



MEMORANDUM

To: Katherine Mrowka, Division of Water Rights, State Water Resources Control Board
From: Anna Fock, MWH
Review: Yung-Hsin Sun, MWH
Date: February 12, 2009
Subject: December 12, 2008 Department of Fish and Game Memorandum Regarding Water Right Application 30358 for the Davis-Woodland Water Supply Project

BACKGROUND

The Davis-Woodland Water Supply Project (DWWSP) is a proposed joint project of the City of Davis, the University of California, Davis, and the City of Woodland to divert and use surface water from the Sacramento River. These entities are jointly referred to in this memorandum as the "Project Partners." Water Right Application 30358 for the DWWSP was filed in 1994 with the State Water Resources Control Board (SWRCB). The final Environmental Impact Report (EIR) for the DWWSP was certified in October 2007, in compliance with the California Environmental Quality Act (CEQA). The Modeling Technical Appendix in Appendix B to the Draft EIR for this proposed project documents the applications and results of the hydrologic, hydrodynamic, water quality, and water temperature modeling that was performed to analyze the proposed project's potential impacts. These analyses were made through the following two comparisons:

- Comparison of With-Project Conditions to Existing Conditions
- Comparison of Cumulative Conditions With Project to Cumulative Conditions Without Project

On December 11, 2008, the California Department of Fish and Game (DFG) submitted a memorandum regarding some aspects of the Modeling Technical Appendix to the Division of Water Rights. On January 16, 2009, Division of Water Rights sent a letter to the Project Partners, requesting additional information to address the concerns in DFG's memorandum. This memorandum provides such information.

SUMMARY OF DFG'S CONCERNS

DFG's December 11, 2008 memorandum states the following concerns:

- During months for which CALSIM results indicate that there will be unappropriated water in the Sacramento River system, "average monthly flow available for DWWSP diversion ranges from approximately 7 cfs to 93 cfs, consistently well below the diversion rate requested in water right Application 30358."
- "[T]he DEIR presents hydrodynamic and water quality modeling simulations that predict there may be an average monthly change in the Delta X2 location of up to 1.1 kilometers (km) eastward under cumulative condition with exercise of DWWSP diversions." "The location of X2

may be directly affected by DWWSP diversions from the Sacramento River or by indirect triggering of changes in upstream State Water Project and federal Central Valley Project (SWP/CVP) reservoir operations or Delta exports.”

The Division of Water Rights’ January 16, 2009 letter to the Project Partners asked them to provide additional information that will address these concerns.

This memorandum provides information to address this request.

WATER AVAILABILITY

For the CALSIM II modeling simulations that are described in the Modeling Technical Appendix, the amounts of water that are estimated to be diverted by the DWWSP under the Project Water Rights are determined solely by two factors: (a) estimated monthly DWWSP demands; and (b) the SWRCB’s Standard Permit Term 91.

Table 2-3 of the Modeling Technical Appendix lists the estimated monthly Project water demands. These same numbers also are shown in the first row of the following **Table 1**. The second row of this Table 1 shows these same demands converted to average monthly flow rates in cubic-feet per second (cfs). (This Table 1 also lists the total estimated annual demand and the equivalent average flow rate for this total estimated annual demand.)

Table 1. DWWSP Water Demands Under With-Project Conditions Scenario

Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Average Monthly Amount in Acre-Feet												
5,108	3,517	2,808	2,695	2,535	3,345	4,040	5,312	6,509	7,354	7,272	6,221	56,717
Average Monthly Rate in Cubic Feet Per Second												Average
83	59	46	44	46	54	68	86	109	120	118	105	78

DWWSP diversions from the Sacramento River under Project Water Rights would be constrained by the SWRCB’s Standard Permit Term 91. When the diversion prohibition in Term 91 is in effect, Project Partners will not divert any water from the Sacramento River under Project Water Rights. The Term 91 diversion prohibition is described on page 2-6 of the Modeling Technical Appendix.

For With-Project Conditions, Table 4-3 of the Modeling Technical Appendix shows the simulated DWWSP diversions under Project Water Rights (in 1,000 acre-feet) that would occur during each month of the 73-year period of simulation (October 1921 through September 1994). The entry for each month in this table is either: (a) the monthly demand amount shown in Table 1 above for the listed month, if the Term 91 diversion prohibition would not be in effect, or (b) zero, if the Term 91 diversion prohibition would be in effect. A copy of this table is included in this memorandum as **Table 2**. The following **Table 3** shows these same simulated monthly diversions in cfs.

The same approach was used to prepare Table 4-9 of the Technical Modeling Appendix. The following **Table 4** is a copy of this table and the following **Table 5** shows these same monthly diversions in cfs.

The row of averages at the bottom of **Table 3** (just below the row for 1994) shows that the long-term average monthly DWWSP diversions under Project Water Rights range from 7 cfs for July to 93 cfs for September. Because the Term 91 diversion prohibition normally is in effect in July, diversions under Project Water Rights in July would occur only during a few years, which results in the average rate of only 7 cfs for all Julys over the 73-year period. In contrast, the term 91 diversion prohibition normally is

not in effect in September, which results in the much higher average rate for all Septembers over the 73-year period.

Contrary to the statement in the December 11, 2008 DFG memorandum, these 7 and 93-cfs amounts are not indications of the amounts of unappropriated water that will be available in the Sacramento River system for diversion under DWWSP Project Water Rights. Instead, they are the averages of the amounts of water that would be diverted under DWWSP Project Water Rights, by month, over the 73-year period under the limitations of: (a) the monthly DWWSP demands listed in Table 1; and (b) the Term 91 diversion prohibition.

The facts that the numbers in **Tables 3 and 5** are not related to the amounts of unappropriated water that will be available in the Sacramento River is demonstrated by the attached Supplemental Project Water Calculation for January 1 through September 15, 2004 that was prepared by Kevin Long of the Division of Water Rights (see **Attachment A**). This table shows that, during this period, there were 126 days when the Term 91 diversion prohibition was not in effect. These are the days for which the number in column 32 of this table, titled "Supplemental Project Water," is negative. On such days, the amount of unappropriated water equals the opposite of the amount of "Supplemental Project Water." For example, on January 1, 2004, the table shows -15,368 cfs of "Supplemental Project Water," which means that there were 15,368 cfs of unappropriated water. Over these 126 days, the amount of surplus water averaged over 16,500 cfs. All but one of these 126 days had surplus flow rates greater than the total projected DWWSP demand. On most of these days, the surplus flow rates were substantially greater than the total projected DWWSP demand. Similar tables prepared by Bureau of Reclamation staff for 1998 through 2008 (see **Attachment B**, which uses May 2008 as an example) demonstrate that, on days when the Term 91 diversion prohibition is not in effect, the surplus flow rates almost always were substantially greater than the total projected DWWSP demand (Reclamation 2009). Ample unappropriated water therefore will be available for DWWSP diversions under Project Water Rights during times when the Term 91 diversion prohibition is not in effect, and no further water-availability analysis is necessary.

