

Sutter Basin

Sutter and Butte Counties, California Sutter Basin Pilot Feasibility Study

Civil Works Review Board

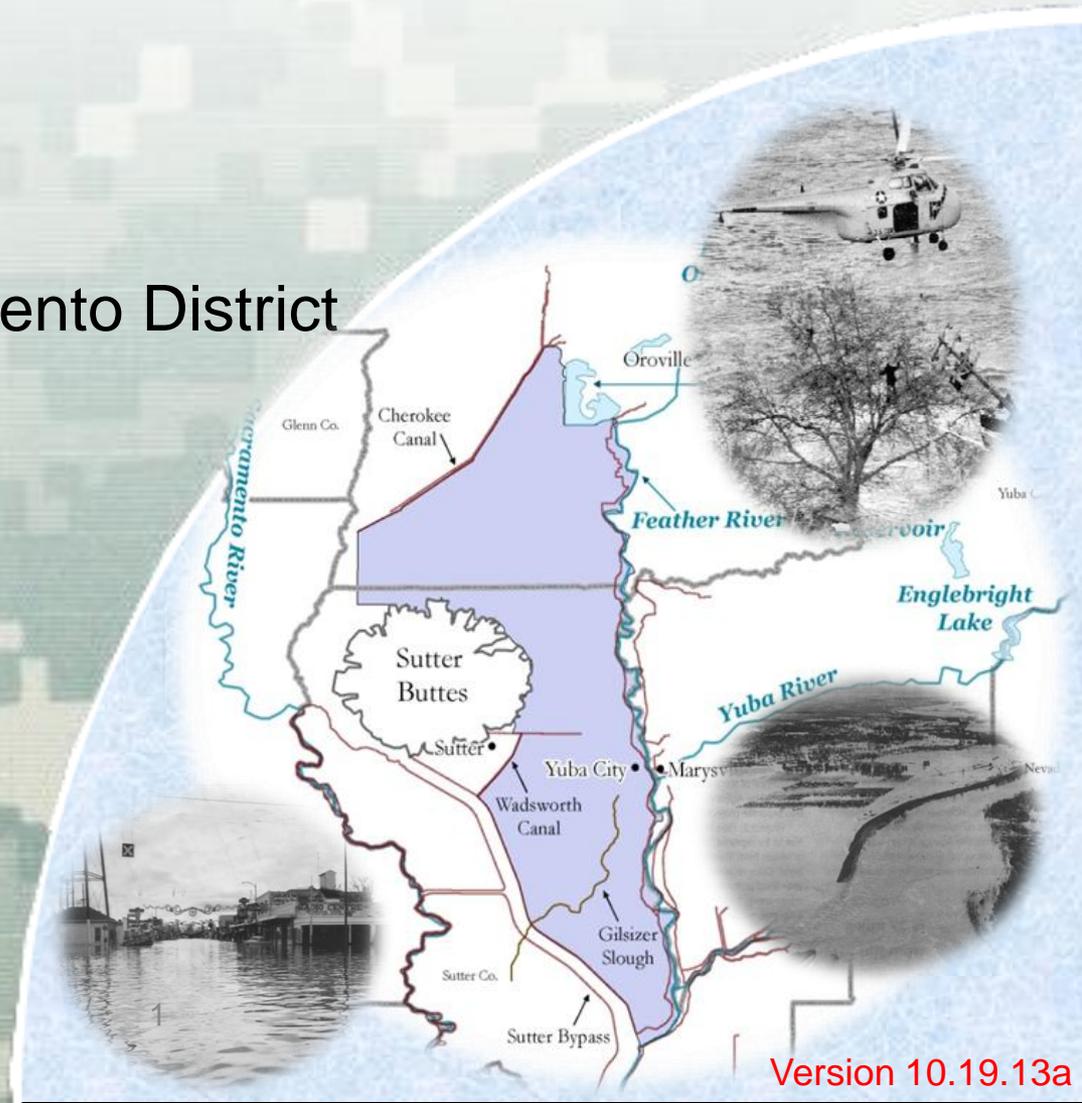
COL Michael J. Farrell
District Commander, Sacramento District

22 October 2013

In Partnership with:



US Army Corps of Engineers
BUILDING STRONG



Version 10.19.13a

Feasibility Study Legislative Authority

- Study authorized under Flood Control Act of 1962 (P.L. 87-874), Sec. 209 which states:

“The Secretary.....authorized and directed to cause surveys for flood control and allied purposes.....under.....Chief of Engineers,.....include the following named localities: Sacramento River Basin.....for the purpose of developing, where feasible, multi-purpose water resource projects.....”



Study Purpose

Determine a Recommended Plan to reduce the flood risk in the Sutter Basin



Non-Federal Sponsors

Feasibility, Design and Construction

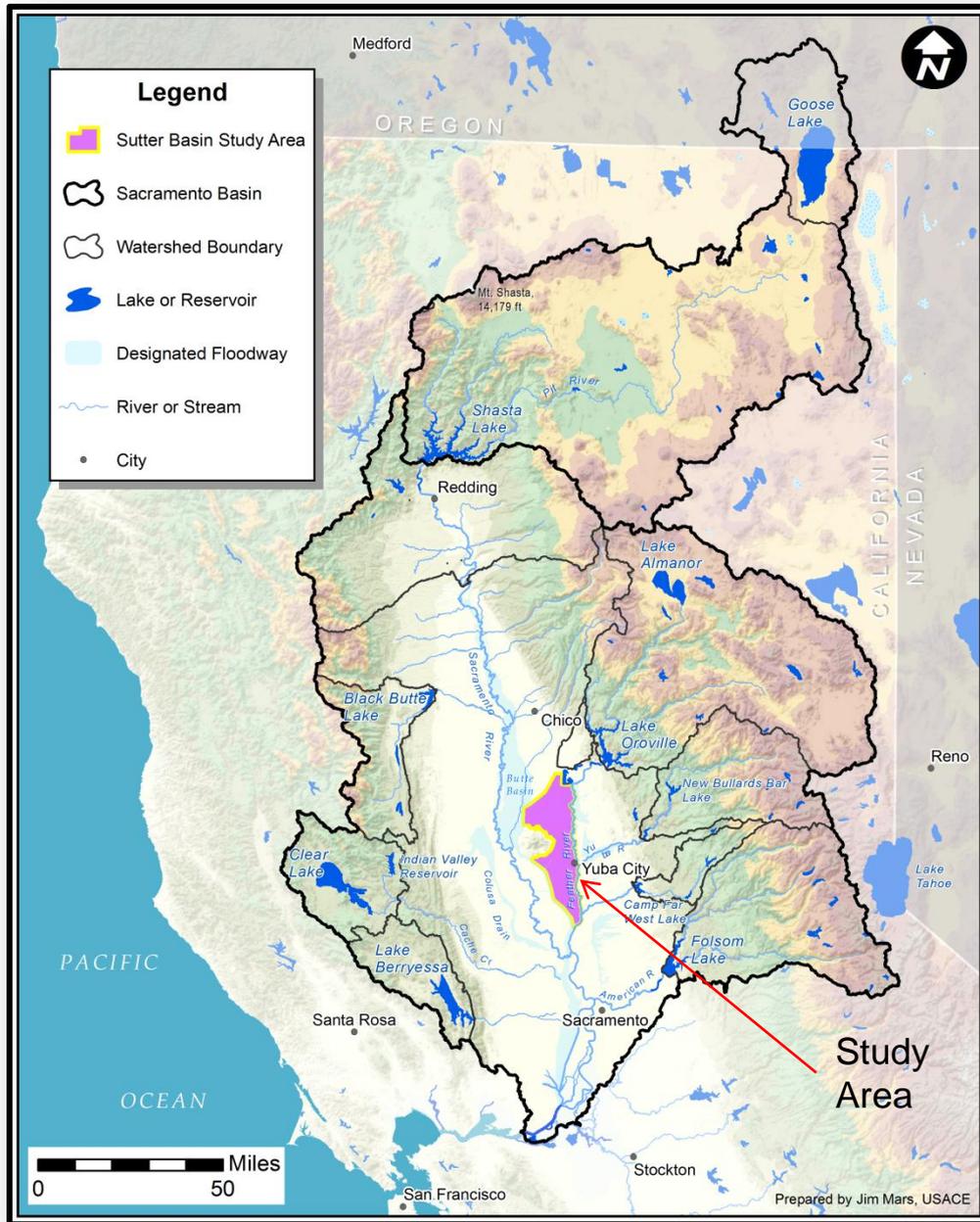


State of California –
Central Valley Flood Protection Board (CVFPB)



Sutter Butte Flood Control Agency (SBFCA)





SACRAMENTO RIVER WATERSHED



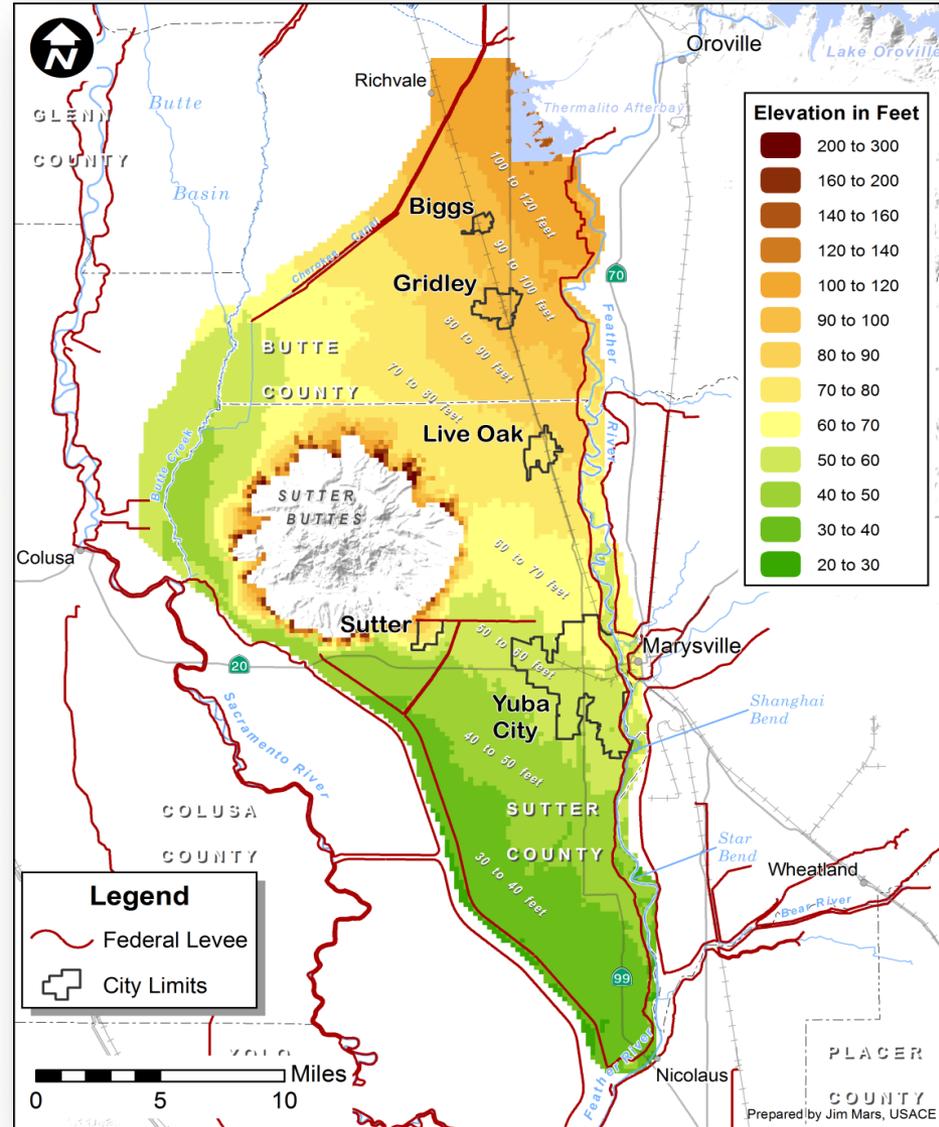
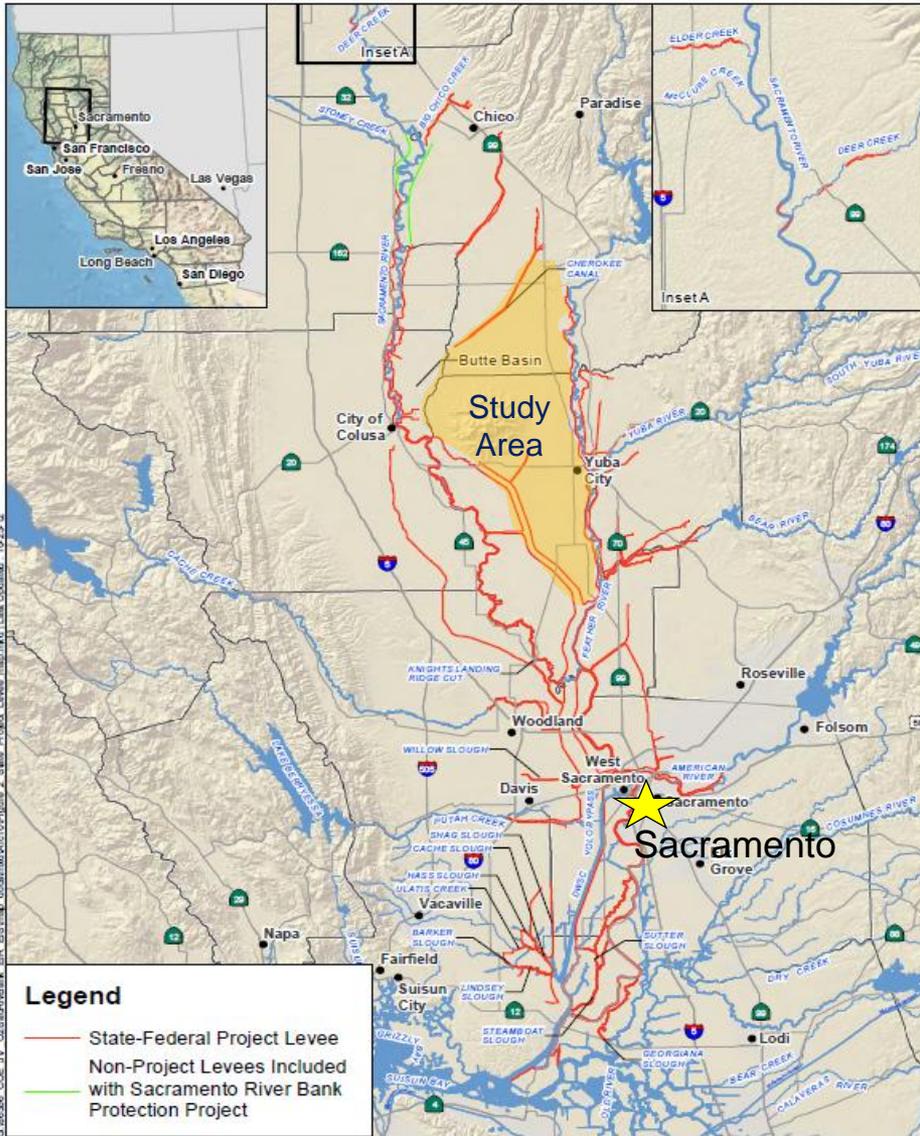
California

