State of California
The Resources Agency
DEPARTMENT OF WATER RESOURCES
DIVISION OF FLOOD MANAGEMENT

Fact Sheet

Sacramento River Flood Control Project Weirs and Flood Relief Structures

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Flood Operations Branch

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Overview

Sacramento Valley has a history of floods and management of floods that goes back as long as people have populated the region. Prior to flood management, the valley floor would be blanketed by seasonal runoff nearly every year; the Sacramento Valley was once nicknamed the “inland sea.” This tendency to flood results from the geography of the region as well as the weather. The occasionally large amounts of rain that fall in the surrounding Coastal ranges and the relatively steep Sierra Nevada mountain ranges produce rapid surface water runoff to the Sacramento River. The amount of this surface water runoff can be quite large, depending on the amount of rainfall, snow melt, and soil moisture of the watershed. Fast water flowing from the mountains is blunted by the relatively shallow grade of the Sacramento River south of the city of Red Bluff, and would often overtop the river banks. In addition, The Sacramento River would begin depositing sediment in the more shallow grades that would often alter its direction of flow. In order to control these storm flows that would otherwise flood farmland and cities, the Sacramento River Flood Control Project (the Project) was created.

The Project was designed with the understanding that runoff from many of the storm events experienced in the Sacramento River watershed cannot be contained within the banks of the river. Nor could this flow be fully contained within a levee system without periodically flooding adjacent property. Thus, the Project was designed to occasionally spill through a system of weirs and flood relief structures into adjacent basins. These basins are designed to contain flood waters and channel them downstream, to eventually be conveyed back into the Sacramento River near Knights Landing and Rio Vista. Dry weather flows are contained within levees near the river banks and land within the flood basins is then used for agricultural purposes.

There are ten overflow structures in the Project (six weirs, three flood relief structures, and an emergency overflow roadway) that serve a similar function as pressure relief valves in a water supply system. Weirs are lowered sections of levees that allow flood flows in excess of the downstream channel capacity to escape into a bypass channel or basin.

All six weirs of the Project (Moulton, Colusa, Tisdale, Fremont, Sacramento, and Cache Creek) consist of the following: (1) a fixed-level, concrete overflow section; followed by (2) a concrete, energy-dissipating stilling basin; with (3) a rock and/or concrete erosion blanket across the channel beyond the stilling basin; and (4) a pair of training levees that define the weir-flow escape channel.

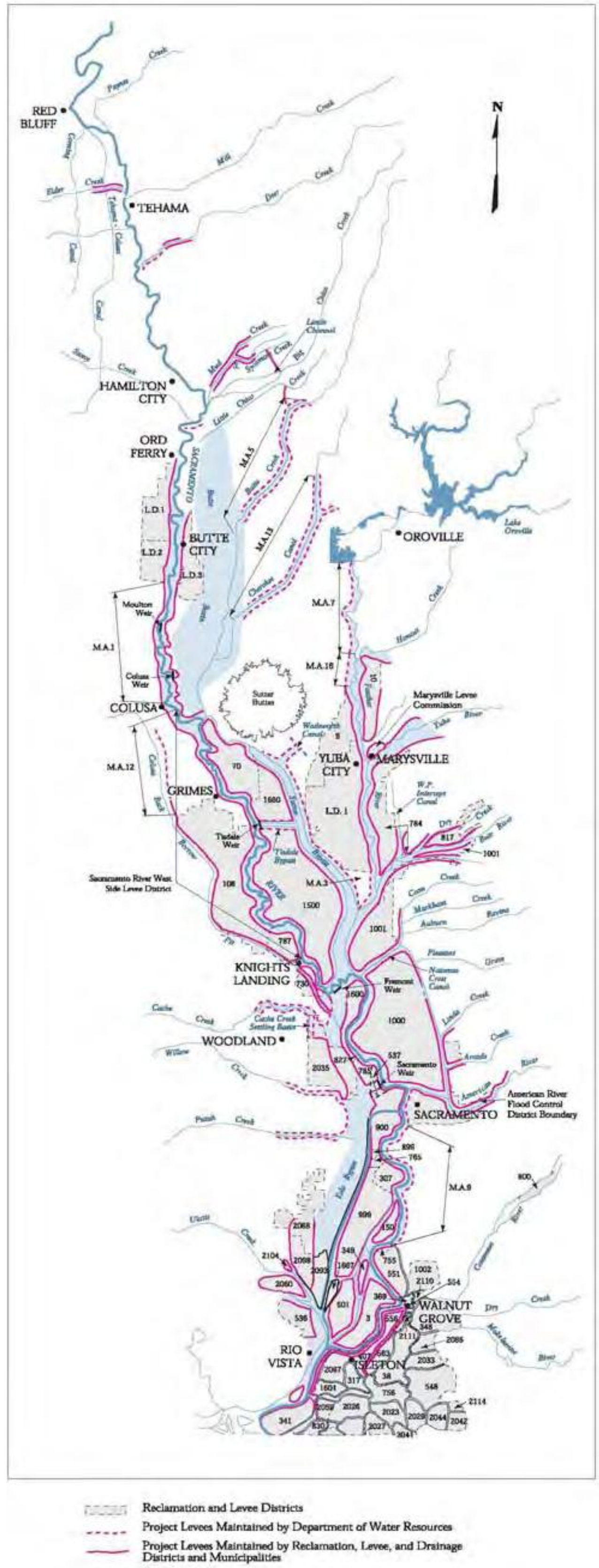
All overflow structures except the Sacramento Weir pass floodwaters by gravity once the river reaches the overflow water surface elevation. The Sacramento Weir has gates on top of the overflow section that hold back floodwaters until opened manually by the Department of Water Resources’ Division of Flood Management.

Four other relief structures are concentrated along 18 river miles between Big Chico Creek (River Mile 194) and the upstream end of the left (east) bank levee of the Sacramento River Flood Control Project (near River Mile 176). These structures function like weirs but are not called weirs because they do not have all four structural characteristics previously described. All of these relief structures convey water into the Butte Basin (a natural trough east of the river) upstream of the levee system designed to guide the flood waters.

Three of the structures are designated as flood relief structures (M&T, 3B's, and Goose Lake). If these three fail as designed a raised 6,000-foot roadway near the south end of Parrott Ranch allows excess floodwaters to escape the Sacramento River to the Butte Basin before being confined by the downstream project levees.

Figure 1 (above), Location Map for Weirs and Relief Structures in the Sacramento River Flood Control Project

Figure 2 (right), Sacramento River Flood Control Project Overview, showing project levees and basins



Moulton Weir


Figure 3, Moulton Weir, January 1997

Moulton Weir was completed in 1932. It is located along the easterly side (left bank looking downstream) of the Sacramento River approximately eight miles north of the town of Colusa and about 100 miles north of Sacramento. Its primary function is to release overflow waters of the Sacramento River into the Butte Basin at such times when floods exceed the safe carrying capacity of the main channel of the Sacramento River downstream from the weir. The fixed crest reinforced concrete weir is 500 feet long with concrete abutments at each end. The outlet channel is flanked by training levees and is approximately 3,000 feet long. The crest elevation is 76.75 feet and the project design capacity of the weir is 25,000 cubic feet per second (cfs). The Moulton Weir is typically the last of the non-gated weirs to overtop, and spills for the shortest duration.

Colusa Weir and Bypass


Figure 4, Colusa Weir, January 1997

Colusa Weir was completed in 1933. It is located along the left bank of the Sacramento River one mile north of the town of Colusa. Its primary function is to release overflow waters of the Sacramento River into the Butte Basin. The fixed crest reinforced concrete weir is 1,650 feet long and is flanked by training levees that connect the river to the basin. The crest elevation is 61.80 feet and the project design capacity of the weir is 70,000 cfs. Normally, the Colusa Weir does not overtop until the Tisdale Weir is also spilling, except for flood events that are characterized by rapid rise in Sacramento River stage.

Tisdale Weir and Bypass

Tisdale weir was completed in 1932. It is located along the left bank of the Sacramento River about ten miles southeast of the town of Meridian and about 56 miles north of Sacramento. Its primary purpose is to release overflow waters of the Sacramento River into the Sutter Bypass via the Tisdale Bypass. The fixed crest reinforced concrete weir is 1,150 long. The four-mile leveed bypass channel (Tisdale Bypass) connects the river to the Sutter Bypass. The crest elevation is 45.45 feet and the project design capacity of the weir is 38,000 cfs. Typically, the Tisdale Weir is the first of the five weirs in the Sacramento River Flood Control System to overtop, and continues to spill for the longest duration.