Table 2. Table 4-3 from the Modeling Technical Appendix

Hydrologic modeling results

Modeling Technical Appendix

Table 4-3. Project Partners' Water Right Diversion (1,000 AF/yr) under With-Project Conditions

Water Year	Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
1922	AN	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	42.1
1923	BN	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	35.6
1924	C	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	16.7
1925	D	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	35.6
1926	D	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	30.5
1927	W	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	42.1
1928	AN	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	35.6
1929	C	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	29.4
1930	D	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	32.1
1931	C	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	20.6
1932	D	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	35.6
1933	C	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	35.6
1934	C	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	24.6
1935	BN	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	35.6
1936	BN	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	35.6
1937	BN	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	47.7
1938	BN	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	47.7
1939	W	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	47.1
1940	AN	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	26.2
1941	W	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	35.6
1942	W	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	49.4
1943	W	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	42.1
1944	W	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	42.1
1945	D	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	35.6
1946	BN	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	35.6
1947	BN	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	35.6
1948	BN	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	35.6
1949	BN	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	35.6
1950	BN	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	35.6
1951	AN	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	35.6
1952	W	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	58.7
1953	W	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	42.1
1954	AN	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	30.5
1955	D	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	35.6
1956	W	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	42.1
1957	AN	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	30.5
1958	W	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	49.4
1959	BN	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	35.6
1960	C	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	35.6
1961	D	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	35.6
1962	BN	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	20.6
1963	W	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	42.1
1964	D	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	21.6
1965	W	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	49.4
1966	BN	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	30.5
1967	W	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	68.5
1968	BN	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	35.6
1969	W	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	49.4
1970	W	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	35.6
1971	W	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	42.1
1972	BN	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	35.6
1973	AN	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	35.6
1974	W	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	58.7
1975	W	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	49.4
1976	C	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	30.2
1977	C	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	23.7
1978	AN	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	42.1
1979	BN	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	35.6
1980	BN	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	35.6
1981	D	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	42.1
1982	W	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	35.6
1983	W	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	43.2
1984	W	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	30.5
1985	D	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	30.2
1986	W	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	35.6
1987	D	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	26.2
1988	C	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	26.2
1989	C	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	26.2
1990	C	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	26.2
1991	C	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	26.2
1992	C	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	26.2
1993	C	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	26.2
1994	AN	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	42.1
1995	C	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	0.0	0.0	6.2	26.2
Average		5.0	3.3	2.6	2.7	2.5	3.3	3.7	4.2	5.1	6.4	7.3	6.2	36.6
Maximum		5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	7.4	7.3	6.2	58.7
Minimum		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.7
Average	W	5.1	3.3	2.6	2.7	2.5	3.3	3.7	4.2	5.1	6.4	7.3	6.2	45.2
Average	AN	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	7.4	7.3	6.2	37.7
Average	BN	4.7	3.3	2.0	2.7	2.5	3.3	4.0	5.3	6.5	7.3	6.2	6.2	35.5
Average	D	5.1	3.3	2.0	2.7	2.5	3.3	4.0	5.3	6.5	7.3	6.2	6.2	22.6
Average	C	5.1	3.5	2.0	2.7	2.5	3.3	4.0	5.3	6.5	7.3	6.2	6.2	26.8

Note: 1. Water year types are based on Sacramento Valley Index: Wet (W), Above Normal (AN), Below Normal (BN), Dry (D), and Critical (C).
 2. Shaded period area represents that Term B1 condition is in effect.

Table 3. Project Partners' Water Right Diversion Under With-Project Conditions in cfs

Water Year	Year Type*	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1922	AN	83	59	46	44	46	54	68	86	109	0	0	105
1923	BN	83	59	46	44	46	54	68	86	0	0	0	105
1924	C	83	59	46	44	44	54	68	86	0	0	0	105
1925	D	83	59	46	44	46	54	68	86	0	0	0	105
1926	D	83	59	46	44	46	54	68	86	0	0	0	105
1927	W	83	59	46	44	46	54	68	86	109	0	0	105
1928	AN	83	59	46	44	44	54	68	86	0	0	0	105
1929	C	83	59	46	44	46	54	68	86	0	0	0	105
1930	D	83	59	46	44	46	54	68	86	0	0	0	105
1931	C	83	59	46	44	46	54	68	86	0	0	0	105
1932	D	83	59	46	44	44	54	68	86	0	0	0	105
1933	C	83	59	46	44	46	54	68	86	0	0	0	105
1934	C	83	59	46	44	46	54	68	86	0	0	0	105
1935	BN	83	59	46	44	46	54	68	86	0	0	0	105
1936	BN	83	59	46	44	44	54	68	86	109	0	0	105
1937	BN	83	59	46	44	46	54	68	86	0	0	0	105
1938	W	83	59	46	44	46	54	68	86	109	0	0	105
1939	D	83	59	46	44	46	54	68	86	0	0	0	105
1940	AN	83	59	46	44	44	54	68	86	0	0	0	105
1941	W	83	59	46	44	46	54	68	86	109	0	118	105
1942	W	83	59	46	44	46	54	68	86	109	0	0	105
1943	W	83	59	46	44	46	54	68	86	109	0	0	105
1944	D	83	59	46	44	44	54	68	86	0	0	0	105
1945	BN	83	59	46	44	46	54	68	86	0	0	0	105
1946	BN	83	59	46	44	46	54	68	86	0	0	0	105
1947	D	83	59	46	44	46	54	68	86	0	0	0	105
1948	BN	83	59	46	44	44	54	68	86	109	0	0	105
1949	D	83	59	46	44	46	54	68	86	0	0	0	105
1950	BN	83	59	46	44	46	54	68	86	0	0	0	105
1951	AN	83	59	46	44	46	54	68	86	0	0	0	105
1952	W	83	59	46	44	44	54	68	86	109	120	118	105
1953	W	83	59	46	44	46	54	68	86	109	0	0	105
1954	AN	83	59	46	44	46	54	68	86	0	0	0	105
1955	D	83	59	46	44	46	54	68	86	0	0	0	105
1956	W	83	59	46	44	44	54	68	86	109	0	0	105
1957	AN	83	59	46	44	46	54	68	86	0	0	0	105
1958	W	83	59	46	44	46	54	68	86	109	0	118	105
1959	BN	83	59	46	44	46	54	68	86	0	0	0	105
1960	D	83	59	46	44	44	54	68	86	0	0	0	105
1961	D	83	59	46	44	46	54	68	86	0	0	0	105
1962	BN	83	59	46	44	46	54	68	86	0	0	0	105
1963	W	83	59	46	44	46	54	68	86	109	0	0	105
1964	D	83	59	46	44	44	54	68	86	0	0	0	105
1965	W	83	59	46	44	46	54	68	86	109	0	118	105
1966	BN	83	59	46	44	46	54	68	86	0	0	0	105
1967	W	83	59	46	44	46	54	68	86	109	120	118	105
1968	BN	83	59	46	44	44	54	68	86	0	0	0	105
1969	W	83	59	46	44	46	54	68	86	109	0	118	105
1970	W	83	59	46	44	46	54	68	86	0	0	0	105
1971	W	83	59	46	44	46	54	68	86	109	0	0	105
1972	BN	83	59	46	44	44	54	68	86	0	0	0	105
1973	AN	83	59	46	44	46	54	68	86	0	0	0	105
1974	W	83	59	46	44	46	54	68	86	109	120	118	105
1975	W	83	59	46	44	46	54	68	86	109	0	118	105
1976	C	83	59	46	44	44	54	68	86	0	0	0	105
1977	C	83	59	46	44	44	54	68	86	0	0	0	105
1978	AN	83	59	46	44	46	54	68	86	109	0	0	105
1979	BN	83	59	46	44	46	54	68	86	0	0	0	105
1980	AN	83	59	46	44	44	54	68	86	109	0	0	105
1981	D	83	59	46	44	46	54	68	86	0	0	0	105
1982	W	83	59	46	44	46	54	68	86	109	0	118	105
1983	W	83	59	46	44	46	54	68	86	109	120	0	105
1984	W	83	59	46	44	44	54	68	86	0	0	118	105
1985	D	83	59	46	44	46	54	68	86	0	0	0	105
1986	W	83	59	46	44	46	54	68	86	0	0	0	105
1987	D	83	59	46	44	46	54	68	86	0	0	0	105
1988	C	83	59	46	44	44	54	68	86	0	0	0	105
1989	D	83	59	46	44	46	54	68	86	0	0	0	105
1990	C	83	59	46	44	46	54	68	86	0	0	0	105
1991	C	83	59	46	44	46	54	68	86	0	0	0	105
1992	C	83	59	46	44	44	54	68	86	0	0	0	105
1993	AN	83	59	46	44	46	54	68	86	109	0	0	105
1994	C	83	59	46	44	46	54	68	86	0	0	0	105
Average		82	55	46	44	45	54	61	69	36	7	16	93
Maximum		83	59	46	44	46	54	68	86	109	120	118	105
Minimum		0	0	46	44	0	0	0	0	0	0	0	0
Average	W	83	56	46	44	45	54	68	86	94	23	56	95
Average	AN	83	59	46	44	45	54	68	78	44	0	0	105
Average	BN	77	55	46	44	45	54	68	80	16	0	0	105
Average	D	83	55	46	44	45	54	55	54	0	0	0	105
Average	C	83	49	46	44	41	50	45	36	0	0	0	52

