

Preliminary Assessment
of
Water Supply Impacts of
CVPIA (B) (2) Actions (Nov. 20, 1997 proposal)

**PRELIMINARY ASSESSMENT OF WATER SUPPLY IMPACTS
OF CVPIA (b)(2) AFRP ACTIONS**

Five operations studies using DWRSIM have been completed to assess the water supply impacts of CVPIA (b)(2) AFRP actions. The water supply impacts are assessed by comparing the CVPIA (b)(2) study with four base case studies that model the 1994 Accord with variations in upstream actions and Vernalis flows.

The following assumptions are common to all five studies:

- 1995 Level hydrology and upstream depletions based on DWR Bulletin 160-98 land use projections (73 years: 1922-1994).
- 1995 Level SWP and CVP demands. Total SWP demand varies from 2.6 MAF to 3.6 MAF/year depending on water conditions. Total CVP demand is 3.3 MAF/year.
- Meet the 1993 winter-run salmon temperature requirements by maintaining Shasta Lake carryover storage at or above 1.9 MAF. In extremely dry years, the Shasta Lake carryover storage is allowed to drop below 1.9 MAF.
- New Melones Reservoir is operated to meet its obligations per USBR's Interim New Melones Operation Plan.

The following are additional assumptions that are specific to each study. For modeling purposes, standards that are less than monthly are converted or approximated to equivalent monthly requirements.

1994 Accord with LOI flows at Vernalis and Upstream CVPIA flows
(Base Case 1)

- Meet the 1994 Bay-Delta Accord water quality requirements.
- Meet the AFRP minimum instream flow requirements (AFRP Upstream Actions 1 through 3) downstream of Keswick, Nimbus, and Whiskeytown Dams.

- Maintain the following LOI minimum flows at Vernalis:

Month	Critical Years	Dry Years	Below Normal Years	Above Normal & Wet Years
Oct.	1,000 cfs	1,000 cfs	1,000 cfs	1,000 cfs
Feb.1- Mar. 31				
Apr. 1-14, May 16-31	1,000 cfs	1,000 cfs	1,000 cfs	1,000 cfs
Apr. 15 – May 15	2,000 cfs	3,000 cfs	4,000 cfs	5,000 cfs

Additional water required to meet the LOI minimum flows at Vernalis is released from New Don Pedro Reservoir and Lake McClure.

1994 Accord with LOI flows at Vernalis and Upstream ESA requirements
(Base Case 2)

The assumptions for Base Case 2 are the same as Base Case 1 except for the following:

- No AFRP minimum instream flow requirements (AFRP Upstream Actions 1 through 3) downstream of Keswick, Nimbus, and Whiskeytown Dams.
- Meet ESA minimum instream flow requirements downstream of Keswick Reservoir. Operate Folsom to meet modified D-1400 flow.

1994 Accord with Upstream CVPIA flows and “Add. Water” to meet Vernalis flows
(Current Obligations) (Base Case 3)

The assumptions for Base Case 3 are the same as Base Case 1 except for the following:

- Meet minimum flows at Vernalis, including pulse flows, per the 1994 Bay-Delta Accord. Additional water is released from New Don Pedro Reservoir and Lake McClure, as necessary, to meet Vernalis flow requirements.

1994 Accord with Upstream CVPIA flows and no “Add. Water” to meet Vernalis flows
(Base Case 4)

The assumptions for Base Case 4 are the same as Base Case 1 except for the following:

- Meet minimum flows at Vernalis, including pulse flows, per the 1994 Bay-Delta Accord to the extent possible. No additional water is released from New Don Pedro Reservoir and Lake McClure to meet Vernalis flow requirements.

1994 Accord with Upstream ESA requirements and no "Add. Water" to meet Vernalis flows
(Base Case 5)

The assumptions for Base Case 5 are the same as Base Case 2 except for the following:

- Meet minimum flows at Vernalis, including pulse flows, per the 1994 Bay-Delta Accord to the extent possible. No additional water is released from New Don Pedro Reservoir and Lake McClure to meet Vernalis flow requirements.

CVPIA (b)(2) AFRP Actions

- Meet the 1994 Bay-Delta Accord standards. No minimum flows at Vernalis, including the pulse flows, are imposed. Instead, alternative flow and export requirements are imposed as discussed under Delta Action 1.
- Meet the AFRP minimum instream flow requirements (same as Base Case 1) downstream of Keswick, Nimbus, and Whiskeytown Dams.
- The minimum instream flow requirement below Goodwin Dam on the Stanislaus River is met per the interim operations agreement. No additional water is provided for the AFRP instream flow requirement (AFRP Upstream Action 4) below Goodwin Dam.

The following AFRP Delta Actions are modeled in this study:

Delta Action 1: Vernalis Adaptive Management Plan (VAMP)

- During April 15 – May 15, increase the flow at Vernalis to meet the target flow conditions (2,000, 3,200, 4,450, 5,700, and 7,000 cfs) and set the Delta export accordingly (1,500, 1,500, 1,500, 2,250, and either 1,500 or 3,000 cfs) as described in the July 9th VAMP framework document. For modeling purposes, a San Luis storage (CVP+SWP) target was chosen to achieve export rates of 1,500 cfs and 3,000 cfs at approximately 50/50 distributions for flows above 5,700 cfs.
- Additional water needed to meet the target flows at Vernalis during April 15 – May 15 is provided from the San Joaquin River upstream of its confluence with the Stanislaus River. Additional water requirements are shared between the Tuolumne (New Don Pedro Reservoir) and Merced (Lake McClure) River basins. The additional water is capped at 110 TAF/year.

Delta Action 3: Additional X2 Protection

- Increase X2 requirements at Chipps Island during March through June to the 1962 level of development.

Delta Action 4: Maintain Sacramento River flows at Freeport

- Establish Sacramento River flows at Freeport from 9,000 to 15,000 cfs for 1- week periods over a 30-day period by Keswick releases if water is available in Shasta Reservoir.

Delta Action 5: Ramping of the San Joaquin River flows

- The allowable Delta export (Banks+Tracy) to the total Delta inflow ratio (E/I) used in the second half of May consisted of the average of the E/I ratio during the first half of May (pulse period) and the allowable E/I ratio of 0.35 in June.

Delta Action 6: Close Delta Cross Channel gates

- Close Delta Cross Channel gates in October through January in all water year types.

Delta Action 7: July Flows and Exports

- The allowable Delta export in July is determined by applying a ratio to the Delta export in June, depending on the X2 position in June. The ratio is 1.0 if the June X2 is at or east of Collinsville (81km) and would increase linearly to a maximum of 1.86 when the June X2 is at Chipps Island (74km). When the June X2 is located west of Chipps Island (74km), no export limit is imposed (beyond existing constraints i.e. 65% E/I ratio) in July.

