THE BOARD OF SUPERVISORS OF THE COUNTY OF STANISLAUS
ACTION AGENDA SUMMARY

DEPT: Public Works BOARD AGENDA # *C-5

Urgent ☐ Routine ☑ AGENDA DATE November 25, 2014

CEO Concurs with Recommendation YES ☐ NO ☐ (Information Attached) 4/5 Vote Required YES ☐ NO ☑

SUBJECT:

Approval to Accept the Final Draft of the Regional Flood Management Plan for the Mid San Joaquin River Region

STAFF RECOMMENDATIONS:

Accept the Final Draft of the Regional Flood Management Plan for the Mid San Joaquin River Region.

FISCAL IMPACT:

On February 27, 2013, Reclamation District (RD) 2092 was awarded a "Letter of Commitment - Directed Funding for Regional Flood Management Plans" in the amount of $869,429. On March 26, 2013 the Board of Supervisors approved a Memorandum of Understanding (MOU) between RD 2092 and the County. In accordance with the MOU, RD 2092 managed and administered the agreement. The County and RD 2092 partnered and collaborated in the development of the Regional Flood Management Plan (RFMP). County staff time was invoiced to RD 2092 for subsequent efforts to develop the RFMP.

(Continue Page 2)

BOARD ACTION AS FOLLOWS:

No. 2014-582

On motion of Supervisor Chiesa, **Seconded by Supervisor** Withrow
and approved by the following vote,
Ayes: Supervisors: O'Brien, Chiesa, Withrow, Monteith, and Chairman De Martini
Noes: Supervisors: None
Excused or Absent: Supervisors: None
Abstaining: Supervisor: None

1) X **Approved as recommended**
2) _____ **Denied**
3) _____ **Approved as amended**
4) _____ **Other:**
MOTION:

Christine Ferraro

ATTEST: CHRISTINE FERRARO TALLMAN, Clerk **File No.**

FISCAL IMPACT (Continued):

The purpose of the Mid San Joaquin River RFMP is to provide a needs assessment, not a mechanism to program, fund and deliver projects. The 37 regionally significant projects have the potential to reduce flood risk within the Mid San Joaquin River Region and have a preliminary project cost of $340 million, with an identified local match of $34 million. Challenges will remain due to limited local funding capacity, but projects will be more successful in finding outside funding due to RFMP guidance. The total needs of the region are beyond our means to fund at this time, as discussed within the RFMP report. There are no identified local match resources to fund the listed projects, however having a plan in place offers an opportunity to seek out funding sources.

DISCUSSION:

The Central Valley Flood Protection Act was signed into law in 2008 and directed the Department of Water Resources (DWR) to prepare, and the Central Valley Flood Protection Board (CVFPB) to adopt, a Central Valley Flood Protection Plan (CVFPP) by July 1, 2012. The CVFPB adopted the CVFPP in June 2012. A major update to that plan will be produced in 2017. The purpose of the CVFPP is to reduce flood risk in the Sacramento and San Joaquin River Basins. The 2017 CVFPP will draw on regional flood management plans developed and submitted by local stakeholders such as local implementing/operation and maintaining agencies; local land use agencies (cities and counties); flood emergency responders; permitting agencies; and, agricultural, tribal and environmental interests that are knowledgeable about flood risk and potential solutions within the region. Stanislaus County is included in the Mid San Joaquin regional area, one of six such regional flood planning areas in the Central Valley.

The Mid San Joaquin River Regional Flood Management Plan (RFMP) effort is being led by Stanislaus County and RD 2092 and has identified 37 regionally significant projects, 19 of which are within the RFMP boundary and 18 of which are within the County but outside the area of State Plan of Flood Control. The 100-year flood plain consists of 78,000 acres and approximately 11,000 residents. The projects include: flood control projects, flood control projects with co-beneficial environmental habitat restoration, ground water recharge projects, and water quality projects. A list of ranked proposed improvements, including estimated costs and benefits, amounts anticipated to be funded by Federal, State, and local cost shares, and local agencies' plans to finance their share of each project's costs are included in the RFMP and the summary projects are attached (Attachment B).

One of our major accomplishments was to engage and collaborate with a wide cross-section of partners that are interested in flood management. This collaboration was completed through an eighteen month public stakeholder engagement process that included eight public workshops and several briefings of local governments and special interest groups. County government stakeholders included County Office of Emergency Services, County Agricultural Commissioner, Planning and Community Development and Public Works.

We have open lines of communication with many diverse agencies and partners. Together we will collaborate on improvements that are most fundable. As an example, there are project partners that have project concepts that may get built without a local agency match, such as improvements at Three Amigos (also known as Non-structural Alternative at the San Joaquin River National Wildlife Refuge) RFMP Project No. 24. We also have projects that require little capital, but can improve flood fight and preparedness, such as Consolidation of Operations and Management (O&M) for the Reclamation Districts RFMP Project A, Flood Education and Emergency Response Planning - Local Planning and Training RFMP Project E. Although funding opportunities may be challenging in the future, the RFMP effort has been worthwhile as it has brought together a diverse group of stakeholders who now communicate and collaborate on flood issues in Stanislaus County.

Flood management planning, up to this point, had not been well documented. The absence of proper planning documents results in a greater liability for the County. Many of the needed preparedness documents will address responsibilities and financial plans. These plans will eliminate or reduce inadequate response and will assist in securing State/Federal funds. This plan should be recognized as a step in the right direction and a proactive model.

RFMP Summary

The purpose of the plan is to develop a flood safe vision for our region. The RFMP effort included outreach to the regional stakeholders that consisted of local, state, and federal government agencies, flood control agencies, irrigation districts, reclamation districts, levee maintenance districts, agricultural interests, landowners, community groups, as well as recreation and environmental interests. These regional stakeholders were invited and participated in the eight planning meetings that were held between April 23, 2013, and July 24, 2014, at various locations within the County, including within the City of Patterson, Old Fisherman's Club, Stanislaus County Main Library in Modesto, Tenth Street Place, Farm Bureau Offices and Harvest Hall. The purpose of the planning meetings was to refine the RFMP development process effort. Valuable discussions occurred and feedback was received on the RFMP development process and proposed regionally significant projects.

Regional Setting

For the purpose of this regional flood management planning process, the Mid San Joaquin River Region (SJR) planning area extends along the San Joaquin River from the confluence of the Stanislaus River to the confluence with the Merced River, most of which is within the corporate boundary of Stanislaus County.

The State Plan of Flood Control (SPFC) Area within our County in the Mid SJR Region is 27,980 acres, with 760 acres in Merced County, 25 acres in San Joaquin County, and the balance of 27,195 acres in Stanislaus County. Four large Central Valley Rivers are relevant to the planning area - the San Joaquin, Merced, Tuolumne, and Stanislaus rivers. All four rivers originate in the western Sierra Nevada, flowing westward toward the valley floor. The San Joaquin River is 330

miles long from its headwaters to its confluence with the Sacramento River, including 37 miles within the Mid SJR Region.

Levees operated and maintained by Reclamation District Nos. 1602 (Del Puerto), 2031 (Elliot), 2063 (Crows Landing), 2091 (Chase), 2092 (Dos Rios Ranch), 2100 (White Lake Ranch), 2101 (Blewitt), 2099 (El Solyo Ranch), and 2102 (Lara Ranch) are a part of the SPFC facilities, as is Gomes Lake, Named Area (NA) 65. Federal flood protection facilities must be inspected at least four times per year according to the Federal Flood Control Regulations (Title 33, Code of Federal Regulations, Section 208.10). Inspections occur immediately before the flood season, immediately following every major high water period, and at intervals not exceeding 90 days. The primary objective of the inspections is to confirm that project facilities maintenance is being carried out effectively, rather than to identify problems with project facilities (DWR, 2013a).

Local Maintaining Agencies (LMAs) are responsible for operating and maintaining levees and associated drainage systems and structures, participating in inspections, flood fighting, and filing annual reports. Maintenance typically includes such items as management of vegetation, rodent burrows, seepage, and erosion.

A large percentage of the Mid SJR Region levee system protects agricultural lands. The agricultural use is largely compatible with occasional flooding, except dairies and permanent tree crops. There are some significant critical infrastructures that are protected by the levees, some of which are the waste water treatment plants for Patterson, Newman and the City of Modesto. Other critical pieces of infrastructure include bridges, such as the Crows Landing Road Bridge, Hills Ferry Bridge, Las Palmas Bridge and Grayson Road Bridge that cross the San Joaquin River.

Flooding and Flood Hazards

The San Joaquin River Basin has experienced flood events in 1983, 1986, 1995, and 1997, 2006, and 2011. In the 30 years since 1983, a federal disaster has been declared four times in the Mid SJR Region for flooding (DWR, 2012a) in 1983, 1986, 1995, and 1997.

In the Mid SJR Region, the largest flood experienced during this time was the 1997 flood, where our region experienced $165 million in damages. However, the potential damages prevented by flood infrastructure was $331 million, with New Melones Dam leading the way in preventing over $175 million in flood damages alone.

In Stanislaus County, the following departments have a role in flood management:

- *Office of Emergency Services* - Mitigation planning, hazard response, coordinates and provides emergency services.
- *Chief Executive Office* - Prepares and updates the Multi-Jurisdictional Hazard Mitigation Plan, and provides information to the public regarding flood hazards.

- *Planning and Community Development* - Establishes land use policy and regulation, and prepares and updates the Safety and Housing Elements within the General Plan.
- *Public Works* - Maintains inventory of public infrastructure including roads and bridges, GIS mapping function which includes research, data collection and GIS map creation.
- *Assessor's Office* - Determines property values, and shares database and resources for risk assessment analysis.
- *Board of Supervisor's and Planning Commission* - Authority over land use decisions and land use planning.

Flood plain delineation is determined by the Federal Emergency Management Agency (FEMA) which has mapped Stanislaus County for the 100-year and 500-year floods. The 100-year floodplain is defined by FEMA as the area with a one percent annual chance of flooding, equal to a 26 percent chance of flooding at least once over the life of a 30-year mortgage. Portions of the Cities of Modesto, Patterson, Newman, and a 1,550-acre area along the Delta-Mendota Canal between Patterson and Newman are located within the 100-year floodplain boundary.

DWR and the USACE recently developed a set of guiding principles (presented in the draft California's Flood Future: Recommendations for Managing the State's Flood Risk of April 2013) that reflect an integrated approach to flood management in which floods cannot be entirely prevented. Flood management seeks to reduce the risk and consequences of flooding to improve public safety, enhance environmental stewardship, and support economic stability. Not all flooding creates hazards. Modern society is coming to recognize that flooding that occurs in areas with flood-compatible land uses can be at worst a nuisance, and at best a vital reinvigorating force for the creation and maintenance of beneficial habitat, both in-channel and on the floodplain. At the same time it can support such benefits as water quality enhancement and groundwater recharge.

Emergency Response

Initial emergency response to disaster events in California is the responsibility of local government entities (i.e., counties, cities, special districts). There are two key separate components of flood response; levee flood fight operations and general public safety operations. The area protected by project levees in the Mid SJR Region planning area is completely within the unincorporated area of Stanislaus County, other than the City of Modesto Jennings Road sewer treatment plant within RD 2091. This fact makes flood response in the planning area a matter of coordinating the activities of County public safety agencies (primarily the Sheriff's Department), and special districts (e.g., fire and reclamation) with jurisdictions in the area.

The local RD's have institutional flood fight knowledge; however, their leadership has not received ICS/NIMS training, which is important in the post-Katrina disaster preparedness world. Stanislaus County OES offers no-cost, one-day introduction to ICS/NIMS training several times per year. It is recommended that the local RD's leadership attend the training and would therefore have the ability to apply ICS/NIMS concepts to agency coordination and mutual aid.

Public safety operations within the planning area do not face highly complex or extensive issues such as those found in heavily urbanized areas in deep flood zones. The existence of normal emergency plans, ICS/NIMS training, and specialized equipment indicate a normal competency to conduct public safety operations in the floodplain if needed.

The Report identifies the following recommendations:

- Develop local levee flood fight plans or a joint coordinated flood fighting plan for related RDs;
- Perform key hydrological studies;
- Complete response plans for public safety agency functions;
- Clarify command and control;
- Provide emergency planning support for RDs;
- Better define mutual aid for flood fight operations;
- Develop a flood response training program; and
- Form a Stanislaus Operational Area Flood Response Working Group within the Stanislaus Operational Area organization.

Operations and Maintenance

Most of the RDs in the Mid San Joaquin Region are rural districts that encompass agricultural land. Accordingly, there are limited or no assessments, which means that individual land owners fund and perform necessary levee maintenance. Typical maintenance activities for the RD's in the region include: vegetation management, rodent control, erosion control/repairs, crown maintenance, and slope grooming.

Vegetation and animal control were common issues that were noted in many of the DWR Levee Inspection Summaries for the RDs in the Region, which were also noted in discussions held with each RD. Environmental permitting challenges and Endangered Species Act (ESA) constraints associated with O&M activities often puts districts in the middle of conflicting regulatory requirements. In these instances, decisions are made to either perform the required O&M and potentially be fined for violating ESA regulations, or perform limited O&M. Since RDs have limited financial resources, the decision is often made to comply with ESA regulations and hope the limited O&M are sufficient.

However, failure to perform regular maintenance not only threatens financial support in the event of a disaster from the Public Law (PL) 84-99 program, but reduces the effectiveness of existing flood management facilities to perform during a flood event, thereby threatening the people and property behind these levees. Currently, RD 2092 is the only district in the Mid San Joaquin Region that is eligible for PL 84-99 disaster assistance. However, this district is in the process of seeking to eliminate O&M responsibilities and that would permit flowage on previously protected lands within the District.

In addition to permitting challenges, many RDs cited differing vegetation criteria as outlined by DWR and USACE as a source of confusion and frustration. These differing criteria can often result in RDs receiving acceptable ratings on DWRs levee inspections, but unacceptable ratings on USACE (PL 84-99) inspections. This is problematic since two or more consecutive unacceptable ratings from USACE can jeopardize a Local Maintaining Agency's (LMA) eligibility in the PL 84-99 program, which provides levee rehabilitation assistance in the event of a disaster.

There are several opportunities within the Mid SJR Region to assist LMA's with their ongoing O&M activities:

- Programmatic Environmental Analysis
- Establish Consistent Levee Vegetation Standards
- Streamline Grant Application Process and/or Support LMA's with Grant Applications
- Consolidation of O&M
- Develop Levee Maintenance Best Management Practice Guidance

Land Use and Environmental Enhancements

Farmland makes up 75 percent of the Mid SJR Region of the SPFC, with urban areas accounting for only four percent out of the 28,750 acres. The primary tool to regulating land use within a floodplain is through a local zoning code, which also implements its general plan, as well as other laws, programs, and policies. Much of the land use within the Mid SJR Region and broader planning area is regulated by the Stanislaus County Code and Stanislaus County General Plan. The Land Use, Conservation/Open Space, and Agricultural elements of the Stanislaus County General Plan include several goals and policies that apply directly or are related to flood management, habitat conservation, and agricultural preservation. Goal five of the Stanislaus County Conservation/Open Space Element is to: "Reserve, as open space, lands subject to natural disaster in order to minimize loss of life and property of residents of Stanislaus County. Policy four under goal one in the Land Use Element states that, "Development within the 100-year floodplain must meet the requirements of Chapter 16.50, Flood Damage Prevention, in the Stanislaus County Code".

Senate Bill 5 (SB5) was passed in 2007 which requires a 200-year level of flood protection for urban and urbanizing areas within California's Central Valley, and recommends 100-year flood protection for non-urban areas. Development in this context includes new residential, commercial, or industrial land uses and buildings for agricultural uses. As some fruit and nut trees are damaged by prolonged inundation and costly to replace, the flood risk needs to be balanced with potential profits before planting orchards. While the provisions of SB5 don't preclude orchards in the 100- or 200-year floodplains, it would be good land use practice to consider flood-compatible uses that include production of crops that are flood-tolerant, open space, some recreational facilities and uses, and areas of rehabilitated floodplain habitat.

Multi-benefit projects are those that combine flood management, environmental, recreational, water quality, and other objectives to achieve improvements in each of these areas. A local example of a multi-beneficial project that has incorporated flood management and environmental objectives is the Dos Rios Ranch/Hidden Valley Mitigation Project. This project would restore flooding and transient floodwater storage to approximately 1,000 acres of historic floodplain, restore riparian habitats, promote river physical processes of scour and deposition, and provide passive recreation along 6 river miles. Levees would be removed from the SPFC along with associated maintenance obligations and the USACE O&M manual would be modified to allow breaching and other modification to the existing levees.

Proposed Regional Improvements

Thirty seven projects were identified as having the potential to reduce flood hazards and provide other benefits to the planning area. A range of project types were identified; some examples include small dam removal, sediment load reduction, floodplain rehabilitation, a levee vegetation management program, studies to better understand flooding hazards, emergency response planning and training, flood education programs, compliance with Senate Bill 5 requirements, and storm drainage enhancements.

The project list has been included as Attachment B.

Regional Priorities

A two-step process was applied to first define the set of eligible projects and then rank them using multiple criteria (multiple criteria evaluation). Two types of potential projects, or "regional improvements", were considered:

- Concept-level recommendations. These were project ideas that were described but not developed in sufficient detail to allow consideration as detailed projects. Often they lacked an identified champion or party to lead the project. Many were ideas for major projects or programs that were appropriate for development at a larger geographic scale than within the Mid SJR Region alone. Sometimes they simply were not ripe for consideration.

- Project-level recommendations. These proposed projects have an identified champion or party to lead the project and some level of development.

The criteria included were agreed to by the project partners and our stakeholder groups. A partial list of the criteria included; implementation feasibility, financial feasibility, flood risk reduction for life and property, operations, maintenance and repair, ecosystem function and institutional support. The list of prioritized projects is attached as Attachment C.

Regional Financial Plan

The cost share estimates provided in this chapter are based on the assumption that potential funding sources will be available at the time a given project moves forward and that the project will receive an award. Many of the Federal and State funding sources discussed are competitive in nature and have limited available funding, therefore an award is not guaranteed even if all criteria is met.

The Region identified a total of 37 projects with a total estimated cost of approximately $340 million. Assuming a minimal local cost share of 10%, this equates to nearly $34 million. Even if these improvements were spread over a 20-year time-frame, it appears the current system of flood management infrastructure funding and implementation may be unsustainable unless other benefits can be provided for other uses or even other regions.

Outlook for the Future

The flood management systems and floodplains of the Mid SJR planning area will be changing dramatically in the decades to come. The following description is an educated guess about what that future will look like -- a projection based on expert judgment and available information from the Regional Flood Management Planning process.

Several land use changes are expected to lead to reduced flood risks in selected areas. The RDs of the SJRNWR and RD 2092 (Dos Rios/Hidden Valley Ranch) are both expected to have completed their transition out of the State Plan of Flood Control. The lands within their boundaries will have shifted to being managed for habitat purposes, and flood risk therefore will decline as a result. Two to three of the remaining five RDs are anticipated to have also ceased to operate as part of the State Plan of Flood Control as a result of financial or operational challenges, though their land use may continue as agricultural production or shift to habitat, recreation, or some mix of those uses. Depending on the land use, flood risks in these areas may decline as well.

Given DWR's anticipated need for habitat mitigation for their flood projects, it seems likely that some portion of these lands will be acquired for habitat purposes through purchase as easements or in fee title. The effects of SB 5 on new development are anticipated to significantly slow the rate of increase in flood risk that might otherwise occur in the cities of Modesto, Patterson, and Newman.

Investments in Emergency Response, which are expected to be relatively easy to fund, are anticipated to lead to major improvements in flood fight and public safety operations coordination, planning, and effectiveness.

Approval to Accept the Administrative Draft of the Regional Flood Management Plan for the Mid San Joaquin River Region and Authorize the Public Works Director to sign the Plan

Limited funding for flood management, particularly at the local level, is expected to continue to constrain project development and implementation. Nonetheless, a portion of the flood management studies proposed in this document is likely to have been completed, and some smaller flood management projects implemented. One or two large projects with a primary flood management purpose may also be implemented or be in process by 2040.

The scenario described above suggests the potential for a future Mid SJR planning area that has reduced flood risk, despite an expected increase in population. It will require a concerted effort by the stakeholders of the Mid SJR planning area to develop, build support for, and get funding for a multiplicity of flood management projects, as well as supporting land use management policies to restrict further development in the floodplain and changes in the operations of upstream reservoirs to reduce flood risk.

With consistent and persistent effort, this vision of the Mid SJR planning area's improved flood future may be achieved, or even surpassed.

The website for the RFMP is http://www.midSJRfloodplan.org, and contains valuable information regarding the plan. Background information regarding the RFMP effort, the schedule, work plan, meetings and workshop agendas/supporting materials, documents prepared for the effort, and links to other useful information are provided.

POLICY ISSUES:

The recommended actions are consistent with the Board's priorities of providing A Safe Community, A Healthy Community, Effective Partnerships, and A Well Planned Infrastructure System by promoting the development of a Regional Flood Management Plan that serves the citizens of Stanislaus County.

STAFFING IMPACT:

The directed funding agreement has been established with DWR; therefore, County staff time has been reimbursed through RD 2092 which managed and administered the agreement. This effort will not impact current staffing levels.

CONTACT PERSON:

Matt Machado, Public Works Director. Telephone: (209) 525-4130.

ATTACHMENTS:

A. Regional Flood Management Plan for the Mid San Joaquin River Region
B. Summary of Proposed Regional Improvements
C. Screening and Ranking Scores

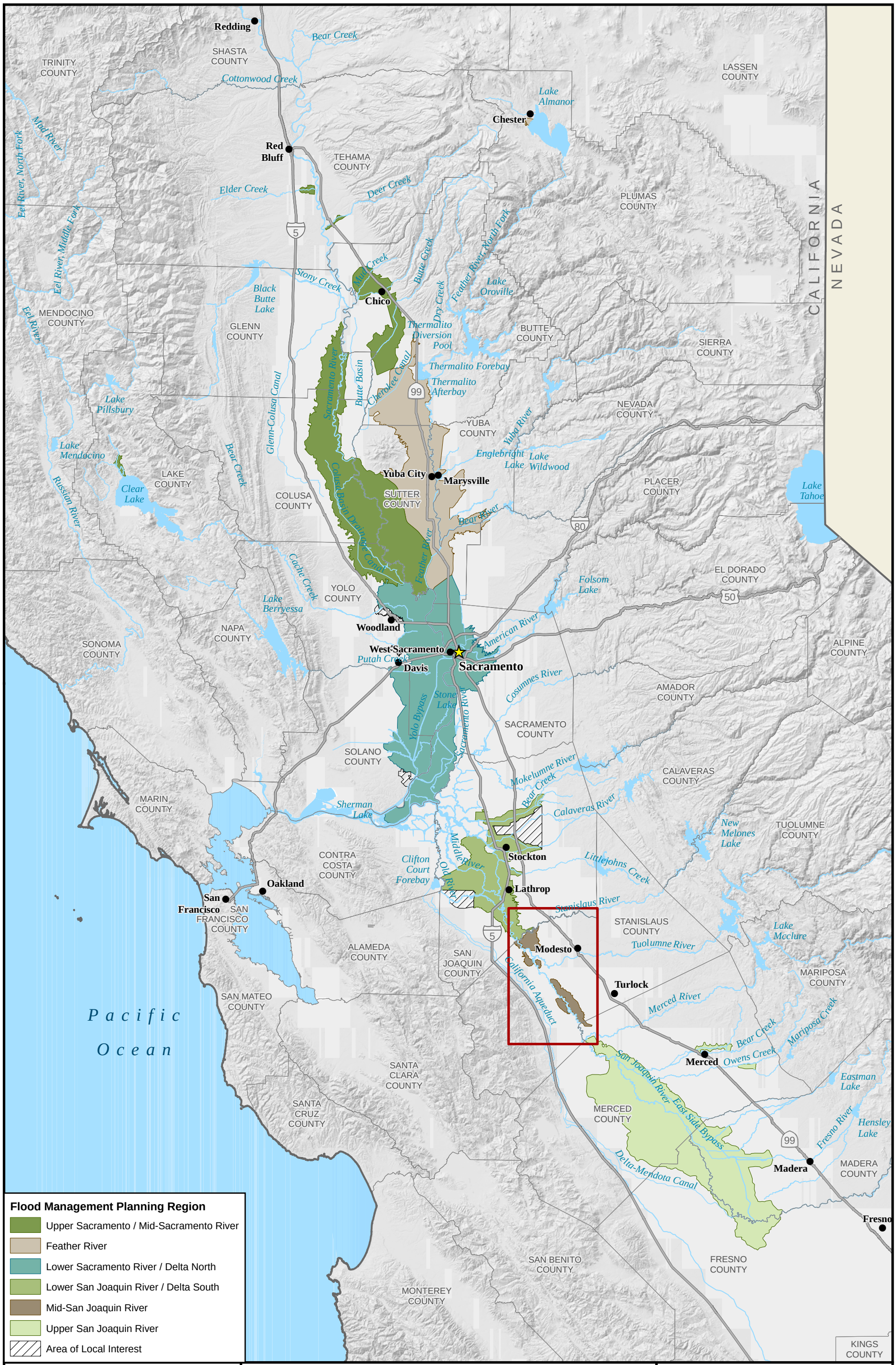
DRAFT FINAL REGIONAL FLOOD MANAGEMENT PLAN for the Mid San Joaquin River Region

October 2014

Prepared for:
Reclamation District 2092 and Stanislaus County

APPENDIX A

Mid San Joaquin River Region Regional Flood Atlas – Draft


Redding
Bear Creek
SHASTA COUNTY
TRINITY COUNTY
Cottonwood Creek
LASSEN COUNTY
Lake Almanor
Chester
Red Bluff
TEHAMA COUNTY
Mad River
Eel River, North Fork
Elder Creek
Deer Creek
PLUMAS COUNTY
CALIFORNIA
NEVADA
Eel River, Middle Fork
Stony Creek
Mud Creek
Butte Creek
Feather River, North Fork
Lake Oroville
Black Butte Lake
Chico
Eel River
MENDOCINO COUNTY
GLENN COUNTY
Dry Creek
Thermalito Diversion Pool
BUTTE COUNTY
SIERRA COUNTY
Thermalito Forebay
Thermalito Afterbay
Sacramento River
Butte Basin
Cherokee Canal
Lake Pillsbury
Glenn-Colusa Canal
NEVADA COUNTY
YUBA COUNTY
Yuba River
Lake Mendocino
Bear Creek
Englebright Lake
Lake Wildwood
Yuba City
Marysville
Clear Lake
LAKE COUNTY
Russian River
COLUSA COUNTY
SUTTER COUNTY
Colusa Basin Drainage Canal
Bear River
PLACER COUNTY
Lake Tahoe
Feather River
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Cache Creek
YOLO COUNTY
Folsom Lake
EL DORADO COUNTY
Lake Berryessa
50
Woodland
NAPA COUNTY
American River
SONOMA COUNTY
West Sacramento
Putah Creek
Davis
Sacramento
ALPINE COUNTY
Cosumnes River
Stone Lake
Yolo Bypass
Sacramento River
AMADOR COUNTY
SACRAMENTO COUNTY
SOLANO COUNTY
Mokelumne River
Bear Creek
CALAVERAS COUNTY
MARIN COUNTY
Sherman Lake
Calaveras River
New Melones Lake
TUOLUMNE COUNTY
Middle River
Stockton
Littlejohns Creek
CONTRA COSTA COUNTY
Clifton Court Forebay
Old River
Lathrop
Oakland
San Francisco
SAN FRANCISCO COUNTY
Stanislaus River
STANISLAUS COUNTY
Lake Moclure
Tuolumne River
Modesto
ALAMEDA COUNTY
SAN JOAQUIN COUNTY
California Aqueduct
MARIPOSA COUNTY
Turlock
SAN MATEO COUNTY
Merced River
Mariposa Creek
Bear Creek
Merced
Owens Creek
SANTA CLARA COUNTY
San Joaquin River
Eastman Lake
East Side Bypass
Fresno River
Hensley Lake
SANTA CRUZ COUNTY
MERCED COUNTY
99
Madera
Delta-Mendota Canal
MADERA COUNTY
Fresno
SAN BENITO COUNTY
FRESNO COUNTY
MONTEREY COUNTY
KINGS COUNTY
Pacific Ocean
Flood Management Planning Region
Upper Sacramento / Mid-Sacramento River
Feather River
Lower Sacramento River / Delta North
Lower San Joaquin River / Delta South
Mid-San Joaquin River
Upper San Joaquin River
Area of Local Interest
1 " = 20 miles
Miles
0 5 10 20
Datum: NAD 83
Zone: N/A
Projection: CA (Teale) Albers
Units: meters
Sources: See Appendix for source citations
Regional Flood Management Planning
Mid-San Joaquin River
Regional Overview
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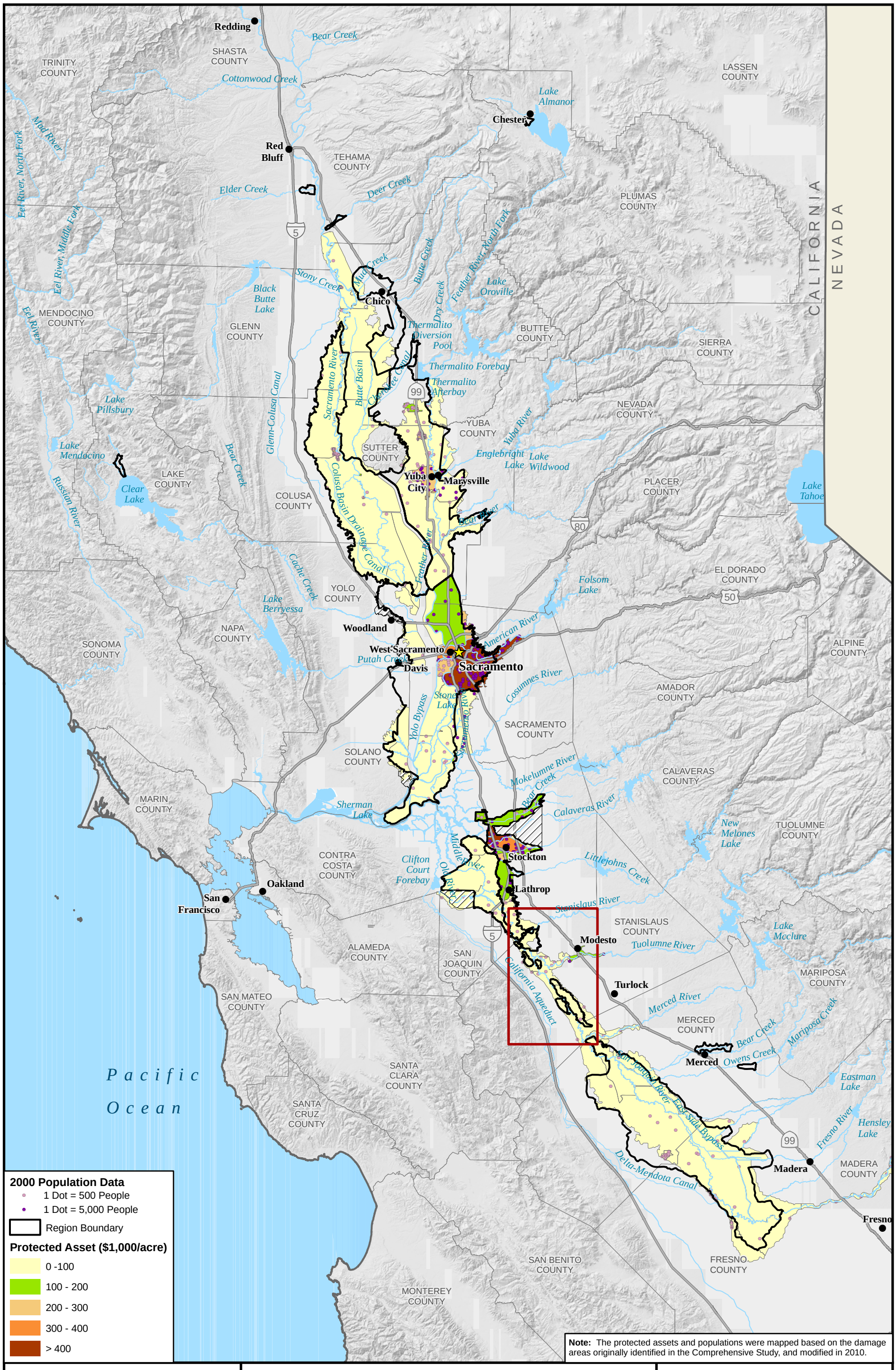
Prepared By: K. Miller
Date: May 10, 2013
File: S:\PROJ\Mid SJ RFMP\MSJ_RFMP\Atlas Info from DWR\Mid-San
MAP 1


Redding
Bear Creek
SHASTA COUNTY
TRINITY COUNTY
Cottonwood Creek
LASSEN COUNTY
Lake Almanor
Chester
Red Bluff
TEHAMA COUNTY
Mad River
Eel River, North Fork
Elder Creek
Deer Creek
PLUMAS COUNTY
CALIFORNIA
NEVADA
Eel River, Middle Fork
Stony Creek
Mud Creek
Butte Creek
Feather River, North Fork
Lake Oroville
Black Butte Lake
Chico
Dry Creek
Thermalito Diversion Pool
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GLENN COUNTY
BUTTE COUNTY
SIERRA COUNTY
Thermalito Forebay
Thermalito Afterbay
Sacramento River
Butte Basin
Cherokee Canal
Lake Pillsbury
Glenn-Colusa Canal
NEVADA COUNTY
YUBA COUNTY
Yuba River
Lake Mendocino
Bear Creek
SUTTER COUNTY
Englebright Lake
Lake Wildwood
Yuba City
Marysville
Clear Lake
LAKE COUNTY
COLUSA COUNTY
Colusa Basin Drainage Canal
Feather River
PLACER COUNTY
Lake Tahoe
Russian River
Bear River
Cache Creek
Lake Berryessa
YOLO COUNTY
Folsom Lake
EL DORADO COUNTY
Woodland
NAPA COUNTY
American River
West Sacramento
Putah Creek
Davis
Sacramento
ALPINE COUNTY
SONOMA COUNTY
Cosumnes River
Stone Lake
Yolo Bypass
Sacramento River
AMADOR COUNTY
SACRAMENTO COUNTY
SOLANO COUNTY
Mokelumne River
Bear Creek
CALAVERAS COUNTY
MARIN COUNTY
Sherman Lake
Calaveras River
New Melones Lake
TUOLUMNE COUNTY
Middle River
Stockton
Littlejohns Creek
CONTRA COSTA COUNTY
Clifton Court Forebay
Old River
Oakland
San Francisco
Lathrop
Stanislaus River
STANISLAUS COUNTY
Lake Mcclure
Modesto
Tuolumne River
ALAMEDA COUNTY
SAN JOAQUIN COUNTY
California Aqueduct
Turlock
MARIPOSA COUNTY
SAN MATEO COUNTY
Merced River
MERCED COUNTY
Bear Creek
Mariposa Creek
Merced
Owens Creek
Eastman Lake
SANTA CLARA COUNTY
San Joaquin River
East Side Bypass
Fresno River
Hensley Lake
SANTA CRUZ COUNTY
Delta-Mendota Canal
Madera
MADERA COUNTY
Fresno
SAN BENITO COUNTY
FRESNO COUNTY
MONTEREY COUNTY
Pacific Ocean
2000 Population Data
1 Dot = 500 People
1 Dot = 5,000 People
Region Boundary
Protected Asset ($1,000/acre)
0 -100
100 - 200
200 - 300
300 - 400
> 400
Note: The protected assets and populations were mapped based on the damage areas originally identified in the Comprehensive Study, and modified in 2010.
1 " = 20 miles
Miles
0 5 10 20
Datum: NAD 83
Zone: N/A
Projection: CA (Teale) Albers
Units: meters
Sources: See Appendix for source citations
Regional Flood Management Planning
Mid-San Joaquin River
Protected Populations and Assets
DRAFT
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Prepared By: K. Miller
Date: May 10, 2013
File: S:\PROJ\Mid SJ RFMP\MSJ_RFMP\Atlas Info from DWR\Mid-San
MAP 2

SAN JOAQUIN COUNTY

STANISLAUS COUNTY

MERCED COUNTY

San Joaquin River

Tuolumne River

Merced River

California Aquedut

Delta-Mendota Canal

Modesto

219

108

99

132

33

5

PS

Local Facility

SPFC Facility

Pump Station

SPFC Levee

Weir

County Boundary

Region Boundary

Other Region

Area not Protected by SPFC Facilities

Levee Flood Protection Zone

Estimated Depth Greater Than 3'

Estimated Depth Less Than 3'

Depth Unknown

1 " = 2 miles

Miles

0 0.5 1 2

Datum: NAD 83
Zone: N/A

Projection: CA (Teale) Albers
Units: meters

Sources: See Appendix for source citations

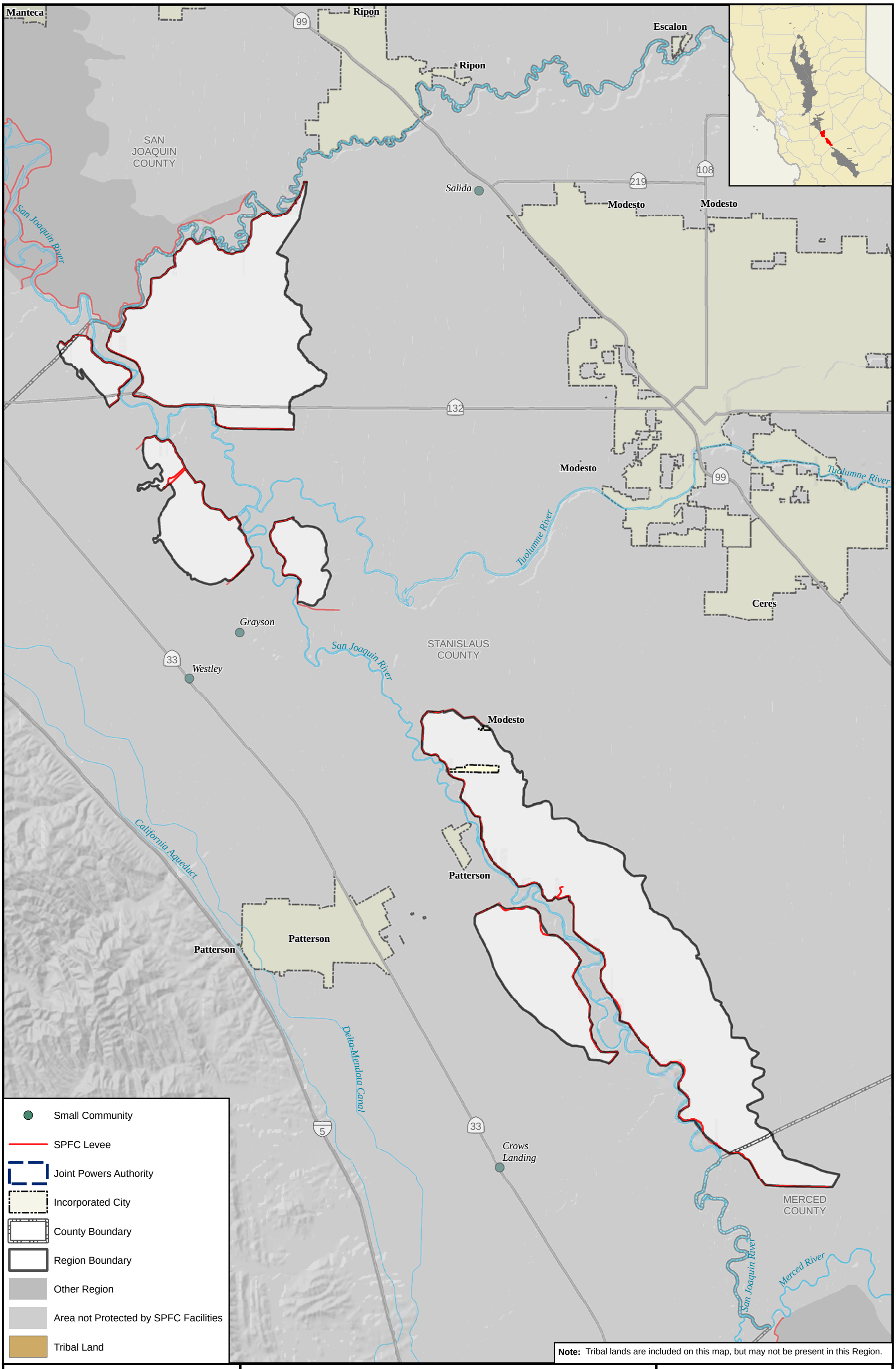
Regional Flood Management Planning

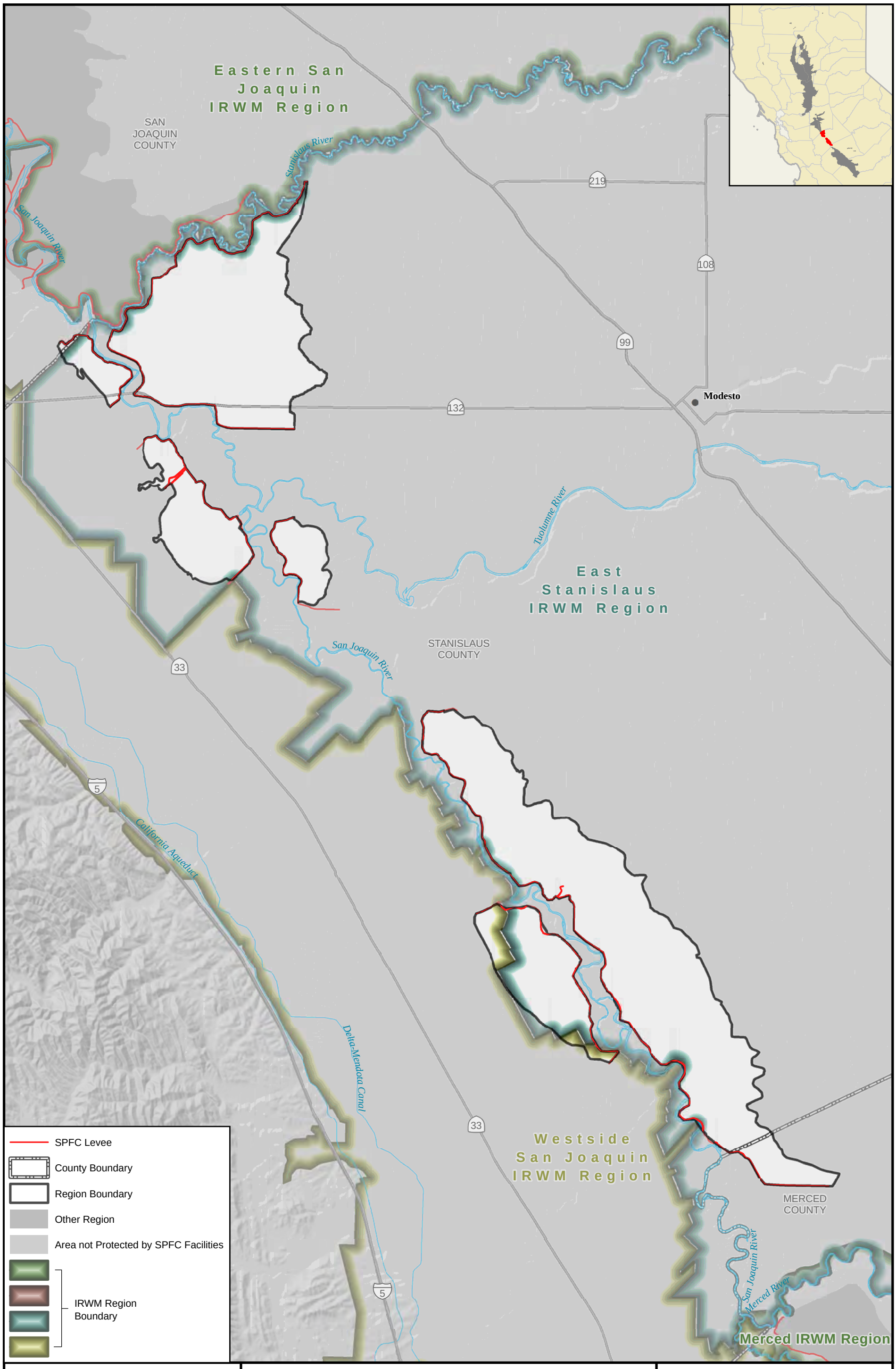
Mid-San Joaquin River
Levee Flood Protection Zones

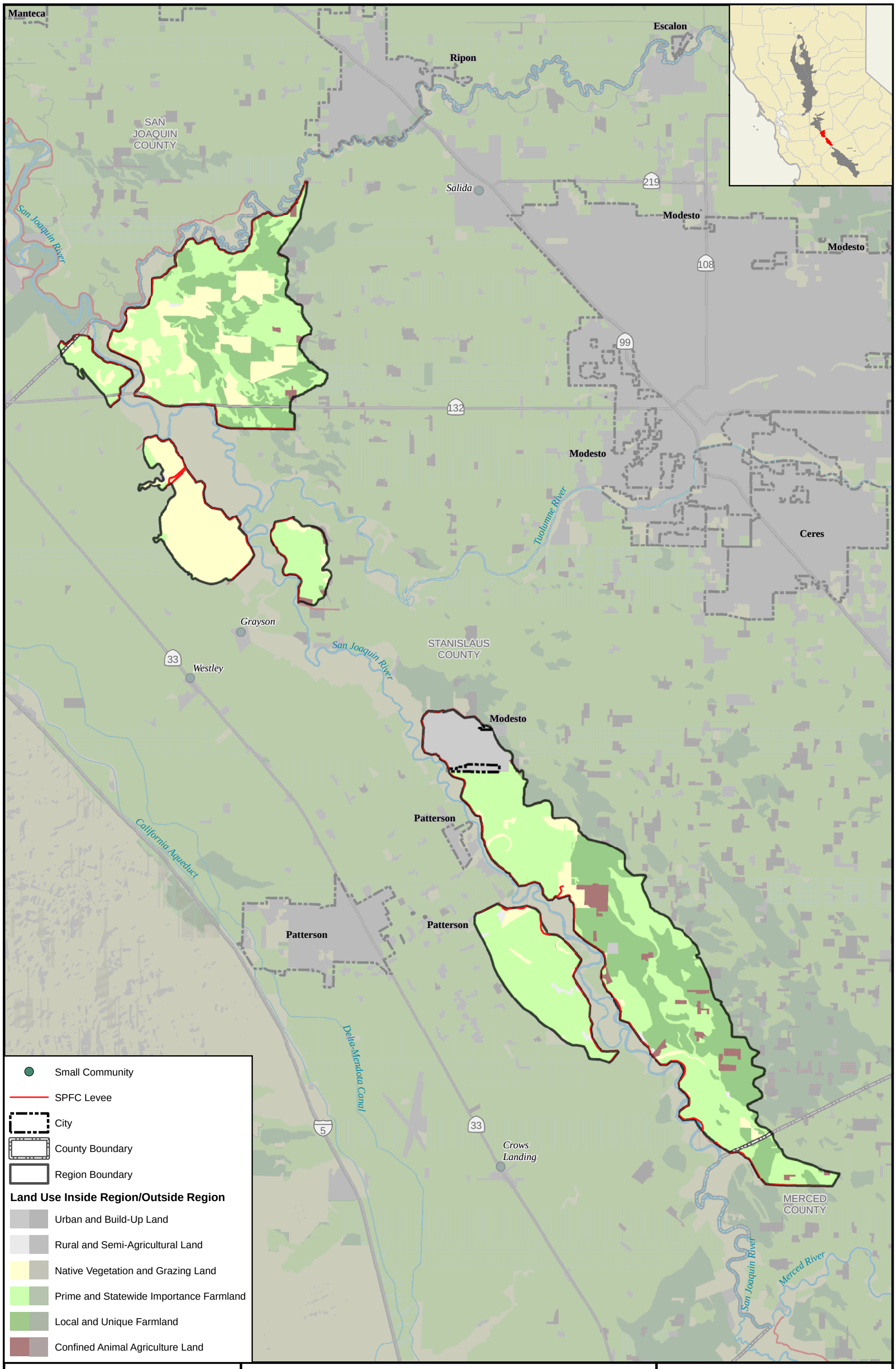
DRAFT DRAFT

Prepared By: K. Miller
Date: May 10, 2013
File: S:\PROJ\Mid SJ RFMP\MSJ_RFMP\Atlas Info from DWR\Mid-San

MAP 3


Manteca
Ripon
Ripon
Escalon
99
SAN JOAQUIN COUNTY
San Joaquin River
Salida
219
108
Modesto
Modesto
Modesto
132
Tuolumne River
99
Ceres
Grayson
STANISLAUS COUNTY
San Joaquin River
33
Westley
Modesto
California Aqueduct
Patterson
Patterson
Patterson
Delta-Mendota Canal
5
33
Crows Landing
MERCED COUNTY
San Joaquin River
Merced River
Small Community
SPFC Levee
Joint Powers Authority
Incorporated City
County Boundary
Region Boundary
Other Region
Area not Protected by SPFC Facilities
Tribal Land
Note: Tribal lands are included on this map, but may not be present in this Region.
1 " = 2 miles
Miles
0 0.5 1 2
Datum: NAD 83
Zone: N/A
Projection: CA (Teale) Albers
Units: meters
Sources: See Appendix for source citations
Regional Flood Management Planning
Mid-San Joaquin River
Local Jurisdictions
DRAFT
DRAFT
Prepared By: K. Miller
Date: May 10, 2013
File: S:\PROJ\Mid SJ RFMP\MSJ_RFMP\Atlas Info from DWR\Mid-San
MAP 4


Eastern San Joaquin IRWM Region
SAN JOAQUIN COUNTY
Stanislaus River
San Joaquin River
219
108
99
Modesto
132
Tuolumne River
East Stanislaus IRWM Region
STANISLAUS COUNTY
San Joaquin River
33
5
California Aqueduct
Delta-Mendota Canal
33
Westside San Joaquin IRWM Region
MERCED COUNTY
San Joaquin River
Merced River
Merced IRWM Region
SPFC Levee
County Boundary
Region Boundary
Other Region
Area not Protected by SPFC Facilities
IRWM Region Boundary
1 " = 2 miles
Miles
0 0.5 1 2
Datum: NAD 83
Zone: N/A
Projection: CA (Teale) Albers
Units: meters
Sources: See Appendix for source citations
Regional Flood Management Planning
Mid-San Joaquin River
DWR Integrated Regional Water Management
Planning Areas
DRAFT
DRAFT
Prepared By: K. Miller
Date: May 10, 2013
MAP 5
File: S:\PROJ\Mid SJ RFMP\MSJ_RFMP\Atlas Info from DWR\Mid-San



1 " = 2 miles

Miles

0 0.5 1 2

Datum: NAD 83
Zone: N/A

Projection: CA (Teale) Albers
Units: meters

Sources: See Appendix for source citations

Regional Flood Management Planning

Mid-San Joaquin River General Land Use

DRAFT DRAFT

Prepared By: K. Miller
Date: May 10, 2013
File: S:\PROJ\Mid SJ RFMP\MSJ_RFMP\Atlas Info from DWR\Mid-San

MAP 6

RD 17
RD 2094
RD 2075
SAN JOAQUIN COUNTY
San Joaquin River
RD 2064
RD 2085
RD 2101
RD 2031
RD 2099
RD 2100
RD 2102
RD 2092
STANISLAUS COUNTY
Tuolumne River
San Joaquin River
RD 2091
NA 65
RD 1602
RD 2063
MERCED COUNTY
San Joaquin River
Merced River
NA 10
California Aqueduct
Delta-Mendota Canal
99
219
108
99
132
33
5
33
Modesto

SPFC Levee
County Boundary
Reclamation District (RD)
Reclamation District (historical)
Levee District (LD)
Maintenance Area (MA)
Named Area (NA)
State Maintained Area (ST)
Other District
Region Boundary
Other Region
Area not Protected by SPFC Facilities

1 " = 2 miles
Miles
0 0.5 1 2

Datum: NAD 83
Zone: N/A
Projection: CA (Teale) Albers
Units: meters
Sources: See Appendix for source citations

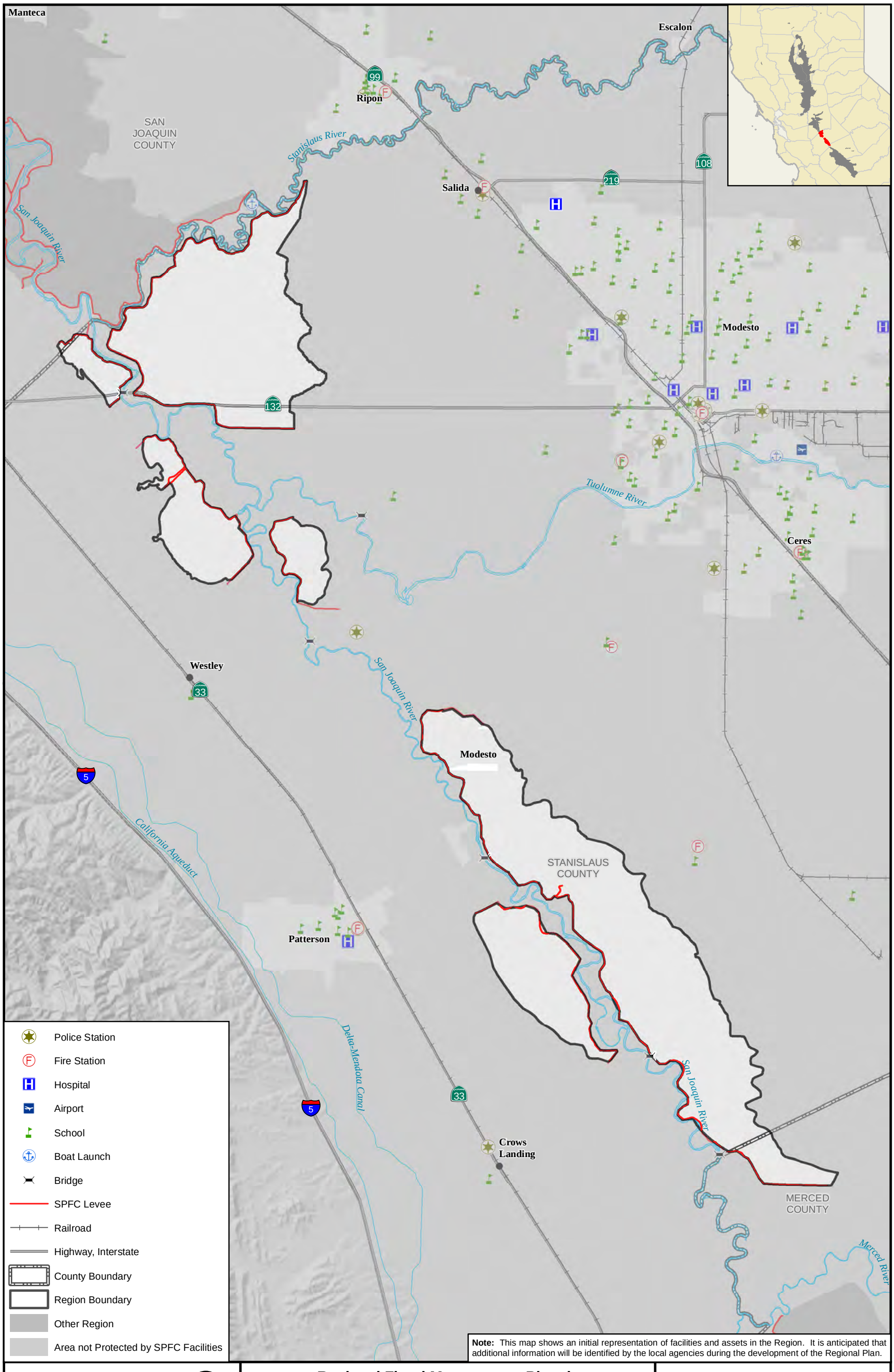
Regional Flood Management Planning

Mid-San Joaquin River Local Maintaining Agencies

DRAFT DRAFT

Prepared By: K. Miller
Date: May 10, 2013
File: S:\PROJ\Mid SJ RFMP\MSJ_RFMP\Atlas Info from DWR\Mid-San

MAP 7



1 " = 2 miles

Miles
0 0.5 1 2

Datum: NAD 83
Zone: N/A

Projection: CA (Teale) Albers
Units: meters

Sources: See Appendix for source citations

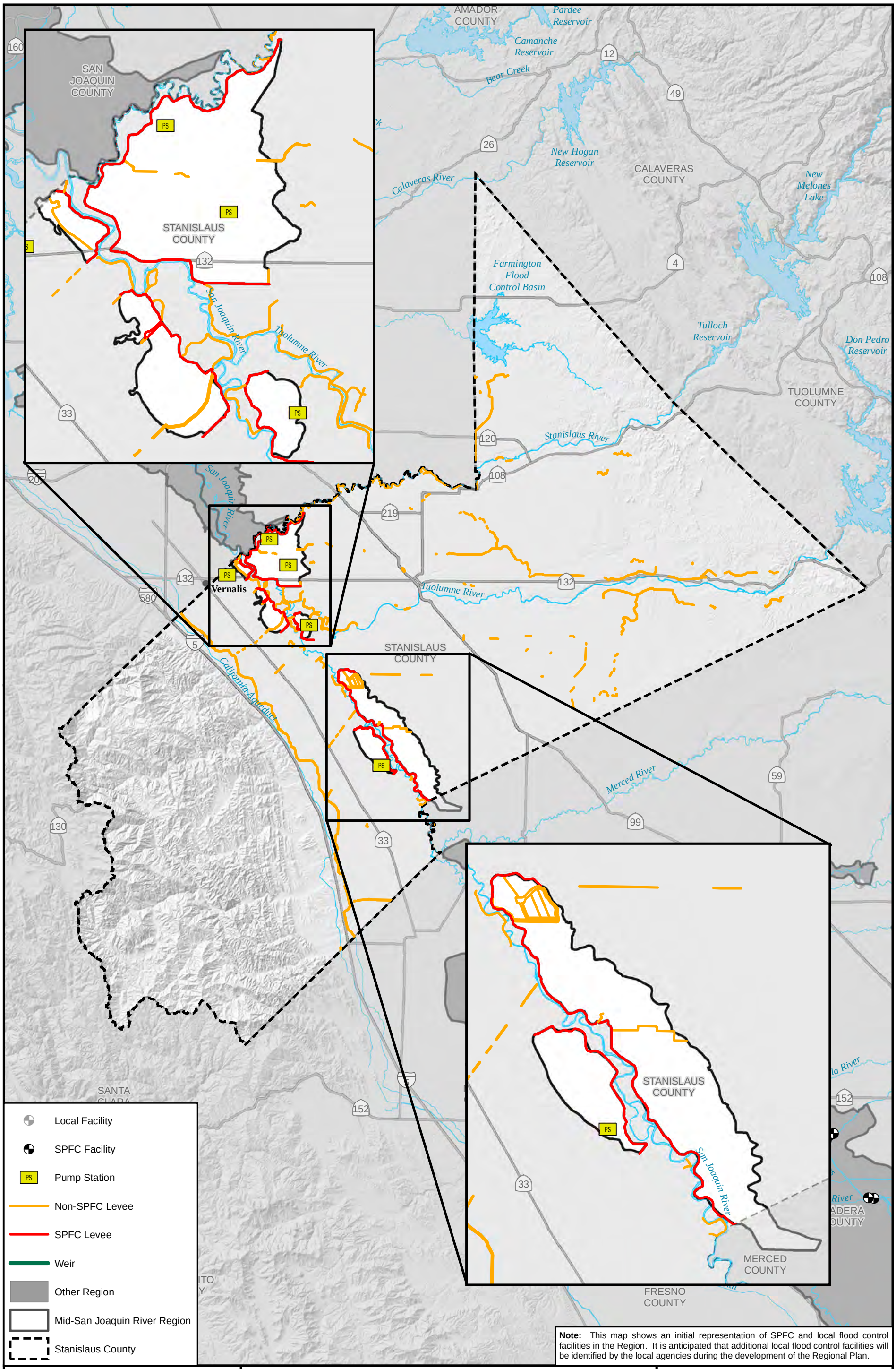
Regional Flood Management Planning

Mid-San Joaquin River
Existing Critical Facilities and Economic Assets

DRAFT DRAFT

Prepared By: K. Miller
Date: May 10, 2013

MAP 8



Note: This map shows an initial representation of SPFC and local flood control facilities in the Region. It is anticipated that additional local flood control facilities will be identified by the local agencies during the development of the Regional Plan.

1 " = 7 miles

0 1.5 3 6 Miles

Datum: NAD 83
Zone: N/A

Projection: CA (Teale) Albers
Units: meters

Sources: See Appendix for source citations

Regional Flood Management Planning

Mid San Joaquin River
SPFC and Local Flood Control Facilities

DRAFT DRAFT

Prepared By: K. Miller
Date: May 10, 2013
File: S:\PROJ\Mid SJ RFMP\MSJ_RFMP\Atlas Info from DWR\Mid-San

MAP 9

Manteca
Escalon
Ripon
SAN JOAQUIN COUNTY
Stanislaus River
San Joaquin River
99
219
108
132
Modesto
Ceres
Tuolumne River
33
5
Patterson
California Aqueduct
Delta-Mendota Canal
STANISLAUS COUNTY
MERCED COUNTY
Merced River

Headquarters
DWR Office
Police Station
Fire Station
Hospital
Jail/Prison
Civic Building
Emergency Operations Center
SPFC Levee
County Boundary
Region Boundary
Other Region
Area not Protected by SPFC Facilities

1 " = 2 miles
Miles
0 0.5 1 2

Datum: NAD 83
Zone: N/A
Projection: CA (Teale) Albers
Units: meters
Sources: See Appendix for source citations

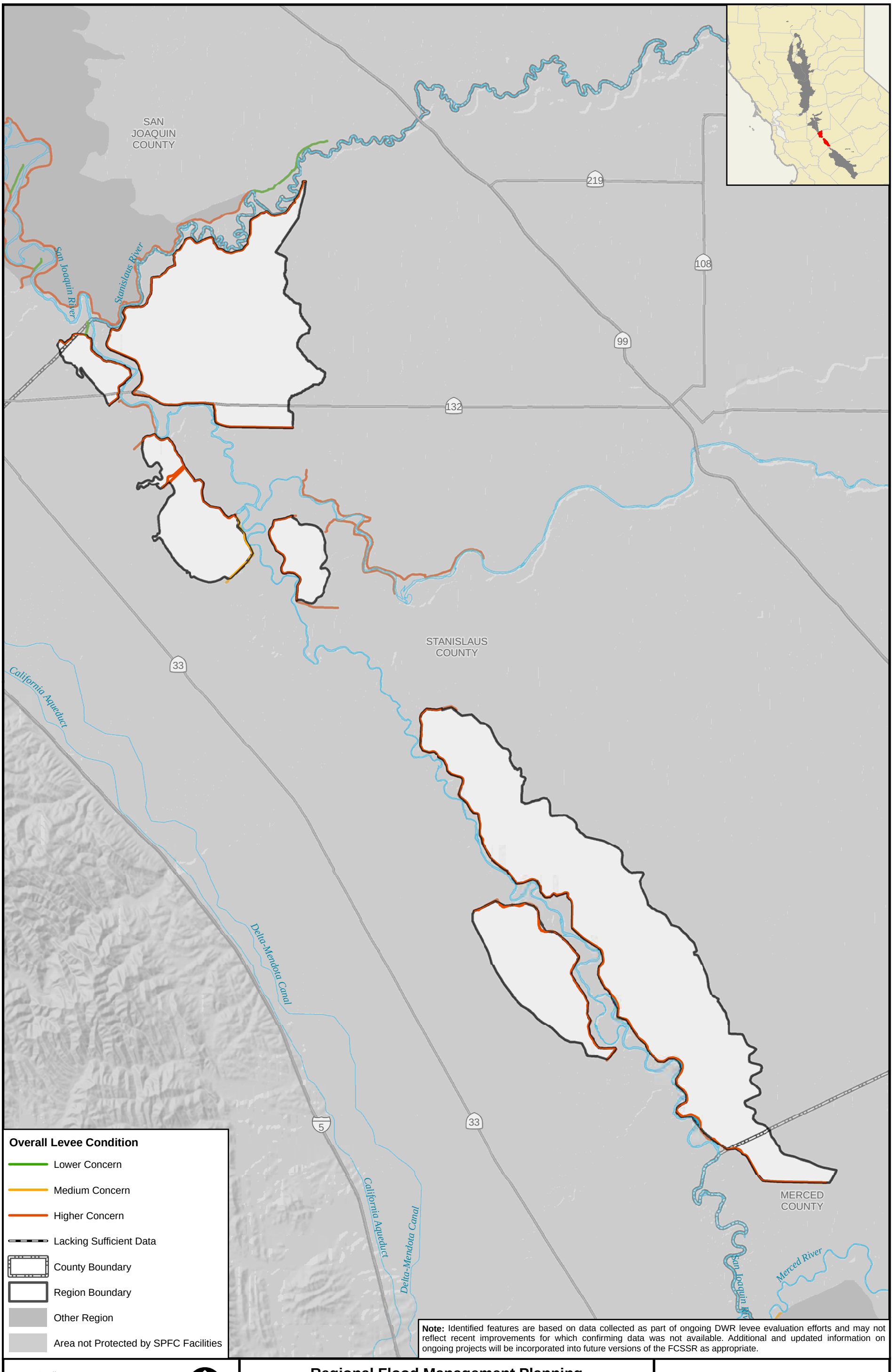
Regional Flood Management Planning

Mid-San Joaquin River
Flood Emergency Response Facilities

DRAFT DRAFT

Prepared By:
Date: July 30, 2013
File:

MAP 10



Note: Identified features are based on data collected as part of ongoing DWR levee evaluation efforts and may not reflect recent improvements for which confirming data was not available. Additional and updated information on ongoing projects will be incorporated into future versions of the FCSSR as appropriate.

1 " = 2 miles

Miles

0 0.5 1 2

Datum: NAD 83
Zone: N/A

Projection: CA (Teale) Albers
Units: meters

Sources: See Appendix for source citations

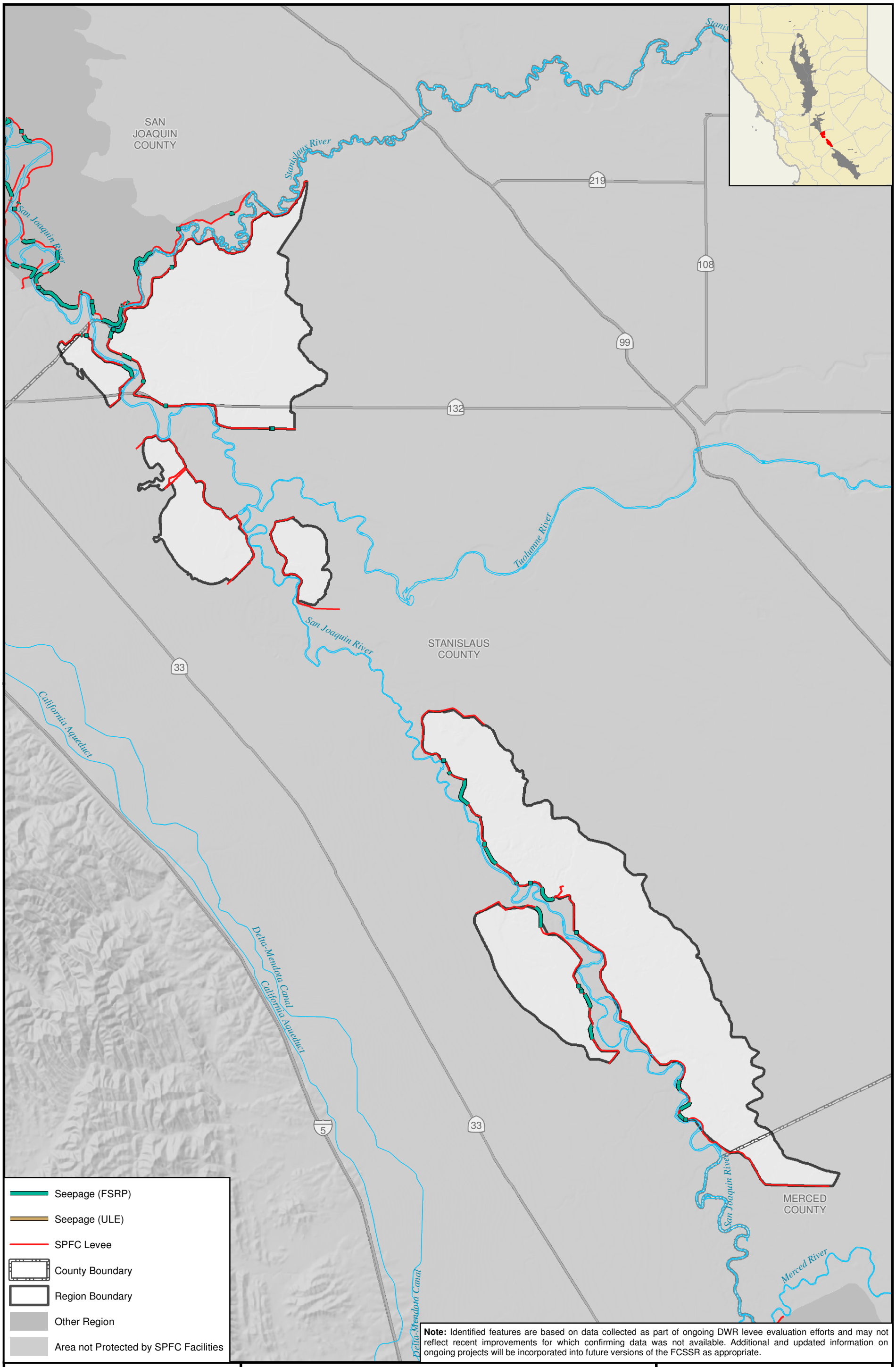
Regional Flood Management Planning

Mid-San Joaquin River Overall Levee Conditions

DRAFT DRAFT

Prepared By: K. Miller
Date: May 10, 2013
File: S:\PROJ\Mid SJ RFMP\MSJ_RFMP\Atlas Info from DWR\Mid-San

MAP 11



Note: Identified features are based on data collected as part of ongoing DWR levee evaluation efforts and may not reflect recent improvements for which confirming data was not available. Additional and updated information on ongoing projects will be incorporated into future versions of the FCSSR as appropriate.

1 " = 2 miles

0 0.5 1 2 Miles

Datum: NAD 83
Zone: N/A

Projection: CA (Teale) Albers
Units: meters

Sources: See Appendix for source citations

Regional Flood Management Planning

Mid-San Joaquin River
Seepage Past Performance Problems

DRAFT DRAFT

Prepared By:
Date: July 30, 2013
File:

MAP 12

SAN JOAQUIN COUNTY

STANISLAUS COUNTY

MERCED COUNTY

San Joaquin River

Tuolumne River

Merced River

California Aqueduct

Delta-Mendota Canal

219

108

99

132

33

5

Slope Instability (FSRP)

Slope Instability (ULE)

SPFC Levee

County Boundary

Region Boundary

Other Region

Area not Protected by SPFC Facilities

Note: Identified features are based on data collected as part of ongoing DWR levee evaluation efforts and may not reflect recent improvements for which confirming data was not available. Additional and updated information on ongoing projects will be incorporated into future versions of the FCSSR as appropriate.

1 " = 2 miles

0 1 2

Datum: NAD 83
Zone: N/A

Projection: CA (Teale) Albers
Units: meters

Sources: See Appendix for source citations

Regional Flood Management Planning

Mid-San Joaquin River
Slope Instability Past Performance Problems

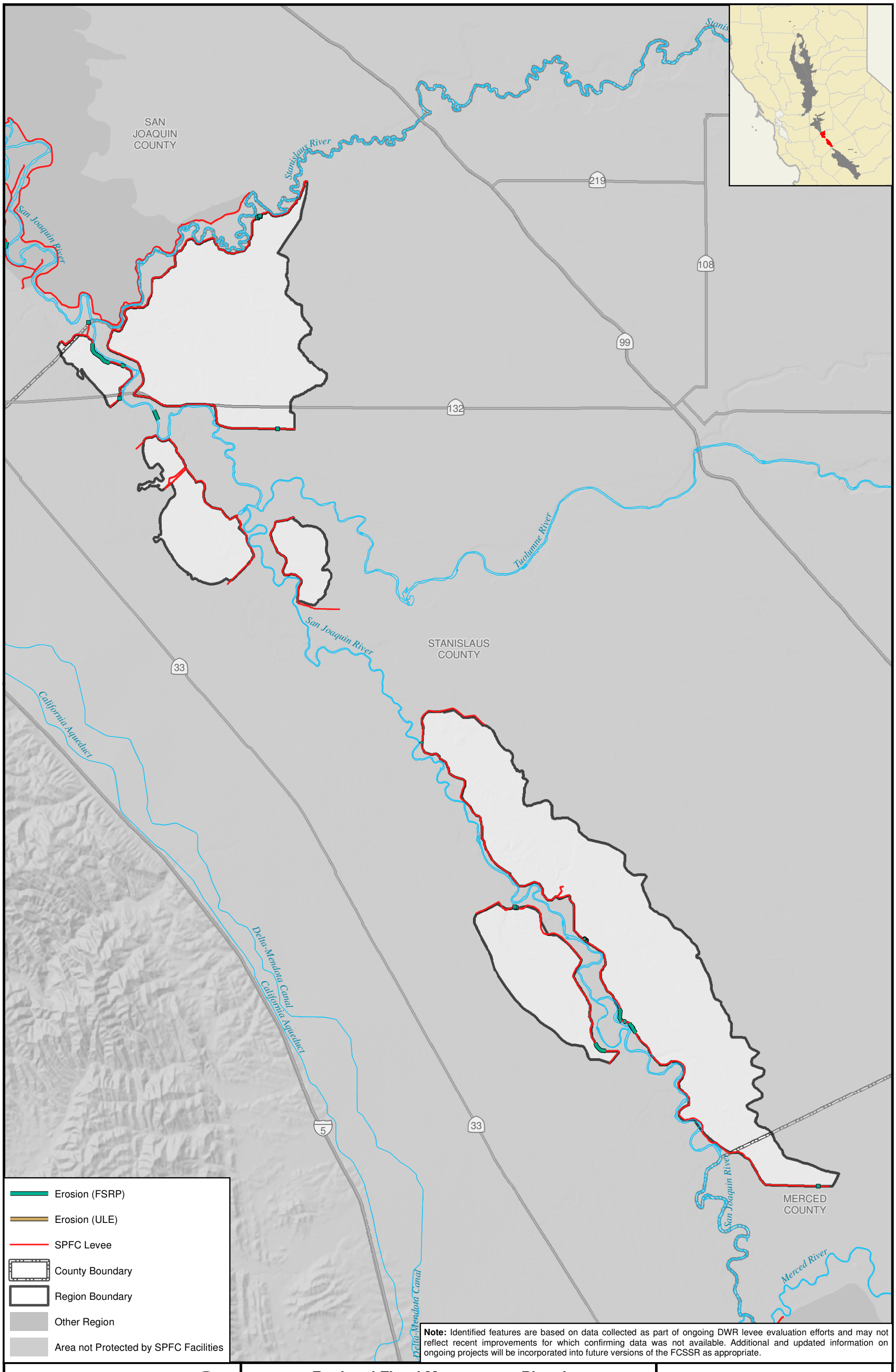
DRAFT DRAFT

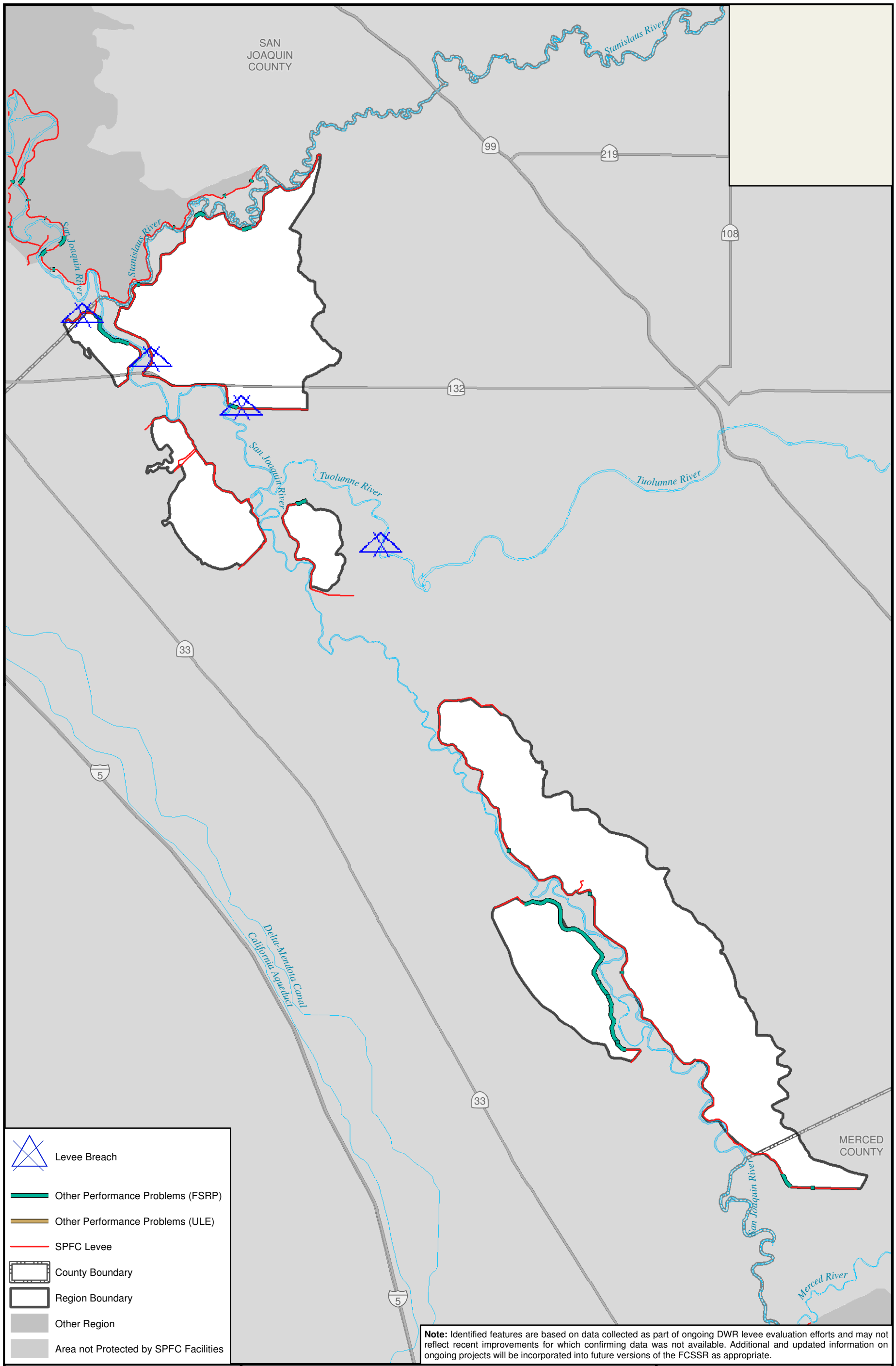
Prepared By: K. Miller

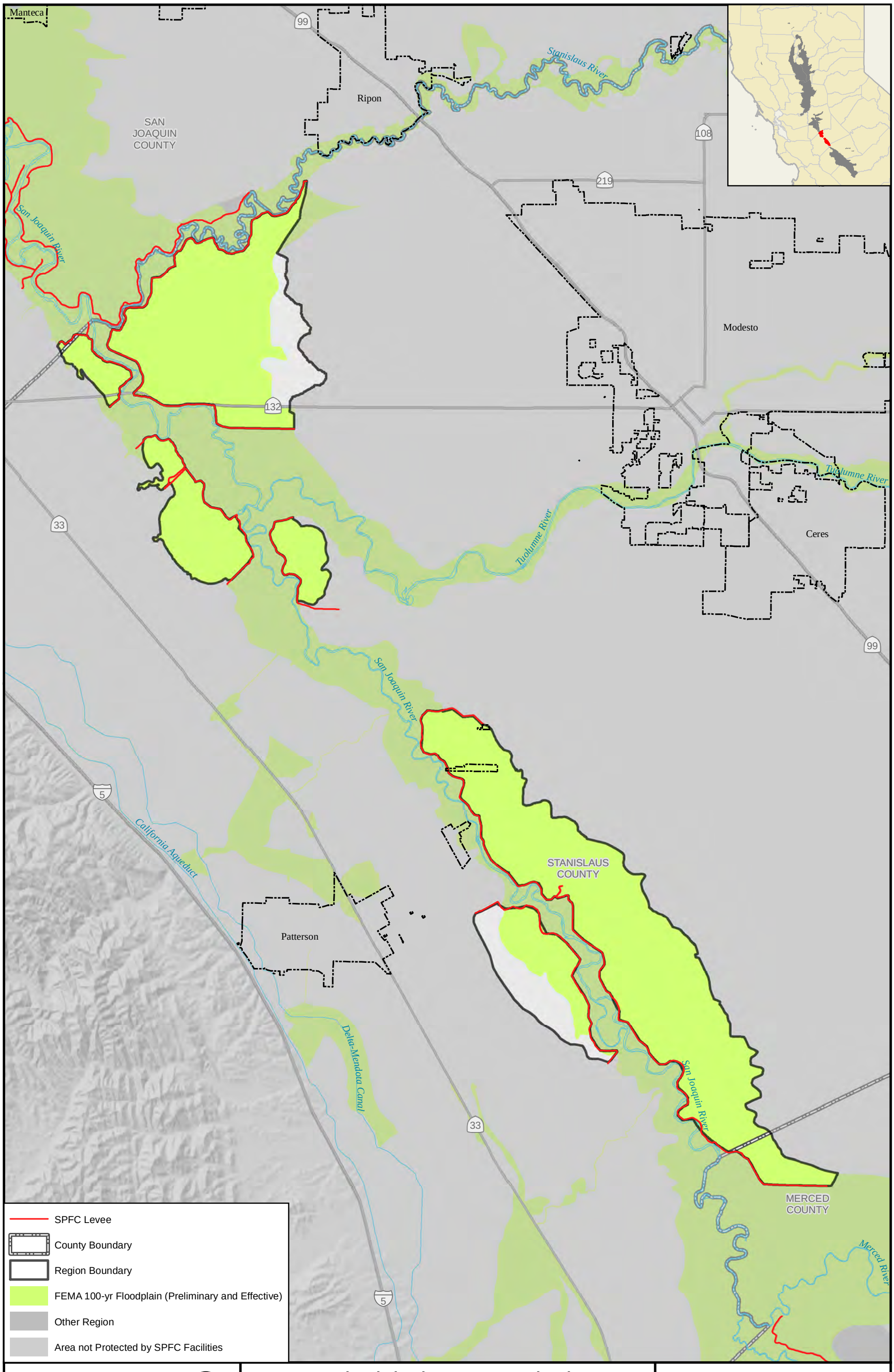
Date: May 10, 2013

File: S:\PROJ\Mid SJ RFMP\MSJ_RFMP\Atlas Info from DWR\Mid-San

MAP 13


SAN JOAQUIN COUNTY
STANISLAUS COUNTY
MERCED COUNTY
Stanislaus River
San Joaquin River
Tuolumne River
Merced River
California Aqueduct
Delta-Mendota Canal
219
108
99
132
33
5
Erosion (FSRP)
Erosion (ULE)
SPFC Levee
County Boundary
Region Boundary
Other Region
Area not Protected by SPFC Facilities
1 " = 2 miles
0 1 2
Datum: NAD 83
Zone: N/A
Projection: CA (Teale) Albers
Units: meters
Sources: See Appendix for source citations
Note: Identified features are based on data collected as part of ongoing DWR levee evaluation efforts and may not reflect recent improvements for which confirming data was not available. Additional and updated information on ongoing projects will be incorporated into future versions of the FCSSR as appropriate.
Regional Flood Management Planning
Mid-San Joaquin River
Erosion Past Performance Problems
DRAFT
DRAFT
Prepared By:
Date: July 30, 2013
File:
MAP 14


SAN JOAQUIN COUNTY
Stanislaus River
San Joaquin River
Stanislaus River
Tuolumne River
Tuolumne River
San Joaquin River
Delta-Mendota Canal
California Aqueduct
San Joaquin River
MERCED COUNTY
Merced River
99
219
108
132
33
5
33
5
Levee Breach
Other Performance Problems (FSRP)
Other Performance Problems (ULE)
SPFC Levee
County Boundary
Region Boundary
Other Region
Area not Protected by SPFC Facilities
Note: Identified features are based on data collected as part of ongoing DWR levee evaluation efforts and may not reflect recent improvements for which confirming data was not available. Additional and updated information on ongoing projects will be incorporated into future versions of the FCSSR as appropriate.
1 " = 2 miles
Miles
0 0.5 1 2
Datum: NAD 83
Zone: N/A
Projection: CA (Teale) Albers
Units: meters
Sources: See Appendix for source citations
Regional Flood Management Planning
Mid-San Joaquin River
Other Past Performance Problems
DRAFT
DRAFT
Prepared By:
Date: July 30, 2013
File:
MAP 15



1 " = 2 miles

0 1 2

Datum: NAD 83
Zone: N/A

Projection: CA (Teale) Albers
Units: meters

Sources: See Appendix for source citations

Regional Flood Management Planning

Mid-San Joaquin River
FEMA 100-Year Floodplain

DRAFT DRAFT

Prepared By: K. Miller
Date: May 10, 2013
File: S:\PROJ\Mid SJ RFMP\MSJ_RFMP\Atlas Info from DWR\Mid-San Joaq

MAP 16

SAN JOAQUIN COUNTY

STANISLAUS COUNTY

MERCED COUNTY

Stanislaus River

San Joaquin River

Tuolumne River

Dry Creek

California Aqueduct

Delta-Mendota Canal

VNSC1

52000 cfs

12000 cfs

46000 cfs

15000 cfs

45000 cfs

MDSC1

PATC1

STVC1

NWMC1

Merced River

65 70 75 80 85 90 95 100 105 110 115

0 5 10 15 20 25 30

219 108 99 132 33 5

River Mile

CNRFC Forecast Gage

30,000 cfs Flood Channel Design Capacity

SPFC Levee

Weir

County Boundary

Region Boundary

Other Region

Area not Protected by SPFC Facilities

Note: The capacities depicted on this map are from the 1957 Design Profile and Operations & Maintenance Manuals and do not represent existing system capacities. The capacities shown represent only those pertaining to leveed channel systems.

1 " = 2 miles

0 1 2

Datum: NAD 83
Zone: N/A

Projection: CA (Teale) Albers
Units: meters

Sources: See Appendix for source citations

Regional Flood Management Planning

Mid-San Joaquin River Channel Capacities and Flood Forecast Monitoring Network

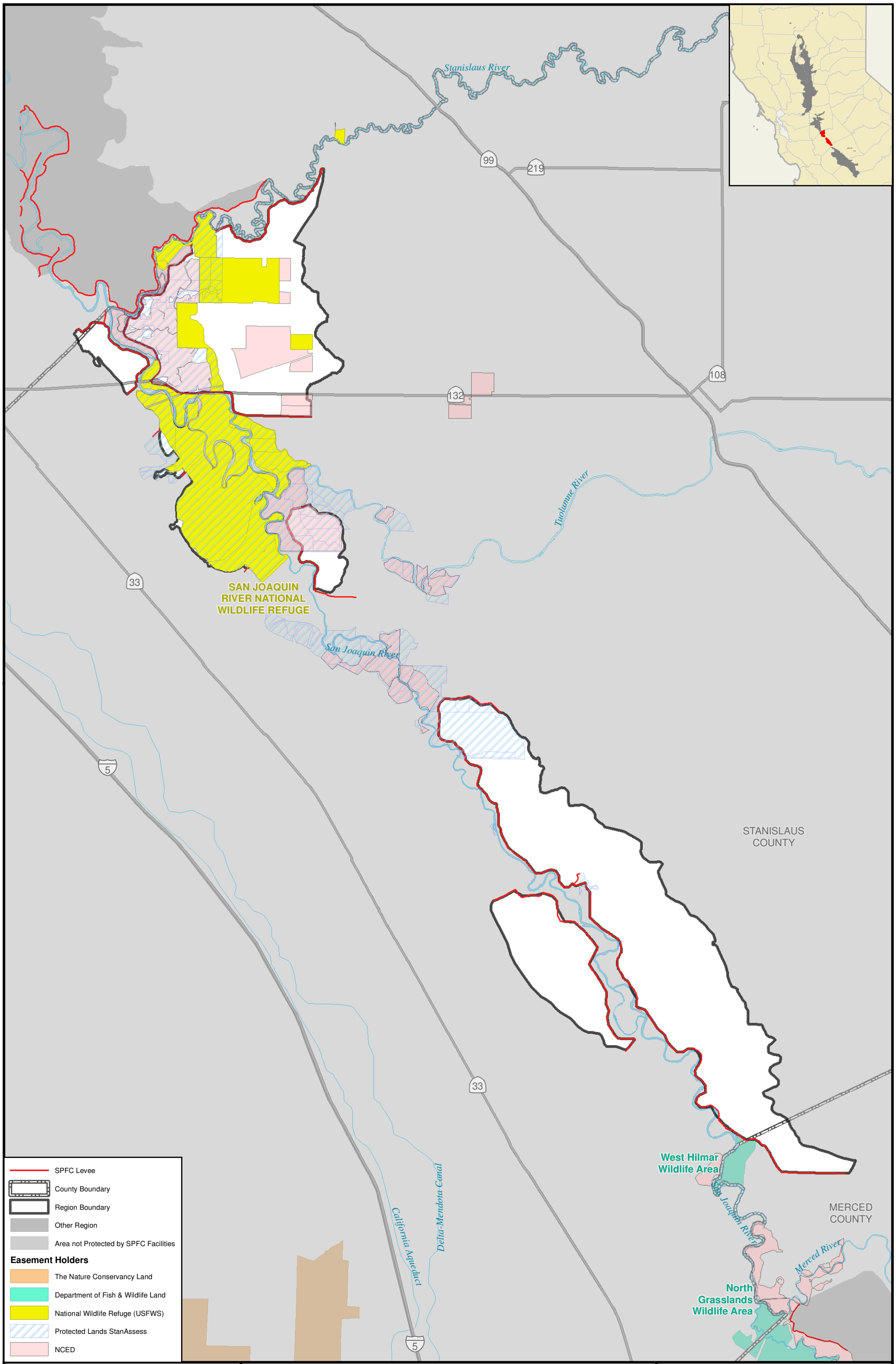
DRAFT DRAFT

Prepared By: K. Miller

Date: May 10, 2013

File: S:\PROJ\Mid SJ RFMP\MSJ_RFMP\Atlas Info from DWR\Mid-San

MAP 17



1 " = 2 miles

0 1 2

Datum: NAD 83
Zone: N/A

Projection: CA (Teale) Albers
Units: meters

Sources: See Appendix for source citations

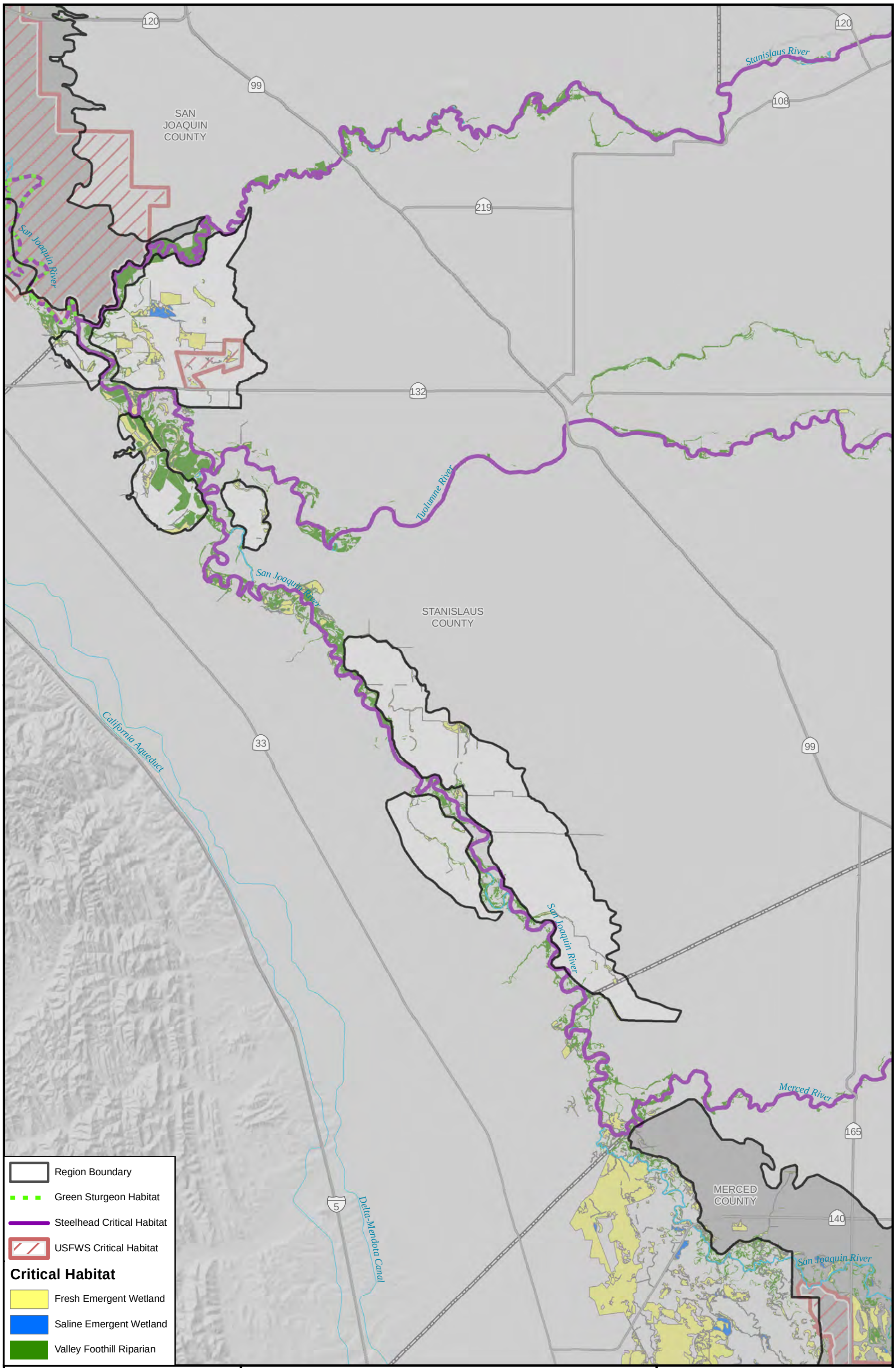
Regional Flood Management Planning

Mid-San Joaquin River
Managed Environmental Lands

DRAFT DRAFT

Prepared
Date: July 30, 2013
File:

MAP 18



1 " = 2 miles

Miles

0 0.5 1 2

Datum: NAD 83
Zone: N/A

Projection: CA (Teale) Albers
Units: meters

Sources: See Appendix for source citations

Regional Flood Management Planning

DRAFT

Mid San Joaquin River Riparian Vegetation, Critical Habitat, and Endangered and Threatened Species

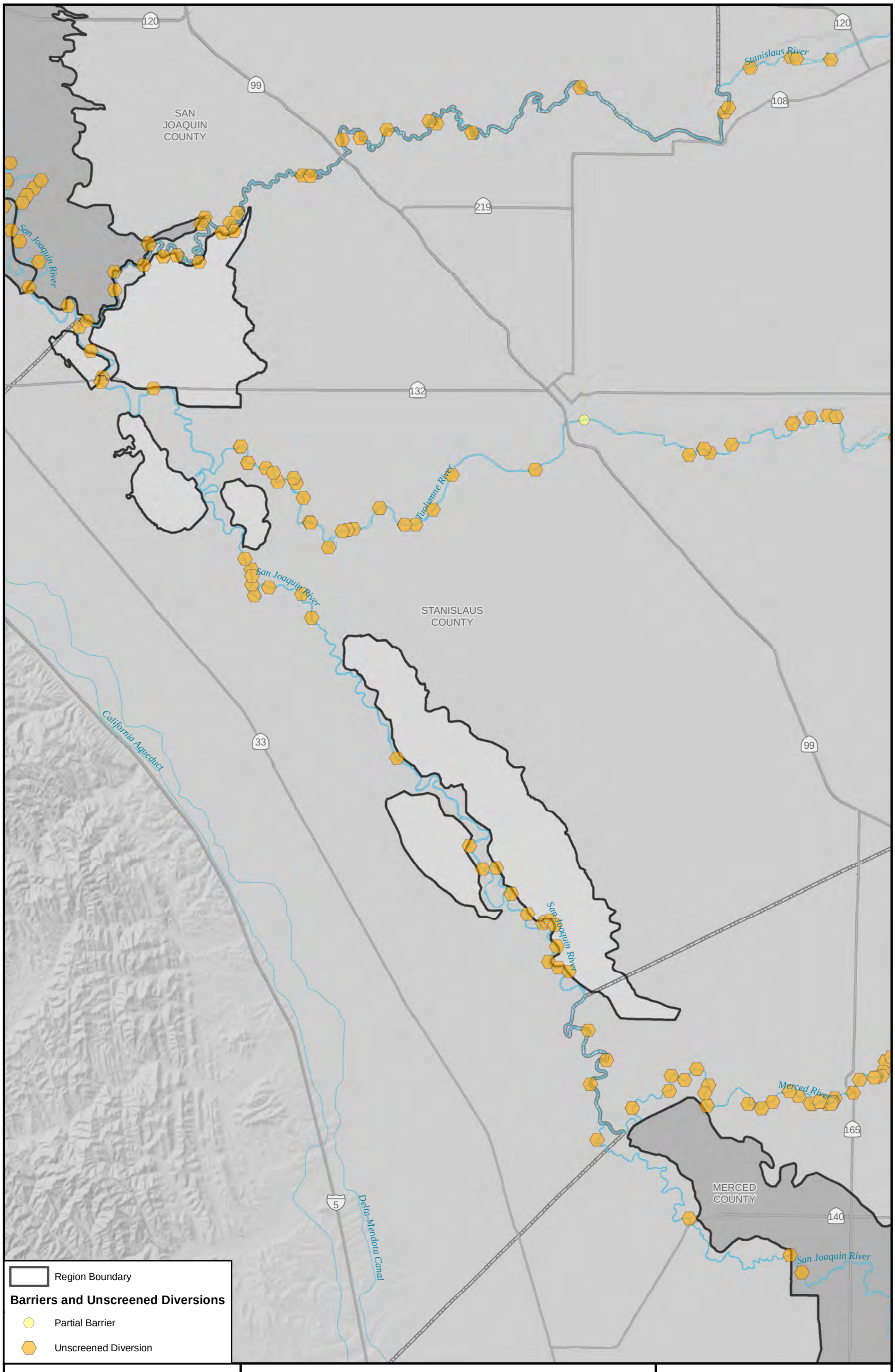
DRAFT

Prepared By: C. Hilliard

Date: February 5th, 2014

MAP 19A

File: S:\PROJ\Mid SJ RFMP\MSJ_RFMP\Atlas Info from DWR\Mid-San Joaquin\MS



1 " = 2 miles

Miles

0 0.5 1 2

Datum: NAD 83
Zone: N/A

Projection: CA (Teale) Albers
Units: meters

Sources: See Appendix for source citations

Regional Flood Management Planning

DRAFT

Mid San Joaquin River
Barriers and Unscreened Diversions

DRAFT

Prepared By: C Hilliard

Date: February 5th, 2014

MAP 19B

File: S:\PROJ\Mid SJ RFMP\MSJ_RFMP\Atlas Info from DWR\Mid-San Joaquin\MS

APPENDIX B
Charter

Mid San Joaquin River Regional Flood Management Plan

CHARTER **May 28, 2013**

Table of Contents

A. Introduction

The Central Valley Flood Protection Plan (CVFPP) calls for DWR to work with local flood management agencies to prepare detailed Regional Flood Management Plans (RFMPs) that, at a minimum, identify and articulate the following:

- Describe flood management challenges and deficiencies at the regional level including operations and maintenance practices, levee and channel inspection, and emergency response plans.
- Propose potential solutions/projects identified by local public agencies and interest groups for the region, projects' costs, and prioritization of the solutions/projects (e.g., enhanced operations and maintenance, emergency response, and floodplain management).
- Propose financial strategies that identify benefits of the projects and sources of the funding for implementation of the projects.

The purpose of the regional planning effort is to build upon the CVFPP by obtaining more region-specific information and local input for long term implementation of a sustainable and integrated flood risk reduction program in the Mid-San Joaquin River Region. The RFMP effort will partner with resource agencies, local governments, levee maintenance agencies, flood emergency responders, stakeholders and property owners with the DWR and Central Valley Flood Protection Board (CVFPB) to identify and prioritize the Region's needs and projects related to integrated regional flood management. The result will be an identification of prioritized actions to reduce flood risk in urban and urbanizing areas, small communities, rural-agricultural areas and sensitive resource areas through a combination of

improvements to the flood protection system for implementation over the long term (next 25 years or so).

This Program Charter will describe the scope and deliverables of the Mid-San Joaquin River RFMP; identify the RFMP stakeholders, management team, and consultant support team and their roles; present the anticipated development schedule and process; and describe the RFMP protocols and ground rules.

B. Charge and Deliverables

DWR encourages the formation of regional working groups to prepare the RFMPs. The Mid SJR RFMP will be developed with input from a Regional Working Group comprised of Regional Stakeholders that include representatives of resource agencies, local governments, levee maintenance agencies, flood emergency responders, stakeholders, and property owners that are knowledgeable about the flood risks and potential solutions within their flood region. The charge of the Regional Working Group is to provide input on the RFMP so that it reflects local conditions and the flood management vision of the region.

Ten workshops will be held for the Regional Working Group to discuss and develop the RFMP. Each workshop will discuss at least two sections of the RFMP, starting one and concluding another, where the RFMP sections will be presented once in draft form and another in final form. The final product of the input and discussions that occur during the ten workshops will be the Mid SJR RFMP.

A desirable outcome of the Mid SJR RFMP process is the development of a formal or ad hoc group to continue into the future, collaborating to implement the vision of the RFMP, the projects identified in the RFMP, and guide and support overall flood management of the Mid San Joaquin River region. While not a specific charge of the RFMP, it is an outcome that we expect the RFMP process to inspire and support.

C. Membership/Participants

Preparation of the RFMP will be managed by the Regional Partners, consisting of RD 2092 and Stanislaus County, assisted by DWR staff and the ESA PWA consultant team. The Regional Working Group will consist of all active participants in the development of the Mid SJR RFMP. The Regional Working Group will provide input to develop the RFMP. Sixteen stakeholder groups and organizations have submitted official commitment letters for the development of the RFMP, and these groups have direct and prior involvement in flood planning, including development of the CVFPP and/or through their professional roles in organizations. Regional Stakeholders and all parties interested in the development of the RFMP are invited to join the Regional Working Group. Anticipated Regional Working Group members include:

- Resource agencies such as the US Fish and Wildlife Service, East Stanislaus Regional Water Management Partnership, as well as the Oakdale, West Stanislaus, Del Puerto, Patterson, El Solyo, and Modesto Irrigation Districts;

- Local governments, including Stanislaus County and the Cities of Modesto, Patterson, Newman, and Turlock;
- Levee maintenance agencies, including RD 2092 and RD 2063;
- Flood emergency agencies, including DWR and Stanislaus County Public Works;
- Interested stakeholders such as Tuolomne River Trust and Sierra Club; and
- Interested property owners, such as Mapes Ranch.

D. Roles and Responsibilities

DWR: Provides relevant and updated information and data such as the GIS layers and electronic files for the Regional Atlas.

Regional Partners (RD 2092 and Stanislaus County, assisted by ESA PWA consultant team): Works with DWR and Regional Stakeholders to provide relevant information to the Technical Team for the RFMP; provides coordination services throughout the project period to ensure broad stakeholder involvement within the region and the neighboring regions; ensures that all relevant perspectives are articulated in the RFMP; provides document review and guidance to the Technical Team; and responsible for executing the Charter.

Technical Team (ESA PWA consultant team): provides technical support to RD 2092 and Stanislaus County in planning, public outreach, and technical services in preparation of the Mid SJR RFMP; and produces the draft and final sections of the Mid SJR RFMP.

Outreach Team (led by Kearns & West staff and East Stanislaus County Resource Conservation District staff, assisted by ESA PWA staff and Julie Rentner of RD 2092): Engages a broad range of stakeholders that are interested and/or affected by the development of the Mid SJR RFMP and its implementation.

Regional Working Group (listed above under C. Membership/Participants): contributes expertise, data and information to develop the Mid SJR RFMP; reviews and provides comments on the Mid SJR RFMP; and represents various interests in the region and serves as the liaison to communicate information to and from their organizations and constituencies.

Facilitation Support (Kearns & West): Provides neutral leadership to the dialogue process and meeting management, which means they will not try to promote a particular outcome for the process; advocates for the process and works to keep the Technical Team and Outreach Team within scope and follow the terms of the Charter; and actively suggests methods to accomplish tasks and oversees preparation of meeting summaries.

E. Decision-Making within Regional Working Group

This is an advisory rather than a final decision making group. The Regional Working Group and Regional Partners will use a consensus-seeking approach and work diligently to find common ground on issues.

F. Schedule and Work Plan

The Regional Partners, Technical Team, Outreach Team, and the Regional Working Group will implement the proposed Work Plan and adhere to the 18-month schedule to the best of their ability. However, the project effort may require adjustment as the project process unfolds.

The Regional Working Group will convene at least ten times starting in July 2013 and is expected to continue through July 2014. Attendance at workshops and/or timely provision of comments and information is critical to ensuring the group completes its work on the RFMP according to schedule.

G. Protocols and Meeting Ground Rules

Protocols

- All Working Group members agree to act in good faith in all aspects of this process and to communicate their interests.
- Working Group members agree not to make commitments they do not intend to keep.
- Parties will act consistently in other forums where similar topics are being discussed, including sessions with the press.
- Working Group members agree to make a concerted effort to provide requested information or to explain the reason why not.
- Meeting notes will be prepared with a focus on key points, ideas, and action items rather than as transcripts. Unless very specific to understanding the content, references will generally be made to the content rather than the members.

Meeting Ground Rules

- Use common conversational courtesy. Don't interrupt each other, use appropriate language, and avoid side conversations.
- Humor is welcome but should never be at someone else's expense.
- Stay focused on the charge and deliverables. There are many related issues and topics that could be discussed. Such topics will be noted, but will not be the focus of discussions.
- Focus on the substantive issues, not on formatting, structure, or wordsmithing. The most helpful input will be advice on how to best address the key issues, not how to organize the document.
- All ideas and points have value. The purpose of the Regional Working Group is to share ideas and capture various perspectives. All ideas have value in this setting. If you believe another approach is better, offer it as a constructive alternative. Please avoid ascribing motives to others.
- Members have a right to change their minds as information is discussed and conditions change.
- Turn cell phones or other electronics off or to silent mode. If you do not believe you will be able to participate fully, please discuss your situation with one of the facilitators.
- Honor time. We have ambitious meeting agendas, so please follow the time guidelines provided by the facilitator.

APPENDIX C
Engagement Record

Appendix C

Engagement Record

The following stakeholders participated in the development of the RFMP.

Agency/Organization	Contact
Stanislaus County	Matt Machado
Reclamation District 2092 (Dos Rios)	Julie Rentner
RD 2031 (Elliot)	William Lyons, Jr
RD 1602 (Del Puerto) -- TWIN OAKS	Dan Roberts
U.S. Fish and Wildlife Service	Kim Forrest
RD 2063 (Crows Landing)	Joe Sallaberry
Modesto Irrigation District	John Davids
Turlock Irrigation District (TID)	Tou B. Her
City of Modesto	Jim Alves
RD 2101 (Blewett)	James Coddington
Stanislaus County	David Leamon
DWR	Paul Romero
DWR	S. Greg Farley
Central Valley Flood Protection Board	James Herota
RD 2063 (Crows Landing)	Albert Mendes
RD 2063 (Crows Landing)	Sue Baldwin
City of Patterson	Mike Willett
City of Patterson	Maria Encinas
City of Newman	Garner Reynolds
Oakdale Irrigation District	Emily Sheldon
Patterson Irrigation District	Peter Rietkerk
Stanislaus County Farm Bureau	Tom Orvis
Tuolumne River Trust	Patrick Koepele
City of Turlock	Dan Madden
City of Modesto/RD 2091	Laura Anhalt
RD 2091 (Chase)	Dan Lamb
CDFW - Region 4	Abimael (Abi) Leon
CDFW	John Shelton
Rural County Representatives of California	Mary Pitto
River Partners	John Carlon
East and West Stanislaus RCD	Chester Anderson
DWR -- FESSRO	Ron Melcer
DWR -- FESSRO	Monique Wilbur
Central San Joaquin Flood Control	Vince Dykzeul
City of Turlock	Larry Gilley
Sacramento Fish and Wildlife Office	Doug Weinrich

Agency/Organization	Contact
AUDUBON CALIFORNIA	Matthew Danielczyk
US Fish and Wildlife	Monica Gutierrez
CVFPB	Joe Countryman
Candidate for Congress California District 10, Stanislaus	Mike Barkley
Stanislaus County OES	Jeff Adney
RD2091 Unit #2 (Gomes Lake)	Robert Caetano
Newman Waste Water Plant	Lance Perry
River Partners	Jeff Holt
Turlock Irrigation District (TID)	Brad Koehn
Stanislaus OES	Debra Thrasher
Patterson Waste Water Plant	Victorio Tostado
RD 2013 and RD2092	Martin Reyes
RD 2092	Stephen Sheppard
Stanislaus Agricultural Commissioner	Milton O'Haire
City of Ceres	Toby Wells
City of Ceres	Michael Brinton
CVFPB	Mike Villines
RD 2092	Bob Ott
Congressman Denham's office	Daron McDaniel
Resource Conservation Solutions.	Bill Loudermilk
ESA	Betty Andrews
Congressman Denham's office	Masis Hagobian
	Bob Endeley
DWR - CVFPO	Brian Smith
DWR - CVFPO	Todd Bernardy
Stanislaus County Agriculture Department	Tim Pelican
DER	Janis Mein
Senator Tom Berryhill's officw	Doug Miller
City of Modesto	Isabelle Chhit
City of Modesto	Ingrid Verastegui
Caltrans	Chuck Carlson
Mapes Ranch	James Bogetti
City of Turlock	David Funk
URS	John Clerici
URS	Cameron Ripley
Latino Emergency Council	Dale Butler
Congressman Denham's office	Kevin Padway
DWR - CVFPB	Bill Edgar
CH2MHill	Rob Tull
City of Modesto	Miguel Alvarez
PBI	Jesse Patchett
TID	Tim Payne
PBI	Ron Baldwin
City of Newman	Perfecto Millan

Agency/Organization	Contact
Stanislaus County	Dan Bernaciak
GEI Consultants	Larry Rodriguez
	Malvern Canell
City of Patterson	Ken Irwin
	Ron Cornell
DWR CVFPO	Eric Tsai
DWR	David Pesavento
USACE	Brigid Briskin
Kjeldsen, Sinnock & Neudeck, Inc., RDs	Christopher Neudeck
City of Newman	Koosun Kim
USDA-NRCS	Kristin Guy
CVFPB	Mike Wright
GEI Consultants	Mike Mirmazaheri
USACE	Ryan Larson
USACE	Tim Crummett
DWR FMO	Ran Singh
DWR FMO	Meredith Harvan
Cal OES	Kyle Noderer
	Greg Nunes
City of Patterson	Joel Andrews
GEI	John Ayres
GEI	Ashley Casey
River Partners	Jerry Dion
DWR	Terri Gaines
PBI	Charles Hillard
WSID/PID	Carrie Loschke
OES	Deb Thrasher
Modesto Wastewater facility	Cindy Fosi

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APPENDIX D

Flood Emergency Response Assessment Technical Memorandum

Flood Emergency Response Assessment Technical Memorandum

Ronald Baldwin, Peterson-Brustad Engineers, Inc.

Mid-San Joaquin River
Regional Flood Management Plan
June 2013

Table of Contents

1. Introduction

The objective of this Technical Manual is to provide an initial assessment of flood emergency response in the Mid-San Joaquin River Region to assist local stakeholders with the development of a regional flood management plan. This report includes a general description of the current situation along with locale specific assessments. It also provides some general conclusions and recommendations but does not recommend or discuss specific improvement projects. Report contents and conclusions are based on a short study area reconnaissance completed in May and early June, past flood experience, and recognition of the jurisdictional complexity of flood response in California.

Earthen levees, such as those used in the Mid-San Joaquin Region, have been a key reclamation methodology in the Central Valley since the beginning of settlements by non-native Americans. This early emphasis on levees led in 1861 to the creation of the "reclamation district" entity by the California legislature. This new special purpose political jurisdiction was created to facilitate cooperative reclamation work by multiple landowners. While successful in meeting that objective, this action also added an element of complexity to modern flood emergency response that is missing in other types of disasters.

The reality is that a separate political entity, the "reclamation district", with historically little administrative structure or depth and often limited financial resources, has primary jurisdiction over a key aspect of flood emergency response, the efforts to prevent a levee from failing or to limit the extent, depth, or duration of flood waters if it does. Counties, cities, and other special purpose districts with historically broader public safety responsibilities are faced with this jurisdictional barrier when formulating their preparedness plans and flood response protocols.

Since "jurisdiction" is a basic concept behind all response, mutual aid, and disaster assistance programs this added jurisdictional complexity ends up, for all practical purposes, dividing flood response into two distinct components; the levee "flood fight" and the more traditional public safety operations (e.g. warning, evacuation, rescue). Each of these components involves different key players, different needed expertise, and different response issues. Each component does, though, share the common problem of how it should interact with the other. This situation does have beneficial aspects if this response dichotomy is recognized and clearly addressed in preparedness planning.

The reconnaissance that serves as the basis for this report included meetings, conversations, or site visits with individuals of the following jurisdictions.

- Stanislaus County OES
- Stanislaus County Agricultural Commissioner
- City of Modesto
- City of Newman
- City of Turlock
- City of Patterson
- Turlock Irrigation District
- Reclamation District 1602
- Reclamation District 2031
- Reclamation District 2063
- Reclamation District 2091
- Reclamation District 2092
- Reclamation District 2099
- Reclamation District 2100
- Reclamation District 2101
- Reclamation District 2102

2. Background

2.a Stanislaus County, the San Joaquin River, and Reclamation History

Initial settlement of Stanislaus County after the Mexican Period was concentrated in close proximity to the San Joaquin River and its tributaries, the Stanislaus and Tuolumne Rivers. The extensive dry plain extending between these rivers made overland travel difficult and subsistence farming impossible at any distance from these water sources. Initial settlement concentrated at the site of ferries established early in the Gold Rush period to serve the heavy traffic to and from the mining areas. A few of these settlements subsequently grew into the first towns in the County.

Key early river towns within the study area were Graysonville (modern Grayson), Tuolumne City, Adamsville, Paradise City, and Hill's Ferry. The population of these centers waxed and waned over time with drought and other economic impacts but the bulk of County population remained near the rivers as long as steamboats were the most convenient means of long distance travel. The subsequent spread in the 1860's of wheat and barley dry land farming into the plains only enhanced the importance of these river towns since steamboats remained for many years the only practical means of shipment of bulk products to cities and international trans-shipment points on the coast.

This settlement pattern began to change with the advent of publicly maintained roads between key Valley urban centers. The establishment of the Stockton to Visalia public highway (along the path of current River Road) with its associated stage coach lines pulled population and businesses away from the immediate vicinity of the rivers. The construction of railroads through the Valley vastly accelerated this population shift. The completion of the railroad down the west side of the County in the 1880's pulled

populations on the west bank of the San Joaquin River back to the new railroad towns of Westley, Patterson, and Newman.

In consequence of these changes the floodplains of the San Joaquin and lower Stanislaus and Tuolumne Rivers had by the late 1880's reverted to the virtually exclusive rural agricultural use which continues today. Grayson is currently the only remaining significant population concentration immediately adjacent to the San Joaquin River.

While small levees were almost certainly built by the first settlers of these floodplains, initial attempts in Stanislaus County to take advantage of the "district" reclamation mechanism occurred only in 1895. In that year thirteen reclamation districts were formed by the Stanislaus Board of Supervisors. These districts encompassed only 60 to 800 acres each, were almost certainly limited in their financial soundness, and by 1930 were reported as long inactive.

The reclamation districts currently seen in Stanislaus County were formed after 1911, during what has been called the third distinct period of Central Valley reclamation activity. In 1911 the State Reclamation Board was created along with the associated Sacramento-San Joaquin Drainage District. Reclamation districts organized after this important action were in the main more intelligently planned under some central control. Reclamation Districts 1602 and 1604 (now RD2091) were formed in 1914, Reclamation District 2031 in 1919, and RD2063 in 1922. The remaining current Stanislaus County reclamation districts were formed at a later period during the implementation of the Lower San Joaquin River and Tributaries flood control project in the 1950's.

The Lower San Joaquin River and Tributaries Project was authorized by the 1944 Flood Control Act and completed during the 1950's and 1960's. This Project improved project levees to the general state that we find them today. The Project was also evidently the catalyst for the completion of drainage infrastructure such as the Gomes Lake drainage system, the reorganization of older districts, and the creation of the newer districts.

But by the time of the Lower San Joaquin River and Tributaries Project the rural nature of the study area floodplain was firmly established. This fact ensured that Stanislaus County reclamation districts would continue to have limited financial depth or capability without any attenuation of their direct responsibility to maintain and flood fight their respective levee systems. This minimal administrative structure, low ability to raise funds, and reliance on volunteers in an emergency would run parallel but separate from the development of increasingly sophisticated and capable emergency response systems by cities and counties throughout the later 20th Century.

2.b Flood Emergency Response Components

The following study discussion makes a clear distinction between the two key components of flood response mentioned in the introduction. These components are more fully defined as follows.

2.b.1 Flood Fight Operations

This component includes those emergency activities aimed at preventing failure of a levee during a flood or, in the event of a levee breach, to physically limit the extent, depth, and/or duration of floodwaters. These operations include levee patrol and basic remedial actions involving the placement of sandbags and plastic visquine. However, importantly, they include the common need for direct expenditure of significant funds for the acquisition of private contractor or construction services, expensive bulk materials (e.g. rock), and heavy equipment (e.g. large pumps). The reclamation district conducts these operations with possible assistance from the Department of Water Resources and the Corps of Engineers as allowed by those agencies' response protocols, funding availability, and agency discretion.

2.b.2 General Public Safety Operations

This component includes public warning, evacuation, rescue, care and shelter, and recovery functions which are the traditional jurisdiction of counties, cities, locally-based State agencies, and special purpose "fire districts". These same entities also operate the mutual aid and other coordination systems that make up the Standardized Emergency Management System (SEMS).

2.b.3 Interaction between Response Components

Local fire and law agencies have jurisdiction within the floodplain for protecting people and property and reclamation districts have jurisdiction for the flood fight. The arrival of the Department of Water Resources and the Corps of Engineers in response to a request from a reclamation district completes the list of key players in the flood fight component. Fire, law, and EMS agencies with jurisdiction within a particular portion of the floodplain complete the list of players for field public safety operations.

In a large flood the geographic scale at which these different groups of agencies establish command and control or organize their response often varies due to

differences in agency jurisdictional boundaries and internal protocols. Therefore, potentially different operational response structures can add to the jurisdictional complexity within the floodplain. How the agencies performing each separate flood response component coordinate or assist those performing the other response component becomes a key organizational and even policy issue in the overall response.

2.c Study Methodology

The methodology for preparing this study was determined by past experience and available budgeted resources. An "Emergency Response Focus Area Review Sheet" (Attachment 1) was initially developed for use during site visits and agency meetings. An initial map and document review was conducted to identify key topographic, infrastructure, road, and population characteristics of the study area as well as key reclamation district and agency contacts.

A site visit/meeting plan was then developed and conducted in May and June. Site visits were limited in order to stay within the project budget for reconnaissance. An initial draft report will be completed and sent to individuals who provided initial input for review for errors or omissions of facts. After a 10 day review period the report will be finalized and forwarded to PBI supervisors for incorporation into subsequent RFMP development activities as needed.

Limited resources for this project prevented extensive cross checking of information provided during meetings and interviews or obtained by visual observation. It is assumed that this study will be reviewed in future group workshops and any errors that remain will be corrected prior to determination of final regional flood management plan flood improvement projects.

3. Analysis

3.a General Area Characteristics

Field reconnaissance revealed the following general area characteristics that bear on any recommendations or prioritization for improving response.

Rural Nature

The Stanislaus County 2010 Hazard Mitigation Plan estimates a population of approximately 2,400 in the 100-year floodplain of the San Joaquin River. The only concentrations of population near the study area, however, is the

town of Grayson situated on bluffs above the San Joaquin River channel, a mobile home park located next to the Shiloh Road bridge on the Tuolumne River and a small group of rental homes in RD1602. Reclamation districts in the northern portion of the region appear to be extremely rural with few residences or structures while the southern portion of the region is more densely populated with several dairies, businesses, and residences, particularly in RD2063.

The few situations in the County where flooding can affect a more significant population concentration are outside of the areas protected by project levees; urban areas in Modesto near the Tuolumne River and Dry Creek and portions of the Cities of Patterson and Newman exposed to sheet flooding from nearby creeks. Even these cases do not present a complex organizational issue for responders responsible for warning, evacuation, and rescue since total potential impacted population at any one location does not exceed a couple of thousand at the most.

While the rural nature of the Mid-San Joaquin Region simplifies the problems of warning, evacuation, and rescue for people, it elevates the importance of other evacuation and recovery issues unique to agricultural areas. Evacuation of dairies, removal of hazardous materials prior to the arrival of flood waters and debris removal after the departure of flood waters, are more complex organizational challenges present in the study area. Particular attention should be paid to these issues during development of potential improvement projects.

Concentration of Critical Infrastructure and Property

There is a concentration of critical infrastructure and property either within or adjacent to areas protected by project levees on the San Joaquin River that does have more complex emergency response planning implications. Critical infrastructure identified in the reconnaissance important to public health, the environment, or public services included Highway 132, at least two important underground pipelines, several vital east-west connector roads, and three waste water treatment plants for the Cities of Modesto, Patterson, and Newman respectively. The Stanislaus County 2010 Hazard Mitigation Plan indicates that total property value including private property within the 100-year floodplain of the San Joaquin River totals $149,520,110 including structures worth $52,849,542.

Some of the identified critical infrastructure has life and safety implications for significant populations located outside of the floodplain itself. After the 1997 floods, the Stanislaus County Board of Supervisors declared the Crows Landing Road bridge over the San Joaquin River to be a vital transportation link critically needed in the event of an emergency. This bridge and the Las Palmas Avenue bridge to the north carry most local

traffic across the San Joaquin River. The loss of either bridge (and potentially both could be lost from one levee breach as discussed below) would require a one hour detour to reach the other side of the River. Since all hospital facilities are on the east side of the San Joaquin River the ability to use these bridges becomes critical to the safety of residents on the west side of the County.

The need to prevent adverse public safety or environmental impacts from the flooding of any of these critical facilities, along with the presence of significant public and private property within the floodplain, places a greater emphasis on examining the flood fight component of Mid-San Joaquin flood emergency response. Improving this component of the response to better prevent flooding, or limit flood extent, is obviously the key to protecting these assets. This report, therefore, focuses particular attention on assessing the status of flood fight operations within the region.

3.b Description of Current Situation and Locale Specific Assessments

The following discussion provides the basic results of the area reconnaissance completed in May. A description of several flood threats outside of the area protected by existing project levees is included.

3.b.1 Reclamation Districts and Project Levees

Reclamation District 2031

Description

Reclamation District 2031's thirteen miles of levees extend along both the south bank of the Stanislaus River and the east bank of the San Joaquin Rivers and protect approximately 5,000 acres at the confluence of those rivers. There are two large private properties within the district; the Faith Ranch, located roughly adjacent to the San Joaquin River and the lower Stanislaus River and the Mapes Ranch, located in the eastern and southern portion of the District.

At least three other property owners are located adjacent to the Stanislaus River east of the reclamation district boundary. These properties are protected by a private interest levee on the river's south bank that connects with the District levee in the vicinity of Caswell State Park. A breach in this private interest levee on the south bank of the Stanislaus River could flood portions of RD2031 along with portions of those properties.

The area is primarily range land for cattle with some habitat easements. There are a limited number of structures located within district boundaries. The headquarters of each respective ranch and most farm structures are located on higher ground that apparently stayed dry in the 1997 flood. The few individual residences within the district boundaries are elevated on artificial mounds or also on high ground. There are no labor

camps or group residences within the District. The District is crossed by Highway 132 and two key underground pipelines, a PG&E natural gas line and the Hetch-Hetchy Aquaduct.

There are three Modesto Irrigation District irrigation canals that flow east to west across RD2031 and terminate into either the Stanislaus River or the San Joaquin River (see report maps). All three canals convey both irrigation and storm drain waters based on season. Lateral 6 discharges by gravity through a pipeline that passes through the levee into the Stanislaus River upstream of its confluence with the San Joaquin River. Lateral 3 discharges into Miller Lake. Water then flows through a channel to a structure on the east side of the Stanislaus River levee, west of Miller Lake and upstream of its confluence with the San Joaquin River. When the Stanislaus River elevations is low the water drains by gravity and when the water elevation submerges the pipes the Miller Lake pumps turn on and lift the water into the river. Finally, Lateral 4 is located at the southern end of the District. While this lateral does not discharge through the levee the north canal bank acts as a portion of the District levee west of Gates Road. At the southeast corner of RD2031 the levee is also the north bank of MID Lateral 4. A breech in this portion of the levee would also be a breech in the canal bank rendering the canal un-usable until the breech is repaired.

Assets in the area

Highway 132
Hetch-Hetchy Aquaduct (Underground)
PG&E Natural Gas Pipeline (Underground)
Modesto Irrigation District canals
MID Miller Lake Pumps
Private irrigation pipelines and field infrastructure
Rangeland infrastructure
Farm structures and equipment

Administrative History and Issues

The Reclamation District is apparently inactive although this situation should be confirmed. It appears, though, that the two property owners maintain and flood fight that section of project levee that lies within their property lines independently with only informal coordination.

Agencies with responsibility in this area for public safety operations as defined above are the Stanislaus Sheriff's Department, the Salida Fire Protection District, the Woodland Avenue Fire Protection District, and the California Highway Patrol.

Recent Flood History and Issues

In 1997, the two primary property owners in the District conducted separate flood fight operations for the section of District levee adjacent to their property lines. Equipment and supplies for these separate operations were provided by each respective ranch. Both ranches maintain a basic inventory of sandbags and other flood fight material. Flood fight operations rely on a few key individuals with flood fight experience for leadership. Long time familiarity with each other allows for informal coordination of their efforts in an emergency.

In the 1997 flood, the District levee was breached approximately 1/8 mile north of Highway 132. Anecdotal information is that the levee probably pushed out after prolonged saturation and pressure from flood waters. The ground to the south of the District levee system is lower and only a portion is protected by a private levee. In 1997, river flood flows inundated this area, breached the private levee, and reached the top of the District's southern levee section maintained by Mapes Ranch. This levee section also subsequently breached. Highway 132 was closed due to the flooding.

The district is flat with no option for use of a relief cut to limit flood depth or extent. Impounded flood waters probably flow to the confluence of the Stanislaus and San Joaquin Rivers and then build back toward high ground. Flood waters are returned to the river through the breaks as the river water elevation drops. There are drain pipes that penetrate the levee with one-way valves which are used for draining internal runoff, but these have minimal usefulness for draining impounded floodwaters from a breach.

Highway 132, running along a bluff line, forms a portion of the district levee section from a point just east of its San Joaquin River bridge approach to Finnegan's Cut. From this point the District's southern levee section extends east and south along Finnegan's Cut and then runs east along a low bluff to high ground. The District levee appears in good condition but is sandy and seeps significantly in high water although serious boils are reported to be rare.

Drain water from Miller Lake flows through a channel to a pump structure on the east side of the RD2031 levee as shown in the report maps. When Stanislaus River elevations are too high for gravity discharge the Miller Lake pumps are activated to provide additional relief. This facility was damaged by flooding during the winter of 1955-56 and repaired through the Flood Relief Law of 1958.

Overall Emergency Response Assessment

There are limited life and safety response issues within this district except for the timely closure of Highway 132 and of public access into the area in a flood event. Safety of flood fight crews operating in the District is of concern. The potential for damage to underground critical infrastructure crossing the district should also be assessed. Staff

with experience in flood fight operations are available but no written plans or procedures for flood fight operations were identified nor any written or formal training program for flood fight crews. Public safety agencies have no written plans or protocols or training programs specific to response to this District.

Reclamation District 2101

Description

Reclamation District 2101's 3.5 miles of levees protect approximately 2,000 acres of farmland belonging to a single family farm in operation since 1919. A portion of the land in the floodplain is leased to an outside dairy operation for cultivation of silage and feed products. The land rises to the west in a series of low bluffs or benches. A spur levee extends northward from the District's north levee section to prevent flood flow from moving along that levee section and causing erosion.

Assets in the area

Highway 132 and associated San Joaquin River bridge
Irrigation systems and two pumping stations
Farmland

Administrative History and Issues

The reclamation district was formed in 1954 and its levees were improved in 1956. District boundaries extend just past Highway 132 on the south to include a portion of the Blewett water district. The District spends approximately $25,000 a year on levee maintenance to include vegetation and rodent control and replacement of gravel for all weather levee road. The District also maintains a stockpile of approximately 1,000 sandbags, stakes, and buttons each and around 1,000 feet of visquine. Family members, hired hands, and emergency hires are used for patrol and basic flood fight operations.

Agencies with responsibility in this area for public safety operations as defined above are the Stanislaus Sheriff's Department and the West Stanislaus County Fire Protection District.

Recent Flood History and Issues

District flooded in 1997 from a levee breach and in 1999 and 2000 from extensive seepage. In 1997, students were hired to help family members and hired hands with levee patrol and flood fight. In that flood over 50 persons were involved in District flood fight operations as well as CCC crews obtained through mutual aid systems.

The main concern during that flood was at the southern end of the district levee system where pressure from high flows was the greatest. A breach at this location would have led to heavy flows across the District, particularly once flood waters broke back into the river at the District's northern end. Such a shift in the river flow could have caused catastrophic scouring of productive soil destroying existing farmland productivity.

Boils were extensive during the 1997 event and water elevations were generally at the levee crown. The District manager subsequently withdrew levee crews due to unacceptably dangerous conditions and the District levee subsequently breached on the north levee section. Flood waters backed into the District damaging infrastructure and depositing large amounts of sand and debris.

Another major issue in the 1997 flood was entry of flood waters into the District from the south over Highway 132. There are private levees along the river south of the District boundary but these were breached by the heavy flood flows flooding the area to the south of Highway 132. Flood waters up to 2-3 feet in depth subsequently flowed over Highway 132 into Reclamation District 2101.

Currently the District has ongoing erosion problems on the riverbank in front of levee during high flow events. In one area this riverbank erosion has reached the toe of the levee. In addition, the Corps repair of the 1997 breach was inadequate and extensive seepage occurs at that location in high water events. The Corps attempted to address this problem by building up the river bank in front of levee but this was not completely successful.

Overall Emergency Response Assessment

There are limited life and safety response issues within this District except for the timely closure of Highway 132 and of public access to the floodplain. Safety of flood fight personnel is a concern. The current District manager is experienced in flood fight operations and does monitor safety of flood fight personnel operating with the District but no written safety training protocols were identified.

No written flood fight operations response plans were identified and agencies responsible for public safety operations in the District do not have written response or training plans specific to this District.

Reclamation Districts 2099/2100/2102

Description

These districts with a combined total of approximately 7 miles of levee are all located on the west bank of the San Joaquin River. They are discussed together since they are all owned and administered by the U.S. Fish and Wildlife Service with a new objective of

habitat restoration. Reclamation Districts 2099, 2100, and 2102 are adjacent to each other but Reclamation Districts 2100 and 2102 are physically separated by a substantial leveed earthen waterway that serves as part of the West Stanislaus Irrigation District system. This waterway/canal allows river water to reach irrigation district pumps located to the west of the floodplain which move the water into the formal canal system.

Assets in the area

Lift pumps and irrigation systems
Desirable habitat resulting from restoration programs
Agricultural structures

Administrative History and Issues

The districts were originally farming operations. The acquisition of these lands by the federal government has changed the mission of the districts to habitat restoration. The federal government is in the process of de-certifying the levees and is conducting studies to determine the potential future use of existing levees.

There is a possibility that levees may be reconfigured to allow the districts to flood during flood peaks thereby lowering river elevations at a critical point in future floods. The Lower San Joaquin/South Delta regions have expressed support for such a project to provide enhanced flood protection on the Lower San Joaquin River. Agencies with responsibility for public safety operations as defined above in this area are the Stanislaus Sheriff's Department and the West Stanislaus County Fire Protection District.
Recent Flood History and Issues

The presence of the West Stanislaus Irrigation District waterway/canal and the "bowl" nature of the floodplain on the west side of the San Joaquin River lowers the risk that the flooding of one district will significantly increase the danger of flooding to an adjacent district. However, the West Stanislaus Irrigation District intake waterway/canal itself poses a flood risk to the districts on either side of it.

The intake ditch/canal was built decades before the project levees. When the project levee was built it was extended across the intake canal but with a water control structure installed to allow controlled flow into the waterway. In the 1997 flood this portion of the levee with the water control structure blew out and was never repaired. No other mechanism was subsequently put in place for controlling flow or water elevations in this ditch/waterway up to the irrigation district pumps. Therefore, in high water events flood waters at the western end of the ditch/waterway have broken out to the north and into Reclamation District 2100.

This type of flooding of the district where there is no breach in the project levee that impounded flood waters can use to return to the river causes extended unnatural

ponding of flood waters on land being restored to habitat. This unnatural ponding has proved detrimental to newly planted desired vegetation. There is no contingency plan in place for making a relief cut in these cases to return impounded waters to the river.

A study is being performed to determine the feasibility and usefulness of placing a weir on each district's levee to allow controlled flooding of the interior in high water events to relieve the flood threat in other areas of the San Joaquin River system. The Lower San Joaquin/South Delta regions have expressed an interest in the use of these districts for such controlled flooding during major flood events as a means to improve flood control on the lower San Joaquin River.

Overall Emergency Response Assessment

These districts present a limited public safety operations issue. The Federal government does not intend to flood fight the levees in the future so safety of flood fight crews operating in the District is not a concern. Public safety agencies have no written plans or protocols specific to response to these Districts.

Reclamation District 2092

Description

Reclamation District 2092's 3.8 miles of project levee protect approximately 2,000 acres of farmland and habitat. The District's levee is in good condition and substantial. There are two property owners within district; River Partners, an environmental organization, and a farm operation. A portion of the River Partners land is leased for farming pending implementation of a final habitat plan.

Structures and farm buildings within District boundaries are located on higher ground on the east side of the district generally above project design flood elevations. The District southern levee section extends east to Shiloh Road to protect the District from flood waters that fill a lower, unprotected, floodplain to the south during high water events. The District's northern levee section also extends east along a bluff to high ground to protect the District from high flows on the Tuolumne River. A pumping station is located in front of District levees near the river channel.

Assets in the area

District pump station
Irrigation Systems
Farmland and habitat
Small number of agricultural structures and a residence
Stanislaus County Honor Farm (along Grayson Road to the south of District boundary)

Administrative History and Issues

District formed in 1959. Area was devoted to farming operations until acquisition of most of the District's land by River Partners. A majority of the land within the District will now be converted over time into habitat.

A study is being conducted to determine whether weirs could be placed on District levees to allow controlled flooding of the District in order to provide additional flood protection for other areas of the San Joaquin River. A flood easement with the other private property owner in the District would be needed for such use. The Lower San Joaquin/South Delta regions have expressed support for such a project to provide improved flood control on the Lower San Joaquin River. Such controlled flooding would also play a role in returning the area to a natural flood regime.

Agencies with responsibility in this area for public safety operations as defined above are the Stanislaus Sheriff's Department and the Westport Fire Protection District.

Recent Flood History and Issues

In the 1997 flood, the District relied on a local individual with flood fight experience and assistance from the local fire district for conducting flood fight operations. Currently, River Partners staff members are also prepared to assist with flood fight operations.

The rise in the elevation of San Joaquin River waters in a flood causes the normal river flow direction to move easterly and more directly along the District levee. This change in flow pattern heightens the potential for erosion on the levee waterside. A large fetch is also created in front of the District levee creating the potential for wave wash damage in addition to normal seepage.

The District acquires sandbags, visquine, and any other needed flood fight materials as needed at the time of the flood. The District levee did not fail in 1997 but private levees to the east and north along the Tuolumne River did fail filling the area between that river and the RD2092 north levee section. District officials feel that the project levee was not constructed as shown in design documents which should be assessed.

Overall Emergency Response Assessment

District presents a limited public safety operations issue in floods. Safety of flood fight crews conducting flood fight operations in the District is a concern. The District currently relies on an individual with flood fight experience who is also committed to assisting RD2031. District does have staff from River Partners designated to assist with flood fight operations and there is a relationship with the local fire district to provide assistance with flood fight operations. No written flood fight operations plans or procedures were identified nor any written or formal training programs. Public safety

agencies have no written plans or training programs specific to response to this area.

Reclamation District 1602

Description

Reclamation District 1602's six miles of levee protect approximately 3,500 acres. There are approximately 13 property owners within the District of which the largest is Patterson Westside Farms which owns around 2,500 acres. Most of the area is farmland used primarily for the production of alfalfa, wheat, and a few other annual crops.

There are several residences with secondary structures on the north and south end of the District but these are on higher ground that historically has not flooded. There is a small group of rental residences, Westside Properties, in the middle of the District next to a levee section vulnerable to extensive seepage. This levee section also sees the highest water elevations against the District levee in a flood.

On the north end of the District is Lake Ramona, a year-round lake of approximately 2 acres. Irrigation tail water from Patterson Irrigation District and Twin Oaks Irrigation District enter the lake and from there can flow into an access ditch leading to a gravity-flow concrete culvert extending through the levee. A small ditch/slough drains the discharge into the River's main channel which is at its nearest proximity to the District levee at this point. There is also a pump at the entrance to the culvert to move runoff and tail water over the levee and into the River during periods of high water. Reclamation District 1602 is directly across the San Joaquin River from Reclamation District 2091. The west bank of the River is generally a little higher than the east bank making Reclamation District 1602 in general less likely to flood than the districts on the opposite bank.

Assets in the Area

Approximately 12-15 residences, both privately owned and rental
Irrigation District pumping station
Irrigation canals/ditches and outfall pipes
Farmland generally under production during period of highest flood risk

Administrative History and Issues

The primary landowner, Patterson Westside Farms, acquired its land over 30 years ago and its staff basically manages the two special districts covering the area; Twin Oaks Irrigation District which primarily services Patterson-Westside Farms and the reclamation district which encompasses a larger area incorporating several more properties. There is an annual meeting of the reclamation district but there are no

assessments and the reclamation district does not have a budget. Property owners share any costs or maintenance work on an informal basis under the initiative of Patterson Westside Farms. The two primary landowners threatened by a flood, Patterson Westside Farms and Westside Properties, show the most initiative in meeting any emergency needs or expenses. Other property owners assist with maintenance for the levee section along their property to a more or less satisfactory degree.

The District maintains some flood fight supplies but has accessed sandbags and sand provided by the County to the public in past floods. Agencies with responsibility in this area for public safety operations as defined above are the Stanislaus Sheriff's Department and the West Stanislaus County Fire Protection District.

Recent Flood History and Issues

In the 1997 flood, the District did not suffer a levee break. There was a significant boil and seepage on the levee section next to Westside Properties. The Corps of Engineers at the request of the District placed a seepage berm behind the levee at this point to prevent levee failure. However, seepage continued beyond the berm and standing water did impact the Westside Properties structures.

The District did experience some levee erosion near Lake Ramona and near its southern end which was mitigated by placing plastic visquine by crews from DWR. Water elevations at these points at the time just reached the toe of the levee making levee failure unlikely.

The District project levee turns and runs to the west at both ends of the District since the areas to the north and south of the District boundary are unprotected. In 1997, flood waters impacted Las Palmas Avenue and nearby residences about one-half mile to the north of the District but did not approach its northern levee extension. Flood waters did impact the District in the south where flows over Crows Landing Road from the south entered the District beyond the west of the end of its southern levee section.

An additional major problem in 1997 was overflows from Salado Creek to the northwest entered the District flooding portions of its land. Salado Creek had overflowed near Patterson flooding portions of that City and adjacent areas. Area drainage systems directed these flows into irrigation ditches running to the south to the vicinity of Reclamation District 1602. These irrigation and other ditches subsequently overflowed flooding portions of the District.

In the 2006 flood, high flows damaged the concrete culvert through the levee at Lake Ramona that carries storm water and tail water run off to the River. The structure at the exit end of the culvert holding the flap-gate to prevent reverse flow failed destroying the flap gate. Flood waters then began to enter the District through the culvert. Emergency actions were taken to stop this reverse flow and a gate was subsequently installed at

the top of the levee. The State has indicated in its inspections that the original flap-gate at the exit end of the culvert must be repaired to meet its O&M standards.

Overall Emergency Response Assessment

There are structures and their residents at risk in the District during floods. Due to the relatively small number of these homes their warning and evacuation is not an overly complicated operation as long as it is timely. Residences at the north and south end of the District would be exposed at most to shallow flooding in future events. The District has a substantial levee that is barely impinged upon by flood waters for most of its length due to the fact that the west bank of the River is generally higher than the east bank. Water elevations that would create a much more significant risk of failure to the District levee would probably lead to failure of the east bank levees first lowering the threat until those breached district(s) filled.

The District has a knowledgeable individual for directing flood fight operations and adequate staff for levee patrol and basic flood fight remedial actions can be obtained. Safety of flood fight crews should be looked at. No written procedures for flood fight or training programs for crews were identified. Flooding from the south over Crows Landing Road is a significant impact given the critical nature of this connection with the east side of the County. The public safety agencies covering this area have no written response plans for this specific area.

Reclamation District 2091

Description

Reclamation District 2091's eight miles of project levee protect approximately 7,000 acres. There are three primary property owners within the District; two farm operations and the City of Modesto which owns 4,500 acres in the northern section. One farm operation is a dairy which grows feed within the District for dairy cows maintained at a different location. The other farm is a mixed hay and crop farm. There is also a firing range owned by Stanislaus County and operated by the Sheriff's Department.

The District is relatively flat but with a south to north elevation gradient. At the north end of the District is the Westport Drain which connects to a Turlock Irrigation District (TID) lateral. Immediately adjacent on the south side of this structure is the new City of Modesto Secondary Waste Water Treatment Facility currently under construction. Storage and treatment ponds of this facility are complete with dikes higher than the district levee. The ponds are located on the northwest portion of the District. Treated waste water from this facility is used to irrigate crops grown on the Modesto property.

An old slough runs northwest to southeast from the vicinity of the treatment plant to the vicinity of West Main Avenue. This slough can serve as a conduit for flood waters

coming from the south to move under and through West Main Avenue.

West Main Avenue is an important east-west County road which bisects the District and is elevated as it approaches the river and its San Joaquin River bridge. The West Main/Las Palmas Avenue bridge along with the Crows Landing Road bridge 10 miles to the south carries most of the daily local traffic across the San Joaquin River.

South of West Main Avenue is a continuation of farm fields and the County firing range. Adjacent to the firing range on its south side is a storm water drainage facility called Reclamation District 2091 Unit #2.

Reclamation District 2091 Unit #2

This facility consists of Gomes Lake, a pumping station, the Harding Drain, the Gomes Lake Bypass Channel, and associated equipment. The Harding Drain is a large open drainage ditch which runs west from the end of Turlock Irrigation District (TID) Lateral #5 at Prairie Flower Road to the RD2091 project levee. From this point the Gomes Lake Bypass Channel runs north along the landside toe of the District's project levee for one-half mile to Gomes Lake. Another drainage ditch for local runoff called locally the "Levee Drain" joins the Gomes Lake Bypass Channel just south of the Lake.

The purpose of this drainage system is to move storm water originating from the Turlock Irrigation District, Sand Creek, City of Turlock, and a large area of unincorporated land to the east of the District to the San Joaquin River. Treated waste water from the City of Turlock Waste Water Treatment Plant and some local runoff through the Levee Drain also enters this system for eventual discharge into the river.

At the point where the Harding Drain reaches the river from the east two flap gate pipes penetrate the levee allowing gravity flow of the runoff into the river. When the river is in flood and gravity flow at this location is no longer possible, the runoff is directed to the north through the Gomes Lake Bypass Channel to Gomes Lake where it can be delivered to the river by gravity flow through the pumping station. If water elevations in the river prevent gravity discharge then the pumps are turned on to move the runoff to the river.

During flood periods, Gomes Lake becomes a holding basin for this storm water runoff. A dike at its northern end prevents the collecting runoff from flowing to the north once the natural lake holding capacity is exceeded. This drainage system was put in place in the 1960's concurrently with project levee improvements, probably as part of the Lower San Joaquin River and Tributaries Project.

Currently the City of Turlock is building a conveyance system to take treated waste water from its treatment plant on Walnut Avenue directly to the river. Infrastructure from

this new system near the river will consist of an underground line and weir/discharge system to empty the treated water into the river.

Assets in the area

City of Modesto Secondary Waste Water Treatment Plant
Stanislaus Sheriff Firing Range and Facility
West Main Avenue and its associated bridge and several secondary County roads
Reclamation District 2091 Unit #2 (Gomes Lake, pumping station and Harding Drain)
Farmland and associated irrigation systems
City of Turlock waste water transfer system

Administrative History and Issues

Reclamation District 2091 has a three-person Board of Trustees composed of the two private property owners and a representative from the City of Modesto. The reclamation district conducted a successful 218 election in the recent past to improve its financial situation. The District now has an approximate annual budget of $100,000 and is attempting to build up an emergency fund.

The District has a contract with the City of Modesto to provide levee maintenance and limited emergency response functions. While this is a positive step it was unclear what the limits of the contracted services are in an emergency or how command for flood fight operations will be established or transferred back to the District if necessary in a flood.

It is also not documented how the flood fight operations command structure will interact with any public safety operations command established for evacuation, rescue, and security in the District. While these issues may be understood by individuals in the different agencies, no written documents defining these command and control protocols were identified.

Another command and control complication is the operation and maintenance of the Unit #2 drainage system in flood events. Reclamation District 2091 was originally responsible for maintenance of the Unit 2 drainage system which is located within the District but serves for the most part the drainage rights of areas outside of the District. It is unclear why the district accepted this responsibility originally but by 1971 the reclamation district was broke and unable to meet this responsibility.

Subsequently, in 1971, a Joint Powers Agreement was formed for the maintenance and operation of the system. This JPA is composed of the City of Turlock, County of

Stanislaus, Turlock Irrigation District (TID), RD2091, and RD2063. TID provides a superintendent who oversees operation of the Gomes Lake Bypass Channel and the pumping station only. It is unclear who would supervise flood fight operations to maintain the Gomes Lake Dike in a flood.

Agencies with responsibility in this area for public safety operations as defined above are the Stanislaus Sheriff's Department, the Westport Fire Protection District, and the Mountain View Fire Protection District.

Recent Flood History and Issues

Flood fight operations are necessary for two distinct structures in this district; the project levee and the Gomes Lake dike. Failure of either structure could flood portions of the district damaging property and potentially critical assets. Failure of the Gomes Lake Dike could also create additional threats to the stability of the project levee. The emergency response organizational structure for coordinating these two operations is unclear as well as the process for resolving any conflicts between each operation that may arise. At least no written protocols or procedures addressing these issues were identified.

In 1997, water elevations are reported to have reached within 1' of the crown of the project levee at locations. The District levee experienced numerous boils north of Gomes Lake at an extreme bend in the levee and additional boils and the failure of a section of the levee back slope adjacent to the Gomes Lake Bypass Channel. While the project levee did not fail, the Gomes Lake Dike did subsequently fail.

The open ditch Gomes Lake Bypass Channel runs immediately adjacent to the landside toe of the project levee for more than one-half mile. It is obviously a serious design flaw to have a large open ditch with running water immediately adjacent to the landside toe of a flood control levee. It prevents adequate levee inspection and is a threat to levee stability. A constriction in the Channel and periods of rapid drawdown of Gomes Lake can create a 300 cfs flow creating the potential for damage to the project levee.

In 1997, when the back slope on a portion of the project levee adjacent to the Bypass Channel failed, the Corps of Engineers placed an emergency buttress to prevent complete levee failure. They also recommended at that time that the pumps moving water from Gomes Lake to the river be stopped in order to allow the water in the Channel to build up and provide a hydrostatic balance to the waterside hydrostatic pressures. The resulting buildup of water in Gomes Lake caused its dike to fail flooding areas to the north and damaging property.

Interdependence with Reclamation District 2063

A significant flood fight issue is the apparent dependence of RD2091 on RD2063 levees for protection from flooding. There is a 16' fall in the river as it runs from the south end of RD2063 to the north end of RD2091. It would appear that a levee breach in RD2063 would flood RD2091 as impounded flood waters flow down this gradient. A study is needed to confirm this conclusion but there is some evidence of this interdependence.

An old cross levee runs east to high ground at the southern end of RD2091 on the north side of the Levee Drain mentioned above (by which this ditch gets its name). This old cross levee is located on a small but noticeable rise in the ground that then gradually descends to the north. A visual inspection indicated that this cross levee was put in place to prevent flood waters from moving north into RD2091 from the area now protected by RD2063 levees.

This assumption is reinforced by the fact that the area encompassed by RD2091 was originally within an older district, RD1604, formed in 1914. Reclamation district 2063 was not formed until eight years later so it can be assumed that improved levees were first placed in RD2091. The cross levee on the south side of the district would have been needed to prevent flood waters from entering the new district from the unprotected, or inadequately protected, area to the south. This situation, if confirmed, has implications for the development of a proper flood fight strategy for RD2091.

Overall Emergency Response Assessment

The presence of considerable infrastructure in this District, particularly the waste treatment plant for a large city, would justify more stringent attention to the planning of flood emergency operations in this area. This attention would be further justified if the dependence of RD2091 on RD2063 levees for protection is confirmed since that would mean that the use of both the Crows Landing Road bridge, which was declared a vital transportation link in 1997, and the West Main/Las Palmas bridge, its nearest alternate route, could be lost from a single levee break.

The higher density of dairy, farm, and other operations (treatment plant, tallow works, etc.) in both districts means that more significant public safety operations for evacuation, security, and rescue would be necessary in a flood. No written flood fight plan or training program was identified. Public safety agencies have no written plans or protocols specific to response to this area.

Safety of flood fight crews is also of a concern. The City of Modesto does provide annual flood fight training but no written, formal, training program for the District was identified. No written flood fight operations plan was identified and command and control protocols for flood fight operations are not as clearly outlined as they should be.

Reclamation District 2063

Description

Reclamation District 2063's 11 miles of project levee protects approximately 10,000 acres. There are numerous property owners within the district including several dairies and farm operations and a tallow works. The primary crops grown in the area are alfalfa and other feed crops. The area is generally flat with a south to north gradient and numerous remnant sloughs in southern portion of district. Crows Landing Road provides the means of crossing the river in the area. District President estimates that flood waters could reach as far east as Morgan Road based on his historical knowledge.

The District has two pumping stations for interior drainage. The Victoria pumping station is located at the end of a slough draining storm water runoff and irrigation tail water from the southern portion of the district. TID tail water can also potentially enter this slough although TID evidently does not have a drainage right into the slough. This slough is also a collection point for levee seepage during flood events. Pipes penetrate the levee to allow gravity flow of runoff and seepage into the river. When river elevations prevent this gravity flow then the pumps are used to remove accumulating waters.

The smaller Nielson pumping station is located at south end of district at end of TID laterals 11 and 12 and is used to pump irrigation tail water, storm water from the

communities of Delhi and Hilmar, and local runoff into the river when river water elevations prevent use of the existing gravity flow pipes with one-way flap gates.

Assets in the area

Crows Landing Road and associated bridge and numerous secondary County roads
Several dairy and farm operations
Tallow works and other businesses
Irrigation and other infrastructure for fields
District pumping stations

Administrative History and Issues

District has an active Board of Trustees with a contract attorney. Current Board president states that it is increasingly difficult to recruit trustees. The District is attempting build an emergency fund but their revenue flow is limited. Savings from changing the method of vegetation control has helped.

Agencies with responsibility in this area for public safety operations as defined above are the Stanislaus Sheriff's Department and the Mountain View Fire Protection District.

Recent Flood History and Issues

District levees are reported to have functioned well in 1997 flood. However, the extensive seepage experienced and high runoff flows in the slough leading to the Victoria pumping station during this event forced the District to install an additional large pump while the flood was still in progress.

There are no levees along the river south of the district so the Reclamation District 2063 levee extends eastward on its south end along the higher north side of an old slough until approximately Central Road. This extension of the project levee to the east prevents flood waters from flanking the south end of levee section facing the San Joaquin River. Where this levee section ends technically as part of the project levee is in dispute between the District and the State. In 1997, flood waters in this area reached near the crown of the levee near the River but did not reach the levee at its eastern end.

High river flows have also caused erosion problems on the river bank below the waterside toe of the District levee. Such erosion if allowed to continue could endanger the stability of the levee. In 2011, the District placed rip rap at several locations to stop erosion that at some locations had reached within 20-50' of the levee toe. This concrete rip rap later became an issue with the Department of Fish and Game.

Farmer volunteers are used for levee patrol in floods and a stockpile of basic flood fight materials is maintained at Victoria Dairy near the center of the District. The Board president supervises patrol and appears to be the most experienced flood fighter in the District. Flood fight operations are generally self-help propositions by property owners but the District did declare an emergency in 2011 in an attempt to obtain State assistance with the riverbank erosion. Assistance was not forthcoming.

During enhanced brush clearing operations after the 1997 flood it was discovered that there are 7 pipe penetrations with one-way valves in the district levee. USACE had no record of these encroachments in the Project documentation but they appear to have been placed to assist with dewatering the district if it flooded. District has repaired and maintained these pipes since their discovery.

Overall Emergency Response Assessment

There is a more significant public safety response component in this area due to the presence of several dairies with hundreds of milk cows and a higher density of farm operations with potential on-site hazardous materials. Recovery operations after a flood could also be more significant. No written plans for public safety or recovery operations for this specific area were identified. Public safety agencies have no written plans or protocols specific to response to this area.

In regard to flood fight operations, the District President is knowledgeable and capable but there does not seem to be a formal response organizational structure outside of the Board of Trustees. No written response plans for flood fight operations were identified. The use of improvised material for flood fight operations (e.g. concrete from farm operations instead of rock) shows initiative but emphasizes the lack of adequate financial resources of the reclamation districts.

The potential dependence of RD2091 on RD2063 levees for protection places a higher importance on the coordination of the flood fight plans and operations of these two districts. Flood characteristics of this area and options for containing flood waters from a breach should be fully explored and documented.

3.b.2 Other San Joaquin River Emergency Response Issues

Lower Tuolumne River – South Bank

Description

A rural area of approximately 1,500 acres located between the north boundary of RD2092 and the south bank of the Tuolumne River. Several farms and structures and a mobile home park are located within this area. Privately constructed levees are present along the south bank. Entire area is unincorporated without a reclamation district.

Recent Flood History and Issues

In the 1997 flood this area flooded when private levees failed on its upstream end. Structures were damaged and evacuation operations were necessary. At least one death was associated with this flooding.

Overall Emergency Response Assessment

Public safety operations in this area will continue to be important but not organizationally complex. Command structures for performing public safety operations in this area should be combined with similar public safety and security operations necessary to support RD2092 and documented.

City of Patterson Waste Water Treatment Plant

Description

The City of Patterson Waste Water Treatment Plant is located at 14901 Poplar Avenue adjacent to the San Joaquin River and across the river from RD2091. The treatment plant with its three separate treatment processes and associated ponds is located on a

low bench 2-3 feet above a lower section of river bank that extends approximately 300 yards to the river channel.

Administrative History and Issues

The current plant occupies the same location as older pond treatment facilities put in by the City. The City of Patterson owns land in proximity to the plant including portions of the lower bank next to the river. The City is currently developing a waste water treatment master plan that will guide future development of the facility and this municipal function. That plan has not been reviewed to determine the extent it addresses flood issues discussed below.

Recent Flood History and Issues

Past high flows on the San Joaquin River flood the lower riverbank area on the east side of the plant. In the modest 2011 high flow event, flood waters are reported to have reached the base of a fence that surrounds the plant. Additional history on surface flooding of the 1997 is being collected to better identify the threat of surface flooding of the plant. Erosion of the riverbank northeast of the plant is of concern. After 1997, the City placed fill to restore a significant site of riverbank erosion. Continued erosion of the riverbank could lead to a greater flooding threat to the plant itself.

In addition to the threat of flooding from the San Joaquin River, the plant faces a problem with excessive inflow through its sewage lines. Normal inflow into the plant is approximately 1.5 million gallons a day and capacity is 2.25 million gallons. But the plant operator indicated that any significant rain event creates an inflow spike, probably through interconnections with the storm water system in the downtown area.

During the heavy rain events in December 2012 the inflow into the plant reached capacity. The problem is greatest when excessive rains in the Coast Range cause Salado Creek to overflow and flood portions of downtown and some residential areas. In 1997, these greatly increased inflows into the plant caused continuing problems with the maintenance of treatment processes.

The plant currently does not have the capability to bypass excessive flows in its sewage lines into larger existing storage ponds. In an excessive inflow situation the plant operator may have to sacrifice one or more treatment processes to try to contain the water. The potential exists for discharge of inadequately treated waste into the river and extended failure of treatment capability. The plant manager estimates that it could take up to 30 days to restore one of the normal treatment processes.

Overall Emergency Response Assessment

The plant manager is knowledgeable of the flooding potential and has a response concept but no written emergency procedures or protocols for dealing with either a threat of flooding from the river or excessive inflow from plant sewage lines were identified. The City is preparing a waste treatment master plan which may address these issues but that plan has not been reviewed as part of this study.

The plant manager did mention the possibility of installing a bypass system allowing waste water inflow to be stored temporarily in the plant's large Pond #1 and then pumped back into the treatment processes and additional physical protection from high water in the San Joaquin River.

Portions of the City of Patterson is also exposed to sheet flooding from Salado Creek. This threat does not present overly complex response organizational issues for ensuring public safety primarily due to the shallowness of such flooding.

City of Newman Waste Water Treatment Plant

Description

The Newman Waste Water Treatment Plant is located in proximity to the San Joaquin River on Hill's Ferry Road. The plant is located next to lower ground to the east that floods when flows in the river are high. Plant facilities are located at two levels. On the lowest level next to the river floodplain are the oxidation pond, facility maintenance building, and several pumps. At a higher level to the west side are Treatment Ponds 1 and 2 and ponds where treated water is stored to be used for irrigation of several hundred acres of city-owned farm land that surrounds the plant.

Waste water is treated in Ponds 1 and 2 and then transferred by gravity flow to the oxidation pond. Treated water from the oxidation pond is then pumped back up hill to the storage ponds. Tail water from the irrigated land to the west is reclaimed and re-used with zero discharge to the San Joaquin River. Tail water and runoff from farms in the surrounding area flow to a ditch near the plant maintenance building where it can enter the river through one-way pipes. The facilities permit only allows storm water discharge into the River. During high water conditions when the riverbank east of the plant is flooded a pump located at the gravity pipes is used to move accumulating runoff over the entrance road and into the river.

The plant entrance road connects to a designed levee on the east side of the oxidation pond to form a flood control levee at a uniform elevation of 72'. This levee protects the oxidation pond, plant building, and several pumps from inundation from the river.

However, directly adjacent to the oxidation pond on its south side is the Newman Wasteway built by the Bureau of Reclamation to carry storm runoff from Newman and the surrounding area to the river. The wasteway north embankment adjacent to the plant is substantial but not a designed levee.

Administrative History and Issues

The treatment plant is owned by the City of Newman which also owns several hundred acres of farmland adjacent to the west side of the plant. Treated waste water is used to irrigate this farmland.

Recent Flood History and Issues

Orestimba Creek runs from the Coastal Range to the San Joaquin River on the north side of Newman. During severe rainfall events in the Coastal Range, Orestimba Creek will deposit debris where it runs under the railroad and Highway 33 which will cause it to overflow its banks. The parallel north-south railroad and Highway 33 embankments form a "canal" that channels this overflow into the City of Newman affecting dozens of structures. These flood waters also enter waste water lines and threaten to overwhelm the plant's ability to either treat or hold these higher inflows. In the 1997 flood, it took weeks for the plant to clear the ponds of this excessive inflow. The plant has no means of bypassing excessive flows directly into the river.

In the 1997 flood, water elevations to the east of the plant reached within 2 feet of the crown of the City levee protecting the oxidation pond. Wave wash was a serious problem in that event and the City has since been slowly placing rip rap on the oxidation

pond levee to protect it from this source of potential failure. The levee is not yet entirely protected in this manner.

The City must flood fight this levee while water levels remain high as well as monitor the Newman Waste Way embankment which is covered in vegetation and experiences seepage during high water events. The high water elevations in the river also back up runoff coming down the waste way putting pressure on the wasteway embankments on either side. The embankments are substantial but not engineered for flood control. If either the City levee or the waste way embankment fails then the oxidation pond will be flooded and rendered inoperable. The plant has no means of redirecting effluent into alternate storage ponds or to the river. Partially treated waste water could enter the river in this scenario and restoration of normal plant operations could be lengthy.

Overall Emergency Response Assessment

The plant manager is knowledgeable on the flooding threats and is taking what steps he can to improve the performance of the City levee that protects the west side of the

oxidation pond and plant maintenance building. Additional issues remain including ensuring that interior runoff can be pumped back to the river during high flow periods.

The performance of the Newman Wasteway embankment that protects the south side of the oxidation pond needs to be evaluated. The facility operations and maintenance manual has a section on flooding and the plant manager has added a section to the facility's standard operating procedures on flood response based on past experiences.

Public safety operations are required in the City of Newman itself due to the flooding from Orestimba Creek but this does not seem to present overly complex emergency response organizational issues.

