because of the more frequent and larger wind waves from longer wind fetch lengths.

The Delta is a prime example of why IWM is important in California. Due to its location, importance for much of California's water supply, deteriorating ecosystem conditions, questions about levee integrity and feasibility for improvements, and other issues, flood management cannot be considered in isolation of other resource needs. The importance of the Delta and its levees to the State has been included many times in legislation and codes. In addition, multiple Federal and State processes are underway to solve a variety of resource management problems in the Delta, and several include consideration of levee improvements or other flood management actions. These plans, especially the BDCP and the DSC Delta Plan, are expected to alter Delta conditions and will influence the future of IWM in the Delta. Implementation of these programs would alter ecosystem conditions and water infrastructure, which would influence Delta flood risk; therefore, flood management in the Delta needs to be considered as part of these planning efforts.

4.2 USACE Public Law 84-99 Relief Policies

USACE administers a fund for emergency management activities pursuant to the Flood Control and Coastal Emergency Act, commonly known as USACE's authority under Public Law (PL) 84-99. PL 84-99, 69 Stat. 186, codified at 33 U.S.C. § 701n, allows the USACE to undertake activities, including disaster preparedness, advance measures, emergency operations (flood response and post-flood response), rehabilitation of flood damage reduction projects that have been damaged or destroyed by flood, protection or repair of Federally authorized shore protective works that are threatened or damaged by coastal storms, and provisions for emergency water supply due to drought or contaminated source.

A particular flood management system is required to be active in the PL 84-99 program at the time of the flood event to be eligible for Federal funds for rehabilitation, based on USACE inspections. An eligible flood risk reduction system that is damaged by a flood event will be rehabilitated and restored to its predisaster status. Rehabilitation of Federal systems will be Federally funded, and non-Federal systems will rehabilitated with a cost-share between Federal and non-Federal sponsors.

Local flood management agencies have expressed concern about the standards to retain active status in the PL 84-99 rehabilitation program for reasons that include cost to comply with the policy, lack of local O&M funding, potential environmental impacts, conflicting agency requirements, and so on.

4.3 Federal Credit for Non-Federal In-kind Contributions

Local agencies interviewed for the Flood Future Report expressed concern that utilizing Section 221 in lieu of Section 104 crediting might slow local projects efforts. Policies regarding in-kind credit consideration for implementation of advance flood risk management measures by a local entity have been amended. New Section 104 applications (Section 104 of the Water Resources Development Act [WRDA] of 1986) will no longer be considered. Rather, Section 221 authority crediting may be used (Section 221 of the Flood Control Act of 1970, as amended by Section 2003 of the WRDA of 2007, codified under 42 U.S.C. § 1962d-5b and ER 1165-2-208 dated February 17, 2012). Section 221 provides a more comprehensive authority for affording such credit to a non-Federal entity.

House at Risk due to Bank Erosion in Hamilton City

The types of eligible in-kind contributions for which credit could be afforded include planning activities, designs related to construction, and construction. Pursuant to Section 221, credit for allowable in-kind contributions requires an agreement with USACE before work begins. Such agreements include:

- In the case where there is an existing feasibility cost-sharing agreement (FCSA), design agreement, or project partnership agreement (PPA), the sponsor may provide in-kind contributions in accordance with terms of the applicable agreement.
- In the case of projects that are or will be specifically authorized (and no FCSA or PPA exists), an in-kind memorandum of understanding (MOU) for planning may be executed once the USACE South Pacific Division Commander's certification of a reconnaissance report (905b Report) is released. For construction projects, an MOU may be executed once a draft feasibility report has been issued for public review.
- In cases where projects are to be implemented under the Continuing Authority Program or a regional authority (and no FCSA or PPA exists), an MOU can be executed after the USACE South Pacific Division Commander approves the initiation of the feasibility study. An MOU for design and implementation may be executed after the Commander approves the project's decision document.
- Credit for construction of a project, or separable element is limited to credit toward all features of the project covered by specific Project Partnership Agreements or amendment. Excess credit may not be transferred to features of the project not covered by the agreement or to other projects.

Upon completion of the advanced work, USACE would prepare an Integral Determination Report, and the process for determining final credit is undertaken.

4.4 Budgeting for Flood Management

Flood risk management in California is a shared responsibility among local, State, and Federal agencies. These agencies face daunting challenges in balancing their budgets. Shortfalls in agency budgets are issues of great concern in planning for implementation of programs that rely on complying with Federal government cost-sharing requirements. Local agencies believe that reductions in Federal spending could signal that USACE and other agencies might not continue to fund flood management projects at the same level. Another issue is that local, State, and Federal budgeting processes do not have the same fiscal calendars and planning horizons.

Flooding along West Fork Carson River, 1997

4.4.1 Local Agency Budgeting Process

Local agency budgets are determined on an annual basis. A local agency's budget fiscal year is usually consistent with the State (July 1 to June 30). Typically, local flood management agencies either receive part of the general fund of an agency or rely on assessments to fund projects and O&M. Agencies that are funded through a general fund have to compete with other projects and county needs (e.g., water, sewer, transportation, parks) for funding both capital projects and O&M. Some agencies are partially funded through development fees or special project assessments that can be limited by assessment zone boundaries. This could be an issue if upstream conditions in one assessment zone cause flooding in a downstream assessment zone, but funds for the upstream zone cannot be used to pay for the downstream improvements. The issue could be significant when a county in a rural assessment zone has upstream problems that result in flooding in downstream urban areas. For most local agencies, revenue is generated by a type of property tax assessment. Unlike other states, California's ability to invest in its infrastructure is limited by voter-approved initiatives, such as Proposition 13 (limiting property tax increases) and Proposition 218 (requiring voter approval for new assessments).

50th Street Los Angeles County Post Flash Flood, 2005

4.4.2 State Budgeting Process

State budgets are determined annually. The governor of California puts forward a budget in January, which is reviewed and then revised in May based on updated State revenue projections. The legislature should adopt a revised budget by June 30. State fiscal year budget is from July 1 to June 30. State agencies such as DWR are primarily funded under the State's general fund but in recent decades have received significant funding for capital projects from bonds such as those from Propositions 204, 12, 13, 40, 50, 84, and IE, as discussed previously.

4.4.3 Federal Appropriations Process

Figure J-5 illustrates the annual appropriation cycle for the USACE Civil Works (CW) Energy and Water appropriations process. The USACE CW budget is part of the President's discretionary budget, a small part of the overall Federal budget.

On the surface, the preparation is fairly straightforward and follows the schedule shown in Figure J-5. In January, the Office of Management and Budget (OMB) issues guidance to the government agencies for preparing their budget requests. In the March-April timeframe, USACE finalizes guidance for the agency's budget submission. In September, government agencies submit their requests to the OMB. In November-December, OMB issues a passback, and in January of the following year, each agency prepares its justifications and budget book for the President's Budget release. In February, the President initiates the appropriation process by submitting his annual budget for the upcoming fiscal year to Congress. The President recommends spending levels for various programs and agencies of the Federal government in the form of budgetary authority. When the President submits his budget to Congress, USACE provides detailed justification materials to the House and Senate appropriations subcommittees, who then hold hearings. The USACE focuses the justification details for the USACE appropriations and authorizations subcommittees, and members of the agency testify. After the hearings are completed and the House and Senate appropriations committees have received their spending ceilings, the subcommittees begin to mark up the regular bills and report them to the full committees.

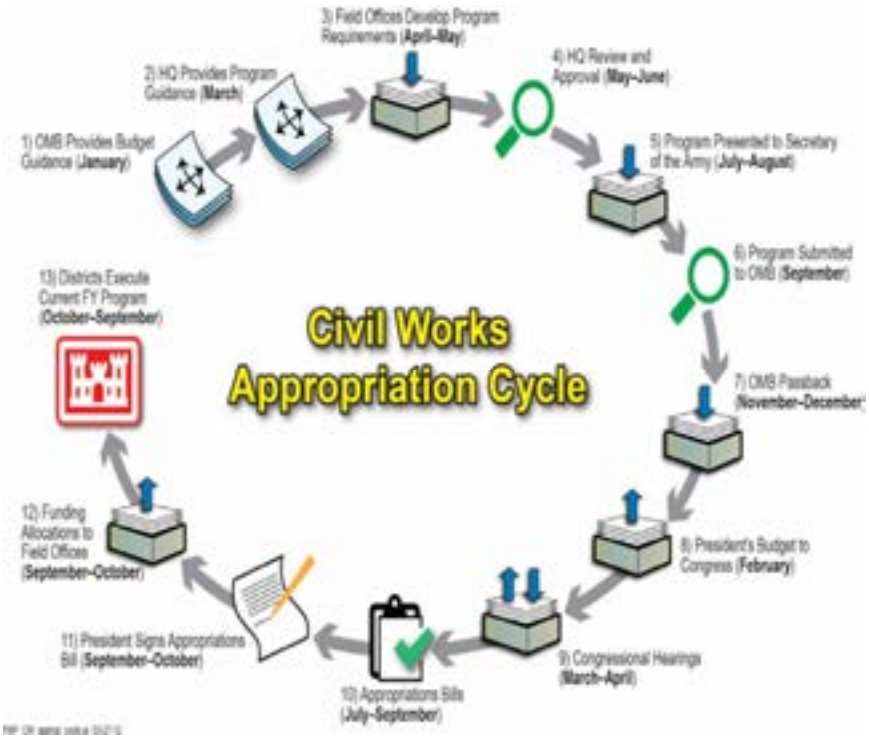


Figure J-5. Annual Appropriation Cycle

This report is made to the House or Senate, and then the bill is brought to the floor. Next, the bill goes to Conference, where members of the House and Senate appropriations subcommittees negotiate passed bills with the full committees between the House and Senate. Once there is an agreement, Congress sends the bill to the President to sign. The appropriations bill is passed as an Act, and USACE receives funding allocations for that fiscal year.

4.4.4 USACE Budget Development

Federal agency budgets are determined annually, and the President's discretionary spending budget is established by policy at the Office of Management and Budget

(OMB) to assist in developing priorities for discretionary expenditures in the President's budget consistent with the policy to reduce the national deficit—with a balanced budget as the goal on an annual basis. Federal budget fiscal year is from October 1 through September 30.

USACE Civil Works budgeting has evolved based on several recent and significant shifts in policies and strategic goals. These are:

- Decreased Federal spending is anticipated to continue to decline for the next several years.
- USACE cannot continue to fund all studies or ongoing projects at the same rate with significantly decreased appropriations.
- Completion of studies and projects on time and within budget is critical to the timely upgrading, construction, and maintenance of the nation's infrastructure.
- More public-private partnerships are needed to help finance the modernization of this infrastructure.

USACE's prioritization of studies and projects through business line budgeting, as well as its subsequent funding, will ensure that USACE projects are both cost effective and completed in a timely manner, resulting in:

- Funding fewer studies and projects in any given budget year
- Increased funding over shorter periods for fewer, high-priority projects
- More reliance on public-private partnerships to provide an adequate funding stream over a given period
- More sophisticated prioritization methodologies that focus on economic, environmental, life safety, and social criteria to ensure that the most optimal mix of critical work is funded first

Sacramento River, 2005

4.4.5 NFIP Modernization

The National Flood Insurance Program, which was instituted in 1968, is managed by FEMA and requires implementation of prescribed floodplain management practices to obtain Federally subsidized flood insurance. The NFIP requirements have evolved over time as more has become known, and best practices have been added. Early FIRMs did not accurately account for the risk reduction required within 100-year floodplain. Not until the late 1970s were certification requirements for levees developed and implemented with new maps.

In recent years, FEMA has been updating the FIRMs for all communities, which involved updating existing levee information to provide risk reduction within the 100-year floodplain. When the new maps no longer recognized levees as providing risk reduction, many communities, particularly in rural agricultural areas, were deemed to be in a 100-year special flood hazard area requiring stricter building standards. Many communities consider that the requirements make it difficult to invest in agriculturally related operations or commercial and housing facilities. In some communities, flood infrastructure might not be FEMA-defined levees, but instead consist of channels and ditches. As a result, some areas that are located behind non-levee infrastructure might be ineligible for the NFIP. Modernization of the NFIP could be achieved through program reauthorization, statutory amendment, and/or regulatory changes. Goals of modernization could include updated criteria for designations of FEMA flood zones or development of a new agricultural zone. In 2012, the NFIP was reauthorized through September 30, 2017, and includes reforms that are designed to assist local and State agencies in implementing policies to adapt to sea level rise and flooding related to climate change.

Highway 1 Bridge over the Carmel River, March 1995

5.0 Recommendations

5.1 Introduction

California faces a challenging future due to existing and increasing flood risk. Approximately 7 million people and $580 billion in assets are exposed to flooding statewide. Flooding occurs in every part of California in different forms—from tsunamis along the coast to alluvial fan flooding in the deserts, and from deep flooding in the Central Valley to flash flooding in southern California. Flood management is the responsibility of a complex array of more than 1,300 agencies with at least 42 different governance structures. These agencies are responsible for operating and maintaining more than 19,000 miles of levees, 1,500 dams, 1,000 debris basins, and 36 major reservoirs. Capital investment in flood management in the last decade is more than $11 billion; however, this includes one-time funding from Propositions 1E and 84 bonds. In general, local funding for capital investment and O&M is declining along with the economy. Federal funding for project investments has been declining, and State funding has been tied to bond funding. Current capital investment needs for California are greater than $50 billion, which is far higher than existing available funding. This estimate does not include the overall cost to provide adequate levels of flood protection statewide, which would exceed $100 billion. New strategies must be implemented in the future to provide appropriate levels of flood protection throughout California.

5.2 An Integrated Water Management Approach

The success of flood management in California can be enhanced by IWM. DWR and USACE support using an IWM approach and have started to structure flood management programs to support multibenefit projects. IWM is a strategic approach to planning and implementation that combines specific flood management, water supply, and ecosystem actions to deliver multiple benefits. IWM relies on blending knowledge from a variety of disciplines, including engineering, economics, environmental sciences, public policy, and public information. IWM provides:

- High value, multiple benefits – The value of using an IWM approach is in the results (as shown in Figure J-6), including improved public safety, enhanced environmental stewardship, and statewide economic stability. Localized, narrowly focused projects generally are not the best use of public resources and might have negative unintended consequences in nearby regions. The IWM approach helps deliver more benefits at a faster pace, using fewer resources, than single-benefit projects.

Figure J-6. An Integrated Water Management Approach

- Regional collaboration and cooperation opportunities – Using an IWM approach to meet flood management needs is not a one-time activity. Efforts to reduce flood risk will require unprecedented alignment and cooperation among public agencies, tribal entities, landowners, interest-based groups, and other stakeholders. Collaboration must address information gathering and other tools, policies, planning, regulations, and investment needs.
- Broader access to funding – IWM provides the potential to access funding sources that might not have been available to single-benefit projects. This is important when seeking to achieve sufficient and stable funding for long-term flood management. IWM is a promising strategy; however, it is important to recognize the significant funding obstacles that are now facing California.

5.3 Recommendations for Managing California's Flood Risk

Seven recommendations were identified to address flood management issues and address flood risk in California based on the information gathering and other efforts used to develop the Flood Future Report. All of the recommendations are consistent with the overall IWM approach. The foundation of the IWM planning approach is improved alignment and interaction, which leads to agreement on tools, planning activities, policy and investment actions, and ultimately more beneficial results.

These recommendations are directed to all local, State, Tribal, and Federal agencies with responsibility for one or more of the following:

- Agriculture
- Cultural and Recreation Resources
- Environmental Habitat and Ecosystem Restoration
- Flood Management
- Land Use Planning
- Public Safety
- Water Resources

The recommendations are intended to guide discussions and encourage collaboration among public agencies, elected officials, and key stakeholders to achieve necessary policy reforms and program results. The recommendations (numbered 1 through 7) are organized under the categories of Tools, Plans, and Actions, as shown in Figure J-7.

The seven recommendations are provided below:

Tools

- **Revised Assessments:** Conduct regional flood risk assessments to understand statewide flood risk.
- **Flood Risk Awareness:** Increase public and policymaker awareness about flood risk to facilitate informed decisions.
- **Flood Readiness:** Support flood emergency preparedness, response, and recovery programs to reduce flood impacts.

Plans

- **Land Use Planning:** Encourage land use planning practices that reduce the consequence of flooding.
- **Regional, Systemwide, Statewide Planning:** Conduct flood management from regional, systemwide, and statewide perspectives to maximize resources.

Actions

- **Increase Agency Collaboration:** Facilitate public agency alignment to improve flood management planning, policies, and investments. Actions include the infrastructure improvements and innovations conducted by flood and water management agencies.
- **Establish Sufficient and Stable Funding:** Establish sufficient and stable funding mechanisms for projects/programs to reduce flood risk.

The objective of these recommendations is to facilitate improved public safety, environmental stewardship, and economic stability by reducing flood risk in California. The recommendations in this attachment are high-level strategies, the implementation of which is intended to be worked out in collaboration with local, State, Tribal, and Federal agencies, as well as other stakeholder groups. Each of the recommendations is described in the following sections along with potential implementation strategies.

These recommendations were formulated using the process described in this attachment and the information developed in the other Flood Future Report attachments. Table J-4 is a matrix showing linkages between the recommendations and major findings from the other attachments.

Figure J-7. Recommendation Organization

Examples of Flooding Throughout California

Coastal Flooding in Southern California

Tsunami Flooding in Crescent City, 2011

Flooding in Northern Los Angeles County, 2005

Alluvial Fan Flooding in Riverside County, 2004

Flooding in Santa Clara, 1995

Stormwater Flooding in Los Angeles

Table J-4. Matrix of Recommendations versus SFMP Findings

Flood Future Report Findings	Risk Assessments	Flood Risk Awareness	Flood Readiness	Land Use Planning	Regional, Systemwide, and Statewide Planning	Agency Collaboration	Sufficient and Stable Funding
Inadequate understanding of flood risk	●	●					
Inconsistent flood risk assessment method	●						
Few systemwide risk assessments have been completed	●						
Lack of understanding FEMA levee accreditation process	●	●					
Insufficient data and mapping	●	●	●				
Lack of climate change guidance	●	●	●				
20% of California population exposed to flooding within the 500-year floodplain	●	●	●	●			
Over $580 billion in assets exposed to flooding within the 500-year floodplain	●	●	●	●			
Loss of function of critical facilities could have catastrophic economic impact	●	●	●	●			
One-size-fits-all approaches do not work in California	●	●	●	●	●		
Need improved emergency management coordination	●	●	●	●			
Local agency understanding of emergency management processes need improved emergency management			●				
Disconnect between land use planning and flood risk			●				
Local agency decision makers do not understand flood risk				●			
Inefficient communication between and within flood management agencies		●	●	●		●	
Flood agency does not feel like full partner in IRWM process		●	●	●	●		
Systemwide approach to flood management leverages resources			●	●	●	●	

Table J-4. Matrix of Recommendations versus SFMP Findings

Flood Future Report Findings	Risk Assessments	Flood Risk Awareness	Flood Readiness	Land Use Planning	Regional, Systemwide, and Statewide Planning	Agency Collaboration	Sufficient and Stable Funding
IWM can provide new funding mechanisms for projects					●	●	
Changing regulatory requirements make O&M difficult					●	●	
Diverse governance structures makes flood management difficult					●	●	
Local agencies are facing conflicts in permitting requirements					●	●	
Local agencies need help communicating needs to Federal agencies					●	●	
Flood management agencies face funding challenges					●	●	●
Small agencies lack resources to apply for grants		●			●	●	●
Local agencies lack funding for O&M on existing infrastructure						●	●
Local agency funding is limited by Propositions 13 and 218						●	●
Flood management funding is reliant on bond funding						●	●
Project needs exceed available funding						●	●

1 Conduct regional flood risk assessments to better understand statewide flood risk

Identifying flood risks is an important first step toward reducing risk and prioritizing flood management infrastructure needs in California; however, few detailed risk assessments have been completed. This often causes agencies to default to overly simplistic methods or leave their flood risk undetermined. Several complex methods are currently used to assess flood risk, which results in confusion and inconsistent assessment of risk. A consistent method of assessing risk would be more cost effective and result in better understanding of risk.

Goal: Consistent and locally appropriate assessments of flood risk to help local governments make informed decisions about priorities for land use, emergency response, ecosystem functions, and flood management projects throughout the state.

Strategies:

- **Identify regional methods and evaluate flood risk to prioritize areas where flood risk exists.**

  Standard methods to evaluate flood risk in California must be identified for each region of the state. Technical support for risk evaluations and data collection are needed to support the efforts of local agencies. "One-size-fits-all" approaches do not work for flood risk management due to the different climates, geographies, and types of flooding that exist in California. Each region of the state experiences flood risk differently. As described in *Attachment G: Risk Information Inventory*, different types of risk assessments are performed statewide. For example, FEMA, California Emergency Management Agency (CalEMA), and many local agencies assess flood risk in terms of FIRMs, as well as in terms of the 100-year (1 percent annual exceedance probability) and the 500-year (0.2 percent annual exceedance probability) flood events. However, one of the primary methods DWR and the USACE uses to assess flood risk is in terms of expected annual damage (EAD), which is a more rigorous risk assessment methodology that requires data, expertise, and other resources not available to many local agencies.

  Agencies in each region of the state need to collaborate to identify risk assessment methodologies that can meet the needs of agencies at all levels and be cost effective. Varying levels of assessment are needed to meet the resources and risk acceptance levels in different areas of the state. For example, more detailed levels of assessment might be needed in highly urban areas where more assets would be at risk. However, risk assessment methodologies need to be compatible so that results can be used by agencies across the state to assess and prioritize flood risk.

Strategies (continued):

- **Assist in identifying regional flood risk reduction goals and corresponding acceptable levels of residual risk throughout the state.**

  In California, flood risk reduction needs vary across the state. Appropriate levels of risk reduction will vary based on the number of lives and amount of property at risk, degree of urbanization, flood types, number of critical facilities, and level of acceptable risk for the region. National and international reliance on California products and facilities must be considered in identifying an appropriate level of risk reduction.

  Determination of the level of risk reduction should be locally driven, with expertise and technical resources provided by Federal and State agencies. Currently, most agencies use a 100-year event as the basis for assessing risk and constructing facilities; however, in highly urban areas with a high risk of flooding, this level of risk reduction might not be adequate. In other more rural areas of the state where flooding is intermittent, the existing level of risk reduction might be adequate. Residents and local decision makers must understand flood risk, as well as assist in identifying the acceptable level of risk for their region. Climate change should be included in this assessment.

- **Identify opportunities to restore or maintain natural systems.**

  Flood risk evaluations should explore opportunities to restore or maintain the function of existing natural systems. Development in floodplains can permanently alter natural floodplain functions, destroy the habitats of sensitive species, and reduce the beneficial connections between different types of habitat and adjacent floodway corridors.

  Effective floodplain management finds the appropriate balance between providing for public safety and protecting sensitive ecosystems. Floodplains that function well not only provide habitat for a significant variety of plant and wildlife species but also provide natural attenuation of flood flow peaks. Flooding in natural functioning floodplains can recharge groundwater basins, improve water quality, and control erosion. Local, State, and Federal agencies should collaborate when performing risk assessments and during other planning efforts to identify, protect, and restore natural ecosystems.

Northern California Flooding, 1997

Strategies (continued):

- **Assist agencies in assessing the impacts of climate change and sea level rise.**

  Currently, information about climate change and sea level rise has not been developed for many areas of the state; additionally, many local agencies do not know how to access or use available information. Using such information is mandatory under some planning programs because certain conditions could have an impact on land use or other planning decisions. Currently, information related to sea level rise and climate change is being developed and refined by a number of different agencies, including the California Geological Survey, DWR, California Coastal Commission, and the Ocean Protection Council. Due to the spatial coverage and availability of these data, individual local agencies might have difficulty in dedicating resources to coordinate with the agencies involved for the use of data. Consolidating information will facilitate its dissemination to regional or local agencies and will provide for better communication and cooperation for data use. Federal and State agencies should assist local agencies in identifying and compiling data. Climate change materials could be made available electronically on DWR's website via the Water Data Library (WDL), the California Data Exchange Center (CDEC), or another source.

Coastal Flooding in Northern California

2 Increase public and policymaker awareness about flood risks to facilitate informed decisions

Tools

Policymakers and the public have varying levels of understanding about the risks and consequences of flooding. Historically, decisions have been made that lead to putting people and property at increased risk.

Goals: Local, State, and Federal officials support policies, programs, and financing strategies to reduce flood risk in California. California voters support funding mechanisms to reduce flood risk. California residents in flood-prone regions support local flood preparedness efforts and develop personal preparedness plans.

Strategies:

- **Develop consistent messaging of local, State, and Federal initiatives for public awareness of flood risks.**

  Public agencies, using common language and outreach tools, will help avoid public confusion and will maximize limited financial resources. There are several existing programs that inform communities about ongoing flood management activities such as FloodSmart, FloodSAFE, Risk MAP, the National Flood Risk Management program, and other local efforts. Residents and decision makers in flood-prone communities typically are presented with flood risk as it relates to the NFIP, and participants might not understand the risk to facilities or potential impacts to their neighborhoods. Increased coordination and alignment of these efforts could leverage resources to expand awareness of flood risks and reduce confusion about flood risk terminology.

  Materials should be developed to specifically address understanding not only of flood risk but also how land use and other planning decisions directly impact this risk. Messages need to be tailored to specific audiences so that the public understands the impacts of local decisions. In addition, different types of materials or messages might be needed for different areas of the state based on location, whether the area is rural or urban, and local flooding circumstances. Local agencies should help craft emblematic messages about risk for their communities, such as how flooding could impact regional infrastructure, how deep flooding would be at a specific location, or the economic impacts of flooding in a region. Some local agencies might need additional assistance because they do not have the expertise or resources to perform outreach.

Strategies (continued):

- **Provide State and Federal outreach program tools, templates, and other resource materials to local agencies.**

  Sharing resources saves time and money, and will facilitate public awareness efforts in many regions. Sharing resources will foster consistency among outreach programs. Coordination of resources, studies, and findings would reduce duplicative efforts, as well as reduce the potential for confusing or contradictory messages about flood risk. In addition, Federal and State agencies should coordinate with local agencies since the local agencies are often better suited to understand how best to reach out and inform their communities. Metrics should be put in place to determine the effectiveness of messages and outreach efforts. Currently, the USACE and FEMA are required to report findings on outreach activity metrics on a quarterly basis.

- **Catalog, provide, and promote online information resources about flood risk programs, grants, and other related topics.**

  A lot of information is available online about flood management, including data, case studies, budget information, and planning tools. Making agencies aware of and providing easy access to this information will improve flood management at all levels of government. To make this information useable, it is important to develop the ability to store and manage flood risk information gathered statewide in a centralized database and website. Currently, DWR utilizes the WDL, CDEC, and Flood Emergency Response Information System (FERIS) to facilitate dissemination of flood information.

  - The WDL is a searchable Geographic Information System (GIS) interface on the Internet. WDL allows users to access information about monitoring gauges, groundwater data, and water quality.
  - CDEC provides a centralized location to store and process real-time hydrologic information gathered from different contributors statewide.
  - FERIS is a geospatial information system that allows for integration of existing CDEC systems with real-time data collection and data exchange.

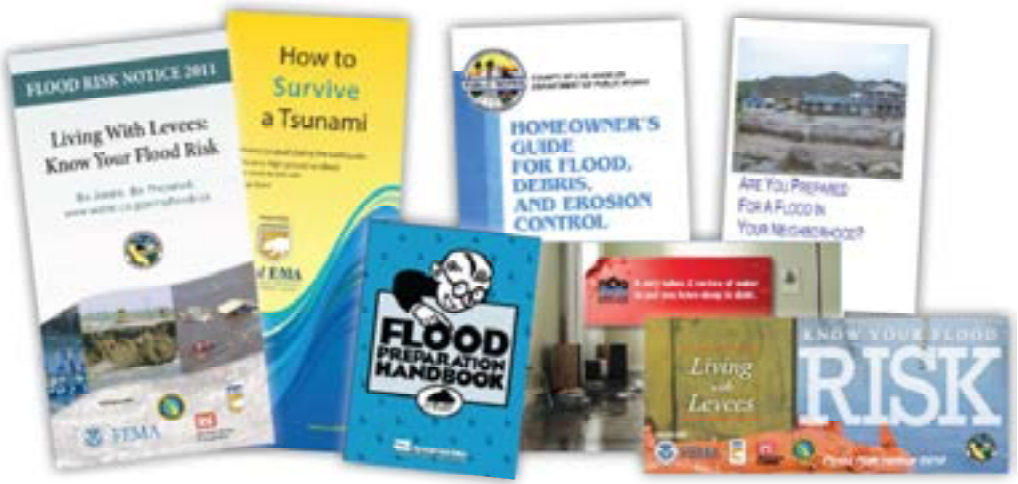
  CDEC should be used to forecast coordinated operation of reservoirs, the CVFPP, and new systems and sources of information should be coordinated as they are developed. FERIS was developed for flood operations in California. These tools could be expanded, or new tools could be developed, to store data and information identified and developed as part of the data needs assessment. Having a website would be a valuable tool for key decision makers and would provide an excellent resource for local agencies to learn more about other agency projects and approaches to managing flood risk.

Tools

Strategies (continued):

- **Share research data and other information between public agencies in a timely fashion.**

  Sharing information fosters collaboration and cooperation between agencies, which helps save time and money as regional plans and projects are developed. Flood management at all levels is involved in developing data, mapping, studies, and designs of flood infrastructure. Improving coordination and alignment between agencies will improve sharing of this information, particularly if agencies are working together on IWM projects.



A Sample of Existing Flood Awareness Information in California

3 Increase support for flood emergency preparedness, response, and recovery programs to reduce flood impacts

Flood emergency management is a cost-effective, nonstructural tool to reduce flood risk. Flood emergency preparedness, response, and recovery are often fragmented between local agencies within a region and even within different departments of a single agency. Funds for emergency planning are often reduced during difficult or contracting budget cycles.

Goal: Effective and comprehensive flood emergency preparedness, response, and recovery at all levels of government.

Strategies:

- **Provide funding specifically for increased coordination among responders, facility managers, planners, and representatives of State and Federal resource agencies to improve readiness.**

  Pre-event coordination improves emergency preparedness by identifying and reinforcing areas of expertise, available resources, and planning agreements. Currently, local, State, and Federal agency flood managers coordinate through regional preseason meetings, which are held around the state. However, many local agencies do not have adequate funding to participate in these meetings. These meetings focus on weather conditions, potential flood conditions, flood-fighting methods, proper coordination among local-State-Federal agencies, and DWR Flood Emergency Response (FloodER) activities. In the past, the meetings have been well attended, but attendance could be expanded to include local agency planning staff. This would facilitate better alignment within and between local agencies statewide.

  In addition, if adequate funding were provided, these meetings could convene more frequently to improve regional coordination between agencies and to provide a forum for sharing information and best practices, and for disseminating guidance for flood preparedness, response, and recovery. Specific activities that could be facilitated through these meetings include guidance on how to prepare for flood fights, how to develop an emergency management plan, and how to complete requests for disaster recovery funding, including PL 84-99 requests and FEMA claims. Funding also could be useful to support other types of flood emergency readiness and coordination.

Tools

Strategies (continued):

- **Develop or improve Flood Emergency Management Plans.**

  Consistent emergency plans based on the State Emergency Management System will help local responders work together to solicit and accept State and Federal assistance during emergencies.[2] Hazard mitigation planning is performed at a local, State, and Federal level. State Hazard Mitigation Plans (SHMPs) are required at a State level to continue Federal disaster assistance funding. In California, Local Hazard Mitigation Plans (LHMPs) have been developed by 37 counties, almost 300 cities, and more than 360 special districts. These plans are living documents that analyze risk from natural hazards, coordinate available resources, and implement actions to reduce or eliminate risks. State and Federal agencies should work with local agencies to use Hazard Mitigation Plans (HMPs), as well as other information, to complete flood emergency management plans. To encourage proper emergency preparedness planning for flood events, grant funding and other cost-sharing could be linked to completion of emergency management plans and HMPs. Also, emergency management plans could be encouraged in Federal feasibility studies as a nonstructural measure to reduce risk. State and Federal agencies also could promote completion of these plans by providing coordination and technical assistance to local agencies for preparation of the HMPs.

Flood Fighting in Northern California, 2004

[2] USACE requires the adequacy of existing or development of a comprehensive Flood Warning Emergency Evacuation Plan for such Federal decision documents where public safety is at issue.

Strategies (continued):

- **Conduct flood emergency preparedness and response exercises statewide and increase participation among public agencies at all levels in flood-fight training.**

  Regular training, tabletop drills, and functional exercises are necessary parts of disaster preparedness. In some areas of California and for some types of floods (e.g., tsunamis), there are detailed flood emergency preparedness and response plans. However, for some types of flooding (e.g., alluvial fan and coastal), less is understood about how to plan for, prepare for, and respond to these floods. This strategy would build upon ongoing efforts to understand alluvial and coastal flooding to determine how to develop predefined emergency response plans.

  In addition, existing programs could be expanded by conducting more training sessions and working to expand local agencies' knowledge of flood emergency preparedness, response, and recovery. These programs could work with CalEMA to organize annual flood-fight response exercises statewide similar to CalEMA's Golden Guardian program, which simulates disaster exercises.[3] For example, in 2011, the Golden Guardian program held a full-scale exercise simulating a major flood in the Inland Region of California. It focused on testing flood managers' preparedness, response, and recovery capabilities.

- **Identify data and forecasting needs for emergency response and water management.**

  Accurate and timely forecasts for flood events can increase warning time, save lives, and reduce property damage. Additional data will help improve the readiness and response to floods. Agencies statewide need additional flood management information, such as from monitoring gauges and mapping. This information should be used for a wide range of activities—from planning to responding to flood events. These data needs go beyond emergency response to information needed for assessing risk. The SFMP teams collected detailed information about flood risk but did not identify missing data requirements or detailed information about emergency response. To obtain a complete picture of what is needed statewide, an assessment of existing emergency management data and tools will be needed. An assessment would focus on emergency response data/forecasting needs and identify areas of overlap where data or tools could be used for other planning purposes. These needs include investment in monitoring gauges, forecasting points, flood warning systems, and other technologies. Once the needs are assessed, investment options could be identified to prioritize the needs. For this effort to be successful, funding will be needed for acquisition of new data and tools.

[3] Note: The next flood-specific Golden Guardian exercise is planned for 2015. The exercise will simulate a catastrophic flood in southern California and will focus on response and recovery capabilities.

Plans

4 Encourage land use planning practices that reduce the consequences of flooding

Development in California has increased in areas that are at risk for flooding. Some local land use agencies experience pressure to foster economic growth by approving development in areas with high exposure to floods.

Goal: Reduced risk to people, property, and economies in floodplains.

Strategies:

- **Work with organizations that represent flood management and land use professionals to develop planning principles that will help decision makers determine if property is at risk for flooding.**

  Promote these principles as "best management practices" (BMPs) to increase wise land use planning. Similar to other statewide programs, BMPs could be developed for development within or adjacent to a floodplain. This might include levee setbacks, or employing riparian corridor policies or greenspace ordinances into local land use planning decisions. The BMPs could be developed at the State level to address a variety of applications and then be distributed to all flood risk managers to use as guidelines for future development on lands in floodplains. BMPs for flood-compatible land use could be developed by local, State, and Federal agencies. These BMPs could adopt the practices described in Federal Executive Order 11988, which requires Federal agencies to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practical alternative. The BMPs could require that all projects proposed within a floodplain demonstrate practical alternatives to development in the floodplain, along with an evaluation of impacts of each alternative. If impacts within a floodplain cannot be avoided, the applicant would have to demonstrate how to mitigate the impacts or restore the floodplain to the extent possible. The BMPs would encourage development of a standard level of risk reduction based on the people and property at risk in the region. The level of risk reduction would be determined by local agencies but would be reviewed by local, State, and Federal flood management agencies.

Strategies (continued):

- **Facilitate regular coordination at all levels among land use planners, resource managers, floodplain managers, and emergency response managers.**

  Coordination among planners, flood managers, resource managers, and emergency response managers can help to reduce impacts of flooding and improve public safety. Planning departments in most local agencies are tasked with approving planning proposals on a project-by-project basis. In most communities, if the development is not within the FEMA flood hazard zone or within the jurisdiction of a Federal agency, or if the project owner is not seeking financial support from the State, then flood managers typically do not get involved in land use decision making. This can result in development that increases the impact or required infrastructure to manage stormwater and/or floods.

  Facilitating improved alignment and coordination between land use and flood management would result in better understanding of flood risk and potential impacts to proposed developments, as well as improved decision making. Specifically, flood risk information has the potential to influence land use policy decisions related to developing and expanding communities within a floodplain, which would result in reductions to flood damage claims and long-term O&M costs on projects.

  At the planning stage, additional measures might be incorporated into the initial proposed projects that could provide community benefits, such as setback areas that act as greenways or trails, and greatly reduce the need to retrofit or replace undersized infrastructure in the future. Too often, regional and land use policymakers realize flood risk and economic losses only after a damaging flood event.

  Regional and local land use policymakers could make better informed planning decisions if the hazards of flooding are described in advance in terms of loss of life, loss of functionality, and potential economic and environmental impacts. Federal and State agencies should take the lead in hosting workshops, meetings, and other forums to promote coordination and information sharing between planners and flood managers. These activities could be coordinated with emergency management workshops and training activities.

Plans

Strategies (continued):

- **Link funding for flood management improvements to implementation of BMPs for floodplain management.**

  Fiscal incentives can help improve land use planning to reduce risks to people and property, as well as to maintain and restore natural functions of floodplains. Local planning decisions and land use planning policies are typically handled at the local level. A variety of statutes govern flood management associated with land use planning; however, in general, flood managers are not included in land use decisions.

  BMPs that encourage fully integrated land use and flood management decisions should be incentivized. Also, development of model land use ordinances and revisions to building codes for development of critical facilities within a floodplain are other tools that could be used. Providing incentives for local agencies to integrate flood risk into planning efforts is an approach that should be used to encourage improved land use decisions that reduce flood risk. This would be accomplished by linking grant funding (or other cost-share funding) to the implementation of flood management planning guidelines or BMPs that encourage integrated land use and flood planning decisions.

