



Meeting Summary

Levee Performance Scope

Definition Work Group Meeting #3

September 28, 2009, 10:30 am – 4:30 pm
Location: Center for Collaborative Policy
815 S St, First Floor
Sacramento, CA 95811

WORK GROUP ATTENDANCE:

Name	Affiliation	Status
Steve Chainey	CA Department of Water Resources (DWR)	Partner
Ron Heinzen	SJAFCA	Partner
Gil Labrie	Brannan-Andrus LMD	Partner
Mary Perlea	U.S. Army Corps of Engineers	Partner
Jeff Twitchell	Sutter County	Partner
Gary Hester	DWR	CVFMP Program Manager
Roger Lee	DWR	CVFPO*
Joseph Bartlett	DWR	CVFPO*
Mary Jimenez	MWH Americas Inc. (MWH)	Technical Lead
Josh Yang	MWH	Team
Dorian Fougères	Center for Collaborative Policy (CCP)	Facilitator
Nicole Ugarte	CCP	Facilitation Support / Note-taker

*Central Valley Flood Planning Office

Absent:

Peter Buck	SAFCA	Partner
Les Harder	SAFCA	Partner
Stuart Edell	Butte County Public Works, Sutter Butte Flood Control Agency	Partner
Reggie Hill	Lower San Joaquin Levee District	Partner
Chris Neudeck	RD 17 and Sherman Island	Partner
Bill Darsie	RD 17 & Sherman Island	Alternate
Mike Inamine	DWR	DWR Lead
Ken Kirby	DWR	CVFMP Program Manager

Observers:

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Ann Martin	Praxis Consulting Group, Inc.	Observer
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ACTION ITEMS:

1. **Send comments and suggestions for the CVFPP Glossary to Mary Jimenez**
(mary.jimenez@us.mwhglobal.com)
 - Suggested revisions and comments will be captured in track changes
2. **Review Draft Deliverable #3 and send resources or citations to Mary Jimenez (email above)**
3. **Review Draft Deliverable #4 and send titles or information to Mary Jimenez (email above)**

FINAL MEETING:

A Microsoft Outlook calendar invitation will be sent for the final LPSDWG meeting:

- Thursday, October 8, 9 am – 3 pm, MWH American River Room, 3321 Power Inn Road, Suite 300, Sacramento

MEETING #3 OBJECTIVES:

- Detailed discussion of Deliverable #2
- Review Draft Deliverable #3

SUMMARY:

Welcome and Greetings

Dorian Fougères, Facilitator with CCP, opened the meeting and reviewed the agenda and meeting materials.

Revised Materials

Mary Jimenez, Technical Lead with MWH, reviewed minor changes in the Charter – an update of the Partners List, and changing the prioritization of Deliverable #1 to Critical/Important/Less Important.

Ms. Jimenez also referred to the revised Glossary, with the Partners' comments reflected in track changes. Additional revisions to the Glossary can be sent to Ms. Jimenez.

Work Group Membership Update

The group was informed Dan Tibbitts, US Army Corps of Engineers, would no longer participate in the Work Group due to time, and could not represent anyone but the Corps in order to avoid any conflict of interests. Reggie Hill, Lower San Joaquin Levee District, had also communicated that he should no longer participated due to his absences at the first two meetings, but Partners agreed Mr. Hill's comments would be appreciated and he should remain informed of the group's work and invited to comment.

Update on Regional Conditions Work Group Activities

Gary Hester, CVFMP Program Manager, explained the plan for the five Regional Conditions Work Groups, how the Topic Scope Definition Work Groups fit in, and an outline of the report's progress. An outline for the report had been developed, and there will be a section to identify problems. This is where the findings of the Topic Scope Definition Work Groups will be integrated. Mr. Hester affirmed that the overall document will be posted on the web for review, and that all participants of the process are

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encouraged to give feedback through the final stages (not just at the end). As the final Levee Performance Scope Definition Work Group meeting will take place before the report is near its final stages, the Partners decided to discuss potential review and comment processes at the next meeting on October 8th. The tentative recommendation was to circulate the draft report, provide an opportunity for Partners to comment, and then hold some sort of session to consolidate comments.

