3.0 SPFC Facilities

This section describes SPFC facilities according to the function they perform, which is to manage stormwater runoff. Therefore, the facility descriptions are presented geographically by river reach, generally bounded by points where significant inflows or outflows occur.

The facility descriptions are scaled to the major facilities-levees, pumping plants, weirs or other water control structures, drop structures, dams/reservoirs, other major channel improvements, and mitigation areas. Smaller components of these facilities and associated features, such as transportation relocations, stream gages, pipes passing through levees, or bridges, are not included in this section, but can be found in unit-specific O&M manuals or the O&M summary data table included on the reference DVD that accompanies this report.

The facilities are generally described in an upstream-to-downstream direction. However, since the flood management system is not linear, but a network of tributary and distributary channels, some deviation from the upstream-to-downstream convention is necessary. Levees referred to as being on the left bank or right bank of a river reach are based on their position when looking downstream.

Levee data for the SPFC are mostly consistent with the California Levee Database (CLD). Since CLD information is continually being revised to reflect the best available information, future updates to this SPFC Descriptive Document will reflect changes since the prior draft or update.

3.1 Summary

This subsection presents a high-level summary of the SPFC facilities that are described in more detail in Sections 3.2 and 3.3. Except for the backwater effect of flows mingling in the Delta, SPFC facilities on the Sacramento River and tributaries operate independently from SPFC facilities on the San Joaquin River and tributaries. The Sacramento River system carries flood flows that are about 10 times greater in volume than those in the San Joaquin River system.

Both the Sacramento and San Joaquin rivers use bypass systems to carry a large portion of floodwater. Together, the rivers and their tributaries have nearly 1,600 miles of SPFC (or “project”) levees. Non-SPFC reservoirs in

each system have flood reservation storage that significantly helps attenuate flows and aids in operation of downstream SPFC facilities.

3.1.1 Sacramento River Basin

The flood management system along the Sacramento River and tributaries manages flood flows originating from an area of approximately 27,000 square miles. Major tributaries to the Sacramento River include the Feather, Yuba, Bear, and American rivers, which discharge to the Sacramento River from the east. Three smaller upstream SPFC projects on streams tributary to the Sacramento River are shown in Figure 3-1 (North Fork Feather River near Chester, Middle Creek, and Adin projects). Figure 3-2 shows an overview of SPFC facilities in the Sacramento River Basin. The design flow capacities of the various stream reaches are also shown on Figure 3-2 and listed in Table 3-1.

Table 3-1 shows design capacities from the unit-specific O&M manuals and from the 1957 Revised Profile Drawings (see Section 6.6.1), and in some cases these capacities are inconsistent within a given river reach. The State operates SPFC facilities in the Sacramento River Basin based on the 1957 profile rather than on design flows from the O&M manuals.

These capacities are based on hydraulic analyses conducted before 1960, generally to establish the minimum top of levees during the design phase. These capacities do not account for geotechnical conditions that may result in actual capacities being less than design capacities. In some cases, State, federal, or local agencies may have conducted more recent hydraulic studies that result in higher or lower flows than those shown in the table – see the Flood Control System Status Report (DWR, 2010) for updated estimates of actual capacities and the CVFPP for resolution of these inconsistencies.

Where the design flow capacities from O&M manuals are different for the left-bank levee and right-bank levee along a particular reach, the lowest capacity is shown in Figure 3-2. Detailed maps of the area covered in Figure 3-2 are included in Attachment A.

Upstream from Ord Ferry at about River Mile 183 on the Sacramento River, most SPFC facilities were constructed primarily to help reduce local flooding and have no association with the continuous flood management system that stretches from Ord Ferry to Collinsville in the Delta.

Flow in the Sacramento River is reduced by spilling floodwater into bypass areas through historic overflow areas and SPFC weirs. The first spill from the Sacramento River occurs just upstream from the start of the levee system at Ord Ferry. Floodwater leaves the river through three non-SPFC

paths and flows into the Butte Basin, which drains into the Sutter Bypass. Additionally, floodwater spills into bypasses over five SPFC weirs. Because of these spills to the bypass areas, the design flow capacity of the Sacramento River generally decreases in a downstream direction except where tributary inflow increases river flow. For example, the design capacity of the Sacramento River upstream from the leveed system is about 260,000 cfs. Downstream from the Tisdale Weir, the design capacity of the river is only 30,000 cfs.

The comprehensive system of SPFC levees, river channels, overflow weirs, drainage pumping plants, and flood bypass channels is the largest flood management system in California. This system includes the following major SPFC facilities:

- About 440 miles of river, canal, and stream channels (including an enlarged channel of the Sacramento River from Cache Slough to Collinsville)
- About 1,000 miles of levees (along the Sacramento River channel, Sutter and Yolo basins, and Feather, Yuba, Bear, and American rivers)
- Four relief bypasses (Sutter, Tisdale, Sacramento, and Yolo bypasses)
- Knights Landing Ridge Cut to connect the Colusa Basin to the Yolo Bypass
- Five major weirs (Sacramento Weir, built in 1916; Fremont Weir, built in 1924; and Moulton, Tisdale, and Colusa weirs, built in 1932 and 1933)
- Two sets of outfall gates
- Five major drainage pumping plants
- Numerous appurtenant structures such as minor weirs and control structures, bridges, and gaging stations

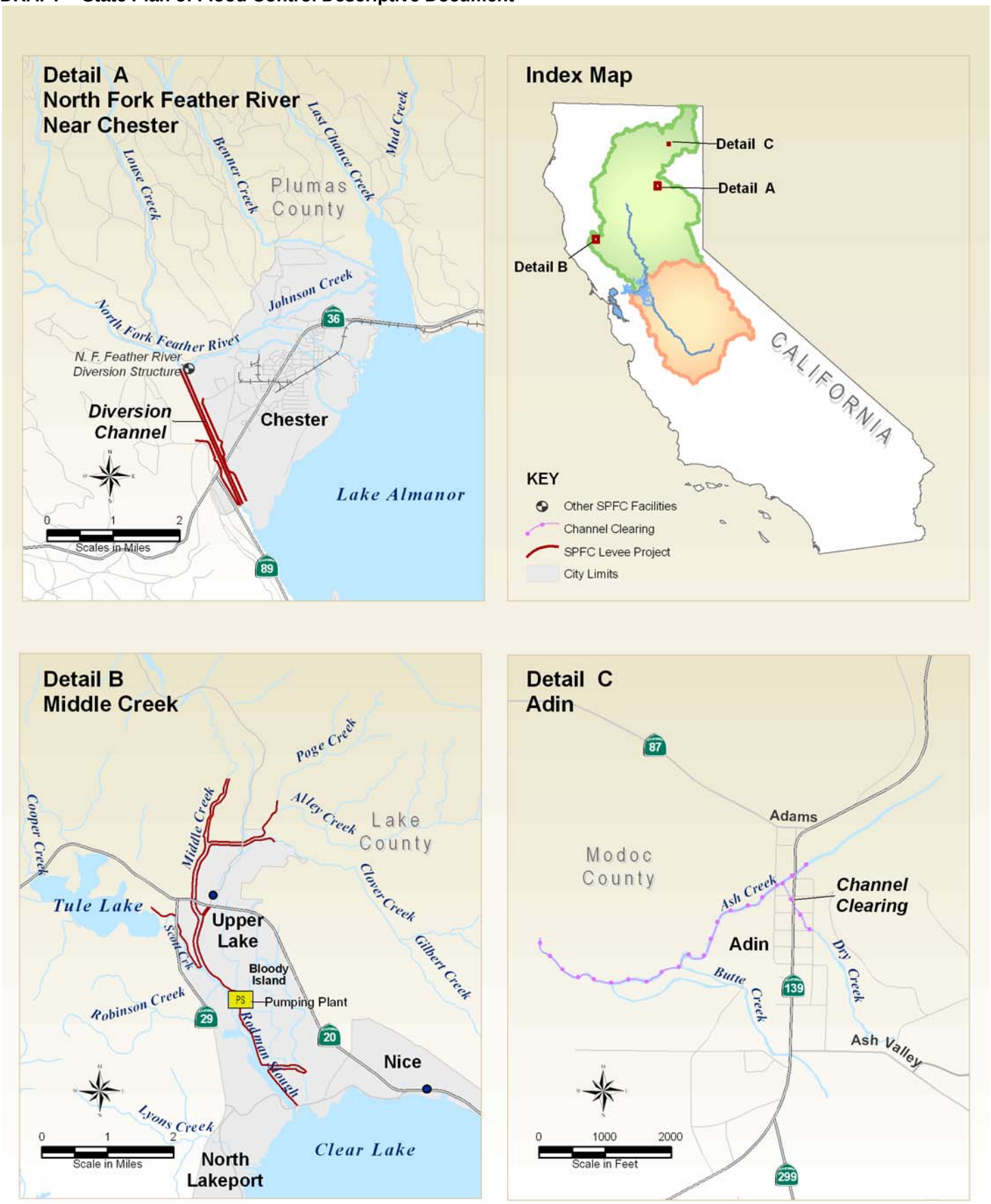

Figure 3-1. State Plan of Flood Control Facilities within the Sacramento River Basin at Chester, Middle Creek, and Adin