High Water in the Sacramento-San Joaquin Delta, 1997

5 Implement flood management from regional, systemwide, and statewide perspectives to provide multiple benefits

Historically, flood management projects have been developed primarily on a site-by-site basis. This approach does not consider California's complex regulatory, permitting, and water management environment. It is important for flood management agencies and water agencies to work together to develop regional solutions that produce integrated benefits.

Goal: Agencies at all levels of government use an IWM approach for flood management.

Strategies:

- **Identify regional flood planning areas.**

  Specific regions for flood management planning could be established throughout the state to encourage agency coordination between flood management agencies. Boundaries for these regions could be watershed based, systemwide, and consistent with existing State and Federal agency boundaries, including existing IRWM planning areas. IRWM is the application of IWM principles on a regional basis in California. Regional flood planning areas could be developed to promote regional or systemwide planning for flood management. These areas would enable the complex array of flood management agencies to begin working together to resolve common flooding, permitting, planning, and funding problems on a regional or systemwide basis. Ultimately, these planning regions and IRWM groups might coalesce into a single planning entity; however, initially these regional flood planning areas need to be defined and based upon flood management considerations. New regional flood planning areas should be established, adhering to the following principles:

  - The regions should promote system- or watershed-scale planning; therefore, they should be hydrologically based (i.e., based upon California Water Plan [CWP] hydrologic regions or Hydrologic Unit Code [HUC] 8 watersheds).
  - To the extent possible, the regions should respect existing, established planning areas such as those associated with IRWM (i.e., Proposition 84 funding regions).
  - To the extent possible, the regions should incorporate key agency organizational boundaries (i.e., USACE district boundaries).

Strategies (continued)

The local agencies within each established region, working with DWR and USACE, should make changes to coordinate planning activities on a regional scale to accomplish a number of objectives, including:

- Assistance with the implementation of the Flood Future Report recommendations
- Development of a plan for the region
- Development of a finance plan to prioritize needs and financial assistance requests
- Identification of key issues/obstacles to planning, funding, and project implementation
- Coordination with IRWM planning groups, particularly in relation to grant acquisition activities

The establishment of regional flood planning areas statewide would be similar in form to the establishment of the CVFPP Regional Flood Management Planning (RFMP) areas. The existing RFMP areas are similar in form but smaller in size and scope than the proposed flood management regions. For example, the RFMPs cover smaller geographic areas, so these areas would be considered subareas under the SFMP.

- **Prioritize flood management projects in each region.**

  Regional priorities for flood management actions can foster IWM actions and make the best use of funding. Flooding happens locally, and local agencies have the best understanding of the flood risk for a specific area. For this reason, local and regional agencies are better informed to prioritize flood management needs; however, priorities would have to be established using a set of standard statewide criteria, which would be developed collaboratively by local, State, and Federal agencies as part of Recommendation 6. Local agencies would work first at a local level to determine priorities for flood management and then would work with other regional agencies to determine regional or systemwide priorities. Ultimately, these local or regional priorities would be compiled at a statewide level to establish flood management priorities.

- **Expand State and Federal processes for developing, funding, and implementing flood management projects with an integrated approach in each region.**

  Encourage and incorporate project components to achieve a broad range of objectives. Develop common terminology for State and Federal programs to help grantors and grantees understand the IWM approach.

Strategies (continued):

- **Improve coordination between programs and entities for water management and flood management planning.**

  State and Federal funding requirements must include coordination between flood management and water management programs. Improving coordination between regional water management and flood management planning is a key strategy to increase implementation of IWM projects. Existing planning groups and forums should be utilized to the extent possible. By coordinating water and flood management planning with balanced representation, a common understanding of flood management, water supply, water quality, environmental stewardship, public safety, and economic sustainability factors would be developed. Where possible, policy changes that promote this holistic approach to IWM should be proposed and sponsored (for example, changes to existing IRWM legislation).

- **Link funding to an IWM approach.**

  Incentivizing an IWM approach with State and/or Federal funds will encourage local agencies to consider systemwide, multibenefit projects when developing options for flood management. State and Federal agencies historically have partnered with local agencies to help fund flood management projects in California. An IWM approach to projects could leverage available funding and develop solutions that address multiple objectives. In addition, multi-stakeholder partnerships and multibenefit projects could spread costs among project partners, as well as leverage a broader set of funding sources.

  Coordination among diverse agencies and entities is the key to successful planning and implementation of an IWM approach. Therefore, it is important to develop common terminology for State and Federal programs for project proponents to maximize funding from all sources. Coordination should be expanded to include outreach beyond project proponents to other affected stakeholders. For example, improving coordination to landowners impacted by a multibenefit project could increase the likelihood of implementation by reducing potential opposition.

Vic Fazio Wildlife Area at South End of Yolo Bypass

Plans

Actions

6 Increase collaboration among public agencies to improve flood management planning, policies, and investments

California has more than 1,300 agencies with direct responsibility for flood management. This complex governance situation makes agency coordination fragmented and difficult. California's flood and water management agencies oversee the operation, maintenance, and improvement of vital infrastructure and facilities within agency boundaries. This traditional "silo" approach is inefficient and expensive. Improved agency collaboration and alignment will provide a variety of benefits, including fostering innovative solutions to problems, improving planning and permitting processes, developing high-value multibenefit projects, and prioritizing investment needs.

Goal: Improved coordination and alignment among local, State, and Federal public agencies, providing increased effectiveness and efficiency in all aspects of flood management.

Strategies:

- **Establish regional working groups to foster efficient permitting, planning, and implementation of flood management projects.**

  Local, State, and Federal agencies must work together to develop solutions and work through regional issues. Agencies should work together to incentivize participation of resource agencies in regional working groups that focus on planning and implementing flood management projects. These working groups would provide a forum to prioritize projects, facilitate discussions about permitting, and address regional issues. The forums would foster a process tailored for specific regions and address specific flood management and regulatory issues unique to those areas. Funding could be provided to resource agencies to ensure participation in these forums. Success metrics would be established and tracked, and ongoing funding for participating agencies would be linked to demonstrated progress, such as the number of projects permitted.

  There are several existing, working forums that assist with agency coordination, which could serve as models or examples to assist with formation of the regional working groups as described. These include:

  - California Coastal Sediment Management Workgroup (CSMW)
  - California Levee Roundtable
  - Dredged Material Management Office (DMMO)

Strategies (continued):

- **Provide funding and in-kind credit programs for regional planning.**

  State and Federal agencies should develop financing program guidelines to encourage local agencies to collaborate on multibenefit projects. Programs such as the subventions and grant funding could be realigned to direct more funding toward multibenefit or watershed-based projects.

  Currently, DWR's Statewide and Delta Subventions Programs are operated on a "first-come, first-served" basis. In addition to those programs, in-kind service credits could stipulate the requirement of regional, systemwide, and statewide planning. Also, grant funding processes and criteria should be simplified and standardized to reduce the level of effort and expertise required to apply.

- **Develop a methodology to prioritize and implement flood management investments.**

  Current funding criteria and processes are complex and hamper the development and implementation of priority projects. A new methodology should be developed and used by local, State, and Federal agencies to establish investment priorities across the state. Alignment among current and future local, State, and Federal resources is needed to implement priority flood projects and programs.

  Developing a flood management funding priority represents a shift from the status quo. Currently, funding levels are identified, and then projects are identified to use this funding. Prioritizing projects will change this process by first identifying needs then seeking the funding to meet these needs.

  To make this new paradigm successful, local, State, and Federal agencies must work together to develop criteria for project prioritization. These criteria must have the capability of working across all areas of the state, with different types of flooding, and with different types of projects. Once the criteria are developed, projects would be prioritized at a local level, then at a regional or systemwide level. Ultimately, the prioritization will be used to establish statewide priorities for flood management in California. Having a statewide set of flood management priorities would articulate needs to State and Federal decision makers responsible for setting investments.

Orange County, California, 1969

Actions

Actions

7 Establish sufficient and stable funding mechanisms to reduce flood risk

The backlog of identified flood management projects is primarily due to lack of funding, which puts the State's economy, environmental resources, and millions of people at risk. Prioritizing and communicating flood management investment needs will help generate support for increased funding. Sustained investment in California's flood management systems should help avoid much larger future costs for flood recovery.

Goal: Funding to implement necessary flood management programs and projects in California.

Strategies:

- **Assess the applicability of all potential sources and propose new options to provide sufficient and stable funding for flood management.**

  Local and State flood management partners should work together to propose changes or alterations to local funding methods. For example, changes to current law (e.g., Proposition 218, the 1996 Right to Vote on Taxes Act) could include reclassification of flood management agencies to be exempted public safety utilities or the establishment of regional assessment districts, in areas where such districts do not exist. Implementing these changes would help local agencies develop additional funding sources for O&M and capital projects. Regional assessment districts should be established where needed to support flood management.

  Identifying new sources of funding for flood management projects is critical to being able to meet future flood management needs. To identify sources of funding, all existing funding sources should be assessed by a wide range of flood and financial experts, including university partners and corporate experts. This assessment should be used to identify the best methods to fund future projects.

- **Improve and facilitate access to information about State and Federal funding sources.**

  A central online resource catalog should be developed to describe the different funding programs and provide guidance to local agencies on how to apply for funding. All potential funding sources for flood management funding should be identified and information compiled. This information should be used to develop an online "how-to" guide explaining how to apply for funding from these programs. The guide would describe current programs, their purposes, general requirements (eligibility), resource contact information, potential funding levels, and links to websites.

Strategies (continued):

Such guidance could assist tribes, rural-urban, rural-agricultural areas, and disadvantaged communities with access to grant opportunities. This effort would include outreach to agencies to provide information and expertise in how to apply for grant funding and how to prepare solicitation packages. Focused outreach would build upon existing Federal and State programs that are ongoing. Workshops would be conducted to disseminate information statewide.

- **Increase funding for flood management projects.**

  Local and State agencies must work together to advocate for sufficient and stable funding for regionally based IWM projects. Additional funding sources are needed to fund flood management projects and would include maximizing existing funding and identifying ways to minimize project costs, as well as researching for new funding sources.

  Existing funding can be maximized by implementing systemwide approaches and multibenefit projects. Using systemwide approaches enables projects to seek funding from multiple sources and to share costs among local agencies. Regional flood planning areas should be used to identify and prioritize these systemwide projects. Project prioritization should be used by Federal and State agencies to assess flood risk priorities statewide.

  Project costs can be reduced by working with resource agencies to improve project permitting, which could result in substantial cost savings. Local agencies could share costs with other entities (agencies, stakeholders groups, or private entities) that benefit from a project. Cost allocation would be developed on a case–by-case basis. Effective land use planning is another way to reduce future flood management costs by providing adequate natural systems that can accommodate floods.

California State Capitol

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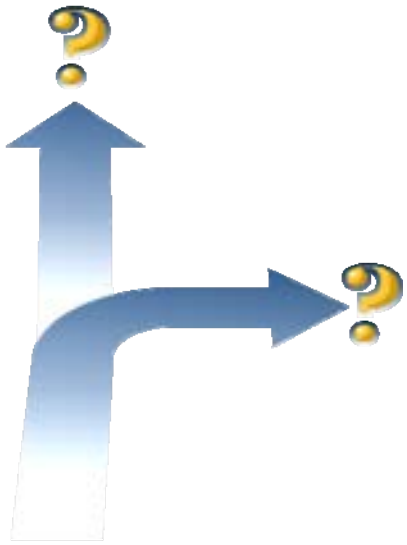
6.0 Charting a Path Forward

A foundation of alignment among public agencies charts the path to success.



Flood management is at a crossroads. Either we continue down the path of fragmented planning, unreliable funding, and narrowly focused projects, or we use an IWM approach to flood management, which provides more benefits, sufficient and stable funding, broad support, and improved public safety.

Inaction could result in flood consequences of catastrophic proportions, risking lives and jeopardizing property and environmental resources. Maintaining the status quo will needlessly expose local and State economies to financial ruin.

As described in the recommendations, the path forward to effective results is charted using tools, plans, and actions.

Tools

Improved information and understanding leads to enhanced public safety and other IWM benefits. The tools described in the recommendations, such as flood risk assessments, should be implemented in the short term, and longer-term actions should be pursued.

Results

Plans

Flood management solutions must be developed using an IWM approach. Regional planning must be part of statewide planning for policy and investment priorities. Regional flood management planning areas and forums must be established to:

- Overcome perceived or real institutional barriers
- Reduce the regulatory and administrative burden to operate, maintain, and improve flood infrastructure
- Develop multibenefit solutions

Actions

Agencies throughout the state should strive for alignment on governance and for policies on flood management. Agency alignment will make the best use of limited time, money, and staff resources.

Financial investment priorities and sustained funding must be established. Public agencies at every level must work together to develop and pursue both short-term and long-term sustainable financing to support flood management that uses an IWM approach.

Results

The recommendations outlined in the Flood Future Report are designed to deliver measureable results to achieve public safety, environmental stewardship, and economic stability. These results include:

- Reduced risk and consequences of flooding
- Informed decisions for flood risk made by policy leaders and the public
- Protected ecosystems and preserved floodplain functions
- Multiple benefits delivered for projects funded by State and Federal agencies
- Improved flood management governance and policies
- Identification of statewide investment priorities
- Sufficient and stable funding for flood management

Results

California's future depends on elected officials, stakeholders, and agencies at every level of government working together to improve public safety, enhance environmental stewardship, and achieve economic stability.

Sutter Buttes Mountain Range in North-Central California

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Appendix A: Flood Future Report Components

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Appendix A: Flood Future Report Components

California's Flood Future Report is composed of three layers of documents, which were developed with different audiences and purposes, as shown in Figure J-A-1. The three main layers are the Policy Brief, Highlights, and main report including the technical attachments (or technical memoranda).

The Policy Brief document provides a high-level summary of the key information contained in the Flood Future Report and its technical attachments. This document is meant to inform legislators, legislative staff, and agency executives about the report.

The Highlights document, which is an Executive Summary of the Flood Future Report, is more detailed than the Policy Brief slightly expanding the level of detail of the information provided in the Policy Brief. The Highlights document is intended for use by legislators, legislative staff, agency executives, and the public.

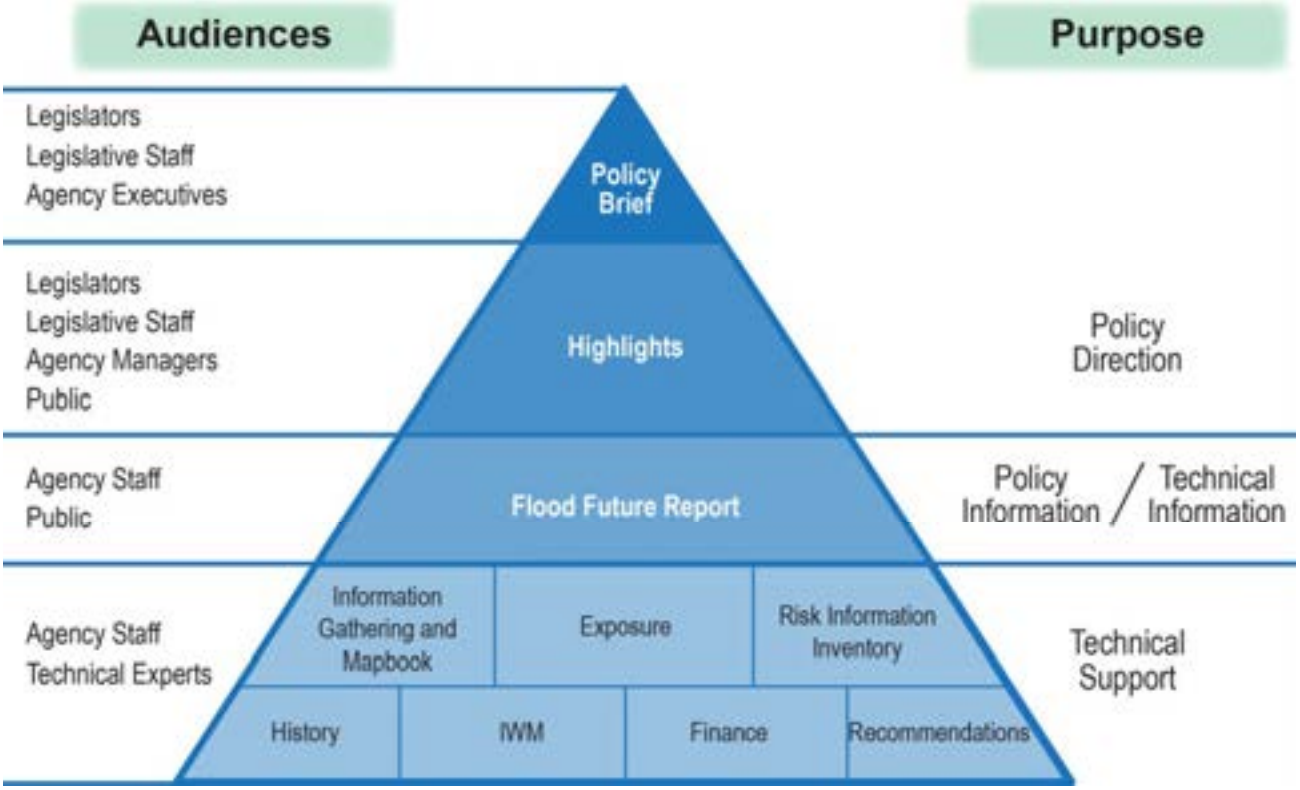

Figure J-A-1. Flood Future Report Components Diagram

The Flood Future Report provides a compilation of the information developed in the technical attachments. This document contains a comprehensive look at flooding throughout the state, and it describes the challenges and opportunities facing flood management. The Flood Future Report also provides information to make decisions about policies and financial investments to improve public safety, environmental stewardship, and economic stability.

This report is supported by eight technical attachments:

- ***Attachment A: References***
- ***Attachment B: Glossary***
- ***Attachment C: History of California Flooding.*** This attachment provides a detailed history of flooding in the 10 major California Water Plan hydrologic regions.
- ***Attachment D: Summary of Exposure and Infrastructure Inventory by County (Mapbook).*** This attachment is a mapbook organized by county providing information on exposure to flooding, flood infrastructure, flood types present, list of major floods, and information on the planned/proposed projects.
- ***Attachment E: Existing Conditions of Flood Management in California (Information Gathering Findings).*** This attachment provides an overview of the information gathering effort to collect flood management information from local, State, Tribal, and Federal agencies, as well as a detailed summary of the results of the information gathering effort. The purpose of this effort was to develop a better understanding of flood risk management in the State of California.
- ***Attachment F: Flood Hazard Exposure Analysis.*** This attachment describes the methodology used to identify flood hazard exposure statewide as well as the results of the flood hazard exposure analysis. This analysis was performed to provide insight into potential flood risks throughout the state.
- ***Attachment G: Risk Information Inventory.*** This attachment provides a better understanding of flood risk statewide, based on the best available information. To characterize flood risk in the California, the SFMP developed a risk exposure analysis used in conjunction with an inventory of risk-relevant information gathered from agency meetings.
- ***Attachment H: Practicing Flood Management Using an Integrated Water Management Approach***. This attachment provides a description of the evolution of flood management practices toward and using an IWM approach, an overview of IWM, the benefits of using an IWM approach, and sample case studies of projects that have used an IWM approach.
- ***Attachment I: Finance Strategies.*** This attachment provides an understanding of the current status of flood management financing and the challenges that lie ahead as California develops recommendations to address flood management issues.
- ***Attachment J: Recommendations to Improve Flood Management in California.*** This attachment provides a detailed description of how the Flood Future Report recommendations were developed and outlines the recommendations along with other high-level challenges.

Each of the documents follows a color scheme that was developed for the Highlights document. The documents are formatted using different-colored headers to indicate the purpose of a given section. The color scheme follows the following coding format:

- Introduction (light blue)
- Understanding the Situation (brown)
- The Problem (goldenrod)
- The Solution (royal blue)
- Recommendations (green)
- The Path Forward (yellow)

Any and all appendices to an attachment were coded using a light blue to represent that this is background or supporting information.

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Appendix B: Compilation of Opportunities and Challenges from Local Agencies, Past Efforts, and Flood Experts

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Table J-B-1. Recommendations to Improve Flood Management in California

ID	Source	Major Category	Minor Category	Minor Category 2	Opportunities and Challenges/Recommendation
1	Local Agency	Financing	Projects & Planning		Funding mechanism for future construction is perhaps overly dependent on future development and growth. Development and growth are constrained by water supply.
2	Local Agency	Processes & Policy	Projects & Planning	Flood Infrastructure Maintenance	A flood control district with defined roles and responsibilities would be helpful. However, the majority of flood issues are simply a nuisance; not typically resulting in significant damage to homes or businesses. When damage does occur, it is typically to streets and other infrastructure.
3	Local Agency	Processes & Policy	Projects & Planning		Developer subdivision maps are typically valid for 5 years, but in recent years, the State has mandated extensions to help developers. This makes it difficult for the city to address new issues on older approved, but un-built, developments.
4	Local Agency	Processes & Policy	Projects & Planning		Restrictions applied by the California Department of Fish and Wildlife (CDFW) are unrealistic. "Desert scrub is not a wetland." They have made mosquito and vector control more difficult. Nuisance water (runoff from over-watered lawns) has been classified as springs by the CDFW. Reeds that pop up from this type of water are not wetlands.
5	Local Agency	Financing	Flood Infrastructure Maintenance		Funding: current system is development driven. Funds have decreased significantly in recent years.
6	Local Agency	Local	Flood Infrastructure Maintenance		Different agencies have different interests in flood control. In Palmdale's case, the dry lakebed where all stormwater drains to is owned by the Federal government and used for the shuttle landing runway. They want the stormwater to continue bringing fine soil deposits to fill the lakebed fissures. They are opposed to the city retaining stormwater and using it to recharge the aquifer.
7	Local Agency	Processes & Policy	Knowledge/Awareness		Those responsible for flood control need to be educated on Integrated Flood Management to improve inter-agency cooperation.
8	Local Agency	Processes & Policy	Projects & Planning		Environmental Regulation, specifically with Fish and Wildlife is a challenge.
9	Local Agency	Financing	Flood Infrastructure Maintenance	Projects & Planning	For dams and reservoirs, Los Angeles County Department of Power and Water (LACDPW) has a certain level of protection to attenuate and needs to be able to clean out the accumulated silt and debris because these dams are the cornerstone of their flood control. All their dams are older and LACDPW has many seismic upgrade projects to get things up to date, including security improvements to protect against acts of terrorism. They have not experienced any major incidents but have had security issues. LACDPW works on all types of upgrade projects, including mechanical, electrical, dam safety, and others, but this is costly. The ability to manage the sediment and maintain the functionality of dams is challenging. On the upstream side of the dam, LACDPW is challenged with cleaning up the sediment. On the downstream side, channels are not sized to handle debris flow, so it becomes a capacity issue with moving sediments down the channel. Thus, management and disposal of sediment is a big issue. Sending sediments downstream can interfere with treatment plants downstream of the reservoirs, which further complicate things.
10	Local Agency	Financing	Flood Infrastructure Maintenance		Mitigation costs are very high (they can run between $180,000 and $200,000 per acre). This, on top of the construction costs, is very high. Channels are not designed to be full of brush and trees, and LACDPW is running out of areas to use mitigation.
11	Local Agency	Financing	Flood Infrastructure Maintenance		Pump plants are the key components to their flood control system (62 pump plants), and LACDPW needs funding for R&R projects because the infrastructure is over 50 years old and won't last forever.
12	Local Agency	IWM	Projects & Planning		LACDPW operates three seawater barrier projects that protect the aquifers. Injected water is made up of a combination of Metropolitan Water Department of Southern California water and, more recently, recycled water for local sustainability; the goal over time is to rely entirely on local resources (recycled water for the injection). LACDPW also has partnerships with the U.S. Geological Survey (USGS) and Water Resources Department (WRD) to define the feasibility of installing seawater barriers. Los Angeles County Flood Control District (LACFCD) owns these barriers as part of the water conservation mission.
13	Local Agency	Local	Flood Infrastructure Maintenance		Total annual expenditures for O&M are $75 million. The total costs for CIP projects are substantial.
14	Local Agency	Financing	Flood Infrastructure Maintenance		Oftentimes, there can be a conflict amongst the beneficial uses of flood infrastructure, and LACDPW hopes to see in the report how these benefits can coexist without compromising flood control. LACDPW wants to improve the habitat but often has to sacrifice the flood control benefit; it's important to balance these competing benefits. There needs to be a consensus to compromising on the multiple benefits so we can all go forward together. One such issue is vegetation on levees in Southern California.
15	Local Agency	Local	Flood Infrastructure Maintenance		The issues of aging infrastructure, sediment management, and regulatory impacts need to be re-emphasized when considering present and future needs of LACFCD and the 10 million people it serves in the LA area.
16	Local Agency	Financing	Projects & Planning		The disadvantaged communities (DAC) idea came up during the IRWM Planning process, and LACDPW recommends that bonds be available to help fund the projects within these DACs.
17	Local Agency	Local	Flood Infrastructure Maintenance		Concrete channels like the San Gabriel and Los Angeles River are old and will not last forever. The process, mechanics, and cost to do all this are overwhelming. More money is going to O&M than to capital projects.
18	Local Agency	Local	Flood Infrastructure Maintenance		LACDPW has a couple of detention basins, which are different than the dams and debris basins. These are major flood control systems and include the Pan Pacific Park detention basin.

Table J-B-1. Recommendations to Improve Flood Management in California

ID	Source	Major Category	Minor Category	Minor Category 2	Opportunities and Challenges/Recommendation
19	Local Agency	Processes & Policy	Projects & Planning		USACE 404 (dredging), 1601 (streambed mitigation), and 401 are regulations that are challenging. Regulations from CDFW and RWQCBs are also challenging. Also, the Forest Service requires LACDPW to get special permits for infrastructure in the mountain areas. The Endangered Species Act is a challenge through the Fish and Wildlife Service. The Migratory Bird Treaty Act and trying to accommodate the bird nesting requirements are also a challenge.
20	Local Agency	Funding Info.	Flood Infrastructure Maintenance		The 2010 USACE Infrastructure Report Card indicates a rating of -C for Orange County Public Works (OCPW) flood control infrastructure; and it will cost more than $2 billion over the next 90 years to build this infrastructure to convey the current 100-year storm flow event given their current annual budget. Other factors involved with the prioritization of projects in their capital improvement are based on the current fiscal year budget, current reserves, and future reserves.
21	Local Agency	Processes & Policy	Projects & Planning		The 100-year storm event threshold in Southern California should not be changed; if the threshold is increased above the 100-year to 200-year or 500-year events, their investment into the current infrastructure will be null and void; costing much more for a higher threshold.
22	Local Agency	Financing	Flood Infrastructure Maintenance		As OCPW meets its goal of building infrastructure to convey the 100-year storm event, the FEMA Special Flood Hazard Area (SFHA, aka 100-year floodplain) will be drastically reduced to containment within the channel, as well as mandatory flood insurance. With the residents' incentive to not acquire mandatory flood insurance, it will be a challenge for FEMA and perhaps the State to maintain the flood insurance program.
23	Local Agency	Financing	Flood Infrastructure Maintenance		It is currently a challenge to obtain vital project approval from regulatory agencies such as the California Coastal Commission, which react slow and too often at the last minute imposing unreasonable requests without merit, oftentimes postponing projects for nearly a decade and holding up OCPW's budget and capital improvement plan.
24	Local Agency	Financing	Flood Infrastructure Maintenance		Water quality requirements are from various regional boards are a challenge (San Diego RWQCB for South County and Santa Ana RWQCB for North County). OCPW needs to use the flood control budget to address these requirements. There is no additional source of funding to address these water quality issues.
25	Local Agency	Financing	Flood Infrastructure Maintenance		Operation and maintenance is also part of the flood control budget, and as they improve these channels OCPW will be required to include habitat or water quality components, which can often lead to additional mitigation efforts, which costs money. O&M comes from the flood control budget and takes away from the Capital Improvement Program (CIP) budget.
26	Local Agency	Financing	Projects & Planning		A challenge is the water quality issues related to requirements of regional water quality control boards (San Diego RWQCB for South County and Santa Ana RWQCB for North County). OCPW needs to use the flood control budget to address these requirements, further taking away budget to satisfy these requests. Incorporation of requirements from the RWQCBs and other regulatory agencies can be quite costly, taking away funds from that which would go to other projects and thereby slowing progress on the CIP. OCPW would like to see grant opportunities offered for these types of project elements (including mitigation).
27	Local Agency	Financing	Projects & Planning		OCPW is looking for multi-purpose projects to partner with; however, the limited amount of right-of-way it has alongside its channels does not allow OCPW to incorporate recreation (bikeways, etc.) and meandering channels for restoration into OCPW projects. Due to the cost of real estate in Orange County, OCPW finds that the cost of right-of-way for the amount of acquisition needed is prohibitive. Perhaps this issue may need to be considered in grant evaluations so that grants can be made available for this type of situation.
28	Local Agency	Local	Flood Infrastructure Maintenance	Projects & Planning	Some of the deficient bridges (Beach Boulevard) are owned by the California Department of Transportation (Caltrans), so it becomes both a flood control and transportation issue. There are several bridges along Beach Boulevard (approximately 7) that OCPW does not have rights to. Coordination with Caltrans has been challenging. OCPW recommends improving funding opportunities to give Caltrans incentive and means to address these deficiencies within the cities and counties.
29	Local Agency	Processes & Policy	Projects & Planning		Regulatory requirements are a challenge, due to cost and time for process. OCPW has projects where the cost of mitigation is more than the actual project. For example, San Diego Creek passes by a sewage treatment system and because the channel is a soft bottom, OCPW had to call an emergency in 2004 to remove vegetation but needed board approval for the funding. Mitigation is up to $2 million to remove vegetation, but OCPW is still awaiting this funding. The Coastal Commission and Fish & Wildlife take a long time. Prado Dam: expecting subvention funds for purchasing right-of-way for Prado Dam. OCPW has had to divert funds for capital improvement projects to purchase these rights-of-ways.
30	Local Agency	Local	Projects & Planning		For some watersheds, it will be more difficult to have construction projects due to limits on total maximum daily loads (TMDLs) (San Diego Creek). The selenium TMDL has become more restrictive; construction projects are now so expensive to mitigate for selenium by removing the soil and taking it to a dump site.
31	Local Agency	Processes & Policy	Projects & Planning		Sometimes, there are unimproved reaches owned by other entities, and OCPW agrees that if they improve the channel to a 100-year facility then OCPW will maintain it. Once OCPW takes over ownership and maintenance, then costs to maintain must be budgeted for. OCPW is in the process of accepting some of the reaches owned by Irvine Company, Great Park, etc. After completion of the project, the private entity has to apply for a conditional letter of map revision (CLOMR) and has to apply for the letter of map revision (LOMR) within 6 months. OCPW looked into getting a very low interest loan and accelerating its CIP program, but this didn't work because some of its projects would take a lot longer than that timeframe.

Table J-B-1. Recommendations to Improve Flood Management in California

ID	Source	Major Category	Minor Category	Minor Category 2	Opportunities and Challenges/Recommendation
32	Local Agency	Processes & Policy	Projects & Planning		The maintenance of natural and soft-bottom channels is costly, and the costs are exacerbated when the regulatory agencies demand a mitigation project for the maintenance of a natural/ soft-bottom channel; the cost in some cases is much more than the capital improvement project.
33	Local Agency	Financing	Flood Infrastructure Maintenance		Infrastructure is aging; a significant number of 50-100 year facilities are in need of replacement or a major upgrade. The Ventura County Watershed Protection District (VCWPD) does not have enough revenue to maintain its facilities.
34	Local Agency	Financing	Flood Infrastructure Maintenance		Another challenge is that there are a number of levees that need to be taken care of and need upgrades to get up to standard, costing millions of dollars. VCWPD doesn't have these resources, so they are working with USACE to get this funding. VCWPD is looking forward to new levee guidelines that will allow vegetation in some areas. For instance, VCWPD has a small levee/flood wall that has vegetation on one side with no direct linkage to the flood wall and channel behind it; there is no seepage or failure but it does not meet the guidelines and is therefore not considered a levee. The only levee certified is Sespe Creek.
35	Local Agency	Financing	Flood Infrastructure Maintenance		There are concerns that a lot of the money will be focused on the levee system for central California and VCWPD wants to make sure that even though Ventura County is not as urbanized as Orange County and Los Angeles, they should still be considered to receive money.
36	Local Agency	IWM	Projects & Planning		VCWPD applauds the IRWM approach (looking at how well the efforts are coordinated and integrated) because that's the way to distribute monies effectively. Considering benefits and how to get more bang for the buck is also important.
37	Local Agency	Processes & Policy	Projects & Planning		There are problems with the levee certification program because there are very limited funds that VCWPD can obtain for the projects of that type, and very little in the way of a multi-objective approach that can be done for these projects. Price tags are very expensive (SC1 is about $40 to $50 million and VCWPD is very unlikely to find funding for this) and needs another formula.
38	Local Agency	Financing	Projects & Planning		Approximately $380 million is needed for improvements to Lower Calleguas Creek. This is, not even the entire assessment of the watershed, which is still ongoing. VCWPD recognizes that funding for improvements is a challenge but applauds the efforts and recognizes that DWR is trying to prioritize how the money can be best spent.
39	Local Agency	IWM	Projects & Planning		Regarding IWM, VCWPD looks at the watershed level to come up with a systematic way to identify projects and allocate funding, and to stage the projects appropriately. VCWPD recommends that DWR develop tools to help with this and to determine how they will mitigate efficiently and cost effectively. VCWPD recommends an integrated model that looks at the entire picture, integrating hydrology and hydraulics with all infrastructure in place to allow agencies and communities to assess potential problems for future projects at any stream to evaluate groundwater, surface water, erosion, and how the new infrastructure would affect all of these. Ideally, this model would show the effects upstream and downstream of the potential project site. Creating a tool that is not expensive that is available to everyone to show 'what if' scenarios would be greatly beneficial. Investing in planning leads to cost savings in the long run.
40	Local Agency	Processes & Policy	Projects & Planning		Funding is a challenge for VCWPD, as well as regulations and mitigation. It is difficult to provide adequate flood protection without necessary revenue.
41	Local Agency	Processes & Policy	Projects & Planning		Regarding the challenges with existing regulations and mitigations, time of construction is often impacted in dealing with sensitive species due to seasonal constraints related to habitat restrictions. VCWPD is trying to come up with an integrated mitigation banking system to work with nongovernment organizations (NGOs) to identify habitat that is at risk and will be ideal for future restoration. Construction costs add up when you stop a project to allow nesting to finish. There needs to be flexibility with respect to certain species to allow construction to continue.
42	Local Agency	Processes & Policy	Projects & Planning		Legislation can go a long way in creating potential local bonding measures and flexibility through local districts. Need to determine how to assess the costs to all the beneficiaries in a more responsible manner because Propositions 218 and 13 have had a huge impact on funding for all infrastructures. A new approach is to demand maintenance costs for new infrastructure coming on line and to classify them as utilities so we can service this. Need a balance between identifying level of service and what it is that we can accomplish. State and local agencies should look at what can we afford, rather than shopping on credit and figuring out later how we can pay for it.
43	Local Agency	Processes & Policy	Projects & Planning		VCWPD recommends that they need legislation to manage facilities rather than our current laws that require agencies to go to boards and get approval for specific projects one at a time.
44	Local Agency	Processes & Policy	Projects & Planning		Need more recommendations to push communities to re-think the way they do business. Streams are a resource to enhance habitat and improve recreation. Need land use credits to promote conservation of open space for the natural function of a stream and sell development rights to the higher-density areas.
45	Local Agency	Financing	Flood Response		It is very difficult to integrate water management and flood control in the desert with low-recurrence-level storms of a flash-flood nature.
46	Local Agency	Processes & Policy	Projects & Planning	Flood Infrastructure Maintenance	Maintaining and improving existing flood channels is hindered by local environmental groups. The District has put together a "Multi-Species Habitat Plan", but because the USACE and the Regional Water Quality Board weren't included in the process, they have resisted adopting it.
47	Local Agency	Financing	Projects & Planning		Thousand Palms Area – there has been a USACE project in the works since 1994 (The Whitewater River Basin – "Thousand Palms Flood control Project"), but funding shortages have stopped any progress. The project would implement 5.5 miles of needed flood protection in the area. Providing regional flood protection for the Thousand Palms Area is a high priority to the District.

