

Appendix 4

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AVERAGE UNIMPAIRED FLOW BY WATERSHED (TAF)

Based on DWR 1922-1992 average unimpaired flow data

Watershed	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Stony Creek	1.8	13.0	47.0	82.5	97.7	71.8	48.1	25.6	8.1	1.1	0.1	0.2	397
Sacramento River	305.6	462.0	826.6	1,081.8	1,232.4	1,205.7	972.0	670.3	428.0	297.4	254.0	257.0	7,993
Feather River	109.4	197.6	366.7	454.9	543.0	630.8	682.7	620.8	321.1	150.1	99.4	86.8	4,263
Yuba River	33.9	96.5	194.9	243.4	286.1	318.2	362.5	399.7	206.8	54.8	23.1	19.9	2,240
Bear River	4.8	15.0	40.0	55.6	67.2	59.7	38.7	15.9	5.7	2.5	1.2	1.4	308
American River	26.8	93.3	197.5	270.7	316.1	369.9	437.2	488.7	263.3	64.0	15.7	11.7	2,555
Cosumnes River	1.9	10.0	30.0	50.3	63.5	71.7	64.5	41.6	14.8	3.5	1.2	0.7	354
Mokelumne River	5.7	19.7	37.9	45.9	58.2	77.4	122.6	187.9	115.7	23.9	4.3	2.6	702
Calaveras River	0.4	4.6	15.9	28.6	39.1	34.4	21.0	5.9	2.0	0.8	0.3	0.3	153
Stanislaus River	9.8	28.5	52.9	71.5	91.3	121.5	190.7	278.1	171.6	51.0	12.2	6.4	1,085
Tuolumne River	17.0	49.6	89.8	109.2	142.0	180.5	270.9	437.0	343.4	116.6	23.8	11.5	1,791
Merced River	7.2	20.4	43.6	57.6	82.7	96.7	145.8	238.3	167.6	51.8	12.0	5.3	929
Chowchilla River	0.1	1.5	6.0	10.6	17.9	17.0	11.5	3.8	1.1	0.2	0.0	0.0	70
Fresno River	0.4	1.8	5.8	9.9	16.8	18.8	15.6	9.2	4.9	1.8	0.4	0.4	86
San Joaquin River	19.3	33.5	60.5	73.6	100.0	136.9	234.3	426.1	366.2	160.5	50.3	23.8	1,685
TOTAL	544	1,047	2,015	2,646	3,154	3,411	3,618	3,849	2,420	980	498	428	24,610

AVERAGE PERCENT CONTRIBUTION BY WATERSHED

Contribution based on 1922-1992 average unimpaired flow data

Watershed	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Stony Creek	0.32%	1.24%	2.33%	3.12%	3.10%	2.10%	1.33%	0.67%	0.33%	0.12%	0.01%	0.05%
Sacramento River	56.18%	44.13%	41.02%	40.88%	39.07%	35.35%	26.86%	17.41%	17.68%	30.35%	51.00%	60.04%
Feather River	20.12%	18.87%	18.20%	17.19%	17.22%	18.49%	18.87%	16.13%	13.27%	15.32%	19.96%	20.28%
Yuba River	6.23%	9.22%	9.67%	9.20%	9.07%	9.33%	10.02%	10.38%	8.54%	5.59%	4.64%	4.66%
Bear River	0.89%	1.44%	1.98%	2.10%	2.13%	1.75%	1.07%	0.41%	0.23%	0.26%	0.24%	0.34%
American River	4.92%	8.91%	9.80%	10.23%	10.02%	10.84%	12.09%	12.70%	10.88%	6.53%	3.16%	2.74%
Cosumnes River	0.34%	0.96%	1.49%	1.90%	2.01%	2.10%	1.78%	1.08%	0.61%	0.36%	0.25%	0.16%
Mokelumne River	1.04%	1.88%	1.88%	1.73%	1.85%	2.27%	3.39%	4.88%	4.78%	2.44%	0.87%	0.61%
Calaveras River	0.07%	0.44%	0.79%	1.08%	1.24%	1.01%	0.58%	0.15%	0.08%	0.08%	0.06%	0.06%
Stanislaus River	1.81%	2.72%	2.63%	2.70%	2.89%	3.56%	5.27%	7.22%	7.09%	5.21%	2.45%	1.49%
Tuolumne River	3.12%	4.73%	4.46%	4.13%	4.50%	5.29%	7.49%	11.35%	14.19%	11.89%	4.78%	2.68%
Merced River	1.32%	1.95%	2.16%	2.18%	2.62%	2.84%	4.03%	6.19%	6.92%	5.28%	2.40%	1.23%
Chowchilla River	0.01%	0.14%	0.30%	0.40%	0.57%	0.50%	0.32%	0.10%	0.04%	0.02%	0.01%	0.01%
Fresno River	0.08%	0.17%	0.29%	0.37%	0.53%	0.55%	0.43%	0.24%	0.20%	0.18%	0.08%	0.09%
San Joaquin River	3.54%	3.20%	3.00%	2.78%	3.17%	4.01%	6.48%	11.07%	15.13%	16.38%	10.10%	5.57%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

