Rural Flood Protection in the Sacramento Valley

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Prepared for the State of California Department of Water Resources and the Central Valley Flood Protection Board, in support of the Central Valley Flood Protection Plan (CVFPP)

Prepared by:

Sacramento Valley Flood Control Action Work Group

SUMMARY

This report has been compiled by the Sacramento Valley Flood Control Action Work Group (Workgroup) which is a committee of the Central Valley Flood Control Association (CCVFCA). The Workgroup is a partnership of both urban and agricultural interests, formed in March 2008, with the intention of engaging local expertise and resources to assist in the formulation of a regional flood protection plan for the Sacramento Valley. As a first step, the Workgroup committed to identifying a set of flood protection goals for the Sacramento Valley, which provides the opportunity to realize multiple objectives. The Workgroup then committed to elaborating on these goals to provide substantive input into the Central Valley Flood Protection Plan (CVFPP) currently being undertaken by the California Department of Water Resources (State). The Workgroup feels that some of the most important issues that must be considered include:

Clearly identifying and articulating which parts of the flood protection system currently do not function adequately and how can they be improved.

Protecting the paramount flood protection purpose of the Central Valley Flood Control Projects and providing appropriate opportunities to incorporate other compatible objectives.

Improving land use planning – assessing and implementing the risk appropriate for development in the floodplain.

Making funding available to implement flood protection projects.

Operating and maintaining the existing and future project features, including programmatic permits to improve efficiency.

To this end the Workgroup has identified a set of guiding goals that the plan should address for rural areas. The goals are public safety & welfare, sustainability and project implementation. In this document, the Workgroup focuses on a series of recommendations to support these key goals.

Specifically, the report is focused on several issues associated with these goals. First, the report explains the economic, environmental and societal benefits to the region and the state from small, agricultural

IMPORTANT ISSUES

We feel that some of the most important issues that must be considered include:

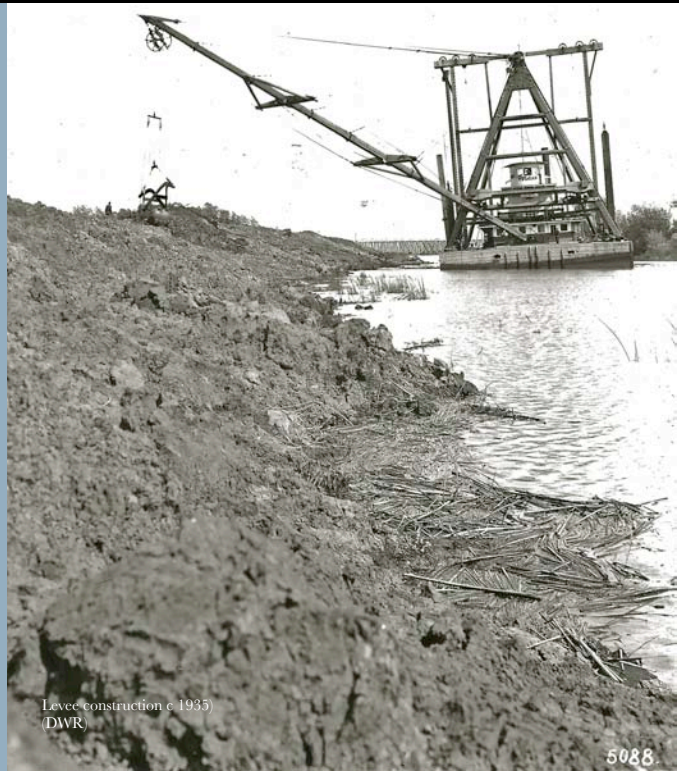
Clearly identifying and articulating which parts of the flood protection system currently do not function adequately and how can they be improved

Balancing potentially competing interests

Improved land use planning – minimizing development in the floodplain, and urban encroachment on the rural community

Availability of funding to implement flood protection projects

Operation and maintenance, including programmatic permits to improve efficiency



Levee construction c 1935 (DWR)

communities. California is the top producer of agricultural products in the nation with an industry value of $37.5 billion in 2010. The Central Valley of California provides approximately 25% of the US food supply; it provides approximately 50% of US grown fruits, nuts, and vegetables; over 1 million jobs in California are directly or indirectly supported by agriculture and approximately 22% of the US rice production is from California (the northern Sacramento region is the heart of the California rice industry) (CDFA, 2011).

The issues of levee standards for rural areas are discussed in detail, including recommendations by the Workgroup for a rural levee program and a risk appropriate design standard which would be used in the program. The Workgroup believes that the Central Valley Flood Protection Plan (CVFPP) should embrace the concept of the urban and rural areas "getting better together" by including in the CVFPP repairs and improvements for both urban and rural areas; a system wide approach. It is proposed that this rural levee program, and corresponding levee standard, would be developed for those areas that are not defined as urban/urbanizing or a small community. This represents the vast majority of the levee system in the Central Valley and consists of areas where the land use is predominately agriculture.

Transitory flood water storage and flood bypass areas are likely to be a significant element of any future flood management planning efforts. If any of these are pursued, they should be done so with the principle that they need to support the continued capability of agricultural operations to diversify and remain flexible to meeting changing market demands and crop production technology. The concepts and distinctions of each (water storage versus bypass) require an unambiguous and clearly characterized description. Transitory storage should be undertaken in a planned and coordinated manner with all affected landowners, including compensation and recovery plans developed to the satisfaction of all parties.

The Workgroup has substantial concerns with the manner in which habitat and ecosystem restoration has been conducted in recent years. The rural community recognizes and values the importance of the ecosystem, and as land guardians consider themselves to be front-line stewards of the rural ecosystem. There is a need to encourage compatibility between wildlife habitat and existing agricultural activities and practices. Agricultural areas with their large open expanses of farmland, mosaic of small grain crop residues, and shallow flooded fields, allows wildlife to feed and rest, thereby providing high quality wildlife habitat. Rather than randomly placing ecosystem activities adjacent to farming with no regard for consequences, the key should be promoting the logical connectivity of farming and ecosystem activities.

Finally, the report discusses the issues of planning,

Fremont Weir in flood
(C. B. Bowles)

preparation, response and recovery for rural areas. These are critical elements of flood management planning for rural areas. Planning should include such elements as developing financial and compensatory assistance programs, development of emergency response plans that include access and egress plans and asset deployment plans, a FEMA agricultural zone which allows reinvestment in essential infrastructure regardless of the level of flood protection, and improved flood-warning systems. Preparation includes both structural as well as non-structural pre-emptive activities that attenuate or mitigate the consequences of flooding, such as structural levee improvements, training and drills, improved interagency coordination and communication, and identification of regionally accessible material and equipment resources. Response elements should include rapid deployment of available resources and prompt execution of predefined emergency action plans. A post flood recovery program should be developed that includes: expedited infrastructure repair, including levees, how dewatering is conducted, and how critical infrastructure and economic activity will be restored in an efficient and timely manner. Recovery programs should include affordable, low cost insurance options or tax incentives to rebuild or replace infrastructure in agricultural communities including residences, crops, livestock, pumps, machinery, equipment, and other infrastructure. This program should include private, local, state and federal funding sources and programs.

