Appendix D

Evaluation of the No Project Alternative (LSJR Alternative 1 and SDWQ Alternative 1)

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Acronyms and Abbreviations

BO	biological opinion
CEQA	California Environmental Quality Act
cfs	cubic feet per second
CSJWCD	Central San Joaquin Water Conservation District
DWR	California Department of Water Resources
FERC	Federal Energy Regulatory Commission
LSJR	Lower San Joaquin River
NMFS	National Marine Fisheries Service
NMI	New Melones Reservoir Index
OID	Oakdale Irrigation District
OMR	Old River at Middle River
ppt	parts per thousand
SDWQ	southern Delta water quality
SED	substitute environmental document
SEWD	Stockton East Water District
SJR	San Joaquin River
SJRA	San Joaquin River Agreement
SSJID	South San Joaquin Irrigation District
State Water Board	State Water Resources Control Board’s
TAF/y	thousand acre-feet per year
USBR	U.S. Bureau of Reclamation
VAMP	Vernalis Adaptive Management Plan
WSE	Water Supply Effects model

D.1 Introduction

The California Environmental Quality Act (CEQA) Guidelines require that the potential impacts of not approving a proposed project be evaluated under a No Project Alternative. "The purpose of describing and analyzing a No Project Alternative is to allow decision makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project." (14 Cal. Code Regs., § 15126.6(e)(1).) When the project is the revision of an existing regulatory plan, such as the 2006 *Water Quality Control Plan for the San Francisco Bay/Sacramento–San Joaquin Delta Estuary* (2006 Bay-Delta Plan), the No Project Alternative will be the continuation of the existing plan and its implementation into the future. (14 Cal. Code Regs., § 15126.6(e)(3)(A).) Thus, in general, the existing plan and the projects initiated under the existing plan would continue until the new plan amendments[1] are approved. The No Project Alternative analysis must discuss the existing conditions "as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services." (14 Cal. Code Regs., § 15126.6(e)(2).)

For the purposes of this analysis, the No Project Alternative is the continuation of the State Water Resources Control Board's (State Water Board) 2006 Bay-Delta Plan, as implemented through the State Water Board's Water Right Decision 1641 (D-1641) (revised March 15, 2000), including implementation of the San Joaquin River (SJR) at Vernalis flow objectives (also referred to as the SJR flow objectives) and the southern Delta salinity (EC[2]) objectives (including the salinity objective on the SJR at Vernalis). Lower San Joaquin River (LSJR) Alternative 1 and southern Delta water quality (SDWQ) Alternative 1 are referred to as the No Project Alternative in this appendix and in Chapter 15, *No Project Alternative (LSJR Alternative 1 and SDWQ Alternative 1)*, which evaluates the potential impacts of the no project alternative.

This appendix describes the assumptions in the State Water Board's Water Supply Effects (WSE) model, which was used to model the baseline and estimate the changes in flows needed to fully comply with the 2006 Bay-Delta Plan as implemented through D-1641.

[1] These plan amendments are the *project* as defined in State CEQA Guidelines, Section 15378.

[2] EC is electrical conductivity, which is generally expressed in deciSiemens per meter (dS/m) in this document. Measurement of EC is a widely accepted indirect method to determine the salinity of water, which is the concentration of dissolved salts (often expressed in parts per thousand or parts per million). EC and salinity are therefore used interchangeably in this appendix.

D.2 Description of the No Project Alternative

The No Project Alternative assumes continued implementation of, and full compliance with, the 2006 Bay-Delta Plan, as implemented through D-1641. The No Project Alternative focuses on effects related to the implementation of Vernalis flow and southern Delta salinity objectives because these objectives are the ones proposed to be amended. The Vernalis flow objectives were first established in the 1995 Bay-Delta Plan to protect fish and wildlife beneficial uses. These objectives include the minimum monthly flow rates for fish and wildlife beneficial uses during specific times of the year, as presented in Table 3 of the 2006 Bay-Delta Plan and implemented through D-1641. In D-1641, the State Water Board assigned compliance with these minimum flows on the SJR at Vernalis to the U.S. Bureau of Reclamation (USBR). When the State Water Board subsequently amended the Bay-Delta Plan in 2006, it approved an interim flow regime through the Vernalis Adaptive Management Plan (VAMP) experiment, as proposed in the San Joaquin River Agreement (SJRA), in lieu of meeting the April-May pulse flow objective (as presented in Table 3 of the 2006 Bay-Delta Plan).

No Project Alternative conditions differ from baseline conditions because the Vernalis flow objectives in Table 3 of the 2006 Bay-Delta Plan have not been fully implemented and are not part of the baseline because of the implementation of the SJRA and VAMP. The VAMP flows, which are generally lower than the Table 3 flows in the 2006 Bay-Delta Plan, are thus included in the baseline. During VAMP, a portion of the flows needed to comply with VAMP came from the three eastside tributaries[3] even though the 2006 Bay-Delta Plan and D-1641 do not contain numeric or narrative flow requirements specific to those rivers. However, the No Project Alternative does not include VAMP flows because that experimental flow regime concluded in 2011. The No Project Alternative and the baseline both include the 2009 National Marine Fisheries Service (NMFS) Biological Opinion (BO) flow requirements on the Stanislaus River, Federal Energy Regulatory Commission (FERC) requirements on the Tuolumne and Merced Rivers, and the Davis-Grunsky requirements on the Merced River.

The No Project Alternative assumes the flows would continue to be the responsibility of USBR and that the objectives would be met with additional releases from New Melones Reservoir on the Stanislaus River. The analytical approach used here evaluates increased releases from New Melones Reservoir to meet the objectives, because such releases could be the primary method by which the Vernalis flow objectives and southern Delta salinity objectives would be achieved. Focusing the evaluation on New Melones Reservoir releases affords an evaluation of maximum potential water supply impacts compared to assuming that increases in Vernalis flow would be distributed among the tributaries.

The No Project Alternative also assumes continuation of the southern Delta salinity objectives for agricultural beneficial uses identified in Table 2 of the 2006 Bay-Delta Plan and full compliance with these objectives as implemented through D-1641. Under D-1641, compliance with the numeric salinity objectives on the SJR at Vernalis (station C-10) is the obligation of USBR. Compliance with the numeric salinity objectives at the three interior southern Delta compliance stations – SJR at Brandt Bridge (station C-6), Old River near Middle River (station C-8), and Old River at Tracy Road

[3] In this document, the term *three eastside tributaries* refers to the Stanislaus, Tuolumne, and Merced Rivers.

Bridge (station P-12) – are the combined obligation of USBR and the California Department of Water Resources (DWR).

D.3 Evaluating the No Project Alternative

D.3.1 Modeling

For water-related projects in California, it is standard practice to evaluate the difference between baseline conditions and the alternatives using a sequence of historical hydrology (often monthly) that includes the effects from seasonal and year-to-year variations in rainfall, runoff, and reservoir operations. It is important to evaluate changes that would result from revised reservoir operations using a full range of runoff conditions. Baseline conditions for water resources (e.g., runoff, reservoir storage, river flows, salinity, and temperature) can often be described using the most recent 10-25 years of historical measurements. However, because new facilities may be added or operating rules may change (i.e., VAMP, Old River at Middle River [OMR] limits), a long-term planning-model comparison approach is often used to evaluate the differences between a baseline case with certain operating rules and facilities, and a project (alternative) case.

