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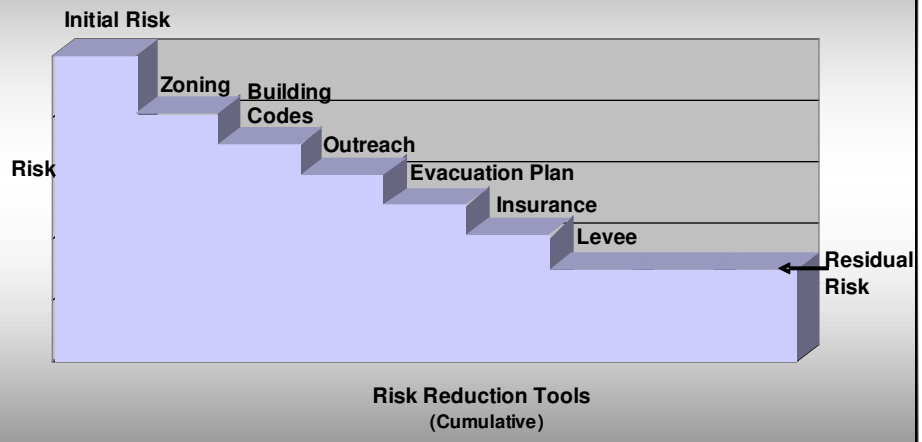
Taking Steps to Manage Flood Risk

By Rod Mayer

National Committee on Levee Safety

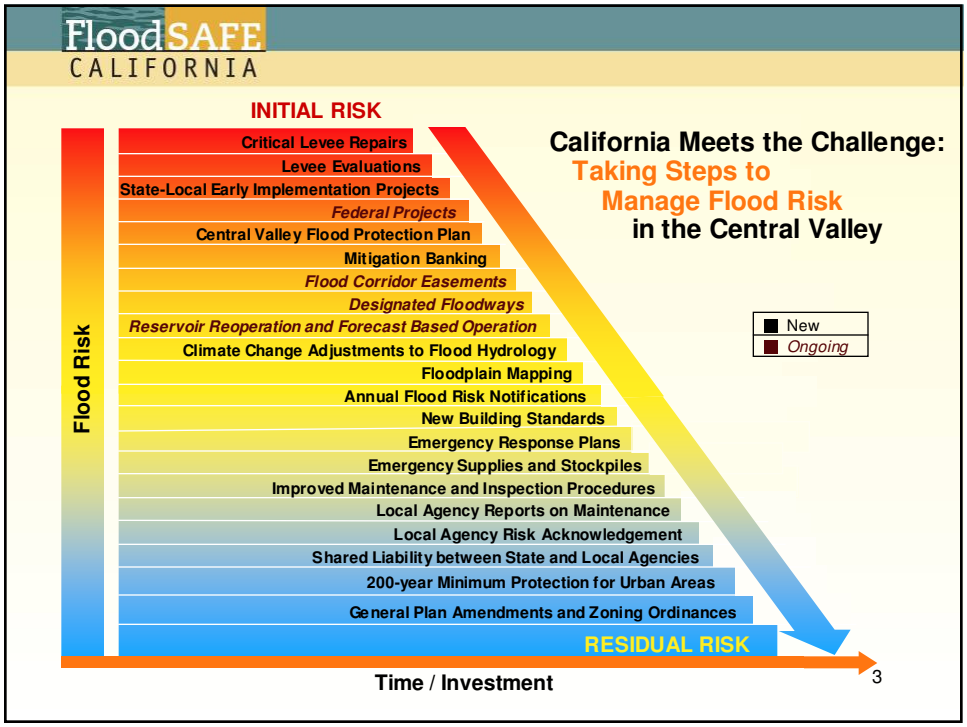
October 2008

FLOOD RISK MANAGEMENT: BUYING DOWN RISK



<u>All</u> stakeholders contribute to reducing risk!

