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Table 1: Drainage Areas and Mean Annual Runoff

	Drainage area (sq mi)	Mean Annual Runoff (MAR) (AF)
KINGS RIVER		
Above Pine Flat Dam[1]	1,545	1,790,536
Mill Creek near Piedra[2]	127	30,625
COTTONWOOD CREEK		
Near Elderwood	60	9,484
KAWEAH RIVER		
Above Terminus Dam - Lake Kaweah	561	475,223
Dry Creek near Lemoncove	80	15,783
at McKay Point	647	
TULE RIVER		
Above Success Dam	391	158,911
DEER CREEK		
Near fountain springs	83	23,892
WHITE RIVER		
Near Ducor	91	6,842
POSO CREEK		
Near Oildale	230	32,218
KERN RIVER		
Above Isabella Dam	2,074	
Near Bakersfield (Kern River at first point of measurement)	2,407	813,400
CALIENTE CREEK		
At Caliente	322	1,636
LOS GATOS CREEK		
Above Nunez Canyon near Coalinga	96	2,563
At I-5	514	

[1] Four river runoff above reservoir is mean annual unimpaired runoff for the 1962-2001 period.
[2] All other stream runoff is for 1974 calendar year, which was an approximately average runoff year (109% of the 1962-2001 average).

Table 2: Runoff Totals for the Four Tulare Basin Rivers

Year	Kings		Kaweah		Tule		Kern		Total	1894-2001	1962-2001
	TAF	% of avg	TAF	% of avg	TAF	% of avg	TAF	% of avg	TAF	% of avg	% of avg
1894	1459	87%	352	82%	104	75%	533	73%	2448	82%	76%
1895	2242	134%	579	135%	208	149%	1023	140%	4052	136%	125%
1896	1536	91%	377	88%	117	84%	620	85%	2650	89%	82%
1897	1948	116%	500	117%	177	127%	893	122%	3518	118%	109%
1898	881	52%	194	45%	38	27%	252	34%	1365	46%	42%
1899	1278	76%	274	64%	48	34%	339	46%	1939	65%	60%
1900	1307	78%	277	65%	45	32%	332	45%	1961	66%	61%
1901	2956	176%	680	159%	174	125%	880	120%	4690	157%	145%
1902	1505	90%	360	84%	104	75%	553	75%	2522	85%	78%
1903	1640	98%	382	89%	101	72%	546	74%	2669	90%	82%
1904	1687	100%	385	90%	99	71%	493	67%	2664	89%	82%
1905	1448	86%	348	81%	105	75%	532	73%	2433	82%	75%
1906	3900	232%	1149	268%	469	337%	1901	259%	7419	249%	229%
1907	2733	163%	609	142%	208	149%	991	135%	4541	152%	140%
1908	997	59%	257	60%	110	79%	499	68%	1863	63%	58%
1909	2742	163%	802	187%	284	204%	1839	251%	5667	190%	175%
1910	1718	102%	409	95%	156	112%	659	90%	2942	99%	91%
1911	2748	164%	546	127%	184	132%	1013	138%	4492	151%	139%
1912	967	58%	207	48%	43	31%	387	53%	1604	54%	50%
1913	940	56%	221	51%	46	33%	368	50%	1574	53%	49%
1914	2475	147%	486	113%	159	114%	1114	152%	4233	142%	131%
1915	1795	107%	370	86%	84	60%	646	88%	2894	97%	89%
1916	2938	175%	762	178%	310	223%	2520	344%	6531	219%	202%
1917	1862	111%	471	110%	133	96%	823	112%	3290	110%	102%
1918	1349	80%	228	53%	53	38%	539	74%	2168	73%	67%
1919	1190	71%	259	60%	71	51%	499	68%	2018	68%	62%
1920	1392	83%	350	82%	86	62%	601	82%	2428	81%	75%
1921	1507	90%	348	81%	97	70%	510	70%	2461	83%	76%
1922	2167	129%	461	108%	123	89%	861	117%	3613	121%	112%
1923	1535	91%	363	85%	99	71%	501	68%	2498	84%	77%
1924	392	23%	102	24%	24	17%	188	26%	706	24%	22%
1925	1275	76%	325	76%	85	61%	466	64%	2152	72%	66%
1926	1024	61%	219	51%	57	41%	367	50%	1667	56%	51%
1927	1941	116%	483	113%	164	117%	793	108%	3381	113%	104%
1928	959	57%	203	47%	59	43%	313	43%	1534	51%	47%
1929	848	51%	223	52%	48	34%	323	44%	1442	48%	45%
1930	857	51%	218	51%	51	37%	350	48%	1476	50%	46%
1931	466	28%	114	27%	25	18%	186	25%	791	27%	24%
1932	2038	121%	520	121%	138	99%	738	101%	3434	115%	106%
1933	1176	70%	284	66%	80	57%	441	60%	1980	66%	61%
