



US Army Corps
of Engineers®



FEMA



STATE OF CALIFORNIA WORKSHOP TO INFORM A NATIONAL LEVEE SAFETY PROGRAM

NOVEMBER 2022 MEETING SUMMARY

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Background

On November 15-17, 2022, members of the U.S. Army Corps of Engineers (USACE), State of California Department of Water Resources (DWR), and State of California Central Valley Flood Protection Board (CVFPB) held a workshop to share information to help inform the development of the National Levee Safety Program. The workshop was one in a series convened by USACE as part of the stakeholder engagement process for the National Levee Safety Program.

There are multiple reasons that USACE had interest in learning from the State of California, including: the scale and effectiveness of its dam safety program; experience and lessons learned with the evaluation of woody vegetation in the Central Valley; existing state authorities for some levees; a state levee inventory; implementation of robust levee safety activities; and significant experience working with the National Flood Insurance Program.

The objectives of the workshop were:

- Learn from the State of California regarding their experience and lessons learned in developing mature levee safety programs and the interoperability of those programs with larger floodplain management activities and regulations.
- Understand the State of California's woody vegetation management policies and practices and the pros/cons of that approach.

Summary of Discussion

WELCOME/INTRODUCTIONS

Mike Bachand (USACE) and Mike Mierzwa (DWR) welcomed participants and initiated introductions. Opening remarks were provided by Gary Lippner (DWR) and Phoebe Percell (USACE).

PROMOTING STATE LEEVE SAFETY PROGRAMS

PRESENTATION: FRAMEWORK, PURPOSE, AND ASSUMPTIONS OF A NATIONAL LEEVE SAFETY PROGRAM

Tammy Conforti (USACE) presented the framework and key components/deliverables anticipated for a National Levee Safety Program, including operating assumptions, relationships between dam safety/levee safety/flood risk management, the evolution of thinking from the current National Dam Safety Program, and the relationship between National Levee Safety Guidelines and USACE guidance and standards. [See Appendix B].

- The National Levee Safety Act requirements are codified in the United States Code (U.S.C.) Title 33 Chapter 46.
 - » The Act has been amended multiple times over the last 15 years through Water Resource Development Acts (WRDAs).
 - » First appropriations received in 2020 to get program moving.
- The National Levee Safety Program would complement a shared vision approach to flood risk managed by USACE and FEMA – the National Flood Insurance Program (NFIP) includes 21,000 participating communities and the National Dam Safety Program includes information on 90,000 dams across the country.
 - » The law designates USACE and FEMA as lead agencies for particular activities and co-leads for others (see presentation slide 2).
- The high-level goals of a National Levee Safety Program include:
 - » Develop a national approach for managing flood losses while protecting/restoring natural benefits of floodplains.
 - » Improve public awareness and understanding of flood risk to promote investment and preparedness.

- » Consolidate and make available timely and accurate data about flood risk and infrastructure performance.
- » Articulate roles and responsibilities at each level of government to ensure 1) decisions are made within a commonly understood framework and 2) programs are complementary.
- The primary components of a National Levee Safety Program include:
 - » National Levee Safety Guidelines – provides resources to work towards national consistency
 - » National Levee Database – supports data collection and management to support investment and decision making
 - » Integrated Levee Management – establishes a framework for infrastructure managers from a variety of entities to coordinate watershed management efforts
- The National Levee Safety Program team is in the process of engaging interested parties in the program design concepts. Phase I outreach focused on purpose and scope. Activities included:
 - » Developed stakeholder & tribal engagement/ social media plans
 - » Launched program website(www.leveesafety.org) with public resources (reports, fact sheets)
 - » Conducted 3 public launch webinars
 - » Conducted 9 virtual, four-hour workshops (~600 attendees)
 - » Initiated tribal engagement activities (webinars, phone calls, and emails)
- Phase II (Spring 2023) outreach will focus on feedback on priorities and options, and Phase III (Fall/Winter 2023) will solicit input on draft National Levee Safety Program products.
- Feedback to date has been a mix, with some people supporting the overall concepts of an integrated approach and others advocating for the national program to focus only on levee performance.
- USACE recognizes that vegetation on levees is a complex issue and still needs to comply with the requirements of Section 3014 of WRRDA 2014, requiring USACE to review its vegetation management policies and take into account local and regional differences. USACE initially started this review, but soon realized managing levees needs to be considered comprehensively. It is USACE's intent to develop vegetation management guidelines as part of the National Levee Safety Guidelines development process, and then revise its own USACE policies to reflect national best practices.
- The National Levee Safety Program will include a Model State Levee Safety Program Guide that can support states in the development of state-level programs. The program requires participating states to:
 - » Adopt and implement the National Levee Safety Guidelines
 - » Carry out public education activities
 - » Share/manage levee information in the National Levee Database
- Other opportunities for state programs include:
 - » Build capacity in levee owners/operators
 - » Collaborate across programmatic and political jurisdictions
 - » Apply services in a fair and equitable way across disadvantaged communities, tribes, and individuals particularly vulnerable to flooding
- Stakeholder feedback to date on state levee safety programs includes:
 - » Identified benefits:

- Alignment across federal agencies and programs to reduce barriers
- Coordination between states
- Improved levee oversight and consistent compliance
- Technical assistance
- Clearinghouse to manage data
- » Challenges or concerns raised has included:
 - Appetite and ability for establishing authority within existing state governments
 - Lack of trust in federal/state programs
 - Limited resources/expertise
 - Added government process/burden
- The National Levee Database has evolved over time. The overall goal of the database is to provide up-to-date information on all levees in the nation, which can be used by anyone associated with or interested in levee management, to support decision-making and risk communication.
- Feedback received through the Phase I outreach regarding the National Levee Database has included:
 - » Agreement that data is essential to flood risk management
 - » Provide information that supports:
 - NFIP accreditation
 - Flood risk and hazard identification
 - Emergency response
 - Prioritization of operation and maintenance (O&M) activities
 - » Concerns raised:
 - Unclear who uses the information and how
 - Incomplete or inaccurate information
 - Levee owners want to be part of the data management process
- In general, the common thread across agencies is using risk information to inform decisions.
 - » Whereas historical focus has been on recurrence intervals (e.g., 100-year and 500-year floods) the trend is moving to a risk-informed approach to management.
- There are many activities occurring in parallel between the National Levee Safety Program and the USACE Levee Safety Program that will continue to inform one another over time.

Discussion – Regulatory Authority and State Program Design

- Some participants were surprised to learn DWR does not have regulatory authority for all levees within the state. There are some specific entities that do have regulatory authority within a specific geography (e.g., Central Valley Flood Protection Board); however, it is not the same as the statewide authority for dams.
 - » One important need from the National Levee Safety Program is model legislation for states to adopt to improve regulatory authority. However, states will vary widely in how they oversee levee programs. Governance structures will have to be flexible to accommodate these differences.

- DWR actively reaches out to their counterparts in other states to coordinate on flood risk management issues, for example by reviewing relevant information coming through the Federal Register and coordinating annually at the Association of State Floodplain Management Agencies (ASFPM) conference. FEMA hosts a roundtable at the ASFPM conference every year to promote coordination under NFIP which DWR finds useful.
 - » Organizationally, states vary widely on where NFIP coordinators are located within state agencies – some are in resource agencies, others are in dam safety, etc.
 - » It would be a helpful mapping exercise for ASFPM to survey states to find out which states have NFIP coordinators, floodplain managers, dam safety managers, and levee safety managers; and where they are located within the state governments.

Discussion – Levee Databases

- The California Levee Database still exists but levees are not being actively added to it. DWR will follow up on the status of the database and its relationship to other databases such as the Flood Emergency Response Information Exchange (FERIX) and the National Levee Database.
 - » Coordination is important to determine if and how data updates cascade between systems.
 - » Data needs are different for local, state, and federal agency needs.
 - » Additional discussion is needed to determine what data fields are most useful in the National Levee Database, who has access to those fields, and who has permissions to add or update data.
- USACE continually reviews and updates information in the National Levee Database. For example, two years ago there were 9,000 levees listed in the National Levee Database. Now the number of levees is 7,000 because many structures that were incorrectly listed as levees have been removed from the database.
 - » The definition of a levee still presents challenges with what infrastructure is included in databases and how they are labeled.

PRESENTATION: UNDERSTANDING CALIFORNIA'S SYSTEM OF FLOOD RISK MANAGEMENT

Jeremy Arich (DWR) presented on the roles, responsibilities, and interoperability of floodplain management, levee safety, dam safety, and emergency planning and response activities and programs. [See Appendix C]

- There are four major types of natural flood hazard in California:
 - » Riverine (levees)
 - » Coastal (levees and other defense structures)
 - » Alluvial (no levees)
 - » Pluvial (levees absolutely impossible)
 - » Dam inundation / engineered structure is actually a human-based flood hazard, so it is not often included as a natural hazard
- The Mediterranean climate in California means the rain is concentrated in a few months in the winter.
- California has well over \$800B of structures and 7M people in the 500-yr floodplain.
- Levees are critical to protecting this property and people – there are over 14,000 miles of levees in California.
- There are over 1,300 agencies in CA with flood management legal authorities, so coordination is a challenge.

- \$2B invested annually, mostly in ongoing maintenance, but also capital improvements – local agencies in most years bear most of the costs.
- DWR programs have three foci:
 1. Proactive actions (which take considerable engagement to pick appropriate actions for various flood hazards and community resources)
 2. Active actions (which when implemented constantly work)
 3. Responsive actions (which start at the local level, but scale up in response when resources are exhausted)
- DWR has roughly 5 different types of groupings of activities:
 1. Planning
 2. Floodplain management (which is a blend of planning and mapping with the intent being to regulate risk)
 3. Projects (which include structural and non-structural actions, and can be implemented at various scales)
 4. Operations and maintenance of existing defense systems (typically these ongoing activities suffer funding shortages)
 5. Flood emergency response (which include immediate, short-term, and long-term recovery operations in addition to the immediate response)
- DWR's Division of Flood Management has around 300 staff and 4 major functional branches (soon to have a 5th branch for Public Safety):
 1. Flood projects
 2. Floodplain management
 3. Hydrology-Flood operations
 4. Flood maintenance
- DWR coordinates its dam safety and floodplain management activities, and also serves as a dam regulator through the Division of Safety of Dams (DSOD), regulating 1,250 dams in California (a jurisdictional dam is 25 feet or taller). They also co-regulate Federal Energy Regulatory Commission dams. The Division of Safety of Dams is funded through fees.
- The Central Valley Flood Protection Board serves a regulatory function in its geographic area.

Discussion – Formal v. Informal State Programs

- There is debate as to whether formal state levee safety programs should be promoted at the state level or whether the focus should just be on ensuring levee safety activities are accomplished.
 - » Calling it a 'Levee Safety Program' could limit what activities are undertaken compared to a broader flood risk program. California has an integrated flood risk management program that essentially plays the role of a state levee safety program.
 - » One reason an integrated approach is necessary in California is the significant role that reservoir operations plays in relation to levee systems.

Discussion – Program Structure

- Program responsibilities, structure, and relationships have evolved over time, generally established through legislation or sometimes executive order.
- State programs typically interact with local projects through incentives like grants that provide the opportunity to ensure local efforts also support state-level goals.

PRESENTATION: PRIORITIZING LEVEE RISK MANAGEMENT ACTIVITIES

Mike Mierzwa (DWR) presented on the State of California approach to prioritizing levees to determine appropriate actions and resource allocation. [See Appendix D].

- The 2022 Central Valley Flood Protection Plan (CVFPP) is the second update of the plan that is updated every 5 years (previous versions were 2012 and 2017). The Plan provides:
 - » The strategic blueprint for flood risk management in the Central Valley
 - » The State Systemwide Investment Approach that guides the investment for areas covered by the State Plan of Flood Control
- The plan fulfills the requirements of the 2008 Central Valley Flood Protection Act, supports the Water Resilience Portfolio (the Administration's blueprint for equipping California to cope with extreme droughts, floods, and other water resources challenges), and aligns with the California Water Plan (the State's strategic plan for sustainably and equitably managing and developing water resources for current and future generations).
- The three primary themes of the Central Valley Flood Protection Plan are:
 - » Build flood system climate resiliency
 - » Increase accountability through performance tracking and transparency
 - » Align strategically with other State water management planning efforts
- The Plan outlines investment needs over 30 years of \$17B - \$21B, which includes \$12-16B of capital investments and \$250-310M in annual funding for routine activities. It serves as an advocacy document and feeds into the State Hazard Mitigation Plan.
- The plan outlines the following categories in a statewide portfolio to which every category has an investment approach:
 - » **Systemwide:** A primary example of a systemwide approach is the use of flood bypasses like the Sutter and Yolo bypasses. Rather than focusing on individual levee systems and using resources to make each system more resilient, the larger bypass project can reduce the risk to all of those systems by allowing more water to flow through the bypass systems.
 - » **Urban:** areas are those with populations of more than 10,000. DWR is legislatively required to provide 200-year level of protection to urban areas.
 - » **Small communities:** those with populations 1,000 to 10,000 people.
 - » **Rural-agricultural areas.**

Discussion – Support to Communities

- DWR provides technical support, emergency preparedness, planning level data (response, modeling) and various types of assistance in identifying and funding projects including:
 - » DWR worked with USACE on a flood future report using FEMA's Hazards of the US (HAZUS) data. USACE should look at the contents and analysis in this report to inform future State of Levees Report to Congress. DWR helps communities understand opportunities and actively encourages local entities to pursue federal grants like FEMA Building Resilient Infrastructure and Communities (BRIC).
 - » DWR has a lot of hydrologic and hydraulic data and typically knows in advance where there is potential for overtopping.
 - » DWR actively reaches out to communities to notify them of available services at the state and federal levels. The State of California may be able to provide matching funds for federal grants.
 - » DWR helps fund feasibility studies for small communities.
 - » The California Office of Emergency Services has begun an effort to support sustainability coordinators for disadvantaged communities to help write grant applications for FEMA funding.
 - » DWR has a cost share program that supports implementation of portions of an authorized project before federal funding is appropriated.
 - USACE feasibility studies can be complex, time consuming, and expensive. One example of an urban area feasibility study took 8 years and \$10M to complete.
 - One example is the Sutter Basin project. There was a National Economic Development (NED) portion and Locally Preferred Plan. Even though the NED plan was selected by USACE, there were portions of the Locally Preferred Plan that the State implemented prior to study completion that were still beneficial and worth implementing.

Discussion – Decision Making and Factors for Funding

- DWR uses factors other than benefit/cost ratio in making investment decisions. Typically, calculating costs is relatively straightforward while calculating benefits can be challenging.
 - » In general, the DWR rule is that a project cannot result in a risk increase, so if there is a community that wants to grow significantly, they must demonstrate how risk will be reduced.
 - » California does not have a restriction preventing levee raises through normal processes; however, there are restrictions on transferring risk so that analysis has to be done before a permit will be issued. DWR does not do emergency levee raises. In California, the experience has been that under seepage or through seepage are more likely to cause failure than overtopping.
- There is a feeling from some that there is not enough attention and investment on the rural levee portfolio.
 - » The systemwide and urban categories of projects receive the most funding based on the scale of those projects. They are typically more ready to implement a project which is one of the prioritization factors.
 - » Most urban communities want more protection and are willing to help fund additional risk reduction efforts.
- There is no legislative requirement for Emergency Action Plans for levees; however, DWR does require them to qualify for state grant funding. Levee Emergency Action Plans are most often incorporated into County Hazard Mitigation Plans (which are required for all counties).
- Projects require Central Valley Flood Protection Board permits and likely USACE Section 408 permission to proceed so that risk review takes place through that process.

Discussion – Fragility Curves

- The use of fragility curves in conducting assessments is important; however, there are different assumptions and methodologies that agencies use. FEMA is using fragility curves for Risk Rating, but those may be different than the fragility curves USACE develops during a risk assessment or that DWR uses for its planning purposes.
 - » A comparison of fragility curve methodologies and results from specific examples would be a useful exercise.
 - » For insurance updates, FEMA will benefit from better/more up-to-date fragility curve data.

Discussion – Dam Safety in California

- California is just now starting its own grant program for dams.
- FEMA eliminated funding from its Hazard Mitigation Grant Program for any dams rated ‘fair’ and only looks at poor/unsatisfactory; however, California identified needs for dams rated ‘fair’ because of seismic risks. Every October, the Division of Safety of Dams posts the hazard classification and the condition assessment for all the dams that it regulates. If deficiencies are identified, the dam owner applies for remediation funds and submits plans and specifications. The Division of Safety of Dams reviews to verify the design meets standards/criteria.
- Post-Oroville, the Division of Safety of Dams is reviewing Emergency Action Plans for dams, then California Office of Emergency Services approves them. Owners then have exercises to test their plans.
- DWR creates inundation maps and they are of varying quality and scale.
 - » There may be multiple dams and multiple inundation maps that look different. Evacuation planning typically occurs at the county level (local sheriff).
 - » Inundation maps are made public.

Discussion – Federal Standards and Incentives

- One of the more challenging issues from a national perspective is looking at standards. Historically flood frequency standards have been relied on to make decisions, however in the future, especially in light of uncertainty associated with climate change, a risk standard might be a better goal.
- There is an opportunity for USACE and FEMA to help align incentives by using requirements and opportunities. For example, linking State Hazard Mitigation Plans with activities communities implement for the NFIP Community Rating System and identifying opportunities where additional funding from other federal agencies (e.g., EPA or USACE) is more likely to be available if they undertake risk reduction actions.

PRESENTATION: CALIFORNIA STATE SYSTEMWIDE INVESTMENT APPROACH

Todd Bernardy (DWR) presented on the State Systemwide Investment Approach (SSIA).

- DWR uses a portfolio approach to flood risk reduction that it calls the State Systemwide Investment Approach (SSIA).
- To develop the State Systemwide Investment Approach, DWR undertook a significant outreach effort to collect the information needed to develop the approach including:
 - » Flood management plans
 - » Floodplain risk management activities
 - » Flood risk reduction projects (capital investments)
 - » Flood system operations
 - » Flood emergency response
 - » Basin-wide studies
- Incorporated into the SSIA were components from California Senate Bill 5 which requires 200-year level of protection for urban areas by 2025. Additionally, Senate Bill 5 directed DWR to consider ecosystem enhancements where feasible, which led to DWR develop its conservation strategy.
 - » If urban areas are not able to demonstrate progress toward getting 200-year level of protection, then they will be restricted from issuing new land development or building permits.
- DWR used basin-wide studies to identify the best locations for incorporating resilient features, matching local priorities, and where to focus on ecosystem restoration.
 - » Layered on top of this plan are USACE feasibility studies that help meet some of the goals in the plan and further define the federal interest.
- For the Urban Flood Risk Reduction efforts, DWR promotes the adoption of multiple benefits. If a community puts forward a proposal that achieves multiple benefits or leverages funding they are rewarded. For example, if a community is able to incorporate ecosystem benefits, provide additional risk reduction, and achieve a 200-year level of protection, then DWR would consider reducing the cost share for that community.
- Urban Flood Risk Reduction had \$1.8B in funds to use toward helping communities meet cost share requirements for federal programs (not grants).
- The DWR cost share process for the Urban Flood Risk Reduction required those requesting cost share funds to demonstrate an understanding of EO11988 and broader flood risk challenges, such as climate change adaptation approaches.
 - » For example, in the Natomas basin, to qualify for the funding, the plan was changed to include land conservation easements to limit potential future growth.
- The overall intent of these efforts is to align goals and incentivize communities.
- DWR also incorporates dam safety awareness and operations into flood risk planning. For example, if there is an identified issue or condition change at a dam, DWR will restrict the reservoir levels to reduce risk.

Discussion

- A principle for consideration for the National Levee Safety Program is to ensure there is coordination across dam safety programs so that reservoir operations and potential downstream impacts are taken into account in the broader flood risk planning efforts.

PRESENTATION: HYDROLOGY AND FLOOD OPERATIONS

Jeremy Hill (DWR) presented on the activities of the Hydrology and Flood Operations Branch.

- One activity of the Hydrology and Flood Operations Branch is flood forecasting.
 - » For river forecasting, there are 300 data collection points throughout the state, including 100 official threshold monitors that provide the triggers for when DWR begins notifying levee owners of potential flood forecasts.
 - » Seasonal forecasting is based on assessments of water supply and snowpack and on-the-ground knowledge from reservoir operators, water managers, and local maintaining agencies.
 - » River forecasts serve as planning dashboards for local agencies.
 - » DWR also conducts research on the potential impact in the state of atmospheric rivers.
- DWR coordinates the efforts to move water throughout the state in times of high water and flood emergency. This requires awareness of the state of levees downstream of systems to determine the appropriate water releases.
 - » The DWR Flood Operations Center leads flood response in close coordination with the California Office of Emergency Services. The role for California Office of Emergency Services increases once the recovery phase begins.
 - » DWR provides Flood Emergency Response Grants to primary response agencies within communities (typically county emergency agencies).
 - » California Office of Emergency Services also supports communities to update their Hazard Mitigation Plans.
 - » DWR has pre-staged flood response materials at several Flood Fight Material Locations.
 - » If DWR forecasts are of significant concern, they will send flood fight specialists out to be available to respond.
 - » When water levels / forecasts trigger monitoring phases, DWR notifies reclamation districts to begin patrolling their levees. The districts communicate back to the Flood Operations Center, and the Center coordinates with reservoir operators to keep everyone informed if any potential issues arise.
 - » DWR levee inspectors serve as the eyes and ears for any levee issues. For example, if issues are identified they may contact the Central Valley Flood Protection Board for potential enforcement actions.

Discussion

- One idea discussed as part of the National Levee Safety Program is to incentivize state participation through other benefits. For example, if a state has a strong levee safety program, they could qualify for expedited or streamlined Section 408 reviews, or potentially in the future move toward a self-certification process for permitting approvals.

PRESENTATION: FLOOD SYSTEM SUSTAINABILITY SECTION

Dave Wheeldon (DWR) presented on the activities of the Flood System Sustainability Section.

- DWR helps coordinate repairs to damaged systems eligible for funding from USACE through P.L. 84-99.
 - » DWR has developed System Wide Improvement Framework (SWIF) plans for levees it owns and operates, and DWR has provided funding to local agencies to support their SWIF development.
 - » DWR also tracks deferred maintenance on systems. Since the P.L. 84-99 Rehabilitation Program does not pay for deferred maintenance, DWR will pay for those repairs.
 - » DWR collects the maintenance cost data and uses that data as part of its funding requests overall.

- DWR manages approximately 1,200 miles of levees. There are around 1,500 locally constructed and operated levees that cover about 3,000 miles.
 - » DWR inspections evaluate systems and components and prioritize actions based on the hazards and potential consequences.
 - » There are some activities the DWR tries to implement on rural levees that typically get less attention. This includes work to add crowned roadways on top of levees, addressing areas of erosion, and other fixes.
 - » To ensure a balanced portfolio approach, DWR does distribute its resources across the categories of levees, which includes attention to rural levees.
- DWR has learned that supporting funding for projects across the portfolio has had the benefit of building up the expertise of levee owners/operators as well as the consultants they rely on.
- DWR has a Flood Maintenance Assistance Program (FMAP) that provides grants to local maintaining authorities to help them meet and maintain their eligibility in the USACE P.L. 84-99 Rehabilitation Program.
 - » By providing funding for operations and maintenance, DWR is supporting local authorities to be able to use their own funding for non-routine issues that may be costly and less predictable.
- Deferred Maintenance Projects – Pipes and Penetrations
 - » DWR evaluates and rehabilitates pipes and penetrations.
 - » Video and physical inspections are conducted every 5 years.
 - » Rehabilitation or replacement is funded 100% by the state.
- Storm Damage Emergency Rehabilitation
 - » This program is the DWR-led rehabilitation program that essentially helps fund any rehabilitation efforts that are not covered by the USACE P.L. 84-99 Rehabilitation Program.
 - » The work is only for restoration of projects and does not include improvements to projects.
- DWR works to mirror federal funding opportunities. For example, if a community can get 75% of a project funded by FEMA through Building Resilient Infrastructure and Communities, then the state can coordinate its grant programs to cover the remaining 25% cost share.
- The state also provides high hazard potential grants. Because the Division of Safety of Dams is the regulator, dam hazard grants are managed through other DWR programs.

