

CENTRAL VALLEY FLOOD MANAGEMENT PLANNING PROGRAM



Public Draft

2012 Central Valley Flood Protection Plan

Attachment 7A: Local and Regional Project Summaries

January 2012

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1.0 Local and Regional Project Summaries

Draft local/regional project summary forms for 56 projects are provided on the following pages. The information was gathered to supplement what was presented in Section 9 of Attachment 7: Plan Formulation and support plan formulation activities during Phases 1 and 2 of 2012 CVFPP development. Initial research has been conducted and information gathered for each local/regional project. The summaries include information about the project type, location, project proponents, and a brief description and status as of 2011.

Note that the information in this attachment completed for the 2012 CVFPP is a work in progress. Some information is missing or incomplete, but will be updated in support of the 2017 CVFPP as project concepts are further developed and some projects are implemented in coordination with partner agencies. For more information regarding regional planning and implementation, see Section 4 of the 2012 CVFPP.

Because of the preliminary status of this project information, no attempt has been made to evaluate the feasibility of the project concepts at this level of development. Local and regional projects not included in this attachment are not precluded from participation in State programs.

1.0 Local and Regional Project Summaries

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1.1 Middle Creek Flood Damage Reduction and Ecosystem Restoration Project

ID: 003

Project Type: Floodplain Management

Location Information:

- **Region** – Lower Sacramento
- **Subregion** – Cache Creek
- **Location** – The Project is located at the north end of Clear Lake in the area bounded by State Highway 20 and Rodman Slough, see Middle Creek Location Map.
- **Community Setting** – Nonurban (18 residences, 1,650 acres of agricultural land)

Project Proponents:

- **Lead Agency** – Lake County Flood Control and Water Conservation District.
- **Potential Partners** – U.S. Army Corps of Engineers (USACE), Central Valley Flood Protection Board, California Department of Fish and Game (DFG)/Wildlife, Conservation Board, California State Water Resources Control Board (SWRCB), Central Valley Regional Water Quality Control Board (Central Valley Water Board), California Bay-Delta Authority, California Department of Water Resources (DWR), local Native American tribes, Resource Conservation Districts, Lake County Special Districts, Lake County watershed groups, nonprofit organizations
- **Contact Information** – Robert L. A. Lossius, Assistant Public Works Director

Description:

- **Purpose** – The project will eliminate flood risk to 18 residential structures, numerous outbuildings, and approximately 1,650 acres of agricultural land (through removal and relocation), and will restore damaged habitat and the water quality of the Clear Lake watershed.

- **Concept** – The project encompasses about 1,650 acres, extending from the current shoreline of Clear Lake to the 100-year floodplain boundary. This would restore the entire floodplain in the study area, with the exception of the tribal lands adjacent to the study area. The project plan focuses on reconnecting the floodplain of Middle Creek to the historic Robinson Lake wetland area by breaching the existing levee system to create inlets that direct flows into the study area and providing flood damage reduction by relocating residents from the floodplain.
- To accomplish this, a portion of the Middle Creek Project levee from the confluence of Scotts and Middle creeks to Clear Lake would need to be reauthorized and breached. Channels and sloughs would also be constructed to direct creek flows from the breaches through the study area to Clear Lake. A ring levee would be constructed to provide an existing level of protection for the tribal lands. Implementation of this alternative would result in 765 acres of wetlands, 230 acres of riparian, 405 acres of open water, and 250 acres of upland habitat.
- This project would also require that all structures and personal property be removed from the study area. A total of 22 structures and associated infrastructure (septic tanks, plumbing, and electrical) would be demolished and removed from the project area. Wells would be abandoned and capped as required by county and State standards. Property owners would be compensated and relocated outside the floodplain. All current agricultural practices within the floodplain would be discontinued.
- See Middle Creek Project Map.
- **Relation to SPFC Facilities** – *Identify which State Plan of Flood Control Facilities that would be modified by this project.*

Project Status: Design (2008 – 2010); Construction (2012 – 2015)

Applicable Management Action(s): Floodplain Management – Easements/Acquisitions.

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management.
- **Supporting Goals** – Improve Operations and Maintenance (O&M), Promote Ecosystem Functions, Promote Multi-Benefit Projects.

Extent of Benefit Area: Regional: flooding benefits in the local area plus sediment loading reduction in Clear Lake.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit:**
 - Reduce flood risk by removing structures and property at risk of severe flooding as a result of levee failure. There are 18 homes and numerous outbuildings subject to flooding should the levees fail. Approximately 1,650 acres of agricultural land would be flooded. Because flood depths are great (more than 5 feet in most locations) and would extend for extended periods, potential flood damages are high.
 - Protect more than 3 miles of public roads and a major, high-voltage Pacific Gas and Electric Company (PG&E) transmission line, which cross the project area and are currently vulnerable to flood damage, by elevating or retrofitting the existing structures.
 - The DWR currently maintains the Middle Creek Flood Control Project in the project area. The project would remove approximately 3 miles of substandard levees, one pumping station, and one weir structure from the Flood Control Project. The project would result in lower O&M (\$110,000 to \$160,000 per year) and emergency response costs (estimated in excess of \$300,000 per major flood event) for DWR and cooperating State and federal agencies.
- **Ecosystem Restoration:**
 - Restore up to 1400 acres of the 7,520 acres of historic wetlands in the Clear Lake Basin that have either been lost or severely impacted. This is a 79 percent increase in the basin's existing wetland habitat. Of the historic 9,300 acres of freshwater wetlands that existed in the Clear Lake Basin, approximately 7,520 acres (80 percent) have been lost or severely impacted. Restored habitat includes open water, seasonal wetlands, instream aquatic habitat, shaded aquatic habitat, and perennial wetlands. Additional upland habitat will be protected adjacent to the wetland and stream areas.
 - Provide a significant increase in habitat for fish and wildlife. This project would greatly improve the bird-nesting habitat and increase the available spawning habitat for native and nonnative fish. The area is currently used extensively by migratory waterfowl.

- Preserve the fish and wildlife resources and the cultural resources in the project area.
- Several special-status wildlife species could benefit from the creation of wetland, open water, and riparian habitats in the expanded floodplain. Some species include the northwestern pond turtle (*Actinemys marmorata marmorata*), American white pelican (*Pelecanus erythrorhynchos*), double-crested cormorant (*Phalacrocorax auritus*), western least bittern (*Ixobrychus exilis*), osprey (*Pandion haliaetus*), white-tailed kite (*Elanus leucurus*), bald eagle (*Haliaeetus leucocephalus*), northern harrier (*Circus cyaneus*), Cooper's hawk (*Accipiter cooperii*), American peregrine falcon (*Falco peregrines anatum*), California yellow warbler (*Dendroica petechial*), yellow-breasted chat (*Icteria virens*), tricolored blackbird (*Egelaius tricolor*), fringed myotis (*Myotis thysanodes*), long-eared myotis (*Myotis septentrionalis*), long-legged myotis (*Myotis volans*), pallid bat (*Antroxous pallidus*), and Townsend's western big-eared bat (*Corynorhinus townsendii townsendii*).
- **Water Supply**
 - Sediment is the primary nutrient source (97 percent of Clear Lake's total phosphorus load is sediment bound) contributing to the cultural eutrophication of Clear Lake. It has been estimated that the current sediment and phosphorus load is twice the pre-European sediment load. Approximately 71 percent of the sediment and phosphorus entering Clear Lake is from Scotts and Middle Creek watersheds. It has been estimated that the project would remove up to 40 percent of phosphorus entering Clear Lake from Middle and Scotts creeks. Reduced phosphorus concentrations in Clear Lake would potentially reduce the chlorophyll concentrations by 33 percent. A corresponding reduction in total organic carbon would also be realized;
 - Wetlands are known to efficiently remove nitrogen from the water column. Because the project area is hydraulically connected to Clear Lake, it would provide some nitrogen removal benefits to Clear Lake. These benefits are unknown and have not been quantified;
 - Improved water quality in Clear Lake will reduce the cost of treating lake water to drinking water standards.
- **Recreation and Other Benefits**

- Recreation and tourism will be enhanced by improving the water quality in Clear Lake. In 1994, the U.S. Department of Agriculture (USDA) Soil Conservation Service estimated that \$7 million in tourism is lost annually due to water-quality issues in Clear Lake.

Implementation Cost: \$38 million

Implementation Considerations

- **Redirected Hydraulic Impacts** – Flood protection is provided by removing the existing structures and allowing the natural flooding to occur in the project area. This should not negatively impact flooding in surrounding areas.
- **Adverse Environmental Impact and Regulatory Issues** – Environmental Impact Statement (EIS) reports positive permanent impacts and only temporary (construction related) negative impacts (noise, fisheries, recreation, aesthetics). See Table S-1 from Feasibility Study (EIS)/Environmental Impact Report (EIR)
- **Other**

Associated Studies:

Feasibility Study/EIS/EIR, Available:

<http://www.water.ca.gov/floodmgmt/fpo/sgb/fpcp/prop13/proposals/4006_MiddleCreek/Feasibility_Report.pdf>, Note: Table S-1 is available, <http://www.water.ca.gov/floodmgmt/fpo/sgb/fpcp/prop13/proposals/4006_MiddleCreek/executive_summary_table.pdf>

References:

Project Summary Sheet, Available:

<http://www.water.ca.gov/floodmgmt/fpo/sgb/fpcp/prop13/proposals/4006_MiddleCreek/4006_Middle_Creek_Summary.pdf>

Project Summary Sheet 2, Available:

<http://www.water.ca.gov/floodmgmt/fpo/sgb/fpcp/prop13/proposals/4006_MiddleCreek/4006summary.pdf>

Flood Protection Corridor Program (FPCP) Grant Application, Available:

<http://www.water.ca.gov/floodmgmt/fpo/sgb/fpcp/prop13/proposals/4006_MiddleCreek/Application.pdf>

Middle Creek Restoration Web page, Available:

<http://www.co.lake.ca.us/Government/Directory/Water_Resources/Department_Programs/Middle_Creek.htm>

1.2 Cache Creek Settling Basin Floodway Bypass

ID: 004

Project Type: Floodplain Management

Location Information:

- **Region** – Lower Sacramento
- **Subregion** – Cache Creek
- **Location** – Woodland, California. Near Interstate (I-) 5 and State Route 113.
- **Community Setting** – Small community

Project Proponents:

- **Potential Lead Agency** – Yolo County Flood Control and Water Conservation District (see Cache Creek Organizational Structure).
- **Potential Partners** – City of Woodland, Yolo County, Central Valley Flood Protection Board (legal owner and operator).
- **Contact Information** – Frank Borcalli (floodSAFE Yolo).

Description:

- **Purpose** – Relieve flooding associated with poor hydraulics through the Cache Creek Settling Basin (severe flood events only).
- **Concept** – The Cache Creek Settling Basin is currently used to trap mercury-laden sediments before Cache Creek enters the Yolo Bypass, reducing sediment loading inside the bypass. In 1992, modifications were made to the settling basin (new levees, increased height on existing levees) with the intent of trapping additional sediment; however, the unintended result was increased flooding in the area. The proposed modification would move the levees north and west to create a floodway that would be used to bypass the settling basin during severe flood events (see Cache Creek Map).

- **Relation to SPFC Facilities** – *Identify which State Plan of Flood Control Facilities that would be modified by this project.*

Project Status: FloodSAFE Yolo presentation (June 22, 2009) targeted October 2009 for conducting the Feasibility Study, but no documentation was found. floodSAFE Yolo's Web site only has information through mid-2009.

Applicable Management Action(s): System Modifications – Bypasses.

Contribution to CVFPP Goals: Indicates the draft 2012 Central Valley Flood Protection Plan (CVFPP) goal to which the project is likely to contribute to. Because each project has the potential to contribute to more than one goal, all applicable goals are identified.

- **Primary Goal** – Improve Flood Risk Management.
- **Supporting Goals** – *Promote Multi-Benefit Projects.*

Extent of Benefit Area: Local benefits through flood mitigation. Potential regional costs due to increased sediment transport into Yolo Bypass and downstream.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit** – Bypass floodway would reduce flooding in Woodland.
- **Ecosystem Restoration** – Floodway could be used for restoration *(not discussed in existing materials).*
- **Water Supply** – Not applicable.
- **Recreation and Other Benefits** – Not applicable.

Implementation Cost: Not available

Implementation Considerations:

- **Redirected Hydraulic Impacts** – The area downstream from this project is the Yolo Bypass, which is designed to handle large flood volumes. Reducing flooding in the Cache Creek Settling Basin probably will not result in overtopping of the bypass, unless significant sediment loading reduces the capacity (see below).
- **Adverse Environmental Impact and Regulatory Issues** – The issues identified below address the complete removal of the settling basin, not just the addition of the floodway bypass:
 - Sediment disposition in the Yolo Bypass would inundate and render useless 435 acres of abandoned industrial waste oxidation ponds owned by the City of Woodland.
 - Backwater effects caused by the sediment deposited in the Yolo Bypass would require the following modifications to the Sacramento River Flood Control Project:
 - Yolo Bypass levees would need to be raised a maximum of 2.2 feet from .8 miles downstream from I-5, upstream to the Fremont Weir.
 - Knights Landing Ridge cut levees would need to be raised 1.8 feet.
 - Sacramento River levees would need to be raised a maximum of 1 foot from the Fremont Weir to the Sacramento Bypass.
 - Dredging in the Sacramento River System and San Francisco Bay System would be decreased annually by 88 and 7 acre-feet, respectively.
- **Other**

Associated Studies:

This section lists ongoing and prior studies that have assessed this project.

References:

Flood SAFE Yolo Cache Creek Settling Basin webpage, Available:
<<http://www.ycfwcd.org/settlingbasin.html>>

flood SAFE Yolo Presentation: Cache Creek Settling Basin Symposium:
Managing the Basin – Who’s Doing What? June 22, 2009. Francis E.
Borcalli, PE. Available:

<<http://www.ycfcwcd.org/documents/CacheCreekSettlingBasinPresentation.pdf>>

flood SAFE Yolo Fact Sheet: Floodplain Interrupted: The Story of Cache
Creek Settling Basin. Available:

<<http://www.ycfcwcd.org/documents/FloodplainInterruptedFactSheet.pdf>>

Flood control: Fix the Settling Basin, Opinion Piece by Dr. Bill Marble
Chair of the Water Resources Association and Woodland City
Councilmember. Available:

<<http://www.woodlandrecordtv.com/files/WoodlandRecordJune09Web.pdf>

>

1.3 Project Title – Stabilize Cache Creek through grade control structures and other measures

ID: 005

Project Type: System Modifications

Location Information:

- **Region** – Lower Sacramento.
- **Subregion** – Cache Creek.
- **Location** – Cache Creek in Yolo County.
- **Community Setting** – Multiple projects through the creek basin mostly in nonurban areas, or small communities with a flood control goal of protecting an urban area (City of Woodland).

Project Proponents:

- **Potential Lead Agency** – Yolo County Flood Control Water Conservation District, Yolo County, City of Woodland.
- **Potential Partners** – Cache Creek Conservancy, Cache Creek Conservancy, Yolo County Resource Conservation District, Lake County Flood Control & Water Conservation District, Cache Creek Water Forum, Cache Creek Wild, Cache Creek Aggregate Producers, DFG, DWR, Federal Emergency Management Agency (FEMA), Reclamation District 2035, Riparian Landowners, State Reclamation Board, Town of Esparto, Town of Madison, Tuleyome, USACE, U.S. Bureau of Land Management, U.S. Fish and Wildlife Service (USFWS).
- **Contact Information** – Fran Borcalli (floodSAFE Yolo)

Description:

- **Purpose** – Periodic high flows in Cache Creek cause extensive bank erosion, levee degradation, and local flooding, threatening the north and northeast sections of the City of Woodland and the town of Yolo.
- **Concept** – A well-planned series of projects and programs will ultimately provide 200-year level or greater of flood protection and levee integrity by combining the cumulative effects of integrated

actions throughout the Cache Creek corridor. These projects are collectively referred to as the Cache Creek Integrated Project, which combines integrated flood management and integrated water management programs for Cache Creek. They are discussed in the Yolo County Integrated Regional Water Management Plan (IRWMP).

- **Relation to SPFC Facilities** – Multiple levees and dams throughout the Cache Creek corridor.

Project Status: Most of the projects are still in the planning stage. A few are complete (e.g., Creation of the FloodSAFE Yolo pilot program), while others are in the construction stage (e.g., Capay Dam reliability/restoration project), and others are ongoing (e.g., Corell-Rodgers Wetlands Enhancement Project).

Applicable Management Action(s): System Modifications – Levees/Floodwalls/Hydraulic Structures

Note: Different projects would address different management actions, and to one degree or another span all the primary management actions. The Yolo County IRWMP organized the Cache Creek Integrated Project within a framework of three elements. These are:

1. Flood Management Element (11 projects/actions).
2. Water and Aquatic Habitat Element (14 projects/actions).
3. Recreation and Riparian Habitat Element (10 projects/actions).

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management.
- **Supporting Goals** – Improve O&M, Promote Ecosystem Functions, Improve Institutional Support, Promote Multi-Benefit Projects.

Extent of Benefit Area: The project addresses the entire Cache Creek corridor and would therefore have local, regional, and systemwide benefits.

Potential to Provide Multi-Benefits: Different projects within the Cache Creek Integrated Project may contribute to different benefit categories.

- **Flood Damage Reduction Benefit** – E.g., Cache Creek North Levee Setback project.
- **Ecosystem Restoration** – E.g., Corell-Rodgers Wetlands project.

- **Water Supply** – E.g., Capay Dam reliability/restoration project.
- **Recreation and Other Benefits** – E.g., Cache Creek Nature Preserve Improvement project.

Implementation Cost: Costs vary by project. E.g., Corell-Rodgers Wetlands Project (\$70,000); Cache Creek north Levee Setback project (\$5.7 million)

Implementation Considerations:

- **Redirected Hydraulic Impacts** – The goal of the Cache Creek Integrated Project is to address the creek channel as a whole and determine how each project affects upstream and downstream impacts.
- **Adverse Environmental Impact and Regulatory Issues** – *Flood management actions, especially structural management actions, have the potential to adversely impact the environment while meeting other flood management goals. Each project is evaluated on its potential to create adverse environmental impacts such as habitat loss and alteration of key physical processes.*
- **Other**

Associated Studies

Cache Creek North Levee Setback Project IS/Proposed Mitigated Negative Declaration and Environmental Assessment. Available:
<<http://wrca.library.ucr.edu/digitaldocs/296.pdf>>

Draft YCFCWCD-YZWD Conjunctive Use Feasibility Study. Available:
<http://www.ycfcwcd.org/documents/ycfc-yzwd-report_1-22-07.pdf>

Capay Dam Apron Replacement Project IS/Proposed Mitigated Negative Declaration and Environmental Assessment. Available:
<<http://www.ycfcwcd.org/documents/208607-capay-ismnd.pdf>>

Cache Creek Fisheries Survey. Available:
<[http://www.yolowra.org/Library/Final%20Cache%20Creek%20Fish%20Survey%20Report%202008%20\(revised\).pdf](http://www.yolowra.org/Library/Final%20Cache%20Creek%20Fish%20Survey%20Report%202008%20(revised).pdf)>

Cache Creek Settling Basin. Available:
<<http://www.ycfcwcd.org/settlingbasin.html>>

References

Yolo County IRWMP. Available:

<http://yolowra.org/irwmp_documents.html>

Water Resources Association of Yolo County. Available:

<<http://www.yolowra.org/index.html>>

1.4 Rehabilitate and provide operable gates for Sacramento Weir

ID: 010

Project Type: System Modifications

Location Information:

- **Region** – Lower Sacramento.
- **Subregion** – Sacramento.
- **Location** – Sacramento Weir.
- **Community Setting** – Urban.

Project Proponents:

- Potential Lead Agency – DWR.
- Potential Partners – USACE.
- **Contact Information** –

Description:

- **Purpose** – Rehabilitate and provide operable gates for Sacramento Weir to improve operational flexibility, safety, and O&M costs. Sacramento is the only weir that requires manual operation for flow release and requires more active operations. It is a gated low dam along the west bank of the Sacramento River where 48 wooden weir gates are manually opened when flood stage in the Sacramento River at the “I” Street Bridge reach 27.5 feet above mean sea level (msl) (i.e., 98,000 cubic feet per second (cfs)). Sacramento Weir diverts Sacramento River water into the Yolo Bypass when it backs up from American River flows.
- **Concept** – Increase the frequency and duration of Yolo Bypass inundation via the modification of the Fremont or Sacramento weirs to improve fish migration, food production, and spawning and rearing habitat. Modifications will be made to reduce leakage at the Sacramento Weir and therefore reduce attraction of fish from the Yolo Bypass to the weir where they are blocked and could become stranded. This action may require excavation of a channel to convey water from the Sacramento River to the Sacramento Weir and from the Sacramento Weir to the Toe Drain, construction of new gates at a portion of the

weir, and minor modifications to the stilling basin of the weir to ensure proper basin drainage. Specific design criteria of the ramps would need to be determined (BDCP, 2010).

- Rehabilitate and provide operable gates for Sacramento Weir to improve operational flexibility, safety, and O&M costs.
- **Relation to SPFC Facilities** – Sacramento Weir

Project Status: Conceptual

Applicable Management Action(s): System Modifications –
Levees/Floodwalls/Hydraulic Structures

Contribution to CVFPP Goals:

- **Primary Goal** – Improve flood risk management
- **Supporting Goals** – Improve O&M, promote ecosystem functions

Extent of Benefit Area: Project has local and regional benefits.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit** – Reduce potential flood damage if the Sacramento Weir were compromised or should fail, affecting the Sacramento Metropolitan Area, which includes residential homes, large infrastructure, transportation, business, and agricultural farmland.
- **Ecosystem Restoration** – Sacramento Weir improvements would reduce juvenile fish stranding and improve upstream adult fish passage.
- **Water Supply** – None
- **Recreation and Other Benefits** – None

Implementation Cost: Unknown at this time

Implementation Considerations:

- **Redirected Hydraulic Impacts** – Hydraulic impacts are not known at this time, and analysis would have to refer to the EIR if project approved.

- **Adverse Environmental Impact and Regulatory Issues** – No adverse environmental impact anticipated, analysis would have to refer to the EIR if project approved.
- **Other**

Associated Studies

None

References

Bay Delta Conservation Plan (BDCP). Local Issues Group Meeting – Yolo Bypass Fishery Enhancement Meeting Handouts. October 6, 2010.
Available:

<http://baydeltaconservationplan.com/Libraries/General_Documents/10-06-10_BDCP_Info_Packet-Yolo.sflb.ashx>. Accessed: May 11, 2011.

Central Valley Flood Management Planning Program. Draft State Plan of Flood Control Descriptive Document. January 2010.

1.5 Conaway Ranch Flood Easement

ID: 013

Project Type: Floodplain Management

Location Information:

- **Region** – Lower Sacramento
- **Subregion** – Yolo
- **Location** – East of Davis and Woodland
- **Community Setting** – Nonurban area

Project Proponents:

- Potential Lead Agency – Yolo County
- Potential Partners
- Contact Information

Description:

- **Purpose** – Restrict the existing development rights to maintain the agricultural and open space character of the Conaway Ranch, with the associated fish and wildlife habitat values, while allowing the implementation of a multi-objective resources management program.
- **Concept** – The Conaway Preservation Group (CPG) was asked to convey a conservation easement that will be sufficiently restrictive of development and use rights to support grant funding from one or more of the funding sources administered by the Wildlife Conservation Board, while at the same time being sufficiently flexible to accommodate the further resource management projects envisioned for the Conaway Ranch.
- This project was abandoned after a settlement was reached in 2006 that requires CPG to notify Yolo County regarding any water transfers; provide first right to negotiate to Yolo County for any short- or long-term water rights transfers, or sale of the ranch; seek Yolo County's input for public access projects; and to pay for fees and cost of suit.
- **Relation to SPFC Facilities** – SPFC Lands

Project Status: Abandoned

Applicable Management Action(s): Floodplain Management – Easements/Acquisitions

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Promote Ecosystem Functions, Promote Multi-Benefit Projects

Extent of Benefit Area: Project would have local benefits.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit** – Significantly increase flood protection for the Sacramento region, including Natomas and downtown Sacramento, by opening the proposed conservation easement area to accommodate periodic, temporary flood flows.
- **Ecosystem Restoration** – Enhance fish passage through the Yolo Bypass and increase access to seasonally inundated floodplain habitat on Conaway Ranch to contribute to efforts to improve conditions for native fish and provide the foundation for other enhancement projects.
- **Water Supply**
- **Recreation and Other Benefits** – Provide managed public recreation and environmental education opportunities.

Implementation Cost: *Summaries available implementation costs estimates.*

Implementation Considerations:

- **Redirected Hydraulic Impacts** – Redirected flood impacts occur when a project moves the risk of flooding from one area to another area. For example, improvements to flood protection in one area can result in increased flood flows in a downstream area; therefore, increasing the flood risk downstream. Project is qualitatively evaluated with respect to its potential to redirect hydraulic impacts.
- **Adverse Environmental Impact and Regulatory Issues** – Flood management actions, especially structural management actions, have the potential to adversely impact the environment while meeting other flood management goals. Each project is evaluated on its potential to

create adverse environmental impacts such as habitat loss and alteration of key physical processes.

- **Other**

Associated Studies

This section lists ongoing and prior studies that have assessed this project.

References

Conaway Settlement Agreement. Available:

<<http://www.conawayranch.com/files/u1/ConawaySettlementAgreement.pdf>>

Conaway Ranch - Protected! By Family Water Alliance. Available:

<http://www.familywateralliance.com/issues_conaway.html>

Conservation Easement Strategy. Available:

<http://www.conawayranch.com/files/u1/Conservation_Easement_-_Strategy.pdf>

1.6 Remove sediment and rehabilitate structure, as necessary, at Fremont Weir

ID: 014

Project Type: O&M

Location Information:

- **Region** – Lower Sacramento
- **Subregion** – Yolo
- **Location** – Fremont Weir
- **Community Setting** – Nonurban

Project Proponents:

- Potential Lead Agency – DWR
- Potential Partners – USACE
- **Contact Information** –

Description:

- **Purpose** –The area between the Fremont Weir and the Sacramento River is one of high sediment deposition, as fast-moving water from upstream meets slower moving water in the Yolo Bypass. Sediment buildup and vegetative growth diverts water into the Yolo Bypass. When silt and vegetation build up in a bypass, the flood control channel becomes shallower and hydraulically less efficient and has less water-carrying capacity. As a result, more water flows down the main part of the river, putting more pressure on the levees downstream, and increases the chance of a levee break.
- **Concept** – DWR plans to dredge around the Fremont Weir to restore flow capacity. The Fremont Weir sediment removal project involves discharging up to 1,000,000 cubic yards of sediment removed from the weir to adjacent agricultural land. The discharger has demonstrated that the sediments are not contaminated with pesticides and have similar leachable metal contents as native soils at the discharge site. Therefore, the discharge of dredged sediment poses little or no threat to water quality and a conditional waiver of Waste Discharge Requirements (WDR) is appropriate for this portion of the project.

