CALFED Bay-Delta Program Storage and Conveyance Refinement Process:

A Status Report on System Modeling Using DWRSIM

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CALFED Storage and Conveyance Refinement Process: A Status Report on DWRSIM Model Studies

This brief report presents status of DWRSIM model studies activities since last quarterly report of January 22, 1998. Today's presentation covers three aspects of completed studies since last status report.

a) List of Completed DWRSIM Model studies along with key assumptions.

b) Summary of criteria used in sensitivity studies and comparative benefits in terms of SWP and CVP deliveries

c) Summary of Water Supply Impacts on Delta exports and storages depleted.

A list of completed DWRSIM studies and key model assumptions are presented in Table 1. Description of CALFED program alternatives referred to in this table is given in Appendix 'A'. A list of previously completed studies as of January 22, 1998, is given in Appendix 'B'. Details of study assumptions, inputs and results for these studies are also available on the DWR's Hydrology and Operations Section home page at the URL;

http://www.hydro.water.ca.gov/calfed.html

Study results in terms of project deliveries are presented in Table 2. Water supply impacts along with listing of sensitivity analysis criteria are summarized in Tables 3A and 3B.

Water supply impacts in terms of changes in exports and storages for these 18 sensitivity studies, are presented in Tables 4 to 21 in a Delta mass balance format, both for critically dry period of 1928-1934 and long-term period of 1922-1994.

Key results from selected studies are also presented in several graphs and charts.

TABLE 1
CALFED DWRSIM STUDIES AND KEY MODELING ASSUMPTIONS

The following studies have been completed since last quarterly report of January 22, 1998.

1. New Facilities - SDI and 10K IF (ALT 3): Study 2020d09b-calfed-595

Study 529 with SDI, 5K IF and 1,000 cfs minimum flow through Delta channels for South of Delta exports, is modified as follows.

- 10K IF capacity
- IF not in E/I Ratio
- Rio Vista flow criteria 3,000 cfs in July and August
- Maximum south of Delta diversion of 5,000 cfs in May.

2. New Facilities - SDI and SDSS (ALT 2): Study 2020d09b-calfed-608

Study 530 with South Delta Improvements (SDI) and 2.0 MAF South of Delta Surface Storage (SDSS) with 3500 cfs inlet and outlet capacities is modified for;

- November to January E/I Ratio equals 0.5
- February to June E/I Ratio equals 0.25.

3. New Facilities - SDI, NDGS, NDSS, NDES, SDGS & SDSS (ALT 1): Study 2020d09b-calfed-609

Study 531 (ALT 1C) with 4.75 MAF storage, is modified for;

- There is no geomorphological flow restriction for Sacramento River flow diversions to North of Delta Surface Storage.

4. New Facilities - SDI, NDGS, NDSS, NDES, SDGS & SDSS (ALT 1): Study 2020d09b-calfed-610

Study 531 (ALT 1C) with 4.75 MAF storage, is modified for;

- November to January E/I Ratio equals 0.5
- February to June E/I Ratio equals 0.25.
- There is no geomorphological flow restriction for Sacramento River flow diversions to North of Delta Surface Storage.

5. New Facilities - SDI and 5K IF (ALT 3): Study 2020d09b-calfed-611

Study 578 with SDI and 5K IF, IF not in E/I Ratio, Rio Vista min flow 3,000 cfs in July and August, 5K max export in May and 1,000 cfs minimum flow through Delta channels for South of Delta exports, is modified as follows.

- 3,000 cfs minimum flow through Delta channels for South of Delta exports.

6. New Facilities - SDI, 5K IF & Storage (ALT 3): Study 2020d09b-calfed-612

Study 579 with SDI, 5K IF, 6.2 MAF storage, IF not in E/I Ratio, Rio Vista min flow 3,000 cfs in July and August, 5K max export in May, 1,000 cfs minimum flow through Delta channels for South of Delta exports and Zero Sacramento River trigger for diversion to NDSS, is modified as follows.

- 3,000 cfs minimum flow through Delta channels for South of Delta exports.

7. New Facilities - SDI and 15K IF (ALT 3): Study 2020d09b-calfed-613

Study 580 with SDI and 15K IF, IF not in E/I Ratio, Rio Vista min flow 3,000 cfs in July and August, 5K max export in May and 1,000 cfs minimum flow through Delta channels for South of Delta exports, is modified as follows.

- 3,000 cfs minimum flow through Delta channels for South of Delta exports.

8. New Facilities - SDI, 15K IF & Storage (ALT 3): Study 2020d09b-calfed-614

Study 581 with SDI, 15K IF, 6.2 MAF storage, IF not in E/I Ratio, Rio Vista min flow 3,000 cfs in July and August, 5K max export in May, 1,000 cfs minimum flow through Delta channels for South of Delta exports and Zero Sacramento River trigger for diversion to NDSS, is modified as follows.

- 3,000 cfs minimum flow through Delta channels for South of Delta exports.

9. New Facilities - SDI and 10K IF (ALT 3): Study 2020d09b-calfed-615

Study 595 with SDI, 10K IF, IF not in E/I, 3,000 cfs Rio Vista in July and August, 5k max export in May and 1,000 cfs minimum flow through Delta channels for South of Delta exports, is modified as follows.

- 3,000 cfs minimum flow through Delta channels for South of Delta exports.

10. New Facilities - SDI, 10K IF & Storage (ALT 3): Study 2020d09b-calfed-616

Study 567 with SDI, 10K IF, 6.2 MAF storage, IF not in E/I Ratio, Rio Vista min flow 3,000 cfs in July and August, 5K max export in May, 1,000 cfs minimum flow through

Delta channels for South of Delta exports and Zero Sacramento River trigger for diversion to NDSS, is modified as follows.

- 3,000 cfs minimum flow through Delta channels for South of Delta exports.

11. New Facility - SDI (ALT 2): Study 2020d09b-calfed-623

Study 528 for South Delta Improvements (SDI) with 1995 WQCP X2 Level of development (except 1962 LOD for May and June for Chipps Island), is modified for;

- 1962 X2 Level of development for Chipps Island and Roe Island from March to June.

12. New Facilities - SDI, 15K IF & Storage (ALT 3): Study 2020d09b-calfed-624

Study 532A with SDI, 10K IF, 6.2 MAF storage, IF not in E/I Ratio, Rio Vista min flow 3,000 cfs in July and August, 5K max export in May, 1,000 cfs minimum flow through Delta channels for South of Delta exports, Zero Sacramento River trigger for diversion to NDSS and with 1995 WQCP X2 Level of development (except 1962 LOD for May and June for Chipps Island), is modified as follows.

- 1962 X2 Level of development for Chipps Island and Roe Island from March to June.

13. New Facilities - SDI and 10K IF (ALT 3): Study 2020d09b-calfed-625

Study 595 with SDI, 10K IF, IF not in E/I, 3,000 cfs Rio Vista in July and August, 5k max export in May, 1,000 cfs minimum flow through Delta channels for South of Delta exports and with 1995 WQCP X2 Level of development (except 1962 LOD for May and June for Chipps Island), is modified as follows.

- 1962 X2 Level of development for Chipps Island and Roe Island from March to June.

14. New Facilities - SDI, 10K IF & Storage (ALT 3): Study 2020d09b-calfed-626

Study 567 with SDI, 10K IF, 6.2 MAF storage, IF not in E/I Ratio, Rio Vista min flow 3,000 cfs in July and August, 5K max export in May, 1,000 cfs minimum flow through Delta channels for South of Delta exports, Zero Sacramento River trigger for diversion to NDSS and with 1995 WQCP X2 Level of development (except 1962 LOD for May and June for Chipps Island), is modified as follows.

- 1962 X2 Level of development for Chipps Island and Roe Island from March to June.

15. New Facility - SDI (ALT 2): Study 2020d09b-calfed-627

Study 528 for South Delta Improvements (SDI) with 1995 WQCP X2 Level of development (except 1962 LOD for May and June for Chipps Island), is modified for;

- 1983 X2 Level of development for Chipps Island and Roe Island from March to June.

16. New Facilities - SDI, 15K IF & Storage (ALT 3): Study 2020d09b-calfed-628

Study 532A with SDI, 10K IF, 6.2 MAF storage, IF not in E/I Ratio, Rio Vista min flow 3,000 cfs in July and August, 5K max export in May, 1,000 cfs minimum flow through Delta channels for South of Delta exports, Zero Sacramento River trigger for diversion to NDSS and with 1995 WQCP X2 Level of development (except 1962 LOD for May and June for Chipps Island), is modified as follows.

- 1983 X2 Level of development for Chipps Island and Roe Island from March to June.

17. New Facilities - SDI and 10K IF (ALT 3): Study 2020d09b-calfed-629

Study 595 with SDI, 10K IF, IF not in E/I, 3,000 cfs Rio Vista in July and August, 5k max export in May, 1,000 cfs minimum flow through Delta channels for South of Delta exports and with 1995 WQCP X2 Level of development (except 1962 LOD for May and June for Chipps Island), is modified as follows.

- 1983 X2 Level of development for Chipps Island and Roe Island from March to June.

18. New Facilities - SDI, 10K IF & Storage (ALT 3): Study 2020d09b-calfed-630

Study 567 with SDI, 10K IF, 6.2 MAF storage, IF not in E/I Ratio, Rio Vista min flow 3,000 cfs in July and August, 5K max export in May, 1,000 cfs minimum flow through Delta channels for South of Delta exports, Zero Sacramento River trigger for diversion to NDSS and with 1995 WQCP X2 Level of development (except 1962 LOD for May and June for Chipps Island), is modified as follows.

- 1983 X2 Level of development for Chipps Island and Roe Island from March to June.