1934	647	39%	131	30%	20	15%	228	31%	1026	34%	32%
1935	1599	95%	358	83%	89	64%	474	65%	2519	85%	78%
1936	1829	109%	487	114%	171	122%	796	109%	3283	110%	101%
1937	2273	135%	677	158%	306	219%	1260	172%	4516	152%	139%
1938	3181	190%	871	203%	355	255%	1359	185%	5766	193%	178%
1939	962	57%	247	58%	83	60%	461	63%	1754	59%	54%
1940	1717	102%	513	120%	211	151%	789	108%	3229	108%	100%
1941	2465	147%	642	150%	236	169%	1401	191%	4743	159%	146%
1942	1980	118%	491	114%	136	97%	772	105%	3378	113%	104%
1943	1973	118%	671	157%	364	262%	1221	167%	4230	142%	131%
1944	1149	68%	315	74%	102	73%	626	85%	2193	74%	68%
1945	2018	120%	551	128%	203	146%	938	128%	3709	124%	115%
1946	1599	95%	356	83%	94	67%	651	89%	2700	91%	83%
1947	1098	65%	265	62%	52	37%	407	56%	1822	61%	56%
1948	989	59%	261	61%	64	46%	330	45%	1645	55%	51%
1949	953	57%	219	51%	49	35%	303	41%	1524	51%	47%
1950	1272	76%	301	70%	62	44%	601	82%	2236	75%	69%
1951	1576	94%	421	98%	154	111%	442	60%	2593	87%	80%
1952	2751	164%	825	192%	320	230%	1501	205%	5397	181%	167%
1953	1146	68%	308	72%	99	71%	549	75%	2102	71%	65%
1954	1300	77%	306	71%	89	64%	528	72%	2223	75%	69%
1955	1100	66%	276	64%	65	46%	444	61%	1884	63%	58%
1956	2516	150%	725	169%	209	150%	841	115%	4291	144%	133%
1957	1246	74%	295	69%	65	47%	444	61%	2050	69%	63%
1958	2454	146%	640	149%	223	160%	1105	151%	4422	148%	137%
1959	810	48%	155	36%	32	23%	258	35%	1254	42%	39%
1960	713	42%	180	42%	48	35%	300	41%	1241	42%	38%
1961	555	33%	117	27%	25	18%	178	24%	875	29%	27%
1962	1837	109%	401	93%	86	62%	698	95%	3021	101%	93%
1963	1855	111%	491	115%	120	86%	801	109%	3268	110%	101%
1964	856	51%	230	54%	60	43%	339	46%	1485	50%	46%
1965	1930	115%	488	114%	138	99%	720	98%	3275	110%	101%
1966	1197	71%	248	58%	47	34%	679	93%	2171	73%	67%
1967	3225	192%	1025	239%	374	268%	1396	190%	6020	201%	186%
1968	822	49%	220	51%	67	48%	454	62%	1564	52%	48%
1969	4198	250%	1271	296%	504	362%	2461	336%	8434	283%	260%
1970	1298	77%	359	84%	122	88%	589	80%	2369	80%	73%
1971	1156	69%	293	68%	84	60%	427	58%	1960	66%	61%
1972	849	51%	168	39%	35	25%	268	37%	1320	44%	41%
1973	2085	124%	616	144%	225	162%	980	134%	3906	131%	121%
1974	2056	122%	490	114%	157	112%	819	112%	3521	118%	109%
1975	1558	93%	384	89%	122	88%	565	77%	2629	88%	81%
1976	535	32%	147	34%	42	30%	249	34%	974	33%	30%
1977	386	23%	94	22%	16	11%	197	27%	693	23%	21%
1978	3363	200%	834	194%	273	196%	1654	226%	6124	205%	189%
1979	1701	101%	416	97%	114	82%	673	92%	2904	97%	90%
1980	2992	178%	885	206%	330	237%	1640	224%	5846	196%	181%
1981	1028	61%	248	58%	80	58%	449	61%	1806	61%	56%
1982	3053	182%	772	180%	230	165%	1271	173%	5326	179%	164%
1983	4287	255%	1402	327%	615	441%	2489	340%	8793	295%	272%
1984	1935	115%	517	121%	187	134%	822	112%	3460	116%	107%
1985	1236	74%	332	78%	112	80%	672	92%	2352	79%	73%
1986	3190	190%	815	190%	247	177%	1445	197%	5697	191%	176%
1987	764	46%	192	45%	57	41%	376	51%	1389	47%	43%
1988	820	49%	186	43%	46	33%	295	40%	1347	45%	42%
1989	897	53%	215	50%	55	39%	397	54%	1564	52%	48%
1990	684	41%	141	33%	30	21%	204	28%	1059	36%	33%
1991	1061	63%	252	59%	60	43%	406	55%	1779	60%	55%
1992	699	42%	149	35%	31	22%	297	41%	1177	39%	36%
1993	2479	148%	549	128%	140	101%	854	116%	4023	135%	124%
1994	867	52%	192	45%	46	33%	336	46%	1441	48%	44%

Table 2: Runoff Totals for the Four Tulare Basin Rivers (Continued)