Discussion – Local Resources for Cost Share

- What does DWR do in instances where local interests do not have the resources to meet cost share requirements?
 - » DWR tries to look for opportunities where the local interest may be able to provide some work in-kind or find other ways to meet the cost share needs.
 - » If a local managing authority is no longer able to maintain their system, there is a process where DWR can take over the operations and maintenance responsibilities for that system.
 - » Lastly, if the project is no longer serving its purpose, it is possible to request that the project be deauthorized by Congress.
- Typically, grants from federal agencies cannot be co-mingled; however, there are instances where federal funds granted through states are no longer considered federal funds and can be used to match/support other federal grants. For example, after Community Development Block Grants are processed through states, the funds are no longer considered federal funds with restrictions.

Discussion – Flood Risk Notification Highlights/NFIP

- In the Central Valley, flood risk notifications are sent out to all property owners (over 280,000 mailers are sent out annually).
 - » The primary message of the flood risk notifications is for property owners to purchase flood insurance.
- The State of California will provide up to \$50K in funding for communities to develop CRS improvement plans.
- DWR develops Levee Flood Protection Zone Maps.
 - » These maps do not include level of protection and are not the same as NFIP maps.
 - » Local agencies can choose to be included in this process and communities can get Community Rating System credits for participating.
 - » FEMA is using the National Levee Database leveed area maps for Risk Rating.
 - » The majority of FEMA's California maps are more than 10 years old.
- One challenge with the NFIP process is that communities have to fund the cost of efforts that reduce risk, but it translates to a reduction in insurance premiums for individual property owners, so the benefits are not evenly distributed.
 - » NFIP policies are now being dropped at record rates in California. The trend in California is that property owners begin to drop coverage if premiums reach \$1K/year.
- Risk Rating 2.0 seems to have equity challenges. For example, after reassessments there were areas of Santa Barbara (predominantly wealthy households) that saw flood insurance premiums reduced, while East Los Angeles (less wealthy households) had premiums increased.
- California is seeking to develop an affordable flood insurance option. Pilot projects are underway to identify private insurance options to supplement NFIP plans (coordinated effort between CA Department of Insurance, DWR, and University of California at Davis).

VEGETATION MANAGEMENT BEST PRACTICES

Background from USACE

- USACE is interested in understanding the State's role in flood risk and floodplain management and how vegetation challenges are addressed.
- After Hurricane Katrina USACE began to stringently implement its no-vegetation policy (due to the uncertainty introduced by vegetation on levees).
- USACE recognizes that a no-vegetation approach is not practical in some circumstances and is working through the development of National Levee Safety Guidelines to account for regional variability through engagement with engineering experts, environmental experts, and others to discuss how to best use risk-informed approaches to vegetation management on levees.

Background from DWR

- Historically there have been challenges working with the resource agencies on the vegetation management issues. Often, the engineering solutions were developed prior to engaging with the resource agencies.
- Rather than a standard for vegetation, it might be better to establish a process for risk evaluation for vegetation.
- Quantifying the environmental benefits of vegetation is challenging. DWR assumes the environmental benefits are high and does not attempt to quantify them.

PRESENTATION: LEVEE VEGETATION MANAGEMENT PROJECT

Cassandra Musto (DWR) presented on the Levee Vegetation Management Project (LVMP).

- There are a variety of challenges related to levees that intersect with people and the environment, including:
 - » Continued urbanization/development in the floodplain
 - » 1M people living behind levees in the Central Valley
 - » Aging infrastructure
 - » Diminishing habitats
 - » Endangered species
- The Central Valley Flood Protection Plan includes a vegetation management strategy which explains the commitment to maintaining visibility and accessibility on levees and recognition that some trees do pose unacceptable threats to the integrity of levees. Trees that pose unacceptable threats will be identified and removed, or managed to reduce risks.
 - » The vegetation management zone includes the upper 20 feet of the water side of the levee and 15 feet on the land side.
- DWR has coordinated on levee research with Central Valley Floodplain Board, the Central Valley Flood Control Association, California Fish & Wildlife, U.S. Fish & Wildlife, and National Oceanographic and Atmospheric Administration.
- DWR has six areas of focus:
 - » Tree root studies
 - » Tree root interaction with cutoff walls
 - » Seepage stability related to roots
 - » Tree pull-down tests and root pit dimensions
 - » Burrowing mammal habitat
 - » Historical performance of levees with trees (a review of 7,000 levee incident records)
- There are 14 technical reports and two synthesis reports summarizing the findings. One take away has been that generally, trees themselves do not induce failures but it is the interaction with other levee deficiencies that can lead to potential failure modes.
- Of the 7,000 levee incidents reviewed, the findings were:
 - » 350 of the incidents resulted in failure
 - » Failures were caused by erosion (70% of incidents), seepage (18%), sloping (7%), breach (3%), and overtopping (1%)
 - » None of the failures were the direct result of the trees on levees
 - » Of the 7,000 incidents, 16 had some tree-related issues
- The DWR process for identifying potential unacceptable threats include 7 criteria:
 - » Large trees on under-sized levees
 - » Large trees on the lower 1/3 of the landside
 - » Underseepage
 - » Waterside erosion
 - » Levee crown integrity

- » Infrastructure concerns
- » Flood operations accessibility
- The process is to inspect levees for issues related to the seven criteria and document and photograph the issues.
 - » Staff use a mobile app to collect data.
 - » There is then a QA/QC process to review the data.
 - » Any tree that is flagged for meeting one or more of the criteria is then reviewed by a team to develop a management solution for that tree.
- Trees are categorized as:
 - » Potentially unacceptable threat
 - » Monitor
 - » Non-threat
- For trees identified as unacceptable threat, the management process is typically to seek a permit for removal.
- DWR completed the initial tree screening on 287 miles of levees.
 - » Over 1,000 trees were identified as meeting the Levee Tree Analysis criteria.
 - » Currently DWR is about 60% of the way through the review team process, and to date 211 trees have been flagged for management actions.

Discussion – Vegetation

- What are the different factors for landside versus waterside for vegetation considerations?
 - » On the waterside, roots can help prevent erosion and the shade trees provide is critical for the riparian habitat.
 - » Woody vegetation on the landside is more concerning as it can provide or exacerbate a pathway for piping. Seepage analysis has shown that performance issues are more likely to occur from root ball issues on the landside. The major considerations from a management perspective are visibility and accessibility for inspections and flood fighting.
- This approach assumes ecosystem value of riparian vegetation and does not take any action to measure that value.
- This approach has been adopted by the State of California because:
 - » Less than 5% of riparian habitat in the state remains – much of it is on levees.
 - » Removal requires compensatory mitigation, which is expensive.
 - » Supports the DWR a conservation strategy which values benefits to ecosystem services of healthy vegetation and slowing down water velocity.

CLOSING

Workshop participants thanked one another for a productive meeting, noting the discussions were very informative and beneficial. Participants agreed to identify future opportunities to coordinate.



Appendix A: Agenda

State of California Workshop to Inform a National Levee Safety Program



US Army Corps
of Engineers

AGENDA | November 15-17, 2022 | Sacramento, CA

LOCATION

State-Federal Flood Operations Center
Joint Operations Center (2nd Floor)
3310 El Camino Ave, Sacramento CA, 95821

MEETING OBJECTIVES

- **LEARN** from the State of California regarding their experience and lessons learned in developing mature levee safety programs and the interoperability of those programs with larger floodplain management activities and regulations.
- **UNDERSTAND** the State of California's woody vegetation management policies and practices and the pros/cons of that approach.

ANTICIPATED ATTENDEES

- Lance Ablang, CADWR
- Brad Arcement, USACE
- Jeremy Arrich, CADWR
- Mike Bachand, USACE
- Sarah Backus, CVFPB
- Todd Bernardy, CADWR
- Kyle Bickler, CADWR
- Boni Bigornia, USACE
- Amy Bindra, CADWR
- Robin Brewer, CADWR
- Amy Bush, CADWR
- Liz Bryson, CADWR
- Tammy Conforti, USACE
- Ruth Darling, CVFPB
- Simar Dhanota, CADWR
- Jane Dolan, CVFPB
- Jit Dua, CVFPB
- Mitra Emami, CADWR
- Andy Goodwin, USACE
- Jeremy Hill, CADWR
- Laura Hollender, CADWR
- Gary Lippner, CADWR
- Michael Mierzwa, CADWR
- Phoebe Percell, USACE
- George Qualley, CADWR
- Michael Sabbaghian, CADWR
- Jill Self, CADWR
- Darren Suen, CVFPB
- Noah Vroman, USACE
- Dave Wheeldon, CADWR
- Chris Williams, CADWR
- Michael Wright, CVFPB
- Wade Wylie, CADWR
- Linda Manning, Council Oak
- Nick Brubaker, Council Oak

PART 1: PROMOTING STATE LEVEE SAFETY PROGRAMS

DAY ONE – 11.15.22

8:00 – 8:30 am

ARRIVAL

8:30 – 8:45 am

WELCOME AND INTRODUCTIONS

8:45 – 10:00 am

SESSION 1: THE FRAMEWORK, PURPOSE, AND ASSUMPTIONS OF A NATIONAL LEVEE SAFETY PROGRAM

Presentation (USACE): Current thinking about the framework, key components/deliverables anticipated for a National Levee Safety Program, including operating assumptions, relationships between dam safety/levee safety/flood risk management, the evolution of thinking from current National Dam Safety Program and the relationship between National Levee Safety Guidelines and USACE guidance and standards.

Discussion and Questions

10:00 – 10:15 am

BREAK

10:15 am – 12:15 pm

SESSION 2: UNDERSTANDING CALIFORNIA'S SYSTEM OF FLOOD RISK MANAGEMENT

Presentation (State of California): The roles, responsibilities, and interoperability of floodplain management, levee safety, dam safety, and emergency planning and response activities and programs.

Discussion Questions:

- What are the strengths and weaknesses of the California approach?
- Who is responsible for communicating flood risk to people who live behind levees? Is it integrated across dams and levees or program-specific?

READ AHEAD: 2017 Flood Protection Plan, 2022 Draft Flood Protection Plan, California Flood Future (2013)

AGENDA / State of California Workshop to Inform a National Levee Safety Program

12:15 – 1:45 pm

LUNCH

1:45 – 3:45 pm

SESSION 3: PRIORITIZING LEVEE RISK MANAGEMENT ACTIVITIES

Presentation (State of California): Approach to “binning” levees along the rural/urban continuum and the differentiated actions promoted for each grouping, including any standards.

Presentation (USACE): Options under consideration for prioritizing levees at the state level.

Discussion Questions:

- What are the most important actions that should be informed by prioritizing or binning? (e.g., Emergency Action Plans, community evacuation plans, risk assessments, standards, etc.)?
- What are the most important factors that should be considered in an approach to prioritizing or binning (e.g., comparability across states, similarity with dam safety, ease in prioritizing, equity, etc.)?
- What are the pros and cons of the options presented?
- Which of these options would you recommend for a National Levee Safety Program and why?

READ AHEAD: *Options for Prioritizing Levees (USACE), Certified Flood Protection Plan (CA), Urban Level of Protection Criteria (CA)*

3:45 – 4:00 pm

BREAK

4:00 – 5:00 pm

SESSION 4: VALUE TO STATES AND COMMUNITIES OF A NATIONAL LEVEE SAFETY STANDARD

Discussion: The value of a levee safety standard/target to which communities can assess their levee risk management efforts.

Presentation (State of California): The development and use of level of protection standard for levees, how it was developed, and how it is applied.

Discussion Questions:

- What are the benefits of having a common levee safety target for the nation?
- What are the downsides of not having a common levee safety target?
- If adopted, how should a target be used? (e.g., voluntary for communities, inform state and federal activities and investments)?
- What factors should be considered when considering options for the development of a standard/target (e.g., able to understand, cost and complexity to implement, usefulness for states, usefulness for owner/operators)?
- What are the pros and cons of each option?

5:00 pm

DAY ONE WRAP UP

5:15 pm

ADJOURN

PART 1: PROMOTING STATE LEVEE SAFETY PROGRAMS

DAY TWO – 11.16.22

8:00 – 8:30 am

ARRIVAL

8:30 – 8:45 am

RECAP AND AGENDA REVIEW

8:45 – 9:45 am

SESSION 5: DETAILED OUTLINE OF THE MODEL STATE LEVEE SAFETY PROGRAM GUIDE

Presentation (USACE): Anticipated content of a Model Levee Safety Program, including key changes in approach from the Model Dam Safety Program.

Discussion Questions:

- Does the annotated outline of the Model State Levee Safety Program include all the aspects you would anticipate?
- Do the changes in scope and approach from Dam Safety make sense?
- Are there places where the National Dam Safety Program could adopt a levee approach?
- Does the overall state program design provide meaningful connections with floodplain management and dam safety responsibilities at the state while allowing state-specific flexibility?

- Are there areas where states need more flexibility? More prescription? Why?
- Are there places in the model levee safety program where disadvantaged communities could be called out for additional services, focus, or prioritization? How might state levee safety programs better serve disadvantaged communities?
- What unique activities or features should be considered for tribal government implementation? Are there a subset of activities that seem most relevant to tribes interested in implementing all or part of the program? From a tribal perspective, are the initial set of tiered activities reasonable?

READ AHEAD: *Model Levee Safety Program Annotated Outline*

9:45 – 10:00 am

BREAK

10:00 – 11:30 am

SESSION 6: GETTING TO MATURE LEVEE SAFETY PROGRAMS

Presentation (USACE): State Levee Safety Program and maturity tiering.

Discussion Questions:

- Are there any categories of activity (rows) that need to be added?
- Do the first two tiers of activities seem achievable to help ensure states/tribes receive assistance to move to higher tiers?
- Incrementally, do these higher tiers make sense, and do the identified benefits help you move from one to the other?
- Do you have any suggestions for the time frames for the cycles mentioned in NLD & Data Management section?
- Is there a subset of the activities that seem most relevant to tribes interested in implementing all or part of the program? From a tribal perspective, are the initial set of tiered activities reasonable? How should incentives be adjusted to support tribal government implementation?
- What incentives and support do state levee safety programs need to better serve disadvantaged communities?
- Other than funding, what would be the most effective future “incentives” that could be connected to tiering?

READ AHEAD: *State Levee Safety Program Initial Eligibility, Program Maturity and Tiering Concept (USACE), FEMA’s Tiered State Framework Under NFIP*

11:30 am – 1:00 pm

LUNCH

1:00 – 2:00 pm

SESSION 7: BUILDING AWARENESS OF LEVEE-RELATED FLOOD RISK IN CALIFORNIA

Presentation (State of California): Techniques, tools, responsibilities, and materials that assist states in raising awareness of flood risk generally and to owners/operators specifically. This presentation also discusses process changes and updates associated with the speed with which flood insurance rates are updated under Risk Rating to maintain/reduce rates after an improvement to the levee and/or consider reinstating the Provisional Accreditation of Levees process.

2:00 – 2:15 pm

BREAK

2:15 – 3:30 pm

SESSION 8: ASSISTANCE TO LEVEE OWNERS AND COMMUNITIES

Presentation (State of California): Current state programs that assist levee owners/operators in the following: technical assistance, assistance in applying for federal funding, data, building technical capacity for inspections/assessments, and state funding assistance.

3:30 – 4:30 pm

SESSION 9: DISCUSSION FOR INTERACTION AMONG FEDERAL PROGRAMS

Discussion Questions:

- Are there any federal programs working at cross-purposes to good flood risk management?
- How are states currently working with tribes to implement floodplain/flood risk management? Does the State of California provide funding directly to tribes?
- Are there any places where USACE or FEMA programs could be tweaked or adjusted to assist communities in managing levee-related flood risk?

4:30 pm

DAY TWO WRAP UP

5:00 pm

ADJOURN



PART 2: VEGETATION MANAGEMENT BEST PRACTICES

DAY THREE – 11.17.22

8:00 – 8:30 am

ARRIVAL

8:30 – 8:45 am

AGENDA REVIEW AND INTRODUCTION OF NEW PARTICIPANTS

8:45 – 10:15 am

SESSION 10: CALIFORNIA'S APPROACH TO VEGETATION RISK MANAGEMENT

Presentation (State of California): Vegetation management approach, tools, and methodologies, including best practices for inspection, assessment, and removal.

Discussion Questions:

- What are the pros and cons of California's current vegetation management approach?
- What have been participants' experiences working with federal and state resources agencies regarding this approach?

10:15 – 10:30 am

BREAK

10:30 – 11:45 am

SESSION 11: CALIFORNIA APPROACH TO UNDERSTANDING BENEFITS OF VEGETATION ON LEVEES

Presentation (State of California): An overview of research, analysis, and understanding of the benefits vegetation can provide, including what was considered and rejected.

Discussion Questions:

- Data sources used by California to assess ecosystem benefits such as temperature, aquatic habitat, terrestrial habitat, and others?
- Are any related activities undertaken by the State of California that attempt to consider levee realignment, removal, or other techniques to provide environmental benefits such as aquifer recharge and wetlands restoration/protection? If so, explain how they work in context with flood risk management overall and the use and retention of levees.

11:45 am

DAY THREE WRAP UP

12:00 pm

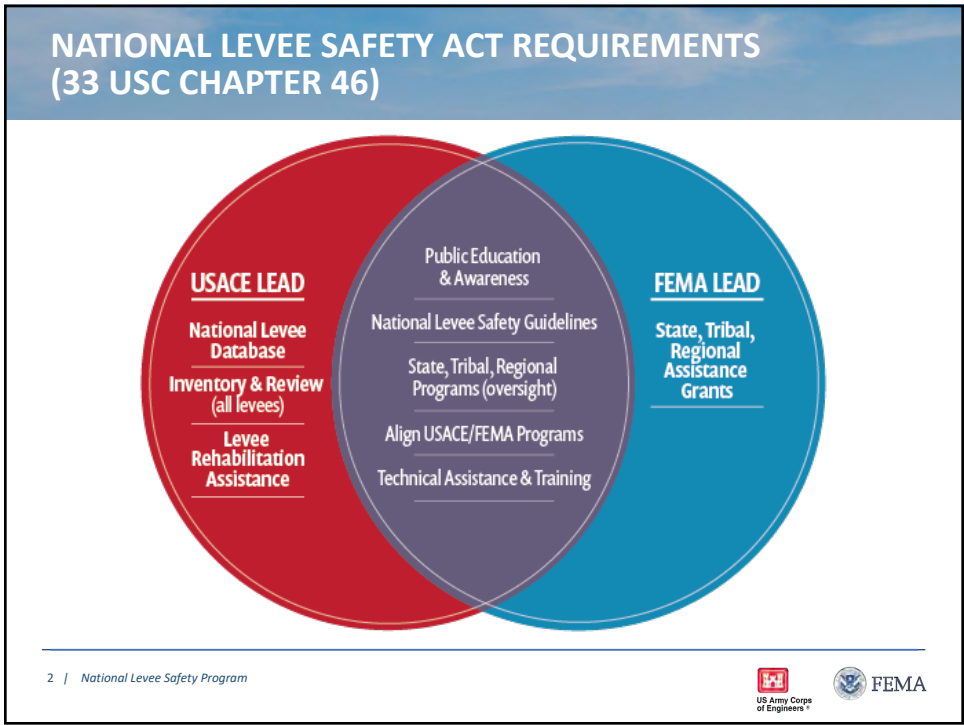
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Appendix B:
Presentation – National Levee Safety Program

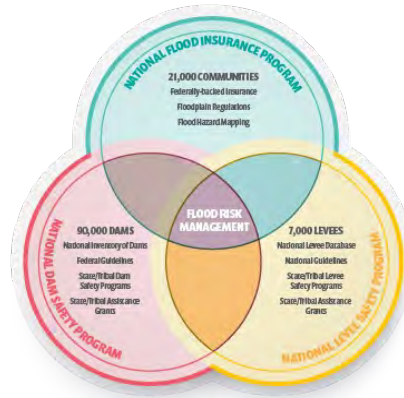


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2

SHARED VISION – DAMS & LEVEES IN CONTEXT OF OVERALL FLOOD RISK



3

TOP LEVEL GOALS

1. Develop a *national approach* for managing flood losses while protecting/restoring natural benefits of floodplains.
2. Improve *public awareness and understanding of flood risk* to promote investment and preparedness.
3. Consolidate and make available *timely and accurate data* about flood risk and infrastructure performance.
4. Articulate *roles and responsibilities at each level of government* to ensure decisions are made within a commonly understood framework and programs are complementary.

4

COMPONENTS OF THE NATIONAL LEEVE SAFETY PROGRAM

NATIONAL LEEVE DATABASE
 LEVEE LOCATION, BENEFITS
 STATES/REGIONS, TRIBES, FEDERAL AGENCIES
 Helps guide management, investment, and data collection

INTEGRATED LEEVE MANAGEMENT
 STATES/REGIONS, TRIBES, FEDERAL AGENCIES
 Promotes use of national guidelines and Levee Safety Programs

NATIONAL LEEVE SAFETY GUIDELINES
 BEST PRACTICES
 CHANGE OPERATORS, LOCAL GOVERNMENT, EMERGENCY MANAGERS, ENGINEERING FIRMS
 Provides a resource for national consistency

Reduce disaster suffering and improve community resiliency in areas behind levees.

5 | National Levee Safety Program

5

STAKEHOLDER & TRIBAL ENGAGEMENT ACTIVITIES

STAKEHOLDER FEEDBACK		
WINTER 2021	PHASE 1: GATHERING INITIAL INPUT ON PURPOSE & SCOPE	MAIN ACTIVITIES <ul style="list-style-type: none"> ■ In-person stakeholder meetings across the U.S. and territories, targeting locations with disadvantaged communities ■ Virtual webinars ■ Announcement in Federal Register
FALL 2022	PHASE 2: SOLICIT FEEDBACK ON PRIORITIES & OPTIONS	
FALL 2023	PHASE 3: SOLICIT FEEDBACK ON DRAFT PRODUCTS	

ACCOMPLISHMENTS TO-DATE

- Developed stakeholder & tribal engagement/ social media plans
- Launched program website(www.leveesafety.org) with public resources (reports, fact sheets)
- Conducted 3 public launch webinars
- Conducted 9 virtual four-hour workshops (~600 attendees)
- Initiated tribal engagement activities (webinars, phone calls, and emails)

FY 2022 ACTIVITIES

- Developed Phase 1 Public Comment Summary Report
- Planning Phase 2 stakeholder & tribal engagement activities
- Specific meetings to discuss information related to levees owners and states
- Topic specific workshops with SMEs on vegetation and risk concepts

6 | National Levee Safety Program

6

NATIONAL LEEVE SAFETY GUIDELINES



Common set of practices for:

- Use in all phases of a levee lifecycle (design, build, operate, maintain, and manage)
- Improved predictability of levee performance
- Flood risk management activities for communities with levees

Assumptions:

- Voluntary, comprehensive, available for all to use
- Adaptable to a variety of local and regional conditions
- Will be updated and improved over time

7 | National Levee Safety Program



7

FEEDBACK

- Split between those who wanted the program to focus solely on levee performance and those who saw value in a broader, integrated approach.
- Areas identified for this program to address –
 - Public Awareness
 - Funding
 - Consistent inspections/assessments
 - Design/Rehabilitation
 - Operations and maintenance (veg)
 - Climate and future conditions
 - Emergency management

8 | National Levee Safety Program



8

CONNECTION – USACE VEGETATION MANAGEMENT POLICIES

USACE Vegetation Management Policies

- Initially USACE started reviewing its vegetation policies separately but soon realized that managing levees must be comprehensive.
- It is USACE’s intent to include vegetation management as part of the development of the National Levee Safety Guidelines. Once complete, USACE will revise its policies to align with those best practices.


Section 3013 of WRRDA 2014 requires USACE to conduct a comprehensive review of its vegetation management policies for levees in order to develop approaches that take into account local and regional factors.

MODEL LEVEE SAFETY PROGRAMS



- Encourage the establishment of state/regional, tribal, and federal levee safety programs to ensure oversight and management of all levees.
- Provide models/examples for consistent, scalable and effective governance of levee safety programs.
- Will consider program levels (tiers of excellence) based on program maturity factors. May align with increased incentives (streamlining, funding, assistance, training).
- Tribes may have different needs from states – will consider specific tribal needs.

KEY FOR IMPLEMENTATION –THE STATES



States currently have legal responsibilities for floodplain management (NFIP) and 49 out of 50 states have formal dam safety programs.