- Sacramento River Drainage Area: 14,000 sq. miles
- Feather River Drainage Area: 6,000 sq. miles
- System is highly regulated by upstream reservoirs
 - Shasta Dam
 - Oroville Dam
 - New Bullards Bar Dam

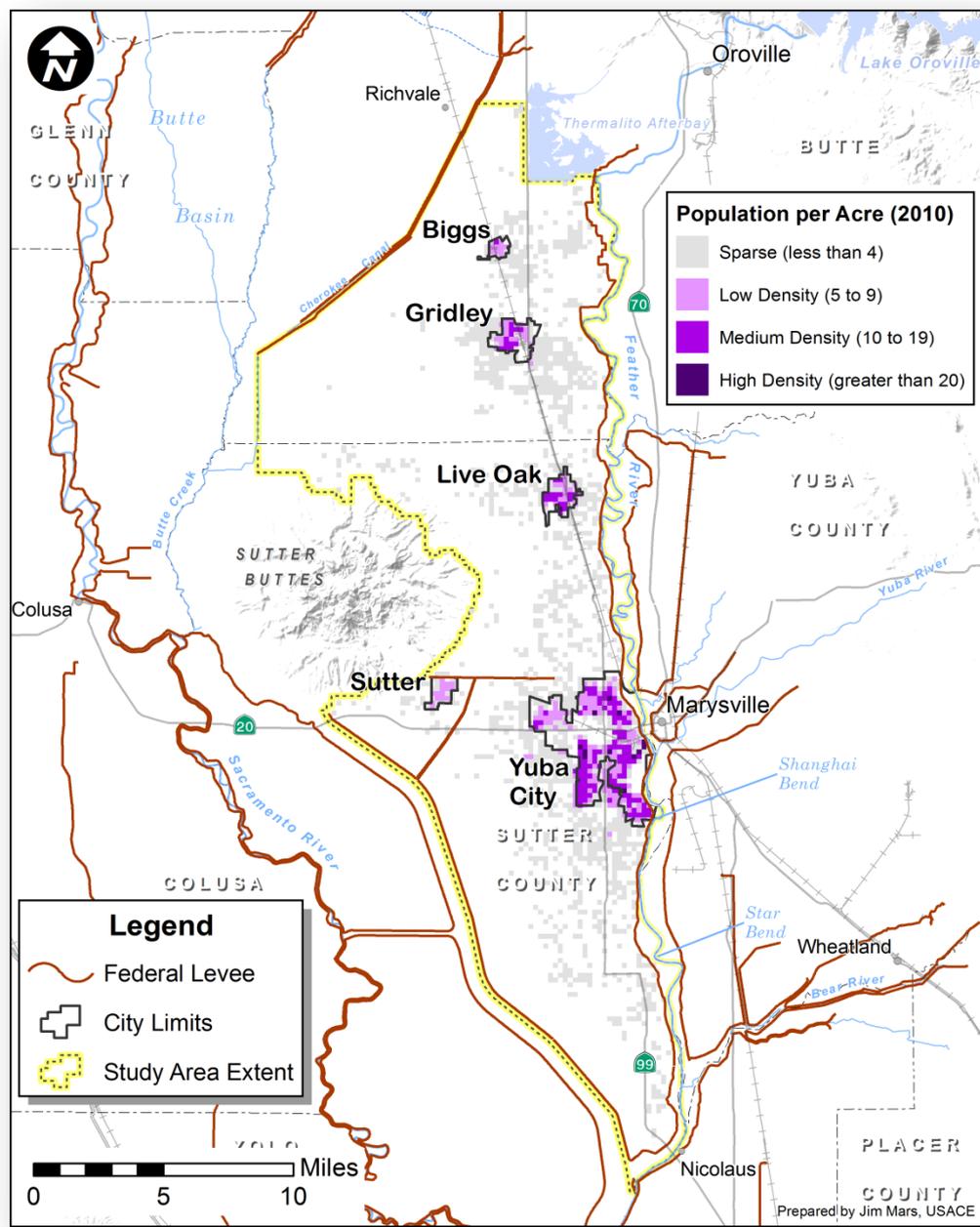


Sacramento River Flood Control Project

Study Area



Study Area Population



All are within Residual 0.2 (1/500) ACE floodplain

Town of Sutter:	250
Yuba City:	67,370
City of Biggs:	1,760
City of Gridley:	6,380
City of Live Oak:	8,360
Sutter County Rural:	6,340
Butte County Rural:	4,900

Total: 95,400



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Sutter Basin Study History

- Feasibility study initiated in April 2000 with Reclamation Board (Central Valley Flood Protection Board) as sponsor
- Feasibility Scoping Meeting (FSM) was held in January 2005
- Sutter Butte Flood Control Agency (SBFCA) formed in 2007
- SBFCA signed on as additional partner in June 2010
- In 2010 property owners passed a \$6.65 million per year assessment to support study and construct FRM actions
- In February 2011, the study was selected as a Pilot Study as part of the USACE National Pilot Program



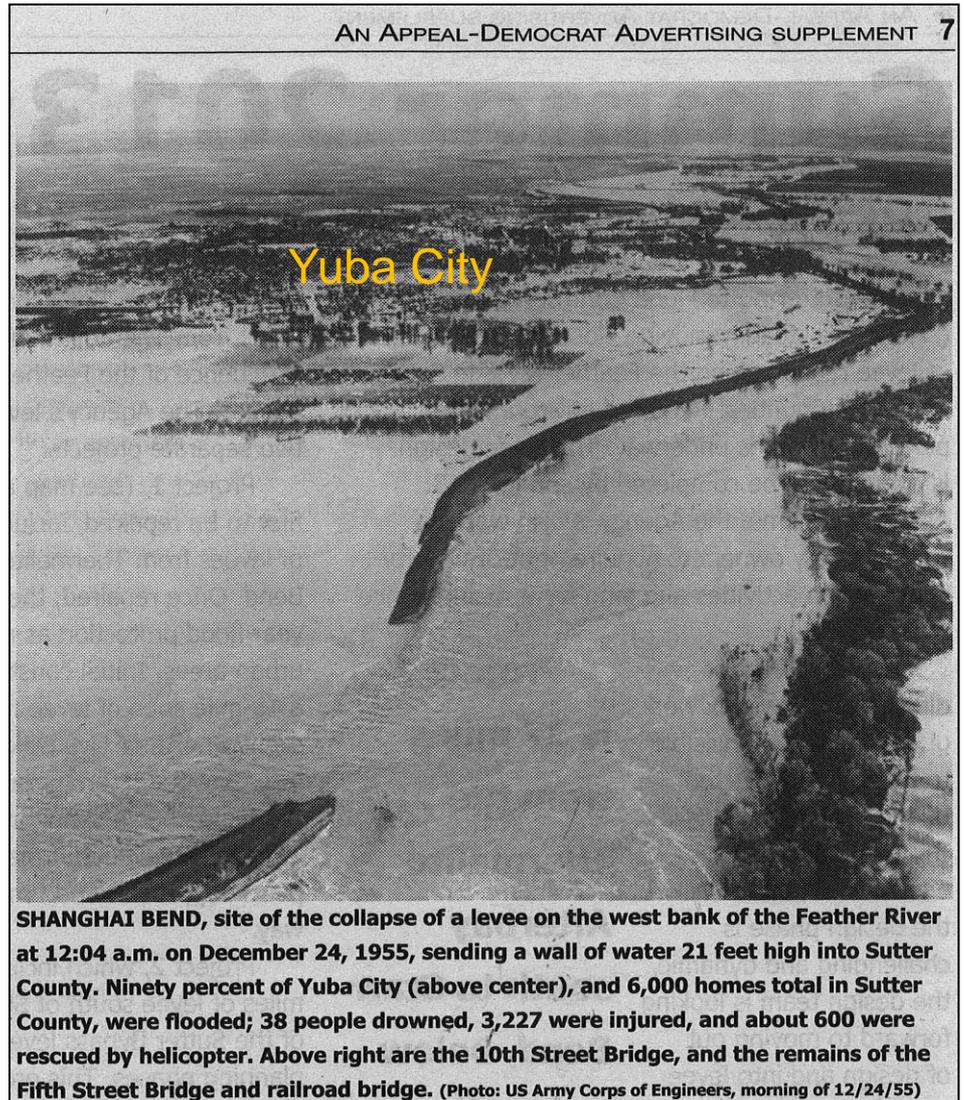
Problems

- Flood Risk: A high risk of flooding from levee seepage failure threatens the public safety of approximately 95,000 people, as well as property and critical infrastructure - life safety throughout the study area
- Ecosystem Value: Existing levees have isolated the floodplains from waterways, which has eliminated significant floodplain habitats for native species, including Federally listed species and other special status species



Flooding History

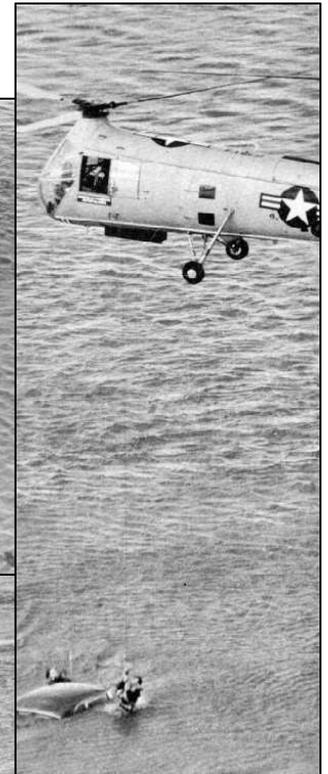
- 1955 Levee Failure (12:04 am)
 - Max Depth of 21 Feet
 - 6,000 Homes Flooded
 - 38 People Drowned
 - 3,227 People Injured
 - 600 Rescued by Helicopter
- Additional levee failures adjacent to Sutter Basin in 1986 and 1997
- From 1950 to 2011 extensive flood fighting has occurred during 19 events
- Unlike mid-west flood fights where sandbags are placed on top of levees, during Sutter Basin flood fights sandbags are placed behind levees



Life Safety Factors

Historic floods have occurred during the months of December through February:

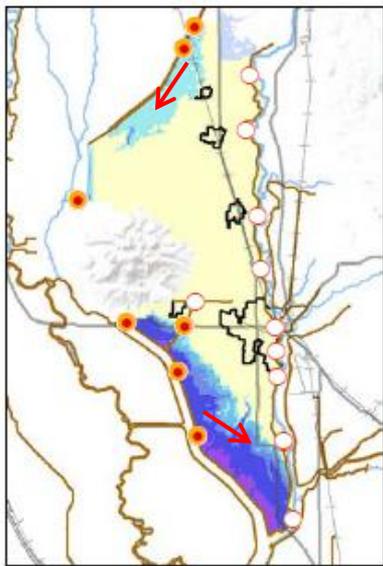
- Air Temperatures (38 to 55° F)
- Water Temperatures (45 to 55° F)
- These cold temps significantly increase risk of death by exposure.
- Hypothermia can set in within 15-30 minutes; death in 1-3 hrs. (USCG)



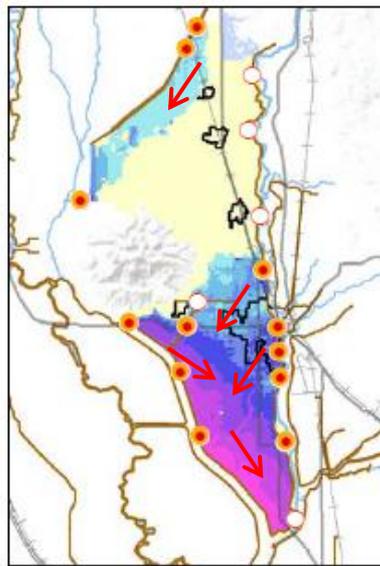
1955 Flood
Southern Basin



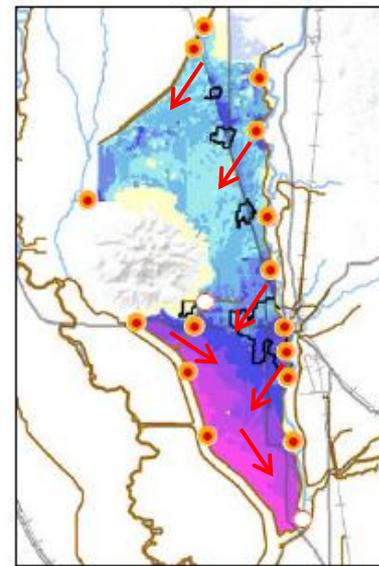
Existing Conditions Composite ACE Floodplains with Potential Levee Breach Scenarios



