

4.0 SPFC Lands

In most cases, federal project authorizations require the local sponsor to provide all lands, easements, and rights-of-way for project construction, maintenance, and operation. Property rights for SPFC lands are held by the Sacramento-San Joaquin Drainage District (SSJDD), which is under the jurisdiction of the Board. The SSJDD was created by State legislation in 1913 and has associated property rights going back to 1900.

SPFC property rights extend to about 18,000 parcels of land. All comprehensive property records, indexes, and mapping associated with SPFC lands are maintained by DWR's Division of Engineering-Geodetic Branch, Cadastral Survey Section. Each parcel of land has a file folder containing hard copies of the parcel description and other pertinent information. About 400 plat maps show the locations of the land parcels. Since the recording system has been in place for more than 100 years, it is set up to identify rights on individual properties at specific locations and is not readily suitable to general queries or other summaries.

4.1 Summary

In general, SSJDD acquired and holds property rights necessary for the original construction of facilities and ongoing O&M, and to allow flooding, ponding, seeping or overflow of water. Property rights are for approximately 210,500 acres of land throughout 19 Central Valley counties. Table 4-1 summarizes, by county, the approximate acreage of land on which SSJDD holds property rights.

Table 4-1. Acres of Land for Which Sacramento-San Joaquin Drainage District Holds Property Rights, by County

County	Acres
Butte	7,010
Colusa	5,272
Fresno	5,018
Glenn	38,000
Lake	174
Madera	5,460
Mariposa	3,246
Merced	10,900
Modoc	2
Placer	95
Plumas	177
Sacramento	8,650
San Joaquin	4,350
Solano	16,100
Stanislaus	500
Sutter	29,200
Tehama	580
Yolo	74,800
Yuba	950

Note: This table represents approximate acres of land in each county. For more information on property rights, contact DWR Division of Engineering-Geodetic Branch, Cadastral Survey Section.

4.2 Data Gaps

The record of SPFC property rights holdings is not clear in all areas. Because of the incremental construction of SPFC facilities over almost a century, records are not of uniform quality and records for rights in some areas are missing.

SPFC property rights have been acquired and disposed of for various reasons throughout the history of the SPFC in the Sacramento and San Joaquin river valleys. For example, property rights may have been acquired for spoiling or borrowing of soil material necessary for construction and, in some cases, these rights were disposed of through sale or transfer after construction.

Standards for easements beyond the landside toe of levees for O&M have varied with time. Since the 1980s, a 10-foot easement has been standard.

However, a majority of SPFC levee easements were acquired before that time according to standards existing at the time of acquisition. Therefore, 10-foot easements do not exist throughout the system. Similarly, easements to gain access to and from various points along the levee system are not consistent. In some areas, unauthorized encroachments extend well into easement areas and sit on easements or on levees.

4.3 Fee Title Lands

Fee title lands, or fee simple lands, are those with full ownership. Some of the property rights for the SPFC are held in fee title, but the current method of record-keeping does not allow easy summarization of these holdings. Some levees are on lands owned by the State. The State owns the land within the Chowchilla Bypass, and the Eastside Bypass upstream from Sand Slough.

In some areas, land was purchased by the State in fee and then disposed of while the State retained some easement rights.

4.4 Easements

Easements are limited-use rights to property owned by others. SSJDD often acquired property rights in areas where it was determined that purchasing easements was more appropriate than purchasing the land in fee title. The majority of SSJDD's property rights are easements. In these locations, most notably the Sutter, Sacramento, Yolo, Butte, Tisdale, and Mariposa bypasses, and the Eastside Bypass downstream from Sand Slough, flowage easements were acquired that compensate landowners for giving the SSJDD the right to flow or flood water over land.

Common easement types used by SSJDD are listed below:

- **Levee** – Standard levee easement language has been revised numerous times in the past 100 years. With each revision, the standard version has become more specific and defined. Also, standard language has been modified or sections deleted in some easement deeds, as requested by the grantor. Because of the revisions and customization, language in each deed must be evaluated to determine SSJDD's exact rights for the parcel. For example, two levee easements (acquired at different times, one 60 years ago to build the levee, the other 5 years ago to enlarge and improve the levee) are adjacent but have different levee rights. The latter would have the right to preserve and retain all vegetative growth desirable for project purposes; the older document would only state that

SSJDD had the right to build, construct, reconstruct, repair, and maintain, with no mention of replanting or preserving vegetation. Current levee language, Rights 1 through 8 (revised in 1994) are as follows:

1. *Construct, reconstruct, enlarge, fence, plant with trees, shrubs and other vegetation, preserve and retain all vegetative growth desirable for project purposes, repair and use flood control works, which shall include, but not be limited to, access, haul and patrol roads, levees, ditches, embankments, channels, berms, fences and appurtenant structures, and operate and maintain said flood control works in conformity with the Code of Federal Regulations, Corps of Engineers' Standard O&M Manual, and State of California Standards.*
2. *Clear and remove from said flood control works any or all natural or artificial obstructions, improvements, trees and vegetation necessary for construction, operation, maintenance, repair, reconstruction and emergence flood fight.*
3. *Flow waters and materials and by said flow erode.*
4. *Place or deposit earth, debris, sediment or other material.*
5. *Excavate and remove earth, debris, sediment, or other material, including that placed or deposited as above.*
6. *Locate or relocate roads and public utility facilities by grantee or others.*
7. *Restrict the rights of the grantor, his successors and assigns, without limitations, to explore, extract, remove, drill, mine or operate through the surface or upper 100 feet of the subsurface in exercise of the grantor's interest in any minerals, including oil and gas.*
8. *Restrict any use by others which may interfere with any of the uses listed herein or any use necessary or incidental thereto.*

- **Access** – A perpetual easement and right-of-way to construct, reconstruct, operate, maintain, and use an access and service road over a property.
- **Canal/Channel** – A perpetual easement and right-of-way to construct, reconstruct, enlarge, operate, and maintain, a canal or ditch, and all works necessary and appurtenant to a flood control facility.

- **Drainage and Flowage** – A perpetual easement and right-of-way to construct, reconstruct, enlarge, operate, and maintain drainage facilities, and to flood, seep, pond, and overflow water over a property.
- **Flowage** – A perpetual easement and right-of-way to flood, seep, pond, and overflow water over, through, and across a property.
- **Slope** – A perpetual easement, with the right to construct, reconstruct, extend, and maintain cut and fill slopes and drainage facilities over a property.
- **Temporary** – Other temporary easements and rights of way for access, borrow, spoil, and construction may have been acquired. Since these rights terminated after construction, they are no longer part of the SPFC property rights.

4.5 Agreements

SSJDD has agreements with public entities (city, county, utilities, other State departments, and federal) for specified use of easements and properties. Each agreement is unique and allows specific uses and restrictions.

4.6 Designated Floodways

See Sections 2.4.3 and 6.8.1 for descriptions of designated floodways. Designated floodways are not considered lands of the SPFC, but they are a condition for successful operation of the SPFC. They do not carry specific property rights, but are a regulatory designation.

4.7 Historic Overflow to Butte Basin

See Section 3.2.5 for a description of historic overflow into the Butte Basin and inundation of lands within the basin. Also see Section 6.8.2 for a description of Board regulation of overflow to the Butte Basin under CCR Title 3. By precedent of historical use, the SPFC relies on continued overflow during floods for successful operation of levees along the Sacramento River.

4.8 Encroachment Permits

The Board issues permits for encroachments that are compatible with the flood system and do not hamper O&M. These are not SPFC property rights, but are permitted use of SPFC facilities. However, there are many unpermitted encroachments on SPFC facilities. Some of these encroachments are clearly incompatible with O&M of SPFC facilities and should be removed. Others need permitting to document their presence.

As part of the American River Common Features General Reevaluation Report (GRR), USACE estimated that encroachments exist on (USACE, 2008):

- Fifty-seven percent of the left bank of the Sacramento River, from Natomas Cross Canal to American River
- Thirteen percent of the left bank of the Sacramento River, from the American River to Morrison Creek
- Nine percent of the right bank of the American River
- Twenty-six percent of the left bank of the American River

Similar estimates are not available for other river reaches within the SPFC.

Limiting and controlling encroachments are important to public safety. Encroachments can limit visibility for inspections and can impede access necessary for floodfights and O&M. Encroachments can significantly delay planned construction activities.

Encroachment permits granted by the Board must also be approved by USACE.

4.9 Ongoing Evaluation

Each individual property upon which the SSJDD holds property rights represents an agreement between the previous owner of the rights and SSJDD or a Final Order of Condemnation forcibly transferring property rights to the government. While standard ownership and easement rights agreements have been used by SSJDD, these agreements have changed throughout the years. In addition, individual property owners may have negotiated modified agreement terms. While the types of property rights may be aggregated into groups of similar rights, each individual deed must be reviewed to understand the specific rights held for the parcel.

Documentation and analysis of SPFC lands is extremely complex. More than 100 years of records exist that document thousands of land acquisitions and disposals. Over this period, recordkeeping protocols, technology, surveying accuracy and methods, and legal language have all changed and developed significantly. Many early records use descriptive language that leaves significant interpretation to the boundary delineation of a parcel or the rights conferred by the deed. Compiling, rectifying, and standardizing these records into a state-of-the-art electronic database is an ongoing activity underway by DWR. This effort has been initiated, but substantial work remains to be completed so that records can be analyzed in detail. In the absence of this completed geographic information system (GIS) database, only approximate conclusions can be drawn from the existing data. Specific inquiries into the rights of individual parcels or groups of parcels are handled by DWR's Division of Engineering, Geodetic Branch.

Based on rights that can be quantified, additional property rights may need to be obtained, especially for gaining access to SPFC facilities and for adequate easements along the landside toes of levees. Therefore, the State and local maintaining agencies (LMA) may not have the land rights necessary for SPFC facility O&M as intended.

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5.0 SPFC Operations and Maintenance

The modes of O&M are part of the SPFC. Modes of O&M for the SPFC include O&M manuals, inspections of SPFC facilities, maintenance by the State and LMAs, and flood operations.