- The January 12, 2009, draft of the Bay-Delta Conservation Plan (BDCP) proposes to add a notch to the Fremont Weir and flood the Yolo Bypass more frequently and for longer periods later in the agricultural season. There is a proposed measure to “modify the Fremont Weir and the Yolo Bypass to create an operable gate to sustain flood flows into the Bypass for 30 to 45 days between December 1 and May 15 to create floodplain habitat for Chinook salmon (*Oncorhynchus tshawytscha*) and Sacramento splittail (*Pogonichthys macrolepidotus*). This would eliminate the current agricultural activities, curb all public use when the Fremont Weir is spilling, and prevent the wetland management practices.
- **Relation to SPFC Facilities** – Fremont Weir

Project Status: Completed (Nov. 15, 2006) or may be under construction

Applicable Management Action(s): O&M – Dredging and Clearing

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Improve O&M, Improve Institutional Support, Promote Multi-Benefit Projects

Extent of Benefit Area: The project has local, regional, and systemwide benefits.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit** – Removing sediment and improving the Fremont Weir would alleviate the threat to public safety and the potential liability for substantial damages from backwater effects of restricted flood flows. This weir is close to the Sacramento Metropolitan Area, which would be in potential danger if sedimentation problems to the Fremont Weir were not addressed.
- **Ecosystem Restoration** – None
- **Water Supply** – None
- **Recreation and Other Benefits** – None

Implementation Cost: \$2.6 million budget to remove built-up sediment and vegetative growth from Fremont Weir. Unknown cost of weir modification.

Implementation Considerations:

- **Redirected Hydraulic Impacts** – Hydraulic changes are expected to have beneficial impacts.
- **Adverse Environmental Impact and Regulatory Issues** – No adverse affects.
- **Other**

Associated Studies

This section lists ongoing and prior studies that have assessed this project.

References

Rominger, Robyn. Farmers urging funding for flood-control channels. California Farm Bureau Federation. February 4, 2001.

Water Resources Association of Yolo County. Integrated Regional Water Management Plan. Putah Creek Meeting. 2007. Available: http://www.yolowra.org/Final_IRWMP_April07/16-Appendix%20E-1_E-2_Stakeholder_SacRiverMtgs.pdf. Accessed: May 11, 2011.

California Department of Fish and Game. Yolo Bypass Wildlife Area Land Management Plan. June 2008.

Project Summary. Available: http://www.swrcb.ca.gov/rwqcb5/board_decisions/tentative_orders/0605/remont/fremont-buff.pdf. Accessed: May 10, 2011

Water Education Foundation. Flood Management Tour shows participants real world solutions to California's flood issues. Aquaformia, the California Water News Blog. Posted: June 22, 2009. Available: <http://aquaformia.com/archives/9611>

1.7 Review and modify bypass channel vegetation as necessary to assure proper balance of storage and conveyance in upper Butte Basin

ID: 017

Project Type: O&M

Location Information:

- **Region** – Upper Sacramento
- **Subregion** – Butte Basin
- **Location** – The Butte Basin is a natural overflow area that extends from south of Big Chico Creek to the Sutter Buttes. Located along the western boundary of Butte County and the eastern boundary of Glenn County, it is bisected by State Highway 162 and located approximately halfway between State Highways 99 and 45 in the Pennington, West of Biggs, Butte City, Llano Seco, and Nelson U.S. Geological Survey (USGS) 75 minute quadrangles.
- **Community Setting** – Other

Project Proponents:

- **Potential Lead Agency** – DWR
- **Potential Partners** – Butte Creek Watershed Conservancy, DFG, Wildlife Conservation Board, USFWS, USACE
- **Contact Information** –

Description:

- **Purpose** – Flooding is an increasing problem in the middle and lower parts of the Butte Basin watershed, most likely due to the lack of storage in the upper Butte Basin and urbanization through the covering of land with impermeable surfaces. Flooding has become an issue primarily in human-inhabited reaches such as the residential areas along the middle section of Butte Creek. Certain areas within this reach also appear to have the highest amount of meandering, due to the nature of

the bed material, the human-introduced mining tailings, and lack of intact and mature riparian vegetation.

The 1997 Emergency Watershed Protection projects helped stabilize banks using large rock riprap and concrete, which is not conducive to productive riparian habitat. Further, they accelerate flows, increased bed scour in some areas, deposition in others, downstream bank erosion, and ultimately may cause future problems for property owners downstream.

- **Concept** – Some implementation methods may include the following:

Restore Riparian, Wetland, and Upland Habitat – This reach contains numerous opportunities for ecosystem restoration through the establishment of healthy habitat. This measure can accomplish restoration goals through levee modifications, and realignments of existing levees and other structural changes. This measure could also be combined with other measures that call for the establishment of transient storage areas. Restoration of vegetation within the conveyance system can reduce flow capacity, but can also improve reliability of the system by stabilizing banks and reducing erosion. This measure was retained for further consideration.

Channelization – Channelization could be performed in this reach of the Sutter Bypass by creating a larger low-flow channel to provide more rapid drainage for the Butte Basin. The channel would drain to the southern end of Butte Basin. It would also provide for ecosystem habitat.

- **Relation to SPFC Facilities** – Colusa Weir, Moulton Weir, 3Bs Weir, Goose Lake Weir, and M&T Weir

Project Status: Conceptual

Applicable Management Action(s): O&M – Vegetation Management

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Improve O&M, Promote Ecosystem Functions, Promote Multi-Benefit Projects

Extent of Benefit Area: This project has local and regional benefits.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit** – The upper Butte Basin and downstream communities would benefit with greater flood storage at the upstream. This project will have an effect in the peak stage, reducing peak flows and on “high” flow duration.
- **Ecosystem Restoration** – Project can provide opportunities for management, including maintenance, enhancement, protection, and restoration of communities for a variety of resident and migratory birds, mammalian species, special status species and their habitats, riverine species, and riparian communities. O&M staff can monitor leading populations and control of exotic weeds and other invasives; maintaining or enhancing in-stream flows, implementing best management practices for mosquito control in managed wetlands,
- **Water Supply** – There are possible conjunctive use opportunities using Butte Basin as a site in exchanging conservation space with groundwater. The existing surface water distribution system would need to be expanded.
- **Recreation and Other Benefits** – Potential to integrate climate change strategies in the goals, O&M tasks on the site, including fuel reduction for habitat diversity or for adjacent residential and urban interface mandates. Project can mirror other programs that reduce greenhouse gas emissions in facilities, residences, and vehicles that are maintained and operated on the properties.

Implementation Cost: Based on Upper Butte Basin Wildlife Area Land Management Plan (O&M costs): \$1.08 million for Staffing Costs and \$865,000 for Operational Costs. These costs are for the entire plan, not sure just this particle efforts.

Implementation Considerations:

- **Redirected Hydraulic Impacts** – Improvements to the upper Butte Basin will only improve the hydraulics downstream from the system. Hydraulic impacts are unknown at this time.
- **Adverse Environmental Impact and Regulatory Issues** – Project may affect the ecosystem habitat during implementation but beneficial environmental impacts are greater in the long term.
- **Other**

Associated Studies

This section lists ongoing and prior studies that have assessed this project.

References

Butte Creek Watershed Conservancy. Butte Creek Watershed Project – Existing Conditions Report. August 1998. Available: <<http://buttecreekwatershed.org/Watershed/ECR.pdf>>. Accessed: April 28, 2011

Upper Butte Basin Wildlife Area Draft Land Management Plan. October 2009. Available: <<http://www.dfg.ca.gov/lands/mgmtplans/ubbwa/>>. Accessed: April 29, 2011

1.8 Stabilize Cherokee Canal watershed to reduce sediment transport and long-term O&M costs

ID: 018

Project Type: Excessive sedimentation and debris accumulation in the Cherokee Canal clogs the channel and results in channel bank overtopping in high-flow events. This project aims to stabilize Cherokee Canal by reducing sediment transport and long-term O&M costs.

Location Information:

- **Region** – Upper Sacramento
- **Subregion** – Butte Basin
- **Location** – Cherokee Canal, which was originally constructed to protect agricultural land from mining debris, now serves as an irrigation drainage canal. Dry Creek becomes Cherokee Canal northeast from Richvale, and Gold Run and Cottonwood Creek join the Cherokee Canal upstream of the Richvale Road crossing. Cherokee Canal eventually enters Butte Creek near the southwestern corner of Butte County, south of Highway 162.
- Cherokee Canal, a tributary of the Butte Creek/Butte Basin element of the Sacramento River Flood Control Project, is a 21-mile-long leveed channel from Dry Creek to the Butte Sink in Butte County, California.
- **Community Setting** – Nonurban

Project Proponents:

- **Potential Lead Agency** – DWR, USACE
- **Potential Partners** – Butte County, California Department of Fish and Game (CDFG) and the local watershed groups (Butte Creek Watershed Conservancy, Cherokee Watershed Group, Cherokee Watershed Alliance, Butte County Resource Conservation District, etc.). Enlisting the assistance of the California Conservation Corps could significantly reduce the cost of maintenance.
- **Contact Information** – Craig Gaines (USACE)

Description:

- **Purpose** – The primary flooding hazards within the Cherokee Watershed is caused by sedimentation and structures located within the FEMA Special Flood Hazard Area (SFHA). According to a 1970 report by DWR (*Debris Deposition in the Cherokee Canal Flood Control Project*), Cherokee Canal experiences flooding due to heavy rains and valley flooding. After several historical attempts to rectify the sediment and debris loading of the channel and in response to the Sacramento River Major and Minor Tributaries Flood Control Act of 1944, the USACE developed the *Review of Interim Flood Control Survey Report of Sacramento River and Tributaries, Cherokee Canal and Butte Creek, 15 June 1948*. The report recommended building a levee and channel flood control project and the present Cherokee Canal was constructed in 1960 based upon the recommendations in the report. Dry Creek contributes the most sediment to Cherokee Canal. According to a recent study of the hydrologic, hydraulic, and sediment yield/transport in Dry Creek and Cherokee Canal (USACE, 2003), it is estimated that 103,000 tons of sediment would be delivered to Cherokee Canal in a 100-year event.
- **Concept** – Establish a regular channel maintenance and sedimentation removal program.
- **Relation to SPFC Facilities** – Not applicable

Project Status: Reconnaissance Level

Applicable Management Action(s): O&M: Vegetation Management

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Improve O&M, Promote Ecosystem Functions, Improve Institutional Support, Promote Multi-Benefit Projects

Extent of Benefit Area: This project would have local, regional, and/or systemwide benefits.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit** – This project would reduce the flood risk on critical facilities in the Cherokee Watershed, which includes police department, hospitals, Red Cross shelters, schools, facilities holding hazardous materials and air transportation facilities.

Clearance of sedimentation and debris would maintain water capacity of the Cherokee Canal and prevent flow restrictions caused by buildup.

- **Ecosystem Restoration** – Maintenance of sedimentation and debris in the Cherokee Canal would prevent disturbance of fish and other natural habitat. This project would promote ecosystem restoration with the clearing of sediment and debris buildup along the canal and against overpasses, bridges, etc.
- The project would include a 300- to 400-acre wetlands restoration site about 10 miles northwest of Oroville and preserve about 840 acres of existing wetland/riparian habitat along the canal downstream from the restoration site by controlling sediment transport. This would establish a rich diversity of habitats for migratory waterfowl, resident birds, and other wildlife, including several listed endangered species.
- **Water Supply** – Not applicable
- **Recreation and Other Benefits** – Not applicable

Implementation Cost: Cost of this project would be dependent on the process of the development of the sediment removal program. Project funding for maintenance could be shared between the State and local agencies. A detailed cost estimate would be developed at the time of project implementation.

Implementation Considerations:

- **Redirected Hydraulic Impacts** – This would improve and maintain the hydraulics of the Cherokee Canal. When sedimentation and debris collect along the streams and builds up on the sides of the bridges, it results in a reduction in flow capacity and creates a blockage of flow upstream from the obstruction(s), ultimately changing the hydraulics of this system. Continued maintenance of this channel would improve hydraulics and reduce the flood risk for this area.
- **Adverse Environmental Impact and Regulatory Issues** – There are no potential adverse environmental impacts or regulatory issues.
- **Other**

Associated Studies

This section lists ongoing and prior studies that have assessed this project.

References

Butte County. Butte County Flood Mitigation Plan. 2006. Available:
<<http://www.buttecounty.net/~media/County%20Files/OEM/Public%20Internet/Butte%20FMP%20-%20FINAL%201-8-10.ashx>>. Accessed April 19, 2011.

1.9 Modifications to the 3Bs Natural Overflow Area

ID: 019

Project Type: System Modifications

Location Information:

- **Region** – Upper Sacramento
- **Subregion** – Butte Basin
- **Location** – North of Ord Ferry Road on the Sacramento River river mile (RM) 186.5 +/-
- **Community Setting** – Nonurban

Project Proponents:

- **Potential Lead Agency** – Mike Inamine, Sutter Butte Flood Control Agency
- **Potential Partners**
- **Contact Information** –

Description:

- **Purpose** – 3Bs Natural Overflow Area is not operated or designed correctly. The result is that head cuts allow overflows into Butte Basin when the Sacramento River is well below flood stage, resulting in extensive, unnecessary damages to infrastructure and agriculture and reducing the storage capacity of Butte Basin for a major storm event. This project would include modifications of the existing 3Bs Natural Overflow Area for proper design and operation.

The 3Bs is one of the three low points on the east side of the Sacramento River where floodwater flows away from the main river channel during high flows. The 3Bs Natural Overflow Area, critical to the operation of Butte Basin, was never designed or constructed to operate as a Flood Relief Structure (FRS).

The State Plan Flood Control (SPFC) relies on the 3Bs Natural Overflow Area to protect downstream levees on the Sacramento River.

Overflow in the Butte Basin still occurs and is essential to the success of the downstream flood management system along the Sacramento River. Of the three prominent overflow areas include 3Bs (as well as M&T and Goose Lake) is about 15.5 river miles downstream from Chico Landing. As SPFC facilities for which the State has maintenance responsibility under the California Water Code (CWC), DWR maintains both the State-constructed overbank flow features (M&T and Goose Lake FRS) and the USACE-constructed bank stabilization features of the 1986 Butte Basin Plan. The Central Valley Flood Protection Board (Board) requires the elevation of 3Bs Natural Overflow to remain at or below the elevation required for flood flows to overtop when the gage at Ord Ferry Bridge reaches 114 feet National geodetic Vertical Datum (NGVD), which is equivalent to a flood flow of approximately 100,000 cfs.

- **Concept** – *Describes how the project is anticipated to be implemented and what are the elements that constitute that project. May include a range of implementation methods and elements.*
- **Relation to SPFC Facilities** – 3Bs Natural Overflow area. Other facilities in the Butte Basin Overflow area include Good Lake FRS and M&T.

Project Status: Conceptual Level

Applicable Management Action(s): System Modifications:
Levees/Floodwalls/Hydraulic Structures

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Improve O&M

Extent of Benefit Area: This project would have local, regional, and systemwide benefits.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit** – Elimination of unnecessary damage to property, agriculture, and infrastructure damages. Elimination of needless interruptions of interstate commerce (roads will not be flooded except in a flood event).
- **Ecosystem Restoration** – Not applicable

- **Water Supply** – Preserves flood storage for major flood event (systemwide benefit).
- **Recreation and Other Benefits** – Improved public safety (only floods during a flood event).

Implementation Cost: *Summaries available implementation costs estimates.*

Implementation Considerations:

- **Redirected Hydraulic Impacts** – Improving the 3Bs Natural Overflow Area may increase the flood storage capacity in the Butte Basin. As this project is only a modification of the existing 3Bs Natural Overflow, none or minimal adverse hydraulic impacts are expected upstream and downstream from the system. Flood risk downstream and upstream from the project location should either improve.
- **Adverse Environmental Impact and Regulatory Issues** – Modification to the 3Bs Natural Overflow Area may have adverse effects on the hydraulics of the system and local environmental effects. An environmental impact assessment would have to be considered for this project.
- **Other**

Associated Studies

This section lists ongoing and prior studies that have assessed this project.

References

Sacramento River Conservation Area Forum Handbook. 2003. Available: <http://www.sacramentoriver.org/srcaf/publications/handbook/Ch5_SacRiv_Hand03_webready.pdf>. Accessed April 18, 2011.

Adams, Ronald and David Gallo. The Economic Impact on Glenn County of Public Land Acquisition and Habitat Restoration Activities in the Sacramento River Conservation Area. 2001. Available <[http://www.sacramentoriver.org/SRCAF/library_doc/Glenn_County_Economic_Impact_Study_Restoration_\(2001\).pdf](http://www.sacramentoriver.org/SRCAF/library_doc/Glenn_County_Economic_Impact_Study_Restoration_(2001).pdf)>. Accessed April 18, 2011

California Department of Water Resources (DWR). State Plan of Flood Control Facilities. 2010. Available: <<http://www.water.ca.gov/cvfm/docs/SPFCDescriptiveDocNov2010Section3Part4.pdf>>. Accessed April 19, 2011

1.10 Construct peak overflow detention basin in the Colusa Basin Drainage Area

ID: 020

Project Type: Additional Storage

Location Information:

- **Region** – Upper Sacramento
- **Subregion** – Colusa Basin Drain
- **Location** – Wilson Creek and Willow Creek
- **Community Setting** – Other

Project Proponents:

- **Potential Lead Agency** – Colusa Basin Drainage District
- **Potential Partners** – DWR, Glenn County, local interest groups
- **Contact Information** – Ernie Ohlin, Deputy Director of Public Works – Water Resources, Tehama County

Description:

- **Purpose** – Alleviating peak flood flows, reduce the flood risk
- **Concept** – Create detention facilities to alleviate peak flows. Project would capture surface stormwater for conservation, conjunctive use, and increased water supply. The Colusa Basin Drainage District (CBDD) is currently planning two flood water detention facilities: one west of Willows on South Fork Willow Creek to reduce flooding in Willows, and one in the Wilson Creek area. The South Fork Willow Creek Detention Facility is completely designed, has nearly all permits secured, and has a bid packet ready for distribution as soon as funding becomes available. The Wilson Creek Detention Facility still requires further study to determine its feasibility. In addition to these two sites, the CBDD has other sites in Glenn and Colusa counties targeted for remediation measures, including, but not limited to, detention facilities (2008).

- **Relation to SPFC Facilities** – None

Project Status: Design (South Fork Willow Creek Detention Facility), Feasibility (Wilson Creek Detention Facility)

Applicable Management Action(s): Additional Storage – Floodplain (Transitory) Storage

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Improve O&M, Improve Institutional Support, Promote Multi-Benefit Projects

Extent of Benefit Area: Project would have local, regional, and systemwide benefits.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit** – Reducing peak flows would minimize property damages caused by flooding within the study area and minimize downstream property. Alleviating peak flood floods would also reduce the risk to public health and safety, and reduce flood damages to residences, businesses, and public infrastructure in the vicinity of the project area. Project would capture surface stormwater for conservation, conjunctive use, and increased water supply.
- **Ecosystem Restoration** – Project would enhance and protect environmental resources.
- **Water Supply** – Project would improve water quality by minimizing erosion and sedimentation, as well as assist in groundwater recharge of the local aquifer(s).
- **Recreation and Other Benefits** – None

Implementation Cost: Capital Construction: \$11.2-13.7 million (South Fork Willow Creek), \$10.3 – \$12.6 million (Wilson Creek); Wilson Creek: \$292,000 (South Fork Willow Creek), \$178,000 (Wilson Creek)

Implementation Considerations:

- **Redirected Hydraulic Impacts** – Possible changes to timing of channel incision, channel form, and land uses on upper watershed sediment runoff.

- **Adverse Environmental Impact and Regulatory Issues** – Colusa Basin groundwater has elevated salt concentrations that may adversely affect yields of commonly grown crops.
- **Other**

Associated Studies

Wilson Creek Detention Facility Hydrogeologic Basin Evaluation.

References

H.T. Harvey & Associates. Colusa Basin Watershed Assessment – Final. December 15, 2008. Available: <[http://132.241.99.23/SRCAF/library_doc/Colusa%20Basin%20Watershed%20Assessment%20\(2008\).pdf](http://132.241.99.23/SRCAF/library_doc/Colusa%20Basin%20Watershed%20Assessment%20(2008).pdf)>. Accessed: May 10, 2011.

U.S. Bureau of Reclamation. Wilson Creek Detention Facility Hydrogeologic Basin Evaluation. Available: <<http://www.glenncountywater.org/documents/CBDDWilsonCreekSOWfoRWeb.pdf>>. Accessed: May 10, 2011

CH2MHILL. Benefit/Cost Analysis for Colusa Basin Drainage District Integrated Watershed Management Plan Feasibility Study Technical Memorandum. 2004. Available: <http://www.water.ca.gov/economics/downloads/Colusa/appendix-b_c_analysis.pdf>. Accessed: May 10, 2011

1.11 Colusa Drain improvements

ID: 021

Project Type: System Modifications

Location Information:

- **Region** – Upper Sacramento
- **Subregion** – Colusa Drain
- **Location** – Colusa Basin Drain extends from its junction with Willow Creek south to the vicinity of Colusa and then follows the alignment of the Reclamation District (RD) 108 Back Levee, terminating at the Knights Landing Outfall Gates on the Sacramento River in Yolo County.
- **Community Setting** – Nonurban

Project Proponents:

- Potential Lead Agency – DWR, CBDD
- Potential Partners – Colusa County Resource Conservation District (RCD), USDA
- Contact Information – Eugene Massa Jr., CBDD General Manager
- Description:
- **Purpose** – The Colusa Basin Drain was original constructed to provide adequate drainage for agricultural production, not to provide minimum necessary conveyance for winter flood prevention. As agricultural production and volumes of applied irrigation water have expanded, the drain has also been shown to be undersized in places for handling summer irrigation return flows. According to the DWR, the typical pattern of flooding occurring along the Colusa Drain Basin is primarily the result of runoff from foothill streams during the winter and releases of irrigation water from rice fields during the summer. Original capacity was approximately 1,450 cfs with 1 foot of freeboard; but currently is about 2,100 cfs at Highway 20 and about 12,450 cfs at Knights Landing.

In addition, land has been put into agricultural production up to the western edge of the Colusa Basin Drain (canal), and the levees have been built along the western edge of the canal to protect agricultural lands. These levees may act to constrict the canal's capacity and thereby incrementally raise the canal water surface elevation in places.

- **Concept** – DWR (1962, 1964) prepared hydraulics models of the Colusa Drain Basin channel to serve as a basis for evaluating the flood benefits in terms of reduced inundation area resulting from a range of management actions: (1) improved drainage facilities from the Knights Landing Ridge Cut through the Yolo Bypass, (2) systems of levees along the Colusa Basin Drain, (3) flood control reservoirs in the western foothills, and (4) watershed management. DWR (1990) updated the evaluation of these alternatives, many of which are still under consideration, and added a fifth evaluation of enlarging the Knights Landing Ridge Cut.

DWR first considered the potential benefits of constructed new and/or enlarged levees along the existing Colusa Basin Drain to create a maximum channel top width of 450 to 1,000 feet. DWR reevaluated the levee project, estimating it then to cost \$76 million for protecting 180,000 acres, yielding a cost-benefit ratio of 0.19 over 50 years of the 100-year protection level project at an 8.875 percent discount rate. The levee protection alternative has generally been abandoned in favor of projects that use reservoirs on the foothill streams to detain floodwaters.

Improvements to the Colusa Basin Drain will be discussed in the Integrated Watershed Management Plan. Updates to this (currently unpublished) Management Plan are available on the Colusa County RCD Web site. The goals and objectives in improving flood control described in the Assessment Report (Harvey, 2008) include:

- Reduce flooding along the Colusa Basin Drain and other flood prone areas
- Assess the status and functionality of degrading flood control infrastructure (e.g., drainage canals, ditches, canal banks, levees)
- Find ways to allow floodwaters onto floodplains without damaging crops, homes, and infrastructure
- Determine the cumulative effects of existing wetland and riparian restoration projects on flooding

- Protect banks/levees of ephemeral streams: reducing localized flooding
- Improve infiltration ability of flood-prone areas and natural drainages
- Identify (geographically) where natural channels have been removed (through land leveling, etc.) and identify its effect upon storm runoff and localized flooding
- Compensate farmers whose rice land is used for off-stream storage
- Develop and implement measures to control runoff in foothills, orchards, rice fields, rangelands, and on all other agricultural lands
- The Colusa Basin Watershed Assessment report identifies several example projects that could address some of the stakeholder concerns. The watershed planning goals will not be formalized until the management plan is underway. Since the watershed planning goals will not be formalized until the management plan is underway, the following merely provides examples of a few potential projects. The purpose of this list is simply to provide preliminary examples of projects that could come out of an integrated planning process. This list includes: (1) Foothill Streams – Creek Bank Stabilization and Riparian Habitat Restoration Projects; (2) Oak Woodland Habitat Management; and (3) Wetland and Riparian Management and Restoration Projects.
- **Relation to SPFC Facilities** – Knights Landing Ridge Cut, Colusa Weir

Project Status: Conceptual

Applicable Management Action(s): System Modifications – Levees/Floodwalls/ Hydraulic Structures

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Improve O&M, Improve Institutional Support, Promote Multi-Benefit Projects

Extent of Benefit Area: This project would likely have local, regional, and/or systemwide benefits.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit** – Improvements to the Colusa Basin Drain would reduce flooding in this area. Could take away peak flows and reduce physical flow constrictions. Currently, an unintentional lake forms due to inability to free flow into the Sacramento River.
- **Ecosystem Restoration** – Little to no benefits for ecosystem. Colusa Basin Drainage Canal is a major contributor of warm water into the Sacramento River, which has a detrimental effect on salmonids. The Colusa Basin Drain “attracts adult fish into an area where survival is unlikely and returns agricultural drain water of high temperature and poor quality into the Sacramento River” at Knights Landing (DFG, 2003). There are special-status wildlife species that are known to or that may occur in the valley foothill woodlands in the Colusa Basin Watershed such as Cooper’s hawk, Swainson’s hawk (*Buteo swainsoni*), long-eared owl (*Asio otus*), etc., and common wildlife species found in this habitat. There is potential for riparian habitat restoration through revegetation. Will result in better water movement and volume.
- **Water Supply** – Could improve the water quality by identifying water quality issues and recommending water quality control measures for urban and rural areas. Educate the landowners to help control non-point source pollution and recommend/implement best management practices for agricultural and rangeland areas to reduce soil erosion and associated sediment loading into drainages.
- **Recreation and Other Benefits** – Hunting, boating, and fishing are among the most popular recreation activities in the Colusa Basin Watershed.

Implementation Cost: Not applicable

Implementation Considerations:

- **Redirected Hydraulic Impacts** – Improvements to the Colusa Drain may have hydraulic effects downstream from the drain and areas surrounding the basin.
- **Adverse Environmental Impact and Regulatory Issues** – There is a potential for a reduction of habitat and effect the water quality.

- **Other** – Conflicts with current land uses and surrounding agriculture. There may be ecosystem constraints to counties, also public opposition.

Associated Studies

This section lists ongoing and prior studies that have assessed this project.

References

Colusa County Resources Conservation District. Final - Colusa Basin Watershed Assessment. Prepared by: H.T. Harvey & Associates. December 15, 2008.

Colusa County Resource Conservation District. Colusa Basin Watershed Management Plan website. Available:
<<http://www.colusarcd.org/nodes/projects/WatershedManagementPlan.htm>>. Accessed: April 28, 2011.

1.12 Protect M&T pumping facilities

ID: 024

Project Type: System Modifications

Location Information:

- **Region** – Upper Sacramento
- **Subregion** – Downstream from Chico
- **Location** – Left bank of Sacramento River RM 192.8 +/-
- **Community Setting** – Nonurban

Project Proponents:

- **Potential Lead Agency** –
- **Potential Partners** – Sacramento River Conservation Area, Butte Creek Watershed Conservancy, Sacramento Valley Landowners Association, DWR, Department of Parks and Recreation, DFG, City of Chico, USACE, USFWS
- **Contact Information** – Mike Inamine, Sutter-Butte Flood Control Agency

Description:

- **Purpose** – The current meandering of the Sacramento River is resulting in the need for dredging of the river to keep the pump facilities operational, either the river or the pump intake needs to be relocated to allow for pumping without dredging. This agricultural pumping facility was relocated from Big Chico Creek to protect threatened and endangered anadromous fish populations and pumping requirements for adjacent agriculture, managed wetlands (federal, State, and private), and City of Chico wastewater facility without a significant effect upon river meander. As a result of natural riverine dynamics, future encroachment of a gravel bar will continue to exist causing a substantial threat to the operation of the pumping facility, the fish screens, and the outfall.
- **Concept** – A proposal to structure a process that will develop a long-term solution to meeting water needs of the beneficiaries of the

M&T/Llano Seco pumping facility while maintaining the natural river meander process in the Sacramento River. The proposal states that larger scale measures that address longer term, larger scale processes will likely provide more persistent results.