Figure 5, Tisdale Weir and Tisdale Bypass (Sutter Bypass in background, January 1997

Fremont Weir

Fremont Weir was completed in 1924. It is the first overflow structure on the river's right bank and its two-mile overall length marks the beginning of the Yolo Bypass. It is located about 15 miles northwest of Sacramento and eight miles northeast of Woodland. South of this latitude the Yolo Bypass conveys 80 percent of the system’s floodwaters through Yolo and Solano Counties until it connects to the Sacramento River a few miles upstream of Rio Vista. The weir’s primary purpose is to release overflow waters of the Sacramento River, Sutter Bypass, and the Feather River into the Yolo Bypass. The crest elevation is 33.50 feet and the project design capacity of the weir is 343,000 cfs.

Figure 6, Fremont Weir (Sutter Bypass on left, and Yolo Bypass on right)

Sacramento Weir and Bypass

The Sacramento Weir was completed in 1916. It is the only weir that is manually operated – all others overflow by gravity on their own. It is located along the right bank of the Sacramento River approximately 4 miles upstream of the Tower Bridge, and about 2 miles upstream from the mouth of the American River. Its primary purpose is to protect the City of Sacramento from excessive flood stages in the Sacramento River channel downstream of the American River. The weir limits flood stages (water surface elevations) in the Sacramento River to project design levels through the Sacramento/West Sacramento area. The project design capacity of the weir is 112,000 cfs.

It is 1,920 feet long and consists of 48 gates that divert Sacramento and American River floodwaters to the west down the mile-long Sacramento Bypass to the Yolo Bypass. Each gate has 38 vertical wooden plank "needles" (4 inches thick by 1 foot wide by 6 feet long), hinged at the bottom and retained at the top by a hollow metal beam. The beam is manually released using a latch. Flood forecasters provide the necessary predictive information to weir operators who manage the number of opened gates in order to control the river's water surface elevation. Closing the hinged gates is a more laborious process than opening them. While opening a gate takes only a matter of minutes, closing it can take up to an hour. Long, hooked poles are used to raise each gate from its free open position to the vertical upright position. The hollow metal beam is then replaced, and the gate is released and allowed to rest against it.

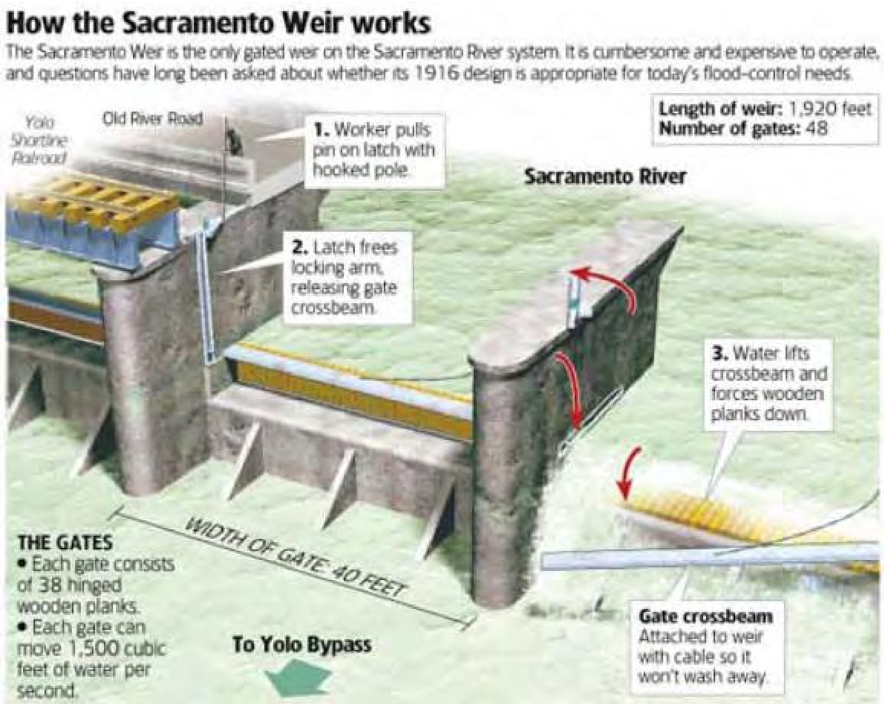


Figure 7. Diagram Depicting the Opening of the Sacramento Weir.
Appeared in the Sacramento Bee on January 5, 2006.

The Department of Water Resources operates the weir according to regulations established by the U.S. Army Corps of Engineers. The opening and closing criteria have been optimized to balance two goals: (1) minimize sediment deposition due to decreased flow velocities downstream from the weir to the mouth of American River; and (2) limit the flooding of agricultural lands in the Yolo Bypass until after they have been inundated by floodwaters over Fremont Weir.

Though the weir crest elevation is 24.75 feet, the weir gates are not opened until the river reaches 27.5 feet at the I Street gage with a forecast to continue rising. This gage is about 1,000 feet upstream from the I Street Bridge and about 3,500 feet downstream from the mouth of the American River. The number of gates to be opened is determined by the NWS/DWR river forecasting team to meet either of two criteria: (1) to prevent the stage at the I Street gage from exceeding 29 feet, or (2) to hold the stage at the downstream end of the weir to 27.5 feet. Once all 48 gates are open, Sacramento River stages from Verona to Freeport may continue to rise during a major flood event. Project design stages are 41.3 feet at Verona, 31.5 feet at the south end of the Sacramento Weir, and 31 feet at the I Street gage.

Figure 8, Sacramento Weir with Yolo Bypass in foreground, January 1997

Figure 9, Sacramento Weir with American River in background, March 1995 (30,000 cfs)

During a major flood, opening the weir gates at river stages below 27.5 feet does not reduce ultimate peak flood stages in the Sacramento River from Verona to Freeport. Diversion of the majority of upstream floodwaters to the Yolo Bypass from Fremont Weir controls Sacramento River flood stages at Verona.

Downstream of the Sacramento Weir, the design flood capacity of the American River is 5,000 cfs higher than that of the Sacramento River. Flows from the American River channel during a major flood event often exceed the capacity of the Sacramento River downstream of the confluence. When this occurs, floodwaters flow upstream from the mouth of the American River to the Sacramento Weir.

The weir gates are closed as rapidly as practicable once the stage at the weir drops below 25 feet. This provides "flushing" flows to re-suspend sediment deposited in the Sacramento River between the Sacramento Weir and the American River during the low flow periods when the weir is open during the peak of the flood event.

A rating table has been developed to estimate flow over the Sacramento Weir into the Yolo Bypass (Table 1). This table can be used to calculate both the approximate discharge per open gate and, for higher stages, the approximate discharge over closed gates as well. All stages are listed with respect to USGS mean sea level datum.

Table 1. Rating Table for the Sacramento Weir.

Sacramento River Stage at Gage Opposite of Weir - ft (USGS)	Discharge over Weir Crest per Open Gate (cfs)									
	0.0	**0.1**	**0.2**	**0.3**	**0.4**	**0.5**	**0.6**	**0.7**	**0.8**	**0.9**
22	0	3	8	14	22	30	40	50	61	73
23	86	100	114	130	146	163	181	199	218	238
24	258	279	301	323	346	370	394	419	445	471
25	498	525	552	581	610	639	669	699	730	762
26	794	826	859	893	927	961	996	1031	1067	1103
27	1140	1177	1215	1253	1291	1330	1370	1410	1450	1490
28	1531	1573	1615	1657	1700	1743	1786	1830	1874	1918
29	1963	2008	2054	2100	2146	2193	2240	2288	2336	2384
30	2432	2481	2530	2580	2630	2680	2730	2781	2832	2884
31	2936	2988	3041	3094	3147	3200	3254	3308	3362	3417
	Discharge over each Closed Gate (cfs)									
28	0	4	11	20	30	41	54	68	82	98
29	115	132	151	171	191	212	234	256	280	304
30	329	355	381	408	436	465	494	524	554	585
31	617	650	683	717	752	787	823	860	897	935