Table J-B-1. Recommendations to Improve Flood Management in California

ID	Source	Major Category	Minor Category	Minor Category 2	Opportunities and Challenges/Recommendation
48	Local Agency	Funding Info.	Projects & Planning		North Indio: Master plan needs to be completed. The area has existing development that is subject to alluvial fan flooding. Currently the flood protection infrastructure predates the development and is inadequate. The goal is to convey the flooding to the White Water River Channel.
49	Local Agency	Funding Info.	Projects & Planning		Funding: While the existing infrastructure is performing adequately, there is insufficient funding available for new construction needed in the Thousand Palms and North Indio areas.
50	Local Agency	Processes & Policy	Flood Infrastructure Maintenance		Because there are several Indian Reservation lands near Coachella Valley Water District's (CVWD's) area, EPA gets involved in regulatory issues. In CVWD's experience, EPA has been difficult to work with and has slowed progress on maintenance and improvement efforts. For example, recently, CVWD had a request for 17 miles of channel maintenance near the Salton Sea, which the USACE supported, but they encountered resistance from the EPA. That request has been abandoned. EPA seems to have more power than USACE, and is difficult to work with.
51	Local Agency	Financing	Projects & Planning		Currently, there is no funding program in place. If a flood control agency was created, it would likely be funded with help from State and Federal agencies. In the long run, new infrastructure could be funded by development impact fees.
52	Local Agency	Financing	Projects & Planning		Because no one in the county is technically responsible for planning, building, operating, and maintaining flood management infrastructure, a flood control agency should be established. This agency could be independent, a part of the county, or a part of the Imperial Irrigation District (IID). An agency of this type is needed to truly deal with flood management on a regional level, especially as further development occurs. Currently, IID is the unofficial flood control agency because of its interest in protecting its water delivery system, but that is not a defined responsibility/role.
53	Local Agency	Financing	Flood Infrastructure Maintenance		The majority of the flood protection system is old. There are many areas with problems, and the system cannot realistically be expected to deal with flood issues under current conditions (it was never designed for storm runoff in the first place). For example, Imperial Dam is 80 years old. At least once a year, a storm causes damage to some part of the infrastructure.
54	Local Agency	Infrastructure	Flood Infrastructure Maintenance		County public works bridges do not provide adequate clearance, causing the roads to flood during storms, which negatively affects emergency response efforts.
55	Local Agency	Processes & Policy	Flood Response		Imperial County needs to establish clear roles and responsibilities for flood control and management among the various stakeholders in the region.
56	Local Agency	Processes & Policy	Projects & Planning		Roles and responsibilities of participating agencies need to be better defined and addressed (the county and cities). They need to look at things from a more regional perspective and better understand the side effects their decisions have on those downstream.
57	Local Agency	Financing	Projects & Planning		Funding is needed for habitat creation and mitigation requirements.
58	Local Agency	Financing	Projects & Planning		The community is still in the mode of antiquated flood control, wanting flood control cheap and providing further economic development. In other words, the public, has, at times, been opposed to keeping development out of floodplains. One way the District attempted to help was to buy floodplain properties outright, with initial enthusiasm, but later resistance. Although, this has moved forward in some areas.
59	Local Agency	Financing	Projects & Planning		In high-density areas, instead of paying flood insurance, recommend pooling everybody's money and building flood mitigation infrastructure.
60	Local Agency	IWM	Projects & Planning		Finding partners for IWM. Environmental groups are primarily pursuing litigation, not interested in enhancing/partnering on projects or contributing funding. There are too many loopholes, and funding is uncertain, USACE seems superior in its attitude about dealing with local agencies (i.e., agreements made regarding mitigation and maintenance during Murrieta Creek project have not been kept).
61	Local Agency	Processes & Policy	Knowledge/Awareness		Need to identify erosion hazard setbacks. The existing models assume fixed banks.
62	Local Agency	Processes & Policy	Projects & Planning		Biggest hindrance to building projects: Acquiring right-of-way, getting permits with tied-down regulations (goalposts keep moving), and existing utilities.
63	Local Agency	Processes & Policy	Projects & Planning		Permits required: USACE 404 permit, State Regional Board permits (3 boards within jurisdiction include San Diego, Santa Ana, and Colorado River—with staffing/budget cuts, turnaround time has increased), Fish and Wildlife stream alteration permits, internal habitat conservation plans, tribal habitat conservation plans. Any negotiations are far too long a process (on one project mentioned, the permitting negotiations have taken over a year thus far).
64	Local Agency	Processes & Policy	Projects & Planning		When floodplains are delineated, lateral erosion is not typically considered. Existing models assume fixed banks. The State may want to consider more lateral erosion issues. The District recommends identifying erosion hazard setbacks.
65	Local Agency	Processes & Policy	Projects & Planning		IRWM Plan process – all the agencies get together and come up with great projects/ideas, but nobody is responsible to implement the plan. It seems like all the agencies bring their projects that would have been done anyway and put them into the IRWM Plan. The IRWM Plan is not making projects happen; previously planned projects are just compiled into the IRWM Plan document.
66	Local Agency	Financing	Projects & Planning		Funding is insufficient to achieve expected flood protection. The city stormwater division is currently studying ways to improve funding.

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ID	Source	Major Category	Minor Category	Minor Category 2	Opportunities and Challenges/Recommendation
67	Local Agency	Processes & Policy	Projects & Planning		Environmental permits required for existing channel maintenance are too restrictive and costly. In recent years, emergency permits have been the only way to maintain channels.
68	Local Agency	Processes & Policy	Projects & Planning		Water quality requirements are also too strict. Stored stormwater has been classified as wastewater.
69	Local Agency	Financing	Flood Response		Funding: Prop 218 makes collecting the revenues needed for flood control nearly impossible. Several agencies suggested adding flood control districts to the list of utilities exempted from some of the Prop 218 restrictions.
70	Local Agency	Financing	Projects & Planning	Flood Infrastructure Maintenance	Environmental compliance for maintaining existing channels is too rigid and costly. This causes reduced flood capacity due to neglect.
71	Local Agency	Financing	Projects & Planning	Projects & Planning	FEMA process for grant applications is too slow. Some of the grants the County is working on (Hazard Mitigation) have been tied up for 2 years. When the process takes this long, project financing is insufficient for increased costs. Suggestion: Why couldn't the State act as a bank and front FEMA grants, and then collect the repayment from FEMA later?
72	Local Agency	IWM	Knowledge/Awareness		The additional stakeholders brought in by the IWM process can sometimes be a disincentive for incorporating IWM unless the additional goals come with increased funding.
73	Local Agency	Local	Flood Infrastructure Maintenance		Beneficial reuse of sediment - In Penasquitos and Tijuana estuaries, the City of San Diego covers the cost of desilting. The City feels other agencies should be helping with these costs because they have a regional benefit and are a huge cost to the City.
74	Local Agency	Local	Projects & Planning		For floodplains with just a few repetitive loss properties, it would actually make most sense economically and environmentally to buy out and relocate those property owners than to build costly flood control infrastructure. Two ideal locations for this type of policy in San Diego County include the Tijuana River Valley and Sorrento Valley.
75	Local Agency	Processes & Policy	Projects & Planning		The goals of water quality and flood control seem to be in conflict.
76	Local Agency	Processes & Policy	Projects & Planning	Knowledge/Awareness	Coastal regions are concerned with the impacts of sea level rise.
77	Local Agency	Processes & Policy	Projects & Planning		San Diego County Flood Control District, City of San Diego, and City of Imperial Beach: The Tijuana River Valley is an area of regional flood concern that is even more difficult to deal with regulatory-wise because it includes stakeholders on both sides of the border.
78	Local Agency	Processes & Policy	Projects & Planning		City of Oceanside: Designated habitat areas should be mapped so that if new habitat sprouts up in other areas it doesn't have the same restrictions.
79	Local Agency	Processes & Policy	Flood Infrastructure Maintenance	Projects & Planning	Permitting - Channel maintenance is a huge issue. Permitting requirements for channel maintenance is the biggest impediment to the division.
80	Local Agency	Processes & Policy	Flood Infrastructure Maintenance	Projects & Planning	Emergency Permits are the only way the division has been able to get permits for maintenance in the recent past.
81	Local Agency	Processes & Policy	Projects & Planning		The regional board requirements are often not compatible with flood control.
82	Local Agency	Processes & Policy	Projects & Planning		TMDL requirements are too strict; Integration of water quality is costly.
83	Local Agency	Processes & Policy	Projects & Planning		Environmental permits required for existing channel maintenance are too restrictive and costly. In recent years, emergency permits have been the only way to maintain channels.
84	Local Agency	Processes & Policy	Projects & Planning		Water quality requirements are also too strict. Stored stormwater has been classified as wastewater.
85	Local Agency	Financing	Flood Infrastructure Maintenance		State needs a better plan to maintain levees through vegetation control, sediment removal, and erosion control.
86	Local Agency	Infrastructure	Flood Infrastructure Maintenance		State should provide sustainable funding to maintain Sutter Bypass levees, M&T weir levee, Cherokee Canal levees, Tisdale Weir levee, Big Chico Creek levees, and Sacramento River levees.
87	Local Agency	Infrastructure	Flood Infrastructure Maintenance	Projects & Planning	State needs to use the CVFPP and the USACE feasibility study to develop a long-term plan to fix the Sutter Bypass.
88	Local Agency	Infrastructure	Flood Infrastructure Maintenance	Projects & Planning	The Sutter Bypass Project should be a priority because it is needed for urban protection.
89	Local Agency	Funding Info.	Flood Infrastructure Maintenance		Last project funded locally was in 1964 for the Sycamore-Mud Creek levees. All the other projects are either Federal or State funded. There is no capability for enough local funding to carry out a new project.
90	Local Agency	IWM	Projects & Planning		Existing IWM programs that improve ecosystems in river corridors should be preserved.
91	Local Agency	Local	Flood Infrastructure Maintenance	Projects & Planning	Little Chico Creek and a part of Sycamore-Mud Creek (last leg) levees have only 50-year protection. They need to be improved for a 100-year protection plan.
92	Local Agency	Local	Knowledge/Awareness	Projects & Planning	Additional gauges should be installed that are capable of recording high flows (high flow measurements needed for calibration). This will provide data that is needed for flood modeling.
93	Local Agency	Processes & Policy	Projects & Planning		A compatible FEMA/State policy is needed that would allow new development or replacement of existing structures to support existing businesses and rural agricultural communities.
94	Local Agency	Processes & Policy	Projects & Planning		State flood policy should support the sustainability of agriculture.

Table J-B-1. Recommendations to Improve Flood Management in California

ID	Source	Major Category	Minor Category	Minor Category 2	Opportunities and Challenges/Recommendation
95	Local Agency	Financing	Flood Infrastructure Maintenance		Because only 23,000 people live in the entire County of Colusa, it is a non-urban area; this makes it difficult to upgrade levees to the new FEMA standards. Impossible to change all levees to fit the new standards; focus on fixing the main issues.
96	Local Agency	Financing	Flood Response		Agricultural regions need help from the State to fund some of the flood insurance premiums.
97	Local Agency	Financing	Flood Response		The State should place more emphasis on flood protection for small communities and agricultural areas.
98	Local Agency	Financing	Projects & Planning		The USACE cost/benefit analysis is not applicable for agricultural areas; need a different approach.
99	Local Agency	Financing	Projects & Planning		National Flood Insurance Plan needs modifications for non-urban areas.
100	Local Agency	Financing	Projects & Planning		Need more reasonable flood insurance rates for agricultural areas.
101	Local Agency	Financing	Projects & Planning		The State's grant process should be modified to better accommodate agricultural areas.
102	Local Agency	Processes & Policy	Projects & Planning		More work is needed on inter-relations between the agriculture community and flood management.
103	Local Agency	Local	Projects & Planning		There is only one standard for improving levees, based on urban needs - need a different process and separate standards for flood control funding and implementation in agricultural areas (i.e., a non-urban levee improvement process).
104	Local Agency	Financing	Flood Infrastructure Maintenance		More funding is needed to fix vegetation, sedimentation and erosion problems in flood channels.
105	Local Agency	Financing	Projects & Planning		Projects should be developed to impound flood flows for use by agriculture and recreation. Retention facilities and reservoirs need to be built for this purpose.
106	Local Agency	Local	Projects & Planning		An integrated plan is needed to address flooding on South Fork Willow Creek and Wilson Creek.
107	Local Agency	Financing	Projects & Planning		It is hard for rural counties to qualify for State and Federal funding grants. Glenn County is a disadvantaged community with a small population and cannot afford to fund flood programs on its own.
108	Local Agency	Local	Flood Response		Many highways in the County frequently close during flood events. This is not a safe situation because it prevents the transportation of people and materials that are needed for flood response actions.
109	Local Agency	Local	Projects & Planning		Completion of the J levee near Hamilton City is a high priority. The design to reconstruct this levee has been completed. Funding is needed for construction. Delays in completing the level are inhibiting development projects in the area.
110	Local Agency	Local	Projects & Planning		Additional groundwater recharge capability would help to mitigate flood events around the City of Orland.
111	Local Agency	Local	Flood Infrastructure Maintenance	Flood Response	There are numerous issues related to flooding on Stony Creek. There are vegetation issues in the channel, which cannot be addressed because the river banks are owned by private owners. In addition, Black Butte Reservoir operations are often not optimized for flood control.
112	Local Agency	Local	Knowledge/Awareness		The Federal and State operators of upstream reservoirs should improve communication with downstream counties to provide more warning time about an approaching flood flow.
113	Local Agency	Processes & Policy	Flood Response		Storage facilities should be built in the foothills to store water during flood events.
114	Local Agency	Processes & Policy	Projects & Planning		Local development projects in the Sacramento Valley need to be completed before implementation of projects such as BDCP, which will move water south. Otherwise, there will be significant negative impacts on Sacramento Valley counties.
115	Local Agency	Infrastructure	Flood Infrastructure Maintenance		Sutter Bypass: repair East levees, construct new setback levees, restore habitat.
116	Local Agency	Funding Info.	Projects & Planning		Feather River feasibility study needs to move forward.
117	Local Agency	Financing	Projects & Planning		County needs more funding for all the flood projects that are pending.
118	Local Agency	Financing	Projects & Planning		In agricultural areas, numerous drainage projects are needed.
119	Local Agency	IWM	Projects & Planning		IWM: • Flood projects should not have to compete against water supply projects • Flood management and land planning should be integrated. • Flood management should be considered as part of urban water management plans and groundwater management plans.
120	Local Agency	Local	Flood Infrastructure Maintenance		Need assistance to restore historical conveyance capacity of the water supply system (sedimentation issues).
121	Local Agency	Local	Flood Response		Use agricultural areas for flood relief; can also be used as groundwater recharge.
122	Local Agency	Local	Projects & Planning		State and Federal flood standards seem to be constantly evolving; new design criteria often are adopted during ongoing projects, which causes delays.
123	Local Agency	Local	Projects & Planning		Sutter Butte Flood Control Agency (SBFCA) Environmental Improvement Plan (EIP) Project needs to be completed: this is very critical to protect the County economy.

Table J-B-1. Recommendations to Improve Flood Management in California

ID	Source	Major Category	Minor Category	Minor Category 2	Opportunities and Challenges/Recommendation
124	Local Agency	Financing	Projects & Planning	Flood Infrastructure Maintenance	Another challenge relative to regulatory is the discrepancy between design and regulation. For example, original USACE design of channelized portion of Santa Rosa Creek never considered sediment. Subsequently, Alameda County Flood Control Water Conservation District (ACFCWCD) was required to clean out Santa Rosa Creek, but no funding was available. Multi-agency, multi-disciplinary approach would be better.
125	Local Agency	Financing	Knowledge/Awareness		Funding and incentives should be developed for individual agencies to develop 2-D modeling that FEMA does not provide to generate a more accurate depiction of the floodplain.
126	Local Agency	Financing	Knowledge/Awareness		State should interface with FEMA regarding a more customized approach to floodplain identification and review. One size fits all is not always applicable. State or FEMA should provide some credit or incentive for re-mapping to correct inaccurate maps to a higher level of detail.
127	Local Agency	Processes & Policy	Knowledge/Awareness		State should implement workshops on available funding opportunities to enable smaller agencies to be more aware and better compete for these opportunities. Opportunities for funding and grants for education and training should be equal across the playing field to counteract the Central Valley focus. One solution is to make FEMA representatives a primary source of information since they regularly interface with individual agencies.
128	Local Agency	Processes & Policy	Projects & Planning		Unified, regional approach to address sea level rise and coastal flooding in Bay Area. Sea level rise is a major consideration relative to long-term flood planning. However the process of researching and addressing sea level rise is very expensive compared to standard flood control. For example, the 5-year CIP Program identifies approximately $13 to $14 million annually (depending on available funding) to address flood control, but a coastal flood wall alone costs $16 million. Three sections of inboard levees in Hayward (north), Union City (central), and Fremont (south) have costs in the millions.
129	Local Agency	Processes & Policy	Projects & Planning		A major challenge for implementation of flood control projects is regulatory permitting. All of the red tape is wasting public resources. There is no uniform or consistent consideration of flood control projects, and each is subject to a variable schedule and mitigation scenario. The unpredictable and lengthy schedule can preclude realization of funding opportunities because often funding is only authorized for "shovel-ready" projects with permits in hand. Similarly, high mitigation ratios and associated costs can preclude successful implementation of a project. A possible solution would be a type of global permit and mitigation ration cap for agencies charged with implementing certain required activities.
130	Local Agency	Processes & Policy	Projects & Planning		Streamline the regulatory permitting process to reduce schedule delays, mitigation ratios, and costs. Uniform guidelines for processing flood control applications should be implemented. State has an oversight role to play to ensure this process moves forward in a balanced way.
131	Local Agency	Financing	Projects & Planning	Flood Infrastructure Maintenance	DWR Grants Recommendations: • Should address region-wide and common themes of regional needs. • Grants should be based watershed-wide. • Currently, all grants are capital project oriented. There is a need for maintenance-oriented grants.
132	Local Agency	Financing	Projects & Planning		Incentives for Rain Water Harvesting: • Helps water supply and flood protection
133	Local Agency	Processes & Policy	Flood Infrastructure Maintenance	Projects & Planning	Maintenance Issues: • Maintenance of existing facilities is hampered by regulation and environmental mitigation. This should be addressed statewide. • Maintenance is the primary challenge of Zone 7s from a funding and operations standpoint • Grants do not address the maintenance piece of flood management. • Maintenance operations should be included in the DWR definition of flood management.
134	Local Agency	Processes & Policy	Flood Response		Water Rights: • Stormwater collected needs to be pumped out. This is expensive. • Recommendation: not having to pump water all back would provide cost savings.
135	Local Agency	Processes & Policy	Knowledge/Awareness	Projects & Planning	Flows for Flood Modeling – would recommend coordination of flows between DWR and other agencies. Watershed elevation varies depending on which model you look at.
136	Local Agency	Processes & Policy	Projects & Planning		Stormwater and IRWM Plan: Stormwater is not included in IRWM Plan. Recommend that stormwater not be included in flood-related funding if not required to participate in IRWM Plan.
137	Local Agency	Processes & Policy	Projects & Planning		Project Type Differentiation: • State should facilitate the differentiation between kinds of projects: capital improvement projects versus maintenance projects. • State-level facilitation and coordination.

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138	Local Agency	Processes & Policy	Projects & Planning		Development Challenges: • Distinguish agency as permanent service provider as opposed to developers. • Streamline permit process for flood agencies.
139	Local Agency	Financing	Projects & Planning		Funding Priorities: Projects already underway should receive priority in funding. Otherwise, especially in flood, unfinished projects are a lost investment.
140	Local Agency	IWM	Flood Infrastructure Maintenance		The DWR IWM definition should include maintenance. Sediment management is a part of flood management. Adaptive management should be flexible to deal with maintenance. The best solutions are closest to natural conditions.
141	Local Agency	Processes & Policy	Knowledge/Awareness		FEMA Mapping Process: very costly to obtain the level of detail needed for modeling, permitting, etc. A Napa-specific project, St. Helena, revealed large inaccuracies in the floodwater surface elevation. This type of issue becomes problematic when it is necessary to show no impact to the water surface elevation in post-project conditions. Also, more funding is needed to update flood maps from the State. Pushing this burden to the local level is not sustainable or financially feasible.
142	Local Agency	Processes & Policy	Projects & Planning		Agency Challenge: Sediment Management – Sediment removal is a big challenge for the district. Have received EPA funds for removal. Very difficult to obtain permits to address.
143	Local Agency	Processes & Policy	Projects & Planning		Standardization of Levee Certification Rules: Sometimes not applicable to local conditions. For example, trees on levees are not relevant to Napa area.
144	Local Agency	Processes & Policy	Projects & Planning		Adaptive/Flexible Management Allowances – would like acknowledgment that local presence may know best. The district would suggest allowing more flexibility and regulatory authority at the local level.
145	Local Agency	Financing	Projects & Planning		In regards to Prop. 218, Sewer Surcharge and Funding in general: possible flexibility between water and recycled water funding sources. Voter approval waived due to classification as sewer system made Sewer Surcharge possible. If classified as Stormwater, voter approval is needed and is next to impossible to obtain.
146	Local Agency	IWM	Projects & Planning		In DWR's definition of IWM, San Francisco Public Utilities Commission (SFPUC) and the San Francisco Department of Public Works (DPW) would like to comment on the following: • DWR does not address urban flood management enough in this definition. • Consider the addition of reuse/recharge as part of flood management. Reuse should be more prioritized.
147	Local Agency	Processes & Policy	Flood Response	Knowledge/Awareness	DWR's Role in Urban Areas: There is a need for definition and/or clarification of DWR's role in urban flood control and relationship with highly urbanized city agencies. Need to acknowledge that flood control programs are still created by cities. Urban flood management is not addressed enough.
148	Local Agency	Processes & Policy	Knowledge/Awareness		In regards to Sea Level Rise: • Range of projected increase too broad for practical local use. Modeling is fairly unrefined, bathtub method using only elevation comparisons, not infiltration, drainage models, etc. Some studies have been done by Bay Conservation and Development Commission (BCDC), but room for much more research and guidance.
149	Local Agency	Processes & Policy	Knowledge/Awareness	Projects & Planning	In regard to Climate Change Adaptation – interpreting data meaningfully, planning guidance is not specific/clarified for direct system applicability. • Research regarding impacts, opportunities in stormwater not on Federal or State radar. More focused on water supply. Rarely addressed in discussion. No leaders in research or tangible parameters developed. • DWR has opportunity to influence funding for research of sea level rise and storm intensity. Generally understudied and not considered as urgent of an issue as it should be. • There currently is more focus on greenhouse gas (GHG) mitigation measures, but less support in climate change adaptation. Sizing, liability issues, armoring/retreat development. • Needs policy-level discussion and funding mechanisms.
150	Local Agency	Financing	Flood Infrastructure Maintenance	Knowledge/Awareness	State should work with USACE on how economic analysis is applied to projects (i.e., levees). USACE should look at entire system. One size fits all approach does not work. Current methodology precludes things like rehabilitation work on levees, rural projects, and is skewed towards projects with high property values.
151	Local Agency	Financing	Projects & Planning		Agency Challenge: Funding • No way to prioritize flood control projects (i.e., in IRWM Planning process) given uncertainty of State grants. Laws regarding benefit assessment districts, Props 13 and 218 are limitations for generating local revenues. For example, the entire watershed area might contribute to flooding issues, but the current laws practically limit the assessment districts to the much smaller areas of flooding impacts.

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ID	Source	Major Category	Minor Category	Minor Category 2	Opportunities and Challenges/Recommendation
152	Local Agency	IWM	Projects & Planning		Agency Comment regarding DWR's definition of IWM: Sonoma County Water Agency (SCWA) and Reclamation District (RD) 2068 concurred that they disagree with the expectation that all flood control projects should be multi-benefit/multi-objective, because some projects are most efficient without another benefit (i.e., a flood control project); however, multi-benefit/multi-objective projects are more likely to receive grant funding. Some flood control projects have physical constraints to have multi-benefits. In concept, it is a good idea; however, this definition potentially conflicts with public safety objective. Public safety is paramount and you cannot trade it off for things like habitat enhancement. IWM also implies additional costs for things that flood control agencies are not charged with, but no one else brings money to the table.
153	Local Agency	Local	Knowledge/Awareness	Projects & Planning	FEMA mapping is poor, especially for unincorporated areas. Need a program to provide improved and updated FEMA flood mapping – existing FEMA maps are outdated and do not account for current population growth, especially in unincorporated areas. RD 2068 has taken on task to identify risk areas, but unfunded. The recent DWR effort (Best Available Maps) caused some confusion with local jurisdictions. FEMA is updating some mapping in Solano County.
154	Local Agency	Processes & Policy	Flood Infrastructure Maintenance	Knowledge/Awareness	Agency Challenge: Flood Flow Management• Inadequate infrastructure, particularly in rural areas. Need to look at entire system as a whole. Reclamation districts and flood control agencies cannot design and build systems to accommodate maximum runoff within their jurisdictions; it is cost-prohibitive. A different approach is taken to detain runoff where it falls and to distribute the flood flow across a large area until flood event dissipates (i.e., "keep the water in the ditch"). Old solution was to make culverts larger, but that just propagates the problem downstream. Flooding issues in Delta and multi-agency coordination – need multi-agency, multi-county planning strategy for flood control planning. Old solution was to oversize culverts, but this resulted in displacement of the problem downstream. Therefore, need a systematic approach to managing flows.
155	Local Agency	Processes & Policy	Flood Response		State should work with agencies to pre-define flood control response: 1) plan properly, 2) prepare system and rectify deficiencies, 3) response, and 4) recovery.
156	Local Agency	Processes & Policy	Knowledge/Awareness		State should provide better outreach to flood management agencies. How do new floodplain requirements apply to jurisdictions, how will it impact new development, what are consequences?
157	Local Agency	Processes & Policy	Projects & Planning		Agency Challenge: USACE Process: One size fits all approach does not work. Cost/benefit analysis is structured such that it favors projects in urban areas; projects in rural unincorporated areas are more difficult to qualify for Federal funding under the USACE process. For levees, the incremental analysis is too regionalized and does not account for the whole watershed, looks only at part of the system. Cost/benefit analysis is not effective in agricultural areas because land values are low and therefore difficult to qualify. Rural areas cannot afford to build USACE-approved levees. System needs to recognize interconnectedness of system. If levees in RD 2098 fail, RD 2068 fails, too.
158	Local Agency	Processes & Policy	Projects & Planning		Agency Challenge: Regulatory Process Different agendas conflict during project implementation; i.e., RWQCB regulates sediment issues upstream on a site-by-site basis; however, in the Delta, higher turbidity for listed species such as Delta Smelt is desirable. There is a lack of a holistic approach to regulations. Permits contain many conflicting terms and conditions, and they require high mitigation contributions (up to 40% of project costs).
159	Local Agency	Processes & Policy	Projects & Planning	Knowledge/Awareness	Agency Challenge: Land Use Inability of flood management agencies to control land use – growth exceeds flood control infrastructure. Cities want development for tax revenue/economic development, but this places more infrastructure into floodplains and pushes flood problems downstream. Primary challenges are land use planning, funding, and regulatory process. There is no nexus between flood control activities implemented by Solano County Water Agency (SCWA)/Reclamation District (RD) 2068 and the local land use jurisdictions. Interaction with land use is informal, but there is generally good coordination with cities in Solano County (SCWA/RD 2068 have no formal land use authority); municipalities comply with the California Environmental Quality Act (CEQA) during land use permitting process, which discloses potential flooding effects. "Ranchette"-style development in flat areas/floodplains is a challenge. Low population in unincorporated areas do not pencil out in cost/benefit analyses, making it difficult and not cost effective to implement Federal projects.
160	Local Agency	Processes & Policy	Projects & Planning	Knowledge/Awareness	State should advocate for rural/agricultural area designation because infrastructure that supports agriculture is different that urban. There is too much focus on liability. Statewide planning should include a rural perspective.
161	Local Agency	Processes & Policy	Projects & Planning	Knowledge/Awareness	State should interface with FEMA and locals regarding a more customized approach to floodplain identification and review. One size fits all is not always applicable. Maps need to be corrected to be more accurate, particularly for unincorporated areas.
162	Local Agency	Processes & Policy	Projects & Planning	Knowledge/Awareness	State should advocate for rural/agricultural area designation because infrastructure that supports agriculture is different than urban. There is too much focus on liability.
163	Local Agency	Processes & Policy	Projects & Planning		Regulatory process should be streamlined and coordinated (cross purposes) to reduce schedule effects, costs, mitigation requirements.

Table J-B-1. Recommendations to Improve Flood Management in California

ID	Source	Major Category	Minor Category	Minor Category 2	Opportunities and Challenges/Recommendation
164	Local Agency	Financing	Flood Response		Del Norte County is unable to afford flood maintenance or improvements, thus earlier flood warning would allow for sufficient lead time to carry out evacuations and flood emergency response.
165	Local Agency	Infrastructure	Flood Infrastructure Maintenance		The current flood control and general infrastructure was designed with the PacifiCorps Dams in place, yet there is little information known on how they will be affected by the removal of the Dams. There is currently no funding identified if removal of the Dams necessitates replacing or improving the infrastructure. In addition, there is evidence that houses and urban development around False Klamath Cove are located within the original riverbed from before construction of the Dams. There is a concern that once the Dams are removed, the river will return to its original streambed.
166	Local Agency	Local	Flood Response		Highway 101, the only north-south route in the region, routinely floods near Klamath due to known grade elevation issue, resulting in Highway 101 temporary closures. A Caltrans project to remedy this issue has been proposed, but may have been shelved.
167	Local Agency	Financing	Projects & Planning		The State should re-evaluate its cost-sharing funding requirements and cost-share formulas for sparsely populated counties and communities. The sparsely populated Counties have difficulty in competing for the Statewide funding programs.
168	Local Agency	Processes & Policy	Projects & Planning		The Harbor has not fully recovered from the damages incurred during these four events, with the most recent Tsunami triggered from the Japan earthquake of March 2011. Greater support from the State Office of Emergency Services (OES) and the USACE is needed to generate the local cost-share components that are needed to fully recover and rebuild from the natural disasters. The USACE Section 404 wetlands permits and the California Coastal Commission regulations have also significantly hampered rebuilding the Harbor in a timely and acceptable fashion.
169	Local Agency	Local	Flood Response		Lake Earl is a volatile issue, and the County of Del Norte has neither the staff nor funding to address the continual flood and public health hazards associated with it. DWR, with its mission of managing water resources to benefit California's people while also protecting, restoring, and enhancing natural and human environments, should examine its own role in the Lake Earl issue and try to bring a balance to the environmental and human interest.
170	Local Agency	Local	Projects & Planning		Del Norte County experiences annual flooding at known locations. However, due to California Coastal Commission and Department of Fish and Wildlife permitting requirements and the lack of available funding, the County is significantly challenged to take any proactive measures to prevent repetitive flood damage to homes, roads, bridges, and septic tanks. The major timing and funding options for flood projects is during a flood emergency, which is dangerous and costly, and does nothing to prevent future problems.
171	Local Agency	Local	Projects & Planning		Further studies and investigations into the hydrologic and financial affects on downstream communities need to be done before decisions are made to remove the PacifiCorp Dams. Furthermore, should the dam removal require community and infrastructure changes, funding should be made available to do so.
172	Local Agency	Financing	Flood Infrastructure Maintenance		Repairs are done to the levees only when emergency funding is available.
173	Local Agency	Funding Info.	Projects & Planning	Flood Infrastructure Maintenance	The Salt River Project has been in progress for more than 10 years. It is a collaborative effort between the California Coastal Commission, CDFW, U.S. Fish and Wildlife Service (USFWS), Ducks Unlimited, and Humboldt County.
174	Local Agency	Local	Flood Infrastructure Maintenance		The dike at Jacobs Avenue, which was built in the 1930s started failing in the 1990s and has yet to be fully repaired.
175	Local Agency	Local	Flood Infrastructure Maintenance		Jolly Giant Creek Dam within the City of Arcata (Humboldt State) was originally built for water supply, but it is currently used for flood control. It uses an 8-inch cast-iron pipe for discharge and doesn't have a floodway, causing spillway overtopping during high flows. When this happens, there is no lead time to notify emergency services.
176	Local Agency	Processes & Policy	Flood Infrastructure Maintenance		California Coastal Commission, Department of Fish and Wildlife, USFWS, and National Oceanic and Atmospheric Administration (NOAA) Fisheries environmental permitting requirements make it near impossible to be proactive about maintaining and improving the flood control system.
177	Local Agency	Processes & Policy	Knowledge/Awareness	Flood Infrastructure Maintenance	Sea level rise is a concern for the Coastal County of Humboldt, especially how it will affect critical infrastructure such as the wastewater treatment plants for Eureka and Arcata. DWR and others need to develop response solutions to plan for the inevitable rise in sea level impacting critical infrastructure.
178	Local Agency	Processes & Policy	Projects & Planning		Permitting for flood maintenance work is granted under the condition that all work is done by hand. The County and Cities rely heavily on the California Conservation Corps and Cal Fire for this, and would not be able to fund projects otherwise. Similar programs utilizing sediment removal equipment should be developed for removal of river sediment build-up that impedes the conveyance of flood flows throughout the County. This would significantly reduce the risk of flooding to critical infrastructure.
179	Local Agency	Processes & Policy	Projects & Planning		Humboldt County and the Cities do not have the resources to be proactive about flood control. Not only is it hard to fund the projects, but applying for a State grant is lengthy and costly. This, on top of having to comply with strict environmental permitting requirements, prevents the County and Cities from being able to keep up with maintaining their flood control systems that protect both the ecosystem and the communities. The agencies feel that while they are ensuring the protection of the environment, the California Coastal Commission and the Department of Fish and Wildlife are ignoring the potential flood hazards being posed to humans.

Table J-B-1. Recommendations to Improve Flood Management in California

ID	Source	Major Category	Minor Category	Minor Category 2	Opportunities and Challenges/Recommendation
180	Local Agency	Processes & Policy	Projects & Planning		In lieu of upgrading their flood control system, the County OES would like additional stream gauges. This will allow emergency responders to get a better idea of what water level and damages to expect so that they can respond timely and appropriately.
181	Local Agency	Processes & Policy	Projects & Planning		Some mechanism needs to be established to communicate and coordinate with permitting agencies such as the California Coastal Commission and the Department of Fish and Wildlife so that conflicting requirements and goals can be resolved.
182	Local Agency	Financing	Flood Infrastructure Maintenance		When FEMA updated the floodplain maps, the City of Susanville was given 2 years to get the levees accredited before the maps were redrawn without the levees and an expanded floodplain. However, neither the State of California nor FEMA provided any guidance on how to fund the levee improvements. Without funding, the Susanville levees will not qualify for accreditation even though the levees are serving as levees, with or without FEMA recognition. In addition, the new FEMA insurance rates are being raised, and mortgage companies are reevaluating homes that may be in the enlarged floodplain.
183	Local Agency	Funding Info.	Projects & Planning		The City of Susanville is currently applying for Proposition 84 funding, and some projects have had the support of the U.S. Department of Agriculture and the Natural Resource Conservation Services.
184	Local Agency	Funding Info.	Projects & Planning		Large urban areas can afford to invest a lot of money into managing floods, but small rural communities cannot. The City of Susanville has a budget of $0.5 million and a 1% growth rate, and even if the City is awarded a grant, it cannot meet the minimum match funding requirement to accept the grant. Without additional assistance from the State or Federal Government, the flood control needs of the City will not be met.
185	Local Agency	Funding Info.	Projects & Planning		While the State grant funding programs go a long way toward assisting needed flood control projects, the State should further review its scoring criteria and requirements and ensure that considerations for disadvantaged, particularly less populated, communities are enough to allow for reasonable participation. As of now, small cities and counties with extremely small populations (such as the City of Susanville, and Lassen County) cannot even cover the cost of preparing a competitive grant application and participate at the minimum 10% to 30% local cost-sharing levels currently required by the DWR FloodSAFE and IRWM Programs.
186	Local Agency	Financing	Flood Infrastructure Maintenance	Flood Response	Typically, flood repairs can only be made during or after emergencies; otherwise, permitting required by the California Department of Fish and Wildlife, the Lahontan Water Board, or the USACE prevents any flood work. Because of this, flood improvements are never made, only flood repairs, and they are made in nonfavorable conditions.
187	Local Agency	Financing	Flood Response	Flood Infrastructure Maintenance	Due to strict permitting requirements, improvements are never made for flood control infrastructure. What work that needs to be performed in order to protect lives and property is done during flood emergencies, when conditions are especially dangerous for workers. One way to ease the permitting restrictions would be to have a separate designation for streams that are used only for flood control.
188	Local Agency	Financing	Projects & Planning	Flood Infrastructure Maintenance	Streams that are used for flood control should be put into a separate designation with less onerous environmental permitting requirements. In this way, it will be easier to carry out flood maintenance and develop flood control improvement projects that are needed to maintain minimum levels of flood protection.
189	Local Agency	Local	Projects & Planning		The biggest problem in planning for flood control and emergency response is that the farmers control all the water until it floods the City of Susanville. Currently, the U.S. Department of Agriculture and the Natural Resources Conservation District is applying for funds to improve the Susan River from Hog Flat to McCoy Dam and the release valve to the Susan River.
190	Local Agency	Processes & Policy	Projects & Planning		In addition, there appears to be a disconnect between the County, State, and Federal governments from local flood management groups. The City of Susanville took the lead in developing the Multi-Hazard Mitigation Plan for Lassen County, the City of Susanville, and the Susanville Rancheria.
191	Local Agency	Financing	Projects & Planning		Modoc County applied to the Local Levee Assistance Program (LLAP)+F224 but it did not receive any funds. Most California Grants require a cost-share, and although disadvantage communities need to match only 10%, that amount is still too costly for rural communities. Moreover, the staff needed to develop a grant application or planning document is not available.
192	Local Agency	Financing	Projects & Planning		The IRWM Plan program provides an option; however, the scoring system does not provide enough consideration to disadvantage communities. For example, projects that are shovel-ready receive more points than projects that are in the planning phase, but a disadvantage community is less financially able to produce shovel-ready projects.
193	Local Agency	Financing	Projects & Planning		California Grant programs do not do enough to assist disadvantaged communities. Although the cost share is less for areas accepted as disadvantaged communities, the reduced cost share is often still too high. Moreover, disadvantaged communities are less able to supply the staffing needed to assemble a grant proposal. Scoring and criteria for California grant proposals need to be reviewed and adjusted, taking into consideration the ability of the disadvantage communities to develop competitive applications and project plans.
194	Local Agency	Processes & Policy	Projects & Planning		Blanket regulations protecting sensitive species and streams restrict the County's ability to maintain the streams. For example, the streams in the region are non-salmonid bearing but the County and Central Modoc Resource Conservation District (RCD) must comply with expensive permitting requirements. Because of these requirements, the County is not able to clear streams of debris or sediment, resulting in reduced capacity and high flows carrying debris across County Road 1 (California 81) and the City of Alturas.

