Appendix A
M&I Contractor Data Summary

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Contractor [(1)]	Contract No.	Maximum Contract Amount (acre-feet [AF])	Central Valley Project (CVP) Municipal & Industrial (M&I) Historical Use (AF) [(2)]	Estimated 2010 Public Health & Safety (PHS) Need (AF)	2010 Non-CVP Supplies (AF)			Projected CVP M&I Demand in 2030 (AF)	Estimated 2030 PHS Need (AF)	2030 Non-CVP Supplies (AF)			Data Sources and Assumptions
					Normal Year	Dry Year	Critical Year			Normal Year	Dry Year	Critical Year	
		Data provided by Bureau of Reclamation (Reclamation)	Based on last 3 years of deliveries unconstrained by availability of CVP water; unadjusted	Based on Reclamation's formula: (Population * 55 gpd) + (80% of Commercial & Instit.) + (90% of Indust.) + (10% for losses); unless otherwise noted	Based on information provided in contractor Urban Water Management Plans (UWMPs) or Reclamation data; Recycled water supplies are not included; UWMP Data: Dry year = 1st year of multi-year dry period; Critical year = single dry year.			Assumed to be full contract amount for M&I Contractors; see notes for Ag contractors	Based on Reclamation's formula: (Population * 55 gpd) + (80% of Commercial & Instit.) + (90% of Indust.) + (10% for losses); unless otherwise noted	Based on information provided in contractor UWMPs or Reclamation data; Recycled water supplies are not included			
M&I Contractors													
Redding Basin													
Bella Vista Water District	14-06-200-851A-LTR1	24,578	6,899	2,705	0	0	0	24,578	3,625	0	0	0	Based on extrapolation from 2009 Reclamation PHS calculations using average area growth rate. (California Department of Finance [DOF] 2007a; City of Redding 2012; Shasta County 2004)
Centerville Community Services District (CSD)	14-06-200-3367X-LTR1	2,900	978	489	900	900	900	2,900	1,450	900	900	900	No data available on population, demand, or supplies. 2010 PHS need assumed to be half of historical use. 2030 PHS need assumed to be half of 2030 demand. Non-CVP supplies provided by Centerville CSD. (Centerville CSD 2012)
City of Redding	14-06-200-5272A-LTR1	6,140	5,382	16,230	40,000	40,000	37,314	6,140	22,420	40,000	40,000	37,314	Based on data from 2005 UWMP. (City of Redding 2006)
City of Shasta Lake	4-07-20-W1134-LTR1	4,400	2,867	1,236	2,000	2,000	2,000	4,400	1,656	2,000	2,000	2,000	Based on extrapolation from 2009 Reclamation PHS calculations using average area growth rate. (California DOF 2007a; City of Redding 2012; Shasta County 2004)
Clear Creek CSD	14-06-200-489-A-LTR1	15,300	2,016	680	30	30	30	15,300	911	30	30	30	Based on extrapolation from 2009 Reclamation PHS calculations using average area growth rate. (California DOF 2007a; City of Redding 2012; Shasta County 2004)
Mountain Gate CSD	14-06-200-6998-LTR1	1,350	832	416	0	0	0	1,350	675	0	0	0	No data available on population, demand, or supplies. 2010 PHS need assumed to be half of historical use. 2030 PHS need assumed to be half of 2030 demand. Non-CVP supplies assumed to be 0.
Shasta CSD	14-06-200-862A-LTR1	1,000	782	391	0	0	0	1,000	500	0	0	0	No data available on population, demand, or supplies. 2010 PHS need assumed to be half of historical use. 2030 PHS need assumed to be half of 2030 demand. Non-CVP supplies assumed to be 0.
Shasta County Water Agency	14-06-200-3367A-LTR1	1,022	393	355	0	0	0	1,022	601	0	0	0	Based on 2008 Reclamation water needs assessment. (Reclamation 2008)
U.S. Forest Service (Shasta)	14-06-200-3464A-LTR1	10	-	0	0	0	0	10	5	0	0	0	No data available on population, demand, or supplies. 2010 PHS need assumed to be half of historical use. 2030 PHS need assumed to be half of 2030 demand. Non-CVP supplies assumed to be 0.
American River Division													
City of Roseville	14-06-200-3474A-IR3	32,000	30,913	15,867	14,000	30,000	30,000	32,000	27,206	34,000	30,000	30,000	Based on data from 2010 UWMP and clarifications from City of Roseville. (City of Roseville 2011, 2012a, and 2012b)
East Bay Municipal Utility District (EBMUD)	14-06-200-5183A-LTR1	133,000	133,000	157,584	242,000	153,000	130,000	133,000	174,016	257,000	165,000	136,000	Based on data from 2010 UWMP and clarifications from EBMUD. EBMUD historical use defined in contract with Reclamation. (EBMUD 2011)
El Dorado Irrigation District	14-06-200-1357A-LTR1	7,550	5,728	10,580	59,640	57,080	50,080	7,550	16,903	99,640	57,080	50,080	Based on data from 2010 UWMP. (El Dorado Irrigation District 2011)
Placer County Water Agency	14-06-200-5082A	35,000	0	40,083	248,972	216,575	172,725	35,000	43,789	256,494	225,664	172,725	Based on data from 2010 UWMP. (Placer County Water Agency 2011)
Sacramento County Water Agency	6-07-20-W1372	22,000	4,877	18,981	40,730	41,772	45,420	22,000	35,618	65,253	58,736	86,036	Based on data from 2010 SCWA UWMP, clarificiactions from SCWA, and City of Folsom 2010 UWMP. PHS need and non-CVP supply data for City of Folsom calculated using proportionate size of City's CVP subcontract to total water supply (Sacramento County Water Agency 2011, City of Folsom 2011)
	assignment from SMUD	30,000	-					30,000					
Sacramento Municipal Utility District (SMUD)	14-06-200-5198A	30,000	6,021	26,685	18,024	18,024	18,024	30,000	37,637	18,024	18,024	18,024	Demand and non-CVP supplies based on 2008 Reclamation water needs assessment. Historical use provided by SMUD. (Reclamation 2008; SMUD 2012)
San Juan Water District	6-07-20-W1373-LTR1	24,200	6,558	15,516	58,000	58,000	58,000	24,200	17,117	58,000	58,000	58,000	Based on data from 2010 UWMP. (San Juan Water District 2011)
Delta Division													
City of Tracy	14-06-200-7858A	10,000	10,000	10,262	14,333	18,833	13,833	10,000	17,207	25,000	30,700	24,200	Based on data from 2010 UWMP. Historical use provided by City of Tracy.
(Westside)	7-07-20-W0045-IR11-B	2,500						2,500					
(Banta-Carbona)	14-06-200-4305A-IR11-B	5,000						5,000					(City of Tracy 2011 and 2012)
Contra Costa Water District (CCWD)	I75r-3401A-LTR1	195,000	170,000	79,500	28,500	23,000	23,000	195,000	119,139	30,700	28,300	28,300	Based on data from 2010 UWMP. Historical use provided by CCWD. (CCWD 2011 and 2012)
U.S. Department of Veteran Affairs	3-07-20-W1124-LTR1	850	70	35	0	0	0	850	425	0	0	0	No data available on population, demand, or supplies. 2010 PHS need assumed to be half of historical use. 2030 PHS need assumed to be half of 2030 demand. Non-CVP supplies assumed to be 0.

Contractor [1]	Contract No.	Maximum Contract Amount (acre-feet [AF])	Central Valley Project (CVP) Municipal & Industrial (M&I) Historical Use (AF) [2]	Estimated 2010 Public Health & Safety (PHS) Need (AF)	2010 Non-CVP Supplies (AF)			Projected CVP M&I Demand in 2030 (AF)	Estimated 2030 PHS Need (AF)	2030 Non-CVP Supplies (AF)			Data Sources and Assumptions
					Normal Year	Dry Year	Critical Year			Normal Year	Dry Year	Critical Year	
		Data provided by Bureau of Reclamation (Reclamation)	Based on last 3 years of deliveries unconstrained by availability of CVP water; unadjusted	Based on Reclamation's formula: (Population * 55 gpd) + (80% of Commercial & Instit.) + (90% of Indust.) + (10% for losses); unless otherwise noted	Based on information provided in contractor Urban Water Management Plans (UWMPs) or Reclamation data; Recycled water supplies are not included; UWMP Data: Dry year = 1st year of multi-year dry period; Critical year = single dry year.			Assumed to be full contract amount for M&I Contractors; see notes for Ag contractors	Based on Reclamation's formula: (Population * 55 gpd) + (80% of Commercial & Instit.) + (90% of Indust.) + (10% for losses); unless otherwise noted	Based on information provided in contractor UWMPs or Reclamation data; Recycled water supplies are not included			
Export Area/South of Sacramento-San Joaquin River Delta													
City of Avenal	14-06-200-4619A	3,500	2,820	2,810	0	0	0	3,500	4,271	0	0	0	Based on extrapolation from 2009 Reclamation PHS calculations using average area growth rate. (California DOF 2007b, 2007c, and 2007d; City of Coalinga 2006; San Benito County Water District et al 2011; SCVWD 2010)
City of Coalinga	14-06-200-4173A	10,000	7,189	3,068	0	0	0	10,000	3,327	1,500	1,500	1,500	Based on data from 2005 UWMP. (City of Coalinga 2006)
City of Huron	14-06-200-7081A	3,000	1,120	708	0	0	0	3,000	1,076	0	0	0	Based on extrapolation from 2009 Reclamation PHS calculations using average area growth rate. (California DOF 2007b, 2007c, and 2007d; City of Coalinga 2006; San Benito County Water District et al 2011; SCVWD 2010)
San Benito County Water District	8-07-20-W0130	43,800	4,026	3,571	9,950	4,004	4,004	43,800	7,769	9,950	7,608	7,608	Based on data from 2010 UWMP. (San Benito County Water District et al 2011)
Santa Clara Valley Water District (SCVWD)	7-07-20-W0023	152,500	152,500	242,149	320,700	216,200	287,840	119,400	283,371	319,050	216,200	310,990	Based on data from 2010 UWMP. (SCVWD 2010; SCVWD 2012)
State of California	14-06-200-8033A	10	8	3	0	0	0	10	4	0	0	0	Based on extrapolation from 2009 Reclamation PHS calculations using average area growth rate. (California DOF 2007b, 2007c, and 2007c; City of Coalinga 2006; San Benito County Water District et al 2011; SCVWD 2010)
Agriculture Contractors With Small Amount of M&I Deliveries													
Sacramento River													
Colusa County Water District	14-06-200-304-A-LTR1	68,164	201	101	22,000	22,000	22,000	285	143	22,000	22,000	22,000	Supply data based on 2008 Reclamation water needs assessment. No data available on demand or population. 2010 PHS need assumed to be half of historical use. 2030 demand estimate based on extrapolation of historical use using average area growth rate. 2030 PHS need assumed to be half of 2030 demand. (California DOF 2007e, 2007f, 2007g, and 2007h; Reclamation 2008)
Corning Water District	14-06-200-6575-LTR1	23,000	6	3	5,800	5,800	5,800	9	4	5,800	5,800	5,800	Supply data based on 2008 Reclamation water needs assessment. No data available on demand or population. 2010 PHS need assumed to be half of historical use. 2030 demand estimate based on extrapolation of historical use using average area growth rate. 2030 PHS need assumed to be half of 2030 demand. (California DOF 2007e, 2007f, 2007g, and 2007h; Reclamation 2008)
Dunnigan Water District	14-06-200-399-A-LTR1	19,000	136	68	6,500	6,500	6,500	193	97	6,500	6,500	6,500	Supply data based on 2008 Reclamation water needs assessment. No data available on demand or population. 2010 PHS need assumed to be half of historical use. 2030 demand estimate based on extrapolation of historical use using average area growth rate. 2030 PHS need assumed to be half of 2030 demand. (California DOF 2007e, 2007f, 2007g, and 2007h; Reclamation 2008)
Kanawha Water District	14-06-200-466-A-LTR1	45,000	5	3	174	174	174	7	4	174	174	174	Supply data based on 2008 Reclamation water needs assessment. No data available on demand or population. 2010 PHS need assumed to be half of historical use. 2030 demand estimate based on extrapolation of historical use using average area growth rate. 2030 PHS need assumed to be half of 2030 demand. (California DOF 2007e, 2007f, 2007g, and 2007h; Reclamation 2008)
Orland-Artois Water District	14-06-200-8382A-LTR1	53,000	10	5	13,700	13,700	13,700	14	7	13,700	13,700	13,700	Supply data based on 2008 Reclamation water needs assessment. No data available on demand or population. 2010 PHS need assumed to be half of historical use. 2030 demand estimate based on extrapolation of historical use using average area growth rate. 2030 PHS need assumed to be half of 2030 demand. (California DOF 2007e, 2007f, 2007g, and 2007h; Reclamation 2008)

Contractor [(1)]	Contract No.	Maximum Contract Amount (acre-feet [AF])	Central Valley Project (CVP) Municipal & Industrial (M&I) Historical Use (AF) [(2)]	Estimated 2010 Public Health & Safety (PHS) Need (AF)	2010 Non-CVP Supplies (AF) Normal Year	2010 Non-CVP Supplies (AF) Dry Year	2010 Non-CVP Supplies (AF) Critical Year	Projected CVP M&I Demand in 2030 (AF)	Estimated 2030 PHS Need (AF)	2030 Non-CVP Supplies (AF) Normal Year	2030 Non-CVP Supplies (AF) Dry Year	2030 Non-CVP Supplies (AF) Critical Year	Data Sources and Assumptions
		Data provided by Bureau of Reclamation (Reclamation)	Based on last 3 years of deliveries unconstrained by availability of CVP water; unadjusted	Based on Reclamation's formula: (Population * 55 gpd) + (80% of Commercial & Instit.) + (90% of Indust.) + (10% for losses); unless otherwise noted	Based on information provided in contractor Urban Water Management Plans (UWMPs) or Reclamation data; Recycled water supplies are not included; UWMP Data: Dry year = 1st year of multi-year dry period; Critical year = single dry year.			Assumed to be full contract amount for M&I Contractors; see notes for Ag contractors	Based on Reclamation's formula: (Population * 55 gpd) + (80% of Commercial & Instit.) + (90% of Indust.) + (10% for losses); unless otherwise noted	Based on information provided in contractor UWMPs or Reclamation data; Recycled water supplies are not included			
Delta Division													
Byron-Bethany Irrigation District	14-06-200-785-LTR1	20,600	800	400	0	0	0	1,112	556	0	0	0	No data available on population, demand, or supplies. 2010 PHS need assumed to be half of historical use. 2030 demand estimate based on extrapolation of historical use using average area growth rate. 2030 PHS need assumed to be half of 2030 demand. Non-CVP supplies assumed to be 0. (California DOF 2007i and 2007j; CCWD 2011; City of Tracy 2011)
Del Puerto Water District	14-06-200-922-LTR1	140,210	27	14	3,000	3,000	3,000	38	19	3,000	3,000	3,000	Supply data based on 2008 Reclamation water needs assessment. No data available on demand or population. 2010 PHS need assumed to be half of historical use. 2030 demand estimate based on extrapolation of historical use using average area growth rate. 2030 PHS need assumed to be half of 2030 demand. (California DOF 2007i and 2007j; CCWD 2011; City of Tracy 2011; Reclamation 2008)
Export Area/South of Sacramento-San Joaquin River Delta													
Pacheco Water District	6-07-20-W0469 (SLC/DMC)	10,080	12	6	4,597	4,597	4,597	18	9	4,597	4,597	4,597	Supply data based on 2009 Water Management Plan. No data available on demand or population. 2010 PHS need assumed to be half of historical use. 2030 demand estimate based on extrapolation of historical use using average area growth rate. 2030 PHS need assumed to be half of 2030 demand. (California DOF 2007b, 2007c, and 2007d; City of Coalinga 2006; Pacheco Water District 2010; San Benito County Water District et al 2011; SCVWD 2010)
Panoche Water District	14-06-200-7864A (SLC/DMC)	94,000	88	44	0	0	0	134	67	0	0	0	No data available on population, demand, or supplies. 2010 PHS need assumed to be half of historical use. 2030 demand estimate based on extrapolation of historical use using average area growth rate. 2030 PHS need assumed to be half of 2030 demand. Non-CVP supplies assumed to be 0. (California DOF 2007b, 2007c, and 2007d; City of Coalinga 2006; San Benito County Water District et al 2011; SCVWD 2010)
San Luis Water District	14-06-200-7773A (SLC/DMC)	125,080	1,085	543	0	0	0	1,649	825	0	0	0	No data available on population, demand, or supplies. 2010 PHS need assumed to be half of historical use. 2030 demand estimate based on extrapolation of historical use using average area growth rate. 2030 PHS need assumed to be half of 2030 demand. Non-CVP supplies assumed to be 0. (California DOF 2007b, 2007c, and 2007d; City of Coalinga 2006; San Benito County Water District et al 2011; SCVWD 2010)
Westlands Water District [(3)]	14-06-200-495A-IR1	1,186,688	4,015	1,131	130,000	130,000	130,000	6,103	3,051	130,000	130,000	130,000	Based on extrapolation from 2009 Reclamation PHS calculations using average area growth rate. (California DOF 2007b, 2007c, and 2007d; City of Coalinga 2006; San Benito County Water District et al 2011; SCVWD 2010)
Cross Valley Canal													
Fresno County	14-06-200-8292A-IR12	3,000	541	271	0	0	0	828	414	0	0	0	No data available on demand or supplies. 2010 PHS need assumed to be half of historical use. 2030 demand estimate based on extrapolation of historical use using average area growth rate. 2030 PHS need assumed to be half of 2030 demand. Non-CVP supplies assumed to be 0. (California DOF 2007b, 2007k, and 2007l; Reclamation 2008)
Hills Valley Irrigation District	14-06-200-8466A-IR12	3,346	0	0	1,048	1,048	1,048	0	0	1,048	1,048	1,048	Supply data based on 2008 Reclamation water needs assessment. No data available on M&I demand or population. No historical use of M&I water. 2030 demand estimate also assumed to be zero. (Reclamation 2008)
Kern-Tulare Water District (includes Rag Gulch Water District)	14-06-200-8601A-IR12	53,300	0	0	6,873	6,873	6,873	0	0	6,873	6,873	6,873	Supply data based on 2008 Reclamation water needs assessment. No data available on M&I demand or population. No historical use of M&I water. 2030 demand estimate also assumed to be zero. (Reclamation 2008)
Lower Tule River Irrigation District	14-06-200-8237A-IR12	31,102	0	0	66,040	66,040	66,040	0	0	66,040	66,040	66,040	Supply data based on 2008 Reclamation water needs assessment. No data available on M&I demand or population. No historical use of M&I water. 2030 demand estimate also assumed to be zero. (Reclamation 2008)
Pixley Irrigation District	14-06-200-8238A-IR12	31,102	0	0	42,259	42,259	42,259	0	0	42,259	42,259	42,259	Supply data based on 2008 Reclamation water needs assessment. No data available on M&I demand or population. No historical use of M&I water. 2030 demand estimate also assumed to be zero. (Reclamation 2008)
Tri-Valley Water District	14-06-200-8565A-IR12	1,142	0	0	0	0	0	0	0	0	0	0	No data available on demand or supplies.

Contractor (1)	Contract No.	Maximum Contract Amount (acre-feet [AF])	Central Valley Project (CVP) Municipal & Industrial (M&I) Historical Use (AF) (2)	Estimated 2010 Public Health & Safety (PHS) Need (AF)	2010 Non-CVP Supplies (AF)			Projected CVP M&I Demand in 2030 (AF)	Estimated 2030 PHS Need (AF)	2030 Non-CVP Supplies (AF)			Data Sources and Assumptions
					Normal Year	Dry Year	Critical Year			Normal Year	Dry Year	Critical Year	
		Data provided by Bureau of Reclamation (Reclamation)	Based on last 3 years of deliveries unconstrained by availability of CVP water; unadjusted	Based on Reclamation's formula: (Population * 55 gpd) + (80% of Commercial & Instit.) + (90% of Indust.) + (10% for losses); unless otherwise noted	Based on information provided in contractor Urban Water Management Plans (UWMPs) or Reclamation data; Recycled water supplies are not included; UWMP Data: Dry year = 1st year of multi-year dry period; Critical year = single dry year.			Assumed to be full contract amount for M&I Contractors; see notes for Ag contractors	Based on Reclamation's formula: (Population * 55 gpd) + (80% of Commercial & Instit.) + (90% of Indust.) + (10% for losses); unless otherwise noted	Based on information provided in contractor UWMPs or Reclamation data; Recycled water supplies are not included			
Tulare County	14-06-200-8293A-IR12	5,308	573	287	0	0	0	877	438	0	0	0	No data available on demand or supplies. 2010 PHS need assumed to be half of historical use. 2030 demand estimate based on extrapolation of historical use using average area growth rate. 2030 PHS need assumed to be half of 2030 demand. Non-CVP supplies assumed to be 0. (California DOF 2007b, 2007k, and 2007l)

Notes: AF = acre-feet; CCWD = Contra Costa Water District; CSD = Community Services District; CVP = Central Valley Project; DOF = Department of Finance; EBMUD = East Bay Municipal Utility District; M&I = municipal and industrial; PHS = public health and safety; Reclamation = Bureau of Reclamation; SMUD = Sacramento Municipal Utility District; UWMP = Urban Water Management Plan; WD = Water District

(1) The following contractors are mixed use, but considered "Primarily M&I" for the purposes of this table: Bella Vista Water District; Clear Creek CSD; City of Tracy; Santa Clara Valley Water District; and San Benito County Water District.
(2) Unconstrained years for historical use calculations: North of Delta - 2006, 2007, 2010; American River - 2006, 2007, 2010; South of Delta - 2003, 2005, 2006
(3) Westlands Water District contract amount includes contract for 1,150,000 AF and the following assignments: Broadview WD assignment = 27,000 AF, Centinella WD = 2,500 AF, Mercy Springs WD = 4,198 AF, Widren WD = 2,990 AF. Only assignment with M&I water use is Broadview WD.

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Appendix B
Water Operations Model Documentation

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Appendix B Water Operations Model Documentation

B.1 Background and Project Description

The purpose of the Central Valley Project (CVP) Municipal and Industrial Water Shortage Policy (M&I WSP) is to:

- Define water shortage terms and conditions applicable to CVP ~~M&I~~ water service contractors;
- Determine the quantity of water made available to the water service contractors from the CVP ~~Establish CVP water supply levels~~ that, together with the M&I water contractors' drought water conservation measures and other non-CVP water supplies, would assist the M&I water service contractors in their efforts to protect public health and safety during severe or continuing droughts; and
- Provide information to ~~M&I~~ water service contractors for their use in water supply planning and development of drought contingency plans.

This technical appendix to the Environmental Impact Statement (EIS) describes modeling tools and assumptions used in analysis of M&I WSP alternatives. The EIS evaluated alternatives that were either proposed for consideration or designed to cover the range of potential CVP allocation procedures. Each alternative was simulated in a model of the CVP and State Water Project (SWP) to determine effects on water supply to CVP contractors, operations of CVP and SWP facilities, and environmental effects. Model results for each alternative were compared to results of a No Action Alternative to quantify changes in water deliveries, reservoir storage levels, river flows, and CVP/SWP operations in the Sacramento-San Joaquin River Delta (Delta). Simulated water deliveries were used in the economic analysis of each alternative. Simulated reservoir storage, river flow, Delta outflow and exports were used to evaluate environmental effects during preparation of the EIS. Key model results are summarized and presented in this report for each alternative.

B.2 Water Operations Modeling

Water operations modeling is a key step in the analysis of M&I WSP alternatives. Water operations model results frequently serve as the basis of subsequent economic and environmental analyses. This section provides a brief description of the model used to analyze alternatives. Descriptions include model assumptions and modifications made to baseline model files provided by the Bureau of Reclamation (Reclamation). Model limitations for analysis of M&I WSP alternatives are also described.

B.2.1 Operations Model

CalSim II was used to simulate CVP/SWP operations, including CVP allocations and deliveries to water service contractors. CalSim II is a planning model designed to simulate operations of CVP and SWP reservoirs and water delivery systems. CalSim II simulates flood control operating criteria, water delivery policies, in-stream flow, and Delta outflow requirements. CalSim II is the best available tool for modeling CVP and SWP operations and is the primary system-wide hydrologic model used by California Department of Water Resources (DWR) and Reclamation to conduct planning and impact analyses of potential projects.

CalSim II is a simulation by optimization model. The model simulates operations by solving a mixed-integer linear program to maximize an objective function for each month of the simulation. CalSim II was developed by Reclamation and DWR to simulate operation of the CVP and SWP for defined physical conditions and a set of regulatory requirements. The model simulates these conditions using 82 years of historical hydrology from water year 1922 through 2003.

CalSim II modeling conducted for the M&I WSP was developed from a baseline model provided by Reclamation to the project team. Baseline CalSim II simulations at both existing and future levels of development were developed by Reclamation in January 2012. Baseline studies include actions under the reasonable and prudent alternatives from the National Oceanic Atmospheric Administration National Marine Fishery Service (NOAA Fisheries) 2009 Biological Opinion (BO) for Chinook salmon and United States Fish and Wildlife Service (USFWS) 2008 BO for delta smelt. Additional key assumptions governing CVP/SWP operations in CalSim II are described in Attachment A.

B.2.1.1 CalSim II Representation of Demands, Allocations, and Deliveries

A key aspect of CalSim II for comparison of M&I WSP alternatives is how the model simulates CVP contractor demands, CVP allocations, and water deliveries. Demands in CalSim II vary depending on the location in the system. Demands upstream of the Delta, in both the Sacramento and San Joaquin valleys are simulated based on current or projected land use and population estimates. These demands vary from year-to-year based on hydrology. Demands are calculated for areas supplied by CVP contractors and simulated deliveries are limited by allocations and contract amounts. Demands in CalSim II for areas supplied by

CVP exports from the Delta are approximated with CVP contract amounts. Therefore, these demands are constant every year in the model. This assumption is appropriate in the export service area where demand for CVP water typically exceeds the availability.

CalSim II simulates CVP allocations based on demands and available water supply. Starting in March each year, CalSim II calculates available CVP water supply as the sum of storage in CVP reservoirs (Trinity Lake, Shasta Lake, Folsom Lake, and CVP San Luis Reservoir) plus forecasted inflow on the Sacramento and American rivers plus inflow to Mendota Pool from the Kings River through the James Bypass. The sum of these terms, defined as the Water Supply Index, approximates the water available to the CVP. The Water Supply Index is used in conjunction with a ~~Demand~~ Delivery Index that approximates the CVP's ability to meet demands under current regulatory requirements. The Water Supply Index and ~~Demand~~ Delivery Index define the demand that can be met by the supply each year. This volume is split between current year deliveries and carryover storage to protect against future dry years. The estimate of current year deliveries is then used to determine allocations to CVP contractors. An initial allocation is made in March, updated in April, and a final allocation is made in May. This approach approximates the steps taken by CVP operators each year to determine available water supply, demands, and allocate water to CVP contractors.

Logic in CalSim II differentiates between north of Delta (NOD) and south of Delta (SOD) contractors. Allocations to NOD contractors are determined based on available water supply. Allocations to SOD contractors can be limited by both water supply and the ability to move water through the Delta under the simulated regulatory constraints and meet monthly demands. Therefore, in some years allocations to SOD contractors are lower than allocations to NOD contractors.

Reclamation does not have discretion to determine allocations to Sacramento River Settlement Contractors, San Joaquin River Exchange Contractors, certain named State Wildlife Areas and National Wildlife Refuges, and one of the privately owned/managed wetlands comprising the Grassland Resources Conservation District as identified under Section 3406(d) of the Central Valley Project Improvement Act (CVPIA). Annual allocations for these contractors are determined annually based on the forecasted full natural inflow to Shasta Lake. CalSim II simulates allocations to these contractors based on inflow to Shasta Lake.

CVP water service contractor allocations are based on available water supply. In years when the water supply is not adequate to provide full allocations to all water service contractors, allocations are cut based on rules in CalSim II. Allocation rules can be used to simulate different allocations between agricultural and M&I water service contracts as evaluated in several M&I WSP alternatives.

B.2.1.2 Modifications to Reclamation CalSim II Baselines

Baseline models provided by Reclamation required modifications for use in evaluating operations under M&I WSP alternatives, including the No Action Alternative. The follow sections describe key changes.

Redding Basin M&I Demand Baseline model demands for CVP water service contractors in the Redding Basin include both agricultural and M&I demands. Bella Vista Water District (WD) and Clear Creek Community Services District (CSD) are represented as mixed-use contractors that supply both agricultural and M&I water. For the purpose of evaluating M&I WSP alternatives (at a future level of development) all Redding Basin water service deliveries are assumed to meet M&I demands. This assumption is conservative ~~and~~ in that it results in higher demands on the CVP under most M&I WSP alternatives.

The baseline model also simulated all CVP water service deliveries occurring on an irrigation season pattern with minimal deliveries during winter months. This pattern of deliveries is not consistent with recent historical M&I delivery data for Redding Basin CVP water service contractors. Historical M&I delivery data for each contractor was provided by Reclamation's Northern California Area Office and reviewed to develop a monthly delivery pattern and representation of M&I deliveries. Baseline model deliveries, as a percent of annual deliveries, are compared with recent historical M&I delivery data in Figure B-1. Baseline model deliveries ~~show~~ are higher ~~deliveries~~ than most contractors' historical deliveries from April through July, and lower ~~deliveries~~ the remainder of the year with essentially no deliveries from November through March.

The baseline model from Reclamation was modified to better represent ~~actual~~ historical M&I deliveries to Redding Basin contractors. An average Redding Basin M&I demand pattern was developed from historical M&I delivery data (see Figure B-1). The average demand pattern was further split between indoor and outdoor M&I use. Indoor M&I demand was assumed to be approximately equal to the percent of historical deliveries that occurred during winter months when outdoor demand is minimal. Therefore, monthly indoor demand is approximately four percent of the annual demand. Monthly d~~D~~emand in excess of four percent in Figure B-1 is assumed to be for outdoor uses. Return flows from indoor uses were equal to deliveries, while return flows from outdoor uses were a fraction of the non-consumptive use. Modifications to Redding Basin deliveries and return flows from the Reclamation provided baseline models were done to maintain basin depletions in the baseline models.

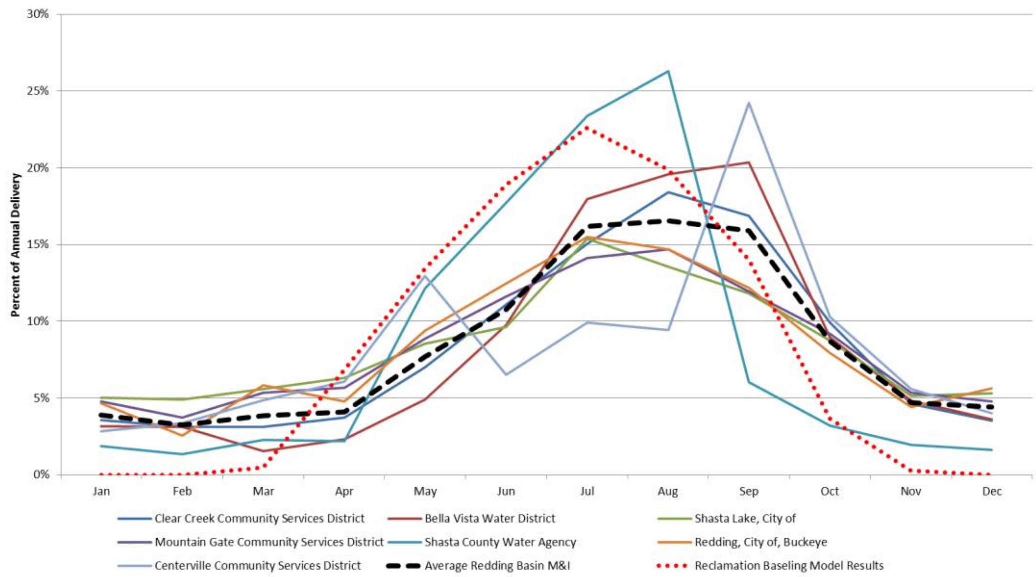


Figure B-1. Historical Redding Basin M&I Deliveries and Baseline Model Deliveries

CVP Contract for East Bay Municipal Utility District The baseline model from Reclamation included a simple representation of CVP deliveries to East Bay Municipal Utility District (EBMUD). EBMUD can divert CVP water from the Sacramento River through the Freeport Regional Water Project (Freeport Project). Representation of these deliveries in CalSim II has historically been a time-series developed with input from EBMUD representatives based on analysis of EBMUD's Mokelumne River project. The baseline model from Reclamation was modified to better represent EBMUD's contract with Reclamation, simulate EBMUD's Freeport Project diversions, and simulate how diversions may change under each M&I WSP alternative.

EBMUD's contract for CVP water is unique in that EBMUD is only permitted to take delivery of CVP water when the March 1 forecast of October 1 total system storage in their reservoirs is less than 500 thousand acre-feet (TAF). In these years, the Reclamation contract limits EBMUD's delivery to a maximum of 133 TAF in a single year, and not more than 165 TAF in any period of three consecutive years that EBMUD's total system storage forecast remains below 500 TAF. However, EBMUD's diversion capacity through the Freeport Project currently limits annual diversions to approximately 112 TAF. These contract and capacity limitations were added to the baseline model to evaluate M&I WSP alternatives.

The project team also worked with representatives from EBMUD to update and understand EBMUD's planned operation of the Freeport Project, and how operations may change under different CVP allocations. EBMUD provided updated information on years when total system storage is expected to be less than 500 TAF. Additionally, based on discussions with EBMUD, diversions were capped at 65 TAF in the first year and second year~~s~~ when permitted to take delivery of CVP water, and 35 TAF in the third year so as not to exceed the 165 TAF limit. The three-year pattern repeats if EBMUD is contractually permitted to take delivery of CVP water for more than three consecutive years. Diversions can also be limited by CVP allocations, though the allocations are applied to the total contract amount of 133 TAF each year.

Small M&I Deliveries from Primarily Agricultural CVP Contractors
Historical M&I delivery data provided by Reclamation's area offices showed several contractors that primarily deliver agricultural water have delivered small volumes of M&I water in recent years. These small volumes were not represented in baseline models provided by Reclamation. Therefore, baseline models were modified to simulate delivery of this M&I water, subject to M&I allocations. Delivery of small volumes of M&I water were added to Tehama-Colusa Canal deliveries (approximately 500 acre-feet per year [AFY]), the upper Delta-Mendota Canal deliveries (approximately 1,150 AFY), and San Luis Unit deliveries (approximately 7,900 AFY). Annual volumes of future M&I delivery by these primarily agricultural water service contractors were estimated based on historical M&I delivery data and estimated regional growth rates. Contractual limits on agricultural deliveries were reduced by the volume of M&I water identified.

Additional M&I Delivery Adjustments The baseline model represented M&I deliveries from the upper Delta-Mendota Canal as agricultural deliveries and subject to agricultural allocations. This primarily affects M&I deliveries to the City of Tracy and the United States Department of Veteran Affairs. A separate M&I demand and delivery arc were added to the model and simulated M&I deliveries were constrained by SOD M&I allocations.

Baseline models identified several CVP water service contractors as mixed use, delivering both agricultural and M&I water. These contractors include Bella Vista WD and Clear Creek CSD in the Redding Basin, and San Benito County WD and Santa Clara Valley Water District ~~(SCVWD)~~ in the San Felipe Division. It was assumed that future demands for ~~three of~~ these four contractors would be 100 percent M&I water. This assumption is conservative ~~and~~ in that it results in higher demands on the CVP under most M&I WSP alternatives. ~~The exception is SCVWD that stated it intends to maintain the current split between agricultural and M&I deliveries into the future. That split has 119.4 TAF of M&I water and 33.1 TAF of agricultural water annually.~~

Sacramento River Water Reliability Study Reclamation baseline models included the Sacramento River Water Reliability Study at the future level of development. This project would construct a new diversion facility on the Sacramento River near Elverta for diversion to Placer County Water Agency contractors Roseville and Sacramento Suburban WD. The City of Sacramento would also divert water at this location. This project is not reasonably foreseeable at this time and was therefore removed from the baseline model. This required shifting diversions that took place at the Elverta diversion back to the American River.

Existing Conditions and Maximum Historical Use Reclamation baseline models for the existing level of development included standard assumptions for CVP M&I demands. These demands have been developed and accepted by modelers at both Reclamation and DWR as representative of approximately existing level of development demands. However, for this analysis these demands were reviewed and compared to calculated values of maximum historical use. Maximum historical use values were developed in conjunction with Reclamation staff and provided to M&I contractors for review. Maximum historical use values for each M&I contractor were simulated in the Existing Conditions model run.

B.2.1.3 Level of Development

CalSim II simulations at a projected Level of Development (LOD) are used to depict how the modeled water system might operate with an assumed physical and institutional configuration imposed on a long-term hydrologic sequence. An existing LOD study assumes that current land use, facilities, and operational objectives are in place for each year of simulation (water year 1922 through 2003). The results are a depiction of the current environment. A future LOD study is needed to explore how the system may perform under an assumed future set of physical and institutional conditions. This future setting is developed by assuming year 2030 land use, facilities, and operational objectives.

Existing Level of Development The Existing Conditions CalSim II model simulation depicts how the Delta, its major tributaries, and the CVP/SWP operate at the current LOD without the Project. Parameters used to describe existing LOD hydrologic conditions and current operating rules were developed by Reclamation. Key assumptions defining the Existing Condition are provided in Attachment A. This set of land use, demands, and assumptions provide a reasonable simulation of current water system operations. These assumptions include actions ~~under~~ in the reasonable and prudent alternatives from NOAA Fisheries’~~s~~ 2009 BO for Chinook salmon and USFWS’s 2008 BO for delta smelt.

Future Level of Development The No Action Alternative CalSim II simulation depicts how the Delta, its major tributaries, and the CVP/SWP may operate in the future without implementation ~~on~~ of one of the action alternatives. Areas tributary to the Delta have experienced numerous physical and institutional changes over the decades, and are continuing to experience change. Projecting the availability of facilities, institutional, and regulatory requirements, and the practices that will affect the management of future water supplies and demands is a daunting task. Nevertheless, reasonable assumptions must be made regarding these items to estimate future conditions. Reasonably foreseeable changes incorporated in the No Action Alternative, as compared to the Existing Condition, ~~which lead to~~that result in the largest changes in the CVP/SWP system include:

- Land use conversion from agricultural demand to urban demand, primarily in the American River Basin
- Full San Joaquin River Restoration Program flows
- South Bay Aqueduct capacity expansion
- Expanded Los Vaqueros Reservoir capacity to 160,000 acre-feet (AF).

B.2.1.4 CalSim II Limitations

There are limitations to the use of CalSim II for most projects. CalSim II is a monthly model and does not capture daily fluctuations in flow, reservoir storage, or Delta exports. Certain types of analyses, such as hydropower generation or flood control operations, are more challenging with a monthly model. However, the alternatives evaluated here are not expected to create large changes in flood control operations. Analyses of water supply, reservoir storage, and trends in river flows and Delta operations can be performed on a monthly time-step.

CalSim II is a simulation by optimization model of a very complex system. This complexity, combined with mathematical optimization techniques, can create relatively large differences in model results in some months or years for comparatively small differences in simulated conditions in the CVP/SWP system. These differences are more model nuance than effects of a project alternative. Model runs in support of the EIS were reviewed for model nuances and in some cases adjustments were made to eliminate unrealistic differences between project alternatives. Adjustments were made to CalSim II code based on month-by-month comparisons of model results for two different alternatives that considered a variety of factors including system conditions such as reservoir storage, allocations, and hydrology. Professional judgement, based on both development and application of CalSim II and an understanding of actual CVP/SWP operations, was applied when making adjustments. However, there can still be differences in simulation results that are more a function of the model than expected change due to a project alternative. Interpretation of these differences is important when reviewing results to avoid drawing erroneous conclusions.

Another limitation of CalSim II is that the model is more appropriately used for doing comparative analysis, and not in an absolute sense. Analysis performed in support of this EIS was done in a comparative sense by looking at the difference in water service allocations and project operations between alternatives. These comparisons help illustrate changes in deliveries and environmental conditions as a result of an alternative. The reader is cautioned against using CalSim II results for determining expected water supply reliabilities.

A specific limitation of CalSim II for the M&I WSP analysis pertains to simulated allocations and deliveries to Reclamation's Cross Valley Canal (CVC) contractors. Based on historical delivery data, two CVC contractors deliver approximately 1,100 AFY of M&I water under their contracts with Reclamation. CVC contracts are unique within the CVP in that the source of water to supply these contracts is from the Delta, but the physical water delivered to these contractors is from the Friant Division through the Friant-Kern Canal. CVC contractors make arrangements and agreements to exchange their Delta supplies with Friant Division contractors such as Arvin-Edison Water Storage District (Arvin-Edison) that can take delivery of water from the Delta. CVC contractors take delivery of a portion of Arvin-Edison's Friant water in exchange for water from the Delta. CVC contract allocations are equal to SOD agricultural water service contracts.

