FloodSAFE California Overview

Water Plan Update 2013 Plenary
California Water Plan Update

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Division of Flood Management
California Department of Water Resources

October 27, 2011
Timeline of Central Valley Flood Issues

1850
- CA Gold Rush (1849)
- CA Statehood (1850)
- Fed Arkansas Reclamation Act (1850)
- State Flood Control Act (1861)
- Reclamation District Act (1861)

1900
- CA Statehood (1850)
- Fed Arkansas Reclamation Act (1850)
- State Flood Control Act (1861)
- Reclamation District Act (1861)

1950
- Local Levee Construction Era (1860-1910)
- Fed Flood Control & Dam Construction Era (1910-1950)
- State Flood Control, Operation and Maintenance Era (1960s-2002)
- FloodSAFE Era (Post 2003)

2000
- State Flood Control, Operation and Maintenance Era (1960s-2002)
- FloodSAFE Era (Post 2003)

- Props. 1E & 84 (2006)
- Early Implementation Projects (2007- )
- Paterno Decision (2003)
- Hurricane Katrina (2005)
- California Flood Legislation (2007)
- Statewide Flood Management Planning Program (2010)
- CVFPP (2012) To be updated every 5 years after

- Central Valley Floods (1997)
- Oroville Dam (1967)
- Folsom Dam (1955)
- SACramento River Flood Control Project (1917)
- Stockton Deep Ship Channel (1933)
- Lower SJR and Tributaries Project (1944)
- Shasta Dam (1944)
- Central Valley Floods (1997)

- DWR (1956)
## Historical C.V. Flood Consequences

<table>
<thead>
<tr>
<th>Event / Region</th>
<th>1986</th>
<th>1997</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Statewide¹</td>
<td>Central Valley²</td>
</tr>
<tr>
<td>Estimated losses</td>
<td>$720M</td>
<td>$466M</td>
</tr>
<tr>
<td>Fatalities</td>
<td>13</td>
<td>1</td>
</tr>
<tr>
<td>Homes</td>
<td>13,829</td>
<td>7,194</td>
</tr>
<tr>
<td>Businesses</td>
<td>1,152</td>
<td>639</td>
</tr>
</tbody>
</table>

1. Cal-OES,  
2. USACE Post Flood Assessment (1999)
## 2006 Flood Bonds

<table>
<thead>
<tr>
<th></th>
<th>Prop 1E</th>
<th>Prop 84</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bond Totals</td>
<td>$4.09B</td>
<td>$800M</td>
<td>$4.89B</td>
</tr>
<tr>
<td>Appropriated (FY10/11)</td>
<td>$2.45B</td>
<td>$746M</td>
<td>$3.19B</td>
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<tr>
<td>Remaining Funds</td>
<td>$1.64B</td>
<td>$54M</td>
<td>$1.70B</td>
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</table>
### Key FloodSAFE Related Legislation

<table>
<thead>
<tr>
<th>Legislation</th>
<th>Major Statewide DWR Flood Initiatives</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>AB 142</td>
<td>• Levee &amp; Flood System Repair</td>
<td>2006</td>
</tr>
<tr>
<td>AB 140</td>
<td>• Disaster Preparedness and Flood Prevention Bond Act of 2006</td>
<td>2006</td>
</tr>
<tr>
<td>Prop 1E</td>
<td>• Disaster Preparedness and Flood Protection Bond Act of 2006 ($4.09B)</td>
<td>2006</td>
</tr>
<tr>
<td>Prop 84</td>
<td>• Safe Drinking Water, Water Quality and Supply, Food Control, River and Coastal Protection Bond Act of 2006 ($5.39B)*</td>
<td>2006</td>
</tr>
<tr>
<td>AB 739</td>
<td>• Storm water discharge</td>
<td>2007</td>
</tr>
<tr>
<td>SB 27</td>
<td>• Sacramento-San Joaquin Delta Emergency Preparedness Act of 2008</td>
<td>2008</td>
</tr>
</tbody>
</table>