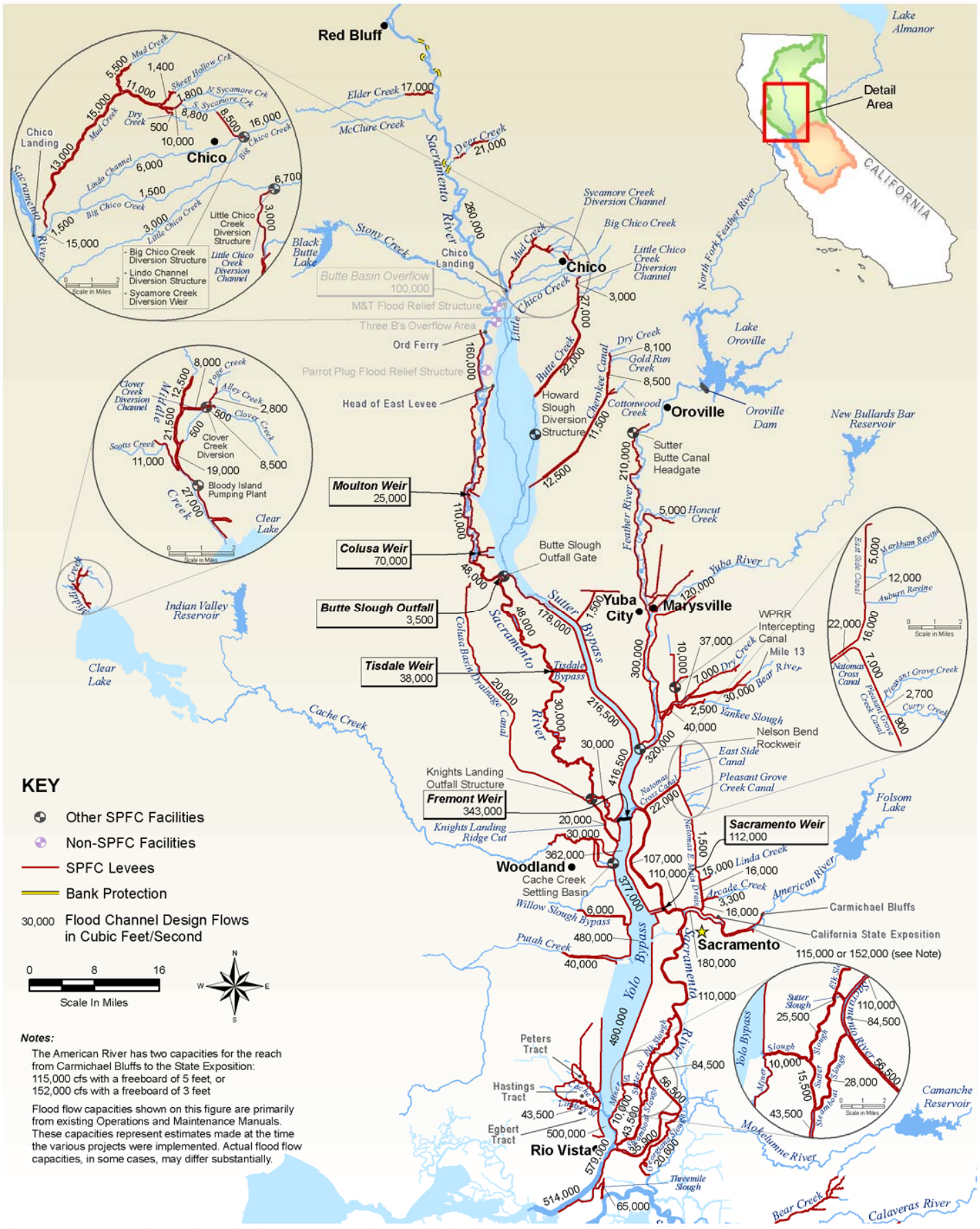

Figure 3-2. Design Flood Flow Capacities Within the Sacramento River, Bypasses, and Major Tributaries and Distributaries in the Sacramento River Basin

Table 3-1. Design Capacities by Reach in the Sacramento River Basin

River Reach[1]	River Miles		Design Capacity (cfs) from O&M Manual		Design Capacity (cfs) from 1957 Revised Profile Drawings (Basis of State Operations)
	From	To	Left Bank	Right Bank	
Red Bluff to Chico Landing					
Sacramento River					
Deer Creek to Chico Landing			260,000 cfs from Senate Document No. 23		
Tributaries to Sacramento River					
Elder Creek	6.00	0.00	17,000	17,000	17,000
Deer Creek	7.40	0.00	21,000	21,000	21,000
Chico Landing to Colusa Weir					
Sacramento River					
Chico Landing to head of east levee	175.00	166.00	160,000	160,000	160,000
East levee head to Moulton Weir	166.00	148.25	160,000	160,000	160,000
Moulton Weir to Colusa Weir	148.25	138.00	110,000	135,000	135,000
Tributaries to Sacramento River					
Mud Creek and Big Chico Creek					
Mud Creek – End of Levees to Sycamore Creek	8.2[2]	6.8[2]	5,500	5,500	No Data
Mud Creek – Sycamore Creek to SPRR	6.8[2]	4.3[2]	15,000	15,000	15,000
Mud Creek – SPRR to Big Chico Creek	4.3[2]	0	13,000	13,000	13,000 to 15,000
Big Chico Creek – Mud Creek to Sacramento River	0.2[2]	0	15,000	15,000	15,000
Distributaries from Sacramento River					
Overflow to Butte Basin	175.00	166.00	100,000 cfs from Senate Document No. 23		
Moulton Weir	158.5	158.5	25,000	25,000	25,000
Colusa Weir	146[2]	146[2]	70,000	70,000	70,000

Table 3-1. Design Capacities by Reach in the Sacramento River Basin (Contd.)

River Reach[1]	River Miles		Design Capacity (cfs) from O&M Manual		Design Capacity (cfs) from 1957 Revised Profile Drawings (Basis of State Operations)
	From	To	Left Bank	Right Bank	
Colusa Weir to Fremont Weir					
Sacramento River					
Colusa Weir to Butte Slough	138.00	130.00	48,000	48,000	65,000
Butte Slough to Tisdale Weir	130.00	119.50	66,000	48,000	66,000
Tisdale Weir to Knights Landing	119.50	90.00	30,000	30,000	30,000
Knights Landing to Fremont Weir	90.00	85.00	30,000	30,000	30,000
Tributaries to Sacramento River					
Butte Slough Outfall	138[2]	138[2]	3,500	3,500	1,000
Knights Landing Outfall	90[2]	90[2]	No Data	No Data	No Data
Distributaries from Sacramento River					
Tisdale Weir and Bypass	119[2]	119[2]	38,000	38,000	38,000
Fremont Weir	85[2]	82[2]	343,000	343,000	343,000
Sutter Bypass					
Butte Slough to Wadsworth Canal	93[2]	83.00	178,000	178,000	150,000
Wadsworth Canal to Tisdale Bypass	83.00	77.80	178,000	178,000	155,000
Tisdale Bypass to Feather River	77.80	67.00	216,500	216,500	180,000
Feather River to Verona	67.00	59.00	416,500	416,500	380,000
Tributaries to Sutter Bypass:					
Butte Creek					
Little Chico Creek Diversion Channel to Midway	15.3[2]	8[2]	27,000	27,000	27,000
Midway to 1.6 Miles Downstream of Aguas Frias Road	8[2]	0	22,000	22,000	22,000

Table 3-1. Design Capacities by Reach in the Sacramento River Basin (Contd.)