TABLE 2

PRELIMINARY DWRSIM STUDIES RESULTS WATER SUPPLY DELIVERIES OF CALFED STORAGE & CONVEYANCE FACILITIES

ID	VER	DATE	COMPONENT	SWP Deliveries		CVP Deliveries		SWP & CVP Deliveries	
				Critical	73-yr.	Critical	73-yr.	Critical	73-yr.
514	906	02/26/98	1995 WQCP+Selected Upstream AFRP instream flows	2117	3257	1917	2543	4034	5800
529	906	10/10/97	S.528+5K IF	2085	3365	1843	2497	3928	5862
595	906e	03/23/98	S.529+3K RV+5K May+10K IF+IF not E/I+min 1K thru Delta	2078	3316	1732	2466	3810	5782
530	906	01/30/98	S.528+SDSS	2557	3702	1894	2467	4451	6169
608	906-1	02/20/98	S.530+E/I reduced	2076	3472	1778	2400	3854	5872
531	906	10/10/97	S.528+NDGS+NDSS+NDES+SDGS+SDSS	2699	3804	1840	2542	4539	6346
609	906-1	02/19/98	S.531+NDSS 0 trigger	2906	3955	1822	2532	4728	6487
610	906-1	02/20/98	S.531+NDSS 0 trigger+E/I reduced	2355	3675	1702	2422	4057	6097
578	906-1	03/24/98	S.529+5K IF+min 1K thru Delta+3K RV+5K May	2111	3357	1810	2487	3921	5844
611	906-1	03/09/98	S.578+3K thru Delta	2159	3355	1852	2504	4011	5859
579	906-1	10/30/97	S.533+5K IF+0 trigger value+3K RV+5K May	3213	4045	1823	2419	5036	6454
612	906-1	02/23/98	S.579+3K thru Delta	3274	4058	1837	2433	5111	6491
580	906-1	03/24/98	S.529+15K IF+min 1K thru Delta+3K RV+5K May	2069	3302	1737	2443	3806	5745
613	906-1	03/09/98	S.580+3K thru Delta	2174	3385	1895	2506	4069	5891
581	906-1	10/30/97	S.534+15K IF+0 trigger value+3K RV+5K May	3303	4056	1375	2283	4678	6339
614	906-1	02/23/98	S.581+3K thru Delta	3355	4072	1774	2425	5129	6497
615	906e	03/09/98	S.595+3K thru Delta	2154	3338	1877	2499	4031	5837
567	906	04/09/98	S.533+10K IF+3K RV+5K May+1K thru Delta	3240	4041	1648	2580	4888	6621
616	906-1	04/13/98	S.567+3K thru Delta	3271	4032	1888	2650	5159	6682
528	906	10/10/97	No Action+SDI	2136	3348	1944	2538	4080	5886
623	906e	03/23/98	S.528+1962 X2 LOD	2106	3337	1937	2531	4043	5868
532a	906	10/22/97	S.532+1K thru Delta+0 trigger NDSS	3020	3983	1806	2520	4826	6503
624	906e	03/23/98	S.532a+1962 X2 LOD	2974	3978	1770	2514	4744	6492
625	906e	03/24/98	S.595+1962 X2 LOD	2052	3293	1731	2459	3783	5752
626	906e	04/09/98	S.567+1962 X2 LOD	3175	4031	1640	2576	4815	6607
627	906e	03/23/98	S.528+1983 X2 LOD	2251	3399	1949	2536	4200	5935
628	906e	03/24/98	S.532a+1983 X2 LOD	3123	4010	1836	2520	4959	6530
629	906e	03/26/98	S.595+1983 X2 LOD	2210	3376	1750	2477	3960	5853
630	906e	04/11/98	S.567+1983 X2 LOD	3463	4043	1754	2597	5217	6640

All units TAF/yr
Interruptible deliveries are not included in SWP

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Table 3A
PRELIMINARY DWRSIM SENSITIVITY STUDIES RESULTS WATER SUPPLY BENEFITS OF CALFED STORAGE & CONVEYANCE FACILITIES

ID	Component	Isolated Facility Capacity (cfs)	E/I Ratio	Through Delta Export (cfs)	X2 LOD (1)	NDSS NDES Trigger (TAF)	SWP & CVP Deliveries (2) Critical (TAF)	SWP & CVP Deliveries (2) 73-yr (TAF)	SWP Interruptible (2) Critical (TAF)	SWP Interruptible (2) 73-yr (TAF)
529	S.528+5K IF	5K	Yes		WQCP		-106	62	69	106
595	S.529+3K RV+5K May+ 10K IF+IF not E/I+ min 1K thru Delta	10K	No	1000	WQCP		-224	-18	121	179
530	S.528+SDSS		Yes		WQCP		417	369	-31	-53
608	S.530+Reduced E/I		0.5 Nov-Jan 0.25 Feb-Jun		WQCP		-180	72	-33	-103
531	SDI+Storages		Yes		WQCP	1500	505	546	-31	-79
609	S.531+0 trigger		-		WQCP	0	694	687	-31	-82
610	S.531+0 trigger+Reduced E/I		0.5 Nov-Jan 0.25 Feb-Jun		WQCP	0	23	297	-33	-112
578	S.529+3K RV+5K May	5K	No	1000	WQCP		-6	100	123	180
611	S.578+3K thru Delta	5K	No	3000	WQCP		-23	59	123	191
579	S.533+0 trigger+3K RV+5K May	5K	No	1000	WQCP	0	1001	654	-29	-13
612	S.579+3K thru Delta	5K	No	3000	WQCP	0	1077	691	-29	-12
580	S.529+3K RV+5K May	15K	No	1000	WQCP		-48	45	118	181
613	S.580+3K thru Delta	15K	No	3000	WQCP		35	91	118	189
581	S.534+3K RV+5K May	15K	No	1000	WQCP	0	644	539	-28	-21
614	S.581+3K thru Delta	15K	No	3000	WQCP	0	1095	697	-29	-6
595	S.529+3K RV+5K May+ 10K IF+IF not E/I+ min 1K thru Delta	10K	No	1000	WQCP		-224	-18	121	179
615	S.595+3K thru Delta	10K	No	3000	WQCP		-3	37	124	200
567	S.533+3K RV+5K May	10K	No	1000	WQCP	0	854	821	-29	-29
616	S.567+3K thru Delta	10K	No	3000	WQCP	0	1125	882	-29	-5

(1) WQCP X2 LOD also includes 1962 X2 LOD change in May and June for Chipps Islands.
(2) Benefits measured against Benchmark Study 514.
DWR Modeling Support Branch 4/24/98.

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Table 3B

PRELIMINARY DWRSIM SENSITIVITY STUDIES RESULTS WATER SUPPLY BENEFITS OF CALFED STORAGE & CONVEYANCE FACILITIES

ID	Component	Isolated Facility Capacity (cfs)	E/I Ratio	Through Delta Export (cfs)	X2 LOD (1)	NDSS NDES Trigger (TAF)	SWP & CVP Deliveries (2) (TAF) Critical	SWP & CVP Deliveries (2) (TAF) 73-yr	SWP Interruptible (2) (TAF) Critical	SWP Interruptible (2) (TAF) 73-yr
528	No Action+SDI		Yes		WQCP		46	86	57	112
623	S.528+1962 X2 LOD		Yes		1962		9	68	45	97
532A	S.532+0 trigger NDSS		Yes	1000	WQCP	0	792	700	-32	-66
624	S.532a+1962 X2 LOD		Yes	1000	1962	0	710	692	-31	-67
595	S.529+3K RV+5K May+ 10K IF+IF not E/I+ min 1K thru Delta	10K	No	1000	WQCP		-224	-18	121	179
625	S.595+1962 X2 LOD	10K	No	1000	1962		-251	-48	87	168
567	S.533+3K RV+5K May	10K	No	1000	WQCP	0	854	821	-29	-29
626	S.567+1962 X2 LOD	10K	No	1000	1962	0	781	807	-28	-33
528	No Action+SDI		Yes		WQCP		46	86	57	112
627	S.528+1983 X2 LOD		Yes		1983		166	135	52	111
532A	S.532+0 trigger		Yes	1000	WQCP	0	792	700	-32	-66
628	S.532a+1983 X2 LOD		Yes	1000	1983	0	925	730	-31	-67
595	S.529+3K RV+5K May+ 10K IF+IF not E/I+ min 1K thru Delta	10K	No	1000	WQCP		-224	-18	121	179
629	S.595+1983 X2 LOD	10K	No	1000	1983		-74	53	154	193
567	S.533+3K RV+5K May	10K	No	1000	WQCP	0	854	821	-29	-29
630	S.567+1983 X2 LOD	10K	No	1000	1983	0	1183	840	-28	-5

(1) 1962 and 1983 X2 LOD change is only in March, April, May and June for Chipps and Roe Islands.
(2) Benefits measured against Benchmark Study 514.
DWR Modeling Support Branch 4/24/98.

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TABLE 4

SUMMARY OF WATER SUPPLY IMPACTS

All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	2020D09B-CALFED-529			2020D09B-CALFED-595					
	TOTAL	CVP	SWP	TOTAL		CVP		SWP	
A. (i) Total Delta Exports	4288	2089	2199	4235	[-53]	2000	[-88]	2234	[34]
(ii) Net Storage Used	1202	868	333	1262	[-60]	926	[-57]	335	[-2]
(a) Existing North-of-Delta		868	333			926	[-57]	335	[-2]
(b) New North-of-Delta			0					0	[0]
WATER SUPPLY IMPACT (i+ii)					-113				
(iii) Add water from CP81 & CP20	90			89	[1]				
(iv) Other Storage Used	187	91	96	173	[14]	67	[23]	105	[-9]
(b) New In-Delta			0					0	[0]
(a) Existing South-of-Delta		91	96			67	[23]	105	[-9]
(b) New South-of-Delta			0					0	[0]
B. Total Delta Outflow	5166			5276	[110]				
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)									
A. Total Delta Exports	6530	2760	3770	6533	[2]	2735	[-25]	3798	[27]
WATER SUPPLY IMPACT					2				
B. Add water	24			23	[1]				
C. EOM SEPT SACTO BASIN STORAGE	6654	4918	1736	6340	[-314]	4706	[-211]	1634	[-102]
(i) Existing Sacto Basin		4918	1736			4706	[-211]	1634	[-102]
(ii) New Sacto Basin			0					0	[0]
D. EOM SEPT NEW MELONES STORAGE	1065			1066	[1]				
E. Total Delta Outflow	14283			14300	[16]				

TABLE 5

SUMMARY OF WATER SUPPLY IMPACTS

All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	2020D09B-CALFED-530			2020D09B-CALFED-608					
	TOTAL	CVP	SWP	TOTAL		CVP		SWP	
A. (i) Total Delta Exports	4465	2153	2312	3946	[-519]	2065	[-87]	1880	[-431]
(ii) Net Storage Used	1200	876	324	1189	[11]	858	[17]	330	[-6]
(a) Existing North-of-Delta		876	324			858	[17]	330	[-6]
(b) New North-of-Delta			0					0	[0]
WATER SUPPLY IMPACT (i+ii)					-508				
(iii) Add water from CP81 & CP20	90			97	[-7]				
(iv) Other Storage Used	433	78	355	354	[79]	50	[28]	304	[51]
(b) New In-Delta			0					0	[0]
(a) Existing South-of-Delta		78	114			50	[28]	91	[22]
(b) New South-of-Delta			240					212	[28]
B. Total Delta Outflow	4991			5500	[508]				
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)									
A. Total Delta Exports	6715	2729	3985	6337	[-377]	2657	[-71]	3680	[-305]
WATER SUPPLY IMPACT					-377				
B. Add water	24			26	[-2]				
C. EOM SEPT SACTO BASIN STORAGE	6689	4943	1745	6725	[36]	4967	[23]	1758	[12]
(i) Existing Sacto Basin		4943	1745			4967	[23]	1758	[12]
(ii) New Sacto Basin			0					0	[0]
D. EOM SEPT NEW MELONES STORAGE	1066			1062	[-4]				
E. Total Delta Outflow	14098			14474	[376]				