San Joaquin River Basin Watersheds Contribution relative to the SJR Basin

Watershed	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Stanislaus River	18.32%	21.05%	20.46%	21.51%	20.25%	21.26%	21.95%	19.97%	16.27%	13.37%	12.34%	13.44%
Tuolumne River	31.61%	36.65%	34.73%	32.85%	31.51%	31.58%	31.18%	31.38%	32.56%	30.52%	24.12%	24.25%
Merced River	13.37%	15.11%	16.84%	17.32%	18.36%	16.93%	16.78%	17.11%	15.89%	13.56%	12.12%	11.10%
Chowchilla River	0.10%	1.08%	2.31%	3.20%	3.96%	2.98%	1.33%	0.27%	0.10%	0.06%	0.03%	0.09%
Fresno River	0.78%	1.32%	2.25%	2.98%	3.73%	3.28%	1.79%	0.66%	0.46%	0.46%	0.41%	0.82%
San Joaquin River	35.83%	24.79%	23.41%	22.15%	22.19%	23.97%	26.97%	30.60%	34.72%	42.03%	50.99%	50.31%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Sacramento River Basin Watersheds Contribution relative to the SR Basin

Watershed	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Stony Creek	0.36%	1.43%	2.68%	3.56%	3.62%	2.53%	1.75%	1.04%	0.59%	0.19%	0.02%	0.06%
Sacramento River	62.34%	50.67%	47.06%	46.76%	45.59%	42.46%	35.35%	27.29%	31.35%	49.72%	63.61%	67.51%
Feather River	22.32%	21.67%	20.88%	19.66%	20.09%	22.21%	24.83%	25.27%	23.52%	25.10%	24.89%	22.80%
Yuba River	6.92%	10.59%	11.10%	10.52%	10.58%	11.21%	13.18%	16.27%	15.14%	9.17%	5.79%	5.24%
Bear River	0.99%	1.65%	2.28%	2.40%	2.48%	2.10%	1.41%	0.65%	0.42%	0.42%	0.30%	0.38%
American River	5.46%	10.23%	11.24%	11.70%	11.69%	13.02%	15.90%	19.89%	19.29%	10.69%	3.94%	3.08%
Cosumnes River	0.38%	1.10%	1.71%	2.17%	2.35%	2.52%	2.35%	1.69%	1.08%	0.59%	0.31%	0.17%
Mokelumne River	1.16%	2.16%	2.16%	1.98%	2.15%	2.73%	4.46%	7.65%	8.47%	3.99%	1.08%	0.69%
Calaveras River	0.08%	0.51%	0.91%	1.24%	1.45%	1.21%	0.76%	0.24%	0.15%	0.13%	0.07%	0.07%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

SAN JOAQUIN RIVER AT VERNALIS, REQUIRED PULSE AND X2 FLOW (TAF)