3.b.3 Additional Emergency Response Information

County of Stanislaus

Meetings or telephone interviews were conducted with Stanislaus County OES and Agricultural Commissioner and an email summary was obtained from Stanislaus County Public Works on flood response. There was no time for interviews of agencies with specific field response jurisdiction, the Sheriff's Department and several fire districts so a general picture was obtained through these limited contacts.

Stanislaus County OES maintains standard response plans and response facilities such as the operational area emergency operations center. The Office demonstrates competence in disaster management and has experience with response to urban flooding in the Modesto area and along the rivers.

In regard to flood response, there are limited specific written plans or procedures for response into the areas of the reclamation districts during a flood. Given the limited complexity of public safety operations in most of these rural areas, detailed written plans may not be necessary. Information or issues of importance for flood response in areas protected by project levees were identified as follows.

<u>Interaction with Reclamation Districts</u>

Stanislaus OES indicated that they often lack good contacts with the reclamation districts. The County is not aware of any written flood fight operations plans maintained by those agencies. It recognizes the reclamation districts as responsible for such planning. There has been some friction in the interaction of the County with the districts in regard to proclaiming emergencies and the process for requesting assistance with flood fight operations. This appeared to be mainly an issue of clarification of the process of coordination between these separate jurisdictions for flood fight assistance and activation of emergency authorities and powers.

Evacuation Planning

No written evacuation plans for areas protected by project levees were identified. No written plans for assisting property owners with the evacuation of dairies and hazardous materials stored at farm operations were identified. The County did not identify a specific role in the conduct of dairy or hazardous materials evacuation.

Flood Fight Materials and Mutual Aid

Stanislaus County Public Works maintains a supply of sandbags and sand for distribution to the public. No stockpiles are maintained specifically for supporting flood fight operations by reclamation districts although at least one district indicated it had accessed this supply for flood fight operations. The Operational Area emergency operations center procedures do not clearly define the mutual aid system that reclamation districts would use to request mutual aid for flood fight operations.

Flood Fight Operations Training

The County does not conduct flood-specific training or provide DWR flood fight classes to its employees. There is a level of involvement of local fire districts with reclamation district flood fight operations but the level of training provided to fire district staff for those activities is unknown. The City of Modesto indicated that waste water treatment plant staff do receive annual flood fight training.

Debris Removal

County Public Works recognizes a function with debris removal from County roads. FEMA will allow the County to assist with removal of debris from private property that did not originate with the property owner's possession or land but a written debris removal plan with criteria to ensure that debris removed meets eligibility rules is needed. The County does not have such a plan at this time.

No written plan for organizing the removal of hazardous waste from a flooded area was identified. County Environmental Resources would have a role in this activity but time did not allow an interview with that organization. Follow up on this is recommended.

4. Geographic Area

See attached annotated maps.

5. Recommendations

5.a General Conclusions

5.a.1 In Regard to Public Safety Operations

While they are obviously important, public safety operations within the study area do not face highly complex or extensive issues such as are found in heavily urbanized areas in deep flood zones. The shallow nature of potential flooding in the more urban areas of Patterson and Newman cause considerable damage but again are not a highly complex organizational response challenge. Development of extensive pre-plans for conducting resident warning, evacuation, or rescue would, in general, not be a priority for the study area if resources are limited. There are currently no written response plans specific to the study area.

There are two issues regarding public safety operations, however, that the reconnaissance indicates should be examined more closely for possible action. First, the structure of field command and control in regard to flood fight operations and public safety operations, as well as the manner of their interaction, was unclear in some districts and not clearly documented in any. Second, the area does present the potential problem of evacuation of dairies and bulk hazardous materials from rural sites and debris removal following a flood. These more complex organizational issues should be examined more closely for potential action.

5.a.2 In Regard to Flood Fight Operations

The presence of considerable private property, vital bridges and roads, and substantial infrastructure critical to public safety and health focuses attention on the quality of flood fight operations. Effective and rapid action to prevent a levee breach, or to limit the extent, depth, or duration of flood waters in the event of a breach, is the only methodology for minimizing possible long term adverse impacts from loss of this infrastructure. Flood fight operations in this case would include plans for rapid removal of equipment or components of facilities where possible to speed restoration of services.

Currently there are very knowledgeable and experienced people available to direct flood fight operations but little or no written flood fight plans reflecting this knowledge. Flood fight operations are organized at the time of the emergency and are mostly conducted informally. The command structure for conducting flood fight operations in some cases is unclear, or at least not documented.

Also, the financial situation of the reclamation districts is relatively weak and could be a barrier to improvement actions and response. Grants or other sources of alternate funding should be explored to enhance reclamation district response capabilities.

Finally, processes for reclamation districts to request mutual aid should be clearly defined and jurisdictions need to at least discuss and better define their policies for supporting flood fight operations if requested.

5.a.3 In Regard to Overall Flood Emergency Response Preparedness

The Mid-San Joaquin River Region is at a point where initial detailed planning for future flood fight operations and concurrent public safety operations is needed and justified. Opportunities for accomplishing this planning in the near future are discussed below. However, a major problem in areas that have completed such detailed planning and training in the past is maintenance.

The long intervals between floods, and the other demands placed on the time of officials, makes maintenance of plans and training over the long intervals between major floods difficult. The consistent communication and cooperation that is a key element of joint planning tends to stop when initial resources run out and other demands on time become a constant distraction. Any major project to improve flood response in the Mid-San Joaquin River Region should include a mechanism for ensuring proper maintenance of resulting improved plans and training programs created as a result of the regional flood management plan process.

5b. Specific Recommended Projects

5.b.1 Develop Local Flood Fight Plans

In regard to flood fight operations, develop local flood fight plans as the highest priority response improvement project. These plans would document 1) historic and flood fight knowledge of current and past district responders, 2) current response procedures for levee flood fight, and 3) options for containing floods from a breach. Reclamation districts, as the local jurisdiction responsible for maintaining the project levees and general flood control within their boundaries, would prepare the plans with the assistance of other local jurisdictions.

As noted below, a standard template for development of such flood fight plans (also called flood safety plans or tactical flood plans in other contexts) is emerging in the Central Valley that is supported by the Department of Water Resources and FEMA. This template uses a map format to display information complemented with a concise written reclamation district emergency operations plan. The standard template is consistent with FEMA preparedness planning guidance and has been approved by the Department of Water Resources.

5.b.2 Perform Key Hydrological Studies

A key preliminary to preparing the local flood fight plans in the Mid-San Joaquin River Region is completion of some detailed topographic and hydrological studies. The key study would be for the area protected by RD2091 and RD2063. The characteristics of flood flows that would occur in the event of a breach in either district need to be identified. The other studies would better define flood threats to the waste water treatment plants of Newman and Patterson.

In regard to the first study, the RD2091/2063 area, as noted in this report, contains considerable critical infrastructure and is the most highly populated area protected directly by project levees. There is reason to believe that RD2091 is dependent on the RD2063 levees for protection as well as on its own levee system. A breach in RD2091 could possibly also cause flood waters to back into RD2063 to some extent.

In order to ensure the best possible protection of critical infrastructure in RD2091 (e.g. the Modesto waste water treatment plant and Gomes Lake) this relationship needs to be confirmed. If confirmed the characteristics of flood flows from RD2063 into RD2091 and vice versa needs to be thoroughly understood in order to identify practical containment options and an effective joint flood fight plan between districts. Part of this study would include an update of the current topography and elevations of the area by LIDAR or other means.

The smaller micro-studies for the other treatment plans would confirm water elevations at which there is a significant threat to those facilities and the characteristics of flood water movement in the event 1) water elevations rise above the eastern boundary fence line at the Patterson plant, or 2) either the Newman Plant flood control levee or Newman Wasteway embankment fails. This detailed information would allow development of better trigger levels for actions to protect infrastructure and better plans for maintaining service if either of these contingencies materialize.

5.b.3 Complete Response Plans for Public Safety Agency Functions

The primary general public protection action in floods is evacuation. Elements of such operations include warning, provision of public information and instructions, rescue, and shelter operations. They also can include provisions for orderly shutdown of threatened critical infrastructure and evacuation of critical, portable, equipment.

It is recommended that public safety agency evacuation plans and maps be developed at a minimum for the area protected by RD1604, RD2063, and RD2091. Evacuation procedures for these rural districts could be included on the respective flood contingency map or displayed on separate evacuation maps. In addition, formal urban evacuation maps should be developed for those populated areas of the Cities of Newman, Patterson, and Modesto exposed to sheet flow or flood water back up from

area streams and creeks. These urban evacuation maps would be developed in accordance with the Guide to Urban Evacuation Mapping available at www.sjmap.org/oesmg.

Evacuation procedures shown on these maps should also address rural evacuation issues such as locations of dairies and storage of bulk hazardous materials with detailed procedures for their orderly evacuation and temporary storage. All evacuation maps would display the emergency response command organization for conducting these operations and the response organization structure. These plans and maps would be developed in cooperation with local law and fire agencies and the reclamation districts.

Finally, Stanislaus County should develop a debris removal plan and policy. Preparation of such a written plan would assist with ensuring reimbursement for debris removal costs incurred by the County after a flood from the State and federal disaster assistance programs. Stanislaus County operates the local waste disposal system and has both jurisdiction and resources for operating a debris removal program. Ensuring eligibility for disaster financial assistance will allow the County to perform authorized debris removal without delay or uncertainty.

5.b.4 Clarify Command and Control

As noted above, command of flood fight operations within RD2091, and how that command relates to public safety command, is unclear or at least not clearly documented. It is a high priority that local jurisdictions should clarify and document the command structure for areas threatened by flood waters. In particular, it is important to clarify how the flood fight commands and public safety agency commands will interact. These protocols could be included on flood contingency and evacuation maps or shown on a separate flood fight unified command map. In addition, reclamation districts should adopt a formal mechanism for clearly designating a flood fight incident commander as part of their flood safety plans.

5.b.5 Arrange for Emergency Planning Support for Reclamation Districts

The limited financial resources and staffing of reclamation districts makes development and maintenance of detailed and adequate flood fight plans difficult. There is also a lack of expertise within reclamation districts for preparation of proper written emergency plans. The County of Stanislaus and City of Modesto should enter into an agreement with the reclamation districts to provide administrative and professional support for the development and maintenance of district flood fight plans. A cost sharing arrangement could be developed within this agreement.

5.b.6 Better Define Operational Area Logistical Support for Flood Fight Operations

Jurisdictions making up the Stanislaus Operational Area should develop an agreement or procedure outlining the specific process and characteristics for providing levee flood fight support and mutual aid to reclamation districts. Potential support would include assistance with levee patrol, flood fight crews, and funds for the acquisition of private contractors and bulk materials. In particular, the provision of funds, or purchasing support, for acquisition of private vendors or bulk materials should be clearly defined. Total dependence on the State or federal governments for emergency funding of response to threats to levee integrity could lead to delays that result in levee failure. Local jurisdictions should identify circumstances in which they will intervene to support reclamation district response financially to protect their interests and the general public.

5.b.7 Develop a Flood Response Training Program

State and federal governments require that public agencies institutionalize the National Incident Management System (NIMS) for management of disaster incidents. The Department of Water Resources has also issued standardized protocols for marking levee problems during levee patrols. A realistic training policy and program for reclamation districts should be developed as part of the planning process.

5.b.8 Form a Stanislaus Operational Area Flood Response Working Group

The Stanislaus Operational Area should form a flood response working group composed of the reclamation districts and public safety agencies with jurisdiction within the flood plain. This working group should be created through a written agreement or protocol that defines meeting frequency, objectives, and specific review items. This group could then ensure that flood contingency maps, evacuation plans, and training standards developed in past preparedness projects are maintained. This process would also ensure that there is ongoing communication between jurisdictions and that new officials are properly briefed on current preparedness plans and their status.

6. Opportunities

6a. Availability of Standard Local Flood Emergency Plan Templates

The issuance of two grants by the Department of Water Resources for local flood emergency response projects has stimulated discussion on the need for local flood response plans and the proper format for such plans. Indeed, DWR grant guidance indicates that completion of such plans are a prerequisite to obtaining funds for other response items such as supplies or communications. The recent addition of Water Code Section 9650 (AB156) which requires the preparation of “flood safety plans” also has highlighted the need for a standard and acceptable template for such local flood response plans.

San Joaquin County has over the past decade developed a local flood response plan template using a mapping format. The flood contingency maps and urban evacuation maps developed under this concept display flood emergency response information, plans, and protocols in a user friendly format. FEMA subsequently provided funds for development of guides for implementing similar mapping programs. In 2012, San Joaquin County adapted this concept to fully conform to the requirements of Water Code Section 9650 for its urban areas protected by project levees. The new plan template enhanced previous mapping products and integrated them with a new written reclamation district emergency operations plan.

During the summer of 2013, flood safety plans initially completed for two San Joaquin County reclamation districts using this new format were submitted to the Department of Water Resources and the Central Valley Flood Protection Board for review. Subsequently, the Department of Water Resources indicated that this format met Section 9650 requirements and that the Department considered this format the preferred methodology for completing local flood response plans required by their grant guidance.

Grant funding has now been awarded, or is in the process of submission and review, for implementation of this planning template throughout the Delta and the Mid and Upper Sacramento River. This situation provides an opportunity for the Mid-San Joaquin River Region to more rapidly complete any local flood planning project since tested methodology already approved by the State, and consistent with similar efforts in other regions, is now available

6b. Funding Opportunities for Flood Emergency Preparedness

Propositions 1E and 84 passed by the voters in 2006 provided, among other things, for $135 million in funding for enhancing flood emergency response in the State. In 2013 the Department of Water Resources issued the first grants to locals from these funds for local flood emergency response projects. In March 2013 a “statewide” grant with total funding of $5 million was issued and in August 2013 a “Delta specific” grant with total funding of $5 million was issued. Stanislaus County jurisdictions were eligible for applying for the statewide grant but failed to do so.

However, the Department of Water Resources has indicated that it is identifying funds for a second round of these grants that could occur in 2014. Funds for a second round of the Delta specific grant have already been identified which provides some assurance that a second round of the statewide grant will also be forthcoming.

This situation provides a possible opportunity for the Mid-San Joaquin River Region to begin to implement emergency response and preparedness projects identified and in the regional flood management plan process. This potential funding opportunity should be integrated into the final plan and the funding needs for specific projects identified

within the RFMP so that jurisdictions are prepared to submit a joint, well-planned, application.

6.c Development of Joint Planning and Plan Maintenance Mechanisms

The Mid-San Joaquin River Region regional flood management plan process provides an opportunity for local jurisdictions to form embryo mechanisms and procedures for future joint flood emergency response planning and maintenance activities. Procedures and protocols used to jointly develop the regional plan should be adjusted for use after the completion of this project to perform joint planning or to jointly seek funding for identified projects.

7. Sources

The following documents and persons were contacted as part of this report to supplement personal observation of the study area. Listing of an individual does not imply necessary endorsement of all report details or conclusions.

Documents

Stanislaus County Multi-Jurisdictional Hazard Mitigation Plan, updated 2010

Annals of Stanislaus County, I. Brotherton, 1982

Stories of Stanislaus, S. Elias, 1924

California Department of Public Works Bulletin No. 37, Irrigation, Reclamation and Other Public Districts in California, 1930

2012 Inspection and Local Maintaining Agency Report of the Central Valley State-Federal Flood Protection System, Appendix B

Officials and Individuals

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Modesto Waste Water Treatment Plant

Robert Caetano
Turlock Irrigation District

Tou Her
Turlock Irrigation District

Jeff Holt
River Partners

Brad Koehn
Turlock Irrigation District

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Maria Encinas
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Kim Forrest
U.S Fish and Wildlife Service

Larry Gilley
City of Turlock Municipal Utilities

Lance Perry
City of Newman Waste Water Plant

Julie Rentner
RD2092/River Partners

Martin Reyes
RD2031 and RD2092

Garner Reynolds
City of Newman Public Works

Stephen Sheppard
River Partners/RD2092

Tony Martinez
Reclamation District 1602

Dan Lamb
Reclamation District 2091

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Milton O'Haire
Stanislaus Agricultural Commissioner

Joe Sallaberry
Reclamation District 2063

Ed and William Lyons
Reclamation District 2031

Dan Roberts
Reclamation District 1602

Attachment 1

Emergency Response Focus Area Review Sheet

Objective: Develop a comprehensive description of the status of Flood Emergency Preparedness, Response, and Recovery (FEPRR) capabilities in order to identify and prioritize possible improvements with local agencies.

Review Issues:

Existing County and City plans/policies in regard to following specific flood response issues:

- Flood forecasting and early warning/public notification systems
- Public education initiatives (flood elevation level markings on utility poles, etc.)
- Specific plans or procedures for public safety response within LMAs.

  Evacuation plans to include pre-identified routes, organization, traffic control, shelter areas, and transportation. Are any such plans specific to LMAs or only general?

  Degree of integration of evacuation/rescue plans with LMA flood fight plans. Do evacuation/rescue plans reference LMA potential need to move material and staff into evacuation zone? Would the public safety IC be aware of location of concurrent LMA operations such as making relief cuts or placing emergency pumping stations?

  Plans for collecting hazardous or toxic materials released and/or deposited from a flood

  Recovery plans specific to floods including a debris removal plan.

- Stockpiling of resources; 1) flood fight materials to support LMAs, 2) evacuation/rescue/command/communications materials and equipment, or 3) FF materials for use by the public.

  County/city policy for supporting LMAs with engineering/construction services for levee problems.

  Existence of contact lists/standby contracts for vendors of 1) flood fight materials, 2) engineering/construction services and 3) shelter support

- Does the OA have a mutual aid system and coordinator specifically identified to handle mutual aid requests from LMAs for assistance with levee patrol, flood fight, emergency engineering work on a levee or engineering actions to physically contain a flood.
- Designation of critical facilities to protect/flood proof? Specific plans to protect or mitigate damage to critical facilities in event of potential breach (e.g. pulling pump motors, turning off systems or removing computers/controls, etc)

Flood proofing or mitigation projects for critical facilities pre-identified and documented to facilitate rapid application for implementation funding if it becomes available.

- Training of county and city response personnel; 1) Standard SEMS and NIMS training; 2) flood specific training; 3) levee flood fight training (e.g. DWR flood fight class or training on levee patrol) to support LMA response on the levees, and 4) other relevant training.

- Is there a pre-established unified command structure for field operations in a flood;

  1) Unified command for multi-jurisdictional warning/evacuation/rescue operations

  2) Unified command for multi-jurisdictional flood fight operations (LMAs with neighboring LMAs and with DWR/USACE)

  3) Specific command or coordination protocols between LMAs and public safety agencies operating in the area).

  If the county/city only create such commands at the time of the emergency is there a protocol for doing that in place.

- Flood response exercises – city, county, state-level**.** Exercises with LMAs.

- Communications capabilities and protocols

  1) Tactical communications between County/city responders and LMAs

  2) Communications protocols between county/city to DWR on flood fight issues

- Emergency response agreements with city, county, state, etc. that address issues of liability and roles & responsibilities for flood fight (levee) response and public safety response.

- Integration of environmental compliance and mitigation into flood fighting plans

  Mutual Aid Agreements – with other agencies specific to flood response (such as California Conservation Corps, etc.) Agreements to train and use Sheriff work crews, etc.

- History FEMA/State reimbursement; 1) Reimbursement of expenditures for county/city public safety response; 2)reimbursement of expenditures made in support of flood fight operations.

<u>Existing Levee Maintaining Agencies Emergency Response Plans(ERP) in regard to:</u>

- Water Code Section 9650 (AB156) Levee Safety Plan criteria; Flood Preparedness Plan, Levee Patrol Plan, LMA Communications Plan, Flood Fight Plan, Dewatering Plan.

  NOTE: An AB156 LSP is not required for rural districts with less than 1,000 residents but is still a good template to use to evaluate LMA preparedness

Flood Preparedness Plan

Stockpile of FF resources; availability of engineering services

Responsibility assigned for monitoring of water conditions and action criteria established for 1) alerting trustees and staff, 2) starting levee patrol, 3) pre-positioning FF materials, 4) notifying county and state agencies

NIMS/SEMS training policy and program for 1) trustees, 2) staff, 3) volunteers obtained at time of emergency.

Authorities and responsibilities identified in writing for emergency expenditure of funds, signing of contracts, speaking for district in multi-agency coordination processes.

Levee patrol plan

Staffing identified, patrol organization and scheduling identified, communications protocol; patrol sectors pre-identified if warranted, safety equipment and written safety protocols

Pre-identified staging areas for FF supplies along levee. Pre-identified delivery points to meet resources/staff coming from outside of district.

Does the LMA have a levee problem staking protocol and do patrols have needed materials.

Are volunteers or staff obtained at time of emergency provided safety/NIMS/staking protocols/reporting and debriefing training.

Flood Fight Plan

Does LMA have clear written protocols for 1) assigning a LMA Incident Commander in accordance with NIMS protocols, 2) providing authority to sign contracts or expend LMA funds for emergency actions, and 3) communicating with county/city/state agencies?

Flood history relevant to future flood response operations documented. Extent, direction, and characteristics of flood flow in the event of a breach known and documented. Key elevations known and documented (e.g. 100-year flood, key ground elevations, key contours)

Potential containment actions analyzed, identified and documented (e.g. relief cuts, emergency berms)

LMA reporting protocol in place for reporting levee problems, patrol status or results, or mutual aid requests to city, County, DWR.

LMA contingency fund in place for contracting with vendors for emergency actions on their levees or for purchasing additional flood fight materials.

Standby contracts in place or pre-established contract templates and emergency contracting process.

Does LMA have any on-going planning process in place with neighboring LMAs or any mutual aid agreements with neighboring LMAs or county/cities for help with levee patrol, basic flood fight operations (bagging a boil).

Integration of environmental compliance and mitigation into flood fighting plans

Dewatering Plan

Dewatering plan identified and/or documented (e.g. relief cut, placement of emergency pumps, removal of ponded water)

Are current pumping stations above 100-year flood elevation? Plans for removing motors or protecting pumps in place if not?

Is it clear in the LMA plan or the county/city emergency plans who will finance dewatering operations in the event an area is flooded? Is there any protocol for requesting State or federal assistance with dewatering?

<u>Existing situation in regard to levee rehabilitation and restoration of flood protection existing prior to the flood event</u>.

- Identification of the responsibilities between the State and local agencies to repair damage to both SPFC and non-SPFC levees after a flood event

- Implications for LMAs if they lose eligibility for federal assistance through the USACE Rehabilitation and Inspection Program (RIP)

- Feasibility of those LMAs developing and implementing System-Wide Improvement Framework (SWIF) plans, or even regional SWIF

Attachment 2

Additional Considerations for Flood Emergency Preparedness

Any flood preparedness program must face the major maintenance issue posed by the long intervals between major floods on the San Joaquin River. The predictable high rates of personnel turnover over the course of a decade or two alone makes it highly probable that when a major flood next arrives the great majority of responders will have had little training and no practical flood response experience. The following comments are provided to further assist with identification of specific flood control improvement projects.

Identify, collect, and centralize information critical for decision making

A priority should be given to collecting information critical for making effective and rapid decisions in a future flood. How high is that dry land levee? What happened 20 years ago in the 1997 floods? How will the water flow if the levee does breach? It will be time consuming or impossible to collect this when the flood arrives. Information, options, and prompts to assist the initial organization of an effective response should also be collected or decided upon.

Display plans and information in a user friendly format

Key response decisions will inevitably be made in the field where time pressures, stress, and human reaction to chaotic environments place a premium on ease of access of information needed for making those decisions and organizing the initial response. User-friendly formats should be used to display critical information.

Plan for taking better advantage of flood warning times

The difficulty of maintaining extensive training programs for floods over the long intervals between major floods means that the time between initial flood warning and arrival must be fully and expertly exploited. Even 24 hours of warning is sufficient to provide competent, but very likely inexperienced, responders with enough information to organize an effective response. But the use of this time must be intelligently pre-planned. Detailed plans for providing abbreviated training and safety sessions to both flood fight crews and public safety responders, particularly command personnel, could expedite the organization of an effective response, help meet State and Federal requirements for reimbursement, and improve results.

RD 2085

RD 2064

RD 2031

RD 2101

RD 2099

Private Interest Levee

Dairy

Farm

Dairy

Faith Ranch Headquarters

Maps Ranch Headquarters

Spyk Levee

Levee Breach 1997

Riverbank Erosion

Riverbank Erosion

Project Levee

Pump Station

1997 Boils

Levee Breach 1997

Pump Station

District Headquarters

Highway 132

Riverbank Erosion

Blewett Water District

PGE UG Pipeline

Hetch Hetchy Aquaduct

Highway 132

District Levee

Levee Breach 1997

County

Reclamation District

N

0 0.25 0.5 0.75 1 2 Miles

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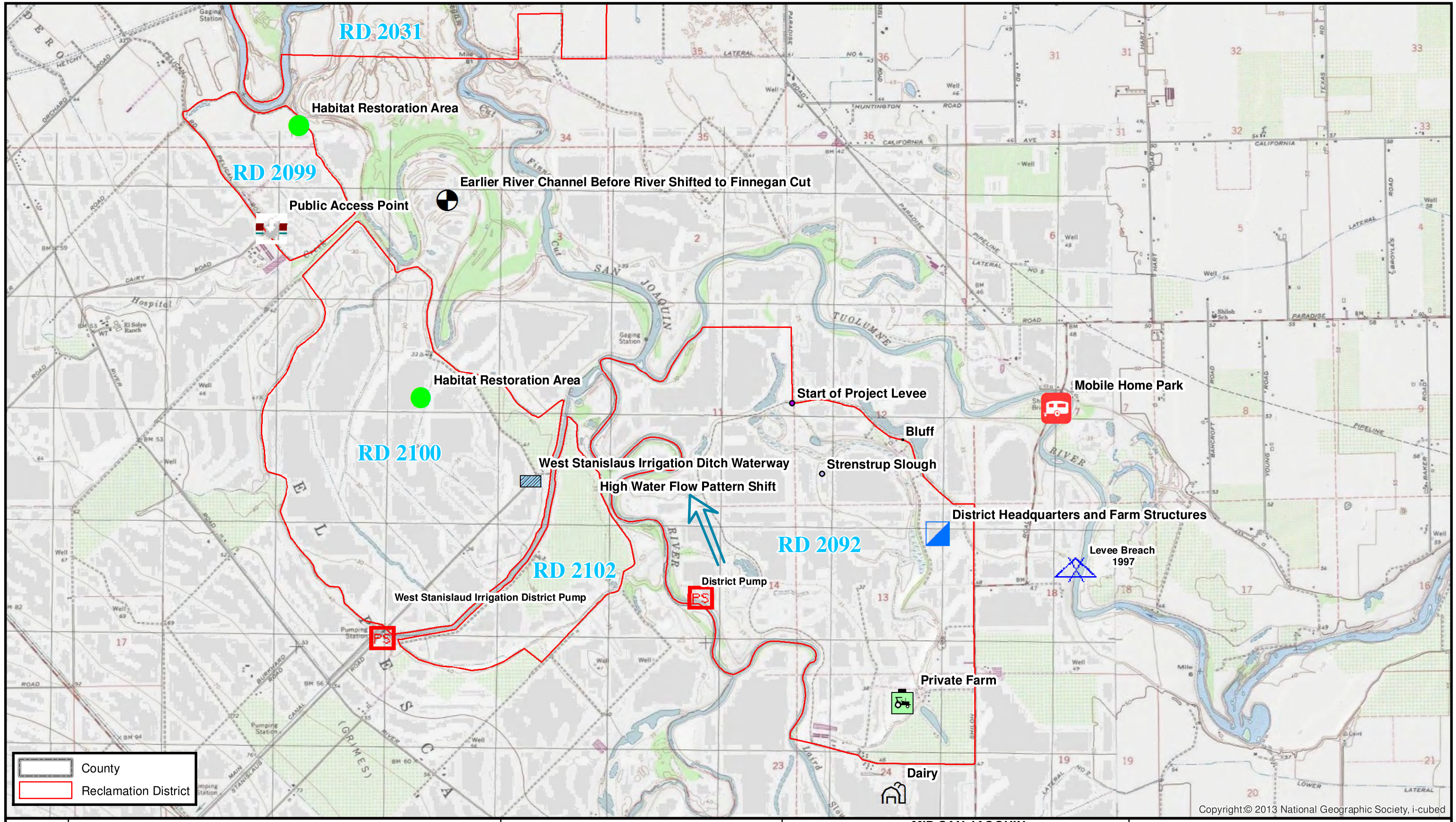
MID SAN JAOQUIN
REGIONAL FLOOD MANAGEMENT PLAN

AREA MAP 1



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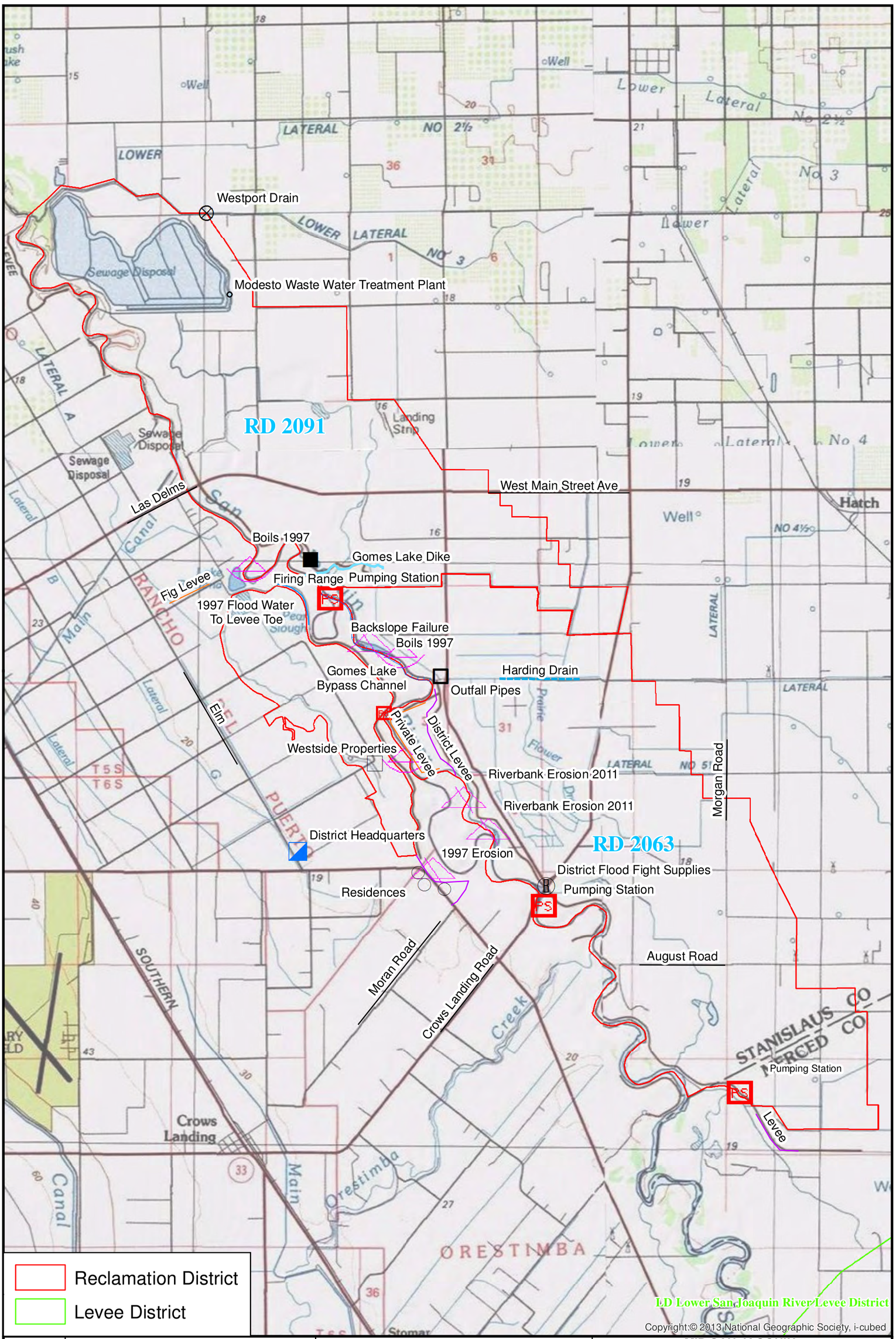
MID SAN JAOQUIN
REGIONAL FLOOD MANAGEMENT PLAN

AREA MAP 2



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MID SAN JAOQUIN
REGIONAL FLOOD MANAGEMENT PLAN

AREA MAP 3

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APPENDIX E

Operations and Maintenance Assessment Technical Memorandum

Operations and Maintenance Assessment Technical Memorandum

Charles Hilliard, Peterson-Brustad, Inc.

Mid-San Joaquin River
Regional Flood Management Plan
March 2014

Table of Contents

I. Abbreviations & Acronyms

CVFPB……..….Central Valley Flood Protection Board
DWR……Department of Water Resources
EIR…….……Environmental Impact Report
ESA…….……Endangered Species Act
LM……..Levee Mile
LMA…….Local Maintaining Agency
LMA Report……...Inspection and Local Maintaining Agency Report
NULE……Non-Urban Levee Evaluation
O&M…….....Operations and Maintenance
RD/District…..……..…Reclamation District
Region……Mid San Joaquin River Region
SPFC……State Plan of Flood Control
State……..……State of California
USACE…….……United States Army Corps of Engineers

II. Definitions

Department of Water Resources (DWR) Levee Inspection Summary Table Ratings

Acceptable (A) – No immediate work required, other than routine maintenance. The flood protection project will function as designed and intended with a high degree of reliability, and necessary cyclical maintenance is being performed adequately.

Minimally Acceptable (M) – One or more deficient conditions exist in the flood protection project that needs to be improved or corrected. However, the project will essentially function as designed with a lesser degree of reliability than what the project could provide.

Unacceptable (U) – One or more deficient conditions exist that may prevent the project from functioning as designed, intended, or required.

NOTE: Instances where M* are given, this means that this levee segment would have received an "A" rating, but there were very small portions of levee that received a rating of "U".

Non-Urban Levee Evaluation (NULE) Levee Ratings

Hazard Level A - When water reaches the assessment water surface elevation (typically the 1955/1957 profile), there is a low likelihood of either levee failure or the need to flood-fight to prevent levee failure.

Hazard Level B - When water reaches the assessment water surface elevation (typically the 1955/1957 profile), there is a moderate likelihood of levee failure or the need to flood-fight to prevent levee failure.

Hazard Level C - When water reaches the assessment water surface elevation (typically the 1955/1957 profile), there is a high likelihood of levee failure or the need to flood-fight to prevent levee failure.

Lacking Sufficient Data (Category LD) - Lacking sufficient data regarding levee past performance or hazard indicators to be able to assign a hazard level or there is poor correlation between past performance and hazard indicators.

1. Introduction

The objective of this Operations and Maintenance (O&M) Memorandum is to provide an initial assessment of the Operation and Maintenance practices in the Mid San Joaquin River Region in order to assist local stakeholders with the development of a Regional Flood Management Plan (RFMP). This report includes a description of each Reclamation District (RD) and/or Local Maintaining Agency (LMA), including the agency responsible for O&M in each district, characteristics of each district, typical O&M activities performed, approximate expenditures, budget information, and a summary of identified O&M deficiencies. General recommendations are also included for each district, along with over-arching general recommendations in the beginning of this report. The contents of this report are based on reviewing available information and discussions with Reclamation District (RD) staff responsible for flood control system O&M.

2. Study Methodology

The methodology for preparing this report was determined using available information from DWR and based on discussions with RD representatives. Each source document was reviewed for relevant information on the reclamation districts within the Mid San Joaquin River Region. The information gathered was then cross checked between sources in order to find the most current and reliable information.

3. General Findings

Typical maintenance activities for the districts in the region include: vegetation management, rodent control, erosion control/repairs, and crown maintenance. Most of the RDs in the Mid San Joaquin Region are rural districts which encompass agricultural land. Accordingly, there are limited or no assessments, which means that individual land owners fund and perform necessary levee maintenance.

Vegetation and animal control were common issues that were noted in many of the DWR Levee Inspection Summaries for the RDs in the Region. Vegetation and rodent control challenges were also noted in discussions held with each RD. Discussions with RD staff and representatives indicated environmental permitting challenges and Endangered Species Act (ESA) constraints associated with O&M activities often puts districts in the middle of conflicting regulatory requirements. Examples of this include being disallowed to remove vegetation that is habitat for endangered species, constraints on methods of animal control, and permitting challenges when using controlled burns as a means of vegetation management. In these instances, RDs have to make the decision of whether to perform the required O&M and potentially be fined for violating ESA regulations, or perform limited O&M that complies with ESA

requirements at the risk of failing regular inspections. Since RDs have limited financial resources as it is, the decision is often made to comply with ESA regulations and hope the limited O&M is sufficient.

However, failure to perform regular maintenance not only threatens financial support in the event of a disaster from the PL 84-99 program, but reduces the effectiveness of existing flood control facilities to perform during a flood event, thereby threatening the people and property behind these levees. Currently, RD 2092 is the only District in the Mid San Joaquin Region that is eligible for PL 84-99 disaster assistance. However, the District is in the process of seeking to eliminate O&M responsibilities and will permit flowage on previously protected lands within the District.

In addition to permitting challenges, many RDs cited differing vegetation criteria as outlined by DWR and USACE as a source of confusion and frustration. In the past, these differing criteria would often result in RDs receiving acceptable ratings on DWRs levee inspections, but unacceptable ratings on USACE (PL 84-99) inspections. This was problematic since just one unacceptable rating from USACE can jeopardize an LMA's eligibility in the PL 84-99 program, which provides levee rehabilitation assistance in the event of a disaster. Recently USACE changed their vegetation policy, deciding that otherwise eligible levees would not be removed from active PL84-99 status because of vegetation concerns alone. This interim policy change was meant to help alleviate this vegetation issue and will be replaced by a permanent vegetation policy once it is determined.

Furthermore, many LMAs noted they were comfortable funding minimal O&M responsibilities, but this level of O&M has been insufficient to meet State and Federal requirements. Given their limited financial resources, these Districts are not able to generate the capital needed to implement large-scale levee repairs. The table below summarizes the approximate annual O&M expenditures, and sources of funding for the LMAs in the Region.

LMA	Approx. Levee Miles Maintained	Approx. Annual O&M Expenditures	O&M Funding Sources
RD 1602	6.29	$10,000 - $12,000	Individual Property Owners
RD 2031	13.19	$30,000	Individual Property Owners
RD 2063	10.63	$83,000	Assessments
RD 2091	7.89*	$40,000 - $50,000	Assessments
RD 2092	3.76	$10,000 - $12,000	Individual Property Owners
RD 2101	3.51	$25,000	Individual Property Owner

Gomes Lake	0.3	$14,000 - $35,000	JPA (TID, Stanislaus County, City of Turlock, RD 2091, RD 2063)

*0.3 miles are maintained by TID under the Gomes Lake JPA

Based on this information, funding of routine O&M appears sustainable. However, this does not consider funding needs for large-scale repairs. DWR grant programs can help LMAs with these expenses, but financial resources of the LMAs are limited, making it difficult to meet the local cost-share requirements. Furthermore, LMA staff limitations, combined with the fact that district staff are typically work and/or manage farms full-time, mean there is little time left to apply for this funding. It is also noted that some LMAs expressed an interest in pooling O&M equipment resources to help control O&M expenses.

4. General Recommendations for Improving O&M in the Region

Based on the findings in the previous section, PBI has developed the following recommendations to improve O&M in the Region.

Programmatic Environmental Analysis for O&M

As previously discussed, O&M activities such as vegetation and rodent control can impact endangered species and habitat for these species. Reform of current permitting regulations may help RDs more effectively meet their O&M responsibilities, while complying with applicable regulations. A programmatic approach to permitting routine O&M responsibilities for SPFC facilities through the region, or the State, may help meet their O&M responsibilities while complying with applicable regulations.

Establish Consistent Levee Vegetation Standards

Maintenance and/or removal of vegetation along the levee is aimed at improving public safety, levee surface visibility, and levee accessibility. However, as noted in the previous section, it is common for an RD to receive an acceptable rating from DWR on vegetation management, but an unacceptable rating from USACE. RDs in the Region need DWR and USACE to agree on a common standard for levee vegetation management.

A brief summary of the differing vegetation standards is provided below.

The USACE's vegetation policy is outlined in an Engineering Technical Letter (ETL) titled "Guidelines for Landscape Planting and Vegetation Management at Levees, Floodwalls, Embankment Dams, and Appurtenant Structures." According to the ETL, a vegetation-free zone must be maintained along all levees. The vegetation-free zone is defined as a three-dimensional corridor surrounding all levees, floodwalls, embankment dams, and critical appurtenant structures in all flood damage reduction systems. The

ETL requires removal of all vegetation (except grass) on existing levees, plus vegetation within 15-feet of the landside levee toe. Tree canopies extending into this zone must be trimmed 8-feet above the ground.

By contrast, DWR's vegetation policy incorporates a Life Cycle Management (LCM) approach for "legacy" vegetation. This policy is aimed at limiting the financial costs associated with extensive vegetation removal and potentially significant loss of habitat along levees. Under DWRs vegetation management strategy, levees containing legacy trees along the landside or waterside slopes will be managed to allow vegetation and trees to live out their normal life cycles except where they pose a threat, while gradually progressing (over several decades) toward the current USACE policy of "eliminating woody vegetation from the vegetation free zone." The LCM approach allows for the preservation of riparian habitat as long as the vegetation does not impair visibility and accessibility. The crown must be kept free of all vegetation since it serves as a patrol road for levee maintenance.

DWR's policy also permits trees on the waterside slope that are farther than 20' from the crest because of engineering benefits including erosion protection, soil reinforcement, and sediment recruitment, provided visibility requirements are met, and the vegetation does not pose a threat to the integrity of the levee.

Recently USACE has released its "Interim Policy for Determining Eligibility Status of Flood Risk Reduction Management Projects for the Rehabilitation Program Pursuant to Public Law (P.L.) 84-99" (March 2014). This document has set interim policies on levee vegetation management. Following this interim policy, levee systems will no longer be removed from the PL84-99 Program for vegetation issues alone while long term policies are set. This is a good short term solution until long term policies are set. These long term policies may be more in line with DWR guidelines.

Reconciling these two differing criteria will enable RDs to focus on a meeting a single vegetation standard for their levees. If this recommendation is combined with the programmatic approach to permitting routine O&M responsibilities for SPFC facilities as discussed previously, this would enable RDs to comply with permitting requirements while completing regular O&M responsibilities.

Streamline Grant Application Process and/or Support LMAs with Grant Applications

DWR has many grant programs available to assist LMAs with repairs and improvements to their levee systems, which is good since many RDs lack the financial resources to implement large-scale repairs/improvements. However, grant applications can take a significant amount of time to prepare, and technical expertise to complete. Limited RD staff resources mean that grants often go unapplied for, thus propagating system deficiencies.

RDs have expressed a desire to have DWR staff assist in the preparation of grant applications, especially for deficiencies identified by DWR. The RDs could review and have their respective Boards approve such applications, if necessary. This would help address critical erosion/seepage sites and other needed repairs identified by DWR.

As mentioned previously, RDs in the Mid San Joaquin Region have limited financial resources, making it difficult for these areas to meet the local cost-sharing requirements for State and Federal grant programs. Revisions to the State's local cost-sharing guidelines for projects that provide regional flood system benefits should be considered by DWR.

Finally, many of the RDs in the Region are not formally organized which prevents them from being able to enter into funding agreements with the State. A solution is needed to enable Districts to apply for State funding. For Districts where organization is infeasible, one possibility is agreements amongst several Districts to enter into funding agreements with DWR.

Consolidation of O&M

Large mowers and grout equipment used for vegetation and rodent control can be expensive, and are not used continuously. Therefore, an opportunity exists for RDs in the Region to pool their resources and share upfront and maintenance costs of operating one piece of machinery, rather than each RD having to own and operate their own.

Develop Levee Maintenance Best Management Practice (BMP) Guidance

Development of a handbook of best management practices for levee management would help educate LMA staff and standardize O&M practices. The handbook would include guidance for all O&M challenges, including addressing burrows/burrowing animals, and managing vegetation consistent with both DWR and USACE standards (until one standard can be agreed upon).

It would describe methods (e.g. dragging chains, goat grazing, mechanical trimming) and include the pros and cons of each, so each LMA can choose what works best for their situation.

Encroachments (those in place, but lacking permitting documentation) could also be addressed within the handbook. If no such protocol exists this would be a natural place to develop it.

Develop a Technical Support and Education Program to Inform LMAs on Levee Maintenance Issues

This program would be a medium through which educational materials such as the BMP handbook described above could be disseminated. This would likely be done by a staff

person who would meet in person with LMA staff and organize workshops to benefit multiple LMAs. This program could also be expanded to support LMAs in grant applications, but this expansion would most likely require local cost share from benefitted parties.

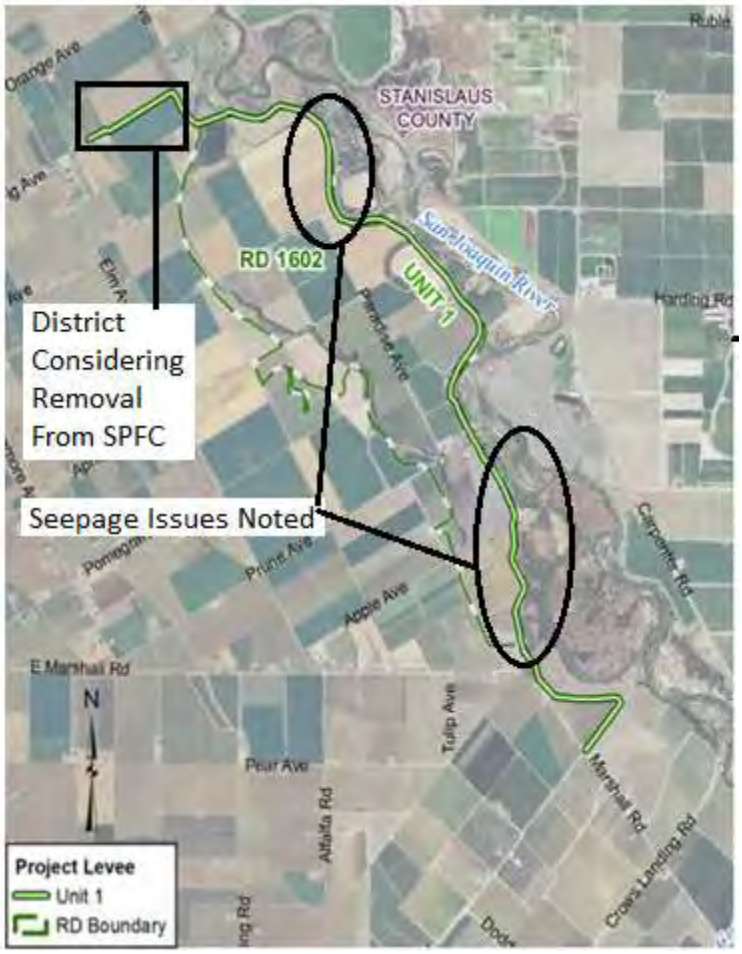
5. Individual District O&M Information

5.1 RD 1602 – Del Puerto

Maintaining Agency Information:

Reclamation District No. 1602

<u>Contact:</u>
Dan Roberts
Manager
District Office
2012 Apple Avenue
Patterson CA 95363
Phone: (209) 605-7117



Area Characteristics:

RD 1602 has 6.29 miles of levees along the left bank of the San Joaquin River that protect 3,500 acres of land. The protected land is mainly agricultural, used for growing alfalfa, wheat, tomatoes, and similar crops.

The district does have an annual landowner meeting, but there is no official board of trustees, and therefore there are no assessments. Thus, the O&M responsibilities fall to the property holders, who share any costs and maintenance duties on an informal basis under the initiative of Patterson Westside Farms, the district's primary land owner.

Typical Maintenance Activities:

Rodent Control, Slope Dragging, Vegetation Spraying

Estimated O&M Expenditures:

In the 2011-2012 and 2012-2013 RD 1602 estimated their O&M cost to be $10,000 and $12,000 respectively.

Budget Information:

There is not a formal O&M budget for RD 1602. Routine O&M is funded as required by the individual property owners.

Summary of O&M Deficiencies:

The table below was developed by DWR as part of the 2012 Inspection and Local Maintaining Agency Report and indicates specific problems on each levee and assigns a rating based on that information. Explanation of ratings criteria can be found under Abbreviations, Acronyms, and Definitions in the front of the manual.

The table shows inspection data from Fall 2011 and Fall 2012 as well as the change in that time, with an improvement being in green and a decline in red.

DWR Levee Inspection Summary

RD1602	Total LMA Miles	6.29										
	Fall 2011				Fall 2012				Change			
	Overall LMA Rating			U	Overall LMA Rating			U				
Rated Item	M Miles	U Miles	M+4U Miles	Thresh. %	M Miles	U Miles	M+4U Miles	Thresh. %	M Miles	U Miles	M+4U Miles	Thresh. %
Earthen Levee												
Vegetation	4.54		4.54	**72.18**	2.10		2.10	**33.39**	-2.44		-2.44	**-38.79**
Trim / Thin Trees	0.03		0.03	**0.48**					-0.03		-0.03	**-0.48**
Encroachments	0.05		0.05	**0.80**	0.04		0.04	**0.64**	-0.01		-0.01	**-0.16**
Animal Control	0.29		0.29	**4.61**	0.55		0.55	**8.74**	0.26		0.26	**4.13**
Slope Stability	0.04		0.04	**0.64**	0.04		0.04	**0.64**				**0.00**
Interior Drainage & Piping Systems												
Encroachments	0.01		0.01	**0.16**	0.01		0.01	**0.16**				**0.00**
Flap Gates	0.01		0.01	**0.16**	0.01		0.01	**0.16**				**0.00**
Concrete Tilting / Settlement	0.01		0.01	**0.16**	0.01		0.01	**0.16**				**0.00**
LMA Totals:	4.98	0.00	4.98	**79.17**	2.76	0.00	2.76	**43.88**	-2.22	0.00	-2.22	**-35.29**

***Maximum Allowable Threshold: 10%** **A: Acceptable** **M: Minimally Acceptable** **U: Unacceptable**

The levee inspection summary table shows that there is a positive trend from Fall 2011 to Fall 2012 in all areas except animal control. Although there is positive trend, the levee is still rated as unacceptable because of vegetation issues (M+4U>10%).

The 2012 LMA report found that there was significant rodent activity in the area, unauthorized encroachment at the levee, and unauthorized vehicle traffic between LM 0.0 and 0.5 as well as other locations.

The NULE project was conducted by DWR in recent years. The geotechnical information gathered as part of this effort and corresponding hazard ratings is shown below.

NULE RESULTS - RD 1602								
RD #	RD Name	Unit #	Segment #	Under-seepage	Slope Stability	Through Seepage	Erosion	Overall
1602	Del Puerto	1	190	C	A	C	A	C

The District staff cited funding for large scale projects/improvements, permitting, and rodent control as their primary O&M challenges. A 1,700 foot section of levee with seepage issues was also discussed. The district has been instructed to repair the section but they do not have the funding to complete the project, or the staffing or expertise to complete any application for grant money that might help pay for the project. The project was estimated to cost $2.9 million by DWR.

A possible desire to remove a portion of levee on the northwest side of the district from the SPFC was also mentioned. The levee is apparently on high ground and not very useful.

Needs and Suggestions Identified by the District:

- Assistance from DWR to prepare grant applications for large-scale repairs
- Establish consistent levee vegetation standards between DWR and USACE
- Remove a portion of the levee from the SPFC

5.2 RD 2031 – Elliot

Maintaining Agency Information:

Reclamation District No. 2031

Contact:
William Lyons, Jr
Landowner
Mapes Ranch
10555 Maze Boulevard
Modesto CA 95358
Phone: (209) 522-1762

Area Characteristics:

RD 2031 has 13.19 miles of levees with two separate units. Unit 01 is 7.15 miles long and lies on the left bank of the Stanislaus River while Unit 02 is 6.04 miles long and lies on the right bank of the San Joaquin River. These levees protect approximately 5,000 acres of land that is used primarily as range land for cattle. There are a limited number of structures within the district boundaries, and the structures that do exist are located high ground.

The Reclamation District has been inactive, but has recently requested re-activation from Stanislaus County and appointment of three Trustees. In the district's inactivity, the responsibility for levee maintenance has fallen to the property owners. Participation in maintenance in adjacent levees varies from landowner to landowner, with some owners being very active, and others being completely inactive.

The two primary landowners in the area, Faith Ranch and Mapes Ranch, noted that government agencies own land within the district, but are unwilling or unable to join a board of directors.

Typical Maintenance Activities:

Re-gravel and scrape roads, check valves, rodent control, and vegetation management

Estimated O&M Expenditures:

It was estimated that the two primary landowners spend around $30,000 per year between them.

Budget Information:

Since the district is inactive there are no assessments or formal budget for this district.

Summary of O&M Deficiencies:

The table on the following page was developed by DWR as part of the 2012 Inspection and Local Maintaining Agency Report and indicates specific problems on each levee and assigns a rating based on that information. Explanation of ratings criteria can be found under Abbreviations, Acronyms, and Definitions in the front of the manual.

The table shows inspection data from Fall 2011 and Fall 2012 as well as the change in that time, with an improvement being in green and a decline in red.

DWR Levee Inspection Summary

RD2031	Total LMA Miles	13.19										
	Fall 2011				Fall 2012				Change			
	Overall LMA Rating			M *	Overall LMA Rating			M				
Rated Item	M Miles	U Miles	M+4U Miles	Thresh. %	M Miles	U Miles	M+4U Miles	Thresh. %	M Miles	U Miles	M+4U Miles	Thresh. %
Earthen Levee												
Vegetation	0.02		0.02	0.15	0.02		0.02	0.15				0.00
Trim / Thin Trees	0.62		0.62	4.70	0.61		0.61	4.63	-0.01		-0.01	-0.08
Encroachments	0.01		0.01	0.08	0.52		0.52	3.94	0.51		0.51	3.87
Animal Control	0.03	0.01	0.07	0.53	0.14	0.03	0.26	1.97	0.11	0.02	0.19	1.44
Erosion / Bank Caving	0.03	0.01	0.07	0.53	0.03	0.01	0.07	0.53				0.00
Crown Surface / Depressions / Rutting	0.02		0.02	0.15	0.07		0.07	0.53	0.05		0.05	0.38
Seepage / Sandboils		0.01	0.04	0.30						-0.01	-0.04	-0.30
Interior Drainage & Piping Systems												
Flap Gates						0.01	0.04	0.30		0.01	0.04	0.30
Supplemental												
DWR Erosion Survey	0.04		0.04	0.30	0.04		0.04	0.30				0.00
LMA Totals:	0.77	0.03	0.89	6.75*	1.43	0.05	1.63	12.36	0.66	0.02	0.74	5.61

***Maximum Allowable Threshold: 10%** **A: Acceptable** **M: Minimally Acceptable** **U: Unacceptable**

The levee inspection summary table shows an overall negative trend from Fall 2011 to Fall 2012. Encroachment is the largest negative change with 0.51 miles changing from acceptable to minimally acceptable. Tree trimming and thinning remains one of the larger problems.

The 2012 LMA report found that there is one or more encroachments that may significantly impact the integrity of the area.

The NULE project was conducted by DWR in recent years. The geotechnical information gathered as part of this effort and corresponding hazard ratings is shown below.

NULE RESULTS - RD 2031								
RD #	RD Name	Unit #	Segment #	Under-seepage	Slope Stability	Through Seepage	Erosion	Overall
2031	Elliot	1	191	C	A	B	A	C
		2	341	C	A	C	C	C

The District landowners cited funding, endangered species issues, and seepage as their primary O&M challenges. Funding is a challenge because each landowner must pay for their own maintenance. The district also contains Riparian Brush Rabbit, Aleutian Cackling Goose, and Valley Elderberry Longhorn Beetle habitats that must be considered when doing levee maintenance. A 1.5 to 2 mile seepage site along Highway 132 (Unit 02) was mentioned as a major challenge. In any high water event this portion of levee is subject to major seepage. District landowners also mentioned that RD 2031 is not subject to flood surges as much as it is to prolonged high water on the levees. This causes a problem with seepage through the levees. Furthermore, there is concern that in the future, as a result of climate change, upstream reservoirs may release water over more extended periods, causing longer high water along RD 2031 levees and therefore more seepage issues.

Representatives from Mapes and Faith Ranches cited the lack of an organized district as a challenge. They would like to address this by setting up a board but have found that organization of this effort to be a challenge itself.

Needs and Suggestions Identified by the District:

- Reform permitting regulations to enable more effective O&M
- Assistance from DWR to prepare grant applications for large-scale repairs
- Establish consistent levee vegetation standards between DWR and USACE
- Increased funding from the State to implement O&M activities and capital improvements
- Need staff to focus on O&M
- Possible removal of a levee portion from the SPFC [TBD upon coordination with RD]
- State support to address and enforce encroachment violations within the District

5.3 RD 2063 – Crow's Landing

Maintaining Agency Information:

Reclamation District No. 2063

Contact:
Joe Sallaberry
President
5780 South Central
Turlock CA 95380
Phone: (209) 587-2305

Area Characteristics:

RD 2063 has 10.63 miles of levee along the right bank of the San Joaquin River that protects 10,000 acres of land. The protected area has numerous property owners, including several dairies and farm operations, as well as a tallow works.

The district has an active board of trustees that is responsible for the O&M of the levees.

Project Maintenance Activities:

Erosion repair, gate repair, minor structural repair including pipe removal, rodent baiting and trapping, slope dragging, tree removal, thinning and trimming, pump maintenance, and vegetation burning.

The District also reported corrected issues and ongoing corrective actions in response to DWR inspection comments. The corrective actions included encroachment control, erosion and levee slope repair, rodent control, tree thinning and trimming, and vegetation control.

Estimated O&M Expenditures:

The estimated 2011-2012 and 2012-2013 O&M costs were estimated to be $168,100 and $83,000 respectively.

Budget Information:

The District chose not to disclose specific numbers but was willing to say that funding is not an issue. It was reported that the district will use the entirety of its budget this year but may have a surplus next year.

Summary of O&M Deficiencies:

The table below was developed by DWR as part of the 2012 Inspection and Local Maintaining Agency Report and indicates specific problems on each levee and assigns a rating based on that information. Explanation of ratings criteria can be found under Abbreviations, Acronyms, and Definitions in the front of the manual.

The table shows inspection data from Fall 2011 and Fall 2012 as well as the change in that time, with an improvement being in green and a decline in red.

DWR Levee Inspection Summary

RD2063	Total LMA Miles	10.63										
	Fall 2011				Fall 2012				Change			
	Overall LMA Rating		U		Overall LMA Rating		U					
Rated Item	M Miles	U Miles	M+4U Miles	Thresh. %	M Miles	U Miles	M+4U Miles	Thresh. %	M Miles	U Miles	M+4U Miles	Thresh. %
Farther Levee												
Vegetation	2.03		2.03	**19.10**	1.10		1.10	**10.35**	-0.93		-0.93	-8.75
Trim / Thin Trees	0.03		0.03	**0.28**					-0.03		-0.03	-0.28
Encroachments	0.12	0.01	0.16	**1.51**					-0.12	-0.01	-0.16	-1.51
Animal Control	0.11		0.11	**1.04**	0.11		0.11	**1.04**	0.00			**0.00**
Slope Stability	0.01		0.01	**0.09**					-0.01		-0.01	-0.09
Erosion / Bank Caving		0.16	0.64	**6.02**	0.02	0.01	0.06	**0.56**	0.02	-0.15	-0.58	-5.46
Crown Surface / Depressions / Rutting	10.58		10.58	**99.53**	10.58		10.58	**99.53**				**0.00**
LMA Totals:	12.88	0.17	13.56	**127.56**	11.81	0.01	11.85	**111.48**	-1.07	-0.16	-1.71	-16.09

***Maximum Allowable Threshold: 10%** **A: Acceptable** **M: Minimally Acceptable** **U: Unacceptable**

The levee inspection summary table shows an overall positive trend from 2011 to 2012. Crown surface/depressions/rutting are a major issue, present in almost the whole length of the levee. Vegetation is also noted as an issue that needs to be addressed.

The 2011 LMA report found that there was erosion on the levee between levee mile 3 and 4. It was also found that there was unauthorized cattle grazing and vehicular traffic on the entire length of the levee access.

The 2012 LMA report found a number of issues:

- The crown of the roadway may be unusable in poor weather conditions.
- RD 2063 Pumping Plant (Nelson Drain) is rated as unacceptable. The current

condition may significantly impact its performance.

- Turlock Irrigation District (TID) has cut a ramp for access. RD 2063 has asked for it to be repaired, but does not believe it will affect the integrity of the levee.
- The Reclamation District reported an agricultural ditch that has encroached into the berm and the toe of the project levee.

It is noted that the District does not agree with the deficiencies cited in the 2012 LMA Report. The District believes the levees are acceptable.

The NULE project was conducted by DWR in recent years. The geotechnical information gathered as part of this effort and corresponding hazard ratings is shown below.

NULE RESULTS - RD 2063								
RD #	RD Name	Unit #	Segment #	Under-seepage	Slope Stability	Through Seepage	Erosion	Overall
2063	Crow's Landing	1	194	C	A	C	A	C

Needs and Suggestions Identified by the District:

- Establish consistent levee vegetation standards between DWR and USACE

5.4 RD 2091 – Chase

Maintaining Agency Information:

Reclamation District No. 2091

Contact:
Wendel Trinkler, Jr
President
District Office
7007 Jennings Road
Modesto CA 95358
Phone: (209) 537-9883

Area Characteristics:

RD 2091 has 7.89 miles of levee within its boundary, which is broken into two units. RD 2091 is only responsible for Unit 01 which is 7.59 miles long and lies along the right bank of the San Joaquin River. Unit 02 is considered part of the Gomes Lake Facility and will be discussed in a separate section. RD 2091 levees protect approximately 7,000 acres of land and the Waste Water Treatment Plant which serves the City of Modesto.

RD 2091is an active district, with a three-person board of trustees that is composed of two private property owners and a representative of the City of Modesto. The district has a contract with the City of Modesto to provide levee maintenance.

Typical Maintenance Activities:

Erosion control, flood preparedness, inspections, minor structure repair, roadway maintenance, rodent control, slope dragging, tree trimming, and vegetation burning and spraying.

Estimated O&M Expenditures:

In 2011-2012 and 2012-2013 RD 2091 estimated their O&M cost to be $40,535 and $45,877 respectively.

Budget Information:

Because of a recent successful 218 election the district now has an approximate budget of $100,000 per year.

Summary of O&M Deficiencies:

The table below was developed by DWR as part of the 2012 Inspection and Local Maintaining Agency Report and indicates specific problems on each levee and assigns a rating based on that information. Explanation of ratings criteria can be found under Abbreviations, Acronyms, and Definitions in the front of the manual.

The table shows inspection data from Fall 2011 and Fall 2012 as well as the change in that time, with an improvement being in green and a decline in red.

DWR Levee Inspection Summary

RD2091	Total LMA Miles	7.92											
	Fall 2011				Fall 2012				Change			
	Overall LMA Rating			M *	Overall LMA Rating			A				
Rated Item	M Miles	U Miles	M+4U Miles	Thresh. %	M Miles	U Miles	M+4U Miles	Thresh. %	M Miles	U Miles	M+4U Miles	Thresh. %
Earthen Levee												
Vegetation					0.04		0.04	0.51	0.04		0.04	0.51
Trim / Thin Trees	0.01		0.01	0.13	0.04		0.04	0.51	0.03		0.03	0.38
Animal Control	0.01		0.01	0.13	0.08		0.08	1.01	0.07		0.07	0.88
Slope Stability		0.01	0.04	0.51						-0.01	-0.04	-0.51
LMA Totals:	0.02	0.01	0.06	0.76*	0.16	0.00	0.16	2.02	0.14	-0.01	0.10	1.26

***Maximum Allowable Threshold: 10%** **A: Acceptable** **M: Minimally Acceptable** **U: Unacceptable**

The levee inspection summary table shows a negative trend in most areas from 2011 to 2012, but the unacceptable portions of the levee were fixed, allowing for an acceptable rating. Animal control, vegetation, and tree trimming/thinning all saw a decline while slope stability saw a very small improvement.

Both the 2011 and 2012 LMA reports state that there is a 100 foot long and 5 to 7 foot wide erosion site at levee Unit 01, LM 1.5.

The NULE project was conducted by DWR in recent years. The geotechnical information gathered as part of this effort and corresponding hazard ratings is shown

below.

NULE RESULTS - RD 2091								
RD #	RD Name	Unit #	Segment #	Under-seepage	Slope Stability	Through Seepage	Erosion	Overall
2091	Chase	1	199	C	A	C	A	C

In addition to the State-Identified deficiencies listed above, the district cited funding for larger projects, permits for encroachments and vegetation burning, and rodent issues as O&M challenges.

The district also cited the problem of being dependent on RD 2063 in the USACE PL84-99 program. The two districts are contained in the same "leveed area" so they share a rating. RD 2091's levees are well maintained and are kept up to standards, while RD 2063's are not, which causes both of the districts to be inactive within the PL84-99 program.

Needs and Suggestions Identified by the District:

- Reform permitting regulations to enable more effective O&M
- Assistance from DWR to prepare grant applications for large-scale repairs
- Establish consistent levee vegetation standards between DWR and USACE
- Coordinate with agencies that hold permitting authority for O&M activities, such as California Air Resource Board (CARB) and United States Fish & Wildlife Service (USFWS), to ensure their established standards are consistent
- Educate USACE and DWR levee inspection staff on the difference between gopher holes and squirrel holes
- Divorce this district from RD 2063 with regards to PL84-99 eligibility

5.5 RD 2092 – Dos Rios

Maintaining Agency Information:

Reclamation District No. 2092

Contact:
Stephen Sheppard
580 Vallombrosa Avenue
Chico CA 95926
Phone: (209) 639-2216

Area Characteristics:

RD 2092 has 3.76 miles of levee along the right bank of the San Joaquin River that protects approximately 2,000 acres of farmland and habitat, as well as a heifer barn (located on high ground).

RD 2092 is managed by a board of trustees, with maintenance and repairs being performed by the primary property owners.

Typical Maintenance Activities:

The district reported that O&M is minimal, with only a few days per year allocated to the task. However, they do plan to reduce vegetation through mowing and herbicide treatments as well as backfill animal burrows and remove animals such as skunks. The district also cites time spent with inspectors as a maintenance activity.

Estimated O&M Expenditures:

In the 2012-2013 fiscal year the estimated O&M cost for the landowner was reported to be $10,000 to $12,000.

Budget Information:

It was reported that there is no dedicated amount budgeted for O&M. The primary landowners spend the required amount to maintain the levees.

Summary of O&M Challenges and Deficiencies:

The table below was developed by DWR as part of the 2012 Inspection and Local Maintaining Agency Report and indicates specific problems on each levee and assigns a rating based on that information. Explanation of ratings criteria can be found under Abbreviations, Acronyms, and Definitions in the front of the manual.

The table shows inspection data from Fall 2011 and Fall 2012 as well as the change in that time, with an improvement being in green and a decline in red.

DWR Levee Inspection Summary

RD2092	Total LMA Miles	3.76										
	Fall 2011				Fall 2012				Change			
	Overall LMA Rating		M *		Overall LMA Rating		A					
Rated Item	M Miles	U Miles	M+4U Miles	Thresh. %	M Miles	U Miles	M+4U Miles	Thresh. %	M Miles	U Miles	M+4U Miles	Thresh. %
Earthen Levee												
Encroachments					0.01		0.01	**0.27**	0.01		0.01	**0.27**
Animal Control	0.12		0.12	**3.19**	0.04		0.04	**1.06**	-0.08		-0.08	**-2.13**
Slope Stability	0.05		0.05	**1.33**	0.01		0.01	**0.27**	-0.04		-0.04	**-1.06**
Crown Surface / Depressions / Rutting	0.01		0.01	**0.27**					-0.01		-0.01	**-0.27**
Seepage / Sandboils		0.01	0.04	**1.06**						-0.01	-0.04	**-1.06**
Emergency Supplies & Equipment					0.04		0.04	**1.06**	0.04		0.04	**1.06**
Flood Preparedness & Training					0.04		0.04	**1.06**	0.04		0.04	**1.06**
LMA Totals:	0.18	0.01	0.22	**5.85***	0.14	0.00	0.14	**3.72**	-0.04	-0.01	-0.08	**-2.13**

***Maximum Allowable Threshold: 10%** **A: Acceptable** **M: Minimally Acceptable** **U: Unacceptable**

The levee inspection summary table shows a positive trend from 2011 to 2012, with the levee receiving an acceptable rating in 2012. Animal control is seen to be one of the biggest issues, along with emergency supplies and equipment and flood preparedness and training.

The 2011 LMA report found historical seepage areas because of high water levels at various locations of the levee, but does not report exactly where these issues occur.

The 2012 LMA report found the following issues:

- Significant rodent activity in area.
- Vegetation, levee crown shape, rodent burrows, and slope instability.
- Slope damage because of livestock.
- Encroachments by agricultural ditches and fences on levee Unit 1.

The NULE project was conducted by DWR in recent years. The geotechnical information gathered as part of this effort and corresponding hazard ratings is shown below.

NULE RESULTS – RD 2092								
RD #	RD Name	Unit #	Segment #	Under-seepage	Slope Stability	Through Seepage	Erosion	Overall
2092	Dos Rios	1	200	B	A	B	C	C

In addition to the State-identified deficiencies, the district cited that differing standards between DWR and USACE are the most difficult challenge that they face. These differing or conflicting standards make it difficult for the district to plan for future O&M. The district also noted that encroachments are a major challenge and that the cost to TV video inspect pipeline encroachments will be very large.

Needs and Suggestions Identified by the District:

- Establish consistent levee vegetation standards between DWR and USACE
- Assistance on backfilling rodent holes
- Assistance moving encroachments back to an acceptable distance or obtaining permits
- In the future, this district will be the site of a non-structural flood control project and modification of the O&M manual is desired to eliminate levee maintenance responsibilities and permit flowage on previously protected lands. The mechanism to gain such approval requires further guidance from DWR, CVPFB and USACE as well as funding for engineering analysis and permitting.

5.6 RD 2101 – Blewett

Maintaining Agency Information:

Reclamation District No. 2101

Contact:
James Coddington
President
6130 Huntingdale Circle
Stockton CA 95219
Phone: (209) 477-2156

Area Characteristics:

RD 2101 has 3.51 miles of levee, broken into two separate units. Unit 01 is 3.20 miles long and lies on the left bank of the San Joaquin River. Unit 02 is a spur levee, which is 0.31 miles long and is located on the left bank of the San Joaquin River. These levees protect approximately 2,000 acres of land. The land is predominantly farmland, with a portion leased to a dairy operation for cultivation of silage and feed products.

The district is active and takes responsibility for the O&M of the levee system within its area.

Typical Maintenance Activities:

Levee geometry shaping (once every two years), inspection, minor structure repair, roadway maintenance, grouting of rodent burrows (which landowner feels does not work), animal trapping, tree removal, vegetation mowing and spraying (4-6 times per year).

Estimated O&M Expenditures:

In the 2012-2013 fiscal year the district expects O&M costs to be $25,000.

Budget Information:

The district O&M is funded by the landowner and as such does not have a set budget. The landowner plans for around $5,000 per levee mile, but noted that that figure changes from year to year.

Summary of O&M Deficiencies:

The table below was developed by DWR as part of the 2012 Inspection and Local Maintaining Agency Report and indicates specific problems on each levee and assigns a rating based on that information. Explanation of ratings criteria can be found under Abbreviations, Acronyms, and Definitions in the front of the manual.

The table shows inspection data from Fall 2011 and Fall 2012 as well as the change in that time, with an improvement being in green and a decline in red.

DWR Levee Inspection Summary

RD2101	Total LMA Miles	3.51											
	Fall 2011				Fall 2012				Change			
	Overall LMA Rating		U		Overall LMA Rating		U					
Rated Item	M Miles	U Miles	M+4U Miles	Thresh. %	M Miles	U Miles	M+4U Miles	Thresh. %	M Miles	U Miles	M+4U Miles	Thresh. %
Earthen Levee												
Vegetation	2.98		2.98	**84.90**	0.08		0.08	**2.28**	-2.90		-2.90	**-82.62**
Trim / Thin Trees	0.24		0.24	**6.84**	0.02		0.02	**0.57**	-0.22		-0.22	**-6.27**
Encroachments					0.01		0.01	**0.29**	0.01		0.01	**0.29**
Animal Control	0.03	0.21	0.87	**24.79**	0.24	0.02	0.32	**9.12**	0.21	-0.19	-0.55	**-15.67**
Erosion / Bank Caving	0.02		0.02	**0.57**	0.02		0.02	**0.57**				**0.00**
Supplemental												
DWR Erosion Survey		0.10	0.40	**11.40**		0.10	0.40	**11.40**				**0.00**
LMA Totals:	3.27	0.31	4.51	**128.49**	0.37	0.12	0.85	**24.22**	-2.90	-0.19	-3.66	**-104.27**

***Maximum Allowable Threshold: 10%** **A: Acceptable** **M: Minimally Acceptable** **U: Unacceptable**

The levee inspection summary table shows an unacceptable rating for these levees, though there is a positive trend from 2011-2012. Animal control and vegetation are the two largest areas of concern.

The 2012 LMA report found the following issues:

- Significant rodent activity in area.
- Historical breach location at levee Unit 01, LM 1.8 to 1.95.
- Erosions sites at levee Unit 01, LM 1.9, 2.0, and 2.9, levee Unit 02, LM 3.

The NULE project was conducted by DWR in recent years. The geotechnical information gathered as part of this effort and corresponding hazard ratings is shown below.

NULE RESULTS - RD 2101								
RD #	RD Name	Unit #	Segment #	Under-seepage	Slope Stability	Through Seepage	Erosion	Overall
2101	Blewett	1	206	C	A	C	C	C
		2	340	NA	NA	NA	NA	NA

The District representative cited funding, vegetation control, erosion, seepage, and rodent control as their primary O&M challenges. It was also noted that the book keeping effort to keep the O&M funded and staffed is complex. Rodent control efforts using bait traps were also abandoned because of threat of legal action from an advocacy group. A large erosion site was noted as a major challenge the district is facing, because of the cost of repair. Seepage is an issue for RD 2101.

Needs and Suggestions Identified by the District:

- Reform permitting regulations to enable more effective O&M
- Establish consistent levee vegetation standards between DWR and USACE
- Develop a more effective rodent and vegetation control program
- Assistance from DWR to prepare grant applications for major repairs.

Other Notes:

The District representative is frustrated with the fact that the State/Federal government built levees out of sand, then made the Districts responsible for the levees, and is now penalizing them for seepage issues. The District feels that they should not be penalized for an issue they did not create.

5.7 Turlock Irrigation District – Gomes Lake Named Area 65

Maintaining Agency Information:

Gomes Lake JPA

Contact:
Brad Koehn
(209) 883-8203

Area Characteristics:

The Gomes Lake Pumping Facility and its associated infrastructure protect more than 10,000 acres of land within local RD's. The facility works to prevent flooding by pumping backed up water through the levees into the San Joaquin River.

The Gomes Lake facility is operated by joint powers agreement (JPA) between Turlock Irrigation District (TID), Stanislaus County, City of Turlock, and RD's 2091 and 2063.

Note: Unit 01 of Gomes Lake is actually Unit 02 of RD 2091.

The JPA is active and has a contract with TID to perform the maintenance on Gomes Lake Dike.

Typical Maintenance Activities:

Rodent control and vegetation management.

Estimated O&M Expenditures:

The JPA spent $404,000 between 2005 and 2007 for once per decade pump maintenance. Annual operation costs range from $14,000 to $35,000.

Budget Information:

The facility is funded through the JPA, with each partner being assessed a percentage. TID representatives reported an annual O&M budget cap of $63,000.

Summary of O&M Deficiencies:

None.

Needs and Suggestions Identified by the District:

- Assistance from DWR to prepare grant applications for major repairs

5.8 RD 2099/ RD2100/ RD2102

Maintaining District Information:

US Fish and Wildlife Service

Contact:
Kim Forrest
Refuge Manager
San Luis National Wildlife Refuge Complex
PO Box 2176
Los Banos, CA 93635
Phone: (209) 826-3508

Area Characteristics:

These districts are discussed together because of the fact that the lands they encompass have been purchased by the US Fish and Wildlife Service and are now part of the San Joaquin River National Wildlife Refuge.

The project levees are breached at the West Stanislaus Irrigation District Canal entrance and no longer provide flood protection to these districts. Further, there is no intention by the current property owner, the USFWS, to provide future maintenance of the levees and the RDs have been effectively dissolved. Therefore, it is our understanding that future O&M is not required.

6. Sources

The following documents were used as part of the research for this report.

Peterson-Brustad Engineers (PBI), 2013.Flood Emergency Response Assessment Technical Memorandum.

DWR, 2011. 2011 Local Maintaining Agency Annual Report for Levees of the State Plan of Flood Control, Appendix B.

DWR, 2012. 2012 Inspection and Local Maintaining Agency Report of the Central Valley State-Federal Flood Protection System, Appendix B.

APPENDIX F
Project Descriptions and Evaluations

Contents

Project Name: WSID Fish Screen and Change in Point of Diversion Project

Project Name: Black Gulch Storm Drainage Study

Project Lead: City of Patterson

Potential Project Partners:

Stanislaus County

Short Project Description:

There is a permitted spillway into the Delta Mendota Canal (DMC) from Black Gulch, a drainage situated between Salado and Del Puerto creeks, which keeps a local commercial area in Patterson from flooding. A study needs to be performed to determine what alternative solutions might be appropriate if/when the DMC Authority decides to not renew the permit.

Long Project Description:

Black Gulch resides between Salado Creek and Del Puerto Creek and storm drain flows enter the existing Villa Del Lago development in the City via culvert crossings underneath Interstate 5 and the California Aqueduct. There is a permitted spillway into the DMC that keeps the Del Lago Commercial area from flooding. A study needs to be performed to evaluate options to contain flood control water if the DMC Authority elects to not renew an agreement, which allows for the overflow of storm drainage into the DMC during heavy rain events. A drainage study is needed to evaluate options to address storm water flow at this location and to try to renew the permit. The Black Gulch runoff typically works its way through varying sized culverts until it reaches the San Joaquin River.

In the screening- and ranking-level assessments, it is assumed that the items identified in the proposed study would be implemented and, therefore, the anticipated benefits would be realized. The only exception is the cost-effectiveness criterion, RC-9, where only the cost and benefit of the study can be compared because the costs for the action items that would come out of the study can't be estimated until the study is complete.

Unique Project Characteristics:

None specified

Project Status:	Pre-planning
Project Cost:	**$**28,000
Project Timeframe:	Undetermined
Cost-sharing:	Stanislaus County
Multi-benefit Project:	Potentially
Types of benefits:	The project would improve flood risk management and could potentially improve operations and maintenance, promote ecosystem functions, and/or promote multi-benefit projects.
Source of Project:	City of Patterson, SDMP

Background Information:

None provided

Screening-level assessment

SC-1. ***Consistency with RFMP goals.*** Consistent with CVFPP goals: improve flood risk management, improve operations and maintenance, promote ecosystem functions, improve institutional support, promote multi-benefit projects.

Note: If the project is a study, evaluate the goals of the ultimate project that would flow from the study.

- **Low** if it meets *only* the multi-benefit project supporting objective.
- **Medium** as long as it meets 1-2 of the primary and/or supporting objectives and does not qualify as "Low."
- **High** if it includes meeting 3 or more of the primary and/or supporting objectives.

Medium

The project would improve flood risk management and could potentially improve operations and maintenance, promote ecosystem functions, and/or promote multi-benefit projects. Due to the uncertainty as to whether or not action items would be identified or implemented out of the study, the score is "Medium" instead of "High."

SC-2. ***Implementation feasibility.*** Consider existing laws or regulations, community opposition/support, or other factors affecting implementation feasibility.

Note: If the project is a study, evaluate only the implementation feasibility of completing the study.

- **Low** if the project is judged to face significant odds (e.g., a similar project has already been forcefully pursued and has failed to progress, and there is little reason to expect a different outcome now.)
- **Medium** if the project has been developed as a concept and has a description and an identified lead.
- **High** if the project has already gone through feasibility analysis and been found feasible, if appropriate, or the project already has reasonable assurance of being implemented by a capable project lead.

Medium

The score is "Medium" because the project has been developed as a concept, has a description, and identified lead, the City of Patterson.

Ranking-level assessment

RC-1. ***Implementation feasibility.*** (As in Screening-level assessment guidance.)

Medium

RC-2. ***Financial feasibility.*** Capacity to cover local share, with funding availability, or all project costs).

Note: project costs should be considered to include both the initial costs and the ongoing operations,

maintenance, and repair costs, though this information may not be available. If the project is a study, evaluate only the financial feasibility of completing the study.

- **Low** if the anticipated project lead does not have the resources to either 1) carry out the project; or 2) supply any needed local cost share. Given the findings of the Financial Plan, projects are identified as "Low" if the anticipated local cost share exceeds $500,000, unless the project has been successful in attracting grant funding so far.
- **Medium** if the project does not meet the criteria for "Low" or "High" Financial Feasibility.
- **High** if the anticipated project lead has the resources to either 1) carry out the project; or 2) supply any needed local cost share and a plausible funding source for the balance has been identified. Given the findings of the Financial Plan, we estimate that for most entities in the planning area, local cost shares will need to be less than $20,000 to be funded. For projects having an anticipated local cost share exceeding $500,000, the project will be scored "High" if it has been successful in attracting most of the needed funding already.

High

Given the relatively low estimated cost of $28,000 and the magnitude of the tax base, it is anticipated that local funding for the project or a local cost share requirement can be met. The financial feasibility of the actions that would be identified in the study cannot be evaluated until the study is complete.

RC-3. ***Flood risk reduction - life risk***. Change in the number of lives potentially at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project may reduce loss of life.
- **Medium** if the project is expected to reduce loss of life based on a qualitative assessment.
- **High** if the project has been analyzed for effect on loss of life and is expected to reduce it.

Low

As the De Lago Commercial Area personnel are expected to be present at the site during floods, reduction of flood risk there is anticipated to potentially reduce the risk of loss of life.

RC-4. ***Flood risk reduction - flood damage.*** Change in the value of assets at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to create a locally-significant reduction in flood risk.
- **Medium** if the project is expected to create a regionally-significant reduction in flood risk.
- **High** if the project is expected to create a significant reduction in flood risk from a regional perspective and beyond.

Low

This project may provide at least locally-significant reduction in flood risk.

RC-5. ***Operations, maintenance and repair.*** Improvement in efficiency and effectiveness, or reduction of need at present and over the long term.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to only modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

N/A

Not possible to assess at this time.

RC-6. ***Ecosystem function*****.** Consistency with ecosystem priorities and goals of the (Draft) CVFPP metrics, the (Draft) Conservation Strategy (if available) and/or adopted conservation or recovery plans.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to increase ecosystem function compared to current conditions, but is not specifically consistent with the priorities and goals of the Draft CVFPP metrics or other adopted conservation or recovery plans.
- **Medium** if the project is consistent with the priorities and goals of one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.
- **High** if the project is if the project is consistent with the priorities and goals of more than one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.

N/A

Not possible to assess at this time.

RC-7. ***Institutional support*****.** Improved support for entities contributing to flood management.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

N/A

No benefits identified.

RC-8. ***Other benefits.*** "Multiple benefits" not addressed by criteria above, e.g., water quality, recreation, public access, water supply, groundwater recharge, economic, etc.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

N/A

Not possible to assess at this time.

RC-9. ***Cost-effectiveness.*** Benefits vs costs compared to other projects accomplishing similar benefits.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the lower third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **High** if the project is expected to fall within the upper third of the projects considered in terms of the mix of benefits provided for the given project cost.

Medium

The score is "Medium" because there is not a clear reason to differentiate this project as "Low" or "High."

RC-10. ***Low potential for dis-benefits (post-mitigation).*** Low potential for negative outcomes after mitigation; a "High" score indicates very low probability; a "Low" score indicates high probability, etc.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of dis-benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the upper third of the projects considered in terms of the mix of anticipated dis-benefits.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of anticipated dis-benefits.

- **High** if the project is expected to fall within the lower third of the projects considered in terms of the mix of anticipated dis-benefits.

Medium

The score is "Medium" because there is not a clear reason to differentiate this project as "Low" or "High."

Project Name: City of Newman/Bureau of Reclamation Flood Levee Rehabilitation

Project Lead: City of Newman

Potential Project Partners:

Bureau of Reclamation

Short Project Description:

Rehabilitate a flood protection levee on Bureau of Reclamation property between the Newman Wasteway and the City of Newman Wastewater Treatment Plant (WWTP).

Long Project Description:

Option 1: Repair erosion and rodent damage by excavating, replacing and compacting levee. Construct uniform 2.5:1 slope and construct 12' access road atop flood levee for maintenance. Place slope protection, rip-rap or cobble, on flood prone side. Provide agreements for continual maintenance, patrolling during flooding and control of weeds and rodents. Option 2: Bureau of Reclamation deed over said flood levee to City of Newman for full repair and maintenance by City of Newman. Option 3: Bureau of Reclamation provide long term lease of said levee property to City of Newman for full repair and maintenance.

Unique Project Characteristics:

The subject flood protection levee is on the Bureau of Reclamation property; however, the levee protects the City of Newman's wastewater treatment plant. This has created the situation that the City of Newman is unable to provide ongoing maintenance to said levee, therefore the levee has not been maintained since 1979 and is now subject to failure.

Project Status:	Pre-planning
Project Cost:	**$**225,000
Project Timeframe:	45-day construction time
Cost-sharing:	Bureau of Reclamation/City of Newman
Multi-benefit Project:	Yes
Types of benefits:	The project would improve flood risk management. As the project would protect water quality in the event of a flood event, it is also considered consistent with the supporting objective of promoting multi-benefit projects.
Source of Project:	City of Newman

Background Information:

In 1979, the City of Newman upgraded its wastewater treatment plant which included the construction of a flood protection levee to protect the WWTP from periodic flooding from the San Joaquin River. At that time, for reasons unknown, approximately 2150 feet of flood protection levee at the south east section of the WWTP sits on Bureau of Reclamation property along the Newman Wasteway. The City of Newman WWTP continually maintains, improves and patrols during flooding, the section(s) of flood protection levees that sit within the City of Newman-WWTP property. However, the City of Newman hasn't the authority to maintain that section of flood protection levee that is on the Bureau of Reclamation property. Over the year's rodents, erosion and neglect has compromised the integrity of the Bureau of Reclamation flood protection levee. During flood years seepage has been observed by City personnel on the Reclamation section of levee.

Screening-level assessment

SC-1. ***Consistency with RFMP goals.*** Consistent with CVFPP goals: improve flood risk management, improve operations and maintenance, promote ecosystem functions, improve institutional support, promote multi-benefit projects.

Note: If the project is a study, evaluate the goals of the ultimate project that would flow from the study.

- **Low** if it meets *only* the multi-benefit project supporting objective.
- **Medium** as long as it meets 1-2 of the primary and/or supporting objectives and does not qualify as "Low."
- **High** if it includes meeting 3 or more of the primary and/or supporting objectives.

Medium

The project would improve flood risk management. As the project would protect water quality in the event of a flood event, it is also considered consistent with the supporting objective of promoting multi-benefit projects.

SC-2. ***Implementation feasibility.*** Consider existing laws or regulations, community opposition/support, or other factors affecting implementation feasibility.

Note: If the project is a study, evaluate only the implementation feasibility of completing the study.

- **Low** if the project is judged to face significant odds (e.g., a similar project has already been forcefully pursued and has failed to progress, and there is little reason to expect a different outcome now.)
- **Medium** if the project has been developed as a concept and has a description and an identified lead.
- **High** if the project has already gone through feasibility analysis and been found feasible, if appropriate, or the project already has reasonable assurance of being implemented by a capable project lead.

Medium

The score is "Medium" because the project has been developed as a concept, has a description, and identified lead, the City of Newman.

Ranking-level assessment

RC-1. ***Implementation feasibility.*** (As in Screening-level assessment guidance.)

Medium

RC-2. ***Financial feasibility.*** Capacity to cover local share, with funding availability, or all project costs).

Note: project costs should be considered to include both the initial costs and the ongoing operations, maintenance, and repair costs, though this information may not be available. If the project is a study, evaluate only the financial feasibility of completing the study.

- **Low** if the anticipated project lead does not have the resources to either 1) carry out the project; or 2) supply any needed local cost share. Given the findings of the Financial Plan, projects are identified as "Low" if the anticipated local cost share exceeds $500,000, unless the project has been successful in attracting grant funding so far.
- **Medium** if the project does not meet the criteria for "Low" or "High" Financial Feasibility.
- **High** if the anticipated project lead has the resources to either 1) carry out the project; or 2) supply any needed local cost share and a plausible funding source for the balance has been identified. Given the findings of the Financial Plan, we estimate that for most entities in the planning area, local cost shares will need to be less than $20,000 to be funded. For projects having an anticipated local cost share exceeding $500,000, the project will be scored "High" if it has been successful in attracting most of the needed funding already.

High

Given the importance of the WWTP facilities to the urban area of Newman and the magnitude of the tax base combined with the modest project cost, it is anticipated that local funding for the project or a local cost share requirement can be met.

RC-3. ***Flood risk reduction - life risk***. Change in the number of lives potentially at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project may reduce loss of life.
- **Medium** if the project is expected to reduce loss of life based on a qualitative assessment.
- **High** if the project has been analyzed for effect on loss of life and is expected to reduce it.

Medium

As personnel are expected to be present at the site during floods, reduction of flood risk at the WWTP is anticipated to reduce the risk of loss of life.

RC-4. ***Flood risk reduction - flood damage.*** Change in the value of assets at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to create a locally-significant reduction in flood risk.
- **Medium** if the project is expected to create a regionally-significant reduction in flood risk.
- **High** if the project is expected to create a significant reduction in flood risk from a regional perspective and beyond.

Low

This project is expected to provide at least a locally-significant reduction in flood risk.

RC-5. ***Operations, maintenance and repair.*** Improvement in efficiency and effectiveness, or reduction of need at present and over the long term.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to only modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

N/A

Not possible to assess at this time.

RC-6. ***Ecosystem function*****.** Consistency with ecosystem priorities and goals of the (Draft) CVFPP metrics, the (Draft) Conservation Strategy (if available) and/or adopted conservation or recovery plans.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to increase ecosystem function compared to current conditions, but is not specifically consistent with the priorities and goals of the Draft CVFPP metrics or other adopted conservation or recovery plans.
- **Medium** if the project is consistent with the priorities and goals of one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.
- **High** if the project is if the project is consistent with the priorities and goals of more than one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.

N/A

No benefits identified.

RC-7. ***Institutional support*****.** Improved support for entities contributing to flood management.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

N/A

No benefits identified.

RC-8. ***Other benefits.*** "Multiple benefits" not addressed by criteria above, e.g., water quality, recreation, public access, water supply, groundwater recharge, economic, etc.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Medium

Material and at least locally-significant water quality and economic stability benefits would accrue as a result of repairing the levee.

RC-9. ***Cost-effectiveness.*** Benefits vs costs compared to other projects accomplishing similar benefits.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the lower third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **High** if the project is expected to fall within the upper third of the projects considered in terms of the mix of benefits provided for the given project cost.

Medium

The score is "Medium" because there is not a clear reason to differentiate this project as "Low" or "High."

RC-10. ***Low potential for dis-benefits (post-mitigation).*** Low potential for negative outcomes after mitigation; a "High" score indicates very low probability; a "Low" score indicates high probability, etc.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of dis-benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the upper third of the projects considered in terms of the mix of anticipated dis-benefits.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of anticipated dis-benefits.

- **High** if the project is expected to fall within the lower third of the projects considered in terms of the mix of anticipated dis-benefits.

Medium

The score is "Medium" because there is not a clear reason to differentiate this project as "Low" or "High."

Project Name: Consolidation of O&M

Project Lead: Reclamation District 2092

Potential Project Partners:

One or more Reclamation Districts (RDs), so far interested parties include: RD 2031, 2101, 2092, 2091, 1602; City of Modesto - however, the details of consolidation needs further development; DWR (funding, technical assistance); RCDs, Stanislaus County (potential governance and management partners)

Short Project Description:

Two or more Reclamation Districts form a formal partnership to share technical, financial, and/or operational capacity to perform necessary operations and maintenance (O&M). As an initial step, invest 2 person-years to investigate potential governance options and design and implement a pilot maintenance agreement project.

Long Project Description:

The Mid San Joaquin Region's RDs have ongoing Operations & Maintenance responsibilities as described in O&M Manuals developed for each RD as part of the San Joaquin River & Tributaries Project. Each RD has responsibilities for project facilities, including emergency response, routine monitoring, maintenance, and repair. To the extent that these responsibilities require specialized knowledge, equipment, supplies, and staff, savings may be realized by consolidating some or all of the fulfillment of responsibilities under a single entity. This entity might be a separate joint powers authority, or the consolidation might simply take the form of an RD entering into an agreement to perform selected responsibilities for one or more other RDs. For example, RD 2091, which has a vested interest in the performance of the levees within RD 2063, immediately upstream, might enter into an agreement with RD 2063 to perform maintenance on the levees and other facilities within RD 2063 in exchange for payment.

This project will explore the potential for consolidation of O&M responsibilities, draft a pilot maintenance agreement, and implement such an agreement if two or more RDs choose to participate. Once the maintenance agreement has been entered into, project staff will monitor the implementation effort, advise the participating RDs on implementation options and strategies, and develop a report assessing the effectiveness of the first two years of the pilot project, lessons learned, and recommendations for the future.

Unique Project Characteristics:

Potential to increase the sustainability and effectiveness of flood system O&M activities for participating RDs, as well as providing initial groundwork in the form of a pilot project that may lead to additional similar efforts elsewhere.

Project Status:	Planning
Project Cost:	$200,000
Project Timeframe:	1-5 years
Cost-sharing:	Any participating RDs; possibly DWR
Multi-benefit Project:	Yes
Types of benefits:	The project would improve flood risk management; operations and maintenance; and institutional support.
Source of Project:	RD 2092

Background Information:

USACE O&M Manuals, Maintenance Agreement with Central Valley Flood Protection Board

Screening-level assessment

SC-1. ***Consistency with RFMP goals.*** Consistent with CVFPP goals: improve flood risk management, improve operations and maintenance, promote ecosystem functions, improve institutional support, promote multi-benefit projects.
Note: If the project is a study, evaluate the goals of the ultimate project that would flow from the study.

- **Low** if it meets *only* the multi-benefit project supporting objective.
- **Medium** as long as it meets 1-2 of the primary and/or supporting objectives and does not qualify as "Low."
- **High** if it includes meeting 3 or more of the primary and/or supporting objectives.

High

The project would improve flood risk management; operations and maintenance; and institutional support.

SC-2. ***Implementation feasibility.*** Consider existing laws or regulations, community opposition/support, or other factors affecting implementation feasibility.
Note: If the project is a study, evaluate only the implementation feasibility of completing the study.

- **Low** if the project is judged to face significant odds (e.g., a similar project has already been forcefully pursued and has failed to progress, and there is little reason to expect a different outcome now.)
- **Medium** if the project has been developed as a concept and has a description and an identified lead.
- **High** if the project has already gone through feasibility analysis and been found feasible, if appropriate, or the project already has reasonable assurance of being implemented by a capable project lead.

Medium

The score is "Medium" because the project has been developed as a concept, has a description, and identified lead, Reclamation District 2092.

Ranking-level assessment

RC-1. ***Implementation feasibility.*** (As in Screening-level assessment guidance.)

Medium

RC-2. ***Financial feasibility.*** Capacity to cover local share, with funding availability, or all project costs).
Note: project costs should be considered to include both the initial costs and the ongoing operations, maintenance, and repair costs, though this information may not be available. If the project is a study, evaluate only the financial feasibility of completing the study.

- **Low** if the anticipated project lead does not have the resources to either 1) carry out the project; or 2) supply any needed local cost share. Given the findings of the Financial Plan, projects are identified as "Low" if the anticipated local cost share exceeds $500,000, unless the project has been successful in attracting grant funding so far.
- **Medium** if the project does not meet the criteria for "Low" or "High" Financial Feasibility.
- **High** if the anticipated project lead has the resources to either 1) carry out the project; or 2) supply any needed local cost share and a plausible funding source for the balance has been identified. Given the findings of the Financial Plan, we estimate that for most entities in the planning area, local cost shares will need to be less than $20,000 to be funded. For projects having an anticipated local cost share exceeding $500,000, the project will be scored "High" if it has been successful in attracting most of the needed funding already.

Medium

While a plausible funding source has not been identified, it is anticipated that local funding for the project or a local cost share requirement can be met, particularly given the number of parties that are interested in pursuing the project. Still, the project was evaluated as "Medium," given that the funders will be private landowners and the local cost share is $20,000 or more.

RC-3. ***Flood risk reduction - life risk***. Change in the number of lives potentially at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project may reduce loss of life.
- **Medium** if the project is expected to reduce loss of life based on a qualitative assessment.
- **High** if the project has been analyzed for effect on loss of life and is expected to reduce it.

Low

If operations and maintenance are materially improved in the relevant portion of the planning area, the project may reduce loss of life in the event of a flood. As sufficient detail regarding the potential consolidation of responsibilities has not been developed at this time, a score of "Low" is assigned.

RC-4. ***Flood risk reduction - flood damage.*** Change in the value of assets at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to create a locally-significant reduction in flood risk.
- **Medium** if the project is expected to create a regionally-significant reduction in flood risk.
- **High** if the project is expected to create a significant reduction in flood risk from a regional perspective and beyond.

Medium

This project would provide a regionally-significant reduction in flood risk.

RC-5. ***Operations, maintenance and repair.*** Improvement in efficiency and effectiveness, or reduction of need at present and over the long term.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to only modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

High

The project is expected and intended to materially improve operations, maintenance, and repair at least on a local scale, and potentially on a regional scale.

RC-6. ***Ecosystem function*****.** Consistency with ecosystem priorities and goals of the (Draft) CVFPP metrics, the (Draft) Conservation Strategy (if available) and/or adopted conservation or recovery plans.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to increase ecosystem function compared to current conditions, but is not specifically consistent with the priorities and goals of the Draft CVFPP metrics or other adopted conservation or recovery plans.
- **Medium** if the project is consistent with the priorities and goals of one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.
- **High** if the project is if the project is consistent with the priorities and goals of more than one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.

N/A

Not possible to assess at this time.

RC-7. ***Institutional support*****.** Improved support for entities contributing to flood management.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

High

The project has the potential to improve institutional support on at least a local scale and possibly on a regional scale.

RC-8. ***Other benefits.*** "Multiple benefits" not addressed by criteria above, e.g., water quality, recreation, public access, water supply, groundwater recharge, economic, etc.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Medium

Material and at least locally-significant economic stability benefits would accrue as a result of consolidation of O&M responsibilities.

RC-9. ***Cost-effectiveness.*** Benefits vs costs compared to other projects accomplishing similar benefits.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the lower third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **High** if the project is expected to fall within the upper third of the projects considered in terms of the mix of benefits provided for the given project cost.

Medium

The score is "Medium" because there is not a clear reason to differentiate this project as "Low" or "High."

RC-10. ***Low potential for dis-benefits (post-mitigation).*** Low potential for negative outcomes after mitigation; a "High" score indicates very low probability; a "Low" score indicates high probability, etc.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of dis-benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the upper third of the projects considered in terms of the mix of anticipated dis-benefits.

- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of anticipated dis-benefits.
- **High** if the project is expected to fall within the lower third of the projects considered in terms of the mix of anticipated dis-benefits.

High

Given the nature of the project, there is a low potential for dis-benefits.

Project Name: Dennett Dam Removal

Project Lead: Tuolumne River Trust

Potential Project Partners:

No partners identified at this time

Short Project Description:

Removal of Dennett Dam, an abandoned low-head dam located on the lower Tuolumne River in Modesto, California. The dam has been an instream barrier to anadromous fish passage, controlling local hydraulic and sediment transport conditions, for over 60 years, while also impeding water flow in the river. It is also a significant safety hazard adjacent to a major park, and has been the location of three drowning deaths in the last five years, including two children.

Long Project Description:

The specific short-term goal of the project is to remove Dennett Dam and restore the channel and adjacent riparian vegetation. By removing the dam, we expect to achieve the following specific long-term objectives:

- Improve upstream passage for anadromous fish
- Improve downstream rearing habitat and passage for juvenile anadromous fish
- Reduce non-native predatory fish habitat
- Improve riparian and shaded riverine aquatic habitat at the project site
- Remove an impediment to water flow within the river channel

The project also will achieve two key community objectives:

- Remove a hazardous in-stream structure to reduce the risk of drowning in the river
- Improve recreational boating opportunities through the project reach

With the removal of Dennett Dam and associated channel and riparian restoration, we expect several important ecological features and functions to be rehabilitated at the project site. Most notably, we expect fish passage to improve noticeably providing unimpeded access for anadromous fish to 37 miles of the lower Tuolumne River, including access to the prime spawning grounds for steelhead trout and fall run Chinook salmon. An assessment of fish passage at the dam completed for the Tuolumne River Trust by HDR Engineering, Inc. based on NMFS and CDFW protocols of fish passage, and using hydraulic and survey data analyzed with HEC-RAS v.4.1, determined that Dennett Dam is a partial barrier that does not meet the selected fish passage criteria for a 1-foot hydraulic differential across the dam crest for flows less than 1,800 cfs. The analysis also developed a flow-frequency relationship, which estimates a 1,640 cfs flow has an exceedance probability, during adult salmon migration, of 20%. To be more explicit, approximately 80% of the time, the dam creates a passage barrier to up migrating adult salmon. By removing Dennett Dam, we remove this passage barrier and improve passage in general.

We also anticipate that downstream passage and rearing habitat for juvenile salmon and steelhead will improve. As noted above, there are a number of exotic fishes that inhabit the Tuolumne River, including black bass and striped bass, which are known predators of juvenile salmon. According to a Sediment Management Proposal prepared for the Tuolumne River Trust by NewFields River Basins Services, LLC, Dennett Dam creates a backwater effect extending approximately 4.36 miles upstream. This slow moving water behind the dam creates excellent warm water habitat for these predatory fish. On the downstream

side of the dam, two large eddies on either side of the river also create very good habitat for predator species to lie in wait as juveniles flush over the middle section of the dam. Dam removal will restore sediment transport, create a more natural channel with a defined thalweg and associated pools, thus reducing predator habitat.

In addition, dam removal will reduce solar heating of the river water, thus reducing temperature stressors on the fish, particularly juveniles. By removing the slow, shallow pool in the river, water will have less of a chance to heat in the air. After removal of the dam is completed, we will undertake riparian restoration in the immediate project vicinity, which will in turn, provide more shaded riverine aquatic habitat providing more shading of the river water itself. Simultaneously reducing predator habitat and increasing shaded riverine aquatic habitat will reduce stressors on juvenile salmonids and have the combined effect of improving downstream migratory and rearing conditions for the fish.

Unique Project Characteristics:

This project can be completed in conjunction with other flood damage reduction, parks development, and habitat restoration projects, such as the development of the Tuolumne River Regional Park, the replacement of the 7th Street Bridge, or other projects in the vicinity.

Project Status: Planning. The Dam Removal Basis of Design Report is complete. Funding is required to complete a sediment toxicology test, plus NEPA/CEQA, and permitting.
Project Cost: $700,000
Project Timeframe: 2 years
Cost-sharing: US Fish and Wildlife Service contributed $105,000 and City of Modesto contributed $10,000 towards completing the Basis of Design Report
Multi-benefit Project: Yes
Types of benefits: The project would improve flood risk management (reduced loss of life), promote ecosystem functions, and improve recreation, making it a multi-benefit project.
Source of Project: Tuolumne River Trust

Background Information:

None provided

Screening-level assessment

SC-1. ***Consistency with RFMP goals.*** Consistent with CVFPP goals: improve flood risk management, improve operations and maintenance, promote ecosystem functions, improve institutional support, promote multi-benefit projects.

Note: If the project is a study, evaluate the goals of the ultimate project that would flow from the study.

- **Low** if it meets *only* the multi-benefit project supporting objective.
- **Medium** as long as it meets 1-2 of the primary and/or supporting objectives and does not qualify as "Low."
- **High** if it includes meeting 3 or more of the primary and/or supporting objectives.

High

The project would improve flood risk management (reduced loss of life), promote ecosystem functions, and improve recreation, making it a multi-benefit project.

SC-2. ***Implementation feasibility.*** Consider existing laws or regulations, community opposition/support, or other factors affecting implementation feasibility.
Note: If the project is a study, evaluate only the implementation feasibility of completing the study.

- **Low** if the project is judged to face significant odds (e.g., a similar project has already been forcefully pursued and has failed to progress, and there is little reason to expect a different outcome now.)
- **Medium** if the project has been developed as a concept and has a description and an identified lead.
- **High** if the project has already gone through feasibility analysis and been found feasible, if appropriate, or the project already has reasonable assurance of being implemented by a capable project lead.

High

Preliminary designs have been developed and the project has support from the City of Modesto and the United States Fish and Wildlife Service.

Ranking-level assessment

RC-1. ***Implementation feasibility.*** (As in Screening-level assessment guidance.)

High

RC-2. ***Financial feasibility.*** Capacity to cover local share, with funding availability, or all project costs).
Note: project costs should be considered to include both the initial costs and the ongoing operations, maintenance, and repair costs, though this information may not be available. If the project is a study, evaluate only the financial feasibility of completing the study.

- **Low** if the anticipated project lead does not have the resources to either 1) carry out the project; or 2) supply any needed local cost share. Given the findings of the Financial Plan, projects are identified as "Low" if the anticipated local cost share exceeds $500,000, unless the project has been successful in attracting grant funding so far.
- **Medium** if the project does not meet the criteria for "Low" or "High" Financial Feasibility.
- **High** if the anticipated project lead has the resources to either 1) carry out the project; or 2) supply any needed local cost share and a plausible funding source for the balance has been identified. Given the findings of the Financial Plan, we estimate that for most entities in the planning area, local cost shares will need to be less than $20,000 to be funded. For projects having an anticipated local cost share exceeding $500,000, the project will be scored "High" if it has been successful in attracting most of the needed funding already.

Medium

The Tuolumne River Trust does not have the resources to supply the local cost share. However, because the City of Modesto contributed to the cost of the Basis of Design Report and there is general local support for the project, it is reasonable to expect that the Tuolumne River Trust would be able to meet the local cost share for this project through partnerships and potentially through fundraising. It is noted that local financial limitations have contributed to this project not being implemented in the past despite local support and studies that were funded and completed. Thus, the project was assessed as "Medium" in terms of financial feasibility.

RC-3. ***Flood risk reduction - life risk***. Change in the number of lives potentially at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project may reduce loss of life.
- **Medium** if the project is expected to reduce loss of life based on a qualitative assessment.
- **High** if the project has been analyzed for effect on loss of life and is expected to reduce it.

High

From a purely flood risk perspective, it is expected that the project would reduce loss of life based on the local flooding issues that Dennett Dam causes and its proximity to developed areas in Modesto, and, therefore, an initial score of "Medium" is appropriate. However, as there have been three drowning deaths at Dennett Dam in the last five years, even though they were not related to flooding, the score is elevated to "High."

RC-4. ***Flood risk reduction - flood damage.*** Change in the value of assets at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to create a locally-significant reduction in flood risk.
- **Medium** if the project is expected to create a regionally-significant reduction in flood risk.
- **High** if the project is expected to create a significant reduction in flood risk from a regional perspective and beyond.

Low

The project is expected to create a locally-significant reduction in flood risk in the vicinity of Dennett Dam.

RC-5. ***Operations, maintenance and repair.*** Improvement in efficiency and effectiveness, or reduction of need at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to only modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

N/A

No benefits identified.

RC-6. ***Ecosystem function*.** Consistency with ecosystem priorities and goals of the (Draft) CVFPP metrics, the (Draft) Conservation Strategy (if available) and/or adopted conservation or recovery plans.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to increase ecosystem function compared to current conditions, but is not specifically consistent with the priorities and goals of the Draft CVFPP metrics or other adopted conservation or recovery plans.
- **Medium** if the project is consistent with the priorities and goals of one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.
- **High** if the project is if the project is consistent with the priorities and goals of more than one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.

High

The project is consistent with draft BWFS/CS objectives metrics 6a, Shaded Riparian Aquatic, and 6b, Riparian, under metric 6, Habitats, as well as metric 8c, Fish Passage Barriers, under metric 8, Stressors. The project would support the implementation of the Central Valley Joint Venture Implementation Plan and the Riparian Conservation Plan. It is also included in the Tuolumne River Regional Park Master Plan.

RC-7. ***Institutional support*.** Improved support for entities contributing to flood management.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

N/A

No benefits identified.

RC-8. ***Other benefits.*** "Multiple benefits" not addressed by criteria above, e.g., water quality, recreation, public access, water supply, groundwater recharge, economic, etc.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Medium

The project would materially increase recreation and public benefits access on the Tuolumne River at a locally-significant scale.

RC-9. ***Cost-effectiveness.*** Benefits vs costs compared to other projects accomplishing similar benefits.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the lower third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **High** if the project is expected to fall within the upper third of the projects considered in terms of the mix of benefits provided for the given project cost.

High

The score is "High" because removal of the dam would contribute substantially to the reduction of life risk at relatively modest costs, as well as providing other benefits.

RC-10. ***Low potential for dis-benefits (post-mitigation).*** Low potential for negative outcomes after mitigation; a "High" score indicates very low probability; a "Low" score indicates high probability, etc.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of dis-benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the upper third of the projects considered in terms of the mix of anticipated dis-benefits.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of anticipated dis-benefits.

- **High** if the project is expected to fall within the lower third of the projects considered in terms of the mix of anticipated dis-benefits.

High

No dis-benefits have been identified.

Project Name: Dos Rios Ranch Floodplain Expansion and Ecosystem Restoration Project and Hidden Valley Ranch Mitigation Project

Project Lead: River Partners

Potential Project Partners:

Wildlife Conservation Board (WCB); California Department of Water Resources (DWR); United States Bureau of Reclamation (USBR); United States Fish and Wildlife Service (USFWS); Natural Resources Conservation Service (NRCS); San Francisco Public Utilities Commission (SFPUC); California Department of Fish and Wildlife (CDFW) (funding partners, technical assistance); Central Valley Flood Protection Board (CVFPB); National Marine Fisheries Service (NMFS); United States Army Corps of Engineers (USACE); regulatory agencies; environmental non-governmental organizations (NGOs); local municipalities; Reclamation District 2092 (project support and approvals); regional flood management agencies with mitigation needs that may be filled on the property

Short Project Description:

Project to restore flooding and transient floodwater storage to approximately 1,000 acres of historic floodplain, restore riparian habitats, and promote river physical processes of scour and deposition along 6 river miles. Remove levee maintenance obligations from State Plan of Flood Control (SPFC) and modify USACE O&M manual to allow breaching and other modification to the existing levees. Provide 191 acres of habitat mitigation for future regional SPFC environmental impacts.

Long Project Description:

River Partners owns the fee title for 2,100 acres of flood-prone farmlands at the confluence of the San Joaquin and Tuolumne Rivers in Stanislaus County. The properties will be restored to multi-benefit wildlife habitat and transient floodwater storage areas through the re-establishment of native vegetation, grading, levee breaching, and other local improvements (such as fish screening surface diversions, permanently retiring riparian water rights, weed management, recreational development, and removing bank revetment). Currently, 600 acres are being restored, and planning is underway for the remaining acreage. All flood management activities require regulatory approval from local, state and federal agencies. While the property has been purchased, additional investment is needed to develop mitigation opportunities, address permitting needs, and remove levees from the federal project or otherwise modify the maintenance obligations.

Unique Project Characteristics:

This project is aligned with the goals and objectives of many overlapping conservation, recreation, local and regional planning efforts. The property is immediately adjacent to the San Joaquin River National Wildlife Refuge and sits within the proposed boundary expansion area. The mitigation component has the potential to provide future mitigation to SPFC activities for the entire San Joaquin River watershed. Advanced mitigation planning will require substantial involvement from the regulatory agencies.

Project Status:	Planning, Implementation
Project Cost:	**$**8,000,000
Project Timeframe:	1-5 years
Cost-sharing:	Varies: Costs for restoration may be eligible for funding from local, state or federal grant programs.

Multi-benefit Project: Yes
Types of benefits: The project would improve flood risk management, promote ecosystem functions, and promote multi-benefit projects.
Source of Project: River Partners

Background Information:
Various technical reports and memos – please request from River Partners

Screening-level assessment

SC-1. ***Consistency with RFMP goals.*** Consistent with CVFPP goals: improve flood risk management, improve operations and maintenance, promote ecosystem functions, improve institutional support, promote multi-benefit projects.
Note: If the project is a study, evaluate the goals of the ultimate project that would flow from the study.

- **Low** if it meets *only* the multi-benefit project supporting objective.
- **Medium** as long as it meets 1-2 of the primary and/or supporting objectives and does not qualify as "Low."
- **High** if it includes meeting 3 or more of the primary and/or supporting objectives.

High

The project would improve flood risk management, promote ecosystem functions, and promote multi-benefit projects.

SC-2. ***Implementation feasibility.*** Consider existing laws or regulations, community opposition/support, or other factors affecting implementation feasibility.
Note: If the project is a study, evaluate only the implementation feasibility of completing the study.

- **Low** if the project is judged to face significant odds (e.g., a similar project has already been forcefully pursued and has failed to progress, and there is little reason to expect a different outcome now.)
- **Medium** if the project has been developed as a concept and has a description and an identified lead.
- **High** if the project has already gone through feasibility analysis and been found feasible, if appropriate, or the project already has reasonable assurance of being implemented by a capable project lead.

High

The project has reasonable assurance of being implemented by the lead, River Partners, who is committed to seeing the project through and has cultivated broad agency support.

Ranking-level assessment

RC-1. ***Implementation feasibility.*** (As in Screening-level assessment guidance.)

High

RC-2. ***Financial feasibility.*** Capacity to cover local share, with funding availability, or all project costs).
Note: project costs should be considered to include both the initial costs and the ongoing operations, maintenance, and repair costs, though this information may not be available. If the project is a study, evaluate only the financial feasibility of completing the study.

- **Low** if the anticipated project lead does not have the resources to either 1) carry out the project; or 2) supply any needed local cost share. Given the findings of the Financial Plan, projects are identified as "Low" if the anticipated local cost share exceeds $500,000, unless the project has been successful in attracting grant funding so far.
- **Medium** if the project does not meet the criteria for "Low" or "High" Financial Feasibility.
- **High** if the anticipated project lead has the resources to either 1) carry out the project; or 2) supply any needed local cost share and a plausible funding source for the balance has been identified. Given the findings of the Financial Plan, we estimate that for most entities in the planning area, local cost shares will need to be less than $20,000 to be funded. For projects having an anticipated local cost share exceeding $500,000, the project will be scored "High" if it has been successful in attracting most of the needed funding already.

High

The project cost is estimated at $8 million; $38 million have already been obligated or invested in the project. Because of the success of the project in attracting funds so far, it has been evaluated as having "High" financial feasibility.

RC-3. ***Flood risk reduction - life risk***. Change in the number of lives potentially at risk, at present and over the long term.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project may reduce loss of life.
- **Medium** if the project is expected to reduce loss of life based on a qualitative assessment.
- **High** if the project has been analyzed for effect on loss of life and is expected to reduce it.

Low

It is possible that the transitory storage provided by the project could result in the reduction of loss of life.

RC-4. ***Flood risk reduction - flood damage.*** Change in the value of assets at risk, at present and over the long term.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to create a locally-significant reduction in flood risk.
- **Medium** if the project is expected to create a regionally-significant reduction in flood risk.
- **High** if the project is expected to create a significant reduction in flood risk from a regional perspective and beyond.

Low

The project is anticipated to provide a locally-significant reduction in flood risk.

RC-5. ***Operations, maintenance and repair.*** Improvement in efficiency and effectiveness, or reduction of need at present and over the long term.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to only modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Medium

This project is expected to remove up to 3.76 miles of levees from the SPFC.

RC-6. ***Ecosystem function*****.** Consistency with ecosystem priorities and goals of the (Draft) CVFPP metrics, the (Draft) Conservation Strategy (if available) and/or adopted conservation or recovery plans.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to increase ecosystem function compared to current conditions, but is not specifically consistent with the priorities and goals of the Draft CVFPP metrics or other adopted conservation or recovery plans.
- **Medium** if the project is consistent with the priorities and goals of one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.
- **High** if the project is if the project is consistent with the priorities and goals of more than one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.

High

The project is consistent with draft BWFS/CS objectives metrics 5a, Inundated Floodplain, and 5b, Riverine Geomorphic Processes, under metric 5, Ecosystem Processes - Improve and enhance natural dynamic hydrologic and geomorphic processes; metrics 6a, Shaded Riparian Cover, and 6b, Riparian, under metric 6, Habitats; as well as metric 8b, Levees, under metric 8, Stressors - Reduce stressors related to the

development and operation of the flood management system that negatively affect important species. (Are SRA, riparian, and floodplain ag a part of the project?)

RC-7. ***Institutional support*.** Improved support for entities contributing to flood management.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

N/A

No benefits identified.

RC-8. ***Other benefits.*** "Multiple benefits" not addressed by criteria above, e.g., water quality, recreation, public access, water supply, groundwater recharge, economic, etc.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

High

The project is expected to materially increase water quality and groundwater recharge at a locally-significant scale over the long-term. The project would provide a regionally significant recreation improvement as described in the Central Valley Vision document prepared by California State Parks.

RC-9. ***Cost-effectiveness.*** Benefits vs costs compared to other projects accomplishing similar benefits.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the lower third of the projects considered in terms of the mix of benefits provided for the given project cost.

- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **High** if the project is expected to fall within the upper third of the projects considered in terms of the mix of benefits provided for the given project cost.

High

While the cost for the completion of the project is high at $8 million, the benefits are expected to outweigh the cost, demonstrated both by the fact that project has successfully attracted most of the needed funding and the estimated per acre cost of restoration is below typical values.

RC-10. ***Low potential for dis-benefits (post-mitigation).*** Low potential for negative outcomes after mitigation; a "High" score indicates very low probability; a "Low" score indicates high probability, etc.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of dis-benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the upper third of the projects considered in terms of the mix of anticipated dis-benefits.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of anticipated dis-benefits.
- **High** if the project is expected to fall within the lower third of the projects considered in terms of the mix of anticipated dis-benefits.

High

No significant dis-benefits are anticipated. A short-term water quality dis-benefit is anticipated because water pollutants such as pesticides and nutrients that are present in site soils would be transported to the channel when flood waters recede. A minor reduction in the tax base is another anticipated dis-benefit. While the property is currently subject to a lower tax rate through a Williamson Act contract, the property value is expected to descrease after project implementation, which would reduce the property tax collected.

Project Name: Dry Creek Watershed Detention Reconnaissance Study

Project Lead: Stanislaus County and City of Modesto

Potential Project Partners:

USACE

Short Project Description:

Complete a reconnaissance study of potential options for reducing flood risks by detaining flood flows in the Dry Creek watershed, upstream of the City of Modesto.

Long Project Description:

In 2012, the 1600-acre Dos Rios Ranch was purchased by River Partners for management as flood-prone wildlife habitat and potentially as a transient floodwater storage basin. Funding for the acquisition was provided by the USDA NRCS, California Wildlife Conservation Board, DWR, the California River Parkways Program, the San Francisco Public Utilities Commission, the USFWS North American Wetland Conservation Act (NAWCA), the US Bureau of Reclamation and USFWS Central Valley Project Conservation Program, and River Partners. The USDA NRCS holds a Wetland Reserve Program easement, the Tuolumne River Trust holds a Conservation Easement, and River Partners holds the fee title for the property. In 2013, the remaining 497 acres of flood-prone land within Reclamation District 2092 (Dos Rios) were purchased by River Partners for similar purposes. The Tuolumne River Trust holds a Conservation Easement on the property which expressly provides for the future development of habitat mitigation opportunities for SPFC impacts on 191 acres of the property, and River Partners owns the fee title. River Partners hopes to use the NSA example from the Three Amigos project as a model for floodplain reconnection on the RD 2092 properties. Habitat restoration is currently underway and is expected to be completed in phases over the next 8 to 10 years. Restoration activities include screening river pumps to protect juvenile salmonids, earthwork to create floodplain swales and benches as well as high-elevation refugia for terrestrial species, planting, and ongoing vegetation maintenance, and eventual modification to the existing levee to provide for floodplain reconnection and transient floodwater storage. Additional funding and permitting is required to complete the full build-out of the Dos Rios Ranch Habitat Restoration Project.

Unique Project Characteristics:

Dry Creek in Stanislaus County has the largest uncontrolled flow in the San Joaquin River basin, which affects both downstream and upstream flood levels within the system.

Project Status:	Pending funding grants
Project Cost:	$250,000
Project Timeframe:	2015-2016 pending funding
Cost-sharing:	Up to 10% pending funding
Multi-benefit Project:	Yes
Types of benefits:	The project would improve flood risk management and could potentially improve operations and maintenance, promote ecosystem functions, and/or promote multi-benefit projects.

Source of Project:

Background Information:

None provided

Screening-level assessment

SC-1. ***Consistency with RFMP goals.*** Consistent with CVFPP goals: improve flood risk management, improve operations and maintenance, promote ecosystem functions, improve institutional support, promote multi-benefit projects.

Note: If the project is a study, evaluate the goals of the ultimate project that would flow from the study.

- **Low** if it meets *only* the multi-benefit project supporting objective.
- **Medium** as long as it meets 1-2 of the primary and/or supporting objectives and does not qualify as "Low."
- **High** if it includes meeting 3 or more of the primary and/or supporting objectives.

Medium

The project would improve flood risk management and could potentially improve operations and maintenance, promote ecosystem functions, and/or promote multi-benefit projects. Due to the uncertainty as to project benefits beyond flood risk reduction, the score is "Medium" instead of "High."

SC-2. ***Implementation feasibility.*** Consider existing laws or regulations, community opposition/support, or other factors affecting implementation feasibility.

Note: If the project is a study, evaluate only the implementation feasibility of completing the study.

- **Low** if the project is judged to face significant odds (e.g., a similar project has already been forcefully pursued and has failed to progress, and there is little reason to expect a different outcome now.)
- **Medium** if the project has been developed as a concept and has a description and an identified lead.
- **High** if the project has already gone through feasibility analysis and been found feasible, if appropriate, or the project already has reasonable assurance of being implemented by a capable project lead.

Medium

The score is "Medium" because the project has been developed as a concept, has a description, and identified co-leads, Stanislaus County and the City of Modesto.

Ranking-level assessment

RC-1. ***Implementation feasibility.*** (As in Screening-level assessment guidance.)

Medium

RC-2. ***Financial feasibility.*** Capacity to cover local share, with funding availability, or all project costs).

Note: project costs should be considered to include both the initial costs and the ongoing operations, maintenance, and repair costs, though this information may not be available. If the project is a study, evaluate only the financial feasibility of completing the study.

- **Low** if the anticipated project lead does not have the resources to either 1) carry out the project; or 2) supply any needed local cost share. Given the findings of the Financial Plan, projects are identified as "Low" if the anticipated local cost share exceeds $500,000, unless the project has been successful in attracting grant funding so far.
- **Medium** if the project does not meet the criteria for "Low" or "High" Financial Feasibility.
- **High** if the anticipated project lead has the resources to either 1) carry out the project; or 2) supply any needed local cost share and a plausible funding source for the balance has been identified. Given the findings of the Financial Plan, we estimate that for most entities in the planning area, local cost shares will need to be less than $20,000 to be funded. For projects having an anticipated local cost share exceeding $500,000, the project will be scored "High" if it has been successful in attracting most of the needed funding already.

High

As the cost is relatively modest and grant funds are pending, the assigned score is "High."

RC-3. ***Flood risk reduction - life risk***. Change in the number of lives potentially at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project may reduce loss of life.
- **Medium** if the project is expected to reduce loss of life based on a qualitative assessment.
- **High** if the project has been analyzed for effect on loss of life and is expected to reduce it.

Medium

The actions that would flow from this study could potentially reduce the risk of flooding in and near Modesto. Considering the potential lives lost in a flood event, the reduction in risk would be regionally significant.

RC-4. ***Flood risk reduction - flood damage.*** Change in the value of assets at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to create a locally-significant reduction in flood risk.
- **Medium** if the project is expected to create a regionally-significant reduction in flood risk.
- **High** if the project is expected to create a significant reduction in flood risk from a regional perspective and beyond.

Medium

The actions that would flow from this study could potentially reduce the risk of flooding in and near Modesto. Considering the assets at risk, the reduction in risk would be regionally significant.

RC-5. ***Operations, maintenance and repair.*** Improvement in efficiency and effectiveness, or reduction of need at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to only modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

N/A

No benefits identified.

RC-6. ***Ecosystem function*****.** Consistency with ecosystem priorities and goals of the (Draft) CVFPP metrics, the (Draft) Conservation Strategy (if available) and/or adopted conservation or recovery plans.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to increase ecosystem function compared to current conditions, but is not specifically consistent with the priorities and goals of the Draft CVFPP metrics or other adopted conservation or recovery plans.
- **Medium** if the project is consistent with the priorities and goals of one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.
- **High** if the project is if the project is consistent with the priorities and goals of more than one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.

N/A

No benefits identified.

RC-7. ***Institutional support*****.** Improved support for entities contributing to flood management.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

N/A

No benefits identified.

RC-8. ***Other benefits.*** "Multiple benefits" not addressed by criteria above, e.g., water quality, recreation, public access, water supply, groundwater recharge, economic, etc.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

N/A

No benefits identified.

RC-9. ***Cost-effectiveness.*** Benefits vs costs compared to other projects accomplishing similar benefits.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the lower third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **High** if the project is expected to fall within the upper third of the projects considered in terms of the mix of benefits provided for the given project cost.

Medium

The score is "Medium" because there is not a clear reason to differentiate this project as "Low" or "High."

RC-10. ***Low potential for dis-benefits (post-mitigation).*** Low potential for negative outcomes after mitigation; a "High" score indicates very low probability; a "Low" score indicates high probability, etc.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of dis-benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the upper third of the projects considered in terms of the mix of anticipated dis-benefits.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of anticipated dis-benefits.

- **High** if the project is expected to fall within the lower third of the projects considered in terms of the mix of anticipated dis-benefits.

Medium

The score is "Medium" because there is not a clear reason to differentiate this project as "Low" or "High."

Project Name: Emergency Response Plan – Debris Management

Project Lead: Stanislaus County Office of Emergency Services

Potential Project Partners:

Stanislaus County Public Works, cities within Stanislaus County, city public works departments within Stanislaus County, Patterson Irrigation District, West Stanislaus Irrigation District

Short Project Description:

A debris management plan is needed to better prepare to restore public services and ensure public health and safety in the aftermath of a flood or earthquake and to better position the Mid SJR Region for emergency response funding from the State of California, Federal Emergency Management Agency (FEMA), and other participating entities. Stanislaus County Office of Emergency Services proposes the development of a comprehensive, countywide debris management plan.

Long Project Description:

As described by FEMA, "debris removal operations can be time-consuming and costly. Over the last five years, debris removal operations accounted for approximately 27 percent of the disaster recovery costs." For Stanislaus County and its communities to recover from a disaster in a timely manner, a debris management plan is key. The debris management plan developed would consider large-scale debris removal and disposal operations after a flood or earthquake. By developing a debris management plan, Stanislaus County will be better prepared to address disaster-related debris in a time-efficient manner, expediting the recovery process. Components of the plan may include:

- Staff Roles and Responsibilities
- Situation and Assumptions
- Debris Collection Plan
- Debris Management Sites
- Contracted Services
- Private Property Demolition and Debris Removal
- Public Information Plan

Unique Project Characteristics:

Both the Patterson Irrigation District and West Stanislaus Irrigation District divert water from the San Joaquin River for delivery to farms within their districts, resulting in significant contributions to the local and state economies annually. River debris and sediment deposition at their intakes and elsewhere within their infrastructure diminish their ability to provide reliable and safe water supplies, and public safety, during and following flood events. Intense rain-flood events within their watersheds can cause similar challenges within and adjacent to their canal systems.

Project Status:	Pre-planning
Project Cost:	**$**110,000
Project Timeframe:	1-5 years
Cost-sharing:	In anticipation of future contributions toward operations and maintenance benefits following plan development, the Patterson Irrigation District and West Stanislaus Irrigation District will consider a reasonable cost share for plan development. In-lieu

contribution of their representatives time and expense to participate in district components of plan development is their preferred cost-share approach.

Multi-benefit Project: Yes

Types of benefits: The project would improve flood risk management and institutional support.

Source of Project: The project was an outcome of the emergency response technical memorandum prepared by the Mid SJR RFMP project team. Stakeholders participating in workshops during the fall of 2013 also suggested that this project be considered.

Background Information:

None provided

Screening-level assessment

SC-1. ***Consistency with RFMP goals.*** Consistent with CVFPP goals: improve flood risk management, improve operations and maintenance, promote ecosystem functions, improve institutional support, promote multi-benefit projects.

Note: If the project is a study, evaluate the goals of the ultimate project that would flow from the study.

- **Low** if it meets *only* the multi-benefit project supporting objective.
- **Medium** as long as it meets 1-2 of the primary and/or supporting objectives and does not qualify as "Low."
- **High** if it includes meeting 3 or more of the primary and/or supporting objectives.

Medium

The project would improve flood risk management and institutional support.

SC-2. ***Implementation feasibility.*** Consider existing laws or regulations, community opposition/support, or other factors affecting implementation feasibility.

Note: If the project is a study, evaluate only the implementation feasibility of completing the study.

- **Low** if the project is judged to face significant odds (e.g., a similar project has already been forcefully pursued and has failed to progress, and there is little reason to expect a different outcome now.)
- **Medium** if the project has been developed as a concept and has a description and an identified lead.
- **High** if the project has already gone through feasibility analysis and been found feasible, if appropriate, or the project already has reasonable assurance of being implemented by a capable project lead.

Medium

The score is "Medium" because the project has been developed as a concept, has a description, and identified lead, the Stanislaus County Office of Emergency Services.

Ranking-level assessment

RC-1. ***Implementation feasibility.*** (As in Screening-level assessment guidance.)

Medium

RC-2. ***Financial feasibility.*** Capacity to cover local share, with funding availability, or all project costs).
Note: project costs should be considered to include both the initial costs and the ongoing operations, maintenance, and repair costs, though this information may not be available. If the project is a study, evaluate only the financial feasibility of completing the study.

- **Low** if the anticipated project lead does not have the resources to either 1) carry out the project; or 2) supply any needed local cost share. Given the findings of the Financial Plan, projects are identified as "Low" if the anticipated local cost share exceeds $500,000, unless the project has been successful in attracting grant funding so far.
- **Medium** if the project does not meet the criteria for "Low" or "High" Financial Feasibility.
- **High** if the anticipated project lead has the resources to either 1) carry out the project; or 2) supply any needed local cost share and a plausible funding source for the balance has been identified. Given the findings of the Financial Plan, we estimate that for most entities in the planning area, local cost shares will need to be less than $20,000 to be funded. For projects having an anticipated local cost share exceeding $500,000, the project will be scored "High" if it has been successful in attracting most of the needed funding already.

High

The Stanislaus County Office of Emergency Services has the resources to supply the majority of the local cost share, and the Patterson Irrigation District and West Stanislaus Irrigation District will consider a reasonable cost share for plan development.

RC-3. ***Flood risk reduction - life risk***. Change in the number of lives potentially at risk, at present and over the long term.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project may reduce loss of life.
- **Medium** if the project is expected to reduce loss of life based on a qualitative assessment.
- **High** if the project has been analyzed for effect on loss of life and is expected to reduce it.

Low

The focus of the project is to manage debris in the aftermath of a flood. While the focus is not to reduce loss of life, it is possible that implementation of the Debris Management Plan would do so.

RC-4. ***Flood risk reduction - flood damage.*** Change in the value of assets at risk, at present and over the long term.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to create a locally-significant reduction in flood risk.
- **Medium** if the project is expected to create a regionally-significant reduction in flood risk.
- **High** if the project is expected to create a significant reduction in flood risk from a regional perspective and beyond.

Low

Flood damage could be reduced by improving post-flood recovery and debris clearing.

RC-5. ***Operations, maintenance and repair.*** Improvement in efficiency and effectiveness, or reduction of need at present and over the long term.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to only modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Low

O&M could be easier to perform with improved post-flood debris management.

RC-6. ***Ecosystem function*****.** Consistency with ecosystem priorities and goals of the (Draft) CVFPP metrics, the (Draft) Conservation Strategy (if available) and/or adopted conservation or recovery plans.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to increase ecosystem function compared to current conditions, but is not specifically consistent with the priorities and goals of the Draft CVFPP metrics or other adopted conservation or recovery plans.
- **Medium** if the project is consistent with the priorities and goals of one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.
- **High** if the project is if the project is consistent with the priorities and goals of more than one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.

N/A

No benefits identified.

RC-7. ***Institutional support*****.** Improved support for entities contributing to flood management.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Medium

An effective debris management strategy is anticipated to allow businesses to reopen more quickly and reduce the cost of emergency responsse. The project is expected to provide economic benefits at least at a locally-significant level.

RC-8. ***Other benefits.*** "Multiple benefits" not addressed by criteria above, e.g., water quality, recreation, public access, water supply, groundwater recharge, economic, etc.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

High

Given the high cost of debris management, the project is anticipated to have material economic benefits on a regionally-significant level.

RC-9. ***Cost-effectiveness.*** Benefits vs costs compared to other projects accomplishing similar benefits.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the lower third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **High** if the project is expected to fall within the upper third of the projects considered in terms of the mix of benefits provided for the given project cost.

High

The cost of the project is very low when compared to the benefits. The project would fall in the upper third of projects considered in terms of the mix of benefits provided for the given project cost, and is considered high among the upper third.

RC-10. ***Low potential for dis-benefits (post-mitigation).*** Low potential for negative outcomes after mitigation; a "High" score indicates very low probability; a "Low" score indicates high probability, etc.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of dis-benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the upper third of the projects considered in terms of the mix of anticipated dis-benefits.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of anticipated dis-benefits.
- **High** if the project is expected to fall within the lower third of the projects considered in terms of the mix of anticipated dis-benefits.

High

No dis-benefits are anticipated.

Project Name: Emergency Response Plan – Local Planning and Training

Project Lead: Stanislaus County Office of Emergency Services

Potential Project Partners:

Stanislaus County; City of Modesto; City of Patterson; City of Newman; Reclamation Districts 1602, 2063, and 2091; Patterson Irrigation District; West Stanislaus Irrigation District

Short Project Description:

Planning and training are necessary to improve coordination between local agencies so that emergency response can be improved in the planning area. A program would be developed and implemented to address this need.

Long Project Description:

To affirm effective response coordination among agencies during a flood within the Mid San Joaquin River Region, it is important that local agencies plan, prepare, and train for such an incident. Actions that should be addressed include, but are not limited to:

- Response plans for public safety agency functions, including evacuation and debris management planning
- Development and training on the command and communication structure for areas threatened by flood waters. This would include an emphasis on the National Incident Management System (NIMS) and Standardized Emergency Management System (SEMS).
- Coordination of local response plans between county, impacted cities and reclamation districts.

Unique Project Characteristics:

The West Stanislaus Irrigation District and Patterson Irrigation District are non-State Plan of Flood Control entities, yet their Districts comprise significant portions of the west side of the watershed within the Mid-San Joaquin River Region. Their participation with SPFC entities in flood management and organized response activities can help strengthen flood
resilience, public safety, and protect important infrastructure in the Mid-SJR Region. They maintain communications with their farmers and their local communities, have infrastructure and property within the 100 year floodplain, storage facilities, access, equipment, and other assets of potential value before/during/after flood events.

Project Status:	Pre-planning
Project Cost:	**$**110,000
Project Timeframe:	1-5 years
Cost-sharing:	In anticipation of future benefits to the Patterson Irrigation District and West Stanislaus Irrigation District resulting from a good plan - better communication and training - the districts will consider a reasonable cost share. In-lieu contribution of their representatives' time and expense to participate in district components of the project is their preferred cost-share approach.
Multi-benefit Project:	Potentially
Types of benefits:	The project would improve flood risk management; operations and maintenance; and institutional support.
Source of Project:	The project was an outcome of the emergency response technical memorandum prepared by the Mid SJR RFMP project team. Stakeholders participating in workshops during the fall of 2013 also suggested that this project be considered.

Background Information:
None provided

Screening-level assessment

SC-1. ***Consistency with RFMP goals.*** Consistent with CVFPP goals: improve flood risk management, improve operations and maintenance, promote ecosystem functions, improve institutional support, promote multi-benefit projects.
Note: If the project is a study, evaluate the goals of the ultimate project that would flow from the study.

- **Low** if it meets *only* the multi-benefit project supporting objective.
- **Medium** as long as it meets 1-2 of the primary and/or supporting objectives and does not qualify as "Low."
- **High** if it includes meeting 3 or more of the primary and/or supporting objectives.

High

The project would improve flood risk management; operations and maintenance; and institutional support.

SC-2. ***Implementation feasibility.*** Consider existing laws or regulations, community opposition/support, or other factors affecting implementation feasibility.
Note: If the project is a study, evaluate only the implementation feasibility of completing the study.

- **Low** if the project is judged to face significant odds (e.g., a similar project has already been forcefully pursued and has failed to progress, and there is little reason to expect a different outcome now.)
- **Medium** if the project has been developed as a concept and has a description and an identified lead.
- **High** if the project has already gone through feasibility analysis and been found feasible, if appropriate, or the project already has reasonable assurance of being implemented by a capable project lead.

High

The project has a capable project lead, support from expected participants and a reasonable assurance of being implemented given the commitment of the project lead.

Ranking-level assessment

RC-1. ***Implementation feasibility.*** (As in Screening-level assessment guidance.)

High

RC-2. ***Financial feasibility.*** Capacity to cover local share, with funding availability, or all project costs).
Note: project costs should be considered to include both the initial costs and the ongoing operations,

maintenance, and repair costs, though this information may not be available. If the project is a study, evaluate only the financial feasibility of completing the study.

- **Low** if the anticipated project lead does not have the resources to either 1) carry out the project; or 2) supply any needed local cost share. Given the findings of the Financial Plan, projects are identified as "Low" if the anticipated local cost share exceeds $500,000, unless the project has been successful in attracting grant funding so far.
- **Medium** if the project does not meet the criteria for "Low" or "High" Financial Feasibility.
- **High** if the anticipated project lead has the resources to either 1) carry out the project; or 2) supply any needed local cost share and a plausible funding source for the balance has been identified. Given the findings of the Financial Plan, we estimate that for most entities in the planning area, local cost shares will need to be less than $20,000 to be funded. For projects having an anticipated local cost share exceeding $500,000, the project will be scored "High" if it has been successful in attracting most of the needed funding already.

High

The project lead has the ability to carry out the project or supply any needed local cost share; the cost is modest and grant funding is anticipated to be available.

RC-3. ***Flood risk reduction - life risk***. Change in the number of lives potentially at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project may reduce loss of life.
- **Medium** if the project is expected to reduce loss of life based on a qualitative assessment.
- **High** if the project has been analyzed for effect on loss of life and is expected to reduce it.

Medium

Given that flood risk management would improve through better agency coordination and emergency response, the project is expected to reduce loss of life.

RC-4. ***Flood risk reduction - flood damage.*** Change in the value of assets at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to create a locally-significant reduction in flood risk.
- **Medium** if the project is expected to create a regionally-significant reduction in flood risk.
- **High** if the project is expected to create a significant reduction in flood risk from a regional perspective and beyond.

Medium

Given that flood risk management would improve through better agency coordination and emergency response, the project is expected to also reduce flood damage, and at a regionally-significant level.

RC-5. ***Operations, maintenance and repair.*** Improvement in efficiency and effectiveness, or reduction of need at present and over the long term.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to only modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

High

The project is expected to enhance operations at a regionally-significant level.

RC-6. ***Ecosystem function*****.** Consistency with ecosystem priorities and goals of the (Draft) CVFPP metrics, the (Draft) Conservation Strategy (if available) and/or adopted conservation or recovery plans.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to increase ecosystem function compared to current conditions, but is not specifically consistent with the priorities and goals of the Draft CVFPP metrics or other adopted conservation or recovery plans.
- **Medium** if the project is consistent with the priorities and goals of one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.
- **High** if the project is if the project is consistent with the priorities and goals of more than one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.

N/A

No benefits identified.

RC-7. ***Institutional support*****.** Improved support for entities contributing to flood management.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

High

The project is expected to improve institutional support at a regionally-significant level.

RC-8. ***Other benefits.*** "Multiple benefits" not addressed by criteria above, e.g., water quality, recreation, public access, water supply, groundwater recharge, economic, etc.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

N/A

No benefits identified.

RC-9. ***Cost-effectiveness.*** Benefits vs costs compared to other projects accomplishing similar benefits.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the lower third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **High** if the project is expected to fall within the upper third of the projects considered in terms of the mix of benefits provided for the given project cost.

High

The cost of the project is very low when compared to the benefits. The project would fall in the upper third of projects considered in terms of the mix of benefits provided for the given project cost, and is considered high among the upper third.

RC-10. ***Low potential for dis-benefits (post-mitigation).*** Low potential for negative outcomes after mitigation; a "High" score indicates very low probability; a "Low" score indicates high probability, etc.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of dis-benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the upper third of the projects considered in terms of the mix of anticipated dis-benefits.

- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of anticipated dis-benefits.
- **High** if the project is expected to fall within the lower third of the projects considered in terms of the mix of anticipated dis-benefits.

High

Given the nature of the project, there is a low potential for dis-benefits.

Project Name: Flood Risk Education

Project Lead: River Partners

Potential Project Partners:

DWR and USACE levee maintenance and inspection staff; CVFPB; regional flood management agencies, including San Joaquin River Flood Control Agency (SJRFCA); San Joaquin Area Flood Control Agency (SJAFCA); Lower San Joaquin Levee District (LSJLD); counties; cities; USFWS, CDFW, USACE, NGOs with an interest in river and flood management and education

Short Project Description:

Develop and implement a regional flood risk management educational program to raise awareness of flood risks and elevate the level of public understanding with respect to flood risk management needs and the value of investments to address them. For the local maintaining agencies (LMAs), include education on their role in flood risk management and provide technical guidance/assistance on levee maintenance activities and permitting requirements.

Long Project Description:

Flood management in the Central Valley has developed into a very complex regulatory endeavor – once simple maintenance activities now require review from multiple resource agencies and complex funding structures. Often the public, policy-makers, and stakeholders are not aware of the importance of flood risk management in land use planning, development, agricultural practices and soil quality management, transportation projects, and environmental and recreation improvement efforts. This lack of awareness leads to conflicts among user groups and flood management interests. This project would develop an education program to raise awareness of flood risks and elevate the level of public understanding of regional flood risk management needs and the value of investments to address them. Example educational products include brochures and brief handouts relevant to regional flood interests, presentations for community groups and LMAs, and possibly a website devoted to flood risk management education. A specific educational effort would be devoted to raising awareness of rural landowners with respect to levee maintenance obligations/opportunities, permitting assistance, and project implementation strategies.

Unique Project Characteristics:

This project would strengthen institutional structures in the area of interest, and may indirectly promote broader support for flood risk management investment at a local level, environmental stewardship, and improved public safety.

Project Status: Pre-planning
Project Cost: $30,000
Project Timeframe: Dependent upon funding – could start immediately and continue indefinitely contingent upon funding
Cost-sharing: Opportunities exist to cost-share with other educational outreach programs managed by local agencies and California's resource agencies
Multi-benefit Project: Yes
Types of benefits: The project would improve flood risk management and could improve operations and maintenance and institutional support indirectly.
Source of Project: River Partners

Background Information:

None provided

Screening-level assessment

SC-1. ***Consistency with RFMP goals.*** Consistent with CVFPP goals: improve flood risk management, improve operations and maintenance, promote ecosystem functions, improve institutional support, promote multi-benefit projects.
Note: If the project is a study, evaluate the goals of the ultimate project that would flow from the study.

- **Low** if it meets *only* the multi-benefit project supporting objective.
- **Medium** as long as it meets 1-2 of the primary and/or supporting objectives and does not qualify as "Low."
- **High** if it includes meeting 3 or more of the primary and/or supporting objectives.

High

The project would improve flood risk management and could improve operations and maintenance and institutional support indirectly.

SC-2. ***Implementation feasibility.*** Consider existing laws or regulations, community opposition/support, or other factors affecting implementation feasibility.
Note: If the project is a study, evaluate only the implementation feasibility of completing the study.

- **Low** if the project is judged to face significant odds (e.g., a similar project has already been forcefully pursued and has failed to progress, and there is little reason to expect a different outcome now.)
- **Medium** if the project has been developed as a concept and has a description and an identified lead.
- **High** if the project has already gone through feasibility analysis and been found feasible, if appropriate, or the project already has reasonable assurance of being implemented by a capable project lead.

Medium

The score is "Medium" because the project has been developed as a concept, has a description, and identified lead, River Partners.

Ranking-level assessment

RC-1. ***Implementation feasibility.*** (As in Screening-level assessment guidance.)

Medium

RC-2. ***Financial feasibility.*** Capacity to cover local share, with funding availability, or all project costs).
Note: project costs should be considered to include both the initial costs and the ongoing operations,

maintenance, and repair costs, though this information may not be available. If the project is a study, evaluate only the financial feasibility of completing the study.

- **Low** if the anticipated project lead does not have the resources to either 1) carry out the project; or 2) supply any needed local cost share. Given the findings of the Financial Plan, projects are identified as "Low" if the anticipated local cost share exceeds $500,000, unless the project has been successful in attracting grant funding so far.
- **Medium** if the project does not meet the criteria for "Low" or "High" Financial Feasibility.
- **High** if the anticipated project lead has the resources to either 1) carry out the project; or 2) supply any needed local cost share and a plausible funding source for the balance has been identified. Given the findings of the Financial Plan, we estimate that for most entities in the planning area, local cost shares will need to be less than $20,000 to be funded. For projects having an anticipated local cost share exceeding $500,000, the project will be scored "High" if it has been successful in attracting most of the needed funding already.

High

River Partners does not have the resources to supply the local cost share; however, opportunities exist for fundraising for the local cost-share, as well as the potential to have a local cost share provided by other educational outreach programs managed by local agencies and possibly California's resource agencies. Additionally, the cost is relatively modest. Thus, financial feasibility is scored as "high."

RC-3. ***Flood risk reduction - life risk***. Change in the number of lives potentially at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project may reduce loss of life.
- **Medium** if the project is expected to reduce loss of life based on a qualitative assessment.
- **High** if the project has been analyzed for effect on loss of life and is expected to reduce it.

Low

If the population in the planning area is more educated about flood risk, it could result in greater public support for projects that reduce loss of life, and the project could change the number of lives potentially at risk.

RC-4. ***Flood risk reduction - flood damage.*** Change in the value of assets at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to create a locally-significant reduction in flood risk.
- **Medium** if the project is expected to create a regionally-significant reduction in flood risk.
- **High** if the project is expected to create a significant reduction in flood risk from a regional perspective and beyond.

Medium

If the population in the planning area is more educated about flood risk, it could result in greater public support for projects that reduce flood damages and less public support for projects that would increase the assets exposed to flood risk. This pro

RC-5. ***Operations, maintenance and repair.*** Improvement in efficiency and effectiveness, or reduction of need at present and over the long term.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to only modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Low

If the population in the planning area is more educated about flood risk, it could result in outcomes that would improve operations and maintenance, such as collaboration between local landowners and LMAs. Given the level of uncertainty associated with th

RC-6. ***Ecosystem function*****.** Consistency with ecosystem priorities and goals of the (Draft) CVFPP metrics, the (Draft) Conservation Strategy (if available) and/or adopted conservation or recovery plans.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to increase ecosystem function compared to current conditions, but is not specifically consistent with the priorities and goals of the Draft CVFPP metrics or other adopted conservation or recovery plans.
- **Medium** if the project is consistent with the priorities and goals of one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.
- **High** if the project is if the project is consistent with the priorities and goals of more than one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.

N/A

No benefits identified.

RC-7. ***Institutional support*****.** Improved support for entities contributing to flood management.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Low

If the population in the planning area is more educated about flood risk, it could result in outcomes that would improve institutional support, particularly related to response, recovery, and land use and development planning. Given the level of uncertain

RC-8. ***Other benefits.*** "Multiple benefits" not addressed by criteria above, e.g., water quality, recreation, public access, water supply, groundwater recharge, economic, etc.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Low

If the population in the planning area is more educated about flood risk, it could result in a variety of indirect benefits. Given the level of uncertainty associated with that potential outcome, the score of "Low" is assigned.

RC-9. ***Cost-effectiveness.*** Benefits vs costs compared to other projects accomplishing similar benefits.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the lower third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **High** if the project is expected to fall within the upper third of the projects considered in terms of the mix of benefits provided for the given project cost.

High

The cost of the project is very low when compared to the benefits. The project would fall in the upper third of projects considered in terms of the mix of benefits provided for the given project cost, and is considered high among the upper third.

RC-10. ***Low potential for dis-benefits (post-mitigation).*** Low potential for negative outcomes after mitigation; a "High" score indicates very low probability; a "Low" score indicates high probability, etc.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of dis-benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the upper third of the projects considered in terms of the mix of anticipated dis-benefits.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of anticipated dis-benefits.
- **High** if the project is expected to fall within the lower third of the projects considered in terms of the mix of anticipated dis-benefits.

High

No dis-benefits are anticipated.

Project Name: Gomes Lake / Harding Drain Improvements

Project Lead: Gomes Lake Joint Powers Authority

Potential Project Partners:

Turlock Irrigation District, City of Turlock, Stanislaus County, Reclamation District 2063, Reclamation District 2091

Short Project Description:

This project includes multiple components to enhance the function, reliability, flexibility and capacity of the Gomes Lake facility, which stores and drains stormwater and return flows, providing flood risk reduction behind the east bank levees of the San Joaquin River.

Long Project Description:

Currently, the pump sump area is always submerged, requiring divers for any maintenance work and to remove fallen debris that could damage the pumps during operation. Construction of a gated weir or berm in the lake upstream of the pumps would isolate the pumps so they could be de-watered. A gravity bypass could be built around the pumping plant to continue the option of gravity flow into the San Joaquin River that currently passes through the below-base pump discharges. Replacement of aging flap gates at the pumping plant discharge is also needed. The aging gates do not open fully, causing additional head loss during pumping. There may be other pumping plant facilities that need to be improved as well.

The two existing slide gates at the terminus of the Harding Drain act in a single seating direction (only closed when San Joaquin River water level is higher than the drain). Gates capable of resisting both seating and unseating head are required for flexibility. With the installation of such gates, drain water could be conveyed to Gomes Lake any time of the year. For example, this would provide the ability to exercise the Gomes Lake pumps during the summer. The existing discharge pipes are corrugated metal and are aging and are in need of repair. Replacement or slip lining the pipes would extend the life of the structure. Other improvements are needed such as installation of trash racks at the culvert inlets.

Currently, there is vulnerability in the event of a pump outage during a flood. Gomes Lake has insufficient storage capacity to accommodate such an outage, and therefore there may be risk of flooding in such an event. It would be beneficial to increase the size of Gomes Lake to create sufficient storage capacity to handle one of the three pumps to be out for a 24-hour period. The original pumps are still used in the original pumping plant. Replacement of the old pumps with more efficient and higher capacity pumps would also provide reduced risk of flooding.

Unique Project Characteristics:

None specified

Project Status:	Pre-planning
Project Cost:	$1,700,000
Project Timeframe:	1-5 years
Cost-sharing:	No opportunities identified to date
Multi-benefit Project:	Yes
Types of benefits:	The project would improve flood risk management and operations and maintenance.
Source of Project:	Turlock Irrigation District

Background Information:

None provided

Screening-level assessment

SC-1. ***Consistency with RFMP goals.*** Consistent with CVFPP goals: improve flood risk management, improve operations and maintenance, promote ecosystem functions, improve institutional support, promote multi-benefit projects.
Note: If the project is a study, evaluate the goals of the ultimate project that would flow from the study.

- **Low** if it meets *only* the multi-benefit project supporting objective.
- **Medium** as long as it meets 1-2 of the primary and/or supporting objectives and does not qualify as "Low."
- **High** if it includes meeting 3 or more of the primary and/or supporting objectives.

Medium

The project would improve flood risk management and operations and maintenance.

SC-2. ***Implementation feasibility.*** Consider existing laws or regulations, community opposition/support, or other factors affecting implementation feasibility.
Note: If the project is a study, evaluate only the implementation feasibility of completing the study.

- **Low** if the project is judged to face significant odds (e.g., a similar project has already been forcefully pursued and has failed to progress, and there is little reason to expect a different outcome now.)
- **Medium** if the project has been developed as a concept and has a description and an identified lead.
- **High** if the project has already gone through feasibility analysis and been found feasible, if appropriate, or the project already has reasonable assurance of being implemented by a capable project lead.

Medium

The score is "Medium" because the project has been developed as a concept, has a description, and identified lead, Gomes Lake Joint Powers Authority.

Ranking-level assessment

RC-1. ***Implementation feasibility.*** (As in Screening-level assessment guidance.)

Medium

RC-2. ***Financial feasibility.*** Capacity to cover local share, with funding availability, or all project costs).
Note: project costs should be considered to include both the initial costs and the ongoing operations, maintenance, and repair costs, though this information may not be available. If the project is a study, evaluate only the financial feasibility of completing the study.

- **Low** if the anticipated project lead does not have the resources to either 1) carry out the project; or 2) supply any needed local cost share. Given the findings of the Financial Plan, projects are identified as "Low" if the anticipated local cost share exceeds $500,000, unless the project has been successful in attracting grant funding so far.
- **Medium** if the project does not meet the criteria for "Low" or "High" Financial Feasibility.
- **High** if the anticipated project lead has the resources to either 1) carry out the project; or 2) supply any needed local cost share and a plausible funding source for the balance has been identified. Given the findings of the Financial Plan, we estimate that for most entities in the planning area, local cost shares will need to be less than $20,000 to be funded. For projects having an anticipated local cost share exceeding $500,000, the project will be scored "High" if it has been successful in attracting most of the needed funding already.

Medium

The cost of the project has not been determined, and cost-share partners have not been identified. However, it is anticipated that the Gomes Lake Joint Powers Authority has the resources to supply the local share on their own or through potential future partnerships. Still, the project was evaluated as "Medium," given that the funders will be local government and the local cost share is $20,000 or more.

RC-3. ***Flood risk reduction - life risk***. Change in the number of lives potentially at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project may reduce loss of life.
- **Medium** if the project is expected to reduce loss of life based on a qualitative assessment.
- **High** if the project has been analyzed for effect on loss of life and is expected to reduce it.

Low

Improved flexibility in the operation of Gomes Lake and the Harding Drain may result in a reduction in the number of lives at risk.

RC-4. ***Flood risk reduction - flood damage.*** Change in the value of assets at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to create a locally-significant reduction in flood risk.
- **Medium** if the project is expected to create a regionally-significant reduction in flood risk.
- **High** if the project is expected to create a significant reduction in flood risk from a regional perspective and beyond.

Low

Improvements to these facilities and the resultant increased flood management flexibility is expected to result in a locally-significant reduction in flood risk.

RC-5. ***Operations, maintenance and repair.*** Improvement in efficiency and effectiveness, or reduction of need at present and over the long term.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to only modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Medium

The project would materially improve operations and maintenance at the local level. For example, maintenance at Gomes Lake would become much easier to complete if the pumps could be dewatered as proposed.

RC-6. ***Ecosystem function*****.** Consistency with ecosystem priorities and goals of the (Draft) CVFPP metrics, the (Draft) Conservation Strategy (if available) and/or adopted conservation or recovery plans.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to increase ecosystem function compared to current conditions, but is not specifically consistent with the priorities and goals of the Draft CVFPP metrics or other adopted conservation or recovery plans.
- **Medium** if the project is consistent with the priorities and goals of one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.
- **High** if the project is if the project is consistent with the priorities and goals of more than one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.

N/A

No benefits identified.

RC-7. ***Institutional support*****.** Improved support for entities contributing to flood management.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

N/A

No benefits identified.

RC-8. ***Other benefits.*** "Multiple benefits" not addressed by criteria above, e.g., water quality, recreation, public access, water supply, groundwater recharge, economic, etc.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

N/A

No benefits identified.

RC-9. ***Cost-effectiveness.*** Benefits vs costs compared to other projects accomplishing similar benefits.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the lower third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **High** if the project is expected to fall within the upper third of the projects considered in terms of the mix of benefits provided for the given project cost.

Medium

The score is "Medium" because there is not a clear reason to differentiate this project as "Low" or "High."

RC-10. ***Low potential for dis-benefits (post-mitigation).*** Low potential for negative outcomes after mitigation; a "High" score indicates very low probability; a "Low" score indicates high probability, etc.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of dis-benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the upper third of the projects considered in terms of the mix of anticipated dis-benefits.

- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of anticipated dis-benefits.
- **High** if the project is expected to fall within the lower third of the projects considered in terms of the mix of anticipated dis-benefits.

High

No dis-benefits are anticipated.

Project Name: Hydraulic and Channel Migration Studies

Project Lead: Stanislaus County Office of Emergency Services

Potential Project Partners:

RD 2091, Gomes Lake JPA, City of Modesto, City of Newman, City of Patterson

Short Project Description:

Two regional studies (mainstem San Joaquin River flood hydraulics and channel migration) and three focused hydraulic studies are needed to better inform flood management in the Mid SJR Region.

Long Project Description:

Two regional studies are required to advance flood management planning within the Mid SJR Region's planning area. First, updated baseline hydraulic analyses of flood conditions on the mainstem of the San Joaquin River in the Mid SJR Region's planning area are needed to inform site-specific studies of flood hazards and better identify flood hazard mitigation opportunities. The analyses will include a range of flood events, such as the 2-, 10-, 25-, 100-, and 200-year events and will largely or entirely rely on available models and hydrology as developed for the CVFPP. A report on this study will provide a regional evaluation of the level of performance of the flood management facilities and produce a set of recommendations for improvements and a strategy for pursuing them. Second, as a counterpart to the hydraulic analyses, a channel migration study within the same area will also be conducted to identify under current (baseline) conditions approximately where, and by what degree, channel movement is anticipated to occur, creating challenges and opportunities for flood management. The results of the channel migration study will be used to inform the recommendations in the hydraulic study.

These two regional studies will provide the backdrop for a set of three site-specific studies to address flood risks within the region. While the regional studies will not include all of the relevant information needed for the site-specific studies, they will provide key contextual information. The site-specific studies will include: 1) RDs 2091 and 2063, including the City of Modesto's wastewater treatment plant on Jennings Avenue and the Gomes Lake project; 2) the City of Patterson's wastewater treatment plant; and 3) the City of Newman's wastewater treatment plant. Each of these site-specific studies is described in further detail below.

The RD 2091/RD 2063 area contains considerable critical infrastructure (e.g., the Modesto wastewater treatment plant and Gomes Lake) and is the most highly populated area protected directly by project levees. The characteristics of flood flows that would occur in the event of a breach in either district need to be identified. There is the potential that RD 2091 is dependent on the RD 2063 levees for protection as well as on its own levee system. A breach in RD 2091 could also possibly cause flood waters to back into RD 2063 to some extent. The characteristics of flood flows from RD 2063 into RD 2091, and vice versa, also needs to be thoroughly understood in order to identify practical containment options and an effective flood fight plan for the districts. This study would include obtaining the current topography and bathymetry from new sources as needed to supplement existing datasets. The study report will include specific recommendations to reduce flood risks and inform an effective flood fight plan for the RDs.

Hydraulic studies for the Newman and Patterson Wastewater Treatment Plans (WWTPs) would confirm water elevations at which there is a significant threat to those facilities and the characteristics of flood water movement in the event that 1) water elevations rise above the eastern boundary fence line at the Patterson plant, or 2) either the Newman Wastewater Treatment Plant flood control levee or the Newman Wasteway embankment fails. This detailed information would allow development of better trigger levels for actions to protect infrastructure and better plans for maintaining service if either of these events were to occur.

Current and planned studies completed by DWR under the Central Valley Flood Protection Plan (CVFPP) and other programs should be accessed initially for information relevant to the above issues. Any current relevant information generated by those studies can be used as a starting point for the studies described above.

Unique Project Characteristics:

None specified

Project Status: Pre-planning
Project Cost: $200,000
Project Timeframe: 1-5 years
Cost-sharing: Undetermined
Multi-benefit Project: Yes
Types of benefits: The project would contribute to our understanding of flood risk and, therefore, would help to improve flood risk management.
Source of Project: The project was an outcome of the emergency response technical memorandum prepared by the Mid SJR RFMP project team. Stakeholders participating in workshops during the fall of 2013 also suggested that this project be considered.

Background Information:

None provided

Screening-level assessment

SC-1. ***Consistency with RFMP goals.*** Consistent with CVFPP goals: improve flood risk management, improve operations and maintenance, promote ecosystem functions, improve institutional support, promote multi-benefit projects.

Note: If the project is a study, evaluate the goals of the ultimate project that would flow from the study.

- **Low** if it meets *only* the multi-benefit project supporting objective.
- **Medium** as long as it meets 1-2 of the primary and/or supporting objectives and does not qualify as "Low."
- **High** if it includes meeting 3 or more of the primary and/or supporting objectives.

Medium

The project would contribute to our understanding of flood risk and, therefore, would help to improve flood risk management.

SC-2. ***Implementation feasibility.*** Consider existing laws or regulations, community opposition/support, or other factors affecting implementation feasibility.

Note: If the project is a study, evaluate only the implementation feasibility of completing the study.

- **Low** if the project is judged to face significant odds (e.g., a similar project has already been forcefully pursued and has failed to progress, and there is little reason to expect a different outcome now.)

- **Medium** if the project has been developed as a concept and has a description and an identified lead.
- **High** if the project has already gone through feasibility analysis and been found feasible, if appropriate, or the project already has reasonable assurance of being implemented by a capable project lead.

Medium

The score is "Medium" because the project has been developed as a concept, has a description, and identified lead, Stanislaus County Office of Emergency Services.