The short-term protection plan to protect the functionality and delivery of water supplies to the fish screen and pumping facility is to continue to maintain the position of the gravel bar to protect the facilities until a solution is in place. Continued removal of the gravel bar will be conducted until a long-term solution is set. Divers will continue to inspect the existing gravel bar annually and collect necessary data on the southern migration of sediment deposition. The long-term solution process will consist of gathering data, convening a Steering Committee composed of stakeholders and recognized experts, researching existing conditions of the river, understanding fluvial geomorphology, monitoring the gravel bar, gathering data from surveyors, hydrologists, and geotechnical engineers, and preparing a river model to assist in determining an appropriate long-term solution.

- **Relation to SPFC Facilities** – M&T/Llano Seco Pumping and Fish Screen Facility, City of Chico Wastewater Treatment Plant Outfall

Project Status: Reconnaissance

Applicable Management Action(s): System Modifications – Levees/Floodwalls/Hydraulic Structures

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Improve O&M, Promote Ecosystem Functions, Improve Institutional Support, Promote Multi-Benefit Projects

Extent of Benefit Area: This project would have local and regional benefits.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit** – Protects necessary hard point in the area.
- **Ecosystem Restoration** – Project aims to reach goals of the CALFED Bay-Delta Program (CALFED) Ecosystem Restoration Plan and Anadromous Fish Restoration Plan for all salmonid species, connectivity to upstream spawning and rearing habitat in Butte and Big

Chico Creeks, which is essential to the sustainable populations of spring-run, winter-run, fall-run and late fall-run salmon and steelhead trout (*Oncorhynchus mykiss*).

- **Water Supply** – The project aims to provide continued assurance of a reliable water protect the M&T pumping facility that supplies water to the M&T Chico Ranch and Llano Seco Ranch.
- **Recreation and Other Benefits** – Possible effect on boating/navigation.

Implementation Cost: Minimum of \$400,000 per dredging; approximately \$5 million

Implementation Considerations:

- **Redirected Hydraulic Impacts** – River hydraulics and cover along the bank will be affected by the project since the project will alter bank configuration and structural features (e.g., riparian vegetation and placement of woody complexes), potentially affecting the quantity and quality of near-shore habitat for migrating juvenile steelhead and other listed fish species.
- **Adverse Environmental Impact and Regulatory Issues** – Removal of riparian vegetation from the riverbank would result in temporary loss of a source of State Recreation Area (SRA) cover for juvenile salmon, but will be replaced with additional riparian vegetation and woody materials to reduce homogeneity of the water velocity and provide cover for fish when flows are high.
- **Other**

Associated Studies

This section lists ongoing and prior studies that have assessed this project.

References

M&T/Llano Seco Fish Screen Facility – Short-Term/Long-Term Protection Project. Summary Sheet.

Gallaway Consulting, Inc. M&T/Llano Seco Fish Screen Facility Short Term Protection Project Temporary Maintenance of Channel Alignment River Mile 192.5-R. Administrative Draft Environmental Assessment and Initial Study. October 2005.

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M&T/Llano Seco Fish Screen Facility – Short-Term/Long-Term Protection Project, Phase II. Technical Memorandum Workshop #5 Summary. December 19, 2008.

1.13 Secure meander zones along upper Sacramento River where major infrastructure is threatened

ID: 026

Project Type: Floodplain Management

Location Information:

- **Region** – Upper Sacramento
- **Subregion** – Downstream of Chico
- **Location** – Red Bluff to Ord Ferry Reach
- **Community Setting** – Other

Project Proponents:

- **Potential Lead Agency** – DWR
- **Potential Partners** – USACE, CALFED, Sacramento River Conservation Area Forum (SRCAF), USFWS, DFG, Department of Parks and Recreation, Wildlife Conservation Board, The Nature Conservancy, Sacramento River Partners, and other nonprofit organizations and stakeholders
- **Contact Information** –

Description:

- **Purpose** – Meandering portions of the Sacramento River, particularly through the Red Bluff-to-Colusa reach, demonstrate the role of an active riverine process creating and maintain riparian habitats, such as water flow, erosion/deposition, lateral channel migration, and ecological succession. River meandering and avulsion create a mosaic of landscapes and vegetative diversity that is key to the wildlife habitat value of the system. The ability of the river to meander, avulse, and generate new floodplain surfaces is crucial to supporting diverse riparian habitats and healthy populations of riparian-dependent species.

When not constrained by natural or man-made erosion-resistant banks, large alluvial meandering rivers have a tendency to migrate laterally (E. Larson, 2007).

The Sacramento River's "inner river zone" is a river alluvium that has experienced river channel migration in the recent past and is likely to experience channel movement in the near future; the area includes the 100-year meander belt and area of project bank erosion over the next 50 years.

- **Concept** – Government and nonprofit organizations have developed guidelines to ensure riparian habitat management along the river addresses the dynamics of the riparian ecosystem and the reality of the local agricultural economy. A detailed site assessment protocol has been established in Chico's Landing Restoration Management Plan Summary, which recommends detailed site assessments be routinely performed to characterize conservation properties and tailored to individual circumstances at each property.

Public access is an issue of substantial concern in the study area with opinions expressed both for and against increased access. Public access is desired in the form of additional boat facilities and road access to the river or to and through public lands. Private landowners have concerns about the potential for increased trespassing. As a result, public access in certain areas will need to be carefully planned to strike a balance among recreation use, other human uses, landowner concerns, and programs for the protection and restoration of the dynamic Sacramento River system.

The conflict between river channel movement and the need to protect adjacent human infrastructure (e.g., towns, bridges, water pumps) can be avoided through long-term planning efforts using process-based geomorphic simulation modeling to forecast potential long-term, landscape-level effects of water management decisions on river meander migration (E. Larson, 2007).

- **Relation to SPFC Facilities** – Not applicable

Project Status: Conceptual

Applicable Management Action(s): Floodplain Management – Easements/Acquisitions

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Improve O&M, Promote Ecosystem Functions, Promote Multi-Benefit Projects

Extent of Benefit Area: The project would likely have local and regional benefits.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit** – Project aims to decrease the risk of flood damage for infrastructure along the meandering Sacramento River.
- **Ecosystem Restoration** – Project will be able to help maintain and even restore the riparian ecosystem that provides habitat for hundreds of resident and migratory birds, fish, and wildlife species.
- **Water Supply** – Not applicable
- **Recreation and Other Benefits** – Additional new lands along the upper Sacramento River could be used for public road access, boating facilities, outreach areas (using signage, kiosks, nature center), camping facilities, bank fishing access, new fishing trails, hunting access, non-motorized trails and nature observation, picnics, and developed river parks. This area also provides a rich bed load of fine soil and nutrients in the extended flood zone that have enabled productive farming for miles along the broad river corridor.

Implementation Cost: Not applicable

Implementation Considerations:

- **Redirected Hydraulic Impacts** – Changes to the meandering river will alter flow path, but negative hydraulics impacts are uncertain.
- **Adverse Environmental Impact and Regulatory Issues** – Adverse environmental impacts to the ecosystem and communities will depend on project implementation methods. There may be a disruption to the ecosystem and existing habitat while securing the meander zones.
- **Other**

Associated Studies

This section lists ongoing and prior studies that have assessed this project.

References

Larsen, E.W., Girvetz, E.H., and Fremier A. K. Landscape level planning in alluvial riparian floodplain ecosystems: Using geomorphic modeling to avoid conflicts between human infrastructure and habitat conservation. *Landscape and Urban Planning*, Volume 79, pg 388-346. 2007.

CALFED Bay-Delta Program website. Available:
<http://www.science.calwater.ca.gov/pdf/eco_restor_sac_river.pdf>.
Accessed: April 29, 2011.

The Nature Conservancy (TNC). Sacramento River Public Recreation Access Study: Red Bluff to Colusa. January 28, 2003. Available
<<http://www.sacramentoriverportal.org/recreation/report.htm>>. Accessed:
April 29, 2011

1.14 Remove sediment and rehabilitate structure, as necessary, at Colusa Weir

ID: 028

Project Type: O&M

Location Information:

- **Region** – Upper Sacramento
- **Subregion** – Downstream from Chico
- **Location** – Colusa Weir and downstream from the weir
- **Community Setting** – Nonurban

Project Proponents:

- **Potential Lead Agency** – DWR
- **Potential Partners** – The Nature Conservancy (TNC), California State Parks, USACE
- **Contact Information** –

Description:

- **Purpose** – This area is a massive deposit center for sediment. Extensive sediment removal is necessary to restore the Colusa Bypass flood carrying capacity and to ensure proper operation of the flood control system. Sediment deposits have reduced the flow capacity of the bypass and the efficiency of the flood control system by forcing flows to remain in the Sacramento River. Deposits forming at the entrance to Colusa Bypass increases stage thresholds for flows entering the floodway, exacerbating flood risk in the main channel downstream from the entrance. It also affects flood conveyance, potentially causing backwater effects that could limit diversion of flood discharge into the bypass system. Colusa Weir is fundamental to flood control in the lower Sacramento Valley because it is the only major exit point for flood flows upstream from the channel constriction.
- **Concept** – Removal sediment along the Colusa Weir and downstream from the weir. Also, rehabilitate Colusa Weir.

- The Colusa SRA Habitat Restoration & Tisdale Bypass Sediment Removal Project is to restore habitat on 139 total acres on the Ward Property within the Colusa Subreach, including 35 acres grassland, 11 acres oak savannah, and 93 acres riparian forest, as mitigation for impacts to riparian habitat caused by the clearing of Tisdale Bypass. Ensure habitat restoration will not affect flood flows within the Colusa Subreach.
- Relation to SPFC Facilities – Colusa Weir

Project Status: Conceptual for rehabilitation of structure. Sediment removal project under construction, March 2009 to December 2011.

Applicable Management Action(s): O&M – Dredging and Clearing

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Improve O&M, Promote Ecosystem Functions, Improve Institutional Support, Promote Multi-Benefit Projects

Extent of Benefit Area: The project will have local and regional benefits.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit** – Removal of the deposits forming at the entrance of the Colusa Bypass would decrease flood risk in the main channel downstream from the entrance.
- **Ecosystem Restoration** – The Habitat Restoration portion of the project includes restoring 139 total acres on the Ward Property within the Colusa Subreach, including grasslands, oak savannah, riparian forest, and mitigation for impacts to riparian habitat.
- **Water Supply** – Would for more flow to go downstream, which may help those who depend on this water.
- **Recreation and Other Benefits** – None

Implementation Cost: *Summaries available implementation costs estimates.*

Implementation Considerations:

- **Redirected Hydraulic Impacts** – Hydraulic changes would have beneficial impacts.
- **Adverse Environmental Impact and Regulatory Issues** – Project may have little adverse environmental impact.
- **Other**

Associated Studies:

- Colusa SRA Habitat Restoration & Tisdale Bypass Sediment Removal Project (2008)
- Status of the Lower Sacramento Valley Flood-Control System within the Context of its Natural Geomorphic Setting (August 2008)

References

California Department of Water Resources (DWR). Final Report of the Flood Emergency Action Team. 1997. Available: <<http://www.water.ca.gov/historicaldocs/irwm/feat-1997/fcsib1g.html>>. Accessed: May 6, 2011.

Sacramento River Conservation Area Forum. 2008. Available: <http://www.sacramentoriver.org/srcaf/publications/2008_SRCAF_Annual_Report.pdf>. Accessed: May 6, 2011

M. Singer, R. Aalto and L. A. James. Status of the Lower Sacramento Valley Flood-Control System within the Context of its Natural Geomorphic Setting. ASCE Natural Hazards Review. August 2008.

1.15 Construct peak overflow detention basins on streams in Tehama County

ID: 036 (and possibly 041)

Project Type: Additional Storage

- **Location Information:**
- **Region** – Upper Sacramento
- **Subregion** – Westside Tributaries
- **Location** – The County of Tehama is located in the Sacramento Valley midway between the city of Sacramento and the Oregon border. Tehama County encompasses an area of nearly 3,000 square miles and is divided by the Sacramento River, which flows through the county from north to south. Approximately 35 percent of the county is west of the Sacramento River and 65 percent is east. The county is bordered on the west by Trinity and Mendocino counties along the Pacific Coast Ranges, Shasta County on the north, Plumas County on the east along the ridgeline of the Sierra Nevada-Cascade Mountains, and on the south by Butte and Glenn counties.
- **Community Setting** – Small Community (City of Corning, Pop. less than 8,000)

Project Proponents:

- **Potential Lead Agency** – Tehama County Flood Control & Water Conservation District
- **Potential Partners** – City of Corning
- **Contact Information** – Ernie Ohlin, Deputy Director of Public Works – Water Resources, Tehama County

Description:

- **Purpose** – Tehama County has suffered major adverse flood impacts from Burch and Jewett creeks during flood events. They overflow and cause major overland sheet flow flooding of infrastructure, homes, etc. Construction of control structures to allow for peak flows to be discharged into detention basins would reduce flood impacts.

- **Concept** – The locations of the proposed detention basins have not yet been determined; however, potential benefits would include:
 - Alleviate peak flood flows, reduce the risk to public health and safety, and reduce flood damage to residences, businesses, and public infrastructure in the vicinity of the city of Corning
 - Assist in groundwater recharge of the local aquifer
 - Capture surface stormwater for conservation, conjunctive use, and increased water supply
- **Relation to SPFC Facilities** – *Identify which State Plan of Flood Control Facilities that would modified by this project.*

Project Status: Conceptual: The October 2006 Tehama County Flood Mitigation Plan identifies several actions that are recommended for implementation to mitigate the adverse impacts from flooding in Tehama County. Formulate a Flood Management Plan for Jewett and Burch creeks in the vicinity of Corning is one such action and includes consideration of detention storage as a possible action.

Applicable Management Action(s): Additional Storage – Floodplain (Transitory) Storage

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Promote Multi-Benefit Projects

Extent of Benefit Area: Reducing peak flood flows and releasing them at a later time have local benefits and could apply regionally and statewide if controlled releases are coordinated with other downstream and upstream agencies.

- **Potential to Provide Multi-Benefits**
- **Flood Damage Reduction Benefit** – Reduce flooding locally by reducing peak flows.

Reduce downstream flooding by conducting controlled releases of the retained water.

- **Ecosystem Restoration** – Creation of detention basins also creates open space and potential habitat for wildlife and native vegetation.

- **Water Supply** – Detention basins hold water up to a maximum of 30 days; therefore, depending on the soils underlying each detention basin, water will naturally seep to the ground while water is retained in the detention basin.

Due to the fact that a detention basin will release the floodwaters over a longer period of time, there will be additional groundwater recharge occurring via streambed recharge.

Water quality downstream will be improved since sediment and debris would collect in the basins.

- **Recreation and Other Benefits**

Implementation Cost: Costs for completing the Flood Management Plan was estimated at approximately \$300,000. No estimate for implementation/construction of the basins.

Implementation Considerations:

- **Redirected Hydraulic Impacts** – Detention basins would be emptied at a controlled rate to ensure that flows are maintained within the channel capacity. This would potentially improve flooding conditions downstream from the project.
- **Adverse Environmental Impact and Regulatory Issues** – *Flood management actions, especially structural management actions, have the potential to adversely impact the environment while meeting other flood management goals. Each project is evaluated on its potential to create adverse environmental impacts such as habitat loss and alteration of key physical processes.*
- **Other**

Associated Studies

This section lists ongoing and prior studies that have assessed this project.

References

Drainage Study. Available:

<<http://www.civilsolutions.com/workspaces/tehama/report-total-04-06-updated-cover.pdf>>

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Secretary of the Army Civil Works Division Annual Report FY 07 South Pacific Division. Available:

http://www.usace.army.mil/CECW/PID/Documents/annual_reps/fy07/SPD_fy07.pdf

Tehama County Flood Mitigation Plan. Available:

<http://www.tehamacountywater.ca.gov/fmp.htm>

1.16 Construct peak overflow detention basins on streams in Glenn County

ID: 037

Project Type: Additional Storage

Location Information:

- **Region** – Upper Sacramento
- **Subregion** – Westside Tributaries
- **Location** – The County of Glenn is located in the Sacramento Valley midway between the city of Sacramento and Redding in Northern California. The city of Willows is located in western Glenn County along I-5, approximately 85 miles north of Sacramento.
- **Community Setting** – Small Community (City of Willows, Pop. Less than 7,000) and surrounding rural area.

Project Proponents:

- **Potential Lead Agency** – Colusa Basin Drainage District
- **Potential Partners** – U.S. Department of the Interior, Bureau of Reclamation (Reclamation), DWR
- **Contact Information** – Ernie Ohlin, Deputy Director of Public Works – Water Resources, Tehama County

Description:

- **Purpose** – The CBDD is currently planning two floodwater detention facilities: one west of Willows on South Fork Willow Creek to reduce flooding in Willows, and one in the Wilson Creek area. In addition to these two sites, the CBDD has other sites in Glenn and Colusa counties (e.g., Funks Creek reservoir) targeted for remediation measures, including, but not limited to, detention facilities.
- **Concept** – The South Fork Willow Creek Basin would be located in the foothills approximately 12 miles west of Willows. The basin would detain stormwater from upper Willow Creek, which would then be released after storm flows recede. The proposed embankment (dam) would be approximately 70 feet high, including 10 feet of freeboard

above the 100-year water surface elevation. The embankment cross section would range from 200 to 550 feet wide at the bottom and up to 20 feet wide at the top. The total length of the embankment would be roughly 600 feet. The detention basin would accommodate up to 5200 acre-feet of storage and would inundate approximately 305 acres during the 100-year storm.

As designed, the South Fork Willow Creek detention basin is anticipated to reduce peak flow in the combined Willow Creek and Wilson Creek channels at Willows (at flood stages, Willow Creek and Wilson Creek are practically combined channels) by approximately 14 percent for the 100-year flood and 11 percent for the 5-year flood. Modeling suggests the flooded area would reduce as much as 25 percent for the 100-year flood and 47 percent for the 5-year flood.

The proposed Wilson Creek detention basin would be located and designed to operate in the same manner as the South Fork Willow Creek detention basin. The embankment would be 55 feet high (10 feet of freeboard above the 100-year water surface elevation), and the cross section would be approximately 300 feet wide at the bottom and 20 feet wide at the top. The total length of the embankment would be roughly 3,500 feet, and the basin would hold up to 2,300 acre-feet and inundate approximately 163 acres during the 100-year design inflow. The Wilson Creek detention basin is anticipated to reduce peak flow in the combined Willow Creek and Wilson Creek channels at Willows by approximately 7 percent for the 100-year flood and 6 percent for a 5-year flood. Modeling suggests the flooded area in the vicinity of Willows would reduce as much as 13 percent for the 100-year flood and 26 percent for the 5-year flood.

Potential benefits of the two basins would include:

- Alleviate peak flood flows, reduce the risk to public health and safety, and reduce flood damage to residences, businesses and public infrastructure in the vicinity of the city of Corning
- Assist in groundwater recharge of the local aquifer
- Capture surface stormwater for conservation, conjunctive use, and increased water supply
- **Relation to SPFC Facilities** – *Identify which State Plan of Flood Control Facilities that would modified by this project.*

Project Status: The South Fork Willow Creek Detention Facility is completely designed, has nearly all permits secured and has a bid packet ready for distribution as soon as funding becomes available. The Wilson Creek Detention Facility still requires further study to determine its feasibility.

Applicable Management Action(s): Additional Storage – Floodplain (Transitory) Storage

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Promote Multi-Benefit Projects

Extent of Benefit Area: Reducing peak flood flows and releasing them at a later time have local benefits and could apply regionally and statewide if controlled releases are coordinated with other downstream and upstream agencies.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit** – Reduce flooding locally by reducing peak flows.
- Reduce downstream flooding by conducting controlled releases of the retained water.
- **Ecosystem Restoration** – Creation of detention basins also creates open space and potential habitat for wildlife and native vegetation.
- **Water Supply** – Detention basins hold water up to a maximum of 30 days; therefore, depending on the soils underlying each detention basin, water will naturally seep to the ground while water is retained in the detention basin.

Due to the fact that a detention basin will release the floodwaters over a longer period of time, there will be additional groundwater recharge occurring via streambed recharge.

Water quality downstream will be improved since sediment and debris would collect in the basins, and erosion would be minimized due to controlled discharge.

- **Recreation and Other Benefits**

Implementation Cost: Capital Construction: \$11.2 – 13.7 million (South Fork Willow Creek), \$10.3 – \$12.6 million (Wilson Creek); Wilson Creek: \$292,000 (South Fork Willow Creek), \$178,000 (Wilson Creek)

Implementation Considerations:

- **Redirected Hydraulic Impacts** – Detention basins would be emptied at a controlled rate to ensure that flows are maintained within the channel capacity. This would potentially improve flooding conditions downstream of the project.
- **Adverse Environmental Impact and Regulatory Issues** – Colusa Basin groundwater has elevated salt concentrations that may adversely affect yields of commonly grown crops.
- **Other**

Associated Studies

Colusa Basin Drainage District Watershed Management Plan (Not yet released)

References

Glenn County general plan Volume II. Available:
<<http://gcplanupdate.net/documents/docs/VOLUME%20II-ISSUES-1.pdf>>

Colusa Basin Drainage District Integrated Water Management Plan presentation. Available:
<http://colusagroundwater.ucdavis.edu/040109_Glenn_Colusa%20Presentations%20pdf/Massa%20Presentation%20-%20CBDD.pdf>

Wilson Creek detention Basin Hydrogeologic Evaluation. Available:
<<http://www.glenncountywater.org/documents/CBDDWilsonCreekSOWforWeb.pdf>>

Colusa Basin Watershed Assessment. Available:
<<http://www.colusarcid.org/nodes/projects/ColusaBasinWatershedAssessmentMainPage.htm>>

1.17 Gravel augmentation at Cottonwood Creek.

ID: 040

Project Type: Ecosystem Functions

Location Information:

- **Region** – Upper Sacramento
- **Sub-region** – Eastside/Westside Tributaries
- **Location** – North Fork Cottonwood Creek, located between 9,600 and 10,000 feet in elevation within the White Mountains
- **Community Setting** – Nonurban area

Project Proponents:

- **Potential Lead Agency** – National Forest Service (NFS)
- **Potential Partners** – DFG, USFWS
- **Contact Information** – Erin Lutrick

Description:

- **Purpose** – Improve spawning habitat within the North Fork Cottonwood Creek, for the federally endangered Paiute cutthroat trout (*Oncorhynchus clarki seleniris*).
- **Concept** – The North Fork Cottonwood Creek Gravel Augmentation Project would improve spawning habitat by adding gravel within an approximately 2-mile section of North Fork Cottonwood Creek. Up to 3 cubic yards of weed-free rounded gravel from ½ inch to 1 inch in diameter would be delivered by truck to a stockpile site above the Cottonwood Creek 4WD route, and transported from there to the project site by pack stock, and stockpiled in small piles in the vicinity of the creek.

The gravel would be placed in the creek by hand, using a standard shovel and buckets at up to 25 individual sites, until enough gravel has been placed to adequately provide for spawning habitat (approximately 3 inches deep, in areas ranging from 5 to 10 square feet at each site). Implementation of the project is expected to be completed within 5

days, and would occur during the late summer/early fall months, outside the spawning period for the Paiute cutthroat trout.

Monitoring would occur during the next several years, and follow-up work would occur as needed. It is anticipated that additional gravel augmentation would be needed within 10 to 12 years, as gravel becomes embedded or washed downstream and unavailable as spawning habitat.

Relation to SPFC Facilities – Not applicable.

Project Status: Gravel Augmentation has been completed. No follow-up monitoring has occurred due to insufficient funding.

Applicable Management Action(s): Ecosystem Functions

Contribution to CVFPP Goals:

- **Primary Goal** – Not applicable
- **Supporting Goals** – Promote Ecosystem Functions

Extent of Benefit Area: Local increase in trout population.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit**
- **Ecosystem Restoration** – This project is consistent with management direction in the *Inyo National Forest Land and Resource Management Plan* (1988) with regards to Threatened and Endangered fish:
 - Rehabilitate and maintain essential habitat for these species according to the species' recovery plans and Memoranda of Understanding with the DFG and the USFWS.
 - Provide high-quality habitat for threatened and endangered fish species based on the results of habitat capability model analyses.
- **Water Supply**
- **Recreation and Other Benefits**
 - Increased fish populations could eventually lead to increased fishing tourism.

Implementation Cost: Initial project costs estimated at approximately \$21,000.

Implementation Considerations:

- **Redirected Hydraulic Impacts**
- **Adverse Environmental Impact and Regulatory Issues** – The Paiute cutthroat trout were transplanted in this creek as a refuge for their native habitat in the Carson-Iceberg Wilderness. Since Cottonwood Creek is not their native habitat, a small potential exists for negative impacts on the local ecosystem once the cutthroat trout populations have sufficiently increased. It has been determined that these potential negative impacts are offset by the positive impacts of saving an endangered species from possible extinction.
- **Other**

Associated Studies

Due to funding issues, no follow-up studies have been completed for this project.

References

Article on project. Available: <http://yubanet.com/regional/Forest-Service-is-Seeking-Comments-on-a-Proposal-to-Improve-Spawning-Habitat-in-the-North-Fork-of-Cottonwood-Creek_printer.php>

Decision Memo: North Fork Cottonwood Creek Gravel Augmentation Project. Provided by Erin Lutrick

1.18 Stabilize Sycamore Creek erosion through construction of grade control structures

ID: 042

Project Type:

- **System Modifications** - Levees/Floodwalls/Hydraulic Structures

Location Information:

- **Region** – Upper Sacramento
- **Subregion** – Eastside/Westside Tributaries
- **Location** – Sycamore Creek, a tributary of Mud Creek. Levees on the left bank of Mud Creek extend upstream along Highway 99 to nearly the mouth of Sycamore Creek
- **Community Setting** – Urban

Project Proponents:

- **Potential Lead Agency** – DWR
- **Potential Partners** – TNC
- **Contact Information** –

Description:

- **Purpose** – In recent years, significant erosion has occurred of the bed and bank on the lower reaches of Sycamore Creek, both directly at and just below its confluence with the Diversion Channel from Big Chico Creek. The channel, before the addition of floodwaters, was a relatively small stream with no significant scour holes or erosion into the underlying “fanglomerate” geologic structure. Scour and erosion is evident in an originally buried sewer pipe being exposed and scour at several bridges downstream of Cohasset Road. All such erosion is taking place in the areas of Mud Creek and its tributary Sycamore Creek that are far upstream from the areas of these creeks affected by the backwater of the Sacramento River. With the relatively narrow levees along Mud Creek, sediment carried by the stream has no place to go besides settle in the bottom of the flood control channel. Due to levees on both sides of the channel, and added sediment from channel

erosion upstream, this is perhaps most dramatic on Mud Creek, beginning from the reach between Meridian Road and Sacramento Avenue, and continuing to Big Chico Creek. Depending on the storm, sediment may either be deposited in the channel, if the river is at high stage and the creek(s) have the discharge necessary to transport sediment. Another possibility is if the river is at a lower stage, the creeks may sluice this sediment down to where it meets the river backwater.