One Team: Relevant, Ready, Responsive and Reliable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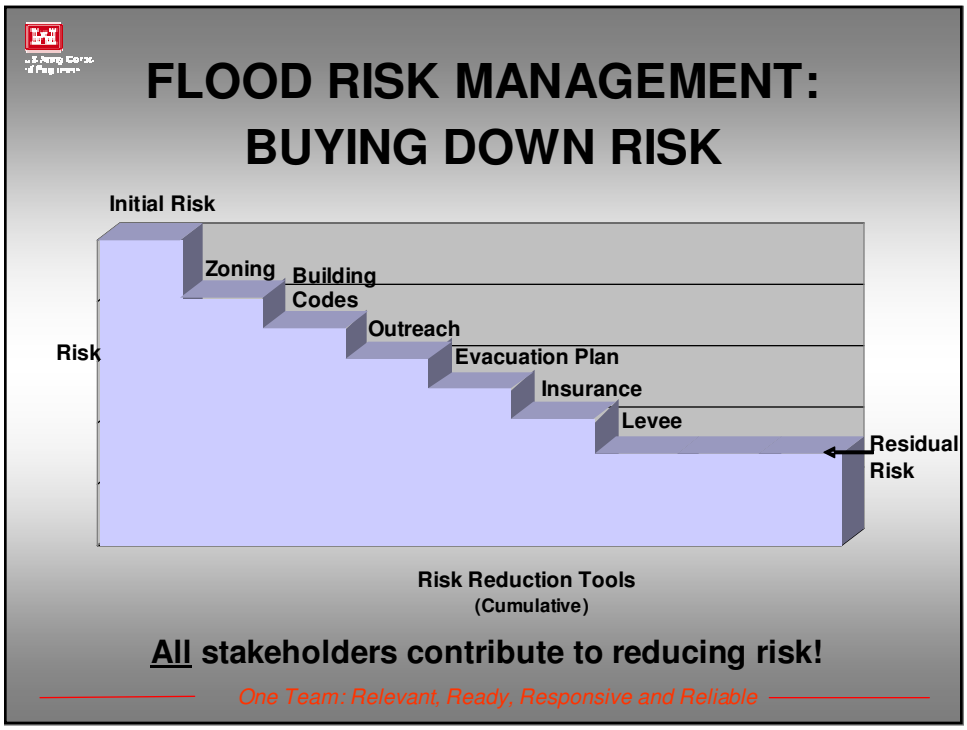
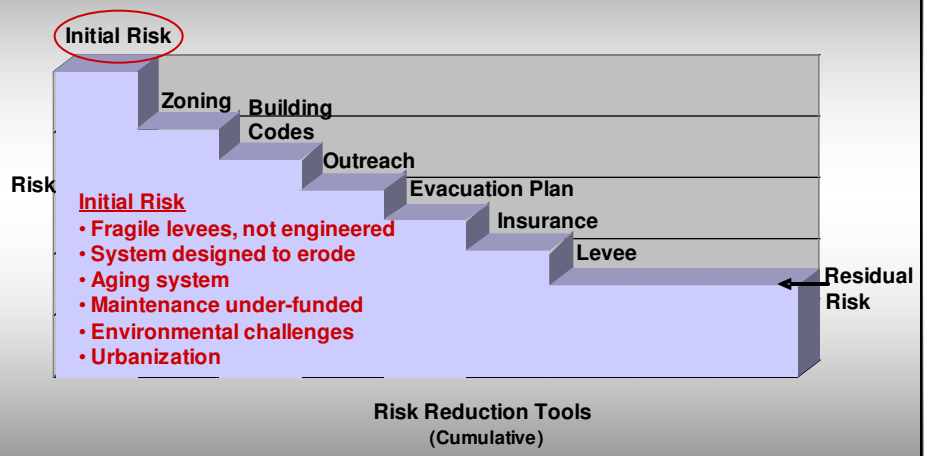
CALIFORNIA
INITIAL RISK
California Meets the Challenge:
Taking Steps to
Manage Flood Risk
in the Central Valley
Critical Levee Repairs
Levee Evaluations
State-Local Early Implementation Projects
Federal Projects
Central Valley Flood Protection Plan
Mitigation Banking
Flood Corridor Easements
Designated Floodways
Reservoir Reoperation and Forecast Based Operation
Climate Change Adjustments to Flood Hydrology
Floodplain Mapping
Annual Flood Risk Notifications
New Building Standards
Emergency Response Plans
Emergency Supplies and Stockpiles
Improved Maintenance and Inspection Procedures
Local Agency Reports on Maintenance
Local Agency Risk Acknowledgement
Shared Liability between State and Local Agencies
200-year Minimum Protection for Urban Areas
General Plan Amendments and Zoning Ordinances
RESIDUAL RISK
New
Ongoing
Flood Risk
Time / Investment
3


FLOOD RISK MANAGEMENT:
BUYING DOWN RISK
Initial Risk
Zoning
Building Codes
Outreach
Evacuation Plan
Insurance
Levee
Risk
Residual Risk
Risk Reduction Tools
(Cumulative)
All stakeholders contribute to reducing risk!
One Team: Relevant, Ready, Responsive and Reliable

FLOOD RISK MANAGEMENT: BUYING DOWN RISK



All stakeholders contribute to reducing risk!

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Central Valley Flood Control System

- Levees built from 1860 to 1960 by locals and later incorporated into the federal system
- 1,600 miles of federal levees
- The federal system protects:
  - 1 1/2 million acres
  - 200,000+ parcels
  - 600,000+ people
  - $50+ billion in property
- 730 miles of non-federal levees in the Delta
- Federal levees designed for flows established by Corps of Engineers
- Levee reliability is not known well

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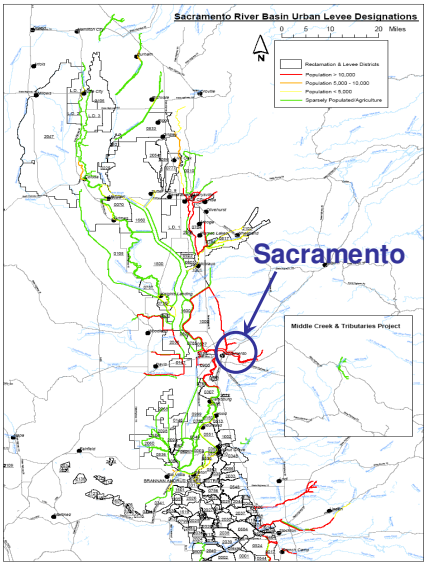
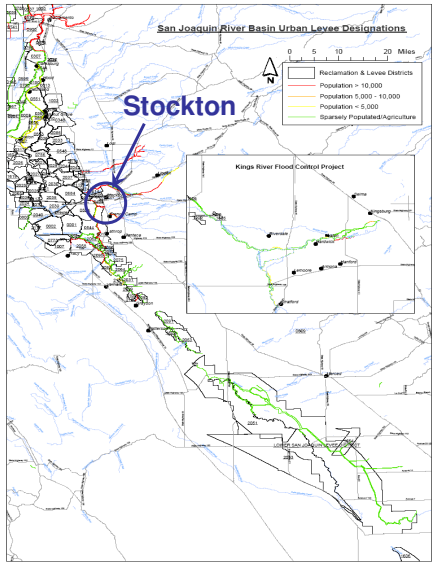
Sacramento Valley



San Joaquin Valley



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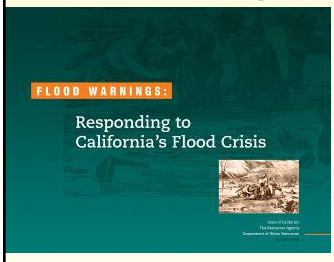
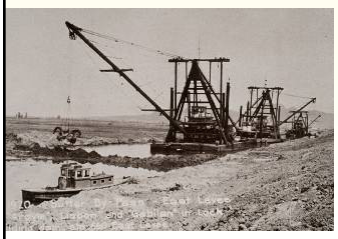
The System's Key Challenges





- Aging Infrastructure
- Increasing development in floodplains
- Court decisions have increased the State's liability
- State, local, and federal funding for flood management has declined

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State Liability and Land Use

- State provided assurances to the federal government
- Paterno Decision identified the State as having liability as if the State had built the levee
- Land use approved by local agencies
- No restrictions on floodplain development except through NFIP
- FEMA maps inaccurate and out of date