Table J-B-1. Recommendations to Improve Flood Management in California

ID	Source	Major Category	Minor Category	Minor Category 2	Opportunities and Challenges/Recommendation
195	Local Agency	Processes & Policy	Projects & Planning		Easements or Memorandums of Understanding (MOUs) with the landowners would enable maintenance of the streams, allowing for not only flood control, but habitat restoration as well. Over 15 years ago, the County had an agreement with DWR and California Department of Fish and Wildlife to clear floodways; however, this agreement is no longer in place.
196	Local Agency	Local	Flood Response		County Road 1 (California 81), which is the main thoroughfare and main access for emergency response between Reno and Alturas, floods annually. Portions of County Road 1 (California 81) are lower than the berms and sometimes act as floodplains. Flooding is mainly due to debris, channelization of the stream, and sediment. The floods on the Pit River tend to be flashy and will bottleneck at County Road 1 (California 81). Due to environmental restrictions, permitting issues, or private lands agreements, maintenance is restricted to only within 25 feet downstream and upstream of the County Road.
197	Local Agency	Financing	Projects & Planning		Eighty percent of the land in Modoc County is Federal Land, and most of the flows that threaten the City of Alturas and County Road 1 (California 81) on the east Side of the Werner mountains run off from Federal Lands. In addition, the reduced land area available for development further constrains Modoc County's ability to raise funds, via property taxes, for flood control projects or to maintain staff. Modoc County is severely disadvantaged relative to population base and income levels, and it needs special consideration to participate in the current and future DWR funding programs to improve flood control infrastructure and IRWM program activities.
198	Local Agency	Financing	Projects & Planning		For environmental regulations to be the most effective, exclusions should be made considering the applicability of the environmental requirements. In addition, disadvantage communities should be able to receive assistance from the imposing agency to comply with environmental requirements. Non-funded mandates from FEMA and others make it difficult for Modoc County and the City of Alturas to pay flood insurance and improve its flood protection systems to meet the current 100-year minimum requirements.
199	Local Agency	Local	Flood Infrastructure Maintenance	Projects & Planning	Surprise Valley, on the eastern slope of the Werner Mountains is prone to flooding due to the alluvial fan in the area. However, due to the lack of floodplain mapping in Surprise Valley, the County is unable to restrict development in locations susceptible to alluvial fans and flooding. Surprise Valley is a popular location for development, and many of the homes that are near drainages have historical significance.
200	Local Agency	Local	Flood Infrastructure Maintenance	Projects & Planning	South of Alturas the bridge decks are too low; high flows go over the bridges. The Department of Fish and Wildlife will not allow the County to remedy this via reducing flows, due to CEQA requirements.
201	Local Agency	Local	Flood Infrastructure Maintenance		The wastewater treatment plant for the City of Alturas is a concern due to its location on the Pit River.
202	Local Agency	Local	Flood Infrastructure Maintenance	Flood Response	Most of the levees and reservoirs identified in the California Levee Database map brought to the meeting are solely used for irrigation and do not assist in flood control, with the exception of the Dorris Reservoir, which is owned and operated by the U.S. Fish & Wildlife Service, and Tule Reservoir (formerly known as Moon Lake). Both of the lakes discharge to the County, and could cause flooding. In addition, expansion of the Big Sage Dam is expected in the future, and if a Hazard Plan were developed, the Dam could be used to alleviate flood flow backups, as well as assist in wetlands restoration.
203	Local Agency	Local	Flood Infrastructure Maintenance	Flood Response	Without consulting the County of Modoc, Caltrans installed a drainage pipe through the levee near Alturas, destabilizing the levee.
204	Local Agency	Local	Flood Infrastructure Maintenance		The USACE levees that are protecting the City of Alturas have worked well since they were constructed in the 1970s. Within the City of Alturas, below the 100-year floodplain, sits Modoc County's hospital. By disaccrediting these levees, FEMA has laid a cost-benefit problem onto the County between moving the County Hospital and improving the levees. Currently, the County cannot afford to fund either option.
205	Local Agency	Financing	Flood Infrastructure Maintenance		The watershed is difficult to manage for flooding for many reasons: watershed characteristics, environmental regulations, under-designed infrastructure, and lack of funding. The watershed consists of steep terrain and alluvial fan, and floods cause heavy sediment and debris flooding. In addition, high water can also cause the streams to change their course, making it difficult to locate and maintain infrastructure.
206	Local Agency	Financing	Flood Infrastructure Maintenance		Berms installed by the USACE in response to the 1964 flooding have not been maintained, and stream aggradation has collectively reduced the flood flow conveyance in the channel systems where the berms and levees are installed.
207	Local Agency	Processes & Policy	Projects & Planning	Flood Infrastructure Maintenance	State and Federal projects have caused more problems than they've solved at some locations. For example, mechanical down-cutting in streams has resulted in lost diversions and increased sedimentation downstream.
208	Local Agency	Financing	Projects & Planning		In many situations, the State will provide funding to implement flood control programs, but no funding is provided for program maintenance. Therefore, the Counties are left to foot the bill. Moreover, as environmental restrictions get tighter, the harder and more costly it becomes to maintain a flood control program.
209	Local Agency	Financing	Projects & Planning		Obtaining State funding grants is more difficult for rural communities, especially when there are large urban areas competing in the same region.
210	Local Agency	Financing	Projects & Planning		Many statewide mandates, in addition to being unfunded, are disjointed, uncoordinated, and not applicable. Most State and Federal policies and regulations are generated by large urban areas and applied in a one-size-fits-all fashion.
211	Local Agency	Financing	Projects & Planning		California grant funding programs need to review their criteria and scoring systems. Although the local match funding is often reduced for disadvantaged communities, the disadvantaged communities are often still unable to come up with the reduced match rate, as well as produce the staff and funds necessary to develop a competitive plan.
212	Local Agency	Financing	Projects & Planning		Non-funded mandates from FEMA and others make it difficult for Siskiyou County and its small Cities, particularly McCloud to pay flood insurance and improve its flood protection systems to meet the current 100-year minimum requirements.

Table J-B-1. Recommendations to Improve Flood Management in California

ID	Source	Major Category	Minor Category	Minor Category 2	Opportunities and Challenges/Recommendation
213	Local Agency	Local	Flood Infrastructure Maintenance		Unmaintained berms are under-designed and under maintained and put the Town of Callahan at risk of flooding.
214	Local Agency	Local	Flood Infrastructure Maintenance		Many bridge crossings need maintenance due to the movement of the streams or sediment loads. The bridges themselves may be in acceptable condition, but the shifts and deposit of the streambed under or adjacent to the bridge crossing make the roads very susceptible to flooding. Moreover, these bridges need to be upgraded to handle the 100-year storms. However, environmental restrictions prevent much of the maintenance and improvement work from occurring. Examples include the bridge at Barkhouse Creek, Bar Road at Horse Creek, Sawyers Road Bridge, and the bridges on the Scott River.
215	Local Agency	Local	Flood Infrastructure Maintenance	Projects & Planning	1,056 sites between Scott River and Salmon River have been identified in the Five Counties Damage Information Reporting Tool (DIRT) inventory to contribute a minimum of 20 cubic yards of sediment per site. Part of the problem lies in undersized culverts; however, the County is unable to get funding or permitting to address the undersized culverts.
216	Local Agency	Local	Flood Response	Flood Infrastructure Maintenance	Berms installed by the U.S. Army Corps of Engineers in response to the 1964 flooding are difficult to maintain due to environmental constraints, and stream aggradation has collectively reduced their functions.
217	Local Agency	Processes & Policy	Projects & Planning	Knowledge/Awareness	The new FEMA study has done a disservice to the City of McCloud by conducting the study, identifying problems, and not developing solutions or funding mechanism for the City to address. The study affected 360 parcels, removing 40 parcels from the floodplain, and including 320 into the floodplain. Very little local input was accepted during the study. This is affecting community development, business decisions, and home prices.
218	Local Agency	Processes & Policy	Projects & Planning	Knowledge/Awareness	The pre-FIRM insurance rate for McCloud was $304, now the standard rate is $1,047, and it is uncertain as to the progress on the proposal to eliminate the pre-FIRM rate. This, combined with 19% unemployment, has resulted in residents selling their homes because they are unable to afford flood insurance.
219	Local Agency	Processes & Policy	Projects & Planning		Reduce permitting restrictions imposed by California Department of Fish and Wildlife (CDFW) and the USACE. The permitting requirements imposed by CDFW are not always consistent with the goal, objectives, and permitting requirements developed for the Five County region. The USACE regulatory permitting and levee/channel/road maintenance requirements are inconsistent and conflicting to the point that no maintenance or improvement can take place to enhance or protect County infrastructure, particularly county roads, which are most susceptible to flood risk and damage.
220	Local Agency	Processes & Policy	Knowledge/Awareness		It is recommended that DWR give Counties plenty of notification of change requirements and keep the Regional Council of Rural Counties (RCRC) and other entities involved to distribute information.
221	Local Agency	Processes & Policy	Projects & Planning		It would be very valuable to better coordinate across the mountain counties to overcome limitations in the financial and staff resources. DWR could provide staff resources and expertise to help rural counties. For example, by providing training, technical support, etc.
222	Local Agency	Processes & Policy	Projects & Planning	Knowledge/Awareness	It is recommended that DWR provide technical support on flood issues and opportunities to the rural mountain counties to help counties. Possibly have DWR provide tutorials/pamphlets/contacts for procedural steps, whys, and how-to's. A "Flood Resources" webpage.
223	Local Agency	Financing	Projects & Planning		Cut the IRWM Plan overhead related to competition. Costs associated with grant applications are too high. Earmark money for Rural Areas and DACs. Need help to get local projects in small communities shovel ready, so they can compete. (RE: Cosgrove Study). Current IRWM Plan program needs to be reviewed. Don't want to spend money on consultants that may or may not get funding.
224	Local Agency	Processes & Policy	Flood Infrastructure Maintenance		Seek regulatory relief for maintenance of existing channels.
225	Local Agency	Processes & Policy	Projects & Planning		Critical habitat designations (red-legged frog), environmental effects and permitting requirements make permitting and channel maintenance difficult, if not impossible. This at least increases the costs and puts the price out of range.
226	Local Agency	Local	Projects & Planning		Lost opportunities for funding for the Cosgrove Creek project due to the inability of USACE and FEMA to agree on technical approach and data.
227	Local Agency	Processes & Policy	Projects & Planning		FEMA Maps and survey were incorrect. They were adopted as final in 2010 even though inaccurate. This has caused political upheaval since title companies are sending letters requiring insurance for properties that were affected. The Board of Supervisors has been taking a lot of heat.
228	Local Agency	Processes & Policy	Projects & Planning		CDFW, USFWS, as well as the USACE, need to have consistent requirements for technical studies or environmental compliance.
229	Local Agency	Processes & Policy	Projects & Planning		There should be an appeals or ombudsman process (not just court challenge) to allow for consideration of regulatory requirements, mitigations.
230	Local Agency	Processes & Policy	Projects & Planning		DWR should seek legislative change to allow Flood Control Districts to operate as a utility with rate payers and get away from land based assessments. • Currently at the mercy of bond cycles, grants, and charity for funding. • Average household spends $300 annually on wastewater, $700 a year on water, $70 a year on flood control, and $30 a year on clean water.

Table J-B-1. Recommendations to Improve Flood Management in California

ID	Source	Major Category	Minor Category	Minor Category 2	Opportunities and Challenges/Recommendation
231	Local Agency	Financing	Knowledge/Awareness	Flood Infrastructure Maintenance	Agency Challenge: Community Outreach Lack of community support and awareness of the needs and benefits of flood management infrastructure. Not enough people get wet to create critical mass of support. Most of the big problems have been solved, but the facilities do not have budget for maintenance or expansion needed to accommodate changed conditions.
232	Local Agency	Financing	Projects & Planning		DWR should support matching State and local monies with Federal money.
233	Local Agency	Processes & Policy	Projects & Planning	Flood Infrastructure Maintenance	Agency Challenge: Funding/Revenue Limited ability to raise revenues to maintain existing facilities, expand or build new facilities to meet current needs, or implement new programs to meet regulatory requirements. • Proposition 218 cost and complexity. County has potential risk (possibly liabilities), but no ability to generate revenues to fix the problems. • Inability to put together a capital reserve fund. • Barely able to maintain facilities with current funding. Some zones are funded better than others due to where they were when Proposition 13 was passed.
234	Local Agency	Financing	Projects & Planning		Limited staff and funding resources for Flood Control District to work with the Cities and County during development review.
235	Local Agency	Financing	Projects & Planning		Unfunded mandates from the State; increased regulatory requirements. The RWQCB Municipal Regional Permit (MRP) for the Bay Area placed requirements and responsibilities. District funding sources are insufficient to meet new or expected clean water mandates, such as trash and mercury TMDLs.
236	Local Agency	IWM	Projects & Planning		DWR should continue to provide guidelines, standards and money for locally driven flood management programs. Keep emphasis on capital projects, but support or favor those that include IWM concepts.
237	Local Agency	IWM	Projects & Planning		Agency Challenge: Valuation of IWM Projects- Agency has trouble getting flood project recognized and prioritized in the IRWM Plans. They have not scored well in the past and ranked as lower priority since water supply has been the emphasis, and the value of the IWM projects is not well understood.
238	Local Agency	IWM	Projects & Planning		The problem has been getting IWM projects into the IRWM Plans (East Contra Costa, Bay Area) because they don't include water supply. There have been inequalities and differences in the way projects have been prioritized between the plans. Need to find a way to identify commonalities between the regional plans and those that are within the watershed.
239	Local Agency	Infrastructure	Projects & Planning	Knowledge/Awareness	Agency Challenge: FEMA Mapping and Forecasting FEMA maps out of date and some are inaccurate. • FEMA is snapshot of current conditions; while Flood Control District is interested in hazards for future conditions and developing plans as to how to avoid future problems. • East county floodplain maps are approximate - have good topography, but need a detailed two-dimensional floodplain analysis. • Kellogg Creek FIRM does not correctly show the effect of the Los Vaqueros Reservoir. Need to revisit this analysis and update.
240	Local Agency	Processes & Policy	Flood Infrastructure Maintenance		Agency Challenge: Levee Certification • Some District levees no longer enjoy FEMA accreditation, and the District lacks the resources to study and potentially improve these levees to be re-accredited.
241	Local Agency	Processes & Policy	Flood Infrastructure Maintenance	Projects & Planning	District reservoirs are nearing 50 years old and will likely need rehabilitation or upgrade, including a seismic vulnerability analysis. Needed to keep probability of dam failure low.
242	Local Agency	Processes & Policy	Knowledge/Awareness		DWR shouldn't develop a "Sacramento-based" management model and apply the approach statewide.
243	Local Agency	Processes & Policy	Knowledge/Awareness		Agency Challenge: Forecasting Sea Level Rise & Increased Tidal Flooding Hazards • To conserve resources, the local Flood Control District has delayed seeking recertification pending the results of the Tidal study • Role of the Bay Conservation and Development Commission (BCDC) climate change study has caused great concern since it implied there were problems, put the resolution on local communities, would require major investments, but no funding identified.
244	Local Agency	Processes & Policy	Projects & Planning		DWR should continue to advocate flood protection at the local level. The USACE is interested in very large-scale issues and is not outfitted to properly help locals.
245	Local Agency	Processes & Policy	Projects & Planning		DWR should recognize and accept the risk analysis from the Hazard Mitigation Plans (that used the HAZUS approach) and don't create additional new requirements.
246	Local Agency	Processes & Policy	Projects & Planning		Agency Challenge: Creating equity in the flood zones, drainage areas. Some drainage areas are "unformed" (unfunded- no taxing entity or historic authorization). Some had plans and rates established when Prop 13 passed, others did not and are not funded.

Table J-B-1. Recommendations to Improve Flood Management in California

ID	Source	Major Category	Minor Category	Minor Category 2	Opportunities and Challenges/Recommendation
247	Local Agency	Processes & Policy	Projects & Planning		Agency Challenge: Regulatory Constraints Increased regulatory burden for regular maintenance; development of new projects.
248	Local Agency	Processes & Policy	Projects & Planning		One issue is that the resources agency exaction for impact mitigation is not proportionate with the impact, making good projects infeasible.
249	Local Agency	Financing	Projects & Planning		Find a way to support rural areas - Staff, funding, and technical resources are unavailable to smaller cities as they are not part of the Flood Control District. Rural areas and smaller cities or unincorporated areas of development concentration need support to play the game, either from the State or county. Support is dependent on State bond funds.
250	Local Agency	Financing	Projects & Planning		FEMA money should be coordinated by DWR and CalEMA.
251	Local Agency	Financing	Projects & Planning		Asking for funding is difficult for the smaller communities (time, money). Provide resources for cities to put individual data on the shelf.
252	Local Agency	IWM	Projects & Planning		Reward areas using IWM to streamline permitting and regulatory compliance and make it easier, faster, and cheaper to do flood control projects that employ best practices.
253	Local Agency	Processes & Policy	Knowledge/Awareness		DWR needs to lead on flood control. DWR needs to support the types of programs they're looking for through more than grants and a fact sheet. They need to stand up in front and do some better public relations and Public outreach.
254	Local Agency	Processes & Policy	Knowledge/Awareness		Make it easy to share information – let us maintain our own data, but provide tools. DWR may want to consider a type of "wiki-page" for cities/counties to provide information. Could have GIS component.
255	Local Agency	Processes & Policy	Knowledge/Awareness		Nobody is taking a stand on sea level rise and what to do about it. State needs to take the lead even if local agencies feel that the State coming in is an infringement on their rights to develop.
256	Local Agency	Processes & Policy	Projects & Planning		Flood control needs a regional-, watershed-, or system-wide approach.
257	Local Agency	Processes & Policy	Projects & Planning	Flood Infrastructure Maintenance	Tough to protect an existing infrastructure without mowing over environmental protections.
258	Local Agency	Financing	Projects & Planning		Funding Challenges- cost and time to obtain grant money from various sources and to match available State and Federal monies with local projects at different stages of the project's life. Timing of environmental studies to match with funding cycles. Can find money to build projects via grants but trouble getting local match and ongoing funding for O&M (getting successful Proposition 218 initiatives passed).
259	Local Agency	Financing	Projects & Planning	Knowledge/Awareness	Economic Analysis Issue - Different requirements and methods to do economic analysis (benefit/cost ratio). Varies by program and State/Federal. Hard to quantify the benefit (intangible) of improved habitat and other non-tangible aspect of a project and prove the project provides a net benefit. Data is not there or the analysis is not well understood, no access to training or experienced consultants. Also, recognizing regional and statewide benefits and impacts when establishing Proposition 218 engineering and economic analysis.
260	Local Agency	Processes & Policy	Knowledge/Awareness		Public Acceptance Issue - time and energy to get public awareness and acceptance of a project so they vote in the affirmative on initiatives. Outreach and public affairs adds to the cost. People do not want to pay to prepare for a flood, but once a flood occurs, residents will pay money to sue for loss or damaged property.
261	Local Agency	Processes & Policy	Projects & Planning	Flood Infrastructure Maintenance	Regulatory Challenges- Environmental review and permitting requirements. Obtaining funding is difficult if the project has environmental vulnerabilities. Regulation of long-standing historical programs (e.g., Salinas River, Pajaro River). For example, Monterey County Water Resources Agency (MCWRA) estimated it would be $850,000 just to do the studies (includes expected mitigation cost estimate) to file for the permits to do the channel maintenance program.
262	Local Agency	Processes & Policy	Projects & Planning		Liability Issue- regulatory agencies prevent action to clear channels or open the lagoons to prevent flooding; local agency cannot get permits to do the job and are then held liable for resultant flooding.
263	Local Agency	Financing	Projects & Planning		Grant program requirements exceed the County/City capacity to meet due to lack of staff to track funding programs, develop projects.
264	Local Agency	Financing	Projects & Planning		There is no local support for benefits assessments and we politically could not get anything passed. Can't get voter approval for funding (Proposition 218, benefits assessment). No way to get an affirmative vote in the current environment.
265	Local Agency	Financing	Projects & Planning		Need help integrating available funding sources from the State and Federal agencies. Many of the grants have too many strings attached and require integration of too many items. There is no local support for benefits assessments and we politically we could not get anything passed.
266	Local Agency	Processes & Policy	Projects & Planning		Can't depend on themselves to obtain data, as well as the larger counties. Need to find a way to feel out their place in terms of flood impacts. County is small politically and population-wise, is well connected to water issues. Need to stay abreast of where the water issues are.
267	Local Agency	Processes & Policy	Projects & Planning	Flood Infrastructure Maintenance	Natural function is 99% of the flood process in the county. Most infrastructure naturally exists. Biased toward economic development, and not maintenance. Roads are viewed as a safety issue.

Table J-B-1. Recommendations to Improve Flood Management in California

ID	Source	Major Category	Minor Category	Minor Category 2	Opportunities and Challenges/Recommendation
268	Local Agency	Funding Info.	Flood Infrastructure Maintenance		Alpine County funding sources: 1. State and Federal grants and monies 2. Private development
269	Local Agency	Funding Info.	Projects & Planning	Knowledge/Awareness	Water District zones benefit from property tax levies. General property tax that the district gets that is very small for administration. The Water District boundaries run contiguous with County boundaries. Funding would likely come from an assessment or a tax that would go to the voters. Always seeking grants. Lidia Gutierrez does much of this grant work, through State or Reclamation. More practical discussion of how to deal with flows when the they travel between jurisdictional boundaries
270	Local Agency	Financing	Knowledge/Awareness	Projects & Planning	Identifying the funding responsibility is the issue. Hard to answer where the funding coming from to complete any project, even if there are issues that are identified. Hasn't been much motivation for flood control because there have not been any major flooding incidents. Most people quickly forget about the local flooding and lose interest.
271	Local Agency	Infrastructure	Projects & Planning		A reservoir that does provide flood attenuation for Pacheco Creek is the Pacheco Reservoir. Pacheco Water District, which is essentially not functional, manages the Pacheca Reservoir. The Pacheco Water District has no funding and, due to this, the reservoir needs help. Santa Clara Valley Water District is looking at how to work with the Pacheco Water District. Better identification of responsible party for flood control in a given area.
272	Local Agency	Financing	Projects & Planning		Tried to implement drainage fees, which is somewhat difficult to assess. It would be good if there was a broader assessment ability to raise funds to maintain and complete projects.
273	Local Agency	Processes & Policy	Projects & Planning	Flood Infrastructure Maintenance	Regulatory agencies really don't seem to want to streamline the regulatory process. The County has a good staff for regulatory permitting, but regulatory agencies are not collaborating as well. The regulatory agencies seem to be limiting the availability to work with them to complete projects. It would be nice if there was a clearinghouse of sorts to streamline the process. Small maintenance projects can end up costing much more in regulations than the actual maintenance. State needs to step back and give some of the control to the local agencies. If there was a way to provide more exemptions in CEQA, similar to Fish and Wildlife. It used to be simple to get through these processes, and now it takes months to deal with approval from the agencies.
274	Local Agency	Processes & Policy	Projects & Planning		From a regulatory standpoint, it would be nice to have a regional vetting of the regulations, or a central mitigation system. Rules are ever changing for a habitat mitigation plan, but the yardstick never stays the same, similar with many of these issues. If you had a good maintenance plan, then you should be able to complete a permit, but that is not how it works because it comes down to the individual reviewer. It would be nice to get a voice through CEAC, where they would produce something that provides documentation of the State conditions and needs similar to American Society of Civil Engineers (ASCE) report cards.
275	Local Agency	Financing	Projects & Planning	Knowledge/Awareness	Huge frustration when voting on these revenue sources because the only positive votes are from those directly impacted. Doesn't share the burden with all involved, such as areas contributing flow to areas from increased development.
276	Local Agency	IWM	Knowledge/Awareness		In general, the planning department advocates IWM and promotes it, but is still having trouble getting the "teeth" behind the issues. Regionalization of smart growth and sustainability. County is not homogenous so have disconnected issues and regional needs. Cities cooperate very well with cities of similar needs but the County tends to have missed opportunities with integration of all areas. IWM needs to be and is connected to smart growth and regionalization. Still having issues integrating floodplain management just within their region, so including other regions is difficult and challenging.
277	Local Agency	Processes & Policy	Flood Infrastructure Maintenance		Regulatory constraints have further limited maintenance, so over time the Zone 1/1A channel has been greatly compromised. Zone 1/1A channel was built in the late 1950s with the USACE for agricultural reclamation through a swamp area. This was designed for a 50-year storm but is now providing conveyance for a 2-year storm. Dealing with trying to keep up with expenses for these types of Projects has been a challenge.
278	Local Agency	Processes & Policy	Flood Infrastructure Maintenance	Knowledge/Awareness	Because of the regulations, much of the housing in the County is forced to certain areas, which causes increased sediment and increased flood zones. The County does not have big projects to manage flooding associated with infill of private development; further complicating this is the simple fact that it's hard to fund big projects. FEMA wants the people out of the floodplain, but it is difficult to move people out of the floodplain. The Counties and Cities want more houses to generate more revenue, and the houses are likely going to be next to drainages as they are easier to develop. How do we get smart growth into these antiquated subdivisions that want to redevelop when it impacts the floodplains. Recent development has had impacts on runoff and conveyance of stormwater that isn't accurately reflected in most floodplain maps, complicating the issue of what you are actually dealing with.
279	Local Agency	Financing	Projects & Planning		The County needs to find how to get the funding, which is further challenged by regulatory agencies even though the County has completed a study that works with the regulatory agencies to achieve the drainage facility requirements. This Project is effectively creating a drainage channel through a natural stream channel. Cost to meet the regulatory requirements has potential to be more expensive than the compensatory mitigation.
280	Local Agency	Financing	Flood Infrastructure Maintenance		Agency Challenge: Crumbling infrastructure, obtaining funds with which to construct and maintain infrastructure.
281	Local Agency	Processes & Policy	Projects & Planning	Flood Infrastructure Maintenance	Regulatory environment is ridiculously complicated and difficult to work through. Maintenance and capital projects are all driven by regulatory concerns first and foremost. Priority is to come up with a regulatory system that makes sense and is consistent.
282	Local Agency	Processes & Policy	Knowledge/Awareness		State should take a larger lead in minor FIRM map changes, rather than having to go through FEMA.

Table J-B-1. Recommendations to Improve Flood Management in California

ID	Source	Major Category	Minor Category	Minor Category 2	Opportunities and Challenges/Recommendation
283	Local Agency	Financing	Projects & Planning		Getting money from the State shouldn't be so arduous. It would be nice if there was one consistent way to get through the grant and permitting process, and then concentration could be on completion of the Project.
284	Local Agency	Financing	Projects & Planning		Would be great to get money for the fish passage process, since that is such a large component of present and future projects.
285	Local Agency	Financing	Projects & Planning		It would really great if the regulatory arm of the State was more reasonable, for example when the rules and regulations contradict one another. Over-regulating areas that haven't historically been regulated.
286	Local Agency	Risk	Projects & Planning	Flood Infrastructure Maintenance	Like most communities, Santa Barbara County is struggling with crumbling infrastructure; Santa Maria River levee is currently being modified to address current deficiencies. Santa Maria levee has issues, but they are doing something about it. Road department has an inventory of all bridges and culverts but doesn't include their performance. Multi-Hazard mitigation plan for the County and CIP from County indicate areas of need.
287	Local Agency	IWM	Projects & Planning		Because of geographical limitation (large size of county), IWM not seen as practical. Not a formal process but consider during all Projects and much of the regulatory process drives the agency to this end. Cannot imagine completing the things that they do without completing IWM. Anymore the County's Projects, routine or not routine, have to reach a consensus group. County is already required to include all of the regulating agencies and the interest groups to make projects move forward.
288	Local Agency	Funding Info.			Benefit assessment program, grants, State props, bonds. Assessment put against property taxes per zone, based on the size of the property and the use of the property. Goes up every year with the cost of living index. Get a small percentage of the overall Property tax bill, still constrained to the zone. Special projects are through grants and other available resources. No measures for special flood control Projects through the County, typically just raise the property benefit assessments (voter approved). Active grant program, very successful at submitting grant applications and getting them. Funding may not be commensurate with needs because some zones generate more revenue than others, and like to have reserve for emergencies.
289	Local Agency	Processes & Policy	Projects & Planning		It would also be nice if the State would coordinate with all regulatory aspects, wherein if the State deems a project "good," then all the regulators know. There is a disconnect between the agencies on what the general direction for a project should be.
290	Local Agency	Infrastructure	Flood Response		It is difficult to assess the funds needed for the O&M for their side of the levee system. Many original levees were not built to any standard and have difficulties in meeting any consistent criteria.
291	Local Agency	Financing	Projects & Planning		The County has had Federal funding limitations, so they have been pursuing State funding when possible.
292	Local Agency	Funding Info.	Flood Infrastructure Maintenance		The County received Prop 1E money. Feds are not funding the Pajaro Project as much as they had been so trying to keep the team working consistently is difficult. The Pajaro River Project was Identified in the Federal work plan for 2011, which allowed for possibility of Federal appropriations for 2012. The Pajaro Project is still not in the President's budget for 2012 though.
293	Local Agency	Funding Info.	Flood Response		All fees for flood control in these areas come from development, and there is no development going on.
294	Local Agency	Infrastructure	Flood Infrastructure Maintenance	Knowledge/Awareness	Soquel Creek is full of trees and debris. Aptos Creek has issues with the River mouth closing. Public perception of public risk in these areas is pretty high, and few people think that the County is doing enough. Felton Grove has flooded a bit but people began to expect it, so the concern diminished some, with the residents no longer saying someone should do something about it.
295	Local Agency	IWM	Flood Infrastructure Maintenance		College Lake has turned into an opportunity; it used to be a lake and was pumped out in the summer time to farm the bottom. Currently, there is a dam to keep water from back-flowing into the lake. Santa Cruz County is maintaining the channel downstream of the College Lake pumps to allow more flow, but there is changing demand for these resources. In the future, it may be used as water storage rather than as an agricultural area. The existing dam would be reconstructed to use the lake as storage, and then use the water for supply. The County has looked at operating the dam with fish passage and flood control in mind. Currently, the County is preparing a College Lake management plan with some DWR funding. In general, there has been a trend for summer homes to become permanent homes, with many next to streams or floodplain areas.
296	Local Agency	Local	Flood Infrastructure Maintenance		Another problem has been how to deal with sediment coming from upstream and locally. The County also has significant debris from the redwood forests that has to be considered.
297	Local Agency	Funding Info.			Generally, the County pursues grants including, Prop 50 and Prop 1E. Many times the County will look at assessments for maintenance of the projects when moving forward. However, the County is not to a point with assessment figures yet. The County has also been looking at subventions programs where the State would pay half of the local sponsor share if there were environmental implications. This leads to more omnibus special levee projects that would provide for environmental and flood management financing. Parcel tax etc.
298	Local Agency	Processes & Policy	Projects & Planning		Streamlining of permitting could help out at a residential level.
299	Local Agency	Processes & Policy	Flood Infrastructure Maintenance		The County also has ongoing regulatory issues with the maintenance of existing facilities.

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ID	Source	Major Category	Minor Category	Minor Category 2	Opportunities and Challenges/Recommendation
300	Local Agency	Funding Info.	Projects & Planning		The County probably spends approximately $200,000 in Zone 7 on regulatory monitoring requirements and more in the Pajaro storm drain district. Historically, the County board has been fairly green, and has been pretty well regarded by the regulatory agencies. Santa Cruz County would recommend working better with regulatory agencies, if the agencies were more apt to negotiate.
301	Local Agency	Funding Info.	Projects & Planning		The County is always trying to find ways to promote recognition within the state for the low level of protection on a Federal project. The County has noticed that they don't have strong benefit/cost for major projects so they have to try hard to stay in the overall focus. It would be beneficial if there were a different means of ranking project benefits. Always, more money would be welcome.
302	Local Agency	Funding Info.	Projects & Planning	Flood Response	The County would like to see consideration of agricultural lands as well, because of the impacts to their highly agriculture-based economy. This would likely involve promoting some level of protection for agricultural lands.
303	Local Agency	Processes & Policy	Flood Infrastructure Maintenance		DWR no longer allows dam failure inundation maps to be released publically due to security risks. This information was helpful for El Dorado County (EDC) to better manage their flood risk due to their high number of private and public dams in the County.
304	Local Agency	Local	Projects & Planning		EDC is an extremely old county with over 100 years of contradictory parcel boundaries. This makes it extremely challenging for surveyors to identify correct parcel boundary locations, which has actually led to a few homes being constructed on the wrong parcel. This also makes it very complicated for the County to identify its own easements. It is an extremely time-consuming process to identify where floodplains actually lie without trustworthy parcel data. EDC's mountainous terrain and narrow river channels prevent development in the floodplain. This, in addition to slow development growth, has allowed EDC to avoid having to spend more time and money toward flood control.
305	Local Agency	Local	Flood Response		City of Placerville: Due to steep terrain conditions, development has not really occurred within the floodplain. On occasion when a higher event occurs, the City may experience localized flooding; however, this flooding is easily managed and recedes quickly.
306	Local Agency	Local	Flood Infrastructure Maintenance		Nevada County is impacted by old hydraulic mining affects. Downstream impacts have been mitigated and have become more stabilized as time passes.
307	Local Agency	Local	Flood Response		Nevada County handles localized flooding issues internally, to date. This includes flood issues, including failed culverts.
308	Local Agency	Local	Projects & Planning		Due to Nevada County's steep terrain and low population development, Nevada County hopes to continue providing flood management through a strict land development policy.
309	Local Agency	Processes & Policy	Projects & Planning		Nevada County enforces strict land use management policies, which prevent most flood damages from occurring.
310	Local Agency	Financing	Projects & Planning		Grant applications are too cumbersome and overwhelming; however, Nevada County has not gone after a State grant to date.
311	Local Agency	Processes & Policy	Projects & Planning		Nevada County is most concerned with DWR potentially mandating requirements with the "one size fits all" motto. Rural counties, such as Nevada County, do not have the staff or resources to meet rigorous requirements.
312	Local Agency	Processes & Policy	Projects & Planning		The District is concerned with how DWR will implement 200-year floodplain requirements on local agencies. The District is not clear how it will go about implementing the potential requirements in its County.
313	Local Agency	Processes & Policy	Knowledge/Awareness		DWR levee database has some inaccuracies for Placer County and needs revision. These were identified when viewing DWR's Awareness Mapping.
314	Local Agency	Processes & Policy	Projects & Planning		A challenge that the District faces is how appropriately flood studies are being equally coordinated on both sides of a river. There seems lack of foresight when analyzing impacts on only one side of a river, which has posed problems for the District in the past.
315	Local Agency	IWM	Projects & Planning		The District wants to continue coordinating with DWR on IWM projects. They hope that DWR continues to provide grant funding, such as Prop. 84 and 1E. Challenges that the District face includes developing funding mechanisms to pay for maintenance. The District struggles with DWR paying for design and construction; however, it will not pay for O&M for these funded facilities. The District struggles with coming up with funds to pay for O&M. The District has to pass the fees on to the benefit-receiving agencies. This is extremely difficult for the other cities within Placer County because they are extremely financially strapped. The District works with each agency/community on possible in-kind services trading.
316	Local Agency	Local	Projects & Planning		The District plans on staying involved with the Central Valley CVFED project, where they are participating as a reviewer agency for drafted documents.
317	Local Agency	Financing	Projects & Planning		From the District's perspective, it seem like DWR primarily focuses on leveed protected areas for grant funding and does not provide any other type of funding opportunities. This makes it impossible for counties like Placer to apply because they do not satisfy the criteria. Programs like the Urban Stream Restoration program (http://www.water.ca.gov/urbanstreams/) was a very helpful program to smaller agencies, and the District hope it is funded in the near future.
318	Local Agency	Funding Info.	Projects & Planning		The District has funded one regional project by proposition funding.
319	Local Agency	Funding Info.	Projects & Planning		Fee programs managed by each city are occurring.
320	Local Agency	Funding Info.	Projects & Planning		A challenge that the District is faced with is the restriction not being allowed to use collected fees for O&M.

Table J-B-1. Recommendations to Improve Flood Management in California

ID	Source	Major Category	Minor Category	Minor Category 2	Opportunities and Challenges/Recommendation
321	Local Agency	Funding Info.	Projects & Planning		CSA, new legislation, or new fee program are all options.
322	Local Agency	Financing	Projects & Planning		The District would like to recommend the State to perform more public outreach to flood control agencies on funding opportunities. More information needs to be distributed regarding integrated regional programs.
323	Local Agency	Local	Projects & Planning		Encourage active participation in the Remedial Action Plan (RAP), as well as coordinating with other agencies with projects in the RAP. Work together to define the roles of the RAP, as well as other Joint Powers Authorities (JPAs) like the Regional Water Authority (RWA).
324	Local Agency	Processes & Policy	Projects & Planning		Squash competition between IRWM programs and work together more efficiently.
325	Local Agency	Financing	Projects & Planning		Provide more grant opportunities that have a larger and more diverse range of application requirements. Reduce the amount of effort required to complete a grant application.
326	Local Agency	Funding Info.	Projects & Planning		Allow grant funding to be used for O&M or provide a grant program specifically for O&M.
327	Local Agency	Processes & Policy	Projects & Planning		The submittal requirements for Proposition 84 compared to IE varied significantly. For the Proposition 84, a joint application of multiple agencies was submitted and scored as one application. Although a joint application was submitted for Proposition IE, each project was broken and scored separately, completely defying the point of submitting a joint application. Also by breaking out each individual project as its own, it lost some of the IWM features that as one project it may have brought.
328	Local Agency	Financing	Projects & Planning		It is also recommended that if funding is awarded through one round of grant funding, that grant funding be awarded the future rounds to ensure completion of projects.
329	Local Agency	Processes & Policy	Projects & Planning	Knowledge/Awareness	The County has been dealing with limited FEMA floodplain data. The County does not have the resources or the expertise to conduct flood evaluations on their own. There have been a few flood studies completed due to development projects, but for the most part, FEMA floodplain information is the sole source of floodplain information for the County. In September 2011, a FEMA Flood Insurance Study was conducted for the Sierra Valley, which spans both Sierra and Plumas County. FEMA funded the entire study. This is the first new mapping from FEMA in many years, although the need was identified more than 10 years ago.
330	Local Agency	Processes & Policy	Projects & Planning	Knowledge/Awareness	It is also challenging for the County when Federal and State government rolls out major projects (for example, the Central Valley FloodSAFE program), which slowly trickle down and impact local agencies that are already extremely strapped for resources and funds. It would be extremely helpful if FEMA could provide funding for administrative activities, as well as public outreach.
331	Local Agency	Processes & Policy	Projects & Planning		Plumas County Flood Control and Water Conservation District - Largest challenge is how you fiscally quantify the amount of effort and benefit of projects in a landscape management. An example provided was how do you fiscally quantify the benefit of forest treatments such as lower-temperature burning fires to flood management and mudslide control? It is extremely difficult to fiscally quantify the amount of effort and benefit of these types of activities.
332	Local Agency	Processes & Policy	Projects & Planning		Feather River Coordinated Resource Management (CRM) - Acquiring funding for restoration projects is the hardest challenge for the CRM. Also, getting projects through the permitting process is becoming more difficult especially over the last 5 years. The amount of effort to navigate through the permitting process is fairly small, which is mostly due to small project scopes. However, just in the last 5 years, the amount of effort required to navigate through the permitting process has more than doubled. Sometimes crossing watershed, county, or parcel boundaries for projects requires multiple and different permitting documents. This is extremely challenging and time consuming for the CRM to make sure all required permitting documents are satisfied.
333	Local Agency	Local	Projects & Planning		Most of the restoration projects are taking place in the upper watersheds, where many of these projects are the "plug-and-pond" meadow restoration type projects. One challenge for these types of projects is dealing with the concerns of water rights farther downstream. A primary goal of "plug-and-pond" restoration projects is to try to keep more water in the upper floodplain to slow down the entering river/stream flow.
334	Local Agency	Processes & Policy	Projects & Planning		Overall Discussion - Caltrans and the Federal Highway Administration (FHWA) have worked out a partnership where although both agencies have different permitting requirements, when a project spans both agency's areas, the FHWA will accept Caltrans permitting process, if already approved (Programmatic Agreements for California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) processes are needed. Periodically, there are project spot inspections to make sure that the permitting process is not missing any component; however, overall the permitting process between the two agencies has made it much more streamlined and efficient.
335	Local Agency	Funding Info.	Projects & Planning		Overall, funding O&M has not been an issue for the restoration projects, because primarily flows in the streams/rivers have been fairly low allowing time for plantings to establish. However, if an event had occurred immediately after the installation of the restoration project, there would be no funds to replace or reconstruct.
336	Local Agency	Funding Info.	Projects & Planning		Currently for the County, a portion of the property tax goes towards flood control projects and O&M (very minimal). County budget is very tight.
337	Local Agency	Funding Info.	Projects & Planning		There has been lot of opposition for setting up a community services district (CSD) to cover O&M for infrastructure, such as the levee near Taylorville.
338	Local Agency	Funding Info.	Projects & Planning		The CRM has considered pursuing private foundation grants or maybe even setting up investment trust funds from private investors. Have not moved forward with any of these ideas.