In conclusion the Workgroup recommends that the next steps be a series of key actions:

1. Delivery and presentation of this report to the State resulting in response comments from the State.
2. Coordination between the State and the Workgroup to discuss the State's comments in a series of scheduled meetings.
3. Discussions regarding policy level decisions and how the details contained in this report will impact these policies.
4. Collaboration and discussion between the State and the Workgroup in order to develop a plan for incorporation of essential elements of this report into the CVFPP and planning to implement the recommendations herein.

Section 1

Introduction and Purpose

The Sacramento River watershed is comprised of approximately 26,300 square miles in the northern half of California's Central Valley. Flood protection in the Sacramento River watershed is primarily provided by the Sacramento River Flood Control Project (System). The System was originally authorized by Congress in the Flood Control Act of 1917 and implemented throughout the first half of the 20th century with a single objective, flood control.

FLOOD PROTECTION

The terms flood protection and flood control have historically been used to describe the protection of urban and rural areas from catastrophic flooding. However, in recent years the term flood risk management has been used since it is not possible to protect areas from flooding, or control floods, for all events, and therefore the term management has been the preferred term. Flood risk management typically covers flood prevention, protection, preparedness, emergency response, recovery and lessons learned. In this document we have used the term flood protection, the term is used in DWR's Central Valley Flood Protection Plan, and we emphasize the objective to provide flood protection to the extent feasible.

SACRAMENTO VALLEY

as defined in this document includes the Yolo Bypass and it tributaries.

RURAL AREAS

in the context of this report, describe both the agricultural areas and the communities within the rural areas, that are so critical for the future viability of the rural community.

Feather River flooding, 1986 (DWR)

OVERVIEW

This document is divided into the following primary sections:

1. Guiding Principles and Goals for the Rural Community, which lists the guiding principles for the Workgroup and our vision for what the goals associated with flood protection should be for the rural community.

2. Opportunities, which focuses on vital elements of flood protection related to public safety and welfare, sustainability of the flood protection system, and implementation of the CVFPP.

3. Key Issues for Rural Areas, which highlights the most important issues for rural areas, including the economic benefits of these areas, proposed standards, a discussion on the elements of transitory flood water storage areas, and habitat/ ecosystem concerns.

4. Planning, Preparation, Response and Recovery for Rural Areas, including discussion on funding and compensation, FEMA floodplains and insurance, de-watering after a flood event, infrastructure retrofit in preparation for flood events, flood warning systems and flood preparedness.

5. Regional Interests in the Workgroup, which lists the participating and funding entities in the Workgroup.

The 21st century has brought with it a broad array of competing demands for the resources of the Sacramento River watershed. In order for the System to survive this century, it must evolve to meet the demands of not only flood protection but look for means to assist in improving the ecosystem, providing a reliable water supply with improved water quality, and increasing opportunities for recreation. Additionally, the impacts of climate change and sea-level rise may further challenge System performance. A comprehensive, systemwide, and sustainable set of solutions must be developed and implemented to achieve flood protection and allow the transition of this single objective System conceived in the early 20th century into a multi-objective system designed to meet the competing demands of the 21st century without compromising the paramount flood protection and public health and safety function of the project.

The Sacramento Valley Flood Control Action Workgroup (Workgroup) is a partnership of both urban and rural interests, formed in March 2008, for the benefit of engaging local expertise and resources to assist in the formulation of a regional flood protection plan for the Sacramento Valley. As a first step, the Workgroup committed to identifying a set of flood protection goals for the Sacramento Valley, which provides the opportunity to realize multiple objectives. The Workgroup then committed to elaborating on these goals to provide substantive input into the Central Valley Flood Protection Plan (CVFPP) currently being undertaken by the California Department of Water Resources (State).

The Workgroup recognizes the critical importance and vast resources of the Sacramento Valley, including its capacity as one of the most productive agricultural regions in the world. As a result, the group believes that for system-wide flood protection maintenance and improvements to be successfully implemented, urban and rural communities as well as agricultural areas must all be considered in the identification, evaluation, and prioritization of investments for flood protection. The flood protection infrastructure in the Sacramento Valley was designed to operate as a system and any investments in its maintenance and improvements must consider system-wide performance and benefits.

The Workgroup has elected to communicate their desires toward getting better together through a "White Paper" on Rural Flood Protection in the Sacramento Valley. It should be noted that most, if not all, of the ideas and thoughts herein have been expressed in the formal DWR public process, including formal work groups and committees. We recognize the enormous challenges that the State faces in developing the CVFPP; however, we are passionate that the CVFPP not be developed at the expense or detriment of

the rural community, including its contribution and importance to the State's economic and environmental well being. We also accept that there are limitations to the extent of the CVFPP, particularly with regard to funding, but we would like to ensure that the State is using available funds in an efficient and effective manner. We feel that some of the most important issues that must be considered include:

- Clearly indentifying and articulating which parts of the flood protection system currently do not function adequately and how can they be improved
- Protecting the paramount flood protection purpose of the Central Valley Flood Control Projects and providing appropriate opportunities to incorporate other compatible objectives.
- Improving land use planning – assessing and implementing risk appropriate development in the floodplain
- Assuring availability of funding to implement flood protection projects
- Facilitating operation and maintenance, including programmatic permits to reduce cost and improve efficiency.

The Workgroup acknowledges that varying levels of risk should apply to rural and urban areas. An urban standard of a 200-year recurrence interval level of protection has been defined by state statute. We encourage a 100-year recurrence interval level of protection for small communities and a rural levee standard be developed for the remaining areas. Moreover, the definition of small communities should also include rural populations that are more geographically dispersed than in a formally recognized city or town. A rural levee standard should at least be the functional equal of the 1957 design plan and profile.

The Workgroup intends to assist in advancing the work of the State and the Central Valley Flood Protection Board (CVFPB) by coordinating as a regional partner for the Sacramento Valley portion of the CVFPP. We welcome the opportunity to assist the State in better educating the rural community on expectations, as we collaboratively identify and address the limitations to achieving effective flood protection for rural areas.

Section 2

Guiding Principles and Goals for Rural Areas

Based on the Workgroup's review of the goals identified in FloodSAFE California and the Draft Strategic Plan the Workgroup has further developed the following guiding principles to augment or refine these goals identified by these documents:

1. We believe the paramount duty of the State of California in developing and implementing the CVFPP is to provide for the protection of public safety and welfare.

2. The Sacramento River flood protection system should be recognized, evaluated, and improved as a system and not split into individual components. It should further be designed, maintained, and operated to work as a whole.

3. Flood protection in one part of the Sacramento Valley should not rely on levee failures in other portions of the system. Improvements taken together should not redirect hydraulic impacts from one area to another.

4. There have always been differential levels of flood protection throughout the System as a result of the original geometric design standard. Into the future such differential levels of protection should continue to exist, but this should result from the new understanding and application of acceptable flood risk based on land use and levee design.