5.1 Summary

The State depends on a large number of LMAs to keep the SPFC levees in good condition. The State performs maintenance of structures, channels, and specific levee reaches. USACE does not perform O&M on SPFC facilities.

O&M manuals specify needed inspections and O&M for each unit of the SPFC. A unit may be a reach of levee on one bank of a river, a pumping plant, a weir, control structure, dam and reservoir, or other facility.

Two standard O&M manuals, one each for the Sacramento and San Joaquin river portions of the system, and 145 unit-specific O&M manuals provide information on O&M of facilities.

5.2 Operation and Maintenance Manuals

The O&M manuals contained on the reference DVD included with this report are part of the SPFC. O&M manuals describe actions that maintaining agencies should follow during high-water events and for keeping project facilities in good working condition. USACE has prepared standard O&M manuals for Sacramento and San Joaquin river facilities. These standard O&M manuals are supported by more detailed O&M manuals for each unit of the State-federal flood management system in the Sacramento and San Joaquin valleys.

5.2.1 Standard O&M Manuals

The standard O&M manuals present requirements that apply to all maintaining agencies that operate and maintain the various geographical SPFC units. The two standard O&M manuals are listed below:

- *Standard Operation and Maintenance Manual for the Sacramento River Flood Control Project* (USACE, revised May 1955)
- *Standard Operation and Maintenance Manual for the Lower San Joaquin River Levees, Lower San Joaquin River and Tributaries Project, California* (USACE, April 1959)

The standard O&M manual for the Sacramento River portion of the system (see O&M Manual SAC000) and the standard O&M manual for the San Joaquin River portion of the system (see O&M Manual SJR000) can be found on the reference DVD in the back pocket of this report. This general information applies to all units of each project and conforms with Section 208.10, Title 22 of the Code of Federal Regulations (CFR), as approved by the Acting Secretary of the Army on August 9, 1944, and published in the Federal Register on August 17, 1944. Each manual includes a copy of the regulation.

Examples of general rules contained in each manual for O&M of local flood control works (facilities) are as follows:

- O&M for maximum benefits
- O&M in accordance with USACE-prescribed regulations
- Reserve supply of materials for flood emergencies
- No encroachments that adversely affect O&M
- No improvements without USACE approval
- Semiannual report
- USACE access at all times
- Maintenance and repairs performed by maintaining agencies as deemed necessary by USACE
- Coordination during flood periods

Examples of more detailed O&M information contained in the standard manuals include the following:

- Conditions requiring facility maintenance such as erosion, care of vegetation, burrowing animals, degradation of levee crown
- Need for patrols during floods

- Need for inspections
- Procedures to combat flood conditions

5.2.2 Unit-Specific O&M Manuals

USACE prepared detailed O&M manuals for each separate unit of the State-federal flood management system when each unit was completed. Unit-specific O&M manuals (see reference DVD) were incrementally prepared for specific O&M requirements that apply to the unit. These O&M manuals supplement information included in the standard O&M manuals. Each manual includes information on authorization, location, project description, protection provided, assurances provided by locals, maintenance methods, operation methods, and inspection and reporting. The O&M manuals generally include the as-constructed drawings as an appendix, but file them separately due to their large size. Some manuals include information on repairs or upgrades completed following construction of the original facilities. While a total of 118 unit-specific O&M manuals (see reference DVD) has been found, other manuals may be found.

Most of the unit-specific O&M manuals were prepared for individual segments of levees, often aligned to the LMA responsible for their maintenance. Other unit-specific O&M manuals were prepared for pumping plants along a given reach of stream channel, weirs, diversions, storage reservoirs, or other features of the SPFC.

Each unit-specific O&M manual also includes information on ancillary features that are part of each unit such as bridges, culverts, and other minor drainage facilities, and hydrographic features such as gages necessary for operation. The O&M manuals and the reference DVD contained at the end of this report contain specific information on these features. However, since undocumented changes to these have likely occurred over time, the information should be viewed as a general inventory of these facilities, not a definitive list of existing features.

O&M Manuals SAC1 through SAC17 are early manuals that have been superseded by more recent information in O&M manuals numbered SAC100 and higher. SAC1 through SAC17 are included on the reference DVD for historical completeness, but do not reflect current information.

Repairs and other modifications have been made subsequent to original construction to many levees throughout the system. The common practice is for USACE to prepare a supplemental O&M manual to cover a repair or modification. DWR and USACE are in the process of assembling a set of these supplemental O&M manuals.

5.3 Inspections

Each individual unit-specific O&M manual includes requirements for inspection of SPFC facilities. The State is responsible for inspections of SPFC levees and structures. The State inspects levees that are maintained by DWR and many separate local agencies, and then reports the findings to USACE, which performs quality assurance work. DWR has implemented a self-inspection program that requires LMAs to inspect their levees in the summer and winter, while DWR conducts inspections in the spring and fall. From the inspection information submitted, USACE may choose to conduct follow-up inspections in certain areas. USACE uses its own follow-up inspections and the State’s inspection findings to make Public Law 84-99¹ eligibility determinations for each local agency.

While each O&M manual contains specific inspection criteria, the following are examples of items included in inspections:

- Debris
- Channel vegetation
- Levee vegetation
- Encroachments
- Sedimentation
- Settlement
- Erosion
- Rodent damage
- Condition of structures
- Other conditions specified in each O&M manual

Annual inspection reports and a variety of other inspection reports prepared by DWR’s Flood Project Integrity and Inspection Branch can be found on the California Data Exchange Center (CDEC) Web site:

<http://cdec.water.ca.gov/fsir.html>

The maintenance status of project channels and structures is reported in an annual Inspection Report. Each annual report includes criteria for inspections of levee maintenance, channels, and structures.

5.3.1 Interim Vegetation Inspection Criteria

In April 2007, USACE released a draft white paper, *Treatment of Vegetation Within Local Flood Damage Reduction Systems*, which called for the removal of wild growth, trees, and other encroachments that might impair levee integrity or floodfighting access to reduce the risk of flood

¹ Public Law 84-99 defines federal rehabilitation assistance for flood control works.

damage. Guidance on vegetation standards for flood control structures can be found in USACE Engineering Technical Letter (ETL) 1110-2-571 and Engineering Manual (EM) 1110-2-301. These standards limit uncontrolled vegetation growth (brush, weeds, or trees) to smaller than 2 inches in diameter. USACE notified sponsors that levees that fail to meet these existing standards be rated as unacceptable, with the consequence that they could lose eligibility for federal assistance (Public Law 84-99) in post-flood levee rehabilitation.

In response to USACE vegetation criteria, DWR revised its levee inspection criteria for vegetation in fall 2007. The interim vegetation inspection criteria will be considered in the short term until they can be revised using best available science, and USACE completes its review and revision of its levee vegetation standards. The inspection criteria are aimed at improving public safety by providing visibility for inspections, eliminating vegetation conflicts and encroachments that could hamper floodfight activities, and improving access for overall maintenance.

These criteria apply on the entire landside slope plus a 10-foot-wide easement beyond the landside toe. On the waterside, these criteria apply to vegetation on only the top 20 feet (slope length) of the levee slope. Trees within these areas must be trimmed up to 5 feet above the ground (12 feet above the crown road) and thinned enough for visibility and access. Brush, weeds, or other vegetation more than 12 inches high blocking visibility and access within these levee areas should be trimmed, thinned, mowed, burned, dragged, or otherwise removed in an allowed manner.

5.3.2 Enforcement

During the spring and fall inspection cycles, DWR identifies and documents inspection items as acceptable (A), minimally acceptable (M), or unacceptable (U) considering USACE inspection rating criteria.

The Board, in conjunction with DWR and LMAs, addresses deficient items, including the following:

- Critical items impacting the structural integrity of the levee
- Vegetation not in compliance with interim vegetation inspection criteria, or determined to critically weaken a levee and lower public safety
- Critical erosion issues
- Aggressive rodent control and repair of levee damage by rodents

- Encroachments affecting floodfighting activities or levee integrity

To ensure these inspection deficiencies are addressed, the Board, in conjunction with DWR, does the following:

- Notifies USACE of inspection findings
- Requires submittal of an LMA Corrective Action Plan consistent with the agency's O&M responsibility
- Identifies a time period required to correct deficiencies
- Sends notification letters to appropriate land use agencies indicating inspection status, maintenance history, and impacts on Public Law 84-99 eligibility through DWR's Flood Risk Notification Program

To enforce compliance regarding deficiencies, the State will rate items that are minimally acceptable as unacceptable (U) if they are not corrected within the time period in the notification, unless work is scheduled or in progress. This may lead to an overall rating of unacceptable (U), resulting in loss of Public Law 84-99 eligibility.

Maintenance areas (see Section 5.4.1) and LMAs with levees ranked unacceptable because of vegetation will be expected to remedy deficiencies. To remain eligible for the Public Law 84-99 program, DWR will expect issues to be addressed expeditiously, and in compliance with all appropriate environmental laws.

5.4 Maintenance

Maintenance of SPFC facilities is performed by the State and 81 different LMAs. USACE Regulation 33, CFR 208.10, separates responsibilities into two categories – levees and channels. In addition, the State and LMAs are responsible for satisfying all environmental and resource agency requirements or laws that apply during performance of maintenance activities.

5.4.1 Maintenance by the State

On the Sacramento River portion of the system, DWR maintains levees and roads in accordance with USACE O&M manuals for about 293 miles of levees under DWR jurisdiction. The State also maintains 14 project structures and all project channels for proper operation during floods. Channel maintenance can include erosion repairs and vegetation, debris,

and sediment removal for flow capacity. The State performs maintenance through its Sacramento and Sutter maintenance yards on a continual basis.

For the San Joaquin River portion of the system, the State generally has passed all maintenance responsibility to the LMAs. However, the State has performed some critical erosion repairs identified under the Governor's Executive Order S-01-06, which were funded through a legislative appropriation by Assembly Bill (AB) 142 (Nunez, 2006).

