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Subgroup: Improve Flood Management

Chapter [#] Flood Impact Reduction

Flood Impact Reduction is one of two 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. The other flood management strategy (floodflow management) is discussed in Chapter . Additionally, other resource management strategies discussed in California Water Plan Update 2009 may provide flood management benefits.

The selective application of these strategies provides 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 Reduction 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.

Description

Flood Impact Reduction includes the following types of projects and programs: (1) Floodplain Regulation, (2) Development and Redevelopment Policies, (3) Housing and Building Codes, (4) Information and Education, (5) Disaster Preparedness, (6) Flood Insurance, and (7) Post-flood Recovery.

Floodplain Regulation includes land use policies which guide the development of areas adjacent to streams and rivers which may be subject to periodic flooding or inundation. These measures may include measures to restrict or prohibit development within floodplains. Where development is permitted measures may require protection of buildings and other development from potential flood damage (such as flood-proofing, described below). It may also include acquisition of floodplain lands through purchase or easements and measures intended to restore the natural, beneficial functions and values of the floodplain.

Development and Redevelopment Policies include land use practices that are designed to reduce flood risks, reduce the severity of potential floods, and expedite recovery after floods. This may include floodplain regulation (described above), stream protection ordinances, stormwater management practices, open space preservation, and watershed management programs. The intent of these practices is to reduce risk to structures by limiting development in flood prone areas,

preserving the ability of water courses, wetlands, and open space to absorb precipitation and slowly release runoff, and reducing the extent of impervious surfaces. Redevelopment policies may include measures which impose conditions on future construction that restrict the size and placement of structures, encourage reduction of impervious areas, and encourage the long-term restoration of streams and floodplains.

Housing and Building Codes include specific measures which reduce flood damage, preserve egress routes during high water events, such as rooftop exits in areas subject to deep flooding, or require that streets serving development are elevated above anticipated water levels to ensure safe egress from flooded areas. These codes may include flood proofing, which consists of measures which render buildings and their contents less vulnerable to floods through structural changes to existing buildings and specific design features of new buildings. These measures can include impervious walls without any openings and valves on sewer lines that automatically close from back pressure. Alternatively, the lowest floor could be completely open, consisting of open columns that create a covered patio or storage area.

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. Early warning of flood events, in the form of flood forecasting and warning involves the forecasting of river stages and the timely notification of responsible authorities so that plans for evacuation of people and property can be implemented. Factors which influence the benefits of flood warnings include: reliability of the precipitation forecast, length of forecast warning time, magnitude of reducible damage, and efficiency of response to a warning.

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. Flood preparedness may occur as an element of Hazard Mitigation Planning, which includes analyses of ways to eliminate or reduce the impact of potential hazards, such as floods, earthquakes, or wildfires. 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.

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. If a community participates in the voluntary Community Rating System and implements certain floodplain management activities, the flood insurance premium rates are discounted to reflect the reduced flood risks. This insurance is designed to provide an alternative to disaster assistance and to reduce the escalating costs of repairing damage to buildings and their contents caused by floods.

Post-flood Recovery includes programs and actions that restore utility services, public facilities, and community services, repair levees and other structural flood management facilities, 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.

Connections to Other Resource Management Strategies

The concept of integrated flood management relies on the application of multiple strategies to achieve a comprehensive effect. In addition to the two flood-specific 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. These include: Conjunctive Management; Conveyance; Ecosystem Restoration; Forest Management; Land Use Planning and Management, Surface Storage; System Reoperation; Urban Runoff Management; and Watershed Management. A description of the potential flood management benefits of these other strategies is provided in Chapter __, Floodflow Management.

Potential Benefits of Flood Impact Reduction

The primary benefits of Flood Impact Reduction are derived from the potential to reduce risks to lives and property from flood events, a reduction in the social and economic disruption of flood events, and a reduction in flood recovery costs.

The potential benefits of Flood Impact Reduction 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), community participation in the NFIP / Community Rating System, the extent of current and projected future development within floodplains, and the willingness of local jurisdictions to enact land use policies and practices which reduce exposure to flood risks. 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.

Interregional benefits associated with Flood Impact Reduction are limited, as the conveyance of floodflows does not occur between hydrologic regions. However, the implementation of Flood Impact Reduction 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 could provide benefit to the Delta region. Statewide benefits from Flood Impact Reduction 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 management issues. Implementation of this strategy is not expected to provide benefits to water supply; drought preparedness; water quality, energy (consumption or supply), or resource stewardship.

Potential Costs of Flood Impact Reduction

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 Reduction

Although Flood Impact Reduction can reduce the impacts of flooding, these measures cannot completely eliminate the risks of flooding. Thus the communities and individuals need to understand and be aware of the potential for impacts from flooding to affect lives and property.

FEMA's ongoing map modernization program may result in changes in flood risk designations for some communities, which could change, and in some areas expand, the areas that are subject to flood insurance requirements. The expansion of flood hazard zones can cause short-term impacts to the real estate and development industry as well as the financial industry supporting those sectors.

Global climate change may have a significant impact on the timing and magnitude of precipitation and runoff which could change the magnitude and frequency of future flood events. Thus current Flood Impact Reduction measures may not be sufficient to address potential future impacts.

Integrated flood management suggests the application of a wide range of strategies to achieve a comprehensive result. However, the application of some of these strategies, such as those focused on water supply or land use planning, is beyond the control of local flood managers. Thus, integration creates challenges associated with the close coordination of activities by multiple agencies, both to achieve a coordinated result and avoid unintended consequences. Although IRWM has been proposed as a methodology to address water resource management, coordination of actions by multiple agencies is often complex, requiring memorandums or other legal agreements that address issues of liability and responsibility. The lack of clear mechanisms to implement coordinated actions may hamper the potential for integrated action.

Currently, the extent of flood management needs is not well documented for most portions of the state. The state may need to consider investments in data collection and analysis to address data

gaps and improve understanding of potential flood risks and the extent to which individuals and communities have implemented measures to reduce potential flood impacts.

The costs of Flood Impact Reduction 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.

Implementation of Flood Impact Reduction 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 or conflicts with other means of water resource management.

Recommendations to Facilitate Flood Impact Reduction

To facilitate Flood Impact Reduction, it is recommended:

- Flood control districts and other relevant jurisdictions should analyze potential flood risks and make this information publicly available, including any residual flood risks. The public, businesses, and public agencies should be provided with sufficient information about potential flood risks to make informed decisions that can reduce potential impacts of flooding.
- The Department of Water Resources should work closely with the Office of Emergency Management and State Health Services to ensure a consistent approach to disaster preparedness plans and procedures.
- Flood control districts and other relevant jurisdictions should incorporate the potential affects of climate change into planning for future flood events. Until more refined projections are developed, DWR recommends a 20% higher peak flow reference for planning purposes.
- The Department of Water Resources should develop a comprehensive Central Valley Flood Protection Plan (as described in SB5) with extensive stakeholder input by January 1, 2012.
- The Department of Water Resources should identify opportunities and needs to improve integrated flood management statewide with extensive stakeholder input 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.
- The Department of Water Resources should develop a financing strategy to address statewide flood management needs and the creation and maintenance of IRWM plans by January 1, 2012.

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