

## Summary

State and Federal legislation authorized the development of comprehensive plans for flood damage reduction and ecosystem restoration along the Sacramento and San Joaquin rivers following the disastrous floods that occurred in January 1997. While the loss of life and catastrophic property damage from this natural event provided the impetus for funding a comprehensive evaluation of the flood management system, the need for change had been growing for some time. Earlier system failures had also caused loss of life and billions of dollars in property damage. Population increases, urban expansion into agricultural areas, other land use and infrastructure changes, and continued degradation of riverine ecosystems placed demands on the system that were not originally anticipated. Some public safety projects were at gridlock due to the single-objective approach. Additionally, the costs for maintaining the system were exceeding the fiscal capacity of some local maintenance agencies, resulting in inconsistent and sometimes inadequate levels of maintenance. The authorizing legislation for this study recognizes that a durable flood management system that can be effectively maintained on a long-term basis requires a design to accommodate and respect natural processes and the current benefits and uses offered by the river systems.

The original flood management system consisting of levees, weirs, bypasses, and overflow areas was visionary in its ability to convey large floods with minimal damage. Reflecting public values and attitudes at the time it was developed in the early 1900's, the system was based upon managing and redirecting the flood flows so that land could be put to a higher economic use rather than managing land uses and accepting the fact that flooding will occur. In addition to protecting lives and property, the original system was intended to facilitate use of the rivers for waterborne commerce. Subsequent construction of major foothill reservoirs provided additional flood management capability.

Over time, public interest has expanded to include conserving and protecting natural systems, rather than replacing them with more intensive uses. This public interest, expressed through legislation, recognizes that it is not necessary for public safety and economic prosperity to conflict with conserving natural systems. If conflicts do occur, they can be managed through a balanced approach that retains protecting lives and property as the system's paramount purpose. The use of the system has changed since it was constructed, with water supply conveyance replacing waterborne commerce.

A comprehensive effort to develop an effective plan for the flood management system requires evaluating how the complete system functions, how its performance could be improved, and how changes to parts of the system affect its overall performance. The need for system-wide comprehensive analysis applies to both flood damage reduction and ecosystem restoration objectives. The capability of analyzing the flood management system comprehensively would replace the past practice of making incremental changes to the system without fully understanding how it may affect other parts of the system and the performance of the system as a whole. A major undertaking of the study was developing the necessary analytical tools to evaluate how changes to the system affected the performance of the system as a whole with

respect to reducing flood damages, protecting public safety, and restoring degraded ecosystems. The size, complexity, and differences of the two river basins comprising this study were especially challenging in developing computer models to understand how flood waters moved through the flood management system, how those flows damaged property and threatened public safety, and how flows are related to restoring degraded ecosystems. These computer-modeling tools have the capability to evaluate how broad changes to the system affect its overall performance and potentially redirect impacts to other parts of the system. Further refinement of these models could support future planning for regional changes to the flood management system.

During the course of developing the computer-modeling tools, potential measures were evaluated both individually and in various combinations to understand how the flood management system functions and how it responds to changes. System-wide application of the computer-modeling tools often confirmed or clarified intuitive understandings of the system and provided a sense of scale or quantified the magnitude of the system's response to change. The evaluations led to several important findings about the flood management system. Some of these findings are:

- The system cannot safely convey the flows that it was formerly considered capable of accommodating.
- If levee reliability were improved system-wide, substantial increases in flood storage capacity would be necessary to avoid transferring increased flood risks to downstream areas.
- A comprehensive solution to improve public safety, reduce flood damages, and restore degraded ecosystems will require a combination of measures that increase conveyance capacity, increase flood storage, and improve floodplain management.

It was widely anticipated that the Comprehensive Study would ultimately recommend a "Master Plan" for the development of integrated flood damage reduction and ecosystem restoration projects throughout the Central Valley. Although there is widespread agreement that changes are needed to improve the system, there is no agreement at this time where the various measures should take place.

What did evolve from these planning efforts is a process to develop future projects to meet the system's comprehensive public safety, flood damage reduction and ecosystem restoration objectives. This process consists of guiding principles for integrating flood damage reduction and ecosystem restoration in future changes to the flood management system. The process provides an approach to develop projects that ensures system-wide effects are evaluated regardless of project scale and an administrative structure to oversee consistent application of the process. The guiding principles are intended to apply to any proposal that may affect the flood management system and are summarized below:

- Recognize that public safety is the primary purpose of the flood management system.
- Promote effective floodplain management.
- Recognize the value of agriculture.
- Avoid hydraulic and hydrologic impacts.
- Plan system conveyance capacity that is compatible with all intended uses.

- Provide for sediment continuity.
- Use an ecosystem approach to restore and sustain the health, productivity, and diversity of the floodplain corridors.
- Optimize use of existing facilities.
- Integrate with the CALFED Bay-Delta Program and other programs.
- Promote multi-purpose projects to improve flood management and ecosystem restoration.
- Protect infrastructure.

The Reclamation Board will use these guiding principles for planning future projects that are developed and implemented jointly with the Corps of Engineers, and will take them into account as they may apply to various proposals by others for floodplain encroachments.

Previous Comprehensive Study documents and reports provided information on the evaluations of potential changes to the flood management system conducted during the development of system-wide hydrologic, hydraulic, and flood damage assessment models and during earlier planning of potential “Master Plans.” The purpose for previously reporting this information was to document and share technical findings and to foster public dialogue and interest in potential “Master Plan” components. The process described in this report for selecting future projects does not recommend any projects or contain any decisions regarding alternatives or measures that may address the study objectives. Future detailed planning studies will be conducted as local and regional interests collaborate and agree on water resource problems that could be addressed by changes to the flood management system, and initiate the planning process.

Projects that may be developed and implemented by the Corps of Engineers and The Reclamation Board in the future will generally observe the conditions listed below. These conditions respond to some of the stakeholder concerns that have been widely expressed throughout the course of the study. They are essentially a reiteration of present laws, regulations, and policies.

- Since projects require some level of local cost-sharing and local responsibility for operations and maintenance, broad local support is a prerequisite to detailed planning and implementation.
- Every effort will be made to acquire any real estate needed for future projects through negotiated agreements (willing sellers). Eminent domain is not intended for ecosystem restoration purposes. Eminent domain may be used to protect public safety when necessary.
- The minimum real estate interest needed to satisfy project purposes will be acquired.
- It is the intention of the guiding principles that no one will be harmed by changes to the flood management system. Every effort will be made to avoid, minimize or mitigate for any adverse effects.

Other factors have been identified that will be addressed as future projects are developed and implemented. Some of these other factors are using a science-based adaptive assessment and management approach to measure success and improve future project planning, continued coordination with ongoing resource management programs, completing a series of technical

studies, considering potential climate changes, periodically updating system-wide information, and using a scientific peer review process to confirm project planning decisions.

This interim report sets the foundation for future modifications to the flood management system. The guidance provided in the report will help maximize benefits from the expenditure of local state, and Federal funds. In addition to needed physical changes to the system, meeting the goals of truly reducing future flood damages as well as restoring degraded riverine ecosystems must include improved management of the way we occupy and use the floodplains. Floodplain management can provide early and lasting benefits well before the longer lead-time regional projects can be developed. One factor in meeting the Plan's goals is recognizing the prominent roles that ecosystem and agriculture play as compatible floodplain uses.

The studies clearly show the need to manage the rivers in a comprehensive and system-wide manner. However, opportunities for comprehensive system-wide floodplain management and ecosystem restoration will decrease with time unless immediate work begins under the guidance provided by this interim report.