YEAR	60-20-20 Year Type	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
1922	W	123	0	0	0	190	210	369	365	204	0	0	0	1,461
1937	W	123	0	0	0	190	210	369	365	127	0	0	0	1,384
1938	W	123	0	0	0	190	210	369	365	204	0	0	0	1,461
1941	W	123	0	0	0	190	210	369	365	204	0	0	0	1,461
1942	W	123	0	0	0	190	210	369	365	204	0	0	0	1,461
1943	W	123	0	0	0	190	210	369	365	204	0	0	0	1,461
1952	W	123	0	0	0	190	210	369	365	204	0	0	0	1,461
1956	W	123	0	0	0	190	210	369	365	204	0	0	0	1,461
1958	W	123	0	0	0	190	210	369	365	204	0	0	0	1,461
1965	W	121	0	0	0	190	210	369	365	204	0	0	0	1,459
1967	W	123	0	0	0	190	210	369	365	204	0	0	0	1,461
1969	W	123	0	0	0	190	210	369	365	204	0	0	0	1,461
1974	W	123	0	0	0	190	210	369	365	204	0	0	0	1,461
1975	W	123	0	0	0	190	210	369	365	204	0	0	0	1,461
1978	W	61	0	0	0	190	210	369	365	204	0	0	0	1,399
1980	W	123	0	0	0	190	210	369	365	204	0	0	0	1,461
1982	W	123	0	0	0	190	210	369	365	204	0	0	0	1,461
1983	W	123	0	0	0	190	210	369	365	204	0	0	0	1,461
1986	W	123	0	0	0	190	210	369	365	127	0	0	0	1,384
1993	W	61	0	0	0	190	210	369	365	204	0	0	0	1,399
AVG	W	117	0	0	0	190	210	369	365	196	0	0	0	1,447
1923	AN	123	0	0	0	190	210	318	317	127	0	0	0	1,285
1927	AN	118	0	0	0	190	210	318	317	204	0	0	0	1,357
1932	AN	61	0	0	0	190	131	241	238	127	0	0	0	988
1935	AN	113	0	0	0	118	210	318	317	204	0	0	0	1,280
1936	AN	123	0	0	0	190	210	318	317	127	0	0	0	1,285
1940	AN	123	0	0	0	190	210	318	317	204	0	0	0	1,362
1945	AN	123	0	0	0	190	210	318	238	127	0	0	0	1,206
1946	AN	123	0	0	0	190	210	318	238	127	0	0	0	1,206
1951	AN	123	0	0	0	190	210	318	317	127	0	0	0	1,285
1963	AN	123	0	0	0	190	210	318	317	204	0	0	0	1,362
1970	AN	123	0	0	0	190	210	318	317	127	0	0	0	1,285
1973	AN	120	0	0	0	190	210	318	317	127	0	0	0	1,282
1979	AN	123	0	0	0	190	210	318	317	127	0	0	0	1,285
1984	AN	123	0	0	0	190	210	318	317	127	0	0	0	1,285
AVG	AN	117	0	0	0	185	204	313	300	149	0	0	0	1,268
1925	BN	115	0	0	0	127	140	237	235	84	0	0	0	938
1928	BN	123	0	0	0	127	140	237	235	84	0	0	0	946
1944	BN	123	0	0	0	127	140	186	183	84	0	0	0	843
1948	BN	118	0	0	0	79	87	237	235	136	0	0	0	892
1949	BN	123	0	0	0	79	140	237	183	84	0	0	0	846
1950	BN	123	0	0	0	127	140	237	235	84	0	0	0	946
1953	BN	123	0	0	0	127	140	237	235	136	0	0	0	998
1954	BN	123	0	0	0	127	140	237	235	84	0	0	0	946
1957	BN	123	0	0	0	127	140	237	235	136	0	0	0	998
1962	BN	61	0	0	0	127	140	237	235	84	0	0	0	884
1966	BN	123	0	0	0	127	140	237	183	84	0	0	0	894
1971	BN	123	0	0	0	127	140	237	235	136	0	0	0	998
AVG	BN	117	0	0	0	119	136	233	222	101	0	0	0	927
1926	D	116	0	0	0	127	140	218	218	84	0	0	0	903
1933	D	123	0	0	0	79	87	167	165	84	0	0	0	705
1939	D	123	0	0	0	127	140	167	165	84	0	0	0	806
1947	D	123	0	0	0	127	140	218	165	84	0	0	0	857
1955	D	123	0	0	0	127	140	167	165	84	0	0	0	806
1959	D	123	0	0	0	127	140	167	165	84	0	0	0	806
1964	D	123	0	0	0	127	140	167	165	84	0	0	0	806
1968	D	123	0	0	0	127	140	218	165	84	0	0	0	857
1972	D	123	0	0	0	127	140	218	165	84	0	0	0	857
1981	D	123	0	0	0	127	140	218	165	84	0	0	0	857
1985	D	123	0	0	0	127	140	167	165	84	0	0	0	806
AVG	D	122	0	0	0	123	135	190	170	84	0	0	0	824
1924	C	123	0	0	0	39	44	118	115	42	0	0	0	481
1929	C	117	0	0	0	39	44	118	115	42	0	0	0	475
1930	C	113	0	0	0	39	70	144	115	42	0	0	0	523
1931	C	61	0	0	0	39	44	118	115	42	0	0	0	419
1934	C	115	0	0	0	39	44	118	115	42	0	0	0	473
1960	C	116	0	0	0	63	70	144	115	42	0	0	0	550
1961	C	112	0	0	0	63	70	118	115	42	0	0	0	520
1976	C	123	0	0	0	39	70	118	115	42	0	0	0	507
1977	C	123	0	0	0	39	44	118	115	42	0	0	0	481
1987	C	123	0	0	0	63	70	118	115	42	0	0	0	531
1988	C	111	0	0	0	39	44	118	115	42	0	0	0	469
1989	C	61	0	0	0	39	70	144	115	42	0	0	0	471
1990	C	61	0	0	0	39	44	118	115	42	0	0	0	419
1991	C	61	0	0	0	39	70	144	115	42	0	0	0	471
1992	C	61	0	0	0	63	70	118	115	42	0	0	0	469
1994	C	123	0	0	0	63	70	118	115	42	0	0	0	531
AVG	C	100	0	0	0	47	59	125	115	42	0	0	0	487
AVG ALL		114	0	0	0	136	152	255	245	121	0	0	0	1,023

DELTA, MINIMUM REQUIRED OUTFLOW

(TAF)