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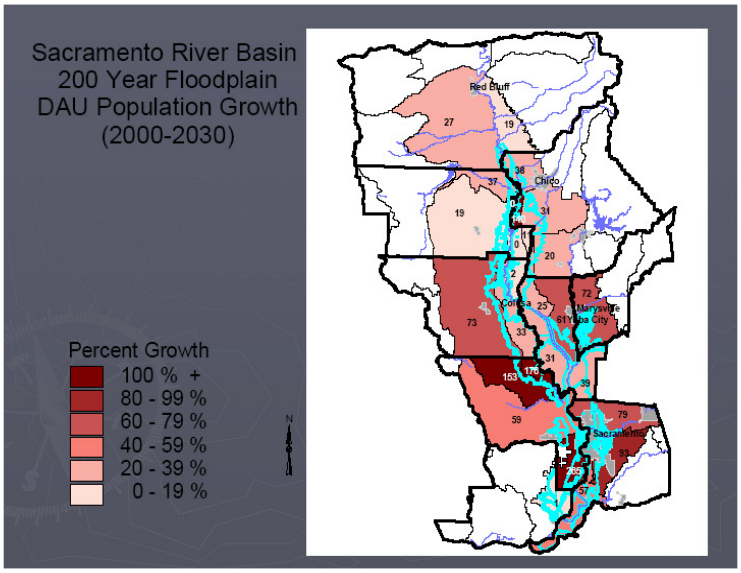

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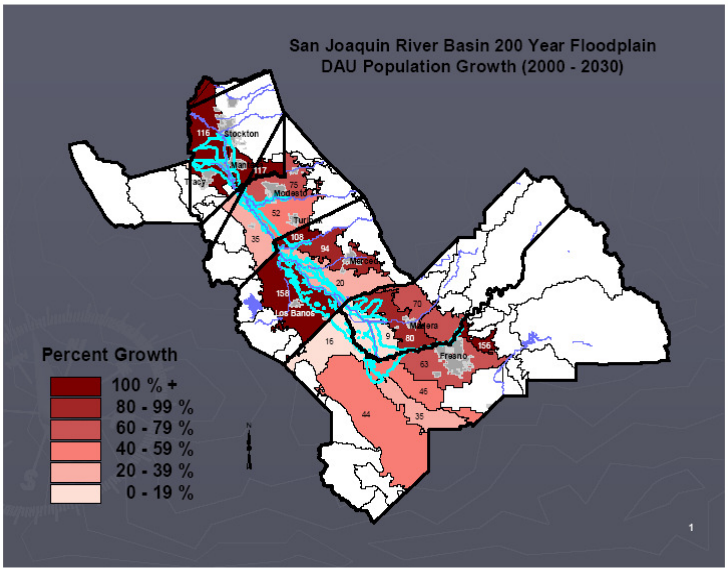

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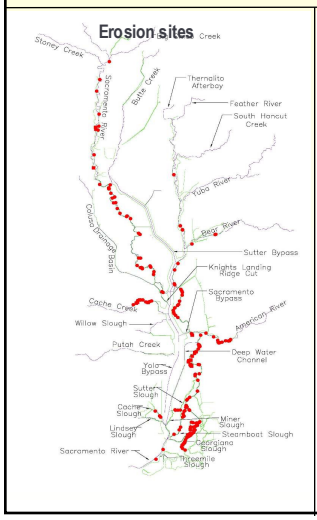
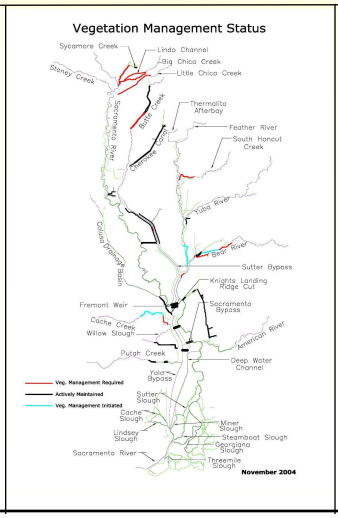
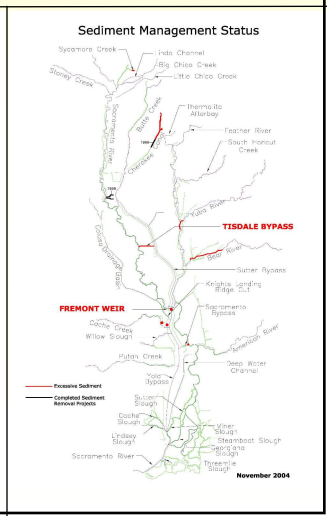
Erosion, Vegetation, and Sedimentation







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2005 KATRINA IMAGES

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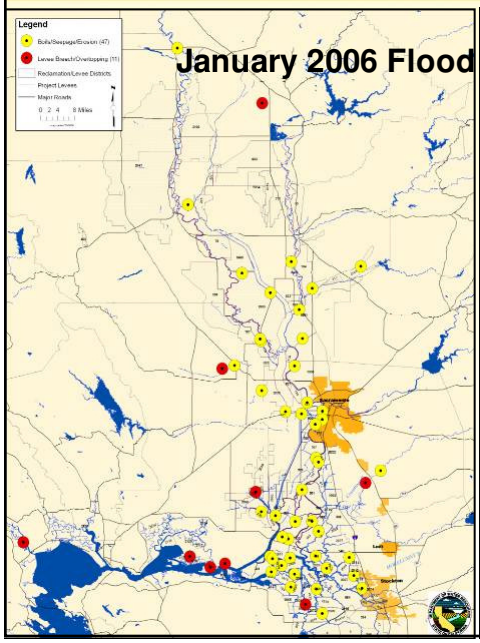