Note:

1. Water year types are based on Sacramento Valley Index: Wet (W), Above Normal (AN), Below Normal (BN), Dry (D), and Critical (C).
2. Shaded period area represents that Term 91 condition is in effect.

Table 4. Table 4-9 from the Modeling Technical Appendix

Modeling Technical Appendix

Hydrologic modeling results

Table 4-9. Project Partners' Water Right Diversion (1,000 AF/yr) under Cumulative Conditions with Project

Water Year	Year Type*	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
1922	AN	5.1	7.4	2.0	2.7	2.5	3.3	4.0	5.2	6.5	0.0	0.0	6.2	42.1
1923	BN	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	35.6
1924	C	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	16.7
1925	D	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	35.6
1926	D	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	30.3
1927	W	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	6.5	0.0	0.0	6.2	42.1
1928	AN	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	35.6
1929	C	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	25.4
1930	D	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	35.6
1931	C	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	20.0
1932	D	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	25.4
1933	C	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	35.6
1934	C	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	20.0
1935	BN	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	35.6
1936	BN	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	6.5	0.0	0.0	6.2	42.1
1937	BN	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	35.6
1938	W	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	6.5	0.0	0.0	6.2	42.1
1939	D	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	25.4
1940	AN	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	35.6
1941	W	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	6.5	0.0	0.0	6.2	42.1
1942	W	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	6.5	0.0	0.0	6.2	42.1
1943	W	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	6.5	0.0	0.0	6.2	42.1
1944	D	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	25.4
1945	BN	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	35.6
1946	BN	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	35.6
1947	D	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	30.3
1948	BN	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	6.5	0.0	0.0	6.2	42.1
1949	D	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	35.6
1950	BN	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	35.6
1951	AN	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	35.6
1952	W	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	6.5	7.4	7.3	6.2	56.7
1953	W	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	6.5	6.5	6.5	6.2	42.1
1954	AN	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	30.3
1955	D	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	35.6
1956	W	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	6.5	0.0	0.0	6.2	42.1
1957	AN	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	35.6
1958	W	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	6.5	0.0	7.3	6.2	48.4
1959	BN	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	35.6
1960	D	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	25.4
1961	D	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	25.4
1962	BN	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	35.6
1963	W	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	6.5	0.0	0.0	6.2	42.1
1964	D	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	31.5
1965	W	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	6.5	0.0	7.3	6.2	48.4
1966	BN	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	30.3
1967	W	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	6.5	7.4	7.3	6.2	56.7
1968	BN	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	25.4
1969	W	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	6.5	0.0	0.0	6.2	42.1
1970	W	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	6.5	0.0	0.0	6.2	35.6
1971	W	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	6.5	0.0	0.0	6.2	42.1
1972	BN	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	35.6
1973	AN	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	35.6
1974	W	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	6.5	7.4	7.3	6.2	56.7
1975	W	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	6.5	0.0	7.3	6.2	48.4
1976	C	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	30.3
1977	C	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	25.4
1978	AN	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	42.1
1979	BN	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	35.6
1980	AN	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	42.1
1981	D	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	20.0
1982	W	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	6.5	0.0	7.3	6.2	48.4
1983	W	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	6.5	0.0	7.3	6.2	48.4
1984	W	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	6.5	0.0	7.3	6.2	48.4
1985	D	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	30.3
1986	W	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	6.5	0.0	0.0	6.2	35.6
1987	D	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	25.4
1988	C	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	25.4
1989	D	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	20.0
1990	C	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	21.5
1991	C	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	25.4
1992	C	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	20.0
1993	AN	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	6.5	0.0	0.0	6.2	42.1
1994	C	5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	0.0	0.0	0.0	6.2	30.3
Average		5.1	3.4	2.8	2.7	2.5	3.3	4.0	5.2	4.1	2.1	0.4	0.6	38.7
Maximum		5.1	3.6	2.8	2.7	2.5	3.3	4.0	5.2	6.5	7.4	7.3	6.2	56.7
Minimum		5.1	0.0	2.8	2.7	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.2
Average	W	5.1	3.3	2.8	2.7	2.5	3.3	4.0	5.3	5.6	1.4	3.1	5.3	45.2
Average	AN	5.1	3.6	2.8	2.7	2.5	3.3	4.0	4.8	2.6	0.0	0.0	6.2	37.7
Average	BN	5.1	2.5	2.8	2.7	2.5	3.3	4.0	4.4	0.0	0.0	0.0	6.2	36.1
Average	D	5.1	3.6	2.8	2.7	2.5	3.3	3.2	3.0	0.0	0.0	0.0	6.2	32.6
Average	C	5.1	3.2	2.8	2.7	2.5	3.1	2.4	2.2	0.0	0.0	0.0	6.2	27.1

Note: 1. Water year types are based on Sacramento Valley Index; Wet (W), Above Normal (AN), Below Normal (BN), Dry (D), and Critical (C).
 2. Shaded period area represents that Term 91 condition is in effect.

