

Summary of **Flood Management Material in the California Water Plan Update 2009**

This describes the extent, subject matter, and location of the flood management material in the California Water Plan Update 2009.

Flood material is ubiquitous in CWP 2009. Volume 1, *The Strategic Plan*, has 274 pages on which the word component “flood” appears 654 times, on 55 percent of the pages and in every one of the seven chapters. Each chapter of Volume 2, *Resource Management Strategies*, deals with a specific and limited strategy; nevertheless, “flood” appears in 26 of the 29 chapters and is discussed significantly in six of the chapters, with one chapter devoted specifically to “Flood Risk Management.” On 658 pages, “flood” is mentioned 808 times, on 26 percent of the pages. Each of the twelve hydrologic region reports in Volume 3, *Regional Reports*, contains a specific section for flood management, numerous other mentions, and an appendix of flood-related material. “Flood” appears 3,154 times, on 53 percent of the 730 pages. Volume 4, *Reference Guide*, consists of 127 supplemental articles. It has 4,545 pages, which mention “flood” 2,797 times, on 16% of the pages. Overall for Volumes 1 through 4, there are 7,413 mentions of “flood” on 23 percent of 6,207 pages.

Beginning on the next page is an index to the material relevant to floods in each chapter.

**Index to Flood Management Material in the California Water Plan Update 2009
Volume 1 -- The Strategic Plan**

Foreword

Director Mark Cowin mentions better flood risk management prominently in his foreword, at five places.

V1, Chapter 1 -- Introduction

Page	General Subject	Description
5	Plan content	Sustainable systems
7, 18	Volume 2 content	Resource Management Categories
8	Water policy concerns	Tabulated
9	Plan content	Enhancements to CWP 2005
11	Project organization diagram	Work team list
13	Advisory committee	Communities of interest
15-16	Integrated flood management	General introduction of the concept, table of update activities, and reference.
18	Regional reports	New issues included
20	Update 2005 recommendations	Progress report on Recommendation 4

V1, Chapter 2 -- Imperative to Act

Page	General Subject	Description
5	Climate change	Increasing floods
6	Flood risk	Discussion of reasons for increase
6	Aging infrastructure	Flood protection system aging
7	State variability	Variations in flood occurrence
8	Lester Snow's perspective	Flood protection for suburbs
9	Climate change	Challenges to flood managers
10	Future uncertainty	Impact of changes
11	Fundamental lessons	Integrated regional planning, groundwater
12-13	Vision, mission, and goals	Mission: forum to update response plans. Goals: improve flood protection, adjust for climate change, integrate flood management. Guiding principles: manage by watershed, increase preparedness, collaborate
18	Integrated flood management	Included in IWRM
20-21	Integrated flood management	General discussion of the topic
21	Climate change	Increase sustainability for flood systems
22	Planning for uncertainty	Improve flood systems and sustainability
22	Planning for uncertainty	IWM includes IFM
24-25	Future scenarios	Scenarios include flood considerations
25	Water portfolios	Response packages promote IFM
26-27	Conclusion	Systems are challenged, have lost resilience, need to be more sustainable. Update 2009 guides IFM.
27-32	Recommendations	State should 1. Invest in flood improvements; 2. Need stable finance source; 4. Lead flood planning if regions cannot; 5. Lead planning and research; 6. Improve flood planning; 7. Renovate flood infrastructure; 8. Articulate and update planning roles of others; 9. Increase flood awareness.

V1, Chapter 3 -- Companion State Plans

Page	General Subject	Description
10	Agency Functions	CVFPB and USACE
13	State agency coordination	Agencies' roles in Update 2009
15	List of companion plans	FloodSAFE Strategic Plan listed
18	Managing an Uncertain Future	Climate change white paper. Flood mentioned
18	Preparing for CA's Next Drought	Actions for future floods listed
18, 21	FloodSAFE Strategic Plan	Sketch of FloodSAFE program. Relates to CWP objectives 6, 8, 13
19	CA Multi-Hazard Mitigation Plan	Includes a flood component
22	Companion Plan Chart	9 plans relate to RMS Category "Improve flood management"
23	CWP Steering Committee	Has assisted with flood management

V1, Chapter 4 -- California Water Today

Page	General Subject	Description
5,7	Resource variability	Floods can be too much; past objectives mostly met
7	Flood damage	Floods threaten life and property
10	Regional reports	Include flood information
14	Existing crises	Flood risk increasing
15	Environment	Floodplain restoration
19	SWP water delivery	Delta threatened by floods
23	Water balances	Reported 8-year sequence does not include major floods
27	Water project operation	Floods are one reason to consider reoperation
28	Water governance	DWR and federal agencies have roles in flood control
29	Flood management	Describes traditional flood management practices, integrated flood management, NFIP use of 100-year flood, problems with 100-year standard and stationarity, need for revised safety factors.
29	Critical challenges	Climate change is increasing floods
31-33	Floods and flooding	Improvements critically needed. Problems include aging infrastructure, development in floodplains. Every region has flood problems including devastating Southern California floods, alluvial fan development, Delta island and Central Valley levee frailty, population growth, outdated mapping, State liability, and several effects of climate change.
33	Environment	Wetland restoration depends on flooding. Sustainable flood protection depends on environmental stewardship
34-35	Climate change, Fig. 4-11	Increased flood occurrence may damage levees
36	American River runoff, Fig. 4-12	5 highest floods have occurred since 1950
36-37	Climate change	Peak flows and dryness both increasing. Historical hydrology losing appropriateness. Flood infrastructure vulnerable to sea level rise and increased storm surge.
40	Water contamination	Higher floods peaks mean more erosion and resulting turbidity. Increased sediment load threatens system integrity.

V1, Chapter 4 -- California Water Today (continued)

Page	General Subject	Description
41	Deferred Maintenance	Aging facilities risk public safety.
42	Deferred levee maintenance	Delta islands flood often, repairs are costly. DWR paper "Flood Warnings:..." documents major deficiencies and challenges. USACE notes 24 critical erosion sites.
43	Flood emergencies	Delta has unique risks. Dam maintenance is critical for public safety.
44	Disadvantaged communities	Most flood projects not developed for them.
44	Funding	Props. 13 and 218 have reduced funds. USACE paying smaller share. Props. 84 and 1E will provide a down payment.
45	Investin in watersheds, Box 4-9	DWR resource restoration programs reduce flood damage.
53	Recent legislation to strengthen flood protection	2007 legislation reformed CVFPB, required CVFPB, required flood risk consideration in local land use, set new urban flood standard.
53-54	FloodSAFE Program	"Flood Warnings" oulines flood problems. State has begun improvement. FloodSAFE has 5 goals: reduce chance of flooding, reduce its consequences, sustain economic growth, protect and enhance ecosystems, promote sustainability. FloodSAFE has essential key partners.
58	Delta and Suisun Marsh	Flood risk is substantial and rising
59-60	Propositions and Bonds	November 2006 bond propositions provided \$4.9 billion for flood and \$1 billion for IRWM.
60	IRWM Appropriations--Box 4-14	\$150 million for Storm Water Flood Management Projects
61	Proposition 1E	\$211 million for 4 critical flood protection projects
61	Proposition 84	IRWM projects including flood protection
63	Federal Water Action Plan	Interim actions by 6 federal agencies in California including integrated flood risk management

V1, Chapter 5 -- Managing an Uncertain Future

Page	General Subject	Description
5	Planning	Flood planning should emphasize sustainability
6-7	Traditional planning	Early efforts assumed records were a sound basis, focused on damages, underestimated risks. Projects had benefits but some may have increased risk.
7-8	New approach	Integrated management is emphasized. Change is anticipated. Now estimating chance of failure for given flood, considering levee performance, flood consequences, environmental impact. Considering sustainability.
10	Recognizing and reducing uncertainty	Uncertainty is from randomness of events and lack of knowledge. Changes may be gradual or sudden.
10,12	Assessing risk	Risks originate from hazards like floods. Annual risk determined by probability of event X value of consequences
11	Sources of future change and uncertainty -- Box 5-3	Gradual change from sea level rise. Sudden change from Delta vulnerability, uncertainty of magnitude of future floods.
13	Understanding flood risks -- Fig. 5.1	General graphic description of flood risk
14	Stochastic simulation	Example HEC-FDA incorporates uncertainty
14-15	Risk Assessment Examples	CWP encourages IFM. Purpose of DRMS is to evaluate risk and consequences of Delta levee failure. DRMS estimates probability that multiple islands will flood simultaneously in a 25-year period.
15-16	DWR economic analysis for flood risk management	Economic Analysis Guidebook provides consistent procedures. Two USACE publications provide guidance for its required risk analysis.
20	Managing for Sustainability	CWP Update 2005 identified 3 sustainability actions that lead to an initiative to improve flood management systems.
24	Water Plan Scenarios	1. Current trends--State has been held liable for flood damage; 2. Slow and strategic growth--assume ag land conversion is more for flood protection and environment than for growth; assume legislation has provided flood protection; 3. Expansive growth--assume urban areas have moved into critical flooding areas; assume State has been held liable for flood damage, as in #1.
35	Summary	IRWM includes IFM on all fronts and at many levels including sustainable flood systems. Future studies will help develop IFM plans.

V1, Chapter 6 -- Integrated Data and Analysis

Page	General Subject	Description
5	Purpose and Motivation	Need new investment in technology to prepare for future flood events and to support IRWM including IFM.
6	Improving tech support for decision making under uncertainty	Meaning of long-term climate change still uncertain
6	Improving tech support for IRWM	Resource management strategies include managing floodplains.
7	Information gaps	Much more information needed to implement IRWM and IFM.
9	Technical challenges	IFM seeks to include structural and nonstructural methods, use floodplains, use appropriate land use practices, enhance environmental stewardship. Relies on multiple strategies using information on daily and hourly time scales. Requires accurate ground information.
9	Climate change	Climate change could have major implications for flood management
11	Climate change white paper	More integration needed for State and local flood systems.
14	Critical activities	Develop strategic plan that identifies program needs to respond to flood management
14	Entities in long-term water management improvement -- Box 6-2	USACE is responsible for developing tools to analyze watersheds and flood management.
16	Critical activities	Develop common schematics to facilitate flood management model integration
22	WEAP proposal review	WEAP cannot track floodflows because of coarse time step.