TABLE 6

SUMMARY OF WATER SUPPLY IMPACTS
All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	2020D09B-CALFED-531			2020D09B-CALFED-609					
	TOTAL	CVP	SWP	TOTAL		CVP		SWP	
A. (i) Total Delta Exports	4654	2130	2524	4830	[175]	2099	[-31]	2730	[206]
(ii) Net Storage Used	1362	883	478	1505	[-142]	875	[7]	629	[-150]
(a) Existing North-of-Delta		883	325			875	[7]	325	[0]
(b) New North-of-Delta			152					304	[-151]
WATER SUPPLY IMPACT (i+ii)					33				
(iii) Add water from CP81 & CP20	91			91	[0]				
(iv) Other Storage Used	332	46	285	344	[-11]	59	[-13]	284	[1]
(b) New In-Delta			0					0	[0]
(a) Existing South-of-Delta		46	106			59	[-13]	105	[0]
(b) New South-of-Delta			179					178	[0]
B. Total Delta Outflow	4965			4921	[-43]				
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)									
A. Total Delta Exports	6845	2803	4041	6983	[137]	2791	[-11]	4191	[149]
WATER SUPPLY IMPACT					137				
B. Add water	24			23	[0]				
C. EOM SEPT SACTO BASIN STORAGE	8108	4825	3282	8467	[359]	4798	[-27]	3669	[387]
(i) Existing Sacto Basin		4825	2342			4798	[-27]	2487	[144]
(ii) New Sacto Basin			939					1182	[-242]
D. EOM SEPT NEW MELONES STORAGE	1066			1066	[0]				
E. Total Delta Outflow	13904			13731	[-172]				

TABLE 7

SUMMARY OF WATER SUPPLY IMPACTS

All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	2020D09B-CALFED-531			2020D09B-CALFED-610					
	TOTAL	CVP	SWP	TOTAL		CVP		SWP	
A. (i) Total Delta Exports	4654	2130	2524	4254	[-400]	1993	[-136]	2261	[-263]
(ii) Net Storage Used	1362	883	478	1423	[-60]	866	[16]	556	[-77]
(a) Existing North-of-Delta		883	325			866	[16]	330	[-4]
(b) New North-of-Delta			152					225	[-72]
WATER SUPPLY IMPACT (i+ii)					-460				
(iii) Add water from CP81 & CP20	91			98	[-7]				
(iv) Other Storage Used	332	46	285	248	[84]	45	[1]	202	[83]
(b) New In-Delta			0					0	[0]
(a) Existing South-of-Delta		46	106			45	[1]	63	[43]
(b) New South-of-Delta			179					139	[40]
B. Total Delta Outflow	4965			5448	[483]				
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)									
A. Total Delta Exports	6845	2803	4041	6527	[-318]	2675	[-128]	3851	[-190]
WATER SUPPLY IMPACT					-318				
B. Add water	24			26	[-2]				
C. EOM SEPT SACTO BASIN STORAGE	8108	4825	3282	8191	[82]	4804	[-21]	3386	[104]
(i) Existing Sacto Basin		4825	2342			4804	[-21]	2373	[31]
(ii) New Sacto Basin			939					1012	[-73]
D. EOM SEPT NEW MELONES STORAGE	1066			1059	[-6]				
E. Total Delta Outflow	13904			14196	[292]				

TABLE 8

SUMMARY OF WATER SUPPLY IMPACTS

All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	2020D09B-CALFED-578			2020D09B-CALFED-611					
	TOTAL	CVP	SWP	TOTAL		CVP		SWP	
A. (i) Total Delta Exports	4314	2047	2267	4463	[148]	2145	[98]	2317	[49]
(ii) Net Storage Used	1219	886	333	1190	[28]	866	[19]	324	[9]
(a) Existing North-of-Delta		886	333			866	[19]	324	[9]
(b) New North-of-Delta			0					0	[0]
WATER SUPPLY IMPACT (i+ii)				176					
(iii) Add water from CP81 & CP20	88			88	[0]				
(iv) Other Storage Used	207	100	107	149	[58]	43	[56]	105	[1]
(b) New In-Delta			0					0	[0]
(a) Existing South-of-Delta		100	107			43	[56]	105	[1]
(b) New South-of-Delta			0					0	[0]
B. Total Delta Outflow	5157			4982	[-174]				
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)									
A. Total Delta Exports	6596	2756	3840	6623	[26]	2773	[17]	3849	[9]
WATER SUPPLY IMPACT				26					
B. Add water	23			24	[0]				
C. EOM SEPT SACTO BASIN STORAGE	6503	4839	1663	6619	[116]	4908	[68]	1710	[47]
(i) Existing Sacto Basin		4839	1663			4908	[68]	1710	[47]
(ii) New Sacto Basin			0					0	[0]
D. EOM SEPT NEW MELONES STORAGE	1067			1067	[0]				
E. Total Delta Outflow	14225			14196	[-28]				

TABLE 9

SUMMARY OF WATER SUPPLY IMPACTS

All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	2020D09B-CALFED-579			2020D09B-CALFED-612					
	TOTAL	CVP	SWP	TOTAL		CVP		SWP	
A. (i) Total Delta Exports	4971	2091	2880	5078	[106]	2130	[39]	2947	[67]
(ii) Net Storage Used	1554	929	625	1508	[46]	873	[55]	635	[-9]
(a) Existing North-of-Delta		929	322			873	[55]	331	[-8]
(b) New North-of-Delta			302					304	[-1]
WATER SUPPLY IMPACT (i+ii)					152				
(iii) Add water from CP81 & CP20	88			88	[0]				
(iv) Other Storage Used	544	68	475	514	[29]	44	[24]	470	[5]
(b) New In-Delta			30					30	[0]
(a) Existing South-of-Delta		68	110			44	[24]	108	[2]
(b) New South-of-Delta			334					331	[2]
B. Total Delta Outflow	4843			4693	[-149]				
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)									
A. Total Delta Exports	7063	2689	4373	7102	[39]	2703	[14]	4398	[25]
WATER SUPPLY IMPACT					39				
B. Add water	22			22	[0]				
C. EOM SEPT SACTO BASIN STORAGE	8384	4738	3645	8466	[81]	4803	[64]	3662	[17]
(i) Existing Sacto Basin		4738	2455			4803	[64]	2464	[8]
(ii) New Sacto Basin			1189					1198	[-8]
D. EOM SEPT NEW MELONES STORAGE	1069			1068	[0]				
E. Total Delta Outflow	13632			13593	[-39]				

TABLE 10

SUMMARY OF WATER SUPPLY IMPACTS

All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	2020D09B-CALFED-580			2020D09B-CALFED-613					
	TOTAL	CVP	SWP	TOTAL		CVP		SWP	
A. (i) Total Delta Exports	4196	1973	2222	4515	[318]	2187	[213]	2327	[105]
(ii) Net Storage Used	1223	886	337	1219	[4]	885	[0]	333	[3]
(a) Existing North-of-Delta		886	337			885	[0]	333	[3]
(b) New North-of-Delta			0					0	[0]
WATER SUPPLY IMPACT (i+ii)					322				
(iii) Add water from CP81 & CP20	89			88	[1]				
(iv) Other Storage Used	205	100	104	151	[54]	44	[55]	106	[-1]
(b) New In-Delta			0					0	[0]
(a) Existing South-of-Delta		100	104			44	[55]	106	[-1]
(b) New South-of-Delta			0					0	[0]
B. Total Delta Outflow	5278			4960	[-317]				
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)									
A. Total Delta Exports	6496	2710	3786	6652	[156]	2775	[65]	3877	[90]
WATER SUPPLY IMPACT					156				
B. Add water	23			23	[0]				
C. EOM SEPT SACTO BASIN STORAGE	6322	4702	1619	6574	[252]	4872	[169]	1702	[83]
(i) Existing Sacto Basin		4702	1619			4872	[169]	1702	[83]
(ii) New Sacto Basin			0					0	[0]
D. EOM SEPT NEW MELONES STORAGE	1066			1066	[0]				
E. Total Delta Outflow	14344			14175	[-169]				

TABLE 11

SUMMARY OF WATER SUPPLY IMPACTS

All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	2020D09B-CALFED-581			2020D09B-CALFED-614					
	TOTAL	CVP	SWP	TOTAL		CVP		SWP	
A. (i) Total Delta Exports	4669	1693	2975	5096	[427]	2069	[375]	3027	[52]
(ii) Net Storage Used	1521	925	596	1521	[0]	888	[37]	633	[-37]
(a) Existing North-of-Delta		925	317			888	[37]	329	[-11]
(b) New North-of-Delta			278					303	[-25]
WATER SUPPLY IMPACT (i+ii)					427				
(iii) Add water from CP81 & CP20	92			88	[3]				
(iv) Other Storage Used	489	19	469	513	[-23]	42	[-22]	470	[-1]
(b) New In-Delta			28					30	[-2]
(a) Existing South-of-Delta		19	108			42	[-22]	108	[0]
(b) New South-of-Delta			331					331	[0]
B. Total Delta Outflow	5096			4683	[-412]				
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)									
A. Total Delta Exports	6948	2557	4391	7117	[168]	2696	[139]	4420	[28]
WATER SUPPLY IMPACT					168				
B. Add water	23			22	[1]				
C. EOM SEPT SACTO BASIN STORAGE	8173	4649	3524	8458	[284]	4791	[142]	3666	[141]
(i) Existing Sacto Basin		4649	2379			4791	[142]	2464	[84]
(ii) New Sacto Basin			1144					1201	[-57]
D. EOM SEPT NEW MELONES STORAGE	1068			1069	[0]				
E. Total Delta Outflow	13759			13583	[-175]				