5. Incentive programs and assurances should be available for rural areas that do not meet the urban or small community levee standards. This does not imply that an easement or other instruments must be in place. These programs should reflect the value to the State's economy of keeping large portions of the valley in agriculture. These programs should include assistance to rural communities and agricultural areas for insurance, emergency preparedness, communications, evacuation, and recovery.

6. Policies should be developed that ensure that these areas continue to encourage a critical mass of farms, agriculturally-related businesses and supporting infrastructure to ensure the economic vitality of agriculture within the region. These policies should protect the unique character and qualities of the region by preserving the cultural heritage, strong agricultural/economic base, unique recreational resources, and biological diversity of the greater Central Valley floodplain. However, it is understood that if rural areas decide to urbanize, they will be subject to the more stringent requirements for such areas.

7. In order that agencies do not address their flood protection needs by impacting neighboring agencies, they should not use eminent domain outside of their boundaries without meaningful consultation so as to minimize those impacts.

8. The implementation of flood protection improvements should be planned, designed, and constructed through partnerships with local agencies. A sustainable funding plan should be developed for implementation of levee repairs and improvements as well as on-going operation and maintenance of the system.


Rice Harvest
(C. B. Bowles)

PUBLIC SAFETY & WELFARE
The paramount duty of the State of California and its flood protection partners is to implement flood protection measures that minimize the flood threat to human life as well as the threats to homes, property, and critical public infrastructure in urban and rural areas.

SUSTAINABILITY
Develop and adequately fund flood protection projects that improve economic viability, minimize project life-cycle costs, and also consider compatibility with agriculture and the ecosystem.

PROJECT IMPLEMENTATION
Projects should be designed and implemented through a partnership between the local agencies, the State, and the USACE. Each partner should seek opportunities to apply permit and approval processes appropriate for the complexity and risk associated with each project. While it is recognized that projects may be implemented in stages, the whole system should be considered through implementation.

9. State policies should support agriculture as the paramount land use within the floodplain.

The Workgroup strongly supports the State and the US Army Corp of Engineers (USACE) in cooperatively developing a new coordinated CVFPP consistent with these principles; and all parties should jointly confer, develop, and provide a unified effort to advance these principles.

The Workgroup has reviewed the goals identified in FloodSAFE California, dating back to 2006, and the Draft Strategic Plan, dated May 28, 2008, and is in agreement with these goals identified by the State. In addition, the Workgroup has identified and adopted a set of flood protection goals for the Sacramento Valley, which allow everyone to get better together. We believe the State should adopt three primary goals for flood protection, as it prepares the CVFPP for the Sacramento Valley and the three primary goals are set out in the box above:

- **Public Safety & Welfare**
- **Sustainability**
- **Project Implementation**

Section 3
Opportunities

Various opportunities are associated with the three primary goals we have identified in Section 2. These are described in the following sections.

3.1 Public Safety and Welfare

With regard to public safety and welfare, we believe that the State should:

- Review current flood emergency procedures for potential updates and improvements, and improve emergency communications capability throughout the entire system
- Identify project deficiencies and prioritize those for rehabilitation and correction
- Increase the intensity and frequency of channel and bank maintenance within the system
- Consider re-operation of reservoirs to further reduce peak flows
- Improve maintenance of the bypasses to ensure ability to pass design flow (the current conveyance capacity of the bypasses should be assessed as well as future impacts, such as concept proposals for the Yolo Bypass by the BDCP)
- Ensure water management, habitat enhancement and maintenance, and development proposals do not degrade system performance or reduce flexibility where excess capacity exists

Rice grain silos
(C. B. Bowles)

• Improve review of current and future encroachment permits to ensure consistency with system objectives

• Increase frequency of inspection and enforcement of encroachment permit violations.

3.2 Sustainability

With regard to the sustainability of the flood protection system, we believe that the State should:

• Establish programmatic general permits to cover routine maintenance activities

• Consider revised floodplain management policies which promote the continued viability of rural areas

• Develop mitigation banks eliminating need for individual mitigation site establishment

• Create process for the beneficial reuse of sediment (material management planning)

• Establish vegetation management policy to be consistent with sound science and prioritizing investment to reduce risk (such as that being developed by the "Round Table" and documented in the "Framework Agreement").

3.3 Project Implementation

With regard to project implementation, we believe that the State should:

• Seek system modifications to solve existing problems while increasing performance or integrating other project purposes.

• Develop tiered design standards that recognize the difference between
urban and rural levees

• Consider implementation of a Sacramento Valley "subventions-like" program to assist rural areas in levee rehabilitation projects (including cost-sharing or funding)

• Update the USACE guidance associated with economic analysis to accurately reflect actual values for flood damage, loss of business and recovery costs and recognition of system wide benefits.

• Limit impact of USACE Section 408 by redefining the applicability of §408 thereby reducing the number of projects which qualify

• Modify (or tier) inspection criteria based on levee type (urban and rural)

• Equitably distribute funds for concurrent urban and rural levee improvements

• Update SRFCP O&M Manual to reflect current laws, regulations, and policies

• Apply a fixed cost-sharing requirement, recognizing whether the situation is a rural, small community or urban area.

Section 4
Key Issues of Concern for Rural Areas

The following chapter focuses on a range of different issues of concern that the Workgroup has identified and discussed at length since its inception in March 2008. Here we list and discuss the primary concerns including standards required for rural areas, a discussion on transitory flood water storage areas and a discussion of our significant concerns related to the ever increasing establishment of habitat and ecosystem enhancement projects. First, however, we provide background on the importance of rural areas to the economic viability of the State.

4.1 Benefits of Rural Areas

The benefits of rural areas can be classified into three broad areas: economic, environmental, and societal.

4.1.1 Economic

• California is the top producer of agricultural products in the nation with an industry value of $37.5 billion in 2010. The Central Valley of California provides approximately 25% of the US food supply, it provides approximately 50% of US grown fruits, nuts, and vegetables, over 1 million jobs in California are directly or indirectly supported by agriculture and approximately 22% of the US rice production is from California (the Sacramento region is the heart of the California rice industry.) Rice is one of the top 10 exports in the State with Japan being the top market. Other top 10 exports in the State include almonds, dairy, wine, grapes, cotton, walnuts, pistachios,

Trucks hauling rice (C. B. Bowles)

tomatoes and strawberries. In 2008, the value of California agriculture exports reached an all time high of $12.9 billion. It should be recognized that dependable agricultural food and fiber production is essential for national security.

• A viable agricultural industry is essential to the State's economy and particularly to the rural areas within the Central Valley.

• Central Valley agriculture provides and supports reliable and inexpensive food and fiber production at the State, National, and global levels.

• The future of rural communities and the viability of agriculture in the Central Valley is dependent upon the State's ability to plan a resilient flood protection system that is managed in a sustainable manner and for FEMA to develop policies that promote the sustainability of agriculture in the floodplain.

• Economic impacts of agricultural production outside immediate geographical location should be included when determining benefit/cost formulas for funding flood protection, levee maintenance, repair and improvement and all other assistance programs. The economic impact is not just the production value but also third party impact issues related to the support and processing of the agricultural product.

4.1.2 Economic

The following are examples of the environmental benefits of agriculture:

• Agriculture provides enormous amounts of feeding and foraging function for multiple species.

