

Implementing the Central Valley Flood Protection Plan

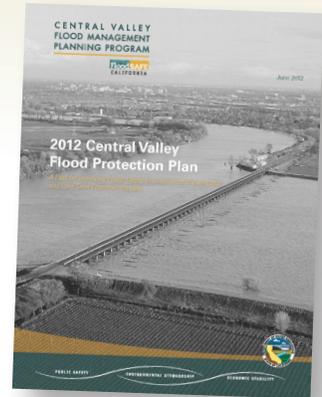
State-Led Basin-Wide Feasibility Studies



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The 2012 Central Valley Flood Protection Plan recommends a State Systemwide Investment Approach for flood risk management in the Central Valley. The California Department of Water Resources has initiated Basin-Wide Feasibility Studies, along with associated Regional Flood Management Planning and the Central Valley Flood System Conservation Strategy, to advance both ongoing and long-term implementation of the State Systemwide Investment Approach. This document describes the role and scope of the Basin-Wide Feasibility Studies.

2012 Central Valley Flood Protection Plan



Background

The Central Valley Flood Protection Plan, adopted by the Central Valley Flood Protection Board in 2012, considered and evaluated three preliminary approaches to flood management for the areas protected by the State Plan of Flood Control (SPFC) facilities. Assessment of these three approaches resulted in formulation of a fourth approach called the State Systemwide Investment Approach (SSIA). All four approaches are presented in Figure 1. The SSIA is an assembly of the most promising, affordable, reasonable, and balanced elements of the three preliminary approaches. The California Department of Water Resources (DWR) has now initiated Basin-Wide Feasibility Studies, along with associated Regional Flood Management Planning and the Central Valley Flood System Conservation Strategy (Conservation Strategy), to advance both ongoing and long-term implementation of the SSIA.

DWR is progressing with implementation of the CVFPP, marking an important step toward modernizing the SPFC facilities to achieve sustainable flood management in the Central Valley. This includes refining the State Systemwide Investment Approach (SSIA); continuing flood system improvements and repairs; and advancing residual risk management through enhanced emergency response, improved operations and maintenance, and wise management of floodplains.

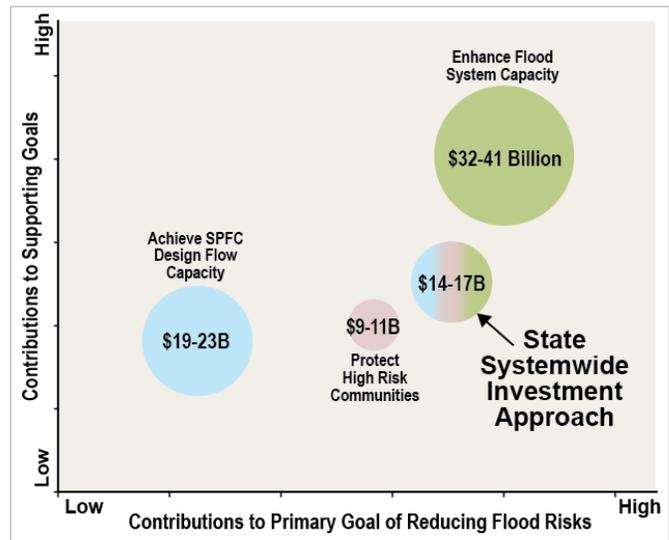


Figure 1. Relative Comparison of Preliminary Approaches to State Systemwide Investment Approach

The State, in the 2012 CVFPP, recognizes the strong links between flood management and other resources in the Central Valley. Using an integrated water management approach, the State is coordinating the development and management of water-related resources, in order to maximize public safety, economic stability, and environmental stewardship. The CVFPP will be refined, updated, and implemented consistent with DWR's integrated water management approach.