Participating State Requirements
(33 USC Ch. 46)

- Adopt and implement the National Levee Safety Guidelines (including inspections and EAPs)
- Carry out public education activities
- Share/manage levee information in the NLD

Other Opportunities with State Levee Safety Programs

- Build capacity in levee owners/operators
- Collaborate across programmatic and political jurisdictions
- Apply services in a fair and equitable way across disadvantaged communities, tribes, and individuals particularly vulnerable to flooding.

11 | National Levee Safety Program






11

FEEDBACK ON THE STATES' ROLE

- **Benefits**
 - Coordination - with federal agencies and other states
 - Align and coordinate state responsibilities/reduce barriers
 - Improved levee oversight
 - Technical assistance
 - Clearinghouse to manage data
 - Consistent compliance
- **Challenges/concerns**
 - Establishing the authority within existing state governments
 - Lack of trust in federal/state programs
 - Limited resources/expertise
 - Added government process/burden

12 | National Levee Safety Program

12

NATIONAL LEVEE DATABASE



- Complete, up-to-date data for all levees in the nation.
- Be used by levee owners, state programs and others to store and manage levee data.
- Combine with other datasets to efficiently and cost-effectively support decisions and actions related to flood risk management.
- Compatible with off the shelf or locally developed inspection and data collection tools.
- Resource to help with flood risk communication.

13 | National Levee Safety Program



13

FEEDBACK ON THE NATIONAL LEVEE DATABASE

- Agreed that data was essential to flood risk management
- Data needs:
 - Support NFIP accreditation
 - Flood risk and hazard information
 - Help with emergency response
 - Aid in prioritizing O&M
- Concerns:
 - Unclear who uses the information and how
 - Incomplete or inaccurate information
 - Levee owners want to be part of the data management process

14 | National Levee Safety Program

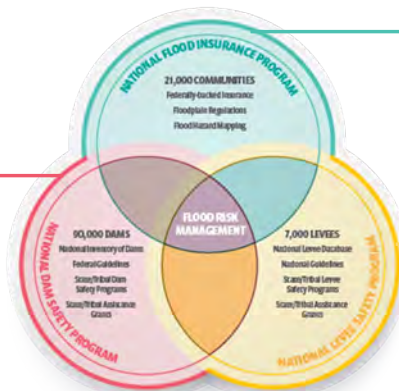
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14

COMMON THREAD – MOVING TOWARDS RISK APPROACHES TO IMPROVE AND SUPPLEMENT DECISION-MAKING

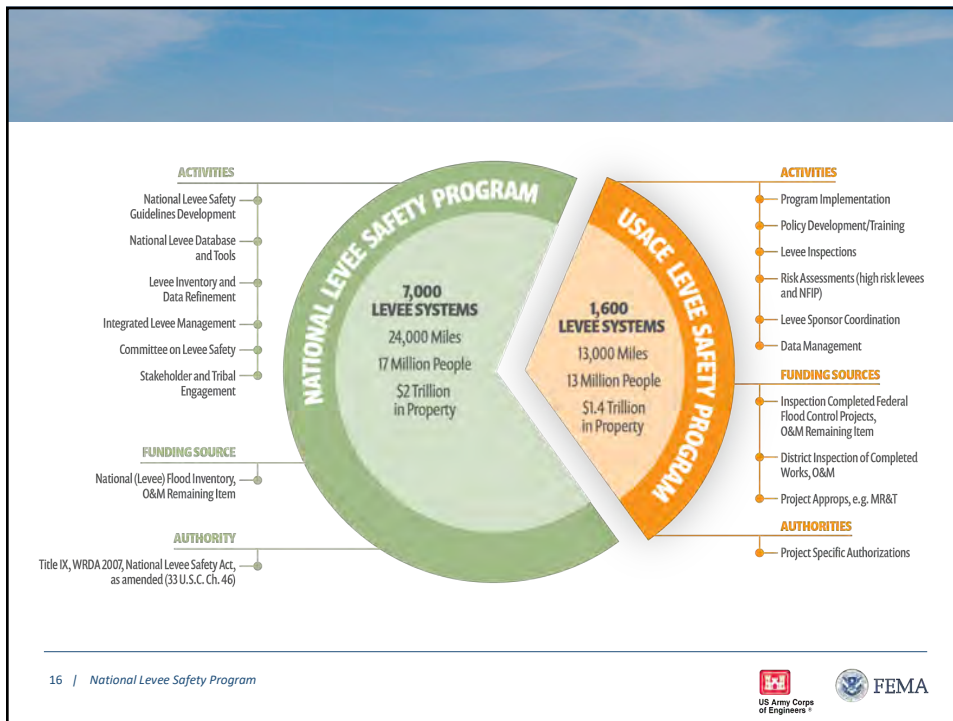
- First Opportunity for Alignment – Hazard Mitigation Plans
- High-hazard Grant Program
- Dam Risk Materials



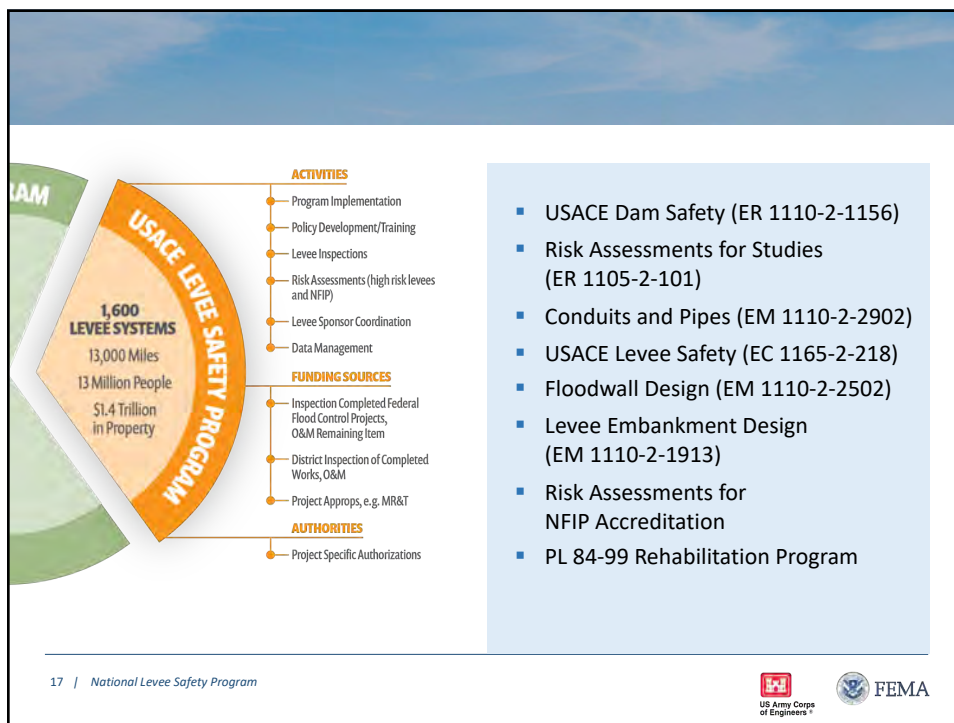
- Future of Flood Risk Data (NFIP Transformation)
 - Biggert – Waters (display residual risk for dams and levees)
 - Risk Rating (first step to a risk-informed NFIP)
-
- Promote best technical practices
 - Build public awareness of residual risk associated with levees
 - NLD – all levees with condition and consequence info



15



16





Appendix C:
Presentation – California’s Flood Risk Management System

California's Flood Risk Management System: Department of Water Resources Activities

USACE National Levee Safety Program
Nov. 15, 2022



Image: Imperial Beach CA (2019).



CALIFORNIA DEPARTMENT OF
WATER RESOURCES

Jeremy Arrich, P.E., State Flood Management Lead
CA Dept. of Water Resources, Division of Flood Management

1

Outline of Today's Topics

- California Flood Risk Basics
- The Work: CA Dept. Water Resources Flood Management Projects and Major Programs
- The Organization: CA Dept. Water Resources Division of Flood Management Areas of Expertise
- Buying Down Risk

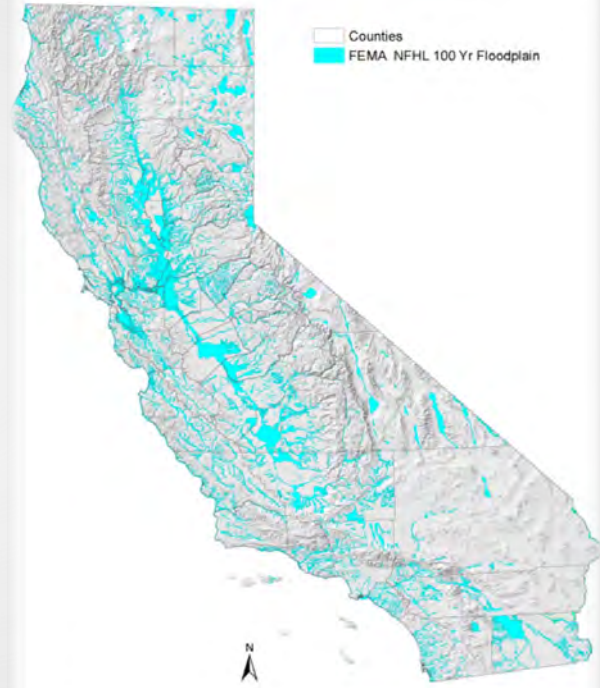


CALIFORNIA DEPARTMENT OF
WATER RESOURCES

2

California Flood Risk Basics

- Various Flood Hazard Types
 - Riverine (shown), Coastal (shown), Alluvial, Pluvial
 - Year round exposure to hazards
- Mediterranean Climate
 - Dry Summers, Wet Winters
- Exposure
 - Over **\$800B** of structures within mapped floodplains
 - Over **7M** people living within floodplains
- Management
 - **+1300** agencies with flood management responsibilities
 - **\$2B** invested annually by local, State, and Federal agencies
 - Mostly operations and maintenance
 - Some on capital improvements
 - Complex / mature regulatory processes



3


**STATE OF CALIFORNIA
Flood Management Facilities and Projects**

- Central Valley Flood Protection Planning
- Regional Flood Management Planning
- Delta Planning
- Systemwide Environment Support
- Statewide Flood Management Planning
- FloodMAR
- Hazard Mitigation Planning
- Reservoir Operations and River Forecasting
- Flood Emergency Preparedness and Operations
- Hydro-Climate Data Collection and Precipitation/Runoff Forecasting
- Real-Time Flood Conditions, Status, and Warnings

- Flood Insurance
- Flood Easements and Land Acquisitions
- Floodplain Mitigation Planning
- City and County Local Assistance
- Community Assistance and Policy Advise ment
- Floodplain Management Policies
 - Floodplain Risk Assessment and Risk Maps
 - Public Education and Awareness
 - Floodplain Management Protection and Risk Awareness
 - Headwaters to Floodplains

- Flood Risk Management
 - Flood Risk Reduction Projects
 - Flood System Operations and Maintenance
- Flood Emergency Response
 - Environmental Permitting for O&M
 - Levee Tree Assessment
 - Delta Levee Subventions*
 - Flood Maintenance Assistance Program*
- Flood Risk Reduction Projects
 - Integrated Regional Watershed Management Program*
 - Small Community Risk Reduction
 - Central Valley Tributaries Program*
 - Urban Flood Risk Reduction*
 - Urban Streams Restoration*
 - Statewide Flood Control Subventions*
 - Systemwide Flood Risk Reduction*
 - Yolo Programmatic Permitting Joint DWR/CVFPB Program
- Flood System Operations and Maintenance
 - Flood System Repair Project*
 - Rural Levee Repair*
 - Small Erosion Repair Program*
 - Channel Operations and Maintenance
 - Emergency Repair Program*

4



DIVISION OF FLOOD MANAGEMENT (DFM)

AREAS OF RESPONSIBILITY

Statewide Flood Risk Reduction Capital Improvements		
\$2.6B State funding committed in support of \$16.9 billion of ongoing flood risk reduction projects since 2007	232 Capital improvement projects completed or in progress	6.9M People protected, including \$16.5 Billion of assets
Central Valley Flood Protection		
1.65M Acres protected by SPFC Facilities	\$80B Property protected in Central Valley	1.3M People protected in Central Valley
Central Valley SPFC Flood System		
1,548 Miles of SPFC Levees	57 Channels and Floodways	68 Structures and pumping plants
Flood System Operations and Maintenance		
287 Miles of levees maintained	1,260 Miles of channels and canals maintained	40 Flood control and related structures maintained
Flood Operations, Emergency Preparedness and Response		
275 Registered flood emergency experts	200+ Emergency managers and partners in 12 pre-season/flood fight coordination meetings annually	\$45M Emergency preparedness grants awarded to 600+ Participating agencies since 2012
Reservoir Operations and River Forecasting		
20+ Annual weather and hydrology briefings, and hundreds of high water mark notifications	338 Total 5-day deterministic river forecast points	11 Reservoir operators participating in either forecast coordinated, or forecast-informed reservoir operations
Real-time Flood Conditions, System Status, and Warnings		
2,301 Active gauging stations reporting on CDEC	\$00K CDEC views per day	150 Hydromet stations owned and/or operated by DFM
Hydroclimate Data Collection and Precipitation/Runoff Forecasting		
\$40M Invested in improved precipitation/runoff forecasting technology	50 Cooperates participating in annual CA Cooperative Snow Surveys	6 Watersheds utilizing aerial remote sensing
Flood Risk Awareness		
215K National Flood Insurance Program policies in place in over 527 NFIP Communities	146 Dam inundation maps reviewed in FY 19/20	300K Received flood risk notification mailers from DWR
Floodplain Management Assistance		
2,248 Water management agencies to interact with	100+ Support updating of flood element of Local Hazard Mitigation Plans per year	\$7.8M Research and studies committed and planned for FY 19/20, and 20/21

Our Mission
To prevent loss of life and reduce property damage caused by floods, and assist in response and recovery efforts following other emergencies.

BY-THE-NUMBERS

- 290 Personnel
- 236 Number of Contract Actions under DFM Management
- \$745M Grants awarded since 2006
- \$2.6B State investment in Flood Projects since 2007

DFM OFFICES

- Flood Projects
- Floodplain Management
- Hydrology-Flood Operations
- Flood Maintenance



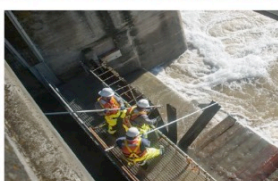
AREAS OF EXPERTISE

- Flood Preparedness and Emergency Response
- Hydrology and Climatology
- Floodplain Risk Management
- Mapping
- Urban Flood Risk Reduction
- Environmental Sustainability
- Modeling
- Risk Assessment
- Flood System O&M
- Financial Assistance
- Evaluation and Engineering
- Levee Safety
- Flood System Repair

CONTACTS

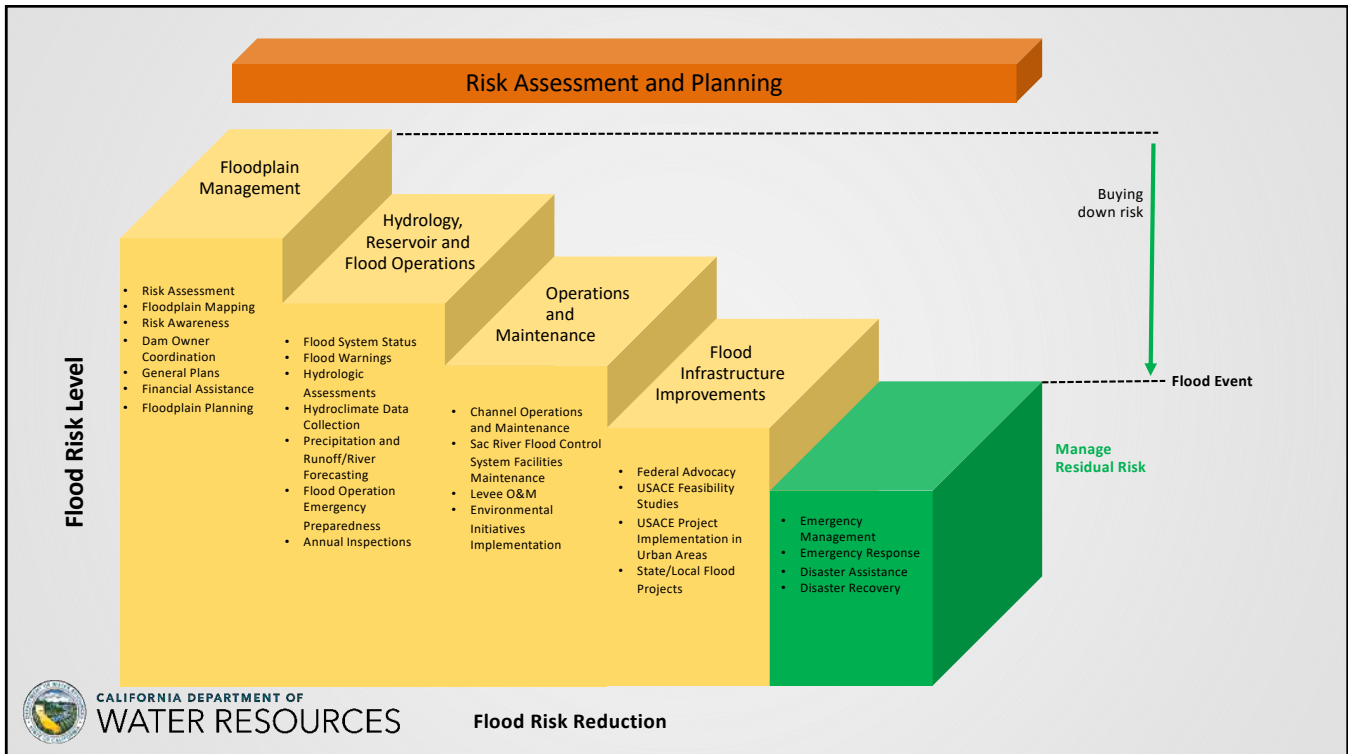
3310 El Camino Ave, Sacramento, CA 95821 | 916-574-6001 | flood@water.ca.gov | https://water.ca.gov/Programs/Flood-Management

https://www.facebook.com/CADWR | https://twitter.com/CA_DWR | https://www.instagram.com/californiaflooding | https://www.youtube.com/user/cwtwater

Based on 2020 Data

5



6



Appendix D:
Presentation – California Approaches for Prioritizing Levees

CA Approaches for Prioritizing Levees

USACE National Levee Safety Program
Consultation
Nov. 15, 2022



Michael Mierzwa, P.E., State Floodplain Manager
CA Dept. of Water Resources, Division of Flood Management

1

Outline

- 2022 Central Valley Flood Protection Plan Messaging
- General Scope of CVFPP-Series
- Systemwide Risk Assessments
- Areas of Interest



2

Central Valley Flood Protection Plan

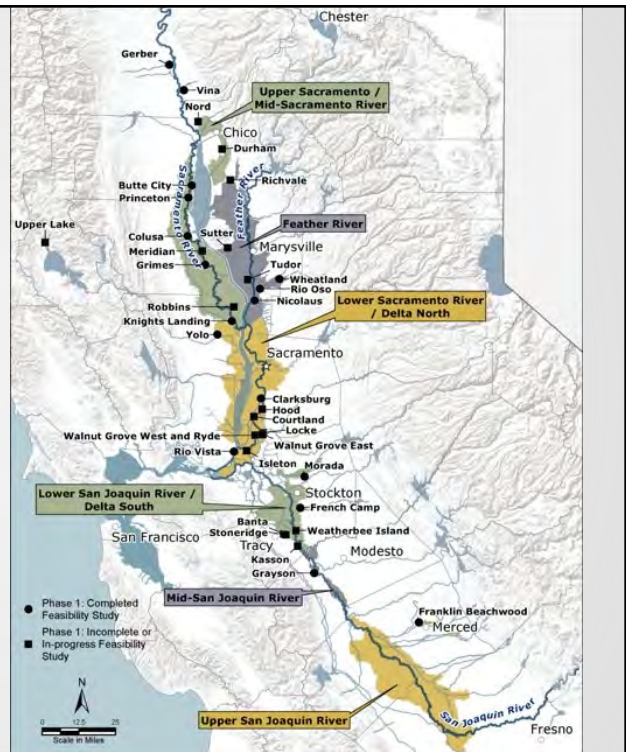
- State’s strategic blueprint for Central Valley flood risk management
- State Systemwide Investment Approach, guides State flood management in areas protected by State Plan of Flood Control
- 2022 CVFPP is second update of the Plan
- Fulfills requirements of the Central Valley Flood Protection Act of 2008



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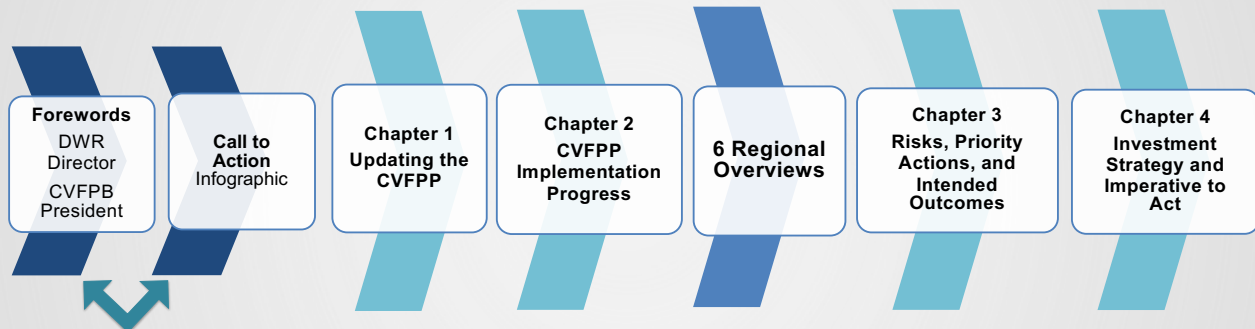
2022 CVFPP Update: Three Primary Themes

- **Build** flood system climate resiliency
- **Increase** accountability and adaptation through performance tracking
- **Align** with other State water management planning efforts



4

Components of the Public Draft 2022 CVFPP Update



Will be completed with CVFPB during Public process

Three Appendices have been released

- CVFPP Background
- Legislative Reference and Reader's Guide
- CVFPP Supplemental Recommendations



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WATER RESOURCES

5

A Shared Responsibility to Act

We must:

- **Work together** to increase public awareness and build support for flood risk management investments
- **Act** swiftly to implement innovative flood management strategies
- **Invest** boldly over the next 30 years
- **Build and leverage** each partners' unique capacity for funding and advocacy
- **Protect** the Central Valley's most vulnerable communities



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6

Central Valley Flood Protection Plan

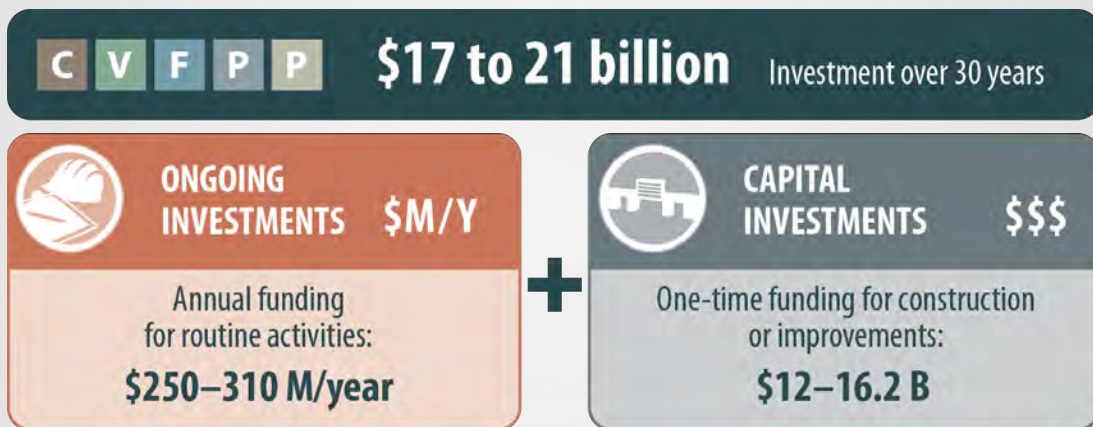
Key Features (as of 2017):