• The preservation of open space, minimizing the area for urban development is an important benefit of agriculture.

• Agricultural practices provide for visual enhancements to the rural environment.

• Agricultural practices re-use natural resources through carefully managed stewardship.

• Agricultural production provides for carbon sequestration.

• Agriculture can be undertaken symbiotically with environmental management, as has been demonstrated by several examples, such as the Yolo Bypass Wildlife Area.

• Modern agricultural conservation practices are considered to be sustainable.

4.1.3 Societal

The following are examples of the societal benefits of agriculture:

• Locally grown food provides stimulus to the local economy providing jobs and revenues to supporting industries.

• Stewardship of natural and human resources is important and an important societal element of agriculture.

• The national security of food production, provided by a domestic food supply, is an important societal value that should be emphasized.

• Agriculture should be used to provide for educational opportunities.

4.2 Levee Standards for Rural Areas

It is proposed that the California Department of Water Resources (State)

ECONOMIC VALUE OF CALIFORNIAN AGRICULTURE

California is the top producer of agricultural products in the nation with an industry value of $37.5 billion in 2010. The Central Valley of California provides approximately 25% of the US food supply, it provides approximately 50% of US grown fruits, nuts, and vegetables, over 1 million jobs in California are directly or indirectly supported by agriculture and approximately 22% of the US rice production is from California (the Sacramento region is the heart of the California rice industry.) Rice is one of the top 10 exports in the State with Japan being the top market. Other top 10 exports in the State include almonds, dairy, wine, grapes, cotton, walnuts, pistachios, tomatoes and strawberries. In 2008, the value of California agriculture exports reached an all time high of $12.9 billion. It should be recognized that dependable agricultural food and fiber production is essential for national security.

Feather River Flooding, 1986 (DWR)

1955 AND 1957 DESIGN FLOOD

FOR THE SACRAMENTO AND SAN JOAQUIN RIVERS

The Sacramento River system carries flood flows that are about 10 times greater in volume than those in the San Joaquin River system.

Levee and channel profiles for the Sacramento River system were developed through hydraulic analyses in 1957, to establish the minimum standard for top-of-levee elevations during the design phase. These capacities do not account for geotechnical or geomorphic conditions that may result in current flood flow capacities being less than design flood flow capacities.

Levee and channel profiles for the San Joaquin River system were developed through hydraulic analyses in 1955.

and the California Central Valley Flood Protection Board (CVFPB) consider developing a program to repair, and in some cases improve, rural levees as part of the Central Valley Flood Protection Plan (CVFPP). It is our understanding that the CVFPP will include elements to improve levees protecting urban and urbanizing areas, which are defined as communities with populations greater than 10,000. DWR is in the process of developing an urban levee standard for these areas. It is also our understanding that the CVFPP will propose that levee systems that protect small communities be improved to meet FEMA's 100-year requirements.

We believe that the CVFPP should embrace the concept of the urban and rural areas "getting better together" by including in the CVFPP repairs and improvements that approach the flood infrastructure from a system wide perspective. We therefore propose that a program, and corresponding levee standard, for those areas that are not defined as urban/urbanizing or a small community. This represents the vast majority of the levee system in the Central Valley and consists of rural areas where the land use is predominately agriculture.

4.2.1 Rural Levee Program

The objective of a Rural Levee Program would be to provide an opportunity for rural Levee Maintenance Agencies (LMAs) to consider repairs to their levee systems to improve public safety and welfare and reduce flood damages in a cost effective manner with financial support from the State. This program should provide flexibility to allow the LMAs to propose specific repairs for defined levee reaches, or to develop a plan of repair for the entire protected area. Elements of this program could include:

1. Prioritization of levee repairs within rural basins with an emphasis on past performance and life safety.
2. Simplify and accelerate the application process and DWR's decision making process to expedite the repair of levees that are in imminent danger of failing during the next high water event.
3. The ability to restore the levee geometry to the 1957 design for the Sacramento River Flood Control Project and the 1955 design for the San Joaquin River Flood Control Project.
4. Work with the USACE to expand the Sacramento River Bank Protection Project to allow for remediation of design and or construction deficiencies and to restore levee geometry.
5. Opportunities to improve reaches of levee where a failure would result in rapid deep flooding to a residential area.
6. Opportunities to improve reaches of levee that protect critical infrastructure of local and statewide importance.
7. The ability to pursue a basin-wide plan in instances where the benefits justify the cost of the plan. Benefits could be

defined as reduction in flood damages, improvements to life safety, or benefits to critical infrastructure.

8. Designation of a rural levee standard.

Cost sharing for this program should be developed that recognizes the importance of preserving these areas in agriculture and the funding limitations of the rural LMAs. In addition, we are also concerned about the transfer of liability as part of this program and do not believe that it is reasonable to ask the LMAs to indemnify the State for a repair program if it is done in accordance with the guidelines of this program as the LMA is merely acting to achieve the level of flood protection promised by the State in the Local Assurance Agreement.

4.2.2 Rural Levee Design Standard

Currently, State and Federal (USACE and FEMA) levee standards do not distinguish between levees that protect urban areas and those that protect rural areas. Furthermore, the State and on a later timeframe, the Corps, are developing more rigorous criteria that will minimize the hazard of a levee failing from mechanisms other than overtopping. While this is an appropriate standard when the consequences of failure may result in the significant loss of life or billions of dollars in damage, implementing levee improvements or repairs to meet this standard requires an enormous financial investment that is not risk-prioritized. As a result, it has been difficult to justify this level of levee repairs for the rural areas. To successfully implement a Rural Levee Program, a rural levee standard should be developed for use when implementing projects as part of this program. The standard would be used for those levees that have repairs or improvements, but would not be applicable for levees that are not repaired.

The following are some initial thoughts on what a rural levee standard might include:

1. Recognize that the 1955/57 levee system is compromised with each flood event due to the progressive nature of internal erosion.

2. Geometry

- Restore the levee geometry to the 1957/1955 design, including freeboard
- Flatten landside levee slopes to 3:1

3. Improve access by providing all weather access roads on the top of levee and on ramps and turnouts.

4. Improve access and visibility by removing or modifying encroachments

5. Base acceptable levee performance on probabilistic methods rather than factors of safety. Emphasis should be on past performance rather than analysis.

6. Modified soil specifications:

- To allow the use of locally available borrow

Alfalfa swather
D. H. Putnam

• To allow for the ability to reuse material from the levee when making repairs

7. Leverage levee performance history, existing information and non-intrusive methods to design seepage remediation.

8. Expand operations and maintenance practices based on the intended, original purpose of rural flood protection. This could include small erosion repairs, seepage repairs, sloughing and small stability repairs.

We believe that in light of the quickly approaching due date for the CVFPP, the rural levee design standard could be developed after the CVFPP is final so long as the CVFPP identifies the need to develop the standard to support the Rural Levee Program. The rural levee design standard would be solely for purposes of supporting the Rural Levee Program. It is not our intent to establish a new standard that all rural levees must meet.