- Concept – Important strategy in the protection and enhancement of rearing habitat for anadromous fish and riparian floodplain vegetation is the selective removal or realignment of levees, berms, revetment and other flood control features at the confluence of Mud Creek and Big Chico Creek with the Sacramento River Level. Local landowners have indicated they would support a more naturalized channel design if it ensured an increase in floodway capacity. Based on a study, the following conservation actions have been recommended:
 - Establish conservation programs with willing landowners adjacent to Mud Creek and Big Chico Creek within the Sacramento River Conservation Area. The Nock and Singh parcels are priority acquisitions for several reasons.
 - Restore landforms to improve floodway capacity and channel-floodplain connectivity.
 - Restore native plant communities to improve floodplain habitat.
 - Ensure long-term management and coordinated conservation ownership.
- **Relation to SPFC Facilities** – Not applicable

Project Status: Feasibility Study

Applicable Management Action(s): System Modifications: Bypasses

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Improve O&M, Promote Ecosystem Functions

Extent of Benefit Area: Project would have local and regional benefits.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit** – Increase flood capacity, improve floodway capacity, improve channel floodplain connectivity for anadromous fish use, and would not cause undesirable flooding on downstream parcels. Important physical processes that create and maintain natural channel and bank conditions would be restored including sediment transport, channel erosion and deposition, and increased temporal and spatial connection of the creek with the floodplain during times of high flow by alleviating the scour and debris problem in the tributaries of Mud Creek (including Sycamore Creek), and prevent backwater from the Sacramento River
- **Ecosystem Restoration** – Juvenile Chinook salmon of all races (spring-, fall-, late fall-and winter-run) and steelhead trout, as well as non-game fish species, including Sacramento sucker (*Catostomus occidentalis*), Sacramento pike-minnow (*Ptychocheilus grandis*), hardhead (*Mylopharodon conocephalus*), hitch (*Lavinia exilicauda*), tule perch (*Hysteroecarpus traskii*), and Sacramento splittail have been documented rearing in the tributaries flowing through or near the study area. The entire confluence area may be extremely important as rearing habitat for juvenile salmonids and restoration at this site may be highly beneficial and cost effective. The project would restore riparian areas which provide productive breeding grounds and offer over-wintering and migration stopover areas for avian species. This area presents excellent opportunities for protecting and restoring habitat critical for anadromous fish, neotropical migrant bird populations, and riparian forest communities.
- The site has deep alluvial soil with natural drainage features, making it ideal for riparian forest restoration. A variety of native riparian vegetation communities may be restored based on the soil conditions and the needs of flood managers.
- **Water Supply** – Project will allow for more groundwater recharge and supply.
- **Recreation and Other Benefits** – Possible location for lineal park along the length of Sycamore Creek to the Sacramento River.

Implementation Cost: *Summaries available implementation costs estimates.*

Implementation Considerations:

- **Redirected Hydraulic Impacts** – This project would alter the hydrologic conditions of this area, changing landforms and key hydrogeomorphic processes from its natural conditions. The hydrographs of the un-dammed tributaries are relatively natural and intact, providing a sound basis for restoration efforts in this area. The natural hydrographs of the tributaries provide the temporal and spatial temperature regime that native aquatic species have evolved with.
- **Adverse Environmental Impact and Regulatory Issues** – Concern for fish and wildlife is related to the stranding of up-migrating adult salmonids and some concern for decreases in riparian vegetation in Bidwell Park.
- **Other**

Associated Studies

This section lists ongoing and prior studies that have assessed this project.

References

Ginney, Eric. Restoration Opportunities at Tributary Confluences: Critical Habitat Assessment of the Big Chico Creek/Mud Creek/Sacramento River Confluence Area. A Nature Conservancy Sacramento River Project. December 2001. Available:

<http://www.sacramentoriverportal.org/big_chico/1_40.pdf>. Accessed: April 20, 2011

Big Chico Creek Watershed – Existing Management Plan. 2006. Available by search: <<http://www.sacramentoriver.org/SRCAF/index.php>>. Accessed April 20, 2011

Sacramento River Watershed Program. 2010. Available: <http://www.sacrriver.org/documents/2010/Roadmap/Eastside_BigChico.pdf>. Accessed April 20, 2011

Maslin, Paul. Environmental Effects of the Big Chico Creek Flood Diversion. Available by search: <<http://www.sacramentoriver.org/SRCAF/index.php>>. Accessed April 20, 2011

1.19 Rehabilitate Chico Creek Diversion Structure

ID: 043

Project Type: System Modifications

Location Information:

- **Region** – Upper Sacramento
- **Subregion** – Eastside/Westside Tributaries
- **Location** – Chico Area
- **Community Setting** – Urban

Project Proponents:

- Potential Lead Agency – DWR
- Potential Partners – USACE, Butte County Public Works
- **Contact Information** –

Description:

- **Purpose** – Big Chico Creek diversion structure helps reduce flood risk in Chico and local transportation facilities. Diversion structures on the eastern side of Chico, Big Chico Creek, and Lindo Channel divert excess flows through a diversion channel to Sycamore Creek. These structures include the Big Chico Creek Gates, Lindo Channel Gates, and the Sycamore Weir. The diversion channel, about 2 miles long, has a design capacity of 8,500 cfs and has a levee along the left bank.
- **Concept** – The project includes the unimproved channels of Big Chico Creek and Lindo Channel that lie between the diversion structure and the Sacramento River.
- Channel improvements and levees extend along both banks of Sycamore Creek, Sheep Hollow, and Mud Creek. About 20 miles of levee are located along these channels, downstream from the diversion channel. Levees line portions of the diversion channel. The design capacity of these levees at their upstream end on Sycamore Creek is 10,000 cfs with 3 feet of freeboard. Sheep Hollow (with a design capacity of 1,400 cfs) and Dry Creek (with a design capacity of 500

cfs) enter Sycamore Creek about 1.8 miles upstream from the Sycamore Creek and Mud Creek confluence. At the confluence, Sycamore Creek has a design capacity of 11,000 cfs and Mud Creek has a capacity of 5,500 cfs. While the design capacity of Mud Creek is 15,000 cfs for most of its length, portions of the channel have a capacity of 13,000 cfs.

- **Relation to SPFC Facilities** – Big Chico Creek Gates, Lindo Channel Gates, Sycamore Weir

Project Status: Conceptual

Applicable Management Action(s): System Modifications – Levees/Floodwalls/Hydraulic Structures

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Improve O&M, Promote Ecosystem Functions, Improve Institutional Support, Promote Multi-Benefit Projects

Extent of Benefit Area: This project has local and regional benefits.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit** – Reduce flood risk in Chico and local transportation facilities.
- **Ecosystem Restoration** – Unknown
- **Water Supply** – Unknown
- **Recreation and Other Benefits** – Unknown

Implementation Cost: *Summaries available for implementation costs estimates.*

Implementation Considerations:

- **Redirected Hydraulic Impacts** – Redirected flood impacts occur when a project moves the risk of flooding from one area to another area. For example, improvements to flood protection in one area can result in increased flood flows in a downstream area; therefore, increasing the flood risk downstream. Project is qualitatively evaluated with respect to its potential to redirect hydraulic impacts.

- **Adverse Environmental Impact and Regulatory Issues** – Flood management actions, especially structural management actions, have the potential to adversely impact the environment while meeting other flood management goals. Each project is evaluated on its potential to create adverse environmental impacts such as habitat loss and alteration of key physical processes.
- **Other**

Associated Studies

None

References

California Department of Water Resources. Central Valley Flood Management Planning Program (FloodSAFE). State Plan of Flood Control Descriptive Document. November 2010. Available: < <http://www.water.ca.gov/cvfmp/documents.cfm> >. Accessed: May 6, 2011

1.20 Deer Creek Levee Setback and Environmental Enhancement Project, Lower Deer Creek Flood Reduction and Fisheries Restoration Project

ID: 044

Project Type: System Modifications - Bypasses

Location Information:

- **Region** – Upper Sacramento
- **Subregion** – Eastside/Westside Tributaries
- **Location** – Deer Creek, a tributary off the middle reach of the Sacramento River, is located near Nevada City and is home to floodplain habitats that have been identified as biological “hotspots” because they provide vital habitat for fish and wildlife. The project is located on the eastern side of Tehama County, near the town of Vina.
 - **Community Setting** – Nonurban

Project Proponents:

- **Potential Lead Agency** – Deer Creek Watershed Conservancy
- **Potential Partners** – Wildlife Conservation Board, USACE, DFG, Tehama County Flood Control and Water Conservation District (WCD), U.S. Department of Transportation (USDOT), Four Pumps Program, National Marine Fisheries Service (NMFS), USFWS
- **Contact Information** – Holly Savage

Description:

- **Purpose** – Portions of levees constructed by USACE in 1948 to convey flows up to 21,000 cfs may not actually have been built to the 21,000 cfs capacity. Modeling results of existing conditions suggest that portions of the existing levee system are overtopped as low as 10,000 cfs.

Reconstructing and setting back the levee on both sides of the stream would increase the floodplain and increase the transitory storage capacity, restore channel form and function to improve O&M and

facilitate flood damage reduction, remove barriers to fish passage, set back levees to connect rivers to floodplains, restore channel alignment, encourage natural physical geomorphic processes including channel migration and sediment transport, protect critical infrastructure corridors from flood waters (MA-069). This project is an effort to respond to the flooding and habitat problems in lower Deer Creek and explore the concept of deliberately using the floodplain of Deer Creek to accommodate part of the flood flows in a controlled fashion. With careful planning and adequate protections for vulnerable property and infrastructure, this project will seek to reduce flood flows and allow the channel to reestablish some of its irregular, hydraulically rough, and ecologically complete pre-levee condition.

- **Concept** – This plan includes developing performance measures; conduct adaptive management experiments; advance process understanding; establish integrated science programs in complicated field settings, compare effectiveness of different restoration strategies; coordinate and extend existing monitoring; and take advantage of existing data. Key milestones include the following:
 - **Phase I** – Chartering with Stakeholders (May 31, 2004); Assembling/Reviewing Existing Data/Information (June 30, 2004); Monitoring Plan Development and Initiation (April 16, 2007); Workshop with Participants/Stakeholders/Agencies (Ongoing) Preliminary Modeling Setup (May 30, 2007); Collection of Additional Data Hydrologic/Hydraulic Modeling Evaluation of Preliminary Scenarios Hydrologic/Hydraulic Analyses for Fluvial Geomorphology Review of Project Elements Versus Conceptual Model Select Alternatives (March 19, 2008); Workshop Alternatives and Evaluation: Technical Advisory Committee (TAC) Meeting – July 7, 2008 Conferences and Other Meetings (Ongoing); Document Alternatives and Monitoring – Feasibility/Monitoring Report (August 15, 2008)
 - **Phase II** – Conceptual Design of Initial Implementation Project Elements Conceptual Design of Selected Alternatives (September 19, 2008) Public Presentation/Workshop of Conceptual Design (July 8, 2008) Final Report/End of Project (January 31, 2009) This project is a direct link to milestones for the Ecosystem Restoration Plan (ERP) Multi-Species Conservation Strategy for the Sacramento River Basin Ecological Processes:
- **Milestone 59** – Develop floodplain management plans, including feasibility studies to construct setback levees, to restore and improve opportunities for rivers to inundate their floodplain on a seasonal basis for at least one tributary within each of the Ecological Management Zones (EMZ) in the Sacramento River Basin.

- **Milestone 64** – Restore 2 miles of the 10-mile target of riparian habitat restoration along the lower reaches of the Deer Creek tributary.
- **Relation to SPFC Facilities** – Not applicable

Project Status: Design

Applicable Management Action(s): System Modifications: Setback
Levees

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Improve O&M, Promote Ecosystem Functions, Improve Institutional Support, Promote Multi-Benefit Projects

Extent of Benefit Area: This project would likely have local, regional, and systemwide benefits.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit** – This project will investigate the feasibility of providing a higher level of flood protection (up to 26,300 cfs, the 100-year flow) by further setting back and/or raising the levees, thereby increasing the level of flood protection and reducing the risk of future levee failure from overtopping and/or lateral scour.
- **Ecosystem Restoration** – Fish passage improvements (steelhead, spring-run and fall-run Chinook) by replacing the existing dam with a seasonal structure and may also increase the deposition of spawning gravel. The project could also expand the riparian zone providing a larger and more continuous corridor by setting-back levees.
- **Water Supply** – There will be groundwater recharge.
- **Recreation and Other Benefits** – This project includes extended livestock exclusion with setback levees, and sediment deposition from decreased flow velocities resulting from the growth of riparian vegetation.

Implementation Cost: \$17,370,888

Implementation Considerations:

- **Redirected Hydraulic Impacts** – The Deer Creek Floodplain Restoration Project will alter the hydraulics for the project area through expansion of the floodplain and removal of the levee setback. Flow during major flood events will not be obstructed by the levee setback and will continue to flow throughout the Deer Creek floodplain.
- Adverse Environmental Impact and Regulatory Issues – Not applicable
- Other

Associated Studies

This section lists ongoing and prior studies that have assessed this project.

References

American Rivers. 2010 Orvis Conservation Grant Project: Sacramento River – Deer Creek. Available: < <http://www.americanrivers.org/our-work/restoring-rivers/floods-floodplains/orvis-conservation-grant-sacramento.html>>. Accessed on April 19, 2011.

Sacramento River Conservation Area Forum – Project Tracker. Available: < http://www.sacramentoriver.org/ProjectTrak/ProjectTrack_Details.aspx?var1=139>. Accessed on April 18, 2011

American Rivers. Deer Creek Floodplain Restoration. Available: <<http://www.americanrivers.org/our-work/water-supply/storage-flows/deer-creek-floodplain-rest.html>>. Accessed on April 19, 2011

1.21 Remove sediment and rehab structure as necessary at Tisdale Weir

ID: 046

Project Type: Operations and Maintenance

Location Information:

- **Region** – Upper Sacramento
- **Subregion** – Sutter Bypass/Tisdale Bypass
- **Location** – Tisdale Weir
- **Community Setting** – Nonurban

Project Proponents:

- Potential Lead Agency – USACE
- Potential Partners – DWR
- **Contact Information** –

Description:

- **Purpose** – Tisdale Weir and Bypass are crucial to the security of the Colusa and Sutter Basins. It provides relief of major flood flows in the main stem of the Sacramento River eastward into the Sutter Bypass. Tisdale Weir sends water into the Tisdale Bypass in Sutter County. There is a serious sediment problem in this area that can cause restriction to flood flows. Debris impedes flow into the Tisdale Bypass, which results in unnecessarily high Sacramento River flows and potential flood risk. Without sedimentation control, the risk of overstressing levees and extensive flood damage increase yearly.

DWR spent approximately \$5 million to remove sediment accumulated at the mouth of Tisdale Weir. In addition, the State is constructing an \$8 million bridge to replace the structure currently across the weir – an ancient wood structure with footings so close together it traps river debris and blocks the flow into the bypass. The old bridge reduced weir capacity to 22,000 cfs from its design capacity of 33,000 cfs. The effect will be a reduction of pressure on the Sacramento River levees that protect the Meridian and Robbins basins from flooding (2008).

- **Concept** – Remove approximately 2.5 million cubic yards from the Tisdale Bypass in summer 2007. Construct a bridge to replace the structure currently across the Tisdale Weir.
- **Relation to SPFC Facilities** – Tisdale Weir

Project Status: Completed or Construction

Applicable Management Action(s): O&M – Dredging and Clearing

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Improve O&M, Improve Institutional Support, Promote Multi-Benefit Projects

Extent of Benefit Area: The project has local, regional, and systemwide benefits.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit** – Removing sediment and improving the Tisdale Weir would alleviate the threat to public safety and the potential liability for substantial damages from backwater effects of restricted flood flows.
- **Ecosystem Restoration** – None
- **Water Supply** – None
- **Recreation and Other Benefits** – None

Implementation Cost: Estimated \$13 million

Implementation Considerations:

- **Redirected Hydraulic Impacts** – None. Hydraulic changes would have beneficial impacts.
- **Adverse Environmental Impact and Regulatory Issues** – No adverse affects.
- **Other**

Associated Studies

None

References

Sutter County Newsletter. 2008. Available:
<http://www.co.sutter.ca.us/pdf/news/Flood_Aware_2008.pdf>. Accessed:
May 10, 2011.

California Department of Water Resources. Report of Activities of the
Department of Water Resources. 2006. Available: <
<http://www.cvpfb.ca.gov/meetings/2006/04-06Item5DWRreport.pdf>>.
Accessed: May 10, 2011.

1.22 Protect Woodson Bridge Hard Point

ID: 051

Project Type: Floodplain Management

Location Information:

- **Region** – Upper Sacramento
- **Subregion** – Upstream of Chico
- **Location** – Tehama County between, Tehama County Highway A9 Bridge (Woodson Bridge).
- **Community Setting** – Small Community

Project Proponents:

- **Potential Lead Agency** – DWR
- **Potential Partners** – DFG, Tehama County, State Parks, TNC, SRCAF, USFWS, USACE
- **Contact Information** – Patricia Bratcher, DFG

Description:

- **Purpose** – Woodson Bridge State Recreation Area is susceptible to renewed bank erosion since the removal of the Palisades Demonstration Bank Protection Project on the Sacramento River since 1997. This area has major erosion problems. If no action taken, it is estimated about 40 acres will be eroded in the next 25 years (DWR, 1998).

The unleveed reach of the Sacramento River has an active meandering bed with wide floodplains. Upstream from Woodson Bridge, extensive existing rock protection on both channel banks maintains the river's alignment through the bridge and prevents erosion. This area has potential for restoration habitat, bank rock removal, bank protection, and reconnection of Kopta Slough to the main channel.

This project is part of the Kopta Slough Flood Protection and Habitat Restoration Project under the project element "Protect West Abutment of Woodson Bridge and City of Corning Sewer Outfall"

- **Concept** – Four options have been developed for erosion protection at Woodson Bridge. The protection options included no site improvements, bendway weirs with bank vegetation, low berm with upper bank vegetation, spur dikes with upper bank vegetation, and bank armor with upper bank vegetation.
- **Relation to SPFC Facilities** – None

Project Status: Conceptual

Applicable Management Action(s): Floodplain Management – Floodproofing

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Improve O&M, Promote Ecosystem Functions

Extent of Benefit Area: Project would have local and regional benefits.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit** – Goal of the project is to reduce flood damage to protect public resources.
- **Ecosystem Restoration** – Project would help restore habitat and ecosystem functions through restoring natural fluvial and floodplain process.
- **Water Supply** – None
- **Recreation and Other Benefits** – Project would protect the existing recreational facilities such as a boat launch ramp for water sports. There are currently nature-related activities, hiking, and picnicking in this area.

Implementation Cost: \$973,000 for spur dikes, \$1.14 million for bendway weirs, \$1.43 million for bank armor, and \$2.66 million for low berm

Implementation Considerations:

- **Redirected Hydraulic Impacts** – Project would interrupt natural channel migration and associated erosion and deposition.

- **Adverse Environmental Impact and Regulatory Issues** – No impact to sensitive plant species. There may be impacts to the erosion of mature riparian forest plant communities, in which impacts can be mitigated. There might also be impacts on animal and riverine aquatic habitat that depend on erosion, channel movement and/or shade.
- **Other**

Associated Studies

Kopta Slough Flood Damage Reduction and Habitat Restoration Project Feasibility Study Proposal (2008)

References

Response to E-mail Request by Stuart Edell, Upper Sacramento Work Group Subcommittee, Objectives Development, Memorandum. October 28, 2010.

California Department of Water Resources (DWR). Hydraulic Analysis, Conceptual Design, and Preliminary Cost Estimate for the Kopta Slough Flood Damage Reduction and Habitat Restoration Study on the Sacramento River, RM 216 to RM 244. Tehama County, CA. December 28, 2009.

DWR. Woodson Bridge State Recreation Area Long-term Solutions Study – Working Draft. November 1998.

Sacramento River Conservation Forum Website. Available: <http://www.sacramentoriver.org/srcaf/index.php?id=kopta>. Accessed: May 5, 2011

1.23 Acquisition and complete restoration of Prospect Island.

ID: 056

Project Type: Floodplain Management

Location Information:

- **Region** – Delta
- **Subregion** – Not applicable
- **Location** – Located in the North Delta in the Cache Slough Complex, at the southern end of the Yolo Bypass
- **Community Setting** – Nonurban area

Project Proponents:

- **Potential Lead Agency** – Department of Water Resources
- **Potential Partners** – Port of West Sacramento, CALFED Bay-Delta Program, DFG, USFWS, Nonprofit environmental organizations
- **Contact Information**

Description:

- **Purpose** – Restore the island to intertidal and appropriate subtidal habitat for the benefit of native fish and improved aquatic ecosystem function.

Prospect Island restoration objectives are:

- Create habitat suitable for federally listed threatened delta smelt (*Hypomesus transpacificus*) and proposed threatened Sacramento splittail.
- Develop feeding, cover, and resting areas for anadromous fish including Chinook salmon.
- Improve waterfowl and shorebird habitat.
- Provide terrestrial and aquatic habitat for other wildlife species.

- **Concept** – The project will entail breaching the Prospect Island levees to restore tidal marsh, open water habitat, and some upland/riparian habitat. Prospect Island offers a unique opportunity for restoration due to comparatively little subsidence, resulting in elevations in the island interior that are assumed suitable for supporting tidal wetlands (pending more specific data).
- **Relation to SPFC Facilities** – An Environmental Assessment/Initial Study (EA/IS) conducted by the USACE and DWR in June 2001 determined that two levees bounding Prospect Island would be breached.

Project Status: Conceptual

Applicable Management Action(s): Floodplain Management – Easements/Acquisitions

Contribution to CVFPP Goals

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Promote Ecosystem Functions, Improve O&M, Promote Multi-Benefit Projects

Extent of Benefit Area: Regional: flooding and ecological benefits in the local area.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit**
 - In the past, levees damaged by floods have had to be repaired. Breaching the levees in a way that will keep shipping lanes safe, will eliminate future need for repairs.
- **Ecosystem Restoration**
 - Between 500 and 1000 acres of intertidal freshwater marsh will be created, depending on the actual elevations of the island.
 - Will partially satisfy required actions and Reasonable and Prudent Alternatives (RPA) in the Salmon Operations Criteria and Plan (OCAP) Biological Opinion (Action 1.6.2 (Liberty Island/Lower Cache Slough)) and the Delta Smelt OCAP Biological Opinion – RPA 4 (restore 8,000 acres of tidal marsh)

- Identified as a Potential Action in the Fish Restoration Program Agreement between DFG and DWR
- Identified as a Bay-Delta Conservation Plan (BDCP) Priority Project for Near-Term Implementation and will count towards the BDCP aquatic habitat target acreage
- Several special-status wildlife species could benefit from the creation of wetland, open water, and riparian habitats in the expanded floodplain. Species include the delta smelt, Sacramento splittail, Central Valley steelhead, and Chinook salmon.
- Water Supply
 - Wetlands are known to improve water quality by binding sediment and removing nitrogen. Improved water quality could have positive impacts on regional water supplies.
- Recreation and Other Benefits
 - Recreational fishing and waterfowl hunting as well as ecotourism could be enhanced by the creation of a wetlands area.
 - Fishery production has been measured in the Delta for at least the past 30 years and has been in decline. This decline was accompanied by a loss of perennial shallow-water habitat (SWH). It is hypothesized that the loss of perennial SWH contributed to the decline in food web resources in the Delta, because wetlands are sources of organic matter and nutrients needed for production at the base of the food web and nursery habitat for juvenile fish.

Implementation Cost: Estimated total cost for interim management, planning, and construction is between \$15 million and \$20 million.

Implementation Considerations:

- **Redirected Hydraulic Impacts** – Flood protection is provided by removing the existing structures and allowing the natural flooding to occur in the project area. This should not negatively impact flooding in surrounding areas.
- **Adverse Environmental Impact and Regulatory Issues** – Temporary construction impacts to wildlife, caused by habitat disturbance and noise, would be offset by long-term improvements in habitat values.
- **Other**

Associated Studies

Prospect Island is adjacent to planned and existing restoration projects in the Cache Slough Complex area. Restoration actions are already underway at nearby Liberty Island.

Prospect Island Environmental Monitoring Plan. Available:
<http://www.water.ca.gov/iep/activities/monitor/pi_monitor/MonitorPlan.cfm>

References

Delta Habitat Projects news release. Available:
<http://www.water.ca.gov/news/newsreleases/2010/122210delta_habitat_projects.pdf>

California Department of Water Resources (DWR). Prospect Island Restoration Project Presentation. Available:
<http://www.deltacouncil.ca.gov/delta_council_meetings/11_2010/docs/supplemental_meeting_materials/DWR_Prospect_Island_Restoration_Project_Presentation.pdf>

Prospect Island Ecosystem Restoration Project EA/IS. Available:
<http://deltarevision.com/2001_docs/2001prospect_island.pdf>

1.24 Acquisition and complete restoration of Liberty Island

ID: 057

Project Type: Floodplain Management

Location Information:

- **Region** – Delta
- **Subregion** – Not applicable
- **Location** – Located in the north delta in the Cache Slough Complex, at the southern end of the Yolo Bypass
- **Community Setting** – Nonurban area

Project Proponents:

- Potential Lead Agency –DWR
- Potential Partners –DFG, USFWS, CALFED, NMFS, Private corporations, Nonprofit environmental organizations
- Contact Information
- Description:
 - Purpose – Liberty Island already supports significant existing wildlife and has outstanding potential for restoration, floodplain management, and endangered species recovery.
 - Concept – Liberty Island is an inundated island encompassing 5,209 acres in the northern Sacramento-San Joaquin Delta (Delta). It has been flooded since 1998 when levees were breached during high-water flows and the levees were not repaired by the landowners. Future restoration plans for Liberty Island are envisioned to use passive approaches that would allow wetland and riparian vegetation to establish naturally. Restoration may also include:
 - Creating additional breaches in the levee filling agricultural water delivery and drainage ditches,
 - Leveling an existing road bisecting the property

- Excavating meandering sloughs to improve habitat quality and native fish access and to prevent fish stranding.
- **Relation to SPFC Facilities** – Additional breaches may be made to the levee.

Project Status: **Unclear.** Restoration activities have already taken part on a small portion (186 acres) by Wildlands Inc. to create the Liberty Island Conservation Bank at the northern tip of Liberty Island; however, this does not appear to be a part of this project.

Applicable Management Action(s): Floodplain Management – Easements/Acquisitions

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Improve O&M, Promote Ecosystem Functions, Promote Multi-Benefit Projects

Extent of Benefit Area: Regional: flooding and ecological benefits in the local area.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit**
 - In the past levees damaged by floods have had to be repaired. Breaching the levees in a way that will keep shipping lanes safe, will eliminate future need for repairs.
- **Ecosystem Restoration**
 - Several special-status wildlife species could benefit from the creation of wetland, open water, and riparian habitats in the expanded floodplain. Species include the delta smelt, Sacramento splittail, Central Valley steelhead, and Chinook salmon.
- **Water Supply**
 - Wetlands are known to improve water quality by binding sediment and removing nitrogen. Improved water quality could have positive impacts on regional water supplies.
- **Recreation and Other Benefits**

- Recreational fishing and waterfowl hunting as well as ecotourism could be enhanced by the creation of a wetlands area.
- Fishery production has been measured in the Delta for at least the past 30 years and has been in decline. This decline was accompanied by a loss of perennial SWH. It is hypothesized that the loss of perennial SWH contributed to the decline in food web resources in the Delta, because wetlands are sources of organic matter and nutrients needed for production at the base of the food web and nursery habitat for juvenile fish.