Refinement of Draft Deliverable #1

During Meeting 2, the group flagged a number of issues and then sent in comments after the meeting to clarify select points. During Meeting #3, Partners modified the language of the flagged issues to address the comments.

The revised Draft Deliverable #1 is attached below.

Discussion of Draft Deliverable #2

The group reviewed the straw proposal for Draft Deliverable #2: Existing Problems and Expected Future Challenges. The Partners decided to instead develop the list from the Key Factors from Deliverable #1, listed below:

- Critical:
 1. Levee Foundation
 2. Levee Geometry
 3. Hydrology and Hydraulics
 4. Levee Soil Material
 5. Waterside Erosion
 6. Earthquakes (in Delta)
 7. Substandard Levee Modifications (in Delta)
- Important:
 1. Encroachments
 2. Impediments to Flood Fighting
 3. Lack of Vegetation Cover
 4. Land Use Practices Outside Levee Easement
 5. Burrowing Rodents
 6. Structures Outside Levee Easement
 7. Unremediated Past Seepage Distress
 8. Penetrations Through or Under Levee
 9. Subsidence: Upper San Joaquin Extraction
 10. Subsidence: Levee Modifications
 11. Rainfall Duration and Intensity
- Less Important:
 1. Vegetation Roots and Treefall
 2. Construction and Manmade Activities
 3. Closure Structures
 4. Earthquakes
 5. Subsidence: Decomposition
 6. Subsidence: Levee Settlement
 7. Subsidence: Delta Consolidation

The Key Factors were prioritized using the following criteria:

- A Key Factor was determined to be *Critical* if the factor was categorized as critical for two or more of the three main failure mechanisms (Internal Erosion, External Erosion, and Slope Stability), or critical for one failure mechanism as well as important for another.
- A Key Factor was determined to be *Less Important* if the factor was categorized as less important for two or more failure mechanisms.
- All remaining Key Factors were categorized as *Important*

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After working through several factors, Partners agreed that the existing problems were not significantly different from the expected future challenges, and thus to combine the two lists.

The Draft Deliverable #2 is attached below.

Review and Refinement of Draft Deliverable #3

During the last meeting, Partners had suggested key documents pertaining to levee performance. During Meeting #3, Partners agreed to send in citations or suggested contacts for locating the recommended resources. The group also identified duplicate entries.

Discussion of Draft Deliverable #4

The group reviewed the list of ongoing and completed projects pertaining to levee performance. The draft Deliverable was divided into ongoing and complete projects for the U.S. Army Corps of Engineers, DWR, and Regional/Local Activities. Partners recommended subdividing each section by the 5 regional areas, then cross checking with the Regional Conditions Work Groups to ensure all projects are listed.

The Draft Deliverable #4 is attached below.

Next Steps

- The group will review and finalize Draft Deliverable #2 together at the next Work Group meeting
- Suggestions and comments on the Glossary, resources for Draft Deliverable #3, or general comments should be sent to Ms. Jimenez via email.