* $800M of Prop 84 for Flood Risk Reduction
<table>
<thead>
<tr>
<th>Legislation</th>
<th>Major Central Valley DWR Flood Initiatives</th>
<th>Year</th>
</tr>
</thead>
</table>
| SB 5         | • Develop preliminary 100-yr & 200-yr floodplain maps for C.V.  
• Propose building code standards in areas protected from a 1-in-200 chance of flooding event  
• Develop a Central Valley Flood Protection Plan (CVFPP) for adoption by the Central Valley Flood Protection Board (CVFPB)  
• Urban Level of Flood Protection (1-in-200 chance of flooding) for Central Valley will apply to future development in urban areas                                                                 | 2007 |
| SB17, SB5    | • Document & update status of State Plan of Flood Control (SPFC)                                                                                                                                                                          | 2007 |
| AB 5         | • Develop new local cost share formulas for repairs / improvements                                                                                                                                                                       | 2007 |
| AB 70        | • Cities & counties share costs associated with potential flood damages in previously undeveloped areas protected by SPFC                                                                                                                                 | 2007 |
| AB 156       | • Send annual flood risk notifications to property owners protected by levees  
• Prepare project levee status reports                                                                                                                                                                                                     | 2007 |
| AB162, SB5, AB156 | • Cities & counties amend their general plans                                                                                                                                                                                     | 2007 |
In 2006 DWR launched the FloodSAFE California Initiative to improve public safety through integrated flood management.

**Accomplishments**

- ✔ Core Flood Management Programs
- ✔ Regional Projects
- ✔ System-Wide Investments
FloodSAFE is about

**Public Safety**
- Making communities safe
- Planning ahead to achieve best collaboration
- Emergency planning and response

**Environmental Stewardship**
- Helping ecosystems thrive
- Creating healthier communities by enhancing the environment
- Responsible and reasonable balance between protecting people and the environment

**Economic Stability**
- Providing for our families’ future
- Protecting businesses and investments
- Enhancing communities
General FloodSAFE Focus Areas

Delta

Central Valley

Statewide
Integrated Water Management Concept

Major Water Management Objectives:

✓ Public Safety
✓ Water Supply Quantity & Quality
✓ Ecosystem

Many Responsible Parties:

✓ Local
✓ State
✓ Federal
Flood Management Functional Areas

- Public Safety
- Systemwide Investments
- Informed Stakeholders
- Regional Projects
- Water Management
- Floodplain Management
- Floodplain Risk Management
- Operations & Maintenance and Environmental Stewardship
- Flood Emergency Response
- Flood Management Planning and Conservation Strategy
- Legislation, Budget, and Communication
- Flood Risk Assessment
- Evaluation & Engineering
- Flood Risk Reduction Projects
- Flood Protection Projects & Project Grants

FloodSAFE California

Public Safety  Environmental Stewardship  Economic Stability
Flood Emergency Response

FLOOD RECOVERY / MITIGATION
- Flood System Improvements / Mitigations
- Flood System Evaluation
- After-Action Reporting
- Flood Recovery
- Flood Fights
- Floodwatch / Patrolling
- Flood Information Dissemination and Notifications
- River Forecasting
- Coordinate Reservoir Operations
- Watershed Run-Off Forecasting

FLOOD PREPAREDNESS / PLANNING
- Flood Emergency Response Planning:
  - DWR EOP Plan
  - Local Agency EPRP Plans
  - Delta EPRP Plan
- Flood Information Tools Development
- Training and Exercises
- Data Management and Exchange
- Real-Time Data Collection

FLOOD RESPONSE
- Inspection of Flood Projects
- LMA Assessment and Reporting
- Flood Project Integrity Assessment
On the Sacramento River at Tehama Bridge, flows exceeded flood stage on several occasions during that period.

Highest observed stage at gage locations during the Dec. 24, 2005 through Jan. 07, 2006 period.
Operations and Maintenance is performed on the Sacramento River Flood Control Project from the Sutter Maintenance Yard which is responsible for the portion of the project north of Knights Landing and the Sacramento Maintenance Yard which is responsible for the portion of the project south of Knights Landing.