We believe the approach outlined in this paper will improve system wide flood management by increasing investments in rural levees and stretch our limited funding to benefit the greatest number of LMAs and property owners. The goal of both the Rural Levee Program and the Rural Levee Design Standard is to effectively invest limited resources to buy down risk.

4.2 Transitory Flood Water Storage and Bypass Areas

Transitory flood water storage areas may become a significant element of any future flood management planning efforts. The terms "transitory flood water storage areas", "flowage easement areas", “flood corridors” and “agricultural conservation areas” need to be clearly defined and subject to broad stakeholder agreement. If any of these are pursued, they should be done so with the principle that they need to support the continued capability of agricultural operations to diversify and remain flexible to meeting changing market demands and crop production technology. The concepts and distinctions of each require an unambiguous and clearly characterized description.

The change in land uses that result in water impoundment for uses other than irrigation, including wetland development, reservoirs, or water conveyance should not result in the seepage of water onto or under the adjacent parcels. These conversions shall mitigate the risks and adverse effects associated with seepage, levee stability, and levee erosion.

Transitory storage should be undertaken in a planned and coordinated manner with all affected landowners, including compensation and recovery plans developed to the satisfaction of all parties.

4.3.1 Agricultural Transitory Flood Water Storage Areas

We believe that these should be defined as rural areas negotiated and mutually agreed to as suitable and designated temporary flood waters storage relief on private (or public) properties, which have been strategically identified in the flood control system and utilized during times of extraordinary and/or emergency storm or flood events, with the following considerations:

• The involved agency(ies) must consider, discuss, and identify such areas in an early, transparent, and open manner with the affected landowner(s), and with the participation of the local flood control agency(ies).

• Fair value for such areas must recognize the public desire and need of such areas or properties for the overall system wide benefit of functioning as emergency flood control and protection of the urban areas.

• Identify areas with minimal human occupation and activity

• Identify areas with minimal number of ownerships or larger single ownership properties

• Identify areas with minimal costly farming or agricultural support infrastructure

• Identify areas with minimal cropping diversity such as large common field crop production fields

• Identify areas with least cost and easily established, required, and implementable farming reconstitution needs and recovery efforts

• Appropriate easements must be perfected and consummated to identify and secure such properties (i.e.; include timeframe of storage use, responsibilities of parties, etc.)

4.3.2 Flowage Easement for New or Extended Floodways or Bypasses

These should be defined as areas negotiated and mutually agreed to as the most suitable for expanded flood conveyance which are strategically located with the following considerations:

• The involved agency(ies) must consider, discuss, and identify such areas in an early, transparent, and open manner with the affected landowner(s), and with the participation of local flood protection governing agency(ies).

• Fair value for such areas must recognize the public desire and need of such areas or properties for the overall system wide benefit

• Identify property areas that are easily separated physically and naturally from other properties in the basin area and other impacted areas.

• Identify areas with minimal human occupation and activity

• Identify areas with minimal costly farming or agricultural support infrastructure.

4.3.3 Agricultural Conservation Areas

These should be defined as rural areas negotiated and mutually agreed to as permanently suitable and designated private property(ies), which have been identified with concurrence of the property owner(s) as utilized only for agricultural and/or farming purposes in exchange for fair value and forgoing development rights on the specified property.

The creation of agricultural conservation areas is a concept that has embraced the idea of the "sale of development rights." It needs to be made clear that these areas will not be pre-determined to flood in a large flood event but due to the levee system protecting the agricultural area meeting a geometric levee shape for agricultural areas may still flood as a result of a lesser standard of performance than urban areas. These areas may flood before an urban/small community levee fails. Assuming these areas are not deliberately flooded until levee design standards are exceeded, there are still significant benefits to the system as a whole from lands remaining in agricultural production. These benefits need to be valued and paid-for in exchange for the designation similar to the Williamson Act but this would be applied to eligible areas protected by the State Plan of Flood Control.

The landowners eligible for the program would not be permanently selling their development rights (which they could if they wished) but more of a long-term preservation of an area for agricultural purposes that comes with yearly payments. These payments help the current landowners stay in business versus the one time payment that could cause the landowner to stop farming and sell the land.

4.3.4 Elements and Nature of Acceptable Easements

Although the nature of the easement will likely vary based on the use in question, the location, and the existing use and value of the property, the following are considerations to be addressed in an acceptable easement:

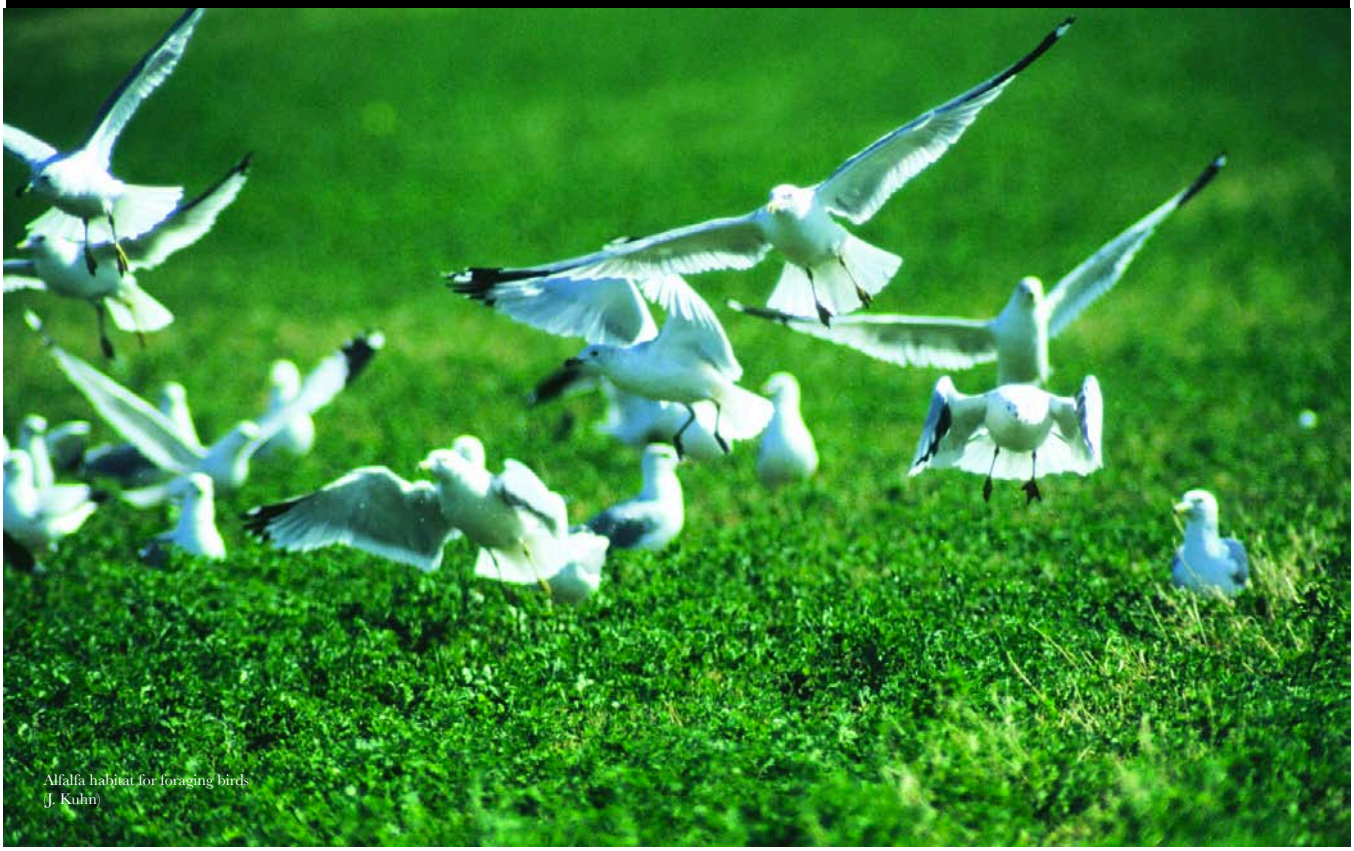
• The easement should be designed to maximize the owner's continued future use of the property while still being consistent with the purpose and need for the easement.