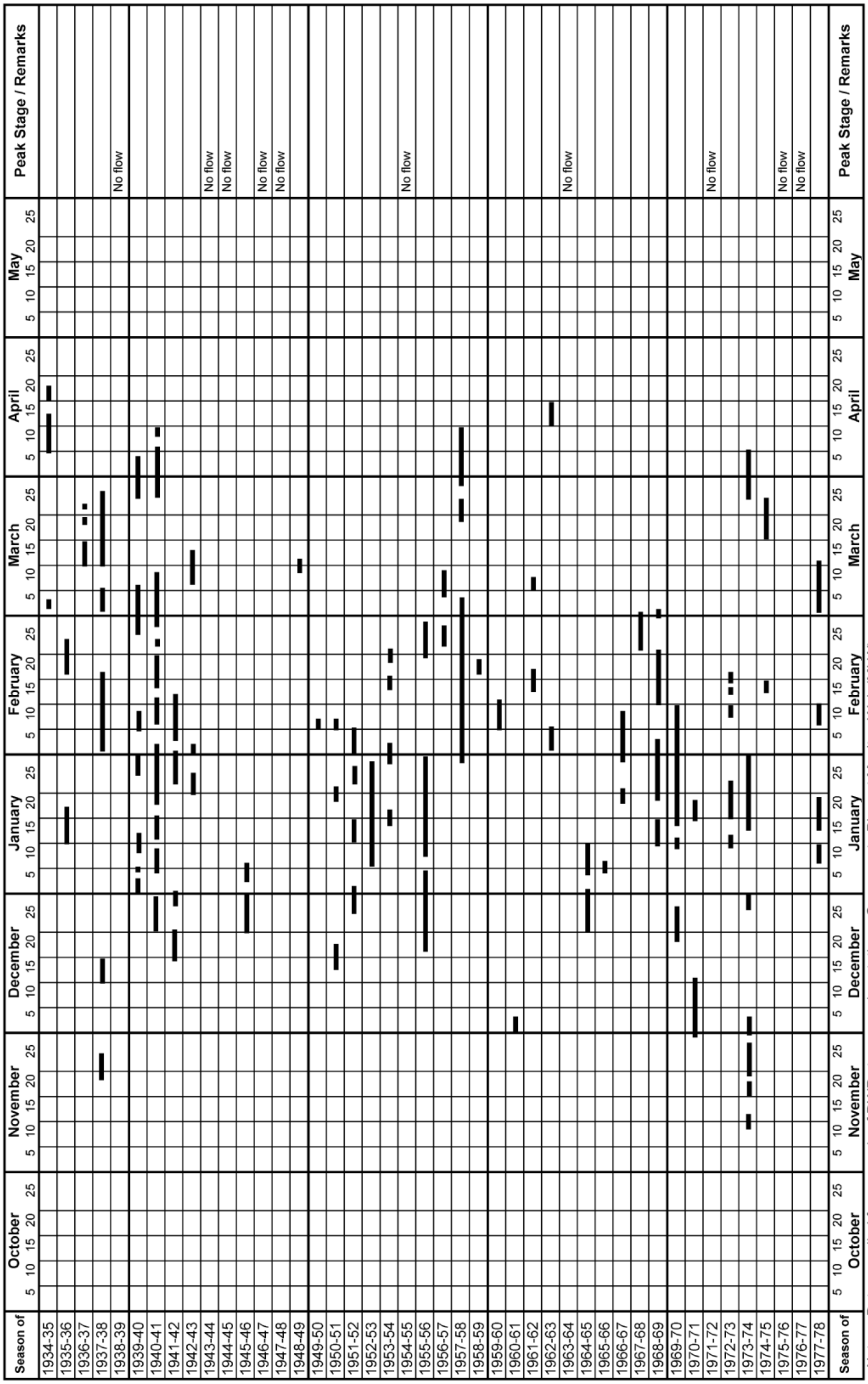
Cache Creek Settling Basin and Weir

The Cache Creek Settling Basin and Weir were originally completed between the late 1930's through the early 1950's. The basin was expanded and the new weir was completed in 1991. It is located in Yolo County about two miles east of the City of Woodland. Its primary purpose is to preserve the floodway capacity of the Yolo Bypass by entrapping the heavy sediment load carried by Cache Creek before its waters pour into the bypass. The basin is bound by levees on all sides and covers approximately 3,600 acres. The roller compacted concrete weir is 1,740 feet long along the east levee of the basin and controls discharge to the bypass. The project design capacity of the weir is 30,000 cfs, which is also the maximum capacity of the upstream Cache Creek channel system.

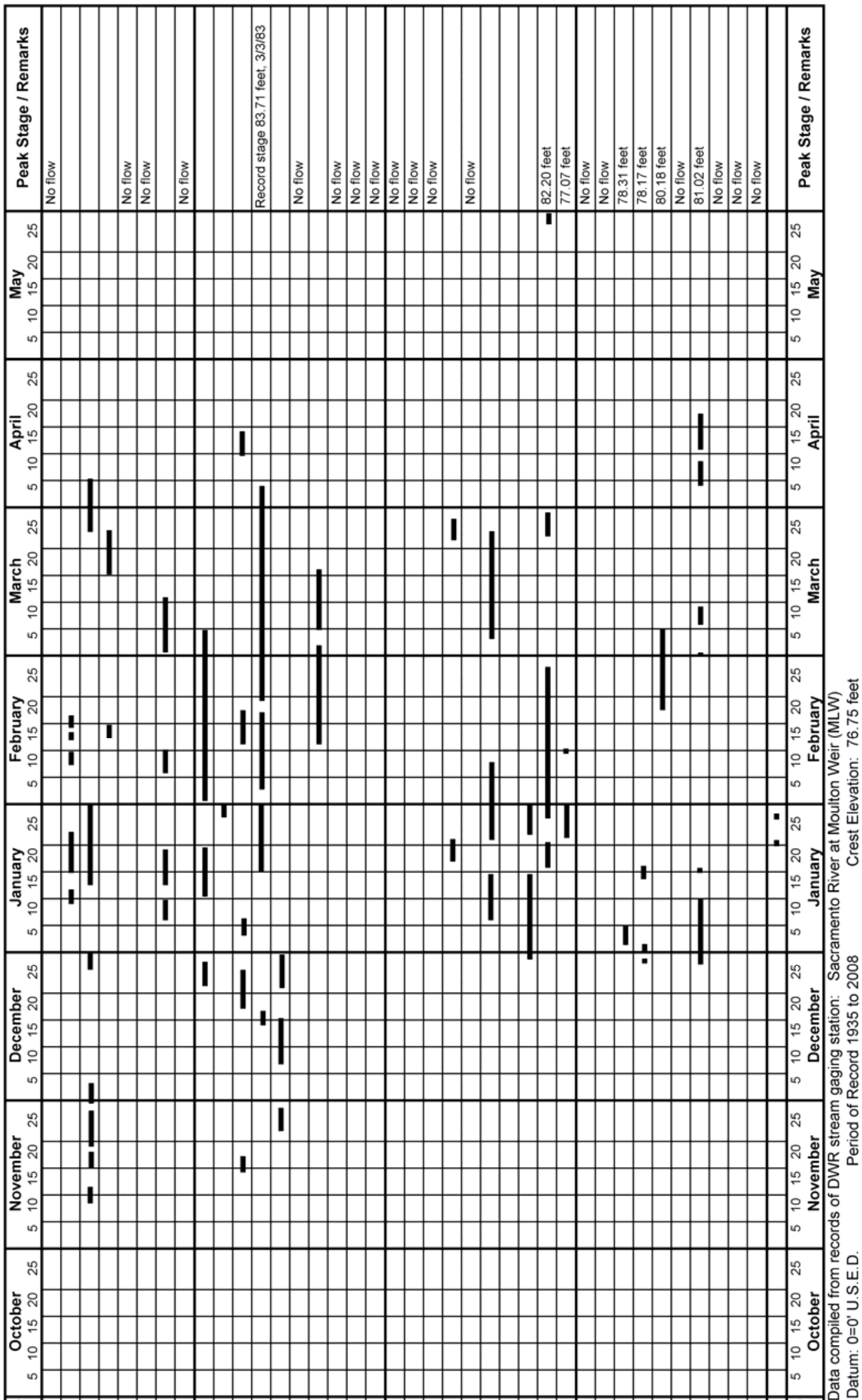
Figure 10, Cache Creek Settling Basin Weir, March 1995