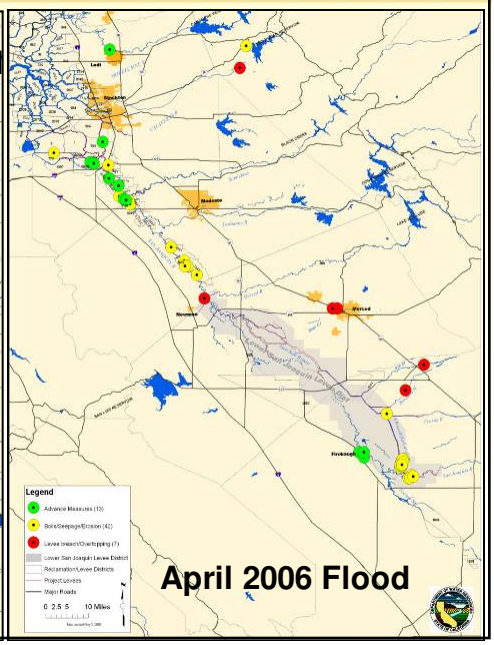

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Propositions 1E and 84 Distribution ($4.89 B)

$3.275 billion (67%)

Central Valley
Repair and improvements to levees and flood projects in the State and Federal Project system and the Delta

$680 million (14%)

Outside Central Valley
Subventions (federal flood control projects outside of the Central Valley, primarily Bay Area and Southern California)

$935 million (19%)

Statewide
Floodplain mapping, flood corridors, stormwater grants and other flood improvements statewide.

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A multi-faceted program to improve public safety through integrated flood management.

- Statewide program
- Four major emphases
- Primarily funded by Propositions 1E and 84
- Big focus on State-Federal system in Central Valley and Delta
- ~10 year effort

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2007 Flood Reform Legislation

- SB 5 / AB 5
  - Floodplain Development
  - Central Valley Flood Protection Plan
- SB 17 – Reclamation Board Reform
- AB 70 – Shared Liability
- AB 162
  - General Plan amendments
  - Flood hazard zones / land use
- AB 156
  - Mapping, Notification
  - Mitigation Banking, Ecosystem Restoration
  - Maintenance Area Formation

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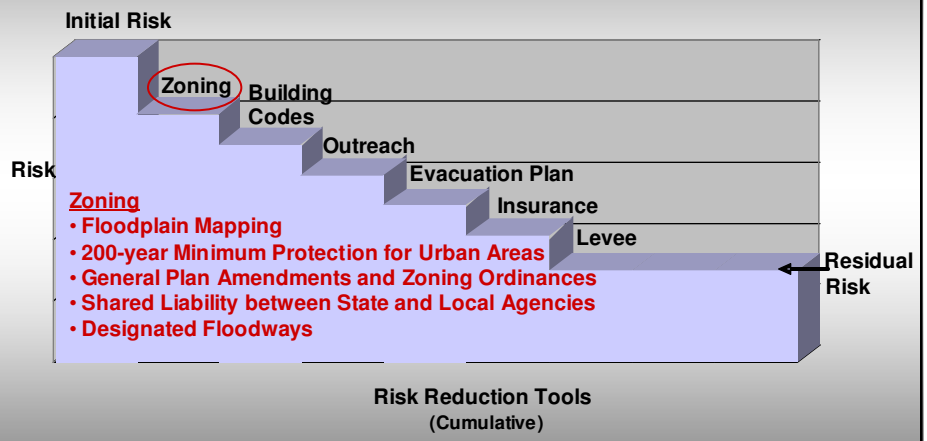
FLOOD RISK MANAGEMENT: BUYING DOWN RISK



All stakeholders contribute to reducing risk!

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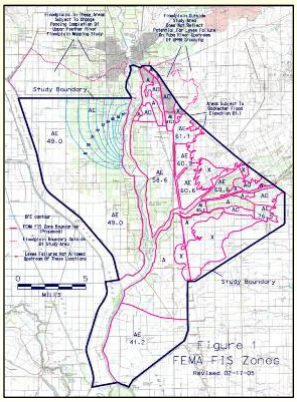
Zoning

Floodplain Mapping

- Maps of Central Valley 100-year and 200-year floodplains
- Mapping studies for FEMA's NFIP
- Maps of Levee Flood Protection Zones
- Awareness flood maps



200-year Minimum Protection for Urban Areas

- Highest standard in the nation
- DWR developing specific criteria
- Applies to urban areas in the Central Valley
- No new development after 2015 without "adequate progress"
- No new development after 2025 in 200-year floodplain

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Zoning

General Plan Amendments and Zoning Ordinances

- Local agencies to amend General Plan consistent with flood hazards
- Guidance on flood hazards under the Safety Element of General Plan
- State review of Safety Element of General Plan Amendments
- Local agencies must address State's comments on Safety Element
- Local agencies must adopt an amended Zoning Ordinance

Shared Liability between State and Local Agencies

- Local agencies that unreasonably approve new development
- Special concerns prior to completing General Plan Amendments

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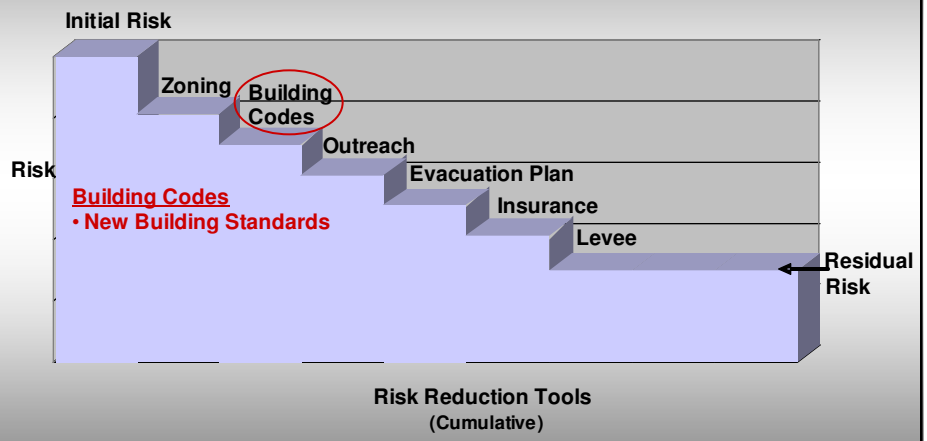
Zoning

Designated Floodways

- Keep people away from flood waters
- Prevent changes that aggravate flooding
- 1,200 miles of designated floodways
- Controlled through permits

FLOOD RISK MANAGEMENT: BUYING DOWN RISK



All stakeholders contribute to reducing risk!