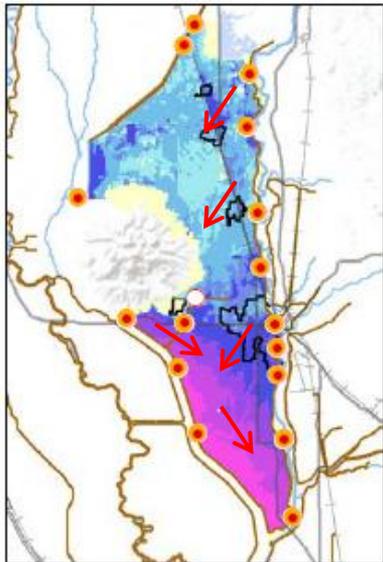
50% (1/2) ACE



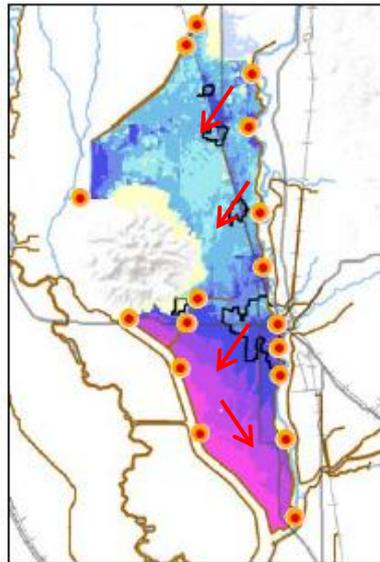
10% (1/10) ACE



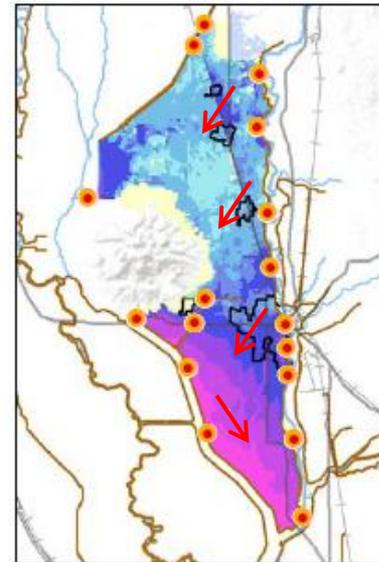
4% (1/25) ACE



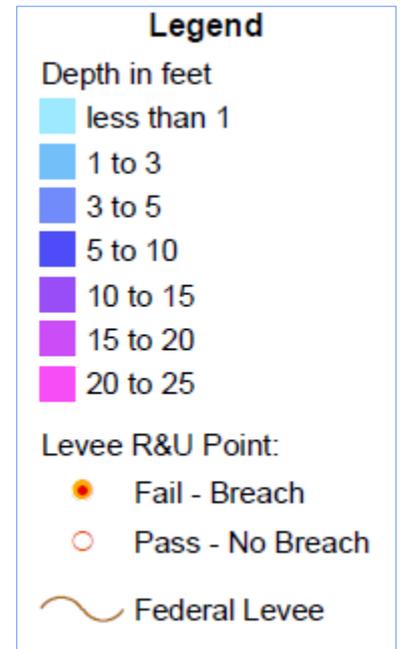
2% (1/50) ACE



1% (1/100) ACE

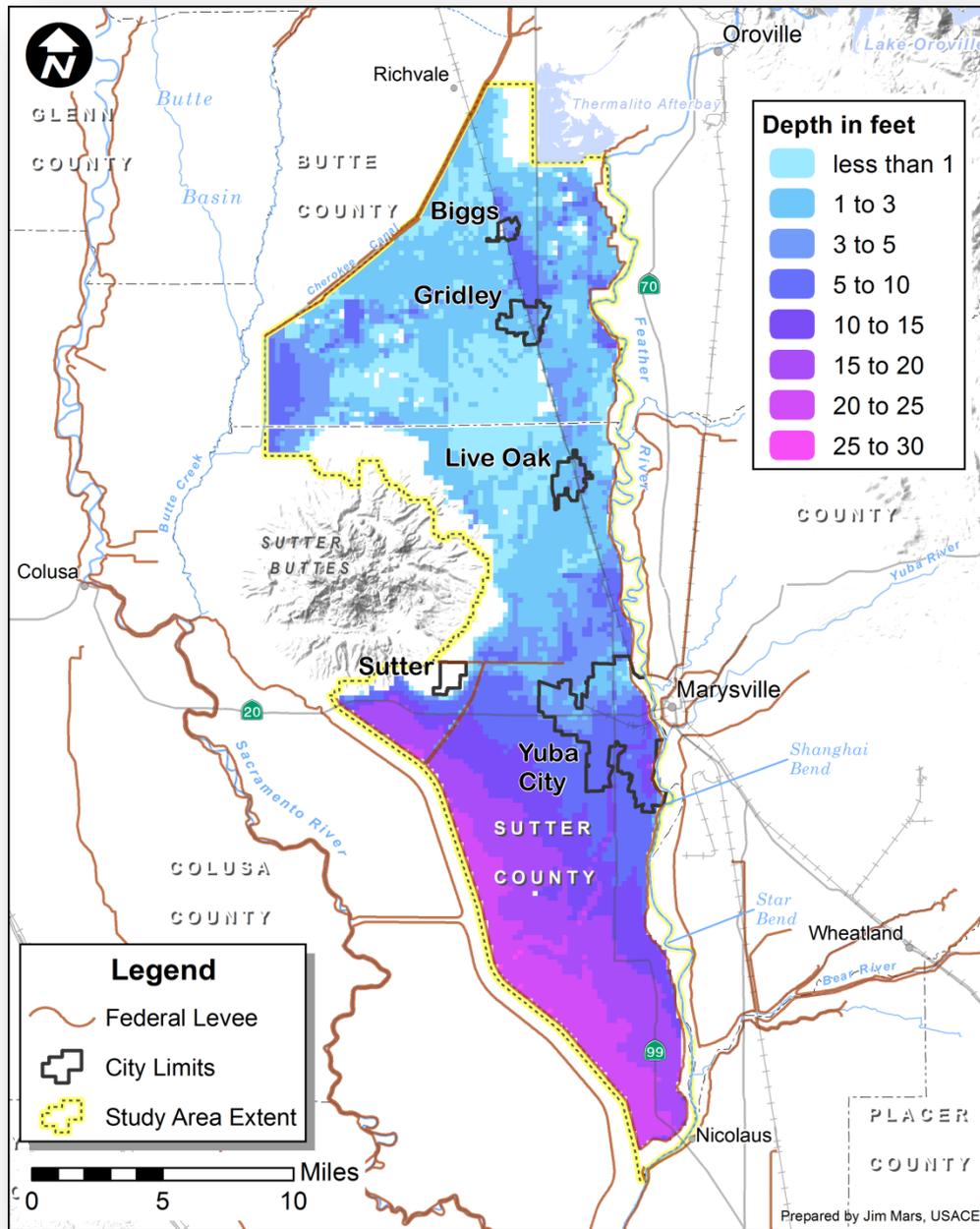


0.5% (1/200) ACE



↘ : General Flood Flow Direction





Existing Conditions / Without Project Floodplain

1% (1/100) ACE Floodplain

- Majority of basin has high probability of flooding .
- All urban areas are flooded except for town of Sutter
- Annual Exceedance Probability:
Yuba City: 4% (1/25)
Northern Communities: 8% (1/13)
- Annual Damages: \$137 Million



Study Objectives

- Reduce the risk to life, health, and public safety due to flooding
- Reduce the risk of property damage due to flooding
- Non-Federal Sponsor's
- Reduce the probability of flooding to urban and urbanizing areas to less than 0.5% (1/200) annual chance exceedance as per State Senate Bill 5
- Reduce residual risk to the rural south portion of the Basin for sustainable high-value agricultural operations



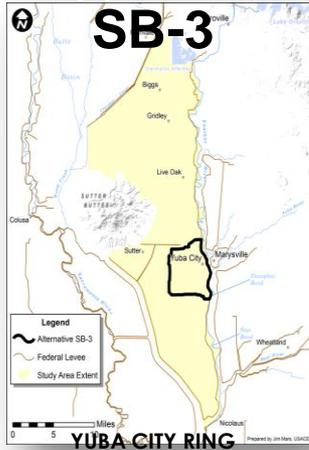
Plan Formulation Process

1. Identified and screened measures
2. Developed alternatives
3. Evaluate full array of alternatives
4. Screen alternatives using risk informed decision making



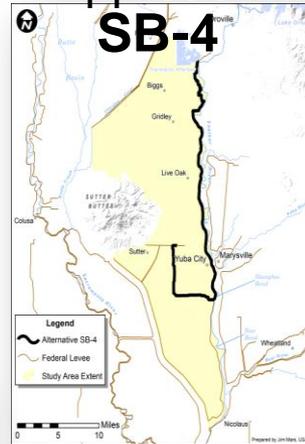
Draft Alternative Approaches

Ring Levee Approach

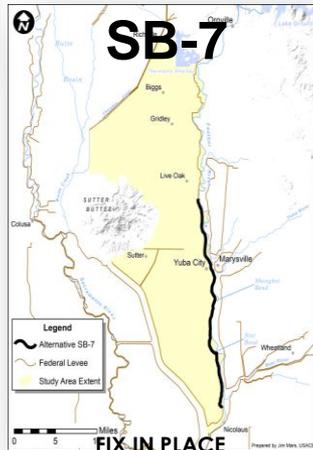


LEVEE

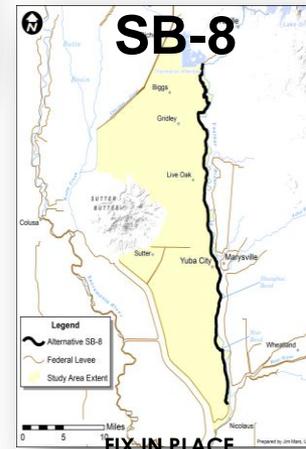
Partial Ring Levee & Fix-in-Place Approach



LITTLE "J" LEVEE

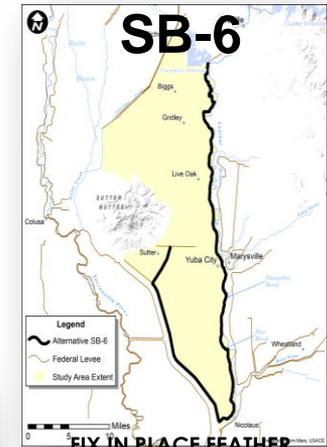


FIX IN PLACE
FEATHER RIVER,
SUNSET WEIR TO
LAUREL AVE



FIX IN PLACE
FEATHER RIVER,
THERMALITO TO
LAUREL AVE

Fix-in-Place Primary Levees Approach



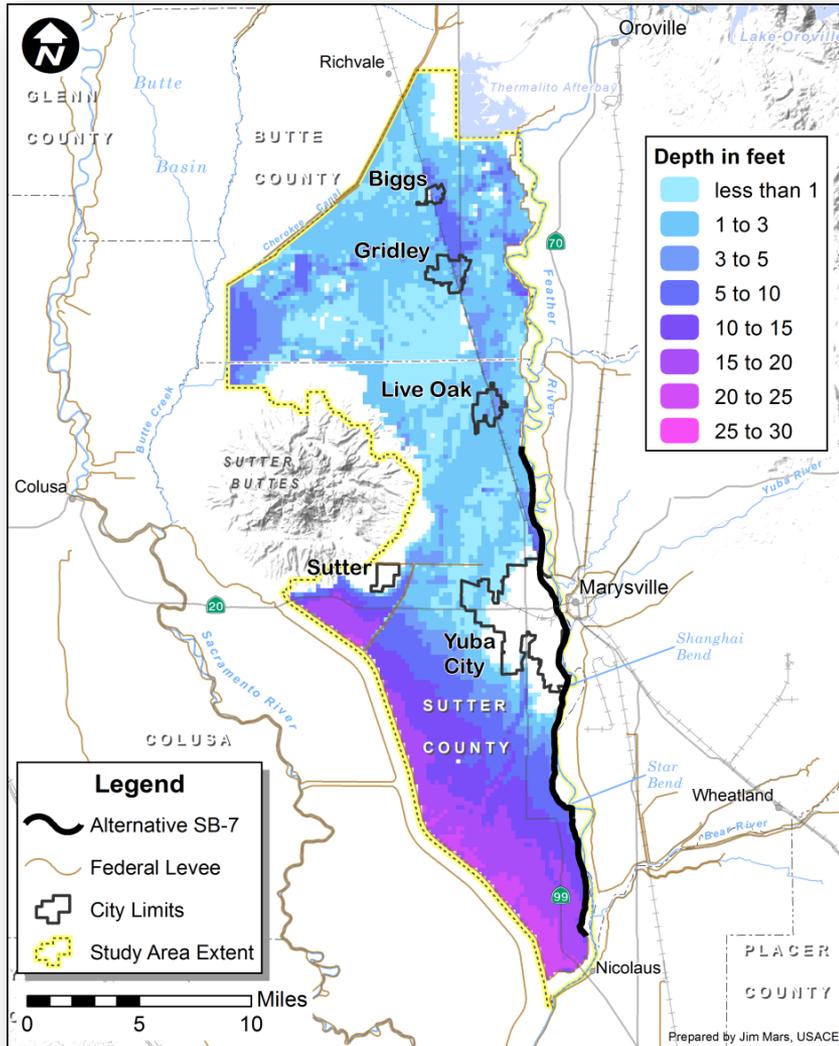
FIX IN PLACE FEATHER
RIVER,
SUTTER BYPASS, AND
WADSWORTH

Fix-in-Place: Feather River Levee Approaches



National Economic Development Plan

Alternative SB-7



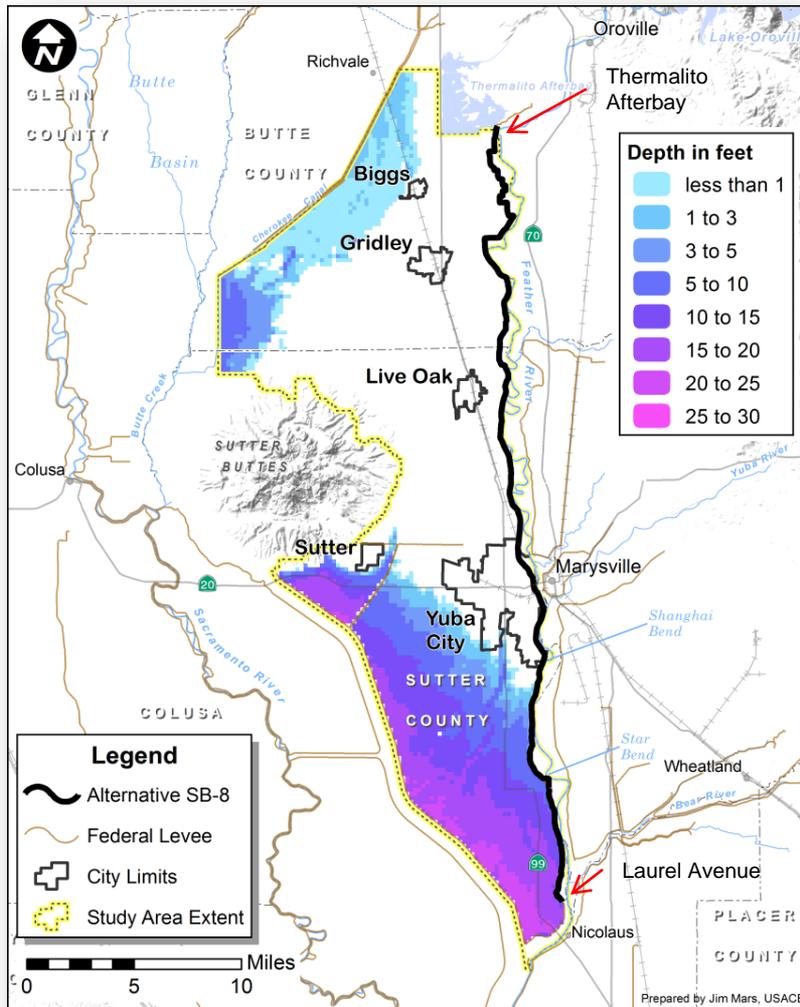
1% ACE Residual Floodplain

- Annual Net Benefits: \$61 million
- First Cost: \$392 million
- Benefit/Cost (@3.5%): 4.4 : 1
- Reduces risk to Yuba City
- Significant residual risk remains in the Basin outside Yuba City



Locally Preferred Plan

Alternative SB-8 (LPP)



1% ACE Residual Floodplain

- Annual Net Benefits: \$ 54 million
- First Cost: \$ 689 million
- Benefit/Cost (@3.5%): 2.6:1
- Reduces risk to Yuba City, Biggs, Gridley, and Live Oak



Final Array of Alternatives

Economic Summary

Category	Alternatives		
	No Action SB-1	NED Plan SB-7 (\$M)	LPP SB-8 (\$M)
Total First Costs ^{2,3}	-	390	686
Interest during Construction	-	38	94
OMRR&R	-	0.28	0.45
Annual Cost	-	18	33
Annual Benefits	-	79	87
Net Benefits ¹	-	61	54
Benefit to Cost Ratio	-	4.4 : 1	2.6 : 1
Benefit to Cost Ratio (@7%)	-	2.3 : 1	1.3 : 1

Notes:

1. Net Benefits (Mean, Standard USACE Practice) of the Final Array of Alternatives using October 2013 Prices (Values in Millions) and 3.50% Discount Rate

2. Feasibility Cost Level (Class 3)

3. Cultural Resource data recovery costs of \$1.6 M and \$3.0 M for SB-7 and SB-8 are not included in economic costs per Corps policy (ER 1105-2-100, Appendix c, paragraph E-63.f.(5)).