- Land area size of State of Florida
- Highest net agricultural production region in United States
- 1,600 miles of Federal-State levees
- Extensive system of bypasses & floodways
- 2 completely different river basins, each w/ over 5 major rivers
- Over 1.3 million people living in floodplains
- +\$80B property / assets at risk



7

Recommended 2017 CVFPP Update Investment



ISTM_047



8

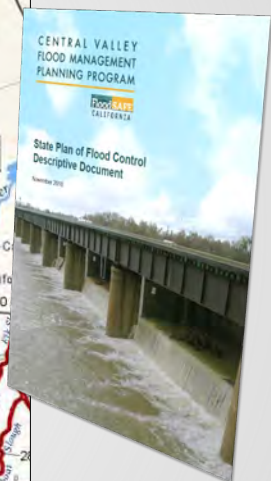
CVFPP Supporting Assessments



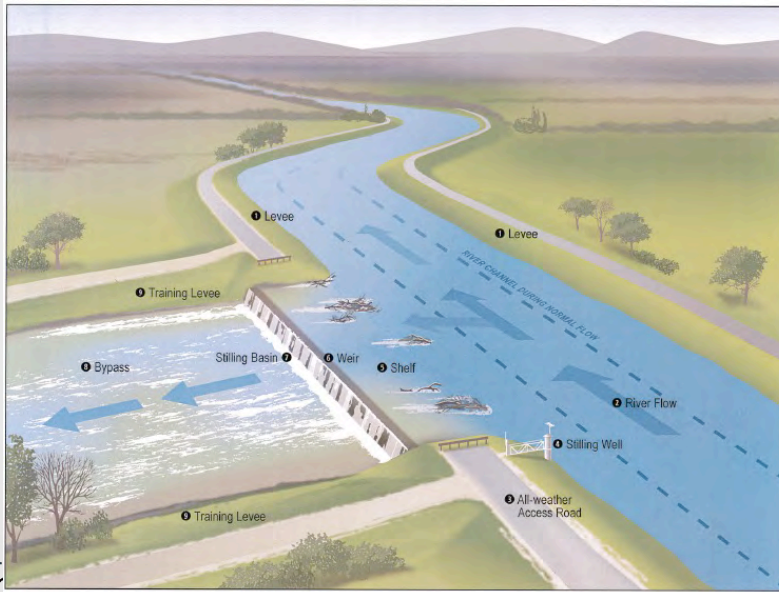
CVFPP Assessment

- BWFS System Performance Analysis
- RFMP Regional Visions and Priorities
- Conservation Strategy
- O&M
- Safety & Risk
- Climate Change
- Long-term Economic Consequences of Flooding
- USACE Feasibility Studies

SPFC Descriptive Document Series



Example of Weir / Flood Bypass



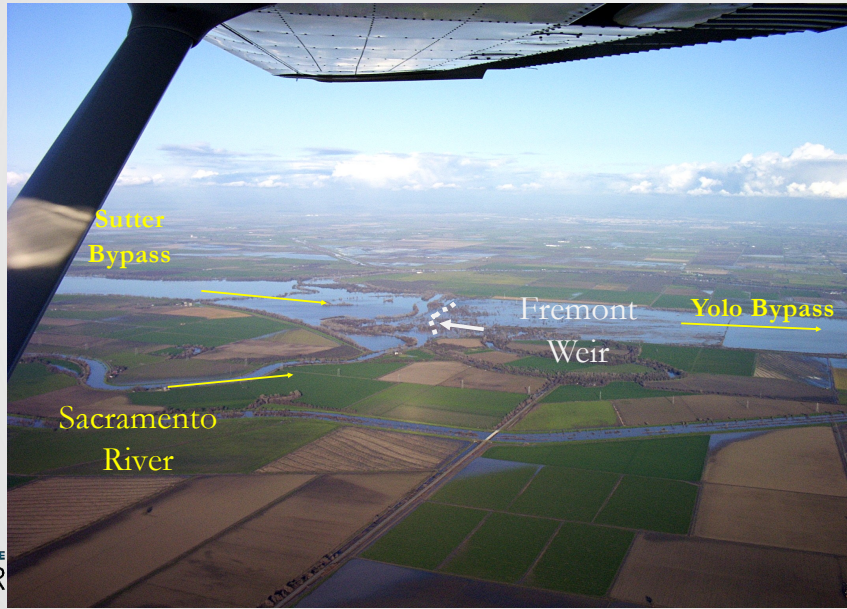
11

Example of Weir Structure



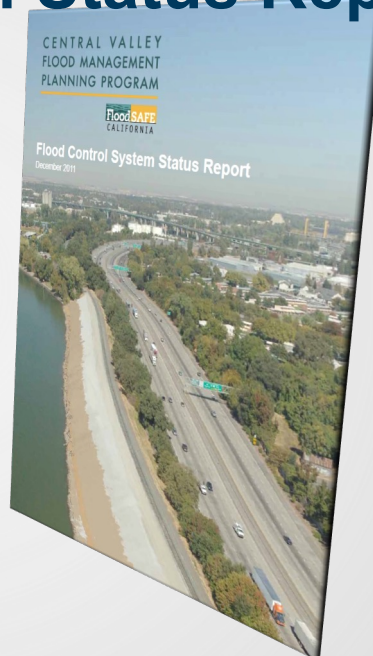
12

Example of Bypass System



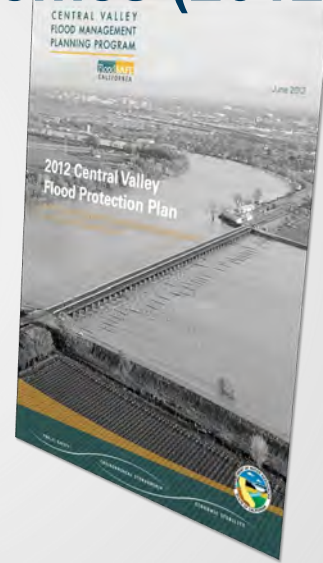
13

Flood Control System Status Report



14

Central Valley Flood Protection Plan Four Major Assessment Themes (2012)



15

Example of a Risk Assessment 2017



16

Example of Risk Assessment 2022

Figure 3.2 Without-SSIA Expected (Average) Annual Life Loss for Central Valley (number of persons)

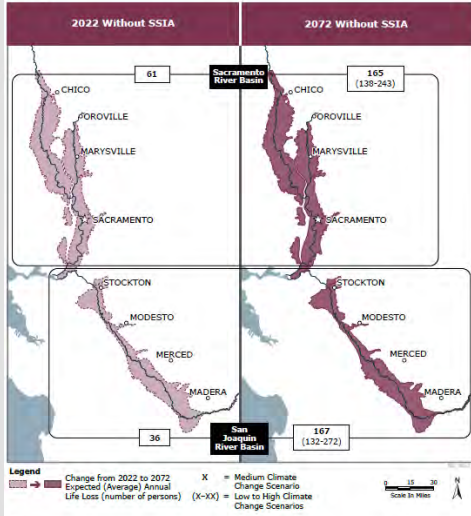
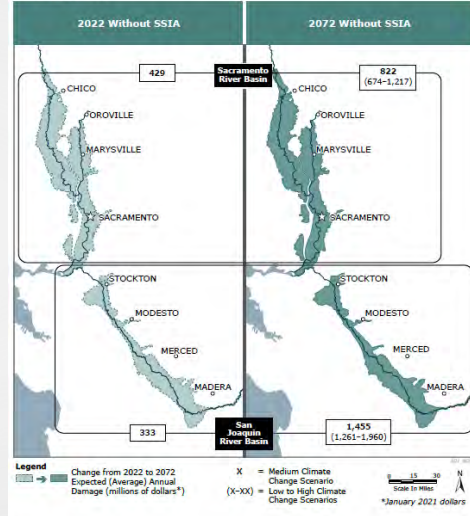


Figure 3.3 Without-SSIA Expected (Average) Annual Economic Damage within Central Valley (millions of dollars*)



Notes:

- Mapped results do not imply levee deficiency or exact consequences of flooding. Modeling is used to understand the relative risk of flooding.
- Potential flood evacuation characteristics are highly uncertain.

Notes:

- Mapped results do not imply levee deficiency or exact consequences of flooding. Modeling is used to understand the relative risk of flooding.
- Potential flood and evacuation characteristics are highly uncertain.

17

Prioritizing Management Actions via Areas of Interest

Table 3.1 Ongoing Management Action Categories for the 2022 SSIA Portfolio

Management Action Category	Management Actions
Systemwide	<ul style="list-style-type: none"> • State operations, planning, and performance tracking. • Systemwide risk assessments. • Emergency management. • Reservoir operations. • Annual operation and maintenance. • Flood management policy actions.
Urban	<ul style="list-style-type: none"> • Risk awareness, floodproofing, and local land use planning. • Studies and analysis.
Rural	<ul style="list-style-type: none"> • Risk awareness, floodproofing, and local land use planning. • Studies and analysis.
Small Community	<ul style="list-style-type: none"> • Risk awareness, floodproofing, and local land use planning. • Studies and analysis.

Table 3.2 Capital Management Action Categories of the 2022 SSIA Portfolio

Management Action Category	Management Actions
Systemwide	<ul style="list-style-type: none"> • Multi-benefit flood improvement programs. • Reservoir and floodplain storage. • Groundwater recharge and flood managed aquifer recharge (Flood-MAR). • Deferred maintenance.
Urban	<ul style="list-style-type: none"> • Levee improvements for 200-year level of protection. • Other infrastructure and multi-benefit flood improvements.
Rural	<ul style="list-style-type: none"> • Levee repair and infrastructure improvements. • Small-scale levee setbacks and floodplain storage. • Land acquisitions in fee or easements. • Habitat restoration/reconnection.
Small Community	<ul style="list-style-type: none"> • Levee repair and infrastructure improvements for up to 100-year level of protection. • Small-scale levee setbacks and floodplain storage. • Land acquisitions in fee or easements. • Habitat restoration and reconnection.

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CVFPP Recap

- State law requires updates every 5 years
- Actions divided between ongoing management and capital (improvements)
- Four areas of interest
 - Systemwide
 - Urban
 - Small Community
 - Rural
- Evolving assessments include
 - Channel capacity analyses
 - Levee performance assessments
 - Computer modeling risk assessments (with climate change and population growth)
 - Scenarios of different high level strategies applied



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Appendix E:
Presentation – California State Systemwide Investment Approach

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State Systemwide Investment Approach

November 2022



Todd Bernardy, Branch Manager

1

State Systemwide Investment Approach (SSIA)

Implemented Through Five Major Programs

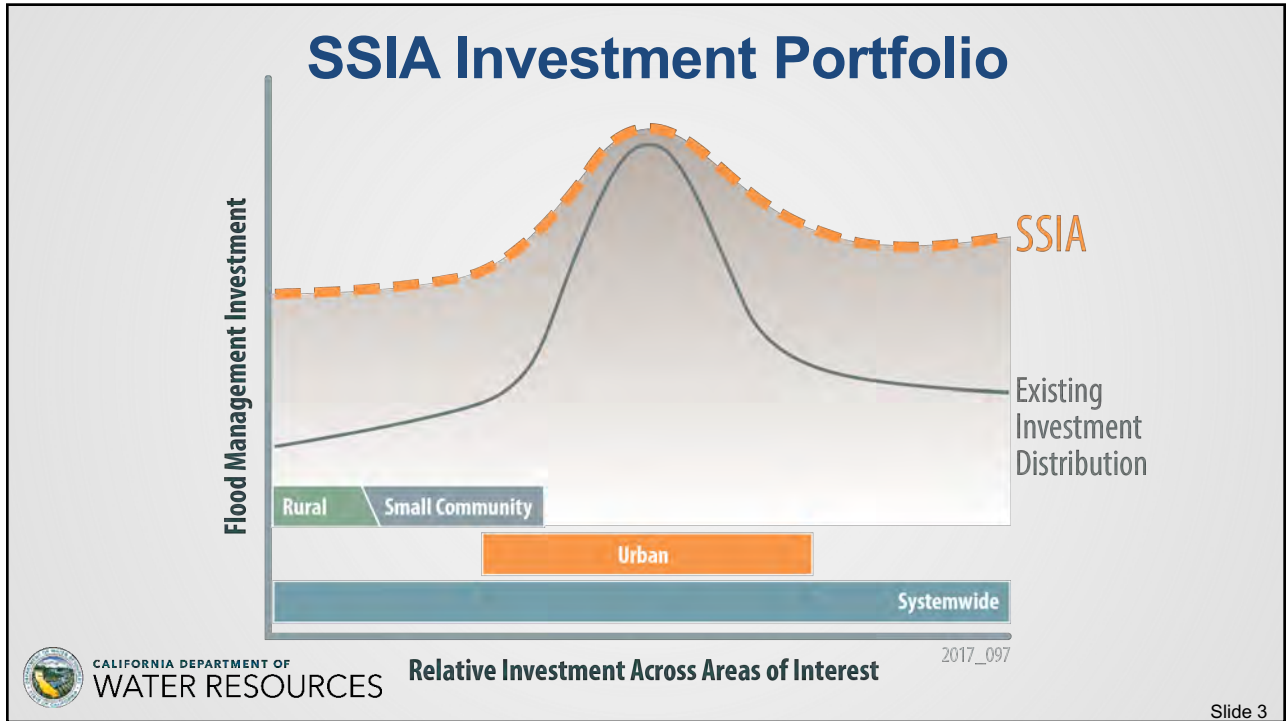
- Flood Management Planning
- Floodplain Risk Management
- **Flood Risk Reduction Projects (Capital Investments)**
- Flood System Operations and Maintenance
- Flood Emergency Response



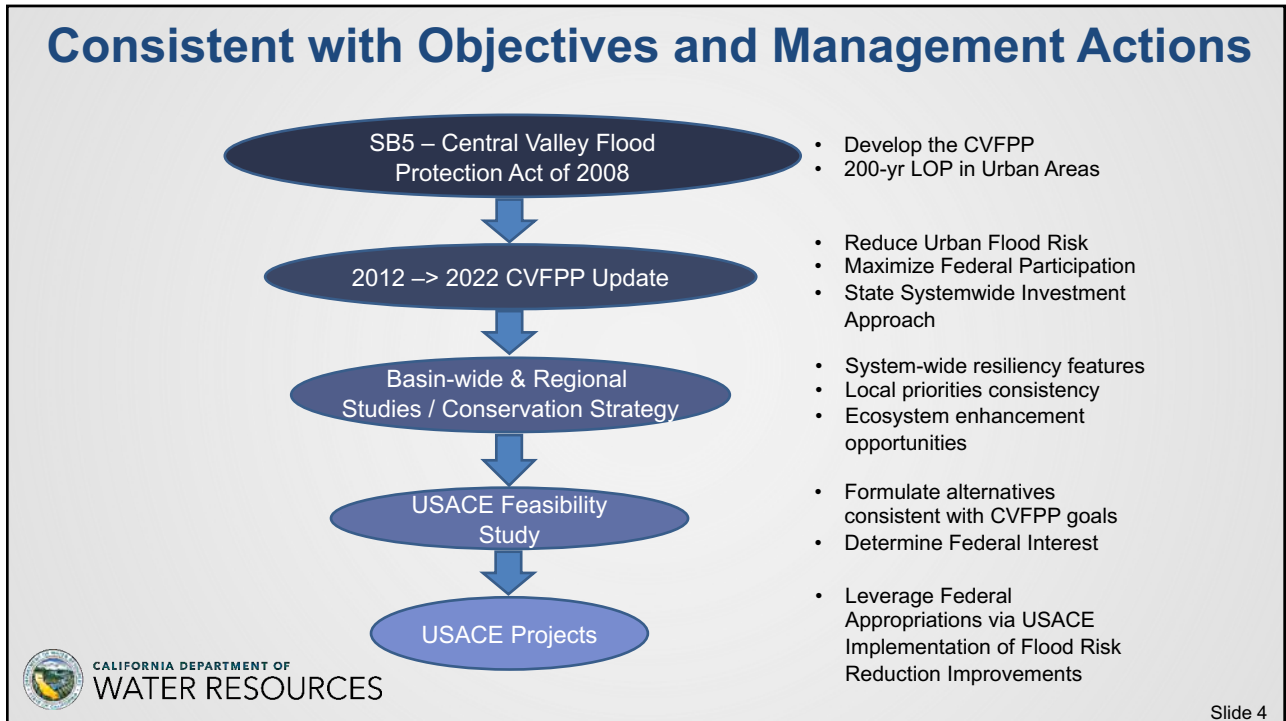
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Slide 2

2



3



4

USACE Project Progress

Merced →

Lathrop/Manteca →

Woodland →

**Natomas | ARCF 2016 | Dam Raise
West Sacramento | Stockton |
Marysville** →

**South Sac Streams | JFP
Sutter Basin | WRDA 96/99** →

- Initiation - Letter of Intent (LOI)
- Federal Authority/Appropriation
- Feasibility Cost Share Agreement (FCSA)
- Tentative Selected Plan (TSP)
- NEPA/CEQA ROD/NOD
- Chief's Report
- Project Authorization - WRDA
- Federal Appropriation for Pre-Construction Engineering Design (PED)
- Design Agreement (DA)
- PED
- Federal Appropriation and New Start for Construction
- Project Partnership Agreement (PPA)
- Construction Start
- Supplemental EIS/EIR (Future)
- Project Completion/O&M Manual Finalized
- Environmental Mitigation and Fiscal Completion

Legend

■ Board Actions

Slide 5

5

USACE Projects Cost & Value In Central Valley Urban Areas

Cost	\$8.3 Billion
Levee Miles	300 miles
People Protected	1.1 Million
Assets Protected	\$108 Billion
Acres Protected	553,000

Cost Share Breakdown

Progress

Levee Miles	160
Remaining	140
Complete	

□ Remaining
■ Complete

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Local State Federal

Remaining	\$5,062
Spent	\$3,280

Spent

Local	\$452
State	\$1,309
Federal	\$539

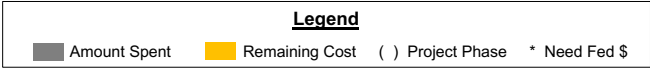
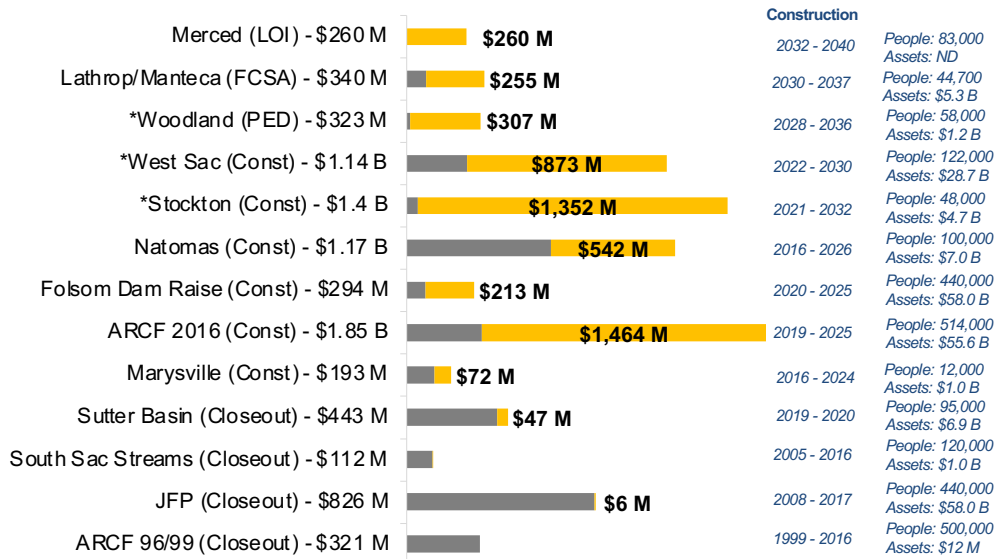
Remaining

Local	\$949
State	\$1,432
Federal	\$3,661

Slide 6

6

USACE Project Status Summary



7

Active Construction



Marysville



Natomas



ARCF 2016



Folsom Dam Raise



Smith Canal

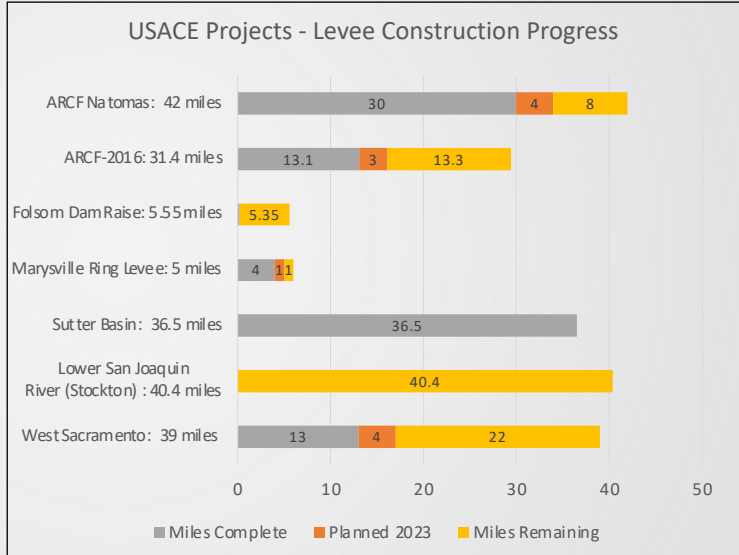


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Summary of Construction Activities

Key Construction Occurring This Year

- ARCF – Natomas Reach B, H and Pumping Plant 4 in Reach D
- ARCF 2016 – Sacramento River Seepage and Erosion
- Marysville Ring Levee – Phase 3



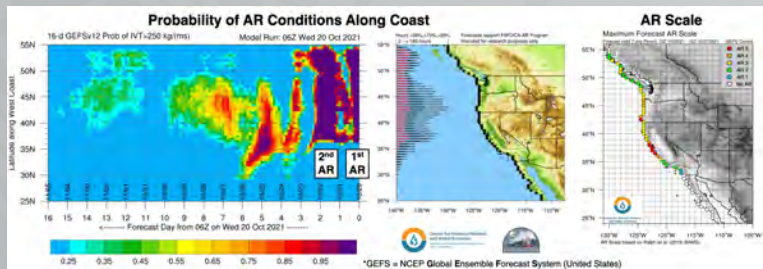
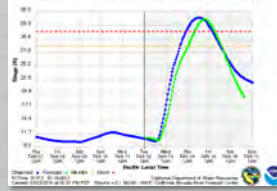
Slide 9



Appendix F:
**Presentation – California Activities of the Hydrology and Flood
Operations Branch**

Hydrology

- River Forecasting (thresholds)
- Seasonal Forecasting (water supply, snowpack)
- Coordination with reservoir operators/water managers, local maintaining agencies
- Atmospheric Rivers



1

Flood Operations

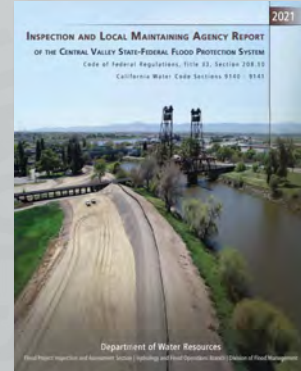
- FOC Rosters, Incident Command Teams
- Plans, Training, Exercises
- Coordination with partners
- Flood Emergency Response Grants
- Prepositioning flood fight materials
- High water notification calls
- Technical, Direct Assistance



2

Flood Project Inspections

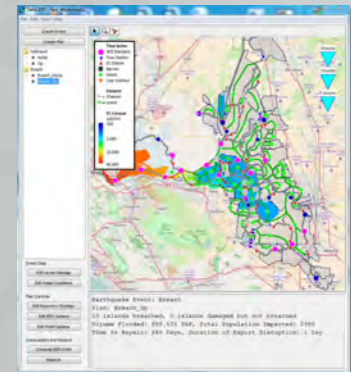
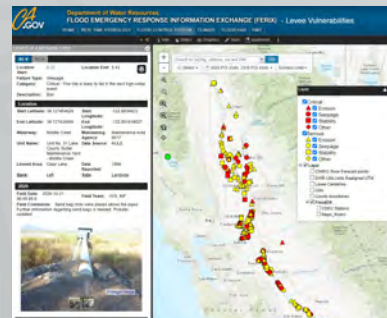
- State Plan of Flood Control inspections
- Utility Crossing Inspections
- Erosion Surveys
- Designated Floodways
- Levee Logs
- Annual Inspection Report
- Coordination with partners