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Building Codes

New Building Standards

- **By January 1, 2009 submit to California Building Standards Commission**
- **Standards for construction in areas**
  - **where 200-year flood would exceed 3 feet deep, and**
  - **protected by facilities of the Central Valley Flood Protection Plan**
- **Reduce flood damage**
- **Protect life, safety, and construction**

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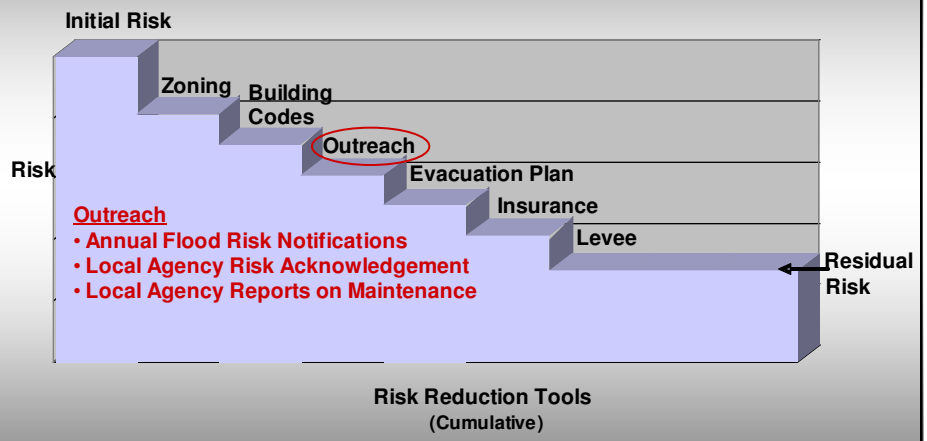
FLOOD RISK MANAGEMENT: BUYING DOWN RISK



All stakeholders contribute to reducing risk!

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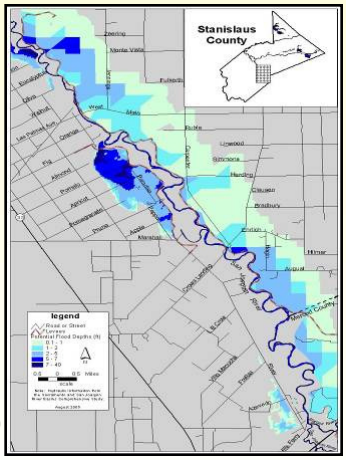
Outreach

Annual Flood Risk Notifications

- Written notifications by September 1, 2010
- All landowners behind State-federal levees
- Depth of flooding
- Potential cost of damage
- Flood insurance purchase recommended



Local Agency Risk Acknowledgement

- Cities and counties benefiting from EIP funds
- Adopt by formal resolution
- Level of protection (use best available data)
- DWR approval to modify or rescind

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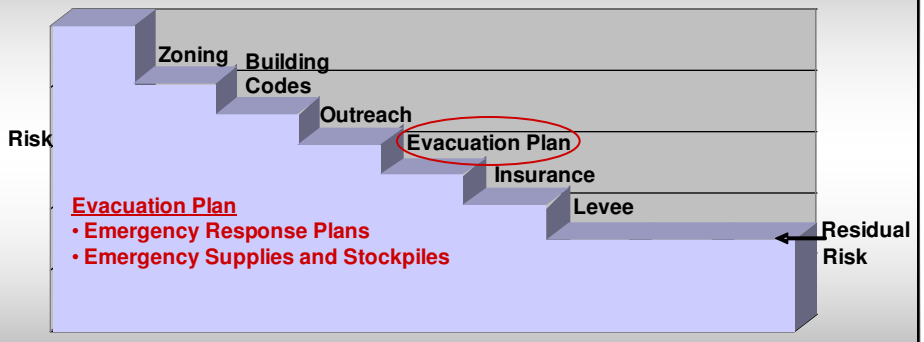
Outreach

Local Agency Reports on Maintenance

- Local maintaining agencies to report annually
- Information on the levees maintained
- Summary of maintenance performed
- Fiscal year budget and planned work
- Annual maintenance ratings
- Reports compiled by DWR and disseminated

FLOOD RISK MANAGEMENT: BUYING DOWN RISK



All stakeholders contribute to reducing risk!

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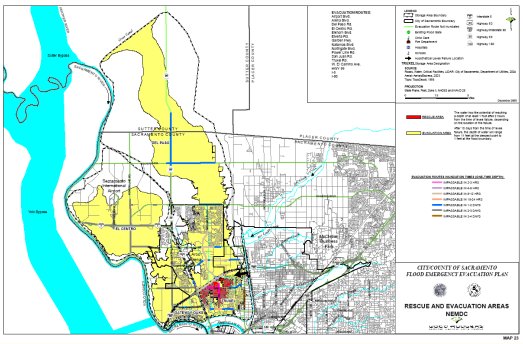
Evacuation Plan



Emergency Response Plans

- Evacuation
- Rescue
- Flood Fight
- Relief Cuts
- Recovery
- DWR taking the lead to develop plans working with local agencies
- Models for alluvial fans, unleveed areas, leveed areas
- Required by law for semi-urban and urban communities receiving state funds

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Evacuation Plan

Emergency Supplies and Stockpiles

- Flood fight materials stockpiles in warehouses and containers
- Rock stockpiles for Delta
- Loading and transfer facilities for Delta
- Developing Delta emergency plan and stockpiles