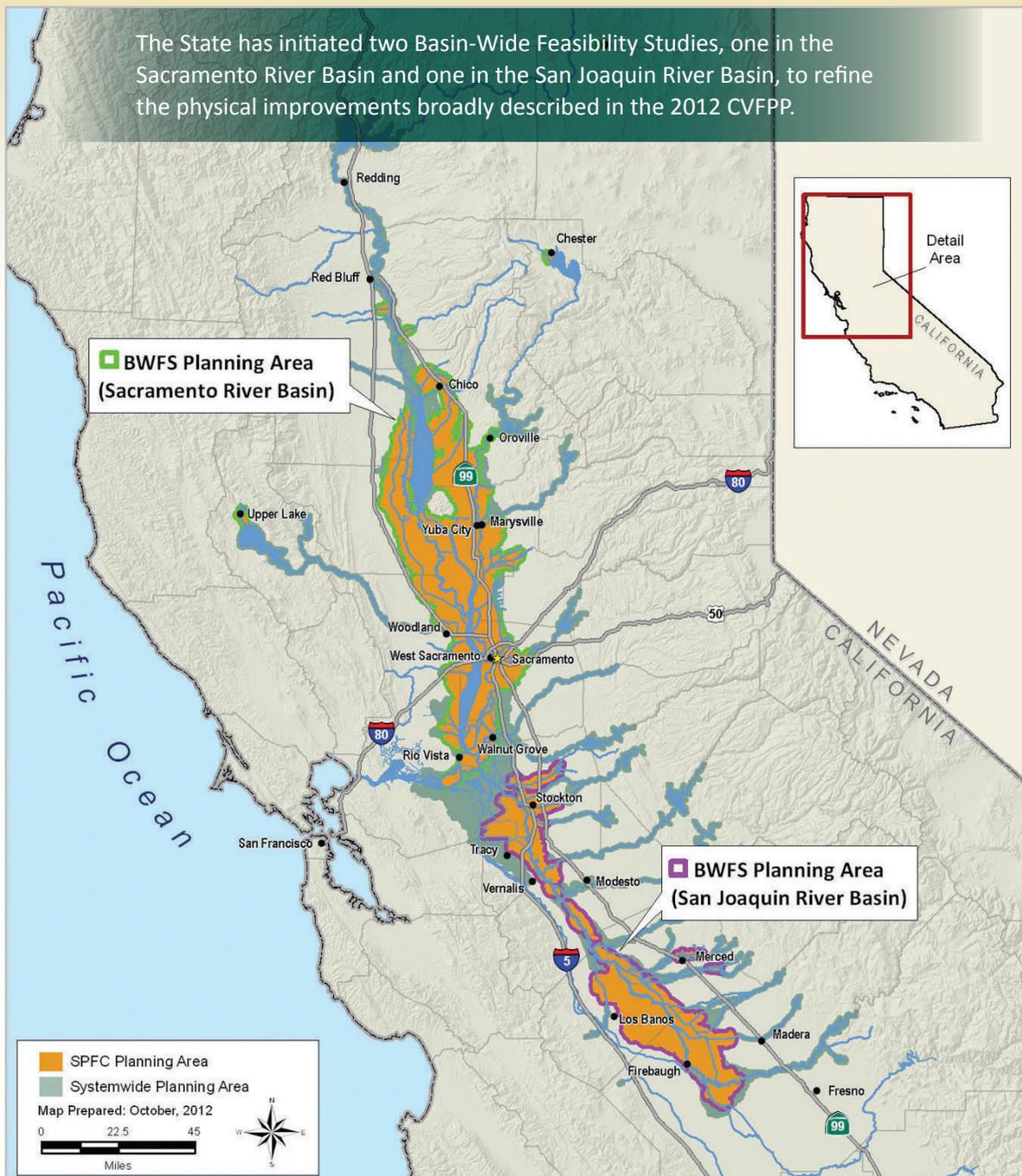


Figure 2. Geographic Scope of Basin-Wide Feasibility Studies Consistent with the 2012 CVFPP

Updates to the CVFPP will be prepared by DWR every five years, beginning in 2017. Updates will build upon the previous CVFPP, with the level of detail generally increasing over time as feasibility studies and implementation programs progress. Each five-year update cycle will involve reviewing and reconfirming underlying needs, updating technical data and tools, reassessing risks and

actions to reduce those risks, completing studies and feasibility analyses, and recommending actions and policies to support continued implementation of the plan. The five-year updates will also inform State financing and investment planning, and provide linkages to related integrated water management projects and programs.

State Systemwide Investment Approach Refinement

The SSIA includes two types of physical actions: (1) regional improvements address local and regional flood management needs; and (2) system improvements are long-term SPFC improvements that provide cross-regional benefits and improve overall flood system function, flexibility, and resiliency. System improvements typically have a larger scope and scale than regional improvements and, consequently, will take longer to implement.

To help identify regional improvements that align with local preferences, DWR has launched the locally-led Regional Flood Management Planning (RFMP) effort by providing directed funding to support bottom-up regional plan development consistent with the CVFPP. DWR's Basin-Wide Feasibility Studies (BWFS) are refining system improvements identified in the CVFPP, including cross-regional flood management and conservation actions, while considering recommendations from regional plans.

Efforts stemming from the 2012 CVFPP, including the BWFS, Central Valley Flood System Conservation Strategy (Conservation Strategy), and RFMP, will continue to focus on the SPFC and lands receiving protection from the SPFC (Figure 1). They will also be consistent with the established goals of the CVFPP.

Primary CVFPP Goal

- Improve Flood Risk Management—Reduce the chance of flooding, and damages once flooding occurs, and improve public safety, preparedness, and emergency response.

Supporting CVFPP Goals

- Improve Operations and Maintenance
- Promote Ecosystem Functions
- Improve Institutional Support
- Promote Multi-Benefit Projects

The BWFS will develop objectives that are consistent with the over-arching CVFPP goals, to help guide

Flexible, Resilient, and Sustainable Flood Management

The CVFPP seeks to achieve a more flexible, resilient, and sustainable flood management system in the Central Valley.

Flood system flexibility is the ability of the flood management system to adapt to changing conditions, such as changing hydrologic, social, political, regulatory, or ecologic conditions.

Flood system resiliency is the ability of the flood management system to continue to provide benefits and recover quickly after damaging floods.

Flood system sustainability refers to a system that is socially, environmentally, and financially sustainable for an enduring period.

refinement of the SSIA. BWFS objectives will reflect the State's desire to achieve a more flexible, resilient, and sustainable flood management system in the Central Valley.

Purpose of Basin-Wide Feasibility Studies

The purpose of the BWFS is to evaluate the feasibility of different alternatives for improving the flood management system, consistent with the SSIA, including

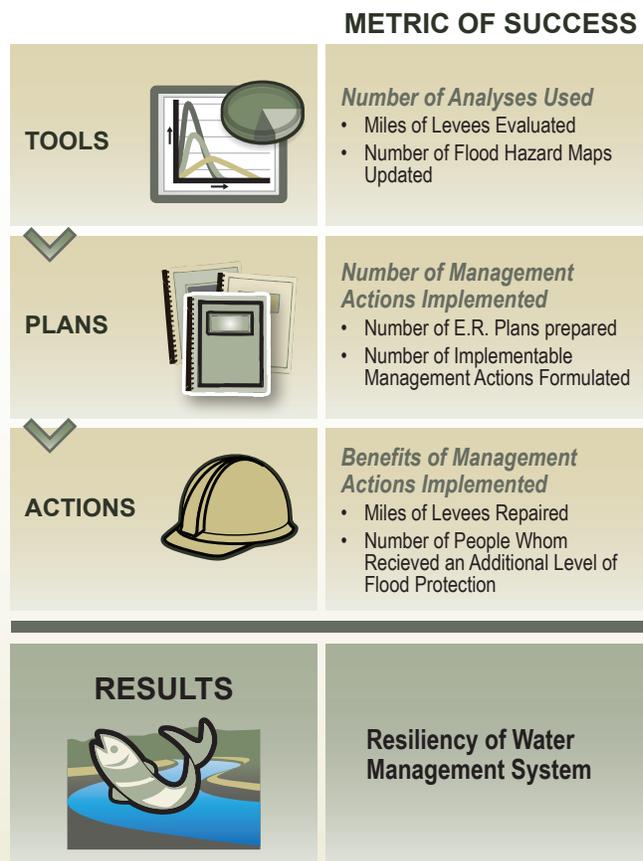
- Improving flood management system flexibility and resiliency through expansion and extension of the flood bypass system and other system improvements
- Integrating ecosystem enhancements and other multi-objective projects with systemwide flood management improvements
- Combining regional improvements with system improvements to identify the State's systemwide investment package.