YEAR	40-30-30 Year Type	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
1927	W	246	268	277	369	633	1,241	1,000	1,274	513	492	299	179	6,791
1938	W	246	268	277	369	1,282	1,060	853	1,049	1,074	492	246	179	7,395
1941	W	246	268	277	369	1,164	1,012	913	968	887	492	276	179	7,051
1942	W	246	268	277	369	1,132	957	641	1,219	592	492	254	179	6,626
1943	W	246	268	277	369	1,250	1,116	1,128	1,159	428	492	325	179	7,237
1952	W	246	268	277	369	1,163	1,143	898	1,217	1,185	492	246	179	7,683
1953	W	246	268	277	369	1,149	864	652	645	412	492	260	179	5,813
1956	W	246	268	277	369	946	999	887	890	736	492	250	179	6,539
1958	W	246	268	277	369	517	1,125	860	996	1,125	492	246	179	6,700
1963	W	246	268	277	369	633	1,541	636	1,228	646	492	269	179	6,784
1965	W	246	268	277	369	1,086	1,099	512	1,400	446	492	303	179	6,677
1967	W	246	268	277	369	1,469	1,113	1,059	883	1,047	492	246	179	7,648
1969	W	246	268	277	369	1,238	975	817	1,206	1,178	492	246	179	7,491
1970	W	246	268	277	369	898	917	874	238	338	492	299	179	5,395
1971	W	246	268	277	369	1,349	1,057	1,146	559	497	492	262	179	6,701
1974	W	246	268	277	369	955	964	1,020	1,083	603	492	263	179	6,719
1975	W	246	268	277	369	633	1,369	1,065	587	836	492	249	179	6,570
1982	W	246	268	277	369	1,082	1,073	941	961	813	492	246	179	6,947
1983	W	246	268	277	369	960	864	711	837	1,007	492	246	179	6,456
1984	W	246	268	277	369	944	998	954	416	494	492	308	179	5,945
1986	W	246	268	277	369	633	1,166	887	711	573	492	301	179	6,102
AVG	W	246	268	277	369	1,006	1,079	879	930	735	492	269	179	6,727
1922	AN	246	268	277	369	633	1,348	780	581	1,396	492	246	179	6,815
1928	AN	246	268	277	369	614	599	1,311	997	343	492	308	179	6,003
1940	AN	246	268	277	555	633	1,706	1,126	1,049	437	492	336	179	7,304
1951	AN	246	268	277	369	1,090	1,124	820	543	374	492	286	179	6,068
1954	AN	246	268	277	277	588	1,323	1,078	1,283	366	492	298	179	6,675
1957	AN	246	268	277	277	412	625	1,114	377	537	492	279	179	5,083
1973	AN	246	268	277	369	1,346	1,103	847	712	641	492	282	179	6,762
1978	AN	333	208	215	597	1,581	1,365	1,268	1,112	615	492	272	179	8,237
1980	AN	246	268	277	369	1,295	1,011	892	706	533	492	274	179	6,542
1993	AN	332	208	215	397	1,540	1,327	1,311	1,192	705	492	246	179	8,144
AVG	AN	263	256	265	395	973	1,153	1,055	855	595	492	283	179	6,763
1923	BN	246	268	277	369	1,293	752	588	616	506	400	246	179	5,740
1935	BN	335	208	215	292	633	701	602	1,713	617	400	246	179	6,141
1936	BN	246	268	277	277	633	1,397	894	570	517	400	246	179	5,904
1937	BN	246	268	277	369	378	1,267	1,012	1,016	601	400	246	179	6,259
1945	BN	246	268	277	369	633	1,633	686	589	546	400	246	179	6,072
1946	BN	246	268	277	369	1,268	812	543	689	522	400	246	179	5,819
1948	BN	246	268	277	277	633	369	536	669	554	400	246	179	4,654
1950	BN	246	268	277	277	633	624	630	669	533	400	246	179	4,982
1959	BN	246	268	277	277	561	1,229	507	377	393	400	246	179	4,960
1962	BN	246	268	277	369	419	1,632	786	689	388	400	246	179	5,899
1966	BN	246	268	277	369	536	567	544	676	331	400	248	179	4,641
1968	BN	246	268	277	369	568	1,425	792	336	351	400	246	179	5,457
1972	BN	246	268	277	369	633	686	570	469	344	400	246	179	4,687
1979	BN	246	268	277	277	621	1,162	935	478	642	400	246	179	5,731
AVG	BN	252	264	273	331	674	1,018	688	683	489	400	246	179	5,496
1925	D	331	208	215	369	549	564	633	625	520	307	215	179	4,715
1926	D	246	268	277	277	407	610	572	634	304	307	215	179	4,296
1930	D	350	208	215	369	633	701	594	518	346	307	215	179	4,635
1932	D	184	352	215	369	633	701	666	558	608	307	215	179	4,987
1939	D	246	268	277	277	401	353	593	369	417	307	215	179	3,902
1944	D	246	268	277	277	401	618	531	340	462	307	215	179	4,121
1947	D	246	268	277	369	389	701	666	362	405	307	215	179	4,384
1949	D	246	268	277	277	376	439	561	676	450	307	215	179	4,271
1955	D	246	268	277	369	628	447	400	354	426	307	215	179	4,116
1960	D	246	268	277	277	495	701	668	459	344	307	215	179	4,436
1961	D	246	268	277	369	434	700	604	343	411	307	215	179	4,353
1964	D	246	268	277	369	632	479	363	429	393	307	215	179	4,157
1981	D	246	268	277	369	610	588	831	371	368	307	215	179	4,629
1985	D	246	268	277	369	404	664	504	580	337	307	215	179	4,350
1987	D	246	268	277	277	406	701	568	316	443	307	215	179	4,203
1989	D	289	208	255	277	592	486	587	619	306	307	215	179	4,320
AVG	D	257	262	264	329	499	591	584	472	409	307	215	179	4,367
1924	C	246	268	277	277	391	621	350	424	410	246	184	179	3,873
1929	C	246	268	277	277	398	584	405	394	359	246	184	179	3,817
1931	C	246	268	277	277	437	382	406	430	410	246	283	179	3,841
1933	C	246	268	277	277	410	382	600	355	415	246	283	179	3,938
1934	C	184	352	215	369	633	701	596	349	410	246	184	179	4,418
1976	C	246	268	277	277	376	400	412	379	410	246	184	179	3,654
1977	C	281	212	258	277	607	373	417	424	410	246	184	179	3,868
1988	C	246	268	277	369	633	484	402	408	410	246	208	179	4,130
1990	C	246	268	277	277	633	405	585	354	410	246	184	179	4,064
1991	C	284	208	261	277	598	374	656	335	354	246	184	179	3,956
1992	C	345	208	215	283	628	692	616	354	399	246	184	179	4,349
1994	C	246	268	277	277	396	624	471	364	410	246	184	179	3,942
AVG	C	255	260	264	293	512	502	493	381	401	246	203	179	3,988
AVG ALL		253	263	269	344	745	876	738	682	542	393	244	179	5,528

DELTA, NET CONSUMPTIVE USE

(TAF)

