CALSIM II ASSUMPTIONS, SENSITIVITY ANALYSES, PERTINENT EDITS

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CALSIM II ASUMPTIONS

1 Introduction

CalSim II, a water resources planning model, is used by DWR and Reclamation to evaluate the effects of each Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project (Project) alternative used to conduct the CEQA/NEPA analysis for the Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project Environmental Impact Statement/ Environmental Impact Report (EIS/EIR). A comparative analysis of benefits will also be used to support alternatives evaluation. This chapter describes CalSim II and its application in operations studies for the Project.

1.1 WRIMS

CalSim II is a particular application of the Water Resources Integrated Modeling System (WRIMS). WRIMS is generalized water resources software developed by the California Department of Water Resources (DWR) Bay-Delta Office. WRIMS is entirely data driven and can be applied to most reservoir river basin systems. WRIMS represents the physical system (reservoirs, streams, canals, pumping stations, etc.) by a network of nodes and arcs. The model user describes system connectivity and various operational constraints using a modeling language known as Water Resources Simulation Language (WRESL). WRIMS subsequently simulates system operation using optimization techniques to route water through the network based on mass balance accounting. A mixed integer programming solver determines an optimal set of decisions in each monthly time step for a set of user-defined priorities (weights) and system constraints. The model is described by DWR (2000) and Draper et al. (2004).

1.2 CalSim II

CalSim II was jointly developed by the U.S. Department of the Interior, Bureau of Reclamation (Reclamation), and DWR for performing planning studies related to CVP and SWP operations. The primary purpose of CalSim II is to evaluate the water supply reliability of the CVP and SWP at current and future levels of development (e.g., 2015, 2035), with and without various assumed future facilities, and with different modes of facility operations. Geographically, the model covers the drainage basin of the Delta, CVP and SWP deliveries to the Tulare basin, and SWP deliveries to the San Francisco Bay Area (Bay Area), Central Coast, and Southern California. CalSim II typically simulates system operations for an 82-year period using a monthly time step. The model assumes that facilities, land use, water supply contracts, and regulatory requirements are constant over this period, representing a fixed level of development. The historical flow record of October 1921 to September 2003, adjusted for the influence of land use changes, upstream flow regulations, and potentially climate change, is used to represent the possible range of water supply conditions. Results from a single simulation may not necessarily correspond to actual system operations for a specific month or year, but are representative of general water supply conditions over the modeled period of record. Model results are best interpreted using various statistical measures such as long-term or year-type averages. CalSim II can be used in either a comparative or an absolute mode. The comparative mode consists of comparing two model runs: one containing modifications representing an alternative and one that does not. Differences in certain factors, such as deliveries or reservoir storage levels, are analyzed to determine the impacts of each alternative. In the absolute mode, results of a single model run, such as the amount of delivery or reservoir levels, are considered directly. Model assumptions are generally believed to be more reliable in a comparative mode than in an absolute mode. All of the assumptions are the same for baseline and alternative model runs, except assumptions regarding the action, and the focus of the analysis is on the differences in the results. For the purposes of the Project, CalSim II modeling output is used in the comparative mode rather than in the absolute mode.

2 General Assumptions

This section documents both the version of CalSim II the Project modeling is based on, and the general modifications that were made to CalSim II for the Project.

2.1 CalSim II Version

CalSim II models prepared for the California Water Commission (CWC) to support Water Storage Investment Program (WSIP) studies were used as the basis for all models discussed in this document.

- 2030 future condition with projected climate and sea level conditions for a thirty-year period centered at 2030 (climate period 2016-2045),
- 2070 future condition with projected climate and sea level conditions for a thirty-year period centered at 2070 (climate period 2056-2085)

The CalSim II model used for the WSIP product was derived from the model developed and published by DWR as part of the State Water Project Final Delivery Capability Report 2015 (DWR 2015). The primary change by the CWC to the DCR 2015 scenarios were related to climate change and sea level rise (CWC 2016). All other assumptions are as described in the DCR 2015.