The State Water Board's WSE model was used to simulate baseline and modified hydrologic responses to the LSJR and SDWQ alternatives. The WSE model is a monthly water balance spreadsheet model that calculates the changes in river flows, water supply diversions, and reservoir operations that would occur in each of the three eastside tributaries based upon user-defined inputs, inputs to CALSIM, and flood storage rules. The WSE model allows the release flow targets for each tributary to be a specified fraction of the monthly unimpaired runoff or any other minimum flow requirement.

The WSE model is discussed in further detail in Appendix F.1, *Hydrologic and Water Quality Modeling*.

D.3.2 Assumptions

The monthly sequence of river flows, water supply diversions, reservoir storage, and Vernalis salinity for the No Project Alternative differs from the recent historical measurements and from baseline because of differences in assumptions used to calculate the baseline and the No Project Alternative.

The No Project Alternative differs from the baseline condition for the following reasons:

1. For baseline, the Vernalis pulse flow objectives for a ~~30~~31-day period April 15-May 15 are based on the VAMP that was in effect during the 12-year period (2000-2011). VAMP has ended, and in the absence of VAMP, the original, higher D-1641pulse flow objectives that are dependent only on the SJR water year type and Delta outflow are assumed for the No Project Alternative.
2. Under baseline conditions, the Vernalis base flow objectives for February-June are in effect, except for the April 15-May 15 period as described above~~which are dependent on the SJR water year type and the daily location of the 2-parts per thousand (ppt) salinity (i.e., Delta outflow), were not always fully implemented during the 1996-2011 period. This occurred when the SJRA cap of 110 thousand acre-feet per year (TAF/y) for meeting the Vernalis flow requirements was met.~~, The No-Project Alternative assumes full compliance with D-1641 flow requirements.

3. The No Project Alternative would meet the southern Delta salinity objectives by requiring additional New Melones Reservoir releases. An assumed EC increment from Vernalis to Tracy Boulevard reduced by higher Vernalis flow (i.e., EC increment [µS/cm] = 300,000 / Vernalis flow [cubic feet per second (cfs)]) was calculated for each month to estimate the maximum allowed Vernalis EC and the corresponding additional flow releases from New Melones Reservoir to meet the EC objectives at Tracy Boulevard. In some years, this assumption resulted in much higher flows relative to baseline.
4. Baseline allows water to be purchased from the Merced and Tuolumne Rivers to satisfy VAMP flow objectives. The No Project Alternative would not include the purchased water for the purposes of satisfying Vernalis flow objectives, so flows on the Merced and Tuolumne Rivers would be lower when compared to baseline in April and May of some years. The No Project Alternative would satisfy the D-1641 flows with releases from New Melones Reservoir alone.

The No Project Alternative would be different than the recently observed historical flow and salinity conditions for the reasons described above and for the following additional reasons:

1. The required flows on the Stanislaus River at Goodwin Dam have been recently revised by the NMFS BO, requiring generally higher fish flows for Chinook salmon and Central Valley steelhead (NMFS 2009). These higher flows are included in baseline and the No Project Alternative.
2. The full CVP contract for Stanislaus River water (155 TAF/y) has recently been required by a 2014 federal court judgment (*Stockton East Water District v. United States)*; USBR has fulfilled demands by Oakdale Irrigation District (OID) and South San Joaquin Irrigation District (SSJID) up to 600 TAF/y under the 1988 Agreement, but has rarely delivered the full 155 TAF/y contract with Stockton East Water District (SEWD) and Central San Joaquin Water Conservation District (CSJWCD), subject to availability based on the New Melones Index condition. Both baseline and the No Project Alternative assume the full diversion objective of 755 TAF/y subject to district demands and water availability.

The assumptions made for the No Project Alternative include reasonably foreseeable and feasible future actions, and therefore provide a sufficient degree of analysis to evaluate the environmental effects being considered. (State CEQA Guidelines, § 15204(a)) The baseline is the same baseline used for impact analysis in Chapters 5–14 of this recirculated substitute environmental document (SED).

D.3.3 Estimating Flows for the No Project Alternative

This section describes the methods used to estimate the additional flows needed to comply with the No Project Alternative (i.e., continuation of the 2006 Bay-Delta Plan objectives as implemented through D-1641) and compares the additional flows against the baseline results for 1922–2003. The analysis assumes that additional Vernalis flows would come entirely from New Melones Reservoir on the Stanislaus River.

Stanislaus River Flow Requirements

The State Water Board's WSE model was used to evaluate all of the alternatives and includes the Stanislaus River flows at Goodwin Dam, as required by the NMFS BO (NMFS 2009). The NMFS BO requires specified daily flows be released from New Melones Reservoir at certain times of the year related to the lifecycle of steelhead and Chinook species. The daily flow patterns depend on runoff and reservoir storage conditions each year. Specifically, pulse flows are required during the fall for adult attraction, and during the spring for outmigration cues and juvenile outmigration. Flows generally range from approximately 200–1,500 cfs in the fall and approximately 200–5,000 cfs in the spring.

The NMFS flow requirements are based on five different daily flow schedules based on the New Melones Reservoir Index (NMI) value of each year, as described in Appendix 2E of the NMFS BO. These requirements are incorporated in the WSE model using the monthly totals of the daily flow values, resulting in an equivalent monthly average flow, as shown in Table D-1. The NMI is calculated as the end of February storage plus the (forecasted) Stanislaus River runoff volume for March-September. The monthly flows are allocated based on the NMI value each year. Because these flow requirements are based in part on New Melones Reservoir storage, this may result in a change in the NMFS BO flow requirement in the No Project Alternative relative to baseline, due to changes in storage.

Table D-1. Stanislaus River Monthly Flows at Goodwin Dam Required by NMFS Biological Opinion Appendix 2E (NMFS 2009) as a Function of New Melones Index [NMI]) as Incorporated in the WSE Model

NMI WY Type	NMI Value[a] (TAF)	Oct (cfs)	Nov (cfs)	Dec (cfs)	Jan (cfs)	Feb (cfs)	Mar (cfs)	Apr (cfs)	May (cfs)	Jun (cfs)	Jul (cfs)	Aug (cfs)	Sep (cfs)	Annual (TAF)
C	<1,400	583	200	200	220	214	200	459	400	150	150	150	150	185
D	<2,000	567	200	200	226	221	200	765	630	200	200	200	200	230
BN	<2,500	773	200	200	233	235	200	1,551	1,240	363	250	250	250	347
AN	<3,000	795	200	200	240	235	1,518	1,398	1,552	938	300	300	300	483
W	>3,000	840	300	300	369	364	1,645	1,630	1,955	1,098	428	400	400	589

cfs = cubic feet per second
WY = water year
TAF = thousand acre-feet
C = critical
D = dry
BN = below normal
AN = above normal
W = wet

[a] Stanislaus flows are currently implemented under year types defined by the New Melones Interim Plan of Operation (USBR 2007) although these NMI water year type ranges are not specifically defined in the NMFS Biological Opinion.