Table J-B-1. Recommendations to Improve Flood Management in California

ID	Source	Major Category	Minor Category	Minor Category 2	Opportunities and Challenges/Recommendation
339	Local Agency	Funding Info.	Projects & Planning		No Capital Improvement Plan projects for Flood.
340	Local Agency	Local	Projects & Planning		Drainage master plans are needed for Quincy, East Quincy, and Chester.
341	Local Agency	Financing	Projects & Planning		A challenge going after a specific grant is proving the cost breakdown of benefits. It is extremely time consuming determining the cost breakdown of every benefit such as fish, flood protection, and fire protection.
342	Local Agency	Financing	Projects & Planning		The grant application process is extremely time consuming and expensive and small counties and agencies are having a very hard time competing. Hard to quantify parameters. Rules are so complicated and difficult for small communities to complete.
343	Local Agency	Processes & Policy	Projects & Planning		Due to Sierra County's low population, they have always felt like they are at the bottom of FEMA's funded project list. Until recently, Sierra County has had no updates to their floodplain mapping, either completed by the County or by FEMA, since the original release date over 20 years ago. However, FEMA has recently funded the Sierra Countywide digital FIRMs conversion project, as well as two new Flood Insurance Studies (FIS) for the Sierra Valley and Indian Valley areas. As part of the Digital FIRM effort, Sierra County has opted to incorporate all available flood-mapping data into the FEMA FIRMs. Sources of flood data include DWR Awareness Mapping, Caltrans information, as well as other best available information available. D Zone designation has also been removed from the FEMA Digital FIRMs due to the insurance implications with lenders.
344	Local Agency	Financing	Projects & Planning		Challenges that Sierra County faces is that they are extremely limited on staff, funds, and resources to perform new flood studies or manage a flood protection program. Overall, the County gets limited attention from State and Federal organizations. In 1975 the Army Corps of Engineers performed a study on the Downie River, which in 1998 they performed an updated extending the floodplain information. However, other than these few studies, the County gets little to no assistance.
345	Local Agency	Processes & Policy	Projects & Planning		Sierra County is also impacted by the past affects of gold mining along its rivers/streams. When large storm events occur, the County is severely impacted by high-sediment loads traveling down rivers and creeks filling up limited channel capacity. Regulation requirements and the environmental permitting process have become so difficult to navigate successfully, that it is not really a possibility to get approval to dredge out accumulated sediment. Instead, Sierra County must deal with the loss of flood protection and the increased probability of flooding in its most populated areas.
346	Local Agency	Local	Flood Infrastructure Maintenance	Flood Response	Sierra County does not have any certified levees; however, there are leveed segments that the County depends upon during storm events. Most of these levee segments are overtopped during large storm events.
347	Local Agency	Financing	Projects & Planning		DWR grants are primarily scoped for large jurisdictions or large agencies. Rural Counties/Agencies are left behind because they are unable to meet all application requirements, especially the cost/benefit analysis component because they are so expensive to perform.
348	Local Agency	Processes & Policy	Projects & Planning		Environmental regulations have become so difficult to navigate through successfully, that counties such as Sierra, cannot manage channel sediment aggregation and are losing valuable channel capacity.
349	Local Agency	Processes & Policy	Projects & Planning		Sierra County has added many additional requirements and scenarios to its Flood Ordinance. The ordinance has gone above and beyond the DWR ordinance requirements. It is recommended to develop stricter Flood Ordinances to help protect counties from development issues in the future.
350	Local Agency	Financing	Projects & Planning		All agencies agreed that funding is the key to success for Yolo. For the City of Woodland, without development, there is no funding generated for the County. With the approval of Proposition 218, it is extremely difficult, if not impossible to get funding programs voted on for approval.
351	Local Agency	Processes & Policy	Projects & Planning		The delineation and enforcement of DWR's 200-year floodplain requirements may have huge implications for the City of Woodland and other unincorporated portions of Yolo County. It is a constant challenge to remind the State and other surrounding counties that Yolo County is designed to flood and is the flood solution for many of the other surrounding counties in the area. The County has chosen to stay as a rural county, and sometimes it feels like they are punished for making that decision.
352	Local Agency	Financing	Projects & Planning		City of Woodland is very limited on funding opportunities with Proposition 218 in place. In today's economy, it is extremely difficult to get a 2/3 majority vote.
353	Local Agency	Financing	Projects & Planning		Any additional grant funding would be extremely beneficial to Yolo. However, Yolo County wants to remind DWR that currently most grant funding programs are for communities with major development. It is extremely hard for a rural county to pursue grants with cost-benefit analysis requirements. Rural counties, such as Yolo, cannot meet the required cost-benefit analysis ratio.
354	Local Agency	Infrastructure	Flood Infrastructure Maintenance		Yolo also deals with strict drainage laws and poorly planned development in the floodway/floodplain. Yolo is faced with dealing with repetitive losses due to old structures such as schools, railroads, being built in the floodplain. It is a challenge to hold these types of structures accountable for flooding issues.
355	Local Agency	Local	Knowledge/Awareness		Yolo County Flood Control and Water Conservation District (FCWCD) has developed their Supervisory Control and Data Acquisition (SCADA) System, which monitors all releases, water levels, and pending levels of the FCWCD infrastructure system. A linked system of all the releases from Clear Lake and Indian Valley Reservoir is monitored. Live, 360-degree camera feed is available to view all infrastructure. This system is extremely sophisticated and useful for the FCWCD.

Table J-B-1. Recommendations to Improve Flood Management in California

ID	Source	Major Category	Minor Category	Minor Category 2	Opportunities and Challenges/Recommendation
356	Local Agency	Processes & Policy	Projects & Planning		There needs to be clarification on what establishes priority over and among environmental regulations. Things don't get done because there are competing layers of regulations, which makes it hard to get anything moving. It is very difficult to get a permit for anything nowadays.
357	Local Agency	Financing	Projects & Planning		There needs to be a way to figure out how the State can support agriculture in some of these floodplains. There is a perception that all the money is going to urban areas. • Perhaps the State can assist agricultural communities through a glorified Williamson Act that provides annual payments to agriculture so that they can continue to do agriculture.
358	Local Agency	Processes & Policy	Projects & Planning		State should be working on an agricultural levee standard. Agricultural areas won't be able to afford 200-year level of protection. If agricultural areas had a method to build a levee, an agricultural levee standard would help know what to build.
359	Local Agency	Processes & Policy	Projects & Planning		It would be helpful to coordinate with FEMA to develop a new flood zone designation for agricultural areas.
360	Local Agency	Processes & Policy	Flood Response		Assistance on communication plans, evacuation plans, emergency response plans and post-recovery plans would be helpful for these areas too.
361	Local Agency	Financing	Flood Infrastructure Maintenance	Projects & Planning	American River Flood Control District (ARFCD) noted that they face continued levee deterioration. Local maintenance agencies (LMAs) need to step up every year to maintain an older and older system. Addressing encroachments and erosion repairs would be a big help because they are very expensive and exceed the ability of most maintainers.
362	Local Agency	Financing	Flood Infrastructure Maintenance	Projects & Planning	Pete Ghelfi noted that flood agencies need relief from Proposition 218 requirements by providing an exemption for flood control and public safety. Flood agencies need the ability to raise money to fix things, and nobody has the time and funding to form an assessment district. If we spend $4 billion to improve the system and don't have enough money to maintain the levees, that's a problem.
363	Local Agency	Financing	Knowledge/Awareness		Pete Ghelfi noted that if people could better understand their flood risk, it would be easier to fund flood improvements. But they don't understand their flood risk, so it's hard to get funds. It is similar to asking the general public, "How much money should our government spend on defense?" It is hard for the general public to understand the risks that they are vulnerable to and how much investment is appropriate for addressing those risks.
364	Local Agency	Financing	Knowledge/Awareness	Projects & Planning	Recommend that the State focuses its money on protecting large urban areas through grant programs and protecting agriculture. Not much money should be spent in the hills of Folsom and Roseville. Not all of the bond funds should be spent on studies.
365	Local Agency	Financing	Projects & Planning		It should be noted that it is too difficult for projects to meet the USACE's Benefit/Cost ratio, especially for nonurban areas.
366	Local Agency	Processes & Policy	Knowledge/Awareness		It should be noted that it would be helpful for the State to provide funding for a common set of regional, inter-jurisdictional hydraulic models. Old models often stop at agency boundaries. But rivers flow across boundaries, and each agency differs on which models to use and which baseline assumptions are appropriate. If everyone is not on the same model, it is difficult to measure project impacts. Dry Creek is an example of an area where a regional model would be beneficial. For example, Sacramento County may not have the same model (or may use different assumptions) as Placer County or the City of Sacramento.
367	Local Agency	Processes & Policy	Knowledge/Awareness		More coordination needs to take place between planning/land use agencies and flood control maintaining agencies. County agencies don't know about erosion repairs that have been conducted in their own jurisdictions. They almost never get briefings from LMAs on the status of their system. DWR Maintenance Area 9 never provides a briefing to the Sacramento city council. Most of the County's board has no idea of who maintains their levees. More communication needs to take place.
368	Local Agency	Processes & Policy	Projects & Planning		Some of the practices of FEMA create disincentives to purchase flood insurance. Under FEMA's new mapping criteria, if freeboard isn't sufficient, FEMA assigns it to a D-zone. However, nobody knows what a D-zone is, and flood insurance is not required. But flood insurance in this zone is more expensive than the standard X policy. Recommend that an area with this scenario should be assigned its own separate zone and should pay a mandatory Preferred Risk Policy rate (the cheapest rate for flood insurance).
369	Local Agency	Processes & Policy	Projects & Planning		Meeting new inspection standards is also a challenge. Levees must pass a USACE inspection to be eligible for PL 84-99 assistance. ARFCD and other maintainers have had to step up what they do to meet USACE criteria. Some of these standards seem to add questionable benefit to system integrity (e.g., adding sod cover on a railroad embankment).
370	Local Agency	Processes & Policy	Projects & Planning		It would be helpful for the State to clarify its role as to where it plans on limiting requirements for 200-year protection for urban areas. The State should stay within areas where it currently has liability associated with the State/Federal levee system. How far will the State drill down? They won't fix every storm drain. However, upgrading aging pump stations throughout the system that drain through a project levee, for example, would be something that is useful.
371	Local Agency	Processes & Policy	Projects & Planning		Recommend providing clarity on standards. Federal and State standards sometimes differ and local agencies are handcuffed until those issues are resolved. Compliance with these standards can be very costly too.
372	Local Agency	Processes & Policy	Projects & Planning		Recommend that the 200-year level of protection standard shouldn't apply to levee-protected areas. 200-year level of protection also shouldn't apply to local streams and internal drainage. The State doesn't need to impose requirements upstream.

Table J-B-1. Recommendations to Improve Flood Management in California

ID	Source	Major Category	Minor Category	Minor Category 2	Opportunities and Challenges/Recommendation
373	Local Agency	Processes & Policy	Projects & Planning		The State currently raises standards and leaves it up to the locals to comply with them. The State needs to provide a more long-range view instead of setting a standard and backing away.
374	Local Agency	Financing	Projects & Planning		It would be beneficial to do a countywide assessment to have continual funding, instead of asking for funding on an annual basis.
375	Local Agency	Processes & Policy	Projects & Planning		Complying with evolving standards is a big burden on flood control agencies. Standards seem driven by the State and Federal government's desire to escape liability and seemed to be based on opinion instead of science. For example, RD 17 100-Year Levee Seepage Area project needed to acquire right-of-way three times within 2 years.
376	Local Agency	Processes & Policy	Projects & Planning		San Joaquin County Flood Control and Water Conservation District (SJCFCWCD) is involved and concerned about how Senate Bill 5 will be implemented. They had been participating in the Urban Levee Design Criteria and Urban Level of Protection Work Groups and are very concerned about how they will be implemented.
377	Local Agency	Processes & Policy	Projects & Planning		Getting an exemption on Proposition 218 for flood control or public safety would be helpful. But trying to fight for an exemption hasn't gotten very far. Revising Proposition 218 will likely require a constitutional amendment, so Proposition 218 requirements are unlikely to change in the near future.
378	Local Agency	Processes & Policy	Projects & Planning		The prospect of eliminating the 104 credit is an ongoing issue that needs to be resolved.
379	Local Agency	Processes & Policy	Knowledge/Awareness	Projects & Planning	It would be useful to have a State website so that local flood control agencies can find floodways and flood zones accurately. Using paper maps is time-consuming. Stanislaus County has a local GIS system, but the Stanislaus County Public Works Department is not being funded to keep it up to date. So they are going to lose that GIS data in the near future. A California-based website would be very useful. Stanislaus County Public Works is financed through assessments which are tied to gas tax funds.
380	Local Agency	Local	Projects & Planning		It is a challenge preventing development that encroaches into the floodplain. In previous floods, many of the damages were to structures that weren't supposed to be allowed in the floodplain in the first place. Encroachments can also infringe on channel capacity.
381	Local Agency	Processes & Policy	Projects & Planning		One challenge to flood management is that the Tuolumne River upstream of the New Don Pedro Reservoir is considered "wild and scenic" and must therefore comply with the Wild and Scenic Rivers Act. Encroachment into the wild and scenic portions of the river would require an act of Congress. Furthermore, any attempt to increase the flood conservation space within the reservoir would directly infringe on reservoir space reserved for water supply. The desire to produce hydropower, meet water supply objectives and minimum in-stream flow requirements can sometimes constrain operational flexibility to achieve flood control objectives. In this respect, New Don Pedro Reservoir has much tighter tolerances than other reservoirs in the San Joaquin region.
382	Local Agency	Processes & Policy	Projects & Planning		An opportunity for improved flood management is improved modeling and IT tools. Recent advances have significantly increased the ability of Turlock Irrigation District (TID) to manage real-time information. TID is always looking for further opportunities to improve in this area.
383	Local Agency	Processes & Policy	Projects & Planning		A challenge to integrating flood control and groundwater recharge is 1) finding favorable soil conditions that have high rates of infiltration 2) overcoming institutional and infrastructure challenges (It would be difficult institutionally for TID to do work outside its service area. It would require a lot of infrastructure to pipe the water to these areas).
384	Local Agency	Processes & Policy	Projects & Planning		The agency thinks of integrated flood management as coordination of real-time releases among reservoir operators in the region. There have been situations in the past in which TID has been asked to reduce releases from New Don Pedro Reservoir because other reservoirs in the region are already full. TID has regional reservoir operation coordination meetings with USACE and DWR, but are not a part of DWR's forecast-based reservoir operations program.
385	Local Agency	Processes & Policy	Knowledge/Awareness		There are unstudied A zones from FEMA, no elevations for elevation certificates, so individuals have to hire an engineer. They have to make sure elevation structures get to where they need to be height wise. For latest maps, creek alignments and floodplain boundaries don't match. The 200-year flood awareness mapping isn't mapped yet, and they don't have the money or time to solve it. Accurate mapping is an issue - liability on locals if not accurate. Long term, need more detailed studies.
386	Local Agency	Funding Info.	Projects & Planning		Corning- Haven't applied for flood mitigation grants in over 10 years, trying to keep the stream beds clean and pipes flowing, haven't applied for stormwater grants. Development impact fees.
387	Local Agency	Local	Flood Infrastructure Maintenance		Corning - areas in southwest county have creeks that overtop once the river backs up. The roadways become the channel, in particular Ross Road experiences flooding. The Solano area becomes a river (south area) and has water up to 3 feet deep. The county is trying to determine all areas that have "makeshift" rivers when there are high flows.
388	Local Agency	Local	Flood Infrastructure Maintenance		Columbia and Kirkwood are two bridges that need to be replaced. There was a report done. There are topo maps, surveying, and benchmarks. The county wants to see some retention basins west of Interstate 5 to contain some of the water during high flows.
389	Local Agency	Local	Flood Infrastructure Maintenance		DWR is working on the erosion issue at Woodson Bridge, impacting the Wastewater Treatment Plant (WWTP) discharge. This will potentially affect the bridge at State Avenue. Need a historic solution to divert the water.
390	Local Agency	Local	Flood Infrastructure Maintenance		Red Bluff River Park - gravel has been deposited in areas where Lake Red Bluff forms in the summer and is stuck since there is a ban on gravel mining. Now, Lake Red Bluff is gone and this gravel should be moved to areas where the gravel is needed.

Table J-B-1. Recommendations to Improve Flood Management in California

ID	Source	Major Category	Minor Category	Minor Category 2	Opportunities and Challenges/Recommendation
391	Local Agency	Local	Projects & Planning		Have a list of levees that were assessed by USACE but the report isn't done. The main issues are on Deer Creek, east of Hwy 99, in the upper reach by Leninger Road. The levee itself narrows and the county wants to widen the levee and replace bridge by the railroad. Trying to find a way to address those issues and need money to do so.
392	Local Agency	Financing	Flood Infrastructure Maintenance	Projects & Planning	Financial, Distinguishing between different types of levees (not all levees serve the same purpose), clearing requirements are not realistic, different agencies want different things (need happy medium), agreements were in the 1960s- level of maintenance was different than what is required today, no funding put into place to deal with issues today.
393	Local Agency	Financing	Flood Infrastructure Maintenance		Significant erosion issues occur due to decomposed grant soils - erode, deposit downstream, cause fishery problems, results in channel issues (on storm can change flood inundation). Erosion control is a major issue.
394	Local Agency	Financing	Flood Infrastructure Maintenance	Projects & Planning	Small population affected by flooding, so the county is burdened with unattainable money. Flooding is not the priority to public.
395	Local Agency	Financing	Flood Infrastructure Maintenance		Finding funds for rural areas is becoming harder to do. Most funding goes to cities.
396	Local Agency	Financing	Flood Infrastructure Maintenance		No low interest loans for flood/levee projects.
397	Local Agency	Local	Flood Response		5Cs applies for State, local, and Federal grants.
398	Local Agency	Financing	Flood Response	Projects & Planning	Funding is not available because of their risk level (small population and small structures).
399	Local Agency	Financing	Projects & Planning	Flood Infrastructure Maintenance	Financing - New levee rules have increased the cost for O&M.
400	Local Agency	Financing	Projects & Planning		State revolving fund for levee improvements is needed (moderate payback).
401	Local Agency	Processes & Policy	Flood Response		PL 8499: Two reports a year, unacceptable rating, can't get out of the agreement without an act of congress, USACE wants to poison gophers and spray herbicide in the creek (County does not use herbicides), cost less to repair levee themselves if it is damaged than try to go through the USACE, disagree with USACE policy for water quality and fish habitat. Levees are different than what are in the valley- they see water maybe a couple times in 10 years. 1996-97 was last big flood event in last 20 years which lasted 8 hours (10 hours tops) before water levels went back to normal. FEMA maps are too conservative for this area. Erosion/sedimentation problems (decomposed granite washes away easily). Agencies are contradicting each other.
402	Local Agency	Processes & Policy	Projects & Planning		The system was built 40 years ago but today's standards are expected. It's hard to catch up. County board will not approve funding for a study to bring levees into compliance.
403	Local Agency	Processes & Policy	Projects & Planning		Stuck between USACE, CDFW, RWQCB, and other agencies - they all have conflicting direction.
404	Local Agency	Processes & Policy	Flood Response		One of the largest flood-related concerns for Fresno County is to maintain certified levees. After FEMA decertified many of the county's levees, the county has made it a priority to work with and help local agencies improve and maintain their levees to a level FEMA considers "certified." Many agency officials at Fresno County believe FEMA was not following their own protocols when assessing the status of the levees, and that the levees in Fresno County were improperly decertified.
405	Local Agency	Processes & Policy	Flood Response		When assigning flood zones and redrawing flood maps, FEMA was accused to being overly conservative and of decertifying levees inappropriately. When comparing multiple maps, it appeared FEMA would always carry over the lowest flood protection rating for an area, from the previous set of maps. A consequence of this flawed assessment is that certain areas of the county are thought to be at a higher flood risk than they actually experience. Another consequence is that future funds may be improperly allocated to improving an area which does not need improvement.
406	Local Agency	Financing	Flood Infrastructure Maintenance		Local agencies have trouble clearing channels of vegetation and debris, as is required by certain environmental ordinances. One example of this is in the east side irrigation districts. Channel clearing is costly, and there are not many extra funds for this sort of maintenance and occasional repair.
407	Local Agency	Processes & Policy	Flood Infrastructure Maintenance		Originally, agencies were told some vegetation must remain to ensure bank stability, later they were told no vegetation in the corridor is acceptable, due to environmental concerns.
408	Local Agency	Processes & Policy	Projects & Planning		Sometimes, it is not clear who is responsible for maintaining the levee. Shared channel-clearing responsibilities between agencies discourage responsibility, for fear of liability in the event of a failure. Because no one takes responsibility for an unclear channel, the channel capacity decreases as vegetation and debris continue to build. In Firebaugh, levees are not maintained for fear that the maintaining agency will later be held accountable for future flood damage. Unfortunately, this causes a reactive response to flood control, instead of a proactive response.
409	Local Agency	Funding Info.	Flood Infrastructure Maintenance		The Kings River Conservation District is under the USACE vegetation requirement, but they intend to be under the California State criteria. The bottom line is that Kings River Conservation District needs to remain stay under the USACE criteria in order to remain eligible for reimbursement for levee repairs, should a failure occur. Currently, USACE pays 100% for their repair work.
410	Local Agency	Processes & Policy	Flood Infrastructure Maintenance		Some of the larger agencies are not responsible for maintaining the channel for certain unincorporated reaches of the channel. For example, King's River Conservation District is not responsible for clearing channels that are under the jurisdiction of the Tranquility Irrigation District.

Table J-B-1. Recommendations to Improve Flood Management in California

ID	Source	Major Category	Minor Category	Minor Category 2	Opportunities and Challenges/Recommendation
411	Local Agency	Processes & Policy	Flood Infrastructure Maintenance		Channel debris floating from one agency's jurisdiction into the jurisdiction of their downstream neighbor, which can also be a problem.
412	Local Agency	Local	Flood Infrastructure Maintenance		The towns of Firebaugh and Tranquility have proven problematic for the county of Fresno with regard to flood protection. Near Firebaugh, there is no agency specifically designated for maintaining the levees. This lack of maintenance has led to an increase in flood risk. Firebaugh is a big issue because the high flows through this area result in high risk of flood damage. There are also political issues, which discourages levee maintenance.
413	Local Agency	Risk	Flood Infrastructure Maintenance		Near Tranquility, there are notable risks to agricultural lands flooding because during heavy precipitation, the inflow exceeds the outflow for this area. The State criterion is to pass at least 4,500 cubic feet per second (cfs) through this reach during certain parts of the year, in order to maintain a healthy salmon population. No agency is taking the lead to improve the levees near Tranquility, CA. The county sends assistance to this area, but there are no proactive measures taken to improve flood protection in this area.
414	Local Agency	Processes & Policy	Projects & Planning		There are significant gaps in knowledge about levee ownership and responsibility in the lower basin. For example, there are gaps between areas where Kings River Conservation District has authority and where State Plan of Flood Control has authority.
415	Local Agency	Processes & Policy	Flood Infrastructure Maintenance		Sometimes, Fresno County finds itself responsible for channel maintenance for an area that falls between the jurisdictions of two local maintaining agencies. It was suggested the Lower San Joaquin Levee District is responsible for maintaining the bypass channel, but it was unclear. Moreover, no agency maintains the levees downstream of the Mendota Pool.
416	Local Agency	Local	Flood Response		King's River Conservation District gets lots of complaints when flow rates along certain stretches increase beyond a "comfortable level" for residents. Managing flow rates through each reach of the Kings River is critical to the system's success.
417	Local Agency	Local	Flood Response		Fresno Slough does not have enough capacity to pass all the flows from Kings River during certain times of the year. Fresno slough should be cleaned up in order to pass flood flows. In certain parts of the river system, the downstream reaches are the "bottlenecks" that constrain the operation and flow rates at certain upstream reaches.
418	Local Agency	Local	Flood Response		Flooding has occurred upstream of some of the higher lakes on the end side of Fresno County, in some of the unincorporated areas. This flood occurs because it is difficult to divert runoff into Tulare Basin or down the river.
419	Local Agency	Local	Flood Response		Channel capacity is reduced when channels are not maintained and vegetation is not removed.
420	Local Agency	Local	Flood Response		There have been occasional flooding problems near Huron, along highway 269, and the east side streams. Other problems were reported near the River Belmont.
421	Local Agency	Funding Info.	Projects & Planning		Fresno County is still waiting for 303 grant funds for groundwater management planning. Although a grant was awarded, the State has not yet disbursed the funds.
422	Local Agency	Funding Info.	Projects & Planning		Fresno Metropolitan Flood Control District receives funds through property tax and benefit assessments. This group mentioned the noticeable bias for funding environmental/rewilding projects.
423	Local Agency	Funding Info.	Projects & Planning		Fresno Irrigation District is financed by means of water assessments. Fresno Irrigation District operates under the storm drainage agreements and is reimbursed for the cost of operation and maintenance.
424	Local Agency	Funding Info.	Projects & Planning		Kings River Conservation District receives funds through property taxes, and power generation at the Pine Flat hydroelectric plant. During wet years, there is more money to spend; during dry years, there is less. Kings River levee evaluation project and the critical levee repair project are currently held up due to lack of funding.
425	Local Agency	Financing	Projects & Planning		To keep levees better maintained, it was suggested there be a levee maintenance district in the towns of Firebaugh and Tranquility.
426	Local Agency	Processes & Policy	Projects & Planning		When levees are decertified, they are still used to divert water. There should be a consistent method to determine the expected failure point in the levee. Currently there is no standard. The expected failure location could be determined by rough approximation or by a very rigorous analysis. This inconsistency has/could lead to controversy.
427	Local Agency	Financing	Projects & Planning		It is helpful that current grant planning now considers flood risk and flood protection projects as a possible recipient for funding. This was not always true in the past. Since this change, financing is less of a barrier for many flood-related projects from taking place. The recommendation is to continue to lessen this financial constraint.
428	Local Agency	Processes & Policy	Projects & Planning		The State should come up with recommendation regarding what agency is responsible for flood control downstream of the James Bypass. After leaving Reclamation District 1606, there is no agency responsible for flooding until you get down to the State Plan of Flood Control.
429	Local Agency	Local	Projects & Planning		To lessen the impacts on downstream channels, it was suggested to set up a detention basins west of Interstate 5, east of the California Aqueduct to catch sediment and debris
430	Local Agency	Processes & Policy	Projects & Planning		Create maps identifying the 200-year flood zone. For certain land uses, FEMA requires a 200-year flood protection be provided; however, there are no maps identifying the flooded region.
431	Local Agency	Risk	Flood Response		It would be helpful (specifically to Kings River Conservation District) if the State provided more accurate forecasts regarding snowmelt and future flow rates. Problems arise when whether forecasts are inaccurate.
432	Local Agency	Processes & Policy	Flood Infrastructure Maintenance		There are gaps and overlaps in IRWM Plan jurisdictional boundaries. This can be confusing. There should be a process to remove these gaps and overlaps. Boundaries were changed to more closely reflect hydrologic boundaries than political boundaries.

Table J-B-1. Recommendations to Improve Flood Management in California

ID	Source	Major Category	Minor Category	Minor Category 2	Opportunities and Challenges/Recommendation
433	Local Agency	Processes & Policy	Projects & Planning		Groundwater banking is a possible solution to the storage problem. One difficulty with groundwater banking is that the land aboveground also needs to be owned by the agency storing the water.
434	Local Agency	Financing	Flood Infrastructure Maintenance	Projects & Planning	The County is looking to establish long-term, reliable funding sources to complete routine O&M. The County is currently playing catch up on O&M, and it has become more complicated and expensive to meet the environmental permitting requirements and mitigation costs. Both of these have the potential to impact the ability of flood channels to pass their design flows.
435	Local Agency	Processes & Policy	Projects & Planning	Flood Infrastructure Maintenance	The State government should look to the Federal government for issues regarding operation and maintenance on levees along channels and creeks because there is a maintenance conflict regarding vegetation and similar environmental issues.
436	Local Agency	Processes & Policy	Projects & Planning		It was mentioned that upcoming Federal legislation would further restrict the local agency's ability to control navigable waterways. If this legislation passes it would be harder for Madera County to maintain creek beds and riverbeds.
437	Local Agency	Processes & Policy	Projects & Planning		There needs to be a better balance between flood control needs and environmental preservation. The momentum is in favor or environmental preservation, and this is making it hard for Merced County to provide adequate flood protection.
438	Local Agency	Local	Projects & Planning	Knowledge/Awareness	Eventually, all reservoirs will need to be raised to prepare for climate change and the change in inflow hydrographs.
439	Local Agency	Processes & Policy	Knowledge/Awareness		With the future condition of global warming, which will create greater uncertainty in the timing and volume of rainfall, as well as snowmelt and decreasing channel capacity, more flooding is likely to occur in the future. Additional focus is needed to incorporate these changes into flood management activities.
440	Local Agency	Processes & Policy	Projects & Planning		There needs to be a less challenging permitting process, and fewer environmental regulations make it more difficult for local agencies to meet their required O&M obligations and responsibilities. Currently, the environmental permitting process and associated costs are reducing the amount maintenance work that can be performed on an annual basis.
441	Local Agency	Financing	Projects & Planning		Reluctance to consider a statewide agricultural levee standard. Right now, the State only has one standard for evaluating levee protection. Since levees that provide protection to agricultural lands offer less "benefit" than levees that provide protection to urbanized areas, the benefit/cost ratio is less than 1.0, which makes it difficult to fund levees to protect agricultural lands. If less stringent levee standards were developed for agricultural lands, the cost would be smaller and it would be easier to obtain funding for the construction or improvement to levees which protect agricultural property.
442	Local Agency	Financing	Projects & Planning		For urban areas, the State requires 200-year flood protection. Since there is not enough damageable property to justify building 200-year protection in most areas of the county, this requirement is not always met. However, if a 200-year flood shall occur and Yuba County requests aid from the State, Yuba County will have to justify its noncompliance with said requirement before receiving compensation from the State. It was noted that 200-year protection is not a requirement to receive State or Federal funding.
443	Local Agency	Financing	Projects & Planning		Lack of local funding. There is a fixed amount of money from the local agency money. Flood management / levee improvement projects share the same funding source as internal drainage improvements. The local budget is tight.
444	Local Agency	Local	Flood Response	Projects & Planning	A large portion of the Yuba County population lives in rural areas. Expensive flood protection measures cannot be justified if they only provide protection to a small portion of the population.
445	Local Agency	Processes & Policy	Flood Response	Knowledge/Awareness	Determine the appropriate level of flood protection. Urbanized areas will require greater protection than agricultural areas. When multiple land uses are in the same floodway, the flood protection of the most critical land use should govern the flood protection for the entire floodway. This is how Reclamation District 784 evaluates the required levee protection. Certain land uses require 200-year flood protection, while other land uses do not require any protection.
446	Local Agency	Processes & Policy	Flood Response		Change flood protection requirements. Certain areas were originally not within the 100-year floodplain. After FEMA remapped the area, some of these parcels are now considered to be within the 100-year floodplain. Areas within FEMA's Zone A are not considered sustainable. This Zone A status applies to certain agricultural lands within Yuba County. Yuba County feels it is important to provide adequate flood protection for agricultural lands in order to maintain a healthy economic community.
447	Local Agency	Local	Flood Response		Highly unpredictable flooding, possibly anywhere, in the county. Flood response is our challenge. If Highway 395 is closed, major challenge would be feeding and housing trapped motorists and getting people to trauma care. The county has no air support without borrowing from other counties. The county does have a strong unified command for emergency response.
448	Local Agency	Local	Flood Response		Oak Creek was the most recent documented event, but no recommendations from the post flood team, which included DWR, have been distributed after the emergency response.
449	Local Agency	Local	Knowledge/Awareness		The national weather service data is inadequate for Owens Valley. The information from the national weather service in Las Vegas does not show storms in Owens Valley. We get more useful information by extrapolating from what the Reno office is reporting for Mono County.
450	Local Agency	Local	Projects & Planning		Community is looking for follow-up from DWR on Oak Creek post flood analysis.
451	Local Agency	Local	Projects & Planning		Permitting issues (Lahontan RWQCB) limit dredging of creeks to maintain flow capacity.
452	Local Agency	Financing	Knowledge/Awareness		Flood hazard areas have constantly changing topography. Cost of collecting adequate data to design flood control structures is financially unfeasible. While the hydrology may be within 20%, the hydraulics is too uncertain.

Table J-B-1. Recommendations to Improve Flood Management in California

ID	Source	Major Category	Minor Category	Minor Category 2	Opportunities and Challenges/Recommendation
453	Local Agency	Financing	Projects & Planning		County has inadequate local tax base and no Federal interest. Funding of construction and maintenance of flood control only feasible where there is higher density.
454	Local Agency	Financing	Projects & Planning	Flood Infrastructure Maintenance	County has no governance structure for maintenance of developer built facilities.
455	Local Agency	Local	Projects & Planning		The County's main tool is land use planning. This tool is limited and the County has no power or political will to limit development in the flood plain.
456	Local Agency	Processes & Policy	Projects & Planning		Stronger regulatory authority over land use in flood plains would be useful.
457	Local Agency	Local	Flood Infrastructure Maintenance		Kings County PW: Regulations have limited the ability to restore scoured material at bridges after a storm.
458	Local Agency	Local	Flood Response		Kings County needs air quality exemptions during flood fights to enable use of portable engine pumps. Need to be able to burn vegetation in channels as an effective means of vegetation control.
459	Local Agency	Infrastructure	Flood Infrastructure Maintenance		Town of Mammoth Lakes: Constructed a 60-inch storm drain as part of a master plan. That master plan has since been updated. Currently focusing on stabilizing hillsides to prevent debris flows.
460	Local Agency	Local	Flood Infrastructure Maintenance		County of Mono: Poor flood mapping is an issue. County is making progress with improving the quality of flood mapping. County has detailed mapping on part of the West Walker River.
461	Local Agency	Local	Flood Infrastructure Maintenance		Note that the majority of the county is Federally owned, and Los Angeles Department of Water and Power owns a significant area; 75% of the population is in the Town of Mammoth-Lakes.
462	Local Agency	Local	Knowledge/Awareness		Mapping is being accomplished through the FEMA's "Cooperating Technical Partners Program (CTP)," which is coordinated through the local Transportation Commission.
463	Local Agency	Local	Projects & Planning		County of Mono is responsible for map conditions, grants and transportation funding
464	Local Agency	Risk	Projects & Planning		Town of Mammoth Lakes: The grant conditions seem to be set up for urban areas, difficult for rural areas to compete. Transient populations are at risk from flooding, but base population is what is used for grants. Permanent population is 8,500, yet daily tourism could be as high as 35,000. Need way to recognize this in risk assessments.
465	Local Agency	Processes & Policy	Projects & Planning		County of Mono: The Digital FIRMs flood zone designation "D" is inappropriate; flood insurance requirements apply, same cost as Zone A. Better mapping needed for doing risk assessments.
466	Local Agency	Financing	Flood Infrastructure Maintenance		Kaweah Delta Water Conservation District (WCD): Environmental issues of the Corps limit the window of opportunities for routine maintenance on the Kaweah River and its tributaries. Also on the White River.
467	Local Agency	Financing	Projects & Planning		Tulare County Flood Control District (FCD): Environmental hurdles are a significant challenge to Tulare County's ability to restore facilities after flooding. The need for USACE permits prior to restoring culverts is an example.
468	Local Agency	Local	Flood Response	Knowledge/Awareness	Kaweah and Tule Rivers need some flood warning stream gauges installed, particularly downstream of Porterville on the Tule River.
469	Local Agency	Local	Knowledge/Awareness		Tulare Lake Basin Water Storage District (WSD): It is important to maintain current levels of data collection by the State for forecasting runoff levels. Would like to see more stream gage data, particularly downstream on the Kaweah and Tule. This is helpful for flood response. Were permitting not as onerous, additional stream gages could be funded locally.
470	Local Agency	Local	Knowledge/Awareness		Lower Tule River ID: State should at least maintain current levels of service and preferably enhance State's role in collecting snow survey and runoff forecasting; another snow pillow is needed for Tule River.
471	Local Agency	Processes & Policy	Projects & Planning		Consensus of group: Need expedited permitting process for channel and culvert cleaning. Need consistent rules between internal USACE departments and with Central Valley Board of Flood Control (Reclamation Board) on acceptable vegetation for levee and flood corridors. Not providing proper maintenance puts communities and farm land at greater risk. Indecision on vegetation control may cause loss of eligibility for funding from USACE under PL 84-99, for post flood restoration.
472	Local Agency	Processes & Policy	Projects & Planning		Like to see guidance on 200 year flood level issue and 85% confidence on 100 year. Provide guidance on 200 year flood and what it looks like.
473	Local Agency	Processes & Policy	Projects & Planning		Like to see more focus on regional level rather than city level or small projects.
474	Local Agency	Infrastructure	Projects & Planning		Risks are major with flashy flooding. Need assistance thought with environmental permitting constraints; it has become a huge problem in managing flood hazards. This is making it difficult to maintain existing facilities thus potentially increasing risk.
475	Local Agency	Processes & Policy	Projects & Planning		A guideline for how to handle Right of way as it affects risk.
476	Local Agency	IWM	Knowledge/Awareness		The Flood Future Report should include discussion about who will be accountable, the goals and mandates, and the flow of funds.
477	Local Agency	Processes & Policy	Projects & Planning		DWR should consider right of way and acquisition issues and find out more about the coordination and governance for planning that goes on in the region.