The following AFRP Delta Actions are not modeled in this study:

- Delta Action 2: Old River Barrier Operation
- Delta Action 8: Evaluate exports and inflows in December – January

TABLE 1

SUMMARY OF SIMULATED CVP DELIVERY IMPACT BY YEAR TYPE
(Negative value indicates a decrease in CVP deliveries)

YEAR TYPES BASED ON SAC. BASIN 40-30-30	CVPIA (b)(2) Vs. Base Case 1	CVPIA (b)(2) Vs. Base Case 2	CVPIA (b)(2) Vs. Base Case 3	CVPIA (b)(2) Vs. Base Case 4	CVPIA (b)(2) Vs. Base Case 5
	Jan.- Dec. Total (TAF)				
N YEARS	21	21	21	21	21
WET MAX	-230	-292	-242	-241	-219
WET AVG	-63	-27	-63	-64	-58
WET MIN	102	254	102	101	94
N YEARS	10	10	10	10	10
AN MAX	-457	-398	-487	-485	-399
AN AVG	-150	-148	-166	-161	-150
AN MIN	1	2	0	0	0
N YEARS	14	14	14	14	14
BN MAX	-284	-409	-331	-320	-532
BN AVG	-90	-95	-97	-91	-110
BN MIN	82	108	89	87	165
N YEARS	16	16	16	16	16
DRY MAX	-499	-620	-395	-395	-619
DRY AVG	-66	-120	-81	-76	-152
DRY MIN	73	201	66	62	79
N YEARS	12	12	12	12	12
CRIT MAX	-115	-599	-142	-122	-683
CRIT AVG	-42	-235	-57	-36	-288
CRIT MIN	16	-74	0	4	-133

Base Case 1 - Accord + LOI flows + Upstream CVPIA flows

Base Case 2 - Accord + LOI flows + Upstream ESA

Base Case 3 - Accord with "Add. Water" + Upstream CVPIA flows

Base Case 4 - Accord with No "Add. Water" + Upstream CVPIA

Base Case 5 - Accord with No "Add. Water" + Upstream ESA

TABLE 2

SUMMARY OF SIMULATED SWP DELIVERY IMPACT BY YEAR TYPE
 (Negative value indicates a decrease in SWP deliveries)

YEAR TYPES BASED ON SAC. BASIN 40-30-30	CVPIA (b)(2) Vs. Base Case 1	CVPIA (b)(2) Vs. Base Case 2	CVPIA (b)(2) Vs. Base Case 3	CVPIA (b)(2) Vs. Base Case 4	CVPIA (b)(2) Vs. Base Case 5
	Jan.- Dec. Total (TAF)				
N YEARS	21	21	21	21	21
WET MAX	-2	-137	-2	-2	-2
WET AVG	1	-7	1	2	2
WET MIN	16	0	15	33	37
N YEARS	10	10	10	10	10
AN MAX	-3	-293	-4	-4	-2
AN AVG	0	-30	-1	0	3
AN MIN	3	1	4	5	19
N YEARS	14	14	14	14	14
BN MAX	-135	-202	-211	-184	-6
BN AVG	-18	-1	-22	-20	17
BN MIN	0	288	29	29	243
N YEARS	16	16	16	16	16
DRY MAX	-104	-319	-132	-130	-76
DRY AVG	-25	-113	-31	-28	29
DRY MIN	9	0	24	54	155
N YEARS	12	12	12	12	12
CRIT MAX	-202	-153	-238	-123	-59
CRIT AVG	-59	74	-76	-43	33
CRIT MIN	94	438	68	68	169

Base Case 1 - Accord + LOI flows + Upstream CVPIA flows

Base Case 2 - Accord + LOI flows + Upstream ESA

Base Case 3 - Accord with "Add. Water" + Upstream CVPIA flows

Base Case 4 - Accord with No "Add. Water" + Upstream CVPIA

Base Case 5 - Accord with No "Add. Water" + Upstream ESA

TABLE 3

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

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	1995D06A-CVPIA-557 BASE CASE 1			1995D06A-CVPIA-549		
	TOTAL	CVP	SWP	TOTAL	CVP	SWP
A. (i) Total Delta Exports	4221	2095	2125	4080 [-140]	2022 [-73]	2058 [-67]
(ii) Net Storage Used	1273	953	320	1271 [2]	938 [15]	332 [-12]
(a) Existing North-of-Delta		953	320		938 [15]	332 [-12]
(b) New North-of-Delta			0			0 [0]
WATER SUPPLY IMPACT (i+ii)				<u>-138</u>		
(iii) Add water from CP81 & CP20	42			29 [13]		
(iv) Other Storage Used	166	55	111	175 [-9]	63 [-8]	111 [0]
(b) New In-Delta			0			0 [0]
(a) Existing South-of-Delta		55	111		63 [-8]	111 [0]
(b) New South-of-Delta			0			0 [0]
B. Total Delta Outflow	4943			5060 [117]		
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)						
A. Total Delta Exports	5890	2805	3084	5761 [-128]	2726 [-79]	3035 [-48]
WATER SUPPLY IMPACT				<u>-128</u>		
B. Add water	19			44 [-24]		
C. EOM SEPT SACTO BASIN STORAGE	7378	4897	2481	7270 [-108]	4823 [-74]	2446 [-34]
(i) Existing Sacto Basin		4897	2481		4823 [-74]	2446 [-34]
(ii) New Sacto Basin			0			0 [0]
D. EOM SEPT NEW MELONES STORAGE	1246			1245 [-1]		
E. Total Delta Outflow	14600			14748 [148]		

TABLE 4

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

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	1995D06A-CVPIA-559 BASE CASE 2			1995D06A-CVPIA-549			
	TOTAL	CVP	SWP	TOTAL	CVP	SWP	
A. (i) Total Delta Exports	4290	2213	2076	4080 [-209]	2022 [-191]	2058 [-18]	
(ii) Net Storage Used	1287	955	332	1271 [16]	938 [17]	332 [0]	
(a) Existing North-of-Delta		955	332		938 [17]	332 [0]	
(b) New North-of-Delta			0			0 [0]	
WATER SUPPLY IMPACT (i+ii)				<hr/> -193			
(iii) Add water from CP81 & CP20	42			29 [13]			
(iv) Other Storage Used	167	55	111	175 [-8]	63 [-8]	111 [0]	
(b) New In-Delta			0			0 [0]	
(a) Existing South-of-Delta		55	111		63 [-8]	111 [0]	
(b) New South-of-Delta			0			0 [0]	
B. Total Delta Outflow	4893			5060 [166]			
 II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)							
A. Total Delta Exports	5911	2836	3075	5761 [-149]	2726 [-110]	3035 [-39]	
WATER SUPPLY IMPACT				<hr/> -149			
B. Add water	19			44 [-24]			
C. EOM SEPT SACTO BASIN STORAGE	7586	5189	2396	7270 [-316]	4823 [-366]	2446 [49]	
(i) Existing Sacto Basin		5189	2396		4823 [-366]	2446 [49]	
(ii) New Sacto Basin			0			0 [0]	
D. EOM SEPT NEW MELONES STORAGE	1246			1245 [-1]			
E. Total Delta Outflow	14565			14748 [183]			