Vernalis Flow Objectives

The No Project Alternative assumes full D-1641 Vernalis flow objectives,[4] whereas baseline incorporates VAMP. The D-1641 flow objectives at Vernalis are higher when the X2 location[5] is

[4] Vernalis flow objectives specified for February-June are based on the SJR 60-20-20 water year index and the ~~end-of month X2 valuesnumber of days per month when X2 must be maintained at a specified location~~ (i.e., Delta outflow).

[5] X2 is the location of the 2 parts per thousand salinity contour (isohaline), 1 meter off the bottom of the estuary measured in kilometers upstream from the Golden Gate Bridge. The abundance of several estuarine species has been correlated with X2. In the 2006 Bay-Delta Plan, a salinity value--or electrical conductivity (EC) value--of

downstream of Chipps Island (i.e., higher outflow). Table D-2 shows the monthly D-1641 flow objectives for the two cases: X2 upstream or X2 at/downstream of Chipps Island (75 kilometers [km]). Because the ~~30~~31-day pulse flow spans half of April and May, the required flows in these 2 months were calculated as the average of the base flow and the pulse flow. There were several years when the baseline model flows did not meet the Vernalis flow objectives because the SJRA cap of 110 TAF

Table D-2. D-1641 Vernalis Monthly Flow Objectives (cfs) for X2 Upstream or At/Downstream of Chipps Island (km 75) Based on SJR 60-20-20 Water-Year Type

D-1641 with X2 >75 km[a]	Feb	Mar	Apr[b]	May[b]	Jun
C	710	710	2,265	2,265	710
D	1,420	1,420	3,430	3,430	1,420
BN	1,420	1,420	3,730	3,730	1,420
AN	2,130	2,130	4,995	4,995	2,130
W	2,130	2,130	5,795	5,795	2,130
D-1641 with X2 ≤~~<~~75 km[a]	Feb	Mar	Apr[b]	May[b]	Jun
C	1,140	1,140	2,340	2,340	1,140
D	2,280	2,280	3,580	3,580	2,280
BN	2,280	2,280	3,880	3,880	2,280
AN	3,420	3,420	5,220	5,220	3,420
W	3,420	3,420	6,020	6,020	3,420

km = kilometers
cfs = cubic feet per second
C = critical
D = dry
BN = below normal
AN = above normal
W = wet
[a] The WSE model utilized X2 position from CALSIM II in order to determine Vernalis flow requirements.
[b] April and May flows are the average of base flow and pulse flow.

per year on the additional releases needed to meet the Vernalis flow requirements was met. Full compliance with the Vernalis flow objectives would have a substantial effect on water supply diversions from the Stanislaus River because of the additional water needed to satisfy the objectives.

Southern Delta Salinity Objectives

The No Project Alternative would include full compliance with the southern Delta salinity objectives. This includes compliance at SJR at Vernalis and the three interior southern Delta compliance locations. The baseline meets the Vernalis salinity objectives but may not have enough of an EC

2.64 millimhos/centimeter (mmhos/cm) is used to represent the X2 location. Note, in this document, EC is generally expressed in deciSiemens per meter (dS/m). The conversion is 1 mmhos/cm = 1 dS/cm.

buffer (i.e., Vernalis salinity objective minus Vernalis salinity) to meet the southern Delta EC objectives. Though this was not always the case for the historically observed EC at Vernalis, the Vernalis salinity objectives were always met in the baseline results.

The historical EC measurements have generally been highest at the Old River at Tracy Boulevard station, as described in Appendix F.2, *Evaluation of Historical Flow and Salinity Measurements of the Lower San Joaquin River and Southern Delta*. Therefore, the Tracy Boulevard station was selected to determine compliance with the southern Delta salinity objectives. The Vernalis EC required to meet the Old River at Tracy Boulevard salinity objectives was calculated based on the observed EC increments between Vernalis and Tracy Boulevard that were dependent on Vernalis flow. Based on historical EC data, the EC increment at Tracy Boulevard was estimated as:

EC Increment (μS/cm) = 300,000 / Vernalis flow (cfs) *(Eqn. D-1)*

For example, the EC increment from Vernalis to Tracy Boulevard would be 300 μS/cm when the Vernalis flow was 1,000 cfs, 150 μS/cm when the Vernalis flow was 2,000 cfs, and 100 μS/cm when the Vernalis flow was 3,000 cfs. The measured EC increments at Brandt Bridge and Union Island were generally much less (approximately 33 percent of the Tracy Boulevard EC increment).

To achieve full compliance with the salinity objectives at Tracy Boulevard, the Vernalis EC must be reduced to the EC objective minus the EC increment. For example, if the Vernalis flow was 4,000 cfs in April, the assumed EC increment from Vernalis to Tracy Boulevard would be 75 μS/cm and the Vernalis EC would need to be less than 625 μS/cm in order to also meet the EC objective of 700 μS/cm at Tracy Boulevard. The Vernalis EC can be reduced, if necessary, by increasing the Vernalis flow with additional New Melones Reservoir releases. If the Stanislaus EC was 0 μS/cm, then the Vernalis EC would change as the inverse of the Vernalis flow change (ratio).

D.3.4 No Project Alternative Results

The baseline flows at Vernalis were compared to No Project Alternative flows at Vernalis to determine the volume of additional Stanislaus water needed to fully comply with the assumptions of the No Project Alternative. Table D-3 summarizes the annual baseline New Melones Reservoir releases and the additional releases that would be required under the No Project Alternative. The first column gives the baseline New Melones Reservoir annual water year releases (excluding releases for diversions), which ranged from 186 to 2,219 TAF, with an average release volume of 404 TAF. The second column gives the No Project Alternative New Melones Reservoir annual water year releases (excluding releases for diversions), which would range from 195 to 2,219 TAF, with an average release volume of 474 TAF, an increase of 70 TAF per year.

The third and fourth columns of Table D-3 give the flows needed to fully satisfy the Vernalis flow objectives for baseline and the No Project Alternative, respectively. There would be a considerable amount of water needed in a few years when the SJR water year index was wet; the required baseline releases ranged from 0 to 186 TAF, with an average of 31 TAF. The required releases under the No Project Alternative ranged from 0 to 460 TAF, with an average of 82 TAF.

The fifth column of Table D-3 gives the additional flow released under baseline to meet the EC objective at Vernalis, which ranged from 0 to 70 TAF. The sixth column gives the additional releases needed for the No Project Alternative to meet the EC objective at both Vernalis and Old River at Tracy Boulevard. Because the EC increment was conservatively estimated, the total additional releases from New Melones Reservoir to meet the No Project Alternative conditions ranged from

0 to 267 TAF, with an average of 60 TAF; there were 3 years when there was not enough water in New Melones Reservoir to meet the Tracy Boulevard objective in all months. About half of the total additional water was required to meet the Tracy Boulevard EC objectives.

The last column of Table D-3 gives the annual VAMP releases (in April and May) on the Tuolumne and Merced Rivers that were assumed in the baseline. These VAMP releases ranged from 0 to 77 TAF, with an average of 26 TAF. The majority of these VAMP purchases were on the Merced River, so, in the absence of VAMP, Merced River flows would be lower in some years in the No Project Alternative relative to baseline. Under the No Project Alternative, it is assumed that these VAMP flows would be replaced by Stanislaus River flows required to meet D-1641 Vernalis flow requirements (as shown in column 4 of Table D-3).