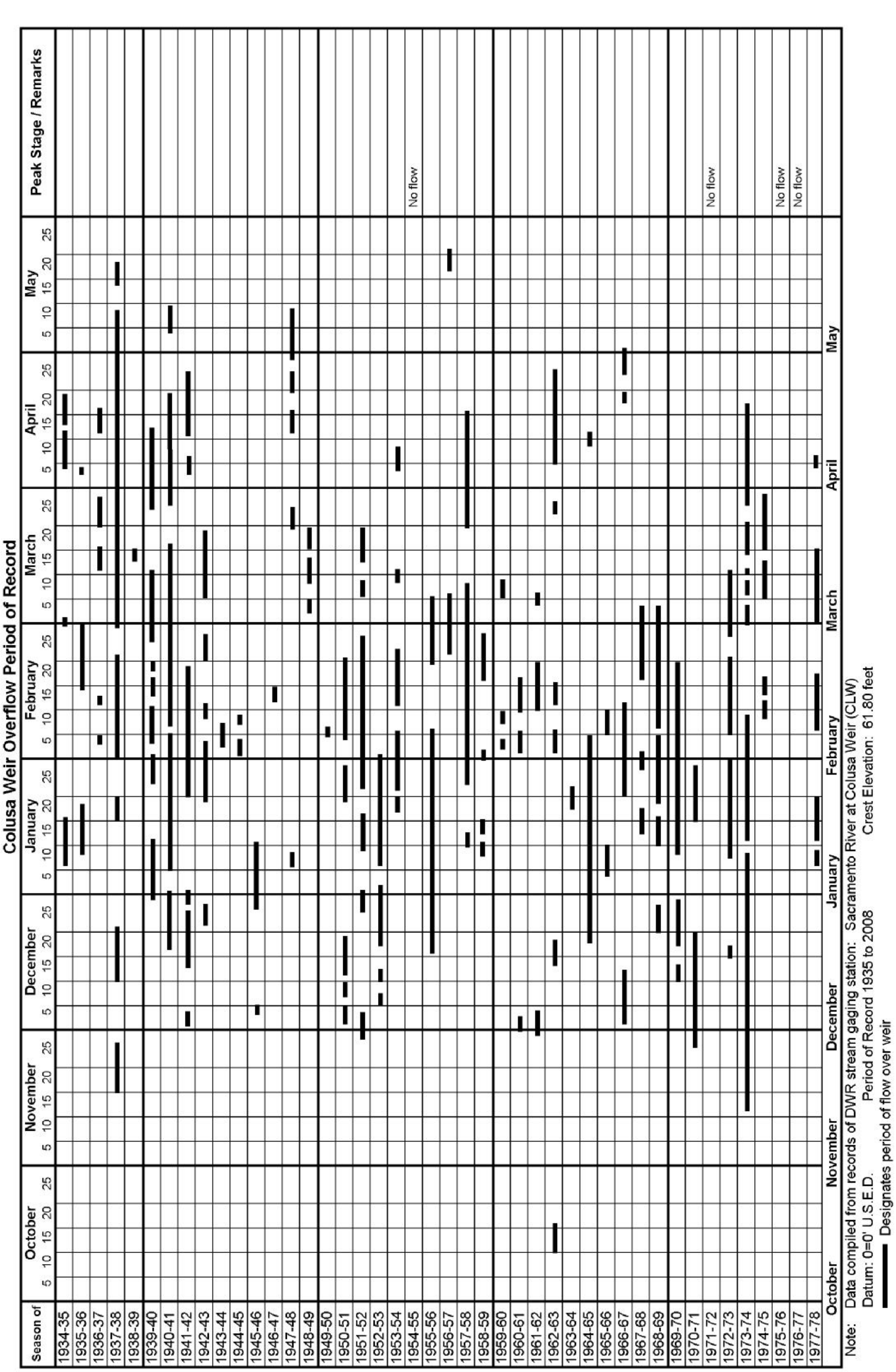
Overflow records for Moulton, Colusa, Tisdale, Fremont, and Sacramento Weirs from 1934 through 2007 are found on the following pages. Subsequent years will be added as the charts are updated.