V1, Chapter 7 -- Implementation Plan

Page	General Subject	Description
6	Strategic plan vision statement	Serves as foundation for flood planning
8-11	Objective 1	Expand IRWM to build partnerships for sustainable watershed and floodplain management. Emphasize adapting to climate change including flood event increases. Plan on a watershed scale. Identify risk areas for flooding.
14-18	Objective 3	Expand conjunctive management and improve storage and conveyance to manage floodflows. Consider reoperation of reservoirs, which will require active cooperation. Use flood flows as conjunctive use supplies. Quantify costs of reoperation for flood management and support hydrologic updates.
21-23	Objective 5	Practice environmental stewardship by improving floodplain functions to sustain flood management systems. Sustainable, resilient, adaptive flood protection requires enhancing biological diversity, restoring ecosystem functions, enhancing or re-establishing native habitat, establishing hydrologic connectivity, and enhancing carbon sequestration. Identify, and protect from sea level rise, boundary wetlands in the Bay and Delta.
23-26	Objective 6	Practice IFM to obtain better flood protection, more sustainable flood systems, and enhanced floodplain ecosystems. Balance floodplain living benefits against floodplain flooding benefits. Recognize the effects of climate change, the financial responsibility for flood damage, and the benefits of system reoperation.
26-31		Manage a sustainable Delta by restoring interconnected habitats, analyzing and improving reservoir operations, improving emergency response, and completing the CVFPP.
32	Objective 8	Prepare emergency plans for flood (State to assist local government).
35-38	Objective 10	Improve data and analysis to support flood management systems. Include identifying data needs, providing updated estimates of climate change effects, a study of adaptive management using field data, and development of a common schematic for the California water management system.
41-42	Objective 13	Assure equitable distribution of benefits by providing benefits for disadvantaged communities and vulnerable populations.

**Index to Flood Management Material in the California Water Plan Update 2009
Volume 2 -- Resource Management Strategies**

Volume 2 has an introductory chapter and 28 additional chapters, one for each resource management strategy. Of chapters 2-29, 25 mention "flood", but in nine of those the reference is non-substantial with respect to flood management, including three in which "flood" only appears in reference names. The following index only treats the Introduction and remaining sixteen chapters, numbers 4, 5, 6, 8, 12, 13, 17, 19, 20, and 22-28.

V2, Chapter 1 -- Introduction

The introduction refers to flood management to establish its place in the resource management strategies and to define how it fits into the content of the sections of each chapter. "Flood Risk Management" is identified as one of the strategies. On pages 10-11, Table 1-1 identifies potential strategy benefits for the strategies described in the sixteen chapters noted above.

V2, Chapter 4 -- Conveyance--Delta

Page	General Subject	Description
5	Delta conveyance	Delta geography and demands on conveyance
8-9	Delta conveyance benefits	Increased conveyance benefits flood management by increasing flow capacity and may incorporate habitat improvements.
10	Delta conveyance issues	Maintaining existing conveyance is critical, and may be diminished by silt, debris, or vegetation.
10	Delta conveyance issues	Flood control, water quality, and water supply compete for Delta conveyance.
13	Climate change	May require more Delta conveyance
14	Delta Project levees	Threatened by eight Delta factors
15	Delta conveyance capacity	May need a strategy to maintain

V2, Chapter 5 -- Conveyance--Regional/Local

Page	General Subject	Description
7-8	Conveyance benefits	Can help flood management by allowing higher flows
9	Conveyance benefits	Best Management Practices can reduce flood flows. Enlarged conveyance can incorporate improved habitat.
10	Conveyance issues	Maintaining existing conveyance is critical, and may be diminished by silt, debris, or vegetation.
12	Climate change	May require more conveyance
13	Conveyance capacity	May need a strategy to maintain

V2, Chapter 6 -- System Reoperation

Page	General Subject	Description
6	Folsom reoperation	Will improve flood protection, in conjunction with new facilities
7	Uses of reoperation, Box 6-2	Changing timing or volume of releases or increasing storage or flood capacity can benefit flood control
8	Forecast-coordinated operations	Improved forecasts can allow more pre-flood drawdown. An agreement is being negotiated for Oroville/New Bullards Bar.
8	Forecast-based operations	Dynamic flood storage can enhance both flood control and water conservation.
9	Reservoir storage and release, Figs. 6-1 and 6-2	Forecast-coordinated operation at Oroville and NBB can reduce storage and release peaks.
9	F-CO assumptions	F-CO will focus on flood risk reduction and water supply
11	System reoperation benefits	Improved flood safety and response flexibility
13	Constraints to reoperation	Facility capacities; federal project purpose change
14	Flood control diagrams	Difficult and time consuming to change

V2, Chapter 8 -- Conjunctive Management and Groundwater Storage

Page	General Subject	Description
5, 9	Benefits and objectives	CM & GS can improve flood management
14	Other strategies	CM & GS works well with floodplain management
22	Benefits, Table 8-1	CU & GM can convert flood flows to stored water, allow more flood storage in reservoirs, assist with resisting salt water intrusion, reduce urban runoff peaks.
24	Land use change	Floodplain recharge areas are being urbanized; reservation of detention ponds can improve flood protection.
27	Constraints	Allowing floodwaters into retention basins increases maintenance costs. Improved coordination is essential.
29	Environmental concerns	Flood peak flows may be necessary for ecosystem, should be balanced with conjunctive management.
29-30	Climate change	Will result in more winter floods, less snow, higher sea levels. CM & GS projects may help mitigate the effects
31-32	Recommendations	Quantify costs of CM & GS for flood control management; support update of hydrology; encourage and fund local and regional coordination.

V2, Chapter 12 -- Surface Storage--CALFED

Page	General Subject	Description
5,6	Surface Storage	Proposed 2010 bond measure includes flood funding; CALFED planners said new onstream reservoirs for water supply and flood won't meet California's needs; new storage should also benefit ecosystem, habitat, and watersupply reliability.
8	Temperance Flat Reservoir, Table 12-1	Initial formulation; would include 6 additional purposes including flood control
16	Links to other strategies	CALFED surface storage investigation includes flood control as a secondary purpose.

V2, Chapter 13 -- Surface Storage--Regional/Local

Page	General Subject	Description
5	Surface storage	Many local agencies use it for flood control
6	Surface storage	Seven Oaks reservoir has a flood control purpose

V2, Chapter 17 -- Pollution Prevention

Page	General Subject	Description
14	Wetlands	Wetlands can provide flood control benefits.

V2, Chapter 19 -- Urban Runoff Management

Page	General Subject	Description
5, 7, 9	Urban runoff management	Traditionally viewed and usually successful as a flood control response; alters timing and extent of flooding; may increase flooding downstream
10	Joint benefits	Flood basins can be athletic fields, for example; watershed approach can offer multiple benefits.

V2, Chapter 20 -- Agricultural Lands Stewardship

Page	General Subject	Description
8	California agriculture	Has been affected by floods
9	Strategies requiring land	Flood management and seven other RMSs may be compatible with or may conflict with agriculture.
10	Flood Protection Corridor Program, Box 20-2	Program offers grants for nonstructural projects that also enhance habitat or protect agricultural use
12	Examples of agricultural land stewardship, Box 20-3	Ways the actions help flood management: wetland management slows water flow, streambank protection can leave natural flooding areas, farm ponds retard runoff
13-14	Benefits of ag land stewardship	Can reduce State costs for flood management, provide benefits for floodplain management, spread floodwaters to reduce flood impact
15	Ag land BMPs	Providing ponds helps flood management
16	Benefits of ag land stewardship	Can avoid costs of increased runoff due to urbanization
21	Major issues	Easement provisions prohibiting flow-impeding crops may eliminate high-value crops; reserving land for floodwater spreading may drive up costs; regulations are complex.
26, 27	Recommendations	Integrate responses to flood regulation overlap; develop coordinated programs to acquire conservation easements and develop farm ponds
29	Recommendations	Fund floodplain protection easements; allow high value crops.

V2, Chapter 22 -- Ecosystem Restoration

Page	General Subject	Description
5	Overview	Strategy focuses on aquatic, riparian, and floodplain ecosystems, most affected by flood planning, which must prevent ecosystem damage and facilitate maintenance or suffer public rejection. Restoration depends on restoring water-driven processes including floodplain flooding, natural erosion and deposition, balance of infiltration and runoff, and seasonal flow variation.
6, 7	Current activities	Include acquisition of land and preparation for tidal marsh and seasonal floodplain. Santa Ana River program integrates habitat restoration and flood control, especially at Prado Dam. Aggressive arundo removal is key.
8	Benefits of meadows	Spread flood peaks and recharge the aquifer
9	Sustainability	Ecosystem restoration makes flood projects more sustainable. Sustainability is analogous to resilience in ecosystems. Integrated sustainable projects must have both flood/water and ecosystem components sustainable.

V2, Chapter 22 -- Ecosystem Restoration (continued)

Page	General Subject	Description
9, 10	Climate change	Expected to reduce water storage and reduce ecosystem resilience. Lends impetus to using floodplains for flood protection. Options are to increase use of bypasses and increasing habitat in floodplains.
10-12	Flood Management	Ecosystem restoration can support sustainable flood management by reducing erosion, increasing conveyance, and armoring levee surfaces with appropriate plants. Four structural flood measures affect ecosystems: dams, levees, bypasses, and setback levees. First two reduce, second two increase flood inundation. Bypasses can increase fish habitat.
12	Environmental water use	Efficiency improved by bypasses and setback levees
12	Other effects of ecosystem restoration	Expansion of riparian forests into floodplains reduces flood velocities, erosion, and sedimentation of streams, makes more room for flood peaks. Interaction of habitat, flood management, and agriculture can reduce flood risk on farmland not under flood easement.
13	Potential costs	No comprehensive Statewide summary exists. Projects with ecosystem restoration have higher start-up costs but lower life-cycle costs.
14	Conflict with traditional flood management	Incorporation of habitat may run counter to flood control needs. No consensus exists on methods of design. Need assurance that ecosystem considerations will not increase flood risk.
15, 16	Recommendations	Devise climate change adaptations that benefit ecosystems and flood management by reconnecting rivers to floodplains, increasing setback levees and bypasses, expanding riparian forests: promote multidisciplinary water and flood management by fostering a shared vision; expand financial incentives for habitat on farms.