Table D-3. Estimated Annual Baseline and No Project Alternative New Melones Reservoir Releases (thousand acre-feet [TAF]) for Vernalis Flow Objectives and Southern Delta Salinity Objectives (Vernalis and Tracy Boulevard EC Objectives), and Baseline VAMP Releases from the Tuolumne and Merced Rivers

Year[a]	Total Releases[b] (Baseline)	Total Releases[b] (No-Project)	Stanislaus Releases for Vernalis Flow[c] (Baseline)	Stanislaus Releases for Vernalis Flow[d] (No-Project)	Stanislaus Releases for Salinity[e] (Baseline)	Stanislaus Releases for Salinity[f,g] (No-Project)	Tuolumne and Merced VAMP (Baseline)
1922	308	308	0	0	0	0	0
1923	365	376	47	50	0	8	9
1924	266	452	0	24	18	180	0
1925	210	258	0	0	0	48	0
1926	285	375	56	107	0	84	25
1927	310	412	105	203	0	7	25
1928	240	316	26	47	0	54	69
1929	190	366	0	5	1	173	13
1930	191	377	12	54	0	143	25
1931	261	491	0	109	70	191	0
1932	256	474	92	266	0	43	26
1933	222	405	35	106	1	112	25
1934	218	482	15	110	21	190	31
1935	348	394	186	211	0	22	31
1936	274	268	70	52	0	12	62
1937	225	234	27	27	0	9	0
1938	419	419	0	0	0	0	0
1939	362	398	12	0	0	48	25
1940	325	339	15	9	0	20	27
1941	446	446	0	0	0	0	0
1942	449	449	0	0	0	0	7
1943	870	771	0	0	0	4	0
1944	406	420	36	26	0	24	77

Year[a]	Total Releases[b] (Baseline)	Total Releases[b] (No-Project)	Stanislaus Releases for Vernalis Flow[c] (Baseline)	Stanislaus Releases for Vernalis Flow[d] (No-Project)	Stanislaus Releases for Salinity[e] (Baseline)	Stanislaus Releases for Salinity[f,g] (No-Project)	Tuolumne and Merced VAMP (Baseline)
1945	331	321	10	0	0	0	37
1946	479	522	15	46	0	13	59
1947	288	460	45	141	0	75	25
1948	299	450	75	179	0	47	48
1949	233	456	8	198	0	78	25
1950	251	402	35	185	0	50	58
1951	368	433	86	240	0	18	77
1952	499	280	0	0	0	0	0
1953	545	399	39	50	0	14	77
1954	358	398	17	20	0	39	0
1955	231	372	0	34	0	107	0
1956	443	325	10	26	0	0	44
1957	390	394	49	28	0	26	77
1958	413	413	0	0	0	0	0
1959	372	437	27	43	0	49	71
1960	245	402	0	30	2	129	13
1961	210	473	8	88	7	190	0
1962	247	376	78	136	0	71	77
1963	386	469	182	288	0	22	77
1964	197	363	12	83	0	100	25
1965	392	459	95	224	0	40	41
1966	272	458	35	202	0	73	75
1967	472	333	58	58	0	0	0
1968	344	409	0	112	0	58	17
1969	506	422	0	0	0	0	0
1970	959	818	66	137	0	13	77
1971	392	391	64	43	0	20	73
1972	380	489	39	180	0	72	0
1973	367	399	61	190	4	18	42
1974	457	356	15	57	0	0	57
1975	485	459	27	137	0	0	73
1976	250	374	0	0	0	126	0
1977	219	537	5	74	18	267	9
1978	186	195	0	0	0	9	0
1979	408	317	103	98	0	18	77
1980	441	298	0	0	0	0	0
1981	347	401	4	17	0	43	5

Year[a]	Total Releases[b] (Baseline)	Total Releases[b] (No-Project)	Stanislaus Releases for Vernalis Flow[c] (Baseline)	Stanislaus Releases for Vernalis Flow[d] (No-Project)	Stanislaus Releases for Salinity[e] (Baseline)	Stanislaus Releases for Salinity[f,g] (No-Project)	Tuolumne and Merced VAMP (Baseline)
1982	610	542	0	0	0	0	0
1983	2219	2219	0	0	0	0	0
1984	1166	1185	0	15	0	5	21
1985	340	387	0	9	0	37	0
1986	604	471	0	0	0	0	0
1987	379	439	0	0	0	89	0
1988	229	471	0	39	26	228	0
1989	201	481	0	110	14	184	0
1990	202	489	0	64	16	238	0
1991	196	536	0	93	13	260	0
1992	193	454	11	130	7	150	0
1993	293	630	141	460	0	17	0
1994	214	464	0	42	26	234	2
1995	315	326	28	28	0	11	0
1996	447	468	1	0	0	21	25
1997	1243	1289	22	171	0	11	59
1998	766	612	0	0	0	0	0
1999	844	869	62	71	0	16	51
2000	477	496	22	19	0	22	73
2001	319	370	0	79	0	75	0
2002	354	558	116	254	0	75	41
2003	387	598	164	357	0	62	25
Minimum	186	195	0	0	0	0	0
Average	404	474	31	82	3	60	26
Maximum	2219	2219	186	460	70	267	77

VAMP = Vernalis Adaptive Management ~~Program~~Plan

[a] All releases except VAMP are releases from New Melones Reservoir only.

[b] Includes all flow and salinity releases and excludes releases for diversions. Includes the flows required by the National Marine Fisheries Services (NMFS) Biological Opinion Stanislaus River reasonably prudent alternative, including Action 3.1.3.

[c] Includes VAMP pulse flow releases from New Melones Reservoir only and D-1641 base flow releases, and excludes releases for EC objective.

[d] Includes D-1641 pulse and base flow releases from New Melones Reservoir only, and excludes releases for EC objective.

[e] Additional release to meet EC objective at Vernalis.

[f] Additional release to meet EC objective at Vernalis and Tracy Boulevard.

[g] No Project Alternative EC objective was unachievable for 1931, 1991, and 1992. The shortfall was 5 TAF in 1931, 6 TAF in 1991, and 1060 TAF in 1992.

Under the No Project Alternative, the average annual extra flow needed relative to baseline in order to attain the Vernalis flow objectives (50 TAF) and the EC objectives (57 TAF) is greater than the increase in the average annual releases for Stanislaus River flow (70 TAF). This occurs because occasionally some Stanislaus River flow requirements are lower under the No Project Alternative than under baseline; spills (which are rare on the Stanislaus River even under baseline conditions) and NMFS BO flows tend to be a little lower under the No Project Alternative because New Melones storage tends to be lower. Still, the overall average Stanislaus River releases required by the No Project Alternative are substantially greater than the releases required by the baseline alternative.

The WSE model was used to evaluate effects of the No Project Alternative. Table D-4 and Figures D-1 through D-6 present WSE model results for river flows, reservoir carryover storage, and water supply diversions on the three eastside tributaries and the SJR at Vernalis under the No Project Alternative and baseline conditions.