Year	Kings		Kaweah		Tule		Kern		Total	1894-2001	1962-2001
	TAF	% of avg	TAF	% of avg	TAF	% of avg	TAF	% of avg	TAF	% of avg	% of avg
1995	3371	201%	866	202%	252	181%	1385	189%	5874	197%	181%
1996	2062	123%	528	123%	169	121%	1038	142%	3796	127%	117%
1997	2563	153%	764	178%	357	257%	1182	161%	4866	163%	150%
1998	2981	178%	934	218%	461	331%	1718	234%	6095	205%	188%
1999	1242	74%	266	62%	97	70%	434	59%	2039	68%	63%
2000	1501	89%	369	86%	108	77%	476	65%	2454	82%	76%
2001	1002	60%	262	61%	59	42%	381	52%	1704	57%	53%
1894-2001 Averac	1,681		430		140		735		2,985		
1962-2001 Averac	1,789		477		161		816		3,244		

Notes

1. Percent of average is for the 1894-2001 long-term average
2. Kings, Kaweah, and Tule- 1909-2000 from USACE data; 1894-1908 from USBR 1970 which uses USGS and USACE data for Kings and correlation for Kaweah and Tule; 2001 data from DWR CDEC web site
3. Kern data from 1894-1999 from KWCA 1999 water supply report; 2000 and 2001 from CDEC; 1916 runoff total of 2.5 MAF is suspect since USGS gaging station only shows about 2.0 MAF

Table 3: Minor Stream Runoff

	Calendar Year			
	1977	**1978**	**1979**	**1983**
4-river runoff % of average	23%	205%	97%	295%
Minor Stream	**Runoff (AF)[1]**	**Runoff (AF)**	**Runoff (AF)**	**Runoff (AF)**
Mill Creek	2,165	88,328	25,412	143,352
Cottonwood Creek	94	27,946	7,747	51,621
Sand Creek	25	11,801	3,077	20,924
Dry Creek	796	42,716	12,163	86,156
Deer Creek	3,504	36,345	15,856	107,876
White River	557	16,869	4,967	34,028
Poso Creek	1,853	50,752	22,734	155,660
Caliente Creek	109	24,761	3,374	N/A[2]
Los Gatos Creek	449	28,815	2,758	34,100

[1] From USGS records available on-line, calendar year values.
[2] N/A - not available.

Table 4: Reservoir Information

	Year completed	Capacity (AF)	Operator
KINGS RIVER			
Pine Flat Dam - Pine Flat Lake	1952	1,000,000	USACOE
Courtwright Reservoir	1958	123,300	PG&E
Wishon Reservoir	1957	128,600	PG&E
KAWEAH RIVER			
Terminus Dam - Lake Kaweah	1961	143,000	USACOE
Spillway raise	2004	185,630	
TULE RIVER			
Success Dam - Success Lake	1961	82,300	USACOE
Temporary storage restriction	2004	29,200	
KERN RIVER			
Isabella Dam - Lake Isabella	1953	568,000	USACOE

Table 5: Kings River Water Distribution

	1979[1] - 102% of average		1988 – 49% of average		1995[2] - 203% of average	
Location	Volume (TAF)	Flow (cfs) and period[3]	Volume (TAF)	Flow (cfs) and period	Volume (TAF)	Flow (cfs) and period
Gould Canal	157.8	< 419 cfs; Oct-Sep, no flow mid-Nov to early Dec	94.1	< 426 cfs; late Dec to early Aug; Apr, May discontinuous	101.1	< 426 cfs; Oct-Sep, Mar discontinuous
Fresno Canal	475.1	< 1406 cfs; Oct-Nov, late Feb-Sep	331.0	< 1538 cfs; late Feb to Sep; Apr, May discontinuous	399.0	< 1510 cfs; Feb, Mar, Apr-Sep
Consolidated Canal	492.4	< 1934 cfs; Oct-Nov, Feb-Sep, continuous Apr-Jul	80.2	< 1535 cfs; Jan, May-Aug, discontinuous	441.2	<1850 cfs; Jan, Mar, Apr-Sept
Alta Canal	210.6	< 939 cfs, Oct, mid-Apr to Aug	59.3	< 670 cfs, Jun-July	235.5	< 945 cfs, Apr-Sep;
Peoples Canal	234.4	< 768 cfs; Oct-Sep; continuous mid-Dec to early Sep	100.5	< 783 cfs; Feb-Sep; continuous June to mid-Sep	210.4	< 927 cfs, Jan-Sep;
Lakelands Canal	34.3	< 340 cfs; Apr-Sep discontinuous	18.9	< 170 cfs; Jun-Aug	53.0	< 478; May, July-Sep
Lemoore Canal	107.8	< 469 cfs, late Jan to Sep; no flow in mid May	76.6	< 448 cfs, mid-Feb to early Apr, Jun to early Sep	79.2	< 410 cfs, Jan-Sep; continuous mid-Mar to Sep
Last Chance Ditch	107.9	< 379 cfs, Oct-Sep; continuous mid-May to Aug	31.2	< 433 cfs; Jan, Jun-July	102.3	< 415 cfs, Jan-Sep; continuous mid-Mar to Sep
Westlake Canal	13.3	< 57 cfs, Oct-Sep; continuous mid May to Aug	2.9	< 61 cfs, Jun-Aug discontinuous	1.4	< 52 cfs; Aug only
Empire Westside Canal	17.1	< 87 cfs, Oct-Sep; continuous mid Apr to early-Sept	4.5	< 68 cfs, Feb, Jun-Aug;	6.0	< 50 cfs, Apr-Sep; continuous June to mid-Sept
Stratford Canal	7.3	< 65 cfs, Oct-Sep discontinuous	4.0	< 65 cfs, Mar, Jun-Aug discontinuous	6.1	< 60 cfs, Apr-Sep; continuous June to mid-Sept
Empire Weir #2 (over weir)	14.3	< 149 cfs, Oct-Sep; discontinuous	9.2	< 149 cfs, Jan, Feb, Jun-Aug; discontinuous	56.6	< 677 cfs, Apr-Sep; continuous June to early Sept
Blakely Canal	43.1	< 215 cfs, Nov-Aug discontinuous	14.1	< 217 cfs, Jun-Aug; discontinuous	23.2	< 197 cfs, Apr-Sep; continuous June to early Sept
Tulare Lake Canal	55.2	< 337 cfs, Oct-Sep discontinuous	17.8	< 356 cfs, Jan, Feb, Jun-Aug discontinuous	48.2	<413 cfs, Apr-Sep; continuous June to early Sept
Friant-Kern Canal into River[4]	191.0	Oct, Nov, Feb-Apr, Jul, Aug	45.1	May-July	58.9	Feb, Mar, Sep
Fresno Slough	11.8	< 984 cfs; Feb-Jul discontinuous	0	N/A	586.5	< 3994 cfs; Mar-Aug
Total Diversions[5]	2223.5	Year round, June and July maximum	857.2	Dec-Sep, June and July maximum	2080.9	Year round, May and July maximum