3

Operations Support

- California Data Exchange Center
- Flood Emergency Response Info Exchange (FERIX)
- Decision Support Tools
- Forecast-Coordinated Operations
- Forecast Informed Reservoir Operations



4



Appendix G:
Presentation – California Levee Tree Assessment Overview

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Levee Tree Assessment Overview

11.17.2022 Session 10

National Levee Safety Program Workshop: Nov 15 – 17, 2022



Cassandra Nguyen Musto, Assoc. Landscape Architect, Specialist,
Flood Maintenance Operations Branch, Division of Flood Management

1

Levee Vegetation Management Project (LVMP)

Key Staff

- Cassandra Nguyen Musto, Assoc Landscape Architect (Spec.)
- Kristin Jacobs, Landscape Architect
- Simar Dhanota, Supervising Water Resources Engineer (Spec.)
- George Qualley, Principal Engineer & Former DFM Div Manager



Contributors

- Division of Multi-benefit Initiatives
- Flood Maintenance & Operations Branch
- Flood Project Inspection & Assessment Section
- Multiple Subject Matter Experts and Technical Advisors



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2

2

Presentation Outline

1. Challenges
2. DWR Guidance
3. Research
4. Levee Tree Assessment
5. Key Take-Aways



Photo Credit: CA Dept of Water Resources

1. Challenges

Challenges

- Urbanization in a flood plain
- Aging levees
- Diminishing habitat
- Endangered species



2. Guidance Documents

Importance of a Plan

Over 1 Million people living and working in a metropolitan area with one of highest flood risks in the nation

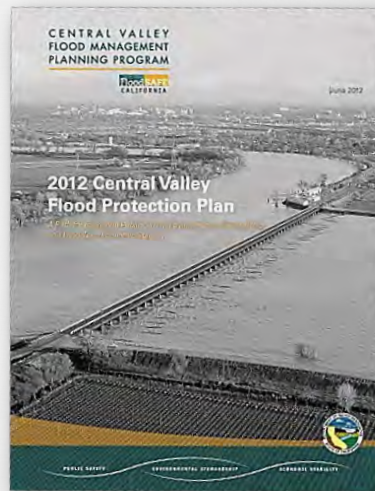


Photo Credit: GoogleMaps



Central Valley Flood Protection Plan

2012 Central Valley Flood Protection Plan (CVFPP) – A blueprint to improve flood risk management in the Central Valley



Levee Vegetation Management Strategy (LVMS)

A strategy to address management of vegetation in the flood control system in the California Central Valley

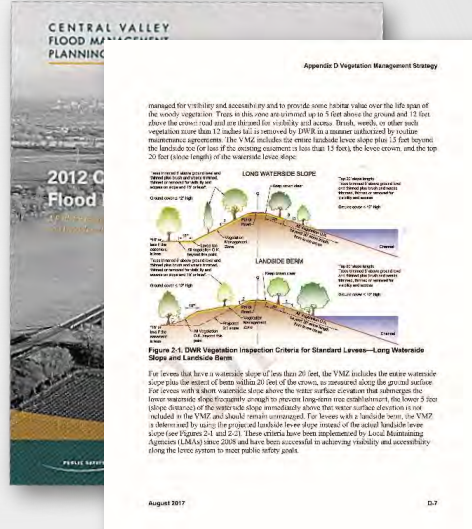


Figure 2.1 – from the 2016 Conservation Strategy, Appendix D, (Page D-7)

Levee Vegetation Management Strategy (LVMS)

Addresses trees that pose an unacceptable threat to levee integrity

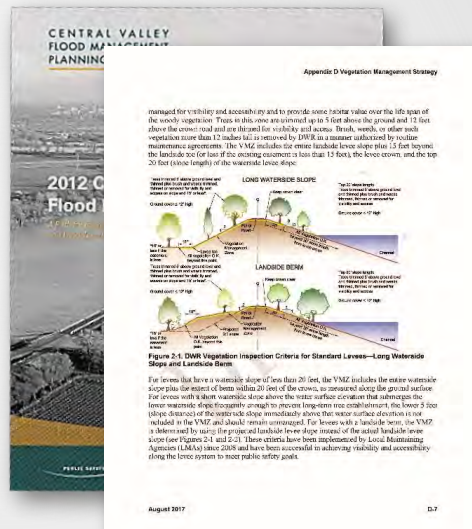


Figure 2.1 – from the 2016 Conservation Strategy, Appendix D, (Page D-7)

Levee Vegetation Management Strategy (LVMS)

Affirms the State's commitment to maintain visibility and accessibility within the vegetation management zone (VMZ) with trimming & thinning

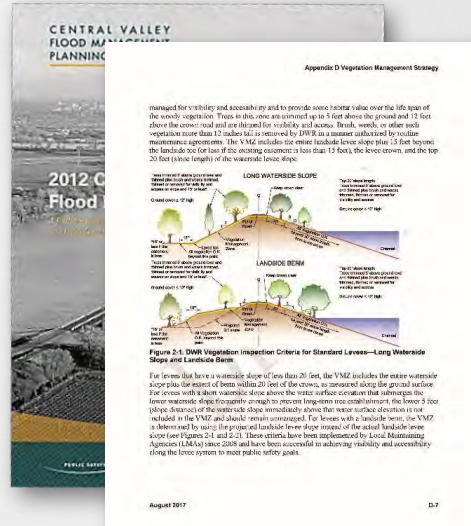


Figure 2.1 – from the 2016 Conservation Strategy, Appendix D, (Page D-7)



Levee Vegetation Management Strategy – Vegetation Mgmt Zone

Defines the levee vegetation management zone: Upper 20 ft of waterside slope, crown, landside slope & 15 ft from landside levee toe)

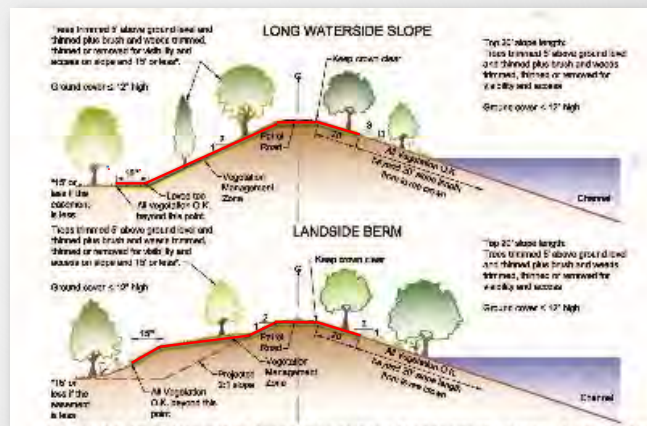


Figure 2.1 – DWR Vegetation Inspection Criteria for Standard Levees – Long Waterside Slope and Landside Berm



Levee Tree Assessment

The LTA addresses a provision in the CVFPP & LVMS:

- "...trees that pose an *unacceptable threat* to levee integrity will be identified and removed, or managed to reduce their threat to an acceptable level."



3. The Research

California Levee Vegetation Research Program (CLVRP)

- Agencies came together to ask questions
- These questions and the research results contributed to the scientific foundation of DWR's guidance and tools to manage vegetation on levees we maintain



California Levee Vegetation Research Program Scope



Tree root architecture studies



Tree root interactions with cutoff walls



Seepage and stability related to roots



Tree pull-down tests/Root pit dimensions



Burrowing mammal habitat associations/grouting efficacy



Historical performance of levees with trees

Principal Investigators / Contributions

Eight (8) Principal Investigators (PI's)

- Dr. Alison Berry, Professor of Plant Sciences, UC Davis
- Dr. Les Harder, Sr. Geotechnical Engineer, HDR Consulting
- Dr. Dirk van Vuren, Professor of Wildlife Biology, UC Davis
- Dr. Nicholas Sitar, Professor of Civil Engineering (geotechnical), UC Berkeley
- Dr. Jonathon Bray, Professor of Civil Engineering (geotechnical), UC Berkeley
- Dr. Chris Peterson, Professor of Plant Biology, University of Georgia
- Dr. Sujan Punyamurthula, Sr. Geotechnical Engineer, AECOM/URS
- Dr. Gerald Bawden, Program Scientist, USGS



Three (3) PhD Dissertations

- Dr. Diego Cobos-Roa
- Dr. Michelle Shriro
- Dr. Shih-Ming Chung



- Two (2) International Science Conferences
- Fourteen (14) Scientific/Technical Reports
- Numerous PI/Team leader-led technical workshops/presentations/panel discussions



The Research – A Collaborative Effort

Parallel USACE ERDC effort led by Dr. Maureen Corcoran, *et al.*

Collaboration included:

Regular Communication

- Roundtable progress updates, technical meetings, field meetings
- Formal joint technical workshops
- Formal public communiques (3)
- Regular email distributions
- Two Science Conferences: 2007, 2012



ERDC
ENGINEER RESEARCH & DEVELOPMENT CENTER

Image Credit: Dr. Maureen Corcoran, ERDC



Synthesis Reports

Synthesis and distillation of the science – the research provided the foundation to determine which trees posed an unacceptable threat to levee integrity



Tree Impacts on Levee Integrity

Basic Implications of the Research

- Trees, by themselves, do not induce potential failure modes in levees
- It is their interaction with existing levee deficiencies and vulnerabilities that levee maintainers should most worry about; not a healthy tree on a structurally sound levee



Photo Credit: CA Dept of Water Resources

Historical Performance of Levees

Dr. Sujan Punyamurthula (URS) performed an extensive study of over 350 levee failures and approximately 7,000 levee incidents in California's Central Valley

All types of incidents and levee performance issues NOT limited to those few issues related peripherally to trees (16 out of 7,000 incidents are tree issues; none are breaches. Incidents only)

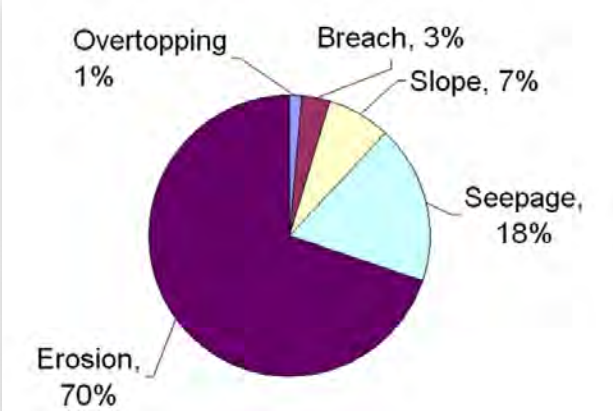


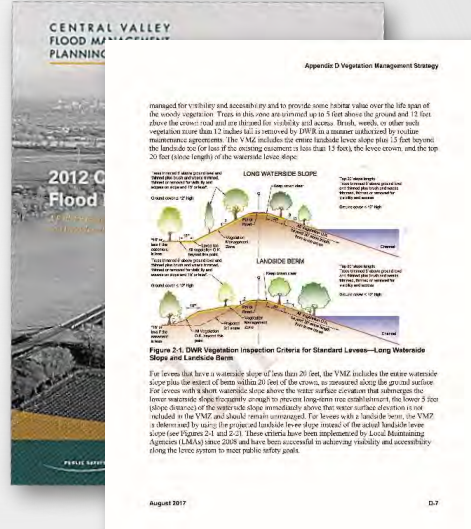
Image Credit: Dr. Sujan Punyamurthula, URS

4. The Levee Tree Assessment

What is an unacceptable threat?

A provision in the CVFPP & LVMS:

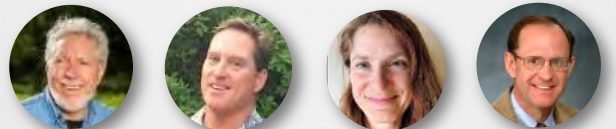
➤ "...trees that pose an *unacceptable threat* to levee integrity will be identified and removed or managed to reduce their threat to an acceptable level."



Original PI's and More

Principal Investigators (PI's)

- Dr. Alison Berry, Professor of Plant Sciences, UC Davis
- Dr. Les Harder, Sr. Geotechnical Engineer, HDR Consulting
- Dr. Dirk van Vuren, Professor of Wildlife Biology, UC Davis
- Dr. Nicholas Sitar, Professor of Civil Engineering (geotechnical), UC Berkeley
- Dr. Chris Peterson, Professor of Plant Biology, University of Georgia



Steve Chainey, GEI
 John Lichter, Tree Associates
 Laura Kaplan, Facilitator
 Dr. Doug Shields, Consulting Hydraulic Engineer



Levee Tree Assessment

The LTA is designed to identify which trees have the potential to pose an “unacceptable threat” to levee integrity”, to categorize their threat level, and suggest preliminary management actions



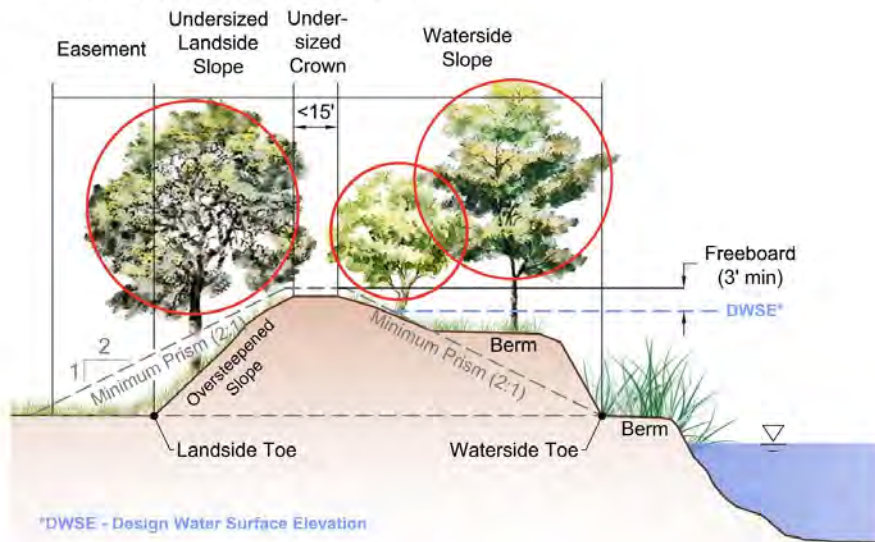
7 Flagging Criteria

1. Large trees on **under-sized** levees
2. Large trees on lower 1/3 of landside of levees with **through-seepage**
3. Large trees near landside toe of levee with **underseepage**
4. Large trees near existing areas of **waterside erosion** at levee toe
5. Large trees near **levee crown**
6. Trees near **critical infrastructure**
7. Trees near levee **crown & access roads**



Photo Credit: CA Dept of Water Resources

Criterion 1 - Undersized Levels

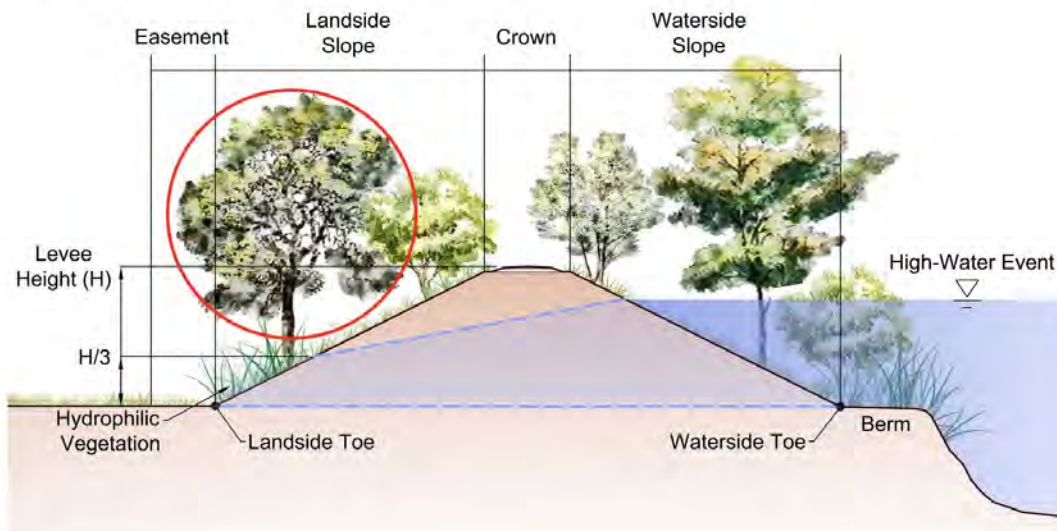


On levees meeting the definition of undersized, trees with a diameter at breast height (DBH) greater than or equal to 18 inches located on either the landside or waterside slopes of the levee.

27

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Criterion 2 - Through-Seepage

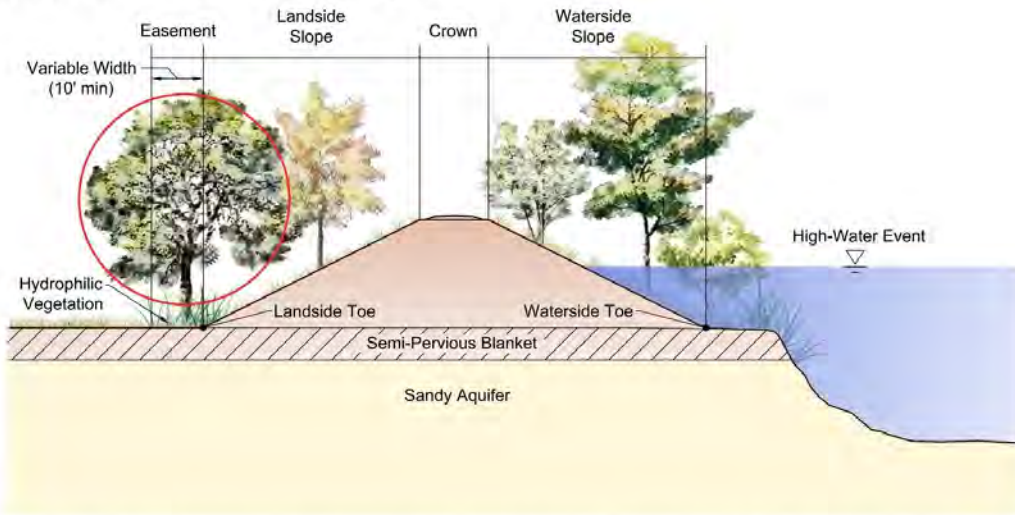


On levees with documented through-seepage deficiencies, trees with a diameter at breast height (DBH) greater than or equal to 18 inches growing on the lower third of the landside levee slope.

28

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Criterion 3 - Underseepage

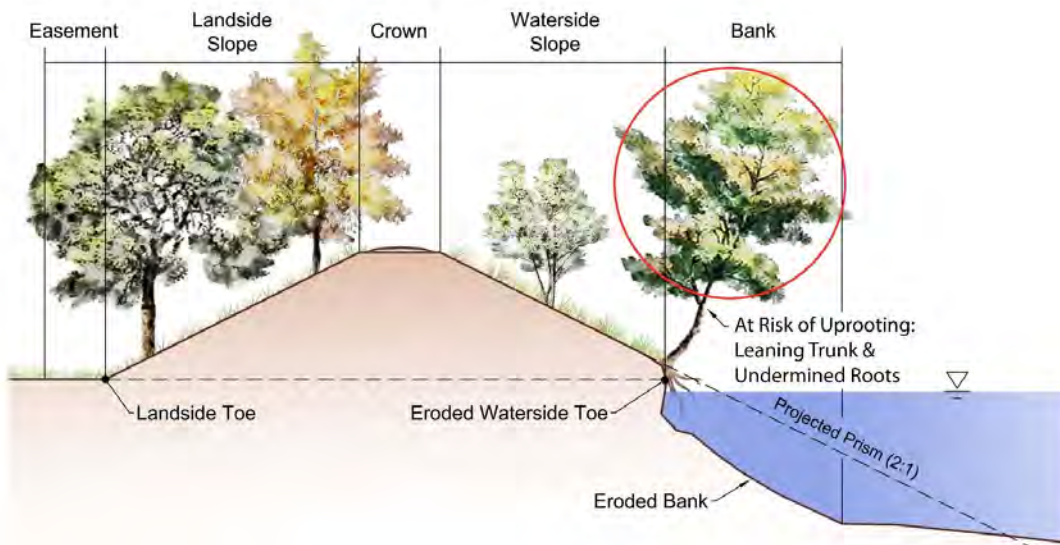


On levees with documented underseepage deficiencies, trees with a diameter at breast height (DBH) greater than or equal to 18 inches growing on the landside levee toe or immediately landward of the landside levee toe and within the landside maintenance easement.

29

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Criterion 4 - Waterside Erosion

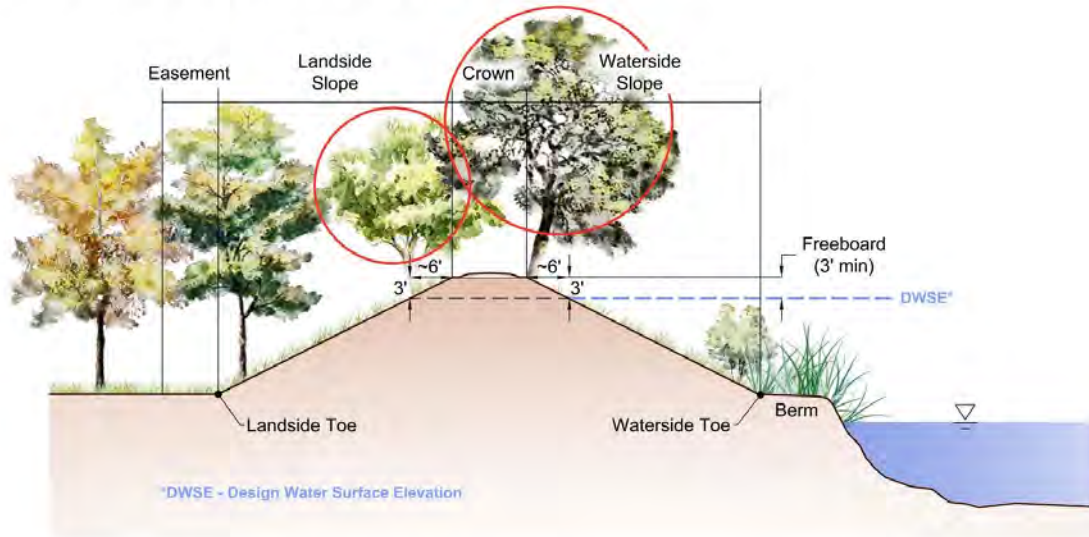


In areas of active, waterside erosion that could potentially compromise levee integrity, trees that are causing erosion or that could worsen existing erosion.

30

30

Criterion 5 - Levee Crown Integrity

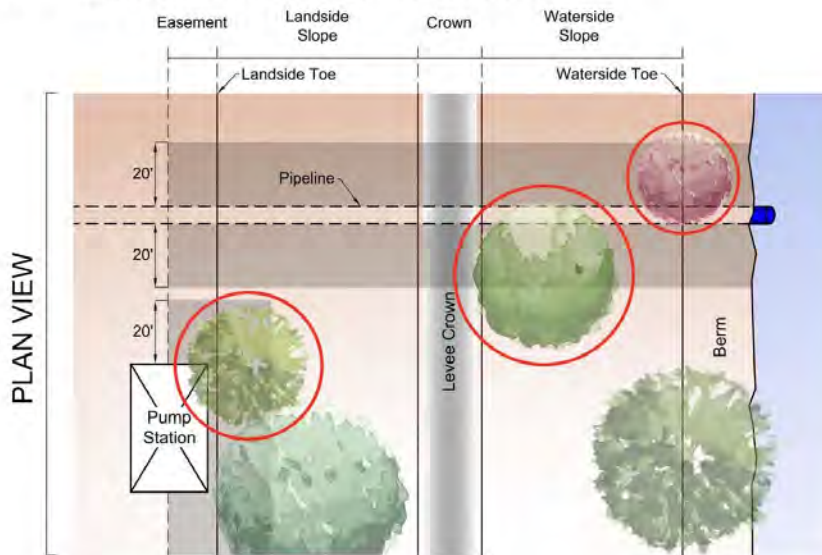


Trees with a DBH greater than or equal to 18 inches and with any part of the trunk in the top 3 vertical feet of the levee crown.