TABLE 12

SUMMARY OF WATER SUPPLY IMPACTS

All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	2020D09B-CALFED-595			2020D09B-CALFED-615					
	TOTAL	CVP	SWP	TOTAL		CVP		SWP	
A. (i) Total Delta Exports	4235	2000	2234	4484	[249]	2170	[169]	2314	[80]
(ii) Net Storage Used	1262	926	335	1203	[59]	877	[48]	325	[10]
(a) Existing North-of-Delta		926	335			877	[48]	325	[10]
(b) New North-of-Delta			0					0	[0]
WATER SUPPLY IMPACT (i+ii)					308				
(iii) Add water from CP81 & CP20	89			88	[1]				
(iv) Other Storage Used	173	67	105	150	[23]	44	[23]	105	[0]
(b) New In-Delta			0					0	[0]
(a) Existing South-of-Delta		67	105			44	[23]	105	[0]
(b) New South-of-Delta			0					0	[0]
B. Total Delta Outflow	5276			4973	[-303]				
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)									
A. Total Delta Exports	6533	2735	3798	6611	[78]	2769	[34]	3841	[43]
WATER SUPPLY IMPACT					78				
B. Add water	23			23	[0]				
C. EOM SEPT SACTO BASIN STORAGE	6340	4706	1634	6619	[278]	4887	[181]	1731	[96]
(i) Existing Sacto Basin		4706	1634			4887	[181]	1731	[96]
(ii) New Sacto Basin			0					0	[0]
D. EOM SEPT NEW MELONES STORAGE	1066			1066	[0]				
E. Total Delta Outflow	14300			14212	[-87]				

TABLE 13

SUMMARY OF WATER SUPPLY IMPACTS
All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	2020D09B-CALFED-567			2020D09B-CALFED-616					
	TOTAL	CVP	SWP	TOTAL		CVP		SWP	
A. (i) Total Delta Exports	4841	1927	2914	5119	[277]	2174	[247]	2944	[30]
(ii) Net Storage Used	1558	921	637	1513	[44]	883	[37]	629	[7]
(a) Existing North-of-Delta		921	333			883	[37]	325	[7]
(b) New North-of-Delta			303					303	[0]
WATER SUPPLY IMPACT (i+ii)					321				
(iii) Add water from CP81 & CP20	90			88	[2]				
(iv) Other Storage Used	526	58	467	520	[6]	50	[8]	469	[-2]
(b) New In-Delta			29					30	[0]
(a) Existing South-of-Delta		58	106			50	[8]	108	[-1]
(b) New South-of-Delta			331					331	[0]
B. Total Delta Outflow	4969			4656	[-313]				
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)									
A. Total Delta Exports	7212	2846	4366	7297	[84]	2915	[69]	4381	[14]
WATER SUPPLY IMPACT					84				
B. Add water	22			21	[0]				
C. EOM SEPT SACTO BASIN STORAGE	8138	4576	3562	8381	[242]	4730	[154]	3650	[88]
(i) Existing Sacto Basin		4576	2401			4730	[154]	2448	[46]
(ii) New Sacto Basin			1161					1202	[-41]
D. EOM SEPT NEW MELONES STORAGE	1070			1070	[0]				
E. Total Delta Outflow	13496			13409	[-86]				

TABLE 14

SUMMARY OF WATER SUPPLY IMPACTS

All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	2020D09B-CALFED-528			2020D09B-CALFED-623					
	TOTAL	CVP	SWP	TOTAL		CVP		SWP	
A. (i) Total Delta Exports	4460	2221	2238	4410	[-49]	2214	[-7]	2195	[-42]
(ii) Net Storage Used	1216	884	332	1221	[-5]	887	[-3]	334	[-2]
(a) Existing North-of-Delta		884	332			887	[-3]	334	[-2]
(b) New North-of-Delta			0					0	[0]
WATER SUPPLY IMPACT (i+ii)					-54				
(iii) Add water from CP81 & CP20	90			90	[0]				
(iv) Other Storage Used	156	59	97	157	[0]	60	[0]	96	[0]
(b) New In-Delta			0					0	[0]
(a) Existing South-of-Delta		59	97			60	[0]	96	[0]
(b) New South-of-Delta			0					0	[0]
B. Total Delta Outflow	5017			5072	[54]				
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)									
A. Total Delta Exports	6559	2801	3758	6527	[-31]	2794	[-6]	3733	[-25]
WATER SUPPLY IMPACT					-31				
B. Add water	24			24	[0]				
C. EOM SEPT SACTO BASIN STORAGE	6683	4921	1761	6630	[-52]	4889	[-32]	1740	[-20]
(i) Existing Sacto Basin		4921	1761			4889	[-32]	1740	[-20]
(ii) New Sacto Basin			0					0	[0]
D. EOM SEPT NEW MELONES STORAGE	1065			1066	[1]				
E. Total Delta Outflow	14256			14289	[33]				

TABLE 15

SUMMARY OF WATER SUPPLY IMPACTS

All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	2020D09B-CALFED-532A			2020D09B-CALFED-624					
	TOTAL	CVP	SWP	TOTAL		CVP		SWP	
A. (i) Total Delta Exports	4835	2077	2757	4765	[-70]	2042	[-35]	2723	[-34]
(ii) Net Storage Used	1502	872	629	1500	[1]	881	[-8]	619	[10]
(a) Existing North-of-Delta		872	325			881	[-8]	326	[0]
(b) New North-of-Delta			304					293	[11]
WATER SUPPLY IMPACT (i+ii)					-69				
(iii) Add water from CP81 & CP20	91			91	[0]				
(iv) Other Storage Used	437	65	371	425	[12]	65	[0]	359	[11]
(b) New In-Delta			0					0	[0]
(a) Existing South-of-Delta		65	90			65	[0]	85	[5]
(b) New South-of-Delta			280					274	[6]
B. Total Delta Outflow	4915			4982	[67]				
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)									
A. Total Delta Exports	7022	2778	4244	7010	[-11]	2773	[-5]	4237	[-6]
WATER SUPPLY IMPACT					-11				
B. Add water	23			24	[0]				
C. EOM SEPT SACTO BASIN STORAGE	8243	4733	3510	8149	[-94]	4700	[-33]	3449	[-60]
(i) Existing Sacto Basin		4733	2409			4700	[-33]	2386	[-22]
(ii) New Sacto Basin			1101					1062	[38]
D. EOM SEPT NEW MELONES STORAGE	1065			1065	[0]				
E. Total Delta Outflow	13681			13694	[13]				

TABLE 16

SUMMARY OF WATER SUPPLY IMPACTS

All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	2020D09B-CALFED-595			2020D09B-CALFED-625					
	TOTAL	CVP	SWP	TOTAL		CVP		SWP	
A. (i) Total Delta Exports	4235	2000	2234	4176	[-58]	2000	[0]	2175	[-58]
(ii) Net Storage Used	1262	926	335	1268	[-6]	929	[-3]	338	[-2]
(a) Existing North-of-Delta		926	335			929	[-3]	338	[-2]
(b) New North-of-Delta			0					0	[0]
WATER SUPPLY IMPACT (i+ii)					-64				
(iii) Add water from CP81 & CP20	89			91	[-2]				
(iv) Other Storage Used	173	67	105	172	[1]	67	[0]	104	[0]
(b) New In-Delta			0					0	[0]
(a) Existing South-of-Delta		67	105			67	[0]	104	[0]
(b) New South-of-Delta			0					0	[0]
B. Total Delta Outflow	5276			5342	[65]				
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)									
A. Total Delta Exports	6533	2735	3798	6493	[-39]	2728	[-6]	3765	[-32]
WATER SUPPLY IMPACT					-39				
B. Add water	23			24	[0]				
C. EOM SEPT SACTO BASIN STORAGE	6340	4706	1634	6253	[-87]	4668	[-37]	1584	[-50]
(i) Existing Sacto Basin		4706	1634			4668	[-37]	1584	[-50]
(ii) New Sacto Basin			0					0	[0]
D. EOM SEPT NEW MELONES STORAGE	1066			1066	[0]				
E. Total Delta Outflow	14300			14341	[41]				

TABLE 17

SUMMARY OF WATER SUPPLY IMPACTS

All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	2020D09B-CALFED-567			2020D09B-CALFED-626					
	TOTAL	CVP	SWP	TOTAL		CVP		SWP	
A. (i) Total Delta Exports	4841	1927	2914	4775	[-66]	1923	[-4]	2852	[-62]
(ii) Net Storage Used	1558	921	637	1569	[-11]	927	[-6]	642	[-5]
(a) Existing North-of-Delta		921	333			927	[-6]	337	[-4]
(b) New North-of-Delta			303					304	[0]
WATER SUPPLY IMPACT (i+ii)					-77				
(iii) Add water from CP81 & CP20	90			92	[-2]				
(iv) Other Storage Used	526	58	467	522	[4]	54	[4]	467	[0]
(b) New In-Delta			29					30	[0]
(a) Existing South-of-Delta		58	106			54	[4]	105	[1]
(b) New South-of-Delta			331					331	[0]
B. Total Delta Outflow	4969			5049	[79]				
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)									
A. Total Delta Exports	7212	2846	4366	7195	[-17]	2842	[-3]	4352	[-14]
WATER SUPPLY IMPACT					-17				
B. Add water	22			22	[0]				
C. EOM SEPT SACTO BASIN STORAGE	8138	4576	3562	8040	[-98]	4539	[-36]	3501	[-61]
(i) Existing Sacto Basin		4576	2401			4539	[-36]	2379	[-21]
(ii) New Sacto Basin			1161					1121	[39]
D. EOM SEPT NEW MELONES STORAGE	1070			1070	[0]				
E. Total Delta Outflow	13496			13513	[17]				

TABLE 18

SUMMARY OF WATER SUPPLY IMPACTS

All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	2020D09B-CALFED-528			2020D09B-CALFED-627					
	TOTAL	CVP	SWP	TOTAL		CVP		SWP	
A. (i) Total Delta Exports	4460	2221	2238	4603	[142]	2257	[35]	2345	[107]
(ii) Net Storage Used	1216	884	332	1214	[1]	887	[-2]	327	[4]
(a) Existing North-of-Delta		884	332			887	[-2]	327	[4]
(b) New North-of-Delta			0					0	[0]
WATER SUPPLY IMPACT (i+ii)					143				
(iii) Add water from CP81 & CP20	90			89	[0]				
(iv) Other Storage Used	156	59	97	127	[28]	29	[29]	97	[0]
(b) New In-Delta			0					0	[0]
(a) Existing South-of-Delta		59	97			29	[29]	97	[0]
(b) New South-of-Delta			0					0	[0]
B. Total Delta Outflow	5017			4897	[-120]				
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)									
A. Total Delta Exports	6559	2801	3758	6606	[46]	2798	[-2]	3807	[49]
WATER SUPPLY IMPACT					46				
B. Add water	24			23	[0]				
C. EOM SEPT SACTO BASIN STORAGE	6683	4921	1761	6832	[149]	4975	[53]	1857	[96]
(i) Existing Sacto Basin		4921	1761			4975	[53]	1857	[96]
(ii) New Sacto Basin			0					0	[0]
D. EOM SEPT NEW MELONES STORAGE	1065			1065	[0]				
E. Total Delta Outflow	14256			14227	[-28]				

