



— BUREAU OF —
RECLAMATION

LTO Action 5

**Exhibit 3, Determination of National
Environmental Policy Act Adequacy Supporting
Documentation**

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Contents

1.	Determination of National Environmental Policy Act Adequacy Supporting Documentation	1-1
1.1	Water Supply	1-1
1.1.1	Trinity River, Sacramento River, Clear Creek, and American River	1-3
1.1.2	Stanislaus River and San Joaquin River	1-4
1.1.3	Bay-Delta	1-5
1.1.4	CVP and SWP Service Areas	1-6
1.1.4.1	Central Coast Region	1-6
1.1.4.2	Tulare Lake Region	1-6
1.1.4.3	South Lahontan Region	1-7
1.1.4.4	South Coast Region	1-7
1.2	Groundwater	1-8
1.3	Recreation	1-10
1.4	Indian Trust Resources	1-14
1.5	Water Quality	1-15

Tables

Table H-51a	Action 5 - Trinity River, Sacramento River, Clear Creek, and American River Contract Deliveries (TAF)	1-4
Table H-51b.	Action 5 – Stanislaus River and San Joaquin River Contract Deliveries (TAF)	1-5
Table H-51c.	Action 5 - Bay-Delta Contract Deliveries (TAF)	1-5
Table H-51d.	Action 5 - Central Coast Region Contract Deliveries (TAF)	1-6
Table H-51e.	Action 5 - Tulare Lake ^a Region Contract Deliveries (TAF)	1-7
Table H-51f.	Action 5 - South Lahontan Region Contract Deliveries (TAF)	1-7
Table H-51g.	Action 5 - South Coast Region Contract Deliveries (TAF)	1-8
Table 1.	Shasta Elevation-Storage Relationship	1-11
Table 2.	Trinity Elevation-Storage Relationship	1-13
Table 3.	Monthly Average Electrical Conductivity (in micromhos per centimeter) at Delta Assessment Locations for the Full Simulation Period under Action 5, and Difference from the No Action Alternative	1-15
Table 4.	Monthly Average Electrical Conductivity (in millimhos per centimeter) at Suisun Marsh Assessment Locations for the Full Simulation Period under Action 5, and Difference from the No Action Alternative	1-17
Table 5.	Monthly Average Dissolved Organic Carbon (in milligrams per liter) at Delta Assessment Locations for the Full Simulation Period under Action 5, and Difference from the No Action Alternative	1-18

Figures

Figure 1. March - February CVP Delivery Total Averages.....	1-1
Figure 2. March - February CVP Delivery Total Critically Dry Years	1-2
Figure 3. March - February CVP Delivery PSC N Dry and Critically Dry Years	1-2
Figure 4. March - February SWP SOD Ag + MI Dry and Critically Dry Years	1-3
Figure 5. CalSim simulated average Groundwater pumping for Sacramento and San Joaquin Basins	1-8
Figure 6. CalSim simulated average Groundwater pumping for Sacramento and San Joaquin Basins in Critically Dry Years.....	1-9
Figure 7. CalSim simulated average Groundwater pumping for Sacramento Basin	1-9
Figure 8. CalSim simulated average Groundwater pumping for Sacramento Basin for Dry and Critically Dry years	1-10
Figure 9. Oct - Sept Average Shasta Reservoir Elevation	1-11
Figure 10. Sacramento River Long-Term Average Flow Downstream of Keswick Reservoir	1-12
Figure 11. Sacramento Flow Below Keswick.....	1-12
Figure 12. Oct - Sept Average Trinity Reservoir Elevation	1-13
Figure 13. Trinity River Long-Term Average Flow Downstream of Lewiston Reservoir.....	1-14
Figure 14. Trinity Reservoir Releases during dry period	1-14
Figure 15. Trinity Reservoir Releases during wet period	1-15

1. Determination of National Environmental Policy Act Adequacy Supporting Documentation

The resources described below include additional details of the Action 5 NEPA analysis. These resources were identified for further description based on modeling results and their connection with observable changes associated with Action 5, primarily those on the Sacramento River and the Delta.