River Reach[1]	River Miles		Design Capacity (cfs) from O&M Manual		Design Capacity (cfs) from 1957 Revised Profile Drawings (Basis of State Operations)
	From	To	Left Bank	Right Bank	
Cherokee Canal					
Dry Creek to Gold Run Creek at Nelson Road	21.7[2]	20.2[2]	N/A	8,100	No Data
Gold Run Creek at Nelson Road to Cottonwood Creek at Western Canal	20.2[2]	15.8[2]	8,500	8,500	No Data
Cottonwood Creek at Western Canal to RD 833 Canal Entrance at Afton Road	15.8[2]	7.9[2]	11,500	11,500	12,500
RD833 Canal Entrance at Afton Road to Lower Butte Basin about 1 Mile Downstream of Colusa-Gridley Road	7.9[2]	0	12,500	12,500	12,500
Wadsworth Canal	5.00	0.50	1,500	1,500	1,500
Feather River					
Oroville to mouth of Yuba River	50.85	27.40	210,000	210,000	210,000
Mouth of Yuba River to Bear River	27.40	12.00	300,000	300,000	300,000
Bear River to Yolo bypass	12.00	7.60	320,000	320,000	320,000
Tributaries to Feather River					
Honcut Creek	4.50[2]	0.00[2]	5,000	5,000	25,000
Yuba River	5.00	0.50	120,000	120,000	120,000
Bear River					
Mile 13 to Dry Creek	13.00[2]	6.00[2]	30,000	30,000	30,000
Dry Creek to WPRR	6.00[2]	4.70[2]	37,000	37,000	37,000
WPRR to Feather River	4.70[2]	0.00[2]	40,000	40,000	40,000
Tributaries to Bear River					
WP Interceptor Channel	6.30[2]	0.00[2]	10,000	10,000	10,000
South Dry Creek	1.50[2]	0.00[2]	7,000	7,000	9,000
Yankee Slough	4.00[2]	0.00[2]	2,500	2,500	2,500

Table 3-1. Design Capacities by Reach in the Sacramento River Basin (Contd.)

River Reach[1]	River Miles		Design Capacity (cfs) from O&M Manual		Design Capacity (cfs) from 1957 Revised Profile Drawings (Basis of State Operations)
	From	To	Left Bank	Right Bank	
Fremont Weir to American River					
Sacramento River					
Fremont Weir to Sacramento Weir	85.00	63.90	107,000	107,000	107,000
Sacramento Weir to American River	63.40	51.70	110,000	110,000	18,000
Tributaries to Sacramento River					
Natomas Cross Canal	4.7	0.1	22,000	22,000	22,000
Tributaries to Natomas Cross Canal					
East Side Canal					
WPRR to Markham Ravine	No Data	No Data	N/A	5,000	5,000
Markham Ravine to Auburn Ravine	No Data	No Data	N/A	12,000	12,000
Auburn Ravine to Natomas Cross Canal	No Data	No Data	N/A	16,000	16,000
Pleasant Grove Creek Canal					
Sankey Road to Keys Road	No Data	No Data	900	900	800
Keys Road to Pleasant Grove Creek	No Data	No Data	2,700	2,700	2,300
Pleasant Grove Creek to Natomas Cross Canal	No Data	No Data	7,000	7,000	6,000
American River					
Carmichael to State Fair Grounds (left bank)	10.00[2]	3.00[2]	115,000 to 152,000[3]	N/A	115,000 to 152,000[3]
Mayhew to State Fair Grounds (right bank)	13.00[2]	3.00[2]	N/A	115,000 to 152,000[3]	115,000 to 152,000[3]
State Fair Grounds to Sacramento River	3.00[2]	0.00	180,000	180,000	180,000
Tributaries to American River					
Natomas East Main Drainage Canal					
Sankey Road to Dry (Linda) Creek	13.00[2]	4.00[2]	N/A	1,100	1,500
Dry (Linda) Creek to Arcade Creek	4.00[2]	2.00[2]	12,600 to 12,900	12,600 to 12,900	16,300
Arcade Creek to American River	2.00[2]	0.00	16,000 to 16,300	16,000 to 16,300	16,000 to 16,300

Table 3-1. Design Capacities by Reach in the Sacramento River Basin (Contd.)

River Reach[1]	River Miles		Design Capacity (cfs) from O&M Manual		Design Capacity (cfs) from 1957 Revised Profile Drawings (Basis of State Operations)
	From	To	Left Bank	Right Bank	
Tributaries to Natomas East Main Drainage Canal:					
Dry Creek (previously, Linda Creek)	1.30[2]	0.00	15,000	N/A	15,000
Arcade Creek	2.00[2]	0.00	3,300	3,300	3,300
Distributaries from Sacramento River:					
Sacramento Weir and Bypass	45.30	45.30	112,000	112,000	112,000
Yolo Bypass					
Fremont Weir to Knight's Landing Ridge Cut	57[2]	54[2]	343,000	343,000	343,000
Knight's Landing Ridge Cut to Cache Creek	54[2]	51.8	362,000	362,000	362,000
Cache Creek to Sacramento Weir	51.8	45.3	377,000	377,000	377,000
Sacramento Weir to Putah Creek	45.30	39.5	480,000	480,000	480,000
Putah Creek to Miner Slough	39.5	19[2]	490,000	490,000	490,000
Miner Slough to Cache Slough	No Data	No Data	490,000	490,000	500,000
Cache Slough to Sacramento River	No Data	0.00	490,000	490,000	500,000
Tributaries to Yolo Bypass:					
Knight's Landing Ridge Cut	2.6	0	20,000	20,000	20,000
Cache Creek	12.7	0	30,000	30,000	30,000
Willow Slough	No Data	0	6,000	6,000	6,000
Putah Creek	9.7	0	40,000	40,000	62,000
Miner Slough	1.68	0	10,000	10,000	10,000
Cache Slough and Lindsey Slough	No Data	0	43,500	43,500	30,000

Table 3-1. Design Capacities by Reach in the Sacramento River Basin (Contd.)

River Reach[1]	River Miles		Design Capacity (cfs) from O&M Manual		Design Capacity (cfs) from 1957 Revised Profile Drawings (Basis of State Operations)
	From	To	Left Bank	Right Bank	
American River to Collinsville					
Sacramento River					
American River to Elk Slough	51.6	42.3	110,000	110,000	110,000
Elk Slough to Sutter Slough	42.1	34.3	110,000	110,000	110,000
Sutter Slough to Steamboat Slough	34.1	32.7	84,500	84,500	85,000
Steamboat Slough to head of Georgiana Slough	32.5	26.75	56,500	56,500	56,500
Georgiana Slough to Yolo Bypass Junction	26.5	14.75	35,900	35,900	35,900
Yolo Bypass to 3-Mile Slough	14.62	9.75	579,000	579,000	579,000
3-Mile Slough to Collinsville	9.5	0	514,000	514,000	514,000
Distributaries from Sacramento River:					
Steamboat Slough – Sac River to Sutter Slough	10	7	28,000	28,000	28,000
Steamboat Slough – Sutter Slough to Sac River	7	0	43,500	43,500	43,500
Sutter Slough - Sacramento River to Miner	No Data	0	25,500	25,500	26,500
Sutter Slough - Miner to Steamboat	6.55[2]	No Data	15,500	15,500	15,500
Georgiana Slough	10	0	20,600	20,600	20,600
3-Mile Slough	No Data	0	65,000	65,000	65,000

Notes:
[1] Sequential river reaches were not necessarily designed as a system. Therefore, the capacities in the table do not add up. In some cases, left- and right-bank levees along the same reach may have different design capacities.
[2] The river mile was estimated at this location.
[3] The capacity is 115,000 cfs at 5 feet of freeboard and 152,000 cfs at 3 feet of freeboard.
Key:
cfs = cubic feet per second
N/A = not applicable
No Data = No Data currently presented
O&M = operations and maintenance
WPRR = Western Pacific Railroad

3.1.2 San Joaquin River Basin

The flood management system along the San Joaquin River manages flood flows originating from an area of approximately 16,700 square miles in the Sierra Nevada, Central Valley, and Coastal Range in Central California. Major tributaries to the San Joaquin River include the Mokelumne, Calaveras, Stanislaus, Tuolumne, Merced, and Fresno rivers, which discharge to the San Joaquin River from the east. In addition, during flood release events from Pine Flat Reservoir, the majority of Kings River flows are diverted north through the James Bypass into the San Joaquin River.

Unlike on the Sacramento River, where SPFC levees are continuous from Ord Ferry to the Delta, San Joaquin River SPFC levees are intermittent from near River Mile 225 to the Delta. The Chowchilla, Eastside, and Mariposa bypasses are the main SPFC facilities for the upstream portion of the San Joaquin River system. For portions of the system, these bypasses are the only SPFC facilities, and the San Joaquin River itself is not part of the SPFC. The bypass system ends upstream from the Merced River.

Figure 3-3 shows an overview of SPFC facilities in the San Joaquin River Basin. The design flow capacities of the various stream reaches are shown in Figure 3-3 and listed in Table 3-2. The State operates SPFC facilities in the San Joaquin River Basin based on the 1955 profile (see Section 6.6.2) rather than on design flows from the O&M manuals.

Where the design flow capacities from O&M manuals were different for the left-bank levee and right-bank levee along a particular reach, the lowest capacity is shown in Figure 3-3. Detailed maps of the area covered in Figure 3-3 are included in Attachment A. Similar to the discussion for Table 3-1 in Section 3.1.1, Table 3-2 shows design capacities used to set minimum levee height, without consideration of geotechnical conditions that may lower the actual capacities. See the Flood Control System Status Report (DWR, 2010) for updated estimates of actual capacities and the CVFPP for resolution of these inconsistencies.