Channel Maintenance – Sediment Removal

**Before**

**After**
FEMA’s floodplain mapping includes:
- Flood Insurance Rate Maps (FIRM)
- Digital Flood Insurance Rate Maps (DFIRM)

DWR’s floodplain mapping includes:
- Awareness Floodplain Maps
- Best Available Mapping (BAM)
- Levee Flood Protection Zones (LFPZ) Maps
- Central Valley Floodplain Evaluation and Delineation (CVFED) Maps
- Alluvial Fan Floodplain Evaluation and Delineation (AFFED) Maps
Flood Grant and Special Projects

- USACE / CVFPB Projects
- USACE / CVFPB Feasibility Studies
- Early Implementation Program
- Flood Control Subventions Program
- Local Levee Assistance Program (LLAP)
- Flood Corridor Program
- Yuba-Feather Flood Protection Program
High priority projects need to be implemented now, in advance of completion and adoption of the Central Valley Flood Protection Plan (the Plan) required by State legislation for completion and adoption in 2012.
Early Implementation Program

Construction progress during the Feather River Setback Levee

Setback Levee at Star Bend
Feather River
### New Risk Assessment Efforts

<table>
<thead>
<tr>
<th>Program: Major Deliverable</th>
<th>Estimated Date</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Central Valley Hydrology Study (CVHS)</strong></td>
<td></td>
</tr>
<tr>
<td>Reservoir Models</td>
<td>Spring 2011</td>
</tr>
<tr>
<td>Unregulated Inflow Hydrology</td>
<td>Summer 2011</td>
</tr>
<tr>
<td>Regulated – Unregulated Transforms</td>
<td>Fall 2011</td>
</tr>
<tr>
<td>Regulated Stage – Flow Frequencies</td>
<td>Winter 2012</td>
</tr>
<tr>
<td><strong>Central Valley Floodplain Evaluation &amp; Delineation (CVFED)</strong></td>
<td></td>
</tr>
<tr>
<td>Systemwide Hydraulic Models</td>
<td>Spring 2012</td>
</tr>
<tr>
<td>Impact Area Spreading / Inundation Models</td>
<td>Summer 2012</td>
</tr>
<tr>
<td>Composite Floodplains</td>
<td>Fall 2012</td>
</tr>
<tr>
<td>Reach Specific Water Surface Profiles</td>
<td>Winter 2013</td>
</tr>
<tr>
<td><strong>Central Valley Flood Protection Plan 2012 (CVFPP)</strong></td>
<td></td>
</tr>
<tr>
<td>Impact Area Expected Annual Damages</td>
<td>Summer 2011</td>
</tr>
<tr>
<td>Impact Area Expected Annual Life Loss</td>
<td>Fall 2011</td>
</tr>
<tr>
<td>Systemwide Expected Annual Damages</td>
<td>Fall 2011</td>
</tr>
<tr>
<td>Systemwide Expected Annual Life Loss</td>
<td>Fall 2011</td>
</tr>
</tbody>
</table>
Levee Evaluation and Flood Modeling

- Data Acquisition
- Levee Evaluation
- Modeling
Table 2. Levee Design Criteria Summary for Intermittently-Loaded Levees