Anticipated Accomplishments of Basin-Wide Feasibility Studies

Scheduled to be completed by mid-2016, DWR anticipates accomplishing the following through BWFS:

- Refine the scale and location of major SSIA system improvements for flood management within the SPFC.
 - Assess State interest in regional flood management improvements identified in regional plans.
 - Integrate systemwide environmental conservation with flood system improvements as part of the SSIA, including potential mitigation needs and restoration opportunities.
- Inform the 2017 update to the CVFPP and FloodSAFE Financing Plan by:
 - Establishing a framework for evaluating multi-objective project benefits, identifying beneficiaries, and allocating costs on a systemwide scale.
 - Refining the magnitude and types of State investments needed in each basin.
 - Identifying implementation considerations for system improvements, including project sequencing and State priorities.
 - Identify elements of the SSIA that can be further developed, in an efficient and timely manner, in ongoing federal cost-share feasibility studies.
 - Identify elements of the SSIA that should be incorporated into new federal cost-share feasibility studies.

Integrated Water Management Approach in Flood Management



DWR is using an Integrated Water Management (IWM) approach to implement FloodSAFE, fostering public safety, environmental stewardship, and economic stability statewide.

DWR's IWM approach consists of systematic steps in program development and implementation that include: developing **tools** to provide the data and analysis results needed for flood management decision making; preparing **plans** informed by these tools and input from stakeholders, to guide the State's implementation efforts; formulating and implementing **actions** (activities that fund, manage, and oversee implementation); and delivering **results** that provide value to California's residents. The results will be flood system resiliency; a system that is resourceful, can rapidly recover from major floods, is robust, and can provide redundancy.

Integration and Coordination with Parallel Efforts

The BWFS and subsequent CVFPP update will incorporate findings and data from many ongoing efforts under FloodSAFE and DWR as a whole. Key planning efforts that directly interact with the BWFS are described briefly below and illustrated in Figure 3.

Central Valley Flood System Conservation Strategy

The Conservation Strategy will document DWR’s approach for implementing the three environmental objectives of the Central Valley Flood Protection Act of 2008: (1) promote natural dynamic hydrologic and geomorphic processes; (2) increase and improve habitat quantity, diversity, and connectivity, and (3) promote the recovery and stability of native species populations. Building on the Conservation Framework in the 2012 CVFPP, it will provide the systemwide context for improving environmental conditions and trends as part of the BWFS and the 2017 CVFPP. The Conservation Strategy will include measurable conservation objectives and regional conservation actions, and permitting strategies to support SSIA implementation. In combination with

regional permitting efforts, the Conservation Strategy will support regulatory approvals needed for SSIA implementation.

Through integration of the Conservation Strategy and the BWFS, DWR intends to proactively improve environmental conditions from a systemwide perspective, thereby reducing compensatory mitigation needs for individual projects. DWR is developing the Conservation Strategy in close coordination with regulatory agencies and stakeholders. The Conservation Strategy will be completed in parallel with the BWFS.

Regional Flood Management Planning

RFMP is an important part of flood management improvement planning in the Central Valley. The locally-led RFMP effort will develop long-term, regional flood management plans that address local needs (such as urban level of flood protection requirements), articulate local/regional priorities, and establish the common vision of regional partners. DWR has provided funding and resource support to help develop regional plans consistent with the 2012 CVFPP. It is anticipated that all regional plans will be completed in 2014.