Under the No Project Alternative, flow in the Stanislaus River would generally be equal to or greater than baseline (Table D-4 and Figures D-2a and D-6a). Because the Stanislaus River water supply diversions were reduced to meet the required Stanislaus flows and continue the 2006 Bay-Delta Plan as implemented through D-1641, generally the No Project Alternative annual diversions would be equal to or less than baseline (Figures D-1a and D-2c) and New Melones Reservoir storage would either be equal to or less than baseline (Figures D-1b and D-2b). The baseline average diversions of 637 TAF/y would be potentially reduced to an average of 578 TAF/y. This reduction in the Stanislaus River water supply diversions would be closest to the reductions needed for LSJR Alternative 3 (i.e., 40 percent unimpaired flow; which would result in an average diversion of 558 TAF/y). Although most of the additional flows would come from reduced diversions, without additional constraints on withdrawals from storage, a large portion of the additional flow could be taken from storage and in some years would completely drain the reservoir (Figure D-1b). Although the average diversion is still relatively high for the No Project Alternative, in some years, Stanislaus River diversions could be near zero (Figures D-1a and D-2c).

Conditions on the Tuolumne River would generally be similar under the No Project Alternative and the baseline, as the baseline does not release much water for VAMP (Table D-4, Figures D-3a, D-3b, D-3c, and D-3d, and Figure D-6b). Under the No Project Alternative, Lake McClure on the Merced River would retain some additional water in storage due to the reduction in flows otherwise released for VAMP under baseline (Figure D-4b). Under the No Project Alternative, February–June flows on the Merced River would be reduced compared to baseline in over half of the years (Figure D-4a), with all the reductions occurring during the VAMP months of April and May, as a result of no VAMP implementation (Table D-4). This reduction in flow on the Merced River is opposite to the increases in Merced River flows that were associated with the LSJR alternatives.

SJR February-June flows at Vernalis under the No Project Alternative are similar to the baseline conditions (Figure D-5a); as were the combined diversion on the Stanislaus, Tuolumne, and Merced Rivers in most years, with baseline diversions being lower in about 20 percent of the years (Figure D-5b). Under the No Project Alternative, the SJR flows at Vernalis as a percentage of unimpaired flow were very similar to baseline flows (Figure D-5c).

Table D-4. Monthly Cumulative Distributions of Baseline Flow and Differences from Baseline for the No Project Alternative for the 82-Year WSE Modeling Period

Percentile	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Stanislaus Flow at Ripon – Baseline												
10	729	248	224	270	230	308	573	525	292	293	302	311
50	889	319	288	337	385	486	1,556	1,422	629	437	416	419
90	1,116	454	421	576	1,285	1,911	1,997	2,107	1,655	705	632	667
No Project – Percent difference from Baseline												
10	-3%	0%	1%	9%	5%	1%	82%	66%	121%	98%	47%	-8%
50	-4%	0%	7%	3%	32%	31%	10%	12%	49%	73%	47%	0%
90	-1%	-1%	-3%	-1%	0%	0%	14%	11%	-8%	44%	43%	-6%
Tuolumne Flow at Modesto (cfs) – Baseline												
10	290	246	257	316	312	349	546	546	270	262	277	256
50	550	464	470	570	647	1,568	1,414	1,238	499	448	426	422
90	813	756	1,152	3,424	5,084	5,097	4,591	4,810	4,387	3,331	652	691
No Project – Percent difference from Baseline												
10	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
50	0%	0%	1%	2%	11%	0%	-6%	-12%	0%	0%	0%	0%
90	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Merced Flow at Stevinson (cfs) – Baseline												
10	325	266	277	280	312	283	150	117	88	55	32	55
50	423	338	348	385	450	384	508	473	225	155	163	170
90	548	419	991	1,621	2,556	1,728	973	2,478	2,981	2,113	1,150	544
No Project – Percent difference from Baseline												
10	0%	2%	0%	0%	0%	0%	-29%	-76%	0%	0%	0%	0%
50	0%	1%	0%	0%	0%	0%	-54%	-52%	4%	0%	6%	2%
90	3%	6%	2%	0%	14%	0%	-5%	0%	0%	0%	0%	0%
San Joaquin River Flow at Vernalis (cfs) – Baseline												
10	2,000	1,566	1,513	1,481	1,856	1,614	1,616	1,543	1,009	959	1,055	1,488
50	2,598	1,981	1,941	2,200	3,489	3,502	4,640	4,600	2,280	1,620	1,544	2,024
90	3,331	2,724	4,264	10,926	15,228	13,821	12,538	13,327	11,586	6,902	2,983	2,940
No Project – Percent difference from Baseline												
10	0%	0%	8%	5%	17%	21%	42%	22%	64%	71%	50%	0%
50	-1%	0%	1%	1%	1%	1%	0%	-3%	0%	18%	10%	-1%
90	-1%	2%	0%	0%	1%	0%	0%	1%	-1%	-1%	-2%	-2%

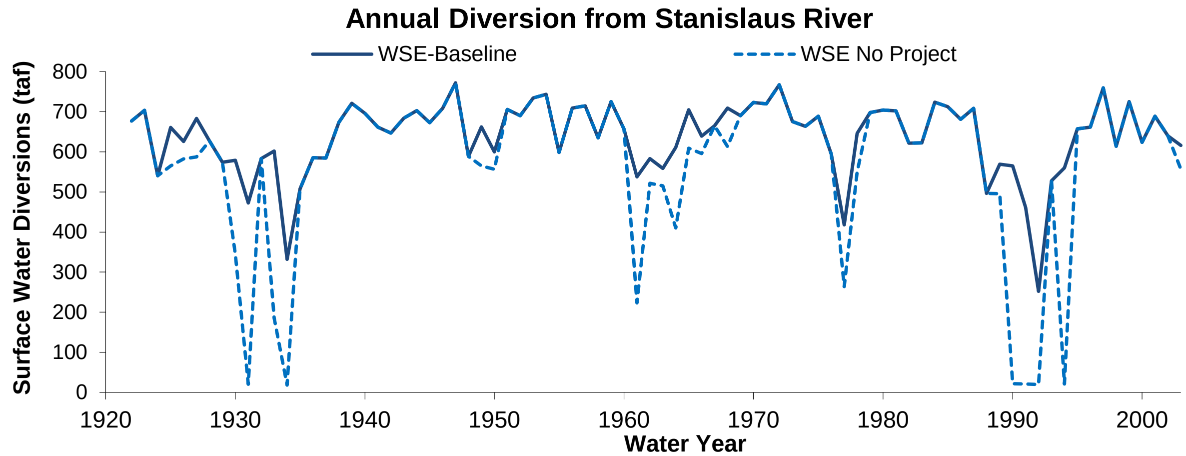

Figure D-1a. Stanislaus River Baseline and No Project Alternative Annual Diversions (TAF = thousand acre-feet)