TABLE 5

SUMMARY OF WATER SUPPLY IMPACTS

All values in Thousand Acre-Foot/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	1995D06A-CVPIA-560 BASE CASE 3			1995D06A-CVPIA-549		
	TOTAL	CVP	SWP	TOTAL	CVP	SWP
A. (i) Total Delta Exports	4255	2104	2150	4080 [-174]	2022 [-82]	2058 [-92]
(ii) Net Storage Used	1213	907	306	1271 [-57]	938 [-31]	332 [-26]
(a) Existing North-of-Delta		907	306		938 [-31]	332 [-26]
(b) New North-of-Delta			0			0 [0]
WATER SUPPLY IMPACT (i+ii)				-231		
(iii) Add water from CP81 & CP20	152			29 [123]		
(iv) Other Storage Used	157	48	108	175 [-18]	63 [-15]	111 [-2]
(b) New In-Delta			0			0 [0]
(a) Existing South-of-Delta		48	108		63 [-15]	111 [-2]
(b) New South-of-Delta			0			0 [0]
B. Total Delta Outflow	4949			5060 [110]		
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)						
A. Total Delta Exports	5904	2815	3088	5761 [-142]	2726 [-89]	3035 [-53]
WATER SUPPLY IMPACT				-142		
B. Add water	60			44 [15]		
C. EOM SEPT SACTO BASIN STORAGE	7398	4905	2493	7270 [-128]	4823 [-81]	2446 [-46]
(i) Existing Sacto Basin		4905	2493		4823 [-81]	2446 [-46]
(ii) New Sacto Basin			0			0 [0]
D. EOM SEPT NEW MELONES STORAGE	1189			1245 [56]		
E. Total Delta Outflow	14598			14748 [150]		

TABLE 6

SUMMARY OF WATER SUPPLY IMPACTS

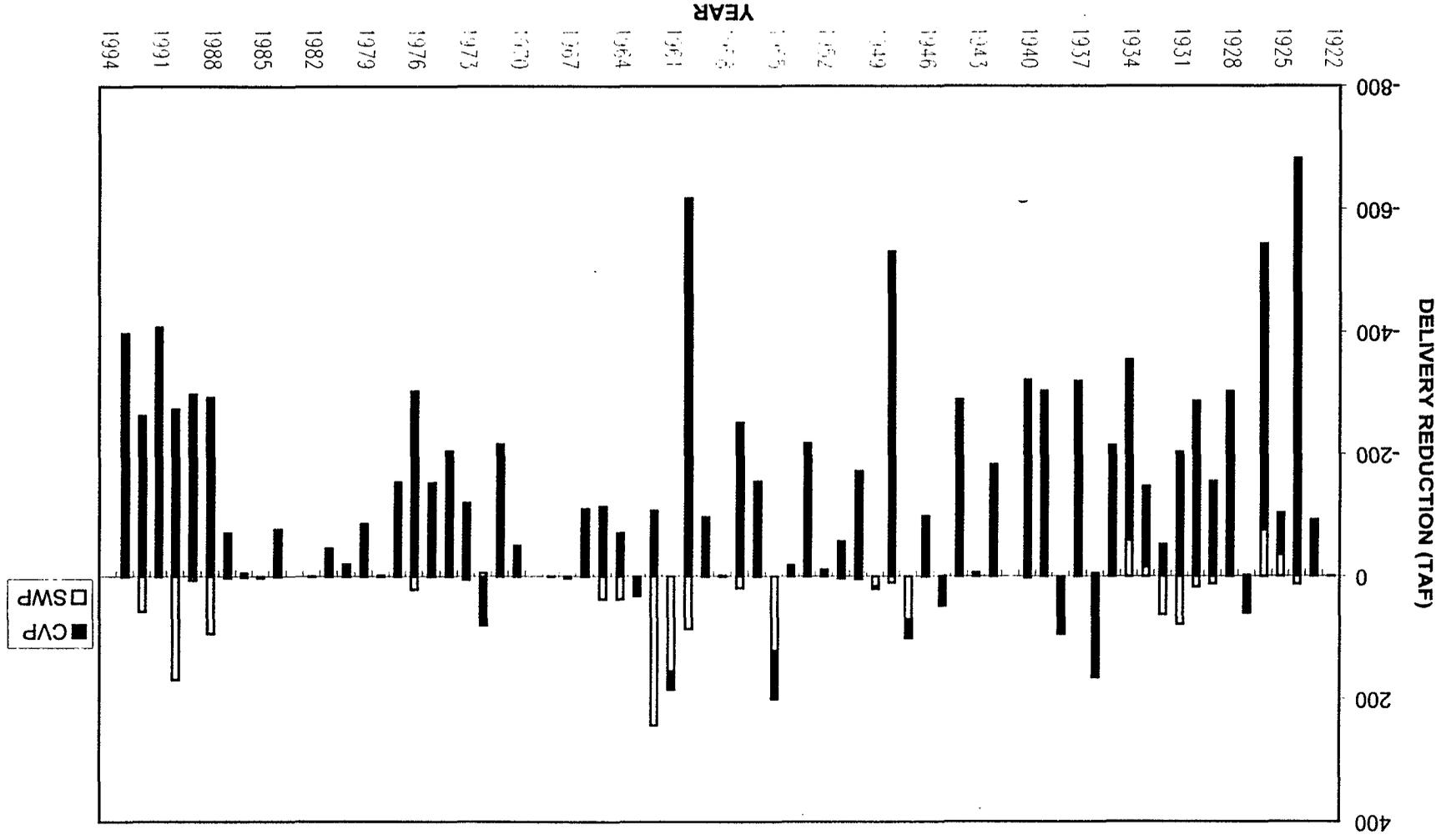
All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	1995D06A-CVPIA-560A BASE CASE 4			1995D06A-CVPIA-549		
	TOTAL	CVP	SWP	TOTAL	CVP	SWP
A. (i) Total Delta Exports	4178	2076	2101	4080 [-97]	2022 [-53]	2058 [-43]
(ii) Net Storage Used	1203	882	321	1271 [-67]	938 [-55]	332 [-11]
(a) Existing North-of-Delta		882	321		938 [-55]	332 [-11]
(b) New North-of-Delta			0			0 [0]
WATER SUPPLY IMPACT (i+ii)				-164		
(iii) Add water from CP81 & CP20	0			29 [-29]		
(iv) Other Storage Used	164	52	111	175 [-11]	63 [-11]	111 [0]
(b) New In-Delta			0			0 [0]
(a) Existing South-of-Delta		52	111		63 [-11]	111 [0]
(b) New South-of-Delta			0			0 [0]
B. Total Delta Outflow	4952			5060 [108]		
 II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)						
A. Total Delta Exports	5891	2809	3081	5761 [-129]	2726 [-83]	3035 [-46]
WATER SUPPLY IMPACT				-129		
B. Add water	0			44 [-44]		
C. EOM SEPT SACTO BASIN STORAGE	7367	4891	2476	7270 [-97]	4823 [-67]	2446 [-29]
(i) Existing Sacto Basin		4891	2476		4823 [-67]	2446 [-29]
(ii) New Sacto Basin			0			0 [0]
D. EOM SEPT NEW MELONES STORAGE	1115			1245 [130]		
E. Total Delta Outflow	14610			14748 [138]		

TABLE 7

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

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	1995D06A-CVPIA-562 BASE CASE 5			1995D06A-CVPIA-549		
	TOTAL	CVP	SWP	TOTAL	CVP	SWP
A. (i) Total Delta Exports	4297	2256	2041	4080 [-216]	2022 [-233]	2058 [16]
(ii) Net Storage Used	1251	925	326	1271 [-19]	938 [-12]	332 [-6]
(a) Existing North-of-Delta		925	326		938 [-12]	332 [-6]
(b) New North-of-Delta			0			0 [0]
WATER SUPPLY IMPACT (i+ii)				-235		
(iii) Add water from CP81 & CP20	0			29 [-29]		
(iv) Other Storage Used	151	39	111	175 [-24]	63 [-24]	111 [0]
(b) New In-Delta			0			0 [0]
(a) Existing South-of-Delta		39	111		63 [-24]	111 [0]
(b) New South-of-Delta			0			0 [0]
B. Total Delta Outflow	4886			5060 [173]		
 II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)						
A. Total Delta Exports	5906	2863	3043	5761 [-144]	2726 [-136]	3035 [-7]
WATER SUPPLY IMPACT				-144		
B. Add water	0			44 [-44]		
C. EOM SEPT SACTO BASIN STORAGE	7630	5174	2456	7270 [-360]	4823 [-350]	2446 [-9]
(i) Existing Sacto Basin		5174	2456		4823 [-350]	2446 [-9]
(ii) New Sacto Basin			0			0 [0]
D. EOM SEPT NEW MELONES STORAGE	1116			1245 [129]		
E. Total Delta Outflow	14580			14748 [168]		