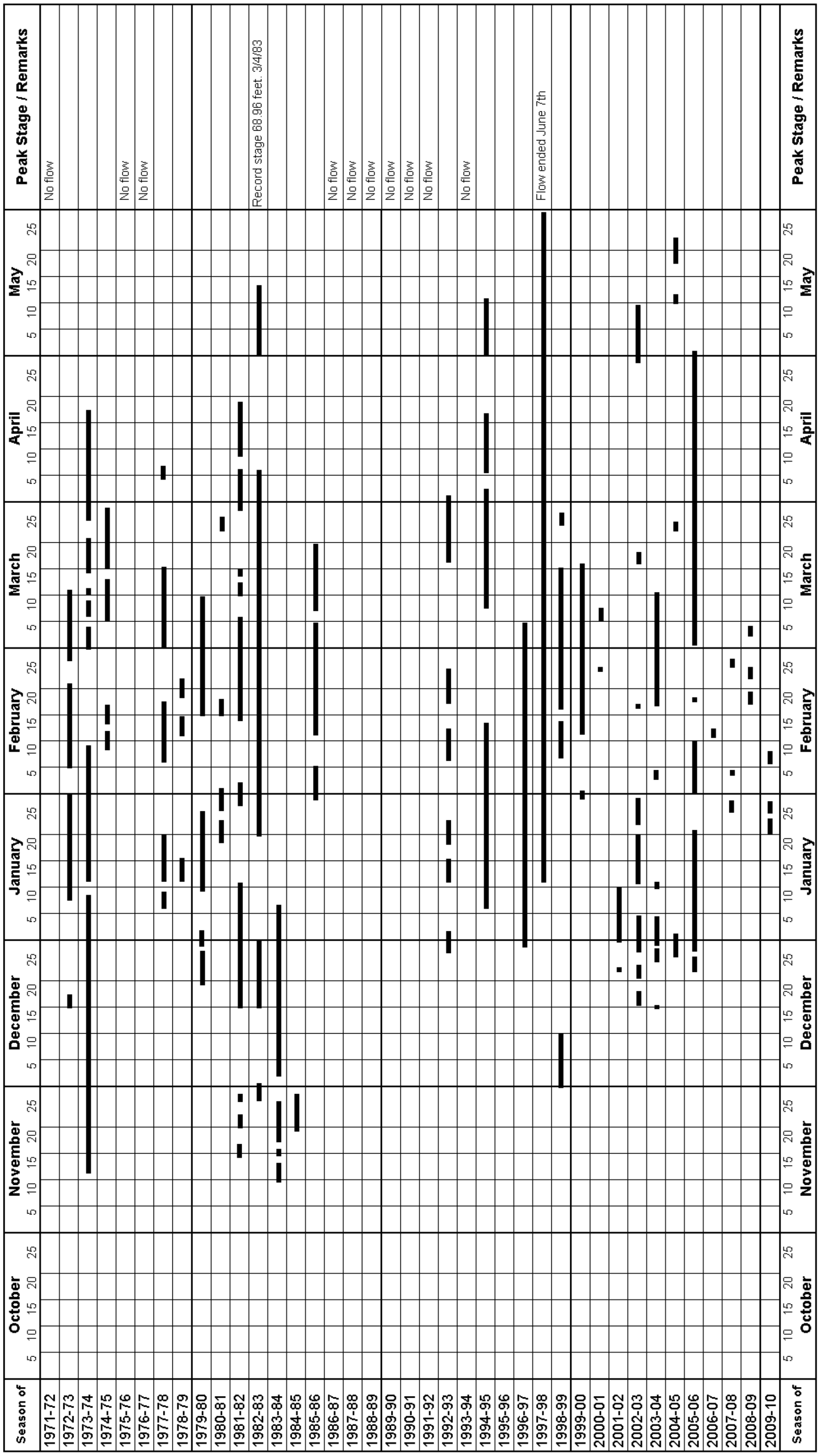
Moulton Weir Overflow Period of Record



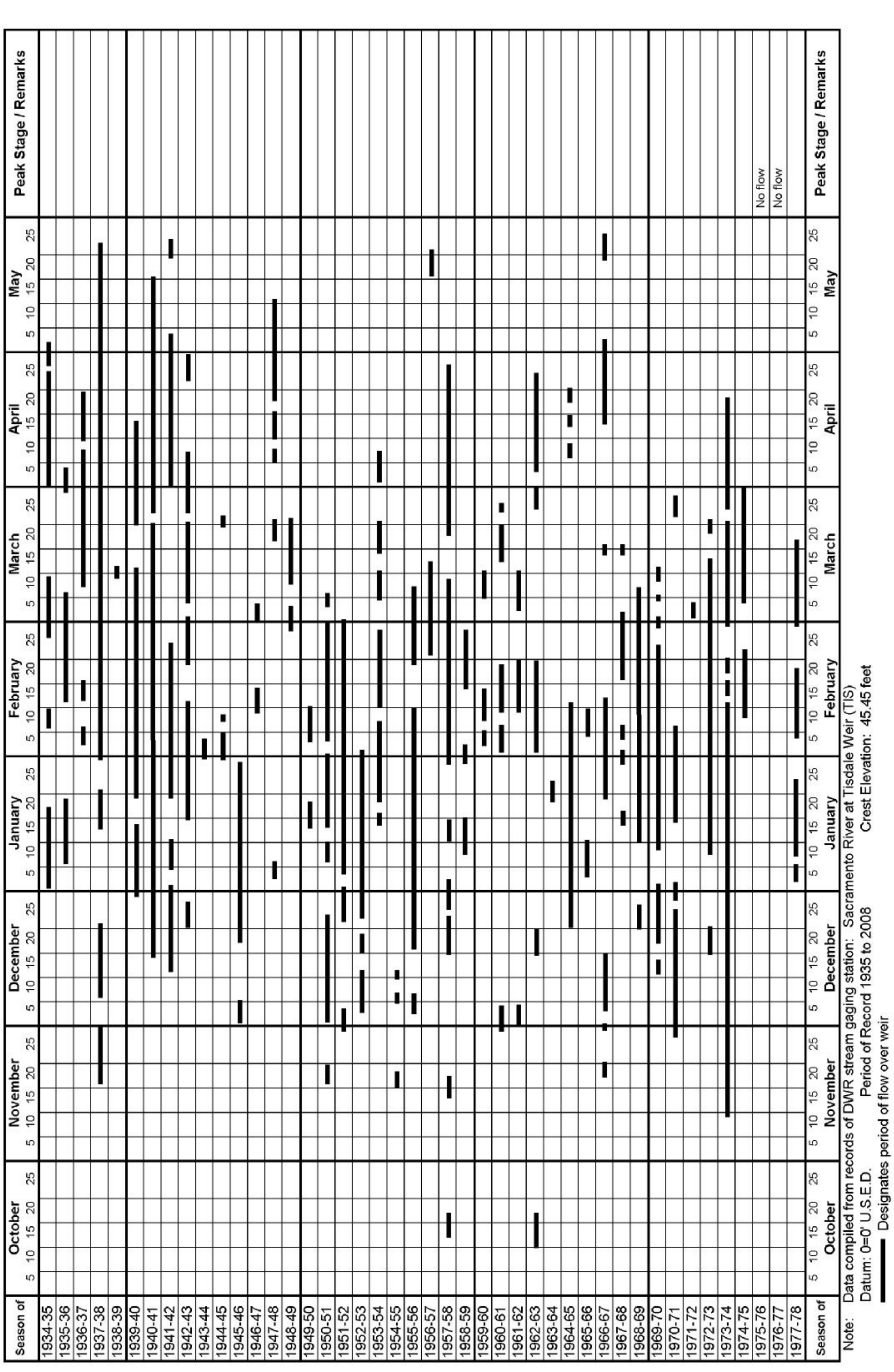
Note: Data compiled from records of DWR stream gaging station: Sacramento River at Moulton Weir (MLW)
Datum: 0=0' U.S.E.D. Period of Record 1935 to 2008 Crest Elevation: 76.75 feet
Designates period of flow over weir

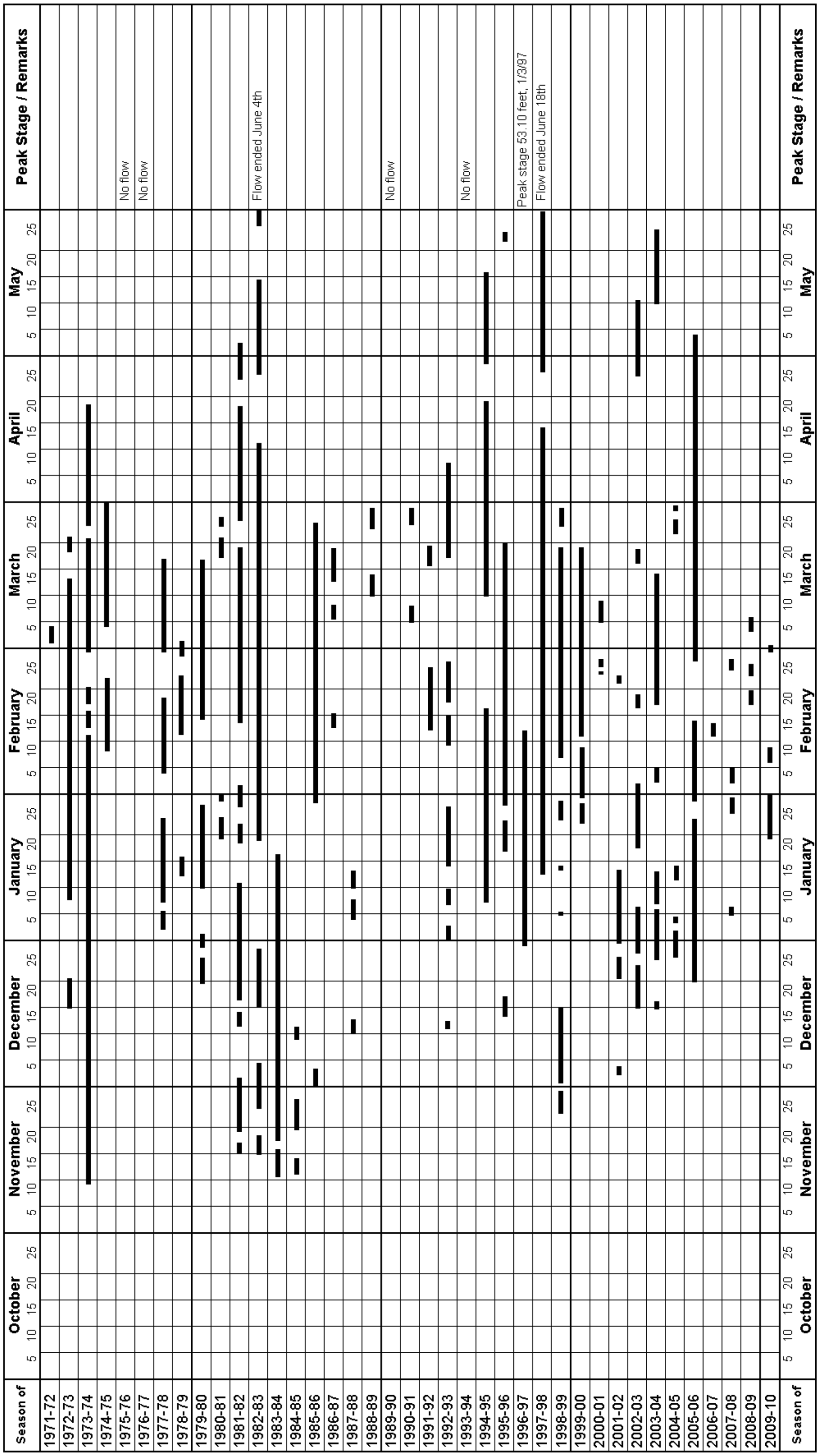

Season of
October 5 10 15 20 25
November 5 10 15 20 25
December 5 10 15 20 25
January 5 10 15 20 25
February 5 10 15 20 25
March 5 10 15 20 25
April 5 10 15 20 25
May 5 10 15 20 25
Peak Stage / Remarks
1971-72 No flow
1972-73
1973-74
1974-75
1975-76 No flow
1976-77 No flow
1977-78
1978-79 No flow
1979-80
1980-81
1981-82
1982-83 Record stage 83.71 feet, 3/3/83
1983-84
1984-85 No flow
1985-86
1986-87 No flow
1987-88 No flow
1988-89 No flow
1989-90 No flow
1990-91 No flow
1991-92 No flow
1992-93
1993-94 No flow
1994-95
1995-96
1996-97
1997-98 82.20 feet
1998-99 77.07 feet
1999-00 No flow
2000-01 No flow
2001-02 78.31 feet
2002-03 78.17 feet
2003-04 80.18 feet
2004-05 No flow
2005-06 81.02 feet
2006-07 No flow
2007-08 No flow
2008-09 No flow
2009-10
Note: Data compiled from records of DWR stream gaging station: Sacramento River at Moulton Weir (MLW)
Datum: 0=0' U.S.E.D. Period of Record 1935 to 2008 Crest Elevation: 76.75 feet
Designates period of flow over weir


Colusa Weir Overflow Period of Record
Season of
October
November
December
January
February
March
April
May
Peak Stage / Remarks
1934-35
1935-36
1936-37
1937-38
1938-39
1939-40
1940-41
1941-42
1942-43
1943-44
1944-45
1945-46
1946-47
1947-48
1948-49
1949-50
1950-51
1951-52
1952-53
1953-54
1954-55
1955-56
1956-57
1957-58
1958-59
1959-60
1960-61
1961-62
1962-63
1963-64
1964-65
1965-66
1966-67
1967-68
1968-69
1969-70
1970-71
1971-72
1972-73
1973-74
1974-75
1975-76
1976-77
1977-78
No flow
No flow
No flow
No flow
Note: Data compiled from records of DWR stream gaging station: Sacramento River at Colusa Weir (CLW)
Datum: 0=0' U.S.E.D.
Period of Record 1935 to 2008
Crest Elevation: 61.80 feet
Designates period of flow over weir