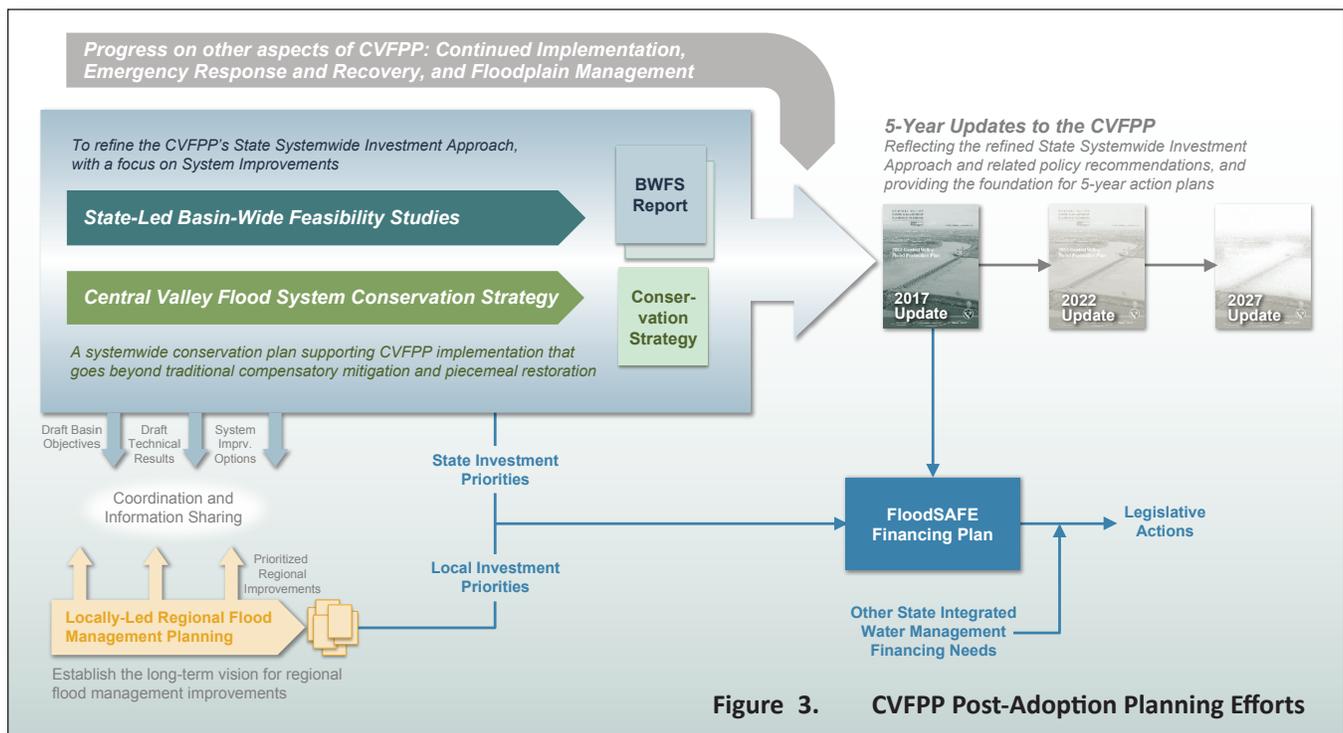


Figure 3. CVFPP Post-Adoption Planning Efforts

At minimum, each regional plan will include (1) an informational atlas describing the regional setting and available information, (2) a vision of flood management for the region, (3) a prioritized list of potential local/regional projects consistent with the 2012 CVFPP, and (4) a financial plan that includes local funding strategies and considers financial feasibility.

DWR plans to actively engage with RFMP to ensure that information developed through systemwide planning efforts are available for regional plan development. Emerging technical findings will be shared during key development stages, including problem identification, objectives development, system performance analyses, cost-benefit assessments, and implementation considerations. Similar feedback from RFMP will be equally valuable in developing the BWFS.

RFMP is vital to flood management planning and will help identify local and regional priorities and potential funding mechanisms. The BWFS and Conservation Strategy will be informed by these locally developed plans, such that local perspectives are represented in the analyses of systemwide flood management and conservation actions consistent

with the SSIA. However, neither RFMP nor BWFS will authorize projects or allocate funding.

Federal Coordination

The majority of Central Valley flood management facilities, and nearly all SPFC facilities, are part of the State-federal flood protection system. Accordingly, federal coordination is required for actions ranging from individual permits to Congressional actions or appropriations for modifications to SPFC facilities.

The State-led BWFS focus on the State's decision making needs, and are not intended to fulfill the federal decision-making process on a system scale. Rather, DWR is coordinating with the U.S. Army Corps of Engineers to determine federal participation in regional projects through ongoing federal cost-share feasibility studies, and in the broader system context through the Central Valley Integrated Flood Management Study.

DWR is also engaging various other federal agencies through its CVFPP implementation efforts with respect to floodplain management, regulatory compliance, and integrated water management.



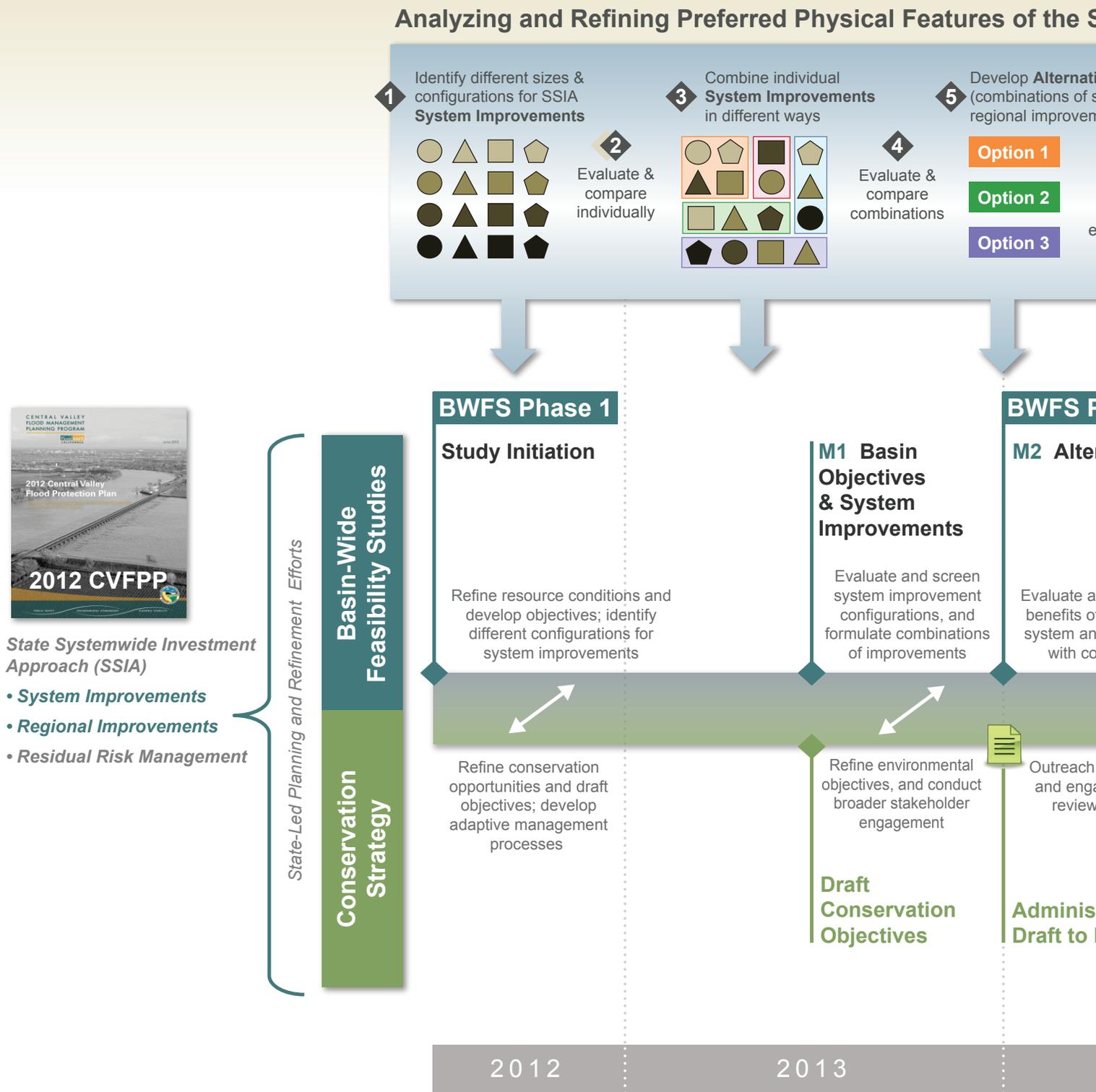
Physical Features of the State Systemwide Investment Approach