ANNUAL SWP AND CVP DELIVERY REDUCTIONS (TAF)
CVPIA (b)(2) Versus Base Case 5 (Accord with No "Add. Water" + Upstream ESA flows)

FIGURE 1

FIGURE 2

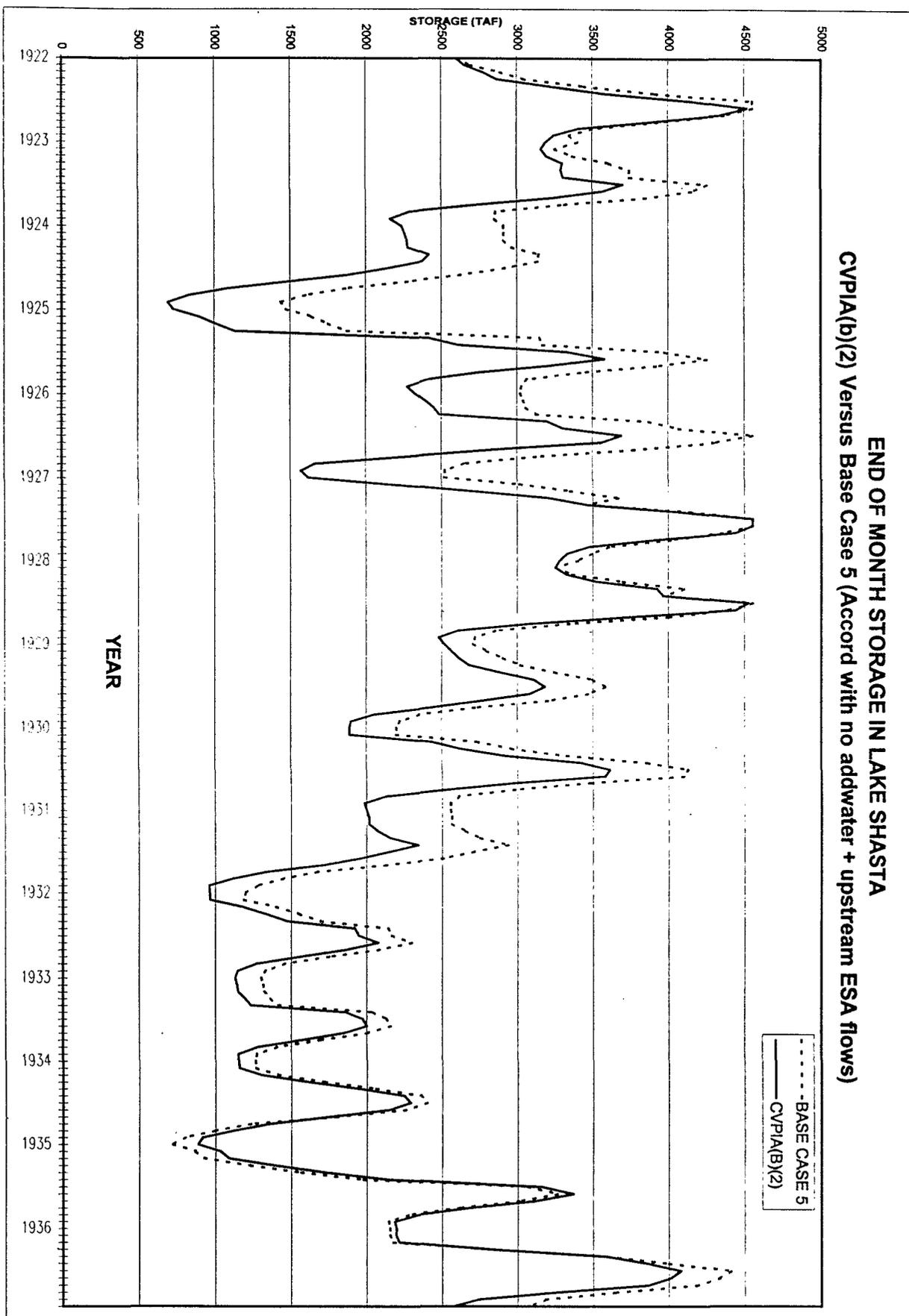
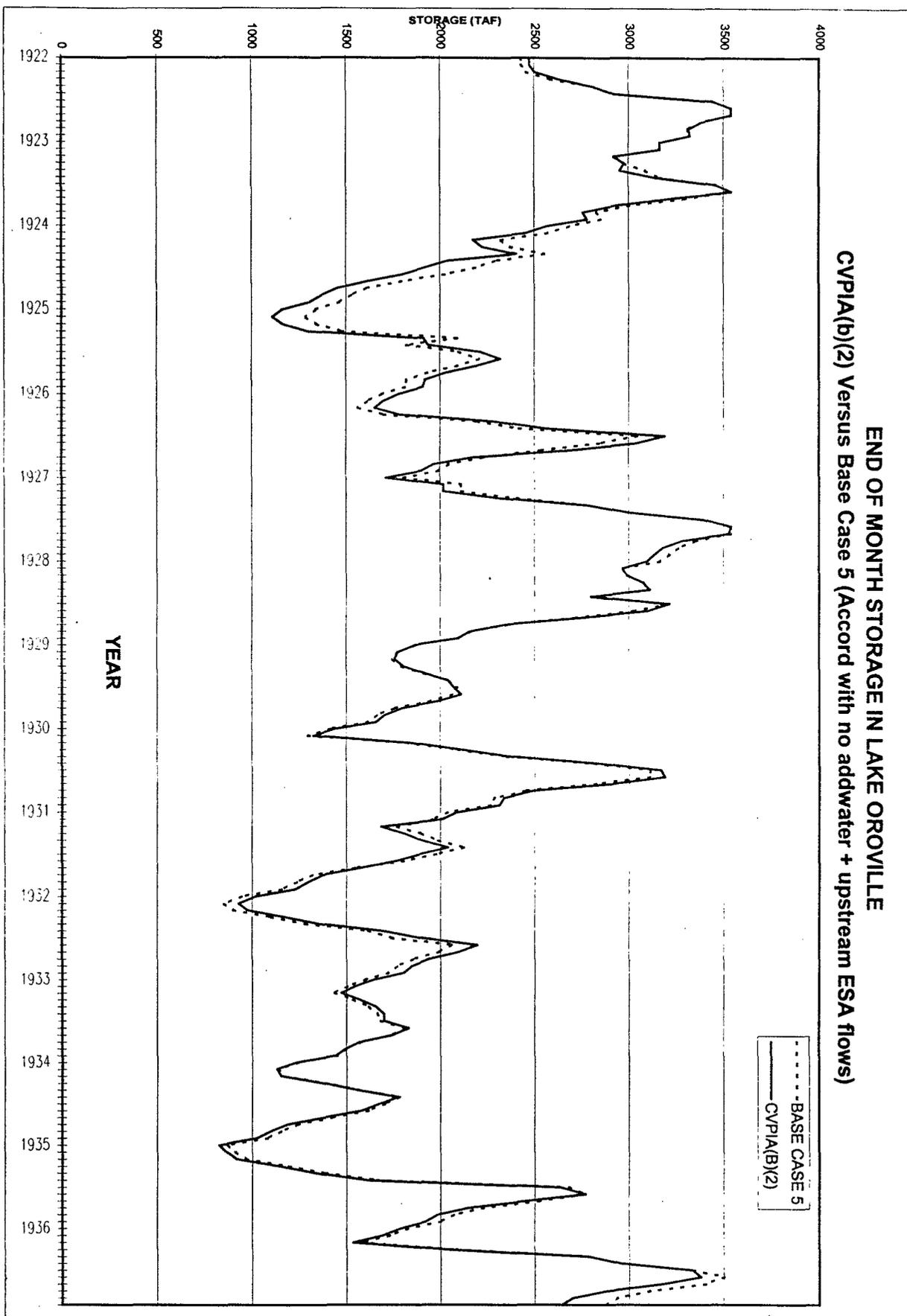