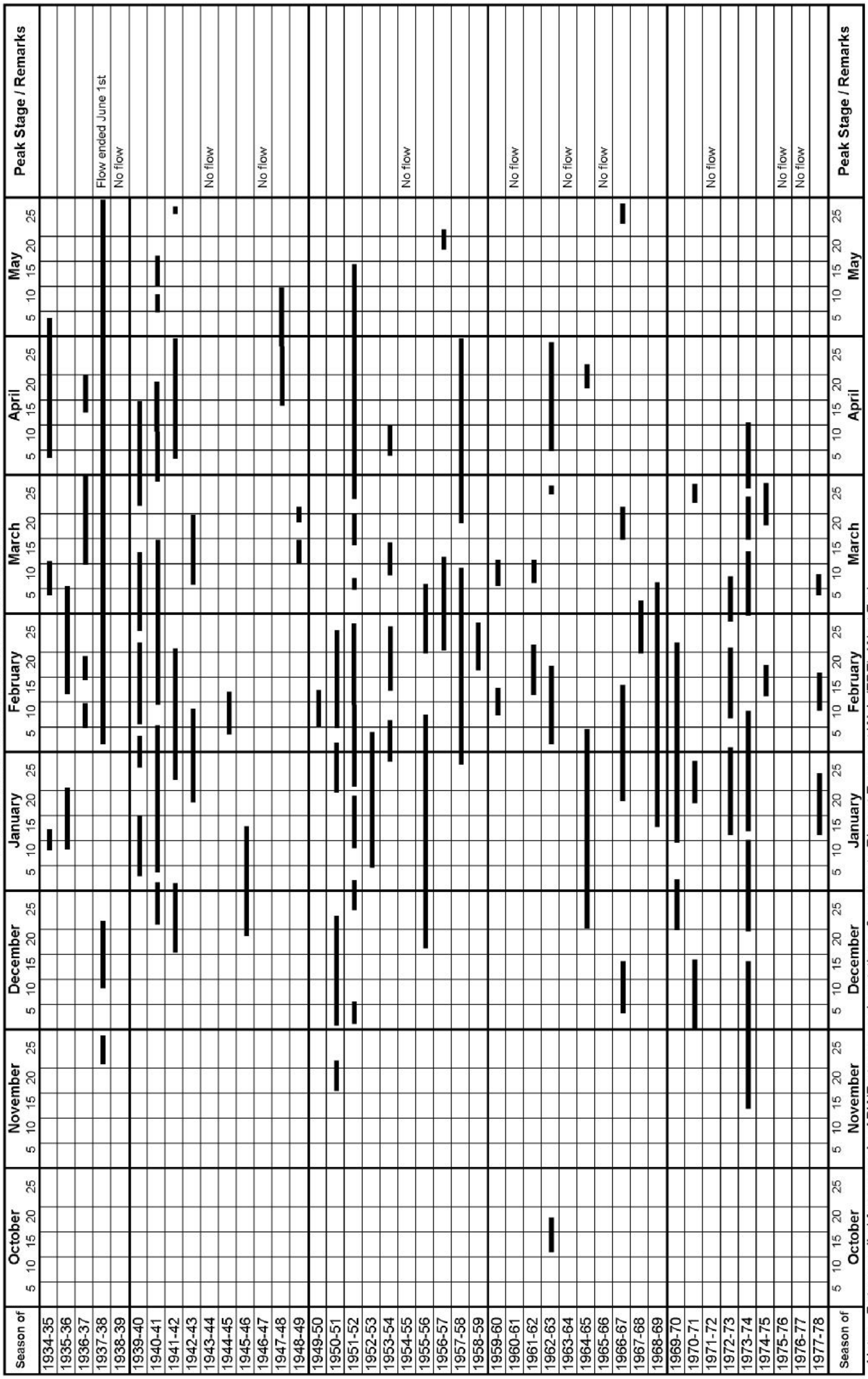
Note: Data compiled from records of DWR stream gaging station: Sacramento River at Colusa Weir (CLW)
Datum: 0=0' U.S.E.D. Period of Record 1935 to 2008 Crest Elevation: 61.80 feet
▬ Designates period of flow over weir


Tisdale Weir Overflow Period of Record
Season of
October
November
December
January
February
March
April
May
Peak Stage / Remarks
5 10 15 20 25
1934-35
1935-36
1936-37
1937-38
1938-39
1939-40
1940-41
1941-42
1942-43
1943-44
1944-45
1945-46
1946-47
1947-48
1948-49
1949-50
1950-51
1951-52
1952-53
1953-54
1954-55
1955-56
1956-57
1957-58
1958-59
1959-60
1960-61
1961-62
1962-63
1963-64
1964-65
1965-66
1966-67
1967-68
1968-69
1969-70
1970-71
1971-72
1972-73
1973-74
1974-75
1975-76
1976-77
1977-78
No flow
No flow
Note: Data compiled from records of DWR stream gaging station: Sacramento River at Tisdale Weir (TIS)
Datum: 0=0' U.S.E.D. Period of Record 1935 to 2008 Crest Elevation: 45.45 feet
Designates period of flow over weir

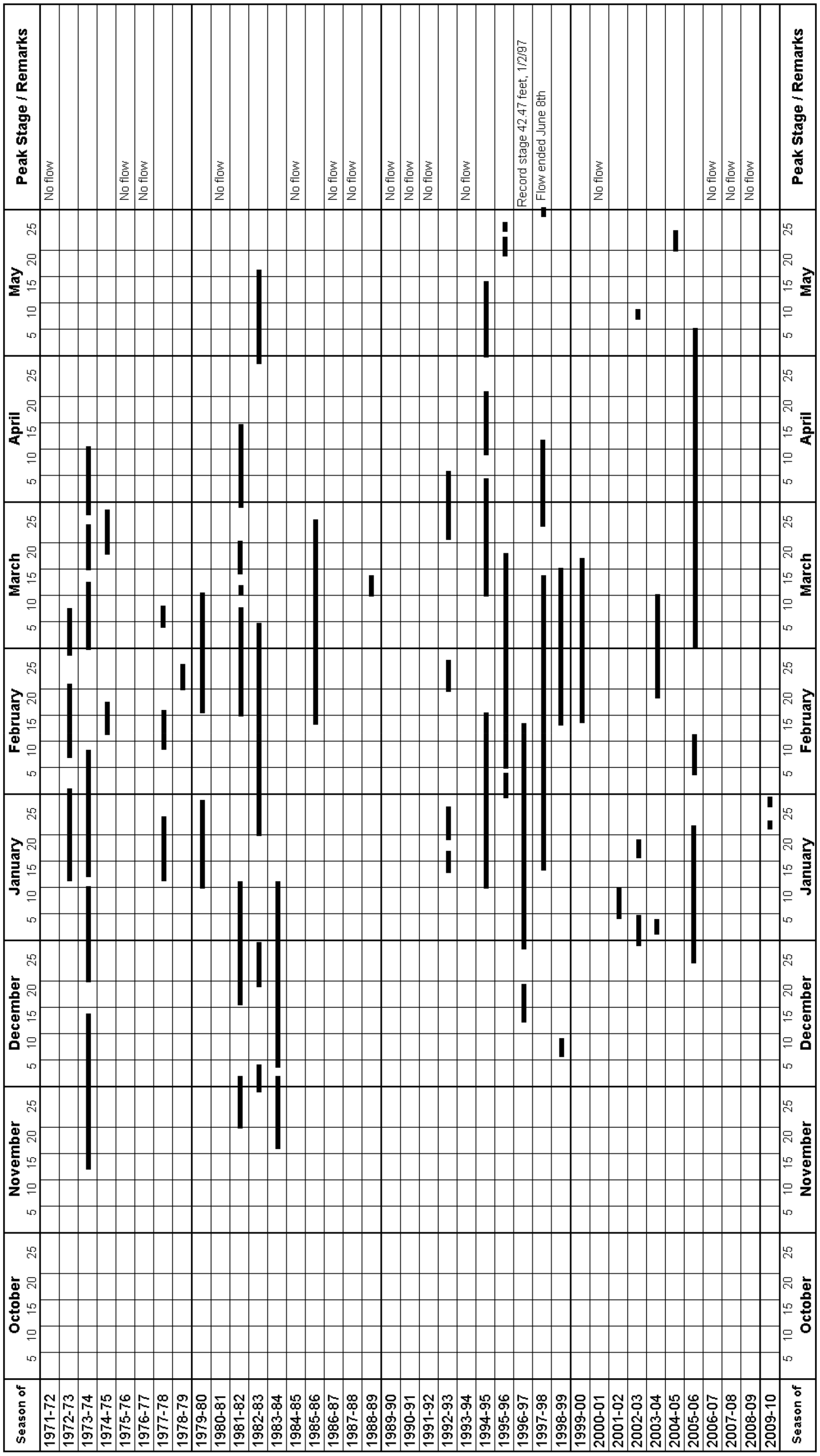


Note: Data compiled from records of DWR stream gaging station: Sacramento River at Tisdale Weir (TIS)
Datum: 0=0' U.S.E.D. Period of Record 1935 to 2008 Crest Elevation: 45.45 feet
▬ Designates period of flow over weir