YEAR	40-30-30 Year Type	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
1927	W	59	11	39	0	0	21	36	128	212	255	177	109	1,047
1938	W	71	37	0	0	0	0	60	131	225	255	177	104	1,060
1941	W	69	48	0	0	0	0	0	110	220	255	177	109	988
1942	W	62	44	0	0	0	10	0	105	220	255	177	107	980
1943	W	71	33	23	0	0	0	51	130	225	255	177	109	1,074
1952	W	62	35	0	0	0	0	45	131	223	254	177	108	1,035
1953	W	81	40	0	0	22	38	54	129	210	255	175	109	1,113
1956	W	78	45	0	0	0	49	51	117	221	255	177	90	1,083
1958	W	54	51	36	0	0	0	0	106	215	255	174	106	997
1963	W	24	47	20	0	0	0	0	114	221	255	177	102	960
1965	W	54	37	0	0	15	33	36	134	226	253	164	109	1,061
1967	W	81	17	0	0	15	0	0	127	204	255	177	108	984
1969	W	73	37	20	0	0	27	67	137	225	255	177	105	1,123
1970	W	59	46	3	0	0	26	87	147	220	255	177	107	1,127
1971	W	71	0	0	0	19	22	77	113	221	255	177	108	1,063
1974	W	50	3	0	0	15	0	40	132	217	238	177	109	981
1975	W	63	48	42	0	0	0	63	135	225	250	166	109	1,101
1982	W	53	7	0	0	0	0	5	130	220	255	177	70	917
1983	W	49	0	0	0	0	0	2	121	224	255	175	88	914
1984	W	73	4	0	0	0	32	82	145	225	255	176	108	1,100
1986	W	70	27	9	0	0	0	62	128	226	254	177	93	1,046
AVG	W	63	29	9	0	4	12	39	126	220	254	175	103	1,036
1922	AN	71	42	8	0	0	24	77	126	225	255	177	108	1,113
1928	AN	48	36	11	0	0	0	74	131	225	255	177	109	1,066
1940	AN	68	52	51	0	0	0	64	128	225	255	177	105	1,125
1951	AN	51	10	0	0	0	20	71	120	223	255	176	107	1,033
1954	AN	78	45	53	0	0	0	64	138	218	255	176	109	1,136
1957	AN	64	52	56	0	0	22	62	82	208	255	177	102	1,080
1973	AN	43	0	0	0	0	0	83	144	226	255	177	105	1,033
1978	AN	78	40	8	0	0	0	28	130	226	255	177	104	1,046
1980	AN	52	43	0	0	0	13	67	126	224	242	177	109	1,053
1993	AN	60	51	0	0	0	0	70	100	186	255	177	109	1,008
AVG	AN	61	37	19	0	0	8	66	123	219	254	177	107	1,069
1923	BN	65	31	0	0	14	53	26	135	221	255	177	93	1,070
1935	BN	73	34	16	0	9	0	0	128	226	255	177	108	1,026
1936	BN	61	48	43	0	0	26	66	118	203	255	177	102	1,099
1937	BN	69	52	31	0	0	0	70	139	223	255	177	109	1,125
1945	BN	62	31	2	0	0	0	85	130	225	255	177	109	1,076
1946	BN	46	44	0	0	8	21	91	125	226	254	177	108	1,100
1948	BN	48	47	54	0	21	4	34	97	204	255	177	107	1,048
1950	BN	79	47	48	0	0	19	80	138	226	255	177	100	1,169
1959	BN	79	51	54	0	0	46	89	155	226	255	177	57	1,189
1962	BN	80	35	48	0	0	24	88	145	226	254	177	108	1,185
1966	BN	80	26	0	0	0	47	90	146	225	250	177	108	1,149
1968	BN	79	46	49	0	0	1	83	139	226	255	142	109	1,129
1972	BN	78	47	22	0	8	64	87	154	220	255	177	90	1,202
1979	BN	81	38	55	0	0	6	69	134	226	252	177	109	1,147
AVG	BN	70	41	30	0	4	22	68	135	222	254	175	101	1,122
1925	D	52	42	0	0	0	23	21	78	206	255	177	108	962
1926	D	78	45	49	0	0	50	0	126	226	255	177	109	1,115
1930	D	79	52	43	0	0	0	67	131	226	255	176	104	1,133
1932	D	75	41	0	0	0	37	80	133	226	255	177	109	1,133
1939	D	63	49	52	0	2	9	96	140	226	255	177	105	1,174
1944	D	76	48	48	0	0	39	62	117	212	255	177	109	1,143
1947	D	77	34	37	0	0	1	95	146	214	255	177	109	1,145
1949	D	67	50	32	0	0	0	93	144	226	253	176	107	1,148
1955	D	81	38	14	0	0	39	45	118	222	255	177	102	1,091
1960	D	81	52	51	0	0	30	79	133	225	255	177	108	1,191
1961	D	80	27	48	0	9	7	77	136	226	255	175	103	1,143
1964	D	58	31	52	0	22	47	96	155	200	254	173	107	1,195
1981	D	80	51	47	0	8	0	80	140	226	255	177	101	1,165
1985	D	54	0	4	0	0	0	82	142	220	255	177	101	1,035
1987	D	80	52	51	0	0	0	91	149	226	255	177	109	1,190
1989	D	78	41	39	0	2	0	92	150	223	255	173	57	1,110
AVG	D	72	41	35	0	3	18	72	134	221	255	176	103	1,130
1924	C	74	49	53	0	3	41	100	159	226	255	177	108	1,245
1929	C	80	33	12	0	4	26	89	151	190	255	177	109	1,126
1931	C	64	45	57	0	0	37	98	119	216	255	177	109	1,177
1933	C	81	50	44	0	12	8	98	128	225	255	177	108	1,186
1934	C	65	52	24	0	0	51	94	145	216	255	177	102	1,181
1976	C	46	51	57	1	22	74	87	168	222	255	151	92	1,226
1977	C	71	48	52	0	27	50	96	114	224	255	177	92	1,206
1988	C	69	41	16	0	15	50	70	122	207	255	177	109	1,131
1990	C	59	43	55	0	0	46	91	71	214	255	177	108	1,119
1991	C	75	50	50	1	20	0	83	124	181	255	173	109	1,121
1992	C	51	50	50	0	0	0	70	139	221	255	177	109	1,122
1994	C	71	38	43	0	0	51	77	92	222	255	177	106	1,132
AVG	C	67	46	43	0	9	36	88	128	214	255	175	105	1,164
AVG ALL		67	38	26	0	4	19	64	129	219	254	175	104	1,099