FIGURE 3



Sensitivity Analysis of CVPIA (b)(2) AFRP Actions

Four operations studies using DWRSIM are underway to assess the water supply impacts of various CVPIA (b)(2) AFRP actions and the effect of joint point and south-of-Delta storage. The water supply impacts are assessed by comparing the studies with a previously completed base study (Base Case 4 included in the December 16, 1997, package).

Base Case 4

- Meet the 1994 Bay-Delta Accord water quality requirements.
- Meet the AFRP minimum instream flow requirements (AFRP Upstream Actions 1 through 3) downstream of Keswick, Nimbus and Whiskeytown Dams.
- Meet the minimum flows at Vernalis, including pulse flows, per the 1994 Bay-Delta Accord to the extent possible. No additional water is released from New Don Pedro Reservoir and Lake McClure to meet Vernalis flow requirements.

Impacts of AFRP Actions:

Study 1

The assumptions are the same as Base Case 4, except higher flows at Freeport are provided per DA4.

Study 2

The assumptions are the same as Study 1, except the following changes:

- Delta Cross Channel gate is closed October through January in all years. (DA6)
- No minimum flows at Vernalis, including pulse flows, are imposed. Instead VAMP flows and export criteria for April 15 through May 15 are imposed. (DA1)

Study 3

The assumptions are the same as Study 2, except additional X2 days (DA3) are imposed per DA3 and ramping of May exports is imposed per DA5.

Study 4

The assumptions are the same as Study 3, except July exports are reduced per DA7. (In other words, Study 4 includes all AFRP actions except the winter smolt survival study.)

TABLE 1
SUMMARY OF SIMULATED CVP DELIVERY IMPACT BY YEAR TYPE
 (Negative value indicates a decrease in CVP deliveries)

YEAR TYPES BASED ON SAC. BASIN 40-30-30	STUDY 1 Vs. Base Case 4	STUDY 2 Vs. Base Case 4	STUDY 3 Vs. Base Case 4	STUDY 4 Vs. Base Case 4
	Jan.- Dec. Total (TAF)	Jan.- Dec. Total (TAF)	Jan.- Dec. Total (TAF)	Jan.- Dec. Total (TAF)
21 YEARS				
WET MAX	0	-241	-241	-241
WET AVG	2	-50	-64	-64
WET MIN	39	116	100	101
10 YEARS				
AN MAX	-6	-479	-487	-485
AN AVG	-1	-140	-162	-161
AN MIN	2	43	0	0
14 YEARS				
BN MAX	-88	-325	-320	-320
BN AVG	-6	-82	-91	-91
BN MIN	7	129	87	87
16 YEARS				
DRY MAX	-134	-393	-395	-395
DRY AVG	-9	-54	-76	-76
DRY MIN	2	65	62	62
12 YEARS				
CRIT MAX	-79	-166	-122	-122
CRIT AVG	-14	1	-35	-36
CRIT MIN	0	76	13	4

STUDY 1 : BASE CASE 4 + SAC FLOW

2 : BASE CASE 4 + SAC FLOW + X-CHANNEL + VAMP

3 : BASE CASE 4 + SAC FLOW + X-CHANNEL + VAMP + X2 + RAMPING

4 : BASE CASE 4 + SAC FLOW + X-CHANNEL + VAMP + X2 + RAMPING + JULY EXPORT RESTRICTION

D-009590

TABLE 2
SUMMARY OF SIMULATED SWP DELIVERY IMPACT BY YEAR TYPE
(Negative value indicates a decrease in SWP deliveries)

YEAR TYPES BASED ON SAC. BASIN 40-30-30	STUDY 1	STUDY 2	STUDY 3	STUDY 4
	Vs. Base Case 4			
	Jan.- Dec. Total (TAF)	Jan.- Dec. Total (TAF)	Jan.- Dec. Total (TAF)	Jan.- Dec. Total (TAF)
21 YEARS				
WET MAX	0	-5	-2	-2
WET AVG	0	1	2	2
WET MIN	0	28	33	33
10 YEARS				
AN MAX	0	-4	-4	-4
AN AVG	0	0	0	0
AN MIN	1	3	5	5
14 YEARS				
BN MAX	0	-119	-184	-184
BN AVG	1	-7	-20	-20
BN MIN	13	75	29	29
16 YEARS				
DRY MAX	-3	-64	-130	-130
DRY AVG	1	-10	-29	-28
DRY MIN	9	83	54	54
12 YEARS				
CRIT MAX	0	-67	-123	-123
CRIT AVG	7	3	-42	-43
CRIT MIN	30	91	68	68

STUDY 1 : BASE CASE 4 + SAC FLOW

2 : BASE CASE 4 + SAC FLOW + X-CHANNEL + VAMP

3 : BASE CASE 4 + SAC FLOW + X-CHANNEL + VAMP + X2 + RAMPING

4 : BASE CASE 4 + SAC FLOW + X-CHANNEL + VAMP + X2 + RAMPING + JULY EXPORT RESTRICTION

D-009591

TABLE 3

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

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	1995D06A-CVPIA-560A (Base Case 4)			1995D06A-CVPIA-586 (Study 1)						
	TOTAL	CVP	SWP	TOTAL	CVP	SWP				
	A. (i) Total Delta Exports	4178	2076	2101	4178	[0]	2076	[0]	2101	[0]
(ii) Net Storage Used	1203	882	321	1203	[0]	882	[0]	321	[0]	
(a) Existing North-of-Delta		882	321			882	[0]	321	[0]	
(b) New North-of-Delta			0					0	[0]	
WATER SUPPLY IMPACT (i+ii)										
(iii) Add water from CP81 & CP20	0			0	[0]					
(iv) Other Storage Used	164	52	111	164	[0]	52	[0]	111	[0]	
(b) New In-Delta			0					0	[0]	
(a) Existing South-of-Delta		52	111			52	[0]	111	[0]	
(b) New South-of-Delta			0					0	[0]	
B. Total Delta Outflow	4952			4952	[0]					
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)										
A. Total Delta Exports	5891	2809	3081	5888	(-2)	2805	(-4)	3083	(+2)	
WATER SUPPLY IMPACT										
B. Add water	0			0	[0]					
C. EOM SEPT SACTO BASIN STORAGE	7367	4891	2476	7365	(-2)	4876	(-15)	2488	(+12)	
(i) Existing Sacto Basin		4891	2476			4876	(-15)	2488	(+12)	
(ii) New Sacto Basin			0					0	[0]	
D. EOM SEPT NEW MELONES STORAGE	1115			1114	[0]					
E. Total Delta Outflow	14610			14614	(+4)					