1 1979 followed wet 1978; fall and early winter water reflects antecedent conditions.
2 1995 followed very dry 1994; fall and early winter lack of water reflects antecedent conditions.
3 Cfs is max flow; all periods listed have continuous flow unless noted otherwise; discontinuous signifies that 2 or more days in month have 0 flow.
4 Friant-Kern Canal discharge into the river through the Kings River wasteway. Does not include additional deliveries up-canal into FID system.
5 Total River diversions minus Fresno Slough flow.

Table 6: Bodies of Water in the Kaweah-Tulare Lake Basin that Contain White Bass (reproduced from CDFG 1987)

Body of Water	Dewatering Code	Volume (acre-feet)	Rotenone Required (gallons)
TULARE COUNTY			
Kaweah Reservoir	5	8000	5333
Kaweah River-- below reservoir	3	180	117
St. Johns River	2	0-680	0-442
Cross Creek to Hwy 99	2	0	--
Cottonwood Creek	5	5	3
Wutchumna Ditch	2	20	13
Bravo Lake	5	1000	650
Borrow Pits-- Lone Star Industries	5	845	550
Lindsay-Strathmore Irrigation District Canal	2	0	--
Tule River from Road 192 to Hwy 43	5	30	20
Subtotal		10,080-10,760	6,686-7,128
Alta Irrigation District Canals Below Barriers			
Banks Ditch	3	2	1
Cross Creek Wasteway	2	0	--
Wiese Ditch	2	0	--
Kennedy Schoolhouse Ditch	2	0	--
Button Ditch	2	0	--
Williams Ditch	3	1	1
Clough Ditch	2	0	--
Sand Creek	2	0	--
Leyendekker's Ditch	3	3	2
Meyer's Pond	4	18	12
Subtotal		24	16
Kaweah Delta Water Storage District Percolation Ponds			
Basin #1	3	4	3
Basin #3	2	0	--
Basin #4	2	0	--
Basin #5	3	100	70
Basin #6	2	0	--
Basin #8	2	0	--
Basin #9	3	3	2

Table 6: Bodies of Water in the Kaweah-Tulare Lake Basin that Contain White Bass (reproduced from CDFG 1987) (Continued)

Body of Water	Dewatering Code	Volume (acre-feet)	Rotenone Required (gallons)
Basin #10	2	0	--
Basin #11	2	0	--
Basin #13	3	11	8
Basin #17	3	2	1
Basin #19	3	1	0.5
Basin #18	2	0	--
Basin #21	2	0	--
Basin #22	2	0	--
Basin #24	2	0	--
Basin #28	2	0	--
Basin #29	2	0	--
Basin #30	2	0	--
Subtotal		118	84.5
Kaweah Delta Water Storage District Canals			
Consolidated People's Ditch System	2	0	--
Johnson Slough	2	0	--
Locust Grove Ditch	2	0	--
Extension Ditch	2	0	--
Davis Ditch	2	0	--
Catron Ditch	2	0	--
Rice Ditch	2	0	--
Outside Creek	2	0-20	0-13
Gray Ditch	2	0	--
Hutchinson Ditch	2	0	--
Inside Creek	2	0	--
Elk Bayou	3	15	10
Deep Creek	2	0-35	0-23
Negro Slough	2	0-5	0-3
Farmers Ditch	2	0-4	0-3
Tulare Colony Ditch	2	0	--
Mill Creek	2	0	--
Tulare Irrigation Canal	2	0-35	0-23
Fleming Ditch	2	0	--
Packwood Creek	2	0-25	0-16
Evans Ditch	2	0	--
Persian Ditch	2	0	--
Watson Ditch	2	0	--
Long Canal	2	0	--
Ketchum Ditch	2	0	--
Packwood Canal	2	0	--
Matthews Ditch	2	0	--
Jennings Ditch	2	0	--
Modoc Ditch	2	0	--