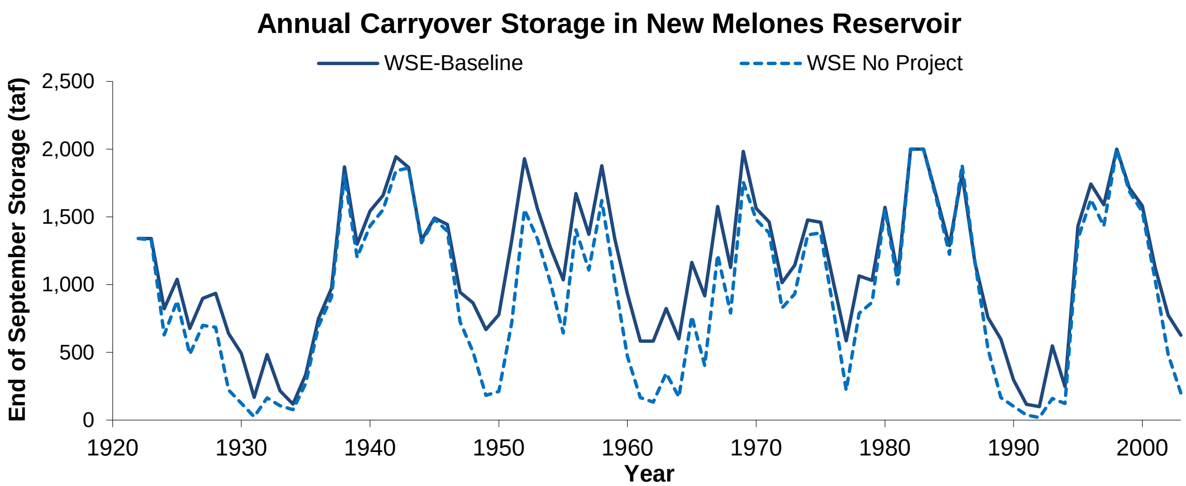

Figure D-1b. New Melones Baseline and No Project Alternative Carryover Storage (TAF = thousand acre-feet)

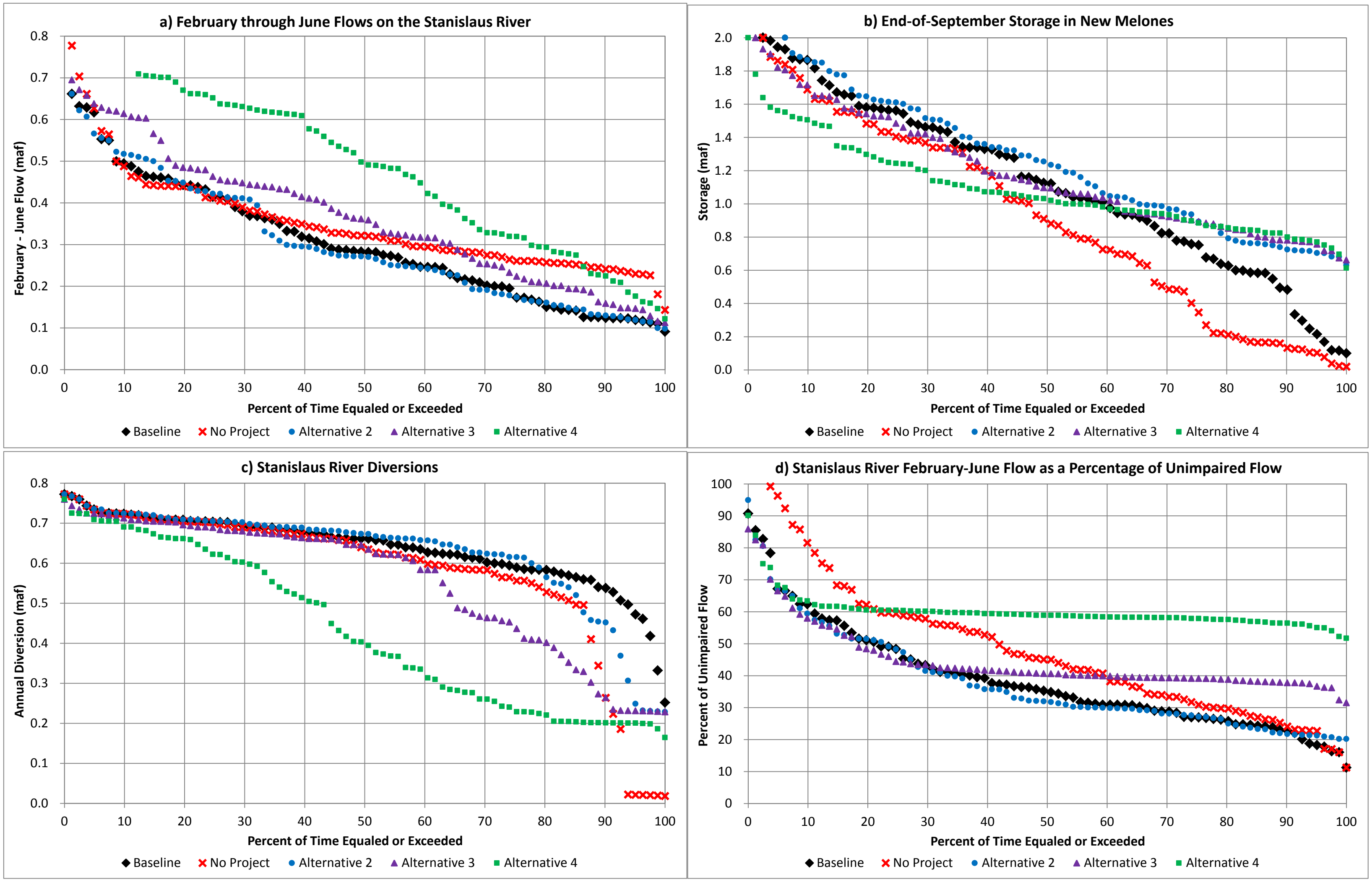

Figure D-2. Stanislaus River a) February-June Flow at Ripon, b) End-of-September (i.e., Carryover) Storage in New Melones Reservoir, c) Diversions, and d) February-June Flow as a Percentage of Unimpaired Flow