1.1 Water Supply

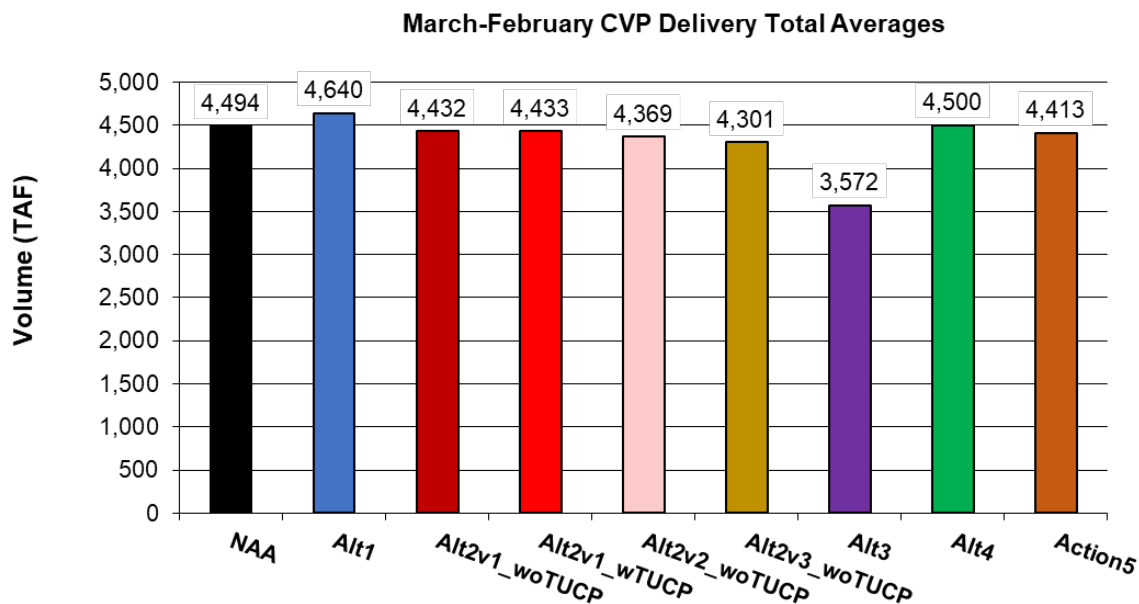


Figure 1. March - February CVP Delivery Total Averages

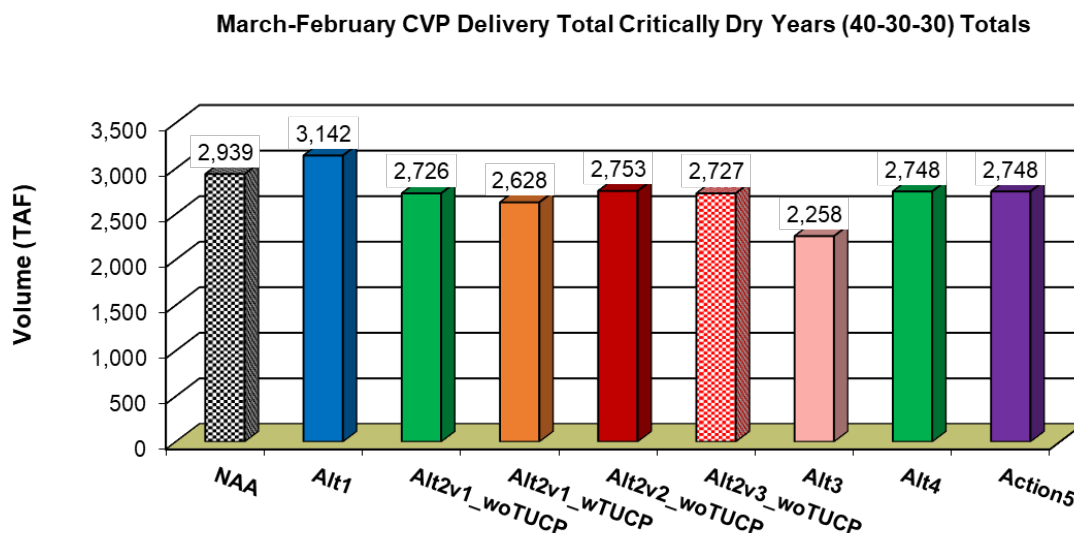


Figure 2. March - February CVP Delivery Total Critically Dry Years

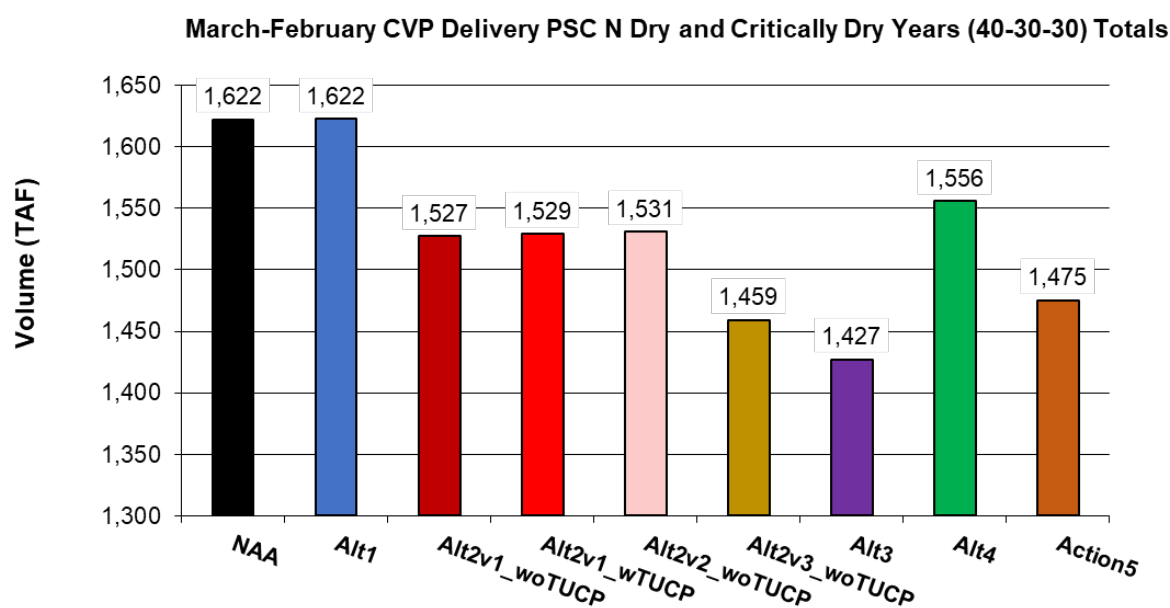


Figure 3. March - February CVP Delivery PSC N Dry and Critically Dry Years

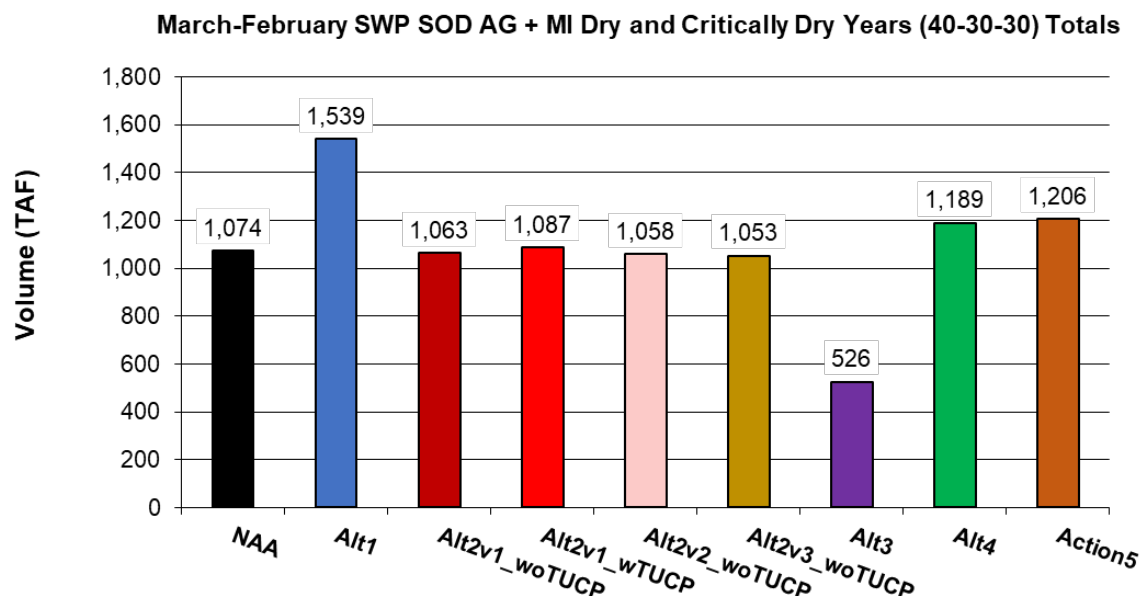


Figure 4. March - February SWP SOD Ag + MI Dry and Critically Dry Years

1.1.1 Trinity River, Sacramento River, Clear Creek, and American River

The table numbering system in this Water supply section corresponds to the numbering system in the 2024 LTO Final EIS.