Table 6: Bodies of Water in the Kaweah-Tulare Lake Basin that Contain White Bass (reproduced from CDFG 1987) (Continued)

Body of Water	Dewatering Code	Volume (acre-feet)	Rotenone Required (gallons)
Uphill Ditch	2	0	--
Goshen Ditch	2	0	--
Elbow Creek	3	5	3
Tulare Irrigation District Canal	2	0-80	0-52
Cameron Creek	2	0-45	0-29
Miot Ditch	2	0	--
Kaweah Canal	2	0	--
Cardoza Ditch	2	0	--
Bates Slough	3	22	14
Subtotal		44-293	24-190
KINGS COUNTY			
South Fork Kings River below Weir 1	4	425	276
Tule River downstream from Hwy 43	4	700	455
Blakely Canal	4	150	98
Stratford Canal	3	0	--
Tulare Lake Canal	4	165	197
Gates-Jones Canal	4	210	137
Wilbur Ditch	4	115	75
Empire Westside Canal	4	25	16
Hacienda Main Canal	4	65	42
Westlake Farms Canal	4	25	16
Sand Ridge Canal	4	30	20
Homeland Canal	4	340	221
Lovelace Canal	3	80	52
Lemoore Main Canal	2	0	--
McGlassen Ditch	2	0	--
Settler's Ditch East	2	0	--
Settler's Ditch West	2	0	--
Peoples Ditch	2	0	--
Last Chance Ditch	2	0	--
Lakeside Ditch	2	0	--
East Lakeside Ditch	2	0	--
Lakeland Canal	3	185	120
Cross Creek below Hwy 99			
Middle Branch	4	145	94
East Branch	4	55	36
West Branch	3	20	13
Sweet Canal	4	110	72
Lamberson Canal	4	100	67

Table 6: Bodies of Water in the Kaweah-Tulare Lake Basin that Contain White Bass (reproduced from CDFG 1987) (Continued)

Body of Water	Dewatering Code	Volume (acre-feet)	Rotenone Required (gallons)
Tulare Lake Storage District Water			
Lateral A	2	0	--
Lateral B	2	0	--
Melga Canal	2	0	--
Kings County Company Canal			
Lateral A	3	40	27
Lateral B	2	0	--
Lateral C	2	0	--
Tulare Lake Drainage District			
Main Drain	3	100	67
North Percolation Pond	3	660	429
Corcoran Irrigation District Pond	3	200	130
South Wilbur Area	1	0	--
Hacienda Ponds			
East	2	5	3
West	1	0	--
Middle	1	0	--
Subtotal		3950	2663
KERN COUNTY			
Kern River from Interstate 5 to Sand Ridge Canal	3	130	85
Subtotal		130	85
TOTAL		14,346-15,275	9,558-10,167

DEWATERING CODE
1 -- Dry except under flood conditions
2 -- Usually dry in late summer; dry for extended period
3 -- Dewatered periodically for maintenance or other reasons
4 -- Dewatered only by pumping
5 -- Retains water year-round

Table 7: Kaweah River Water Distribution

	1977 - 20% of average		1978 – 176% of average		1979 - 88% of average	
Location	**Volume (TAF)**	**Flow (cfs) and period**	**Volume (TAF)**	**Flow (cfs) and period**	**Volume (TAF)**	**Flow (cfs) and period**
Wutchumna Ditch	27.6	< 173 cfs, Oct- Sep	78.0	< 342 cfs, Oct- Sep	64.8	< 309 cfs, Oct- Sep
Wutchumna Ditch for transfer[1]	12.7	< 166 cfs, Jun- Sep	0		0	
St Johns below McKay Pt.	12	No flow in Nov and Dec, otherwise year-round	381	No flow in Nov, otherwise year-round	146.4	No flow in Sept, otherwise year-round
Lower Kaweah below McKay Pt.	49	No flow in Nov and Dec, otherwise year-round	402	Year-round	210	Year-round
Deep Creek	0.65	No flow most of the year	85.4	100-300 cfs most of the year	55.2	Winter pulse; 100-200 cfs April-Aug
Packwood Creek	0		31.5	50-200 cfs winter, spring and early summer	8.5	Winter pulse; 10-100 cfs late May-June
Mill Creek	5.4	<100 cfs June-Aug	42.7	50-200 cfs most of the year; peak flows May-July	32.4	50-100 cfs year-round
Elk Bayou to Tule River	0		13.8	Winter and spring pulse	0.03	
Lakeside ditch[2]	0		98	100-400 cfs most of the year	64	100-300 cfs Jan-Aug; occasional low/0 flow in winter, July-Aug
Cross Creek from Kaweah River [3]	0		3.6	Feb-Mar pulse	0	
Friant-Kern Canal into St. John's	0		32.5		61.7	
Friant-Kern Canal into Lower Kaweah	0		38.9		76.9	

[1] Assume Transfer into Friant-Kern Canal.
[2] Receives mostly St, John's Water, smaller amounts of Kings River water, Cottonwood Creek, Alta ID tailwater.
[3] Assume other water in Cross Creek from St. John's River, Cottonwood Creek or Alta ID tailwater.