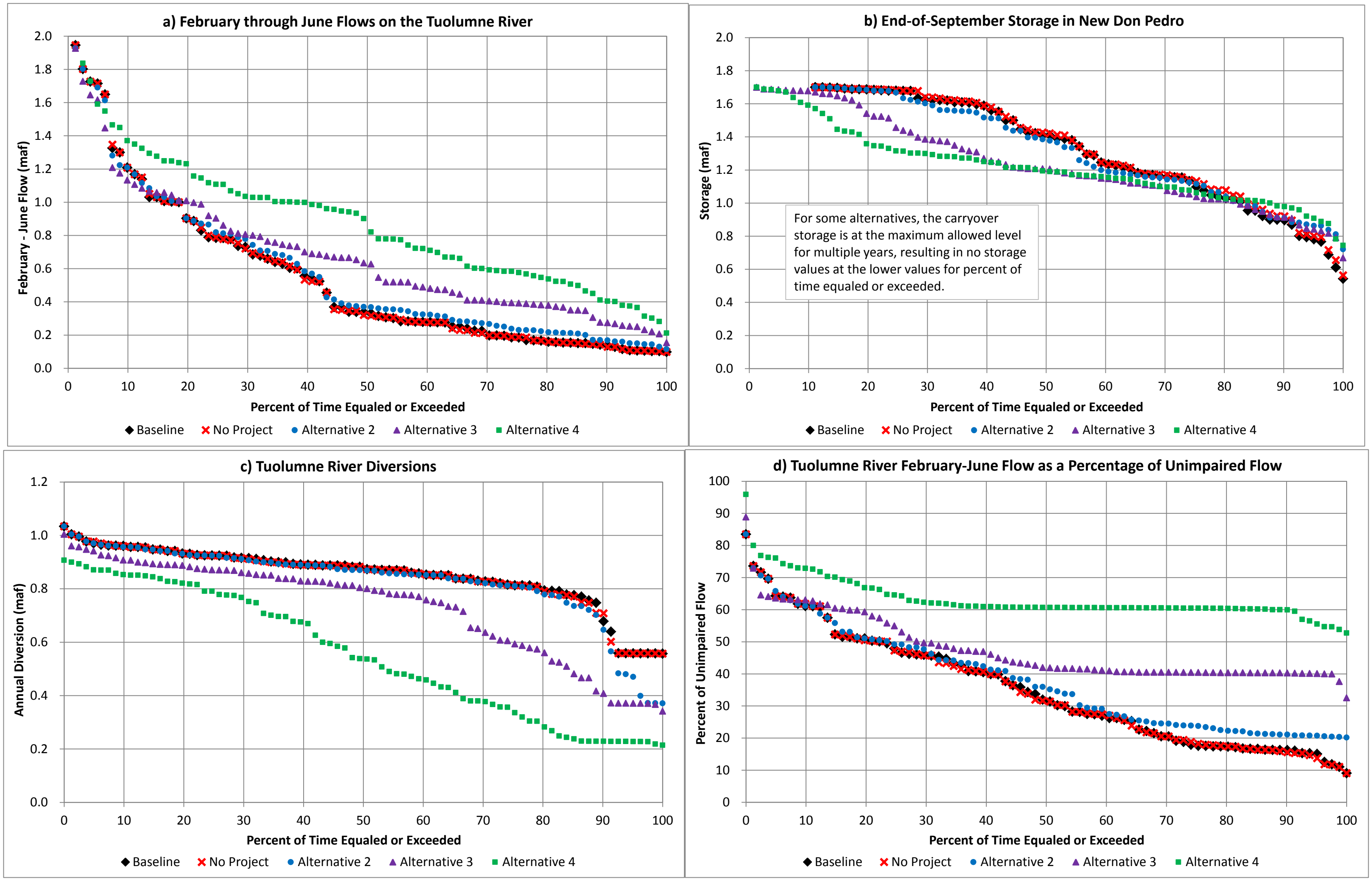

Figure D-3. Tuolumne River a) February-June Flow at Modesto, b) End-of-September (i.e., Carryover) Storage in New Don Pedro Reservoir, c) Diversions, and d) February-June Flow as a Percentage of Unimpaired Flow

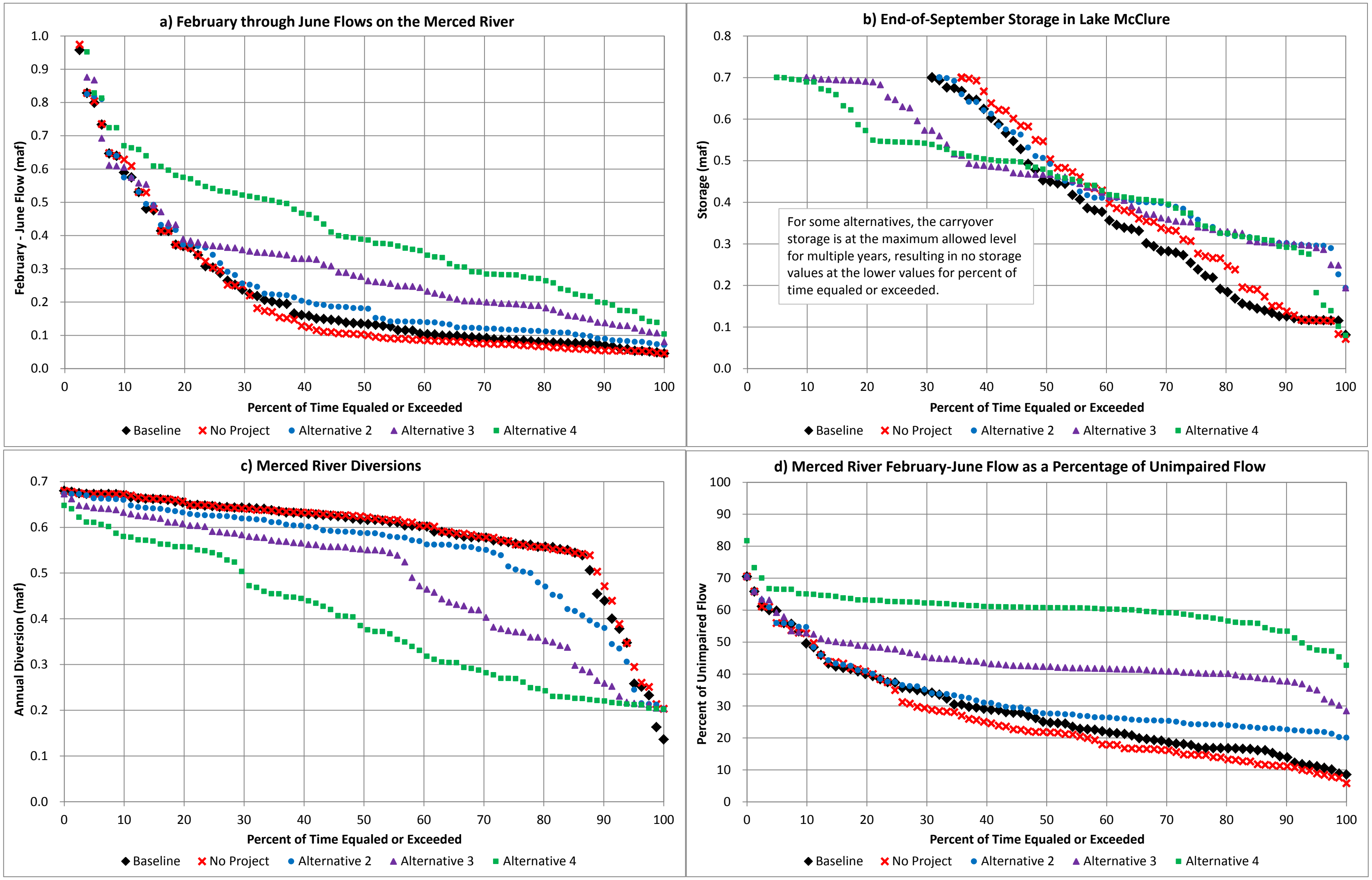

Figure D-4. Merced River a) February-to-June Flow at Stevinson, b) End-of-September (i.e., Carryover) Storage in Lake McClure, c) Diversions, and d) February-June Flow as a Percentage of Unimpaired Flow