State Responsibility in Water Code 8361

CWC 8361 specifies the portions of the SRFCP with State responsibility for O&M:

8361. The department shall maintain and operate on behalf of the state the following units or portions of the works of the Sacramento River Flood Control Project, and the cost of maintenance and operation shall be defrayed by the state:

(a) The east levee of the Sutter Bypass north of Nelson Slough.

(b) The levees and channels of the Wadsworth Canal, Willow Slough Channel downstream from the Southern Pacific Railroad from Davis to Woodland except that portion of the north levee thereof lying within Reclamation District No. 2035, Putah Creek downstream from Winters, the intercepting canals draining into them, and all structures incidental thereto.

(c) The collecting canals, sumps, pumps, and structures of the drainage system of Project No. 6 east of the Sutter Bypass.

(d) The bypass channels of the Butte Slough Bypass, the Sutter Bypass, the Tisdale Bypass, the Yolo Bypass, and the Sacramento Bypass with all cuts, canals, bridges, dams, and other structures and improvements contained therein and in the borrow pits thereof.

(e) The levees of the Sacramento Bypass.

(f) The channels and overflow channels of the Sacramento River and its tributaries and the major and minor tributaries' flood control projects as authorized and defined in Sections 12648, 12648.1, and 12656.5.

(g) The Knights Landing ridge cut flowage area.

(h) The flood relief channels controlled by the Moulton and Colusa Weirs and the training levees thereof.

(i) The levee on the left bank of the Sacramento River adjoining Butte Basin, from the Butte Slough outfall gates upstream to a point four miles northerly from the Moulton Weir, after completion.

(j) All weirs and flood relief structures.

(k) The west levee of the Yolo Bypass, extending from the west end of the Fremont Weir southerly to the Cache Creek Settling Basin and from Willow Slough Channel to Putah Creek and the east levee of the Yolo Bypass from Fremont Weir southerly two miles.

(l) The levee on the west bank of Feather River extending a distance of about two miles southerly from the Sutter-Butte Canal headgate.

(m) The levees of Cache Creek and the easterly and westerly levees of Cache Creek Settling Basin; excepting the portion of the southerly levee of Cache Creek lying upstream from State Highway Route 7 (U.S. 99W).

(n) The flowage area of Western Pacific Intercepting Canal extending northerly for a distance of five miles from Bear River.

(o) The levees of Tisdale Bypass from Tisdale Weir 4.5 miles easterly to Sutter Bypass.

(p) The flood relief structures or weirs and other structures or facilities essential for their proper functioning in the vicinity of the Sacramento River between Big Chico Creek and the north boundary of Glenn County Levee District No. 3.

Channel Maintenance

DWR's channel maintenance responsibilities include monitoring channels to be certain that the banks of a channel are not being damaged by rain or wave wash, and that no sloughing of banks has occurred, and to make appropriate repairs. In addition, DWR is responsible for maintaining all project channels to control vegetation, sedimentation, fallen trees, and other debris affecting design capacity.

O&M Manual SAC165 is a supplement to the standard O&M Manual for the SRFCP. This O&M manual covers channel clearing for the waterway

that lies between the levees of the Sacramento River from Ord Ferry to Collinsville, the channels of the lower reaches of the Feather and American rivers, and all tributary and distributary streams included in the SPFC.

Maintenance Areas

When an LMA is not able to operate or maintain project levees permitted by the Board to acceptable standards, DWR or the Board is authorized to form a maintenance area and take responsibility for the levee when in the best interest of the State. CWC Section 12878 defines a maintenance area as:

"Maintenance area" means described or delineated lands that are found by the board or department to be benefited by the maintenance and operation of a particular unit of a project.

The procedure for forming a maintenance area is covered in CWC Sections 12878 through 12878.21. The flood benefit of this program is that it addresses sections of levee that are not being maintained through either (1) identifying another maintaining agency willing to accept the maintenance responsibility, or (2) turning over maintenance responsibilities to the State to be paid for by local beneficiaries. Ten maintenance areas (1, 3, 4, 5, 7, 9, 12, 13, 16, and 17) are currently active within the jurisdictional boundaries of the Board (see Figures 5-1 and 5-2). Based on their location, levees within these maintenance areas are maintained by either the Sacramento or Sutter maintenance yards.

5.4.2 Maintenance by Local Maintaining Agencies

Most levees in the SPFC are maintained by LMAs that fund maintenance activities through assessing landowners within their boundaries. These LMAs are composed primarily of levee districts and RDs. A variety of cities, counties, and other public agencies and municipalities also maintain project levees. In addition, DWR is the LMA for specific facilities defined in CWC Section 8361 and for specific maintenance areas (see Section 5.4.1). Maintaining agencies are shown in Figures 5-1 and 5-2, and listed in Table 5-1 along with the SPFC facilities they maintain.

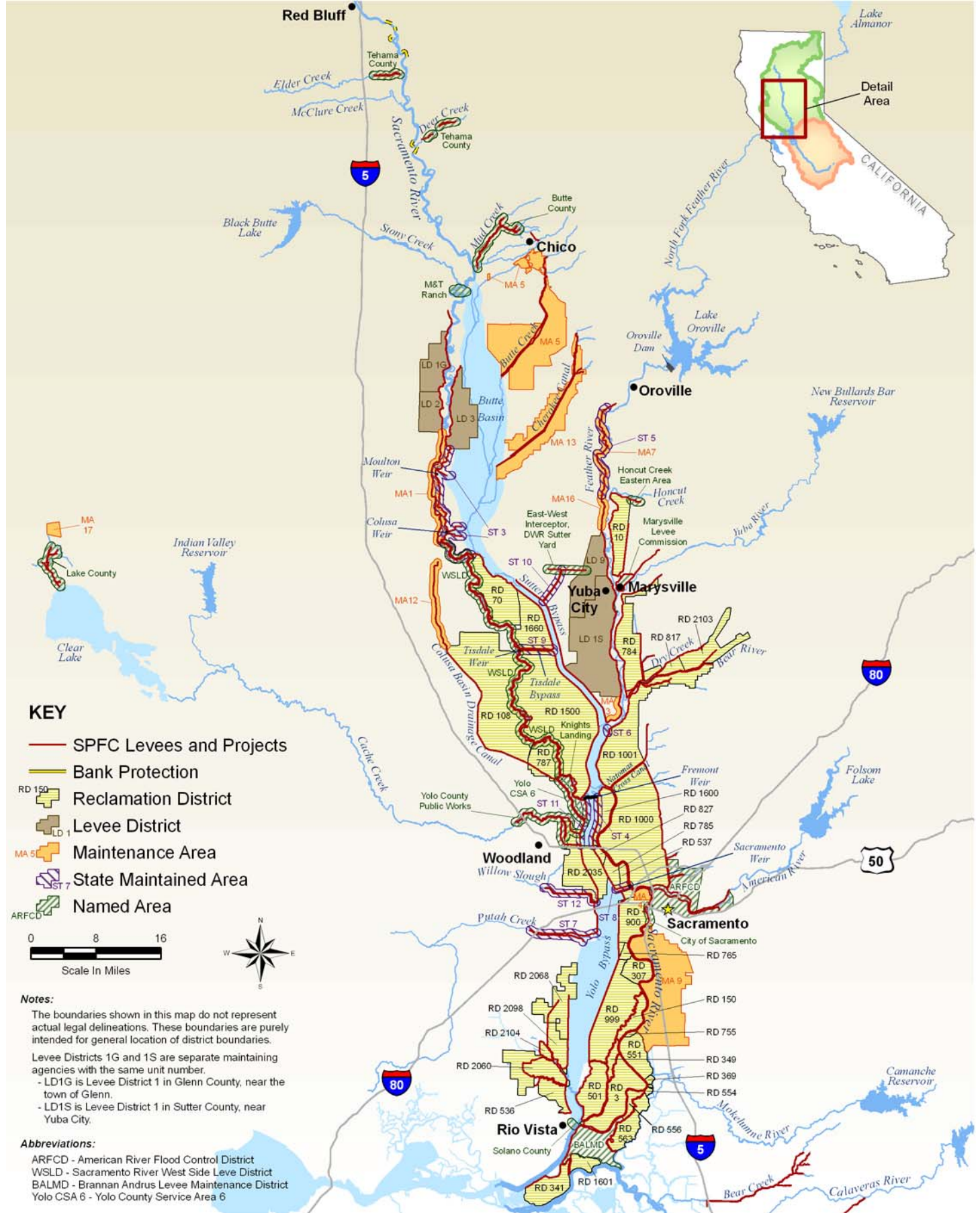


Figure 5-1. Locations of Local Maintaining Agencies within the Sacramento River Watershed