Ranking-level assessment

RC-1. ***Implementation feasibility.*** (As in Screening-level assessment guidance.)

Medium

RC-2. ***Financial feasibility.*** Capacity to cover local share, with funding availability, or all project costs).
Note: project costs should be considered to include both the initial costs and the ongoing operations, maintenance, and repair costs, though this information may not be available. If the project is a study, evaluate only the financial feasibility of completing the study.

- **Low** if the anticipated project lead does not have the resources to either 1) carry out the project; or 2) supply any needed local cost share. Given the findings of the Financial Plan, projects are identified as "Low" if the anticipated local cost share exceeds $500,000, unless the project has been successful in attracting grant funding so far.
- **Medium** if the project does not meet the criteria for "Low" or "High" Financial Feasibility.
- **High** if the anticipated project lead has the resources to either 1) carry out the project; or 2) supply any needed local cost share and a plausible funding source for the balance has been identified. Given the findings of the Financial Plan, we estimate that for most entities in the planning area, local cost shares will need to be less than $20,000 to be funded. For projects having an anticipated local cost share exceeding $500,000, the project will be scored "High" if it has been successful in attracting most of the needed funding already.

Medium

The cost of the project has not been determined, and cost-share partners have not been identified. However, it is anticipated that the Stanislaus County Office of Emergency Services has the resources to supply the local share on their own or through potential future partnerships. Still, the project was evaluated as "Medium," given that the funders will belocal government and the local cost share is $20,000 or more.

RC-3. ***Flood risk reduction - life risk***. Change in the number of lives potentially at risk, at present and over the long term.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project may reduce loss of life.
- **Medium** if the project is expected to reduce loss of life based on a qualitative assessment.

- **High** if the project has been analyzed for effect on loss of life and is expected to reduce it.

Low

If flood risks are better understood, the proposed study may contribute to reducing the number of lives at risk.

RC-4. ***Flood risk reduction - flood damage.*** Change in the value of assets at risk, at present and over the long term.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to create a locally-significant reduction in flood risk.
- **Medium** if the project is expected to create a regionally-significant reduction in flood risk.
- **High** if the project is expected to create a significant reduction in flood risk from a regional perspective and beyond.

Low

If flood operations improve as a result of better understanding of flood risks, and/or flood risk reduction actions are identified in the proposed study and subsequently implemented, the value of assets at risk is expected to be reduced at a locally-signi

RC-5. ***Operations, maintenance and repair.*** Improvement in efficiency and effectiveness, or reduction of need at present and over the long term.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to only modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Medium

If flood operations can be improved as a result of better understanding of flood risks, this project will enhance their efficiency and effectiveness. This is expected to occur at least at a locally-significant level.

RC-6. ***Ecosystem function*****.** Consistency with ecosystem priorities and goals of the (Draft) CVFPP metrics, the (Draft) Conservation Strategy (if available) and/or adopted conservation or recovery plans.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to increase ecosystem function compared to current conditions, but is not specifically consistent with the priorities and goals of the Draft CVFPP metrics or other adopted conservation or recovery plans.
- **Medium** if the project is consistent with the priorities and goals of one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.
- **High** if the project is if the project is consistent with the priorities and goals of more than one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.

N/A

No benefits identified.

RC-7. ***Institutional support*.** Improved support for entities contributing to flood management.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

N/A

No benefits identified.

RC-8. ***Other benefits.*** "Multiple benefits" not addressed by criteria above, e.g., water quality, recreation, public access, water supply, groundwater recharge, economic, etc.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

N/A

No benefits identified.

RC-9. ***Cost-effectiveness.*** Benefits vs costs compared to other projects accomplishing similar benefits.
Note: if the project is a study, score as "Medium."

To the extent that projects have a similar mix of benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the lower third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **High** if the project is expected to fall within the upper third of the projects considered in terms of the mix of benefits provided for the given project cost.

Medium

The score is "Medium" because there is not a clear reason to differentiate this project as "Low" or "High."

RC-10. ***Low potential for dis-benefits (post-mitigation).*** Low potential for negative outcomes after mitigation; a "High" score indicates very low probability; a "Low" score indicates high probability, etc.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of dis-benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the upper third of the projects considered in terms of the mix of anticipated dis-benefits.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of anticipated dis-benefits.
- **High** if the project is expected to fall within the lower third of the projects considered in terms of the mix of anticipated dis-benefits.

High

No dis-benefits are anticipated.

Project Name: Integrated Levee Vegetation Management – Flood Maintenance and Habitat

Project Lead: River Partners

Potential Project Partners:

Funding partners - WCB, DWR, USBR, NRCS; landowners; RDs; environmental NGOs; technical experts - as needed

Short Project Description:

This project includes re-establishing appropriate vegetation on levee slopes to promote terrestrial wildlife survival during floods – either native sod on active levees or native brush vegetation on inactive levees (RDs 2099, 2100, 2102, and 2092 in the future).

Long Project Description:

Since 2002, wildlife researchers at the Endangered Species Recovery Program at CSU Stanislaus have been working with landowners and other stakeholders to identify habitat management and restoration activities that can contribute to the recovery of terrestrial riparian species in the region including riparian brush rabbit and riparian wood rat. Levees in the region provide crucial high-ground refugia for such wildlife during flood events. Vegetation on levees in the region is currently not managed to facilitate levee use during floods for wildlife survival and post-flood recovery. On levees that have been or will be removed from the federal project, brushy vegetation can be re-established on the levees through a three-year restoration project and live trapping has shown that these efforts are successful for wildlife recovery. On levees that must continue to pass state and federal inspections/maintenance requirements, native grass sod has been shown to provide marginal habitat that can act as a movement corridor for terrestrial species during flood events. This project includes re-establishing appropriate vegetation on levee slopes to promote terrestrial wildlife survival during floods – either native sod on active levees, or native brush vegetation on inactive levees (RDs 2099, 2100, 2102, and 2092 in the future).

Unique Project Characteristics:

Once established, the vegetation proposed for levee slopes requires very low maintenance. On inactive levees, the vegetation is left alone after the initial 3-year establishment period. On active levees, maintenance requirements can be reduced to mowing once per year to facilitate spring inspections. Native sod promotes erosion control on levee slopes as well as wildlife usage, thus this is a multi-benefit project. On private lands, this project will require consultation with the wildlife agencies regarding future levee vegetation maintenance.

Project Status:	Planning
Project Cost:	$6,400,000
Project Timeframe:	1-5 years
Cost-sharing:	Varies: Some costs for levee vegetation management may be eligible for funding from local, state or federal grant programs.
Multi-benefit Project:	Yes
Types of benefits:	The project would improve operations and maintenance; promote ecosystem functions; improve institutional support; and promote multi-benefit projects.
Source of Project:	River Partners

Background Information:

Check next CNGA Grasslands Journal; Various technical reports from ESRP – please request from River Partners

Screening-level assessment

SC-1. ***Consistency with RFMP goals.*** Consistent with CVFPP goals: improve flood risk management, improve operations and maintenance, promote ecosystem functions, improve institutional support, promote multi-benefit projects.

Note: If the project is a study, evaluate the goals of the ultimate project that would flow from the study.

- **Low** if it meets *only* the multi-benefit project supporting objective.
- **Medium** as long as it meets 1-2 of the primary and/or supporting objectives and does not qualify as "Low."
- **High** if it includes meeting 3 or more of the primary and/or supporting objectives.

High

The project would improve operations and maintenance; promote ecosystem functions; improve institutional support; and promote multi-benefit projects.

SC-2. ***Implementation feasibility.*** Consider existing laws or regulations, community opposition/support, or other factors affecting implementation feasibility.

Note: If the project is a study, evaluate only the implementation feasibility of completing the study.

- **Low** if the project is judged to face significant odds (e.g., a similar project has already been forcefully pursued and has failed to progress, and there is little reason to expect a different outcome now.)
- **Medium** if the project has been developed as a concept and has a description and an identified lead.
- **High** if the project has already gone through feasibility analysis and been found feasible, if appropriate, or the project already has reasonable assurance of being implemented by a capable project lead.

High

Over 8 miles of levees on the San Joaquin River National Wildlife Refuge have already been planted in brushy vegetation or native grasses. Funding was provided for that work from multiple sources including the United States Fish and Wildlife Service, Cen

Ranking-level assessment

RC-1. ***Implementation feasibility.*** (As in Screening-level assessment guidance.)

High

RC-2. ***Financial feasibility.*** Capacity to cover local share, with funding availability, or all project costs).

Note: project costs should be considered to include both the initial costs and the ongoing operations, maintenance, and repair costs, though this information may not be available. If the project is a study, evaluate only the financial feasibility of completing the study.

- **Low** if the anticipated project lead does not have the resources to either 1) carry out the project; or 2) supply any needed local cost share. Given the findings of the Financial Plan, projects are identified as "Low" if the anticipated local cost share exceeds $500,000, unless the project has been successful in attracting grant funding so far.
- **Medium** if the project does not meet the criteria for "Low" or "High" Financial Feasibility.
- **High** if the anticipated project lead has the resources to either 1) carry out the project; or 2) supply any needed local cost share and a plausible funding source for the balance has been identified. Given the findings of the Financial Plan, we estimate that for most entities in the planning area, local cost shares will need to be less than $20,000 to be funded. For projects having an anticipated local cost share exceeding $500,000, the project will be scored "High" if it has been successful in attracting most of the needed funding already.

Medium

Several funding partners have been identified, and it is anticipated that River Partners would be able to fundraise to meet the local cost share. The project has demonstrated success in fundraising for 8 miles of levee vegetation since 2006, and there is one funding application pending with the Central Valley Regional Water Quality Control Board. Still, the project was evaluated as "Medium," given that the cost of implementing the project throughout the region is relatively high.

RC-3. ***Flood risk reduction - life risk***. Change in the number of lives potentially at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project may reduce loss of life.
- **Medium** if the project is expected to reduce loss of life based on a qualitative assessment.
- **High** if the project has been analyzed for effect on loss of life and is expected to reduce it.

N/A

No benefits identified.

RC-4. ***Flood risk reduction - flood damage.*** Change in the value of assets at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to create a locally-significant reduction in flood risk.
- **Medium** if the project is expected to create a regionally-significant reduction in flood risk.
- **High** if the project is expected to create a significant reduction in flood risk from a regional perspective and beyond.

N/A

No benefits identified.

RC-5. ***Operations, maintenance and repair.*** Improvement in efficiency and effectiveness, or reduction of need at present and over the long term.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to only modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

High

Proposed actions may reduce maintenance costs and help to stabilize levees, resulting in less erosion. If implemented on a regional scale, the project could have regionally-significant benefits.

RC-6. ***Ecosystem function*****.** Consistency with ecosystem priorities and goals of the (Draft) CVFPP metrics, the (Draft) Conservation Strategy (if available) and/or adopted conservation or recovery plans.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to increase ecosystem function compared to current conditions, but is not specifically consistent with the priorities and goals of the Draft CVFPP metrics or other adopted conservation or recovery plans.
- **Medium** if the project is consistent with the priorities and goals of one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.
- **High** if the project is if the project is consistent with the priorities and goals of more than one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.

High

The project is consistent with draft BWFS/CS objectives metric 7a, Threatened and Endanered Target Species, under metric 7, Species - Contribute to the recovery and stability of native species populatons and overall biotic community diversity. It is also consistent with the Recovery Plan for Upland Species of the San Joaquin Valley.

RC-7. ***Institutional support*****.** Improved support for entities contributing to flood management.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

N/A

No benefits identified.

RC-8. ***Other benefits.*** "Multiple benefits" not addressed by criteria above, e.g., water quality, recreation, public access, water supply, groundwater recharge, economic, etc.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Low

If implemented on a regional scale, the project could have material and regionally significant aesthetic benefits.

RC-9. ***Cost-effectiveness.*** Benefits vs costs compared to other projects accomplishing similar benefits.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the lower third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **High** if the project is expected to fall within the upper third of the projects considered in terms of the mix of benefits provided for the given project cost.

Medium

The score is "Medium" because there is not a clear reason to differentiate this project as "Low" or "High."

RC-10. ***Low potential for dis-benefits (post-mitigation).*** Low potential for negative outcomes after mitigation; a "High" score indicates very low probability; a "Low" score indicates high probability, etc. Note: if the project is a study, score as "Medium."

To the extent that projects have a similar mix of dis-benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the upper third of the projects considered in terms of the mix of anticipated dis-benefits.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of anticipated dis-benefits.
- **High** if the project is expected to fall within the lower third of the projects considered in terms of the mix of anticipated dis-benefits.

High

No dis-benefits have been identified.

Project Name: La Grange Floodplain Restoration and Spawning Gravel Augmentation

Project Lead: Tuolumne River Trust

Potential Project Partners:

Stanislaus County Parks and Recreation

Short Project Description:

Restore 77 acres of degraded floodplain habitat along the Tuolumne River in La Grange while developing a source of spawning gravel to improve and enhance existing spawning beds in the Tuolumne River.

Long Project Description:

The floodplain in the project area was heavily altered by gold dredging operations in the 1930's-1950's and has never recovered. As a result of the gold dredging, the floodplain has become armored and it supports little riparian vegetation. Additionally, the floodplains adjacent to the rivers are artificially elevated and disconnected from the channel. Coupled with the heavily altered flow regime, the gravels are rarely, if ever, activated, thus they provide no benefit to spawning salmonids. Meanwhile, the in-channel spawning beds are heavily degraded because they cannot be replenished through normal geomorphic processes because of the sediment-blocking of Don Pedro and La Grange Dams. Through this project, we will harvest gravels from the floodplain and place them in the spawning riffles, while simultaneously lowering and revegetating the floodplain.

Stanislaus County presently owns approximately 200 acres of Tuolumne River floodplain near the town of La Grange. The land extends from approximately RM 49.2 - 50.6 on the south bank and from RM 49.9 - RM 50.6 on the north bank. This is a proposal to undertake a project on about 77 acres out of the 200 acres of county land. The project is floodplain and riparian restoration to recreate a more natural environment for the benefit of riparian species, San Joaquin fall-run Chinook salmon, and steelhead. The project will improve riparian habitat along the lower Tuolumne River, and improve chinook salmon and steelhead spawning and rearing habitat. The following goals will be met by implementing this project: recovery of at-risk native species (Central Valley steelhead and Central Valley fall-run Chinook salmon), restoration of fish spawning and rearing habitat, rehabilitation of natural channel-floodplain processes, and rehabilitation of native riparian habitat. The goal of this project is to improve the functionality of the Tuolumne River floodplain and channel to provide riparian habitat to support riparian species and San Joaquin fall-run Chinook salmon and steelhead trout. The primary objectives for the restoration project are: a. Restore functional floodplains that allow inundation at a greater frequency and reduce risks of juvenile salmonid stranding. b. Restore native riparian vegetation by preserving existing native vegetation and planting the appropriate species on restored surfaces inundated by the contemporary hydrologic regime. c. Exclude trespassing cattle from the county property by building fences. d. Build a loop trail consistent with the restoration project to improve recreational access and utility.

Unique Project Characteristics:

None specified

Project Status:	Pre-planning
Project Cost:	$1,500,000
Project Timeframe:	1-5 years
Cost-sharing:	No opportunities identified to date
Multi-benefit Project:	Yes

Types of benefits: The project would improve flood risk management, promote ecosystem functions, and promote multi-benefit projects.

Source of Project: East Stanislaus Integrated Regional Water Management Partnership

Background Information:

East Stanislaus Integrated Regional Water Management Partnership website: http://www.eaststanirwm.org/

Screening-level assessment

SC-1. ***Consistency with RFMP goals.*** Consistent with CVFPP goals: improve flood risk management, improve operations and maintenance, promote ecosystem functions, improve institutional support, promote multi-benefit projects.

Note: If the project is a study, evaluate the goals of the ultimate project that would flow from the study.

- **Low** if it meets *only* the multi-benefit project supporting objective.
- **Medium** as long as it meets 1-2 of the primary and/or supporting objectives and does not qualify as "Low."
- **High** if it includes meeting 3 or more of the primary and/or supporting objectives.

High

The project would improve flood risk management, promote ecosystem functions, and promote multi-benefit projects.

SC-2. ***Implementation feasibility.*** Consider existing laws or regulations, community opposition/support, or other factors affecting implementation feasibility.

Note: If the project is a study, evaluate only the implementation feasibility of completing the study.

- **Low** if the project is judged to face significant odds (e.g., a similar project has already been forcefully pursued and has failed to progress, and there is little reason to expect a different outcome now.)
- **Medium** if the project has been developed as a concept and has a description and an identified lead.
- **High** if the project has already gone through feasibility analysis and been found feasible, if appropriate, or the project already has reasonable assurance of being implemented by a capable project lead.

Medium

The score is "Medium" because the project has been developed as a concept, has a description, and identified lead, the Tuolumne River Trust.

Ranking-level assessment

RC-1. ***Implementation feasibility.*** (As in Screening-level assessment guidance.)

Medium

RC-2. ***Financial feasibility.*** Capacity to cover local share, with funding availability, or all project costs).

Note: project costs should be considered to include both the initial costs and the ongoing operations, maintenance, and repair costs, though this information may not be available. If the project is a study, evaluate only the financial feasibility of completing the study.

- **Low** if the anticipated project lead does not have the resources to either 1) carry out the project; or 2) supply any needed local cost share. Given the findings of the Financial Plan, projects are identified as "Low" if the anticipated local cost share exceeds $500,000, unless the project has been successful in attracting grant funding so far.
- **Medium** if the project does not meet the criteria for "Low" or "High" Financial Feasibility.
- **High** if the anticipated project lead has the resources to either 1) carry out the project; or 2) supply any needed local cost share and a plausible funding source for the balance has been identified. Given the findings of the Financial Plan, we estimate that for most entities in the planning area, local cost shares will need to be less than $20,000 to be funded. For projects having an anticipated local cost share exceeding $500,000, the project will be scored "High" if it has been successful in attracting most of the needed funding already.

Medium

The Tuolumne River Trust does not have the resources to carry out the project or supply the local cost share. No potential funding partners have been identified. The project was evaluated as "Medium," given that the project is being championed by an NGO and the local cost share is $20,000 or more.

RC-3. ***Flood risk reduction - life risk***. Change in the number of lives potentially at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project may reduce loss of life.
- **Medium** if the project is expected to reduce loss of life based on a qualitative assessment.
- **High** if the project has been analyzed for effect on loss of life and is expected to reduce it.

Low

The proposed floodplain rehabilitation is expected to reduce flood risk and may reduce loss of life in adjacent areas.

RC-4. ***Flood risk reduction - flood damage.*** Change in the value of assets at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to create a locally-significant reduction in flood risk.
- **Medium** if the project is expected to create a regionally-significant reduction in flood risk.

- **High** if the project is expected to create a significant reduction in flood risk from a regional perspective and beyond.

Low

The proposed floodplain rehabilitation is expected to create a locally-significant reduction in flood risk.

RC-5. ***Operations, maintenance and repair.*** Improvement in efficiency and effectiveness, or reduction of need at present and over the long term.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to only modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

N/A

No benefits identified.

RC-6. ***Ecosystem function*****.** Consistency with ecosystem priorities and goals of the (Draft) CVFPP metrics, the (Draft) Conservation Strategy (if available) and/or adopted conservation or recovery plans.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to increase ecosystem function compared to current conditions, but is not specifically consistent with the priorities and goals of the Draft CVFPP metrics or other adopted conservation or recovery plans.
- **Medium** if the project is consistent with the priorities and goals of one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.
- **High** if the project is if the project is consistent with the priorities and goals of more than one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.

High

The project is consistent with CVFPP metrics 5a, Inundated Floodplain, and 5b, Riverine Geomorphic Processes, under metric 5, Ecosystem Processes - Improve and enhance natural dynamic hydrologic and geomorphic processes; metrics 6a, Shaded Riparian Aquatic (SRA) Cover, 6b, Riparian, under metric 6, Habitats - Increase and improve quantity, diversity, quality, and connectivity of riverine aquatic and floodplain habitats; and metric 7, Species - Contribute to the recovery and stability of native species populations and overall biotic community diversity, for Central Valley steelhead and Central Valley fall-run Chinook salmon.

RC-7. ***Institutional support*.** Improved support for entities contributing to flood management.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

N/A

No benefits identified.

RC-8. ***Other benefits.*** "Multiple benefits" not addressed by criteria above, e.g., water quality, recreation, public access, water supply, groundwater recharge, economic, etc.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Medium

The project would materially increase water quality, recreation and groundwater recharge at a locally-significant scale.

RC-9. ***Cost-effectiveness.*** Benefits vs costs compared to other projects accomplishing similar benefits.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the lower third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **High** if the project is expected to fall within the upper third of the projects considered in terms of the mix of benefits provided for the given project cost.

High

The score is "High" because the provision of this type of ecosystem benefit at this magnitude could occur at a cost that is low relative to similar projects.

RC-10. ***Low potential for dis-benefits (post-mitigation).*** Low potential for negative outcomes after mitigation; a "High" score indicates very low probability; a "Low" score indicates high probability, etc.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of dis-benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the upper third of the projects considered in terms of the mix of anticipated dis-benefits.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of anticipated dis-benefits.
- **High** if the project is expected to fall within the lower third of the projects considered in terms of the mix of anticipated dis-benefits.

High

No significant dis-benefits are anticipated. A minor reduction in the tax base is an expected dis-benefit. While the property is currently subject to a lower tax rate through a Williamson Act contract, the property value is expected to descrease after project implementation, which would reduce the property tax collected.

Project Name: Little Salado Creek

Project Lead: Stanislaus County

Potential Project Partners:

USACE

Short Project Description:

Construction of a project to partially divert, retain, and percolate up to 1,030 cubic feet per second (cfs) of flow from Little Salado Creek.

Long Project Description:

The County proposes to place the portion of Salado Creek that traverses the 1,532-acre former Crows Landing Air Facility in an underground conveyance. The existing channel conveyance capacity will need to be upgraded to convey the calculated design storm runoff flows. This can be achieved by upsizing the existing underground channel sections and creating new underground conveyances that will replace and exceed the capacity aboveground conveyances. Three segments of the creek would be placed underground:

• An approximately 4,000 foot segment of the creek that extends northeast from the culvert beneath the Delta Mendota Canal at Davis Road to the culvert on the south side of Runway 11-29;

• An approximately 1,300-foot segment of the creek that extends from the north side of runway 11-29 to the west side of Runway 16-34; and

• An approximately 5,800-foot segment of the creek that extends from the east side of runway 16-34 to the existing 24-inch diameter drain pipe at Marshall Road.

The County has considered options that would allow the creek to remain aboveground within its project boundaries, but open channels would not be considered compatible with its plans to reuse airport pavements for the development of a general aviation facility. Federal Aviation Administration (FAA) guidance at Advisory Circular 150/5200-33B, "Wildlife Hazard Attractants on and Near Airports" warn against the creation of open water or wet areas that support wildlife habitat within 10,000 feet of aircraft movement areas. The 1,532-acre site does not provide sufficient area to accommodate FAA's advised separation. The County does intend to incorporate a groundwater recharge component into the project through the use of perforated pipe in the segments listed above or several other potential methods. The design of the proposed conveyances will be developed following additional hydrological studies.

Unique Project Characteristics:

None specified

Project Status:	Planning
Project Cost:	**$**5,000,000
Project Timeframe:	1-5 years
Cost-sharing:	Stanislaus County, USACE and State for construction; Stanislaus County for maintenance. County may form a Benefit Assessment District for maintenance,; and a local levee district may be formed to operate and maintain flood control portions of the project.
Multi-benefit Project:	Yes
Types of benefits:	The project would improve flood risk management and provide groundwater recharge, making it a multi-benefit project.

Source of Project: Stanislaus County

Background Information:

The Storm Drainage Water Quality Master Plan was prepared in 2007 for the West Park development provides background information on flows from Little Salado Creek in the project area. The existing study area, consists primarily of agricultural lands and the former Crows Landing Naval Air Facility. The following paragraphs are based or were taken from the 2007 storm drainage master plan.

As illustrated in Figure 2.0, bBoth the Delta-Mendota Canal (DMC) and the California Aqueduct (CAQ) traverse the study area, with the DMC acting as a natural drainage boundary because water cannot flow from one side to the other without being intercepted by the canal. The DMC facility has historically been used for both irrigation and for drainage purposes. The DMC splits the study area roughly down the middle, creating westerly and easterly drainage subareas. The only connection for the two drainage areas is at the Little Salado Creek double box culvert crossing beneath the DMC.

Storm runoff from the Little Salado Creek watershed and west of the CAQ enters the pProject area from across both Interstate 5 and the CAQ, via two 78-inch diameter pipes, which then open out into a control structure just east of the CAQ. From that point, runoff then enters a 24-inch diameter pipe, which runs east toward the DMC. Just before reaching the DMC, the 24-inch pipe terminates into an open ditch that drains towards and through the double box culverts crossing beneath the DMC. On the east side of the DMC, the box culverts drain out into an open channel ditch that continues in a northeasterly direction toward the low point at the intersection of State Route 33 and Marshall Road. Along the way to this discharge point, it crosses beneath anthe Aairfield through multiple culverts. On the east side of the DMC, Little Salado Creek serves as a tailwater irrigation drain ditch for the surrounding agricultural fields. At its terminus discharge point from the Project site, wWater drains through a 24-inch diameter drain pipe that flows east along Marshall Road for about 4.5 miles to its final discharge point at the San Joaquin River.

Salado Creek enters the pProject area at the proposed northwest boundary just north of the intersection of Oak Flat Road and Interstate 5, just south of the proposed stormwater quality detention basin. Storm runoff west of the CAQ crosses over the Aqueduct via an open box culvert overchute and then continues north by means of an open channel until it reaches the DMC. At the DMC, it crosses over the canal via another open box culvert overchute which then drains into an open channel that flows toward the City of Patterson. Also, at the upstream side of the DMC are three recently constructed 60-inch diameter overflow pipes that discharge excess storm runoff directly into the DMC (see photographs below of both overchutes at the CAQ and DMC). From the information gathered thus far, it is not known what flood analysis studies were completed for Salado Creek with these spillover pipes. The limits of this study are outside the scope to evaluate in more detail the impacts of the spill over pipes on Salado Creek. More detailed hydraulic and hydrologic analysis will need to be explored in subsequent reports.

Screening-level assessment

SC-1. ***Consistency with RFMP goals.*** Consistent with CVFPP goals: improve flood risk management, improve operations and maintenance, promote ecosystem functions, improve institutional support, promote multi-benefit projects.

Note: If the project is a study, evaluate the goals of the ultimate project that would flow from the study.

- **Low** if it meets *only* the multi-benefit project supporting objective.
- **Medium** as long as it meets 1-2 of the primary and/or supporting objectives and does not qualify as "Low."

- **High** if it includes meeting 3 or more of the primary and/or supporting objectives.

Medium

The project would improve flood risk management and groundwater recharge, making it a multi-benefit project.

SC-2. ***Implementation feasibility.*** Consider existing laws or regulations, community opposition/support, or other factors affecting implementation feasibility.
Note: If the project is a study, evaluate only the implementation feasibility of completing the study.

- **Low** if the project is judged to face significant odds (e.g., a similar project has already been forcefully pursued and has failed to progress, and there is little reason to expect a different outcome now.)
- **Medium** if the project has been developed as a concept and has a description and an identified lead.
- **High** if the project has already gone through feasibility analysis and been found feasible, if appropriate, or the project already has reasonable assurance of being implemented by a capable project lead.

High

The project is a priority of Stanislaus County and part of a larger project that is on track for implementation.

Ranking-level assessment

RC-1. ***Implementation feasibility.*** (As in Screening-level assessment guidance.)

High

RC-2. ***Financial feasibility.*** Capacity to cover local share, with funding availability, or all project costs).
Note: project costs should be considered to include both the initial costs and the ongoing operations, maintenance, and repair costs, though this information may not be available. If the project is a study, evaluate only the financial feasibility of completing the study.

- **Low** if the anticipated project lead does not have the resources to either 1) carry out the project; or 2) supply any needed local cost share. Given the findings of the Financial Plan, projects are identified as "Low" if the anticipated local cost share exceeds $500,000, unless the project has been successful in attracting grant funding so far.
- **Medium** if the project does not meet the criteria for "Low" or "High" Financial Feasibility.
- **High** if the anticipated project lead has the resources to either 1) carry out the project; or 2) supply any needed local cost share and a plausible funding source for the balance has been identified. Given the findings of the Financial Plan, we estimate that for most entities in the planning area, local cost shares will need to be less than $20,000 to be funded. For projects having an anticipated local cost share exceeding $500,000, the project will be scored "High" if it has been successful in attracting most of the needed funding already.

Medium

The project was evaluated as "Medium," given that the champion is Stanislaus County and the local cost share is $20,000 or more.

RC-3. ***Flood risk reduction - life risk***. Change in the number of lives potentially at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project may reduce loss of life.
- **Medium** if the project is expected to reduce loss of life based on a qualitative assessment.
- **High** if the project has been analyzed for effect on loss of life and is expected to reduce it.

Low

The project would improve flood risk management and, therefore, may reduce loss of life.

RC-4. ***Flood risk reduction - flood damage.*** Change in the value of assets at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to create a locally-significant reduction in flood risk.
- **Medium** if the project is expected to create a regionally-significant reduction in flood risk.
- **High** if the project is expected to create a significant reduction in flood risk from a regional perspective and beyond.

Low

The project would result in a locally-significant reduction in flood risk.

RC-5. ***Operations, maintenance and repair.*** Improvement in efficiency and effectiveness, or reduction of need at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to only modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

N/A

No benefits identified.

RC-6. ***Ecosystem function*.** Consistency with ecosystem priorities and goals of the (Draft) CVFPP metrics, the (Draft) Conservation Strategy (if available) and/or adopted conservation or recovery plans.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to increase ecosystem function compared to current conditions, but is not specifically consistent with the priorities and goals of the Draft CVFPP metrics or other adopted conservation or recovery plans.
- **Medium** if the project is consistent with the priorities and goals of one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.
- **High** if the project is if the project is consistent with the priorities and goals of more than one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.

N/A

No benefits identified.

RC-7. ***Institutional support*.** Improved support for entities contributing to flood management.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

N/A

No benefits identified.

RC-8. ***Other benefits.*** "Multiple benefits" not addressed by criteria above, e.g., water quality, recreation, public access, water supply, groundwater recharge, economic, etc.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Medium

The project includes a groundwater recharge component, the details of which are still being defined. The project would result in at least a locally-significant improvement in groundwater recharge, and a score of "Medium" is assigned. Depending on the scale of the groundwater component, there could be a regionally-significant level.

RC-9. ***Cost-effectiveness.*** Benefits vs costs compared to other projects accomplishing similar benefits.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the lower third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **High** if the project is expected to fall within the upper third of the projects considered in terms of the mix of benefits provided for the given project cost.

Medium

The score is "Medium" because there is not a clear reason to differentiate this project as "Low" or "High."

RC-10. ***Low potential for dis-benefits (post-mitigation).*** Low potential for negative outcomes after mitigation; a "High" score indicates very low probability; a "Low" score indicates high probability, etc.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of dis-benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the upper third of the projects considered in terms of the mix of anticipated dis-benefits.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of anticipated dis-benefits.
- **High** if the project is expected to fall within the lower third of the projects considered in terms of the mix of anticipated dis-benefits.

High

No dis-benefits are anticipated.

Project Name: Modesto WWTP - Reduce Flood Risk

Project Lead: City of Modesto

Potential Project Partners:

No partners identified at this time

Short Project Description:

Develop and evaluate potential solutions to existing flood hazards at the Modesto Sutter and Jennings WWTPs, including completion of two studies (Sutter Plant Relocation Feasibility Study and a Wastewater Treatment Facilities Master Plan) that are currently in process, and implement the preferred alternative.

Long Project Description:

The City of Modesto's wastewater treatment facilities span two locations and both are situated within 100-year floodplains, one on the Tuolumne River and one on the San Joaquin River. The City is currently engaged in reconnaissance studies to identify long-term options for the facilities, potentially including consolidation of both plants at the Jennings Facility site. While a preferred project alternative has not been developed or identified, any scenario for their operations will incorporate components or design considerations to reduce flood risks at the facility or facilities.

This project would encompass the design and construction of at least the flood risk reduction features of the proposed project, which could include relocation of the Sutter Plant or portions thereof. This description assumes that the flood risk reduction components will be sufficiently separable to allow funding to be sought for specific project features with a flood risk reduction focus.

Unique Project Characteristics:

None specified

Project Status:	Pre-planning
Project Cost:	$80,000,000
Project Timeframe:	Undetermined
Cost-sharing:	No opportunities identified to date
Multi-benefit Project:	Yes
Types of benefits:	The project would improve flood risk management. As the project would protect water quality in the event of a flood event, it is considered consistent with the supporting objective of promoting multi-benefit projects. It is possible that flood risk reduct
Source of Project:	City of Modesto

Background Information:

None provided

Screening-level assessment

SC-1. ***Consistency with RFMP goals.*** Consistent with CVFPP goals: improve flood risk management, improve operations and maintenance, promote ecosystem functions, improve institutional support, promote multi-benefit projects.

Note: If the project is a study, evaluate the goals of the ultimate project that would flow from the study.

- **Low** if it meets *only* the multi-benefit project supporting objective.
- **Medium** as long as it meets 1-2 of the primary and/or supporting objectives and does not qualify as "Low."
- **High** if it includes meeting 3 or more of the primary and/or supporting objectives.

Medium

The project would improve flood risk management. As the project would protect water quality in the event of a flood event, it is considered consistent with the supporting objective of promoting multi-benefit projects. It is possible that flood risk reduction features identified in the reconnaissance studies that are currently underway would improve operations and maintenance, promote ecosystem functions, and/or improve institutional support. However, because the flood risk reduction features are not yet defined, the score reflects only the flood risk management and multi-benefit project goals.

SC-2. ***Implementation feasibility.*** Consider existing laws or regulations, community opposition/support, or other factors affecting implementation feasibility.

Note: If the project is a study, evaluate only the implementation feasibility of completing the study.

- **Low** if the project is judged to face significant odds (e.g., a similar project has already been forcefully pursued and has failed to progress, and there is little reason to expect a different outcome now.)
- **Medium** if the project has been developed as a concept and has a description and an identified lead.
- **High** if the project has already gone through feasibility analysis and been found feasible, if appropriate, or the project already has reasonable assurance of being implemented by a capable project lead.

High

Feasibility studies are currently underway. While not yet complete, the actions that are identified are expected to be those that are deemed feasible.

Ranking-level assessment

RC-1. ***Implementation feasibility.*** (As in Screening-level assessment guidance.)

High

RC-2. ***Financial feasibility.*** Capacity to cover local share, with funding availability, or all project costs).
Note: project costs should be considered to include both the initial costs and the ongoing operations, maintenance, and repair costs, though this information may not be available. If the project is a study, evaluate only the financial feasibility of completing the study.

- **Low** if the anticipated project lead does not have the resources to either 1) carry out the project; or 2) supply any needed local cost share. Given the findings of the Financial Plan, projects are identified as "Low" if the anticipated local cost share exceeds $500,000, unless the project has been successful in attracting grant funding so far.
- **Medium** if the project does not meet the criteria for "Low" or "High" Financial Feasibility.
- **High** if the anticipated project lead has the resources to either 1) carry out the project; or 2) supply any needed local cost share and a plausible funding source for the balance has been identified. Given the findings of the Financial Plan, we estimate that for most entities in the planning area, local cost shares will need to be less than $20,000 to be funded. For projects having an anticipated local cost share exceeding $500,000, the project will be scored "High" if it has been successful in attracting most of the needed funding already.

Low

The City of Modesto does not currently have the resources to implement the actions that will come out of the reconnaissance study process. The cost of those actions has not been determined, and potential cost-share partners have not been identified. The project was evaluated as "High," given that the funders will be local government and the local cost share is anticipated to be $500,000 or more.

RC-3. ***Flood risk reduction - life risk***. Change in the number of lives potentially at risk, at present and over the long term.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project may reduce loss of life.
- **Medium** if the project is expected to reduce loss of life based on a qualitative assessment.
- **High** if the project has been analyzed for effect on loss of life and is expected to reduce it.

Medium

As personnel are expected to be present at the site during floods, reduction of flood risk there is anticipated to reduce the risk of loss of life.

RC-4. ***Flood risk reduction - flood damage.*** Change in the value of assets at risk, at present and over the long term.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to create a locally-significant reduction in flood risk.
- **Medium** if the project is expected to create a regionally-significant reduction in flood risk.
- **High** if the project is expected to create a significant reduction in flood risk from a regional perspective and beyond.

Low

The project is expected to create a locally-significant reduction in flood risk.

RC-5. ***Operations, maintenance and repair.*** Improvement in efficiency and effectiveness, or reduction of need at present and over the long term.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to only modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

N/A

No benefits identified.

RC-6. ***Ecosystem function*****.** Consistency with ecosystem priorities and goals of the (Draft) CVFPP metrics, the (Draft) Conservation Strategy (if available) and/or adopted conservation or recovery plans.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to increase ecosystem function compared to current conditions, but is not specifically consistent with the priorities and goals of the Draft CVFPP metrics or other adopted conservation or recovery plans.
- **Medium** if the project is consistent with the priorities and goals of one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.
- **High** if the project is if the project is consistent with the priorities and goals of more than one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.

N/A

No benefits identified.

RC-7. ***Institutional support*****.** Improved support for entities contributing to flood management.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.

- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

N/A

No benefits identified.

RC-8. ***Other benefits.*** "Multiple benefits" not addressed by criteria above, e.g., water quality, recreation, public access, water supply, groundwater recharge, economic, etc.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Medium

Material, locally-significant water quality and economic stability benefits are anticipated as a result of implementing flood risk reduction actions identified through the reconnaissance studies.

RC-9. ***Cost-effectiveness.*** Benefits vs costs compared to other projects accomplishing similar benefits.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the lower third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **High** if the project is expected to fall within the upper third of the projects considered in terms of the mix of benefits provided for the given project cost.

Medium

The score is "Medium" because there is not a clear reason to differentiate this project as "Low" or "High."

RC-10. ***Low potential for dis-benefits (post-mitigation).*** Low potential for negative outcomes after mitigation; a "High" score indicates very low probability; a "Low" score indicates high probability, etc.
Note: if the project is a study, score as "Medium."

To the extent that projects have a similar mix of dis-benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the upper third of the projects considered in terms of the mix of anticipated dis-benefits.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of anticipated dis-benefits.
- **High** if the project is expected to fall within the lower third of the projects considered in terms of the mix of anticipated dis-benefits.

Medium

The score is "Medium" because there is not a clear reason to differentiate this project as "Low" or "High."

Project Name: Orestimba Creek Flood Risk Management Project

Project Lead: Stanislaus County

Potential Project Partners:

City of Newman, Orestimba Creek Flood Control District, USACE

Short Project Description:

Construction of a 4.7-mile chevron levee along east bank of Central California Irrigation District (CCID) Main Canal and a 1-mile cross levee to reduce flood risk to Newman and adjacent agricultural areas, providing a 200-year level of protection. The chevron levee would include 3 feet of freeboard above the mean 200-year water surface elevation.

Long Project Description:

The chevron levee would be constructed parallel to the east bank of the CCID Main Canal. Starting at the Newman Wasteway, the levee would continue north to a location near Lundy Road, at which point the levee alignment would angle diagonally away from the canal toward the northeast for another 0.7 miles to tie in to the CNRR embankment near an existing culvert. This existing culvert would function to reduce the frequency and duration of floodwater ponding on the north side of the levee. The levee would also extend an additional 35 feet east of the CNRR embankment to ensure that floodwaters do not flank the proposed levee. The levee would be approximately 4.7 miles in total length. The proposed levee is higher than roadway elevations at four crossing locations, and a gap in the top portion of the levee is required to meet highway vertical curve safety standards. A slotted abutment would be constructed in the levee on each side of these roadways. During a flood event, stop logs would be placed into the slotted abutments across the roadways. When installed, the stop log structure would be approximately 1 to 3 feet high and would prevent floodwaters from flowing through the gap. This would not interfere with traffic because the roadway to the west of the structure would be flooded when the stop logs were in place. The stop-log closure structures would be located at four locations where existing roads cross the proposed levee alignment. These road crossings include Shells Road, Draper Road, Orestimba Creek Road, and Stuhr Road. Another gate closure would be constructed where the levee crosses the CNRR railroad embankment. The proposed levee is higher than the railway and a gap in the top portion of the levee is required to prevent interference with the levee grade. An abutment would be constructed in the levee on each side of the railway. During a flood event, floodgates hinged on the abutment would be closed across the railway. When installed, the swing gate structure would be approximately 2 to 3 feet high and would prevent floodwaters from flowing through the gap. This would not interfere with railway traffic because the railway north of the levee would be flooded when the swing gate structure was in place.

Where the levee crosses State Highway 33, the highway would be raised to meet levee design elevations. Highway 33 would be raised over an additional 2000 foot length to account for longer vertical curves necessary to go over the higher levee. Another component of the levee is a seepage berm. The proposed project would also include a railroad embankment protection plan. During small flood events and localized rainfall events, Orestimba Creek floodwater or local runoff would be conveyed to the east side of the railroad embankment through existing drainage culverts. However, the railroad would be overtopped during a large flood event. To mitigate for this condition, the east side of the railroad embankment would require a sand filter and be lined with rock revetment to prevent erosion. Approximately 10 culverts under the CNRR embankment would be extended to accommodate the seepage embankment and erosion protection. New upstream and downstream headwalls would be constructed at each culvert. The railroad embankment

protection plan begins where the proposed levee crosses the railroad and ends where the railroad crosses Orestimba Creek. The distance is approximately 2 miles.

Stanislaus County has three low water crossings of Orestimba Creek that are closed every year during normal precipitation that would be improved under this project. The three low water crossings of Orestimba Creek from west to east are Bell Road, Jorgensen Road, and Eastin Road. Bell Road is the most westerly road and has automatic gates that drop when there is water on the road. This location does not incur as many stranded vehicles as the other two and not resulted in a fatality. The Bell Road crossing is a much shallower crossing than the other two as it does not drop as far down into the creek bottom as the other two crossings due to 3 culverts at low flow channel elevation. The low water crossing at Jorgensen Road has automatic gates that drop when there is water on the road. The channel profile at this location has a much more defined river channel that is approximately 8 to 10 feet lower than the existing top of bank elevation. Jorgensen Road does not have culverts and so any flows here flow over the road. Jorgensen Road has not had fatalities, however, Stanislaus County Public Works has had many dozens of vehicles in the last 20 years try to cross here and subsequently get stranded while Orestimba Creek is flowing. The low water crossing at Eastin Road is the most heavily traveled of the three low water crossings. This location has automatic gates that drop when there is water on the road. This location does have a 24" diameter culvert that carries a minimal amount of water under the road at the low flow condition. This location floods approximately up to 5 feet above the crown of the road. Stanislaus County has had 2 fatalities at this location due to people leaving their stranded vehicles and getting swept downstream in the flood. The project would include the building of bridges and/or culverts to raise the roads at the locations described above.

Unique Project Characteristics:

None specified

Project Status:	Planning
Project Cost:	**$**44,000,000
Project Timeframe:	1-5 years
Cost-sharing:	Federal contribution of $23,230,000 with non-federal contribution of $21,100,000
Multi-benefit Project:	Yes
Types of benefits:	This project would reduce flood risk in the near term by providing protection against the 200-year flood. Note: It may lead to greater future flood risk if further development in the floodplain is spurred by its implementation. The project would also impr
Source of Project:	USACE

Background Information:

Orestimba Creek Flood Risk Management Draft Feasibility Report and EA/IS - http://173.254.66.117/news-and-information/e-docs.html (see document list under Public Works)

Screening-level assessment

SC-1. ***Consistency with RFMP goals.*** Consistent with CVFPP goals: improve flood risk management, improve operations and maintenance, promote ecosystem functions, improve institutional support, promote multi-benefit projects.

Note: If the project is a study, evaluate the goals of the ultimate project that would flow from the study.

- **Low** if it meets *only* the multi-benefit project supporting objective.

- **Medium** as long as it meets 1-2 of the primary and/or supporting objectives and does not qualify as "Low."
- **High** if it includes meeting 3 or more of the primary and/or supporting objectives.

Medium

This project would reduce flood risk in the near term by providing protection against the 200-year flood. Note: It may lead to greater future flood risk if further development in the floodplain is spurred by its implementation. The project would also improve institutional support.

SC-2. ***Implementation feasibility.*** Consider existing laws or regulations, community opposition/support, or other factors affecting implementation feasibility.
Note: If the project is a study, evaluate only the implementation feasibility of completing the study.

- **Low** if the project is judged to face significant odds (e.g., a similar project has already been forcefully pursued and has failed to progress, and there is little reason to expect a different outcome now.)
- **Medium** if the project has been developed as a concept and has a description and an identified lead.
- **High** if the project has already gone through feasibility analysis and been found feasible, if appropriate, or the project already has reasonable assurance of being implemented by a capable project lead.

High

The feasibility of the project has been evaluated in a document prepared by the United States Army Corps of Engineers (USACE).

Ranking-level assessment

RC-1. ***Implementation feasibility.*** (As in Screening-level assessment guidance.)

High

RC-2. ***Financial feasibility.*** Capacity to cover local share, with funding availability, or all project costs).
Note: project costs should be considered to include both the initial costs and the ongoing operations, maintenance, and repair costs, though this information may not be available. If the project is a study, evaluate only the financial feasibility of completing the study.

- **Low** if the anticipated project lead does not have the resources to either 1) carry out the project; or 2) supply any needed local cost share. Given the findings of the Financial Plan, projects are identified as "Low" if the anticipated local cost share exceeds $500,000, unless the project has been successful in attracting grant funding so far.
- **Medium** if the project does not meet the criteria for "Low" or "High" Financial Feasibility.
- **High** if the anticipated project lead has the resources to either 1) carry out the project; or 2) supply any needed local cost share and a plausible funding source for the balance has been identified. Given the findings of the Financial Plan, we estimate that for most entities in the

planning area, local cost shares will need to be less than $20,000 to be funded. For projects having an anticipated local cost share exceeding $500,000, the project will be scored "High" if it has been successful in attracting most of the needed funding already.

Low

The estimated $21.1 million local cost share of the total project cost to be born by local government is relatively high -- greater than $500,000, and the project is therefore evaluated as having "Low" financial feasibility.

RC-3. ***Flood risk reduction - life risk***. Change in the number of lives potentially at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project may reduce loss of life.
- **Medium** if the project is expected to reduce loss of life based on a qualitative assessment.
- **High** if the project has been analyzed for effect on loss of life and is expected to reduce it.

Medium

At least one death has occurred as a result of flooding on Orestimba Creek. The project would protect portions of the City of Newman that are currently in the 100-year floodplain.

RC-4. ***Flood risk reduction - flood damage.*** Change in the value of assets at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to create a locally-significant reduction in flood risk.
- **Medium** if the project is expected to create a regionally-significant reduction in flood risk.
- **High** if the project is expected to create a significant reduction in flood risk from a regional perspective and beyond.

Medium

According to the USACE feasibility study, the project is expected to improve flood risk in the City of Newman and surrounding agricultural areas, which is considered regionally-significant. The USACE analysis estimates annual benefits of $3.128 million.

RC-5. ***Operations, maintenance and repair.*** Improvement in efficiency and effectiveness, or reduction of need at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to only modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

N/A

No benefits identified. The project would add flood management facilities and, therefore, would add to operations, maintenance, and repair requirements. This is noted under RC-10.

RC-6. ***Ecosystem function*****.** Consistency with ecosystem priorities and goals of the (Draft) CVFPP metrics, the (Draft) Conservation Strategy (if available) and/or adopted conservation or recovery plans.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to increase ecosystem function compared to current conditions, but is not specifically consistent with the priorities and goals of the Draft CVFPP metrics or other adopted conservation or recovery plans.
- **Medium** if the project is consistent with the priorities and goals of one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.
- **High** if the project is if the project is consistent with the priorities and goals of more than one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.

N/A

No benefits identified.

RC-7. ***Institutional support*****.** Improved support for entities contributing to flood management.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Medium

The project will improve institutional support at a locally-significant level, per the emergency planning and response components of the project.

RC-8. ***Other benefits.*** "Multiple benefits" not addressed by criteria above, e.g., water quality, recreation, public access, water supply, groundwater recharge, economic, etc.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

N/A

No benefits identified

RC-9. ***Cost-effectiveness.*** Benefits vs costs compared to other projects accomplishing similar benefits.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the lower third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **High** if the project is expected to fall within the upper third of the projects considered in terms of the mix of benefits provided for the given project cost.

Medium

A benefit: cost ratio of 1.34 has been estimated for the Tentatively Recommended Plan; this is anticipated to fall in the mid-range of the projects considered.

RC-10. ***Low potential for dis-benefits (post-mitigation).*** Low potential for negative outcomes after mitigation; a "High" score indicates very low probability; a "Low" score indicates high probability, etc.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of dis-benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the upper third of the projects considered in terms of the mix of anticipated dis-benefits.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of anticipated dis-benefits.

- **High** if the project is expected to fall within the lower third of the projects considered in terms of the mix of anticipated dis-benefits.

Medium

The USACE EIR/EIS suggests that there will be no significant dis-benefits, but there will be an increase in operations, maintenance, and repair requirements as a result of the project; this is anticipated to fall in the mid-range of the projects considered.

Project Name: Patterson WWTP – Reduce Flood Risks

Project Lead: City of Patterson

Potential Project Partners:

No partners identified at this time

Short Project Description:

Develop and evaluate potential solutions to existing flood hazards at the City of Patterson WWTP.

Long Project Description:

There is limited information available concerning the extent of flooding that occurs at or near the City of Patterson Waste Water Treatment Plant (WWTP) located along the San Joaquin River. Further study is needed to understand if the existing berm system surrounding the WWTP is adequate to control flooding or if the berms are of adequate size or length to control the seasonal flooding. A review of the limits of the flooding around the WWTP is needed. Specifically, the site should be surveyed to determine the size and heights of embankments, and high water elevations should be determined and whether they could affect operation of the WWTP. If inadequate, design solutions will be recommended which may include extending the embankments, increasing the height of the existing embankments or if the current system is adequate recommend no action.

In the screening- and ranking-level assessments, it is assumed that the items identified in the proposed study would be implemented and, therefore, the anticipated benefits would be realized. The only exception is the cost-effectiveness criterion, RC-9, where only the cost and benefit of the study can be compared because the costs for the action items that would come out of the study can't be estimated until the study is complete.

Unique Project Characteristics:

None specified

Project Status:	Pre-planning
Project Cost:	$27,000
Project Timeframe:	Undetermined
Cost-sharing:	No opportunities identified to date
Multi-benefit Project:	Yes
Types of benefits:	The project would improve flood risk management. As the project would protect water quality in the event of a flood event, it is considered consistent with the supporting objective of promoting multi-benefit projects.
Source of Project:	City of Patterson

Background Information:

None provided

Screening-level assessment

SC-1. ***Consistency with RFMP goals.*** Consistent with CVFPP goals: improve flood risk management, improve operations and maintenance, promote ecosystem functions, improve institutional support, promote multi-benefit projects.

Note: If the project is a study, evaluate the goals of the ultimate project that would flow from the study.

- **Low** if it meets *only* the multi-benefit project supporting objective.
- **Medium** as long as it meets 1-2 of the primary and/or supporting objectives and does not qualify as "Low."
- **High** if it includes meeting 3 or more of the primary and/or supporting objectives.

Medium

The project would improve flood risk management. As the project would protect water quality in the event of a flood event, it is considered consistent with the supporting objective of promoting multi-benefit projects.

SC-2. ***Implementation feasibility.*** Consider existing laws or regulations, community opposition/support, or other factors affecting implementation feasibility.

Note: If the project is a study, evaluate only the implementation feasibility of completing the study.

- **Low** if the project is judged to face significant odds (e.g., a similar project has already been forcefully pursued and has failed to progress, and there is little reason to expect a different outcome now.)
- **Medium** if the project has been developed as a concept and has a description and an identified lead.
- **High** if the project has already gone through feasibility analysis and been found feasible, if appropriate, or the project already has reasonable assurance of being implemented by a capable project lead.

Medium

The score is "Medium" because the project has been developed as a concept, has a description, and identified lead, the City of Patterson.

Ranking-level assessment

RC-1. ***Implementation feasibility.*** (As in Screening-level assessment guidance.)

Medium

RC-2. ***Financial feasibility.*** Capacity to cover local share, with funding availability, or all project costs).

Note: project costs should be considered to include both the initial costs and the ongoing operations, maintenance, and repair costs, though this information may not be available. If the project is a study, evaluate only the financial feasibility of completing the study.

- **Low** if the anticipated project lead does not have the resources to either 1) carry out the project; or 2) supply any needed local cost share. Given the findings of the Financial Plan, projects are identified as "Low" if the anticipated local cost share exceeds $500,000, unless the project has been successful in attracting grant funding so far.
- **Medium** if the project does not meet the criteria for "Low" or "High" Financial Feasibility.
- **High** if the anticipated project lead has the resources to either 1) carry out the project; or 2) supply any needed local cost share and a plausible funding source for the balance has been identified. Given the findings of the Financial Plan, we estimate that for most entities in the planning area, local cost shares will need to be less than $20,000 to be funded. For projects having an anticipated local cost share exceeding $500,000, the project will be scored "High" if it has been successful in attracting most of the needed funding already.

High

Given the importance of the WWTP facilities to the urban area of Patterson and the magnitude of the tax base as well as the relatively modest cost of the project, it is anticipated that local funding for the project or a local cost share requirement can be met.

RC-3. ***Flood risk reduction - life risk***. Change in the number of lives potentially at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project may reduce loss of life.
- **Medium** if the project is expected to reduce loss of life based on a qualitative assessment.
- **High** if the project has been analyzed for effect on loss of life and is expected to reduce it.

Low

As personnel are expected to be present at the site during floods, reduction of flood risk there is anticipated to potentially reduce the risk of loss of life.

RC-4. ***Flood risk reduction - flood damage.*** Change in the value of assets at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to create a locally-significant reduction in flood risk.
- **Medium** if the project is expected to create a regionally-significant reduction in flood risk.
- **High** if the project is expected to create a significant reduction in flood risk from a regional perspective and beyond.

Low

This project is expected to provide at least locally-significant reduction in flood risk.

RC-5. ***Operations, maintenance and repair.*** Improvement in efficiency and effectiveness, or reduction of need at present and over the long term.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to only modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

N/A

No benefits identified. The project would add flood management facilities and, therefore, would add to operations, maintenance, and repair requirements. This is noted under RC-10.

RC-6. ***Ecosystem function*****.** Consistency with ecosystem priorities and goals of the (Draft) CVFPP metrics, the (Draft) Conservation Strategy (if available) and/or adopted conservation or recovery plans.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to increase ecosystem function compared to current conditions, but is not specifically consistent with the priorities and goals of the Draft CVFPP metrics or other adopted conservation or recovery plans.
- **Medium** if the project is consistent with the priorities and goals of one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.
- **High** if the project is if the project is consistent with the priorities and goals of more than one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.

N/A

No benefits identified.

RC-7. ***Institutional support*****.** Improved support for entities contributing to flood management.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

N/A

No benefits identified.

RC-8. ***Other benefits.*** "Multiple benefits" not addressed by criteria above, e.g., water quality, recreation, public access, water supply, groundwater recharge, economic, etc.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Low

At least minimum, locally-significant modest water quality and economic stability benefits may are expected to accrue as a result of implementing any flood risk reduction actions that may be identified through this study and subsequently implemented.

RC-9. ***Cost-effectiveness.*** Benefits vs costs compared to other projects accomplishing similar benefits.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the lower third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **High** if the project is expected to fall within the upper third of the projects considered in terms of the mix of benefits provided for the given project cost.

Medium

The score is "Medium" because there is not a clear reason to differentiate this project as "Low" or "High."

RC-10. ***Low potential for dis-benefits (post-mitigation).*** Low potential for negative outcomes after mitigation; a "High" score indicates very low probability; a "Low" score indicates high probability, etc.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of dis-benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the upper third of the projects considered in terms of the mix of anticipated dis-benefits.

- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of anticipated dis-benefits.
- **High** if the project is expected to fall within the lower third of the projects considered in terms of the mix of anticipated dis-benefits.

Medium

The score is "Medium" because there is not a clear reason to differentiate this project as "Low" or "High."

Project Name: RD 1602 Resilience

Project Lead: RD 1602

Potential Project Partners:

CVFPB - permitting, technical assistance; landowners - funding, governance; DWR - funding, technical assistance; USACE - small role in emergency response, possibly funding for repairs; Stanislaus County - oversees district governance and financing; engineering firms, environmental firms, other technical experts as needed

Short Project Description:

Complete the necessary repairs and upgrades to bring RD levee system back into "Active" status for PL84-99 eligibility.

Long Project Description:

Many of the reclamation districts (RDs) in the planning area have been unable to maintain levees to United States Army Corps of Engineers (USACE) standards because they lacked the funding and staff to complete necessary repairs. As a result, these RDs no longer have "Active" status per the PL84-99 eligibility requirements.

This project would address the current deficiencies of the levees under the jurisdiction of RD 1602 including completion of the necessary repairs and upgrades to bring the levee system back into "Active" status for PL84-99 eligibility. Necessary actions can be found in RD inspection reports from 2013 – all "U" ratings need to be fixed immediately and all "M" ratings need to be fixed within 2 years or less. Actions listed in the inspection reports vary by RD, but generally include:

- structural repairs to levees, pumps, or other facilities
- removal of unpermitted encroachments (i.e. structures, fences, pipes, etc.)
- researching and negotiating encroachment permits for previously unpermitted encroachments
- improved fund-raising capacity for needed O&M
- improved technical capacity to perform necessary O&M (i.e. visual inspections of pipes, rodent control, erosion repairs, emergency road access, etc.)
- development of Emergency Response Plan for the RD
- establishment of Board of Trustees or maintenance agreement with another local agency(ies)
- others as needed

Specific deficiencies identified in the 2013 inspection report for RD 1602 include the following:

"U" rated items –

- Animal Control

"M" rated items –

- 1.68 miles of vegetation issues
- Encroachments
- 0.04 miles of slope stability concerns

The USACE Interim Policy for Determining Eligibility Status of Flood Risk Management Projects for the Rehabilitation Program Pursuant to PL 84-99 (Interim Policy) went into effect on March 21, 2014 and temporarily suspends PL 84-99 eligibility determinations, including generally excluding levee vegetation condition requirements. The Interim Policy allows for districts to make eligibility determinations based on a subset of items from the full inspection list. The path to regaining Active Status is through the USACE System-Wide Improvement Framework Policy (SWIF), which requires that the districts present a plan to address the deficiencies identified.

Unique Project Characteristics:

Varies – may include incorporation of environmental, water supply, or other secondary benefits to the region

Project Status:	Pre-planning
Project Cost:	$4,700,000
Project Timeframe:	1-5 years
Cost-sharing:	Some costs may be eligible for funding from local, state or federal grant programs – likely requires active Reclamation District with Trustees and financial oversight from the County.
Multi-benefit Project:	Potentially
Types of benefits:	The project would improve flood risk management; operations and maintenance; and institutional support.
Source of Project:	RD 1602

Background Information:

Maintenance reports; Inspection Reports; Maintenance Agreement with CVFPB; USACE O&M Manual

Screening-level assessment

SC-1. ***Consistency with RFMP goals.*** Consistent with CVFPP goals: improve flood risk management, improve operations and maintenance, promote ecosystem functions, improve institutional support, promote multi-benefit projects.

Note: If the project is a study, evaluate the goals of the ultimate project that would flow from the study.

- **Low** if it meets *only* the multi-benefit project supporting objective.
- **Medium** as long as it meets 1-2 of the primary and/or supporting objectives and does not qualify as "Low."
- **High** if it includes meeting 3 or more of the primary and/or supporting objectives.

High

The project would improve flood risk management; operations and maintenance; and institutional support.

SC-2. ***Implementation feasibility.*** Consider existing laws or regulations, community opposition/support, or other factors affecting implementation feasibility.

Note: If the project is a study, evaluate only the implementation feasibility of completing the study.

- **Low** if the project is judged to face significant odds (e.g., a similar project has already been forcefully pursued and has failed to progress, and there is little reason to expect a different outcome now.)
- **Medium** if the project has been developed as a concept and has a description and an identified lead.
- **High** if the project has already gone through feasibility analysis and been found feasible, if appropriate, or the project already has reasonable assurance of being implemented by a capable project lead.

Medium

The score is "Medium" because the project has been developed as a concept, has a description, and identified lead, RD 1602.

Ranking-level assessment

RC-1. ***Implementation feasibility.*** (As in Screening-level assessment guidance.)

Medium

RC-2. ***Financial feasibility.*** Capacity to cover local share, with funding availability, or all project costs).
Note: project costs should be considered to include both the initial costs and the ongoing operations, maintenance, and repair costs, though this information may not be available. If the project is a study, evaluate only the financial feasibility of completing the study.

- **Low** if the anticipated project lead does not have the resources to either 1) carry out the project; or 2) supply any needed local cost share. Given the findings of the Financial Plan, projects are identified as "Low" if the anticipated local cost share exceeds $500,000, unless the project has been successful in attracting grant funding so far.
- **Medium** if the project does not meet the criteria for "Low" or "High" Financial Feasibility.
- **High** if the anticipated project lead has the resources to either 1) carry out the project; or 2) supply any needed local cost share and a plausible funding source for the balance has been identified. Given the findings of the Financial Plan, we estimate that for most entities in the planning area, local cost shares will need to be less than $20,000 to be funded. For projects having an anticipated local cost share exceeding $500,000, the project will be scored "High" if it has been successful in attracting most of the needed funding already.

Low

RD 1602 does not have the resources to fund the project or the local cost share, and the project cost is greater than the anticipated size of the assessment potential within the District over the next 30 years.

RC-3. ***Flood risk reduction - life risk***. Change in the number of lives potentially at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project may reduce loss of life.

- **Medium** if the project is expected to reduce loss of life based on a qualitative assessment.
- **High** if the project has been analyzed for effect on loss of life and is expected to reduce it.

Low

Improvements to levees and other infrastructure, emergency response, and operations and maintenance may reduce loss of life.

RC-4. ***Flood risk reduction - flood damage.*** Change in the value of assets at risk, at present and over the long term.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to create a locally-significant reduction in flood risk.
- **Medium** if the project is expected to create a regionally-significant reduction in flood risk.
- **High** if the project is expected to create a significant reduction in flood risk from a regional perspective and beyond.

Low

Improvements to levees and other infrastructure, emergency response, and operations and maintenance are expected to result in a locally-significant reduction in flood risk.

RC-5. ***Operations, maintenance and repair.*** Improvement in efficiency and effectiveness, or reduction of need at present and over the long term.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to only modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Medium

The project is expected to materially improve operations and maintenance at a local level.

RC-6. ***Ecosystem function*****.** Consistency with ecosystem priorities and goals of the (Draft) CVFPP metrics, the (Draft) Conservation Strategy (if available) and/or adopted conservation or recovery plans.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to increase ecosystem function compared to current conditions, but is not specifically consistent with the priorities and goals of the Draft CVFPP metrics or other adopted conservation or recovery plans.

- **Medium** if the project is consistent with the priorities and goals of one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.
- **High** if the project is if the project is consistent with the priorities and goals of more than one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.

N/A

No benefits identified.

RC-7. ***Institutional support*.** Improved support for entities contributing to flood management.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Medium

The project is expected to materially improve institutional support at a local level.

RC-8. ***Other benefits.*** "Multiple benefits" not addressed by criteria above, e.g., water quality, recreation, public access, water supply, groundwater recharge, economic, etc.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Medium

Improved protection for assets within RD 1602 is expected to result in a material increase in economic benefits at a locally-significant scale.

RC-9. ***Cost-effectiveness.*** Benefits vs costs compared to other projects accomplishing similar benefits.
Note: if the project is a study, score as "Medium."

To the extent that projects have a similar mix of benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the lower third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **High** if the project is expected to fall within the upper third of the projects considered in terms of the mix of benefits provided for the given project cost.

Low

The score is "Low" because the project cost is high relative to the assets that would be protected by it.

RC-10. ***Low potential for dis-benefits (post-mitigation).*** Low potential for negative outcomes after mitigation; a "High" score indicates very low probability; a "Low" score indicates high probability, etc.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of dis-benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the upper third of the projects considered in terms of the mix of anticipated dis-benefits.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of anticipated dis-benefits.
- **High** if the project is expected to fall within the lower third of the projects considered in terms of the mix of anticipated dis-benefits.

High

No dis-benefits are anticipated.

Project Name: RD 2031 Resilience

Project Lead: RD 2031

Potential Project Partners:

CVFPB - permitting, technical assistance; landowners - funding, governance; DWR - funding, technical assistance; USACE - small role in emergency response, possibly funding for repairs; Stanislaus County - oversees district governance and financing; engineering firms, environmental firms, other technical experts as needed

Short Project Description:

Complete the necessary repairs and upgrades to bring RD levee system back into "Active" status for PL84-99 eligibility.

Long Project Description:

Many of the reclamation districts (RDs) in the planning area have been unable to maintain levees to United States Army Corps of Engineers (USACE) standards because they lacked the funding and staff to complete necessary repairs. As a result, these RDs no longer have "Active" status per the PL84-99 eligibility requirements.

This project would address the current deficiencies of the levees under the jurisdiction of RD 2031 including completion of the necessary repairs and upgrades to bring the levee system back into "Active" status for PL84-99 eligibility. Necessary actions can be found in RD inspection reports from 2013 – all "U" ratings need to be fixed immediately and all "M" ratings need to be fixed within 2 years or less. Actions listed in the inspection reports vary by RD, but generally include:

- structural repairs to levees, pumps, or other facilities
- removal of unpermitted encroachments (i.e. structures, fences, pipes, etc.)
- researching and negotiating encroachment permits for previously unpermitted encroachments
- improved fund-raising capacity for needed O&M
- improved technical capacity to perform necessary O&M (i.e. visual inspections of pipes, rodent control, erosion repairs, emergency road access, etc.)
- development of Emergency Response Plan for the RD
- establishment of Board of Trustees or maintenance agreement with another local agency(ies)
- others as needed

Specific deficiencies identified in the 2013 inspection report for RD 2031 include the following:

"U" rated items –

- Animal Control

"M" rated items –

- Vegetation issues
- Tree trimming
- Encroachments

• 0.03 miles of erosion issues

• 0.07 miles of surface depression issues

The USACE Interim Policy for Determining Eligibility Status of Flood Risk Management Projects for the Rehabilitation Program Pursuant to PL 84-99 (Interim Policy) went into effect on March 21, 2014 and temporarily suspends PL 84-99 eligibility determinations, including generally excluding levee vegetation condition requirements. The Interim Policy allows for districts to make eligibility determinations based on a subset of items from the full inspection list. The path to regaining Active Status is through the USACE System-Wide Improvement Framework Policy (SWIF), which requires that the districts present a plan to address the deficiencies identified.

Unique Project Characteristics:

Varies – may include incorporation of environmental, water supply, or other secondary benefits to the region

Project Status:	Pre-planning
Project Cost:	**$**2,000,000
Project Timeframe:	1-5 years
Cost-sharing:	Some costs may be eligible for funding from local, state or federal grant programs – likely requires active Reclamation District with Trustees and financial oversight from the County.
Multi-benefit Project:	Potentially
Types of benefits:	The project would improve flood risk management; operations and maintenance; and institutional support.
Source of Project:	RD 2031

Background Information:

Maintenance reports; Inspection Reports; Maintenance Agreement with CVFPB; USACE O&M Manual

Screening-level assessment

SC-1. ***Consistency with RFMP goals.*** Consistent with CVFPP goals: improve flood risk management, improve operations and maintenance, promote ecosystem functions, improve institutional support, promote multi-benefit projects.

Note: If the project is a study, evaluate the goals of the ultimate project that would flow from the study.

- **Low** if it meets *only* the multi-benefit project supporting objective.
- **Medium** as long as it meets 1-2 of the primary and/or supporting objectives and does not qualify as "Low."
- **High** if it includes meeting 3 or more of the primary and/or supporting objectives.

High

The project would improve flood risk management; operations and maintenance; and institutional support.

SC-2. ***Implementation feasibility.*** Consider existing laws or regulations, community opposition/support, or other factors affecting implementation feasibility.

Note: If the project is a study, evaluate only the implementation feasibility of completing the study.

- **Low** if the project is judged to face significant odds (e.g., a similar project has already been forcefully pursued and has failed to progress, and there is little reason to expect a different outcome now.)
- **Medium** if the project has been developed as a concept and has a description and an identified lead.
- **High** if the project has already gone through feasibility analysis and been found feasible, if appropriate, or the project already has reasonable assurance of being implemented by a capable project lead.

Medium

The score is "Medium" because the project has been developed as a concept, has a description, and identified lead, RD 2031.

Ranking-level assessment

RC-1. ***Implementation feasibility.*** (As in Screening-level assessment guidance.)

Medium

RC-2. ***Financial feasibility.*** Capacity to cover local share, with funding availability, or all project costs).
Note: project costs should be considered to include both the initial costs and the ongoing operations, maintenance, and repair costs, though this information may not be available. If the project is a study, evaluate only the financial feasibility of completing the study.

- **Low** if the anticipated project lead does not have the resources to either 1) carry out the project; or 2) supply any needed local cost share. Given the findings of the Financial Plan, projects are identified as "Low" if the anticipated local cost share exceeds $500,000, unless the project has been successful in attracting grant funding so far.
- **Medium** if the project does not meet the criteria for "Low" or "High" Financial Feasibility.
- **High** if the anticipated project lead has the resources to either 1) carry out the project; or 2) supply any needed local cost share and a plausible funding source for the balance has been identified. Given the findings of the Financial Plan, we estimate that for most entities in the planning area, local cost shares will need to be less than $20,000 to be funded. For projects having an anticipated local cost share exceeding $500,000, the project will be scored "High" if it has been successful in attracting most of the needed funding already.

High

RD 2031 is expected to have the resources to fund the local cost share, as that is expected to be less than two years' worth of the hypothetical benefit potential within the District.

RC-3. ***Flood risk reduction - life risk***. Change in the number of lives potentially at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project may reduce loss of life.
- **Medium** if the project is expected to reduce loss of life based on a qualitative assessment.
- **High** if the project has been analyzed for effect on loss of life and is expected to reduce it.

Low

While improvements to levees and other infrastructure, emergency response, and operations and maintenance may improve as a result of this project, the risk of loss of life in the area protected by these levees is extremely low due to the lack of residences and small number of people typically exposed to flood hazards on these lands.

RC-4. ***Flood risk reduction - flood damage.*** Change in the value of assets at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to create a locally-significant reduction in flood risk.
- **Medium** if the project is expected to create a regionally-significant reduction in flood risk.
- **High** if the project is expected to create a significant reduction in flood risk from a regional perspective and beyond.

Low

Improvements to levees and other infrastructure, emergency response, and operations and maintenance are expected to result in a locally-significant reduction in flood risk.

RC-5. ***Operations, maintenance and repair.*** Improvement in efficiency and effectiveness, or reduction of need at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to only modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Medium

The project is expected to materially improve operations and maintenance at a local level.

RC-6. ***Ecosystem function*****.** Consistency with ecosystem priorities and goals of the (Draft) CVFPP metrics, the (Draft) Conservation Strategy (if available) and/or adopted conservation or recovery plans.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to increase ecosystem function compared to current conditions, but is not specifically consistent with the priorities and goals of the Draft CVFPP metrics or other adopted conservation or recovery plans.
- **Medium** if the project is consistent with the priorities and goals of one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.
- **High** if the project is if the project is consistent with the priorities and goals of more than one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.

N/A

No benefits identified.

RC-7. ***Institutional support*.** Improved support for entities contributing to flood management.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Medium

The project is expected to materially improve institutional support at a local level.

RC-8. ***Other benefits.*** "Multiple benefits" not addressed by criteria above, e.g., water quality, recreation, public access, water supply, groundwater recharge, economic, etc.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Medium

Improved protection for assets within RD 2031 would result in a material increase in economic benefits at a locally-significant scale.

RC-9. ***Cost-effectiveness.*** Benefits vs costs compared to other projects accomplishing similar benefits.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the lower third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **High** if the project is expected to fall within the upper third of the projects considered in terms of the mix of benefits provided for the given project cost.

Medium

The score is "Medium" because there is not a clear reason to differentiate this project as "Low" or "High."

RC-10. ***Low potential for dis-benefits (post-mitigation).*** Low potential for negative outcomes after mitigation; a "High" score indicates very low probability; a "Low" score indicates high probability, etc.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of dis-benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the upper third of the projects considered in terms of the mix of anticipated dis-benefits.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of anticipated dis-benefits.
- **High** if the project is expected to fall within the lower third of the projects considered in terms of the mix of anticipated dis-benefits.

High

No dis-benefits are anticipated.

Project Name: RD 2063 Resilience

Project Lead: RD 2063

Potential Project Partners:

CVFPB - permitting, technical assistance; landowners - funding, governance; DWR - funding, technical assistance; USACE - small role in emergency response, possibly funding for repairs; Stanislaus County - oversees district governance and financing; engineering firms, environmental firms, other technical experts as needed

Short Project Description:

Complete the necessary repairs and upgrades to bring RD levee system back into "Active" status for PL84-99 eligibility.

Long Project Description:

Many of the reclamation districts (RDs) in the planning area have been unable to maintain levees to United States Army Corps of Engineers (USACE) standards because they lacked the funding and staff to complete necessary repairs. As a result, these RDs no longer have "Active" status per the PL84-99 eligibility requirements.

This project would address the current deficiencies of the levees under the jurisdiction of RD 2063 including completion of the necessary repairs and upgrades to bring the levee system back into "Active" status for PL84-99 eligibility. Necessary actions can be found in RD inspection reports from 2013 – all "U" ratings need to be fixed immediately and all "M" ratings need to be fixed within 2 years or less. Actions listed in the inspection reports vary by RD, but generally include:

- structural repairs to levees, pumps, or other facilities
- removal of unpermitted encroachments (i.e. structures, fences, pipes, etc.)
- researching and negotiating encroachment permits for previously unpermitted encroachments
- improved fund-raising capacity for needed O&M
- improved technical capacity to perform necessary O&M (i.e. visual inspections of pipes, rodent control, erosion repairs, emergency road access, etc.)
- development of Emergency Response Plan for the RD
- establishment of Board of Trustees or maintenance agreement with another local agency(ies)
- others as needed

Specific deficiencies identified in the 2013 inspection report for RD 2063 include the following:

"U" rated items –

- Erosion / Bank Caving

"M" rated items –

- 0.14 miles of vegetation issues
- Tree trimming
- Animal control

• Encroachments

• ER preparadness / training

The USACE Interim Policy for Determining Eligibility Status of Flood Risk Management Projects for the Rehabilitation Program Pursuant to PL 84-99 (Interim Policy) went into effect on March 21, 2014 and temporarily suspends PL 84-99 eligibility determinations, including generally excluding levee vegetation condition requirements. The Interim Policy allows for districts to make eligibility determinations based on a subset of items from the full inspection list so that the focus remains on the levees in the worst condition first. The path to regaining Active Status is through the USACE System-Wide Improvement Framework Policy (SWIF), which requires that the districts present a plan to address the deficiencies identified.

Unique Project Characteristics:

Varies – may include incorporation of environmental, water supply, or other secondary benefits to the region

Project Status:	Pre-planning
Project Cost:	**$**3,500,000
Project Timeframe:	1-5 years
Cost-sharing:	Some costs may be eligible for funding from local, state or federal grant programs – likely requires active Reclamation District with Trustees and financial oversight from the County.
Multi-benefit Project:	Potentially
Types of benefits:	The project would improve flood risk management; operations and maintenance; and institutional support.
Source of Project:	RD 2063

Background Information:

Maintenance reports; Inspection Reports; Maintenance Agreement with CVFPB; USACE O&M Manual

Screening-level assessment

SC-1. ***Consistency with RFMP goals.*** Consistent with CVFPP goals: improve flood risk management, improve operations and maintenance, promote ecosystem functions, improve institutional support, promote multi-benefit projects.

Note: If the project is a study, evaluate the goals of the ultimate project that would flow from the study.

- **Low** if it meets *only* the multi-benefit project supporting objective.
- **Medium** as long as it meets 1-2 of the primary and/or supporting objectives and does not qualify as "Low."
- **High** if it includes meeting 3 or more of the primary and/or supporting objectives.

High

The project would improve flood risk management; operations and maintenance; and institutional support.

SC-2. ***Implementation feasibility.*** Consider existing laws or regulations, community opposition/support, or other factors affecting implementation feasibility.

Note: If the project is a study, evaluate only the implementation feasibility of completing the study.

- **Low** if the project is judged to face significant odds (e.g., a similar project has already been forcefully pursued and has failed to progress, and there is little reason to expect a different outcome now.)
- **Medium** if the project has been developed as a concept and has a description and an identified lead.
- **High** if the project has already gone through feasibility analysis and been found feasible, if appropriate, or the project already has reasonable assurance of being implemented by a capable project lead.

Medium

The score is "Medium" because the project has been developed as a concept, has a description, and identified lead, RD 2063.

Ranking-level assessment

RC-1. ***Implementation feasibility.*** (As in Screening-level assessment guidance.)

Medium

RC-2. ***Financial feasibility.*** Capacity to cover local share, with funding availability, or all project costs).
Note: project costs should be considered to include both the initial costs and the ongoing operations, maintenance, and repair costs, though this information may not be available. If the project is a study, evaluate only the financial feasibility of completing the study.

- **Low** if the anticipated project lead does not have the resources to either 1) carry out the project; or 2) supply any needed local cost share. Given the findings of the Financial Plan, projects are identified as "Low" if the anticipated local cost share exceeds $500,000, unless the project has been successful in attracting grant funding so far.
- **Medium** if the project does not meet the criteria for "Low" or "High" Financial Feasibility.
- **High** if the anticipated project lead has the resources to either 1) carry out the project; or 2) supply any needed local cost share and a plausible funding source for the balance has been identified. Given the findings of the Financial Plan, we estimate that for most entities in the planning area, local cost shares will need to be less than $20,000 to be funded. For projects having an anticipated local cost share exceeding $500,000, the project will be scored "High" if it has been successful in attracting most of the needed funding already.

High

RD 2063 is anticipated to be able to cover the local cost share, as that is expected to be less than one years' worth of the hypothetical benefit potential within the District.

RC-3. ***Flood risk reduction - life risk***. Change in the number of lives potentially at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project may reduce loss of life.
- **Medium** if the project is expected to reduce loss of life based on a qualitative assessment.
- **High** if the project has been analyzed for effect on loss of life and is expected to reduce it.

Low

Improvements to levees and other infrastructure, emergency response, and operations and maintenance may reduce loss of life.

RC-4. ***Flood risk reduction - flood damage.*** Change in the value of assets at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to create a locally-significant reduction in flood risk.
- **Medium** if the project is expected to create a regionally-significant reduction in flood risk.
- **High** if the project is expected to create a significant reduction in flood risk from a regional perspective and beyond.

Low

Improvements to levees and other infrastructure, emergency response, and operations and maintenance are expected to result in a locally-significant reduction in flood risk.

RC-5. ***Operations, maintenance and repair.*** Improvement in efficiency and effectiveness, or reduction of need at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to only modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Medium

The project is expected to materially improve operations and maintenance at a local level.

RC-6. ***Ecosystem function*****.** Consistency with ecosystem priorities and goals of the (Draft) CVFPP metrics, the (Draft) Conservation Strategy (if available) and/or adopted conservation or recovery plans.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to increase ecosystem function compared to current conditions, but is not specifically consistent with the priorities and goals of the Draft CVFPP metrics or other adopted conservation or recovery plans.
- **Medium** if the project is consistent with the priorities and goals of one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.
- **High** if the project is if the project is consistent with the priorities and goals of more than one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.

N/A

No benefits identified.

RC-7. ***Institutional support*.** Improved support for entities contributing to flood management.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Medium

The project is expected to materially improve institutional support at a local level.

RC-8. ***Other benefits.*** "Multiple benefits" not addressed by criteria above, e.g., water quality, recreation, public access, water supply, groundwater recharge, economic, etc.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Medium

Improved protection for assets within RD 2063 would result in a material increase in economic benefits at a locally-significant scale.

RC-9. ***Cost-effectiveness.*** Benefits vs costs compared to other projects accomplishing similar benefits.

Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the lower third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **High** if the project is expected to fall within the upper third of the projects considered in terms of the mix of benefits provided for the given project cost.

Medium

The score is "Medium" because there is not a clear reason to differentiate this project as "Low" or "High."

RC-10. ***Low potential for dis-benefits (post-mitigation).*** Low potential for negative outcomes after mitigation; a "High" score indicates very low probability; a "Low" score indicates high probability, etc.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of dis-benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the upper third of the projects considered in terms of the mix of anticipated dis-benefits.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of anticipated dis-benefits.
- **High** if the project is expected to fall within the lower third of the projects considered in terms of the mix of anticipated dis-benefits.

High

No dis-benefits are anticipated.

Project Name: RD 2091 Resilience

Project Lead: RD 2091

Potential Project Partners:

CVFPB - permitting, technical assistance; landowners - funding, governance; DWR - funding, technical assistance; USACE - small role in emergency response, possibly funding for repairs; Stanislaus County - oversees district governance and financing; engineering firms, environmental firms, other technical experts as needed

Short Project Description:

Complete the necessary repairs and upgrades to bring RD levee system back into "Active" status for PL84-99 eligibility.

Long Project Description:

Many of the reclamation districts (RDs) in the planning area have been unable to maintain levees to United States Army Corps of Engineers (USACE) standards because they lacked the funding and staff to complete necessary repairs. As a result, these RDs no longer have "Active" status per the PL84-99 eligibility requirements.

This project would address the current deficiencies of the levees under the jurisdiction of RD 2091 including completion of the necessary repairs and upgrades to bring the levee system back into "Active" status for PL84-99 eligibility. Necessary actions can be found in RD inspection reports from 2013 – all "U" ratings need to be fixed immediately and all "M" ratings need to be fixed within 2 years or less. Actions listed in the inspection reports vary by RD, but generally include:

- structural repairs to levees, pumps, or other facilities
- removal of unpermitted encroachments (i.e. structures, fences, pipes, etc.)
- researching and negotiating encroachment permits for previously unpermitted encroachments
- improved fund-raising capacity for needed O&M
- improved technical capacity to perform necessary O&M (i.e. visual inspections of pipes, rodent control, erosion repairs, emergency road access, etc.)
- development of Emergency Response Plan for the RD
- establishment of Board of Trustees or maintenance agreement with another local agency(ies)
- others as needed

Specific deficiencies identified in the 2013 inspection report for RD 2091 include the following:

"U" rated items –

- None

"M" rated items –

- Flood Preparadness & Training

The USACE Interim Policy for Determining Eligibility Status of Flood Risk Management Projects for the Rehabilitation Program Pursuant to PL 84-99 (Interim Policy) went into effect on March 21, 2014 and temporarily suspends PL 84-99 eligibility determinations, including generally excluding levee vegetation

condition requirements. The Interim Policy allows for districts to make eligibility determinations based on a subset of items from the full inspection list so that the focus remains on the levees in the worst condition first. The path to regaining Active Status is through the USACE System-Wide Improvement Framework Policy (SWIF), which requires that the districts present a plan to address the deficiencies identified.

Unique Project Characteristics:

Varies – may include incorporation of environmental, water supply, or other secondary benefits to the region

Project Status:	Pre-planning
Project Cost:	**$**400,000
Project Timeframe:	1-5 years
Cost-sharing:	Some costs may be eligible for funding from local, state or federal grant programs – likely requires active Reclamation District with Trustees and financial oversight from the County.
Multi-benefit Project:	Potentially
Types of benefits:	The project would improve flood risk management; operations and maintenance; and institutional support.
Source of Project:	RD 2091

Background Information:

Maintenance reports; Inspection Reports; Maintenance Agreement with CVFPB; USACE O&M Manual

Screening-level assessment

SC-1. ***Consistency with RFMP goals.*** Consistent with CVFPP goals: improve flood risk management, improve operations and maintenance, promote ecosystem functions, improve institutional support, promote multi-benefit projects.

Note: If the project is a study, evaluate the goals of the ultimate project that would flow from the study.

- **Low** if it meets *only* the multi-benefit project supporting objective.
- **Medium** as long as it meets 1-2 of the primary and/or supporting objectives and does not qualify as "Low."
- **High** if it includes meeting 3 or more of the primary and/or supporting objectives.

High

The project would improve flood risk management; operations and maintenance; and institutional support.

SC-2. ***Implementation feasibility.*** Consider existing laws or regulations, community opposition/support, or other factors affecting implementation feasibility.

Note: If the project is a study, evaluate only the implementation feasibility of completing the study.

- **Low** if the project is judged to face significant odds (e.g., a similar project has already been forcefully pursued and has failed to progress, and there is little reason to expect a different outcome now.)

- **Medium** if the project has been developed as a concept and has a description and an identified lead.
- **High** if the project has already gone through feasibility analysis and been found feasible, if appropriate, or the project already has reasonable assurance of being implemented by a capable project lead.

Medium

The score is "Medium" because the project has been developed as a concept, has a description, and identified lead, RD 2091.

Ranking-level assessment

RC-1. ***Implementation feasibility.*** (As in Screening-level assessment guidance.)

Medium

RC-2. ***Financial feasibility.*** Capacity to cover local share, with funding availability, or all project costs).
Note: project costs should be considered to include both the initial costs and the ongoing operations, maintenance, and repair costs, though this information may not be available. If the project is a study, evaluate only the financial feasibility of completing the study.

- **Low** if the anticipated project lead does not have the resources to either 1) carry out the project; or 2) supply any needed local cost share. Given the findings of the Financial Plan, projects are identified as "Low" if the anticipated local cost share exceeds $500,000, unless the project has been successful in attracting grant funding so far.
- **Medium** if the project does not meet the criteria for "Low" or "High" Financial Feasibility.
- **High** if the anticipated project lead has the resources to either 1) carry out the project; or 2) supply any needed local cost share and a plausible funding source for the balance has been identified. Given the findings of the Financial Plan, we estimate that for most entities in the planning area, local cost shares will need to be less than $20,000 to be funded. For projects having an anticipated local cost share exceeding $500,000, the project will be scored "High" if it has been successful in attracting most of the needed funding already.

High

RD 2091 is expected to be able to provide the local cost share, as the cost is relatively modest and the Gomes Lake JPA may be willing to contribute.

RC-3. ***Flood risk reduction - life risk***. Change in the number of lives potentially at risk, at present and over the long term.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project may reduce loss of life.
- **Medium** if the project is expected to reduce loss of life based on a qualitative assessment.
- **High** if the project has been analyzed for effect on loss of life and is expected to reduce it.

Low

Improvements to levees and other infrastructure, emergency response, and operations and maintenance may reduce loss of life.

RC-4. ***Flood risk reduction - flood damage.*** Change in the value of assets at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to create a locally-significant reduction in flood risk.
- **Medium** if the project is expected to create a regionally-significant reduction in flood risk.
- **High** if the project is expected to create a significant reduction in flood risk from a regional perspective and beyond.

Low

Improvements to levees and other infrastructure, emergency response, and operations and maintenance are expected to result in a locally-significant reduction in flood risk.

RC-5. ***Operations, maintenance and repair.*** Improvement in efficiency and effectiveness, or reduction of need at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to only modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Medium

The project is expected to materially improve operations and maintenance at a local level.

RC-6. ***Ecosystem function*****.** Consistency with ecosystem priorities and goals of the (Draft) CVFPP metrics, the (Draft) Conservation Strategy (if available) and/or adopted conservation or recovery plans.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to increase ecosystem function compared to current conditions, but is not specifically consistent with the priorities and goals of the Draft CVFPP metrics or other adopted conservation or recovery plans.
- **Medium** if the project is consistent with the priorities and goals of one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.

- **High** if the project is if the project is consistent with the priorities and goals of more than one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.

N/A

No benefits identified.

RC-7. ***Institutional support*.** Improved support for entities contributing to flood management.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Medium

The project is expected to materially improve institutional support at a local level.

RC-8. ***Other benefits.*** "Multiple benefits" not addressed by criteria above, e.g., water quality, recreation, public access, water supply, groundwater recharge, economic, etc.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Medium

Improved protection for assets within RD 2091 would result in a material increase in economic benefits at a locally-significant scale.

RC-9. ***Cost-effectiveness.*** Benefits vs costs compared to other projects accomplishing similar benefits.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the lower third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **High** if the project is expected to fall within the upper third of the projects considered in terms of the mix of benefits provided for the given project cost.

High

The score is "High" because the project cost is low relative to the assets that would be protected by it.

RC-10. ***Low potential for dis-benefits (post-mitigation).*** Low potential for negative outcomes after mitigation; a "High" score indicates very low probability; a "Low" score indicates high probability, etc.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of dis-benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the upper third of the projects considered in terms of the mix of anticipated dis-benefits.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of anticipated dis-benefits.
- **High** if the project is expected to fall within the lower third of the projects considered in terms of the mix of anticipated dis-benefits.

High

No dis-benefits are anticipated.

Project Name: RD 2101 Resilience

Project Lead: RD 2101

Potential Project Partners:

CVFPB - permitting, technical assistance; landowners - funding, governance; DWR - funding, technical assistance; USACE - small role in emergency response, possibly funding for repairs; Stanislaus County - oversees district governance and financing; engineering firms, environmental firms, other technical experts as needed

Short Project Description:

Complete the necessary repairs and upgrades to bring RD levee system back into "Active" status for PL84-99 eligibility, including addressing a major levee erosion site.

Long Project Description:

Many of the reclamation districts (RDs) in the planning area have been unable to maintain levees to United States Army Corps of Engineers (USACE) standards because they lacked the funding and staff to complete necessary repairs. As a result, these RDs no longer have "Active" status per the PL84-99 eligibility requirements.

This project would address the current deficiencies of the levees under the jurisdiction of RD 2101 including completion of the necessary repairs and upgrades to bring the levee system back into "Active" status for PL84-99 eligibility. Necessary actions can be found in RD inspection reports from 2013 – all "U" ratings need to be fixed immediately and all "M" ratings need to be fixed within 2 years or less. Actions listed in the inspection reports vary by RD, but generally include:

- structural repairs to levees, pumps, or other facilities
- removal of unpermitted encroachments (i.e. structures, fences, pipes, etc.)
- researching and negotiating encroachment permits for previously unpermitted encroachments
- improved fund-raising capacity for needed O&M
- improved technical capacity to perform necessary O&M (i.e. visual inspections of pipes, rodent control, erosion repairs, emergency road access, etc.)
- development of Emergency Response Plan for the RD
- establishment of Board of Trustees or maintenance agreement with another local agency(ies)
- others as needed

Specific deficiencies identified in the 2013 inspection report for RD 2101 include the following:

"U" rated items –

- 0.10 miles of erosion
- Animal control

"M" rated items –

- Tree trimming

The USACE Interim Policy for Determining Eligibility Status of Flood Risk Management Projects for the Rehabilitation Program Pursuant to PL 84-99 (Interim Policy) went into effect on March 21, 2014 and temporarily suspends PL 84-99 eligibility determinations, including generally excluding levee vegetation condition requirements. The Interim Policy allows for districts to make eligibility determinations based on a subset of items from the full inspection list so that the focus remains on the levees in the worst condition first. The path to regaining Active Status is through the USACE System-Wide Improvement Framework Policy (SWIF), which requires that the districts present a plan to address the deficiencies identified.

Unique Project Characteristics:

Varies – may include incorporation of environmental, water supply, or other secondary benefits to the region

Project Status:	Pre-planning
Project Cost:	$2,500,000
Project Timeframe:	1-5 years
Cost-sharing:	Some costs may be eligible for funding from local, state or federal grant programs – likely requires active Reclamation District with Trustees and financial oversight from the County.
Multi-benefit Project:	Potentially
Types of benefits:	The project would improve flood risk management; operations and maintenance; and institutional support. It may also promote multi-benefit projects as a result of reducing sediment inflows to the river if the eroding levee is repaired.
Source of Project:	RD 2101

Background Information:

Maintenance reports; Inspection Reports; Maintenance Agreement with CVFPB; USACE O&M Manual

Screening-level assessment

SC-1. ***Consistency with RFMP goals.*** Consistent with CVFPP goals: improve flood risk management, improve operations and maintenance, promote ecosystem functions, improve institutional support, promote multi-benefit projects.

Note: If the project is a study, evaluate the goals of the ultimate project that would flow from the study.

- **Low** if it meets *only* the multi-benefit project supporting objective.
- **Medium** as long as it meets 1-2 of the primary and/or supporting objectives and does not qualify as "Low."
- **High** if it includes meeting 3 or more of the primary and/or supporting objectives.

High

The project would improve flood risk management; operations and maintenance; and institutional support. It may also promote multi-benefit projects as a result of reducing sediment inflows to the river if the eroding levee is repaired.

SC-2. ***Implementation feasibility.*** Consider existing laws or regulations, community opposition/support, or other factors affecting implementation feasibility.

Note: If the project is a study, evaluate only the implementation feasibility of completing the study.

- **Low** if the project is judged to face significant odds (e.g., a similar project has already been forcefully pursued and has failed to progress, and there is little reason to expect a different outcome now.)
- **Medium** if the project has been developed as a concept and has a description and an identified lead.
- **High** if the project has already gone through feasibility analysis and been found feasible, if appropriate, or the project already has reasonable assurance of being implemented by a capable project lead.

Medium

The score is "Medium" because the project has been developed as a concept, has a description, and identified lead, RD 2101.

Ranking-level assessment

RC-1. ***Implementation feasibility.*** (As in Screening-level assessment guidance.)

Medium

RC-2. ***Financial feasibility.*** Capacity to cover local share, with funding availability, or all project costs).
Note: project costs should be considered to include both the initial costs and the ongoing operations, maintenance, and repair costs, though this information may not be available. If the project is a study, evaluate only the financial feasibility of completing the study.

- **Low** if the anticipated project lead does not have the resources to either 1) carry out the project; or 2) supply any needed local cost share. Given the findings of the Financial Plan, projects are identified as "Low" if the anticipated local cost share exceeds $500,000, unless the project has been successful in attracting grant funding so far.
- **Medium** if the project does not meet the criteria for "Low" or "High" Financial Feasibility.
- **High** if the anticipated project lead has the resources to either 1) carry out the project; or 2) supply any needed local cost share and a plausible funding source for the balance has been identified. Given the findings of the Financial Plan, we estimate that for most entities in the planning area, local cost shares will need to be less than $20,000 to be funded. For projects having an anticipated local cost share exceeding $500,000, the project will be scored "High" if it has been successful in attracting most of the needed funding already.

Low

RD 2101 may have the resources to fund the project but may not want to fund the local cost share. Because the local cost share is relatively high for an individual landowner, the project has been assessed as having "Low" financial feasibility.

RC-3. ***Flood risk reduction - life risk***. Change in the number of lives potentially at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project may reduce loss of life.
- **Medium** if the project is expected to reduce loss of life based on a qualitative assessment.
- **High** if the project has been analyzed for effect on loss of life and is expected to reduce it.

Low

While improvements to levees and other infrastructure, emergency response, and operations and maintenance may improve as a result of this project, the risk of loss of life in the area protected by these levees is extremely low due to the lack of residences and small number of people exposed to flood risks on these lands.

RC-4. ***Flood risk reduction - flood damage.*** Change in the value of assets at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to create a locally-significant reduction in flood risk.
- **Medium** if the project is expected to create a regionally-significant reduction in flood risk.
- **High** if the project is expected to create a significant reduction in flood risk from a regional perspective and beyond.

Low

Improvements to levees and other infrastructure, emergency response, and operations and maintenance are expected to result in a locally-significant reduction in flood risk.

RC-5. ***Operations, maintenance and repair.*** Improvement in efficiency and effectiveness, or reduction of need at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to only modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Medium

The project is expected to materially improve operations and maintenance at a local level.

RC-6. ***Ecosystem function*****.** Consistency with ecosystem priorities and goals of the (Draft) CVFPP metrics, the (Draft) Conservation Strategy (if available) and/or adopted conservation or recovery plans.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to increase ecosystem function compared to current conditions, but is not specifically consistent with the priorities and goals of the Draft CVFPP metrics or other adopted conservation or recovery plans.
- **Medium** if the project is consistent with the priorities and goals of one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.
- **High** if the project is if the project is consistent with the priorities and goals of more than one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.

N/A

No benefits identified.

RC-7. ***Institutional support*.** Improved support for entities contributing to flood management.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Medium

The project is expected to materially improve institutional support at a local level.

RC-8. ***Other benefits.*** "Multiple benefits" not addressed by criteria above, e.g., water quality, recreation, public access, water supply, groundwater recharge, economic, etc.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Medium

Improved protection for assets within RD 2101 would result in a material increase in economic benefits at a locally-significant scale. Additionally, water quality benefits may accrue to the river through reduced levee erosion.

RC-9. ***Cost-effectiveness.*** Benefits vs costs compared to other projects accomplishing similar benefits.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the lower third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **High** if the project is expected to fall within the upper third of the projects considered in terms of the mix of benefits provided for the given project cost.

Low

The score is "Low" because the project cost is high relative to the assets that would be protected by it.

RC-10. ***Low potential for dis-benefits (post-mitigation).*** Low potential for negative outcomes after mitigation; a "High" score indicates very low probability; a "Low" score indicates high probability, etc.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of dis-benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the upper third of the projects considered in terms of the mix of anticipated dis-benefits.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of anticipated dis-benefits.
- **High** if the project is expected to fall within the lower third of the projects considered in terms of the mix of anticipated dis-benefits.

High

No dis-benefits are anticipated.

Project Name: Reducing Sediment Loading into the San Joaquin River from Westside Agricultural Lands

Project Lead: West Stanislaus RCD

Potential Project Partners:
NRCS, irrigation districts, Westside Coalition

Short Project Description:
Improve irrigation technology with buried drip and sprinkler irrigation systems that allow for the capacity to irrigate a variety of crop types and effectively eliminate erosion of sediment off of farm fields when compared to traditional, flood irrigation practices. Sediment loading results in reduced capacity of and increased flooding in Westside Creeks and the San Joaquin River.

Long Project Description:
Sediment erosion into Westside creeks and the San Joaquin River from agricultural land on the west side of Stanislaus and Merced Counties has been an ongoing problem since the inception of agriculture in that region. The sediment loading results in reduced capacity of and increased flooding in Westside Creeks and the San Joaquin River as well as diminished farm land productivity and increased pollution and costs.

Recent improvements in irrigation technology for large acreages allows for significant reductions in the amount of sediment eroding off of farmland. The improvements include buried drip and sprinkler irrigation systems that allow for the capacity to irrigate a variety of crop types and that effectively eliminate erosion of sediment off of farm fields when compared to traditional, flood irrigation practices.

These irrigation systems are in high demand because of increased crop production and reduced costs to growers allowing for more precise application of amendments. But, the systems remain cost prohibitive if producers must shoulder their full cost. NRCS and Proposition 84 State funds have cost-shared with producers to fund these types of irrigation systems but demand and need significantly outstrips funding capacity and State funds are no longer available.

Approximately 45% of the irrigated land on the Westside of the San Joaquin River has been converted to either drip or sprinkler systems in the last 10 years. Along with improved irrigation management, the use of PAM, sediment retention ponds and tail-water recirculation systems there has been an approximately 50% reduction in sediment loading to the San Joaquin River over the last 35 years. Our goal is to reduce sediment loading by 95% when compared to 1979 figures and convert over 80% of the agricultural land to drip or sprinkler irrigation systems (a total of approximately 65,000 acres).

Along with the implementation of recent advances in irrigation technologies we will also look at the feasibility of developing wetlands in strategic places on the Westside that further reduce sediment loading to the creeks and the river. Reducing sediment loads to the San Joaquin River has the added benefit of improving water quality by also reducing the amount of pesticides and herbicides reaching surface waters.

Unique Project Characteristics:
Reduces sediment loading to the San Joaquin River, reduces the buildup of choke points and flooding potential in the San Joaquin River, improves farming practices that come with economic and environmental improvements, increases acreage of wetland habitats.

Project Status: Ongoing with an existing list of interested producers.
Project Cost: $65,000,000
Project Timeframe: 15 years

Cost-sharing: NRCS 33%, grower 33%, RFMP 33% or development of funds for low interest loans to growers, repaid and available indefinitely for farm improvements that conserve water, protect water resources and reduce flooding risks.
Multi-benefit Project: Yes
Types of benefits: The project would improve flood risk management, improve operations and maintenance, and promote multi-benefit projects.
Source of Project: West Stanislaus Resource Conservation District

Background Information:
None provided

Screening-level assessment

SC-1. ***Consistency with RFMP goals.*** Consistent with CVFPP goals: improve flood risk management, improve operations and maintenance, promote ecosystem functions, improve institutional support, promote multi-benefit projects.
Note: If the project is a study, evaluate the goals of the ultimate project that would flow from the study.

- **Low** if it meets *only* the multi-benefit project supporting objective.
- **Medium** as long as it meets 1-2 of the primary and/or supporting objectives and does not qualify as "Low."
- **High** if it includes meeting 3 or more of the primary and/or supporting objectives.

High

The project would improve flood risk management, improve operations and maintenance, and promote multi-benefit projects.

SC-2. ***Implementation feasibility.*** Consider existing laws or regulations, community opposition/support, or other factors affecting implementation feasibility.
Note: If the project is a study, evaluate only the implementation feasibility of completing the study.

- **Low** if the project is judged to face significant odds (e.g., a similar project has already been forcefully pursued and has failed to progress, and there is little reason to expect a different outcome now.)
- **Medium** if the project has been developed as a concept and has a description and an identified lead.
- **High** if the project has already gone through feasibility analysis and been found feasible, if appropriate, or the project already has reasonable assurance of being implemented by a capable project lead.

High

The project is ongoing, has been successful, and the project lead, the West Stanislaus RCD, is motivated to continue the effort.

Ranking-level assessment

RC-1. ***Implementation feasibility.*** (As in Screening-level assessment guidance.)

High

RC-2. ***Financial feasibility.*** Capacity to cover local share, with funding availability, or all project costs).
Note: project costs should be considered to include both the initial costs and the ongoing operations, maintenance, and repair costs, though this information may not be available. If the project is a study, evaluate only the financial feasibility of completing the study.

- **Low** if the anticipated project lead does not have the resources to either 1) carry out the project; or 2) supply any needed local cost share. Given the findings of the Financial Plan, projects are identified as "Low" if the anticipated local cost share exceeds $500,000, unless the project has been successful in attracting grant funding so far.
- **Medium** if the project does not meet the criteria for "Low" or "High" Financial Feasibility.
- **High** if the anticipated project lead has the resources to either 1) carry out the project; or 2) supply any needed local cost share and a plausible funding source for the balance has been identified. Given the findings of the Financial Plan, we estimate that for most entities in the planning area, local cost shares will need to be less than $20,000 to be funded. For projects having an anticipated local cost share exceeding $500,000, the project will be scored "High" if it has been successful in attracting most of the needed funding already.

Low

Funding for this project would be split evenly among NRCS, growers, and the State through the CVFPP process, should it be granted. Because the local cost share would be relatively high (greater than $500,000), it is considered "Low" in terms of financial feasibility.

RC-3. ***Flood risk reduction - life risk***. Change in the number of lives potentially at risk, at present and over the long term.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project may reduce loss of life.
- **Medium** if the project is expected to reduce loss of life based on a qualitative assessment.
- **High** if the project has been analyzed for effect on loss of life and is expected to reduce it.

Low

A reduction in erosion from farms in the planning area would reduce sedimentation in the channel and the resultant loss of channel capacity. This may result in reduced risk of loss of life.

RC-4. ***Flood risk reduction - flood damage.*** Change in the value of assets at risk, at present and over the long term.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to create a locally-significant reduction in flood risk.
- **Medium** if the project is expected to create a regionally-significant reduction in flood risk.
- **High** if the project is expected to create a significant reduction in flood risk from a regional perspective and beyond.

Low

A reduction in erosion from farms in the planning area would reduce sedimentation in the channel and the resultant loss of channel capacity. This could result in a regionally-significant reduction in flood risk. Given the uncertainty associated with how w

RC-5. ***Operations, maintenance and repair.*** Improvement in efficiency and effectiveness, or reduction of need at present and over the long term.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to only modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Low

If irrigation technologies are upgraded on a sufficient number of farms to significantly reduce sedimentation, the project may materially increase operations, maintenance, and repair benefits at a locally- or regionally-significant scale. Since the actual

RC-6. ***Ecosystem function*****.** Consistency with ecosystem priorities and goals of the (Draft) CVFPP metrics, the (Draft) Conservation Strategy (if available) and/or adopted conservation or recovery plans.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to increase ecosystem function compared to current conditions, but is not specifically consistent with the priorities and goals of the Draft CVFPP metrics or other adopted conservation or recovery plans.
- **Medium** if the project is consistent with the priorities and goals of one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.
- **High** if the project is if the project is consistent with the priorities and goals of more than one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.

N/A

No benefits identified.

RC-7. ***Institutional support*.** Improved support for entities contributing to flood management.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

N/A

No benefits identified.

RC-8. ***Other benefits.*** "Multiple benefits" not addressed by criteria above, e.g., water quality, recreation, public access, water supply, groundwater recharge, economic, etc.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Medium

The project would have water supply benefits through conservation as well as water quality benefits because fewer pollutants (e.g., sediment, pesticides, nutrients) would be carried off of farms in surface water runoff. Since the actual magnitude of the project benefits cannot be quantified at this time, the score assigned is "Medium."

RC-9. ***Cost-effectiveness.*** Benefits vs costs compared to other projects accomplishing similar benefits.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the lower third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **High** if the project is expected to fall within the upper third of the projects considered in terms of the mix of benefits provided for the given project cost.

Low

The score is "Low" because the project cost is very high while the magnitude of the project benefits are uncertain.

RC-10. ***Low potential for dis-benefits (post-mitigation).*** Low potential for negative outcomes after mitigation; a "High" score indicates very low probability; a "Low" score indicates high probability, etc.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of dis-benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the upper third of the projects considered in terms of the mix of anticipated dis-benefits.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of anticipated dis-benefits.
- **High** if the project is expected to fall within the lower third of the projects considered in terms of the mix of anticipated dis-benefits.

High

No dis-benefits are anticipated.

Project Name: Regional Maintenance Technical Support

Project Lead: RD 2091 and RD 2092

Potential Project Partners:

CVFPB - permitting, technical assistance; landowners - funding, governance; DWR - funding, technical assistance; USACE - possibly funding for repairs; Stanislaus County - oversees governance and financing; engineering firms, environmental firms, other technical experts as needed

Short Project Description:

Development and implementation of a shared staffing position to support LMA fulfillment of maintenance responsibilities within the Mid SJR Region.

Long Project Description:

It is very challenging for LMAs in the Mid SJR Region to fulfill their maintenance responsibilities to the satisfaction of both DWR and the USACE. This is true, in part, because LMA's have limited staff resources. Typically, maintenance responsibilities are only a small part of any one staff member's job. It is also because of such factors as conflicting standards, evolving and variable regulatory constraints, inconsistent or missing guidance with regard to permitting and best management practices with regard to compliance with permitting requirements.

By creating and funding a shared staffing position within the Mid SJR Region to support LMA fulfillment of maintenance responsibilities, the LMAs will create a knowledgeable and informed staffmember that will be able to effectively interact with the inspection programs and regulatory agencies to identify maintenance practices that meet inspection agency, regulatory agency, and LMA needs. This staffmember will also proactively engage participating LMAs on maintenance practices, providing advice, leadership, and directing some or all maintenance activities.

An initial effort would be required to establish the governance, financing, staffing, administration, position responsibilities and accounting for in-kind contributions. The position would be funded for at least two years as a pilot project. The initiation of this effort would require at least the participation of 2 or more LMAs; may grow to involve more LMAs after initial establishment. Additionally, the responsibilities of the position might expand after the pilot effort to include additional functions, such as supporting LMAs in seeking project funding from state and federal programs.

Unique Project Characteristics:

Will generate regional benefits; may provide a model for other regions

Project Status:	Pre-planning
Project Cost:	**$**100,000
Project Timeframe:	1-5 years
Cost-sharing:	Participating LMAs, possibly Stanislaus County. Some costs may also be eligible for funding from local, state or federal grant programs
Multi-benefit Project:	Yes
Types of benefits:	The project would improve flood risk management; operations and maintenance; and institutional support.
Source of Project:	RD 2092, consultant team

Background Information:

Maintenance reports; Inspection Reports; Maintenance Agreement with CVFPB; USACE O&M Manual

Screening-level assessment

SC-1. ***Consistency with RFMP goals.*** Consistent with CVFPP goals: improve flood risk management, improve operations and maintenance, promote ecosystem functions, improve institutional support, promote multi-benefit projects.
Note: If the project is a study, evaluate the goals of the ultimate project that would flow from the study.

- **Low** if it meets *only* the multi-benefit project supporting objective.
- **Medium** as long as it meets 1-2 of the primary and/or supporting objectives and does not qualify as "Low."
- **High** if it includes meeting 3 or more of the primary and/or supporting objectives.

High

The project would improve flood risk management; operations and maintenance; and institutional support as well as promote ecosystem functions and improve water quality, making it a multi-benefit project.

SC-2. ***Implementation feasibility.*** Consider existing laws or regulations, community opposition/support, or other factors affecting implementation feasibility.
Note: If the project is a study, evaluate only the implementation feasibility of completing the study.

- **Low** if the project is judged to face significant odds (e.g., a similar project has already been forcefully pursued and has failed to progress, and there is little reason to expect a different outcome now.)
- **Medium** if the project has been developed as a concept and has a description and an identified lead.
- **High** if the project has already gone through feasibility analysis and been found feasible, if appropriate, or the project already has reasonable assurance of being implemented by a capable project lead.

Medium

The score is "Medium" because the project has been developed as a concept, has a description, and identified lead and co-lead, RD 2092 and RD 2091, respectively.

Ranking-level assessment

RC-1. ***Implementation feasibility.*** (As in Screening-level assessment guidance.)

Medium

RC-2. ***Financial feasibility.*** Capacity to cover local share, with funding availability, or all project costs).
Note: project costs should be considered to include both the initial costs and the ongoing operations,

maintenance, and repair costs, though this information may not be available. If the project is a study, evaluate only the financial feasibility of completing the study.

- **Low** if the anticipated project lead does not have the resources to either 1) carry out the project; or 2) supply any needed local cost share. Given the findings of the Financial Plan, projects are identified as "Low" if the anticipated local cost share exceeds $500,000, unless the project has been successful in attracting grant funding so far.
- **Medium** if the project does not meet the criteria for "Low" or "High" Financial Feasibility.
- **High** if the anticipated project lead has the resources to either 1) carry out the project; or 2) supply any needed local cost share and a plausible funding source for the balance has been identified. Given the findings of the Financial Plan, we estimate that for most entities in the planning area, local cost shares will need to be less than $20,000 to be funded. For projects having an anticipated local cost share exceeding $500,000, the project will be scored "High" if it has been successful in attracting most of the needed funding already.

High

RD 2092 does not have the resources to cover the local share. However, through partnerships with other LMAs, local agencies, and potential grant funding, it is anticipated that RD 2092 can generate sufficient funds for the project, as the anticipated local cost share is relatively modest.

RC-3. ***Flood risk reduction - life risk***. Change in the number of lives potentially at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project may reduce loss of life.
- **Medium** if the project is expected to reduce loss of life based on a qualitative assessment.
- **High** if the project has been analyzed for effect on loss of life and is expected to reduce it.

Low

If the activities conducted under this project results in reduced flood risk, loss of life may also be reduced.

RC-4. ***Flood risk reduction - flood damage.*** Change in the value of assets at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to create a locally-significant reduction in flood risk.
- **Medium** if the project is expected to create a regionally-significant reduction in flood risk.
- **High** if the project is expected to create a significant reduction in flood risk from a regional perspective and beyond.

Medium

If the activities conducted under this project result in reduced flood risk, the value of assets of risk may also be reduced at a regionally-significant level.

RC-5. ***Operations, maintenance and repair.*** Improvement in efficiency and effectiveness, or reduction of need at present and over the long term.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to only modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

High

The project would materially improve operations and maintenance at a regionally-significant scale and could provide a model for other regions.

RC-6. ***Ecosystem function*****.** Consistency with ecosystem priorities and goals of the (Draft) CVFPP metrics, the (Draft) Conservation Strategy (if available) and/or adopted conservation or recovery plans.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to increase ecosystem function compared to current conditions, but is not specifically consistent with the priorities and goals of the Draft CVFPP metrics or other adopted conservation or recovery plans.
- **Medium** if the project is consistent with the priorities and goals of one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.
- **High** if the project is if the project is consistent with the priorities and goals of more than one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.

Low

The project would reduce environmentally-damaging maintenance actions by providing technical support for design and permitting.

RC-7. ***Institutional support*****.** Improved support for entities contributing to flood management.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

High

The project would materially improve institutional support at a regionally-significant scale and could provide a model for other regions.

RC-8. ***Other benefits.*** "Multiple benefits" not addressed by criteria above, e.g., water quality, recreation, public access, water supply, groundwater recharge, economic, etc.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Low

The project would improve water quality by reducing environmentally-damaging maintenance actions such as vegetation removal and concrete dumping.

RC-9. ***Cost-effectiveness.*** Benefits vs costs compared to other projects accomplishing similar benefits.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the lower third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **High** if the project is expected to fall within the upper third of the projects considered in terms of the mix of benefits provided for the given project cost.

High

If successful, the benefits to flood risk management; operations and maintenance; and institutional support would outweigh the modest cost. This project is expected to fall into the lower one third of those analyzed in this RFMP.

RC-10. ***Low potential for dis-benefits (post-mitigation).*** Low potential for negative outcomes after mitigation; a "High" score indicates very low probability; a "Low" score indicates high probability, etc.
Note: if the project is a study, score as "Medium."

To the extent that projects have a similar mix of dis-benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the upper third of the projects considered in terms of the mix of anticipated dis-benefits.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of anticipated dis-benefits.
- **High** if the project is expected to fall within the lower third of the projects considered in terms of the mix of anticipated dis-benefits.

High

No dis-benefits are anticipated.

Project Name: Riverfront Park Project

Project Lead: City of Patterson

Potential Project Partners:

Stanislaus County, San Joaquin River Valley Coalition, River Partners, San Joaquin River Partnership, California Department of Boating and Waterways

Short Project Description:

Creation of a riverfront park, recreational trail, and enhanced habitat along the western bank of the San Joaquin River between Old Las Palmas Avenue and Eucalyptus Avenue.

Long Project Description:

The proposed Riverfront County Park would extend along the west side of the San Joaquin River from Old Las Palmas Avenue to Eucalyptus Avenue, a distance of approximately 8,000 feet (about 1.5 miles). Although the exact dimensions of the park have yet to be determined, it is intended that the park would vary in width, generally between 100 and 200 feet, creating linear park of approximately 20 acres. The project would restore riparian and upland habitat, extending and enhancing a habitat corridor that has been significantly degraded. Restoration of vegetative cover may reduce flood risk to adjacent and downstream properties. The park's primary amenity, the multi-use recreational trail, would connect with the City of Patterson's planned bicycle and pedestrian network, providing greatly enhanced access to the riverfront, and encouraging bicycling and walking.

Unique Project Characteristics:

This project would improve community health by increasing recreational use of the riverfront. It would environmental health by enhancing and increasing habitat. It would provide opportunities for environmental education and recreational programming.

Project Status:	Pre-planning
Project Cost:	$2,500,000
Project Timeframe:	Undetermined
Cost-sharing:	Cost will be shared by Stanislaus County and the City of Patterson at an undetermined ratio.
Multi-benefit Project:	Yes
Types of benefits:	The project may improve flood risk management, and would promote ecosystem functions and improve recreation, making it a multi-benefit project.
Source of Project:	City of Patterson

Background Information:

The concept for the Riverfront County Park has been explored in the process of developing the City of Patterson's Parks and Recreation Master Plan (currently in draft form). It is an important link in the City's proposed recreational trail system. It would also be the community's primary access to the San Joaquin River for boating, swimming, fishing or just enjoying. Public input has confirmed the value of this proposed park to the community.

Screening-level assessment

SC-1. ***Consistency with RFMP goals.*** Consistent with CVFPP goals: improve flood risk management, improve operations and maintenance, promote ecosystem functions, improve institutional support, promote multi-benefit projects.

Note: If the project is a study, evaluate the goals of the ultimate project that would flow from the study.

- **Low** if it meets *only* the multi-benefit project supporting objective.
- **Medium** as long as it meets 1-2 of the primary and/or supporting objectives and does not qualify as "Low."
- **High** if it includes meeting 3 or more of the primary and/or supporting objectives.

High

The project may improve flood risk management, would promote ecosystem functions, and improve recreation, making it a multi-benefit project.

SC-2. ***Implementation feasibility.*** Consider existing laws or regulations, community opposition/support, or other factors affecting implementation feasibility.

Note: If the project is a study, evaluate only the implementation feasibility of completing the study.

- **Low** if the project is judged to face significant odds (e.g., a similar project has already been forcefully pursued and has failed to progress, and there is little reason to expect a different outcome now.)
- **Medium** if the project has been developed as a concept and has a description and an identified lead.
- **High** if the project has already gone through feasibility analysis and been found feasible, if appropriate, or the project already has reasonable assurance of being implemented by a capable project lead.

Medium

The score is "Medium" because the project has been developed as a concept, has a description, and identified lead, the City of Patterson.

Ranking-level assessment

RC-1. ***Implementation feasibility.*** (As in Screening-level assessment guidance.)

Medium

RC-2. ***Financial feasibility.*** Capacity to cover local share, with funding availability, or all project costs).

Note: project costs should be considered to include both the initial costs and the ongoing operations, maintenance, and repair costs, though this information may not be available. If the project is a study, evaluate only the financial feasibility of completing the study.

- **Low** if the anticipated project lead does not have the resources to either 1) carry out the project; or 2) supply any needed local cost share. Given the findings of the Financial Plan, projects are identified as "Low" if the anticipated local cost share exceeds $500,000, unless the project has been successful in attracting grant funding so far.
- **Medium** if the project does not meet the criteria for "Low" or "High" Financial Feasibility.
- **High** if the anticipated project lead has the resources to either 1) carry out the project; or 2) supply any needed local cost share and a plausible funding source for the balance has been identified. Given the findings of the Financial Plan, we estimate that for most entities in the planning area, local cost shares will need to be less than $20,000 to be funded. For projects having an anticipated local cost share exceeding $500,000, the project will be scored "High" if it has been successful in attracting most of the needed funding already.

Medium

Together with Stanislaus County, the City of Patterson may be able to fund any needed local cost share, which is anticipated to be less than $500,000. As a result, the project is considered "Medium" in terms of financial feasibility.

RC-3. ***Flood risk reduction - life risk***. Change in the number of lives potentially at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project may reduce loss of life.
- **Medium** if the project is expected to reduce loss of life based on a qualitative assessment.
- **High** if the project has been analyzed for effect on loss of life and is expected to reduce it.

Low

If the proposed park results in assurance of minimal development of the land, the project has the potential to reduce loss of life.

RC-4. ***Flood risk reduction - flood damage.*** Change in the value of assets at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to create a locally-significant reduction in flood risk.
- **Medium** if the project is expected to create a regionally-significant reduction in flood risk.
- **High** if the project is expected to create a significant reduction in flood risk from a regional perspective and beyond.

Low

If the proposed park results in the reduction of flood risk, the project has the potential to reduce flood damages on a locally-significant level.

RC-5. ***Operations, maintenance and repair.*** Improvement in efficiency and effectiveness, or reduction of need at present and over the long term.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to only modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

N/A

No benefits identified.

RC-6. ***Ecosystem function*****.** Consistency with ecosystem priorities and goals of the (Draft) CVFPP metrics, the (Draft) Conservation Strategy (if available) and/or adopted conservation or recovery plans.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to increase ecosystem function compared to current conditions, but is not specifically consistent with the priorities and goals of the Draft CVFPP metrics or other adopted conservation or recovery plans.
- **Medium** if the project is consistent with the priorities and goals of one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.
- **High** if the project is if the project is consistent with the priorities and goals of more than one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.

High

The project is consistent with CVFPP metrics 6a, Shaded Riparian Aquatic (SRA) Cover, and 6b, Riparian, under metric 6, Habitats - Increase and improve quantity, diversity, quality, and connectivity of riverine aquatic and floodplain habitats.

RC-7. ***Institutional support*****.** Improved support for entities contributing to flood management.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

N/A

No benefits identified.

RC-8. ***Other benefits.*** "Multiple benefits" not addressed by criteria above, e.g., water quality, recreation, public access, water supply, groundwater recharge, economic, etc.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Medium

The proposed park would materially improve recreation on a locally-significant scale and provide water quality and public access benefits.

RC-9. ***Cost-effectiveness.*** Benefits vs costs compared to other projects accomplishing similar benefits.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the lower third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **High** if the project is expected to fall within the upper third of the projects considered in terms of the mix of benefits provided for the given project cost.

Low

Based on the high cost of the project and the uncertainty regarding the magnitude and nature of its benefits, a score of "Low" is assigned.

RC-10. ***Low potential for dis-benefits (post-mitigation).*** Low potential for negative outcomes after mitigation; a "High" score indicates very low probability; a "Low" score indicates high probability, etc.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of dis-benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the upper third of the projects considered in terms of the mix of anticipated dis-benefits.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of anticipated dis-benefits.
- **High** if the project is expected to fall within the lower third of the projects considered in terms of the mix of anticipated dis-benefits.

High

A small decrease in the local tax base would result from

Project Name: Salado Creek Flood Management Project

Project Lead: City of Patterson

Potential Project Partners:
Stanislaus County

Short Project Description:
Widening of Salado Creek from the Delta Mendota Canal to the city limits.

Long Project Description:
The project involves widening of Salado Creek from the Delta Mendota Canal (DMC) to the city limits, which is approximately 6,000 feet in length. The width of Salado Creek would be widened to accommodate 710 cubic feet per second to match the City of Patterson Storm Drain Master Plan sizing requirements. In addition, this project would also limit the Delta Mendota Canal to the City Limits.

Through review of air photos may indicate that some portions of the creek may already be of adequate width to accommodate the design flow. This project estimate assumes that the full length between the DMC and the City limits requires widening.

Unique Project Characteristics:
Upon research of 1916 USGS topographic maps, Salado Creek was channelized prior to 1916. Looking at the government survey from the 1870's, the creek stops and appears on the map to possibly sheet flow or fan.

Project Status:	Pre-planning
Project Cost:	$600,000
Project Timeframe:	Undetermined
Cost-sharing:	Cost will be shared by Stanislaus County and the City of Patterson at an undetermined ratio
Multi-benefit Project:	Yes
Types of benefits:	The project would improve flood risk management.
Source of Project:	City of Patterson

Background Information:
None provided

Screening-level assessment

SC-1. ***Consistency with RFMP goals.*** Consistent with CVFPP goals: improve flood risk management, improve operations and maintenance, promote ecosystem functions, improve institutional support, promote multi-benefit projects.

Note: If the project is a study, evaluate the goals of the ultimate project that would flow from the study.

- **Low** if it meets *only* the multi-benefit project supporting objective.
- **Medium** as long as it meets 1-2 of the primary and/or supporting objectives and does not qualify as "Low."
- **High** if it includes meeting 3 or more of the primary and/or supporting objectives.

Medium

The project would improve flood risk management.

SC-2. ***Implementation feasibility.*** Consider existing laws or regulations, community opposition/support, or other factors affecting implementation feasibility.
Note: If the project is a study, evaluate only the implementation feasibility of completing the study.

- **Low** if the project is judged to face significant odds (e.g., a similar project has already been forcefully pursued and has failed to progress, and there is little reason to expect a different outcome now.)
- **Medium** if the project has been developed as a concept and has a description and an identified lead.
- **High** if the project has already gone through feasibility analysis and been found feasible, if appropriate, or the project already has reasonable assurance of being implemented by a capable project lead.

Medium

The score is "Medium" because the project has been developed as a concept, has a description, and identified lead, the City of Patterson.

Ranking-level assessment

RC-1. ***Implementation feasibility.*** (As in Screening-level assessment guidance.)

Medium

RC-2. ***Financial feasibility.*** Capacity to cover local share, with funding availability, or all project costs).
Note: project costs should be considered to include both the initial costs and the ongoing operations, maintenance, and repair costs, though this information may not be available. If the project is a study, evaluate only the financial feasibility of completing the study.

- **Low** if the anticipated project lead does not have the resources to either 1) carry out the project; or 2) supply any needed local cost share. Given the findings of the Financial Plan, projects are identified as “Low” if the anticipated local cost share exceeds $500,000, unless the project has been successful in attracting grant funding so far.
- **Medium** if the project does not meet the criteria for “Low” or “High” Financial Feasibility.
- **High** if the anticipated project lead has the resources to either 1) carry out the project; or 2) supply any needed local cost share and a plausible funding source for the balance has been identified. Given the findings of the Financial Plan, we estimate that for most entities in the planning area, local cost shares will need to be less than $20,000 to be funded. For projects having an anticipated local cost share exceeding $500,000, the project will be scored “High” if it has been successful in attracting most of the needed funding already.

Medium

Through a partnership with Stanislaus County, the City of Patterson may be able to fund any needed local cost share, which is anticipated to be less than $500,000. As a result, the project is considered "Medium" in terms of financial feasibility.

RC-3. ***Flood risk reduction - life risk***. Change in the number of lives potentially at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project may reduce loss of life.
- **Medium** if the project is expected to reduce loss of life based on a qualitative assessment.
- **High** if the project has been analyzed for effect on loss of life and is expected to reduce it.

Low

Additional capacity to convey flows may result in the reduction of loss of life.

RC-4. ***Flood risk reduction - flood damage.*** Change in the value of assets at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to create a locally-significant reduction in flood risk.
- **Medium** if the project is expected to create a regionally-significant reduction in flood risk.
- **High** if the project is expected to create a significant reduction in flood risk from a regional perspective and beyond.

Low

The project would result in a locally-significant reduction in flood risk.

RC-5. ***Operations, maintenance and repair.*** Improvement in efficiency and effectiveness, or reduction of need at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to only modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

N/A

No benefits identified.

RC-6. ***Ecosystem function*.** Consistency with ecosystem priorities and goals of the (Draft) CVFPP metrics, the (Draft) Conservation Strategy (if available) and/or adopted conservation or recovery plans.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to increase ecosystem function compared to current conditions, but is not specifically consistent with the priorities and goals of the Draft CVFPP metrics or other adopted conservation or recovery plans.
- **Medium** if the project is consistent with the priorities and goals of one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.
- **High** if the project is if the project is consistent with the priorities and goals of more than one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.

N/A

No benefits identified.

RC-7. ***Institutional support*.** Improved support for entities contributing to flood management.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

N/A

No benefits identified.

RC-8. ***Other benefits.*** "Multiple benefits" not addressed by criteria above, e.g., water quality, recreation, public access, water supply, groundwater recharge, economic, etc.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

N/A

No benefits identified.

RC-9. ***Cost-effectiveness.*** Benefits vs costs compared to other projects accomplishing similar benefits.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the lower third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **High** if the project is expected to fall within the upper third of the projects considered in terms of the mix of benefits provided for the given project cost.

Medium

The score is "Medium" because there is not a clear reason to differentiate this project as "Low" or "High."

RC-10. ***Low potential for dis-benefits (post-mitigation).*** Low potential for negative outcomes after mitigation; a "High" score indicates very low probability; a "Low" score indicates high probability, etc.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of dis-benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the upper third of the projects considered in terms of the mix of anticipated dis-benefits.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of anticipated dis-benefits.
- **High** if the project is expected to fall within the lower third of the projects considered in terms of the mix of anticipated dis-benefits.

Medium

The score is "Medium" because there is not a clear reason to differentiate this project as "Low" or "High."

Project Name: SB5 Compliance – City of Modesto

Project Lead: City of Modesto

Potential Project Partners:

Stanislaus County

Short Project Description:

Comply with SB 5 regulations through update of the City's relevant planning documents and completion of a preliminary engineering report to identify potential alternatives on how the City can provide 200-year flood protection.

Long Project Description:

Senate Bill 5 was passed in 2007 which requires a 200-year level of flood protection for urban and urbanizing areas within California's Central Valley. Under SB5, development in moderate or special flood hazard areas (i.e. 500-year and 100-year floodplains, respectively) would only be allowed within the Central Valley if the city or county can find, based on substantial evidence in the record, that the development will be subject to flood depths of 3 feet or less during a 200-year flood event. The City is in the process of mapping the 200-year floodplains from the Tuolumne River within Modesto to determine where an Urban Level of Flood Protection (ULOP) finding is required (e.g., where potential depth from a 200-year flood event is greater than 3 feet). This will inform Modesto on where a ULOP finding in the City will be required, and where a ULOP finding is not required. The City is required to make the ULOP finding before: (1) entering into a development agreement for any property that is located within a flood hazard zone; (2) approving a discretionary permit or other discretionary entitlement, or a ministerial permit that would result in the construction of a new residence, for a project that is located within a flood hazard zone; or (3) approving a tentative map, or a parcel map for which a tentative map was not required, for any subdivision that is located within a flood hazard zone.

Phase I of this project will develop proposed amendments to the City of Modesto Urban Area General Plan and City of Modesto Zoning Code to include information associated with the new 200-year flood maps and ULOP provisions, as well as the 2012 Central Valley Flood Protection Plan. Proposed amendments can include supporting goals, policies, and implementation programs for the General Plan, and standards, regulations, and potentially new zoning districts for the Zoning Code.

For areas where ULOP findings are required, the next step, Phase II, will be for Modesto to complete a preliminary engineering report to identify potential alternatives for those areas. Implementation of the recommended alternatives will provide 200-year flood protection to targeted areas of the City. Phase III of this project will be to determine how the City will finance the proposed improvements.

Unique Project Characteristics:

Implementation of this project will enable Modesto to not only comply with SB5 regulations but to determine which areas within the City are most appropriate for growth and where flood risk is minimized. This will enable Modesto to continue to grow and provide opportunities for economic development.

Project Status:	Pre-planning
Project Cost:	$130,000
Project Timeframe:	Phases I and II - 1 year; Phase III - 10-20 years
Cost-sharing:	No opportunities identified to date
Multi-benefit Project:	Yes
Types of benefits:	The project would improve flood risk management and institutional support.

Source of Project: City of Modesto

Background Information:
None provided

Screening-level assessment

SC-1. ***Consistency with RFMP goals.*** Consistent with CVFPP goals: improve flood risk management, improve operations and maintenance, promote ecosystem functions, improve institutional support, promote multi-benefit projects.
Note: If the project is a study, evaluate the goals of the ultimate project that would flow from the study.

- **Low** if it meets *only* the multi-benefit project supporting objective.
- **Medium** as long as it meets 1-2 of the primary and/or supporting objectives and does not qualify as "Low."
- **High** if it includes meeting 3 or more of the primary and/or supporting objectives.

High

The project would improve flood risk management, institutional support, and is considered a multi-benefit project because there would be an economic benefit in avoiding land development restrictions that would come with non-compliance and in having new development protected from the 200-year flood.

SC-2. ***Implementation feasibility.*** Consider existing laws or regulations, community opposition/support, or other factors affecting implementation feasibility.
Note: If the project is a study, evaluate only the implementation feasibility of completing the study.

- **Low** if the project is judged to face significant odds (e.g., a similar project has already been forcefully pursued and has failed to progress, and there is little reason to expect a different outcome now.)
- **Medium** if the project has been developed as a concept and has a description and an identified lead.
- **High** if the project has already gone through feasibility analysis and been found feasible, if appropriate, or the project already has reasonable assurance of being implemented by a capable project lead.

High

The analysis and planning called for by this project is required by law.

Ranking-level assessment

RC-1. ***Implementation feasibility.*** (As in Screening-level assessment guidance.)

High

RC-2. ***Financial feasibility.*** Capacity to cover local share, with funding availability, or all project costs).
Note: project costs should be considered to include both the initial costs and the ongoing operations, maintenance, and repair costs, though this information may not be available. If the project is a study, evaluate only the financial feasibility of completing the study.

- **Low** if the anticipated project lead does not have the resources to either 1) carry out the project; or 2) supply any needed local cost share. Given the findings of the Financial Plan, projects are identified as "Low" if the anticipated local cost share exceeds $500,000, unless the project has been successful in attracting grant funding so far.
- **Medium** if the project does not meet the criteria for "Low" or "High" Financial Feasibility.
- **High** if the anticipated project lead has the resources to either 1) carry out the project; or 2) supply any needed local cost share and a plausible funding source for the balance has been identified. Given the findings of the Financial Plan, we estimate that for most entities in the planning area, local cost shares will need to be less than $20,000 to be funded. For projects having an anticipated local cost share exceeding $500,000, the project will be scored "High" if it has been successful in attracting most of the needed funding already.

High

The City of Modesto has the resources to carry out Phase I and Phase II of the project. The cost of Phase III is unknown and is likely to be significant. Potential funding sources for Phase III will need to be evaluated during Phase II.

RC-3. ***Flood risk reduction - life risk***. Change in the number of lives potentially at risk, at present and over the long term.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project may reduce loss of life.
- **Medium** if the project is expected to reduce loss of life based on a qualitative assessment.
- **High** if the project has been analyzed for effect on loss of life and is expected to reduce it.

Medium

Improving 200-year flood management would reduce loss of life.

RC-4. ***Flood risk reduction - flood damage.*** Change in the value of assets at risk, at present and over the long term.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to create a locally-significant reduction in flood risk.
- **Medium** if the project is expected to create a regionally-significant reduction in flood risk.
- **High** if the project is expected to create a significant reduction in flood risk from a regional perspective and beyond.

Low

Improving 200-year flood protection management in the City of Modesto would reduce flood damages at a locally-significant scale.

RC-5. ***Operations, maintenance and repair.*** Improvement in efficiency and effectiveness, or reduction of need at present and over the long term.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to only modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

N/A

No benefits identified.

RC-6. ***Ecosystem function*****.** Consistency with ecosystem priorities and goals of the (Draft) CVFPP metrics, the (Draft) Conservation Strategy (if available) and/or adopted conservation or recovery plans.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to increase ecosystem function compared to current conditions, but is not specifically consistent with the priorities and goals of the Draft CVFPP metrics or other adopted conservation or recovery plans.
- **Medium** if the project is consistent with the priorities and goals of one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.
- **High** if the project is if the project is consistent with the priorities and goals of more than one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.

N/A

No benefits identified.

RC-7. ***Institutional support*****.** Improved support for entities contributing to flood management.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Low

This project would modestly improve institutional support for flood management entities.

RC-8. ***Other benefits.*** "Multiple benefits" not addressed by criteria above, e.g., water quality, recreation, public access, water supply, groundwater recharge, economic, etc.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Low

The project would modestly improve the sustainability of economic development in the area.

RC-9. ***Cost-effectiveness.*** Benefits vs costs compared to other projects accomplishing similar benefits.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the lower third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **High** if the project is expected to fall within the upper third of the projects considered in terms of the mix of benefits provided for the given project cost.

High

The score is "High" because the cost is relatively modest in comparison with the benefits of compliance with state law and the improved floodplain management that would flow from this project into the future.

RC-10. ***Low potential for dis-benefits (post-mitigation).*** Low potential for negative outcomes after mitigation; a "High" score indicates very low probability; a "Low" score indicates high probability, etc.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of dis-benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the upper third of the projects considered in terms of the mix of anticipated dis-benefits.

- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of anticipated dis-benefits.
- **High** if the project is expected to fall within the lower third of the projects considered in terms of the mix of anticipated dis-benefits.

Medium

The score is "Medium" because there is not a clear reason to differentiate this project as "Low" or "High."

Project Name: SB5 Compliance – City of Newman

Project Lead: City of Newman

Potential Project Partners:

No partners identified at this time

Short Project Description:

Comply with SB 5 regulations through update of the City's relevant planning documents and completion of a preliminary engineering report to identify potential alternatives on how the City can provide 200-year flood protection.

Long Project Description:

Senate Bill 5 was passed in 2007 which requires a 200-year level of flood protection for urban and urbanizing areas within California's Central Valley. Under SB5, development in moderate or special flood hazard areas (i.e. 500-year and 100-year floodplains, respectively) would only be allowed within the Central Valley if the city or county can find, based on substantial evidence in the record, that the development will be subject to flood depths of 3 feet or less during a 200-year flood event.

Phase I of the project will include mapping of the 200-year floodplains in the City to determine where an Urban Level of Flood Protection (ULOP) finding is required (e.g., where potential depth from a 200-year flood event is greater than 3 feet). This will inform Newman on where a ULOP finding in the City will be required, and where a ULOP finding is not required. The City is required to make the ULOP finding before: (1) entering into a development agreement for any property that is located within a flood hazard zone; (2) approving a discretionary permit or other discretionary entitlement, or a ministerial permit that would result in the construction of a new residence, for a project that is located within a flood hazard zone; or (3) approving a tentative map, or a parcel map for which a tentative map was not required, for any subdivision that is located within a flood hazard zone.

In addition, this project will develop proposed amendments to the Newman 2030 General Plan and City of Newman Zoning Code to include information associated with the new 200-year flood maps and ULOP provisions, as well as the 2012 Central Valley Flood Protection Plan. Proposed amendments can include supporting goals, policies, and implementation programs for the General Plan, and standards, regulations, and potentially new zoning districts for the Zoning Code.

For areas where ULOP findings are required, the next step, Phase II, will be for Newman to complete a preliminary engineering report to identify potential alternatives for those areas. Implementation of the recommended alternatives will provide 200-year flood protection to targeted areas of the City. Phase III of this project will be to determine how the City will finance the proposed improvements.

Unique Project Characteristics:

Implementation of this project will enable Newman to not only comply with SB5 regulations but to determine which areas within the City are most appropriate for growth and where flood risk is minimized. This will enable Newman to continue to grow and provide opportunities for economic development.

Project Status:	Pre-planning
Project Cost:	**$**125,000
Project Timeframe:	Phases I and II – 3 years?; Phase III - 10-20 years
Cost-sharing:	City of Patterson could potentially share the costs of the 200-year floodplain mapping as there may be efficiencies for the modeling and maps to be prepared for both jurisdictions at the same time.

Multi-benefit Project: Yes
Types of benefits: The project would improve flood risk management and institutional support.
Source of Project: City of Newman

Background Information:
None provided

Screening-level assessment

SC-1. ***Consistency with RFMP goals.*** Consistent with CVFPP goals: improve flood risk management, improve operations and maintenance, promote ecosystem functions, improve institutional support, promote multi-benefit projects.
Note: If the project is a study, evaluate the goals of the ultimate project that would flow from the study.

- **Low** if it meets *only* the multi-benefit project supporting objective.
- **Medium** as long as it meets 1-2 of the primary and/or supporting objectives and does not qualify as "Low."
- **High** if it includes meeting 3 or more of the primary and/or supporting objectives.

High

The project would improve flood risk management, institutional support, and is considered a multi-benefit project because there would be an economic benefit in avoiding land development restrictions that would come with non-compliance and in having new development protected from the 200-year flood.

SC-2. ***Implementation feasibility.*** Consider existing laws or regulations, community opposition/support, or other factors affecting implementation feasibility.
Note: If the project is a study, evaluate only the implementation feasibility of completing the study.

- **Low** if the project is judged to face significant odds (e.g., a similar project has already been forcefully pursued and has failed to progress, and there is little reason to expect a different outcome now.)
- **Medium** if the project has been developed as a concept and has a description and an identified lead.
- **High** if the project has already gone through feasibility analysis and been found feasible, if appropriate, or the project already has reasonable assurance of being implemented by a capable project lead.

High

The analysis and planning called for by this project is required by law.

Ranking-level assessment

RC-1. ***Implementation feasibility.*** (As in Screening-level assessment guidance.)

High

RC-2. ***Financial feasibility.*** Capacity to cover local share, with funding availability, or all project costs).
Note: project costs should be considered to include both the initial costs and the ongoing operations, maintenance, and repair costs, though this information may not be available. If the project is a study, evaluate only the financial feasibility of completing the study.

- **Low** if the anticipated project lead does not have the resources to either 1) carry out the project; or 2) supply any needed local cost share. Given the findings of the Financial Plan, projects are identified as "Low" if the anticipated local cost share exceeds $500,000, unless the project has been successful in attracting grant funding so far.
- **Medium** if the project does not meet the criteria for "Low" or "High" Financial Feasibility.
- **High** if the anticipated project lead has the resources to either 1) carry out the project; or 2) supply any needed local cost share and a plausible funding source for the balance has been identified. Given the findings of the Financial Plan, we estimate that for most entities in the planning area, local cost shares will need to be less than $20,000 to be funded. For projects having an anticipated local cost share exceeding $500,000, the project will be scored "High" if it has been successful in attracting most of the needed funding already.

High

The City of Newman has the resources to carry out Phase I and Phase II of the project. The cost of Phase III is unknown and is likely to be significant. Potential funding sources for Phase III will need to be evaluated during Phase II.

RC-3. ***Flood risk reduction - life risk***. Change in the number of lives potentially at risk, at present and over the long term.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project may reduce loss of life.
- **Medium** if the project is expected to reduce loss of life based on a qualitative assessment.
- **High** if the project has been analyzed for effect on loss of life and is expected to reduce it.

Medium

Improving 200-year flood management would reduce loss of life.

RC-4. ***Flood risk reduction - flood damage.*** Change in the value of assets at risk, at present and over the long term.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to create a locally-significant reduction in flood risk.
- **Medium** if the project is expected to create a regionally-significant reduction in flood risk.
- **High** if the project is expected to create a significant reduction in flood risk from a regional perspective and beyond.

Low

Improving 200-year flood protection management in the City of Newman would reduce flood damages at a locally-significant scale.

RC-5. ***Operations, maintenance and repair.*** Improvement in efficiency and effectiveness, or reduction of need at present and over the long term.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to only modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

N/A

No benefits identified.

RC-6. ***Ecosystem function*****.** Consistency with ecosystem priorities and goals of the (Draft) CVFPP metrics, the (Draft) Conservation Strategy (if available) and/or adopted conservation or recovery plans.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to increase ecosystem function compared to current conditions, but is not specifically consistent with the priorities and goals of the Draft CVFPP metrics or other adopted conservation or recovery plans.
- **Medium** if the project is consistent with the priorities and goals of one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.
- **High** if the project is if the project is consistent with the priorities and goals of more than one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.

N/A

No benefits identified.

RC-7. ***Institutional support*****.** Improved support for entities contributing to flood management.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.

- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Low

This project would modestly improve institutional support for flood management entities.

RC-8. ***Other benefits.*** "Multiple benefits" not addressed by criteria above, e.g., water quality, recreation, public access, water supply, groundwater recharge, economic, etc.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Low

The project would modestly improve the sustainability of economic development in the area.

RC-9. ***Cost-effectiveness.*** Benefits vs costs compared to other projects accomplishing similar benefits.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the lower third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **High** if the project is expected to fall within the upper third of the projects considered in terms of the mix of benefits provided for the given project cost.

High

The score is "High" because the cost is relatively modest in comparison with the benefits of compliance with state law and the improved floodplain management that would flow from this project into the future.

RC-10. ***Low potential for dis-benefits (post-mitigation).*** Low potential for negative outcomes after mitigation; a "High" score indicates very low probability; a "Low" score indicates high probability, etc.
Note: if the project is a study, score as "Medium."

To the extent that projects have a similar mix of dis-benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the upper third of the projects considered in terms of the mix of anticipated dis-benefits.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of anticipated dis-benefits.
- **High** if the project is expected to fall within the lower third of the projects considered in terms of the mix of anticipated dis-benefits.

Medium

The score is "Medium" because there is not a clear reason to differentiate this project as "Low" or "High."

Project Name: SB5 Compliance – City of Patterson

Project Lead: City of Patterson

Potential Project Partners:

No partners identified at this time

Short Project Description:

Comply with SB 5 regulations through update of the City's relevant planning documents and completion of a preliminary engineering report to identify potential alternatives on how the City can provide 200-year flood protection.

Long Project Description:

Senate Bill 5 was passed in 2007 which requires a 200-year level of flood protection for urban and urbanizing areas within California's Central Valley. Under SB5, development in moderate or special flood hazard areas (i.e. 500-year and 100-year floodplains, respectively) would only be allowed within the Central Valley if the city or county can find, based on substantial evidence in the record, that the development will be subject to flood depths of 3 feet or less during a 200-year flood event.

Phase I of the project will include mapping of the 200-year floodplains in the City of Patterson's General Plan Area to determine where an Urban Level of Flood Protection (ULOP) finding is required (e.g., where potential depth from a 200-year flood event is greater than 3 feet). This will inform Patterson on where a ULOP finding in the City will be required, and where a ULOP finding is not required. The City is required to make the ULOP finding before: (1) entering into a development agreement for any property that is located within a flood hazard zone; (2) approving a discretionary permit or other discretionary entitlement, or a ministerial permit that would result in the construction of a new residence, for a project that is located within a flood hazard zone; or (3) approving a tentative map, or a parcel map for which a tentative map was not required, for any subdivision that is located within a flood hazard zone.

In addition, this project will develop proposed amendments to the City of Patterson General Plan and City of Patterson Zoning Code to include information associated with the new 200-year flood maps and ULOP provisions, as well as the 2012 Central Valley Flood Protection Plan. Proposed amendments can include supporting goals, policies, and implementation programs for the General Plan, and standards, regulations, and potentially new zoning districts for the Zoning Code.

For areas where ULOP findings are required, the next step, Phase II, will be for Patterson to complete a preliminary engineering report to identify potential alternatives for those areas. Implementation of the recommended alternatives will provide 200-year flood protection to targeted areas of the City. Phase III of this project will be to determine how the City will finance the proposed improvements.

Unique Project Characteristics:

Implementation of this project will enable Patterson to not only comply with SB5 regulations but to determine which areas within the City are most appropriate for growth and where flood risk is minimized. This will enable Patterson to continue to grow and provide opportunities for economic development.

Project Status:	Pre-planning
Project Cost:	$205,000
Project Timeframe:	Phases I and II – 3 years?; Phase III - 10-20 years
Cost-sharing:	City of Patterson could potentially share the costs of the 200-year floodplain mapping with the City of Newman as there may be efficiencies for the modeling and maps to be prepared for both jurisdictions at the same time.

Multi-benefit Project: Yes
Types of benefits: The project would improve flood risk management and institutional support.
Source of Project: City of Patterson

Background Information:
None provided

Screening-level assessment

SC-1. ***Consistency with RFMP goals.*** Consistent with CVFPP goals: improve flood risk management, improve operations and maintenance, promote ecosystem functions, improve institutional support, promote multi-benefit projects.
Note: If the project is a study, evaluate the goals of the ultimate project that would flow from the study.

- **Low** if it meets *only* the multi-benefit project supporting objective.
- **Medium** as long as it meets 1-2 of the primary and/or supporting objectives and does not qualify as "Low."
- **High** if it includes meeting 3 or more of the primary and/or supporting objectives.

High

The project would improve flood risk management, institutional support, and is considered a multi-benefit project because there would be an economic benefit in avoiding land development restrictions that would come with non-compliance and in having new development protected from the 200-year flood.

SC-2. ***Implementation feasibility.*** Consider existing laws or regulations, community opposition/support, or other factors affecting implementation feasibility.
Note: If the project is a study, evaluate only the implementation feasibility of completing the study.

- **Low** if the project is judged to face significant odds (e.g., a similar project has already been forcefully pursued and has failed to progress, and there is little reason to expect a different outcome now.)
- **Medium** if the project has been developed as a concept and has a description and an identified lead.
- **High** if the project has already gone through feasibility analysis and been found feasible, if appropriate, or the project already has reasonable assurance of being implemented by a capable project lead.

High

The analysis and planning called for by this project is required by law.

Ranking-level assessment

RC-1. ***Implementation feasibility.*** (As in Screening-level assessment guidance.)

High

RC-2. ***Financial feasibility.*** Capacity to cover local share, with funding availability, or all project costs).
Note: project costs should be considered to include both the initial costs and the ongoing operations, maintenance, and repair costs, though this information may not be available. If the project is a study, evaluate only the financial feasibility of completing the study.

- **Low** if the anticipated project lead does not have the resources to either 1) carry out the project; or 2) supply any needed local cost share. Given the findings of the Financial Plan, projects are identified as "Low" if the anticipated local cost share exceeds $500,000, unless the project has been successful in attracting grant funding so far.
- **Medium** if the project does not meet the criteria for "Low" or "High" Financial Feasibility.
- **High** if the anticipated project lead has the resources to either 1) carry out the project; or 2) supply any needed local cost share and a plausible funding source for the balance has been identified. Given the findings of the Financial Plan, we estimate that for most entities in the planning area, local cost shares will need to be less than $20,000 to be funded. For projects having an anticipated local cost share exceeding $500,000, the project will be scored "High" if it has been successful in attracting most of the needed funding already.

High

The City of Patterson has the resources to carry out Phase I and Phase II of the project. The cost of Phase III is unknown and is likely to be significant. Potential funding sources for Phase III will need to be evaluated during Phase II.

RC-3. ***Flood risk reduction - life risk***. Change in the number of lives potentially at risk, at present and over the long term.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project may reduce loss of life.
- **Medium** if the project is expected to reduce loss of life based on a qualitative assessment.
- **High** if the project has been analyzed for effect on loss of life and is expected to reduce it.

Medium

Improving 200-year flood management would reduce loss of life.

RC-4. ***Flood risk reduction - flood damage.*** Change in the value of assets at risk, at present and over the long term.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to create a locally-significant reduction in flood risk.
- **Medium** if the project is expected to create a regionally-significant reduction in flood risk.
- **High** if the project is expected to create a significant reduction in flood risk from a regional perspective and beyond.

Low

Improving 200-year flood protection management in the City of Patterson would reduce flood damages at a locally-significant scale.

RC-5. ***Operations, maintenance and repair.*** Improvement in efficiency and effectiveness, or reduction of need at present and over the long term.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to only modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

N/A

No benefits identified.

RC-6. ***Ecosystem function*****.** Consistency with ecosystem priorities and goals of the (Draft) CVFPP metrics, the (Draft) Conservation Strategy (if available) and/or adopted conservation or recovery plans.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to increase ecosystem function compared to current conditions, but is not specifically consistent with the priorities and goals of the Draft CVFPP metrics or other adopted conservation or recovery plans.
- **Medium** if the project is consistent with the priorities and goals of one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.
- **High** if the project is if the project is consistent with the priorities and goals of more than one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.

N/A

No benefits identified.

RC-7. ***Institutional support*****.** Improved support for entities contributing to flood management.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.

- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Low

This project would modestly improve institutional support for flood management entities.

RC-8. ***Other benefits.*** "Multiple benefits" not addressed by criteria above, e.g., water quality, recreation, public access, water supply, groundwater recharge, economic, etc.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Low

The project would modestly improve the sustainability of economic development in the area.

RC-9. ***Cost-effectiveness.*** Benefits vs costs compared to other projects accomplishing similar benefits.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the lower third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **High** if the project is expected to fall within the upper third of the projects considered in terms of the mix of benefits provided for the given project cost.

High

The score is "High" because the cost is relatively modest in comparison with the benefits of compliance with state law and the improved floodplain management that would flow from this project into the future.

RC-10. ***Low potential for dis-benefits (post-mitigation).*** Low potential for negative outcomes after mitigation; a "High" score indicates very low probability; a "Low" score indicates high probability, etc.
Note: if the project is a study, score as "Medium."

To the extent that projects have a similar mix of dis-benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the upper third of the projects considered in terms of the mix of anticipated dis-benefits.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of anticipated dis-benefits.
- **High** if the project is expected to fall within the lower third of the projects considered in terms of the mix of anticipated dis-benefits.

Medium

The score is "Medium" because there is not a clear reason to differentiate this project as "Low" or "High."

Project Name: Sediment Management Investigation

Project Lead: River Partners

Potential Project Partners:

DWR, CVFPB, flood management agencies relevant to the Upper SJR RFMP and Lower SJR/Delta South RFMP

Short Project Description:

Complete a study that identifies sediment-induced chokepoints along the San Joaquin River in the planning area, the dynamics that create them, and potential actions to improve flood conveyance in those areas.

Long Project Description:

This project would include several analyses to better inform sediment management in the planning area. If specific flood hydraulic analyses for the mainstem of the San Joaquin River in the Mid SJR Region's planning area have been completed prior to the initiation of this study, those models and results would be relied upon adequate to generally identify hydraulic chokepoints created by sedimentation during flood events with stages in the vicinity of the levee crest profile, assuming all flows are contained by the current levees. If those hydraulic studies have not yet been completed, this study would rely on new applications of the existing Central Valley Floodplain Evaluation and Delineation Program (CVFED) model of the San Joaquin River and representations of flood hydrology adequate for the study purpose.

To determine how the channel has changed over time, recent topographic and bathymetric data represented in the hydraulic model would be compared to data from existing sources, including the 1917 Debris Commission Survey, construction of the project levees (1955), and Sacramento and San Joaquin Basins Comprehensive Study (2002).

Lastly, a field survey would be completed to gather San Joaquin River sediment data for current and future study purposes. With the assumption that the river is capacity-limited in delivering sediment into and out of the Mid SJR Region's planning area, grain size data collected as part of this study would be combined with available channel geometry data and used to estimate upstream sediment inflow to the region, outflow from the region, and typical transport capacities for reaches within the study area. The grain size data could also be used for potential future channel migration analysis, sediment transport modeling, and/or evaluation of dredge material disposal options, not included as part of the current study. Identification of apparent areas of erosion and deposition in the field can cross-check the desktop chokepoint analysis and provide a basis for estimates of the volumes of sediment in the study reach that have been contributed by bank erosion in recent years and sediment that has been stored in the channel as deposits during a similar time frame. Data collected and estimated in the course of this study will be used to develop an approximate sediment budget and a conceptual model of sediment transport dynamics for the San Joaquin River between the Merced River and the Stanislaus River. Based on the information developed through the activities described above, sediment management recommendations would be made for the San Joaquin River to improve flood conveyance within the Mid SJR Region's planning area.

Unique Project Characteristics:

None specified

Project Status:	Pre-planning
Project Cost:	**$**250,000
Project Timeframe:	1-5 years
Cost-sharing:	Undetermined
Multi-benefit Project:	Yes

Types of benefits: The project would improve flood risk management; operations and maintenance; and institutional support.

Source of Project: River Partners

Background Information:

1917 Debris Commission Survey, construction of the project levees (1955), and Sacramento and San Joaquin Basins Comprehensive Study (2002)

Screening-level assessment

SC-1. ***Consistency with RFMP goals.*** Consistent with CVFPP goals: improve flood risk management, improve operations and maintenance, promote ecosystem functions, improve institutional support, promote multi-benefit projects.

Note: If the project is a study, evaluate the goals of the ultimate project that would flow from the study.

- **Low** if it meets *only* the multi-benefit project supporting objective.
- **Medium** as long as it meets 1-2 of the primary and/or supporting objectives and does not qualify as "Low."
- **High** if it includes meeting 3 or more of the primary and/or supporting objectives.

High

The project would improve flood risk management; operations and maintenance; and institutional support.

SC-2. ***Implementation feasibility.*** Consider existing laws or regulations, community opposition/support, or other factors affecting implementation feasibility.

Note: If the project is a study, evaluate only the implementation feasibility of completing the study.

- **Low** if the project is judged to face significant odds (e.g., a similar project has already been forcefully pursued and has failed to progress, and there is little reason to expect a different outcome now.)
- **Medium** if the project has been developed as a concept and has a description and an identified lead.
- **High** if the project has already gone through feasibility analysis and been found feasible, if appropriate, or the project already has reasonable assurance of being implemented by a capable project lead.

Medium

The score is "Medium" because the project has been developed as a concept, has a description, and identified lead, the River Partners.

Ranking-level assessment

RC-1. ***Implementation feasibility.*** (As in Screening-level assessment guidance.)

Medium

RC-2. ***Financial feasibility.*** Capacity to cover local share, with funding availability, or all project costs).
Note: project costs should be considered to include both the initial costs and the ongoing operations, maintenance, and repair costs, though this information may not be available. If the project is a study, evaluate only the financial feasibility of completing the study.

- **Low** if the anticipated project lead does not have the resources to either 1) carry out the project; or 2) supply any needed local cost share. Given the findings of the Financial Plan, projects are identified as "Low" if the anticipated local cost share exceeds $500,000, unless the project has been successful in attracting grant funding so far.
- **Medium** if the project does not meet the criteria for "Low" or "High" Financial Feasibility.
- **High** if the anticipated project lead has the resources to either 1) carry out the project; or 2) supply any needed local cost share and a plausible funding source for the balance has been identified. Given the findings of the Financial Plan, we estimate that for most entities in the planning area, local cost shares will need to be less than $20,000 to be funded. For projects having an anticipated local cost share exceeding $500,000, the project will be scored "High" if it has been successful in attracting most of the needed funding already.

Medium

River Partners is expected to either supply the local cost share or successfully fundraise for it. However, the local cost share is anticipated to be greater than $20,000, so the project has been assessed as having "Medium" financial feasibility.

RC-3. ***Flood risk reduction - life risk***. Change in the number of lives potentially at risk, at present and over the long term.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project may reduce loss of life.
- **Medium** if the project is expected to reduce loss of life based on a qualitative assessment.
- **High** if the project has been analyzed for effect on loss of life and is expected to reduce it.

N/A

Given the uncertainty associated with post-study implementation of flood management actions, no benefits are identified.

RC-4. ***Flood risk reduction - flood damage.*** Change in the value of assets at risk, at present and over the long term.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to create a locally-significant reduction in flood risk.
- **Medium** if the project is expected to create a regionally-significant reduction in flood risk.

- **High** if the project is expected to create a significant reduction in flood risk from a regional perspective and beyond.

N/A

Given the uncertainty associated with post-study implementation of flood management actions, no benefits are identified.

RC-5. ***Operations, maintenance and repair.*** Improvement in efficiency and effectiveness, or reduction of need at present and over the long term.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to only modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Low

Information gained through the study may be used to improve operations, maintenance, and repair.

RC-6. ***Ecosystem function*****.** Consistency with ecosystem priorities and goals of the (Draft) CVFPP metrics, the (Draft) Conservation Strategy (if available) and/or adopted conservation or recovery plans.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to increase ecosystem function compared to current conditions, but is not specifically consistent with the priorities and goals of the Draft CVFPP metrics or other adopted conservation or recovery plans.
- **Medium** if the project is consistent with the priorities and goals of one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.
- **High** if the project is if the project is consistent with the priorities and goals of more than one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.

Low

Understanding the sediment transport regime in the region would inform ecosystem rehabilitation efforts, but would not directly improve ecosystem function.

RC-7. ***Institutional support*****.** Improved support for entities contributing to flood management.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

N/A

No benefits identified.

RC-8. ***Other benefits.*** "Multiple benefits" not addressed by criteria above, e.g., water quality, recreation, public access, water supply, groundwater recharge, economic, etc.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

N/A

No benefits identified.

RC-9. ***Cost-effectiveness.*** Benefits vs costs compared to other projects accomplishing similar benefits.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the lower third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **High** if the project is expected to fall within the upper third of the projects considered in terms of the mix of benefits provided for the given project cost.

High

The information gained through the proposed study has the potential to be very useful to flood and resource managers and has a relatively low cost.

RC-10. ***Low potential for dis-benefits (post-mitigation).*** Low potential for negative outcomes after mitigation; a "High" score indicates very low probability; a "Low" score indicates high probability, etc. Note: if the project is a study, score as "Medium."

To the extent that projects have a similar mix of dis-benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the upper third of the projects considered in terms of the mix of anticipated dis-benefits.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of anticipated dis-benefits.
- **High** if the project is expected to fall within the lower third of the projects considered in terms of the mix of anticipated dis-benefits.

High

No dis-benefits are identified.

Project Name: Storm Drainage Enhancements along Salado Creek

Project Lead: City of Patterson

Potential Project Partners:
No partners identified at this time

Short Project Description:
Installation of reinforced concrete pipelines under the California Northern Railroad wooden bridge to improve storm drainage along Salado Creek.

Long Project Description:
The inlet structure for the 96" Cured in Place Pipe (CIPP) just downstream of the California Northern Railroad (CNRR) wooden bridge has a limited capacity and includes a debris collection grate at the pipe inlet that is too small. These conditions contribute to frequent flooding within and upstream of this area and prevent the available capacity in the 96" CIPP from being fully utilized. The inlet structure needs to be enlarged at this location to reduce flooding and to provide discharge capacity.

This project is located downstream of the State Highway 33 and starts where the CNRR bridge crosses Salado Creek. The project will install two new 72 inch diameter reinforced concrete pipelines (RCP) under the bridge. Each pipe will be 60 feet in length. The existing trash rack at the entrance to the 96 inch pipeline will also be replaced with a new static (non-powered) unit. A new precast headwall will be installed on the upstream side of the twin 72 inch pipelines. The canal between the outlet of the new pipeline and the existing 96 inch pipeline will be lined with concrete.

Unique Project Characteristics:
None specified

Project Status:	Pre-planning
Project Cost:	**$**880,000
Project Timeframe:	Undetermined
Cost-sharing:	No opportunities identified to date
Multi-benefit Project:	Yes
Types of benefits:	The project would improve flood risk management.
Source of Project:	City of Patterson

Background Information:
None provided

Screening-level assessment

SC-1. ***Consistency with RFMP goals.*** Consistent with CVFPP goals: improve flood risk management, improve operations and maintenance, promote ecosystem functions, improve institutional support, promote multi-benefit projects.

Note: If the project is a study, evaluate the goals of the ultimate project that would flow from the study.

- **Low** if it meets *only* the multi-benefit project supporting objective.

- **Medium** as long as it meets 1-2 of the primary and/or supporting objectives and does not qualify as "Low."
- **High** if it includes meeting 3 or more of the primary and/or supporting objectives.

Medium

The project would improve flood risk management.

SC-2. ***Implementation feasibility.*** Consider existing laws or regulations, community opposition/support, or other factors affecting implementation feasibility.
Note: If the project is a study, evaluate only the implementation feasibility of completing the study.

- **Low** if the project is judged to face significant odds (e.g., a similar project has already been forcefully pursued and has failed to progress, and there is little reason to expect a different outcome now.)
- **Medium** if the project has been developed as a concept and has a description and an identified lead.
- **High** if the project has already gone through feasibility analysis and been found feasible, if appropriate, or the project already has reasonable assurance of being implemented by a capable project lead.