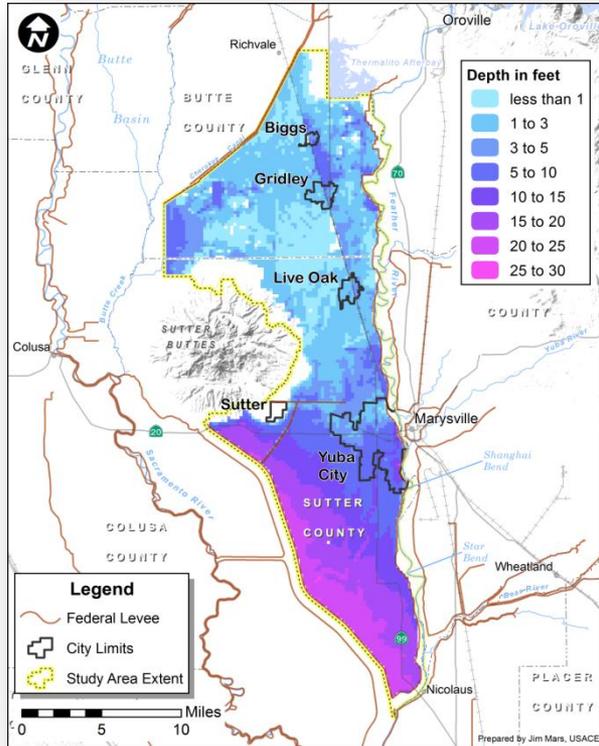
Residual Risk Summary of Life Safety Metrics & Damages

Evaluation Metric	Alternative*		
	SB-1 No Action	SB-7 NED	SB-8 LPP
Population Remaining at Risk	94,600	38,200	6,600
Critical Infrastructure- Life Safety Facilities Remaining at Risk	28	11	1
Evacuation Routes Available (Number of Routes)	0	1	5
Potentially Developable Floodplain (Acres)	71,800	88,200	100,200
Residual Annual Damages	\$137 Million	\$58 Million	\$50 Million

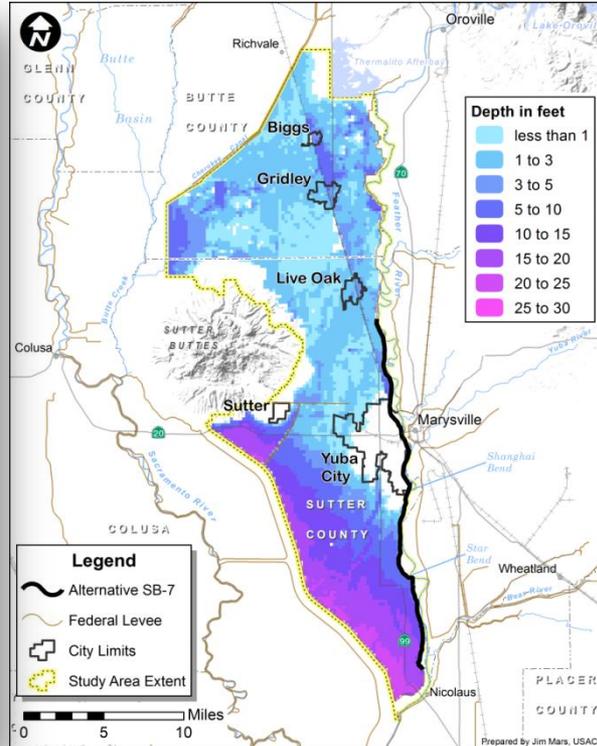
*1% ACE Residual Floodplains used for the residual risk comparison



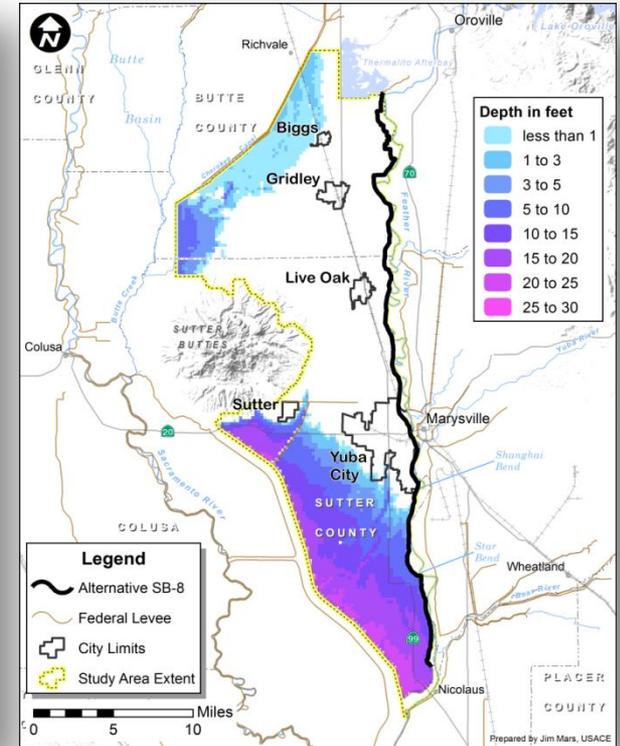
Population Remaining at Risk



No Action



NED



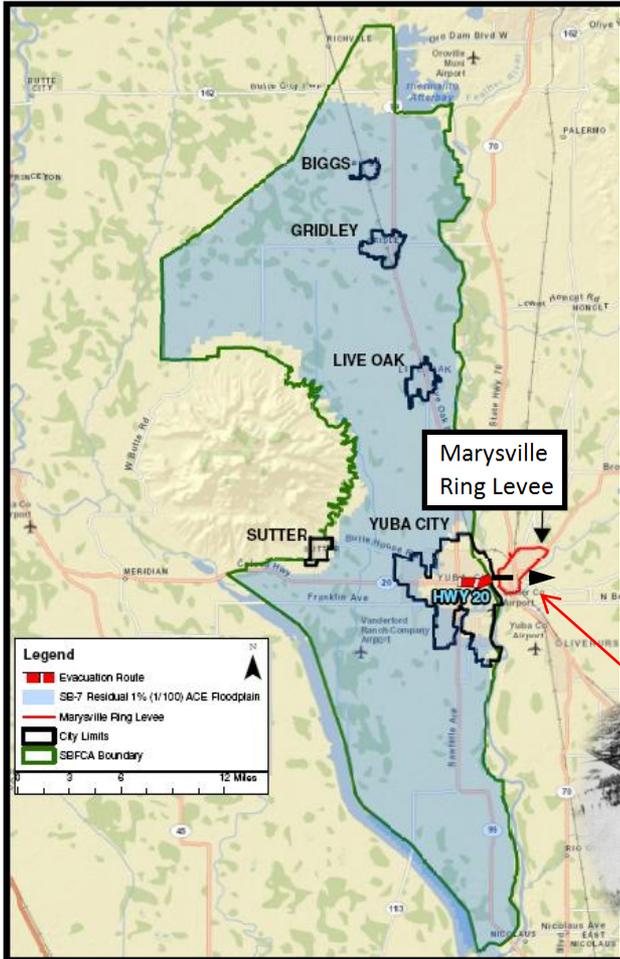
LPP

Comparison of Residual Flood Plains
using 1% (1/100) ACE Composite Floodplains



Evacuation Routes

1% ACE Residual Floodplain



NED



Photo taken December 23, 1955



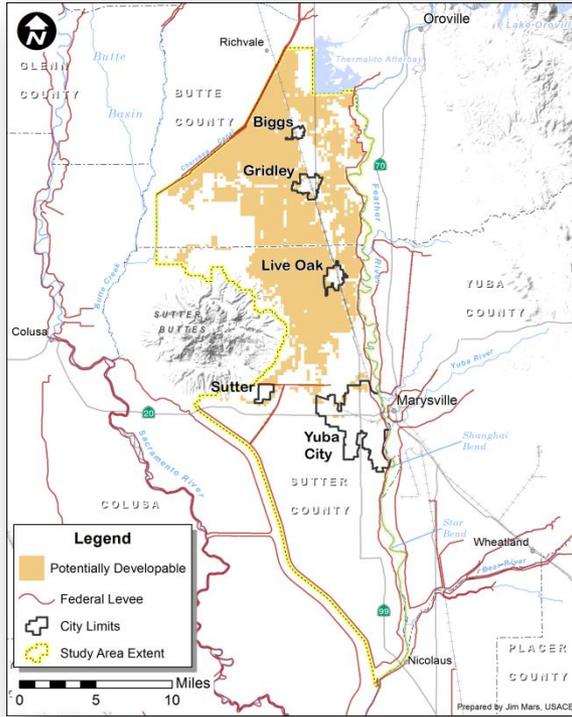
LPP



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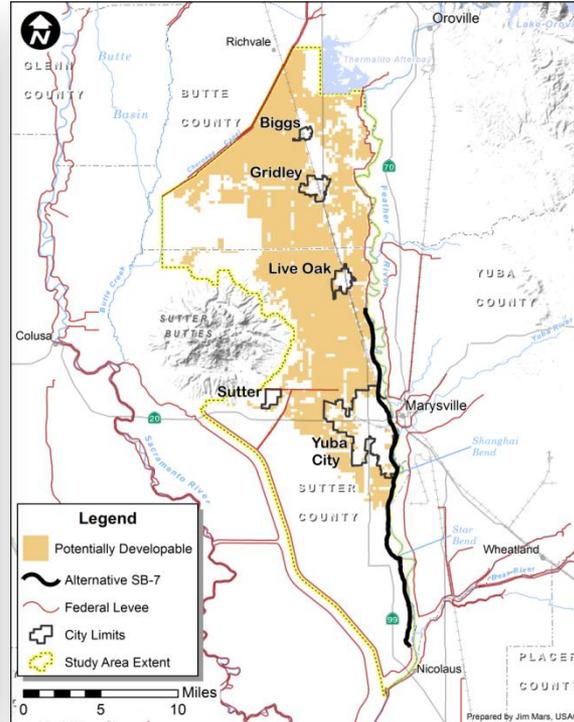
Potentially Developable Floodplain

Comparison Using 1% ACE Residual Floodplains



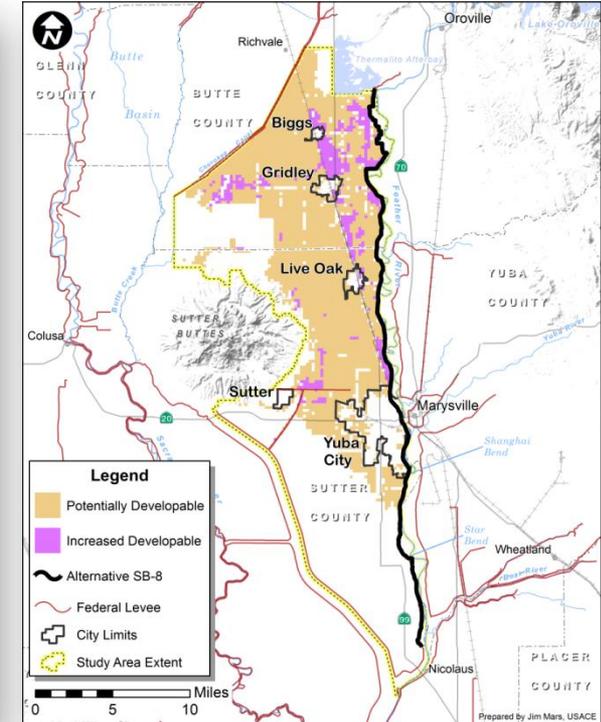
No Action

Existing 71,800 acres of defined Potentially Developable Floodplain*



NED

Increase of 16,400 acres around Yuba City from the No Action Plan



LPP

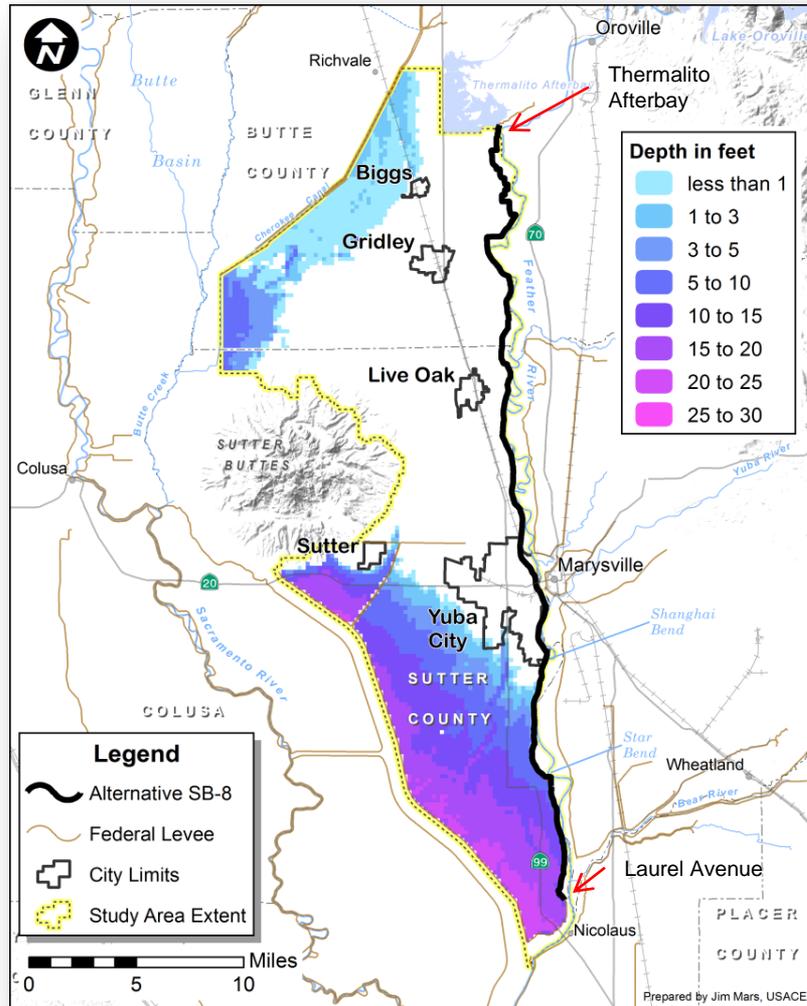
Increase in acres (magenta) from NED to the LPP: 12,000 acres

* Study evaluation metric of potentially developable floodplains is defined as:
Acres within the 1% ACE floodplain with depths of less than 3 feet.