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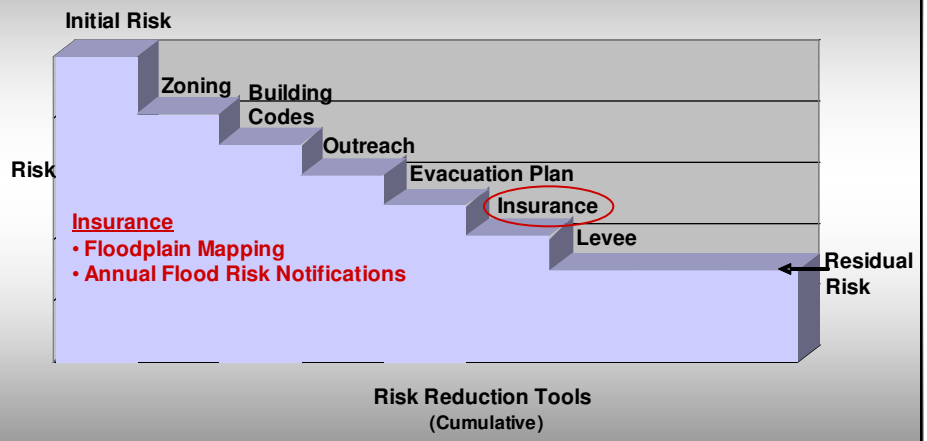
FLOOD RISK MANAGEMENT: BUYING DOWN RISK



All stakeholders contribute to reducing risk!

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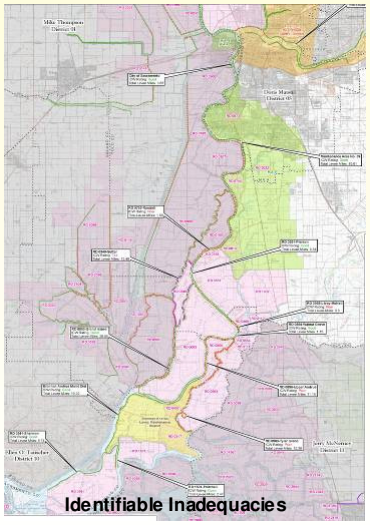
Insurance



Floodplain Mapping

- Paid Corps for Identifiable Inadequacies
- Fully supporting FEMA
- Performing floodplain mapping studies to FEMA standards

Annual Flood Risk Notifications

- Annual written landowner notifications
- Risk and damage information
- Promoting voluntary purchase of insurance

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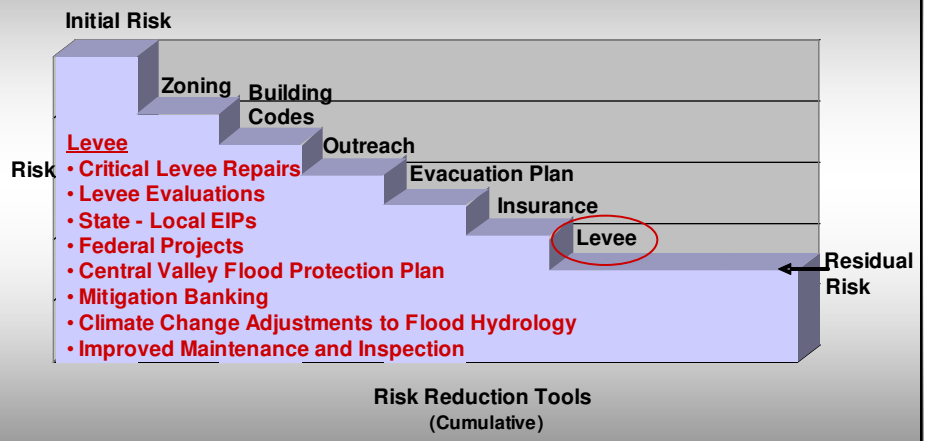
FLOOD RISK MANAGEMENT: BUYING DOWN RISK



All stakeholders contribute to reducing risk!

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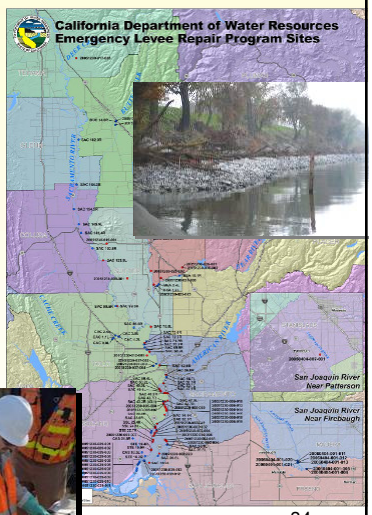
Levee

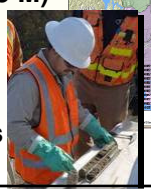
Critical Levee Repairs

- 60 critical erosion sites repaired
- 63 critical PL 84-99 sites rehabilitated
- 111 non-critical PL 84-99 sites rehabilitated
- $295 million State funds spent
- Continuing work
  - 12 critical sites
  - 243 non-critical sites



Levee Evaluations

- 350 miles urban federal levees ($85 M)
- Up to 150 miles urban local levees ($45 M)
- 10 - 15 holes per mile
- Helicopter Electromagnetic Surveys
- Topographic/Bathymetric Surveys
- Geomorphologic/Performance Studies
- 1,250 miles non-urban federal levees



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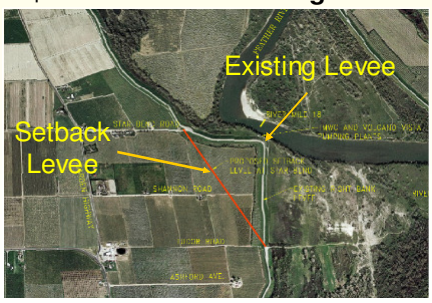
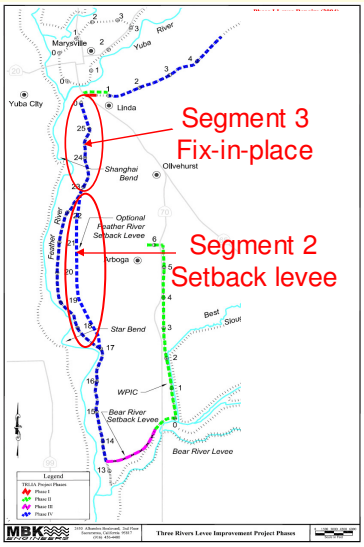
Levee

State – Local Early Implementation Projects

- No regrets
- 2 setback levee projects
- 2 slurry wall projects
- $212 million State contribution in FY 07-08
- $99 million local contribution in FY 07-08
- $400 million State budget for FY 08-09