Regional improvements address local and regional flood needs. Examples include projects to achieve an urban level of flood protection or protect small communities. They are typically smaller in scope, geographic scale, and cost than system improvements, and will be implemented primarily by local or regional entities.

System improvements provide cross-regional benefits and improve overall flood system function, flexibility, and resiliency. They include actions that can improve the overall performance of the SPFC in managing large floods, such as bypass expansion and flood storage operations, and support systemwide ecosystem functions. They are intended to provide benefits above and beyond the levels of flood protection achieved through regional improvements. System improvements typically have a larger scope and scale than regional improvements and, consequently, will take longer to implement.

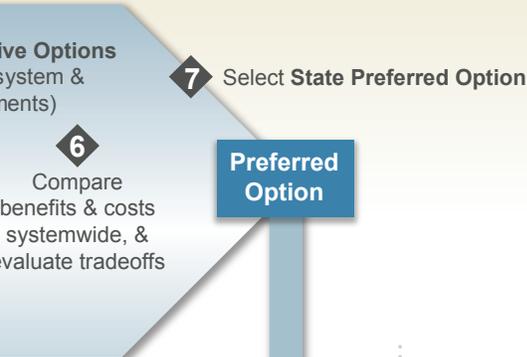
In addition to these physical features, the SSIA also incorporates non-structural actions to address residual flood risks, or those risks that will remain even after regional improvements and system improvements have been implemented. These actions address emergency preparedness and response, post-flood recovery, and wise management of SPFC floodplains.

Figure 4. Study Approach and Milestones for Basin-Wide Feasibility Studies and Central Valley Flood System Conservation Strategy