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>DWSE (Option 1)</td>
<td>Median 200-year WSE</td>
</tr>
<tr>
<td>DWSE (Option 2)</td>
<td>90% assurance 200-year WSE</td>
</tr>
<tr>
<td>TOL (Option 1) for hydraulic criteria</td>
<td>Median 200-year WSE + higher of (1) 3 feet, or (2) height for wind setup and wave runup</td>
</tr>
<tr>
<td>TOL (Option 2) for hydraulic criteria</td>
<td>Lower of A or B, where:</td>
</tr>
<tr>
<td></td>
<td>• A is the higher of (1) 90% assurance 200-year WSE, (2) median 200-year WSE plus three feet, or (3) median 200-year WSE plus height for wind setup and wave runup</td>
</tr>
<tr>
<td></td>
<td>• B is the higher of (1) 95% assurance 200-year WSE, (2) median 200-year WSE plus two feet, or (3) median 200-year WSE plus height for wind setup and wave runup</td>
</tr>
<tr>
<td>HTOL (Option 1) for geotechnical criteria</td>
<td>Lower of (1) median 200-year WSE plus three feet, or (2) median 500-year WSE</td>
</tr>
<tr>
<td>HTOL (Option 2) for geotechnical criteria</td>
<td>Lower of (1) median 200-year WSE plus three feet, (2) physical top of levee if it is equal to or higher than the 95% assurance 200-year WSE and at least two feet above the median 200-year WSE, or (3) median 500-year WSE</td>
</tr>
<tr>
<td>Seepage - Exit Gradient at Levee Toe</td>
<td>For DWSE</td>
</tr>
<tr>
<td></td>
<td>For HTOL</td>
</tr>
<tr>
<td></td>
<td>$\gamma \geq 112\text{pcf}$  $\gamma \leq 112\text{pcf}$  $\gamma \geq 112\text{pcf}$  $\gamma \leq 112\text{pcf}$</td>
</tr>
<tr>
<td></td>
<td>$i \leq 0.5$  $FS \geq 1.6$  $i \leq 0.6$  $FS \geq 1.3$</td>
</tr>
<tr>
<td>Seepage - Exit Gradient at Seepage Berm Toe</td>
<td>$i \leq 0.8$  $FS \geq 1.0$  $&lt;20%$ FS degradation for berms less than 100 feet  $&lt;10%$ FS degradation for berms less than 100 feet</td>
</tr>
<tr>
<td>Steady State Slope Stability</td>
<td>$FS \geq 1.4$  $FS \geq 1.2$</td>
</tr>
<tr>
<td>Seismic Vulnerability</td>
<td>Restore grade and dimensions for at least 10-year WSE plus three feet of freeboard or higher for wind setup and wave runup within eight weeks</td>
</tr>
<tr>
<td>Levee Geometry</td>
<td>For new or extensive reconstruction on a major stream, minimum 20-foot-wide crown, 3h:1v waterside and landside slopes for all levees except bypass levees (4h:1v waterside slope)</td>
</tr>
</tbody>
</table>

Note: The median 200-year WSE, the 90% assurance 200-year WSE, and the 65% assurance 200-year WSE in this table are assumed to have been increased appropriately to account for the potential for new, updated hydrology to yield higher flows.
Flood Control System Status Report

Considers:
- Levees
- Channels
- Structures

Describes Flood Hazard as:
- Low
- Medium
- High

“...baseline information ... to identify the most critical levee safety issues, quantify the true costs of levee safety, prioritize future funding, and provide data for risk-based assessments in an efficient or cost-effective manner.” – ASCE America’s Infrastructure 2009 Report Card
Establishing Investment Needs & Priorities:
Overview of the Central Valley Flood Protection Plan
Reducing Flood Risk in the United States

ASCE’s 2009 America’s Infrastructure Report Card

WATER AND ENVIRONMENT
LEVÉES 2009 GRADE D-

RAISING THE GRADES
SOLUTIONS
THAT WILL WORK NOW

- ADOPT the following recommendations from the 2009 National Committee on Levee Safety:
  - ESTABLISH a National Levee Safety Commission;
  - COMPLETE the National Levee Inventory for both federal and nonfederal levees. The inventory must be regularly updated and maintained;
  - ADOPT a hazard potential classification system;
  - CREATE a strong education and outreach program to inform local leaders and residents about the level of protection they can expect from a nearby levee;

- PHASE in mandatory purchase of flood insurance with risk-based premiums for structures in areas protected by levees;

- INCREASE funding at all levels of government to address structural and nonstructural solutions that reduce risk to people and property. Additionally, investments should be targeted to address life-cycle costs and research;

- REQUIRE the development and exercising of emergency action plans for levee-protected areas;

- ENSURE that operation and maintenance plans cover all elements of the system, recognizing that levees are part of complex systems that also include pumps, interior drainage systems, closures, penetrations, and transitions;

- ASSESS levees using updated hydrology and hydraulic analyses that incorporate the impact of urbanization and climate change, particularly for coastal levees.