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Levee

Federal Projects

- Many State – Local – Federal Studies and Projects
- Active construction on:
  - Folsom Dam Joint Federal Project
  - American River Common Features Project
  - South Sacramento County Streams Project
  - Sacramento River Bank Protection Project
- Federal construction to follow State-Local EIPs

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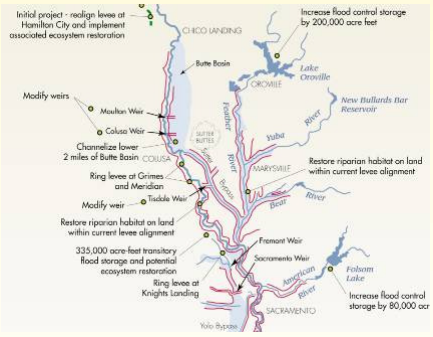
Levee

Central Valley Flood Protection Plan

- By 2012 with 5-year updates
- Beyond State-Federal System
- Build upon Comprehensive Study
- Programmatic systemwide plan
- Clarify State-Federal System
- Recommend repairs/improvements
- Add and remove facilities



Mitigation Banking

- Authorized by new law
- Advances levee work
- More efficient spending for mitigation
- Streamline environmental compliance
- Cooperate with partners/conservation plans

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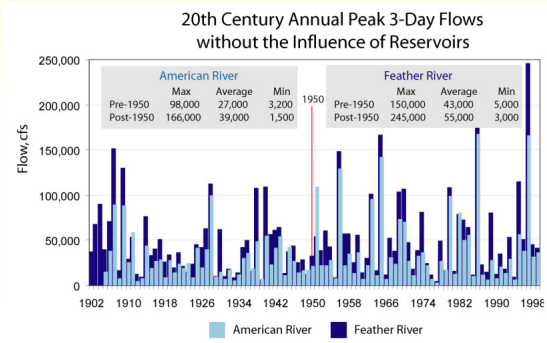
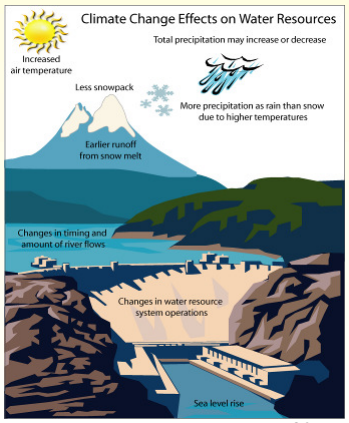
Levee

Climate Change Adjustments to Flood Hydrology

- Corps updating Central Valley flood hydrology
- Incorporating climate change
- Collaborating with Corps in development





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Levee

Improved Maintenance and Inspection

- Interagency Collaborative Program
- Channel clearing projects
- Sediment removal projects
- Channel management plans
- Only nonfederal sponsor with delegated inspection responsibilities
- Added engineers to inspection team
- Improving inspection procedures
  - hydraulic studies
  - levee and channel surveys
  - Corps rating system

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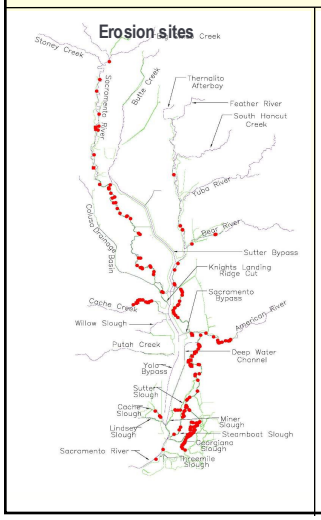
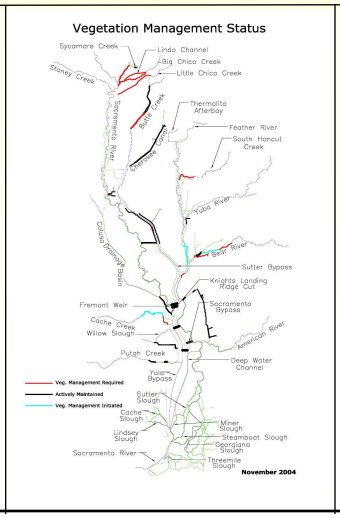
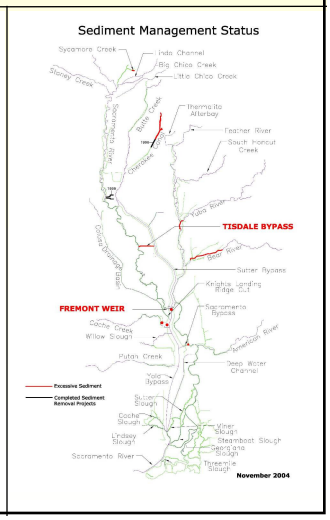
Levee

Erosion, Vegetation, and Sedimentation







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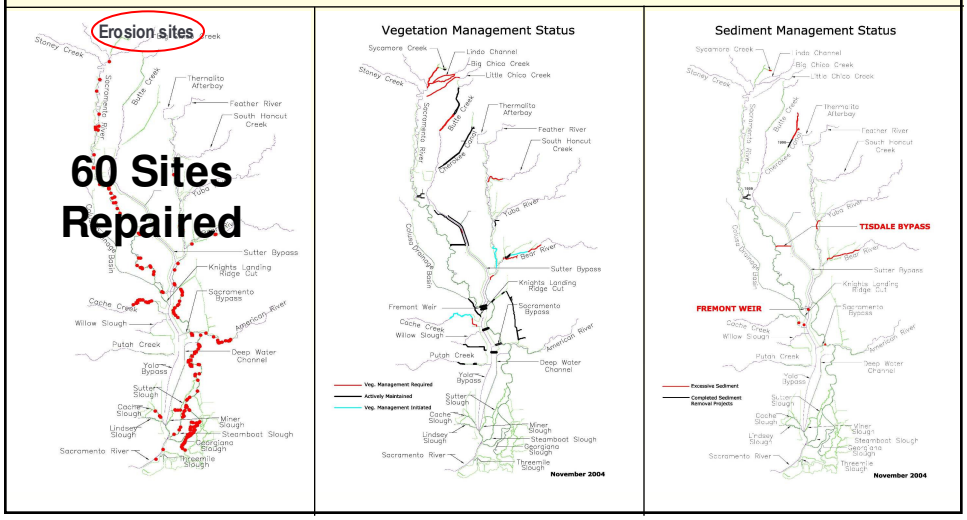
Levee