Recommended Plan

Alternative SB-8 (LPP)



1% ACE Residual Floodplain

- Fix-in-Place
- 41.4 miles of Feather River levees from Thermalito Afterbay to south of Laurel Avenue
- ASA(CW) approval of exception to NED plan received 07 May 2013
- Satisfies sponsor objective and State Senate Bill 5 for flood risk management of existing urban areas
- Annual Net Benefits: \$ 54 million
- First Cost: \$ 689 million
- Benefit/Cost (@3.5%): 2.6:1
- Federal Cost Share: \$ 255 million (Limited investment to the NED Plan cost share)



Recommended Plan Non-Structural Features

Non-structural features that are an integrated part of the Recommended Plan are:

- Updated Flood Plain Management Plan
- Flood warning system
- Emergency evacuation plan
- Flood fight pre-staging areas
- Flood risk communication / community outreach



Recommended Plan EO 11988 Discussion

- Wise use of floodplains concept incorporated as a life safety metric: LPP is the Recommended Plan because of much reduced residual risk to public safety in northern urban centers. Southern basin subject to deep flooding.
- Population Growth: 425,000 people by 2070
- No induced development:
 - No action potentially developable land of 71,800 acres can accommodate anticipated population growth
 - Development concentrated in and around existing urban areas
- Natural Floodplain Values:
 - Natural floodplain areas and values within the basin were redefined when levees were constructed in early 20th century. Remnant natural floodplains within the basin are in conservation easements or preserve areas
 - Existing levees are located hundreds of feet from the main channel supporting remnant riparian areas and connected to the Feather River floodplain with high habitat values
- Project recommendation complies with EO 11988



Recommended Plan

ETL 1110-2-571 Compliance

- USACE policy requires that all new federally authorized cost shared levee projects be designed to meet the current vegetation management standards
- The Recommended Plan (SB-8) will remove all woody vegetation from the levee top and slopes and within 15 feet of the levee toe in full compliance with Engineering Technical Letter (ETL) 1110-2-571
- In the PED phase, other options available to conform to the ETL will be investigated and incorporated as appropriate



Recommended Plan Public Involvement

- Feasibility / 408 Joint Scoping Meetings – June 27 and June 28, 2011
- EIR/SEIS supplements the Feather River West Levee project Sec 408 EIR/EIS
- Integrated Draft Feasibility Report and EIR/SEIS released for 45-day public review, ending July 29, 2013
- Public Meeting on Draft Report held on July 22, 2013 to receive comments
- Public comments on Sec 408 project focus on ecosystem restoration, downstream effects, growth inducement (agricultural land conversion)
- NGOs concerns were directly coordinated and mitigated through a MOU by the local sponsor SBFCA
- 8 comment letters and meeting comments were received for Sutter Basin Pilot Feasibility Report



Recommended Plan

Environmental Compliance

- Received EPA EC-2 rating (Environmental Concerns and Requests Additional Information in Final SEIS); air quality and 404(b)1 concerns resolved in FEIS
- Section 7 Endangered Species Act Consultation – ESA compliance with USFWS and NMFS for feasibility study is complete
- Section 106 National Historic Preservation Act – Programmatic Agreement executed with SHPO on June 8, 2012
- Fish and Wildlife Mitigation Plan developed in compliance with Section 2036(a) of WRDA 2007
- NEPA compliance is complete
- Compliant with all other applicable Laws, Executive Orders and Federal regulations



Recommended Plan

Environmental Mitigation Requirements

- Proposed Mitigation Plan includes compensation for loss of riparian habitat due to construction and ETL 1110-2-571 compliance
- Purchase of mitigation bank credits to compensate for impacts to the Federally-listed Giant Garter Snake, and Section 404 wetland impacts
- Monitoring plan proposed to ensure success of proposed mitigation at the Star Bend Conservation Area and Three Rivers Floodway Corridor Restoration Site
- Some uncertainty with mitigation for O&M



Environmental Operating Principles

1. Foster sustainability as a way of life throughout the organization.
2. Proactively consider environmental consequences of all Corps activities and act accordingly.
3. Create mutually supporting economic and environmentally sustainable solutions.
4. Continue to meet our corporate responsibility and accountability under the law for activities undertaken by the Corps, which may impact human and natural environments.
5. Consider the environment in employing a risk management and systems approach throughout the life cycles of projects and programs.
6. Leverage scientific, economic and social knowledge to understand the environmental context and effects of Corps actions in a collaborative manner.
7. Employ an open, transparent process that respects views of individuals and groups interested in Corps activities.



Environmental Operating Principles Implementation

- Pilot planning process was based on risk informed decision making that was focused on process transparency and communication
- Coordinated with the State on their system wide Central Valley Flood Control Project and program
- Fix-in-Place strategy avoids or minimizes environmental impacts while maximizing future safety and economic benefits to the community
- Worked with local resource agencies during the planning process to minimize impacts to the environment
- Allows for continued floodplain connection on the waterside while reducing flood risk to the established urban areas of the basin
- Held risk workshops, charettes, stakeholder and public meetings throughout the process



Recommended Plan

Review Issues and Comments DQC/ATR

- DQC and ATR was originally scheduled for only concurrent review at Draft Report.
- Concerns by the Vertical Team and PDT were mitigated with the addition of three “mini” ATRs: Geotechnical existing conditions; Progress Report – Plan Formulation; and Progress Report – Rough Draft Technical Appendices.
- All DQC and ATR comments were addressed and resolved
- Significant ATR comment themes were:
 - ▶ Number of geotechnical index points
 - ▶ Clarification on judgment portion of fragility curves
 - ▶ Clarification of key assumptions throughout documentation
 - ▶ Validation of 2002 Comprehensive Study Hydrology
 - ▶ Documentation of metric calculations



Recommended Plan

Review Issues and Comments IEPR

- Type I Independent External Peer Review (IEPR) was conducted by Battelle Memorial Institute. Panel of four with technical expertise in assessing adequacy and acceptability of economic, engineering, and environmental methods, models, and analyses
- Type I IEPR was scheduled for concurrent review of the Draft Report
- IEPR resulted in 19 comments with significance rated High for 1, Medium for 15, and Low for 3
- 61 Recommendations: 42 Adopted, 19 Not Adopted
 - ▶ Not adopted for the following;
 - ▶ Best available data
 - ▶ Fragility curves methodology
 - ▶ Seepage analysis methodology
 - ▶ Reach selection and geotechnical reliability
- Panel Concur with 18 and Non Concur with 1 of 19 Agency Responses



Project Implementation

- Early Implementation Construction by Sponsors
 - ▶ Constructed Star Bend reach in 2009
 - ▶ Began Shanghai Bend reach in 2013
 - ▶ 33 U.S.C Section 408 for the Feather West Levee Project - Final ROD signed 13 September 2013
- Crediting: Potential credit for local construction determined to be integral to Federal project; Eligible credit to be afforded in accordance with a PPA
 - ▶ Section 104 Credit for Local Star Bend Setback Levee (Eligibility Memo 10 June 2009)
 - ▶ Section 221 Credit for Local Feather River West Improvement Project (MOU executed 14 June 2013)
- Design Phase: 2 years
- Construction Phase: 6 years



Risk Management

- Pilot Program is a Risk Informed Formulation Process
- Risk Workshops (2)
- Study Risk Register
- Cost and Schedule Risk Analysis
- Risk Assessment Memorandum
- Communication and Transparency of Process
- Vertical Team Integration



Study Team Members

- Project Management
- Planning
 - Plan Formulation
 - Environmental
 - Economics
 - Cultural Resources
- Engineering
 - Hydraulics
 - Hydrology
 - Geotechnical
 - Cost Engineering
 - Value Engineering
 - Civil Design
- Real Estate
- Vertical Team
 - DST
 - RIT
 - ATR
 - IEPR
 - OWPR
- Sponsors
 - Sutter Butte Flood Control Agency
 - State of California Central Valley Flood Protection Board
- Public Affairs Office
- Office of Counsel



Sutter Basin Pilot Feasibility Study Schedule

**November
2012**

- **Decision Point #2** for TSP
- ASA(CW) Policy Exemption of NED Request

**June
2013**

- Concurrent Review
- Release of Draft Report

**August
2013**

- Final Report to SPD & HQ

**October
2013**

- Decision Point #3 – CWRB

**November
2013**

- State & Agency Review

**March
2014**

- Decision Point #4
- Chief's Report



District Recommendation

- Release the Final Report for State and Agency Review
- Approve the Final Report
- Complete the Chief's Report



Statements from the Non-Federal Sponsors



- Sutter Butte Flood Control Agency
 - Represented by:
 - Mike Inamine, Executive Director (by phone)
 - Scott Shapiro, General Counsel
 - Michael Bessette, Director of Engineering
 - Presenting on Support and Residual Risk Management Tools



- California's Central Valley Flood Protection Board
 - Represented by Keith Swanson, Chief, Division of Flood Management, California Department of Water Resources
 - Presenting on Central Valley Flood Protection Plan and its connection to this study



Strong Community Support!

- The State of California and the Sutter Butte Flood Control Agency (SBFCA) have strongly supported this study and strongly support the Recommended Plan.
- The State of California and SBFCA have funded the study and are funding tens of millions of dollars of advance construction.
- In the midst of nearly 20% unemployment, this economically disadvantaged community has advanced a local assessment to pay for the study and construction and has received overwhelming voter support, even with the highest assessment rates in the Central Valley.



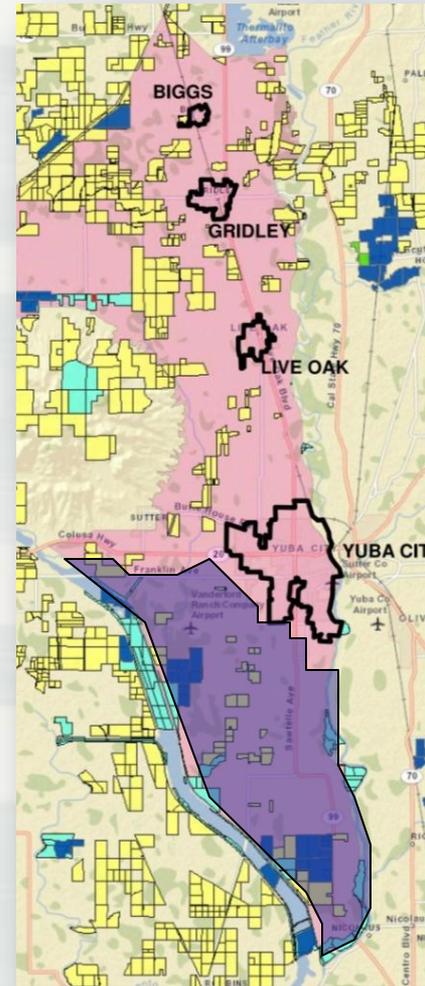
Sutter Basin Residual Risk Management Tools: An Overview

- California Senate Bill 5
- California's Williamson Act Contracts
- Development Impact Fees
- Conservation Easements / Agricultural Easements
- Agricultural Mitigation Fees
- Flood Risk Notifications and FEMA CRS
- Other Flood Management Tools
 - Floodplain Management Plan
 - Basin-wide emergency response planning
 - Multi-objective projects
- System-Wide Improvement Framework



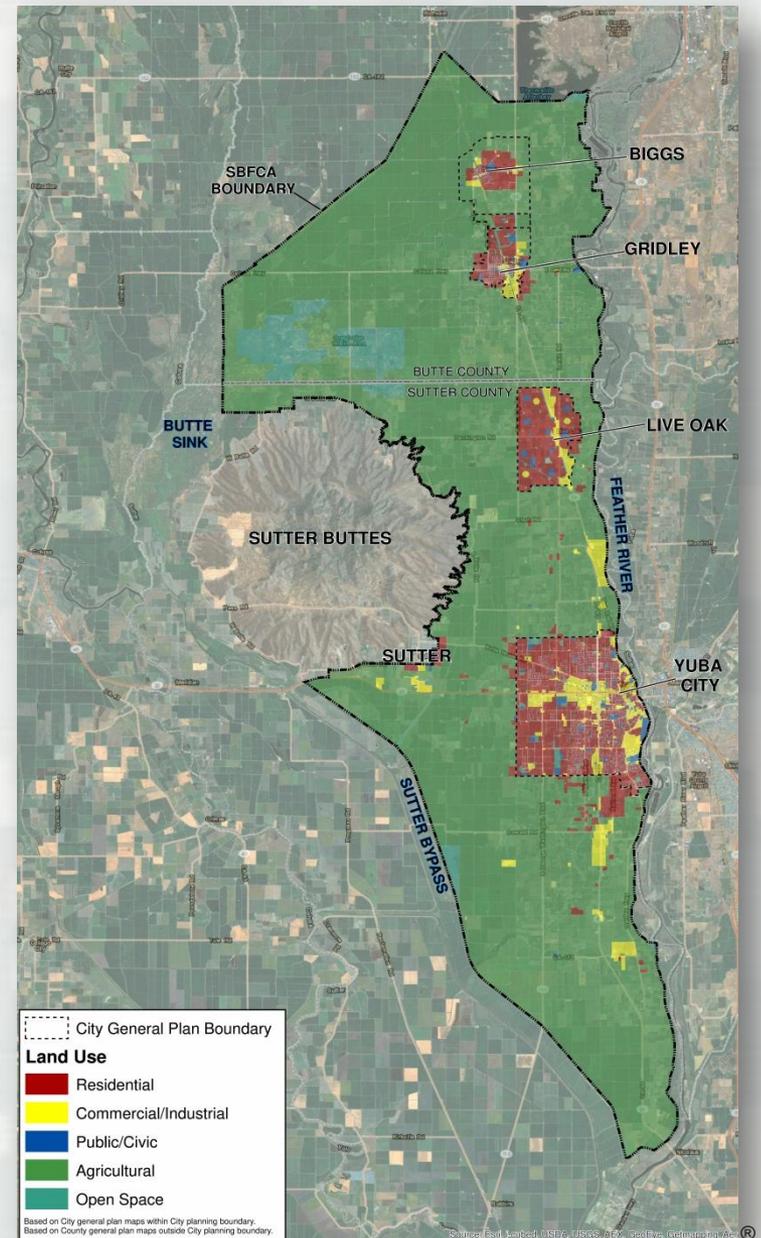
California's Senate Bill 5

- State law precludes development in the Central Valley's urban areas without 200-year flood protection.
- The purple area in the picture, which is the deep floodplain, does not receive protection from the Recommended Plan, thus precluding urban development.
- SBFCA's advance construction efforts will also not achieve 200-year protection for this area.



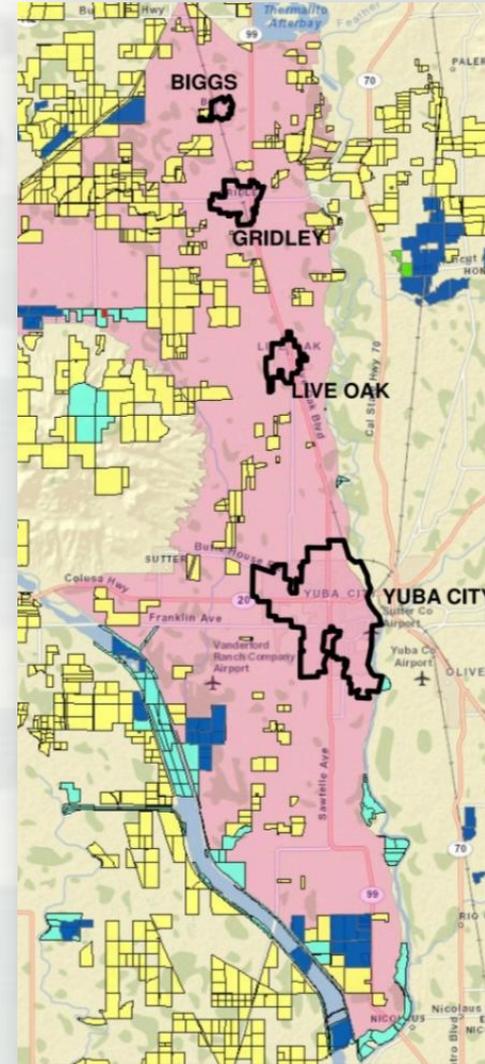
Designated Land Uses

- Other State laws require that counties and cities designate current and future allowed land uses.
- Current and future designated uses in the basin are predominately agricultural (see green areas on map) and must be consistent with Senate Bill 5.
- Keeping the remainder of the basin agricultural is important to the nearly 100,000 residents of the basin, many of whom work in agriculture-supported industries.