V2, Chapter 23 -- Forest Management

Page	General Subject	Description
10	Climate change	More winter floods will increase need for new dams
11	Meadows	Attenuate flood peaks
14	Riparian forests	attenuate flood peaks, reduce flow velocities, increase flood width and depth, increase recharge.
19	Forest road management	Roads increase flood peaks.
20	Urban forestry	Urban trees intercept rainfall.
24	Surface water rights	Flood projects may be considered an infringement

V2, Chapter 24 -- Land Use Planning and Management

Page	General Subject	Description
5	Land use	Has direct relationship to flood management
11	Flooding	Replenishes soils and recharges groundwater. Development diminishes floodplain function; compact urban development reduces flood control costs; use of natural channels reduces pollution in runoff
17, 18	Coordinating land use and flood management	Paterno Decision and Hurricane Katrina were catalysts for flood risk legislation.
18	SB 5, Flood management	Requires CVFPP, defines urban level flood protection, requires DWR floodplain mapping
18	AB 5, Flood management	Technical changes to SB 5, SB 17, and AB 162
18, 19	AB 156, Flood control	Authorizes actions enhancing flood information, requires DWR mapping, requires SPFC status report, requires identification of LFPZs and property owner notifications, changes requirements for MAs.
19	AB 70, Flood liability	Requires locals to pay reasonable share of flood damage costs, if new development has increased risk
19	AB 162, General plans	Requires flood element in city/county GPs. Locals may exclude flood-prone lands from development.
19	Coordinating land development and flood management	Can provide public safety and ecosystem improvements
20	Benefits of compact and sustainable development	Keeps people and structures out of flood hazard zones, reduces runoff volume and intensity
24	Benefits of C & S development, Box 24-8	Helps protect floodplains, reduces impervious surface area
26	Recommendations	State should set a baseline for each watershed for comprehensive flood management with floodplain planning; use CEQA to mitigate effect of new development on floodplains; give funding priority to projects with ag easements for floodplain management; increase funding for sustainable community plans furthering floodplain management; serve as a clearinghouse for flood management information; monitor, evaluate, and report on the effectiveness of the 2007 flood legislation package.

V2, Chapter 25 -- Recharge Areas Protection

Page	General Subject	Description
9	Retention basins	Pre-1950 basins attenuate peaks and recharge aquifers; post-1950 basins also serve recreation needs.
10	Benefits	Diversion of water benefits flood control

V2, Chapter 26 -- Water-Dependent Recreation

Page	General Subject	Description
8	Benefits to WDR from flood projects	Can include recreation facilities, green environments. Can partner with recreation development. Examples are Napa River, Lake Elizabeth in Fremont, and Temecula flood easement project.
15	Issues facing WDR	Dams reduce coastal sediment supply
15	Problem solutions	Linear parks along flood control projects; flood facilities that are closer to natural ecological systems
20	Issues facing WDR	Poor reservoir management may impact recreation
21	Recommendations	Include recreation in new floodways or levees; fund recreation with FloodSAFE grants for mitigation and environmental enhancement.

V2, Chapter 27 -- Watershed Management

Page	General Subject	Description
6	Watershed defined, Box 27-1	Effective watershed management recognizes the role of floods.
9, 11	Benefits	Reduced flood damages may be quantified
10	Watershed management output, Table 27-1	Reduction of flood damages, enhanced floodplain habitat, healthier floodplain soil.
13, 15	Issues facing watershed management	Runoff intensified by urbanization increases flood damage; population pressure and past forest practices intensify wildfires, which increase reservoir O&M and flood severity.
16	Recommendations	Retain natural floodplains as much as possible; restore and preserve natural channel morphology.

V2, Chapter 28 -- Flood Risk Management

Page	General Subject	Description
5	Flood Risk Management	To enhance flood protection. Key element of IFM. IFM Maximizes floodplain benefits, minimizes flood loss, and recognizes flood benefits.
5	Background of FRM	Traditional reliance on structures has shifted to IFM.
5	Description of FRM	Wide range of programs: structural, land use management, emergency handling
5-7	Structural approaches	Dams, levees, channels, bypasses, flood coordination, maintenance.
8, 9	Land Use Management	Floodplain restoration, floodplain regulation, development policies, building codes, flood insurance
9-11	Emergency handling	Information and education, disaster preparedness, flood emergency response, post-flood recovery
11, 12	Connections to other RMSs	Connects to conjunctive use, conveyance, surface storage, system reoperation, urban runoff management.
12, 13	Benefits of FRM	Primary, to reduce flood risk. Other benefits from floodplain improvements. Level of benefits depends on potential need and actions of local government. Interregional benefits are limited. State benefits accrue from reduction of liability. Other benefits include drought preparedness, reduced overdraft, better water quality, some energy savings, enhanced habitat.
13, 14	Costs of FRM	High expense of structural projects, maintenance; lesser cost of land use management, long term cost of flood insurance.
14, 15	Common issues facing FRM	Cannot eliminate all flood risk; liability is a State challenge; climate change affect hydrology; Integration (use of IFM) is complex in terms of coordination; need is not well documented Statewide.
15, 16	Structural approach issues	Past construction allows occupation of floodplains; cost of construction is substantial; maintenance is underfinanced; environmental review is lengthy and restrictive
16	Land use management issues	Map modernization may change risk designations, insurance requirements. Floodplain restoration requires careful study. Funding is often insufficient for an improved land use program.
16-17	Disaster preparedness, response, and recovery issues	DWR lacks needed emergency response agreements; recovery organization needs attention.

V2, Chapter 28 -- Flood Risk Management (continued)

Page	General Subject	Description
17-18	General recommendations	Research climate change; describe SRFCP/SJRFCS status and recommend changes; describe statewide status, identify needs, develop finance strategy; develop incentives for IRWM flood planning; develop statewide flood database; map 200-year floodplains and evaluate 200-year standard.
18	Structural approach recommendations	Clarify liability; develop buyback program for setback levees and floodplains; develop model agreements for construction and O&M, addressing liability; plan structures with an IFM approach; develop recommendations for streamlining environmental review.
18-19	Land use management recommendations	Update FIRMs; incorporate flood element in land use plans; bar new critical facilities from 200-year floodplain; use latest mapping in CEQA reviews; inform public of flood risks; develop State funding for revising general plans and restoring floodplains; promote floodplain preservation and restoration.
20	Disaster preparedness, response, and recovery recommendations	Work with CalEMA and DHS to ensure a consistent approach; develop improvements for post-flood recovery.

Index to Flood Management Material in the California Water Plan Update 2009
Volume 3 -- Regional Reports

Volume 3 consists of 12 reports, one for each hydrologic region and special interest area. The reports all have the same outline, with only minor variations. The first index (General Regional Report) covers most of the information given in all reports. It is given in the same order as the reports, but no page numbers are given. Then all reports are described by exception to the general report. Actual page numbers in the reports are preceded by the one- or two-character identifiers given below; page references in this index and references to table , figure, and box numbers drop the prefix.

General Regional Report

Page	General Subject	Description
	Watersheds	<ul style="list-style-type: none"> •Descriptions of rivers that include those that are entries in Table A-1, Record floods.
	Flood hazards	<ul style="list-style-type: none"> •Types of flooding •A bulleted list of general flood hazards
	Historic floods	<ul style="list-style-type: none"> •A brief summary of notable past floods •A reference to more material in Table A-1, Record floods
	Flood governance	<ul style="list-style-type: none"> •Flood management described as an effort of many agencies •Participants listed in Box 3 •Reference to Table A-2 that describes their roles
	Constructed facilities	<ul style="list-style-type: none"> •General description of the region's flood works •A reference to Table A-3, Flood control facilities
	Coordination and reservoir operations	<ul style="list-style-type: none"> •States that the region has no forecast-coordinated operations agreements •Describes interagency cooperation during floods •Indicates methods and roles in management of reservoir flood control spaces •Describes flood control diagrams in general •Reference to Table A-3, Flood control facilities
	Maintenance	<ul style="list-style-type: none"> •Notes importance of maintenance •Indicates current maintenance difficulties •Indicates, in general, the agencies responsible for maintenance •Identifies facilities maintained by USACE •Identifies facilities maintained by USBR •Identifies facilities financed by NRCS.
	Regulation	<ul style="list-style-type: none"> •Describes responsibility for floodways •Describes importance of floodplain ordinances •Lists designated floodways and responsible agencies.
	Flood insurance	<ul style="list-style-type: none"> •Describes NFIP and the adjunct CRS •Notes importance of mapping •Gives status of FIRMs •Gives participants in CRS and their classes •Gives a URL for CRS information

General Regional Report

Page	General Subject	Description
	Information and education	<ul style="list-style-type: none"> •CDEC is described •Number of listed gages given for the region •A URL is given for CDEC •Agencies with the most of gages identified •A URL for USGS gage data is given •DWR Awareness mapping is described and the status given •NWS AHPS is described •Reference made to Table A-5, AHPS stream forecast points.
	Event management	<ul style="list-style-type: none"> •Flood emergency response under SEMS is described •Reference made to Table A-4, Response organizations •Roles of Cal EMA, the FOC, and USACE are described. •Recovery operations are described in general. •Agency roles in mitigation and preparedness are described in brief.
	Integrated regional water management	<ul style="list-style-type: none"> •IRWMPs having flood management content are identified in Table 3, Strategies of IRWMPs •Regional projects are identified or summarized.
	Recent accomplishments	<ul style="list-style-type: none"> •Recently constructed flood control facilities are mentioned briefly •Reference made to Table A-3, Flood control facilities.
	Challenges: flooding	<ul style="list-style-type: none"> •Generalized description of flood problems •Value of a discharged-based standard is stated •Particular places at risk are identified by name •Urbanization and undesirable vegetation identified as problems. •Effective preparedness is described •Value of mapping noted •Some forms of mitigation described •Modern complexities of maintenance funding and operations are described. •Wildfire and ensuing debris flows are identified as a problem
	Drought and flood planning	<ul style="list-style-type: none"> •Flood planning efforts of regional and local agencies are described in brief. •Number of counties with hazard mitigation plans is given. •FloodSAFE described

General Regional Report

Page	General Subject	Description
A	Flood parameters	•Reference made to Table A-1, Record floods
A	Flood descriptions	•Short descriptions of historic floods are given.
A	Record floods, Table A-1	•Gives stream, gage location, mean annual runoff, peak stage, and peak discharge. • Box A-1 describes selection criteria.
A	Flood governance	•Agencies involved and their responsibilities given in Table A-2 •Descriptions of some table categories given in the text.
A	Structural approaches	•Reference made to Table A-3, Flood control facilities
A	Disaster preparation, response, and recovery	•Involvement of many organizations noted •Required use of SEMS noted •Procedure briefly described •Reference made to Table A-4, Flood emergency responders •AHPS described •Table A-5, AHPS forecast points, referenced.
A	Integrated regional water management	•Description of IRWMPs that include flood control •Brief description of content.

NC -- North Coast Hydrologic Region (exceptions to the general index)

Page	General Subject	Description
11	Tribal information, Box 2	Flood risks are described as an issue.
23-24	Coordination and reservoir operations	"Forecast-coordinated" is omitted. Operation of Lake Sonoma and Lake Mendocino are described in particular.
25	Event management	A 2009 intercounty tsunami exercise is described.
30	Integrated regional water management	Specific projects include a culvert replacement.
31	Recent accomplishments	Tsunami protection in Crescent City is noted.
34	Challenges: flooding	At risk are 4 locations on the Russian River and places on the Trinity, Garcia, Navarro, and Elk Rivers. Ten cities/towns are cited to be at risk. Tsunami danger is noted. Salt River and Laguna de Santa Rosa are identified as sediment problem locations. Preparedness needs include Tribal response systems and Russian River floodproofing. Debris flows not mentioned as a problem.
	Drought and flood planning	Entire section is omitted. FloodSAFE is described in "Looking to the future".
37	Looking to the future	FloodSAFE is described.
B1	Erosion and sedimentation	Excess sediment can contribute to flooding.