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Draft Deliverable #1

Factors	Internal Erosion	External Erosion	Slope Stability	Notes/Clarification
Levee Foundation	C	C	C	
Levee Geometry	C	C	C	
Encroachments	I	LI	I	
<u>Lack of</u> Vegetation Cover	LI	C	I	<u>Perlea: Considered having a positive impact on levee against erosion. It should be only grass or maximum 2 inches in diameter, no woody vegetation.</u> <u>Chainey: applies to effects of vegetation cover reducing near-surface velocity by flowing water, or root reinforcement of soils on banks and levee slopes</u>
Vegetation Roots & Treefall	LI	LI	LI	<u>Perlea: Considered having a negative impact on levee</u>
Land Use Practices <u>Outside of Easement</u>	I	LI	I	<u>Perlea: Land use outside the levee easement</u>
<u>Burrowing (Chainey)</u> Rodents	C	LI	LI	
Hydraulic Head	C	C	C	
Impediments to Flood Fighting, <u>Inspection and Maintenance (Perlea)</u>	I	I	I	
Structure Outside <u>Levee Footprint (Chainey)</u>	C	LI	LI	
Construction & Other Manmade Activities	I	LI	LI	
Unremediated Past Seepage Distress	C	LI	LI	
Levee <u>Soil (Chainey)</u> Material	C	C	C	
Waterside Erosion	C	C	C	
Penetrations <u>Through or Under Levee</u>	C	LI	LI	<u>Perlea: Includes penetration in the levee embankment or its foundation</u>
Closure Structures (<u>Flood Gates, Rolling Gates, Stoplogs</u>)	LI	LI	LI	<u>Chainey: such as flood gates at road and railway crossings of levees</u>
Earthquakes	LI	LI	LI	<u>Perlea: Did we not decide it has a pretty big impact on levee stability?</u>
Delta <u>Specific (Perlea)</u>	C	LI	C	
Subsidence: Organic Soil Decomposition (Delta Specific)	LI	LI	LI	<u>Does not mean that it doesn't happen, just less important</u>
Subsidence: Levee Settlement	LI	LI	LI	
Delta- Consolidation	LI	I	LI	<u>Perlea: Is this not part of subsidence in Delta? Why is it called "consolidation". At least call it "settlement".</u>
Upper San Joaquin- Groundwater	<u>LI</u>	I	LI	<u>Heinzen: We listed LI for internal because we believe that most of the 3-4 feet of settlement has been mitigated—this may not be</u>

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and Oil Extraction				<u>correct everywhere so might consider changing this to "I"</u>
<u>Substandard</u> Levee Modifications	I	LI	I	<u>Except properly engineered Levee Improvements</u>
Delta	I	LI	C	<u>Except properly engineered Levee Improvements</u>
Rain <u>fall (Chainey)</u> Duration & Intensity	LI	I	<u>LI</u>	<u>Chainey: applies to levee surface erosion and slope saturation caused by rainfall, but does not include the effect of watershed storm events on river hydrology.</u>

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Draft Deliverable #2

<i>CRITICAL</i>	
LEEVE FOUNDATION	EXISTING PROBLEMS & FUTURE CHALLENGES
1. Technical Risk Factor	<ul style="list-style-type: none"> • Underseepage • Slope stability • Seismic
2. Policy	<ul style="list-style-type: none"> • variable design flood elevation • variable safety factors • engineering standards change over time • new regulations • new gov't priorities • new legislation
3. Financial Constraints	<ul style="list-style-type: none"> • Corps benefits/cost ratio • Limited Fed/state/local funding
LEEVE GEOMETRY	EXISTING PROBLEMS & FUTURE CHALLENGES
1. Technical Risk Factor	<ul style="list-style-type: none"> • Inability to access for flood fighting • Slope stability • Internal erosion to through seepage • Erosion below and above levee toe • Hydraulic constraints to waterside improvements
2. Policy	<ul style="list-style-type: none"> • Insufficient, inconsistent minimum state or federal standards for existing and new levees • Regulatory constraints to waterside improvements and repairs
3. Financial Constraints	<ul style="list-style-type: none"> • High cost to bring existing levees to new standards
EXISTING PROBLEMS & FUTURE CHALLENGES	

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HYDROLOGY AND HYDRAULICS	
1. Technical Risk Factor	<ul style="list-style-type: none"> • Overtopping • Landside erosion by overtopping • Climate change affecting watershed hydrology and hydraulics • Upstream/downstream levee failures • Development in the watershed that increases peak runoff • Development in the bypasses and overflow that decreases flow conveyance • Structural weakening due extended time of high stage and rapid drawdown •
2. Policy	<ul style="list-style-type: none"> • Reservoir operations • Flood relief structures • Different levels of protection • Maintaining channel capacities • Operation of closure structures • Inconsistent freeboard standards among Federal and State** • Unresolved risk, uncertainty and confidence level criteria*
3. Financial Constraints	<ul style="list-style-type: none"> • Corps benefits/cost ratio • Limited Fed/state/local funding
LEVEE SOIL MATERIAL	EXISTING PROBLEMS & FUTURE CHALLENGES
1. Technical Risk Factor	<ul style="list-style-type: none"> • Availability of borrow material • Through seepage • Stability • Material quality and soil contamination • Tension cracks • Embankment erosion
2. Policy	<ul style="list-style-type: none"> • Environmental restrictions on use of dredge materials and work periods • Environmental and cultural restrictions on use of borrow material • Variable acceptance criteria by different agencies • Surface Mining and Reclamation Act regulations and constraints • Air quality restrictions on use of aged equipment
3. Financial Constraints	<ul style="list-style-type: none"> • Cost of material sources and transportation