Table 8: Tule River Water Distribution

	1998 - 297% of average		2000 – 69% of average		1996 - 108% of average	
Location	**Volume (TAF)**	**Flow (cfs) and period[1]**	**Volume (TAF)**	**Flow (cfs) and period**	**Volume (TAF)**	**Flow (cfs) and period**
Tule River below Success[2]	435	Year round[3]	96.9	Year round[4]	168.7	Year round[5]
Tule River below Porterville[6]	184[7]	Continuous after 12/9; usually above 150 cfs	24.3	Mid-March pulse (<=150 cfs); June-Aug (100-200 cfs)	54.9	50 – 300 cfs, Oct-Apr; Dec, Jan July, Aug discontinuous
Tule River at Turnball Weir	60	Mid-Jan through Sep; up to 800 cfs	4.7	< 135 cfs; Late Feb to mid-March; June pulse	8.4	10 –50 cfs; late Feb-mid April; sporadic May-July
Friant-Kern into Tule	0		5.9	< 148 cfs; Mid-Mar to early April	13	< 115 cfs; Nov and May; 1 to 10 days in all other months except 0 in Jan & Sep
Friant-Kern into Porter Slough	0		3	< 21 cfs Late Mar-Sep; Apr, May, Aug, Sep discontinuous	1.2	< 30 cfs; Apr-Sep, sporadic
Porter Slough Headgate	30.5	50 to 100 cfs; mid-Jan to Sep	4.8	< 118 cfs; mid-Feb to mid-Mar	30.6	< 108 cfs; Oct to early Dec, mid-Jan to early Apr, mid-June to mid-Sept
RD 770 pump into Friant-Kern	95 to 103 [8]	200 – 700 cfs from 2/26 to 6/19	0		0	
Ditches						
Pioneer	3.7	Year round, <1 cfs Nov – early April; up to 19 cfs Apr-Oct	5.4	Year-round	5.8	All year except winter
Cambell and Moreland	4.1	8 -19 cfs, May-Sep	5.5	Mid-Mar to-Sep; discontinuous in Mar and Apr; nearly continuous after late Apr	7.8	Most of year except for zero cfs in Dec & Jan and short period of no flow in Apr, Jul, Sep
Hubbs and Miner	1.2	3 -10 cfs, March-Sep discontinuous	1.5	Apr-Sep; discontinuous	1.8	Mid-Mar to Sept discontinuous
Poplar	49.2	50 - 100 cfs nearly year-round, zero in Nov and early Jan	19.3	Feb-Sep; nearly continuous from Apr-Sep (2 days of zero flow in May)	40.8	All year except for Dec to early Feb
Woods-Central	55.1	50 –200 cfs; Dec-Aug	22.6	Feb-Mar pulse; late June to Aug	13	Feb-Mar, Aug

[1] Unless otherwise noted flow is continuous for the period given. A note of "discontinuous" indicates no flow for less than 15 days per month during the period; a note of "sporadic" indicates no flow for more than 15 days per month during the period.
[2] 1998 and 2000 Tule River below Success plotted as outflow in Figure 1
[3] Storage above conservation pool from November through July; flood control releases from 12/3/97 to 7/5/98
[4] Storage above conservation pool from late Jan to mid-April; flood control release from 2/17/00 to 3/19/00
[5] Storage above conservation pool from November to mid-April; periodic flood control release during that period
[6] Rockford station
[7] 0 pre-rain; some diversion in winter but still peaks; steady but declining flow through summer
[8] 7 pumps 90 to 100 cfs capacity; Watermaster value (95) different than FWUA value (103)

Table 9: Tulare Lake Basin Water Imports and Exports

	Water Year		
	1998	**2000**	**2001**
	189%[1]	76%	53%
Imports[2]	(TAF)	(TAF)	(TAF)
1. CVP			
a. Friant	882	1272	790
b. San Luis Canal	1065	1020	992
c. DMC- Mendota Pool	42	107	106
d. CVC	0	0	14
2. SWP[3]	1296	2073	900
Total	3286	4472	2802
Exports			
1. Kings River			
a. James Bypass	984	0	0
2. Kern River Interitie			
a. Friant-Kern canal	59	0/ND	0/ND
b. Kern River runoff	130	0/ND	0/ND
3. Pumped water into CA Aqueduct	0	0	158
Total	1173	0	158

[1] % of 1962-2006 long-term average
[2] 6% of the volume is added for seepage and evaporation on SWP, San Luis, and CVC.
[3] SWP represents net import; additional water in the Aqueduct is passed through to regions south and west.
0/ND - No Data but assumed 0

Table 10: Hydrographic Connections within the Tulare Lake Basin and to the San Joaquin River and California Aqueduct[1]