SF -- San Francisco Bay Hydrologic Region (exceptions)

Page	General Subject	Description
9	Land use patterns	Discusses development on floodplains
18	Surface water pollution	Degrading of riparian areas impacts floodplains and flood storage
20	Future water quality priorities	Flood prevention most effective in reducing flood contaminants
21	Water governance	Promises more information in 2013 and refers to Appendix A.
22	Planning organizations, Box 2	Bay Area Flood Protection Association and flood control functions of Bay Area Water Forum listed
25	Coordination and reservoir operations	"Forecast-coordinated" is omitted. Reference is made to Table A-3, Flood control facilities.
34	Accomplishments	Stimulus funding obtained for two flood-related projects
35	Challenges	Debris flows not identified as a problem.
37	Looking to the future	Reference to map showing a meter rise in sea level.
41	Implementation next steps	Key item is linking water/land use and flood management
B2	Wetland restoration	Napa River FC project includes restored flood storage areas
B3	Future water quality priorities	NC Water Board developing floodplain protection policy. A low impact development project includes floodplain connectivity, restoration, and creation, and floodwater storage.

CC -- Central Coast Hydrologic Region (exceptions)

Page	General Subject	Description
5	Watersheds	Pajaro River noted for flooding
7	Ecosystems	Salinas River habitat reduced by flood control activities
16-17	Water supplies	USBR Twitchell Reservoir and Lake Cachuma projects include flood storage.
22	Flood Hazards	Problems with FIRMs described
24	Coordination and reservoir operations	"Forecast-coordinated" is omitted.
33	Drought and flood planning	Local planning efforts not discussed.
	Accomplishments	Entire section is omitted. Flood accomplishments moved to Appendix A.
36	Climate change	Effect on flood management is significant.
A7	Accomplishments	Bulleted list of flood control accomplishments

SC -- South Coast Hydrologic Region (exceptions)

Page	General Subject	Description
12	Ecosystems	Flood facilities and maintenance alter natural processes.
19	Land use patterns	Channel linings decrease groundwater recharge.
22	Local surface water supply	Impound structures provide flood protection.
33	Water governance	Governance agencies also coordinate flood management.
34	Water governance	Regional planning includes flood management stakeholders.
35	Flood hazards	Reference to Figure SC-7, FEMA floodplains
35	Historic floods	Paragraph about largest discharges on record
36	Historic Floods-Figure SC-7	FEMA floodplains in the region
37	Constructed facilities	Text on functions of local flood control agencies
39	Constructed facilities	References to Figure A-1, schematic of the LACDA project, and Figure A-2, schematic of the SAROC projects
39	Coordination and reservoir operations	"Forecast-coordinated" omitted from disclaimer about operation agreements.
40	Maintenance	No USBR facilities in the region. NRCS facilities not specifically identified in this section.
40	Regulation	No designated floodways are identified.
41	Information and education	No list of agencies with many gages
43	Relationship with other regions	Delta levee vulnerability impacts South Coast supply reliability.
44	Relationship with other regions	Floodwater can enter the SWP supply at Kern River Intertie.
45	IRWM	No table of IRWMP strategies; no discussion of regional flood projects, but instead a reference to a discussion in Appendix A. There is a statement that <i>arundo</i> removal reduces flood hazards.
51-53	Challenges	Flood challenges are not separated, but described in several titled paragraphs. "Flood control infrastructure" (51-52) notes aging facilities, urbanization threat, funding problems, effects of environmental projects. "Local flooding impacts" (52) identifies recurring flooding as a problem and suggests solutions. "San Jacinto River" (52) singled out as a major flooding issue. "Effects of urbanization" (52) notes increase of impervious area, undesirable vegetation, need for land use regulation, hillside, low area, and steep watershed flooding, and flooding of disadvantaged communities. "Preparedness for and response to flood events" (53) covers need for preparedness, value of mapping, and mitigation methods. "Debris flows" (53) identifies after-fire flooding as a problem. Flood aspects also mention in " Storm water capture " (52) and " invasive species " (52).
56	Looking to the future	Region will continue developing integrated water management. Reauthorization of flood control dams for water supply is being studied.
57	Climate change	Runoff changes and sea level rise may increase flooding and erosion.
A4	Flood governance	Text describes activities of six flood control districts or FCWCDs.
A4-A8	Structural approaches	Short descriptions of the LACDA project and the SAROC projects, and schematics of these two systems, Figures A1 and A2.
B2	Quality of local surface water	Mentions flood control facilities in the Los Angeles and Sanata Ana watersheds

SR -- Sacramento River Hydrologic Region (exceptions)

Page	General Subject	Description
7-8	Ecosystems	Folsom Reservoir and Shasta Dam protect Sacramento from floods.
10	Regional water conditions	Major reservoirs provide flood control benefits.
13	Water supplies	Major reservoirs provide flood control benefits.
19	Water governance	Promises more information in 2013 and refers to Appendix A.
21-22	Constructed facilities	The SRFCP is described
22	Coordination of flood operations	Joint DWR-NWS-YCWA-USACE efforts to develop forecast-coordinated operations on the Feather and Yuba Rivers is described.
24	Information and education	LFPZ mapping for the SRFCP is described.
25	Relationship with other regions	Cooperation between this region and MC is required.
30	Recent accomplishments	Two regional flood agencies organized.
31	Flood planning	Local planning efforts not discussed.
31-32	Flood planning	CVFMP described.
32	Climate change	Will affect flood control
A3	Structural approaches	Reference made to Fig. A-1, SRFCP
B8	Sedimentation and erosion	Increases downstream flooding

SJ -- San Joaquin River Hydrologic Region (exceptions)

Page	General Subject	Description
3, 5	Watersheds	Panoche Creek floods may enter SJR or Fresno Slough
5	Watersheds	Kings River contributes to SJR in floods
6	Ecosystems	Riparian areas exist along flood channels
13	Water supply	Land subsidence may damage flood channels
14	Water uses	Large reservoirs provide storage for floods
19-20	Project operations	USACE dams on the east side of the San Joaquin Valley are primarily for flood control. Releases to SJR below Friant are primarily flood flows or minimum requirements.
22-23	Structural approaches	The SJR Flood Control System and other USACE projects and the Lower SJR Flood Control Project are described. Reference is made to Fig. A-1, Lower SJR and Tributaries Project, and Fig. A-2, Lower SJR Flood Control Project.
23-24	Coordination and reservoir operations	CVFPB-LSJLD O&M agreement for emergency operations is described.
26	Information and education	LFPZ mapping for the SJR Flood Control System is described.
27	Relationship with other regions	Flood operators' conferences described. DWR and DPR reviewed flood impact of Hetch Hetchy restoration.
32-33	Challenges	Value of a discharge-based standard, effective preparedness, and mitigation are not mentioned. A mapping discussion is added.
34-35	Drought and flood planning	Regional and local flood planning is not described. The CVFMPP is described.
36	Climate change	Will affect flood control.
A3, A5	Structural approaches	The LSJLP and the downstream USACE levees are described and reference is made to Fig. A-1, LSJLP, and Fig. A-2, USACE SJR Levees.
B6	Sedimentation and erosion	Increase downstream flooding

TL -- Tulare Lake Hydrologic Region (exceptions)

Page	General Subject	Description
7	Setting	During Kings River floods, majority of water goes to SJR through Fresno Slough. Buena Vista Lake historically spilled to Tulare Lake. Los Gatos Creek may discharge to Kings River in floods. Minor creeks may cause localized flooding.
8	Watersheds	One watershed problem is ag land flooding.
19-20	Water supply	Multipurpose reservoirs on major streams provide flood control. Land subsidence may damage flood channels.
21	Water uses	Large foothill reservoirs manage water for flood control.
25	Sedimentation and erosion	Increase downstream flooding
26-28	Water governance	Flood control mostly managed by many regional or local agencies. More information promised in 2013. Reference made to Appendix A.
32-33	Floodplain restoration	Tulare Lake flood operations and Kern River Restoration Project are described.
34	Information and education	Hydrology/hydraulics models used by various agencies are identified.
35	Relationship with other regions	SJR Settlement Act expected to improve flood protection.
36	Flood diversions	Flood operation of the Kings River and the Kern River Intertie are described.
38	Integrated regional water management	IRWMPs with flood management are identified in Table 12, but no flood projects are identified.
40-41	Challenges	Does not mention importance of discharge-based standard, places at risk, undesirable vegetation (except <i>arundo</i>), effective preparedness, forms of mitigation, or complexities of maintenance funding.
41-42	Drought and flood planning	Planning efforts of local and regional agencies not described.
42	Looking to the future	IRWM is important in flood control improvement.
A4	Structural approaches	Kings River Flood Control Project is identified.

NL -- North Lahontan Hydrologic Region (exceptions)

Page	General Subject	Description
5	Watersheds	Forest fires can increase flooding
9	Ecosystems	Dams originally constructed for flood control
13	Truckee River Operating Agreement, Box 3	TROA would satisfy all applicable flood control requirements.
14	Water Supplies	Releases from Truckee River reservoirs meet flood control requirements.
15	Water governance	Promises more information in 2013 and refers to Appendix A.
24	Coordination and reservoir operations	No flood control diagrams to describe. Instead describes reservoir operations. Notes problem with Martis Creek dam.
25	Regulation	No designated floodways to list
29	IRWM	No regional projects are identified
	Recent accomplishments	Report has no "Accomplishments" or "Recent Accomplishments" section.
33	Challenges: flooding	Does not include general description, value of discharge-based standard, particular places, urbanization, vegetation problems, effective preparedness, value of mapping, mitigation forms, complexities of maintenance, wildfire and debris flow problems. A short list of general challenges is given.
34	Drought and flood planning	Local flood planning not discussed
A5	Disaster preparation, response, and recovery	Description of NWS Advanced Hydraulic Prediction Service is omitted.

SL -- South Lahontan Hydrologic Region (exceptions)

Page	General Subject	Description
7	Antelope Valley watershed	Flooding problems in Antelope Valley are described. Edwards AFB playas are likely to flood in prolonged rain.
7	Mojave River watershed	Mojave River Dam operated for flood control
21	Water governance	Promises more information in 2013 and refers to Appendix A.
24	Coordination and reservoir operations	Region has no flood control space management or flood control diagrams to describe. Forks Reservoir described under "Structural Approaches." No reference to Table A3.
24	Maintenance	Not appropriate to discuss current maintenance difficulties.
24	Regulation	Discussion of flood protection actions by local agencies.
27-30	IRWM	No IRWM flood projects are identified.
30-32	Recent accomplishments	No flood accomplishments are identified.
32	Challenges: flooding	Does not include general description, value of discharge-based standard, particular places, urbanization, vegetation problems, effective preparedness, value of mapping, mitigation forms, complexities of maintenance, wildfire and debris flow problems. A short list of general challenges is given.
34-35	Drought and flood planning	FloodSAFE is not described.
36-37	Climate change	Effect on floods could be substantial. Town flooding could increase but catastrophic damage unlikely. Could increase sedimentation and erosion.
A4	Disaster preparation, response, and recovery	Description of NWS Advanced Hydraulic Prediction Service is omitted.