Implementation Cost: *Summaries available implementation costs estimates.*

Implementation Considerations:

- **Redirected Hydraulic Impacts** – Flood protection is provided by removing the existing structures and allowing the natural flooding to occur in the project area. This should not negatively impact flooding in surrounding areas.
- **Adverse Environmental Impact and Regulatory Issues** – Temporary construction impacts to wildlife, caused by habitat disturbance and noise, would be offset by long-term improvements in habitat values.
- **Other**

Associated Studies

Liberty Island Conservation Bank Initial Study/Mitigated Negative Declaration. Available:

<http://www.yolobypass.net/docs/meeting_8/liberty_island_april_09_with_tabloid_figures.pdf>

Liberty Island Environmental Monitoring Plan. Available:

<http://www.water.ca.gov/iep/activities/monitor/pi_monitor/liberty/LI_Monitoring_Plan.cfm>

References

Liberty Island Conservation Bank Initial Study/Mitigated Negative Declaration. Available:

<http://www.yolobypass.net/docs/meeting_8/liberty_island_april_09_with_tabloid_figures.pdf>

Delta Habitat Projects news release. Available:

<http://www.water.ca.gov/news/newsreleases/2010/122210delta_habitat_projects.pdf>

1.25 Silt/Sand bar removal along Lower San Joaquin River

ID: 077

Project Type: O&M

Location Information:

- **Region** – Lower San Joaquin
- **Subregion** – Not applicable
- **Location** – Lower San Joaquin (including above, within, and below Paradise Cut)
- **Community Setting** – Nonurban

Project Proponents:

- Potential Lead Agency –
- Potential Partners –
- Contact Information –

Description:

- **Purpose** – The Flood Conveyance Plan identifies areas that need dredging throughout the lower San Joaquin River (including above, within, and below Paradise Cut)
- **Concept** – *Describes how the project is anticipated to be implemented and what are the elements that constitute that project. May include a range of implementation methods and elements.*
- **Relation to SPFC Facilities** – None

Project Status: Unknown

Applicable Management Action(s): O&M – Dredging and Clearing

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Improve O&M, Promote Ecosystem Functions, Promote Multi-Benefit Projects

Extent of Benefit Area: Project has local, regional, and systemwide benefits.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit** – Reduce physical flow constrictions from silt and sandbar issues in the San Joaquin River.
- **Ecosystem Restoration** – Silt and sand deposits results in a decrease in abundance of invertebrates that are important as fish foods, but also results in a change in invertebrate species from those inhabiting the interstitial spaces of large particles to small, burrowing forms less available to fish. DFG observed that “many [fish] have rubbed themselves raw going over the shallow sandbars.” Removal of these deposits will allow for restoration of fish and other aquatic species in affected areas.
- **Water Supply** – None
- **Recreation and Other Benefits** – None

Implementation Cost: Summaries available implementation costs estimates.

Implementation Considerations:

- **Redirected Hydraulic Impacts** – Clearing the San Joaquin River from silt and sandbar buildup would remove flow restrictions therefore allowing water to flow more freely and would alter the hydraulics of the river. No adverse hydraulics impacts expected.
- **Adverse Environmental Impact and Regulatory Issues** – Removal of silt and sandbar may disrupt riverine habitat temporarily but will improve the overall ecosystem.
- **Other**

Associated Studies

This section lists ongoing and prior studies that have assessed this project.

References

San Joaquin River Restoration Program, Fisheries Management Plan Draft.
June 2009.

1.26 Vegetation removal along Mokelumne River

ID: 080

Project Type: O&M

Location Information:

- **Region** – Lower San Joaquin
- **Subregion** – San Joaquin County
- **Location** – Lower San Joaquin River
- **Community Setting** – Nonurban

Project Proponents:

- Potential Lead Agency –
- Potential Partners –
- Contact Information –

Description:

- **Purpose** – General vegetation issues exist on the Mokelumne River. Levees are typically devoid of trees and bushes, as vegetation is generally considered detrimental to the operation of the levees because it prevents easy visual inspection and because tree roots extending into the channel produce eddies that speed erosion of unreinforced soils.

Traditional approaches to levee management involve removal of vegetation to inspect the levees. Unfortunately, this practice creates ideal habitat for ground squirrels, which prefer disturbed soils, barren ground, and elevated areas. Restoration of native riparian vegetation may be an effective means to reduce the impact of burrowing ground squirrels.

- **Concept** – Remove vegetation along the Mokelumne River.

Legislative Platform is to urge the Legislature to adopt a State Joint Resolution supporting additional language into the new Federal Water Resources Development Act, such as “Require the U.S. Army Corps of Engineers to revisit its levee vegetation removal policy to more fully evaluate the potential impacts and implementation challenges.”

Information on the concept for the vegetation removal and bank stabilization in the Coral Hall Road area is currently unavailable.

- **Relation to SPFC Facilities** – Levees along the Mokelumne River in lower San Joaquin River area.

Project Status: Conceptual Level

Applicable Management Action(s): O&M – Vegetation Management

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Improve O&M

Extent of Benefit Area: The project would likely local and regional benefits.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit** – The current urban flood protection system generally provides a 100-year level of flood protection. Many levees in San Joaquin County are USACE project levees; therefore, any improvements to those levees must be coordinated through the USACE. Senate Bill (SB) 5 mandates, among other things, a 200-year level of urban flood protection by 2025. The USACE administers the Lower San Joaquin River Feasibility Study to identify options for improved flood protection for existing urban areas.
- **Ecosystem Restoration** – None
- **Water Supply** – None
- **Recreation and Other Benefits** – None

Implementation Cost: \$14.9 million for the Lower San Joaquin River Feasibility Study Project Cost

Implementation Considerations:

- **Redirected Hydraulic Impacts** – Removal of vegetation could alter the hydraulics of the banks and levees such as flow velocities.
- **Adverse Environmental Impact and Regulatory Issues** – Removal of vegetation on and near levees would have an adverse environmental

impact as the vegetation provides an important habitat to listed, threatened and endangered species.

The removal of vegetation along watercourses reduces the quantity of suitable fish habitat and can cause an increase in water temperature which may lead to fish mortality. Maintaining shoreline and aquatic vegetation provides cover for protection from predators and serves as a food source. Mokelumne River contains some of the largest concentrations of riparian habitats of the Sacramento-San Joaquin Delta; these areas are important to many wildlife species for the food, shelter, and breeding sites they provide.

- **Other**

Associated Studies

None

References

San Joaquin County. Adopted 2011 and 2012 State Legislative/Regulatory Platform and Policy Guidelines. February 8, 2011.

U.S. Fish and Wildlife Service (USFWS). The Ecology of the Sacramento-San Joaquin Delta: A Community Profile. Biological Report 85 (7.22). September 1989. Available: <<http://www.nwrc.usgs.gov/techrpt/85-7-22.pdf>>. Accessed: May 3, 2011

San Joaquin County. County Wide General Plan, Volume III Vegetation, Fish, and Wildlife Habitat. 1992. Available: http://www.sjgov.org/commdev/cgi-bin/cdyn.exe/handouts-planning_GP-V3-IV-F?grp=handouts-planning&obj=GP-V3-IV-F>. Accessed: May 3, 2011

1.27 Vegetation removal and bank stabilization in the Coral Hall Road area

ID: 081

Project Type: O&M

Location Information:

- **Region** – Lower San Joaquin
- **Subregion** – San Joaquin County
- **Location** – Lower San Joaquin River
- **Community Setting** – Nonurban

Project Proponents:

- **Potential Lead Agency** – San Joaquin County and San Joaquin Area Flood Control Agency
- **Potential Partners** – USACE, DWR, Board
- **Contact Information** – Thomas M. Gau, County of San Joaquin Public Works – Interim Director

Description:

- **Purpose** – San Joaquin Central Valley levee system that protects invaluable infrastructure has been neglected for decades. In the Coral Hall Road area, vegetation and bank stabilization are both major issues – due to environmental conflicts, San Joaquin County has been unable to remove vegetation or stabilize levee slopes.

USACE Levee Vegetation Removal Policy – After Hurricane Katrina, the USACE made major levee policy changes, which included new standards banning vegetation on or within 15 feet of levees (2009). Levee owners and operators are concerned that the new policy does not adequately consider that levee vegetation is viewed by many resource agencies as providing important habitat to listed, threatened and endangered species. Pursuant to the Endangered Species Act (ESA), it may be impossible for many levee owners and operators to comply with the new policy within the required timeline. In addition, there is unresolved debate as to whether vegetation impairs levees, or whether

some vegetation can actually help stabilize levees. San Joaquin County is urging that implementation of the levee removal policy be postponed until the impacts can be fully evaluated, and the policy is scientifically validated and properly vetted.

- **Concept** – Legislative Platform is to urge the Legislature to adopt a State Joint Resolution supporting additional language into the new Federal Water Resources Development Act, such as “Require the U.S. Army Corps of Engineers to revisit its levee vegetation removal policy to more fully evaluate the potential impacts and implementation challenges.”

Information on the concept for the vegetation removal and bank stabilization in the Coral Hall Road area is currently unavailable.

- **Relation to SPFC Facilities** – Levees along the San Joaquin River in San Joaquin County.

Project Status: Conceptual Level

Applicable Management Action(s): O&M – Vegetation Management

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Improve O&M, Improve Institutional Support

Extent of Benefit Area: The project would likely local, regional, and systemwide benefits.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit** – The current urban flood protection system generally provides a 100-year level of flood protection. Many levees in San Joaquin County are USACE project levees; therefore, any improvements to those levees must be coordinated through the USACE. SB 5 mandates, among other things, a 200-year level of urban flood protection by 2025. The USACE administers the Lower San Joaquin River Feasibility Study to identify options for improved flood protection for existing urban areas.
- **Ecosystem Restoration** – None
- **Water Supply** – None

- **Recreation and Other Benefits** – None

Implementation Cost: \$14.9 million for the Lower San Joaquin River Feasibility Study (LWJRFS) project cost.

Implementation Considerations:

- **Redirected Hydraulic Impacts** – Removal of vegetation could alter the hydraulics of the banks and levees such as flow velocities.
- **Adverse Environmental Impact and Regulatory Issues** – Removal of vegetation on and near levees would have an adverse environmental impact as the vegetation provides an important habitat to listed, threatened and endangered species.
- Other

Associated Studies

None

References

San Joaquin County. Adopted 2011 and 2012 State Legislative/Regulatory Platform and Policy Guidelines. February 8, 2011.

1.28 Reduce flow constrictions along Ash Slough and Berenda Slough

ID: 117

Project Type: O&M

Location Information:

- **Region** – Upper San Joaquin
- **Subregion** – Madera County
- **Location** – Ash Slough and Berenda Slough
- **Community Setting** – Nonurban

Project Proponents:

- **Potential Lead Agency** – USACE
- **Potential Partners** – Madera County Flood Control, Chowchilla Water District, DWR

• **Contact Information** –

Description:

- **Purpose** – The Ash Slough provides flood control to upstream dams and in some portions carries irrigation water during the irrigation season. Berenda Slough is also an overflow flood control channel that is dry most of the year and carries water during heavy rain years; Berenda Slough is not part of the irrigation system. Flooding has occurred over the Berenda Slough onto roads and farmland.
- **Concept** – *Describes how the project is anticipated to be implemented and what are the elements that constitute that project. May include a range of implementation methods and elements.*
- **Relation to SPFC Facilities** – Ash Slough, Berenda Slough

Project Status: *Identify the status of project development: conceptual level, reconnaissance level, feasibility study, design, environmental documentation, construction, and completed.*

Applicable Management Action(s): O&M – Reduce Flow Constrictions

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Improve O&M, Improve Institutional Support, Promote Multi-Benefit Projects

Extent of Benefit Area: Project would likely have local and regional benefits.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit** – Reduce potential damage to nearby farmland, residential homes, and infrastructure.
- **Ecosystem Restoration** – Riparian habitat exists in Ash Slough.
- **Water Supply** – Groundwater is replenished at Ash Slough for irrigation water use.
- **Recreation and Other Benefits** – Open space trail system along Ash Slough and Berenda Slough that connects the urban area and Berenda Reservoir.

Implementation Cost: *Summaries available implementation costs estimates.*

Implementation Considerations:

- **Redirected Hydraulic Impacts** – Removing or improving restriction areas is worthwhile, but wholesale capacity increases lead to high velocities and erosion concerns.
- **Adverse Environmental Impact and Regulatory Issues** – *Flood management actions, especially structural management actions, have the potential to adversely impact the environment while meeting other flood management goals. Each project is evaluated on its potential to create adverse environmental impacts such as habitat loss and alteration of key physical processes.*

- **Other** – There could be compatibility or a constraint since San Joaquin River Restoration Program (SJRRP) goal could compete, or be compatible, with flood protection.

Associated Studies

This section lists ongoing and prior studies that have assessed this project.

References

City of Chowchilla. General Plan Update 2040 Draft Environmental Impact Report. 2010.

1.29 Repair/modify Los Banos Creek culverts

ID: 118

Project Type: O&M

Location Information:

- **Region** – Upper San Joaquin
- **Subregion** – Los Banos Creek
- **Location** – Los Banos Creek
- **Community Setting** – Nonurban

Project Proponents:

- **Potential Lead Agency** – DWR
- **Potential Partners** – Reclamation

• **Contact Information** –

Description:

- **Purpose** – There are two culverts on Los Banos Creek that constricted flow during the 1998 flood season. Reclamation and DWR’s Division of Safety of Dams have completed numerous inspections of the Los Banos Detention Dam and have classified it as high risk. The water is designed to flow away from the dam, following its natural channel. Over time, cattails and tules have grown around this lower basin and the discharge path, preventing proper drainage and causing water to back up into the surrounding area. There is heavy growth of vegetation, and accumulation of debris and sediment which causes improper drainage.
- **Concept** – San Luis Creek, Los Banos Creek, and the Chowchilla River have caused flooding in the past but were not studied because reservoirs constructed in 1966, 1965, and 1975, respectively have reduced the 1 percent annual chance (100-year) discharges to less than the channel capacities. All of these streams have relatively small, leveed channels. There is no planned development along these channels.

There is a program “Vegetation and Sediment Maintenance Program at Los Banos Detention Dam” that addresses the drainage issues in the project area. Along with vegetation and sediment maintenance, the proposed actions entails stabilizing drainage slopes to prevent erosion into the creek, covering any stockpiled soil to prevent dust and siltation into the creek, and using drip pans or absorbent material to catch drips from equipment while parked.

- **Relation to SPFC Facilities** – San Luis Canal, Los Banos Detention Dam, Los Banles Creek culverts

Project Status: Conceptual Level for repair/modification of culverts; environmental documentation of maintenance program.

Applicable Management Action(s): O&M – Reduce Flow Constrictions

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Improve O&M, Promote Multi-Benefit Projects

Extent of Benefit Area: Project would have local and regional benefits.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit** – Repair of the culverts will allow proper drainage and prevent water backup onto roads and damaging other infrastructure and areas upstream from the culvert. Clearing the blockage of the culvert could prevent structural hazard of the San Luis Canal and the I-5 freeway.
- **Ecosystem Restoration** – Extend area for channel restoration for birds and other wildlife.
- **Water Supply** – None
- **Recreation and Other Benefits** – None

Implementation Cost: *Summaries available implementation costs estimates.*

Implementation Considerations:

- **Redirected Hydraulic Impacts** – Proposed action does not alter existing drainage pattern nor result in substantial increase in the rate or

amount of surface runoff in a manner in which would result in flooding on or off site.

- **Adverse Environmental Impact and Regulatory Issues** – No destruction or adverse modification of the critical habitat of endangered species. Low probability of affecting migratory birds and conservation measures have been incorporated into the project.
- **Other**

Associated Studies

None

References

U.S. Department of the Interior, Bureau of Reclamation – Mid-Pacific Region, Draft Environmental Assessment, Vegetation and Sediment Maintenance Program at Los Banos Detention Dam. June 2010.

Federal Emergency Management Agency. Flood Insurance Study. Merced County, California and Incorporated Areas. September 2010.

1.30 Mendota Pool bypass

ID: 120

Project Type: Ecosystem Functions

Location Information: *Describes project location.*

- **Region** – Upper San Joaquin
- **Subregion** – Not applicable
- **Location** – Western Fresno and Madera counties
- **Community Setting** – Nonurban

Project Proponents:

- Potential Lead Agency – DWR, Reclamation

• Potential Partners –

• Contact Information –

Description:

- **Purpose** – The proposed Mendota Pool Bypass would include a bypass around the Mendota Pool to convey restoration flows of at least 4,500 cfs around the Mendota Pool and reconnect with the San Joaquin River downstream from Mendota Dam. The project could also include constructing a bifurcation structure at the upper end of the bypass to convey flows into the Mendota Pool Bypass.
- **Concept** – The project includes construction, and O&M of the Mendota Pool Bypass and improvements, including O&M of the San Joaquin River channel to allow Reach 2B to convey at least 4,500 cfs. The proposed Mendota Bypass Bifurcation Structure would be designed to divert water from the San Joaquin River to the Mendota Pool, consistent with the design channel capacity of Reach 2B that conveys flows to the Mendota Pool. The bifurcation structure would be designed to direct fish into the bypass channel and minimize or avoid fish passage into the Mendota Pool. Specific bypass alignments and facilities locations will be determined through the course of the EIS/EIR study. Modifications to the current system that may be

required include modifying existing levees, building new levees and a new river channel, and relocating existing infrastructure.

- **Relation to SPFC Facilities** – *Identify which State Plan of Flood Control Facilities that would modified by this project.*

Project Status: Feasibility Study

Applicable Management Action(s): System Modifications – Levees/Floodwalls/Hydraulic Structures

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Promote Ecosystem Functions

Extent of Benefit Area: Local and regional benefits.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit**
- **Ecosystem Restoration** – The project is the result of a settlement agreement that had two parallel goals. One of these goals is to restore and maintain fish populations in “good condition” in the main-stem of the San Joaquin River below Friant Dam to the confluence of the Merced River, including naturally reproducing and self-sustaining populations of salmon and other fish.
- The bifurcation structure would be designed to direct fish into the bypass channel and minimize or avoid fish passage into the Mendota Pool. The bypass channel would mitigate a problem migrating salmon would face in arriving in Mendota Pool and finding unfamiliar water of Delta origin rather than Sierra water from the San Joaquin River and a myriad of pumping and diversion structures.
- **Water Supply** – The project is the result of a settlement agreement that had two parallel goals. One of these goals is to reduce or avoid adverse water supply impacts to all of the Friant Division long-term contractors that may result from the interim flows and restoration flows provided for in the settlement.
- **Recreation and Other Benefits**

Implementation Cost: *Summaries available implementation costs estimates.*

Implementation Considerations:

- **Redirected Hydraulic Impacts** – Restoration actions, including the Mendota Pool Bypass have the potential to conflict with the routing of Kings River flood flows. The Mendota Pool Bypass would cause substantial changes to the geomorphology of the river. These changes could alter sediment transport and river hydraulics, potentially changing erosion and sedimentation characteristics, changing flow routing and ‘stress’ points on adjacent levees and other infrastructure, and changing overall flooding characteristics. The bypass could also cause increased seepage in the area, exacerbating already high groundwater levels around the Mendota Pool. Long-term impacts to agricultural lands are expected as a result of high groundwater levels that are likely to affect production on adjacent agricultural lands. Substantial flood easements, mitigation, or acquisition of these lands will be necessary.
- Construction of the new bifurcation structure may cause changes in localized river hydraulics and flood flow characteristics causing excessive sand deposition in the area, necessitating additional sand removal (dredging) activities.
- **Adverse Environmental Impact and Regulatory Issues** – *Flood management actions, especially structural management actions, have the potential to adversely impact the environment while meeting other flood management goals. Each project is evaluated on its potential to create adverse environmental impacts such as habitat loss and alteration of key physical processes.*
- **Other**

Associated Studies

This section lists ongoing and prior studies that have assessed this project.

References

Mendota Pool Bypass and Reach 2B Improvements Public Scoping Report. February 2010. Available: <http://www.restoresjr.net/program_library/02-Program_Docs/Reach2BScopingReportMainDoc201002.pdf>

USBR Federal Register Notice to Prepare an EIR/EIS. July 2009. Available: <<http://www.federalregister.gov/articles/2009/07/13/E9-16462/mendota-pool-bypass-and-reach-2b-improvements-project-under-the-san-joaquin-river-restoration#p-15>>

1.31 Consider structural modifications to Mariposa bypass

ID: 121

Project Type: System Modifications

Location Information:

- **Region** – Upper San Joaquin
- **Subregion** – Not applicable
- **Location** – San Joaquin River from the Reach 4B headgates near Washington Road to the confluence of the Mariposa Bypass with the San Joaquin River
- **Community Setting** – Nonurban

Project Proponents:

- Potential Lead Agency – DWR, Reclamation
- Potential Partners –
- Contact Information –

Description:

- **Purpose** – Part of the proposed Reach 4B, Eastside Bypass, and Mariposa Bypass Channel and Structural Improvements Project under the SJRRP.
- **Concept** – The proposed action includes improving conveyance capacity in the San Joaquin River from the Reach 4B headgates near Washington Road to the confluence of the Mariposa Bypass with the San Joaquin River (generally referred to as Reach 4B1). The improvements will incorporate modifications to Reach 4B and the Eastside and Mariposa bypass channels to allow for conveyance of Interim and Restoration flows to allow for fish passage. Improvements will also include the incorporation of fish habitat in Reach 4B and/or the bypasses and maintain the current flood operations and conveyance capacity of the system. Additionally, the proposed action may result in an opportunity for improvements to the existing flood system.

Project aspects include:

- Channel modifications to Reach 4B to ensure conveyance of at least 475 cfs.
- Modifications to the San Joaquin River headgates at the upstream end of Reach 4B to ensure fish passage and enable flow routing into Reach 4B.
- Modifications to the Sand Slough Control Structure to ensure fish passage.
- Modifications to structures in the Eastside and Mariposa bypass channels to provide anadromous fish passage on an interim basis until a final flow routing is selected and completed.
- Modifications in the Eastside and Mariposa bypass channels to establish a suitable low-flow channel, if the Secretary in consultation with the Restoration Administrator (RA), determines that such modifications are necessary to support anadromous fish migration through these channels.
- **Relation to SPFC Facilities** – *Identify which State Plan of Flood Control Facilities that would modified by this project.*

Project Status: Feasibility study

Applicable Management Action(s): System Modifications & Ecosystem Functions

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Promote Ecosystem Functions

Extent of Benefit Area: Local, regional, and systemwide benefits.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit** – The [redacted] (Settlement) stipulates that channel modifications be made in Reach 4B to ensure conveyance of at least 475 cfs. Based on preliminary information, these modifications may consist of removing in-channel vegetation, removing excess silt and sediment, and improving road crossings, and may or may not

necessitate modifying the existing levee system. Modifications to the San Joaquin River headgate and the Sand Slough Control Structure could include modifications to the existing structures or replacement of the existing structures with new structures. Improvements to the channel could reduce flood impacts locally.

- **Ecosystem Restoration** – The Settlement stipulates modifications to structures in the Eastside and Mariposa bypasses to provide for fish passage and modifications to the Eastside and Mariposa bypasses to establish a low flow channel. Both the Mariposa Bypass Bifurcation Structure at the head of the Mariposa Bypass and the Mariposa Bypass Drop Structure at the downstream end of the Mariposa Bypass may need to be modified to provide for fish passage under a range of flows (both low and high flows). Modifications could include modifications to the existing structures, construction of fish ladders, or replacement of the existing structures with new structures. In addition, modifications to the low-flow channel may be needed to allow for fish passage under low flows in the Eastside and Mariposa bypasses.
- **Water Supply** – San Joaquin Settlement stipulates that the project should reduce or avoid adverse water supply impacts to all of the Friant Division long-term contractors that may result from the interim flows and restoration flows provided for in the settlement.
- **Recreation and Other Benefits**

Implementation Cost: *Summaries available implementation costs estimates.*

Implementation Considerations:

- **Redirected Hydraulic Impacts** – Existing channel capacity in Reach 4B is extremely limited. Flows of any amount down this reach are likely to cause localized flooding and seepage impacts to adjacent agricultural lands.
- **Adverse Environmental Impact and Regulatory Issues** – *Flood management actions, especially structural management actions, have the potential to adversely impact the environment while meeting other flood management goals. Each project is evaluated on its potential to create adverse environmental impacts such as habitat loss and alteration of key physical processes.*
- **Other**

Associated Studies

This section lists ongoing and prior studies that have assessed this project.

References

U.S. Bureau of Reclamation. Federal Register Notice to Prepare an EIR/EIS. November 2010. Available:

<http://www.federalregister.gov/articles/2010/11/22/2010-29330/san-joaquin-river-restoration-program-reach-4b-eastside-bypass-and-mariposa-bypass-channel-and#p-7>

Reach 4B, Eastside Bypass, and Mariposa Bypass Low Flow Channel and Structural Improvements Project Improvements Public Scoping Report. January 2010. Available:

http://www.restoresjr.net/activities/site_specific/R4B/R4BScopingReportPublicDraftMainDoc201001.pdf

1.32 Consider Westside Integrated Regional Water Management (IRWM) Projects

ID: 133

Project Type: System Modifications

Location Information:

- **Region** – Upper San Joaquin
- **Subregion** – Cache Creek and Putah Creek
- **Location** – Yolo County
- **Community Setting** – Nonurban

Project Proponents:

- **Potential Lead Agency** – Solano County Water Agency
- **Potential Partners** – Lake County Watershed Protection District, Napa County Flood Control and Water Conservation District, Colusa County Resource Conservation District, Water Resources Association of Yolo County
- **Contact Information** – Chris Lee, Supervising Environmental Scientist, Solano County Water Agency

Description:

- **Purpose** – The Westside IRWMP represents primarily the Cache and Putah Creek watersheds. The watersheds of these two creeks encompass portions of Lake, Napa, Solano, Colusa, and Yolo counties. The IRWMP will provide a guideline for implementing watershed planning activities throughout the five-county region.
- **Concept** – The Westside IRWM includes setback levees to capture water, including West Stanislaus.
- **Relation to SPFC Facilities** – (To be determined)

Project Status: Anticipated to take 2 years to complete and adopt the IRWMP (estimated 2013)

Applicable Management Action(s): System Modifications – Setback Levees

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Improve O&M, Promote Ecosystem Functions, Improve Institutional Support, Promote Multi-Benefit Projects

Extent of Benefit Area: Project will potentially have local, regional, and systemwide benefits.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit** – TBD (Report is in progress/has not begun)
- **Ecosystem Restoration** – TBD (Report is in progress/has not begun)
- **Water Supply** – TBD (Report is in progress/has not begun)
- **Recreation and Other Benefits** – TBD (Report is in progress/has not begun)

Implementation Cost: \$1.5 million

Implementation Considerations:

- **Redirected Hydraulic Impacts** – TBD (Report is in progress/has not begun)
- **Adverse Environmental Impact and Regulatory Issues** – TBD (Report is in progress/has not begun)
- **Other**

Associated Studies

Westside IRWM Plan is in progress

References

Solano County Water Agency. Request for Statement of Qualifications for Development of an Integrated Regional Water Management Plan for the Westside Subregion of the Proposition 84 Sacramento River Funding Area.