Medium

The score is "Medium" because the project has been developed as a concept, has a description, and identified lead, the City of Patterson.

Ranking-level assessment

RC-1. ***Implementation feasibility.*** (As in Screening-level assessment guidance.)

Medium

RC-2. ***Financial feasibility.*** Capacity to cover local share, with funding availability, or all project costs).
Note: project costs should be considered to include both the initial costs and the ongoing operations, maintenance, and repair costs, though this information may not be available. If the project is a study, evaluate only the financial feasibility of completing the study.

- **Low** if the anticipated project lead does not have the resources to either 1) carry out the project; or 2) supply any needed local cost share. Given the findings of the Financial Plan, projects are identified as "Low" if the anticipated local cost share exceeds $500,000, unless the project has been successful in attracting grant funding so far.
- **Medium** if the project does not meet the criteria for "Low" or "High" Financial Feasibility.
- **High** if the anticipated project lead has the resources to either 1) carry out the project; or 2) supply any needed local cost share and a plausible funding source for the balance has been identified. Given the findings of the Financial Plan, we estimate that for most entities in the planning area, local cost shares will need to be less than $20,000 to be funded. For projects

having an anticipated local cost share exceeding $500,000, the project will be scored "High" if it has been successful in attracting most of the needed funding already.

Medium

The City of Patterson may have the resources to supply a local cost share. However, the local cost share is anticipated to be greater than $20,000, so the project has been assessed as having "Medium" financial feasibility.

RC-3. ***Flood risk reduction - life risk***. Change in the number of lives potentially at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project may reduce loss of life.
- **Medium** if the project is expected to reduce loss of life based on a qualitative assessment.
- **High** if the project has been analyzed for effect on loss of life and is expected to reduce it.

Low

Reducing flood risk at the project site may also reduce loss of life.

RC-4. ***Flood risk reduction - flood damage.*** Change in the value of assets at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to create a locally-significant reduction in flood risk.
- **Medium** if the project is expected to create a regionally-significant reduction in flood risk.
- **High** if the project is expected to create a significant reduction in flood risk from a regional perspective and beyond.

Low

The project is expected to create a locally-significant reduction in flood risk at and around the project site.

RC-5. ***Operations, maintenance and repair.*** Improvement in efficiency and effectiveness, or reduction of need at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to only modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

N/A

No benefits identified.

RC-6. ***Ecosystem function*.** Consistency with ecosystem priorities and goals of the (Draft) CVFPP metrics, the (Draft) Conservation Strategy (if available) and/or adopted conservation or recovery plans.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to increase ecosystem function compared to current conditions, but is not specifically consistent with the priorities and goals of the Draft CVFPP metrics or other adopted conservation or recovery plans.
- **Medium** if the project is consistent with the priorities and goals of one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.
- **High** if the project is if the project is consistent with the priorities and goals of more than one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.

N/A

No benefits identified.

RC-7. ***Institutional support*.** Improved support for entities contributing to flood management.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

N/A

No benefits identified.

RC-8. ***Other benefits.*** "Multiple benefits" not addressed by criteria above, e.g., water quality, recreation, public access, water supply, groundwater recharge, economic, etc.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.

- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Medium

Improved protection for assets within the vicinity of the project site would result in a material increase in economic benefits at a locally-significant scale.

RC-9. ***Cost-effectiveness.*** Benefits vs costs compared to other projects accomplishing similar benefits.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the lower third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **High** if the project is expected to fall within the upper third of the projects considered in terms of the mix of benefits provided for the given project cost.

Medium

The score is "Medium" because there is not a clear reason to differentiate this project as "Low" or "High."

RC-10. ***Low potential for dis-benefits (post-mitigation).*** Low potential for negative outcomes after mitigation; a "High" score indicates very low probability; a "Low" score indicates high probability, etc.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of dis-benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the upper third of the projects considered in terms of the mix of anticipated dis-benefits.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of anticipated dis-benefits.
- **High** if the project is expected to fall within the lower third of the projects considered in terms of the mix of anticipated dis-benefits.

Medium

No significant dis-benefits are anticipated, but there may be an increase in operations, maintenance, and repair requirements as a result of the project; this is anticipated to fall in the mid-range of the projects considered.

Project Name: Three Amigos (also known as the Non-structural Alternative at the San Joaquin River National Wildlife Refuge)

Project Lead: San Joaquin River National Wildlife Refuge

Potential Project Partners:

River Partners, USFWS Anadromous Fish Restoration Program, USACE, early project partners - USDA/NRCS, DWR, CALFED

Short Project Description:

Project to restore flooding and transient floodwater storage to more than 3,100 acres of historic floodplain, restore riparian habitats, and promote river physical processes of scour and deposition along 3 miles of the San Joaquin River. While the lands have been purchased, additional investment is needed to implement flood risk reduction goals consistent with the Refuge's habitat management goals. Needed efforts include planning and design of the Refuge for flood management as well as removal of levees from the federal project.

Long Project Description:

As a result of the January 1997 floods, the San Joaquin River National Wildlife Refuge (SJRNWR) is working with the US Army Corps of Engineers (USACE) to plan a non-structural flood management alternative (NSA). This alternative includes breaching existing mainstem San Joaquin River levees on refuge land to protect and restore riverine and riparian habitat. This proposed NSA will provide floodplain inundation behind project levees of up to 3,100 acres on the Refuge in some years. The focus of the NSA study, being led by the USACE, has been to identify potential levee breech sites and evaluate potential flooding risk to adjacent landowners. The proposed scope of work will take the next step to identify and explore the potential impacts of the NSA alternative and help to refine this alternative to insure benefits to native aquatic, terrestrial, and avian species. Additional effort beyond the USACE study is needed to examine the potential impacts to existing infrastructure. It will also be necessary to assess potential hazards to wildlife caused by floodplain inundation, particularly terrestrial mammals. The adequacy of constructed floodwater refugia will need to be evaluated, particularly with respect to the endangered riparian brush rabbit.

This project will accomplish all the steps needed to allow implementation of the NSA to proceed. It will build on the technical studies and NSA alternative development that has occurred to date. These include the prior and current USACE NSA analysis, floodplain topographic data generated by DWR for the FloodSAFE Program, and the current study funded by DWR to develop a Water Control Structure design concept for the Refuge. Evaluation of potential resource management issues and monitoring of interim flood conditions prior to full NSA implementation will help the SJRNWR to identify and design the optimal combination of management and infrastructure modifications to meet flood risk reduction objectives while at the same time providing benefits to juvenile Chinook salmon, steelhead, and other native fish species, as well as native wildlife, including riparian obligate birds and mammals. These analyses and additional effort will be required to support the project through any necessary USACE and Central Valley Flood Protection Board procedural steps to allow implementation of the NSA, in addition to environmental documentation and permitting.

Unique Project Characteristics:

The envisioned use of the Refuge as connected floodplain and a site for transitory flood storage would be a remarkable ecological asset in the region and would benefit many endangered and native species in the San Joaquin River Basin. In particular, the proximity of the SJRNWR to salmon-producing tributaries is such that all juvenile salmonids produced in the Tuolumne and Merced rivers pass through riverine habitat of the

SJRNWR. Improved floodplain habitat could provide additional beneficial rearing and growth opportunities in a mainstem system with very little remaining physical habitat diversity. Development and implementation of an NSA that considers fish benefits provides a unique opportunity to the SJRNWR to cooperate with other fish management interests in planning mainstem habitat improvements to benefit the native fish fauna.

Project Status: Planning
Project Cost: $5,500,000
Project Timeframe: More than 5 years
Cost-sharing: No opportunities identified to date
Multi-benefit Project: Yes
Types of benefits: The project would improve flood risk management, promote ecosystem functions, and promote multi-benefit projects.
Source of Project: USFWS AFRP

Background Information:

The USACE is the federal sponsor for all SPFC levees within the region. Under Public Law 84-99, the USACE is authorized, when requested by the non-federal sponsor of a flood work, to implement Non-Structural Alternatives (NSA's) to the rehabilitation, repair, or restoration of flood works damaged by floods. Following the devastating floods in 1997, the USACE convened an Inter-Agency Task Force to evaluate the locations where levees failed in the San Joaquin Basin, and identify opportunities for NSA's. Of 17 sites evaluated in the San Joaquin Basin, one rose to the forefront as an opportunity supported by many partners. The landowners in RDs 2099, 2100, and 2102 (collectively the "Three Amigos") were willing to sell their flood-prone lands, and the USFWS was willing to accept ownership of those lands for management as flood-prone wildlife habitat and inclusion into the adjacent San Joaquin River National Wildlife Refuge (SJRNWR). The USDA NRCS partnered with USACE and USFWS to purchase perpetual floodplain easements on the lands; the USACE purchased flowage easements and the USFWS purchased the underlying fee title of the properties. Additionally, a Memoranda of Agreement was drafted and signed by the USFWS, USACE, and California Reclamation Board (now Central Valley Flood Protection Board) to implement the NSA.

Conceptually, the NSA included the purchase of flowage easements over the lands that were previously provided flood protection by the levees within the Three Amigos in lieu of the levee breach locations being repaired. This required modification to the maintenance manuals for these Reclamation Districts to eliminate the need to perform levee maintenance (i.e. the levees would be maintained in a breached condition as the levees no longer provide flood protection to the district lands). The USACE offered to construct ring levees around existing structures that would be exposed to more frequent flooding under the implementation of the NSA, however ring levees were not constructed at the request of the landowner. Flowage easements were offered on lands outside of the Three Amigos to ensure that unintended flood damages were compensated; however two landowners rejected the offer. Until these remaining landowners accept the flowage easements, the maintenance manual cannot be modified. Today, implementation of the NSA is still largely supported by the resource agencies and the original signatories to the MOA, however the required flowage easements have not yet been offered or accepted.

The Three Amigos cover an area of approximately 3,200 acres. During the 1997 flood event, four failures occurred on the west or left bank levee along the San Joaquin River flooded RDs 2099, 2100, 2101, and 2102. These levees were subsequently repaired even as steps were being taken to implement the Non Structural Alternative. Since that time, however, the SJRNWR has continued to experience flooding, most recently in late December 2010, early January 2011, and late March 2011. This flooding occurs as high river flows back up the West Stanislaus Irrigation District intake canal, which cuts across the SJRNWR between RD 2100

(Hagemann Tract) and RD 2102 (Lara Tract). The canal was at one time protected at its mouth by a levee penetrated by a dual box culvert connection to the canal which was damaged and removed some years ago. The canal is bordered by berms that are prone to overtopping and breaching in high water. At the end of December 2010, flood water flowed through such a breach and flooded a portion of the Lara tract. Flooding in late March 2011 resulted in extensive flooding at the SJRNWR, including both the Lara tract and the Hagemann tract. Drainage of floodwaters from behind breached levees often requires active pumping. Following flooding in the spring of 2006, pumps were inaccessible and lands on the dry side of the RD 2100 levee (Hagemann tract) were inundated for months after the river levels had receded. Such long duration flooding has negative impacts to natural areas, as was documented by River Partners (2008).

Hydraulic modelling to support the restoration of lands formerly protected by the Three Amigos levees has shown that high-elevation refugia and appropriately located levee breaches are needed to ensure that the wildlife habitat requirements of resident populations are met. Since 1997, the levee slopes across the majority of the Three Amigos have been vegetated with brushy native plants to provide cover for terrestrial species fleeing floodwaters, and over 30 acres of elevated refugia have been constructed in consultation with wildlife experts, flood management engineers, and resource agency personnel.

In 2010, DWR has invested in the Ecosystem Restoration and Floodwater Attenuation (ERFA) project at the SJRNWR which includes 551 acres of habitat restoration within the Three Amigos footprint as well as the construction of enhanced reconnection facilities to increase the frequency of inundation of the floodplain fields and to decrease the residence time for impeded floodwaters on the dry side of the levees. The final implementation of this construction will require realization of the NSA in the form of a revised maintenance manual for the SPFC facilities within the Three Amigos. The agencies continue to work to implement this important demonstration project and to illustrate the pathway for removal of levee maintenance obligations from federal project levees. Should other RDs in the Central Valley wish to implement similar NSAs, lessons learned through the implementation of the Three Amigos project may provide a cost savings and a time savings, although the ultimate implementation of the NSA project has yet to be seen.

In 2012, the 1600-acre Dos Rios Ranch was purchased by River Partners for management as flood-prone wildlife habitat and potentially as a transient floodwater storage basin. Funding for the acquisition was provided by the USDA NRCS, California Wildlife Conservation Board, DWR, the California River Parkways Program, the San Francisco Public Utilities Commission, the USFWS North American Wetland Conservation Act (NAWCA), the US Bureau of Reclamation and USFWS Central Valley Project Conservation Program, and River Partners. The USDA NRCS holds a Wetland Reserve Program easement, the Tuolumne River Trust holds a Conservation Easement, and River Partners holds the fee title for the property. In 2013, the remaining 497 acres of flood-prone land within Reclamation District 2092 (Dos Rios) were purchased by River Partners for similar purposes. The Tuolumne River Trust holds a Conservation Easement on the property which expressly provides for the future development of habitat mitigation opportunities for SPFC impacts on 191 acres of the property, and River Partners owns the fee title. River Partners hopes to use the NSA example from the Three Amigos project as a model for floodplain reconnection on the RD 2092 properties. Habitat restoration is currently underway and is expected to be completed in phases over the next 8 to 10 years. Restoration activities include screening river pumps to protect juvenile salmonids, earthwork to create floodplain swales and benches as well as high-elevation refugia for terrestrial species, planting, and ongoing vegetation maintenance, and eventual modification to the existing levee to provide for floodplain reconnection and transient floodwater storage. Additional funding and permitting is required to complete the full build-out of the Dos Rios Ranch Habitat Restoration Project.

The following are additional references on this project:

Portion of AFRP website that features the project:

http://www.fws.gov/stockton/afrp/project.cfm?code=2001-09

USFWS, 2006. San Joaquin River National Wildlife Refuge Final Comprehensive Conservation Plan. September 29. (Available at http://www.fws.gov/Refuge/San_Joaquin_River/what_we_do/conservation.html)
USACE, 2000. Memorandum of Agreement Between the Department of the Army and the United States Fish and Wildlife Service for Implementation of Nonstructural Alternative to the Repair or Restoration of Levees for Reclamation Districts 2099, 2100, and 2102. June 27.
USACE, 1998. PL 84-99 Nonstructural Alternative to Structural Rehabilitation of Levees, San Joaquin River Sub-basins 12 and 13, Reclamation Districts 2099, 2100, and 2102, Sacramento District. September.
USACE, 1997. FONSI (with: Environmental Assessment: PL 84-99 Levee Rehabilitation, Reclamation District 2099, San Joaquin River Basin, Stanislaus County, CA. July 29).

Screening-level assessment

SC-1. ***Consistency with RFMP goals.*** Consistent with CVFPP goals: improve flood risk management, improve operations and maintenance, promote ecosystem functions, improve institutional support, promote multi-benefit projects.

Note: If the project is a study, evaluate the goals of the ultimate project that would flow from the study.

- **Low** if it meets *only* the multi-benefit project supporting objective.
- **Medium** as long as it meets 1-2 of the primary and/or supporting objectives and does not qualify as "Low."
- **High** if it includes meeting 3 or more of the primary and/or supporting objectives.

High

The project would improve flood risk management, promote ecosystem functions, and promote multi-benefit projects.

SC-2. ***Implementation feasibility.*** Consider existing laws or regulations, community opposition/support, or other factors affecting implementation feasibility.

Note: If the project is a study, evaluate only the implementation feasibility of completing the study.

- **Low** if the project is judged to face significant odds (e.g., a similar project has already been forcefully pursued and has failed to progress, and there is little reason to expect a different outcome now.)
- **Medium** if the project has been developed as a concept and has a description and an identified lead.
- **High** if the project has already gone through feasibility analysis and been found feasible, if appropriate, or the project already has reasonable assurance of being implemented by a capable project lead.

High

The project has reasonable assurance of being implemented by the lead, the San Joaquin River National Wildlife Refuge, which is committed to seeing the project through and has the support of the USACE and DWR in doing so.

Ranking-level assessment

RC-1. ***Implementation feasibility.*** (As in Screening-level assessment guidance.)

High

RC-2. ***Financial feasibility.*** Capacity to cover local share, with funding availability, or all project costs).

Note: project costs should be considered to include both the initial costs and the ongoing operations, maintenance, and repair costs, though this information may not be available. If the project is a study, evaluate only the financial feasibility of completing the study.

- **Low** if the anticipated project lead does not have the resources to either 1) carry out the project; or 2) supply any needed local cost share. Given the findings of the Financial Plan, projects are identified as "Low" if the anticipated local cost share exceeds $500,000, unless the project has been successful in attracting grant funding so far.
- **Medium** if the project does not meet the criteria for "Low" or "High" Financial Feasibility.
- **High** if the anticipated project lead has the resources to either 1) carry out the project; or 2) supply any needed local cost share and a plausible funding source for the balance has been identified. Given the findings of the Financial Plan, we estimate that for most entities in the planning area, local cost shares will need to be less than $20,000 to be funded. For projects having an anticipated local cost share exceeding $500,000, the project will be scored "High" if it has been successful in attracting most of the needed funding already.

High

The project is currently more than 90% funded, and financial feasibility has therefore been evaluated as "High," despite having relatively high costs.

RC-3. ***Flood risk reduction - life risk***. Change in the number of lives potentially at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project may reduce loss of life.
- **Medium** if the project is expected to reduce loss of life based on a qualitative assessment.
- **High** if the project has been analyzed for effect on loss of life and is expected to reduce it.

Low

It is possible that the transitory storage provided by the project could result in the reduction of loss of life.

RC-4. ***Flood risk reduction - flood damage.*** Change in the value of assets at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to create a locally-significant reduction in flood risk.
- **Medium** if the project is expected to create a regionally-significant reduction in flood risk.
- **High** if the project is expected to create a significant reduction in flood risk from a regional perspective and beyond.

Low

Enhanced floodplain reconnection at the SJRNWR and securing flood easements at lands at risk from project changes are expected to create at least a locally-significant reduction in flood risk.

RC-5. ***Operations, maintenance and repair.*** Improvement in efficiency and effectiveness, or reduction of need at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to only modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Medium

The project may allow for the cessation of maintenance of 6.9 miles of levee at the SJRNWR, more than 10% of the levee miles within the region. Because this aspect of the project benefits remains uncertain, we have assumed that the project will at least m

RC-6. ***Ecosystem function*****.** Consistency with ecosystem priorities and goals of the (Draft) CVFPP metrics, the (Draft) Conservation Strategy (if available) and/or adopted conservation or recovery plans.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to increase ecosystem function compared to current conditions, but is not specifically consistent with the priorities and goals of the Draft CVFPP metrics or other adopted conservation or recovery plans.
- **Medium** if the project is consistent with the priorities and goals of one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.

- **High** if the project is if the project is consistent with the priorities and goals of more than one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.

High

The project is consistent with CVFPP metrics 5a, Inundated Floodplain, and 5b, Riverine Geomorphic Processes, under metric 5, Ecosystem Processes - Improve and enhance natural dynamic hydrologic and geomorphic processes; metrics 6a, Shaded Riparian Aquatic (SRA) Cover, 6b, Riparian, under metric 6, Habitats - Increase and improve quantity, diversity, quality, and connectivity of riverine aquatic and floodplain habitats; metric 7, Species - Contribute to the recovery and stability of native species populations and overall biotic community diversity, for Central Valley steelhead, Central Valley fall-run Chinook salmon, and other species (specific species metrics for the CVFPP haven't been developed yet); and metric 8b, Levees, under metric 8, Stressors - Reduce stressors related to the development and operation of the flood management system that negatively affect important species.

RC-7. ***Institutional support*.** Improved support for entities contributing to flood management.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Low

The project improves institutional support by providing perpetual land management by the federal government. Prior to the project, the lands were managed by three local districts lacking the resources to manage the flood project.

RC-8. ***Other benefits.*** "Multiple benefits" not addressed by criteria above, e.g., water quality, recreation, public access, water supply, groundwater recharge, economic, etc.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

High

The project would provide material recreational, water quality, public access, and possibly groundwater recharge benefits at a locally-significant scale or better.

RC-9. ***Cost-effectiveness.*** Benefits vs costs compared to other projects accomplishing similar benefits.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the lower third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **High** if the project is expected to fall within the upper third of the projects considered in terms of the mix of benefits provided for the given project cost.

High

The project is very cost-effective relative to other projects with similar outcomes (more than 3,000 acres restored for less than $50m invested to date).

RC-10. ***Low potential for dis-benefits (post-mitigation).*** Low potential for negative outcomes after mitigation; a "High" score indicates very low probability; a "Low" score indicates high probability, etc.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of dis-benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the upper third of the projects considered in terms of the mix of anticipated dis-benefits.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of anticipated dis-benefits.
- **High** if the project is expected to fall within the lower third of the projects considered in terms of the mix of anticipated dis-benefits.

High

No significant dis-benefits are identified. A minor reduction in the tax base is an expected dis-benefit. While the property is currently subject to a lower tax rate through a Williamson Act contract, the property value is expected to descrease after project implementation, which would reduce the property tax collected.

Project Name: Tuolumne River Flood Management Feasibility Study

Project Lead: Stanislaus County

Potential Project Partners:
City of Modesto, USACE

Short Project Description:
Complete a USACE Feasibility Study, or a study similar in scope, that evaluates how the management of the Tuolumne River could be revised to improve flood control, enhance aquatic habitat, and improve water quality.

Long Project Description:
The Northern California Streams, Tuolumne River, California, Reconnaissance Study, Section 905(b) Analysis was prepared by the USACE and published in October 1998. The purpose of the investigation was to document flooding and related problems, and to identify potential opportunities for flood protection and environmental restoration in the Lower Tuolumne River Watershed. Stanislaus County and the City of Modesto were identified as potential non-federal sponsors of the feasibility analysis, which is the next phase of analysis per the USACE protocol. Several measures were identified during the process that were deemed worthy of further analysis at the feasibility level to be included as part of this project. These measures included the evaluation of 1) detention/wetland habitat basin along Dry Creek; 2) a potential site for small off-stream multi-purpose reservoir along the Tuolumne River for flood control storage, habitat, and water supply below La Grange Dam; 3) the construction of levees from below the City of Modesto Wastewater Treatment Plant to approximately two miles east of the airport along the Tuolumne River for flood control and environmental restoration; 4) the riparian corridor from below La Grange Dam to the confluence of the San Joaquin and Tuolumne Rivers (approximately 52 miles); 5) a low-flow meandering channel within the riparian corridor; 6) non-structural measures such as flood flow easements, relocation, elevating structures, ring levees, floodwalls, and floodplain management restrictions along Tuolumne River and Dry Creek; 7) channelization of the Tuolumne River at and downstream of the 9th Street Bridge in Modesto to relieve the Tuolumne River floodwater backwater effect in Dry Creek; and 8) the need to increase the channel capacity of the Tuolumne River at the 9th Street Bridge from 9,000 to 20,000 cubic feet per second (cfs).

Since publication of the Northern California Streams, Tuolumne River, California, Reconnaissance Study, Section 905(b) Analysis, the need for at least one additional analysis has been identified and is included as part of this project. A hydraulic analysis of current conditions is needed to identify any existing constrictions or structures at risk of flood damage along the Tuolumne River. The hydraulic analysis should analyze flood releases of 9,000-15,000 cfs with Dry Creek flows of 5,000-6,000 cfs. With this information in hand, agencies responsible for flood management would be better able to focus future flood damage reduction projects while also improving flood operations of Don Pedro Dam. Other necessary analyses may be identified in the reevaluation of the scope of the feasibility study, which would be necessary given that the reconnaissance study was published more than 15 years ago in 1998.

Unique Project Characteristics:
This project would protect human life and property. It marries flood management and habitat restoration.

Project Status:	Dormant
Project Cost:	$3,000,000
Project Timeframe:	Approximately 5 years
Cost-sharing:	USACE, Stanislaus County, and City of Modesto

Multi-benefit Project: Yes
Types of benefits: The project would improve flood risk management and institutional support.
Source of Project: USACE

Background Information:
See the Northern California Streams, Tuolumne River, California, Reconnaissance Study, Section 905(b) Analysis (October 1998)

Screening-level assessment

SC-1. ***Consistency with RFMP goals.*** Consistent with CVFPP goals: improve flood risk management, improve operations and maintenance, promote ecosystem functions, improve institutional support, promote multi-benefit projects.
Note: If the project is a study, evaluate the goals of the ultimate project that would flow from the study.

- **Low** if it meets *only* the multi-benefit project supporting objective.
- **Medium** as long as it meets 1-2 of the primary and/or supporting objectives and does not qualify as "Low."
- **High** if it includes meeting 3 or more of the primary and/or supporting objectives.

High

The project would improve flood risk management, institutional support, and water quality, making it a multi-benefit project.

SC-2. ***Implementation feasibility.*** Consider existing laws or regulations, community opposition/support, or other factors affecting implementation feasibility.
Note: If the project is a study, evaluate only the implementation feasibility of completing the study.

- **Low** if the project is judged to face significant odds (e.g., a similar project has already been forcefully pursued and has failed to progress, and there is little reason to expect a different outcome now.)
- **Medium** if the project has been developed as a concept and has a description and an identified lead.
- **High** if the project has already gone through feasibility analysis and been found feasible, if appropriate, or the project already has reasonable assurance of being implemented by a capable project lead.

Medium

The score is "Medium" because the project has been developed as a concept, has a description, and identified co-leads, the City of Modesto and Stanislaus County.

Ranking-level assessment

RC-1. ***Implementation feasibility.*** (As in Screening-level assessment guidance.)

Medium

RC-2. ***Financial feasibility.*** Capacity to cover local share, with funding availability, or all project costs).
Note: project costs should be considered to include both the initial costs and the ongoing operations, maintenance, and repair costs, though this information may not be available. If the project is a study, evaluate only the financial feasibility of completing the study.

- **Low** if the anticipated project lead does not have the resources to either 1) carry out the project; or 2) supply any needed local cost share. Given the findings of the Financial Plan, projects are identified as "Low" if the anticipated local cost share exceeds $500,000, unless the project has been successful in attracting grant funding so far.
- **Medium** if the project does not meet the criteria for "Low" or "High" Financial Feasibility.
- **High** if the anticipated project lead has the resources to either 1) carry out the project; or 2) supply any needed local cost share and a plausible funding source for the balance has been identified. Given the findings of the Financial Plan, we estimate that for most entities in the planning area, local cost shares will need to be less than $20,000 to be funded. For projects having an anticipated local cost share exceeding $500,000, the project will be scored "High" if it has been successful in attracting most of the needed funding already.

Medium

The project cost is undetermined, and local cost-share partners have not been identified. It is anticipated that the City of Modesto and Stanislaus County can either supply the local share or form local cost-share partnerships. However, the local cost share is anticipated to be greater than $20,000, so the project has been assessed as having "Medium" financial feasibility.

RC-3. ***Flood risk reduction - life risk***. Change in the number of lives potentially at risk, at present and over the long term.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project may reduce loss of life.
- **Medium** if the project is expected to reduce loss of life based on a qualitative assessment.
- **High** if the project has been analyzed for effect on loss of life and is expected to reduce it.

Medium

The study would generate information that would inform flood management and lead to actions that would reduce loss of life in Modesto, which has the highest population in the planning area.

RC-4. ***Flood risk reduction - flood damage.*** Change in the value of assets at risk, at present and over the long term.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to create a locally-significant reduction in flood risk.
- **Medium** if the project is expected to create a regionally-significant reduction in flood risk.

- **High** if the project is expected to create a significant reduction in flood risk from a regional perspective and beyond.

Medium

The study would generate information that would inform flood management and may lead to actions that would result in the reduction of flood risk in terms of loss of life in the relatively populated river corridor.

RC-5. ***Operations, maintenance and repair.*** Improvement in efficiency and effectiveness, or reduction of need at present and over the long term.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to only modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

N/A

No benefits identified.

RC-6. ***Ecosystem function*****.** Consistency with ecosystem priorities and goals of the (Draft) CVFPP metrics, the (Draft) Conservation Strategy (if available) and/or adopted conservation or recovery plans.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to increase ecosystem function compared to current conditions, but is not specifically consistent with the priorities and goals of the Draft CVFPP metrics or other adopted conservation or recovery plans.
- **Medium** if the project is consistent with the priorities and goals of one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.
- **High** if the project is if the project is consistent with the priorities and goals of more than one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.

Low

Several measures related to ecosystem rehabilitation are included in the scope of the proposed study, but the magnitude of benefits that will flow from actions recommended by the study have not been defined. A score of "Low" has been selected to represent a modest expectation of ultimate project outcomes flowing from this study.

RC-7. ***Institutional support*****.** Improved support for entities contributing to flood management.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

N/A

No benefits identified.

RC-8. ***Other benefits.*** "Multiple benefits" not addressed by criteria above, e.g., water quality, recreation, public access, water supply, groundwater recharge, economic, etc.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Low

Ecosystem rehabilitation has the potential to improve water quality. The study includes an analysis of detention/wetland habitat along Dry Creek, which, if implemented, would be expected to improve water quality. A score of "Low" has been selected to represent a modest expectation of ultimate project outcomes flowing from this study.

RC-9. ***Cost-effectiveness.*** Benefits vs costs compared to other projects accomplishing similar benefits.

Note: if the project is a study, score as "Medium."

To the extent that projects have a similar mix of benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the lower third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **High** if the project is expected to fall within the upper third of the projects considered in terms of the mix of benefits provided for the given project cost.

Medium

The score is "Medium" because there is not a clear reason to differentiate this project as "Low" or "High."

RC-10. ***Low potential for dis-benefits (post-mitigation).*** Low potential for negative outcomes after mitigation; a "High" score indicates very low probability; a "Low" score indicates high probability, etc.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of dis-benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the upper third of the projects considered in terms of the mix of anticipated dis-benefits.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of anticipated dis-benefits.
- **High** if the project is expected to fall within the lower third of the projects considered in terms of the mix of anticipated dis-benefits.

High

No dis-benefits are anticipated. (Betty, would you consider funding a study rather than an implementable project a dis-benefit?)

Project Name: Tuolumne River Regional Park – Carpenter Road/West Modesto Flood Management and Park Development

Project Lead: Tuolumne River Regional Park Joint Powers Authority

Potential Project Partners:

City of Modesto, City of Ceres, Stanislaus County, Tuolumne River Trust

Short Project Description:

Help reduce flood damages in West Modesto neighborhoods while developing the adjacent Tuolumne River Regional Park.

Long Project Description:

The January 1997 flood caused major damage to many areas throughout the Central Valley. In Stanislaus County, one area that was heavily impacted is West Modesto adjacent to the Carpenter Road area of the Tuolumne River Regional Park and has been identified in the 2008 FEMA 100-year Flood Zone. Through this project, a small flood management levee is proposed to be constructed along the northern edge of the Tuolumne River Regional Park, south of the residences, which would protect the neighborhood while the undeveloped parkland is developed. Additionally, habitat restoration and park development activities would be undertaken in order to bring the undeveloped open space area back to a more riparian and natural riverine habitat while creating nature-based land forms to channel flood waters onto and through the Carpenter Road Area of the Tuolumne River Regional Park limiting flooding into the adjacent neighborhoods.

Unique Project Characteristics:

Installing a flood management levee would contribute to protecting human life and property during periods of high water flows in the Tuolumne River. This project marries flood management, habitat restoration, and park development and could be completed with other flood reduction, park development and habitat restoration projects on the Tuolumne River.

Project Status: Planning. The Tuolumne River Regional Park Master Plan, adopted in 2001, includes the overview for development of the Carpenter Road Area. Funding is required to implement the construction of the levee and to develop the Specific Plan for the Carpenter

Project Cost: $750,000

Project Timeframe: Approximately 2 years

Cost-sharing: No opportunities identified to date

Multi-benefit Project: Yes

Types of benefits: The project would improve flood risk management, promote ecosystem functions, and improve recreation, making it a multi-benefit project.

Source of Project: City of Modesto on behalf of the Tuolumne River Regional Park JPA

Background Information:

None provided

Screening-level assessment

SC-1. ***Consistency with RFMP goals.*** Consistent with CVFPP goals: improve flood risk management, improve operations and maintenance, promote ecosystem functions, improve institutional support, promote multi-benefit projects.
Note: If the project is a study, evaluate the goals of the ultimate project that would flow from the study.

- **Low** if it meets *only* the multi-benefit project supporting objective.
- **Medium** as long as it meets 1-2 of the primary and/or supporting objectives and does not qualify as "Low."
- **High** if it includes meeting 3 or more of the primary and/or supporting objectives.

High

The project would improve flood risk management, promote ecosystem functions, and improve recreation, making it a multi-benefit project.

SC-2. ***Implementation feasibility.*** Consider existing laws or regulations, community opposition/support, or other factors affecting implementation feasibility.
Note: If the project is a study, evaluate only the implementation feasibility of completing the study.

- **Low** if the project is judged to face significant odds (e.g., a similar project has already been forcefully pursued and has failed to progress, and there is little reason to expect a different outcome now.)
- **Medium** if the project has been developed as a concept and has a description and an identified lead.
- **High** if the project has already gone through feasibility analysis and been found feasible, if appropriate, or the project already has reasonable assurance of being implemented by a capable project lead.

High

The project has broad support and capable project co-leads, the Tuolumne River Regional Park and Tuolumne Joint Powers Authority.

Ranking-level assessment

RC-1. ***Implementation feasibility.*** (As in Screening-level assessment guidance.)

High

RC-2. ***Financial feasibility.*** Capacity to cover local share, with funding availability, or all project costs).
Note: project costs should be considered to include both the initial costs and the ongoing operations, maintenance, and repair costs, though this information may not be available. If the project is a study, evaluate only the financial feasibility of completing the study.

- **Low** if the anticipated project lead does not have the resources to either 1) carry out the project; or 2) supply any needed local cost share. Given the findings of the Financial Plan, projects are identified as "Low" if the anticipated local cost share exceeds $500,000, unless the project has been successful in attracting grant funding so far.
- **Medium** if the project does not meet the criteria for "Low" or "High" Financial Feasibility.
- **High** if the anticipated project lead has the resources to either 1) carry out the project; or 2) supply any needed local cost share and a plausible funding source for the balance has been identified. Given the findings of the Financial Plan, we estimate that for most entities in the planning area, local cost shares will need to be less than $20,000 to be funded. For projects having an anticipated local cost share exceeding $500,000, the project will be scored "High" if it has been successful in attracting most of the needed funding already.

Medium

The project co-leads do not have the resources to meet the local cost share, and no funding partners have been identified. Additionally, the local cost share is anticipated to be greater than $20,000, so the project has been assessed as having "Medium" financial feasibility.

RC-3. ***Flood risk reduction - life risk***. Change in the number of lives potentially at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project may reduce loss of life.
- **Medium** if the project is expected to reduce loss of life based on a qualitative assessment.
- **High** if the project has been analyzed for effect on loss of life and is expected to reduce it.

Medium

The project would improve flood protection in West Modesto neighborhoods, and is expected to reduce loss of life.

RC-4. ***Flood risk reduction - flood damage.*** Change in the value of assets at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to create a locally-significant reduction in flood risk.
- **Medium** if the project is expected to create a regionally-significant reduction in flood risk.
- **High** if the project is expected to create a significant reduction in flood risk from a regional perspective and beyond.

Low

The project would improve flood protection in West Modesto neighborhoods, and is expected to reduce flood damages at a locally-significant level.

RC-5. ***Operations, maintenance and repair.*** Improvement in efficiency and effectiveness, or reduction of need at present and over the long term.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to only modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

N/A

No benefits identified. The project would add flood management facilities and, therefore, would add to operations, maintenance, and repair requirements. This is noted under RC-10.

RC-6. ***Ecosystem function*****.** Consistency with ecosystem priorities and goals of the (Draft) CVFPP metrics, the (Draft) Conservation Strategy (if available) and/or adopted conservation or recovery plans.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to increase ecosystem function compared to current conditions, but is not specifically consistent with the priorities and goals of the Draft CVFPP metrics or other adopted conservation or recovery plans.
- **Medium** if the project is consistent with the priorities and goals of one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.
- **High** if the project is if the project is consistent with the priorities and goals of more than one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.

High

The project is consistent with CVFPP metrics 6a, Shaded Riparian Aquatic (SRA) Cover, and 6b, Riparian, under metric 6, Habitats - Increase and improve quantity, diversity, quality, and connectivity of riverine aquatic and floodplain habitats. The project is also consistent with the Habitat Restoration Plan for the Lower Tuolumne River.

RC-7. ***Institutional support*****.** Improved support for entities contributing to flood management.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

N/A

No benefits identified.

RC-8. ***Other benefits.*** "Multiple benefits" not addressed by criteria above, e.g., water quality, recreation, public access, water supply, groundwater recharge, economic, etc.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Medium

The project would materially increase recreation and public access benefits on the Tuolumne River at a locally-significant scale.

RC-9. ***Cost-effectiveness.*** Benefits vs costs compared to other projects accomplishing similar benefits.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the lower third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **High** if the project is expected to fall within the upper third of the projects considered in terms of the mix of benefits provided for the given project cost.

High

The score is "High" because the project would provide flood risk reduction, park development, and habitat enhancement in an important urban center at a relatively low cost.

RC-10. ***Low potential for dis-benefits (post-mitigation).*** Low potential for negative outcomes after mitigation; a "High" score indicates very low probability; a "Low" score indicates high probability, etc. Note: if the project is a study, score as "Medium."

To the extent that projects have a similar mix of dis-benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the upper third of the projects considered in terms of the mix of anticipated dis-benefits.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of anticipated dis-benefits.
- **High** if the project is expected to fall within the lower third of the projects considered in terms of the mix of anticipated dis-benefits.

Medium

The score is "Medium" because there is not a clear reason to differentiate this project as "Low" or "High."

Project Name: Tuolumne River Regional Parkway

Project Lead: Tuolumne River Regional Park Joint Powers Authority

Potential Project Partners:

City of Modesto, City of Ceres, Stanislaus County, Tuolumne River Trust

Short Project Description:

Continued development of the undeveloped areas of the Tuolumne River Regional Park including the Gateway Parcel.

Long Project Description:

Development of these two areas of TRRP will focus on protecting and enhancing sensitive habitats and natural areas, including wetlands and riparian corridors; preserving and enhancing existing wildlife habitat areas; protecting and enhancing aquatic species and habitat; promoting a flood management program that provides protection from catastrophic flooding and contributes to the ecological values of the river corridor; developing educational programs that emphasize individual and community responsibility for resource protection and conservation and design areas within the overall park to accommodate multiple purposes and changes in recreational preferences over time while creating active and passive areas within the park.

Development of the 87-acre Gateway Parcel will provide a high-profile public gathering place, close to the commercial centers of Modesto and Ceres and accessible to the rest of the region along major arterial streets and California state Highway 99. In addition to the public gathering areas the park will include a substantial trail network, river access points, active and passive recreational zones, extensive riparian restoration work, storm water purification wetlands and educational interpretive elements.

Development of the 185-acre Carpenter Road Area will provide area for active use of a planned-for sports complex along with a place for land and water reclamation and restoration and educational interpretation. The site will include an extensive river promenade trail network, a mile and half of riparian corridor restoration and more the 100 acres of new forests and meadows along with storm water purification wetlands. Lastly, the development of the Carpenter Road Area will include a nature interpretive center to be located near the sports complex and will host exhibits about the riparian restoration in the park, new forests and meadows, and the many wildlife species that live in and along the river.

Unique Project Characteristics:

The continued development of TRRP will promote conservation and open space along the 7 river miles long park while limiting catastrophic flooding in the neighborhoods adjacent to TRRP. This overall project marries flood management, habitat restoration, educational opportunities, park development and open space conservation.

Project Status:	Planning and construction
Project Cost:	$60,000,000
Project Timeframe:	15-25 years to completion
Cost-sharing:	City of Modesto, County of Stanislaus, State of California Natural Resources Agency have all contributed over $1 million each to this project with grants from the State of California totaling approximately $5.5 million to date.
Multi-benefit Project:	Yes
Types of benefits:	The project would promote ecosystem functions and recreation, making it a multi-benefit project.
Source of Project:	City of Modesto on behalf of the Tuolumne River Regional Park JPA

Background Information:
None provided

Screening-level assessment

SC-1. ***Consistency with RFMP goals.*** Consistent with CVFPP goals: improve flood risk management, improve operations and maintenance, promote ecosystem functions, improve institutional support, promote multi-benefit projects.
Note: If the project is a study, evaluate the goals of the ultimate project that would flow from the study.

- **Low** if it meets *only* the multi-benefit project supporting objective.
- **Medium** as long as it meets 1-2 of the primary and/or supporting objectives and does not qualify as "Low."
- **High** if it includes meeting 3 or more of the primary and/or supporting objectives.

High

The project would improve flood risk management, promote ecosystem functions, and promote recreation, making it a multi-benefit project.

SC-2. ***Implementation feasibility.*** Consider existing laws or regulations, community opposition/support, or other factors affecting implementation feasibility.
Note: If the project is a study, evaluate only the implementation feasibility of completing the study.

- **Low** if the project is judged to face significant odds (e.g., a similar project has already been forcefully pursued and has failed to progress, and there is little reason to expect a different outcome now.)
- **Medium** if the project has been developed as a concept and has a description and an identified lead.
- **High** if the project has already gone through feasibility analysis and been found feasible, if appropriate, or the project already has reasonable assurance of being implemented by a capable project lead.

Medium

The score is "Medium" because the project has been developed as a concept, has a description, and identified co-leads, Tuolumne River Regional Park and the Tuolumne Joint Powers Authority.

Ranking-level assessment

RC-1. ***Implementation feasibility.*** (As in Screening-level assessment guidance.)

Medium

RC-2. ***Financial feasibility.*** Capacity to cover local share, with funding availability, or all project costs).

Note: project costs should be considered to include both the initial costs and the ongoing operations, maintenance, and repair costs, though this information may not be available. If the project is a study, evaluate only the financial feasibility of completing the study.

- **Low** if the anticipated project lead does not have the resources to either 1) carry out the project; or 2) supply any needed local cost share. Given the findings of the Financial Plan, projects are identified as "Low" if the anticipated local cost share exceeds $500,000, unless the project has been successful in attracting grant funding so far.
- **Medium** if the project does not meet the criteria for "Low" or "High" Financial Feasibility.
- **High** if the anticipated project lead has the resources to either 1) carry out the project; or 2) supply any needed local cost share and a plausible funding source for the balance has been identified. Given the findings of the Financial Plan, we estimate that for most entities in the planning area, local cost shares will need to be less than $20,000 to be funded. For projects having an anticipated local cost share exceeding $500,000, the project will be scored "High" if it has been successful in attracting most of the needed funding already.

Low

Significant funding has been provided by cost sharing partners. However, while substantial, the funding is a small part of the estimated cost of the project. Because the local cost share is anticipated to be greater than $500,000, the project has been assessed as having "Low" financial feasibility.

RC-3. ***Flood risk reduction - life risk***. Change in the number of lives potentially at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project may reduce loss of life.
- **Medium** if the project is expected to reduce loss of life based on a qualitative assessment.
- **High** if the project has been analyzed for effect on loss of life and is expected to reduce it.

Low

The project would limit catastrophic flooding in the neighborhoods adjacent to the TRRP, which may reduce loss of life.

RC-4. ***Flood risk reduction - flood damage.*** Change in the value of assets at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to create a locally-significant reduction in flood risk.
- **Medium** if the project is expected to create a regionally-significant reduction in flood risk.
- **High** if the project is expected to create a significant reduction in flood risk from a regional perspective and beyond.

Low

The project would limit catastrophic flooding in the neighborhoods adjacent to the TRRP, which would create a locally-significant reduction in flood risk.

RC-5. ***Operations, maintenance and repair.*** Improvement in efficiency and effectiveness, or reduction of need at present and over the long term.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to only modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

N/A

No benefits identified.

RC-6. ***Ecosystem function*****.** Consistency with ecosystem priorities and goals of the (Draft) CVFPP metrics, the (Draft) Conservation Strategy (if available) and/or adopted conservation or recovery plans.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to increase ecosystem function compared to current conditions, but is not specifically consistent with the priorities and goals of the Draft CVFPP metrics or other adopted conservation or recovery plans.
- **Medium** if the project is consistent with the priorities and goals of one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.
- **High** if the project is if the project is consistent with the priorities and goals of more than one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.

High

The project is consistent with CVFPP metrics 6a, Shaded Riparian Aquatic (SRA) Cover, 6b, Riparian, and 6c, Marsh, under metric 6, Habitats - Increase and improve quantity, diversity, quality, and connectivity of riverine aquatic and floodplain habitats. The project is also consistent with the Habitat Restoration Plan for the Lower Tuolumne River.

RC-7. ***Institutional support*****.** Improved support for entities contributing to flood management.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

N/A

No benefits identified.

RC-8. ***Other benefits.*** "Multiple benefits" not addressed by criteria above, e.g., water quality, recreation, public access, water supply, groundwater recharge, economic, etc.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Medium

The project would materially increase recreation and public access benefits on the Tuolumne River at a locally-significant scale.

RC-9. ***Cost-effectiveness.*** Benefits vs costs compared to other projects accomplishing similar benefits.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the lower third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **High** if the project is expected to fall within the upper third of the projects considered in terms of the mix of benefits provided for the given project cost.

Medium

The score is "Medium" because there is not a clear reason to differentiate this project as "Low" or "High."

RC-10. ***Low potential for dis-benefits (post-mitigation).*** Low potential for negative outcomes after mitigation; a "High" score indicates very low probability; a "Low" score indicates high probability, etc. Note: if the project is a study, score as "Medium."

To the extent that projects have a similar mix of dis-benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the upper third of the projects considered in terms of the mix of anticipated dis-benefits.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of anticipated dis-benefits.
- **High** if the project is expected to fall within the lower third of the projects considered in terms of the mix of anticipated dis-benefits.

Medium

The score is "Medium" because there is not a clear reason to differentiate this project as "Low" or "High."

Project Name: Westside Creeks On-Farm Multi-Benefit Program

Project Lead: Audubon California

Potential Project Partners:

West Stanislaus Resource Conservation District, irrigation districts, Natural Resources Conservation Service, United States Fish and Wildlife Service, California Wildlife Conservation Board

Short Project Description:

Provide outreach and technical assistance to landowners in the Stanislaus County Westside Creek watersheds for multi-benefit flood risk reduction projects.

Long Project Description:

This project would involve Audubon California reaching out to farmers and coordinating multi-benefit flood protection projects throughout entire watersheds on Del Puerto, Ingram-Hospital, and Orestimba Creeks. By addressing an entire watershed, as opposed to supporting piecemeal restoration projects, this project's efforts will match the scale of the solution to the scale of the problem. A three-year program is envisioned that reduces flood risk, prevents erosion, improves water quality, and enhances wildlife habitat and pollinator services on 20 miles or more of creek.

This program proposes supporting project development (landowner outreach, grant writing, permitting, and planning). Various entities will be engaged that could include the West Stanislaus Resource Conservation District , a Conservation Corps (either the California Conservation Corps or the San Joaquin County Regional Conservation Corps), or a local Audubon Society chapter, as well as the landowner, in the on-the-ground implementation, including site preparation, plant installation, and maintenance for two to three years. Typical maintenance tasks include drip irrigation, weed control, and possibly replanting in the case of plant failure

Prior to establishing a combination of native trees, shrubs, forbs, grasses and sedges, the project will likely involve the landowners and NRCD engineers to reduce, or lay back, the bank slope to facilitate plant establishment. This practice has the benefit of increasing channel capacity in the upper portion, thereby reducing flood risk. We then stabilize the new slope by plugging sedges and rushes, which both stabilize the slope, through their root action, and filter water going into the creek.

Unique Project Characteristics:

The project lead, Audubon California, has a proven track record of working with farmers to enhance the wildlife value of farms. Over the past 15 years, Audubon staff has worked with over 100 landowners throughout the Sacramento Valley. The Audubon approach is to use their expertise to reach out to farmers, help identify multiple funders, seek permits, and plan restoration projects. They work closely with the farmer, Resource Conservation Districts, and Conservation Corps to implement the projects.

Project Status: This project is in the concept phase, but since the project lead is currently conducting very similar work in the Sacramento Valley; thus, work could begin very quickly if funding were allocated.
Project Cost: $75,000
Project Timeframe: 3 years
Cost-sharing: The project lead, Audubon California, has been very successful in attracting partners for on-farm habitat restoration. We regularly work with NRCS, USFWS Partners of Fish and Wildlife Program, and the Wildlife Conservation Board. The project lead has also been able to leverage this funding to attract considerable foundation support. During the past two years, the project lead has brought in over $1,000,000 from

state, federal, and private sources to support ten projects. The project lead anticipates that this project will also be funded by multiple sources.

NRCS's Bay Delta Initiative is funding $6,000,000 over five years of water-quality projects on Ingram-Hospital Creek, and this project would incorporate water-quality benefits, so we may be able to use those funds as a cost share. NRCS' EQIP program could also potentially be tapped for wildlife benefits.

The Partners of Fish and Wildlife Program office for the area is potentially interested in contributing $75,000 over three years to these multi-benefit projects. Further, they think there may be potential funding from the regional office for a large-scale program.

Multi-benefit Project: Yes

Types of benefits: The project is anticipated to improve flood risk management; operations and maintenance; and institutional support.

Source of Project: Through the project lead's relationship with the West Stanislaus RCD, they have met several landowners in these watersheds who have asked Audubon California for help implementing this kind of project.

Background Information:

Audubon California has been planning and implanting on-farm habitat restoration projects for 15 years. This work in Yolo County began by the invitation of local farmers. Since that time, Audubon has sought to increase the pace, scope, and scale of our work by expanding into Solano, Colusa, San Joaquin, Stanislaus, and Merced Counties. One of the primary practices is to vegetate waterways that carry agricultural drainage water, as these channels often have available moisture in the summer, which enhances the success of plant installation. When this is done, the channel is widened, and the slope reduced, as it provides space for the vegetation we establish, and reduces erosion.

Audubon California collaborates with The Nature Conservancy and Point Blue Conservation Science in the Migratory Bird Conservation Partnership, where each organization lends its strength to the larger effort of enhancing migratory bird populations in the Central Valley. One of Audubon California's roles in the partnership is reaching out to farmers and providing technical assistance on farm edge plantings, and ensuring that the projects we develop provide food, shelter, and nest sites for migratory and resident birds. In the last few years, several landowners on Del Puerto Creek have asked Audubon California for help with identifying funding opportunities and grant writing, permitting, and planning multi-benefit flood control projects. Audubon's interest is in establishing demonstration projects on working farms that benefit birds and other wildlife, and will lead to large-scale adoption of these practices.

Audubon has observed that many growers are farming to the edge of Del Puerto Creek, and the banks are steep and failing in many places. According to anecdotal evidence, the channel capacity is inadequate in places to carry flood flows during the significant rain events which occur every two to three years. Audubon's typical farm edge planting practice is to reduce the bank slope to facilitate plant establishment. This practice has the added benefit of increasing channel capacity, thereby reducing flood risk.

Screening-level assessment

SC-1. ***Consistency with RFMP goals.*** Consistent with CVFPP goals: improve flood risk management, improve operations and maintenance, promote ecosystem functions, improve institutional support, promote multi-benefit projects.

Note: If the project is a study, evaluate the goals of the ultimate project that would flow from the study.

- **Low** if it meets *only* the multi-benefit project supporting objective.
- **Medium** as long as it meets 1-2 of the primary and/or supporting objectives and does not qualify as "Low."
- **High** if it includes meeting 3 or more of the primary and/or supporting objectives.

High

The project is anticipated to improve flood risk management; operations and maintenance; and institutional support as well as promote ecosystem functions and multi-benefit projects.

SC-2. ***Implementation feasibility.*** Consider existing laws or regulations, community opposition/support, or other factors affecting implementation feasibility.
Note: If the project is a study, evaluate only the implementation feasibility of completing the study.

- **Low** if the project is judged to face significant odds (e.g., a similar project has already been forcefully pursued and has failed to progress, and there is little reason to expect a different outcome now.)
- **Medium** if the project has been developed as a concept and has a description and an identified lead.
- **High** if the project has already gone through feasibility analysis and been found feasible, if appropriate, or the project already has reasonable assurance of being implemented by a capable project lead.

Medium

The score is "Medium" because the project has been developed as a concept, has a description, and identified lead, Audubon California.

Ranking-level assessment

RC-1. ***Implementation feasibility.*** (As in Screening-level assessment guidance.)

Medium

RC-2. ***Financial feasibility.*** Capacity to cover local share, with funding availability, or all project costs).
Note: project costs should be considered to include both the initial costs and the ongoing operations, maintenance, and repair costs, though this information may not be available. If the project is a study, evaluate only the financial feasibility of completing the study.

- **Low** if the anticipated project lead does not have the resources to either 1) carry out the project; or 2) supply any needed local cost share. Given the findings of the Financial Plan, projects are identified as "Low" if the anticipated local cost share exceeds $500,000, unless the project has been successful in attracting grant funding so far.
- **Medium** if the project does not meet the criteria for "Low" or "High" Financial Feasibility.
- **High** if the anticipated project lead has the resources to either 1) carry out the project; or 2) supply any needed local cost share and a plausible funding source for the balance has been identified. Given the findings of the Financial Plan, we estimate that for most entities in the

planning area, local cost shares will need to be less than $20,000 to be funded. For projects having an anticipated local cost share exceeding $500,000, the project will be scored "High" if it has been successful in attracting most of the needed funding already.

High

Audubon may be able to fundraise to supply the local cost share. Because the estimated project local cost share is quite modest, the financial feasibility is evaluated as "High."

RC-3. ***Flood risk reduction - life risk***. Change in the number of lives potentially at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project may reduce loss of life.
- **Medium** if the project is expected to reduce loss of life based on a qualitative assessment.
- **High** if the project has been analyzed for effect on loss of life and is expected to reduce it.

Low

If improved coordination among Westside Creeks landowners results in reduced flood risk, loss of life may also be reduced.

RC-4. ***Flood risk reduction - flood damage.*** Change in the value of assets at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to create a locally-significant reduction in flood risk.
- **Medium** if the project is expected to create a regionally-significant reduction in flood risk.
- **High** if the project is expected to create a significant reduction in flood risk from a regional perspective and beyond.

Low

If improved coordination among Westside Creeks landowners results in reduced flood risk, a reduction in damages could occur at a locally-significant scale.

RC-5. ***Operations, maintenance and repair.*** Improvement in efficiency and effectiveness, or reduction of need at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to only modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.

- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Low

The project is anticipated to materially improve channel maintenance at a locally-significant scale.

RC-6. ***Ecosystem function*.** Consistency with ecosystem priorities and goals of the (Draft) CVFPP metrics, the (Draft) Conservation Strategy (if available) and/or adopted conservation or recovery plans.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to increase ecosystem function compared to current conditions, but is not specifically consistent with the priorities and goals of the Draft CVFPP metrics or other adopted conservation or recovery plans.
- **Medium** if the project is consistent with the priorities and goals of one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.
- **High** if the project is if the project is consistent with the priorities and goals of more than one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.

Medium

Audubon is specifically interested in supporting efforts that incorporate a restoration goal. While project benefits and magnitudes have not specifically been identified at this stage, the project is expected to increase ecosystem function at some level, and would support the Central Valley Joint Venture Implementation Plan and the Riparian Bird Conservation Plan.

RC-7. ***Institutional support*.** Improved support for entities contributing to flood management.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Medium

The project would materially increase institutional support at a locally-significant level. It is anticipated to provide education, funding planning, and design support to landowners along the targeted waterways.

RC-8. ***Other benefits.*** "Multiple benefits" not addressed by criteria above, e.g., water quality, recreation, public access, water supply, groundwater recharge, economic, etc.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Low

Audubon is specifically interested in supporting efforts that incorporate a restoration goal. While project benefits and magnitudes have not specifically been identified at this stage, the project is expected to at least improve water quality at some level, and a score of "Low" has therefore been assigned.

RC-9. ***Cost-effectiveness.*** Benefits vs costs compared to other projects accomplishing similar benefits.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the lower third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **High** if the project is expected to fall within the upper third of the projects considered in terms of the mix of benefits provided for the given project cost.

High

The cost of the project is very low when compared to the benefits.

RC-10. ***Low potential for dis-benefits (post-mitigation).*** Low potential for negative outcomes after mitigation; a "High" score indicates very low probability; a "Low" score indicates high probability, etc.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of dis-benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the upper third of the projects considered in terms of the mix of anticipated dis-benefits.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of anticipated dis-benefits.
- **High** if the project is expected to fall within the lower third of the projects considered in terms of the mix of anticipated dis-benefits.

High

No dis-benefits are anticipated.

Project Name: WSID Fish Screen and Change in Point of Diversion Project

Project Lead: West Stanislaus Irrigation District

Potential Project Partners:

Department of Fish and Wildlife (CDFW), National Marine Fisheries Service (NMFS), U.S. Fish and Wildlife Services (USFWS), U.S. Bureau of Reclamation (USBR)

Short Project Description:

This project will help support three phases of the West Stanislaus Irrigation District (WSID) Fish Screen Project, which will significantly improve site-specific and regional flood management and resilience as well as ecosystem enhancement. Phase 1 would provide cost-share to complete the planning, design and permitting of mutually beneficial fish screen alternatives. Phase 2 funding would contribute to the required 50% non-federal cost-share for construction of WSID's preferred alternative fish screen project. Phase 3 would provide cost-share contribution to help develop and complete the planning, design and permitting of integrated and mutually beneficial flood management and resilience and ecosystem enhancements along 90% of the WSID intake canal and alignment across the SJRNWR.

Long Project Description:

The WSID Fish Screen Project is a state and federal agency priority, and has been included in numerous published conservation and enhancement and restoration plans. These include: 1) Department of Fish and Game. 1990. Central Valley Salmon and Steelhead Restoration and Enhancement Plan (page 107); 2) USFWS. 1995. Working Paper on restoration needs and habitat restoration actions to double natural production of anadromous fish in the Central Valley of California. Volumes 1-3. May 9, 1995. (page 3-Xd-43 and 3-Xd-50-51; 3) USFWS. 2001. Final Restoration Plan for the Anadromous Fish Restoration Program. Adopted January 9, 2001. (page 82"); 4) numerous publications of the CalFed Ecosystem Restoration Program that document the project priorities and progress of this major state/federal/private conservation effort.; and 5) support documents from state and federal agencies responsible for protecting and restoring listed (federal and /or state) fish such as steelhead, and other native fish of concern such as splittail, unique lamprey, white sturgeon, and others that exist in the San Joaquin Basin. Finally, the USFWS management plans and objectives for the San Joaquin River National Wildlife Refuge would be facilitated as a result of planning, permitting, and constructing this proposed project. The three project phases are described below.

Phase 1: Funds would augment non-federal cost-share to the state (existing) and federal (pending) grants to complete the planning, design, and permitting of a "Flood Safe-friendly" fish screen on WSID's water diversion facilities from the San Joaquin River (SJR). This work includes the development of fish screening alternatives at several sites, including new locations to the north near the Highway 132 Bridge over the SJR. Should the District and the partners view this new northern location as a preferred alternative fish screen site(s), this alternative would include new or refurbished linear canals extending west and south from the new diversion and connecting to the District's main canal. It will also require design and permitting for the continued long term use of a short segment (approximately 10%) of the existing WSID intake canal (the extreme western end) as a re-regulating pool to efficiently connect the "fish free" water from the new screen location to the remainder of the District water supply infrastructure (at/near Pump Station 1A).

Phase 2: Should the District select a preferred alternative Fish Screen Project at the Highway 132 site(s), they and their partners will need to secure additional non-federal cost-share funding contributions to complete the construction of the new fish screen and associated infrastructure. The current cost estimate to construct a new fish screen located near Highway 132 is approximately $30M. The federal agencies (USBR/USFWS) require a 50% non-federal cost-share commitment. The District believes that significant benefits to nearby

(proposed) flood management and ecosystem restoration projects will accrue if such a preferred alternative is selected. Hence, Phase 2 of this RFMP Project proposes a significant cost share contribution (to be determined) to help match a 50% federal cost share commitment to the WSID Fish Screen Project.

Phase 3: Either concurrent with or following completion of construction (if at the Highway 132 site(s)), this phase of this RFMP proposal requests cost-share funding contribution for the planning, design, and permitting of a project(s) that uses the remaining 90% of the existing intake canal/alignment across SJRNWR in a mutually-beneficial manner. Clearly, the District will be working very closely with the SJRNWR and other partners on this project phase. The District recognizes that the Three Amigos Project, or similar projects, overlap geographically and functionally and will need to be well-integrated to eventually reach a construction phase. If this phase of the RFMP project is successful, a construction phase would likely be proposed by an appropriate entity.

Unique Project Characteristics:

Reduced operations and maintenance costs and improved efficiency in flood management/maintenance activities would occur over the short and long term in this central portion of the Region upon completion of this proposed project in conjunction with several non-structural flood control projects proposed there. Successful planning, permitting, and construction of this proposed project would also increase institutional and local support for several non-structural flood control projects proposed by the USFWS and River Partners in this central portion of river within the Mid-SJR RFMP planning area.

Project Status: Planning, design, and permitting
Project Cost: **$**38,000,000
Project Timeframe: 1-5 years
Cost-sharing: WSID, CDFW and BR/FWS have thus far invested more than $3.5 M in preliminary planning, advanced planning, design and the permitting of this Intake/Fish Screen Project. The preliminary estimates for construction costs range from $25-30M. This cost estimate is not unlike many other fish screens built throughout the Pacific Northwest. CDFW has made clear that the State needs to obtain cost-share partner in the construction phase, as have the BR/FWS representatives. WSID has continued to participate as a significant cost-share partner in each phase of the project, and has agreed to the long term maintenance and operations costs to operate the new fish screen once completed. In the interim, they continue to operate and maintain their current intake on the SJR just upstream of the Tuolumne River confluence.
Multi-benefit Project: Yes
Types of benefits: The project would improve flood risk management as the diversion would be relocated to a more readily protected location. The WSID diversion would be consolidated with other existing diversions, reducing the number of locations that would be exposed to fl
Source of Project: West Stanislaus Irrigation District

Background Information:

There are reports and other materials available through the West Stanislaus Irrigation District.

Screening-level assessment

SC-1. ***Consistency with RFMP goals.*** Consistent with CVFPP goals: improve flood risk management, improve operations and maintenance, promote ecosystem functions, improve institutional support, promote multi-benefit projects.

Note: If the project is a study, evaluate the goals of the ultimate project that would flow from the study.

- **Low** if it meets *only* the multi-benefit project supporting objective.
- **Medium** as long as it meets 1-2 of the primary and/or supporting objectives and does not qualify as "Low."
- **High** if it includes meeting 3 or more of the primary and/or supporting objectives.

Medium

The project would improve flood management and water supply reliability and protect fish from entrainment, making it a multi-benefit project.

SC-2. ***Implementation feasibility.*** Consider existing laws or regulations, community opposition/support, or other factors affecting implementation feasibility.

Note: If the project is a study, evaluate only the implementation feasibility of completing the study.

- **Low** if the project is judged to face significant odds (e.g., a similar project has already been forcefully pursued and has failed to progress, and there is little reason to expect a different outcome now.)
- **Medium** if the project has been developed as a concept and has a description and an identified lead.
- **High** if the project has already gone through feasibility analysis and been found feasible, if appropriate, or the project already has reasonable assurance of being implemented by a capable project lead.

High

The project has been partially designed and the environmental review process is underway.

Ranking-level assessment

RC-1. ***Implementation feasibility.*** (As in Screening-level assessment guidance.)

High

RC-2. ***Financial feasibility.*** Capacity to cover local share, with funding availability, or all project costs).

Note: project costs should be considered to include both the initial costs and the ongoing operations, maintenance, and repair costs, though this information may not be available. If the project is a study, evaluate only the financial feasibility of completing the study.

- **Low** if the anticipated project lead does not have the resources to either 1) carry out the project; or 2) supply any needed local cost share. Given the findings of the Financial Plan,

projects are identified as "Low" if the anticipated local cost share exceeds $500,000, unless the project has been successful in attracting grant funding so far.

- **Medium** if the project does not meet the criteria for "Low" or "High" Financial Feasibility.
- **High** if the anticipated project lead has the resources to either 1) carry out the project; or 2) supply any needed local cost share and a plausible funding source for the balance has been identified. Given the findings of the Financial Plan, we estimate that for most entities in the planning area, local cost shares will need to be less than $20,000 to be funded. For projects having an anticipated local cost share exceeding $500,000, the project will be scored "High" if it has been successful in attracting most of the needed funding already.

Medium

While the cost of this project is quite high relative to other projects in the planning area, the District has been able to attract some funding to the project thus far. As a result, the project is assessed as having "Medium" financial feasibility.

RC-3. ***Flood risk reduction - life risk***. Change in the number of lives potentially at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project may reduce loss of life.
- **Medium** if the project is expected to reduce loss of life based on a qualitative assessment.
- **High** if the project has been analyzed for effect on loss of life and is expected to reduce it.

N/A

No benefits identified.

RC-4. ***Flood risk reduction - flood damage.*** Change in the value of assets at risk, at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to create a locally-significant reduction in flood risk.
- **Medium** if the project is expected to create a regionally-significant reduction in flood risk.
- **High** if the project is expected to create a significant reduction in flood risk from a regional perspective and beyond.

Low

The project is anticipated to reduce exposure of WSID diversion and delivery infrastucture to flood risk.

RC-5. ***Operations, maintenance and repair.*** Improvement in efficiency and effectiveness, or reduction of need at present and over the long term.

Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to only modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Medium

The project would materially improve O&M at a locally-significant level. Specifically, the O&M of the berms adjacent to the diversion canal will be reduced as a result of relocating these facilities.

RC-6. ***Ecosystem function*.** Consistency with ecosystem priorities and goals of the (Draft) CVFPP metrics, the (Draft) Conservation Strategy (if available) and/or adopted conservation or recovery plans.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to increase ecosystem function compared to current conditions, but is not specifically consistent with the priorities and goals of the Draft CVFPP metrics or other adopted conservation or recovery plans.
- **Medium** if the project is consistent with the priorities and goals of one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.
- **High** if the project is if the project is consistent with the priorities and goals of more than one of the following: 1) the Draft CVFPP metrics or 2) other adopted conservation or recovery plans.

High

This project would screen the largest remaining unscreened diversion along the San Joaquin River. (Note that the diversions/screens metric was removed from the BWFS/CS metrics; the table states that diversions are outside of the scope of the CVFPP and BWFS.) As described in the long project description, the project is consistent with several conservation and recovery plans.

RC-7. ***Institutional support*.** Improved support for entities contributing to flood management.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

Medium

The project would materially improve institutional support at a locally significant level.

RC-8. ***Other benefits.*** "Multiple benefits" not addressed by criteria above, e.g., water quality, recreation, public access, water supply, groundwater recharge, economic, etc.
Note: if the project does not directly incorporate this benefit, score as "N/A." If a study, evaluate the anticipated benefits of the ultimate project that would flow from the study.

- **Low** if the project is expected to modestly increase such benefits compared to current conditions and into the future.
- **Medium** if the project is expected to materially increase such benefits at a locally-significant level compared to current conditions and into the future.
- **High** if the project is expected to materially increase such benefits at a regionally-significant level compared to current conditions and into the future.

High

The project would increase water supply reliability and protect fish from entrainment. Benefits would be realized on a regionally-significant scale.

RC-9. ***Cost-effectiveness.*** Benefits vs costs compared to other projects accomplishing similar benefits.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the lower third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of benefits provided for the given project cost.
- **High** if the project is expected to fall within the upper third of the projects considered in terms of the mix of benefits provided for the given project cost.

Medium

The score is "Medium" because there is not a clear reason to differentiate this project as "Low" or "High."

RC-10. ***Low potential for dis-benefits (post-mitigation).*** Low potential for negative outcomes after mitigation; a "High" score indicates very low probability; a "Low" score indicates high probability, etc.
Note: if the project is a study, score as "Medium."
To the extent that projects have a similar mix of dis-benefits types and magnitudes, they can be compared. Where direct comparison is not possible, projects should be assumed to fall into the "Medium" category unless there is a clear reason to differentiate them as "Low" or "High."

- **Low** if the project is expected to fall within the upper third of the projects considered in terms of the mix of anticipated dis-benefits.
- **Medium** if the project is expected to fall within the middle third of the projects considered in terms of the mix of anticipated dis-benefits.

- **High** if the project is expected to fall within the lower third of the projects considered in terms of the mix of anticipated dis-benefits.

Medium

The score is "Medium" because there is not a clear reason to differentiate this project as "Low" or "High."

H = High; valued as 3 points
M = Medium; valued as 2 points
L = Low; valued as 1 point
N/A = Not Applicable; valued as 0 point

Project Name	SC-1 Consistency with RFMP goals	SC-2 Implementation feasibility	RC-1 Implementation feasibility	RC-2 Financial feasibility	RC-3 Flood risk reduction - life risk	RC-4 Flood risk reduction - flood damage	RC-5 Operations, maintenance, and repair	RC-6 Ecosystem function	RC-7 Institutional support	RC-8 Other benefits	RC-9 Cost-effectiveness	RC-10 Low potential for dis-benefits	Total
Black Gulch Storm Drainage Study	2	2	2	3	1	1	0	0	0	0	2	2	11
City of Newman/Bureau of Reclamation Flood L	2	2	2	3	2	1	0	0	0	2	2	2	14
Consolidation of O&M	3	2	2	2	1	2	3	0	3	2	2	3	20
Dennett Dam Removal	3	3	3	2	3	1	0	3	0	2	3	3	20
Dos Rios Ranch Floodplain Expansion and Eco	3	3	3	3	1	1	2	3	0	3	3	3	22
Dry Creek Watershed Detention Reconnaissanc	2	2	2	3	2	2	0	0	0	0	2	2	13
Emergency Response Plan – Debris Manageme	2	2	2	3	1	1	1	0	2	3	3	3	19
Emergency Response Plan – Local Planning an	3	3	3	3	2	2	3	0	3	0	3	3	22
Flood Risk Education	3	2	2	3	1	2	1	0	1	1	3	3	17
Gomes Lake / Harding Drain Improvements	2	2	2	2	1	1	2	0	0	0	2	3	13
Hydraulic and Channel Migration Studies	2	2	2	2	1	1	2	0	0	0	2	3	13
Integrated Levee Vegetation Management – Flo	3	3	3	2	0	0	3	3	0	1	2	3	17
La Grange Floodplain Restoration and Spawnin	3	2	2	2	1	1	0	3	0	2	3	3	17
Little Salado Creek	2	3	3	2	1	1	0	0	0	2	2	3	14
Modesto WWTP - Reduce Flood Risk	2	3	3	1	2	1	0	0	0	2	2	2	13
Orestimba Creek Flood Risk Management Proje	2	3	3	1	2	2	0	0	2	0	2	2	14
Patterson WWTP – Reduce Flood Risks	2	2	2	3	1	1	0	0	0	1	2	2	12
RD 1602 Resilience	3	2	2	1	1	1	2	0	2	2	1	3	15
RD 2031 Resilience	3	2	2	3	1	1	2	0	2	2	2	3	18
RD 2063 Resilience	3	2	2	3	1	1	2	0	2	2	2	3	18
RD 2091 Resilience	3	2	2	3	1	1	2	0	2	2	3	3	19
RD 2101 Resilience	3	2	2	1	1	1	2	0	2	2	1	3	15
Reducing Sediment Loading into the San Joaqu	3	3	3	1	1	1	1	0	0	2	1	3	13
Regional Maintenance Technical Support	3	2	2	3	1	2	3	1	3	1	3	3	22
Riverfront Park Project	3	2	2	2	1	1	0	3	0	2	1	3	15
Salado Creek Flood Management Project	2	2	2	2	1	1	0	0	0	0	2	2	10
SB5 Compliance – City of Modesto	3	3	3	3	2	1	0	0	1	1	3	2	16
SB5 Compliance – City of Newman	3	3	3	3	2	1	0	0	1	1	3	2	16
SB5 Compliance – City of Patterson	3	3	3	3	2	1	0	0	1	1	3	2	16
Sediment Management Investigation	3	2	2	2	0	0	1	1	0	0	3	3	12
Storm Drainage Enhancements along Salado C	2	2	2	2	1	1	0	0	0	2	2	2	12
Three Amigos (also known as the Non-structura	3	3	3	3	1	1	2	3	1	3	3	3	23
Tuolumne River Flood Management Feasibility S	3	2	2	2	2	2	0	1	0	1	2	3	15
Tuolumne River Regional Park – Carpenter Roa	3	3	3	2	2	1	0	3	0	2	3	2	18
Tuolumne River Regional Parkway	3	2	2	1	1	1	0	3	0	2	2	2	14
Westside Creeks On-Farm Multi-Benefit Prograı	3	2	2	3	1	1	1	2	2	1	3	3	19
WSID Fish Screen and Change in Point of Diver	2	3	3	2	0	1	2	3	2	3	2	2	20

APPENDIX G
Project Concept Descriptions

Concept Name: Develop Expedited Permitting Programs for Maintenance Actions

Short Concept Description: Coordinate with all permitting agencies to develop a permitting program that will reduce the time and cost required to permit routine maintenance actions.

Long Concept Description: Most of the native riparian and aquatic species in the Central Valley are extirpated, extinct, listed as threatened or endangered, or have populations that have been significantly diminished; additionally, waterways have been altered in ways that diminish water quality and habitat value. As a result, maintenance activities often require permits from resource management agencies, including the California Department of Fish and Wildlife (CDFW), United States Fish and Wildlife Service (USFWS), Regional Water Quality Control Board, Central Valley Flood Protection Board, National Marine Fisheries Service, and the United States Army Corps of Engineers (USACE). The Local Maintaining Agencies (LMAs) in the Mid San Joaquin River Region (Mid SJR Region) are small entities with few staff and limited budgets. Legal requirements to protect Central Valley steelhead, Chinook salmon, riparian brush rabbit, riparian woodrat, valley elderberry longhorn beetle, least Bell's vireo, giant garter snake, and Swainson's hawk habitat during the execution of maintenance and construction of flood system maintenance projects are a challenge to meet, and the process to obtain the required permits can be lengthy and expensive. If permits cannot be obtained for levee maintenance, levees often fail to meet criteria established by USACE and are rated as "Unacceptable" in periodic inspections, making those levees ineligible for rehabilitation assistance from USACE under Public Law (PL) 84-99 in the event of a flood. While permitting requirements can make flood system maintenance challenging, protecting species is crucial. Loss of these species - particularly commercially important species like Chinook salmon - could have significant impacts on recreation, quality of life, and the local and regional economy. A program that allows for habitat protection and timely, cost-effective flood system maintenance needs to be developed and implemented.

Source of Concept: Stakeholder idea, developed by the Mid SJR Region's Project Team

Concept Name: Ecosystem Restoration Along Waterways (both in the Mid SJR and the Upper San Joaquin Regions)

Short Concept Description: Similar to routing flood flows onto agricultural land, an alternative approach would be to acquire agricultural properties along the San Joaquin River and allow for seasonal floodplain inundation to provide fish rearing habitat as well as the diversion of flood flows, and, in some areas, the direct recharge of groundwater. This type of project could be implemented as a conservation easement, part of the Central Valley Habitat Exchange, or an ecosystem mitigation bank.

Long Concept Description: Aquatic, riparian, and floodplain habitats along the San Joaquin River have been degraded by a variety of human activities. In recent years, there has been a considerable effort to identify opportunities for habitat rehabilitation along portions of the San Joaquin River within, updstream, and downstream of the Mid SJR Region. It has been determined that large areas exist along the San Joaquin River that could be restored and also used for temporary flood flow storage. Similar to the concept of diverting flood flows to agricultural and refuge lands, flood flows would be diverted to refuge areas or agricultural land that was purchased and returned to floodplain habitat. These areas could be managed in a coordinated way to reduce peak flow and provide temporary storage during a flood event as well as provide floodplain habitat. This concept differs from the Divert Floodflows to Agricultural Lands concept in that it includes an ecosystem rehabilitation and management component. After inundation during high flows, water would recede and return to the channel and percolate into the ground. The United States Army Corps of Engineers Reconnaissance Report, San Joaquin River, Mainstem (January 1993) describes this concept and identifies specific sites that could be used in a network of ecosystem restoration and temporary flood storage areas.

Source of Concept: Stakeholder idea, developed by the Mid SJR Region's Project Team

Concept Name: Divert Flood Flows to Agricultural Lands (both in the Mid and the Upper San Joaquin River Regions)

Short Concept Description: Diverting flood flows onto nearby agricultural and refuge land along the San Joaquin River could decrease peak flows within the channels.

Long Concept Description: Large areas exist along the San Joaquin River that could be used for temporary flood flow storage. With agriculture as the primary land use in the floodplains of the Mid and Upper San Joaquin River regions and the presence of large wildlife refuges along the river, a series of designated areas could be managed in a coordinated way to reduce peak flow and provide temporary storage during a flood event. In some places, this is essentially a "no-action" alternative since it already occurs. Depending on the topography, the types of crops, and the willingness of the landowners, agricultural properties and refuge lands could be utilized as detention basins where excess flood flows would be stored temporarily until water percolates back into the ground. Other agricultural lands would be temporarily flooded and the waters would be routed back into the channel after the high flows recede. The United States Army Corps of Engineers Reconnaissance Report, San Joaquin River, Mainstem (January 1993) describes this concept and identifies specific sites that could be used in a network of temporary flood storage areas.

Source of Concept: Stakeholder idea, developed by the Mid SJR Region's Project Team

Concept Name: Emergency Response Improvement

Short Concept Description: Implement the following measures to improve emergency response in the planning area: 1) develop local flood fight plans with support from larger agencies, such as Modesto and Stanislaus County; 2) develop public safety agency evacuation plans; 3) clarify and document the command structure for areas with flood risk; 4) better define operational area logistical support for flood fight operations; and 5) form a Stanislaus Operational Area flood response working group.

Long Concept Description: A detailed description of each measure listed above is provided below.

Develop Local Flood Fight Plans

In regard to flood fight operations, develop local flood fight plans as the highest priority response improvement project. These plans would document: 1) historic and flood fight knowledge of current and past district responders; 2) current response procedures for levee flood fight; and 3) options for containing floods from a breach. Reclamation districts, as the local jurisdiction responsible for maintaining the project levees and general flood control within their boundaries, would prepare the plans with the assistance of other local jurisdictions such as Modesto and Stanislaus County.

A standard template for development of such flood fight plans (also called flood safety plans or tactical flood plans in other contexts) is emerging in the Central Valley and is supported by the California Department of Water Resources (DWR) and Federal Emergency Management Agency (FEMA). This template uses a map format to display information with a concise written description of the reclamation district emergency operations plan. The standard template is consistent with FEMA preparedness planning guidance and has been approved by DWR.

Develop Public Safety Agency Evacuation Plans

It is recommended that public safety agency evacuation plans and maps be developed, at a minimum, for the areas protected by RDs 1604, 2063, and 2091. Evacuation procedures for these rural districts could be included in the applicable flood contingency map or displayed on separate evacuation maps. Formal urban evacuation maps should also be developed for those populated areas of the cities of Newman, Patterson, and Modesto that are exposed to sheet flow or flood water back-up from area streams and creeks. These urban evacuation maps would be developed in accordance with the Guide to Urban Evacuation Mapping available at www.sjmap.org/oesmg. Evacuation procedures shown on these maps should also address rural evacuation issues such as locations of dairies and storage of bulk hazardous materials with detailed procedures for their orderly evacuation and temporary storage. All evacuation maps would display the emergency response command organization for conducting these operations and the response organization structure. These plans and maps would be developed in cooperation with local law and fire agencies and the RDs.

Clarify Command and Control

It is a high priority that local jurisdictions clarify and document the command structure for areas threatened by floods. In particular, it is important to clarify how the flood fight commands and public safety agency commands will interact. These protocols could be included on flood contingency and evacuation maps or shown on a separate flood fight unified command map. Reclamation districts should

also adopt a formal mechanism for clearly designating a flood fight incident commander as part of their flood safety plans.

Form a Stanislaus Operational Area Flood Response Working Group

The Stanislaus Operational Area should form a flood response working group composed of the reclamation districts and public safety agencies with jurisdiction within the flood plain. This working group should be created through a written agreement or protocol that defines meeting frequency, objectives, and specific review items. This group could then ensure that flood contingency maps, evacuation plans, and training standards developed in past preparedness projects are maintained. This process would also ensure that there is ongoing communication between jurisdictions and that new officials are properly briefed on current preparedness plans and their status.

Additionally, the working group, should develop an agreement or procedure outlining the specific process and characteristics for providing levee flood fight support and mutual aid to RDs. Potential support would include assistance with levee patrol, flood fight crews, and funds for the acquisition of private contractors and bulk materials. In particular, the provision of funds, or purchasing support, for acquisition of private vendors or bulk materials should be clearly defined. Total dependence on the state or federal governments for emergency funding of response to threats to levee integrity could lead to delays that result in levee failure. Local jurisdictions should identify circumstances in which they will intervene to support reclamation district response financially to protect their interests and the general public.

Source of Concept: Peterson-Brustad Engineers, Inc. 2013. Flood Emergency Response Assessment Technical Memorandum. June.

Concept Name: Improve Upstream Reservoir Operations

Short Concept Description: Update and improve upstream reservoir operations through enhancements to coordination among operating entities; use of additional information, including forecasting; broader communications with others, including local communities; improved and accessible gaging; and updated flood control manuals. Analyze and implement actions to modify upstream reservoir operations to improve flood management; aquatic, riparian, and floodplain habitat; water quality; and recreation.

Long Concept Description: The major rainfall events in December 1996 and January 1997 necessitated nearly simultaneous high releases from all reservoirs on the system and uncontrolled emergency releases at Don Pedro and Friant dams. Prior to the large storms in late December 1996, many reservoirs had water elevations at or slightly into their flood storage before the storm arrived. The uncontrolled reservoir releases may have been avoided if controlled releases had been made in advance of the storms based on forecast information. Reservoir operators made initial release decisions on an individual basis without coordinating with other reservoir operators. This resulted in significant and rapid increases in flow on the San Joaquin River downstream of these reservoirs. It is believed that coordinating these outflows may also have significantly reduced flooding in the San Joaquin Valley in January 1997. Forecast-based operations were not possible in 1996/1997, but are now becoming feasible with advances in technology.

Consistent with this concept, DWR's Forecast-Coordinated Operations (F-CO) and Forecast-Based Operations (F-BO) Programs are a component of the FloodSAFE Flood Emergency Response Program and includes a focus on the San Joaquin Watershed. The F-CO Program seeks to coordinate flood releases from the reservoirs located in various tributaries of major rivers to optimize the use of downstream channel capacity, the use of total available flood storage space in the system, and eventually to reduce overall peak floodflows downstream from these reservoirs. The first phase of the program is currently underway and has included a preliminary inventory and assessment of hydrologic gaging networks, evaluation of historical data used to support real-time flood forecasting and emergency operations, use of a decision support system for real-time analysis of data and reservoir scheduling, evaluation of hydrologic constraints and opportunities for improved gaging, forecasting, and operations of major reservoirs and flood facilities. DWR's F-BO Program anticipates the use of improved long-term runoff forecasting and operating within the parameters of an existing flood control diagram.

This project concept includes the DWR F-CO and F-BO Program but goes beyond the scope of that effort. It includes an initial analysis of how upstream reservoirs could be operated differently to improve flood management; aquatic, riparian, and floodplain habitat; water quality; and recreation, followed by the pursuit by federal, state and local operators of forecast-coordinated and forecast-based operations to enhance and more efficiently and effectively operate existing reservoirs. The operators would update and improve upstream reservoir operations through enhancements to coordination among operating entities; use of additional information, including forecasting; broader communications with others in advance of and during flood operations, including local communities and downstream landowners; improved and accessible gage data; and updated flood control manuals.

Source of Concept: DWR, stakeholders participating in development of the Mid and Lower SJR RFMPs

Concept Name: San Joaquin River National Wildlife Refuge - Proposed Expansion

Short Concept Description: The United States Fish and Wildlife Service (USFWS) is considering expanding the San Joaquin River National Wildlife Refuge in two sections to restore and enhance habitat to benefit birds migrating along the Pacific Flyway and many other wildlife species that may be compatible or complementary with flood conveyance and transient floodwater storage on floodplains in the Mid San Joaquin River region.

Long Concept Description: Long-term management of flood-prone lands is an ongoing and widely recognized challenge in integrated floodplain management. If successful, enrollment of additional lands within the San Joaquin River National Wildlife Refuge could allow the USFWS to play an important role in regional and system-wide flood management as a long-term land manager and environmental steward. The USFWS is currently working through the National Environmental Policy Act (NEPA) process to attain approval to expand the congressionally-approved acquisition boundary of the San Joaquin River National Wildlife Refuge. The USFWS is proposing to expand this administrative boundary so that flood-prone lands within the expanded boundary (which is primarily within Stanislaus County) can be acquired or ultimately owned by the USFWS for uses consistent with the National Wildlife Refuge System, including wildlife habitat and wetland habitat management. This Refuge is located in Merced and Stanislaus counties. Many of the parcels within the proposed boundary expansion may also be managed to provide expanded floodway, enhanced channel meander, and increased transient floodwater storage. The current proposal includes ~ 11,000 acres of floodplain lands immediately adjacent to the San Joaquin River. The refuge would be expanded to the north and south of the existing boundary along the San Joaquin River. The northern portion includes a 15-mile reach of the San Joaquin River from the existing boundary north to a point west of Manteca in San Joaquin County. The southern portion lies between the San Joaquin River National Wildlife Refuge and the San Luis National Wildlife Refuge, 26 miles to the south. Once completed, the boundary expansion will allow the USFWS to acquire lands from willing sellers and retain ownership and management responsibilities for lands that contribute towards the mission of the NWR system.

Source of Concept: Stakeholder idea, developed by River Partners and the Mid SJR Region's Project Team

Concept Name: San Joaquin River Basin Sediment Status and Dynamics Study

Short Concept Description: For the entire San Joaquin River basin 1) develop a reach-based sediment budget and conceptual model of sediment processes and then 2) develop one or more sediment transport models and analyze transport processes to develop sediment management recommendations at a basin-wide scale.

Long Concept Description: The San Joaquin River is central to a large number of water and habitat resource management efforts. Sediment transport and associated erosion and deposition in different reaches affects and is affected by many of these resource management efforts. For example, erosion and deposition patterns are affected by changes to the flow release schedule of dams to support fisheries or to reduce flood risk from dams upstream, while flood capacity and the quality of aquatic and riparian habitat are affected by changes in erosion and deposition. Sediment transport studies of the Sacramento River have revealed important trends that influence river management (e.g., the long-term reduction in sediment load and associated problems of channel erosion, loss of fish cover from turbidity, and impacts on rates of tidal wetland accretion in the San Francisco Bay). Data that might provide equivalent insights into the San Joaquin River are lacking because the baseline studies and long-term data are not available.

To develop such information a two-phase approach is recommended. In Phase 1, a holistic geomorphic understanding of the river would be established through development of a sediment budget and identification of the long term trends of aggradation and erosion and lateral migration and stability for different reaches of the river using historical data such as aerial photos, United States Geological Survey (USGS) rating curves, and cross section data. Phase 2 would include assembling existing hydraulic models for the river, filling in data gaps, and parameterizing and developing sediment transport models to allow more predictive assessments to be made under subsequent efforts. Potential tasks under each phase are listed below.

Phase 1 – Perform a geomorphic assessment of sediment transport reaches

1. Map and measure amount and rate of bank migration in different reaches
2. Identify changes in channel thalweg and cross section
3. Review USGS gauge rating curves to look for evidence of channel incision and cross section change
4. Develop sediment rating curves and budgets for USGS gauges on the San Joaquin River at key locations

Phase 2 – Develop sediment transport model for the San Joaquin River

1. Identify the most up-to-date hydraulic models for each reach and fill any data gaps
2. Quantify smaller tributaries and large return flows if these are not currently well represented in hydraulic model
3. Collect bed sediment data
4. Identify and obtain available calibration data sets
5. Choose appropriate sediment transport program and develop the model

Source of Concept: Stakeholder idea, developed by the Mid SJR Region's Project Team

APPENDIX H

Financial Plan Technical Memorandum

Financial Plan
Technical Memorandum

Peterson-Brustad, Inc.
Mid-San Joaquin River

Regional Flood Management Plan
August 2014

Table of Contents

Abbreviations & Acronyms

ACEP……Agricultural Conservation Easement Program
CESCF……Cooperative Endangered Species Conservation Fund
CEQA…….. California Environmental Quality Act
CNRA……California Natural Resource Agency
CRCHP……..California Riparian Habitat Conservation Program
CVFPB……....Central Valley Flood Protection Board
CVP……..Central Valley Project
CVPCP……Central Valley Project Conservation Program
CVPIA……..Central Valley Project Improvement Act
DWR……Department of Water Resources
EIP……Early Implementation Project
EIR……..Environmental Impact Report
EQIP……Environmental Quality Incentives Program
ER……Emergency Response
ESA……Endangered Species Act
F-CO……..Forecast-Coordinated Operations
FCP……Flood Corridor Program
FESSRO…….. FloodSAFE Environmental Stewardship and Statewide Resources Office
FMA……...Flood Mitigation Assistance
FOA……Funding Opportunity Announcement
FSRP……Flood System Repair Project
FWO……...Fish and Wildlife Office
HCP……..Habitat Conservation Plan
HCF……Habitat Conservation Fund
HRP……Habitat Restoration Program
IRWMP……Integrated Regional Water Management Plan
IWCP……Inland Wetlands Conservation Program
LLAP……...Local Levee Assistance Program
LMA……Local Maintaining Agency
LOI……..Letter of Intent
LWCF……..Land and Water Conservation Fund
NAWCA……North American Wetlands Conservation Act
NCRS……National Resource Conservation Service
NFIP……National Flood Insurance Plan
O&M……..Operations and Maintenance
OMB……Office of Management and Budget
PDM……Pre-Disaster Mitigation
RAP……...Regional Acceptance Process
RD/District……Reclamation District

Region……Mid San Joaquin River Region
RFMP……Regional Flood Management Plan
RFP……Request for Proposal
RLA……Recovery Land Acquisition
RWMG……Regional Water Management Group
SCFRR……Small Community Flood Risk Reduction
SFRR……Systemwide Flood Risk Reduction
SPFC……State Plan of Flood Control
State……State of California
SWIF……Systemwide Improvement Framework
TM……Technical Memorandum
UFRR……Urban Flood Risk Reduction
USACE……United States Army Corps of Engineers
USBR……United States Bureau of Reclamation
USDA……United States Department of Agriculture
USFWS……United States Fish and Wildlife Service
WCB……Wildlife Conservation Board

1 Introduction

This Financial Plan Technical Memorandum (TM) is intended to provide a high level overview of the capacity of the Region to fund projects identified in the RFMP. To this end, this TM contains information on Potential Funding Sources, Potential Funding Sources matched to each project, and a summary of funding challenges in the Mid SJR Region planning area. General findings and recommendations for future bond funding are also included.

Many of the identified Federal and State funding programs identified are competitive and have limited available funding, so there is no assurance a project will be selected to receive funding if/when the project moves forward. These funding programs are nevertheless a very important part of getting a project funded, as local agencies must leverage as much outside funding as possible.

The RFMP team researched many different funding sources and compared eligibility requirements to project descriptions to determine funding sources that might be applicable to each project. Based on this information, the RFMP team used professional judgment to estimate potential State and Federal cost shares.

Cost share estimates provided in this TM are based on the assumption that the potential funding sources will be available at the time a given project moves forward. Additionally, cost share estimates provided herein are intended for planning purposes only. A specific financial plan will be necessary if/when each project moves forward.

2 Methodology/Assumptions

The methodology used and the assumptions made within this report are outlined below.

Methodology

The following steps were taken to obtain the data within this report:

- *Project Review*
  - Project descriptions were reviewed to identify key elements of the project, such as location (urban vs. rural, San Joaquin River vs. Tuolumne River, etc.) and main objective (restoration, flood control, etc.)
  - Project Costs were estimated from a number of sources, including existing studies and information from project stakeholders.
    - For PL84-99 projects lacking existing data, a unit cost of $2 million per mile of unacceptable levee was used to estimate a costs.
- *Potential Funding source Research and Review*
  - Potential Funding Sources within the region were researched to determine how much funding was available in each funding source, what type of cost share was offered, and what types of projects were eligible.
- *Project and Cost Share Matching*
  - Once key elements of both projects and funding sources were identified they were used to match projects to funding sources that they met the criteria for.
- *Application of Cost Share Information to Project Cost Data*
  - Once projects were matched with their Potential Funding Sources, the cost share percentages from the funding sources were applied to the project cost to get a cost share (in dollars) at the Federal, State, and Local level. The assumptions made during this process are described below.
- *Local Assessment Analysis*
  - An analysis of potential local assessments was performed by separating the region into land use types and applying the average assessment rates of each land use type. Details of the analysis can be found under the Local Funding Source section.

Assumptions

The following assumptions were made to estimate cost shares for each project:

- When projects matched with multiple funding sources, the lowest cost share percentage was used in order to obtain the most conservative cost share estimate.
- When projects had a cost range, the highest cost was used to obtain the most conservative estimate of cost share.

- DWR programs were assumed to have a 50%-90% cost share range per the DWR's "Guidelines for Establishing Local Agency Cost Sharing Formulas for Select Flood Programs and Projects" (2010) unless it was otherwise stated in grant guidelines.

3 Summary of Financial Challenges in the Region

General Overview

The Mid San Joaquin River Region is predominantly characterized by agriculture and rural land uses. It should be noted that these land use types will not change as long as the land is classified as zone A flood zone. Therefore, raising local funds to implement significant system improvements can be more difficult in this Region compared to more developed areas. Local funding for routine O&M and small repairs is typically provided by landowners within each District. The table below summarizes the approximate annual revenue and expenditures for LMAs in the Region.

LMA	Approx. Levee Miles Maintained	Approx. Annual O&M Expenditures	O&M Funding Sources
RD 1602	6.29	$10,000 - $12,000	Individual Property Owners
RD 2031	13.19	$30,000	Individual Property Owners
RD 2063	10.63	$83,000	Assessments
RD 2091	7.89*	$40,000 - $50,000	Assessments
RD 2092	3.76	$10,000 - $12,000	Individual Property Owners
RD 2101	3.51	$25,000	Individual Property Owner
Gomes Lake	0.3	$14,000 - $35,000	JPA (TID, Stanislaus County, City of Turlock, RD 2091, RD 2063)

*0.3 miles are maintained by TID under the Gomes Lake JPA

During interviews with stakeholders in the Region, many LMAs noted they are comfortable funding basic O&M responsibilities, but given their limited financial resources, they are not able to provide the capital needed to implement large-scale levee repairs. DWR grant programs can help LMAs with these expenses, but financial resources of the LMAs are limited, making it difficult for them to provide the local cost share requirements. Furthermore, LMA staff limitations, combined with the fact that district staff are typically working and/or managing farms full-time, means there is little time left to apply for DWR funding.

The Region identified approximately 37 projects with a total estimated cost of approximately $340M. Assuming a minimal local cost share of 10%, this equates to nearly $34M. Even if these improvements were spread over a 20-year timeframe, it appears the current system of flood control infrastructure funding and implementation may be unsustainable unless other benefits can be provided for other uses or even other regions.

Public Law 84-99 (PL84-99) Program Challenges

Many of the levees in the Mid San Joaquin River Region are part of a Federal flood protection system (i.e., Project levees), and are therefore eligible to participate in the PL 84-99 program. PL 84-99 is a Federal program that provides financial support to eligible and actively enrolled levee systems in the event of a flood event. Specifically, PL 84-99 gives USACE the authority to undertake activities including the following:

- Disaster preparedness
- Advance measures
- Emergency response operations
- Rehabilitation of flood control works threatened or destroyed by flood

In order to receive rehabilitation assistance, a Project levee must be eligible and enrolled in the PL 84-99 program prior to the flood event. An eligible system would be restored to its pre-disaster status at no cost to the owner (typically the owner of a project levee is the State of California).

In order to remain eligible for PL 84-99 damage assistance, Project levees need to receive an Acceptable (A) or Minimally Acceptable (M) rating on the Periodic Inspection Report (PIR) conducted by USACE. If any part of a Project levee system receives an Unacceptable (U) rating, the system is put on probation, and if it receives another Unacceptable rating the following year, it is placed on "inactive" status and is ineligible for the PL 84-99 program until the problems are fixed. Only one LMA in the Mid San Joaquin River Region is currently Active in the PL 84-99 program. The table below summarizes the current status of the Reclamation Districts in the Region:

Maintaining Agency	Overall Rating (2013)	Primary Concerns	PL 84-99 Status
RD 1602 – Del Puerto	U	Animal control & vegetation	Inactive
RD 2031 - Elliot	M*	Tree trimming & animal control	Inactive
RD 2063 – Crow's Landing	M*	Vegetation & erosion/bank caving	Inactive
RD 2091 – Chase	A		Inactive
RD 2092 – Dos Rios	A		Active
RD 2101 - Blewett	U	Animal control & erosion	Inactive
TID – Gomes Lake	n/a	n/a	n/a
RD 2099 El Solyo Ranch	n/a	n/a	n/a
RD 2100 – White Lake Ranch	n/a	n/a	n/a
RD 2102 – Lara Ranch	n/a	n/a	n/a

* Overall LMA Threshold Percent is less than 10%; however, U Rated Miles are present, so the Overall LMA Rating is M instead of A.

Many of the concerns noted by USACE are due to O&M challenges. The result is often levees which fail to meet criteria established by USACE, are rated as Unacceptable in periodic inspections, and are no longer eligible for disaster assistance under the PL 84-99 program.

USACE offers a process through the system-wide improvement framework (SWIF) which allows LMAs to remain temporarily eligible for PL 84-99 assistance while they correct unacceptable deficiencies as part of a broader, system-wide improvement to the levee systems. Submitting a SWIF is a two-step process:

a Letter of Intent (LOI) is submitted followed by submission of a SWIF plan. The applicant has up to two years to develop the SWIF following the acceptance of the LOI by USACE.

A SWIF provides committed sponsors the opportunity to transition their levees to USACE standards. By using a SWIF, sponsors can prioritize deficiencies to address the highest risk first to achieve system-wide risk reduction.

The downside to this is that preparing and implementing a SWIF is an expensive and time-consuming process and the financial benefits are only received in the event of a flood. Even then, the benefits are only directed toward repair of the levee. So the question then becomes "is the cost of regaining active status in the PL 84-99 program economically justified?"

The LOI and SWIF process can cost as much as $200,000 for each LMA. Necessary animal and vegetation control can be expensive due to regulatory constraints, and addressing erosion issues can also be a significant undertaking. The total investment could be up to $500,000 or more for each LMA to regain active status in the PL 84-99 program.

With such a large cost associated with getting back into the PL84-99 program, RDs have started to question the economic benefits of being in the program. Since funds for the program are not spent or even appropriated without support from Congress, and the fact that it is very unlikely that many of the RDs in the Region could meet the cost benefit analysis requirements needed to get funding, many RDs have decided that the money spent on activities such as SWIF preparation might be better used to maintain levees, particularly since it is difficult for them to raise assessments.

4 Available Funding Sources

This section provides an overview of some of the funding sources available in the region. Due to the changing nature of funding sources, this list is not intended to detail every funding source available, but instead includes the most common funding sources in the Region. This section describes funding sources at the Federal and State level, separated into conservation, structural, and non-structural programs. Each program description includes an overview of the program, eligibility information, and information on the application process. A summary table is included at Appendix II.

4.1 Federal Programs

Conservation Funding Sources

4.1.1 Agricultural Conservation Easement Program (ACEP)

Program Overview

Funded by: USDA NCRS

The Agricultural Conservation Easement Program (ACEP) provides financial and technical assistance to help conserve agricultural lands and wetlands and their related benefits. The ACEP consists of two components: Agricultural Land Easement and Wetlands Reserves Easements. Under the Agricultural Land Easements component, NRCS helps Indian tribes, state and local governments and non-governmental organizations protect working agricultural lands and limit non-agricultural uses of the land. Under the Wetlands Reserve Easements component, NRCS helps to restore, protect and enhance enrolled wetlands. Each of these components is explained in more detail below.

Agricultural Land Easements

NRCS provides financial assistance to eligible partners for purchasing Agricultural Land Easements that protect the agricultural use and conservation values of eligible land. In the case of working farms, the program helps farmers and ranchers keep their land in agriculture. The program also protects grazing uses and related conservation values by conserving grassland, including rangeland, pastureland and shrubland. Eligible partners include Indian tribes, state and local governments and non-governmental organizations that have farmland or grassland protection programs.

Under the Agricultural Land component, NRCS may contribute up to 50 percent of the fair market value of the agricultural land easement. Where NRCS determines that grasslands of special environmental significance will be protected, NRCS may contribute up to 75 percent of the fair market value of the agricultural land easement.

Wetland Reserve Easements

NRCS also provides technical and financial assistance directly to private landowners and Indian tribes to restore, protect, and enhance wetlands through the purchase of a wetland reserve easement. For acreage owned by an Indian tribe, there is an additional enrollment option of a 30-year contract.

Through the wetland reserve enrollment options, NRCS may enroll eligible land through:

Permanent Easements – Permanent Easements are conservation easements in perpetuity. NRCS pays 100 percent of the easement value for the purchase of the easement. Additionally, NRCS pays between 75 to 100 percent of the restoration costs.

30-year Easements – 30-year easements expire after 30 years. Under 30-year easements, NRCS pays 50 to 75 percent of the easement value for the purchase of the easement. Additionally, NRCS pays between 50 to 75 percent of the restoration costs.

Term Easements - Term easements are easements that are for the maximum duration allowed under applicable State laws. NRCS pays 50 to 75 percent of the easement value for the purchase of the term easement. Additionally, NRCS pays between 50 to 75 percent of the restoration costs.

30-year Contracts – Term easements are easements that are for the maximum duration allowed under applicable State laws. NRCS pays 50 to 75 percent of the easement value for the purchase of the term easement. Additionally, NRCS pays between 50 to 75 percent of the restoration costs.

For wetland reserve easements, NRCS pays all costs associated with recording the easement in the local land records office, including recording fees, charges for abstracts, survey and appraisal fees, and title insurance.

Eligibility Information

Land eligible for agricultural easements includes cropland, rangeland, grassland, pastureland and nonindustrial private forest land. NRCS will prioritize applications that protect agricultural uses and related conservation values of the land and those that maximize the protection of contiguous acres devoted to agricultural use.

Land eligible for wetland reserve easements includes farmed or converted wetland that can be successfully and cost-effectively restored. NRCS will prioritize applications based the easement's potential for protecting and enhancing habitat for migratory birds and other wildlife.

To enroll land through agricultural land easements, NRCS enters into cooperative agreements with eligible partners. Each easement is required to have an agricultural land easement plan that promotes the long-term viability of the land.

To enroll land through wetland reserve easements, NRCS enters into purchase agreements with eligible private landowners or Indian tribes that include the right for NRCS to develop and implement a wetland reserve restoration easement plan. This plan restores, protects, and enhances the wetland's functions and values.

Application Process

To enroll land through agricultural land easements, eligible partners may submit proposals to NRCS to acquire conservation easements on eligible land.

To enroll land through wetland reserve easements, landowners may apply at any time at the local USDA Service Center.

Sources:

http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/easements/acep/?cid=stelprdb1242695

4.1.2 Anadromous Fish Restoration Program and Anadromous Fish Screen Program

Program Overview

Funded by: USFWS

The Anadromous Fish Restoration Program is designed to:

- Protect, restore, and enhance fish, wildlife, and associated habitats in the Central Valley and Trinity River basins of California;
- Address impacts of the Central Valley Project on fish, wildlife and associated habitats;
- Improve the operational flexibility of the Central Valley Project;
- Increase water-related benefits provided by the Central Valley Project to the State of California through expanded use of voluntary water transfers and improved water conservation;
- Contribute to the State of California's interim and long-term efforts to protect the San Francisco Bay/Sacramento-San Joaquin Delta Estuary;
- Achieve a reasonable balance among competing demands for use of Central Valley Project water, including the requirements of fish and wildlife, agricultural, municipal and industrial and power contractors.

Funding Information

Grant Size/Amount Available: The estimated grant size for FY 14 is $9 million. Individual grant size estimated to be $10,000 - $300,000.

Cost Share: 50%

Eligibility Information

Applicants may be State, local governments, Native American Organizations, other public nonprofit institutions/organizations, private nonprofit/organization. No other Federal agency may apply.

Eligible Activities Include:

- Research to improve management and increase Anadromous fish resources
- Land Acquisition
- Spawning area improvements
- Installation of fish passages
- Construction of fish protection devices
- Data collection

Application Process

The White House's office of Management and Budget (OMB) issues circulars to provide instructions of information to Federal Agencies. OMB Circular No. A-102 and OMB Circular No. A-110 apply to this program. The basic application (SF 424 Application for Federal Assistance form) requires a request for proposal narrative, scope of work with deliverables, budget (SF 424A), and Assurances. Information (SF424B) submitted to the Stockton Fish and Wildlife Office (FWO) for review by a locally convened panel. The panel will select the awardee and forward the information to the station project leader for final approval. No state plan required.

Contact Info:

Ren Lohoefner,
2800 Cottage Way, Suite W2606, Sacramento, California 95825
Phone: (916) 414-6464
Fax: (916) 414-6464.

Sources:

- https://www.cfda.gov/index?s=program&mode=form&tab=core&id=200daf76afcc578965460cdc9537b261
- http://www.whitehouse.gov/omb/circulars_default
- http://www.grants.gov/web/grants/forms/sf-424-instructions.html;jsessionid=hCvzT5VFSf2DQdvL8sbq7nFtKhqLv1fx5Z0v9J6G169pw8CQHKGV

4.1.3 Central Valley Project Implementation Act (CVPIA) – Habitat Restoration Program and Conservation Program

Program Overview

Funded by: USFWS and USBR

The Central Valley Project Conservation Program (CVPCP) and the Central Valley Project Improvement Act Habitat Restoration Program (HRP) represent highly integrated efforts to restore and protect species and habitats impacted by the Central Valley Project (CVP).

The CVPCP and HRP are managed cooperatively by the U.S. Bureau of Reclamation (USBR) and the U.S. Fish and Wildlife Service (USFWS), and receive management input from the California Department of Fish and Game. Both programs are guided by a Technical Team comprised of biologists and managers from these three agencies.

While the programs were established under separate regulatory and legislative authorities, they share the same overall objective of improving conditions for CVP impacted species and habitats. For this reason, the CVPCP and HRP receive proposals and evaluate those proposals under a single integrated process. Proposal submission deadline is in October of each fiscal year.

Funding Information

Grant Size/Amount Available: Available Funding in 2014 Funding Opportunity Announcement (FOA): $2,250,000 with individual awards ranging from $25,000 to $1 million.

Cost Share: There is no cost sharing requirement, but partnering (i.e., cost sharing provided by entities, through cash or in-kind services, which are contributing towards the proposed project) is highly encouraged and the level of partnering is considered during application evaluation.

Eligibility Information

Applicants eligible under this FOA include State or local government agencies, private non-profit or profit organizations, individuals, and educational institutions. Federal agencies are not eligible to submit an application under this FOA. Interested Federal agencies should contact the Program Managers about how to apply for funding, such as through an interagency or intra-agency agreement.

Eligible Activities Include:

- Fee Title/Easement Acquisition: Protection of species or existing habitats impacted by the CVP through the purchase of fee title or conservation easements on lands where threats to these lands are significant. At least 50 percent of the CVPCP and HRP funds will be targeted towards this category of activity. The CVPCP/HRP cannot fund any acquisition projects which would result in mitigation credits for the applicant or seller.

- Habitat Restoration: Restoration of CVP impacted habitats or species populations on lands permanently protected for conservation where restoration actions would markedly improve conditions for impacted species. The CVPCP/HRP cannot fund any restoration projects which would result in mitigation credits for the grant recipient.
- Research: Research addressing status and habitat needs to facilitate species recovery.
- Captive Propagation and Reintroduction: Captive propagation and reintroduction of listed species in order to increase numbers of individuals in a population.

Application Process

The CVPCP and HRP utilize a proposal solicitation process to fund and carry out conservation actions within the Programs' project areas. A single process is applied to both Programs.

At the beginning of each funding cycle, a Funding Opportunity Application (FOA) is posted on www.grants.gov. A brief notice announcing the FOA posting is mailed to prospective applicants using an established mailing list. Proponents who wish to be included on this list should contact Program Managers and provide address information. Contact information for the Program Managers can be found below.

Daniel Strait	Caroline Prose
Manager, CVP Conservation Program & CVPIA Habitat Restoration Program Bureau of Reclamation, MP-152 2800 Cottage Way, Sacramento, CA 95825 (916) 978-5052	Manager, CVPIA Habitat Restoration Program U.S. Fish and Wildlife Service Pacific Southwest Region 2800 Cottage Way, Room W-2606 Sacramento, CA 95825 Phone: (916) 414-6575

Federal agencies are not eligible to submit proposals under the FOA, however they are eligible to receive program funding. Interested federal agencies should contact the Program Managers to discuss how to apply for funding.

The FOA provides up to date information regarding Program priorities and other submission guidelines. The deadline for submitting an application will be indicated in the posted FOA. Generally, deadlines are in mid-November or early December.

Proposals should be submitted in the Programs' standard format indicated in the FOA. All proposals are ranked using a numerical ranking process, but final funding decisions can be based on additional factors.

The following documents and links provide prospective applicants all the information needed to submit a proposal to the Programs:

Documents

CVP/HRP FOA (pdf - 690 KB)

CVPCP/HRP Priority Project Area Map

CVPCP/HRP Priority Species List (pdf - 70 KB)

Sources:

- http://www.usbr.gov/mp/cvpcp/
- http://www.grants.gov/web/grants/view-opportunity.html?oppId=236611

4.1.4 Endangered Species Act Section 6 Grant Program

Program Overview

Funded by: USFWS and CDFW

The Cooperative Endangered Species Conservation Fund (CESCF), provides grants to states and territories to participate in a wide array of voluntary conservation projects for candidate, proposed, and listed species. The program provides funding to states and territories for species and habitat conservation actions on non-federal lands.

Four grant programs are available through the CESCF; they include the "Traditional" Conservation grants and the Nontraditional Habitat Conservation Plan (HCP) Land Acquisition, Habitat Conservation Planning Assistance, and Recovery Land Acquisition Grants (RLA).

"Traditional" Conservation Grants: The "Traditional" Conservation Grants program provides financial assistance to States to implement conservation projects for candidate, listed, and recently recovered species. Funded activities include habitat restoration, species status surveys, public education and outreach, captive propagation and reintroduction, nesting surveys, genetic studies, and development of management plans.

Funding Information

Grant Size/Amount Available: Individual projects can receive $10,000 to $1 million in funding.

Cost Share: Maximum Federal cost share is 75%. If two or more States or territories implement a joint project the Federal cost share can be up to 90%.

Eligibility Information

Participation in the CESCF programs is only available to State agencies that have a current cooperative agreement with the Secretary of the Interior. However, individuals or groups (for example land conservancies, cities, counties, community organizations, or conservation organizations) may work with a State agency that has a cooperative agreement on conservation efforts that are mutually beneficial, as a sub-grantee.

Eligible Activities Include:

- Habitat restoration
- Species status surveys
- Public education and outreach
- Captive propagation and reintroduction
- Nesting surveys,
- Genetic studies

- Development of management plans

Application Process

Project proposals can be submitted by hard copy or through electronic submission through grants.gov. Applicants should refer to the grant announcement for specific requirements.

Project proposals will consist of a narrative description of the project and an Application for Federal Assistance (SF 424) form. The proposal must include a reasonably detailed budget indicating how the funding will be used and how each partner is contributing to the project. The proposal must also indicate the time commitment for maintaining the project's benefits.

Applicants are encouraged to contact the Regional Program Coordinator with any questions regarding what information must be submitted with the project proposal, as incomplete proposals will not be considered for funding. The contact information can be found below.

Regional Director

Dan Cox (HCP)
(916) 414-6539

Lisa Ellis
(916) 414-6741

U.S. Fish and Wildlife Service
Federal Building, 2800 Cottage Way, Room W-2606
Sacramento, CA 95825-1846

Full project application information, including suggested project narrative format, can be found in the grant announcement which can be found at the link below.

Sources:

- http://www.fws.gov/endangered/esa-library/pdf/FY%2014%20CESCF%20RFP%20Grant%20Announcement%20Standard%20Format.FINAL.pdf

4.1.5 Environmental Quality Incentives Program (EQIP)

Program Overview

Funded by: USDA NRCS

The Environmental Quality Incentives Program (EQIP) provides financial and technical assistance to agricultural producers in order to address natural resource concerns and deliver environmental benefits such as improved water and air quality, conserved ground and surface water, reduced soil erosion and sedimentation, and improved or created wildlife habitat.

Eligible program participants receive financial and technical assistance to implement conservation practices, or activities like conservation planning, that address natural resource concerns on their land. Payments are made to participants after conservation practices and activities identified in an EQIP plan of operations are implemented. Contracts can last up to ten years in duration.

Funding Information

Grant Size/Amount Available: Selected projects can receive funding up to $450,000.

Cost Share: Up to 50% Federal cost share.

Eligibility Information

Agricultural producers and owners of non-industrial private forestland and Tribes are eligible to apply for EQIP. Eligible land includes cropland, rangeland, pastureland, non-industrial private forestland and other farm or ranch lands.

Socially disadvantaged, beginning and limited resource farmers, Indian tribes and veterans are eligible for an increased payment rate and may receive advance payment of up to 50 percent to purchase materials and services needed to implement conservation practices included in their EQIP contract.

Applicants must:

- Control or own eligible land
- Comply with adjusted gross income limitation (AGI) provisions
- Be in compliance with the highly erodible land and wetland conservation requirements
- Develop an NRCS EQIP plan of operations

Application Process

NRCS will help eligible producers develop an EQIP plan of operations, which will become the basis of the EQIP contract.

EQIP applications will be ranked based on a number of factors, including the environmental benefits and cost effectiveness of the proposal.

Visit your local USDA Service Center to apply or visit www.nrcs.usda.gov/getstarted.

For more details please visit the NRCS Website.

Sources:

- http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/eqip/

4.1.6 Land and Water Conservation Fund (LWCF)

Program Overview

Funded by: USFWS

The Land and Water Conservation Fund (LWCF) Program provides matching grants to States and local governments for the acquisition and development of public outdoor recreation areas and facilities (as well as funding for shared federal land acquisition and conservation strategies). The program is intended to create and maintain a nationwide legacy of high quality recreation areas and facilities and to stimulate non-federal investments in the protection and maintenance of recreation resources across the United States.

Funding Information

Grant Size/Amount Available: Individual project awards can range from $10,000 to several million.

Cost Share: Up to 50% Federal cost share.

Eligibility Information

Eligible applicants include State governments and local governments (via States).

Eligible Activities Include:

- Land Acquisition
- Design
- Construction
- Material Acquisition
- Recreation

Application Process

Two application packets (one with original signatures and one copy) must be sent to the Office of Grants and Local Service by February 3rd of each year. Unsuccessful applications from one year can be resubmitted for a subsequent year if the proposed project is eligible and the requirements of the application are complete.

For full details describing what should be included in the application packet and necessary forms please see the LWCF application guide. A link to the guide can be found below.

Sources:

- http://www.parks.ca.gov/pages/1008/files/lwcf%20application%20guide_%20final%20draft%2010.10.2013.pdf
- http://www.nps.gov/lwcf/
- http://www.nps.gov/ncrc/programs/lwcf/grants.html
- http://www.nps.gov/ncrc/programs/lwcf/manual/lwcf.pdf

4.1.7 North American Wetlands Conservation Act (NAWCA)

Program Overview

Funded by: USFWS

The North American Wetlands Conservation Act (NAWCA) of 1989 provides matching grants to organizations and individuals who have developed partnerships to carry out wetlands conservation projects in the United States, Canada, and Mexico for the benefit of wetlands-associated migratory birds and other wildlife.

There is a Standard and a Small Grants Program. Both are competitive grants programs and require that grant requests be matched by partner contributions at no less than a 1-to-1 ratio. Funds from Federal sources may contribute towards a project, but are not eligible as match.

The Standard Grants Program supports projects in Canada, the United States, and Mexico that involve long-term protection, restoration, and/or enhancement of wetlands and associated uplands habitats. In Mexico, partners may also conduct projects involving technical training, environmental education and outreach, organizational infrastructure development, and sustainable-use studies.

The Small Grants Program operates only in the United States. It supports the same type of projects and adheres to the same selection criteria and administrative guidelines as the U.S. Standard Grants Program. However, project activities are usually smaller in scope and involve smaller awards.

Funding Information

The Congressional appropriation to fund the Act's Grants Program in FY 2014 is $31,175. Additional program funding comes from fines, penalties, and forfeitures collected under the Migratory Bird Treaty Act of 1918; from Federal fuel excise taxes on small gasoline engines; and from interest accrued on the fund established under the Federal Aid in Wildlife Restoration Act of 1937. In FY 2013 these other sources provided almost $31.5 million in additional grant funds.

Grant Size/Amount Available: $30 million (estimated) available in FY 2014. For the Small Grants Program requests may not exceed $75,000, and funding priority is given to grantees or partners new to the Act's Grants Program. No maximum requests were given for the standard grant program.

Cost Share: Up to 50% Federal Cost Share.

Eligibility Information

Wetland conservation projects in the US, Canada, and Mexico for the benefit of wetlands associated migratory birds and other wildlife are eligible for this program.

Application Process

The U.S. Fish and Wildlife Service's Division of Bird Habitat Conservation is responsible for facilitating the Act's Grants Program.

Standard Grants Program: The process for receiving and preliminarily reviewing project proposals is handled slightly differently for each country and enjoys the active participation of each federal government.

Once a slate of eligible proposals has been determined per each country-program's process, the proposals are further reviewed and ranked by the North American Wetlands Conservation Council, a nine-member council established by the Act. The Council then recommends projects to the Migratory Bird Conservation Commission, a seven-member commission authorized by NAWCA to give final funding approval to projects. The Division administers the grants for all approved Standard Grants Program projects.

Small Grants Program: The process follows that of the U.S. Standard Grants Program, except for the timing of the final funding approval. Each year, the Commission pre-approves the total amount of funding to be distributed to projects in the next fiscal year. Final project-selection authority is delegated to the Council, which then reports its selections back to the Commission. The Division administers the grants for all approved Small Grants Program projects.

Sources:

- http://www.fws.gov/birdhabitat/Grants/NAWCA/index.shtm

Structural Flood Control Funding Sources

4.1.8 Flood Mitigation Assistance (FMA)

Program Overview

The FMA Grant Program was created as part of the National Flood Insurance Reform Act (NFIRA) of 1994 (42 U.S.C. 4104c) with the goal of reducing or eliminating claims under the National Flood Insurance Program (NFIP).

The FMA program is a grant program that provides funding to States, territories, tribal entities and communities to assist in their efforts to reduce or eliminate the risk of repetitive flood damage to buildings and structures insurable under the National Flood Insurance Program (NFIP).

Funding Information

Grant Size/Amount Available: $89 million. Individual planning grants using FMA funds shall not exceed $50,000 to any Applicant or $25,000 to any sub applicant.

Cost Share: Up to 75% Federal cost share (base cost share).

Availability under the FMA Grant Program of depends on the type of properties included in the grant. Severe repetitive loss properties may receive up to 100-percent Federal funding and repetitive loss properties may receive up to 90-percent. Insured properties and planning grants may receive up to 75-percent of the eligible cost of activities. Structures with varying cost share requirements can be submitted in one application. Applicants must provide documentation in the project application showing how the final cost share was derived. The final cost share will be entered into the eGrants system and documentation showing how the final cost share was derived must be attached to the application.

Eligibility Information

Entities eligible to apply for FMA grants include the emergency management agency or a similar office of the 50 States (e.g., the office that has primary emergency management or floodplain management responsibility. Each State, territory, commonwealth, or Indian tribal government shall designate one agency to serve as the Applicant for each FMA program.

Eligible activities for the FMA Grant Program include:

1 Property Acquisition and Structure Demolition or Relocation
2 Structure Elevation
3 Dry Flood-Proofing
4 Minor Localized Flood Reduction Projects
5 Hazard Mitigation Planning (Flood Portion)
6 Non-structural Retrofitting of Existing Buildings and Facilities
7 Management Costs

Application Process

Applications and subapplications for FMA are submitted via the eGrants system https://portal.fema.gov/famsVuWeb/home . If a subapplicant does not use the eGrants system, the Applicant must enter the paper subapplication(s) into the eGrants system on the sub applicant's behalf. Blank applications that conform to the eGrants format are available for printing from the eGrants system https://portal.fema.gov/famsVuWeb/home. Supporting documentation that cannot be electronically attached to the eGrants application (e.g., engineering drawings, photographs, and maps) must be submitted to the appropriate FEMA Regional Office. The entire application, including all paper documentation, must be received by the appropriate FEMA Regional Office no later than the application deadline.

Sources:

- http://www.fema.gov/flood-mitigation-assistance-program
- http://www.ak-prepared.com/grants/FY%2014%20FOA%20-%20FMA%20-%20GPD%20Final%20%282%29%204-15-2014.pdf

4.1.9 Pre-Disaster Mitigation (PDM)

Program Overview

The Pre Disaster Mitigation (PDM) Grant Program was created by Section 203 of the Stafford Act, 42 U.S.C. 5133 with the goal of reducing overall risk to the population and structures from future hazard events, while also reducing reliance on Federal funding from future disasters. The PDM Grant Program is designed to assist States, Territories, Indian Tribal governments, and local communities to implement a sustained pre-disaster natural hazard mitigation program to reduce overall risk to the population and structures from future hazard events, while also reducing reliance on Federal funding from future disasters.

Funding Information

Grant Size/Available Funding: Funding for the PDM program is $23,000,000 with up to $3 million in funding per project.

Cost Share: Up to 75% Federal cost share (base cost share).

For the PDM Grant Program, Federal funding for project and planning activities is generally available for up to 75-percent of the eligible activity costs. The remaining 25-percent of eligible activity costs are derived from non-Federal sources. Small impoverished communities may be eligible for up to a 90-percent Federal cost share. Indian Tribal Grantees meeting the definition of a small impoverished community are eligible for a non-Federal cost share of 10-percent for management costs.

Eligibility Information

Entities eligible to apply for PDM grants include the emergency management agency or a similar office of the 50 States (e.g., the office that has primary emergency management or floodplain management responsibility), the District of Columbia, American Samoa, Guam, the U.S. Virgin Islands, Puerto Rico, the Northern Mariana Islands, and Indian Tribal governments. Each State, Territory, Commonwealth, or Indian Tribal government shall designate one agency to serve as the Applicant for each HMA program. For the definition of the term Indian Tribal government refer to 44 CFR Section 201.2.

Eligible activities for the PDM Grant Program include:

- Property Acquisition and Structure Demolition or Relocation
- Structure Elevation
- Dry Flood-Proofing
- Minor Localized Flood Reduction Projects
- Structural Retrofitting of Existing Buildings
- Non-structural Retrofitting of Existing Buildings
- Safe Room Construction
- Infrastructure Retrofit

- Soil Stabilization
- Wildfire Mitigation
- Hazard Mitigation Planning
- Management Costs

Application Process

Applications and subapplications for PDM are submitted via the eGrants system https://portal.fema.gov/famsVuWeb/home. If a subapplicant does not use the eGrants system, the Applicant must enter the paper subapplication(s) into the eGrants system on the sub applicant's behalf. Blank applications that conform to the eGrants format are available for printing from the eGrants system. Supporting documentation that cannot be electronically attached to the eGrants application (e.g., engineering drawings, photographs, and maps) must be submitted to the appropriate FEMA Regional Office. The entire application, including all paper documentation, must be received by the appropriate FEMA Regional Office no later than the application deadline.

Sources:

- http://www.ak-prepared.com/grants/FY%2014%20FOA%20-%20PDM%20-%20%204-15-2014%20FINAL.pdf

4.1.10 USACE Funding

Program Overview

USACE will provide cost share for improvements to a Federal flood facility if it is determined that there is a Federal interest. Federal cost share information from the Water Resources Development Act of 1986 and its update, the Water Resources Act of 1999 can be found below.

Feasibility Studies

The non-Federal Partner must agree by contract to contribute 50 percent of the cost for such study during the period of such study. Not more than one-half of such non-Federal contribution may be made by the provision of services, materials, supplies, or other in-kind services necessary to prepare the feasibility report.

Structural Flood Control

The non-Federal partners for a structural flood control project shall:

- Pay 5 percent of the cost of the project assigned to flood control during the construction of the project.
- Provide all lands, easements, rights-of-way, and dredged material disposal required only for flood control and perform all related necessary relocations
- Provide that portion of the join costs of lands, easements, rights-of-way, dredged material disposal areas, and relocations which is assigned to flood control.

The non-Federal partners will also have a 35 percent minimum contribution. If the value of the contributions required from the above items is less than 35 percent for the project, the non-Federal partners shall pay during construction of the project such additional amounts as are necessary so that the total contribution is equal to 35 percent of the cost of the project. The non-Federal cost share shall not exceed 50 percent of the total project cost. For non-Federal cost shares that exceed 30 percent of the project cost, the excess amount may be paid over a time period of up to 15 years.

Non-Structural Flood Control

The non-Federal share of the cost of non-structural flood control measures shall be 35 percent of the cost of such measures. The non-Federal interests for any such measures shall be required to provide all lands, easements, rights-of-way, dredged material disposal areas, and relocations necessary for the project, but shall not be required to contribute any amount in cash during construction of the project

Funding Information

Grant Size/Amount Available: N/A

Cost Share: USACE has separate cost share guidelines for different project types. The Federal cost share for the different project types is listed below:

- Feasibility Studies: 50%
- Structural Flood Control: 50% - 65%
- Non Structural Flood Control: 65%

It should be noted that cost share data was taken from the Water Resources Development Acts of 1986 and 1999

Eligibility Information

Eligible Entities include CVFPB with local sponsor.

Eligible activities for the USACE/CVFPB Projects include:

- Land Acquisition
- Design
- Construction

Application Process

A feasibility study is needed in order to determine Federal interest in a project.

Sources:

- http://www.gpo.gov/fdsys/pkg/PLAW-106publ53/pdf/PLAW-106publ53.pdf
- http://www.epw.senate.gov/wrda86.pdf

Non-Structural Flood Control Funding Sources

4.1.11 Emergency Watershed Protection Program – Floodplain Easement Option (EWP-FPE)

Program Overview

Funded by: USDA NCRS

The Emergency Watershed Protection - Floodplain Easement Program (EWP-FPE) provides an alternative measure to traditional EWP recovery, where it is determined that acquiring an easement in lieu of recovery measures is the more economical and prudent approach to reducing a threat to life or property.

The easement area will be restored to the maximum extent practicable to its natural condition. Restoration utilizes structural and nonstructural practices to restore the flood storage and flow, erosion control, and improve the practical management of the easement.

Floodplain easements restore, protect, maintain and enhance the functions of floodplains while conserving their natural values such as fish and wildlife habitat, water quality, flood water retention and ground water recharge. Structures, including buildings, within the floodplain easement must be demolished and removed, or relocated outside the 100-year floodplain or dam breach inundation area.

Funding Information

Grant Size/Amount Available: Information Unavailable

Cost Share: Up to 100% Federal cost share.

A permanent easement is the only enrollment option available for EWP-FPE floodplain easements. Permanent FPE easements are available on the following types of land:

1. Agricultural or open lands. In these cases, NRCS will pay up to 100% of the easement value and up to 100% of the costs for easement restoration.
2. Lands primarily used for residential housing. In these cases, NRCS will pay up to 100% of the easement value and up to 100% of the structure's value if the landowner chooses to have it demolished. If the landowner wished to relocate their residence instead of demolishing it, the NRCS will pay 100% of the costs associated with relocating it to a location outside of the floodplain. A project sponsor is required for these projects and is required to purchase the remaining lot after structures are removed.

Eligibility Information

NRCS may purchase EWP-FPE permanent easements on floodplain lands that:

- The floodplain lands were damaged by flooding at least once within the previous calendar year or have been subject to flood damage at least twice within the previous 10 years [1].
- Other lands within the floodplain are eligible, provided the lands would contribute to the restoration of the flood storage and flow, provide for control of erosion, or that would improve the practical management of the floodplain easement.
- Lands would be inundated or adversely impacted as a result of a dam breach.

[1]If FPE is being offered as recovery for a specific natural disaster, at least one of the instances of flooding must have been a result of that natural disaster.

Application Process

If you are interested in applying for EWP-FPE, please review the documents listed below as they will need to be completed when you apply. More information about the EWP-FPE can be obtained from your local USDA NRCS Field Office.

Form AD-1153, Application for Long-Term Contracted Assistance

Form AD-1157, Option Agreement to Purchase

Form AD-1161, Application for Payment

Sources:

- http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/financial/ewp/?cid=nrcs143_008225

Other Suggested Federal Funding Sources

The Federal funding sources detailed in the previous section was not meant to represent an exhaustive list of opportunities, but are meant to give a broad overview of some of the most common funding sources available. While it would be difficult to list every funding source available the RFMP team would like the most complete list possible. To that end, a list of Federal funding sources that were suggested to the RFMP team too late to make it into the main document.

- Clean Water Act Non-Point Source (NPS) Grant Program

4.2 State Programs

Conservation Funding Sources

4.2.1 California Riparian Habitat Conservation Program (CRCHP)

Program Overview

Funded by: California Wildlife Conservation Board (CA WCB)

The goals of the CRHCP are to protect, preserve, restore and enhance riparian habitat throughout California. To achieve these goals the program has adopted the following seven objectives:

- Assess the current amount and status of riparian habitat throughout the state.
- Identify those areas which are critical to the maintenance of California's riparian ecosystems.
- Identify those areas which are in imminent danger of destruction or significant degradation.
- Prioritize protection needs based on the significance of the site and potential loss or degradation of habitat.
- Develop and fund project-specific strategies to protect, enhance, or restore significant riparian habitat.
- Develop, administer, and fund a grants program for riparian habitat conservation.
- Provide a focal point for statewide riparian habitat conservation efforts.

Funding Information

Grant Size/amount available: $3 million will be available annually for restoration and acquisitions until the year 2020. Grants awards range from $2,000 to $2 million.

Cost Share: 50% - 90%.

Eligibility Information

Eligible entities include nonprofit organizations, local government agencies, state departments, and federal agencies.

Eligible Activities Include:

- Riparian Conservation
- Land Acquisition

Application Process

The WCB accepts applications for funding on a continuous basis.

For information about how to apply for funding for riparian habitat restoration, please contact the Riparian Program Manager (see Contact Information). The application guidelines for restoration projects are available on the website.

Contact Information

Wildlife Conservation Board Riparian Program Manager
1807 13th Street
Sacramento, CA 95814-7117
Phone: 9164451072
Fax: 9163230280

Sources:

- http://rlch.org/funding/california-riparian-habitat-conservation-program
- http://www.privatelandownernetwork.org/yellowpages/resource.aspx?id=14402
- https://www.wcb.ca.gov/Programs/Riparian.aspx

4.2.2 California River Parkways Program

Program Overview

Funded by: California Natural Resource Agency

The California River Parkways Program is a competitive grant program first created under the Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002 (Proposition 50). The program is administered by the Office of the Secretary for Resources and awards funds to public agencies and non-profit organizations to acquire, restore, protect or develop river parkways.

Funding Information

Grant Size/Amount Available: Information Unavailable

Cost Share: 50%-90%

Eligibility Information

Eligible entities include public agencies and California nonprofit organizations

Projects must meet at least two of the following statutory conditions:

- Recreation - Provide compatible recreational opportunities including trails for strolling, hiking, bicycling and equestrian uses along rivers and streams.
- Habitat - Protect, improve, or restore riverine or riparian habitat, including benefits to wildlife habitat and water quality.
- Flood Management - Maintain or restore the open-space character of lands along rivers and streams so that they are compatible with periodic flooding as part of a flood management plan or project.
- Conversion to River Parkways - Convert existing developed riverfront land into uses consistent with River Parkways.
- Conservation and Interpretive Enhancement - Provide facilities to support or interpret river or stream restoration or other conservation activities.

Other Requirements exist. See source documents.

Application Process

The Grant Application has three sections:

1. One Page Summary– Include the following:

- Summarize the specific project you are requesting funds for and the need for it.
- If the project is part of a larger parkway plan, briefly describe the larger parkway plan and how it incorporates this specific project.

- What specific components of the Project will be funded by this grant? Include amounts for each component.
- Eligibility question: How does your Project provide Public Access?

2. Project Evaluation Questions– Please answer all Project Evaluation Questions in Section VI (Page 5) that correspond with the two Statutory Conditions you checked on the Application Form.

3. Supporting Documents– See "What to Submit" section for detailed list (Page 13, source document)

Sources:

- http://bondaccountability.resources.ca.gov/plevel1.aspx?id=22&pid=4
- http://resources.ca.gov/bonds_prop50riverparkway.html
- http://resources.ca.gov/bonds_docs/P50_Grant_Guidelines_FINAL.pdf

4.2.3 Central Valley Flood System Conservation Framework and Strategy

Program Overview

Funded by: DWR FESSRO (Prop 1E)

The program funds planning and implementation of projects in support of the Central Valley Flood System Conservation Framework and the Conservation Strategy. This program intends to incorporate environmental stewardship and sustainability principles into State Plan of Flood Control flood management activities.

Funding Information

Grant Size/Amount Available: $25 million available with a maximum award of $5 million per project.

Cost Share: 50%-90%

Applicants can increase state cost share up to a maximum of 90% by contributing to one or more objectives such as habitat (up to 20% increase), open space (up to 20% increase), recreation (up to 20% increase), combination of habitat, open space, and recreation (up to 20% increase), state facilities (up to 20% increase), and Disadvantaged Area (up to 40% increase). More information can be found in the LLAP Guidelines and Project Solicitation Package (PSP).

Eligibility Information

Eligible entities include Federal, State and local public agencies; private mitigation banks, and Non-profits.

Eligible Activities Include:

- Evaluation, repair, rehabilitation, reconstruction or replacement of levees, weirs, bypasses, and facilities of the SPFC.
- Must incorporate agricultural and environmental stewardship and sustainability into the flood management activities through funding of activities that restore natural ecological processes and/or habitats to provide mitigation for facilities of the SPFC.
- Should provide or lead to ecological improvements including but not limited to
    - Substantial habitat improvements in terms of increased area and/or inundation of floodplain, or increased area of riparian, wetland, or floodplain habitats supporting sensitive species; and
    - A strategic location that substantially improves regional connectivity and/or provides essential habitats in accordance with larger conservation plans.

Application Process

Applicants for funding need to file a project proposal with DWR in response to issuance of an RFP. DWR will not revise the RFP requirements during any period in which project proposals are being solicited. Project proposal requirement details can be found in the funding guidelines. (see sources)

Sources:

- http://www.water.ca.gov/floodsafe/fessro/docs/flood11_guidelines.pdf

4.2.4 Flood Corridor Program (FCP)

Program Overview

The Flood Corridor Program (FCP) funds multi-objective, flood risk reduction projects that protect and restore floodplains and preserve or enhance wildlife habitat and agriculture. The program funds primarily non-structural projects, including acquiring and conserving floodplains, removing structures and precluding development in flood prone areas, and constructing earthen detention basins, along with restoring habitat and protecting agricultural land. Setback levees are also included when they enable a more naturally functioning floodplain.

Flood Corridor Program includes three flood protection grant programs:

- Flood Protection Corridor Program (Propositions 13 and 84);
- Floodway Corridor Program (Proposition 1E); and
- Central Valley Nonstructural Grants Program (Proposition 1E).

Funding Information

Grant Size/Amount Available: Approximately $11million available for grant program. Grant size has a $5 million maximum.

Cost Share: 50%-90%

Eligibility Information

Eligible entities include local public agencies (county, city, district or joint powers authority), nonprofit organizations, California Native American tribes registered as a nonprofit organization or partner of a nonprofit or local public agency.

Also, direct expenditure funding to other government agencies (local, State, or federal), nonprofit organizations, or contractors for projects proposed by DWR that are in the State's interest to fulfill program goals.

Eligible activities for the FCP include:

- Land Acquisition
- Design
- Construction

Application Process

Applicants for competitive grant funding under the program need to file a complete grant application package with DWR. DWR will not revise the grant application package requirements during any period in which competitive project proposals are being solicited.

More program details can be found within the FCP guidelines and online at water.ca.gov. (see sources)

Contact Person:

David Wright
David.Wright@water.ca.gov
(916) 574-1191

Sources:

- http://www.water.ca.gov/floodmgmt/fpo/sgb/fpcp/docs/Final_Flood_Corridor_Guidelines.pdf
- http://www.water.ca.gov/floodmgmt/fpo/sgb/fpcp/funding_cycle.cfm
- FloodSAFE Implementation Programs (January 2014) Draft Table

4.2.5 Habitat Conservation Fund (HCF) Program

Program Overview

Funded by: State General Fund through the CA Dept. of Parks and Recreation

Provides funds to local entities to protect threatened species, to address wildlife corridors, to create rails, and to provide for nature interpretation programs which bring urban residents into park and wildlife areas

Funding Information

Grant Size/Amount Available: $2 million Funded annually through FY 2019/2020. Grants requests generally do not exceed $200,000 however there are not maximum or minimum grants amounts.

Cost Share: 50%

Eligibility Information

Eligible entities include cities, counties, and districts.

Eligible Activities Include:

- Deer/Mountain Lion Habitat
- Rare, Endangered, Threatened, or Fully-Protected Species Habitat
- Wetlands
- Riparian Habitat
- Anadromous Salmonids and Trout Habitat
- Trails
- Wildlife Area Activities

Application Process

The following are the instructions given in the application guide for submitting the application packet

- Each project must have its own application.
- Applicants may apply for more than one PROJECT.
- All applicants are required to submit one, unbound, original application packet.
- Application items should be provided in the order shown in the checklist in the application guide.
- Each application must include a Table of Contents based on the checklist.
- All pages must be numbered.
- If an item is not applicable to the project, the applicant shall respond with “N/A” (not applicable), with an explanation as to why.

- Send only the items on the checklist. Power point presentations, videos, CDs, or letters of support should not be submitted.
- Directions and forms for each checklist item can be found in the application guide.

Sources:

- http://www.parks.ca.gov/pages/1008/files/Riparian%201.1.12%20Final%20Application%20Guide.pdf
- http://www.parks.ca.gov/?page_id=21361
- http://www.parks.ca.gov/pages/1008/files/hcf%20fact%20sheet%203.13.13.pdf

4.2.6 Inland Wetlands Conservation Program (IWCP)

Program Overview

Funded by: California Wildlife Conservation Board (CA WCB)

The Inland Wetlands Conservation Program (IWCP) was created to assist the Central Valley Joint Venture (CVJV) in its mission is to protect, restore, and enhance wetlands and associated habitats. The CVJV, a partnership of twenty two public and private organizations and agencies, has identified through its Implementation Plan specific goals to increase populations of six bird groups: wintering waterfowl, breeding waterfowl, non-breeding shorebirds, breeding shorebirds, waterbirds, and breeding riparian songbirds. The IWCP has a wide range of options to accomplish these goals, including acquisitions of land or water for wetlands or wildlife friendly agriculture, acquisition of conservation easements, restoration of public or private lands, or enhancement of existing degraded habitats. In addition, the program will work toward providing long term reliable water for wetlands and winter-flooded agricultural lands.

Funding Information

Grant Size/Amount Available: $1,000 to 1,000,000

Cost Share: The program offers up to 50 percent cost share.

The landowners share can be met through cash expenditures or in-kind services, such as providing for the long term maintenance of the project.

Eligibility Information

Eligible entities include nonprofit organizations, local governmental agencies and State departments

Eligible Activities Include:

- Fee simple land acquisition
- Leases from landowners for specified period
- Easement land acquisition
- Develop wetland habitat for migrating and wintering waterfowl: construct levees, swales and islands; develop water conveyance and drainage systems; install water control structures; and prepare soil and plant desirable vegetation;
- Develop waterfowl breeding habitat: construct brood water ponds, establish and fence upland nesting habitat, and provide cover and feeding areas;
- Develop waterfowl friendly agricultural practices: fence upland nesting habitat, encourage wildlife friendly grazing practices, and promote winter flooding of croplands; and
- Assist with the development of conjunctive use projects by which multiple objectives are achieved, e.g., restore wetlands to assist with flood control and ground water recharge efforts.

Application Process

WCB meets four times a year, typically in February, May, August and November. Processing time for applications can vary depending on completeness of the application, project benefits, and funding availability. Allow a minimum of six months from submittal of application to project approval.

WCB accepts proposals on a continuous basis, and will notify applicants about whether or not the proposal is acceptable or complete. All proposals will be evaluated with assistance from the California Department of Fish and Wildlife. If a proposed project is accepted, and funding is available, a grant agreement or contract will be prepared for the applicant, and the proposal will be scheduled for consideration at a future WCB meeting.

Once the project is ready for submittal, submit one hard copy of the completed application form, including all attachments. Please include a CD that contains your application (or email the completed application directly to the WCB Project Manager). Include the budget and include any digital photos and maps. Please note: all information that you submit is subject to the unqualified and unconditional right of the WCB to use, reproduce, publish, or display, free of charge.

Applications should be sent to:
John P. Donnelly, Executive Director
Wildlife Conservation Board
1807 13th Street, Suite 103
Sacramento, California 95811-7137

Sources:

- http://ceres.ca.gov/wetlands/introduction/inland_easement.html
- http://rlch.org/funding/california-inland-wetlands-conservation-program

4.2.7 Urban Greening for Sustainable Communities - Planning

Program Overview

Funded by: California Natural Resource Agency (CNRA)

Because of the built-out nature of California's urban areas, the Urban Greening Planning Program will provide funds to assist entities in developing a master urban greening plan that will ultimately result in projects to help the State meet its environmental goals and the creation of healthy communities. The plan must be consistent with the State's planning policies and any applicable general or regional plan. The plan must outline or layout projects that reduce greenhouse gas emissions and provide multiple benefits including, but not limited to, decreasing air and water pollution, reducing the consumption of natural resources and energy, increasing the reliability of local water supplies, or increasing adaptability to climate change.

Funding Information

Grant Size/Amount Available: $20 million to be available in round 3 for the Urban Greening for Sustainable Communities Program. Requests for funding are limited to a maximum of $250,000. Larger grant awards may be considered for organizations that work together to develop joint planning documents that cover all jurisdictions involved.

Cost Share: No matching funds are required for this program, but the Strategic Growth Council encourages leveraging of all resources, including other sources of funds.

Eligibility Information

Eligible entities include a council of governments, countywide authority, a metropolitan planning organization, local government, nonprofit organization, special district, or joint powers authorities where at least one entity qualifies as an eligible applicant.

This grant program is meant to help in developing master urban greening plans. These plans must meet the following criteria:

- Serve as the master document guiding and coordinating greening projects in the applicant's jurisdiction. For the purpose of this program an urban area is a geographic area where the existing or planned-for average density within a half mile radius of the project or an adjacent geographically-equivalent area (minus existing or planned for open space including the proposed project and non-residential uses) is approximately ten (10) dwelling units per acre.
- Be consistent with the state's planning policies pursuant to Section 65041.1 of the Government Code, as they pertain to the following priorities:
    - Promote infill development and equity
    - Protect environmental and agricultural resources
    - Encourage efficient development patterns

- Be consistent with the jurisdiction's general plan or regional plan, where one exists.
- Include projects that will reduce, on as permanent a basis that is feasible, greenhouse gas emissions consistent with the California Global Warming Solutions Act of 2006 (Division 25.5 (commencing with Section 38500) of the Health and Safety Code), and any applicable regional plan.
- Comply with the California Environmental Quality Act (CEQA), Division 13 (commencing with Section 21000 of the Public Resources Code), if the plan will be incorporated into the jurisdiction's general plan or applicable regional plan.

Application Process

For technical assistance in preparing the application, the applicant should contact a Grants Administrator at (916) 653-2812.

The grant application consists of a response to questions, a work plan and supporting documents. Additional information can be found in source documents below.

Sources:

- http://resources.ca.gov/grant_programs.html#
- http://resources.ca.gov/bond/Urban_Greening_PLANNING_Guidelines_October_2012.pdf

4.2.8 Urban Greening for Sustainable Communities - Project

Program Overview

Funded by: California Natural Resource Agency (CNRA)

Because of the built-out nature of California's urban areas, the Urban Greening for Sustainable Communities Program (Program) provides funds to preserve, enhance, increase or establish community green areas such as urban forests, open spaces, wetlands and community spaces (e.g., community gardens). The goal is for these greening projects to incrementally create more viable and sustainable communities throughout the State.

Funding Information

Grant Size/Amount Available: $20 million to be available in round 3 for the Urban Greening for Sustainable Communities Program.

Cost Share: No matching funds are required for this program, but the Strategic Growth Council encourages leveraging of all resources, including other sources of funds.

Eligibility Information

Grant funds will be awarded to a city, county, special district, or nonprofit organization, or joint powers authorities where at least one entity qualifies as an eligible applicant.

Urban Greening Projects must accomplish the following criteria:

- Use natural systems, or systems that mimic natural systems, or Create, enhance, or expand community green spaces.
- Provide multiple benefits including, but not limited to
    - A decrease in air and water pollution, or
    - A reduction in the consumption of natural resources and energy, or
    - An increase in the reliability of local water supplies, or
    - An increased adaptability to climate change.
- Be consistent with the State's planning policies pursuant to Section 65041.1 of the Government Code specific to the following state wide priorities–
    - Promote infill development and invest in existing communities,
    - Protect, preserve and enhance environmental, agricultural and recreational resources,
    - Encourage location and resource efficient new development
- Reduce, on as permanent a basis that is feasible, greenhouse gas emissions consistent with the California Global Warming Solutions Act of 2006 (Division 25.5 (commencing with Section 38500) of the Health and Safety Code), and any applicable regional plan.

Application Process

For technical assistance in preparing the application, the applicant should contact a Grants Administrator at (916) 653-2812.

The grant application consists of a response to questions, a work plan and supporting documents. Additional information can be found in source documents below.

Sources:

- http://resources.ca.gov/bond/Urban_Greening_PROJECT_Guidelines_October_2012.pdf

4.2.9 Urban Streams Restoration Program

Program Overview

Funded by: DWR

Program provides grants for stream restoration projects that reduce flooding or erosion and associated property damages; restore, enhance, or protect the natural environment; and promote community involvement, education, and stewardship in urban streams.

Funding Information

Grant Size/Amount Available: $8 million available. $1 million maximum per eligible project.

Cost Share: Matching contributions are not required but are strongly encouraged to be competitive. Evaluations of projects will consider the financial resources available to the applying partners.

Eligibility Information

Eligible entities include combined sponsorship between Local government agencies and citizen's groups/nonprofits.

Eligible Activities Include:

- Habitat Restoration projects on urban streams
- Recreation
- Flood Management
- Conversion to River Parkways
- Conservation and Interpretive Enhancements

Application Process

Each application form should reflect the total grant dollars being requested for the project. Additional information can be found in source documents below.

Sources:

- http://www.water.ca.gov/urbanstreams/docs/guidelines.pdf

Structural Flood Control Funding Sources

4.2.10 Flood System Repair Project (FSRP)

Program Overview

The Flood System Repair Project (FSRP) is designed to evaluate (feasibility), design, and construct repairs on non-urban SPFC facility (levees, channels, structures, etc.) deficiencies.

Funding Information

Grant Size/Amount Available: Up to $150 million Proposition 1E funds may be allocated to the FSRP through fiscal year 2017. The maximum cost share amount per project will be $5 million.

Cost Share: 50% - 90%

Applicants can increase state cost share up to a maximum of 90% by contributing to one or more objectives such as habitat (up to 20% increase), open space (up to 20% increase), recreation (up to 20% increase), combination of habitat, open space, and recreation (up to 20% increase), state facilities (up to 20% increase), and Disadvantaged Area (up to 40% increase). More information can be found in the LLAP Guidelines and Project Solicitation Package (PSP).

Eligibility Information

Eligible Entities include local agencies or joint powers authority

Eligible activities for the FSRP include:

- Design
- Construction

Application Process

For each eligible repair site or set of repair sites specific to an LMA, DWR will submit an Eligibility Notice to the LMA. The Eligibility Notice will contain:

- A description of the eligible repair site(s), including classification (i.e., critical or proactive repairs).
- Estimated cost of construction.
- A request for an Intent to Participate Letter from the LMA for entering into a Project Agreement with DWR.
- A list of documentation that must accompany the Intent to Participate Letter.

The requirements of the Intent to Participate Letter will be limited to confirmation that the LMA is authorized to contract with the state and intends to implement the project under DWR oversight and with cost share.

The Eligibility Notice will specify a response deadline when Intent to Participate Letters must be either mailed (postmarked), submitted in person, or submitted electronically to DWR, as specified in the Eligibility Notice. An LMA receiving an Eligibility Notice will be encouraged to submit any questions to DWR that might help clarify Intent to Participate Letter requirements within 2 weeks of when the Eligibility Notice was provided. Incomplete Intent to Participate Letters submitted after the response deadline may be considered; however, DWR will reserve the right to delay consideration of such applications until the selection process for previously submitted Intent to Participate Letters is completed.

Please see FSRP Draft Guidelines for more information. (see sources)

Contact Person:

David Wright
David.Wright@water.ca.gov
(916) 574-1191

Sources:

- FloodSAFE Implementation Programs (January 2014) Draft Table
- http://www.water.ca.gov/floodmgmt/fmo/docs/FSRP-Draft-Guidelines-0221.2013.pdf

4.2.11 Integrated Regional Water Management (IRWMP)

Program Overview

Funded by: DWR

The IRWMP program provides funds for development and updates of IRWMP Plans, and implementation of projects in IRWMP Plans. The goals of the program are to assist local public agencies to meet long-term water management needs of the State, including the delivery of safe drinking water, flood risk reduction, and protection of water quality and the environment.

Funding Information

Grant Size/Amount Available: Bond funding allocation for the entire program is $1billion. Prop 84 allots grant funding to 11 funding areas.

Guidelines contain information on how potential funding of multiple IRWMP efforts within a funding area will occur and maximum grant amount per funding area.

Cost Share: 75% (maximum)

Eligibility Information

Applicant must be a local public agency or nonprofit representing an accepted IRWMP Region. Other IRWMP partners may access funds through their own agreements with the applicant/grantee.

Eligible Activities Include:

- Projects and programs that provide immediate regional drought preparedness
- Increase local water supply reliability and the delivery of safe drinking water
- Assist water suppliers and regions to implement conservation programs and measures that are not locally cost-effective
- Reduce water quality conflicts or ecosystem conflicts created by the drought

Application Process

Grant application processes will utilize electronic submittals when possible. Submission of applications will be through DWR's Grant Review and Tracking System (GRanTS). The PSP for any given solicitation will contain specific instructions and links to the GRanTS system.

Additional information can be found in the source documents below.

Sources:

- http://www.water.ca.gov/IRWMP/grants/docs/Guidelines/P84_IRWMP_GL_Drought2014_PublicReviewDraft.pdf

4.2.12 Local Levee Assistance Program (LLAP)

Program Overview

The Local Levee Assistance Program (LLAP) is for projects to immediately repair and improve critically-damaged local levees, evaluate levee stability and levee seepage and underseepage, and to perform design or alternatives analysis. Local levees are levees throughout the State that are not part of the State Plan of Flood Control for the Central Valley and are located outside the Sacramento-San Joaquin Delta.

The LLAP has two components. The Local Levee Critical Repair (LLCR) Program provides for design and repairs of critically-damaged levees. The Local Levee Evaluation (LOLE) Program provides funds for feasibility studies and geotechnical evaluation of levees.

Funding Information

Grant Size/Amount Available: $13 million available. There is a $5 million maximum for LLCR and a $2 million maximum for LOLE.

Cost Share: Both programs offer a 50% base cost share.

Applicants can increase state cost share up to a maximum of 90% by contributing to one or more objectives such as habitat (up to 20% increase), open space (up to 20% increase), recreation (up to 20% increase), combination of habitat, open space, and recreation (up to 20% increase), state facilities (up to 20% increase), and Disadvantaged Area (up to 40% increase). More information can be found in the LLAP Guidelines and Project Solicitation Package (PSP).

Eligibility Information

Eligible Entities include Local Public Agencies or Joint Powers Authorities that are outside of the Legal Delta, are responsible for local (non-SPFC) levees, and are qualified to contract with the state.

Eligible activities for the FCP include:

- Design and Repairs of critically damaged levees (LLCR)
- Feasibility studies and geotechnical evaluation of levees (LOLE)

Application Process

The LLAP program will utilize the Bond Management System (BMS) for solicitation and management of its funding applications and projects. An application must be submitted via the internet using BMS. A series of questions must be answered on BMS and any additional information must be uploaded by the application date.

Specific application information can be found in the LLAP Grant Guidelines. (see sources).

Contact Person:
David Wright
(916) 574-2644
dwright@water.ca.gov

Sources:

- http://www.water.ca.gov/floodmgmt/docs/LLAP_Guidelines_2011_new.pdf
- http://bondaccountability.resources.ca.gov/plevel1.aspx?id=114&pid=4
- http://www.water.ca.gov/floodsafe/docs/local-levee-guidelines.pdf
- http://www.floodplain.org/files/LLAPProgramOverviewPresentation_2011_Sacramento_Luncheon.pdf

4.2.13 Small Community Flood Risk Reduction (SCFRR)

Program Overview

The Small Community Risk Reduction Program is designed to help implement projects to reduce flood risk in small, rural, and agricultural communities in the Central Valley. Funds support non-routine O&M, O&M plan updates, evaluations, feasibility studies, design, and construction of proactive repairs to flood control facilities of the SPFC and appurtenant non-project levees.

Funding Information

Grant Size/Amount Available: $31 million is currently set aside for SCFRR. There will be a $2 million max for evaluations and feasibility studies, $5 million max for implementation or design projects.

Cost Share: 50%-90%

Applicants can increase state cost share up to a maximum of 90% by contributing to one or more objectives such as habitat (up to 20% increase), open space (up to 20% increase), recreation (up to 20% increase), combination of habitat, open space, and recreation (up to 20% increase), state facilities (up to 20% increase), and Disadvantaged Area (up to 40% increase). More information can be found in the LLAP Guidelines and Project Solicitation Package (PSP).

Eligibility Information

Eligible Entities include Local agencies that are responsible for SPFC facilities that protect small and rural communities in the Central Valley that have been designated by the CVFPP to have a high or moderate-high flood threat level.

Eligible activities for the SCFRR include:

- Study
- Design
- Construction
- Non-Routine O&M

Application Process

Information unavailable.

Contact Person:

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(916) 574-1429

Sources:

- FloodSAFE Implementation Programs (January 2014) Draft Table
- http://resources.ca.gov/bond/Agency_Grants_and_Loans_June_2013xlsx.pdf

4.2.14 Storm Water Flood Management Program

Program Overview

Funded by: DWR (Proposition 84)

The Storm Water Flood Management Program is design to help fund storm water management projects that reduce flood damage and provide at least one other type of benefit. This program is part of the IRWMP Grant Program and is only available to projects within existing IRWMP regions.

Funding Information

Grant Size/Amount Available: $91 million was made available for awards in round 2. A maximum award of $30 million per project was set. Round 2 awards were announced in September 2013, with Round 3 expected in the near future. This program is in need of additional funding allocation for future rounds of funding.

Cost Share: 75%

For IRWMP implementation projects that address the needs of a Disadvantaged Community (DAC) and are seeking Proposition 84 funds, funding match may be waived. Funding match may include, but is not limited to, federal funds, local funding, or donated service from non-State sources.

Eligibility Information

Eligible entities include Local agencies or nonprofits representing an IRWMP effort.

Project must be part of an existing IRWMP Plan and be consistent with applicable Water Quality Basin Plan, and cannot be a part of a SPFC facility.

Eligible Activities Include:

- Flood Risk Reduction (related to storm water management)

Application Process

An entity representing an IRWMP region that meets one of the following conditions should submit Region Acceptance Process (RAP) materials on behalf of the proposed IRWMP region:

- Has not already been granted region acceptance
- Is currently conditionally accepted and seeking full acceptance status
- Has made significant modifications to the region's characteristics that necessitate reevaluation of the region

The entity submitting (RAP) materials on behalf of the Regional Water Management Group (RWMG) must have been granted specific consent by the RWMG.

To view full application process please see grant guidelines. (see sources)

Sources:

- http://www.water.ca.gov/IRWMP/grants/docs/Guidelines/P84_IRWMP_GL_Drought2014_PublicReviewDraft.pdf

4.2.15 Systemwide Flood Risk Reduction (SFRR)

Program Overview

The Systemwide Flood Risk Reduction Program is designed to help implement recommendations of the Basin-Wide Feasibility Studies currently being completed by DWR.

SFRR Guidelines are currently under development. These documents will provide detailed information on the following:

- The criteria and process development of the SFRR Program
- The criteria used to select successful applicants
- The timeline for selecting, evaluating and approving SFRR projects
- Outreach activities to notify Agencies within non-urban areas as to when and how funding availability will be made
- Criteria for funding accountability and work performance
- Identifying flood risk management needs
- Flooding Characteristics

Funding Information

Grant Size/Amount Available: To be determined once program guidelines are complete.

Cost Share: To be determined once program guidelines are complete. A 50% - 90% range is used for purposes of this report based on other DWR programs.

Eligibility Information

Eligible entities include local public agencies or joint powers authorities

Eligible activities for the SFRR include:

- Study
- Land Acquisition
- Design
- Construction

Application Process

Process will be detailed in SFRR Guidelines when they are released.

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Sources:

- FloodSAFE Implementation Programs (January 2014) Draft Table
- http://bondaccountability.resources.ca.gov/plevel1.aspx?id=124&pid=5

4.2.16 Urban Flood Risk Reduction (UFRR)

Program Overview

The Urban Flood Risk Reduction (UFRR) Program is designed to help improve urban SPFC levees within the Central Valley to a 200-year level of protection.

The UFRR Program is being developed as a result of the passage of the Central Valley Flood Protection Plan in June 2012. The UFRR Program will replace the Early Implementation Program (EIP) which was developed in 2007 by the Flood Projects Office. The goals of the UFRR Guidelines and associated projects will tie to the mission of DWR, the objectives of FloodSAFE, and the statutory obligations of DWR for improvements to elements of the flood control system. The Guidelines will define the Flood Projects Office's UFRR program purpose, goals, objectives, program elements, program components, strategies, priorities, and overall schedule and budget. It will describe detailed activities and measurable objectives under each of the composite program elements, and provides strategic program direction for the Flood Projects Office. Projects selected for bond funding (as well as those receiving General Funds) are to be consistent with the Flood Projects Office's UFRR Guidelines.

Funding Information

Grant Size/amount available: To be determined in Grant Guidelines when released.

Cost Share: To be determined in Grant Guidelines when released. For purposes of this plan a range of 50-90% is assumed based on other DWR programs.

Eligibility Information

Eligible Entities include local public agencies or joint powers authorities

Eligible activities for the UFRR include:

- Study
- Land Acquisition
- Design
- Construction

Application Process

The application process remains to be determined. More information will become available in the Grant Guidelines when they are released (anticipated late 2014).

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(916) 574-0918

Sources:

- http://bondaccountability.resources.ca.gov/plevel1.aspx?id=99&pid=5

Non-Structural Flood Control Funding Sources

4.2.17 Flood Emergency Response – Forecast- Coordinated Operations (F-CO)

Program Overview

This program is designed to further participation of reservoir operators (affecting the Central Valley) in the F-CO program, especially in obtaining necessary decision support system tools & equipment and field measuring equipment

Funding Information

Grant Size/Amount Available: up to $6 million will be available for the direct grant program through 2015.

Cost Share: 50-90%

Applicants can increase state cost share up to a maximum of 90% by contributing to one or more objectives such as habitat (up to 20% increase), open space (up to 20% increase), recreation (up to 20% increase), combination of habitat, open space, and recreation (up to 20% increase), state facilities (up to 20% increase), and Disadvantaged Area (up to 40% increase). More information can be found in the LLAP Guidelines and Project Solicitation Package (PSP).

Eligibility Information

Eligible Entities include Federal Agencies, State Agencies, or California Local Public Agencies with responsibility for operating a reservoir that has flood control reservation pool and is willing to participate in the Forecast-Coordinated Operations program and willing to coordinate its reservoir releases with other reservoir operators in the river system during flood events

Eligible activities for the F-CO include:

- Study
- Land Acquisition
- Design
- Construction
- Material Acquisition
- Program Enhancement

Application Process

The application package will be considered complete and will be evaluated for funding once the applicants complete the following documents and submit an original signed hard copy to the DWR program manager:

- Application Cover Letter to DWR program manager
- A-1 Application Cover Sheet
- A-2 Applicant's Representatives
- A-3 Project Costs and Budget
- A-4 Local Agency Resolution
- A-5 Applicant's Authority and Capacity
- Attachment B-1- Project Scope of Work and Tasks (including Exhibit A and Exhibit B)
- Attachment B-2 - Environmental Information Form
- A checklist of the materials required for a complete application

DWR Program Manager:
Mr. Jon Ericson
Department of Water Resources
Hydrology and Flood operation Office
Hydrology Branch
3310 El Camino Ave
Sacramento, CA 95821

Contact Person:
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Sources:

- FloodSAFE Implementation Programs (January 2014) Draft Table
- http://www.water.ca.gov/floodsafe/docs/FCO_Program_Grant_Guidelines.pdf

4.2.18 Flood Emergency Response Statewide Emergency Response Grants

Program Overview

This program is designed to provide support for local Emergency Action Plans (EAPs) or related flood preparedness and response activities. Funding is available for material acquisition such as emergency communications equipment to improve emergency response preparedness, and program enhancement activities that improve emergency response.

Funding Information

Grant Size/Amount Available: $15 million

Cost Share: 50-90%

Applicants can increase state cost share up to a maximum of 90% by contributing to one or more objectives such as habitat (up to 20% increase), open space (up to 20% increase), recreation (up to 20% increase), combination of habitat, open space, and recreation (up to 20% increase), state facilities (up to 20% increase), and Disadvantaged Area (up to 40% increase). More information can be found in the LLAP Guidelines and Project Solicitation Package (PSP).