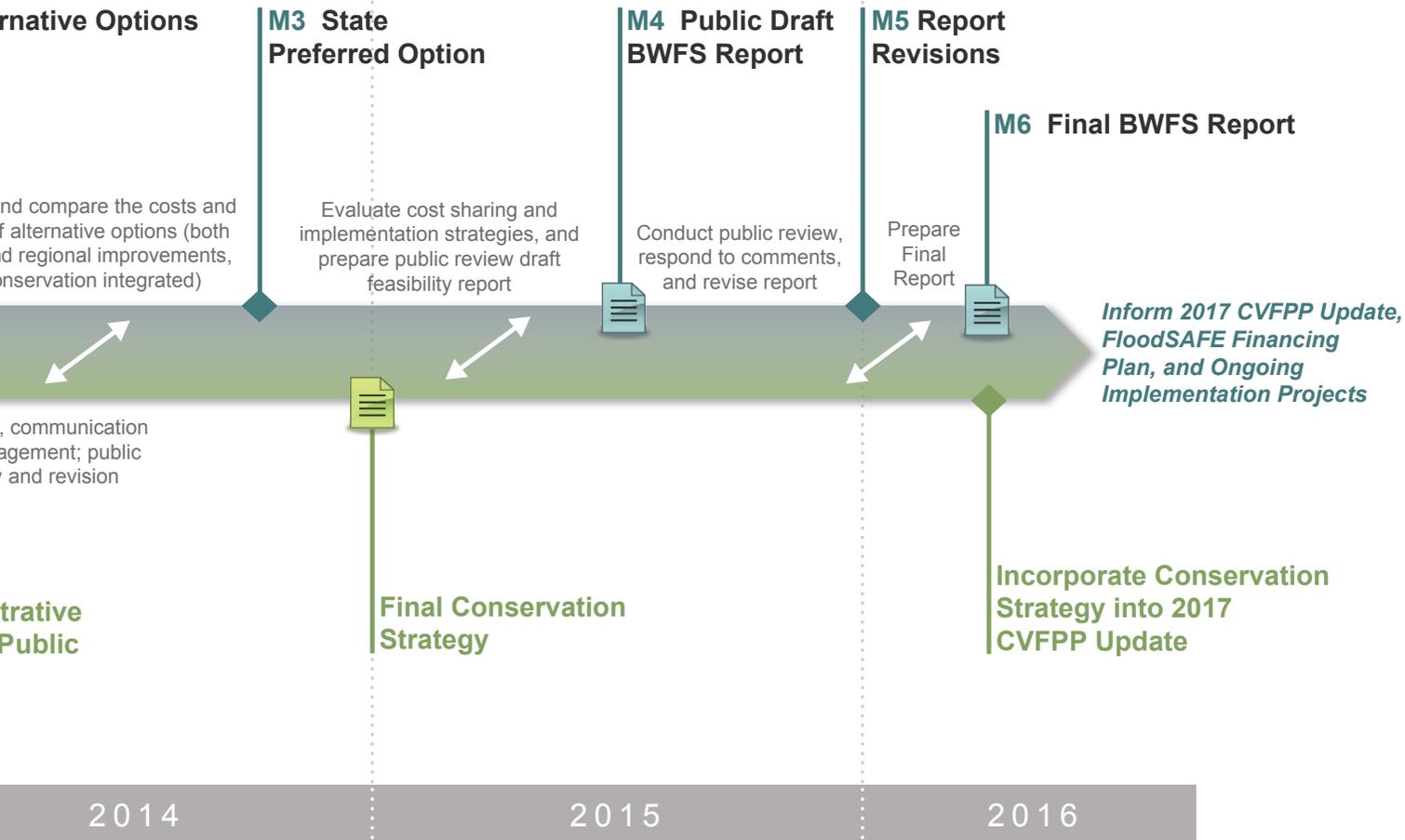


Note: BWFS schedules in the Sacramento River and San Joaquin River basins may differ somewhat due to differences in study complexity, scope, and technical needs.

SSIA



Phase 2



Key:
 BWFS = Basin-Wide Feasibility Study
 Conservation Strategy = Central Valley Flood System Conservation Strategy
 M = Milestone
 SSIA = State Systemwide Investment Approach

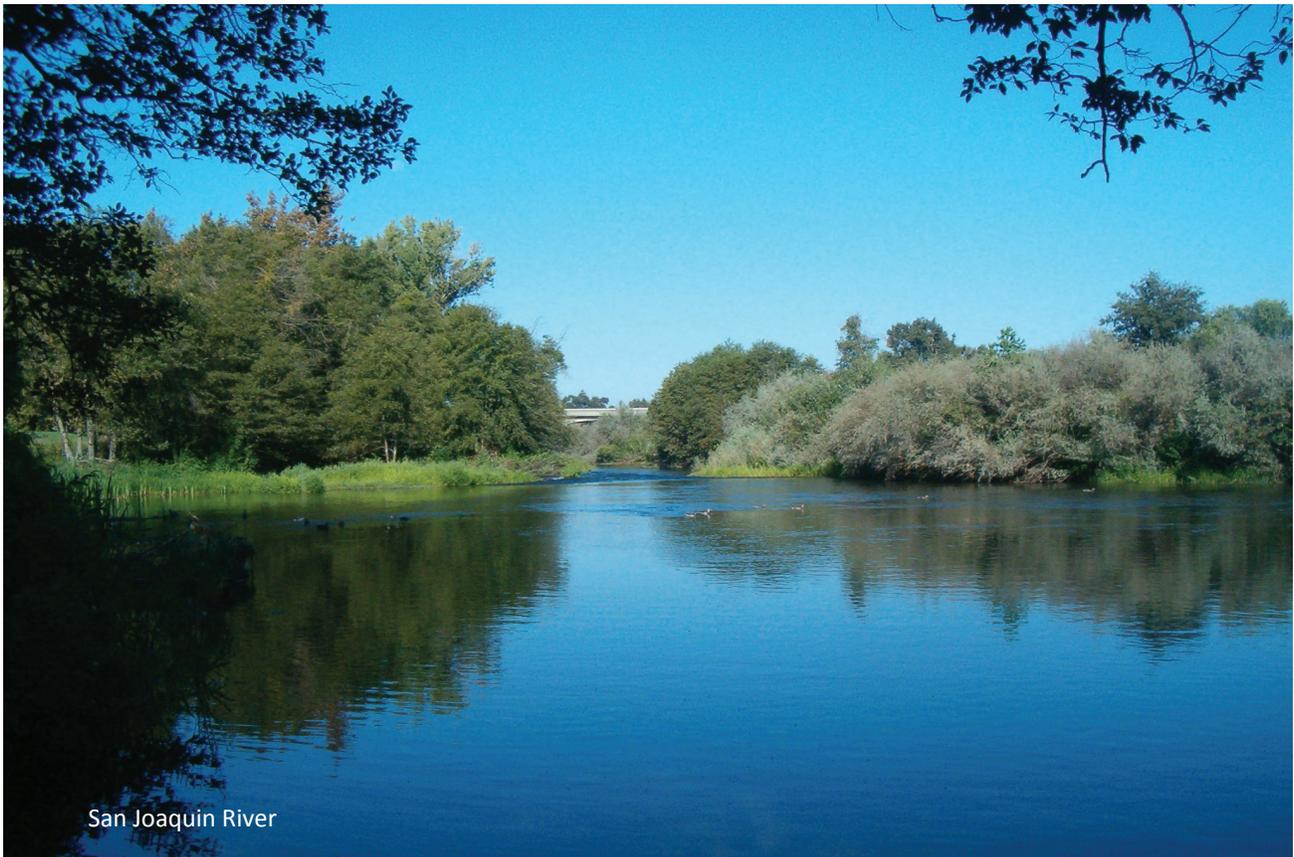
Study Approach

DWR intends to conduct two BWFS: one in the Sacramento River Basin and one in the San Joaquin River Basin. Each study will progress independently through two phases (Figure 4).