**2012 Central Valley Flood Protection Plan
Attachment 7A: Local and Regional Project Summaries**

December 13, 2010. Available:
<<http://www.scwa2.com/Documents/IRWMP/A-112B.Revised.Westside.RFQ.pdf>>

California Department of Water Resources. Integrated Regional Water Management Grants Website. Available:
<http://www.water.ca.gov/irwm/integregio_planning.cfm>

Yolo Water Resources Agency. Minutes of Executive Committee Meeting, March 1, 2011. Available: <
http://www.yolowra.org/executive_agendas/2011/Minutes%20EC%2003-01-11.pdf>

1.33 Pioneer Site Seepage Berm

ID: 1817

Project Type: System Modifications

Location Information:

- **Region** – Lower Sacramento
- **Subregion** – Sacramento
- **Location** – Pioneer Reservoir project located adjacent to the Sacramento River in the City of Sacramento; just upstream from the Pioneer Bridge that U.S. Highway 50 uses to cross the Sacramento River. The project runs in a north-south direction and is bounded on the north by Capitol Mall, on the south by U.S. Highway 50, on the east by Pioneer Reservoir, and on the west by the Sacramento River.
- **Community Setting** – Urban

Project Proponents:

- Potential Lead Agency – USACE
- Potential Partners – Reclamation, State of California, SAFCA
- Contact Information – Annalena Bronson (Reclamation)

Description:

- **Purpose** – Based on recent data from the USACE, SAFCA has identified the Natomas Basin as being at a particularly acute risk of flooding. There has been an increased understanding of underseepage and through seepage problems that jeopardize levee stability when investigating for the Common Features project. The Common Features is developed to provide flood risk management to the City of Sacramento, including Natomas Basin and areas along the north and south sides of the American River. Expanding urban centers lie in floodplains where flooding could result in extensive loss of life and billions of dollars in damages
- **Concept** – The project involves the construction of a seepage berm approximately 500 feet long and 50 feet wide along the landslide of the Sacramento River east-bank levee at RM 58.5; and the installation of

five relief wells adjacent to the seepage berm (north and south end of berm). The berm would be constructed with drain rock and water from the berm and the wells would be discharged into the adjacent City of Sacramento wastewater system where it would be treated.

- SAFCA has adopted a goal of providing 100-year flood protection to the project area by the year 2010.
- **Relation to SPFC Facilities** – Levees along the Sacramento River and American River

Project Status: Planned

Applicable Management Action(s): System Modifications –
Levees/Floodwalls/Hydraulic Structures

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Improve O&M, Promote Ecosystem Functions

Extent of Benefit Area: This project would have local and regional benefits.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit** – The levees in the Natomas Basin protect approximately 53,000 acres of improved agriculture, conservation, and urban lands. Lands owned by the Sacramento International Airport account for more than 10 percent of the total. An uncontrolled flood in the Natomas Basin would cause substantial direct damage to structures in the basin, estimated at \$7.4 billion, and could pose a serious threat of injury and loss of life.
- **Ecosystem Restoration** – Existing vegetation will be preserved to the maximum degree possible, consistent with emerging new USACE levee vegetation guidelines, so as to retain most of the existing riparian habitat values.
- **Water Supply**
- **Recreation and Other Benefits**

Implementation Cost: *Summaries available implementation costs estimates.*

Implementation Considerations:

- **Redirected Hydraulic Impacts** – Redirected flood impacts occur when a project moves the risk of flooding from one area to another area. For example, improvements to flood protection in one area can result in increased flood flows in a downstream area; therefore increasing the flood risk downstream. Project is qualitatively evaluated with respect to its potential to redirect hydraulic impacts.
- **Adverse Environmental Impact and Regulatory Issues** – Flood management actions, especially structural management actions, have the potential to adversely impact the environment while meeting other flood management goals. Each project is evaluated on its potential to create adverse environmental impacts such as habitat loss and alteration of key physical processes.
- **Other**

Associated Studies

This section lists ongoing and prior studies that have assessed this project.

References

State of California Website. Available:

<<http://www.ceqanet.ca.gov/DocDescription.asp?DocPK=595433>>.

Accessed: May 3, 2011

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<http://www.usace.army.mil/CECW/PlanningCOP/Documents/peer/natomas_comments.pdf>. Accessed: May 3, 2011

USACE. Natomas Levee Improvement Program Bank Protection Project Draft Environmental Impact Report. September 2007. Available <http://www.safca.org/documents/FullDEIR_000.pdf>. Accessed: May 3, 2011

1.34 Levee Repair of 25 Erosion Sites Sacramento River Bank Protection Project

ID: 1819

Project Type: System Modifications

Location Information:

- **Region** – Upper and Lower Sacramento
- **Subregion** – Sacramento
- **Location** – Along the Sacramento River and its tributaries in Sacramento, Yolo, Colusa, Sutter, and Tehama counties
- **Community Setting** – Urban

Project Proponents:

- **Potential Lead Agency** – DWR
- **Potential Partners** – Board, USACE
- **Contact Information** – Kip Young, Staff Environmental Scientist; Mike Dietl, USACE

Description:

- **Purpose** – The Sacramento River Bank Protection Project (SRBPP) is a continuing construction project authorized by Section 203 of the Flood Control Act of 1960. The purpose of this project is to provide protection to the Sacramento River Flood Control Project (SRFCP).

Beginning in the 1840s, low, discontinuous levees were built by individual landowners. Since that time, a variety of levee improvement projects have been implemented to regulate and repair the system. Higher winter flows can erode and stress the levees, weakening them and causing them to fail in certain locations. To maintain the integrity of the flood control system, locations within the potential for failure are identified and remedied under the SRBPP.

Based on field assessments of the SRBPP levees conducted in 2007, the Board and the USACE have identified priority sites that are at risk of erosional failure during flooding and/or normal flow conditions. These

sites must be repaired before their condition becomes so critical as to require emergency repair.

- **Concept** – Proposed action consists of implementing bank protection measures along 15,646 linear feet of levees along the Sacramento River and tributaries during 2009 and 2010. Bank protection measures at 22 of the erosion sites would include (1) reinforcing the bank toe with riprap, (2) placing a mixture of riprap and soil on upper banks and tops of the lower bank riprap to create riparian benches above the mean summer water elevation, and (3) planting the benches and upper banks with vegetation to provide bank stabilization and riparian habitat. In-stream woody material (IWM) would also be placed along the sites to provide bank protection and aquatic habitat. Work at the remaining three erosion sites would consist of constructing setback levees on the landside of their existing levees.

Bank protection measures typically consist of large angular rock placed to protect the bank and then a layer of soil/rock material is placed to allow vegetation to grow back on the bank. In addition, dead trees may be added to the mixture for additional habitat use.

- Sacramento, Yolo, Colusa, Sutter, and Tehama counties

Project Status: Design

Applicable Management Action(s): System Modifications –
Levees/Floodwalls/Hydraulic Structures

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Improve O&M, Promote Ecosystem Functions

Extent of Benefit Area: Project has local and regional benefits.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit** – The primary goal of this project is to reduce flood damage for the project area by existing levee rehabilitation.
- **Ecosystem Restoration** – Project will retain existing IWM to the greatest extent practical to maintain size, volume, and complexity. It is to incorporate restoration and increase native riparian vegetation.

- **Water Supply** – Best management practices (BMP) will be implemented to protect water quality, and aquatic habitat, from increased suspended sediments, sedimentation, and chemical pollutants during construction.
- **Recreation and Other Benefits** – Restored levees would ensure local approach visibility for recreational boaters through the use of natural indicators, such as partially emergent portions of IWM and vegetation on the low elevation areas, to act as visual warning of the present of shallowly submerged hardscape.

Implementation Cost: Typically funding ranges from \$20 million to \$30 million a year. Only a portion of this amount is spent within SAFCA's jurisdiction.

Implementation Considerations:

- **Redirected Hydraulic Impacts** – Placing riprap into the river channel may increase the flow velocity within the channel. No significant hydraulic impacts should be anticipated as the project is a repair of existing facilities.
- **Adverse Environmental Impact and Regulatory Issues** – This project would not substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, reduce the number or restrict the range of a special-status species, or eliminate important examples of California history or prehistory. No substantial evidence exists that the project would have a negative or adverse effect on the environment.
- **Other**

Associated Studies

Draft Environmental Assessment/Initial Study for Levee Repair of 25 Erosion Sites Volume 1 Sacramento River Bank Protection Project (April 2009)

References

2009. U.S. Army Corps of Engineers and the Central Valley Flood Protection Board. DRAFT Initial Study (IS) and Proposed Mitigated Negative Declaration. The Erosion Repairs of 5 Bank Protection Sites, 2009 and 2010. Sacramento River Bank Protection Project. April 19.

Sacramento Bank Protection Project Website. Available:
<http://www.safca.org/Programs_SacBankProtection.html>. Accessed:
May 2, 2011.

California Department of Water Resources. Sacramento River Bank
Protection Project. Planning Activities Update. Available:
<[http://www.water.ca.gov/pubs/flood/sacramento_river_bank_protection_p
roject_-_phase_iii/srbpp_-_phase_3_handout_060209.pdf](http://www.water.ca.gov/pubs/flood/sacramento_river_bank_protection_project_-_phase_iii/srbpp_-_phase_3_handout_060209.pdf)>. May 2009.

1.35 South Sacramento County Streams Project Union House Creek Channel Upgrades

ID: 1820

Project Type: System Modifications

Location Information:

- **Region** – Lower Sacramento
- **Subregion** – Sacramento
- **Location** – Union House Creek
- **Community Setting** – Urban

Project Proponents:

- **Potential Lead Agency** – USACE
- **Potential Partners** – Board, Sacramento Area Flood Control Agency
- **Contact Information** – Marsha Sells

Description:

- **Purpose** – The southern portion of the Sacramento urbanized area has historically been vulnerable to flooding from high-water events in the Delta as well as high flows on Morrison Creek, Florin Creek, Elder Creek, and Unionhouse Creek. The South Sacramento Streams Group Project (SSSG), which encompasses these creeks has been the vehicle to improve these creeks. The SSSG project consists of levee improvements starting south of the town of Freeport and running easterly along Morrison Creek and into the urbanized area. This levee crosses the Union Pacific Railroad (UPRR) tracks and extends up four creeks, all within the Morrison Creek watershed. Along these four creeks, a combination of raising the levee, constructing floodwall and channel improvements are being used to provide protection to the community.
- South Sacramento County Streams drainage basin has a long history of flooding during heavy rainfall. Recent flooding in 1952, 1955, 1962, 1963, 1982, and 1986 damaged residences, business, and agricultural land and disrupted transportation and public facilities. Local runoff

from the Morrison Creek watershed can cause flooding due to limited channel capacities and bridge restrictions and contributes to the flood volume in the Beach-Stone Lakes area. In addition the overflow from the Cosumnes and Mokelumne rivers inundates Beach-Stones Lakes, causing high backwater on the study creeks, and threatening the Sacramento Regional Wastewater Treatment Plant and the Pocket Area.

- **Concept** – The proposed action includes reshaping the creek bed and channel into a rectangular concrete lined channel. The proposed action would raise the level of flood protection in the project area to a point that it can safely contain a flood event with less than a 1 percent chance of occurrence in any given year and ensure that the area meets the minimum FEMA level of flood protection.
- **Relation to SPFC Facilities** – None

Project Status: Construction (expected to occur in 2013)

Applicable Management Action(s): System Modifications – Levees/Floodwalls/Hydraulic Structures

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Improve O&M

Extent of Benefit Area: This project would have local and regional benefits.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit** – The project aims to protect this urbanized area from damages to its residences, businesses, and agricultural lands, and protect disruptions of major transportation and public facilities such as Interstate 5 and the Sacramento Regional Wastewater Treatment Plant.
- **Ecosystem Restoration** – Creation of ponds and wetlands, selected planting and seeding, and conversion of areas to higher value wildlife habitat as part of the larger South Sacramento Streams Group Project.
- **Water Supply** – None

- **Recreation and Other Benefits** – There are no existing recreational facilities located adjacent to the Unionhouse Channel Upgrades construction, and no anticipated efforts on recreation in the project area.

Implementation Cost: Approximately \$5 million to 10 million

Implementation Considerations:

- **Redirected Hydraulic Impacts** – Upon reviewing the pre-project and post-project floodplains, the reduced stages indicate that there would not be a negative upstream backwater effect due to the proposed channel upgrades. There would also be no negative downstream hydraulic effects due to the proposed channel upgrades. There is a low potential for groundwater quality and levels to be affected by the proposed action. Therefore, there would be little or no change in groundwater recharge or depletion of groundwater sources used for other beneficial uses.
- **Adverse Environmental Impact and Regulatory Issues** – Construction activities would impact approximately 7 acres of the bank of Unionhouse Creek. This area consists of disturbed habitat and will be affected by the channel improvements. The removal of vegetation on the banks will result in a decrease in cover along the edge of the channel as well as decrease in the input of organic material into the channel, which provide food for aquatic invertebrates and other aquatic species. The proposed project is not expect to have an adverse affect on special-status fish species or their habitats because (1) existing fish habitat is poor, (2) Unionhouse Creek is not designated as Essential Habitat or Critical Habitat, and (3) Unionhouse Creek does not support special-status fish except during flood events.
- **Other**

Associated Studies

South Sacramento County Streams Project – Unionhouse Creek Channel Upgrades Draft Environmental Assessment/Initial Study (October 2008)

References

U.S. Army Corps of Engineers (USACE). South Sacramento County Streams Flood Damage Reduction Project, Morrison Creek at Union Pacific Road (Contract 2A), Sacramento, CA. 2011. Available: https://www.fbo.gov/index?s=opportunity&mode=form&id=496c5711b26c54e56f66249d7bc43174&tab=core&tabmode=list&print_preview=1

USACE. South Sacramento County Stream Project Unionhouse Creek Channel Upgrades, Draft Environmental Assessment/Initial Study. October 2008.

Sacramento Area Flood Control Agency Website. Available: <http://www.safca.org/Programs_SoSacStreams.html>. Accessed: May 2, 2011.

DWR Strategic Growth Plan, Bond Accountability Website. Available: <http://bondaccountability.resources.ca.gov/Project.aspx?ProjectPK=3860-PIE-047&pid=5> Accessed _____.

1.36 Smith Canal Closure Conceptualization

ID: 1844

Project Type: System Modifications

Location Information:

- **Region** – Lower San Joaquin
- **Subregion** – Stockton/Lodi
- **Location** – The Smith Canal is a backwater slough of the Delta in the City of Stockton, just north of the Deep Water Ship Channel. Smith Canal has a small drainage area, so its border levees primarily serve to prevent back-flooding from the Delta, rather than to confine upland riverine flows.
- **Community Setting** – Urban

Project Proponents:

- **Potential Lead Agency** – San Joaquin Area Flood Control Agency
- **Potential Partners** – FEMA, USACE, California Department of Boating and Waterways, CFG, U.S. Coast Guard, State Lands Commission, USFWS, National Oceanic and Atmospheric Administration (NOAA) Fisheries Services
- **Contact Information** – Not available

Description:

- **Purpose** – The Smith Canal levees are highly encroached upon, and certification to FEMA standards may require removal of a substantial number of residential structures before completing required certification investigations, analyses, and construction of required improvements. A more feasible solution will be to construct a closure structure near the mouth of the Canal to limit back-flooding from the Delta. The conceptualization of a closure structure in this project area was asked to be developed by San Joaquin Area Flood Control Agency (SJAFC).
- **Concept** – A closure structure across the mouth of the Smith Canal has been found to be technically feasible, and can be accredited by FEMA

as providing protection against the base flood. If this project can be accredited by FEMA and a decision made to further pursue this concept, the following steps would be made:

- Prepare a Feasibility Study to analyze alternatives, calculate benefit/cost ratios, define operation procedures and responsibilities, and identify a financing plan
 - Prepare an environmental document under California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA), and initiating permitting activities
 - Seek a Conditional Letter of Map Revision from FEMA
 - Seek grants from the State to fund construction
 - Form existing or new assessment districts to pay the local share of construction, O&M, and foreseeable replacements.
- Relation to SPFC Facilities – None

Project Status: Feasibility Study (Draft report scheduled completion July 2016)

Applicable Management Action(s): System Modifications – Levees/Floodwalls/Hydraulic Structures

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Improve O&M

Extent of Benefit Area: This project would have local and regional benefits.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit** – This project would protect a substantial number of residential structures and infrastructure in this urban community.
- **Ecosystem Restoration** – None
- **Water Supply** – None

- **Recreation and Other Benefits** – None

Implementation Cost: Approximately \$25.3 million to 30.4 million (not including annual O&M costs or a sinking fund for replacements)

Implementation Considerations:

- **Redirected Hydraulic Impacts** – Construction of facilities such as a gate control station, pump station, new levees would alter the hydraulics of the project area. The project will be designed to keep flood waters out of the project during base floods.
- **Adverse Environmental Impact and Regulatory Issues** – Any proposed facilities to this area would have an environmental impact. The project requires formal consultation with USFWS on the potential effects to federally threatened and endangered species such as delta smelt and the giant garter snake (*Thamnophis gigas*). A CWA 404 permit is required and consultation can take place through USACE. USFWS requires a biological assessment that analyzes the direct, indirect, and cumulative effects to federally listed species from the proposed project, as well as proposed minimization measures.
- **Other**

Associated Studies

Lower San Joaquin River Feasibility Study

References

Peterson Brustad, Inc. San Joaquin Area Flood Control Agency Smith Canal Closure Structure Conceptualization. June 27, 2008.

1.37 Lower San Joaquin River Feasibility Study

ID: 1845

Project Type: System Modifications

Location Information:

- **Region** – Lower San Joaquin
- **Subregion** – Stockton/Lodi
- **Location** – The study area is located along the lower (northern) portion of the San Joaquin River system in the Central Valley of California. The river flows west to the Central Valley, where it is joined by the Merced, Tuolumne, Stanislaus and Calaveras rivers, and other small tributaries, as it flows north to the Delta. The LSJRFS area includes the main-stem of the San Joaquin River from the Mariposa Bypass downstream to and including the city of Stockton. The study area also includes the distributary channels of the San Joaquin River in the southernmost reaches of the Delta.
- **Community Setting** – Other

Project Proponents:

- Potential Lead Agency – USACE
- Potential Partners – State Central Valley Flood Protection Board (supported by Board), San Joaquin Area Flood Control Agency
- Contact Information –
 - Michelle Williams, USACE
 - Michael Musto, DWR
 - Juan Neira, SJAFCA

Description:

- **Purpose** – Results of this study will help determine needed improvements for future flood protection systems in an effort to reach or exceed the future 200-year level of flood protection. Major flooding in San Joaquin, Stanislaus, and Merced counties along the San Joaquin River occurred in 1983, 1986, 1995 and 1997, causing millions of

dollars of damages to homes, businesses, agricultural crops, and development. Flood damages along the San Joaquin River will likely continue to increase due to population growth and urban development.

The proposed project would increase the conveyance capacity of Paradise Cut by setting back approximately 20,000 feet of existing levee, dry excavating approximately 3,000,000 cubic yards to the San Joaquin River, increasing conveyance in the upstream portion of the San Joaquin River.

- **Concept** – A major challenge of the LSJRFS is coordinating the combining flood damage reduction and ecosystem restoration project elements with other ongoing water resources programs, such as the CALFED Bay-Delta Program, Central Valley Project Improvement Act (CVPIA), the SJRRP, the CVFPP, BDCP, and the Delta Vision.

The primary planning objectives within the LSJRFS area include:

- Reduce the risk of flooding to people and property, and economic damages due to flooding within the primary study area
- Develop a sustainable flood management system for the future, as well as a plan to address and communicate residual flood risks
- Reduce the risk of adverse consequences of floods when they do occur
- Restore the quantity, quality, diversity, and connectivity of riparian, wetland, floodplain, and shaded riverine aquatic habitats where appropriate.

Concepts of the plan have not been developed. Milestones for this project are to formulate, evaluate, and compare alternatives; then identify a tentative recommended plan; followed by a selected recommended plan that will result in a record of decision.

- **Relation to SPFC Facilities** – Facilities (e.g., levees, channels, weirs, control structures, pumping plants) within the project area

Project Status: Feasibility Study (Plan by 2012; Construction Completed by 2025)

Applicable Management Action(s): System Modifications – Levees/Floodwalls/Hydraulic Structures

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Improve O&M, Promote Ecosystem Functions, Improve Institutional Support, Promote Multi-Benefit Projects

Extent of Benefit Area: The project will have local, regional, and/or systemwide benefits.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit** – The lower San Joaquin River area has experienced several major floods in the last 30 years causing millions of damages to properties and businesses. The 1997 flood event damaged 1,842 residences, mobile homes, and businesses in San Joaquin and Stanislaus counties. Estimated average annual equivalent damages (Year 2000) from floods in the lower San Joaquin River Basin amount to about \$20 million, based on preliminary HEC-FDA model for the Comprehensive Study. Crop damages (\$9 million) account for nearly half of the estimated damages. The primary objective of this project is to reduce the risk of flooding to people and property, and economic damages due to flooding within the primary study area. The project will develop a sustainable flood management system for the future, as well as a plan to address and communicate residual flood risks.
- **Ecosystem Restoration** – The LSJRFS states “there is a significant need to include ecosystem restoration into any plan including consideration of flood damage reduction in the area.” There is a major problem with the San Joaquin River ecosystem where hydraulic and geomorphic processes have been severely compromised by flow regulation and confinement of the river by levees and bank protection along portions of the channel. These changes have contributed to declining populations of many plants, fish, and wildlife species associated with these habitats. There is tremendous potential in ecosystem restoration for bird species, plant species, and the riparian habitat.
- **Water Supply** – Water supply benefits for this project are not yet known.
- **Recreation and Other Benefits** – Recreation and other benefits for this project are not yet known.

Implementation Cost: Estimated \$10 million

Implementation Considerations:

- **Redirected Hydraulic Impacts** – There will be hydraulic impacts due to from this project, but the severity of the redirected impacts will not be known until the alternatives are presented.
- **Adverse Environmental Impact and Regulatory Issues** – There may be adverse environmental impacts and regulatory issues from this project.
- **Other**

Associated Studies

Lower San Joaquin River, California Feasibility Study, 2009

References

San Joaquin Area Flood Control Agency (SJAFCA). Website. Available: <http://www.sjafca.com/lower_sj_river_feasibility.php>. Accessed: May 2, 2011

SJAFCA. Lower San Joaquin River, California Feasibility Study – Project Management Plan. Revision August 2009. November 17, 2009.

1.38 American River Common Features Post-Authorization Change and General Reevaluation Report

ID: 1848

Project Type: Study

Location Information:

- **Region** – Lower Sacramento
- **Subregion** – Natomas Basin
- **Location** – Lower American River downstream from the Folsom Dam, Sacramento River downstream from the Natomas Cross Canal, and Natomas Cross Canal
- **Community Setting** – urban, nonurban areas

Project Proponents:

- **Potential Lead Agency** – USACE
- **Potential Partners** – USACE, Board, SAFCA
- **Contact Information** –
 - Dan Tibitts, USACE
 - Ajala Ali, DWR
 - Pete Ghelfi, SAFCA

Description:

- **Purpose** – The Common Features Project was designed to strengthen the American River levees so they can safely pass a flow of 160,000 cfs. The General Reevaluation Report (GRR) will evaluate different aspects of the project. THE Post-Authorization Change (PAC) and GRR focus on changes to the Natomas Basin levees.
- **Concept** – Reevaluate the flood protection alternatives and improvements to the levee system along the lower American River downstream of the Folsom Dam, Sacramento River downstream from

the Natomas Cross Canal, and Natomas Cross Canal, and provide 200-year flood protection.

- **Relation to SPFC Facilities** – Levees along American River, Sacramento River downstream from the Natomas Cross Canal, and Natomas Cross Canal

Project Status: Ongoing. Final PAC and Interim GRR were released in October 2010.

Applicable Management Action(s): Flood Protection System Modification, O&M, Ecosystem Functions, Floodplain Management, Disaster Preparedness and Flood Warning

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Improve O&M, Promote Ecosystem Functions, Improve Institutional Support, Promote Multi-Benefit Projects

Extent of Benefit Area: Local, regional, and systemwide benefits.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit** – The goal of the GRR is to identify a comprehensive plan that will lower the risk of flooding in and around the City of Sacramento, and provide 200-year flood protection.
- **Ecosystem Restoration** – In the Natomas Basin, the plan will provide incidental environmental benefits by capitalizing on the geographic scope and volume of soil borrow material necessary to support the required levee improvements. The plan includes a variety of landscape features that will have the substantial effect of expanding, connecting and enhancing the aquatic and upland habitat preserves that have been created in the Natomas Basin as part of the Natomas Basin Habitat Conservation Plan: reducing wildlife hazards in the vicinity of the airport through improved storm and surface water drainage; and promoting agricultural sustainability in the western portion of the basin through improvements to the existing agricultural irrigation system.
- **Water Supply** – The plan includes construction of new water supply wells as well as improvements to current water supply infrastructure.
- **Recreation and Other Benefits** – The levees along the Sacramento and American rivers effectively cut off public access to the rivers and

their environmental and recreation amenities in many areas. This project offers an opportunity to reestablish connections to the river. Opportunities within the Natomas Basin are limited. Along with providing features that reduce flood risk, there is an opportunity to incorporate a bicycle trail on the levee system.

Implementation Cost: \$15 million

Implementation Considerations:

- **Redirected Hydraulic Impacts** – Comprehensive plan tries to take negative impacts outside of the project area into consideration.
- **Adverse Environmental Impact and Regulatory Issues** – Temporary (construction related) negative impacts.
- **Other**

Associated Studies

None

References

U.S. Army Corps of Engineers. American River Common Features Project, Natomas Post Authorization Change Report And Interim General Reevaluation Report. October 2010. Available:
<http://www.spk.usace.army.mil/projects/civil/americanriver/common_features/final_npac_oct_2010/final_natomas_pacr_oct_2010.pdf>

Sacramento Area Flood Control Agency . Draft Environmental Impact Statement/Draft Environmental Impact Report on the American River Watershed Common Features Project/Natomas Post-authorization Change Report/Natomas Levee Improvement Program, Phase 4b Landside Improvements Project. July 2010. Available:
<<http://www.safca.org/documents/NLIP%20main%20page%20stuff/2010JUL2.DEIR.DEIS.Phase4b/4bDEISDEIRPart1.pdf>>

1.39 Project Title – Frazier Creek/Strathmore Creek Feasibility Study

ID: 1849

Project Type: Study

Location Information:

- **Region** – Upper San Joaquin
- **Subregion** – Tulare County
- **Location** – Community of Strathmore and surrounding lands in Tulare County.
- **Community Setting** – Nonurban area and small community

Project Proponents:

- **Potential Lead Agency** – USACE
- **Potential Partners** – USACE, Board, County of Tulare
- **Contact Information** –
 - USACE PM – Michelle Williams
 - State PM – Efrain Escutia
 - Tulare PM – Jim May

Description:

- **Purpose** – Improve the level of flood protection for the community of Strathmore, State Route 65, bridges, railroads, and surrounding agricultural lands.
- **Concept** – This study will generate an Environmental Impact Statement/Environmental Impact Report (EIS/EIR and feasibility study to evaluate federal, State, and local interests in planning, designing, mitigating, and improving existing levee system of Frazier Creek/Strathmore Creek in Tulare County.
- **Relation to SPFC Facilities** – None

Project Status: Reconnaissance

Applicable Management Action(s): Floodplain Management – Floodproofing

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Improve O&M, Promote Ecosystem Functions, Improve Institutional Support, Promote Multi-Benefit Projects

Extent of Benefit Area: Project would have local benefits

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit**
- **Ecosystem Restoration**
- **Water Supply**
- **Recreation and Other Benefits**

Implementation Cost: \$2.81 million

Implementation Considerations:

- **Redirected Hydraulic Impacts** – TBD.
- **Adverse Environmental Impact and Regulatory Issues** – TBD.
- **Other**

Associated Studies

None.

References

County of Tulare Resource Management Agency Meeting Agenda. October 2009. Available:

<http://bosagendas.co.tulare.ca.us/MG306225/AS306228/AS306245/AI306345/DO306352/DO_306352.PDF>

Report of Activities of the Department of Water Resources. Presented December 2010. Available:

<http://www.floodplain.org/cmsAdmin/uploads/Final_Report_2010-12-03_DWR.pdf>

1.40 Lower Cache Creek Feasibility Study

ID: 1850

Project Type: Study

Location Information:

- **Region** – Lower Sacramento
- **Subregion** – Lower Cache Creek
- **Location** – Lower Cache Creek, Yolo County, California, City of Woodland and vicinity
- **Community Setting** – Urban and nonurban areas

Project Proponents:

- **Lead Agency** – USACE
- **Partners** – USACE, Board, City of Woodland
- **Contact Information** –
 - DWR PM – Efrain Escutia
 - USACE PM – Charles Austin
 - City of Woodland PM – Fran Borcalli

Description:

- **Purpose** – The study will continue efforts suspended in 2004 after local resistance to the USACE-selected flood barrier option alternative.
- **Concept** – The USACE will develop alternatives for a new feasibility study to determine if there is a National Economic Development plan that is federally justified and modifies the SPFC.
- **Relation to SPFC Facilities** – Yolo Bypass/Cache Creek Settling Basin and weir.