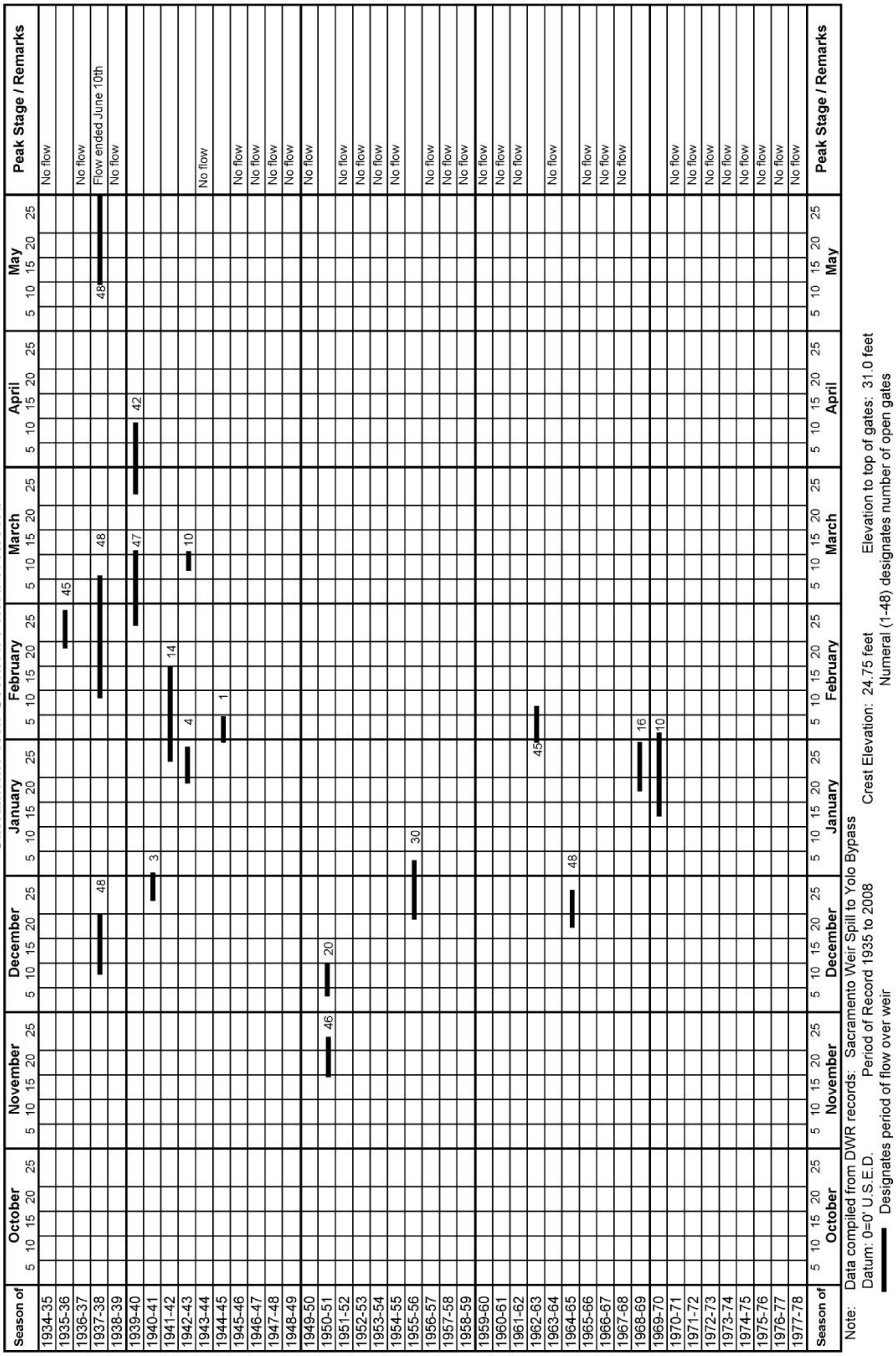
Fremont Weir Overflow Period of Record

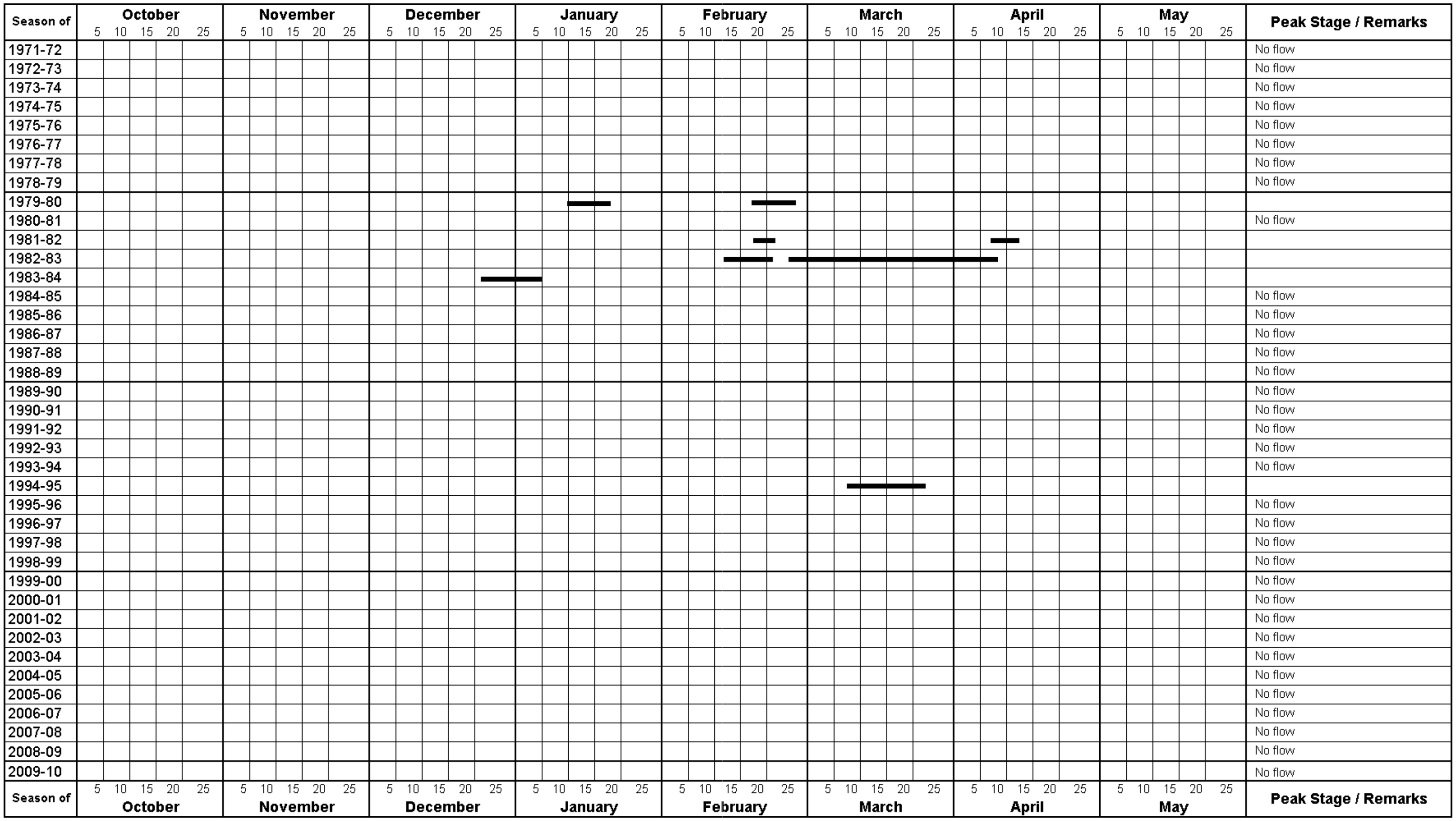


Note: Data compiled from records of DWR stream gaging station: Sacramento River at Freemont Weir (FRE), West End
Datum: 0=0' U.S.E.D. Period of Record 1935 to 2008 Crest Elevation: 33.50 feet
▬ Designates period of flow over weir