CVP and SWP deliveries to contractors and water made available for diversion in the Trinity, Sacramento, Clear Creek, and American river watersheds under Action 5 are detailed in [Table H-51a](#). CVP Refuge Level 2 would see reductions of less than 5% in their total deliveries in both average water years as well as dry and critical water years relative to the No Action Alternative. As discussed in *Section H.2.2 Changes in CVP and SWP Deliveries*, CalSim 3 model output includes minor fluctuations of up to 5% due to model assumptions; approaches and changes 5% or less are considered “similar” to conditions under the No Action Alternative. In addition, minor deviations in CVP Refuge Level 2 deliveries are the result of modeling but do not reflect an intention by Reclamation to deviate from requirements in the Central Valley Project Improvement Act. CVP Settlement Contractor water under average and dry and critical years would see a decrease of 6% and 9%, respectively, relative to the No Action Alternative. CVP M&I water will see increases in both average and dry and critical years, 9% and 8% respectively. CVP Ag water will see slight increases of less than 5% in both average and dry and critical years. SWP M&I water will see the highest increases, with 16% increase for an average year and a 21% increase for dry and critical years.

Table 1-51a Action 5 - Trinity River, Sacramento River, Clear Creek, and American River Contract Deliveries (TAF)

Item	Action 5	No Action Alternative	Difference from No Action Alternative
Annual Average			
CVP Settlement Contractors	1,724	1,830	-106
CVP Refuge Level 2	183	183	0
CVP M&I	112	102	10
CVP Ag	315	311	4
SWP M&I	47	40	7
Dry and Critical Water Years			
CVP Settlement Contractors	1,627	1,779	-152
CVP Refuge Level 2	175	176	-1
CVP M&I	91	84	7
CVP Ag	198	194	4
SWP M&I	36	30	6

^a Sacramento River DWR Hydrologic Region

Ag = Agricultural

CVP = Central Valley Project

M&I = Municipal and Industrial

SWP = State Water Project

1.1.2 Stanislaus River and San Joaquin River

CVP and SWP deliveries to contractors in Stanislaus River and San Joaquin River watersheds under Action 5 are detailed below in [Table H-51b](#). As is indicated in [Table H-51b](#), Relative to the No Action Alternative, Action 5 would see no changes in deliveries, except for CVP Exchange Contractors. CVP Exchange Contractors would see increases of less than 5% in the total deliveries in both average water years as well as dry and critical water years.

Table 1-51b. Action 5 – Stanislaus River and San Joaquin River Contract Deliveries (TAF)

Item	Action 5	No Action Alternative	Difference from No Action Alternative
Annual Average			
CVP Exchange Contractors	807	806	1
CVP Refuge Level 2	256	256	0
CVP M&I	13	13	0
CVP Ag	478	477	1
SWP Ag	3	3	0
Dry and Critical Water Years			
CVP Exchange Contractors	753	750	3
CVP Refuge Level 2	236	236	0
CVP M&I	10	10	0
CVP Ag	210	210	0
SWP Ag	2	2	0

^a San Joaquin River DWR Hydrologic Region

Ag = Agricultural

M&I = Municipal and Industrial

CVP = Central Valley Project

SWP = State Water Project

1.1.3 Bay-Delta

CVP and SWP contract deliveries in the Bay-Delta under Action 5 are detailed below in [Table H-51c](#). As is indicated in [Table H-51c](#), Action 5 would increase water supply deliveries for all contract types relative to the No Action Alternative. The largest increase on a percentage basis would be for CVP agricultural water users in dry and critical water years with those increases averaging approximately 11%.

Table 1-51c. Action 5 - Bay-Delta Contract Deliveries (TAF)

Item	Action 5	No Action Alternative	Difference from No Action Alternative
Annual Average			
CVP M&I	271	265	5
CVP Ag	45	43	2
SWP M&I	192	180	13
Dry and Critical Water Years			
CVP M&I	262	254	7
CVP Ag	19	17	2
SWP M&I	122	111	11

^a San Francisco DWR Hydrologic Region

Ag = Agricultural

M&I = Municipal and Industrial

CVP = Central Valley Project

SWP = State Water Project

1.1.4 CVP and SWP Service Areas

This section details changes in contract deliveries under Action 5 to CVP and SWP Service Areas in the central coast, Tulare Lake, South Lahontan, and south coast regions. In addition to the modeled estimates of changes to water supply, water transfers could increase water supplies in drier year types (but they are not included in the CalSim 3 modeling results). Water transfers are the same under all the alternatives, as described in Chapter 3, Section 3.1.4.5, *Water Transfers*.

1.1.4.1 Central Coast Region

SWP contract deliveries in the central coast region under Action 5 are detailed below in [Table H-51d](#). As is indicated in [Table H-51d](#), SWP M&I deliveries would increase on average approximately 11% under Action 5 relative to the No Action Alternative.

Table 1-51d. Action 5 - Central Coast Region Contract Deliveries (TAF)

Item	Action 5	No Action Alternative	Difference from No Action Alternative
Annual Average			
SWP M&I	40	36	4
Dry and Critical Water Years			
SWP M&I	24	20	4

^a Central Coast DWR Hydrologic Region

M&I = Municipal and Industrial

SWP = State Water Project

1.1.4.2 Tulare Lake Region

CVP and SWP contract deliveries in Tulare Lake region under Action 5 and the No Action Alternative are detailed below in [Table H-51e](#). As is indicated in [Table H-51e](#), there would be an increase or no measurable change to water supply deliveries for all contract types under Action 5 relative to the No Action Alternative. The largest increase on a percentage basis would be for SWP agricultural water users in dry and critical water years with those increases averaging approximately 14%.

Table 1-51e. Action 5 - Tulare Lake^a Region Contract Deliveries (TAF)

Item	Action 5	No Action Alternative	Difference from No Action Alternative
Annual Average			
CVP Refuge Level 2	14	14	0
CVP Ag	607	583	24
SWP M&I	77	71	6
SWP Ag	618	555	63
Dry and Critical Water Years			
CVP Refuge Level 2	13	12	1
CVP Ag	250	237	13
SWP M&I	40	35	5
SWP Ag	311	272	39

^a Does not include Friant-Kern Canal or Madera Canal water users

^b Tulare Lake DWR Hydrologic Region

Ag = Agricultural

CVP = Central Valley Project

M&I = Municipal and Industrial

SWP = State Water Project

1.1.4.3 South Lahontan Region

SWP contract deliveries in south Lahontan region under Action 5 and the No Action Alternative are detailed below in [Table H-51f](#). As is indicated in [Table H-51f](#), SWP M&I deliveries would increase on average approximately 13%.

Table 1-51f. Action 5 - South Lahontan Region Contract Deliveries (TAF)

Item	Action 5	No Action Alternative	Difference from No Action Alternative
Annual Average			
SWP M&I	257	228	29
Dry and Critical Water Years			
SWP M&I	163	131	31

^a South Lahontan DWR Hydrologic Region

M&I = Municipal and Industrial

SWP = State Water Project

1.1.4.4 South Coast Region

SWP contract deliveries in south coast region under Action 5 are detailed below in [Table H-51g](#). As is indicated in [Table H-51g](#), Action 5 would increase water supply deliveries for both contract types. The largest increase on a percentage basis would be for SWP M&I water users in dry and critical water years with those increases averaging approximately 22%.