Eligibility Information

Eligible Entities include California public agencies with responsibility for flood emergency response and are willing to participate and work with DWR to actively improve flood emergency preparedness and response.

Eligible activities for the Statewide ER Grants include:

- Material Acquisition
- Program Enhancement

Application Process

Applicants for grant funding under the Program will file a complete grant application package with the Department. The Department will not revise the grant application package requirements during any period in which project proposals are being solicited. A sample grant application package can be found in the grant guidelines.

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Sources:

- FloodSAFE Implementation Programs (January 2014) Draft Table
- http://www.water.ca.gov/floodmgmt/hafoo/fob/floodER//122112_statewide_flood_er_guidelines_final.pdf

4.2.19 Watershed and Environmental Improvement Program

Program Overview

The Watershed and Environmental Improvement Program is a 10-year, $50 million, program to proactively manage, protect and restore environmental resources affected by our system operations. Funded in part by Water System Improvement Program Measure A bond funds and in part by operating funds, the Program spans the Peninsula, Alameda, and Tuolumne Watersheds, as well areas in San Francisco.

The portion of the program that is applicable to the MSJ Region is the Lower Tuolumne River (downstream of Don Pedro Reservoir). The program is focused on protection of low lying floodplain areas through permanent conservations easements and/or fee title purchase of the property from willing landowners.

Funding Information

Grant Size/Amount Available: $6 million is expected to be spent in the Tuolumne River Watershed. Individual grant size is negotiable, from $10,000 to more than $2 million.

Cost Share: Information Unavailable

Eligibility Information

Information Unavailable

Eligible Activities Include:

- Land Acquisition

Application Process

Information Unavailable

Sources:

- http://www.sfwater.org/modules/showdocument.aspx?documentid=4628

Other Suggested State Funding Sources

The State funding sources detailed in the previous section was not meant to represent an exhaustive list of opportunities, but are meant to give a broad overview of some of the most common funding sources available. While it would be difficult to list every funding source available the RFMP team would like the most complete list possible. To that end, a list of State funding sources that were suggested to the RFMP team too late to make it into the main document.

- CalFED ERP
  - http://calwater.ca.gov/calfed/contracts_and_grants.html
- The California State Parks Division of Boating and Waterways Facility Grants and Loans Program
  - http://www.dbw.ca.gov/Funding/Facilities.aspx#BLFG

4.3 Local Funding Sources

The following sections detail potential sources of funding for the local cost share that is required by many Federal and State grant programs.

4.3.1 Proposition 218 Assessments

This section uses existing assessment data along with a planning level analysis of the Mid SJR Region's potential assessments to give an estimate of the Region's capacity to fund the local cost share for projects in the RFMP. A more detailed, in depth capacity analysis will be needed in the future in order to determine more accurate estimates of what would be affordable in each district.

In order to get this planning level estimate of the Region's potential for future assessments, the Mid SJR Region was separated into five hypothetical benefit areas, using reclamation district and Mid SJR Region boundaries acting as a guide. This method resulted in benefit areas that closely align with the reclamation districts in the Region, only going outside reclamation district boundaries in benefit area 2, which includes a substantial amount of rural acreage east of RD 2031. The portions of the Mid SJR Region that have been converted to refuge land were left out of the analysis.

It should be noted that only areas that contain portions of the Mid SJR Region area were included in the Proposition 218 assessment analysis. Areas outside of the Region are outside of the scope of this report and will require a more in depth approach for calculating assessment potential due to more complicated land use and demographics. While these areas, which include the cities of Modesto, Newman, and Patterson are not included in the assessment analysis, current available funding for these cities is discussed under Local Government funding.

A map of the Mid SJR Region and the identified benefit areas can be found in Figure 1.

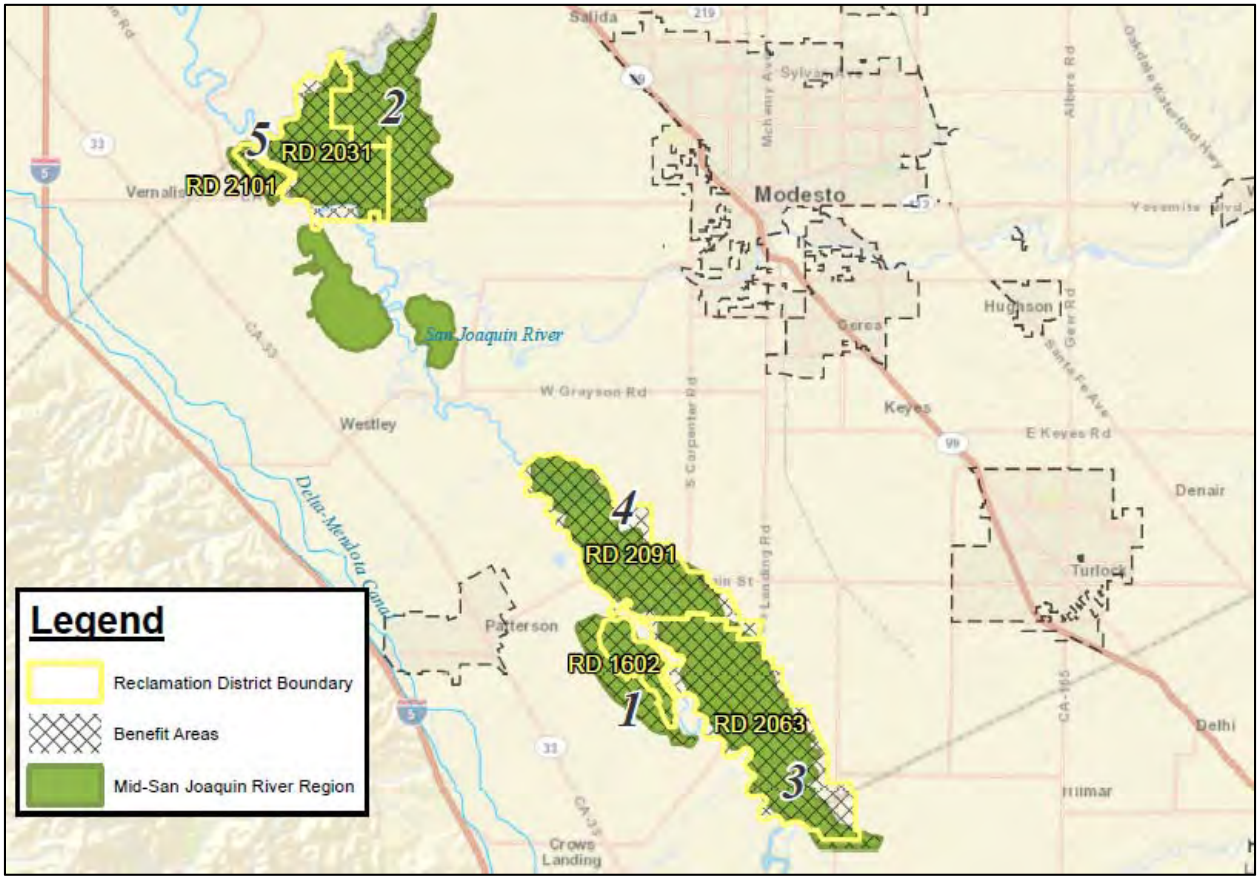

Figure 1: Map of Benefit Areas in Mid SJR Region

Current Assessment and Expenditure Data

The first step in calculating the hypothetical assessment potential of each benefit area was to examine current annual assessment and expenditures of the districts within them. Current assessment data was obtained from the Special Districts Annual Report[1] for the fiscal year ended June 30, 2012. Due to the fact that many districts in the region did not report any assessments, information obtained in meetings with district staff on annual flood control expenditures were substituted for assessment data. A table containing the current assessments and expenditures of each district is given below.

Table 1: Current Assessments and Expenditures of Districts within Benefit Areas

Benefit Area	District Within Benefit Area	Current Assessment
1	1602	$12,000*
2	2031	$30,000*
3	2063	$56,000
4	2091	$50,000*
5	2101	$25,000*
Total		$56,000
*Expenditures for annual O&M.		

Analysis of Assessment Potential

A simplified approach to estimating the Mid SJR Region's assessment potential was taken due to the regions agricultural nature. The analysis involved two variables: land use types within the Mid SJR Region and average assessments of land use types in the Central Valley.

Land use in the Mid SJR Region was divided into two categories: Urban and Built-Up Land and Rural and Agricultural Land, using data provided by DWR in the RFMP atlas map package[2].

For the analysis, hypothetical assessment rates were obtained from the Lower San Joaquin / Delta South Regional Flood Management Plan: Financial Plan Draft Funding Capacity Analysis (2014)[3]. The hypothetical assessment rates contained in the Funding Capacity Analysis are derived from averaging rates for different land use types from several recently approved assessments throughout the Central Valley. Since the basis for these assessment rates are approved assessments within the Central Valley, they can also be used for the Mid SJR Region. Due to the simplified process used for the Mid SJR Region,

[1] California State Controller's Special Districts Annual Report (2013)

[2] DWR RFMP Atlas Map GIS Land Use Data

[3] Lower San Joaquin / Delta South Regional Flood Management Plan: Financial Plan Draft Funding Capacity Analysis, Larsen Wurzel & Associated Inc., 2014

conservative values of $400.00/acre for Urban and Built-Up Land and $7.00/acre for Rural and Agricultural Land were selected. Table 2 details the number of acres of each land use type within the benefit areas and their potential assessments.

Table 2: Land Use and Hypothetical Assessment Potential for Benefit Areas

Benefit Area	District Within Benefit Area	Land Use (acres)		Hypothetical Assessment Potential ($)		
		Urban and Built-Up	Rural and Agricultural	Urban and Built-Up	Rural and Agricultural	Total
1	1602	0	2968	$0	$20,778	$20,778
2	2031	0	10065	$0	$70,461	$70,461
3	2063	37	9572	$14,857	$67,006	$81,864
4	2091	0	7185	$0	$50,298	$50,298
5	2101	8	677	$3,336	$4,739	$8,075

*Benefit area 2 includes additional acreage east of RD 2031.

Net Assessment Potential Table

The hypothetical net annual assessment potential for each benefit area was calculated by subtracting the total current assessment and expenditures from the total hypothetical assessment potential. The results are tabulated in Table 3.

Table 3: Hypothetical Net Assessment Potential

Benefit Area	District Within Benefit Area	Hypothetical Assessment Potential	Total Current Assessments	Hypothetical Net Assessment Potential
1	1602	$20,778	$12,000	$8,778
2	2031	$70,461	$30,000	$40,461
3	2063	$81,864	$56,000	$25,864
4	2091	$50,298	$50,000	$298
5	2101	$8,075	$25,000	$0*
Total				$75,400

*If current assessments were found to be greater than assessment potential, net assessment potential was found to be 0.

It should be noted that benefit area 5 was found to have a higher current assessment than its hypothetical assessment potential. This is an anomaly in the Region, as RD 2101 is small relative to the other districts in the region, but reports expenditures close to that of RD 2031, which contains more than ten times its acreage. Since it was found that benefit area 5 was already being assessed in excess of its potential the net assessment potential was assumed to be 0.

It should also be noted that RD 2063 is currently spending $83,000 per year on O&M responsibilities and is only assessing $56,000 per year. Even if the district assessed up to its hypothetical assessment potential of $81,864 it would not assess enough to meet the current demand. This situation is not sustainable. Since RD 2091 and the Gomes Lake Facilities both depend on RD 2063 for protection, a solution involving funds from these areas could be feasible and should be explored in more detail.

Projected Future Funding Potential

Calculating funding potential using the $75,400 yearly assessment, and assuming a 4% interest rate compounded annually over a 30 year period, would yield $1.3 million in present day dollars.

4.3.2 Local Government Funding

City Governments

The cities of Modesto, Patterson, and Newman are not within the boundaries of the Mid SJR Region as defined by DWR, but are important urban centers to the Mid SJR Regional planning area, have a flood nexus to the Region, and have projects identified in the RFMP effort. Furthermore, the City of Modesto is a key property owner in RD 2091 and the City of Turlock is a beneficiary in the Gomes Lake Facility within RD 2091. Discussions with city staff indicate that there is no existing budget available for flood control projects, and that any contribution would have to come from the City's general fund. These funds are already committed in many cases, thus, any contribution from them would be difficult to obtain.

Stanislaus County

Discussions with County staff found that there is little to no allowance in the existing budget for flood control, with the exceptions of funding for Office of Emergency Service (OES) and funding for the Gomes Lake facility in RD 2091. With this being the case, any contribution from the County for capital improvement projects would likely have to come from their general fund. With so many demands already on the general fund it will be a challenge to divert any additional funds to go toward fulfilling the local cost share for flood control projects. Therefore, County contributions to the local cost share of projects should not be expected.

4.3.3 NGO Funding in the Region

Funding from NGO's in the region is one possible way to raise the local cost share that projects will require. Below are some NGOs with funding programs that could possibly contribute to the required local cost share for projects.

California Water Foundation

The California Water Foundation (CWF), an initiative of Resources Legacy Fund (RLF), awards grants in our three principal program areas – Increasing Water Use Efficiency, Improving Groundwater

Management, and Restoring River Systems – as well as the overarching program area of Advancing Integrated Water Management.

http://www.californiawaterfoundation.org/

National Fish and Wildlife Foundation

NFWF supports conservation efforts in all 50 states, U.S. territories and abroad. Grants are made through a competitive process and awarded to some of the nation's largest environmental organizations, as well as some of the smallest. NFWF specializes in bringing all parties to the table – individuals, government agencies, nonprofit organizations and corporations in order to protect and restore imperiled species, promote healthy oceans and estuaries, improve working landscapes for wildlife, advance sustainable fisheries and conserve water for wildlife and people.

http://nfwf.org/Pages/default.aspx

Stanislaus Community Foundation

Stanislaus Community Foundation supports high impact opportunities within Stanislaus County. Working in partnership with local agencies, the foundation brings funding and resources to the community for grants and scholarships.

http://www.stanislauscommunityfoundation.org/

Trust for Public Land

The Trust for Public Land (TPL) helps communities to raise funds for conservation, conduct conservation research and planning, acquire and protect land, and design and renovate parks, gardens, and playgrounds. The TPL does this by helping state and local governments design, pass, and implement legislation and ballot measures that create new public funds.

https://www.tpl.org/

5 General Findings and Recommendations

5.1 General Findings

The total costs for all projects identified within the Mid SJR Region planning area for this RFMP effort is on the order of $340 million dollars. Below these projects are discussed in two sections: projects within the Mid SJR Region and those outside the Region but within the planning area.

The total estimated cost of all identified projects within the Mid SJR Region is approximately $219 million. Based on the assumed cost share for each project (see Appendix I) this equates to an estimated Federal cost share of $ 135 million, a State cost share of $42 to $71 million, and local funding in the amount of $13 million to $42 million.

According to the assessment analysis, the districts within the Mid SJR Region could hypothetically raise local cost share funds in the range of $1.3 million over the next 30 years. Subtracting that amount from the total required local cost share for all projects within the Mid SJR Region leaves a total of $12 million to $41 million of local cost share deficit. With this amount of local cost share deficit it is clear that the Region will need assistance from sources other than assessments.

Projects that are located outside of the Mid SJR Region, but within the Mid SJR Region planning area totaled approximately $120 million. State cost share for these projects is in the range of $29 million to $54 million, leaving a local cost share range of $6 million to $30 million.

An assessment analysis of the regions outside the boundaries of the Region was not within the scope of this report, but due to the urban nature of many of the areas which these projects are located, it can be assumed that the assessment potential in a successful proposition 218 election would be much larger than that of the rural districts within the boundaries of the Mid SJR Region.

5.2 Recommendations

Due to this Mid SJR Region's lack of local funding potential, the recommendation of the RFMP team is that the State make higher cost shares available for projects in the Region. These higher cost shares will be necessary in order to accomplish many of the projects identified by the RFMP effort. The RFMP team identified two ways of making these higher State cost shares possible. The first is for the State to revisit its grant guidelines, with special consideration to the local ability to pay provisions. This could allow projects that are unable to pay the local cost share the chance to be funded. The second is for the State to consider increasing its contributions for projects that have major ecosystem benefits due to the public benefit such projects provide. Since many of the projects in the Mid SJR Region planning area contain restoration elements this could help make up for the lack of local funding potential.

It is also recommended that the State develop a program to replace the Federal PL84-99 program. This State program could consider the special circumstances of California levees and help rectify the precarious situation that many of the RDs in the Mid SJR Region planning area find themselves in.

Given the estimated State cost share and the local funding deficiencies, additional bond funding on the order of $85 million may be needed in the region. If projects outside of the RFMP boundary are included, this estimate could grow closer to 145 million. These future bond funding estimates are intended for planning purposes only and should only be used for such.

6 Projects Paired with Funding Sources

This section matches each project identified by the RFMP team with applicable funding sources. Each section contains a short description of the project, a brief description of applicable funding sources, and tables detailing project cost share information. An overall summary table has been included in appendix I and III.

6.1 Black Gulch Storm Drainage Study

Short Project Description

There is a permitted spillway into the Delta Mendota Canal (DMC) from Black Gulch, a drainage situated between Salado and Del Puerto Creek, which keeps a local commercial area in Patterson from flooding. A study needs to be performed to determine what alternative solutions might be appropriate if/when the DMC Authority decides to not renew the permit.

Potential Funding Sources

Integrated Regional Water Management Plan (IRWMP) – This project could be included in the next IRWMP due to flood protection benefits, which would make it eligible for funding through IRWMP funding. In order to be included in the IRWMP the project must be suggested to the lead agency preparing the IRWMP update.

Storm Water Flood Management Program – This funding source is designed to help fund storm water management projects that reduce flood damage and provide at least one other type of benefit. In order to qualify this project would have to add a multi-benefit element and become part of an IRWMP, as well as be consistent with the applicable Water Quality Basin Plan.

The following table details the cost share of each funding source along with the cost associated with this project.

Project	Estimated Cost	Potential Funding Opportunities			
		Federal		State	
		Program Name	Cost Share	Program Name	Cost Share
Black Gulch Storm Drainage Study	$28,000	-	-	Integrated Regional Water Management Plan	50% - 75%
		-	-	Storm Water Flood Management Program	50% - 75%

Cost Share Information

Using project descriptions and the cost share data in the table above, estimates of cost shares for this project were calculated. The results are tabulated below, using a range of cost share values to account for uncertainty in the estimating process.

Federal Cost Share (%)	State Cost Share Range (%)		Local Cost Share Range (%)	
	Low	High	Low	High
0%	50%	75%	25%	50%

The following table provides estimates for the Federal, State, and local cost shares using total project cost and the cost share percentages from the above table.

Project	Total Project Cost	Federal Cost Share	Non - Federal Project Cost	State Cost Share Range		Local Cost Share Range	
				Low	High	Low	High
Black Gulch Drainage Study	$28,000	$0	$28,000	$14,000	$21,000	$7,000	$14,000

6.2 City of Newman/Bureau of Reclamation Flood Levee Rehabilitation

Short Project Description

Rehabilitate a flood protection levee on Bureau of Reclamation property between the Newman Wasteway and the City of Newman Wastewater Treatment Plant.

Potential Funding Sources

Pre-Disaster Mitigation (PDM) – This funding source requires that a project help implement a sustained pre-disaster hazard mitigation program to reduce risk in future hazard events. Since this is a proactive project designed to avoid future flood control issues it meets this criteria.

Integrated Regional Water Management Plan (IRWMP) – This project could be included in the next IRWMP due to flood protection benefits, which would make it eligible for funding through IRWMP funding. In order to be included in the IRWMP the project must be suggested to the lead agency preparing the IRWMP update.

Local Levee Assistance Program (LLAP) –This funding source requires that funds be used on local levees (Non-SPFC) that are not within the Sacrament-San Joaquin Delta. This project meets both of these requirements.

The following table details the cost share of each funding source along with the cost associated with this project.

Project	Estimated Cost	Potential Funding Opportunities			
		Federal		State	
		Program Name	Cost Share	Program Name	Cost Share
City of Newman / Bureau of Reclamation Flood Levee Rehabilitation	$225,000	Pre-Disaster Mitigation (PDM)	75% - 90%	Integrated Regional Water Management Plan (IRWMP)	50% - 75%
		-	-	Local Levee Assistance Program	50%-90%

Short Project Description

Rehabilitate a flood protection levee on Bureau of Reclamation property between the Newman Wasteway and the City of Newman Wastewater Treatment Plant.

Cost Share Information

Using project descriptions and the cost share data in the table above, estimates of cost shares for this project were calculated. The results are tabulated below, using a range of cost share values to account for uncertainty in the estimating process.

Federal Cost Share (%)	State Cost Share Range (%)		Local Cost Share Range (%)	
	Low	High	Low	High
75%	50%	90%	10%	50%

The following table provides estimates for the Federal, State, and local cost shares using total project cost and the cost share percentages from the above table.

Project	Total Project Cost	Federal Cost Share	Non-Federal Project Cost	State Cost Share Range		Local Cost Share Range	
				Low	High	Low	High
City of Newman/ Bureau of Reclamation Flood Levee Rehabilitation	$225,000	$168,750	$56,250	$28,125	$50,625	5,625	$28,125

6.3 Consolidation of O&M

Short Project Description

Two or more Reclamation Districts form a formal partnership to share technical, financial, and/or operational capacity to perform necessary O&M. As an initial step, invest 2 person-years to investigate potential governance options and design and implement a pilot maintenance agreement project.

Potential Funding Sources

Small Community Flood Risk Reduction – This funding source is designed to help implement projects to reduce flood risk in small, rural, and agricultural communities in the Central Valley. This project would fit this criteria because it will benefit rural and agricultural communities by making O&M more manageable while at the same time creating flood risk reduction due to better quality O&M.

The following table details the cost share of each funding source along with the cost associated with this project.

Project	Estimated Cost	Potential Funding Opportunities			
		Federal		State	
		Program Name	Cost Share	Program Name	Cost Share
Consolidation of O&M	$200,000	-	-	Small Community Flood Risk Reduction (SCFRR)	50%-90%

Cost Share Information

Using project descriptions and the cost share data in the table above, estimates of cost shares for this project were calculated. The results are tabulated below, using a range of cost share values to account for uncertainty in the estimating process.

Federal Cost Share (%)	State Cost Share Range (%)		Local Cost Share Range (%)	
	Low	High	Low	High
0%	50%	90%	10%	50%

The following table provides estimates for the Federal, State, and local cost shares using total project cost and the cost share percentages from the above table.

Project	Total Project Cost	Federal Cost Share	Non-Federal Project Cost	State Cost Share Range		Local Cost Share Range	
				Low	High	Low	High
Consolidation of O&M	$200,000	$0	$200,000	$100,000	$180,000	$20,000	$100,000

6.4 Dennet Dam Removal

Short Project Description

Removal of Dennett Dam, an abandoned low-head dam located on the lower Tuolumne River in Modesto, California. The dam has been an in stream barrier to anadromous fish passage, controlling local hydraulic and sediment transport conditions, for over 60 years, while also impeding water flow in the river. It is also a significant safety hazard adjacent to a major park, and has been the location of three drowning deaths in the last five years, including two children.

Potential Funding Sources

Anadromous Fish Restoration Program and Anadromous Fish Screen Program – This funding source is meant to help fund projects that protect, restore, or enhance fish, wildlife, and associated habitat throughout the Central Valley and Trinity River Basins of California. The Dennet Damn project meets the criteria of the funding source due to its benefit to anadromous fish.

Central Valley Project Implementation Act (CVPIA) – Habitat Restoration Program and Conservation Program – This funding source is meant to restore and protect species and habitats impacted by the Central Valley Project (CVP).

Endangered Species Act Section 6 Grant Program – This funding source provides grants to states and territories to participate in a wide variety of voluntary conservation projects for candidate, proposed, and listed species on non-federal lands. This project would qualify for funding due to its benefit to endangered species.

Land and Water Conservation Fund – This funding source provides matching grants to States and local governments for the acquisition and development of public outdoor recreation area and facilities, as well as funding for shared federal land acquisition and conservation strategies. This project meets the criteria of the funding source due to the benefit that it will create to recreational activities near the dam (swimming, boating, etc.).

North American Wetland Conservation Act (NAWCA) – This funding source provided matching grants to help fund projects that offer wetlands conservation for benefit of wetlands-associated migratory birds and other wildlife. This project qualifies for this program due to the fish and habitat benefits that it provides.

Pre-Disaster Mitigation (PDM) – This funding source requires that a project help implement a sustained pre-disaster hazard mitigation program to reduce risk in future hazard events. Since this is a proactive project designed to avoid future flood control issues it meets this criteria.

California Riparian Habitat Conservation Program – The goals of the CRHCP are to protect, preserve, restore and enhance riparian habitat throughout California. This program will fund programs that further these goals, which this project does with the riparian vegetation restoration element.

California River Parkways Program – This funding source awards funds to public agencies and non-profit organizations to acquire, restore, protect or develop river parkways. Projects must be multi-benefit. Since this project will provide better and safer access to the Tuolumne River and has multi-benefit components it would qualify for funding.

Habitat Conservation Fund Program – This funding source provides funds to local entities to protect threatened species, to address wildlife corridors, to create rails, and to provide nature interpretation programs which bring urban residents into park and wildlife areas. Since this project will protect endangered species and provide better and safer access to the Tuolumne River it will qualify for this program.

Urban Streams Restoration Program – This funding source provides grants for stream restoration projects that reduce flooding or erosion and associated property damages. Projects should restore, enhance, or protect their natural environment and promote community involvement, education, and stewardship in urban streams. This project meets this criteria since it will be restoring habitat along the project area.

Integrated Regional Water Management Plan (IRWMP) – This Project could possibly be included in IRWMP due to flood protection and restoration benefits, which would make it eligible for funding through the Plan. In order to be included in the IRWMP the project must be suggested to the lead agency preparing the IRWMP update.

The following table details the cost share of each funding source along with the cost associated with this project.

Project	Estimated Cost	Potential Funding Opportunities			
		Federal		State	
		Program Name	Cost Share	Program Name	Cost Share
Dennet Dam Removal	$700,000	Anadromous Fish Restoration Program and Anadromous Fish Screen Program	50%	California Riparian Habitat Conservation Program (CRCHP)	50%-90%
		Central Valley Project Improvement Act (CVPIA) – Habitat Restoration Program and Conservation Program	Not Req.	California River Parkways Program	50%-90%

		Endangered Species Act Section 6 Grant Program	75% - 90%	Habitat Conservation Fund (HCF) Program	50%
		Land and Water Conservation Fund	50%	Urban Streams Restoration Program	Not Req.
		North American Wetlands Conservation Act (NAWCA)	50%	Integrated Regional Water Management Plan (IRWMP)	50% - 75%
		Pre-Disaster Mitigation (PDM)	75% - 90%		

Cost Share Information

Using project descriptions and the cost share data in the table above, estimates of cost shares for this project were calculated. The results are tabulated below, using a range of cost share values to account for uncertainty in the estimating process.

Federal Cost Share (%)	State Cost Share Range (%)		Local Cost Share Range (%)	
	Low	High	Low	High
50%	50%	90%	10%	50%

The following table provides estimates for the Federal, State, and local cost shares using total project cost and the cost share percentages from the above table.

Project	Total Project Cost	Federal Cost Share	Non-Federal Project Cost	State Cost Share Range		Local Cost Share Range	
				Low	High	Low	High
Dennet Dam Removal	$700,000	$350,000	$350,000	$175,000	$315,000	$35,000	$175,000

6.5 Dos Rios Ranch Floodplain Expansion and Ecosystem Restoration Project and Hidden Valley Ranch Mitigation Project

Short Project Description

Project to restore flooding and transient floodwater storage to ~1,000 acres of historic floodplain, restore riparian habitats, and promote river physical processes of scour and deposition along 6 river miles. Remove levee maintenance obligations from SPFC and modify Corps O&M manual to allow breaching and other modification to the existing levees. Provide 191 acres of habitat mitigation for future regional SPFC environmental impacts.

Potential Funding Sources

Anadromous Fish Restoration Program and Anadromous Fish Screen Program – This funding source is meant to help fund projects that protect, restore, or enhance fish, wildlife, and associated habitat throughout the Central Valley and Trinity River Basins of California. This project meets the criteria of the funding program due to its benefit to anadromous fish.

Central Valley Project Implementation Act (CVPIA) – Habitat Restoration Program and Conservation Program – This funding source is meant to restore and protect species and habitats impacted by the Central Valley Project (CVP).

Endangered Species Act Section 6 Grant Program – This funding program provides grants to states and territories to participate in a wide variety of voluntary conservation projects for candidate, proposed, and listed species on non-federal lands. This project would qualify for funding due to its benefit to endangered species.

Land and Water Conservation Fund – This funding program provides matching grants to States and local governments for the acquisition and development of public outdoor recreation area and facilities, as well as funding for shared federal land acquisition and conservation strategies. This project meets the criteria of the funding program due to the benefit that it will create to recreational activities near the dam (swimming, boating, etc.).

North American Wetland Conservation Act (NAWCA) – This funding source provided matching grants to help fund projects that offer wetlands conservation for benefit of wetlands-associated migratory birds and other wildlife. This project qualifies for this source due to the fish and habitat benefits that it provides.

California Riparian Habitat Conservation Program – The goals of the CRHCP are to protect, preserve, restore and enhance riparian habitat throughout California. This program will fund programs that further these goals, which this project does with the riparian vegetation restoration element.

Central Valley Flood System Conservation Framework and Strategy – This funding source is meant to help implement projects in support of the Central Valley Flood System Conservation Framework and Conservation Strategy. Eligible projects will incorporate environmental stewardship and sustainability principles into State Plan of Flood Control flood management activities.

Flood Corridor Program (FCP) – This funding source is designed to fund non-structural flood risk reduction projects containing ecosystem and/or agricultural land conservation components. Since this project contains both a non-structural flood risk reduction component and ecosystem benefits it meets this programs criteria.

Habitat Conservation Fund Program – This funding source provides funds to local entities to protect threatened species, to address wildlife corridors, to create rails, and to provide nature interpretation programs which bring urban residents into park and wildlife areas. Since this project will protect endangered species and provide better and safer access to the Tuolumne River it will qualify for this program.

Inland Wetlands Conservation Program – This funding source was created to protect, restore, and enhance wetlands and associated habitats. Since this project will restore degraded floodplain habitat it meets the requirements of the funding source.

Integrated Regional Water Management Plan (IRWMP) – This Project could possibly be included in IRWMP due to flood protection benefits, which would make it eligible for funding through the Plan. In order to be included in the IRWMP the project must be suggested to the lead agency preparing the IRWMP update.

Systemwide Flood Risk Reduction (SWFRR) – This funding source is designed to help implement recommendations of the Basin-wide Feasibility Studies. Guidelines are currently under development. In order to qualify this project would have to become part of the Basin-wide Feasibility Study.

The following table details the cost share of each funding source along with the cost associated with this project.

Project	Estimated Cost	Potential Funding Opportunities			
		Federal		State	
		Program Name	Cost Share	Program Name	Cost Share
Dos Rios Ranch Floodplain Expansion and Ecosystem Restoration Project and Hidden Valley Ranch Mitigation Project	$8,000,000	Anadromous Fish Restoration Program and Anadromous Fish Screen Program	50%	California Riparian Habitat Conservation Program (CRCHP)	50%-90%
		Central Valley Project Implementation Act (CVPIA) – Habitat Restoration Program and Conservation Program	Not Req.	Central Valley Flood System Conservation Framework and Strategy	50% - 90%
		Endangered Species Act Section 6 Grant Program	75% - 90%	Flood Corridor (FCP)	50%-90%
		Land and Water Conservation Fund	50%	Habitat Conservation Fund (HCF) Program	50%
		North American Wetlands Conservation Act (NAWCA)	50%	Inland Wetlands Conservation Program	50%
				Integrated Regional Water Management (IRWM)	50%-75%
				Systemwide Flood Risk Reduction (SWFRR)	50%-90%

Cost Share Information

Using project descriptions and the cost share data in the table above, estimates of cost shares for this project were calculated. The results are tabulated below, using a range of cost share values to account for uncertainty in the estimating process.

Federal Cost Share (%)	State Cost Share Range (%)		Local Cost Share Range (%)	
	Low	High	Low	High
50%	50%	90%	10%	50%

The following table provides estimates for the Federal, State, and local cost shares using total project cost and the cost share percentages from the above table.

Project	Total Project Cost	Federal Cost Share	Non - Federal Project Cost	State Cost Share Range		Local Cost Share Range	
				Low	High	Low	High
Dos Rios Ranch Floodplain Expansion and Ecosystem Restoration Project and Hidden Valley Ranch Mitigation Project	$8,000,000	$4,000,000	$4,000,000	$2,000,000	$3,600,000	$400,000	$2,000,000

6.6 Dry Creek Watershed Detention Reconnaissance Study

Short Project Description

Complete a reconnaissance study of potential options for reducing flood risks by detaining flood flows in the Dry Creek watershed, upstream of the City of Modesto.

Potential Funding Sources

Flood Mitigation Assistance – This funding source provides grants in order to implement projects that reduce or eliminate the risk of repetitive flood damage to buildings and structures insurable under the National Flood Insurance Program. This project would qualify for this funding source since it has the potential to reduce flood risk to qualifying buildings and structures.

USACE Funding – This funding source requires that USACE adopt the project. This project may qualify for USACE adoption.

Integrated Regional Water Management Plan (IRWMP) – This project could be included in the next IRWMP due to flood protection benefits, which would make it eligible for funding through IRWMP funding. In order to be included in the IRWMP the project must be suggested to the lead agency preparing the IRWMP update.

Systemwide Flood Risk Reduction (SWFRR) – This funding source is designed to help implement recommendations of the Basin-Wide Feasibility Studies. Guidelines are currently under development. In order to qualify this project would have to become part of the Basin-Wide Feasibility Study.

The following table details the cost share of each funding source along with the cost associated with this project.

Project	Estimated Cost	Potential Funding Opportunities			
		Federal		State	
		Program Name	Cost Share	Program Name	Cost Share
Dry Creek Watershed Detention Reconnaissance Study	$250,000	Flood Mitigation Assistance (FMA)	75%-100%	Integrated Regional Water Management (IRWMP)	50% - 75%
		USACE Funding	50%	Systemwide Flood Risk Reduction (SFRR)	50%-90%

Cost Share Information

Using project descriptions and the cost share data in the table above, estimates of cost shares for this project were calculated. The results are tabulated below, using a range of cost share values to account for uncertainty in the estimating process.

Federal Cost Share (%)	State Cost Share Range (%)		Local Cost Share Range (%)	
	Low	High	Low	High
50%	50%	90%	10%	50%

The following table provides estimates for the Federal, State, and local cost shares using total project cost and the cost share percentages from the above table.

Project	Total Project Cost	Federal Cost Share	Non-Federal Project Cost	State Cost Share Range		Local Cost Share Range	
				Low	High	Low	High
Dry Creek Watershed Detention Reconnaissance Study	$250,000	$125,000	$125,000	$62,500	$112,500	$12,500	$62,500

6.7 Emergency Response Plan – Debris Management

Short Project Description

A debris management plan is needed to better prepare to restore public services and ensure public health and safety in the aftermath of a flood and to better position the Mid SJR Region for emergency response funding from the State of California, FEMA, and other participating entities. Stanislaus County proposes developing a comprehensive, countywide debris management plan.

Potential Funding Sources

Flood Emergency Response Statewide Emergency Response Grants – This funding source is intended to provide support local Emergency Action Plans (EAPs) or related flood preparedness and response activities. Funding is available for material acquisition such as emergency communications equipment, or for program enhancement activities meant to improve emergency response. Due to this projects emergency response element it is believed that it is eligible for this funding source.

The following table details the cost share of each funding source along with the cost associated with this project.

Project	Estimated Cost	Potential Funding Opportunities			
		Federal		State	
		Program Name	Cost Share	Program Name	Cost Share
Emergency Response Plan - Debri Management	$70,000 - $110,000	-	-	Flood Emergency Response Statewide Emergency Response Grants	50%-90%

Cost Share Information

Using project descriptions and the cost share data in the table above, estimates of cost shares for this project were calculated. The results are tabulated below, using a range of cost share values to account for uncertainty in the estimating process.

Federal Cost Share (%)	State Cost Share Range (%)		Local Cost Share Range (%)	
	Low	High	Low	High
0%	50%	90%	10%	50%

The following table provides estimates for the Federal, State, and local cost shares using total project cost and the cost share percentages from the above table.

Project	Total Project Cost	Federal Cost Share	Non-Federal Project Cost	State Cost Share Range		Local Cost Share Range	
				Low	High	Low	High
Emergency Response Plan - Debris Management	$110,000	$0	$110,000	$55,000	$99,000	$11,000	$55,000

6.8 Emergency Response Plan – Local Planning and Training

Short Project Description

Planning and training are necessary to improve coordination between local agencies so that emergency response can be improved in the planning area. A program would be developed and implemented to address this need.

Potential Funding Sources

Flood Emergency Response Statewide Emergency Response Grants – This funding source is intended to provide support local Emergency Action Plans (EAPs) or related flood preparedness and response activities. Funding is available for material acquisition such as emergency communications equipment, or for program enhancement activities meant to improve emergency response. Due to this projects emergency response element it is believed that it is eligible for this funding source.

The following table details the cost share of each funding source along with the cost associated with this project.

Project	Estimated Cost	Potential Funding Opportunities			
		Federal		State	
		Program Name	Cost Share	Program Name	Cost Share
Emergency Response Plan - Local Planning and Training	$70,000 - $110,000	-	-	Flood Emergency Response Statewide Emergency Response Grants	50%-90%

Cost Share Information

Using project descriptions and the cost share data in the table above, estimates of cost shares for this project were calculated. The results are tabulated below, using a range of cost share values to account for uncertainty in the estimating process.

Federal Cost Share (%)	State Cost Share Range (%)		Local Cost Share Range (%)	
	Low	High	Low	High
0%	50%	90%	10%	50%

The following table provides estimates for the Federal, State, and local cost shares using total project cost and the cost share percentages from the above table.

Project	Total Project Cost	Federal Cost Share	Non-Federal Project Cost	State Cost Share Range		Local Cost Share Range	
				Low	High	Low	High
Emergency Response Plan - Local Planning and Training	$110,000	$0	$110,000	$55,000	$99,000	$11,000	$55,000

6.9 Flood Risk Education

Short Project Description

Develop and implement a regional flood risk management educational program to raise awareness of flood risks and elevate the level of public understanding with respect to flood risk management needs and the value of investments to address them. For the LMAs, include education on their role in flood risk management and provide technical guidance/assistance on levee maintenance activities and permitting requirements.

Potential Funding Sources

Central Valley Flood System Conservation Framework and Strategy – This funding source is meant to help implement projects in support of the Central Valley Flood System Conservation Framework and Conservation Strategy. Eligible projects will incorporate environmental stewardship and sustainability principles into State Plan of Flood Control flood management activities. This project is believed to be eligible for this funding due to its ability to educate LMAs in both flood risk management and in sustainability.

Urban Flood Risk Reduction (UFRR) – This funding source is designed to help improve urban SPFC levees within the Central Valley to a 200-year level of protection. Since this project would educate LMAs that are responsible for urban SPFC levees it is believed that it would qualify for funding under this program.

The following table details the cost share of each funding source along with the cost associated with this project.

Project	Estimated Cost	Potential Funding Opportunities			
		Federal		State	
		Program Name	Cost Share	Program Name	Cost Share
Flood Risk Education	Ranges from a one time $30,000 cost to an annual cost of $100,000	Central Valley Project Improvement Act (CVPIA) – Habitat Restoration Program and Conservation Program	Not Req.	Urban Flood Risk Reduction (UFRR)	50%-90%

Cost Share Information

Using project descriptions and the cost share data in the table above, estimates of cost shares for this project were calculated. The results are tabulated below, using a range of cost share values to account for uncertainty in the estimating process.

Federal Cost Share (%)	State Cost Share Range (%)		Local Cost Share Range (%)	
	Low	High	Low	High
50%	50%	90%	10%	50%

The following table provides estimates for the Federal, State, and local cost shares using total project cost and the cost share percentages from the above table.

Project	Total Project Cost	Federal Cost Share	Non-Federal Project Cost	State Cost Share Range		Local Cost Share Range	
				Low	High	Low	High
Flood Risk Education	$30,000	$15,000	$15,000	$7,500	$13,500	$1,500	$7,500

6.10 Gomes Lake / Harding Drain Improvements

Short Project Description

This project includes multiple components to enhance the function, reliability, flexibility and capacity of the Gomes Lake facility, which stores and drains stormwater and return flows, providing flood risk reduction behind the east bank levees of the San Joaquin River.

Potential Funding Sources

Flood Mitigation Assistance – This funding source provides grants in order to implement projects that reduce or eliminate the risk of repetitive flood damage to buildings and structures insurable under the National Flood Insurance Program. This project would qualify for this funding source since it has the potential to reduce flood risk to qualifying buildings and structures.

Pre-Disaster Mitigation (PDM) – This funding source requires that a project help implement a sustained pre-disaster hazard mitigation program to reduce risk in future hazard events. Since this is a proactive project designed to avoid future flood control issues it meets this criteria.

Integrated Regional Water Management Plan (IRWMP) – This project could be included in the next IRWMP due to flood protection benefits, which would make it eligible for funding through IRWMP funding. In order to be included in the IRWMP the project must be suggested to the lead agency preparing the IRWMP update.

Storm Water Flood Management Program – This funding source is designed to help fund storm water management projects that reduce flood damage and provide at least one other type of benefit. In order to qualify this project would have to add a multi-benefit element and become part of an IRWMP, as well as be consistent with the applicable Water Quality Basin Plan.

Urban Flood Risk Reduction (UFRR) – This funding source is designed to help improve urban SPFC levees within the Central Valley to a 200-year level of protection. Since this project would provide flood risk reduction to the east bank levees on the San Joaquin River it would qualify.

The table on the next page details the cost share of each funding source along with the cost associated with this project.

Project	Estimated Cost	Potential Funding Opportunities			
		Federal		State	
		Program Name	Cost Share	Program Name	Cost Share
Gomes Lake / Harding Drain Improvements	$1,000,000-$1,700,000	Flood Mitigation Assistance (FMA)	75%-100%	Integrated Regional Water Management (IRWMP)	50% - 75%
		Pre-Disaster Mitigation (PDM)	75% - 90%	Storm Water Flood Management Program	75%
		-	-	Urban Flood Risk Reduction (UFRR)	50%-90%

Cost Share Information

Using project descriptions and the cost share data in the table above, estimates of cost shares for this project were calculated. The results are tabulated below, using a range of cost share values to account for uncertainty in the estimating process.

Federal Cost Share (%)	State Cost Share Range (%)		Local Cost Share Range (%)	
	Low	High	Low	High
75%	50%	90%	10%	50%

The following table provides estimates for the Federal, State, and local cost shares using total project cost and the cost share percentages from the above table.

Project	Total Project Cost	Federal Cost Share	Non - Federal Project Cost	State Cost Share Range		Local Cost Share Range	
				Low	High	Low	High
Gomes Lake / Harding Drain Improvements	$1,700,000	$1,275,000	$425,000	$212,500	$382,500	$42,500	$212,500

6.11 Hydraulic and Channel Migration Studies

Short Project Description

Two regional studies (mainstem San Joaquin River flood hydraulics and channel migration) and three focused hydraulic studies are needed to better inform flood management in the Mid SJR Region.

Potential Funding Sources

Integrated Regional Water Management Plan (IRWMP) – This project could be included in the next IRWMP due to flood protection benefits, which would make it eligible for funding through IRWMP funding. In order to be included in the IRWMP the project must be suggested to the lead agency preparing the IRWMP update.

The following table details the cost share of each funding source along with the cost associated with this project.

Project	Estimated Cost	Potential Funding Opportunities			
		Federal		State	
		Program Name	Cost Share	Program Name	Cost Share
Hydraulic and Channel Migration Studies	$200,000	-	-	Integrated Regional Water Management (IRWMP)	50% - 75%

Cost Share Information

Using project descriptions and the cost share data in the table above, estimates of cost shares for this project were calculated. The results are tabulated below, using a range of cost share values to account for uncertainty in the estimating process.

Federal Cost Share (%)	State Cost Share Range (%)		Local Cost Share Range (%)	
	Low	High	Low	High
0%	50%	75%	25%	50%

The following table provides estimates for the Federal, State, and local cost shares using total project cost and the cost share percentages from the above table.

Project	Total Project Cost	Federal Cost Share	Non - Federal Project Cost	State Cost Share Range		Local Cost Share Range	
				Low	High	Low	High
Hydraulic and Channel Migration Studies	$200,000	$0	$200,000	$100,000	$150,000	$50,000	$100,000

6.12 Integrated Levee Vegetation Management – Flood Maintenance and Habitat

Short Project Description

This project includes re-establishing appropriate vegetation on levee slopes to promote terrestrial wildlife survival during floods – either native sod on active levees, or native brush vegetation on inactive levees (RDs 2099, 2100, 2102, and 2092 in the future).

Potential Funding Sources

Central Valley Project Implementation Act (CVPIA) – Habitat Restoration Program and Conservation Program – This funding source is meant to restore and protect species and habitats impacted by the Central Valley Project (CVP). Since this project involves adding habitat for native species it is believed that it will be eligible for this funding.

Endangered Species Act Section 6 Grant Program – This funding source provides grants to states and territories to participate in a wide variety of voluntary conservation projects for candidate, proposed, and listed species on non-federal lands. This project would qualify for funding due to its benefit to endangered species.

California Riparian Habitat Conservation Program – The goals of the CRHCP are to protect, preserve, restore and enhance riparian habitat throughout California. This program will fund programs that further these goals, which this project does with the riparian vegetation restoration element.

Central Valley Flood System Conservation Framework and Strategy – This funding source is meant to help implement projects in support of the Central Valley Flood System Conservation Framework and Conservation Strategy. Eligible projects will incorporate environmental stewardship and sustainability principles into State Plan of Flood Control flood management activities. This project provides environmental benefits along levees which is consistent with the goals of the funding source.

Integrated Regional Water Management Plan (IRWMP) – This Project could possibly be included in IRWMP due to environmental and wildlife benefits, which would make it eligible for funding through the Plan. In order to be included in the IRWMP the project must be suggested to the lead agency preparing the IRWMP update.

The table on the following page details the cost share of each funding source along with the cost associated with this project.

Project	Estimated Cost	Potential Funding Opportunities			
		Federal		State	
		Program Name	Cost Share	Program Name	Cost Share
Integrated Levee Vegetation Management - Flood Maintenance and Habitat	$6,400,000	Central Valley Project Improvement Act (CVPIA) – Habitat Restoration Program and Conservation Program	Not Req.	California Riparian Habitat Conservation Program (CRCHP)	50%-90%
		Endangered Species Act Section 6 Grant Program	75% - 90%	Central Valley Flood System Conservation Framework and Strategy	50% - 90%
		-	-	Integrated Regional Water Management (IRWMP)	50% - 75%

Cost Share Information

Using project descriptions and the cost share data in the table above, estimates of cost shares for this project were calculated. The results are tabulated below, using a range of cost share values to account for uncertainty in the estimating process.

Federal Cost Share (%)	State Cost Share Range (%)		Local Cost Share Range (%)	
	Low	High	Low	High
75%	50%	90%	10%	50%

The table on the following pages provides estimates for the Federal, State, and local cost shares using total project cost and the cost share percentages from the above table.

Project	Total Project Cost	Federal Cost Share	Non-Federal Project Cost	State Cost Share Range		Local Cost Share Range	
				Low	High	Low	High
Integrated Levee Vegetation Management - Flood Maintenance and Habitat	$6,400,000	$4,800,000	$1,600,000	$800,000	$1,440,000	$160,000	$800,000

6.13 La Grange Floodplain Restoration and Spawning Gravel Augmentation

Short Project Description

Restore 77 acres of degraded floodplain habitat along the Tuolumne River in La Grange while developing a program of spawning gravel to improve and enhance existing spawning beds in the Tuolumne River.

Potential Funding Sources

Anadromous Fish Restoration Program and Anadromous Fish Screen Program – This funding source is intended to help fund projects that protect, restore, or enhance fish, wildlife, and associated habitat throughout the Central Valley and Trinity River Basins of California. This project meets the criteria of the funding source due to its benefit to anadromous fish.

Central Valley Project Implementation Act (CVPIA) – Habitat Restoration Program and Conservation Program – This funding source is meant to restore and protect species and habitats impacted by the Central Valley Project (CVP). This project meets the criteria of this funding source due to its benefit to anadromous fish and to riparian habitat.

Endangered Species Act Section 6 Grant Program – This funding source provides grants to states and territories to participate in a wide variety of voluntary conservation projects for candidate, proposed, and listed species on non-federal lands. This project would qualify for funding due to its benefit to endangered species.

North American Wetland Conservation Act (NAWCA) – This funding source provides matching grants to help fund projects that offer wetlands conservation for benefit of wetlands-associated migratory birds and other wildlife. This project qualifies for this program due to the fish and habitat benefits that it provides.

Pre-Disaster Mitigation (PDM) – This funding source requires that a project help implement a sustained pre-disaster hazard mitigation program to reduce risk in future hazard events. Since this is a proactive project designed to allow for flood inundation within the natural floodplain, which would alleviate stress on downstream levees, it would meet the criteria for this funding source.

California Riparian Habitat Conservation Program – The goals of the CRHCP are to protect, preserve, restore and enhance riparian habitat throughout California. This program will fund programs that further these goals, which this project does with the riparian vegetation restoration element.

Central Valley Flood System Conservation Framework and Strategy – This funding source is meant to help implement projects in support of the Central Valley Flood System Conservation Framework and Conservation Strategy. Eligible projects will incorporate environmental stewardship and sustainability principles into State Plan of Flood Control flood management activities. Since this project would benefit

SPFC facilities downstream and incorporates habitat and wildlife restoration, it would fulfill the criteria of this funding source.

Flood Corridor Program (FCP) – This funding source is designed to fund non-structural flood risk reduction projects containing ecosystem and/or agricultural land conservation components. Since this project contains both a non-structural flood risk reduction component and ecosystem benefits it meets this programs criteria.

Habitat Conservation Fund Program – This funding source provides funds to local entities to protect threatened species, to address wildlife corridors, to create rails, and to provide nature interpretation programs which bring urban residents into park and wildlife areas. Since this project will protect endangered species, provide ecosystem restoration opportunities, and provide recreational opportunities it meets the requirements of this funding source.

Inland Wetlands Conservation Program – This funding source was created to protect, restore, and enhance wetlands and associated habitats. Since this project will restore degraded floodplain habitat it meets the requirements of the funding source.

Watershed and Environmental Improvement Program – This funding source is primarily focused on protection of low lying floodplain areas along the Lower Tuolumne River through permanent conservation easements and/or fee title purchase of property from willing landowners. Since the project is to restore a natural floodplain this funding source would apply.

The table on the following page details the cost share of each funding source along with the cost associated with this project.

Project	Estimated Cost	Potential Funding Opportunities			
		Federal		State	
		Program Name	Cost Share	Program Name	Cost Share
La Grange Floodplain Restoration and Spawning Gravel Augmentation	$1,500,000	Anadromous Fish Restoration Program and Anadromous Fish Screen Program	50%	California Riparian Habitat Conservation Program (CRCHP)	50%-90%
		Central Valley Project Implementation Act (CVPIA) – Habitat Restoration Program and Conservation Program	Not Req.	Central Valley Flood System Conservation Framework and Strategy	50%-90%
		Endangered Species Act Section 6 Grant Program	75% - 90%	Flood Corridor (FCP)	50%-90%
		North American Wetlands Conservation Act (NAWCA)	50%	Habitat Conservation Fund (HCF) Program	50%
		Pre-Disaster Mitigation (PDM)	75% - 90%	Inland Wetlands Conservation Program	50%
		-		Watershed and Environmental Improvement Program	Not Req.

Cost Share Information

Using project descriptions and the cost share data in the table above, estimates of cost shares for this project were calculated. The results are tabulated below, using a range of cost share values to account for uncertainty in the estimating process.

Federal Cost Share (%)	State Cost Share Range (%)		Local Cost Share Range (%)	
	Low	High	Low	High
50%	50%	90%	10%	50%

The following table provides estimates for the Federal, State, and local cost shares using total project cost and the cost share percentages from the above table.

Project	Total Project Cost	Federal Cost Share	State Project Cost	State Cost Share Range		Local Cost Share Range	
				Low	High	Low	High
La Grange Floodplain Restoration and Spawning Gravel Augmentation	$1,500,000	$750,000	$750,000	$375,000	$675,000	$75,000	$375,000

6.14 Little Salado Creek

Short Project Description

Construction of a project to partially divert, retain and percolate the 1030 cfs of Little Salado Creek.

Potential Funding Sources

Flood Mitigation Assistance – This funding program provides grants in order to implement projects that reduce or eliminate the risk of repetitive flood damage to buildings and structures insurable under the National Flood Insurance Program. This project may qualify for this funding source since it has the potential to reduce flood risk to qualifying buildings and structures.

Pre-Disaster Mitigation (PDM) – This funding source requires that a project help implement a sustained pre-disaster hazard mitigation program to reduce risk in future hazard events. Since this is a proactive project designed to avoid future flood control issues it meets this criteria.

USACE Funding – This funding source requires that USACE adopt the project. This project may have the potential to be adopted by USACE.

Flood System Repair Project (FSRP) - The Flood System Repair Project (FSRP) is designed to evaluate (feasibility), design, and construct repairs on non-urban SPFC facility (levees, channels, structures, etc.) deficiencies. Since this project involves repairing SPFC levees in non-urban areas it meets the criteria for this funding source.

Integrated Regional Water Management Plan (IRWMP) – This Project could possibly be included in IRWMP due to flood protection benefits, which would make it eligible for funding through the Plan. In order to be included in the IRWMP the project must be suggested to the lead agency preparing the IRWMP update.

Small Community Flood Risk Reduction – This funding program is designed to help implement projects to reduce flood risk in small, rural, and agricultural communities in the Central Valley. This project would fit this criteria because it will benefit rural and agricultural communities by reducing flood risk.

Storm Water Flood Management Program – This funding program is designed to help fund storm water management projects that reduce flood damage and provide at least one other type of benefit. In order to qualify this project would have to add a multi-benefit element and become part of an IRWMP, as well as be consistent with the applicable Water Quality Basin Plan.

Systemwide Flood Risk Reduction (SWFRR) – This funding source is designed to help implement recommendations of the Basin-wide Feasibility Studies. Guidelines are currently under development. In order to qualify this project would have to become part of the Basin-wide Feasibility Study.

The following table details the cost share of each funding source along with the cost associated with this project.

Project	Estimated Cost	Potential Funding Opportunities			
		Federal		State	
		Program Name	Cost Share	Program Name	Cost Share
Little Salado Creek	$5,000,000	Flood Mitigation Assistance (FMA)	75%-100%	Flood System Repair Project (FSRP)	50% - 90%
		Pre-Disaster Mitigation (PDM)	75% - 90%	Integrated Regional Water Management (IRWM)	50%-75%
		USACE Funding	50%	Small Community Flood Risk Reduction (SCFRR)	50%-90%
				Storm Water Flood Management Program	50% - 75%
				Systemwide Flood Risk Reduction (SWFRR)	50%-90%

Cost Share Information

Using project descriptions and the cost share data in the table above, estimates of cost shares for this project were calculated. The results are tabulated below, using a range of cost share values to account for uncertainty in the estimating process.

Federal Cost Share (%)	State Cost Share Range (%)		Local Cost Share Range (%)	
	Low	High	Low	High
50%	50%	90%	10%	50%

The following table provides estimates for the Federal, State, and local cost shares using total project cost and the cost share percentages from the above table.

Project	Total Project Cost	Federal Cost Share	Non - Federal Project Cost	State Cost Share Range		Local Cost Share Range	
				Low	High	Low	High
Little Salado Creek	$5,000,000	$2,500,000	$2,500,000	$1,250,000	$2,250,000	$250,000	$1,250,000

6.15 Modesto WWTP – Reduce Flood Risk

Short Project Description

Develop and evaluate potential solutions to existing flood hazards at the Modesto Sutter and Jennings WWTPs, including completion of two studies (Sutter Plant Relocation Feasibility Study and a Wastewater Treatment Facilities Master Plan) that are currently in process, and implement the preferred alternative.

Potential Funding Sources

Flood Mitigation Assistance – This funding source provides grants in order to implement projects that reduce or eliminate the risk of repetitive flood damage to buildings and structures insurable under the National Flood Insurance Program. This project would qualify for this funding source since it has the potential to reduce flood risk to qualifying buildings and structures.

Pre-Disaster Mitigation (PDM) – This funding source requires that a project help implement a sustained pre-disaster hazard mitigation program to reduce risk in future hazard events. Since this is a proactive project designed to avoid future flood control issues it meets this criteria.

Integrated Regional Water Management Plan (IRWMP) – This Project could possibly be included in IRWMP due to flood protection benefits, which would make it eligible for funding through the Plan. In order to be included in the IRWMP the project must be suggested to the lead agency preparing the IRWMP update.

Systemwide Flood Risk Reduction (SWFRR) – This funding source is designed to help implement recommendations of the Basin-wide Feasibility Studies. Guidelines are currently under development. In order to qualify this project would have to become part of the Basin-wide Feasibility Study.

The following table details the cost share of each funding source along with the cost associated with this project.

Project	Estimated Cost	Potential Funding Opportunities			
		Federal		State	
		Program Name	Cost Share	Program Name	Cost Share
Modesto WWTP - Reduce Flood Risk	$80,000,000	Flood Mitigation Assistance (FMA)	75%-100%	Integrated Regional Water Management (IRWM)	50%-75%
		Pre-Disaster Mitigation (PDM)	75% - 90%	Systemwide Flood Risk Reduction (SWFRR)	50%-90%

Cost Share Information

Using project descriptions and the cost share data in the table above, estimates of cost shares for this project were calculated. The results are tabulated below, using a range of cost share values to account for uncertainty in the estimating process.

Federal Cost Share (%)	State Cost Share Range (%)		Local Cost Share Range (%)	
	Low	High	Low	High
75%	50%	90%	10%	50%

The following table provides estimates for the Federal, State, and local cost shares using total project cost and the cost share percentages from the above table.

Project	Total Project Cost	Federal Cost Share	Non - Federal Project Cost	State Cost Share Range		Local Cost Share Range	
				Low	High	Low	High
Modesto WWTP - Reduce Flood Risk	$80,000,000	$60,000,000	$20,000,000	$10,000,000	$18,000,000	$2,000,000	$10,000,000

Table to be updated when cost data is made available.

6.16 Orestimba Creek Flood Management Project

Short Project Description

Construction of 4 mile chevron levee along east bank of CCID Main Canal and a 1 mile cross levee to reduce flood risk to Newman and adjacent agricultural areas, providing a 200-year level of protection. The chevron levee would include 3 feet of freeboard above the mean 200-year water surface elevation.

Potential Funding Sources

Flood Mitigation Assistance – This funding source provides grants in order to implement projects that reduce or eliminate the risk of repetitive flood damage to buildings and structures insurable under the National Flood Insurance Program. This project would qualify for this funding source since it has the potential to reduce flood risk to qualifying buildings and structures.

Pre-Disaster Mitigation (PDM) – This funding source requires that a project help implement a sustained pre-disaster hazard mitigation program to reduce risk in future hazard events. Since this is a proactive project designed to avoid future flood control issues it meets this criteria.

USACE Funding – This funding source requires that USACE adopt the project. This project has been identified in the Orestimba Creek Feasibility Study and would therefore be eligible for Federal cost share through USACE.

Urban Flood Risk Reduction (UFRR) – This funding source is designed to help improve urban SPFC levees within the Central Valley to a 200-year level of protection. While this project does not deal specifically with SPFC levees, it does protect an urban area (City of Newman) that has many assets.

The following table details the cost share of each funding source along with the cost associated with this project.

Project	Estimated Cost	Potential Funding Opportunities			
		Federal		State	
		Program Name	Cost Share	Program Name	Cost Share
Orestimba Creek Flood Management Project	$44 million (Design and construction) $100,000/yr (O&M)	Flood Mitigation Assistance (FMA)	75%-100%	Urban Flood Risk Reduction (UFRR)	50%-90%
		Pre-Disaster Mitigation (PDM)	75% - 90%	-	
		USACE Funding	50%		

Cost Share Information

Using project descriptions and the cost share data in the table above, estimates of cost shares for this project were calculated. The results are tabulated below, using a range of cost share values to account for uncertainty in the estimating process.

Federal Cost Share (%)	State Cost Share Range (%)		Local Cost Share Range (%)	
	Low	High	Low	High
50%	50%	90%	10%	50%

The following table provides estimates for the Federal, State, and local cost shares using total project cost and the cost share percentages from the above table.

Project	Total Project Cost	Federal Cost Share	Non-Federal Project Cost	State Cost Share Range		Local Cost Share Range	
				Low	High	Low	High
Orestimba Creek Flood Management Project	$44,000,000	$22,000,000	$22,000,000	$11,000,000	$19,800,000	$2,200,000	$11,000,000

6.17 Patterson WWTP - Reduce Flood Risk

Short Project Description

Develop and evaluate potential solutions to existing flood hazards at the City of Patterson Waste Water Treatment Plant.

Potential Funding Sources

Pre-Disaster Mitigation (PDM) – This funding source requires that a project help implement a sustained pre-disaster hazard mitigation program to reduce risk in future hazard events. Since this is a proactive project designed to avoid future flood control issues it meets this criteria.

Integrated Regional Water Management Plan (IRWMP) – This project could be included in the next IRWMP due to flood protection benefits, which would make it eligible for funding through IRWMP funding. In order to be included in the IRWMP the project must be suggested to the lead agency preparing the IRWMP update.

Local Levee Assistance Program (LLAP) –This funding source requires that funds be used on local levees (Non-SPFC) that are not within the Sacrament-San Joaquin Delta. This project meets both of these requirements.

The following table details the cost share of each funding source along with the cost associated with this project.

Project	Estimated Cost	Potential Funding Opportunities			
		Federal		State	
		Program Name	Cost Share	Program Name	Cost Share
Patterson WWTP - Reduce Flood Risk	$27,000	Pre-Disaster Mitigation (PDM)	75% - 90%	Integrated Regional Water Management (IRWM)	50% - 75%
		-	-	Small Community Flood Risk Reduction (SCFRR)	50%-90%

Cost Share Information

Using project descriptions and the cost share data in the table above, estimates of cost shares for this project were calculated. The results are tabulated below, using a range of cost share values to account for uncertainty in the estimating process.

Federal Cost Share (%)	State Cost Share Range (%)		Local Cost Share Range (%)	
	Low	High	Low	High
75%	50%	90%	10%	50%

The following table provides estimates for the Federal, State, and local cost shares using total project cost and the cost share percentages from the above table.

Project	Total Project Cost	Federal Cost Share	Non-Federal Project Cost	State Cost Share Range		Local Cost Share Range	
				Low	High	Low	High
Patterson WWTP - Reduce Flood Risk	$27,000	$20,250	$6,750	$3,375	$6,075	$675	$3,375

6.18 Reclamation District 1602 Resilience

Short Project Description

This project would address the current deficiencies of the levees under the jurisdiction of RD 1602. This would include the costs of becoming active in the SWIF process and completion of the necessary repairs and upgrades to bring the levee system back into "Active" status for PL84-99 eligibility. Necessary actions can be found in RD inspection reports from 2013 – all "U" ratings need to be fixed immediately and all "M" ratings need to be fixed within 2 years or less.

Potential Funding Sources

Flood Mitigation Assistance – This funding source provides grants in order to implement projects that reduce or eliminate the risk of repetitive flood damage to buildings and structures insurable under the National Flood Insurance Program. This project would qualify for this funding source since it has the potential to reduce flood risk to qualifying buildings and structures.

Pre-Disaster Mitigation (PDM) – This funding source requires that a project help implement a sustained pre-disaster hazard mitigation program to reduce risk in future hazard events. Since this is a proactive project designed to avoid future flood control issues it meets this criteria.

Flood System Repair Project (FSRP) - The Flood System Repair Project (FSRP) is designed to evaluate (feasibility), design, and construct repairs on non-urban SPFC facility (levees, channels, structures, etc.) deficiencies. Since this project involves repairing SPFC levees in non-urban areas it meets the criteria for this funding source.

Small Community Flood Risk Reduction – This funding source is designed to help implement projects to reduce flood risk in small, rural, and agricultural communities in the Central Valley. This project would fit this criteria because it will benefit rural and agricultural communities by repairing and upgrading the levees protecting them.

Systemwide Flood Risk Reduction (SWFRR) – This funding source is designed to help implement recommendations of the Basin-Wide Feasibility Studies. Guidelines are currently under development. In order to qualify this project would have to become part of the Basin-Wide Feasibility Study.

The table on the following page details the cost share of each funding source along with the cost associated with this project.

Project	Estimated Cost	Potential Funding Opportunities			
		Federal		State	
		Program Name	Cost Share	Program Name	Cost Share
Reclamation District 1602 Resilience Project	$4,700,000	Flood Mitigation Assistance (FMA)	75%-100%	Flood System Repair Project (FSRP)	50% - 90%
		Pre-Disaster Mitigation (PDM)	75% - 90%	Small Community Flood Risk Reduction (SCFRR)	50%-90%
				Systemwide Flood Risk Reduction (SWFRR)	50%-90%

Cost Share Information

Using project descriptions and the cost share data in the table above, estimates of cost shares for this project were calculated. The results are tabulated below, using a range of cost share values to account for uncertainty in the estimating process.

Federal Cost Share (%)	State Cost Share Range (%)		Local Cost Share Range (%)	
	Low	High	Low	High
75%	50%	90%	10%	50%

The following table provides estimates for the Federal, State, and local cost shares using total project cost and the cost share percentages from the above table.

Project	Total Project Cost	Federal Cost Share	Non - Federal Project Cost	State Cost Share Range		Local Cost Share Range	
				Low	High	Low	High
Reclamation District 1602 Resilience	$4,700,000$	$3,525,000	$1,175,000	$587,500	$1,057,500	$117,500	$587,500

6.19 Reclamation District 2031 Resilience

Short Project Description

This project would address the current deficiencies of the levees under the jurisdiction of RD 2031. This would include the costs of becoming active in the SWIF process and completion of the necessary repairs and upgrades to bring the levee system back into "Active" status for PL84-99 eligibility. Necessary actions can be found in RD inspection reports from 2013 – all "U" ratings need to be fixed immediately and all "M" ratings need to be fixed within 2 years or less.

Potential Funding Sources

Flood Mitigation Assistance – This funding source provides grants in order to implement projects that reduce or eliminate the risk of repetitive flood damage to buildings and structures insurable under the National Flood Insurance Program. This project would qualify for this funding source since it has the potential to reduce flood risk to qualifying buildings and structures.

Pre-Disaster Mitigation (PDM) – This funding source requires that a project help implement a sustained pre-disaster hazard mitigation program to reduce risk in future hazard events. Since this is a proactive project designed to avoid future flood control issues it meets this criteria.

Flood System Repair Project (FSRP) - The Flood System Repair Project (FSRP) is designed to evaluate (feasibility), design, and construct repairs on non-urban SPFC facility (levees, channels, structures, etc.) deficiencies. Since this project involves repairing SPFC levees in non-urban areas it meets the criteria for this funding source.

Small Community Flood Risk Reduction – This funding source is designed to help implement projects to reduce flood risk in small, rural, and agricultural communities in the Central Valley. This project would fit this criteria because it will benefit rural and agricultural communities by repairing and upgrading the levees protecting them.

Systemwide Flood Risk Reduction (SWFRR) – This funding source is designed to help implement recommendations of the Basin-Wide Feasibility Studies. Guidelines are currently under development. In order to qualify this project would have to become part of the Basin-Wide Feasibility Study.

The table on the following page details the cost share of each funding source along with the cost associated with this project.

Project	Estimated Cost	Potential Funding Opportunities			
		Federal		State	
		Program Name	Cost Share	Program Name	Cost Share
Reclamation District 2031 Resilience Project	$2,000,000	Flood Mitigation Assistance (FMA)	75%-100%	Flood System Repair Project (FSRP)	50% - 90%
		Pre-Disaster Mitigation (PDM)	75% - 90%	Small Community Flood Risk Reduction (SCFRR)	50%-90%
				Systemwide Flood Risk Reduction (SWFRR)	50%-90%

Cost Share Information

Using project descriptions and the cost share data in the table above, estimates of cost shares for this project were calculated. The results are tabulated below, using a range of cost share values to account for uncertainty in the estimating process.

Federal Cost Share (%)	State Cost Share Range (%)		Local Cost Share Range (%)	
	Low	High	Low	High
75%	50%	90%	10%	50%

The following table provides estimates for the Federal, State, and local cost shares using total project cost and the cost share percentages from the above table.

Project	Total Project Cost	Federal Cost Share	Non - Federal Project Cost	State Cost Share Range		Local Cost Share Range	
				Low	High	Low	High
Reclamation District 2031 Resilience	$2,000,000	$1,500,000	$500,000	$250,000	$450,000	$50,000	$250,000

6.20 Reclamation District 2063 Resilience

Short Project Description

This project would address the current deficiencies of the levees under the jurisdiction of RD 2063. This would include the costs of becoming active in the SWIF process and completion of the necessary repairs and upgrades to bring the levee system back into "Active" status for PL84-99 eligibility. Necessary actions can be found in RD inspection reports from 2013 – all "U" ratings need to be fixed immediately and all "M" ratings need to be fixed within 2 years or less.

Potential Funding Sources

Flood Mitigation Assistance – This funding source provides grants in order to implement projects that reduce or eliminate the risk of repetitive flood damage to buildings and structures insurable under the National Flood Insurance Program. This project would qualify for this funding source since it has the potential to reduce flood risk to qualifying buildings and structures.

Pre-Disaster Mitigation (PDM) – This funding source requires that a project help implement a sustained pre-disaster hazard mitigation program to reduce risk in future hazard events. Since this is a proactive project designed to avoid future flood control issues it meets this criteria.

Flood System Repair Project (FSRP) - The Flood System Repair Project (FSRP) is designed to evaluate (feasibility), design, and construct repairs on non-urban SPFC facility (levees, channels, structures, etc.) deficiencies. Since this project involves repairing SPFC levees in non-urban areas it meets the criteria for this funding source.

Small Community Flood Risk Reduction – This funding source is designed to help implement projects to reduce flood risk in small, rural, and agricultural communities in the Central Valley. This project would fit this criteria because it will benefit rural and agricultural communities by repairing and upgrading the levees protecting them.

Systemwide Flood Risk Reduction (SWFRR) – This funding source is designed to help implement recommendations of the Basin-Wide Feasibility Studies. Guidelines are currently under development. In order to qualify this project would have to become part of the Basin-Wide Feasibility Study.

The table on the following page details the cost share of each funding source along with the cost associated with this project.

Project	Estimated Cost	Potential Funding Opportunities			
		Federal		State	
		Program Name	Cost Share	Program Name	Cost Share
Reclamation District 2063 Resilience Project	$3,500,000	Flood Mitigation Assistance (FMA)	75%-100%	Flood System Repair Project (FSRP)	50% - 90%
		Pre-Disaster Mitigation (PDM)	75% - 90%	Small Community Flood Risk Reduction (SCFRR)	50%-90%
				Systemwide Flood Risk Reduction (SWFRR)	50%-90%

Cost Share Information

Using project descriptions and the cost share data in the table above, estimates of cost shares for this project were calculated. The results are tabulated below, using a range of cost share values to account for uncertainty in the estimating process.

Federal Cost Share (%)	State Cost Share Range (%)		Local Cost Share Range (%)	
	Low	High	Low	High
75%	50%	90%	10%	50%

The following table provides estimates for the Federal, State, and local cost shares using total project cost and the cost share percentages from the above table.

Project	Total Project Cost	Federal Cost Share	Non - Federal Project Cost	State Cost Share Range		Local Cost Share Range	
				Low	High	Low	High
Reclamation District 2063 Resilience	$3,500,000	$2,625,000	$875,000	$437,500	$787,500	$87,500	$437,500

6.21 Reclamation District 2091 Resilience

Short Project Description

This project would address the current deficiencies of the levees under the jurisdiction of RD 2091. This would include the costs of becoming active in the SWIF process and completion of the necessary repairs and upgrades to bring the levee system back into "Active" status for PL84-99 eligibility. Necessary actions can be found in RD inspection reports from 2013 – all "U" ratings need to be fixed immediately and all "M" ratings need to be fixed within 2 years or less.

Potential Funding Sources

Flood Mitigation Assistance – This funding source provides grants in order to implement projects that reduce or eliminate the risk of repetitive flood damage to buildings and structures insurable under the National Flood Insurance Program. This project would qualify for this funding source since it has the potential to reduce flood risk to qualifying buildings and structures.

Pre-Disaster Mitigation (PDM) – This funding source requires that a project help implement a sustained pre-disaster hazard mitigation program to reduce risk in future hazard events. Since this is a proactive project designed to avoid future flood control issues it meets this criteria.

Flood System Repair Project (FSRP) - The Flood System Repair Project (FSRP) is designed to evaluate (feasibility), design, and construct repairs on non-urban SPFC facility (levees, channels, structures, etc.) deficiencies. Since this project involves repairing SPFC levees in non-urban areas it meets the criteria for this funding source.

Small Community Flood Risk Reduction – This funding source is designed to help implement projects to reduce flood risk in small, rural, and agricultural communities in the Central Valley. This project would fit this criteria because it will benefit rural and agricultural communities by repairing and upgrading the levees protecting them.

Systemwide Flood Risk Reduction (SWFRR) – This funding source is designed to help implement recommendations of the Basin-Wide Feasibility Studies. Guidelines are currently under development. In order to qualify this project would have to become part of the Basin-Wide Feasibility Study.

The table on the following page details the cost share of each funding source along with the cost associated with this project.

Project	Estimated Cost	Potential Funding Opportunities			
		Federal		State	
		Program Name	Cost Share	Program Name	Cost Share
Reclamation District 2091 Resilience Project	$400,000	Flood Mitigation Assistance (FMA)	75%-100%	Flood System Repair Project (FSRP)	50% - 90%
		Pre-Disaster Mitigation (PDM)	75% - 90%	Small Community Flood Risk Reduction (SCFRR)	50%-90%
				Systemwide Flood Risk Reduction (SWFRR)	50%-90%

Cost Share Information

Using project descriptions and the cost share data in the table above, estimates of cost shares for this project were calculated. The results are tabulated below, using a range of cost share values to account for uncertainty in the estimating process.

Federal Cost Share (%)	State Cost Share Range (%)		Local Cost Share Range (%)	
	Low	High	Low	High
75%	50%	90%	10%	50%

The following table provides estimates for the Federal, State, and local cost shares using total project cost and the cost share percentages from the above table.

Project	Total Project Cost	Federal Cost Share	Non - Federal Project Cost	State Cost Share Range		Local Cost Share Range	
				Low	High	Low	High
Reclamation District 2091 Resilience	$400,000	$300,000	$100,000	$50,000	$90,000	$10,000	$50,000

6.22 Reclamation District 2101 Resilience

Short Project Description

This project would address the current deficiencies of the levees under the jurisdiction of RD 2101. This would include the costs of becoming active in the SWIF process and completion of the necessary repairs and upgrades to bring the levee system back into "Active" status for PL84-99 eligibility. Necessary actions can be found in RD inspection reports from 2013 – all "U" ratings need to be fixed immediately and all "M" ratings need to be fixed within 2 years or less.

Potential Funding Sources

Flood Mitigation Assistance – This funding source provides grants in order to implement projects that reduce or eliminate the risk of repetitive flood damage to buildings and structures insurable under the National Flood Insurance Program. This project would qualify for this funding source since it has the potential to reduce flood risk to qualifying buildings and structures.

Pre-Disaster Mitigation (PDM) – This funding source requires that a project help implement a sustained pre-disaster hazard mitigation program to reduce risk in future hazard events. Since this is a proactive project designed to avoid future flood control issues it meets this criteria.

Flood System Repair Project (FSRP) - The Flood System Repair Project (FSRP) is designed to evaluate (feasibility), design, and construct repairs on non-urban SPFC facility (levees, channels, structures, etc.) deficiencies. Since this project involves repairing SPFC levees in non-urban areas it meets the criteria for this funding source.

Small Community Flood Risk Reduction – This funding source is designed to help implement projects to reduce flood risk in small, rural, and agricultural communities in the Central Valley. This project would fit this criteria because it will benefit rural and agricultural communities by repairing and upgrading the levees protecting them.

Systemwide Flood Risk Reduction (SWFRR) – This funding source is designed to help implement recommendations of the Basin-Wide Feasibility Studies. Guidelines are currently under development. In order to qualify this project would have to become part of the Basin-Wide Feasibility Study.

The table on the following page details the cost share of each funding source along with the cost associated with this project.

Project	Estimated Cost	Potential Funding Opportunities			
		Federal		State	
		Program Name	Cost Share	Program Name	Cost Share
Reclamation District 2101 Resilience Project	$2,500,000	Flood Mitigation Assistance (FMA)	75%-100%	Flood System Repair Project (FSRP)	50% - 90%
		Pre-Disaster Mitigation (PDM)	75% - 90%	Small Community Flood Risk Reduction (SCFRR)	50%-90%
				Systemwide Flood Risk Reduction (SWFRR)	50%-90%

Cost Share Information

Using project descriptions and the cost share data in the table above, estimates of cost shares for this project were calculated. The results are tabulated below, using a range of cost share values to account for uncertainty in the estimating process.

Federal Cost Share (%)	State Cost Share Range (%)		Local Cost Share Range (%)	
	Low	High	Low	High
75%	50%	90%	10%	50%

The following table provides estimates for the Federal, State, and local cost shares using total project cost and the cost share percentages from the above table.

Project	Total Project Cost	Federal Cost Share	Non - Federal Project Cost	State Cost Share Range		Local Cost Share Range	
				Low	High	Low	High
Reclamation District 2101 Resilience	$2,500,000	$1,875,000	$625,000	$312,500	$562,500	$62,500	$312,500

6.23 Reducing Sediment Loading into the San Joaquin River from Westside Agricultural Lands

Short Project Description

Improve irrigation technology with buried drip and sprinkler irrigation systems that allow for the capacity to irrigate a variety of crop types and effectively eliminate erosion of sediment off of farm fields when compared to traditional, flood irrigation practices. Sediment loading results in reduced capacity of and increased flooding in Westside Creeks and the San Joaquin River.

Potential Funding Sources

Environmental Quality Incentives Program (EQIP) – This funding sources is designed to provide financial and technical assistance to agricultural producers in order to address natural resource concerns and deliver environmental benefits. This project meets the criteria of this funding source since it involves agricultural producers and has an environmental benefit.

Integrated Regional Water Management Plan (IRWMP) – This project could be included in the next IRWMP due to flood protection benefits, which would make it eligible for funding through IRWMP funding. In order to be included in the IRWMP the project must be suggested to the lead agency preparing the IRWMP update.

The following table details the cost share of each funding source along with the cost associated with this project.

Project	Estimated Cost	Potential Funding Opportunities			
		Federal		State	
		Program Name	Cost Share	Program Name	Cost Share
Reducing Sediment Loading into San Joaquin River from Westside Agricultural Lands	$65,000,000	Environmental Quality Incentives Program (EQIP)	50%	Integrated Regional Water Management (IRWM)	50% - 75%

Cost Share Information

Using project descriptions and the cost share data in the table above, estimates of cost shares for this project were calculated. The results are tabulated below, using a range of cost share values to account for uncertainty in the estimating process.

Federal Cost Share (%)	State Cost Share Range (%)		Local Cost Share Range (%)	
	Low	High	Low	High
50%	50%	75%	25%	50%

The following table provides estimates for the Federal, State, and local cost shares using total project cost and the cost share percentages from the above table.

Project	Total Project Cost	Federal Cost Share	State Project Cost	State Cost Share Range		Local Cost Share Range	
				Low	High	Low	High
Reducing Sediment Loading into San Joaquin River from Westside Agricultural Lands	$65,000,000	$32,500,000	$32,500,000	$16,250,000	$24,375,000	$8,125,000	$16,250,000

Note: Project cost is based on 65,000 acres at $1,000 per acre.

6.24 Regional Maintenance Technical Support

Short Project Description

Development and implementation of a shared staffing position to support LMA fulfillment of maintenance responsibilities within the Mid SJR Region.

Potential Funding Sources

Integrated Regional Water Management Plan (IRWMP) – This Project could possibly be included in IRWMP due to flood protection benefits, which would make it eligible for funding through the Plan. In order to be included in the IRWMP the project must be suggested to the lead agency preparing the IRWMP update.

Small Community Flood Risk Reduction – This funding program is designed to help implement projects to reduce flood risk in small, rural, and agricultural communities in the Central Valley. This project would fit this criteria because it will benefit rural and agricultural communities by making O&M more manageable while at the same time creating flood risk reduction due to better quality O&M.

The following table details the cost share of each funding source along with the cost associated with this project.

Project	Estimated Cost	Potential Funding Opportunities			
		Federal		State	
		Program Name	Cost Share	Program Name	Cost Share
Regional Maintenance Technical Support	$100,000			Integrated Regional Water Management (IRWM)	50%-75%
				Small Community Flood Risk Reduction (SCFRR)	50%-90%

Cost Share Information

Using project descriptions and the cost share data in the table above, estimates of cost shares for this project were calculated. The results are tabulated below, using a range of cost share values to account for uncertainty in the estimating process.

Federal Cost Share (%)	State Cost Share Range (%)		Local Cost Share Range (%)	
	Low	High	Low	High
0%	50%	90%	10%	50%

The following table provides estimates for the Federal, State, and local cost shares using total project cost and the cost share percentages from the above table.

Project	Total Project Cost	Federal Cost Share	Non - Federal Project Cost	State Cost Share Range		Local Cost Share Range	
				Low	High	Low	High
Regional Maintenance Technical Support	$100,000	$0	$100,000	$50,000	$90,000	$10,000	$50,000

6.25 Riverfront Park Project

Short Project Description

Creation of a riverfront park, recreational trail, and enhanced habitat along the western bank of the San Joaquin River between Old Las Palmas Avenue and Eucalyptus Avenue.

Potential Funding Sources

Central Valley Project Implementation Act (CVPIA) – Habitat Restoration Program and Conservation Program – This funding source is meant to restore and protect species and habitats impacted by the Central Valley Project (CVP). This project meets the criteria for this funding source due to its habitat restoration elements.

Land and Water Conservation Fund – This funding source provides matching grants to States and local governments for the acquisition and development of public outdoor recreation area and facilities, as well as funding for shared federal land acquisition and conservation strategies. This project meets the criteria of the funding source due to the fact that it will create to recreational opportunities with the planned recreational trail.

North American Wetland Conservation Act (NAWCA) – This funding source provided matching grants to help fund projects that offer wetlands conservation for benefit of wetlands-associated migratory birds and other wildlife. This project qualifies for this program due to the habitat restoration benefits that it provides.

California Riparian Habitat Conservation Program – The goals of the CRHCP are to protect, preserve, restore and enhance riparian habitat throughout California. This program will fund programs that further these goals, which this project does with the riparian vegetation restoration element.

California River Parkways Program – This funding source awards funds to public agencies and non-profit organizations to acquire, restore, protect or develop river parkways. Projects must be multi-benefit. Since this project will create a River Parkway that will restore habitat and has multi-benefit elements like the recreational trail it meets this funding sources criteria.

Flood Corridor Program (FCP) – This funding source is designed to fund non-structural flood risk reduction projects containing ecosystem and/or agricultural land conservation components. Since this project contains both a non-structural flood risk reduction component and ecosystem benefits it meets this programs criteria.

Habitat Conservation Fund Program – This funding source provides funds to local entities to protect threatened species, to address wildlife corridors, to create rails, and to provide nature interpretation programs which bring urban residents into park and wildlife areas. Since this project will restore riparian vegetation and create recreational opportunities it meets this programs criteria.

Inland Wetlands Conservation Program – This funding source was created to protect, restore, and enhance wetlands and associated habitats. Since this project will restore degraded habitat it meets the requirements of this funding source.

Urban Streams Restoration Program – This funding source provides grants for stream restoration projects that reduce flooding or erosion and associated property damages. Projects should restore, enhance, or protect their natural environment and promote community involvement, education, and stewardship in urban streams. This project meets this criteria since it will be restoring habitat and promoting community involvement with recreational opportunities.

The following table details the cost share of each funding source along with the cost associated with this project.

Project	Estimated Cost	Potential Funding Opportunities			
		Federal		State	
		Program Name	Cost Share	Program Name	Cost Share
Riverfront Park Project	$2,500,000	Central Valley Project Implementation Act (CVPIA) – Habitat Restoration Program and Conservation Program	Not Req.	California Riparian Habitat Conservation Program (CRCHP)	50%-90%
		Land and Water Conservation Fund	50%	California River Parkways Program	50%-90%
		Pre-Disaster Mitigation (PDM)	75% - 90%	Flood Corridor (FCP)	50%-90%
		-	-	Habitat Conservation Fund (HCF) Program	50%
				Inland Wetlands Conservation Program	50%
				Urban Streams Restoration Program	Not Req.

Cost Share Information

Using project descriptions and the cost share data in the table above, estimates of cost shares for this project were calculated. The results are tabulated below, using a range of cost share values to account for uncertainty in the estimating process.

Federal Cost Share (%)	State Cost Share Range (%)		Local Cost Share Range (%)	
	Low	High	Low	High
50%	50%	90%	10%	50%

The following table provides estimates for the Federal, State, and local cost shares using total project cost and the cost share percentages from the above table.

Project	Total Project Cost	Federal Cost Share	Non-Federal Project Cost	State Cost Share Range		Local Cost Share Range	
				Low	High	Low	High
Riverfront Park Project	$2,500,000	$1,250,000	$1,250,000	$625,000	$1,125,000	$125,000	$625,000

6.26 Salado Creek Flood Management Project

Short Project Description

Widening of Salado Creek from the Delta Mendota Canal to the city limits.

Potential Funding Sources

Flood Mitigation Assistance – This funding source provides grants in order to implement projects that reduce or eliminate the risk of repetitive flood damage to buildings and structures insurable under the National Flood Insurance Program. This project would qualify for this funding source since it has the potential to reduce flood risk to qualifying buildings and structures.

Pre-Disaster Mitigation (PDM) – This funding source requires that a project help implement a sustained pre-disaster hazard mitigation program to reduce risk in future hazard events. Since this is a proactive project designed to avoid future flood control issues it meets this criteria.

Urban Streams Restoration Program – This funding source provides grants for stream restoration projects that reduce flooding or erosion and associated property damages. Projects should restore, enhance, or protect their natural environment and promote community involvement, education, and stewardship in urban streams. This project meets the flood reduction criterion but will need to add a multi-benefit element to qualify for this funding source.

Integrated Regional Water Management Plan (IRWMP) – This project could be included in the next IRWMP due to flood protection benefits, which would make it eligible for funding through IRWMP funding. In order to be included in the IRWMP the project must be suggested to the lead agency preparing the IRWMP update.

Storm Water Flood Management Program – This funding source is designed to help fund storm water management projects that reduce flood damage and provide at least one other type of benefit. In order to qualify this project would have to add a multi-benefit element and become part of an IRWMP, as well as be consistent with the applicable Water Quality Basin Plan.

Urban Flood Risk Reduction (UFRR) – This funding source is designed to help improve urban SPFC levees within the Central Valley to a 200-year level of protection. While this project does not deal specifically with urban SPFC levees it could benefit urban SPFC levees downstream of the project area.

The following table details the cost share of each funding source along with the cost associated with this project.

Project	Estimated Cost	Potential Funding Opportunities			
		Federal		State	
		Program Name	Cost Share	Program Name	Cost Share
Salado Creek Flood Management Project	$600,000	North American Wetlands Conservation Act (NAWCA)	50%	Urban Streams Restoration Program	Not Req.
		Flood Mitigation Assistance (FMA)	75%-100%	Integrated Regional Water Management (IRWMP)	50% - 75%
		-	-	Storm Water Flood Management Program	50% - 75%
				Urban Flood Risk Reduction (UFRR)	50%-90%

Cost Share Information

Using project descriptions and the cost share data in the table above, estimates of cost shares for this project were calculated. The results are tabulated below, using a range of cost share values to account for uncertainty in the estimating process.

Federal Cost Share (%)	State Cost Share Range (%)		Local Cost Share Range (%)	
	Low	High	Low	High
50%	50%	75%	25%	50%

The following table provides estimates for the Federal, State, and local cost shares using total project cost and the cost share percentages from the above table.

Project	Total Project Cost	Federal Cost Share	Non-Federal Project Cost	State Cost Share Range		Local Cost Share Range	
				Low	High	Low	High
Salado Creek Flood Management Project	$600,000	$300,000	$300,000	$150,000	$225,000	$75,000	$150,000

6.27 SB5 Compliance – City of Modesto

Short Project Description

Comply with SB 5 regulations through update of the City's relevant planning documents and completion of a preliminary engineering report to identify potential alternatives on how the City can provide 200-year flood protection.

Potential Funding Sources

Flood Mitigation Assistance – This funding source provides grants in order to implement projects that reduce or eliminate the risk of repetitive flood damage to buildings and structures insurable under the National Flood Insurance Program. This project would qualify for this funding source since it has the potential to reduce flood risk to qualifying buildings and structures.

Pre-Disaster Mitigation (PDM) – This funding source requires that a project help implement a sustained pre-disaster hazard mitigation program to reduce risk in future hazard events. Since this is a proactive project designed to avoid future flood control issues it meets this criteria.

Integrated Regional Water Management Plan (IRWMP) – This project could be included in the next IRWMP due to flood protection benefits, which would make it eligible for funding through IRWMP funding. In order to be included in the IRWMP the project must be suggested to the lead agency preparing the IRWMP update.

Urban Flood Risk Reduction (UFRR) – This funding source is designed to help improve urban SPFC levees within the Central Valley to a 200-year level of protection. Since this project deals with urban SPFC levees it would qualify for funding.

The following table details the cost share of each funding source along with the cost associated with this project.

Project	Estimated Cost	Potential Funding Opportunities			
		Federal		State	
		Program Name	Cost Share	Program Name	Cost Share
SB5 Compliance - City of Modesto	Phase I - $30,000 Phase II - $100,000	Flood Mitigation Assistance (FMA)	75%-100%	Integrated Regional Water Management (IRWMP)	50% - 75%
		Pre-Disaster Mitigation (PDM)	75% - 90%	Urban Flood Risk Reduction (UFRR)	50%-90%

Cost Share Information

Using project descriptions and the cost share data in the table on the previous page, estimates of cost shares for this project were calculated. The results are tabulated below, using a range of cost share values to account for uncertainty in the estimating process.

Federal Cost Share (%)	State Cost Share Range (%)		Local Cost Share Range (%)	
	Low	High	Low	High
75%	50%	90%	10%	50%

The following table provides estimates for the Federal, State, and local cost shares using total project cost and the cost share percentages from the above table.

Project	Total Project Cost	Federal Cost Share	Non-Federal Project Cost	State Cost Share Range		Local Cost Share Range	
				Low	High	Low	High
SB5 Compliance - City of Modesto	$130,000	$97,500	$32,500	$16,250	$29,250	$3,250	$16,250

6.28 SB5 Compliance – City of Newman

Short Project Description

Comply with SB 5 regulations through update of the City's relevant planning documents and completion of a preliminary engineering report to identify potential alternatives on how the City can provide 200-year flood protection.

Potential Funding Sources

Flood Mitigation Assistance – This funding source provides grants in order to implement projects that reduce or eliminate the risk of repetitive flood damage to buildings and structures insurable under the National Flood Insurance Program. This project would qualify for this funding source since it has the potential to reduce flood risk to qualifying buildings and structures.

Pre-Disaster Mitigation (PDM) – This funding source requires that a project help implement a sustained pre-disaster hazard mitigation program to reduce risk in future hazard events. Since this is a proactive project designed to avoid future flood control issues it meets this criteria.

Integrated Regional Water Management Plan (IRWMP) – This project could be included in the next IRWMP due to flood protection benefits, which would make it eligible for funding through IRWMP funding. In order to be included in the IRWMP the project must be suggested to the lead agency preparing the IRWMP update.

Urban Flood Risk Reduction (UFRR) – This funding source is designed to help improve urban SPFC levees within the Central Valley to a 200-year level of protection. Since this project deals with urban SPFC levees it would qualify for funding.

The following table details the cost share of each funding source along with the cost associated with this project.

Project	Estimated Cost	Potential Funding Opportunities			
		Federal		State	
		Program Name	Cost Share	Program Name	Cost Share
SB5 Compliance - City of Newman	Phase I - $75,000 Phase II - $50,000	Flood Mitigation Assistance (FMA)	75%-100%	Integrated Regional Water Management (IRWMP)	50% - 75%
		Pre-Disaster Mitigation (PDM)	75% - 90%	Urban Flood Risk Reduction (UFRR)	50%-90%

Cost Share Information

Using project descriptions and the cost share data in the table on the previous page, estimates of cost shares for this project were calculated. The results are tabulated below, using a range of cost share values to account for uncertainty in the estimating process.

Federal Cost Share (%)	State Cost Share Range (%)		Local Cost Share Range (%)	
	Low	High	Low	High
75%	50%	90%	10%	50%

The following table provides estimates for the Federal, State, and local cost shares using total project cost and the cost share percentages from the above table.

Project	Total Project Cost	Federal Cost Share	Non-Federal Project Cost	State Cost Share Range		Local Cost Share Range	
				Low	High	Low	High
SB5 Compliance - City of Newman	$125,000	$93,750	$31,250	$15,625	$28,125	$3,125	$15,625

6.29 SB5 Compliance – City of Patterson

Short Project Description

Comply with SB 5 regulations through update of the City's relevant planning documents and completion of a preliminary engineering report to identify potential alternatives on how the City can provide 200-year flood protection.

Potential Funding Sources

Pre-Disaster Mitigation (PDM) – This funding source requires that a project help implement a sustained pre-disaster hazard mitigation program to reduce risk in future hazard events. Since this is a proactive project designed to avoid future flood control issues it meets this criteria.

Integrated Regional Water Management Plan (IRWMP) – This project could be included in the next IRWMP due to flood protection benefits, which would make it eligible for funding through IRWMP funding. In order to be included in the IRWMP the project must be suggested to the lead agency preparing the IRWMP update.

Urban Flood Risk Reduction (UFRR) – This funding source is designed to help improve urban SPFC levees within the Central Valley to a 200-year level of protection. Since this project deals with urban SPFC levees it would qualify for funding.

The following table details the cost share of each funding source along with the cost associated with this project.

Project	Estimated Cost	Potential Funding Opportunities			
		Federal		State	
		Program Name	Cost Share	Program Name	Cost Share
SB5 Compliance - City of Patterson	Phase I - $105,000 Phase II - $100,000	Pre-Disaster Mitigation (PDM)	75% - 90%	Integrated Regional Water Management (IRWMP)	50% - 75%
		-	-	Urban Flood Risk Reduction (UFRR)	50%-90%

Cost Share Information

Using project descriptions and the cost share data in the table above, estimates of cost shares for this project were calculated. The results are tabulated below, using a range of cost share values to account for uncertainty in the estimating process.

Federal Cost Share (%)	State Cost Share Range (%)		Local Cost Share Range (%)	
	Low	High	Low	High
75%	50%	90%	10%	50%

The following table provides estimates for the Federal, State, and local cost shares using total project cost and the cost share percentages from the above table.

Project	Total Project Cost	Federal Cost Share	Non-Federal Project Cost	State Cost Share Range		Local Cost Share Range	
				Low	High	Low	High
SB5 Compliance - City of Patterson	$205,000	$153,750	$51,250	$25,625	$46,125	$5,125	$25,625

6.30 Sediment Management Investigation

Short Project Description

Complete a study that identifies sediment-induced chokepoints along the San Joaquin River in the planning area, the dynamics that create them, and potential actions to improve flood conveyance in those areas.

Potential Funding Sources

Integrated Regional Water Management Plan (IRWMP) – This project could be included in the next IRWMP due to flood protection benefits, which would make it eligible for funding through IRWMP funding. In order to be included in the IRWMP the project must be suggested to the lead agency preparing the IRWMP update.

Small Community Flood Risk Reduction – This funding source is designed to help implement projects to reduce flood risk in small, rural, and agricultural communities in the Central Valley. This project would fit this criteria because it will benefit rural and agricultural communities by providing a plan to improve flood conveyance along their levees.

Systemwide Flood Risk Reduction (SWFRR) – This funding source is designed to help implement recommendations of the Basin-Wide Feasibility Studies. Guidelines are currently under development. In order to qualify this project would have to become part of the Basin-Wide Feasibility Study.

The following table details the cost share of each funding source along with the cost associated with this project.

Project	Estimated Cost	Potential Funding Opportunities			
		Federal		State	
		Program Name	Cost Share	Program Name	Cost Share
Sediment Management Investigation	$250,000	-	-	Integrated Regional Water Management (IRWMP)	50% - 75%
				Small Community Flood Risk Reduction (SCFRR)	50%-90%
				Systemwide Flood Risk Reduction (SFRR)	50%-90%

Cost Share Information

Using project descriptions and the cost share data in the table above, estimates of cost shares for this project were calculated. The results are tabulated below, using a range of cost share values to account for uncertainty in the estimating process.

Federal Cost Share (%)	State Cost Share Range (%)		Local Cost Share Range (%)	
	Low	High	Low	High
0%	50%	90%	10%	50%

The following table provides estimates for the Federal, State, and local cost shares using total project cost and the cost share percentages from the above table.

Project	Total Project Cost	Federal Cost Share	Non-Federal Project Cost	State Cost Share Range		Local Cost Share Range	
				Low	High	Low	High
Sediment Management Investigation	$250,000	$0	$250,000	$125,000	$225,000	$25,000	$125,000

6.31 Storm Drainage Enhancements along Salado Creek

Short Project Description

Installation of reinforced concrete pipelines under the California Northern Railroad wooden bridge to improve storm drainage along Salado Creek.

Potential Funding Sources

Pre-Disaster Mitigation (PDM) – This funding source requires that a project help implement a sustained pre-disaster hazard mitigation program to reduce risk in future hazard events. Since this is a proactive project designed to avoid future flood control issues it meets this criteria.

Integrated Regional Water Management Plan (IRWMP) – This project could be included in the next IRWMP due to flood protection benefits, which would make it eligible for funding through IRWMP funding. In order to be included in the IRWMP the project must be suggested to the lead agency preparing the IRWMP update.

Storm Water Flood Management Program – This funding source is designed to help fund storm water management projects that reduce flood damage and provide at least one other type of benefit. In order to qualify this project would have to add a multi-benefit element and become part of an IRWMP, as well as be consistent with the applicable Water Quality Basin Plan.

Urban Flood Risk Reduction (UFRR) – This funding source is designed to help improve urban SPFC levees within the Central Valley to a 200-year level of protection. While this project does not deal with SPFC levees in particular, it does reduce flood risk in an urban area.

The following table details the cost share of each funding source along with the cost associated with this project.

Project	Estimated Cost	Potential Funding Opportunities			
		Federal		State	
		Program Name	Cost Share	Program Name	Cost Share
Storm Drainage Enhancements along Salado Creek	$880,000	Pre-Disaster Mitigation (PDM)	75% - 90%	Integrated Regional Water Management (IRWMP)	50% - 75%
		-	-	Storm Water Flood Management Program	50%-75%
				Urban Flood Risk Reduction (UFRR)	50%-90%

Cost Share Information

Using project descriptions and the cost share data in the table above, estimates of cost shares for this project were calculated. The results are tabulated below, using a range of cost share values to account for uncertainty in the estimating process.

Federal Cost Share (%)	State Cost Share Range (%)		Local Cost Share Range (%)	
	Low	High	Low	High
75%	50%	90%	10%	50%

The following table provides estimates for the Federal, State, and local cost shares using total project cost and the cost share percentages from the above table.

Project	Total Project Cost	Federal Cost Share	Non-Federal Project Cost	State Cost Share Range		Local Cost Share Range	
				Low	High	Low	High
Storm Drainage Enhancements along Salado Creek	$880,000	$660,000	$220,000	$110,000	$198,000	$22,000	$110,000

6.32 Three Amigos (also known as the Non-structural Alternative at the San Joaquin River National Wildlife Refuge)

Short Project Description

Project to restore flooding and transient floodwater storage to more than 3,100 acres of historic floodplain, restore riparian habitats, and promote river physical processes of scour and deposition along 3 miles of the San Joaquin River. While the lands have been purchased, additional investment is needed to implement flood risk reduction goals consistent with the Refuge's habitat management goals. Needed efforts include planning and design of the Refuge for flood management as well as removal of levees from the federal project.

Potential Funding Sources

Anadromous Fish Restoration Program and Anadromous Fish Screen Program – This funding source is meant to help fund projects that protect, restore, or enhance fish, wildlife, and associated habitat throughout the Central Valley and Trinity River Basins of California. This project meets the criteria of the funding source due to its benefit to anadromous fish.

Central Valley Project Implementation Act (CVPIA) – Habitat Restoration Program and Conservation Program – This funding source is meant to restore and protect species and habitats impacted by the Central Valley Project (CVP). This project meets the criteria of this funding source due to its benefit to riparian vegetation.

Emergency Watershed Protection Program-Floodplain Easement Option (EWP-FPE) – This funding source is designed to provide and alternative measure to traditional EWP recovery, where it is determined that acquiring an easement in lieu of recovery measures is the more economical and prudent approach to reducing threat to life or property. This project has purchased all land necessary land but may use this resource if more land were being considered.

California Riparian Habitat Conservation Program – The goals of the CRHCP are to protect, preserve, restore and enhance riparian habitat throughout California. This program will fund programs that further these goals, which this project does with the riparian vegetation restoration element.

Central Valley Flood System Conservation Framework and Strategy – This funding source is meant to help implement projects in support of the Central Valley Flood System Conservation Framework and Conservation Strategy. Eligible projects will incorporate environmental stewardship and sustainability principles into State Plan of Flood Control flood management activities. This project meets the criteria of this funding source by integrating environmental sustainability and restoration with flood risk reduction.

Flood Corridor Program (FCP) – This funding source is designed to fund non-structural flood risk reduction projects containing ecosystem and/or agricultural land conservation components. Since this

project contains both a non-structural flood risk reduction component and ecosystem benefits it meets this programs criteria.

Inland Wetlands Conservation Program – This funding source was created to protect, restore, and enhance wetlands and associated habitats. Since this project will restore floodplain habitat it meets the requirements of the funding source.

Integrated Regional Water Management Plan (IRWMP) – This project could be included in the next IRWMP due to flood protection benefits, which would make it eligible for funding through IRWMP funding. In order to be included in the IRWMP the project must be suggested to the lead agency preparing the IRWMP update.

Systemwide Flood Risk Reduction (SFRR) – This funding source is designed to help implement recommendations of the Basin-Wide Feasibility Studies. Guidelines are currently under development. In order to qualify this project would have to become part of the Basin-Wide Feasibility Study.

The table on the following page details the cost share of each funding source along with the cost associated with this project.

Project	Estimated Cost	Potential Funding Opportunities			
		Federal		State	
		Program Name	Cost Share	Program Name	Cost Share
Three Amigos (also known as the Non-structural Alternative at the San Joaquin River National Wildlife Refuge)	$5,500,000	Anadromous Fish Restoration Program and Anadromous Fish Screen Program	50%	California Riparian Habitat Conservation Program (CRCHP)	50%-90%
		Central Valley Project Implementation Act (CVPIA) – Habitat Restoration Program and Conservation Program	Not Req.	Central Valley Flood System Conservation Framework and Strategy	50%-90%
		Emergency Watershed Protection Program – Floodplain Easement Option (EWP-FPE)	Not Req.	Flood Corridor (FCP)	50%-90%
		-	-	Inland Wetlands Conservation Program	50%
				Integrated Regional Water Management (IRWMP)	50%-75%
				Systemwide Flood Risk Reduction (SFRR)	50%-90%

Cost Share Information

Using project descriptions and the cost share data in the table above, estimates of cost shares for this project were calculated. The results are tabulated below, using a range of cost share values to account for uncertainty in the estimating process.

Federal Cost Share (%)	State Cost Share Range (%)		Local Cost Share Range (%)	
	Low	High	Low	High
	50%	90%	10%	50%

The following table provides estimates for the Federal, State, and local cost shares using total project cost and the cost share percentages from the above table.

Project	Total Project Cost	Federal Cost Share	Non-Federal Project Cost	State Cost Share Range		Local Cost Share Range	
				Low	High	Low	High
Three Amigos (also known as the Non-structural Alternative at the San Joaquin River National Wildlife Refuge)	$5,500,000	$2,750,000	$2,750,000$0	$1,375,000	$2,475,000	$275,000	$1,375,000

6.33 Tuolumne River Flood Management Feasibility Study

Short Project Description

Complete a USACE Feasibility Study, or a study similar in scope, that evaluates how the management of the Tuolumne River could be revised to improve flood control, enhance aquatic habitat, and improve water quality.

Potential Funding Sources

USACE Funding – This funding source requires that USACE adopt the project. It is believed that this project has the potential to be adopted by USACE.

Integrated Regional Water Management Plan (IRWMP) – This project could be included in the next IRWMP due to flood protection benefits, which would make it eligible for funding through IRWMP funding. In order to be included in the IRWMP the project must be suggested to the lead agency preparing the IRWMP update.

The following table details the cost share of each funding source along with the cost associated with this project.

Project	Estimated Cost	Potential Funding Opportunities			
		Federal		State	
		Program Name	Cost Share	Program Name	Cost Share
Tuolumne River Flood Management Feasibility Study	$3,000,000	USACE Funding	50%	Integrated Regional Water Management (IRWMP)	50%-75%

Cost Share Information

Using project descriptions and the cost share data in the table above, estimates of cost shares for this project were calculated. The results are tabulated below, using a range of cost share values to account for uncertainty in the estimating process.

Federal Cost Share (%)	State Cost Share Range (%)		Local Cost Share Range (%)	
	Low	High	Low	High
50%	50%	75%	25%	50%

The following table provides estimates for the Federal, State, and local cost shares using total project cost and the cost share percentages from the above table.

Project	Total Project Cost	Federal Cost Share	Non-Federal Project Cost	State Cost Share Range		Local Cost Share Range	
				Low	High	Low	High
Tuolumne River Flood Management Feasibility Study	$3,000,000	$1,500,000	$1,500,000	$750,000	$1,125,000	$375,000	$750,000

Note: Table to be updated once cost information is provided.

6.34 Tuolumne River Regional Park – Carpenter Road/West Modesto Flood Management and Park Development

Short Project Description

Help reduce flood damages in West Modesto neighborhoods while developing the adjacent Tuolumne River Regional Park.

Potential Funding Sources

Central Valley Project Implementation Act (CVPIA) – Habitat Restoration Program and Conservation Program – This funding source is meant to restore and protect species and habitats impacted by the Central Valley Project (CVP). This project meets the CVPIA criteria due to its riparian habitat restoration component.

Land and Water Conservation Fund – This funding source provides matching grants to States and local governments for the acquisition and development of public outdoor recreation area and facilities, as well as funding for shared federal land acquisition and conservation strategies. This project meets criteria of this funding source due to its park development element.

North American Wetland Conservation Act (NAWCA) – This funding source provided matching grants to help fund projects that offer wetlands conservation for benefit of wetlands-associated migratory birds and other wildlife. This project qualifies for this program due to the habitat benefits that it provides.

Flood Mitigation Assistance – This funding source provides grants in order to implement projects that reduce or eliminate the risk of repetitive flood damage to buildings and structures insurable under the National Flood Insurance Program. This project would qualify for this funding source since it has the potential to reduce flood risk to qualifying buildings and structures.

California Riparian Habitat Conservation Program – The goals of the CRHCP are to protect, preserve, restore and enhance riparian habitat throughout California. This program will fund programs that further these goals, which this project does with the riparian vegetation restoration element.

California River Parkways Program – This funding source awards funds to public agencies and non-profit organizations to acquire, restore, protect or develop river parkways. Projects must be multi-benefit. This project meets the criteria of this funding source due to the park development and habitat restoration elements.

Habitat Conservation Fund Program – This funding source provides funds to local entities to protect threatened species, to address wildlife corridors, to create rails, and to provide nature interpretation programs which bring urban residents into park and wildlife areas. Since this project will develop a park for urban residents and will restore riparian vegetation it meets the criteria of this funding source.

Inland Wetlands Conservation Program – This funding source was created to protect, restore, and enhance wetlands and associated habitats. Since this project will restore degraded floodplain habitat it meets the requirements of the funding source.

Integrated Regional Water Management Plan (IRWMP) – This project could be included in the next IRWMP due to flood protection benefits, which would make it eligible for funding through IRWMP funding. In order to be included in the IRWMP the project must be suggested to the lead agency preparing the IRWMP update.

The following table details the cost share of each funding source along with the cost associated with this project.

Project	Estimated Cost	Potential Funding Opportunities			
		Federal		State	
		Program Name	Cost Share	Program Name	Cost Share
Tuolumne River Regional Park – Carpenter Road/West Modesto Flood Management and Park Development	$750,000	Central Valley Project Improvement Act (CVPIA) – Habitat Restoration Program and Conservation Program	Not Req.	California Riparian Habitat Conservation Program (CRCHP)	50%-90%
		Land and Water Conservation Fund	50%	California River Parkways Program	50%-90%
		North American Wetlands Conservation Act (NAWCA)	50%	Habitat Conservation Fund (HCF) Program	50%
		Flood Mitigation Assistance (FMA)	75%-100%	Inland Wetlands Conservation Program	50%
		-	-	Integrated Regional Water Management (IRWMP)	50%-75%

Cost Share Information

Using project descriptions and the cost share data in the table above, estimates of cost shares for this project were calculated. The results are tabulated below, using a range of cost share values to account for uncertainty in the estimating process.

Federal Cost Share (%)	State Cost Share Range (%)		Local Cost Share Range (%)	
	Low	High	Low	High
50%	50%	90%	10%	50%

The following table provides estimates for the Federal, State, and local cost shares using total project cost and the cost share percentages from the above table.

Project	Total Project Cost	Federal Cost Share	Non-Federal Project Cost	State Cost Share Range		Local Cost Share Range	
				Low	High	Low	High
Tuolumne River Regional Park – Carpenter Road/West Modesto Flood Management and Park Development	$750,000	$375,000	$375,000	$187,500	$337,500	$37,500	$187,500

6.35 Tuolumne River Regional Parkway

Short Project Description

Continued development of the undeveloped areas of the Tuolumne River Regional Park including the Gateway Parcel.

Potential Funding Sources

Central Valley Project Implementation Act (CVPIA) – Habitat Restoration Program and Conservation Program – This funding source is meant to restore and protect species and habitats impacted by the Central Valley Project (CVP). This project meets the CVPIA criteria due to its riparian habitat restoration component.

Land and Water Conservation Fund – This funding source provides matching grants to States and local governments for the acquisition and development of public outdoor recreation area and facilities, as well as funding for shared federal land acquisition and conservation strategies. This project meets criteria of this funding source due to its park development element.

North American Wetland Conservation Act (NAWCA) – This funding source provided matching grants to help fund projects that offer wetlands conservation for benefit of wetlands-associated migratory birds and other wildlife. This project qualifies for this program due to the habitat benefits that it provides.

Flood Mitigation Assistance – This funding source provides grants in order to implement projects that reduce or eliminate the risk of repetitive flood damage to buildings and structures insurable under the National Flood Insurance Program. This project would qualify for this funding source since it has the potential to reduce flood risk to qualifying buildings and structures.

California Riparian Habitat Conservation Program – The goals of the CRHCP are to protect, preserve, restore and enhance riparian habitat throughout California. This program will fund programs that further these goals, which this project does with the riparian vegetation restoration element.

California River Parkways Program – This funding source awards funds to public agencies and non-profit organizations to acquire, restore, protect or develop river parkways. Projects must be multi-benefit. This project meets the criteria of this funding source due to the park development and habitat restoration elements.

Habitat Conservation Fund Program – This funding source provides funds to local entities to protect threatened species, to address wildlife corridors, to create rails, and to provide nature interpretation programs which bring urban residents into park and wildlife areas. Since this project will develop a park for urban residents and will restore riparian vegetation it meets the criteria of this funding source.

Inland Wetlands Conservation Program – This funding source was created to protect, restore, and enhance wetlands and associated habitats. Since this project will restore degraded floodplain habitat it meets the requirements of the funding source.

Urban Greening for Sustainable Communities – Planning – This funding source is designed to assist entities in developing a master urban greening plan that will ultimately result in project to help the State meet its environmental goals and the creating of healthy communities. The plan must outline or layout projects that reduce greenhouse gas emission and provide multiple benefits. This project meets this criteria due to its planning element, as well as it multi-benefit elements.

Urban Greening for Sustainable Communities – Project – This funding source is designed to provide funds to preserve, enhance, increase, or establish community green areas such as urban forests, open spaces, wetlands, and community spaces (e.g. community gardens). This project meets this criteria due to its restoration and parkway development elements, as well as other multi-benefit aspects.

The following table details the cost share of each funding source along with the cost associated with this project.

Project	Estimated Cost	Potential Funding Opportunities			
		Federal		State	
		Program Name	Cost Share	Program Name	Cost Share
Tuolumne River Regional Parkway	$60,000,000	Central Valley Project Improvement Act (CVPIA) – Habitat Restoration Program and Conservation Program	Not Req.	California Riparian Habitat Conservation Program (CRCHP)	50%-90%
		Land and Water Conservation Fund	50%	California River Parkways Program	50%-90%
		North American Wetlands Conservation Act (NAWCA)	50%	Habitat Conservation Fund (HCF) Program	50%
		Flood Mitigation Assistance (FMA)	75%-100%	Inland Wetlands Conservation Program	50%
		-	-	Urban Greening for Sustainable Communities - Planning	Not Req.
				Urban Greening for Sustainable Communities - Project	Not Req.

Cost Share Information

Using project descriptions and the cost share data in the table above, estimates of cost shares for this project were calculated. The results are tabulated below, using a range of cost share values to account for uncertainty in the estimating process.

Federal Cost Share (%)	State Cost Share Range (%)		Local Cost Share Range (%)	
	Low	High	Low	High
50%	50%	90%	10%	50%

The following table provides estimates for the Federal, State, and local cost shares using total project cost and the cost share percentages from the above table.

Project	Total Project Cost	Federal Cost Share	Non-Federal Project Cost	State Cost Share Range		Local Cost Share Range	
				Low	High	Low	High
Tuolumne River Regional Parkway	$60,000,000	$30,000,000	$30,000,000	$15,000,000	$27,000,000	$3,000,000	$15,000,000

6.36 Westside Creeks On-Farm Multi-Benefit Program

Short Project Description

Provide outreach and technical assistance to landowners in the Stanislaus County Westside Creek watersheds for multi-benefit flood risk reduction projects.

Potential Funding Sources

Anadromous Fish Restoration Program and Anadromous Fish Screen Program – This funding source is meant to help fund projects that protect, restore, or enhance fish, wildlife, and associated habitat throughout the Central Valley and Trinity River Basins of California. This project meets the criteria of the funding program due to its benefit to anadromous fish.

Central Valley Project Implementation Act (CVPIA) – Habitat Restoration Program and Conservation Program – This funding source is meant to restore and protect species and habitats impacted by the Central Valley Project (CVP). This project meets the CVPIA criteria due to its riparian habitat restoration component.

Endangered Species Act Section 6 Grant Program – This funding program provides grants to states and territories to participate in a wide variety of voluntary conservation projects for candidate, proposed, and listed species on non-federal lands. This project would qualify for funding due to its benefit to endangered species.

Environmental Quality Incentives Program (EQIP) – This funding sources is designed to provide financial and technical assistance to agricultural producers in order to address natural resource concerns and deliver environmental benefits. This project meets the criteria of this funding program since it involves agricultural producers and has an environmental benefit.

North American Wetland Conservation Act (NAWCA) – This funding source provided matching grants to help fund projects that offer wetlands conservation for benefit of wetlands-associated migratory birds and other wildlife. This project qualifies for this program due to the habitat benefits that it provides.

Flood Mitigation Assistance – This funding source provides grants in order to implement projects that reduce or eliminate the risk of repetitive flood damage to buildings and structures insurable under the National Flood Insurance Program. This project would qualify for this funding source since it has the potential to reduce flood risk to qualifying buildings and structures.

Pre-Disaster Mitigation (PDM) – This funding source requires that a project help implement a sustained pre-disaster hazard mitigation program to reduce risk in future hazard events. Since this is a proactive project designed to avoid future flood control issues it meets this criteria.

California Riparian Habitat Conservation Program – The goals of the CRHCP are to protect, preserve, restore and enhance riparian habitat throughout California. This program will fund programs that further these goals, which this project does with the riparian vegetation restoration element.

Flood Corridor Program (FCP) – This funding source is designed to fund non-structural flood risk reduction projects containing ecosystem and/or agricultural land conservation components. Since this project contains both a non-structural flood risk reduction component and ecosystem benefits it meets this programs criteria.

Inland Wetlands Conservation Program – This funding source was created to protect, restore, and enhance wetlands and associated habitats. Since this project will restore degraded floodplain habitat it meets the requirements of the funding source.

Integrated Regional Water Management Plan (IRWMP) – This Project could possibly be included in IRWMP due to flood protection benefits, which would make it eligible for funding through the Plan. In order to be included in the IRWMP the project must be suggested to the lead agency preparing the IRWMP update.

Small Community Flood Risk Reduction – This funding program is designed to help implement projects to reduce flood risk in small, rural, and agricultural communities in the Central Valley. This project would fit this criteria because it will benefit rural and agricultural communities by making O&M more manageable while at the same time creating flood risk reduction due to better quality O&M.

The following table details the cost share of each funding source along with the cost associated with this project.

Project	Estimated Cost	Potential Funding Opportunities			
		Federal		State	
		Program Name	Cost Share	Program Name	Cost Share
Westside Creeks On-Farm Multi-Benefit Program	$75,000	Anadromous Fish Restoration Program and Anadromous Fish Screen Program	50%	California Riparian Habitat Conservation Program (CRCHP)	50%-90%
		Central Valley Project Implementation Act (CVPIA) – Habitat Restoration Program and Conservation Program	Not Req.	Flood Corridor (FCP)	50%-90%
		Endangered Species Act Section 6 Grant Program	75% - 90%	Inland Wetlands Conservation Program	50%
		Environmental Quality Incentives Program (EQIP)	50%	Integrated Regional Water Management (IRWM)	50% - 75%
		North American Wetlands Conservation Act (NAWCA)	50%	Small Community Flood Risk Reduction (SCFRR)	50% - 90%
		Flood Mitigation Assistance (FMA)	75% - 100%		
		Pre-Disaster Mitigation (PDM)	75% - 90%		

Cost Share Information

Using project descriptions and the cost share data in the table above, estimates of cost shares for this project were calculated. The results are tabulated below, using a range of cost share values to account for uncertainty in the estimating process.

Federal Cost Share (%)	State Cost Share Range (%)		Local Cost Share Range (%)	
	Low	High	Low	High
50%	50%	90%	10%	50%

The following table provides estimates for the Federal, State, and local cost shares using total project cost and the cost share percentages from the above table.

Project	Total Project Cost	Federal Cost Share	Non - Federal Project Cost	State Cost Share Range		Local Cost Share Range	
				Low	High	Low	High
Westside Creeks On-Farm Multi-Benefit Program	$75,000	$37,500	$37,500	$18,750	$33,750	$3,750	$18,750

6.37 WSID Fish Screen Project

Short Project Description

This RMFP Project will help support three (3) Phases of the WSID Fish Screen Project while significantly improving site specific and Regional flood management and resilience, and ecosystem enhancement. Phase 1 would provide cost-share to complete the planning, design and permitting of mutually beneficial fish screen alternatives. Phase 2 funding would contribute to the required 50% non-federal cost-share for construction of WSID's preferred alternative fish screen project. Phase 3 would provide cost-share contribution to help complete the planning, design and permitting of integrated and mutually beneficial flood management and resilience and ecosystem enhancements along 90% of the WSID intake canal and alignment across the SJRNWR.

Potential Funding Sources

Anadromous Fish Restoration Program and Anadromous Fish Screen Program – This funding source is meant to help fund projects that protect, restore, or enhance fish, wildlife, and associated habitat throughout the Central Valley and Trinity River Basins of California. This project meets the criteria of the funding program due to its benefit to anadromous fish.

Central Valley Project Implementation Act (CVPIA) – Habitat Restoration Program and Conservation Program – This funding source is meant to restore and protect species and habitats impacted by the Central Valley Project (CVP). This project meets the CVPIA criteria due to its riparian habitat restoration component.

Endangered Species Act Section 6 Grant Program – This funding program provides grants to states and territories to participate in a wide variety of voluntary conservation projects for candidate, proposed, and listed species on non-federal lands. This project would qualify for funding due to its benefit to endangered species.

Flood Corridor Program (FCP) – This funding source is designed to fund non-structural flood risk reduction projects containing ecosystem and/or agricultural land conservation components. Since this project contains both a non-structural flood risk reduction component and ecosystem benefits it meets

The following table details the cost share of each funding source along with the cost associated with this project.

Project	Estimated Cost	Potential Funding Opportunities			
		Federal		State	
		Program Name	Cost Share	Program Name	Cost Share
WSID Fish Screen Project	$38,000,000	Anadromous Fish Restoration Program and Anadromous Fish Screen Program	50%	Flood Corridor (FCP)	50%-90%
		Central Valley Project Implementation Act (CVPIA) – Habitat Restoration Program and Conservation Program	Not Req.		
		Endangered Species Act Section 6 Grant Program	75% - 90%		

Cost Share Information

Using project descriptions and the cost share data in the table above, estimates of cost shares for this project were calculated. The results are tabulated below, using a range of cost share values to account for uncertainty in the estimating process.

Federal Cost Share (%)	State Cost Share Range (%)		Local Cost Share Range (%)	
	Low	High	Low	High
50%	50%	90%	10%	50%

The following table provides estimates for the Federal, State, and local cost shares using total project cost and the cost share percentages from the above table.

Project	Total Project Cost	Federal Cost Share	Non - Federal Project Cost	State Cost Share Range		Local Cost Share Range	
				Low	High	Low	High
WSID Fish Screen Project	$38,000,000	$19,000,000	$19,000,000	$9,500,000	$17,100,000	$1,900,000	$9,500,000

Appendix I Project Cost Share Table

Project Cost Share Table

Projects Within the Mid San Joaquin Region Boundary

Project	Cost Share (%)						Cost Share ($)								
	Federal Cost Share (%)	State Cost Share Range (%)		Local Cost Share Range (%)		Total Project Cost	Federal Cost Share	Non - Federal Project Cost	State Cost Share Range		Local Cost Share Range		Local Cost Share Source		
		Low	High	Low	High				Low	High	Low	High	Private Land Owners	Local Government	Non-Profit Organization
Consolidation of O&M	0%	50%	90%	10%	50%	$200,000	$0	$200,000	$100,000	$180,000	$20,000	$100,000	X		
Dos Rios Ranch Floodplain Expansion and Ecosystem Restoration Project and Hidden Valley Ranch Mitigation Project	50%	50%	90%	10%	50%	$8,000,000	$4,000,000	$4,000,000	$2,000,000	$3,600,000	$400,000	$2,000,000			X
Emergency Response Plan - Debris Management	0%	50%	90%	10%	50%	$110,000	$0	$110,000	$55,000	$99,000	$11,000	$55,000		X	
Emergency Response Plan - Local Planning and Training	0%	50%	90%	10%	50%	$110,000	$0	$110,000	$55,000	$99,000	$11,000	$55,000		X	
Flood Risk Education	50%	50%	90%	10%	50%	$30,000	$15,000	$15,000	$7,500	$13,500	$1,500	$7,500			X
Gomes Lake / Harding Drain Improvements	75%	50%	90%	10%	50%	$1,700,000	$1,275,000	$425,000	$212,500	$382,500	$42,500	$212,500		X	
Hydraulic and Channel Migration Studies	0%	50%	75%	25%	50%	$200,000	$0	$200,000	$100,000	$150,000	$50,000	$100,000		X	
Integrated Levee Vegetation Management - Flood Maintenance and Habitat	75%	50%	90%	10%	50%	$6,400,000	$4,800,000	$1,600,000	$800,000	$1,440,000	$160,000	$800,000			X
Modesto WWTP - Reduce Flood Risk	75%	50%	90%	10%	50%	$80,000,000	$60,000,000	$20,000,000	$10,000,000	$18,000,000	$2,000,000	$10,000,000		X	
Reclamation District 1602 Resilience	75%	50%	90%	10%	50%	$4,700,000	$3,525,000	$1,175,000	$587,500	$1,057,500	$117,500	$587,500		X	
Reclamation District 2031 Resilience	75%	50%	90%	10%	50%	$2,000,000	$1,500,000	$500,000	$250,000	$450,000	$50,000	$250,000	X		
Reclamation District 2063 Resilience	75%	50%	90%	10%	50%	$3,500,000	$2,625,000	$875,000	$437,500	$787,500	$87,500	$437,500	X		
Reclamation District 2091 Resilience	75%	50%	90%	10%	50%	$400,000	$300,000	$100,000	$50,000	$90,000	$10,000	$50,000	X		
Reclamation District 2101 Resilience	75%	50%	90%	10%	50%	$2,500,000	$1,875,000	$625,000	$312,500	$562,500	$62,500	$312,500	X		
Reducing Sediment Loading into San Joaquin River from Westside Agricultural Lands	50%	50%	75%	25%	50%	$65,000,000	$32,500,000	$32,500,000	$16,250,000	$24,375,000	$8,125,000	$16,250,000		X	

Project Cost Share Table

Projects Within the Mid San Joaquin Region Boundary

Project	Cost Share (%)						Cost Share ($)								
	Federal Cost Share (%)	State Cost Share Range (%)		Local Cost Share Range (%)		Total Project Cost	Federal Cost Share	Non - Federal Project Cost	State Cost Share Range		Local Cost Share Range		Local Cost Share Source		
		Low	High	Low	High				Low	High	Low	High	Private Land Owners	Local Government	Non-Profit Organization
Regional Maintenance Technical Support	0%	50%	90%	10%	50%	$100,000	$0	$100,000	$50,000	$90,000	$10,000	$50,000	**X**		
Sediment Management Investigation	0%	50%	90%	10%	50%	$250,000	$0	$250,000	$125,000	$225,000	$25,000	$125,000			**X**
Three Amigos (also known as the Non-structural Alternative at the San Joaquin River National Wildlife Refuge)	50%	50%	90%	10%	50%	$5,500,000	$2,750,000	$2,750,000	$1,375,000	$2,475,000	$275,000	$1,375,000			**X**
Westside Creeks On-Farm Multi-Benefit Program	50%	50%	90%	10%	50%	$75,000	$37,500	$37,500	$18,750	$33,750	$3,750	$18,750			**X**
WSID Fish Screen Project	50%	50%	90%	10%	50%	$38,000,000	$19,000,000	$19,000,000	$9,500,000	$17,100,000	$1,900,000	$9,500,000		**X**	
Totals						$218,775,000	$134,202,500	$84,572,500	$42,286,250	$71,210,250	$13,362,250	$42,286,250			

Project Cost Share Table

Projects Outside of the Mid San Joaquin Region Boundary

Project	Cost Share (%)						Cost Share ($)								
	Federal Cost Share (%)	State Cost Share Range (%)		Local Cost Share Range (%)		Total Project Cost	Federal Cost Share	Non - Federal Project Cost	State Cost Share Range		Local Cost Share Range		Local Cost Share Source		
		Low	High	Low	High				Low	High	Low	High	Private Land Owners	Local Government	Non-Profit Organization
Black Gulch Drainage Study	0%	50%	75%	25%	50%	$28,000	$0	$28,000	$14,000	$21,000	$7,000	$14,000		X	
City of Newman/ Bureau of Reclamation Flood Levee Rehabilitation	75%	50%	90%	10%	50%	$225,000	$168,750	$56,250	$28,125	$50,625	$5,625	$28,125		X	
Dennet Dam Removal	50%	50%	90%	10%	50%	$700,000	$350,000	$350,000	$175,000	$315,000	$35,000	$175,000			X
Dry Creek Watershed Detention Reconnaissance Study	50%	50%	90%	10%	50%	$250,000	$125,000	$125,000	$62,500	$112,500	$12,500	$62,500		X	
La Grange Floodplain Restoration and Spawning Gravel Augmentation	50%	50%	90%	10%	50%	$1,500,000	$750,000	$750,000	$375,000	$675,000	$75,000	$375,000			X
Little Salado Creek	50%	50%	90%	10%	50%	$5,000,000	$2,500,000	$2,500,000	$1,250,000	$2,250,000	$250,000	$1,250,000		X	
Orestimba Creek Flood Management Project	50%	50%	90%	10%	50%	$44,000,000	$22,000,000	$22,000,000	$11,000,000	$19,800,000	$2,200,000	$11,000,000		X	
Patterson WWTP - Reduce Flood Risk	75%	50%	90%	10%	50%	$27,000	$20,250	$6,750	$3,375	$6,075	$675	$3,375		X	
Riverfront Park Project	50%	50%	90%	10%	50%	$2,500,000	$1,250,000	$1,250,000	$625,000	$1,125,000	$125,000	$625,000		X	
Salado Creek Flood Management Project	50%	50%	75%	25%	50%	$600,000	$300,000	$300,000	$150,000	$225,000	$75,000	$150,000		X	
SB5 Compliance - City of Modesto	75%	50%	90%	10%	50%	$130,000	$97,500	$32,500	$16,250	$29,250	$3,250	$16,250		X	
SB5 Compliance - City of Newman	75%	50%	90%	10%	50%	$125,000	$93,750	$31,250	$15,625	$28,125	$3,125	$15,625		X	
SB5 Compliance - City of Patterson	75%	50%	90%	10%	50%	$205,000	$153,750	$51,250	$25,625	$46,125	$5,125	$25,625		X	
Storm Drainage Enhancements along Salado Creek	75%	50%	90%	10%	50%	$880,000	$660,000	$220,000	$110,000	$198,000	$22,000	$110,000		X	
Tuolumne River Flood Management Feasibility Study	50%	50%	75%	25%	50%	$3,000,000	$1,500,000	$1,500,000	$750,000	$1,125,000	$375,000	$750,000		X	

Project Cost Share Table

Projects Outside of the Mid San Joaquin Region Boundary

Project	Cost Share (%)					Total Project Cost	Cost Share ($)								
	Federal Cost Share (%)	State Cost Share Range (%)		Local Cost Share Range (%)			Federal Cost Share	Non - Federal Project Cost	State Cost Share Range		Local Cost Share Range		Local Cost Share Source		
		Low	High	Low	High				Low	High	Low	High	Private Land Owners	Local Government	Non-Profit Organization
Tuolumne River Regional Park – Carpenter Road/West Modesto Flood Management and Park Development	50%	50%	90%	10%	50%	$750,000	$375,000	$375,000	$187,500	$337,500	$37,500	$187,500		**X**	
Tuolumne River Regional Parkway	50%	50%	90%	10%	50%	$60,000,000	$30,000,000	$30,000,000	$15,000,000	$27,000,000	$3,000,000	$15,000,000		**X**	
Totals						$119,920,000	$60,344,000	$59,576,000	$29,788,000	$53,344,200	$6,231,800	$29,788,000			

Appendix II Funding Source Description Table

Mid San Joaquin Funding Source Descriptions

Type	No.	Program Name	Funding Agency	Program Summary	Allowed Project Elements: Study	Land Acquisition	Design	Construction	Material Acquisition	Program Enhancement	Recreation	Who is Eligible to Apply	Award Amount	Cost Share
FEDERAL PROGRAMS														
Conservation	1	Agricultural Conservation Easement Program (ACEP)	USDA NCRS	The Agricultural Conservation Easement Program (ACEP) provides financial and technical assistance to help conserve agricultural lands and wetlands and their related benefits		X						Indian Tribes, State Government, Local Government	Uknown	Varies 50%-75%
	2	Anadromous Fish Restoration Program and Anadromous Fish Screen Program	USFWS	The Anadromous Fish Restoration Program is designed • To protect, restore, and enhance fish, wildlife, and associated habitats in the Central Valley and Trinity River basins of California; • To address impacts of the Central Valley Project on fish, wildlife and associated habitats; • To improve the operational flexibility of the Central Valley Project; • To increase water-related benefits provided by the Central Valley Project to the State of California through expanded use of voluntary water transfers and improved water conservation; • To contribute to the State of California's interim and long-term efforts to protect the San Francisco Bay/Sacramento-San Joaquin Delta Estuary; • To achieve a reasonable balance among competing demands for use of Central Valley Project water, including the requirements of fish and wildlife, agricultural, municipal and industrial and power contractors.	X	X	X	X	X	X	X	State, local governments, Native American Organizations, other public nonprofit institutions/organizations, private nonprofit/organization. No other Federal agency may apply	The estimated grant size for FY 14 is $9 million. Individual grant size estimated to be $10,000 - $300,000.	50%
	3	Central Valley Project Improvement Act (CVPIA) – Habitat Restoration Program and Conservation Program	USFWS and USBR	The Central Valley Project Conservation Program (CVPCP) and the Central Valley Project Improvement Act (CVPIA) Habitat Restoration Program (HRP) represent highly integrated efforts to restore and protect species and habitats impacted by the CVP.	X	X	X	X	X			Government agencies, private non-profit or profit organizations, individuals, and educational institutions. Federal agencies are not eligible to submit an application under this FOA	$25,000 to $1M	Not Required
	4	Endangered Species Act Section 6 Grant Program	USFWS, CDFW	The Cooperative Endangered Species Conservation Fund (section 6 of the ESA), provides grants to states and territories to participate in a wide array of voluntary conservation projects for candidate, proposed, and listed species. The program provides funding to states and territories for species and habitat conservation actions on non-federal lands.	X	X	X	X				Participation in the CESCF programs is only available to State agencies that have a current cooperative agreement with the Secretary of the Interior. However, individuals or groups (for example land conservancies, cities, counties, community organizations, or conservation organizations) may work with a State agency that has a cooperative agreement on conservation efforts that are mutually beneficial, as a subgrantee	negotiable- $10,000 to $1 million	75% 90% when two or more states implement a join project
	5	Environmental Quality Incentives Program (EQIP)	USDA NCRS	EQIP provides financial and technical assistance to agricultural producers in order to address natural resource concerns and deliver environmental benefits such as improved water and air quality, conserved ground and surface water, reduced soil erosion and sedimentation or improved or created wildlife habitat. Eligible program participants receive financial and technical assistance to implement conservation practices, or activities like conservation planning, that address natural resource concerns on their land.			X	X	X			Agricultural producers and owners of non-industrial private forestland and Tribes are eligible to apply for EQIP. Eligible land includes cropland, rangeland, pastureland, non-industrial private forestland and other farm or ranch lands.	$450,000 - Max	50%

Mid San Joaquin Funding Source Descriptions

Type	No.	Program Name	Funding Agency	Program Summary	Allowed Project Elements: Study	Land Acquisition	Design	Construction	Material Acquisition	Program Enhancement	Recreation	Who is Eligible to Apply	Award Amount	Cost Share
FEDERAL PROGRAMS														
Conservation	6	Land and Water Conservation Fund	USFWS	The LWCF Program provides matching grants to States and local governments for the acquisition and development of public outdoor recreation areas and facilities (as well as funding for shared federal land acquisition and conservation strategies). The program is intended to create and maintain a nationwide legacy of high quality recreation areas and facilities and to stimulate non-federal investments in the protection and maintenance of recreation resources across the United States.		X	X	X	X		X	State Governments and Local Governments (through States governments)	$10,000 to several million	50%
	7	North American Wetlands Conservation Act (NAWCA)	USFWS	The North American Wetlands Conservation Act (Act, or NAWCA) of 1989 provides matching grants to organizations and individuals who have developed partnerships to carry out wetlands conservation projects in the United States, Canada, and Mexico for the benefit of wetlands-associated migratory birds and other wildlife.		X	X	X				Entities with the U.S., Canada, or Mexico pursuing wetland conservation projects	$75,000 (Small Grants Program)	50%
Structural Flood Control	8	Flood Mitigation Assistance (FMA)	FEMA	The FMA program is a grant program that provides funding to States, Territories, Tribal entities and communities to assist in their efforts to reduce or eliminate the risk of repetitive flood damage to buildings and structures insurable under the National Flood Insurance Program (NFIP).		X	X	X	X			Native American tribal governments (Federally recognized), State governments, City or township governments, County governments	Uknown	75%-100%
	9	Pre-Disaster Mitigation (PDM)	FEMA	The PDM Grant Program is designed to assist States, Territories, Indian Tribal governments, and local communities to implement a sustained pre-disaster natural hazard mitigation program to reduce overall risk to the population and structures from future hazard events, while also reducing reliance on Federal funding from future disasters.		X	X	X	X			Native American tribal governments (Federally recognized), State governments, City or township governments, County governments	$3M - Max	75% 90% for small impoverished communities
	10	USACE Funding		Cost sharing with USACE on SPFC USACE studies and projects	X	X	X	X				CVFPB with local sponsor.	Uknown	50% - 65%
Non-Structural Flood Control	11	Emergency Watershed Protection Program – Floodplain Easement Option (EWP-FPE)	USDA NCRS	The Emergency Watershed Protection - Floodplain Easement Program (EWP-FPE) provides an alternative measure to traditional EWP recovery, where it is determined that acquiring an easement in lieu of recovery measures is the more economical and prudent approach to reducing a threat to life or property.		X						Landowners or Local and State Governments with Lands that meet program criteria. See Source Document.	Landowner will receive lowest of fair market value, geographic area cap, or a voluntary written offer from the land owner	Not Required

Mid San Joaquin Funding Source Description Table

Type	No.	Program Name	Funding Agency	Program Summary	Allowed Project Elements: Study	Land Acquisition	Design	Construction	Material Acquisition	Program Enhancement	Recreation	Who is Eligible to Apply	Award Amount	Cost Share
STATE PROGRAMS														
Conservation	12	California Riparian Habitat Conservation Program (CRCHP)	CA WCB	The goals of the CRHCP, as noted in its enabling legislation, are to protect, preserve, restore and enhance riparian habitat throughout California		X	X	X				Nonprofit organizations, local government agencies, state departments, and federal agencies.	$2,000 to $2M	50% - 90%
	13	California River Parkways Program	California Natural Resource Agency	The Proposition 50 California River Parkways Grant Program in the Resources Agency is a competitive grant program for river parkways projects. Eligible projects must provide public access or be a component of a larger parkway plan that provides public access. In addition, projects must meet two of the following conditions: Provide compatible recreational opportunities including trails for strolling, hiking, bicycling, and equestrian uses along rivers and streams. Protect, improve, or restore riverine or riparian habitat, including benefits to wildlife habitat and water quality. Maintain or restore the open-space character of lands along rivers and streams so that they are compatible with periodic flooding as part of a flood management plan or project. Convert existing developed riverfront land into uses consistent with river parkways. Provide facilities to support or interpret river or stream restoration or other conservation activities.	X	X	X	X	X		X	Public Agencies and California Nonprofit Organizations	Unknown	50% - 90%
	14	Central Valley Flood System Conservation Framework and Strategy	DWR FESSRO (Prop 1E)	The program funds planning and implementation of projects in support of the Central Valley Flood System Conservation Framework and the Conservation Strategy. The projects will incorporate environmental stewardship and sustainability principles into State Plan of Flood Control flood management activities.			X	X				Federal, State and Local public agencies; private mitigation banks, Non-profits (501(c)(3))	$5M - Maximum	50% - 90%
	15	Flood Corridor (FCP)	DWR-FloodSAFE	Non-structural flood risk reduction projects containing ecosystem and/or agricultural land conservation components		X	X	X				Local public agencies (county, city, district or joint powers authority), nonprofit organizations, California Native American Tribes registered as a nonprofit organization or partner of a nonprofit or local public agency.	$5M- Maximum	50% - 90%
	16	Habitat Conservation Fund (HCF) Program	CA Dept. of Parks and Recreation	Provides funds to local entities to protect threatened species, to address wildlife corridors, to create rails, and to provide for nature interpretation programs which bring urban residents into park and wildlife areas			X	X		X	X		Does not usually exceed $200,000 however there are not maximum or minimum amounts	50%

Mid San Joaquin Funding Source Description Table

Type	No.	Program Name	Funding Agency	Program Summary	Allowed Project Elements: Study	Land Acquisition	Design	Construction	Material Acquisition	Program Enhancement	Recreation	Who is Eligible to Apply	Award Amount	Cost Share
STATE PROGRAMS														
Conservation	17	Inland Wetlands Conservation Program	CA WCB	The Inland Wetlands Conservation Program (IWCP) was created to assist the Central Valley Joint Venture (CVJV) in its mission is to protect, restore, and enhance wetlands and associated habitats. The CVJV, a partnership of twenty two public and private organizations and agencies, has identified through its Implementation Plan specific goals to increase populations of six bird groups: wintering waterfowl, breeding waterfowl, non-breeding shorebirds, breeding shorebirds, waterbirds, and breeding riparian songbirds. The IWCP has a wide range of options to accomplish these goals, including acquisitions of land or water for wetlands or wildlife friendly agriculture, acquisition of conservation easements, restoration of public or private lands, or enhancement of existing degraded habitats. In addition, the program will work toward providing long term reliable water for wetlands and winter-flooded agricultural lands.		X	X	X				Nonprofit organizations, local governmental agencies and state departments	$1,000 to $1M	50%
	18	Urban Greening for Sustainable Communities - Planning	California Natural Resource Agency	Because of the built-out nature of California's urban areas, the Urban Greening Planning Program (Program) will provide funds to assist entities in developing a master urban greening plan that will ultimately result in projects to help the State meet its environmental goals and the creation of healthy communities. The plan must be consistent with the State's planning policies and any applicable general or regional plan. The plan must outline or layout projects that reduce greenhouse gas emissions and provide multiple benefits including, but not limited to, decreasing air and water pollution, reducing the consumption of natural resources and energy, increasing the reliability of local water supplies, or increasing adaptability to climate change.			X					A council of governments, countywide authority, a metropolitan planning organization, local government, nonprofit organization, special district, or joint powers authorities where at least one entity qualifies as an eligible applicant	$250,000 -Maximum	Not Req.
	19	Urban Greening for Sustainable Communities - Project	California Natural Resource Agency	Because of the built-out nature of California's urban areas, the Urban Greening for Sustainable Communities Program (Program) provides funds to preserve, enhance, increase or establish community green areas such as urban forests, open spaces, wetlands and community spaces (e.g., community gardens). The goal is for these greening projects to incrementally create more viable and sustainable communities throughout the State.				X	X		X	Grant Funds will be awarded to a city, county, special district, or nonprofit organization, or joint powers authorities where at least one entity qualifies as an eligible applicant.	Unknown	Not Req.
	20	Urban Streams Restoration Program		Program provides grants for stream restoration projects that reduce flooding or erosion and associated property damages; restore, enhance, or protect the natural environment; and promote community involvement, education, and stewardship in urban streams.			X	X		X			$1 million per eligible project	Not Req.

Mid San Joaquin Funding Source Description Table

Type	No.	Program Name	Funding Agency	Program Summary	Allowed Project Elements: Study	Land Acquisition	Design	Construction	Material Acquisition	Program Enhancement	Recreation	Who is Eligible to Apply	Award Amount	Cost Share
STATE PROGRAMS														
Structural Flood Control	21	Flood System Repair Project (FSRP)	DWR-FloodSAFE	The Flood System Repair Project (FSRP) is designed to evaluate (feasibility), design, and construct repairs on non-urban SPFC facility (levees, channels, structures, etc.) deficiencies.			X	X				An LMA sponsor for an FSRP repair project must be a levee district, reclamation district, or other agency with maintenance re sponsibilities for SPFC facilities.	$5M- Maximum	50%-90%
	22	Integrated Regional Water Management (IRWM)		Grant funds for development and revisions of IRWM Plans, and implementation of projects in IRWM Plans. Goals of Projects: to assist local public agencies to meet long-term water management needs of the State, including the delivery of safe drinking water, flood risk reduction, and protection of water quality and the environment.	X	X	X	X	X	X	X	Applicant must be a local public agency or nonprofit representing an accepted IRWM Region. Other IRWM partners may access funds through their own agreements with the applicant/grantee.	Uknown	50%-75%
	23	Local Levee Assistance Program (LLAP)	DWR-FloodSAFE	The Local Levee Assistance Program (LLAP) is for projects to immediately repair and improve critically-damaged local levees, evaluate levee stability and levee seepage and underseepage, and to perform design or alternatives analysis. Local levees are levees throughout the State that are not part of the State Plan of Flood Control for the Central Valley and are not located within the Sacramento-San Joaquin Delta. The LLAP has two components. The Local Levee Critical Repair (LLCR) Program provides for design and repairs of critically-damaged levees. The Local Levee Evaluation (LOLE) Program provides funds for feasibility studies and geotechnical evaluation of levees.	X		X	X				Local Public Agencies or Joint Powers Authorities that are outside of the Legal Delta, are responsible for local (non-SPFC) levees, and are qualified to contract with the state.	$1M - Maximum	50% - 90%
	24	Small Community Flood Risk Reduction (SCFRR)	DWR-FloodSAFE	The Small Community Risk Reduction Program is designed to help implement projects to reduce flood risk in small, rural, and agricultural communities in the Central Valley. Funds support non-routine O&M, O&M plan updates, evaluations, feasibility studies, design, and construction of proactive repairs to flood control facilities of the SPFC and appurtenant non-project levees.	X		X	X				Local agencies that are responsible for SPFC facilities that protect small and rural communities in the central valley that have been designated by the CVFPP to have a high or moderate-high flood threat level.	$2M Maximum for feasibility studies $5M Maximuim for implementatior design of projects	50% - 90%
	25	Storm Water Flood Management Program		The Storm Water Flood Management Program is design to help fund storm water management projects that reduce flood damage and provide at least one other type of benefit. Project must not be part of the State Plan of Flood Control. Project must be part of an existing IRWM Plan and be consistent with applicable Water Quality Basin Plan				X				Local agencies or nonprofits representing an IRWM effort.	Maximum- 30 million per project	50% - 75%
	26	Systemwide Flood Risk Reduction (SWFRR)	DWR-FloodSAFE	The Systemwide Flood Risk Reduction Program is designed to help implement recommendations of the Basin-wide feasibility studies. Guidelines are currently under development	X	X	X	X				Local public agencies or joint powers authorities	Uknown	50% - 90%
	27	Urban Flood Risk Reduction (UFRR)	DWR-FloodSAFE	The Urban Flood Risk Reduction Program is designed to help improve urban SPFC levees within the Central Valley to a 200-year level of protection.	X	X	X	X				Local public agencies or joint powers authorities	$200M-Maximum per project	50% - 90%

Mid San Joaquin Funding Source Description Table

Type	No.	Program Name	Funding Agency	Program Summary	Allowed Project Elements: Study	Land Acquisition	Design	Construction	Material Acquisition	Program Enhancement	Recreation	Who is Eligible to Apply	Award Amount	Cost Share
STATE PROGRAMS														
Non-Structural Flood Control	28	Flood Emergency Response – Forecast-Coordinate Operations (F-CO)	DWR-FloodSAFE	This program is designed to further participation of reservoir operators (affecting the Central Valley) in the F-CO program, especially in obtaining necessary decision support system tools & equipment and field measuring equipment	X	X	X	X	X	X		Federal Agencies, State Agencies, or California Local Public Agencies with responsibility for operating a reservoir that has flood control reservation pool and is willing to participate in the Forecast-Coordinated Operations program and willing to coordinate its reservoir releases with other reservoir operators in the river system during flood events	$6M	50% - 90%
	29	Flood Emergency Response Statewide Emergency Response Grants	DWR-FloodSAFE	This program is designed to provide support for local EAPs or related flood preparedness and response activities. Funding is available for material acquisition such as emergency communications equipment to improve emergency response preparedness, and program enhancement activities that improve emergency response.					X	X		California public agencies with primary responsibility for flood emergency response and coordination are eligible to apply.	$15M	50% - 90%
	30	Watershed and Environmental Improvement Program	SFPUC	The Watershed and Environmental Improvement Program is a 10-year, $50 million, program to proactively manage, protect and restore environmental resources affected by our system operations. Funded in part by Water System Improvement Program Measure A bond funds and in part by operating funds, the Program spans the Peninsula, Alameda, and Tuolumne Watersheds, as well areas in San Francisco. The portion of the program that is applicable to the MSJ Region is the Lower Tuolumne River (downstream of Don Pedro Reservoir). The program is focused on protection of low lying floodplain areas through permanent conservations easements and/or fee title purchase of the property from willing landowners.		X	X	X			X	Land owners and Agencies within the Lower Tuolumne watershed that are interested in obtaining permanent conservation easements.	$6 million is expected to be spent in the Tuolumne River Watershed. Invididual grant size is negotiable, from $10,000 to $2 million +	Not Req.

Appendix III Project Funding Sources Table

Mid San Joaquin Regional Projects Funding Sources

Project	Funding Sources																														
	Federal											State																			
	Conservation							Structural Flood Control			Non-Structural Flood Control	Conservation									Structural Flood Control							Non-Structural Flood Control		
	Agricultural Conservation Easement Program (ACEP)	Anadromous Fish Restoration Program and Anadromous Fish Screen Program	Central Valley Project Implementation Act (CVPIA) – Habitat Restoration Program and Conservation Program	Endangered Species Act Section 6 Grant Program	Environmental Quality Incentives Program (EQIP)	Land and Water Conservation Fund	North American Wetlands Conservation Act (NAWCA)	Flood Mitigation Assistance (FMA)	Pre-Disaster Mitigation (PDM)	USACE Funding	Emergency Watershed Protection Program – Floodplain Easement Option (EWP-FPE)	California Riparian Habitat Conservation Program (CRCHP)	California River Parkways Program	Central Valley Flood System Conservation Framework and Strategy	Flood Corridor (FCP)	Habitat Conservation Fund (HCF) Program	Inland Wetlands Conservation Program	Urban Greening for Sustainable Communities - Planning	Urban Greening for Sustainable Communities - Project	Urban Streams Restoration Program	Flood System Repair Project (FSRP)	Integrated Regional Water Management (IRWM)	Local Levee Assistance Program (LLAP)	Small Community Flood Risk Reduction (SCFRR)	Storm Water Flood Management Program	Systemwide Flood Risk Reduction (SWFRR)	Urban Flood Risk Reduction (UFRR)	Flood Emergency Response – Forecast- Coordinate Operations (F-CO)	Flood Emergency Response Statewide Emergency Response Grants	Watershed and Environmental Improvement Program
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Black Gulch Storm Drainage Study																						X			X					
City of Newman/ Bureau of Reclamation Flood Levee Rehabilitation									X													X	X							
Consolidation of O&M																								X						
Dennett Dam Removal		X	X	X		X	X		X			X	X			X				X		X								
Dos Rios Ranch Floodplain Expansion and Ecosystem Restoration Project and Hidden		X	X	X		X	X	X	X		X	X		X	X	X	X					X			X					
Dry Creek Watershed Detention Reconnaissance Study								X		X												X				X				
Emergency Response Plan – Debris Management																													X	
Emergency Response Plan – Local Planning and Training																													X	
Flood Risk Education														X													X			
Gomes Lake / Harding Drain Improvements								X	X													X			X		X			
Hydraulic and Channel Migration Studies																						X								
Integrated Levee Vegetation Management – Flood Maintenance and Habitat			X	X								X		X								X								
La Grange Floodplain Restoration and Spawning Gravel Augmentation		X	X	X			X		X			X		X	X	X	X													X
Little Salado Creek								X	X	X											X	X		X	X	X				
Modesto WWTP-Reduce Flood Risk								X	X													X				X				
Orestimba Creek Flood Management Project								X	X	X																	X			
Patterson WWTP - Reduce Flood Risk									X													X	X							
Reclamation District 1602 Resilience								X	X												X			X		X				
Reclamation District 2031 Resilience								X	X												X			X		X				

Mid San Joaquin Regional Projects Funding Sources

Project	Federal											State																		
	Conservation							Structural Flood Control			Non-Structural Flood Control	Conservation									Structural Flood Control							Non-Structural Flood Control		
	Agricultural Conservation Easement Program (ACEP)	Anadromous Fish Restoration Program and Anadromous Fish Screen Program	Central Valley Project Implementation Act (CVPIA) – Habitat Restoration Program and Conservation Program	Endangered Species Act Section 6 Grant Program	Environmental Quality Incentives Program (EQIP)	Land and Water Conservation Fund	North American Wetlands Conservation Act (NAWCA)	Flood Mitigation Assistance (FMA)	Pre-Disaster Mitigation (PDM)	USACE Funding	Emergency Watershed Protection Program – Floodplain Easement Option (EWP-FPE)	California Riparian Habitat Conservation Program (CRCHP)	California River Parkways Program	Central Valley Flood System Conservation Framework and Strategy	Flood Corridor (FCP)	Habitat Conservation Fund (HCF) Program	Inland Wetlands Conservation Program	Urban Greening for Sustainable Communities - Planning	Urban Greening for Sustainable Communities - Project	Urban Streams Restoration Program	Flood System Repair Project (FSRP)	Integrated Regional Water Management (IRWM)	Local Levee Assistance Program (LLAP)	Small Community Flood Risk Reduction (SCFRR)	Storm Water Flood Management Program	Systemwide Flood Risk Reduction (SWFRR)	Urban Flood Risk Reduction (UFRR)	Flood Emergency Response – Forecast- Coordinate Operations (F-CO)	Flood Emergency Response Statewide Emergency Response Grants	Watershed and Environmental Improvement Program
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Reclamation District 2063 Resilience								X	X												X			X		X				
Reclamation District 2091 Resilience								X	X												X			X		X				
Reclamation District 2101 Resilience								X	X												X			X		X				
Reducing Sediment Loading into the San Joaquin River from Westside Agricultural Lands					X																	X								
Regional Maintnenace Technical Support																						X		X						
Riverfront Park Project			X			X			X			X	X		X	X	X			X										
Salado Creek Flood Management Project							X	X												X		X			X		X			
SB5 Compliance – City of Modesto								X	X													X					X			
SB5 Compliance – City of Newman								X	X													X					X			
SB5 Compliance – City of Patterson									X													X					X			
Sediment Management Investigation																						X		X		X				
Storm Drainage Enhancements along Salado Creek									X													X			X		X			
Three Amigos (also known as the Non-structural Alternative at the San Joaquin River National Wildlife Refuge)		X	X								X	X		X	X		X					X				X				
Tuolumne River Flood Management Feasibility Study										X												X								
Tuolumne River Regional Park – Carpenter Road/West Modesto Flood Management and			X			X	X	X				X	X			X	X					X								
Tuolumne River Regional Parkway			X			X	X	X				X	X			X	X	X	X											
Westside Creeks On-Farm Multi-Benefit Program		X	X	X	X		X	X	X			X			X		X					X		X						
WSID Fish Screen Project		X	X	X											X															

Project	Estimated Cost	Potential Funding Opportunities			
		Federal		State	
		Program Name	Cost Share	Program Name	Cost Share
Black Gulch Storm Drainage Study	$28,000			Integrated Regional Water Management (IRWM)	50%-75%
				Storm Water Flood Management Program	50%-75%
City of Newman / Bureau of Reclamation Flood Levee Rehabilitation	$225,000	Pre-Disaster Mitigation (PDM)	75% - 90%	Integrated Regional Water Management (IRWM)	50%-75%
				Local Levee Assistance Program	50%-90%
Consolidation of O&M	$200,000			Small Community Flood Risk Reduction (SCFRR)	50%-90%
Dennet Dam Removal	$700,000	Anadromous Fish Restoration Program and Anadromous Fish Screen Program	50%	California Riparian Habitat Conservation Program (CRCHP)	50%-90%
		Central Valley Project Improvement Act (CVPIA) – Habitat Restoration Program and Conservation Program	Not Req.	California River Parkways Program	50%-90%
		Endangered Species Act Section 6 Grant Program	75% - 90%	Habitat Conservation Fund (HCF) Program	50%
		Land and Water Conservation Fund	50%	Urban Streams Restoration Program	Not Req.
		North American Wetlands Conservation Act (NAWCA)	50%	Integrated Regional Water Management (IRWM)	50%-75%
		Pre-Disaster Mitigation (PDM)	75% - 90%		
Dos Rios Ranch Floodplain Expansion and Ecosystem Restoration Project and Hidden Valley Ranch Mitigation Project	$8,000,000	Anadromous Fish Restoration Program and Anadromous Fish Screen Program	50%	California Riparian Habitat Conservation Program (CRCHP)	50%-90%
		Central Valley Project Implementation Act (CVPIA) – Habitat Restoration Program and Conservation Program	Not Req.	Central Valley Flood System Conservation Framework and Strategy	50% - 90%
		Endangered Species Act Section 6 Grant Program	75% - 90%	Flood Corridor (FCP)	50%-90%
		Land and Water Conservation Fund	50%	Habitat Conservation Fund (HCF) Program	50%
		North American Wetlands Conservation Act (NAWCA)	50%	Inland Wetlands Conservation Program	50%
				Integrated Regional Water Management (IRWM)	50%-75%
				Systemwide Flood Risk Reduction (SWFRR)	50%-90%
Dry Creek Watershed Detention Reconnaissance Study	$250,000	Flood Mitigation Assistance (FMA)	75%-100%	Integrated Regional Water Management (IRWM)	50%-75%
		USACE Funding	50%	Systemwide Flood Risk Reduction (SWFRR)	50%-90%
Emergency Response Plan - Debri Management	$70,000 - $110,000			Flood Emergency Response Statewide Emergency Response Grants	50%-90%
Emergency Response Plan - Local Planning and Training	$70,000 - $110,000			Flood Emergency Response Statewide Emergency Response Grants	50%-90%
Flood Risk Education	Ranges from One time $30,000 to annual $100,000	Central Valley Project Improvement Act (CVPIA) – Habitat Restoration Program and Conservation Program	Not Required	Urban Flood Risk Reduction (UFRR)	50%-90%
Gomes Lake / Harding Drain Improvements	$1,000,000-1,700,000	Flood Mitigation Assistance (FMA)	75%-100%	Integrated Regional Water Management (IRWM)	50%-75%
		Pre-Disaster Mitigation (PDM)	75% - 90%	Storm Water Flood Management Program	50%-75%
				Urban Flood Risk Reduction (UFRR)	50%-90%
Hydraulic and Channel Migration Studies	$200,000			Integrated Regional Water Management (IRWM)	50%-75%
Integrated Levee Vegetation Management - Flood Maintenance and Habitat	$6,400,000	Central Valley Project Improvement Act (CVPIA) – Habitat Restoration Program and Conservation Program	Not Required	California Riparian Habitat Conservation Program (CRCHP)	50%-90%
		Endangered Species Act Section 6 Grant Program	75% - 90%	Central Valley Flood System Conservation Framework and Strategy	50% - 90%
				Integrated Regional Water Management (IRWM)	50%-75%
Modesto WWTP - Reduce Flood Risk	$80,000,000	Flood Mitigation Assistance (FMA)	75%-100%	Integrated Regional Water Management (IRWM)	50%-75%
		Pre-Disaster Mitigation (PDM)	75% - 90%	Systemwide Flood Risk Reduction (SWFRR)	50%-90%

Project	Estimated Cost	Potential Funding Opportunities			
		Federal		State	
		Program Name	Cost Share	Program Name	Cost Share
La Grange Floodplain Restoration and Spawning Gravel Augmentation	$1,500,000	Anadromous Fish Restoration Program and Anadromous Fish Screen Program	50%	California Riparian Habitat Conservation Program (CRCHP)	50%-90%
		Central Valley Project Implementation Act (CVPIA) – Habitat Restoration Program and Conservation Program	Not Req.	Central Valley Flood System Conservation Framework and Strategy	50%-90%
		Endangered Species Act Section 6 Grant Program	75% - 90%	Flood Corridor (FCP)	50%-90%
		North American Wetlands Conservation Act (NAWCA)	50%	Habitat Conservation Fund (HCF) Program	50%
		Pre-Disaster Mitigation (PDM)	75% - 90%	Inland Wetlands Conservation Program	50%
				Watershed and Environmental Improvement Program	Not Req.
Little Salado Creek	$5,000,000	Flood Mitigation Assistance (FMA)	75%-100%	Flood System Repair Project (FSRP)	50% - 90%
		Pre-Disaster Mitigation (PDM)	75% - 90%	Integrated Regional Water Management (IRWM)	50%-75%
		USACE Funding	50%	Small Community Flood Risk Reduction (SCFRR)	50%-90%
				Storm Water Flood Management Program	50% - 75%
				Systemwide Flood Risk Reduction (SWFRR)	50%-90%
Orestimba Creek Flood Management Project	$44 million (planning) $100,000/yr (O&M)	Flood Mitigation Assistance (FMA)	75%-100%	Urban Flood Risk Reduction (UFRR)	50%-90%
		Pre-Disaster Mitigation (PDM)	75% - 90%		
		USACE Funding	50%		
Patterson WWTP - Reduce Flood Risk	$27,000	Pre-Disaster Mitigation (PDM)	75% - 90%	Integrated Regional Water Management (IRWM)	50%-75%
				Small Community Flood Risk Reduction (SCFRR)	50%-90%
Reclamation District 1602 Resilience Project	$4,700,000	Flood Mitigation Assistance (FMA)	75%-100%	Flood System Repair Project (FSRP)	50% - 90%
		Pre-Disaster Mitigation (PDM)	75% - 90%	Small Community Flood Risk Reduction (SCFRR)	50%-90%
				Systemwide Flood Risk Reduction (SWFRR)	50%-90%
Reclamation District 2031 Resilience Project	$2,000,000	Flood Mitigation Assistance (FMA)	75%-100%	Flood System Repair Project (FSRP)	50% - 90%
		Pre-Disaster Mitigation (PDM)	75% - 90%	Small Community Flood Risk Reduction (SCFRR)	50%-90%
				Systemwide Flood Risk Reduction (SWFRR)	50%-90%
Reclamation District 2063 Resilience Project	$3,500,000	Flood Mitigation Assistance (FMA)	75%-100%	Flood System Repair Project (FSRP)	50% - 90%
		Pre-Disaster Mitigation (PDM)	75% - 90%	Small Community Flood Risk Reduction (SCFRR)	50%-90%
				Systemwide Flood Risk Reduction (SWFRR)	50%-90%
Reclamation District 2091 Resilience Project	$400,000	Flood Mitigation Assistance (FMA)	75%-100%	Flood System Repair Project (FSRP)	50% - 90%
		Pre-Disaster Mitigation (PDM)	75% - 90%	Small Community Flood Risk Reduction (SCFRR)	50%-90%
				Systemwide Flood Risk Reduction (SWFRR)	50%-90%
Reclamation District 2101 Resilience Project	$2,500,000	Flood Mitigation Assistance (FMA)	75%-100%	Flood System Repair Project (FSRP)	50% - 90%
		Pre-Disaster Mitigation (PDM)	75% - 90%	Small Community Flood Risk Reduction (SCFRR)	50%-90%
				Systemwide Flood Risk Reduction (SWFRR)	50%-90%
Reducing Sediment Loading into San Joaquin River from Westside Agricultural Lands	$65,000,000	Environmental Quality Incentives Program (EQIP)	50%	Integrated Regional Water Management (IRWM)	50%-75%
Regional Maintenance Technical Support	$100,000			Integrated Regional Water Management (IRWM)	50%-75%
				Small Community Flood Risk Reduction (SCFRR)	50%-90%

Project	Estimated Cost	Potential Funding Opportunities			
		Federal		State	
		Program Name	Cost Share	Program Name	Cost Share
Riverfront Park Project	$2,500,000	Central Valley Project Implementation Act (CVPIA) – Habitat Restoration Program and Conservation Program	Not Req.	California Riparian Habitat Conservation Program (CRCHP)	50%-90%
		Land and Water Conservation Fund	50%	California River Parkways Program	50%-90%
		Pre-Disaster Mitigation (PDM)	75% - 90%	Flood Corridor (FCP)	50%-90%
				Habitat Conservation Fund (HCF) Program	50%
				Inland Wetlands Conservation Program	50%
				Urban Streams Restoration Program	Not Req.
Salado Creek Flood Management Project	$600,000	North American Wetlands Conservation Act (NAWCA)	50%	Urban Streams Restoration Program	Not Req.
		Flood Mitigation Assistance (FMA)	75%-100%	Integrated Regional Water Management (IRWM)	50%-75%
				Storm Water Flood Management Program	50% - 75%
				Urban Flood Risk Reduction (UFRR)	50%-90%
SB5 Compliance - City of Modesto	Phase I -$30,000 Phase II - $100,000	Flood Mitigation Assistance (FMA)	75%-100%	Integrated Regional Water Management (IRWM)	50%-75%
		Pre-Disaster Mitigation (PDM)	75% - 90%	Urban Flood Risk Reduction (UFRR)	50%-90%
SB5 Compliance - City of Newman	Phase I -$75,000 Phase II - $50,000	Flood Mitigation Assistance (FMA)	75%-100%	Integrated Regional Water Management (IRWM)	50%-75%
		Pre-Disaster Mitigation (PDM)	75% - 90%	Urban Flood Risk Reduction (UFRR)	50%-90%
SB5 Compliance - City of Patterson	Phase I -$105,000 Phase II - $100,000	Pre-Disaster Mitigation (PDM)	75% - 90%	Integrated Regional Water Management (IRWM)	50%-75%
				Urban Flood Risk Reduction (UFRR)	50%-90%
Sediment Management Investigation	$250,000			Integrated Regional Water Management (IRWM)	50%-75%
				Small Community Flood Risk Reduction (SCFRR)	50%-90%
				Systemwide Flood Risk Reduction (SWFRR)	50%-90%
Storm Drainage Enhancements along Salado Creek	$880,000	Pre-Disaster Mitigation (PDM)	75% - 90%	Integrated Regional Water Management (IRWM)	50%-75%
				Storm Water Flood Management Program	50% - 75%
				Urban Flood Risk Reduction (UFRR)	50%-90%
Three Amigos (also known as the Non-structural Alternative at the San Joaquin River National Wildlife Refuge)	$5,500,000	Anadromous Fish Restoration Program and Anadromous Fish Screen Program	50%	California Riparian Habitat Conservation Program (CRCHP)	50%-90%
		Central Valley Project Implementation Act (CVPIA) – Habitat Restoration Program and Conservation Program	Not Required	Central Valley Flood System Conservation Framework and Strategy	50%-90%
		Emergency Watershed Protection Program – Floodplain Easement Option (EWP-FPE)	Not Required	Flood Corridor (FCP)	50%-90%
				Inland Wetlands Conservation Program	50%
				Integrated Regional Water Management (IRWM)	50%-75%
				Systemwide Flood Risk Reduction (SWFRR)	50%-90%
Tuolumne River Flood Management Feasibility Study	$3,000,000	USACE Funding	50%	Integrated Regional Water Management (IRWM)	50%-75%
Tuolumne River Regional Park – Carpenter Road/West Modesto Flood Management and Park Development	$750,000	Central Valley Project Improvement Act (CVPIA) – Habitat Restoration Program and Conservation Program	Not Req.	California Riparian Habitat Conservation Program (CRCHP)	50%-90%
		Land and Water Conservation Fund	50%	California River Parkways Program	50%-90%
		North American Wetlands Conservation Act (NAWCA)	50%	Habitat Conservation Fund (HCF) Program	50%
		Flood Mitigation Assistance (FMA)	75%-100%	Inland Wetlands Conservation Program	50%
				Integrated Regional Water Management (IRWM)	50%-75%

Project	Estimated Cost	Potential Funding Opportunities			
		Federal		State	
		Program Name	Cost Share	Program Name	Cost Share
Tuolumne River Regional Parkway	$60,000,000	Central Valley Project Improvement Act (CVPIA) – Habitat Restoration Program and Conservation Program	Not Req.	California Riparian Habitat Conservation Program (CRCHP)	50%-90%
		Land and Water Conservation Fund	50%	California River Parkways Program	50%-90%
		North American Wetlands Conservation Act (NAWCA)	50%	Habitat Conservation Fund (HCF) Program	50%
		Flood Mitigation Assistance (FMA)	75%-100%	Inland Wetlands Conservation Program	50%
				Urban Greening for Sustainable Communities - Planning	Not Req.
				Urban Greening for Sustainable Communities - Project	Not Req.
Westside Creeks On-Farm Multi-Benefit Program	$75,000	Anadromous Fish Restoration Program and Anadromous Fish Screen Program	50%	California Riparian Habitat Conservation Program (CRCHP)	50%-90%
		Central Valley Project Implementation Act (CVPIA) – Habitat Restoration Program and Conservation Program	Not Req.	Flood Corridor (FCP)	50%-90%
		Endangered Species Act Section 6 Grant Program	75% - 90%	Inland Wetlands Conservation Program	50%
		Environmental Quality Incentives Program (EQIP)	50%	Integrated Regional Water Management (IRWM)	50% - 75%
		North American Wetlands Conservation Act (NAWCA)	50%	Small Community Flood Risk Reduction (SCFRR)	50% - 90%
		Flood Mitigation Assistance (FMA)	75% - 100%		
		Pre-Disaster Mitigation (PDM)	75% - 90%		
WSID Fish Screen Project	$38,000,000	Anadromous Fish Restoration Program and Anadromous Fish Screen Program	50%	Flood Corridor (FCP)	50%-90%
		Central Valley Project Implementation Act (CVPIA) – Habitat Restoration Program and Conservation Program	Not Req.		
		Endangered Species Act Section 6 Grant Program	75% - 90%		

Appendix IV Sources

The following sources were used in determining information on funding sources.