Major SPFC facilities along the San Joaquin River and tributaries include the following:

- Chowchilla Canal Bypass (and levees), which begins at the San Joaquin River downstream from Gravelly Ford, diverts San Joaquin River flows, and discharges the flows into the Eastside Bypass

- Eastside Bypass (and levees), which begins at the Fresno River, collects drainage from the east, and discharges to the San Joaquin River between Fremont Ford and Bear Creek

- Mariposa Bypass, which begins at the Eastside Bypass and discharges to the San Joaquin River (and levees)
- Approximately 99 miles of levees along the San Joaquin River
- Approximately 135 miles of levees along San Joaquin River tributaries and distributaries
- Six instream control structures (Chowchilla Bypass Control Structure, San Joaquin River Control Structure, Mariposa Bypass Control Structure, Eastside Bypass Control Structure, Sand Slough Control Structure, and San Joaquin River Structure)
- Two major pumping plants

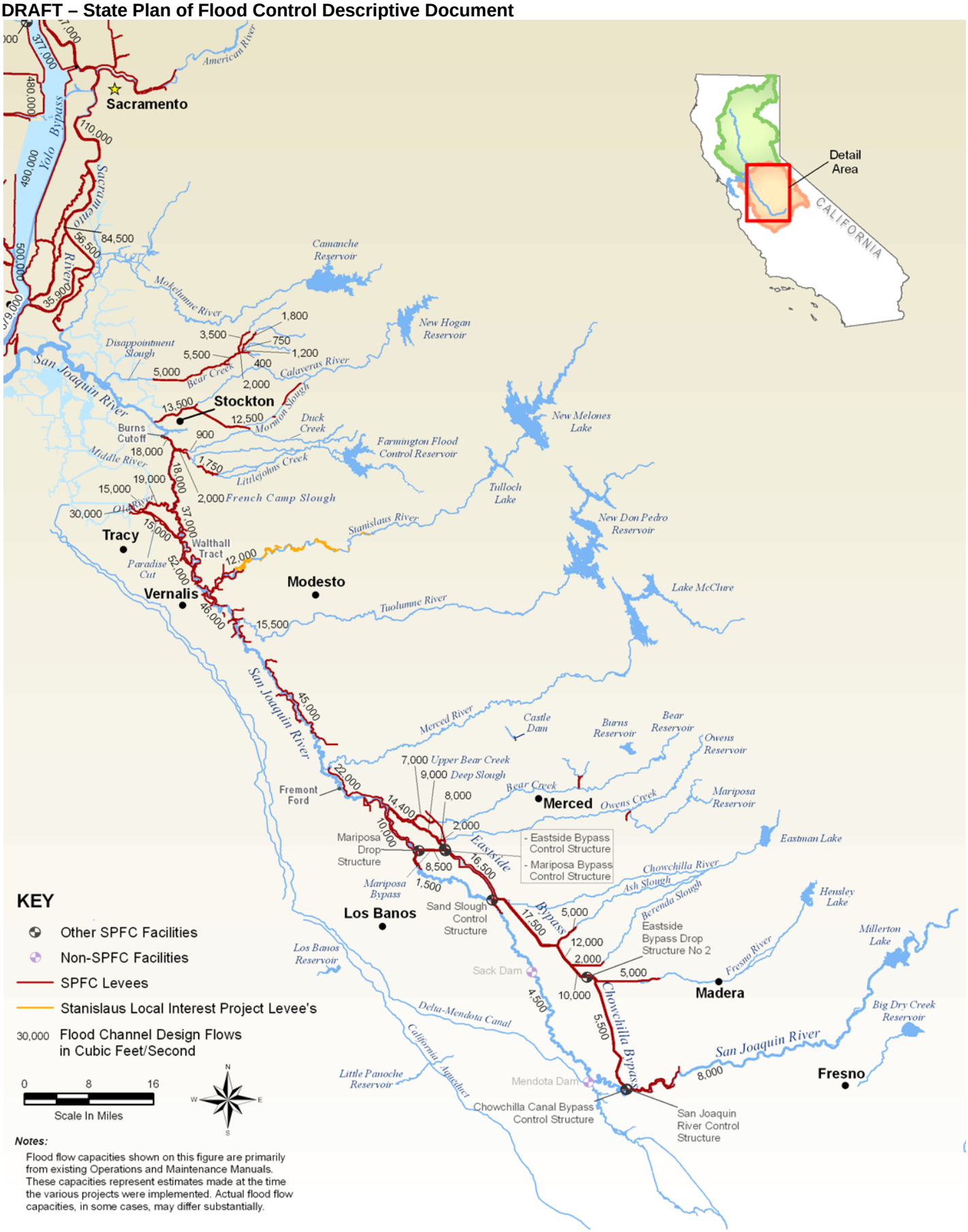

Figure 3-3. Design Flood Flow Capacities Within the San Joaquin River, Bypasses, and Major Tributaries and Distributaries in the San Joaquin River Basin

Table 3-2. Design Capacities by Reach in the San Joaquin River Basin

River Reach[1]	River Miles		Design Capacity (cfs) from O&M Manual[2]	
	From	To	Left Bank	Right Bank
Friant Dam to Chowchilla Canal Bypass				
San Joaquin River	224.66	214.03	8,000	8,000
Chowchilla Canal Bypass to Sand Slough Control Structure				
San Joaquin River	170[3]	166.44	4,500	4,500
Distributaries from San Joaquin River:				
Chowchilla Bypass	32.04	15.85	5,500	5,500
Eastside Bypass				
Fresno River to Berenda Slough	15.85	13.59	10,000	10,000
Berenda Slough to Ash Slough	13.59	10.48	12,000	12,000
Ash Slough to Sand Slough	10.48	0.00	17,500	17,500
Tributaries to Eastside Bypass:				
Fresno River	8.36	0.00	5,000	5,000
Berenda Slough	4.28	0.00	2,000	2,000
Ash Slough	4.52	0.00	5,000	5,000
Sand Slough Control Structure to Merced River				
San Joaquin River				
Control Structure to Mariposa Bypass	149.89	145.15	1,500	1,500
Mariposa Bypass to Eastside Bypass	145.15	133.80	10,000	10,000
Eastside Bypass to Merced River	133.80	116.66	22,000	22,000
Tributaries to San Joaquin River:				
Mariposa Bypass	4.23	0.00	8,500	8,500
Eastside Bypass				
Control Structure to Mariposa Bypass	8.96	16[3]	16,500	16,500
Mariposa Bypass to Owens Creek	8.96	5[3]	8,000	8,000
Owens Creek to Bear Creek	5[3]	1[3]	9,000	9,000
Bear Creek to San Joaquin River	1[3]	0.00	14,400	14,400

Table 3-2. Design Capacities by Reach in the San Joaquin River Basin (Contd.)

River Reach[1]	River Miles		Design Capacity (cfs) from O&M Manual	
	From	To	Left Bank	Right Bank
Tributaries to Eastside Bypass:				
Owens Creek	0.98	0.00	No Data	No Data
Deep Slough	6.66	0.00	9,000	9,000
Upper Bear Creek	7.98	4.25	7,000	7,000
Bear Creek	4.25	0.00	14,400	14,400
Merced River to Stanislaus River				
San Joaquin River				
Merced River to Tuolumne River	110.90	81.50	45,000	45,000
Tuolumne River to Stanislaus River	81.50	72.60	46,000	46,000
Tributaries to San Joaquin River:				
Tuolumne River	0.60	0.00	15,000	15,000
Stanislaus River	11.90	0.00	12,000	12,000
Stanislaus River to Burns Cutoff				
San Joaquin River				
Stanislaus River to Paradise Cut	72.60	58.30	52,000	52,000
Paradise Cut to Old River	58.30	53.30	37,000	37,000
Old River to Burns Cutoff	53.30	40.60	18,000	18,000
Tributaries to San Joaquin River:				
French Camp Slough	6.40	0.00	3,000	2,000
Tributaries to French Camp Slough:				
Littlejohns Creek	1.00	0.00	1,750	1,750
Duck Creek	0.90	0.00	900	900
Distributaries from San Joaquin River:				
Paradise Cut – San Joaquin River to Old River	0.00	7.4 or 5.9[3]	15,000	15,000
Old River – downstream from Paradise Cut	5.9	8.2	30,000	30,000

Table 3-2. Design Capacities by Reach in the San Joaquin River Basin (Contd.)