Table 5. Project Partners' Water Right Diversion Under Cumulative Conditions in cfs

Water Year	Year Type*	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1922	AN	83	59	46	44	46	54	68	86	109	0	0	105
1923	BN	83	59	46	44	46	54	68	86	0	0	0	105
1924	C	83	59	46	44	44	54	68	86	0	0	0	105
1925	D	83	59	46	44	46	54	68	86	0	0	0	105
1926	D	83	59	46	44	46	54	68	86	0	0	0	105
1927	W	83	59	46	44	46	54	68	86	109	0	0	105
1928	AN	83	59	46	44	44	54	68	86	0	0	0	105
1929	C	83	59	46	44	46	54	68	86	0	0	0	105
1930	D	83	59	46	44	46	54	68	86	0	0	0	105
1931	C	83	59	46	44	46	54	68	86	0	0	0	105
1932	D	83	59	46	44	44	54	68	86	0	0	0	105
1933	C	83	59	46	44	46	54	68	86	0	0	0	105
1934	C	83	59	46	44	46	54	68	86	0	0	0	105
1935	BN	83	59	46	44	46	54	68	86	0	0	0	105
1936	BN	83	59	46	44	44	54	68	86	109	0	0	105
1937	BN	83	59	46	44	46	54	68	86	0	0	0	105
1938	W	83	59	46	44	46	54	68	86	109	0	0	105
1939	D	83	59	46	44	46	54	68	86	0	0	0	105
1940	AN	83	59	46	44	44	54	68	86	0	0	0	105
1941	W	83	59	46	44	46	54	68	86	109	0	0	105
1942	W	83	59	46	44	46	54	68	86	109	0	0	105
1943	W	83	59	46	44	46	54	68	86	109	0	0	105
1944	D	83	59	46	44	44	54	68	86	0	0	0	105
1945	BN	83	59	46	44	46	54	68	86	0	0	0	105
1946	BN	83	59	46	44	46	54	68	86	0	0	0	105
1947	D	83	59	46	44	46	54	68	86	0	0	0	105
1948	BN	83	59	46	44	44	54	68	86	109	0	0	105
1949	D	83	59	46	44	46	54	68	86	0	0	0	105
1950	BN	83	59	46	44	46	54	68	86	0	0	0	105
1951	AN	83	59	46	44	46	54	68	86	0	0	0	105
1952	W	83	59	46	44	44	54	68	86	109	120	118	105
1953	W	83	59	46	44	46	54	68	86	109	0	0	105
1954	AN	83	59	46	44	46	54	68	86	0	0	0	105
1955	D	83	59	46	44	46	54	68	86	0	0	0	105
1956	W	83	59	46	44	44	54	68	86	109	0	0	105
1957	AN	83	59	46	44	46	54	68	86	0	0	0	105
1958	W	83	59	46	44	46	54	68	86	109	0	118	105
1959	BN	83	59	46	44	46	54	68	86	0	0	0	105
1960	D	83	59	46	44	44	54	68	86	0	0	0	105
1961	D	83	59	46	44	46	54	68	86	0	0	0	105
1962	BN	83	59	46	44	46	54	68	86	0	0	0	105
1963	W	83	59	46	44	46	54	68	86	109	0	0	105
1964	D	83	59	46	44	44	54	68	86	0	0	0	105
1965	W	83	59	46	44	46	54	68	86	109	0	118	105
1966	BN	83	59	46	44	46	54	68	86	0	0	0	105
1967	W	83	59	46	44	46	54	68	86	109	120	118	105
1968	BN	83	59	46	44	44	54	68	86	0	0	0	105
1969	W	83	59	46	44	46	54	68	86	109	0	0	105
1970	W	83	59	46	44	46	54	68	86	0	0	0	105
1971	W	83	59	46	44	46	54	68	86	109	0	0	105
1972	BN	83	59	46	44	44	54	68	86	0	0	0	105
1973	AN	83	59	46	44	46	54	68	86	0	0	0	105
1974	W	83	59	46	44	46	54	68	86	109	120	118	105
1975	W	83	59	46	44	46	54	68	86	109	0	118	105
1976	C	83	59	46	44	44	54	68	86	0	0	0	105
1977	C	83	59	46	44	46	54	68	86	0	0	0	105
1978	AN	83	59	46	44	46	54	68	86	109	0	0	105
1979	BN	83	59	46	44	46	54	68	86	0	0	0	105
1980	AN	83	59	46	44	44	54	68	86	109	0	0	105
1981	D	83	59	46	44	46	54	68	86	0	0	0	105
1982	W	83	59	46	44	46	54	68	86	109	0	118	105
1983	W	83	59	46	44	46	54	68	86	109	120	118	105
1984	W	83	59	46	44	44	54	68	86	0	0	118	105
1985	D	83	59	46	44	46	54	68	86	0	0	0	105
1986	W	83	59	46	44	46	54	68	86	0	0	0	105
1987	D	83	59	46	44	46	54	68	86	0	0	0	105
1988	C	83	59	46	44	44	54	68	86	0	0	0	105
1989	D	83	59	46	44	46	54	68	86	0	0	0	105
1990	C	83	59	46	44	46	54	68	86	0	0	0	105
1991	C	83	59	46	44	46	54	68	86	0	0	0	105
1992	C	83	59	46	44	44	54	68	86	0	0	0	105
1993	AN	83	59	46	44	46	54	68	86	109	0	0	105
1994	C	83	59	46	44	46	54	68	86	0	0	0	105
Average		83	57	46	44	45	54	60	67	36	7	15	95
Maximum		83	59	46	44	46	54	68	86	109	120	118	105
Minimum		83	0	46	44	44	0	0	0	0	0	0	0
Average	W	83	56	46	44	45	54	68	86	94	23	51	100
Average	AN	83	59	46	44	45	54	68	78	44	0	0	105
Average	BN	83	59	46	44	45	54	68	80	16	0	0	105
Average	D	83	59	46	44	45	54	55	49	0	0	0	105
Average	C	83	54	46	44	45	50	40	36	0	0	0	52

Note:

1. Water year types are based on Sacramento Valley Index: Wet (W), Above Normal (AN), Below Normal (BN), Dry (D), and Critical (C).
2. Shaded period area represents that Term 91 condition is in effect.

X2 LOCATIONS

X2 is defined as the location of the 2 parts per thousand (ppt) salinity isohaline at 1 meter above the bottom of the Sacramento River Channel (measured as 2,640 microSiemens per centimeter ($\mu\text{S}/\text{cm}$) surface salinity). As documented in the 2002 CALSIM II Benchmark Studies Assumptions (California Department of Water Resources 2002), the Kimmerer and Monismith monthly equation developed in 1992 (Kimmerer and Monismith 1992a) is used in CALSIM II to estimate the mean monthly location of X2 relative to the monthly averaged Delta outflow in that month and the location of X2 in the previous month. This equation is:

$$X2_t = 122.2 + 0.3278 X2_{t-1} - 17.65 \log_{10} \text{NDOI}$$

where:

$X2_t$ = Monthly averaged distance of the 2,640 $\mu\text{S}/\text{cm}$ surface isohaline from the Golden Gate Bridge, in kilometers (km) and along the main shipping channel during the present month;

$X2_{t-1}$ = Monthly averaged distance of this parameter during the previous month;

NDOI = Monthly averaged Net Delta Outflow Index in cfs in the month during which X2 is computed.

This equation indicates that a reduction in the Net Delta Outflow Index will increase the distance of X2 from the Golden Gate Bridge (that is, cause X2 to move eastward). In 1992, Kimmerer and Monismith made comparisons of the monthly X2 locations that were calculated with the above equation to observed X2 data for October 1967 through November 1991 (Kimmerer and Monismith 1992b). The coefficient of determination, R^2 , for this comparison was 0.96, which demonstrates a very high correlation between the observed values and the predicted values. The standard error for this prediction was 2.30 km.