Erosion, Vegetation, and Sedimentation



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Levee

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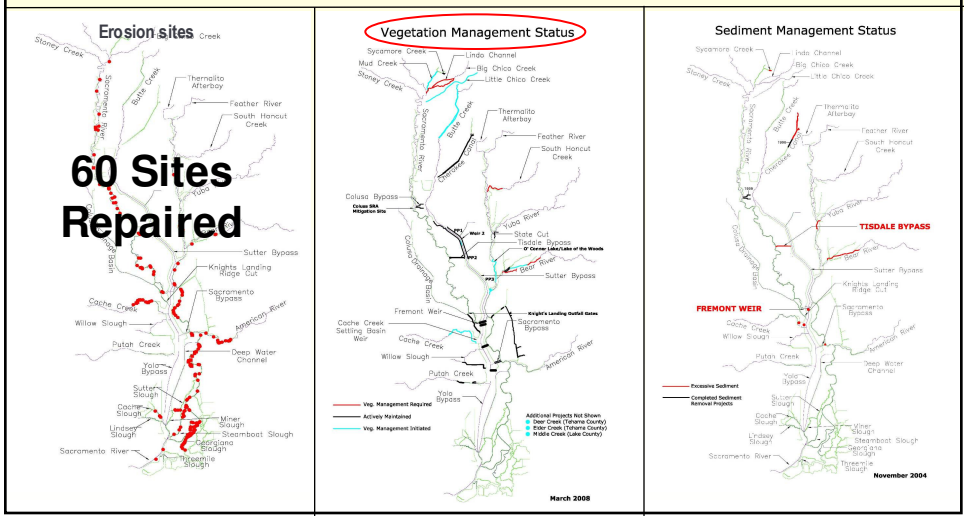

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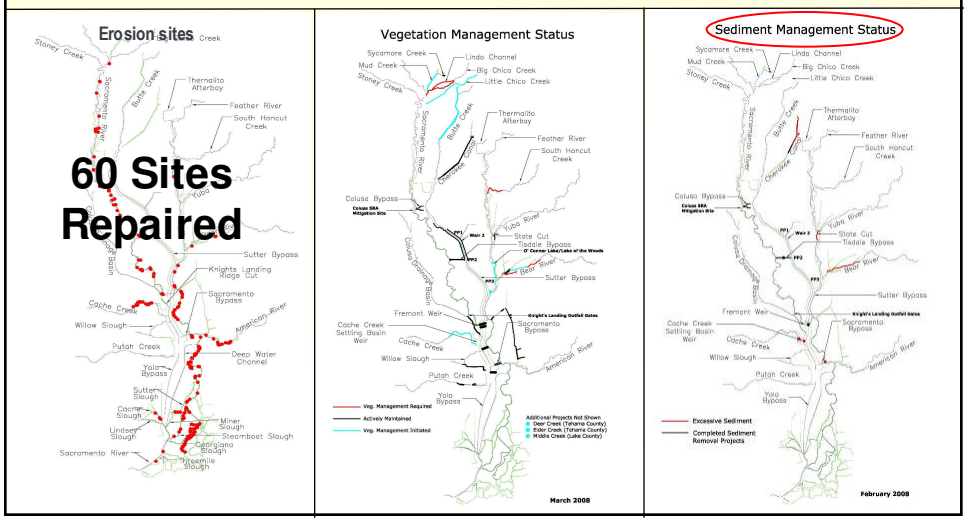

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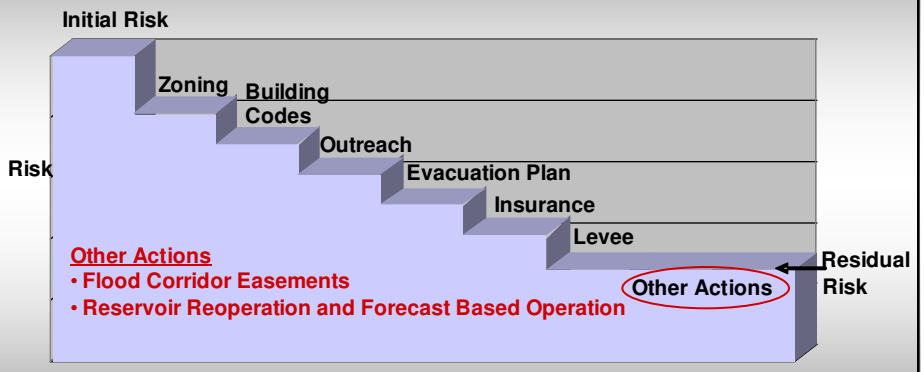

All stakeholders contribute to reducing risk!

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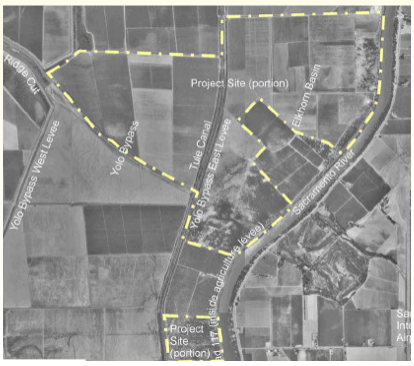
Other Actions

Flood Corridor Easements

- Acquire flood easements
- Acquire conservation easements
- Reduce flood risk
- Preserve agriculture and/or habitat
- Restore habitat and/or mitigate
- Expand floodways
- Relocate and floodproof structures
- Applies in rural and urban areas



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Other Actions

Reservoir Reoperation and Forecast Based Operation

- Improve operation under existing diagrams
- Modify reservoir operation rules
- Forecast-based operations
- Coordinated operations of reservoirs
- Integration of flood control and water supply components of the reservoirs
- Long-term effort

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