31

31

Criterion 6 - Infrastructure of Concern



All trees of any size within 20 feet horizontally from the alignment (surface or subsurface) of infrastructure of concern.

32

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Criterion 7 - Flood Operations Accessibility



Adjacent to levee crown roads or access roads and ramps, any tree that would potentially block or damage the road or ramp and significantly impede emergency access if the tree were to break or uproot, in whole or in part.

33

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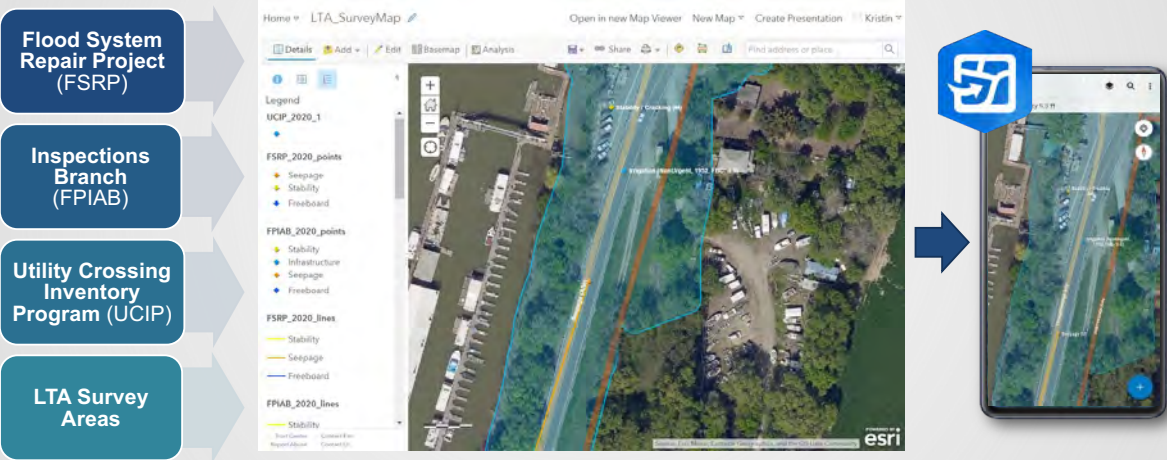
LTA Process



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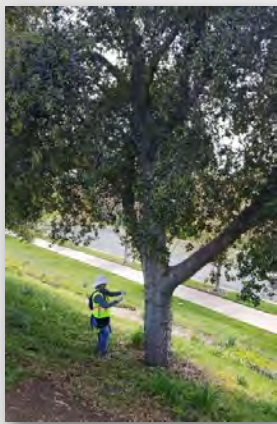
34

1. Compile Levee Deficiencies & Vulnerabilities



35

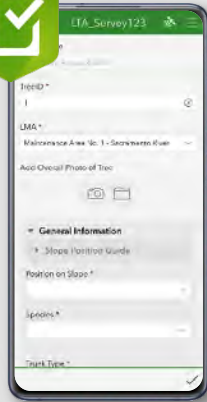
2. Collect Field Data / Determine Prelim Threat Category



- Identify trees that may pose unacceptable threat based on levee vulnerability, tree size, and other risk factors.
- Preliminarily categorized as follows:
 - Potentially unacceptable threat
 - Monitor
 - Non-Threat

36

esri Screening Tool



ArcGIS Survey123 My Surveys Help

LTA_Survey123 Overview Design Collaborate Analyze Data Settings

8/13/19 - 10/21/21 Filter Report Export Open in Map Viewer Form view 961/961

LTA_Survey123

Submitted by: Cassandra.Moto@water.ca.gov_DWR
Submitted time: Oct 20, 2021, 11:55:34 AM

Survey Date
Oct 20, 2021

TreeID
6

LMA
South Levee, Unit 2 - Cache Creek

SurveyDate	UniqueID	TreeID	LMA_Short	SlopePt
Oct 20, 2021	ST0001_U2_2021_00_06	6	South Levee, Unit 2 - Cache Creek	Lower L
Oct 20, 2021	ST0001_U2_2021_00_05	5	South Levee, Unit 2 - Cache Creek	Lower L
Oct 20, 2021	ST0001_U2_2021_00_04	4	South Levee, Unit 2 - Cache Creek	Oversize Berm (p

1 of 961 selected

UniqueID
ST0001_U2_2021_0006

Add Overall Photo of Tree



esri Screening Tool



ArcGIS Survey123 My Surveys Help

LTA_Survey123 Overview Design Collaborate Analyze Data Settings

8/13/19 - 10/21/21 Filter Report Export Open in Map Viewer Form view 961/961

LTA_Survey123

Submitted by: Cassandra.Moto@water.ca.gov_DWR
Submitted time: Oct 20, 2021, 11:55:34 AM

Survey Date
Oct 20, 2021

TreeID
6

LMA
South Levee, Unit 2 - Cache Creek

SurveyDate	UniqueID	TreeID	LMA_Short	SlopePt
Oct 20, 2021	ST0001_U2_2021_00_06	6	South Levee, Unit 2 - Cache Creek	Lower L
Oct 20, 2021	ST0001_U2_2021_00_05	5	South Levee, Unit 2 - Cache Creek	Lower L
Oct 20, 2021	ST0001_U2_2021_00_04	4	South Levee, Unit 2 - Cache Creek	Oversize Berm (p

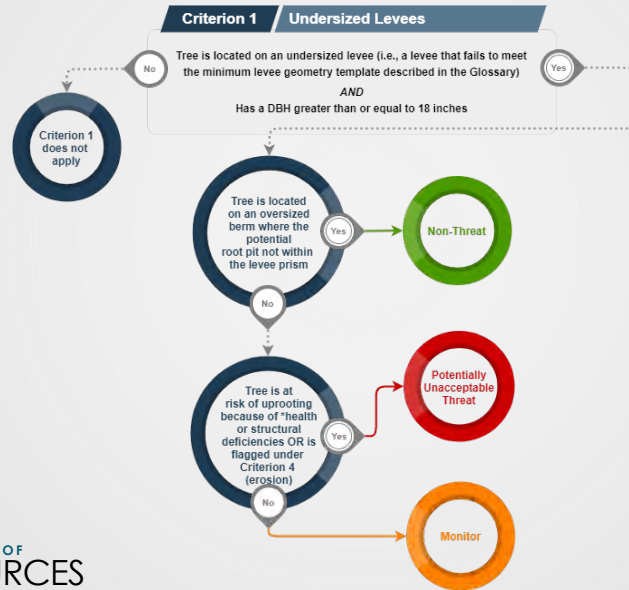
1 of 961 selected

UniqueID
ST0001_U2_2021_0006

Add Overall Photo of Tree



Threat Categorization Decision Tree



3. LTA Review Process



4. Permitting



5. Implement Tree Management Actions



Photo Credit: CA Dept of Water Resources

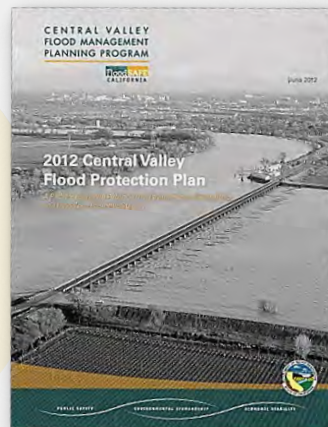
5. Key Messages

43

Key Message

1

The Central Valley Flood Protection Plan is the State's blueprint for managing flood risk in California

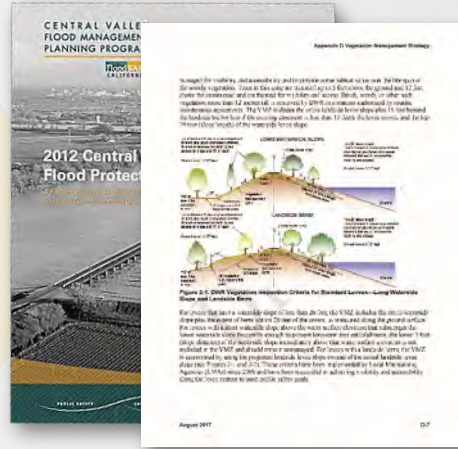


44

Key Message

2

The LVMS guides the State's levee vegetation management practices



Key Message

3

The LTA implements one aspect of the State's Levee Vegetation Management Strategy



Key Message

4

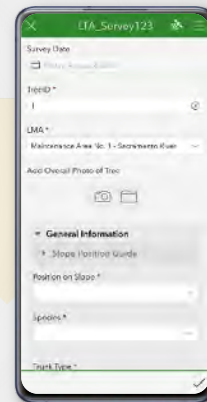
LTA identifies trees that potentially pose an “unacceptable threat to levee integrity” and provides preliminary threat categories for these trees



Key Message

5

LTA standardizes tree assessments with a decision-tree algorithm that reduces bias and variations in the field



Key Message

6

LTA is a science-based approach that adapts and changes as we gain new information to improve and update our best management practices for our levees



Key Message

7

DWR's Levee Vegetation Mgmt Strategy meets the criteria in WRRDA 2014, Section 3013 such as:

- Provide the greatest benefits for public safety with limited resources;
- Preservation, protection, and enhancement of natural resources;
- Use of available science and consideration of historical record re: link between vegetation on levees and flood risk;



Reference Documents

- CVFPP, Levee Vegetation Management Strategy
- Urban Levee Design Criteria (ULDC)
- California Code of Regulations, Title 23, Section 131 – Vegetation
- LTA, Appendix H – Guidance on Removing Trees, Stumps, and Roots and Remediating Levees
- WRRDA 2014, Section 3013

Questions & Discussion





Appendix H:
Presentation – California Levee and Land Use Standards

Levee and Land Use Standards

USACE National Levee Safety Program
Consultation
Nov. 15, 2022



The massive flood of January 1997 forced a breach on the east levee of the Feather River in Yuba County. DWR/ January 4, 1997.



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Michael Mierzwa, P.E., State Floodplain Manager
CA Dept. of Water Resources, Division of Flood Management

1

Outline

- Central Valley Flood Protection Act & Linking State and Local Planning (aka the Handbook)
- Urban Areas & Urban Levee Standards
- Urban Level of Protection

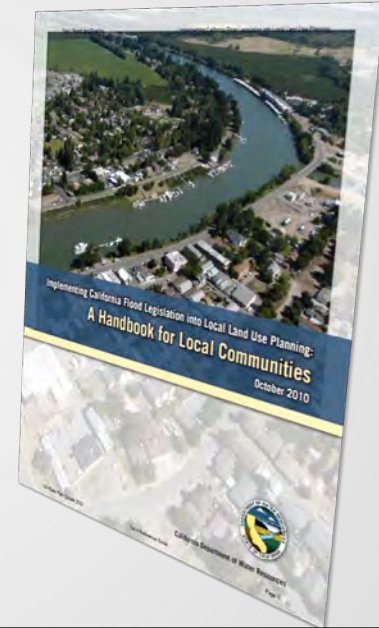


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2

Central Valley Flood Protection Act

- 2007 package of water bills including SB5 aka the Central Valley Flood Protection Act
- Amended state flood and land use management laws
- Addressed primarily local government responsibilities
- Links local and regional land use planning with flood risk management
- Established the Central Valley Flood Protection Plan
- New focus of 200-year protection in urban and urbanizing areas of the Central Valley
- Various geographical regions with different legislative deadlines



3

Example of Scales of Land Use Planning

2007 Flood Risk Management Legislation - Responsibility of Local Jurisdictions			
Planning Documents and Tools	State of California Requirements	Additional Sacramento-San Joaquin Valley ¹ Requirements	Additional Sacramento-San Joaquin Drainage District ² Requirements
General Plan Safety Element	<ul style="list-style-type: none"> Identify and revise, per new flood hazard information Establish goals, policies (guidelines), and mitigation measures to protect from the risk of flooding Allows information in floodplain management ordinances to be used 	<ul style="list-style-type: none"> May be required, see "general plan" above 	<ul style="list-style-type: none"> Prior to preparation or revision, consult with Central Valley Flood Protection Board and other agencies Prior to adoption or Amendment, submit to Central Valley Flood Protection Board for review
General Plan Housing Element & Regional Housing Needs Assessment	<ul style="list-style-type: none"> Consider and may exclude land that is not adequately protected, to avoid the risk of flooding 	<ul style="list-style-type: none"> May be required, see "general plan" row above 	--
Local Hazard Mitigation Plan	<ul style="list-style-type: none"> May adopt safety element in conjunction with local hazard mitigation plan (potential benefits) 	--	--
Local Plan of Flood Protection	--	<ul style="list-style-type: none"> May prepare according to Water Code guidelines 	--
Zoning Ordinance	--	<ul style="list-style-type: none"> Amend for consistency, per amendments made to general plan, per Central Valley Flood Protection Plan 	--

¹ All cities and counties.
² See Appendix A for a listing of cities and counties within the Sacramento-San Joaquin Valley.
³ See Appendix B for a listing of cities and counties within the Sacramento-San Joaquin Drainage District.

Implementation

- *What communities should be doing now to update the general plan.*

Land Use Element

- Identify areas subject to flooding via FEMA and DWR floodplain mapping

Conservation Element

- Identify areas that may accommodate floodwater for groundwater recharge and stormwater management

Safety Element

- Identify and revise flood hazard information
- Establish policies to protect communities from flooding risks

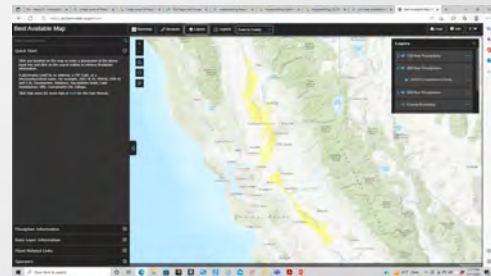
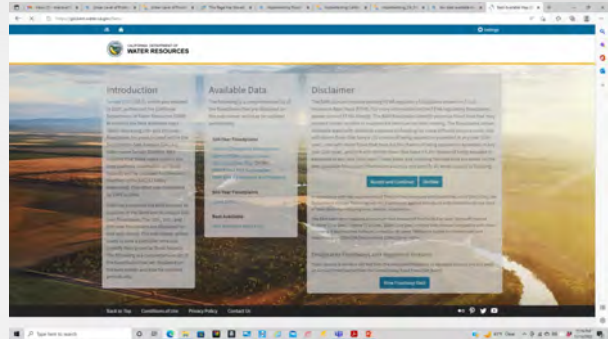


4

Resources Available to Support Land Use Planning

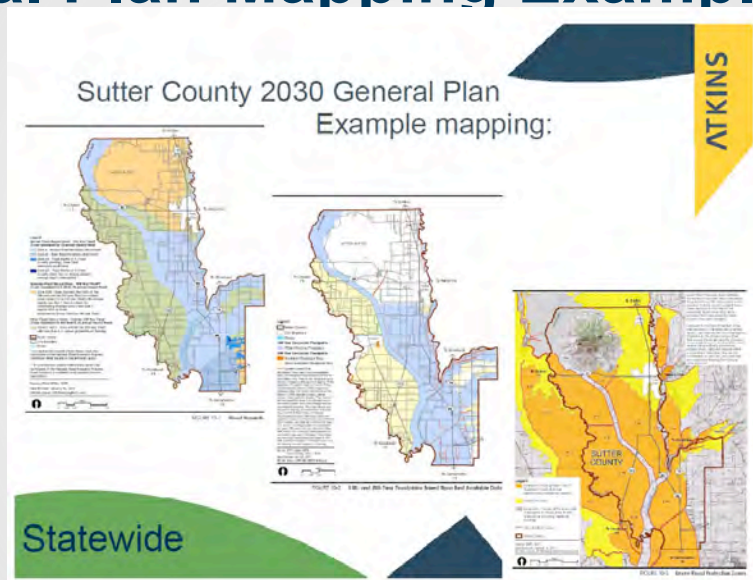
Land Use Element (effective NOW)

- Required to annually review and identify areas subject to flooding via
 - FEMA or DWR floodplain mapping:
 - FEMA Flood Insurance Rate Maps (FIRM)
 - FEMA Digital Flood Insurance Rate Maps (DFIRM)
 - FEMA Digital Q3 Flood Data
 - DWR Awareness Floodplain Maps
 - DWR Best Available Mapping (BAM)
 - DWR Levee Flood Protection Zone (LFPZ) Maps
 - DWR Central Valley Floodplain Evaluation and Delineation (CVFED) Maps
 - DWR 200-year Floodplain Maps



5

General Plan Mapping Example



6

Specific Requirements for Central Valley

ATKINS
Sacramento-San Joaquin Valley
Implementation

- 33 counties
- 85 cities
- Senate Bill 5
- Senate Bill 1278
- Assembly Bill 1965
- Central Valley Flood Protection Plan
- 200-year ULOP

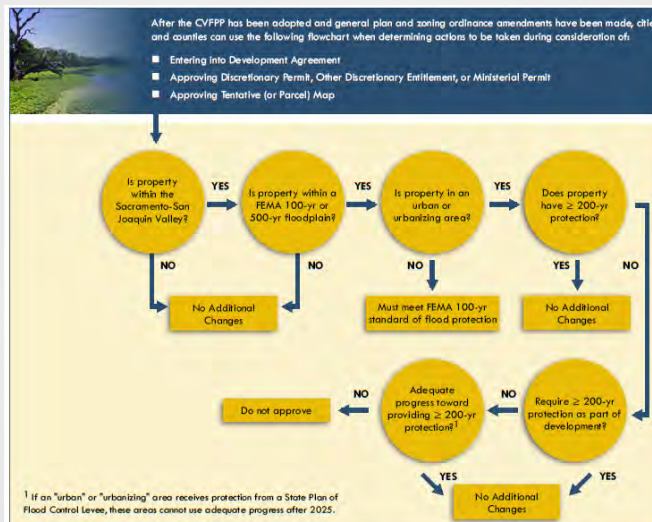
Linkage to the Central Valley Flood Protection Plan

- General Plans required updated w/in 24 months
 - Locations consistent with state identified flood mapping (LFPZs)
 - Goals, policies, objectives with the CVFPP
 - **Development of mitigation measures (often levee improvements)**
- Zoning Ordinance required updated w/in 36 months



7

Process for Triggering State & Local Planning Consistency



8

Urban Areas

As mentioned above, Government Code Sections 65865.5, 65962, and 66474.5 pertain specifically to areas within the SSJV that are within a flood hazard zone, which includes areas subject to flooding that are either within a FEMA special flood hazard area (100-year floodplain) or an area of moderate hazard (500-year floodplain). Cities and counties in the SSJV cannot approve development agreements for a property, discretionary permit/discretionary entitlement/ministerial permit for a project, or a tentative map/parcel map for a subdivision in these zones unless it has been demonstrated that one of the following conditions exists:

Urban or Urbanizing Areas

- protected, or have made adequate progress toward providing protection from the 200-year flood in urban areas (10,000 or more residents) or urbanizing areas (planned or anticipated to have 10,000 residents or more within the next 10 years), or

Nonurbanized Areas

- protected, or have made adequate progress toward providing protection from the 100-year flood in nonurbanized areas (fewer than 10,000 residents).



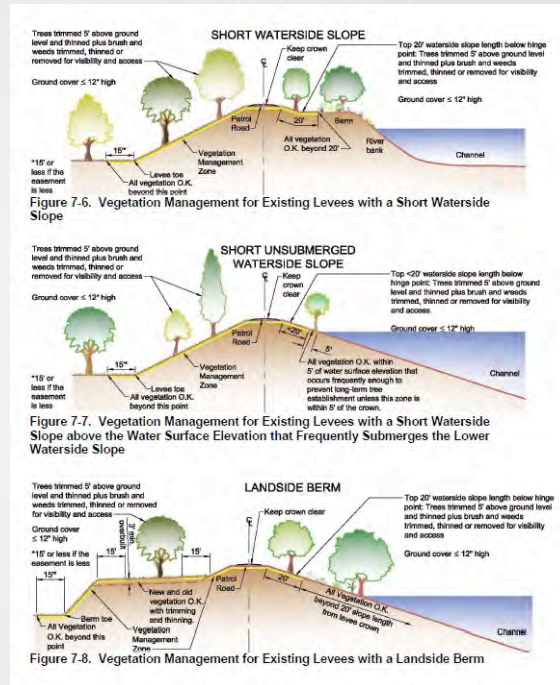
Urban Levee Design Criteria

- Provides design, evaluation, operation and maintenance criteria for urban levees
- Includes requirements and guidance
- Addresses both FEMA and USACE approaches (based on 2012 standards)
- Other guiding principles
 - Right of way for vehicle access
 - Encroachments and vegetation need to be managed
 - Levee systems should not rely on emergency measures (i.e. human intervention)
 - Levees need security systems to prevent human damage
 - Criteria for operations, maintenance, inspection, monitoring, and remediation of poor performance needs to be developed
- Considers
 - Geotechnical performance (structural and seismic performance)
 - Hydrologic / Hydraulic performance (Design Water Surface Elevation)
- USACE EM 1110-2-1913 (draft at time and included)



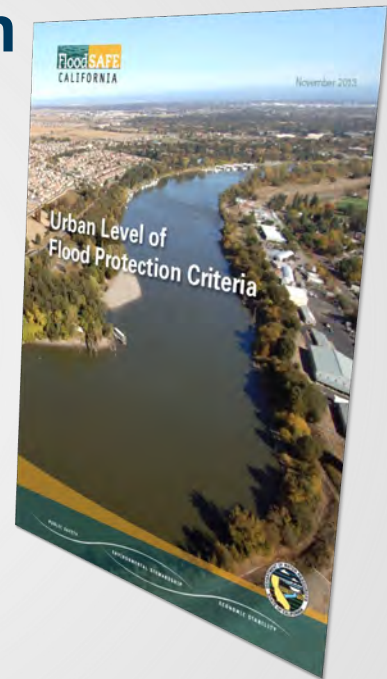
ULDC Vegetation

- Extensive guidance on allowing vegetation on levees provided within ULDC (3 of 4 scenarios shown)
- Key principle is practicing vegetation life-cycle management
 - Vegetation 4” or less in diameter removed in consultation with resource management agencies
 - Larger vegetation permitted provided not a safety hazard
 - Periodic evaluation of vegetation



Urban Level of Protection

- Expands upon the ULDC to allow structural (levee) or nonstructural means of providing protection
- Links back to Handbook & General Plan updates:
 - Local hazard identification
 - Local mitigation measures
- Provides templates for making findings and presenting evidence (to allow for state review)
- Recommends updates every 5 years or if water surface conditions change by 6”



Recap

- 2007 Comprehensive legislation addressed linking state and local flood hazard planning
- Areas of the Central Valley have additional planning requirements
- Levees are a key element of Central Valley flood defense
- DWR prepared an Urban Levee Design Criteria (ULDC) and Urban Levee of Protection (ULOP) guides in addition to Handbook for Local Planning



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**Appendix I:
Presentation – California Floodplain Management
Local Levee Assistance**

Floodplain Management Local Levee Assistance

USACE National Levee Safety Program Consultation
Nov. 16, 2022

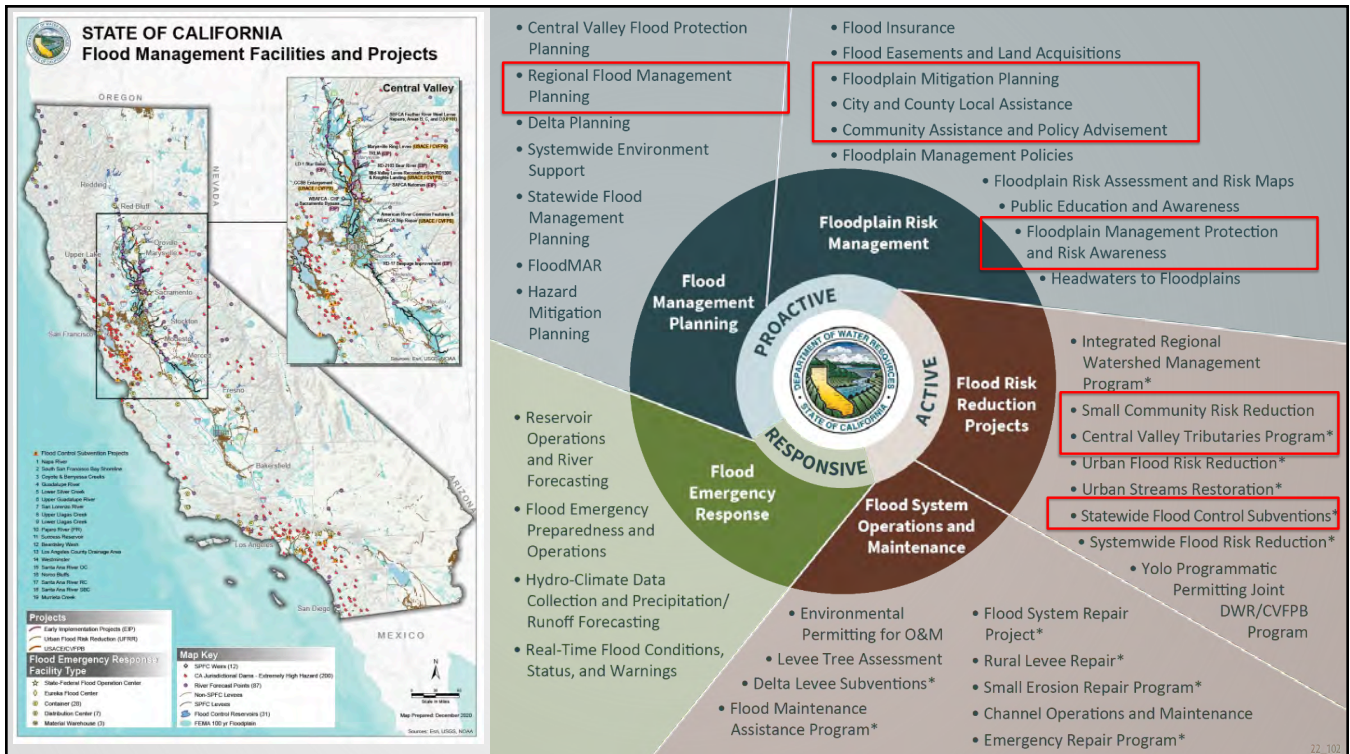


Image: Los Angeles Magazine, Aug. 14, 2022 photo from Huntington Beach floods of 1983.