• Payments to compensate for the reduced usefulness of the property (whether conservation easements or flood easements) should be provided to the owner in a revenue stream that best meets the needs of the owner. In some cases that will be a large up front payment with smaller payments over the years to reflect the more limited use of the property. In other cases, it may be a smaller up-front payment with a more substantial residual payment stream. The payment stream should also recognize larger balloon payments to compensate the owner for property damage and restoration costs after a flood event.

4.2 Habitat/Ecosystem Issues

The Workgroup has substantial concerns with the manner in which habitat and ecosystem restoration has been conducted in recent years. The rural community recognizes and values the importance of the ecosystem, and as land guardians consider themselves to be stewards of the rural ecosystem. There is a need to encourage compatibility between agricultural practices and wildlife habitat. We recognize that there can be compatibility between agricultural practices and ecosystem health. Agricultural areas with their large open expanses of farmland, mosaic of small grain crop residues, and shallow

Rice grain prior to harvest (C. B. Bowles)



Alfalfa habitat for foraging birds
(J. Kuhn)

flooded fields, allows wildlife to feed and rest, thereby providing high quality wildlife habitat. The following are the most significant areas of concerns:

• The magnitude and extent of ecosystem enhancement should not compromise flood protection, public safety, or existing agricultural land uses and benefits (e.g. unreasonable restrictions or requirements affecting existing conditions).

• Land, levee, and channel management plans for ecosystem enhancement areas must be produced prior to implementation. These plans should not diminish the ability to provide flood protection, including design flood conveyance capacity.

• Agricultural endeavors should be recognized and credited as providing and enhancing wildlife environments and green space. Existing farming practices provide viable terrestrial and water habitats (e.g. rice, alfalfa) for the ecosystem (e.g. Pacific Flyway). A provision to pay landowners to "farm" habitat should be considered.

• Flood protection activities for many rural areas, including maintenance of levees, also provides protection for habitat areas.

• Agriculturists should be included in the development of ecosystem restoration plans. They are the stewards of the land and are familiar with site specific variables that will affect the viability of restoration efforts. In some circumstances, implementation of ecosystem restoration projects would stand a greater chance of success if implemented by the landowner. Programs should be developed that incentivizes property owners to develop habitat and maintain species on their land. In many cases, the property owner will be able to improve/create habitat more affordably than a government led effort.

• Restoration and ecosystem projects must assume full responsibility for impacts, to adjacent landowners, water and flood management agencies from the development and operation of those projects, including regulatory requirements. Such assurances should be legally enforceable.

Section 5

Planning, Preparation, Response and Recovery for Rural Areas

Planning, preparation, response and recovery are critical elements of flood management planning for rural areas. To date, we have heard little discussion at the State level of these issues, and therefore here we highlight these elements. Planning should include such elements as developing financial and compensatory assistance programs, development of emergency response plans

that include access and egress plans and asset deployment plans, a FEMA agricultural zone, and improved flood-warning systems. Preparation includes both structural as well as non-structural pre-emptive activities that attenuate or mitigate the consequences of flooding, such as structural levee improvements, storage, training and drills, improved interagency coordination and communication, and provision of regionally accessible material and equipment resources. Response elements should include; rapid deployment of available resources and prompt execution of predefined emergency action plans. A post flood recovery program should be developed that includes: expedited infrastructure repair, including levees, how dewatering is conducted, and how critical infrastructure and economic activity will be restored in an efficient and timely manner. Recovery programs should include affordable, low cost insurance options or tax incentives to rebuild or replace infrastructure in agricultural communities including residences, crops, livestock, pumps, machinery, equipment, and other infrastructure. This program should include potential private, local, state and federal funding sources and programs.

These flood management activities, while identified as discrete components, are intended to portray a unified and seamless strategy for dealing with flood events in California.

Our current system (Reclamation Districts, Levee Maintenance Agencies, local government, DWR, and other State agencies such as OES) disempowers the lowest level of government "command" and forces decisions for relatively modest levee problems to higher levels of command or levels of government where either decision making authority and/or funding is available. The lowest level of command is the first people and contact on the scene; the RD officials and their engineers, then come the County, DWR, and Federal officials in the field. The local RD has the best information and can make fastest assessment of the problems. However, for problems that go beyond sandbags, we have an upside down funding system where the RDs quickly throw up their hands due to lack of readily available funds. Consequently, response to the emergency event is delayed due to the need to transfer information to these higher levels of command, that have probably not yet been on the ground to make an assessment (e.g. County OES, DWR, State OES, USACE). A good emergency response system empowers and encourages the lowest level of command that can deal with a problem the fastest and at the lowest cost, to deal with it and arms them with resources and the ability to expeditiously implement pre-planned responses.

Emergency action plans for damage control, repair, and recovery must be developed so that assistance is quick and timely. Local flood control and county agencies must be included in the retrofit and recovery effort and plan.

5.1 Planning

5.1.1 Funding and Compensation (Financial Assistance)

A tiered level of flood protection will present challenges to rural areas. Funding mechanisms should be provided to address these challenges in exchange for a comparatively lower level of flood protection than urban and urbanizing areas.

Reliable funding is essential for agricultural communities and areas to develop and implement flood protection and recovery plans, store equipment, train community members in flood emergencies and fighting, and be provided funding for levee maintenance and repairs.

Other critical elements of funding and compensatory planning should include:

- Sources of funding for compensation for flood damages, repair, and recovery of property and infrastructure must be legislatively established and identified
- Procedures to be followed for qualifying and distributing these funds must be clearly delineated in the legislation
- Efficient and understandable procedures for applying for funds must be established
- Process for accomplishing or acquiring compensation must be planned out step by step and done in a timely manner
- Specific contact persons and/or agencies responsible for administrating and distributing these funds must be identified.

5.1.2 FEMA Floodplains and Insurance

FEMA's current flood insurance rate map designations do not recognize the unique issues that agriculture faces in the Central Valley. These issues will have a profound effect on the continued viability of the rural and agricultural communities in the floodplain.