CalSim II's representation of CVC contract deliveries is approximate and does not represent actual operations. CalSim II does not simulate deliveries to CVC contractors such that annual deliveries equal CVC contract totals multiplied by the SOD agricultural water service allocation. Additionally, CalSim II does not simulate exchange of Delta supplies for Friant Division supplies for CVC contractors.

These limitations do not have any meaningful effect on model results. The small quantities of M&I water delivered by CVC contractors, approximately 1,100 AFY, are beyond the level of accuracy in CalSim II.

B.2.1.5 Additional Limitations

Another limitation, beyond the scope of CalSim II, is related to coordination between CVP and SWP operations. CVP and SWP operations are linked through the 1986 Coordinated Operations Agreement (COA) that defines each project's obligations to meet demands within the Sacramento River B~~b~~asin and each project's share of water available for export from the Delta. The existing COA was signed in 1986 and has not been updated since that time. However, since that time there have been several significant changes in Delta regulations including State Water Resources Control Board (SWRCB) Decision 1641, the NOAA Fisheries 2009 BO for Chinook salmon, and the USFWS 2008 BO for delta smelt. Each of these regulations had a significant effect on Delta operations such as increased required Delta outflow and restrictions to Delta exports.

The COA has not been updated to address these changes and Reclamation and DWR effectively operate under a "handshake" agreement to meet ~~to~~ requirements contained in these ~~additional~~ regulations. Modeling of project alternatives simulates the current method used by CVP and SWP operators to meet these requirements. However, the uncertainty surrounding COA should be considered when reviewing these model results.

B.3 Alternative 1: No Action Alternative

The No Action Alternative represents a projection of current conditions to the most reasonable future conditions that could occur during the life of the proposed federal action without any action alternative being implemented. Thus, the No Action Alternative provides a baseline against which action alternatives can be compared.

The No Action Alternative represents continued implementation of the current 2001 Draft M&I WSP, as modified by Alternative 1B of the 2005 Environmental Assessment. This existing draft policy is currently guiding Reclamation's ~~operations of the CVP and the~~ allocation of CVP water to agricultural and M&I water service contractors during Conditions of Shortage~~,~~ and would continue to ~~guide CVP allocations~~ if none of the proposed action alternatives are chosen.

The allocation of available CVP water supplies between M&I and agricultural water service contractors under the No Action Alternative is presented in Table B-1. In years when CVP water supplies are not adequate to provide water to all water service contractors, M&I water service contractor allocations are maintained at 100 percent of their Contract Total as agricultural water service contractor allocations are reduced to 75 percent of their Contract Total. Then, both M&I and agricultural water service contractor allocations are reduced. M&I allocations are reduced to 75 percent of historical use as agricultural water service contractor allocations are reduced to 50 percent of Contract Total. M&I water service contractor allocations are maintained at 75 percent of historical use until agricultural water service contractor allocations are reduced in incremental steps to 25 percent of Contract Total. Then allocations to both groups of contractors are again reduced together. M&I water service contractor allocations are reduced in incremental steps to 50 percent of historical use and agricultural water service contract allocations are reduced in incremental steps to zero.

In years when the M&I water service contractor allocations are less than 75 percent of historical use, Reclamation would attempt to provide the amount of ~~unmet~~ public health and safety (PHS) need~~s~~ unmet by contractors' CVP allocation and other non-CVP supplies, up to 75 percent of the ~~M&I~~ historical use, subject to the availability of CVP water supplies~~if the water is available~~. There are some years in which allocations to agricultural water service contractors are at or near zero. In those years, the increased deliveries for unmet PHS need to M&I water service contractors may not be fully realized. Water made available to M&I water service contractors ~~deliveries~~ may be reduced below 75 percent of historical use and below the unmet PHS need~~s~~ when CVP water is not available.

For an M&I water service contractor to be eligible to request an adjustment to their historical use or an adjustment for PHS need~~for the M&I allocation~~, the water service contract must reference the M&I WSP. In addition, the water service contractor must: 1) have developed and be implementing a water conservation plan that meets CVPIA criteria; and 2) be measuring such water consistent with Section 3405(b) of the CVPIA. The No Action Alternative assumes that Reclamation will incorporate in all new, renewed, and amended water service contracts, as appropriate, a provision that references the M&I WSP.

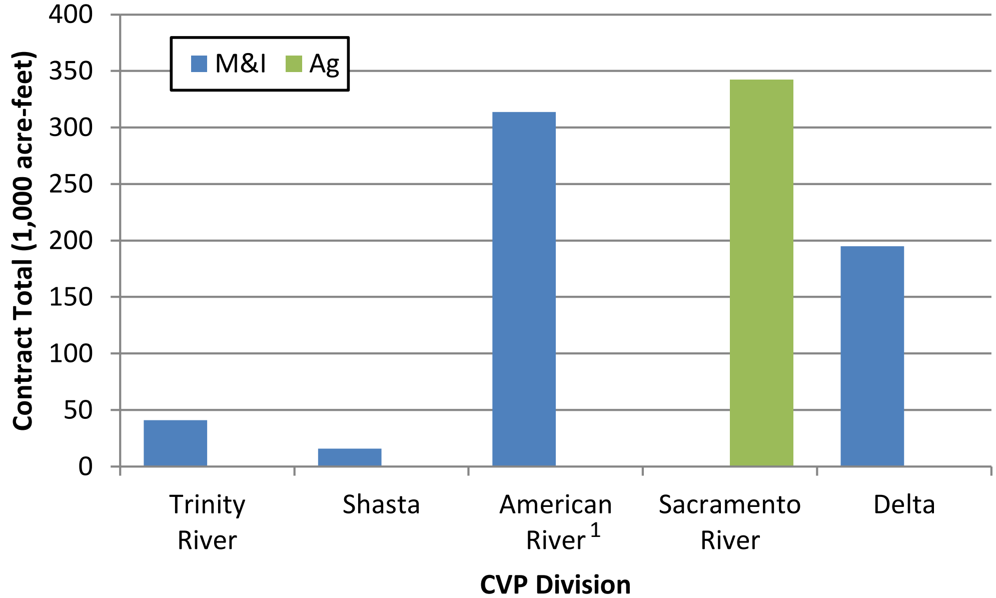
Table B-1. Alternative 1, No Action Alternative, Water Allocation Steps

Allocation Step	Allocation to Agricultural Water Service Contractors (% of ~~c~~Contract ~~t~~Total)	Allocation to M&I Water Service Contractors
1	100% to 75%	100% of Contract Total
2	70%	95% of historical use
3	65%	90% of historical use
4	60%	85% of historical use
5	55%	80% of historical use
6	50% to 25%	75% of historical use
7	20% [1]	The Maximum of: (1) 70% of M&I historical use or (2) Unmet PHS need up to 75% of historical use
8	15% [1]	The Maximum of: (1) 65% of M&I historical use or (2) Unmet PHS need up to 75% of historical use
9	10% [1]	The Maximum of: (1) 60% of M&I historical use or (2) Unmet PHS need up to 75% of historical use
10	5% [1]	The Maximum of: (1) 55% of M&I historical use or (2) Unmet PHS need up to 75% of historical use
11	0% [1]	The Maximum of: (1) 50% of M&I historical use or (2) Unmet PHS need up to 75% of historical use

[1] Allocations to agricultural water service contractors will be further reduced, if necessary, within the Year (Water service contractor Year is defined as March 1 of each calendar year through the last day of February of the following calendar year.) ~~contract year~~ to provide unmet PHS needs to M&I water service contractors within the same ~~contract y~~Year, provided CVP water is available.

The No Action Alternative represents a future condition and was modeled at a future level of development in CalSim II. It was assumed that at a future level of development all M&I water service contractor’s historical use would equal the Contract Total.

One of several key facts that affects the operation of the CVP under each alternative is the difference in water service contract totals between agricultural and M&I contracts north and south of the Delta. Figures B-2 and B-3 summarize total contract quantities for agricultural and M&I water service contracts for north and south of the Delta. These figures are based on contract quantities provided by Reclamation.



[1] M&I contracts in the American River Division include 133,000 AF for EBMUD

Figure B-2. NOD Water Service Contract Totals by CVP Division

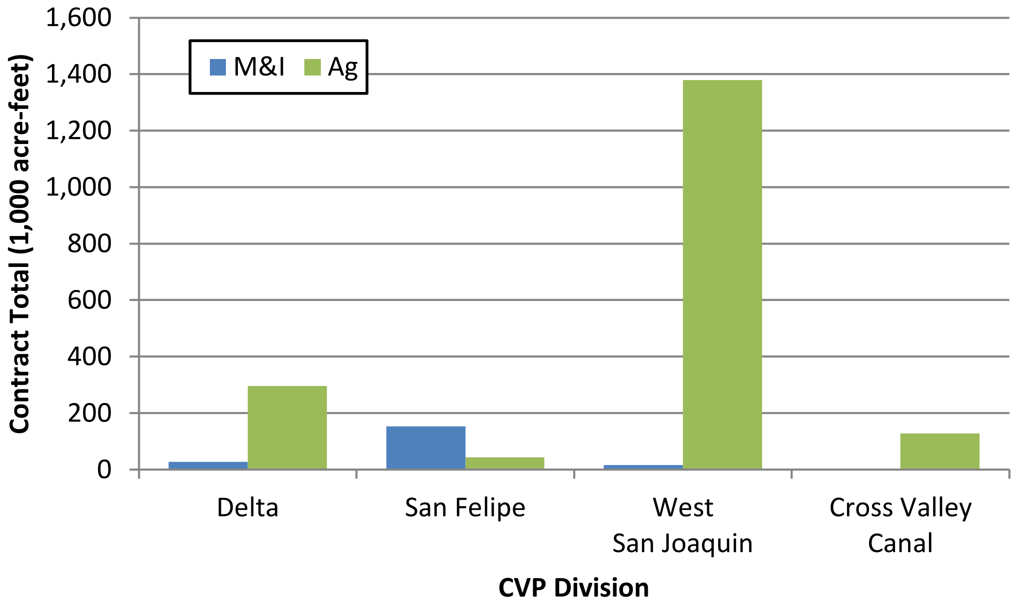


Figure B-3. SOD Water Service Contract Totals by CVP Division

Figures B-2 and B-3 illustrate several key facts related to total water service contracts and the geographical distribution of agricultural and M&I contracts. First, the majority of CVP M&I water service contracts are located north of the Delta in the American River and Delta divisions. Second, total water service contracts south of ~~the~~ Delta are significantly more than north of Delta with the vast majority being agricultural water service contracts. These facts lead to shifts in deliveries under the range of alternatives evaluated for the M&I WSP. Higher allocations to M&I water service contractors result in more deliveries north of the Delta, particularly in the American River and Delta divisions. Higher M&I allocations mean lower agricultural allocations and reduced CVP Delta exports and SOD deliveries. The opposite is also true wherein higher agricultural allocations results in reduced deliveries in the American River Division, higher CVP Delta exports, and higher SOD deliveries.

Unmet PHS needs were calculated based on the CalSim II results from the No Action Alternative. In most instances unmet PHS needs were a small volume of water in a limited number of years. Deliveries of unmet PHS need were not explicitly modeled in the No Action Alternative.

B.3.1 No Action Alternative Results

Results from the No Action Alternative simulation are used to depict operation of the CVP and SWP without any changes to the M&I WSP. No Action Alternative results are used for comparison with results from the other alternatives to assess the environmental effects of the action alternatives.

The primary difference between the No Action Alternative and each action alternative evaluated is the method used to share water between CVP agricultural and M&I water service contractors during times of shortage. Therefore, key outputs from the model are simulated allocations to NOD and SOD agricultural and M&I water service contractors, and simulated deliveries. Figures B-4 and B-5 and Table B-2 summarize these results for the No Action Alternative.

Figure B-4 illustrates simulated M&I water service contract allocations for NOD and SOD contractors for the No Action Alternative. SOD allocations are lower than NOD allocations in approximately 40 percent of the years due to limitations on moving water through the Delta and limitations on the ability to export Delta surplus in the winter to fill the CVP portion of San Luis Reservoir.

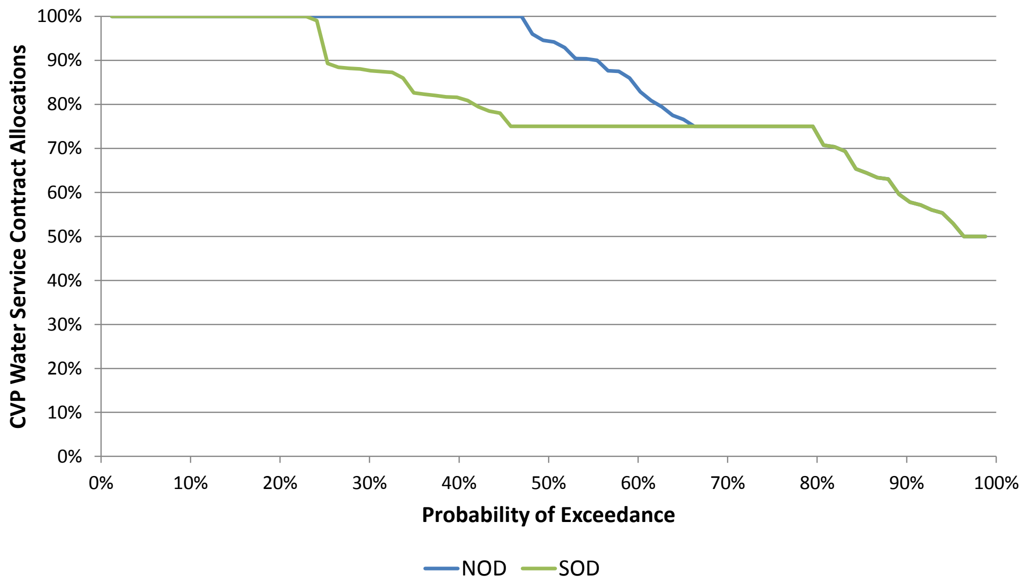


Figure B-4. CVP M&I Water Service Contract Allocations under the No Action Alternative

Figure B-5 illustrates simulated agricultural water service contract allocations for NOD and SOD contractors for the No Action Alternative. SOD allocations are lower than NOD allocations in approximately 60 percent of the years due to limitations on moving water through the Delta and limitations on the ability to export Delta surplus in the winter to fill the CVP portion of San Luis Reservoir.

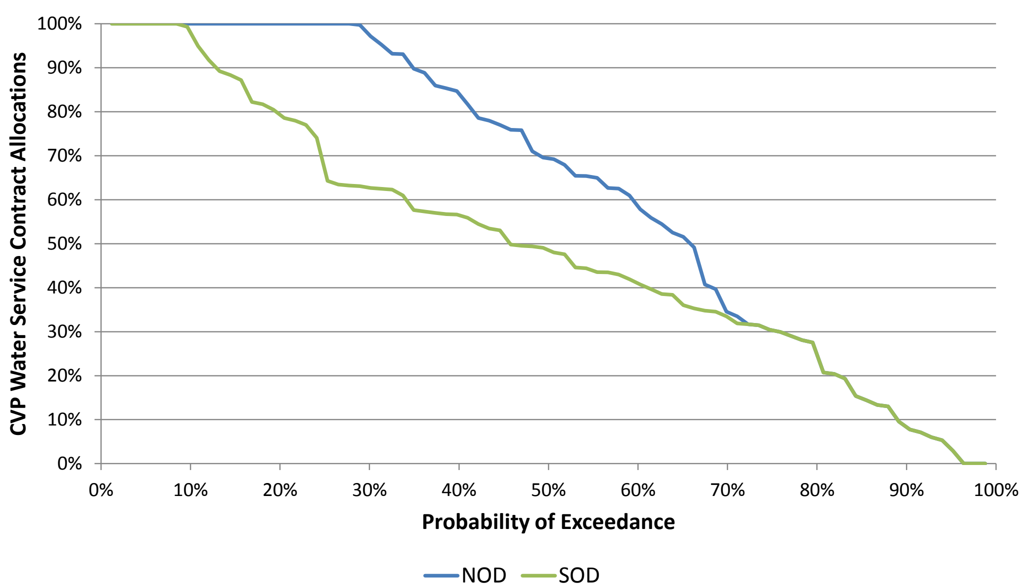


Figure B-5. CVP Agricultural Water Service Contract Allocations under the No Action Alternative

Table B-2 shows contract allocations for both NOD and SOD M&I and agricultural water service contractors for every year of the simulation under the No Action Alternative. This information is provided to allow contractors to better understand deliveries under different conditions. Individual contractors can use the allocations in Table B-2 to determine their deliveries each year by multiplying the applicable allocation by their contract total. However, the use of these values in an absolute sense should be avoided. A more appropriate comparison is the change in simulated allocations and deliveries between two alternatives.

Table B-2. Annual CVP Water Service Allocations under the No Action Alternative (Percent of Contract Total)

	No Action Alternative / Alternative 1			
	M&I		Ag	
Year	NOD	SOD	NOD	SOD
1922	100%	100%	100%	88%
1923	83%	75%	58%	48%
1924	57%	57%	7%	7%
1925	81%	81%	56%	56%
1926	64%	64%	14%	14%
1927	100%	82%	100%	57%
1928	77%	75%	52%	44%
1929	50%	50%	0%	0%
1930	65%	65%	15%	15%
1931	58%	58%	8%	8%
1932	63%	63%	13%	13%
1933	53%	53%	3%	3%
1934	60%	60%	10%	10%
1935	75%	75%	28%	28%
1936	75%	75%	40%	40%
1937	75%	75%	33%	33%
1938	100%	100%	100%	100%
1939	75%	75%	30%	30%
1940	100%	75%	93%	48%
1941	100%	100%	100%	80%
1942	100%	100%	100%	89%
1943	100%	100%	79%	79%
1944	71%	71%	21%	21%
1945	88%	88%	63%	63%
1946	100%	87%	85%	62%
1947	75%	75%	41%	41%
1948	100%	75%	85%	32%
1949	93%	82%	68%	57%
1950	75%	75%	28%	28%
1951	100%	88%	93%	63%
1952	100%	100%	100%	100%
1953	100%	75%	100%	44%
1954	100%	75%	97%	44%

Year	No Action Alternative / Alternative 1			
	M&I		Ag	
	NOD	SOD	NOD	SOD
1955	75%	75%	32%	32%
1956	100%	100%	100%	82%
1957	95%	75%	70%	35%
1958	100%	100%	100%	99%
1959	90%	75%	65%	36%
1960	75%	75%	30%	30%
1961	78%	75%	53%	50%
1962	100%	75%	76%	45%
1963	100%	75%	100%	50%
1964	75%	75%	35%	35%
1965	100%	100%	78%	78%
1966	100%	75%	86%	49%
1967	100%	100%	100%	100%
1968	90%	75%	65%	39%
1969	100%	100%	100%	100%
1970	90%	87%	65%	62%
1971	100%	75%	89%	35%
1972	75%	75%	49%	42%
1973	100%	82%	95%	57%
1974	100%	100%	100%	87%
1975	100%	89%	100%	64%
1976	56%	56%	6%	6%
1977	55%	55%	5%	5%
1978	100%	100%	100%	92%
1979	79%	79%	54%	54%
1980	100%	100%	82%	82%
1981	94%	75%	69%	43%
1982	100%	100%	100%	100%
1983	100%	100%	100%	100%
1984	100%	88%	90%	63%
1985	96%	78%	71%	53%
1986	86%	86%	61%	61%
1987	70%	70%	20%	20%
1988	50%	50%	0%	0%
1989	75%	75%	29%	29%
1990	50%	50%	0%	0%
1991	63%	63%	13%	13%
1992	69%	69%	19%	19%
1993	100%	88%	100%	63%
1994	88%	83%	63%	58%
1995	100%	100%	100%	95%
1996	100%	99%	100%	74%
1997	100%	100%	77%	77%
1998	100%	100%	100%	100%
1999	100%	82%	100%	57%
2000	100%	78%	100%	53%

Year	No Action Alternative / Alternative 1			
	M&I		Ag	
	NOD	SOD	NOD	SOD
2001	75%	75%	31%	31%
2002	100%	75%	76%	38%
2003	100%	75%	100%	49%

Table B-3~~2~~ provides a summary of the average annual March through February contract year delivery to M&I and agricultural water service contractors in the NOD and SOD service areas by year type. The year type is the Sacramento Valley Water Year Type based on the 40-30-30 index as defined in SWRCB Decision 1641 (D-1641). Average annual delivery for all years is also provided.

Table B-3. Summary of CVP Water Service Contract Deliveries under the No Action Alternative (TAF)

	M&I		Ag		Total		
Year Type	**NOD**	**SOD**	**NOD**	**SOD**	**NOD**	**SOD**	**Total**
Wet	391	193	290	1,354	681	1,548	2,229
Above Normal	407	173	281	1,053	688	1,226	1,915
Below Normal	358	159	184	741	543	900	1,442
Dry	332	150	124	573	456	723	1,180
Critical	299	117	35	170	335	287	621
All Years	**361**	**164**	**196**	**858**	**557**	**1,022**	**1,579**

Results presented in Table B-3~~2~~ are summarized by NOD and SOD contractors, based on the allocation used to determine the volume of CVP water available to the contractor. NOD M&I water service contractors include contractors in the Redding area, American River B~~b~~asin, EBMUD, and Contra Costa Water District (CCWD). These contractors are all allocated water using the NOD allocation provided by Reclamation. SOD M&I water service contractors include those in the San Felipe, West San Joaquin, and Delta divisions. These contractors are allocated water based on the SOD allocation provided by Reclamation.

In addition to water deliveries, CalSim II modeling of the No Action Alternative provides a baseline operation of the CVP and SWP for use in the environmental analysis. Baseline operations include reservoir storage levels, river flows, and Delta operations including inflow, outflow, and CVP and SWP exports.

Tables B-4 through B-18 provide a summary of average monthly values for key system parameters in the CVP and SWP by Sacramento Valley Water Year Type. The Sacramento Valley Water Year Type is used because the Sacramento Valley is the primary water supply for CVP reservoirs and Delta exports that provide water to meet CVP water service contracts. Generally, the results show how reservoir storage, river flows, Delta outflow, and Delta exports are higher in wetter years and can be significantly lower in critical years. Results are presented for major CVP and SWP facilities and the rivers affected by the CVP and SWP. Results are presented here for the No Action Alternative. These results are used in subsequent sections for comparison with results from the other alternatives to quantify changes in CVP and SWP operations.

~~Table B-3 is a summary of average monthly values for key system parameters. Comparisons between these values and average monthly values for each alternative are provided in subsequent sections.~~

Table B-4. Summary of Trinity Lake Storage under the No Action Alternative (TAF)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	1,529	1,558	1,655	1,762	1,923	2,061	2,238	2,272	2,249	2,119	1,998	1,846
Above Normal	1,375	1,385	1,459	1,582	1,735	1,903	2,073	2,078	2,046	1,926	1,787	1,642
Below Normal	1,273	1,280	1,300	1,359	1,433	1,530	1,699	1,684	1,640	1,518	1,373	1,267
Dry	1,300	1,306	1,333	1,345	1,425	1,553	1,686	1,637	1,577	1,414	1,252	1,141
Critical	1,008	994	997	972	1,011	1,083	1,142	1,115	1,083	941	793	724
All Years	**1,336**	**1,347**	**1,399**	**1,460**	**1,569**	**1,692**	**1,840**	**1,835**	**1,797**	**1,661**	**1,520**	**1,398**

Table B-5. Summary of Shasta Lake Storage under the No Action Alternative (TAF)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	2,854	2,880	3,150	3,419	3,640	3,860	4,315	4,470	4,285	3,870	3,521	3,118
Above Normal	2,540	2,485	2,663	3,152	3,414	3,968	4,414	4,477	4,121	3,543	3,214	3,031
Below Normal	2,639	2,590	2,664	2,978	3,322	3,714	4,089	4,113	3,772	3,248	2,933	2,881
Dry	2,488	2,493	2,651	2,822	3,184	3,669	3,815	3,726	3,343	2,835	2,548	2,491
Critical	2,154	2,076	2,137	2,290	2,443	2,675	2,617	2,498	2,121	1,655	1,378	1,330
All Years	**2,588**	**2,570**	**2,738**	**3,008**	**3,278**	**3,636**	**3,933**	**3,958**	**3,650**	**3,164**	**2,848**	**2,666**

Table B-6. Summary of Folsom Lake Storage under the No Action Alternative (TAF)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	514	478	517	520	505	634	792	963	959	866	767	600
Above Normal	460	403	417	513	533	649	794	965	938	742	675	551
Below Normal	485	456	450	496	538	627	786	925	902	683	639	576
Dry	461	432	438	434	495	600	703	775	703	538	463	439
Critical	415	369	347	333	348	411	447	464	423	342	289	260
All Years	**475**	**437**	**449**	**468**	**490**	**595**	**721**	**843**	**811**	**668**	**595**	**504**

Table B-7. Summary of Lake Oroville Storage under the No Action Alternative (TAF)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	1,994	2,093	2,422	2,663	2,858	2,945	3,304	3,508	3,484	3,122	2,912	2,443
Above Normal	1,694	1,790	1,885	2,286	2,622	2,942	3,304	3,498	3,395	2,824	2,404	1,956
Below Normal	1,781	1,799	1,833	2,065	2,322	2,598	2,978	3,194	3,078	2,486	2,005	1,715
Dry	1,563	1,599	1,629	1,755	1,983	2,311	2,509	2,550	2,339	1,793	1,505	1,295
Critical	1,474	1,489	1,499	1,588	1,686	1,843	1,847	1,807	1,635	1,297	1,173	1,106
All Years	**1,743**	**1,802**	**1,934**	**2,149**	**2,368**	**2,585**	**2,860**	**2,994**	**2,880**	**2,411**	**2,120**	**1,800**

Table B-8. Summary of CVP San Luis Reservoir Storage under the No Action Alternative (TAF)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	226	365	534	667	787	894	811	651	491	296	182	207
Above Normal	193	341	516	627	719	823	719	519	338	159	87	127
Below Normal	244	392	576	689	746	813	723	546	353	244	169	226
Dry	257	371	556	689	752	778	690	521	307	215	113	147
Critical	264	385	540	656	718	727	672	563	379	268	205	196
All Years	**237**	**370**	**544**	**668**	**752**	**820**	**736**	**572**	**388**	**245**	**154**	**184**

Table B-9. Summary of SWP San Luis Reservoir Storage under the No Action Alternative (TAF)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	473	500	615	714	796	877	710	498	370	395	436	526
Above Normal	347	346	508	613	660	726	560	329	203	232	295	431
Below Normal	350	356	489	578	650	696	542	323	176	223	299	435
Dry	355	369	547	681	767	795	653	459	250	286	207	288
Critical	333	292	396	523	584	605	529	422	268	262	158	143
All Years	**387**	**394**	**531**	**641**	**714**	**766**	**621**	**424**	**271**	**299**	**301**	**388**

Table B-10. Summary of Sacramento River at Keswick Flows under the No Action Alternative (cubic feet per second [cfs])

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	6,611	7,924	11,328	16,148	18,421	16,225	9,499	9,496	10,527	12,901	11,062	12,765
Above Normal	6,465	6,897	5,484	7,643	14,501	8,375	6,088	7,918	11,320	14,312	10,452	8,638
Below Normal	6,102	6,020	5,196	4,253	5,941	4,795	5,223	6,999	10,777	13,116	10,013	5,338
Dry	5,703	5,422	3,941	3,896	3,753	3,745	5,717	7,252	11,280	13,398	9,647	5,385
Critical	5,552	5,098	3,682	3,452	3,881	3,482	6,389	6,858	10,450	12,264	9,161	4,618
All Years	**6,148**	**6,486**	**6,685**	**8,325**	**10,369**	**8,521**	**6,984**	**7,960**	**10,840**	**13,160**	**10,205**	**8,081**

Table B-11. Summary of Sacramento River at Navigation Control Point (NCP) Flows under the No Action Alternative (cfs)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	6,908	11,003	17,333	19,128	19,841	18,286	13,459	10,402	6,460	6,554	6,097	12,587
Above Normal	5,962	8,953	10,765	16,524	19,096	17,629	10,203	7,456	5,780	6,996	5,295	8,265
Below Normal	5,481	7,749	8,262	12,374	14,410	12,044	7,067	5,459	5,250	6,224	4,946	4,931
Dry	5,078	7,311	8,722	8,871	11,608	11,318	5,319	4,561	5,262	6,820	4,798	5,023
Critical	5,148	5,368	6,084	7,870	8,812	8,139	4,027	3,999	4,917	6,309	5,026	4,147
All Years	**5,867**	**8,512**	**11,287**	**13,695**	**15,383**	**14,109**	**8,724**	**6,908**	**5,665**	**6,585**	**5,341**	**7,752**

Table B-12. Summary of American River at Nimbus Flows under the No Action Alternative (cfs)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	1,669	3,427	5,724	8,623	9,098	6,043	5,174	5,941	5,789	3,847	3,129	4,348
Above Normal	1,621	3,392	3,021	4,550	6,139	5,308	3,452	3,599	3,231	4,402	2,344	3,402
Below Normal	1,822	2,152	2,514	2,218	4,048	2,491	2,850	2,791	2,628	4,749	1,854	2,335
Dry	1,572	1,996	1,711	1,642	1,829	2,022	1,878	1,719	2,382	3,192	2,042	1,461
Critical	1,483	1,812	1,493	1,309	1,201	911	1,052	1,123	1,564	1,611	1,177	968
All Years	**1,639**	**2,654**	**3,280**	**4,331**	**5,051**	**3,695**	**3,198**	**3,429**	**3,509**	**3,611**	**2,272**	**2,737**

Table B-13. Summary of American River at H Street Flows under the No Action Alternative (cfs)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	1,507	3,318	5,583	8,492	8,911	5,850	4,975	5,719	5,508	3,182	2,551	4,136
Above Normal	1,468	3,262	2,853	4,452	6,024	5,145	3,250	3,396	2,970	3,766	1,767	3,197
Below Normal	1,651	2,018	2,338	2,076	3,923	2,326	2,676	2,588	2,376	4,195	1,336	2,138
Dry	1,409	1,862	1,545	1,501	1,689	1,881	1,691	1,522	2,138	2,779	1,653	1,262
Critical	1,320	1,662	1,334	1,161	1,060	762	876	945	1,340	1,316	899	782
All Years	**1,477**	**2,526**	**3,121**	**4,198**	**4,903**	**3,529**	**3,009**	**3,224**	**3,252**	**3,079**	**1,790**	**2,536**

Table B-14. Summary of Lower Feather River Flows under the No Action Alternative (cfs)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	3,933	4,487	10,462	22,634	25,878	23,670	15,958	14,394	10,274	8,465	5,677	10,785
Above Normal	2,883	3,186	5,752	10,793	12,631	19,314	9,852	8,168	6,431	9,655	7,958	9,881
Below Normal	3,434	2,587	3,673	5,376	8,183	6,844	5,333	4,738	4,755	9,459	8,520	6,477
Dry	2,976	2,213	3,257	4,263	4,222	4,574	4,136	3,701	4,037	7,832	4,777	5,292
Critical	2,481	1,829	2,487	3,383	3,094	2,636	3,297	2,515	2,620	4,871	2,117	2,255
All Years	**3,272**	**3,084**	**5,865**	**11,105**	**12,830**	**12,890**	**8,802**	**7,748**	**6,280**	**8,144**	**5,778**	**7,463**

Table B-15. Summary of Delta Inflows from Sacramento Basin under the No Action Alternative (TAF)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Wet	808	1,312	2,818	4,716	4,887	4,351	2,654	1,991	1,431	1,225	996	1,687	28,877
Above Normal	652	997	1,484	2,773	3,199	3,209	1,632	1,305	975	1,346	1,016	1,326	19,913
Below Normal	682	823	1,142	1,454	1,904	1,462	1,067	864	817	1,310	998	862	13,384
Dry	612	758	1,000	1,092	1,287	1,276	797	671	736	1,141	777	733	10,881
Critical	571	574	708	886	873	816	601	485	555	788	522	441	7,818
All Years	**686**	**953**	**1,629**	**2,519**	**2,753**	**2,498**	**1,525**	**1,188**	**979**	**1,175**	**882**	**1,102**	**17,888**

Table B-16. Summary of Delta Outflow under the No Action Alternative (TAF)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Wet	468	1,059	2,733	5,184	5,285	4,824	3,303	2,497	1,374	689	314	1,172	28,902
Above Normal	336	729	1,141	2,906	3,408	3,269	1,964	1,508	702	582	246	704	17,493
Below Normal	339	511	763	1,351	2,009	1,416	1,340	982	472	446	246	240	10,113
Dry	322	501	540	888	1,173	1,199	864	630	400	310	254	206	7,288
Critical	287	366	356	687	742	732	529	368	320	251	231	179	5,047
All Years	**368**	**693**	**1,335**	**2,595**	**2,884**	**2,620**	**1,831**	**1,372**	**753**	**485**	**267**	**587**	**15,789**

Table B-17. Summary of Jones Pumping Plant Exports under the No Action Alternative (TAF)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Wet	227	230	248	217	217	232	92	99	224	281	283	260	2,609
Above Normal	214	232	246	180	180	225	64	55	190	252	283	259	2,378
Below Normal	234	237	263	193	158	179	61	53	138	265	248	262	2,291
Dry	215	205	255	202	155	136	60	53	93	246	177	227	2,025
Critical	215	203	211	168	133	95	53	51	27	110	119	144	1,529
All Years	**222**	**222**	**246**	**197**	**175**	**181**	**70**	**68**	**147**	**241**	**230**	**236**	**2,235**

Table B-18. Summary of Banks Pumping Plant Exports under the No Action Alternative (TAF)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Wet	235	252	306	273	314	359	109	112	245	424	437	375	3,440
Above Normal	180	177	333	209	218	274	63	51	195	410	431	395	2,935
Below Normal	202	208	312	197	214	254	64	49	133	429	437	391	2,889
Dry	169	173	330	199	172	148	58	56	88	393	254	303	2,343
Critical	147	91	214	175	142	100	46	44	33	220	65	103	1,381
All Years	**194**	**193**	**303**	**220**	**227**	**245**	**74**	**70**	**153**	**386**	**341**	**325**	**2,730**

Several American River Division contractors who divert water directly out of Folsom Lake expressed concern regarding the ability to physically divert enough water to meet demands during periods when the water surface elevation in Folsom was below certain levels. These contractors identified water surface elevations in the range of 320 feet to 350 feet above mean sea level as being of particular concern. These water surface elevations correspond to approximately 75 TAF and 148 TAF of storage, respectively.

The following figures, compiled as Figure B-6, illustrate the probability of exceedance for Folsom Lake water surface elevation being above or below these levels based on modeling of the No Action Alternative. Modeling performed for the EIS assumes that a minimum storage of 90 TAF must be maintained in Folsom Lake. This corresponds to a water surface elevation of approximately 327 feet. Information in the following figures provides the frequency of water surface elevations being within the range of concern. However, caution should be used in assessment of this information in an absolute sense. A better use of this information is provided in subsequent figures that compare water surface elevations between different alternatives. These comparisons provide the relative change in the probability of Folsom water surface elevation being at or below these levels.

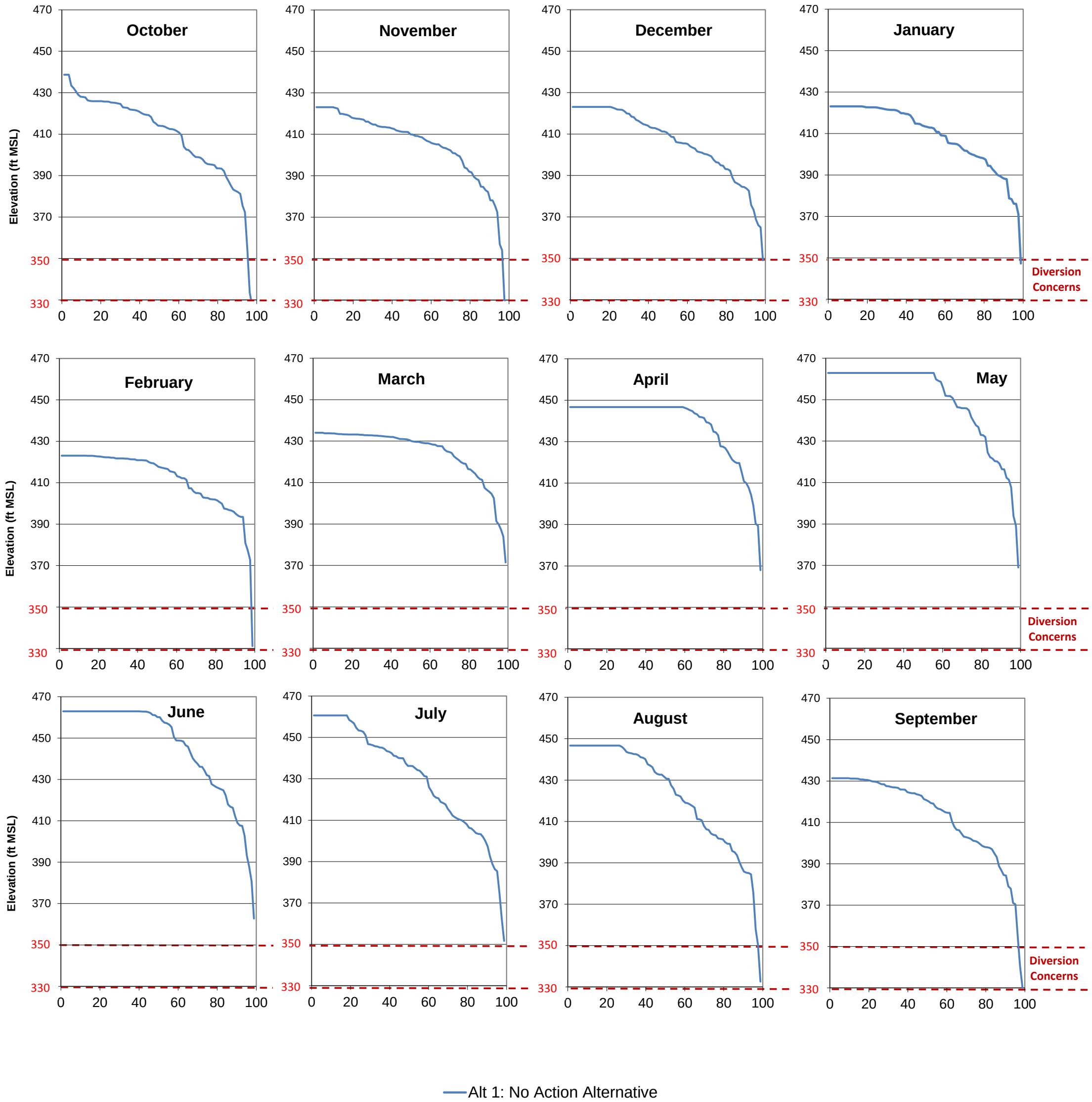


Figure B-6. Probability of Exceedance for Folsom Lake Water Surface Elevation under the No Action Alternative

Figure B-6 shows simulated Folsom Lake water surface elevations can be below elevation 350 feet in the months of August through February, though not necessarily for all months in any single year. In any given month the probability that the water surface elevation will be below elevation 350 is less than 5 percent.

B.4 Alternative 2: Equal Agricultural and M&I Allocation

Under Alternative 2, Equal Agricultural and M&I Allocation, M&I water service contractors would receive the same allocation as percent of Contract Total as agricultural water service contractors. This means that in years when the CVP water supplies are not adequate to provide water to all water service contractors, agricultural and M&I water service contractors would be reduced by the same percentage.

This allocation methodology would provide a larger volume of CVP water to agricultural water service contractors than the No Action Alternative. This alternative will facilitate a tradeoff analysis that considers the potential effects associated with a lower level of deliveries to M&I water service contractors.

In years when ~~the~~ CVP water supplies are not adequate to provide water to all water service contractors, M&I water service contractor allocations would be reduced at the same levels as agricultural water service contractor allocations. The reductions would be on a percentage basis of contract total, reflective of the available CVP water supply for that respective year.

Alternative 2 would have no provisions for unmet PHS ~~deliveries~~ need that would be made available by Reclamation from CVP water supplies. During extremely low CVP water supply or ~~shortage conditions~~ a Condition of Shortage, M&I water service contractors would need to rely on available non-CVP supplies. In cases where an M&I water service contractor does not own sufficient non-CVP supplies to meet their PHS need~~demands~~, they would need to rely on water transfers and water exchanges (willing buyers and willing sellers) to make up the unmet portion of their PHS need~~demand~~. This market driven system is in effect throughout California and has been used during previous years of reduced CVP water allocations~~water shortages~~.

B.4.1 Equal Agricultural and M&I Allocation Alternative Results

Results from ~~the~~ Alternative 2 are summarized and compared to the No Action Alternative. The primary difference between the No Action Alternative and ~~the~~ Alternative 2 is the method used to share water between CVP agricultural and M&I water service contractors during a Condition of Shortage~~times of shortage~~. Therefore, key outputs from the model are simulated allocations to NOD and SOD agricultural and M&I water service contractors and simulated deliveries. Figures B-6 and B-7 and Tables B-4 and B-5 summarize these results for Alternative 2 and compare results to the No Action Alternative.