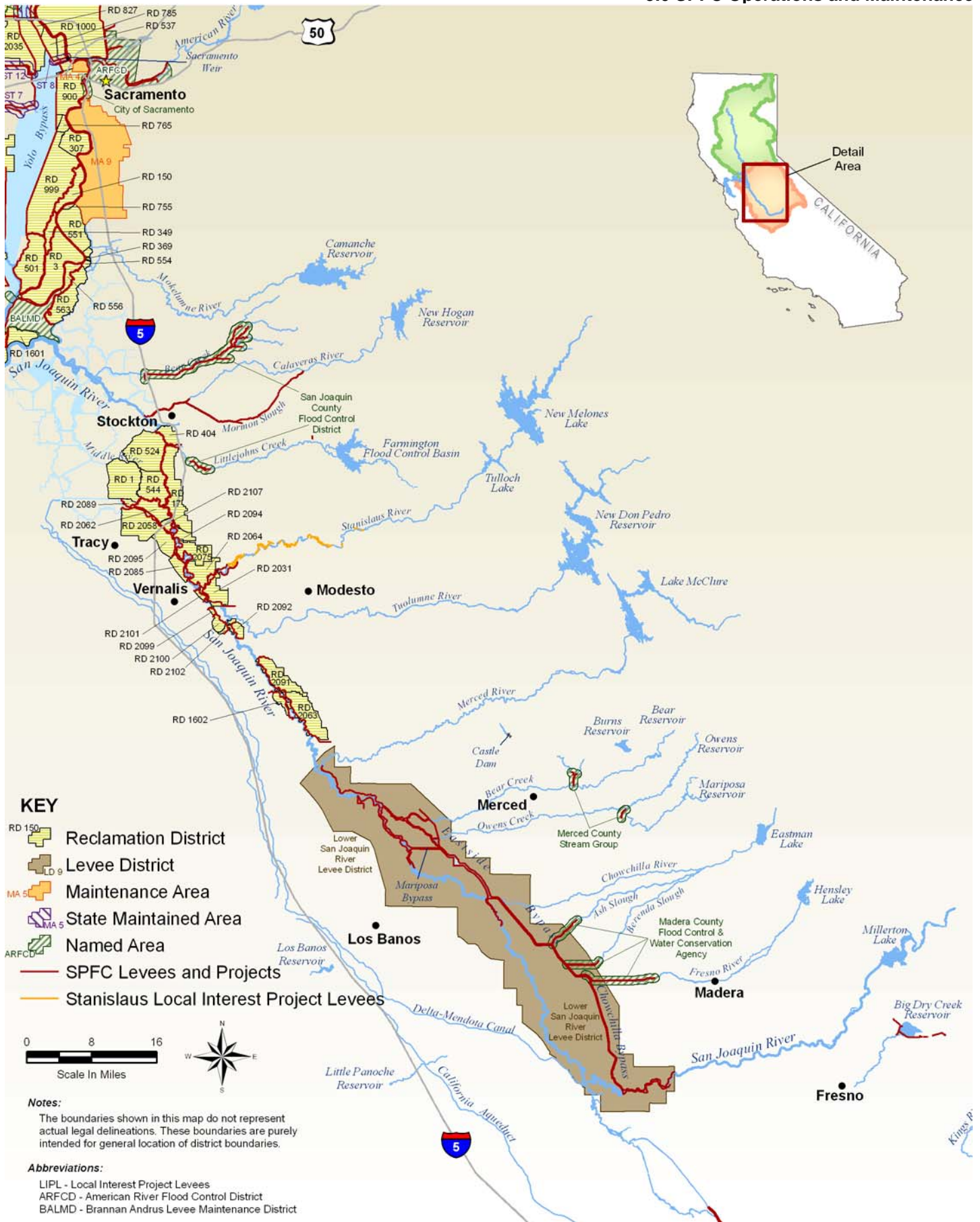


Figure 5-2. Locations of Local Maintaining Agencies within the San Joaquin River Watershed
 January 2010

Table 5-1. Local Maintaining Agencies for State Plan of Flood Control Facilities

State Plan of Flood Control Facility	Local Maintaining Agency
North Fork Feather River channel improvements, including a diversion structure, an excavated rock-lined diversion channel, seven drop structures, and levees	Plumas County Department of Public Works
Feather River right-bank levee, High ground to Yuba City	LD 9
Feather River right-bank levee, Yuba City to Sutter Bypass	LD 1 (Sutter County)
Feather River left-bank levee, Honcut Creek to Jack Slough	RD 10
Feather River left-bank levee, Yuba River to Bear River	RD 784
Sutter-Butte Canal Headgate	DWR
Honcut Creek left bank levee, upstream from Feather River confluence	RD 10
Back levee for RD 10, along Jack and Simmerly sloughs	RD 10
Ring levee around City of Marysville	Marysville Levee Commission
Yuba River right-bank levee, upstream from Marysville ring levee	Marysville Levee Commission
Yuba River left-bank levee, upstream from Feather River confluence	RD 784
Feather River left-bank levee	RD 784
Feather River right-bank levee	LD 1 (Sutter County)
Dry Creek left-bank levee, upstream from Bear River confluence	RD 817, RD 2103
Dry Creek right-bank levee, upstream from Bear River confluence	RD 784
Bear River right- and left-bank levees, upstream from Dry Creek confluence	RD 817
Yankee Slough right- and left-bank levee, upstream from Bear River confluence	RD 1001
WPRR Intercepting Channel right bank levee	RD 784
Bear River right-bank levee, downstream from Dry Creek confluence	RD 784
Bear River left-bank levee, downstream from Dry Creek confluence	RD 1001
Feather River right-bank levee from Bear River to Sutter Bypass	LD 1 (Sutter County)
Feather River left-bank levee from Bear River to Sutter Bypass	RD 1001
Nelson Bend/Rock weir on Feather River at Sutter Bypass	DWR – Sutter Yard
Feather River/Sutter Bypass right-bank levee, upstream from Sacramento River confluence	RD 1500
Feather River/Sutter Bypass left-bank levee, upstream from Sacramento River confluence	RD 1001
American River right-bank levee, upstream from Natomas East Main Drainage Canal	American River Flood Control District

Table 5-1. Local Maintaining Agencies for State Plan of Flood Control Facilities (Contd.)

State Plan of Flood Control Facility	Local Maintaining Agency
Vegetation mitigating, five sites between H Street and Watt Avenue	American River Flood Control District
Pumps along American River at H Street and Watt Avenue	County of Sacramento
American River left-bank levee, upstream from Natomas East Main Drainage Canal	American River Flood Control District
Natomas East Main Drainage Canal right-bank levee at Sankey Road	American River Flood Control District
Linda Creek left-bank levee, upstream from Natomas East Main Drainage Canal	American River Flood Control District
Magpie Creek diversion channel	American River Flood Control District
Natomas East Main Drainage Canal right- and left-bank levees, from Arcade Creek to American River	American River Flood Control District
Arcade Creek right- and left-bank levees, upstream from Natomas East Main Drainage Canal	American River Flood Control District
American River right-bank levee, from Natomas East Drainage Canal to Sacramento River	RD 1000
Lower Butte Creek channel improvements and Howard Slough diversion structure	TBD
Butte Slough Outfall Gates	DWR – Sutter Yard
Right-bank levee from Butte Slough Outfall Gates to Sutter Bypass	RD 70
Sutter Bypass pumps and right- and left-bank levees from Highway 20 to Wadsworth Canal	DWR – Sutter Yard, RD 70, RD 1660
Sutter Bypass right-bank levee from Wadsworth Canal to Tisdale Bypass	RD 1660
Sutter Bypass right-bank levee downstream from Tisdale Bypass to Feather River confluence	RD 1500
Feather River/Sutter Bypass right-bank levee, upstream from Sacramento River confluence	RD 1500
Feather River/Sutter Bypass left-bank levee, upstream from Sacramento River confluence	RD 1001
Colusa Basin Drain left-bank levee	RD 108
Knights Landing Outfall Gates	RD 108
Knights Landing Ridge cut channel and right- and left-bank levees	Knights Landing Ridge Drainage District
Middle Creek and Tributaries Project	Lake County Watershed Protection District
Willow Slough diversion weir, right- and left-bank levees to confluence with Yolo Bypass	DWR – Sac Yard

Table 5-1. Local Maintaining Agencies for State Plan of Flood Control Facilities (Contd.)

State Plan of Flood Control Facility	Local Maintaining Agency
South Fork Putah Creek Preserve Restoration	TBD
Yolo Bypass right-bank levee from Fremont Weir to Knights Landing Ridge Cut	TBD
Yolo Bypass left-bank levee from Knights Landing Ridge Cut to Cache Creek Settling Basin	RD 1600
Yolo Bypass right-bank levee from Cache Creek to Sacramento Bypass	RD 2035
Yolo Bypass left-bank levee from Cache Creek to Sacramento Bypass	RD 785, RD 827, RD 2035
Yolo Bypass right-bank levee from Sacramento Bypass to Putah Creek	RD 2068 to RD 536, RD 2060
Yolo Basin Wetlands	TBD
Yolo Bypass right-bank levee from Putah Creek to Sacramento River	RD 536, RD 2060
Yolo Bypass left-bank levee from Putah Creek to Sacramento River	RD 501, RD 999
Ash Creek and Dry Creek channel clearing	Adin Community Services District
Salt Creek channel clearing, upstream from Sacramento River confluence	Tehama County Flood Control and Water Conservation District
Elder Creek channel clearing and left-bank levee upstream from Sacramento River confluence	Tehama County Flood Control and Water Conservation District
McClure Creek channel clearing near Highway 99	Tehama County Flood Control and Water Conservation District
Deer Creek channel clearing and right and left-bank levees upstream from Delany Slough to Sacramento River	Tehama County
Big Chico/Sandy Gulch (Lindo Channel) left-bank levee and Big Chico Creek Gates, Lindo Channel Gates, and Sycamore weir diversion structures	Butte County Public Works
Big Chico/Sandy Gulch (Lindo Channel) channel maintenance	Butte County Public Works
Sycamore, Sheep Hollow and Mud Creeks right- and left-bank levees	Butte County Public Works
Sacramento River right-bank levee from Ord Ferry to Moulton Weir	LD 1 (Glen County), LD 2
Sacramento River left-bank levee from Ord Ferry to Moulton Weir	LD 3
Sacramento River left-bank levee from Moulton Weir to Colusa Weir	LD 3
Sacramento River left-bank levee from Colusa Weir to Tisdale Weir	RD 70, RD 1660

Table 5-1. Local Maintaining Agencies for State Plan of Flood Control Facilities (Contd.)

State Plan of Flood Control Facility	Local Maintaining Agency
Sacramento River right-bank levee from Fremont Weir to Sacramento Weir	RD 1600, RD 827
Sacramento River left-bank levee from Fremont Weir to Sacramento Weir	RD 1000
East Side Canal and Natomas Cross Canal right-bank levee	RD 1001
Pleasant Grove Canal and Natomas Cross Canal left-bank levee	RD 1000
Sacramento River left-bank levee from Sacramento Weir to American River confluence	RD 537
Sacramento River right-bank levee from American River to Elk Slough	MA 4, RD 307, RD 537, RD 900, RD 765, RD 999
Sacramento River left-bank levee from American River to Elk Slough	American River Flood Control District, MA 9
Sacramento River right-bank levee from Elk Slough to Collinsville	RD 3, RD 150, RD 349
Sacramento River left-bank levee from Elk Slough to Collinsville	RD 369, RD 407, RD 551, RD 554, RD 556, RD 755, Brannan Andrus Levee District
Elk Slough right- and left-bank levees	RD 150, RD 999
Sutter Slough right- and left-bank levees	RD 349, RD 999
Miner Slough right- and left-bank levees	RD 501, RD 999
Steamboat Slough right- and left-bank levees	RD 3, RD 349, RD 501
Georgiana Slough right- and left-bank levees	RD 556, RD 563, Brannan Andrus Levee District
Three Mile Slough right- and left-bank levees	RD 341, RD 1601
Chowchilla and Eastside Bypass right- and left-bank levees	Lower San Joaquin Levee District
Castle Dam	Merced Irrigation District

Key:

LD = levee district

RD = reclamation district

TBD = to be determined

WPRR = Western Pacific Railroad

Sixty LMAs perform maintenance for the SRFCP. Twenty-nine LMAs perform maintenance for the SPFC in the San Joaquin River Basin. AB 156 (Laird, 2007), Local Agency Annual Report 2008 (DWR, 2008a), provides maps and available reports for each entity (see reference DVD).