Modifications were made by Reclamation for analysis of Project alternatives to the publically available CWC studies to include recent model updates, Reclamation guidance on American River contract assumptions, and incorporation of the California Water Fix into the future conditions studies. Specific modifications included the following:

- El Dorado ID and El Dorado County demands reflecting future contract assumptions
- Generalization of Folsom size inputs, and

- California Water Fix implementation and generalization of capacity assumptions

Ten CalSim II studies, five for existing conditions (2030 conditions) and five for future conditions (2070 conditions), were prepared for Project, as described below.

2.1.1 Existing Condition Runs

Model simulations for use in evaluating Project alternatives effects under existing conditions were developed. These simulations included the following:

- ExistBase – 2030 CWC with Reclamation Adjustments – Basis of comparison for Existing Condition scenarios
- ExistAlt1 – ExistBase with weir notch Alternative 1 and Fish Passage Facility
- ExistAlt4 – ExistBase with weir notch Alternative 4 and Fish Passage Facility
- ExistAlt5 – ExistBase with weir notch Alternative 5 and Fish Passage Facility
- ExistAlt6 – ExistBase with weir notch Alternative 6 and Fish Passage Facility

2.1.2 Future Condition Runs

Model simulations for use in evaluating Project alternatives effects under future conditions were developed. These simulations included the following:

- FutureBase – 2070 CWC with Reclamation adjustments and California Water Fix implementation – Basis of comparison for future condition scenarios
- FutureAlt1 – FutureBase with weir notch Alternative 1 and Fish Passage Facility
- FutureAlt4 – FutureBase with weir notch Alternative 4 and Fish Passage Facility
- FutureAlt5 – FutureBase with weir notch Alternative 5 and Fish Passage Facility
- FutureAlt6 – FutureBase with weir notch Alternative 6 and Fish Passage Facility

Two separate, independently operated, gated facilities are combined in the Alternative studies listed.

- Weir notch alternatives 1, 4, 5, and 6 – gates are operated to be open November 1 through March 16
- Fish passage facility – gates open upon weir overtopping, and remain open until the water surface elevation falls to a stage of 22 feet, whereupon they are closed and remain closed until the next weir overtopping event.

Monthly flow volumes computed by CalSim II are disaggregated based on an historical flow pattern to enable a representation of daily independent flow values. Daily weir spills are then calculated accordingly and re-aggregated to a monthly average weir spill.

CalSim II logic was adapted to identify river stage and notch operation criteria on a daily basis, combining the operations of both the fish passage facility and the weir notch alternative. Rating tables depicting weir flow under four potential weir conditions were used – all gates closed, fish passage only, weir notch only, and both fish passage and weir notch. The weir notch gate operation is pre-determined to be open November 1 – March 16, and daily switches are looked up from a table. The fish passage facility operation is dynamically determined based on the daily flow and previous day's gate status.

Between completion of the Draft EIS/EIR and release of the Final EIS/EIR, the State of California decided to study a smaller California WaterFix project with one tunnel instead of two. This change to the project will modify how the project would be constructed and operated, so it must undergo additional engineering and environmental compliance. The process to modify water rights through the State Water Resources Control Board has been halted. Because of these changes, the project is not reasonably foreseeable. The modeling was completed before this change; therefore, California WaterFix is still included in the future modeling simulations. Reclamation and DWR considered whether removal of California WaterFix in the future conditions (for both the No Action and action alternatives) could change the impact analysis, and the results of that investigation are in Section 2.2. Removal of California WaterFix from the No Action Alternative would not result in changes to the results of the alternatives analysis, so the modeling was not re-run without California WaterFix

2.1.3 System-Wide Assumptions

Table 2.1-1 summarizes assumptions for the CalSim II models developed for DWR's 2015 Delivery Capability Report Early Long-Term Alternative. The only changes to the model for use in the Project are as described above.