Table 1-51g. Action 5 - South Coast Region Contract Deliveries (TAF)

Item	Action 5	No Action Alternative	Difference from No Action Alternative
Annual Average			
SWP M&I	1,269	1,151	118
SWP Ag	7	7	1
Dry and Critical Water Years			
SWP M&I	673	586	87
SWP Ag	3	3	1

^a South Coast DWR Hydrologic Region

Ag = Agricultural

M&I = Municipal and Industrial

SWP = State Water Project

1.2 Groundwater

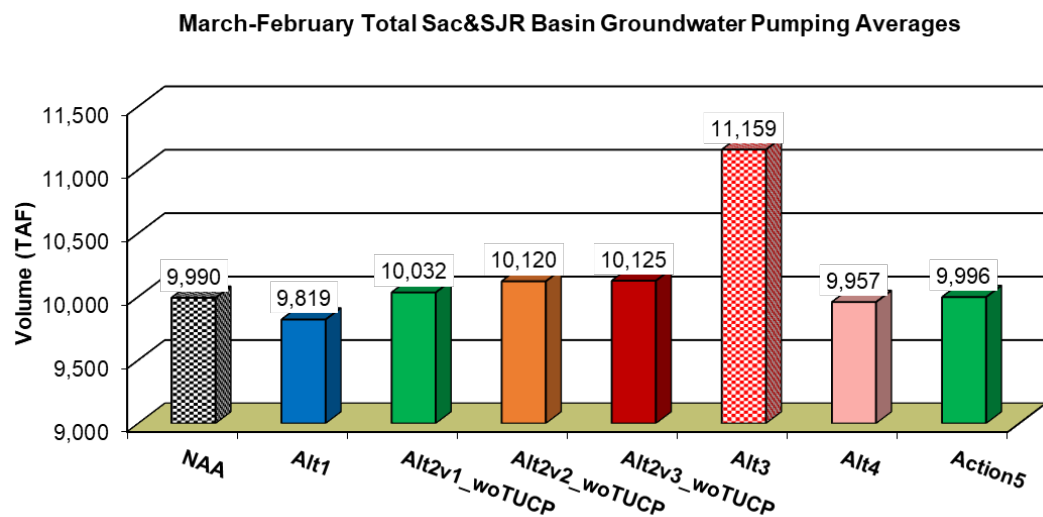


Figure 5. CalSim simulated average Groundwater pumping for Sacramento and San Joaquin Basins

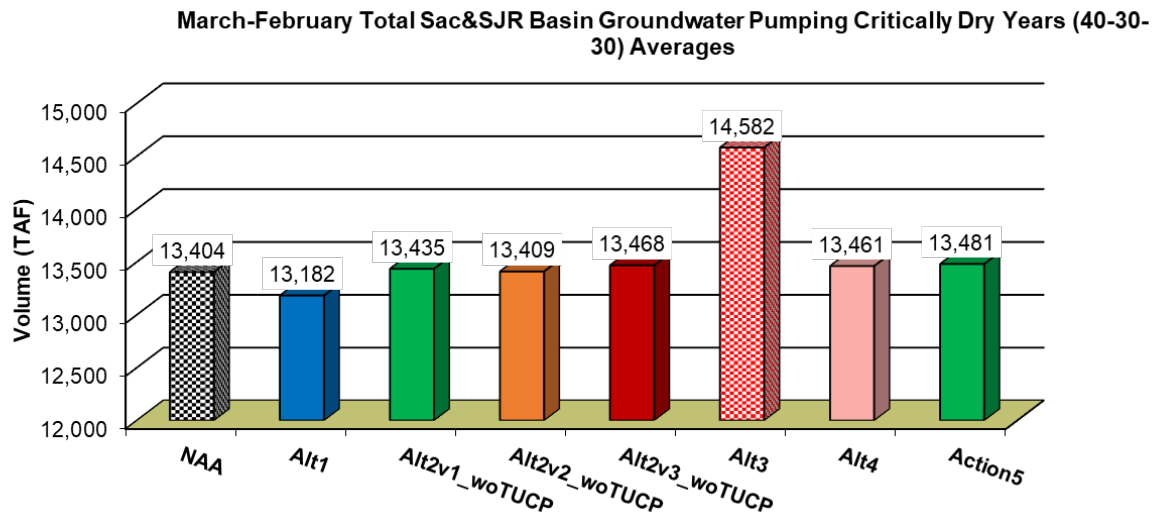


Figure 6. CalSim simulated average Groundwater pumping for Sacramento and San Joaquin Basins in Critically Dry Years