While we recognize that the federal flood insurance program is not administered by the State of California, we feel it is essential the State join with the rural interest to pursue changes to the NFIP that would create a new flood zone designation that would allow agriculture to remain viable in these rural areas. The benefit of this new zone would not only benefit California but the rest of the nation as other regions face levee decertification resulting in large swaths of agricultural areas being mapped into the regulatory floodplain.


Rice combine harvesters
(C. B. Bowles)

5.1.3 Creation of a New Agricultural Zone

A significant portion of rural areas in the Central Valley are not protected by levees constructed to modern standards. In order for states like California to continue to sustain a robust agricultural economy and discourage unplanned, ill-conceived urbanization of these rural areas, changes are needed to the NFIP which will promote the sustainability of agriculture in the floodplain. MapMod has or will map most of the agricultural areas in the Central Valley into a special flood hazard area (SFHA). The rural communities that occupy these floodplains lack the financial ability to improve their levee systems to meet FEMA's 100-year certification criteria. The restrictions on development in an SFHA, while effectively curbing development in the floodplain, do not provide the flexibility needed to sustain agriculture. The strict regulations have made reinvestment in agricultural operation facilities, commercial facilities in support of agriculture, equipment repair facilities, livestock and crop processing facilities, housing for agricultural operators, or temporary farm worker housing, financially infeasible and/or unattainable. Agriculture represents a necessary and vital component of our nation's economy, and it is important that the NFIP not have the side effect of injuring the agricultural economy. However, as currently implemented, the result of NFIP policies will be to displace vibrant agricultural communities with rural "ghost towns," which will have long-term implications to the decline of agriculture in the floodplain. Development of an agricultural zone is necessary to promote prudent floodplain management principles and minimize the risk of increased urbanization of the floodplain.

A new agricultural zone will allow the replacement or reinvestment in existing structures and a limited number of new structures required to support the viability of the agricultural community, to be built under certain conditions. This zone would not require the expensive elevation of structures or dry flood proofing, but would still have requirements for wet flood proofing certain structures. (Sacramento Metro Chamber, 2011).

5.1.4 Flood Warning Systems

The current flood warning system for the Sacramento Valley is archaic and grossly out-dated. At best, it provides some level of warning to urbanized areas, but little, if no, early warning to rural areas. In particular the following areas should be focused on for rural areas:

• A flood forecasting system for rural and agricultural areas using data from rainfall gauges and river stage gauges through the non-urbanized areas of the Sacramento Valley. Ideally, these monitoring locations should provide data to inform and update flood prediction models for the Sacramento Valley. A system of this type does not currently exist for rural communities, which is surprising for an area of such State significance. Interactive monitoring and modeling will provide the most efficient means to predict flood warnings.

•The flood forecasting system for rural and agricultural areas should be incorporated into a specific ALERT system, connecting rainfall gauges and river stage gauges to predictive flood

THE IMPORTANCE OF A NEW AGRICULTURAL ZONE

A new agricultural zone will allow the replacement or reinvestment in existing structures and a limited number of new structures required to support the viability of the agricultural community, to be built under certain conditions. This zone would not require the expensive elevation of structures or dry flood proofing, but would still have requirements for wet flood proofing certain structures. (Sacramento Metro Chamber, 2011).


Rice grain silos
(C. B. Bowles)

models to flood control managers, not just at the State level, but also at the local level, such as Reclamation District and LMA managers. The local entities are likely to be the most responsive to short-term flood fighting needs, but must be supported by the State due to insufficient resources.

• Flood warnings and bulletins should be provided by State controlled warning centers, to local entities and emergency services in the rural community. Transmission methods could include radio, web, or telephone.

• Interpretation of flood warnings and river height bulletins must be clearly explained to local land, reclamation district, and levee maintenance agency managers, as well as emergency services in the rural community.

• Provide clear guidelines that identifies where flood warning information can be obtained.

• Flood classifications must be clearly defined for the rural community in order that local land and flood control agency managers, as well as emergency services, can interpret and anticipate the likely severity of the flood event. tomatoes and strawberries. In 2008, the value of California agriculture exports reached an all time high of $12.9 billion. It should be recognized that dependable agricultural food and fiber production is essential for national security.

5.2 Preparation

Preparation includes both structural as well as non-structural pre-emptive activities that attenuate or mitigate the consequences of flooding, such as structural levee improvements, training and drills, improved interagency coordination and communication, safe areas for equipment, and provision of regionally accessible material, equipment and labor resources. Programmatic environmental permits should be developed for levee improvement and maintenance purposes that clearly define the mitigation requirements and provide for this function over future generations.

5.2.1 Structural Improvements

Examples of structural improvements to be considered as part of preparation should include as appropriate:

• System evaluation issues, such as levee deficiency issues – height, width, all weather roads (crown road and ramps)

• Evaluation and implementation of new or improved storage and flood water conveyance capacity

• Raising of existing properties above the Base Flood Elevation (BFE)

• Wet and dry flood proof

• Construction of ring levees around relatively small or isolated communities

• Construct pads elevated above potential flood elevation for storage of farm equipment

• Improvement of ingress and egress locations to low lying areas to facilitate emergency access.

• Identification and creation of raised areas, or other safe havens for flood evacuations

•Erosion reduction measures such as erosion berms, slope flattening, vegetation planting

5.2.2 Non-Structural Improvements

Examples of non-structural improvements to be considered as part of preparation should include as appropriate:

• Emergency response training both for local flood control agencies (Reclamation, Levee Districts, Levee Maintenance Agencies) staff, local law enforcement and emergency services personnel, State and Federal agency staff.

• Interagency coordination and communication – improvements are necessary among law enforcement, county, RD, LD, LMA, flood fighting coalition, including dedicated radio frequencies and communication systems, and backup repeater systems.

• Regionally accessible materials and equipment, pre-located caches – sand bags, contracts for materials

• Backup power supplies for flood fighting – pump backups, etc.

5.3 Emergency Response Plans

Response elements should include rapid deployment of available resources and prompt execution of predefined emergency action plans. A post flood recovery program should be developed that includes: expedited infrastructure repair, including levees, how dewatering is conducted, and how critical infrastructure and economic activity will be restored in an efficient and timely manner. Recovery programs should include affordable, low cost insurance options or tax incentives to rebuild or replace infrastructure in agricultural communities including residences, crops, livestock, pumps, machinery,

Agricultural landscape (C. B. Bowles)

equipment, and other infrastructure. This program should include potential private, local, state and federal funding sources and programs.

The elements of an emergency response plan should include:

- A locally developed plan
- Access to State funding to maintain the plan
- A pre-planned response – e.g.Jones Tract – long delay for response – hierarchical response system (What is the process/order) (this is in place through State Emergency Management System (SEMS) it just may take a while – it could be inherent)
- Dovetailed into County Multi-Hazard Mitigation Plans
- A trigger based on river stage/ forecast for JOC/OES involvement (typically a County led effort)
- State criteria in meeting an emergency response plan.