Figure B-~~6~~7 illustrates simulated M&I water service contract allocations for NOD and SOD contractors under ~~the~~ Alternative 2 and the No Action Alternative. Allocations to both NOD and SOD M&I contractors are reduced under Alternative 2 in order to provide an equal allocation to agricultural water service contractors. M&I allocations can be as low as 5 percent of C~~c~~ontract T~~t~~otal to both NOD and SOD contractors, compared to minimum allocations of 50 percent under the No Action Alternative. Additionally, the probability of 100 percent allocations to M&I water service contractors decreases by approximately 15 percent for both NOD and SOD contractors.

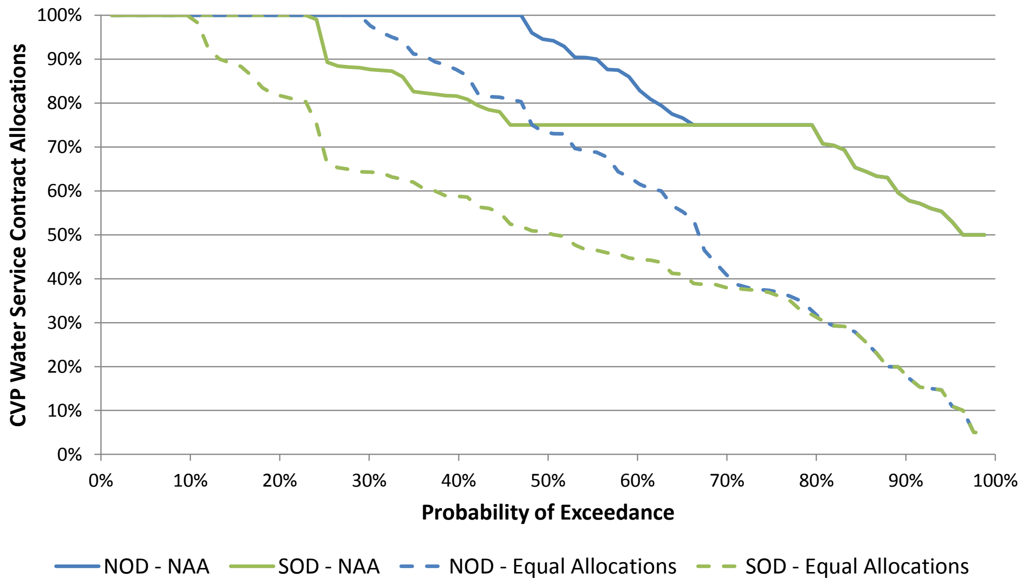


Figure B-7. Comparison of CVP M&I Water Service Contract Allocations under Alternative 2 and the No Action Alternative

Figure B-8~~7~~ illustrates simulated agricultural water service contract allocations for NOD and SOD contractors under Alternative 2 and the No Action Alternative. Allocations to agricultural water service contracts increase in most years under Alternative 2. The minimum simulated allocation increases from 0 percent under the No Action Alternative to 5 percent under Alternative 2.

Years when agricultural allocations are lowest in the No Action Alternative, for example, 20 percent or less, tend to have larger increases under Alternative 2 because in these years M&I allocations are typically 50 percent higher than agricultural allocations in the No Action Alternative. However, as seen by comparison with Figure B-6, M&I allocations are reduced by approximately 40 percent in order to increase agricultural allocations by approximately 8 percent.

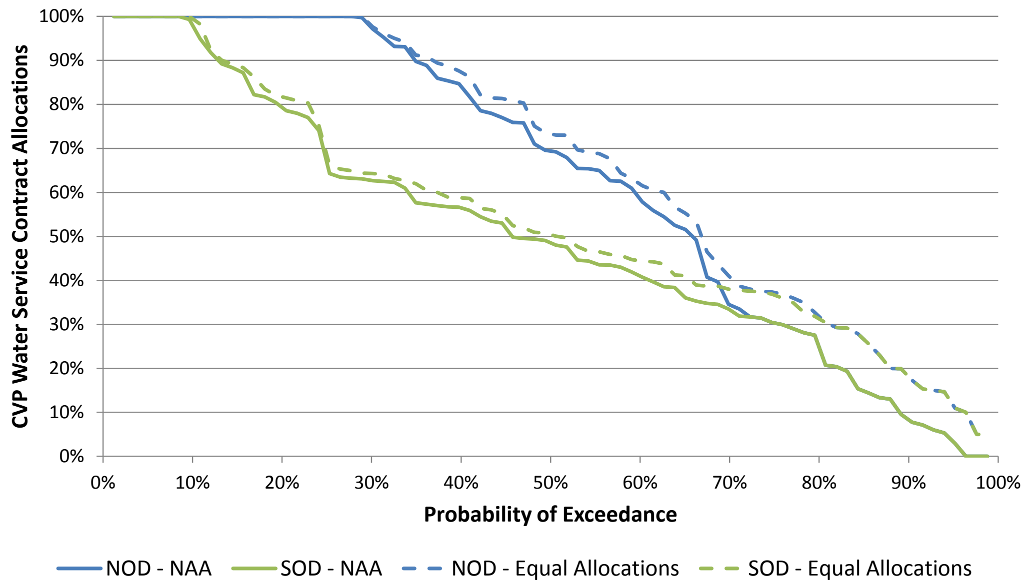


Figure B-8. Comparison of CVP Agricultural Water Service Contract Allocations under Alternative 2 and the No Action Alternative

Table B-19 compares CVP water service contract allocations under Alternative 2 with the No Action Alternative. Results in this table show how M&I allocations are reduced and agricultural allocations are increased in most years. Of particular interest are the shifts in allocations during critical drought periods, such as what occurred from 1929 through 1934, in 1976 and 1977, and in 1987 through 1992. In these years, under the No Action Alternative, M&I allocations are typically 50 percent greater than agricultural allocations. In order to achieve an equal allocation, under Alternative 2, M&I allocations are reduced by approximately 40 percent in order to increase agricultural allocations by approximately 8 percent. This large difference in the change in allocation is necessary because of the difference in the volume of M&I water as compared to agricultural water service contracts.

Table B-19. Comparison of Annual CVP Water Service Contract Allocations under the No Action Alternative and Alternative 2 (Percent of Contract Total)

	Alternative 2				Change from No Action Alternative (Alternative 2 minus the No Action Alternative)			
	M&I		Ag		M&I		Ag	
Year	NOD	SOD	NOD	SOD	NOD	SOD	NOD	SOD
1922	100%	89%	100%	89%	0%	-11%	0%	1%
1923	61%	50%	61%	50%	-21%	-25%	4%	2%
1924	15%	15%	15%	15%	-42%	-42%	8%	8%
1925	60%	56%	60%	56%	-20%	-25%	5%	0%
1926	26%	26%	26%	26%	-39%	-39%	11%	11%
1927	100%	59%	100%	59%	0%	-23%	0%	2%
1928	55%	46%	55%	46%	-21%	-29%	4%	2%
1929	5%	5%	5%	5%	-45%	-45%	5%	5%
1930	29%	29%	29%	29%	-36%	-36%	14%	14%
1931	15%	15%	15%	15%	-43%	-43%	7%	7%
1932	20%	20%	20%	20%	-43%	-43%	7%	7%
1933	11%	11%	11%	11%	-42%	-42%	8%	8%
1934	17%	17%	17%	17%	-42%	-42%	8%	8%
1935	33%	33%	33%	33%	-42%	-42%	5%	5%
1936	44%	44%	44%	44%	-31%	-31%	4%	4%
1937	36%	36%	36%	36%	-39%	-39%	2%	2%
1938	100%	100%	100%	100%	0%	0%	0%	0%
1939	37%	37%	37%	37%	-38%	-38%	6%	6%
1940	95%	50%	95%	50%	-5%	-25%	2%	2%
1941	100%	82%	100%	82%	0%	-18%	0%	2%
1942	100%	90%	100%	90%	0%	-10%	0%	1%
1943	81%	81%	81%	81%	-19%	-19%	3%	3%
1944	28%	28%	28%	28%	-43%	-43%	7%	7%
1945	63%	63%	63%	63%	-24%	-24%	1%	1%
1946	89%	64%	89%	64%	-11%	-23%	3%	2%
1947	46%	46%	46%	46%	-29%	-29%	6%	6%
1948	88%	32%	88%	32%	-12%	-43%	3%	0%
1949	74%	62%	74%	62%	-19%	-20%	6%	5%
1950	35%	35%	35%	35%	-40%	-40%	7%	7%
1951	94%	65%	94%	65%	-6%	-23%	1%	2%
1952	100%	100%	100%	100%	0%	0%	0%	0%
1953	100%	47%	100%	47%	0%	-28%	0%	2%
1954	98%	46%	98%	46%	-2%	-29%	0%	2%
1955	38%	38%	38%	38%	-37%	-37%	6%	6%
1956	100%	84%	100%	84%	0%	-16%	0%	1%
1957	73%	38%	73%	38%	-22%	-37%	3%	3%
1958	100%	100%	100%	100%	0%	0%	0%	1%
1959	70%	39%	70%	39%	-21%	-36%	4%	3%
1960	37%	37%	37%	37%	-38%	-38%	7%	7%
1961	57%	51%	57%	51%	-21%	-24%	4%	1%

Year	Alternative 2				Change from No Action Alternative (Alternative 2 minus the No Action Alternative)			
	M&I		Ag		M&I		Ag	
	NOD	SOD	NOD	SOD	NOD	SOD	NOD	SOD
1962	81%	48%	81%	48%	-19%	-27%	5%	3%
1963	100%	52%	100%	52%	0%	-23%	0%	3%
1964	41%	41%	41%	41%	-34%	-34%	6%	6%
1965	81%	81%	81%	81%	-19%	-19%	3%	3%
1966	89%	51%	89%	51%	-11%	-24%	3%	2%
1967	100%	100%	100%	100%	0%	0%	0%	0%
1968	69%	41%	69%	41%	-21%	-34%	4%	3%
1969	100%	100%	100%	100%	0%	0%	0%	0%
1970	69%	64%	69%	64%	-22%	-23%	3%	2%
1971	91%	39%	91%	39%	-9%	-36%	2%	4%
1972	53%	45%	53%	45%	-22%	-30%	4%	3%
1973	96%	59%	96%	59%	-4%	-23%	1%	2%
1974	100%	88%	100%	88%	0%	-12%	0%	1%
1975	100%	66%	100%	66%	0%	-23%	0%	2%
1976	20%	20%	20%	20%	-36%	-36%	14%	14%
1977	15%	15%	15%	15%	-40%	-40%	10%	10%
1978	100%	92%	100%	92%	0%	-8%	0%	1%
1979	60%	60%	60%	60%	-19%	-19%	6%	6%
1980	86%	86%	86%	86%	-14%	-14%	4%	4%
1981	73%	44%	73%	44%	-21%	-31%	4%	1%
1982	100%	100%	100%	100%	0%	0%	0%	0%
1983	100%	100%	100%	100%	0%	0%	0%	0%
1984	91%	65%	91%	65%	-9%	-23%	1%	2%
1985	75%	56%	75%	56%	-21%	-22%	4%	3%
1986	64%	64%	64%	64%	-22%	-22%	3%	3%
1987	29%	29%	29%	29%	-41%	-41%	9%	9%
1988	10%	10%	10%	10%	-40%	-40%	10%	10%
1989	39%	39%	39%	39%	-36%	-36%	10%	10%
1990	5%	5%	5%	5%	-45%	-45%	5%	5%
1991	23%	23%	23%	23%	-40%	-40%	10%	10%
1992	30%	30%	30%	30%	-39%	-39%	11%	11%
1993	100%	63%	100%	63%	0%	-26%	0%	0%
1994	68%	60%	68%	60%	-20%	-22%	5%	3%
1995	100%	98%	100%	98%	0%	-2%	0%	3%
1996	100%	75%	100%	75%	0%	-24%	0%	1%
1997	80%	80%	80%	80%	-20%	-20%	3%	3%
1998	100%	100%	100%	100%	0%	0%	0%	0%
1999	100%	59%	100%	59%	0%	-23%	0%	2%
2000	100%	55%	100%	55%	0%	-23%	0%	2%
2001	38%	38%	38%	38%	-37%	-37%	6%	6%
2002	82%	44%	82%	44%	-18%	-31%	6%	6%
2003	100%	52%	100%	52%	0%	-23%	0%	3%

Table B-204 provides a summary of the average annual March through February contract year delivery to M&I and agricultural water service contractors in the NOD and SOD service areas by year type. The year type is the Sacramento Valley Water Year Type based on the 40-30-30 index. Results are presented for Alternative 2 and the change in delivery from the No Action Alternative.

Table B-204. Summary of CVP Water Service Contract Deliveries under Alternative 2 and Change from the No Action Alternative (TAF)

	M&I		Ag		Total		
Year Type	**NOD**	**SOD**	**NOD**	**SOD**	**NOD**	**SOD**	**Total**
Wet	378	165	293	1,386	671	1,551	2,221
Above Normal	386	129	286	1,093	672	1,222	1,894
Below Normal	266	95	198	805	464	900	1,364
Dry	216	81	146	691	362	773	1,135
Critical	107	36	62	307	169	344	513
All Years	**283**	**110**	**209**	**932**	**492**	**1,042**	**1,534**
Change from No Action Alternative							
Wet	-13	-28	3	31	-10	3	-7
Above Normal	-21	-45	5	40	-16	-4	-20
Below Normal	-92	-65	14	65	-79	0	-79
Dry	-117	-69	22	118	-94	49	-45
Critical	-193	-81	27	138	-166	57	-109
All Years	**-77**	**-54**	**13**	**73**	**-65**	**20**	**-45**

Results presented in Table B-204 show that under Alternative 2, M&I deliveries decrease by approximately 130 TAF combined for NOD and SOD contractors while agricultural deliveries increase by approximately 85 TAF. This results in a total reduction in CVP water service contract deliveries of 45 TAF. Generally, changes in deliveries get larger with drier year types. In wetter year types the difference between allocations to agricultural and M&I contractors are smaller, and allocations may be equal if water supplies are adequate to provide 100 percent allocation to all contractors. In drier year types the differences in allocations are typically larger under the No Action Alternative as the existing M&I WSP preference to M&I contractors can provide M&I allocations that are 50 percent higher than agricultural allocations. These larger differences in the No Action Alternative create larger changes in deliveries when allocations to M&I and agricultural contractors are equal under Alternative 2.

Reductions in M&I deliveries are considerable in drier (i.e., below normal, dry, and critical) years. Critical year deliveries are reduced by approximately 65 percent as compared to the No Action Alternative. These reductions would be a substantial impact in most divisions of the CVP that provide M&I deliveries.

The following tables provide a summary of average monthly values for key system parameters in the CVP and SWP by Sacramento Valley Water Year Type. Results for Alternative 2 are presented, followed by the change from the No Action Alternative. ~~Average monthly changes in CVP/SWP reservoir storage, river flows, and Delta operations are typically small. The largest and most consistent changes in CVP operations occur in the American River Division. Lower M&I allocations for American River Division M&I contractors reduce diversions out of and downstream of Folsom Lake. Lower diversions keep storage in Folsom Lake higher and more of this water is then allocated and released for delivery to SOD agricultural water service contractors. This increases flows on the lower American River supports higher exports CVP exports compared to the No Action Alternative.~~

Results summarized in Table B-21 show relatively small changes in Trinity Lake storage as compared to the No Action Alternative. Trinity Lake storage can change in response to differences in CVP allocations that can directly affect Trinity Lake operations, or can indirectly be affected by changing storage in other CVP reservoirs. These changes in other CVP reservoirs can affect the storage balance between all CVP reservoirs and change operations.

Table B-21. Summary of Trinity Lake Storage under Alternative 2 and Change from the No Action Alternative (TAF)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	1,526	1,556	1,654	1,762	1,923	2,060	2,237	2,271	2,248	2,118	1,997	1,846
Above Normal	1,373	1,384	1,458	1,585	1,738	1,906	2,075	2,080	2,052	1,932	1,793	1,648
Below Normal	1,263	1,270	1,291	1,350	1,424	1,520	1,690	1,674	1,631	1,502	1,361	1,259
Dry	1,305	1,311	1,337	1,350	1,430	1,558	1,690	1,641	1,580	1,413	1,249	1,140
Critical	1,011	994	999	973	1,014	1,087	1,145	1,114	1,082	949	795	720
All Years	**1,335**	**1,346**	**1,398**	**1,460**	**1,570**	**1,693**	**1,840**	**1,834**	**1,797**	**1,660**	**1,518**	**1,397**
Change from No Action Alternative												
Wet	-3	-1	-1	0	0	-1	-1	-1	-1	-1	-1	0
Above Normal	-2	-1	-1	3	3	3	3	3	6	6	6	6
Below Normal	-10	-10	-9	-9	-9	-9	-9	-9	-9	-16	-12	-9
Dry	5	5	4	5	5	5	4	4	3	-1	-3	-1
Critical	4	1	2	1	3	3	3	-1	-1	8	1	-3
All Years	**-1**	**-1**	**-1**	**0**	**0**	**0**	**0**	**-1**	**-1**	**-1**	**-2**	**-1**

Results summarized in Table B-22 show relatively small changes in Shasta Lake storage as compared to the No Action Alternative. Shasta Lake storage is lower in certain year types, potentially due to changes in allocations that shift the location of the demand within the CVP. Equal allocations for agricultural and M&I water service contractors in Alternative 2 increase the delivery of CVP water south of the Delta due to the large agricultural water service contract volumes in the West San Joaquin Division (see Figure B-3) and deliveries to agricultural water service contractors in the Tehama-Colusa Canal service area. This can result in lower storage in NOD CVP reservoirs.

Table B-22. Summary of Shasta Lake Storage under Alternative 2 and Change from the No Action Alternative (TAF)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	2,841	2,873	3,146	3,420	3,640	3,860	4,315	4,470	4,285	3,870	3,521	3,119
Above Normal	2,545	2,493	2,670	3,158	3,418	3,972	4,417	4,476	4,117	3,538	3,210	3,026
Below Normal	2,623	2,571	2,642	2,956	3,299	3,689	4,061	4,080	3,739	3,228	2,910	2,856
Dry	2,503	2,511	2,668	2,837	3,197	3,682	3,823	3,727	3,339	2,842	2,537	2,484
Critical	2,130	2,058	2,119	2,270	2,423	2,655	2,587	2,469	2,102	1,630	1,371	1,331
All Years	**2,582**	**2,567**	**2,735**	**3,006**	**3,274**	**3,632**	**3,926**	**3,948**	**3,640**	**3,158**	**2,840**	**2,659**
Change from No Action Alternative												
Wet	-13	-8	-4	1	0	0	0	0	-1	0	0	1
Above Normal	6	8	7	6	4	3	3	0	-4	-4	-4	-5
Below Normal	-16	-19	-21	-21	-23	-25	-28	-33	-33	-20	-23	-25
Dry	15	18	17	14	13	13	9	1	-4	7	-11	-8
Critical	-24	-17	-18	-20	-20	-21	-30	-29	-19	-25	-7	1
All Years	**-6**	**-3**	**-3**	**-2**	**-3**	**-4**	**-7**	**-10**	**-10**	**-6**	**-8**	**-6**

Results summarized in Table B-23 show Folsom Lake storage is consistently higher under Alternative 2 compared to the No Action Alternative. Storage in Folsom Lake is higher because of the reduction of M&I allocations under an equal allocation operation. Reduced M&I allocations reduce diversions from Folsom Lake by American River Division contractors.

Table B-23. Summary of Folsom Lake Storage under Alternative 2 and Change from the No Action Alternative (TAF)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	516	480	518	520	505	634	792	964	959	867	769	601
Above Normal	467	409	422	513	533	649	794	966	938	742	676	553
Below Normal	494	467	460	507	547	637	787	926	904	687	648	582
Dry	468	439	445	442	501	603	708	782	713	547	464	444
Critical	426	381	357	343	360	426	467	490	456	372	313	285
All Years	**481**	**444**	**455**	**474**	**494**	**599**	**725**	**849**	**819**	**675**	**601**	**510**

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Change from No Action Alternative												
Wet	2	2	1	0	0	0	0	1	1	1	2	1
Above Normal	7	6	5	0	0	0	0	0	0	0	1	1
Below Normal	9	10	10	11	9	9	1	1	2	4	10	6
Dry	7	7	7	8	6	3	5	8	10	9	0	5
Critical	12	12	10	10	12	15	20	25	33	31	24	25
All Years	**6**	**7**	**6**	**5**	**5**	**4**	**4**	**6**	**8**	**8**	**6**	**6**

Results summarized in Table B-24 show relatively small changes in Lake Oroville storage under Alternative 2 compared to the No Action Alternative. Storage in Lake Oroville can be both higher and lower as a result of small changes in SWP operations. SWP operations are affected by changes within the CVP because the two projects are linked by the COA. Changes in CVP operations affect water accounting in project reservoirs and the Delta, which can change the water available to each project in the Delta.

Table B-24. Summary of Lake Oroville Storage under Alternative 2 and Change from the No Action Alternative (TAF)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	1,987	2,086	2,422	2,663	2,859	2,945	3,304	3,508	3,484	3,122	2,913	2,443
Above Normal	1,693	1,789	1,883	2,283	2,619	2,942	3,304	3,498	3,395	2,824	2,404	1,956
Below Normal	1,786	1,805	1,840	2,072	2,326	2,602	2,982	3,197	3,085	2,491	2,012	1,728
Dry	1,565	1,602	1,632	1,756	1,984	2,313	2,511	2,553	2,348	1,803	1,509	1,285
Critical	1,458	1,475	1,480	1,569	1,666	1,822	1,828	1,791	1,626	1,280	1,156	1,087
All Years	**1,740**	**1,799**	**1,932**	**2,147**	**2,366**	**2,583**	**2,859**	**2,992**	**2,882**	**2,412**	**2,119**	**1,797**
Change from No Action Alternative												
Wet	-6	-6	0	0	0	0	0	0	0	0	0	0
Above Normal	-1	0	-2	-3	-2	0	0	0	0	0	0	0
Below Normal	5	7	7	7	4	4	4	2	7	5	7	13
Dry	3	3	3	1	1	2	2	3	9	10	4	-10
Critical	-15	-14	-19	-18	-21	-21	-19	-16	-9	-18	-17	-19
All Years	**-3**	**-2**	**-1**	**-2**	**-2**	**-2**	**-2**	**-1**	**2**	**1**	**0**	**-3**

Results summarized in Table B-25 show a seasonal shift in storage in CVP San Luis Reservoir under Alternative 2. In Alternative 2, more of the water being delivered out of CVP San Luis Reservoir storage is going to meet agricultural water service contracts on an agricultural demand pattern, with higher summer demand and lower winter demand. This shift in delivery pattern tends to decrease storage in the CVP portion of San Luis Reservoir from March through August or September. Conversely, during the October through February period less water is being delivered to M&I contractors, particularly those in the San Felipe Division, and CVP San Luis Reservoir storage is typically higher.

Table B-25. Summary of CVP San Luis Reservoir Storage under Alternative 2 and Change from the No Action Alternative (TAF)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	235	377	546	677	794	892	808	648	487	291	179	206
Above Normal	192	343	521	626	719	816	714	515	334	156	82	127
Below Normal	250	405	596	697	753	809	717	542	349	241	175	234
Dry	257	376	564	694	758	772	680	507	286	191	113	152
Critical	275	403	564	675	730	732	673	558	365	244	198	192
All Years	**242**	**380**	**557**	**677**	**759**	**817**	**731**	**566**	**379**	**234**	**152**	**185**
Change from No Action Alternative												
Wet	9	12	12	11	8	-2	-3	-3	-4	-5	-3	-2
Above Normal	0	2	5	0	0	-8	-6	-4	-4	-4	-5	0
Below Normal	6	12	20	8	7	-4	-6	-4	-4	-3	5	8
Dry	0	5	8	5	6	-6	-10	-14	-21	-25	0	5
Critical	11	18	24	19	12	5	1	-5	-13	-24	-7	-4
All Years	**5**	**10**	**13**	**9**	**7**	**-3**	**-5**	**-6**	**-9**	**-12**	**-2**	**1**

Results summarized in Table B-26 show relatively small changes in SWP San Luis Reservoir storage. Storage in SWP San Luis Reservoir is generally higher in critical years when Lake Oroville storage was generally lower. These changes can result from a shift in the timing of when water is moved from Lake Oroville through the Delta, and changes in the volume of water exported at Banks Pumping Plant.

Table B-26. Summary of SWP San Luis Reservoir Storage under Alternative 2 and Change from the No Action Alternative (TAF)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	482	509	626	721	803	879	713	502	373	400	441	531
Above Normal	350	349	512	616	662	728	561	330	203	232	296	432
Below Normal	348	351	499	597	649	693	540	322	175	220	296	434
Dry	365	385	563	697	781	805	662	466	251	286	208	298
Critical	361	320	431	556	618	639	563	455	291	300	192	178
All Years	**397**	**404**	**545**	**655**	**724**	**774**	**628**	**431**	**276**	**305**	**308**	**397**

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Change from No Action Alternative												
Wet	9	9	10	7	7	2	2	3	3	4	5	5
Above Normal	3	3	4	3	2	2	1	1	0	0	1	1
Below Normal	-3	-5	10	19	-1	-3	-2	-1	-1	-2	-2	0
Dry	11	16	17	16	14	10	9	7	1	-1	1	10
Critical	28	28	35	34	34	34	34	33	24	38	34	35
All Years	**9**	**10**	**14**	**15**	**10**	**8**	**7**	**7**	**5**	**6**	**6**	**9**

Results summarized in Table B-27 show changes in Sacramento River flows at Keswick Dam. Releases from Keswick Dam change due to differences in operations at Shasta and Trinity lakes. Reductions in flow in wet years can be a reduction in flood control releases from Shasta Lake due to lower storage conditions under Alternative 2. Increases in flow in some months can be balanced out by decreases in other months; these fluctuations indicate a small shift in the timing of Shasta Lake releases or Trinity River imports.

Table B-27. Summary of Sacramento River at Keswick Dam Flows under Alternative 2 and Change from the No Action Alternative (cfs)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	6,670	7,822	11,258	16,076	18,434	16,226	9,501	9,497	10,533	12,887	11,063	12,721
Above Normal	6,359	6,846	5,503	7,653	14,535	8,385	6,090	7,980	11,323	14,319	10,446	8,652
Below Normal	6,086	6,042	5,231	4,231	5,985	4,835	5,272	7,086	10,778	13,003	10,005	5,322
Dry	5,692	5,377	3,970	3,923	3,784	3,746	5,800	7,369	11,328	13,344	9,979	5,294
Critical	5,547	5,046	3,673	3,501	3,842	3,485	6,550	6,908	10,296	12,215	9,064	4,513
All Years	**6,146**	**6,432**	**6,677**	**8,313**	**10,387**	**8,530**	**7,036**	**8,018**	**10,831**	**13,118**	**10,262**	**8,031**
Change from No Action Alternative												
Wet	60	-102	-70	-72	13	1	2	1	6	-14	1	-44
Above Normal	-106	-50	19	10	34	10	2	62	3	6	-6	15
Below Normal	-15	22	35	-22	44	40	49	88	1	-113	-8	-16
Dry	-11	-45	30	26	31	1	83	117	48	-54	332	-91
Critical	-5	-52	-9	49	-39	3	162	50	-154	-49	-97	-105
All Years	**-2**	**-53**	**-8**	**-12**	**18**	**9**	**51**	**58**	**-9**	**-42**	**57**	**-50**

Results summarized in Table B-28 show changes in Sacramento River flow at the Navigation Control Point (NCP) or Wilkins Slough. These changes are similar to those shown above at Keswick Dam, but reflect any changes in Tehama-Colusa Canal deliveries as a result of higher agricultural allocations and Redding Basin M&I deliveries.

Table B-28. Summary of Sacramento River at NCP Flows under Alternative 2 and Change from the No Action Alternative (cfs)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	6,964	10,958	17,327	19,124	19,837	18,278	13,453	10,396	6,458	6,533	6,092	12,538
Above Normal	5,850	8,903	10,749	16,522	19,092	17,625	10,199	7,509	5,769	6,993	5,280	8,275
Below Normal	5,474	7,769	8,284	12,355	14,412	12,065	7,102	5,537	5,238	6,123	4,935	4,923
Dry	5,065	7,262	8,747	8,851	11,633	11,311	5,396	4,659	5,275	6,740	5,116	4,950
Critical	5,158	5,316	6,076	7,916	8,766	8,133	4,169	4,013	4,737	6,225	4,912	4,075
All Years	**5,866**	**8,476**	**11,290**	**13,692**	**15,381**	**14,108**	**8,765**	**6,950**	**5,637**	**6,531**	**5,389**	**7,710**
Change from No Action Alternative												
Wet	55	-45	-6	-4	-4	-7	-6	-5	-2	-21	-4	-49
Above Normal	-112	-50	-15	-3	-3	-3	-4	53	-11	-3	-15	10
Below Normal	-7	20	22	-19	2	21	35	78	-13	-101	-11	-8
Dry	-13	-50	25	-20	25	-7	77	98	13	-80	318	-73
Critical	10	-52	-8	46	-46	-6	142	13	-180	-84	-114	-71
All Years	**-1**	**-36**	**4**	**-3**	**-3**	**-1**	**41**	**43**	**-28**	**-54**	**48**	**-42**

Results summarized in Table B-29 show changes in releases from Nimbus Dam to the lower American River. Nimbus Dam release is consistently higher under Alternative 2 compared to the No Action Alternative because there are lower CVP M&I diversions from Folsom Lake. Lower diversions create higher storage in Folsom Lake and the water is either spilled, released to meet higher minimum flow requirements under the Flow Management Standard (FMS), or released to meet demands in the Delta. Higher storage in Folsom Lake can trigger higher minimum flow requirements under the FMS in periods such as October through December when FMS flows are based in part on end-of-September storage, or the summer when FMS flows may be adjusted based on forecasted end-of-September storage.

Table B-29. Summary of American River at Nimbus Dam Flows under Alternative 2 and Change from the No Action Alternative (cfs)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	1,686	3,447	5,755	8,654	9,114	6,045	5,176	5,950	5,798	3,851	3,128	4,380
Above Normal	1,707	3,403	3,067	4,645	6,164	5,311	3,461	3,612	3,248	4,418	2,346	3,417
Below Normal	1,854	2,154	2,529	2,237	4,101	2,505	3,031	2,846	2,692	4,783	1,826	2,443
Dry	1,565	2,017	1,728	1,652	1,894	2,093	1,927	1,741	2,433	3,310	2,266	1,444
Critical	1,498	1,846	1,554	1,351	1,202	913	1,056	1,129	1,539	1,760	1,380	1,019
All Years	**1,664**	**2,672**	**3,312**	**4,366**	**5,083**	**3,715**	**3,243**	**3,448**	**3,533**	**3,668**	**2,346**	**2,772**

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Change from No Action Alternative												
Wet	17	20	30	31	16	3	2	8	9	4	-1	32
Above Normal	86	11	47	94	25	3	9	13	18	16	2	15
Below Normal	32	2	15	19	53	14	181	55	64	34	-28	108
Dry	-7	21	18	10	65	70	49	22	51	118	225	-16
Critical	15	34	60	41	1	2	3	5	-25	149	203	51
All Years	**24**	**18**	**32**	**35**	**32**	**19**	**44**	**20**	**24**	**57**	**74**	**35**

Results summarized in Table B-30 show changes in lower American River flow at H Street. Changes in flow at H Street are essentially the same as changes in Nimbus Dam releases presented in Table B-29.

Table B-30. Summary of American River at H Street Flows under Alternative 2 and Change from the No Action Alternative (TAF)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	1,523	3,338	5,614	8,522	8,927	5,852	4,977	5,727	5,517	3,186	2,550	4,168
Above Normal	1,554	3,272	2,893	4,546	6,047	5,148	3,259	3,409	2,988	3,783	1,769	3,212
Below Normal	1,682	2,020	2,354	2,094	3,976	2,339	2,856	2,641	2,439	4,229	1,308	2,246
Dry	1,403	1,883	1,562	1,511	1,754	1,951	1,739	1,543	2,189	2,875	1,860	1,243
Critical	1,334	1,696	1,394	1,201	1,060	762	877	951	1,315	1,465	1,101	830
All Years	**1,501**	**2,544**	**3,152**	**4,233**	**4,934**	**3,548**	**3,053**	**3,244**	**3,276**	**3,131**	**1,860**	**2,570**
Change from No Action Alternative												
Wet	16	20	30	31	16	3	2	8	9	4	-1	32
Above Normal	86	10	40	94	23	3	9	13	17	16	2	15
Below Normal	32	2	15	18	53	13	181	53	62	34	-28	108
Dry	-7	21	17	10	65	70	48	22	50	97	207	-18
Critical	15	34	60	40	0	-1	1	5	-25	149	201	49
All Years	**24**	**18**	**31**	**35**	**32**	**19**	**44**	**19**	**23**	**52**	**70**	**34**

Results summarized in Table B-31 show changes in lower Feather River flow. These changes generally occur from changes in the timing of when water is moved from Lake Oroville to SWP San Luis Reservoir.

Table B-31. Summary of Lower Feather River Flows under Alternative 2 and Change from the No Action Alternative (cfs)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	3,955	4,484	10,352	22,636	25,866	23,672	15,954	14,390	10,269	8,462	5,669	10,784
Above Normal	2,882	3,178	5,782	10,795	12,619	19,270	9,849	8,164	6,426	9,648	7,961	9,871
Below Normal	3,417	2,557	3,664	5,371	8,225	6,840	5,330	4,764	4,670	9,495	8,492	6,360
Dry	2,977	2,213	3,253	4,260	4,215	4,570	4,124	3,684	3,927	7,808	4,872	5,522
Critical	2,484	1,824	2,598	3,378	3,091	2,630	3,255	2,461	2,494	5,092	1,966	2,254
All Years	**3,276**	**3,076**	**5,848**	**11,104**	**12,830**	**12,882**	**8,791**	**7,740**	**6,221**	**8,175**	**5,770**	**7,492**
Change from No Action Alternative												
Wet	22	-4	-110	2	-12	2	-4	-4	-5	-2	-8	-2
Above Normal	-2	-8	29	2	-12	-44	-4	-4	-5	-7	4	-10
Below Normal	-17	-30	-8	-5	42	-4	-2	26	-85	36	-27	-117
Dry	1	0	-4	-3	-8	-5	-11	-17	-110	-24	95	230
Critical	3	-4	111	-4	-4	-6	-43	-54	-126	221	-151	-1
All Years	**4**	**-8**	**-17**	**-1**	**-1**	**-8**	**-11**	**-9**	**-59**	**32**	**-8**	**29**

Results summarized in Table B-32 show changes in Delta inflow from the Sacramento River Basin. Results are presented in thousands of acre-feet to better illustrate the shifts in water supplies. Under Alternative 2, more water enters the Delta from the Sacramento River and Yolo Bypass because of a reduction in NOD M&I deliveries. The average annual increase in Delta inflow is 25 TAF. This value is different from the values presented in Table B-20 that show an average annual reduction in NOD CVP M&I delivery of 77 TAF and an average annual increase in NOD agricultural delivery of 13 TAF. Values in Table B-20 include CVP M&I deliveries to CCWD that divert water from within the Delta.

Table B-32. Summary of Delta Inflows from Sacramento Basin under Alternative 2 and Change from the No Action Alternative (TAF)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Wet	814	1,306	2,809	4,713	4,888	4,351	2,653	1,991	1,431	1,224	995	1,686	28,861
Above Normal	650	994	1,489	2,779	3,202	3,206	1,632	1,309	975	1,346	1,015	1,326	19,923
Below Normal	683	823	1,143	1,453	1,912	1,464	1,079	874	815	1,308	995	861	13,410
Dry	611	757	1,002	1,093	1,291	1,280	803	677	735	1,144	822	745	10,960
Critical	573	573	717	891	870	815	610	488	544	812	526	446	7,865
All Years	**688**	**950**	**1,629**	**2,520**	**2,756**	**2,499**	**1,530**	**1,192**	**977**	**1,178**	**891**	**1,104**	**17,913**

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Change from No Action Alternative													
Wet	6	-7	-9	-3	1	0	-1	0	0	-1	-1	-1	-16
Above Normal	-2	-2	5	6	2	-2	0	4	0	0	-1	0	10
Below Normal	1	0	1	0	8	2	12	9	-1	-2	-3	-1	26
Dry	-1	-1	2	1	5	3	6	6	-2	3	45	12	80
Critical	2	-1	10	5	-3	0	9	4	-11	24	4	5	46
All Years	**2**	**-3**	**0**	**1**	**2**	**1**	**4**	**4**	**-2**	**4**	**10**	**3**	**25**

Results summarized in Table B-33 show changes in Delta outflow under Alternative 2 compared to the No Action Alternative. Delta outflow increases under Alternative 2 due to the increase in Delta inflow from the Sacramento River and because of simulated in-Delta transfers for CCWD. CalSim II simulates the transfer of water from in-Delta agricultural users to CCWD per existing agreements. These transfers reduce the consumptive use of water in the Delta and provide an additional source of water for CCWD. The average annual reduction in Delta consumptive use between Alternative 2 and the No Action Alternative is approximately 23 TAF. The result is no net change in CCWD diversion; however, the source of water shifts under Alternative 2 from CVP supplies to transfer supplies.

Table B-33. Summary of Delta Outflow under Alternative 2 and Change from the No Action Alternative (TAF)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Wet	471	1,052	2,724	5,182	5,287	4,826	3,303	2,496	1,374	689	314	1,172	28,889
Above Normal	339	730	1,147	2,917	3,408	3,265	1,963	1,512	702	585	246	704	17,517
Below Normal	340	509	746	1,350	2,026	1,420	1,352	992	470	458	246	243	10,151
Dry	322	495	544	890	1,178	1,202	870	636	400	311	263	213	7,325
Critical	292	366	359	695	744	733	539	380	322	249	218	179	5,076
All Years	**370**	**689**	**1,331**	**2,597**	**2,888**	**2,622**	**1,835**	**1,377**	**754**	**487**	**267**	**589**	**15,807**
Change from No Action Alternative													
Wet	2	-7	-10	-2	2	2	-1	-1	0	0	0	0	-13
Above Normal	3	0	6	11	0	-3	0	4	0	3	0	-1	24
Below Normal	1	-2	-17	0	17	4	12	10	-2	12	0	3	38
Dry	1	-5	3	2	4	3	6	6	0	1	9	7	37
Critical	5	-1	3	8	2	1	10	12	3	-2	-12	1	29
All Years	**2**	**-4**	**-4**	**3**	**5**	**2**	**5**	**5**	**0**	**2**	**0**	**2**	**18**

As seen in the following tables, Delta exports at both Jones and Banks pumping plants increase under Alternative 2. Delta outflow increases in order to maintain water quality standards with the increased exports. Delta outflow also increases from additional spill from Folsom Lake.

Results summarized in Table B-34 show increases in Jones Pumping Plant exports under Alternative 2. CVP exports increase as a result of higher SOD agricultural allocations and the relative magnitude of the volume of SOD agricultural water service contracts as compared to NOD water service contract volumes. Results show increased CVP exports occur primarily in the months of July and August and in drier years when water is reallocated from NOD M&I to SOD agriculture.

Table B-34. Summary of Jones Pumping Plant Exports under Alternative 2 and Change from the No Action Alternative (TAF)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Wet	230	231	246	217	216	230	92	99	224	281	283	260	2,608
Above Normal	211	233	246	178	184	225	64	55	190	253	283	261	2,382
Below Normal	236	242	267	183	159	178	61	53	139	268	256	261	2,303
Dry	214	207	255	202	159	137	60	54	95	254	198	231	2,065
Critical	216	206	214	168	132	94	53	51	32	115	138	146	1,565
All Years	**223**	**224**	**247**	**195**	**177**	**180**	**70**	**68**	**148**	**244**	**238**	**237**	**2,251**
Change from No Action Alternative													
Wet	3	2	-3	0	-1	-2	0	0	0	0	0	0	-1
Above Normal	-3	1	1	-2	4	1	0	0	0	1	0	2	4
Below Normal	2	5	4	-9	1	0	0	0	1	3	8	-1	12
Dry	0	2	0	0	4	1	0	0	3	7	21	4	41
Critical	1	3	3	0	-1	-1	0	0	5	4	19	2	36
All Years	**1**	**2**	**0**	**-2**	**1**	**-1**	**0**	**0**	**2**	**3**	**9**	**1**	**17**

Results summarized in Table B-35 show increases in Banks Pumping Plant exports under Alternative 2. Increases in SWP exports reflect a shift in moving more water from Lake Oroville to SOD, and the ability of the SWP to pick up additional spills from Folsom Lake during some years and months.