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	<ul style="list-style-type: none"> • Cost of material placement • Cost of permitting
WATERSIDE EROSION	EXISTING PROBLEMS & FUTURE CHALLENGES
1. Technical Risk Factor	<ul style="list-style-type: none"> • Levee slope failure • Seepage through the levee and foundation • Loss of waterside berm • Loss of critical sections • Impact of geomorphology • Source of sediment deposition downstream • River meander • Weak composition of levee and foundation • Loss of vegetation and natural habitat
2. Policy	<ul style="list-style-type: none"> • Environmental constraints • Corps policy on vegetation
3. Financial Constraints	<ul style="list-style-type: none"> • Cost of bank protection • Cost of mitigation • Limited locations available for bank habitat mitigation • Limited Federal and State funding
EARTHQUAKE (IN DELTA)	EXISTING PROBLEMS & FUTURE CHALLENGES
1. Technical Risk Factor	<ul style="list-style-type: none"> • Slope stability • Settlement due to liquefaction • Increased salinity of water supply • Interruption of water deliveries south of the Delta • Loss of islands • Wave erosion of flooded islands • Loss of lives • Sea level rise • Loss or interruption of transportation and infrastructure
2. Policy	<ul style="list-style-type: none"> • Inconsistency in analytical methods and lack of regulation thereof • Low benefit/construction cost ratio • Whether to protect all Delta islands (DRMS)
3. Financial Constraints	<ul style="list-style-type: none"> • High cost of seismic mitigation and reclaiming flooded islands

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	<ul style="list-style-type: none"> • Low benefit/construction cost ratio
SUBSTANDARD LEVEE MODIFICATIONS (IN DELTA)	EXISTING PROBLEMS & FUTURE CHALLENGES
1. Technical Risk Factor	<ul style="list-style-type: none"> • Slope stability • Seepage through the levee • Seepage through the foundation • Settlement • Wave and wake erosion • Loss of critical section
2. Policy	<ul style="list-style-type: none"> • Lack of oversight • Time required for environmental permitting
3. Financial Constraints	<ul style="list-style-type: none"> • Inadequate resources of local levee maintaining agencies • Liability for environmental penalties • Cost of environmental mitigation • Loss of Federal funding for flood repair
<i>IMPORTANT</i>	
ENCROACHMENTS	EXISTING PROBLEMS & FUTURE CHALLENGES
1. Technical Risk Factor	
2. Policy	
3. Financial Constraints	
IMPEDIMENTS TO FLOOD FIGHTING	EXISTING PROBLEMS & FUTURE CHALLENGES
1. Technical Risk Factor	
2. Policy	
3. Financial Constraints	
LACK OF VEGETATION COVER	EXISTING PROBLEMS & FUTURE CHALLENGES
1. Technical Risk Factor	
2. Policy	
3. Financial Constraints	