Michael Mierzwa, P.E., State Floodplain Manager
CA Dept. of Water Resources, Division of Flood Management

1



2

Outline

- Overview of DFM’s Floodplain Management Local Assistance Programs
- Statewide Flood Control Subventions Program
- Small Community Flood Risk Reduction Program
- Coastal Flood Risk Reduction Program
- Floodplain Management Protection and Risk Awareness Program
- Grant Portal
- FEMA High Hazard Potential Dam Program
- FEMA / Cal OES Hazard Mitigation Assistance grants support
- Flood After Fire Tool Kit



3

DWR’s Floodplain Management Financial Assistance Programs

DWR Flood Risk Reduction Grant Program	Status	State Plan of Flood Control	Central Valley	Statewide	Current Fund Source
Statewide Flood Control Subventions Program	Ongoing			✓	Proposition 1E
Local Levee Assistance Program	Legacy / Closed			✓	Proposition 1E
Small Community Flood Risk Reduction Program*	Funding Committed	✓			Proposition 1E
Regional Flood Management Planning	Ongoing	✓			Propositions 1E & 68
Central Valley Tributaries Program	Ongoing		✓		Proposition 1
Coastal Flood Risk Reduction Protection Program*	Funding Committed			✓	Propositions 1 & 68
Floodplain Management Protection and Risk Awareness Program	Pending	✓	✓	✓	Proposition 68
Conveyance Subsidence Program	Funding Committed		✓		General Fund Earmark

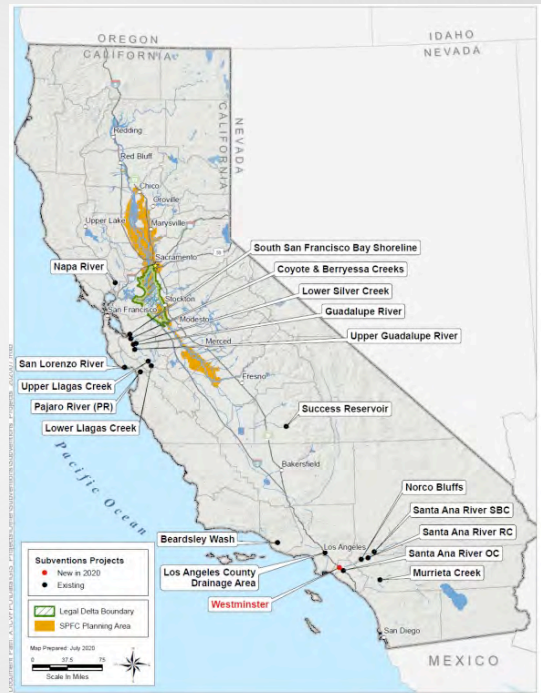


NOTE: These (*) programs may have future competitive funding rounds in the next several years.

4

Statewide Flood Control Subventions Program

- State's authority to cost share in locally-led USACE flood risk reduction projects est. 1945 in CA Water Code
- Projects must be specifically named in the CA Water Code
- The legislature has named 46 projects outside the Central Valley
- 19 of these projects have moved into design or construction (shown in map)
- DWR's role is to reimburse (to subvent) local project sponsors after costs are incurred
- DWR also prepares summary reports to the CA legislature (based on the USACE Chiefs Reports)
- DWR has paid over \$500M in claims since 2020 for non-Central Valley projects



5

Small Community Flood Risk Reduction Program Background



- Program created within DWR following the adoption of the 2012 Central Valley Flood Protection Plan
- Described approaches for protecting small communities in Section 3.3 (page 3-9) via:
 - System improvements
 - Adjacent urban improvements
 - New state funded small community program
- \$50M of Proposition 1E funds set aside to initiate the program in 2015; completely committed



6

Other Uses for SCFRR Feasibility Studies

The SCFRR feasibility studies (Phase 1) were also intended to be living documents and used for more than informing the SCFRR program. Other uses may help communities:

- Incorporate study recommendations into Local Hazard Mitigation Plans (which need to be updated every 5 years)
- Initiate small non-structural actions that can result in National Flood Insurance Program (NFIP) premium reductions via the Community Rating System (CRS)¹
- Inform general plan updates
- Use the plans to update both the RFMPs and CVFPP
- Link small community projects with Sustainable Groundwater Management Act (SGMA) Groundwater Sustainability Plan (GSP) mitigation actions



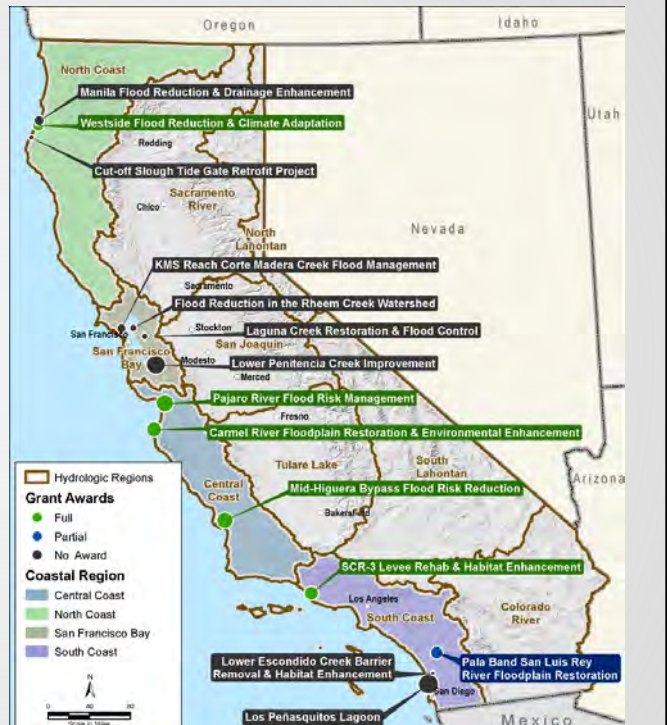
Image: Artist rendition of new Yolo County Branch Library in community of Yolo, Yolo County, CA. Building elevated above Base Flood Elevation (BFE).

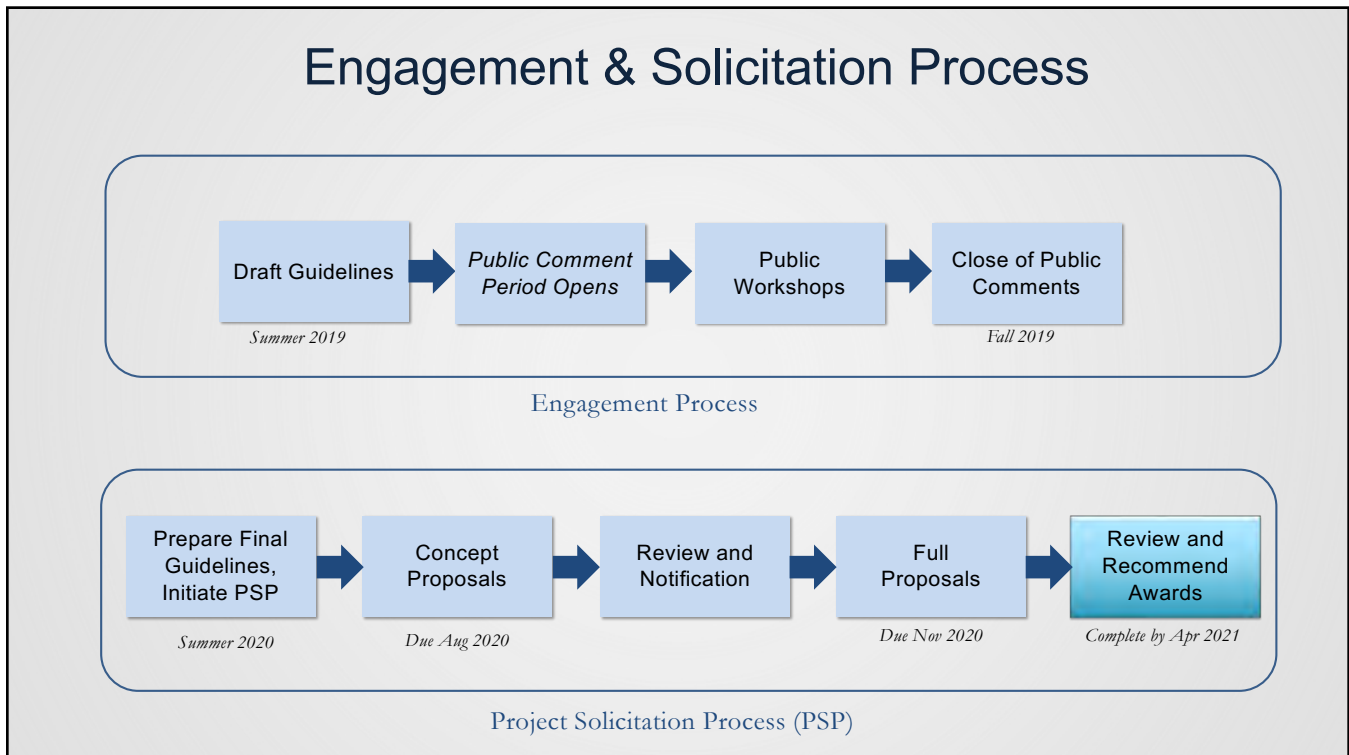
1. There are examples in CA of FEMA providing enough CRS Activity 420 credit for counties to improve 2 CRS classes, resulting in a 10% reduction in NFIP premiums for all NFIP policy holders within Special Flood Hazard Areas within the county "community".



Coastal Flood Risk Reduction Program

- AB97 (2017) authorized \$25.65M Prop 1
- For Coastal Watersheds
- Included a concept proposal process
- Bond Requirements:
 - Flood risk reduction
 - Ecosystem enhancement
 - Construction or capital asset acquisition
- Priority FEMA Coastal SFHAs





9

Floodplain Management, Protection, and Risk Awareness Grant Program (FMPRA) - Overview

- Proposition 68: California Drought, Water, Parks, Climate, Coastal Protection, and Outdoor Access for All Act of 2018
- Statewide program w/primary objective address flood risk related to;
 - Stormwater flooding, mudslides, and flash flooding
- Prioritizes: economically disadvantaged community assistance, multi-benefit project features, and flood risk reduction projects in a FEMA Special Flood Hazard Area
- Program supports (1) Planning & Monitoring and (2) Implementation projects
- \$50.4M available funding
 - \$45.36M implementation project
 - \$5.04M planning and monitoring projects
- Incorporates Concept Proposal Phase into Solicitation Process



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Final Funding Awards



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11


California Grants Portal

- <https://www.grants.ca.gov/>

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FIND YOUR OPPORTUNITY

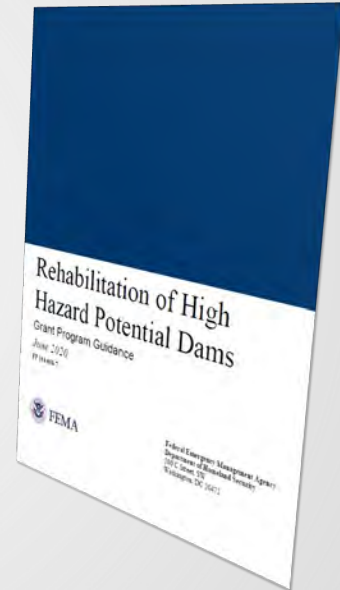
I am looking for funding in sector with at least until the application deadline.

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FEMA High Hazard Potential Dam Grant Program

- Established in 2016 by Water Infrastructure Improvements for the Nation Act (WIIN)
- Previous funding in 2019, 2020, and 2021
- Funding increasing each year (FY2022 is \$22M nationwide)
- DWR is the state applicant / administrator
- Eligible sub-applications for FY2022 were submitted to FEMA in July 2022
- FEMA maximum funding for California will be determined in Sept. 2022
- DWR will submit recommended funding awards to FEMA around Dec. 2022



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HHPD Eligibility

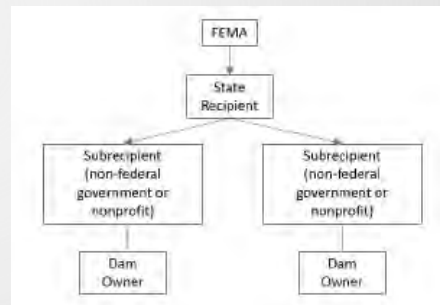
- State dam safety program
- Classified as a high hazard (or greater) dam
- Have an Emergency Action Plan (EAP)
- Be located within a jurisdiction with an approved Hazard Mitigation Plan
- Fail to meet minimum dam safety standards

Activities can including:

- Repair
- Removal
- Structural / non-structural rehabilitation

Contact:

Levi Warr – Levi.Warr@water.ca.gov



14

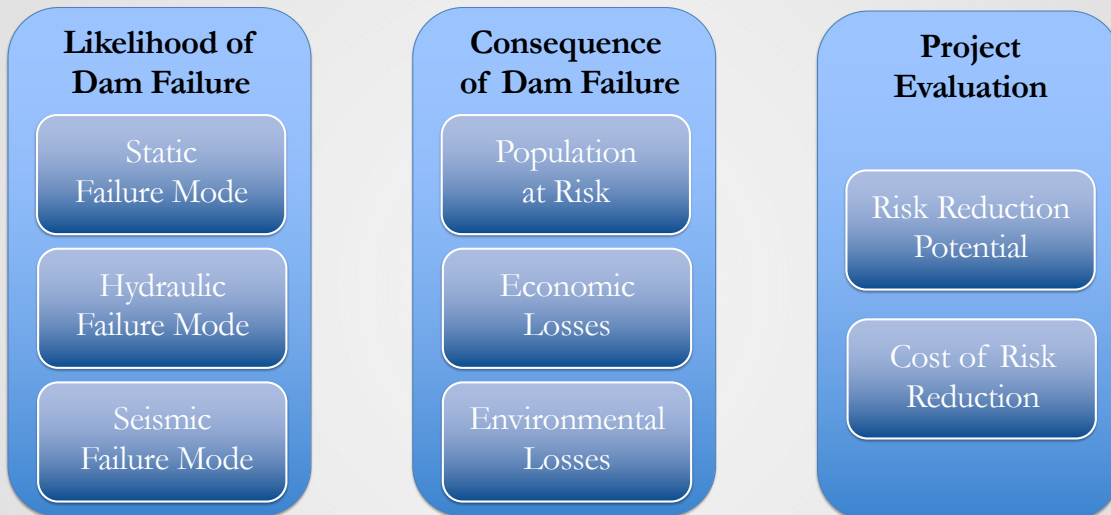
2022 HHPD Program

- Non-Federal cost share of not less than 35%
- FEMA-approved State Hazard Mitigation Plan
 - All dam risks
- \$2.75M maximum award per subrecipient
- Three-year period of performance



15

HHPD Project Ranking Approach



Projects ranked according to risk reduction or improved risk understanding



16

FEMA Hazard Mitigation Assistance: The Big Three

HMA Program	Pre-Disaster	Post-Disaster	Authorities & Requirements
Building Resilient Infrastructure and Communities (BRIC)	✓		Stafford Act (1988) / Hazard Mitigation Plan Activity
Flood Mitigation Assistance (FMA) Grant Program	✓		National Flood Insurance Program (1968) / Must be NFIP Community / Must be HMP Flood Activity
Hazard Mitigation Grant Program (HMGP)		✓	Stafford Act (1988) / Hazard Mitigation Plan Activity



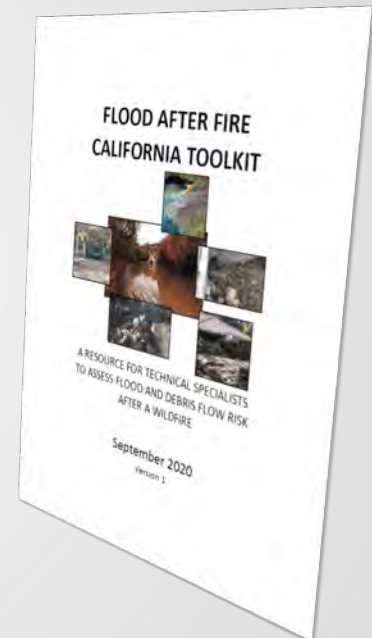
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NOTE: FEMA has other specialty programs too, including its High Hazard Potential Dam (HHPD) Program.

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California Flood After Fire Tool Kit

- Gauging and data is needed for the altered watershed
- Tool Kit Audience – Technical “modelers” for assessing watershed flood risk following a fire
 - Geomorphologists, soil scientists, emergency managers, GIS specialists, hydrologic and hydraulic engineers
- Can be used by Watershed Emergency Response Team (WERT) and Burned Area Emergency Response (BAER)



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Recap

- DFM has extensive and varied competitive local assistance grant programs
- Most of these programs help fund levee construction / improvement programs
- State funds can be used to meet the non-Federal cost share for Federal flood risk reduction projects, in fact, some programs like the Statewide Flood Control Subventions Program are designed to only do that
- DWR's guidelines involve extensive public comment, but are linked to requirements in specific funding authorizations and appropriation language, thus making funding of many local sponsored single purpose projects difficult
- Despite the large number of different programs, the amount of funding provided in each solicitation is limited – many projects are not selected
- DWR also serves as the applicant (i.e. administrative selection and pass through) for FEMA's High Hazard Potential Dam grant program, but this program also is limited in funding



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Appendix J:
Presentation – California Levee Flood Risk Awareness

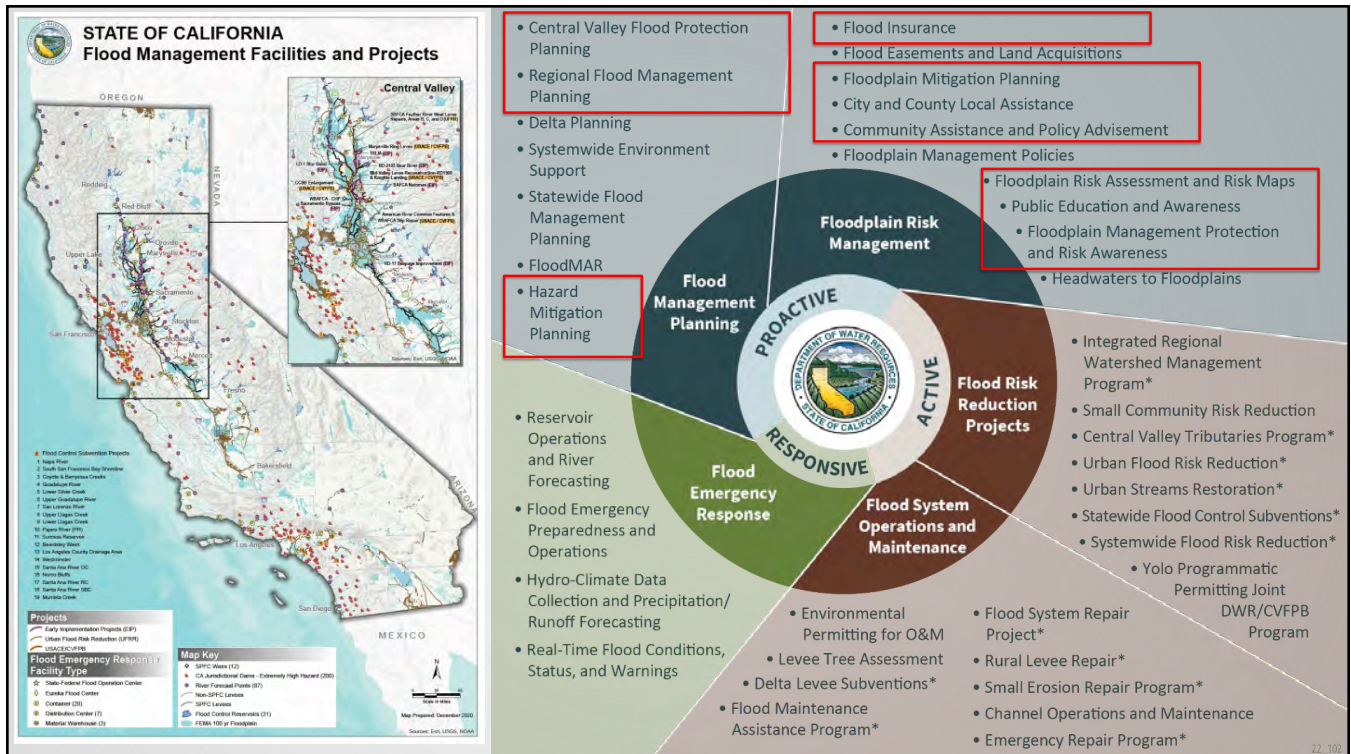
Levee Flood Risk Awareness

USACE National Levee Safety Program Consultation
Nov. 16, 2022



Michael Mierzwa, P.E., State Floodplain Manager
CA Dept. of Water Resources, Division of Flood Management

1



2

Outline

- Flood Risk Notification Program
- Levee Flood Protection Zones
- National Flood Insurance Program
 - Community Assistance Program
 - Community Rating System
- Community-Based Flood Insurance Pilots
- CA Flood Preparedness Week
- CA Silver Jackets / Watershed University
- FloodHub
- Dam Inundation Mapping Viewer



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3

Flood Risk Notification Highlights

- Annual notification to property owners of their flood risk
- Legal Mandate (C.W.C. § 9121) established in 2007
- Over 280,000 mailers are sent out annually



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4

2022 Flood Risk Notification Flier

Dear Property Owner,

It's important to know your flood risk. Flooding can happen at any time, even during drought. Your property is located behind a State/Federal project levee. According to our records, your property located at _____ may be exposed to potential flood risk from the _____ levee. Your property may also be at risk for flooding from other sources not identified in this notice, such as creeks and local storm drains.

Visit water.ca.gov/myfloordrisk and enter your property address to find the areas subject to flooding if State/Federal levees should fail, and to get information about State/Federal levees in your area.

Flood Risk Notification Program
California Department of Water Resources
P.O. Box 142525
Sacramento, CA 94231-0025

Protect what you value most.



FLOODING-
Because nobody thinks it can happen to them.

Find out about your risk!
www.water.ca.gov/myfloordrisk

Consider these facts . . .