As shown in the preceding Table 1, the maximum DWWSP diversion would be 120 cfs. Accordingly, the maximum direct effect that DWWSP diversions could have on the NDOI would be to reduce NDOI by 120 cfs. At an NDOI of 5,000 cfs, a reduction in NDOI of 120 cfs (to 4,880 cfs) would increase X2 by approximately 0.2 km. ($(\log_{10} 5000 - \log_{10} 4880) \times 17.65 = 0.187$.) At higher NDOI values, the increase in X2 that would be caused by a 120-cfs reduction in NDOI would be smaller.

This calculation demonstrates that DWWSP diversions will not directly cause significant shifts in X2 locations, even with the assumption that a 120-cfs upstream diversion would result in an equivalent reduction in NDOI. In actual operations, the Net Delta Outflow Index is the result of many factors, including inflows into the Delta, Delta precipitation, CVP and SWP Delta exports, in-Delta diversions, and Delta channel depletions. CALSIM II uses an optimization routine to simulate the system operations through weighting multi-objectives functions and requirements. Because of these multiple factors and different weightings, a reduction in Delta inflows from DWWSP diversions may cause the CALSIM II modeling simulation to shift some of these other factors, which in turn sometimes may lead to modeled shifts in X2 that are somewhat greater than the shifts that are directly caused by the DWWSP diversions.

Table 5-18 of the Modeling Technical Appendix shows the monthly changes in the X2 under the Cumulative Conditions With Project scenario compared to the Cumulative Conditions Without Project scenario. All of the simulated X2 shifts that are shown in Table 5-18 are significantly less than the 2.3-km standard error of the Kimmerer and Monismith monthly equation. None of these simulated shifts therefore is statistically significant.

Table 5-18 indicates that modeled increases in X2 of greater than the 0.2 km, which, as discussed above, is the maximum increase that could be directly caused by DWWSP diversions, would occur during 25 months of the 876-month simulation period. These infrequent (less than 3 percent) modeled X2 shifts are the artifacts of CALSIM II's simulations of changes in CVP and SWP operations and are not direct effects of DWWSP diversions. This point is highlighted by the three largest modeled shifts, which are for Augusts of 1945, 1949 and 1954. These modeled shifts all are for months for which there are no DWWSP diversions, which demonstrates that they are artifacts of the CALSIM II modeling rather than actual effects of DWWSP diversions.

In summary, because the modeled shifts in X2 of greater than 0.2 km all are statistically insignificant, occur only very infrequently and are not the direct results of DWWSP diversions, it is reasonable to conclude that the effects of the proposed DWWSP diversions on X2 will be insignificant.

REFERENCES

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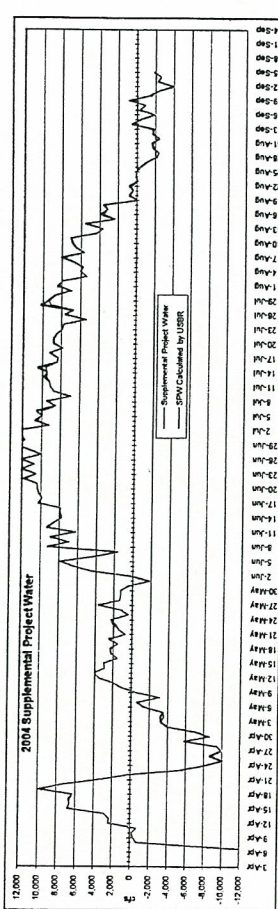
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Attachment A

SWRCB Division of Water Rights
Supplemental Project Water Calculation
Prepared by Kevin Long