River Reach[1]	River Miles		Design Capacity (cfs) from O&M Manual	
	From	To	Left Bank	Right Bank
Old River – San Joaquin to Middle River	No Data	No Data	19,000	19,000
Old River – Middle River to Paradise Cut	No Data	No Data	19,000	15,000
Old River/Salmon Slough – Paradise Cut to Grant Line Canal	No Data	No Data	N/A	30,000
Burns Cutoff to Disappointment Slough				
Tributaries to San Joaquin River:				
Calaveras River	5.80	0.00	13,500	13,500
Tributaries to Calaveras River:				
Mormon Slough	8.40	6.20	12,500	12,500
Bear Creek – Disappointment Slough to Mosher Creek	No Data	No Data	5,500	5,500
Bear Creek – Mosher Creek to Paddy Creek	No Data	No Data	5,000	5,000
Bear Creek – upstream from Paddy Creek	No Data	No Data	3,500	3,500
Tributaries to Bear Creek:				
Paddy Creek – Bear Creek to North Paddy Creek	No Data	No Data	2,000	2,000
Paddy Creek – upstream from North Paddy Creek	No Data	No Data	400	400
Middle Paddy Creek	No Data	No Data	750	750
North Paddy Creek – Paddy Creek to Middle Paddy Creek	No Data	No Data	1,800	1,800
North Paddy Creek – upstream from Middle Paddy Creek	No Data	No Data	1,200	1,200

Notes:
[1] Sequential river reaches were not necessarily designed as a system. Therefore, the capacities in the table do not add up. In some cases, left- and right-bank levees along the same reach may have different design capacities.
[2] The State operates SPFC facilities in the San Joaquin River Basin based on the 1955 profile rather than on design flows from the O&M manuals.
[3] The river mile was estimated at this location.
Key:
cfs = cubic feet per second
N/A = not applicable
No Data = No Data currently presented
O&M = operations and maintenance

3.2 SPFC Facilities in the Sacramento River Basin

This section describes SPFC facilities in the Sacramento River Basin, reach by reach. Because of the numerous locations of tributary and distributary flow, the Feather River watershed, American River watershed, Sutter Bypass watershed, Yolo Bypass watershed, and Sacramento River watershed are described separately. The description for the Sacramento River watershed identifies where the Feather River, American River, Sutter Bypass, and Yolo Bypass are either tributary or distributary to the Sacramento River.

Figure 3-4 is an index map of the Sacramento River Basin showing the five major watersheds, including SPFC facilities.

3.2.1 Feather River Watershed

The Feather River, a tributary to the Sacramento River, drains a major watershed in the Sierra and Cascade mountain ranges. Figure 3-5 shows SPFC facilities in the Feather River watershed.

Figure 3-4. Index Map of the Sacramento River Basin Including the Five Major Watersheds With Facilities of the State Plan of Flood Control

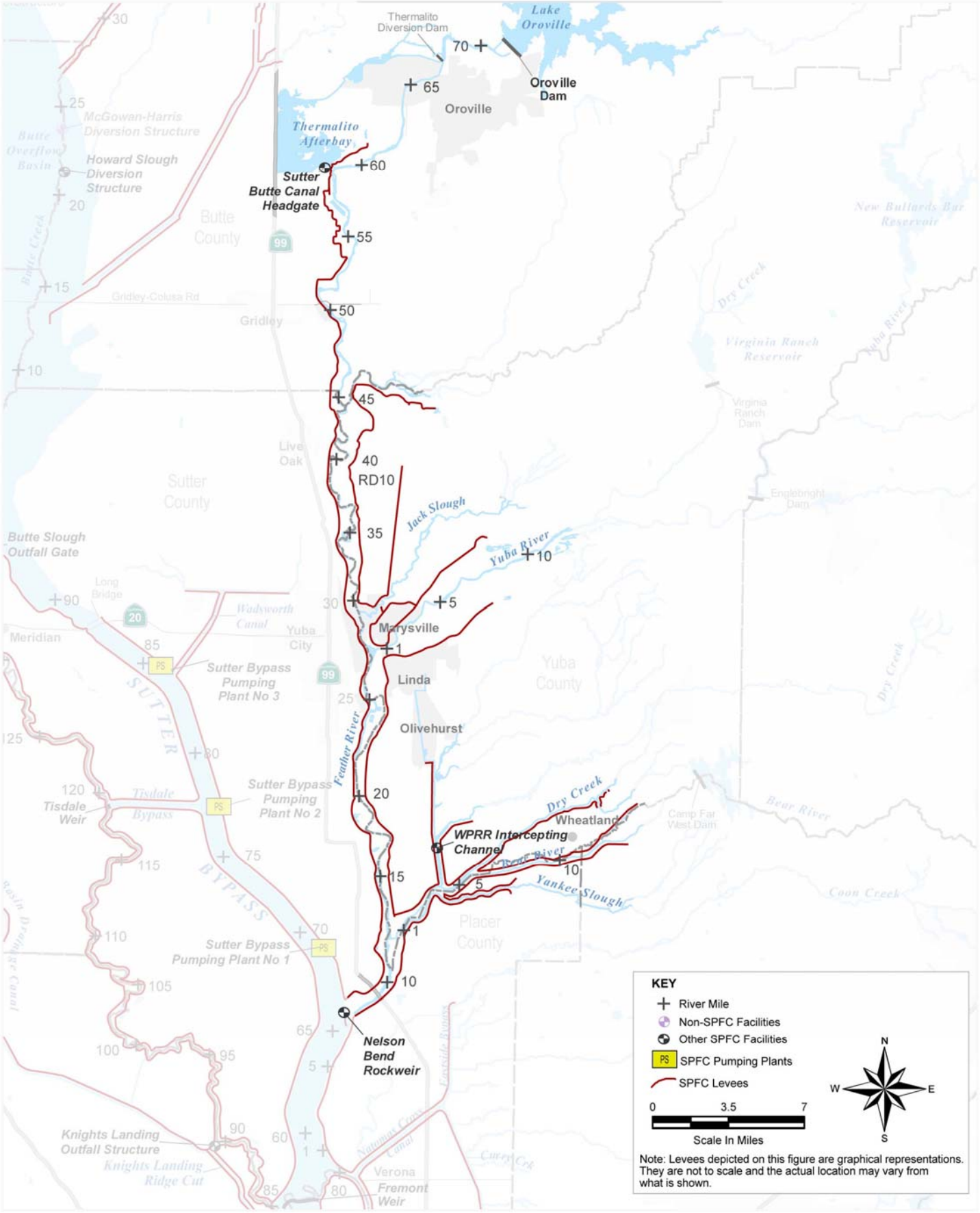

Figure 3-5. Feather River Watershed – State Plan of Flood Control Facilities Along the Feather, Yuba, and Bear Rivers and Tributaries

North Fork Feather River Near Chester

SPFC channel improvements and levees (see O&M Manual SAC508) reduce flood risk to the town of Chester, bridges for Highway 36, two county roads, and a railroad. The project (see Figure 3-1) consists of a diversion structure, an excavated rock-lined diversion channel, about 3 miles of levees along the channel (about 1.8 miles on the left bank and 1.2 miles on the right bank), and seven drop structures. At design flow (based on the O&M manual), an estimated 3,000 cfs would pass through the diversion structure to the North Fork Feather River and to Lake Almanor, and approximately 10,000 cfs would be conveyed by the diversion channel to Lake Almanor. The project is located upstream from Lake Oroville. Project O&M are performed by the Plumas County Department of Public Works.

Oroville Dam and Facilities

Lake Oroville and related facilities are operated by DWR to provide multiple benefits, including flood management. Of a total storage of 3.5 million acre-feet, the lake is operated with 750,000 acre-feet available for flood storage during the flood season. Since the State has provided assurances for flood management operation, Oroville Dam and facilities are included in the SPFC.

Feather River from Thermalito to Yuba River

This reach of river has a channel design capacity of 210,000 cfs at 3 feet of freeboard based on the O&M manuals. SPFC facilities include right- and left-bank levees along the Feather River, the Sutter-Butte Canal Headgate, a levee on the left bank of Honcut Creek, a back levee for Reclamation District (RD) 10, and a ring levee around Marysville. The levees were originally built by local interests and enlarged or improved by USACE as project levees.

Oroville Dam is part of the SPFC

- The Feather River right-bank levee (see O&M Manuals SAC144, SAC152, and SAC154), about 28 miles long, reduces flood risk to adjacent agricultural lands and the towns of Gridley, Live Oak, and Yuba City. Maintenance is provided by DWR through Maintenance Areas 7 and 16, and Levee Districts 1 and 9.

- The Feather River left-bank levee (see O&M Manual SAC151), extending about 11.2 miles from Honcut Creek to Jack Slough just north of Marysville, reduces flood risk for RD 10. Maintenance is provided by RD 10.

- The Sutter-Butte Canal Headgate (O&M Manual SAC160) controls release of river water to the irrigation canal. The Sutter-Butte Canal now receives water from the Thermalito Afterbay – no supplement to O&M Manual SAC160 has been found to document this change. The structure is operated and maintained by DWR.

- A left-bank levee (see O&M Manual SAC151) along Honcut Creek extends about 4.5 miles from high ground to the confluence with the Feather River. The Honcut Creek design channel capacity is 5,000 cfs, based on the O&M manual. This differs from the design capacity of 25,000 cfs from the 1957 revised profile. The levee is maintained by DWR and RD 10.