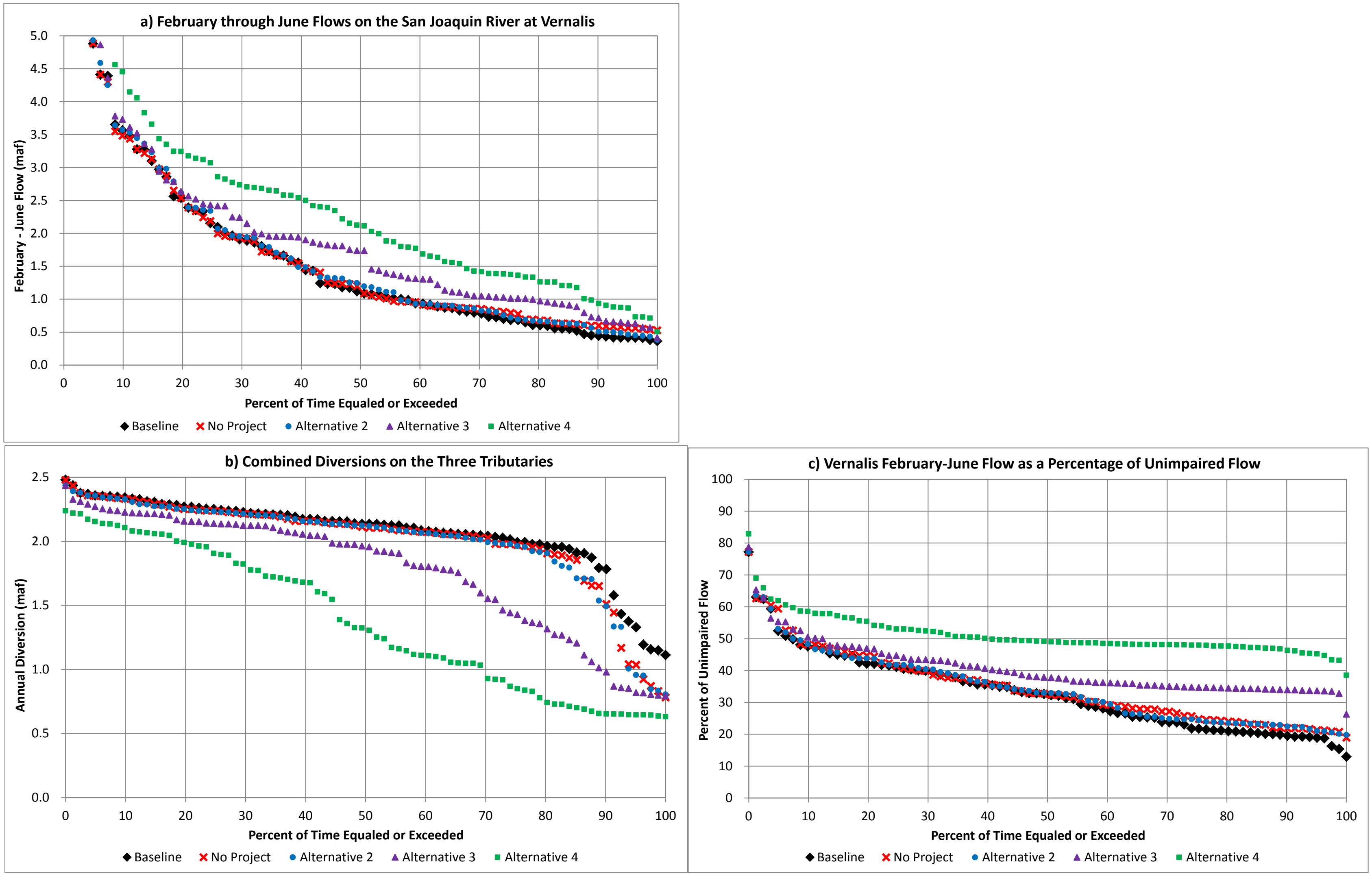

Figure D-5. San Joaquin River a) February-June Flow at Vernalis, b) Combined Diversions from the Three Tributaries (Stanislaus, Tuolumne, and Merced Rivers), and c) February-June Flow as a Percentage of Unimpaired Flow

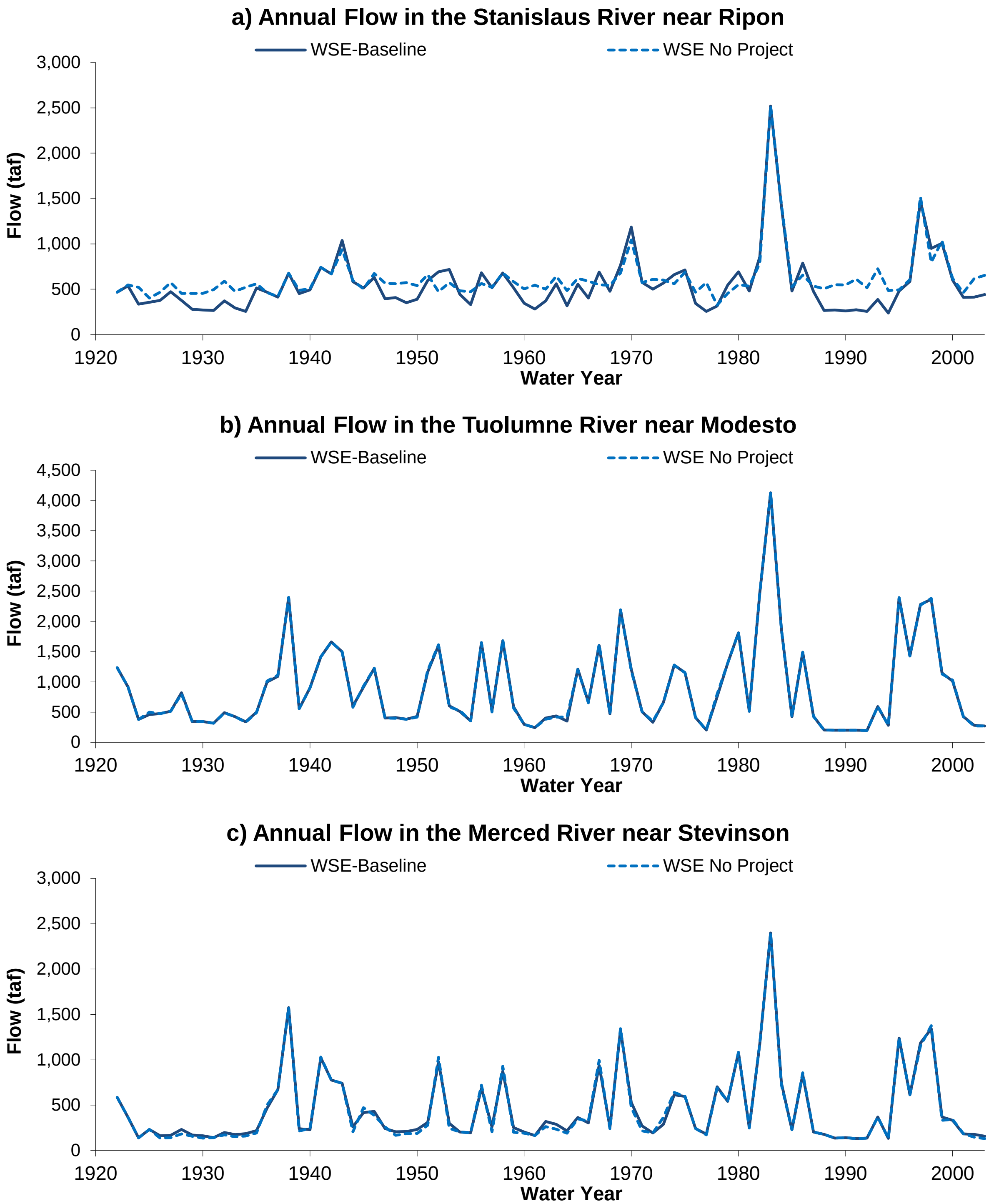

Figure D-6. Comparison of Baseline and No Project Alternative Annual Flow Volume (TAF = thousand acre-feet) for the a) Stanislaus, b) Tuolumne, and c) Merced Rivers near their Confluences with the San Joaquin River from 1922–2003