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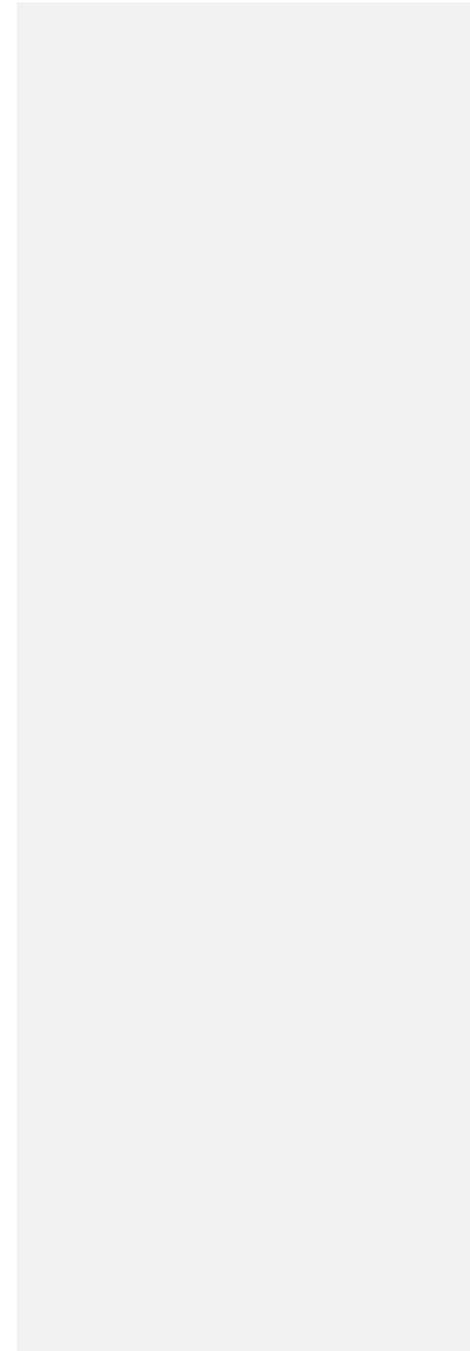
LAND USE PRACTICES OUTSIDE EASEMENT	EXISTING PROBLEMS & FUTURE CHALLENGES
1. Technical Risk Factor	
2. Policy	
3. Financial Constraints	
BURROWING RODENTS	EXISTING PROBLEMS & FUTURE CHALLENGES
1. Technical Risk Factor	
2. Policy	
3. Financial Constraints	
STRUCTURES OUTSIDE LEVEE EASEMENT	EXISTING PROBLEMS & FUTURE CHALLENGES
1. Technical Risk Factor	
2. Policy	
3. Financial Constraints	
UNREMIEDIATED PAST SEEPAGE DISTRESS	EXISTING PROBLEMS & FUTURE CHALLENGES
1. Technical Risk Factor	
2. Policy	
3. Financial Constraints	
PENETRATIONS THROUGH OR UNDER LEVEE	EXISTING PROBLEMS & FUTURE CHALLENGES
1. Technical Risk Factor	
2. Policy	
3. Financial Constraints	
SUBSIDENCE: USJ EXTRACTION	EXISTING PROBLEMS & FUTURE CHALLENGES
1. Technical Risk Factor	
2. Policy	
3. Financial Constraints	
SUBSIDENCE: LEVEE MODIFICATIONS	EXISTING PROBLEMS & FUTURE CHALLENGES
1. Technical Risk Factor	
2. Policy	
3. Financial Constraints	

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RAINFALL DURATION & INTENSITY	EXISTING PROBLEMS & FUTURE CHALLENGES
1. Technical Risk Factor	
2. Policy	
3. Financial Constraints	
<i>LESS IMPORTANT</i>	
VEGETATION ROOTS & TREEFALL	EXISTING PROBLEMS & FUTURE CHALLENGES
1. Technical Risk Factor	
2. Policy	
3. Financial Constraints	
CONSTRUCTION & MANMADE ACTIVITIES	EXISTING PROBLEMS & FUTURE CHALLENGES
1. Technical Risk Factor	
2. Policy	
3. Financial Constraints	
CLOSURE STRUCTURES	EXISTING PROBLEMS & FUTURE CHALLENGES
1. Technical Risk Factor	
2. Policy	
3. Financial Constraints	
EARTHQUAKES	EXISTING PROBLEMS & FUTURE CHALLENGES
1. Technical Risk Factor	
2. Policy	
3. Financial Constraints	
SUBSIDENCE: DECOMPOSITION	EXISTING PROBLEMS & FUTURE CHALLENGES
1. Technical Risk Factor	
2. Policy	
3. Financial Constraints	
SUBSIDENCE: LEVEE SETTLEMENT	EXISTING PROBLEMS & FUTURE CHALLENGES
1. Technical Risk Factor	
2. Policy	
3. Financial Constraints	
SUBSIDENCE: DELTA:	EXISTING PROBLEMS & FUTURE CHALLENGES

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CONSOLIDATION	
1. Technical Risk Factor	
2. Policy	
3. Financial Constraints	



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Draft Deliverable #4

Deliverable #4 – Levee Performance Evaluation Activities

Review and update a list of previously compiled levee performance evaluation activities to develop a comprehensive list of other levee performance evaluation activities that the CVFPP Plan Development Team should become familiar with and coordinate with regularly.