- The back levee (see O&M Manual SAC151) for RD 10 extends about 8 miles along Jack Slough and Simmerly Slough. The levee reduces flood risk from waters from the east. The levee is maintained by RD 10. Together, the Honcut Creek levee, the left-bank levee along the Feather River, and the back levee nearly surround RD 10.

Source: California Disaster Office, 1956.
The ring levee protects Marysville during the Flood of 1955

- The ring levee (see O&M Manual SAC147) around Marysville is about 7.2 miles long. The levee reduces flood risk to Marysville from the Feather River, the Yuba River, and Jack and Simmerly sloughs. The levee is maintained by the Marysville Levee Commission.

Yuba River

The channel capacity of the Yuba River upstream from its confluence with the Feather River is 120,000 cfs based on the O&M manuals. SPFC facilities include right- and left-bank levees. The right-bank levee (see O&M Manual SAC147) extends about 4 miles upstream from the Marysville ring levee (see description above). The levee is maintained by the Marysville Levee Commission. Note that the water control manual for the upstream New Bullards Bar Dam specifies 180,000 cfs for the Yuba River.

The left-bank levee (see O&M Manuals SAC145 and SAC149) extends about 6.1 miles from high ground to the confluence connection with Feather River levees. The levee is maintained by RD 784, and reduces flood risk to Linda and Olivehurst and adjoining agricultural land. The left-bank levee was originally built by local interests and enlarged or improved to project standards by USACE as a project levee.

Feather River from Yuba River to Bear River

The design channel capacity of the Feather River in this reach is 300,000 cfs with 3 feet of freeboard, based on the O&M manuals. SPFC facilities include right- and left-bank levees. The right-bank levee (see O&M Manual SAC144), about 14 miles long, reduces flood risk to Yuba City and adjoining agricultural land. The right-bank levee is maintained by Levee District 1. The left-bank levee (see O&M Manual SAC145) is about 13 miles long. The levee is maintained by RD 784 and reduces flood risk to Linda and Olivehurst and adjoining agricultural land.

The Three Rivers Levee Improvement Authority (TRLIA) has also completed levee setbacks that are now operable. The levee setbacks did not change the design capacity of this reach.

Bear River

SPFC facilities in the Bear River watershed include levees along Dry Creek, the Bear River, Yankee Slough, and the Western Pacific Railroad (WPRR) Intercepting Channel. Originally built by local interests, these levees were later repaired or enlarged to project standards by USACE.

- Dry Creek has a design channel capacity of 7,000 cfs based on the O&M manuals. This differs from the design capacity of 9,000 cfs estimated in the 1957 revised profile. The 1.5-mile-long right-bank levee (see O&M Manual SAC145) extends from high ground to the confluence with the Bear River. The levee is maintained by RD 784. The left-bank levee (see O&M Manual SAC146) extends about 8.5 miles from high ground to the confluence with the Bear River. The levee reduces flood risk to Wheatland and adjoining agricultural land. The left-bank levee is maintained by RD 817, RD 2103, and DWR.

- Upstream from its confluence with Dry Creek, the Bear River design channel capacity is 30,000 cfs, based on the O&M manual. The right-bank levee extends about 8.9 miles from high ground to the confluence. The levee is maintained by RD 817 and DWR and reduces flood risk to Wheatland and adjoining agricultural land. The left-bank levee (see O&M manual SAC141.1) extends about 7.5 miles from high ground to the confluence with Dry Creek.

- Yankee Slough has a design channel capacity of 2,500 cfs based on the O&M manual. Left- and right-bank levees (see O&M Manual SAC141.1) each extend about 4 miles from high ground to the confluence with the Bear River. Both levees along Yankee Slough are maintained by RD 1001.

- The design capacity of the WPRR Intercepting Channel is 10,000 cfs, based on the O&M manual. The right-bank levee, about 6.3 miles in length, extends from high ground and serves as a back levee for RD 784. Levee improvements by TRLIA have not yet been included in the O&M manual. The left-bank levee, about 4.2 miles in length, also reduces flood risk to RD 784. The levees are maintained by RD 784.

- Downstream from the Dry Creek confluence, the right-bank levee (see O&M Manual SAC145) of the Bear River extends about 4.7 miles to its connection with the Feather River levee. The levee is maintained by RD 784. Construction of a setback levee in 2005 and 2006 by TRLIA has not yet been included in the O&M manual. The WPRR Intercepting Channel enters Bear Creek from the north along this reach. Downstream from the WPRR Intercepting Channel, Bear Creek has a design capacity of 40,000 cfs with 3 feet of freeboard, based on the O&M manuals. Downstream from the Dry Creek confluence, the left-bank levee (see O&M Manuals SAC141.1 and SAC141.2) of Bear Creek extends about 5 miles to its connection with the Feather River levee. Yankee Slough enters along the left side of this reach. The left-bank levee is maintained by RD 1001.

Feather River from Bear River to Sutter Bypass

The design channel capacity of the Feather River in this reach is 320,000 cfs with 3 feet of freeboard based on the O&M manuals. SPFC facilities include left- and right-bank levees and a rock weir at Nelson Bend.

The right-bank levee (see O&M Manual SAC143) is 5.2 miles in length. Maintenance is provided by Levee District 1 and DWR through Maintenance Area 3. The left-bank levee (see O&M Manuals SAC141.1 and SAC141.2) is about 5 miles long and is maintained by RD 1001. Originally built by local interests, these levees were later enlarged or improved to project standards by USACE.

The rock weir (see O&M Manual SAC501) was constructed in 1970 and 1971 to control flow where the Feather River meets the Sutter Bypass. The improvements (Nelson Bend Modification Project) provide protection against the formation of Feather River overflow channels into the Sutter Bypass, and acts to retard deposition of sediments in the Sutter Bypass during flood flows.

Joint Feather River/Sutter Bypass Channel to the Sacramento River

From their junction, the Feather River and Sutter Bypass flow in a joint channel to the Sacramento River. The design channel capacity of this reach is 416,500 cfs with 6 feet of freeboard, based on the O&M manuals. SPFC facilities include left- and right-bank levees about 1.3 miles apart. The

right-bank levee (see O&M Manual SAC129), about 10 miles long, reduces flood risk to agricultural land in RD 1500. The levee is maintained by RD 1500. The left-bank levee (see O&M Manual SAC141.1), about 7 miles long, reduces flood risk to agricultural land in RD 1001. The levee is maintained by RD 1001. The left-bank levee was originally built by local interests and later enlarged or improved to project standards by USACE.

3.2.2 American River Watershed

The American River enters the Sacramento River at the City of Sacramento. Figure 3-6 includes SPFC facilities in the American River watershed.

American River from Carmichael Bluff to Natomas East Main Drainage Canal

The design capacity of this reach is 115,000 cfs with 5 feet of freeboard and 152,000 cfs with 3 feet of freeboard, based on the O&M manuals. SPFC facilities along this reach include right- and left-bank levees, two pumping plants, and vegetation on mitigation sites. The levees and pumping plants reduce flood risk to urban areas in Sacramento County. Portions of the levee were originally built by local interests and portions of these levees were enlarged to project standards by USACE.

The right-bank levee (see O&M Manuals SAC118.2 and SAC517) extends about 12 miles from high ground to the Natomas East Main Drainage Canal. The levee is maintained by American River Flood Control District and DWR through Maintenance Areas 10 and 11. The levee was constructed by USACE and was improved by USACE as part of the 1996 and 1999 Common Features authorization. Two SPFC pumping plants (see O&M Manual SAC518) are located along the American River and are operated by Sacramento County. Pumping Plant No. 1 is located about 1 mile downstream from the H Street Bridge; Pumping Plant No. 2 is located about 0.25 mile east of the Watt Avenue Bridge. The pumping plants dispose of local drainage water from about 15.5 square miles from the area located behind the levee. Five vegetation mitigation sites (see O&M Manual SAC517.3) are located between the Watt Avenue and Howe Avenue bridges.

Based on the O&M manual, the left-bank levee (see O&M Manual SAC118.1) begins at Mayhew Road, about 3.5 miles downstream from the right-bank levee and extends about 9 miles from high ground to the Natomas East Main Drainage Canal. The levee has been extended by USACE upstream from Mayhew. Four vegetation mitigation sites (see O&M Manual SAC118.1A) are located along this reach of levee. The levee is maintained by the American River Flood Control District, and DWR maintains the channel.