- **Phase 1** will be conducted concurrently with RFMP and the Conservation Strategy, and will focus on developing specific objectives and physical options for system improvements, including bypass modifications, operational changes, and other cross-regional features. Different physical configurations and scales for system improvements will be analyzed and compared. These configurations will integrate systemwide conservation opportunities consistent with the Conservation Strategy for regional mitigation and systemwide enhancement. A short-list of promising system element configurations, consistent with the SSIA as defined in the 2012 CVFPP, will then be identified for further evaluation.

- **Phase 2** will consist of evaluating and comparing the physical improvement components of the SSIA on a systemwide scale, considering their costs, effects, and benefits. Systemwide analysis tools will be used to assess hydrologic and hydraulic effects and associated, economic, life safety, environmental, and other benefits. This evaluation will support selection of a State preferred option in each basin, in coordination with the Conservation Strategy. Findings and recommendations will be documented in two reports, one for each basin.

DWR is closely linking the State-led BWFS and Conservation Strategy to achieve progress in changing the status quo of Central Valley flood management. DWR will actively promote information sharing between the BWFS— Conservation Strategy and locally-led RFMP. Figure 3 depicts opportunities for interaction and information exchange, although the specific details are expected to evolve as these three efforts progress.



Level of Detail

The BWFS will conduct technical analyses and evaluations needed to refine the physical features and cost of the SSIA broadly described in the 2012 CVFPP. Subsequent work, outside the BWFS, will be required to develop project-specific designs, approvals, and environmental compliance sufficient to begin construction (Figure 5).

DWR will use the best available information and latest policies in the BWFS. SSIA elements will be refined to different levels of detail in the BWFS, reflecting State priorities and potential implementation roles, the large geographies of the studies, and interdependency with ongoing planning efforts led by others.

Milestones

DWR has identified six milestones within the 3-year time frame for development of the BWFS (Figure 4).

1. Basin Objectives and System Improvements
2. Alternative Options
3. State Preferred Option

4. Public Draft BWFS Report
5. Report Revisions
6. Final BWFS Report

These milestones facilitate periodic DWR policy-level review and decision making, and dissemination of information to the public on study progress and findings. The milestones also provide additional opportunities to align the CVFPP with other parallel efforts for consistency and coordinated progress.

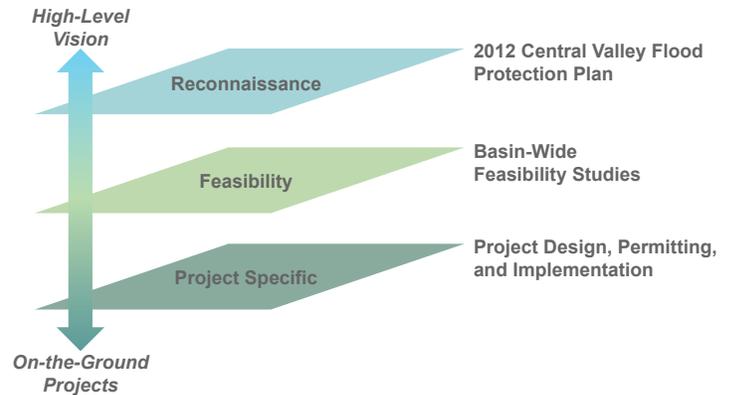


Figure 5. Levels of Detail for CVFPP Implementation Efforts

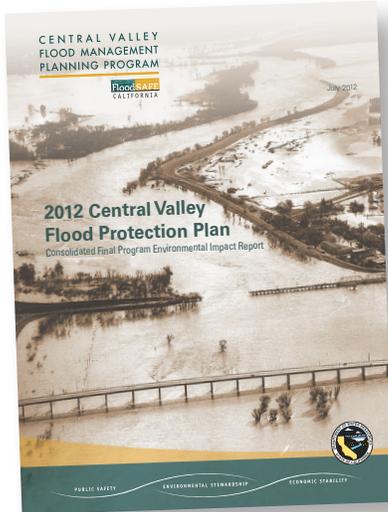


Financial Planning and Long-Term Funding

DWR's flood management planning efforts—including BWFS, Conservation Strategy, and RFMP—do not commit existing or future funding; however, they contribute to development of the FloodSAFE Financing Plan and further legislative actions and bond laws that may provide long-term financial stability to flood management in the Central Valley.

Environmental Review

DWR is considering several potential approaches to environmental review for the BWFS. To the extent possible, DWR intends to rely on the 2012 CVFPP Consolidated Final Program Environmental Impact Report for the BWFS and the 2017 CVFPP update. In addition, DWR and maintaining agencies may also use the Program Environmental Impact Report as a source of information to support relevant permitting processes. If applicable, environmental review would be initiated under provisions of the California Environmental Quality Act and the National Environmental Protection Act, as appropriate.



2012 Central Valley Flood Protection Plan Consolidated Final Program Environmental Impact Report



Supporting Technical Evaluations

Technical analyses supporting the BWFS will help refine the physical features of the system improvements identified in the SSIA, with a focus on improving flood system flexibility and resiliency. Analyses will cover systemwide flood hydrology, reservoir operations, riverine and estuary channel hydraulic evaluations, levee performance, flood damage and life risk analyses, regional economics and other benefits assessments, engineering and cost estimates, and climate change considerations. These analyses will consider benefits to public safety, flood damage reduction, ecosystem functions, and other integrated water management benefits, with an end goal of identifying potential beneficiaries and cost sharing partners.

Technical analyses for the BWFS will refine the SSIA in two phases (Figure 4).

- Analyses in Phase 1 initially focus on refining SSIA system improvements, considering different physical scales, footprints, and combinations (weir widening combined with bypass widening or flow constriction removal, for example).
- Phase 2 will evaluate and compare the costs and benefits of SSIA options (both system and regional improvements to meet the objectives, with conservation actions integrated).