Table B-35. Summary of Banks Pumping Plant Exports under Alternative 2 and Change from the No Action Alternative (TAF)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Wet	237	252	309	273	314	359	109	112	245	424	437	375	3,444
Above Normal	182	177	333	208	218	274	63	51	195	410	431	395	2,936
Below Normal	202	208	328	207	205	253	64	49	132	428	437	393	2,904
Dry	170	178	330	199	171	148	59	55	85	396	273	311	2,375
Critical	148	93	223	176	143	100	46	44	28	243	63	106	1,412
All Years	**195**	**194**	**308**	**222**	**225**	**244**	**74**	**70**	**151**	**390**	**345**	**328**	**2,746**
Change from No Action Alternative													
Wet	2	0	3	0	0	0	0	0	0	0	0	0	4
Above Normal	2	0	0	0	0	0	0	0	0	-1	0	0	1
Below Normal	0	0	16	10	-9	-2	0	0	-1	-1	0	2	16
Dry	1	5	0	0	-1	-1	0	0	-3	3	19	8	32
Critical	0	1	9	1	1	0	0	-1	-5	23	-2	3	31
All Years	**1**	**1**	**5**	**2**	**-2**	**0**	**0**	**0**	**-2**	**4**	**4**	**3**	**16**

The following figures, compiled in Figure B-9, illustrate the probability of exceedance for Folsom Lake water surface elevation being above or below levels of concern for M&I diversion capacity under Alternative 2 and the No Action Alternative. Figure B-9 shows simulated Folsom Lake water surface elevations under Alternative 2 are higher than those under the No Action Alternative. The probability of the water surface elevation being below elevation 350 is less under Alternative 2 from October through January, and in August and September. Simulated water surface elevations remain above elevation 350 feet in December and January under Alternative 2.

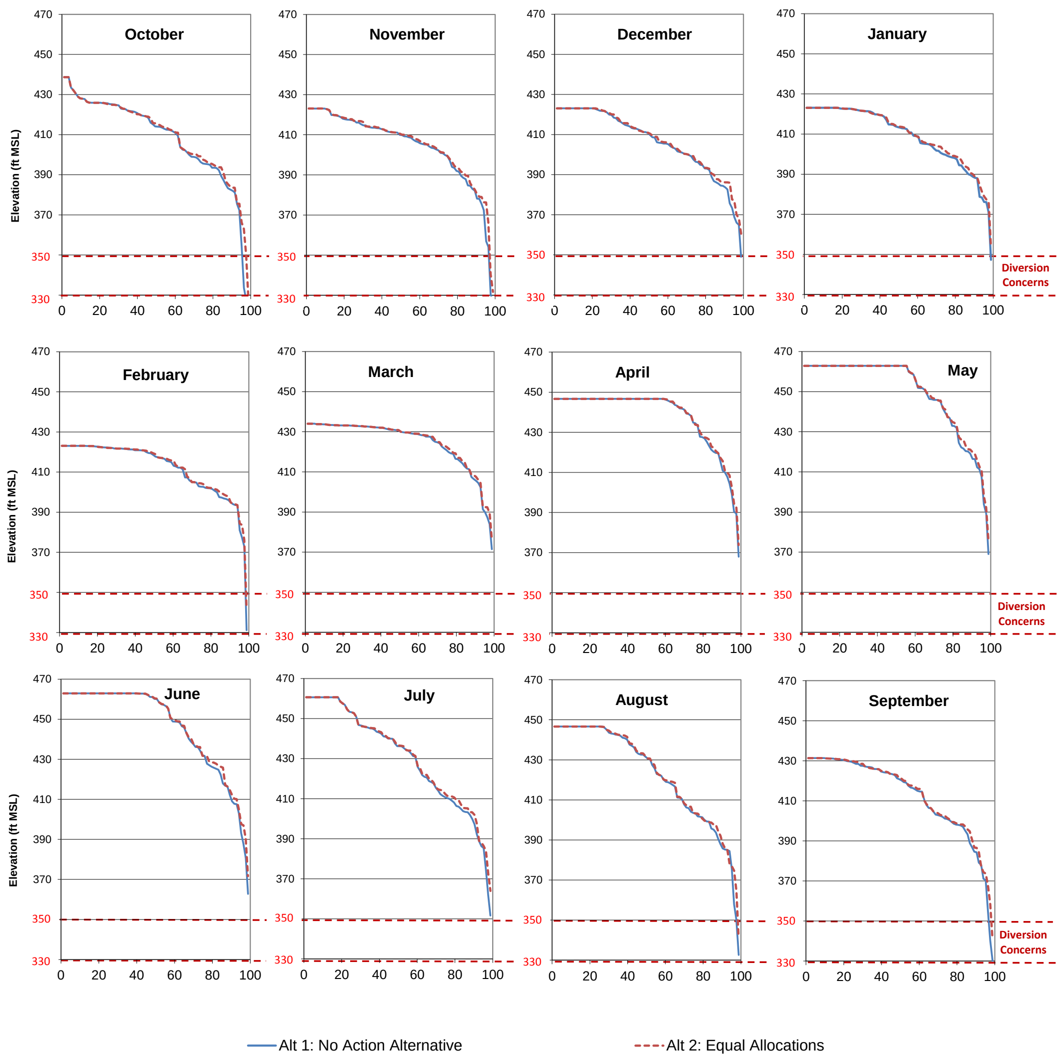


Figure B-9. Probability of Exceedance for Folsom Lake Water Surface Elevation under Alternative 2 and the No Action Alternative

B.5 Alternative 3: Full M&I Allocation Preference

Under Alternative 3, Full M&I Allocation Preference, M&I water service contractors would ~~a 100 percent~~receive a higher allocation as compared to all other alternatives. Under this alternative, Reclamation would attempt to provide a 100 percent allocation to M&I water service contractors during a Condition of Shortage~~water shortage conditions~~, to the extent that adequate CVP water supplies are available. This would be achieved by reducing ~~the~~ allocations to agricultural water service contractors as needed to maximize the frequency of 100 percent allocations to M&I water service contractors.

This allocation methodology would provide the lowest volume of CVP water to agricultural water service contractors compared to all other alternatives. Also, this alternative will facilitate a tradeoff analysis that considers the potential effects associated with providing larger volumes of CVP water to M&I water service contractors.

In years when CVP water supplies are not adequate to provide 100 percent allocation to all water service contractors, M&I water service contractor allocations are maintained at 100 percent of their Contract Total as agricultural water service contractor allocations are reduced as needed to provide for the 100 percent allocation to ~~the~~ M&I water service contractors. In years when agricultural water service contractor allocations are reduced to zero and CVP water supplies are not adequate to provide ~~the~~ a 100 percent allocation to ~~the~~ M&I water service contractors, then allocation to M&I water service contractors would be reduced based on ~~the~~ available CVP water supply. Under Alternative 3~~these low water supply conditions~~, M&I water service contractor allocations could theoretically be reduced to zero.

The allocation of available CVP water supplies between M&I and agricultural water service contractors during a Condition of ~~s~~Shortages ~~conditions~~ is presented in Table B-36.

Table B-36. Alternative 3, Full M&I Allocation Preference, Water Allocation Steps

Allocation Step	Allocation to Agricultural Water Service Contractors (% of Contract Total)	Allocation to M&I Water Service Contractors (% of Contract Total)
1	100%	100%
2	95%	100%
3	90%	100%
4	85%	100%
5	80%	100%
6	75%	100%
7	70%	100%
8	65%	100%
9	60%	100%
10	55%	100%
11	50%	100%
12	45%	100%
13	40%	100%
14	35%	100%
15	30%	100%
16	25%	100%
17	20%	100%
18	15%	100%
19	10%	100%
20	5%	100%
21[1]	0%	Between 100% to 0%

[1] Once agricultural water service contractor allocations have been reduced to zero and if CVP water supplies are not adequate to provide the full allocation to the M&I water service contractor allocations, then the allocation to the M&I water service contractors would be reduced and the M&I allocations would equal available CVP water supply.

B.5.1 Full M&I Preference Alternative Results

Results from Alternative 3 are summarized and compared to the No Action Alternative. The primary difference between the No Action Alternative and ~~the~~ Alternative 3 is the method used to share water between CVP agricultural and M&I water service contractors during a Condition of Shortage~~times of shortage~~. Therefore, key outputs from the model are simulated allocations to NOD and SOD agricultural and M&I water service contractors and simulated deliveries. Figures B-~~8~~ 10 and B-~~9~~ 11 and Tables B-37 and B-38 summarize these results for Alternative 3 and compare with results from the No Action Alternative.

Figure B-~~8~~10 illustrates simulated M&I water service contract allocations for NOD and SOD contractors for Alternative 3 and the No Action Alternative. Under Alternative 3, M&I allocations are equal for both NOD and SOD contractors, because it is possible to convey enough water through the Delta for SOD M&I contractors. The probability of full M&I allocations under this alternative is greater than 90 percent. M&I allocations are reduced from 100 percent under Alternative 3 only when there is not enough water to meet all M&I contractors at a 100 percent allocation.

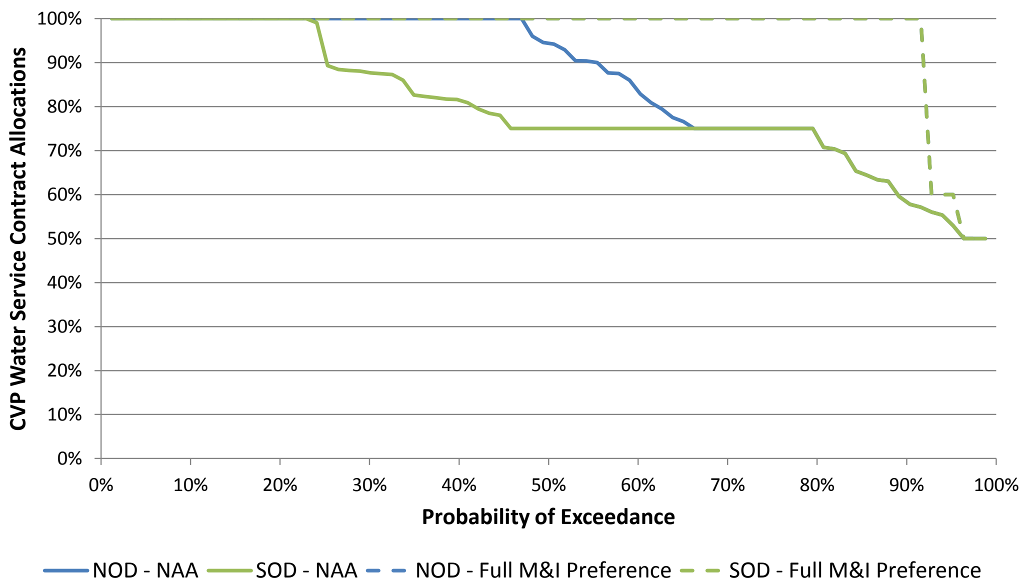


Figure B-10. Comparison of CVP M&I Water Service Contract Allocations under Alternative 3 and the No Action Alternative

Figure B-~~9~~11 illustrates simulated agricultural water service contract allocations for NOD and SOD contractors for Alternative 3 and the No Action Alternative. Allocations to agricultural water service contractors are reduced more frequently with this alternative in order to maintain M&I allocations at 100 percent.

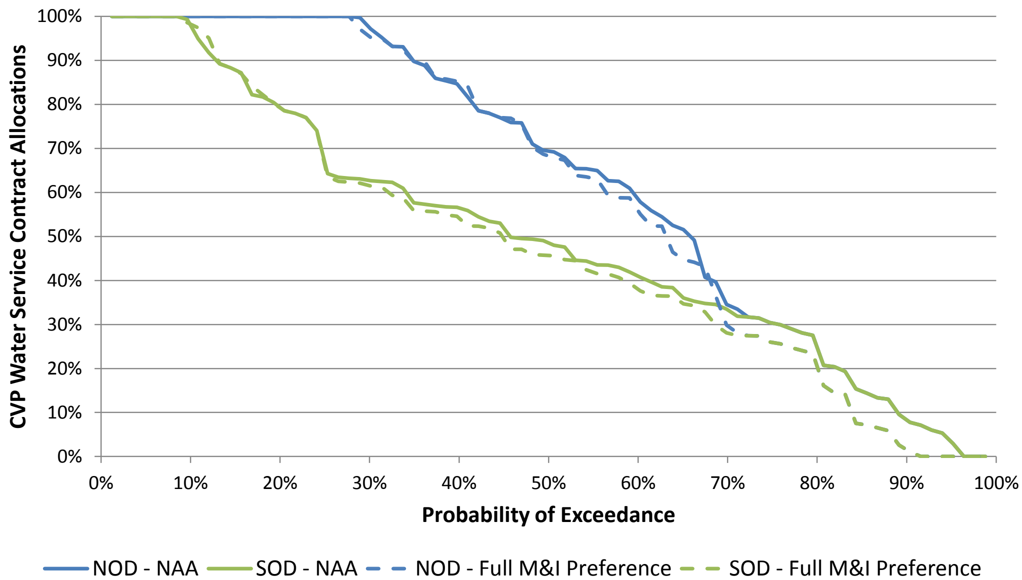


Figure B-11. Comparison of CVP Agricultural Water Service Contract Allocations under Alternative 3 and the No Action Alternative

Table B-37 compares CVP water service contract allocations under Alternative 3 with the No Action Alternative. Results in this table show how M&I allocations are increased and agricultural allocations are decreased in most years. Of particular interest are the shifts in allocations during critical drought periods, such as what occurred from 1929 through 1934, in 1976 and 1977, and in 1987 through 1992. In these years, under the No Action Alternative, M&I allocations are typically 50 percent greater than agricultural allocations. Under Alternative 3, M&I allocations are increased by approximately 27 percent and agricultural allocations are decreased approximately 5 percent.

Table B-37. Comparison of Annual CVP Water Service Contract Allocations under the No Action Alternative and Alternative 3 (Percent of Contract Total)

	Alternative 3				Change from No Action Alternative (Alternative 3 minus the No Action Alternative)			
	M&I		Ag		M&I		Ag	
Year	NOD	SOD	NOD	SOD	NOD	SOD	NOD	SOD
1922	100%	100%	100%	88%	0%	0%	0%	0%
1923	100%	100%	55%	46%	17%	25%	-3%	-2%
1924	100%	100%	0%	0%	43%	43%	-7%	-7%
1925	100%	100%	52%	52%	19%	19%	-4%	-4%
1926	100%	100%	7%	7%	36%	36%	-8%	-8%
1927	100%	100%	100%	56%	0%	18%	0%	-1%
1928	100%	100%	46%	42%	23%	25%	-5%	-2%

Year	Alternative 3				Change from No Action Alternative (Alternative 3 minus the No Action Alternative)			
	M&I		Ag		M&I		Ag	
	NOD	SOD	NOD	SOD	NOD	SOD	NOD	SOD
1929	50%	50%	0%	0%	0%	0%	0%	0%
1930	100%	100%	7%	7%	35%	35%	-8%	-8%
1931	100%	100%	1%	1%	42%	42%	-7%	-7%
1932	100%	100%	8%	8%	37%	37%	-6%	-6%
1933	60%	60%	0%	0%	7%	7%	-3%	-3%
1934	100%	100%	3%	3%	40%	40%	-7%	-7%
1935	100%	100%	23%	23%	25%	25%	-4%	-4%
1936	100%	100%	45%	45%	25%	25%	5%	5%
1937	100%	100%	28%	28%	25%	25%	-5%	-5%
1938	100%	100%	100%	100%	0%	0%	0%	0%
1939	100%	100%	26%	26%	25%	25%	-5%	-5%
1940	100%	100%	92%	46%	0%	25%	-1%	-2%
1941	100%	100%	100%	80%	0%	0%	0%	0%
1942	100%	100%	100%	89%	0%	0%	0%	0%
1943	100%	100%	79%	79%	0%	0%	0%	0%
1944	100%	100%	16%	16%	29%	29%	-5%	-5%
1945	100%	100%	59%	59%	12%	12%	-3%	-3%
1946	100%	100%	85%	61%	0%	13%	0%	-1%
1947	100%	100%	36%	36%	25%	25%	-4%	-4%
1948	100%	100%	86%	27%	0%	25%	1%	-4%
1949	100%	100%	67%	56%	7%	18%	-1%	-1%
1950	100%	100%	24%	24%	25%	25%	-4%	-4%
1951	100%	100%	93%	62%	0%	12%	0%	-1%
1952	100%	100%	100%	100%	0%	0%	0%	0%
1953	100%	100%	100%	42%	0%	25%	0%	-2%
1954	100%	100%	97%	41%	0%	25%	0%	-2%
1955	100%	100%	27%	27%	25%	25%	-4%	-4%
1956	100%	100%	100%	82%	0%	0%	0%	0%
1957	100%	100%	69%	33%	5%	25%	-1%	-2%
1958	100%	100%	100%	99%	0%	0%	0%	-1%
1959	100%	100%	64%	34%	10%	25%	-2%	-2%
1960	100%	100%	26%	26%	25%	25%	-4%	-4%
1961	100%	100%	43%	38%	22%	25%	-9%	-12%
1962	100%	100%	77%	44%	0%	25%	1%	0%
1963	100%	100%	100%	46%	0%	25%	0%	-4%
1964	100%	100%	30%	30%	25%	25%	-5%	-5%
1965	100%	100%	78%	78%	0%	0%	0%	0%
1966	100%	100%	86%	47%	0%	25%	0%	-2%
1967	100%	100%	100%	100%	0%	0%	0%	0%
1968	100%	100%	63%	37%	10%	25%	-2%	-2%
1969	100%	100%	100%	100%	0%	0%	0%	0%
1970	100%	100%	64%	61%	10%	13%	-2%	-1%
1971	100%	100%	90%	35%	0%	25%	1%	-1%

	Alternative 3				**Change from No Action Alternative (Alternative 3 minus the No Action Alternative)**			
	M&I		**Ag**		**M&I**		**Ag**	
Year	**NOD**	**SOD**	**NOD**	**SOD**	**NOD**	**SOD**	**NOD**	**SOD**
1972	100%	100%	44%	39%	25%	25%	-5%	-3%
1973	100%	100%	95%	55%	0%	18%	0%	-2%
1974	100%	100%	100%	87%	0%	0%	0%	0%
1975	100%	100%	100%	64%	0%	11%	0%	-1%
1976	60%	60%	0%	0%	4%	4%	-6%	-6%
1977	60%	60%	0%	0%	5%	5%	-5%	-5%
1978	100%	100%	100%	97%	0%	0%	0%	6%
1979	100%	100%	52%	52%	21%	21%	-2%	-2%
1980	100%	100%	84%	84%	0%	0%	2%	2%
1981	100%	100%	68%	41%	6%	25%	-1%	-2%
1982	100%	100%	100%	100%	0%	0%	0%	0%
1983	100%	100%	100%	100%	0%	0%	0%	0%
1984	100%	100%	90%	63%	0%	12%	0%	-1%
1985	100%	100%	70%	51%	4%	22%	-1%	-2%
1986	100%	100%	59%	59%	14%	14%	-2%	-2%
1987	100%	100%	14%	14%	30%	30%	-6%	-6%
1988	50%	50%	0%	0%	0%	0%	0%	0%
1989	100%	100%	25%	25%	25%	25%	-4%	-4%
1990	50%	50%	0%	0%	0%	0%	0%	0%
1991	100%	100%	6%	6%	37%	37%	-7%	-7%
1992	100%	100%	14%	14%	31%	31%	-5%	-5%
1993	100%	100%	95%	62%	0%	12%	-5%	-1%
1994	100%	100%	59%	55%	12%	17%	-4%	-3%
1995	100%	100%	100%	95%	0%	0%	0%	0%
1996	100%	100%	100%	74%	0%	1%	0%	0%
1997	100%	100%	77%	77%	0%	0%	0%	0%
1998	100%	100%	100%	100%	0%	0%	0%	0%
1999	100%	100%	100%	56%	0%	18%	0%	-1%
2000	100%	100%	100%	52%	0%	22%	0%	-2%
2001	100%	100%	27%	27%	25%	25%	-4%	-4%
2002	100%	100%	76%	36%	0%	25%	0%	-2%
2003	100%	100%	100%	47%	0%	25%	0%	-2%

Table B-38~~7~~ provides a summary of the average annual March through February contract year delivery to M&I and agricultural water service contractors in the NOD and SOD service areas by year type. The year type is the Sacramento Valley Water Year Type based on the 40-30-30 index. Results are presented for Alternative 3 and the change in delivery from the No Action Alternative.

Table B-38. Summary of CVP Water Service Contract Deliveries under Alternative 3 and Change from the No Action Alternative (TAF)

	M&I		Ag		Total		
Year Type	**NOD**	**SOD**	**NOD**	**SOD**	**NOD**	**SOD**	**Total**
Wet	394	206	290	1,343	684	1,550	2,234
Above Normal	416	202	279	1,044	696	1,247	1,942
Below Normal	406	207	179	704	585	911	1,496
Dry	413	205	110	493	523	698	1,221
Critical	363	155	22	98	385	253	637
All Years	**399**	**198**	**190**	**819**	**588**	**1,017**	**1,605**
Change from No Action Alternative							
Wet	3	13	0	-11	3	2	5
Above Normal	9	29	-2	-9	7	20	28
Below Normal	47	48	-5	-37	42	11	53
Dry	81	55	-14	-80	67	-25	42
Critical	64	38	-14	-72	50	-34	16
All Years	**38**	**34**	**-6**	**-40**	**31**	**-5**	**26**

Results presented in Table B-38~~7~~ show the increase in deliveries to M&I contractors and the reduction to NOD and SOD agricultural contractors ~~north and south of Delta~~. The largest magnitude changes in deliveries occur in dry years as in these years M&I allocations are less than 100 percent, but there is still water allocated to agricultural contractors in the No Action Alternative. Under Alternative 3, this water is allocated to M&I contractors. Changes in critical years are less than dry years because in some critical years agricultural allocations are already zero under the No Action Alternative and cannot be further reduced to increase M&I allocations under Alternative 3.

The following tables provide a summary of average monthly values for key system parameters in the CVP and SWP by Sacramento Valley Water Year Type. Results for Alternative 3 are presented, followed by the change from the No Action Alternative.

Results summarized in Table B-39 show relatively small changes Trinity Lake storage as compared to the No Action Alternative. Trinity Lake storage can change in response to differences in CVP allocations that can directly affect Trinity Lake operations, or can indirectly affect Trinity Lake by changing storage in other CVP reservoirs. These changes in other CVP reservoirs can affect the storage balance between all CVP reservoirs and change operations.

Table B-39. Summary of Trinity Lake Storage under Alternative 3 and Change from the No Action Alternative (TAF)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	1,529	1,558	1,655	1,763	1,923	2,060	2,238	2,272	2,249	2,119	1,998	1,846
Above Normal	1,384	1,386	1,461	1,586	1,734	1,902	2,071	2,076	2,045	1,926	1,787	1,644
Below Normal	1,281	1,288	1,307	1,365	1,440	1,536	1,708	1,692	1,649	1,526	1,383	1,277
Dry	1,302	1,309	1,335	1,347	1,428	1,556	1,690	1,642	1,581	1,415	1,253	1,140
Critical	1,002	988	994	971	1,010	1,081	1,141	1,114	1,083	941	791	723
All Years	**1,338**	**1,349**	**1,401**	**1,462**	**1,571**	**1,694**	**1,842**	**1,836**	**1,799**	**1,663**	**1,522**	**1,400**
Change from No Action Alternative												
Wet	0	0	0	0	0	-1	0	0	0	0	0	0
Above Normal	9	1	1	4	-1	-1	-1	-1	-1	0	0	2
Below Normal	7	7	7	6	6	6	8	8	8	8	9	9
Dry	3	3	3	2	2	3	5	4	4	2	1	-1
Critical	-6	-6	-3	-1	-1	-2	-1	-1	0	0	-2	0
All Years	**2**	**1**	**2**	**2**	**1**	**1**	**2**	**2**	**2**	**2**	**1**	**2**

Results summarized in Table B-40 show the differences in Shasta Lake storage under Alternative 3, as compared to the No Action Alternative. Shasta Lake storage is higher in critical years and on average across all years. These changes may be due in part to lower agricultural allocations that reduce CVP SOD deliveries under Alternative 3. Reduced SOD deliveries can result in less demand on Shasta Lake since the majority of increased CVP deliveries in Alternative 3 occur within the American River Basin. However, it should be noted that the magnitude of the changes presented in Table B-40 is small relative to the volumes of water stored, released, and delivered in the CVP.

Table B-40. Summary of Shasta Lake Storage under Alternative 3 and Change from the No Action Alternative (TAF)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	2,848	2,878	3,147	3,419	3,640	3,860	4,316	4,473	4,289	3,874	3,526	3,121
Above Normal	2,535	2,484	2,663	3,152	3,413	3,968	4,414	4,477	4,122	3,542	3,212	3,022
Below Normal	2,646	2,596	2,669	2,984	3,328	3,721	4,096	4,121	3,781	3,251	2,936	2,884
Dry	2,484	2,482	2,642	2,815	3,177	3,660	3,805	3,721	3,339	2,824	2,542	2,490
Critical	2,170	2,094	2,155	2,304	2,460	2,691	2,633	2,513	2,133	1,668	1,378	1,332
All Years	**2,589**	**2,570**	**2,739**	**3,010**	**3,279**	**3,637**	**3,935**	**3,962**	**3,654**	**3,166**	**2,849**	**2,666**

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Change from No Action Alternative												
Wet	-6	-3	-3	-1	0	0	1	3	4	4	5	3
Above Normal	-5	-1	0	1	-1	0	0	1	0	-1	-2	-9
Below Normal	7	6	5	6	6	7	7	8	9	3	3	3
Dry	-4	-11	-9	-7	-7	-9	-9	-4	-5	-10	-6	-1
Critical	17	18	19	15	17	16	16	15	12	12	0	2
All Years	**0**	**0**	**1**	**2**	**2**	**2**	**2**	**3**	**4**	**1**	**1**	**0**

Results summarized in Table B-41 show the differences in Folsom Lake storage under Alternative 3 as compared to the No Action Alternative. Folsom Lake storage is consistently lower in Alternative 3 than in the No Action Alternative. The full M&I preference for allocations in Alternative 3 increases CVP deliveries to American River Division contractors and diversions out of Folsom Lake. These diversions reduce storage in Folsom Lake.

Table B-41. Summary of Folsom Lake Storage under Alternative 3 and Change from the No Action Alternative (TAF)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	513	477	517	520	505	634	792	963	958	866	766	601
Above Normal	459	401	417	512	533	649	794	965	938	741	674	550
Below Normal	486	457	450	492	535	624	784	925	902	681	635	574
Dry	462	432	438	433	495	601	703	773	703	532	466	443
Critical	408	359	335	320	336	403	439	458	417	333	281	251
All Years	**474**	**435**	**447**	**466**	**487**	**593**	**720**	**841**	**810**	**665**	**593**	**503**
Change from No Action Alternative												
Wet	-1	-1	0	0	0	0	0	0	0	0	-1	0
Above Normal	-2	-2	0	0	0	0	0	0	0	0	0	-2
Below Normal	1	0	0	-4	-3	-3	-1	0	0	-2	-4	-1
Dry	1	0	0	-1	0	1	0	-1	0	-6	3	3
Critical	-7	-10	-11	-13	-12	-8	-8	-6	-6	-9	-7	-9
All Years	**-1**	**-2**	**-2**	**-3**	**-2**	**-2**	**-1**	**-1**	**-1**	**-3**	**-2**	**-1**

Results in Table B-42 show the differences in Lake Oroville storage. Lake Oroville storage is generally lower in Alternative 3 than in the No Action Alternative, particularly in critical years. Lake Oroville storage changes as a result of changes in CVP operations because the two projects are linked by the COA.

Table B-42. Summary of Lake Oroville Storage under Alternative 3 and Change from the No Action Alternative (TAF)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	1,991	2,090	2,418	2,660	2,858	2,945	3,304	3,508	3,484	3,123	2,913	2,443
Above Normal	1,688	1,783	1,880	2,282	2,619	2,943	3,304	3,498	3,395	2,824	2,404	1,956
Below Normal	1,778	1,796	1,832	2,064	2,323	2,600	2,979	3,197	3,075	2,484	2,001	1,708
Dry	1,562	1,599	1,630	1,754	1,982	2,310	2,508	2,548	2,332	1,782	1,491	1,291
Critical	1,457	1,476	1,481	1,569	1,665	1,822	1,825	1,784	1,612	1,277	1,162	1,095
All Years	**1,738**	**1,797**	**1,929**	**2,145**	**2,365**	**2,582**	**2,857**	**2,990**	**2,874**	**2,406**	**2,114**	**1,796**
Change from No Action Alternative												
Wet	-3	-3	-3	-3	0	0	0	0	0	0	0	0
Above Normal	-5	-7	-5	-4	-3	0	0	0	0	0	0	0
Below Normal	-4	-3	-1	-1	2	2	2	2	-2	-2	-4	-7
Dry	-1	-1	1	-1	-1	-1	-1	-2	-7	-11	-14	-4
Critical	-17	-13	-18	-19	-22	-22	-22	-23	-23	-20	-11	-11
All Years	**-5**	**-4**	**-4**	**-5**	**-4**	**-3**	**-3**	**-3**	**-5**	**-6**	**-5**	**-4**

Results in Table B-43 show the effects of Alternative 3 on CVP San Luis Reservoir storage. Under Alternative 3, there is an average annual net reduction in CVP SOD deliveries of approximately 5 TAF (see Table B-38). Reduced deliveries and reduced CVP exports affect CVP San Luis Reservoir. There is also a seasonal shift in storage in many years due in part to the change in the delivery pattern when reducing agricultural deliveries in the summer months and increasing M&I deliveries in the fall and winter months.

Table B-43. Summary of CVP San Luis Reservoir Storage under Alternative 3 and Change from the No Action Alternative (TAF)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	224	362	530	664	785	893	810	649	489	295	181	206
Above Normal	186	334	507	628	723	828	723	520	337	156	83	126
Below Normal	226	376	558	674	745	812	720	541	340	234	154	208
Dry	249	368	546	680	743	772	686	520	310	228	110	136
Critical	257	376	535	652	715	724	673	567	389	282	232	214
All Years	**229**	**364**	**536**	**662**	**750**	**818**	**735**	**572**	**388**	**248**	**154**	**180**

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Change from No Action Alternative												
Wet	-2	-2	-4	-3	-2	-1	-1	-1	-1	-2	-1	-2
Above Normal	-7	-7	-10	1	4	5	4	1	-1	-3	-4	-1
Below Normal	-18	-16	-18	-14	0	-2	-3	-5	-13	-10	-15	-19
Dry	-8	-3	-10	-9	-9	-7	-4	-1	3	13	-4	-10
Critical	-8	-9	-5	-3	-3	-3	1	4	11	14	27	18
All Years	**-7**	**-6**	**-9**	**-6**	**-2**	**-2**	**-1**	**-1**	**-1**	**2**	**0**	**-4**

Results in Table B-44 show the change in storage in SWP San Luis Reservoir under Alternative 3. Changes in SWP operations are relatively small and differences in SWP San Luis Reservoir storage occur as a result of changes in the timing of moving water from Lake Oroville into SWP San Luis Reservoir and changes in SWP Delta exports.

Table B-44. Summary of SWP San Luis Reservoir Storage under Alternative 3 and Change from the No Action Alternative (TAF)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	475	501	617	716	799	878	711	500	371	396	436	526
Above Normal	353	351	513	619	665	730	563	331	202	233	297	434
Below Normal	347	352	483	571	641	693	538	320	176	223	300	435
Dry	359	376	540	673	760	789	648	453	249	289	219	289
Critical	342	299	397	527	594	613	538	434	275	269	163	147
All Years	**390**	**397**	**530**	**640**	**714**	**767**	**621**	**424**	**272**	**301**	**305**	**390**
Change from No Action Alternative												
Wet	1	1	1	2	3	1	1	1	1	0	0	0
Above Normal	6	4	5	5	5	4	3	3	-1	1	2	3
Below Normal	-3	-4	-7	-7	-9	-4	-4	-3	-1	0	1	0
Dry	4	7	-7	-8	-7	-5	-5	-5	-1	2	12	1
Critical	9	8	1	5	10	9	9	11	8	8	5	5
All Years	**3**	**3**	**-1**	**-1**	**0**	**1**	**0**	**1**	**1**	**2**	**4**	**2**

Results in Table B-45 show the relatively small changes in the timing of releases from Keswick Reservoir. These changes in timing affect flows on the upper Sacramento River and in many instances reflect model nuances more than expected changes in actual operations under Alternative 3.

Table B-45. Summary of Sacramento River at Keswick Dam Flows under Alternative 3 and Change from the No Action Alternative (cfs)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	6,620	7,874	11,335	16,107	18,407	16,245	9,479	9,474	10,504	12,897	11,042	12,795
Above Normal	6,584	6,982	5,491	7,629	14,539	8,365	6,087	7,908	11,324	14,311	10,469	8,727
Below Normal	6,070	6,045	5,199	4,257	5,944	4,782	5,185	6,980	10,768	13,204	10,002	5,344
Dry	5,647	5,536	3,910	3,889	3,753	3,747	5,692	7,184	11,281	13,536	9,582	5,338
Critical	5,433	5,068	3,627	3,491	3,830	3,517	6,379	6,876	10,471	12,260	9,398	4,542
All Years	**6,134**	**6,507**	**6,674**	**8,315**	**10,363**	**8,529**	**6,964**	**7,936**	**10,835**	**13,203**	**10,220**	**8,083**
Change from No Action Alternative												
Wet	10	-50	8	-42	-15	20	-20	-22	-23	-4	-20	30
Above Normal	118	85	7	-14	39	-11	-1	-10	3	-1	16	89
Below Normal	-31	25	3	4	3	-14	-39	-19	-9	88	-11	6
Dry	-55	113	-31	-7	-1	1	-25	-67	1	137	-65	-47
Critical	-120	-30	-55	38	-51	36	-10	18	21	-4	237	-77
All Years	**-14**	**21**	**-11**	**-11**	**-6**	**8**	**-20**	**-24**	**-5**	**43**	**15**	**2**

Results in Table B-46 summarize the changes in Sacramento River flow at the NCP. These changes typically mirror changes seen upstream at Keswick Dam, but can reflect changes in deliveries to the Tehama-Colusa Canal and Redding Basin contractors.

Table B-46. Summary of Sacramento River at NCP Flows under Alternative 3 and Change from the No Action Alternative (cfs)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	6,920	11,008	17,341	19,131	19,844	18,294	13,442	10,385	6,441	6,555	6,080	12,622
Above Normal	6,086	9,046	10,775	16,524	19,102	17,631	10,207	7,451	5,791	7,001	5,317	8,357
Below Normal	5,452	7,780	8,273	12,382	14,414	12,043	7,031	5,442	5,244	6,302	4,930	4,922
Dry	5,024	7,431	8,697	8,870	11,612	11,320	5,291	4,499	5,283	6,948	4,730	4,973
Critical	5,033	5,345	6,029	7,911	8,758	8,185	4,025	4,027	4,956	6,319	5,284	4,053
All Years	**5,855**	**8,556**	**11,279**	**13,703**	**15,379**	**14,119**	**8,707**	**6,889**	**5,670**	**6,629**	**5,359**	**7,750**
Change from No Action Alternative												
Wet	11	5	8	3	3	8	-17	-17	-18	0	-16	35
Above Normal	123	93	11	0	6	3	5	-5	10	6	23	92
Below Normal	-28	31	11	8	4	0	-37	-17	-7	78	-16	-9
Dry	-55	120	-25	-1	4	2	-28	-62	21	128	-68	-50
Critical	-115	-23	-55	41	-54	46	-2	28	38	10	258	-93
All Years	**-12**	**44**	**-8**	**8**	**-4**	**10**	**-17**	**-18**	**5**	**44**	**18**	**-2**

Results in Table B-47 show changes in releases from Nimbus Dam to the lower American River under Alternative 3 as compared to the No Action Alternative. Nimbus release is generally reduced under Alternative 3 as a result of increases in CVP M&I deliveries out of Folsom Lake. Higher deliveries result in lower Folsom Lake storage. Lower Folsom Lake storage can reduce minimum flow requirements under the FMS that uses Folsom Lake storage during some months to determine the minimum flow. However, simulated flows under Alternative 3 meet the minimum flows under the FMS at all times. Lower storage in Folsom Lake also provides the opportunity to capture more water during periods of high inflow when more of the water is released for flood control in the No Action Alternative.

Table B-47. Summary of American River at Nimbus Flows under Alternative 3 and Change from the No Action Alternative (cfs)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	1,672	3,423	5,707	8,615	9,090	6,041	5,169	5,940	5,787	3,846	3,143	4,320
Above Normal	1,567	3,395	2,978	4,538	6,122	5,296	3,447	3,597	3,220	4,401	2,339	3,417
Below Normal	1,776	2,152	2,509	2,261	4,009	2,472	2,785	2,737	2,584	4,738	1,849	2,261
Dry	1,570	2,009	1,708	1,642	1,796	1,966	1,848	1,687	2,307	3,216	1,843	1,397
Critical	1,513	1,843	1,496	1,313	1,170	833	993	1,049	1,514	1,614	1,102	986
All Years	**1,629**	**2,660**	**3,267**	**4,334**	**5,028**	**3,666**	**3,170**	**3,401**	**3,475**	**3,615**	**2,220**	**2,707**
Change from No Action Alternative												
Wet	3	-4	-18	-8	-7	-2	-5	-1	-2	-1	13	-28
Above Normal	-54	3	-43	-13	-17	-12	-4	-2	-11	-1	-6	15
Below Normal	-46	0	-5	43	-39	-19	-66	-54	-44	-10	-4	-74
Dry	-2	13	-3	0	-33	-56	-30	-32	-75	23	-199	-64
Critical	30	31	2	4	-31	-78	-59	-74	-51	3	-75	19
All Years	**-11**	**7**	**-13**	**4**	**-23**	**-29**	**-29**	**-28**	**-34**	**3**	**-52**	**-31**

Results summarized in Table B-48 show changes in lower American River flow at H Street. Changes in flow at H Street are essentially the same as changes in Nimbus Dam releases presented in Table B-47. Simulated flows at H Street meet minimum flow requirements at all times.

Table B-48. Summary of American River at H Street Flows under Alternative 3 and Change from the No Action Alternative (TAF)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	1,510	3,314	5,566	8,484	8,904	5,848	4,971	5,719	5,506	3,182	2,565	4,108
Above Normal	1,415	3,266	2,810	4,440	6,009	5,137	3,252	3,399	2,960	3,765	1,762	3,212
Below Normal	1,605	2,018	2,334	2,118	3,884	2,308	2,610	2,535	2,333	4,185	1,332	2,064
Dry	1,408	1,876	1,542	1,501	1,657	1,826	1,662	1,490	2,063	2,803	1,454	1,200
Critical	1,351	1,693	1,336	1,165	1,031	687	821	873	1,291	1,320	825	810
All Years	**1,467**	**2,533**	**3,108**	**4,201**	**4,880**	**3,501**	**2,983**	**3,198**	**3,219**	**3,083**	**1,738**	**2,507**
Change from No Action Alternative												
Wet	3	-4	-18	-8	-7	-2	-4	0	-2	-1	13	-28
Above Normal	-53	4	-43	-12	-15	-8	2	3	-10	-1	-6	15
Below Normal	-46	1	-5	43	-39	-19	-65	-53	-43	-10	-4	-74
Dry	-2	13	-3	0	-33	-56	-29	-31	-75	24	-199	-61
Critical	31	31	2	4	-29	-75	-55	-73	-49	4	-75	28
All Years	**-10**	**7**	**-13**	**4**	**-23**	**-28**	**-26**	**-26**	**-33**	**4**	**-52**	**-29**

Results summarized in Table B-49 show changes in lower Feather River flows as a result of changes in Lake Oroville operations. These changes generally reflect shifts in the timing of releases from Lake Oroville.

Table B-49. Summary of Lower Feather River Flows under Alternative 3 and Change from the No Action Alternative (cfs)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	3,932	4,490	10,496	22,631	25,833	23,667	15,960	14,396	10,277	8,461	5,682	10,791
Above Normal	2,891	3,209	5,724	10,774	12,627	19,261	9,855	8,174	6,433	9,655	7,959	9,883
Below Normal	3,436	2,576	3,640	5,380	8,146	6,846	5,334	4,731	4,836	9,456	8,551	6,528
Dry	3,064	2,219	3,258	4,265	4,224	4,578	4,138	3,712	4,124	7,901	4,840	5,085
Critical	2,490	1,825	2,575	3,384	3,096	2,639	3,305	2,526	2,640	4,831	1,964	2,255
All Years	**3,293**	**3,087**	**5,879**	**11,102**	**12,810**	**12,883**	**8,805**	**7,753**	**6,317**	**8,152**	**5,776**	**7,429**
Change from No Action Alternative												
Wet	-2	2	34	-4	-45	-4	3	2	4	-4	5	6
Above Normal	8	23	-28	-18	-4	-54	3	6	2	0	1	2
Below Normal	2	-12	-32	3	-37	2	1	-7	81	-3	31	51
Dry	88	7	1	2	2	3	2	11	87	69	63	-207
Critical	9	-4	88	1	2	3	8	12	19	-40	-153	-1
All Years	**22**	**3**	**14**	**-3**	**-20**	**-7**	**3**	**5**	**37**	**8**	**-2**	**-35**

Results summarized in Table B-50 show changes in Delta inflow from the Sacramento River Basin under Alternative 3. Results are presented in thousands of acre-feet to better illustrate the shifts in water supplies. Under Alternative 3, less water enters the Delta from the Sacramento River and Yolo Bypass because of an increase in NOD M&I deliveries. The average annual decrease in Delta inflow is 11 TAF.