TABLE 4

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

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	1995D06A-CVPIA-560A (Base Case 4)			1995D06A-CVPIA-589 (Study 2)		
	TOTAL	CVP	SWP	TOTAL	CVP	SWP
A. (i) Total Delta Exports	4178	2076	2101	4167 (-11)	2066 (-10)	2100 (-1)
(ii) Net Storage Used	1203	882	321	1269 (-66)	942 (-60)	327 (-6)
(a) Existing North-of-Delta		882	321		942 (-60)	327 (-6)
(b) New North-of-Delta			0			0 [0]
WATER SUPPLY IMPACT (i+ii)				-77		
(iii) Add water from CP81 & CP20	0			29 (-29)		
(iv) Other Storage Used	164	52	111	173 (-9)	62 (-10)	111 [0]
(b) New In-Delta			0			0 [0]
(a) Existing South-of-Delta		52	111		62 (-10)	111 [0]
(b) New South-of-Delta			0			0 [0]
B. Total Delta Outflow	4952			4974 (+22)		
 II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)						
A. Total Delta Exports	5891	2809	3081	5804 (-87)	2747 (-62)	3056 (-25)
WATER SUPPLY IMPACT				-87		
B. Add water	0			44 (-44)		
C. EOM SEPT SACTO BASIN STORAGE	7367	4891	2476	7355 (-12)	4879 (-12)	2476 [0]
(i) Existing Sacto Basin		4891	2476		4879 (-12)	2476 [0]
(ii) New Sacto Basin			0			0 [0]
D. EOM SEPT NEW MELONES STORAGE	1115			1245 (+130)		
E. Total Delta Outflow	14610			14705 (+95)		

TABLE 5

SUMMARY OF WATER SUPPLY IMPACTS

All values in Thousand Acre-Foot/Year

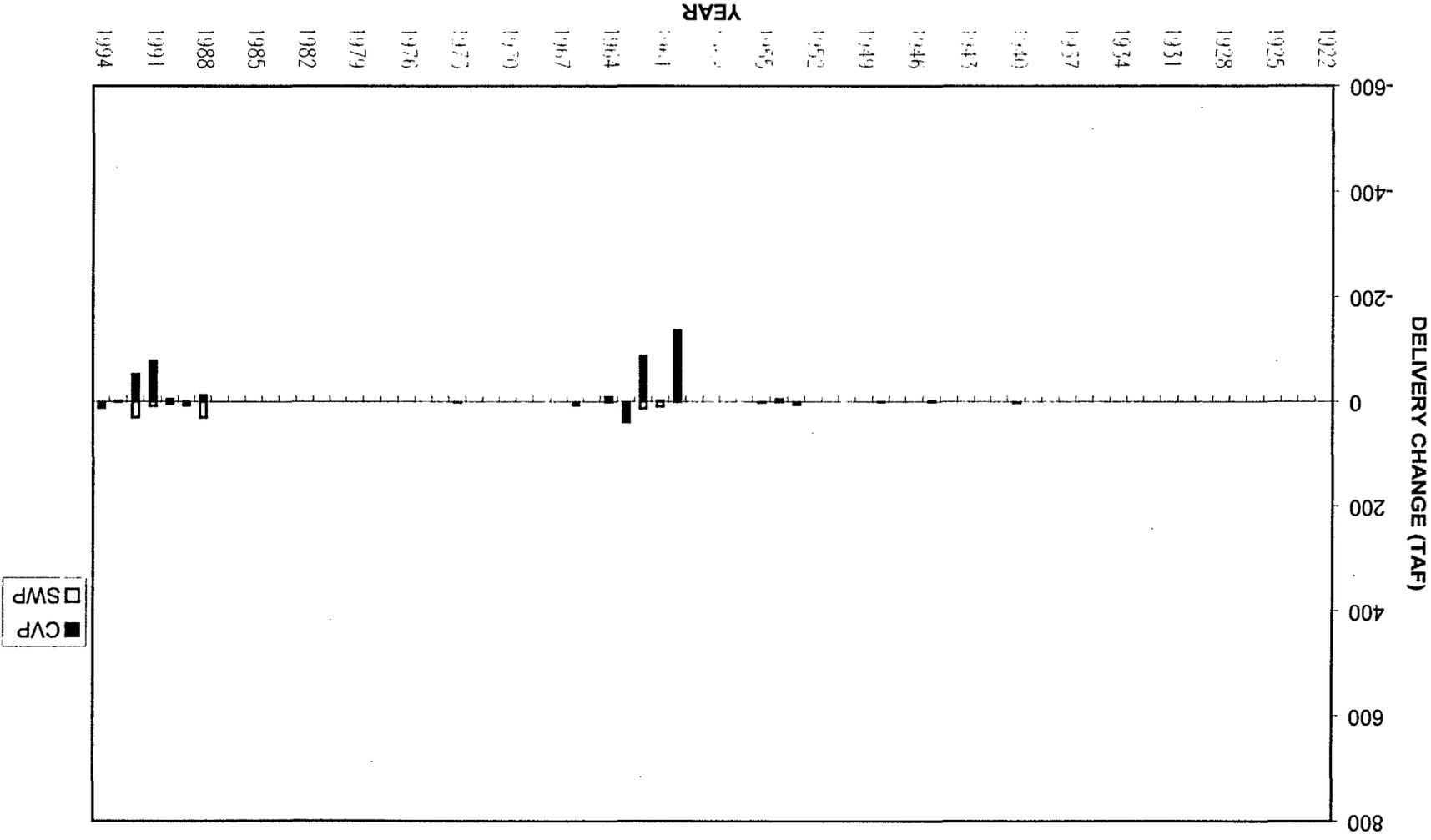
I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	1995D06A-CVPIA-560A (Base Case 4)			1995D06A-CVPIA-590 (Study 3)		
	TOTAL	CVP	SWP	TOTAL	CVP	SWP
A. (i) Total Delta Exports	4178	2076	2101	4080 (-97)	2022 (-54)	2058 (-43)
(ii) Net Storage Used	1203	882	321	1271 (-68)	938 (-56)	333 (-12)
(a) Existing North-of-Delta		882	321		938 (-56)	333 (-12)
(b) New North-of-Delta			0			0 [0]
WATER SUPPLY IMPACT (i+ii)				-165		
(iii) Add water from CP81 & CP20	0			29 (-29)		
(iv) Other Storage Used	164	52	111	175 (-11)	63 (-11)	111 [0]
(b) New In-Delta			0			0 [0]
(a) Existing South-of-Delta		52	111		63 (-11)	111 [0]
(b) New South-of-Delta			0			0 [0]
B. Total Delta Outflow	4952			5060 (+108)		
II. 73-YEAR (1922-1994) AVERAGES						
(Oct 1921 - Sep 1994)						
A. Total Delta Exports	5891	2809	3081	5762 (-129)	2726 (-83)	3035 (-46)
WATER SUPPLY IMPACT				-129		
B. Add water	0			44 (-44)		
C. EOM SEPT SACTO BASIN STORAGE	7367	4891	2476	7271 (-96)	4828 (-63)	2443 (-33)
(i) Existing Sacto Basin		4891	2476		4828 (-63)	2443 (-33)
(ii) New Sacto Basin			0			0 [0]
D. EOM SEPT NEW MELONES STORAGE	1115			1245 (+130)		
E. Total Delta Outflow	14610			14748 (+138)		

