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About this draft: This is a working draft. It is incomplete. The chapter contains placeholders for some figures and tables. Much of the data is missing. Full discussion of some topics may be incomplete. This is the second of several drafts to be circulated in 2008 before the public review draft is distributed in December.

Subgroup: Improve Flood Management

Chapter [#] Flood Impact Modification

Flood impact modification is one of four strategies specifically intended to improve flood management. It includes projects and programs that assist individuals and communities to prepare for, respond to, and recover from a flood. Other flood management strategies are flood susceptibility modification, floodflow modification, and floodplain restoration (see discussion of these in their volume 2 chapters). Additionally, other resource management strategies discussed in California Water Plan Update 2009 may provide flood management benefits.

The selective application of this suite of strategies creates an opportunity to engage in Integrated Flood Management, a process that promotes a comprehensive approach to flood management that considers land and water resources at a watershed scale within the context of integrated regional water management, which aims to maximize the benefits of floodplains and minimize the loss of life and damage to property from flooding.

Flood Impact Modification in California

Background

Traditionally, flood management has relied on physical improvements that divert or reduce flood waters and avoid damage to lives and property. Often referred to as “flood control,” this concept has favored physical modification of stream channels, dams and surface impoundments, levees, and other structures that altered or confined natural watercourses. More recently, the emphasis has shifted to a more integrated approach that includes both structural and non-structural methods and seeks to enhance the ability of undeveloped floodplains and open spaces to reduce the incidence of floods and the implementation of land use practices that minimize the risk to lives and property. This multi-faceted approach to flood management relies on the integration of multiple strategies to achieve the broad goal of improving flood management.

To identify statewide flood risks and inform the State’s flood management policies and investment decisions, the Department of Water Resources has initiated the FloodSAFE California program. The goals of the FloodSAFE program are (1) Reduce the Chance of Flooding – Reduce the frequency and size of floods that could damage California communities, homes and property, and critical public infrastructure; (2) Reduce the Consequences of Flooding – Take actions prior to flooding that will help reduce the adverse consequences of floods when they do occur and allow for quicker recovery after flooding; (3) Sustain Economic Growth – Provide continuing opportunities for prudent economic development that supports robust regional and statewide economies without creating additional risk; (4) Protect and Enhance Ecosystems – Improve flood management systems in ways that protect, restore and, where possible, enhance ecosystems and other public trust resources; and (5) Promote Sustainability – Take actions that improve compatibility with the natural environment and reduce the expected costs to operate and maintain flood management systems into the future.

Description

Flood impact modification includes the following types of projects and programs:

- Information and Education
- Disaster Preparedness
- Post-flood Recovery
- Flood Insurance

Information and Education

Information and Education is an important element of flood management. To understand potential risks, flood hazard information is a prerequisite to sound education. The development of needed technical information includes the hydrology and hydraulics of streams and rivers, delineation of the areas subject to inundation, assessment of properties at risk, and calculation of the probabilities of various levels of loss from floods. Once potential flood risks are known, public education is a powerful tool to modify the impact of future events. If the public understands the potential risks, then they can make decisions to reduce their risk, increase their personal safety, and expedite recovery after floods.

Disaster Preparedness

Disaster Preparedness includes the development of plans and procedure on how to respond to a flood and the implementation of measures that can reduce future hazards. Emergency response planning includes activities undertaken in advance of an emergency to develop operational capabilities and improve effective response to disasters, such as the preparation of a comprehensive response plan, training of local response personnel, designation of evacuation procedures, and the conduct of exercises to assess readiness.

Hazard Mitigation Planning includes analyses of ways to eliminate or reduce the impact of flood disasters. The federal Disaster Mitigation Act of 2000 requires each state to develop and maintain a State Hazard Mitigation Plan to address various potential disasters, including floods. A local hazard mitigation plan, approved by the Federal Emergency Management Agency (FEMA), is required to receive grant funds for mitigation projects from the federal Hazard Mitigation Grant Program and the federal Pre-Disaster Mitigation Grant Program.

Post-flood Recovery

Post-flood Recovery includes programs and actions that restore public facilities and services, provide aid to individuals, and facilitate other forms of assistance to individuals, businesses, and communities. The restoration of public facilities and services is crucial to expediting post-flood recovery as vital public services are needed to permit homes and businesses to return to functionality. In the period immediately following the flood, individual residents and business owners may require aid to protect lives and property. Various forms of assistance can also expedite recovery, which may be in the form of temporary shelter, grants or loans, or other forms of financial assistance. Typically, the issuance of a disaster declaration (by the Governor and/or President) expands the forms of assistance that can be offered. Some grants and loans may be conditioned on reducing future flood risks by reducing or eliminating development in flood prone areas or minimizing future flood exposure through reconstruction techniques.

Flood Insurance

Flood Insurance is provided by the federal government via the National Flood Insurance Program (NFIP), which was established by Congress in 1968. The NFIP enables property owners in participating communities to purchase insurance as a protection against flood losses in exchange for state and community floodplain management regulations that reduce future flood damages. Participation in the NFIP is based on an agreement between each community and the federal government. If a community adopts and enforces a floodplain management ordinance to reduce future flood risk to new construction in floodplains, the federal government will make flood insurance available within the community as a financial protection against flood losses. This insurance is designed to provide an insurance alternative to disaster assistance and to reduce the escalating costs of repairing damage to buildings and their contents caused by floods.