1. Agricultural Conservation Easement Program (ACEP)

http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/easements/acep/?cid=stelprdb1242695

2. Anadromous Fish Restoration Program and Anadromous Fish Screen Program

   - https://www.cfda.gov/index?s=program&mode=form&tab=core&id=200daf76afcc578965460cdc9537b261

3. Central Valley Project Implementation Act (CVPIA) – Habitat Restoration Program and Conservation Program

   - http://www.usbr.gov/mp/cvpcp/
   - http://www.grants.gov/web/grants/view-opportunity.html?oppId=236611

4. Endangered Species Act Section 6 Grant Program

   - http://www.fws.gov/endangered/esa-library/pdf/FY%2014%20CESCF%20RFP%20Grant%20Announcement%20Standard%20Format.FINAL.pdf

5. Environmental Quality Incentives Program (EQIP)

   - http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/eqip/

6. Land and Water Conservation Fund

   - http://www.nps.gov/lwcf/
   - http://www.nps.gov/ncrc/programs/lwcf/grants.html
   - http://www.nps.gov/ncrc/programs/lwcf/manual/lwcf.pdf
   - http://www.parks.ca.gov/pages/1008/files/lwcf%20application%20guide_%20final%20draft%2010.10.2013.pdf

7. North American Wetlands Conservation Act (NAWCA)

   - http://www.fws.gov/birdhabitat/Grants/NAWCA/index.shtm

8. Flood Mitigation Assistance (FMA)

   - 2013 Flood Mitigation Assistance FOA

9. Pre-Disaster Mitigation (PDM)

   - 2013 Pre Disaster Mitigation FOA

10. USACE Funding

- http://www.gpo.gov/fdsys/pkg/PLAW-106publ53/pdf/PLAW-106publ53.pdf
- http://www.epw.senate.gov/wrda86.pdf

11. Emergency Watershed Protection Program – Floodplain Easement Option (EWP-FPE)

- http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/financial/ewp/?cid=nrcs143_008225

12. California Riparian Habitat Conservation Program (CRCHP)

- http://rlch.org/funding/california-riparian-habitat-conservation-program
- http://www.privatelandownernetwork.org/yellowpages/resource.aspx?id=14402
- https://www.wcb.ca.gov/Programs/Riparian.aspx

13. California River Parkways Program

- http://bondaccountability.resources.ca.gov/plevel1.aspx?id=22&pid=4
- http://resources.ca.gov/bonds_prop50riverparkway.html
- http://resources.ca.gov/bonds_docs/P50_Grant_Guidelines_FINAL.pdf

14. Central Valley Flood System Conservation Framework and Strategy

http://www.water.ca.gov/floodsafe/fessro/docs/flood11_guidelines.pdf

15. Flood Corridor Program (FCP)

- http://www.water.ca.gov/floodmgmt/fpo/sgb/fpcp/docs/Final_Flood_Corridor_Guidelines.pdf
- http://www.water.ca.gov/floodmgmt/fpo/sgb/fpcp/funding_cycle.cfm
- FloodSAFE Implementation Programs (January 2014) Draft Table

16. Habitat Conservation Fund (HCF) Program

- http://www.parks.ca.gov/?page_id=21361
- HCF fact sheet 3.13.13

17. Inland Wetlands Conservation Program

- http://ceres.ca.gov/wetlands/introduction/inland_easement.html
- http://rlch.org/funding/california-inland-wetlands-conservation-program

18. Urban Greening for Sustainable Communities - Planning

- http://resources.ca.gov/grant_programs.html#
- http://resources.ca.gov/bond/Urban_Greening_PLANNING_Guidelines_October_2012.pdf

19. Urban Greening for Sustainable Communities – Project

    - http://resources.ca.gov/bond/Urban_Greening_PROJECT_Guidelines_October_2012.pdf

20. Urban Streams Restoration Program

    - http://www.water.ca.gov/urbanstreams/docs/guidelines.pdf

21. Flood System Repair Project (FSRP)

    - FloodSAFE Implementation Programs (January 2014) Draft Table
    - http://www.water.ca.gov/floodmgmt/fmo/docs/FSRP-Draft-Guidelines-0221.2013.pdf

22. Integrated Regional Water Management (IRWMP)

23. Local Levee Assistance Program (LLAP)

    - http://www.water.ca.gov/floodmgmt/docs/LLAP_Guidelines_2011_new.pdf
    - http://bondaccountability.resources.ca.gov/plevel1.aspx?id=114&pid=4
    - http://www.water.ca.gov/floodsafe/docs/local-levee-guidelines.pdf
    - http://www.floodplain.org/files/LLAPProgramOverviewPresentation_2011_Sacramento_Luncheon.pdf

24. Small Community Flood Risk Reduction (SCFRR)

    - FloodSAFE Implementation Programs (January 2014) Draft Table
    - http://resources.ca.gov/bond/Agency_Grants_and_Loans_June_2013xlsx.pdf

25. Storm Water Flood Management Program

    - http://www.water.ca.gov/IRMWP/grants/docs/Guidelines/P84_IRMWP_GL_Drought2014_PublicReviewDraft.pdf

26. Systemwide Flood Risk Reduction (SWFRR)

    - FloodSAFE Implementation Programs (January 2014) Draft Table
    - http://bondaccountability.resources.ca.gov/plevel1.aspx?id=124&pid=5

27. Urban Flood Risk Reduction (UFRR)

    - http://bondaccountability.resources.ca.gov/plevel1.aspx?id=99&pid=5

28. Flood Emergency Response – Forecast- Coordinate Operations (F-CO)

    - FloodSAFE Implementation Programs (January 2014) Draft Table
    - http://www.water.ca.gov/floodsafe/docs/FCO_Program_Grant_Guidelines.pdf

29. Flood Emergency Response Statewide Emergency Response Grants

- FloodSAFE Implementation Programs (January 2014) Draft Table
- http://www.water.ca.gov/floodmgmt/hafoo/fob/floodER//122112_statewide_flood_er_guidelines_final.pdf

30. Watershed and Environmental Improvement Program

- http://www.sfwater.org/modules/showdocument.aspx?documentid=4628

DRAFT FINAL REGIONAL FLOOD MANAGEMENT PLAN for the Mid San Joaquin River Region

October 2014

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List of Acronyms

2000 Census	United States 2000 Census of Population and Housing
AB156	Assembly Bill 156
Atlas	Mid-San Joaquin River Regional Flood Atlas
BFE	base flood elevation (associated with 1% or 100-year flood event)
BMP	Best Management Practice
BWFS	Basin-wide Feasibility Studies
Cal OES	Governor's Office of Emergency Services
CCID	Central California Irrigation District
CCR	California Code of Regulations
CDC	California Department of Conservation
CDF	California Department of Finance
CDFW	California Department of Fish and Wildlife
cfs	cubic feet per second
CNDDB	California Natural Diversity Database
CNRR	California Northern Railroad
Comprehensive Study	Sacramento and San Joaquin River Basins Comprehensive Study
CVBJ	Central Valley Business Journal
CVFPB	Central Valley Flood Protection Board
CVFMP Program	Central Valley Flood Management Planning Program
CVFPP	Central Valley Flood Protection Plan
CVHE	Central Valley Habitat Exchange
CVHS	Central Valley Hydrology Study
CVRWQCB	Central Valley Regional Water Quality Control Board
CV-SALTS	Central Valley Salinity Alternatives for Long-Term Sustainability
CWC	California Water Code

DOI	United States Department of the Interior
DPR	California Department of Parks and Recreation
DWR	California Department of Water Resources
EOP	Emergency Operations Plan
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ETL	Engineering Technical Letter
F-BO	Forecast-Based Operations
F-CO	Forecast-Coordinated Operations
FCSSR	Flood Control System Status Report
FEAT	Flood Emergency Action Team
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
FSRP	Flood System Repair Project
GAR	Geotechnical Assessment Report
GLPP	Gomes Lake Pumping Plant
Grasslands WMA	Grasslands Wildlife Management Area
I-5	Interstate 5
ICS	Incident Command System
ID	Irrigation District
IRWM	Integrated Regional Water Management
IWRIS	Integrated Water Resources Information System
JPA	Joint Powers Agreement
LAT	Levee Assessment Tool
LCM	Life Cycle Management
LD	Lacking Sufficient Data
LFPZ	Levee Flood Protection Zone
LHMP	Local Hazard Mitigation Plan
LiDAR	Light Detection and Ranging
LMA	Local Maintaining Agency
Merced ID	Merced Irrigation District
Merced NWR	Merced National Wildlife Refuge
MID	Modesto Irrigation District
Mid SJR Region	Mid San Joaquin River Region
msl	mean sea level
NA	Named Area
NFIP	National Flood Insurance Program
NIMS	National Incident Management System
NRCS	Natural Resources Conservation Service
NSA	Non Structural Alternative
NULE	Non-Urban Levee Evaluation

NWS	National Weather Service
O&M	Operations and Maintenance
OCFCD	Orestimba Creek Flood Control District
OES	Office of Emergency Services
PBI	Peterson-Brustad, Inc.
PIER	Public Interest Energy Research
Planning Area	Mid San Joaquin River Region
POI	Point of Interest
PSP	Proposal Solicitation Package
RAMP	Regional Advance Mitigation Monitoring
RD	Reclamation District
Refuge Complex	San Luis National Wildlife Refuge Complex
RFMP	Regional Flood Management Plan
SB5	Senate Bill 5
SEMS	Standardized Emergency Management System
SFHA	Special Flood Hazard Area
SPFC	State Plan of Flood Control
SJRNWR	San Joaquin River National Wildlife Refuge Complex
SPRR	Southern Pacific Railroad
SRA	State Regional Area
STANCOG	Stanislaus Council of Governments
TDS	total dissolved solids
TID	Turlock Irrigation District
TNC	The Nature Conservancy
TRRP	Tuolumne River Regional Park
WSE	water surface elevation
WIWRP	Westside Integrated Water Resources Plan
WWTP	Wastewater Treatment Plant
ULOP	Urban Level of Flood Protection
USACE	United States Army Corps of Engineers
USBR	United States Bureau of Reclamation
USFWS	United States Fish and Wildlife Service
US Census Bureau	United States Census Bureau

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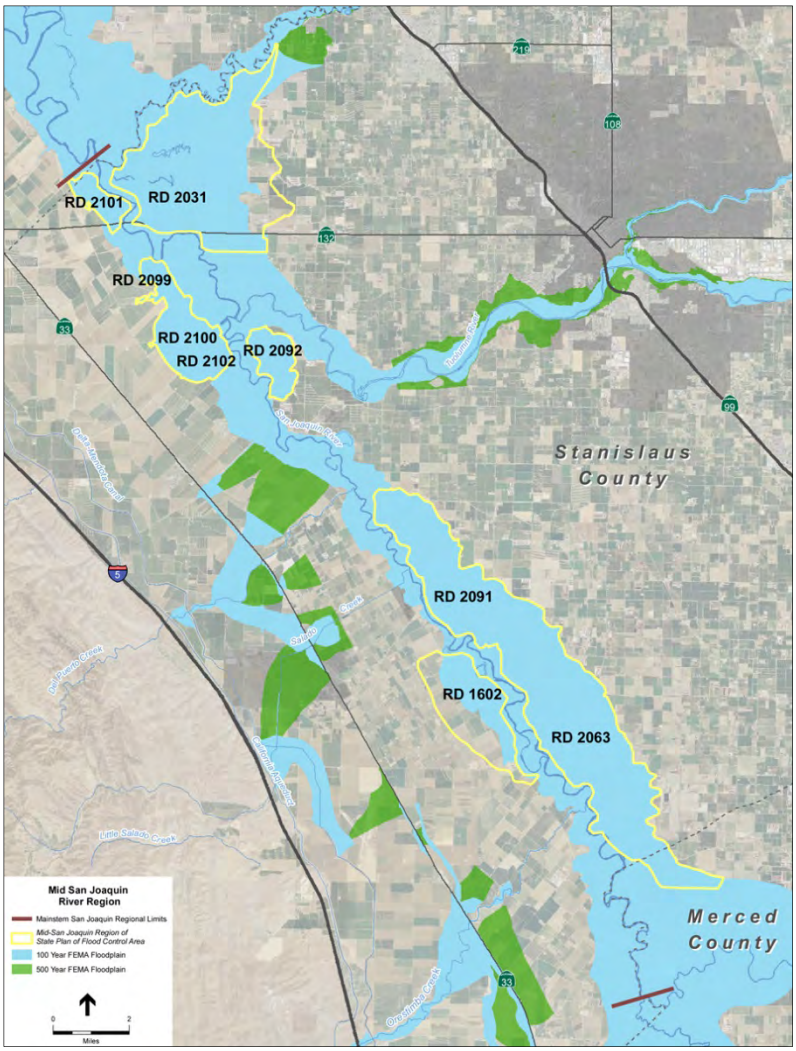
Executive Summary

Where is the Mid San Joaquin River? The Regional Flood Management Plan (RFMP) for the Mid San Joaquin River (Mid SJR) Region planning area includes the floodplain corridor extending along the mainstem San Joaquin River from its confluence with the Merced River to its confluence with the Stanislaus River, the lower reaches of each of the major tributaries (the Merced, the Tuolumne, and the Stanislaus Rivers) that are protected by facilities within the State Plan of Flood Control (SPFC), and additional floodplain areas that have a nexus to the SPFC, as shown on Figure 1 below.

What is the purpose? The purpose of the RFMP is to develop and articulate a flood-safe vision for the Mid SJR Region that is both practical and ambitious in reshaping the status quo with regards to flood management.

What are the goals of the RFMP? The goals of the RFMP are consistent with the Central Valley Flood Protection Plan goals of improving flood risk management, improving operations and maintenance, promoting ecosystem functions, improving institutional support, and promoting multi-benefit projects.



How was the RFMP developed? Development of the RFMP process was co-led by Reclamation District (RD) 2092 and Stanislaus County. An 18-month public stakeholder engagement process was held from April 2013 to September 2014 where stakeholders were invited to participate in plan development. A total of eight public workshops were held to solicit input on all aspects of plan development. In addition, several briefings of local governments and special interest groups were made to inform various agencies and groups of the process and to gather input.

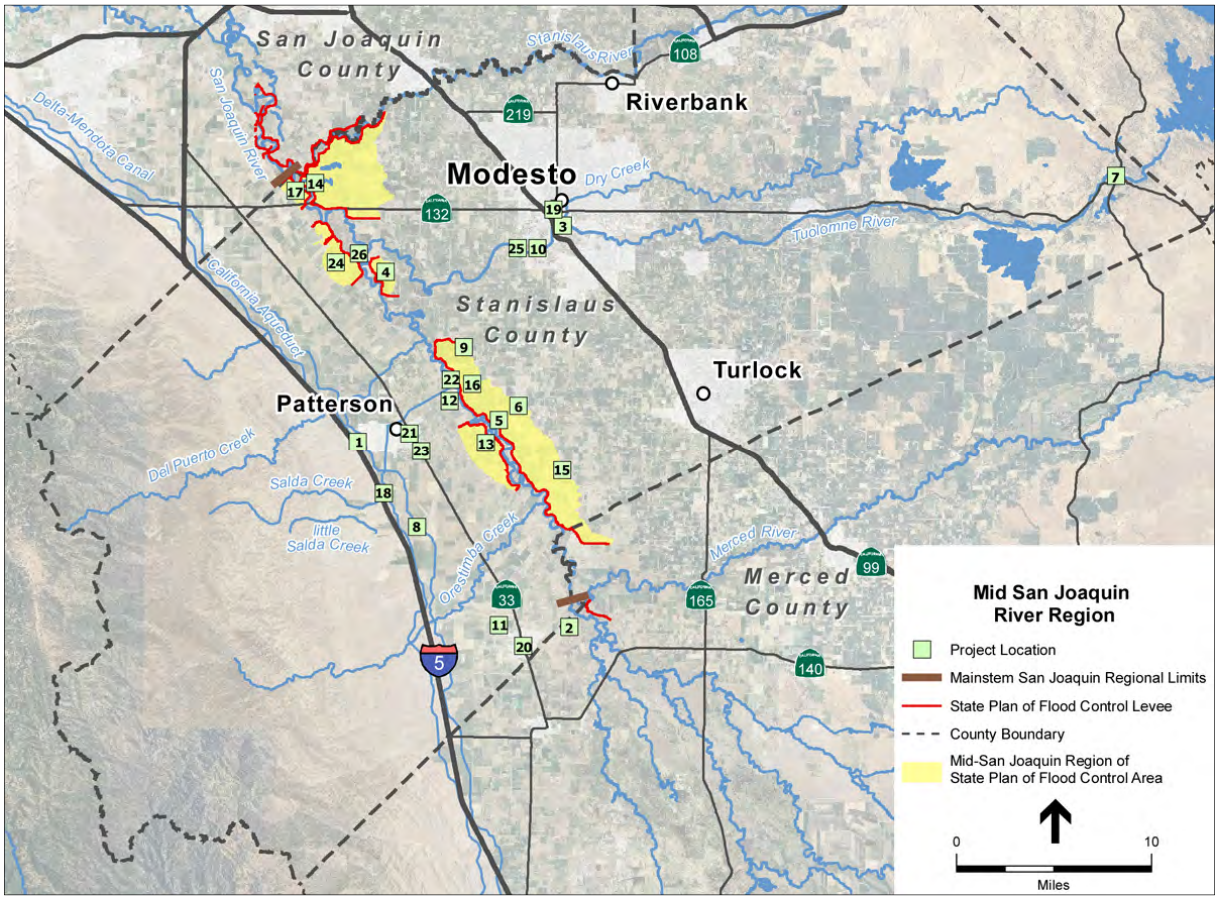
Who was involved? In addition to RD 2092 and Stanislaus County, a host of stakeholders from the region, including agricultural representatives and agricultural landowners, non-agricultural landowners and developers, public agencies, elected officials, environmental and conservation organizations, community groups (particularly those involved in emergency services), educational institutions, and representatives of low-income and/or at-risk populations, particularly those that may be impacted by flooding, contributed to the content of this plan through their participation.

Who has flood management responsibilities in the planning area? Federal and State agencies such as the Central Valley Flood Protection Board, US Army Corps of Engineers, State Department of Water Resources and US Bureau of Reclamation; irrigation districts that include Merced, Turlock and Modesto; nine Local Maintaining Agencies (Reclamation Districts 1602, 2031, 2063, 2091, 2092, 2099, 2100, 2102, and 2101), as shown on Figure 1, located on the previous page; Stanislaus, Merced, and San Joaquin Counties; and the Cities of Patterson, Newman, and Modesto.

Why prepare a RFMP? As shown in Figure 1 on the previous page, a large portion of the planning area contains 100- and 500-year floodplains that are concentrated along the San Joaquin River and its tributaries. Stanislaus County, together with the portions of the Mid SJR Region within Merced and San Joaquin Counties, is estimated to include nearly 78,000 acres within the 100-year floodplain. Most of these lands are in agricultural production, with some habitat land and open space areas. A total of 11,063 people reside within these floodplain lands, with 2,129 people residing within floodplain lands included in the Mid SJR Region's Local Maintaining Agencies (LMAs).

What are the characteristics of the flood management system at present? The current flood management system relies primarily on two key components: 1) a system of aging levees that are able to convey a 25- to 50-year flood event and are subject to significant seepage hazards; and 2) an emergency response system that has strengths, but lacks integration amongst the various groups that respond to emergencies Additionally, many of the LMAs lack Boards; most are struggling to meet operations and maintenance standards and are inactive under PL 84-99; and at least two do not appear to be financially sustainable. Four of the LMAs in the region are currently working towards having their levees removed from the SPFC as integrated ecosystem enhancement and flood management efforts.

How will we make our region flood-safe? Through the stakeholder process, 37 projects were identified as having the potential to reduce flood hazards and provide other benefits to the planning area. A range of project types were identified that include small dam removal, sediment load reduction, floodplain rehabilitation, a levee vegetation management program, studies to better understand flooding hazards, emergency response planning and training, flood education programs, compliance with Senate Bill 5 requirements, and storm drainage enhancements. The locations of projects with a specific project site are shown in Figure 2 located on the following page. These projects were evaluated, ranked, and categorized into three tiers (Highest Priority, High Priority, and Medium Priority) in accordance with criteria developed for this RFMP. Project locations are shown on the next page with location numbers following the project titles. Projects that don't involve a specific site are represented by letters after the project title, and projects with a * following the title indicates that it is primarily or entirely a study.



Highest Priority

City of Newman/Bureau of Reclamation Flood Levee Rehabilitation (2)
Consolidation of O&M (A)
Dennett Dam Removal (3)
Dry Creek Watershed Detention Reconnaissance Study (B)*
Emergency Response Plan – Local Planning and Training (D)
Flood Risk Education (E)
Modesto WWTP - Reduce Flood Risk (9) (10)
Orestimba Creek Flood Risk Management Project (11)
Regional Maintenance Technical Support (H)
SB5 Compliance – City of Modesto (19)*
SB5 Compliance – City of Newman (20)*
SB5 Compliance – City of Patterson (21)*
Tuolumne River Flood Management Feasibility Study (J)*
Tuolumne River Regional Park – Carpenter Road/West Modesto Flood Management and Park Development (26)

High Priority

Dos Rios Ranch Floodplain Expansion and Ecosystem Restoration Project and Hidden Valley Ranch Mitigation Project (4)
Emergency Response Plan – Debris Management (C)
Integrated Levee Vegetation Management – Flood Maintenance and Habitat (F)
La Grange Floodplain Restoration and Spawning Gravel Augmentation (7)
RD 2031 Resilience (14)
RD 2063 Resilience (15)
RD 2091 Resilience (16)
Three Amigos (also known as the Non-structural Alternative at the San Joaquin River National Wildlife Refuge) (24)
WSID Fish Screen and Change in Point of Diversion Project (27)
Westside Creeks On-Farm Multi-Benefit Program (L)

Medium Priority

Black Gulch Storm Drainage Study (1)*
Gomes Lake / Harding Drain Improvements (5)
Hydraulic and Channel Migration Studies (6)*
Little Salado Creek (8)
Patterson WWTP – Reduce Flood Risks (12)*
RD 1602 Resilience (13)
RD 2101 Resilience (17)
Reducing Sediment Loading into the San Joaquin River from Westside Agricultural Lands (G)
Riverfront Park Project (22)
Salado Creek Flood Management Project (18)
Sediment Management Investigation (I)*
Storm Drainage Enhancements along Salado Creek (23)
Tuolumne River Regional Parkway (K)

Who are the key partners? The agencies that would lead and support the development and implementation of the 37 projects that have been identified in the Mid SJR Region are the key partners for the RFMP. Key partners include Stanislaus County; the Cities of Modesto, Patterson, and Newman; all nine reclamation districts; River Partners; Tuolumne River Trust; Gomes Lake Joint Powers Authority; West Stanislaus RCD; San Joaquin River National Wildlife Refuge; Tuolumne River Regional Park Joint Powers Authority; Audubon California; and West Stanislaus Irrigation District.

How will we pay for our regional improvements? The total cost for the flood-safe vision is on the order of $340 million. Local interests within the Mid SJR Region have limited capacity to raise funds to meet the local cost share. Even with investment from the State and federal funding, which is competitive, there is little hope to find the local cost share to fix the flood management system currently in place. Instead, the stakeholders will continue working to develop fund-able flood improvement projects. The state has made a strong case for Multi-Benefit projects, and the Mid SJR Region has ample opportunities to identify and implement integrated ecosystem and flood management improvements.

How would actions envisioned in the RFMP change our flood future (year 2040+)? A few of the projects included in the RFMP were planned or underway even before the RFMP was drafted, but most were not. Without the RFMP, the level of flood literacy in the Mid SJR Planning Area would be dramatically lower. Flood risks would be greater, driven by population growth, floodplain development, and less investment in flood management, including emergency response. With the RFMP, significant flood management challenges will remain due to limited local funding capacity, but projects will be more successful in finding outside funding due to RFMP guidance on funding programs, drawing attention to regional issues and opportunities, and highlighting of key flood management gaps and opportunities for high-return, modest investment projects.

1. Introduction

A cornerstone of the FloodSAFE California initiative, the Central Valley Flood Management Planning (CVFMP) Program provided the structure for the successful development and adoption of the 2012 Central Valley Flood Protection Plan (CVFPP)*. The CVFMP Program was launched in 2008 to guide, manage and implement integrated flood management actions for the Sacramento and San Joaquin valleys as required by passage of legislation in 2007. CVFMP is now assisting in the planning and coordination of major implementation actions of the 2012 CVFPP, including State-led Basin-wide Feasibility Studies (BWFS), locally-led Regional Flood Management Planning, and the Central Valley Flood System Conservation Strategy. Each of these planning efforts will be incorporated into the next update of the CVFPP, which is scheduled for 2017. Implementation of CVFPP actions have already begun and will be expanded after the 2017 Plan is updated. (From http://www.water.ca.gov/cvfmp/, accessed July 1, 2013.)*

This document is a Regional Flood Management Plan (RFMP) for the Mid San Joaquin River (Mid SJR) Region planning area, an area generally described as the floodplain corridor extending along the mainstem San Joaquin River from its confluence with the Merced River to its confluence with the Stanislaus River, the lower reaches of each of the major tributaries (the Merced, the Tuolumne, and the Stanislaus Rivers) that are protected by facilities within the State Plan of Flood Control (SPFC), and additional floodplain areas that have a nexus to the SPFC. As will be further described below, it has been developed through a broad stakeholder process during 2013-2014.

The Mid SJR RFMP is one of six regional Central Valley flood management plans developed as part of this process. The six regional flood management plans include the Mid Sacramento River, Feather River, Lower Sacramento River/Delta-North, Lower San Joaquin River/Delta-South, Mid San Joaquin River, and Upper San Joaquin River. Assets within each flood planning region are protected by the SPFC facilities. Map 1, Regional Overview, of the Mid San Joaquin River Regional Flood Atlas (Atlas) shows the location of each of the nine flood planning regions (in Appendix A, Mid San Joaquin River Region Regional Flood Atlas - Draft). The boundaries of each region were defined based on mapped Central Valley Levee Flood Protection Zones that were delineated in the CVFPP. These zones were based on the floodplain management activities completed through partnerships between the California Department of Water Resources (DWR), the United States Army

Corps of Engineers (USACE), and local agencies from 2007 through 2011 in response to the passage of Propositions 1E and 84 in November 2006 (DWR, 2012).

1.1 Purpose

The purpose of the RFMP is to develop and articulate a flood-safe vision for the Mid SJR Region that is both practical and ambitious in reshaping the status quo with regards to flood management. The plan is founded in an understanding of the broader statewide flood management system and enhancement needs as articulated in the 2012 CVFPP and ongoing State-led efforts, such as the BWFS for the San Joaquin Basin and the Central Valley Flood System Conservation Strategy. But most importantly, the plan is an expression of the interests and priorities of the stakeholders of the Mid SJR Region, developed for the particular landscape and considerations of the region and moderated by the realities of financing requirements and local capacities.

1.2 Process

The process used to develop this RFMP for the Mid SJR Region planning area has been co-led by Reclamation District (RD) 2092 (Dos Rios) and Stanislaus County. Through early outreach in 2012, a list of key cooperators was developed, including:

- Oakdale Irrigation District
- West Stanislaus Irrigation District
- Del Puerto Irrigation District
- Patterson Irrigation District
- El Solyo Irrigation District
- City of Turlock
- City of Modesto
- Reclamation District 2063
- City of Patterson
- Mapes Ranch
- Tuolumne River Trust
- Sierra Club – Yokuts Chapter
- Modesto Irrigation District
- East Stanislaus Regional Water Management Partnership
- Stanislaus County Public Works
- U.S. Fish and Wildlife Service

A technical consultant team was solicited and selected through a competitive bidding process, and a successful grant application was submitted to DWR, and subsequently awarded in Spring 2013. Two initial planning meetings were held in the spring and early summer of 2013 which were broadly publicized to encourage stakeholder involvement. A charter for the process was drawn up, circulated and adopted; it is provided as Appendix B of this Plan. A website was developed for communication among stakeholders, the other regions, and DWR. A series of public workshops was initiated in July 2013 and continued through July 2014. Briefings were held for key players within the region. Coordination with adjacent and other regions occurred through a variety of means throughout the development of the RFMP.

1.3 Stakeholder Engagement

A concerted effort was made to create an inclusive process that would provide multiple opportunities for regional stakeholders to participate in the development of the plan. A Stakeholder Engagement Plan was developed early in the process with input from regional stakeholders and DWR. Part of the engagement plan included the development of a website to provide stakeholders and interested parties a single, easily-accessible source of information about the regional plan process and products.

1.3.1 Regional Stakeholders

As described above, Stanislaus County and RD 2092 co-led the development of this plan. Within Stanislaus County, the Department of Public Works held the lead role with additional involvement from the Department of Environmental Resources, Department of Agriculture, Office of Emergency Services, Chief Executive Office, and the Department of Planning and Community Development. Regional stakeholders contributed to the preparation of the plan. Potential stakeholders within the Mid SJR Region included all individuals and entities with an interest in the region, including resource agencies, local governments, local maintaining agencies (LMAs), flood emergency responders, property owners, community organizations and environmental stewardship groups.

1.3.2 Stakeholder Outreach

The Regional Partners implemented a 16-month public stakeholder engagement process from April 2013 to July 2014 where stakeholders were invited to participate in the development of this plan. A total of eight public workshops were held to facilitate discussions between stakeholders and the Regional Partners regarding all aspects of plan development. The scope of each chapter of the RFMP was first introduced at a public workshop and feedback from attendees was solicited. Afterward, a draft chapter was prepared, posted on the RFMP website in advance of the following workshop where the draft was presented and feedback solicited. The draft chapter was then revised, posted online in advance of and presented at the next workshop. This format was followed for all of the chapters in this document. In addition, several briefings of local governments and special interest groups were made during this 16-month time period to inform various agencies and groups of the process and to gather input.

A host of stakeholders, including agricultural representatives and agricultural landowners, non-agricultural landowners and developers, public agencies, elected officials, environmental and conservation organizations, community groups (particularly those involved in emergency services), educational institutions, and representatives of low-income and/or at-risk populations, particularly those that may be impacted by flooding, contributed to the content of this plan through their participation. A record of participants in plan development is included in this document in Appendix C, Engagement Record.

Additionally, extensive effort was made to gather input from the Native American tribes. Regular correspondence with representatives of the Inter-Tribal Council, Table Mountain Rancheria, North Fork Rancheria of Mono Indians, Tule River Tribe of CA, Tuolumne We-Wuk Indians Tribal Council, and CA Miwok Tribe occurred over the last 16 months. No input from the tribes was received.

Another component of stakeholder outreach includes the Central Valley Flood Protection Board (CVFPB) convening the Regional Planning/System-Wide Coordination Committee (Coordinating Committee) monthly starting in January 2013. The Coordinating Committee meetings are informal, follow a discussion format, and are open to all stakeholders interested in regional flood management planning and systemwide feasibility studies. The meetings have been very effective in facilitating stakeholder coordination and are scheduled to continue for at least two years. Some coordination among RFMP regions has begun and will continue as the implementation of the CVFPP progresses.

1.4 Document Overview

This RFMP contains ten chapters that cover the following items.

Chapter 1, Introduction includes a discussion of what the purpose of the RFMP is, the process by which this document was prepared, and how the stakeholders were engaged.

Chapter 2, Regional Setting describes the setting of the Mid San Joaquin River Region, providing context and background for the chapters that follow.

Chapter 3, Flooding and Flood Hazards describes flood conditions and known flood hazards within the Mid San Joaquin Region planning area.

Chapter 4, Emergency Response provides a description of the current status of flood emergency response to the Mid San Joaquin Region and an assessment of the relative state of flood response readiness of responsible agencies.

Chapter 5, Operations & Maintenance provides an assessment of the Operation and Maintenance practices in the Mid San Joaquin Region.

Chapter 6, Land Use and Environmental Enhancements provides information on the current and anticipated future relationships between land use within the floodplain and flood risks, identifies desirable ecosystem enhancements, and provides linkages between potential flood management actions and ecosystem enhancement.

Chapter 7, Proposed Regional Improvements describes the proposed regional improvements, or projects, and the project concepts that were identified through the stakeholder engagement process that address the flood issues identified in the previous chapters.

Chapter 8, Regional Priorities explains the criteria used to evaluate and prioritize the projects and concepts described in Chapter 7.

Chapter 9, Regional Financial Plan provides a high level overview of the capacity of the Mid San Joaquin Region to fund the projects identified in the RFMP and to identify any deficiencies in funding.

Chapter 10, Outlook for the Future provides a discussion of the Region's future with respect to flood management.

2. Regional Setting

2.1 Introduction

As described in Chapter 1, Introduction, one of the initial steps in the regional flood management planning process was to collect pertinent information on the Mid San Joaquin River regional flood management planning region (Mid SJR Region) and surrounding areas, followed by obtaining valuable input from stakeholders to complete the picture of existing flood management in this portion of the Central Valley. The purpose of this chapter is to describe the setting of the Mid SJR Region, providing context and background for the chapters that follow. Topics covered are those that are relevant to flood management within the Mid SJR Region and surrounding areas that have a nexus with State Plan of Flood Control (SPFC) facilities. This chapter is intended to provide an accurate characterization of the region to support the development of integrated multi-benefit solutions to flood management problems in the Mid SJR Region. The content of this chapter includes information on the following:

- location of the Mid SJR Region;
- the geography of the Mid SJR Region;
- San Joaquin, Merced, Tuolumne, and Stanislaus rivers, as well as the Westside Tributaries (e.g., Orestimba, Salado, Del Puerto, and Dry creeks);
- land use, ecologically sensitive areas, existing habitats, assets, and population within the region and surrounding areas;
- a brief description of the Mid SJR Region river-related recreational resources, needs, and planning processes;
- an introduction to flooding issues and flood management infrastructure within the San Joaquin River Basin and Mid SJR Region;
- an introduction to operations and maintenance (O&M) of relevant flood management infrastructure;
- an introduction to emergency response in the region and surrounding areas; and
- a brief description of additional relevant planning processes.

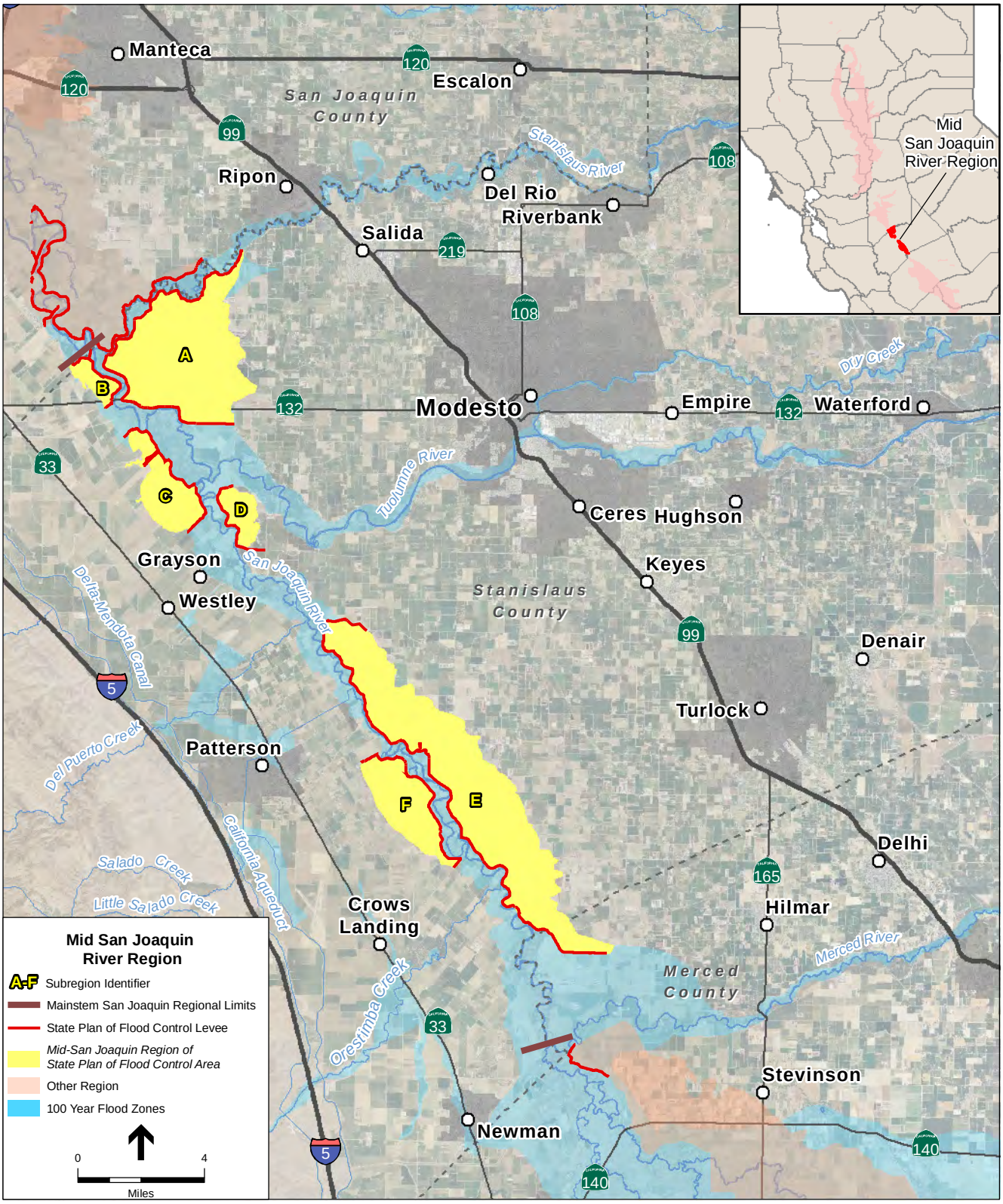
Sources for the information provided in this chapter include reports prepared by USACE, DWR, Federal Emergency Management Agency (FEMA), California Department of Finance (CDF), Stanislaus County, San Joaquin County, City of Modesto, Peterson-Brustad Engineers, Inc. (PBI), City of Modesto, City of Ceres, and Stanislaus County Joint Powers Authority; web content published by the City of Patterson, Stanislaus County, Central Valley Salinity Coalition, United States Environmental Protection Agency (EPA), and the United States Census Bureau (US Census Bureau); and data from DWR and the California Department of Fish and Wildlife (CDFW).

2.2 Regional Overview

The Mid SJR Region is made up of six non-contiguous areas within Stanislaus, Merced, and San Joaquin counties as shown in **Figure 2-1**, **Mid San Joaquin River Region Boundaries** and Map 1, Regional Overview, of the Atlas (Appendix A). These boundaries are consistent with those included in the 2012 CVFPP. The size of each of the non-contiguous areas is labeled on Figure 2-1. Each non-contiguous area is also labeled with the letters A through F, and will be referred to as Subregions A through F in the remainder of this document.

For the purpose of this regional flood management planning process, the Mid SJR Region planning area (planning area) extends along the San Joaquin River from the confluence of the Stanislaus River to the confluence with the Merced River, as shown in Figure 2-1. Because the Mid SJR Region of the SPFC is non-contiguous along the San Joaquin River, and because the flood concerns of the region related to the San Joaquin River and its tributaries extend beyond the specific area of the SPFC, any area that experiences flood issues within the vicinity of the Mid SJR Region of the SPFC and has a nexus with the SPFC facilities is included within the Mid SJR Region and this plan. The planning area includes nine Reclamation Districts: 1602 (Del Puerto), 2031 (Elliot), 2063 (Crows Landing), 2091 (Chase), 2092 (Dos Rios Ranch), 2100 (White Lake Ranch), 2101 (Blewitt), 2099 (El Solyo Ranch), and 2102 (Lara Ranch); Named Area 65 (Gomes Lake); the cities of Modesto, Ceres, Turlock, Patterson, Newman, Oakdale, Riverbank, Waterford, and Hughson; the communities of Grayson, Westley, and Crows Landing; the Patterson, West Stanislaus, El Solyo, Del Puerto, Modesto, Turlock, Twin Oaks, and Oakdale Irrigation Districts; and the Newman Drainage District. Subregion A includes RD 2031; Subregion B includes RD 2101; Subregion C includes RDs 2099, 2100, and 2102; Subregion D includes RD 2092; Subregion E includes RDs 2063 and 2091 and NA 65; Subregion F includes RD 1602.

The majority of the SPFC Area in the Mid SJR Region is located within Stanislaus County (27,980 acres) with approximately 760 and 25 acres within Merced and San Joaquin counties, respectively. The City of Modesto, which is located approximately nine miles east of the San Joaquin River, has jurisdiction over two small areas within Subregion E. The majority of the planning area is rural and agricultural. Approximately 75% of the SPFC Area and 42% of Stanislaus County is in agricultural production, with 50% of the SPFC Area identified as having soils classified as Prime Farmland and Farmland of Statewide Importance.



SOURCE: USDA, 2012; ESRI, 2012; DWR, 2013; ESA, 2013

Figure 2-1

Mid San Joaquin River Region Boundaries

2.2.1 Geography and Land Use

The planning area is located within the northern San Joaquin Valley. The San Joaquin Valley is bordered on the west by the Diablo Range, part of the California Coast Ranges, on the north by the Sacramento-San Joaquin Delta, and on the east by the Sierra Nevada. Two basins are contained within the San Joaquin Valley—the San Joaquin River Basin in the north and the Tulare Lake Basin in the south. The valley itself is low in elevation and has generally gentle topographic relief. The topography of the San Joaquin River corridor in the Mid SJR Region is typical of the San Joaquin Valley and generally flat, with elevations ranging from approximately 25 to 70 feet above mean sea level.

The land uses within the planning area are predominantly agricultural, including a mix of dairies, livestock pasture and range, livestock feed crops, and orchards. Total agricultural gross income in Stanislaus County totaled $3.07 billion in 2011, an 18% increase over 2010 agricultural values. Relative to other parts of the San Joaquin Valley, the planning area has a high concentration of dairy cows, particularly in the southern end and concentrated around the San Joaquin River corridor (EPA, 2013). According to the 1997 Census of Agriculture, the three counties included in the planning area are among the top 10 dairy-producing counties in the nation. According to the 2012 Census of Agriculture, these three counties continue to place within the top seven milk-producing counties in California, the largest milk-producing state in the nation. Milk is the top agricultural commodity in the region, but almond production has significantly increased in recent years.

2.2.2 Waterways

Four large Central Valley rivers are relevant to the planning area – the San Joaquin, Merced, Tuolumne, and Stanislaus rivers (Figure 2-1). All four rivers originate in the western Sierra Nevada, flowing westward toward the valley floor. The San Joaquin River is 330 miles long from its headwaters to its confluence with the Sacramento River, including 37 miles within the Mid SJR Region. The watershed area of the San Joaquin River upstream of the Mid SJR Region (upstream of the Merced River) is approximately 10,000 square miles. By the time the San Joaquin River flows out of the region, it is draining a total of approximately 14,000 square miles, having received the flow of the Merced, Tuolumne, and Stanislaus rivers, as well as the inflow from the smaller drainages on the west side of the valley. The San Joaquin River originates high in the Sierra Nevada Mountains and is dominated by snowmelt, draining elevations as high as 14,000 feet above mean sea level (msl). The average slope of the San Joaquin River within the Mid SJR Region is very low, falling approximately 1 foot/mile as the valley floor drops from about 65 feet to 25 feet msl at the downstream limit. The length, headwaters elevation, and watershed area of the San Joaquin, Merced, Tuolumne, and Merced rivers along with creeks within the planning area are included in **Table 2-1**, **Rivers and Creeks in Planning Area**. These major tributary watersheds make up approximately 83% of the contributing area augmenting the flow of the San Joaquin River within the region. Dry Creek, tributary to the Tuolumne River, is another significant waterway with respect to flood management within the planning area. The confluence of Dry Creek and the Tuolumne River is near the center of the City of Modesto.

Table 2-1
Rivers and Creeks in Planning Area

River or Stream	Length (miles)	Headwaters Elevation (above mean sea level)	Watershed Area (square miles)
San Joaquin River	330	14,000	14,000[1]
Merced River	145	13,000	1,300
Tuolumne River	149	13,000	1,900
Stanislaus River	96	11,000	1,200
Dry Creek	76	480	196
Orestimba Creek	41	3,600	134
Salado Creek	20	2,600	25
Del Puerto Creek	29	3,600	73

[1] From headwaters to Stanislaus River confluence

SOURCE: USACE, 2012; Atlas geodatabase; USGS, 2012; USGS, 2013

Each of the major rivers tributary to the San Joaquin River is controlled by upstream dams, each of which is operated for multiple purposes that include flood storage. The San Joaquin River is controlled in its headwaters, upstream of the Mid SJR Region, by Friant Dam and is further influenced by multiple control, diversion structures, and parallel flood bypass systems before it reaches the region. Each of the rivers is expected to convey a particular level of flood flow or discharge, by design or circumstance (see Section 3.6, Channel Conveyance Capacity and Flood Forecast Monitoring Network, for more information on conveyance capacity in the region). To help manage the lands needed to convey flood flows, the CVFPB has designated a floodway along each of these rivers below the flood management dams and regulates these lands to limit encroachments that would hamper their function in conveying floods. A description of the flood management infrastructure along each waterway is provided later in the flood management section of this chapter. Three notable tributaries to the San Joaquin River flow from the west out of the Diablo Range, part of the California Coast Range include Orestimba, Salado, and Del Puerto creeks. Orestimba Creek meets the San Joaquin River near the City of Newman. The confluence of Del Puerto Creek and the San Joaquin River is north of Patterson. Salado Creek ends in Patterson near the Southern Pacific Railroad (SPRR) tracks.

Within the planning area, the low-gradient San Joaquin River meanders through a complex topography that is in part the product of a long history of river-driven processes: abandoned slough channels, oxbow lakes, floodplain wetlands. Digitization of historic maps, shown in **Figure 2-2**, **Historic Channels of the San Joaquin River Corridor,** provides a long-term perspective on the dynamics of river processes over a relatively short history since European settlement.

2.2.3 Climate and Hydrology

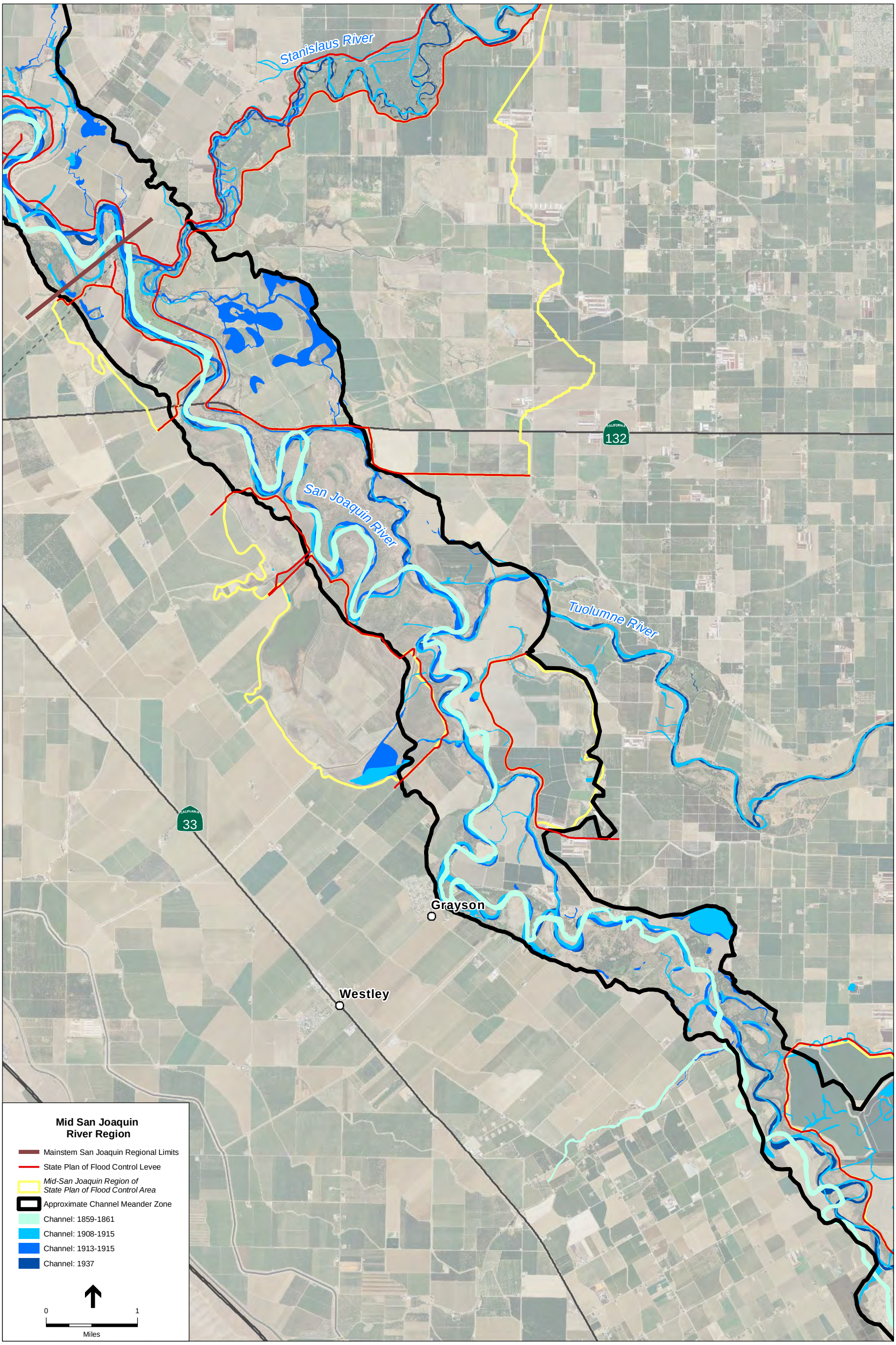
The climate of the San Joaquin Valley is semiarid with hot, dry summers and mild winters. The majority of rainfall occurs from November through April as rain in lower regions and snow at higher elevations. The average annual precipitation in the planning area is between 10 and 11 inches (FEMA, 2008). Flows in the San Joaquin, Merced, Tuolumne, and Stanislaus rivers are dominated by a combination of rain from November through April and snowmelt in the spring. Historically, spring snowmelt would result in localized long-duration flooding for the lower reaches of the major rivers from March through June, and occasional winter storms would result in localized and short duration flooding in December through February. Occasionally, warm winter storms (commonly referred to as “pineapple express”) precipitate

rain on previously accumulated snow in the upper watershed which produces rapid runoff that can overwhelm the flood storage capacity of the region (as was seen in the winter storms of 1997). The runoff pattern of the annual hydrographs of these major rivers has been dramatically altered by flood management and water supply operations of the reservoirs upstream. Large flood flows into the reservoirs are detained in storage, and are either released slowly during and after the flood, or retained toward the end of the specified flood management season to provide water supply. Tributaries entering the system downstream of the reservoirs can contribute significant inflows during flood events.

Several indications of climate change have been observed in California. In the last century, sea levels along the coast has increased by seven inches, the average early spring Sierra Nevada snowpack has decreased by approximately 10 percent, and the temperature has risen 1° F on average with higher increases at higher elevations. Some of the implications of these changes have also been observed. The loss in average early spring snowpack represents a loss of 1.5 million acre-feet of water supply storage. Natural peak flows have increased in many rivers, potentially increasing flood risk. In the last decade, many cities in Southern California have seen the lowest annual precipitation levels on record. A changing climate will continue to increase uncertainty for management of water supply, water quality, flood management, and environmental stewardship (DWR, 2008).

Climate change data for the planning area are available through the Public Interest Energy Research (PIER) Cal-Adapt website. See **Figure 2-3, Cal-Adapt Data for Stanislaus County**, for a graphic representation of the data for Stanislaus County. The historical average temperature in Stanislaus County is 60.6 °F. Future average temperatures under high- and low-emissions scenarios are projected to be 67.2 and 64.6 °F, respectively. Implications of climate change for the Central Valley were identified in the California Adaptation Planning Guide, Understanding Regional Characteristics document (CEMA et al., 2012). The mountainous areas of the state, including the Sierra Nevada, are projected to have less precipitation as snow, more precipitation as rain, and be subject to rapid snowmelt events. This will result in extreme, high-flow events and flooding in the Central Valley. Shorter rainfall events and more rapid snowmelt will reduce water supply because it will be more difficult to capture water in reservoirs or for groundwater recharge. Lower water levels are expected to impact the recreation and tourism industries as well. Agriculture will be impacted by climate change as a result of changes in water availability and stress to livestock and crops under altered temperature regimes. For example, cows may experience heat stress with increases in daily high temperatures, and the projected increase in daily low temperatures will decrease nighttime cooling for nut trees, which is expected to decrease the productivity of the trees. With all of the projected implications, the economically disadvantaged will be disproportionately impacted (CEMA et al., 2012).

A series of regional and statewide adaptation strategies for state and local water managers were recommended by the DWR in Managing an Uncertain Future: Climate Change Adaptation Strategies for California's Water (DWR, 2008). The recommendations are also useful in adapting to a growing population, ecosystem rehabilitation, and flood protection. Regional strategies outlined in the plan include 1) Provide sustainable funding for statewide and integrated regional water management; 2) Fully develop the potential of integrated regional water management; and 3) Aggressively increase water use efficiency. Statewide strategies include 1) Practice and promote integrated flood management; 2) Enhance and sustain ecosystems; 3) Expand water storage and conjunctive management of surface and groundwater resources; 4) Fix Delta water supply, quality, and ecosystem conditions; 4) Preserve, upgrade, and increase monitoring, data analysis, and management; 5) Plan for and adapt to sea level rise; and 6) Identify and fund focused climate change impacts and adaptation research and analysis. Specific actions were identified under each of the regional and statewide strategies (DWR, 2008).



SOURCE: USDA, 2012; ESRI, 2012; DWR, 2013; ESA, 2013

Figure 2-2

Historic Channels of San Joaquin River Corridor

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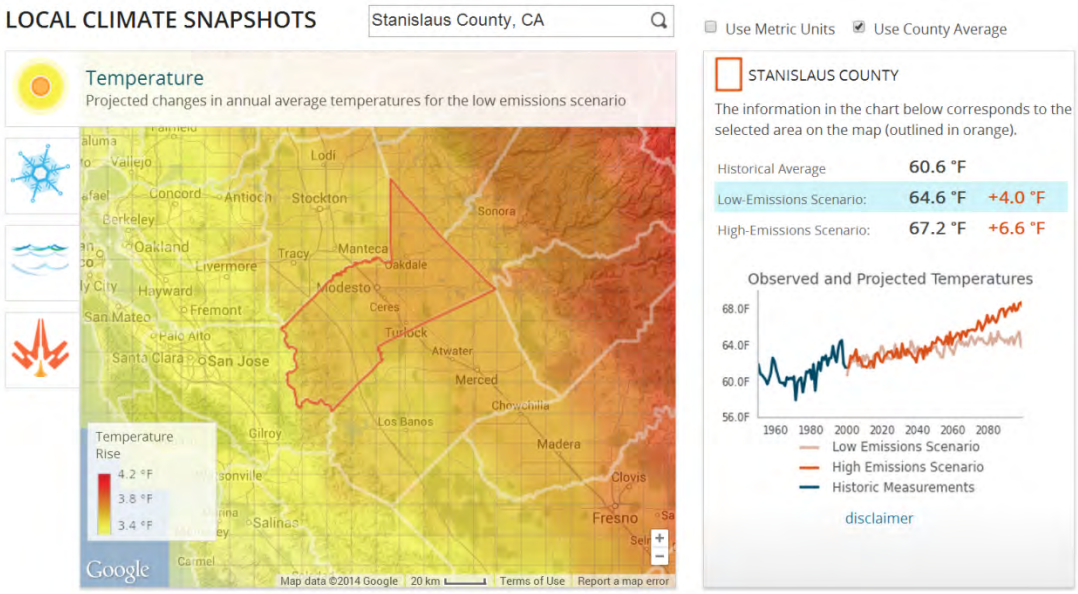


Figure 2-3
Cal-Adapt Data for Stanislaus County

2.2.4 Groundwater

The planning area is located within the San Joaquin River groundwater basin, with two groundwater subbasins identified on the east side of the San Joaquin River between the Merced and the Stanislaus rivers, divided by the Tuolumne River, the Turlock and Modesto subbasins, and one on the west side, the Delta-Mendota Subbasin. The region is heavily groundwater dependent. Marine sediments in the Diablo Range on the west side contribute to high total dissolved solids (TDS) levels in the streamflow recharging the groundwater on the west side, including nitrates, boron, chloride, and organic compounds. West side soils tend to be less permeable, and depth to groundwater is greater than on the east side of the San Joaquin River. The west side includes areas of shallow saline groundwater within about 10 feet of the ground surface over a large portion of the subbasin. There are also localized areas of high iron, fluoride, nitrate, and boron. On the east side, agricultural pesticides and herbicides are more prevalent in the groundwater. There are areas of hard groundwater and localized areas of high chloride, boron, dibromochloropropane, nitrate, iron, and manganese in the east side subbasins. Groundwater generally contributes to flow in the San Joaquin River and the middle to lower reaches of the Stanislaus and Tuolumne rivers (DWR, 2003; IWRIS, 2013). Groundwater overdraft has been identified as a major problem for the agricultural industry in the planning area, and Stanislaus County recently adopted a groundwater mining ordinance to manage the issue (Stanislaus County, 2013). Integrated water management projects that promote groundwater recharge would help to alleviate this regional issue. The Stanislaus County Water Advisory Committee was formed in December 2013 to advise the Stanislaus County Board of Supervisors on groundwater matters and provide a needs assessment, prioritize issues, and develop draft policies/directives (Stanislaus County, 2013). A 5-year action plan prepared by the committee was accepted by the Stanislaus County Board of Supervisors in June 2014 (Modesto Bee, 2014a).

2.2.5 Water Supply and Transportation Corridors

Major linear infrastructure within the planning area includes roadways, a railway, and water transport canals. The Delta-Mendota Canal (part of the federal Central Valley Project) and California Aqueduct (part of the State Water Project) run generally north-south to the east of Patterson and Newman near the base of the Diablo Range and parallel to Interstate 5 and Highway 33 on the west side of the San Joaquin River corridor. Numerous local water supply canals also parallel these generally north-south features on the west side; on the east side, these canals tend to run generally east-west. Two water delivery canals on the west side also run east-west, the West Stanislaus Irrigation District West Stanislaus Canal and the Patterson Irrigation District Main Canal, delivering water supply from the San Joaquin River to local canals. **Figure 2-4**, **Water and Irrigation Districts in Stanislaus County**, shows the jurisdictional boundaries of the water and irrigation districts that cover the majority of the planning area. The California Northern Railroad line runs along Highway 33. The east side of the Mid SJR Region includes another important north-south transportation route in Highway 99, while Highway 132 crosses the San Joaquin River corridor in an east-west alignment near the northern limit of the Mid SJR Region. Additional east-west crossings of the San Joaquin River corridor moving north to south include West Grayson Road, East Las Palmas Avenue/West Main Avenue, Crows Landing Road, and Hills Ferry Road.

2.2.6 Pipelines

At least two major underground pipelines cross the San Joaquin River within the planning area. The Hetch-Hetchy pipeline is a major water supply artery for the City of San Francisco that crosses Reclamation District (RD) 2031 (Elliott) and RD 2099 (El Solyo Ranch), where it reaches its lowest elevation in the entire state as it crosses under the San Joaquin River. Pacific Gas & Electric has a natural gas pipeline that also passes under RD 2031 (PBI, 2013).

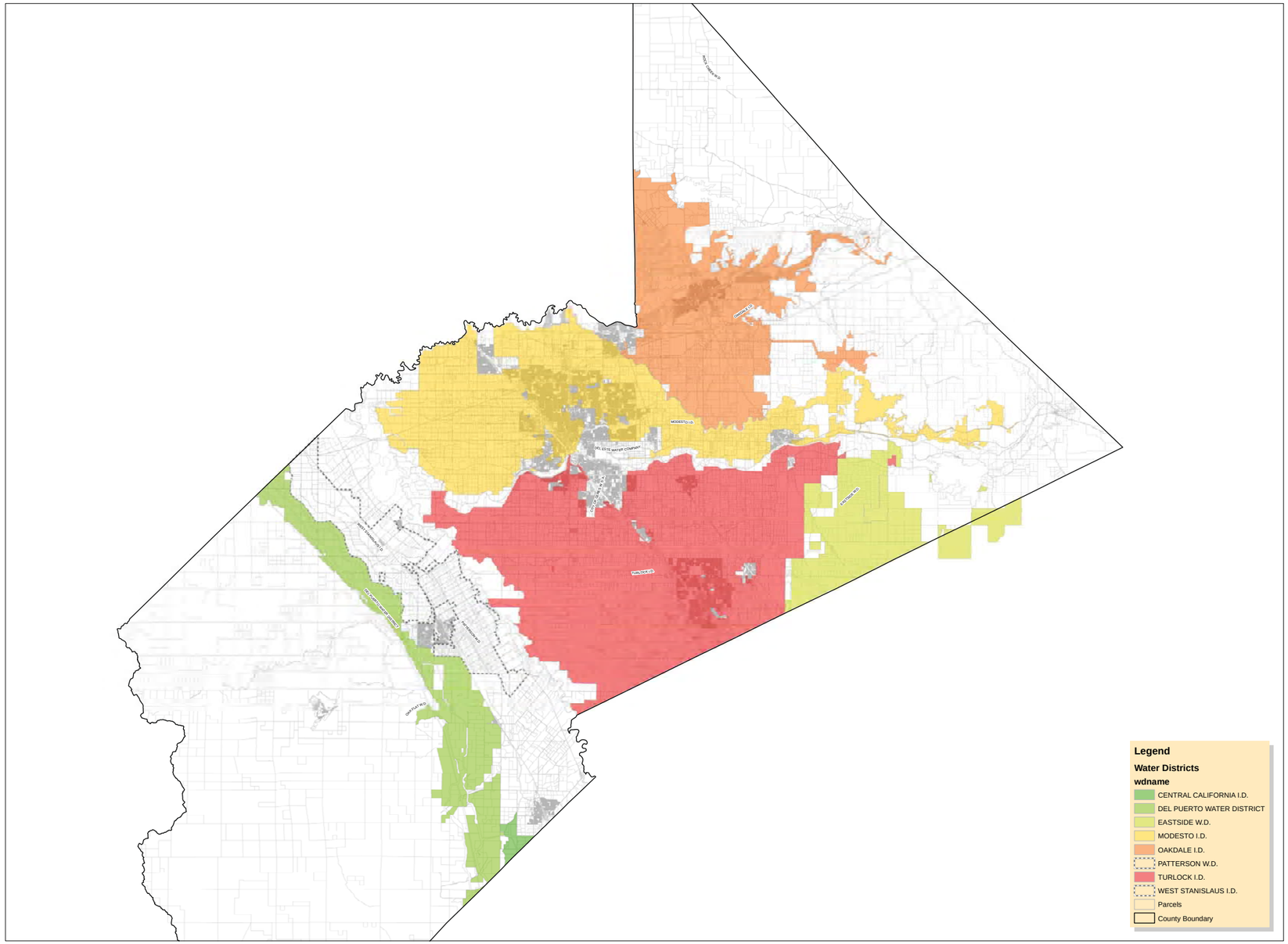
2.3 Flood Management

Flood management includes aspects related to prevention, response, and recovery. The prevention of floods includes flood management infrastructure, O&M of that infrastructure, non-structural approaches including flood-proofing, planning, legislation, regulation, enforcement, and land use decisions that do not place assets in areas with a high probability of flooding. Flood response includes planning, warnings, evacuation, rescue, flood fighting, and monitoring. Recovery involves providing relief centers, temporary housing, counseling, financial assistance, community programs, and rebuilding. This section provides a description of the flood management infrastructure and O&M aspects of flood management in the region. The preparation of this plan is a part of flood prevention planning. Other aspects of flood management are addressed in relevant chapters of this plan, which explore opportunities for flood management enhancement. O&M is discussed in Chapter 5, Operations and Maintenance. Legislation, regulation, and enforcement are discussed in Chapter 7, Proposed Regional Improvements. Land use is addressed in Chapter 6, Land Use and Environmental Enhancements. Response and recovery are discussed in Chapter 4, Emergency Response.

Flood hazards within the planning area are understood at different levels in different locations. More urbanized areas typically have been studied in greater depth. Along the San Joaquin River, for example, detailed floodplain analysis has not been conducted by FEMA, though approximate floodplain mapping has been completed. In the City of Modesto, detailed floodplain analysis has been conducted to map the

35,000 17,500 0 35,000 Feet

WATER DISTRICTS



SOURCE: Stanislaus County, 2009

Figure 2-4
Water and Irrigation Districts in Stanislaus County

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100-year floodplain. The 100-year floodplain is shown in Map 16 of the Atlas (Appendix A). Flood risks in less urban areas are significant in terms of dollars, but the population at risk is relatively small. According to the Stanislaus County Multi-Jurisdictional Hazard Mitigation Plan (2010), approximately 2,400 people live within the 100-year floodplain of the San Joaquin River within Stanislaus County. The same document estimates total property value, including private property, within the 100-year floodplain of the San Joaquin River of $149,520,110, including structures worth $52,849,542 and land worth $87,044,008. This includes 208 miles of canals that provide irrigation to approximately 60,000 acres for the Greater Modesto area by the Modesto Irrigation District (MID, 2014), as well as approximately 250 miles of canals to 150,000 acres of farmland provided by the Turlock Irrigation District (TID, 2014).

The Central Valley Hydrology Study (CVHS) is a current undertaking by the Sacramento District of the USACE in support of an effort by DWR to update hydrologic data and complete floodplain mapping along and behind the federal-state levees in the Central Valley. The CVHS includes development of regulated and unregulated flow frequency curves for more than 200 locations along the Sacramento and San Joaquin rivers for multiple return periods. Unregulated flow is the maximum flow that would be possible at a given point in a river system in the absence of existing reservoirs and other flood management infrastructure. The models used to create the curves will be made available to flood managers.

2.3.1 Flood Management Infrastructure

The flood management system within the San Joaquin Valley includes reservoirs to regulate snowmelt from elevations above 5,000 feet and provide water supply storage, bypasses at lower elevations, and levees that line major rivers. Snowmelt floods are more frequent in the San Joaquin Valley, though rain floods do occur and generally have higher peak flows than snowmelt floods. **Table 2-2, Discharge-Frequency Relationships for Rivers and Creeks Within Planning Area** presents the discharge-frequency relationships for each of the rivers and creeks within the planning area as described by FEMA. (As described above, an updated version of Central Valley flood hydrology is currently under development.)

Table 2-2
Discharge-Frequency Relationships for Rivers and Creeks Within Planning Area

Location	Drainage Area (square miles)	Peak Discharges (cubic feet per second)			
		10 % annual chance (10-year)	2 % annual chance (50-year)	1 % annual chance (100-year)	0.2 % annual chance (500-year)
San Joaquin River at Vernalis	14,010	28,000	52,000	79,000	370,000
Orestimba Creek at Interstate 5	134.0	--	--	15,590	--
Del Puerto Creek at Interstate 5	72.6	--	--	7,960	--
Salado Creek at Interstate 5	25.3	--	--	2,820	--
Salado Creek below Delta-Mendota Canal	25.3	--	710	--	--
Tuolumne River at Modesto	1,884	10,500	32,000	70,000	154,000
Tuolumne River at Waterford	1,640	9,000	10,000	42,000	225,000
Stanislaus River at Oakdale	1,020	7,600	8,000	8,000	41,300
Dry Creek at Modesto	192.3	4,730	9,300	11,800	18,100
Merced River at Crocker-Huffman Dam	1,045	6,640	12,200	14,900	--

SOURCE: FEMA 2008 and 2009;, URS and Stillwater Sciences, 2004

Flood management storage space in San Joaquin Valley reservoirs fills quickly during intense rains (USACE, 1999). Flood management infrastructure upstream of the Mid SJR Region includes large dams and other facilities along the San Joaquin, Merced, Tuolumne, and Stanislaus rivers. **Table 2-3**, **San Joaquin River Basin Dams and Reservoirs**, includes information on each of the dams and reservoirs in the San Joaquin River Basin. Most major reservoirs in the Central Valley have been designed and built to meet multiple purposes, including water supply, recreation, and flood management. These multipurpose reservoirs have defined water conservation space for capturing winter and spring runoff for water supply purposes, and designated flood management space to capture, manage floodflows to reduce flood releases downstream. Water elevation in a reservoir is managed through the release of water according to a rule curve, which is a graph that describes the elevation and associated storage (y-axis) over the year (x-axis) to accommodate defined water uses. There are rule curves that apply to normal, drought, and flood conditions, and all are reservoir-specific.

Table 2-3

San Joaquin River Basin Flood Management Dams and Reservoirs

Project	River/Stream	Storage (TAF)[1]	Maximum Flood Management Space (TAF)	Owner/ Operator	Year
Friant Dam (Millerton Lake)	San Joaquin River	521	170	USBR[2]	1949
Los Banos Detention Dam	Los Banos Creek	35	14	USBR	1965
Hidden Dam (Hensley Lake)	Fresno River	90	65	USACE	1975
Buchanan Dam (Eastman Lake)	Chowchilla River	150	45	USACE	1975
New Exchequer Dam (Lake McClure)	Merced River	1,025	350	Merced ID[3]	1967
McSwain Dam (Lake McSwain)	Merced River	97	0	Merced ID	1967
New Don Pedro Dam (Don Pedro Lake)	Tuolumne River	2,030	340	TID/MID[4]	1970
New Melones Dam (New Melones Lake)	Stanislaus River	2,420	450	USBR	1978

1 TAF = thousand acre-feet, rounded to the nearest 1,000 acre-foot
2 USBR = United States Bureau of Reclamation
3 Merced ID = Merced Irrigation District
4 TID = Turlock Irrigation District; MID = Modesto Irrigation District

SOURCE: USACE, 1999

Consistent with this concept, DWR's Forecast-Coordinated Operations (F-CO) and Forecast-Based Operations (F-BO) programs are a component of the FloodSAFE Flood Emergency Response Program and include a focus on the San Joaquin Watershed. The F-CO Program seeks to coordinate flood releases from the reservoirs located in various tributaries of major rivers to optimize the use of downstream channel capacity, the use of total available flood storage space in the system, and eventually to reduce overall peak floodflows downstream from these reservoirs. The first phase of the program is currently underway and has included a preliminary inventory and assessment of hydrologic gaging networks, evaluation of historical data used to support real-time flood forecasting and emergency operations, use of a decision support system for real-time analysis of data and reservoir scheduling, evaluation of hydrologic constraints and opportunities for improved gaging, forecasting, and operations of major reservoirs and

flood facilities. DWR's F-BO Program anticipates the use of improved long-term runoff forecasting and operating within the parameters of an existing flood management diagram.

Flood management infrastructure within the Mid SJR Region consists of SPFC levees or "project levees," non-project levees, the RD 2091/Named Area 65 Gomes Lake Pumping Plant, and the RD 2063 Pumping Plant and Nelson Drain. **Figure 2-5** and Map 9, **SPFC and Local Flood Management Facilities**, of this plan and the Atlas (Appendix A), respectively, include the locations of this infrastructure.

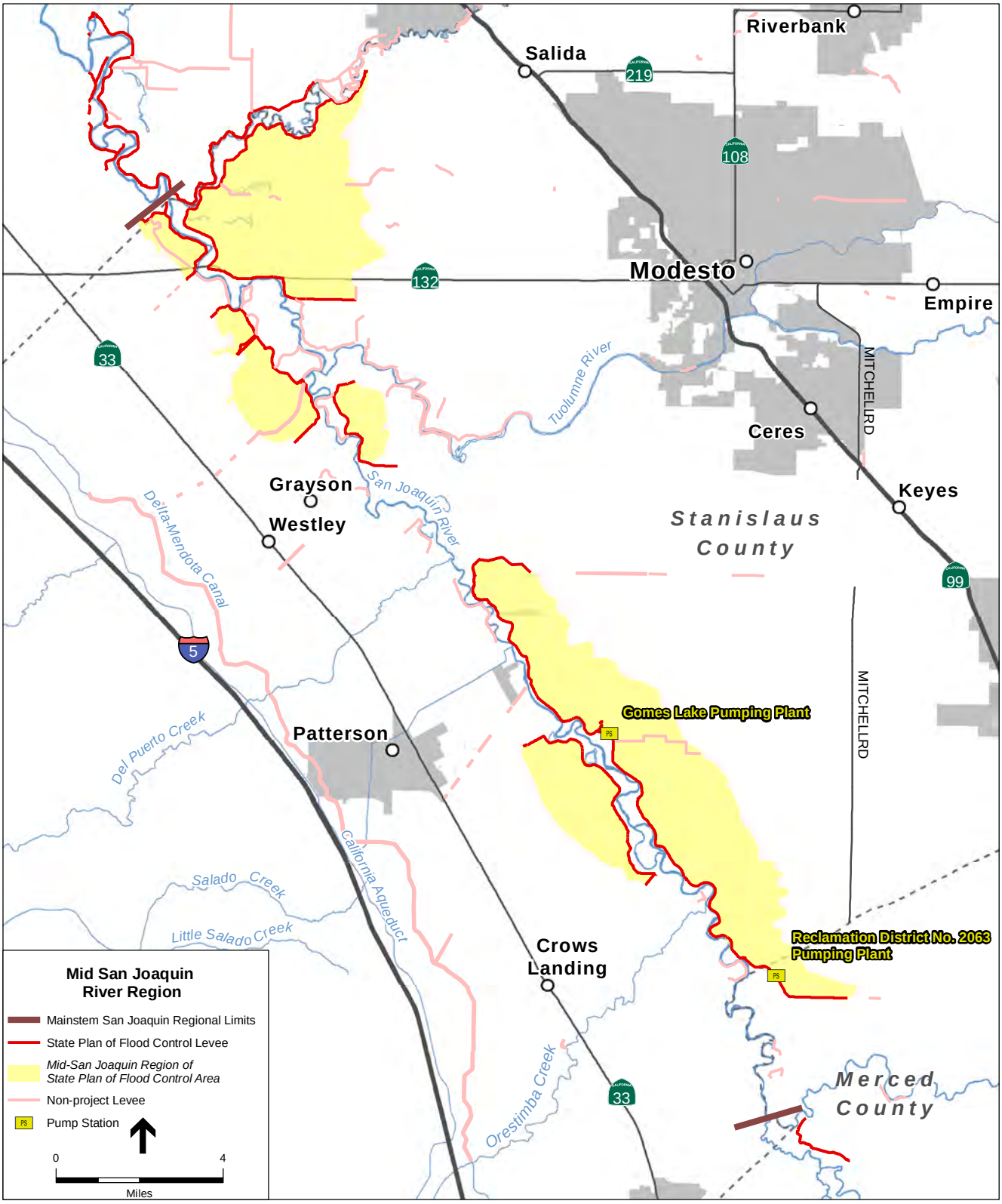
The Gomes Lake Pumping Plant (GLPP) is located approximately just east of the San Joaquin River and just west of Carpenter Road, north of Crows Landing Road. Levees that were constructed in the 1950s and 1960s along the San Joaquin River were preventing stormwater, irrigation tailwater, and water from other sources from draining into the San Joaquin River. The GLPP was constructed so that backed up water could be pumped over the levees and discharged into the San Joaquin River (Stanislaus County, 2011). The Nelson Drain directs runoff from below Mitchell Road during the flood and irrigation seasons, and the RD 2063 Pumping Plant pumps it over the levee and into the San Joaquin River.

2.3.2 Operations and Maintenance Practices

Levees operated and maintained by Reclamation District Nos. 1602 (Del Puerto), 2031 (Elliot), 2063 (Crows Landing), 2091 (Chase), 2092 (Dos Rios Ranch), 2100 (White Lake Ranch), 2101 (Blewitt), 2099 (El Solyo Ranch), and 2102 (Lara Ranch) are a part of the SPFC facilities, as is Gomes Lake, Named Area (NA) 65. Federal flood protection facilities must be inspected at least four times per year according to the Federal Flood Control Regulations (Title 33, Code of Federal Regulations, Section 208.10). Inspections occur immediately before the flood season, immediately following every major high water period, and at intervals not exceeding 90 days. The primary objective of the inspections is to confirm that project facilities maintenance is being carried out effectively, rather than to identify problems with project facilities (DWR, 2013a).

LMAs are responsible for operating and maintaining levees and associated drainage systems and structures, participating in inspections, flood fighting, and filing annual reports. Maintenance typically includes such items as management of vegetation, rodent burrows, seepage, and erosion.

Few of the SPFC levees in the Mid SJR Region are both inspected by DWR and in a condition that DWR deems "Acceptable." Of the nine RDs in the planning area, only five have submitted complete documentation in 2012 as required of LMA's by California Water Code Section 9141 since 2008: RD 1602 (Del Puerto), RD 2063 (Crows Landing), RD 2091 (Chase), RD 2092 (Dos Rios), and RD 2101 (Blewitt). The balance of the LMA's is inactive, with the exception of NA 65, Gomes Lake. NA 65, Gomes Lake is also an LMA required to file annual reports; however, no report was filed in 2012 and the DWR Levee Inspection Report noted that levees in NA 65 are not inspected by DWR. DWR did inspect the pumping plant at Gomes Lake and found it "Acceptable." Of the four non-reporting RDs (RD 2099, El Solyo; RD 2100, White Lake Ranch; RD 2102, Lara Ranch; and RD 2031, Elliott), three are made up of lands owned by the United States Fish and Wildlife Service (USFWS) and are part of the San Joaquin River National Wildlife Refuge (SJRNWR): RD 2099, RD 2100, and RD 2102. In the wake of levee breaches caused by the floods of 1997, the USACE initiated an effort to remove the levees from the project as part of a "Non-Structural Alternative" or NSA under PL 84-99. While the lands were purchased for this purpose and several required acquisitions and improvements have been made, the process to remove the project levees bounding Subregion C from the SPFC is still underway. Based on communication submitted by the Refuge Manager to DWR (for example, the letter dated September 1, 2010



SOURCE: USDA, 2012; ESRI, 2012; DWR, 2013; ESA, 2013

Figure 2-5

SPFC and Local Flood Control Facilities

included in the 2012 LMA Annual Report), the SJRNWR expressed intent to both not maintain the levees of these three RDs and to breach them in the future to restore river-floodplain connectivity, consistent with the NSA. RD 2031, the remaining non-reporting RD, appears to be inactive, though the two property owners within the District (Faith Ranch and Mapes Ranch) continue to perform levee maintenance and engage in flood fights at the levees adjacent to their lands (PBI, 2013). In 2012, the levees in RD 2031 were rated "Minimally Acceptable" by DWR and two river erosion sites were identified. Currently, RD 2031 is working to reorganize.

Of the five reporting RDs, RD 2063 reports challenges in recruiting leadership and generating sufficient revenue to meet District obligations (PBI, 2013). The 2012 DWR Levee Inspection Report indicates that of these five RDs, only RD 2091 and RD 2092 had levees with an overall "Acceptable" rating. The remainder had levees with an overall rating of "Unacceptable." Only one of these Districts had a structure that was inspected, RD 2063: the pumping plant serving the Nelson Drain, which was rated "Unacceptable."

In 2012, DWR found erosion sites at RD 2031 and RD 2101 (two and one, respectively).

2.4 Ecologically Sensitive Areas, Existing Habitat, and Recreation

As the Central Valley was transformed from a natural landscape to a vast agricultural region with areas of urban and rural development, the majority of the aquatic and terrestrial habitat in the planning area was lost. Wetlands and riparian habitat were converted to farms and urban areas. Flood management projects introduced levees that constrict natural channel morphology and migration and prevent the seasonal inundation of floodplains, a key requirement of anadromous fish at the juvenile life stage. Dams restrict anadromous fish migration and natural sediment transport, which is critical to the formation of spawning habitat in river channels, and result in hydrology that is significantly different than that to which aquatic species are highly adapted. Habitat that remains in the planning area is stressed further by the presence of revetment; unscreened diversions; pollutants; and invasive plant, aquatic, and terrestrial species.

While much diminished from its pre-European settlement condition, the planning area contains a rich array of river-related ecologically sensitive areas. These include lands specifically acquired and managed for habitat values, public lands such as parks, private lands with conservation easements, and private lands without easements, but containing valuable natural habitat.

Worldwide, river corridors and floodplain lands are some of the most ecologically valuable areas in the landscape. In an arid region like California, they are also areas with the greatest diversity of wildlife. The combination of complex topography, hydrologically-driven disturbance, gradient of habitat conditions, and flood-driven generation of habitat and food sources for aquatic species make them a tremendous resource for native species, which have adapted to thrive in these conditions. Because these lands have also been tremendously desirable for other uses, such as agriculture and urban development, and few "living" floodplains remain, conservation and restoration of floodplain lands have become a major focus for many resource management agencies. Rivers and floodplains are vitally important to native fish species, including anadromous species like salmon and steelhead, a central focus of the San Joaquin River Restoration Program being implemented upstream of the Mid SJR Region. The San Joaquin Valley and its

wetlands and river corridors also provide vitally important wintering areas for migratory birds on the Pacific Flyway. In addition, vegetated expanses within view of a waterway, and perhaps with access for fishing, swimming, or boating, are natural attractants for people – highly appealing for public access and recreation.

2.4.1 Public Access and Recreation

As population grows in the Mid SJR Region, the need for recreational opportunities on or near waterways also increases. Compared to other California regions, the Central Valley lacks parks for residents and visitors. Major trends that include significant population growth and increasingly sedentary lifestyles contribute to the need for more parks and recreational facilities. With additional recreational opportunities, an economic benefit to the local economy could occur with supporting uses such as marinas, boat rentals, and restaurants.

An array of parks currently occupies lands along the major waterways of the Mid SJR Region with additional improvements and recreational areas proposed. The Stanislaus River Parks ("string of pearls") managed by the USACE include 11 riverside parks between Knights Ferry and the confluence with the San Joaquin River. These parks provide camping, fishing and boating access to the Stanislaus River. The Ripon River Crossing Park is one of these parks. Some of these sites have been fully developed, while others are awaiting further investment.

The Stanislaus River at Highway 99 and downstream includes Caswell Memorial State Park (camping and river access) as well as smaller parks, such as Oak Grove Park in Modesto and the Mohler Tract of the San Joaquin River National Wildlife Refuge (hiking and river access). The USFWS manages a 4-mile walking trail including river access for passive recreation at the terminus of Dairy Road just south of Hwy 132 (Pelican Nature Trail). Most bridge crossings are heavily used by fishermen, although access is largely uncontrolled.

Near Highway 99 and the cities of Modesto and Ceres is the Tuolumne River Regional Park (TRRP), a park being developed jointly by the two Cities and Stanislaus County. This park is being developed on 500 acres of public land along seven miles of the Tuolumne River in a series of separate parks. When completed, it will include 150 acres of developed park lands, pedestrian/biking trails, and over 350 acres of land designated for riparian habitat conservation and restoration. Five of its component parks have been fully or partially developed so far, and one more remains to be initiated. One of the partially-developed parks, Gateway Park, is located at the confluence of Dry Creek and the Tuolumne River in Modesto (EDAW, 2001). Additional river-oriented County parks are also located along the Tuolumne River, such as Riverdale Park and the Shiloh Road river access (closed). Near the town of Grayson, Stanislaus County maintains Laird Park and, near the town of Patterson, the Las Palmas Boat Launch (closed), both located on the San Joaquin River. The George J. Hatfield State Recreation Area is located along the lower Merced River; further upstream is a county facility, Hagaman Park. There is also a County Park at Orestimba Creek near the City of Newman.

In addition to the existing parks and park plans, riverside land in the planning area figures large in the recreational vision of many. The Stanislaus County General Plan (1987) indicates a host of additional county and state parks, both existing and proposed, along the waterways of the planning area, some with direct river access. The Tuolumne River Trust has an active Lower Tuolumne River Parkway initiative, working with a larger coalition of interests to accomplish an array of goals. The Parkway is described as a

series of non-continuous habitat restoration and public access projects in the river and river corridor from La Grange Dam to the San Joaquin River. A river-oriented public access point has been proposed by City of Turlock for lands they own on the San Joaquin River at the outlet of the Harding Drain.

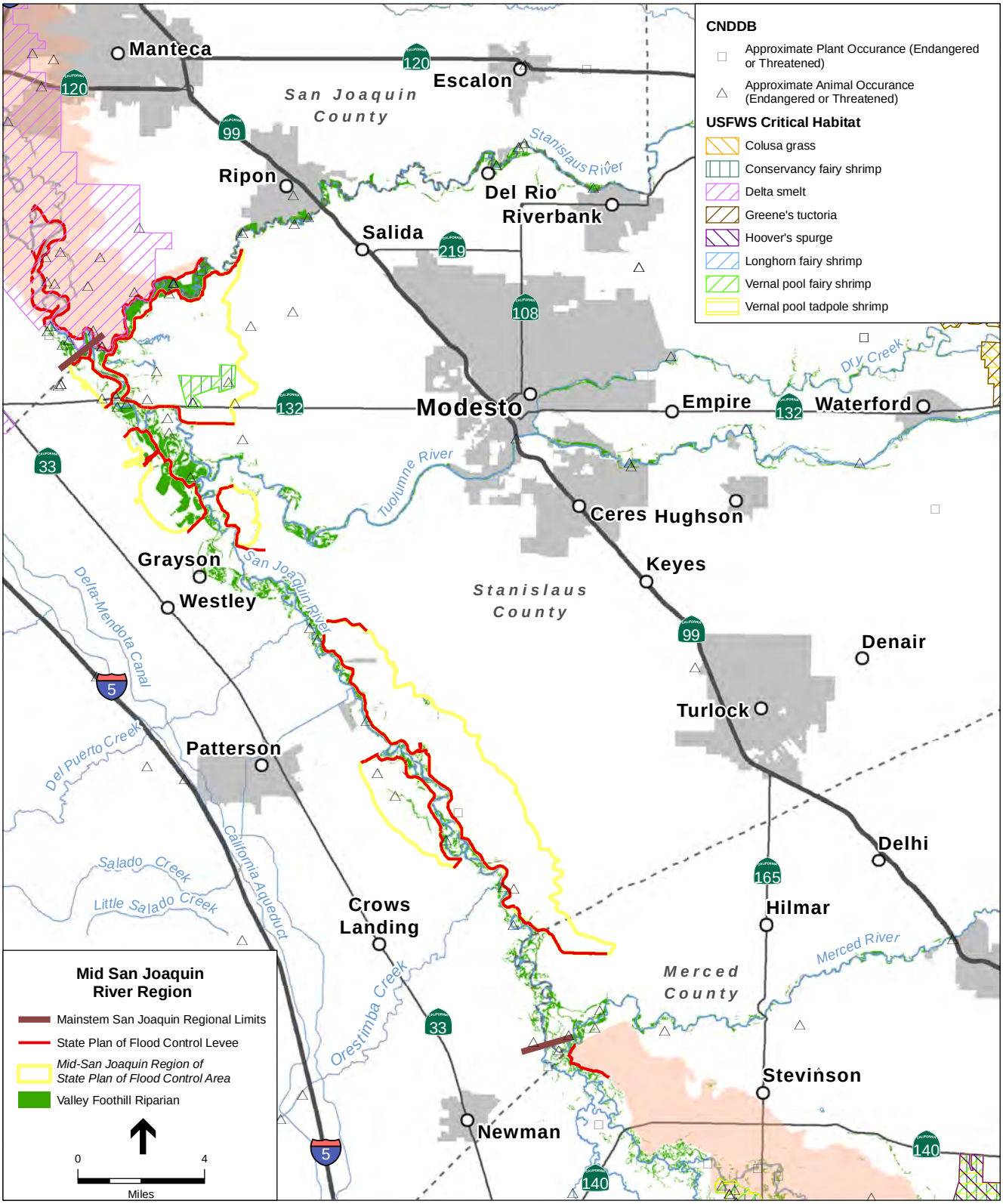
A large scale recreational plan applicable to the Mid SJR Region is the Central Valley Vision Implementation Plan, a strategic plan for State Parks expansion in the Central Valley, developed by the California State Parks in 2009. The Implementation Plan is a catalog of proposed initiatives, to be implemented over the next twenty years, to improve recreation and resource protection in the Central Valley. Many of these initiatives are located within the Mid SJR Region, and include improving the Caswell Memorial State Park, Turlock Lake State Recreational Area (SRA), McConnell SRA (along the Merced River), George J. and Hatfield SRA, and developing Dos Rios Ranch as a public use area.

Other recreational plans for the region include the San Joaquin River Blueway sponsored by the San Joaquin River Partnership, which outlines a vision for the future by proposing a variety of parks, wildlife refuges, and other publicly accessible places that provide the public an opportunity to explore and enjoy the San Joaquin River. If realized, this vision is anticipated to not only improve recreational opportunities in the region, but the air quality, water quality, and health of its users, while providing additional economic benefits in, and flood protection to, the region. The San Joaquin River was one of two rivers in California nominated to become a National Blueway under the Department of Interior "America's Great Outdoors Initiative" in 2010. Recently, however, the United States Department of the Interior (DOI) has reduced its funding of the San Joaquin River Blueway effort and is no longer pursuing implementation of this project.

2.4.2 Ecologically Sensitive Areas and Habitat

There are two wildlife areas, two wildlife refuges, and several large areas of conservation land within and near the Mid SJR Region of the SPFC. Atlas Map 18, Managed Environmental Lands (Appendix A), includes the locations of land managed by the USFWS, CDFW, The Nature Conservancy (TNC), River Partners, Tuolumne River Trust, and others. **Figure 2-6, Managed Environmental Lands and Riparian Vegetation**, shows these areas along with privately-held lands with conservation easements, including those held by the Natural Resources Conservation Service (NRCS). Many of these riverside lands were specifically acquired to restore or preserve floodplain habitat.

The SJRNWR covers nearly 8,000 acres and is part of the San Luis National Wildlife Refuge Complex (Refuge Complex). The refuge includes a contiguous 3,356-acre area that covers nearly all of Subregion C and part of the area between Subregions A and C as shown in Figure 2-1. Six non-contiguous areas cover 1,635 acres of land between Subregion A and C and another small 35-acre parcel is located approximately one mile northeast of the northeast boundary of Subregion A. Three non-contiguous areas within Subregion A and an area with a portion extending outside its northwest boundary total 2,046 acres. The total area of SJRNWR land that is included within the Mid SJR Region is 4,090 acres. Approximately three-quarters of these lands were specifically acquired to allow floodwater to temporarily move out onto the floodplain, now in flood-compatible land use, thereby lowering flood risks and stages in the river. The SJRNWR includes woodland, wetland, and grassland habitats that are important for wintering Aleutian cackling geese as well as songbirds, water birds, and multiple special-status species including riparian brush rabbit (State and federal endangered), riparian woodrat (federal endangered) and Swainson's hawk (State threatened). In 2005, it also became the site of the first known nesting pair of endangered least Bell's vireos in the Central Valley in more than 50 years.



Note: This analysis includes lands within a 1 mile distance of the centerline of the San Joaquin River and its tributaries.

SOURCE: USDA, 2012; ESRI, 2012; DWR, 2013; ESA, 2013

Figure 2-6

Managed Environmental Lands and Riparian Vegetation

Dos Rios Ranch is a 1,600-acre area managed by the Tuolumne River Trust and River Partners located at the confluence of the Tuolumne and the San Joaquin rivers, between the SJRNWR and TRRP. This parcel includes six miles of river frontage and will be managed for habitat and attenuation of flood flows.

In 2013, River Partners acquired the 497-acre Hidden Valley Ranch, adjacent to Dos Rios Ranch, using funding from the DWR and the Wildlife Conservation Board. In addition to expanding the flood attenuation and wildlife habitat objectives of the Dos Rios Ranch project, Hidden Valley Ranch will also host 191 acres of mitigation for future impacts associated with the SPFC.

In addition to the SJRNWR, the USFWS manages the San Luis National Wildlife Refuge (San Luis NWR), located outside of the Mid SJR Region along the San Joaquin River upstream of the confluence with the Merced River and adjacent to California State Route 140. The San Luis NWR and SJRNWR are both part of the Refuge Complex, which also includes the Merced National Wildlife Refuge (Merced NWR), and the Grasslands Wildlife Management Area (Grasslands WMA), and is managed out of the Refuge Complex headquarters in Los Banos. Two wildlife areas managed by CDFW are located near the Mid SJR Region of the SPFC: the West Hilmar Wildlife Area and North Grasslands Wildlife Area. The West Hilmar Wildlife Area is adjacent to Subregion E within Merced and Stanislaus counties and includes 340 acres of woodland, riparian, and grassland habitat. The North Grasslands Wildlife Area covers just over 7,000 acres adjacent to the San Luis NWR to the north and is located in both Merced and Stanislaus counties. The North Grasslands Wildlife Area includes wetland, riparian, and upland habitats. Romero Ranch and Simon Newman Ranch were purchased by TNC in 1998 and provide 61,000 acres of habitat along and in between Orestimba and Garzas creeks.

Map 19, Riparian Vegetation, Critical Habitat, and Endangered and Threatened Species, of the Atlas (Appendix A) identifies areas within the Mid SJR Region and vicinity that are dominated by riparian vegetation; the channels that are critical habitat for steelhead trout (*Oncorhynchus mykiss*); and the approximate locations of occurrences of plant and animal species that are listed as endangered and/or threatened under the California or United States Endangered Species Acts. Extensive riparian vegetation is present within the SJRNWR and there are small swaths of riparian vegetation along the San Joaquin River from the confluence with the Merced River to the confluence with the Stanislaus River. Riparian vegetation that lines the Merced, Tuolumne, and Stanislaus rivers is shown in **Figure 2-6**. As shown in Atlas Map 19 (Appendix A), the San Joaquin, Merced, Tuolumne, and Stanislaus are characterized as Critical Habitat for steelhead trout. Critical Habitats are those that are designated by the USFWS as areas essential to the survival of listed species. Other Critical Habitats located within the Mid SJR Region include those for the vernal pool tadpole shrimp (*Lepidurus packardi*) and vernal pool fairy shrimp (*Branchinecta lynchi*) within Subregion A. The California Natural Diversity Database (CNDDB) is the source of occurrences of endangered plant and animal species shown in Atlas Map 19.

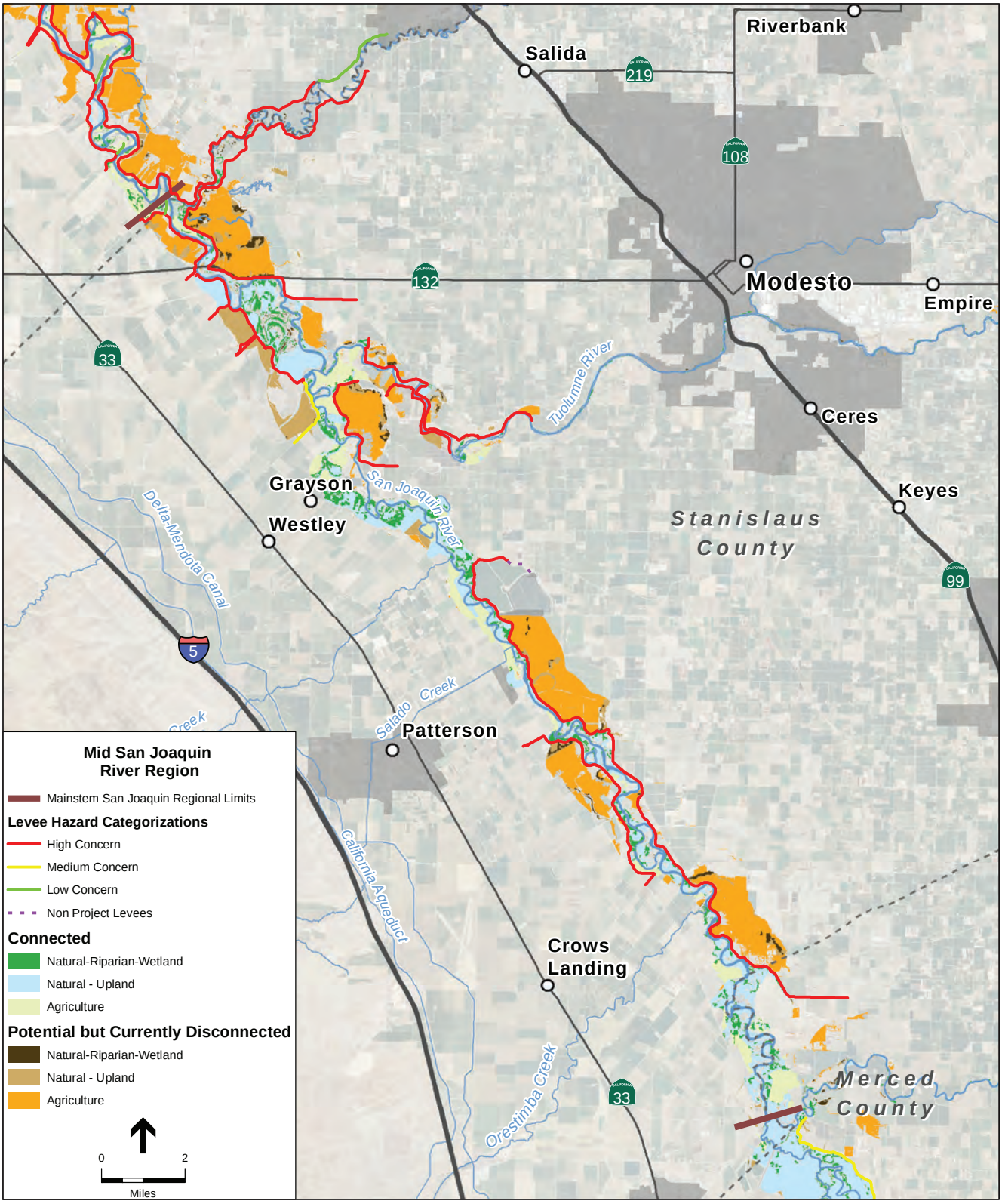
Within Subregion A of the Mid SJR Region of the SPFC, there is an area that is designated as Critical Habitat for the Conservancy fairy shrimp (*Branchinecta conservation*). In east Stanislaus County, there are large areas of Critical Habitat for Colusa grass (*Neostapfia colusana*), California tiger salamander (*Ambystoma californiense*), and vernal pool fairy shrimp (*Lepidurus packardi*). The entire length of the Merced, Tuolumne, Stanislaus, and San Joaquin Rivers in the planning area are designated as Critical Habitat for steelhead trout (*Oncorhynchus mykiss*). The San Joaquin River just downstream of the planning area is designated as Critical Habitat for green sturgeon (*Acipenser medirostris*).

Riparian and wetland-associated sensitive species documented within the San Joaquin River corridor and the lower reaches of the Merced, Tuolumne, and Stanislaus rivers include Delta button-celery, valley elderberry longhorn beetle, riparian woodrat (*Neotoma fuscipes riparia*), riparian brush rabbit (*Sylvilagus bachmani riparius*), least Bell's vireo (*Vireo belli pusillus*), colonies of tricolored blackbirds, Swainson's hawk, pallid bat, and western red bat. This area also provides wading bird rookeries; habitat for Sacramento splittail; and migrating, holding, and rearing habitat for steelhead and fall-run Chinook salmon (DWR, 2012). Since 1998, a captive breeding and reintroduction program has been underway to recover the riparian brush rabbit from the brink of extinction. A viable population of this flood-threatened mammal has been re-established in restored forests at the SJRNWR, and may be delisted with the establishment of two additional viable populations. This species resides wholly within the Mid San Joaquin River and Lower San Joaquin River/Delta-South planning regions, and its preferred habitat is brushy vegetation along levee slopes and riverbanks. Past efforts to clear levee vegetation within this species range have resulted in regulatory conflict.

The banks of the major rivers in the planning area are inconsistently reinforced with rock rip-rap, waste concrete and other rock debris. No engineered rock revetment was included as part of the original SPFC in the region; nonetheless, rock revetment is present and is currently being mapped in the region by DWR. Past efforts to use revetment to stabilize river banks and levees from erosion in this region have resulted in regulatory conflict.

Analyses conducted for the CVFPP (DWR, 2012a) identified 7,760 acres of floodplain lands along river corridors within the planning area that could potentially be hydrologically reconnected to the San Joaquin, Merced, Tuolumne, and Stanislaus rivers for frequent inundation so as to benefit ecological processes. These areas are identified in **Figure 2-7 Potential Floodplain Restoration Areas**.

The CVFPP identified conservation plans that were relevant to the CVFPP planning area in Table 1-1 of Attachment 9E to the CVFPP. The subset of the information in that table that applies to the Mid SJR RFMP planning area is provided below in **Table 2-4**, **Conservation Plans Relevant to the Planning Area**.



Note: This analysis includes lands within a 1 mile distance of the centerline of the San Joaquin River and its tributaries

SOURCE: USDA, 2012; ESRI, 2012; DWR, 2013

Figure 2-7
Potential Floodplain Restoration Area

Table 2-4
Conservation Plans Relevant to Planning Area

	Selected Habitat Targets from Relevant Conservation Plans				Selected Species Targets from Relevant Conservation Plans									
Plan Name	Riparian/SRA	Wetland	Seasonal Floodplain	Riverine Aquatic	Delta Button Celery	Salmonids	Giant Garter Snake	VELB	Yellow-Billed Cuckoo	Bank Swallow	Swainson's Hawk	Least Bell's Vireo	Riparian Brush Rabbit	Riparian Woodrat
San Joaquin County Multi-Species HCP and Open Space Plan	+	+			+		+	+	+	+	+		+	+
PG&E O&M HCP	+	+	+	+	+		+	+		+	+		+	+
San Joaquin River Restoration Program	+		+	++		++								
Central Valley Project-State Water Project OCAP and Associated BOs	+		+	++		++								
CALFED Multi-Species Conservation Strategy	++	++	++	++	++	++	++	++	++	++	++	++	++	++
Central Valley Improvement Act Programs	++		+	++		++	+	+	+	+	+	+	+	+
Central Valley Joint Venture	++	++							++	++	++	++		
Bay-Delta Conservation Plan	++	++	++	++	++	++	++	+	++	+	++	+	+	+
Draft Recovery Plan for the Giant Garter Snake		++					+							
California Red-legged Frog Recovery Plan	+	+	+	+										
Recovery Plan for Upland Species of the San Joaquin Valley, California	+												++	++
California Water Plan	+	+	+	+										
State Water Resources Control Board Plans				+										

\+ A probable or potential relationship exists. The Conservation Strategy is not likely to significantly contribute to the other conservation plan's conservation objectives, or the conservation target is a secondary focus of the conservation plan. For geographic overlap, there is a minor spatial overlap between the conservation plan area and one of the CVFPP planning boundaries.

++ A significant relationship exists. The Conservation Strategy could significantly contribute to the other conservation plan's conservation objectives. For geographic overlap, there is a large spatial overlap between the conservation plan and one of the CVFPP planning boundaries.

SOURCE: Table 1-1, Summary of CVFPP Relationships to Conservation Objectives from Other Conservation Plans, of Attachment 9E the 2012 CVFPP.

2.5 Protected Populations and Assets

Because the vast majority of the lands within the planning area are within Stanislaus County, some of the data presented in this section references Stanislaus County alone.

2.5.1 Protected Populations

Based on data collected during the United States 2010 Census of Population and Housing (US Census Bureau, 2010), the population within the Mid SJR Region boundary is 2,129 (**Table 2-5, Mid San Joaquin River Region Population**). According to the 2010 Census, the total population of Stanislaus County is 514,453. The population of each major city and community is included in **Table 2-6**, **Population of Cities and Communities in Planning Area**. **Table 2-7**, **Population and Assets within 100- and 500-year floodplains in Stanislaus County**, includes the population within the 100- and 500-year floodplains associated with each major river and creek in the planning area. Population and asset data are presented in **Figure 2-8**, **Mid SJR Region Population**, of this plan as well as Maps 2 and 16 of the Atlas (Appendix A). The majority of land within the region is agricultural and as a result, population density is low relative to urban and suburban areas with an average density of less than 1 person per 10 acres. Private residences and other property are included within the assets of the Mid SJR Region at risk from flooding.

Table 2-8, **Mid San Joaquin River Region Land Use**, includes a summary of land use within the Mid SJR Region of the SPFC by acres and percent of region. Land use within the Mid SJR Region of the SPFC and surrounding areas is also shown on Map 6 of the Atlas (Appendix A). Farmland makes up 75 percent of the Mid SJR Region of the SPFC, with urban areas accounting for only four percent. Modesto is the closest large urban area to the Mid SJR Region of the SPFC, approximately 10 miles east, and according to the 2010 Census, has a population of approximately 201,165 (US Census Bureau, 2013a). The small areas within the Mid SJR Region of the SPFC that are under the jurisdiction of the City of Modesto are entirely urban and developed land. The City of Patterson is located approximately 1.2 miles west of Subregion E and has a population of 20,413. Newman is located approximately six miles southwest of Subregion F and has a population of 10,224. The communities of Grayson and Westley have populations of 952 and 603, respectively, and are located approximately 1.8 and 3.8 miles southwest of Subregion D, respectively. Ceres is a city within Stanislaus County, adjacent to Modesto to the south, with a population of 45,417 (US Census Bureau, 2013b). Salida is located northwest of Modesto and has a population of 13,722. Crows Landing is a small community of 355 located between Patterson and Newman along Highway 33. Other cities in Stanislaus County include Oakdale and Riverbank along the Stanislaus River, Hughson and Waterford along the Tuolumne River, and Turlock, which is located many miles from the rivers in the planning area.

Table 2-5
Mid San Joaquin River Region Population

Subregion	Population
A	849
B	77
C	20
D	101
E	1,037
F	45
Total	2,129

SOURCE: 2010 Census

Table 2-6
Population of Cities and Communities in Planning Area

City/Community	Population
Ceres	45,417
Crows Landing	355
Grayson	952
Hughson	6,640
Modesto	201,165
Newman	10,224
Oakdale	20,675
Patterson	20,413
Riverbank	22,678
Salida	13,722
Turlock	68,549
Waterford	8,456
Westley	603

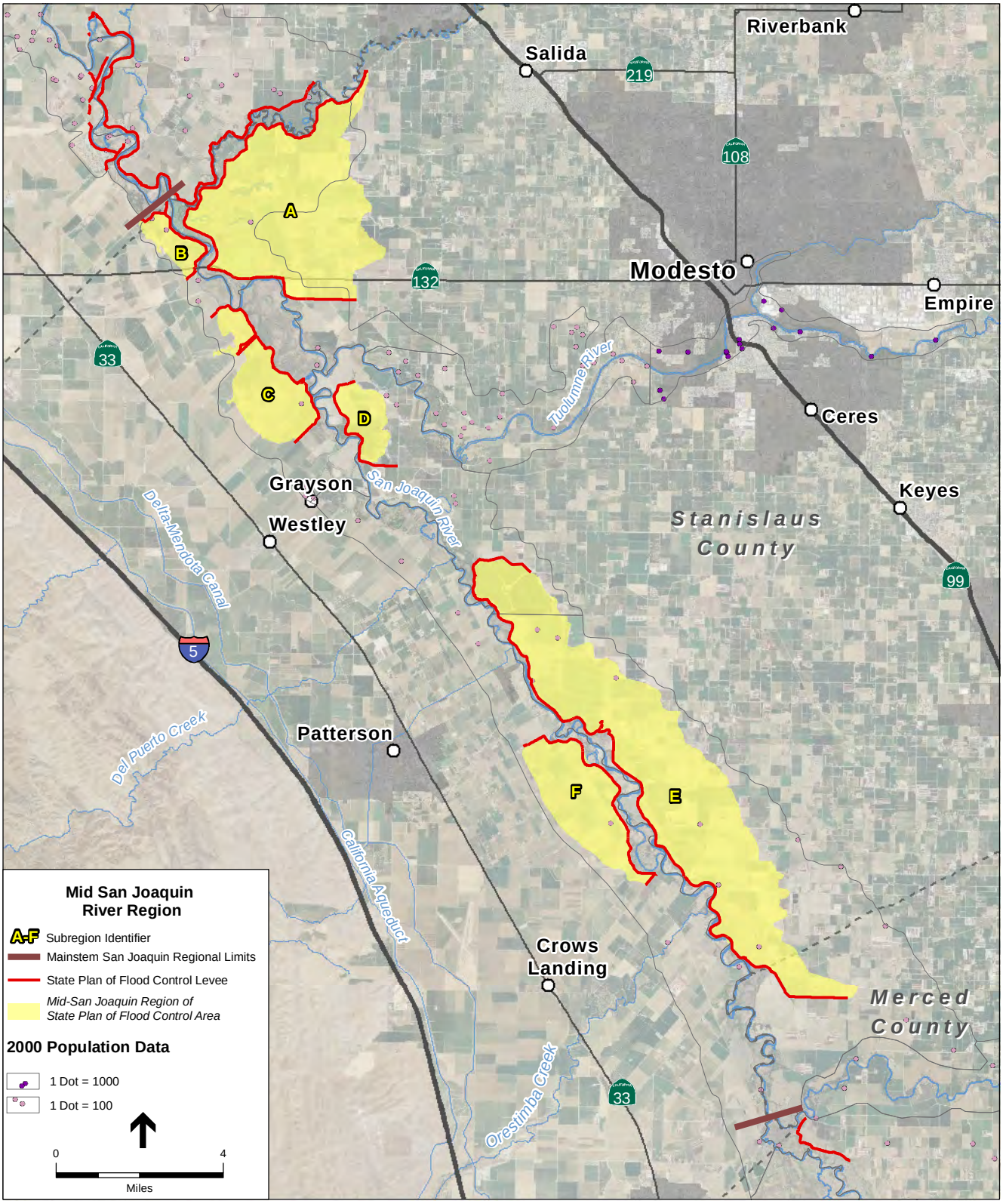
SOURCE: 2010 Census

Table 2-7
Population and Assets within 100- and 500-year Floodplains in Stanislaus County

River	Population	Households	Number of Parcels	Total Value
100-year Floodplain				
Del Puerto Creek	248	71	139	$49,686,842
Dry Creek	747	273	146	$143,550,227
Orestimba Creek	588	223	189	$48,685,552
Salado Creek	38	10	31	$8,795,382
San Joaquin River	2,354	676	630	$149,520,110
Stanislaus River	2,322	892	268	$117,176,939
Tuolumne River	4,766	1,566	974	$187,806,940
500-year Floodplain				
Del Puerto Creek	375	112	194	$62,664,305
Dry Creek	747	273	149	$149,644,108
Orestimba Creek	927	338	300	$77,913,338
Salado Creek	221	70	67	$16,659,356
San Joaquin River	2,408	694	668	$166,250,814
Stanislaus River	2,460	943	465	$200,322,760
Tuolumne River	11,177	3,555	2,162	$578,719,622

SOURCE: Stanislaus County, 2010

Floodplains in the planning area that are in Merced County are not covered above. According to Attachment 8F of the 2012 CVFPP, the general floodplain area along the San Joaquin River at the confluence with the Merced River includes 522 residential units with a total value of $26,196.



SOURCE: USDA, 2012; ESRI, 2012; DWR, 2013; ESA, 2013

Figure 2-8

Mid SJR Region Population

Table 2-8
Mid San Joaquin River Region Land Use

Land Use Category	Acres of Land Type	% of SPFC Area
Urban and Developed Land	1,260	4%
Native Vegetation and Grazing Land	5,160	18%
Local and Unique Farmland	7,260	25%
Prime and Statewide Importance Farmland	14,290	50%
Confined Animal Agricultural Land	620	2%
Rural and Semi-Agricultural Land	160	1%
Total	**28,750**	**100%**

SOURCE: Mid San Joaquin River Region Flood Atlas (Appendix A)

Urban and Developed Land. Urban and developed land is occupied by structures with a building density of at least 1 unit to 1.5 acres, or approximately 6 structures to a 10-acre parcel. Common examples include residential, industrial, commercial, institutional facilities, cemeteries, airports, golf courses, sanitary landfills, sewage treatment, and water control structures.

Native Vegetation and Grazing Land. Land on which the existing vegetation is suited to the grazing of livestock. This category is used only in California and was developed in cooperation with the California Cattlemen's Association, University of California Cooperative Extension, and other groups interested in the extent of grazing activities. Land which consists of open field areas that do not qualify for an agricultural category, mineral and oil extraction areas, and rural freeway interchanges.

Local and Unique Farmland. Farmland of Local Importance - All farmable lands that do not meet the definitions of Prime, Statewide, or Unique. This includes land that is or has been used for irrigated pasture, dryland farming, confined livestock and dairy, poultry facilities, aquaculture and grazing land. Unique Farmland - Lesser quality soils used for the production of the leading agricultural crops in the state. This land is usually irrigated, but may include non-irrigated orchards or vineyards as found in some climatic zones in California. Land must have been cropped at some time during the four years prior to the mapping date.

Prime and Statewide Importance Farmland. Prime Farmland - Irrigated land with the best combination of physical and chemical features able to sustain long term production of agricultural crops. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. Land must have been used for production of irrigated crops at some time during the four years prior to the mapping date. Farmland of Statewide Importance - Irrigated land similar to Prime Farmland that has a good combination of physical and chemical characteristics for the production of agricultural crops. This land has minor shortcomings, such as greater slopes or less ability to store soil moisture than Prime Farmland. Land must have been used for production of irrigated crops at some time during the four years prior to the mapping date.

Confined Animal Agricultural Land. This includes aquaculture, dairies, feedlots, and poultry facilities. Confined Animal Agriculture qualifies for Farmland of Local Importance in some counties.

Rural and Semi-Agricultural Land. This includes residential areas of one to five structures per ten acres. This includes semi-agricultural lands such as farmsteads, agricultural storage and packing sheds, unpaved parking areas, composting facilities, equine facilities, firewood lots, and campgrounds.

It is estimated that a population of approximately 2,400 is located in unincorporated areas within the 100-year (1% annual chance of occurrence) floodplain of the San Joaquin River alone. (See Chapter 3, Flooding and Flood Hazards, of this plan for a map of the 100-year floodplain boundary.) Stanislaus County is estimated to have a population of 14,544 that is exposed to flood hazards during a 100-year event. Additionally, a population of approximately 3,300 is located within all 100-year floodplains in the City of Modesto, 1,600 within all 100-year floodplains in the City of Newman, and 1,500 within all 100-year floodplains in the City of Patterson (Stanislaus County, 2010). The CVFPP estimated potential loss of 50 lives in the Mid SJR Region because of flooding over the next 100 years. The Expected Annual Damages from flooding within the Mid SJR Region is more than $3 million to crops; structures and contents; and business losses (Figure 2-8) (DWR, 2012a). The probability of flood damages shown in **Figure 2-9**, **Expected Annual Damages from Flooding**, takes into account several sources of uncertainty related to levee performance, including the anticipated probability of levee failure based on geotechnical considerations.

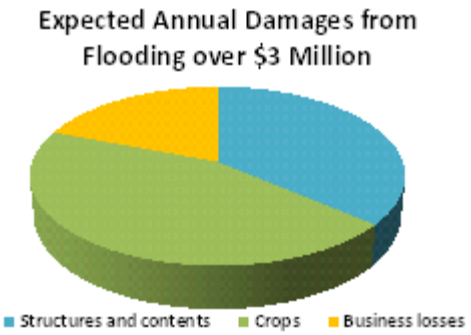
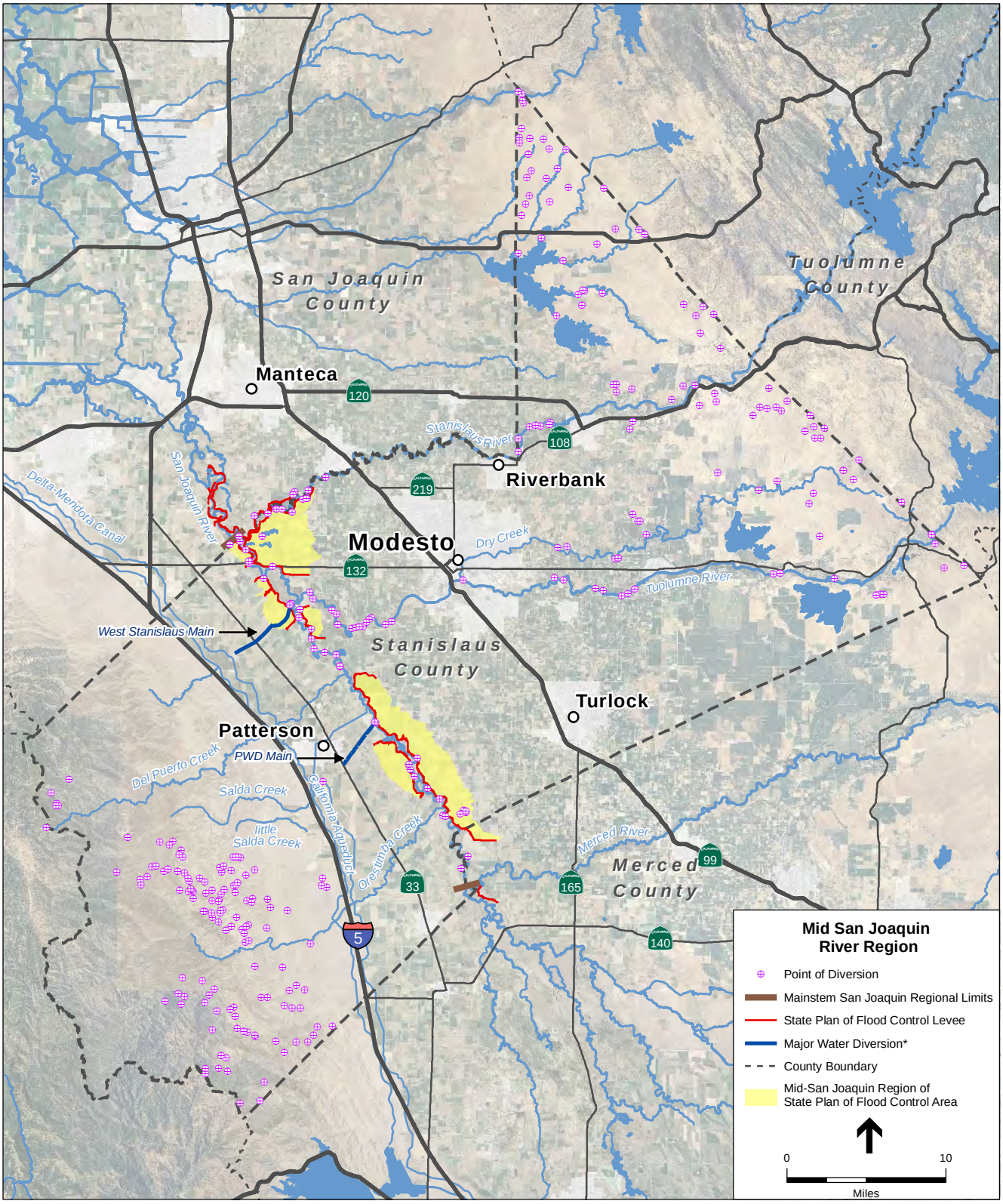


Figure 2-9
Expected Annual Damages from Flooding in the Mid SJR Region

2.5.2 Protected Assets – Critical Public Infrastructure

Types of assets that are protected by the SPFC facilities include state, federal, local, and county facilities; health and public safety facilities; public schools; and other critical public infrastructure. Protected federal, state, and local facilities include canals and pipelines. Local and county facilities include roadways, bridges, water and wastewater facilities and local, non-SPFC levees. Hospitals and emergency operations centers would be considered health and public safety facilities, respectively. Power facilities and substations as well as potential hazardous material (hazmat) storage areas are examples of other critical public infrastructure.

Map 8 of the Atlas, Existing Critical Facilities and Economic Assets, includes the locations of protected assets within the Mid SJR Region and surrounding areas (Appendix A). Assets within the Mid SJR Region of the SPFC shown in Map 8 of the Atlas include SPFC levees along the San Joaquin River, State Highway 132, and the Crows Landing Bridge. **Figure 2-10**, **Major Water Diversion Facilities**, shows the locations of major water diversion facilities within the Mid SJR Region and surrounding areas. Assets within the SPFC Area surrounding communities include police stations in Modesto, Salida, Ripon, Crows Landing, and near the San Joaquin River approximately four miles east of Westley; fire stations in Modesto, Salida, Ripon, Patterson, approximately eight miles east of Patterson and approximately nine miles east of Westley; hospitals in Modesto and Patterson; the Modesto City-County Airport, Patterson Airport, and the Crows Landing Naval



*Likely incomplete data

SOURCE: USDA, 2012; ESRI, 2012; DWR, 2013; ESA, 2013; CSWRCB, 2014

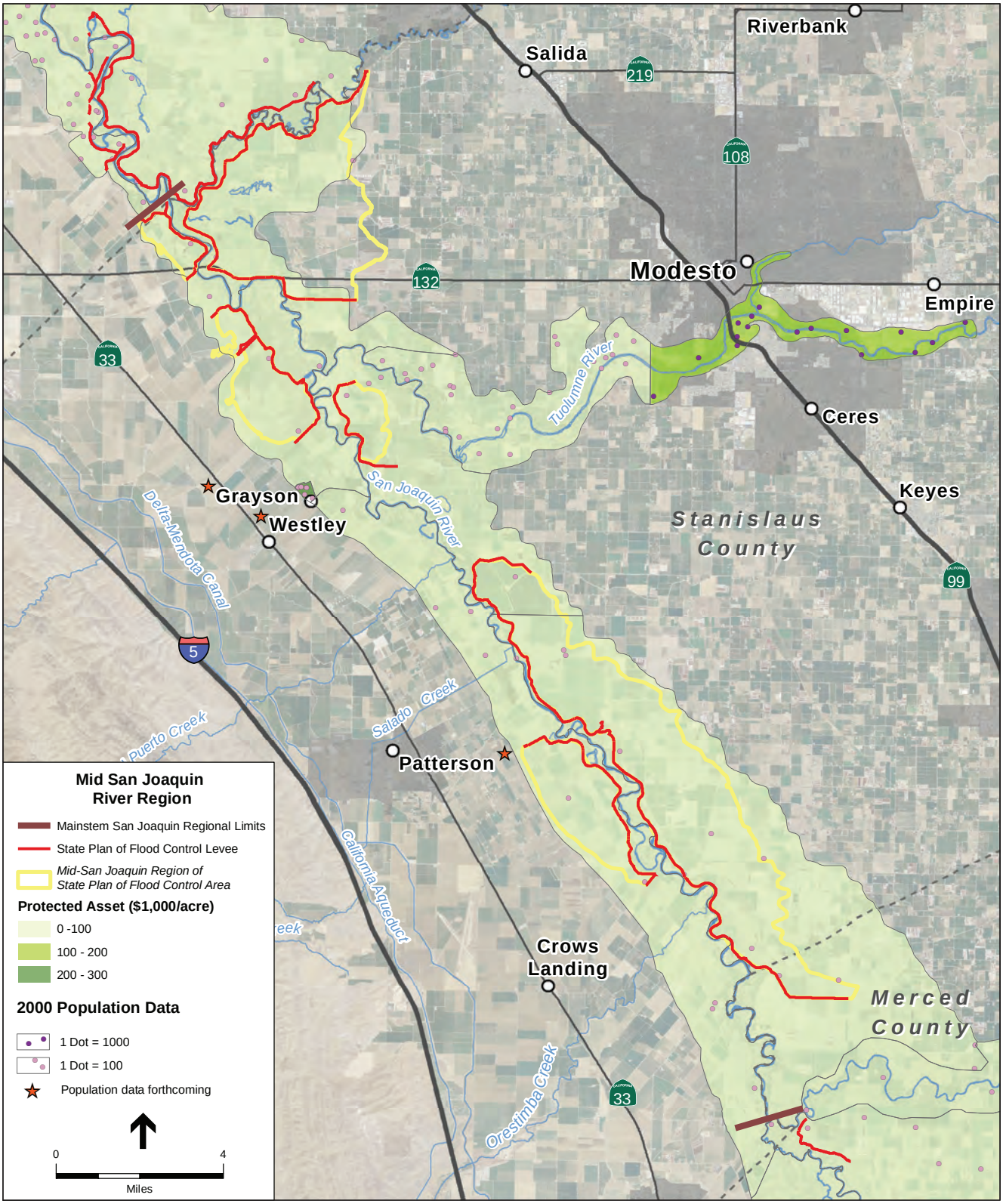
Figure 2-10
Water Diversion Facilities

Air Station (not operational but being redeveloped as a general aviation airport); public schools in Modesto, Ripon, Salida, Westley, Patterson, Crows Landing, and three east of the San Joaquin River outside of these communities; a boat launch in Modesto; the Shiloh Bridge over the Tuolumne River in Stanislaus County; Union Pacific and California Northern railroads; State Highways 33, 99, 108, 219, and Interstate 5 (I-5); and the Modesto, Patterson, and Newman Wastewater Treatment Plants (WWTPs). **Figure 2-11**, **Mid SJR Region Protected Assets**, of this plan and Map 2 of the Atlas (Appendix A) depict assets within the region based on ranges of value. As shown, assets within the Mid SJR Region of the SPFC are valued within the range of $0 to $100,000/acre. The Stanislaus County Multi-Jurisdictional Hazard Mitigation Plan included the value of several assets within the 100- and 500-year flood zones, including Honor Farm, a prison facility in Grayson ($2.36 million), Fox Grove Regional Park along the Tuolumne River near Hughson ($60,000), the Newman Library ($1.03 million), Patterson Library ($1.99 million), and animal services facilities in Modesto near the Tuolumne River upstream of the confluence with Dry Creek ($1.36 million) (Stanislaus County, 2010).

Damage to bridge facilities in the event of a flood could cost tens of millions of dollars to repair. The Highway 132 (Maze Blvd.) bridge, which is a major commuter route between the Modesto vicinity to the Bay Area, would have severe economic impacts on commerce if damages were incurred as a result of flood damage. Highway 99 and the main route of the Union Pacific Railroad (UP) cross the Tuolumne River at Modesto. In a major flood event in which Don Pedro Reservoir overtops the dam, both of these facilities could be at risk. The repair or replacement cost for a mainline railroad bridge capable of carrying heavy freight traffic such as that found on the UP line would be expected to cost tens of millions of dollars. Additional costs would be incurred by the necessity to reroute rail traffic around the damaged bridge and secure alternative transportation measures. Lastly, major public assets located within the Mid SJR region include the Hetch-Hetchy electrical transmission lines and domestic water lines, which service millions of San Francisco Bay Area residents; these are adjacent to the Highway 132 bridge, and are in jeopardy during flood events. The Crows Landing and Las Palmas Avenue bridges that cross the San Joaquin River are a vital transportation link from areas west of the San Joaquin River to east of the river (PBI, 2013). The Crows Landing Bridge is valued at $6.86 million, and the value of the Las Palmas Avenue Bridge is $7.45 million (Stanislaus County, 2010). Both roadways are within the 100-year floodplain.

The cities of Patterson and Newman have WWTPs that are located along the San Joaquin River, but outside of the SPFC Area boundaries. The City of Modesto WWTP includes two facilities located along the Tuolumne and San Joaquin rivers, one within and one outside of the SPFC Area. These facilities are included in the scope of this plan because they are susceptible to flood hazards, which are described in more detail in Chapter 3. The City of Patterson WWTP is located on the left bank of the San Joaquin River just north of the East Las Palmas Avenue/West Main Street river crossing. The City of Newman WWTP is located near the left bank of the San Joaquin River on Hills Ferry Road near the City of Newman. The Modesto WWTPs include the Sutter Avenue Primary Treatment Plant along the right bank of the Tuolumne River adjacent to Bellenita Park and the Jennings Road Secondary Treatment Plant on the right bank of the San Joaquin River within the SPFC Area.

Thus, the critical infrastructure and property either within or adjacent to areas protected by SPFC on the San Joaquin River include roads, important underground pipelines, and the WWTPs described above.



SOURCE: USDA, 2012; ESRI, 2012; DWR, 2013; ESA, 2013

Figure 2-11
Mid SJR Region Protected Assets

Assets within the 500-year floodplain (0.2% annual chance of occurrence) floodplain of Orestimba Creek were evaluated in the Orestimba Creek Draft Interim Feasibility Study (USACE, 2012). **Table 2-9**, **Orestimba Creek 500-year Floodplain Structure Inventory and Property Values**, includes the results of that evaluation as reported in the feasibility study. Assets within the 500-year floodplain include residential, commercial, industrial, and public property valued at a total of just over $300 million. The Eastin Road, Bell Road, and Jorgensen Road low water crossings are also assets within the 500-year floodplain. Over two thirds of those assets, or approximately $211 million, are residential properties. See Chapter 3, Flooding and Flood Hazards, of this plan for a map of the 500-year floodplain boundary.

Table 2-9
Orestimba Creek 500-year Floodplain Structure Inventory and Property Values

	Number of Structures		Structural Value ($1,000)		Content Value ($1,000)		Total Value by Land Use Type ($1,000)
Land Use	Rural	Urban	Rural	Urban	Rural	Urban	
Residential	158	1,122	17,706	123,204	8,853	61,602	$211,365
Commercial	0	62	0	23,732	0	25,030	$48,763
Industrial	0	16	0	13,593	0	20,014	$33,607
Public	0	7	0	4,541	0	2,123	$6,664
Total	158	1,207	$17,706	$165,070	$8,853	$108,769	$300,398

SOURCE: USACE 2012

2.5.3 Protected Assets – Agriculture and Associated Infrastructure

Other assets protected by SPFC facilities include agricultural lands and associated infrastructure, which may be privately owned or owned by irrigation districts, such as the Modesto or Turlock Irrigation Districts. Agricultural land and the crops that it contains, along with supporting water delivery and storm drainage infrastructure, are important assets protected by SPFC facilities.

According to the 2011 Stanislaus County Crop Report, milk is the top agricultural commodity in the planning area (Stanislaus County, 2011). In total, dairy products in Stanislaus County comprised $766 million of gross farm income, approximately one quarter of all agricultural income in the County. Not all dairy production occurs in the floodplains, however; recent spikes in conversion to almond orchards (60% increase in gross income in Stanislaus County from 2010 to 2011) has relegated much annual agriculture to flood-prone or other lands less suited to conversion to permanent crops. The major drought in much of the Mid-western United States in 2012 drove dairy feed prices very high, which negatively impacted many dairies in the San Joaquin Valley. According to a recent news story, over 100 dairies across the San Joaquin Valley closed in 2012 and more were expected to close in 2013 (CVBJ, 2013). Continued conversion of row crops and silage production land uses to nut production is anticipated in coming years, and this trend may have an impact on flood management across the region. Flood damages to orchard crops may result in higher dollar costs than flood damages to annual forage crops, depending on the timing and duration of flooding.

Spring floods pose particular hazards for some crops, most notably orchards. For example, almond trees, which are common in the region, bloom from late February through the end of March. This coincides with

the flooding period for the San Joaquin River. An almond orchard that has saturated soils cannot be sprayed effectively for brown rot, a common fungus that attacks the flower. Orchard trees that have their roots in standing water for prolonged periods during the growing season undergo significant physiological stress. Therefore, with a combination of these factors, if an extended duration flood occurs during bloom time or the early growing season, devastating effects on yields and agricultural income would occur. In general, orchards are generally not considered flood-compatible.

The dairy sector is also highly susceptible to income loss because of flooding – particularly in the early spring. In the spring and early summer, milk production peaks. Dairy cows are extremely stress-sensitive, and milk yields can be expected to fall precipitously when cows are subjected to environmental stresses such as flood events, moving herds out of the floodway, or other activities that disrupt daily routines. According to recent data from the EPA, approximately 21 dairies are located within the 100-year floodplain in the Mid San Joaquin River Region (EPA, 2013).

2.6 Emergency Response/ Public Safety

Two key components of emergency response during flood events include flood fight operations and general public safety operations. Flood fight operations include emergency activities aimed at preventing failure of a levee during a flood or in the event of a levee breach, as well as a maintenance activities provided by the reclamation districts with possible assistance from DWR and USACE. Another component of flood response includes public warning, evacuation rescue, care and shelter, and recovery functions provided by local counties, cities, and special purpose “fire districts.”

Local fire and law enforcement agencies have jurisdiction within the floodplain for protecting people and property, while reclamation districts have jurisdiction for flood fight. In large flood events, the geographic scale at which these different groups of agencies establish command and control or organize their response varies because of differences in agency jurisdictional boundaries and internal protocols (PBI, 2013). See Chapter 4, Emergency Response, for a more detailed discussion on this topic.

2.7 Agricultural Land Management and Water Quality

Water quality is an important component of agricultural land management in the Central Valley. Runoff from agricultural lands must be managed for a variety of pollutants including pesticides, herbicides, salts,

fertilizers, sediment, and pathogens. Commercial growers and confined animal facility operators must comply with the Central Valley Regional Water Quality Control Board (CVRWQCB) Irrigated Lands Regulatory Program and Confined Animal Facility Program requirements, respectively. Water Quality Coalitions have been formed among growers to address regulatory requirements collectively. The various coalitions benefit the growers and regulatory agencies because compliance is handled by a group, rather than on a grower-by-grower basis. The Westside San Joaquin River Watershed Coalition and East San Joaquin Water Quality Coalition are active within the planning area. These coalitions are focused on addressing water quality issues related agricultural operations, including the potential to use managed wetlands to accomplish pollutant removal from drainage. Under the Irrigated Lands Regulatory Program, specific Waste Discharge Requirements are currently being developed for several types of agricultural lands. Elevated salinity and nitrate levels in surface water and groundwater are a problem within the planning area and Central Valley. In 2006, a joint effort began among the Central Valley Regional Water Quality Control Board, State Water Resources Control Board, and local stakeholders to address salinity and nitrate issues within the Central Valley and to adopt long-term solutions. The collaborative effort is called Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS). The Lower San Joaquin River Committee is a subcommittee of the CV-SALTS Executive Committee, was established in 2010, and includes a variety of stakeholders including municipalities, irrigated agriculture, food processors, irrigation districts, and state and federal agencies. The primary goal of the Lower San Joaquin River Committee is to develop water quality objectives that support the beneficial uses on the Lower San Joaquin River, including the Mid SJR Region (CV-SALTS, 2013). The committee is currently working with the CVRWQCB, United States Bureau of Reclamation (USBR), and others to implement a real-time management system to manage salt in the Lower San Joaquin River watershed. One water quality and wildlife management strategy that could be used to reduce salts is exemplified by the wetlands created by Mickey Saso along the San Joaquin River in which agricultural drainage is used to provide wildlife habitat and remove sediment, pesticides, herbicides, and other contaminants. The wetlands could be used to store irrigation water that is higher in salts, and the water could be discharged into the San Joaquin River during higher river flows when salt concentrations are lower. Funding is available for projects aimed at improving water quality in agricultural areas. For example, the NRCS, which is part of the United States Department of Agriculture, provides funding through its Bay-Delta initiative for small, high-impact projects that protect water quality in the tributaries to the Sacramento-San Joaquin Delta.

2.8 Integrated Regional Water Management Planning

The Integrated Regional Water Management (IRWM) planning process, fostered by recent legislation and bond measures and administered by DWR, adopts a strategy for regional water management solutions that incorporates physical, environmental, societal, economic, legal, and jurisdictional aspects and use of an extensive stakeholder engagement process. The IRWM planning process is intended to be more effective than traditional methods by incorporating all of the relevant aspects of water management planning rather than addressing each aspect through a separate process. Flood management strategies identified in this plan should be incorporated into the IRWM Plans that have overlapping planning area boundaries. Map 5, DWR Integrated Regional Water Management Planning Areas, of the Atlas, includes the boundaries of the two IRWM planning areas with boundaries that overlap with the Mid SJR Region, which include the East Stanislaus and Westside San Joaquin IRWM Regions.

The East Stanislaus IRWM Plan identifies projects and measures to be implemented to meet the goals set for the region, one of which is flood protection. This regional flood management plan and the East Stanislaus IRWM Plan are being developed cooperatively to ensure consistency and integration between the two plans. The East Stanislaus IRWM Plan identifies 28 potential projects, some of which are related to flood management. Flood management-related projects include the La Grange Floodplain Restoration and Spawning Gravel Augmentation, Dos Rios Floodplain and Riparian Habitat Restoration, and the Integrated Stormwater Resource Management and Groundwater Augmentation Plan. Because of economic challenges in the East Stanislaus IRWM Region, funding to implement these projects has not yet been secured. Remaining IRWMP funding is limited and additional funds may or may not be forthcoming. One more round of Proposition 84 implementation funding is expected, with submittals due in December 2014/January 2015 timeframe to potentially fund identified projects in 2015. The East Stanislaus Region expects to pursue grant funding through Round 3. Prior to release of the DWR Proposal Solicitation Package (PSP), the East Stanislaus Regional Water Management Partnership, the Regional Water Management Group for the region, and the Steering Committee will meet to determine next steps. No future funding for the Proposition 1E Stormwater and Flood Management grant program has yet been authorized.

The Westside Integrated Water Resources Plan (WIWRP) was adopted in 2006 to address the integrated regional water management needs and opportunities of the Trans-San Joaquin-Tulare/Kern area. Part of the Mid San Joaquin Region is located within this area, but the WIWRP was not specific with respect to that region. Therefore, a process is now underway to update the WIWRP in accordance with the latest DWR IRWP guidelines and requirements and to provide a Westside-San Joaquin region specific IRWMP by Summer 2014.

The Governor and Legislature have directed DWR to expedite the solicitation and award of $200 million in IRWM funding to support projects and programs that provide immediate regional drought preparedness, increase local water supply reliability and the delivery of safe drinking water, assist water suppliers and regions to implement conservation programs and measures that are not locally cost-effective, and/or reduce water quality conflicts or ecosystem conflicts created by the drought. DWR received 39 grant applications requesting a total of $339 million in IRWM grant funds for projects totaling in excess of $970 million for the 2014 IRWM Drought Grant Solicitation. Grants have been awarded, and a table summarizing the grant applicants, IRWM region, requested grant amounts, and total project costs is available online (DWR, 2014a).

3. Flooding and Flood Hazards

3.1 Introduction

The purpose of this chapter is to describe flood conditions and known flood hazards within the planning area for the Mid San Joaquin River Region (planning area). Topics covered are those that are relevant to flood management within the planning area. The content of this chapter includes information on the following:

- flood history within the San Joaquin River Basin, including flood system performance during the 1983, 1986, 1995, and 1997, 2006, and 2011 flood events;
- flood management infrastructure within the San Joaquin River Basin and Mid SJR Region;
- roles of agencies with flood management responsibilities within the Mid SJR Region;
- organizations in the region with a flood management focus;
- the 100-, 200-, and 500-year floodplain boundaries;
- calculated design channel capacities;
- information on the Flood Forecast Monitoring Network;
- condition of levees throughout the Mid SJR Region;
- detail on known flood hazards;
- a synopsis of system deficiencies within the Mid SJR Region; and
- an introduction to opportunities for flood management improvements and opportunities for integration with additional purposes.

Sources for the information provided in this chapter include reports prepared by the California Department of Water Resources (DWR), the Federal Emergency Management Agency (FEMA), the United States Army Corps of Engineers (USACE), City of Modesto, Stanislaus County, California Department of Finance (CDF), United States Fish and Wildlife Service (USFWS), and McBain and Trush; web content published by the National Weather Service (NWS), Stanislaus, Merced, and San Joaquin Counties, and the Cities of Modesto, Patterson, and Newman; and the United States Code.

Flood hazards within the planning area occur as a result of the combination of the naturally flood-prone character of the San Joaquin Valley, levees that are in poor condition, assets that are located along major rivers, and a range of flood preparedness levels among communities and the LMAs. Within the Mid SJR Region planning area, the cities of Modesto, Newman, Patterson and communities of Westley and Grayson are exposed to flood risk during large runoff events as are large agricultural areas along the San Joaquin, Merced, Tuolumne, and Stanislaus rivers. In Modesto, flooding occurs at the confluence of the Tuolumne River and Dry Creek during intense rains, especially when releases from Don Pedro Reservoir are high. Within the Westside tributary watersheds to the San Joaquin River, intense rainfall results in extensive, low-depth flooding. Each of these hazards is described in this chapter along with brief introductions to identified opportunities to improve flood management in the planning area, which are presented in detail in Chapter 7, Proposed Regional Improvements, of this plan.

3.2 Flood History of the San Joaquin River Basin

There is a long history of catastrophic flooding within the Central Valley that dates back to the early 1800s (USACE, 1999). In the 30 years since 1983, a federal disaster has been declared four times in the Mid SJR Region (DWR, 2012a). A brief history of flooding within the Central Valley was provided in Section 1.2 of the 2012 Central Valley Flood Protection Plan (CVFPP) (DWR, 2012a). The Sacramento and San Joaquin River Basins, California Post-Flood Assessment (Post-Flood Assessment) prepared by the United States Army Corps of Engineers (USACE) provides a detailed history of flooding and flood management within the Central Valley (USACE, 1999). Prior to European settlement and reclamation of lands within the Central Valley, the vast floodplains of the Sacramento and San Joaquin rivers would become inundated during seasonal flood events, often for long periods. Within the San Joaquin Valley alone, snowmelt floods peaking in May or June each year would create several hundred thousand acres of perennial tule marshes and seasonally-flooded wetlands (USACE, 1999).

NIGHT SCENE ON THE SAN JOAQUIN RIVER—MONTE DIABLO IN THE DISTANCE.

These extensive floods have prompted response from those who settled in the Central Valley that continues to the present day. Reclamation districts (RDs) in the Central Valley were formed as early as 1868 to reclaim frequently inundated lands for agriculture. Levees,

small dams, and other diversion infrastructure were constructed by federal, state, and local agencies and turned over to RDs for operation and maintenance (CDF, 1997). Larger flood management projects began to be constructed in the San Joaquin Valley by the Federal Government and local agencies in the mid-1900s. Because of their influence on river flows and river stage, facilities both upstream and downstream of the planning area interact with flood hazards and flood management facilities and activities within the planning area. **Table 3-1**, **San Joaquin River Basin Flood Control Infrastructure**, includes the chronology of large-scale flood management projects within the San Joaquin River Basin. **Figure 3-1**, **Major Flood Control Infrastructure within the San Joaquin River Basin**, includes the locations of these projects and an overview of the flood management infrastructure within the San Joaquin River Basin. As shown in Figure 3-1, levees within the planning area include State Plan of Flood Control (SPFC), or "project," levees and non-project levees. Project levees line the San Joaquin and Stanislaus rivers covering a distance of 72.0 miles. Non-project levees within the planning area are largely non-engineered agricultural levees or material that has been piled along ditches that have been cleared and consist of 0.9 miles along the Merced, 12.0 miles along the Tuolumne, 27.9 miles along the Stanislaus, and 18.9 miles along the San Joaquin River, and 28.0 miles of other levees within the 100-year floodplain. Documented levee failure in the system includes 29 breeches, 3 overtoppings, and seepage in many locations (DWR, 2011c).

Table 3-1
San Joaquin River Basin Flood Control Infrastructure

Project	River/Stream	Storage (TAF)[1]	Maximum Flood Control Space (TAF)	Owner/ Operator	Year
Lower San Joaquin River and Tributaries Project levees	San Joaquin River[2]	n/a	n/a	Multiple entities	1944
Friant Dam (Millerton Lake)	San Joaquin River	521	170	USBR	1949
Los Banos Detention Dam	Los Banos Creek	35	14	USBR	1965
Hidden Dam (Hensley Lake)	Fresno River	90	65	USACE	1975
Buchanan Dam (Eastman Lake)	Chowchilla River	150	45	USACE	1975
New Exchequer Dam (Lake McClure)	Merced River	1,025	350	Merced ID	1967
Don Pedro Dam (Don Pedro Lake)	Tuolumne River	2,030	340	TID/MID	1970
New Melones Dam (New Melones Lake)	Stanislaus River	2,420	450	USBR	1978

USBR = United States Bureau of Reclamation; Merced ID = Merced Irrigation District; TID = Turlock Irrigation District; MID = Modesto Irrigation District

1 TAF = thousand acre-feet, rounded to the nearest 1,000 acre-foot

2 Levees were constructed downstream of the Merced River, Stanislaus River, Old River, Paradise Cut, and Camp Slough.

SOURCE: USACE, 1999

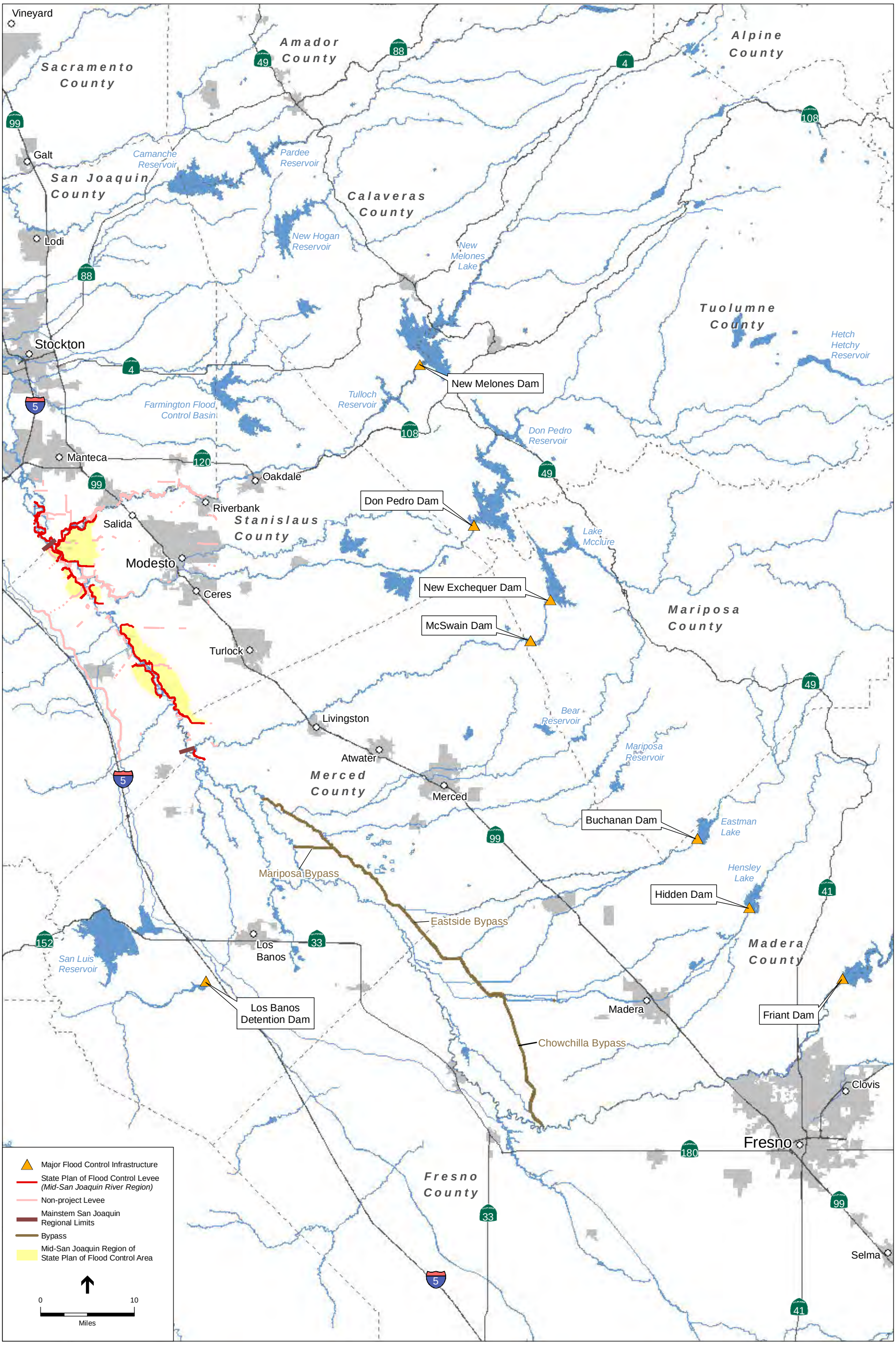
New Melones Dam and Reservoir, completed in 1978, was the last major flood management facilities construction project within the Central Valley (USACE, 1999). Six major floods have occurred since—in 1983, 1986, 1995, 1997, 2006, and 2010. The most significant of the six major floods occurred in January 1997. Flooded area maps were developed to delineate the extent of the 1983, 1986, 1995, and 1997 floods. The maps were developed using aerial photographs, primarily from the DWR Photogrammetry Department. The initial flood boundary delineations only included the flood extent shown in aerial photographs, and any flooded areas not captured in the photographs were excluded from the initial delineated boundary. Areas of known inundation not captured in the photographs, those that were inundated during other flood events, and/or areas included within FEMA GIS data were then added to the

delineation maps by inference. Finally, levee failure locations, including breaks and overtopping, were added to the flooded area maps (USACE, 1999). A description of the flooding extent and levee breaks shown on each map as well as information on reservoir levels and damages sustained and prevented are provided in the discussions below. [Note: the historic flooding maps included below exclude depictions of flooding from the Westside tributaries, though reporting of floods in these areas, when it occurred, is included in the text.]

3.2.1 Flood Control System Performance – 1983 Flood

Numerous storms from November 1982 to March 1983 caused flooding in Northern and Central California. These storms were a result of the El Niño Southern Oscillation, which is characterized by unusually warm ocean temperatures in the Equatorial Pacific and results in increased rainfall in Peru and the southern tier of the United States, including California. Statewide, precipitation in California was 190 percent of normal on average, and in some areas rainfall was more than 220 percent of normal. Snow water content in the Sierra Nevada in 1983 exceeded 230 percent of normal. Snowmelt runoff moving through Central Valley rivers in 1983 was approximately four times the average volume. The combination of storms in the first half of the 1983 water year and one of the wettest Septembers on record in 1982 resulted in all major reservoirs operating within their flood management reservation pools by the end of March. During peak snowmelt runoff in June and July, all reservoirs reached or nearly reached design capacity (USACE, 1999). The estimated exceedance interval for the 1983 event at the San Joaquin River at Newman and the Tuolumne River at Don Pedro Dam is 25-50 and 15-25 years, respectively (USACE, 1999).

The extent of flooding within the Mid SJR Region in 1983 as delineated in the Post-Flood Assessment is shown in **Figure 3-2**, **1983 Detailed View of Flooding Extent**. Refer to the Post-Flood Assessment for maps of the 1983 flooding extent for other portions of the Central Valley (USACE, 1999). One of the four levee breaks that occurred within the San Joaquin River Basin was located in the Mid SJR Region and another was in the vicinity, just downstream of the confluence of the San Joaquin and Stanislaus rivers. The levee break within the Mid SJR Region occurred on March 5th on a SPFC levee along the left bank (looking downstream) of the San Joaquin River just downstream of the confluence with the Tuolumne River and along the San Joaquin River National Wildlife Refuge (SJRNWR), or the former RD 2100. This break resulted in the inundation of 500 acres. The specific cause of this levee break is undocumented (DWR, 2011a; USACE, 1968a). The levee break just downstream of the Mid SJR Region and the San Joaquin River and Stanislaus River confluence also occurred along a SPFC levee, but was along the right bank of the San Joaquin River. The break occurred on March 29th and resulted in the flooding of 6,000 acres within and just outside of the boundaries of RD 2064. The specific cause of this levee break is also unknown (DWR, 2011a; USACE, 1968b). Note that the flooding extent associated with the levee break downstream of the San Joaquin River and Stanislaus River confluence was inferred rather than based on aerial photography.



SOURCE: USDA, 2012; ESRI, 2012; DWR, 2013; ESA, 2013

Figure 3-1

Major Flood Control Infrastructure within the San Joaquin River Basin

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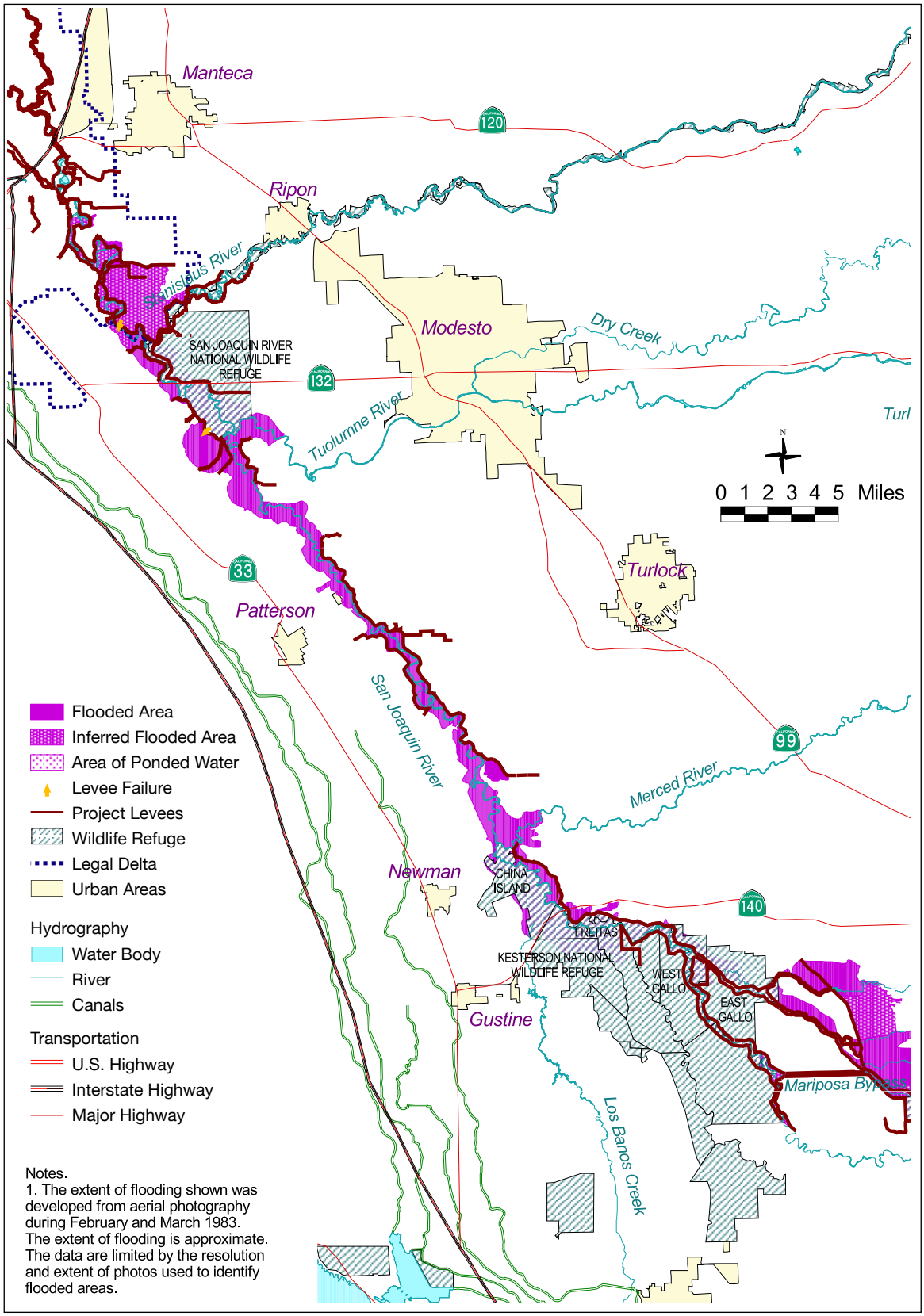


SOURCE: U.S. Army Corps of Engineers, Sacramento District, 1999

Figure 3-2
Detailed View of Flooding Extent
1983

Flooding in 1983 within Stanislaus, Merced, and San Joaquin counties resulted in more than $136 million in damages. **Table 3-2**, **1983 Flood Damages Sustained and Prevented**, includes damages sustained to private, public, and agricultural assets as well as roads, and estimates of damages prevented by flood management projects within the San Joaquin River Basin. The majority of the damage in Stanislaus County was to agricultural lands, with $12 million in losses. Merced and San Joaquin counties sustained damages valued at $614,000 and approximately $123 million, respectively. Total damages prevented by the flood management infrastructure within the San Joaquin River Basin were estimated at nearly $86.6 million. Prevented damages were calculated by USACE by subtracting residual damage, or the damage that did occur even with existing flood management infrastructure in place, from estimated damages that would have occurred without the existing flood management infrastructure in place. No lives were lost as a result of flooding in the Central Valley in 1983.