Facts About LEVÉES

PUBLIC SAFETY
ENVIRONMENTAL STEWARDSHIP
ECONOMIC STABILITY
Improving CA’s “Risk Reduction” Grade

Reducing Flood Risk in CA’s Central Valley

2007 Grade: “D-”

2027 Grade: “A”
Level of Detail in a Study

Conceptual-Level Studies present preliminary information about the nature of potential benefits, types of facilities required, and issues that should be addressed in more detailed studies, to promote discussion among participants. They do not analyze alternatives or reach any conclusions about feasibility or acceptability.

Reconnaissance- or Appraisal-Level Studies include a preliminary assessment of alternatives, and identification of legal and institutional constraints and sensitive environmental resources. Analyses provide the minimum information needed to determine if there are workable solutions or fatal flaws.

Feasibility-Level Studies include additional data collection and analyses needed to develop a full and reasonable range of alternatives, providing enough information for decision makers to understand potential risks, costs, benefits, and beneficiaries. They often integrate compliance under the California Environmental Quality Act, National Environmental Policy Act, and/or other related laws.

Site-Specific Studies quantify resources at a defined project location that can include geological and hydrological conditions and cultural, archaeological, or biological resources. Site-specific studies may be conducted during the feasibility study phase or as part of environmental documentation and permit acquisition.

Design-Level Studies include more detailed field investigations, such as subsurface explorations and topographic surveys, and consider updated design practices and cost trends to develop specific facility sizes, configurations, operations, and costs.

Plans and Specifications provide detailed instructions on how to build a project.

KEY
CVFPP = Central Valley Flood Protection Plan
# Types of Studies for Structural Applications

<table>
<thead>
<tr>
<th>Analysis Type</th>
<th>Systemwide / Watershed Investment</th>
<th>Project Feasibility¹</th>
<th>Project Design²</th>
<th>Project Implementation / Permitting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic Accounting Focus</td>
<td>National Economic Development (NED)</td>
<td></td>
<td></td>
<td>Regional Economic Development (RED)</td>
</tr>
</tbody>
</table>

## Level of Effort of Technical Analysis

<table>
<thead>
<tr>
<th>Capital Investment</th>
<th>$Bs</th>
<th>$100s M</th>
<th>$10s - $1s M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time to Complete Analysis</td>
<td>3-5 years</td>
<td>1 – 2 years</td>
<td>6 – 18 months</td>
</tr>
</tbody>
</table>

## Levee Performance Assumptions

### Upstream Levees
- “Most Likely” Performance
- Top of Levee + Existing Freeboard
- Weir Overflow

### Improvement Project / At Site Levees
- Probabilistic / Monte Carlo Performance
- Proposed Top of Levee + Freeboard

### Downstream Levees
- “Most Likely” Performance
- Top of Levee + Existing Freeboard
- Weir Overflow

1. Capital Investment
2. Time to Complete Analysis
   - 3-5 years
   - 1-2 years
   - 6-18 months
   - 90-120 days

- Economic Accounting Focus:
  - National Economic Development (NED)
  - Regional Economic Development (RED)

- Total Soft Costs:
  - 1 - 2%
  - 10 – 15%
  - 30 – 40%

- Levee Performance Assumptions:
  - Upstream Levees: “Most Likely” Performance
  - Improvement Project / At Site Levees: Probabilistic / Monte Carlo Performance
  - Downstream Levees: “Most Likely” Performance

- Time to Complete Analysis:
  - 3-5 years
  - 1-2 years
  - 6-18 months
  - 90-120 days

- Levee Performance Assumptions:
  - Upstream Levees: “Most Likely” Performance
  - Improvement Project / At Site Levees: Probabilistic / Monte Carlo Performance
  - Downstream Levees: “Most Likely” Performance

- Total Soft Costs:
  - 1 - 2%
  - 10 – 15%
  - 30 – 40%
# Types of Studies for Non-Structural Applications