- Levees may reduce, but do not eliminate, the risk of flooding and are subject to catastrophic failure.
- Even if a levee meets the FEMA standard of protection, there is a greater than 25% chance of a larger flood occurring within any 30-year period (the length of a typical home mortgage).
- Flood damage is not covered by most standard home, rental, and business owner's insurance policies.
- The State recommends that you obtain flood insurance for your property. Contact your insurance agent or call the National Flood Insurance Program at 1-877-336-7627.

Did you know?
7 million California residents live in flood-prone areas.

Remember these simple tips to:

Prevent

Keep storm drains, gutters, and downspouts clear.
Check with your local flood control agency to see if a permit is required if you plan to build on, fill, alter, or upgrade your property.
Never encroach, plant, modify, or build anything on any levee or flood control easement without permits from the appropriate local, state, and federal agencies.

Protect

Never drive through flooded streets or roads. Many people are trapped and die in their vehicles that are stuck during floods.
Never try to escape rising floodwater by going into the attic unless you have roof access, or if there are no other safe options. Consider buying flood insurance. It is a wise investment.

Prepare

Prepare an emergency kit that includes flashlights, radio, batteries, candles, matches, blankets, water, food, first aid kit, and a list and map of all medications.
Keep important documents and valuable possessions on an upper level of the structure, as high as possible.
Make a list of items to take with you and have a plan for your pets.
Know how to safely shut off your utilities.
Listen to authorities for emergency instructions.
Establish a family meeting place.

For more ideas about protecting your property against floods, go to water.ca.gov/myfloordrisk and click on "Protect Your Property from Flooding."

This notification contains important flood risk information regarding the address listed in the flyer. Please share this notice with tenants, if applicable. To find out more information on your flood risk and/or get a list of your local emergency contacts, please visit www.water.ca.gov/myfloordrisk or email us at myfloordrisk@water.ca.gov or call us at 1-877-7461-8058 (1-877-746-7475) TTY: 711

Esta notificación contiene información importante sobre el riesgo de inundación de la propiedad indicada en este folleto. Comparta este aviso con sus inquilanos, si procede. Para obtener más información sobre su riesgo de inundación o obtener una lista de sus contactos de emergencia locales, visite www.water.ca.gov/myfloordrisk o envíenos un correo electrónico a myfloordrisk@water.ca.gov o llame al 1-877-7461-8058 (1-877-746-7475) Línea TTY 711



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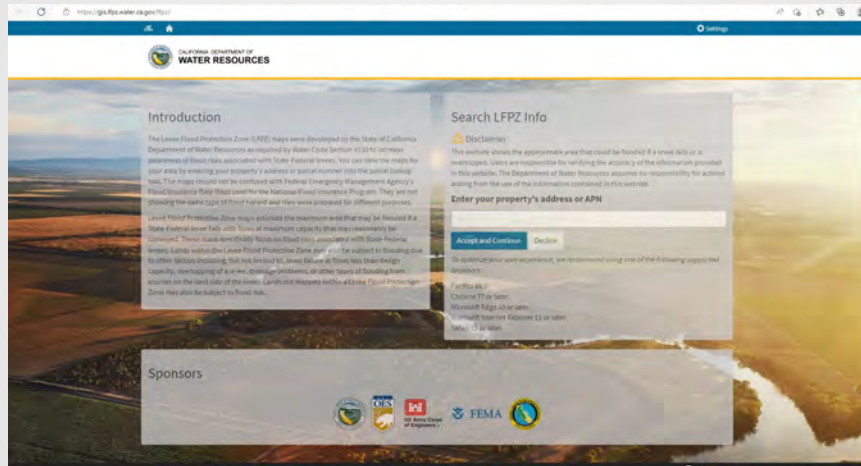
Levee Flood Protection Zone Maps

- Show areas at risk of flooding associated with State-Federal levees (SPFC facilities).
- LFPZ maps are not the same as FEMA's Flood Insurance Rate Maps.



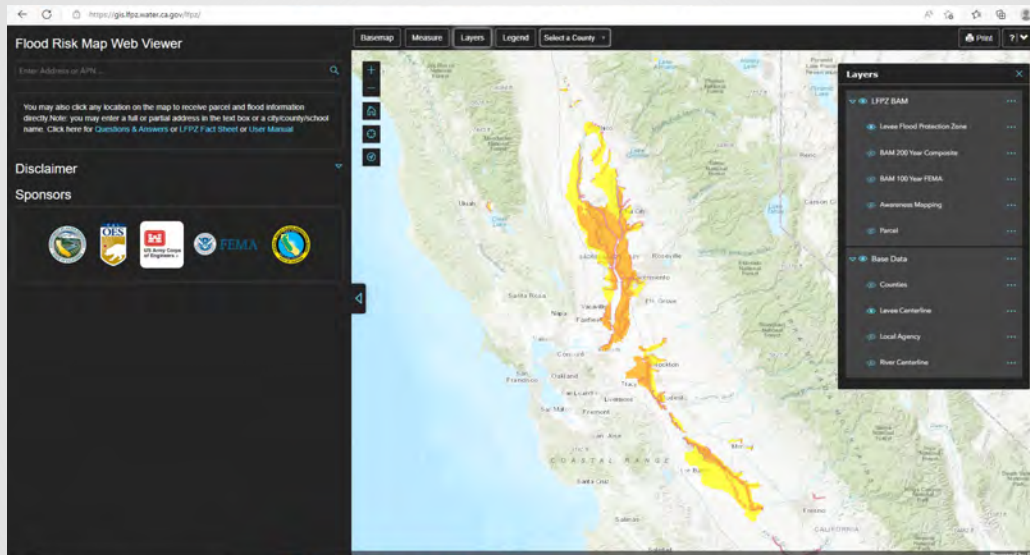
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Levee Flood Protection Zones



7

ArcGIS Viewer



8

DWR – NFIP Crosswalk

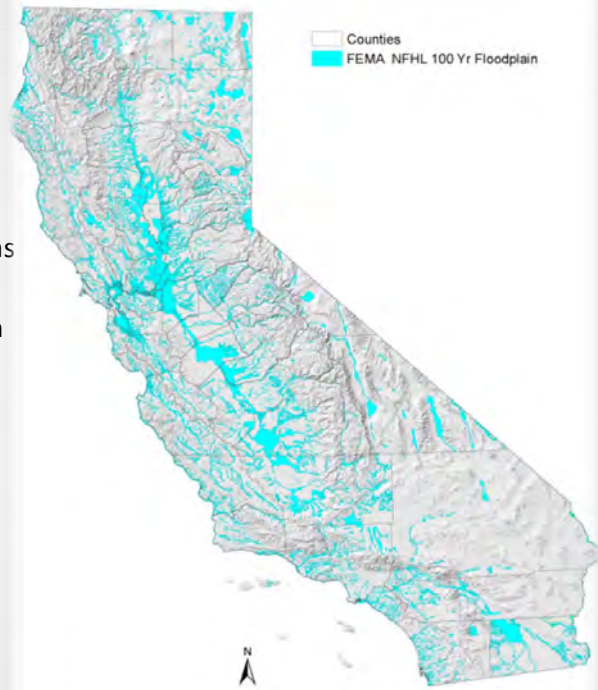
		NFIP Key Activities			
		Mapping	Regulation	Insurance	Mitigation
DWR Floodplain Management Key Activities	Risk Assessment	✓			
	Risk Awareness		✓	✓	
	Financial Assistance				✓
	Flood Planning	✓			✓



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California Floodplains Mapped by FEMA

- Majority of CA’s FEMA maps are 10+ years old
- FEMA’s mapping efforts have focused on urban areas
- FEMA’s process for updating maps takes 5 – 10 yrs due to extensive public engagement and with community-based floodplain managers
- 60% of CA’s population is in coastal areas
- 40% of land in 10 So-Cal counties is alluvial fans
- Alluvial fans are difficult to map using riverine or coastal approaches, and are largely unmapped
- Alluvial flood plains are larger than riverine/coastal floodplains

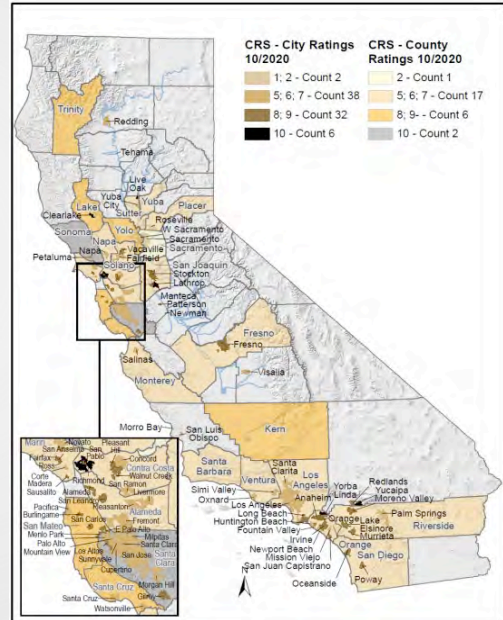


10

National Flood Insurance Program (NFIP)

Four Key Activities:

1. **Mapping** – FEMA major map updates for Fresno, Madera, Orange counties
2. **Insurance** – FEMA has several major administrative initiatives, including Risk Rating 2.0
3. **Mitigation** – 104 of 528 communities participating in Community Rating System
4. **Regulation** – FEMA & DWR perform annual Community Assistance Visits



DWR Floodplain Management Specialists

Northern Region Office

Michael Ward
(530) 529-7378
email: Michael.Ward@water.ca.gov

North Central Region Office

Ray Lee
(916) 376-9638
email: Ray.Lee@water.ca.gov

South Central Region Office

Robert Lampa
(559) 230-3370
email: Robert.Lampa@water.ca.gov

Daniel Burgett
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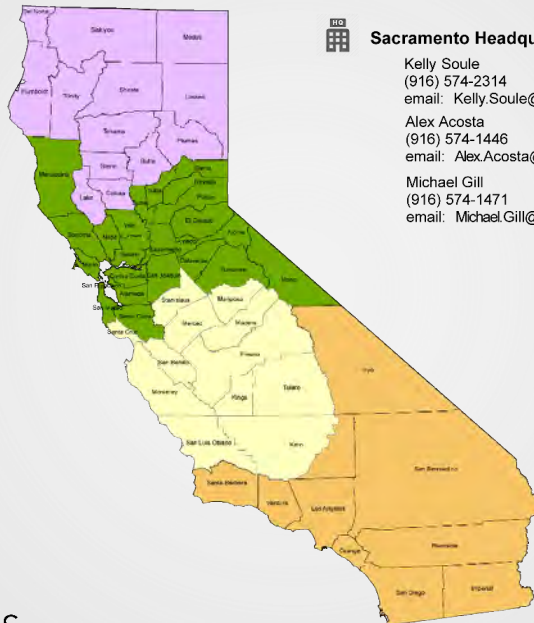
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Updated: February 25, 2020



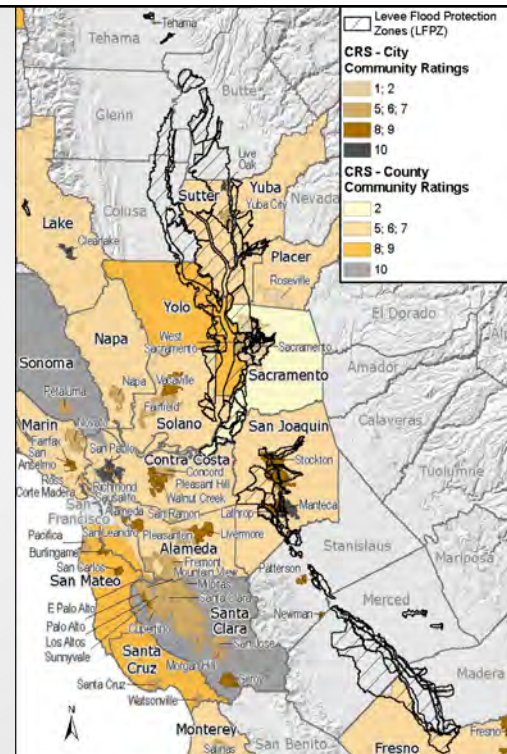
Major NFIP Reform Efforts

Reform	Description	Approx. Next Deadline
NFIP Congressional Reauthorization	NFIP was last authorized in 2012, and was set to expire in 2017; since that time Congress has quickly passed 21 continuing resolutions	On March 11, 2022 Congress extended the NFIP to Sep. 30, 2022; failure to reauthorize could prevent 40,000 home sales per month
NFIP Community Rating System	FEMA administrative effort to collect feedback on changes to the Community Rating System (CRS)	California submitted a letter on Sept. 27, 2021 ; informal communication started with FEMA
Risk Rating 2.0	FEMA administrative effort that will increase national premiums to address growing NFIP deficit	New rates started Oct. 1, 2021 – Apr. 1, 2022
State Assessment of State Owned Property	FEMA has been auditing existing state-level legal and administrative policies and procedures to ensure states comply with the NFIP	CA workplan for updating authorities in progress, schedule due to FEMA Oct. 2022
NFIP Mapping Budget Approval	Typically the State comments on the President's proposed mapping budget in Dec. Funding for FEMA is unknown at this time.	No State letter being prepared at this time
Tiered State Framework (TSF)	FEMA has been auditing the effectiveness of state-led Community Assistance Programs and ranking states; future FEMA reimbursable funding will be based on FEMA's 3-tiered ranks	FEMA will update California's TSF rating in 2023 for FY2324 (July 2023) based on ongoing NFIP-CAP State Support Element performance
NFIP Climate Change and Equity Challenges	Prior to President Biden releasing the Justice40 initiative, FEMA proactively requested public comment on how FEMA could better address climate change and equity within the NFIP and hazard mitigation	California submitted a letter on June 22, 2021 ; DWR is directly communicating with FEMA Region IX
NFIP Endangered Species Impacts	NRDC successfully sued FEMA over its administration of changes to FEMA mapped floodplains; plaintiffs claimed FEMA was ignoring ESA, therefore FEMA: 1) initiated multi-year NEPA EIS to support LOMA/LOMR processes, and 2) FEMA is requesting input on approaches to minimize mapping related environmental impacts	California submitted a letter early 2022 .

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Community Rating System

- A voluntary incentive program for communities that go above and beyond the NFIP minimum requirements to mitigate flood risk.
- The CRS system awards flood insurance discounts ranging from 5% to 45%.
- CRS Element 330 – Outreach Projects
 - Increase awareness of flooding hazards and to motivate actions to reduce potential damages
 - Annual Notice Covering FEMA's Priority Topics
 - Know your flood hazard
 - Insure your property for your flood hazard
 - Protect people from the hazard
 - Protect your property from the hazard
 - Build responsibility
 - Protect natural floodplain functions



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Risk Rating 2.0 & NFIP Penetration

- Risk Rating 2.0 does now consider any levee in the National Levee Database (USACE) when calculating NFIP annual premiums
- Homeowners Affordability Insurance Act of 2014 still limits annual NFIP premium increases to 8%
- Overall Risk Rating is seeing CA NFIP policies increase near the 8% limit; rates are exceeding \$1000/yr and the Congressional Research Service estimates that there will be at least 5 years of compounding rate increases
- **Property owners** are responding to RR2.0 and the drought by **dropping NFIP policies** (but these are the old preferred rate policy holders)
- UC Davis research has shown that up to 40% of CA NFIP claims are outside of mapped Special Flood Hazard Areas (i.e. preferred rate policy holders)
- **Remaining property owners have a smaller insurance pool to “absorb” costs, creating an affordability challenge**



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Affordable Flood Insurance

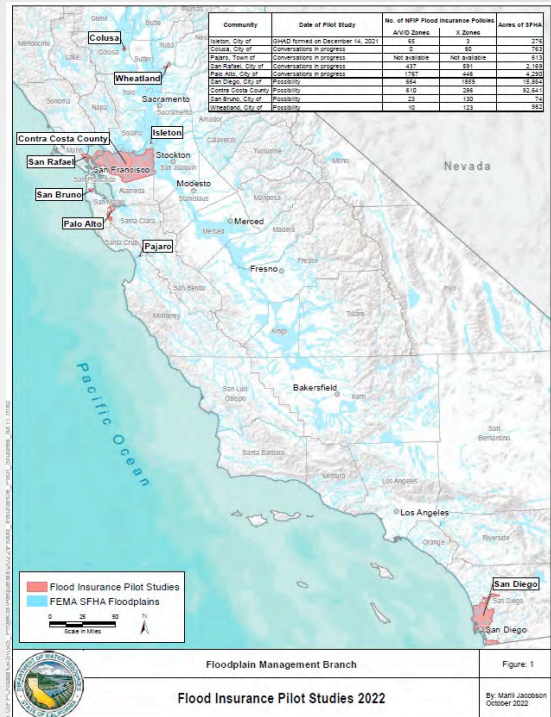
- Discussed in the 2002 AB 1147 Floodplain Management Task Force
- Incorporated into post Katrina 2005 Flood White Paper
- Included in the 2017 CVFPP
- Highlighted in the 2020 Water Resilience Portfolio



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Insurance Pilot Areas

- UC Davis, CA Dept. of Insurance and DWR looking at several community-based insurance pilot areas
- Pilots work by finding private insurance / banking companies that will offer additional insurance to either replace NFIP policies or cover the deductible
- Options are designed to provide equal or better consumer protection and reduce property owner net cost
- Surprisingly many communities have large numbers of preferred rate policy holders that are interested in concept



Flood Preparedness Week



CFPW@water.ca.gov

Flood Hub

- Collaborative research / study partnership focused on understanding flood risk management
 - UC Berkeley, UC Davis, UC Irvine, DWR, USACE FPM, Santa Cruz County, City of San Diego
- Monthly lunch time presentations and dialog
 - Risk assessments, equity / social vulnerability assessments, disaster assistance studies / demographics, historical flood management program history, case studies in California and globally, review of funded projects
- Informs academic community of future research areas & implementation challenges

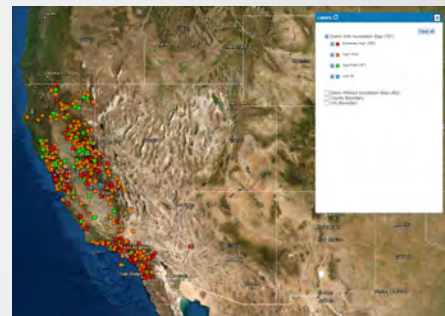


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SB 92 Dam Inundation Map Viewer

- Search for “California Dam Inundation Maps”
- Click on <https://water.ca.gov/Programs/All-Programs/Division-of-Safety-of-Dams/Inundation-Maps>
- Go to & click on “View Approved Inundation Maps”
- Click on “Enter here” & read disclaimer
- DWR’s Division of Safety of Dams is responsible for regulating only State jurisdictional dams
- There are about 1,250 jurisdictional dams
- Dam owners are responsible for preparing inundation maps at least once every 10-years based on the dam’s downstream hazard potential (i.e. exposure, not the risk)
- DWR reviews these maps
- California divides the Federal “high” downstream hazard potential into “extremely high” (potential life loss for at least 1,000 people) and “high” (potential life loss for at least 1 person)



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Recap

- Mapping is key to risk awareness
- Flood and dam inundation maps are confusing, conditional, and situational; requiring extensive engagement
- California has over 512 communities participating in the NFIP; only about a quarter of them participate in the CRS to “exceed” Federal standards
- Increasing national flood insurance claims resulted in FEMA increasing rates, creating an affordability crisis
- Levee protected areas need timely and accurate depictions of levee performance in the National Levee Database, or else they too will be unable to afford insurance
- Partnerships with universities (California has amazing research teams) can lead to a better understanding of areas of greater social vulnerability and flood risk, and can also lead to innovative structural and non-structural measures



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Appendix K:
Presentation – California Flood Maintenance
and Operations Branch

Flood Maintenance and Operations Branch

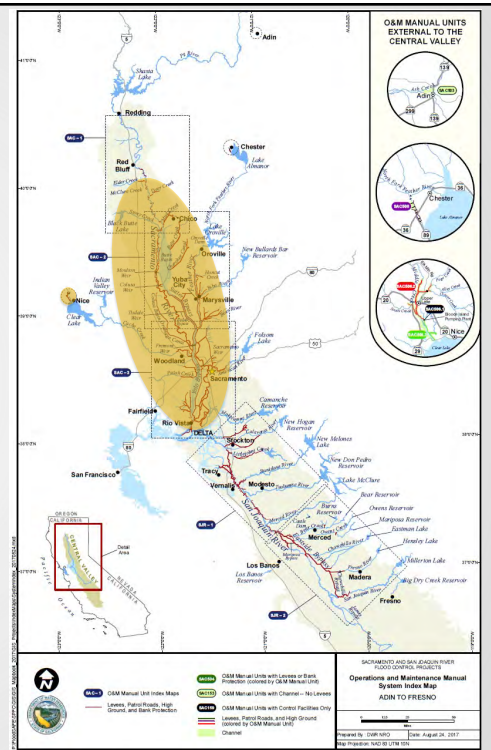
November 16, 2022



1

FMO's Responsibilities

- *Conduct OMRR&R on State-maintained flood system features for which the State gave assurances to the federal government.*
 - Including sections of levee that are local responsibility, but the local maintaining agency is unable to.
 - These responsibilities are established in the California Water Code.
- *262 square miles of floodway*
 - 290 miles of levee
 - 1,200 miles of channels
 - 39 structures (weirs, pumping plants, water control structures, bridges)



2

Organizational Structure

Flood Maintenance and Operations Branch

Sacramento Maintenance Yard

Conducts field operations, maintenance, and repair work on 91 miles of levee and various channels and structures.

Sutter Maintenance Yard

Conducts field operations, maintenance, and repair work on 199 miles of levee and various channels and structures.

Technical Support Section

Provides engineering, geologic, and project management support to the Yards. Manage rehabilitation and replacement projects.

Environmental Support Section

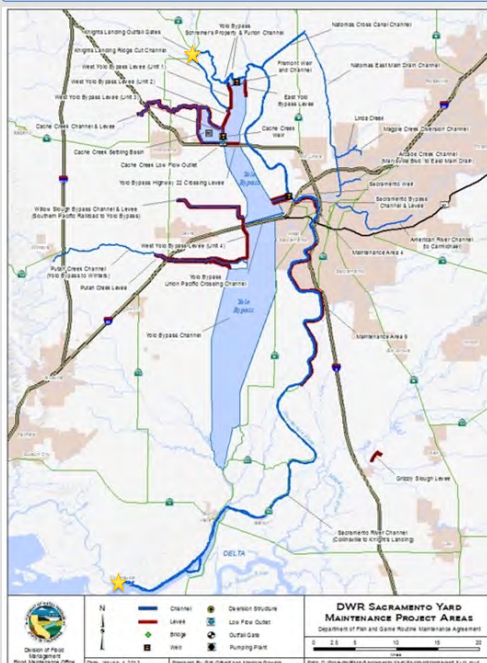
Provides environmental permitting and compliance and tribal consultation support to the Yards and for rehabilitation and replacement projects.

Flood System Sustainability Section

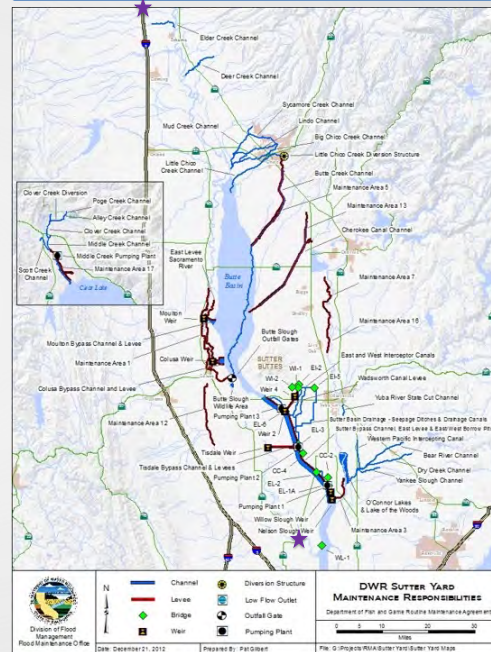
Implements and manages projects that repair levee damages resulting from highwater events and deferred maintenance, administers local assistance, and coordinates with USACE and local maintaining agencies on repair projects.

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Sacramento Maintenance Yard



Sutter Maintenance Yard



4

Examples of O&M Work



Levee Slope Mowing

Levee Slope Burning



Rodent Control

Sediment Removal



Levee Repairs



Debris Removal



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