Table J-B-1. Recommendations to Improve Flood Management in California

ID	Source	Major Category	Minor Category	Minor Category 2	Opportunities and Challenges/Recommendation
478	Local Agency	Financing	Projects & Planning	Knowledge/Awareness	All funding seems to be deferred to IRWM Plans, but other participants may not recognize risk and impacts of flooding.
479	Local Agency	Risk	Projects & Planning		District has found it difficult to quantify loss of life into the cost calculations in the past and looking for guidance. Like to see changes in cost/benefit analysis to provide cost related to lives lost.
480	Local Agency	Processes & Policy	Knowledge/Awareness	Projects & Planning	Like to have standard definition of ecosystem/habitat benefits. Guidance on definition of healthy habitats and riparian policy would be helpful.
481	Local Agency	Risk	Projects & Planning		It would be helpful if the report addressed "residual risk" behind levees. Typically the District designs for 100 year protection but there is a concern about larger events.
482	Local Agency	IWM	Projects & Planning		Will the report look at "consequence" of flooding separately from frequency?
483	Local Agency	IWM	Projects & Planning		Except for one shared watershed, it can be difficult to coordinate and assess what is important to the region using an IRWM Plan. Sometime hard to force disparate regions to work together, groups may be too big.
484	Local Agency	Processes & Policy	Projects & Planning	Flood Infrastructure Maintenance	District uses Corps guidelines for levee vegetation but clarification may be helpful because of competing objectives, especially with environmental concerns. Like to have guidance on USACE levee vegetation policy
485	Local Agency	Infrastructure	Projects & Planning	Knowledge/Awareness	Levee stability, seepage and freeboard are typically addressed but typically do not quantify probability of levee failure. Any guidelines?
486	Local Agency	Processes & Policy	Projects & Planning		District would like to see State policies around LOP. Levees and management of systems. LOP should also identify risk. For instance guidelines on how to protect urban vs. rural. Some rural areas have 10-year protection.
487	Local Agency	Processes & Policy	Flood Response	Knowledge/Awareness	Like to provide guidance on flood warning system – a standard approach.
488	Local Agency	Processes & Policy	Knowledge/Awareness	Projects & Planning	Like to have guidance on how to address climate change impacts because these are hard for agencies to undertake. Like to have assistance from the State with climate change quantification.
489	Local Agency	Processes & Policy	Flood Infrastructure Maintenance		Like to have regional definition of Stewardship for level of service, habitat goals riparian environment.
490	Local Agency	Financing	Projects & Planning		Is there a way to incentivize Cities to participate to take on "enhanced LOP" so there at least minimum guidelines can be achieved? It can be difficult to get them involved. Their funding sources are more focused on transportation systems than flood protection systems.
491	Local Agency	Infrastructure	Projects & Planning		It would be helpful to know how agencies are approaching aging infrastructure. Do others perform asset management analysis on their systems?
492	Local Agency	Financing	Knowledge/Awareness		The Santa Clara Valley Water District (SCVWD) was interested in learning more about the status of State subventions.
493	Local Agency	IWM	Knowledge/Awareness		The SCVWD is looking forward to sharing and learning how other agencies address flood management and IWM issues.
494	Local Agency	Processes & Policy	Projects & Planning		Have State lead the way on asset management of flood infrastructure and incentivize others like Cities, private owners and agencies to participate.
495	Local Agency	Infrastructure	Flood Infrastructure Maintenance	Projects & Planning	In-stream maintenance also includes managing habitat; will there be guidance on how to assess risk with competing objectives? Suggestions were made that the Flood Future Report should address permitting constraints that have become impediments to many of the projects moving forward.
496	Local Agency	Processes & Policy	Knowledge/Awareness	Projects & Planning	Like to have guidelines how to coordinate with agricultural interest that have limited resources and water right concerns that are interested in groundwater component of projects.
497	Local Agency	Processes & Policy	Knowledge/Awareness	Flood Infrastructure Maintenance	Guidelines for invasive species management and sediment removal would be helpful.
498	Local Agency	Financing	Projects & Planning		Like to promote and encourage cross-jurisdictional project funding. Promote and encourage IWM cross-jurisdictional boundaries.
499	Local Agency	Processes & Policy	Knowledge/Awareness	Projects & Planning	How does climate change affect future needs approach?
500	Local Agency	Processes & Policy	Knowledge/Awareness		Set statewide priorities (flood white paper is good example).
501	Local Agency	IWM	Flood Infrastructure Maintenance	Projects & Planning	There are new constraints on O&M of flood management infrastructure and need to assess how impact flood management system. New regulations affect level of risk, along with updated hydrology, land use, Endangered Species Act (ESA) listings, and TMDL permitting.
502	Local Agency	Processes & Policy	Projects & Planning		There is a concern about conflicting Federal mandates and curiosity how this will be addressed in the future. Like to have consistency between State agencies (permitting/water quality/maintenance).
503	Local Agency	Processes & Policy	Projects & Planning	Flood Infrastructure Maintenance	How to resolve different approaches to vegetation on levees: example Contra Costa Water District (CCWD) and USACE?
504	Local Agency	Processes & Policy	Knowledge/Awareness		There is a desire to have an outcome with better cross-pollination of ideas and coordination between agencies including building consistencies between agencies.
505	Local Agency	IWM	Knowledge/Awareness		Suggest developing BMP for IWM.

Table J-B-1. Recommendations to Improve Flood Management in California

ID	Source	Major Category	Minor Category	Minor Category 2	Opportunities and Challenges/Recommendation
506	Local Agency	Processes & Policy	Projects & Planning		Assistance/guidance in land use planning that prevents construction in floodplain.
507	Local Agency	Financing	Projects & Planning		Support funding for projects.
508	Local Agency	Processes & Policy	Knowledge/Awareness		Assistance with developing data/risk assessments of the system.
509	Alluvial Fan Task Force. 2010. *Findings and Recommendations Report*. July.	Processes & Policy	Projects & Planning	Knowledge/Awareness	Recommendation 1 - Floodplain Mapping: The DWR and local agencies should work with FEMA to continue updating existing Flood Insurance Studies (FIS) and companion flood insurance rate maps, and launch new FIS in high-risk alluvial fan areas where local governments expect future development.
510	Alluvial Fan Task Force. 2010. *Findings and Recommendations Report*. July.	Processes & Policy	Knowledge/Awareness		Recommendation 2 - Better Characterization of Alluvial Fan Floodplains: The California Geological Survey (CGS) should work with the United States Geological Survey (USGS) and local agencies to continue development of Quaternary geologic maps in alluvial fan areas projected for future development in order to provide a better understanding of potential hazards.
511	Alluvial Fan Task Force. 2010. *Findings and Recommendations Report*. July.	Processes & Policy	Projects & Planning		Recommendation 3 - Improved Flood Hazard Protection Standards: Local flood management agencies should consider higher levels of flood management protection above the 100-year FEMA regulatory standard in planning for development in alluvial fan areas.
512	Alluvial Fan Task Force. 2010. *Findings and Recommendations Report*. July.	Processes & Policy	Knowledge/Awareness		Recommendation 4 - Documentation of Historical Floods: Local flood management agencies should continue compiling information of past and current alluvial fan flooding events, building upon the historic flood research that was assembled by the Task Force.
513	Alluvial Fan Task Force. 2010. *Findings and Recommendations Report*. July.	Processes & Policy	Knowledge/Awareness		The National Oceanic and Atmospheric Administration (NOAA), USGS, and local agencies should sponsor projects to address the lack of gauged stream and precipitation data to better quantify historical and future flood events on alluvial fan areas.
514	Alluvial Fan Task Force. 2010. *Findings and Recommendations Report*. July.	Processes & Policy	Knowledge/Awareness		Recommendation 6 – Assessment of Existing Debris Basins: The State and local agencies should conduct assessments of the adequacy of strategically located debris basins under a range of scenarios in urbanized areas in light of increased fire and post-fire debris-flow events.
515	Alluvial Fan Task Force. 2010. *Findings and Recommendations Report*. July.	Processes & Policy	Projects & Planning		Recommendation 7 - Multiple-Objective-Management Strategies: DWR should promote multiple-objective alluvial fan water resource management measures as part of the broader Integrated Regional Water Management (IRWM) planning process as described in the economic tools in the Integrated Approach document. Local agencies should develop multiple-objective alluvial fan management strategies into their IRWM plans.
516	Alluvial Fan Task Force. 2010. *Findings and Recommendations Report*. July.	Processes & Policy	Projects & Planning		Recommendation 8 - Decision Support for Communities: The Task Force developed a web-based portal that allows interested parties using the Integrated Approach to access the pre-project screening and flood management tools and data for hazard and resource evaluation for special alluvial fan area being planned or proposed for development. The State should work with local agencies and universities to identify a process to maintain and further develop the database of the web-based portal.
517	Alluvial Fan Task Force. 2010. *Findings and Recommendations Report*. July.	Processes & Policy	Knowledge/Awareness		Recommendation 9 - Outreach for Integrated Approach: Local agencies and private developers should utilize the Integrated Approach tools to plan and evaluate future land use plans in alluvial fan areas. The State and local agencies and universities should support training for the public and private sector on the use of the Integrated Approach.
518	Alluvial Fan Task Force. 2010. *Findings and Recommendations Report*. July.	Processes & Policy	Projects & Planning		Recommendation 10 – Encourage Model Ordinance: The draft model ordinance is designed to ensure that land use decisions achieve three critically important objectives: (1) to minimize flooding and other hazards that are posed by locating development on alluvial fans; (2) to minimize the costs and damages that may result from these hazards; and (3) to preserve and maximize the flood protection, environmental and other beneficial values that alluvial fans provide. Local agencies are encouraged to adopt the draft model ordinance for future land use decisions on alluvial fan areas.
519	Alluvial Fan Task Force. 2010. *Findings and Recommendations Report*. July.	Processes & Policy	Knowledge/Awareness		Recommendation 11 - Floodplain Delineation: DWR should continue to support the Alluvial Fan Floodplain Evaluation and Delineation (AFFED) program beyond 2012, until alluvial fans floodplains projected for development in the next decade have been completed. DWR should provide the alluvial fan maps and other hazard information for use by local governments and the public.
520	Alluvial Fan Task Force. 2010. *Findings and Recommendations Report*. July.	Financing	Flood Infrastructure Maintenance		Recommendation 12 - Addressing Long-term Costs of Development: The State and local agencies should support implementation of economic strategies recommended in the IA that provide a sustained funding for future maintenance of flood management infrastructure.
521	Alluvial Fan Task Force. 2010. *Findings and Recommendations Report*. July.	Financing	Flood Infrastructure Maintenance		Recommendation 13 - Structural Improvements for Existing Alluvial Fan Flood Management Infrastructure: The State should assist in finding a funding mechanism involving local cost sharing to investigate the needs for improvements to existing flood management infrastructures.
522	Alluvial Fan Task Force. 2010. *Findings and Recommendations Report*. July.	Processes & Policy	Knowledge/Awareness		Recommendation 14 - Standards for Community Rating System Points: Standards for Community Rating System Points: The State and FEMA should inform local officials and the public about the benefits of the NFIP Community Rating System (CRS) insurance–rate adjusting program.

Table J-B-1. Recommendations to Improve Flood Management in California

ID	Source	Major Category	Minor Category	Minor Category 2	Opportunities and Challenges/Recommendation
523	California Floodplain Management Task Force. 2002. *Final Recommendations Report*. December.	Processes & Policy	Projects & Planning		Local, State and Federal agencies should consider the risk to life and property from reasonably foreseeable floods when making their land use and floodplain management decisions. To accomplish this objective, decision makers need better information and improved tools. In addition, better tools are needed to comply with the Federal National Flood Insurance Program.
524	California Floodplain Management Task Force. 2002. *Final Recommendations Report*. December.	Processes & Policy	Projects & Planning		State, local, and Federal agencies should implement multi-objective floodplain management on a watershed basis. Where feasible, projects should provide adequate protection for natural, recreational, residential, business, economic, agricultural, and cultural resources and for water quality and supply.
525	California Floodplain Management Task Force. 2002. *Final Recommendations Report*. December.	Financing	Projects & Planning		DWR should identify and actively pursue funding opportunities, technical assistance to local governments and other organizations, and legislative proposals to implement Task Force recommendations and ensure successful floodplain management, recognizing that local governments have the primary responsibility and authority for land use decisions.
526	California Floodplain Management Task Force. 2002. *Final Recommendations Report*. December.	Processes & Policy	Knowledge/Awareness		Awareness Floodplain Mapping – The State should expand its Awareness Floodplain Mapping Program for use by local governments and the public.
527	California Floodplain Management Task Force. 2002. *Final Recommendations Report*. December.	Processes & Policy	Knowledge/Awareness		Future Build-Out Mapping – Local and State agencies preparing floodplain maps should consider current and future planned development.
528	California Floodplain Management Task Force. 2002. *Final Recommendations Report*. December.	Processes & Policy	Knowledge/Awareness		Watershed-Based Mapping – Wherever practical, floodplain maps should be prepared on a watershed basis.
529	California Floodplain Management Task Force. 2002. *Final Recommendations Report*. December.	Processes & Policy	Knowledge/Awareness		Geographic Information System (GIS) - Based Flood Maps – Local, State, and Federal agencies should create, develop, produce, and disseminate compatible GIS-based flood maps.
530	California Floodplain Management Task Force. 2002. *Final Recommendations Report*. December.	Processes & Policy	Knowledge/Awareness		Alluvial Fan Floodplains – Priority for alluvial fan floodplain mapping should be given to those alluvial fan floodplains being considered for development. The State should convene an alluvial fan task force to review information on alluvial fan floodplains, determine future research needs, and develop recommendations specific to alluvial fan floodplain management.
531	California Floodplain Management Task Force. 2002. *Final Recommendations Report*. December.	Processes & Policy	Knowledge/Awareness		Stream Gauging and Monitoring – DWR and other agencies should sponsor projects in cooperation with the United States Geological Survey (USGS) to install real-time gages in priority locations throughout California.
532	California Floodplain Management Task Force. 2002. *Final Recommendations Report*. December.	Processes & Policy	Knowledge/Awareness		Repetitive Losses – Local agencies should work with the Governor's Office of Emergency Services (OES) and DWR to identify repeatedly flooded structures and inform qualifying residents of voluntary programs to prevent future flood losses.
533	California Floodplain Management Task Force. 2002. *Final Recommendations Report*. December.	Processes & Policy	Flood Response		Flood Warning and Local Community Flood Response Programs – The State should increase assistance to local agencies to improve flood-warning programs specific to each watershed.
534	California Floodplain Management Task Force. 2002. *Final Recommendations Report*. December.	Processes & Policy	Knowledge/Awareness		Flood Insurance Rate Map Issues – Decision-makers should gather information and data beyond Flood Insurance Rate Maps (FIRMs) to better assess reasonably foreseeable floods.
535	California Floodplain Management Task Force. 2002. *Final Recommendations Report*. December.	Processes & Policy	Projects & Planning		Exceeding NFIP Floodplain Management Requirements – Local communities should be encouraged to require new and substantially improved buildings to have their lowest floor elevations to be at least one foot above NFIP's base flood elevation, factoring in the effect of full buildout of the watershed. The effects of new or additional flood management measures should be reflected in an updated base flood elevation.

Table J-B-1. Recommendations to Improve Flood Management in California

ID	Source	Major Category	Minor Category	Minor Category 2	Opportunities and Challenges/Recommendation
536	California Floodplain Management Task Force. 2002. *Final Recommendations Report*. December.	Processes & Policy	Projects & Planning		Executive Order – The Governor's 1977 Executive Order for Floodplain Management should be updated.
537	California Floodplain Management Task Force. 2002. *Final Recommendations Report*. December.	Processes & Policy	Projects & Planning		State Multi-Hazard Mitigation Plan – DWR, OES, and other agencies should incorporate into the State Multi-Hazard Mitigation Plan floodplain management measures that will meet Federal Emergency Management Agency (FEMA) requirements.
538	California Floodplain Management Task Force. 2002. *Final Recommendations Report*. December.	Processes & Policy	Projects & Planning		Multi-Hazard Mapping – OES should coordinate with other hazard mapping efforts to develop GIS-based multi-hazard advisory maps and distribute them to local governments and the public.
539	California Floodplain Management Task Force. 2002. *Final Recommendations Report*. December.	Processes & Policy	Projects & Planning		State Building Codes – Ensure that the California Building Standards Code meets, at minimum, NFIP requirements. Ensure that other State codes applicable to public buildings meet, at a minimum, NFIP requirements. Ensure that any local code adoptions or amendments and any development approvals meet, at a minimum, NFIP requirements.
540	California Floodplain Management Task Force. 2002. *Final Recommendations Report*. December.	Processes & Policy	Projects & Planning		Multi-Objective-Management – An M-O-M approach to flood management projects should be promoted.
541	California Floodplain Management Task Force. 2002. *Final Recommendations Report*. December.	Processes & Policy	Projects & Planning		Flood Management Approaches to Ecosystem Restoration and Agricultural Conservation – Flood management programs and projects, while providing for public safety, should maximize opportunities for agricultural conservation and ecosystem protection and restoration, where feasible.
542	California Floodplain Management Task Force. 2002. *Final Recommendations Report*. December.	Processes & Policy	Projects & Planning		Nonstructural Approaches, Restoration, and Conservation of Agriculture and Natural Lands – In planning new or upgraded floodwater management programs and projects, including structural projects, local and State agencies should encourage as part of the design, where appropriate, nonstructural approaches and the conservation of beneficial uses and functions of the floodplain.
543	California Floodplain Management Task Force. 2002. *Final Recommendations Report*. December.	Processes & Policy	Projects & Planning		Tools for Protection of Flood Compatible Land Uses – The State should identify, develop, and support tools to protect flood compatible land uses.
544	California Floodplain Management Task Force. 2002. *Final Recommendations Report*. December.	Processes & Policy	Projects & Planning		Protection of Floodplain Groundwater Recharge Areas – Permitting agencies should consider the impacts of land-use decisions on the capacity of the floodplain to recharge groundwater.
545	California Floodplain Management Task Force. 2002. *Final Recommendations Report*. December.	Processes & Policy	Projects & Planning		Vector Control – During the planning and development of ecosystem restoration projects, the costs and impacts involved with vector control and with monitoring related to mosquito-transmitted diseases should be considered.
546	California Floodplain Management Task Force. 2002. *Final Recommendations Report*. December.	Processes & Policy	Projects & Planning		Multi-Jurisdictional Partnerships – The State should encourage multi-jurisdictional partnerships when floodplain management projects are planned and implemented.
547	California Floodplain Management Task Force. 2002. *Final Recommendations Report*. December.	Processes & Policy	Projects & Planning		Watershed Monitoring – The State and others should financially support the monitoring of flood management projects on a watershed level.
548	California Floodplain Management Task Force. 2002. *Final Recommendations Report*. December.	Processes & Policy	Projects & Planning		Proactive and Adaptive Management of Floodplains – State and local agencies should manage floodplains proactively and adaptively by periodically adjusting to current physical and biological conditions, new scientific information, and knowledge.

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549	California Floodplain Management Task Force. 2002. *Final Recommendations Report*. December.	Processes & Policy	Projects & Planning		Best Management Practices – DWR should work with stakeholders to identify, monitor, and update voluntary BMPs for multi-objective floodplain management.
550	California Floodplain Management Task Force. 2002. *Final Recommendations Report*. December.	Processes & Policy	Projects & Planning		Training, Education, and Professional Certification for Multi-Objective Floodplain Management – The State should encourage the inclusion of multi-objective floodplain management curricula in college and university degree programs.
551	California Floodplain Management Task Force. 2002. *Final Recommendations Report*. December.	Processes & Policy	Projects & Planning		Coordination among Agencies and Groups – The State should encourage and create incentives for additional coordination among stakeholders.
552	California Floodplain Management Task Force. 2002. *Final Recommendations Report*. December.	Processes & Policy	Projects & Planning		State General Plan Guidelines – The State General Plan Guidelines should be updated to reflect the California Floodplain Management Task Force recommendations, as applicable, and to reflect other programs, policies, and standards, including the NFIP, for floodplain management.
553	California Floodplain Management Task Force. 2002. *Final Recommendations Report*. December.	Financing	Projects & Planning		New and Existing Funding Sources – The State and local governments should encourage local, State, and Federal, nongovernmental, and other private cost-sharing to achieve equitable and fair financing of multi-objective floodplain management actions and planning.
554	California Floodplain Management Task Force. 2002. *Final Recommendations Report*. December.	Processes & Policy	Projects & Planning		Task Force Recommendation Priorities – DWR and The Reclamation Board should lead the development of a consensus process, involving appropriate stakeholders, to identify criteria and prioritize the implementation of Task Force recommendations, given the expected expenditures, using existing and new funding sources.
555	California Floodplain Management Task Force. 2002. *Final Recommendations Report*. December.	Processes & Policy	Projects & Planning		Department of Water Resources Outreach Programs – DWR should expand outreach programs to include public service announcements to increase public awareness of floodplain values, flooding hazards, public safety, and hazard mitigation measures.
556	California Floodplain Management Task Force. 2002. *Final Recommendations Report*. December.	Processes & Policy	Projects & Planning		Designated Floodways – DWR and The Reclamation Board should include, in the Community Assistance Workshops, information on the Reclamation Board's current authority to adopt and update designated floodways in the Central Valley. The Reclamation Board should work with stakeholders to identify, if any, a list of Reclamation Board regulations that are impediments to flood compatible uses within the floodway and recommend specific revisions.
557	California Floodplain Management Task Force. 2002. *Final Recommendations Report*. December.	Processes & Policy	Projects & Planning		State Floodplain Management Assistance to Local Governments – The State should provide additional resources to continue and expand implementation of the State's floodplain management programs, including full support of the Community Assistance Contact program.
558	California Floodplain Management Task Force. 2002. *Final Recommendations Report*. December.	Processes & Policy	Projects & Planning		National Flood Insurance Program Compliance Encouragement – Public agencies not subject to local government floodplain management requirements or the Governor's Executive Order on Floodplain management should comply with NFIP requirements.
559	California Floodplain Management Task Force. 2002. *Final Recommendations Report*. December.	Processes & Policy	Projects & Planning		Community Rating System – DWR should educate local officials and the public about the elements and benefits of the Community Rating System (CRS) insurance-rate adjusting program.
560	California Floodplain Management Task Force. 2002. *Final Recommendations Report*. December.	Processes & Policy	Projects & Planning		State Community Rating System Program Coordinator – DWR should designate a State level CRS Program Coordinator familiar with State agencies and local governments that use the CRS program.
561	California Floodplain Management Task Force. 2002. *Final Recommendations Report*. December.	Processes & Policy	Projects & Planning		Interagency Barriers – The Reclamation Board should work with USACE, State agencies, local sponsors and interested parties to identify interagency barriers to efficient implementation of multi-objective flood management projects and to develop options to overcome those interagency barriers.

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ID	Source	Major Category	Minor Category	Minor Category 2	Opportunities and Challenges/Recommendation
562	California Floodplain Management Task Force. 2002. *Final Recommendations Report*. December.	Processes & Policy	Projects & Planning		California Environmental Quality Act Local Analysis Improvement – DWR should provide technical assistance to local agencies and practitioners with a practical, step-by-step CEQA flood hazard and impacts assessment guide. The CEQA Guidelines, Appendix G, should be modified to include the changes shown in Appendix D of this document, Attachment J: Recommendations.
563	California Floodplain Management Task Force. 2002. *Final Recommendations Report*. December.	Processes & Policy	Projects & Planning		Establishment of a California Floodplain Management Advisory Committee – DWR should sponsor a floodplain management advisory committee composed of local and State government representatives, floodplain managers, and other stakeholders, to develop additional recommendations to improve floodplain management practices.
564	CEAC. 2008. "Results of Interviews to Gather Information to Scope the Flood Control Needs Assessment." Memorandum from Dan Cloak Environmental Consulting. April 2.	Processes & Policy	Projects & Planning		Flood control needs, as well as the ability to assess those needs, vary with population density, agency funding mechanisms, intensity of watershed urbanization, and geography.
565	CEAC. 2008. "Results of Interviews to Gather Information to Scope the Flood Control Needs Assessment." Memorandum from Dan Cloak Environmental Consulting. April 2.	Processes & Policy	Projects & Planning		Many California flood control agencies lack staff and funding to adequately assess flood control needs and to define projects that address those needs.
566	CEAC. 2008. "Results of Interviews to Gather Information to Scope the Flood Control Needs Assessment." Memorandum from Dan Cloak Environmental Consulting. April 2.	Processes & Policy	Projects & Planning		Managers of many flood control agencies believe additional flood master planning and regional planning is required to adequately address flooding and flood hazards.
567	CEAC. 2008. "Results of Interviews to Gather Information to Scope the Flood Control Needs Assessment." Memorandum from Dan Cloak Environmental Consulting. April 2.	Processes & Policy	Projects & Planning		In some regions, FIRMs are nonexistent or known to be inaccurate and County government has not systematically evaluated recurring flood damages and risks of future flood damages nor identified projects to address known risks.
568	CEAC. 2008. "Results of Interviews to Gather Information to Scope the Flood Control Needs Assessment." Memorandum from Dan Cloak Environmental Consulting. April 2.	Processes & Policy	Projects & Planning		Most flood control agencies can identify and list existing flood control infrastructure, although in many cases it will be necessary to dig through old reports and consult with agency staff to compile an inventory.
569	CEAC. 2008. "Results of Interviews to Gather Information to Scope the Flood Control Needs Assessment." Memorandum from Dan Cloak Environmental Consulting. April 2.	Processes & Policy	Projects & Planning		Most flood control agencies recognize the potential value of asset management systems, but only a few are actively moving toward implementing asset management—and even fewer have an asset management system in place.

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570	CEAC. 2008. "Results of Interviews to Gather Information to Scope the Flood Control Needs Assessment." Memorandum from Dan Cloak Environmental Consulting. April 2.	Financing	Projects & Planning		Because of funding, environmental, and practical constraints, many existing and planned projects are not designed to protect against damages by a 1% flood, and it is not local policy to design against damages by a 1% flood.
571	CEAC. 2008. "Results of Interviews to Gather Information to Scope the Flood Control Needs Assessment." Memorandum from Dan Cloak Environmental Consulting. April 2.	Processes & Policy	Projects & Planning		Depending on history and circumstance, flood control agencies limit their jurisdiction to maintenance of specific facilities, or limit the area of their jurisdiction by mapped boundary, watershed size, or rate of flood flow, and there is no common threshold among agencies.
572	CEAC. 2008. "Results of Interviews to Gather Information to Scope the Flood Control Needs Assessment." Memorandum from Dan Cloak Environmental Consulting. April 2.	Processes & Policy	Projects & Planning		There is no consistent threshold that distinguishes flood protection needs addressed by cities and towns versus those addressed by counties and special districts.
573	CEAC. 2008. "Results of Interviews to Gather Information to Scope the Flood Control Needs Assessment." Memorandum from Dan Cloak Environmental Consulting. April 2.	Processes & Policy	Projects & Planning		FEMA's levee certification program and/or FIRM modernization will significantly expand flood hazard areas and affect flood insurance requirements in some, but not all, jurisdictions.
574	CEAC. 2008. "Results of Interviews to Gather Information to Scope the Flood Control Needs Assessment." Memorandum from Dan Cloak Environmental Consulting. April 2.	Processes & Policy	Projects & Planning		Only a few flood control agencies are thoroughly engaged in floodplain management, and nearly all flood control agencies defer to another department (within County government) or to City or Town government to review proposed developments in floodplains.
575	CEAC. 2008. "Results of Interviews to Gather Information to Scope the Flood Control Needs Assessment." Memorandum from Dan Cloak Environmental Consulting. April 2.	Processes & Policy	Projects & Planning		In some jurisdictions, a substantial portion of the effort to address flood control needs consists of emergency response and emergency repairs following flood disasters.
576	CEAC. 2008. "Results of Interviews to Gather Information to Scope the Flood Control Needs Assessment." Memorandum from Dan Cloak Environmental Consulting. April 2.	Processes & Policy	Projects & Planning		In many jurisdictions, flow capacity of at least some facilities has been significantly reduced because of regulatory restrictions on vegetation control and sediment removal.
577	CEAC. 2008. "Results of Interviews to Gather Information to Scope the Flood Control Needs Assessment." Memorandum from Dan Cloak Environmental Consulting. April 2.	Processes & Policy	Projects & Planning		Environmental mitigation and monitoring requirements may add 10% to 40% or more to the cost of facility maintenance and to the cost of new or replaced facilities.

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578	CEAC. 2008. "Results of Interviews to Gather Information to Scope the Flood Control Needs Assessment." Memorandum from Dan Cloak Environmental Consulting. April 2.	Processes & Policy	Projects & Planning		State regulatory agencies lack staff and administrative capacity to ensure timely and consistent review of environmental permit applications, and this has a profound effect on the ability of local flood control agencies to fulfill their mission.
579	CEAC. 2008. "Results of Interviews to Gather Information to Scope the Flood Control Needs Assessment." Memorandum from Dan Cloak Environmental Consulting. April 2.	Financing	Projects & Planning		In most cases, project budgets in flood control agency capital improvement programs do not include costs of onsite or offsite environmental mitigation requirements or costs to address geomorphic stability or fish passage, incorporate multiple uses and benefits, or involve stakeholders.
580	CEAC. 2008. "Results of Interviews to Gather Information to Scope the Flood Control Needs Assessment." Memorandum from Dan Cloak Environmental Consulting. April 2.	Financing	Projects & Planning		Most CIP budget estimates are based on "placeholder" numbers or conceptual design, and rarely on preliminary (30% or greater) design.
581	CEAC. 2008. "Results of Interviews to Gather Information to Scope the Flood Control Needs Assessment." Memorandum from Dan Cloak Environmental Consulting. April 2.	Processes & Policy	Projects & Planning		Only a few flood control agencies have active ongoing programs to educate and engage the public in environmental stewardship, outside of participation in stormwater National Pollutant Discharge Elimination System (NPDES) compliance programs.
582	CEAC. 2008. "Results of Interviews to Gather Information to Scope the Flood Control Needs Assessment." Memorandum from Dan Cloak Environmental Consulting. April 2.	Financing	Projects & Planning		In the main, flood control agency managers believe their agencies are at a disadvantage when competing against water and wastewater agencies for funding (including bond-funded programs such as Propositions 50 and 84), and managers of smaller agencies believe they are at a disadvantage when competing against larger agencies for funding.
583	CEAC. 2008. "Results of Interviews to Gather Information to Scope the Flood Control Needs Assessment." Memorandum from Dan Cloak Environmental Consulting. April 2.	Financing	Projects & Planning		Flood control agencies need ongoing local sources of funding to address maintenance needs and capital needs, and flood control agency managers desire changes in State policy—including Proposition 218—which would empower voters to approve local funding.
584	CEAC. 2008. "Results of Interviews to Gather Information to Scope the Flood Control Needs Assessment." Memorandum from Dan Cloak Environmental Consulting. April 2.	Processes & Policy	Projects & Planning		Need for additional permit writers and training at Department of Fish and Wildlife, Regional Water Quality Control Boards, and other agencies.
585	CEAC. 2008. "Results of Interviews to Gather Information to Scope the Flood Control Needs Assessment." Memorandum from Dan Cloak Environmental Consulting. April 2.	Processes & Policy	Projects & Planning		Legislative action, including action on a Constitutional Amendment creating a Proposition 218 exception.

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586	CEAC. 2008. "Results of Interviews to Gather Information to Scope the Flood Control Needs Assessment." Memorandum from Dan Cloak Environmental Consulting. April 2.	Processes & Policy	Flood Response		Better definitions of what activities are allowed under emergency exemptions.
587	DWR. 2009. *California Water Plan, Update 2009*. Volume 2, *Flood Risk Management;* Chapter 28, "Resource Management Strategies."	Processes & Policy	Knowledge/Awareness		The Department of Water Resources should lead research into the potential effects of global climate change on precipitation and runoff patterns, and disseminate revised flood projections needed to plan for flood events. Flood management agencies and local governments should incorporate the potential effects of climate change into planning for future flood events.
588	DWR. 2009. *California Water Plan, Update 2009*. Volume 2, *Flood Risk Management;* Chapter 28, "Resource Management Strategies."	Processes & Policy	Knowledge/Awareness		Consistent with the governor's Executive Order S-13-08, the Ocean Protection Council, the Natural Resources Agency, the Department of Water Resources, and the Governor's Office of Planning and Research, should (1) initiate a statewide climate change adaptation strategy, (2) request that the National Academy of Science establish an expert panel to report on sea level rise impacts; (3) issue interim guidance to State agencies for how to plan on sea level rise in designated coastal and floodplain areas; and (4) initiate a report on critical existing and planned infrastructure projects vulnerable to sea level rise.
589	DWR. 2009. *California Water Plan, Update 2009*. Volume 2, *Flood Risk Management;* Chapter 28, "Resource Management Strategies."	Processes & Policy	Knowledge/Awareness		The Department of Water Resources should, with extensive stakeholder input, describe the current status of the flood management systems in the Sacramento and San Joaquin watersheds and recommend changes throughout the system for those areas currently receiving protection from the State-Federal system by January 1, 2012, consistent with the California Water Code (commencing with §9600).
590	DWR. 2009. *California Water Plan, Update 2009*. Volume 2, *Flood Risk Management;* Chapter 28, "Resource Management Strategies."	Processes & Policy	Knowledge/Awareness		The Department of Water Resources should, with extensive stakeholder input, prepare a report that identifies the current status of flood protection infrastructure and flood risks statewide and identifies opportunities and needs to improve integrated flood management statewide by January 1, 2012.
591	DWR. 2009. *California Water Plan, Update 2009*. Volume 2, *Flood Risk Management;* Chapter 28, "Resource Management Strategies."	Processes & Policy	Projects & Planning		The Department of Water Resources should develop incentives and provide support for the creation and maintenance of IRWM plans that address regional flood management issues by January 1, 2012.
592	DWR. 2009. *California Water Plan, Update 2009*. Volume 2, *Flood Risk Management;* Chapter 28, "Resource Management Strategies."	Financing	Projects & Planning		The Department of Water Resources should develop a financing strategy to address statewide flood management needs identified in the statewide report on flood management risks by January 1, 2012. The strategy should address both capital costs and operation and maintenance costs.
593	DWR. 2009. *California Water Plan, Update 2009*. Volume 2, *Flood Risk Management;* Chapter 28, "Resource Management Strategies."	Financing	Projects & Planning		DWR should develop financing strategy and make it accessible to flood management agencies and local governments. The database should include natural floodplain resources, land use and watershed boundaries, and updated flood hazard areas.
594	DWR. 2009. *California Water Plan, Update 2009*. Volume 2, *Flood Risk Management;* Chapter 28, "Resource Management Strategies."	Processes & Policy	Knowledge/Awareness		DWR should map 200-year floodplains throughout the state, make this information available to flood management agencies and local governments, and evaluate the costs and benefits of establishing the 200-year flood as the minimum planning standard for urban and urbanizing areas statewide. (Currently the 200-year standard is required only for the Central Valley.)
595	DWR. 2009. *California Water Plan, Update 2009*. Volume 2, *Flood Risk Management;* Chapter 28, "Resource Management Strategies."	Processes & Policy	Knowledge/Awareness		The Department of Water Resources should utilize the comments and recommendations in the Flood Risk Management Strategy to inform: 1) the statewide report on opportunities and needs to improve integrated flood management; 2) the Central Valley Flood Protection Plan; and 3) Integrated regional water management planning groups on regional flood management.