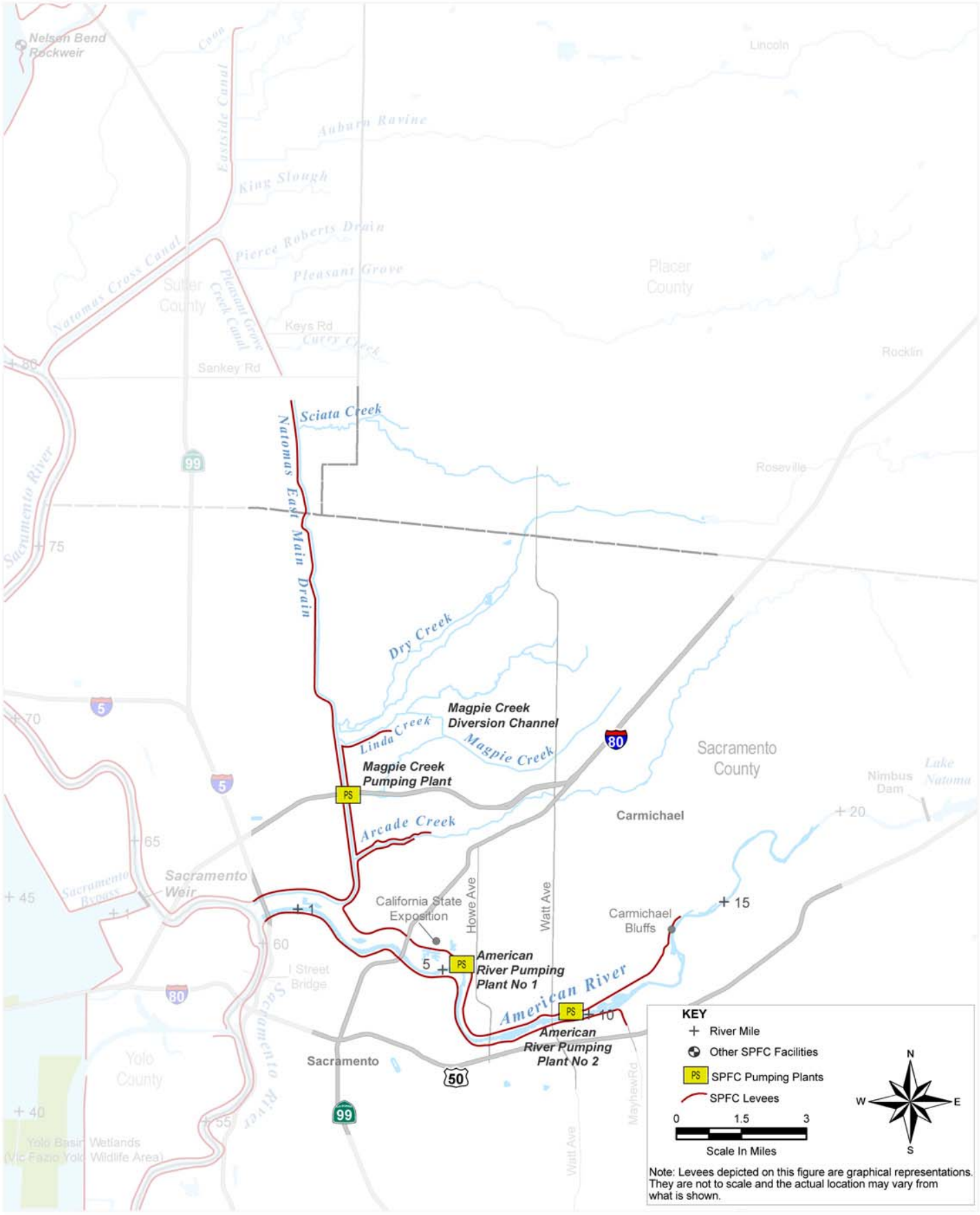

Figure 3-6. American River Watershed – State Plan of Flood Control Facilities Along the American River, Natomas East Main Drainage Canal, Natomas Cross Canal, and Tributaries

Natomas East Main Drainage Canal

The Natomas East Main Drainage Canal was designed to intercept streams approaching RD 1000 from the east and discharge them into the American River. SPFC facilities are levees and improved channels for the Natomas East Main Drainage Canal and tributaries. With the exception of the left-bank levee along Dry Creek and the right-bank levee along Arcade Creek, the levees were originally constructed by local interests and rebuilt by USACE to project standards. The levees are maintained by the American River Flood Control District.

- RD 1000 is entirely surrounded by levees. In the vicinity of Sankey Road on the east side of RD 1000, flow along the levee is southerly into the Natomas East Main Drainage Canal and northerly into the Pleasant Grove Creek Canal (see description under Section 3.2.5). For the reach of the Natomas East Main Drainage Canal from Sankey Road to the to the Dry Creek north levee, there is a right-bank levee (see O&M Manual SAC125) but no left-bank levee. The right-bank levee of Dry Creek has been extended as part of the Sacramento Area Flood Control Agency (SAFCA) and USACE authorized project, but is not yet in the O&M manual. The design capacity of this 9-mile reach of the Natomas East Main Drainage Canal is about 1,500 cfs, based on the O&M manual.

- Dry Creek enters the Natomas East Main Drainage Canal about 4 miles upstream from the American River. A left-bank levee (see O&M Manual SAC118.2) extends about 1.3 miles along Dry Creek. The design capacity of Dry Creek upstream from the Natomas East Main Drainage Canal is 15,000 cfs, based on the O&M manual. A 1.4 mile-long diversion channel from Magpie Creek to Dry Creek is intended to limit flood flows in the lower reaches of Magpie Creek. The Magpie Creek diversion channel has a design capacity of 250 cfs.

- From Arcade Creek to the American River, the Natomas East Main Drainage Canal has a capacity of 16,000 cfs, based on the O&M manuals. This reach of the Natomas East Main Drain has a right-bank levee (see O&M Manual SAC125) and a left-bank levee (see O&M Manual SAC118.2), each about 4 miles long. Along this reach, Arcade Creek enters from the east. The design capacity of Arcade Creek upstream from the Natomas East Main Drainage Canal is 3,300 cfs. Right- and left-bank levees (see O&M Manual SAC118.2) each extend along Arcade Creek about 2 miles from high ground to the Natomas East Main Drainage Canal.

American River from Natomas East Main Drainage Canal to Sacramento River

This reach of river has a design capacity of 180,000 cfs with 3 feet of freeboard, based on the O&M manuals. SPFC facilities include levees along both banks of the river. The right-bank levee (see O&M Manual SAC124) is about 2.2 miles long. The levee was originally built by local interests and accepted into the project without modification because it equaled or exceeded standards by USACE. The levee is maintained by RD 1000. A vegetation mitigation site (see O&M Manual SAC124.2) is located about 0.9 mile upstream from the Sacramento River. The left-bank levee (see O&M Manual SAC118.1) is about 2.5 miles in length. The levee was originally constructed by local interests and rebuilt by USACE to project standards. The levee reduces flood risk for areas in Sacramento County.

3.2.3 Sutter Bypass Watershed

The Sutter Bypass receives water from natural runoff areas south of Chico, overflow and weir flow from the Sacramento River, and drainage from the east side of the bypass through the Wadsworth Canal and pumping plants. The bypass joins the Feather River upstream from its confluence with the Sacramento River near the Fremont Weir. Figure 3-7 includes SPFC facilities in the Sutter Bypass watershed.