CR -- Colorado River Hydrologic Region (exceptions)

Page	General Subject	Description
25	Water governance	Promises more information in 2013 and refers to Appendix A.
28	Coordination and reservoir operations	Descriptions of interagency cooperation and flood control diagrams not pertinent.
28	Regulation	Floodplain ordinances not paired with agencies.
29	Information and education	Models potentially useful for flood management are described. No NWS Advanced Hydraulic Prediction Service points are available in the region, so there is no description and no table reference.
31	IRWM	No IRWMS in the region mention flood management. It does not appear in the IRWM strategies table.
36	Challenges: flood control	No reference to Table A3.
37-38	Challenges	There is no mention of flood management.
38-39	Drought and flood planning	FloodSAFE in not described.
A4	Disaster PR&R	No AHPS reference is necessary.

D -- Delta Area (exceptions)

Page	General Subject	Description
3	Setting	Mentions flooding as a near-annual event and identifies flood protection activities
22	Project operations	SWP/CVP subject to flood requirements
24	Flood hazards	No bulleted list, but a discussion of flood hazards
24	Flood governance	Participant list is Box 4.
25	Structural approaches	No table of flood control facilities and no reference to it here
26	Coordination and reservoir operations	<ul style="list-style-type: none"> •No non-FCO statement •No discussion of flood control space management •No description of flood control diagrams •No table of flood control facilities and no reference to it here •Note that Delta depends on upstream reservoir operations •Reference to SR and SJR for more detail •Note that FCO on the Feather River would benefit Delta
26	Maintenance	No list of USACE-, USBR-, or NRCS-maintained facilities.
27	Information and education	<ul style="list-style-type: none"> •No numbers of listed gages given •NWS, DWR, and USGS hydrologic models are discussed •Delta Risk Management Study is described
30	IRWMP	<ul style="list-style-type: none"> •Note that Delta has no specific IRWMPs •Flood control a common theme of nearby IRWMPs •No Strategies table or project summary
31	Delta Risk Management Study	Delta island flood probability 1-7% annually
31	Recent accomplishments	<ul style="list-style-type: none"> •No table •Five Delta counties developing a joint flood response plan •Two flood control agencies organized since 1989
34-35	Challenges	<ul style="list-style-type: none"> •Discharge-based standard not mentioned •Neither urbanization nor vegetation mentioned •Particular places at risk not identified •Value of mapping not noted •Mitigation not discussed •Debris flows due to wildfire not applicable
35	Drought and flood planning	CVFMP described.
36	Climate change	Climate change will affect flood control
38	RM Strategies--Table 1	List of actions in flood risk management
A4	Flood Risk Management	No section for structural approaches and no facility table
A4	Disaster PR&R	<ul style="list-style-type: none"> •Responders table is Table A3 •No AHPS points in Delta and no table
B1	Setting	Flooding mentioned in general discussion

MC -- Mountain Counties Area (exceptions)

Page	General Subject	Description
6	Watersheds	Table A-1 is American River runoff pattern.
11	Land use patterns	Fire-induced slides can cause later flooding. Open space can attenuate floods
21	Water quality	Erosion may increase downstream flooding.
21	Project operations	Western-edge reservoirs provide flood benefits downstream. Fig. 6 shows storage and flood reservation
25	Flood governance	Participant list is Box 2.
26	Constructed facilities	Table A-3 is Reservoirs providing incidental flood control
26	Coordination and reservoir operations	<ul style="list-style-type: none"> •No MC reservoirs have flood control space benefiting MC •Some MC reservoirs benefit downstream areas incidentally •No description of flood control diagrams •No Table of flood control facilities
27	Maintenance	<ul style="list-style-type: none"> •No identification of facility maintaining agencies •Reference to maintenance information in SR and SJR chapters
28	Information and education	<ul style="list-style-type: none"> •Number of gages not given; refers instead to SR and SJR •Describes functions of NWS relative to floods •Describes functions of State-Federal Flood Operations Center •Refers to SR, SJR, and TL for descriptions of flood models
31	Relationship with hydrologic regions	Describes contribution of mountain reservoirs and other headwaters factors to downstream flood control
32,35	IRWM	<ul style="list-style-type: none"> •Strategies of IRWMPs is Table 7 •Counties adopting HMPs are identified
39	Drought and flood planning	The CVFMPP is described.
39-40	Climate change	Discussion of effects of climate change on flooding
43	Implementation next steps	MC workshops identified flood project maintenance as a key step.
A5	Structural approaches	Notes no flood reservation for benefit of MC
A6	Disaster PR&R	AHPS is not described
A6, A8	Relationship with other regions	<ul style="list-style-type: none"> •Describes how MC reservoirs provide flood benefits downstream •Describes interagency cooperation and FCO on the Feather River •Describes interagency cooperation on the Kings River •Refers to SR, SJR, and TL for more information

Index to Flood Management Material in the California Water Plan Update 2009

Volume 4 -- Reference Guide

Volume four consists of 127 reports, mostly from sources outside the Water Plan authorship, organized under 21 topics which form the major subdivisions of this index. Considering that this volume runs 4,545 pages with 2,843 occurrences of the key word-part "flood", and also that the sources are not necessarily Water Plan authors, indexing is more abbreviated than that for Volumes 1-3. Within each topic, the reports are numbered serially. However, two topics have a one-place gap in the numbering. 48 of the reports do not mention "flood", including one topic in which none of the reports mention "flood". All topics and reports are included in this index. Reports that have no occurrences or no relevant discussion of "flood" are so noted. The abbreviation "FM" is used throughout for flood management. Occasionally "CC" is used for climate change.

V4, Background

Report Number and Name	Page	Description
1. A Look Back at Past California Water Plans	1	Flood discussed in Bulletin 160-66
2. Process Guide: California Water Plan Update 2009	2	Integrated FM incorporated in Update 2009
	4	Integrated FM Team
	5	FM expertise on Advisory Committee
	8, 11	Workshops included FM
	11	Climate change affects FM; changes will be long-term.
	12	Integrating flood critical to Water Plan
3. List of State Companion Plans	13	Community ability for FM varies
	3	DFFP Strategic and Fire Plans relate to FM
	4	DHS Strategic Plan relates to FM
	5	4 PUC Plans and Seismic Safety Comm. Plan relate to FM
4. Progress toward Implementation of Update 2005 Recommendations	6	DWR FloodSAFE Strategic Plan is listed
	2	Recommendation 1 relates to FM
	3,4	Recommendation 2 relates to FM
	6	Recommendation 4 relates strongly to FM
	8	Recommendation 5 related to FM
5. Testimony of Mark Cowin at Little Hoover Commission	9	Recommendation 6 relates strongly to FM
	12	Recommendation 8 relates to Delta FM
	1	Integrated water management affects FM
	4	Apart from SWP, DWR would have FM program.
6. Water Allocation, Use and Regulation in California	5	IRWM provides ability to deal with FM
	6	IRWM-related bonds will provide FM benefits
		"Flood" occurrences are incidental
7. Water Chronology, WEF, 2008		
8. Water Plan Update 2009 Glossary	1	Hall Flood control plan; Salton Sea
	1	"adaptive capacity", "alluvium"
	11	"flood event", "flood fight", "flood irrigation", "floodplain management", "flood risk", "forecast-coordinated operations"
	15	"integrated flood management"
	22	"resource management strategy"
	25	"stochastic simulation"
28	"vision"	

V4, Climate Change

Report Number and Name	Page	Description
1. 2009 California Climate Adaptation Strategy	5	Property damages for coastal flood
	7	CNRA staff worked with flood protection work group
	9	Recommendation to avoid build in flood-vulnerable locations
	13, 15	FM relative to sea level rise
	17, 21-23	Climate change will increase floods
	19	Water storage vs. FM
	26	Land use planning and FM
	27, 28	Handling and changes to flood emergency response
	37	Impacts of floods
	38, 40	Impacts of sea-level rise floods
	39	Flooding increases rodent food
	41	Precipitation pattern change will alter flood expectation
	45	CDPH should conduct health vulnerability assessment for floods
	49	Invasive species vs. floods
	49,50	Ecosystem services can be effective FM
	50, 51	Flood pattern change will affect wildlife
	51	Natural flooding benefits negated by development
	53	Habitats affected by flooding
	54	Sea level rise will exacerbate coastal flooding
	58	Reserves would protect species from flood loss
	62	Short-term actions related to floods and floodplains
	63	Long-term actions related to floods and floodplains
	67	Effects of flooding due to sea-level rise
	69	Precipitation pattern change will increase flooding
	70, 71	Effects of coastal flooding induced by sea-level rise
	73,74	Increased flood risk due to sea-level rise and precipitation pattern change
	75,76	Near-term actions to avoid hazards and protect habitat
	77	Areal coordination of infrastructure projects re flooding
	80	State should fund mapping for flood hazard modeling
	81	FM critical to CA vitality, made uncertain by climate change
	82	Expect more and larger floods; reservoirs need reconsideration
	85	Rainfall changes will affect storage needs, erosion, pollutants
	86	Climate change will increase flooding
87	Water adaptation strategies re FM driven by climate change	
88	FM improved by coordination with water supply and ecosystem	
89	Need financing for FM activities; IRWM plans should include strategies to store flood flows; FM should be integrated with water management	
90	Improve Flood Center to support decision making; develop CVFPP; develop local land use policies to decrease flood risk; incorporate wildlife corridor connectivity in flood plans; reconnect rivers and floodplains; tidal wetlands decrease coastal flooding.	
91	Develop conjunctive use on floodplains	
93	Adjust planning horizons with risk analysis; include flooding changes in CWP updates.	
94-97	Climate change flooding a challenge for agriculture	
97	Sea level rise will flood coastal and upstream ag flooding	
100	Sea level rise and hydrologic changes will increase ag flooding	

V4, Climate Change (Cont'd)