TABLE 19

SUMMARY OF WATER SUPPLY IMPACTS

All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	2020D09B-CALFED-532A			2020D09B-CALFED-628					
	TOTAL	CVP	SWP	TOTAL		CVP		SWP	
A. (i) Total Delta Exports	4835	2077	2757	4966	[130]	2110	[32]	2856	[98]
(ii) Net Storage Used	1502	872	629	1472	[30]	848	[24]	623	[5]
(a) Existing North-of-Delta		872	325			848	[24]	320	[5]
(b) New North-of-Delta			304					303	[0]
WATER SUPPLY IMPACT (i+ii)					160				
(iii) Add water from CP81 & CP20	91			91	[0]				
(iv) Other Storage Used	437	65	371	440	[-3]	63	[1]	376	[-4]
(b) New In-Delta			0					0	[0]
(a) Existing South-of-Delta		65	90			63	[1]	96	[-5]
(b) New South-of-Delta			280					279	[0]
B. Total Delta Outflow	4915			4775	[-140]				
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)									
A. Total Delta Exports	7022	2778	4244	7049	[26]	2778	[0]	4270	[26]
WATER SUPPLY IMPACT					26				
B. Add water	23			23	[0]				
C. EOM SEPT SACTO BASIN STORAGE	8243	4733	3510	8394	[151]	4822	[88]	3572	[62]
(i) Existing Sacto Basin		4733	2409			4822	[88]	2442	[33]
(ii) New Sacto Basin			1101					1129	[-28]
D. EOM SEPT NEW MELONES STORAGE	1065			1065	[0]				
E. Total Delta Outflow	13681			13662	[-19]				

TABLE 20

SUMMARY OF WATER SUPPLY IMPACTS

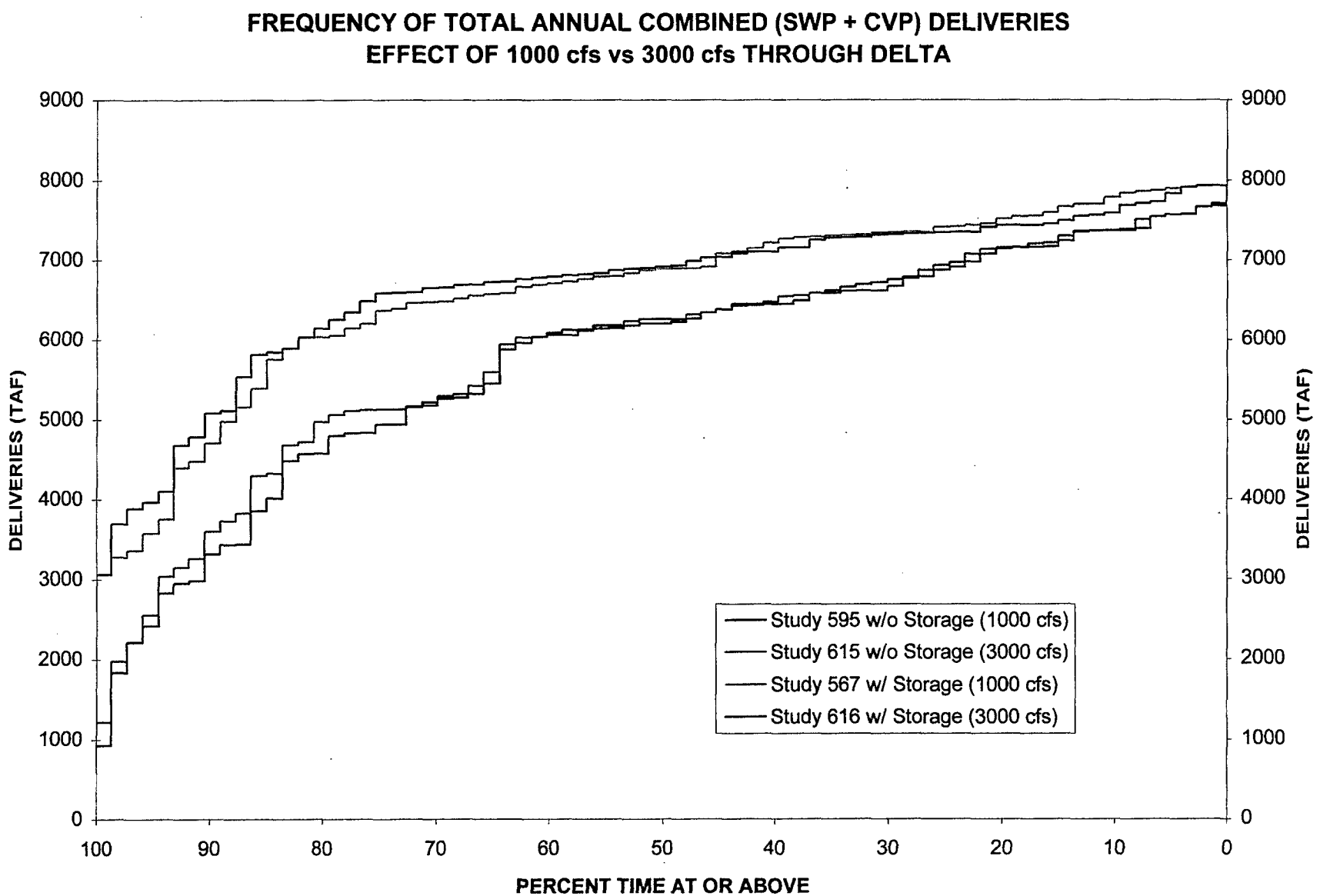
All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	2020D09B-CALFED-595			2020D09B-CALFED-629					
	TOTAL	CVP	SWP	TOTAL		CVP		SWP	
A. (i) Total Delta Exports	4235	2000	2234	4423	[188]	2024	[23]	2399	[165]
(ii) Net Storage Used	1262	926	335	1250	[11]	921	[4]	328	[7]
(a) Existing North-of-Delta		926	335			921	[4]	328	[7]
(b) New North-of-Delta			0					0	[0]
WATER SUPPLY IMPACT (i+ii)					199				
(iii) Add water from CP81 & CP20	89			89	[0]				
(iv) Other Storage Used	173	67	105	170	[3]	63	[4]	106	[-1]
(b) New In-Delta			0					0	[0]
(a) Existing South-of-Delta		67	105			63	[4]	106	[-1]
(b) New South-of-Delta			0					0	[0]
B. Total Delta Outflow	5276			5114	[-161]				
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)									
A. Total Delta Exports	6533	2735	3798	6618	[85]	2746	[11]	3872	[73]
WATER SUPPLY IMPACT					85				
B. Add water	23			22	[0]				
C. EOM SEPT SACTO BASIN STORAGE	6340	4706	1634	6496	[155]	4775	[69]	1720	[86]
(i) Existing Sacto Basin		4706	1634			4775	[69]	1720	[86]
(ii) New Sacto Basin			0					0	[0]
D. EOM SEPT NEW MELONES STORAGE	1066			1068	[1]				
E. Total Delta Outflow	14300			14233	[-66]				

TABLE 21

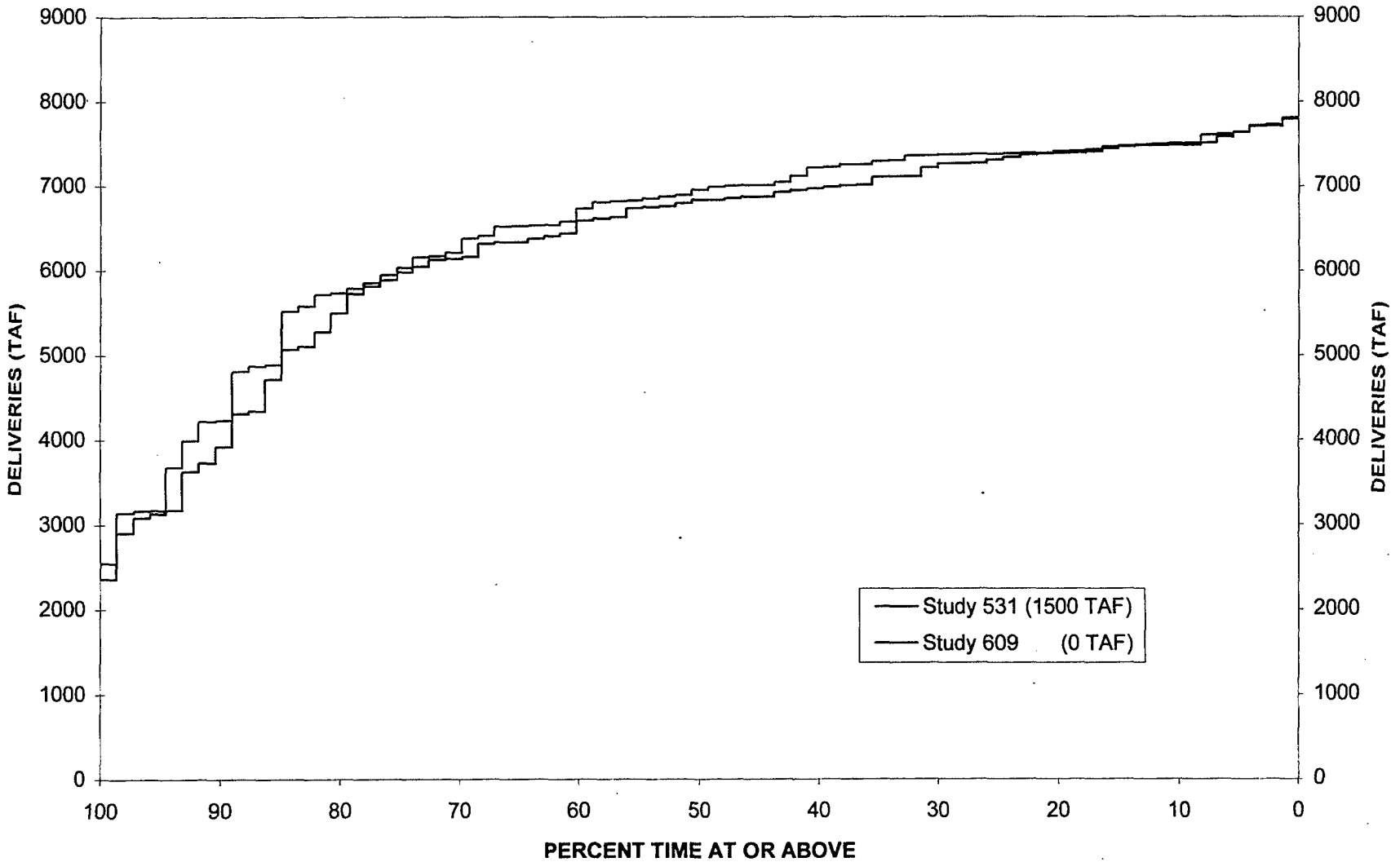
SUMMARY OF WATER SUPPLY IMPACTS
All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	2020D09B-CALFED-567			2020D09B-CALFED-630					
	TOTAL	CVP	SWP	TOTAL		CVP		SWP	
A. (i) Total Delta Exports	4841	1927	2914	5064	[222]	1920	[-7]	3143	[229]
(ii) Net Storage Used	1558	921	637	1531	[26]	917	[3]	614	[22]
(a) Existing North-of-Delta		921	333			917	[3]	314	[19]
(b) New North-of-Delta			303					299	[3]
WATER SUPPLY IMPACT (i+ii)					248				
(iii) Add water from CP81 & CP20	90			90	[0]				
(iv) Other Storage Used	526	58	467	514	[12]	50	[8]	463	[4]
(b) New In-Delta			29					30	[0]
(a) Existing South-of-Delta		58	106			50	[8]	104	[2]
(b) New South-of-Delta			331					328	[2]
B. Total Delta Outflow	4969			4749	[-220]				
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)									
A. Total Delta Exports	7212	2846	4366	7256	[43]	2863	[17]	4393	[26]
WATER SUPPLY IMPACT					43				
B. Add water	22			21	[0]				
C. EOM SEPT SACTO BASIN STORAGE	8138	4576	3562	8336	[197]	4664	[88]	3672	[109]
(i) Existing Sacto Basin		4576	2401			4664	[88]	2467	[65]
(ii) New Sacto Basin			1161					1205	[-43]
D. EOM SEPT NEW MELONES STORAGE	1070			1072	[1]				
E. Total Delta Outflow	13496			13450	[-46]				