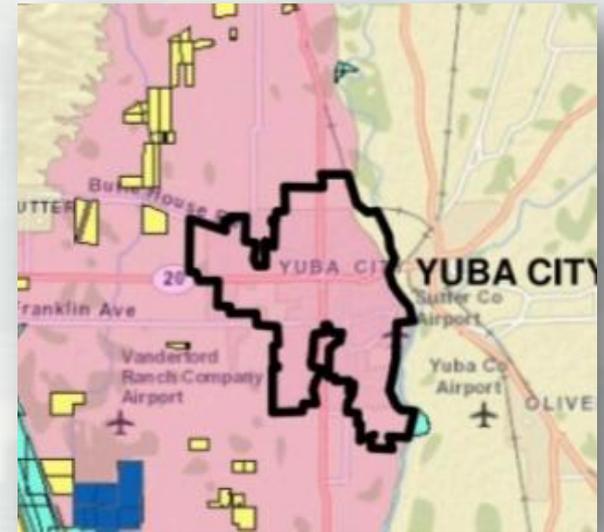
Williamson Act Contracts

- These are State contracts whereby landowners get tax breaks for committing to leave land in agricultural production.
- Significant penalties attach to development of land during the life of the contract.
- All yellow blocks on map indicate the lands under contract.



Development Impact Fees

- An existing joint program of Yuba City and Sutter County under which Yuba City collects fees for any land developed around Yuba City.
- Fees are dedicated to flood risk reduction programs.
- SBFCA is working with Yuba City and Sutter County to channel these funds toward wise floodplain management actions.
- SBFCA is also exploring a broader fee for a more expansive flood risk reduction program.

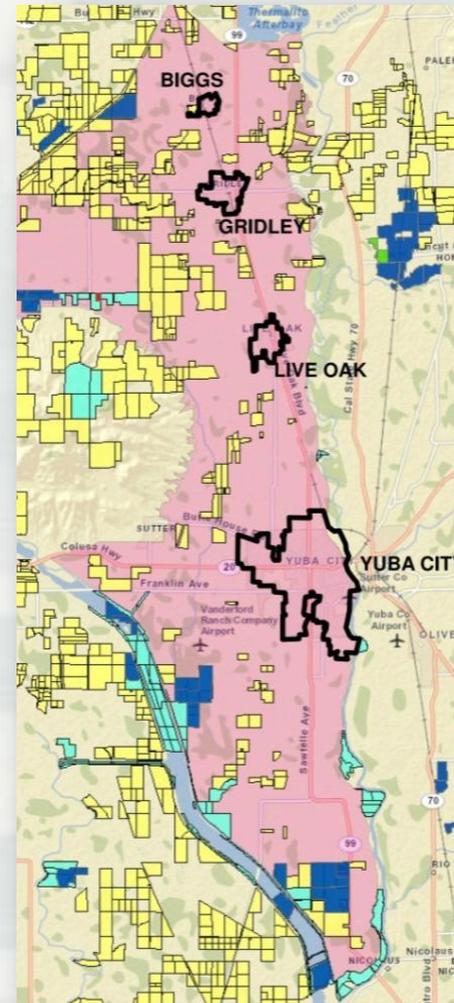


Conservation/Ag Easements

- These are permanent easements that remove the development rights from property forever.
- Conservation easements are shown in blue blocks on the map.

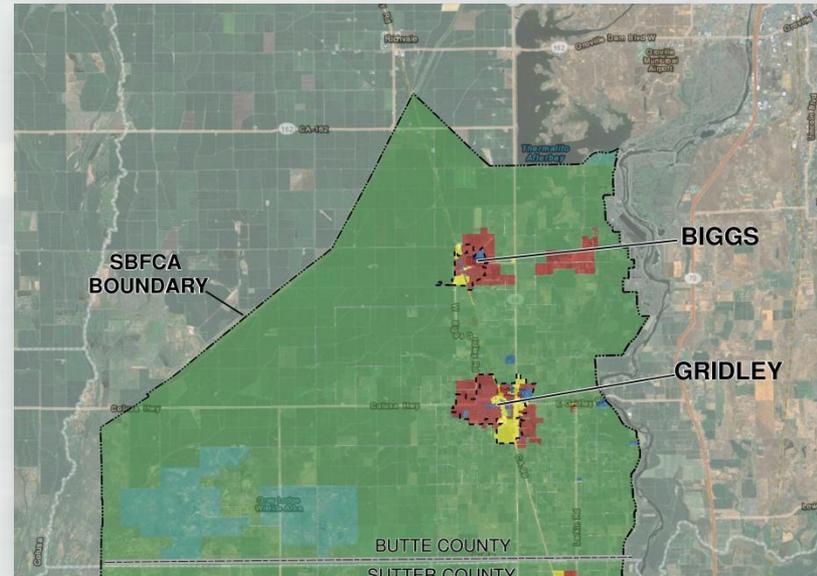


Additional permanent easements recently granted.



Agricultural Mitigation Fee

- The 2010 Butte County General Plan directs the creation of an agricultural mitigation ordinance.
- The ordinance will require developers to permanently protect agricultural land in place of land that is re-designated from agriculture to a non-agricultural designation.



A Planning Commission meeting is scheduled for November 14 to recommend adoption of the ordinance.



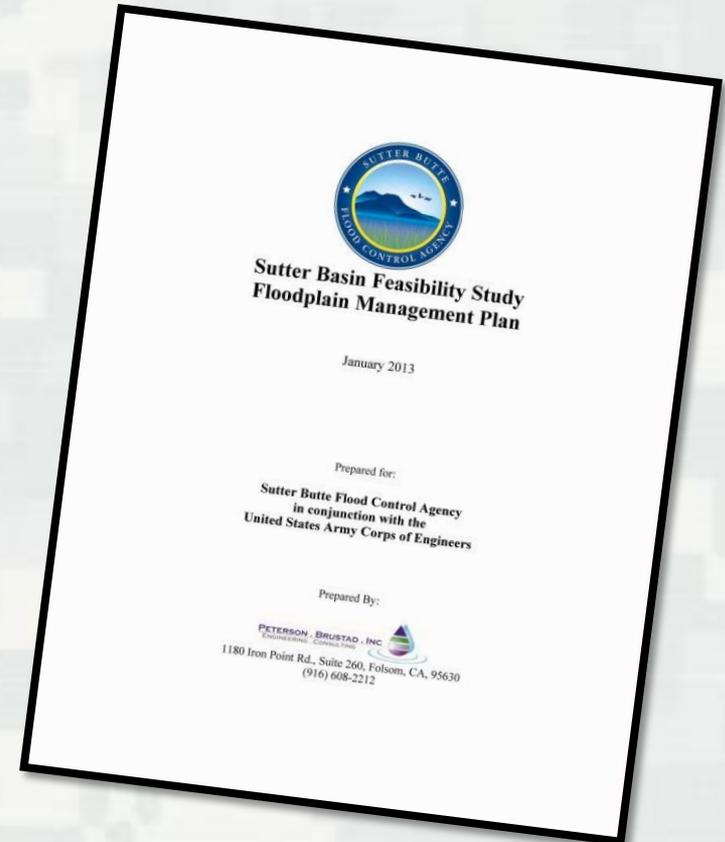
Flood Risk Notification & FEMA CRS

- Since 2009, DWR has annually sent flood risk awareness fliers to over 300,000 property owners protected by the Central Valley's Federally-authorized levee system.
- SBFCA also sends mailings several times a year to all levee protected properties.
- Sutter County annually partners with the local newspaper for flood awareness month every November.
- Sutter County and Yuba City are rated as “6” in the Community Rating System (CRS), ratings that have qualified them for 20% discounts on flood insurance for special flood hazard areas.



Other Flood Management Tools

- SBFCA has developed a "living" Floodplain Management Plan to guide smart floodplain management.
- SBFCA was recently selected for a \$400,000 grant to develop a basin-wide emergency response plan, assuring coordination between the existing two county and four city plans.
- SBFCA was a founding signatory to an historic MOU with conservation NGOs to partner on multi-objective projects in the basin.



System-Wide Improvement Framework

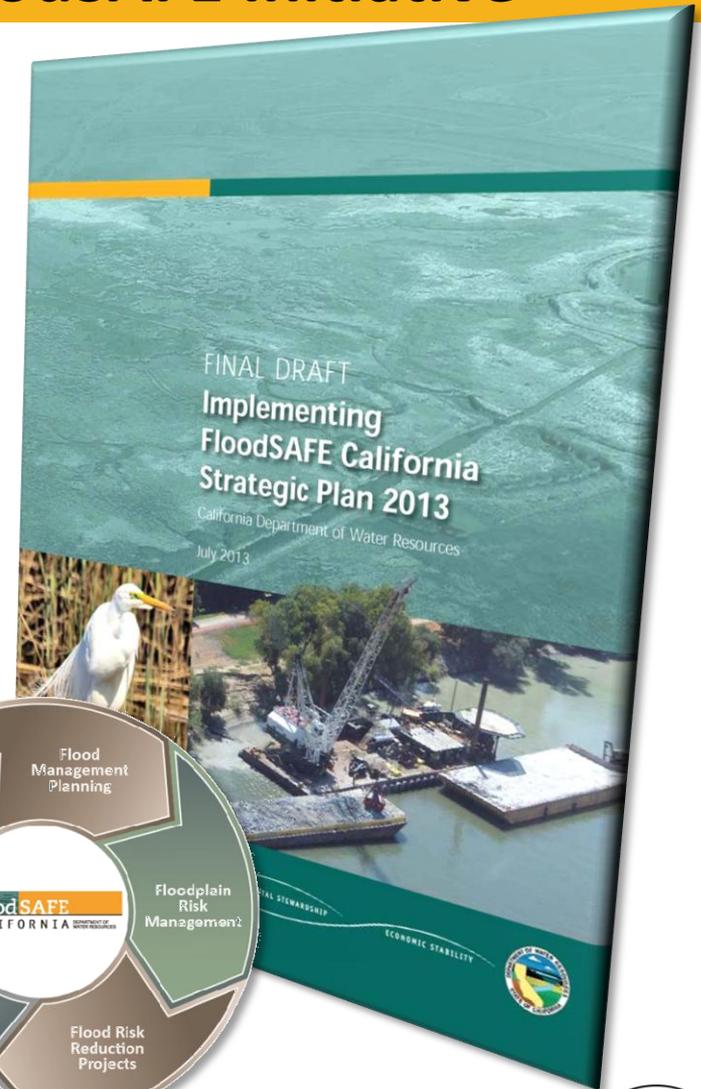
- On March 26, 2013, the CVFPB submitted an LOI to USACE; SBFCA agreed to lead in preparing the SWIF.
- Robust maintenance, coupled with SBFCA's improvements approved under section 408, will remediate many of the problems that resulted in loss of P.L. 84-99 status.
- The non-Federal interests all believe that the obligations contained within an approved SWIF will demonstrate a local, committed approach to continuing to buy-down risk for the basin.



Aligning with California's FloodSAFE Initiative

Sutter Basin Pilot Feasibility Study is consistent with:

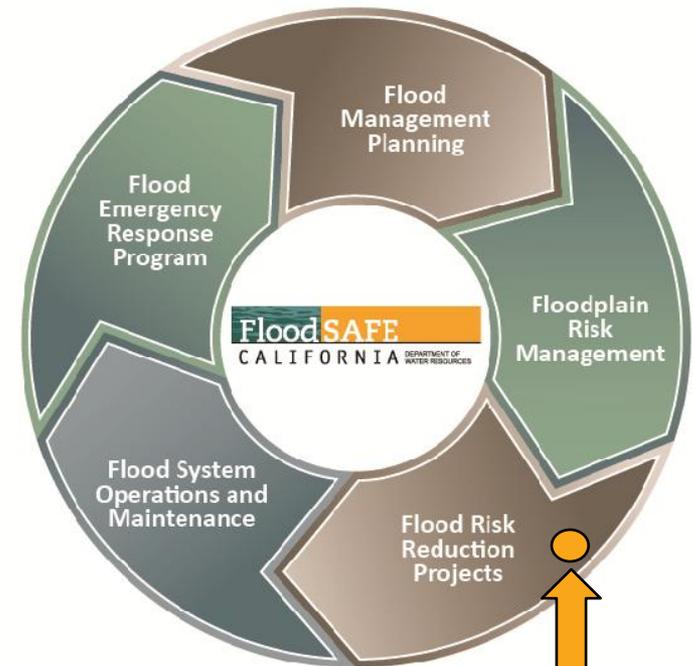
- ✓ *FloodSAFE Strategic Plan (2013)*
- ✓ *Central Valley Flood Protection Plan (2012)*



FloodSAFE Initiative

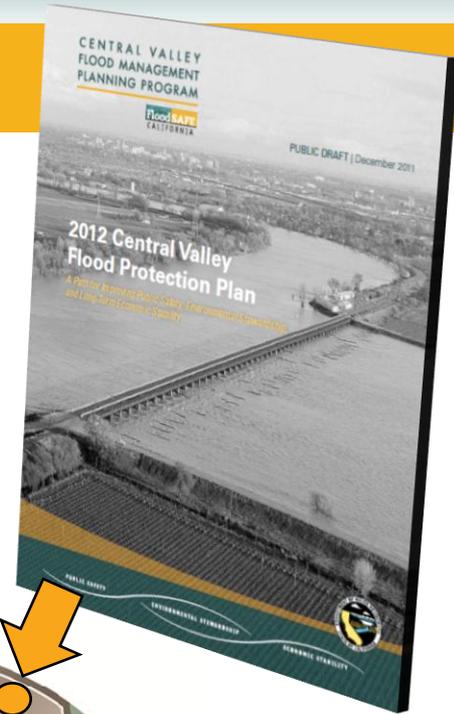
Principles:

- Integrate multi-benefit programs
- Approach flood risk management on a systemwide basis.
- Invest first where the flood risk is highest
- Integrate land use planning in flood management
- Incorporate ecosystem enhancement, environmental stewardship, and conservation strategy into flood management



Sutter Basin Pilot
Feasibility Study

Central Valley Flood Protection Plan (CFVPP)



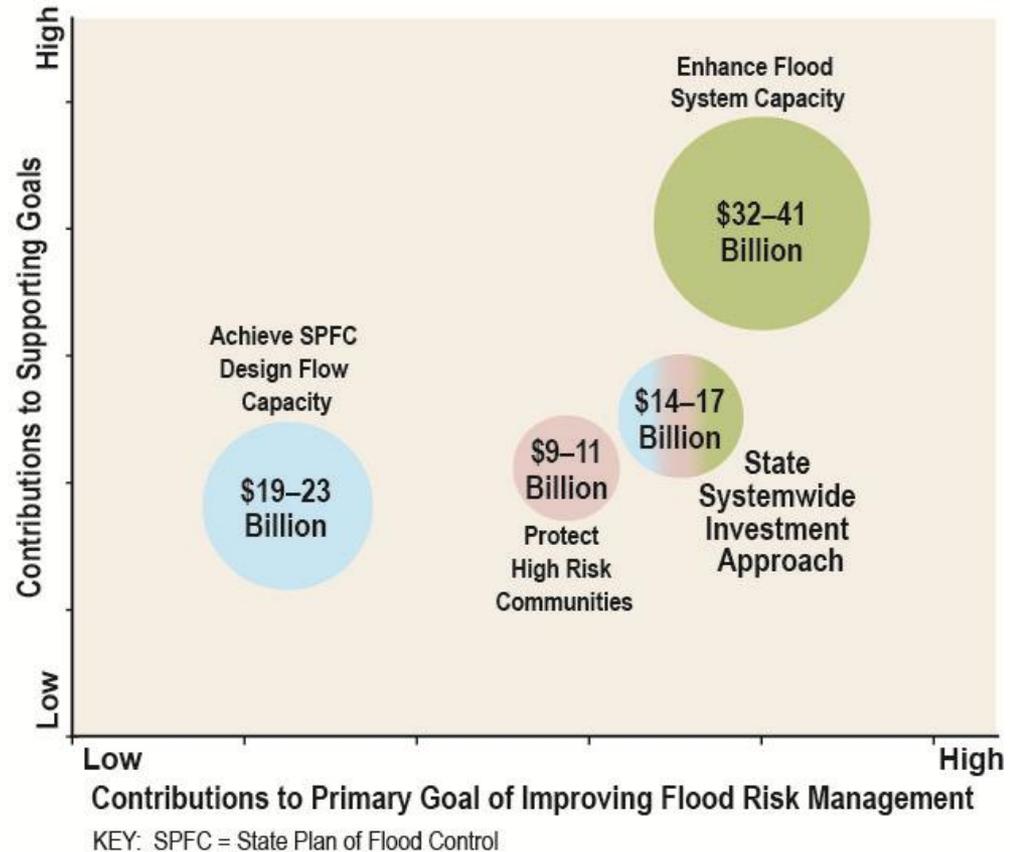
- Through the FloodSAFE Initiative the Central Valley Flood Protection Plan (CVFPP) was born
- Central Valley Flood Protection Plan
 - Establishes State policies and guidance through a State Systemwide Investment Approach
 - Provides a framework for future State investments to modernize the flood system
 - Integrates environmental conservation
 - Promotes Integrated Water Management (IWM)/Integrated Water Resource Management (IWRM)