AVERAGE REQUIRED FLOWS IN WET YEARS (TAF)

Contribution based on 1922-1992 average unimpaired flows and DWRSIM Study 1995C06F-SWRCB-469 data

Watershed	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Stony Creek	1	4	7	12	30	22	10	7	4	1	0	0
Sacramento River	120	133	118	151	374	374	194	189	238	275	249	177
Feather River	43	57	52	63	165	196	136	175	178	139	97	60
Yuba River	13	28	28	34	87	99	72	112	115	51	23	14
Bear River	2	4	6	8	20	19	8	4	3	2	1	1
American River	11	27	28	38	96	115	87	137	146	59	15	8
Cosumnes River	1	3	4	7	19	22	13	12	8	3	1	0
Mokelumne River	2	6	5	6	18	24	24	53	64	22	4	2
Calaveras River	0	1	2	4	12	11	4	2	1	1	0	0
Stanislaus River	21	7	7	10	38	45	81	73	32	26	7	3
Tuolumne River	37	13	12	15	60	66	115	115	64	59	13	5
Merced River	16	5	6	8	35	36	62	62	31	26	6	2
Chowchilla River	0	0	1	1	8	6	5	1	0	0	0	0
Fresno River	1	0	1	1	7	7	7	2	1	1	0	0
San Joaquin River	42	9	8	10	42	50	100	112	68	81	27	10
Total	309	297	286	369	1,010	1,091	918	1,056	955	746	444	282

Sacramento side (months with SJR objectives) = (SAC %) x (Adj Avg Min Delta Outflow) + (SAC %) x (Avg CU)
 Sacramento side (months w/o SJR objectives) = (Overall %) x (Adj Avg Min Delta Outflow) + (SAC %) x (Avg CU)

San Joaquin side (months with SJR objectives) = (SJR %) x (Avg SJR flow objective)
 San Joaquin side (months w/o SJR objectives) = (Overall %) x (Adj Avg Min Delta Outflow)

Average Required SJR Flow by Year Type

Year Type	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
W	117	0	0	0	190	210	369	365	196	0	0	0
AN	117	0	0	0	185	204	313	300	149	0	0	0
BN	117	0	0	0	119	136	233	222	101	0	0	0
D	122	0	0	0	123	135	190	170	84	0	0	0
C	100	0	0	0	47	59	125	115	42	0	0	0

Adjusted Average Minimum Delta Outflow by Year Type (Avg Min Delta Outflow - Avg Required SJR Flow)

Year Type	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
W	129	268	277	369	816	869	510	565	538	492	269	179
AN	146	256	265	395	788	949	742	555	446	492	283	179
BN	136	264	273	331	555	883	455	461	388	400	246	179
D	134	262	264	329	377	456	394	302	325	307	215	179
C	155	260	264	293	465	443	369	266	359	246	203	179

Average Minimum Consumptive Use by Year Type (TAF)

Year Type	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
W	63	29	9	0	4	12	39	126	220	254	175	103
AN	61	37	19	0	0	8	66	123	219	254	177	107
BN	70	41	30	0	4	22	68	135	222	254	175	101
D	72	41	35	0	3	18	72	134	221	255	176	103
C	67	46	43	0	9	36	88	128	214	255	175	105

AVERAGE REQUIRED FLOWS IN ABOVE NORMAL YEARS (TAF)

Contribution based on 1922-1992 average unimpaired flows and DWRSIM Study 1995C06F-SWRCB-469 data

Watershed	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Stony Creek	1	4	7	12	29	24	14	7	4	1	0	0
Sacramento River	129	132	117	161	359	406	286	185	208	275	257	180
Feather River	46	56	52	68	158	213	201	171	156	139	100	61
Yuba River	14	28	28	36	83	107	107	110	101	51	23	14
Bear River	2	4	6	8	20	20	11	4	3	2	1	1
American River	11	27	28	40	92	125	129	135	128	59	16	8
Cosumnes River	1	3	4	8	19	24	19	11	7	3	1	0
Mokelumne River	2	6	5	7	17	26	36	52	56	22	4	2
Calaveras River	0	1	2	4	11	12	6	2	1	1	0	0
Stanislaus River	21	7	7	11	37	43	69	60	24	26	7	3
Tuolumne River	37	12	12	16	58	65	97	94	49	59	14	5
Merced River	16	5	6	9	34	35	52	51	24	26	7	2
Chowchilla River	0	0	1	2	7	6	4	1	0	0	0	0
Fresno River	1	0	1	1	7	7	6	2	1	1	0	0
San Joaquin River	42	8	8	11	41	49	84	92	52	81	29	10
Total	325	293	283	395	973	1,161	1,121	978	813	746	460	286

AVERAGE REQUIRED FLOWS IN BELOW NORMAL YEARS (TAF)