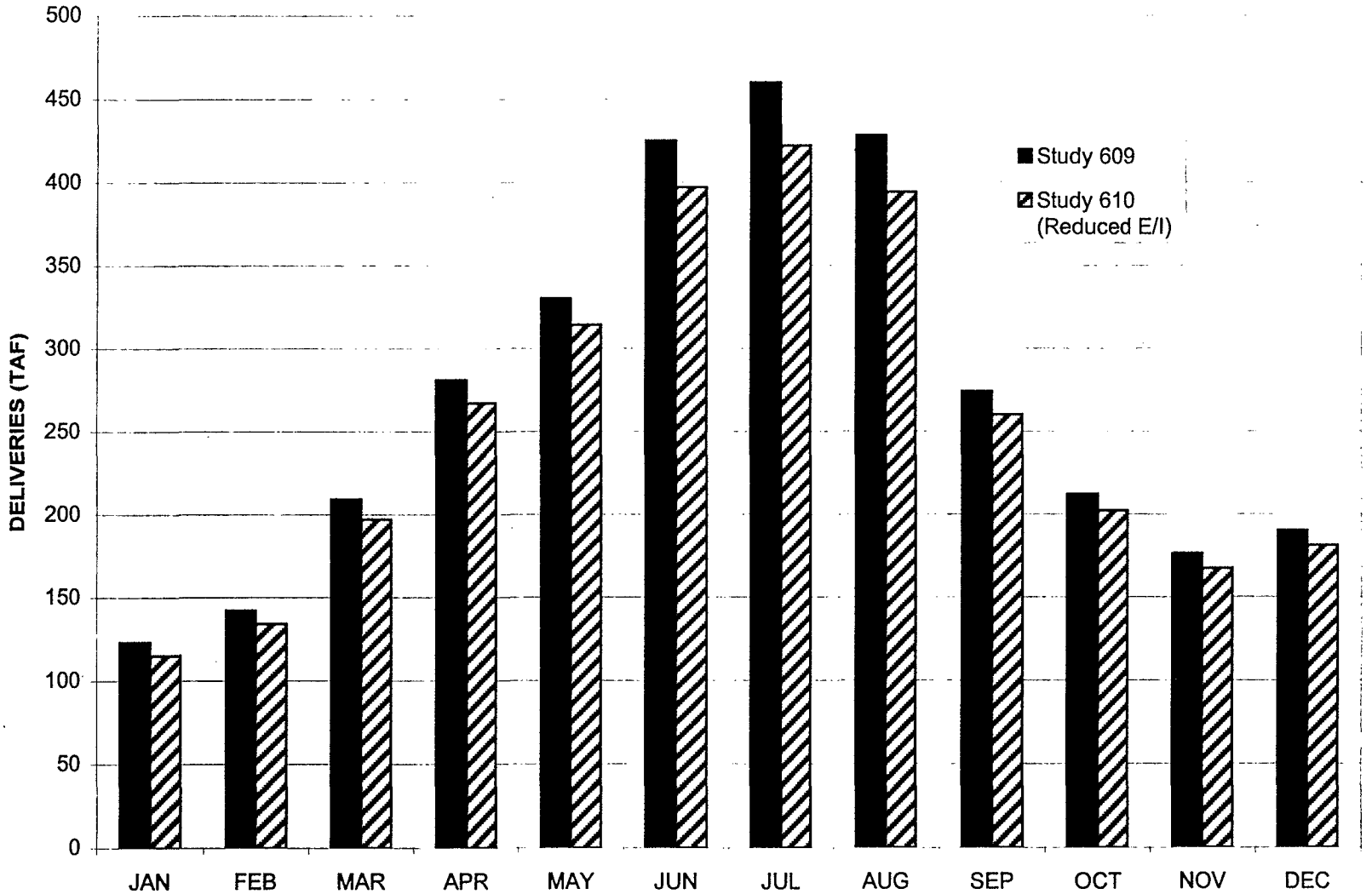

FREQUENCY OF TOTAL ANNUAL COMBINED (SWP + CVP) DELIVERIES
EFFECT OF 1000 cfs vs 3000 cfs THROUGH DELTA
DELIVERIES (TAF)
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
100
90
80
70
60
50
40
30
20
10
0
PERCENT TIME AT OR ABOVE
Study 595 w/o Storage (1000 cfs)
Study 615 w/o Storage (3000 cfs)
Study 567 w/ Storage (1000 cfs)
Study 616 w/ Storage (3000 cfs)

D-010378

FREQUENCY OF TOTAL ANNUAL COMBINED (SWP + CVP) DELIVERIES
EFFECT OF ZERO GEOMORPHOLOGICAL FLOW TRIGGER



MONTHLY DISTRIBUTION OF AVERAGE COMBINED (SWP + CVP) DELIVERIES
EFFECT OF E/I RATIO REDUCTION



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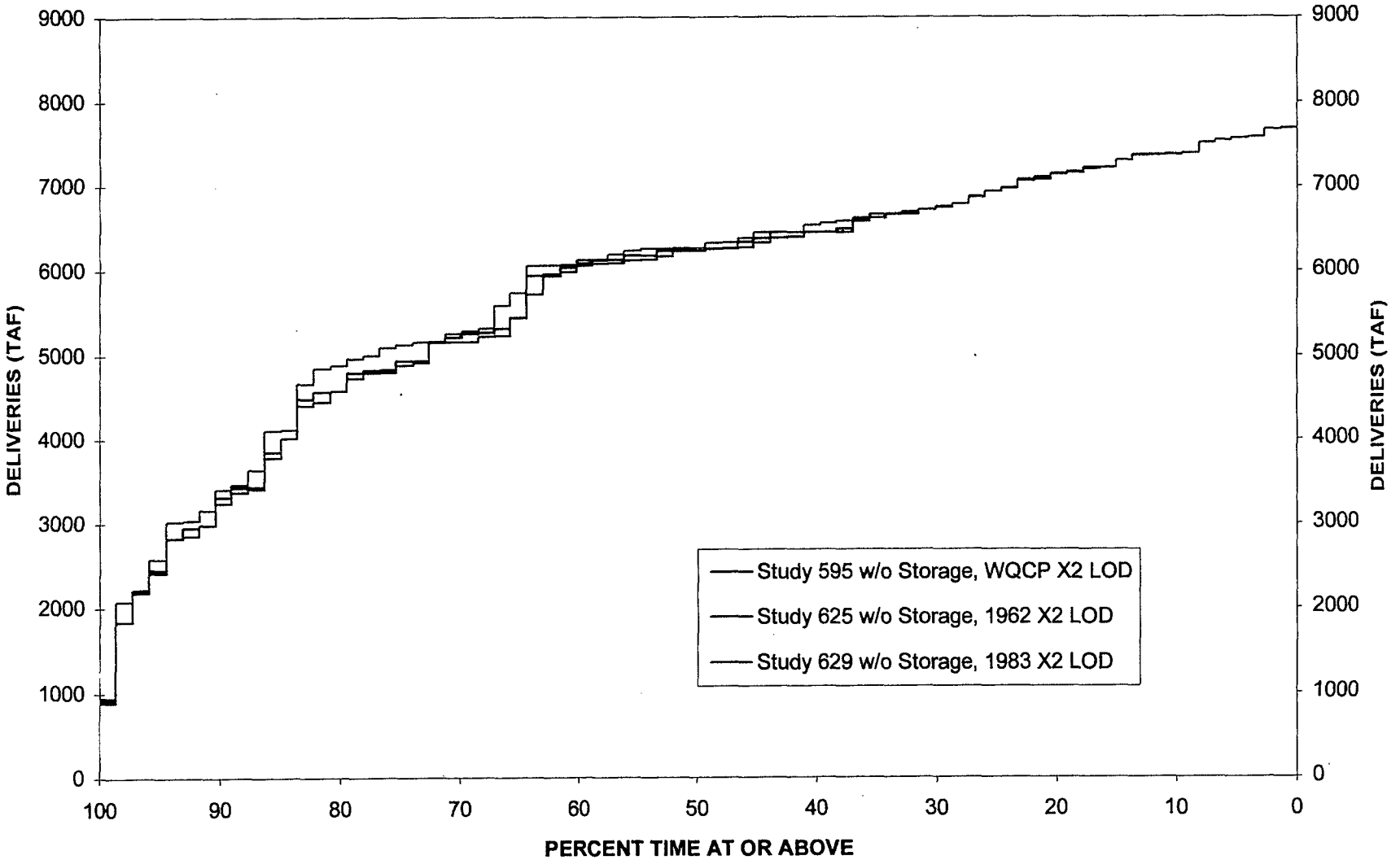
FREQUENCY OF TOTAL ANNUAL COMBINED (SWP + CVP) DELIVERIES
EFFECT OF X2 LEVEL OF DEVELOPMENT