State Systemwide Investment Approach (SSIA)

Creation of the State Systemwide Investment Approach (SSIA)

- Most promising, affordable and timely elements of three preliminary approaches
- Process similar to USACE's method of developing alternatives and selecting a recommended plan
- SSIA Provides:
 - Flexibility
 - Resiliency
 - Sustainability



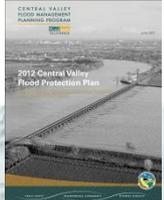
Post-Adoption CVFPP Planning Activities

Central Valley Flood System Conservation Strategy

Regional Flood Management Planning
6 Locally-led Plans

Basin-Wide Feasibility Studies
2 State-led Studies

2017 CVFPP



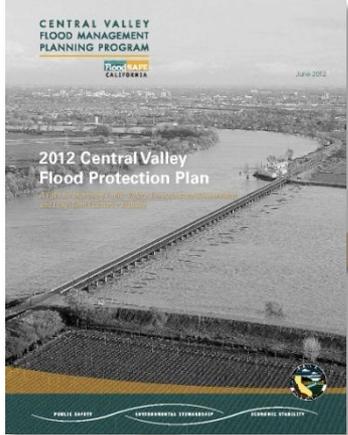
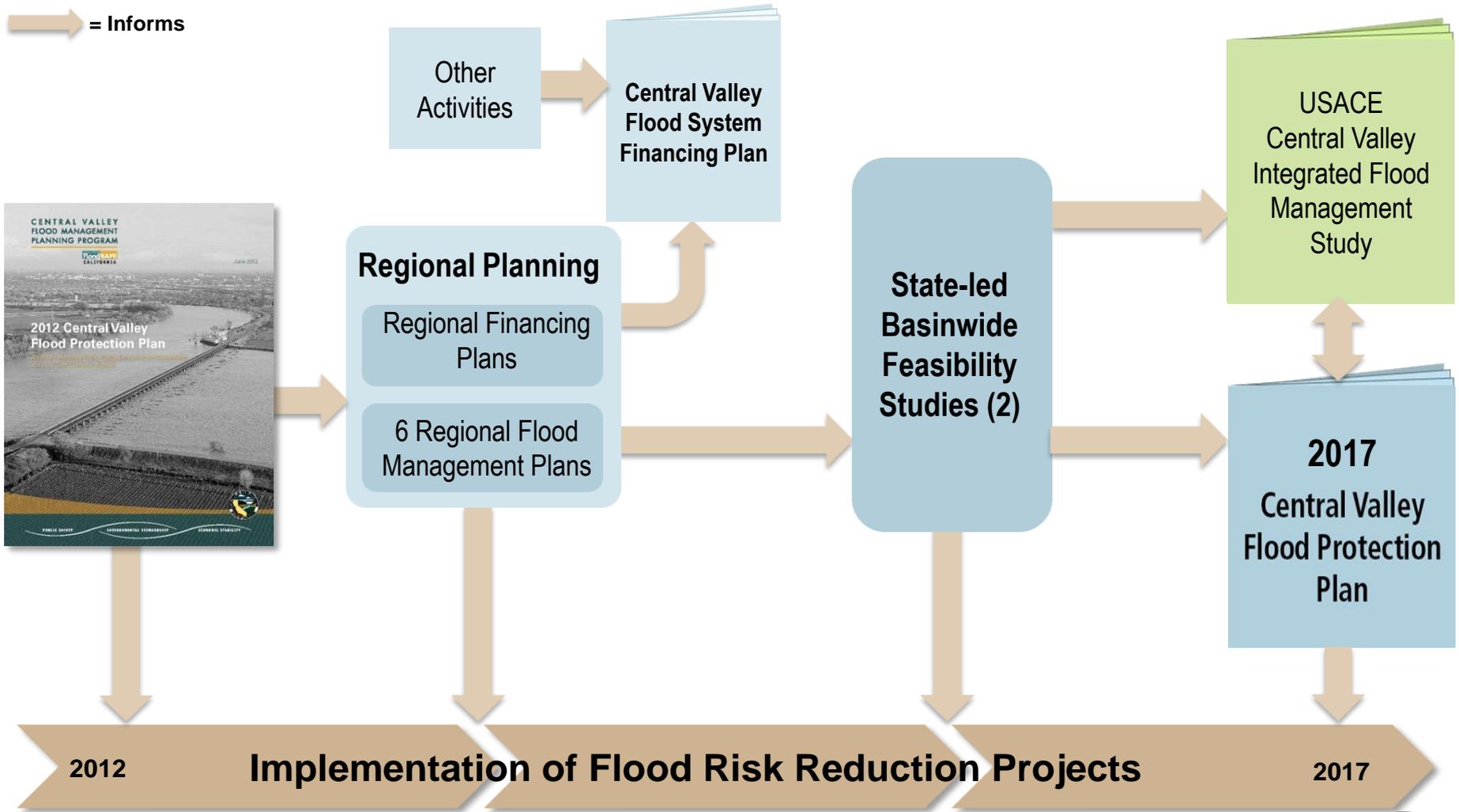
Sacramento River Basin

San Joaquin River Basin



Plans to Implementation

→ = Informs



2012 **Implementation of Flood Risk Reduction Projects** 2017



Sutter Basin

Sutter and Butte Counties, California
Sutter Basin Pilot Feasibility Study

Civil Works Review Board

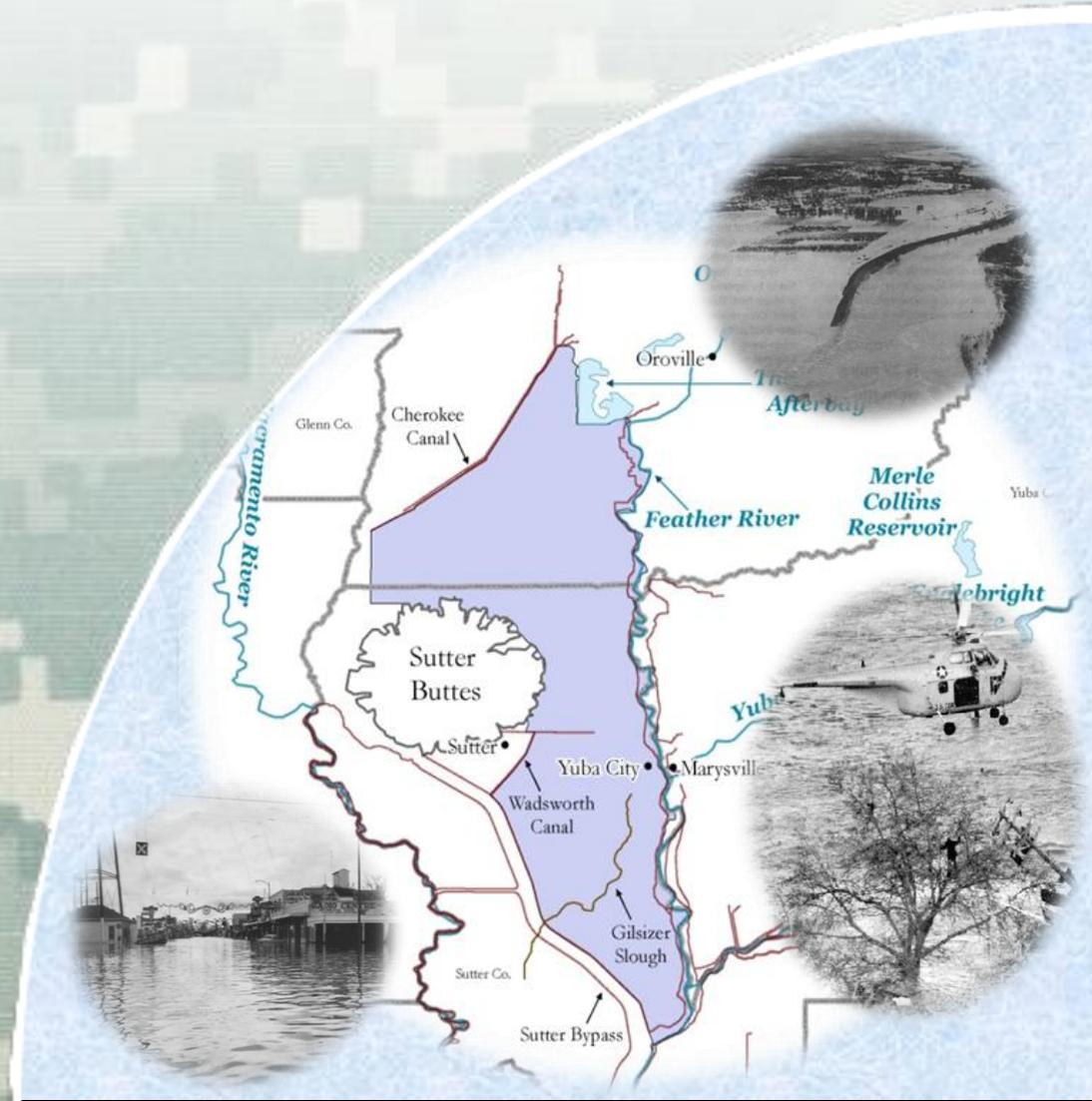
BG C. David Turner
Commander
South Pacific Division

22 October 2013

In Partnership with:



US Army Corps of Engineers
BUILDING STRONG



Briefing Objectives

- Rationale for Support
- Quality Assurance Activities
- Policy Issues
- Independent External Peer Review
- Expected Response to Draft Report of Chief of Engineers
- Division Recommendation



Rationale for SPD Support

- Recommended Plan is a significant positive step to improve flood risk management in Sutter Basin
- Plan addresses residual risk to public and life safety
- Recommended plan based on ASA (CW) approved LPP, but holds Federal cost share at National Economic Development (NED) Plan limit
- Division Engineer's Transmittal Letter signed 16 August 2013
- Report consistent with USACE pilot studies program requirements and complies with all applicable policy & laws
- Recommended plan is technically sound, economically feasible and environmentally acceptable
- Recommended plan supported by project proponent, Congressional delegation, and public



Rationale for SPD Support: USACE Campaign Plan

FY11:

- ▶ Objective 2a: Deliver Integrated and Sustainable Water Resource Solutions: Recommended plan provides positive FRM outputs
- ▶ Objective 2b: Collaborative Approaches: Collaboration with State of California, SBFCA, and the Pilot Program
- ▶ Objective 4b: Communicate Strategically and Transparently: Public workshops and Vertical Team involvement in the Pilot study process



FY13-18:

- ▶ Objective 2a: Modernize the Civil Works Project Planning Process; Implement Planning Modernization: Sutter Basin selected as Pilot Study in February 2011; 2nd through the CWRB; the pilot study as such developed and “flight tested” many of the SMART planning processes and concepts



SPD Quality Assurance Activities

- Continuous Vertical Team (VT) involvement throughout Final Report development
- VT facilitated issue resolution and dialog among vertical and horizontal team throughout pilot study process
- All issues identified in Policy Guidance Memo sufficiently addressed
- A Design Review Plan will be submitted for MSC approval and will include IEPR Type II Safety Assurance Review
- Presentation of ATR and IEPR comments to follow



Policy & Legal Compliance Certification

- Technical and Policy Compliance:
 - ▶ MCX Cost Certification: NWW Cost- Engineering, 11 October 2013
 - ▶ ATR Certification, 02 August 2013
 - Team comprised of members from 12 districts, 2 Centers of Expertise and the RMC
 - All ATR comments resolved
 - ▶ OWPR policy compliance issues resolved, PGM, 16 October 2013
 - ▶ IEPR, complete 23 September 2013, ongoing coordination of agency responses
- Legal certification of Integrated Final Feasibility Report/ Environmental Impact Report / Supplemental Environmental Impact Statement
 - ▶ SPK District Counsel certification 08 August 2013
 - ▶ SPD Division Counsel Legal Certification on 16 August 2013



Policy Issues

- Program complexity
- Compliance with engineering standards
- NED – LPP comparison; NED Exception
- Executive Order 11988 compliance
- Section 7 Endangered Species Act consultation with NMFS and USFWS



Program Complexity

- System Wide Improvement Framework (SWIF) application
- Levee Safety Baseline Condition Risk Assessment
- Feather River West Levee Project Section 408
- Central Valley Flood Protection Plan
- Regulated system



RMC-IWR Levee Safety Baseline Condition Risk Assessment

- Parallel evaluation by Risk Management Center; under agency review; performed with support from SPK
- Methodology further assesses several residual risk management actions such as flood fighting and evacuation routes
- Resulted in very high urgency for action; validates Feasibility Study investment recommendation



Engineering Standard Compliance

Issue: Vegetation Free Zone, Encroachments and Access issues

- Analysis: e.g. Vegetation compliance
 - ▶ FRWLP 408: Vegetation removal limited to construction footprint; maintenance requirement in accordance with existing operations manual
 - ▶ SWIF application in process: Intent is to bring levees in to compliance over time
 - ▶ Recommended Plan recommends vegetation removal to comply with ETL vegetation-free zone (VFZ)
- Resolution: Final compliance methodology to be determined in design phase, either through;
 - ▶ adherence to standard and or Value Engineering design change
 - ▶ variance from standard approved by HQUSACE
 - ▶ project specific exception to policy granted under SWIF process



NED – LPP Comparison

Issue: Justification for the National Economic Development Plan (NED) exception to recommend the Locally Preferred Plan (LPP)

- Analysis: Additional investment of \$297 million for the LPP buys down the residual risk
 - ▶ Non-monetized Other Social Effects benefits
 - ▶ Increases reliability of evacuation routes; especially for most vulnerable demographics (low income, minorities, and population over 56) who disproportionately live in the northern towns
 - ▶ Reduces population at risk
 - ▶ Reduces vulnerability of critical life safety infrastructure
 - ▶ Non structural measures considered to be ineffective and cost prohibitive
 - ▶ LPP increment would be fully funded by the non Federal sponsors
- Resolution: OSE benefits of the LPP substantially reduce the residual life safety risk in the Sutter Basin; USACE supports recommendation of the LPP as the Recommended Plan