From \ To	Upper/Mainstem Kings River	North Fork KingsRiver/ James Bypass	South Fork Kings River	Upper Kaweah River	Wutchumna Ditch	St. John's River/Cross Creek	Lower Kaweah River	Tule River	Kern River	San Joaquin River above Mendota Pool	Mendota Pool	San Joaquin River below Mendota Pool	Friant-Kern Canal	CA Aqueduct	Cross Valley Canal	Arvin-Edison Canal	Kern Water Bank Canal	Tulare Lakebed channels and canals	Tulare Lakebed Flood Cells
Upper/Mainstem Kings River	--	G	G	--	--	G[2]	--	--	--	G[3]	--	--	P	--	--	--	--	--	G[4]
North Fork Kings River/James Bypass	--	--	G	--	--	--	--	--	--	--	G	--	--	--	--	--	--	--	--
South Fork Kings River	--	P	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	G	G
Upper Kaweah River	--	--	--	--	G	G	G	--	--	--	--	--	--	--	--	--	--	--	--
Wutchumna Ditch	--	--	--	--	--	G	G	--	--	--	--	--	P	--	--	--	--	--	--
St. John's River/Cross Creek	--	--	--	--	--	--	--	--[5]	--	--	--	--	P	--	--	--	--	G	G
Lower Kaweah River	--	--	--	--	--	G	--	G[6]	--	--	--	--	--	--	--	--	--	G	--
Tule River	--	--	--	--	--	--	--	--	--	--	--	--	P	--	--	--	--	G	G
Kern River	--	--	--	--	--	--	--	--	--	--	--	--	--	G[7]	G	--	G	--	G[8]
San Joaquin River above Mendota Pool	--	--	--	--	--	--	--	--	--	--	G	G[9]	--	--	--	--	--	--	--
Mendota Pool	--	--	--	--	--	--	--	--	--	--	--	G	--	P[10]	--	--	--	--	--
San Joaquin River below Mendota Pool	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Friant-Kern Canal	G	--	--	--	--	G	G	G	G	--[11]	--	--	--	--	G[12]	G	P	--	--
CA Aqueduct	--	--	G[13]	--	--	--	--	--	--	--	--	--	--	--	P[14]	G[16]	G	G[15]	--
Cross Valley Canal	--	--	--	--	--	--	--	--	G	--	--	--	P	G	--	P	G	--	--
Arvin-Edison Canal	--	--	--	--	--	--	--	--	--	--	--	--	--	P[16]	G	--	G	--	--
Kern Water Bank Canal	--	--	--	--	--	--	--	--	--	--	--	--	--	G	G	--	--	--	--
Tulare Lakebed channels and canals	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	G
Tulare Lakebed Flood Cells	--	--	P	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

LEGEND

Connectivity symbols

G gravity connection

P pumped connection

Color-coded frequency indicator

rare (i.e. severe flood or 1983 flood only)

infrequent (primarily in wet or dry years only)

common (majority of years)

[1] Does not include the connections from the Friant-Kern Canal and Poso Creek to the California Aqueduct via the Shafter-Wasco I.D. and Semi-Tropic W.S.D. systems or the connection of the Coast Range creeks (on the West side of the Basin) to the California Aqueduct
[2] Via Lakelands Canal and Alta Irrigation District distribution system.
[3] Via FID irrigation system.
[4] Via Kings Distribution system, documented in 1969 flood; possibly a connection in other wet years.
[5] Joins channelized Tule River on Tulare Lake Bottom; see connection to Tulare Lakebed channels and canals.
[6] Via Elk Bayou and Tulare Irrigation District spill.
[7] Via Kern River Intertie
[8] Via Kern River Flood Channel and Goose Lake Canal.
[9] Via Chowchilla Eastside Bypass.
[10] Via Lateral 7L
[11] Potential for Gravity connection via Little Dry Creek Wasteway, constructed for maintenance purposes to flush sand out of the Friant-Kern Canal but not used to-date.
[12] Currently (2007) via Arvin-Edison Canal; new bi-directional connection being constructed
[13] Via Lateral A.
[14] Water moves by gravity from the Aqueduct into the CVC but pumping is required to move water to the east to the first demand area
[15] Via Lateral B. Water from the California Aqueduct is also stored in the south end flood cells during non-flood years.
[16] Via Arvin-Edison Intertie

Table 11a: Principal Hydrographic Pathways Out of the Tulare Lake Basin for Non-Swimming Organisms and Toxicants

Pathway	Frequency of Flow	Gravity or Pump	Comments
Upper Kings-FID system-SJR	most years, sporadic	gravity	irrigation and winter runoff tailwater
Upper Kings-Lower Kings-James Bypass-SJR	high runoff periods with flood control releases in average and wetter years	gravity	occurred in 14 out of 30 water years since 1977
Upper Kings- Lower Kings- James Bypass-Mendota Pool – CA	high runoff periods in wet years	gravity, pump at end	occurred in 1995, 1998 and 2006
Fresno stream group- Fresno flood control- FID- SJR	high runoff periods	gravity	
Upper Kings- Lower Kings-Tulare Lakebed –SJR;	1983 only	gravity, pump, gravity	
Upper Kings- F-K Canal- Kern River or CVC –CA;	high runoff periods in wet years	pump then gravity	occurred in 4 out of 30 water years since 1977
Upper Kaweah- F-K Canal- Kern River or CVC –CA;	high runoff periods in wet years	pump then gravity	occurred in 7 out of 30 water years since 1977
Upper Kaweah—Wutchumna Ditch- F-K Canal- CVC or Arvin-Edison Canal –CA;	non-wet years, sporadic	pump then gravity or pump	
Upper Tule- F-K Canal- Kern River or CVC –CA;	high runoff periods in wet years	pump then gravity	occurred in 9 out of 30 water years since 1977
Kern River – CA	high runoff periods in wet years	gravity	occurred in 10 out of 30 years since 1977
Kern River – Kern Water Bank or Arvin-Edison canals– CA,	drier years	gravity and pump	surface water may be in canals when groundwater is pumped into canal for export