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596	DWR. 2009. *California Water Plan, Update 2009*. Volume 2, *Flood Risk Management;* Chapter 28, "Resource Management Strategies."	Processes & Policy	Projects & Planning		The Legislature should enact legislation that clarifies the liability for structural flood management facilities and defines what constitutes "reasonable" impacts on downstream drainage and property.
597	DWR. 2009. *California Water Plan, Update 2009*. Volume 2, *Flood Risk Management;* Chapter 28, "Resource Management Strategies."	Financing	Projects & Planning		DWR and local flood jurisdictions should establish long-term buyback programs to acquire properties immediately adjacent to levees and other structural facilities to facilitate the eventual removal of these structures, thereby enhancing the potential for setback levees and floodplain restoration where feasible.
598	DWR. 2009. *California Water Plan, Update 2009*. Volume 2, *Flood Risk Management;* Chapter 28, "Resource Management Strategies."	Processes & Policy	Projects & Planning		To facilitate cross-jurisdictional projects and programs, the Governor's Office of Planning and Research should develop guidelines and model legal agreements (e.g., Memorandum of Understanding or Joint Powers Authority) that clearly delineate responsibilities for construction, operation, and maintenance of flood management facilities and programs and address liability issues.
599	DWR. 2009. *California Water Plan, Update 2009*. Volume 2, *Flood Risk Management;* Chapter 28, "Resource Management Strategies."	Processes & Policy	Projects & Planning		Planning for structural projects should be integrated into a comprehensive integrated flood management approach that takes a watershed perspective.
600	DWR. 2009. *California Water Plan, Update 2009*. Volume 2, *Flood Risk Management;* Chapter 28, "Resource Management Strategies."	Processes & Policy	Flood Infrastructure Maintenance		For routine maintenance of structural facilities, DWR should develop recommendations for streamlined environmental review and permitting that result in time and cost savings, while protecting and enhancing sensitive environmental resources.
601	DWR. 2009. *California Water Plan, Update 2009*. Volume 2, *Flood Risk Management;* Chapter 28, "Resource Management Strategies."	Processes & Policy	Projects & Planning		The Department of Water Resources should continue to work with the Federal Emergency Management Agency to expedite the review and update of flood insurance rate maps and expand ongoing efforts to enhance public understanding of potential flood risks.
602	DWR. 2009. *California Water Plan, Update 2009*. Volume 2, *Flood Risk Management;* Chapter 28, "Resource Management Strategies."	Processes & Policy	Projects & Planning		Local governments should prepare revised general plans and regulations that respond to statutory mandates to address flood risks and update them frequently because hydrologic projections change. As required by Government Code Section 65302, the land use element should identify and annually review flood-prone areas identified by FEMA or DWR. The revised General Plans and regulations should reflect an IWM approach and consider future development on tribal lands. DWR and OPR should provide technical assistance to local governments to revise their General Plans and land use regulations.
603	DWR. 2009. *California Water Plan, Update 2009*. Volume 2, *Flood Risk Management;* Chapter 28, "Resource Management Strategies."	Processes & Policy	Projects & Planning		Local land-use agencies should not allow new critical public facilities (such as fire stations, emergency shelters, hospitals or schools) to be constructed within the 200-year floodplain. Existing critical facilities located in flood-prone areas should be noted in the Emergency Plans prepared by local agencies, with evacuation and egress routes clearly identified.
604	DWR. 2009. *California Water Plan, Update 2009*. Volume 2, *Flood Risk Management;* Chapter 28, "Resource Management Strategies."	Processes & Policy	Projects & Planning		CEQA reviews of development projects in floodplains should use the latest floodplain mapping data available, implement General Plan flood management policies, and ensure that flood risks associated with development projects are fully understood and properly mitigated. The potential impacts of "floodproofing" individual development projects to the risk of upstream and downstream flooding should be evaluated and mitigated if significant.
605	DWR. 2009. *California Water Plan, Update 2009*. Volume 2, *Flood Risk Management;* Chapter 28, "Resource Management Strategies."	Processes & Policy	Knowledge/Awareness		DWR (as required by Water Code Section 9130) and local agencies should analyze potential flood risks, including residual flood risks to property within levee protection zones, and make this information publicly available, including residual flood risks. The public, businesses, tribal governments, and public agencies should be provided with sufficient information about potential flood risks to make informed decisions that can reduce potential impacts of flooding.

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606	DWR. 2009. *California Water Plan, Update 2009*. Volume 2, *Flood Risk Management;* Chapter 28, "Resource Management Strategies."	Financing	Projects & Planning		The State should explore additional funding options for local government preparation of revised General Plans and land use regulations that address flood risks, and for floodplain function restoration projects. State funding for floodplain function restoration projects should be prioritized based on the magnitude of flood risks that would be avoided, and the magnitude of ecosystem and water resources benefits that would be created.
607	DWR. 2009. *California Water Plan, Update 2009*. Volume 2, *Flood Risk Management;* Chapter 28, "Resource Management Strategies."	Processes & Policy	Projects & Planning		Local flood management jurisdictions should promote the preservation of existing floodplains and restoration of natural floodplain functions where feasible and carefully analyze the interface between natural and naturalized floodplains and structural flood management systems, to ensure that erosion and debris deposition from these natural areas do not create undue hazards to downstream facilities and property.
608	DWR. 2009. *California Water Plan, Update 2009*. Volume 2, *Flood Risk Management;* Chapter 28, "Resource Management Strategies."	Processes & Policy	Projects & Planning		The Department of Water Resources should work closely with the Governor's Office of Emergency Services and California Department of Health Services to ensure a consistent approach to disaster preparedness plans and procedures.
609	DWR. 2009. *California Water Plan, Update 2009*. Volume 2, *Flood Risk Management;* Chapter 28, "Resource Management Strategies."	Processes & Policy	Projects & Planning		The Department of Water Resources should take the lead in developing guidance and recommending improved, organized approaches for post-flood recovery, at the State, regional, and local levels. Creation of a statewide California Recovery Authority should be considered.
610	DWR. 2005. *Flood Warnings: Responding to California's Flood Crisis*. January.	Processes & Policy	Projects & Planning		Ensure the integrity of existing flood project infrastructure through improved maintenance programs that balance public safety and needed environmental protection.
611	DWR. 2005. *Flood Warnings: Responding to California's Flood Crisis*. January.	Processes & Policy	Knowledge/Awareness		Evaluate the integrity and capability of existing flood control project facilities and prepare an economically viable rehabilitation plan.
612	DWR. 2005. *Flood Warnings: Responding to California's Flood Crisis*. January.	Processes & Policy	Flood Response		Improve the effectiveness of emergency response programs.
613	DWR. 2005. *Flood Warnings: Responding to California's Flood Crisis*. January.	Financing	Knowledge/Awareness		Create a sustainable fund to support flood management programs.
614	DWR. 2005. *Flood Warnings: Responding to California's Flood Crisis*. January.	Processes & Policy	Knowledge/Awareness		Update floodplain maps and provide better education on flood risks to the public and to agencies that authorize development in floodplains.
615	DWR. 2005. *Flood Warnings: Responding to California's Flood Crisis*. January.	Processes & Policy	Projects & Planning		Where feasible, implement a multi-objective management approach forfloodplains that would include, but not be limited to, increased floodprotection, ecosystem restoration, and farmland protection.
616	DWR. 2005. *Flood Warnings: Responding to California's Flood Crisis*. January.	Processes & Policy	Projects & Planning		Evaluate potential policies and procedures that may determine the State's capacity to fund levee maintenance, infrastructure improvements and emergency response in the Delta.
617	DWR. 2005. *Flood Warnings: Responding to California's Flood Crisis*. January.	Processes & Policy	Projects & Planning		Examine existing flood insurance requirements and consider the creation of a "California Flood Insurance Fund," a sustainable State insurance fund to compensate property owners for flood damage.
618	DWR. 2005. *Flood Warnings: Responding to California's Flood Crisis*. January.	Processes & Policy	Projects & Planning		Create a Central Valley Flood Control Assessment District with the authority to assess fees that would provide adequate flood control protection for regional participants.
619	DWR. 2005. *Flood Warnings: Responding to California's Flood Crisis*. January.	Processes & Policy	Projects & Planning		Enact legislative and constitutional changes that would reduce taxpayer exposure for funding flood disaster claims. Revisions would include constitutional amendments to exempt flood control projects from inverse condemnation liability and exempt local flood control districts from the Proposition 218 two-thirds voting requirement.

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ID	Source	Major Category	Minor Category	Minor Category 2	Opportunities and Challenges/Recommendation
620	Blue Ribbon Task Force. 2008. *Delta Vision Strategic Plan*. October.	Processes & Policy	Projects & Planning		Change the operating rules of excising reservoirs to incorporate and reflect modern forecasting capabilities.
621	Blue Ribbon Task Force. 2008. *Delta Vision Strategic Plan*. October.	Processes & Policy	Projects & Planning		Require the Department of Water Resources to immediately create a flood bypass along the lower San Joaquin River.
622	Blue Ribbon Task Force. 2008. *Delta Vision Strategic Plan*. October.	Processes & Policy	Projects & Planning		Request that the Department of Water Resources encourage greater infiltration as part of watershed management planning.
623	Blue Ribbon Task Force. 2008. *Delta Vision Strategic Plan*. October.	Processes & Policy	Projects & Planning		Immediately strengthen land use oversight of the Cosumnes/Mokelumne floodway and the San Joaquin/South Delta lowlands.
624	Blue Ribbon Task Force. 2008. *Delta Vision Strategic Plan*. October.	Processes & Policy	Projects & Planning		Immediately strengthen land use oversight for Bethel Island, the city of Isleton, and Brannan-Andrus Island.
625	Blue Ribbon Task Force. 2008. *Delta Vision Strategic Plan*. October.	Processes & Policy	Projects & Planning		Immediately prepare local plans for these five at-risk locations within the primary zone: Walnut Grove (including the residential area on Grand Island), Locke, Clarksburg, Courtland, and Terminous.
626	Blue Ribbon Task Force. 2008. *Delta Vision Strategic Plan*. October.	Processes & Policy	Projects & Planning		Immediately form a landowner consortium to create a new land use strategy that fosters recreation, increases habitat, reverses subsidence, sequesters carbon, improves handling of dredged material, and continues appropriate agriculture on Sherman, Twitchell, and Jersey Islands.
627	Blue Ribbon Task Force. 2008. *Delta Vision Strategic Plan*. October.	Processes & Policy	Projects & Planning		Require the Department of Water Resources, in cooperation with local Reclamation Districts and other agencies, to develop a comprehensive plan for Delta levee investments.
628	Blue Ribbon Task Force. 2008. *Delta Vision Strategic Plan*. October.	Financing	Projects & Planning		Prioritize the $750 million appropriated by Proposition 1E and Proposition 84 funds for the improvement of Delta levees, including legacy towns.
629	Blue Ribbon Task Force. 2008. *Delta Vision Strategic Plan*. October.	Processes & Policy	Projects & Planning		Require those preparing the comprehensive levee plan to incorporate the Delta Levees Classification Table to ensure consistency between levee designs and the uses of land and water enabled by those levees.
630	Blue Ribbon Task Force. 2008. *Delta Vision Strategic Plan*. October.	Financing	Projects & Planning		Continue the existing Department of Water Resources levee Subventions Program until the comprehensive levee plan is completed.
631	Blue Ribbon Task Force. 2008. *Delta Vision Strategic Plan*. October.	Financing	Projects & Planning		Vest continuing authority for levee priorities and funding with the California Delta Ecosystem and Water Council to ensure a cost-effective and sustainable relationship between levee investments and management of the Delta over the long term.
632	USACE. 2002. *The Comprehensive Plan; Interim Report*. December 20.	Processes & Policy	Flood Response		Recognize that public safety is the primary purpose of the flood management system. Proposed changes to the flood management systems must not compromise public safety. The flood management systems for the Sacramento and San Joaquin River basins were authorized, designed, and are operated to protect public safety. Public safety considerations include the transportation and communications infrastructure necessary to accommodate an effective emergency response program. Since flooding often results in widespread economic and social hardships, it is recognized that protection of public safety is the primary purpose of the flood management systems. Public safety means increased security for people, infrastructure, and agricultural production.
633	USACE. 2002. *The Comprehensive Plan; Interim Report*. December 20.	Processes & Policy	Projects & Planning		Promote effective floodplain management. The floodplains of the Sacramento and San Joaquin rivers include overflow areas that store and convey large volumes of floodwater during flood events. This storage contributes to the flood protection of downstream property. All projects proposing modifications to the flood management system should consider the benefits of the roles of the floodplain in flood management and maintaining ecosystem processes. It is important to recognize that floodplains can be managed to further reduce damages and to avoid future damages without changing flood frequencies or modifying existing uses. It is essential to encourage and promote effective floodplain planning and management practices that improve public safety, reduce the susceptibility to damaging floods, preserve agriculture and habitat, and restore degraded ecosystems in the floodplain. Effective floodplain management involves actions that remove or modify damageable property; adapt land uses to be more compatible with flooding; influence future project decisions that benefit social, agricultural, and environmental values; and discourage development in areas with high flood risk. A clear communication of residual risk in those areas protected by structural features of the flood management system will encourage improved floodplain management practices.

Table J-B-1. Recommendations to Improve Flood Management in California

ID	Source	Major Category	Minor Category	Minor Category 2	Opportunities and Challenges/Recommendation
634	USACE. 2002. *The Comprehensive Plan; Interim Report*. December 20.	Processes & Policy	Projects & Planning		Recognize the value of agriculture. Future projects will take into account individual and cumulative impacts of project development on agriculture and other open space lands, the flood damage reduction and ecosystem benefit s of these lands, the economic and environmental effects on crop production, and the effects on associated service industries, infrastructure, and local communities. Agricultural lands in the Central Valley contribute significantly to the economy and quality of life in the region, the state, and the nation, and provide essential habitat components for many important species. Agricultural and open space lands offer substantial benefits in protecting natural values and in incurring lower monetary flood damages than more intensive land uses.
635	USACE. 2002. *The Comprehensive Plan; Interim Report*. December 20.	Processes & Policy	Projects & Planning		Avoid hydraulic and hydrologic impacts. The hydrology and hydraulics of the Sacramento and San Joaquin rivers and associated floodplains and ecosystems will be considered as complete systems at local and watershed levels. Studies clearly demonstrate that the hydrologic and hydraulic characteristics of the waterways and associated floodplains and ecosystems of each river basin represent a complete and interconnected system, and that changes to one part of the system will change other parts of the system. Future projects will be evaluated individually and cumulatively to ensure that there are no significant hydraulic effects to other lands and communities along the system and to ensure compatibility with local and regional flood damage reduction and ecosystem restoration goals. In working toward the restoration of a dynamic river system, some effects may be considered either beneficial or adverse, depending upon what is being affected. Each proposed project will undergo assessment for its potential effect on all aspects of the flow regime (flood magnitude, timing, duration, frequency, and rate of change) that affect natural functions such as sediment supply, transport and deposition processes, and channel cross-sectional and plan form changes, as well as man-made and natural resources, upstream and downstream of project sites. Hydrologic evaluations will take into account the best available information on the effects and uncertainties of potential climate changes.
636	USACE. 2002. *The Comprehensive Plan; Interim Report*. December 20.	Processes & Policy	Projects & Planning		Plan system conveyance capacity that is compatible with all intended uses. Future projects that modify system conveyance capacity will utilize a watershed approach to establish system conveyance capacities that are compatible with release rates for reservoirs and functional geomorphic and biological processes. Modifications to conveyance capacities should account for effects of restored habitat.
637	USACE. 2002. *The Comprehensive Plan; Interim Report*. December 20.	Processes & Policy	Projects & Planning		Provide for sediment continuity. Management of sediment throughout the river systems is critical for maintaining the ecosystem and flood damage reduction functions of the river corridor. Providing for more natural movement of sediment through a river system will balance areas of erosion and deposit ion and support the dynamic habitat changes that characterize a healthy self sustaining riverine ecosystem. Future projects should be consistent with an integrated flood management design, including sediment inputs, that provides a balanced sediment budget within the channel to benefit geomorphic processes and riparian habitats, maintains the integrity of the design capacity, and reduces maintenance costs.
638	USACE. 2002. *The Comprehensive Plan; Interim Report*. December 20.	Processes & Policy	Projects & Planning		Use an ecosystem approach to restore and sustain the health, productivity, and diversity of the floodplain corridors. The ecosystem approach restores and sustains the health, productivity, and biological diversity of ecosystems by factoring in a fu all range of ecological components in project planning. The ecosystem approach recognizes and seeks to address the problems of habitat fragmentation and the piecemeal restoration and mitigation previously applied in addressing natural resources. Ecosystem restoration uses a systems view in assessing and addressing restoration needs and opportunities and in formulating and evaluating alternatives. Biotic resources are dependent on, and functionally related to, other ecosystem components. Recognition of the interconnectedness and dynamics of natural systems interwoven with human activities in the landscape is integral to this process. The philosophy behind ecosystem restoration promotes consideration of the effects of decisions over the long term and incorporates the ecosystem approach. Future projects will consider the needs of native aquatic, wetland, and terrestrial communities to improve the potential for their long-term survival as self-sustaining, functioning systems.
639	USACE. 2002. *The Comprehensive Plan; Interim Report*. December 20.	Processes & Policy	Projects & Planning		Optimize use of existing facilities. Significant contributions to both flood damage reduction and ecosystem restoration may be attainable through integrated or facility-specific reservoir reoperation, integrated use of public land for multiple purposes, and protection and management of existing high-value habitats within the flood management system. Therefore, the operation and management of existing facilities could be optimized to reasonably maximize system benefits and minimize the need for new facilities. Currently, there is a substantial array of facilities that directly or indirectly contribute to flood management and/or ecosystem health along the Sacramento and San Joaquin rivers. The objectives of the general design, construction, and operation of these facilities are to meet the needs of the immediate impact area or limited resource targets. At the time these facilities were constructed, it was not possible to measure or take into account effects that may have occurred in other areas of the river system. Because of their design and information available at the time of their construction, many existing facilities do not achieve their full potential for providing ecosystem benefits. The system-wide models can be used to evaluate systemwide effects.

Table J-B-1. Recommendations to Improve Flood Management in California

ID	Source	Major Category	Minor Category	Minor Category 2	Opportunities and Challenges/Recommendation
640	USACE. 2002. *The Comprehensive Plan; Interim Report*. December 20.	Processes & Policy	Projects & Planning		Integrate with the CALFED Bay-Delta Program and other programs. Future projects should consider the status and objectives of ongoing flood management and ecosystem restoration programs, including, but not limited to CALFED, to ensure awareness of other planning efforts and prevent unintentional conflicts in designs or duplication of efforts. Projects need to recognize and support the CALFED single blueprint for ecosystem restoration and species recovery in the Bay-Delta and its watershed. To the extent possible, projects should integrate and adopt those CALFED Ecosystem Restoration Program (ERP) goals, objectives, targets and programmatic actions associated with the flood management system of the Sacramento and San Joaquin rivers, and incorporate conservation measures from the CALFED Multi-Species Conservation Strategy (MSCS). In that context, future projects will give priority to those actions that provide benefits for both flood damage reduction and ecosystem restoration. The CALFED science program and CALFED's considerable institutional and administrative framework was established to expand and communicate relevant, unbiased scientific knowledge, monitor performance, implement an adaptive management process, and measure progress. Future projects should build upon the CALFED ERP, rather than develop independent, parallel restoration programs, and implement applicable portions of the CALFED ERP to the extent of potential non-Federal sponsor interest. Additionally, future projects should take into account the floodplain areas and conveyance capacities needed by major regional planning efforts such as the San Joaquin River Management Plan (SJRMP) and the Sacramento River Conservation Area Forum (SRCAF).
641	USACE. 2002. *The Comprehensive Plan; Interim Report*. December 20.	Processes & Policy	Projects & Planning		Promote multi-purpose projects to improve flood management and ecosystem restoration. Proposals for modifying the flood management system for the primary purpose of either flood damage reduction or ecosystem restoration should consider opportunities for benefiting more than a single purpose. Multiple-purpose projects are more effective, considering costs and resource conservation. Projects that include flood damage reduction and ecosystem restoration (as well as other potential purposes) will foster partnering, reduce conflicts, and serve the overall public interest. In accordance with State law, projects with multiple-purposes are eligible for increased State cost-sharing.
642	USACE. 2002. *The Comprehensive Plan; Interim Report*. December 20.	Processes & Policy	Projects & Planning		Protect infrastructure. Future modifications to the flood management system should consider direct and indirect impacts to infrastructure, including, but not limited to transportation (highways, railroads, navigation), communications, utility, and water transport systems. Transportation corridors and facilities are necessary for economic viability, emergency/evacuation response, and public safety. Potential impacts to infrastructure could limit future options and could result in unintended consequences.
643	DWR. 1980. *California Flood Management: An Evaluation of Flood Damage Prevention Programs*. Bulletin 199. September.	Processes & Policy	Projects & Planning		Flood management agencies should strive for more imaginative analyses in devising solutions to these potential disasters. In some instances, additional physical works should be constructed and complemented by programs to deal with the residual flood risk. In other cases, extensive floodplain management programs should provide an appropriate mix of structural and nonstructural measures. These would include flood proofing, flood warning, watershed treatment, and removal of existing development from the floodplains as supplements to existing physical works. The Santa Ana River Basin requires immediate attention. To a lesser degree, other areas in need of attention are: The Sacramento-San Joaquin Delta, the Sacramento River between the Butte County line and Chico Landing, the Colusa Drain, portions of the San Joaquin Valley, and northern Santa Clara County.
644	DWR. 1981. *California Flood Management: An Evaluation of Flood Damage Prevention Programs*. Bulletin 199. September.	Processes & Policy	Projects & Planning		Action should be taken at the national level to ensure strengthening of the National Flood Insurance Program. All flood-prone California communities should enter the program and implement the floodplain regulations called for by the program. The State should continue supplementing the Federal effort. Both FEMA and State agencies should ensure that natural hazard mitigation measures are effectively implemented as a condition for Federal disaster assistance.
645	DWR. 1982. *California Flood Management: An Evaluation of Flood Damage Prevention Programs*. Bulletin 199. September.	Processes & Policy	Projects & Planning		Completion of technical studies of flood risk, as a basis for floodplain regulation and flood insurance, needs to be accelerated by FEMA and supplemental State funding appropriated. All planning, zoning, and public works agencies should implement nonstructural flood management in partially developed areas before future development renders it impractical. Planning for future development must incorporate a positive effort to permit only nondamageable, compatible uses in high flood risk areas. Local government must require consultation with local flood control districts regarding flood hazard identification, avoidance or mitigation as a formal part of the process for subdivision and building approval, and must require local decision makers to make written findings of fact regarding flood hazard and disposition of flood control district recommendations. Local government needs to explore the question of its liability in permitting development in a known flood-prone area. In addition, local governments should develop incentives to encourage compatible uses of the flood plain consistent with the degree of flooding. The Department and FEMA should explore and implement possible actions or sanctions against local governments that allow unsuitable development in floodplains, including noncompliance with Federal flood insurance regulations. FEMA should enforce effective hazard mitigation measures as a condition for Federal disaster assistance. The Department will recommend that all future State appropriations for flood disaster relief have requirements for hazard mitigation. As an example, Senate Bill 366 (Chapter 254, Statutes of 1979) for relief of Los Angeles and Riverside Counties required that adequate land use controls be exercised to assure that new construction or rebuilding of damaged buildings in flood or debris hazard areas be allowed only where adequate protection is to be provided.

Table J-B-1. Recommendations to Improve Flood Management in California

ID	Source	Major Category	Minor Category	Minor Category 2	Opportunities and Challenges/Recommendation
646	DWR. 1983. *California Flood Management: An Evaluation of Flood Damage Prevention Programs.* Bulletin 199. September.	Processes & Policy	Projects & Planning		Nonstructural alternatives, which could include flood proofing, floodplain acquisition, evacuation and relocation or replacement of existing structures or utilities, should be considered on the same basis and receive the same Federal and State financial assistance and encouragement as structural alternatives. The USACE has developed procedures to implement the provisions of Section 73 of the Water Resources Development Act of 1974 (PL 93- 251), which requires consideration of nonstructural alternatives, and should recommend these measures as part of a comprehensive flood plain management project. The California Legislature should consider amending Water Code Sections 12573 and 12583, which provide State financial assistance for non-Federal costs, to include costs for those nonstructural measures required by Section 73.
647	DWR. 1984. *California Flood Management: An Evaluation of Flood Damage Prevention Programs.* Bulletin 199. September.	Financing	Projects & Planning		In order to give priority to the more critical flood problems, the Department will recommend to Congress priorities for studies and projects being considered for Federal authorization or funding.
648	DWR. 1985. *California Flood Management: An Evaluation of Flood Damage Prevention Programs.* Bulletin 199. September.	Processes & Policy	Projects & Planning		All future levee project proposals should include construction of "set back" levees to enable more riparian growth and less intensive maintenance practices. The Department will continue efforts at persuading flood project maintenance agencies to limit vegetative control at rock revetment sites to that growth, which substantially threatens to endanger the integrity of the revetment or carrying capacity of the project. Efforts will continue to employ mowing more often in lieu of burning levee slopes and to time the mowing and burning of levee slopes so as to not disturb nesting birds. There should be continued research to find feasible revegetation programs for rock revetments and levees. The Department will continue to strive for more use of an Integrated Pest Management (IPM) approach to maintenance, utilizing the natural enemies and physical needs to control unwanted pests on levees. In order to avoid rewarding improvident maintenance, all State recommendations for disaster assistance will require a hazard mitigation program that brings a project up to some reasonable standard that is maintained.
649	DWR. 1986. *California Flood Management: An Evaluation of Flood Damage Prevention Programs.* Bulletin 199. September.	Processes & Policy	Projects & Planning		All planning, zoning, and public works agencies need to emphasize protection of wetlands and riparian vegetation as a technique of nonstructural flood management and to enhance water quality. Additional data should be generated, through studies similar to the USACE Pilot Levee Program on Steamboat Slough, to measure the cost effectiveness of various methods of riparian vegetation protection. Using this data, appropriate government agencies should continue their vigorous efforts to enact regulations to protect riparian vegetation and wetlands. This is particularly true in the aftermath of Proposition 13 wherein operation and maintenance funds are greatly reduced.
650	DWR. 1987. *California Flood Management: An Evaluation of Flood Damage Prevention Programs.* Bulletin 199. September.	Processes & Policy	Projects & Planning		Flood-fighting measures should be submitted to a post project analysis of environmental impact, consistency with State policy such as protection of wetland and riparian habitat, and cost effectiveness. Results of these analyses should be used to guide future emergency action and long-term action needed to prevent future damage. Senate Bill 366 (Chapter 254, Statutes of 1979) provided funds for the Department to make analyses of cost effectiveness of emergency funds allocated therein to the Los Angeles County Flood Control District, City of Los Angeles, and Riverside County Flood Control and Water Conservation District. The findings of these analyses will be used as guidelines in declaring future emergencies under the provisions of Section 128 of the Water Code.
651	DWR. 1988. *California Flood Management: An Evaluation of Flood Damage Prevention Programs.* Bulletin 199. September.	Processes & Policy	Projects & Planning		FEMA should accelerate its effort to complete studies in rural areas and institute a program for informing residents of the rare opportunity they have to prevent the flood disasters and unnecessary expenses experienced by some developed areas. Rural administrators and the public could benefit from graphic illustrations of the flood damage suffered by more populated sections of the state that failed to adopt nonstructural flood management practices early in their development.
652	DWR. 1989. *California Flood Management: An Evaluation of Flood Damage Prevention Programs.* Bulletin 199. September.	Processes & Policy	Projects & Planning		All levels of government should encourage an active and effective role by the public early in the flood management planning process. They should recognize that public involvement is required in the local approval. Environmental Impact Report (EIR) and right-of-way acquisition processes, and can produce more acceptable projects, as well as avoid delays, litigation, and rejection by decision-making bodies. Public involvement is basically a process that combines the needs and wishes of various publics with the professional expertise of an agency to produce a result that will maximize the efforts of both.* * "Public Participation," Proceedings of Flood Management Conference. Sacramento, California, October 24, 25, 1978, p. 82; other papers in this volume would be useful to flood management agencies.
653	DWR. 1990. *California Flood Management: An Evaluation of Flood Damage Prevention Programs.* Bulletin 199. September.	Processes & Policy	Projects & Planning		The State Reclamation Board and other regulatory agencies should examine their rules and regulations for allowing prudent uses in flood plains with the objective of preventing rising agricultural flood damage. Long-term capital-intensive crops such 8S orchards should be regulated so as to be excluded from areas where they will suffer frequent serious damage.

Table J-B-1. Recommendations to Improve Flood Management in California

ID	Source	Major Category	Minor Category	Minor Category 2	Opportunities and Challenges/Recommendation
654	Independent Review Panel. 2007. *A California Challenge—Flooding in the Central Valley.* Prepared for DWR. October 15.	Processes & Policy	Projects & Planning		Manage the floodplain by focusing new development outside the floodplain or in low-risk locations within protected areas of the floodplain, supporting the use of undeveloped and unprotected land for agriculture and other low-intensity land uses. Floodplain management should be accompanied by requirements for local governments to adopt and enforce needed land use controls, financial and technical support to enable them to do so, and appropriate penalties if local governments fail to manage development to reduce flood risk. The State should continue to support the Federal Emergency Management Agency's levee policy and assist them in accelerating completion and adoption of updated flood maps. This would ensure that any new development in areas behind inadequate levees takes place under the land-use provisions mandated by the National Flood Insurance Program, as a minimum.
655	Independent Review Panel. 2007. *A California Challenge—Flooding in the Central Valley.* Prepared for DWR. October 15.	Processes & Policy	Projects & Planning		Site, where feasible, new levees or major rehabilitation of levees at a distance from the river and from existing levees. This would provide a degree of redundancy in the system, increase the land available for habitat and flood storage, reduce operation and maintenance costs, and help to ensure the integrity of the structures. Levees built this decade will be in place for decades to come, and now is the time to begin building structures that will last. Where re-siting is not feasible, the existing flood system should be modified to mitigate the impacts of floods that exceed the design level of the system.
656	Independent Review Panel. 2007. *A California Challenge—Flooding in the Central Valley.* Prepared for DWR. October 15.	Processes & Policy	Projects & Planning		Mitigate potential financial losses to those behind levees and to those in the non-levied 500-year floodplain shown on Federal Emergency Management Agency flood maps through institution of mandatory purchase of flood insurance, or thought inclusion of flood insurance in homeowners' policies of those within these areas.
657	Independent Review Panel. 2007. *A California Challenge—Flooding in the Central Valley.* Prepared for DWR. October 15.	Processes & Policy	Projects & Planning		Share the liability for flood damages among State and local governments. This would ensure that any local governments making land-use decisions that could increase potential flood damages share not only the benefits of that development, but also any liability incurred from potential flood consequences should those decisions prove to have been unwise.
658	Independent Review Panel. 2007. *A California Challenge—Flooding in the Central Valley.* Prepared for DWR. October 15.	Processes & Policy	Knowledge/Awareness		Communicate to the public and each property owner in the floodplain the specific risks of occupying areas at risk of flooding, and provide steps property owners can take to reduce their exposure to flood damages.
659	Independent Review Panel. 2007. *A California Challenge—Flooding in the Central Valley.* Prepared for DWR. October 15.	Processes & Policy	Knowledge/Awareness		Work together with the development, environmental, and business communities, and with citizens. Outreach and coordination with these groups is vital to the success of any floodplain management program for the Central Valley.
660	Independent Review Panel. 2007. *A California Challenge—Flooding in the Central Valley.* Prepared for DWR. October 15.	Processes & Policy	Projects & Planning		Supplement the structural protection provided with floodproofing, elevation of homes and businesses, land-use regulations, and other nonstructural approaches to reduce the residual risk that will continue to exist. Support this with emergency response systems including the development of post-disaster sheltering and redevelopment plans and the exercising of floodplain evacuation plans on a regular basis.
661	Independent Review Panel. 2007. *A California Challenge—Flooding in the Central Valley.* Prepared for DWR. October 15.	Processes & Policy	Projects & Planning		Dealing with the flooding in the Central Valley will require a close examination of existing governmental institutions and how they work together. The lessons learned from the New Orleans disaster point out the disconnects that develop when too many agencies are involved in the decision-making process and no one agency has overall direction. Large flood events exploit those disconnects. California must address this difficult issue, especially in terms of the large number of overlapping roles, responsibilities, and accountabilities of reclamation districts, and State and local governments. Without reforming the institutions that manage flood protection, large investments in infrastructure are likely to be wasted.
662	USACE. 2006. *Draft Final Report of the Interagency Performance Evaluation Task Force Performance Evaluation of the New Orleans and Southeast Louisiana Hurricane Protection System.* June 1.	Processes & Policy	Projects & Planning		Planning and design methods need to be system-based, allowing an in-depth analysis of how a combination of structures and floodplain management measures will perform together. These methods need to be able to consider the performance of the system beyond the design criteria, including the life cycle value of resilience and redundancy in the design. Dynamic factors such as subsidence and changing hazard levels must be included. Flood protection structures need to be designed as a part of a complete system-based approach to protection, providing balanced and uniform levels of protection from the perspectives of time, level of hazard, and reliability. Resilience should be factored into all designs to prevent catastrophic failures. The maintenance condition of levees is an important factor in their overall performance and should be monitored.
663	USACE. 2006. *Draft Final Report of the Interagency Performance Evaluation Task Force Performance Evaluation of the New Orleans and Southeast Louisiana Hurricane Protection System.* June 1.	Processes & Policy	Knowledge/Awareness		Knowledge of hydrologic and hydraulic factors and the flood flows and heights that result has increased dramatically over the last decades. Data developed more than 10 years ago generally provides an inadequate description for today or for the future. Defining the hazard of the future requires a significantly more sophisticated approach than traditional practice. Peak values alone (water levels generated by storms or flood events) do not characterize risk; full hydrographs are needed to assess both structural performance and potential flooding.

Table J-B-1. Recommendations to Improve Flood Management in California

ID	Source	Major Category	Minor Category	Minor Category 2	Opportunities and Challenges/Recommendation
664	USACE. 2006. *Draft Final Report of the Interagency Performance Evaluation Task Force Performance Evaluation of the New Orleans and Southeast Louisiana Hurricane Protection System*. June 1.	Processes & Policy	Projects & Planning		Risk assessment provides a new and more comprehensive method to understand the inherent vulnerability for areas protected by complex protection systems and subjected to uncertain natural hazards. It provides a direct view into the sources of vulnerability, providing a valuable tool for public officials at all levels to focus resources and attention on the most serious problems and to seek solutions that reduce risk through both strengthening the reliability of the physical structures and reducing exposure of people and property to losses. Mapping the economic and human health and safety consequences of flooding has created a powerful information base from which risk assessments and future planning priorities can be informed. As seen in New Orleans, damages and loss of life are directly tied to depth of flooding, which in turn was inversely tied to the elevation of the location or sub-basin.
665	USACE. 2006. *Draft Final Report of the Interagency Performance Evaluation Task Force Performance Evaluation of the New Orleans and Southeast Louisiana Hurricane Protection System*. June 1.	Processes & Policy	Projects & Planning		During Katrina, infrastructure and business damages were much larger than what had been estimated previously. The linkages necessary for a healthy business community were destroyed. Even at the residential level, damages as they relate to the cost of repairing and/or replacing houses were much greater when large segments of the population suffered and the damages, where the business and community infrastructure were also destroyed. It should be noted that the economic analysis as currently practiced does not account for these effects.
666	Independent Review Panel. 2007. *A California Challenge—Flooding in the Central Valley*. Prepared for DWR. October 15.	Processes & Policy	Projects & Planning		Provide the highest level of risk reduction feasible to existing urban areas where thousands of people are at unacceptably high risk. The Panel believes that this level of protection should be equivalent to protection against the Standard Project Flood, which represents a flood that can be expected from the most severe combination of meteorological and hydrologic conditions that are considered reasonably characteristic of the region. Providing this level of protection does not, by itself, prevent the failure of the system or of individual levees; nor does it guarantee that the Standard Project Flood cannot be exceeded in rare circumstances. One hundred year protection is not an acceptable level of protection for urban areas.
667	Independent Review Panel. 2007. *A California Challenge—Flooding in the Central Valley*. Prepared for DWR. October 15.	Processes & Policy	Projects & Planning		Develop an implementation plan for providing this reasonably high level of protection for all urban areas. The needed level of flood protection should be phased in with at least a 200-year level of flood protection to be achieved by 2020, and Standard Project Flood protection by 2030. Priority should be given to urban areas in deep floodplains.
668	Independent Review Panel. 2007. *A California Challenge—Flooding in the Central Valley*. Prepared for DWR. October 15.	Processes & Policy	Projects & Planning		In less populated areas, provide for protection against less severe floods (e.g., less than 200-year protection) as economically and environmentally justified, and maintain that lower level of protection into the future.
669	Independent Review Panel. 2007. *A California Challenge—Flooding in the Central Valley*. Prepared for DWR. October 15.	Processes & Policy	Projects & Planning		Ensure that any flood protection provided is sustainable fiscally and physically over time.
670	Independent Review Panel. 2007. *A California Challenge—Flooding in the Central Valley*. Prepared for DWR. October 15.	Processes & Policy	Projects & Planning		Manage the floodplain by focusing new development outside the floodplain or in low-risk locations within protected areas of the floodplain, supporting the use of undeveloped and unprotected land for agriculture and other low-intensity land uses. Floodplain management should be accompanied by requirements for local governments to adopt and enforce needed land use controls, financial and technical support to enable them to do so, and appropriate penalties if local governments fail to manage development to reduce flood risk. The State should continue to support the Federal Emergency Management Agency's levee policy and assist them in accelerating completion and adoption of updated flood maps. This would ensure that any new development in areas behind inadequate levees takes place under the land-use provisions mandated by the National Flood Insurance Program, as a minimum.
671	Independent Review Panel. 2007. *A California Challenge—Flooding in the Central Valley*. Prepared for DWR. October 15.	Processes & Policy	Projects & Planning	Flood Infrastructure Maintenance	Site, where feasible, new levees or major rehabilitation of levees at a distance from the river and from existing levees. This would provide a degree of redundancy in the system, increase the land available for habitat and flood storage, reduce operation and maintenance costs, and help to ensure the integrity of the structures. Levees built this decade will be in place for decades to come, and now is the time to begin building structures that will last. Where re-siting is not feasible, the existing flood system should be modified to mitigate the impacts of floods that exceed the design level of the system.
672	Independent Review Panel. 2007. *A California Challenge—Flooding in the Central Valley*. Prepared for DWR. October 15.	Processes & Policy	Projects & Planning		Mitigate potential financial losses to those behind levees and to those in the non-levied 500-year floodplain shown on Federal Emergency Management Agency flood maps through institution of mandatory purchase of flood insurance, or through inclusion of flood insurance in homeowners' policies of those within these areas. Insurance should be mandatory behind all levees.
673	Independent Review Panel. 2007. *A California Challenge—Flooding in the Central Valley*. Prepared for DWR. October 15.	Processes & Policy	Projects & Planning		Share the liability for flood damages among State and local governments. This would ensure that any local governments making land-use decisions that could increase potential flood damages share not only the benefits of that development, but also any liability incurred from potential flood consequences should those decisions prove to have been unwise.