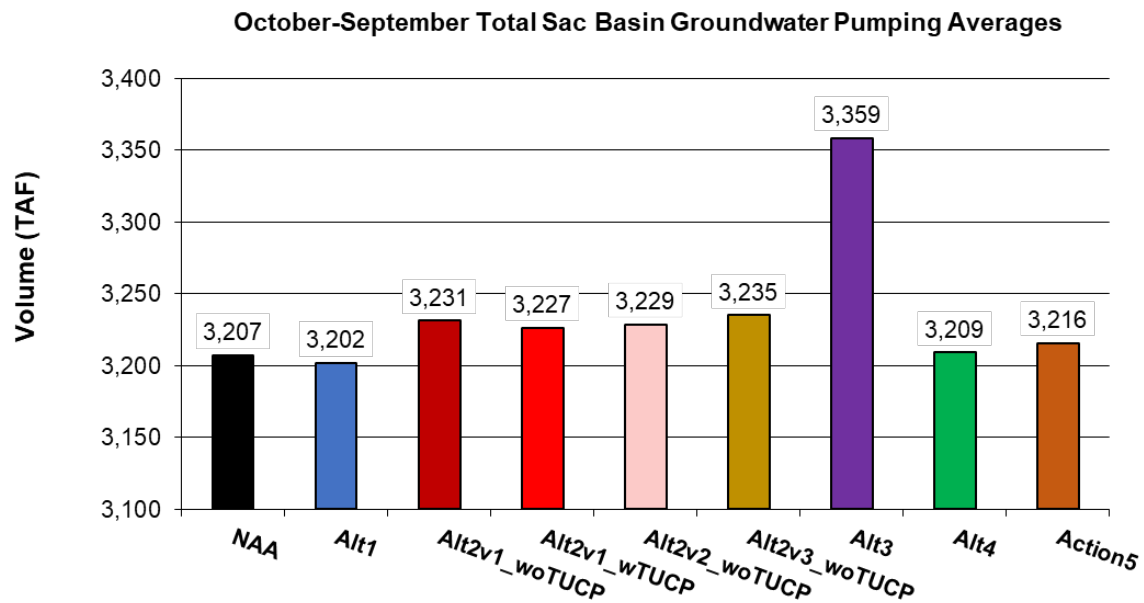


Figure 7. CalSim simulated average Groundwater pumping for Sacramento Basin

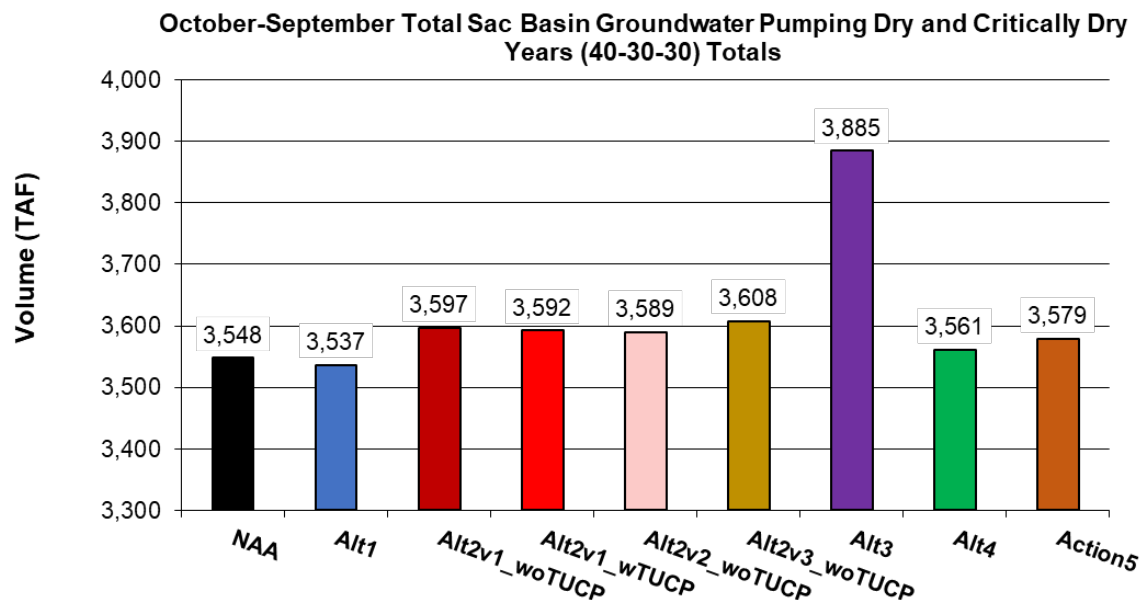


Figure 8. CalSim simulated average Groundwater pumping for Sacramento Basin for Dry and Critically Dry years

1.3 Recreation

Long-term average elevation is established by taking the Elevation-Storage Relationship pairs corresponding to storage volumes above and below the Long-term Average Volume and interpolating the elevation.

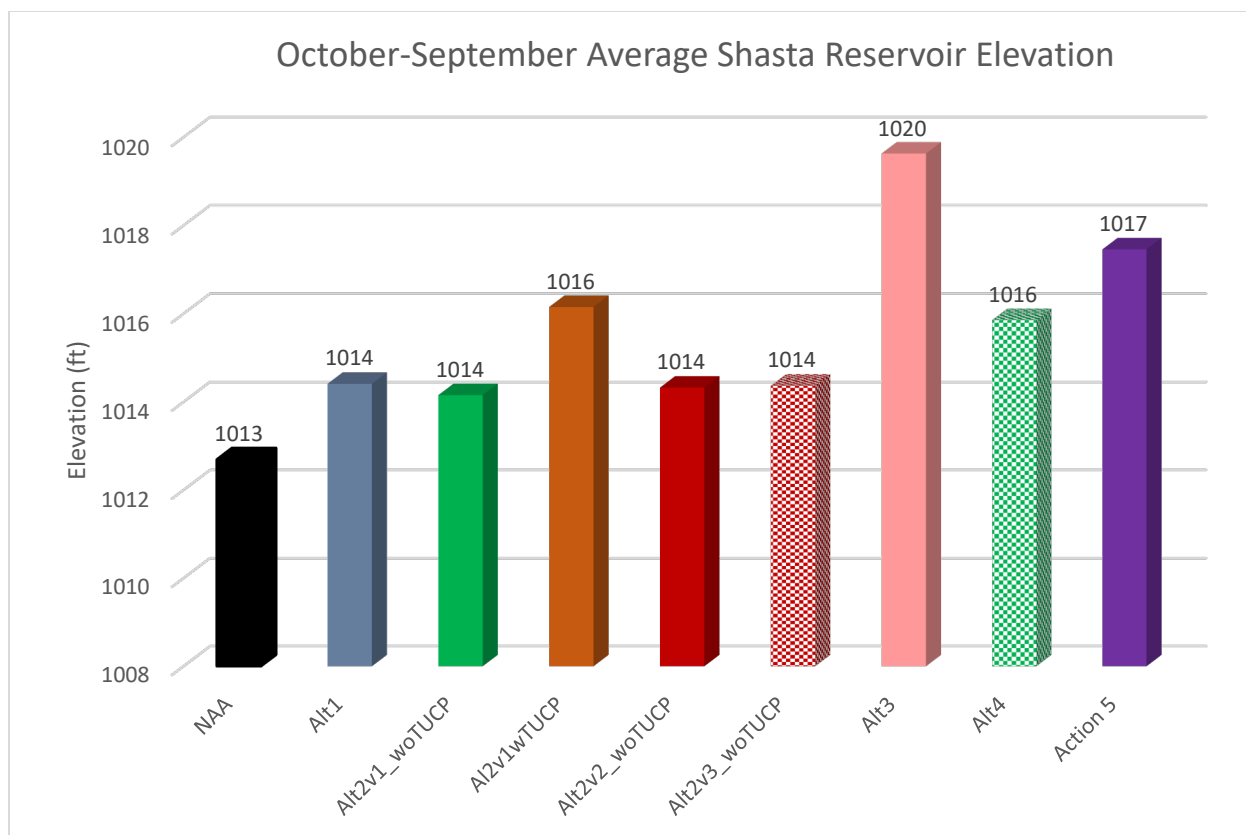


Figure 9. Oct - Sept Average Shasta Reservoir Elevation

Table 1. Shasta Elevation-Storage Relationship

Elevation (ft)	Storage (TAF)	Alternative	Long-term Average Volume (TAF)	Interpolated Long-term average elevation (ft)
1012	3097.82	NAA	3114	1013
1013	3121.03	Alt1	3154	1014
1014	3144.37	Alt2v1_woTUCP	3148	1014
1015	3167.82	Alt2v1wTUCP	3195	1016
1016	3191.40	Alt2v2_woTUCP	3152	1014
1017	3215.10	Alt2v3_woTUCP	3153	1014
1018	3238.92	Alt3	3278	1020
1019	3262.86	Alt4	3188	1016
1020	3286.93	Action 5	3226	1017