Table B-50. Summary of Delta Inflows from Sacramento Basin under Alternative 3 and Change from the No Action Alternative (TAF)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Wet	809	1,310	2,820	4,713	4,884	4,352	2,653	1,990	1,430	1,224	996	1,688	28,869
Above Normal	656	1,004	1,480	2,770	3,201	3,205	1,633	1,305	975	1,346	1,017	1,332	19,924
Below Normal	677	824	1,140	1,457	1,901	1,460	1,062	860	818	1,313	998	860	13,370
Dry	613	766	998	1,092	1,285	1,274	794	666	738	1,153	764	714	10,856
Critical	566	574	710	889	868	814	598	483	555	785	523	435	7,801
All Years	**686**	**955**	**1,629**	**2,518**	**2,751**	**2,497**	**1,523**	**1,186**	**979**	**1,177**	**879**	**1,097**	**17,876**
Change from No Action Alternative													
Wet	1	-3	2	-3	-3	1	-1	-1	-1	-1	0	1	-8
Above Normal	4	7	-4	-2	1	-4	1	0	0	0	1	6	11
Below Normal	-5	1	-2	3	-3	-1	-6	-5	2	4	0	-2	-14
Dry	2	9	-2	0	-2	-3	-3	-5	1	12	-13	-19	-24
Critical	-5	0	2	3	-5	-1	-3	-2	0	-3	1	-6	-18
All Years	**0**	**2**	**0**	**0**	**-2**	**-1**	**-2**	**-2**	**0**	**3**	**-3**	**-4**	**-11**

Results summarized in Table B-51 show the average monthly and annual changes in Delta outflow under Alternative 3. Delta outflow under Alternative 3 is reduced by approximately 12 TAF on an average annual basis. Delta outflow is reduced, as compared to the No Action Alternative, because of reductions in Delta inflow from the Sacramento River and Yolo Bypass and by higher consumptive use from agricultural water users within the Delta. As discussed in the results for Alternative 2, CalSim II includes logic to simulate transfers from agricultural water users in the Delta to CCWD. These transfers reduce the consumptive use within the Delta to make water available for CCWD. Under Alternative 3, CCWD is allocated and diverts more CVP water than in the No Action Alternative and this reduces their demand for transfer water. The average annual increase in Delta consumptive use in Alternative 3 is approximately 12 TAF. Therefore, the total water available in the Delta is reduced by approximately 23 TAF on an average annual basis: 11 TAF less inflow and 12 TAF more consumptive use.

Table B-51. Summary of Delta Outflow under Alternative 3 and Change from the No Action Alternative (TAF)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Wet	469	1,055	2,735	5,181	5,282	4,825	3,302	2,496	1,373	690	314	1,172	28,892
Above Normal	337	735	1,138	2,894	3,408	3,264	1,964	1,508	702	582	246	704	17,482
Below Normal	339	509	764	1,354	1,998	1,415	1,334	977	480	442	246	238	10,096
Dry	325	497	557	888	1,172	1,197	861	626	401	307	242	202	7,276
Critical	288	366	357	688	739	734	526	365	320	250	222	179	5,034
All Years	**369**	**692**	**1,339**	**2,593**	**2,880**	**2,619**	**1,828**	**1,370**	**755**	**483**	**263**	**586**	**15,777**
Change from No Action Alternative													
Wet	1	-4	2	-3	-3	1	-1	-1	-1	1	0	0	-10
Above Normal	1	6	-3	-12	0	-4	1	0	0	0	0	0	-11
Below Normal	0	-2	0	3	-12	-1	-6	-5	9	-3	0	-2	-17
Dry	3	-3	16	0	-1	-2	-3	-4	1	-3	-11	-4	-12
Critical	1	0	1	0	-3	2	-3	-2	0	-1	-9	0	-14
All Years	**1**	**-2**	**4**	**-2**	**-4**	**-1**	**-2**	**-2**	**1**	**-1**	**-4**	**-1**	**-12**

Results summarized in Table B-52 show the average monthly and annual changes in CVP Jones Pumping Plant exports. Average annual Jones exports are reduced by approximately 5 TAF as compared to the No Action Alternative.

Table B-52. Summary of Jones Pumping Plant Exports under Alternative 3 and Change from the No Action Alternative (TAF)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Wet	228	231	248	217	217	232	92	99	224	280	283	260	2,611
Above Normal	213	232	245	189	181	225	64	55	190	252	283	265	2,393
Below Normal	229	241	263	195	170	177	61	53	130	267	243	262	2,290
Dry	209	209	250	202	153	136	60	53	90	245	162	223	1,992
Critical	209	204	217	167	130	92	54	50	27	105	129	136	1,521
All Years	**219**	**224**	**246**	**198**	**177**	**180**	**70**	**68**	**145**	**241**	**227**	**235**	**2,229**
Change from No Action Alternative													
Wet	1	1	0	0	0	0	0	0	0	-1	0	0	2
Above Normal	-1	0	0	9	1	0	0	0	0	0	0	5	15
Below Normal	-5	3	0	2	13	-2	0	0	-9	2	-5	0	0
Dry	-5	3	-5	0	-2	0	0	0	-3	-1	-15	-4	-32
Critical	-6	1	7	-1	-3	-3	1	0	0	-5	10	-9	-8
All Years	**-3**	**2**	**0**	**1**	**1**	**-1**	**0**	**0**	**-2**	**-1**	**-3**	**-1**	**-5**

Results summarized in Table B-53 show the average monthly and annual changes in SWP Banks Pumping Plant exports. Average annual Banks exports are reduced by approximately 6 TAF as compared to the No Action Alternative.

Table B-53. Summary of Banks Pumping Plant Exports under Alternative 3 and Change from the No Action Alternative (TAF)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Wet	234	252	306	274	315	359	109	112	245	423	437	375	3,440
Above Normal	183	178	333	209	218	274	63	51	195	410	431	395	2,939
Below Normal	201	208	310	195	210	256	64	49	134	429	437	389	2,879
Dry	172	181	318	199	174	148	58	55	90	390	258	291	2,334
Critical	147	90	208	179	143	99	45	45	33	213	59	101	1,362
All Years	**195**	**194**	**299**	**220**	**227**	**245**	**74**	**70**	**154**	**384**	**341**	**322**	**2,724**
Change from No Action Alternative													
Wet	-1	0	0	0	0	0	0	0	0	-1	0	0	-1
Above Normal	3	1	0	0	0	0	0	0	0	0	0	0	4
Below Normal	-1	-1	-3	-2	-4	2	0	0	2	0	0	-2	-9
Dry	3	8	-13	0	1	-1	0	-1	3	-3	4	-12	-9
Critical	0	-1	-6	4	1	-1	-1	0	0	-7	-6	-2	-19
All Years	**1**	**2**	**-4**	**0**	**0**	**0**	**0**	**0**	**1**	**-2**	**0**	**-3**	**-6**

The following figures, compiled as Figure B-12, illustrate the probability of exceedance for Folsom Lake water surface elevation being above or below levels of concern for M&I diversion capacity under Alternative 3 and the No Action Alternative. Figure B-12 shows simulated Folsom Lake water surface elevations under Alternative 3 are lower than those under the No Action Alternative. The probability of the water surface elevation being below elevation 350 is higher under Alternative 3 in October, November, and July, and similar to the probability under the No Action Alternative in all other months.

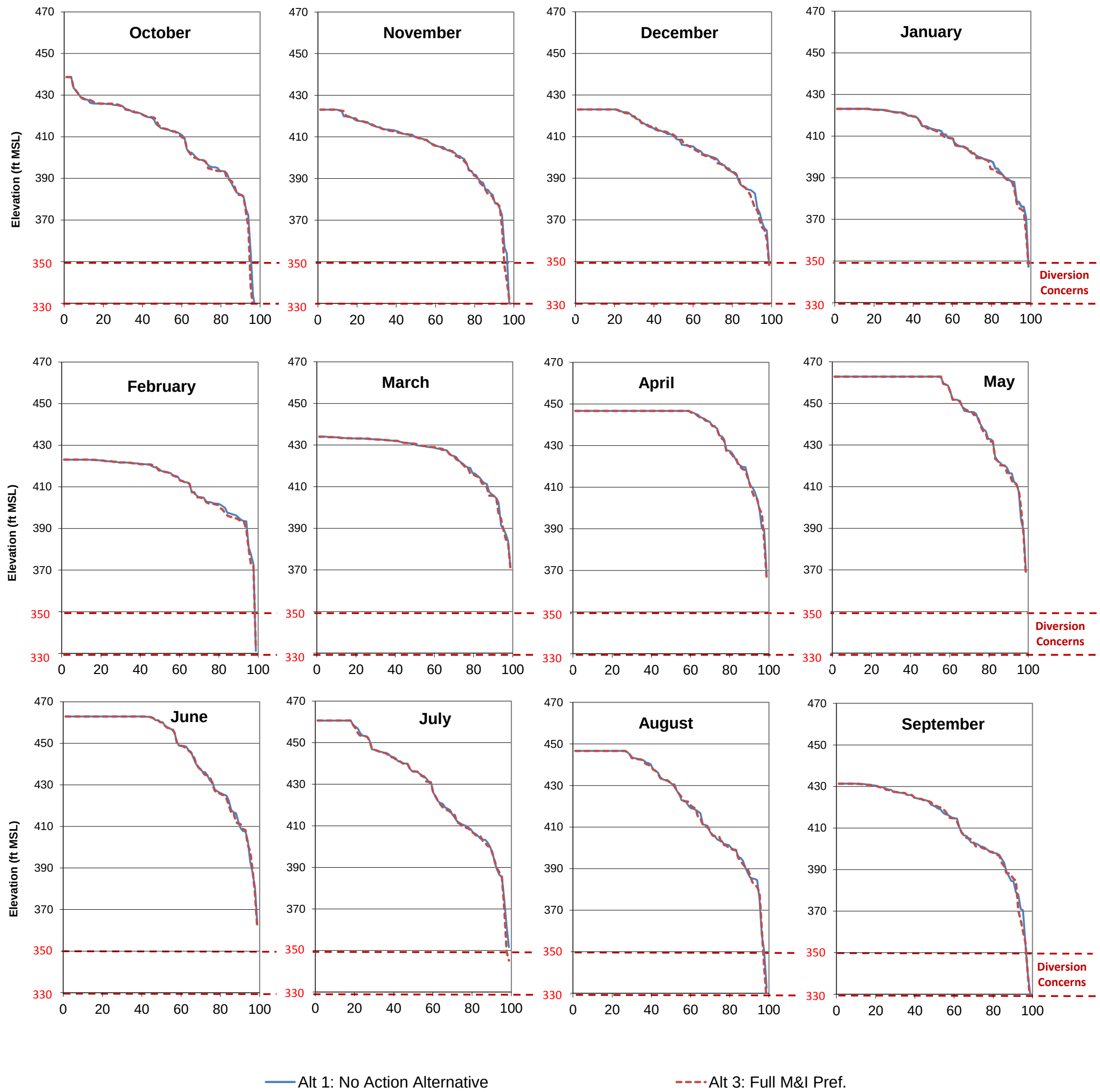


Figure B-12. Probability of Exceedance for Folsom Lake Water Surface Elevation under Alternative 2 and the No Action Alternative

B.6 Alternative 4: Updated M&I WSP

Alternative 4, Updated M&I WSP, is similar to the No Action Alternative. This alternative comprises the updated M&I WSP developed by Reclamation with stakeholder input received during the M&I WSP workshops held between May 2010 and January 2011, with clarifying revisions made to address comments from stakeholders received after Stakeholder Workshop 4 was held in November 2010 and from public comments on the Draft EIS. Reclamation used this stakeholder workshop process and stakeholder input to identify elements of the 2001 Draft M&I WSP (represented in the No Action Alternative) that could be improved. These updates are described in greater detail in the EIS.

The allocation method and reduction steps under Alternative 4 and the No Action Alternative are very similar. In years when ~~the~~ CVP water supplies are not adequate to provide the Contract Total to all water service contractors, M&I water service contractor allocations are maintained at 100 percent of their Contract Total as the agricultural water service contractor allocations are reduced to 75 percent of their Contract Total in ~~several~~ incremental steps. M&I water service contractor allocation reductions begin once the agricultural contractor allocations are reduced to 75 percent of Contract Total. At this point, M&I water service contractor allocations are reduced to 75 percent of their historical use in ~~several~~ incremental steps as agricultural water service contractor allocations are reduced to 50 percent of their Contract Total. The M&I water service contractor allocations are maintained at 75 percent of their historical use until agricultural water service contractor allocations are reduced in incremental steps to 25 percent of their Contract Total. Then, M&I water service contractor allocations are reduced in incremental steps to 50 percent of historical use until agricultural water service contractor allocations are reduced in incremental steps to zero.

In years when the M&I water service contractor allocations are less than 75 percent of historical use, M&I water service contractors may request an adjustment to their allocation to provide at least the unmet ~~need~~ portion of their PHS need~~demand~~, up to a maximum of 75 percent of the M&I water service contractor historical use. There are some years in which allocations to agricultural water service contractors are at or near zero. In those years, the increased allocations to M&I water service contractors may not be fully realized. Also, though this alternative would target a minimum M&I water service contractor allocation of 50 percent of their historical use or unmet PHS need, whichever is greater, the increased allocation is not guaranteed and would only be made available to the extent that CVP water supplies are available.

The allocation of available CVP water supplies between M&I and agricultural water service contractors during a Condition of ~~s~~Shortages ~~conditions~~ under Alternative 4 is presented in Table B-~~9~~54.

Table B-54. Alternative 4, Updated M&I WSP, Water Allocation Steps

Allocation Step	Allocation to Agricultural Water Service Contractors (% of Contract Total)	Allocation to M&I Water Service Contractors [1]
1	100%–~~-~~75%	100% of ~~c~~Contract ~~t~~Total
7	70%	95% of historical use
8	65%	90% of historical use
9	60%	85% of historical use
10	55%	80% of historical use
11	50%–~~-~~25%	75% of historical use [2]~~[1]~~
12	20%	70% of historical use ~~[1]~~[2]
13	15%	65% of historical use ~~[1]~~[2]

Allocation Step	Allocation to Agricultural Water Service Contractors (% of Contract Total)	Allocation to M&I Water Service Contractors [1]
14	10%	60% of historical use [~~1~~2]
15	5%	55% of historical use [~~1~~2]
16	0%	50% of historical use [~~1~~2]

1 For any contract for both irrigation and M&I uses which does not set forth individual Contract Totals for each use, the M&I allocation will be determined by historical use.

~~1~~2 Subject to PHS considerations described in Implementation Guidelines. Depending on CVP water supply conditions and CVP operational constraints, it is possible for M&I deliveries to be less than the unmet PHS need and to be reduced below 50 percent if CVP water availability is insufficient.

B.6.1 Updated M&I WSP Results

Comparisons of Tables B-1 and B-54~~9~~ show that the allocation method between the No Action Alternative and Alternative 4 are very similar. It is only when allocations to M&I contractors ~~go~~are~~es~~ below 75 percent that there may be differences as the No Action Alternative considers PHS need ~~demand~~ up to 75 percent of historical use. However, for the purpose of modeling both alternatives at a future LOD, it was assumed that all M&I water service contractors will have used their full C~~c~~ontract T~~t~~otal and historical use is equal to the C~~c~~ontract T~~t~~otal. The other changes made to update the M&I WSP relate to the calculation of historical use and updates to the language. Therefore, for modeling purposes, there is no difference between the No Action Alternative and ~~the~~ Alternative 4.

B.7 Alternative 5: M&I Contractor Suggested WSP

Alternative 5, M&I Contractor Suggested WSP, is similar to Alternative 4 (Updated M&I WSP). This alternative was developed and recommended by several M&I water service contractors who participated in the M&I WSP workshops held between May 2010 and January 2011. The differences between Alternative 4 and Alternative 5 include the following:

- Attempts to provide ~~a greater level of assurance that~~ an increased quantity of CVP water ~~will be~~ allocated to M&I water service contractors to supply the unmet portion of the PHS needs ~~demand~~s during a Condition of Shortage~~water shortage conditions~~.

- ~~Would require modification to CVP operations, i.e., would provide increased carryover in CVP storage facilities to reserve water in storage to meet the ensuing year anticipated unmet portion of the M&I water service contractors' PHS demands.~~

- Increases the upper limit for consideration of additional allocations to assist in meeting ~~of when water would be reallocated from the agricultural water service contractors to provide at least the~~ unmet PHS need ~~demands~~ from an initial allocation of 75 percent of historical use (used in Alternative 4) to an initial allocation of 95 percent of historical use. This means that in years when the M&I water service contractor allocations are 95 percent of adjusted historical use or less, water would be reallocated from agricultural water service contractors to provide the greater of the allocation percentage of historical use or the PHS needs.

- Adjusts unconstrained year historical use first by the use of non-CVP supplies, then population growth, and finally extraordinary water conservation measures, before the three years of adjusted historical use are averaged to calculate the overall adjusted historical use.

- Qualifies the use of non-potable supplies when considering non-CVP supplies for the determination of unmet PHS ~~unmet~~ need. Non-potable non-CVP supplies would not be included as available non-CVP water satisfying PHS needs except to the extent that they are used to meet non-domestic uses of commercial, institutional, and industrial demands.

Most of the differences between Alternative 4 and 5 surround delivery of any unmet PHS need ~~demand~~ to M&I water service contractors. Several of these individual components are not addressed directly in the modeling because they apply to calculation of historical use and PHS need, or attempt to deliver a higher percentage of adjusted historical use. Modeling of project alternatives was completed at a future LOD and it was assumed that historical use was equal to the contract total for all contractors.

The first two proposed changes were addressed in the modeling by attempting to deliver 100 percent of any unmet PHS need ~~demand~~ in all years. Future PHS ~~demands~~ needs were calculated by the project team and circulated to stakeholders for comment. PHS ~~demands~~ needs under normal, dry, and critical years were compared with simulated delivery of CVP contract water to each contractor for the No Action Alternative. Unmet PHS need was calculated as any PHS ~~demand~~ need in excess of the combination of delivered CVP contract water and non-CVP supplies. Unmet PHS need was zero or a small quantity of water in most years for most M&I water service contractors. CalSim II was re-run to simulate delivery of unmet PHS needs in all years to analyze ~~the~~ Alternative 5. ~~This was done without the need to modify reservoir operations to increase carryover in CVP reservoirs to meet unmet PHS needs in subsequent years.~~

B.7.1 M&I Contractor Suggested WSP Results

Table B-55 compares CVP water service contract allocations under Alternative 5 with the No Action Alternative. There are minimal differences in model results between the No Action Alternative and Alternative 5. This is due to the relatively small volumes of unmet PHS need ~~demand~~ calculated under the No Action Alternative. Delivery of these volumes of water under Alternative 5 has minimal effects on CVP/SWP operations and no effect on allocations to M&I or agricultural water service contractors.

Table B-55. Comparison of Annual CVP Water Service Contract Allocations under the No Action Alternative and Alternative 5 (Percent of Contract Total)

	Alternative 5				Change from No Action Alternative (Alternative 5 minus the NO Action Alternative)			
	M&I		Ag		M&I		Ag	
Year	NOD	SOD	NOD	SOD	NOD	SOD	NOD	SOD
1922	100%	100%	100%	88%	0%	0%	0%	0%
1923	83%	75%	58%	48%	0%	0%	0%	0%
1924	57%	57%	7%	7%	0%	0%	0%	0%
1925	81%	81%	56%	56%	0%	0%	0%	0%
1926	64%	64%	14%	14%	0%	0%	0%	0%
1927	100%	82%	100%	57%	0%	0%	0%	0%
1928	77%	75%	52%	44%	0%	0%	0%	0%
1929	50%	50%	0%	0%	0%	0%	0%	0%
1930	65%	65%	15%	15%	0%	0%	0%	0%
1931	58%	58%	8%	8%	0%	0%	0%	0%
1932	63%	63%	13%	13%	0%	0%	0%	0%
1933	53%	53%	3%	3%	0%	0%	0%	0%
1934	60%	60%	10%	10%	0%	0%	0%	0%
1935	75%	75%	28%	28%	0%	0%	0%	0%
1936	75%	75%	40%	40%	0%	0%	0%	0%
1937	75%	75%	33%	33%	0%	0%	0%	0%
1938	100%	100%	100%	100%	0%	0%	0%	0%
1939	75%	75%	30%	30%	0%	0%	0%	0%
1940	100%	75%	93%	48%	0%	0%	0%	0%
1941	100%	100%	100%	80%	0%	0%	0%	0%
1942	100%	100%	100%	89%	0%	0%	0%	0%
1943	100%	100%	79%	79%	0%	0%	0%	0%
1944	71%	71%	21%	21%	0%	0%	0%	0%
1945	88%	88%	63%	63%	0%	0%	0%	0%
1946	100%	87%	85%	62%	0%	0%	0%	0%
1947	75%	75%	41%	41%	0%	0%	0%	0%
1948	100%	75%	85%	32%	0%	0%	0%	0%
1949	93%	82%	68%	57%	0%	0%	0%	0%
1950	75%	75%	28%	28%	0%	0%	0%	0%
1951	100%	88%	93%	63%	0%	0%	0%	0%
1952	100%	100%	100%	100%	0%	0%	0%	0%
1953	100%	75%	100%	44%	0%	0%	0%	0%
1954	100%	75%	97%	43%	0%	0%	0%	0%
1955	75%	75%	32%	32%	0%	0%	0%	0%
1956	100%	100%	100%	82%	0%	0%	0%	0%
1957	95%	75%	70%	35%	0%	0%	0%	0%
1958	100%	100%	100%	99%	0%	0%	0%	0%
1959	90%	75%	65%	36%	0%	0%	0%	0%
1960	75%	75%	30%	30%	0%	0%	0%	0%
1961	77%	75%	52%	49%	0%	0%	0%	0%

	Alternative 5				Change from No Action Alternative (Alternative 5 minus the NO Action Alternative)			
	M&I		Ag		M&I		Ag	
Year	NOD	SOD	NOD	SOD	NOD	SOD	NOD	SOD
1962	100%	75%	76%	45%	0%	0%	0%	0%
1963	100%	75%	100%	50%	0%	0%	0%	0%
1964	75%	75%	35%	35%	0%	0%	0%	0%
1965	100%	100%	78%	78%	0%	0%	0%	0%
1966	100%	75%	86%	49%	0%	0%	0%	0%
1967	100%	100%	100%	100%	0%	0%	0%	0%
1968	90%	75%	65%	39%	0%	0%	0%	0%
1969	100%	100%	100%	100%	0%	0%	0%	0%
1970	90%	87%	65%	62%	0%	0%	0%	0%
1971	100%	75%	89%	35%	0%	0%	0%	0%
1972	75%	75%	49%	42%	0%	0%	0%	0%
1973	100%	82%	95%	57%	0%	0%	0%	0%
1974	100%	100%	100%	87%	0%	0%	0%	0%
1975	100%	89%	100%	64%	0%	0%	0%	0%
1976	56%	56%	6%	6%	0%	0%	0%	0%
1977	55%	55%	5%	5%	0%	0%	0%	0%
1978	100%	100%	100%	92%	0%	0%	0%	0%
1979	80%	80%	55%	55%	0%	0%	0%	0%
1980	100%	100%	82%	82%	0%	0%	0%	0%
1981	94%	75%	69%	43%	0%	0%	0%	0%
1982	100%	100%	100%	100%	0%	0%	0%	0%
1983	100%	100%	100%	100%	0%	0%	0%	0%
1984	100%	88%	90%	63%	0%	0%	0%	0%
1985	96%	78%	71%	53%	0%	0%	0%	0%
1986	86%	86%	61%	61%	0%	0%	0%	0%
1987	70%	70%	20%	20%	0%	0%	0%	0%
1988	50%	50%	0%	0%	0%	0%	0%	0%
1989	75%	75%	29%	29%	0%	0%	0%	0%
1990	50%	50%	0%	0%	0%	0%	0%	0%
1991	63%	63%	13%	13%	0%	0%	0%	0%
1992	69%	69%	19%	19%	0%	0%	0%	0%
1993	100%	88%	99%	63%	0%	0%	0%	0%
1994	87%	83%	62%	58%	0%	0%	0%	0%
1995	100%	100%	100%	95%	0%	0%	0%	0%
1996	100%	99%	100%	74%	0%	0%	0%	0%
1997	100%	100%	77%	77%	0%	0%	0%	0%
1998	100%	100%	100%	100%	0%	0%	0%	0%
1999	100%	82%	100%	57%	0%	0%	0%	0%
2000	100%	78%	100%	53%	0%	0%	0%	0%
2001	75%	75%	31%	31%	0%	0%	0%	0%
2002	100%	75%	76%	38%	0%	0%	0%	0%
2003	100%	75%	100%	49%	0%	0%	0%	0%

Table B-56~~10~~ provides a summary of the average annual March through February contract year delivery to M&I and agricultural water service contractors in the NOD and SOD service areas by year type for Alternative 5. The year type is the Sacramento Valley Water Year Type based on the 40-30-30 index. Results are presented for Alternative 5 and the change in delivery from the No Action Alternative.

Results presented in Table B-56~~10~~ show a small increase in deliveries to SOD M&I contractors and a small decrease in deliveries to SOD agricultural contractors. The majority of these changes in deliveries are related to delivering unmet PHS need to the City of Avenal. The City of Avenal relies solely on CVP supplies to meet demands and may have unmet PHS need in the future if CVP allocations are less than 100 percent of ~~c~~Contract ~~t~~Total.

Table B-56. Summary of CVP Water Service Contract Deliveries under Alternative 5 and Change from the No Action Alternative (TAF)

	M&I		**Ag**		**Total**		
Year Type	**NOD**	**SOD**	**NOD**	**SOD**	**NOD**	**SOD**	**Total**
Wet	391	193	290	1,354	681	1,548	2,229
Above Normal	407	174	281	1,053	688	1,226	1,914
Below Normal	358	160	184	741	543	901	1,443
Dry	332	152	124	573	456	724	1,180
Critical	299	119	35	170	334	288	623
All Years	**361**	**165**	**196**	**858**	**557**	**1,023**	**1,579**
Change from No Action Alternative							
Wet	0.0	0.3	0.0	-0.2	0.0	0.1	0.1
Above Normal	0.0	0.5	0.0	-0.5	0.0	-0.1	-0.1
Below Normal	0.0	0.8	0.0	0.1	0.0	0.9	1.0
Dry	0.0	1.4	-0.1	-0.5	-0.1	0.9	0.8
Critical	-0.1	1.5	0.0	-0.1	-0.1	1.4	1.3
All Years	**0.0**	**0.8**	**0.0**	**-0.2**	**0.0**	**0.6**	**0.6**

Tables B-57 through B-71 provide a summary of average monthly values for key system parameters in the CVP and SWP by Sacramento Valley Water Year Type. Results for Alternative 5 are presented, followed by the change from the No Action Alternative. Results in the following tables illustrate that changes in CVP and SWP operations under Alternative 5 are relatively small as compared to the No Action Alternative. This occurs because the volume of unmet PHS need is zero in many years, or a small quantity of water for a few M&I water service contractors. The delivery of this volume of water in only a few years has a minimal effect on CVP or SWP operations.

Table B-57. Summary of Trinity Lake Storage under Alternative 5 and Change from the No Action Alternative (TAF)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	1,529	1,558	1,655	1,762	1,923	2,061	2,238	2,272	2,249	2,119	1,998	1,846
Above Normal	1,375	1,386	1,460	1,582	1,735	1,903	2,073	2,078	2,046	1,926	1,787	1,642
Below Normal	1,273	1,280	1,300	1,360	1,433	1,530	1,699	1,684	1,640	1,518	1,373	1,267
Dry	1,300	1,306	1,333	1,345	1,425	1,553	1,686	1,637	1,577	1,414	1,252	1,141
Critical	1,007	993	997	972	1,011	1,083	1,142	1,115	1,083	941	793	723
All Years	**1,336**	**1,347**	**1,399**	**1,460**	**1,569**	**1,692**	**1,840**	**1,835**	**1,797**	**1,661**	**1,520**	**1,398**
Change from No Action Alternative												
Wet	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal	0	0	0	0	0	0	0	0	0	0	0	0
Below Normal	0	0	0	0	0	0	0	0	0	0	0	0
Dry	0	0	0	0	0	0	0	0	0	0	0	0
Critical	0	0	0	0	0	0	0	0	0	0	0	0
All Years	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Table B-58. Summary of Shasta Lake Storage under Alternative 5 and Change from the No Action Alternative (TAF)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	2,854	2,880	3,150	3,419	3,640	3,860	4,315	4,470	4,285	3,870	3,521	3,118
Above Normal	2,539	2,485	2,663	3,151	3,414	3,968	4,414	4,477	4,121	3,543	3,214	3,031
Below Normal	2,639	2,590	2,664	2,978	3,322	3,714	4,089	4,113	3,772	3,248	2,933	2,881
Dry	2,487	2,493	2,651	2,822	3,184	3,669	3,814	3,725	3,343	2,835	2,548	2,491
Critical	2,153	2,075	2,136	2,289	2,442	2,674	2,616	2,497	2,120	1,654	1,377	1,329
All Years	**2,588**	**2,570**	**2,738**	**3,008**	**3,277**	**3,635**	**3,932**	**3,958**	**3,650**	**3,164**	**2,848**	**2,665**
Change from No Action Alternative												
Wet	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal	0	0	0	0	0	0	0	0	0	0	0	0
Below Normal	0	0	0	0	0	0	0	0	0	0	0	0
Dry	0	0	0	0	0	0	0	0	0	0	0	0
Critical	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
All Years	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Table B-59. Summary of Folsom Lake Storage under Alternative 5 and Change from the No Action Alternative (TAF)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	514	478	517	520	505	634	792	963	959	866	767	600
Above Normal	460	403	417	513	533	649	794	965	938	742	675	551
Below Normal	485	456	450	496	538	627	786	925	902	683	639	575
Dry	461	432	438	434	495	600	703	774	703	538	464	439
Critical	415	369	346	333	348	411	447	464	423	342	289	260
All Years	**475**	**437**	**449**	**468**	**490**	**595**	**721**	**843**	**811**	**668**	**595**	**504**
Change from No Action Alternative												
Wet	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal	0	0	0	0	0	0	0	0	0	0	0	0
Below Normal	0	0	0	0	0	0	0	0	0	0	0	0
Dry	0	0	0	0	0	0	0	0	0	0	0	0
Critical	0	0	0	0	0	0	0	0	0	0	0	0
All Years	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Table B-60. Summary of Lake Oroville Storage under Alternative 5 and Change from the No Action Alternative (TAF)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	1,994	2,093	2,422	2,663	2,858	2,945	3,304	3,508	3,484	3,122	2,912	2,443
Above Normal	1,694	1,790	1,885	2,286	2,622	2,942	3,304	3,498	3,395	2,824	2,404	1,956
Below Normal	1,781	1,799	1,833	2,065	2,322	2,598	2,978	3,194	3,078	2,486	2,005	1,715
Dry	1,562	1,599	1,629	1,755	1,983	2,311	2,509	2,550	2,339	1,793	1,505	1,295
Critical	1,474	1,489	1,499	1,588	1,686	1,843	1,847	1,807	1,635	1,297	1,173	1,106
All Years	**1,743**	**1,802**	**1,934**	**2,149**	**2,368**	**2,585**	**2,860**	**2,994**	**2,880**	**2,411**	**2,120**	**1,800**
Change from No Action Alternative												
Wet	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal	0	0	0	0	0	0	0	0	0	0	0	0
Below Normal	0	0	0	0	0	0	0	0	0	0	0	0
Dry	0	0	0	0	0	0	0	0	0	0	0	0
Critical	0	0	0	0	0	0	0	0	0	0	0	0
All Years	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Table B-61. Summary of CVP San Luis Reservoir Storage under Alternative 5 and Change from the No Action Alternative (TAF)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	226	365	533	667	787	894	811	651	490	296	182	207
Above Normal	192	341	516	626	718	823	719	519	338	159	87	127
Below Normal	244	392	576	689	746	813	723	546	353	243	169	226
Dry	256	371	556	688	751	778	690	521	306	215	113	146
Critical	264	385	539	656	718	727	672	563	378	268	204	195
All Years	**236**	**370**	**544**	**668**	**752**	**820**	**736**	**572**	**388**	**245**	**154**	**184**
Change from No Action Alternative												
Wet	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal	0	0	0	0	0	0	0	0	0	0	0	0
Below Normal	0	0	0	0	0	0	0	0	0	0	0	0
Dry	0	0	0	-1	0	0	0	0	0	0	0	0
Critical	0	0	0	0	0	0	0	0	0	-1	-1	-1
All Years	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Table B-62. Summary of SWP San Luis Reservoir Storage under Alternative 5 and Change from the No Action Alternative (TAF)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	473	500	615	714	796	877	710	498	370	395	436	526
Above Normal	347	346	508	613	660	726	560	329	203	232	295	431
Below Normal	350	356	489	578	650	696	542	323	176	223	298	435
Dry	355	369	547	681	767	795	653	459	250	286	207	288
Critical	333	292	396	523	584	605	529	422	268	262	158	143
All Years	**387**	**394**	**531**	**641**	**714**	**766**	**621**	**424**	**271**	**299**	**301**	**388**
Change from No Action Alternative												
Wet	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal	0	0	0	0	0	0	0	0	0	0	0	0
Below Normal	0	0	0	0	0	0	0	0	0	0	0	0
Dry	0	0	0	0	0	0	0	0	0	0	0	0
Critical	0	0	0	0	0	0	0	0	0	0	0	0
All Years	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Table B-63. Summary of Sacramento River at Keswick Dam Flows under Alternative 5 and Change from the No Action Alternative (cfs)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	6,611	7,924	11,326	16,147	18,421	16,225	9,499	9,496	10,527	12,901	11,062	12,765
Above Normal	6,464	6,897	5,484	7,642	14,500	8,375	6,088	7,913	11,320	14,312	10,452	8,641
Below Normal	6,102	6,021	5,196	4,253	5,940	4,795	5,223	6,999	10,776	13,116	10,014	5,340
Dry	5,703	5,422	3,939	3,896	3,753	3,745	5,717	7,252	11,280	13,399	9,651	5,387
Critical	5,554	5,098	3,683	3,452	3,879	3,482	6,389	6,858	10,450	12,267	9,159	4,620
All Years	**6,148**	**6,486**	**6,685**	**8,325**	**10,368**	**8,520**	**6,984**	**7,959**	**10,840**	**13,161**	**10,206**	**8,082**
Change from No Action Alternative												
Wet	0	0	-2	-1	-1	0	0	0	0	0	0	0
Above Normal	-1	0	0	-1	-1	0	0	-5	0	0	0	4
Below Normal	0	1	0	0	-1	0	0	0	0	0	0	2
Dry	0	0	-1	0	0	0	0	0	0	0	3	2
Critical	1	1	1	0	-2	0	0	0	0	2	-2	2
All Years	**0**	**0**	**-1**	**0**	**-1**	**0**	**0**	**-1**	**0**	**0**	**1**	**2**

Table B-64. Summary of Sacramento River at NCP Flows under Alternative 5 and Change from the No Action Alternative (cfs)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	6,909	11,003	17,333	19,128	19,841	18,286	13,459	10,402	6,460	6,554	6,097	12,587
Above Normal	5,961	8,953	10,765	16,524	19,095	17,629	10,203	7,451	5,781	6,996	5,295	8,269
Below Normal	5,481	7,749	8,262	12,374	14,410	12,044	7,067	5,459	5,250	6,225	4,946	4,933
Dry	5,079	7,311	8,721	8,871	11,608	11,318	5,319	4,561	5,262	6,821	4,801	5,026
Critical	5,149	5,368	6,085	7,870	8,810	8,139	4,027	4,000	4,917	6,311	5,024	4,149
All Years	**5,867**	**8,513**	**11,286**	**13,695**	**15,383**	**14,109**	**8,724**	**6,907**	**5,665**	**6,586**	**5,342**	**7,753**
Change from No Action Alternative												
Wet	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal	-1	1	0	0	0	0	0	-5	0	0	0	4
Below Normal	0	1	0	0	0	0	0	0	0	0	0	2
Dry	0	0	-1	0	0	0	0	0	0	1	3	2
Critical	1	0	1	0	-2	0	0	0	0	2	-1	2
All Years	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**-1**	**0**	**1**	**1**	**2**

Table B-65. Summary of American River at Nimbus Dam Flows under Alternative 5 and Change from the No Action Alternative (cfs)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	1,669	3,427	5,724	8,623	9,098	6,043	5,174	5,941	5,789	3,847	3,129	4,348
Above Normal	1,624	3,391	3,021	4,550	6,139	5,308	3,452	3,599	3,231	4,402	2,344	3,402
Below Normal	1,822	2,152	2,514	2,218	4,049	2,491	2,850	2,791	2,628	4,748	1,854	2,336
Dry	1,572	1,996	1,711	1,642	1,829	2,022	1,878	1,719	2,383	3,193	2,041	1,461
Critical	1,483	1,812	1,493	1,309	1,201	911	1,052	1,123	1,564	1,612	1,175	968
All Years	**1,640**	**2,654**	**3,280**	**4,331**	**5,051**	**3,695**	**3,198**	**3,429**	**3,509**	**3,611**	**2,272**	**2,738**
Change from No Action Alternative												
Wet	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal	3	-1	0	0	0	0	0	0	0	0	0	0
Below Normal	0	0	0	0	0	0	-1	0	0	0	0	0
Dry	0	0	0	0	0	0	0	0	0	1	0	0
Critical	0	0	0	0	0	0	0	0	0	1	-1	0
All Years	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Table B-66. Summary of American River at H Street Flows under Alternative 5 and Change from the No Action Alternative (TAF)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	1,507	3,318	5,583	8,492	8,911	5,850	4,975	5,719	5,508	3,182	2,551	4,136
Above Normal	1,471	3,262	2,853	4,452	6,024	5,145	3,250	3,396	2,970	3,766	1,767	3,197
Below Normal	1,651	2,018	2,338	2,075	3,923	2,326	2,675	2,588	2,376	4,195	1,336	2,138
Dry	1,409	1,863	1,545	1,501	1,689	1,881	1,691	1,522	2,138	2,779	1,653	1,262
Critical	1,320	1,662	1,334	1,161	1,060	762	876	945	1,340	1,317	898	782
All Years	**1,477**	**2,526**	**3,121**	**4,198**	**4,903**	**3,529**	**3,009**	**3,224**	**3,252**	**3,079**	**1,790**	**2,536**
Change from No Action Alternative												
Wet	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal	3	-1	0	0	0	0	0	0	0	0	0	0
Below Normal	0	0	0	0	0	0	-1	0	0	0	0	0
Dry	0	0	0	0	0	0	0	0	0	1	0	0
Critical	0	0	0	0	0	0	0	0	0	1	-1	0
All Years	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Table B-67. Summary of Lower Feather River Flows under Alternative 5 and Change from the No Action Alternative (cfs)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Wet	3,933	4,487	10,462	22,634	25,879	23,671	15,958	14,394	10,274	8,465	5,677	10,785
Above Normal	2,883	3,187	5,752	10,792	12,631	19,314	9,852	8,168	6,431	9,655	7,958	9,881
Below Normal	3,434	2,587	3,673	5,376	8,184	6,844	5,333	4,738	4,755	9,459	8,520	6,478
Dry	2,976	2,212	3,257	4,263	4,222	4,574	4,136	3,701	4,036	7,831	4,777	5,292
Critical	2,481	1,829	2,486	3,383	3,094	2,636	3,297	2,515	2,621	4,870	2,118	2,255
All Years	**3,271**	**3,084**	**5,865**	**11,105**	**12,831**	**12,890**	**8,803**	**7,749**	**6,280**	**8,144**	**5,778**	**7,463**
Change from No Action Alternative												
Wet	0	0	0	0	1	0	0	0	0	0	0	0
Above Normal	0	0	0	0	0	0	0	0	0	0	0	0
Below Normal	0	0	0	0	1	0	0	0	0	0	0	2
Dry	0	0	0	0	0	0	0	0	-1	0	0	-1
Critical	0	0	-1	0	0	0	0	0	0	-1	1	0
All Years	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Table B-68. Summary of Delta Inflows from Sacramento Basin under Alternative 5 and Change from the No Action Alternative (TAF)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Wet	808	1,312	2,818	4,716	4,887	4,351	2,654	1,991	1,431	1,225	996	1,687	28,877
Above Normal	652	997	1,484	2,773	3,199	3,209	1,632	1,305	975	1,346	1,016	1,326	19,913
Below Normal	682	823	1,142	1,454	1,904	1,462	1,067	864	817	1,310	998	862	13,384
Dry	612	758	1,000	1,092	1,287	1,276	797	671	736	1,141	777	733	10,881
Critical	571	574	708	886	873	816	601	485	555	788	522	441	7,818
All Years	**686**	**953**	**1,629**	**2,519**	**2,753**	**2,498**	**1,525**	**1,188**	**979**	**1,175**	**882**	**1,102**	**17,888**
Change from No Action Alternative													
Wet	0	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal	0	0	0	0	0	0	0	0	0	0	0	0	0
Below Normal	0	0	0	0	0	0	0	0	0	0	0	0	0
Dry	0	0	0	0	0	0	0	0	0	0	0	0	0
Critical	0	0	0	0	0	0	0	0	0	0	0	0	0
All Years	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Table B-69. Summary of Delta Outflow under Alternative 5 and Change from the No Action Alternative (TAF)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Wet	468	1,059	2,733	5,183	5,285	4,824	3,303	2,497	1,374	689	314	1,172	28,902
Above Normal	336	729	1,141	2,905	3,408	3,269	1,964	1,508	702	582	246	704	17,493
Below Normal	339	511	763	1,351	2,009	1,416	1,340	982	472	446	246	240	10,113
Dry	322	501	540	888	1,173	1,199	864	630	400	310	254	206	7,288
Critical	287	366	356	686	742	732	529	368	320	251	230	179	5,046
All Years	**368**	**693**	**1,335**	**2,595**	**2,884**	**2,620**	**1,831**	**1,372**	**753**	**485**	**267**	**587**	**15,789**
Change from No Action Alternative													
Wet	0	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal	0	0	0	0	0	0	0	0	0	0	0	0	-1
Below Normal	0	0	0	0	0	0	0	0	0	0	0	0	0
Dry	0	0	0	0	0	0	0	0	0	0	0	0	0
Critical	0	0	0	-1	0	0	0	0	0	0	0	0	-1
All Years	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Table B-70. Summary of Jones Pumping Plant Exports under Alternative 5 and Change from the No Action Alternative (TAF)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Wet	227	230	248	217	217	232	92	99	224	281	283	260	2,609
Above Normal	214	232	246	180	180	225	64	55	190	252	283	260	2,379
Below Normal	234	237	263	193	158	179	61	53	138	265	248	262	2,291
Dry	215	205	255	202	155	136	60	53	93	246	178	227	2,025
Critical	215	203	211	168	133	95	53	51	27	110	119	144	1,530
All Years	**222**	**222**	**246**	**197**	**176**	**181**	**70**	**68**	**147**	**241**	**230**	**236**	**2,235**
Change from No Action Alternative													
Wet	0	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal	0	0	0	0	0	0	0	0	0	0	0	0	0
Below Normal	0	0	0	0	0	0	0	0	0	0	0	0	1
Dry	0	0	0	0	0	0	0	0	0	0	0	0	1
Critical	0	0	0	0	0	0	0	0	0	0	0	0	1
All Years	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**

Table B-71. Summary of Banks Pumping Plant Exports under Alternative 5 and Change from the No Action Alternative (TAF)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Wet	235	252	306	273	314	359	109	112	245	424	437	375	3,440
Above Normal	180	177	333	209	218	274	63	51	195	410	431	395	2,935
Below Normal	202	208	312	197	214	254	64	49	133	429	437	391	2,888
Dry	169	173	330	199	172	148	58	56	88	393	254	303	2,343
Critical	147	91	214	175	141	100	46	44	33	220	65	103	1,381
All Years	**194**	**193**	**303**	**220**	**227**	**244**	**74**	**70**	**153**	**386**	**341**	**325**	**2,730**
Change from No Action Alternative													
Wet	0	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal	0	0	0	0	0	0	0	0	0	0	0	0	0
Below Normal	0	0	0	0	0	0	0	0	0	0	0	0	0
Dry	0	0	0	0	0	0	0	0	0	0	0	0	0
Critical	0	0	0	0	0	0	0	0	0	0	0	0	0
All Years	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

There is no meaningful change in the probability of exceedance for Folsom Lake water surface elevation being above or below levels of concern for M&I diversion capacity under Alternative 5 as compared to the No Action Alternative.