Note: Data compiled from records of DWR stream gaging station: Sacramento River at Freemont Weir (FRE), West End
Datum: 0=0' U.S.E.D. Period of Record 1935 to 2008 Crest Elevation: 33.50 feet
▬ Designates period of flow over weir


Sacramento Weir Overflow Period of Record
Season of
October November December January February March April May
5 10 15 20 25
Peak Stage / Remarks
1934-35 No flow
1935-36 45
1936-37 No flow
1937-38 48 48 Flow ended June 10th
1938-39 No flow
1939-40 47 42
1940-41 3
1941-42 14
1942-43 4 10
1943-44 No flow
1944-45 1
1945-46 No flow
1946-47 No flow
1947-48 No flow
1948-49 No flow
1949-50 No flow
1950-51 46 20
1951-52 No flow
1952-53 No flow
1953-54 No flow
1954-55 No flow
1955-56 30
1956-57 No flow
1957-58 No flow
1958-59 No flow
1959-60 No flow
1960-61 No flow
1961-62 No flow
1962-63 45
1963-64 No flow
1964-65 48
1965-66 No flow
1966-67 No flow
1967-68 No flow
1968-69 16
1969-70 10
1970-71 No flow
1971-72 No flow
1972-73 No flow
1973-74 No flow
1974-75 No flow
1975-76 No flow
1976-77 No flow
1977-78 No flow
Note: Data compiled from DWR records: Sacramento Weir Spill to Yolo Bypass
Datum: 0=0' U.S.E.D. Period of Record 1935 to 2008 Crest Elevation: 24.75 feet Elevation to top of gates: 31.0 feet
Designates period of flow over weir
Numeral (1-48) designates number of open gates



Note: Data compiled from DWR records: Sacramento Weir Spill to Yolo Bypass
Datum: 0=0' U.S.E.D. Period of Record 1935 to 2008 Crest Elevation: 24.75 feet Elevation to top of gates: 31.0 feet
▬ Designates period of flow over weir

Sacramento Valley Flood Control Historical Timeline

(Based on *Battling the Inland Sea*, by Robert Kelley)

1849	U.S. Congress passes Swamp Land Act of 1849
1850	Swamp Land Act of 1850
January 7, 1850	City of Sacramento floods
March, 1850	Another storm hits Sacramento. Hardin Bigelow organizes flood fighting party and successfully dams most low points along American and Sacramento Rivers (Bigelow soon becomes Mayor of Sacramento)
1851	First levees built in Sacramento (3-feet high)
December, 1852	First levees built in Sacramento failed
March, 1853	Second flood of season (larger than first) inundates Sacramento
May 31, 1861	AB 54 (State Reclamation Act) passed – Swamplands Commission created, tasked with statewide flood control program development
1861	Andrew Humphreys of the U.S. Army Corps of Engineers (USACE) submits Mississippi River flood study to U.S. Congress – Advocates levees only, main channel flood control approach (All storm flow to remain within levees, and assumption that river will scour out material from the bed to accommodate additional flow)
1862	City of Sacramento Levee District created
March 22, 1866	AB 591 passes – State-wide Swampland Commission dissolved (Reclamation authority delegated to county boards of supervisors)
1867 – 1880	Reclamation districts upstream and downstream of Colusa race each other to construct levees on each bank of Sacramento River
April 13, 1868	Sacramento Valley Levee District 1 (Sutter County) created
May 30, 1868	Green Act (named for *Colusa Sun* editor William S. Green, who authored the bill) passes – Greatly reduces County authority to block reclamation projects. William Green is also the earliest known figure to call for a system of flood overflow basins for the Sacramento River
December 6, 1871	Colusa-area swampland owner, William Parks completes construction of earthen dam across Butte Slough, the effect of which will inundate the property of others upstream

December 27, 1871	Parks Dam is cut by parties unknown; releasing pooled floodwaters downstream – Dam is rebuilt in following year
January 19, 1874	Parks Dam fails
December 28, 1874	L.F. Moulton proxy and Parks Dam flood victim, Justin Laux v. William Parks: Suit is dismissed when Parks purchases Laux's farm
January, 1875	Marysville inundated by water and mining sediment via Yuba River – Mining sediment from hydraulic mining operations had for several years been polluting rivers and settling in river beds, thus raising the bed elevation, and causing more frequent flooding and more extensive damage to adjacent properties
January 25, 1875	Parks Dam fails again
May 7, 1875	William Parks petitions for creation of swampland district
June 3, 1875	County Supervisors deny Parks' request to rebuild dam
June 16, 1875	William Parks' Swampland District (SLD) 226 created – Construction of dam recommences
January 5, 1876	Floodwaters impounded by Parks Dam breach Reclamation District (RD) 70 levee; flooding farm properties downstream
January 8, 1876	Thirty to Forty armed men from RD 70 form naval party to successfully destroy Parks Dam
March 4, 1876	Judge Phil. Keyser issues injunction against Parks' and SLD 226 dam constuction
March, 1878	Drainage Bill enacted – Independent public commission would establish drainage districts; State Engineer would plan projects (based on levees only); Districts would raise and expend taxes, construct and operate projects
March, 1879	Judge Phil. Keyser issues injunction against Bear River mining operations, citing Equity Clause
November, 1879	State Supreme Court overturns Keyser's injunction
January 21, 1880	California's first State Engineer, William Hammond Hall, submits Irrigation/Flood Control Report to State Legislature – A damning report on the mining operations' environmental destruction that advocated State control of drainage
September 26, 1881	Drainage Act declared unconstitutional – Act was not created by State Legislature

January, 1884	Edwards Woodruff v. North Bloomfield Gravel Mining Company-- Prohibited the discharge of mining waste in surface waters
February, 1891	USACE's Biggs Commission Report asserts mining operations may continue, with mining companies construction of debris dams, and Federal restoration of natural river channels downstream
March, 1893	Caminetti Bill (based on Biggs Commission Report findings) signed by President Benjamin Harrison – Establishes California Debris Commission
December, 1894	Marsden Manson & C.E. Grunsky, (consulting engineers working foe State Commissioner of Public Works, A.H. Rose,) issue *Marsden & Grunsky Report for Sacramento Valley Flood Control*, and present it to California Governor – First comprehensive report that advocated bypass channels (William Green had asserted this need three decades earlier)
January, 1896	Flood of '96 – Many mining debris dams (products of Biggs Commission recommendations) fail, sending waste downstream
March, 1896	Rivers and Harbors Act enacted in Congress -- $250K appropriated (none of which was for mining assistance)
May, 1902	River Improvement and Drainage Association of California created
May 11, 1904	San Francisco Chronicle editor and Commonwealth Club founder, Edward Adams' public presentation on statewide flood control and reclamation – A retelling of California reclamation history to date, and a call for State and Federal governments to assert control of future planning
1904	U.S. Army Corps of Engineers' Dabney Commission issues report that rejects the Manson & Grunsky Report's findings of the need for bypass channels and a design flood of 300,000 cfs. Advocates levees only main channel approach and a design flood of 250,000 cfs
March 19, 1907	Flood of '07 – First flood event to occur with USGS staff gages in place to measure river levels – Observed flow calculated to be 600,000 cfs (more than *double* the Dabney design flood) Feather River dumps into Butte Sink, Yuba City & Shanghai Bend Sacramento River jumps banks both north and south of Colusa
1907	USACE's California Debris Commission expands navigation assurance role to include flood control
1909	Flood of '09 – Nearly as large as the Flood of '07
1910	Thomas H. Jackson of the USACE produces the "Jackson Report"; the foundational plan for the Sacramento Flood Control Project – employing the Manson & Grunsky Report's bypass channels, only with a design flood of 600,000 cfs
1911	State Flood Control Act enacted

1913	State Reclamation Board given greater authority
1913	Dredging of the mouth of the Sacramento River begins – Continues through the 1920s
1917	Congress enacts Flood Control Act – Includes funding for the Sacramento Flood Control Project, but largely limited to navigation related tasks
1928	Flood Control Act of ’28 – Enacted as a response to the Mississippi Flood of ’27, and adds flood control to USACE directives
1936	Flood Control Act of ’36 – Promotion of multi-purpose water resource projects for USACE purview
February 11, 1986	Flood of ’86 – 600,000 cfs (maximum design flow) pours into Sacramento-San Joaquin Delta via Sacramento River and Yolo Bypass. Only upstream flood control reservoirs prevent approximately *one million cfs* from severely testing the Sacramento Flood Control Project. As a result, the system largely works as designed
January 3, 1997	Flood of ’97 – nearly 600,000 cfs again pours into Sacramento-San Joaquin Delta via Sacramento River and Yolo Bypass. Only upstream reservoirs prevent approximately one million cfs from inundating the Sacramento Flood Control Project.