Notes:
CA- California Aqueduct
CVC- Cross Valley Canal
FID- Fresno Irrigation District
F-K- Friant-Kern
SJR- San Joaquin River
"Upper" river reach is above and "Lower" is below the Friant-Kern Canal
The Kern River Intertie was completed in 1977 so that year is used as the common base year for all pathways out of the Basin

Table 11b: Potential Hydrographic Pathways Out of the Tulare Lake Basin for Swimming Organisms

Pathway	Frequency of Flow	Gravity or Pump	Comments
Upper Kings-F-K Canal- Lower Kings	high runoff periods in wet years	pump	
Upper Kaweah-F-K Canal- Lower Kings	high runoff periods in wet years	pump	
Upper Kaweah—Wutchumna- F-K Canal- Lower Kings	non-wet years, sporadic	pump	
Lower Kaweah/St. John's- Alta ID system-Foothill streams- Lower Kings	high runoff periods		requires flow in foothill streams; likely barriers in non-flood conditions
Lower Kaweah/St. John's- Alta ID system- Lower Kings	high runoff periods and irrigation season		likely barriers in non-flood conditions
Upper Tule-- F-K Canal- Lower Kings	high runoff periods in wet years	pump	
Lower Tule-Lower Kaweah/Cross Creek-Alta ID-Lower Kings	high runoff periods and irrigation season		likely barriers in non-flood conditions
Tulare Lakebed canals-Lower Kings	high runoff periods and irrigation season		CADFG indicates that canal connections may allow fish to swim around the Empire Weirs 1 and 2. These have not been verified.

Notes:
F-K- Friant-Kern
"Upper" river reach is above and "Lower" is below the Friant-Kern Canal

Table 12: Fish species of the Tulare Lake Basin

Fish Species of the Tulare Lake Basin		Pine Flat Reservoir	Lake Kaweah	Lake Success	Lake Isabella
Common Name	**Scientific Name**				
Largemouth bass	*Micropterus salmoides*	X	X	X	X
Smallmouth bass	*Micropterus dolomieu*	X	X	X	
Spotted bass	*Micropterus punctulatus*	X	X		
White bass[1]	*Morone chrysops*				
Striped bass	*Morone saxatilis*				
Bluegill	*Lepomis macrochirus*	X	X	X	X
Redear sunfish	*Lepomis microlophus*	X	X	X	X[2]
Green sunfish	*Lepomis cyanellus*	X	X		X
White crappie	*Pomoxis annularis*	X	X	X	X
Black crappie	*Pomoxis nigromaculatus*	X	X	X	X
Bigscale logperch	*Percina macrolepida*				X
Threadfin shad	*Dorosoma petenense*	X	X	X	X
Hardhead	*Mylopharodon conocephalus*	X	X		X
Sacramento blackfish	*Orthodon microlepidotus*		X	X	
Sacramento splittail	*Pogonichthys macrolepidotus*				
Sacramento pikeminnow	*Ptychocheilus grandis*	X	X	X	X
Hitch	*Lavinia exilicauda*	X			X
California roach	*Lavinia symmetricus*	X	X		
Golden shiner	*Notemigonus crysoleucas*	X	X	X	X
Goldfish	*Carassius auratus*	X	X	X	X
Common carp	*Cyprinus carpio*	X	X	X	X
Channel catfish	*Ictalurus punctatus*	X	X	X	X
White catfish	*Ameiurus catus*	X	X	X	X
Brown bullhead	*Ameiurus nebulosus*	X	X		
Chinook salmon	*Oncorhynchus tshawytscha*	X[3]			X
Rainbow trout	*Oncorhynchus mykiss*	X	X	X	X
Brown trout	*Salmo trutta*	X	X	X	X
Inland silversides	*Menidia beryllina*				
Sacramento sucker	*Catostomus occidentalis*	X	X	X	X
Riffle sculpin	*Cottus gulosus*		X		
Threespine stickleback	*Gasterosteus aculeatus*	X	X		
Mosquitofish	*Gambusia affinis*	X	X	X	
Western brook lamprey	*Lampetra richardsoni*				
Kern brook lamprey	*Lampetra hubbsi*				

[1] The last known occurrence of this species within the Basin was documented at Pine Flat Reservoir in 2000. Since white bass have not been observed or captured for the last six years, this species is likely absent from the Basin (Stan Stephens and Randy Kelly, CDFG, personal communication, August 2006).
[2] Redear sunfish x green sunfish hybrid
[3] Both reservoirs have been planted by CDFG.