<u>DWR</u>
Ongoing Activities
Urban Levee Geotechnical Evaluation Program
USACE/SAFCA/DWR Levee Vegetation Research Collaborative
Construction inspections
CVFPB inspections, reviews, permitting activities
Assembly Bill 156 Levee Conditions Survey
Levee Maintenance Authority(ies) Inspection Reports (DWR; LDs; RDs,)
Urban Levee Geotechnical Evaluations – Geotechnical Data Reports (varies, 2008/09)
San Joaquin River Restoration Program
Bay Delta Conservation Plan
Completed Activities
FloodSAFE Strategic Plan – Public Review Draft (June 2008)
Sacramento and San Joaquin River Basins California, Comprehensive Study – Interim Report (December 2002)
California Flood Management Task Force, Management Report (December 2002)
Delta Risk Management Strategy – Phase I Report (February 2009)
Sacramento and San Joaquin River Basins, California, Post-Flood Assessment (March 1999)
Final Report – Governor’s Flood Emergency Action Team (May 1997)
San Joaquin River System Levee Repair Prioritization Report (December 2007)
Flood Warnings: Responding to California’s Flood Crisis (2005 White Paper; January 2005)
California Levee Roundtable - California’s Central Valley Flood Control Improvement Framework (February 2009)

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Third Draft Interim Levee Design Criteria for Urban and Urbanizing Area State-Federal Project Levees
<u>U.S. Army Corps of Engineers</u>
Ongoing Activities
Annual Project levee inspections
Levee Identifiable Inadequacies Floodplain Management (Joint DWR-USACE GIS database)
System Analysis of State Plan of Flood Control
Sacramento River Bank Protection Project Program , California (Flood control system maintenance repairs construction authority)
Sacramento San Joaquin Delta CALFED Levee Stability Program
Sacramento San Joaquin Delta – Delta Islands and Levees Feasibility Study
Sutter and Butte County Feasibility Study, Sutter County, California (with Sutter-Butte Flood Control Agency and DWR)
Lower -American River Common Features General Reevaluation Report (Feasibility study)
Sacramento River Bank Protection Program, Phases II and III (Future maintenance authority projects)
West Sacramento General Reevaluation Report (Feasibility study; starting 2009)
Lower San Joaquin River Feasibility Study (with San Joaquin Area Flood Control Agency)
Natomas Levee Improvement Program (NLIP) (Chainey)
Marysville Project Engineering Design Documentation
WRDA 96/99 Sacramento and American River Improvement Program
Napa Creek Flood Control Project and Bank Stabilization (Chainey)
Completed Activities
Lower Cache Creek Feasibility Study (March 2003)
Yuba River Basin Project, California (Feasibility Study, April 1998)
Sacramento River Flood Control Project, California, Mid-Valley Area, Phase III (August 2005)
San Joaquin River Restoration Program – Initial Program Alternatives Report (June 2008)
[Feather River / Bear River Levee Setback – Yuba and Marysville, etc.] not sure of exact title of project (Chainey)
<u>Regional/ Local Activities</u>
Ongoing Activities
Natomas Levee Improvement Program (NLIP) (Chainey)
Cache Creek Comprehensive Flood Management Program (as sponsored by Yolo County, not Corps) (Chainey)

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<u>Napa Creek Flood Control Project and Bank Stabilization (a Corps project w/ local Napa Co FCD sponsor) (Chainey)</u>
<u>West Sacramento Early Implementation Program</u>
<u>Sutter Butte Flood Control Agency Early Implementation Program</u>
<u>RD 17 Improvements/Repairs</u>
<u>TRILIA Levee Improvements on Feather River, Bear River, Yuba River, WPIC</u>
Completed Activities
<u>Lower Cache Creek Bank Protection (recent projects by DWR) (Chainey)</u>