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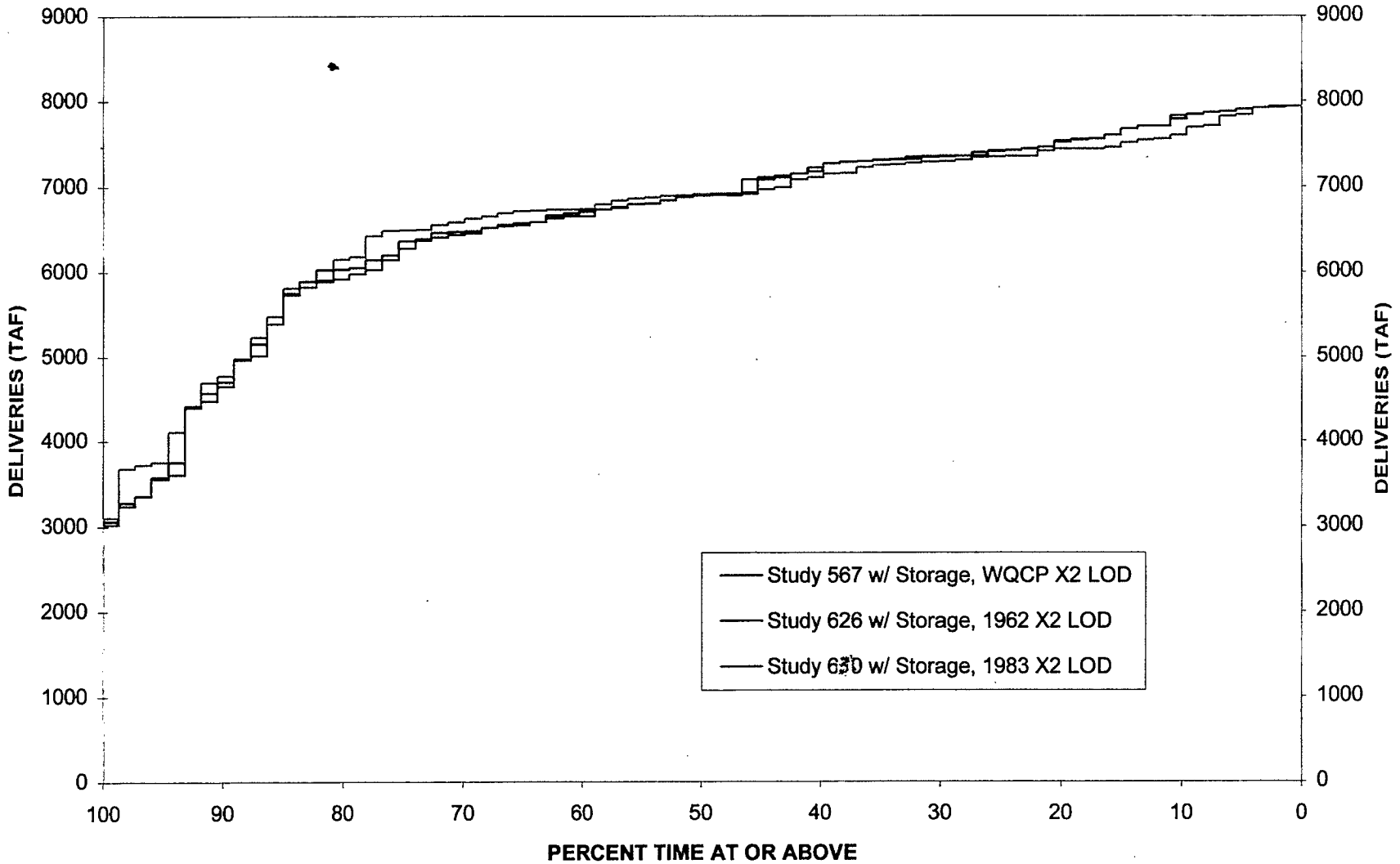
FREQUENCY OF TOTAL ANNUAL COMBINED (SWP + CVP) DELIVERIES
EFFECT OF X2 LEVEL OF DEVELOPMENT



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APPENDIX A
CALFED PROGRAM ALTERNATIVES

		Programs						Storage						Conveyance												
														South Delta				North Delta				Isolated Facilities				
		Water Quality	Water Use Efficiency	Ecosystem Restoration	Levee System Integrity	Water Transfers	Watershed Coordination	surface storage on Sac R. tributaries (in MAF)	surface storage on San Joaquin R. (in TAF)	groundwater storage in Sac Valley (in TAF)	groundwater storage in San Joaquin Valley (in TAF)	surface storage off-aqueduct (in MAF)	in-Delta storage (in TAF)	Tracy/CCF intertie and new fish facility	new CCF intake structure	operable Old R. barrier (or equivalent)	flow & stage control measures installed (or equivalent)	channel enlargement along Old R.	screened intake at Hood	North Delta Channel Modifications	Mokelumne River Floodway (East)	Mokelumne R. Floodway (West) and Tyler Island Aquatic Habitat	East Delta Habitat	3 isolated conveyance channels	5,000 cfs open channel/pipeline from Hood to CCF	15,000 cfs open channel from Hood to CCF
Existing Through Delta Channels	Alt 1 A	X	X	X	X	X	X																			
	B	X	X	X	X	X	X							X		X	X									
	C	X	X	X	X	X	X	3		250	500	1		X	X	X	X	X								
Modified Through Delta	Alt 2 A	X	X	X	X	X	X							X	X	X	X	X	X	X						
	B	X	X	X	X	X	X	3	500	250	500	2		X	X	X	X	X	X	X						
	D	X	X	X	X	X	X					2		X	X	X		X	X		X		X			
	E	X	X	X	X	X	X	3	500	250	500	2		X	X	X		X				X	X			
Dual System	Alt 3 A	X	X	X	X	X	X							X	X	X	X	X	X	X					X	
	B	X	X	X	X	X	X	3	500	250	500	2	200	X	X	X	X	X	X	X					X	
	E	X	X	X	X	X	X	3	500	250	500	2	200	X	X	X			X	X						X
	H	X	X	X	X	X	X	3	500	250	500	2		X	X	X		X	X			X	X		X	
	I	X	X	X	X	X	X	3	500	250	500	2	100	X	X				X	X				X		X

D-010383

D-010383

APPENDIX B
CALFED DWRSIM COMPLETED STUDIES AS OF JANUARY 22, 1998
AND KEY ASSUMPTIONS

A. Existing System studies

1. D-1485 Base Study: Study 2020d09b-calfed-527

D-1485 Bay-Delta Standards
2020 level hydrology
SWP variable demand
Stanislaus Operation (USBR Interim Operation Plan)

2. Benchmark: Study 2020d09b-calfed-514

1995 WQCP Bay-Delta Standards
Selected Upstream AFRP in-stream flows

3. Benchmark Reoperation: Study 2020d09b-calfed-515a

Study 514 (Benchmark) plus
- maximum wheeling of CVP water through SWP facilities

4. Benchmark Reoperation: Study 2020d09b-calfed-515

Study 514 (Benchmark) plus
- maximum wheeling of CVP water through SWP facilities
- unmet CVP demands on SWP system

5. No Action: Study 2020d09b-calfed-516a

Study 514 (Benchmark) plus
AFRP Delta Actions
a. April-May export restrictions
   - 1:3 below normal, dry & critical years
   - 1:4 above normal years
   - 1:5 wet years
b. More X2 days at Chipps Island in May-June
c. Delta Cross Channel closed November through June.

6. No Action: Study 2020d09b-calfed-516

Study 514 (Benchmark) plus
AFRP in-stream flows below Goodwin Dam
AFRP Delta Actions
a. April-May export restrictions

- 1:3 below normal, dry & critical years
- 1:4 above normal years
- 1:5 wet years

b. More X2 days at Chipps Island in May-June
c. Delta Cross Channel closed November through June.

7. No Action with Reoperation: Study 2020d09b-calfed-517

Study 516 (No Action) plus
- maximum wheeling of CVP water through SWP facilities
- unmet CVP demand on SWP system

8. No Action with Reoperation and ERPP (ALT 1A): Study 2020d09b-calfed-518

Study 517 (No Action with Reoperation) plus
- ERPP flow targets

9. Calfed Affected Environment - Existing Conditions Study: 1995d06a-calfed-558

1995 WQCP Bay-Delta Standards
1995 Level of Development
SWP Demand varies from 2.6 to 3.5 MAF
CVP demand is 3.3 MAF
Upstream in-stream flows same as Study 516
Selected Delta Actions
a. Vernalis Adaptive Management Plan Flows (VAMP)
b. More X2 days at Chipps Island in May-June
c. Delta Cross Channel closed November through June.

B. New Facility Scenarios

Note: New Criteria
Isolated facility criteria
- included in E/I ratio and SJR April-May pulse ratio
- no constraint on IF diversions to total Delta export ratio (i.e., 100%)

Minimum through Delta exports
1000 cfs Oct-Mar and July-Sept
0 cfs Apr-June

9. New Facility -SDI (ALT 2A): Study 2020d09b-calfed-528

Study 518 (ALT 1A) plus
- South Delta Improvements (SDI)

10. New Facility - SDI & IF (ALT 3A): Study 2020d09b-calfed-529

Study 528 (ALT 2A) plus
- 5,000 cfs Isolated Facility (IF)
- Delta Cross Channel gates closed from September through June and open July through August.

11. New Facilities - SDI & SDSS (ALT 2D): Study 2020d09b-calfed-530

Study 528 (ALT 2A) plus
- 2.0 MAF South of Delta Surface Storage (SDSS)
- 3500 cfs Inlet and Outlet capacities.