January 1 through September 15, 2004

Date	Whiskeytown Lake (MHI)				Shasta Lake (SHA)				Folsom Lake (FL)				Delta Export				SARCB Term B1 Supplemental Project Water Calculation - Order WR 81-15									
	WHL Inflow	WHL Outflow	WHL Storage	WHL Change	SHA Inflow	SHA Outflow	SHA Storage	SHA Change	FL Inflow	FL Outflow	FL Storage	FL Change	Delta	Delta	Delta	Delta	OTD	OTD	OTD	OTD						
08/01/04	2,084	1,945	1,935	10	2,019	1,957	1,957	62	1,577	232	1,828	155	4,308	208	8,233	50	10,759	9,298	10,749	1,206	1,333	8,210	1,010	-2,461	-2,429	
08/02/04	1,798	1,621	1,971	158	1,722	1,757	5,705	3,983	1,572	235	1,043	774	6,525	4,391	5,683	50	10,128	10,009	10,744	1,066	1,333	9,323	1,037	-1,773	-1,727	
08/03/04	1,061	1,057	1,057	4	1,011	1,011	4,176	4,055	1,570	235	2,293	468	7,219	4,378	175	5,015	50	9,818	10,839	9,568	1,032	1,333	7,173	2,400	1,720	1,894
08/04/04	1,001	997	1,001	4	986	3,882	5,009	1,966	1,566	239	1,861	-56	5,764	4,369	153	5,451	46	10,021	10,371	9,973	1,175	1,333	7,503	2,400	841	-443
08/05/04	1,042	1,005	1,000	-37	986	3,969	5,024	1,966	1,566	239	1,861	-56	5,764	4,409	132	5,624	46	10,210	10,047	10,165	1,175	1,333	7,657	2,400	878	-1,974
08/06/04	1,173	1,019	1,058	-154	1,096	3,376	4,598	1,966	1,566	239	1,861	-56	5,764	4,469	132	5,624	46	10,210	10,061	9,608	1,126	1,333	7,149	2,400	756	-303
08/07/04	1,003	1,027	1,010	17	1,096	3,376	4,598	1,966	1,566	239	1,861	-56	5,764	4,469	132	5,624	46	10,210	10,061	9,608	1,126	1,333	7,149	2,400	756	-303
08/08/04	1,003	1,027	1,010	17	1,096	3,376	4,598	1,966	1,566	239	1,861	-56	5,764	4,469	132	5,624	46	10,210	10,061	9,608	1,126	1,333	7,149	2,400	756	-303
08/09/04	1,003	1,027	1,010	17	1,096	3,376	4,598	1,966	1,566	239	1,861	-56	5,764	4,469	132	5,624	46	10,210	10,061	9,608	1,126	1,333	7,149	2,400	756	-303
08/10/04	1,003	1,027	1,010	17	1,096	3,376	4,598	1,966	1,566	239	1,861	-56	5,764	4,469	132	5,624	46	10,210	10,061	9,608	1,126	1,333	7,149	2,400	756	-303
08/11/04	1,003	1,027	1,010	17	1,096	3,376	4,598	1,966	1,566	239	1,861	-56	5,764	4,469	132	5,624	46	10,210	10,061	9,608	1,126	1,333	7,149	2,400	756	-303
08/12/04	1,003	1,027	1,010	17	1,096	3,376	4,598	1,966	1,566	239	1,861	-56	5,764	4,469	132	5,624	46	10,210	10,061	9,608	1,126	1,333	7,149	2,400	756	-303
08/13/04	1,003	1,027	1,010	17	1,096	3,376	4,598	1,966	1,566	239	1,861	-56	5,764	4,469	132	5,624	46	10,210	10,061	9,608	1,126	1,333	7,149	2,400	756	-303
08/14/04	1,003	1,027	1,010	17	1,096	3,376	4,598	1,966	1,566	239	1,861	-56	5,764	4,469	132	5,624	46	10,210	10,061	9,608	1,126	1,333	7,149	2,400	756	-303
08/15/04	1,003	1,027	1,010	17	1,096	3,376	4,598	1,966	1,566	239	1,861	-56	5,764	4,469	132	5,624	46	10,210	10,061	9,608	1,126	1,333	7,149	2,400	756	-303
08/16/04	1,003	1,027	1,010	17	1,096	3,376	4,598	1,966	1,566	239	1,861	-56	5,764	4,469	132	5,624	46	10,210	10,061	9,608	1,126	1,333	7,149	2,400	756	-303
08/17/04	1,003	1,027	1,010	17	1,096	3,376	4,598	1,966	1,566	239	1,861	-56	5,764	4,469	132	5,624	46	10,210	10,061	9,608	1,126	1,333	7,149	2,400	756	-303
08/18/04	1,003	1,027	1,010	17	1,096	3,376	4,598	1,966	1,566	239	1,861	-56	5,764	4,469	132	5,624	46	10,210	10,061	9,608	1,126	1,333	7,149	2,400	756	-303
08/19/04	1,003	1,027	1,010	17	1,096	3,376	4,598	1,966	1,566	239	1,861	-56	5,764	4,469	132	5,624	46	10,210	10,061	9,608	1,126	1,333	7,149	2,400	756	-303
08/20/04	1,003	1,027	1,010	17	1,096	3,376	4,598	1,966	1,566	239	1,861	-56	5,764	4,469	132	5,624	46	10,210	10,061	9,608	1,126	1,333	7,149	2,400	756	-303
08/21/04	1,003	1,027	1,010	17	1,096	3,376	4,598	1,966	1,566	239	1,861	-56	5,764	4,469	132	5,624	46	10,210	10,061	9,608	1,126	1,333	7,149	2,400	756	-303
08/22/04	1,003	1,027	1,010	17	1,096	3,376	4,598	1,966	1,566	239	1,861	-56	5,764	4,469	132	5,624	46	10,210	10,061	9,608	1,126	1,333	7,149	2,400	756	-303
08/23/04	1,003	1,027	1,010	17	1,096	3,376	4,598	1,966	1,566	239	1,861	-56	5,764	4,469	132	5,624	46	10,210	10,061	9,608	1,126	1,333	7,149	2,400	756	-303
08/24/04	1,003	1,027	1,010	17	1,096	3,376	4,598	1,966	1,566	239	1,861	-56	5,764	4,469	132	5,624	46	10,210	10,061	9,608	1,126	1,333	7,149	2,400	756	-303
08/25/04	1,003	1,027	1,010	17	1,096	3,376	4,598	1,966	1,566	239	1,861	-56	5,764	4,469	132	5,624	46	10,210	10,061	9,608	1,126	1,333	7,149	2,400	756	-303
08/26/04	1,003	1,027	1,010	17	1,096	3,376	4,598	1,966	1,566	239	1,861	-56	5,764	4,469	132	5,624	46	10,210	10,061	9,608	1,126	1,333	7,149	2,400	756	-303
08/27/04	1,003	1,027	1,010	17	1,096	3,376	4,598	1,966	1,566	239	1,861	-56	5,764	4,469	132	5,624	46	10,210	10,061	9,608	1,126	1,333	7,149	2,400	756	-303
08/28/04	1,003	1,027	1,010	17	1,096	3,376	4,598	1,966	1,566	239	1,861	-56	5,764	4,469	132	5,624	46	10,210	10,061	9,608	1,126	1,333	7,149	2,400	756	-303
08/29/04	1,003	1,027	1,010	17	1,096	3,376	4,598	1,966	1,566	239	1,861	-56	5,764	4,469	132	5,624	46	10,210	10,061	9,608	1,126	1,333	7,149	2,400	756	-303
08/30/04	1,003	1,027	1,010	17	1,096	3,376	4,598	1,966	1,566	239	1,861	-56	5,764	4,469	132	5,624	46	10,210	10,061	9,608	1,126	1,333	7,149	2,400	756	-303
08/31/04	1,003	1,027	1,010	17	1,096	3,376	4,598	1,966	1,566	239	1,861	-56	5,764	4,469	132	5,624	46	10,210	10,061	9,608	1,126	1,333	7,149	2,400	756	-303



Attachment B

United States Department of the Interior
Bureau of Reclamation – Central Valley Project – California
Supplemental Project Water

May 1 to 31, 2008

MAY 2008

UNITED STATES DEPARTMENT OF THE INTERIOR
U.S. BUREAU OF RECLAMATION-CENTRAL VALLEY PROJECT-CALIFORNIA

RUN DATE: August 5, 2008
Page 1 of 3

DAILY CVP-SWP COORDINATED OPERATION

DAY	WHISKEYTOWN LAKE				SHASTA LAKE				FOLSOM LAKE				TOTAL FEDERAL STORAGE WITHDRAWAL ADJUSTED TO DELTA
	GLEAR CREEK AND SPRING CR/P/P RELEASE	NATURAL FLOW	STORAGE WITHDRAWAL	KESWICK RELEASE	COMPUTED INFLOW	SPRING CR/P/P RELEASE	STORAGE WITHDRAWAL	WHISKEY TOWN + SHASTA STORAGE WITHDRAWAL	NATOMA RELEASE	DELIVERIES FROM FOLSOM LAKE	COMPUTED INFLOW	STORAGE WITHDRAWAL	
1	283	316	-33	8,041	5,018	83	2,940	2,907	1,064	236	2,917	-1,617	-499
2	283	207	76	8,014	5,074	83	2,857	2,933	1,060	243	2,903	-1,600	-266
3	283	163	120	8,259	5,603	83	2,573	2,693	1,059	240	2,916	-1,617	-669
4	283	169	114	8,275	5,536	83	2,656	2,770	1,066	245	3,194	-1,883	-217
5	283	175	108	8,270	5,515	83	2,672	2,780	1,061	253	2,442	-1,128	1,079
6	417	256	161	8,265	7,179	217	869	1,030	1,064	235	3,660	-2,361	1,779
7	287	177	110	8,278	6,935	87	1,256	1,366	1,057	237	4,169	-2,875	572
8	283	193	90	8,264	6,370	83	1,811	1,901	1,063	240	3,831	-2,528	-182
9	283	181	102	8,266	7,196	83	987	1,089	1,058	251	3,095	-1,786	242
10	283	211	72	8,268	6,655	83	1,530	1,602	1,060	259	3,207	-1,888	994
11	282	283	-1	8,266	6,354	82	1,830	1,829	1,064	259	3,380	-2,057	-852
12	282	256	26	8,265	6,540	82	1,643	1,669	1,056	253	3,394	-2,085	-691
13	282	161	121	8,261	6,432	82	1,747	1,868	1,058	257	3,180	-1,865	-184
14	282	168	114	9,475	6,323	82	3,070	3,184	1,062	272	3,146	-1,812	-776
15	286	96	190	10,881	5,996	86	4,799	4,989	1,064	274	3,274	-1,936	-210
16	491	211	280	9,064	7,651	291	1,122	1,402	1,061	284	4,522	-3,177	2
17	283	180	103	9,044	7,895	83	1,066	1,169	1,063	284	4,125	-2,778	-1,444
18	283	160	123	9,960	6,642	83	3,235	3,358	1,061	296	4,370	-3,013	-910
19	283	162	121	10,067	7,459	83	2,525	2,646	1,067	291	3,484	-2,126	171
20	283	138	145	10,007	8,298	83	1,626	1,771	1,060	276	3,290	-1,954	2,863
21	398	109	289	10,019	4,574	198	5,247	5,536	1,496	258	2,680	-926	-552
22	964	85	879	10,049	5,845	764	3,440	4,319	1,563	263	2,344	-518	243
23	283	143	140	10,047	5,498	83	4,466	4,606	1,567	278	1,896	-51	2,840
24	282	278	4	10,004	6,523	82	3,399	3,403	1,509	244	1,964	-211	2,595
25	282	170	112	10,067	6,166	82	3,819	3,931	1,511	238	2,324	-575	1,560
26	282	126	156	10,056	6,232	82	3,742	3,898	1,562	253	1,873	-58	4,961
27	525	155	370	10,047	7,098	325	2,624	2,994	1,537	262	1,992	-193	4,261
28	520	115	405	10,039	10,410	320	-691	-286	1,780	254	1,531	503	4,413
29	283	124	159	10,026	7,061	83	2,882	3,041	1,994	261	2,055	200	3,906
30	326	112	214	10,038	6,956	126	2,956	3,170	1,894	270	1,796	368	4,131
31	283	125	158	10,052	5,861	83	4,108	4,266	1,955	271	2,068	158	4,266