Table 3-2
1983 Flood Damages Sustained and Prevented

Damages Sustained ($1,000)[1]

County	Private	Public	Agricultural	Road	Total
Stanislaus	$111	$541	$12,200	$35	$12,887
Merced	$200	$414	$0	$0	$614
San Joaquin	no data	$25,204	$97,533	$35	$122,722
Total Damages Sustained					$136,223

Damages Prevented

Project	Damages Prevented ($1,000)[1]
Lower San Joaquin River Levees	$6,600
Friant Dam	$23,690
Hidden Dam	$2,900
Buchanan Dam	$3,400
Merced County Streams	$10,200
New Exchequer Dam	$14,400
Don Pedro Dam	$12,700
New Melones Dam	$12,700
Total Damages Prevented	$86,590

1 Damages are in 1983 dollars. Prevented damages were calculated by USACE by subtracting residual damage, or the damage that did occur even with existing flood management infrastructure in place, from estimated damages that would have occurred without the existing flood management infrastructure in place.

SOURCE: USACE, 1999

3.2.2 Flood Control System Performance – 1986 Flood

The floods of 1986 were caused by a series of four storms from February 11th through 19th. A 300-mile-wide band of heavy precipitation was positioned along San Francisco to Sacramento to Lake Tahoe. Precipitation within this area in the nine day period of February 11th through 19th ranged from 100 to 200 percent of normal for the entire month of February. Several precipitation records were set during these storms, including the greatest precipitation in February in the State at the Four Trees station in the Feather River

Basin. The estimated exceedance interval for the 1986 event at the San Joaquin River at Newman and the Tuolumne River at Don Pedro Dam is 10-20 and 30-40 years, respectively (USACE, 1999).

The San Joaquin River Basin was relatively unaffected when compared to the Sacramento River Basin in the 1986 floods. The extent of flooding within the Mid SJR Region in 1986 as delineated in the Post-Flood Assessment is shown in **Figure 3-3**, **1986 Detailed View of Flooding Extent**. As shown, portions of floodplains where levees do not line the San Joaquin River were inundated, but not to a great extent. With the exception of Millerton Lake, all major San Joaquin River Basin reservoirs remained with more than 90 percent of flood management reservation capacity available. Millerton Lake was operating with only 16 percent of flood management capacity available. The San Joaquin River at Vernalis reached a peak of 29.86 feet (gage datum), which is 0.86 feet above flood stage.

No damages were sustained in Stanislaus County during the 1986 event. San Joaquin County and Merced County sustained damages totaling over $13.7 million and $70,000, respectively. **Table 3-3**, **1986 Flood Damages Sustained and Prevented**, includes damages sustained to private and public assets, and estimates of damages prevented by flood management projects within the San Joaquin River Basin. Flood management infrastructure within the San Joaquin Valley was estimated to have prevented almost $218 million in potential damages. One life was lost during the 1986 floods in Placer County in the Sacramento River Basin (USACE, 1999).

Table 3-3
1986 Flood Damages Sustained and Prevented

Damages Sustained ($1,000)[1]

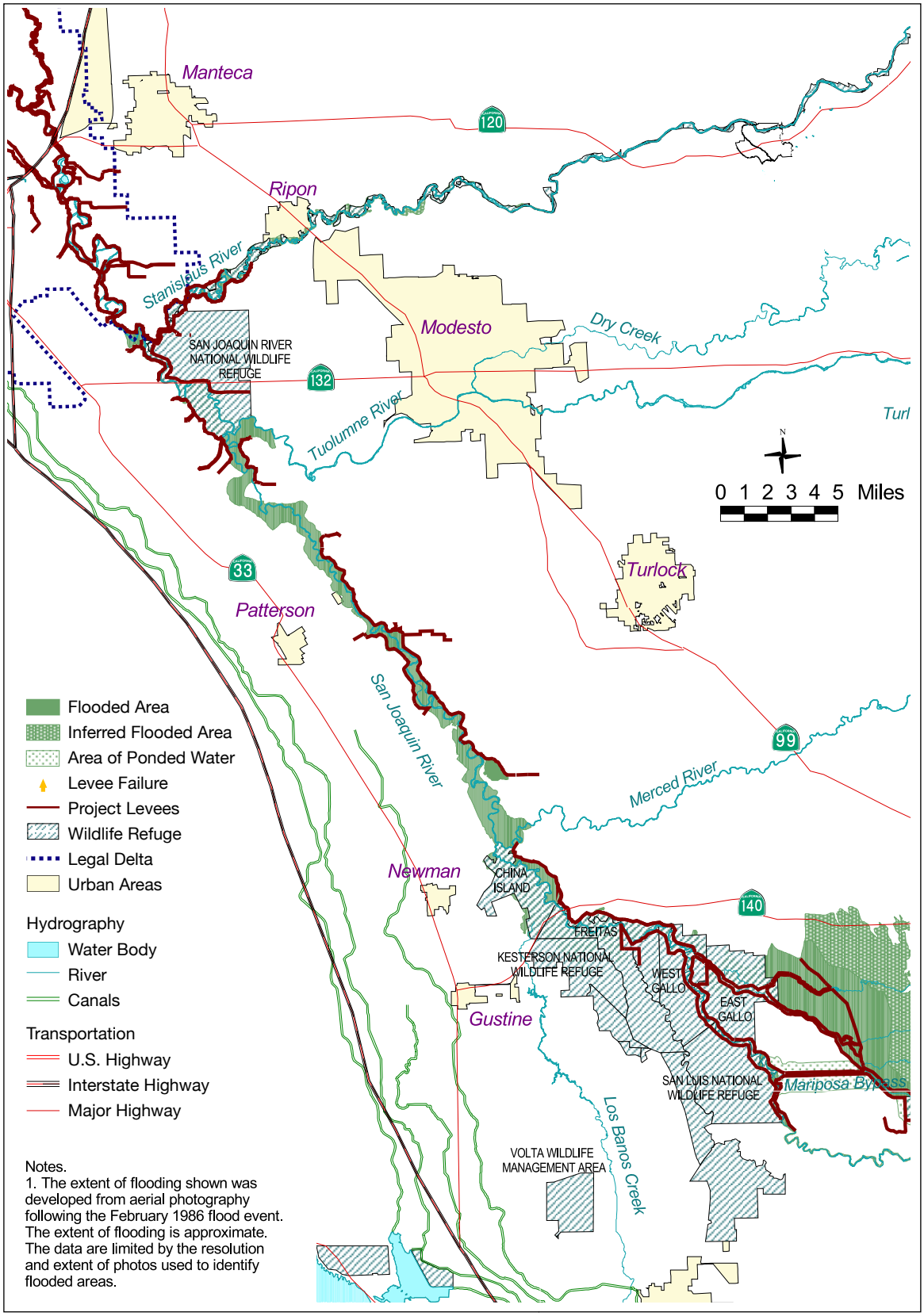
County	Private	Public	Total
Stanislaus	$0	$0	$0
Merced	$70	$0	$70
San Joaquin	$6,500	$7,238	$13,738
Total Damages Sustained			$13,808

Damages Prevented

Project	Damages Prevented ($1,000)[1]
Lower San Joaquin River Levees	$17,300
Friant Dam	$33,190
Hidden Dam	$1,900
Buchanan Dam	$6,000
Merced County Streams	$8,000
New Exchequer Dam	$23,300
Don Pedro Dam	$25,600
New Melones Dam	$102,500
Total Damages Prevented	$217,790

1 Damages are in 1986 dollars. Prevented damages were calculated by USACE by subtracting residual damage, or the damage that did occur even with existing flood management infrastructure in place, from estimated damages that would have occurred without the existing flood management infrastructure in place.

SOURCE: USACE, 1999



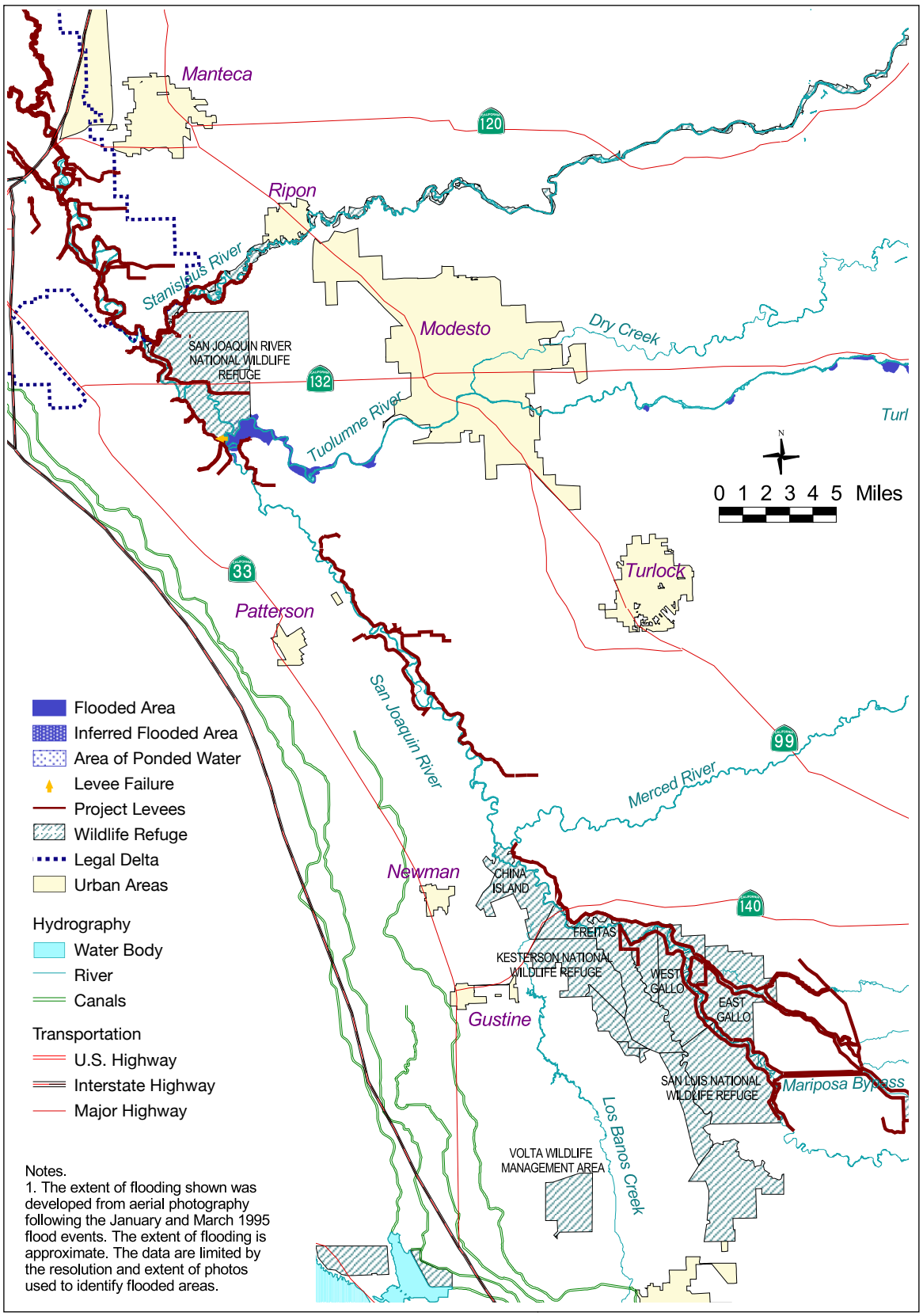
SOURCE: U.S. Army Corps of Engineers, Sacramento District, 1999

Figure 3-3
Detailed View of Flooding Extent
1986

3.2.3 Flood Control System Performance – 1995 Flood

In January and March of 1995, the El Niño Southern Oscillation caused large rain storms in northern and southern California. The Sacramento River Basin was most affected by the storms in January, and the March rain storms primarily affected the coast and southern California. Snowpack water content was more than 150 percent of normal in the Sierra Nevada and a significant portion of the Sacramento River Basin. At the beginning of January, all of the major Sacramento and San Joaquin River reservoirs had more than 100 percent of the flood management reservation pool available. After the January storm, flood management reservation pool capacity varied greatly between reservoirs within both the Sacramento and San Joaquin River Basins. This was also the case during the March storm, with Millerton Lake operating with four percent of flood management storage remaining and New Melones Lake, a very large reservoir, having 315 percent of flood storage available. All of the major reservoirs in the Sacramento or San Joaquin River Basins operated during the January 1995 floods with the majority of their flood management pools available. Flooding that occurred in January was a result of the failure of storm drainage systems and local flooding along small streams (USACE, 1999). The estimated exceedance interval for the 1995 event at the San Joaquin River at Newman and the Tuolumne River at Don Pedro Dam is 5-10 and 5-15 years, respectively (USACE, 1999).

Similar to the 1986 floods, the San Joaquin River Basin was affected to a much lesser extent than the Sacramento River Basin in the 1995 floods (USACE, 1999). However, in March 1995, flooding from Orestimba Creek caused an estimated $5.6 million in damages in and around the City of Newman. The March 1995 storm was the largest on record (1932 – 2010) at Orestimba Creek. Flows in Orestimba Creek reached 12,000 cubic feet per second (cfs). Overland flow from Orestimba Creek flooded agricultural fields and inundated the City of Newman (USACE, 2012). The extent of flooding within the Mid SJR Region in 1995 as delineated in the Post-Flood Assessment is shown in **Figure 3-4**, **1995 Detailed View of Flooding Extent** (USACE, 1999). As shown, small areas along the Tuolumne River just upstream of and at the confluence with the San Joaquin River were inundated. Otherwise, flow remained in the river channels within and near the Mid SJR Region with the exception of flooding that occurred in the Orestimba Creek floodplain (USACE, 2012). [Note that flooding from Orestimba Creek is not shown on Figure 3-4.] There was a levee breach along the left bank of the San Joaquin River near the southern boundary of the SJRNWR. The cause of the breach is undocumented (DWR, 2011a; USACE, 1968a). It does not appear that flooding resulted from this levee breach (USACE, 1999).



SOURCE: U.S. Army Corps of Engineers, Sacramento District, 1999

Figure 3-4
Detailed View of Flooding Extent
1995

Damages in Stanislaus, Merced, and San Joaquin counties totaled $95.8 million and all losses were agricultural assets. **Table 3-4**, **1995 Flood Damages Sustained and Prevented**, includes damages sustained to private, public, and agricultural assets, and estimates of damages prevented by flood management projects within the San Joaquin River Basin. Over $108.5 million in damages were estimated to have been prevented by the flood management system within the San Joaquin River Basin (USACE, 1999). No lives were lost as a result of flooding in the Central Valley in 1995.

Table 3-4
1995 Flood Damages Sustained and Prevented

Damages Sustained ($1,000)[1]

County	Private	Public	Agricultural	Total
Stanislaus	$0	$0	$52,447	$52,447
Merced	$0	$0	$38,854	$38,854
San Joaquin	$0	$0	$4,499	$4,499
Total Damages Sustained				$95,800

Damages Prevented

Project	Damages Prevented ($1,000)[1]
Lower San Joaquin River Levees[2]	$583
Friant Dam	$54,310
Hidden Dam	$2,200
Buchanan Dam	$1,800
Merced County Streams[2]	$2,400
New Exchequer Dam	$25,700
Don Pedro Dam	$19,500
New Melones Dam	$2,100
Total Damages Prevented	$108,593

1 Damages are in 1995 dollars. Prevented damages were calculated by USACE by subtracting residual damage, or the damage that did occur even with existing flood management infrastructure in place, from estimated damages that would have occurred without the existing flood management infrastructure in place.

SOURCE: USACE, 1999

3.2.4 Flood Control System Performance – 1997 Flood

Severe flooding was caused in 1997 by the combination of the second wettest December on record in the Sierra Nevada and three tropical storms that hit northern California on December 29, 30, and 31, 1996. Within three days, more than 30 inches of rain fell in the upper watersheds of the Sierra Nevada. Record flows were a result in both the Sacramento and San Joaquin River Basins. In mid-December, a cold storm brought snow to the Sierra Nevada foothills, which was then melted by the three warm storms at the end of December. Snowmelt was estimated to account for approximately 15 percent of the total runoff volume (USACE, 1999).

During the month of December 1996, the flood management reservation space in most of the major reservoirs in the Sacramento and San Joaquin River Basins was needed to accommodate heavy rainfall prior to the three tropical storms at the end of the month. During the series of three storms at the end of

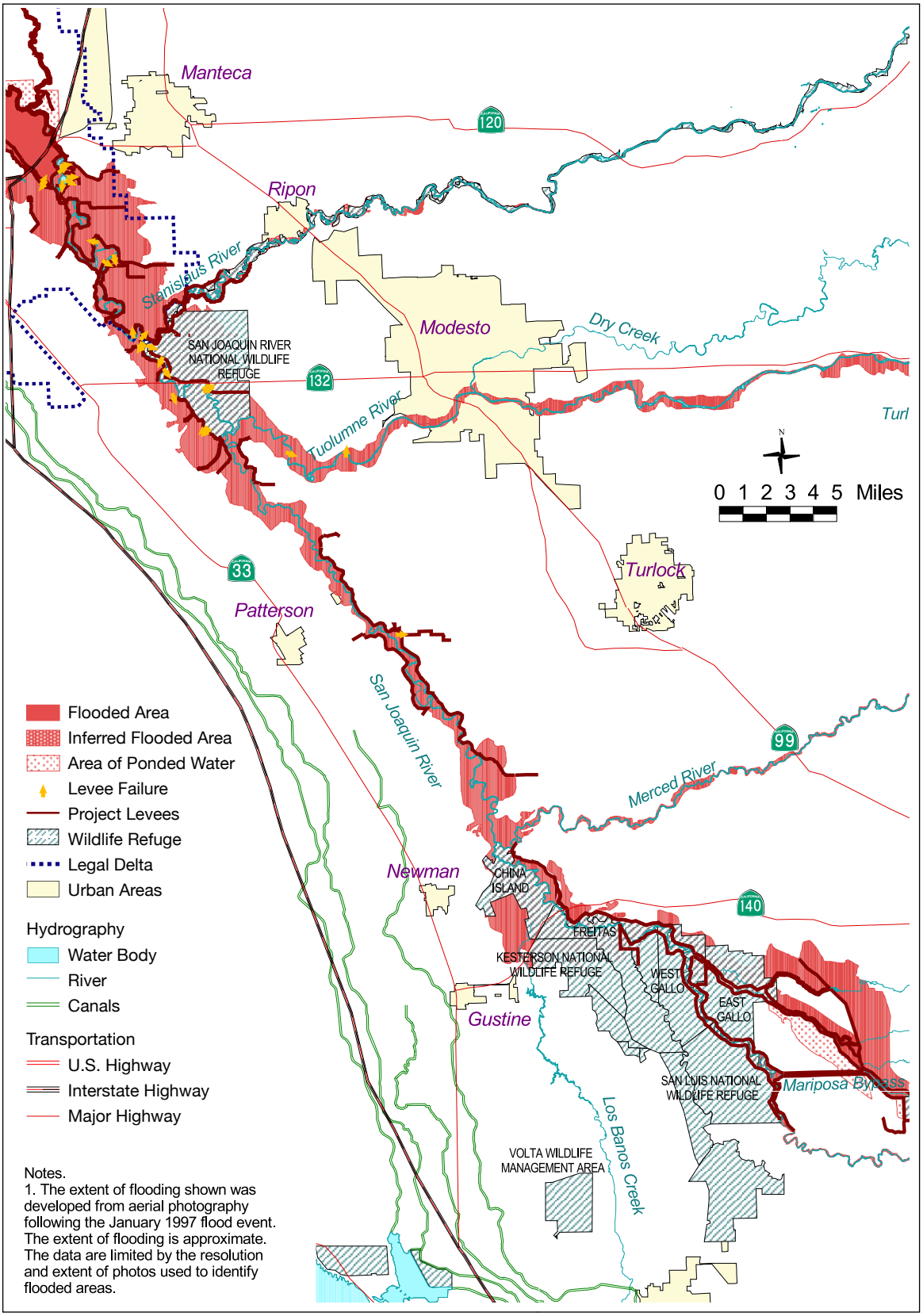
December, the flood management system in the San Joaquin River Basin was unable to contain the volume of runoff coming from the Sierra Nevada. Millerton Lake and Don Pedro Reservoir both exceeded their design capacity. Peak hourly inflow and outflow at Millerton Lake was 95,000 cfs and 63,000 cfs, respectively. At Don Pedro Reservoir, peak hourly inflow and outflow was 121,000 cfs and 59,000 cfs, respectively (USACE, 1999). The banks of the Tuolumne River overtopped in Modesto, Waterford, La Grange, and Roberts Ferry because of high flows from Don Pedro Reservoir. The estimated exceedance interval for the December 1996-1997 flood event at the San Joaquin River at Newman and the Tuolumne River at Don Pedro Dam is 90-110 and 80-110 years, respectively (USACE, 1999).

Numerous levee breaks occurred in the San Joaquin River Basin during the 1997 floods. The extent of flooding within the Mid SJR Region and the locations of levee breaks in 1997 as documented in the Post-Flood Assessment are shown in **Figure 3-5**, **1997 Detailed View of Flooding Extent**. As shown in Figure 3-5, levee breaks occurred along the Tuolumne and San Joaquin rivers within and near the Mid SJR Region. A total of 13 levee breaks occurred within Stanislaus County during the 1997 event. As stated in **Table 3-5**, the cause of each levee breach is unknown. Flooding occurred along the Merced River, Tuolumne River, and San Joaquin River, particularly within and near the SJRNWR. Areas within Modesto, Ripon, Waterford, La Grange, and Roberts Ferry were inundated.

Table 3-5
1997 Levee Breaches, Seepage, Boils, and Erosion in Mid SJR Region

Reclamation District	Channel Capacity (cfs)	Description of Levee Damage
2031 (Elliot)	46,000	5 breaches, including one 350 feet long. Breach causes are unknown, but squirrel activity was noted in the vicinity of 3 of the breaches and seepage was noted along 2 breach repair sites during the 1998 high water event. It is suspected by property owners that one of the breaks occurred because of prolonged saturation and pressure from flood waters. Wavewash damage at each of the 5 breach locations along the landside toe and mid-slope. Unknown if repairs have been made for wavewash damage.
2091 (Chase)	45,000	Severe seepage, sloughing of landside berm because of seepage, and extensive boils
n/a	15,000	2 levee breaks, cause unknown
2099 (El Solyo Ranch)	46,000	One 200-foot-wide breach, cause unknown; major wavewash damage along both slopes and landside wavewash damage, evidence that erosion damage may not have been repaired - 2009 Kleinfelder reconnaissance noted 3- to 4-foot vertical face along waterside slope about 2 to 3 feet below the crest, linear extent may be greater, but was obscured by dense vegetation.
2100 (White Lake Ranch)	46,000	3 breaches, cause unknown, seepage noted at 2 of the 3 repair sites after the event; massive wavewash damage along the landside slope and shoulder with vertical faces of 6 to 7 feet, sometimes extending into the crown. It's unknown if the wavewash damage was repaired
2101 (Blewitt)	46,000	Cause of breach unknown, but heavy seepage and multiple boils were noted at the breach repair site during the 1998 high water event; 1- to 2-inch-wide longitudinal cracking noted along landside toe during 1997 event and was attributed to a pump pit. During the 1997 event, the levee sustained wavewash damage along the landside slope. A 3- to 4-foot vertical face in the landside slope was repaired after the event.

SOURCE: DWR, 2011a; PBI, 2013; USACE, 1961; USACE, 1968a, 1968b, 1968c, and 1968d.



SOURCE: U.S. Army Corps of Engineers, Sacramento District, 1999

Figure 3-5
Detailed View of Flooding Extent
1997

A levee failure at Finnegan Cut and two levee breaches on the San Joaquin River resulted in flooding within RD 2031 boundaries (USACE, 1999). The RD 2031 levee was breached approximately 1/8 mile north of Highway 132. Anecdotal information suggests that the levee probably breached after prolonged saturation and pressure from flood waters. The ground to the south of the District levee system is lower and only a portion is protected by a private levee. Additionally, in 1997, river flood flows inundated an area south of the District levee system, and reached the top of the District's southern levee section maintained by Mapes Ranch. This levee section also subsequently breached.

Water rose to within one foot of the crown of the RD 2091 project levee, and numerous boils north of Gomes Lake at an extreme bend in the levee and additional boils in other locations were noted. While the project levee did not fail, the Gomes Lake Dike did subsequently fail. A section of the levee back slope adjacent to the Gomes Lake Bypass Channel failed as well (PBI, 2013).

Four levee failures on the west levee along the San Joaquin River and levee failures in two locations along the east levee flooded the RDs 2099, 2100, 2101, and 2102 (USACE, 1999). RD 2101 has ongoing erosion problems on the riverbank in front of levee during high flow events. In one area this riverbank erosion has reached the toe of the levee. The USACE repair of the 1997 breach was not effective, and extensive seepage occurs at that location in high water events. An attempt by the USACE to address this problem was made by building up the river bank in front of levee, but was not completely successful (PBI, 2013). Another major issue in the 1997 flood was entry of flood waters into RD 2101 from the south over Highway 132. Private levees along the river south of RD 2101 were breached by the heavy flows flooding the area to the south of Highway 132. Flood waters up to 2-3 feet deep subsequently flowed over Highway 132 into RD 2101 (PBI, 2013). Downstream of the Mid SJR Region, water from the four breaches along the RD 2094 levee along the San Joaquin River flooded RD 2096. At the confluence of the San Joaquin and Stanislaus rivers, the levee along the right bank of the San Joaquin River along the RD 2064 boundary failed in two places. The levee along the right bank of the San Joaquin River failed in three places near the boundaries of RD 2075 (USACE, 1999).

In the 1997 flood, RD 1602 did not suffer a levee break. There was a significant boil and seepage on the levee section next to Westside Properties, a small group of residences within the district boundary. At the request of RD 1602, the USACE had previously placed a seepage berm behind the levee to prevent levee failure because of seepage. However, seepage continued beyond the berm and standing water did impact the Westside Properties structures. Flood waters impacted Las Palmas Avenue and nearby residences about one-half mile to the north of RD 1602, but did not approach its northern levee extension. Flood waters over Crows Landing Road entered RD 1602. When overbank flow from Salado Creek flooded portions of Patterson and surrounding areas, water was routed to RD 1602 through the local drainage network and resulted in flooding within RD 1602 lands.

Flood waters nearly reached the crown of the levee that runs along the south end of RD 2063, but the levees held. However extensive seepage and high flows in the slough that leads to the Victoria Pumping Station necessitated a pump installation while flooding was in progress.

A rural area of approximately 1,500 acres is located between the north boundary of RD 2092 and the south bank of the Tuolumne River. Several farms and structures and a mobile home park are located within this area. Privately constructed levees are present along the south bank of the Tuolumne River. The entire area is unincorporated without a reclamation district. In the 1997 flood, this area flooded when private levees failed on its upstream end. Structures were damaged and evacuation operations were necessary. At least one death was associated with this flooding (PBI, 2013).

The Newman and Patterson wastewater treatment plants (WWTPs) were affected by the 1997 flood. In the 1997 flood, water elevations to the east of the Newman WWTP plant reached within two feet of the crown of the City levee protecting the oxidation pond. Wave wash was a serious problem in that event, and the City has been slowly placing rip rap on the oxidation pond levee since, a project that is not yet complete. The Patterson WWTP did not flood in 1997, but after the event the City of Patterson placed fill to restore a significant erosion site on the bank of the San Joaquin River (Ignacio Lopez, personal communication, July 11, 2013; PBI, 2013).

Significant damages were sustained in Stanislaus, Merced, and San Joaquin Counties during the 1997 floods, totaling almost $166 million. **Table 3-6**, **1995 Flood Damages Sustained and Prevented**, includes damages to individual, public, business, road and bridge, and agricultural assets. Significant damages were also prevented in the San Joaquin River Basin. More than an estimated $331 million in damages were avoided because of the flood management infrastructure that is in place. New Melones Dam alone is estimated to have prevented nearly $176 million. The USACE reported that no lives were lost as a result of flooding in the Central Valley in 1997 (USACE, 1999), though local sources reported one death (PBI, 2013). Highway 132, a vital transportation link, was closed as a result of flooding in 1997, flooding that occurred because of a levee breach in RD 2031. After the 1997 event, it was also recognized by Stanislaus County that the Crows Landing and Las Palmas Avenue Bridges that cross the San Joaquin River are also vital transportation links from areas west of the San Joaquin River to hospitals and other services east of the river (PBI, 2013).

Table 3-6
1997 Flood Damages Sustained and Prevented

Damages Sustained ($1,000)[1]

County	Individual	Public	Business	Road	Agricultural	Total
Stanislaus	$20,680	$23,200	$3,650	$0	$30,832	$78,362
Merced	$0	$570	$0	n/a	$7,610	$8,180
San Joaquin	$46,500	$9,500	$10,000	n/a	$13,455	$79,455
Total Damages Sustained						$165,997

Damages Prevented

Project	Damages Prevented ($1,000)[1]
Lower San Joaquin River Levees	--
Friant Dam	$3,320
Hidden Dam	$5,670
Buchanan Dam	$2,180
Merced County Streams	$27,500
New Exchequer Dam	$86,210
Don Pedro Dam	$30,690
New Melones Dam	$175,770
Total Damages Prevented	$331,340

[1] Damages are in 1997 dollars. Prevented damages were calculated by USACE by subtracting residual damage, or the damage that did occur even with existing flood management infrastructure in place, from estimated damages that would have occurred without the existing flood management infrastructure in place.

SOURCE: USACE, 1999

3.2.5 Levee Repair Investments

The USACE has emergency management authority under PL 84-99, Flood Control and Coastal Emergencies (33 U.S.C. 701n) (69 Stat. 186). Under PL 84-99, the USACE may undertake disaster preparedness, emergency response, and rehabilitation, activities. **Table 3-7** includes a description of the rehabilitation assistance that the USACE provided after the 1997 flood. Rehabilitation assistance may have been provided after other flood events in the region or to other entities after the 1997 flood, but no records were obtained that described such assistance.

Table 3-7
Rehabilitation Assistance under PL 84-99 After 1997 Flood

Reclamation District	Year	Description of Repair	Cost
1602	1997	Restored west levee along SJR with compacted fill in 2 locations – Levee Mile 0.89 at Lake Ramona and Levee Mile 5.47 to Levee Mile 5.71.	$449,200
2063	1997	Restored east levee from Levee Mile 1.81 to Levee Mile 2.27 by filling wavewash-damaged areas with fill and resloping to 3:1. Sand boils were also remediated from Levee Mile 5.52 to Levee Mile 5.64 by constructing a gravel berm on the landside of the levee.	$1,060,000
2091	1997	Restored east levee along SJR after a breach from Levee Mile 0.00 to Levee Mile 0.05. Clay fill topped with aggregate course was used to repair the breach and the waterside and landslide slopes were reset at 3:1 and 2:1, respectively.	unknown
2092	1997	Repaired damage from Levee Mile 0.09 to Levee Mile 1.25 with fill material over filter fabric on the waterside and 1-foot of aggregate base course on the road shoulder.	$151,200
2100 and 2102	1997	Repair of 3 levee breaches	Phase I – unknown Phase II – $1,200,000 Phase III - $968,450

Note: Rehabilitation assistance may have been provided after other flood events in the region or to other entities after the 1997 flood, but no records were obtained that described such assistance.

SOURCE: USACE, 1997a-b, 2001 a-d, 2006, 2007, and undated

3.3 Entities with a Role in Flood Management

In the Mid SJR Region, most flood management activities occur at the local level with an overlay of broader planning and oversight occurring at the state and federal levels. At the local level, there are many agencies with discrete responsibilities and limited investment has been made to date in coordinating these for effectiveness and efficiency.

3.3.1 State and Federal Agencies

The oversight agency for flood management in the Central Valley is the Central Valley Flood Protection Board (CVFPB). The CVFPB mission is threefold, including to control flooding along the Sacramento and San Joaquin rivers and their tributaries in cooperation with the USACE; cooperate with various federal, state, and local agencies in establishing, planning, constructing, operating, and maintaining flood management works; and maintain the integrity of the existing flood management system and designated floodways through regulatory authority by issuing permits for encroachments. The USACE, United States Bureau of Reclamation (USBR), Merced Irrigation District (Merced ID), Turlock Irrigation District (TID), and Modesto Irrigation District (MID) own and operate reservoirs within the San Joaquin River Basin (Table 3-1). These agencies, particularly the USACE, have been involved in the study, design, and construction of flood management projects, which are often part of multiple purpose facilities (e.g., reservoirs also used for water supply).

The role of DWR is described in Chapter 1 of the CVFPP. Per California Water Code (CWC) Sections 8532 - 8533, the State has a responsibility to build and maintain flood management facilities along the Sacramento and San Joaquin rivers and tributaries to preserve the welfare of the residents and landowners within the reclaimed overflow basins in the Central Valley. Additionally, the State is responsible for responding to emergencies and public threats, and, therefore, has an interest in avoiding and mitigating known flood risks.

3.3.2 Local Maintaining Agencies

LMAs are any city, county, district, or other political subdivision of the State that is authorized to operate and maintain levees. Map 7, Local Maintaining Agencies, of the Atlas (Appendix A) includes the jurisdictional boundaries of all of the LMAs associated with the Mid SJR Region. Mid SJR Region LMAs include RDs 1602 (Del Puerto), 2031 (Elliot), 2063 (Crows Landing), 2091 (Chase), 2092 (Dos Rios Ranch), 2099 (El Solyo Ranch), 2100 (White Lake Ranch), 2101 (Blewitt), 2102 (Lara Ranch), and the TID. TID provides water for the irrigation of land within Merced and Stanislaus counties between the Tuolumne and Merced rivers and east of the San Joaquin River; it is one of the responsible entities for the levee and drainage facilities at Gomes Lake. Lands within Reclamation District Nos. 2099, 2100, and 2102 were purchased by the federal government and are now owned by the USFWS and managed as a part of the SJRNWR. Under the requirements of CWC Section 9140, DWR prepares the LMA Annual Report for submittal to the CVFPB each year by December 31. Per CWC Section 9140, each LMA must provide DWR with information regarding the levees that they operate and maintain by September 30 of each year. Refer to Appendix A for a description of the information that LMAs must submit annually to DWR. **Table 3-8**, **Facilities Maintained by Mid SJR Region LMAs**, includes a list of the levees that are maintained by LMAs with jurisdictional boundaries that overlap with the Mid SJR Region of the SPFC.

In addition to the LMAs described above, Stanislaus, Merced, and San Joaquin Counties and the Cities of Patterson, Newman, and Modesto have flood management responsibilities within the Mid SJR Region planning area. The General Plan for each of these cities and counties complies with Section 65300 of the California Government Code and identifies areas that are subject to flooding within the land use element; each addresses flooding in the safety and conservation elements. Each jurisdiction's regulations and flood management activities are briefly described below.

Table 3-8
Facilities Maintained by Mid SJR Region LMAs

Sub region	Area (acres)	LMA	Facilities Maintained				
			Levees	Total levees (miles)	2012 levee rating	Structures	2012 structure rating
A	8,851	**RD 2031** (Elliot)	7.15 miles of levee, left bank of the Stanislaus River; 6.04 miles of levee, right bank of the San Joaquin River	13.19	Minimally Acceptable	N/A	N/A
B	685	**RD 2101** (Blewitt)	3.20 miles of levee, left bank of the San Joaquin River; 0.31 miles of levee, right bank of the San Joaquin River	3.51	Unacceptable	N/A	N/A
C		**RD 2099** (El Solyo Ranch)	2.40 miles of levee, left bank of the San Joaquin River	2.4	N/A	N/A	N/A
	2,410	**RD 2100** (White Lake Ranch)	2.70 miles of levee, left bank of the San Joaquin River	2.7	N/A	N/A	N/A
		RD 2102 (Lara Ranch)	1.80 miles of levee, left bank of the San Joaquin River	1.8	N/A	N/A	N/A
D	1,003	**RD 2092** (Dos Rios Ranch)	3.76 miles of levee, right bank of the San Joaquin River	3.76	Acceptable	N/A	N/A
E		**RD 2063** (Crows Landing)	10.63 mile of levee, right bank of the San Joaquin River	10.63	Unacceptable	PP (Nelson Drain)	Unacceptable
	12,850	**RD 2091** (Chase)	7.59 miles of levee, right bank of the San Joaquin River; 0.33 miles of levee, San Joaquin River, bank n/a[1]	7.92	Acceptable	N/A	N/A
		NA 65 Turlock Irrigation District (TID)	0.30-mile Gomes Lake Spur Levee[1]	0 (counted as RD 2091)	N/A	PP (Gomes Lake)	Acceptable
F	2,968	**RD 1602** (Del Puerto)	6.29 miles of levee, left bank of the San Joaquin River	6.29	Unacceptable	N/A	N/A
			TOTAL	52.2			

1 DWR, 2012c indicates that this levee is associated with RD, 2091, not NA 65.

SOURCE: Mid San Joaquin River Regional Flood Atlas (Appendix A); DWR, 2012c (LMA Annual Monitoring Report).

3.3.3 Counties, Cities, and Flood Control Districts

Stanislaus County manages flooding through land use planning and regulations; provision of emergency response services and data used in flood risk analysis; and coordination with other agencies. Supervisorial Districts 2, 3, and 5 are relevant to the Mid SJR Region planning area (Stanislaus County, 2013a). Chapter 16.50, Flood Damage Prevention, of the Stanislaus County Code includes standards for construction, utilities, subdivisions, manufactured homes, recreational vehicles, and activities within floodways to minimize public and private losses because of flooding within special flood hazard areas within the unincorporated areas of the county. The Stanislaus County Office of Emergency Services; Chief Executive Office; Department of Public Works, Departments of Planning and Community Development and Public Works; and the Assessor's Office each play a role in managing flood risk and flood hazards within Stanislaus County. **Table 3-9, Stanislaus County Flood Management** includes a description of the responsibilities of each of the relevant parts of the Stanislaus County government.

Table 3-9
Stanislaus County Flood Management

Role	Department
Authority on mitigation planning, hazard response, and community issues; maintains historical data of past events; understands Emergency Operations Plans for the County and nine cities; coordinates and provides emergency services	Office of Emergency Services
Prepares and updates the Multi-Jurisdictional Hazard Mitigation Plan; provides inventory of current and future County facilities for hazard mapping, including insured value of each County-owned facility; provides information to the public regarding flood hazards	Chief Executive Office
Prepares and updates Safety and Housing Elements of the General Plan and Multi-Jurisdictional Hazard Mitigation Plan; establishes land use policy and regulation; develops mitigation goals and strategy	Planning and Community Development
Maintains inventory and valuation of public infrastructure including roads, traffic signals, drainage facilities, lighting facilities, bridges, and airports; GIS map creation, research, data collection, data verification, and hazard analysis	Public Works
Determines property values; shares database and resources for risk assessment analyses	Assessor's Office
Authority over land use decisions and land use planning	Board of Supervisors
Authority over land use decisions and land use planning	Planning Commission

SOURCE: Stanislaus County Multi-Jurisdictional Hazard Mitigation Plan, Updated 2010.

Merced County manages flooding through land use planning and regulations; emergency response planning and preparation; provision of information regarding flood risk, including Base Flood Elevation Certificates for specific parcels; and coordination with other agencies. Chapter 18.34, Special Flood Hazard Areas, of the Merced County Code includes floodplain management regulations. Provisions for flood hazard reduction are outlined in Section 18.34.050 and include standards for construction, utilities, subdivisions, manufactured homes, recreational vehicles, and activities within floodways. The Department of Code Enforcement, Development Services, Economic Development, Engineering, Planning, and Public Works are responsible for various aspects of flood management within Merced County. The County employs an emergency preparedness coordinator and convenes meetings of the Emergency Preparedness Committee each quarter. The Merced Streams Group and Merced Irrigation District collaborate with the

Merced County Public Works Department in operating and maintaining the flood management systems in Merced County (Merced County, 2013). The San Joaquin County Flood Control and Water Conservation District offers flood management services including providing floodplain map determination services to residents, realtors, lenders, and insurance agents; copies of FEMA elevation certificates; site visits to review flood and drainage issues and the Flood Zone Viewer, which is an online tool accessible from the County website that provides the designated flood zone for any address or Assessor's Parcel Number in San Joaquin County. The San Joaquin County website also includes flood emergency information, an informational video, FEMA contact information, historical flood area map, general flood protection information, and guidance on building within a floodplain.

The City of Patterson Public Works Department's flood management responsibilities include providing restrictions and regulations that govern use of floodplains; providing information on how property owners can protect themselves from flood damage; and providing information on the National Flood Insurance Program (NFIP) (Patterson, 2013). The City of Patterson Water Operations Division does not maintain levees and, therefore, does not report to DWR as part of the annual LMA report process. The Patterson Municipal Code includes regulations on flooding in Title 17, Flood Hazard Areas. Chapter 4.11, Floodplain Management, of the Patterson City Code includes regulations intended to reduce flood losses. The City Manager is the designated Floodplain Administrator and is responsible for development permit review; review, use, and development of base flood data; notification of other agencies regarding alteration or relocation of a watercourse; documentation of floodplain development; map determinations if conflicts in mapped boundaries arise; and remedial action for any violations of the regulations in Chapter 4.11. Departments that support the Floodplain Administrator in these duties include Building, Community Development, and Public Works.

The Orestimba Creek Flood Control District (OCFCD) has jurisdiction over a 17,652-acre area north of the City of Newman that includes a portion of the right bank of the San Joaquin River at the confluence with Orestimba Creek. The OCFCD was established in 1984 and has the responsibility for maintaining existing flood management facilities within its sphere of influence. Five directors are elected by local landowners to run the OCFCD and must hold title to land within the district boundaries (Stanislaus County, 2013b).

The City of Newman manages floods through land use planning, including serving as local sponsor in the Orestimba Creek Draft Interim Feasibility Study; land use regulations; a partnership with the Stanislaus County Office of Emergency Services; and coordination with local agencies such as the OCFCD. Chapter 4.11, Floodplain Management, of the Newman City Code includes local regulations on land uses within flood hazard areas as delineated by the Federal Insurance Administration or FEMA. Standards for construction, utilities, residential developments, recreational vehicles, building permits, and activities within designated floodways are outlined in Chapter 4.11 of the Newman City Code.

The City of Modesto manages flooding through land use planning and regulations; provision of emergency response services, data used in flood risk analysis, and annual flood fight training; and coordination with other agencies. The City of Modesto Municipal Code addresses the management of floods within Modesto jurisdictional boundaries in Chapter 4, Floodplain Management of Title 9, Building Regulations. Article 5, Provisions for Flood Hazard Reduction, outlines standards for construction, utilities, land development, placement of manufactured homes, recreational vehicles, and activities within floodways. Methods of reducing flood losses are listed in Section 9-4.104 and include restricting or prohibiting land uses which are dangerous to health, safety, and property because of water or erosion hazards, or which result in damaging increases in erosion or flood heights or velocities; requiring that land uses vulnerable to floods, including facilities which serve those uses, are protected against flood damage at the time of initial

construction; controlling the alteration of natural floodplains, stream channels, and natural protective barriers, which help accommodate or channel floodwaters; control of filling, grading, dredging, and other development which may increase flood damage; and prevention or regulation of the construction of flood barriers that unnaturally divert floodwaters or increase flood hazards in other areas. A representative from the City of Modesto sits as one of three individuals on the RD 2091 Board of Trustees. Modesto is contracted with RD 2091 to provide levee maintenance and limited emergency response (PBI, 2013). Departments involved in floodplain management include Community and Economic Development, Public Works, and Utility Planning & Projects.

3.3.4 Flood Management NGOs

Within the Mid SJR Region, there are several informal organizations with a flood management focus. The San Joaquin River Flood Control Association has the following stated purpose: "to improve the hydraulic capacity of the channels of the San Joaquin River in order to minimize the risk of damage to adjacent lands." At present, this ad hoc organization meets twice annually and includes participants from the entire length of the San Joaquin River. The Lower Tuolumne Farmers are another informal organization of approximately 30 families and landowners who are working with the Modesto and Turlock IDs to make sure that their needs are considered in Don Pedro's operational decision-making, including flood operations. Additionally, public-private partnerships have developed among the USFWS, Tuolumne River Trust, River Partners, and DWR to develop floodplain expansion and floodwater attenuation concepts in the region.

3.4 Emergency Response/ Public Safety

In an event of a flood, there are several layers of emergency response that are employed, as shown below in **Table 3-10 Flood Emergency Responders**, which depends on the location and type of flood emergency. There are two key separate components of flood response; levee flood fight operations and general public safety operations. Levee flood fight operations include emergency activities aimed at preventing failure of a levee during a flood or containing flood waters in the event of a levee does fail. Reclamation districts, where they exist, have jurisdiction for performing levee flood fight operations. Among local jurisdictions in the Mid San Joaquin River planning area, only the City of Modesto and some fire agencies are known to have participated in some way in levee flood fight operations. In regard to the other response component, public safety operations, fire agencies provide fire suppression and rescue and law agencies provide traffic control and security functions. Public warning and evacuation activities may be shared by multiple agencies depending on a jurisdiction's response plans. Overall, public safety operations within an area protected by a levee are performed by the local county or city agency, special purpose district (e.g., fire district), or community-based organization that has jurisdiction within that area. Other entities, as shown below in Table 3-8, also provide assistance during a flood emergency when requested. These various entities can help respond to a flood emergency by providing coordination between agencies, as well as personnel and equipment for flood fighting.

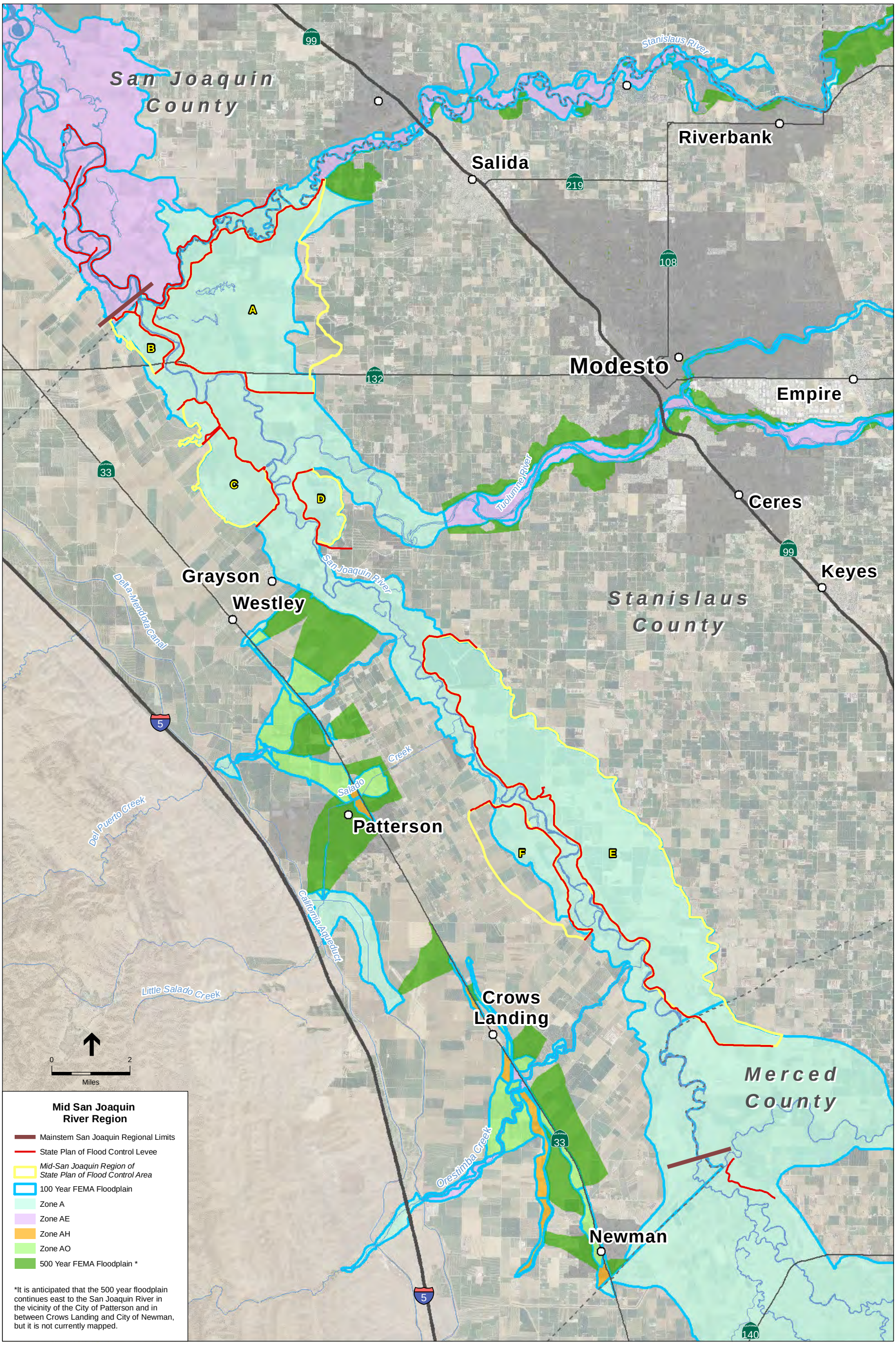
Table 3-10
Flood Emergency Responders, Mid SJR Region

Responder	Level	Comment
Person(s) or organization(s) on the site	0	Any emergency
Emergency services units of the cities in the region	1	Any emergency
Reclamation Districts 1602, 2099, 2100, 2101, 2102	1	Levees on the west bank of the San Joaquin River
Reclamation Districts 2031, 2063, 2091, 2092	1	Levees on the east bank of the San Joaquin River
Emergency services units of the counties in the region	1 or 2	Any emergency, and by request from Level 1 responders
Department of Water Resources	2	Flood Operations Center, flood fight and Corps liaison
California Emergency Management Agency, Inland Region	3	Any emergency, by request of county (operational area)
US Army Corps of Engineers	3	Specified water-related emergencies, by request of DWR
California Conservation Corps	3	Personnel and equipment for flood fight
Department of Forestry and Fire Protection	3	Personnel and equipment for flood fight
California Emergency Management Agency Headquarters	4	All emergencies, entire planning area, by request of Cal EMA Region

SOURCE: DWR, 2009.

3.5 Delineated Floodplain Boundaries

The 100-year floodplain is defined by FEMA as the area with a one percent annual chance of flooding, equal to a 26 percent chance of flooding at least once over the life of a 30-year mortgage. The FEMA 100-year floodplain within and surrounding the Mid SJR Region is shown in **Figure 3-6**, **100- and 500-year FEMA Floodplain within the Planning Area** and Map 16, FEMA 100-Year Floodplain, of the Atlas (Appendix A). The primary areas that have a one percent annual chance of flooding are identified by FEMA as Zone A or AE. As shown in Figure 3-6, the majority of the area along the San Joaquin River is designated Zone A. The Zone A designation is applied to areas where detailed analyses were not performed in delineating the 100-year floodplain boundary and, therefore, base flood elevations (BFEs) are not available for those areas. Zone A flood extents are typically estimated using observed flood extents or other simple methods. The 100-year floodplains along the Merced, Tuolumne, and Stanislaus rivers are classified as Zone AE, and this designation applies to the 100-year floodplain where detailed analyses were completed and BFEs are available. Some parts of the AE Zone may be identified as "Floodway," used to indicate the primary flow zone, where more stringent regulatory constraints apply. The identifier Zone AH is applied to ponded areas within the 100-year floodplain where average flood depths are between one and three feet and velocities are low. Zone AO applies to shallow flow areas within the 100-year floodplain where average flood depths are between one and three feet, but are subject to higher flow velocities. As shown in Figure 3-6, Subregions B, C, D, and E are located entirely within the 100-year floodplain boundary. Portions of sub regions A and F, or 7,524 and 1,475 acres, respectively, are within the 100-year floodplain boundary. Portions of the Cities of Modesto, Patterson, Newman, and a 1,550-acre area along the Delta-Mendota Canal between Patterson and Newman are located within the 100-year floodplain boundary. Subregions A through D are within a portion of the 100-year floodplain boundary that ranges from approximately 8.5 miles wide at the confluence of the San Joaquin and Stanislaus rivers along the northern extent of Subregion A, to about 0.9 miles wide near Grayson, downstream of Subregion D. Along Orestimba Creek, the 100-year floodplain extends approximately one mile to the north and south. The 100-year floodplains of the Stanislaus and Tuolumne rivers and Dry Creek extend into the City of Modesto by up to 0.5 miles in places.



SOURCE: USDA, 2012; ESRI, 2012; DWR, 2013; ESA, 2013.

Figure 3-6

100- and 500-year FEMA Floodplain within the Planning Area

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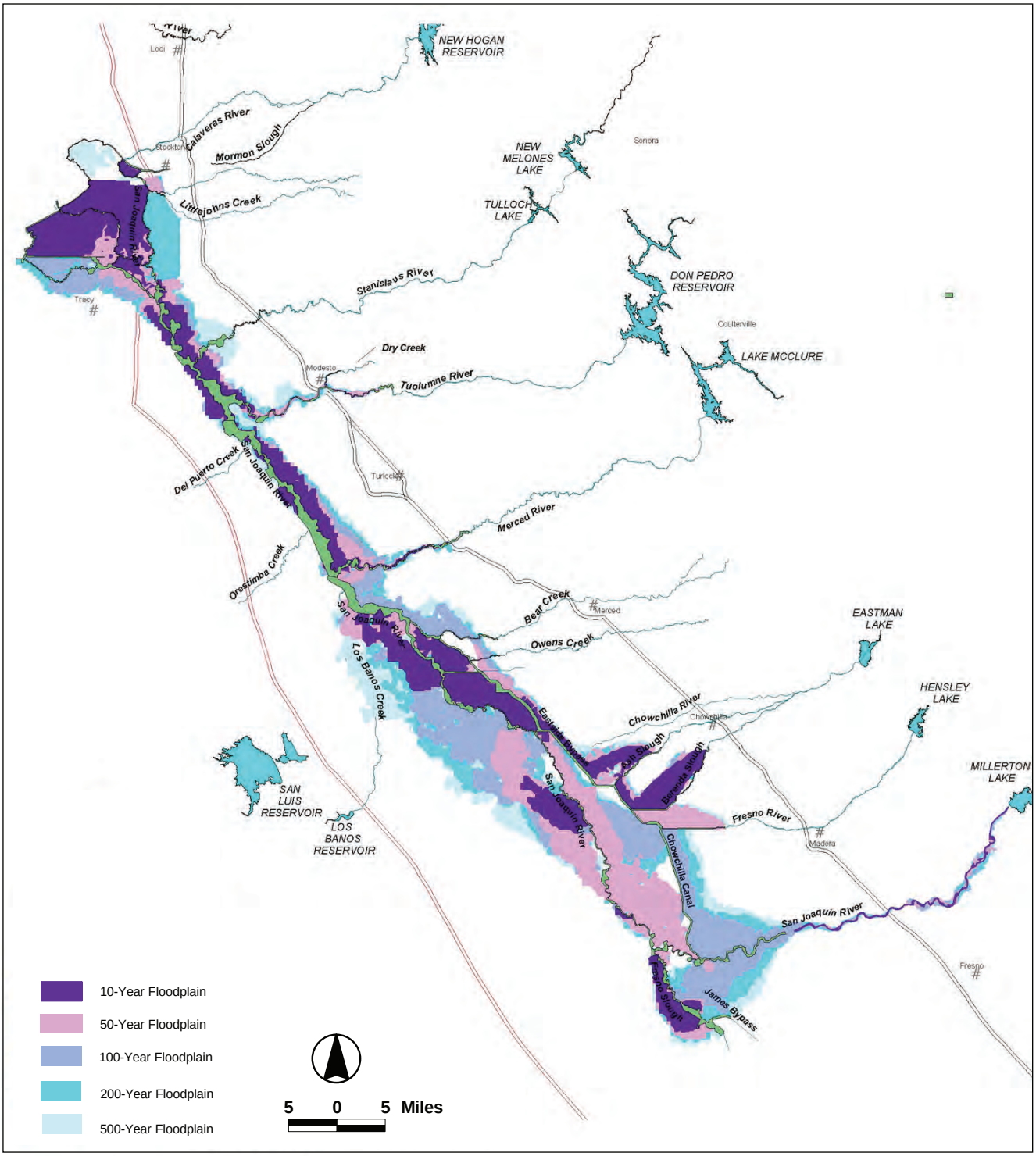
The City of Patterson is located within the 100-year floodplain of Del Puerto Creek, which flows north of the City of Patterson but breaks out to the south during very large flood events, as well as being influenced by breakout flows from the Hirschfield lateral entering the City from the south, which also generates flooding in Patterson during 100-year flood events. The community of Grayson is located along the left bank of the San Joaquin River and is not located within the 100-year floodplain. The City of Newman is within the 100-year floodplain of an irrigation canal that meets Orestimba Creek approximately 3.5 miles north of the City of Newman. The 100-year floodplain of the San Joaquin River also extends to the southwest edge of the City Newman. Portions of Modesto lie within the 100-year floodplain of the Stanislaus and Tuolumne rivers. Westley, Crows Landing, Turlock, Hilmar, Delhi, and Ripon are outside of any 100-year floodplain.

The 200- and 500-year (0.5% and 0.2% annual chance of occurrence, respectively) floodplains were delineated as a part of the Sacramento and San Joaquin River Basins Comprehensive Study (Comprehensive Study) prepared by the USACE (USACE, 2002). The 200- and 500-year floodplain boundaries as delineated in the Comprehensive Study are shown in **Figure 3-7**. The 500-year floodplain boundary is also delineated by FEMA and is provided in **Figure 3-6**. As shown in both figures, the 500-year boundary extends beyond the 100-year floodplain to many noncontiguous areas along the San Joaquin, Merced, Tuolumne, and Stanislaus rivers. Updated delineations of the 200-year floodplain boundaries within four defined regions of Central Valley have been completed as part of the DWR Central Valley Floodplain Evaluation and Delineation Program, as shown in **Figure 3-8**.

An updated Flood Insurance Study (FIS) that reexamines the extent of the 100-, 200-, and 500-year floodplains of the Tuolumne River and Dry Creek within, upstream of, and downstream of, the City of Modesto was recently completed. The floodplain boundaries delineated in the FIS will be used by FEMA to develop Preliminary Flood Insurance Rate Maps (FIRMs), which will undergo a 90-day public review. The Preliminary FIRMs will become Effective FIRMs after the FEMA mapping process is complete.

3.5.1 Designated Floodways (CVFPB)

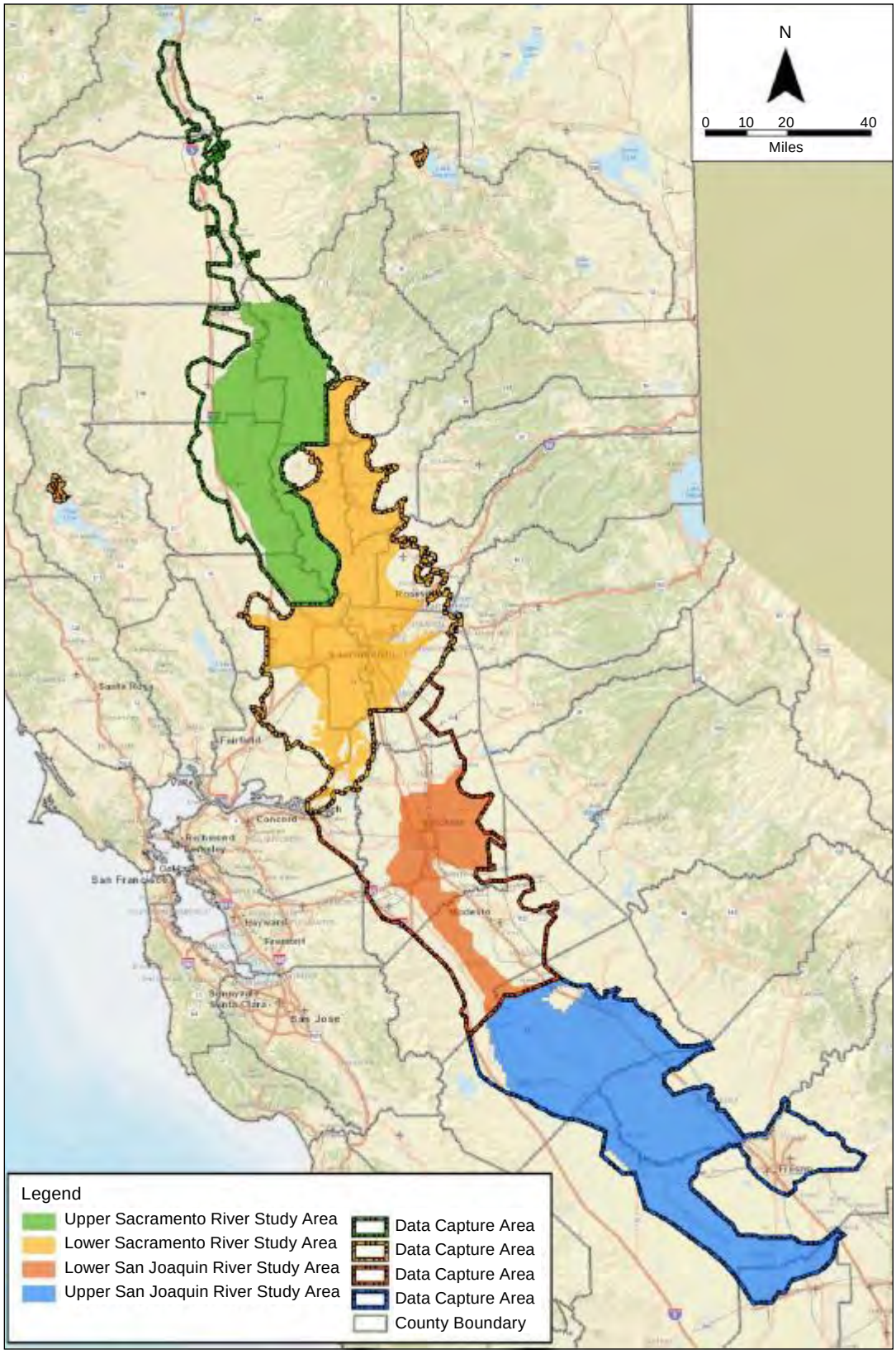
In addition to the regulatory floodplains and floodways designated by FEMA, California has its own system of Designated Floodways in the Central Valley. In this system, a Designated Floodway is the channel and the portion of the adjoining floodplain that is required for the passage of a design flood, which is the flood that the system is designed to adequately convey. It is also the floodway between existing levees as adopted by the CVFPB or the California Legislature. Projects within a Designated Floodway require an encroachment permit from the CVFPB. **Figure 3-9, Designated Floodways**, includes Designated Floodways within the planning area. As shown, in many areas, especially along the San Joaquin River, the extent of the Designated Floodways within the floodplains of the planning area is less than the effective 100-year floodplain as delineated by FEMA. This is the case because the levees in these areas provide varying levels of protection below that which would be required to convey 100-year flood flows. Maintenance of channel capacity in a Designated Floodway is the responsibility of the applicable RD.



Note: Composite floodplains shown do not include operational effects of headwaters reservoirs (storage facilities upstream of the major flood control reservoirs).

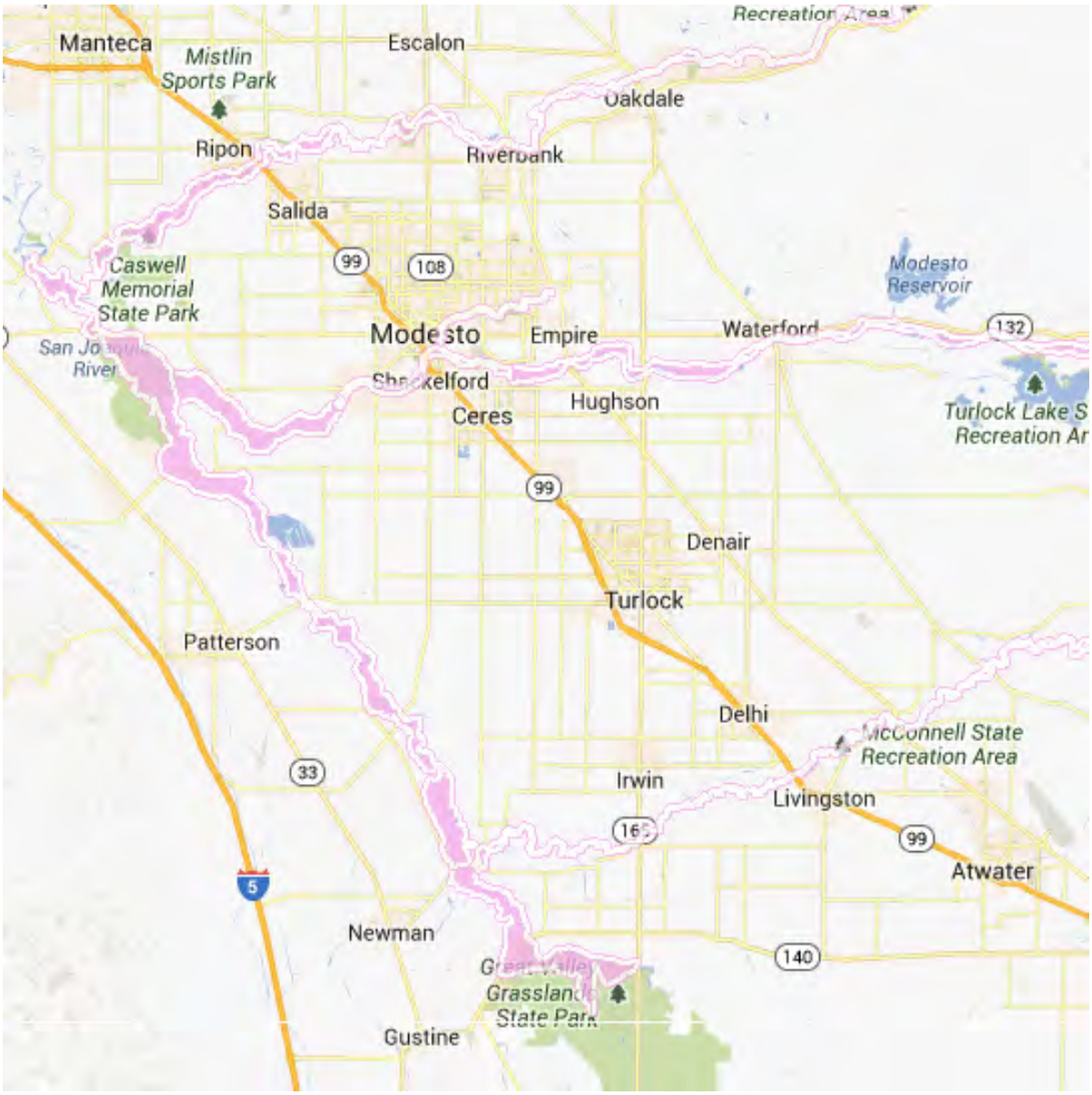
SOURCE: U.S. Army Corps of Engineers, 2001

Figure 3-7
San Joaquin River Basin
Floodplain Delineations



SOURCE: DWR, 2013

Figure 3-8
Central Valley Floodplain Evaluation and Delineation Program Boundaries



SOURCE: DWR, 2013

Figure 3-9
Designated Floodways

3.6 Channel Conveyance Capacity and Flood Forecast Monitoring Network

The conveyance capacity of a channel is the maximum rate of flowing water that can be conveyed by a river, canal, or bypass without exceeding a threshold value. As part of the Central Valley Flood Management Planning (CVFMP) Program, channel capacities were calculated along portions of the San Joaquin and Stanislaus rivers within the Mid SJR Region using a very limited hydrologic record from actual flood events without the consideration of temporal and spatial flow and depth variations. These capacities are shown on Map 17, Channel Capacities and Flood Forecast Monitoring Network, of the Atlas (Appendix A). It is important to note that the calculated capacities do not reflect vegetation changes, channel sedimentation/erosion, or flood system degradation (e.g., because of encroachments, settlement, subsidence) or improvements implemented after the occurrence of the historical floods used in the design capacity calculations (DWR, 2013a).

This analysis found that within the Mid SJR Region, 43 of 45 miles of river channel potentially cannot pass design flows, predominantly on the San Joaquin River (DWR, 2011c). The San Joaquin River upstream of the Tuolumne River to the Merced River confluence has a design capacity of 45,000 cfs, but an estimated current capacity of only 22,000 – 35,000 cfs. Downstream of the Tuolumne River to the Stanislaus River, the design capacity is 46,000 cfs, while the estimated current capacity is only 25,000 cfs. The lowest reaches of the Stanislaus River (11.9 miles) have a design capacity of 12,000 cfs, though the estimated conveyance capacity is far greater: 23,000 cfs. The lowest 0.6 miles of the Tuolumne River has a design capacity of 15,000 cfs. (Current conveyance capacity for the Tuolumne was not estimated; however, riverside landowners along the lower Tuolumne River report flood damages when flows exceed 8,200 cfs.) Where levees contain these flows, capacities are based on an overall engineering estimate of levee effectiveness, not levee overtopping alone (DWR, 2011b).

The levee and diversion systems along the San Joaquin River are not designed to contain the objective release from each of the upstream reservoirs simultaneously (USACE, 1999). An objective release is the maximum dam outflow allowed as specified in the USACE Water Control Plan. Objective flows are defined for a specific river reach based on local conditions, collaboratively with local entities, and intended to result in no damage to the system. Considerations in establishing objective flows may include levee stability, levee seepage, riparian habitat, and adjacent land uses (USACE, 1999).

Flood flow travel time is a key factor in flood management and unique in each system. Over time, sediment has accumulated within the northern portion of the San Joaquin River, which has decreased channel capacity and increased travel time. Water released from Friant Dam on the San Joaquin River takes more than five days to reach the confluence of the San Joaquin and Merced rivers and another two days to reach Vernalis. The travel time for water released from New Exchequer Dam on the Merced River is 42 hours to the confluence with the San Joaquin River. Releases from Don Pedro Dam on the Tuolumne River to Vernalis take approximately two days to travel to Vernalis. Discharges from New Melones Dam on the Stanislaus River take a little more than one day to pass through Vernalis (USACE, 1999). Rainstorms centered over the Merced, Tuolumne, and/or Stanislaus rivers take between one and two days to arrive at the San Joaquin River.

The DWR River Forecasting Section collaborates with the NWS California-Nevada River Forecast Center (CNRFC) in providing daily reservoir inflow, river flow, and water level forecasts throughout California and portions of Nevada. The DWR Flood Operations Branch and the NWS use these forecasts in determining the appropriate level of Federal-State flood response activation and operations. **Table 3-11** includes the flood stage categories at key river gages along the San Joaquin, Merced, Tuolumne, and Stanislaus rivers. At the San Joaquin River at Vernalis gage, which is downstream of the Mid SJR Region, seepage begins to occur when flows reach a stage of 21 feet[1]; seepage becomes severe at 26 feet; and at 37.3 feet, the levees overtop (NWS, 2013a). At the Newman gage of the San Joaquin River, seepage begins near the Newman WWTP at a stage of 62 feet; at 63 feet levee patrols are required; Sand Slough begins to flow when stage reaches 63.6 feet; the Fisherman's Bend Trailer Park north of Hills Ferry Road begins to flood at 65 feet; project flood stage is reached at 69.4 feet; the top of the levee that surrounds the Newman WWTP is reached at 70 feet; and at 71.7 feet, water reaches the top of the right bank levee (NWS, 2013b). Flood stage is reached at 71 feet on the Merced River at Stevinson (NWS, 2013c). On the Tuolumne River at Modesto, extensive flooding occurs when the river reaches a stage of 67 feet. Extensive damage could be caused to residential, industrial, and commercial properties within the City of Modesto at flows greater than 40,000 cfs (NWS, 2013d). At the Orange Blossom Road gage along the Stanislaus River, inundation of camp sites at Caswell State Park occurs when the river reaches a height of 10.5 feet; at 11 feet, the Orange Blossom Park begins to flood; and at 11.5 feet, access roads and park areas at Caswell State Park are flooded along with the lower areas within Orange Blossom Park (NWS, 2013e).

Table 3-11
Flood Stage Categories along the San Joaquin, Merced, Tuolumne, and Stanislaus Rivers

River Gage	Major Flood Stage (feet)[1]	Discharge (cfs)	Moderate Flood Stage (feet)[1]	Discharge (cfs)	Flood Stage (feet)[1]	Discharge (cfs)	Action Stage (feet)[1]	Discharge (cfs)
San Joaquin River at Vernalis	37.3	80,800	32	50,000	29	34,000	24.5	22,400
San Joaquin River at Newman	71.7	>25,800[2]	70.7	>25800[2]	69.4	>25,800[2]	63	13,200
Merced River at Stevinson	75	10,029	73.8	9,080	71	6,865	67	3,090
Tuolumne River at Modesto	67	39,400	66	35,300	55	11,200	50.5	7,340
Stanislaus River at Orange Blossom Bridge	22	>7,238[3]	21	>7,238[3]	16	>7,238[3]	13	>7,238[3]

1 Gage datum
2 Stage-Discharge records for San Joaquin River at Newman do not extend above 66.5 feet.
3 Stage-Discharge records for Stanislaus River at Orange Blossom Bridge do not extend above 12.4 feet.

SOURCE: NWS, 2013a-e; CDEC, 2014a-e

1 In this and each subsequent instance in this paragraph, river stage is presented relative to the gage datum.

3.7 Levee Conditions

Project levees, which are part of the State-Federal Flood Protection System, and non-project (local) levees are both key flood management features within the planning area.

Protection provided by SPFC levees is defined by levee flood protection zones (LFPZ) per the requirements of Assembly Bill 156 (AB156). An LFPZ is defined as the area that receives protection from a levee that is part of the SPFC facilities. There are generally three groups of LFPZs – areas that are subject to flooding from ponding of less than three feet deep, areas that are subject to flooding from ponding greater than three feet deep, and areas subject to flooding from channels or overland flow where the depth is unknown. Maps that define the boundaries of each type LFPZ were required under AB156. Map 3, Levee Flood Protection Zones, of the Atlas shows the LFPZ boundaries within the Mid SJR Region (Appendix A). The LFPZs associated with depths of more or less than three feet generally apply to areas surrounded by levees where the lateral extent of flooding can be easily identified. The boundary of the unknown depth LFPZ should not be considered precise because these areas are not surrounded completely by levees or other hydraulic controls, and, therefore, require more information to delineate. The Estimated Depth Less Than 3' LFPZ designation applies to 514,895 acres within the Mid SJR Region. The Estimated Depth Greater Than 3' LFPZ designation covers 788,158 acres. A large portion of the subarea of Mid SJR Region that extends into Merced County, or 343,636 acres, is characterized by the Depth Unknown LFPZ designation.

San Joaquin River flows that are less than the design flow may still result in levee damage and may seep through the levees and damage adjacent areas (USACE, 1999). The DWR Non-Urban Levee Evaluations (NULE) project included the evaluation of over 560 miles of project and non-project, non-urban levees within the San Joaquin River Basin, including those within the Mid SJR Region. The evaluation was the first phase of a project to characterize the condition of the levees generally within the Sacramento and San Joaquin River Basins, referred to as the North and South NULE study areas, respectively. The primary purpose of the NULE project was to evaluate SPFC levees and appurtenant non-SPFC levees to determine whether they met geotechnical criteria and identify measures to meet those criteria, if necessary. The first phase included non-intrusive studies followed by field explorations, testing, and more detailed geotechnical analyses on selected levees. The studies in Phase 1 of the South NULE project included comprehensive data collection efforts; the development of a database that included extensive records describing levee construction and performance during high flow events; field reconnaissance surveys along 560 miles of non-urban levee; geomorphic studies involving aerial photographs, vintage topographic maps, regional geologic maps, soil survey maps, and existing topographic data; development of the Levee Assessment Tool (LAT), which was used to assign hazard indicator scores that could be compared to past performance; coordination with local agencies, including interviews with over 40 LMAs; and development of conceptual remediation costs. The following four hazard categories were defined during LAT development:

- **Hazard Level A** – When water reaches the assessment water surface elevation (WSE), there is a low likelihood of either levee failure or the need to flood-fight to prevent levee failure.
- **Hazard Level B** – When water reaches the assessment WSE, there is a moderate likelihood of either levee failure or the need to flood-fight to prevent levee failure.
- **Hazard Level C** – When water reaches the assessment WSE, there is a high likelihood of either levee failure or the need to flood-fight to prevent levee failure.

- **Lacking Sufficient Data (Category LD)** – The segment is currently lacking sufficient data about past performance or hazard indicators to assign a hazard level, or there is poor correlation between past performance and hazard indicator scores.

Levees within the South NULE study area were divided into 114 segments, and each segment was evaluated according to four potential geotechnical failure modes – underseepage, slope stability, through seepage, and erosion. Hazard scores for each of the four failure modes were used to generate an overall hazard category designation for each levee segment. Each segment was also reviewed in terms of levee geometry, freeboard, and the history of overtopping (DWR, 2011a).

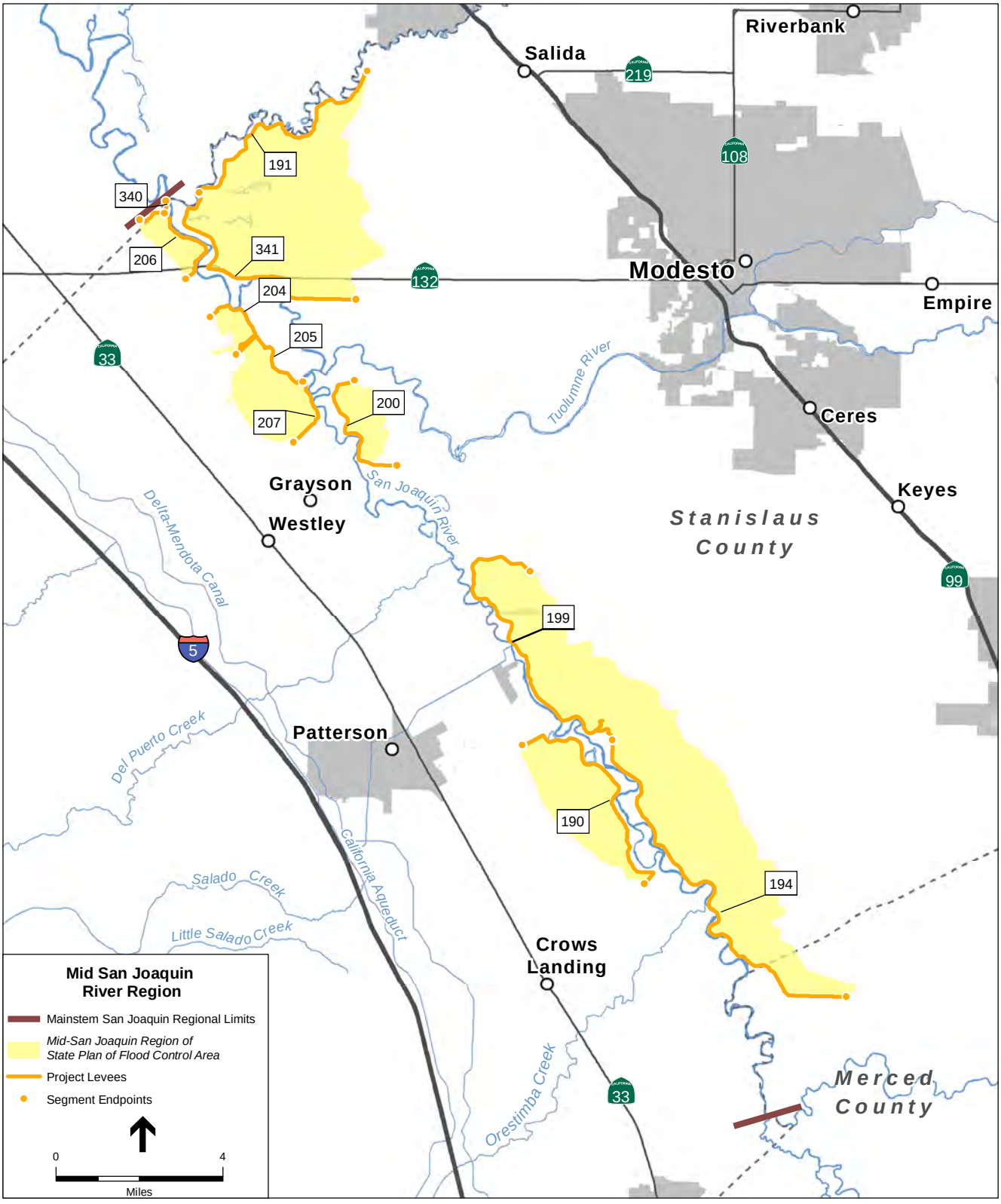
The hazard categories that were assigned to each of the 14 levee segments within the Mid SJR Region are provided in **Table 3-12**. **Figure 3-10** includes the location of each levee segment on a map. Most levees in the Mid SJR Region were identified as having a high likelihood of failure, or the need for flood fighting to prevent failure. Underseepage and through seepage are the dominant issue; the Hazard Category C is assigned to 11 and 10 of the 14 segments for each of these issues, respectively. Additionally, five segments were given the Hazard Category C for documented erosion. Levee Segment 5002 was given a hazard category of LD because while erosion sites were not observed during site reconnaissance, over-steepened waterside slopes are shown in Light Detection and Ranging (LiDAR) data. However, crest widths in the over-steepened areas are 20 to 90 feet generally, and review of topographic maps do not suggest a Hazard Level C for erosion hazard is appropriate along this levee segment. Detail is provided on the basis for each of the assigned hazard categories in Volume 3, Appendix C of the Geotechnical Assessment Report, South NULE Study Area (DWR, 2011a).

Table 3-12
NULE Hazard Categories Assigned to Levees within Mid SJR Region

	Potential Failure Mode			
	Underseepage	Stability[1]	Through Seepage	Erosion
Levee Segment	Hazard Category			
190	C	A	C	A
191	C	A	B	A
194	C	A	C	A
199	C	A	C	A
200	B	A	B	C
204	C	B	C	A
205	C	B	C	A
206	C	A	C	C
207	B	B	B	A
340	Not Assessed	Not Assessed	Not Assessed	A
341	C	A	C	C
5001 (non-project)	C	A	C	C
5002 (non-project)	C	A	C	LD (A/B)
5003 (non-project)	C	A	C	C

[1] Stability was assessed independently of through seepage and underseepage. Seepage might cause instability not accounted for in the stability assessment.

SOURCE: DWR, 2011a



SOURCE: USDA, 2012; ESRI, 2012; DWR, 2013; ESA, 2013

Figure 3-10

NULE Levee Segments within the Mid SJR Region

Map 11, Overall Levee Conditions, of the Atlas (Appendix A) includes a simplified representation of the condition of project levees within the Mid SJR Region as evaluated under the South NULE effort and supplemented with DWR annual inspection data and data from other sources, as presented in the December 2011 Flood Control System Status Report (FCSSR) (DWR, 2011c). The FCSSR included the following Levee Status Factors in the evaluation of the status of SPFC levees: inadequate levee geometry; seepage; structural instability; erosion; settlement; penetrations; levee vegetation; rodent damage; and encroachments. Four categories are included in Map 11: levees with lower, medium, or higher concern and those lacking sufficient data for a designation.

With few exceptions, the project levees within the Mid SJR Region shown in Map 11 are designated as being of higher concern. Levees along the entire river side of Subregions A, B, D, E, and F are designated as being of higher concern. Along the river side of Subregion C, 9,476-feet of levee are designated of medium concern and the remaining length of the levee (26,583 feet) is considered of higher concern. In addition to levees that form portions of the subregion boundaries, levees along the Tuolumne River upstream of Subregion D are labeled as being of higher concern. A spur levee (1,580 ft) at the northeastern corner of Subregion B and a 1,556-foot length of levee along the right bank of the Stanislaus River across from and just upstream of Subregion A are characterized as being of lower concern. Levees directly across the majority of Subregion A, along with those downstream of the Mid SJR Region, are shown in Map 11 and characterized as being of higher concern, with the exception of two short levees in that area that are labeled as being of lower concern.

The locations of project levees having known issues with seepage, slope instability, and erosion are shown in Maps 12, 13, and 14, of the Atlas, respectively (Appendix A). As shown in Map 12, seepage issues occur along levees within Subregions A, B, E, and F. Levee seepage is not currently an issue within Subregions C and D. Problems with slope instability are noted at one location within Subregion A, four locations within Subregion D, three locations, one of which is a 7,000-foot levee segment, within Subregion E, and two locations along Subregion F. Erosion is an issue within Subregions A (5 instances), B (3 instances), E (2 instances), and F (6 instances).

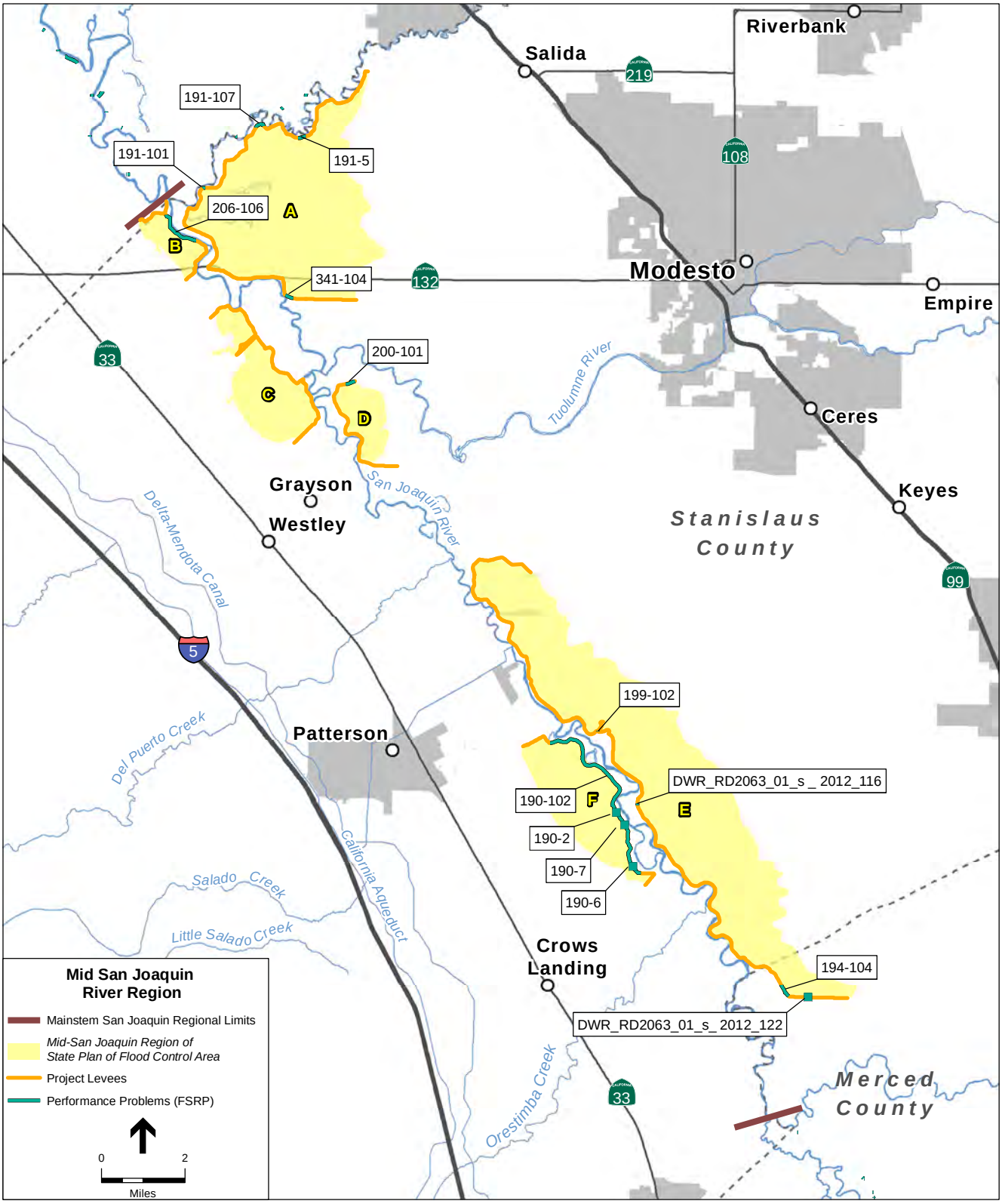
Map 15, Other Past Performance Problems, of the Atlas (Appendix A) includes the locations of documented performance problems with project levees that are not associated with seepage, slope instability, and erosion. **Table 3-13** includes brief descriptions of the performance problems shown in Map 15 and **Figure 3-11**, the latter of which includes labels to identify the location of each performance problem. As described in Table 3-11, these past levee performance problems relate to animal burrows, historic breaches, installed berms, pipe penetration, damage because of farming activities, and available freeboard.

Table 3-13
Other[1] Past Levee Performance Problems

Subregion	Flood System Repair Project (FSRP) Point of Interest (POI) No.	Performance Problem
	191-5	1969 observation of squirrel burrows in landward slope. No significant damage to the levee from animal burrowing was observed in this area during the 2012 site reconnaissance.
A	191-101	Site of 1969 levee breach. According to the RD 2031 representative, no seepage or boils have been observed in this area since 1978. No indications of slope instability were observed during 2012 site reconnaissance.
	191-107	Site of 1969 breach. According to the RD 2031 representative, no seepage or boils have been observed in this area since 1978. No indications of slope instability were observed during 2012 site reconnaissance.
	341-104	Three breaches occurred in this area in 1997 and were repaired by the USACE. According to the RD 2031 representative, there has been no flood fight subsequent to the breach repair. A few medium to large burrows were observed on landside and waterside slopes.
B	206-106	Site of 1969 levee break. According to the RD 2101 representative, the site was repaired by USACE. Seepage was observed in the area in 1997.
C	n/a	n/a
D	200-101	Berm placed on waterside shoulder in 1997 to prevent overtopping. Portions of a berm on the waterside shoulder were visible during 2012 site reconnaissance. A 12-inch-diameter irrigation pipe penetrating near the top of the levee and light poles on the slope were also noted.
E	194-104	Levee toe is cut about 12 inches, apparently by farming activities.
	199-2	A 6-inch-diameter vertical hole was noted in the middle of the levee crown in 2009. No damage was observed in this area during 2012 site reconnaissance.
	199-102	Per 1997 flood damage assessment inspection report, the spur levee broke and the repair was completed in 1997.
	DWR_RD2063_01_s _ 2012_116	Minor cut by the farmer at the toe, about 24 inches, access roads on landside and waterside, erosion on the waterside is minor.
	DWR_RD2063_01_s _ 2012_122	The landside toe is cut by farming activities, encroaching into the levee prism about 5 feet high and 150 feet long. The cut is in an area where the levee extends away from the river towards high ground.
F	190-2	About 4 to 5 feet of freeboard at this location during the 1997 flood event. The RD 1602 representative indicated this location is just where the 1997 observation was made and that in 1997 there was about 4-5 feet of freeboard along most of the levee. No additional field data were obtained during 2012 site reconnaissance. This POI should be considered for removal from the FSRP POI list.
	190-6	Animal burrows throughout waterside slope in 1997. Animal burrows were observed throughout this area and in the remaining portions of the levee segment. This area appears to be a little lower elevation than upstream and downstream areas. This area experiences very little hydraulic head (about 1 foot) at the Geotechnical Assessment Report (GAR) assessment water surface elevation. POI 190-6 is within the extent of POI-102 which also documents extensive animal burrowing. POI 190-6 should be considered for removal from the FSRP POI list.
	190-7	Sandbags placed in rodent holes on waterside slope in 1997. Major rodent activity was noted in the area. No evidence of sandbags or excessive burrowing were observed at this location during 2012 site reconnaissance. Burrowing was noted as a problem throughout the levee segment, but appears to be a local maintenance issue. The extent of POI 190-7 is within the extent of POI-102 which also documents extensive animal burrowing. POI 190-7 should be considered for removal from the FSRP POI list.
	190-102	Burrows were evident throughout levee segment during 2012 site reconnaissance and appear to be a local maintenance issue.

[1] "Other" refers to performance problems with project levees that are not associated with seepage, slope instability, and erosion.

SOURCE: DWR, 2012b



SOURCE: USDA, 2012; ESRI, 2012; DWR, 2013; ESA, 2013

Figure 3-11

Locations of Other Past Levee Performance Problems

3.8 Identified Flooding and Flood Hazards

Identified flood hazards within the Mid SJR Region are located within the Cities of Modesto, Patterson, and Newman; agricultural lands that surround those cities; flooding also occurs on lands managed to preserve habitat along the San Joaquin, Tuolumne and Stanislaus rivers. This section includes a description of known flood hazards. Some flood hazards are the result of cloudburst storms on small watersheds in populated areas; others are because of high river flows resulting from large storm systems interacting with flood management reservoirs and deficient levee systems. The most devastating floods within the Central Valley are caused by warm Pacific storms that sweep in from the west or southwest, picking up moisture over thousands of miles of ocean, causing torrential rains when intercepted by the mountains surrounding the Central Valley (DWR, 2012a).

As shown in **Figure 3-12**, land uses within the 500- and 100-year floodplain include urban; rural and semi-rural agricultural; native vegetation and grazing land; farmland of prime and Statewide importance; local and unique farmland; and confined animal agriculture. **Table 3-14** includes the area in acres associated with each of these land uses within the 100-year floodplain boundary. During the 100-year event, some degree of damage to a significant portion of the assets within the 100-year floodplain lands could occur. **Table 3-15** includes the population, households, number of parcels, and total value of assets within the 100- and 500-year floodplains in Stanislaus County. **Table 3-16** includes a summary of flood hazard exposure information for Stanislaus County.

3.8.1 City of Modesto

Flood risk within the City of Modesto is a result of proximity to the Tuolumne and Stanislaus rivers and Dry Creek as well as the operations of large reservoirs on the rivers. The Tuolumne River represents the greatest flood threat to Modesto, particularly when flows are high in the Tuolumne River and rain is heavy in the Dry Creek watershed (FEMA, 2008). During large winter rainstorms, Dry Creek contributes significant but short duration flood flows to the Tuolumne River (McBain and Trush, 2000). Flooding along the Tuolumne River occurs as a result of rainstorms from November through March and snowmelt from April through May. Snowmelt floods along the Tuolumne River have lower peaks that those generated by rain, but are longer in duration with a greater volume of water.

The 2010 – 2015 City of Modesto Local Hazard Mitigation Plan (LHMP) identifies the Modesto City-County airport, schools, utility infrastructure, emergency services, agriculture, sanitation facilities, and residential development as potentially affected by flooding within the city. On one or more occasion each winter, flood water backs up on Morton Boulevard, a minor street, from underneath the La Loma Bridge at the confluence of the Tuolumne River and Dry Creek and exposes a number of houses along Dry Creek to potential flooding. In addition to flooding because of structural failure or levee overtopping, the failure of New Melones, Don Pedro or LaGrange Dams would cause severe flooding within Modesto that would be expected to result in injuries, loss of life, limited transportation routes, and utility services. The Modesto LHMP includes a series of policies that form a mitigation strategy to manage flood risk in the City (Modesto, 2011). Specific flood management projects that have been identified within the City of Modesto are provided in Chapter 7, Proposed Regional Improvements, of this plan. These include the Northeast Storm Drainage Interceptor Project and improvements to the City of Modesto wastewater treatment facilities.

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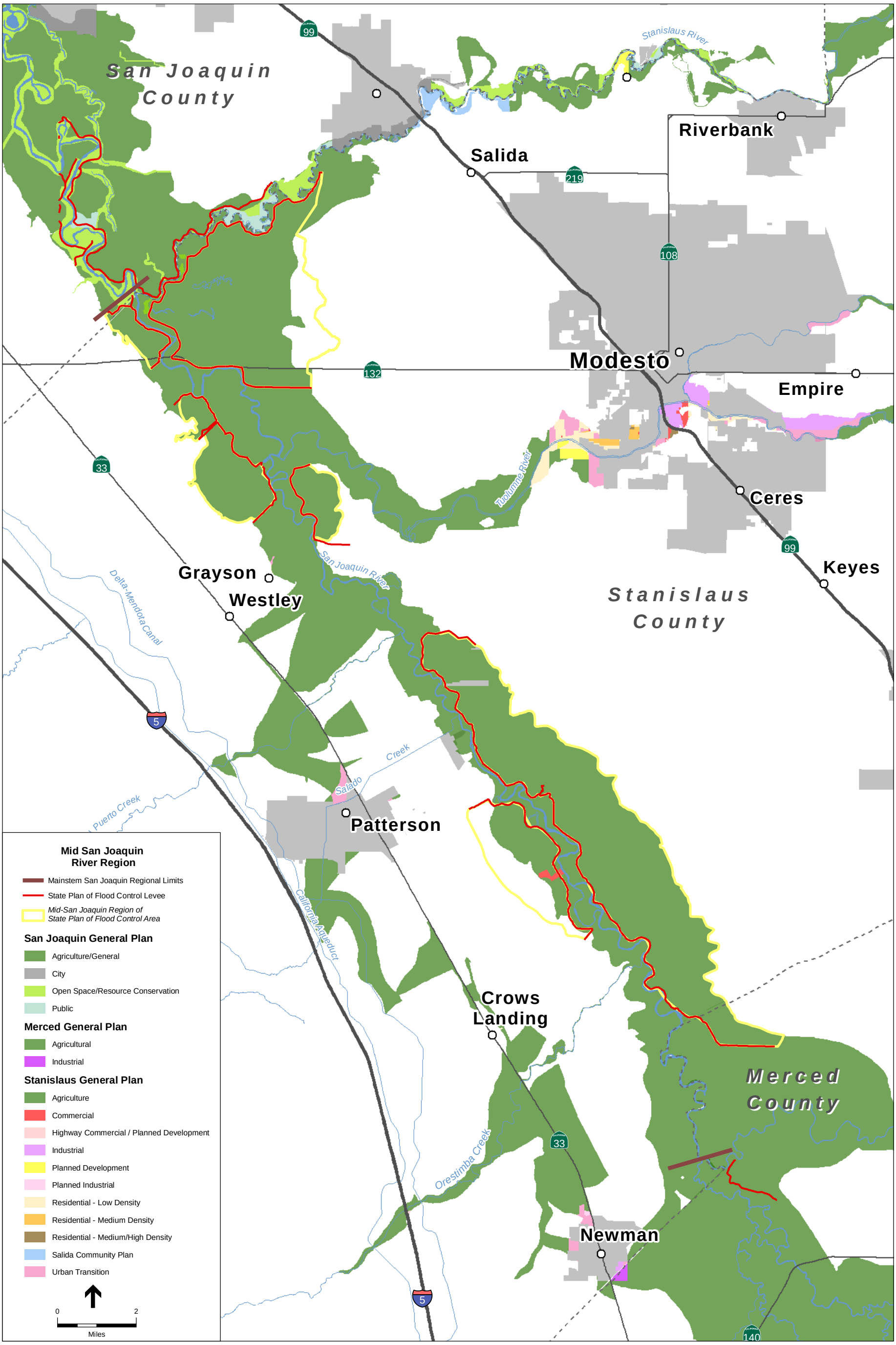

SOURCE: USDA, 2012; ESRI, 2012; DWR, 2013; ESA, 2013

Figure 3-12

General Plan Land Uses within 100- and 500-year FEMA Floodplains

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Table 3-14
Area Covered by Land Use Types within 100-year Floodplain in Mid SJR Region

Land Use Category[1]	Acres of Land Type	% of Total Area
Urban and Developed Land	1,264	5%
Native Vegetation and Grazing Land	4,955	19%
Local and Unique Farmland	6,831	26%
Prime and Statewide Importance Farmland	12,134	47%
Confined Animal Agricultural Land	561	2%
Rural and Semi-Agricultural Land	193	1%
Total	25,936	100%

1 See Appendix A for descriptions of how land use categories were defined.

SOURCE: Mid San Joaquin River Region Flood Atlas (Appendix A)

Table 3-15
Population and Assets within 100- and 500-year Floodplains in Stanislaus County

River	Population	Households	Number of Parcels	Total Value
100-year Floodplain				
Del Puerto Creek	248	71	139	$49,686,842
Dry Creek	747	273	146	$143,550,227
Orestimba Creek	588	223	189	$48,685,552
Salado Creek	38	10	31	$8,795,382
San Joaquin River	2,354	676	630	$149,520,110
Stanislaus River	2,322	892	268	$117,176,939
Tuolumne River	4,766	1,566	974	$187,806,940
500-year Floodplain				
Del Puerto Creek	375	112	194	$62,664,305
Dry Creek	747	273	149	$149,644,108
Orestimba Creek	927	338	300	$77,913,338
Salado Creek	221	70	67	$16,659,356
San Joaquin River	2,408	694	668	$166,250,814
Stanislaus River	2,460	943	465	$200,322,760
Tuolumne River	11,177	3,555	2,162	$578,719,622

SOURCE: 2010 Multi-Jurisdictional Hazard Mitigation Plan

Table 3-16
Stanislaus County Flood Hazard Exposure

County Statistics

Total Acreage	970,172
Total Population	447,034
Total Structures	151,500
Total Value of Structures and Contents	$38.8 billion
Total Agricultural Acreage	376,858
Total Value of Crops	$857.3 million

Summary of Exposure to Flood Hazard

	100-year event	500-year event
Exposed Area (acres)	61,984	81,320
Percent of Area Exposed	6	8
Population Exposed	14,544	36,621
Percent of Population Exposed	3	8
Structures Exposed	3,879	10,434
Total Depreciated Replacement Value of Exposed Structures and Contents	$802.2 million	$2.2 billion
Exposed Crops (acres)	40,331	54,493
Value of Exposed Crops	$54.4 million	$91.8 million
Department of Defense Facilities Exposed	0	0
Essential Facilities Exposed	6	23
High Potential Loss Facilities Exposed	1	1
Lifeline Utilities Exposed	1	1
Transportation Facilities Exposed	37	51
Transportation Segments Exposed (miles)	29	40
Native American Tribal Land Exposed (acres)	0	0
Total Sensitive Plant Species Exposed	19	19
Total Sensitive Animal Species Exposed	34	34

SOURCE: Figure D-99 Summary of Available Flood Types, Flood History, and Flood Hazard Exposure, Stanislaus County

The City of Modesto treats wastewater at two facilities, the Sutter Avenue Primary Treatment Plant along the right bank of the Tuolumne River adjacent to Bellenita Park and the Jennings Road Secondary Treatment Plant on the right bank of the San Joaquin River. These facilities are at a relatively high risk of flooding because they are located along the Tuolumne and San Joaquin rivers. As part of one alternative to plant upgrades in the 2007 Wastewater Treatment Master Plan Update, a concrete-wall construction levee was proposed that would be built along the river side of the Sutter Avenue Primary Treatment Plant to an elevation of 70 feet and provide approximately two feet of freeboard over the 100-year floodplain elevation. A berm levee was described for the north, east, and west boundaries of the facility. The potential for the concrete-wall levee to result in flooding upstream was acknowledged, and an alternative

was also considered in the form of fill placement to protect primary treatment facilities from the 100-year event as well as reduction in the size of the sludge drying beds (Modesto, 2007). A supplement to the 2007 Wastewater Treatment Master Plan was released in 2008, and noted the need for improvements to existing flood management levees at the Sutter Avenue plant because of seepage from the Tuolumne River that impacts irrigation fields during high flows. It was also acknowledged that seepage may be a threat to the foundation of the chlorine building, and that levee stability improvements are warranted where sand boils have occurred, as well as improvements to control subsidence at the building and a new retaining wall (Modesto, 2008). A feasibility study is currently underway to evaluate potential solutions to flood hazards at the Sutter Avenue and Jennings Road treatment plants. Initial analysis under the ongoing feasibility study indicates that providing 200-year protection at the Sutter plant may be economically feasible, and the City is considering the option of attaining a 200-year level of protection instead of the 100-year level of protection that has been considered previously. The City is also considering a concrete-wall construction levee at the Jennings Road Secondary Treatment Plant similar to what is described above for the Sutter Avenue plant (Laura Anhalt, personal communication, September 26, 2013). Information on potential flood management improvements that the City of Modesto is in the process of exploring is provided in Chapter 7, Proposed Regional Improvements, of this plan.

3.8.2 Westside Tributaries; Cities of Patterson and Newman

Flooding within Patterson and Newman can occur as a result of rainstorms originating over the Pacific Ocean generally from October through April. These rainstorms can deliver precipitation to one or more of the Westside tributary drainages of the San Joaquin River - Orestimba, Salado, and Del Puerto creeks. In instances of heavy precipitation in one or more of the Westside tributary watersheds, flooding characterized by high peaks, moderate duration, and a large runoff volume can occur. Downstream of the Diablo Range foothills, the carrying capacity of Orestimba, Salado, and Del Puerto creeks is reduced because of siltation and vegetation (FEMA, 2008). Flooding is primarily in the form of sheetflow that is generally less than two feet in depth with an unpredictable flowpath. Cloudburst storms in this area are rare and generally result in minor flooding. Streamflow records for Orestimba and Del Puerto creeks are relatively short (1932 and 1959 to present day, respectively), and Salado Creek does not have a streamflow gage.

Historic and contemporary accounts of flooding within Patterson and Newman are relatively few. The largest flood on record was in April 1958, with a peak flow of 10,200 cfs at the Orestimba Creek at Newman gage. That event resulted in damage to agricultural facilities in the Orestimba Creek Basin as well as public, commercial, and residential assets within the Salado Creek Basin. Evacuation of residents and flood fighting with sandbags was required in both basins. The most costly flood within the Westside tributary area prior to the costly 1995 flood event (see Section 3.2.3 for a description) was in February 1980, resulting in nearly $340,000 in damage within the Orestimba Creek Basin and $1 million within the County's Westside region. A flood in December 1955 caused significant damage to agricultural, residential, and commercial properties; roads and culverts; and SPRR ballast (railbed) and ties as well as breaks in the Delta-Mendota Canal.

In February 1959, Patterson received more than two inches of rain within 24 hours. Flooding from Orestimba Creek eroded the west Anderson Road Bridge embankment, resulting in cracks in the bridge. In that event, floodwater from Del Puerto Creek felled several telephone poles and lines and washed out a canyon bridge east of Interstate 5. Within Patterson, pumping was required to remove flood waters from local streets.

Approximately six inches of rain within the Orestimba Creek Basin in early February 1963 inundated 2,000 acres of farmland four to five miles north of Newman, which caused erosion and silt and debris deposition. Additionally, erosion occurred at the Delta-Mendota Canal siphon and the approaches to both road and railroad bridges. In January 1969, three to five inches of rainfall caused erosion, sediment deposition, and impacted walnut orchards. A Salado Creek embankment south of Patterson failed in March 1983, and State Highway 33 was inundated north of town. The evacuation of some Patterson residents was carried out during that event.

Orestimba, Salado, and Del Puerto creeks are each constricted at the Delta-Mendota Canal, and floodwaters pond to the west of the canal as a result. The overchute that allows Salado Creek flows to pass over the Delta-Mendota Canal, located approximately three miles upstream of Patterson, has a capacity of 710 cfs, or approximately the 50-year event (two percent annual change of occurrence) (FEMA, 2008). The overchute constricts Salado Creek flood flows when it is active. Ponding at Salado Creek is diverted to the southeast for a few miles where flood flows reenter the creek, but add significantly to flood flows near the Naval Auxiliary Landing Field northwest of Crows Landing. The channel capacity of Salado Creek downstream of the overchute is 300 cfs, and high flows exceed the banks at several locations southwest and west of Patterson. Flood flows do not return to Salado Creek because the floodplain slopes away from the channel and small levees would block the return. Sheetflow from Salado Creek enters Patterson from the west, and generally flows from southwest to northeast. Ponding occurs within Patterson along the SPRR embankment because it is three feet higher than the land surface and existing drainage structures are not effective. When all three Westside tributaries are generating overland flow, the severity of flooding in Patterson in these areas is intensified, and substantial ponding of floodwaters occurs where channel, culvert, and bridge capacities are insufficient, particularly along levees, County road embankments, and the SPRR. In these instances, floodwater ponding is generally deeper than overland flow, and either overtops the obstruction, is directed along the obstruction, or dissipates by seepage and evaporation.

The City of Patterson WWTP is located on the left bank of the San Joaquin River just north of the East Las Palmas Avenue/West Main Street river crossing and across the river from RD 2091. The WWTP is located on a low bench 2-3 feet above a lower section of river bank that extends approximately 300 yards to the river channel. Past high flows on the San Joaquin River have flooded the lower riverbank area on the east side of the plant. In the modest 2011 high flow event, flood waters are reported to have reached the base of a fence that surrounds the plant. After the 1997 flood, the City placed fill to restore a significant site of riverbank erosion. Continued erosion of the riverbank could result in greater flood risk at the WWTP. High flow events result in a spike in inflows to the WWTP, probably through interconnections with the stormwater system in Downtown Patterson. The problem is greatest when rain in the Coast Range cause Salado Creek to overflow. In 1997, these greatly increased inflows into the plant caused continuing problems with the maintenance of

biological treatment processes. During heavy rains December 2012, the inflow into the plant reached the capacity of 2.25 million gallons per day. The plant currently does not have the capability to bypass excessive flows in its sewage lines into larger existing storage ponds. In an excessive inflow situation, the plant operator may have to sacrifice one or more treatment processes to try to contain the water. The potential exists for discharge of inadequately treated waste into the river and extended failure of treatment capability. The plant manager estimates that after surges in inflow, it could take up to 30 days to restore the biological communities used in secondary treatment of wastewater at the plant. The City is currently developing a master plan that will guide future development of the facility and this municipal function (PBI, 2013).

Orestimba Creek, one of the Westside tributary drainages cited above, is a primary source of flooding in Newman. The problem is sufficiently severe to have led to a recent USACE investigation of possible fixes. The following three problems were identified in the Orestimba Creek Draft Interim Feasibility Study (USACE, 2012):

1. There is a high probability of flooding which threatens public health and safety in the City of Newman and surrounding rural areas.

2. The City of Newman and surrounding agricultural land have incurred damages from past flooding. The March 1995 event resulted in approximately $7.8 million in damages (2011 dollars) to agricultural land and crops, residential and commercial properties, the Delta-Mendota Canal, the Central California Irrigation District (CCID), bridges, and road crossings.

3. The Orestimba Creek channel has been altered by human activity (sand and gravel extraction and farms encroaching on banks). The capacity of the channel has been increased between the Delta-Mendota Canal and Jorgensen Road, and the channel slope reduced between Jorgensen and Morris Roads. There is significant transport capacity and reduced sediment load downstream of Jorgensen Road, which may be why the local channel geometry has changed in the recent past.

During events between the 3- and 10-year (33% and 10% annual chance of occurrence, respectively), flows begin to exceed channel capacity downstream of Jorgensen Road and inundate adjacent agricultural land. Floods greater than the 10-year event are diverted 2.5 miles from the channel into Newman. Overland flow collects along the CCID Main Canal on its west side and the California Northern Railroad (CNRR) embankments. Water is then conveyed south along Highway 33 and the CNRR berm to Newman. Flows continue over the highway and railroad berm, over fields and farm roads, and finally to the San Joaquin River. Local topography and the shallow, unconfined nature of flooding in this area cause the exact course of floodwater to be unpredictable (USACE, 2012).

San Joaquin River flows also pose a flood hazard to the Newman WWTP, which is located one mile northeast of Newman along the left bank of the San Joaquin River on Hills Ferry Road. When stage in the San Joaquin River reaches 62 feet above msl, landside seepage begins near the Newman WWTP. At 70 feet above msl, the river reaches to the top of the levee that surrounds the Newman WWTP (NWS, 2013b). A description of potential flood management improvements that the City of Newman is exploring for the Newman WWTP is provided in Chapter 7, Proposed Regional Improvements, of this plan.

Landowners along Del Puerto Creek have concerns regarding flood risk and potential property damage. They recognize the need for a coordinated effort to improve flood management along Del Puerto Creek, but lack sufficient resources. The West Stanislaus Resource Conservation District notes similar issues along Orestimba Creek (Matthew Danielczyk, personal communication, 2013). Stakeholders suggest that there is potential for an organized group of landowners, resource conservation districts, and other

stakeholders, including organizations such as Audubon California, to form and begin to address flood hazards within the Del Puerto Creek, Orestimba Creek, and Solado Creek watersheds. A description of a potential regional improvement addressing this opportunity is provided in Chapter 7, Proposed Regional Improvements, of this plan.

3.8.3 Managed Environmental Lands

Many environmental lands along waterways in the Mid San Joaquin River corridor are intended to flood, including lands within the SJRNWR and at Dos Rios Ranch at the confluence of the Tuolumne and San Joaquin rivers. As previously described, floodplain inundation can be enormously beneficial to native species and riparian habitat. For these lands, flooding is a positive event.

Lands within RDs 2099, 2100, and 2102, referred to collectively as "The Three Amigos," were purchased by the federal government for flood relief after the 1997 flood as a "Non Structural Alternative (NSA)" under PL 84-99. The intent was to remove the levees from the SPFC and allow flood inundation to occur on these lands. These lands are now owned by the USFWS and managed as a part of the SJRNWR. The Three Amigos cover an area of approximately 3,200 acres. During the 1997 flood event, four failures occurred on the west or left bank levee along the San Joaquin River flooded RDs 2099, 2100, 2101, and 2102. These levees were subsequently repaired even as steps were being taken to implement the NSA. Since that time, however, the SJRNWR has continued to experience flooding, most recently in late December 2010, early January 2011, and late March 2011. This flooding occurs as high river flows back up the West Stanislaus Irrigation District intake canal, which cuts across the SJRNWR between RD 2100 (Hagemann Tract) and RD 2102 (Lara Tract). The canal was at one time protected at its mouth by a levee penetrated by a dual box culvert connection to the canal which was damaged and removed some years ago. The canal is bordered by berms that are prone to overtopping and breaching in high water. At the end of December 2010, flood water flowed through such a breach and flooded a portion of the Lara tract. Flooding in late March 2011 resulted in extensive flooding at the SJRNWR, including both the Lara tract and the Hagemann tract. Drainage of floodwaters from behind breached levees often requires active pumping. Following flooding in the spring of 2006, pumps were inaccessible and lands on the dry side of the RD 2100 levee (Hagemann tract) were inundated for months after the river levels had receded. Such long duration flooding has negative impacts to natural areas, as was documented by River Partners (2008).

Dos Rios Ranch, or Reclamation District 2092, is a 1,600-acre area managed by the Tuolumne River Trust and River Partners located between the SJRNWR and the Tuolumne River Regional Park. The 497-acre Hidden Valley Ranch, adjacent to Dos Rios Ranch, provides all of the lands that are flood protected by the levee in RD 2092 (approximately 1,000 acres total). Like Three Amigos, the management of Dos Rios Ranch will seek to retain or enhance its function as active floodplain to provide ecological benefits. As a demonstration of its accessibility to flooding even under current conditions, floodplain fields within the Dos Rios Ranch property were flooded on March 27, 2011 when the 3- to 5-foot berms that run along the fields were overtopped by flood flows.

3.8.4 Agricultural Lands Not Protected by Project Levees

Many floodplain lands are farmed in the Mid SJR Region. In general, these lands are protected from small floods by berms (often described as private levees, yet not engineered) and active flood fighting. Lands protected by such berms are prone to frequent flooding, much as the Dos Rios Ranch example cited above.

3.8.5 Dam Inundation Hazard

Dam failure is the breakdown, collapse or other failure of a dam structure characterized by the uncontrolled release of impounded water that results in downstream flooding. The 2010 Stanislaus County Multi-Jurisdictional Hazard Mitigation Plan includes a map with the extent of the dam inundation hazard area associated with Don Pedro, Exchequer, New Melones, San Luis, Pine Flat, and Tulloch Reservoirs. This map is provided as **Figure 3-13**, **2010 Stanislaus County – Dam Inundation Hazard**. As shown in Figure 3-13, large areas would be inundated if any of these dams were to fail, including a portion of Modesto, Ceres, and Newman. The 2010 Stanislaus County Multi-Jurisdictional Hazard Mitigation Plan also includes a detailed risk analysis for each dam. While the damages that would be caused by a dam failure would be extremely large, the probability of such an occurrence is small.

3.9 Flood Management Improvement and Integration Opportunities

Many opportunities for the improvement and integration of flood management within the planning area with other regional and statewide goals have been identified through the regional flood planning process, as described below. Detailed descriptions of each of those opportunities are provided in Chapter 7, Proposed Regional Improvements, of this plan. A brief introduction to several previously-proposed flood risk reduction multi-benefit projects is provided in this section as well.

3.9.1 Flood Management Approach

Not all flooding creates hazards. Modern society is coming to recognize that flooding that occurs in areas with flood-compatible land uses can be at worst a nuisance, and at best a vital reinvigorating force for the creation and maintenance of beneficial habitat, both in-channel and on the floodplain. At the same time it can support such benefits as water quality enhancement and groundwater recharge. Yet the human propensity for siting homes and development along waterways has given us a legacy of land use that puts significant investments and lives at risk during flood events. With the adoption of the 2012 CVFPP and the readiness of the state to invest significantly in reshaping the approach to flood management in the Central Valley, there is a tremendous opportunity to rethink and retool the flood management system we know today. That reshaping of flood management approaches can be accomplished in a way that provides flood risk reduction to life and property as well as a broader array of public goals, including economic stability and environmental stewardship.

DWR and the USACE recently developed a set of guiding principles (presented in the draft California's Flood Future: Recommendations for Managing the State's Flood Risk of April 2013) that reflect an integrated approach to flood management:

- Floods cannot be entirely prevented. Flood management seeks to reduce the risk and consequences of flooding to improve public safety, enhance environmental stewardship, and support economic stability.

- Multiple-benefit flood management solutions designed from a systemwide perspective provide the most responsible use of public resources.
- Flood management is a shared responsibility. Effective flood management is enhanced by collaboration and partnerships among public agencies at all levels (local, State, Federal) and across geographic boundaries.
- Public agencies must achieve sustainable solutions while making risk-informed decisions for flood management that will be durable across a spectrum of variables, including climate change.

These principles are expected to underlie flood management investment in California in the future.

3.9.2 Previously-Identified Flood Risk Reduction Multi-benefit Opportunities

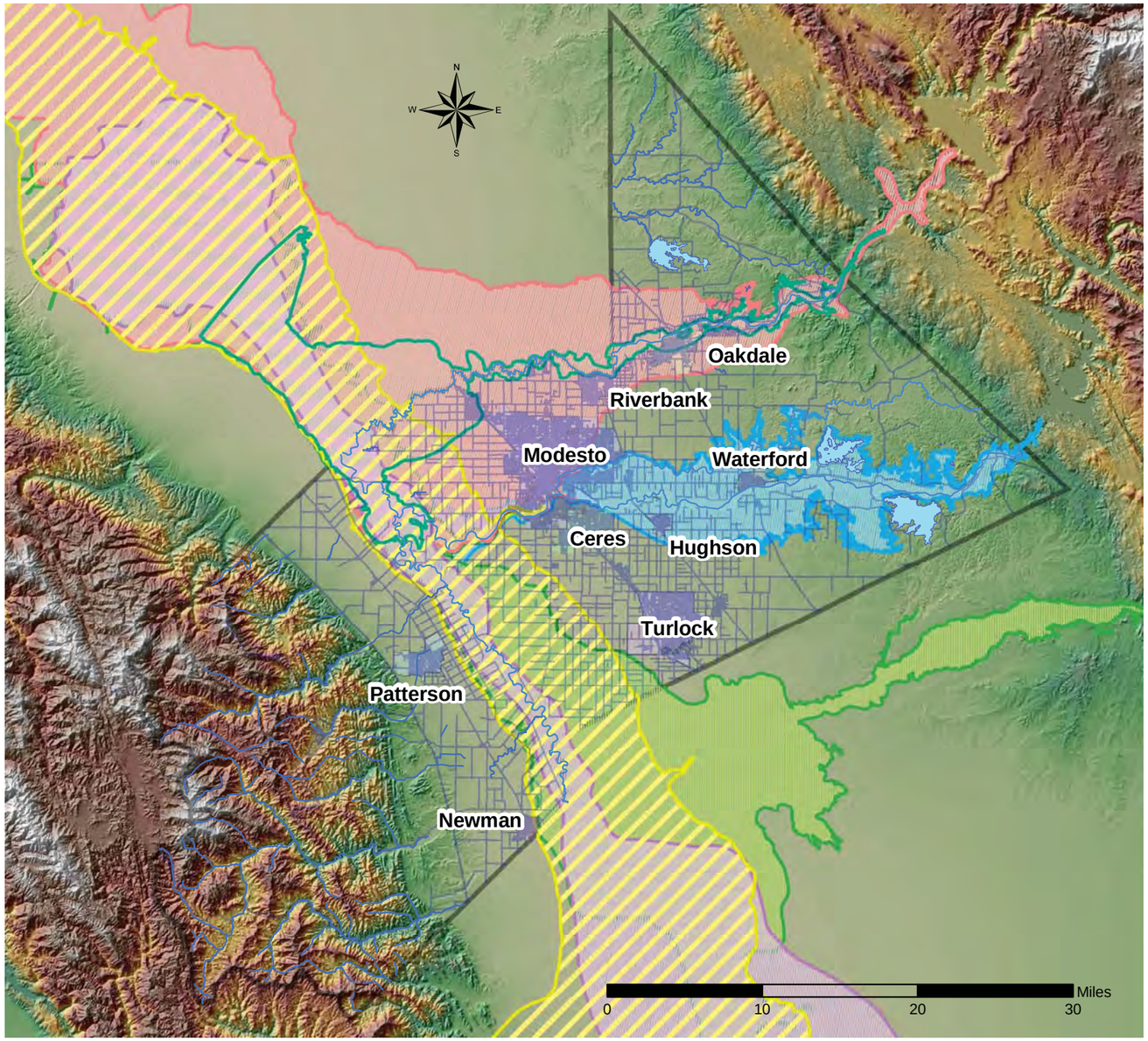
As an initial step in the planning process, previously-identified flood management opportunities for the Mid SJR Region were reviewed. In this subsection, we review some of these flood system capacity expansion ideas that appear to hold special potential for achieving multiple benefits together with flood risk reduction.

More so than in any other region of the Central Valley, leadership in the kind of innovative, multi-benefit approaches to flood management envisioned by the 2012 CVFPP has already been demonstrated within the planning area. The Three Amigos and Dos Rios Ranch projects, on adjacent properties at the confluence of the San Joaquin River and the Tuolumne River, are partially developed concepts for integrated flood management, habitat enhancement, and other benefits that already provide flood risk reduction locally. Both projects have the potential, with further action, to provide additional flood risk reduction, both locally and possibly to downstream communities such as Stockton and Lathrop. These two projects are briefly discussed below and presented in more detail in Chapter 7, Proposed Regional Improvements.

As previously described in Section 3.2.4 Flood Control System Performance – 1997 Flood, the purchase of the Three Amigos was intended to serve as a NSA for flood hazard reduction, in which lands behind the levees would be allowed to inundate; land uses would change to be compatible with flooding; flood easements would be purchased; ring levees and floodwalls would be built to provide local protection; and levees would no longer need to be maintained. While the components of the NSA were being developed, however, the levees were repaired. Since that time, the full implementation of the NSA has stalled. Meanwhile, in 2002, restoration of 777 acres of riparian habitat began on the SJRNWR. Since 2002, approximately 2,700 acres of habitat has been rehabilitated. Recently, the USACE has been reinvigorating the effort to implement the NSA and DWR has funded an effort to investigate the potential for transitory floodplain storage in more detail. Additional information on the structural and nonstructural components of this project is provided in Chapter 7, Proposed Regional Improvements.

The USFWS has proposed the expansion of the SJRNWR in two sections to the north and south of the existing property. A Draft Environmental Assessment of the proposed expansion was released in November 2012 (USFWS, 2012). The expansion would allocate up to an additional 22,156 acres to the SJRNWR, which could provide non-structural flood management opportunities. The flood management opportunities associated with the proposed expansion of the SJRNWR is described in Chapter 7, Proposed Regional Improvements, of this plan.

2010 Stanislaus County -- Dam Inundation Hazard



Map Legend:

- Lakes
- Rivers
- Streams
- Roads

Dam Inundation Areas

Dam Name

- Don Pedro
- Exchequer
- New Melones
- San Luis
- Pine Flat
- Tulloch

Map displays Stanislaus County with Dam Inundation Areas of regional dams.

Prepared by:
Stanislaus County
Public Works - GIS
November, 2009

SOURCE: Stanislaus County, 2010

Figure 3-13
2010 Stanislaus County – Dam Inundation Hazard

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The Dos Rios Ranch property is in a prime location for floodplain rehabilitation and the provision of transitory flood storage. A study to investigation its flood storage potential is underway. Other resource management projects that have and/or are expected to contribute to flood risk reduction within the planning area include the La Grange Floodplain Restoration and Spawning Gravel Augmentation. This, along projects with proposed activities within Dos Rios Ranch, is discussed further in Chapter 7, Proposed Regional Improvements, of this plan.

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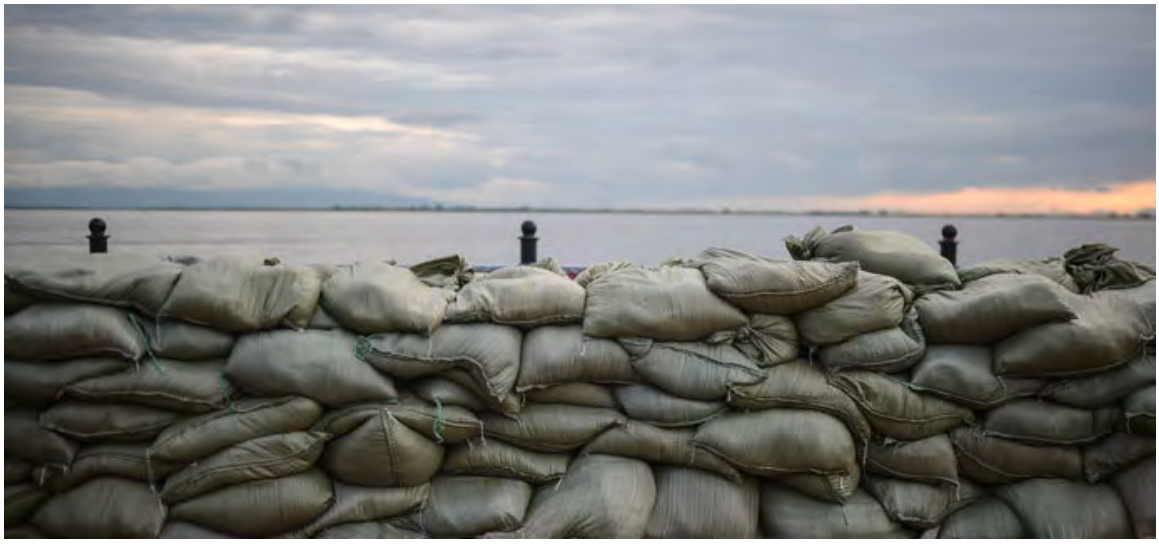

4. Emergency Response

4.1 Introduction

This Chapter of the RFMP describes the current status of flood emergency response in the Mid SJR Region and provides an assessment of the relative state of flood response readiness of responsible agencies. This Chapter also summarizes the response structure and agency roles and the nature of residual risk in the area. Finally, key response issues are identified with recommended actions for improving the level of flood response readiness

Information in this Chapter is based on a field survey performed in May/June 2013 from which the Flood Emergency Response Assessment Technical Memorandum found in Appendix D was developed. Information generated by the field survey was provided to local stakeholders for review and subsequent modification and enhancement as appropriate through RFMP workshops and meetings.

4.2 Background

Initial emergency response to disaster events in California is the responsibility of local government entities (i.e., counties, cities, special districts) and, in some cases, locally-based State agencies (e.g., California Highway Patrol). These local entities provide emergency response within their jurisdiction which is defined by geography and specific mandated response functions. Due to this jurisdiction, local entities and locally-based State agencies retain command of all subsequent emergency response and recovery activities occurring within that jurisdiction. The National Incident Management System (NIMS) and the Standardized Emergency Management System (SEMS) require that agencies use the Incident Command System (ICS) to manage their response. Where a disaster event extends across multiple different jurisdictions, by geography or function, the Incident Command System recommends that a Unified Command be established but does not require it.

Counties and many cities also maintain a specialized "emergency management" function within their organization. This emergency management function is responsible for coordinating the response of the departments of the jurisdiction, assisting those internal departments with disaster readiness activities, and providing executive management control of the overall response. The emergency management organizations performing this function generally prepare and maintain an emergency operations plan (EOP) which describes how the disaster management function will be conducted. Annexes to this EOP provide plans/procedures of the jurisdiction's departments where they exist.

Counties also administer the "operational area" organization, which is a special purpose organization established by State law composed of all local public jurisdictions within the county. The purpose of this multi-agency organization is to manage response resources and information within the County political boundaries. This special purpose operational area organization provides a key communications and coordination link between local agencies as well as between those agencies and the State.

Except for those locally-based State agencies which have initial emergency response responsibilities and therefore a local incident command role, State agencies provide resources and support to the responsible local agencies at their request. These resources are acquired under protocols laid out in mutual aid systems and the SEMS. The Governor's Office of Emergency Services (Cal OES) is responsible for the coordination of this State response in support of impacted local agencies, and for assisting State agencies to maintain a readiness to provide such emergency support. However, Cal OES does not play a role in the disaster command structure managing the response in the field. The FEMA, which coordinates the response of federal agencies at requests for resources or support from the State, also does not have a role in the local command structure managing response activities.

Local agencies having this "incident command" authority are responsible for maintaining a readiness to meet their responsibilities for a disaster occurring within their jurisdictional boundaries using the protocols of the NIMS and SEMS. Such readiness may take the form of developing a pre-planned NIMS response organization for response to specific disaster agents, preparing written plans or protocols, conducting training and exercise programs, and the acquisition of specialized equipment, supplies, and facilities. Whether an existing plan or training program is adequate or otherwise of an acceptable nature is subjective. Statutes only provide readiness mandates of a general nature and federal and State guidance does not provide a methodology for determining whether any particular response activity can be performed to a sufficient level by a jurisdiction. Therefore, any assessment of a local agency's "readiness" is dependent to a large degree on a subjective evaluation based on one or more "readiness indicators" (e.g., existence of a written plan or conduct of an exercise) that can be reviewed and assessed.

4.3 Flood Response

4.3.1 Flood Response Roles

Flood Emergency Response Structure

There are two key separate components of flood response; levee flood fight operations and general public safety operations. These components must be evaluated separately because each is conducted by a different group of jurisdictions/agencies and each component has very different response issues and challenges. Levee flood fight operations include emergency activities aimed at preventing failure of a levee during a flood or containing flood waters in the event of a levee does fail. Such activities include levee patrol,

basic remedial actions involving the placement of sandbags and plastic visquine, and the acquisition of private vendors or bulk materials for more substantive remedial actions on a levee such as making a relief cut. General public safety operations include response activities such as public warning, evacuation, rescue, fire suppression, and recovery that are normally conducted in the area protected by a levee by traditional law and fire agencies.

Reclamation districts (RDs), where they exist, have jurisdiction for performing levee flood fight operations as a concomitant of their day-to-day levee maintenance responsibility, which is established in the Operation & Maintenance (O&M) Manuals, the Supplements, and Authorization and Assurance Agreements with the State and the USACE. Among local jurisdictions in the Mid San Joaquin River planning area, only the City of Modesto and some fire agencies are known to have participated in some way in levee flood fight operations. In regard to the other response component, public safety operations, fire agencies provide fire suppression and rescue and law agencies provide traffic control and security functions. Public warning and evacuation activities may be shared by multiple agencies depending on a jurisdiction's response plans. Overall, public safety operations within an area protected by a levee are performed by the local county or city agency, special purpose district (e.g., fire district), or community-based organization that has jurisdiction within that area.

The Mid SJR Region includes nine RDs where these two separate response components exist and must be conducted together in a coordinated manner. **Table 4-1, Mid SJR Region Reclamation Districts,** shows the approximate size, status, land uses, and assets of each of these districts along with the local agencies responsible for performing the public safety operations component within the area protected by that district's levee.

Table 4-1

Mid SJR Region Reclamation Districts

RDs	Size (acres) Levees	Primary Land Use	Critical Public Assets	Status of District	Public Safety Agencies*
1602	3,500 acres 6.29 miles	Agriculture	Westside Properties Rental Units	Active	Sheriff WSCFPD
2031	10,000 acres 13.19 miles	Agriculture	Highway 132 PG&E Pipeline Hetch Hetchy Aquaduct	Inactive	Sheriff's Dept; SFPD WAFPD CHP
2063	10,000 acres 10.63 miles	Agriculture	Crows Landing Road Bridge	Active	Sheriff MVFPD
2091	7,000 acres 7.92 miles	Agriculture	Modesto Waste Water Treatment Plant; Gomes Lake Drainage System; West Main Street bridge	Active	Sheriff MVFPD WPFPD
2092	2,000 acres 3.76 miles	Agriculture Habitat	N/A	Active	Sheriff WPFPD
2099	2.32 miles	Habitat	N/A	Inactive; removed levees from system	Sheriff WSCFPD
2100	2.70 miles	Habitat	N/A	Inactive; removed levees from system	Sheriff WSCFPD
2101	2,000 acres 3.51 miles	Agriculture	Highway 132	Active	Sheriff WSCFPD
2102		Habitat	N/A	Inactive; removed levees from system	Sheriff WSCFPD

Agency Abbreviations

CHP	California Highway Patrol		
MVFPD	Mountain View Fire Protection District	WAFPD	Woodland Avenue Fire Protection District
SFPD	Salida Fire Protection District	WPFPD	Westport Fire Protection District
Sheriff	Stanislaus County Sheriff's Department	WSCFPD	West Stanislaus County Fire Protection District

Coordination of Multi-Agency Response

Within the Mid SJR Region planning area, the Stanislaus County Office of Emergency Services (OES) Division is responsible for the day-to-day administration of Stanislaus County's disaster preparedness, mitigation, response, and recovery programs. OES also provides administrative support to the Stanislaus Operational Area Council and Stanislaus County Disaster Council. In a disaster, the Division is responsible for coordinating the response of County departments within the County's jurisdiction (i.e., the unincorporated area). OES, acting as the Stanislaus Operational Area, also coordinates information sharing and resource sharing among the separate jurisdictions (e.g., cities, districts) involved in the disaster. OES maintains emergency operations center facilities for the performance of these coordination activities.

The area protected by project levees in the Mid SJR Region planning area is completely within the unincorporated area of Stanislaus County. This fact makes flood response in the planning area a matter of coordinating the activities of 1) County public safety agencies (primarily the Sheriff's Department), and 2) special districts (e.g., fire and reclamation) with jurisdiction in the area. No incorporated city has jurisdiction to provide public safety services within an area protected by project levees.

The City of Modesto does own a critical facility and land located within RD 2091. Modesto, as a property owner within RD 2091, participates in the administration of that district as a trustee on the district's board. In addition, Modesto has a contractual arrangement with RD 2091 to provide assistance with levee flood fight operations. While the Cities of Newman and Patterson each own a critical facility vulnerable to possible flooding, these facilities are within the unincorporated area and the Sheriff's Department and the West Stanislaus County Rural Fire District would provide public safety functions at those facilities. Those Cities would remain responsible for managing and protecting their facility during a flood event.

The coordination of agencies conducting public safety operations in the field for any specific incident would be accomplished through 1) one or more established Unified Incident Commands and command posts, and 2) the Stanislaus County OES. No written pre-planned ICS organization or pre-planned unified command relationships are in place. These relationships would at this point be developed at the time of the emergency.

Mutual Aid

The California Master Mutual Aid Agreement was implemented in the 1950's to serve as a mechanism for separate California political jurisdictions to share resources in a disaster. The Agreement establishes a process for "no cost" borrowing of resources from other jurisdictions. The requesting jurisdiction does, however, provide for the maintenance of these outside resources while serving within the requesting jurisdiction. The Master Mutual Aid Agreement is based on the sharing of existing resources held in common (e.g., fire trucks, police officers). There are no provisions, requirements, or protocols in this Agreement for the direct expenditure of funds on the behalf of another jurisdiction to meet its responsibilities. In fact, FEMA public agency disaster assistance regulations discourage such expenditures.

Stanislaus County and its jurisdictions (i.e., cities and special districts) share resources in a disaster under the provisions of this Master Mutual Aid Agreement. No special or separate mutual aid agreement exists within the Stanislaus Operational Area. Since the Master Mutual Aid Agreement does not mandate or address the direct provision of funds to help meet another jurisdiction's responsibilities, Stanislaus Operational Area jurisdictions are not required to assist a RD to meet its function of preventing a levee failure, or physically containing a flood, with direct expenditures. Stanislaus County, the City of Modesto, and fire agencies in the area indicate that they have no explicit policy regarding providing assistance to RDs, financial or otherwise.

U.S. Army Corps of Engineers and PL 84-99 Programs

USACE plays a unique role in flood response that must be clearly recognized in any planning effort to improve local response capabilities. Most levees forming the SPFC were constructed through federal flood management programs. USACE supervised the construction of such levees and upon completion of each project the responsibility for its maintenance was turned over to a local maintaining agency under written agreement. These agreements included an obligation to operate and maintain the project according to O&M manuals developed by USACE as well as provide assurances and other commitments. This federal obligation originating in the generally distant beginnings of the current levee system has played a central and critical role in subsequent flood emergency response.

O&M Manual Flood Fight Components

USACE O&M Manuals issued at the time of project completion contain suggested methods of combating flood conditions. The LMAs obligation to conform to their respective O&M manuals means that this information must be referenced when current flood safety plans are developed. However, some of this information is no longer current with modern response systems. Thus, while LMAs should ensure that flood safety plans are consistent with their O&M Manuals, they should develop their plans with the current operational area response system and protocols in mind. LMAs should note where flood response protocols must deviate from out-of-date suggestions in their O&M Manual. This information can then be forwarded to USACE as an addendum to the manual. This will ensure that flood fight operations are conducted in a manner consistent with current response systems as well as the O&M manuals. This action should occur concurrently with coordination with USACE for integration of federal resources into flood fight operational protocols. USACE involvement in flood fight under PL 84-99 authorities will continue despite federal action to remove LMAs from PL 84-99 levee rehabilitation support and flood safety plans will need to address this involvement while maintaining O&M manuals as an active and critical part of flood response.

PL84-99 Levee Rehabilitation

A long standing role of USACE in flood emergency response was rehabilitation of damaged levees after a flood under PL 84-99 authority. Historically, there has been a strong dependence on the federal funding under this program to perform expensive re-construction of levee breaches and other levee rehabilitation actions. With the exception of RD 2092 (Active status) and RD 2091 (Partial Inactive status), the remaining LMAs in the Mid SJR Region are not currently active under PL 84-99; if they remain inactive, these LMAs will not be eligible to receive repair funding after the next flood event. Ineligibility for such assistance has wide-ranging consequences for the future of flood management in California and how levee maintenance will be funded and structured in the future will need to be determined.

It is clear that the ability of the LMAs in the Mid SJR Region, with the possible exception of RD 2031, to repair levee breaches, or perform extensive repairs to levees damaged by impounded flood waters, is questionable. RD 2031 is the exception due to the corporate nature of land ownership within that district which allows landowners to bring considerable financial support to bear outside of the normal special district assessment process. However, RD 2031 is currently inactive with no board of trustees or fundraising abilities, and depending solely on the landowners for its financial capacity is not reliable. Other districts in the Mid San Joaquin River Region would have insufficient funds to undertake such massive construction projects and little ability through current special district assessment processes to generate the needed funds. Experience has also shown that districts suffering a breach and subsequent flooding have found it nearly impossible to obtain loans from banks or other financial institutions to generate cash flow for immediate action.

Absent this critical historic USACE assistance, the rehabilitation of the flood management system after a flood is unknown. If the LMAs cannot act promptly, then areas will remain flooded for longer periods and remain vulnerable to flooding from minor events for longer periods. This will further degrade the ability of the LMA to finance any rehabilitation of the system to its prior condition.

In this situation, the question becomes whether the next level of government, cities and county, with assets impacted by the flood waters would act to perform levee rehabilitation. It has been noted elsewhere in this chapter how the involvement of these entities in levee flood fight has been greatly hindered by the jurisdictional barrier created by the formation of special districts for flood management in the past. This jurisdictional barrier clearly also serves as a hindrance to action by those local entities to system rehabilitation. Motivation to act by a city or county would be entirely dependent on that organization's perception of the level of importance of regaining use of any of its infrastructure impacted by the flood waters.

If city or county government fails to act, it would fall to the State, in particular to DWR, to act to repair breaches and other levee damages. The lack of a standing emergency fund for such purposes at the State level means that such action would require a political decision at the time of the event. There is no clear pre-event policy addressing this issue in place at the State level as there is no clear pre-event policy at the city or county levels. There is no ready source of funds at the LMA, local or State level in place to replace this historic federal assistance because there is no clear policy as to how this change in federal policy will be addressed.

Some possible options available to address the loss of PL 84-99 funding includes joint discussions to define a new structure for rehabilitating levee systems carried out by local and State agencies. This will involve either strengthening the LMA's ability to perform this work or identifying new roles for other local and State agencies in system rehabilitation. Once a conceptual policy is in place then funding sources can be identified. The SB27 Sacramento-San Joaquin Delta Multi-Hazard Coordination Task Force report issued by the Governor in 2011 identified the need for a substantial emergency fund to be created to ensure adequate cash flow for expensive levee flood fight operations in an emergency. The role of such an emergency fund to provide cash flow for the rehabilitation of the system after a flood could be added to the discussions concerning implementation of a new local/State structure for meeting this essential flood management activity.

4.3.2 Emergency Response Readiness

Analysis of Residual Risk

Project levees were constructed in the Mid SJR Region to prevent damage from a flood of a specified magnitude. Since one or more of the levees may not perform this function in the future due to a design, construction, or maintenance flaw, there is a "residual risk" that flood waters at, or below, design criteria will degrade and fail the levee. In addition, because levees are designed to control floods of a specified magnitude there is also a "residual risk" to the protected area that a flood exceeding the design criteria of the levee will occur and either overtop or otherwise fail the levee.

This residual risk is addressed by developing the capacity to 1) effectively respond to the appearance of a flaw in a levee to prevent complete failure, 2) effectively respond to physically limit the extent, depth, or duration of floodwaters if a levee fails, 3) remove people and property from the area subject to flooding, and 4) provide additional physical protection to specific assets in place that cannot be removed. The level of organizational, resource, and procedural capacity needed to perform these actions depends, in part, on the potential response complexity of an area (for example, it is generally a more complex matter to evacuate an urban area than a rural area).

In regard to emergency response, the capacity needed to adequately address this residual risk would be partially dependent on the relative difficulty of performing the protective actions listed above. In this regard, the planning area project levees and surrounding area do not present any special problems for the conduct of flood fight operations. No special circumstances or conditions exist that would prevent application of standard flood fight techniques where needed. In general, the complexity of performing evacuation to remove people and property from an area subject to flooding is less than for many areas of the Central Valley due to its rural nature. Even those urban areas subject to flooding in the vicinity of the San Joaquin River are only exposed to shallow flooding reducing the complexity of conducting effective removal operations. These sparse populations, limited numbers of critical infrastructure sites, or shallow flooding impacts lower the need for highly complex response plans (e.g., detailed evacuation routing). As noted in the Technical Memorandum in Appendix D, two exceptions to this are evacuation of dairies and presence of hazardous materials, which justify relatively more complex response procedures and special equipment to ensure proper warning and assistance is provided to affected residents.

Flood Fight Readiness

Determining whether an existing response capacity is adequate is highly subjective. For a short-term study some simple indicators, as shown below in **Table 4-2**, **Indicators in Flood Fight Readiness**, must be used to merely provide an impression of the degree of attention that jurisdictions are applying to preparing to respond to a flood. In regard to flood fight capacity such simple indicators are the existence of 1) written levee flood fight plans or flood-specific plans for supporting agencies, 2) trained personnel to perform levee patrol and basic remedial actions (sandbagging, etc), 3) written and unambiguous flood fight command and control protocols, and 4) stockpiles of materials or budgeted funds for emergency response. Simple indicators of the capacity of the Stanislaus Operational Area (all jurisdictions of the County) to rapidly and effectively support RD flood fight operations would be the existence of 1) flood

fight stockpiles maintained by entities other than RDs, 2) flood specific mutual aid procedures, 3) clear and unambiguous policy commitments for providing personnel and funds to RDs, and 4) regular joint exercises with RDs.

Table 4-2

Indicators of Flood Fight Readiness

Agency	Flood Fight Plan or Procedures Specific to Helping w/ Flood Fight	Clear Flood Fight Command Protocols	On-Hand Resources: Materials, Trained Crews, Emergency Fund (EF)	Clear Flood Fight Mutual Aid Policy for Providing Materials, Personnel or Funds to RDs	Regular Flood Fight Exercises: Internal, Multi-Agency
RD 1602	No	Patterson Westside Farms provides leadership; No NIMS training	Stockpile - Yes Crews – limited no. of volunteers only EF - No	No	No
RD 2031	No	Landowners supervise their own operations; No District command nor NIMS training	Stockpile – Yes Crews – Hired hands only EF - No	No	No
RD 2063	No	District President provides leadership; No NIMS training	Stockpile – Yes Crews – volunteers only EF - Yes	No	No
RD 2091	No	Unclear command for Project Levee; Unclear command for Gomes Lake Dike	Stockpiles - No Crews – Yes, City of Modesto provides trained crews under contract EF - Yes	No	No
RD 2092	No	Landowner provides leadership but relies on an advisor shared with RD2031; no NIMS training	Stockpiles – No Crews – No EF – No	No	No
RD 2099/ 2100/2102	N/A	N/A	N/A	N/A	N/A
RD 2101	No	District President provides leadership; No NIMS training	Stockpile – Yes Crews – relies on family or emergency hires ER – No	No	No
County of Stanislaus	No	N/A	Stockpile – for General Public only Crews – No EF – No	No	No
City of Modesto	No	Shares response with RD 2091 but unclear how incident command would be established	Stockpile – No Crews – WWTP staff trained annually EF – No	No	No
City of Newman	Some flood specific SOPs for response at WWTP	PW provides leadership at WWTP; no NIMS training	Stockpile – No Crews – No EF – No	No	No
City of Patterson	No	PW provides leadership at WWTP; no NIMS training	Stockpile – No Crews – No EF – No	No	No
CHP	No	N/A	Stockpile – No Crews – No EF – No	No	No
MVFPD	No	No	Stockpile – No Crews – No EF – No	No	No

Table 4-2 (Continued)

Indicators of Flood Fight Readiness

Agency	Flood Fight Plan or Procedures Specific to Helping w/ Flood Fight	Clear Flood Fight Command Protocols	On-Hand Resources: Materials, Trained Crews, Emergency Fund (EF)	Clear Flood Fight Mutual Aid Policy for Providing Materials, Personnel or Funds to RDs	Regular Flood Fight Exercises: Internal, Multi-Agency
SFPD	No	No	Stockpile – No Crews – No EF – No	No	No
Sheriff	No	No	Stockpile – No Crews – No EF – No	No	No
WAFPD	No	No	Stockpile – No Crews – No EF – No	No	No
WPFPD	No	No	Stockpile – No Crews – No EF – No	Has responded to look at levee at request of citizen; no training	No
WSCFPD	No	No	Stockpile – No Crews – No EF – No	Has responded to look at levee at request of citizen; no training	No

Agency Abbreviations

CHP	California Highway Patrol
MVFPD	Mountain View Fire Protection District
SFPD	Salida Fire Protection District
Sheriff	Stanislaus County Sheriff's Department
WAFPD	Woodland Avenue Fire Protection District
WPFPD	Westport Fire Protection District
WSCFPD	West Stanislaus County Fire Protection District

General Assessment of the Readiness to Conduct Flood Fight Operations

A review of the capacity indicators above indicates that the readiness of the Stanislaus Operational Area jurisdictions to conduct effective flood fight operations is below optimal. RDs have no written plans for conducting flood fight operations that would make key information and procedures readily available to responders. While there is clear leadership within many districts for organizing and conducting flood fight operations, none of the personnel who were identified as potential managers of such operations have ICS/NIMS training. Leadership would, therefore, be competent but would lack the ability to apply ICS/NIMS concepts to agency coordination and mutual aid.

Stanislaus Operational Area agencies other than RDs do not maintain stockpiles of flood fight materials, do not have clear policies in regard to providing support to RDs, and do not maintained staff to assist with levee patrol. The only exception is the City of Modesto which does provide flood fight assistance to RD 2091 under contract. While there is no committed budget, the City and RD 2091 agree that in the event of a declared emergency, or in the event that both parties agree, the City will take appropriate defensive action within its financial means to stabilize, protect and rebuild the levee to prevent losses to the City and RD 2091, while insuring public safety and well-being in order to protect the City's WWTP. WWTP staff would perform the necessary duties. In regard to the provision of funds to prevent levee failure, the City of Modesto and Stanislaus County would only say that that policy issue would be decided at the time of the emergency.

Finally, RDs and those jurisdictions which would, or could conceivably, provide flood fight assistance do not conduct regular exercises to identify gaps in the development of an optimal response capability. These factors, the existence of a normal level of residual risk, and a review of best practices available in the Central Valley would justify the evaluation that the Mid SJR Region planning area's capacity to address residual risk through flood fight operations is well below optimal.

Public Safety Operations Readiness

In regard to public safety operations within the area protected by a project levee, some simple indicators of response capacity, as shown below in **Table 4-3**, **Level of Public Safety Operations Readiness**, would be the existence of 1) general response plans, 2) flood specific response plans and/or training programs, 3) general Incident Command System/National Incident Management System (NIMS) training programs, and 4) written protocols for establishing multi-agency command and control in the floodplain. Indicators of the capacity of the Stanislaus Operational Area to rapidly and effectively apply resources to assist with the removal of people and property from threatened areas would be existence of 1) resources/equipment for conducting warning, evacuation, and rescue operations and 2) clear law, fire, and EMS mutual aid procedures.

Table 4-3

Level of Public Safety Operations Readiness

Agency	Written Emergency Response Plan (General and/or Flood Specific)	Training and Frequency (ICS/NIMS; Flood Response Specific)	Command and Control Protocols for Flood Operations	Resources/Equipment Available/Suitable for Floodplain Warning, Evacuation, Rescue, etc.	Written Mutual Aid Procedures for Law, Fire, EMS
Stanislaus County	Standard EOP only No Flood Specific Plans	ICS/NIMS - Yes FF specific – No	No	Yes	Yes
City of Modesto	Standard EOP only No Flood Specific Plans	ICS/NIMS – Yes, within Fire/Law FF specific – Yes, WWTP staff receive FF training and NIMS training	No	Yes	Yes
City of Newman	Standard EOP only Some Flood SOPs for their WWTP	ICS/NIMS – Fire and Law FF Specific – No	No	Yes	Yes
City of Patterson	Standard EOP only No Flood Specific Plans	ICS/NIMS – Fire and Law FF Specific – No	No	Yes	Yes
City of Turlock	Standard EOP only No Flood Specific Plans	ICS/NIMS – Fire and Law FF Specific – No	No	Yes	Yes
MVFPD	None	ICS/NIMS – Yes Flood Specific – No	No	Yes	Yes
SFPD	None	ICS/NIMS – Yes Flood Specific - No	No	Yes	Yes
WAFPD	None	ICS/NIMS – Yes Flood specific – No	No	Yes	Yes
WPFPD	None	ICS/NIMS – Yes Flood specific – No	No	Yes	Yes
WSCFPD	None	ICS/NIMS – Yes Flood specific – No	No	Yes	Yes

Agency Abbreviations

CHP	California Highway Patrol
MVFPD	Mountain View Fire Protection District
SFPD	Salida Fire Protection District
Sheriff	Stanislaus County Sheriff's Department
WAFPD	Woodland Avenue Fire Protection District
WPFPD	Westport Fire Protection District
WSCFPD	West Stanislaus County Fire Protection District

General Assessment of Readiness to Conduct Public Safety Operations

A review of the capacity indicators above indicate that the readiness of the Stanislaus Operational Area jurisdictions to conduct effective public safety operations in the floodplain are adequate but below optimal based on a review of best practices in the Central Valley. Jurisdictions maintain normal general emergency operations plans and conduct general ICS/NIMS training. There are the normal established fire and law mutual aid systems and specialized equipment for command and control is available. However, specific plans for response in the floodplain do not exist and no flood response specific training is provided to responders. The exception would be City of Modesto WWTP staff who receives flood fight training. However, this is for flood fight operations and not necessarily evacuation or rescue operations.

Written plans for conducting more complex elements of public safety operations in a floodplain (e.g., evacuation of dairies and hazardous materials) were not identified. Specific, written, protocols for establishing command and control in the floodplain during flood events were also not identified. Finally facility-specific written plans for removing or protecting in place critical infrastructure components were not identified.

The existence of normal emergency plans, ICS/NIMS training, and specialized equipment indicate a normal competency to conduct public safety operations in the floodplain if needed. This competency, coupled with the less complex nature of the evacuation/rescue/security problem in the floodplain, would indicate normal and adequate response capacity. However, the lack of flood specific plans and training, as well as the lack of written plans for more complex rural evacuation issues, would indicate that the Mid SJR Region planning area's flood response capacity for public safety operations is less optimal than it could be.

Gaps and Overlaps

Written emergency plans that do exist in the Mid SJR Region are general in nature and prepared by each jurisdiction to describe how they will conduct their own operations within their own jurisdictional boundaries. Although an Operational Area Council was identified, there are no procedures specific to the operation of the Stanislaus multi-agency Operational Area organization. The lack of flood response specific procedures or plans precludes the existence of overlaps. The lack of specific written command or response protocols specifically for response in the area protected by project levees makes it impossible to evaluate whether any other assumptions exist within jurisdictions about command or coordination that would conflict with each other.

The readiness analysis performed above indicate that four key general gaps exist in the Mid SJR Region planning area's capacity to address all flood response issues in an optimal manner.

- Lack of written levee flood fight plans or floodplain-specific procedures within each jurisdiction's emergency operations plans. This is a key planning deficiency for RD 2091/RD 2063 where there are numerous critical assets.
- Ambiguity in identifying who is in command of flood fight operations. In those cases where command is identified, there is a lack of ICS/NIMS training.
- Lack of clear and unambiguous policies by operational area jurisdictions in regard to providing mutual aid of personnel, resources/materials, and funds to support levee flood fight operations.
- Lack of joint exercises to identify response gaps and improvement opportunities.

Specific response issues relating to these four general gap categories are discussed below.

4.3.3 Funding and Commitment

There are two RDs that were identified as having a standing emergency fund to support flood fight efforts. Other districts indicated that assistance, funds or in-kind help, would be solicited from property owners in the district at the time of the emergency. The limited financial situation of RDs makes their ability to respond to flood emergencies difficult.

No other jurisdictions in the Stanislaus Operational Area maintain a designated and budgeted emergency fund for responding to emergencies. Jurisdictions would clearly be dependent on their internal general fund reserves or contingency fund to meet extraordinary costs of meeting their direct emergency response mandates. Whether a jurisdiction's general fund could deal with the extraordinary costs of responding to a disaster would be dependent on the size of the disaster and magnitude of its impact.

Use of a jurisdiction's internal general fund to assist the RDs with levee flood fight operations is not required by existing mutual aid agreements or any statute. Such expenditure of jurisdictional tax dollars in another jurisdiction has legal barriers and issues with FEMA disaster assistance regulations that would best be addressed with a written flood-specific mutual aid protocol. Such a protocol does not exist in the Mid SJR Region.

Examination of the general funds of Stanislaus Operational Area jurisdictions would not be productive with absence of a clear commitment or protocol for providing direct expenditure on behalf of another jurisdiction. No jurisdiction in the Stanislaus Operational Area has made a clear commitment to assist with funding the levee flood fight responsibilities of the RDs.

Two rural fire districts do have a history of responding to look at a levee status at the request of residents. They did not interact with the RD and did not provide on-going patrol or other assistance. The City of Modesto has a contractual arrangement with RD 2091 to provide levee patrol and basic flood fight response to levee problems. While there is no committed budget, the City and RD 2091 agree that in and event of a declared emergency, or in the event that both parties agree, the City will take appropriate defensive action within its financial means to stabilize, protect and rebuild the levee to prevent losses to the City and RD 2091, while insuring public safety and well-being in order to protect the City's Wastewater Treatment Plant. This contractual arrangement is unclear as to the specific limitations of such assistance and does not have clear provisions for providing emergency financial assistance. The City of Modesto representative indicated that the City would have to evaluate whether it would provide such assistance at the time. **Without a clear commitment to provide financial assistance, and without a designated budgeted emergency fund, it is difficult to evaluate the capacity of the jurisdictions to assist with flood fight operations.**

4.4 Response Issues

The following issues associated with emergency response planning for the Mid SJR Region have been identified:

- **Interaction with RDs.** Stanislaus OES indicated that they often lack good contacts with the RDs. There has been some friction in the interaction of the County with the districts in regard to proclaiming emergencies and the process for requesting assistance with flood fight operations. This appeared to be mainly an issue of clarification of the process of coordination between these separate jurisdictions for flood fight assistance and activation of emergency authorities and powers.

- **LMA Responsibilities.** While it is clear that a levee maintaining agency is responsible for maintaining its levee and repairing any damage that may be caused by a flood, it is less clear whether an LMA is directly responsible for 1) removing impounded flood waters resulting from a breach, and 2) taking action to limit damage if flood waters originating within their jurisdiction leaves their jurisdiction. General experience is that LMAs assist with removing impounded flood waters to some extent within their financial resources but do not cross jurisdictional boundaries to flood fight flood waters leaving their jurisdiction.

- **Evacuation Planning.** Written evacuation plans for areas protected by project levees were not identified and no written plans for assisting property owners with the evacuation of dairies and removal of hazardous materials stored at farm operations were identified. The County did not identify a specific role for its departments in the conduct of dairy evacuation or hazardous materials removal. The rural nature of the Mid SJR Region simplifies the problems of warning, evacuation, and rescue for people but it elevates the importance of other evacuation and recovery issues unique to agricultural areas such as evacuation of dairies, removal of hazardous materials prior to the arrival of flood waters, and debris removal after the departure of flood waters.

- **Flood Fight Materials and Mutual Aid.** No jurisdiction outside of RDs was identified that maintains stockpiles of materials specifically for supporting levee flood fight operations. There is no specific process for RDs to request mutual aid.

- **Flood Fight Operations Training.** No jurisdiction was identified that conducts regular flood-specific training or provide DWR flood fight classes to its employees.

- **Debris Removal.** County Public Works recognizes a function with debris removal from County roads. FEMA will allow the County to assist with removal of debris from private property that did not originate from the property owner's possessions or land. The County would need to accept that role and develop a written debris removal plan with criteria for ensuring that debris removed by the County meets eligibility rules. The County does not have such a plan at this time.

- **Hazardous Materials.** No written plan for organizing the removal of hazardous waste from a flooded area was identified.

- **Cost Recovery.** None of the emergency responders have cost recovery documentation policies in place.

- **Life Safety.** The Crows Landing Road and the Las Palmas Avenue bridges are needed in the event of an emergency because they carry most local traffic across the San Joaquin River. The loss of either bridge would require a one hour detour to reach the other side of the River. Since all hospital facilities are on the east side of the San Joaquin River the ability to use these bridges becomes critical to the safety of residents on the west side of the County. Loss of Highway 132 would exacerbate this problem and resultant delays in moving sick or injured people to appropriate care.

4.5 Opportunities

Despite the issues identified for emergency response planning in the Mid SJR Region, there are many opportunities for the region to improve emergency response, as discussed below.

4.5.1 Standard Local Flood Response Plan Templates

The issuance of two grants by DWR for local flood emergency response projects has stimulated discussion on the need for local tactical flood response plans and the proper format for such plans. DWR grant guidance indicates that completion of such plans is a prerequisite to obtaining funds for other response

items such as supplies or communications. The recent addition of Water Code Section 9650 (AB156) which requires the preparation of "flood safety plans" also has highlighted the need for a standard and acceptable template for such local tactical flood response plans.

Such plans would have a levee flood fight component and a public safety warning/evacuation/rescue component. San Joaquin County has over the past decade developed a local tactical flood response plan (called a flood safety plan within Section 9650) template using a mapping format and addressing both components. The maps and procedures developed under this concept display flood emergency response information, plans, and protocols in a user friendly format. FEMA subsequently provided funds for the development of guides for implementing a similar program. In 2012, San Joaquin County adapted this concept to fully conform to the requirements of Water Code Section 9650.

During the summer of 2013, local tactical flood response plans (or flood safety plans) in line with this latest standard were completed for two San Joaquin County RDs and submitted to DWR and the CVFPB for review. Subsequently, DWR indicated that this format met Section 9650 requirements and that the Department considered this format the preferred methodology for completing local tactical flood response plans required by their grant guidance.

This situation provides an opportunity for the Mid San Joaquin River Planning Area to more rapidly complete local tactical flood planning project since clear, detailed, and tested methodology is now approved by the State

4.5.2 Funding Opportunities

Propositions 1E and 84 passed by the voters in 2006 provided, among other things, for $135 million in funding for enhancing flood emergency response in the State. In 2013, DWR issued the first grants to locals from these funds for local flood emergency response projects. A "statewide" grant with total funding of $5 million was issued in March 2013, and a "Delta-specific" grant with total funding of $5 million was issued in August 2013. Stanislaus County jurisdictions were eligible for applying for the statewide grant but did not submit an application. However, DWR has indicated that it is identifying funds for a second round of these grants that could occur in 2014. Funds for a second round of the Delta-specific grant have already been identified which provides some assurance that a second round of the statewide grant will also be forthcoming.