Contribution based on 1922-1992 average unimpaired flows and DWRSIM Study 1995C06F-SWRCB-469 data

Watershed	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Stony Creek	1	4	7	10	20	23	9	6	4	1	0	0
Sacramento River	128	137	126	135	255	384	185	162	191	248	237	176
Feather River	46	59	56	57	112	201	130	150	143	125	93	59
Yuba River	14	29	30	30	59	101	69	97	92	46	22	14
Bear River	2	4	6	7	14	19	7	4	3	2	1	1
American River	11	28	30	34	65	118	83	118	118	53	15	8
Cosumnes River	1	3	5	6	13	23	12	10	7	3	1	0
Mokelumne River	2	6	6	6	12	25	23	46	52	20	4	2
Calaveras River	0	1	2	4	8	11	4	1	1	1	0	0
Stanislaus River	21	7	7	9	24	29	51	44	16	21	6	3
Tuolumne River	37	12	12	14	37	43	73	70	33	48	12	5
Merced River	16	5	6	7	22	23	39	38	16	21	6	2
Chowchilla River	0	0	1	1	5	4	3	1	0	0	0	0
Fresno River	1	0	1	1	4	4	4	1	0	1	0	0
San Joaquin River	42	8	8	9	26	32	63	68	35	66	25	10
Total	322	305	303	331	679	1,041	756	817	711	654	421	280

AVERAGE REQUIRED FLOWS IN DRY YEARS (TAF)

Contribution based on 1922-1992 average unimpaired flows and DWRSIM Study 1995C06F-SWRCB-469 data

Watershed	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Stony Creek	1	4	7	10	14	12	8	5	3	1	0	0
Sacramento River	129	136	125	134	173	201	165	119	171	220	222	177
Feather River	46	58	55	57	76	105	116	110	128	111	87	60
Yuba River	14	28	29	30	40	53	61	71	83	41	20	14
Bear River	2	4	6	7	9	10	7	3	2	2	1	1
American River	11	28	30	34	44	62	74	87	105	47	14	8
Cosumnes River	1	3	5	6	9	12	11	7	6	3	1	0
Mokelumne River	2	6	6	6	8	13	21	33	46	18	4	2
Calaveras River	0	1	2	4	5	6	4	1	1	1	0	0
Stanislaus River	22	7	7	9	25	29	42	34	14	16	5	3
Tuolumne River	39	12	12	14	39	43	59	53	27	37	10	5
Merced River	16	5	6	7	23	23	32	29	13	16	5	2
Chowchilla River	0	0	1	1	5	4	3	0	0	0	0	0
Fresno River	1	0	1	1	5	4	3	1	0	1	0	0
San Joaquin River	44	8	8	9	27	32	51	52	29	50	22	10
Total	329	303	299	329	502	608	656	606	629	562	391	282

AVERAGE REQUIRED FLOWS IN CRITICALLY DRY YEARS (TAF)

Contribution based on 1922-1992 average unimpaired flows and DWRSIM Study 1995C06F-SWRCB-469 data

Watershed	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Stony Creek	1	4	7	9	17	12	8	4	3	1	0	0
Sacramento River	138	138	128	120	216	204	161	107	179	201	214	178
Feather River	50	59	57	50	95	106	113	99	135	102	84	60
Yuba River	15	29	30	27	50	54	60	64	87	37	20	14
Bear River	2	4	6	6	12	10	6	3	2	2	1	1
American River	12	28	31	30	55	62	73	78	110	43	13	8
Cosumnes River	1	3	5	6	11	12	11	7	6	2	1	0
Mokelumne River	3	6	6	5	10	13	20	30	48	16	4	2
Calaveras River	0	1	2	3	7	6	3	1	1	1	0	0
Stanislaus River	18	7	7	8	9	12	27	23	7	13	5	3
Tuolumne River	32	12	12	12	15	19	39	36	14	29	10	5
Merced River	13	5	6	6	9	10	21	20	7	13	5	2
Chowchilla River	0	0	1	1	2	2	2	0	0	0	0	0
Fresno River	1	0	1	1	2	2	2	1	0	0	0	0
San Joaquin River	36	8	8	8	10	14	34	35	15	40	20	10
Total	322	306	307	293	520	538	581	509	614	501	377	284

Yuba River Watershed

Minimum Required Downstream Flow at Control Point 45 on the Yuba River Model Network (TAF) (see footnote 1)

Year Type	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Wet	8.7	18.3	18.3	22.3	57.0	64.9	47.5	73.9	75.5	33.4	14.9	9.0
Above Normal	9.4	18.1	18.2	23.9	54.8	70.4	70.0	72.4	66.1	33.4	15.4	9.1
Below Normal	9.3	18.8	19.5	20.0	38.9	66.6	45.3	63.6	60.6	30.0	14.1	9.0
Dry	9.4	18.7	19.4	19.9	26.4	34.8	40.3	46.6	54.3	26.6	13.3	9.0
Critically Dry	10.1	19.0	19.9	17.7	32.9	35.3	39.5	42.1	56.9	24.4	12.8	9.1

Minimum Required Downstream Flow at Control Point 30 on the Yuba River Model Network (TAF) (see footnote 2)

Year Type	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Wet	1.3	2.6	2.6	3.2	8.2	9.4	6.9	10.7	10.9	4.8	2.1	1.3
Above Normal	1.4	2.6	2.6	3.4	7.9	10.2	10.1	10.4	9.5	4.8	2.2	1.3
Below Normal	1.3	2.7	2.8	2.9	5.6	9.6	6.5	9.2	8.7	4.3	2.0	1.3
Dry	1.4	2.7	2.8	2.9	3.8	5.0	5.8	6.7	7.8	3.8	1.9	1.3
Critically Dry	1.5	2.7	2.9	2.6	4.8	5.1	5.7	6.1	8.2	3.5	1.8	1.3