Attachment A
CalSim II Assumptions for Existing and Future No Action Conditions

	Period of Simulation: 82 years (1922-2003)	
	Existing Level Study	**Future Level Study**
HYDROLOGY		
Level of Development	2005 Level, *DWR Bulletin 160-98*[1]	2020 Level, *DWR Bulletin 160-98*[2]
Sacramento River Region Demands		
CVP	Land use based, limited by full contract M&I demand of max historical use	Land use based, full build-out of contract amounts
SWP (Feather River Service Area [FRSA])	Land use based, limited by full contract	
Non-Project	Land use based	
Woodland-Davis Clean Water Agency	Not included	
Antioch	Pre-1914 water right	
CVP Refuges	Recent historical Level 2 water needs	Firm Level 2 water needs
American River Basin Demands		
Water rights	2005 Level	2020 Level
CVP	2010 max historical use	2020 Level, contract total
San Joaquin River Basin Demands		
Friant Unit	Limited by contract amounts, based on current allocation policy	
Lower Basin	Land use based with district level operations and constraints	
Stanislaus River Basin[3]	Land use based, with New Melones Interim Operations Plan and NOAA Fisheries BO (June 2009), Actions 3.1.2 and 3.1.3[4]	
South of Delta Demands		
CVP	Full contract	
Contra Costa Water District	195 TAF/year (yr)	
SWP (with North Bay Aqueduct)	3.0-4.1 million AF (MAF)/yr	4.1 MAF/yr
SWP Article 21 Demand	Metropolitan Water District of Southern California up to 200 TAF/month (Dec-Mar), Kern County Water Agency demand up to 180 TAF/month and others up to 34 TAF/month	

	Period of Simulation: 82 years (1922-2003)	
	Existing Level Study	**Future Level Study**
FACILITIES		
Red Bluff Diversion Dam	Fish Passage Improvement Project in place with 2,500 cfs capacity	
Freeport Regional Water Project	Included with diversions to EBMUD	
Banks Pumping Capacity	Physical capacity is 10,300 cfs, 6,680 cfs permitted capacity up to 8,500 cfs (Dec 15th–Mar 15th) depending on Vernalis flow conditions[5] additional capacity of 500 cfs (up to 7,180 cfs) allowed for Jul–Sep for reducing impact of NOAA Fisheries BO on SWP (Jun 2009), Action 4.2.1[4]	
Jones Pumping Capacity	Exports up to 4,600 cfs permit capacity in all months	
Delta-Mendota Canal-California Aqueduct Intertie	Included with 400 cfs capacity	
Los Vaqueros Reservoir Capacity	103 TAF	160 TAF
South Bay Aqueduct	300 cfs	South Bay Aqueduct Enlargement to 430 cfs
REGULATORY STANDARDS		
Trinity River		
Minimum Flow below Lewiston Dam	Trinity EIS Preferred Alternative (369-815 TAF/yr)	
Trinity Reservoir End-of-September Minimum Storage	Trinity EIS Preferred Alternative (600 TAF as able)	
Clear Creek		
Minimum Flow below Whiskeytown Dam	Downstream water rights, 1963 Reclamation Proposal to USFWS and NPS, predetermined CVPIA 3406(b)(2) flows and NOAA Fisheries BO (June 2009) Action I.1.1[4]	
Upper Sacramento River		
Shasta Lake End-of-September Minimum Storage	NOAA Fisheries 2004 Winter-run BO (1900 TAF), predetermined CVPIA 3406(b)(2) flows, and NOAA Fisheries BO (Jun 2009) Action I.2.1[4]	
Minimum Flow below Keswick Dam	Flows for SWRCB Water Rights Order 90-5 and 1993 Winter-run BO temperature control, predetermined CVPIA 3406(b)(2) flows, and NOAA Fisheries BO (Jun 2009), Action I.2.2[4]	
Feather River		
Minimum Flow below Thermalito Diversion Dam	2006 Settlement Agreement (700/800 cfs)	
Minimum Flow below Thermalito Afterbay outlet	1983 DWR, California Department of Fish & Game (DFG) Agreement (750-1700 cfs)	

	Period of Simulation: 82 years (1922-2003)	
	Existing Level Study	**Future Level Study**
Yuba River		
Minimum flow below Daguerre Point Dam	D-1644 Operations (Lower Yuba River Accord)[6]	
American River		
Minimum Flow below Nimbus Dam	American River Flow Management as required by NOAA Fisheries BO (Jun 2009), Action 2.1[4]	
Minimum Flow at H Street Bridge	SWRCB D-893	
Lower Sacramento River		
Minimum Flow near Rio Vista	SWRCB D-1641	
Mokelumne River		
Minimum Flow below Camanche Dam	Federal Energy Regulatory Commission 2916-029, 1996 Joint Settlement Agreement (100-325 cfs)	
Minimum Flow below Woodbridge Diversion Dam	Federal Energy Regulatory Commission 2916-029, 1996 Joint Settlement Agreement (25-300 cfs)	
Stanislaus River		
Minimum Flow below Goodwin Dam	1987 Reclamation, DFG agreement, and flows required for NOAA Fisheries BO (Jun 2009) Actions III.1.2 and III.1.3[4]	
Minimum Dissolved Oxygen	SWRCB D-1422	
REGULATORY STANDARDS		
Merced River		
Minimum Flow below Crocker-Huffman Diversion Dam	Davis-Grunsky (180-220 cfs, Nov-Mar) and Cowell Agreement	
Minimum Flow at Shaffer Bridge	Federal Energy Regulatory Commission 2179 (25-100 cfs)	
Tuolumne River		
Minimum Flow at Lagrange Bridge	Federal Energy Regulatory Commission 2299-024, 1995 Settlement Agreement (94-301 TAF/yr)	
San Joaquin River		
San Joaquin River Restoration	Interim flows	Full flows
Maximum Salinity near Vernalis	SWRCB D-1641	
Minimum Flow near Vernalis	SWRCB D-1641, NOAA Fisheries BO (Jun 2009), Action 4.2.1[4]	

	Period of Simulation: 82 years (1922-2003)	
	Existing Level Study	**Future Level Study**
Sacramento River-San Joaquin River Delta		
Delta Outflow Index (Flow and Salinity)	SWRCB D-1641, USFWS BO (Dec 2008), Action 4[4]	
Delta Cross Channel Gates	SWRCB D-1641, NOAA Fisheries BO (Jun 2009) Action 4.1.2[4]	
Delta Exports	SWRCB D-1641, NOAA Fisheries BO (Jun 2009) Action 4.2.1[4]	
Combined Flow in Old and Middle River	USFWS BO (Dec 2008), Actions 1–3 and NOAA Fisheries BO (Jun 2009), Action 4.2.3[4]	
OPERATIONS CRITERIA		
Subsystem		
Upper Sacramento River		
Flow Objective for Navigation (Wilkins Slough)	NOAA Fisheries BO (Jun 2009) Action I.4[4]; 3,250 – 5,000 cfs based on CVP water supply condition	
American River		
Folsom Dam Flood Control	Variable 400/670 without outlet modifications	
Feather River		
Flow at Mouth	Maintain DFG/DWR flow target above Verona or 2,800 cfs Apr-Sep, dependent on Oroville inflow and FRSA allocation	
System-wide		
CVP Water Allocation		
CVP Settlement and Exchange	100% (75% in Shasta Critical years)	
CVP Refuges	100% (75% in Shasta Critical years)	
CVP Agriculture	100% - 0% based on supply; additionally limited due to D-1641, USFWS BO (Dec 2008) and NOAA Fisheries BO (Jun 2009) export restrictions[4]	
CVP Municipal & Industrial	100% - 0% based on supply; additionally limited due to D-1641, USFWS BO (Dec 2008) and NOAA Fisheries BO (Jun 2009) export restrictions[4]	
OPERATIONS CRITERIA		
SWP Water Allocation		
North of Delta (FRSA)	Contract specific	
South of Delta	Based on supply, Monterey Agreement; allocations limited due to D-1641, USFWS BO (Dec 2008) and NOAA Fisheries BO (Jun 2009) export restrictions[4]	

	Period of Simulation: 82 years (1922-2003)	
	Existing Level Study	**Future Level Study**
CVP/SWP Coordinated Operations		
Sharing of Responsibility for In Basin Use	1986 COA	
Sharing of Surplus Flows	1986 COA	
Sharing of Restricted Export Capacity	Equal sharing of export capacity under SWRCB D-1641, USFWS BO (Dec 2008) and NOAA Fisheries BO (Jun 2009) export restrictions[4]	
Transfers		
Lower Yuba River Accord[7]	Yuba River acquisitions for reducing impact of NOAA Fisheries BO export restrictions on SWP	

[1] The Sacramento Valley hydrology used in the existing conditions CalSim II model reflects nominal 2005 land-use assumptions. The nominal 2005 land-use was determined by interpolation between the 1995 and projected 2020 land-use assumptions associated with Bulletin 160-98. The San Joaquin Valley hydrology reflects 2005 land-use assumptions developed by Reclamation. Existing-level projected land-use assumptions are being coordinated with the California Water Plan Update for future models.

[2] The Sacramento Valley hydrology used in the Future Conditions CalSim II model reflects 2020 land-use assumptions associated with Bulletin 160-98. The San Joaquin Valley hydrology reflects draft 2030 land-use assumptions developed by Reclamation. Development of future-level projected land-use assumptions are being coordinated with the California Water Plan Update for future models.

[3] The CalSim II model representation for the Stanislaus River does not necessarily represent Reclamation's current or future operational policies. A suitable plan for supporting flows has not been developed for NOAA Fisheries BO (Jun 2009), Action 3.1.3.

[4] In cooperation with Reclamation, NOAA Fisheries, USFWS, and DFG, DWR has developed assumptions for implementation of the USFWS BO (December 15, 2008) and NOAA Fisheries BO (June 4, 2009) in CalSim II.

[5] Current US Army Corps of Engineers permit for Harvey O. Banks Pumping Plant allows for an average diversion rate of 6,680 cfs in all months. Diversion rate can increase up to one-third of the rate of San Joaquin River flow at Vernalis during Dec 15th–Mar 15th up to a maximum diversion of 8,500 cfs, if Vernalis flow exceeds 1,000 cfs.

[6] D-1644 and the Lower Yuba River Accord are assumed to be implemented for Existing and Future Conditions. The Yuba River is not dynamically modeled in CalSim II. Yuba River hydrology and availability of water acquisitions under the Lower Yuba River Accord are based on modeling performed and provided by the Lower Yuba River Accord EIS/EIR study team.

[7] Acquisitions of Component 1 water under the Lower Yuba River Accord, and use of 500 cfs dedicated capacity at Banks Pumping Plant during Jul–Sep, are assumed to be used to reduce as much of the effect of the April–May Delta export actions on SWP contractors as possible.

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Attachment B
Comparison of No Action Alternative with Action Alternatives

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The following set of figures compare monthly time-series of CalSim II output for the No Action Alternative (NAA) with Alternative 2, Equal Agricultural and M&I Allocation (Equal Allocations). Figures are included for reservoir storage in Trinity, Shasta, and Folsom lakes, Lake Oroville, and San Luis Reservoir. River flows are provided on the upper Sacramento River, the lower Feather and American rivers, and Delta inflow. Figures for Delta outflow, CVP and SWP exports, and the location of X2 are also included. In many months the differences in model outputs are small and difficult to discern. This is consistent with the tables in the main body of Appendix B that summarize changes with average monthly values by water year type. Generally, the changes in CVP and SWP operations under Alternative 2 are small compared to the range of operational variability in the No Action Alternative. These monthly figures are provided as further support for this conclusion. However, there can be some months when differences are larger and readily seen in the following figures. Figures are included to provide a more complete summary of the changes in CVP and SWP operations under the various alternatives.