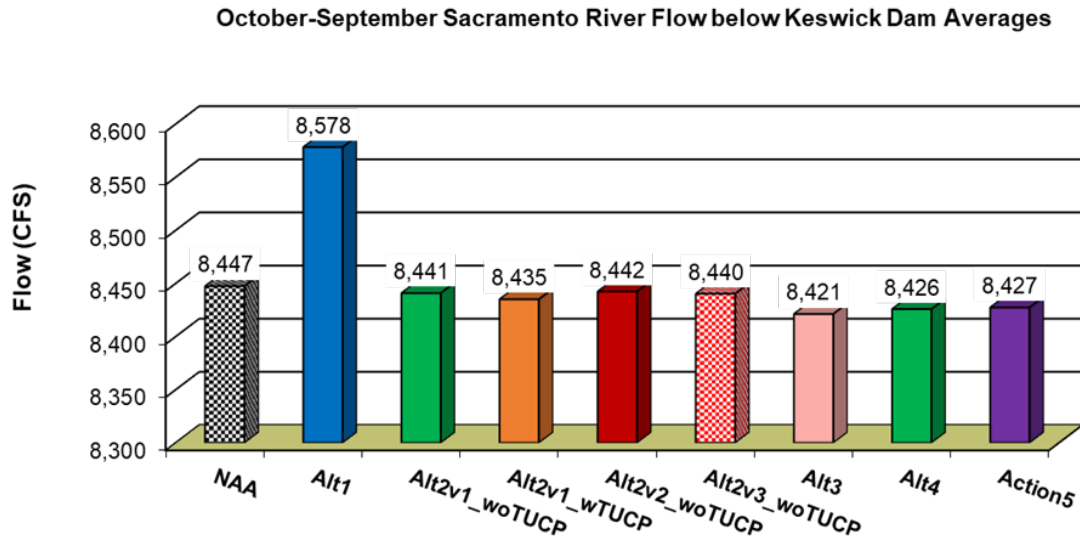


Figure 10. Sacramento River Long-Term Average Flow Downstream of Keswick Reservoir

October-September Sacramento River Flow below Keswick Dam (C_KSWCK/CHANNEL) Averages							
	Flow (CFS)	Difference from NAA	Difference from Alt2v1_w TUCP	Difference from Alt2v2_w TUCP	Time Period	Climate Scenario	CalSim version
NAA	8,447.46		6.6	5.1	1921-2021	2022 Media	CalSim 3
Alt1	8,578.20	130.7	137.4	135.9	1921-2021	2022 Media	CalSim 3
Alt2v1_woTUCP	8,440.84	-6.6		-1.5	1921-2021	2022 Media	CalSim 3
Alt2v1_wTUCP	8,435.05	-12.4	-5.8	-7.3	1921-2021	2022 Media	CalSim 3
Alt2v2_woTUCP	8,442.34	-5.1	1.5		1921-2021	2022 Media	CalSim 3
Alt2v3_woTUCP	8,440.3	0.0	-0.6	-2.1	1921-2021	2022 Media	CalSim 3
Alt3	8,421.2		-19.6	-21.1	1921-2021	2022 Media	CalSim 3
Alt4	8,425.8	-21.7	-15.0	-16.5	1921-2021	2022 Media	CalSim 3
Action5	8,427.3	-20.1			1921-2021	2022 Media	CalSim 3

Figure 11. Sacramento Flow Below Keswick

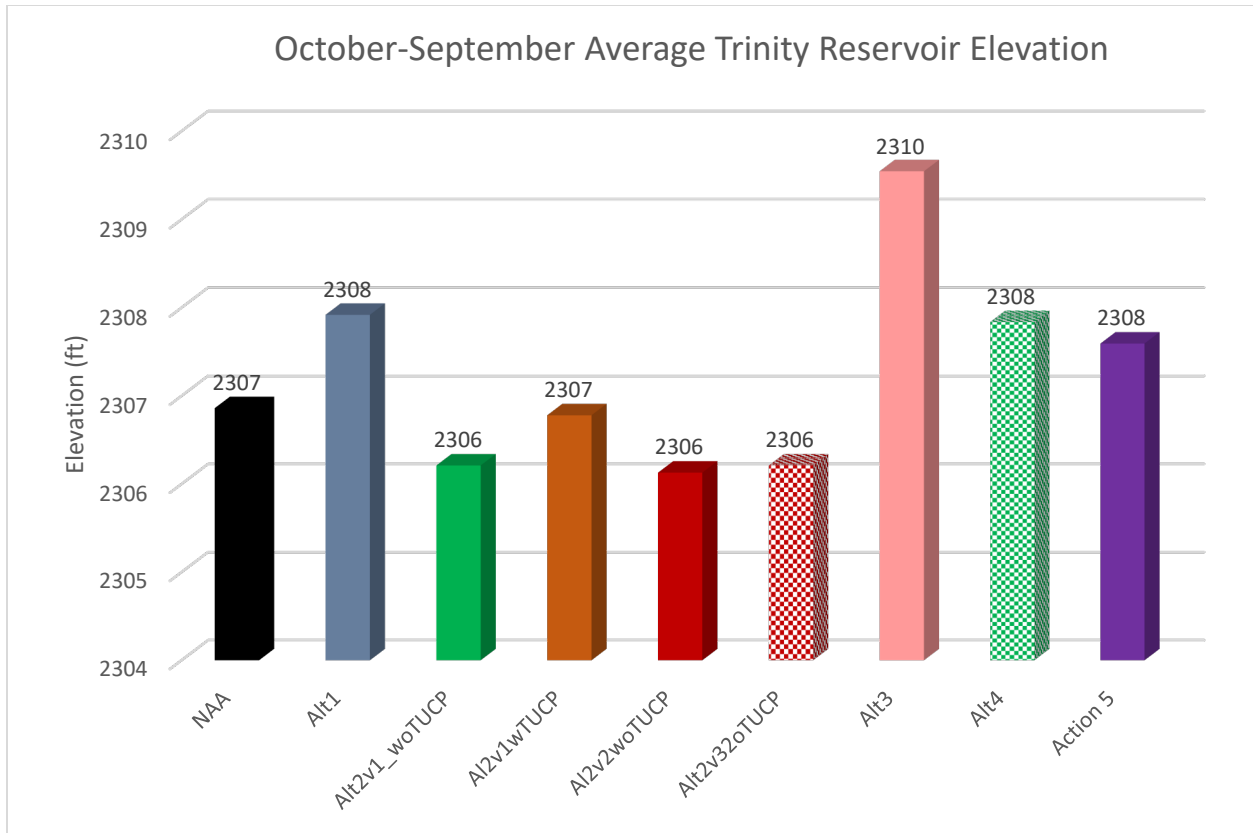


Figure 12. Oct - Sept Average Trinity Reservoir Elevation

Table 2. Trinity Elevation-Storage Relationship

Elevation (ft)	Storage (TAF)	Alternative	Long-term Average Volume (TAF)	Interpolated Long-term average elevation (ft)
2285	1292.41	NAA	1545	2307
2290	1347.25	Alt1	1558	2308
2295	1403.88	Alt2v1_woTUCP	1537	2306
2300	1462.18	Alt2v1wTUCP	1544	2307
2305	1522.11	Alt2v2woTUCP	1536	2306
2310	1583.59	Alt2v32oTUCP	1537	2306
2315	1646.67	Alt3	1578	2310
2320	1711.42	Alt4	1557	2308
2325	1777.74	Action 5	1554	2308