COMMENTS:

MAY 2008

UNITED STATES DEPARTMENT OF THE INTERIOR
U.S. BUREAU OF RECLAMATION-CENTRAL VALLEY PROJECT-CALIFORNIA

RUN DATE August 5, 2008
Page 2 of 3

DAILY CVP-SWP COORDINATED OPERATION

DAY	LAKE OROVILLE		DELTA EXPORT				TOTAL DELTA EXPORT	FOLSOM SOUTH CANAL
	COMPUTED INFLOW	STORAGE WITHDRAWAL	DMC C/CANAL	STATE DELTA PUMPING PLANT	GLIFTON COURT FOREBAY			
1	4,645	-1,221	767	924	803	1,690	52	
2	3,752	526	1,075	517	696	1,592	50	
3	4,723	-447	1,093	645	695	1,738	50	
4	4,404	-128	1,105	596	690	1,701	50	
5	5,014	-723	1,108	550	688	1,658	50	
6	6,329	-2,056	1,103	550	690	1,653	50	
7	6,036	-1,734	1,101	663	686	1,764	50	
8	5,981	-1,620	1,096	507	692	1,602	50	
9	6,102	-1,809	1,094	647	699	1,741	50	
10	5,418	-1,218	1,096	719	694	1,816	50	
11	5,830	-1,733	1,095	688	684	1,783	50	
12	5,859	-1,882	1,093	633	686	1,726	50	
13	5,163	-1,356	1,087	677	688	1,764	50	
14	5,230	-1,512	1,113	614	690	1,727	50	
15	6,373	-2,810	1,134	618	699	1,752	50	
16	7,872	-4,394	1,130	497	489	1,627	50	
17	7,404	-3,854	1,135	92	697	1,227	50	
18	6,429	-2,836	1,138	1,050	690	2,188	50	
19	6,238	-2,642	1,142	801	695	1,942	50	
20	5,137	-1,205	1,141	548	522	1,689	50	
21	4,652	-278	1,118	712	873	1,830	50	
22	3,785	479	1,107	377	695	1,484	50	
23	3,453	723	1,240	975	1,495	2,214	50	
24	3,924	268	1,307	1,334	1,495	2,640	50	
25	3,449	778	1,280	1,570	1,062	2,850	50	
26	3,662	630	1,278	1,478	1,499	2,756	50	
27	2,465	1,874	1,295	541	1,038	1,836	50	
28	3,854	522	1,297	1,182	1,175	2,479	50	
29	2,143	2,287	1,291	1,187	1,188	2,478	50	
30	2,638	1,796	1,316	1,370	1,498	2,686	50	
31	3,277	994	1,317	586	1,199	1,903	50	

COMMENTS:

SUPPLEMENTAL PROJECT WATER

DAY	FEDERAL	STATE	TOTAL	TOTAL DIVERSION	SAN JOAQUIN RIVER	SEASONAL ADJUST	EXPORT INDEX	CARRIAGE WATER	SUPPLEMENTAL PROJECT WATER
1	-499	-484	-983	1,638	3,711	1,000	-3,073	0	-2,621
2	-266	-1,662	-1,928	1,542	3,722	1,000	-3,180	0	-3,470
3	-669	-1,854	-2,523	1,688	3,766	1,000	-3,078	0	-4,211
4	-217	-1,438	-1,655	1,651	3,744	1,000	-3,093	0	-3,088
5	1,079	526	1,605	1,608	3,777	1,000	-3,169	0	-3
6	1,779	-447	1,332	1,603	3,828	1,000	-3,225	0	-271
7	572	-128	444	1,714	3,864	1,000	-3,150	0	-1,270
8	-182	-723	-905	1,552	3,855	1,000	-3,303	0	-2,457
9	242	-2,056	-1,814	1,691	3,955	1,000	-3,264	0	-3,506
10	994	-1,734	-740	1,766	3,864	1,000	-3,098	0	-2,505
11	-852	-1,620	-2,472	1,733	4,020	1,000	-3,287	0	-4,205
12	-691	-1,809	-2,500	1,676	4,180	1,000	-3,504	0	-4,176
13	-184	-1,218	-1,402	1,714	4,010	1,000	-3,296	0	-3,117
14	-776	-1,733	-2,509	1,677	3,891	1,000	-3,214	0	-4,186
15	-210	-1,882	-2,092	1,702	3,864	1,000	-3,162	0	-3,793
16	2	-1,356	-1,354	1,577	3,755	1,000	-3,178	0	-2,931
17	-1,444	-1,512	-2,956	1,177	3,711	1,000	-3,534	0	-4,133
18	-910	-2,810	-3,720	2,138	3,660	1,000	-2,522	0	-5,858
19	171	-4,394	-4,223	1,892	3,744	1,000	-2,852	0	-6,116
20	2,863	-3,854	-991	1,639	3,700	1,000	-3,061	0	-2,630
21	-552	-2,836	-3,388	1,780	3,482	1,000	-2,702	0	-5,168
22	243	-2,642	-2,399	1,434	3,230	1,000	-2,796	0	-3,832
23	2,840	-1,205	1,635	2,164	2,800	1,000	-1,636	0	-529
24	2,595	-278	2,317	2,590	2,368	1,000	-778	0	-274
25	1,560	479	2,039	2,800	2,224	1,000	-424	0	-761
26	4,961	723	5,684	2,706	2,288	1,000	-582	0	2,978
27	4,261	268	4,529	1,786	2,184	1,000	-1,398	0	2,743
28	4,413	778	5,191	2,429	2,017	1,000	-588	0	2,762
29	3,906	630	4,536	2,428	2,017	1,000	-589	0	2,108
30	4,131	1,874	6,005	2,636	1,962	1,000	-326	0	3,369
31	4,266	522	4,788	1,853	1,791	1,000	-938	0	2,935

COMMENTS:

MINIMUM FILING FEE: \$100.00
 FILE ORIGINAL & ONE COPY
 TYPE OR PRINT IN BLACK INK
 (For explanation of entries required, see
 booklet "How to File an Application to
 Appropriate Water in California")

STATE OF CALIFORNIA
 STATE WATER RESOURCES CONTROL BOARD
 DIVISION OF WATER RIGHTS
 901 P Street, Sacramento
 P.O. Box 2000, Sacramento, CA 95812-2000



APPLICATION TO APPROPRIATE WATER BY PERM.