LMA Responsibility in California Water Code 8370

The LMAs are responsible for maintaining facilities not included in the section on State responsibility in CWC 8361. CWC 8370 specifies responsibilities of the LMAs:

8370. It is the responsibility, liability and duty of the reclamation districts, levee districts, protection districts, drainage districts, municipalities, and other public agencies within the Sacramento River Flood Control Project limits, to maintain and operate the works of the project within the boundaries or jurisdiction of such agencies, excepting only those works enumerated in Section 8361 and those for which provision for maintenance and operation is made by Federal law.

Local Reporting Requirements

An example of the evolving nature of the SPFC is the additions to the CWC resulting from the adoption of AB 156 (Laird, 2007), Flood Control. AB 156 was enacted during the 2007-2008 legislative session. Additions to the CWC include requirements for LMAs to submit to DWR, by September 30 of each year, specific information relative to the project levees they operate and maintain. In turn, DWR is required to summarize this information in an annual report to the Board by December 30 of each year.

Required information includes the following:

- Information known to the LMA that is relevant to the condition or performance of a project levee.
- Information identifying known conditions that might impair or compromise the level of flood protection provided by a project levee.
- Summary of maintenance performed by the LMA during the previous fiscal year.
- Statement of work and estimated cost for O&M of a project levee for the current fiscal year.
- Any other readily available information contained in records of the LMA relevant to the condition or performance of a project levee.

5.5 Operations

The standard O&M manuals and unit-specific O&M manuals specify necessary operations during high water. In most cases for levees, the operation is limited to patrolling at specified river stages and floodfighting, as necessary. Other facilities, such as pumping plants, control structures, and the Sacramento Weir, require more active operations.

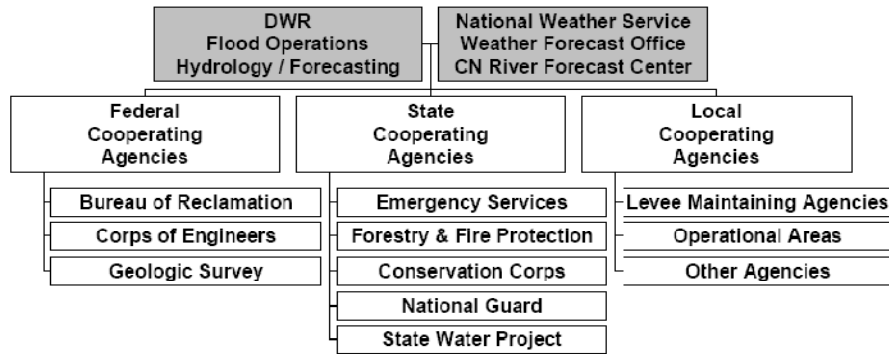
5.5.1 Stream Gages

Gages for stream stage and flow are essential to successful operation of SPFC facilities. Most unit-specific O&M manuals include specific stream gages (called hydrographic facilities in most manuals). The condition or existence of these gages may have changed over time, evolving to the set of stream gages, precipitation stations, snow accumulation stations, and other tools used by the State-federal Flood Operations Center (FOC) (see Section 5.5.2) during flood operations. These tools and historical records can be found on the California Data Exchange Center (CDEC) Web site: <http://cdec.water.ca.gov/>. These represent base data that may be revised after analysis. Data for DWR-maintained gages can be found on DWR's Water Data Library Web site: <http://www.water.ca.gov/waterdatalibrary/> and data for U.S. Geological Survey (USGS)-maintained gages can be found on the USGS Web site: <http://waterdata.usgs.gov/ca/nwis/rt>.

5.5.2 State-Federal Flood Operations Center

The FOC, located in Sacramento, California, is a component of the Flood Operations Branch of DWR's Division of Flood Management. While not specifically for the SPFC, actions of the FOC are essential for SPFC operations.

As major storm systems approach California, forecasters from the National Weather Service (NWS) and DWR forecast the location, amount, and timing of expected precipitation, make river forecasts, and prepare emergency notifications. In addition to the NWS, many agencies cooperate with DWR during flood emergencies and some send representatives to work at the FOC. Figure 5-3 provides an overview of local, State, and federal cooperating agencies with co-located agencies depicted by shaded boxes.



Key:
 CN = California-Nevada
 DWR = California Department of Water Resources

Figure 5-3. Cooperating Agencies in State-Federal Flood Operations Center

5.5.3 High-Water Levee Patrols

Each unit-specific O&M manual provides information on required high-water patrols, generally keyed to water stages at stream gages. These patrols are performed by LMAs beginning at river stages specified in the unit-specific O&M manuals.

5.5.4 Flood Fights

Each of the standard O&M manuals contains methods for combating floods.

5.5.5 Facilities Requiring Active Operations

The following SPFC facilities require active operation by DWR or local agencies. The procedures for operation are included in the unit-specific O&M manuals.

Pumping Plants

The following SPFC pumping plants require active operation:

- Two pumping plants along the American River (see O&M Manual SAC518)
- Magpie Creek
- Three pumping plants along the Sutter Bypass (see O&M Manual SAC159)
- Pumping plant along the lower San Joaquin River between the Merced and Tuolumne rivers (see O&M Manual SJR6A)

- Pumping plant along the lower San Joaquin River between Paradise Cut and Old River (see O&M Manual SJR3A)
- Three pumping plants along the Mormon Slough Diversion Channel (see O&M Manual SJR611.2)

Weirs

Two SPFC weirs require operation to release flow:

- Howard Slough Diversion (see O&M Manual 153)
- Sacramento Weir (see O&M Manual 158)

Dams

Two SPFC dams control flow in the system:

- Oroville Dam on the Feather River (see Oroville Dam and Reservoir Report on Reservoir Regulation for Flood Control, Appendix IV, dated August 1970)
- Castle Creek Dam (see O&M Manual SJR607A)

Control Structures

Several SPFC water control structures require active manual operation:

- Sutter-Butte Canal Headgate (see O&M Manual SAC160)
- Butte Slough Outfall Gates (see O&M Manual SAC161)
- Knights Landing Outfall Gates (see O&M Manual SAC162)
- Lindo Channel and Big Chico Creek diversion gates (see O&M Manual SAC504)
- Chowchilla Bypass Control Structure (see O&M Manual SJR601B)
- San Joaquin River Control Structure (see O&M Manual SJR601B)
- Mariposa Bypass Control Structure (see O&M Manual SJR601A)
- Eastside Bypass Control Structure (see O&M Manual SJR601A)
- San Joaquin River Control Structure (see O&M Manual SJR601)

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6.0 SPFC Conditions

By providing assurances of cooperation to the federal government, the State has agreed to abide by the conditions, or terms, set forth in various federal documents.

6.1 Summary

Conditions that accompany a flood management project are generally in place before project development, but also continue to assure the safe O&M of project facilities in the long term. These conditions include assurances provided by State and local sponsors, federal flood control regulations, provisions of the standard and unit-specific O&M manuals, flood profiles that influence channel maintenance, and project cooperation agreements.

6.2 Assurances

State assurances to the federal government are a condition for federal participation in a flood management project. As mentioned in Section 1.3, at a minimum, the assurances include that the State provide without cost to the United States, all lands, easements, and rights-of-way necessary for completion of the project; bear the expense of necessary highway, railroad, and bridge alterations; hold and save the United States free from claims for damages resulting from construction of the works; and operate and maintain all works, after completion. Depending on when a facility was authorized (Congressional authorization) and constructed, there could be additional assurances.

Similarly, local project sponsors provide assurances to the State.

6.3 Federal Flood Control Regulations

Nonfederal sponsors abiding by the federal flood control regulations are a condition for federal projects. Federal flood control regulations are contained in 33 CFR Section 208. Federal requirements for O&M are contained in 33 CFR Section 208.10. The regulations apply to both State and LMA O&M of SPFC facilities.

6.4 Standard O&M Manuals

As mentioned in Section 5.2.1, the standard O&M manuals present requirements that apply to all maintaining agencies that operate and maintain the various geographical SPFC units. Fulfilling the requirements outlined in the standard O&M manuals is a condition for federal projects.

6.5 Unit-Specific O&M Manuals

As mentioned in Section 5.2.2, unit-specific O&M manuals supplement information included in the standard O&M manuals with O&M requirements applicable to each unit. Fulfilling the requirements outlined in the unit-specific O&M manuals is a condition for federal projects.

6.6 Design Profiles

USACE has prepared water elevation profiles based on design flows for both the Sacramento River and the San Joaquin River portions of the flood management system. Flood system improvements that have occurred subsequent to the 1950s are not reflected in the design profiles discussed below. The State operates SPFC facilities based on the 1957 and 1955 profiles rather than on design flows from the O&M manuals. The profiles are on the reference DVD included in this document or can be viewed on the Board Web site at <http://recbd.ca.gov/profiles/index.cfm>.

The Board uses designated floodways (see Section 2.4.3) as a management tool for passage of design flows shown by the 1957 and 1955 profiles described below.

It should be noted that the USACE now uses uncertainty analyses that no longer uses a single flow value for a river reach. This may require revisions to how the following flow profiles are used in the future.