October-September Trinity Flow below Lewiston (C_LWSTN/CHANNEL) Averages							
	Flow (CFS)	Difference from NAA	Difference from Alt2v1_wo TUCP	Difference from Alt2v2_wo TUCP	Time Period	Climate Scenario	CalSim version
NAA	1,055.83		4.2	6.6	1921-2021	2022 Media	Cal Sim 3
Alt1	1,065.05	9.2	13.4	15.8	1921-2021	2022 Media	Cal Sim 3
Alt2v1_woTUCP	1,051.66	-4.2		2.4	1921-2021	2022 Media	Cal Sim 3
Alt2v1_wTUCP	1,052.44	-3.4	0.8	3.2	1921-2021	2022 Media	Cal Sim 3
Alt2v2_woTUCP	1,049.21	-6.6	-2.4		1921-2021	2022 Media	Cal Sim 3
Alt2v3_woTUCP	1,051.0	0.0	-0.7	1.8	1921-2021	2022 Media	Cal Sim 3
Alt3	1,065.7		14.0	16.5	1921-2021	2022 Media	Cal Sim 3
Alt4	1,062.8	7.0	11.2	13.6	1921-2021	2022 Media	Cal Sim 3
Action5	1,057.8	2.0			1921-2021	2022 Media	Cal Sim 3

Figure 13. Trinity River Long-Term Average Flow Downstream of Lewiston Reservoir

1.4 Indian Trust Resources

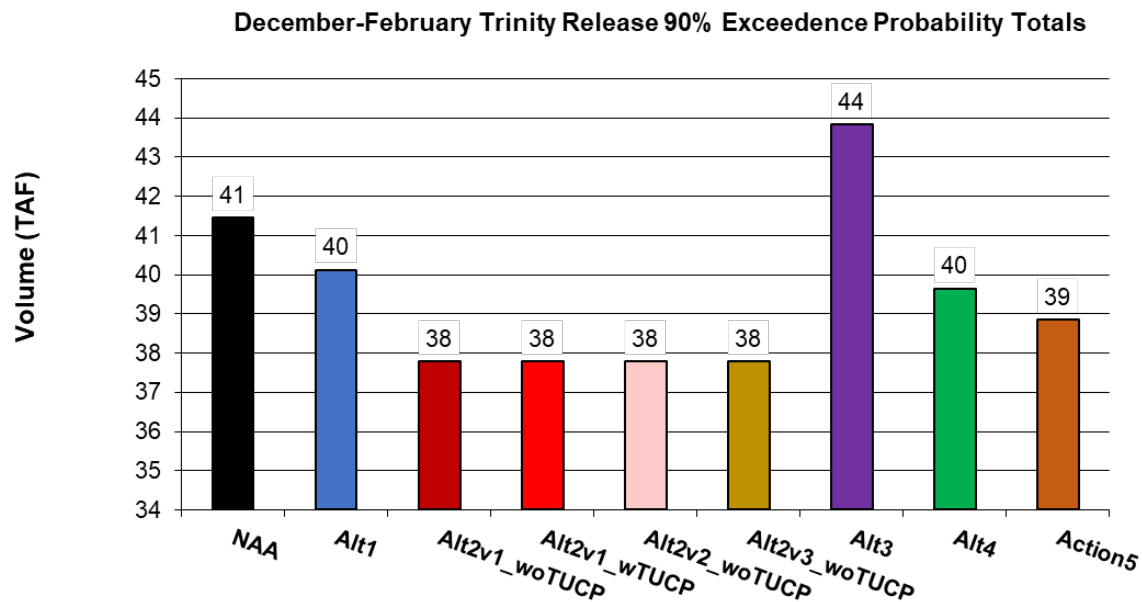


Figure 14. Trinity Reservoir Releases during dry period

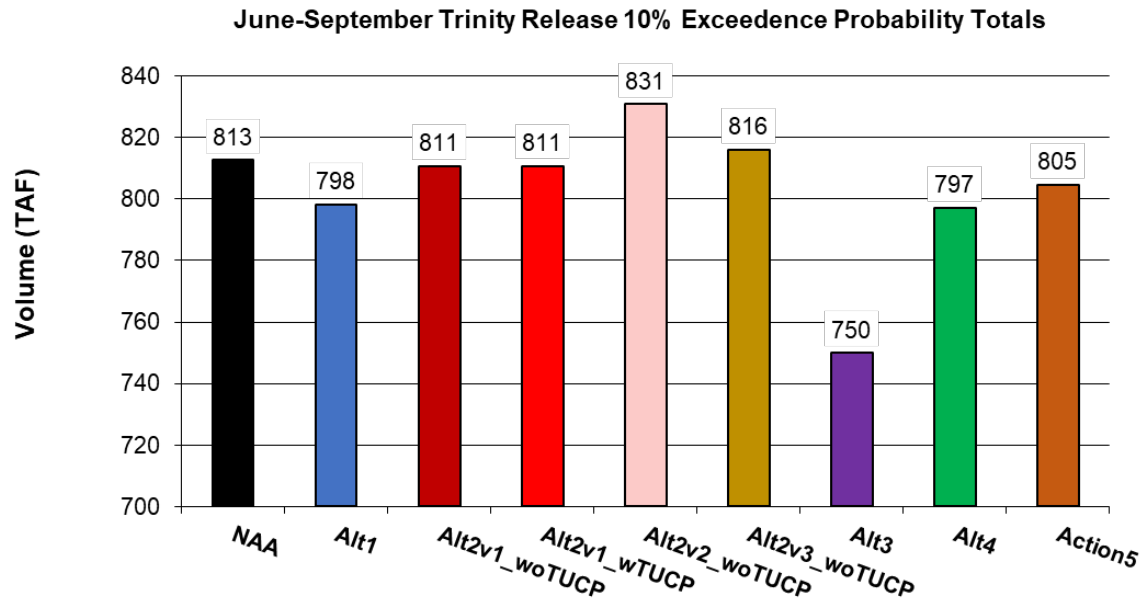


Figure 15. Trinity Reservoir Releases during wet period

1.5 Water Quality

Table 3. Monthly Average Electrical Conductivity (in micromhos per centimeter) at Delta Assessment Locations for the Full Simulation Period under Action 5, and Difference from the No Action Alternative