5.4 Recovery

Recovery after flood events should be focused on returning the rural economy back to full production as soon as possible. Every effort should be made to financially empower the local community to rebuild. Elements of this recovery should include, but not be limited to:

- Initial emergency funding mechanisms and declarations should be identified and established in order to expedite recovery actions. De-watering of flood waters captured on flooded rural and agricultural land is an essential element of post-flood recovery. De-watering procedures must be pre-planned for the area (i.e. pumps need to be adequately supplied and be able to come on line quickly). Dewatering must be accomplished as soon as possible in an efficient way to minimize financial losses and allow prior normal use of the properties in a timely manner
- Rapid restoration of critical infrastructure including water, power, communication, and transportation in order to re-establish both public and private services
- Power sources and required site access must be pre-arranged and understood.
- Develop a de-watering plan such that pads for emergency equipment are in place, identified breach areas for when water needs to be drained out of basin, identify critical infrastructure needed for basin recovery, etc.
- All required permits and regulatory requirements should be programmatically established and implementable prior to an anticipated flood event so that complications or delays are avoided in the dewatering and recovery effort.
- Reconstruction or rehabilitation of sewer systems, water supply, decontamination of wells.
- Repair of erosion damage to inboard levee slopes.
- Removal of debris, trash and hazardous materials.

Section 6
Recommendations and Next Steps

In conclusion the Workgroup recommends that the next steps be a series of key actions:

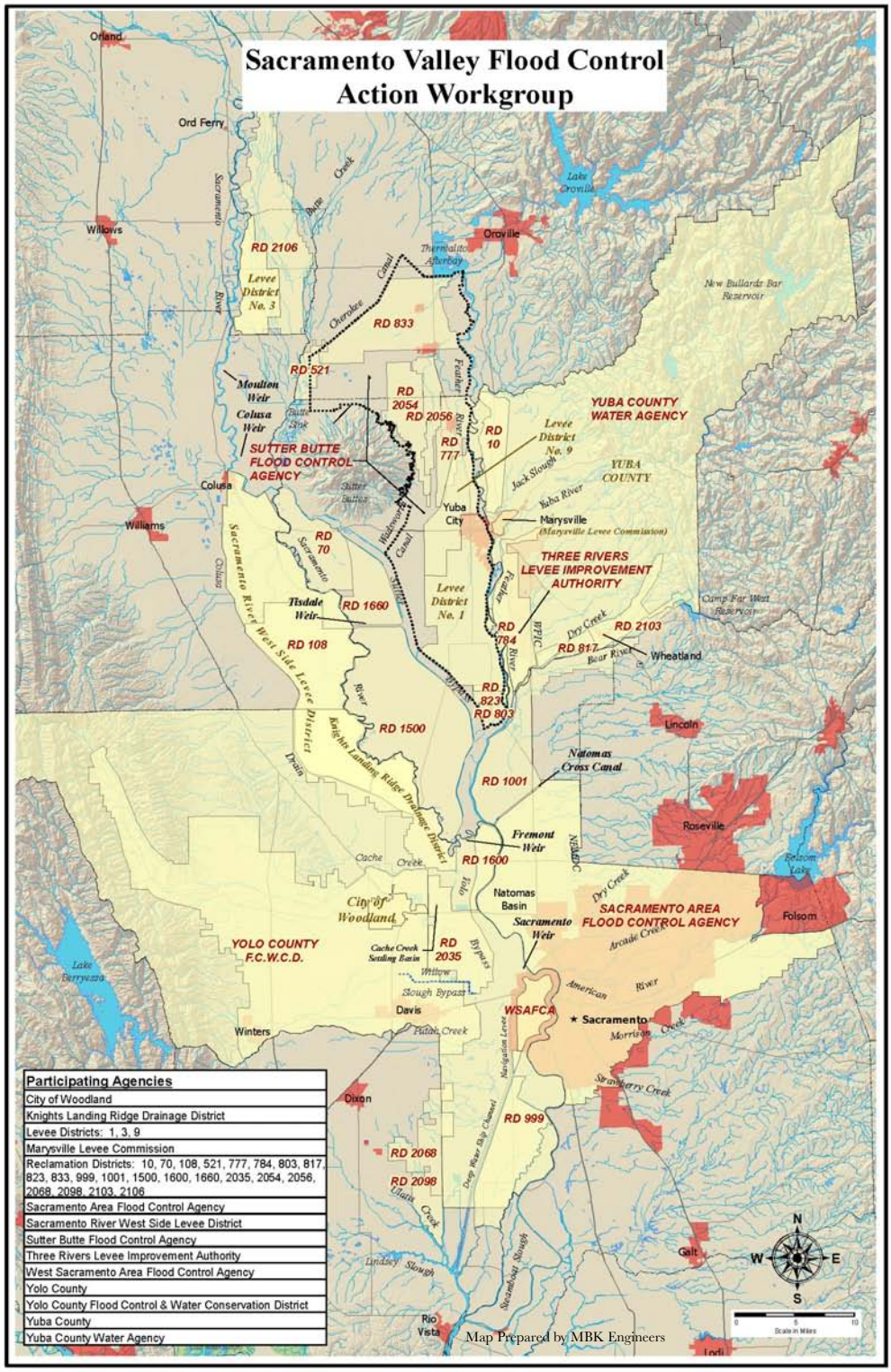
1. Delivery and presentation of this report to the State resulting in response comments from DWR.
2. Coordination between the State and the Workgroup to discuss the State's comments in a series of scheduled meetings.
3. Discussions regarding policy level decisions and how the details contained in this report will impact these policies.
4. Collaboration and discussion between the State and the Workgroup in order to develop a plan for incorporation of essential elements of this report into the CVFPP and planning to implement the recommendations herein.

Section 7
Regional Interests in the Workgroup

The Workgroup was formed in March 2008 as a committee of the California Central Valley Flood Control Association (CCVFCA) for the benefit of engaging local expertise, a broad range of interests, and resources to assist in the formulation of a regional flood protection plan for the Sacramento Valley. The Workgroup includes the following participating agencies:

- Knights Landing Ridge Drainage District
- Levee District 1, 3, and 9
- Marysville Levee Commission
- Reclamation Districts 10, 70, 108, 521, 777, 784, 803, 817, 823, 833, 1001, 1500, 1600, 1660, 2035, 2054, 2056, 2068, 2098, 2103, and 2106
- Sacramento Area Flood Control Agency (SAFCA)
- Sacramento River Westside Levee District
- Sutter-Butte Flood Control Agency
- Three River Levee Improvement Authority
- West Sacramento Area Flood Control Agency (WSAFCA)
- City of Woodland
- Yolo County
- Yolo County Flood Control & Water Conservation District
- Yuba County
- Yuba County Water Agency

New levee construction, Natomas, Sacramento
(C. B. Bowles)



Section 7

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Sacramento Metro Chamber, 2011. Modernization of FEMA's National Flood Insurance Program (NFIP), Sacramento Metro Chamber, Cap to Cap, May 7-11, 2011.

Section 8

Acknowledgements

The core drafting group for this paper consists of:

Lewis Bair, Chris Bowles, Tara Brocker, Bill Edgar, Tom Ellis, Steve Fordice, Pete Ghelfi, Mike Hardesty, Mike Inamine, Ric Reinhardt, Scott Shapiro, Max Sakato, and Melinda Terry; however there are many other individuals who contributed in numerous ways towards the development of the report since March 2008.