Report Number and Name	Page	Description
1. 2009 California Climate Adaptation Strategy (Cont'd)	101	Adaptive FM will benefit floodplain ag
	103	Use flood easements on ag lands; improve levees and groundwater capture
	106	Purchase wetland easements on flood-prone ag lands
	111	Climate change will increase flooding and flood/fire events
	117	More urban trees to reduce flooding
	120	CAL FIRE to examine climate change impacts on flooding
	124	Sea level rise and hydrologic changes will increase flooding
	126	Floods damage transmission lines, drainage systems, roads
	128	Floods damage transmission lines, drainage systems, roads; Sea level rise can damage airports
	129	Floods plus sea level rise threatens roads, railroads, drainage, levees
	130, 131	Infrastructure damage due to sea level rise
	131	Flood zones will be remapped for sea level rise
	135	Buffer areas for future inundation zones
	148-178	Table of short term actions, all of which are indexed above. Flood actions on pages 153, 157, 159, 160, 162-166, 169, 170, and 178.
2. Accounting for Climate Change	2,5	Climate change may increase floods
	5	Potential climate change impact on floods
	6	More difficult to refill reservoirs in spring
	7	Little effect on Stanislaus River storage
	8	Climate change may increase floods
	9	Design floods will be bigger; problems of bigger floods.
	12	Colorado River needs study; bigger floods likely; need long-term model studies.
3. Adapting California's Water Management to Climate Change	5	Summary of FM problems due to climate change
	7	CA water management includes FM; land use related to FM; effective response will integrate FM with other concerns
	9	Climate change may increase floods
	10	Climate change will change reservoir operations
	12	Climate change may increase floods
	14	Population growth, land use policies increase flood exposure
	16	FM has potential for climate change adaptation
	18,19	FM options for change adaptation; problems with adaptation
	20	Tabulated options; water supply-FM linkage
	23	Studies of FM adaptation reviewed; more needed
	25	Water supply mgmt. leads FM in preparing for climate change
	27	Reservoir operation policy; Delta issues complex
	28-30	FM policies hamper adaptation; FEMA and flood insurance; State raising climate change alarm; 2007 legislation; infrastructure solutions are difficult; coordination.
	31	Federal and local FM funding problems
	34-36	Improve science; regulatory implications; resilient development; flood risk information; funding; coordination.
37-38	Conclusions: Flooding will increase; reservoir reoperation, structures, insurance, land use management, low-impact development are some options; current FM policy, lack of funding ampers change. Most needed are new studies and discouraging development in flood-prone areas.	

V4, Climate Change (Cont'd)

Report Number and Name	Page	Description
4. Advanced Policy Analysis 2009	20	DWR proposed strategy is to promote integrated FM
	57-58	Practice and promote integrated FM
	58-59	Enhance and sustain ecosystems
	60	Expand conjunctive use in floodplains
	61	Fix Delta with integrated approach including FM
	62	Identify and fund focused climate change adaptation
5. Climate Action Team: Biennial Report	12	Climate change affects water storage/FM system balance
	25	\$50 billion in property threatened by sea level rise in CA
	38	Data collection improving; floods will be more frequent
	46	Cost of future SF Bay flooding being estimated
	58-63	Various economic analyses of flooding costs
	90-91	Studies needed: sea level rise, storm forecasting, flood risk, improvement in evaluation techniques, water system contamination due to floods
	101	Need to study environmental justice aspect of population displacement due to floods
	107	Executive Order to guide State agencies re sea level rise
	109	Land use strategies and consequences
	112	Climate change will increase flooding
	113	DWR pursuing integrated FM, preservation of ecosystems
	113-114	Climate change and sea level rise will cause more flooding, will impact transportation, beaches, wetlands
	117	Floods a challenge to agriculture
119	Increased flooding will affect public health	
6. Climate Change and California Water Resources: A Survey and Summary of the Literature	11	Cost of sea level rise; need quantitative study on climate change effects on FM; good hydromet data essential.
	22-23	El Niño changes would alter flood patterns; increased storms means more floods, more need for FM
	32	Climate change affects ecology through changed flooding
	35	Increased precipitation a worry in flood-prone areas
	37-38	Traditional hydrology based on trendless climate
	38	SWP operations considers FM
	39	Effect of reservoir operating rule change
	40	Climate change imposes a flood cost on society; concurrent flood and drought increases possible
	40-41	Increase in floods has high cost potential, but it is difficult to quantify. Development, protection, distribution of precipitation are all important factors in cost analysis.
	44	State should improve weather and flood forecasting
	46	State should reevaluate flood risks, evaluate non-structural options. 20th century FM design focused on extreme events.
	47	Dams designed according to expected flood
	49	Reservoir reoperation should be studied; DWR, USBR, CCWD, and locals considering flooding 4 Delta islands
52	Good hydromet data essential.	

V4, Climate Change (Cont'd)

Report Number and Name	Page	Description
7. Climate Change and Water	15	Climate change will increase floods; floods will affect water quality; negative exceeds positive in climate change.
	16	Climate change affects reservoir operation; current practices may need changing
	37	Underestimation of floods and uncertainty
	38	Climate drying can feature intense precipitation and flooding
	49-50	General description of floods and consequences worldwide
	52	Alluvial aquifers are recharged mainly by floods
	53-54	Likely changes in flood pattern worldwide
	56	Costly and harmful increases in flooding likely
	58	Discussion of flood damages on a worldwide basis
	60	Lack of climate change consideration causes flood underestimation
	61	US and other countries addressing climate change in FM
	62	Tabulated examples of adaptation to climate change
	63	Resilient strategies for adaptive FM "robust to uncertainty"
	68	Effect of increased flooding on wetlands
	72	Worldwide ag and forestry vulnerable to increased flooding
	77, 79	Increase in floods will adversely affect food supply, contamination, and human health
	79	Floods increase health problems and water contamination
	82	Table of climate change effects, including floods
	83	Floods endanger water infrastructure; use climate projections in water infrastructure design.
	85	Few countries consider climate change in FM; increased population increases flood risk.
	85-86	Effect of floods on infrastructure
	87	Insurance vs. flooding; transportation vs. flooding
	89-127	This section is about climate change in other places than CA. Flood references for it are not included in this index.
	131	Flood control is a benefit of hydropower development
	132	Wetland restoration decreases flooding
	133	Forest preservation and reforestation decrease flooding
	139-140	Policy implications for FM aspects of climate change
142	Projected warming in the western (US) mountains by the mid-21st century is very likely to cause large decreases in snowpack, earlier snowmelt, more winter rain events, increased peak winter flows and flooding.	
142	Negative impacts of increased flooding on sustainable development unlikely to be avoidable.	
148	Integrated approach needed for hydropower development	
8. Climate Change Scenarios and Sea Level Rise Estimates	38	Floods will continue in the future.
	60	Important to study floods

V4, Climate Change (Cont'd)

Report Number and Name	Page	Description
9. Climate Change Adaptation Strategies for California's Water	4-8	Effect of climate change on floods; stationary hydrology no longer adequate
	8	Effect on water quality due to flooding
	9	Sea level rise will increase coastal flooding; dam operations in question
	10	Developing new FM strategy is a challenge
	12	Floods need stable funding
	14	Flood content of IRWMs
	18	Integrated FM is a needed strategy
	19	Convene System Reoperation Task Force
	20	Update hydrology, improve JOC
	20-21	Develop CVFPP: contents of CVFPP
	21	Local emergency and land use strategies
	22	FloodSAFE goals
	23-24	Flood role in enhancing and sustaining ecosystems
	25	More flood storage needed
	26	Conjunctive use plans to integrate floodplain management
	27-28	Delta floods increasing; State to invest
	29	Need more hydromet gages
	30	Flood infrastructure vulnerable to rising seas
	31	Sensitivity and risk analysis needed for flood studies; CWP to update flood situation changes for 25-year horizon
	32	CWP State companion plans inform flood emphasis
10. Internalizing Climate Change	10	CA flood risk change (due to CC) among nation's highest
	13	Climate changes may amplify flood risks
11. IRWM Climate Change Document Clearinghouse	2, 4, 5, 9, 10	References, URLs, and synopses of papers discussing flood subjects
12. Overview of Climate-change Scenarios being Analyzed by CA Climate Action Team		No occurrences of "flood"
13. Population projections for CA climate change scenarios		No occurrences of "flood"
14. The Future is Now (Summary)		No occurrences of "flood"
15. The Future is Now: An Update on Climate Change Science Impacts and Response Options for CA	30	Rain/snow ratio increase means more floods
	31	Climate change and current operating rules lead to less storage
	38	Storm surge and high runoff tend to occur concurrently
	44	Causes of extreme events
	48	No increase in normalized flood loss costs
	58	Critique of Medellin-Azuara paper
	60	Delta flood impacts
	66-67	Flood effect of sea level rise; for example, La Jolla
	68	Combined effect of CC and non-CC events
	69	Flooding after wildfire
	70	Delta flood risks
	79	Adaptation to climate variability
	80	Meaning of climate adaptation, with flood example
	88	More flooding expected; operation of Lake Shasta
112	Documentation of flood trends	
114	Significant upward trend in extreme floods not documented	

V4, Climate Change (Cont'd)

Report Number and Name	Page	Description
16. The State of Climate Change Science for Water Resources Operations, Planning, and Management	1	Vulnerability of FC infrastructure will increase
	4	Climate has central role in FM
	12	American River flood-generating rainfall
	17	Trends in runoff distribution will affect FM
17. USGS Circular 1331: Climate Change and Water Resources Management: A Federal Perspective	10	Climate change affects flood risk
	11	Chapter 3 focuses on flood risk
	14	Current FM practices may be unable to cope with flood risk
	15	Floods to be more frequent in some places
	17	Updated hydrology; land cover and use affect FM; aging levees, poor maintenance, population pressure increase flood risk
	18-19	Various climate change impacts on FM
	19	Altered flood regimes affect ecosystems; sea level changes modify flood risk
	20	Hydropower at risk in multi-purpose reservoirs due to FM
	23-24	FM considerations in climate trend analysis
	24	Hydromet data important for FM modeling
	26	Climate information for decision making
	29-30	Climate data for flood risk evaluation; methods; using climate projection and paleoflood information
	31	Research needed for precipitation extremes
	38-39	Adapting operations for flood risk
	39	Adapting water demand management and infrastructure for FM
	40	Land use decisions affect flood risk
	42	LiDAR coverage scanty for riverine floodplains
44-45	Non-stationarity important for updating hydrology	
56	Historical documentation of floods	
57	Flood reconstruction using paleoflood information	
18. Using Future Climate Projections	16	Earlier snowmelt affects FM
	27	Modeling streamflow for flood planning
	39	Snowmelt related to FM
	57	Runoff changes related to FM