<table>
<thead>
<tr>
<th>Analysis Type</th>
<th>Water Surface Profile</th>
<th>Composite Floodplain Mapping</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Study Focus</strong></td>
<td>Identify Water Surface Elevations</td>
<td>1. Develop Depth Inundation Maps</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Estimate Flood Inundation Time</td>
</tr>
</tbody>
</table>

## Level of Effort of Technical Analysis

| Time to Complete Analysis<sup>1</sup> | 90 – 120 days | 1 – 2 years |

## Levee Performance Assumptions

<table>
<thead>
<tr>
<th>Upstream Leveses</th>
<th>“Most Likely” Performance</th>
<th>Top of Levee + Freeboard</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Weir Overflow</td>
</tr>
<tr>
<td>Improvement Project / At Site Leveses</td>
<td>Top of Levee + Freeboard</td>
<td>Hydraulic Failure of Levee to Landside Toe (aka Removal)</td>
</tr>
<tr>
<td></td>
<td>Weir Overflow</td>
<td></td>
</tr>
<tr>
<td>Downstream Leveses</td>
<td>“Most Likely” Performance</td>
<td></td>
</tr>
</tbody>
</table>

1. Time to Complete Analysis assuming existing system hydraulic and floodplain models are available.
Chapter 1:
Establishing the Need for a Central Valley Flood Protection Plan
Risk = Hazard + Exposure + Performance + Consequences
Flood Hazard Types in California

The duration and spatial extent of flooding in different hazard types is a function of both the local geography and hydrology.

- **Alluvial Fans**: Flooding can occur when fast-moving mountain streams spread as they reach flatter plains.
- **Banked Rivers / Headwater Regions**: Mountainous and hilly terrain has natural defined banks that quickly pass flood waters.
- **Coastal / Tidal Estuary**: Subject to daily tidal action and often comprising a complex network of braided channels, these areas form flood-prone islands.
- **Deep Floodplain**: These flatlands are prone to seasonal flooding. Many of these areas are protected by levees.
## Deep Floodplain Hazard Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Alluvial Fans</th>
<th>Banked Rivers / Headwaters</th>
<th>Coastal / Tidal Estuaries</th>
<th>Deep Floodplains</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time to Peak</td>
<td>Hours</td>
<td>Hours</td>
<td>Days</td>
<td>Days</td>
</tr>
<tr>
<td>Duration of Flood</td>
<td>Hours</td>
<td>Weeks</td>
<td>Seasonal</td>
<td>Weeks</td>
</tr>
<tr>
<td>Area Flooded</td>
<td>Small</td>
<td>Small</td>
<td>Medium</td>
<td>Large</td>
</tr>
<tr>
<td>Drainage Area</td>
<td>Small</td>
<td>Medium</td>
<td>Variable</td>
<td>Large</td>
</tr>
<tr>
<td>Characteristic Storm</td>
<td>Thunderstorm</td>
<td>Winter</td>
<td>Winter &amp; Spring Tide</td>
<td>Winter &amp; Snow Melt</td>
</tr>
<tr>
<td>High Sediment Load</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Man-Made Levees</td>
<td>Rare</td>
<td>Rare</td>
<td>Variable</td>
<td>Common</td>
</tr>
</tbody>
</table>
Chapter 2:
Evaluating Preliminary Approaches Leading to State Systemwide Investment Approach
Approaches Overview

Achieve SPFC Design Flow Capacity
Address flow capacity and other conditions for existing SPFC facilities. No major changes to footprint or operation of SPFC facilities.

Protect High Risk Communities
Focus on protecting life safety for populations at highest risk, including urban areas and small communities.

Enhance Flood System Capacity
Seek opportunities to achieve multiple benefits through enhancing flood system storage and conveyance capacity.