Project Status: Reconnaissance

Applicable Management Action(s): Flood Protection System Modification.

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Improve O&M, Promote Ecosystem Functions, Improve Institutional Support, Promote Multi-Benefit Projects

Extent of Benefit Area: Local and regional benefits.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit**
- **Ecosystem Restoration**
- **Water Supply**
- **Recreation and Other Benefits**

Implementation Cost: \$5.5 million.

Implementation Considerations:

- **Redirected Hydraulic Impacts** – Yolo Bypass, Cache Creek Settling Basin and weir.
- **Adverse Environmental Impact and Regulatory Issues** – TBD.
- **Other**

Associated Studies

Original Feasibility Study that was ultimately rejected. October 2002. Lower Cache Creek, Yolo County, Ca, City Of Woodland and Vicinity: Draft Feasibility Report for Potential Flood Damage

Reduction Project.

<http://www.spk.usace.army.mil/projects/civil/lowercachecreek/feas.html>

Original EIS. March 2003. Lower Cache Creek Environmental Impact Statement/Environmental Impact Report.
<http://www.spk.usace.army.mil/projects/civil/lowercachecreek/eiseir.html>

References

U.S. Army Corps of Engineers (USACE). Lower Cache Creek, Yolo County, City Of Woodland and Vicinity, Ca Feasibility Study Review Plan. April 2010 (Rev.).

Available: <http://www.spk.usace.army.mil/organizations/cespkpd/Review%20Plans/LCC_RP_.pdf>

1.41 Merced County Streams Feasibility Study and GRR.

ID: 1852

Project Type: Study

Location Information:

- **Region** – Upper San Joaquin
- **Subregion** – Merced County
- **Location** – Black Rascal Creek and Bear Creek
- **Community Setting** – Urban and nonurban

Project Proponents:

- **Potential Lead Agency** – USACE
- **Potential Partners** – USACE, Board, Merced County
- **Contact Information** –
 - Katie Huff, USACE
 - Ajala Ali, DWR
 - Kellie Jacobs, Merced Public Works

Description:

- **Purpose** – The purpose of this project is to evaluate options to increase the level of flood protection from a 50-year event to 200 years for the Merced urban area.
- **Concept** – Feasibility study would study options for flood protection project on Black Rascal Creek, which would also offer protection along Bear Creek.
- **Relation to SPFC Facilities** – Identify which SPFC facilities would be modified by this project.

Project Status: Reconnaissance level. Merced County is currently pursuing an effort with the DWR, to have the State sign on to the project as the primary non-federal partner.

Applicable Management Action(s): Flood Protection System Modification

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Improve O&M, Promote Ecosystem Functions, Improve Institutional Support, Promote Multi-Benefit Projects

Extent of Benefit Area: Project has local and regional benefits.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit** – The primary goal of the study is to determine how 200-year flood protection can be achieved, while providing a viable alternative to the Haystack Dam project.
- **Ecosystem Restoration**
- **Water Supply**
- **Recreation and Other Benefits**

Implementation Cost: \$3 million.

Implementation Considerations:

- **Redirected Hydraulic Impacts** – Not applicable
- **Adverse Environmental Impact and Regulatory Issues** – Not applicable
- **Other**

Associated Studies

None.

References

MCAG Fact Sheet. Available:

<<http://www.mcagov.org/onevoice/2010/priorities/federal/Waterflood.pdf>>

1.42 Rock Creek/Keefer Slough Feasibility Study

ID: 1853

Project Type: Study

Location Information:

- **Region** – Upper Sacramento
- **Subregion** – Eastside/Westside Tributaries
- **Location** – The study area is located in Butte County and includes Rock Creek, Keefer Slough, portions of the City of Chico with an estimated population of 87,713, and the town of Nord.
- **Community Setting** – Urban and nonurban

Project Proponents:

- **Lead Agency** – USACE
- **Partners** – USACE, Board, Butte County
- **Contact Information** –
 - David Vanrijn, USACE
 - Ajala Ali, DWR
 - Mike Crump, Butte County

Description:

- **Purpose** – The feasibility study will improve the level of flood protection for the communities of Chico, Nord, State Routes 99 and 32, and surrounding agricultural land.
- **Concept** – The study will identify flood risk management, recreational, and ecosystem restoration improvements up to at least a 200-year level of protection. The study will identify structural and nonstructural alternatives to increase flood protection levels and evaluate further federal interest in pursuing alternatives based upon costs, benefits, environmental effects, and local interest and support.

Alternatives analyzed during the feasibility investigation will be a combination of one or more flood control and ecosystem restoration

measures identified during the reconnaissance phase; additional measures may be considered. These alternative measures include (1) setback levees and stream channel improvements, (2) environmental restoration measures, (3) bypass and diversion structures, and (4) detention storage measures. The goal of this project is to provide the greatest environmental benefits possible in conjunction with the proposed flood control project. Primary objectives include reducing flood risk and property damages, preserving existing resources, improving water quality, restoring wetlands, increasing riparian and riverine habitat, and reducing cobble and sediment transport.

- **Relation to SPFC Facilities** – Identify which SPFC facilities that would be modified by this project.

Project Status: Feasibility Study

Applicable Management Action(s): Additional Floodplain and Reservoir Storage, Flood Protection System Modification, Ecosystem Functions

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Promote Ecosystem Functions Promote Multi-Benefit Projects

Extent of Benefit Area: Project has local and regional benefits.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit** – The project goal is to improve the level of flood protection for the communities of Chico, Nord, State Routes 99 and 32, and surrounding agricultural land.
- **Ecosystem Restoration** – Ecosystem Restoration Improvements will be included. Significant issues to be analyzed in depth in the EIS/EIR include appropriate levels of the flood damage reduction, adverse effects on vegetation and wildlife resources, special-status species, esthetics, cultural resources, recreation, and cumulative effects of related projects in the study area.
- **Recreation and Other Benefits** – Recreational Improvements will be included.

Implementation Cost: \$3 million.

Implementation Considerations:

- **Redirected Hydraulic Impacts – None**
- **Adverse Environmental Impact and Regulatory Issues.**
- **Other**

Associated Studies

The USACE initiated but did not complete a reconnaissance study in 2002.

References

CVFP Board Approval of Letter of Intent for the Rock Creek/Keefer Slough Feasibility Study. Available:

<http://www.cvfpb.ca.gov/meetings/2010/092310Item8K_Rock%20Creek_FeasStudyLtrofIntent.pdf>

1.43 Sutter Basin Feasibility Study.

ID: 1854

Project Type: Study

Location Information:

- **Region** – Lower Sacramento
- **Subregion** – Sutter Basin
- **Location** – The study area is that area hydraulically connected to Yuba City, California, and roughly bounded by the Feather River, Sutter Bypass, Wadsworth Canal, Sutter Buttes, and Cherokee Canal. The elongated, irregularly shaped study area covers about 284 square miles and is about 43 miles long, north to south, and up to 9 miles wide, east to west. Flood waters potentially threatening the study area originate from the Feather River watershed or the upper Sacramento River watershed, above Colusa Weir. These waterways have drainage areas of 5,921 and 12,090 square miles, respectively.
- **Community Setting** – Urban and nonurban areas

Project Proponents:

- Lead Agency – USACE
- Partners – USACE, Board, Sutter-Butte Flood Control Agency
- Contact Information –
 - Laura Whitney, USACE
 - Michael Musto, DWR
 - William Edgar, Sutter-Butte Flood Control Agency

Description:

- **Purpose** – This multipurpose feasibility study aims to address levee improvement measures for existing levee systems as well as environmental restoration and recreation opportunities.
- **Concept** – The study will investigate measures to improve the level of flood protection for Yuba City to a 200-year level. The study will also

evaluate existing flood protection and determine if further protection is feasible for the area located within the boundaries of the Sacramento River Flood Control Project in Butte and Sutter counties. Alternatives to be considered during the feasibility study include reoperation of upstream reservoirs, reconstruction of project levees, constructing a ring levee around Yuba City, modification of the Sutter Bypass, modification of the Fremont Weir and others.

- **Relation to SPFC Facilities** – Levees of the Feather River, Sutter Bypass, and Cherokee Canal adjacent to the project

Project Status: Feasibility study

Applicable Management Action(s): Flood Protection System Modification, Ecosystem Functions

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Promote Ecosystem Functions, Promote Multi-Benefit Projects

Extent of Benefit Area: local, regional, and systemwide benefits

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit** – The study area is almost completely bounded by project levees and the high ground of the Sutter Buttes. Consequently, the primary flood-related problems in the study area are associated with potential levee failure. Opportunities for reducing flood risk could be associated with increasing levee integrity, building new levees, altering waterway flow regimes as affected by upstream reservoirs, providing new bypasses, and nonstructural measures to accommodate flood events and improve public safety.
- **Ecosystem Restoration** – The ecosystem restoration and recreation measures that are being considered would be secondary to the flood damage reduction objective. If possible, the study will include environmental features beyond the scope of mitigation, and potential funding sources for ecosystem restoration are being researched. Opportunities to restore degraded ecosystems are those that would reconnect former floodplains and wetlands with the waterways from which they have been separated, regrading mine tailing areas,

enhancing or protecting interior drainage corridors, and by operating reservoirs to provide more “natural” flow regimes.

- **Recreation and Other Benefits** – A secondary goal of the study will be to identify increased recreation opportunities.

Implementation Cost: \$12 million

Implementation Considerations:

- **Redirected Hydraulic Impacts** – Implementation would result in positive effects on flood protection to the local community. No adverse hydraulic effects are anticipated to occur
- **Adverse Environmental Impact and Regulatory Issues** – Only temporary (construction-related) negative impacts are expected as a result of this project.
- **Other**

Associated StudiesNone.

References

U.S. Army Corps of Engineers (USACE). Sutter Basin Flood Risk Management, Ecosystem Restoration and Recreation Feasibility Study Review Plan. April 2010 (Rev.). Available:

<http://www.spk.usace.army.mil/organizations/cespk-pd/Review%20Plans/Sutter_Review_Plan_28apr10.pdf>

Final California’s Central Valley Flood System Improvement Framework. February 2009. Available:

<http://www.nfrmp.us/docs/CACVFloodSystemImprovementFramework_2-27-09FINAL.pdf>

Report of Activities of the Department of Water Resources. Presented December 2010. Available:

<http://www.floodplain.org/cmsAdmin/uploads/Final_Report_2010-12-03_DWR.pdf>

1.44 West Sacramento Area Flood Control Agency Project and General Reevaluation Report

ID: 1855

Project Type: Study

Location Information:

- **Region** – Lower Sacramento
- **Subregion** – West Sacramento
- **Location** – Located in eastern Yolo County in the north central region of California’s Central Valley. The study area approximately corresponds with the city limit for the City of West Sacramento comprising 13,000 acres of mixed-use land and an estimated population of 44,000 residents.
- **Community Setting** – Urban and nonurban areas

Project Proponents:

- **Lead Agency** – USACE
- **Partners** – USACE, Board, West Sacramento Area Flood Control Agency (WSAFCA)
- **Contact Information** –
 - Elizabeth Henderson, USACE
 - Michael Musto, DWR
 - Michael Bessette, WSAFCA

Description:

- **Purpose** – The Water Resources Development Act (WRDA) of 1992 and the Energy and Water Development and Appropriations Act (EWDAA) of 1999 authorized the West Sacramento Project, although that project is largely constructed, it is not complete. Subsequent to authorization, additional information regarding deep under seepage of levees has become available. The project partners have requested additional investigation into the remaining flood-related issues in the

study area. USACE has determined that the subsequent investigation be pursued as a GRR.

- **Concept** – The GRR is being conducted to study future work necessary to provide a minimum of 200-year level of protection for the City of West Sacramento. Elements included in the GRR are: hydraulic and hydrology studies, geotechnical analysis, environmental documentation, economic analysis, cultural resources studies, cost estimating and value engineering, and public involvement and outreach.
- **Relation to SPFC Facilities** – Levees of the Sacramento Bypass, Yolo Bypass, Sacramento River, and Sacramento Deep Water Ship Channel. Sacramento Weir.

Project Status: Feasibility Study

Applicable Management Action(s): Flood Protection System Modification, Ecosystem Functions

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Promote Ecosystem Functions, Promote Multi-Benefit Projects

Extent of Benefit Area: Local and regional benefits.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit** – Potential flood risk management measures range from modifying and/or increasing conveyance through raising and strengthening levees, widening channels and bypass areas, and modifying weirs and bypasses. Nonstructural floodplain management measures would also be considered.
- **Ecosystem Restoration** – Primary ecosystem problems are (1) construction of levees and land-use changes have separated rivers from historic floodplains, and (2) construction of reservoirs has altered historic flow regimes, both of which have resulted in loss of floodplain process and associated native habitats. Technical analyses completed to date within the proposed study area indicate the potential to restore the ecosystem with specific benefits to the following special-status species: Swainson's hawk; Cooper's hawk; Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*); Giant garter snake; Central Valley steelhead; Sacramento River winter-run Chinook salmon;

Central Valley spring-run Chinook salmon ESU; Central Valley fall-/late fall-run Chinook salmon ESU; rose-mallow (*Hibiscus moscheutos*); and, Sanford's arrowhead (*Sagittaria sanfordii*). The project may also have high stakeholder and resource agency interest due to the existence of encroachments and vegetation on existing levees and potential impacts to endangered species habitat, depending on how the vegetation and encroachment issues are addressed.

- **Recreation and Other Benefits** – A secondary goal of the study will be to identify increased recreational opportunities.

Implementation Cost: \$5.7 million

Implementation Considerations:

- **Redirected Hydraulic Impacts** – Implementation would result in positive effects on flood protection to the local community. No adverse hydraulic effects are anticipated to occur.
- **Adverse Environmental Impact and Regulatory Issues** – Only temporary (construction related) negative impacts are expected as a result of this project.
- **Other**

Associated Studies

West Sacramento Project, West Sacramento, California: Design Memorandum and Environmental Assessment/Initial Study – USACE (May 1995)

References

U.S. Army Corps of Engineers (USACE). West Sacramento, California Flood Risk Management and Ecosystem Restoration General Reevaluation Report Review Plan. April 2010. Available: <http://www.spk.usace.army.mil/organizations/cespk-pd/Review%20Plans/West_Sac_Review_Plan_30April2010.pdf>

Final California's Central Valley Flood System Improvement Framework. February 2009. Available: <http://www.nfrmp.us/docs/CACVFloodSystemImprovementFramework_2-27-09FINAL.pdf>

1.45 West Stanislaus County Orestimba Creek Feasibility Study

ID: 1856

Project Type: Study

Location Information:

- **Region** – Lower San Joaquin
- **Subregion** – Stanislaus County
- **Location** – West side of the San Joaquin River in Stanislaus County, California, near the City of Newman.
- **Community Setting** – Nonurban and small community

Project Proponents:

- Potential Lead Agency – USACE
- Potential Partners – USACE, City of Woodland, Board, Stanislaus County
- Contact Information –
 - Michelle Williams, USACE
 - Ajala Ali, DWR
 - Matt Machado, Stanislaus County

Description:

- **Purpose** – The Orestimba Creek Feasibility Study will evaluate feasible flood protection alternatives for the City of Newman and the surrounding agricultural areas. State and local agencies are pursuing federal authorization of a locally preferred plan that improves the level of flood protection from 4 years to 200years.
- **Concept** – The Orestimba Creek channel is not able to convey a flood event larger than a 10-year magnitude; therefore, the creek does not currently play a major role in conveying flood flows. The existing channel conveys less than 20 percent of the 100-year discharge. The remainder of the flow runs overland through agricultural and residential

properties on its way to the San Joaquin River, creating shallow, sheet-flow flooding. The project is a General Investigations study undertaken to evaluate structural and nonstructural flood risk management measures, including channel modifications, construction of new levees, and construction of an interceptor canal.

As the evaluation of alternatives for the feasibility study progressed, the locally favored alternative of Upstream Dry Dam was not economically justified. This alternative also has environmental and safety concerns that would be highly controversial if this alternative were carried forward. The most acceptable alternative has proven to be a combination of widening the stream channel to double its capacity, and constructing chevron levees 3 to 4 feet high around the town to protect it from flooding.

- **Relation to SPFC Facilities** – Not applicable

Project Status: Feasibility study

Applicable Management Action(s): Flood Protection System Modification

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Not applicable

Extent of Benefit Area: Local benefits.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit** – The preferred alternative is designed to be protective of the town (Chevron Levees) and reduce the flood threat to surrounding agricultural areas (channel widening).
- **Ecosystem Restoration**
- **Water Supply**
- **Recreation and Other Benefits**

Implementation Cost: \$6.8 million

Implementation Considerations:

- **Redirected Hydraulic Impacts** – Increased channel flow in Orestimba Creek during flood events could have potential negative impacts downstream.
- **Adverse Environmental Impact and Regulatory Issues** – A combined EIS/EIR is being developed for this study. The current selected alternative requires a large amount of mitigation for environmental impacts within Orestimba Creek. Refinements to design aspects are being done to maintain an economically justified alternative.
- **Other**

Associated Studies

None.

References

U.S. Army Corps of Engineers (USACE). Orestimba Creek, California Flood Risk Management Feasibility Study Review Plan. April 2010. Available: <http://www.spk.usace.army.mil/organizations/cespk-pd/Review%20Plans/Orestimba_Creek_Review_Plan_30apr10.pdf>

USACE. Orestimba Creek Feasibility Study Team Recognized for Innovative Thinking. September 2009. <http://www.army.mil/-news/2009/09/18/27573-orestimba-creek-feasibility-study-team-recognized-for-innovative-thinking/>

1.46 Project Title – White River/Deer Creek Feasibility Study

ID: 1857

Project Type: Study

Location Information:

- **Region** – Upper San Joaquin
- **Subregion** – Tulare County
- **Location** – Community of Earlimart and 300 square miles of farmland in Tulare County
- **Community Setting** – Nonurban area and small community

Project Proponents:

- **Potential Lead Agency** – USACE
- **Potential Partners** – USACE, Board, County of Tulare
- **Contact Information** –
 - USACE PM – Michelle Williams
 - State PM – Efrain Escutia
 - Tulare PM – Jim May

Description:

- **Purpose** – Improve the level of flood protection for the community of Earlimart, State Route 99, railroads, federal aqueduct, and 300 square miles of farmland in Tulare County.
- **Concept** – This study will generate an EIS/EIR and feasibility study to evaluate federal, State, and local interests in planning, designing, mitigating, and improving existing levee system of White River and Deer Creek in Tulare County.
- **Relation to SPFC Facilities** – None.

Project Status: Reconnaissance level

Applicable Management Action(s): Flood Protection System Modification

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Improve O&M, Promote Ecosystem Functions, Improve Institutional Support, Promote Multi-Benefit Projects

Extent of Benefit Area: Project would have local benefits.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit**
- **Ecosystem Restoration**
- **Water Supply**
- **Recreation and Other Benefits**

Implementation Cost: \$3.13 million.

Implementation Considerations:

- **Redirected Hydraulic Impacts** – TBD
- **Adverse Environmental Impact and Regulatory Issues** – TBD
- **Other**

Associated StudiesNone.

References

County of Tulare Resource Management Agency Meeting Agenda. October 2009. Available:

<http://bosagendas.co.tulare.ca.us/MG306225/AS306228/AS306245/AI306345/DO306352/DO_306352.PDF>

Report of Activities of the Department of Water Resources. Presented December 2010. Available:

<http://www.floodplain.org/cmsAdmin/uploads/Final_Report_2010-12-03_DWR.pdf>

1.47 Yuba River basin Project GRR

ID: 1858

Project Type: Study

Location Information:

- **Region** – Lower Sacramento
- **Subregion** – Yuba
- **Location** – Western Yuba County 50 miles north of Sacramento, California. The study area is a portion of the Yuba-Feather-Bear Rivers watershed.
- **Community Setting** – Urban, nonurban area, and small community

Project Proponents:

- **Lead Agency** – USACE
- **Partners** – USACE, Yuba County Water Agency, Reclamation District 784, Board
- **Contact Information** –
 - DWR PM Efrain Escutia
 - USACE PM Mark Ellis
 - YCWA PM Tom Engler

Description:

- **Purpose** – The GRR will reevaluate the flood protection alternatives and improvements to the levee system and channels protecting the urban areas of Marysville, Linda, Olivehurst, Arboga, and surrounding agricultural land and provide 200-year flood protection.
- **Concept** – Although the 1998 Final Feasibility Study identified needed project elements, the USACE and Board are reevaluating the project and preparing a GRR to expand the project area to include the Goldfields, the Feather River from River Mile (RM) 20 to the Bear River confluence, the Bear River from the Feather River confluence to the Western Pacific Interceptor Canal, and the Western Pacific Interceptor Canal. In addition, the study will evaluate increasing the

level of flood protection to 200-year for the Yuba River Basin area. Ecosystem restoration as a secondary project purpose is also under study.

- **Relation to SPFC Facilities** – Not applicable

Project Status: Feasibility study

Applicable Management Action(s): Flood Protection System Modification

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Improve O&M, Promote Ecosystem Functions, Improve Institutional Support, Promote Multi-Benefit Projects.

Extent of Benefit Area: Local and regional benefits.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit**
- **Ecosystem Restoration**
- **Water Supply**
- **Recreation and Other Benefits**

Implementation Cost: \$16 million.

Implementation Considerations:

- **Redirected Hydraulic Impacts** – Lower Feather River
- **Adverse Environmental Impact and Regulatory Issues** – None
- **Other**

Associated Studies

Marysville Ring Levee Engineering Documentation Report. April 2010.
Available:

ftp://ftp.usace.army.mil/pub/spk/Marysville_Ring_levee/PPA/MRL%20E%20DR%20Main%20Report.pdf

References

U.S. Army Corps of Engineers (USACE). Yuba River basin, California Flood Risk Management General Reevaluation Study Review Plan. April 2010 (Rev.). Available:
http://www.spk.usace.army.mil/organizations/cespk-pd/Review%20Plans/YUBA_RIVER_BASIN_GRR_REVIEW_PLAN_%20April2010.pdf

Final California's Central Valley Flood System Improvement Framework. February 2009. Available:
http://www.nfrmp.us/docs/CACVFloodSystemImprovementFramework_2-27-09FINAL.pdf

1.48 Mid-Valley Area Levee Reconstruction Project

ID: 1859

Project Type: System Modifications

Location Information:

- **Region** – Lower Sacramento
- **Subregion** – Sacramento
- **Location** – Sutter and Sacramento Counties
- **Community Setting** – Urban

Project Proponents:

- **Potential Lead Agency** – DWR, USACE
- **Potential Partners** – Board, seven local agencies and counties, including Knights Landing Drainage District and Yolo County

Contact Information –

Description:

- **Purpose** – The Mid-Valley Project is part of the Knights Landing Ridge Drainage District. The project proposes to repair levees at 13 sites northwest of the City of Sacramento that have required floodfighting or experienced seepage and boils during previous flood events. These levees are integral to the systemwide performance of the Sacramento River Flood Control Project and provide direct protection to the towns of Knights Landing, Verona, and Nicholas, indirect flood protection to the cities of Sacramento and West Sacramento, while also protecting 93,000 acres of farmland and associated infrastructure that support the Sacramento Valley's capacity as one of the most productive agricultural regions of the world. The repair of levees in Area 3 will nearly triple the level of flood protection afforded the town of Knights Landing and the adjacent agricultural areas.
- **Concept** – Restore levees to design standards on the Feather and Sacramento rivers and tributaries just north of Sacramento. Project sites extend from the Tisdale Bypass to the Sacramento Bypass and include

levees of the Sacramento River, Feather River, Yolo and Sutter bypasses, and Knights Landing Ridge Cut.

Area 3 levee reconstruction involves 3.4 miles of levee repair along the Knights Landing Ridge Cut and 1.3 miles of levee repair along the west bank of the Sacramento River. The repair of 17 sites located within Area 1 was completed in 1998. The remaining 13 sites in 3 areas across Yolo and Sutter counties are still in need of repair. These repairs include seepage and stability berms, levee crown restoration, slurry cutoff walls, interior drains, and encroachment relocations.

The USACE is creating a Limited Reevaluation Report for this project due in 2012. The environmental document is in the process of being updated.

- **Relation to SPFC Facilities** – Tisdale Bypass, Sacramento Bypass, levees of the Sacramento River, Feather River, Yolo and Sutter bypasses, Knights Landing Ridge Cut.

Project Status: No additional federal funding provided as of November 2011. The Corps is operating on carryover funds to complete designs for the six sites within Area 3. The Corps will continue to request federal funding for this project.

Applicable Management Action(s): System Modifications – Levees/Floodwalls/Hydraulic Structures

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Improve O&M, Improve Institutional Support

Extent of Benefit Area: Project would have local, regional, and systemwide benefits.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit** – Provide direct protection to the towns of Knights Landing, Verona, and Nicholas, indirect flood protection to the Cities of Sacramento and West Sacramento. Also protects 93,000 acres of farmland and associated infrastructure that support the Sacramento Valley's capacity as one of the most productive agricultural regions of the world.
- **Ecosystem Restoration** – None

- Water Supply – None
- Recreation and Other Benefits – None

Implementation Cost: \$54 million

Implementation Considerations:

- **Redirected Hydraulic Impacts.** – Levee restoration and reconstruction project. No significant hydraulic impact is anticipated.
- **Adverse Environmental Impact and Regulatory Issues**
- **Other**

Associated Studies: None

References

DWR. California Department of Water Resources FloodSafe Federal Appropriations Project List (Revised as of February 14, 2011). Agenda Item No. 7. Available:
<[http://www.cwc.ca.gov/docs/Agenda_Item_7_%20re%20DWR%20Appr ops%20FY09-FY11%20\(2-14-11%20final\).pdf](http://www.cwc.ca.gov/docs/Agenda_Item_7_%20re%20DWR%20Appr ops%20FY09-FY11%20(2-14-11%20final).pdf)>

Reclamation District 108. Mid-Valley Project. Available:
<<http://rd108.org/flood-control/mid-valley-project>>

USACE. California's Central Valley Flood System Improvement Framework. February 27, 2009. Available:
<http://www.nfrmp.us/docs/CACVFloodSystemImprovementFramework_2-27-09FINAL.pdf>

DWR. Report of Activities of the Department of Water Resources. Presented before the Central Valley Flood Protection Board on December 3, 2010. Available:
<http://www.floodplain.org/cmsAdmin/uploads/Final_Report_2010-12-03_DWR.pdf>

1.49 Sacramento River Flood Control System Evaluation

ID: 1862

Project Type: System Modifications

Location Information:

- **Region** – Upper/Lower Sacramento River
- **Subregion** – [all subregions]
- **Location** – All levees along the Sacramento River
- **Community Setting** – Nonurban

Project Proponents:

- **Potential Lead Agency** – USACE
- **Potential Partners** – USACE, DWR
- **Contact Information** –
 - Tom Karvonen, USACE
 - Michael Musto, DWR

Description:

- **Purpose** – The Sacramento River Flood Control System Evaluation was prepared by the USACE and initiated in 1986 to determine the extent of levee reconstruction required to bring the system to original design standards. The evaluation is divided into five phases or areas. Work on Phase I, the Sacramento Urban Area Reconstruction Project, was completed in 1993. Work on Phase II, the Marysville/Yuba City Area, was scheduled for completion in 1999. Phase III (Mid-Valley Area), Phase IV (Lower Sacramento Area), and V (Upper Sacramento Area) completed engineering and design, and construction schedules should have been developed.
- **Concept** – One of the areas identified in the report are the deficiencies in the structural integrity of the levees along the Feather and Yuba rivers, indicating that the level of flood protection provided by these levees is lower than previously thought. Without the remedial

recommendations identified in this report, Sutter County is obliged to acknowledge the lower level of protection. This could be a significant constraint on planned growth in the study area. The area of Sutter County impacted extends from the Butte/Sutter County line along the Feather River west to the Sutter Bypass and south to their confluence.