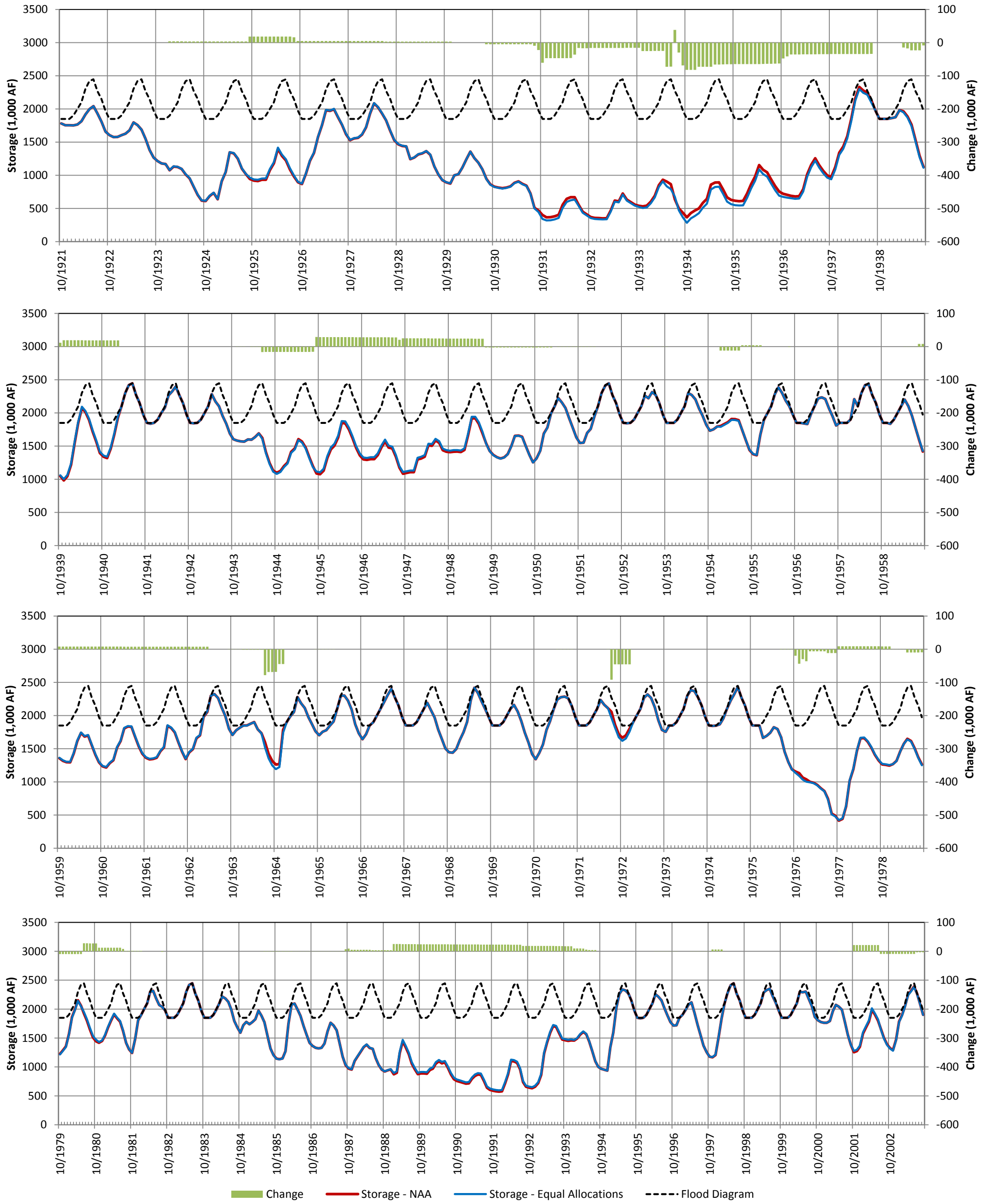

Figure 1. Comparison of Trinity Lake Storage for Alternative 2

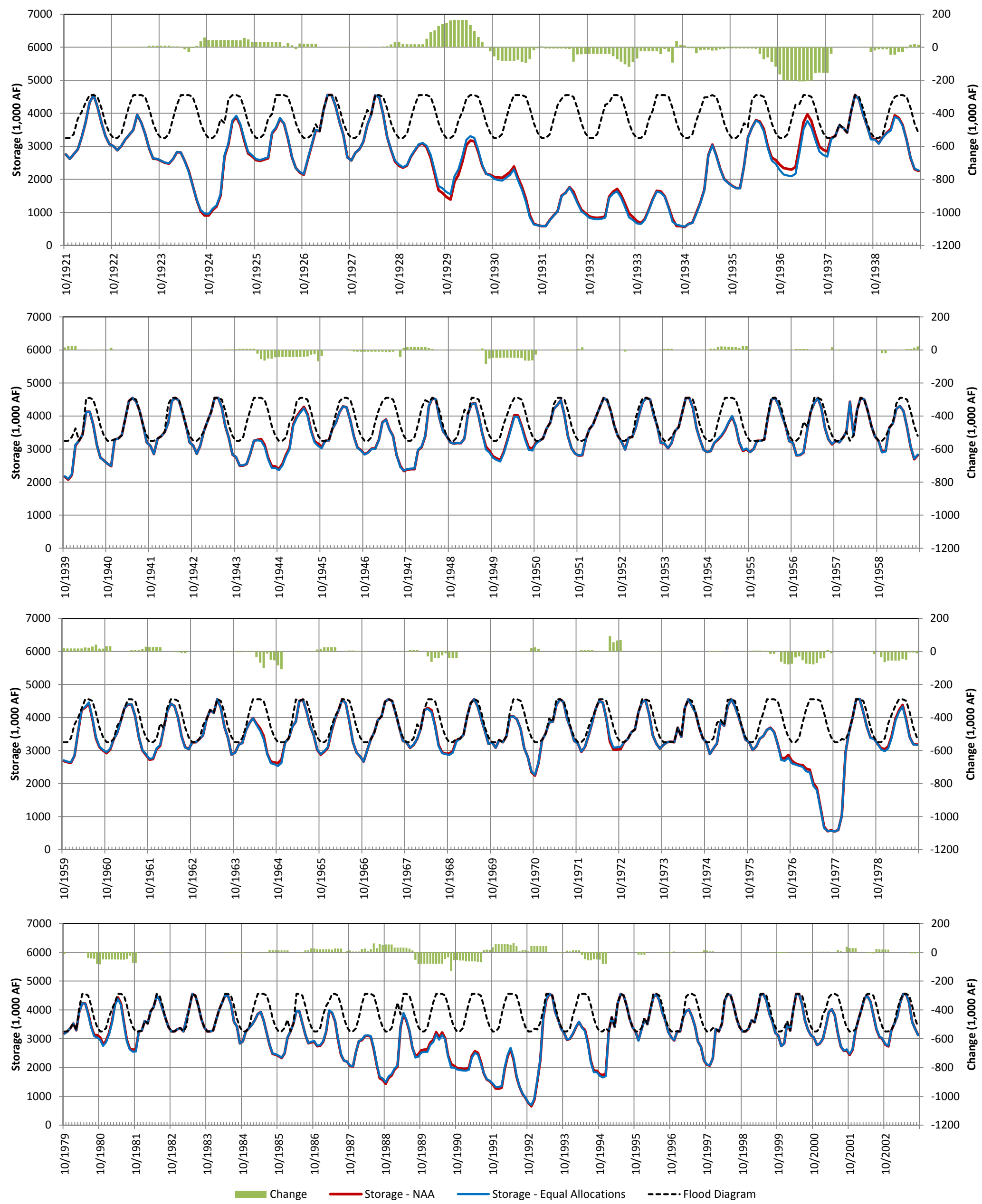

Figure 2. Comparison of Shasta Lake Storage for Alternative 2

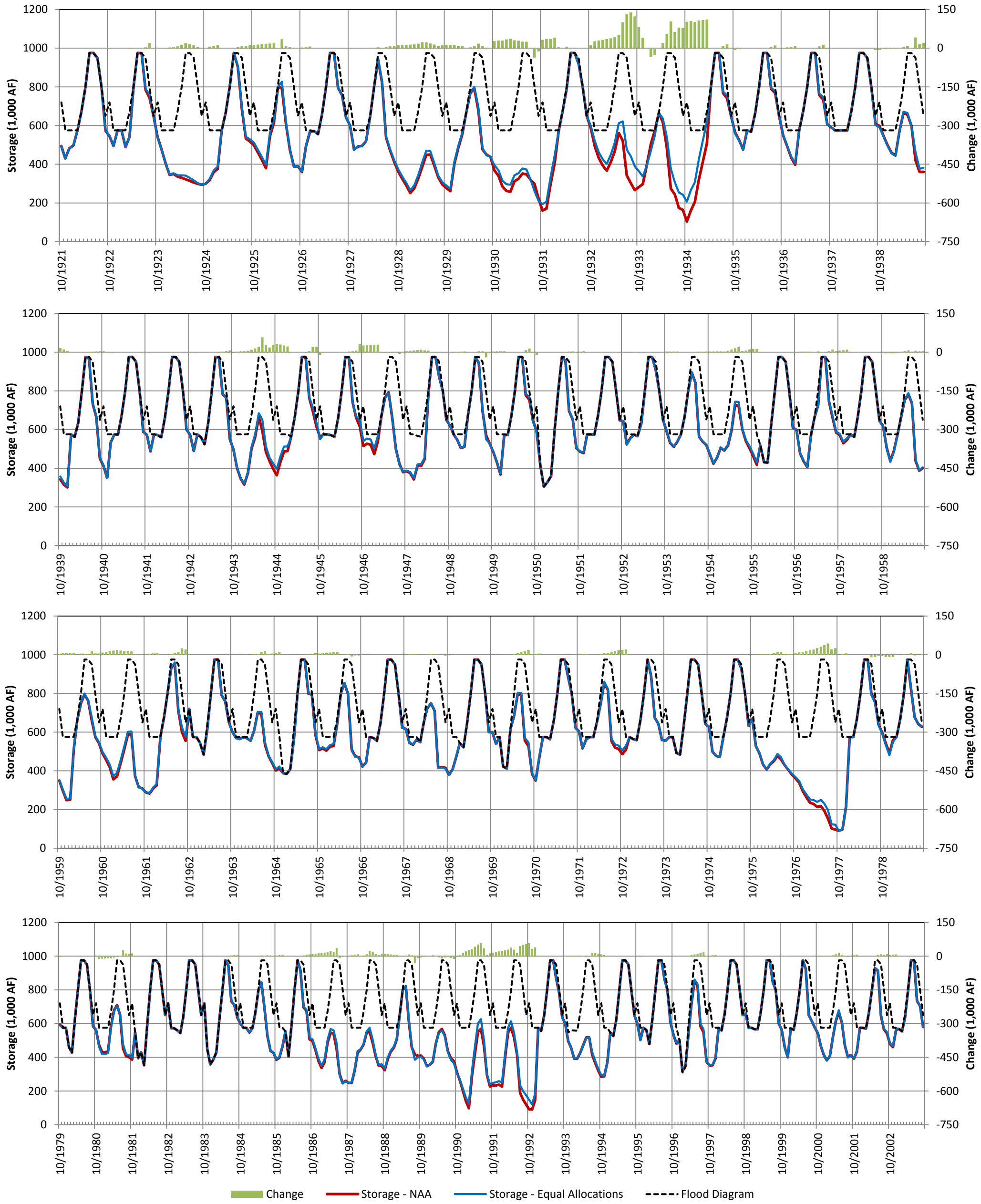

Figure 3. Comparison of Folsom Lake Storage for Alternative 2

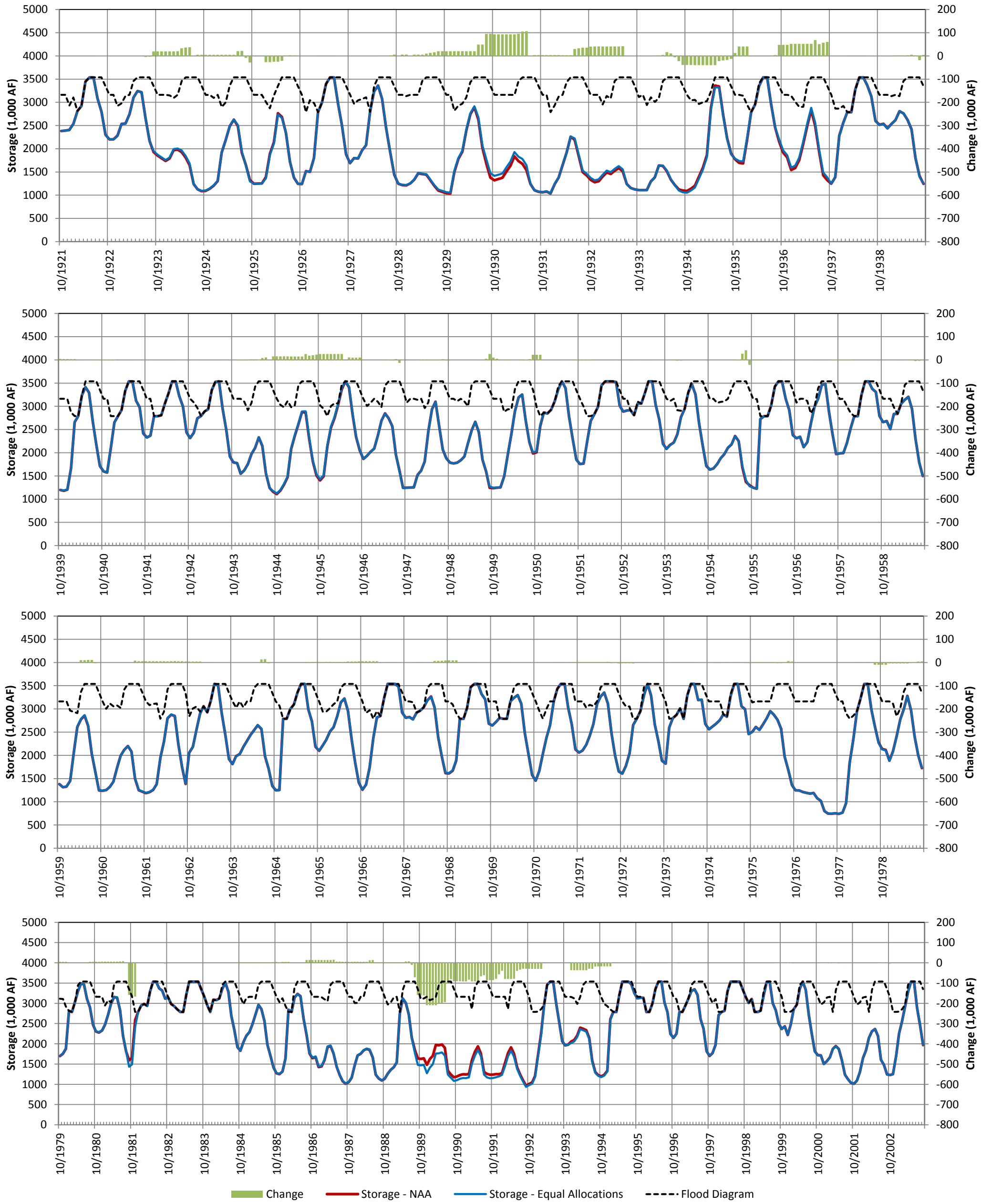

Figure 4. Comparison of Lake Oroville Storage for Alternative 2

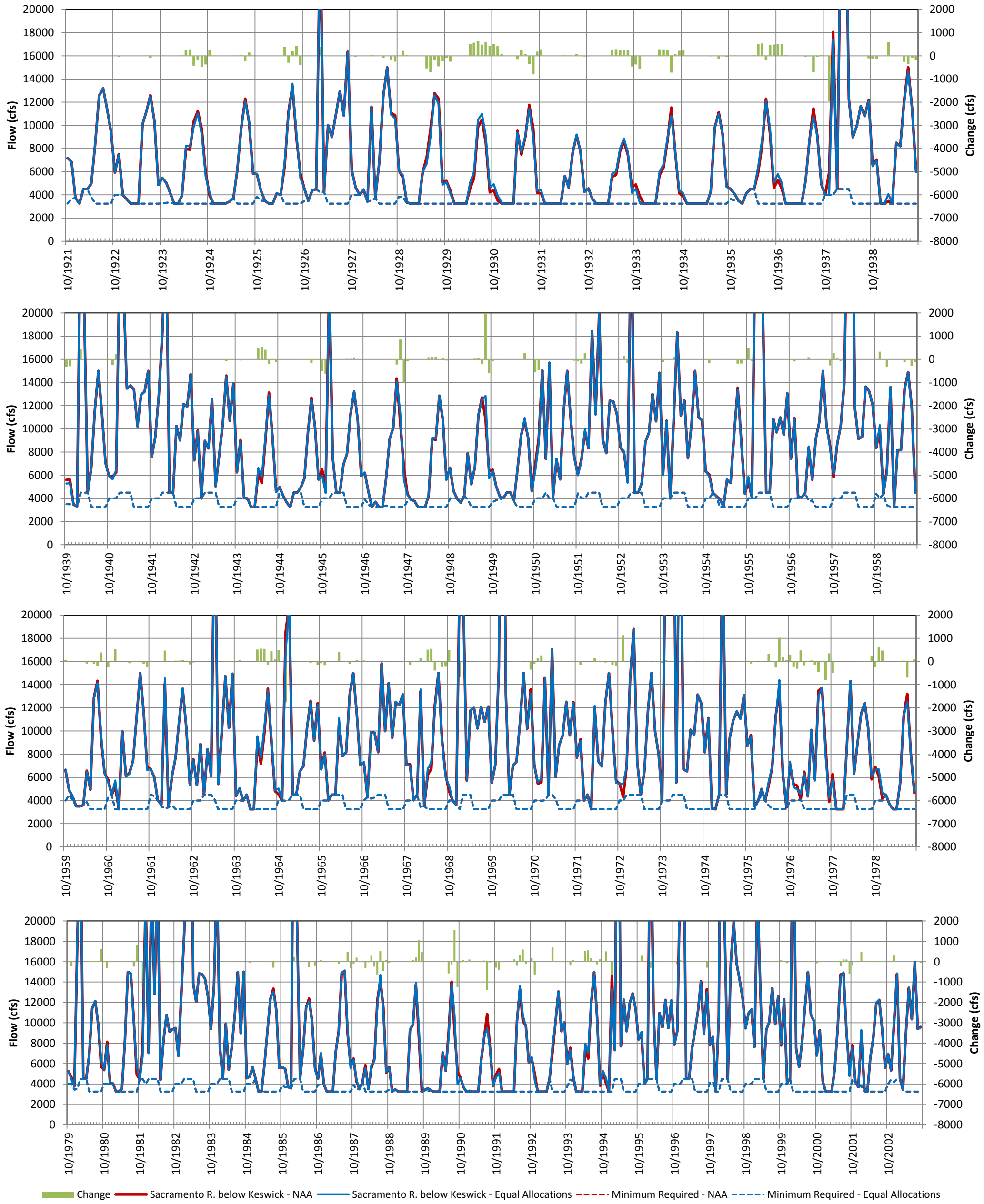

Figure 5. Comparison of Sacramento River below Keswick Flow for Alternative 2

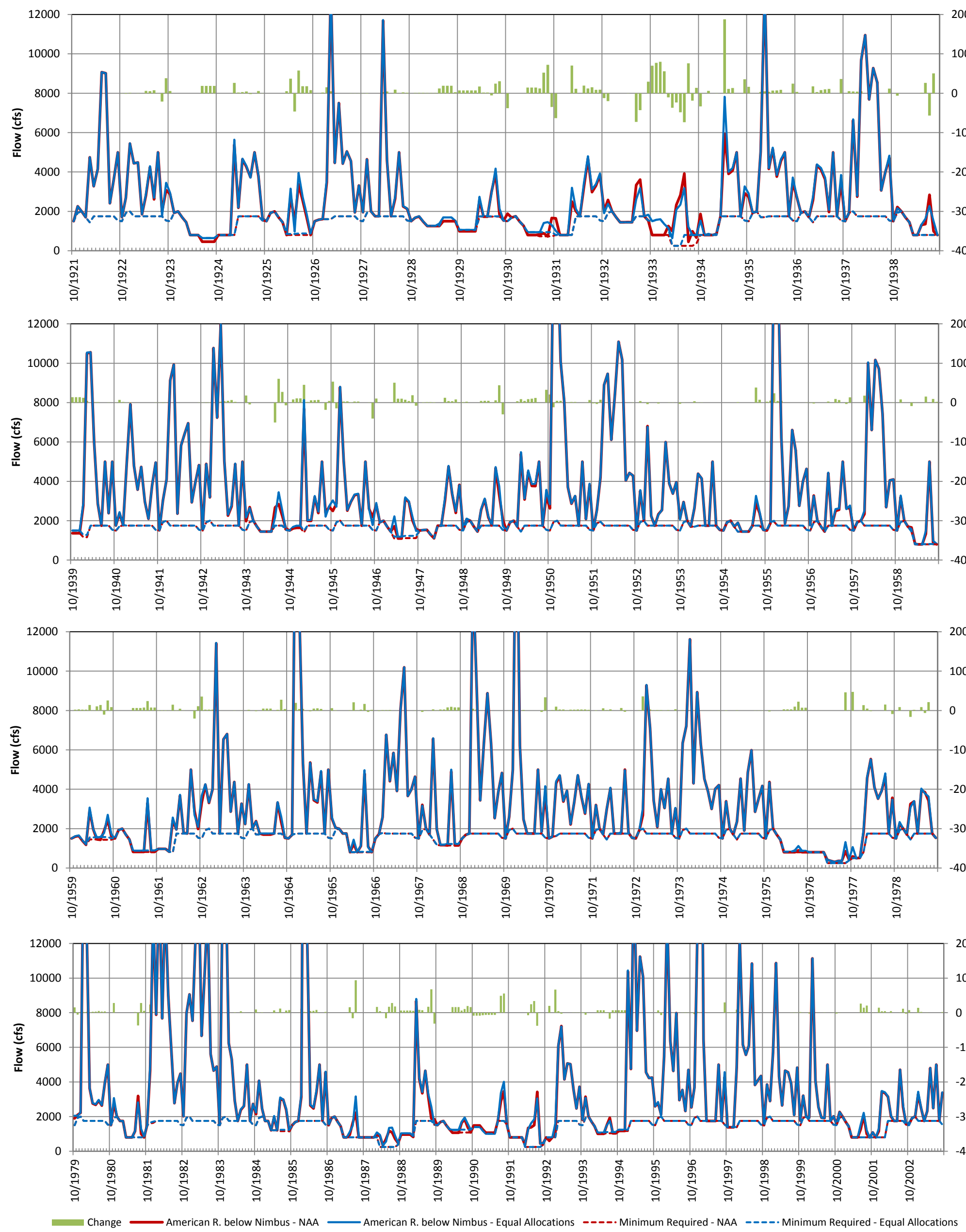

Figure 6. Comparison of American River below Nimbus Flow for Alternative 2

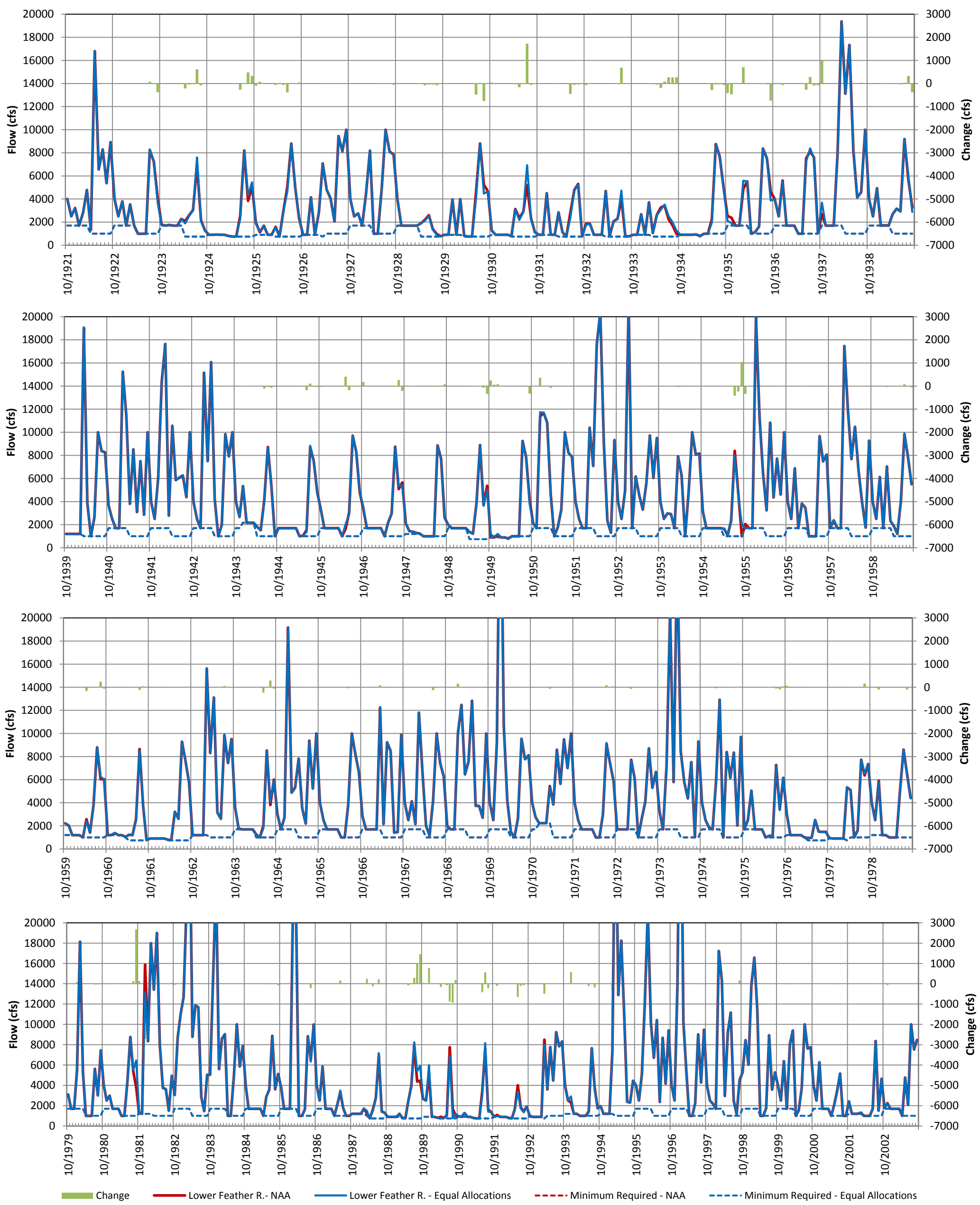

Figure 7. Comparison of Lower Feather River Flow for Alternative 2

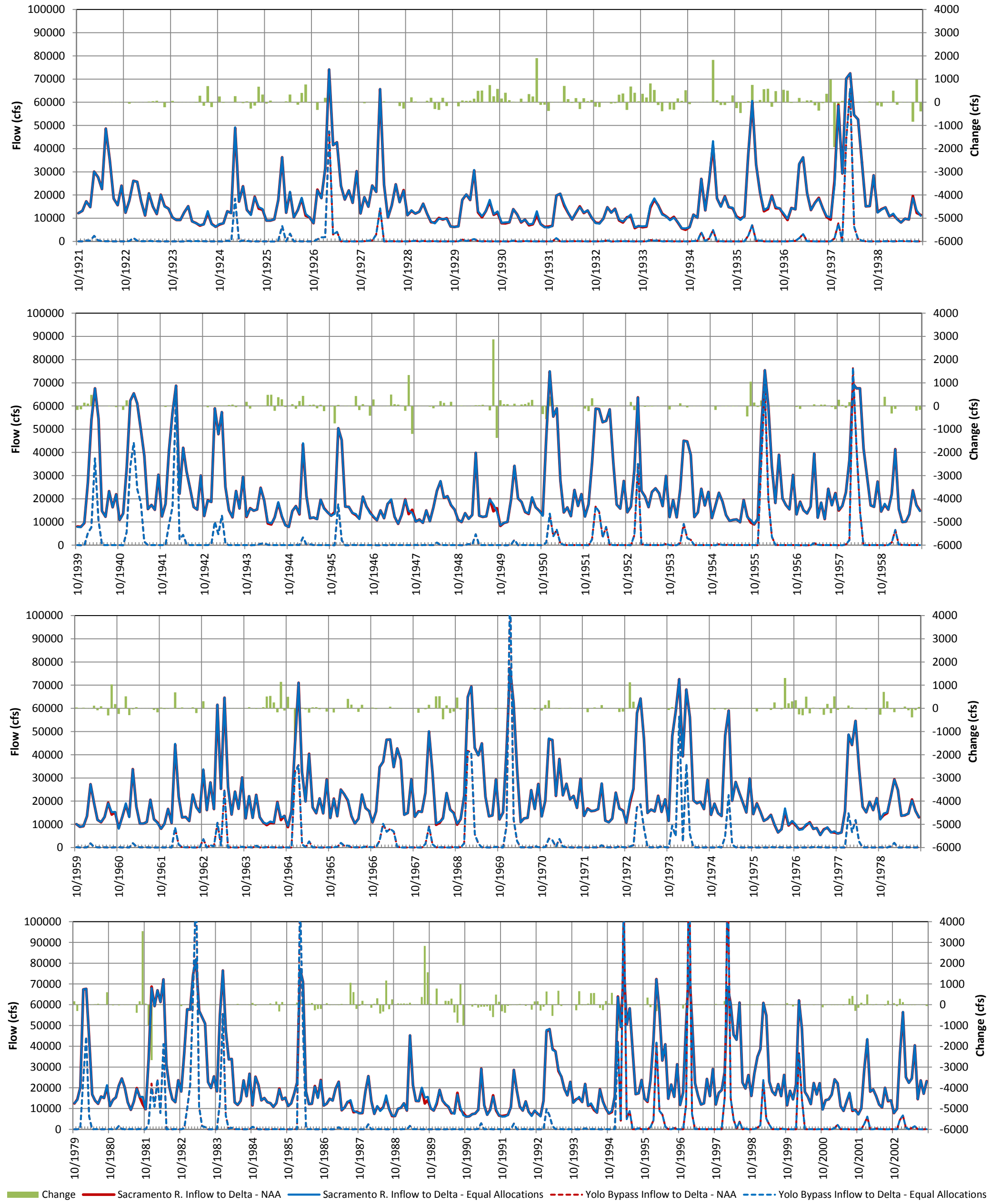

Figure 8. Comparison of Delta Inflow for Alternative 2

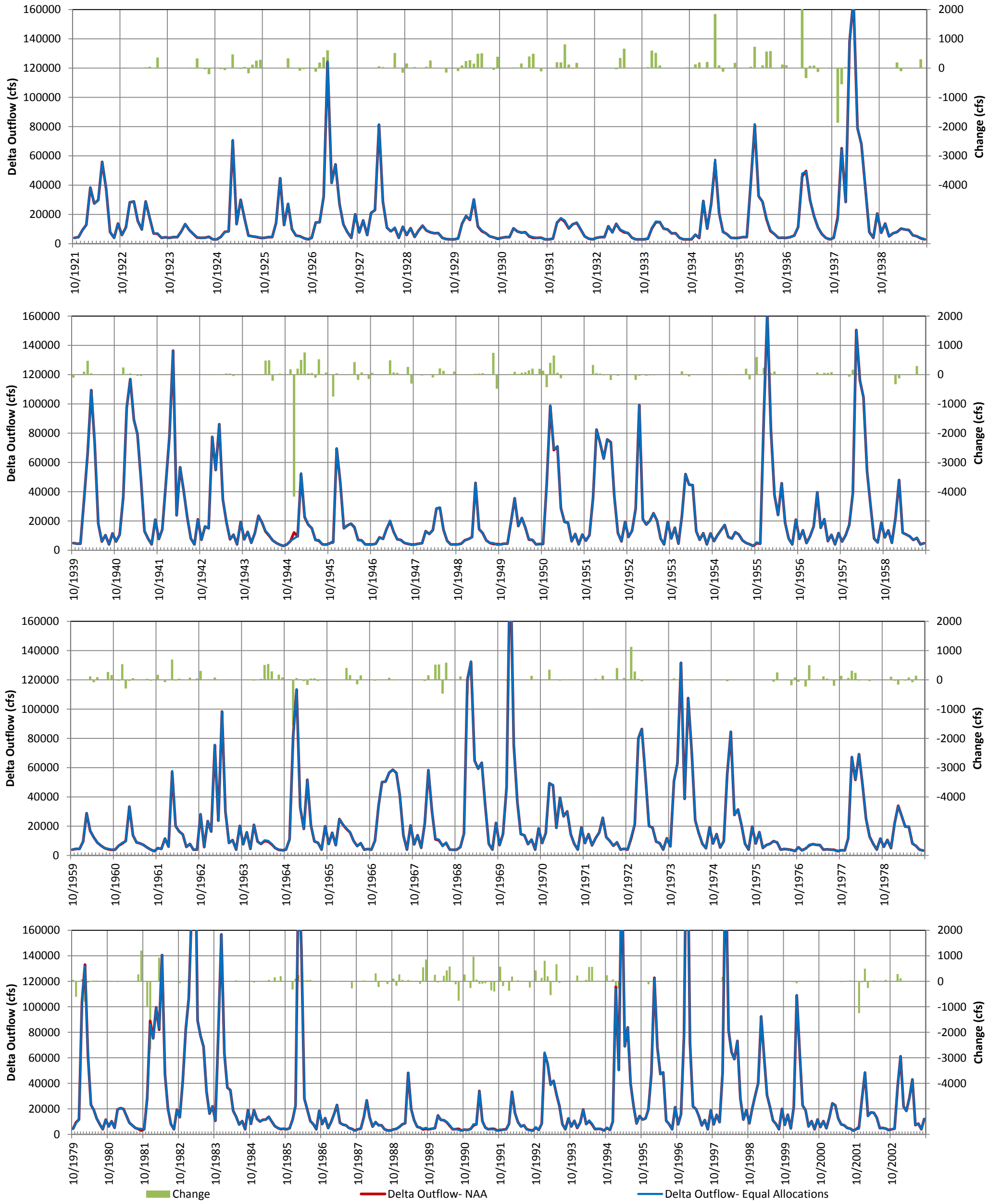

Figure 9. Comparison of Delta Outflow for Alternative 2

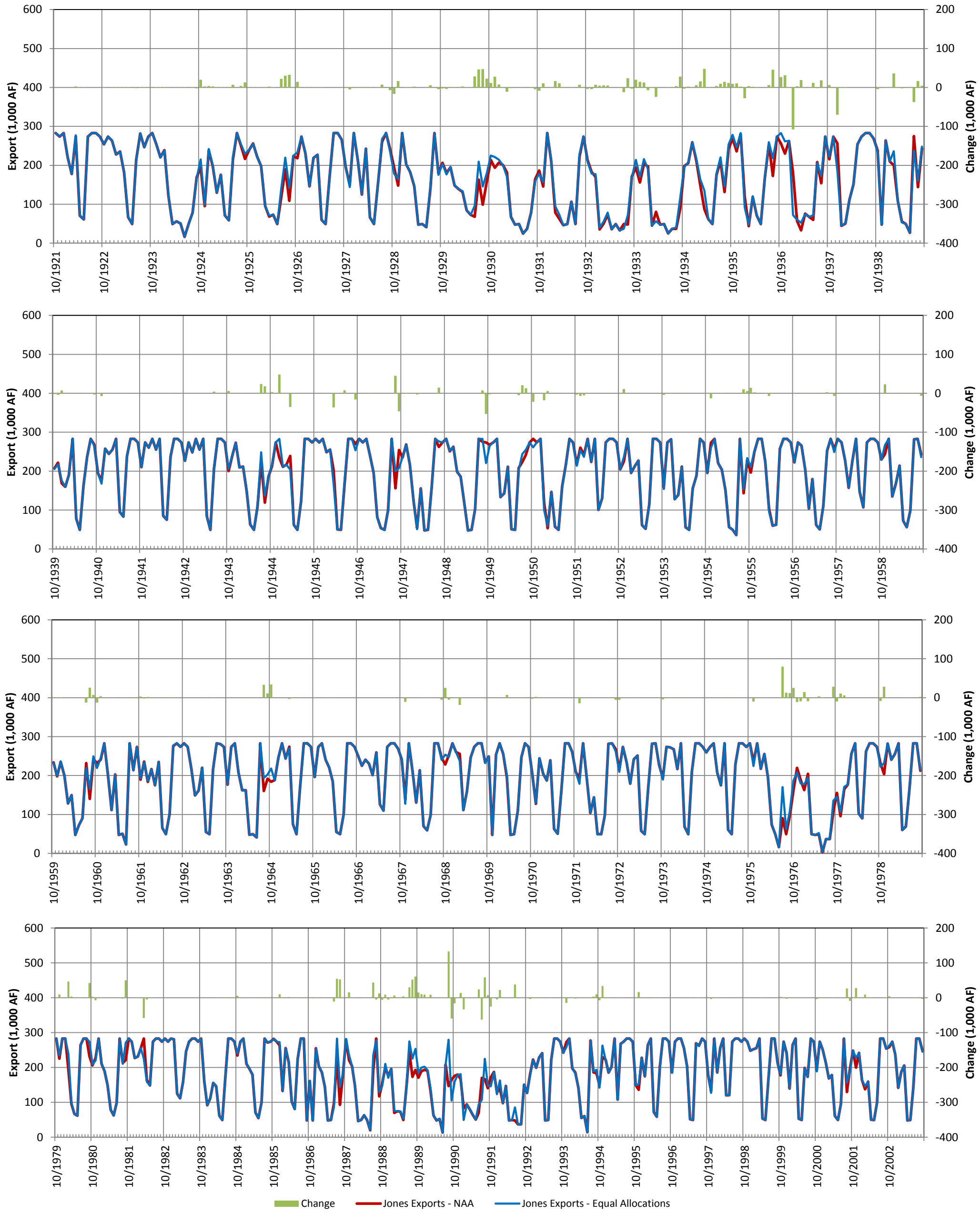

Figure 10. Comparison of Jones Pumping Plant for Alternative 2

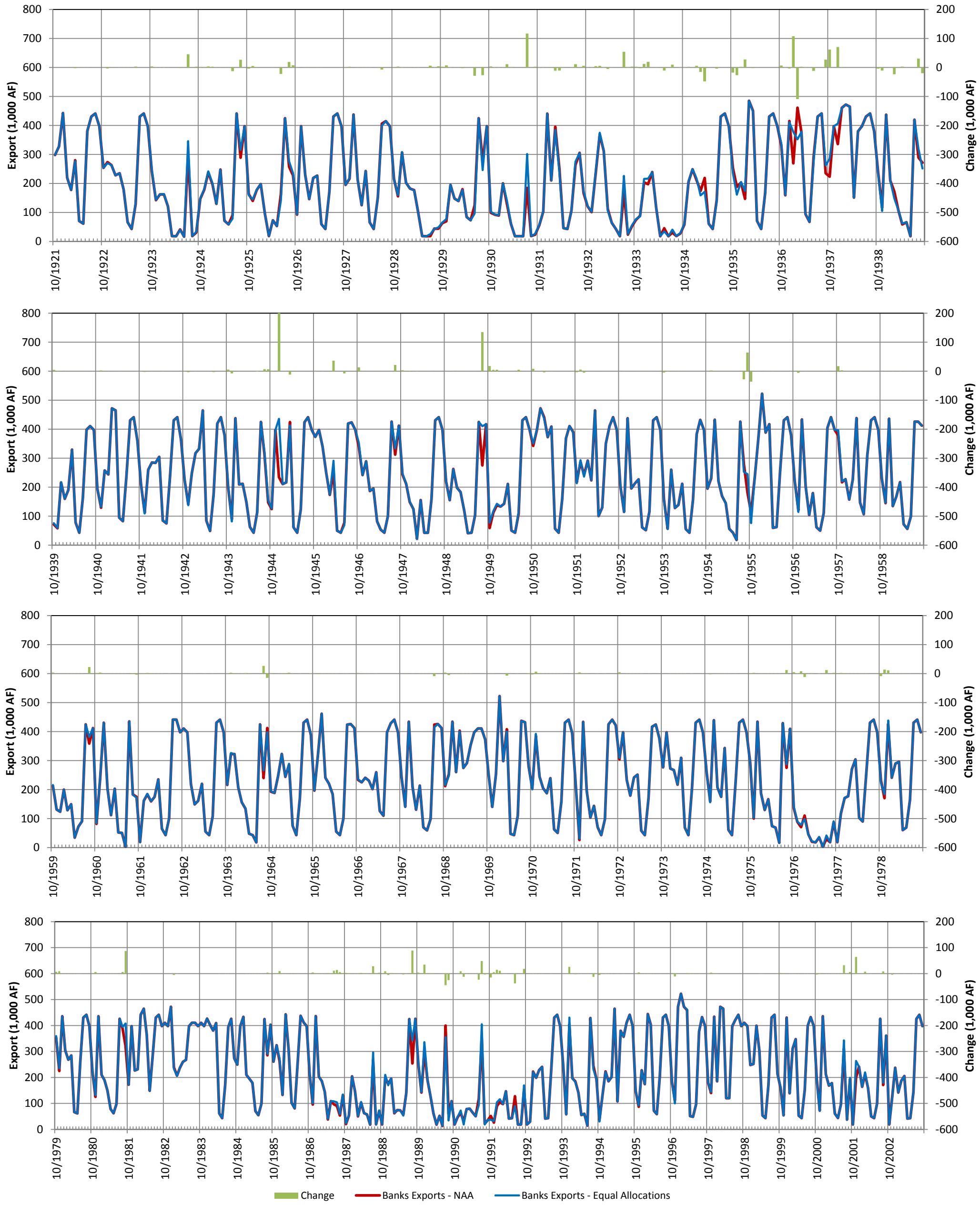

Figure 11. Comparison of Banks Pumping Plant for Alternative 2

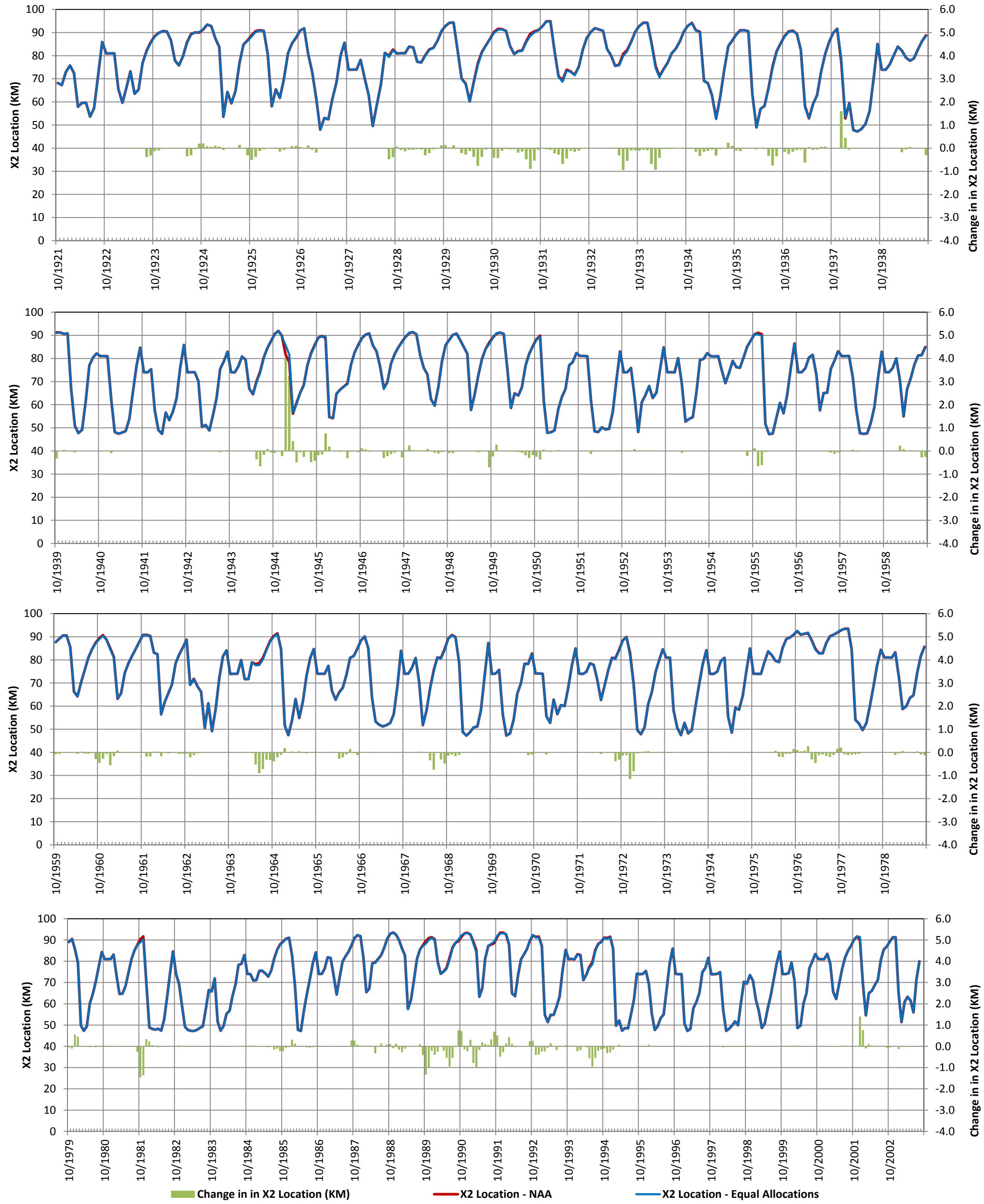

Figure 12. Comparison of X2 Location for Alternative 2

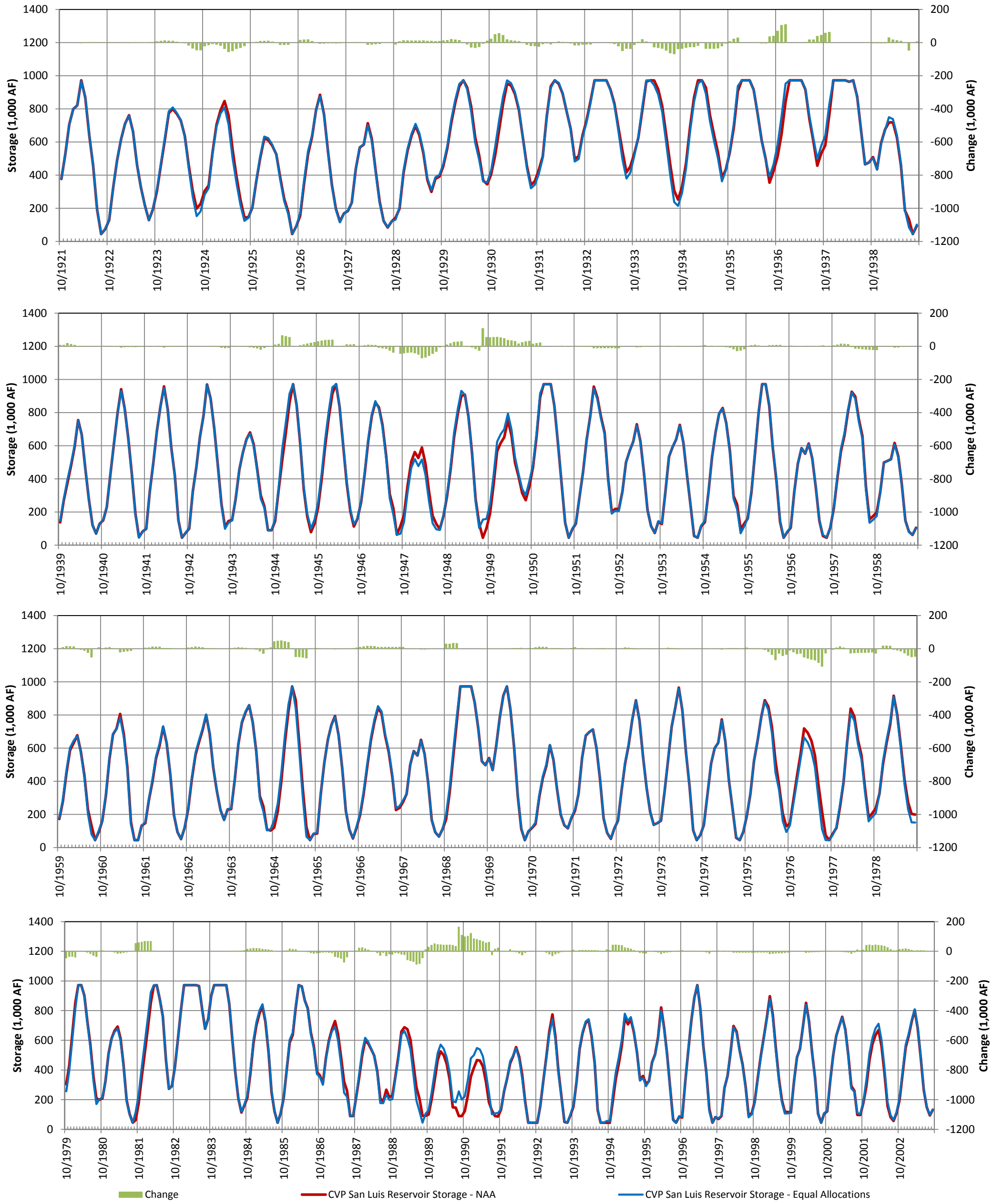

Figure 13. Comparison of CVP San Luis Reservoir Storage for Alternative 2

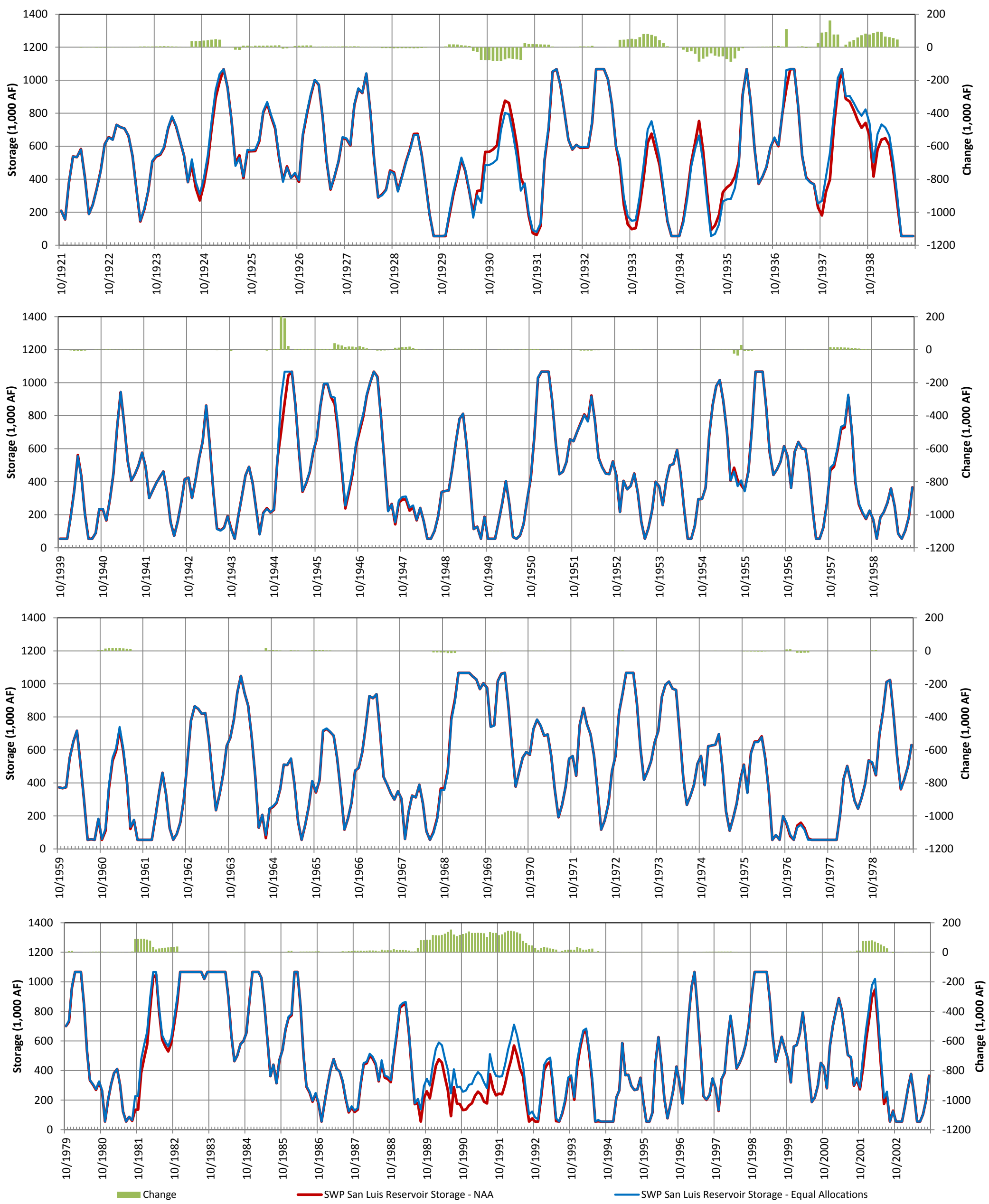

Figure 14. Comparison of SWP San Luis Reservoir Storage for Alternative 2

The following set of figures compare monthly time-series of CalSim II output for the No Action Alternative with Alternative 3, Full M&I Allocation Preference (Full M&I Preference). In many months the differences in model outputs are small and difficult to discern. This is consistent with the tables in the main body of Appendix B that summarize changes with average monthly values by water year type. Generally, the changes in CVP and SWP operations under Alternative 3 are small compared to the range of operational variability in the No Action Alternative. These monthly figures are provided as further support for this conclusion. However, there can be some months when differences are larger and readily seen in the following figures. Figures are included to provide a more complete summary of the changes in CVP and SWP operations under the various alternatives.