Policies and Guidance

State Systemwide Investment Approach
Chapter 3:
Evaluating the State Systemwide Investment Approach
(i.e., Measuring the Plan Benefits)
CVFPP Relative Cost and Performance

Relative Cost and Performance of the Three Preliminary Approaches with SSIA
Element Type of CVFPP Investments

4 Types of Elements Covered in CVFPP:

- System Improvements
- Urban Improvements
- Rural Improvements
- Residual Risk Management Actions
Chapter 4:
Central Valley Flood Protection Plan Implementation
(i.e., Paying for the Plan)
Moving from Plans to Implementation

- Flood System Deficiencies
- Capital Improvements
- Managing State-federal Flood System
- Financing Strategy
- Local/State Interest and Funding
- Federal Interest and Funding
- Implementation Issues
- History/ Accomplishments
- Five-year Bond Expenditure Plan
- CVFPP Capital Improvements
- Delta Capital Improvements
- Statewide Flood Management Plan Capital Improvements
- 2017 CVFPP
- Two Systemwide Feasibility Studies
- CVFPP Systemwide Improvements
- Urban Improvements
- Rural and Small Community Improvements
- Residual Risk Management

TIME

PUBLIC SAFETY  ENVIRONMENTAL STEWARDSHIP  ECONOMIC STABILITY
## Timing of CVFPP Implementation

<table>
<thead>
<tr>
<th>Near-Term Investment (Prop 1E &amp; 84)</th>
<th>Future Investment (New State Funding Sources)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Foundational Improvements</strong></td>
<td></td>
</tr>
<tr>
<td>• Levee improvement</td>
<td></td>
</tr>
<tr>
<td>• Repairing erosion sites</td>
<td></td>
</tr>
<tr>
<td>• All weather road on levee crown</td>
<td></td>
</tr>
<tr>
<td><strong>Increasing System Flexibility</strong></td>
<td></td>
</tr>
<tr>
<td>• Levee setbacks</td>
<td></td>
</tr>
<tr>
<td>• Forecast-Based Coordinated Operations</td>
<td></td>
</tr>
<tr>
<td>• Land acquisition for bypasses</td>
<td></td>
</tr>
<tr>
<td><strong>Peak Flow Reduction</strong></td>
<td></td>
</tr>
<tr>
<td>• System improvement projects</td>
<td></td>
</tr>
<tr>
<td>(i.e., expansion and extension of bypasses)</td>
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<tr>
<td>• Conservation strategy implementation</td>
<td></td>
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<tr>
<td><strong>Emergency Response</strong></td>
<td></td>
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<tr>
<td>• Operations &amp; Maintenance</td>
<td></td>
</tr>
<tr>
<td>• Floodplain Management</td>
<td></td>
</tr>
</tbody>
</table>

- 0 - 5 years
- 5 - 10 years
- 10 - 15 years
- 15 - 20 years
- On Going
Investment Regions within CVFPP
Process for Identifying Specific Projects

Define and map Flood Protection Zones in the Central Valley

Assess deficiencies in FPZs → Identify solutions

Prepare Regional Financial Plan

Prepare Regional Flood Management Plan using FPZ information in the region

State-led Basinwide Feasibility Studies

USACE Central Valley Integrated Flood Management Study

Implementation of Flood Risk Reduction Projects

KEY

FPZ – Flood Protection Zone
USACE – U.S. Army Corps of Engineers
CVFPP Investment Totals by Region

- Regional Investments based on costs associated with projects included in State Systemwide Investment Approach (SSIA)
- Specific regional costs will change based on Regional Flood Management Plans
- Actual costs will likely be higher due to future price increases & incremental nature of implementation
Estimated Local, State, & Federal Contributions

SSIA Investments by Agency Level (in $million)

<table>
<thead>
<tr>
<th>Partner</th>
<th>Low</th>
<th>to</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local</td>
<td>790</td>
<td>to</td>
<td>945</td>
</tr>
<tr>
<td>State</td>
<td>6,065</td>
<td>to</td>
<td>7,475</td>
</tr>
<tr>
<td>Federal</td>
<td>6,350</td>
<td>to</td>
<td>7,700</td>
</tr>
<tr>
<td>TOTALS</td>
<td>13,205</td>
<td>to</td>
<td>16,120</td>
</tr>
</tbody>
</table>
Meeting Changing Needs

CVFPP updated every 5 years:

- Technical Information Updated Based on Project & Program Activities
- Investment Recommendations Used to Support Long-Term Financing

Next CVFPP in 2017
Questions

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