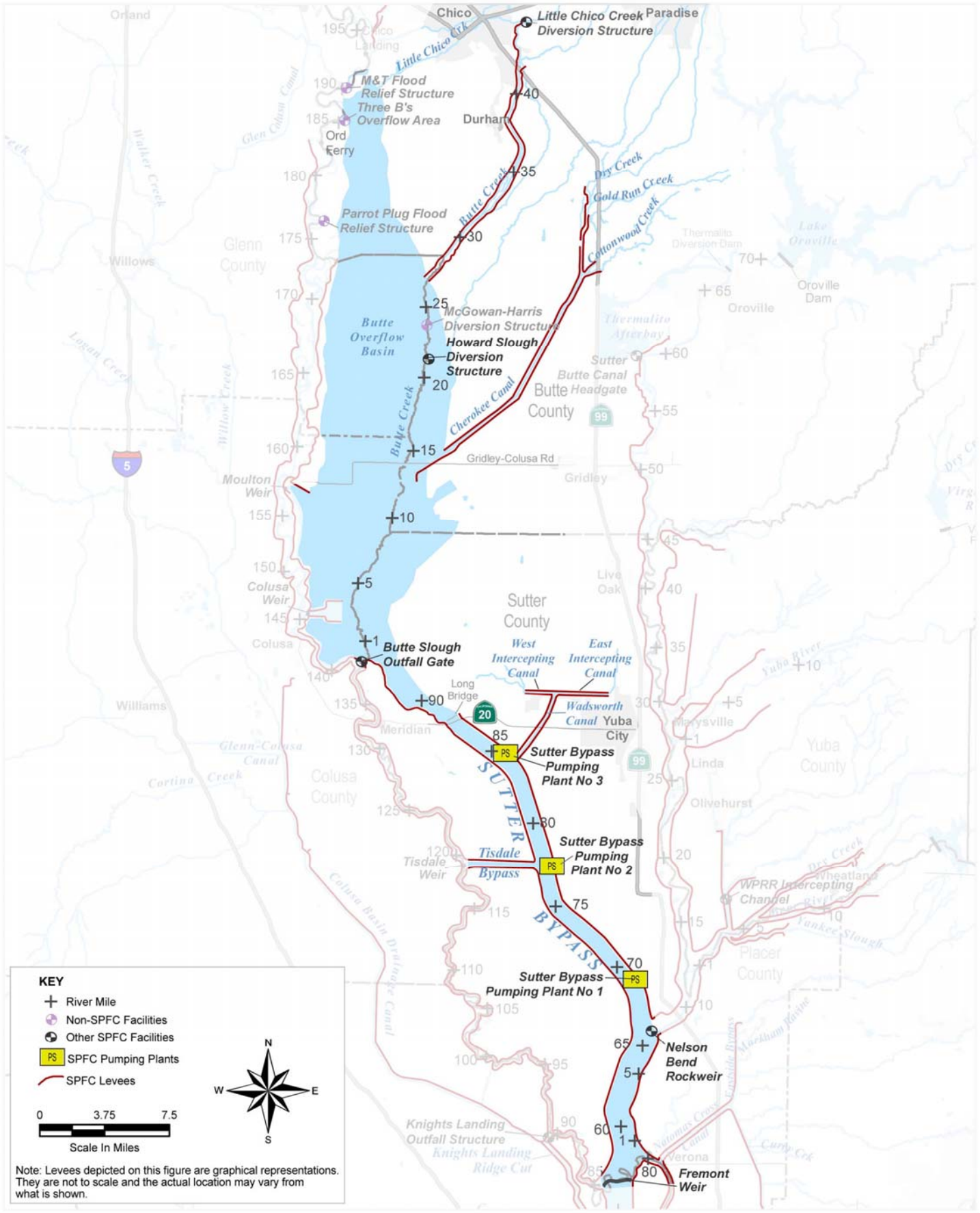

Figure 3-7. Sutter Bypass Watershed – State Plan of Flood Control Facilities Along Butte Creek, Cherokee Canal, Sutter Bypass, and Tributaries

Butte Creek Upstream from Butte Basin

SPFC facilities for Butte Creek include a diversion structure on Little Chico Creek, a diversion channel from Little Chico Creek to Butte Creek, and levees along the diversion channel and along Butte Creek. The facilities reduce flood risk to Chico, Durham, adjoining agricultural land, Highway 99, and several railroads and county roads. With the exception of levees along the downstream 8 miles of Butte Creek, levees were originally built by local interests and set back or enlarged to project standards by USACE. The facilities are maintained by DWR through Maintenance Area 5.

- The ungated Little Chico Diversion Structure (see O&M Manual SAC516) was designed to limit flood flows through Chico and route excess flood flows to Butte Creek. Upstream from the diversion, Little Chico Creek has a design capacity of 6,700 cfs, based on the O&M manual. The design capacity of Little Chico Creek downstream from the diversion is about 2,200 cfs. The design capacity of the 3-mile-long diversion channel to Butte Creek is about 3,000 cfs with 3 feet of freeboard. According to the O&M manual, the diversion channel can carry 4,500 cfs with no freeboard. The diversion channel has intermittent levees along the right bank (see O&M Manual SAC516).

- The design capacity of Butte Creek downstream from the confluence with the Little Chico Creek Diversion is 27,000 cfs with 3 feet of freeboard, based on the O&M manual. The channel can carry 40,000 cfs with no freeboard. Right- and left-bank levees (see O&M Manuals SAC515 and SAC516) extend about 15 miles downstream to the Butte Basin.

Cherokee Canal

SPFC facilities (see O&M Manual SAC519) consist of levees along Cherokee Canal, the lower reaches of Cottonwood Creek and Gold Run Creek, and irrigation and drainage structures from Butte Basin to high ground. The facilities provide reduced flood risk to adjacent agricultural lands, area transportation facilities, and irrigation canals. The facilities are maintained by DWR through Maintenance Area 13.

- The right-bank levee along Dry Creek and Gold Run Creek extends about 5.2 miles from high ground to the confluence with Cottonwood Creek. The left-bank levee extends about 3.5 miles from high ground to the confluence with Cottonwood Creek. The design capacity of this reach is about 8,500 cfs with 3 feet of freeboard, based on the O&M manual.

- The lower reach of Cottonwood Creek has a design capacity of about 3,500 cfs. Right- and left-bank levees, each about 1.3 miles long, extend from high ground to the connection with the Cherokee Canal levees.

- Downstream from Cottonwood Creek, the Cherokee Canal has a design capacity varying from 11,500 cfs to 12,500 cfs, based on the O&M manual. The right-bank levee extends about 14 miles. The left-bank levee is about 17 miles long. About midway along this reach, to allow flow to enter from the east, the left-bank levee is broken into two parallel segments for approximately 1.5 miles.

Butte Basin

SPFC facilities within the Butte Basin include channel improvements along lower Butte Creek and the Butte Slough Outfall Gates to the Sacramento River.

Water from Butte Creek (see O&M Manuals SAC153, SAC515, and SAC516), the Cherokee Canal (see O&M Manual SAC519), and other small tributaries from the north and east enter the Butte Basin. Flood flow from the Sacramento River enters the upper end of the Butte Basin (see discussion in Section 3.2.5) at three overflow areas below Chico Landing on the Sacramento River. While DWR performs some maintenance on these overflow areas (known as Three B's, M&T, and Parrot Plug), they are not the SPFC facilities, but their continued use is an important condition of operation of the SPFC (see Section 6.8).

Flood flow to the Butte Basin from the Sacramento River also occurs from the Moulton Weir (see O&M Manual SAC154) and from the Colusa Weir (see O&M Manuals SAC155 and SAC502). The weirs are described in Section 3.2.5, Sacramento River Watershed. The Butte Basin provides about 1 million acre-feet of storage at flood stage.

SPFC facilities in the Butte Basin are described below:

- Downstream from the Butte Creek levees, channel improvements (see O&M Manual SAC153) extend about 13 miles along lower Butte Creek to the Gridley-Colusa Road. The channel improvements and clearing allow a flow of about 2,500 cfs without extensive overbank flooding. The improvements along this reach also included replacing the old Howard Slough Diversion Structure with a new structure. The diversion structure is located across Butte Creek about 0.5 mile downstream from the bifurcation with Howard Slough. The O&M manual states that the nearby McGowan-Harris Diversion Structure, which was constructed by local interests, is not part of the project, but must be operated in

conjunction with the Howard Slough Diversion Structure. Both of these diversion structures are for irrigation and provide no flood management role. However, DWR does inspect these structures to be sure that flashboards are removed during the non-irrigation season to minimize their impact of flood stage.

- The Butte Slough Outfall Gates (see O&M Manual SAC161) to the Sacramento River control passage of floodwaters from the Butte Basin to the Sacramento River at a maximum flow of about 3,500 cfs, based on the O&M manual. The gates also allow passage of Butte Slough drainage water to the Sacramento River during the irrigation season.

Flood flows in the Butte Basin flow through Butte Slough and into the Sutter Bypass about 8 miles downstream from the Butte Slough Outfall Gates.

Butte Slough

SPFC facilities include the right-bank levee (see O&M Manual SAC134) from the Butte Slough Outfall Gates to the head of the Sutter Bypass. The levee, about 7.3 miles long, reduces flood risk to RD 70 and is maintained by RD 70. The levee was constructed by local interests and reconstructed to adopted grade and section by USACE. Based on the O&M manual, the design capacity of this reach is 185,000 cfs at the upstream end and 178,000 cfs with 6 feet of freeboard at the beginning of the Sutter Bypass.

Sutter Bypass

SPFC facilities along the Sutter Bypass and tributaries include levees and pumping plants. The levees along the Sutter Bypass are about 4,000 feet apart.

- From Long Bridge, just upstream from Highway 20 to the Wadsworth Canal, SPFC facilities include levees and a pumping plant. This reach has a design capacity of 178,000 cfs with 6 feet of freeboard, based on the O&M manuals. The right-bank levee (see O&M Manuals SAC133 and SAC134) is about 4.5 miles long and reduces flood risk to the town of Meridian and agricultural land in RD 70 and RD 1660. The left-bank levee (see O&M Manual SAC135) is about 4 miles long and reduces flood risk to adjacent agricultural land south of the town of Sutter and to Yuba City. Pumping Plant No. 3 (see O&M Manual SAC159) discharges water to the Sutter Bypass from the area located behind the levee. The plant has a capacity of about 180 cfs. In addition, reverse gravity flow water from the bypass provides irrigation water to adjacent agricultural areas.