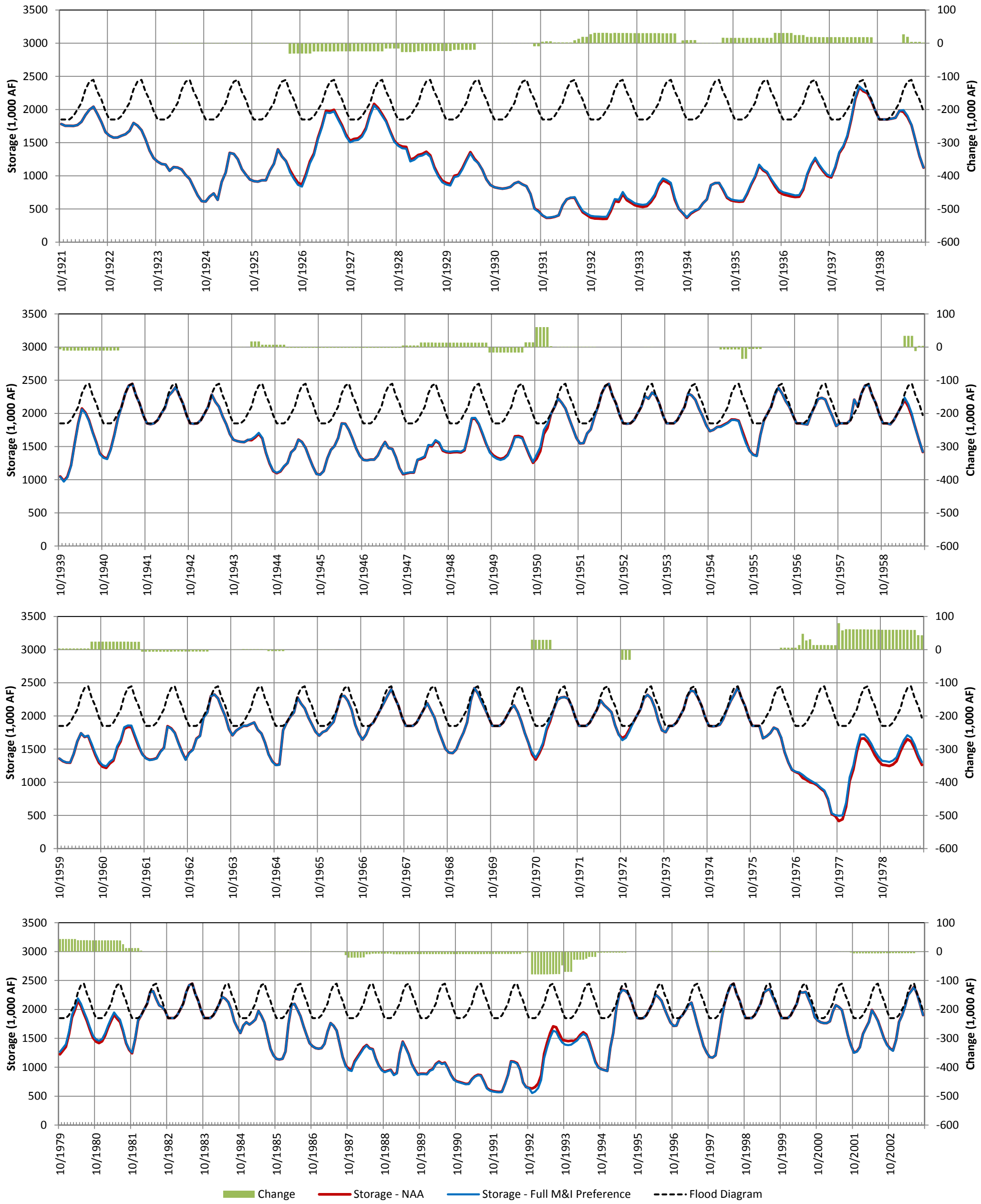

Figure 15. Comparison of Trinity Lake Storage for Alternative 3

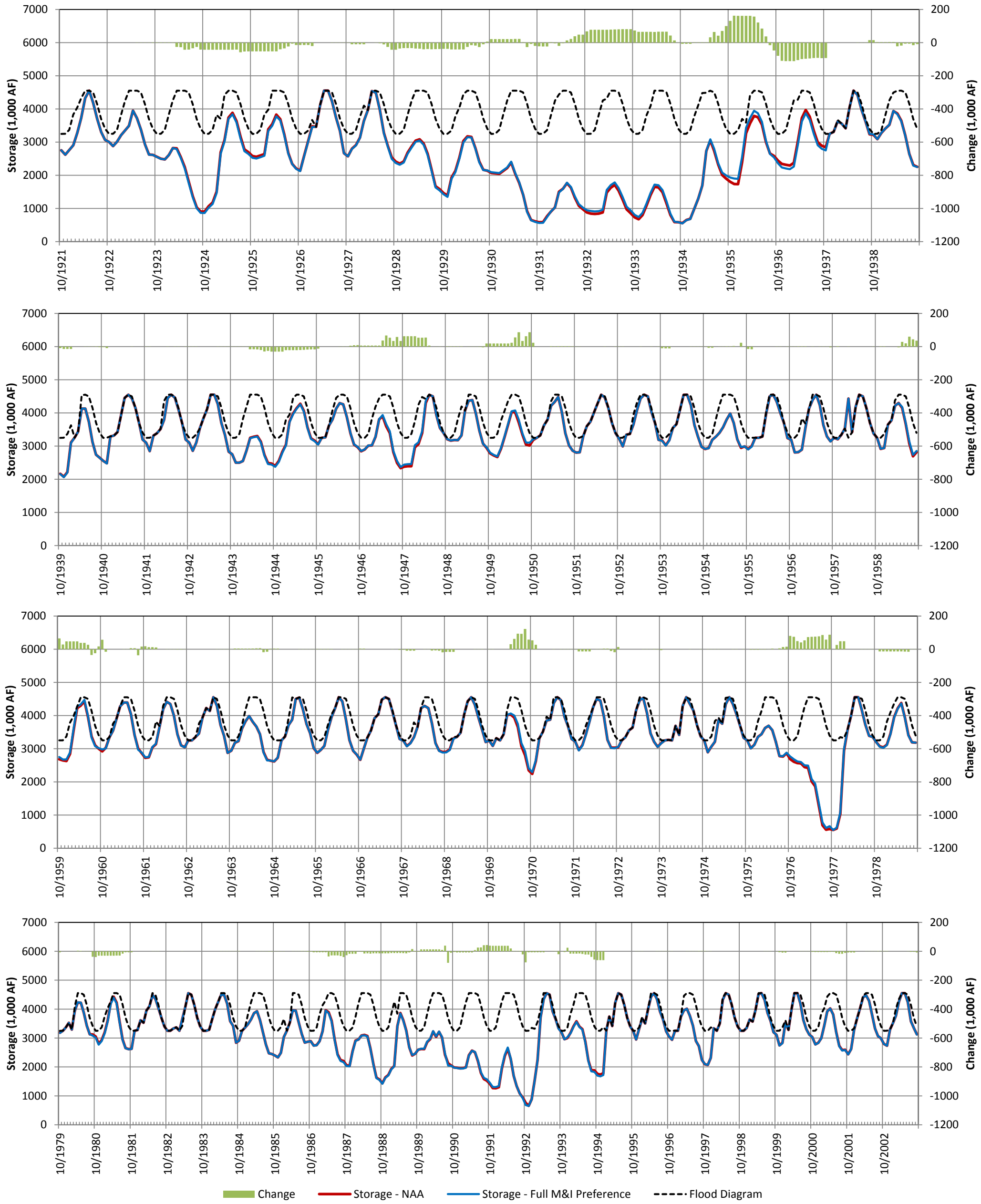

Figure 16. Comparison of Shasta Lake Storage for Alternative 3

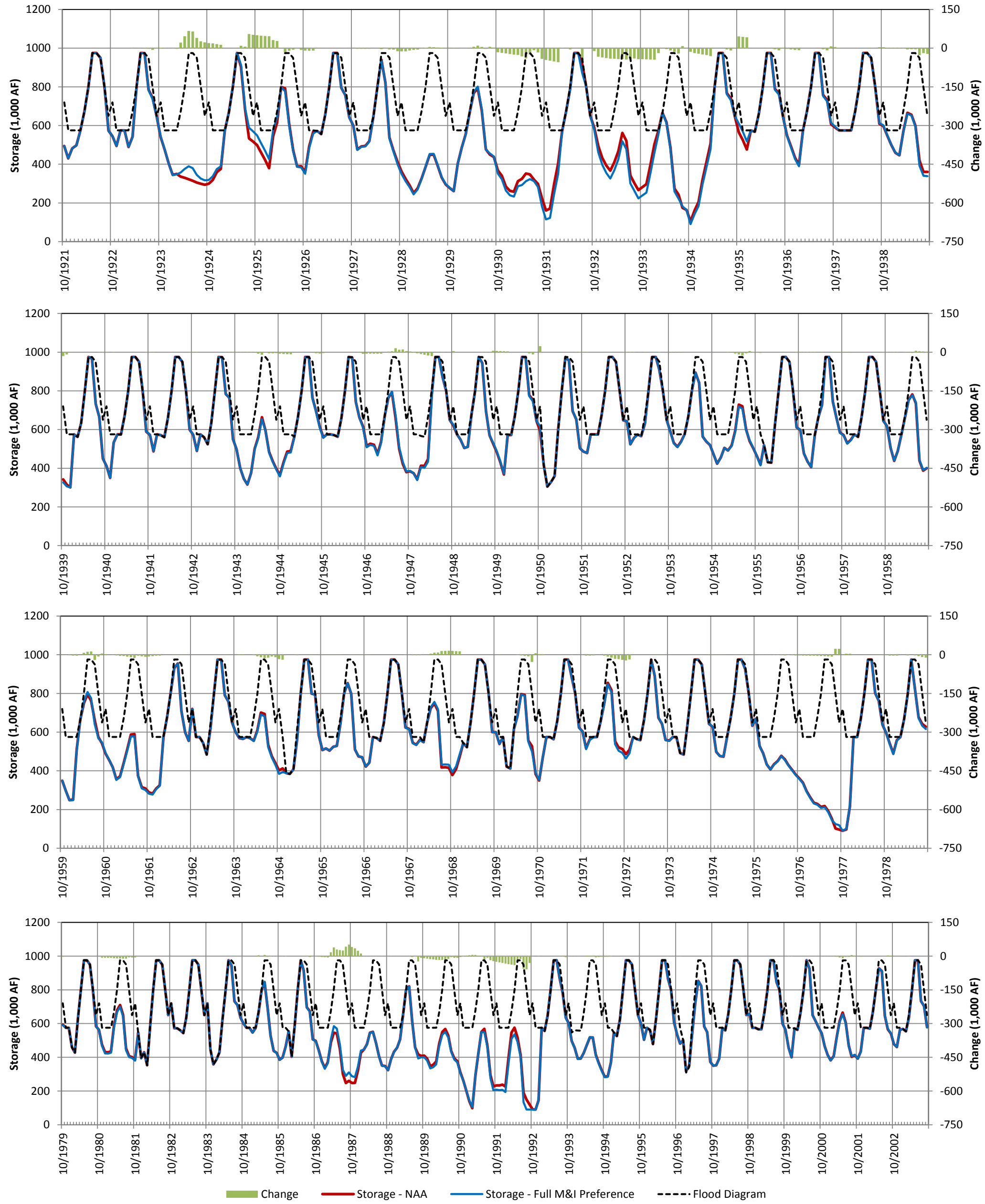

Figure 17. Comparison of Folsom Lake Storage for Alternative 3

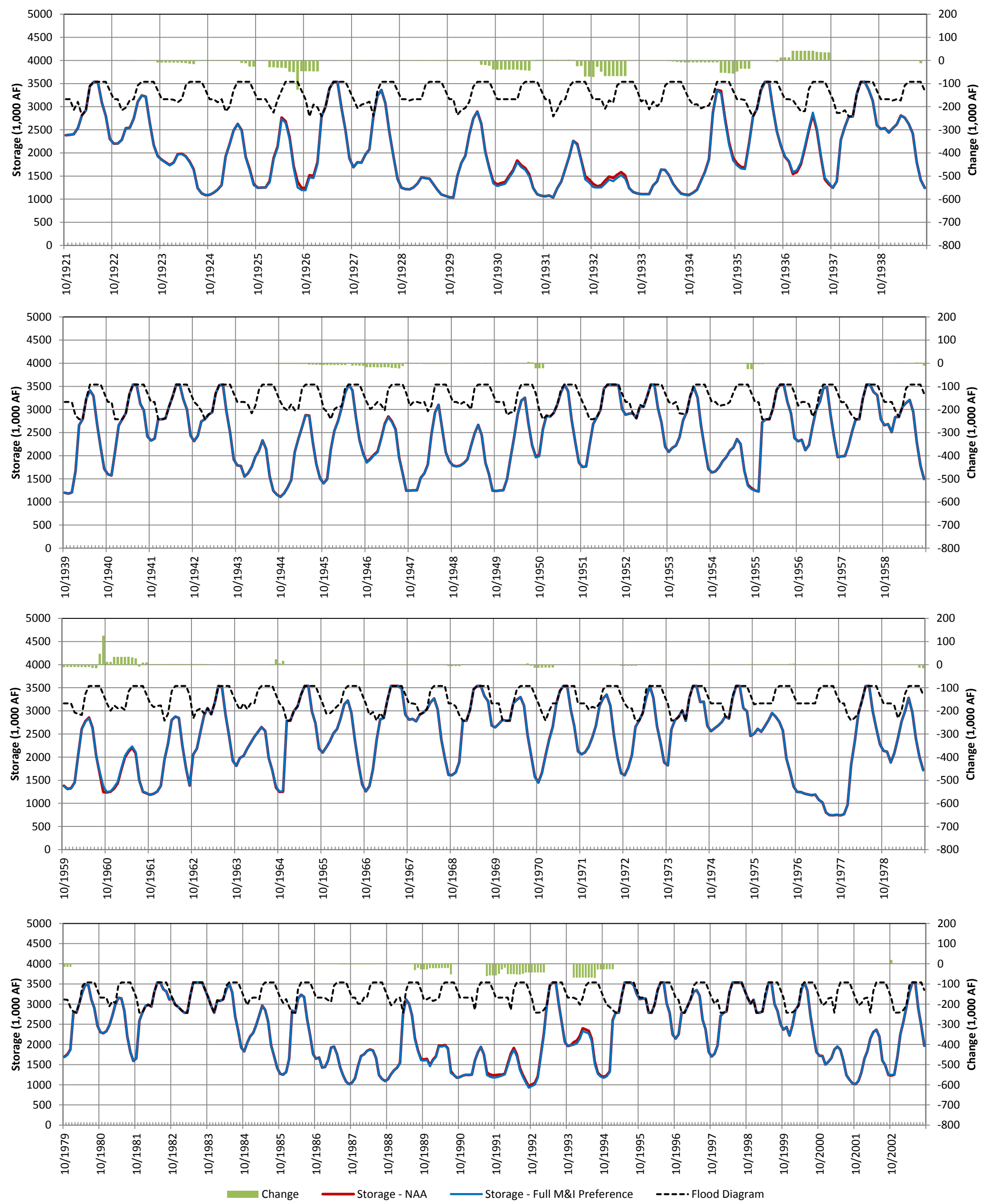

Figure 18. Comparison of Lake Oroville Storage for Alternative 3

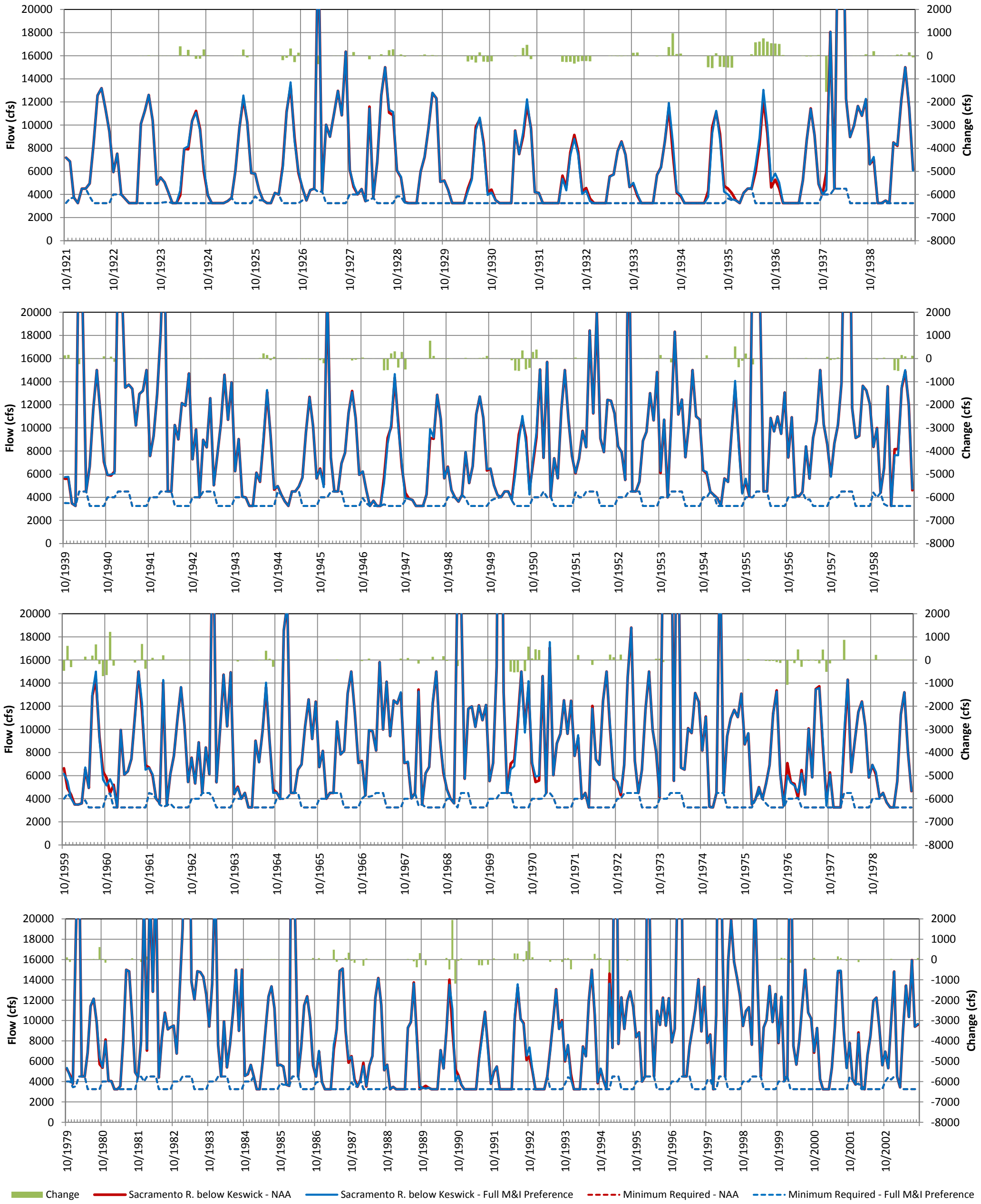

Figure 19. Comparison of Sacramento River below Keswick Flow for Alternative 3

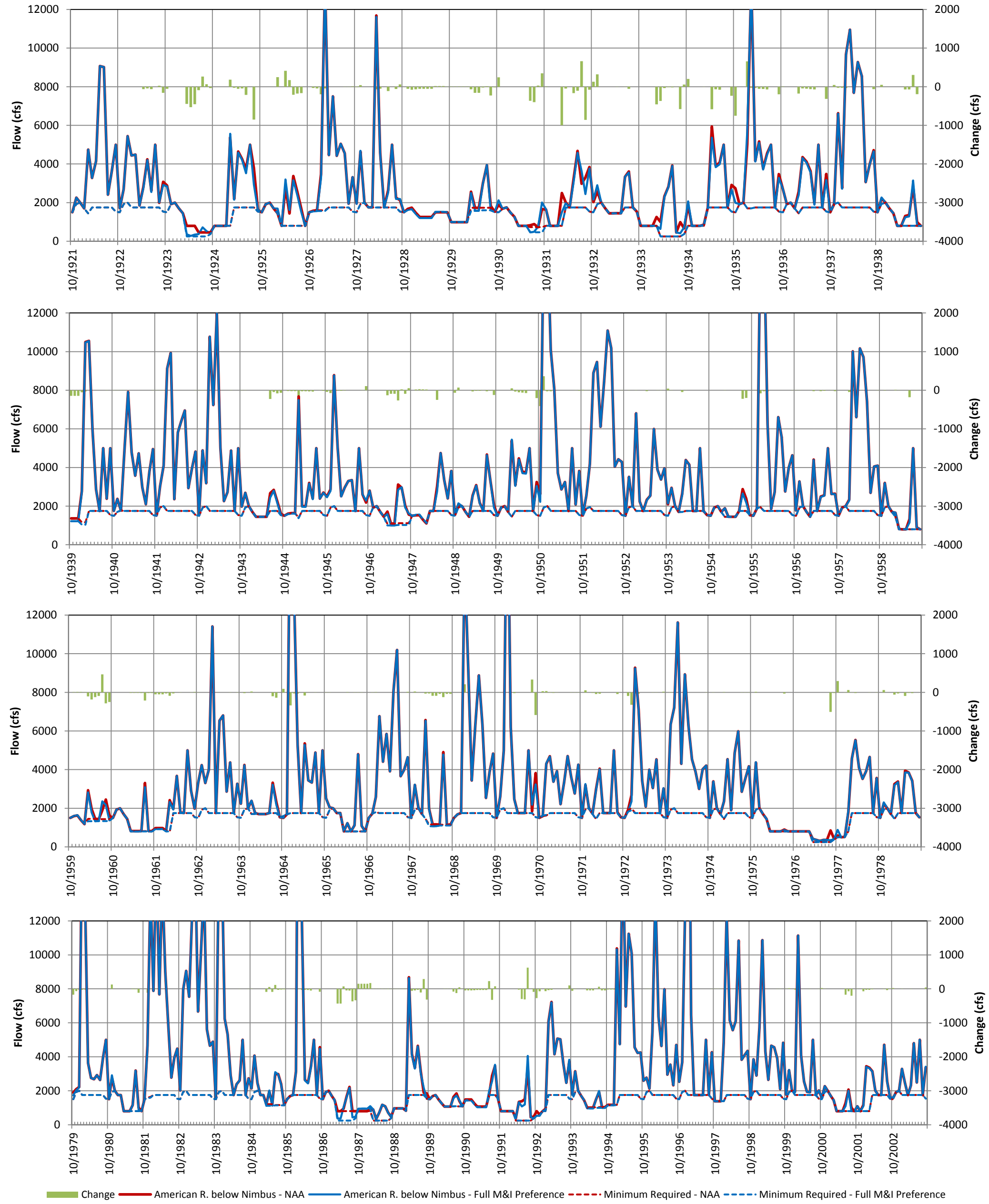

Figure 20. Comparison of American River below Nimbus Flow for Alternative 3

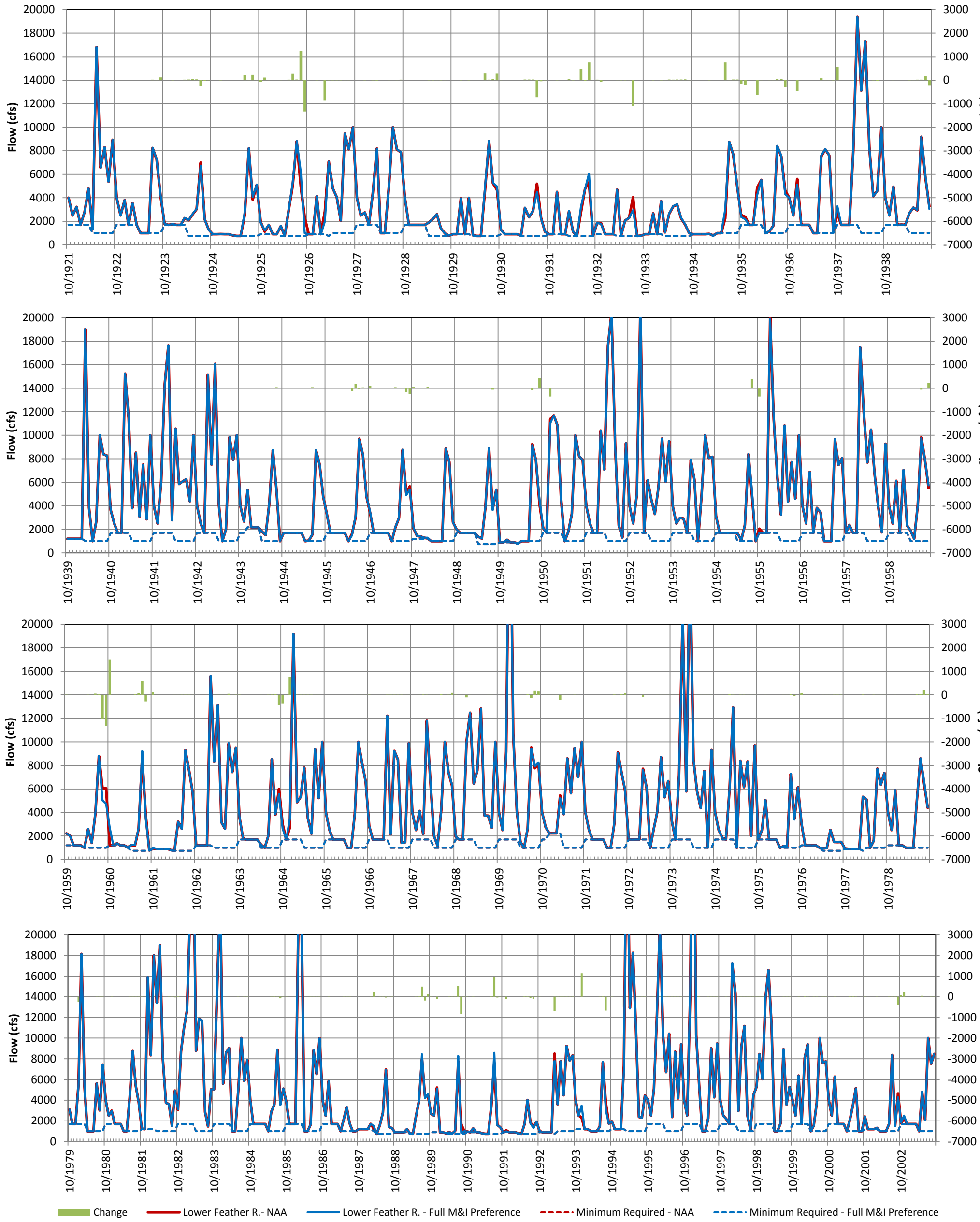

Figure 21. Comparison of Lower Feather River Flow for Alternative 3

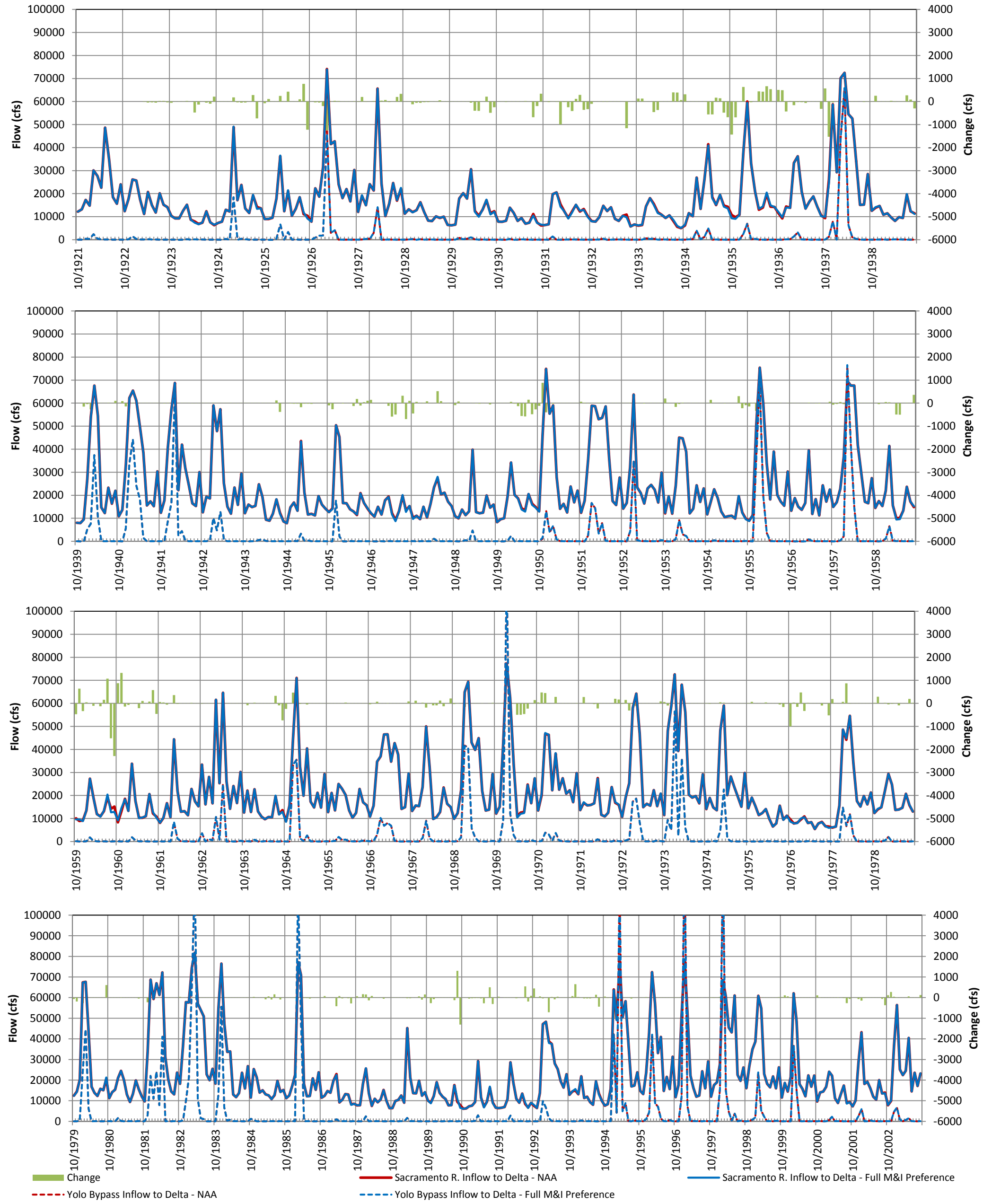

Figure 22. Comparison of Delta Inflow for Alternative 3

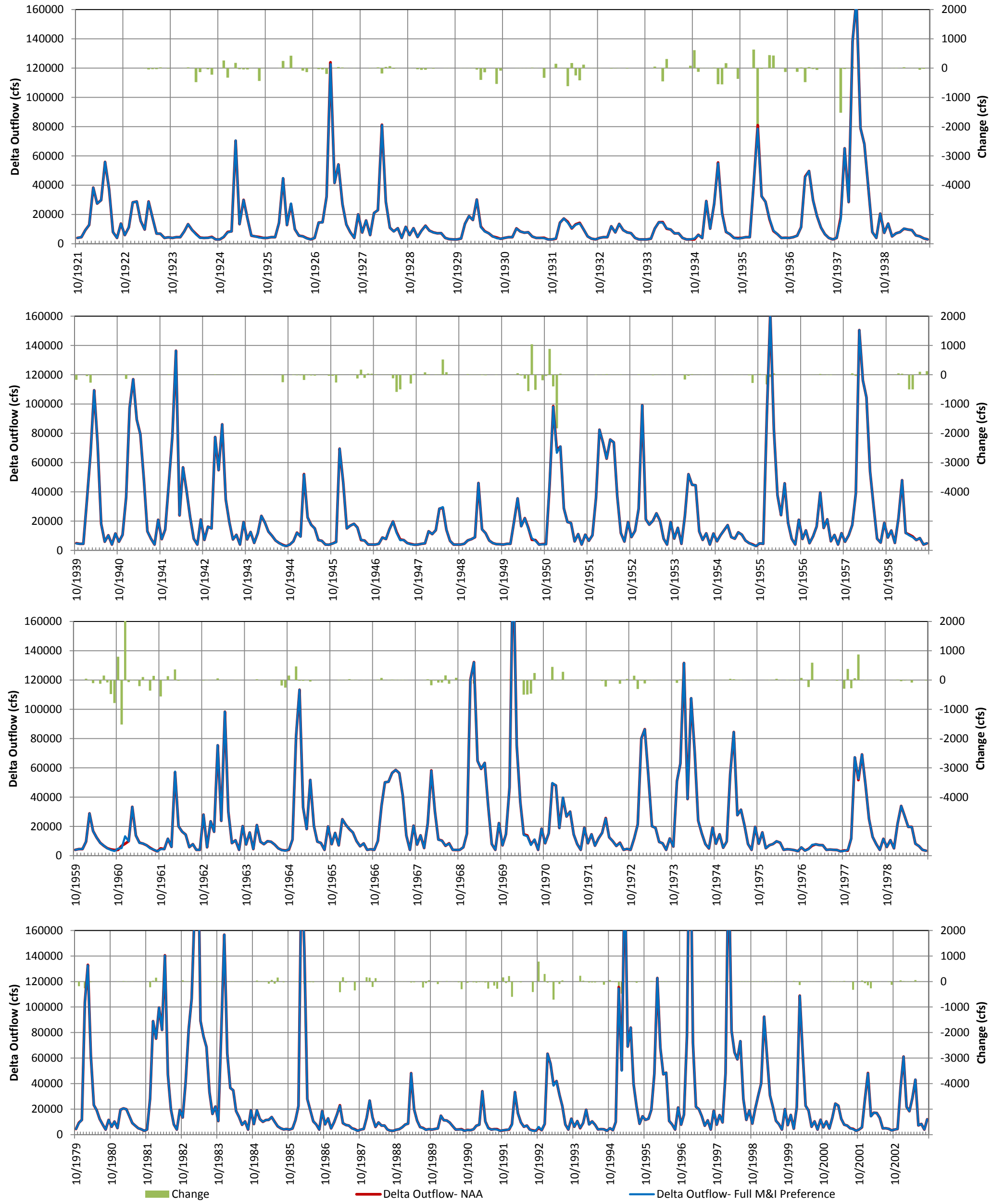

Figure 23. Comparison of Delta Outflow for Alternative 3

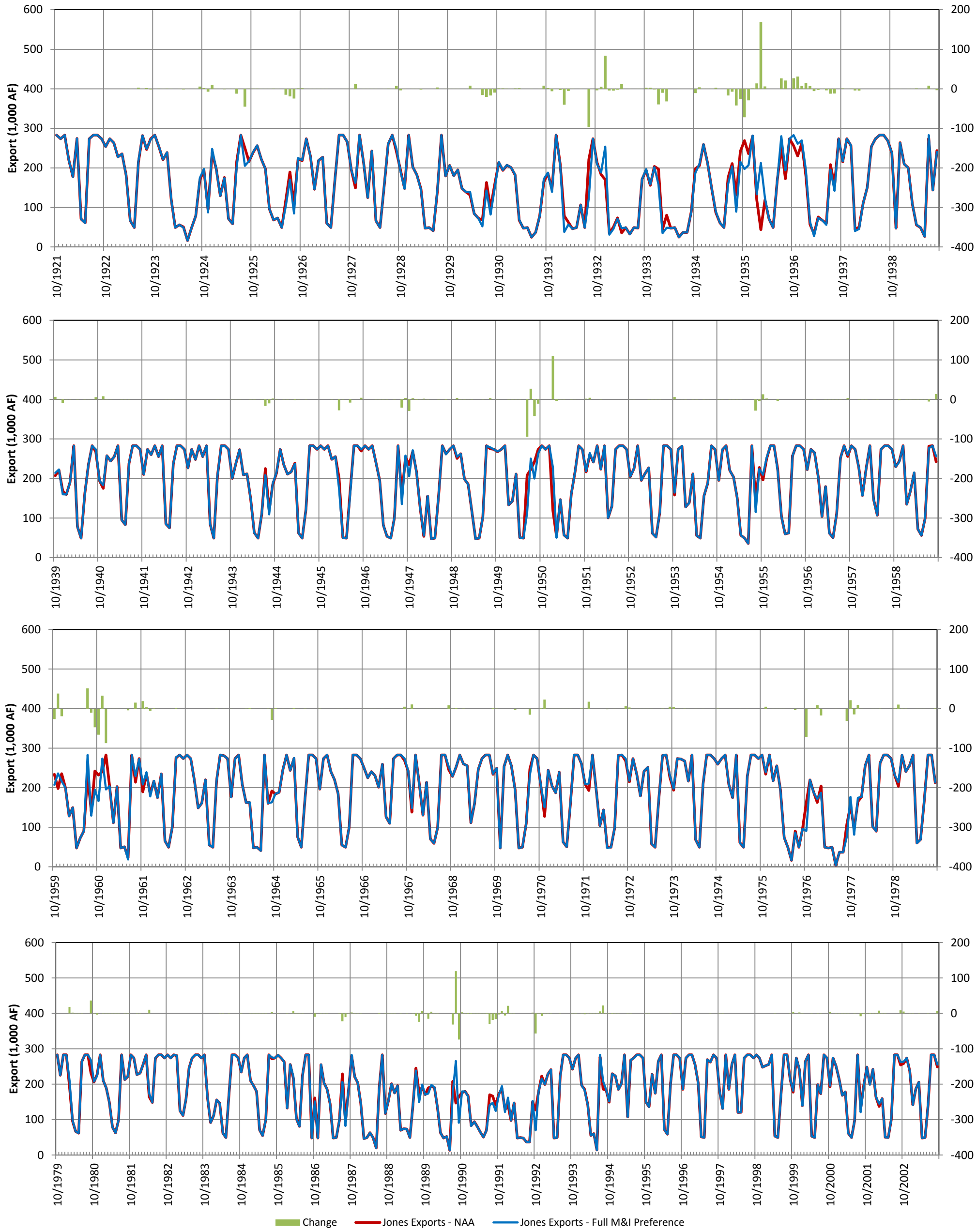

Figure 24. Comparison of Jones Pumping Plant for Alternative 3

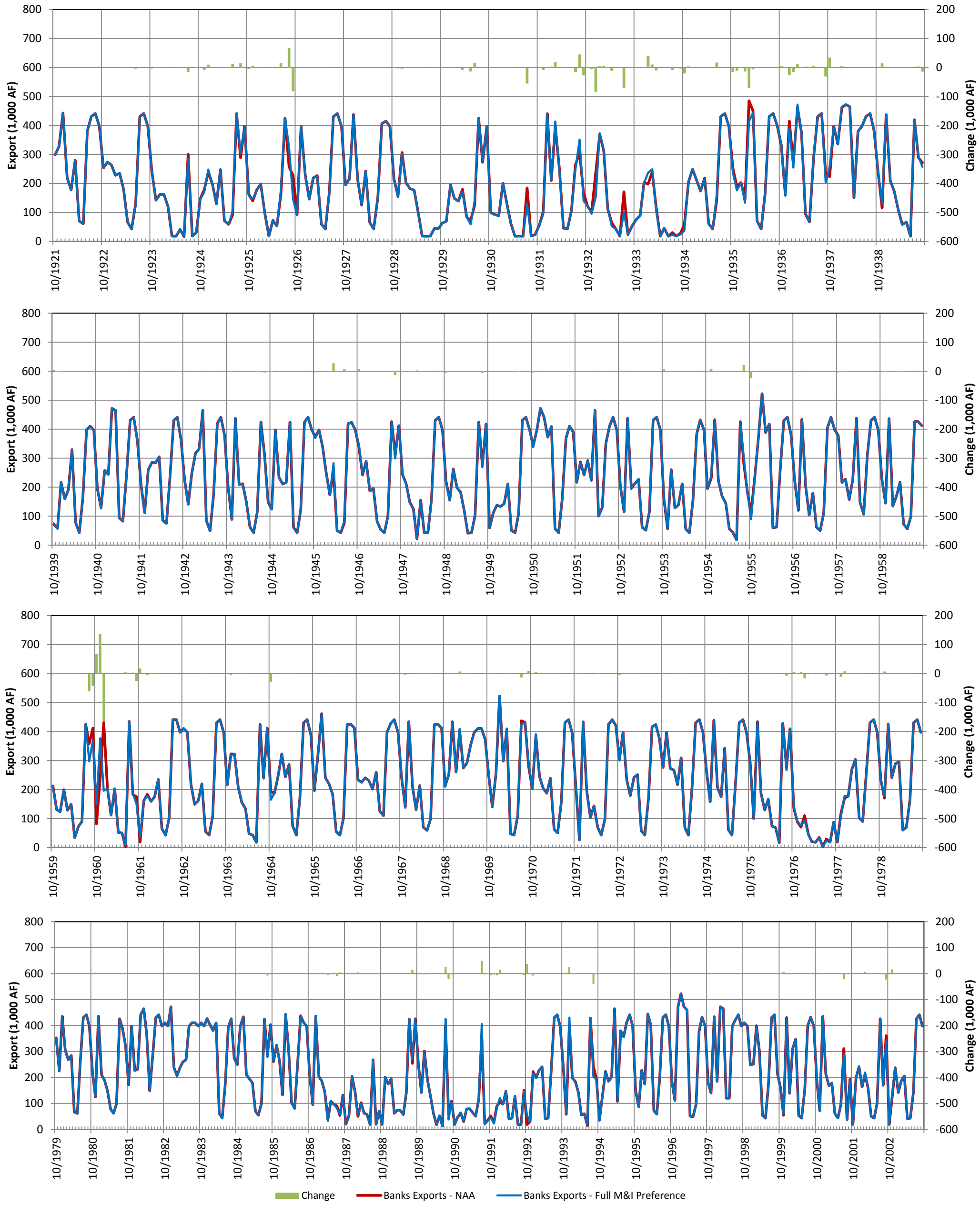

Figure 25. Comparison of Banks Pumping Plant for Alternative 3

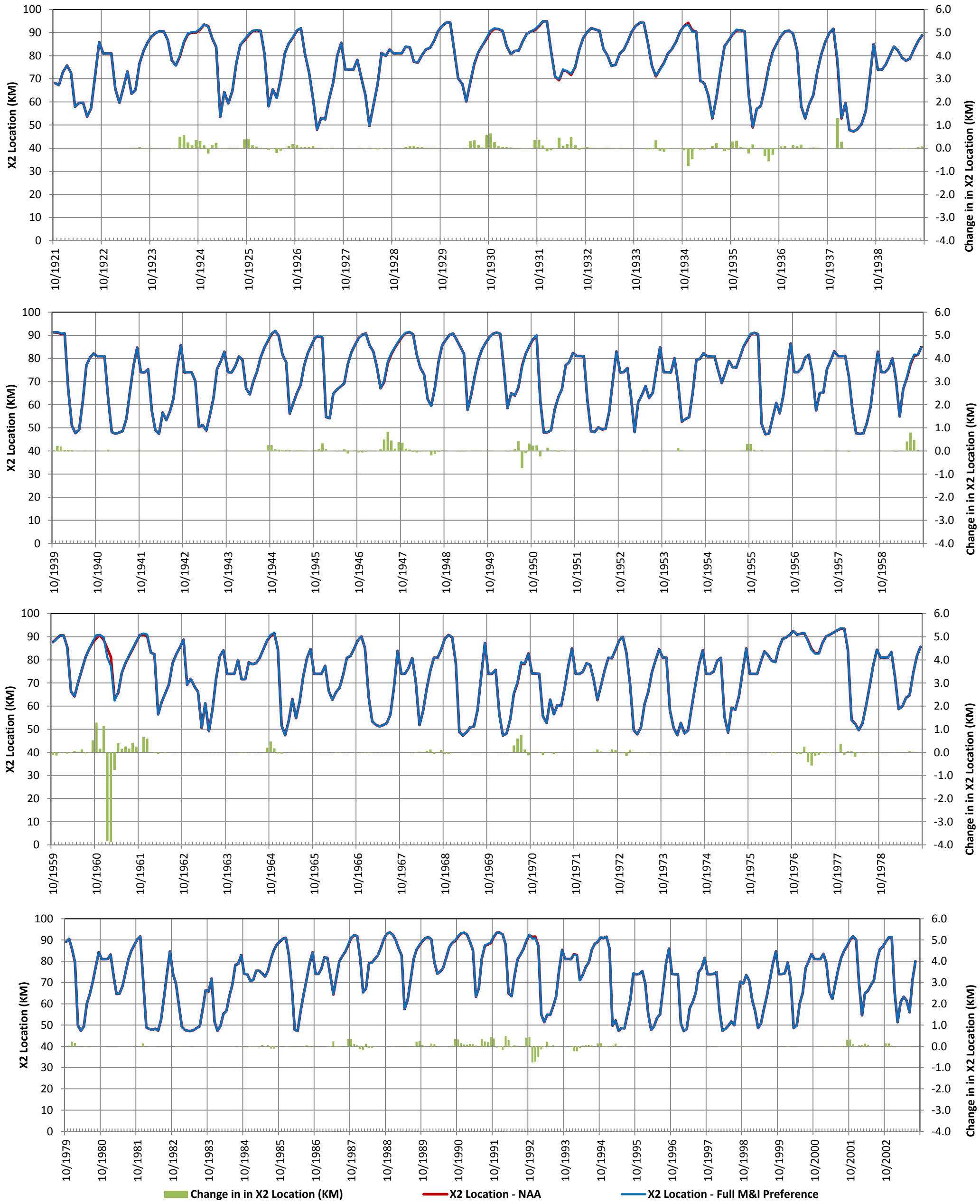

Figure 26. Comparison of X2 Location for Alternative 3

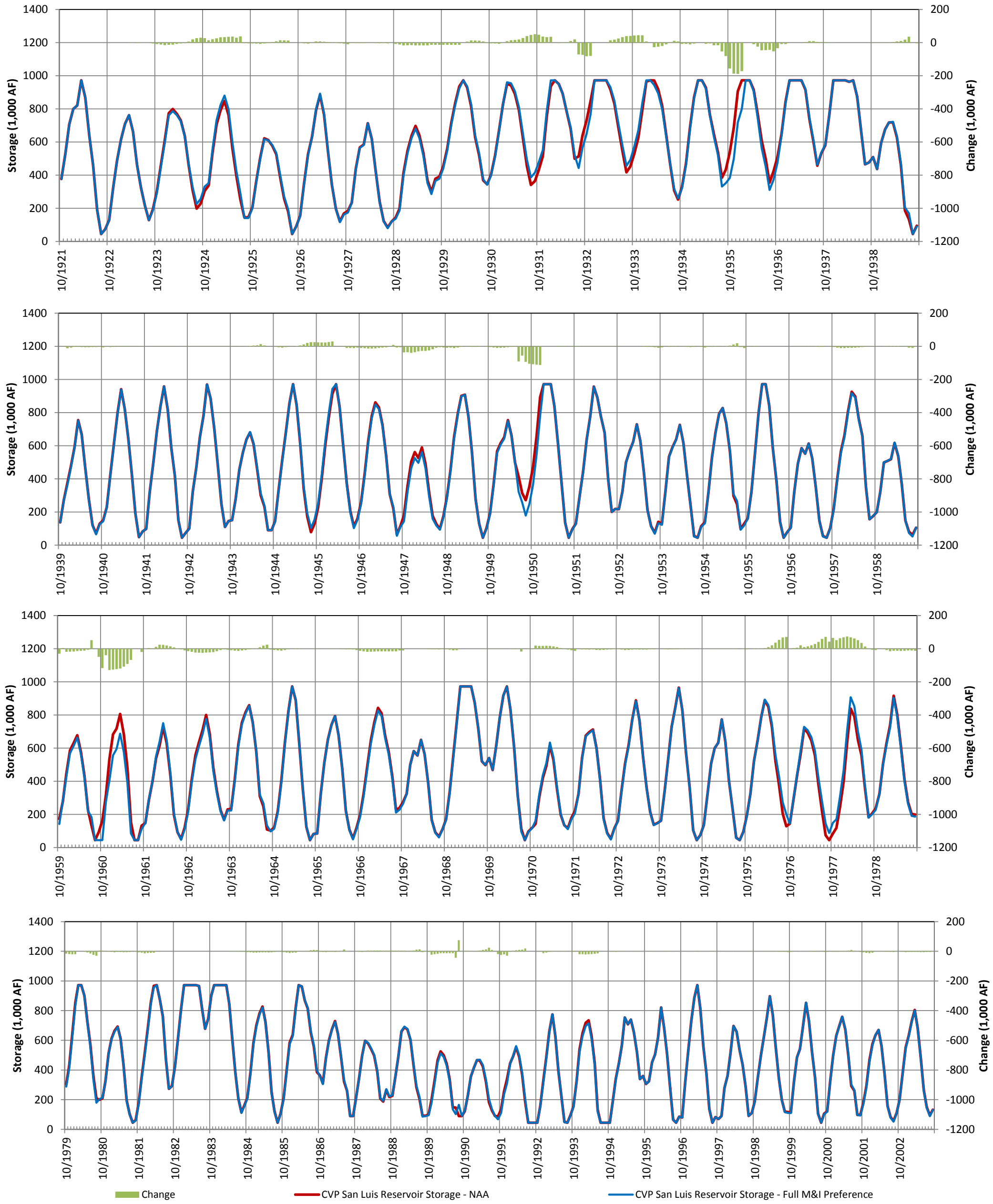

Figure 27. Comparison of CVP San Luis Reservoir Storage for Alternative 3

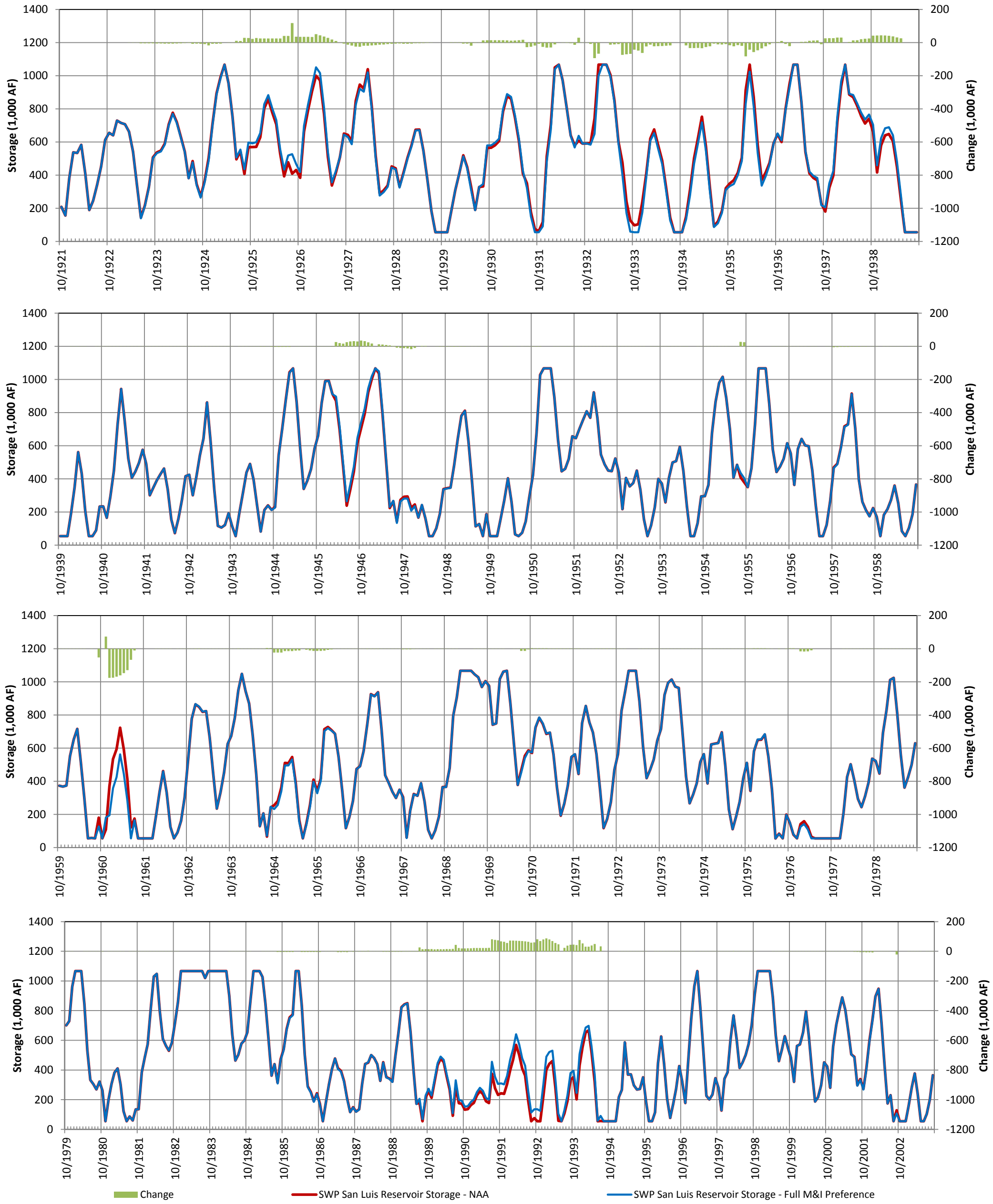

Figure 28. Comparison of SWP San Luis Reservoir Storage for Alternative 3

Monthly time-series of CalSim II output for the No Action Alternative with Alternative 5 are not included because differences in monthly values are minimal.

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