EO11988 Compliance

Issue: ASA(CW) Conditional approval of NED Exception allowing recommendation of LPP required additional EO11988 compliance rationale

- Analysis:
 - ▶ Performed risk based assessment in consideration of:
 - Population Growth
 - Induced Development
 - Natural Floodplain Values
 - SBFCA Residual Risk Management Tools
 - ▶ Strong rationale to support wise use of floodplain
- Future levee modifications that may remove barriers to development will require USACE evaluation and potential 408 permission
- Resolution: Recommendation is compliant with EO11988; ASA granted NED exception to recommend LPP





ESA Coordination

Issue: Additional Section 7 Endangered Species Act (ESA) consultation with NMFS and USFWS required

- Analysis
 - ▶ Potential cost for uncertain OMRR&R impacts is less than \$1M or \$45K per year; acceptable risk, within contingency
 - ▶ Financial costs for OMRR&R mitigation: approximately 40% are associated with LPP plan, which is a 100% non-federal financial responsibility
 - ▶ The Sutter Feasibility Study BiOp supplements the FRWLP Sec. 408 BiOp, for which there are no required modifications to the existing OMRR&R manual
 - ▶ Sponsors have initiated a SWIF; work during Design to minimize impacts
- Resolution: Sponsors have OMRR&R responsibility; have accepted uncertainty associated with additional consultation required for OMRR&R manual; remaining ESA uncertainty would not change the project recommendation, or identification of the NED plan



IEPR Agency Response: 1 Non-Concur

- Issue: IEPR Comment – *Medium Significance* – Methods used to divide the levees into reaches may result in inaccurate calculations of geotechnical reliability that may impact the estimated net benefit of the project.
- Analysis: USACE Response: Not adopted.
 - ▶ Reach selection:
 - Professional difference of opinion
 - Several factors mitigate the risk of error in estimated benefits
 - Based on information provided for Panel review general concurrence that methods used were soundly executed and that the risk to investment decision is low
 - ▶ Benefit Uncertainty:
 - Economic Sensitivity Analysis performed in accordance ER1105-2-101; probabilistic ranges of BCR assess impact of all uncertainties including Geotech; potential range of BCR for recommended plan is 1.7 -3.3; project is justified despite geotechnical uncertainty
 - ▶ Proposed final written Agency Responses to the issues raised and recommendations in IEPR report coordinated with vertical team and FRM Planning Center of Expertise
- Recommendation: Agency position documented in Feasibility Report is policy compliant and further validated by Levee Safety Baseline Risk Assessment;



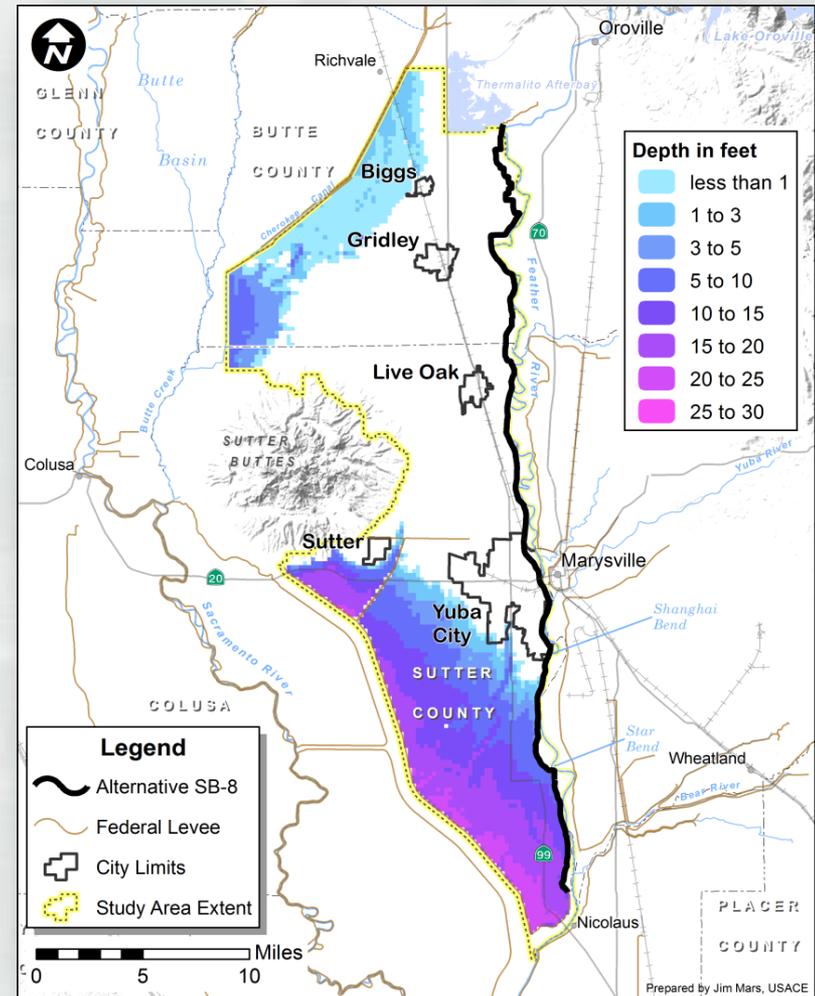
Expected Response to Draft Report of the Chief of Engineers

- Favorable response to draft Chief's Report expected
- Recommendation supported by non-Federal project proponents, the SBFCA, CVFPB, and Congressional Delegation



Division Recommendation

- Release Final Report for State and Agency Review
- Approve Final Report
- Complete Chief's Report



Recommended Plan: SB-8
1% ACE Residual Floodplain

Sutter Basin

Sutter and Butte Counties, California Sutter Basin Pilot Feasibility Study

Agency Technical Review

Ronnie Barcak, Alaska District

ATR Lead, FRM-PCX

22 October 2013

In Partnership with:



US Army Corps of Engineers
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Agency Technical Review

- National Team Effort led by POA with reviewers from POA, SAM, MVP, SWL, SPN, MVS, MVK, MVN, MVR, LRB, IWR, NWW, & RMC
- Certified Model HEC-FRM was used
- Cost Certified 02 August 2013 and Re-certified 10 October 2013
- ATR Certified for Draft Final Report: 07 August 2013
- No additional ATR required for Final Report, due to no significant technical or policy revisions to the Draft Final Report
- ATR complete



ATR Process

- ATR was scheduled for concurrent review at Draft Final Report.
- To manage risk, several interim and focused ATRs were completed during the study process.
- 227 DrChecks comments generated through all reviews.
- All ATR comments have been resolved and closed



ATR Items of Significance

- Qualitative vs. Quantitative Perspective
 - ▶ Number of geotechnical index points
 - ▶ Clarification on judgment portion of fragility curves
- All ATR items of significance were resolved as per USACE guidance and policy.



Sutter Basin Pilot Feasibility Draft Report - Draft Environmental Impact Report/Supplemental Environmental Impact Statement

Presented to the
October 22



Battelle

Karen Johnson-Young, PMP
Program Manager

Richard Uhler, PMP
Project Manager

IEPR – Sutter Basin

Sutter Basin Panel Members	Panel Discipline
Kevin Coulton, P.E. (<i>lead panel member</i>)	Hydrology & Hydraulic Engineering
Richard Sisson, Ph.D., P.E. (<i>dual role</i>)	Civil & Geotechnical Engineering
Linda Leeman	Biology/Ecology
Donald Ator	Civil Works Economics

The Sutter Basin IEPR was conducted in July-August 2013

- Panel Reviewed the June 2013 version of the documents
- Project documents were prepared as a Pilot Study/Pre-SMART Planning Process

IEPR – Sutter Basin

Sutter Basin Final IEPR Report submitted on August 19, 2013

Results:

- 19 Final Panel Comments
 - 1 high significance
 - 15 medium significance
 - 3 low significance

Post-Final Panel Comments/Response results documented on September 10, 2013

Results:

- PDT Evaluator Responses to Final Panel Comments
 - 10 Concur
 - 9 Non-concur
- Panel BackCheck Responses to the PDT Responses
 - 18 Concur
 - 1 Non-concur

IEPR – Sutter Basin

▶ Notable Panel Findings from the Final IEPR Report

- The feasibility study planning objectives to reduce flood risk are referenced to a federal 1% (100-year) annual chance exceedance (ACE) event which appears to conflict with a 2007 California law that requires flood protection for the 0.5% (200-year) ACE event in urban areas.
- Methods used to divide the levees into reaches may result in inaccurate calculations of geotechnical reliability that could impact the estimated net benefit of the project.
- Methods used to develop geotechnical fragility curves have not been sufficiently calibrated by using observed frequency of actual failures.
- Statistical parameters for seepage analyses may overestimate the projects net benefits because the methods might inflate factors describing variability.
- Residual risks of levee failure in events up to and including the 1% ACE floodplain subsequent to repair have not been evaluated.
- Economic risk and uncertainty associated with future without-project conditions did not take into account expected population growth.
- The spatial impact of woodland vegetation removal, identified as a significant and unavoidable impact in the short term, is not evaluated in terms of potential long-term fragmentation of wildlife habitat.

IEPR – Sutter Basin

Conclusion

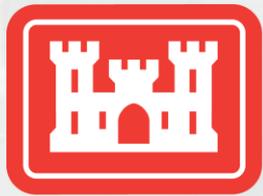
- The Panel concurred with all but one PDT Response to the Final Panel Comments.
 - The Panel recognizes that no standard method exists for selecting levee reaches. Although the method used for this study may introduce excessive variability that could overstate the probability of failure, it does not affect the selection of the TSP.

Sutter Basin Pilot Feasibility Study, Sutter and Butte Counties, CA

HQUSACE POLICY REVIEW CONCERNS

Scott Nicholson
Office of Water Project Review
Planning and Policy Division

October 22 2013



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HQUSACE Team Reviews:

- TSP Milestone Meeting was held in November 2012
- Draft report review July 2013
- Final Feasibility Report /EIS: October 2013

HQ OWPR Review Team:

Tom Hughes
Mark Matusiak
John Cline
Chandra Pathak
Aaron Hostyk



Policy Issues from Planning Workshops, TSP Milestone & Draft Report Reviews

- ❑ Problem Identification
- ❑ **Independent Plan Formulation from Sec 408**
- ❑ Residual Risk Management – Life Safety
- ❑ Plan Reliability/Uncertainty
- ❑ **Continued ESA Section 7 Consultation**
- ❑ Cost Certification
- ❑ **NED Plan Evaluation - Completeness**
- ❑ Cultural Resources
- ❑ **Residual Risk - Induced Growth in the Floodplain**



Significant Areas of Policy Concern:

- ❑ **Independent Plan Formulation from Sec 408**
- ❑ **ESA Section 7 Consultation**
- ❑ **Residual Risk - Induced Growth in the Floodplain**
- ❑ **NED Plan Evaluation - Completeness**



Plan Formulation

- **CONCERN:** Independent Formulation from 33 USC Sec. 408 Permission to Modify a Federal Project. The LPP plan is generally the same as the West Feather River Section 408. In addition, the Sutter feasibility study EIS is a tiered document from the Section 408 EIS.
- **REASON:** ER 1105-2-100 and the Unified National Program for Floodplain Management require broader objectives based on the problems and opportunities identified. The planning problem for the 408 Permission is levee performance. This narrow definition could limit identifying broader floodplain management objectives.
- **RESOLUTION:** The formulation established an independent set of flood risk management objectives that resulted in a comprehensive array of alternatives separate from the Section 408. During plan evaluation it became evident that the 408 plan was not the NED plan. The reconciliation of the two reports was accomplished by the Sponsors' support of a 100% non-federal incremental cost LPP plan approved by the ASA(CW) and identified as the recommended plan.
- **RESOLUTION IMPACT:** Concern Resolved.



Plan Endangered Species Act Consultation

- **CONCERN:** Endangered Species Act Section 7 Consultation
- **REASON:** Feasibility reports include a lifecycle assessment of the recommended plan in consultation with federal resource agencies. ER 1105-2-100.
- **RESOLUTION:** Under the Endangered Species Act USFWS and NMFS continue to have a responsibility to evaluate construction and operation changes. Continued coordination with the resource agencies will help identify reasonable opportunities to minimize O&M impacts. While informal consultation is always a possibility during the remainder of the project lifecycle, in this case we agreed to formally reinstate consultation once the O&M manual has been completed. The coordination of issues of concern to resource agencies will be more structured and incorporated into PED phase of the project.
- **RESOLUTION IMPACT:** The Final Report consultation for construction is completed, existing O&M operations are acceptable, and the sponsors are willing to accept the financial responsibilities that are incorporated into the OMRR&R costs for the project. Concern Resolved.



Residual Risk: Induced Growth in the Floodplain

- **CONCERN.** Residual risk and potential induced growth in the floodplain. The potential for significant growth in residual risk due to the effects of induced development within the floodplain are documented in both Sutter and Butte County land use plans as well as state of California population projections.
- **REASON.** EO 11988 and Unified National Program for Floodplain Management concept of wise use of floodplains requires all practicable alternatives are to be considered in the development and evaluation of alternatives. ER 1150-2-26
- **RESOLUTION.** UNP goals were incorporated into the formulation and screening of alternatives to minimize residual risk. The sponsors are mitigating the residual risk by implementing floodplain management measures in coordination with numerous NGO's as part of the response to comments on the West Feather River Section 408. The issue was resolved based on ASA(CW) endorsement of the LPP plan.
- **RESOLUTION IMPACT:** The lack of economic drivers along with development restrictions in place at the local, state and federal level will continue to control and limit urbanized development in the areas with the greatest potential for loss of life. Concern Resolved.



NED Plan Evaluation - Completeness

- **CONCERN.** “Separable project elements” is defined in 33 U.S.C. Section 2213(f) and is taken into consideration to evaluate project completeness.
- **REASON:** This issue could impact cost sharing responsibilities for the LPP incremental cost based on the evaluation of completeness of the NED plan. Because of the particular geographic circumstances of Sutter Basin and the linearity of the Feather River, more detail was necessary to establish the independent nature of the three hydraulic reaches designated as separable elements and how they achieve project objectives.
- **RESOLUTION:** ER 1105-2-100, page E-9, states a separable element in it is part of a project that “can be implemented as a separate action” that The formulation of each separable element for this project should therefore be shown to encompass project objectives including the reduction of risk to life (a stated project objective) with regard to evacuation routes independently of the other separable elements.
- **RESOLUTION IMPACT:** The report was revised adding text referencing use of life safety objectives and evacuation route assessment in evaluating separable benefits and costs of “separable elements”. The LPP remains supportable as the recommended plan at 100% non-federal incremental cost. Concern Resolved



HQUSACE POLICY COMPLIANCE REVIEW TEAM RECOMMENDATION

**Approval to release the draft Chief's Report –
Feasibility Report and EIS for S&A Review.**



Sutter Basin Pilot Feasibility Study

Sutter & Butte Counties, California

General Lessons Learned

- + Vertical team engagement key
- + Parametric cost estimates for screening
- △ Consultation challenges
- △ Concurrent simultaneous reviews



Division Lessons Learned

- + As one of first pilot studies, laid groundwork and demonstrated practicality of SMART planning
- + Successful application of EO 11988
- + Critical use of Risk Assessment tools to document
- △ Ecosystem restoration objectives filtered early; alternatives that deliver ER + FRM (such as setback levees) cost more and deliver same \$ benefits as FRM only (e.g., levees) alternatives
- △ Need agency alignment on application of multi-criteria decision-making