Connections to Other Resource Management Strategies

As discussed above, this strategy is one of four specifically intended to improve flood management (flood susceptibility modification, floodflow modification, and floodplain restoration are addressed in other chapters). The concept of integrated flood management relies on the application of multiple strategies to achieve a comprehensive effect. In addition to these key strategies, other strategies included in the water plan also have the potential to provide flood management benefits and may be included as an element of integrated flood management. Potential flood management benefits from other resource management strategies include:

- **Conjunctive management and groundwater storage:** Diversions of surface water for groundwater infiltration could enhance flood management by reducing flows.
- **Conveyance:** Improvements to regional water supply distribution systems could enhance the potential for flood flow conveyance.
- **Ecosystem restoration:** Ecosystem restoration can enhance the ability of open spaces to absorb rainfall and runoff and reduce the potential for flood events, or enhance recovery after flood events.
- **Surface storage:** Reservoirs can be designed to provide storage for floodflows, thereby reducing downstream flood peaks or volumes.
- **System reoperation:** Reoperation of reservoirs constructed for water supply purposes could provide opportunities to preserve and/or enhance flood management capabilities, by providing for the storage of flood flows.
- **Urban runoff management:** Management of urban runoff for purposes of improving water quality can preserve and/or enhance flood management by designing management practices to reduce or delay flood peaks.
- **Watershed management:** Watershed management can promote the retention of open space and habitat which can reduce the severity of flood events and promote recovery after flood events.

Potential Benefits of Flood Impact Modification

The potential benefits of flood impact modification for each hydrologic region vary largely depending on the extent of flood protection planning by local jurisdictions within each region (such as FEMA/OES [Office of Emergency Services] Multi-Hazard Mitigation Plans) and community participation in the NFIP / Community Rating System. The regional reports for each of the 10 hydrologic regions and 2 special interest areas (see Update 2009 volume 3) describe

some of the potential benefits of integrated flood management, which would include non-structural measures such as flood impact modification.

Interregional benefits associated with flood impact modification are limited, as the conveyance of floodflows does not occur between hydrologic regions. However, the implementation of flood impact modification within the Mountain Counties special interest area has the potential to provide benefits to downstream areas in the Sacramento and San Joaquin regions. Similarly, improvements in the Sacramento and San Joaquin regions would provide benefit to the Delta region. Statewide benefits from flood impact modification would accrue from reducing the potential magnitude of damages and the State's need to provide assistance from such events.

Widespread public knowledge of potential for climate change may provide new opportunities to address flood preparedness issues.

Potential Costs of Flood Impact Modification

The Department of Water Resources is working to identify the costs of improving flood management on a statewide basis. Included in this effort are the Central Valley Flood Protection Plan, a Statewide Flood Management Planning Project, and support for enhanced regional flood management through Integrated Regional Water Management (IRWM) plans. Collectively, these efforts will identify flood risks, propose feasible flood management improvements and quantify the cost of implementing the identified improvements. Some preliminary information may be available to inform Update 2009 of the Water Plan, but the bulk of this information may not be available until a subsequent water plan update.

Major Issues Facing Flood Impact Modification

Implementation of flood impact modification will not adversely affect drought preparedness, water quality; or energy consumption. As an element of Integrated Flood Management, this strategy will enhance flood management. Promotion of this strategy as an element of integrated regional water management is unlikely to create challenges, as the implementation non-structural flood management measures are not likely to create issues with other forms of water resource management.

The costs of flood impact modification may not be substantive (as capital costs may be relatively low), but population growth and development pressures and competition for scarce local resources may impede improved flood management measures.

Currently, the extent of flood management across the state needs are not well documented, although some local flood management plans (and multi-hazard mitigation plans) may describe local needs. Many regions lack current hydrologic information or hydraulic models needed to assess potential flood risks, suggesting that the state may need to consider investments in data collection and analysis to address data gaps and improve understanding of potential flood risks.

Recommendations to Facilitate Flood Impact Modification

Consistent with the recommendations of the FloodSAFE Strategic Plan:

- The Department of Water Resources should develop a comprehensive Central Valley Flood Protection Plan (as described in California Senate Bill 5) with extensive stakeholder input by January 1, 2012.
- The Department of Water Resources should identify opportunities and needs to improve integrated flood management statewide and develop a financing strategy by January 1, 2012.
- The Department of Water Resources should develop a strategy to provide incentives and support for the creation and maintenance of IRWM plans that address regional flood management issues by January 1, 2012.

Selected References

- Association of State Floodplain Managers. 2003. No Adverse Impact: A Toolkit for Common Sense Floodplain Management.
- Association of State Floodplain Managers. 2007. National Flood Program and Policies in Review.
- California Department of Water Resources. 1980. California Flood Management: An Evaluation of Flood Damage Prevention Programs, Bulletin 199. Sacramento. Sep.
- California Department of Water Resources. 2006. Progress on Incorporating Climate Change into Management of California Water Resources. Technical Memorandum Report. Jul.
- California Department of Water Resources. 2008. Draft FloodSAFE Strategic Plan. Mar.
- Governor's Office of Emergency Management. 2007. State of California Multi-Hazard Mitigation Plan.
- Federal Emergency Management Agency. 1986. A Unified National Program for Floodplain Management, FEMA Publication 100.
- Federal Emergency Management Agency. 2002. National Insurance Flood Program Description, Aug.
- World Meteorological Programme. 2004. Associated Programme on Flood Management, Integrated Flood Management.
- World Meteorological Programme. 2007. Associated Programme on Flood Management, Formulating a Basin Flood Management Plan. Mar.