Phase III (Mid-Valley Study area) includes portions in the Sacramento River (RMs 70 to 118), Feather River, Knights Landing Ridge Cut, Sutter Bypass, and Yolo Bypass. USACE is proposing to construct levee stability features at 13 sites. Major features include seepage stability berms, levee crown restoration, levee slope reshaping, and slurry trench cutoff walls.

- **Relation to SPFC Facilities** – Levees along the Sacramento River

Project Status: Recent flood events have shown that the existing level of flood protection is significantly less than previously thought. The State of California has requested a reevaluation by the USACE of the entire levee system. Due to lack of federal funding, the project feasibility study is not complete.

Applicable Management Action(s): System Modifications –
Levees/Floodwalls/Hydraulic Structures

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Improve O&M, Improve Institutional Support, Promote Multi-Benefit Projects

Extent of Benefit Area: Project would have local, regional, and systemwide benefits.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit** – Repairing the levees would reduce flood risk potential for communities, businesses, and land nearby.
- **Ecosystem Restoration** – None
- **Water Supply** – None
- **Recreation and Other Benefits** – None

Implementation Cost: \$12 million

Implementation Considerations:

- **Redirected Hydraulic Impacts** – Little to no negative hydraulic impacts. The levees should be repaired to their designed standards.
- **Adverse Environmental Impact and Regulatory Issues** – Need to refer to EIR. Adverse environmental impacts may be insignificant.
- **Other**

Associated Studies

None.

References

California Natural Resources Agency. Sutter County General Planning. Available: <<http://ceres.ca.gov/planning/genplan/sutter/facilities3.html>>

U.S. Army Corps of Engineers (USACE). Sacramento River Flood Control Project, California, Mid-Valley Area, Phase III. Available:<<http://www.stormingmedia.us/47/4715/A471524.html>>

USACE. Post-Flood Assessment for 1983, 1986, 1995, and 1997. Chapter 3 – Central Valley Flood Management Systems. Available: <http://www.auburndamcouncil.org/pages/pdf-files/3-cv_floodmgmt_system.pdf>

1.50 Hamilton City Flood Damage Reduction and Ecosystem Restoration Project

ID: 1863

Project Type: System Modifications

Location Information:

- **Region** – Upper Sacramento
- **Subregion** – Hamilton
- **Location** – Glenn County; Along the Sacramento River just south east of Hamilton City
- **Community Setting** – Urban

Project Proponents:

- **Potential Lead Agency** – DWR (District 2140)
- **Potential Partners** – USACE, Glenn-Colusa Irrigation District, The Nature Conservancy
- **Contact Information** – Lee Ann Grigsby-Puente

Description:

- **Purpose** – Hamilton City and the surrounding agricultural lands are subject to frequent flooding from the Sacramento River. The only existing protection is from the substandard, private J Levee. The current J Levee protects the town of Hamilton City, which has a population of approximately 2,070 residents. There are approximately 758 properties (residential, commercial, and agricultural) that are at risk of flooding if the J Levee were to fail.
- **Concept** – The Hamilton City Flood Damage Reduction and Ecosystem Restoration Project is defined as:
 1. Construction of a new 6.8-mile-setback levee.
 2. The reconnection of 1,480 acres to floodplain between the new set back levee and the river, of which approximately 1,361 acres will be restored to native riparian habitat.

- Relation to SPFC Facilities – Sacramento River levee around Hamilton City

Project Status: Under limited federal funding and grant fund from the Nature Conservancy, the USACE design and the Limited Reevaluation Report (LRR) are in progress. The construction has not been planned due to lack of federal funding. The Project Partnership Agreement (PPA) between the Federal and Non-Federal partners has not been signed.

Applicable Management Action(s): System Modifications – Levees/Floodwalls/Hydraulic Structures

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Improve O&M, Promote Ecosystem Functions, Improve Institutional Support, Promote Multi-Benefit Projects

Extent of Benefit Area: Project has local, regional, and systemwide benefits.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit** – The Project would replace the existing J Levee with a new levee 6.8 miles long that is set back from the Sacramento River and would protect approximately 3,700 acres, including the town of Hamilton City.
- **Ecosystem Restoration** – Ecosystem restoration component of the project will provide 1,361 acres of potential breeding and nesting areas for avian species. The project adjoins 666 acres of restored habitat on the Sacramento River National Wildlife Refuge (SRNWR) and it will expand and enhance habitat for the 35 federally listed species on the SRNWR. The project also adjoins 463 acres of restored habitat on the state-owned Sacramento River Wildlife Area and is directly across the river from the California Department of Parks and Recreation's Bidwell-Sacramento River State Park. Project completion will result in the largest area of connected, viable wildlife habitat (approximately 4,000 acres) within the Sacramento River Project.
- **Water Supply** – None

- **Recreation and Other Benefits** – One of the two primary goals of the project, however, is to protect agricultural land from frequent flooding events.

Implementation Cost: \$53,405,750

Implementation Considerations:

- **Redirected Hydraulic Impacts** – Implementation would result in positive effects on flood protection to the local community. No adverse hydraulic effects would occur.
- **Adverse Environmental Impact and Regulatory Issues** – There will be temporary disturbance to vegetation and wildlife, but these will return after construction is completed. Increased sediment contribution to the river during construction and removal of the levee may impact fisheries but will only be temporary and project will use best management practices to mitigate.
- Other

Associated Studies

USACE. Hamilton City Flood Damage Reduction and Ecosystem Restoration, California. Final Feasibility Report and EIR/EIS. July 2004.

References

Sacramento River Conservation Area Forum. Hamilton City Flood Damage Reduction and Ecosystem Restoration Project website. Available: <http://www.sacramentoriver.org/srcaf/index.php?id=hamilton_city>

USACE. Hamilton City Flood Damage Reduction & Ecosystem Restoration Project Status Report. April 21, 2011. Available: <[http://www.sacramentoriver.org/srcaf/publications/hamilton_city_docs/Hamilton_City_presentation_\(Karvonen_2011\).pdf](http://www.sacramentoriver.org/srcaf/publications/hamilton_city_docs/Hamilton_City_presentation_(Karvonen_2011).pdf)>

Central Valley Non-Structural Grant Program Project Summary.

1.51 Putah Creek Flood Reduction and Habitat Improvement Project

ID: 1864

Project Type: Floodplain Management

Location Information:

- **Region** – Lower Sacramento
- **Subregion** – Solano/Yolo County
- **Location** – Downstream from the Putah Creek Diversion Dam in Solano/Yolo County
- **Community Setting** – Nonurban

Project Proponents:

- **Potential Lead Agency** – Solano County Water Agency
- **Potential Partners** – City of Davis, DFG, USACE, DWR
- **Contact Information** – Rich Marovich, Solano County Water Agency

Description:

- **Purpose** – The main flood risk is due to overtopping and failure of Putah Diversion Dam due to reduced flood flow capacity of the channel below the dam. The dam was designed to pass 34,000 cfs, a 1-in-100-year event. The current capacity is 17,000 cfs, a 1-in-25-year event due to increased channel roughness caused by overgrowth of vegetation in the channel. If the dam is overtopped, it could be undermined in the receding limb of flood flows, interrupting water deliveries to 300,000 municipal water users and irrigation water for 70,000 acres of farmland in Solano County. Eight hundred feet of Putah Creek Road east of Highway 505 are also at risk of failure.
- **Concept** – The project will be completed in four major phases.
 1. Provide planning, communications, stream modeling, and civil engineering.
 2. Complete CEQA and National Environmental Policy Act permitting.

3. Secure easements and right of ways, acquisition parcels that have been identified as critical to the overall success of the flood conveyance; and channel modifications and revegetation to support those new flows and improve habitat.
4. Establish a creek-wide O&M plan for weed management and to maintain the easements encroachment free will be instituted.

Relation to SPFC Facilities – Putah Diversion Dam

Project Status: Unknown

Applicable Management Action(s): Floodplain Management - Floodproofing

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Improve Operations and Maintenance, Promote Ecosystem Functions, Promote Multi-Benefit Projects

Extent of Benefit Area: Project would have local and regional benefits.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit** – Protection and reduction of flood risk to Putah Diversion Dam and Putah Creek Road from failure –
 - Putah Diversion Dam 1 in 25 years to 1 in 100 years and Putah Creek Road from 1 in 10 years to 1 in 200 years
 - Restore channel capacity back to 34,000 cfs
 - Lower water surface elevations and reduce flow velocities by eliminating constrictions
- **Ecosystem Restoration**
 - Links the Interior Coast Range to the Yolo Wildlife Area and will benefit wildlife migration by controlling invasive weeds that block access to the floodplains
 - Enhances riparian habitat that benefits 232 species of birds

- Converts a gravel pit to floodplain and wetlands to cool the temperature for 3 miles downstream
- Enhances wildlife viewing on adjacent City of Winters lands
- **Water Supply** – None
- **Recreation and Other Benefits** – Conserve orchards and row crops

Implementation Cost: \$6,061,858

Implementation Considerations:

- **Redirected Hydraulic Impacts** – Redirected flood impacts occur when a project moves the risk of flooding from one area to another area. For example, improvements to flood protection in one area can result in increased flood flows in a downstream area; therefore increasing the flood risk downstream. Project is qualitatively evaluated with respect to its potential to redirect hydraulic impacts.
- **Adverse Environmental Impact and Regulatory Issues** – Flood management actions, especially structural management actions, have the potential to adversely impact the environment while meeting other flood management goals. Each project is evaluated on its potential to create adverse environmental impacts such as habitat loss and alteration of key physical processes.
- **Other**

Associated Studies

U.S. Army Corps of Engineers (USACE). Habitat Improvement for Native Fish in the Yolo Bypass. December 2002.

References

Central Valley Non-Structural Grant Program Project Summary

1.52 Floodplain Expansion and Ecosystem Restoration at Dos Rios Ranch

ID: 1865

Project Type: Floodplain Management

Location Information:

- **Region** – Lower San Joaquin
- **Subregion** – Tuolumne/ San Joaquin
- **Location** – Stanislaus County; Lower Tuolumne River Parkway; confluence of Tuolumne and San Joaquin rivers
- **Community Setting** – Nonurban

Project Proponents:

- **Potential Lead Agency** – River Partners
- **Potential Partners** – Tuolumne River Trust and USDA NRCS
- **Contact Information** – Julie Rentner, River Partners

Description:

- **Purpose** – Floodplain reconnection and floodplain habitat restoration.
- **Concept** – Phase 2 of a current Flood Control Plan project which acquired the property. This phase will comprise of three major components; restoration planning and permitting, habitat restoration, and a levee breaching study. The project will restore flooding and transient floodwater storage to 948 acres of historic floodplain, restore riparian habitats, and promote river physical processes of scour and deposition along 6 river miles.
- **Relation to SPFC Facilities** – None

Project Status: Phase 1 of the project acquired the flood easement and Phase 2 is in planning.

Applicable Management Action(s): Floodplain Management – Easement/Acquisitions

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Improve O&M, Promote Ecosystem Functions

Extent of Benefit Area: Project would have local and regional benefits.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit** – The flood benefit was obtained through Phase 1 of the project that included the acquisition of the property. Phase 2 is for restoration of the project plus a levee breaching study. If Phases 1 and 2 are considered one project, the flood benefits include the creation of 5,000 to 10,000 acre-feet of transient storage.
- **Ecosystem Restoration** – Improve the quality of the existing habitat linkages and migratory corridors in the region by restoring the biological processes of floodplain ecology to support avian, aquatic, and terrestrial-obligate species.
- **Water Supply** – Currently has groundwater storage and sediment trapping.
- **Recreation and Other Benefits**

Implementation Cost: \$8,519,316

Implementation Considerations:

- Redirected Hydraulic Impacts – None anticipated.
- Adverse Environmental Impact and Regulatory Issues – None anticipated.
- Other

Associated Studies

None

References

Tuolumne River Preservation Trust. Project Information for the Tuolumne River Preservation Trust. 2005 Proposal Number: 0056. Available: <
<https://nrmsecure.dfg.ca.gov/FileHandler.ashx?DocumentVersionID=11007>>

1.53 Elk Slough Area and Habitat Improvement Project

ID: 1866.

Project Type: System Modifications

Location Information:

- **Region** – Lower Sacramento
- **Subregion** – Sacramento
- **Location** – The site is adjacent to the town of Clarksburg, across the river from Elk Grove and Sacramento
- **Community Setting** – Nonurban

Project Proponents:

- Potential Lead Agency – DWR
- Potential Partners – DFG, USACE
- Contact Information – Bob Webber (DWR)

Description:

- **Purpose** – There is a backwater effect from flooding of the Sacramento River and the area is in direct risk of flooding from the Sacramento River as well. There is a risk of levee breaches from other areas such as from West Sacramento levee failures. The area is at risk of development, and encroachment on levees is common. Also, the highest terrain consists of the levees, which puts the area at risk.
- **Concept** – The Elk Slough Area Flood and Habitat Improvements Project proposes to improve flood protection for a rural Delta community and valuable agricultural land, improving much-needed riparian and aquatic habitat, while at the same time reconnecting an important anadromous fish passage.

The project proposes constructing a new headgate structure to establish a flood protection corridor, and to relocate or floodproof existing structures necessary for the establishment of this corridor.

- Relation to SPFC Facilities – None

Project Status: Unknown

Applicable Management Action(s): System Modifications – Closure Structures

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Promote Ecosystem Functions, Improve Institutional Support

Extent of Benefit Area: Project would have local benefits

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit**
 - This project will reduce flood risk from approximately 19 miles of at risk levees, 1,401 people (2000 Census), 38,479 acres, and \$70 million of annual agricultural value, through the establishment of easements and the relocation or minor modification of existing structures.
 - A conservative estimate would be a 10 percent improvement in local flood water conveyance for an overall area of approximately 38,479 acres, which would reduce frequency of flooding and lower stage height. The precise improvements would be determined through this project, as there is no Base Flood Elevation for RD-999. Approximately 4,300 acres of the properties immediately surrounding Elk Slough would have a reduction of stage primarily, as flow would be improved around the slough.
 - The project is intended to improve flowage through the district's drain system and around Elk Slough.
- **Ecosystem Restoration**
 - Project proposes to establish a anadromous fish passage
 - Improve aquatic habitat such as shaded riverine aquatic, scrub-shrub, and riparian forest.

- Improve water quality by laying back the banks of the slough to support native vegetation and improve flood conveyance
- Improve native fish species diversity
- Improve habitat through weed removal
- **Water Supply** – None
- **Recreation and Other Benefits** – Conserve agricultural land (local vineyards and row crops) through agricultural conservation.

Implementation Cost: \$3,042,250

Implementation Considerations:

- **Redirected Hydraulic Impacts** – Redirected flood impacts occur when a project moves the risk of flooding from one area to another area. For example, improvements to flood protection in one area can result in increased flood flows in a downstream area; therefore increasing the flood risk downstream. Project is qualitatively evaluated with respect to its potential to redirect hydraulic impacts.
- **Adverse Environmental Impact and Regulatory Issues** – Flood management actions, especially structural management actions, have the potential to adversely impact the environment while meeting other flood management goals. Each project is evaluated on its potential to create adverse environmental impacts such as habitat loss and alteration of key physical processes.
- **Other**

Associated Studies

None

References

Central Valley Non-Structural Grant Project Information

1.54 Sutter Basin Flood Corridor Conservation Project

ID: 1867

Project Type: Floodplain Management

Location Information:

- **Region** – Lower Sacramento
- **Subregion** – Feather River/Yuba River
- **Location** – Sutter County. Located east of the town of Robbins. Between Armour Road and the west levee of Sutter Bypass near the confluence with the Feather River, and between Kirkville and Maddock roads.
- **Community Setting** – Nonurban

Project Proponents:

- **Potential Lead Agency** – Ducks Unlimited, Western Regional Office
- **Potential Partners** – U.S. Department of Agriculture, Montana Farms
- **Contact Information** – Joe Navari (Ducks Unlimited)

Description:

- **Purpose** – The Sutter Basin, located on west side of Sutter Bypass, has historically been an overflow area for both Sacramento and Feather rivers. Substantial efforts to manage the Sacramento and Feather river floodwaters has resulted in the Sutter Basin being completely surrounded by levees and will remain dry unless levees fail. The subject property has flooded in past due to seepage from western levee of Sutter Bypass and during large flood events due to levee failure.
- **Concept** – The project would place a conservation easement on 2103 acres of agricultural lands. The easement would protect the agricultural productivity, soils, the associated wildlife values and the future of farming in the Sutter Basin. The conservation easement would restrict subdivision and would also provide foraging habitat for wintering migratory birds.

- **Relation to SPFC Facilities** – None

Project Status: Unknown

Applicable Management Action(s): Floodplain Management – Easements/Acquisitions

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Promote Ecosystem Functions

Extent of Benefit Area: Project has local and regional

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit** – Project would place an agricultural conservation easement on 2,103 acres and limit development to outside the project area. Project would protect areas downstream by providing flood capacity to the Sutter Bypass levee during large levee failure and heavy flow events.
- **Ecosystem Restoration** – Project would provide foraging habitat for wintering migratory birds.
- **Water Supply** – None
- **Recreation and Other Benefits** – Project would place an agricultural conservation easement on 2013 acres. Present agricultural use is intensive rice production and produces 80 to 90 100-pound sacks of rice per acre.

Implementation Cost: \$6,431,710

Implementation Considerations:

- **Redirected Hydraulic Impacts** – The project will not reduce the magnitude of a flood flow. The project will lower surface water elevations during a local flood event by keeping the property in low-intensive agriculture on flat land resulting in little or no flood damage. No impairments that would impact flow velocities from flooding because the property will allow low-flow inundation and the property is flat farmland.

- **Adverse Environmental Impact and Regulatory Issues** – No long-term adverse environmental impact.
- **Other**

Associated Studies

None

References

Central Valley Non-Structural Grant Project Information.

Ducks Unlimited, Inc. Flood Protection Corridor Program Project Evaluation Criteria and Competitive Grant Application Form. February 2003. Available: <
http://www.water.ca.gov/floodmgmt/fpo/sgb/fpcp/prop13/proposals/3002_LealProperties/Application.pdf>

1.55 Colusa Ring Levee Flood Protection

ID: 1868

Project Type: Local Area Protection

Location Information:

- **Region** – Upper Sacramento
- **Subregion** – Colusa Drain
- **Location** – Highway 20 just outside City of Colusa limits
- **Community Setting** – Other

Project Proponents:

- Potential Lead Agency – County of Colusa
- Potential Partners
- Contact Information – Chris Ferrari, HDR

Description:

- **Purpose** – In 2000, Phase 1 of a ring levee project was constructed westward of the city limits between high ground to the north and Highway 20, which runs east-west. This included the construction of a new levee along the Colusa Basin Drain to impede floodwater coming from the northeast that historically inundated the project area. After construction of the Phase 1 levee, flooding still occurred from floodwater backing up from the south across Highway 20 and inundating portions of the project area. There is also an existing federal project levee to the south of the city limits approximately 2.1 miles south east of the Phase 1 levee.

Historically flooding has occurred when flood waters flowing in the Colusa Basin Drain spread near the Highway 20 Bridge and extended northeast. Flooding was experienced to an approximate depth of 2.5 feet during high-water events in 1995, 1997, and 1998. In some of these instances, Highway 20, the areas major thoroughfare, was shut down due to flooding. Though these events occurred before the construction of the Phase 1 levee, the area has not experienced similar events to test the new levee system. In addition, since the Phase 1 levee has not been

certified, it is not recognized as having a flood damage reduction benefit to the project area.

- **Concept** – Project would construct a 2.9-mile ring levee to connect to the Phase 1 and federal project levees to provide flood damage reduction from the Colusa Basin Drain, which generally runs north-south to the west of the project area.
- **Relation to SPFC Facilities** – Colusa Basin Drain

Project Status: Phase 1 is complete. Further design and construction are necessary.

Applicable Management Action(s): System Modifications – Levees/Floodwalls/Hydraulic Structures

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Improve O&M, Promote Ecosystem Functions, Improve Institutional Support, Promote Multi-Benefit Projects

Extent of Benefit Area: Project would have local, regional, and systemwide benefits.

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit** – Once certified, the new levee system would effectively cut off flooding associated with the Colusa Basin Drain from the west, removing approximately 2,600 acres out of the floodplain. In a flood event, floodwaters extend into the unincorporated areas of Colusa County, that area directly adjacent to the City of Colusa, inundating agricultural and commercial land. This impacts approximately 110 structures, State Highway 20, and several acres of agricultural land. The total estimated value of the structures impacted by the floodwater is \$26.1 million.
- **Ecosystem Restoration** – Implementation of the project includes restoration of a 27-acre borrow site that will be owned by the City of Colusa and will provide habitat connectivity to the adjacent existing Phase 1 borrow site. The Phase 1 borrow site, currently composed of wetland/pond habitat, will be expanded to provide borrow for the proposed project. The land proposed for the borrow site is currently in agricultural production. Soil will be removed from the borrow site for use during construction. Upon completion of construction, wetland and

pond habitat similar to that created at Phase 1 site will be created at the borrow site.

Areas of unique ecological and biological diversity in and adjacent to the site include vernal pools, seasonal and managed wetlands, alkali grassland, riparian habitats and drainages. Agricultural fields provide foraging habitat for migrating waterfowl along the Pacific Flyway as well as resident and migratory raptors and waterfowl. The site is located adjacent to the 646-acre Colusa National Wildlife Refuge North Central Valley Wildlife Management Area.

- **Water Supply** – None
- **Recreation and Other Benefits** – None

Implementation Cost: \$5.5 million

Implementation Considerations:

- **Redirected Hydraulic Impacts** – Redirected flood impacts occur when a project moves the risk of flooding from one area to another area. For example, improvements to flood protection in one area can result in increased flood flows in a downstream area; therefore increasing the flood risk downstream. Project is qualitatively evaluated with respect to its potential to redirect hydraulic impacts.
- **Adverse Environmental Impact and Regulatory Issues** – Flood management actions, especially structural management actions, have the potential to adversely impact the environment while meeting other flood management goals. Each project is evaluated on its potential to create adverse environmental impacts such as habitat loss and alteration of key physical processes.
- **Other**

Associated Studies

None

References

Central Valley Non-Structural Grant Project Information

1.56 The Lower San Joaquin River Flood Bypass

ID: 1869

Project Type: System Modifications

Location Information:

- **Region** – Lower San Joaquin
- **Subregion** – San Joaquin County, Stockton and South Delta
- **Location** – In the Delta, along Paradise Cut/San Joaquin River, south of Stewart Tract, west of cities of Lathrop and Manteca; at juncture of Interstates 5 and 205
- **Community Setting** – Urban

Project Proponents:

- **Potential Lead Agency** – Southern Delta Levee Protection and Channel Maintenance Authority
- **Potential Partners** – South Delta Water Agency and Reclamation District 2062, American Rivers and Natural Resources Defense Council, River Islands Development Company, San Joaquin County Resource Conservation District, University of the Pacific, American Lands Conservancy
- **Contact Information** – John Brodie (Mokelumne River Watershed Coordinator, San Joaquin County RCD)

Description:

- **Purpose:**
 - High flood stage on San Joaquin River between Mossdale and Stockton
 - High probability of catastrophic flooding in Lathrop, Manteca, Stockton, and unincorporated San Joaquin County
 - Loss of sensitive species habitat
 - Loss of farmland to development

- Uncontrolled flooding on farmland
- **Concept:**
 - Increase flood conveyance capacity through a constrained reach of the San Joaquin River floodway by acquiring easements and fee title to expand Paradise Cut Bypass.
 - Provide floodplain and riparian habitat for sensitive species including riparian brush rabbit, giant garter snake, Sacramento splittail (*Pogonichthys macrolepidotus*), and juvenile Chinook salmon.
 - Preserve agricultural land and protect it from uncontrolled flooding.
- **Relation to SPFC Facilities – Paradise Cut Bypass**

Project Status: Recon or Feasibility Phase

Applicable Management Action(s): System Modifications – Increase Bypasses Capacity

Contribution to CVFPP Goals:

- **Primary Goal** – Improve Flood Risk Management
- **Supporting Goals** – Promote Ecosystem Functions, Improve Institutional Support, Promote Multi-Benefit Projects

Extent of Benefit Area: Project would have local, regional, and systemwide benefits

Potential to Provide Multi-Benefits:

- **Flood Damage Reduction Benefit**
 - “The bypass would open up the most significant flood conveyance bottleneck in the San Joaquin Valley and potentially the state of California – a bottle neck that has implications for both public safety and water supply.” (from application)
 - Reduced flood stage in mainstem San Joaquin River between Vernalis and Stockton.
 - Reduced likelihood of levee failure on San Joaquin River in Lathrup, Manteca, and Stockton areas.

- **Ecosystem Restoration**
 - **Sensitive species and habitat** - Swainson's hawk, valley elderberry longhorn beetle, tricolored blackbird (*Agelaius tricolor*), bats, burrowing owl (*Athene cunicularia*), northern harrier (*Circus cyaneus*), riparian brush rabbit (*Sylvilagus bachmani riparius*), giant garter snake, Swainson's hawk, steelhead salmon, fall-run Chinook and spring-run salmon, Sacramento splittail, others.
 - Riparian corridor along Paradise Cut, a significant riparian corridor connecting the Delta to the lower San Joaquin River and has been identified as a significant natural resource area in the San Joaquin County Conservation Plan.
 - **Benefits** – Up to about 100 acres habitat, 950 acres flood and habitat, and 921 acre flood, agriculture, and habitat.
- **Water Supply** – Increase Bypass capacity and flood flow through the South Delta region would potentially decrease the salinity level in the Delta region and improve the water quality of the regional water supply.
- **Recreation and Other Benefits**
 - **Benefits** – Change of about 4,221 acres of existing agriculture into approximately 2,200 acres of flood and agriculture, and 921 acres of flood and agriculture and habitat.
 - Development avoided by use of flood easements, conservation easements, fee title acquisition, and possibly use Williamson Act contracts.
 - Inundation to some lands controlled by flood easements on others.
 - Flexibility for changes in upstream reservoir management to better optimize the water supply and flood control purposes of four major upstream reservoirs.
 - Wetland creation along the expanded bypass corridor could have significant water quality benefits, including sediment settling out of the water column into the bypass area.
 - While local access may or may not become available, public viewing may be available from developing River Islands development project to the north.

Implementation Cost: \$6,125,000

Implementation Considerations:

- **Redirected Hydraulic Impacts** – Redirected flood impacts occur when a project moves the risk of flooding from one area to another area. For example, improvements to flood protection in one area can result in increased flood flows in a downstream area; therefore increasing the flood risk downstream. Project is qualitatively evaluated with respect to its potential to redirect hydraulic impacts.
- **Adverse Environmental Impact and Regulatory Issues** – Flood management actions, especially structural management actions, have the potential to adversely impact the environment while meeting other flood management goals. Each project is evaluated on its potential to create adverse environmental impacts such as habitat loss and alteration of key physical processes.
- Other

Associated Studies

BDCP EIR/EIS

References

Central Valley Non-Structural Grant Project Information.

BDCP EIR/EIS