TABLE 6

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

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	1995D06A-CVPIA-560A (Base Case 4)			1995D06A-CVPIA-549 (Study 4)		
	TOTAL	CVP	SWP	TOTAL	CVP	SWP
A. (i) Total Delta Exports	4178	2076	2101	4080 (-97)	2022 (-54)	2058 (-43)
(ii) Net Storage Used	1203	882	321	1271 (-68)	938 (-56)	332 (-11)
(a) Existing North-of-Delta		882	321		938 (-56)	332 (-11)
(b) New North-of-Delta			0			0 [0]
WATER SUPPLY IMPACT (i+ii)				<u>-165</u>		
(iii) Add water from CP81 & CP20	0			29 (-29)		
(iv) Other Storage Used	164	52	111	175 (-11)	63 (-11)	111 [0]
(b) New In-Delta			0			0 [0]
(a) Existing South-of-Delta		52	111		63 (-11)	111 [0]
(b) New South-of-Delta			0			0 [0]
B. Total Delta Outflow	4952			5060 (+108)		
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)						
A. Total Delta Exports	5891	2809	3081	5761 (-129)	2726 (-83)	3035 (-46)
WATER SUPPLY IMPACT				<u>-129</u>		
B. Add water	0			44 (-44)		
C. EOM SEPT SACTO BASIN STORAGE	7367	4891	2476	7270 (-97)	4823 (-68)	2446 (-30)
(i) Existing Sacto Basin		4891	2476		4823 (-68)	2446 (-30)
(ii) New Sacto Basin			0			0 0
D. EOM SEPT NEW MELONES STORAGE	1115			1245 (+130)		
E. Total Delta Outflow	14610			14748 (+138)		