12. New Facilities - SDI, NDGS, NDSS, NDES, SDGS & SDSS (ALT 1C): Study 2020d09b-calfed-531

Study 528 (ALT 2A) plus
- 0.25 MAF North of Delta Groundwater Storage (NDGS)
- 2.0 MAF North of Delta Surface Storage (NDSS)
- 1.0 MAF North of Delta Environmental Storage (NDES)
  - diversion and discharge capacities of 5,000 cfs
  - no new diversion in any given water year until a 60,000 cfs mean daily flow event occurred at Chico Landing
- 0.5 MAF South of Delta Groundwater Storage (SDGS)
- 1.0 MAF South of Delta Surface Storage (SDSS) with 3500 cfs inlet and outlet capacities.

13. New Facilities - SDI, NDGS, NDSS, NDES, SDGS, SDSS & SJBSS (ALT 2B): Study 2020d09b-calfed-532

Study 531 (ALT 1C) facilities plus
- 2.0 MAF South of Delta Surface Storage (SDSS)
- 0.24 MAF San Joaquin Basin Surface Storage (SJBSS)

14. New Facilities - SDI, Storage, IF and IDS (ALT 3B): Study 2020d09b-calfed-533

Study 532 (ALT 2B) plus
- 5,000 cfs Isolated Facility (IF)
- 0.2 MAF In Delta Storage (IDS)

15. New Facilities - SDI, Storage, IF and IDS (ALT 3E): Study 2020d09b-calfed-534

Study 532 (ALT 2B) plus
- 15,000 cfs Isolated Facility (IF)
- 0.2 MAF In Delta Storage (IDS)

16. New facilities - SDI & NDSS: Study 2020d09b-calfed-543

Study 528 (ALT 2A) Plus
- 2.0 MAF North of Delta Surface Storage (NDSS)
- 1.0 MAF North of Delta Environmental Storage (NDES)
  - diversion and discharge capacities of 5,000 cfs
  - no new diversion in any given water year until a 60,000 cfs mean daily flow event occurred at Chico Landing.

C. Special Evaluation Studies

1. Interagency Development Team (IDT) Criteria - 2020d09b-calfed-547

Study 529 with 10,000 cfs IF IDT Criteria (No new storage)
Existing 1995 WQCP Standards with following modifications.

a. IF included in E/I Ratio if Banks plus Tracy exports exceed 10,000 cfs.
b. IF not included in E/I Ratio if Banks plus Tracy exports less than 10,000 cfs
c. No minimum through Delta channels diversion for south of Delta exports
d. Maximum export rate of 15,000 cfs (Banks 10,300 cfs and Tracy 4,600 cfs)
e. No south Delta diversions allowed during March through June unless Delta outflow exceeds 50,000 cfs or San Joaquin River at Vernalis exceeds 15,000 cfs
f. Maximum south Delta Diversion of 5,000 cfs in May Restrict Banks pumping to 1,000 cfs to approximate CVP/SWP usage.

2. Fish & Wildlife Service Criteria (Delta Ag from IF): Study 2020d09b-calfed-551

Study 529 with 15,000 cfs IF no storage and 1995 WQCP Standards, modified as follows.

a. Delta Diversions
  - minimum 1,000 cfs through Delta channels diversion for south of Delta export
  - Level 2 Delta Ag delivered from IF
b. Export Restrictions
  - Diversions to IF not subject to E/I Ratio
  - Maximum export rate of 15,000 cfs (Banks 10,300 cfs and Tracy 4,600 cfs)
  - Maximum south Delta diversion of 5,000 cfs in May Restrict Banks pumping to 1,000 cfs to approximate CVP/SWP usage.
c. Rio Vista flow criteria 3,000 cfs in July and August.

3. CALFED Storage Evaluation Study (Delta Ag from IF) - 2020d09b-calfed-555

Study 551 with 15,000 cfs IF Plus:
a. Storages same as Study 534 (Alt 3E)
b. North Delta Surface Storage Sacramento River monthly diversion geomorphological flow trigger of 1,500 TAF.

D. New Facility Sensitivity Studies

1. New Facility - IF: Study 2020d09b-calfed-529b

Study 529 (ALT 3A) with 5,000 cfs IF
- Delta Cross Channel gates closed from November through June and open July through October.

2. New Facility - IF: Study 2020d09b-calfed-529c

Study 529 (ALT 3A) with 5,000 cfs IF
- IF not included in Delta Inflow/Export Ratio
- Delta Cross Channel gates closed from September through June and open July through August.

3. New Facility - IF: Study 2020d09b-calfed-529d

Study 529 (ALT 3A) with 5,000 cfs IF
- Minimum through Delta exports
  3000 cfs Oct-Mar and July-Sept
  0 cfs Apr-June

4. New Facility - IF: Study 2020d09b-calfed-529e

Study 529 (ALT 3A) with 5,000 cfs IF
- IF not included in Delta Inflow/Export Ratio
- Minimum through Delta exports
  3000 cfs Oct-Mar and July-Sept and 0 cfs Apr-June

5. New Facilities - SDI & Storage: Study 2020d09b-calfed-532a

Study 532 (ALT 2B) modified for;
- NDSS and NDES diversion 0 Trigger

6. New facilities - NDSS, NDES: Study 2020d09b-calfed-543a

Study 543 modified for;
- NDSS and NDES diversion 0 Trigger

7. New Facilities - Storage, IF & IDS: Study 2020d09b-calfed-568

Study 534(ALT 3E) 15,000 cfs IF
- Minimum through Delta exports to be zero.

8. New Facilities - Storage, IF & IDS: Study 2020d09b-calfed-569

Study 534(Alt 3E) with 15,000 cfs IF
- IF not in E/I ratio
- NDSS and NDES diversion 0 Trigger

9. New Facilities - SDI: Study 2020d09b-calfed-576

Study 528 modification
- Env E/I ratio, 0.5 Nov-Jan and 0.25 Feb-June

10. New Facilities - SDI & Storage: Study 2020d09b-calfed-577

Study 532 modification
- NDSS 0 Trigger
- Env E/I ratio, 0.5 Nov-Jan and 0.25 Feb-June

11. New Facilities - SDI & IF: Study 2020d09b-calfed-578

Study 529 with 5,000 cfs IF
a. Minimum 1,000 cfs through Delta diversion
b. IF not included in E/I Ratio
c. Rio Vista flow criteria 3,000 cfs in July and August
d. Maximum south Delta diversion of 5,000 cfs in May

12. New Facilities - SDI, Storage, IF & IDS: Study 2020d09b-calfed-579

Study 533(Alt 3B) with 5,000 cfs IF
a. Minimum 1,000 cfs through Delta diversion
b. IF not included in E/I Ratio
c. Rio Vista flow criteria 3,000 cfs in July and August
d. Maximum south Delta diversion of 5,000 cfs in May
e. NDSS and NDES diversion 0 Trigger

13. New Facilities - SDI & IF: Study 2020d09b-calfed-580

Study 529 with 15,000 cfs IF
a. Minimum 1,000 cfs through Delta diversion
b. IF not included in E/I Ratio
c. Rio Vista flow criteria 3,000 cfs in July and August
d. Maximum south Delta diversion of 5,000 cfs in May

14. New Facilities - SDI, Storage, IF & IDS: Study 2020d09b-calfed-581

Study 534 with 15,000 cfs IF
a. Minimum 1,000 cfs through Delta diversion
b. IF not included in E/I Ratio
c. Rio Vista flow criteria 3,000 cfs in July and August
d. Maximum south Delta diversion of 5,000 cfs in May
e. NDSS and NDES diversion 0 Trigger

15. New Facilities - SDI, Storage, IF & IDS (Delta Ag from IF): Study 2020d09b-calfed-582

Study 534 with 15,000 cfs IF
a. Minimum 1,000 cfs through Delta diversion
b. IF not included in E/I Ratio
c. Rio Vista flow criteria 3,000 cfs in July and August
d. Maximum south Delta diversion of 5,000 cfs in May
e. NDSS and NDES diversion 0 Trigger
f. Delta Ag diversion from IF

16. New Facilities - SDI, Storage, IF & IDS (Delta Ag from IF): Study 2020d09b-calfed-583

Study 534 with 15,000 cfs IF
a. No minimum through Delta diversion
b. IF not included in E/I Ratio
c. Rio Vista flow criteria 3,000 cfs in July and August
d. Maximum south Delta diversion of 5,000 cfs in May
e. NDSS and NDES diversion 0 Trigger
f. Delta Ag diversion from IF

17. New Facilities - SDI, IF & Storage - Study 2020d09b-calfed-567

Study 533(Alt 3B) with 10,000 cfs IF Plus:
a. Minimum 1,000 cfs through Delta channels diversion
b. IF not included in E/I Ratio
c. Rio Vista flow criteria 3,000 cfs in July and August
d. Maximum south Delta diversion of 5,000 cfs in May
e. Diversions to NDSS or NDES zero trigger for Sacramento River flow.

E. Environmental Stakeholder Sensitivity Studies

1. Study #1 - Substantially Relaxed Environmental Standards for Alt 3: Study 2020d09b-calfed-565

15,000 cfs IF with no new storage, maximize water supply
a. Delta Standards:

-3,000 cfs minimum delta outflow
- no E/I ratio
- no water quality standards in Delta

b. Instream requirements: Same as Study 514 plus Mod.D-1400 for American River and Stanislaus Interim Operation Plan
c. Operations: Delta Ag and CCC from IF.

2. Study #2 - Substantially Relaxed Environmental Standards for Alt 1: Study 2020d09b-calfed-566

Existing System with SDI
a. Delta Standards:
- 3,000 cfs minimum delta outflow
- no E/I ratio
- only Ag and MI water quality standards in Delta

b. Instream requirements: Same as Study 514 plus Mod.D-1400 for American River and Stanislaus Interim Operation Plan

3. Study #3 - CVP/SWP Demand Reduction Alt 1: Study 2020d09b-calfed-572

Study 532 modifications
a. CVP Demand: Reduce CVP south of Delta demand by 800 TAF in all years and no CVP surrogate and maximum wheeling
b. SWP Demand: Reduce SWP demand to 1995 level.

4. Study #4 - CVP/SWP Demand Reduction Alt 3: Study 2020d09b-calfed-574

Study 534 modifications
a. 10,000 cfs IF
b. CVP Demand: Reduce CVP south of Delta demand by 800 TAF in all years and no CVP surrogate and maximum wheeling
c. SWP Demand: Reduce SWP demand to 1995 level.

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