Minimum Required Downstream Flow at Control Point 12 on the Yuba River Model Network (TAF) (see footnote 3)

Year Type	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Wet	13.3	27.8	27.8	33.9	86.7	98.7	72.3	112.4	114.9	50.8	22.6	13.7
Above Normal	14.3	27.5	27.7	36.3	83.4	107.2	106.6	110.2	100.6	50.8	23.4	13.9
Below Normal	14.2	28.7	29.7	30.4	59.2	101.4	69.0	96.8	92.3	45.7	21.5	13.6
Dry	14.3	28.5	29.5	30.2	40.2	53.0	61.4	70.9	82.6	40.5	20.2	13.7
Critically Dry	15.4	28.9	30.3	27.0	50.1	53.7	60.2	64.0	86.7	37.1	19.5	13.8

Footnote 1

If minimum downstream flows are not met at CP 45, apply deficiencies to the Drum / S. Yuba Canal (NID 13.3%, PG&E 86.7%)

Footnote 2

If minimum downstream flows are not met at CP 30, apply deficiencies to the Slate Creek Tunnel diversion operated by OWID

Footnote 3

If minimum downstream flows are not met at CP 12, apply deficiencies to Yuba County Water Agency

Water Year Type is based on the Sacramento 40-30-30 index.

Bear River Watershed

Minimum Required Downstream Flow at Control Point 3 on the Bear River Model Network (TAF)

(see footnote 1)

Year Type	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Wet	0.7	1.5	2.0	2.7	7.1	6.5	2.7	1.6	1.1	0.8	0.4	0.3
Above Normal	0.7	1.5	2.0	2.9	6.8	7.0	4.0	1.5	1.0	0.8	0.4	0.4
Below Normal	0.7	1.6	2.1	2.4	4.9	6.6	2.6	1.3	0.9	0.7	0.4	0.3
Dry	0.7	1.5	2.1	2.4	3.3	3.5	2.3	1.0	0.8	0.7	0.4	0.3
Critically Dry	0.8	1.6	2.2	2.1	4.1	3.5	2.2	0.9	0.8	0.6	0.4	0.3

Minimum Required Downstream Flow at Control Point 30 on the Bear River Model Network (TAF)

(see footnote 2)

Year Type	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Wet	1.9	4.3	5.7	7.8	20.4	18.5	7.7	4.5	3.2	2.3	1.2	1.0
Above Normal	2.0	4.3	5.7	8.3	19.6	20.1	11.4	4.4	2.8	2.3	1.2	1.0
Below Normal	2.0	4.5	6.1	6.9	13.9	19.0	7.4	3.8	2.5	2.1	1.1	1.0
Dry	2.0	4.4	6.0	6.9	9.4	9.9	6.6	2.8	2.3	1.9	1.0	1.0
Critically Dry	2.2	4.5	6.2	6.2	11.8	10.1	6.4	2.5	2.4	1.7	1.0	1.0

Footnote 1

If minimum downstream flow is not met at CP 3, then apply deficiencies to the Bear River Canal, Gold Hill Combie Canal, Tarr Ditch, and depletion at CP 35.

Footnote 2

If minimum downstream flow at CP 30 is not met, apply 11.5% of the deficiency to Camp Far West ID at CP 26 and 88.5% of the deficiency to South Sutter WD at CP 28.

Tuolumne River Watershed

Minimum Required Inflow to Control Point 81 on the DWRSIM Network (TAF)

(see footnote 3)

Year Type	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Wet	7.8	2.7	2.6	3.2	12.6	14.0	24.3	24.2	13.5	12.3	2.7	1.0
Above Normal	7.8	2.6	2.5	3.4	12.3	13.6	20.6	19.9	10.2	12.3	2.9	1.0
Below Normal	7.8	2.6	2.6	2.9	7.9	9.0	15.3	14.7	7.0	10.0	2.5	1.0
Dry	8.2	2.6	2.5	2.9	8.2	9.0	12.5	11.2	5.8	7.7	2.2	1.0
Critically Dry	6.7	2.6	2.5	2.5	3.1	3.9	8.2	7.6	2.9	6.2	2.0	1.0

Minimum Required Downstream Flow at Control Point 81 on the DWRSIM Network (TAF)

(see footnote 4)

Year Type	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Wet	36.9	12.7	12.3	15.2	59.9	66.3	115.1	114.5	63.9	58.5	12.8	4.8
Above Normal	37.1	12.1	11.8	16.3	58.3	64.5	97.4	94.2	48.5	58.5	13.5	4.8
Below Normal	36.9	12.5	12.1	13.6	37.5	42.8	72.6	69.7	33.0	47.6	11.8	4.8
Dry	38.7	12.4	11.8	13.6	38.6	42.7	59.3	53.3	27.3	36.5	10.3	4.8
Critically Dry	31.7	12.3	11.8	12.1	14.7	18.5	38.8	36.1	13.7	29.3	9.7	4.8

Footnote 3

If minimum required inflow to control point 81 is not met, apply the deficiency to the City of San Francisco exports.

Footnote 4

If the minimum required downstream flow at control point 81 is not met, make additional releases out of New Don Pedro Reservoir to make up the deficiency