A systemwide analysis of benefits and costs will quantify a broader range of potential benefits than the 2012 CVFPP, including those related to reducing risks to people and property, improvements in ecosystem functions, benefits to local and regional economies, and other integrated water management benefits (water supply and quality, for example). Analysis of benefits from a systemwide perspective will support the allocation of refined SSIA system improvement costs to beneficiaries, inform the long-term FloodSAFE Financing Plan, and help shape the State programs that will be needed to implement the SSIA.

The technical analyses will not specifically consider local (non-SPFC) facilities that do not influence the SPFC; ecosystem restoration actions outside the scope of the SPFC; residual risk management and other non-structural actions; and new flood storage. Information and results provided by other integrated flood management programs will be considered in the BWFS, as available. This includes DWR's System Reoperation Study and Forecast-Coordinated Operations/Forecast-Based Operations programs.

Further, the BWFS will be informed by ongoing federal cost-share feasibility studies. These studies will provide feasibility-level data and information (on project features, designs, costs, and benefits) in areas that are already under a feasibility scope investigation, to avoid duplication.

The Next Generation of Systemwide Analysis Tools

DWR is making significant investments in new data, tools, and analytical frameworks to support the BWFS, 2017 CVFPP update, and other flood management activities. This next generation of data and tools includes the following:

- Updated flood hydrology being developed in coordination with U.S. Army Corps of Engineers through the DWR Central Valley Hydrology Study.
- Updated reservoir operations models to simulate the operation of major flood management reservoirs.
- Updated riverine and floodplain hydraulic models to help simulate flood flows in the Central Valley, under development through DWR's Central Valley Floodplain Evaluation and Delineation Program.
- Updated levee performance data from DWR's Levee Evaluations Program.
- New two-dimensional hydraulic models of the flood bypass systems to evaluate the hydraulic and ecological effects of potential modifications.
- Refined information and data to support estimates of economic flood damages and life risk.



Communications and Engagement

Communications and engagement for the BWFS seek to facilitate broad understanding of the roles and joint responsibilities of State, federal, and local agencies in implementing the CVFPP, while providing transparency in State decision making. DWR will proactively coordinate with related projects and programs, agencies, and interests in refining the physical features of the SSIA.

The BWFS communications and engagement strategy will align with DWR's Integrated Water Management campaign and FloodSAFE California Initiative. DWR will closely coordinate with the Central Valley Flood Protection Board to jointly engage stakeholders and interested parties. DWR will also regularly participate in Board meetings and invite Board members and their staff to engage in development of the BWFS.

Framework

BWFS communications and engagement activities will occur in coordination with development of the Conservation Strategy and in tandem with locally-led RFMP development. Several key principles will guide DWR's communications and engagement efforts:

- **Provide a flexible framework** for public and stakeholder engagement that can adapt over time. Successful completion of the BWFS will require providing meaningful opportunities for participation by stakeholders. For example, DWR may conduct topic-specific workshops that coincide with major study deliverables, and multi-agency working groups may be convened to address alignment of cross-discipline and

jurisdictional issues. BWFS communications and engagement efforts may also be modified, based on stakeholder feedback and additional study development needs.

- **Leverage communications and engagement opportunities** and alleviate stakeholder burden. Whenever possible, DWR will coordinate with other ongoing studies and programs (both internal and external to DWR) to hold joint outreach efforts, thereby efficiently engaging stakeholders on related issues and activities. DWR will conduct joint meetings, workshops, and other forms of engagement for the BWFS and Conservation Strategy, whenever possible, to improve efficiency and allow stakeholders to provide coordinated feedback on these closely linked efforts.
- **Recognize the diversity of Central Valley stakeholders, audiences, and issues.** Targeted briefings may be conducted to share information with specific individuals and audiences, as well as for consistency and coordination purposes. Audiences may include federal partners, agricultural interests and community, environmental and conservation groups, regulatory and resource agencies, tribes and California Native American groups, advocacy and interest-based organizations, news media, elected officials and other governmental bodies, cities and counties, agencies, and other interested parties. To ensure that information from the BWFS is broadly accessible, public information materials will continue to be developed for the DWR Web site, newsletters, and social media.

Venues

A variety of communication and engagement venues are being used for the BWFS. Examples include the following:

- DWR will provide monthly briefings to the Board on progress made in implementing the CVFPP, including development of the BWFS. Many local flood management agencies and other interests attend the Board's meetings and these briefings will provide information to a broad group of stakeholders.
- The Central Valley Flood Protection Board has also established an informal Coordinating Committee that supports open discussions and information exchange with stakeholders. This committee provides a venue for all interested parties to discuss DWR's CVFPP implementation efforts, including the BWFS, Conservation Strategy, and RFMP.
- DWR will provide periodic briefings to city and county governments, elected officials, and land use authorities on CVFPP implementation and development of the BWFS.
- DWR will coordinate with implementing agencies, local maintaining agencies, and other local entities through participation in locally-led regional flood management planning efforts.
- Implementation of the CVFPP will require permits and other regulatory approvals. DWR will coordinate with regulatory agencies throughout development of the BWFS and Conservation Strategy to pave the way for successful implementation.
- DWR will continue our coordination with U.S. Army Corps of Engineers in developing the BWFS. There are many common elements between the BWFS efforts and the U.S. Army Corps of Engineers Central Valley Integrated Flood Management Study. Our coordination will leverage the investments that are being made on these two studies by sharing and exchanging information gathered by each study.

DWR continues to engage all interested parties in informal discussions, as needed, to receive input and exchange information related to the BWFS and other CVFPP implementation efforts.

Levee improvement on the north side of the American River (September 2012)



FLOOD MANAGEMENT PLANNING



For more Information on Central Valley Flood Protection
Plan implementation activities, please visit the Central
Valley Flood Management Planning Web site:

www.water.ca.gov/cvfmp

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