Location/Parameter	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
South Fork Mokelumne River at Terminous												
Full Simulation Period Average	188	194	208	211	217	211	199	190	188	185	186	183
Difference from NAA	0	-1	0	0	0	0	-2	-2	0	0	0	0
San Joaquin River at Jersey Point												
Full Simulation Period Average	1671	1675	1170	614	343	254	263	315	401	676	1094	1629
Difference from NAA	579	360	30	-18	-7	-7	-13	-27	-24	3	134	473
San Joaquin River at Prisoners Point												
Full Simulation Period Average	401	429	468	352	294	273	285	250	233	247	293	371
Difference from NAA	75	64	15	-6	-5	3	4	-8	-4	-1	16	66
San Joaquin River at San Andreas Landing												
Full Simulation Period Average	455	475	473	320	241	220	226	226	222	246	305	396
Difference from NAA	90	71	14	-6	-3	0	-1	-8	-4	-2	16	72

Location/Parameter	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
San Joaquin River at Vernalis												
Full Simulation Period Average	624	712	682	626	566	586	448	399	490	571	578	583
Difference from NAA	0	0	0	2	-7	-4	0	1	-2	-3	-5	-3
San Joaquin River at Brandt Bridge												
Full Simulation Period Average	621	707	686	631	569	586	457	404	489	568	580	585
Difference from NAA	-1	0	1	1	-7	-3	0	1	-1	-2	-4	-3
Old River Near Middle River												
Full Simulation Period Average	623	709	683	629	568	586	454	402	490	570	579	584
Difference from NAA	-1	-1	-4	-4	-12	-7	-2	-2	-3	-5	-7	-5
Old River at Tracy Bridge												
Full Simulation Period Average	622	704	700	657	601	606	476	417	482	529	536	557
Difference from NAA	0	0	-1	1	-8	-4	0	1	0	6	15	9
Sacramento River at Emmaton												
Full Simulation Period Average	2385	1985	942	535	269	238	315	429	724	899	1454	2141
Difference from NAA	614	248	3	-3	-10	-13	-43	-63	-26	-22	41	401
Sacramento River at Rio Vista												
Full Simulation Period Average	352	324	245	210	190	188	192	197	224	235	274	322
Difference from NAA	50	18	1	0	0	0	-3	-6	-3	-4	1	30
Sacramento River at Threemile Slough												
Full Simulation Period Average	1042	982	685	409	266	226	240	266	332	440	661	964
Difference from NAA	176	143	189	83	46	18	-14	-38	-83	-41	-31	123
Banks Pumping Plant												
Full Simulation Period Average	538	563	627	539	452	414	405	377	330	321	364	476
Difference from NAA	68	79	8	-25	-47	-59	-27	-4	-18	-17	-3	54
Jones Pumping Plant												
Full Simulation Period Average	569	608	653	572	507	504	455	387	367	382	414	506
Difference from NAA	67	75	22	-7	-9	11	10	-1	-3	3	12	57

Table 4. Monthly Average Electrical Conductivity (in millimhos per centimeter) at Suisun Marsh Assessment Locations for the Full Simulation Period under Action 5, and Difference from the No Action Alternative

Location/Parameter	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Sacramento River at Collinsville												
Full Simulation Period Average	9.0	8.0	4.1	2.1	0.9	0.7	1.0	1.7	3.1	4.2	6.2	8.4
Difference from NAA	2.3	1.1	0.0	-0.1	0.0	-0.1	-0.2	-0.2	-0.1	-0.1	0.2	1.7
Montezuma Slough at National Steel												
Full Simulation Period Average	9.0	7.8	4.4	2.4	1.0	0.9	1.4	2.3	4.1	5.4	7.4	8.9
Difference from NAA	1.6	0.3	-0.4	0.0	-0.1	-0.1	-0.1	-0.2	-0.1	0.0	0.1	1.4
Montezuma Slough Near Beldon Landing												
Full Simulation Period Average	9.6	8.2	5.2	3.0	1.4	1.5	2.2	3.3	5.7	7.0	9.0	9.8
Difference from NAA	0.8	-0.4	-0.8	-0.1	-0.1	-0.1	-0.2	-0.3	-0.1	0.2	0.3	0.6
Chadbourne Slough Near Sunrise Duck Club												
Full Simulation Period Average	11.1	10.0	7.5	4.9	3.2	3.0	3.6	4.5	6.8	8.7	10.4	11.3
Difference from NAA	1.0	0.0	-0.4	-0.2	-0.1	0.0	-0.2	-0.4	-0.1	0.4	0.8	0.8
Suisun Slough 300 Feet South of Volanti Slough												
Full Simulation Period Average	10.3	9.2	6.8	4.3	2.7	2.3	2.8	3.7	5.7	7.5	9.1	10.3
Difference from NAA	0.8	-0.1	-0.6	-0.3	-0.1	-0.1	-0.1	-0.2	-0.1	0.2	0.5	0.7

Table 5. Monthly Average Dissolved Organic Carbon (in milligrams per liter) at Delta Assessment Locations for the Full Simulation Period under Action 5, and Difference from the No Action Alternative

Location/Parameter	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Barker Slough at North Bay Aqueduct												
Full Simulation Period Average	2.3	2.4	2.8	3.1	3.4	3.4	3.2	2.8	2.4	2.3	2.2	2.2
Difference from NAA	0.0	-0.1	-0.1	-0.1	0.0	0.1	0.1	0.1	0.0	0.1	0.0	-0.1
Banks Pumping Plant												
Full Simulation Period Average	3.0	3.0	3.6	4.8	5.4	5.1	4.5	4.1	3.9	3.4	3.2	3.0
Difference from NAA	0.5	0.2	0.2	0.6	0.4	0.1	-0.2	0.1	0.6	0.6	0.5	0.3
Jones Pumping Plant												
Full Simulation Period Average	3.1	3.1	3.6	4.8	5.4	5.0	4.4	4.0	3.8	3.5	3.3	3.1
Difference from NAA	-0.1	-0.1	-0.4	-0.2	0.2	0.1	0.1	0.0	0.0	0.1	0.0	-0.1
San Joaquin River at Antioch												
Full Simulation Period Average	2.2	2.4	2.8	3.3	3.7	3.8	3.5	3.1	2.7	2.5	2.4	2.3
Difference from NAA	-0.1	-0.2	-0.2	-0.1	0.0	0.1	0.0	0.0	-0.1	0.1	0.1	-0.1
Contra Costa Water District Pumping Plant #1												
Full Simulation Period Average	2.5	2.7	3.2	4.0	5.2	5.2	4.7	4.0	3.4	2.9	2.8	2.6
Difference from NAA	0.0	-0.1	-0.2	-0.2	0.2	0.2	0.0	0.0	0.1	0.1	0.1	-0.1

A positive difference denotes an increase from the NAA, and a negative difference indicates a decrease from the NAA.
NAA = No Action Alternative.