V4, Crop Water Use

Report Number and Name	Page	Description
1. ACASA		No occurrences of "flood".
2. Calculating CA Cropping Patterns in 2050		No occurrences of "flood"
3. Central Valley Crop Classification Processing		No relevant occurrences of "flood"
4. CUP Plus Model		No occurrences of "flood"
5. Delta Evaporation of Applied Water (DETAW)		No occurrences of "flood"
6. Definition of Ag and Urban Applied Water Use		No occurrences of "flood"
7		There is no Report No. 7.
8. Evaporation Research--A Review and Interpretation		No occurrences of "flood"
9. Evapotranspiration and Relative Contribution		No occurrences of "flood"
10. ET from a Satellite-based Surface Energy Balance		No relevant occurrences of "flood"
11. Limits to the Productivity of Water in Crop Production		No relevant occurrences of "flood"
12. Model for Estimating ET fom Row Crops		No occurrences of "flood"
13. NWS Reference ET Forecast		No occurrences of "flood"
14. Satellite Imagery Can Support Water Planning		No occurrences of "flood"
15. SC-SIMETAW		No occurrences of "flood"
16. SIMETAW	14	Model can provide ET boundary conditions, reducing flood risk
17. SIMETAW II		No occurrences of "flood"
18. Surface Renewal		No occurrences of "flood"
19. The Promise of Regulated Deficit Irrigation in CA		No occurrences of "flood"
20. Wetland Water Use		No relevant occurrences of "flood"

V4, Data and Analytical Tools

Report Number and Name	Page	Description
1. A Strategic Analysis Framework for Managing Water in CA	2,8	What flood strategy should CA adopt?1
	9	Modeling for flood due to climate change
	31	DWR and USACE modeling efforts for flood
2. Economic Modeling of Agriculture and Water in CA		No occurrences of "flood"
3. Future Quantitative Analysis for CA Water Planning		No occurrences of "flood"
4. Improving Analytical Procedures ... for the CWP		No occurrences of "flood"
5. Integrated Scenario Analysis for the 2009 CWP Update	17	Scenario 1--Current Trends: State regularly sued for flood damages
	18	Scenario 2--Strategic Growth: Ag conversion and regulation for flood protection
	20	Flood Risk partly represented in models
	25-26, 57	In WEAP reservoir model, lowest zone is flood control.
	61	Central Valley PA Model has Yolo and Sutter bypasses with flood logic, Eastside Bypass but no logic yet.
	65	Pine Flat not modeled in CV PA Model; James Bypass flows historic.
	93	Yolo Bypass in the CV PA Model
6. Overview: Shared Vision Planning Workshop	2	WEAP models for Update 2009 Scenarios will include flood
7. Recommended Next Steps for Improving ... the CWP		No occurrences of "flood"
8. Regional and Statewide Management Responses ...	2	Delta is system's weakest link for FM
	3	CALSIM model to explain static flood operation rules
9. Revised Work Plan for Near-Term Quantitative Support ...	24	How the WEAP Update 2009 models will handle flood
	30	Key themes for CWP 2009 include FM
	31	Adjusted flood reservoir rules in Update 2009 scenario analysis scope
10. Status Report on Preliminary Operations Simulations		No relevant occurrences of "flood"
11. Survey of Irrigation Methods in CA in 2001		No relevant occurrences of "flood"
12. Technical Notes to Survey of Irrigation Methods in CA in 2001		No relevant occurrences of "flood"
13. Water Management Lessons for CA	3	Major floods characterize CA water resources
	4	Cost of climate change floods; Delta earthquake; floods a major risk and floodplain factor
	15	CALVIN model important in assessing climate change flood; models have many details
	17	Flood protection critical on Sacramento River; change in floods drives levee policy
	22	Flood control benefits a model limitation

V4, Delta

Report Number and Name	Page	Description
1. Our Vision for "The California Delta"	1	Delta urbanization puts more people in the floodplain
	2	Near-Term Actions to Protect the Delta
2. Context Memoranda Summary Report	5	FM a service provided by the Delta-Suisun
	6-7	Flooding and Delta levees
	9	Delta growers see integrated FM
	9	Before Delta water system, ecosystem had all the water
	12	Delta transportation vulnerable to floods
	13	Delta utilities vulnerable to floods
	14	Multiple island flooding is a Delta issue
3. Foundation Concepts and Some Initial Activities to Restore Ecosystem Functions to the California Delta	4, 8, 12, 14	Restoring floodplains is key Delta activity
	15	Delta changes due to flood control
	17	Factors in Delta FM
	21	Floodplain restoration or enhancement an initial activity to restore Delta ecosystem
	22, 23	Tidal marsh restoration and FM
	24	Enhancement of Yolo Bypass, Mokelumne, Cosumnes floodplains
	26	Wildlife-friendly ag better suited to upland than floodplain
	27	Evaluate potential for lower San Joaquin floodplain
	28	Fish run improvement by flooding
	29	FM not needed if south Delta marshes are restored
4. Glossary of Delta and Suisun Initiatives	3	CALFED Stage 2 Planning
	4	CALFED Surface Storage Investigations
	6	Delta Protection Commission Management Plan Update
	7	Delta Risk Management Study, DWR Delta Levees Program
	8	DWR North Delta Flood Control and Ecosystem Restoration Project, East Contra Costa County HMP/NCCP
	9	FloodSAFE California, including the CVFPP
	10	Lower Yolo Bypass Planning Forum
	14	USACE Delta Dredged Sediment Long-Term Management Strategy; USACE Delta Islands and Levees Feasibility Study
	15	USACE CALFED Levee Stability Program
5. Delta Levees and Ecosystem Function	1	Waiting for Delta flood to take action not a strategy for sustainability
	1,2	Bay-Delta Estuary Functions versus Levee Functions
	2-4	Ecosystem Restoration and Levees
	4	Catastrophic Levee Failure and Ecosystem Function

V4, Drought

Report Number and Name	Page	Description
1. Drought Contingency Plan		Not available yet
2. Concepts and Impacts of Drought in California		Not available yet

V4, Economics

Report Number and Name	Page	Description
1. Continuing Changes in Applied Water Use		No occurrences of "flood"
2. Comparing Changes ...		No occurrences of "flood"

V4, Energy

Report Number and Name	Page	Description
1. Energy Requirements for Water Desalination		No occurrences of "flood"
2. 2005 Integrated Energy Policy Report	183	Climate change could increase FM requirements.
3. Energy Demands on Water Resources	9	FM facilities, etc., created in 20th Century.
	19	Hydrogeneration depends on competing uses including FM
	31	TVA includes FM facilities
	45	FM facilities, etc., created in 20th Century.
	67	Hydrogeneration depends on competing uses including FM

V4, Environmental Justice

Report Number and Name	Page	Description
1. Environmental Justice in California Government		No occurrences of "flood"
2. General Plan Guidelines Ch. 2: Sustainable Development	1	Sustainable development policies include protecting natural floodways

V4, Environment

Report Number and Name	Page	Description
1. A Fresh Perspective for Managing Water in California: Insights from Applying the European Water Framework Directive to the Russian River	14	Russian River floodplain reconnection not started
	17	Ecological restoration impacts Russian River levees
	18	Mediterranean climate includes episodic floods
	24	Hydro alteration is main reason for ecological damage
	28	FM a significant factor in negative water impact
	32	Russian River has history of changes to benefit floodplain ag
	35	Russian River gravel extraction from floodplain pits; aerial photos show changes since 1942
	37	Lakes Sonoma and Mendocino store floodwaters
	40	Table showing Russian River FM agencies.
	41	Functions of water agencies, esp. SCWA and MCWA.
	54	Some Russian basin water bodies besides Lakes Sonoma and Mendocino have been heavily modified for FM.
	65	River levees a significant hydromorphological alteration
	66	Effects of levees, channelization, and gravel pits
	69	Table including floodplain connectivity loss sites
	72	Analysis shows significant environmental impacts from FM and gravel mining
	74	Environmental monitoring needed for floodplain connectivity
	79	Floodplain ag a factor in low status of Russian basin water
	80	Assessment of Russian River water uses includes FM; levees disconnect floodplains from rivers
	81, 82	Russian River FM includes protecting human floodplain use
	82	Dominant land use is ag; much historic floodplain now leveed and not in FEMA flood zone, but should be considered flood protection users
84	Description and impacts of floodplain gravel mining	
88, 90	Cost recovery for FM	
89	Ag and urban sprawl impact aquatic environment	

V4, Environment (Cont'd)

Report Number and Name	Page	Description
2. Applying the Public Trust Doctrine to River Protection		No occurrences of "flood"
3. Considering Water Use Efficiency for the Environment...		No occurrences of "flood"
4. Flow Recommendations to the SWRCB	14	W. Fork San Gabriel River fisheries degraded by FM activity
5. Improving Managed Environmental Water Use: Shasta River Flow and Temperature	13	Environmental water typically includes uncontrolled flood releases
	19	Levee setback a current habitat enhancement strategy
	20	Yolo Bypass combines environmental and traditional water use
	21	In 1900's fish hatcheries were a habitat loss mitigation
	23	Water resources systems analysis had included FM
	56	Recent floodplain monitoring on Nelson Ranch
	76, 79, 82	Shasta River floodplain benches tested for temperature variations
	124	Floodplain effects of unimpaired Shasta River simulation
	142	Limitation of Shasta River flood flow modeling
	147-148	Environmental systems analysis has included FM
	163	Removing Dwinell Dam would restore flood pulses
205	Floodplain effect on water temperature	
6. Managed Environmental Water Use Efficiency	11	Results of removing FM facilities: Cosumnes River and Cold Creek
	16	Benefits of Cosumnes River levee breaches
	25-26	Details of Cosumnes River environmental restoration
	28	Details of Cold Creek restoration
	44	Evaluation of FM as environmental benefit
7. Recommendation regarding scenarios and water demand		No occurrences of "flood"

V4, Floods and Flooding

Report Number and Name	Page	Description
1. 2007 California Flood Legislation Summary	3	Introduction to the paper
	4	Background: Historic floods, SPFC, Central Valley susceptibility, new flood laws. Purpose: describe six 2007 flood laws
	6	Intent of legislation, plans to address system deficiencies, updated flood risk information
	7	Land use regulation to include flood risk management
	7-8	New local flood planning requirements
	8-9	Revised rules for general plans before CVFPP adoption
	9	Revised rules for general plans after CVFPP adoption
	10	Other local planning requirements
	10,12	Requirements for local FM agencies
	11	Tabulated timeline for local agency requirements
	12	New requirements for the CVFPB.
	13	New requirements for DWR
	14	Tabulated timeline for State requirements
	15	More requirements for DWR, CVFPB, local agencies
	2. 2007 California Flood Legislation Companion Reference	5
6		GC 11564, amended by SB 17 and AB 5
6		GC 13332.11.1, added by AB 156
6-7		GC 65007, added by SB 5
8		GC 65300.2, added by AB 162
8-12		GC 65302, amended by AB 162
12		GC 65302.7, added by AB 162
13		GC 65302.9, added by SB 5
13-18		GC 65303.4, 65352, 65584.04, and 65584.06, amended by AB 162
18-20		GC 65860.1, 65865.5, 65962, and 66474.5, added by SB 5
20		HSC 50465, added by SB 5
20		PRC 5096.830, added by AB 156
21		WC 8200 and 8201, added by SB 5
21		WC 8306, added by AB 156
22		WC 8307, added by AB 70
22		WC 8521, amended by SB 17 and AB 5
22-23		WC 8522.3, 8522.5, and 8523, added by AB 5
23-24		WC 8550, 8551, 8552, 8554, and 8575, amended by SB 17 and AB 5
24-25		WC 8577 and 8578, added by SB 17 and AB 5
25		WC 8580, 8581, and 8582, repealed by AB 5
25		WC 85980, added by SB 17 and AB 5
26		WC 8590, amended by AB5 (SB 17)
26		WC 8610.5, added by SB 17 and AB 5
27-30		WC 8612, 8613, 9110, 9120, 9121, 9122, 9130, 9140, 9141, and 9142, added by AB 156
30-37		WC 9600, 9601, 9602, 9603, 9610, 9611, 9612, 9613, 9614, 9615, 9616, 9620, 9621, 9622, 9623, and 9624, added by SB 5
37		WC 9625, added by AB 5
38		WC 9650, 9651, 12585.12, and 12878, added by AB 156
40-41		WC 12878.1, 12878.21, and 12878.23, amended by AB 156