6.6.1 1957 Profile

For the Sacramento River and tributaries, USACE requires that the channels pass the design flows at stages at or below the 1957 design profile. The reference DVD contains 1969 and 2006 letters from USACE to the Board with this directive (USACE, 1969 and 2006). The 1957 profile is shown in the *Sacramento River Flood Control Project, California, Levee and Channel Profiles* (USACE, 1957a) (re-created 2006). The profiles are contained on four sheets identified as File No. 50-10-3334. The profiles include the design flows at various locations throughout the system, and are listed in Table 3-1.

The profiles for the Middle Creek Project are shown in *Cache Creek Basin California, Middle Creek Project, Stream Profiles* (USACE, 1957b) on one sheet, File No. CC-4-20-16 (re-created 2006).

6.6.2 1955 Profile

For the San Joaquin River and tributaries, USACE requires that the channels pass the design flows at stages at or below the 1955 design profile. The 1955 profile for the Merced River and downstream is shown in the *San Joaquin River and Tributaries Project, California, Levee Profiles* (USACE, 1955). The profiles are contained on one sheet identified as Sheet SJ-20-60. The profiles do not include the design flows. Table 3-2 includes design capacities listed in the unit-specific O&M manuals.

The profiles for the Mormon Slough Project are shown on *Mormon Slough Project, San Joaquin County, Plan of Improvement, Profile and Flood Plane* on six sheets (USACE, 1965), File No. 3-20-142 (re-created 2006).

6.7 Project Cooperation Agreements

Project cooperation agreements specify other conditions that must be met by parties to the agreements. These project cooperation agreements have evolved over time, and are especially important before a new project is started.

6.7.1 Federal/State Project Cooperation Agreement

The project cooperation agreement between the Department of the Army and the State of California (The Reclamation Board or Central Valley Flood Protection Board, depending on the date of the agreement) is a contract for project development. While these vary by time and project, a project cooperation agreement contains specific contract provisions. Examples include the following:

- Obligations of both parties, including cost sharing amounts
- Compliance requirements for lands
- Project coordination
- Method of payment
- Dispute resolution
- Requirement for nonfederal operation, maintenance, repair, replacement, and rehabilitation

- Indemnification of the federal government
- Other contract terms

Upon completion of a project, USACE transfers the project to the State through a letter. The State sends USACE a letter that may accept the project as constructed or accept a portion of the project while other portions are completed.

6.7.2 State/Local Project Cooperation Agreement

The project cooperation agreement between the State of California (The Reclamation Board or Central Valley Flood Protection Board, depending on the date of the agreement) and the local sponsor is a contract for project development. Among many provisions, the agreement outlines specific conditions for the local sponsor to fulfill such as cost share, O&M, State hold harmless, and other conditions. Recent agreements have included requirements to participate in federal floodplain management and flood insurance programs, publicize floodplain information, and for the local sponsor to pay the total cost of betterments requested by the local sponsor.

After the State sends a letter of acceptance to USACE, the State sends a letter to the local sponsor transferring project responsibility for O&M, repair, replacement, and rehabilitation of project facilities and related features.

6.8 State-Adopted Conditions

Successful operation of the SPFC requires many other conditions that do not meet the strict definition of the SPFC provided by the Legislature (see Section 1.1). One of the most important conditions for operation of the SPFC is that the upstream reservoirs operate in compliance with the flood storage rules established by USACE. Except for Oroville Dam (see Section 3.2.1) and Castle Dam (see Section 3.3.1), the State has no direct responsibility for operation or maintenance for flood control reservoirs that regulate flow to the SPFC – federal agencies and local agencies are responsible for their operation. Similarly, the State has no direct operational responsibility for many of the other non-SPFC facilities. The State has, however, adopted two important conditions that it believes are essential to success of the SPFC, namely its designated floodway program and regulation of overflow to the Butte Basin.

6.8.1 Designated Floodway Program

The Board considers its Designated Floodway Program (see Section 2.4.3) as a condition for successful operation of the SPFC. Where implemented, the program is important and necessary in helping to limit further development into the active floodways. The program is also considered necessary to help provide for the passage of project design flows (see Section 6.6) along many reaches of the SPFC system. As mentioned, Figure 2-3 shows the location of designated floodways within the Sacramento and San Joaquin river basins. Maps of designated floodways by county can also be found at the Board's Web site: <http://recbd.ca.gov/maps/index.cfm>.

6.8.2 Regulation of Overflow to Butte Basin

The Butte Basin has historically served as one of the natural overflow areas for the Sacramento River. Based on USACE design of the SRFCP levees downstream from Ord Ferry, Sacramento River overflow to the Butte Basin is an important condition (see Section 3.2.5) to maintain the effectiveness of the project. The USACE-designed levees downstream from Ord Ferry to carry 160,000 cfs, while the design capacity of the Sacramento River, just 10 miles upstream, is 260,000 cfs – an obvious reduction in flow capacity that requires outflow from the river.

In 1960, the USACE notified the Board about unauthorized private levees that were obstructing flow into the Butte Basin. The USACE advised the Board that if the Board did not take action to alleviate the hazardous conditions by removing the unauthorized private levees, the USACE would advise Congress that the State was not fulfilling its obligations (Resources Agency, 1964). The USACE suggested that such action may bring federal enforcement and endanger all flood control appropriations for California. This notification by USACE suggests that the USACE believed that maintenance of the flow capacity of the overflow area was necessary for the State to fulfill its assurances to the federal government to operate and maintain the SRFCP.

The State prepared the Master Plan for Flood Control in the Butte Basin (Resources Agency, 1964), ordered the unauthorized private levees to be degraded, and included regulation of overflow to the Butte Basin in 23 CCR (see <http://recbd.ca.gov/regulations/CCRTitle23WatersDiv1.pdf>). The standards for the Butte Basin are contained in Section 135, Division 1, 23 CCR. In general, these standards require approval from the Board for any encroachment that could reduce or impede flood flows, or would reclaim any of the floodplain within the Butte Basin.

The Board has flowage easements over all flooded areas in the Butte Basin. The Board considers the regulation of flow to the Butte Basin as a condition for successful operation of the SPFC.

7.0 Programs and Plans Related to the SPFC

To complete the description of the SPFC, a presentation of its related programs and plans is necessary. These programs and plans also include the responsible oversight and management of the flood system. As additional programs and plans related to the SPFC are developed in the future, information will be incorporated into updates to the FCSSR as necessary, and not in updates to this document.

7.1 Summary

Program and plans for the SPFC are both historical and ongoing. Historical documents include the authorizing federal legislation, as-constructed documents, and O&M manuals. DWR, the Board, and USACE are the main partners in SPFC oversight and management. Ongoing and future programs to improve flood management include the FloodSAFE California (FloodSAFE) initiative, the California Levee Roundtable, the FCSSR, CVFPP, and California Water Plan. In addition, regional entities are working on plans to improve local portions of the SPFC.

7.2 State Oversight and Management of SPFC

The Board is the State agency responsible for the State-federal flood management project in the SPFC Planning Area. DWR serves as the primary technical resource to the CVFPP through DWR's Division of Flood Management. Other State agencies assist the Board and DWR.

7.2.1 Central Valley Flood Protection Board

Following is the mission of the Board²:

- To control flooding along the Sacramento and San Joaquin rivers and their tributaries in cooperation with USACE.

² The Central Valley Flood Protection Board was formerly known as The Reclamation Board. Correspondence, O&M manuals, and other documents prepared before mid-2007 are cited as from The Reclamation Board.

- To cooperate with various agencies of local, State, and federal governments in establishing, planning, constructing, operating, and maintaining flood control works.
- To maintain the integrity of the existing flood control system and designated floodways through the Board's regulatory authority by issuing permits for encroachments.

The Board requires permits for any project that may affect how the existing flood system functions. A permit is required for any project or plan of work that meets the following criteria:

- Is within federal flood control project levees and within a Board easement.
- May have an effect on the flood control functions of project levees.
- Is within a Board-designated floodway.
- Is within regulated Central Valley streams listed in Table 8.1, Title 23, CCR.

These projects include any project that proposes to work in a regulated stream, designated floodway on federal flood management project levee slopes, within 10 feet of a levee toe, or in a location that may have an effect on the flood control facilities. Examples of activities might include, but are not limited to, boat docks, ramps, bridges, sand and gravel mining, placement of fill, fences, and landscaping and irrigation facilities. Streams regulated by the Board are listed in Table 8.1, Title 23, CCR.

With this responsibility, the Board issues encroachment permits when encroachment will not affect O&M of the flood management system. The Board also approves or adopts the flood-related technical work prepared by DWR or other agencies.

7.2.2 Department of Water Resources

DWR's Division of Flood Management provides technical support to the Board and is responsible for most of the work related to the flood management system. Other DWR divisions, such as the Division of Engineering, provide technical support. Examples of work performed by the Division of Flood Management include the following:

- Developed and maintain the CLD
- Emergency preparedness, response, and recovery planning and action

- O&M, including inspections
- Floodplain management, planning, and delineation
- Flood project funding and grants
- Evaluation and engineering for flood project improvements
- Systemwide planning and analysis

DWR's FloodSAFE initiative will guide improvements of the flood management system in the Sacramento and San Joaquin valleys over the next 20-plus years.

7.2.3 California Department of Fish and Game

The California Department of Fish and Game (DFG) assists DWR in its environmental stewardship responsibilities, including the following:

- Providing input on mitigation strategies, including banking opportunities and possible partnerships
- Identifying specific habitat and species restoration and enhancement opportunities
- Providing input on modeling for impact assessment
- Providing input on and reviewing environmental documentation under the California Environmental Quality Act (CEQA)
- Permitting under California Endangered Species Act and DFG Code 1600 for implementation of FloodSAFE projects

7.2.4 Other Assisting State Agencies

Several other State agencies assist the Board and DWR in their management and oversight of the SPFC:

- The California Emergency Management Agency (CALEMA)
- California Building Standards Commission

7.3 Federal Oversight and Management of SPFC

Federal agencies are partners with State agencies in oversight and management of the SPFC.