FIGURE 1
 ANNUAL SWP AND CVP DELIVERY CHANGE (TAF)
 STUDY 1 Versus Base Case 4
 STUDY 1: BASE CASE 4 + SAC FLOW

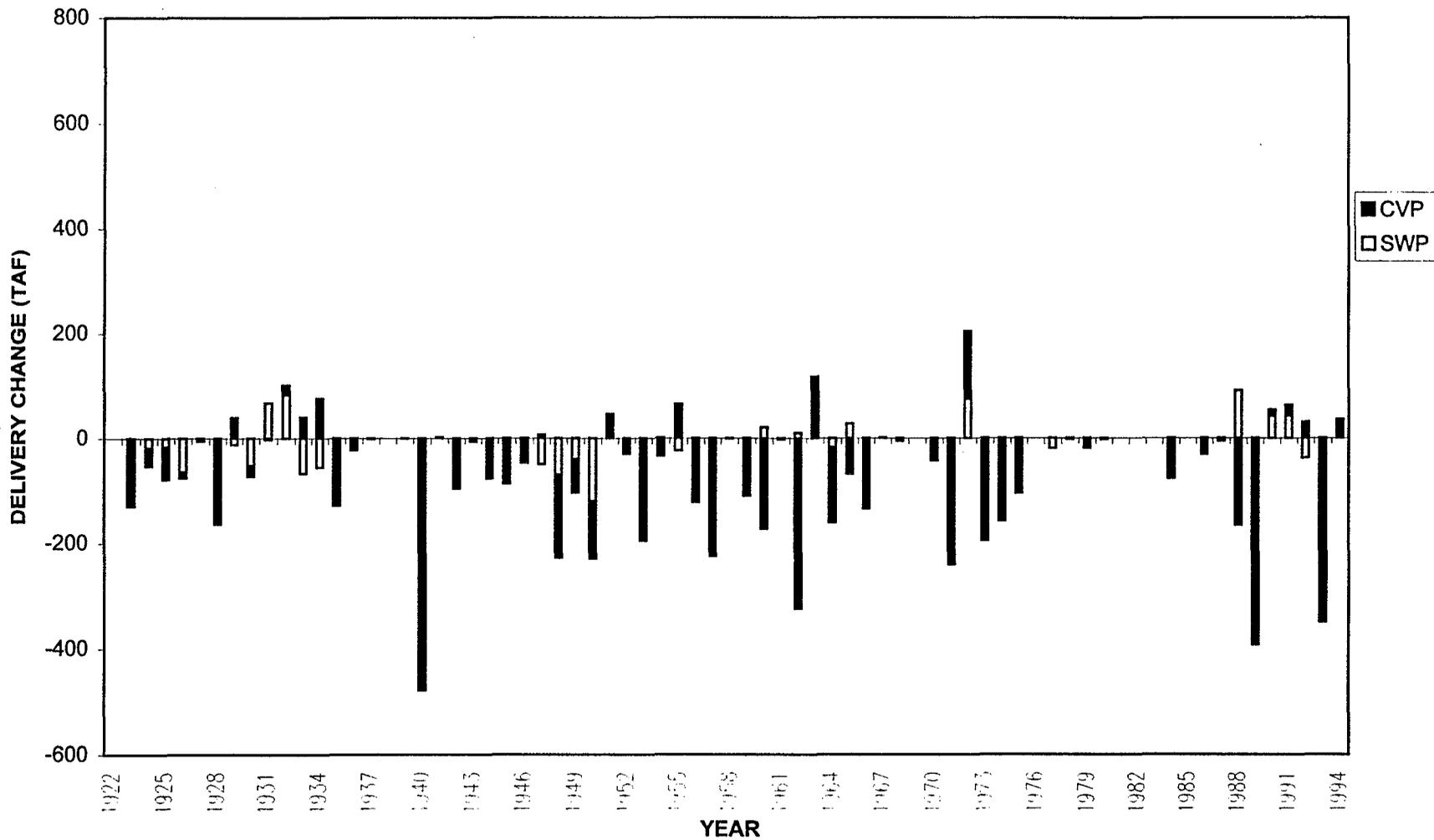


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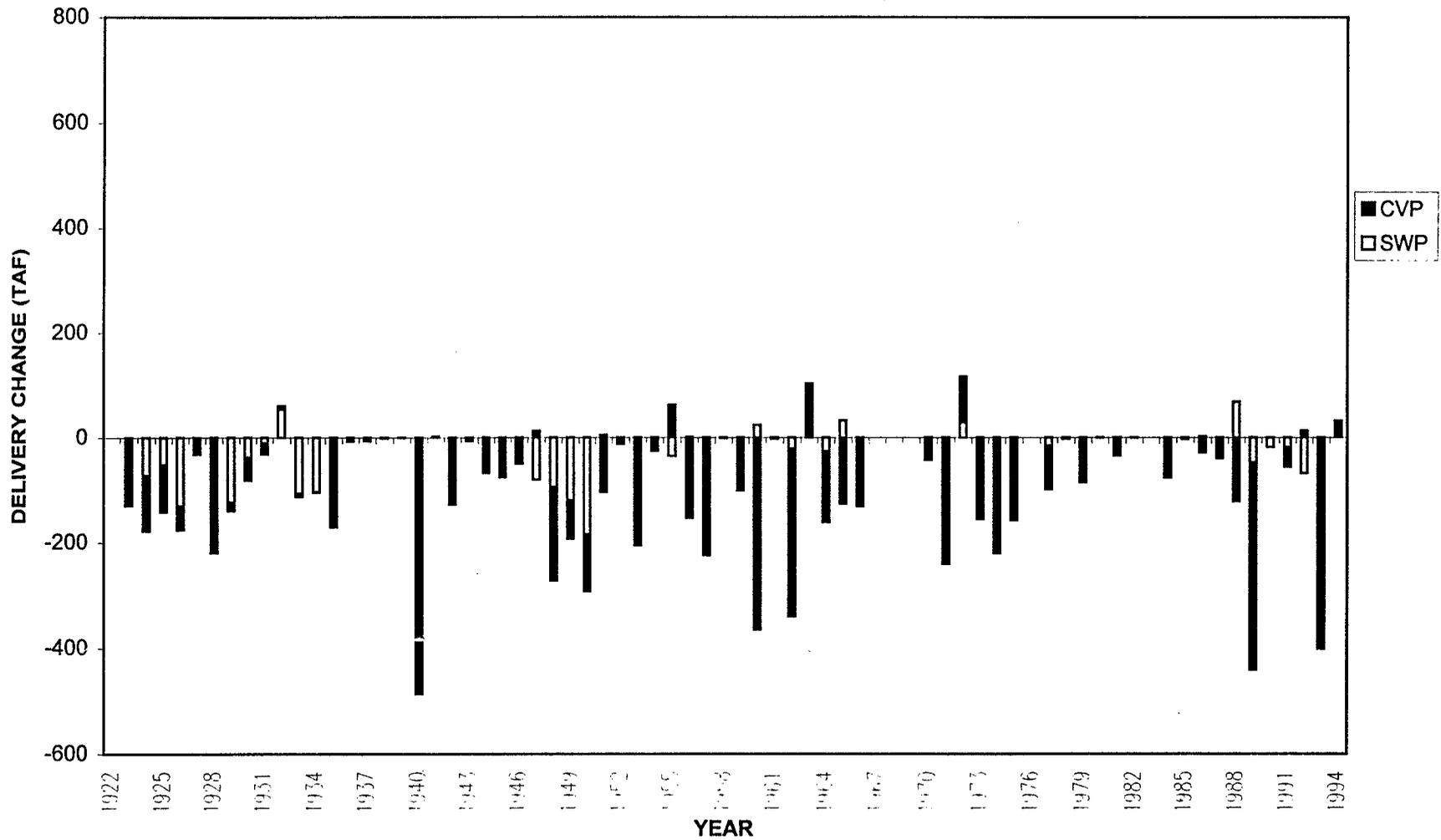
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FIGURE 2
ANNUAL SWP AND CVP DELIVERY CHANGE (TAF)
STUDY 2 Versus Base Case 4
STUDY 2: BASE CASE 4 + SAC FLOW + X-CHANNEL + VAMP



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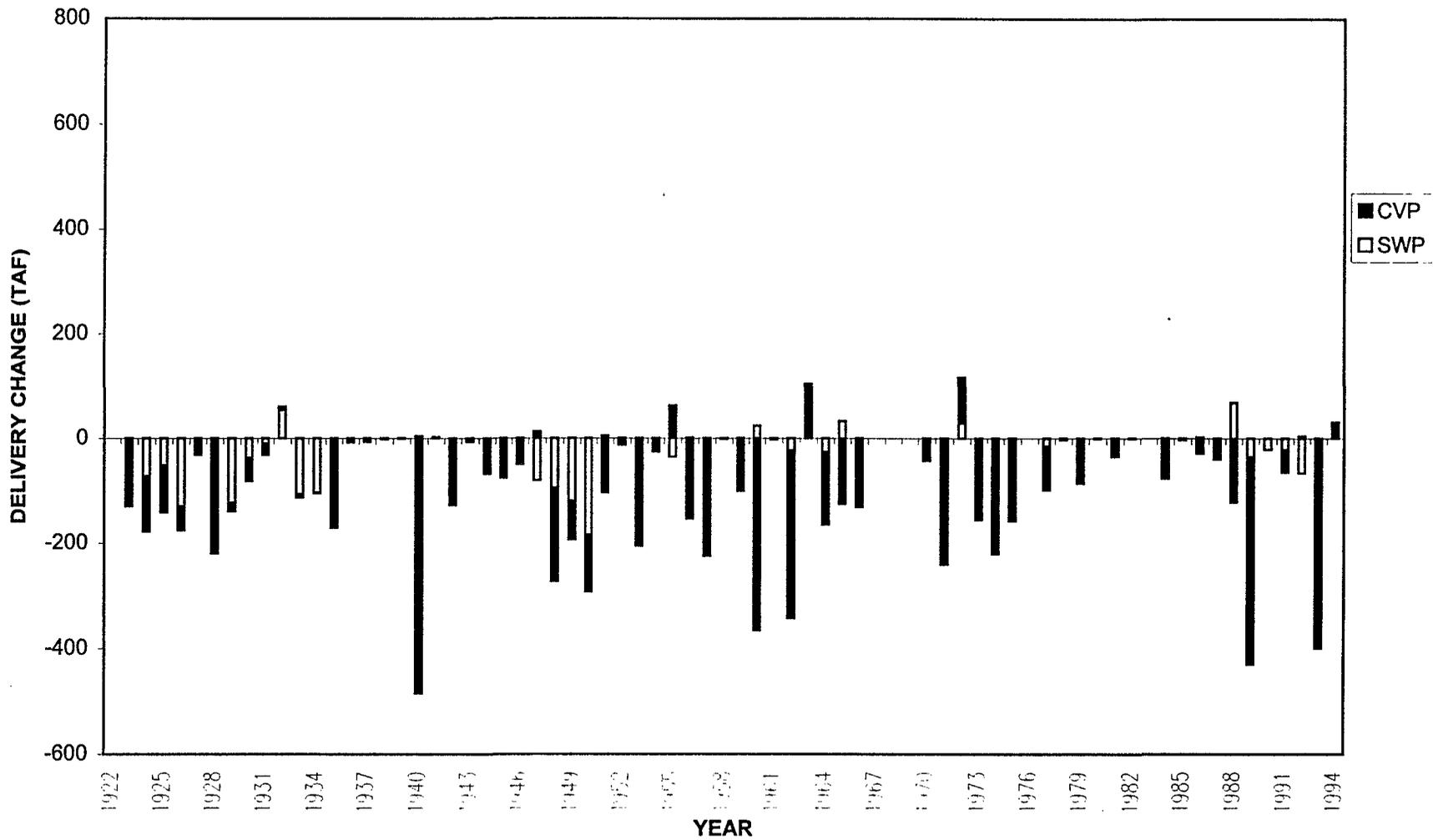
FIGURE 3
ANNUAL SWP AND CVP DELIVERY CHANGE (TAF)
STUDY 3 Versus Base Case 4
STUDY 3: BASE CASE 4 + SAC FLOW + X-CHANNEL + VAMP + X2 + RAMPING



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FIGURE 4
ANNUAL SWP AND CVP DELIVERY CHANGE (TAF)
STUDY 4 Versus Base Case 4

STUDY 4: BASE CASE 4 + SAC FLOW + X-CHANNEL + VAMP + X2 + RAMPING + JULY EXPORT RESTRICTIONS



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