(Check one
 box only)

or



REGISTRATION OF SMALL DOMESTIC USE APPROPRIATION*

(If this is used to register a small domestic use appropriation, the
 terms "application" and "applicant" herein, and in related forms, shall
 mean "registration" and "registrant.")

Application No. _____
 (Leave blank)

1. APPLICANT

Yolo County Flood Control & Water Conservation District (916) 622-0265
 (Name of applicant) (Telephone number where you may be reached
 between 8 a.m. and 5 p.m. - include area code)
34274 State Highway 16
 (Mailing address)
Woodland California 95695
 (City or town) (State) (Zip Code)

2. SOURCE

a. The name of the source at the point of diversion is Sacramento River
 (If unnamed, state that it is an unnamed stream, spring, etc.)
 tributary to Suisun Bay

b. In a normal year does the stream dry up at any point downstream from your project? YES NO If yes, during
 what months is it usually dry? From _____ to _____
 What alternate sources are available to your project should a portion of your requested direct diversion season be
 excluded because of a dry stream or nonavailability of water? local groundwater through conjunctive-use program

3. POINTS OF DIVERSION and REDIVERSION *

a. The point(s) of diversion will be in the County of Yolo or Tehama
 b.

List all points giving coordinate distances from section corner or other tie as allowed by Board regulations i.e. California Coordinate System	Point is within (40-acre subdivision)	Section	Township	Range	Base and Meridian
A:N298,400;E 1,943,550 (Zone 1)	SE 1/4 of NE 1/4	33	27N.	3W.	M.D.
B:N367,950;E 2,105,850 (Zone 2)	SE 1/4 of SW 1/4	27	10N.	3E.	M.D.
C:N339,550;E 2,129,200 (Zone 2)	SE 1/4 of NE 1/4	29	9N.	4E.	M.D.
D:N357,550;E 2,114,800 (Zone 2)	SE 1/4 of SE 1/4	2	9N.	3E.	M.D.

c. Does applicant own the land at point of diversion? YES NO
 d. If applicant does not land at point of diversion, state name and address of owner and what steps have been taken to obtain right of access: See attached Table 1

* Alternate points of diversion are listed. Only one ultimately will be developed and used.

4. PURPOSE OF USE, AMOUNT and SEASON

a. In the table below, state the purpose(s) for which water is to be appropriated, the quantities of water for each purpose and the dates between which diversions will be made. Use gallons per day if rate is less than 0.025 cubic foot per second (approximately 16,000 gallons per day). Purpose must only be "Domestic" for registration of small domestic use.*

PURPOSE OF USE (Irrigation, Domestic, etc.)	DIRECT DIVERSION				STORAGE		
	QUANTITY		SEASON OF DIVERSION **		AMOUNT Acre-feet per annum	COLLECTION SEASON	
	RATE (Cubic feet per second or gallons per day)	AMOUNT (Acre-feet per year)	Beginning Date (Mo.&Day)	Ending Date (Mo.&Day)		Beginning date (Mo.&Day)	Ending Date (Mo.&Day)
[Municipal, Irrigation and Agricultural, Fisheries and							
Aquaculture Research	250	45,000	Jan. 1	Dec. 31			
		45,000	TOTAL AMOUNT			TOTAL AMOUNT	

b. Total combined amount taken by direct diversion and storage during any one year will be 45,000 acre feet.
 * Not to exceed 4,500 gallons per day by direct diversion or 10 acre-feet per annum by storage.

WR 1(0/91)

** As limited by SWRCB Standard Permit Term 91

FOR0053-R1

2/4/94
 \$100.00
 7.4

Proposed Davis-Woodland Water Supply Project

Calendar Year 2040 Projected Monthly Water Consumption, AF/month

(Assumes water supply project is sized to meet projected 2040 demands)

Sacramento River Water Treatment Plant Capacity = 51.8 mgd (23 Davis, 27 Woodland, 1.8 UC Davis)

City of Davis

	<u>Surface Water</u>		<u>Ground Water</u>	<u>Total</u>
	<u>Sacramento River</u>	<u>Solano Project</u>		
January	1,031	0	0	1,031
February	916	0	0	916
March	1,168	0	0	1,168
April	1,626	0	0	1,626
May	2,130	0	0	2,130
June	2,118	0	562	2,679
July	2,188	0	880	3,069
August	2,188	0	835	3,023
September	2,118	0	493	2,611
October	2,153	0	0	2,153
November	1,420	0	0	1,420
December	<u>1,076</u>	<u>0</u>	<u>0</u>	<u>1,076</u>
Annual	20,131	0	2,769	22,900

City of Woodland

	<u>Surface Water</u>		<u>Ground Water</u>	<u>Total</u>
	<u>Sacramento River</u>	<u>Solano Project</u>		
January	1,308	0	0	1,308
February	1,192	0	0	1,192
March	1,645	0	0	1,645
April	1,938	0	0	1,938
May	2,569	0	68	2,636
June	2,486	0	630	3,116
July	2,569	0	814	3,383
August	2,569	0	882	3,451
September	2,486	0	417	2,903
October	2,340	0	0	2,340
November	1,593	0	0	1,593
December	<u>1,312</u>	<u>0</u>	<u>0</u>	<u>1,312</u>
Annual	24,006	0	2,811	26,817

UC Davis

	<u>Surface Water</u>		<u>Ground Water</u>	<u>Total</u>
	<u>Sacramento River</u>	<u>Solano Project</u>		
January	170	170	36	376
February	153	153	72	379
March	170	170	99	439
April	164	164	98	427
May	170	170	227	567
June	164	164	264	593
July	170	170	298	638
August	170	170	291	630
September	164	164	237	566
October	170	170	170	510
November	164	164	119	448
December	<u>170</u>	<u>158</u>	<u>0</u>	<u>328</u>
Annual	2,000	1,988	1,912	5,900

All Project Partners

	<u>Surface Water</u>		<u>Ground Water</u>	<u>Total</u>
	<u>Sacramento River</u>	<u>Solano Project</u>		
January	2,508	170	36	2,714
February	2,261	153	72	2,486
March	2,983	170	99	3,252
April	3,728	164	98	3,990
May	4,868	170	295	5,333
June	4,768	164	1,456	6,388
July	4,927	170	1,993	7,090
August	4,927	170	2,007	7,104
September	4,768	164	1,147	6,079
October	4,662	170	170	5,002
November	3,178	164	119	3,461
December	<u>2,558</u>	<u>158</u>	<u>0</u>	<u>2,716</u>
Annual	46,137	1,988	7,492	55,617