7.3.1 U.S. Army Corps of Engineers

USACE is the nation’s flood control agency. The USACE Sacramento District is the district directly involved with the SPFC and in assisting DWR with studies, analyses, and overall project implementation. USACE

Public Law 84-99 Rehabilitation Assistance of Flood Control Works

Federal and nonfederal flood control works in the Rehabilitation and Inspection Program (RIP) damaged by floods may be repaired at up to 100% federal cost for federal projects. For nonfederal projects, the repairs are cost shared at 80% federal and 20% nonfederal sponsor. To be eligible for these repairs, the projects must be in “Active” status and the assistance is limited to restoration of pre-disaster condition and level of protection. Any deferred maintenance is the responsibility of the sponsor. The intent of the program is to ensure that damaged flood control works are operationally effective before the next flood season. See ER 500-1-1 and EP 500-1-1 for details.

Eligible projects must have an overall system rating of Acceptable or Minimally Acceptable. A Minimally Acceptable project must have deficiencies corrected within 2 years. An Unacceptable system is inactive in the RIP, and the status will remain inactive until the sponsor submits proof that all items rated Unacceptable have been corrected. Inactive systems are ineligible for rehabilitation assistance.

has prepared O&M manuals that guide O&M of the various SPFC units.

Part of the assurances that the State provided to the federal government is that the State will maintain and operate all works after completion in accordance with regulations prescribed by the Secretary of the Army. Title 33 CFR, Chapter II Corps of Engineers, Part 208, prescribes flood control regulations that the SPFC must follow. In addition, USACE headquarters in Washington, D.C., prepares, and periodically updates, policies, standards, and guidance documents on special flood-related subjects.

The State inspects levees maintained by many separate local agencies, and then reports findings of the inspections to USACE, which performs quality assurance (QA) work. From the inspection information submitted, USACE may choose to conduct follow-up inspections in certain areas. USACE uses its own follow-up inspections and the State’s inspection findings to make Public Law 84-99 eligibility determinations for each local agency.

USACE provides the following other assistance:

- Assists in statewide and regional planning efforts
- Cooperates in project development, including providing authorized federal cost-sharing, crediting, and reimbursement
- Applies existing federal programs such as the Sacramento River Bank Protection and Public Law 84-99 programs
- Inspects and coordinates inspection of completed works and rehabilitation to ensure compliance with regulations and O&M manual requirements to maintain active status for Public Law 84-99

- Regulates projects with regard to Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act
- Reviews and, as necessary, modifies reservoir water control manuals for improved flood management, including consideration of climate change
- Certifies levees that meet design criteria and assists in levee certification process
- Maintains current O&M manuals for each construction unit of the project

7.3.2 Federal Emergency Management Agency

The Federal Emergency Management Agency (FEMA) assists DWR with floodplain issues in the following ways:

- Produces digital flood hazard data, provides access to flood hazard data and maps via the Internet, and Map Modernization Program. DWR is a FEMA Cooperating Technical Partner for floodplain mapping.
- Continues partnership with DWR to provide accurate flood hazard maps, develops and maintains a GIS database of California levees and flood management structures, provides technical outreach to communities and citizens on floodplain management issues, and supports the National Flood Insurance Program (NFIP).
- Provides other services, including levee accreditation.

7.3.3 National Weather Service

NWS and the River Forecast Center work with DWR on technical studies, flood forecasting and warning, and related activities. NWS is a co-lead agency with DWR in the FOC.

7.3.4 Other Assisting Federal Agencies

Several other federal agencies assist the Board and DWR in their management and oversight of the SPFC:

- U.S. Department of the Interior, Bureau of Reclamation
- U.S. Fish and Wildlife Service (USFWS)
- National Marine Fisheries Service (NMFS)

7.4 Authorizing Legislation

The authorizing federal legislation and supporting the USACE Chief of Engineers reports for each of the projects in the SPFC are summarized in Section 2.2.

7.5 As-Constructed Drawings

As-constructed drawings are on file with USACE Sacramento District for each unit of the SPFC, but some O&M manuals include as-constructed drawings. In general, these are large-sized drawings that are physically detached from the O&M manuals. These include original drawings prepared when a unit was accepted into the project and modifications, repairs, and other changes made since originally constructed. The drawings often include profiles along the project reach. The State has collected copies of the as-constructed drawings for preparation of electronic copies for its records.

In many cases within the SRFCP, levees and other facilities were originally constructed by local interests before a federally authorized project. In some cases, facilities met or exceeded project standards and were made part of the project by USACE without modification. In other cases, USACE repaired, enlarged, or otherwise modified these existing facilities to bring them to project standards, or USACE constructed new facilities.

8.0 SPFC Updates

This SPFC Descriptive Document is intended to describe what the SPFC is at a given time, and is not a plan for future modifications. However, as the ongoing FloodSAFE initiative makes changes in the SPFC, updates to this SPFC Descriptive Document will be necessary. DWR will prepare future updates when requested by the Board.

8.1 Summary

No specific schedule has been set for preparing updates to this SPFC Descriptive Document. However, several ongoing activities will likely lead to making improvements to existing SPFC facilities, adding new facilities to the SPFC, and potentially physically, or in name, removing existing facilities from the SPFC.

FloodSAFE is DWR's overall initiative for integrated flood management throughout California. The FloodSAFE Implementation Plan describes the work that needs to be accomplished to make flood system improvements (DWR, 2009b). The SPFC is a major focus of this work.

DWR's management works closely with managers from other local, State, and federal agencies. The California Levees Roundtable (Roundtable) provides a venue for agencies to cooperatively address the multiagency issues facing the flood management system.

FCSSR provides information on physical deficiencies and recommendations for improving performance of the flood management system, including the SPFC, in the Sacramento and San Joaquin valleys.

The CVFPP, which will cover the entire flood system including the SPFC, will be a sustainable, integrated flood management plan describing existing flood risk in the Central Valley, and will recommend actions to reduce the probability and consequences of flooding. The CVFPP will rely on information from the FCSSR and from ongoing evaluations. The first issue of the CVFPP is due in 2012, with updates every 5 years.

8.2 FloodSAFE Implementation Plan

FloodSAFE, a statewide multifaceted initiative to improve public safety through integrated flood management, builds on the State's ongoing flood management work.

8.2.1 FloodSAFE Definition

FloodSAFE is an initiative to improve integrated flood management in California through a systemwide approach, while reducing flood risk at the local and regional level. Flood management improvements will, therefore, be achieved through three processes:

1. Improve basic flood management functions, including flood emergency response, O&M of flood management facilities, management of floodplains, repair of erosion sites, and implementation of local projects.
2. Implement regional projects to reduce flood risks including "early implementation projects" and implementation of USACE projects.
3. Implement a systemwide approach in which broad system evaluation is conducted (i.e., map floodplains and evaluate levee conditions throughout the system) to determine flood system deficiencies and define feasible projects/programs to remedy system deficiencies by developing a comprehensive systemwide flood protection plan for the Central Valley (i.e., CVFPP).

8.2.2 Implementation Plan

The FloodSAFE Implementation Plan (DWR, 2009b) defines authorities, responsibilities, timelines, budgets, priorities, and expected outcomes of flood management programs as they are currently known. The implementation plan was prepared at a strategic level of detail to describe the overall objectives of the FloodSAFE initiative and how the work will be accomplished in seven functional areas to achieve these objectives. The seven functional areas describe the type of work being done, rather than organizational structure within the Division of Flood Management.

The implementation plan focuses on flood management work required over approximately the next 5 years, but also provides long-term direction to 2025 and beyond. Much of this work is directly related to improving the SPFC. The seven functional areas are as follows:

1. Emergency response.
2. O&M.

3. Floodplain risk management.
4. Flood protection projects and project grants.
5. Evaluation and engineering.
6. System flood management planning.
7. Legislation, budget, and communication.

8.3 California Levees Roundtable

The Roundtable was created through an effort by officials at the Board following the successful Levee Vegetation Science Conference organized by SAFCA, DWR, and USACE in August 2007. The Roundtable is composed of senior-level officials representing USACE from Headquarters, the South Pacific Division, and the Sacramento District; the Board, DWR, NMFS, USFWS, DFG, RD 2068, and SAFCA. The Roundtable agencies worked together to prepare a short-term framework, the California's Central Valley Flood System Improvement Framework (California Levees Roundtable, 2009), for flood system improvements that are already underway or will be initiated before a comprehensive plan is ready in 2012. The report was adopted by the Board.

The Roundtable continues to meet at the management level to cooperatively address the multiagency issues facing the flood management system.

8.4 Flood Control System Status Report

In 2007, the State Legislature authorized DWR, in Section 9120 of the CWC, to prepare a FCSSR for the SPFC, which is to provide a complete description and analysis of the SPFC, identification of evident deficiencies, and recommendations for improving the performance of the system.

Section 9120 of the CWC states the following:

§9120. (a) The department shall prepare and the board shall adopt a flood control system status report for the State Plan of Flood Control. This status report shall be updated periodically, as determined by the board. For the purpose of preparing the report, the department shall inspect the project levees and review available information to ascertain whether there are evident deficiencies.

(b) The status report shall include identification and description of each facility, an estimate of the risk of levee

failure, a discussion of the inspection and review undertaken pursuant to subdivision (a), and appropriate recommendations regarding the levees and future work activities.

(c) On or before December 31, 2008, the board shall advise the Legislature, in writing, as to the board's schedule of implementation of this section.

The FCSSR contains information on the current condition of the SPFC.

8.5 Central Valley Flood Protection Plan

The CVFPP will be a sustainable, integrated flood management plan describing existing flood risk in the Systemwide Planning Area and recommending actions to reduce the probability and consequences of flooding. The CVFPP will include the entire flood management system of which the SPFC is a part. The CVFPP will also identify mutual goals, objectives, and constraints important in the planning process; distinguish plan elements that address mutual flood risks; and recommend improvements to the State-federal flood management system.