V4, Hydrology

Report Number and Name	Page	Description
1. California River Indices	1	Generalization of flood occurrences
2. Frequency of a 100-Year Flood	1	Derivation of probability of 100-year flood in 30 years
3. Major Floods Since 1950	1	Unimpaired runoff table and comments on 1983, 1997 floods

V4, Infrastructure

Report Number and Name	Page	Description
1. CALFED Bay Delta Surface Storage Investigations Progress Report	16 28	Common metric for flood damage Jones Tract flood experience incorporated in In-Delta Storage Program studies
2. California Reservoir Summary	4	No relevant occurrences of "flood"
3. California's Major Water Projects		No occurrences of "flood"

V4, Landscape Water Use

Report Number and Name	Page	Description
1. 20x2020 Water Conservation Plan		No relevant occurrences of "flood"
2. Urban Landscape Evapotranspiration		No occurrences of "flood"
3. Vegetative Assessment in an Urban Environment		No occurrences of "flood"

V4, Legislation

Report Number and Name	Page	Description
1. Handy Guide to the Bagley-Keene Open Meeting Act		No occurrences of "flood"
2. Recent Water, Energy, and Related Legislation Bills	4	AB 140--Disaster Preparedness and Flood Prevention Bond Act of 2006
	4	AB 142--Flood Control: levee repair and flood control systems
	5	AB 1245--West Sacramento Area Flood Control Agency
	5	AB 1798--Disaster Relief
	7	AB 2348--Flood Control:Pajaro River
	10	AB 5--Flood Management
	10	AB 70--Flood Liability
	10	AB 156--Flood Control
	10	AB 162--Land Use:Water Supply
	11	AB 930--SAFCA:Projects
	12	SB 5--Flood Management
	12	SB 17--Flood Protection
	12-13	SB 276--Flood Control Projects
	13	AB 2045--Urban Forestry Act of 1978
	15	SBX2 1--Water Quality, Flood Control, Water Storage, and Wildlife Preservation
	15	SBX3 1--Reductions in the Budget Act of 2007 Relating to Support of Counties: Temporary Suspensions
	15	AB 74--Flood Control:Middle Creek and Hamilton City Flood Damage Reduction
16	AB 1165--Flood Protection	
18	SB 619--Flood Control: County of Santa Barbara, lower Mission Creek	
3. Safe, Clean, and Reliable Drinking Water Supply Act		No occurrences of "flood"
4. The Brown Act: Open Meetings		No relevant occurrences of "flood"
5. Water Package 2009 Fact Sheet	3	SB 1--Delta Governance/Delta Plan
	6	SB 8--Water Diversion and Use/Funding
	8	Water Bond--Safe, Clean, and Reliable Drinking Water Supply Act of 2010

V4, Litigation and Law

Report Number and Name	Page	Description
1. Chronology of Major Litigation Involving the CVP and the SWP	3	<i>Morici v. US</i> , crop damage caused by seepage
	5	<i>Sumner Peck Ranch v. USBR</i> , flooding due to drainage and irrigation practices
	7	<i>Central Green v. US</i> , subsurface flooding from Madera Canal
	7	<i>Calif. v. US</i> , joint-use canal effect on local streams
2. Selected Litigation Affecting the Delta	1	<i>Akins v. Calif.</i> , DPC filed amicus brief re suing land use agencies
	2	<i>Galli v. Calif.</i> , 1972 Brannan-Andrus flood
	2	<i>Belair v. Riv CFCD</i> , liability for flood works failure
	2-3	<i>Bunch v. Coachella Valley WD</i> , liability for flood works failure
	3	<i>Akins v. Calif.</i> , unplanned use of property to retain floodwater
	3	<i>Paterno v. Calif.</i> , liability for failure of accepted levee
	3	<i>Central Green v. US</i> , subsurface flooding from Madera Canal
	3	<i>Calif. v. US</i> , joint-use canal effect on local streams
3. Summary of Significant Litigation 2005-2009	17	<i>Vanni v. Rindge RD 2039</i> , Upper Jones Tract flood
	17	<i>Cortopassi v. DWR</i> , capacity of Delta channels
	18	Katrina Canal Breaches, flooding due to Hurricane Katrina

V4, Planning

Report Number and Name	Page	Description
1. Addressing California's Uncertain Water Future by Coordinating Long-Term Land Use and Water Planning: Is a Water Element in the General Plan the Next Step?	16	"Water management planning" includes FM in this paper
	18	Five of seven general plan elements relate to FM. Land use element must identify land subject to flooding.
	41	Special water district concept was response to flooding.
	44	Urban water management plans do not discuss flood.
	55	OPR suggests water element for general plans, including FM.
	56	Consolidating a water element with FM involves watershed mapping.
	63	Distributing water to other GP elements reduces clarity.
	65	Riverside Co. Multipurpose Open Space element includes floodplain management.
	67	Imperial and Riverside Cos. address FM in water element or section.
70	GP water element would inform public better.	
2. Collaborative v. Technocratic Policymaking: the CWP	31	State packaged CWP Update 2005 to emphasize FM, etc.
3. Financing Strategies ... for ... Water Resource Projects	2	Benefits of WR projects are associated with purpose, such as FM, and are not diminished by public enjoyment
4. Finding Water for New Growth: Sources, Tools, ...	7	Recharge capacity limits flood flow recharge of groundwater.
	10	County and regional water users groups being formed
5. Future Food Production and Consumption in CA ...		No occurrences of "flood"
6. Strategic Planning Guidelines		No occurrences of "flood"
7. Water for Growth: California's New Frontier	52	Recharge capacity limits flood flow recharge of groundwater.
	55	Re a major seismic event that floods the Delta
	85	Some land-use agencies participate in FM groups.

V4, Sustainability

Report Number and Name	Page	Description
1. Draft Compendium of 2/5/08 Sustainable WR Roundtable		No occurrences of "flood"
2. ACWA Enviro and Econo Sustainable Policy Principles		No occurrences of "flood"
3. Sustainable WR Roundtable Indicator Framework		No occurrences of "flood"
4. Sustainability Workgroup		No occurrences of "flood"
5. Sustainable WR Roundtable Annual Report	16	SWRR Advisory Council suggested adding FM topic
	19	Reservoirs often have FM purpose
	21	Climate change may convert water supply to flood hazard
	37	USACE Missouri River development includes FM
	38	Droughts have hampered Missouri River FM development; Upper Basin and Lower Basin states disagree on FM
	51	Climate variability concerns those worried about flood flows
6. Addressing Sustainability of California's Communities	82, 83, 87, 88	Entries in "Matrix of Candidate SWRR Criteria & Indicators"
	1	Symposium recommends integrated community planning including FM
	2	Symposium case studies included aging levees
	3	Integrated planning in early stages; four additional recommendations about FM and floodplains

V4, Tribal History and Consultation

Report Number and Name	Page	Description
1. 2009 California Tribal Water Summit Proceedings	7	Summit is opportunity to discuss emergency flood response
	15	Flooding can cause power outages and water shortage
	20	DWR should make flood and storm planning part of CWP
	21	DWR should support Tribal emergency planning
	22	DWR should support Tribal floodplain mapping
2. Early CA Laws and Policies related to CA Indians		No occurrences of "flood"
3. Letter to CA Tribal Leaders		No occurrences of "flood"
4. Plenary Topic Table	1	Flood Planning and Management is a topic
5. The Federal-Tribal Trust Relationship		No occurrences of "flood"
6. The Doctrine of Reserved Water Rights		No occurrences of "flood"
7. Tribal Communication Plan	7	Tribal-State water issues include FM
	10	Objectives Table: share information about FM
	12	Objectives Table: share information about flood funding

V4, Water Quality

Report Number and Name	Page	Description
1. California Nonpoint Source Encyclopedia	15	General Plan conservation element may include FM.
	57	Flood prone areas are sensitive conditions for developing streamside management areas.
	65	Road decommissioning can reduce flood hazards.
	87	Forested wetlands provide flood benefits.
	88	Site preparation should avoid flood bottoms
	100	Development should consider floodplain locations
	104	100-year floodplains less suitable for development
	105	Development can increase runoff, cause flooding
	114	Sediment control includes protecting storm drain inlets
	122	DWR Urban Stream Restoration Program funds FM
	123	Reference to video on ecological flood control, etc.
	125	Site disposal systems outside floodplains
	145	Locate deicing materials stockpiles outside floodplains
	181	Locate storage/disposal areas for liquids outside flood areas
	198	DFG regulates flood control projects
	199	FM structural practices
	201	DWR North Delta Improvement Project is opportunity for FM
	204	FM structural practices
205	South Sacramento County Streams Project provides flood damage reduction; reference to video on ecological flood control, etc.	
2. A Clear Blue Future: How Greening California Cities Can Address Water Resources and Climate Challenges in the 21st Century	5	Low impact development practice is providing retention areas
	6	Lid can reduce flooding.
	8	CA reservoirs operated for flood control purposes
	9	Global warming can increase flood events
	10	Retention areas reduce flooding.
	11	LID can reduce flooding; urbanization increases it..
	14	Lid can reduce flooding.

V4, Water Rights

Report Number and Name	Page	Description
1. California Water Rights		No relevant occurrences of "flood"
2. Ch. 15, Federal Interests	41	USBR has responsibilities relating to flood control
	46	CVP not prohibited from delivering surplus flood flows
3. Federal Reserved Water Rights		No occurrences of "flood"
4. Flexibility in the California Water Rights System		No occurrences of "flood"
5. Letter to Delta Vision 9/18/07		No occurrences of "flood"
6		There is no Report No. 6.
7. The Water Rights Process		No occurrences of "flood"
8. Water Rights: Issues and Perspectives		No occurrences of "flood"