Table J-B-1. Recommendations to Improve Flood Management in California

ID	Source	Major Category	Minor Category	Minor Category 2	Opportunities and Challenges/Recommendation
674	Independent Review Panel. 2007. *A California Challenge—Flooding in the Central Valley.* Prepared for DWR. October 15.	Processes & Policy	Knowledge/Awareness		Communicate to the public and each property owner in the floodplain the specific risks of occupying areas at risk of flooding, and provide steps property owners can take to reduce their exposure to flood damages.
675	Independent Review Panel. 2007. *A California Challenge—Flooding in the Central Valley.* Prepared for DWR. October 15.	Processes & Policy	Knowledge/Awareness		Work together with the development, environmental, and business communities, and with citizens. Outreach and coordination with these groups is vital to the success of any floodplain management program. Consider formation of a Task Force of local elected officials, developers, and environmental stakeholders to work with the State to develop an acceptable approach to implement these recommendations over the most expedient timeframe possible.
676	Independent Review Panel. 2007. *A California Challenge—Flooding in the Central Valley.* Prepared for DWR. October 15.	Processes & Policy	Projects & Planning		Supplement the structural protection provided with floodproofing, elevation of homes and businesses, land-use regulations, and other nonstructural approaches to reduce the residual risk that will continue to exist. Support this with emergency response systems, including the development of post-disaster sheltering and redevelopment plans and the exercising of floodplain evacuation plans on a regular basis. Coupled with mandatory insurance and emergency preparedness, floodplain development and land-use standards beyond the minimum standards of the National Flood Insurance Program are necessary. Programs could be based on the development status of the region (developed versus undeveloped), or be based on new floodplain characterizations ("zones") that take the results of levee stability assessments into account and would go beyond those of the Federal Emergency Management Agency's mapping program. Special attention should be paid to areas that are subject to particularly catastrophic sudden life-threatening flooding (i.e., very deep floodplains, levee breaks, and reasonably likely unregulated flows from dams).
677	Interagency Floodplain Management Review Committee. 1994. *A Blueprint for Change—Sharing the Challenge: Floodplain Management into the 21st Century.* June.	Processes & Policy	Projects & Planning		To ensure that the floodplain management effort is organized for success, the President should: 1) Propose enactment of a Floodplain Management Act that establishes a national model for floodplain management, clearly delineates local, tribal, State, and Federal responsibilities, provides fiscal support for State and local floodplain management activities, and recognizes states as the nation's principal floodplain managers; 2) Issue a revised Executive Order clearly defining the responsibility of Federal agencies to exercise sound judgment in floodplain activities; and 3) Activate the Water Resources Council to coordinate Federal and Federal-State-tribal activities in water resources; as appropriate, reestablish basin commissions to provide a forum for Federal-State-tribal coordination on regional issues.
678	Interagency Floodplain Management Review Committee. 1994. *A Blueprint for Change—Sharing the Challenge: Floodplain Management into the 21st Century.* June.	Processes & Policy	Projects & Planning		To focus attention on comprehensive evaluation of all Federal water project and program effects, the President should immediately establish environmental quality and national economic development as co-equal objectives of planning conducted under the Principles and Guidelines. Principles and Guidelines should be revised to accommodate the new objectives and to ensure full consideration of nonstructural alternatives.
679	Interagency Floodplain Management Review Committee. 1994. *A Blueprint for Change—Sharing the Challenge: Floodplain Management into the 21st Century.* June.	Processes & Policy	Projects & Planning		To enhance coordination of project development, to address multiple-objective planning, and to increase customer service, the Administration should support collaborative efforts among Federal agencies and across State, tribal, and local governments.
680	Interagency Floodplain Management Review Committee. 1994. *A Blueprint for Change—Sharing the Challenge: Floodplain Management into the 21st Century.* June.	Financing	Projects & Planning		To ensure continuing State, tribal and local interest in floodplain management success, the Administration should provide for local, tribal, State, and/or Federal cost-sharing in predisaster, recovery, response, and mitigation activities.
681	Interagency Floodplain Management Review Committee. 1994. *A Blueprint for Change—Sharing the Challenge: Floodplain Management into the 21st Century.* June.	Processes & Policy	Projects & Planning		To provide for coordination of the multiple Federal programs dealing with watershed management, the Administration should establish an Interagency Task Force to develop a coordination strategy to guide these actions. 1) Seek legislative authority to increase post-disaster flexibility in the execution of the land acquisition programs; 2) Increase environmental attention in Federal operation and maintenance and disaster recovery activities; 3) Better coordinate the environmentally related land interest acquisition activities of the Federal government; and 4) Fund, through existing authorities, programmatic acquisition of needed lands from willing sellers.

Table J-B-1. Recommendations to Improve Flood Management in California

ID	Source	Major Category	Minor Category	Minor Category 2	Opportunities and Challenges/Recommendation
682	Interagency Floodplain Management Review Committee. 1994. *A Blueprint for Change—Sharing the Challenge: Floodplain Management into the 21st Century*. June.	Processes & Policy	Projects & Planning		To enhance the efficiency and effectiveness of the National Flood Insurance Program, the Administration should: 1) Take vigorous steps to improve the marketing of flood insurance, enforce lender compliance rules, and seek State support of insurance marketing; 2) Reduce the amount of post-disaster support to those who were eligible to buy insurance but did not to that level needed to provide for immediate health, safety, and welfare; provide a safety net for low-income flood victims who were unable to afford flood insurance; 3) Reduce repetitive loss outlays by adding a surcharge to flood insurance policies following each claim under a policy, providing for mitigation insurance riders, and supporting other mitigation activities; 4) Require those who are behind levees that provide protection against less than the standard project flood discharge to purchase actuarially based insurance; 5) Increase the waiting period for activation of flood insurance policies from 5 to 15 days to avoid purchases when flooding is imminent; 6) Leverage technology to improve the timeliness, coverage, and accuracy of flood insurance maps; support map development by levies on the policy base and from appropriated funds because the general taxpayer benefits from this program; and 7) Provide for the purchase of mitigation insurance to cover the cost of elevating, demolishing, or relocating substantially damaged buildings.
683	Interagency Floodplain Management Review Committee. 1994. *A Blueprint for Change—Sharing the Challenge: Floodplain Management into the 21st Century*. June..	Processes & Policy	Projects & Planning		To reduce the vulnerability to flood damages of those in the floodplain, the Administration should: 1) Give full consideration to all possible alternatives for vulnerability reduction, including permanent evacuation of flood-prone areas, flood warning, floodproofing of structures remaining in the floodplain, creation of additional natural and artificial storage, and adequately sized and maintained levees and other structures; 2) Adopt flood damage reduction guidelines based on a revised Principles and Guidelines, which would give full weight to social, economic, and environmental values and would assure that all vulnerability reduction alternatives are given equal consideration; and 3) Where appropriate, reduce the vulnerability of population centers and critical infrastructure to the standard project flood discharge through use of floodplain management activities and programs.
684	Interagency Floodplain Management Review Committee. 1994. *A Blueprint for Change—Sharing the Challenge: Floodplain Management into the 21st Century*. June.	Processes & Policy	Projects & Planning		To ensure that existing Federally constructed water resources projects continue to meet their intended purposes and are reflective of current national social and environmental goals, the Administration should require periodic review of completed projects.
685	Interagency Floodplain Management Review Committee. 1994. *A Blueprint for Change—Sharing the Challenge: Floodplain Management into the 21st Century*. June..	Processes & Policy	Projects & Planning	Flood Response	To capitalize on the successes in local, tribal, State, and Federal predisaster, response, recovery, and mitigation efforts during and following the 1993 flood and to streamline future efforts, the Administration should: 1) Through the NFIP Community Rating System encourage states and communities to develop and implement floodplain management and hazard mitigation plans; 2) Provide funding for programmatic buyouts of structures at risk in the floodplain; 3) Provide States the option of receiving Section 404 Hazard Mitigation Grants as block grants; 4) Assign the Director of the Federal Emergency Management Agency responsibility for integrating Federal disaster response and recovery operations; and 5) Encourage Federal agencies to use non-disaster funding to support hazard mitigation activities on a routine basis.
686	Flood Expert	None	None		None
687	Flood Expert	Processes & Policy	Flood Response		Land use restriction on the dairy, cattle/confined animals industry requiring plan for relocation of animals and milking facilities for dairy industry for facilities located in the floodplain. This is a health and safety issue regarding the disposal of the animal carcasses.
688	Flood Expert	Financing	Flood Infrastructure Maintenance		Provide adequate and sustainable funding for operation, maintenance, repair, rehabilitation, and replacement (OMRR&R) of EXISTING facilities. Only with this funding can we be sure that we won't experience further degradation of performance of existing system features, and a corresponding INCREASE of flood risk.
689	Flood Expert	Financing	Knowledge/Awareness	Flood Response	Enhance systems for—then ensure adequate and sustainable funding for—managing RESIDUAL risk through emergency response (regardless of other actions taken or measures implemented). This will include, for example, expanding the weather and water data collection and sharing system in California enhancing flood forecasting in cooperation with the National Weather Service, improving real-time communication about flooding, developing and updating flood emergency response systems, and so on. With a more effective flood response system, exposure of people and property can be reduced, and vulnerability can be altered.
690	Flood Expert	Processes & Policy	Flood Infrastructure Maintenance		Ensure/maintain capacity of existing channels, removing debris, sediment, etc. to the extent possible. Loss of capacity is a critical problem throughout the State—one for which engineering solutions are well known but for which funds are not consistently available.
691	Flood Expert	Processes & Policy	Knowledge/Awareness	Projects & Planning	Take action to ensure that ratings (stage-flow relationships) are current at key locations, particularly if those locations are critical control points for reservoir operation decision making or for issuing flood warnings.
692	Flood Expert	Processes & Policy	Knowledge/Awareness	Projects & Planning	Revisit, revise, and update reservoir water control manuals, considering opportunities for better use of real-time data, forecasts, and so on. (Note: I am not suggesting "system re-operation" that has been suggested by some, as I doubt whether significant benefits are achievable from this.)
693	Flood Expert	Processes & Policy	Projects & Planning		Continue to promote wise building practices, wise land use (consistent with Urban Level of Protection criteria), thus minimizing FUTURE risk.
694	Flood Expert	Financing	Projects & Planning		Provide locals with funding for studies, designs, and construction through grant programs. The programs should be structured to have a reasonable standard for benefits, but should rely on local agencies for planning, design, right-of-way acquisition, OMRR&R.

Table J-B-1. Recommendations to Improve Flood Management in California

ID	Source	Major Category	Minor Category	Minor Category 2	Opportunities and Challenges/Recommendation
695	Flood Expert	Processes & Policy	Flood Response		Design/deploy/maintain a levee integrity warning system, with sensors that detect changes in levees that indicate impending failure. Couple that with the enhance emergency response systems from item #2 to decrease exposure and flood risk.
696	Flood Expert	Processes & Policy	Projects & Planning		Act to expedite permitting for flood risk management measures. This includes State permitting by the Central Valley Flood Protection Board and Federal permitting as might be required under Section 408.
697	Flood Expert	Financing	Projects & Planning		Work to reduce cost of the Endangered Species Act and other environmental compliance for construction and maintenance.
698	Flood Expert	Financing	Projects & Planning		Identify new funding sources to fill gap by inability of Federal Government to provide adequate funding to progress studies and construction.
699	Flood Expert	Processes & Policy	Projects & Planning		USACE vegetation policy.
700	Flood Expert	Financing	Projects & Planning		USACE policies on crediting non-Federal advance work.
701	Flood Expert	None	None		Look at CVFPP.
702	Flood Expert	Processes & Policy	Projects & Planning		Recast flood risk as just one side of a two-sided coin, the other being flood benefits. Get more specific information on benefits and include it prominently in the report.
703	Flood Expert	Processes & Policy	Projects & Planning		Place more emphasis on the many but lesser problems statewide, such as in communities that suffer frequent shallow flooding. By definition, "frequent" implies less than 100-year protection.
704	Flood Expert	Financing	Projects & Planning		Tie monetary loss to flood events (CalEMA has information on this) and adjust all events to a dollar value for a common date. There is a "California Consumer Cost Index" that might be used. This is one common flood yardstick, and can be important to the reader involved with legislation.
705	Flood Expert	Processes & Policy	Flood Response		Emphasize strongly the need for one-on-one emergency response agreements between LMAs and DWR, to define responsibility for supply and finance of emergency materials and personnel. This need has not had a workout since 1997, but when the next big one comes, it will be obvious.
706	Flood Expert	Processes & Policy	Projects & Planning		Solidify the list of local contacts made via the recent interview process. Make an e-mail list so these agencies and persons can be consulted again for updates.
707	Flood Expert	Processes & Policy	Projects & Planning		Obtain and include as much information as possible on private flood control projects (such as the levees on Deer Creek at Sloughhouse).
708	Flood Expert	Processes & Policy	Projects & Planning		Determine the involvement of tribal organizations in flood management, and incorporate the information.
709	Flood Expert	Processes & Policy	Projects & Planning		Obtain more complete information on floodway regulation and floodway designation.
710	Flood Expert	Processes & Policy	Projects & Planning	Flood Infrastructure Maintenance	Include more specific information on reservoir operation and downstream flow controls.
711	Flood Expert	Processes & Policy	Projects & Planning	Flood Infrastructure Maintenance	Describe the flood-related duties of county flood control districts, reclamation districts, and other flood management participants.
712	Flood Expert	Processes & Policy	Projects & Planning		As areas are throughout the state are identified that have "flood risk," they need to be more actively considered as systems rather than unique individual projects that, when completed, may generate adverse impact to adjacent and downstream areas. To that end it requires significant coordination and planning on behalf of the owners/sponsors of the projects to work together in an attempt to optimize the project(s). The USACE has a new direction focusing on "system analysis."
713	Flood Expert	Processes & Policy	Projects & Planning		Prioritization based on a common assessment approach is essential to gain "corporate "support for completing the right projects first. Developing an accepted tool that is considered fair and impartial is essential to validating the answers to garner the required support at all levels.
714	Flood Expert	Processes & Policy	Flood Response	Flood Infrastructure Maintenance	The reoperation of existing facilities based on forecast based information is an opportunity that needs to be pursued more actively and diligently. Focus must be placed on the benefits to the public with the environmental concerns addressed but as a secondary consideration to deal with the significant financial challenges resulting from compliance and mitigation.
715	Flood Expert	Financing	Projects & Planning		The involvement of the USACE now is essential to the future for Federal investments, not as a guarantee but as a vehicle to reduce disconnects later in the project authorization and execution phases.
716	Flood Expert	Processes & Policy	Projects & Planning		The report should provide a position related to "inducement of development" so it is clear what is being recommended to local entities regarding growth in high-risk areas regardless of the eventual improvements to reduce risk.
717	Flood Expert	Processes & Policy	Knowledge/Awareness		Leverage FEMA efforts in mapping the regional flood hazard information a. The ongoing work provides some initial information, and FEMA's effort is also ongoing. It is reasonable to leverage the efforts for efficiency since the State or FEMA is not to establish the definite information for local, or complete information for local. b. This would need a more practical and implementable schedule and project description.

Table J-B-1. Recommendations to Improve Flood Management in California

ID	Source	Major Category	Minor Category	Minor Category 2	Opportunities and Challenges/Recommendation
718	Flood Expert	Processes & Policy	Projects & Planning	Knowledge/Awareness	Develop an implementable path forward for Federal-local partnership a. Most of the flood management facilities outside the Central Valley are local or Federal-local. Therefore, it is important to define a proper State's role in this matter. b. A watershed approach is necessary for future USACE planning and project authorization. This is more consistent with FEMA approach in delineating the flood risk (stated above). Also, it is more consistent with the new Federal Principles and Requirements, plus Guidelines. c. The important piece of the matter is to establish a strong local preferred alternative, and an implementable means (financially and organizationally) to get there.
719	Flood Expert	Processes & Policy	Projects & Planning	Knowledge/Awareness	Build in requirements for integrated flood management in any future State fund support or assistance. In particular, IRWM Planning. Couple things may be required: a. Realign the IRWM Plan boundary and partners, with incentives of course, if the large-scale IWM perspectives are included. For example, having Folsom Dam operations and 215 water use as part of the approach. The groundwater recharge benefits could offset dry-year diversions and leave water in the river. This scale of work is very similar to what has been incorporated in the Sacramento Area Water Forum. b. If the IWM concept remains smaller in scale, the specifications of using floodplain and water retention facilities should be re-evaluated for their multiple purposes. State should not be involved in the local drainage business and thus, it would be more for being a funding partner or social benefit partner. This would be more similar to what Metropolitan Water District (MWD) and other Los Angeles agencies are doing for the Los Angeles River.
720	Flood Expert	Processes & Policy	Knowledge/Awareness		Consolidation of regional flood management responsibilities and organizational structure a. In CVFPP, this is envisioned to be done through incentive programs. However, it is possible through legislation as well, similar to what Louisiana did. The recommendation could include both or variation of the both.
721	Flood Expert	Processes & Policy	Projects & Planning		Amend Prop 13 or other law to allow assessments to be tied to the properties that are tied to the areas protected by any sort of flood management facilities. a. This is a very strong element for public education process. b. The previous arguments for Prop 13 do not really apply here (in my mind). These properties and their associated values tie directly to flood management. These assessments should be the steady revenue for needed maintenance and improvements.
722	Flood Expert	Processes & Policy	Projects & Planning		Create Flood Risk Management (FRM) Regional Working Groups that look at FRM projects from a watershed or systems approach and incorporate IWM practices; make it mandatory for DWR, CalEMA, California resource agencies, and other pertinent California agencies to attend monthly meetings and produce quarterly reports of their actions and findings; borders for the regional FRM working groups should be based on USGS HUC boundaries; provide specific funds for the meetings and incentives for participation of local FRM agencies and other key stakeholders; companion legislation at the Federal level to require USACE, Bureau of Reclamation, USFWS, National Marine Fisheries Service (NMFS), and other Federal agencies to attend the working groups.
723	Flood Expert	Processes & Policy	Projects & Planning		Replace FEMA's current 1% annual chance flood event (100-year) insurance criteria with a sliding scale system from 2% annual chance (50-year) to 0.2% annual chance (500-year) to better align Federal programs (FEMA & USACE) and make communities and individuals more conscious of their flood risks.
724	Flood Expert	Processes & Policy	Projects & Planning		Conduct gap analyses for areas with high potential for flood risk as a first step towards full risk assessments for the areas.
725	Flood Expert	Financing	Projects & Planning		For areas currently known to be at high risk from floods with sub-standard infrastructure, require a special sales tax of no more than 1% until sufficient funds are generated to build or rehabilitate the infrastructure to acceptable standards; ensure the sales tax is revoked upon completion of the infrastructure and that adequate funding sources have been identified for sustainable maintenance of the infrastructure.
726	Flood Expert	Processes & Policy	Projects & Planning		Require all new developments located within the 0.5% annual chance floodplain to be elevated such that the first floor elevation is at a minimum 30 centimeters above the 0.5% annual chance flood elevation (requires changes to State and local building codes).
727	Flood Expert	Processes & Policy	Projects & Planning		Recommend that SFMP be an ongoing program. This may include legislative changes and funding for effort.

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Appendix C: Glossary

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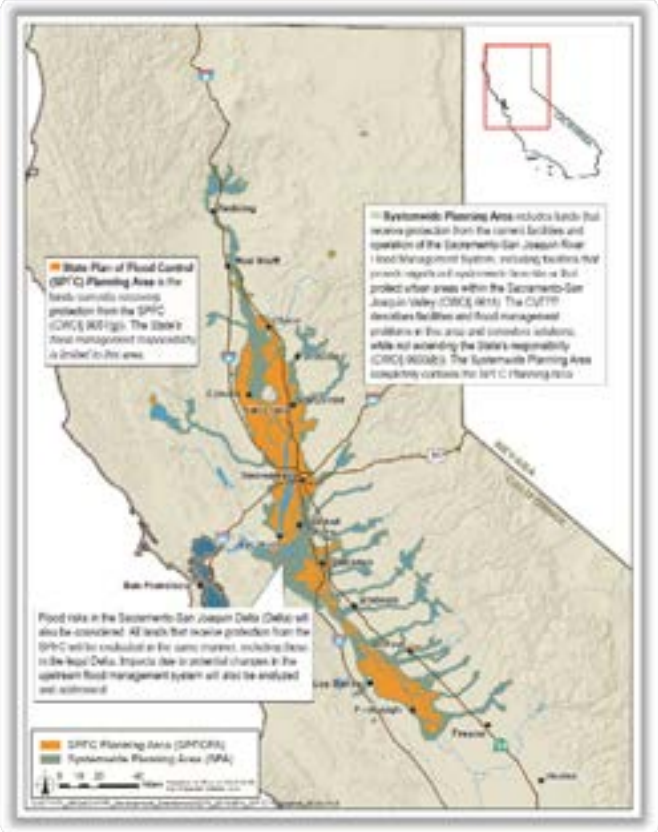
Appendix C: Glossary

2-year event	50 percent chance of exceedance in a given year
20-year event	5 percent chance of exceedance in a given year
50-year event	2 percent chance of exceedance in a given year
100-year event	(also known as a base flood) 1 percent chance of exceedance in a given year
200-year event	0.5 percent chance of exceedance in a given year
500-year event	0.2 percent chance of exceedance in a given year
A-Zone	The A-zone is an area of special flood hazard without water surface elevations determined. Flood insurance is mandatory in areas with a 1 percent annual chance of flooding.
Actions	Informed by tools and guided by plans, actions include activities that fund, manage, and oversee implementation of the projects. Actions also include fostering innovation and developing agency alignment to improve flood management policies, planning, governance, and investments. Actions based on IWM principles and thorough planning efforts will provide the most benefit to Californians.
Alluvial Fan Flooding	Flows of shallow depth and high velocity, with sediment transport, along uncertain flow paths on the surface and at the toe of alluvial fans. Typically caused by localized rainstorms, often with snowmelt.
Atmospheric River	A weather pattern that forms a narrow corridor of concentrated moisture in the atmosphere that drops torrential rains as it passes over land.
Base Flood Elevation	The elevation of surface water resulting from a flood that has a 1 percent chance of equaling or exceeding that level in any given year. The base flood elevation is shown on Flood Insurance Rate Maps for zones AE, AH, A1-A30, AR, AR/A, AR/AE, AR/A1–A30, AR/AH, AR/AO, V1–V30, and VE.
Benefit-to-Cost (B/C) Analysis	The B/C analysis is a formalized procedure for estimating the benefits that a project is expected to generate and the costs necessary to produce the project, and then comparing project alternatives. When planning for flood protection, there will be construction and implementation costs, as well as flood risk reduction benefits.
California Data Exchange Center (CDEC)	The CDEC provides a centralized location to store and process real-time hydrologic information gathered from different contributors statewide.
California Water Plan (CWP)	The CWP provides a collaborative planning framework for elected officials, agencies, tribes, water and resource managers, businesses, academia, stakeholders, and the public to develop findings and recommendations and make informed decisions for California's water future. The plan, updated every 5 years, presents the status and trends of California's water-dependent natural resources; water supplies; and agricultural, urban, and environmental water demands for a range of plausible future scenarios. The CWP also evaluates different combinations of regional and statewide resource management strategies to reduce water demand, increase water supply, reduce flood risk, improve water quality, and enhance environmental and resource stewardship.

Capacity Exceedance	Capacity exceedance implies exceedance of the capacity of a water conveyance, storage facility, or damage-reduction measure. This includes levee or reservoir capacity exceeded before overtopping, channel capacity exceedance, or rise of water above the level of raised structures.
Central Valley Flood Management Planning (CVFMP) Program	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.
Central Valley Flood Protection Plan (CVFPP)	The CVFPP is a State plan that will describe the challenges, opportunities, and a vision for improving flood management in the context of Integrated Water Management in the Central Valley. The CVFPP will document the current and future risks associated with flooding and recommend improvements to the Federal-State flood protection system to reduce the occurrence of major flooding and the consequence of flood damage that could result. The plan was submitted to the Central Valley Flood Protection Board in January 2012 for adoption by July and will be updated every 5 years. The planning area for the CVFPP is shown below.



Central Valley Flood Protection Plan (CVFPP) Floodplain	The floodplains used for the SFMP risk characterization within portions the Central Valley are the CVFPP No Action depth grid floodplains with the addition of the flood bypasses. SFMP received the draft CVFPP floodplains on October 4, 2011. The CVFPP floodplains were based on the floodplains of the *Sacramento and San Joaquin River Basins Comprehensive Study* (USACE, 2002) and modified by the CVFPP to reflect current hydrologic, hydraulic, and geotechnical information. For the SFMP analysis, the Yolo, East Side, Upper Sacramento, Mariposa, Sutter, and Tisdale bypasses were added to the CVFPP floodplains.
Coastal Flooding	Inundation at locations normally above the level of high tide. Often caused by storm surges occurring with high tides. Impacts include property damage and beach erosion.
Community	A political entity that has the authority to adopt and enforce floodplain ordinances for the area under its jurisdiction.
Consequences	Consequences are the quantitative measures of loss, such as direct tangible monetary loss or number of lives lost, when water inundates the people and property exposed.
Critical Facilities	Essential, high potential loss, lifeline, and transportation facilities, as defined by HAZUS-point shapefiles
Debris Flow Flooding	Flows made up of water, liquefied mud, and debris. Can form and accelerate quickly, reach high velocities, and travel great distances. Commonly caused by heavy localized rainfall on hillsides denuded of vegetation.
Economic Risk	Economic risk is the likelihood of flood damage to an identified area under a given climate and land use condition.
Engineered Structure Failure Flooding	Flooding as a result of dam failure or levee failure presents the potential of catastrophic impact, depending on amount of water impounded and location of populated areas downstream.
Essential Facilities	Care facilities, emergency centers, fire stations, police stations, and schools, as defined by HAZUS-point shapefiles.
Expected Annual Damage (EAD)	EAD is the value that measures the severity of flood loss in any given year. EAD does not mean that this amount of damage will occur in any particular year, but rather that over a long period, the average damages will tend to approach that amount.
Exposure	Exposure is a description of who or what is in harm's way.
Fetch	The distance along open water or land over which the wind blows, or the distance waves can traverse unobstructed.
Flash Flooding	Quickly forming floods with high-velocity flows. Often caused by stationary or slow-moving storms. Typically occurs on steep slopes and impermeable surfaces, and in areas adjacent to local streams and creeks.

Flood Emergency Response Information System (FERIS)	FERIS is a geospatial information system that allows for integration of existing California Data Exchange Center (CDEC) systems with real-time data collection and data exchange.
Flood Hazard	The Federal Emergency Management Agency defines a flood hazard as any flood event or condition with the potential to cause fatalities, injuries, property damage, infrastructure damage, agricultural loss, environmental damage, business interruption, or other loss.
Flood Insurance Rate Map (FIRM)	A FIRM is the official map of a community on which the Federal Emergency Management Agency has delineated the Special Flood Hazard Areas, the Base Flood Elevations, and the risk premium zones applicable to the community.
Flood Management	See *flood risk management*. Generally, the terms *flood management* and *flood risk management* are used interchangeably throughout the Flood Future Report.
Flood Risk	Flood risk is the likelihood of consequence of inundation within an identified area, given a specified climate condition, land use condition, and flood management system (existing or planned) in place. The consequence may be direct or indirect economic cost, loss of life, environmental impact, or other specified measure of flood effect. Flood risk is a function of the following components: • Loading, which is the frequency and magnitude of flooding • Performance of flood management measures • Exposure and vulnerability, which are the relationship between the flood hazard (rising or flowing water) and its effect on life loss, property, and/or environmental resources • Consequence Therefore, flood management actions may reduce risk by changing loading, performance, exposure, vulnerability, or consequence.
Flood Risk Management	Flood risk management seeks to reduce flood risks by managing the floodwaters to reduce the probability of flooding (including by levees and dams) and by managing the floodplains to reduce the consequences of flooding. Flood risk management requires integrating and synchronizing programs at various levels of government designed to reduce flood risk. Source: USACE, Institute for Water Resources, a dynamic resource at http://nfrmp.us/frm_terminology.cfm#def17 (accessed March 11, 2013).
Floodplain	The extent of the flood hazard for a 100-year (1 percent chance of exceedance in a given year) or 500-year (0.2 percent chance of exceedance in a given year) event, as determined by CVFPP, FEMA, or USACE.

FloodSAFE California	FloodSAFE California refers to the California Department of Water Resources multi-faceted initiative launched in 2006 to improve public safety through flood management in the context of Integrated Water Management and to reduce potential flood damages in areas of the state with the highest risk. Although led at the State level and initially funded by bond money from Propositions 1E and 84, FloodSAFE implementation relies on the cooperation and assistance of Federal partners, Tribal entities, local sponsors, and other stakeholders. The FloodSAFE vision is a sustainable system of flood management with an IWM approach and emergency response 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.
Hazard Mitigation Plan (HMP)	A community's long-term strategy to reduce disaster losses and break the cycle of disaster damage, reconstruction, and repeated damage is described in an HMP. Results are accomplished through hazard mitigation, which is any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards.
Hazards United States (HAZUS) – Federal Emergency Management Agency (FEMA)	FEMA has developed this Geographic Information System-based U.S. multihazard assessment software, which contains a Flood Loss Estimation Model with flood hazard analysis and flood loss estimation modules for riverine and coastal analyses. The flood hazard analysis module uses characteristics such as frequency, discharge, and ground elevation to estimate flood depth, flood elevation, and flow velocity.
High Potential Loss Facility	Facilities such as dams and hazardous material sites, as defined by HAZUS-point shapefiles.
Hydrologic Engineering Center-Flood Damage Analysis (HEC-FDA)	The U.S. Army Corps of Engineers, Hydrologic Engineering Center (HEC) Flood Damage Analysis (FDA) model is designed to perform risk analysis as part of a flood risk study. The approach explicitly incorporates descriptions of uncertainty of key parameters and functions into project benefit and performance analyses.
Hydrologic Unit Code 8 (HUC8)	A Hydrologic Unit Code 8 is a watershed address consisting of a name and a number (for example, Lower James watershed, 02080206). The 8-digit number is a Hydrologic Unit Code or HUC. The Hydrologic Unit system is a standardized watershed classification system developed by the U.S. Geological Survey in the mid-1970s. Hydrologic units are watershed boundaries organized in a nested hierarchy by size. They range in size from regions to the smaller cataloging units, which are roughly equivalent to local watersheds.
Impact Area	Impact area is a term used for convenience to describe a geographic area for which risk is assessed.
Improvement Project	A Project that will improve or add facilities to the State Plan of Flood Control to increase levels of flood protection for urban areas. Funding for improvement projects is authorized by California Public Resources Code § 5096.821(b).

Integrated Regional Water Management (IRWM)	IRWM promotes the coordinated development and management of water, land, and related resources to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems.
Integrated Water Management (IWM)	IWM is a strategic approach to planning and implementation that combines specific flood management, water supply, and ecosystem actions to deliver multiple benefits. IWM relies on blending knowledge from a variety of disciplines, including engineering, economics, environmental sciences, public policy, and public information. This approach also promotes system flexibility and resiliency to accommodate changing conditions such as regional preferences, ecosystem needs, climate change, flood or drought events, and financing capabilities.
Life-Safety Risk	Life-safety risk represents the number of lives in jeopardy in an identified portion of the state, considering a given climate and land use condition, with a specified plan of flood management in place.
Loading	In the context of flood risk, loading describes the likelihood of occurrence of conditions that lead to loss of life or damage to property if the conditions are not controlled or the consequence is not managed. Loading commonly is described with a discharge-frequency function, which identifies the probability that discharge at a specified location will exceed a specified value.
Local Maintaining Agency (LMA)	LMAs include reclamation districts, State maintaining agencies, improvement districts, and individual districts like American River Flood Control District or Lower San Joaquin Levee District.
Long-Term Average (or Expected) Annual Inundation Damage	See Expected Annual Damage (EAD).
Maintenance and Inspection	Actions required for the proper care and efficient operation of various project elements. These actions may be combined or separated, as best suits the particular project. The guidance for proper maintenance and inspection are contained in ER 1130-2-303. Adaptations needed to satisfy conditions not covered in the ER are encouraged. Outlines of the maintenance and inspection records are be maintained and available for Government inspection. Government inspections will be performed in consultation with the project's sponsor. (Source: ER 1110-2-401)
Management Action	A management action is a specific structural or nonstructural strategy, action, or tactic that contributes to stated goals and addresses identified problems. Management actions could range from potential policy or institutional changes to operational and physical changes to the flood management system. Management actions are broad (not location-specific), and they vary in their level of detail.
Modification	Project modifications include changes in project operation, changes in real estate interests, the physical change of a project feature, addition of project features, or changes in the purposes of a project. (Source ER 1165-2-119)

National Flood Insurance Program (NFIP)	The NFIP is a Federal program created by the U.S. Congress to mitigate future flood losses nationwide. The NFIP requires local communities to enforce building and zoning ordinances in exchange for access to affordable, Federally backed, flood insurance protection for property owners.
Operation	Actions that are necessary for the safe and efficient functioning of a project to produce the benefits set forth in the project authorization. The operational requirements for nonreservoir projects are to be presented as operation plans covering essentially the who, what, where, when, and how of the various project operations. An outline of operation records is to be maintained and available for inspection. The operation of reservoirs, covered in water control manuals shall be separate from this operation and maintenance manual. (Source: ER 1110-2-401)
Operation, Maintenance, Repair, Rehabilitation, and Replacement (OMRR&R)	For Federally funded projects the definition of operation and maintenance (O&M) includes the local entity's financial obligation to operate, maintain, repair, rehabilitate, and replace (OMRR&R) the implemented project. OMRR&R is a non-Federal responsibility when local, regional and/or State entities partner on a Federal project. References to O&M provided in the Flood Future Report include OMRR&R responsibilities when the project is a Federal/non-Federal partnership.
Performance	Performance refers to the effectiveness of flood or floodplain management measures.
Plans	Plans utilize information provided by tools, as well as input from stakeholders to guide the development of the flood management strategies. Plans take into account near- and long-term actions, as well as any additional considerations, such as multiple benefits, environmental concerns, overall water management, and climate change, to formulate long-lasting resilient strategies. Plans include identifying and evaluating possible multibenefit projects and the most effective means of implementing projects using an integrated, collaborative approach.
Project Management Plan	A project management plan defines how a project is executed, monitored, and controlled. It is used to define the approach, scope, and delivery of a project.
Public Resources Code Section 75003.5	The people of California further find and declare that the growth in population of the State and the impacts of climate change pose significant challenges. These challenges must be addressed through careful planning and through improvements in land use and water management that both reduce contributions to global warming and improve the adaptability of our water and flood control systems. Improvements include better integration of water supply, water quality, flood control and ecosystem protection, as well greater water use efficiency and conservation to reduce energy consumption.
Public Resources Code Section 75032(a)	Public Resources Code Section 75032(a) provides funds for: The inspection and evaluation of the integrity and capability of existing flood control project facilities and the development of an economically viable flood control rehabilitation plan.

Reconstruction	Reconstruction consists of addressing the major performance deficiencies caused by a long-term degradation of the foundation, construction materials, and engineering systems that have exceeded their expected service lives and the resulting inability of the project to perform its authorized project functions. (Source: USACE, Program Guidance Letter on Reconstruction, August 16, 2005, http://planning.usace.army.mil/toolbox/library/MemosandLetters/reconstruction.pdf)
Rehabilitation	Rehabilitation refers to a set of activities necessary to bring a deteriorated project back to its original condition. (Source: ER 1110-2-401)
Repair	Repair refers to those activities of a routine nature that maintain the project in a well kept condition. (Source: ER 1110-2-401)
Replacement	Replacement covers those activities taken when a worn-out element or portion of a project is replaced. (Source: ER 1110-2-401)
Residual Risk	Residual risk is the likelihood of damage or other adverse consequence remaining after flood management actions are taken.
Results	Robust tools, thorough planning, and integrated actions deliver results that provide value to California's residents, environment, and economy. Results are tracked using performance measures and sustainability indicators that help improve investment performance and increase flood management benefits.
Severe Repetitive Loss (SRL)	Any NFIP-insured residential property that has met at least one of the following paid flood loss criteria since 1978, regardless of ownership: • Four or more separate claim payments of more than $5,000 each (including building and contents payments) • Two or more separate claim payments (building payments only) where the total of the payments exceeds the current value of the property In either case, two of the claim payments must have occurred within 10 years of each other. Multiple losses at the same location within 10 days of each other are counted as one loss, with the payment amounts added together. The loss history includes all ownership of the property since 1978 or since the building's construction if built after 1978.
Slow Rise Flooding	Slow rise flooding occurs as a gradual inundation as waterways or lakes overflow their banks. Most often caused by heavy precipitation, especially with heavy snowmelt. Includes riverine flooding in deep floodplains and ponding of water in low-lying urban areas, as well as gradual flooding in areas adjacent to local streams and creeks.
Special Flood Hazard Area (SFHA)	SFHAs are areas subject to inundation from a flood that has a 1 percent chance of being equaled or exceeded in a given year.
State Plan of Flood Control (SPFC)	Collectively, the facilities, lands, programs, conditions, and mode of operation and maintenance for the State-Federal flood protection system in the Central Valley. This area is shown in the figure provided under CVFPP definition.

Tools	Tools include data, models, and assessments needed for decision making in all aspects of flood management. DWR continues enhancing and sharing technical resources (tools) across all programs and projects. This includes flood, environmental, and water management data gathering, modeling, and the technical aspects of flood readiness and emergency response. Technical and modeling information help inform thorough and thoughtful planning, along with accurate design of flood management facilities.
Transportation Facility	Runways, railway bridges, rail facilities, port facilities, light-rail facilities, highway bridges, ferry facilities, bus facilities, and airport facilities, as defined by HAZUS-point shapefiles.
Tsunami Flooding	Tsunami flooding occurs as a result of high-speed ocean waves triggered by mass movement that displaces a large volume of water. Causes include earthquakes and underwater landslides. Impact on land depends on wave height and inundation area.
Utilities	Wastewater, potable water, oil, natural gas, electric power, and communications facilities, as defined by HAZUS-point shapefiles.
V-Zone	The V-zone is an area inundated by 1 percent annual chance (100-year) flooding with velocity hazard (wave action); no base flood elevations have been determined.
Vulnerability	Vulnerability is the susceptibility to loss or damage of people and property exposed to the flood hazard.
Water Data Library (WDL)	The WDL is a searchable Geographic Information System (GIS) interface on the Internet. WDL allows users to access information about monitoring gauges, groundwater data, and water quality.

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The complete report, *California's Flood Future: Recommendations for Managing the State's Flood Risk*, including technical attachments and other supporting information is available for review at:

http://www.water.ca.gov/SFMP