As the initial installment of this long-term planning document, the 2012 CVFPP will accomplish the following:

- Document and promote understanding of integrated flood management factors, including existing conditions and likely future challenges, problems, and opportunities, goals and objectives, and potential solutions for improving integrated flood management in the Sacramento-San Joaquin valleys. These factors will be described from multiple perspectives, including local, regional, State, federal, tribal, and other interest-based groups.
- Develop a broadly supported vision for how to improve integrated flood management in the Sacramento-San Joaquin valleys.

The CVFPP will support and guide many implementation activities by local, State, and federal agencies for subsequent feasibility studies, environmental compliance, design, and construction. Development of the CVFPP will be coordinated closely with USACE's Central Valley Integrated Flood Management Study.

The CVFPP will be a sustainable, integrated flood management plan that DWR is required to prepare by January 1, 2012, for adoption by the Board by July 1, 2012. The CVFPP will be a descriptive document and will reflect

a systemwide approach to protecting areas of the Systemwide Planning Area currently receiving protection from flooding by existing facilities of the SPFC. In addition, the CVFPP will include a prioritized list, schedule of implementation, and recommendations on both structural and nonstructural means for improving performance and eliminating deficiencies of flood management facilities, and addressing ecosystem and other water-related objectives. The CVFPP will be updated every 5 years (years ending in 7 and 2).

8.6 Ongoing Evaluations

As part of DWR's FloodSAFE initiative, work is underway by the Division of Flood Management on evaluation and engineering assessments of existing flood management facilities to identify deficiencies and needed improvements. Levee evaluations are being conducted for urban and nonurban areas with the rationale that urban and nonurban areas perform different functions and need to be evaluated under different standards.

8.6.1 Urban Levee Evaluations

One of the highest priorities of the FloodSAFE initiative is the evaluation of project levees protecting urban areas with populations greater than 10,000 residents. The Urban Levee Evaluations (ULE) will perform a geotechnical evaluation on approximately 350 miles of the State-federal levee system of the Sacramento and San Joaquin Flood Control Projects (project levees), focusing on levees protecting the approximate urban areas of Sutter Basin, Marysville, RD 784, Woodland, Natomas, West Sacramento, Davis, San Joaquin Area Flood Control Agency, RD 404, and RD 17. This project consists of geotechnical exploration, testing, and analysis required to evaluate the performance and safety of existing urban project levees, and prefeasibility designs and cost estimates for potential levee repairs where deficiencies are noted.

In general, most urban areas in the Sacramento and San Joaquin valleys currently provide less than the 200-year level of protection called for by legislation.

8.6.2 Non-Urban Levee Evaluations

DWR's Non-Urban Levee Evaluations (NULE) Project will evaluate more than 1,200 miles of nonurban State-federal project levees and approximately 400 miles of appurtenant nonurban nonproject levees to determine if they meet defined geotechnical criteria and, where needed, to identify remedial measures and develop corresponding cost estimates to meet those criteria.

Systemwide Modeling

DWR and USACE are evaluating hydrology and hydraulic information throughout the system to determine flood flows and elevations during different frequency flood events. A variety of other system evaluations will assist work to prepare the CVFPP.

Early Implementation Projects

Some communities have begun levee improvements to correct deficiencies before a comprehensive systemwide CVFPP analysis is completed. Modifications and improvements to the State-federal flood management system are typically accomplished through a partnership among the State, a local sponsor, and USACE. However, in recent years, USACE's budget for capital projects has not been sufficient for flood management system requirements, and necessary system modifications and improvements have not been initiated or have had their completion date severely delayed. To continue the forward progress of these much-needed projects, DWR is using Proposition 1E and 84 funding to direct funds, or competitively award Local Assistance funds, to local flood control agencies in a cost-sharing arrangement to advance projects ready to proceed.

Many of these improvements will eventually become part of the SPFC. The Board has indicated that it will give assurances in the future. From 2007 to 2009, Early Implementation Projects (EIP) have been identified and are in planning, design, construction, or are completed, including the following:

- Setback Levee at Star Bend on the Lower Feather River Right Bank (River Mile 18.0)
- Bear River North Levee Rehabilitation Project
- Natomas Cross Channel South Levee Project
- Feather River Levee Repair Project
- West Sacramento Area Flood Control Agency Project
- Sacramento River East Levee (SREL) and Pleasant Grove Creek Canal

Levee Repairs

Existing levees can have critical problems that could lead to failure during high-water events. Repair of these sites is needed regardless of other planned system improvements. Repairs can be made if the benefit/cost ratio is greater than 1. The Critical Levee Repair Program was established by DWR to carry out the critical levee repair work authorized by the 2006 Disaster Preparedness and Flood Prevention Bond Act. Certain levees have

already been identified as needing repair as a result of existing inspection programs and problems encountered during recent high-water events. Completed repairs are expected to correct deficiencies, including, but not limited to, underseepage, insufficient freeboard, unchecked erosion, and stability. This work will complete levee and erosion repairs begun under AB142 funding and correct deficient levees identified by other programs.

- **Levee Repairs** – Levee repairs can be made when urgent underseepage and slope instability problems exist in an existing levee. The work includes repairs of levee structural problems, exclusive of erosion repairs under the following component. Designs will be developed to repair basic levee deficiencies but not necessarily to increase levels of protection beyond the original levee design. This includes Levee Stability Repairs and Public Law 84-99, Rehabilitation Assistance.
- **Erosion Repairs** – This is an ongoing program that includes the Sacramento River Bank Protection Program and San Joaquin River Erosion Protection Program. Since 2006, the State has spent about \$277 million for repairs to 102 sites. Approximately 161 additional Orders 2, 3, 4, and 5 damaged sites are eligible for repair and rehabilitation by USACE.

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9.0 Observations

Because this SPFC Descriptive Document is intended as a reference document for the existing SPFC, no recommendations for improvements are provided. However, during compilation of material for the document, some observations could be made to facilitate presentation of SPFC materials.

1. While SPFC property rights records are based on physically accessing information about a specific parcel of land, electronic access to that information and electronic representation would make the information more useful.
2. Easements along levee toes appear incomplete. A plan for securing missing easements, including access to various levee reaches, as part of the CVFPP, could improve long-term O&M of the SPFC.
3. Some of the bank protection sites along the Red Bluff to Chico Landing reach of the Sacramento River (O&M Manual SAC512) are no longer effective but are still part of the SPFC. These may be candidate features for removal from the SPFC.
4. Although the SRBPP is considered a part of the SPFC in this document, consideration may warrant not including the project in the future. This is because the intent of the SRBPP is to address ongoing erosion problems and may not qualify as a project within the definition of the SPFC.
5. While some O&M manuals include information on improvements and repairs since original construction, other O&M manuals may not be up to date and could benefit from this supplemental information.
6. There may be supplemental O&M manuals that have either not been located or have not been produced.
7. Unpermitted encroachments on SPFC facilities continue to be a problem.
8. Some projects like Salt Creek, McClure Creek, and Dry Creek at Adin currently meet the definition of the SPFC, but clearly perform no significant function to the major project features along the Sacramento River and perhaps should be removed from the SPFC.

9. On average, the flood management system has performed well, but it is not performing to current expectations primarily because of dated design standards, aging infrastructure, residual environmental needs, and floodplain land uses.
10. River mile numbers for the 1957 Profile for the SRFCP and other sources are not consistent (USACE, 1957a).
11. The State and LMAs may not have the necessary land rights to operate and maintain SPFC facilities as intended.
12. Design flows contained in O&M manuals are often different than design flows obtained from the 1957 profile. In addition, results from State, federal, and local agency studies indicate that actual flow capacities do not agree with either the O&M design capacities or 1957 design capacities in many cases.
13. The State operates SPFC facilities based on the 1957 and 1955 profiles rather than on design flows from the O&M manuals, but it is unknown if the Board ever officially adopted the profiles.
14. USACE use of uncertainty analysis may require revisions to how design capacities are used in maintenance of SPFC facilities.
15. The Butte Basin and the State's designated floodways are both necessary for the State to fulfill its obligation to maintain the project to pass design flows.

10.0 Acronyms and Abbreviations

AB.....	Assembly Bill
Board.....	The Reclamation Board or Central Valley Flood Protection Board
CALEMA.....	California Emergency Management Agency
CCR.....	California Code of Regulations
CDEC	California Data Exchange Center
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
cfs.....	cubic foot per second
CLD	California Levee Database
CVFPP	Central Valley Flood Protection Plan
CWC.....	California Water Code
Delta	Sacramento-San Joaquin Delta
DFG.....	California Department of Fish and Game
DVD.....	digital versatile disc
DWR.....	California Department of Water Resources
EIP.....	Early Implementation Projects
EIS.....	Environmental Impact Statement
EM.....	Engineering Manual
ETL.....	Engineering Technical Letter
FCSSR	Flood Control System Status Report
FEMA	Federal Emergency Management Agency
FloodSAFE	FloodSAFE California initiative
FOC.....	Flood Operations Center
GIS	geographic information system
GRR	General Reevaluation Report
HD	U.S. House document
LIPL.....	local interest project levee
LMA	local maintaining agency
MOU	Memorandum of Understanding

NFIP	National Flood Insurance Program
NGVD	National Geodetic Vertical Datum
NMFS.....	National Marine Fisheries Service
NULE	Non-Urban Levee Evaluation
NWS	National Weather Service
O&M	operations and maintenance
PRC	Public Resources Code
Proposition 1E	Disaster Preparedness and Flood Prevention Act of 2006
QA	quality assurance
RD	Reclamation District
RIP.....	Rehabilitation and Inspection Program
Roundtable	California Levees Roundtable
SAFCA.....	Sacramento Area Flood Control Agency
SD.....	U.S. Senate document
SPFC	State Plan of Flood Control
SRBPP	Sacramento River Bank Protection Project
SREL	Sacramento River East Levee
SRFCP.....	Sacramento River Flood Control Project
SSJDD.....	Sacramento-San Joaquin Drainage District
TRLIA	Three Rivers Levee Improvement Authority
ULE.....	Urban Levee Evaluation
USACE	U.S. Army Corps of Engineers
USFWS.....	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WPRR.....	Western Pacific Railroad
WRDA.....	Water Resources Development Act

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