This situation provides a possible opportunity for the Mid San Joaquin River Region to apply for grant funding to begin to implement emergency response and preparedness projects identified and in the regional flood management plan process. This potential funding opportunity should be integrated into the final plan and the funding needs for specific projects identified within the RFMP so that jurisdictions are prepared to submit a joint, well-planned, application. It should be noted that several RDs lack the institutional capacity to secure grant funding at this time.

4.5.3 Joint Planning and Plan Maintenance Mechanisms

The Mid SJR Region RFMP process provides an opportunity for local jurisdictions to develop mechanisms and procedures for future joint flood emergency response planning and maintenance activities. Procedures and protocols used to jointly develop the regional plan should be adjusted for use after the completion of this project to perform joint planning or to jointly seek funding.

4.5.4 Conversion to Flood-Compatible Uses

The Mid SJR Region RFMP process provides an opportunity for local jurisdictions to consider converting existing uses to flood-compatible ones within floodplains. Flood-compatible uses can include areas used for certain habitat or agriculture. With fewer people and less-at-risk property in these flood prone areas, there would be a reduced need for emergency response. Projects such as Three Amigos that would restore habitat and convert existing uses to flood detention are good examples of projects of this type.

4.6 General Findings

This section describes the findings for public safety operations, flood fight operations, and overall emergency response preparedness.

4.6.1 Public Safety Operations

While they are obviously important, public safety operations within the planning area do not face highly complex or extensive issues such as those found in heavily urbanized areas in deep flood zones. The shallow nature of potential flooding in the more urban areas of Patterson and Newman cause considerable damage but again are not a highly complex organizational response challenge. Development of extensive pre-plans for conducting resident warning, evacuation, or rescue would, in general, not be a priority for the planning area if resources are limited. There are currently no written response plans specific to the planning area.

However, there are two issues regarding public safety operations that should be examined more closely for possible action. First, the structure of field command and control in regard to flood fight operations and public safety operations, as well as the manner of their interaction, was unclear in some districts and not clearly documented in any. Second, the area does present the potential problem of evacuation of dairies and bulk hazardous materials from rural sites and debris removal following a flood. These more complex organizational issues should be examined more closely for potential action.

4.6.2 Flood Fight Operations

The presence of considerable private property, vital bridges and roads, and substantial infrastructure critical to public safety and health focuses attention on the quality of flood fight operations in the planning area. Effective and rapid action to prevent a levee breach, or to limit the extent, depth, or duration of flood waters in the event of a breach, is the only method for minimizing possible long term adverse impacts from loss of this infrastructure. Flood fight operations in this case would include plans for rapid removal of equipment or components of facilities where possible to speed restoration of services.

Currently there are very knowledgeable and experienced people available to direct flood fight operations but little or no written flood fight plans reflecting this knowledge are in place. Flood fight operations are

organized at the time of the emergency and are mostly conducted informally. The command structure for conducting flood fight operations in some cases is unclear, or at least not documented.

Also, the financial situation of the RDs is relatively weak and could be a barrier to improvement actions and response. Grants or other sources of alternate funding should be explored to enhance RD response capabilities although several RDs lack the institutional capacity to secure grant funding at this time. Finally, processes for RDs to request mutual aid should be clearly defined and jurisdictions within the planning area need to at least discuss and better define their policies for supporting flood fight operations if requested. Improved coordination of RDs with the Stanislaus Operational Area organization to improve warning and information flow would also be helpful.

4.6.3 Overall Flood Emergency Response Preparedness

The Mid SJR Region planning area is at a point where initial detailed planning for future flood fight operations and concurrent public safety operations is needed and justified. Opportunities for accomplishing this planning in the near future are discussed below. However, a major problem in areas that have completed such detailed planning and training in the past is maintenance.

The long intervals between floods, and the other demands placed on the time of officials, makes maintenance of plans and training over the long intervals between major floods difficult. The consistent communication and cooperation that is a key element of joint planning tends to stop when initial resources run out and other demands on time become a constant distraction. Any major project to improve flood response in the Mid SJR Region should include a mechanism for ensuring proper maintenance of resulting improved plans and training programs created as a result of project implementation.

4.7 Specific Recommended Projects

Based on the findings made above, the following eight specific projects are recommended to improve flood emergency response planning in the Mid SJR Region and are described in more detail in Sections 4.7.1 through 4.7.8:

- Develop local levee flood flight plans or a joint coordinated flood fighting plan for related RDs;
- Perform key hydrological studies;
- Complete response plans for public safety agency functions;
- Clarify command and control;
- Provide emergency planning support for RDs;
- Better define mutual aid for flood fight operations;
- Develop a flood response training program; and
- Form a Stanislaus Operational Area Flood Response Working Group within the Stanislaus Operational Area organization.

It should be noted that three of the projects evaluated in this RFMP came from these recommendations: Emergency Response Plan – Debris Management, Emergency Response Plan – Local Planning and Training, and Hydraulic and Channel Migration Studies (see Chapter 7, Proposed Regional Improvements).

4.7.1 Local Levee Flood Fight Plans

In regard to flood fight operations, RDs and supporting agencies should develop local levee flood fight plans as part of an overall tactical flood safety plan as outlined by DWR. These flood fight plans would document 1) historic information and flood fight knowledge of current and past district responders; 2) current response procedures for levee flood fight; and 3) options for containing floods from a breach. RDs, as the local jurisdiction responsible, would prepare the plans with the assistance of other local jurisdictions. Flood fight plans should include provisions for flood fighting non-SPFC levees or embankments in the area that could provide protection but are not under the direct maintenance responsibility of a LMA or other agency.

The development of flood fight plans should also include identification of physical constraints to efficient response to levee problems. Areas where levee crowns or landside levee toe areas are inadequate to support potential needed response actions should be identified. Areas whose improvement would support more efficient flood fight response should also be identified. These structural improvements related specifically to flood response can then become a part of the LMA levee improvement plan.

A standard template for development of such levee flood fight plans (part of flood safety plans mandated by AB156 and also called tactical flood plans in DWR grant guidance) is emerging in the Central Valley that is supported by DWR and FEMA. This template uses a map format to display information complemented with a concise written RD emergency operations plan

4.7.2 Hydrological Studies

A key preliminary action to preparing the local flood fight plans in the Mid San Joaquin River region is completion of detailed topographic and hydrological studies for the area protected by RD 2091 and RD 2063. The characteristics of flood flows that would occur in the event of a breach in either district need to be identified. The RD 2091/RD 2063 area contains considerable critical infrastructure and is the most highly populated area protected directly by project levees. There is the potential that RD 2091 is dependent on the RD 2063 levees for protection as well as on its own levee system. A breach in RD 2091 could also possibly cause flood waters to back into RD 2063 to some extent. In order to ensure the best possible protection of critical infrastructure in RD 2091 (e.g., the Modesto wastewater treatment plant and Gomes Lake), studies to determine the degree of dependence of RD 2091 on the RD 2063 levees need to be completed. The characteristics of flood flows from RD 2063 into RD 2091, and vice versa, also needs to be thoroughly understood in order to identify practical containment options and an effective joint flood fight plan between districts. This study would include obtaining the current topography and elevations of the area from new sources as needed to supplement existing datasets.

Other hydrological studies needed would better define flood threats to the wastewater treatment plants of Newman and Patterson. These studies would confirm water elevations at which there is a significant threat to those facilities and the characteristics of flood water movement in the event 1) water elevations rise above the eastern boundary fence line at the Patterson plant, or 2) either the Newman Wastewater Treatment Plant flood management levee or Newman Wasteway embankment fails. This detailed

information would allow development of better trigger levels for actions to protect infrastructure and better plans for maintaining service if either of these events were to occur.

Completion of a channel meander analysis is also necessary for other areas of the Mid SJR Region to better identify future repair needs at specific locations.

Current and planned hydrological studies conducted by DWR under the CVFPP and other programs should be accessed initially for information relevant to the above issues. Any current relevant information generated by those state studies can be used as a starting point for additional needed work.

4.7.3 Response Plans for Public Safety Agency Functions

It is recommended that public safety agency evacuation plans be developed at a minimum for the area protected by RD 1602, RD 2063, and RD 2091. Evacuation procedures could be included on the respective flood safety plan, and should address rural evacuation of dairies and removal of bulk hazardous materials. All plans would provide clear command and control protocols and an emergency response command organization for conducting these operations. These plans and maps would be developed in cooperation with local law and fire agencies and the RDs.

Finally, Stanislaus County should develop a debris removal plan and policy. Preparation of such a written plan would assist with ensuring reimbursement for debris removal costs incurred by the County after a flood from the State and federal disaster assistance programs. Stanislaus County operates the local waste disposal system and has both jurisdiction and resources for operating a debris removal program. Ensuring eligibility for disaster financial assistance will allow the County to perform authorized debris removal without delay or uncertainty.

4.7.4 Command and Control

It is a high priority that local jurisdictions should clarify and document the command structure for areas threatened by flood waters. Command of levee flood fight operations and command of public safety operations should be clarified and defined in terms of ICS procedures. It is also important to clarify how separate flood fight commands and public safety agency commands will interact. These protocols could be included in the local tactical flood response plan (flood safety plan). In addition, RDs should adopt a formal mechanism for clearly designating a flood fight incident commander as part of their flood safety plans.

The ICS provides procedures and protocols for establishing a “unified command” among agencies and jurisdictions with responsibility for managing or responding to a flood event in the same geographical area. Pre-event discussion of a potential unified command structure for flood fight operations is particularly important. Identification of areas of the flood management system that are mutually dependent upon each other for protection will help determine which LMAs must work closely together in a common command. The role in such a unified command for State departmental Incident Command Teams that may arrive to assist should be worked out. Whether State agencies are merely providing advice, assuming a financial or jurisdictional responsibility for flood fight operations, or performing some other role will determine whether such outside resources will be part of the command or only a part of the operations or other function within the response. Review of the number of unified commands needed for maximum efficiency can also determine whether a pre-planned response by CalFIRE Incident Command Teams for helping with incident management is called for.

4.7.5 Emergency Planning Support for RD's

The limited financial resources and staffing of RDs makes development and maintenance of detailed and adequate levee flood fight plans difficult. There is also a lack of expertise within RDs for preparation of proper written emergency plans. The County of Stanislaus and City of Modesto should enter into an agreement with the RDs to provide administrative and professional support for the development and maintenance of district plans. A cost sharing arrangement could be developed within this agreement. Another option would be to have the RDs form a collective that works to develop flood-specific emergency response plans for the levees. The collective could interact directly with the cities and Stanislaus County.

4.7.6 Mutual Aid for Flood Fight Operations

Jurisdictions making up the Stanislaus Operational Area should develop an agreement or procedure outlining the specific process and characteristics for providing levee flood fight support and mutual aid to RDs. Potential support would include assistance with levee patrol, flood fight crews, and funds for the acquisition of private contractors and bulk materials. In particular, the provision of funds, or purchasing support, for acquisition of material from private vendors or bulk materials should be clearly defined. Total dependence on the State or federal governments for emergency funding of response to threats to levee integrity could lead to delays that result in levee failure. Local jurisdictions should identify circumstances in which they will intervene to support RD and non-RD entities response financially to protect their interests and the general public.

4.7.7 Flood Response Training Program

State and federal governments require that public agencies institutionalize the NIMS for management of disaster incidents. DWR has also issued standardized protocols for marking levee problems during levee patrols. A realistic training policy and program for RDs should be developed as part of the planning process to provide familiarization with NIMS procedures and flood fight protocols.

A comprehensive training program should include periodic and sustained joint exercises among agencies involved in flood fight and public safety operations to ensure a well-coordinated response, effective command and control, and familiarity among agencies that do not work together on a routine basis.

4.7.8 Operational Area Flood Response Working Group

The Stanislaus Operational Area should form a flood response working group within that organization composed of the RDs and public safety agencies with jurisdiction within the flood plain. This working group should be created through a written agreement or protocol that defines meeting frequency, objectives, and specific review items. This group could then ensure that flood response products developed in past preparedness projects are maintained. This process would also ensure that there is ongoing communication between jurisdictions and that new officials are properly briefed on current preparedness plans and their status.

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5. Operations & Maintenance

5.1 Introduction

The objective of this Operations and Maintenance (O&M) chapter of the RFMP is to provide an assessment of the Operation and Maintenance practices in the Mid San Joaquin River Region. This chapter includes background information on O&M, general findings, and recommendations for improving O&M in the region.

The content of this chapter is based on reviewing available information such as the Local Maintaining Agency Annual Reports for Levees of the State Plan of Flood Control and Inspection and Local Maintaining Agency Report to the Central Valley State-Federal Flood Protection System, as well as discussions with RD staff responsible for flood management system O&M. The Operations and Maintenance Assessment Technical Memorandum found in Appendix E was also developed from this information, and goes into more specific details of each RD. Information generated throughout the process was provided to local stakeholders for review and subsequent modification and enhancement as appropriate through RFMP workshops and meetings.

5.2 Background

Flood management facilities are subjected to natural forces that can reduce their effectiveness over time. O&M helps maintain the original design and reliability of flood management systems and involves activities including: routine inspections of flood management facilities, erosion control, vegetation removal, debris and sediment removal, and control of burrowing animals. Coupled with long-term flood risk reduction projects, O&M strengthens the structural integrity of the levee systems in the Region. O&M activities are typically performed by the Levee Maintaining Agency (LMA) responsible for specified segments of levee systems.

A common issue in the Mid SJR Region is that wave action and high water events cause erosion on the waterside of levees, thereby altering the levee geometry and reducing a levee's overall effectiveness.

LMAs work to mitigate these issues by placing rock on the waterside of the levee to reduce the erosive forces. To a lesser extent, slope grading/dragging can be done to repair minor depressions in the levee slopes.

Burrowing animals also threaten the structural integrity of levees in the Region. Burrowing rodents can create extensive networks of tunnels throughout levee systems, creating a path for water to get from the waterside to the landside of the levee. LMAs have employed measures such as grouting, baiting, and hunting to remove burrowing animals from their levees.

Additionally, thick vegetation on levees reduces the ability to visually inspect a levee. Therefore, LMAs trim/remove trees/shrubs and mow grass to meet guidelines established by USACE and DWR. It is noted that vegetation requirements differ between USACE and DWR. It should also be noted that USACE has recently moved to an interim vegetation policy while they review their current policies.

Levee O&M are paramount to keeping leveed systems in working order, so that they are reliable and provide an adequate level of protection. To ensure levees are being maintained correctly by the LMA's they are inspected by both the USACE and DWR.

5.3 General Findings

This section describes the O&M findings that apply to the whole region.

Most of the RDs in the Mid San Joaquin Region are rural districts which encompass agricultural land. Accordingly, there are limited or no assessments, which means that individual land owners fund and perform necessary levee maintenance. Typical maintenance activities for the RD's in the region include: vegetation management, rodent control, erosion control/repairs, crown maintenance, and slope dragging.

Vegetation and animal control were common issues that were noted in many of the DWR Levee Inspection Summaries for the RDs in the Region, which were also noted in discussions held with each RD. Discussions with RD staff and representatives indicated environmental permitting challenges and Endangered Species Act (ESA) constraints associated with O&M activities often puts districts in the middle of conflicting regulatory requirements. In these instances, RDs have to make the decision of whether to perform the required O&M and potentially be fined for violating ESA regulations, or perform limited O&M that complies with ESA requirements at the risk of failing regular inspections. Since RDs have limited financial resources as it is, the decision is often made to comply with ESA regulations and hope the limited O&M are sufficient.

However, failure to perform regular maintenance not only threatens financial support in the event of a disaster from the Public Law (PL) 84-99 program, but reduces the effectiveness of existing flood management facilities to perform during a flood event, thereby threatening the people and property behind these levees. Currently, RD 2092 is the only district in the Mid San Joaquin Region that is eligible for PL 84-99 disaster assistance. It should be noted that this district is in the process of seeking to eliminate O&M responsibilities and will permit flowage on previously protected lands within the District.

In addition to permitting challenges, many RDs cited differing vegetation criteria as outlined by DWR and USACE as a source of confusion and frustration. These differing criteria can often result in RDs receiving acceptable ratings on DWRs levee inspections, but unacceptable ratings on USACE (PL 84-99) inspections. This is problematic since two or more consecutive unacceptable ratings from USACE can jeopardize an LMA's eligibility in the PL 84-99 program, which provides levee rehabilitation assistance in the event of a disaster.

Furthermore, many LMAs noted they were comfortable funding minimal O&M responsibilities, but this level of O&M has been insufficient to meet State and Federal requirements. Given their limited financial resources, these Districts are not able to generate the capital needed to implement large-scale levee repairs. **Table 5-1, LMA Expenditures and Funding Sources**, below, summarizes the approximate annual O&M expenditures, and sources of funding for the LMAs in the Region.

Table 5-1
LMA Expenditures and Funding Sources

LMA	Approx. Levee Miles Maintained	Approx. Annual O&M Expenditures	O&M Funding Sources
RD 1602	6.29	$10,000 - $12,000	Individual Property Owners
RD 2031	13.19	$30,000	Individual Property Owners
RD 2063	10.63	$83,000	Assessments
RD 2091	7.89*	$40,000 - $50,000	Assessments
RD 2092	3.76	$10,000 - $12,000	Individual Property Owners
RD 2101	3.51	$25,000	Individual Property Owner
Gomes Lake	0.3	$14,000 - $35,000	Joint Powers Agreement, or JPA (TID, Stanislaus County, City of Turlock, RD 2091, RD 2063)

*0.3 miles are maintained by TID under the Gomes Lake JPA

Based on this information, funding of routine O&M appears sustainable. However, the annual expenditures cited above do not consider funding needs for large-scale repairs or addressing existing encroachments. DWR grant programs can help LMAs with these expenses, but financial resources of the LMAs are limited, making it difficult to meet the local cost-share requirements. Furthermore, LMA staff limitations, combined with the fact that district staff typically work and/or manage farms full-time, mean there is little time left to apply for this funding. It is also noted that some LMAs expressed an interest in pooling O&M equipment resources to help control O&M expenses. In the event that LMAs are unable to fulfill their maintenance obligations, DWR or the CVFPB is authorized to form a State Maintenance Area and take over LMA maintenance obligations and billing the LMA's property owners for the service. An LMA may request formation of a State Maintenance Area or seek to remove levees from the State Plan of Flood Control. To date, no State Maintenance Areas exist in the San Joaquin River Basin, though several exist in the Sacramento River Basin.

5.4 General Recommendations for Improving O&M

Based on the findings made above, the following recommendations to improve O&M in the Mid SJR Region and are described in more detail, below. It should be noted that two of the projects evaluated in this RFMP came from these recommendations: Consolidation of O&M and Regional Maintenance Technical Support (formulated from the recommendation to Develop a Technical Support and Education Program to Inform LMAs on Levee Maintenance Issues). In addition, one project concept to Develop

Expedited Permitting Programs for Maintenance Activities was formulated from the recommendation of implementing a Programmatic Environmental Analysis for O&M, as described below.

5.4.1 Programmatic Environmental Analysis for O&M

As previously discussed, O&M activities such as vegetation and rodent control can impact endangered species and habitat for these species. Reform of current permitting regulations may help RDs more effectively meet their O&M responsibilities, while complying with applicable regulations. A programmatic approach to permitting routine O&M responsibilities for SPFC facilities through the region, or the State, may help meet their O&M responsibilities while complying with applicable regulations.

5.4.2 Establish Consistent Levee Vegetation Standards

Maintenance and/or removal of vegetation along the levee is aimed at improving public safety, levee surface visibility, and levee accessibility. However, as noted in the previous section, it is common for an RD to receive an acceptable rating from DWR on vegetation management, but an unacceptable rating from USACE. RDs in the Region need DWR and USACE to agree on a common standard for levee vegetation management.

A brief summary of the differing vegetation standards is provided below.

The USACE's vegetation policy is outlined in an Engineering Technical Letter (ETL) titled "Guidelines for Landscape Planting and Vegetation Management at Levees, Floodwalls, Embankment Dams, and Appurtenant Structures." According to the ETL, a vegetation-free zone must be maintained along all levees. The vegetation-free zone is defined as a three-dimensional corridor surrounding all levees, floodwalls, embankment dams, and critical appurtenant structures in all flood damage reduction systems. The ETL requires removal of all vegetation (except grass) on existing levees, plus vegetation within 15-feet of the landside levee toe. Tree canopies extending into this zone must be trimmed 8-feet above the ground.

By contrast, DWR's vegetation policy incorporates a Life Cycle Management (LCM) approach for "legacy" vegetation. This policy is aimed at limiting the financial costs associated with extensive vegetation removal and potentially significant loss of habitat along levees. Under DWR's vegetation management strategy, levees containing legacy trees along the landside or waterside slopes will be managed to allow vegetation and trees to live out their normal life cycles except where they pose a threat, while gradually progressing (over several decades) toward the current USACE policy of "eliminating woody vegetation from the vegetation free zone." The LCM approach allows for the preservation of riparian habitat as long as the vegetation does not impair visibility and accessibility. The crown must be kept free of all vegetation since it serves as a patrol road for levee maintenance.

DWR's policy also permits trees on the waterside slope that are farther than 20' from the crest due to engineering benefits including erosion protection, soil reinforcement, and sediment recruitment, provided visibility requirements are met, and the vegetation does not pose a threat to the integrity of the levee.

Recently USACE has released its "Interim Policy for Determining Eligibility Status of Flood Risk Reduction Management Projects for the Rehabilitation Program Pursuant to PL 84-99" (March 2014). This document has set interim policies on levee vegetation management. Following this interim policy, levee systems will

no longer be removed from the PL 84-99 Program for vegetation issues alone while long term policies are set. This is a good short term solution until long term policies are set. These long term policies may be more in line with DWR guidelines.

Reconciling these two differing criteria will enable RDs to focus on a meeting a single vegetation standard for their levees. If this recommendation is combined with the programmatic approach to permitting routine O&M responsibilities for SPFC facilities as discussed previously, this would enable RDs to comply with permitting requirements while completing regular O&M responsibilities.

5.4.3 Streamline Grant Application Process and/or Support LMAs with Grant Applications

DWR has many grant programs available to assist LMAs with repairs and improvements to their levee systems, which is good since many RDs lack the financial resources to implement large-scale repairs/improvements. However, grant applications can take a significant amount of time to prepare, and technical expertise to complete. Limited RD staff resources mean that grants often go unapplied for, thus propagating system deficiencies.

RDs have expressed a desire to have DWR staff assist in the preparation of grant applications, especially for deficiencies identified by DWR. The RDs could review and have their respective Boards approve such applications, if necessary. This would help address critical erosion/seepage sites and other needed repairs identified by DWR.

As mentioned previously, RDs in the Mid San Joaquin Region have limited financial resources, making it difficult for these areas to meet the local cost-sharing requirements for State and Federal grant programs. Revisions to the State's local cost-sharing guidelines for projects that provide regional flood system benefits should be considered by DWR.

Finally, many of the RDs in the Region are not formally organized which prevents them from being able to enter into funding agreements with the State. A solution is needed to enable Districts to apply for State funding. For Districts where organization is infeasible, one possibility is agreements amongst several Districts to enter into funding agreements with DWR.

5.4.4 Consolidation of O&M

Large mowers and grout equipment used for vegetation and rodent control can be expensive, and are not used continuously. Therefore, an opportunity exists for RDs in the Region to pool their resources and share upfront and maintenance costs of operating one piece of machinery, rather than each RD having to own and operation their own mowers and grout equipment.

5.4.5 Develop Levee Maintenance Best Management Practice (BMP) Guidance

Development of a handbook of BMPs for levee management would help educate LMA staff and standardize O&M practices. The handbook would include guidance for all O&M challenges, including addressing burrows/burrowing animals, and managing vegetation consistent with both DWR and USACE standards (until one standard can be agreed upon).

It would describe methods (e.g., dragging chains, goat grazing, mechanical trimming) and include the pros and cons of each, so each LMA can choose what works best for their situation.

Encroachments (those in place, but lacking permitting documentation) could also be addressed within the handbook. If no such protocol exists this would be a natural place to develop it.

5.4.6 Develop a Technical Support and Education Program to Inform LMAs on Levee Maintenance Issues

This program would be a medium through which educational materials such as the BMP handbook described above could be disseminated. This would likely be done by a staff person who would meet in person with LMA staff and organize workshops to benefit multiple LMAs. This program could also be expanded to support LMAs in grant applications, but this expansion would most likely require local cost share from benefitted parties.

6. Land Use and Environmental Enhancements

6.1 Introduction

This chapter provides 1) information on the current and anticipated future relationship between land uses within the floodplain and flood risks within the Mid SJR Region's planning area; 2) identified desirable ecosystem enhancements within the region; and 3) linkages between potential flood management actions and ecosystem enhancement, including funding incentives. Additionally, this chapter provides a list of generic land use and environmental enhancement tools that might be employed to reduce flood risk, enhance ecosystem functions and services and/or habitat, or both. These generic tools may provide concepts worthy of development into potential individual regional improvements; they may also suggest environmental enhancements to potential flood management projects.

Sources for the information provided in this chapter include reports prepared by the Almond Board of California; California Department of Conservation (CDC); California Department of Water Resources (DWR); Central Valley Business Journal (CVBJ); University of California, Berkeley; Hoover, et al.; Krousky and Wells; Stanislaus County; Stanislaus County Agricultural Commissioner; and Stanislaus Council of Governments (STANCOG).

6.2 Past, Present, and Future Land Use

6.2.1 Historical Context

The Draft Environmental Impact Report (EIR) for the 2011 Stanislaus County Regional Transportation Plan includes a detailed description of the history of land use in Stanislaus County that was used to prepare the following discussion. The first Europeans to explore the planning area were Spaniards interested in the watercourses of the San Joaquin Valley. Stanislaus County is named for the Stanislaus River, first discovered by Spanish explorer Lieutenant Gabriel Moraga in 1806. After Mexico achieved independence from Spain in 1821, colonization of California progressed with numerous rancho lands granted by the Mexican governors. Most ranchos were located in the vicinity of missions, but there some ranchos that were located in the San Joaquin and Sacramento Valleys.

After the gold discovery of 1848, the population of California expanded exponentially. Early settlement patterns in Stanislaus County indicate that Gold Rush immigrants ignored valley lands and towns for the foothills of the Sierra Nevada. Communities of that early period, such as La Grange and Knight's Ferry, were predominantly mining camps that grew up along the Tuolumne and Stanislaus Rivers.

By the 1860s, larger and more permanent settlements sprouted along the Stanislaus River, including the towns of Oakdale, New Hope, Adamsville, and Paradise. Initially, wheat was the primary crop because it provided farmers with a source of income relatively quickly. Other cereal grains, such as barley and oats, were also common. Steamboats and small barges plying the San Joaquin River provided early transportation for freight and passengers. Hill's Ferry and Grayson became important shipping points for wheat during the 1860s. Numerous settlements were established on the San Joaquin, Stanislaus, and Tuolumne Rivers, particularly at ferry crossing points, but the river towns were generally abandoned in favor of railroad towns during the 1870s. Agricultural development was spurred when the Central Pacific Railroad (later Southern Pacific Railroad) came to Stanislaus County. Railroads played a key role in the formation of the two largest cities in Stanislaus County, Modesto and Turlock, as well as smaller towns. Like Modesto, Turlock was established in 1871 along the railroad line. During the late 19th and early 20th centuries, Turlock developed as a shipping point and retail center for surrounding farms. Southern Pacific Railroad branch lines constructed through the county in the 1880s stimulated small commercial centers, including Oakdale, Waterford, and Newman.

Implementation of new irrigation systems expanded opportunities for diversification in agriculture for Stanislaus County. For example, although wheat was very important, alfalfa quickly became a significant crop, providing feed for the growing herds of dairy cattle; the cultivation of orchard crops such as peaches, apricots, almonds, and oranges also became possible. Irrigation led to a new agricultural boom in Stanislaus County during the early 20th century. Although the agricultural economy fluctuated during the 20th century, it remains the leading industry in Stanislaus County, generating an annual gross agricultural value of greater than three billion dollars (Stanislaus County, 2011).

6.2.2 Current Land Use and Trends

Existing land use within the planning area is characterized in Chapter 2, Regional Setting. As described there, current land uses within the planning area are predominantly agricultural, including a mix of dairies, livestock pasture and range, livestock feed crops, and orchards. Farmland makes up 75 percent of the Mid SJR Region of the SPFC, with urban areas accounting for only four percent. The small areas within the Mid SJR Region of the SPFC that are under the jurisdiction of the City of Modesto are entirely urban and developed land. **Table 6-1**, **Mid San Joaquin River Region Land Use**, includes a summary of land use within the Mid SJR Region of the SPFC by acres and percent of region.

Table 6-1
Mid San Joaquin River Region Land Use

Land Use Category[1]	Acres of Land Type	% of SPFC Area
Urban and Developed Land	1,260	4%
Native Vegetation and Grazing Land	5,160	18%
Local and Unique Farmland	7,260	25%
Prime and Statewide Importance Farmland	14,290	50%
Confined Animal Agricultural Land	620	2%
Rural and Semi-Agricultural Land	160	1%
Total	28,750	100%

[1] See Chapter 2, Regional Setting, for a description of each of the land use categories.

SOURCE: Mid San Joaquin River Region Flood Atlas (Appendix A)

The remainder of the planning area outside of the Mid SJR Region of the SPFC is also dominated by agriculture and includes the cities of Modesto, Ceres, Turlock, Patterson, and Newman and communities of Grayson, Westley, and Crows Landing. **Table 6-2**, **Land Use in Planning Area**, characterizes land use in the planning area, which is approximately 91 percent agricultural. Existing parks and recreational areas in the planning area are described in Section 2.4.1, Public Access and Restoration.

Table 6-2
Land Use in Planning Area

Land Use Category	Acres of Land Type	% of Planning Area
Agriculture	887,442	91%
Commercial	1,043	<1%
Residential	7,508	1%
Industrial	4,425	<1%
Planned Development	8,808	1%
Urban Transition	9,835	1%
City	53,610	6%
Total	972,671	100%

SOURCE: Stanislaus County, Merced County, San Joaquin County

As described in Section 2.5.3, Protected Assets – Agriculture and Associated Infrastructure of this RFMP, milk is the top agricultural commodity in the planning area, but dairies here have struggled in recent years and almond, walnut and cherry production is increasing remarkably. Over 100 dairies across the San Joaquin Valley closed in 2012 and more were expected to close in 2013 (CVBJ, 2013). The dairy closures were primarily because of sharp increases in feed costs that were a result of a major drought in much of the Mid-western United States in 2012. Given that drought conditions have worsened, the recent trend of dairy closures may continue although a significant reduction in dairy production has yet to be seen for the region (Stanislaus County Ag Commissioner, 2012).

There has been a net decrease in farmland of Prime and Statewide Importance in Stanislaus County over the last 20 years. Irrigated farmland was also on the decline overall, but in 2010 there was a net increase from the planting of orchards and vineyards. There was 16,000 acres of new almond plantings between 2008-2010 (CDC, 2014). Continued conversion of row crops and silage production land uses to nut and fruit production is anticipated in coming years, and this trend may have an impact on flood management across the region. Given the both the cost to replace trees and the high price per unit of production, flood damages to orchard crops may result in higher costs than flood damages to annual forage crops, depending on the timing and duration of flooding (Stanislaus County Ag Commissioner, 2012; University of California, 1997). Almond production in California has increased by over 82 percent in the last 10 years. Consistent with this statewide trend, almond production has increased significantly in Stanislaus, San Joaquin, and Merced counties by approximately 55, 65, and 56 percent, respectively. In Stanislaus County, the majority of the new nut and fruit crops have been planted in the eastern and northeastern portions of the county, though orchards are being planted throughout the county (Modesto Bee, 2014). **Table 6-3**, **California Almond Production by County**, includes the number of pounds produced annually in California counties with commercial almond operations. As shown in this table, Stanislaus County has been one of California's top three almond producing counties within each of last 10 years.

Another trend in agriculture in the San Joaquin Valley is increasing soil salinity. Salinity in San Joaquin Valley soils has been increasing because the water imported via the Central Valley Project and State Water Project to irrigate crops is high in salt content. San Joaquin Valley soils include dense clay layers that prevent the salts from permeating into the ground. As a result, salts build up in the soil and may impede the ability of crops to grow. Many of the soils in the Central Valley are naturally saline and poorly drained, and when irrigated, these soils leach salts into the shallow groundwater and root zone, also impeding plant growth. Without comprehensive salinity management, decreased agricultural production may be observed in decreased acreage of actively farmed land in the region or changes in cropping and irrigation patterns over time. The San Joaquin Basin is experiencing a chronic salt imbalance with significantly more salt brought in through surface water deliveries than is conveyed out. In 2006, a joint effort began among the CVRWQCB, State Water Resources Control Board, and local stakeholders to address salinity issues within the Central Valley and to adopt long-term solutions. The collaborative effort is called Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) and described in more detail in Section 2.7, Agricultural Land Management and Water Quality.

Table 6-3
California Almond Production by County (million pounds)

Crop Year	Stanislaus	San Joaquin	Merced	Kern	Fresno	Madera	Tulare	Kings	Colusa	Glenn	Butte	Yolo	Tehama	Sutter	All Others	Total
2003/04	169.3	55.3	129.3	205.9	176.9	94.5	18.5	12.3	55.0	42.3	50.0	6.6	8.0	5.7	4.1	1,033.6
2004/05	163.9	51.0	127.6	215.8	173.5	93.4	20.4	13.0	38.0	37.2	45.0	4.7	6.9	4.6	2.9	997.9
2005/06	132.2	41.8	102.1	210.1	160.1	82.4	15.9	12.0	40.3	42.6	50.4	5.6	8.4	4.6	2.7	911.4
2006/07	163.6	55.6	124.6	247.8	232.7	100.1	21.5	17.7	50.8	38.4	41.8	6.3	7.7	4.9	3.8	1,117.3
2007/08	223.3	75.2	172.9	271.0	253.8	125.3	26.7	17.9	66.2	51.8	66.7	10.0	11.4	5.6	5.1	1,383.6
2008/09	240.6	82.1	187.3	354.3	322.2	142.7	36.2	23.4	86.0	48.6	56.9	10.4	9.7	5.3	5.2	1,611.0
2009/10	198.8	70.7	156.7	317.9	281.9	112.3	32.6	20.6	75.7	52.7	49.2	12.4	10.9	5.2	4.9	1,402.6
2010/11	202.5	68.0	164.2	403.5	344.2	149.7	42.4	29.9	83.0	55.8	47.1	13.6	11.7	4.9	6.0	1,626.6
2011/12	269.7	87.9	216.7	472.6	443.0	206.1	44.5	39.0	85.5	59.7	49.0	17.9	11.9	6.9	6.6	2,017.1
2012/13	261.8	91.5	201.4	393.4	413.6	203.5	49.1	30.7	85.1	57.9	50.9	18.1	12.5	7.0	7.5	1,884.1

SOURCE: Almond Board of California, 2013

6.2.3 Land Use Regulations

Zoning Codes

The primary tool to regulating land use within a floodplain is through a local zoning code, which also implements its general plan, as well as other laws, programs, and policies. Much of the land use within the Mid SJR Region and broader planning area is regulated by the Stanislaus County Code and Stanislaus County General Plan. The remaining portion of the planning area is regulated by the individual general plans and zoning codes for the cities of Modesto, Ceres, Turlock, Patterson, and Newman. In addition, small amounts of land within the planning area are located within Merced and San Joaquin counties, and are subject to those communities' zoning codes and general plans.

The Land Use, Conservation/Open Space, and Agricultural elements of the Stanislaus County General Plan include several goals and policies that apply directly or are related to flood management, habitat conservation, and agricultural preservation. Goal Five of the Stanislaus County Conservation/Open Space Element is to: "Reserve, as open space, lands subject to natural disaster in order to minimize loss of life and property of residents of Stanislaus County." Policy Four under Goal One in the Land Use Element states that development within the 100-year floodplain must meet the requirements of Chapter 16.50, Flood Damage Prevention, in the Stanislaus County Code. Chapter 16.50, Flood Damage Prevention, applies to special flood hazard areas (SFHAs) within the unincorporated areas of Stanislaus County that are defined in the Stanislaus County Code as having special flood or flood-related hazards and is shown on FEMA Flood Hazard Boundary Map (FHBM) or FIRM as Zone A, AO, AR, AE, A99, or AH. **Figure 3-11**, **General Plan Land Uses within 100-, 200-, and 500-year Floodplains** of this RFMP, shows the boundaries of each of these designated flood zones in the planning area. As shown, a significant portion of the planning area falls within these flood zone designations. Currently, development is permitted within SFHAs provided that the standards included in Chapter 16.50 of the Stanislaus County Code are met. Areas that are designated as floodways by the CVFPB are extremely hazardous because of the velocity and depth of flood waters, which carry debris and have a high erosion potential. Development is prohibited in designated floodways unless certification by a registered professional engineer or architect can be provided demonstrating that encroachments would not result in any increase in the base flood elevation. Merced County, and the cities of Patterson, Modesto, Ceres, and Newman municipal codes include similar requirements. The zoning codes for both San Joaquin County and the City of Turlock do not include specific provisions associated with development within a floodplain.

Senate Bill 5

Other regulations are in effect at the state level that control land use. Senate Bill 5 (SB5) was passed in 2007 which requires a 200-year level of flood protection for urban and urbanizing areas within California's Central Valley, and recommends 100-year flood protection for non-urban areas. Under SB5, development in moderate or special flood hazard areas (i.e. 500-year and 100-year floodplains, respectively) would only be allowed within the Central Valley if a city or county can find, based on substantial evidence in the record, that the development will be subject to less than 3 feet of flooding during a 200-year flood event.

For those areas where potential depth from a 200-year flood event is greater than 3 feet, the local government will be required to make an Urban Level of Flood Protection (ULOP) finding. The local government is required to make the ULOP finding before: (1) entering into a development agreement for any property that is located within a flood hazard zone; (2) approving a discretionary permit or other

discretionary entitlement, or a ministerial permit that would result in the construction of a new residence, for a project that is located within a flood hazard zone; or (3) approving a tentative map, or a parcel map for which a tentative map was not required, for any subdivision that is located within a flood hazard zone. This essentially means that no development can occur in urban or urbanizing areas unless 200-year flood protection (with less than 3 feet of flooding) can be achieved. SB5 regulations require general plans and zoning codes of all local governments in the Central Valley be revised to reflect these standards by July 2016. Local governments then have until 2025 to make the improvements and achieve this urban level of flood protection. See **Figure 6-1**, **General Plan Designations and 100- and 200-year Floodplains**, and **Figure 6-2**, **Zoning Designations and 100- and 200-year Floodplains**, for the current general plan and zoning designations within the 100- and 200-year floodplains in the planning area.

SB5 regulations have the potential to greatly affect future development within the planning area. The only urban (i.e., areas with 10,000 or more people) and urbanizing (i.e., areas that will have 10,000 or more people in 10 years) areas within the planning area are the cities of Modesto, Patterson, and Newman. Although the 200-year flood maps have not been developed for the Mid SJR Region, it is likely that there will be areas that can experience flooding of 3 feet or greater during a 200-year flood event in these cities. Until these cities have their 200-year flood maps completed to determine where the ULOP findings are required to be made, and a plan to achieve the urban level of flood protection by 2025, only limited growth can occur.

Preservation of Agricultural/Open Space Regulations

There are mechanisms in place that help facilitate the preservation of agriculture and open space areas within the Mid SJR Region. Chapter 21.118 Land Use Restriction of the Stanislaus County Zoning Ordinance includes provisions to implement the requirements of a thirty-year land use restriction initiative. Under this chapter, any land that is redesignated or rezoned from an agricultural or open space use to residential is contingent upon the approval by a majority vote of the county voters at a general or special local election. With this provision in place, the conversion of land from agriculture and open space to residential uses is more difficult to effect and the process of redesignation or rezoning takes longer.

Another mechanism for regulating land use is the California Land Conservation Act of 1965, referred to as the Williamson Act, which is a tax relief measure for owners of farmland and open-space lands. The act permits the owner of land that is used for farming or open space uses including wildlife habitat to sign a contract with the applicable county guaranteeing that the land will remain in farming or open space uses for a minimum of 10 years in return for assessing taxes on the property based on the agricultural or open space value rather than the market value, which can result in a significant reduction in property taxes for the landowner. As shown in **Figure 6-3**, **Williamson Act Lands**, significant portions of Stanislaus, Merced, and San Joaquin counties are under Williamson Act contracts with local landowners. The Williamson Act has been an effective agricultural and open-space preservation tool, though land covered under Williamson Act contracts continues to decline in the planning area and throughout California (CDC, 2013). The Agricultural Element of the Stanislaus County General Plan includes policies and implementation measures to continue participation in and contribute to strengthening the Williamson Act to preserve agricultural and open-space lands in Stanislaus County.

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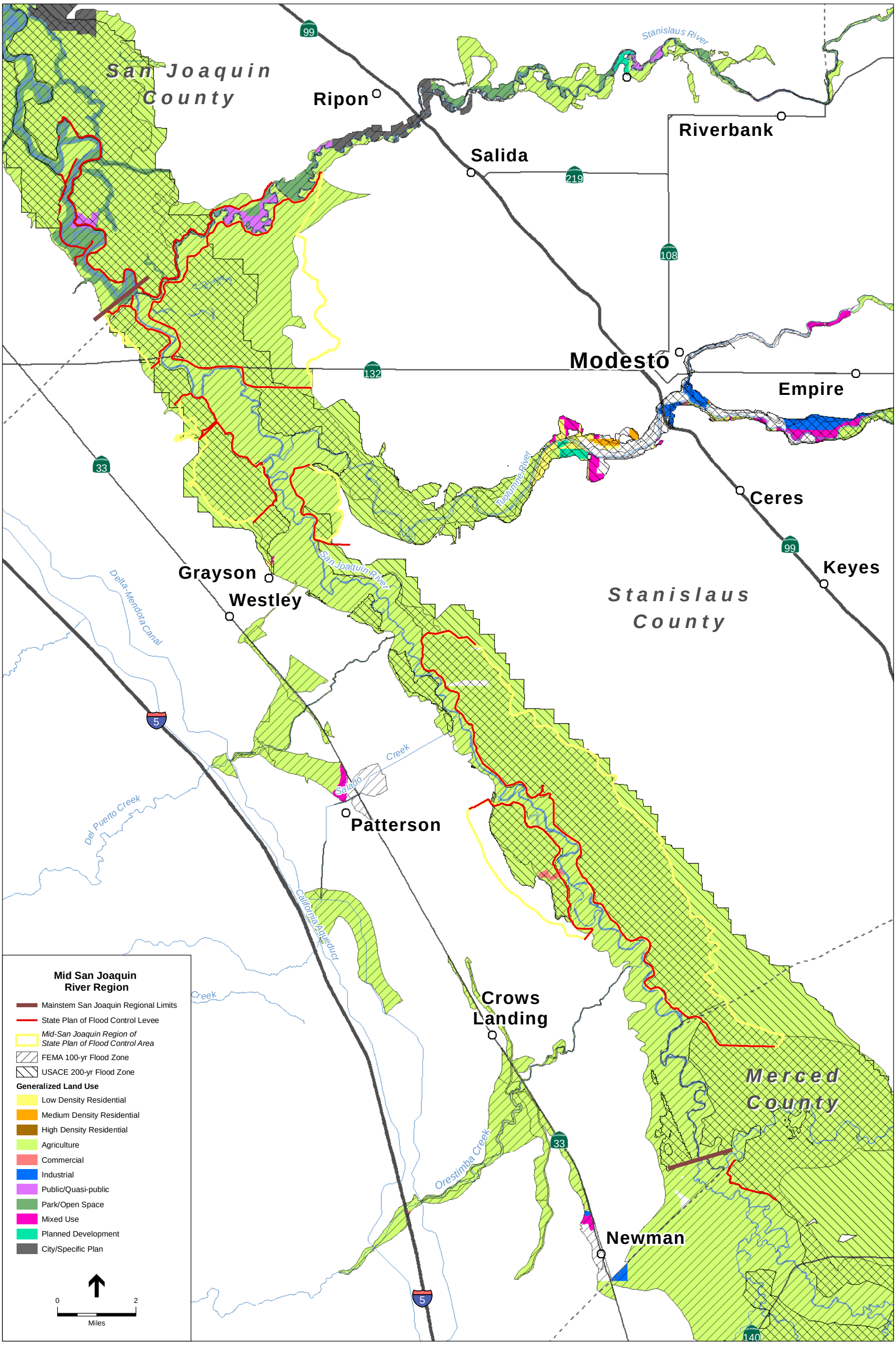
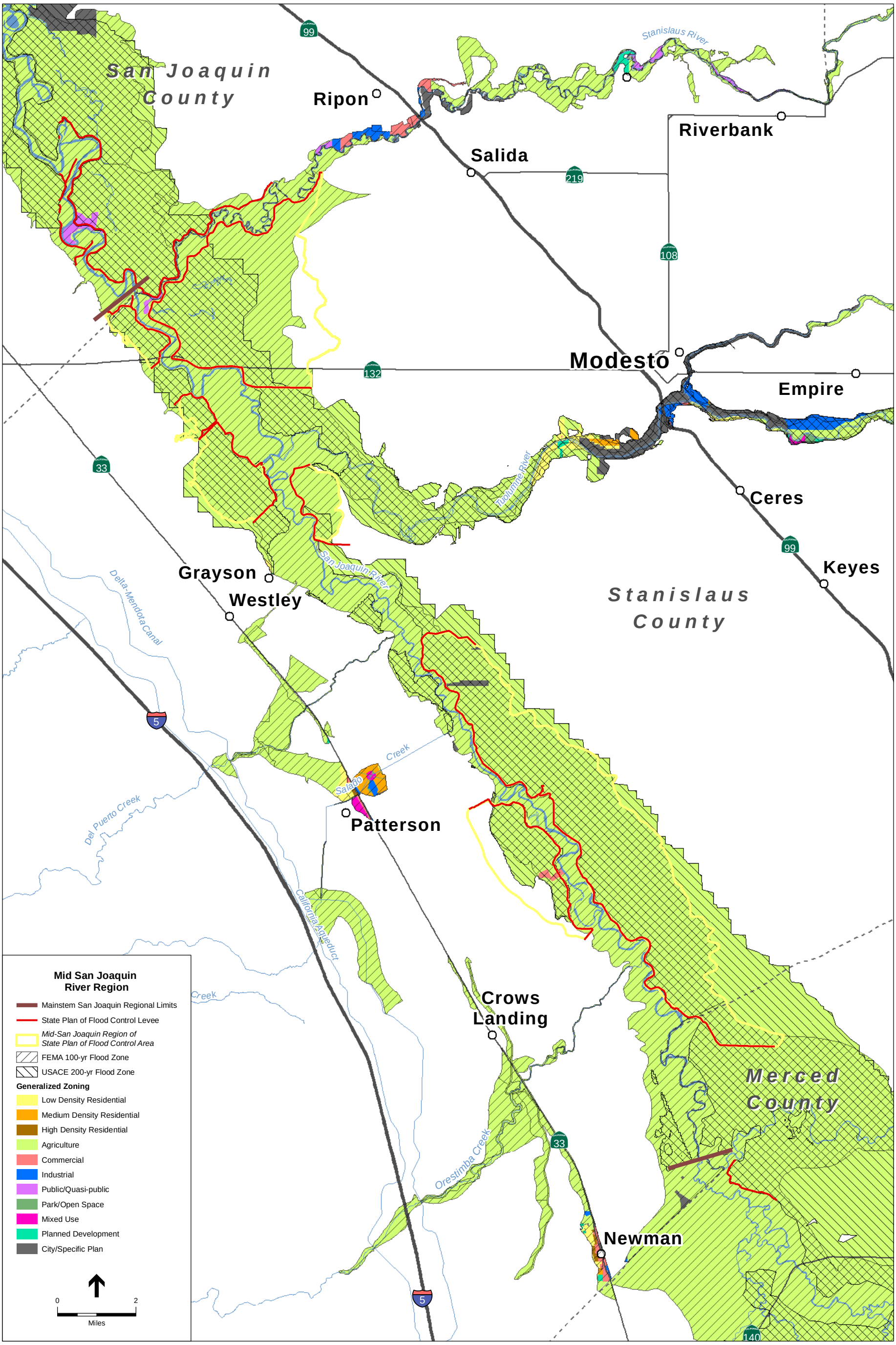


SOURCE: USDA, 2012; ESRI, 2012; DWR, 2013; ESA, 2013

Figure 6-1

General Plan Designations and 100- and 200-year Floodplains



SOURCE: USDA, 2012; ESRI, 2012; DWR, 2013; ESA, 2013

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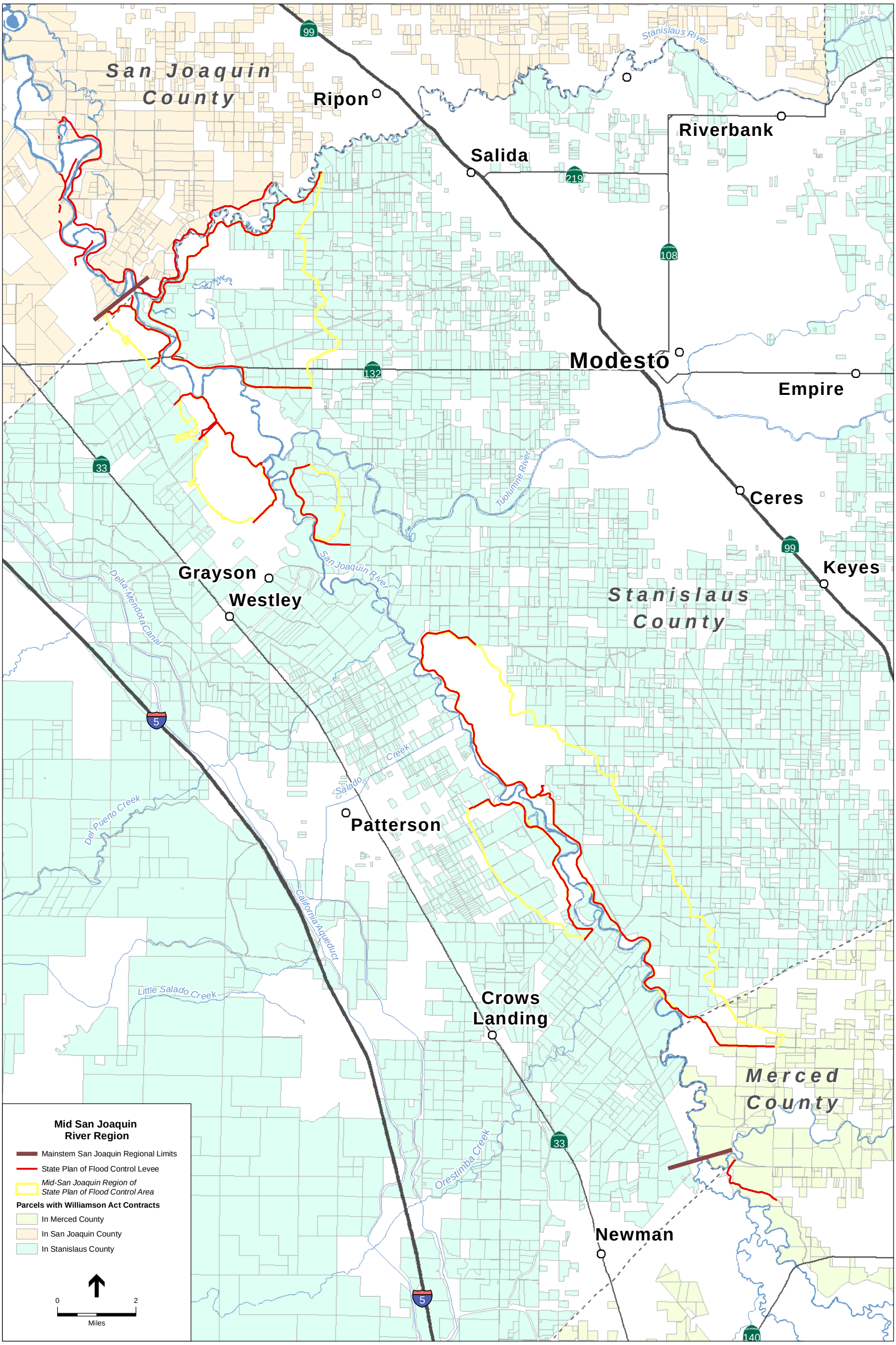
Figure 6-2

Zoning Designations and 100- and 200-year Floodplains



SOURCE: USDA, 2012; San Joaquin Co., 2009; Merced Co., 2010; Stanislaus Co., 2013; ESRI, 2012; DWR, 2013; ESA, 2014

Figure 6-3
Williamson Act Lands

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6.2.4 Land Use and Flood Risk

The land uses within a floodplain significantly influence flood risk. In the context of flood management, risk is defined as the product of the probability of a given flood occurring and the damage that would result. The probability of a given flood occurring is influenced by climate, hydrology, and topography. The damage that would result depends on the land uses within the floodplain, flood protection systems that are in place, and flood proofing measures that have been implemented. Development within a floodplain generally increases the damage that would be caused in the event of a given flood. As described in Section 3.8, Identified Flooding and Flood Hazards, land uses within the 100- and 500-year floodplains in the Mid SJR Region include urban; rural and semi-rural agricultural; native vegetation and grazing land; farmland of prime and Statewide importance; local and unique farmland; and confined animal agriculture. The vast majority of land within the 100- and 500-year floodplains in the Mid SJR Region and broader planning area is agricultural. According to recent data from the EPA, approximately 21 dairies are located within the 100-year floodplain in the Mid SJR Region (EPA, 2013). As discussed above under Section 6.2.3, per SB5, development within the 200-year floodplain in urban areas will not be permitted without protection from a 200-year flood event. SB5 also recommends 100-year flood protection be provided for non-urban areas. Development in this context includes new residential, commercial, or industrial land uses and buildings for agricultural uses. As some fruit and nut trees are damaged by prolonged inundation and costly to replace, the flood risk needs to be balanced with potential profits before planting orchards. While the provisions of SB5 don't preclude orchards in the 100- or 200-year floodplains, it would be good land use practice to consider flood-compatible uses that include production of crops that are flood-tolerant, open space, some recreational facilities and uses, and areas of rehabilitated floodplain habitat.

6.2.5 Land Use Management Tools

Potential land use management tools are listed and described below that could go beyond the requirements of SB5 to reduce flood risk, enhance the environment, improve recreation, and preserve agricultural lands. The following list describes options that have been identified as part of the planning process and may or may not be selected for implementation. Those that are selected would need to be defined further. It should be noted that these tools were not recommended for inclusion as a project in the RFMP at this time.

- As zoning is the primary tool used to regulate land use, zoning designations could be established that only permit flood-compatible land uses within the 100- and 200-year floodplains, particularly in areas that are not able to meet the flood protection requirements of SB5. These designations could also restrict flood-incompatible uses, such as crops that are sensitive to inundation and establishment of new or expanded dairies, to areas outside of the 100- and 200-year floodplains while allowing flood-compatible agriculture within the floodplain boundaries. A separate zoning designation could be applied to areas in the floodplain with high potential for habitat rehabilitation with associated restrictions to encourage the eventual creation of habitat in those areas. This effort would require coordination and approval by local jurisdiction advisory and legislative bodies. The proposed zoning designation would likely require a Stanislaus County General Plan Amendment and an amendment to the Stanislaus County Zoning Code, as well as environmental review.
- New Williamson Act contracts could be established on agricultural lands within floodplains, including on lands that would provide cropland and floodplain habitat, depending on the time of year. This might be accomplished through the development of new incentives or an enhanced

outreach program by Stanislaus County. Open space is considered a consistent land use for parcels enrolled in the Williamson Act in Stanislaus County.

- In order to balance flood risk with potential profits, Stanislaus County could choose to enact policies that would encourage flood-compatible crops and discourage crops that are highly sensitive to prolonged inundation, such as dairies, permanent tree crops and food processing facilities.
- An incentive could be provided for preserving agricultural lands in the 100-, 200-, and 500-year floodplains. Agricultural lands could continue to be preserved through the Stanislaus County Farmland Mitigation Program, which currently requires mitigation for the loss of agricultural land to residential development at a 1:1 ratio, but could be expanded to include any form of land use change that results in the loss of agriculture and extended beyond the unincorporated portions of the County.
- A Transfer of Development Rights Program could be implemented to maintain floodplains in the planning area as open space, fish and wildlife habitat, conservation lands, agriculture, or recreation while encouraging residential and commercial development within areas that are better suited for such development. A large area, such as a County, is needed to effectively implement this planning tool.
- Regional mitigation planning could be developed in the planning area and in collaboration with the resource agencies and neighboring flood planning regions to provide needed environmental mitigation for impacts associated with flood improvement projects and SPFC operations and maintenance (O&M) activities. Any mitigation activities would need to be consistent with the Central Valley Flood System Conservation Strategy (Conservation Strategy), which is scheduled for release in 2014.
- An emergency response fee could be assessed on lands that are particularly costly to serve during a flood event. Two examples of such land uses are dairies and high-density residential development. The fee would be designed to act as a deterrent to placing these land uses in the floodplain and could fund emergency response actions that address the safety of lives and property, but also associated costs such as mitigation for water contamination downstream that generally results when dairies are flooded.
- Additional land within the floodplains of the Mid SJR Region could be zoned for recreation and open space to allow for additional parks and other recreational purposes, and improve public access along the rivers and creeks while keeping the potential risk to floodplain assets low. Changing the zoning of the land would have to be accomplished at the local government level. This process would involve general plan amendments, zoning map amendments, possible amendments to the zoning code and the process would be subject to property owner input, Planning Commission and Board of Supervisor consideration, and action through advertised public hearings.
- Entities that have infrastructure within RDs might be compelled to contribute toward maintenance costs. For example, a pipeline crossing an RD may benefit from flood protection; if so, the pipeline owner could be required to contribute to the flood protection service.
- A statewide fund could be established to support RDs in maintaining levees when there is critical infrastructure within RD boundaries.

6.3 Potential Environmental Enhancements

The rivers in the planning area are critical migratory corridors for steelhead trout and other anadromous fish. Riparian and terrestrial habitats support a variety of wildlife species. As such, there is a need to rehabilitate habitat in the planning area. As stated on page 3-21 of the 2012 CVFPP, "Under the SSIA, ecosystem restoration opportunities are integral parts of systems improvements, as well as urban, small community, and rural-agricultural area flood protection projects." Section 9616 (a) of the California Water Code states that the environmental objectives of the Central Valley Flood Protection Act of 2008 are to 1) promote natural dynamic hydrologic and geomorphic processes, 2) increase and improve the quantity, diversity, and connectivity of riparian, wetland, floodplain, and shaded riverine aquatic habitats, including the agricultural and ecological values of these lands, and 3) promote the recovery and stability of native species and populations and overall biotic community diversity. Prior to and during the regional flood management process, several potential areas and specific habitat rehabilitation projects have been identified in the planning area.

Riparian, wetland, floodplain, and shaded riverine aquatic habitats can be provided in wildlife areas and refuges, designated conservation areas, and agricultural lands. As described in Section 2.4.2, Ecologically Sensitive Areas and Habitat, there are two wildlife areas, two wildlife refuges, and several large areas of conservation land within and near the Mid SJR Region of the SPFC. Atlas Map 18, Managed Environmental Lands (Appendix A), shows the locations of land managed by the USFWS, CDFW, The Nature Conservancy (TNC), River Partners, Tuolumne River Trust, and others. **Figure 2-5**, **Managed Environmental Lands**, shows these areas along with privately-held lands with conservation easements, including those held by the Natural Resources Conservation Service (NRCS). Analyses conducted for the 2012 CVFPP (DWR, 2012) identified 7,760 acres of floodplain lands along river corridors within the planning area that could potentially be hydrologically reconnected to the San Joaquin, Merced, Tuolumne, and Stanislaus rivers so as to benefit ecological processes. As shown in Figure 3-22, Floodplain Inundation Potential of River Corridors in the Lower San Joaquin Basin, of Attachment 9F: Floodplain Restoration Opportunity Analysis of the 2012 CVFPP, the majority of the area with a high potential for floodplain inundation in the planning area is located along the San Joaquin River.

Conservation Needs

The following list describes the aspects of ecosystem degradation relevant to the planning area:

- Loss of frequently-activated floodplains
- Constraints on channel migration processes, which foster the creation of new habitats and reinvigoration of habitats through disturbance
- Reduction in the amount of riparian and marsh habitats
- Hydrologic reconnection of floodplains, including salmon rearing habitat
- Creation of, enhancement, and support of processes to engender riparian and marsh habitats
- Removal of revetment to allow channel migration
- Removal or remediation of fish passage barriers

- Management of invasive plants
- Provision of spawning gravel for salmonids and sturgeon
- Creation of flood refugia for riparian obligate terrestrial species
- Improvement of the connectivity among riparian corridors

In aquatic ecosystem rehabilitation, there is a set of general tools that can be used to meet habitat objectives. These include:

- planting native grasses on levees and a mix of native plants as hedgerows along agricultural lands,
- coordinating vegetation management and erosion control maintenance,
- breaching or setting back levees to reconnect floodplains and provide transient storage,
- removing revetment to restore channel meander potential,
- establishing conservation and flowage easements along agricultural lands,
- removing fish passage barriers and screening surface water diversions,
- augmenting spawning gravel in the river channel,
- filling deep pools in the river channel where non-native fish that prey on native juvenile salmonids tend to congregate (note that before specific deep pools are filled, it is important to determine whether they provide important temperature refugia for anadromous fish), and
- removing non-native invasive vegetation.

Specific attributes of rehabilitated habitat would include seasonally-inundated floodplains, natural geomorphic processes, riparian vegetation, shaded riverine aquatic cover, connectivity with adjacent or nearby habitat. The quality and quantity of riparian habitat will be important in the adaptation of ecosystems to climate change because riparian habitat is often more resilient to change when compared to upland terrestrial habitats, functions as an ecological corridor for a variety of plant and animal species, links aquatic and terrestrial habitats, provides thermal refugia, and may temper anticipated changes to hydrology (Seavy, et al., 2009).

Several ongoing conservation planning efforts have planning area boundaries that overlap with the Mid SJR RFMP planning area boundary, or are relevant because they have a nexus with the Mid SJR Region. Those plans are listed in **Table 2-4**, **Conservation Plans Relevant to Planning Area**. Attachment 2: Conservation Framework of the 2012 CVFPP listed the conservation opportunities that had been identified prior to publication, including several in the Mid SJR RFMP planning area. The list included the reconnection of historical sloughs and oxbows, restoration of riparian habitat, removal of invasive species, and restoration of floodplains along the San Joaquin River roughly between river miles 57 and 118 and the Three Amigos project to restore wetland, riparian, and floodplain habitat, remove nonessential levees, reduce floodway maintenance, and remove invasive species, and the Grayson Bypass Project, which is no longer proposed. In addition to the environmental enhancement projects identified in the CVFPP, opportunities for groundwater recharge in concert with reconnecting floodplain lands were specifically identified for significant parts of the floodplain within the Mid SJR RFMP planning area. In particular, opportunities were identified at a site along Dry Creek, east of Modesto and one mile upstream of the Tuolumne River and described in Attachment 8L: Groundwater Recharge Opportunities Analysis. The range of storage capacity at the site was calculated as 6.6 to 12.7 thousand acre-feet per square mile of recharge area. Last, the Central Valley Habitat Exchange (CVHE) is a new initiative to more completely

quantify the range of environmental benefits that are provided by agricultural lands through restoration activities and/or a change in management by the landowner, and to promote the reintegration of habitat into California's agricultural lands. The CVHE will promote, monitor, and assist in the exchange of habitat credits, which are a measure of the ability of a parcel to support a particular species or natural community. Willing landowners are offered the potential to gain another source of revenue and benefit from having high-quality habitat on their land.

6.4 Flood Management and Environmental and Recreational Enhancement Linkages

Multi-benefit projects are those that combine flood management, environmental, recreational, water quality, and other objectives to achieve improvements in each of these areas. Chapter 4.0, Integration of Conservation and Flood Management, of the Conservation Framework (Attachment 2 to the 2012 CVFPP) provides several examples of projects and programs that have incorporated flood management and environmental objectives. One example of a multi-benefit effort to improve flood management and recreational opportunities is also provided – the Interagency Agreement between DWR and the California Department of Parks and Recreation (DPR), which will support multi-benefit projects at the Colusa Sacramento River State Recreation Area. As part of multi-benefit projects, several actions can be taken that deviate from more traditional flood maintenance, offering dual or multiple benefits. Levees can be removed from the SPFC along with associated maintenance obligations. In such instances, the USACE O&M manual would be modified to allow breaching and other modification to the existing levees. On levees that have been or will be removed from the federal project, brushy vegetation can be re-established on the levees through a three-year restoration project and live trapping has shown that these efforts are successful for wildlife recovery. On levees that must continue to pass state and federal inspections/maintenance requirements, native grass sod has been shown to provide marginal habitat that can act as a movement corridor for terrestrial species during flood events. Recreational access points can be strategically placed to facilitate access for regular inspections and maintenance. Multi-benefit projects as well as any projects that alter hydraulics may have an influence on flood risk in neighboring regions. As such, coordination with the Upper San Joaquin River and Lower San Joaquin River/Delta South regions is crucial in this planning process and into the future as projects are implemented.

Two examples of projects that have been identified during the regional flood management process are introduced in the list below and described in more detail in Chapter 7, Proposed Regional Improvements. The descriptions below provide good examples of multi-benefit projects to illustrate the concept.

- **Floodplain Expansion and Ecosystem Restoration at Dos Rios Ranch/Hidden Valley Mitigation Project** – This project would restore flooding and transient floodwater storage to approximately 1,000 acres of historic floodplain, restore riparian habitats, promote river physical processes of scour and deposition, and provide passive recreation along 6 river miles. Levees would be removed from the SPFC along with associated maintenance obligations and the USACE O&M manual would be modified to allow breaching and other modification to the existing levees. While the property has been purchased, additional investment is needed to develop mitigation opportunities, address

permitting needs, integrate recreational facilities, and remove levees from the federal project or otherwise modify the maintenance obligations.

- **Integrated Levee Vegetation Management – Flood Maintenance and Habitat** – Since 2002, wildlife researchers at the Endangered Species Recovery Program at CSU Stanislaus have been working with landowners and other stakeholders to identify habitat management and restoration activities that can contribute to the recovery of terrestrial riparian species in the region including riparian brush rabbit (*Sylvilagus bachmani riparius*) and riparian wood rat (*Neotoma fuscipes riparia*). Levees in the region provide crucial high-ground refugia for such wildlife during flood events. Vegetation on levees in the region is currently not managed to facilitate levee use during floods for wildlife survival and post-flood recovery. On levees that have been or will be removed from the federal project, brushy vegetation can be re-established on the levees through a three-year restoration project and live trapping has shown that these efforts are successful for wildlife recovery. On levees that must continue to pass state and federal inspections/maintenance requirements, native grass sod has been shown to provide marginal habitat that can act as a movement corridor for terrestrial species during flood events. This project includes re-establishing appropriate vegetation on levee slopes to promote terrestrial wildlife survival during floods – either native sod on active levees, or native brush vegetation on inactive levees (RDs 2099, 2100, 2102, and 2092 in the future).

Meeting multiple objectives broadens the available sources of funding. Flood management projects are generally funded from sources including local assessments, bond funds, and federal and state programs. Examples of funding associated with habitat rehabilitation and/or mitigation that can be accessed by multi-benefit projects include the Restoration Fund established as a requirement of the Central Valley Project Improvement Act (CVPIA), programs under the National Oceanic and Atmospheric Administration (NOAA), USFWS, CDFW, and other state and federal agencies, as well as private foundations and other sources. Consistent with the vision described in the CVFFP, DWR will prioritize funding for multi-benefit projects identified in the current regional flood management planning process.

A number of studies have demonstrated the potential for dedication of floodplains to open space, recreational, and habitat enhancement uses to have a positive economic impact. A recent cost-benefit analysis on a northeast river concluded that the benefits of the 108-mile Meramec Greenway greatly exceed the cost by reducing flood damages and increasing local property values (Krousky and Walls, 2013). A general examination of floodplain valuation in the Central Valley provides a literature review and discusses multiple floodplain services (benefits) in association with their documented cost per acre (Eisenstein and Mozingo, 2013). A 2002 study evaluating the economic impact on Stanislaus County that would result from a floodplain rehabilitation along the San Joaquin and Tuolumne rivers concluded that agricultural production would be reduced, but the net benefit would exceed the loss of agricultural production by approximately $4.86 million over the 25-year period considered in the study. The benefits were associated with economic activity generated by habitat and channel restoration activities, improved aesthetics, and recreational use (USFWS, 2002).

Attachment 9A, Regional Advance Mitigation Planning, of the 2012 CVFPP describes the effort to provide a method to achieve faster, less expensive, and better mitigation for unavoidable impacts associated with infrastructure projects proposed within the state. Regional Advance Mitigation Planning (RAMP) can be integrated with, and add benefits to, conservation planning efforts. The RAMP Work Group formed in 2008 and includes DWR, Caltrans, EPA, USFWS, CDFW, California State Parks, the National Oceanic and Atmospheric Administration, USACE, California Regional Water Quality Control Boards, The Nature Conservancy, Wildlife Conservation Board, UC Davis, Resources Legacy Fund, and the Federal Highway Administration. Projects that include habitat enhancement, such as those listed above, should be considered for inclusion in RAMP.

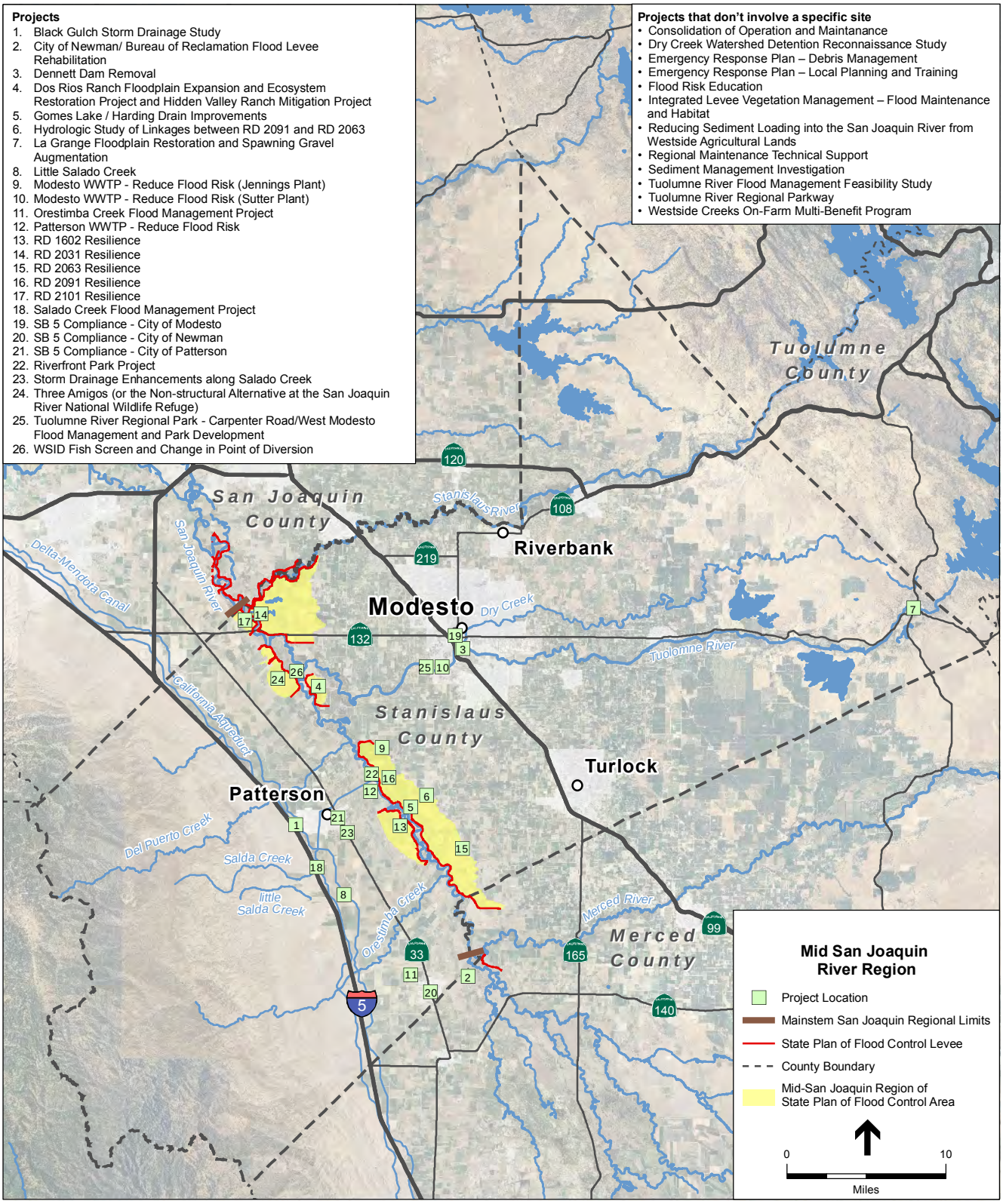
7. Proposed Regional Improvements

7.1 Introduction

This chapter describes the proposed regional improvements, or projects, that were identified through the stakeholder engagement process, which is described in Section 1.3, Stakeholder Engagement. The Regional Partners collaborated with participating stakeholders to develop and refine descriptions of each of the proposed projects. The estimated cost of each project is provided in Chapter 9, Regional Financial Plan. The criteria used to evaluate and rank the projects and the outcome of that process are described in Chapter 8, Regional Priorities.

7.2 Project Descriptions

Thirty seven projects were identified as having the potential to reduce flood hazards and provide other benefits to the planning area. A range of project types were identified; some examples include small dam removal, sediment load reduction, floodplain rehabilitation, a levee vegetation management program, studies to better understand flooding hazards, emergency response planning and training, flood education programs, compliance with Senate Bill 5 requirements, and storm drainage enhancements. The locations of projects with a specific project site are shown in **Figure 7-1, Project Location**s. Projects that don't involve a specific site are listed on Figure 7-1, but not shown on the map. **Table 7-1, Summary of Proposed Regional Improvements**, includes the name, project lead, potential project partners, project status, project cost, project timeline, and a short project description. Potential project partners are those parties that intend to partner or would be willing to consider partnering on a specific project. Detailed descriptions of each project are provided in Appendix F, Project Descriptions and Evaluations.



SOURCE: USDA, 2012; ESRI, 2012; DWR, 2013; ESA, 2013; CSWRCB, 2014

Figure 7-1
Project Locations

Table 7-1
Summary of Proposed Regional Improvements

Project Name	Project Lead	Potential Project Partners	Project Status	Project Cost	Project Timeline	Short Project Description
Black Gulch Storm Drainage Study*	City of Patterson	Stanislaus County	Pre-planning	$28,000	Undetermined	There is a permitted spillway into the Delta Mendota Canal (DMC) from Black Gulch, a drainage situated between Salado and Del Puerto creeks, which keeps a local commercial area in Patterson from flooding. A study needs to be performed to determine what alternative solutions might be appropriate if/when the DMC Authority decides to not renew the permit.
City of Newman/ Bureau of Reclamation Flood Levee Rehabilitation	City of Newman	Bureau of Reclamation	Pre-planning	$225,000	45-day construction time	Rehabilitate a flood protection levee on Bureau of Reclamation property between the Newman Wasteway and the City of Newman Wastewater Treatment Plant (WWTP).
Consolidation of O&M	Reclamation District (RD) 2092	Interested parties include RDs 2031, 2101, 2092, 2091, 1602; City of Modesto; California Department of Water Resources (funding, technical assistance); local Resource Conservation Districts; and Stanislaus County (potential governance and management partners)	Planning	$200,000	1-5 years	Two or more Reclamation Districts form a formal partnership to share technical, financial, and/or operational capacity to perform necessary operations and maintenance (O&M). As an initial step, invest 2 person-years to investigate potential governance options and design and implement a pilot maintenance agreement project.
Dennett Dam Removal	Tuolumne River Trust	No partners identified at this time	Planning. The Dam Removal Basis of Design Report is complete. Funding is required to complete a sediment toxicology test, plus National Environmental Policy Act (NEPA)/California Environmental Quality Act (CEQA), and permitting.	$700,000	2 years	Removal of Dennett Dam, an abandoned low-head dam located on the lower Tuolumne River in Modesto, California. The dam has been an instream barrier to anadromous fish passage, controlling local hydraulic and sediment transport conditions, for over 60 years, while also impeding water flow in the river. It is also a significant safety hazard adjacent to a major park, and has been the location of three drowning deaths in the last five years, including two children.
Dos Rios Ranch Floodplain Expansion and Ecosystem Restoration Project and Hidden Valley Ranch Mitigation Project	River Partners	Wildlife Conservation Board (WCB); DWR; United States Bureau of Reclamation (USBR); United States Fish and Wildlife Service (USFWS); Natural Resources Conservation Service (NRCS); San Francisco Public Utilities Commission (SFPUC); California Department of Fish and Wildlife (CDFW) (funding partners, technical assistance); Central Valley Flood Protection Board (CVFPB); National Marine Fisheries Service (NMFS); United States Army Corps of Engineers (USACE); regulatory agencies; environmental non-governmental organizations (NGOs); local municipalities; Reclamation District 2092 (project support and approvals); regional flood management agencies with mitigation needs that may be filled on the property	Planning, Implementation	$8,000,000	1-5 years	Project to restore flooding and transient floodwater storage to approximately 1,000 acres of historic floodplain, restore riparian habitats, and promote river physical processes of scour and deposition along 6 river miles. Remove levee maintenance obligations from State Plan of Flood Control (SPFC) and modify USACE O&M manual to allow breaching and other modification to the existing levees. Provide 191 acres of habitat mitigation for future regional SPFC environmental impacts.
Dry Creek Watershed Detention Reconnaissance Study*	Stanislaus County and City of Modesto	USACE	Pending funding grants	$250,000	2015-2016 pending funding	Complete a reconnaissance study of potential options for reducing flood risks by detaining flood flows in the Dry Creek watershed, upstream of the City of Modesto.
Emergency Response Plan – Debris Management	Stanislaus County Office of Emergency Services	Stanislaus County Public Works, cities within Stanislaus County, city public works departments within Stanislaus County, Patterson Irrigation District, West Stanislaus Irrigation District	Pre-planning	$110,000	1-5 years	A debris management plan is needed to better prepare to restore public services and ensure public health and safety in the aftermath of a flood or earthquake and to better position the Mid SJR Region for emergency response funding from the State of California, Federal Emergency Management Agency (FEMA), and other participating entities. Stanislaus County Office of Emergency Services proposes the development of a comprehensive, countywide debris management plan.
Emergency Response Plan – Local Planning and Training	Stanislaus County Office of Emergency Services	Stanislaus County; City of Modesto; City of Patterson; City of Newman; Reclamation Districts 1602, 2063, and 2091; Patterson Irrigation District; West Stanislaus Irrigation District	Pre-planning	$110,000	1-5 years	Planning and training are necessary to improve coordination between local agencies so that emergency response can be improved in the planning area. A program would be developed and implemented to address this need.

Table 7-1
Summary of Proposed Regional Improvements

Project Name	Project Lead	Potential Project Partners	Project Status	Project Cost	Project Timeline	Short Project Description
Flood Risk Education	River Partners	DWR and USACE levee maintenance and inspection staff; CVFPB; regional flood management agencies, including San Joaquin River Flood Control Agency (SJRFCA); San Joaquin Area Flood Control Agency (SJAFCA); Lower San Joaquin Levee District (LSJLD); counties; cities; USFWS, CDFW, USACE, NGOs with an interest in river and flood management and education	Pre-planning	$30,000	Dependent upon funding – could start immediately and continue indefinitely contingent upon funding	Develop and implement a regional flood risk management educational program to raise awareness of flood risks and elevate the level of public understanding with respect to flood risk management needs and the value of investments to address them. For the local maintaining agencies (LMAs), include education on their role in flood risk management and provide technical guidance/assistance on levee maintenance activities and permitting requirements.
Gomes Lake / Harding Drain Improvements	Gomes Lake Joint Powers Authority	Turlock Irrigation District, Stanislaus County, Reclamation District 2063, Reclamation District 2091	Pre-planning	$1,700,000	1-5 years	This project includes multiple components to enhance the function, reliability, flexibility and capacity of the Gomes Lake facility, which stores and drains stormwater and return flows, providing flood risk reduction behind the east bank levees of the San Joaquin River.
Hydraulic and Channel Migration Studies*	Stanislaus County Office of Emergency Services	RD 2091, Gomes Lake JPA, City of Modesto, City of Newman, City of Patterson	Pre-planning	$200,000	1-5 years	Two regional studies (mainstem San Joaquin River flood hydraulics and channel migration) and three focused hydraulic studies are needed to better inform flood management in the Mid SJR Region.
Integrated Levee Vegetation Management – Flood Maintenance and Habitat	River Partners	Funding partners - WCB, DWR, USBR, NRCS; landowners; RDs; environmental NGOs; technical experts - as needed	Planning	$6,400,000	1-5 years	This project includes re-establishing appropriate vegetation on levee slopes to promote terrestrial wildlife survival during floods – either native sod on active levees or native brush vegetation on inactive levees (RDs 2099, 2100, 2102, and 2092 in the future).
La Grange Floodplain Restoration and Spawning Gravel Augmentation	Tuolumne River Trust	Stanislaus County Parks and Recreation	Pre-planning	$1,500,000	1-5 years	Restore 77 acres of degraded floodplain habitat along the Tuolumne River in La Grange while developing a source of spawning gravel to improve and enhance existing spawning beds in the Tuolumne River.
Little Salado Creek	Stanislaus County	USACE	Planning	$5,000,000	1-5 years	Construction of a project to partially divert, retain and percolate up to 1,030 cubic feet per second (cfs) of flow from Little Salado Creek.
Modesto WWTP - Reduce Flood Risk	City of Modesto	No partners identified at this time	Pre-planning	$80,000,000	Undetermined	Develop and evaluate potential solutions to existing flood hazards at the Modesto Sutter and Jennings WWTPs, including completion of two studies (Sutter Plant Relocation Feasibility Study and a Wastewater Treatment Facilities Master Plan) that are currently in process, and implement the preferred alternative.
Orestimba Creek Flood Risk Management Project	City of Newman	Stanislaus County, Orestimba Creek Flood Control District, USACE	Planning	$44,000,000	1-5 years	Construction of a 4.7-mile chevron levee along east bank of Central California Irrigation District (CCID) Main Canal and a 1-mile cross levee to reduce flood risk to Newman and adjacent agricultural areas, providing a 200-year level of protection. The chevron levee would include 3 feet of freeboard above the mean 200-year water surface elevation.
Patterson WWTP – Reduce Flood Risks*	City of Patterson	No partners identified at this time	Pre-planning	$27,000	Undetermined	Develop and evaluate potential solutions to existing flood hazards at the City of Patterson WWTP.
RD 1602 Resilience	RD 1602	CVFPB - permitting, technical assistance; landowners - funding, governance; DWR - funding, technical assistance; USACE - small role in emergency response, possibly funding for repairs; Stanislaus County - oversees district governance and financing; engineering firms, environmental firms, other technical experts as needed	Pre-planning	$4,700,000	1-5 years	Complete the necessary repairs and upgrades to bring RD levee system back into “Active” status for PL 84-99 eligibility.
RD 2031 Resilience	RD 2031	CVFPB - permitting, technical assistance; landowners - funding, governance; DWR - funding, technical assistance; USACE - small role in emergency response, possibly funding for repairs; Stanislaus County - oversees district governance and financing; engineering firms, environmental firms, other technical experts as needed	Pre-planning	$2,000,000	1-5 years	Complete the necessary repairs and upgrades to bring RD levee system back into “Active” status for PL 84-99 eligibility.

Table 7-1
Summary of Proposed Regional Improvements

Project Name	Project Lead	Potential Project Partners	Project Status	Project Cost	Project Timeline	Short Project Description
RD 2063 Resilience	RD 2063	CVFPB - permitting, technical assistance; landowners - funding, governance; DWR - funding, technical assistance; USACE - small role in emergency response, possibly funding for repairs; Stanislaus County - oversees district governance and financing; engineering firms, environmental firms, other technical experts as needed	Pre-planning	$900,000	1-5 years	Complete the necessary repairs and upgrades to bring RD levee system back into “Active” status for PL 84-99 eligibility.
RD 2091 Resilience	RD 2091	CVFPB - permitting, technical assistance; landowners - funding, governance; DWR - funding, technical assistance; USACE - small role in emergency response, possibly funding for repairs; Stanislaus County - oversees district governance and financing; engineering firms, environmental firms, other technical experts as needed	Pre-planning	$400,000	1-5 years	Complete the necessary repairs and upgrades to bring RD levee system back into “Active” status for PL 84-99 eligibility.
RD 2101 Resilience	RD 2101	CVFPB - permitting, technical assistance; landowners - funding, governance; DWR - funding, technical assistance; USACE - small role in emergency response, possibly funding for repairs; Stanislaus County - oversees district governance and financing; engineering firms, environmental firms, other technical experts as needed	Pre-planning	$3,000,00	1-5 years	Complete the necessary repairs and upgrades to bring RD levee system back into “Active” status for PL 84-99 eligibility, including addressing a major levee erosion site.
Reducing Sediment Loading into the San Joaquin River from Westside Agricultural Lands	West Stanislaus RCD	NRCS, irrigation districts, Westside Coalition	Ongoing with an existing list of interested producers.	$65,000,000	15 years	Improve irrigation technology with buried drip and sprinkler irrigation systems that allow for the capacity to irrigate a variety of crop types and effectively eliminate erosion of sediment off of farm fields when compared to traditional, flood irrigation practices. Sediment loading results in reduced capacity of and increased flooding in Westside Creeks and the San Joaquin River.
Regional Maintenance Technical Support	RD 2091 and RD 2092	CVFPB - permitting, technical assistance; landowners - funding, governance; DWR - funding, technical assistance; USACE - possibly funding for repairs; Stanislaus County - oversees governance and financing; engineering firms, environmental firms, other technical experts as needed	Pre-planning	$100,000	1-5 years	Development and implementation of a shared staffing position to support LMA fulfillment of maintenance responsibilities within the Mid SJR Region.
Riverfront Park Project	City of Patterson	Stanislaus County, San Joaquin River Valley Coalition	Pre-planning	$2,500,000	Undetermined	Creation of a riverfront park, recreational trail, and enhanced habitat along the western bank of the San Joaquin River between Old Las Palmas Avenue and Eucalyptus Avenue.
Salado Creek Flood Management Project	City of Patterson	Stanislaus County	Pre-planning	$600,000	Undetermined	Widening of Salado Creek from the Delta Mendota Canal to the city limits.
SB5 Compliance – City of Modesto*	City of Modesto	Stanislaus County	Pre-planning	$130,000	Phases I and II - 1 year; Phase III - 10-20 years	Comply with SB 5 regulations through update of the City’s relevant planning documents and completion of a preliminary engineering report to identify potential alternatives on how the City can provide 200-year flood protection.
SB5 Compliance – City of Newman*	City of Newman	No partners identified at this time	Pre-planning	$125,000	Phases I and II – 3 years?; Phase III - 10-20 years	Comply with SB 5 regulations through update of the City’s relevant planning documents and completion of a preliminary engineering report to identify potential alternatives on how the City can provide 200-year flood protection.
SB5 Compliance – City of Patterson*	City of Patterson	No partners identified at this time	Pre-planning	$205,000	Phases I and II – 3 years?; Phase III - 10-20 years	Comply with SB 5 regulations through update of the City’s relevant planning documents and completion of a preliminary engineering report to identify potential alternatives on how the City can provide 200-year flood protection.
Sediment Management Investigation*	River Partners	DWR, CVFPB, flood management agencies relevant to the Upper SJR RFMP and Lower SJR/Delta South RFMP	Pre-planning	$250,000	1-5 years	Complete a study that identifies sediment-induced chokepoints along the San Joaquin River in the planning area, the dynamics that create them, and potential actions to improve flood conveyance in those areas.

Table 7-1
Summary of Proposed Regional Improvements

Project Name	Project Lead	Potential Project Partners	Project Status	Project Cost	Project Timeline	Short Project Description
Storm Drainage Enhancements along Salado Creek	City of Patterson	No partners identified at this time	Pre-planning	$880,000	Undetermined	Installation of reinforced concrete pipelines under the California Northern Railroad wooden bridge to improve storm drainage along Salado Creek.
Three Amigos (also known as the Non-structural Alternative at the San Joaquin River National Wildlife Refuge)	San Joaquin River National Wildlife Refuge	River Partners, USFWS Anadromous Fish Restoration Program, USACE, early project partners - USDA/NRCS, DWR, CALFED	Planning	$5,500,000	More than 5 years	Project to restore flooding and transient floodwater storage to more than 3,100 acres of historic floodplain, restore riparian habitats, and promote river physical processes of scour and deposition along 3 miles of the San Joaquin River. While the lands have been purchased, additional investment is needed to implement flood risk reduction goals consistent with the Refuge's habitat management goals. Needed efforts include planning and design of the Refuge for flood management as well as removal of levees from the federal project.
Tuolumne River Flood Management Feasibility Study*	Stanislaus County	City of Modesto, USACE	Dormant	$3,000,000	Approximately 5 years	Complete a USACE Feasibility Study, or a study similar in scope, that evaluates how the management of the Tuolumne River could be revised to improve flood management, enhance aquatic habitat, and improve water quality.
Tuolumne River Regional Park – Carpenter Road/West Modesto Flood Management and Park Development	Tuolumne River Regional Park Joint Powers Authority	City of Modesto, City of Ceres, Stanislaus County, Tuolumne River Trust	Planning. The Tuolumne River Regional Park Master Plan, adopted in 2001, includes the overview for development of the Carpenter Road Area. Funding is required to implement the construction of the levee and to develop the Specific Plan for the Carpenter Road Area.	$750,000	Approximately 2 years	Help reduce flood damages in West Modesto neighborhoods while developing the adjacent Tuolumne River Regional Park.
Tuolumne River Regional Parkway	Tuolumne River Regional Park Joint Powers Authority	City of Modesto, City of Ceres, Stanislaus County, Tuolumne River Trust	Planning and construction	$60,000,000	15-25 years to completion	Continued development of the undeveloped areas of the Tuolumne River Regional Park including the Gateway Parcel.
Westside Creeks On-Farm Multi-Benefit Program	Audubon California	West Stanislaus Resource Conservation District, irrigation districts, NRCS, USFWS, California Wildlife Conservation Board	This project is in the concept phase, but since the project lead is currently conducting very similar work in the Sacramento Valley; thus, work could begin very quickly if funding were allocated.	$75,000	3 years	Provide outreach and technical assistance to landowners in the Stanislaus County Westside Creek watersheds for multi-benefit flood risk reduction projects.
WSID Fish Screen and Change in Point of Diversion Project	West Stanislaus Irrigation District	CDFW, NMFS, USFWS, USBR	Planning, design, and permitting	$38,000,000	1-5 years	This RMFP Project will help support three (3) Phases of the WSID Fish Screen Project while significantly improving site specific and regional flood management and resilience, and ecosystem enhancement. Phase 1 would provide cost-share to complete the planning, design and permitting of mutually beneficial fish screen alternatives. Phase 2 funding would contribute to the required 50% non-federal cost-share for construction of WSID's preferred alternative fish screen project. Phase 3 would provide cost-share contribution to help develop and complete the planning, design and permitting of integrated and mutually beneficial flood management and resilience and ecosystem enhancements along 90% of the WSID intake canal and alignment across the SJRNWR.

* Indicates a project that is primarily or entirely a study.

7.3 Project Concepts

Table 7-2, Project Concepts, includes nine concepts that were identified during the planning process. These were project ideas that were described but not developed in sufficient detail to allow consideration as detailed projects. Often they lacked an identified champion or party to take the lead. Many were ideas for major projects or programs that were appropriate for development at a larger geographic scale than within the Mid SJR Region alone. More detailed descriptions of each of the project concepts are provided in Appendix G, Project Concept Descriptions.

Table 7-2
Project Concepts

Project Concept Name	Short Description
Develop Expedited Permitting Programs for Maintenance Actions	Coordinate with all permitting agencies to develop a permitting program that will reduce the time and cost required to permit routine maintenance actions.
Divert Flood Flows to Agricultural Lands (both in the Mid SJR and the Upper San Joaquin Regions)	Diverting flood flows onto nearby agricultural and refuge land along the San Joaquin River could decrease peak flows within the channels.
Ecosystem Restoration Along Waterways (both in the Mid SJR and the Upper San Joaquin Regions)	Similar to routing flood flows onto agricultural land, an alternative approach would be to acquire agricultural properties along the San Joaquin River and allow for seasonal floodplain inundation to provide fish rearing habitat as well as the diversion of flood flows, and, in some areas, the direct recharge of groundwater. This type of project could be implemented as a conservation easement, part of the Central Valley Habitat Exchange, or an ecosystem mitigation bank.
Emergency Response Improvement	Implement the following measures to improve emergency response in the planning area: 1) develop local flood fight plans with support from larger agencies, such as Modesto and Stanislaus County; 2) develop public safety agency evacuation plans; 3) clarify and document the command structure for areas with flood risk; 4) better define operational area logistical support for flood fight operations; and 5) form a Stanislaus Operational Area flood response working group.
Improve Upstream Reservoir Operations	Update and improve upstream reservoir operations through enhancements to coordination among operating entities; use of additional information, including forecasting; broader communications with others, including local communities; improved and accessible gaging; and updated flood control manuals. Analyze and implement actions to modify upstream reservoir operations to improve flood management; aquatic, riparian, and floodplain habitat; water quality; and recreation.
San Joaquin River Basin Sediment Status and Dynamics Study	For the entire San Joaquin River basin 1) develop a reach-based sediment budget and conceptual model of sediment processes and then 2) develop one or more sediment transport models and analyze transport processes to develop sediment management recommendations at a basin-wide scale.
San Joaquin River National Wildlife Refuge - Proposed Expansion	The United States Fish and Wildlife Service is considering expanding the San Joaquin River National Wildlife Refuge in two sections to restore and enhance habitat to benefit birds migrating along the Pacific Flyway and many other wildlife species that may be compatible or complementary with flood conveyance and transient floodwater storage on floodplains in the Mid San Joaquin River region.

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8. Regional Priorities

8.1 Introduction

This chapter explains the criteria used to evaluate and prioritize the projects and concepts described in Chapter 7, Proposed Regional Improvements, and describes the process and outcome of evaluating and prioritizing each.

A two-step process was applied to first define the set of eligible projects and then rank them using multiple criteria (multiple criteria evaluation). Two types of potential projects, or "regional improvements", were considered:

- **Concept-level recommendations.** These were project ideas that were described but not developed in sufficient detail to allow consideration as detailed projects. Often they lacked an identified champion or party to lead the project. Many were ideas for major projects or programs that were appropriate for development at a larger geographic scale than within the Mid SJR Region alone. Sometimes they simply were not ripe for consideration.
- **Project-level recommendations.** These proposed projects have an identified champion or party to lead the project and some level of development.

Concept-level recommendations were subject to screening, but not ranking. Project-level recommendations were both screened and ranked. Concept-level recommendations were subject to review and comment as the drafts of this chapter were reviewed. Project-level recommendations were selected through ranking that is based on the application of identified criteria using available information and the judgment of the Regional Partners, subject to review and comment by the stakeholders. This evaluation and ranking was explicit and presented to the stakeholders for review.

8.2 Prioritization Criteria

Prioritization Criteria were used to identify the proposed regional improvements for the Mid SJR RFMP in a transparent two-step process. The Prioritization Criteria applied included both Screening and Ranking Criteria. The flow chart shown in **Figure 8-1**, **Prioritization Process**, depicts the process graphically. First, all potential projects were screened using the Screening Criteria and qualitatively evaluated (High, Medium, Low) to identify which regional improvements would be included in the RFMP. Only potential projects that scored Medium or High on both of the Screening Criteria were retained as draft proposed project-level proposals or regional improvements in the RFMP. Draft proposed project-level regional improvements were submitted for inclusion in the Financial Plan, presented in Chapter 9 of this document. Second, in concert with the development of the Financial Plan, the Ranking Criteria were used by the RFMP Partners to identify the draft relative priority or rank of each of the project-level regional improvements. The ranking was reviewed with the Stakeholders and a final subset of the projects selected for inclusion in this chapter. The final set of Recommended Regional Improvements, including both concept-level and project-level improvements, were made by the RFMP Partners after the Financial Plan was developed and Stakeholder comments were considered.

The projects were evaluated with respect to Ranking Criteria, using available data, on an approximate relative scale, such as High, Medium, Low, or N/A. No weighting factor was applied.[1] A narrative is provided to justify the score selected.

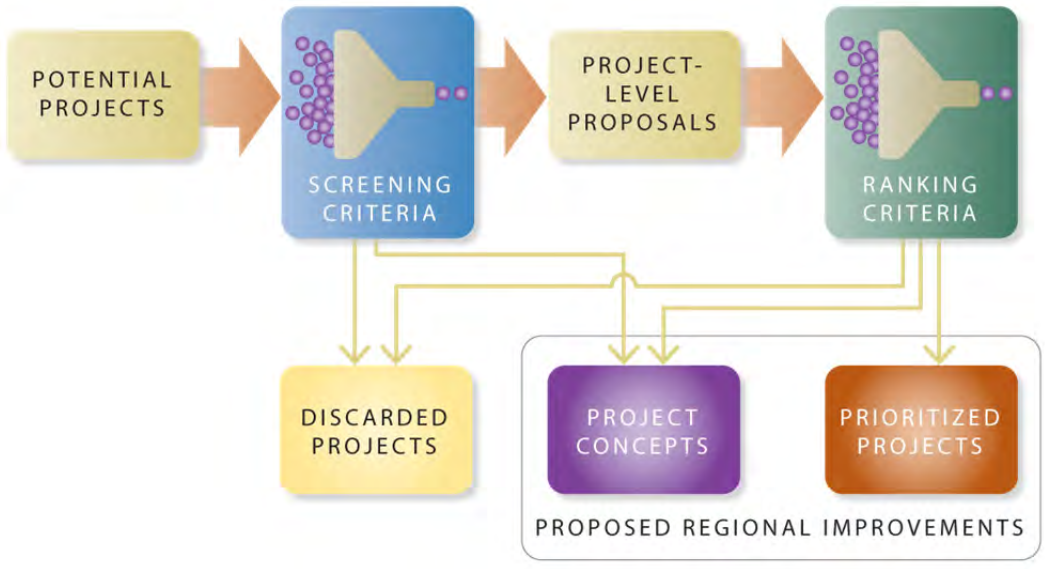

Figure 8-1
Prioritization Process

[1] Preliminary assumption. Additionally, a "level of certainty" modifier may be applied to adjust raw scores if there is significant uncertainty associated with specific proposed projects that makes them inappropriate to directly compare to other, more well-developed projects.

8.2.1 Screening Criteria

Recommended improvements had to score Medium or High on both of these criteria to have been included in the RFMP as Proposed Regional Improvements. The score of Low, Medium, or High for each of the criteria was based on the RFMP objectives and the professional judgment of the Project Partners.

SC1 **Consistency with RFMP goals**. The project is consistent with the goals of the RFMP and CVFPP.

SC2 **Implementation feasibility**. The project is considered reasonably plausible with respect to implementation. It is well-founded with respect to purpose and the expectation of effectiveness and has no significant legal impediments, community opposition, or other factors that would preclude its implementation or make it unlikely.

8.2.2 Ranking Criteria

Given the relatively minor level to which most projects in the Mid SJR Region's planning area have been developed, scoring using the Ranking Criteria was also conducted on a largely semi-quantitative basis, adequate to provide a relative valuation of the proposed projects.

Project-level improvements were ranked by assigning a relative score (High, Medium, Low, or N/A) for each of the following criteria.

RC1 **Implementation feasibility**. No significant legal impediments, community opposition, or other factors exist that would make the project infeasible to implement.

RC2 **Financial feasibility**. There is a current or anticipated source of funding that would cover all or the majority of the cost of the project. If appropriate, funds to cover any required cost share are available or can reasonably be expected to be obtained.

RC3 **Flood risk reduction – life.** A decrease in the number of lives at risk due to flooding, at present and over the long term. This can be achieved either through the movement of individuals out of the floodplain or improved flood protection.

RC4 **Flood risk reduction - flood damage.** A reduction in the assets at risk, measured in dollars, at present and over the long term. This can be achieved either through the modification of land uses within the floodplain or improved flood protection.

RC5 **Operations, maintenance, and repair.** An improvement in efficiency and effectiveness, or reduction of need at present and over the long term

RC6 **Ecosystem function**. The project would be consistent with ecosystem priorities and goals of adopted plans, including the CVFPP's Conservation Strategy. Ecosystem benefits must contribute to recovery and are in addition to any mitigation requirements.

RC7 **Institutional support.** An improvement in the support for entities contributing to flood management.

RC8 **Other benefits**. There are multiple benefits; system-wide effects; benefits that affect areas beyond the region; operations, maintenance and repair needs facilitation or reduction; and/or improved institutional support.

RC9 **Cost-effectiveness**. The benefit is greater than the cost, measured in dollars or the relative cost of achieving similar benefits through other means.

RC10 **Low potential for dis-benefits**. After mitigation, the project would not have any significant adverse impacts.

8.2.3 Scoring

After all of the eligible project-level concepts were scored, points were preliminarily assigned to each criterion score: High = 3, Medium = 2, Low = 1. Guidance was developed for each criterion regarding when the scores of High, Medium, and Low apply. The guidance is included in Appendix F, Project Descriptions and Evaluations. Since two of the ranking criteria relate to the reduction of flood risk, RC-3 (life risk) and RC-4 (flood damages), flood risk reduction was given greater emphasis among the 10 ranking criteria if all criteria are treated equally (no weighting). Projects scoring at least one "High," or at least one "Medium" and one "Low," on the two flood risk reduction ranking criteria were identified as the Highest Priority projects for the RFMP. The remaining projects were ranked based on the summation of all of the ranking criterion scores. They were split into two groups, "High Priority" and "Medium Priority" at a break based on the total (summed) scores.

8.3 Application of Prioritization Criteria

8.3.1 Application of Screening Criteria

Using the scoring guidance described above, each project and project concept was evaluated under the screening criteria. All projects had to score Medium or High on both of these criteria to have been included in the RFMP as Proposed Regional Improvements. All proposed projects passed this test. The scores assigned to each project and project concepts are included in Table 8-1, Screening and Ranking Scores. Appendix F, Project Descriptions and Evaluations, includes a description of why each score was chosen.

8.3.2 Application of Ranking Criteria

Each project was then ranked according to the ten criteria shown in Section 8.2.2. As with the screening criteria, Appendix F includes a description of why each score was chosen under the Ranking Criteria. In some cases, the level of detail available in the project description influenced the scoring. For example, scores of Low and Medium under Ranking Criterion RC-3, Flood Risk Reduction – Life Risk were differentiated, in part, by how well the information in the project description allowed for characterization of the flood risk reduction potential.

8.4 Summary of Screening and Ranking Outcomes

The summary of screening and ranking outcomes is shown in **Table 8-1, Screening and Ranking Scores**. As shown in Table 8-1, all 37 projects were screened, ranked, and are categorized into three tiers: Highest Priority, High Priority, and Medium Priority.

Table 8-1
Screening and Ranking Scores

Project Name	Consistency with RFMP goals SC-1	Implementation feasibility SC-2	Implementation feasibility RC-1	Financial feasibility RC-2	Flood risk reduction - life risk RC-3	Flood risk reduction - flood damage RC-4	Operations, maintenance, and repair RC-5	Ecosystem function RC-6	Institutional support RC-7	Other benefits RC-8	Cost-effectiveness RC-9	Low potential for dis-benefits RC-10
Highest priority												
City of Newman/Bureau of Reclamation Flood Levee Rehabilitation	M	M	M	H	M	L	N/A	N/A	N/A	M	M	M
Consolidation of O&M	H	M	M	M	L	M	H	N/A	H	M	M	H
Dennett Dam Removal	H	H	H	M	H	L	N/A	H	N/A	M	H	H
Dry Creek Watershed Detention Reconnaissance Study*	M	M	M	H	M	M	N/A	N/A	N/A	N/A	M	M
Emergency Response Plan – Local Planning and Training	H	H	H	H	M	M	H	N/A	H	N/A	H	H
Flood Risk Education	H	M	M	H	L	M	L	N/A	L	L	H	H
Modesto WWTP - Reduce Flood Risk	M	H	H	L	M	L	N/A	N/A	N/A	M	M	M
Orestimba Creek Flood Risk Management Project	M	H	H	L	M	M	N/A	N/A	M	N/A	M	M
Regional Maintenance Technical Support	H	M	M	H	L	M	H	L	H	L	H	H
SB5 Compliance – City of Modesto*	H	H	H	H	M	L	N/A	N/A	L	L	H	M
SB5 Compliance – City of Newman*	H	H	H	H	M	L	N/A	N/A	L	L	H	M
SB5 Compliance – City of Patterson*	H	H	H	H	M	L	N/A	N/A	L	L	H	M
Tuolumne River Flood Management Feasibility Study*	H	M	M	M	M	M	N/A	L	N/A	L	M	H
Tuolumne River Regional Park – Carpenter Road/West Modesto Flood Management and Park Development	H	H	H	M	M	L	N/A	H	N/A	M	H	M
High priority												
Dos Rios Ranch Floodplain Expansion and Ecosystem Restoration Project and Hidden Valley Ranch Mitigation Project	H	H	H	H	L	L	M	H	N/A	H	H	H
Emergency Response Plan – Debris Management	M	M	M	H	L	L	L	N/A	M	H	H	H
Integrated Levee Vegetation Management – Flood Maintenance and Habitat	H	H	H	M	N/A	N/A	H	H	N/A	L	M	H
La Grange Floodplain Restoration and Spawning Gravel Augmentation	H	M	M	M	L	L	N/A	H	N/A	M	H	H
RD 2031 Resilience	H	M	M	H	L	L	M	N/A	M	M	M	H
RD 2063 Resilience	H	M	M	H	L	L	M	N/A	M	M	M	H
RD 2091 Resilience	H	M	M	H	L	L	M	N/A	M	M	H	H
Three Amigos (also known as the Non-structural Alternative at the San Joaquin River National Wildlife Refuge)	H	H	H	H	L	L	M	H	L	H	H	H
WSID Fish Screen and Change in Point of Diversion Project	M	H	H	M	N/A	L	M	H	M	H	M	M
Westside Creeks On-Farm Multi-Benefit Program	H	M	M	H	L	L	L	M	M	L	H	H
Medium priority												
Black Gulch Storm Drainage Study*	M	M	M	H	L	L	N/A	N/A	N/A	N/A	M	M
Gomes Lake / Harding Drain Improvements	M	M	M	M	L	L	M	N/A	N/A	N/A	M	H
Hydraulic and Channel Migration Studies*	M	M	M	M	L	L	M	N/A	N/A	N/A	M	H
Little Salado Creek	M	H	H	M	L	L	N/A	N/A	N/A	M	M	H
Patterson WWTP – Reduce Flood Risks*	M	M	M	H	L	L	N/A	N/A	N/A	L	M	M
RD 1602 Resilience	H	M	M	L	L	L	M	N/A	M	M	L	H
RD 2101 Resilience	H	M	M	L	L	L	M	N/A	M	M	L	H
Reducing Sediment Loading into the San Joaquin River from Westside Agricultural Lands	H	H	H	L	L	L	L	N/A	N/A	M	L	H
Riverfront Park Project	H	M	M	M	L	L	N/A	H	N/A	M	L	H
Salado Creek Flood Management Project	M	M	M	M	L	L	N/A	N/A	N/A	N/A	M	M
Sediment Management Investigation*	H	M	M	M	N/A	N/A	L	L	N/A	N/A	H	H
Storm Drainage Enhancements along Salado Creek	M	M	M	M	L	L	N/A	N/A	N/A	M	M	M
Tuolumne River Regional Parkway	H	M	M	L	L	L	N/A	H	N/A	M	M	M

H = High; valued as 3 points
M = Medium; valued as 2 points
L = Low; valued as 1 point
N/A = Not Applicable; valued as 0 point
* Indicates a project that is primarily or entirely a study.
NOTE: See Appendix F for more detail.

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9. Regional Financial Plan

9.1 Introduction

This chapter is meant to provide a high level overview of the capacity of the region to fund the projects identified in the RFMP and to identify deficiencies in funding. To provide this overview, the chapter begins with a summary of the financial challenges in the region, followed by information on available Federal and State funding sources, as well as a discussion on local funding capacity and a summary of estimated cost shares for the projects within the RFMP. Lastly, general findings and recommendations for future bond funding are given. This section is based on Appendix H, Financial Plan Technical Memorandum, of this document.

The cost share estimates provided in this chapter are based on the assumption that potential funding sources will be available at the time a given project moves forward and that the project will receive an award. Many of the Federal and State funding sources discussed in the chapter are competitive in nature and have limited available funding so an award is not guaranteed even if all criteria is met. Additionally, the estimated provided herein are intended for planning purposes only. A specific financial plan will be necessary for each project if/when it moves forward.

9.2 Methodology and Assumptions

The methodologies and assumptions used for the information in this chapter are described below.

9.2.1 Methodology

The following steps were taken to obtain the data within this report:

- *Project Review*
    - Project descriptions were reviewed to identify key elements of the project, such as location (urban vs. rural, San Joaquin River vs. Tuolumne River, etc.) and main objective (restoration, flood management, etc.).
    - Project Costs were estimated from a number of sources, including existing studies and information from project stakeholders.
        - For PL 84-99 projects lacking existing data, a unit cost of $2 million per mile of unacceptable levee was used to estimate a costs.
- *Potential Funding Source Research and Review*
    - Potential Funding Sources within the region were researched to determine how much funding was available in each funding source, what type of cost share was offered, and what types of projects were eligible.
- *Project and Cost Share Matching*
    - Once key elements of both projects and funding sources were identified, they were used to match projects to funding sources that they met the criteria for.
- *Application of Cost Share Information to Project Cost Data*
    - Once projects were matched with their Potential Funding Sources, the cost share percentages from the funding sources were applied to the project cost to get a cost share (in dollars) at the Federal, State, and Local level. The assumptions made during this process are described below.
- *Local Assessment Analysis*
    - An analysis of potential local assessments was performed by separating the region into land use types and applying the average assessment rates of each land use type. Details of the analysis can be found in the Financial Plan Technical Memorandum, attached as Appendix H of this document, under the Local Funding Source section.

9.2.2 Assumptions

The following assumptions were made to estimate cost shares for each project:

- When projects matched with multiple funding sources, the lowest cost share percentage was used in order to obtain the most conservative cost share estimate.
- When projects had a cost range, the highest cost was used to obtain the most conservative estimate of cost share.
- DWR programs were assumed to have a 50%-90% cost share range per the DWR's "Guidelines for Establishing Local Agency Cost Sharing Formulas for Select Flood Programs and Projects" (2010) unless it was otherwise stated in the grant guidelines.

9.3 Financial Challenges

The Mid San Joaquin River Region is predominantly characterized by agriculture and rural land uses. It should be noted that these land use types will not change as long as the land is classified as zone A flood zone. Therefore, raising local funds to implement significant system improvements can be more difficult in this Region compared to more developed areas. Local funding for routine O&M and small repairs is typically provided by landowners within each District. **Table 9-1, LMA Expenditures and Funding Sources**, below summarizes the approximate annual revenue and expenditures for LMAs in the Region.

Table 9-1
LMA Expenditures and Funding Sources

LMA	Approx. Levee Miles Maintained	Approx. Annual O&M Expenditures	O&M Funding Sources
RD 1602	6.29	$10,000 - $12,000	Individual Property Owners
RD 2031	13.19	$30,000	Individual Property Owners
RD 2063	10.63	$83,000	Assessments
RD 2091	7.89*	$40,000 - $50,000	Assessments
RD 2092	3.76	$10,000 - $12,000	Individual Property Owners
RD 2101	3.51	$25,000	Individual Property Owner
Gomes Lake	0.3	$14,000 - $35,000	JPA (TID, Stanislaus County, City of Turlock, RD 2091, RD 2063)

*0.3 miles are maintained by TID under the Gomes Lake JPA

During interviews with stakeholders in the Region, many LMAs noted they are comfortable funding basic O&M responsibilities, but given their limited financial resources, they are not able to provide the capital needed to implement large-scale levee repairs. DWR grant programs can help LMAs with these expenses, but financial resources of the LMAs are limited, making it difficult for them to provide the local cost share requirements. Furthermore, LMA staff limitations, combined with the fact that district staff are typically working and/or managing farms full-time, means there is little time left to apply for DWR funding.

These funding challenges extend to enrollment in the PL 84-99 program, which restores levee systems to pre-disaster condition in the event of a flood event at no cost to the owner. This program has a clear financial benefit in the case of a major flood event, but many of the RDs in the region are inactive in the program. The costs of the process that USACE offers for LMAs to remain temporarily eligible for the program while working to repair identified issues can be as much as $200,000. This cost is not feasible for any of the districts in the Mid SJR Region, which has caused RD staff to begin to question the actual financial benefits of the program, since program benefits are only realized in the case of a flood event. Rather than spend such a large amount of money on the re-enrollment process, many RDs have come to the conclusion that their limited budget is better spent to maintain their levees.

This situation has put the RDs in a difficult position. The cost to be reinstated into the PL 84-99 program is prohibitive but in the event of a levee failure they will not be able to assess enough funding to reconstruct a failed levee without assistance from the Federal government under the PL 84-99 program.

The Region identified a total of 37 projects with a total estimated cost of approximately $340M. Assuming a minimal local cost share of 10%, this equates to nearly $34M. Even if these improvements were spread over a 20-year timeframe, it appears the current system of flood management infrastructure funding and

implementation may be unsustainable unless other benefits can be provided for other uses or even other regions.

9.4 Available Funding Sources

This section provides an overview of some of the funding sources available in the region. Due to the changing nature of funding sources, this list is not intended to detail every funding source available, but instead includes the most common funding sources in the Region. This section describes funding sources at the Federal and State level, separated into conservation, structural, and non-structural programs. The table below includes each funding source looked at within the financial plan, with a short description and the associated cost share. For more detailed information on funding programs, see the Mid San Joaquin RFMP Financial Plan Technical Memorandum, attached as Appendix H of this document.

9.4.1 Federal Programs

Program Name	Program Summary	Cost Share
Conservation Funding Sources		
Agricultural Conservation Easement Program (ACEP)	Provides financial and technical assistance to help conserve agricultural lands and wetlands and their related benefits	50%-75%
Anadromous Fish Restoration Program and Anadromous Fish Screen Program	Designed to protect, restore, and enhance fish, wildlife, and associated habitats in the Central Valley	50%
Central Valley Project Improvement Act (CVPIA) – Habitat Restoration Program and Conservation Program	Highly integrated efforts to restore and protect species and habitats impacted by the CVP.	Not Required
Endangered Species Act Section 6 Grant Program	Provides grants to states and territories to participate in a wide array of voluntary conservation projects for candidate, proposed, and listed species.	75%-90%
Environmental Quality Incentives Program (EQIP)	Provides assistance to agricultural producers in order to address natural resource concerns and deliver environmental benefits.	50%
Land and Water Conservation Fund	Provides matching grants to States and local governments for the acquisition and development of public outdoor recreation areas and facilities.	50%
North American Wetlands Conservation Act (NAWCA)	Provides matching grants to carry out wetlands conservation projects.	50%
Structural Flood Management Funding Sources		
Flood Mitigation Assistance (FMA)	Provides funding to assist in efforts to reduce or eliminate the risk of repetitive flood damage to buildings and structures insurable under the National Flood Insurance Program (NFIP).	75%-100%
Pre-Disaster Mitigation (PDM)	Designed to help implement a sustained pre-disaster natural hazard mitigation program to reduce overall risk to the population and structures from future hazard events, while also reducing reliance on Federal funding from future disasters.	75%-90%
USACE Funding	Cost sharing with USACE on SPFC USACE studies and projects	50% - 65%
Non-Structural Flood Management Funding Sources		
Emergency Watershed Protection Program – Floodplain Easement Option (EWP-FPE)	Provides an alternative measure to traditional EWP recovery, where it is determined that acquiring an easement in lieu of recovery measures is the more economical and prudent approach to reducing a threat to life or property.	Not Required

9.4.2 State Programs

Program Name	Program Summary	Cost Share
Conservation Funding Sources		
California Riparian Habitat Conservation Program (CRCHP)	Designed to protect, preserve, restore and enhance riparian habitat throughout California	50% - 90%
California River Parkways Program	Competitive grant program for river parkways projects.	50% - 90%
Central Valley Flood System Conservation Framework and Strategy	Funds planning and implementation of projects in support of the Central Valley Flood System Conservation Framework and the Conservation Strategy.	50% - 90%
Flood Corridor Program (FCP)	Funds non-structural flood risk reduction projects containing ecosystem and/or agricultural land conservation components	50% - 90%
Habitat Conservation Fund (HCF) Program	Provides funds to local entities to protect threatened species, to address wildlife corridors, to create trails, and to provide for nature interpretation programs which bring urban residents into park and wildlife areas	50%
Inland Wetlands Conservation Program	Created to protect, restore, and enhance wetlands and associated habitats.	50%
Urban Greening for Sustainable Communities - Planning	Provides funds to assist entities in developing a master urban greening plan that will ultimately result in projects to help the State meet its environmental goals and the creation of healthy communities.	Not Req.
Urban Greening for Sustainable Communities - Project	Provides funds to preserve, enhance, increase or establish community green areas such as urban forests, open spaces, wetlands and community spaces (e.g., community gardens).	Not Req.
Urban Streams Restoration Program	Provides grants for stream restoration projects that reduce flooding or erosion and associated property damages; restore, enhance, or protect the natural environment; and promote community involvement, education, and stewardship in urban streams.	Not Req.
Structural Flood Management Funding Sources		
Flood System Repair Project (FSRP)	Designed to evaluate (feasibility), design, and construct repairs on non-urban SPFC facility (levees, channels, structures, etc.) deficiencies.	50%-90%
Integrated Regional Water Management (IRWM)	Grant funds for development and revisions of IRWM Plans, and implementation of projects in IRWM Plans.	50%-75%
Local Levee Assistance Program (LLAP)	Designed for projects to immediately repair and improve critically-damaged local levees, evaluate levee stability and levee seepage and underseepage, and to perform design or alternatives analysis.	50% - 90%
Small Community Flood Risk Reduction (SCFRR)	Designed to help implement projects to reduce flood risk in small, rural, and agricultural communities in the Central Valley.	50% - 90%
Storm Water Flood Management Program	Designed to help fund storm water management projects that reduce flood damage and provide multi-benefits.	50% - 75%
Systemwide Flood Risk Reduction (SWFRR)	Designed to help implement recommendations of the Basin-wide feasibility studies.	50% - 90%
Urban Flood Risk Reduction (UFRR)	Designed to help improve urban SPFC levees within the Central Valley to a 200-year level of protection.	50% - 90%
Non-Structural Flood Management Funding Sources		
Flood Emergency Response – Forecast-Coordinate Operations (F-CO)	Designed to further participation of reservoir operators (affecting the Central Valley) in the F-CO program.	50% - 90%
Flood Emergency Response Statewide Emergency Response Grants	Designed to provide support for local EAPs or related flood preparedness and response activities.	50% - 90%
Watershed and Environmental Improvement Program	Designed to proactively manage, protect and restore environmental resources affected by SPUFC system operations.	Not Req.

9.4.3 Local Funding Sources

The following sections detail potential sources of funding for the local cost share that is required by many Federal and State grant programs.

Proposition 218 Assessments

An analysis of potential local assessments was performed by separating the Region into land use types and applying the average assessment rates of each land use type. Details of the analysis can be found in the Financial Plan Technical Memorandum, attached as Appendix H of this document, under the Local Funding Source section.

Table 9-2, Assessment Analysis shows the details of the results of the assessment analysis.

Table 9-2
Assessment Analysis

Benefit Area	District Within Benefit Area	Hypothetical Assessment Potential	Total Current Assessments	Hypothetical Net Assessment Potential
1	1602	$20,778	$12,000	$8,778
2	2031	$70,461	$30,000	$40,461
3	2063	$81,864	$56,000	$25,864
4	2091	$50,298	$50,000	$298
5	2101	$8,075	$25,000	$0*
Total				$75,400

*If current assessments were found to be greater than assessment potential, net assessment potential was found to be 0.

Calculating future funding potential using the hypothetical net yearly assessment potential of $75,400, and assuming a 4% interest rate compounded annually over a 30 year period, it was found that the region could possibly raise $1.3 million over the next 30 years, in present day dollars.

It should be noted that RD 2063 is currently spending $83,000 per year on O&M responsibilities and is only assessing $56,000 per year. Even if the district assessed up to its hypothetical assessment potential of $81,864 it would not assess enough to meet the current demand. This situation is not sustainable. Since RD 2091 and the Gomes Lake Facilities both depend on RD 2063 for protection, a solution involving funds from these areas could be feasible and should be explored in more detail.

City Governments

The cities of Modesto, Patterson, and Newman are not within the boundaries of the Mid SJR Region as defined by DWR, but are important urban centers to the Mid SJR Region planning area, have a flood nexus to the Region, and have projects identified in the RFMP effort. Furthermore, the City of Modesto is a key property owner in RD 2091 and the City of Turlock is a beneficiary in the Gomes Lake Facility within RD 2091. Discussions with city staff indicate that there is no existing budget available for flood management projects, and that any contribution would have to come from the City's general fund. These funds are already committed in many cases, thus, any contribution from them would be difficult to obtain.

Stanislaus County

Discussions with County staff found that there is little to no allowance in the existing budget for flood management, with the exceptions of funding for Office of Emergency Service (OES) and funding for the Gomes Lake facility in RD 2091. With this being the case, any contribution from the County would likely have to come from their general fund. With so many demands already on the general fund it will be a challenge to divert any additional funds to go toward fulfilling the local cost share for flood management projects. Therefore, County contributions to the local cost share of projects should not be expected.

NGO Funding in the Region

Funding from NGOs in the region is one possible way to raise the local cost share that projects will require. Below are some NGOs with funding programs that could possibly contribute to the required local cost share for projects.

California Water Foundation

The California Water Foundation (CWF), an initiative of Resources Legacy Fund (RLF), awards grants in our three principal program areas – Increasing Water Use Efficiency, Improving Groundwater Management, and Restoring River Systems – as well as the overarching program area of Advancing Integrated Water Management.

http://www.californiawaterfoundation.org/

National Fish and Wildlife Foundation

NFWF supports conservation efforts in all 50 states, U.S. territories and abroad. Grants are made through a competitive process and awarded to some of the nation's largest environmental organizations, as well as some of the smallest. NFWF specializes in bringing all parties to the table – individuals, government agencies, nonprofit organizations and corporations in order to protect and restore imperiled species, promote healthy oceans and estuaries, improve working landscapes for wildlife, advance sustainable fisheries and conserve water for wildlife and people.

http://nfwf.org/Pages/default.aspx

Stanislaus Community Foundation

Stanislaus Community Foundation supports high impact opportunities within Stanislaus County. Working in partnership with local agencies, the foundation brings funding and resources to the community for grants and scholarships.

http://www.stanislauscommunityfoundation.org/

Trust for Public Land

The Trust for Public Land (TPL) helps communities to raise funds for conservation, conduct conservation research and planning, acquire and protect land, and design and renovate parks, gardens, and playgrounds. The TPL does this by helping state and local governments design, pass, and implement legislation and ballot measures that create new public funds.

https://www.tpl.org/

9.5 Project Cost Share

The following tables show estimated cost shares for each project identified by the RFMP effort. The cost shares in the tables represent conservative estimates from the funding sources that each project was matched with. For more information on how projects were matched with funding sources and a detailed list of what funding programs were matched with each project, please see the Mid San Joaquin RFMP Financial Plan Technical Memorandum (Appendix H).

For the following tables projects have been broken into two categories: Projects within the Mid San Joaquin Boundary and Projects Outside of the San Joaquin Boundary. The information in these tables is meant to give a planning level estimate of what the Federal, State, and Local cost shares might look like for each project, and to get a total regional cost for each cost share type, in order to provide insight into the amount of future bond funding that may be needed.

9.6 Findings

The total costs for all projects identified within the Mid SJR Region planning area for this RFMP effort is on the order of $340 million dollars. Below these projects are discussed in two sections: projects within the Mid SJR Region and those outside the Region but within the planning area.

The total estimated cost of all identified projects within the Mid SJR Region is approximately $219 million. Based on the assumed cost share for each project (see Appendix H) this equates to an estimated Federal cost share of $ 135 million, a State cost share of $42 to $71 million, and local funding in the amount of $13 million to $42 million.

According to the assessment analysis, the districts within the Mid SJR Region could hypothetically raise local cost share funds in the range of $1.3 million over the next 30 years. Subtracting that amount from the total required local cost share for all projects within the Mid SJR Region leaves a total of $12 million to $41 million of local cost share deficit. With this amount of local cost share deficit it is clear that the Region will need assistance from sources other than assessments.

Projects that are located outside of the Mid SJR Region, but within the Mid SJR Region planning area totaled approximately $120 million. State cost share for these projects is in the range of $29 million to $54 million, leaving a local cost share range of $6 million to $30 million.

An assessment analysis of the regions outside the boundaries of the Region was not within the scope of this report, but due to the urban nature of many of the areas which these projects are located, it can be assumed that the assessment potential in a successful proposition 218 election would be much larger than that of the rural districts within the boundaries of the Mid SJR Region.

Projects Within the Mid San Joaquin Region Boundary

Project	Cost Share (%)					Project	Total Project Cost	Cost Share ($)								
	Federal Cost Share (%)	State Cost Share Range (%)		Local Cost Share Range (%)				Federal Cost Share	Non - Federal Project Cost	State Cost Share Range		Local Cost Share Range		Local Cost Share Source		
		Low	High	Low	High					Low	High	Low	High	Private Land Owners	Local Government	Non-Profit Organization
Consolidation of O&M	0%	50%	90%	10%	50%	Consolidation of O&M	$200,000	$0	$200,000	$100,000	$180,000	$20,000	$100,000	X		
Dos Rios Ranch Floodplain Expansion and Ecosystem Restoration Project and Hidden Valley Ranch Mitigation Project	50%	50%	90%	10%	50%	Dos Rios Ranch Floodplain Expansion and Ecosystem Restoration Project and Hidden Valley Ranch Mitigation Project	$8,000,000	$4,000,000	$4,000,000	$2,000,000	$3,600,000	$400,000	$2,000,000			X
Emergency Response Plan - Debris Management	0%	50%	90%	10%	50%	Emergency Response Plan - Debris Management	$110,000	$0	$110,000	$55,000	$99,000	$11,000	$55,000		X	
Emergency Response Plan - Local Planning and Training	0%	50%	90%	10%	50%	Emergency Response Plan - Local Planning and Training	$110,000	$0	$110,000	$55,000	$99,000	$11,000	$55,000		X	
Flood Risk Education	50%	50%	90%	10%	50%	Flood Risk Education	$30,000	$15,000	$15,000	$7,500	$13,500	$1,500	$7,500			X
Gomes Lake / Harding Drain Improvements	75%	50%	90%	10%	50%	Gomes Lake / Harding Drain Improvements	$1,700,000	$1,275,000	$425,000	$212,500	$382,500	$42,500	$212,500		X	
Hydraulic and Channel Migration Studies	0%	50%	75%	25%	50%	Hydraulic and Channel Migration Studies	$200,000	$0	$200,000	$100,000	$150,000	$50,000	$100,000		X	
Integrated Levee Vegetation Management - Flood Maintenance and Habitat	75%	50%	90%	10%	50%	Integrated Levee Vegetation Management - Flood Maintenance and Habitat	$6,400,000	$4,800,000	$1,600,000	$800,000	$1,440,000	$160,000	$800,000			X
Modesto WWTP - Reduce Flood Risk	75%	50%	90%	10%	50%	Modesto WWTP - Reduce Flood Risk	$80,000,000	$60,000,000	$20,000,000	$10,000,000	$18,000,000	$2,000,000	$10,000,000		X	
Reclamation District 1602 Resilience	75%	50%	90%	10%	50%	Reclamation District 1602 Resilience	$4,700,000	$3,525,000	$1,175,000	$587,500	$1,057,500	$117,500	$587,500		X	
Reclamation District 2031 Resilience	75%	50%	90%	10%	50%	Reclamation District 2031 Resilience	$2,000,000	$1,500,000	$500,000	$250,000	$450,000	$50,000	$250,000	X		
Reclamation District 2063 Resilience	75%	50%	90%	10%	50%	Reclamation District 2063 Resilience	$3,500,000	$2,625,000	$875,000	$437,500	$787,500	$87,500	$437,500	X		
Reclamation District 2091 Resilience	75%	50%	90%	10%	50%	Reclamation District 2091 Resilience	$400,000	$300,000	$100,000	$50,000	$90,000	$10,000	$50,000	X		
Reclamation District 2101 Resilience	75%	50%	90%	10%	50%	Reclamation District 2101 Resilience	$2,500,000	$1,875,000	$625,000	$312,500	$562,500	$62,500	$312,500	X		
Reducing Sediment Loading into San Joaquin River from Westside Agricultural Lands	50%	50%	75%	25%	50%	Reducing Sediment Loading into San Joaquin River from Westside Agricultural Lands	$65,000,000	$32,500,000	$32,500,000	$16,250,000	$24,375,000	$8,125,000	$16,250,000		X	
Regional Maintenance Technical Support	0%	50%	90%	10%	50%	Regional Maintenance Technical Support	$100,000	$0	$100,000	$50,000	$90,000	$10,000	$50,000	X		
Sediment Management Investigation	0%	50%	90%	10%	50%	Sediment Management Investigation	$250,000	$0	$250,000	$125,000	$225,000	$25,000	$125,000			X
Three Amigos (also known as the Non-structural Alternative at the San Joaquin River National Wildlife Refuge)	50%	50%	90%	10%	50%	Three Amigos (also known as the Non-structural Alternative at the San Joaquin River National Wildlife Refuge)	$5,500,000	$2,750,000	$2,750,000	$1,375,000	$2,475,000	$275,000	$1,375,000			X
Westside Creeks On-Farm Multi-Benefit Program	50%	50%	90%	10%	50%	Westside Creeks On-Farm Multi-Benefit Program	$75,000	$37,500	$37,500	$18,750	$33,750	$3,750	$18,750			X
WSID Fish Screen Project	50%	50%	90%	10%	50%	WSID Fish Screen Project	$38,000,000	$19,000,000	$19,000,000	$9,500,000	$17,100,000	$1,900,000	$9,500,000		X	
Totals							$218,775,000	$134,202,500	$84,572,500	$42,286,250	$71,210,250	$13,362,250	$42,286,250			

Projects Outside of the Mid San Joaquin Region Boundary

	Cost Share (%)						Cost Share ($)								
		State Cost Share Range (%)		Local Cost Share Range (%)					State Cost Share Range		Local Cost Share Range		Local Cost Share Source		
Project	Federal Cost Share (%)	Low	High	Low	High	Total Project Cost	Federal Cost Share	Non - Federal Project Cost	Low	High	Low	High	Private Land Owners	Local Government	Non-Profit Organization
Black Gulch Drainage Study	0%	50%	75%	25%	50%	$28,000	$0	$28,000	$14,000	$21,000	$7,000	$14,000		X	
City of Newman/ Bureau of Reclamation Flood Levee Rehabilitation	75%	50%	90%	10%	50%	$225,000	$168,750	$56,250	$28,125	$50,625	$5,625	$28,125		X	
Dennet Dam Removal	50%	50%	90%	10%	50%	$700,000	$350,000	$350,000	$175,000	$315,000	$35,000	$175,000			X
Dry Creek Watershed Detention Reconnaissance Study	50%	50%	90%	10%	50%	$250,000	$125,000	$125,000	$62,500	$112,500	$12,500	$62,500		X	
La Grange Floodplain Restoration and Spawning Gravel Augmentation	50%	50%	90%	10%	50%	$1,500,000	$750,000	$750,000	$375,000	$675,000	$75,000	$375,000			X
Little Salado Creek	50%	50%	90%	10%	50%	$5,000,000	$2,500,000	$2,500,000	$1,250,000	$2,250,000	$250,000	$1,250,000		X	
Orestimba Creek Flood Management Project	50%	50%	90%	10%	50%	$44,000,000	$22,000,000	$22,000,000	$11,000,000	$19,800,000	$2,200,000	$11,000,000		X	
Patterson WWTP - Reduce Flood Risk	75%	50%	90%	10%	50%	$27,000	$20,250	$6,750	$3,375	$6,075	$675	$3,375		X	
Riverfront Park Project	50%	50%	90%	10%	50%	$2,500,000	$1,250,000	$1,250,000	$625,000	$1,125,000	$125,000	$625,000		X	
Salado Creek Flood Management Project	50%	50%	75%	25%	50%	$600,000	$300,000	$300,000	$150,000	$225,000	$75,000	$150,000		X	
SB5 Compliance - City of Modesto	75%	50%	90%	10%	50%	$130,000	$97,500	$32,500	$16,250	$29,250	$3,250	$16,250		X	
SB5 Compliance - City of Newman	75%	50%	90%	10%	50%	$125,000	$93,750	$31,250	$15,625	$28,125	$3,125	$15,625		X	
SB5 Compliance - City of Patterson	75%	50%	90%	10%	50%	$205,000	$153,750	$51,250	$25,625	$46,125	$5,125	$25,625		X	
Storm Drainage Enhancements along Salado Creek	75%	50%	90%	10%	50%	$880,000	$660,000	$220,000	$110,000	$198,000	$22,000	$110,000		X	
Tuolumne River Flood Management Feasibility Study	50%	50%	75%	25%	50%	$3,000,000	$1,500,000	$1,500,000	$750,000	$1,125,000	$375,000	$750,000		X	
Tuolumne River Regional Park – Carpenter Road/West Modesto Flood Management and Park Development	50%	50%	90%	10%	50%	$750,000	$375,000	$375,000	$187,500	$337,500	$37,500	$187,500		X	
Tuolumne River Regional Parkway	50%	50%	90%	10%	50%	$60,000,000	$30,000,000	$30,000,000	$15,000,000	$27,000,000	$3,000,000	$15,000,000		X	
Totals						$119,920,000	$60,344,000	$59,576,000	$29,788,000	$53,344,200	$6,231,800	$29,788,000			

9.7 Recommendations for Future Bond Funding

Due to the Mid San Joaquin Region's lack of local funding potential, the recommendation of the RFMP team is that the State to make higher cost shares available for projects in the region. These higher cost shares will be necessary in order to accomplish many of the projects identified by the RFMP effort. The RFMP team identified two ways of making these higher State cost shares possible. The first is for the State to revisit its grant guidelines, with special consideration to the local ability to pay provisions. This could allow projects that are unable to pay the local cost share the chance to be funded. The second is for the State to consider increasing its contributions for projects that have major ecosystem benefits due to the public benefit such projects provide. Since many of the projects in the Mid San Joaquin Region contain restoration elements this could help make up for the lack of local funding potential.

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10. Outlook for the Future

In this section, the Mid San Joaquin River's current flood setting is broadly characterized and the expectations for the future within the current planning horizon are described.

10.1 Planning Area in 2014

Stanislaus County, together with the portions of the Mid SJR Region within Merced and San Joaquin Counties, is estimated to include nearly 78,000 acres with a 1% chance of flood inundation each year. Most of these lands are in agricultural production, with an additional portion dedicated to habitat and open space. A total of 11,063 people reside within these floodplain lands, with 2,129 people residing within floodplain lands included in the Mid SJR Region's LMAs. The highest concentration of assets within the floodplains of the planning area occurs along the Tuolumne River in and near the City of Modesto. The wastewater treatment plant serving the city of Patterson is located within the floodplains of the planning area, while one of the two plants serving the city of Modesto is located within RD 2091 of the Mid SJR Region.

At this time, the apparent level of Emergency Response preparedness to address flood hazards within the Mid SJR Region is relatively low. Flood fighting within the Region is conducted on an ad hoc basis, with heavy reliance on the experience of landowners and lacking both written plans and mutual aid agreements. The planning area appears to have a somewhat higher level of preparedness for responding to emergencies in general, but little flood-specific focus. Additionally, little coordination or planning with respect to Emergency Response appears to occur between the LMAs of the Region and the rest of the planning area.

The project levees within the Mid SJR Region are thought to provide sufficient hydraulic capacity to pass approximately a 25- to 50-year flood event. However, all of the LMAs have levees identified as having significant seepage risk, which could cause levee failures and flooding in much smaller events. DWR has estimated the annual probability of flooding behind the project levees in the Region as ranging from more than 4% (flooding in less than a 25-year event) up to 2% (flooding in a 50-year event) (DWR, 2012a).

Of the nine LMAs within the Mid SJR Region, four (RD 2099, RD 2100, RD 2102, RD 2092) are transitioning their levees out of the State Plan of Flood Control as land uses shift towards habitat and away from agricultural production, a change designed to reduce flood risk while providing ecosystem benefits. The remaining five LMAs are currently all "Inactive" under PL 84-99, rendering them ineligible to receive assistance in the form of post-flood repairs. RD 1602 and RD 2031 lack elected Boards of Directors. All of the RDs experience challenges in conducting operations and maintenance to the satisfaction of either the USACE, DWR, or both. Two of the LMAs, RD 2101 and RD 2063, have major erosion sites on their levees. Based on the financial analysis conducted for the RFMP, neither of these RDs appears to be financially sustainable, in part due to the cost of the local share needed for erosion repairs.

10.2 Planning Area in 2040+

The flood management systems and floodplains of the Mid SJR planning area will be changing dramatically in the decades to come.

The following description is an educated guess about what that future will look like—a projection based on expert judgment and available information from the Regional Flood Management Planning process.

Several land use changes are expected to lead to reduced flood risks in selected areas. The RDs of the SJRNWR and RD 2092 (Dos Rios/Hidden Valley Ranch) are both expected to have completed their transition out of the State Plan of Flood Control. The lands within their boundaries will have shifted to being managed for habitat purposes, and flood risk therefore will decline as a result. Two to three of the remaining five RDs are anticipated to have also ceased to operate as part of the State Plan of Flood Control as a result of financial or operational challenges, though their land use may continue as agricultural production or shift to habitat, recreation, or some mix of those uses. Depending on the land use, flood risks in these areas may decline as well. Given DWR's anticipated need for habitat mitigation for their flood projects, it seems likely that some portion of these lands will be acquired for habitat purposes through purchase as easements or in fee title. The effects of SB 5 on new development are anticipated to significantly slow the rate of increase in flood risk that might otherwise occur in the cities of Modesto, Patterson, and Newman.

Investments in Emergency Response, which are expected to be relatively easy to fund, are anticipated to lead to major improvements in flood fight and public safety operations coordination, planning, and effectiveness.

For the RDs that continue to manage levees as part of the State Plan of Flood Control, some changes are anticipated. Consistency between DWR and USACE maintenance requirements seems likely. Operations and maintenance may be consolidated for all or some of the RDs if the proposed exploration of this concept is promising and a successful pilot implementation follows. While regulatory constraints on operations and maintenance activities will continue, additional support for conducting these activities, through guidance or a streamlined permitting program, may exist.

Limited funding for flood management, particularly at the local level, is expected to continue to constrain project development and implementation. Nonetheless, a portion of the flood management studies proposed in this document is likely to have been completed, and some smaller flood management projects implemented. One or two large projects with a primary flood management purpose may also be implemented or in process by this point in time.

The scenario described above suggests the potential for a future Mid SJR planning area that has reduced flood risk, despite an expected increase in population. It will require a concerted effort by the stakeholders of the

Mid SJR planning area to develop, build support for, and get funding for a multiplicity of flood management projects, as well as supporting land use management policies to restrict further development in the floodplain and changes in the operations of upstream reservoirs to reduce flood risk.

With consistent and persistent effort, this vision of the Mid SJR planning area's improved flood future may be achieved—or even surpassed.

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Table 7-1
Summary of Proposed Regional Improvements

Project Name	Project Lead	Potential Project Partners	Project Status	Project Cost	Project Timeline	Short Project Description
Black Gulch Storm Drainage Study*	City of Patterson	Stanislaus County	Pre-planning	$28,000	Undetermined	There is a permitted spillway into the Delta Mendota Canal (DMC) from Black Gulch, a drainage situated between Salado and Del Puerto creeks, which keeps a local commercial area in Patterson from flooding. A study needs to be performed to determine what alternative solutions might be appropriate if/when the DMC Authority decides to not renew the permit.
City of Newman/ Bureau of Reclamation Flood Levee Rehabilitation	City of Newman	Bureau of Reclamation	Pre-planning	$225,000	45-day construction time	Rehabilitate a flood protection levee on Bureau of Reclamation property between the Newman Wasteway and the City of Newman Wastewater Treatment Plant (WWTP).
Consolidation of O&M	Reclamation District (RD) 2092	Interested parties include RDs 2031, 2101, 2092, 2091, 1602; City of Modesto; California Department of Water Resources (funding, technical assistance); local Resource Conservation Districts; and Stanislaus County (potential governance and management partners)	Planning	$200,000	1-5 years	Two or more Reclamation Districts form a formal partnership to share technical, financial, and/or operational capacity to perform necessary operations and maintenance (O&M). As an initial step, invest 2 person-years to investigate potential governance options and design and implement a pilot maintenance agreement project.
Dennett Dam Removal	Tuolumne River Trust	No partners identified at this time	Planning. The Dam Removal Basis of Design Report is complete. Funding is required to complete a sediment toxicology test, plus National Environmental Policy Act (NEPA)/California Environmental Quality Act (CEQA), and permitting.	$700,000	2 years	Removal of Dennett Dam, an abandoned low-head dam located on the lower Tuolumne River in Modesto, California. The dam has been an instream barrier to anadromous fish passage, controlling local hydraulic and sediment transport conditions, for over 60 years, while also impeding water flow in the river. It is also a significant safety hazard adjacent to a major park, and has been the location of three drowning deaths in the last five years, including two children.
Dos Rios Ranch Floodplain Expansion and Ecosystem Restoration Project and Hidden Valley Ranch Mitigation Project	River Partners	Wildlife Conservation Board (WCB); DWR; United States Bureau of Reclamation (USBR); United States Fish and Wildlife Service (USFWS); Natural Resources Conservation Service (NRCS); San Francisco Public Utilities Commission (SFPUC); California Department of Fish and Wildlife (CDFW) (funding partners, technical assistance); Central Valley Flood Protection Board (CVFPB); National Marine Fisheries Service (NMFS); United States Army Corps of Engineers (USACE); regulatory agencies; environmental non-governmental organizations (NGOs); local municipalities; Reclamation District 2092 (project support and approvals); regional flood management agencies with mitigation needs that may be filled on the property	Planning, Implementation	$8,000,000	1-5 years	Project to restore flooding and transient floodwater storage to approximately 1,000 acres of historic floodplain, restore riparian habitats, and promote river physical processes of scour and deposition along 6 river miles. Remove levee maintenance obligations from State Plan of Flood Control (SPFC) and modify USACE O&M manual to allow breaching and other modification to the existing levees. Provide 191 acres of habitat mitigation for future regional SPFC environmental impacts.
Dry Creek Watershed Detention Reconnaissance Study*	Stanislaus County and City of Modesto	USACE	Pending funding grants	$250,000	2015-2016 pending funding	Complete a reconnaissance study of potential options for reducing flood risks by detaining flood flows in the Dry Creek watershed, upstream of the City of Modesto.
Emergency Response Plan – Debris Management	Stanislaus County Office of Emergency Services	Stanislaus County Public Works, cities within Stanislaus County, city public works departments within Stanislaus County, Patterson Irrigation District, West Stanislaus Irrigation District	Pre-planning	$110,000	1-5 years	A debris management plan is needed to better prepare to restore public services and ensure public health and safety in the aftermath of a flood or earthquake and to better position the Mid SJR Region for emergency response funding from the State of California, Federal Emergency Management Agency (FEMA), and other participating entities. Stanislaus County Office of Emergency Services proposes the development of a comprehensive, countywide debris management plan.
Emergency Response Plan – Local Planning and Training	Stanislaus County Office of Emergency Services	Stanislaus County; City of Modesto; City of Patterson; City of Newman; Reclamation Districts 1602, 2063, and 2091; Patterson Irrigation District; West Stanislaus Irrigation District	Pre-planning	$110,000	1-5 years	Planning and training are necessary to improve coordination between local agencies so that emergency response can be improved in the planning area. A program would be developed and implemented to address this need.

Table 7-1
Summary of Proposed Regional Improvements

Project Name	Project Lead	Potential Project Partners	Project Status	Project Cost	Project Timeline	Short Project Description
Flood Risk Education	River Partners	DWR and USACE levee maintenance and inspection staff; CVFPB; regional flood management agencies, including San Joaquin River Flood Control Agency (SJRFCA); San Joaquin Area Flood Control Agency (SJAFCA); Lower San Joaquin Levee District (LSJLD); counties; cities; USFWS, CDFW, USACE, NGOs with an interest in river and flood management and education	Pre-planning	$30,000	Dependent upon funding – could start immediately and continue indefinitely contingent upon funding	Develop and implement a regional flood risk management educational program to raise awareness of flood risks and elevate the level of public understanding with respect to flood risk management needs and the value of investments to address them. For the local maintaining agencies (LMAs), include education on their role in flood risk management and provide technical guidance/assistance on levee maintenance activities and permitting requirements.
Gomes Lake / Harding Drain Improvements	Gomes Lake Joint Powers Authority	Turlock Irrigation District, Stanislaus County, Reclamation District 2063, Reclamation District 2091	Pre-planning	$1,700,000	1-5 years	This project includes multiple components to enhance the function, reliability, flexibility and capacity of the Gomes Lake facility, which stores and drains stormwater and return flows, providing flood risk reduction behind the east bank levees of the San Joaquin River.
Hydraulic and Channel Migration Studies*	Stanislaus County Office of Emergency Services	RD 2091, Gomes Lake JPA, City of Modesto, City of Newman, City of Patterson	Pre-planning	$200,000	1-5 years	Two regional studies (mainstem San Joaquin River flood hydraulics and channel migration) and three focused hydraulic studies are needed to better inform flood management in the Mid SJR Region.
Integrated Levee Vegetation Management – Flood Maintenance and Habitat	River Partners	Funding partners - WCB, DWR, USBR, NRCS; landowners; RDs; environmental NGOs; technical experts - as needed	Planning	$6,400,000	1-5 years	This project includes re-establishing appropriate vegetation on levee slopes to promote terrestrial wildlife survival during floods – either native sod on active levees or native brush vegetation on inactive levees (RDs 2099, 2100, 2102, and 2092 in the future).
La Grange Floodplain Restoration and Spawning Gravel Augmentation	Tuolumne River Trust	Stanislaus County Parks and Recreation	Pre-planning	$1,500,000	1-5 years	Restore 77 acres of degraded floodplain habitat along the Tuolumne River in La Grange while developing a source of spawning gravel to improve and enhance existing spawning beds in the Tuolumne River.
Little Salado Creek	Stanislaus County	USACE	Planning	$5,000,000	1-5 years	Construction of a project to partially divert, retain and percolate up to 1,030 cubic feet per second (cfs) of flow from Little Salado Creek.
Modesto WWTP - Reduce Flood Risk	City of Modesto	No partners identified at this time	Pre-planning	$80,000,000	Undetermined	Develop and evaluate potential solutions to existing flood hazards at the Modesto Sutter and Jennings WWTPs, including completion of two studies (Sutter Plant Relocation Feasibility Study and a Wastewater Treatment Facilities Master Plan) that are currently in process, and implement the preferred alternative.
Orestimba Creek Flood Risk Management Project	City of Newman	Stanislaus County, Orestimba Creek Flood Control District, USACE	Planning	$44,000,000	1-5 years	Construction of a 4.7-mile chevron levee along east bank of Central California Irrigation District (CCID) Main Canal and a 1-mile cross levee to reduce flood risk to Newman and adjacent agricultural areas, providing a 200-year level of protection. The chevron levee would include 3 feet of freeboard above the mean 200-year water surface elevation.
Patterson WWTP – Reduce Flood Risks*	City of Patterson	No partners identified at this time	Pre-planning	$27,000	Undetermined	Develop and evaluate potential solutions to existing flood hazards at the City of Patterson WWTP.
RD 1602 Resilience	RD 1602	CVFPB - permitting, technical assistance; landowners - funding, governance; DWR - funding, technical assistance; USACE - small role in emergency response, possibly funding for repairs; Stanislaus County - oversees district governance and financing; engineering firms, environmental firms, other technical experts as needed	Pre-planning	$4,700,000	1-5 years	Complete the necessary repairs and upgrades to bring RD levee system back into “Active” status for PL 84-99 eligibility.
RD 2031 Resilience	RD 2031	CVFPB - permitting, technical assistance; landowners - funding, governance; DWR - funding, technical assistance; USACE - small role in emergency response, possibly funding for repairs; Stanislaus County - oversees district governance and financing; engineering firms, environmental firms, other technical experts as needed	Pre-planning	$2,000,000	1-5 years	Complete the necessary repairs and upgrades to bring RD levee system back into “Active” status for PL 84-99 eligibility.

Attachment B

Table 7-1
Summary of Proposed Regional Improvements

Project Name	Project Lead	Potential Project Partners	Project Status	Project Cost	Project Timeline	Short Project Description
RD 2063 Resilience	RD 2063	CVFPB - permitting, technical assistance; landowners - funding, governance; DWR - funding, technical assistance; USACE - small role in emergency response, possibly funding for repairs; Stanislaus County - oversees district governance and financing; engineering firms, environmental firms, other technical experts as needed	Pre-planning	$900,000	1-5 years	Complete the necessary repairs and upgrades to bring RD levee system back into “Active” status for PL 84-99 eligibility.
RD 2091 Resilience	RD 2091	CVFPB - permitting, technical assistance; landowners - funding, governance; DWR - funding, technical assistance; USACE - small role in emergency response, possibly funding for repairs; Stanislaus County - oversees district governance and financing; engineering firms, environmental firms, other technical experts as needed	Pre-planning	$400,000	1-5 years	Complete the necessary repairs and upgrades to bring RD levee system back into “Active” status for PL 84-99 eligibility.
RD 2101 Resilience	RD 2101	CVFPB - permitting, technical assistance; landowners - funding, governance; DWR - funding, technical assistance; USACE - small role in emergency response, possibly funding for repairs; Stanislaus County - oversees district governance and financing; engineering firms, environmental firms, other technical experts as needed	Pre-planning	$3,000,00	1-5 years	Complete the necessary repairs and upgrades to bring RD levee system back into “Active” status for PL 84-99 eligibility, including addressing a major levee erosion site.
Reducing Sediment Loading into the San Joaquin River from Westside Agricultural Lands	West Stanislaus RCD	NRCS, irrigation districts, Westside Coalition	Ongoing with an existing list of interested producers.	$65,000,000	15 years	Improve irrigation technology with buried drip and sprinkler irrigation systems that allow for the capacity to irrigate a variety of crop types and effectively eliminate erosion of sediment off of farm fields when compared to traditional, flood irrigation practices. Sediment loading results in reduced capacity of and increased flooding in Westside Creeks and the San Joaquin River.
Regional Maintenance Technical Support	RD 2091 and RD 2092	CVFPB - permitting, technical assistance; landowners - funding, governance; DWR - funding, technical assistance; USACE - possibly funding for repairs; Stanislaus County - oversees governance and financing; engineering firms, environmental firms, other technical experts as needed	Pre-planning	$100,000	1-5 years	Development and implementation of a shared staffing position to support LMA fulfillment of maintenance responsibilities within the Mid SJR Region.
Riverfront Park Project	City of Patterson	Stanislaus County, San Joaquin River Valley Coalition	Pre-planning	$2,500,000	Undetermined	Creation of a riverfront park, recreational trail, and enhanced habitat along the western bank of the San Joaquin River between Old Las Palmas Avenue and Eucalyptus Avenue.
Salado Creek Flood Management Project	City of Patterson	Stanislaus County	Pre-planning	$600,000	Undetermined	Widening of Salado Creek from the Delta Mendota Canal to the city limits.
SB5 Compliance – City of Modesto*	City of Modesto	Stanislaus County	Pre-planning	$130,000	Phases I and II - 1 year; Phase III - 10-20 years	Comply with SB 5 regulations through update of the City’s relevant planning documents and completion of a preliminary engineering report to identify potential alternatives on how the City can provide 200-year flood protection.
SB5 Compliance – City of Newman*	City of Newman	No partners identified at this time	Pre-planning	$125,000	Phases I and II – 3 years?; Phase III - 10-20 years	Comply with SB 5 regulations through update of the City’s relevant planning documents and completion of a preliminary engineering report to identify potential alternatives on how the City can provide 200-year flood protection.
SB5 Compliance – City of Patterson*	City of Patterson	No partners identified at this time	Pre-planning	$205,000	Phases I and II – 3 years?; Phase III - 10-20 years	Comply with SB 5 regulations through update of the City’s relevant planning documents and completion of a preliminary engineering report to identify potential alternatives on how the City can provide 200-year flood protection.
Sediment Management Investigation*	River Partners	DWR, CVFPB, flood management agencies relevant to the Upper SJR RFMP and Lower SJR/Delta South RFMP	Pre-planning	$250,000	1-5 years	Complete a study that identifies sediment-induced chokepoints along the San Joaquin River in the planning area, the dynamics that create them, and potential actions to improve flood conveyance in those areas.

Attachment B

Table 7-1
Summary of Proposed Regional Improvements

Project Name	Project Lead	Potential Project Partners	Project Status	Project Cost	Project Timeline	Short Project Description
Storm Drainage Enhancements along Salado Creek	City of Patterson	No partners identified at this time	Pre-planning	$880,000	Undetermined	Installation of reinforced concrete pipelines under the California Northern Railroad wooden bridge to improve storm drainage along Salado Creek.
Three Amigos (also known as the Non-structural Alternative at the San Joaquin River National Wildlife Refuge)	San Joaquin River National Wildlife Refuge	River Partners, USFWS Anadromous Fish Restoration Program, USACE, early project partners - USDA/NRCS, DWR, CALFED	Planning	$5,500,000	More than 5 years	Project to restore flooding and transient floodwater storage to more than 3,100 acres of historic floodplain, restore riparian habitats, and promote river physical processes of scour and deposition along 3 miles of the San Joaquin River. While the lands have been purchased, additional investment is needed to implement flood risk reduction goals consistent with the Refuge's habitat management goals. Needed efforts include planning and design of the Refuge for flood management as well as removal of levees from the federal project.
Tuolumne River Flood Management Feasibility Study*	Stanislaus County	City of Modesto, USACE	Dormant	$3,000,000	Approximately 5 years	Complete a USACE Feasibility Study, or a study similar in scope, that evaluates how the management of the Tuolumne River could be revised to improve flood management, enhance aquatic habitat, and improve water quality.
Tuolumne River Regional Park – Carpenter Road/West Modesto Flood Management and Park Development	Tuolumne River Regional Park Joint Powers Authority	City of Modesto, City of Ceres, Stanislaus County, Tuolumne River Trust	Planning. The Tuolumne River Regional Park Master Plan, adopted in 2001, includes the overview for development of the Carpenter Road Area. Funding is required to implement the construction of the levee and to develop the Specific Plan for the Carpenter Road Area.	$750,000	Approximately 2 years	Help reduce flood damages in West Modesto neighborhoods while developing the adjacent Tuolumne River Regional Park.
Tuolumne River Regional Parkway	Tuolumne River Regional Park Joint Powers Authority	City of Modesto, City of Ceres, Stanislaus County, Tuolumne River Trust	Planning and construction	$60,000,000	15-25 years to completion	Continued development of the undeveloped areas of the Tuolumne River Regional Park including the Gateway Parcel.
Westside Creeks On-Farm Multi-Benefit Program	Audubon California	West Stanislaus Resource Conservation District, irrigation districts, NRCS, USFWS, California Wildlife Conservation Board	This project is in the concept phase, but since the project lead is currently conducting very similar work in the Sacramento Valley; thus, work could begin very quickly if funding were allocated.	$75,000	3 years	Provide outreach and technical assistance to landowners in the Stanislaus County Westside Creek watersheds for multi-benefit flood risk reduction projects.
WSID Fish Screen and Change in Point of Diversion Project	West Stanislaus Irrigation District	CDFW, NMFS, USFWS, USBR	Planning, design, and permitting	$38,000,000	1-5 years	This RMFP Project will help support three (3) Phases of the WSID Fish Screen Project while significantly improving site specific and regional flood management and resilience, and ecosystem enhancement. Phase 1 would provide cost-share to complete the planning, design and permitting of mutually beneficial fish screen alternatives. Phase 2 funding would contribute to the required 50% non-federal cost-share for construction of WSID's preferred alternative fish screen project. Phase 3 would provide cost-share contribution to help develop and complete the planning, design and permitting of integrated and mutually beneficial flood management and resilience and ecosystem enhancements along 90% of the WSID intake canal and alignment across the SJRNWR.

* Indicates a project that is primarily or entirely a study.

TaAble 8-1
Screening and Ranking Scores

Project Name	Consistency with RFMP goals SC-1	Implementation feasibility SC-2	Implementation feasibility RC-1	Financial feasibility RC-2	Flood risk reduction - life risk RC-3	Flood risk reduction - flood damage RC-4	Operations, maintenance, and repair RC-5	Ecosystem function RC-6	Institutional support RC-7	Other benefits RC-8	Cost-effectiveness RC-9	Low potential for dis-benefits RC-10
Highest priority												
City of Newman/Bureau of Reclamation Flood Levee Rehabilitation	M	M	M	H	M	L	N/A	N/A	N/A	M	M	M
Consolidation of O&M	H	M	M	M	L	M	H	N/A	H	M	M	H
Dennett Dam Removal	H	H	H	M	H	L	N/A	H	N/A	M	H	H
Dry Creek Watershed Detention Reconnaissance Study*	M	M	M	H	M	M	N/A	N/A	N/A	N/A	M	M
Emergency Response Plan – Local Planning and Training	H	H	H	H	M	M	H	N/A	H	N/A	H	H
Flood Risk Education	H	M	M	H	L	M	L	N/A	L	L	H	H
Modesto WWTP - Reduce Flood Risk	M	H	H	L	M	L	N/A	N/A	N/A	M	M	M
Orestimba Creek Flood Risk Management Project	M	H	H	L	M	M	N/A	N/A	M	N/A	M	M
Regional Maintenance Technical Support	H	M	M	H	L	M	H	L	H	L	H	H
SB5 Compliance – City of Modesto*	H	H	H	H	M	L	N/A	N/A	L	L	H	M
SB5 Compliance – City of Newman*	H	H	H	H	M	L	N/A	N/A	L	L	H	M
SB5 Compliance – City of Patterson*	H	H	H	H	M	L	N/A	N/A	L	L	H	M
Tuolumne River Flood Management Feasibility Study*	H	M	M	M	M	M	N/A	L	N/A	L	M	H
Tuolumne River Regional Park – Carpenter Road/West Modesto Flood Management and Park Development	H	H	H	M	M	L	N/A	H	N/A	M	H	M
High priority												
Dos Rios Ranch Floodplain Expansion and Ecosystem Restoration Project and Hidden Valley Ranch Mitigation Project	H	H	H	H	L	L	M	H	N/A	H	H	H
Emergency Response Plan – Debris Management	M	M	M	H	L	L	L	N/A	M	H	H	H
Integrated Levee Vegetation Management – Flood Maintenance and Habitat	H	H	H	M	N/A	N/A	H	H	N/A	L	M	H
La Grange Floodplain Restoration and Spawning Gravel Augmentation	H	M	M	M	L	L	N/A	H	N/A	M	H	H
RD 2031 Resilience	H	M	M	H	L	L	M	N/A	M	M	M	H
RD 2063 Resilience	H	M	M	H	L	L	M	N/A	M	M	M	H
RD 2091 Resilience	H	M	M	H	L	L	M	N/A	M	M	H	H
Three Amigos (also known as the Non-structural Alternative at the San Joaquin River National Wildlife Refuge)	H	H	H	H	L	L	M	H	L	H	H	H
WSID Fish Screen and Change in Point of Diversion Project	M	H	H	M	N/A	L	M	H	M	H	M	M
Westside Creeks On-Farm Multi-Benefit Program	H	M	M	H	L	L	L	M	M	L	H	H
Medium priority												
Black Gulch Storm Drainage Study*	M	M	M	H	L	L	N/A	N/A	N/A	N/A	M	M
Gomes Lake / Harding Drain Improvements	M	M	M	M	L	L	M	N/A	N/A	N/A	M	H
Hydraulic and Channel Migration Studies*	M	M	M	M	L	L	M	N/A	N/A	N/A	M	H
Little Salado Creek	M	H	H	M	L	L	N/A	N/A	N/A	M	M	H
Patterson WWTP – Reduce Flood Risks	M	M	M	H	L	L	N/A	N/A	N/A	L	M	M
RD 1602 Resilience	H	M	M	L	L	L	M	N/A	M	M	L	H
RD 2101 Resilience	H	M	M	L	L	L	M	N/A	M	M	L	H
Reducing Sediment Loading into the San Joaquin River from Westside Agricultural Lands	H	H	H	L	L	L	L	N/A	N/A	M	L	H
Riverfront Park Project	H	M	M	M	L	L	N/A	H	N/A	M	L	H
Salado Creek Flood Management Project	M	M	M	M	L	L	N/A	N/A	N/A	N/A	M	M
Sediment Management Investigation*	H	M	M	M	N/A	N/A	L	L	N/A	N/A	H	H
Storm Drainage Enhancements along Salado Creek	M	M	M	M	L	L	N/A	N/A	N/A	M	M	M
Tuolumne River Regional Parkway	H	M	M	L	L	L	N/A	H	N/A	M	M	M

H = High; valued as 3 points
M = Medium; valued as 2 points
L = Low; valued as 1 point
N/A = Not Applicable; valued as 0 point
* Indicates a project that is a study.
NOTE: See Appendix F for more detail."