Table 2.1-1. CalSim II modeling assumptions

	2015 Delivery Capability Report Early Long-Term Assumptions[1]
Planning Horizon	2025
Period of Simulation	82 years (1922-2003)
HYDROLOGY	
Level of Development (land use)	2030 Level[2]
Climate Change	ELT (2025 emission level + 15 cm SLR)
DEMANDS	
North of Delta (excluding the American River)	
CVP	Land-use based, full build-out of contract amounts[3]
SWP (FRSA)	Land-use based, limited by contract amounts[4, 7]
Non-project	Land-use based, limited by water rights and SWRCB Decisions for Existing Facilities
Antioch Water Works	Pre-1914 water right
Federal refuges	Firm Level 2 water needs[5]
American River Basin	
Water rights	Year 2025, full water rights[6]
CVP	Year 2025, full contracts, including Freeport Regional Water Project[6]
San Joaquin River Basin[8]	

	2015 Delivery Capability Report Early Long-Term Assumptions[1]
Friant Unit	Limited by contract amounts, based on current allocation policy
Lower basin	Land-use based, based on district level operations and constraints
Stanislaus River basin[9, 17]	Land-use based, based on New Melones Interim Operations Plan, up to full CVP Contractor deliveries (155 TAF/yr) depending on New
South of Delta	
CVP	Demand based on contract amounts[3]
Federal refuges	Firm Level 2 water needs[5]
CCWD	195 TAF/yr CVP contract supply and water rights[10]
SWP[4, 11]	Demand based on full Table A amounts (4.13 MAF/yr)
Article 56	Based on 2001-2008 contractor requests
Article 21	MWD demand up to 200 TAF/month (December-March) subject to conveyance capacity, KCWA demand up to 180 TAF/month, and other contractor demands up to 34 TAF/month, subject to conveyance
North Bay Aqueduct	77 TAF/yr demand under SWP contracts, up to 43.7 cfs of excess flow under Fairfield, Vacaville and Benicia Settlement Agreement NOD Allocation Settlement Agreement terms for Napa and Solano[15]
FACILITIES	
System-wide	Existing facilities
Sacramento Valley	
Shasta Lake	Existing, 4,552 TAF capacity
Red Bluff Diversion Dam	Diversion dam operated with gates out all year, NMFS BO (Jun 2009) Action I.3.1[17];
Colusa Basin	Existing conveyance and storage facilities
Lower American River	Hodge criteria for diversion at Fairbairn
Upper American River	PCWA American River pump station
Lower Sacramento River	Freeport Regional Water Project
Fremont Weir	Existing Weir
Delta Export Conveyance	
SWP Banks Pumping Plant (South Delta)	Physical capacity is 10,300 cfs, permitted capacity is 6,680 cfs in all months and up to 8,500 cfs during Dec 15th - Mar 15th depending on Vernalis flow conditions[18]; additional capacity of 500 cfs (up to 7,180 cfs) allowed Jul–Sep for reducing impact of NMFS BO (Jun 2009) Action IV.2.1[17] on SWP[19]
CVP C.W. "Bill" Jones Pumping Plant (formerly Tracy PP)	Permit capacity is 4,600 cfs in all months (allowed for by the Delta-Mendota Canal- California Aqueduct Intertie)

	2015 Delivery Capability Report Early Long-Term Assumptions[1]
Upper Delta-Mendota Canal Capacity	Exports limited to 4,200 cfs plus diversion upstream from DMC constriction plus 400 cfs Delta-Mendota Canal-California Aqueduct Intertie
Los Vaqueros Reservoir	Enlarged storage capacity (160 TAF), existing pump location, Alternate Intake Project included[13]
San Joaquin River	
Millerton Lake (Friant Dam)	Existing, 520 TAF capacity
Lower San Joaquin River	City of Stockton Delta Water Supply Project, 30 mgd capacity
South of Delta (CVP/SWP project facilities)	
South Bay Aqueduct	SBA rehabilitation, 430 cfs capacity from junction with California Aqueduct to Alameda County FC&WSD Zone 7 point
California Aqueduct East Branch	Existing capacity
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/yr as able)
Clear Creek	
Minimum flow below Whiskeytown Dam	Downstream water rights, 1963 Reclamation proposal to USFWS and NPS, predetermined Central Valley Protection Improvement Act 3406(b)(2) flows[20], and NMFS BO (Jun 2009) Action I.1.1[17]
Upper Sacramento River	
Shasta Lake end-of-September minimum storage	NMFS 2004 Winter-run Biological Opinion (1,900 TAF in non-critical dry years), and NMFS BO (Jun 2009) Action I.2.1[17]
Minimum flow below Keswick Dam	Flows for the SWRCB Water Rights Order 90-5, predetermined Central Valley Protection Improvement Act 3406(b)(2) flows, and NMFS BO (Jun 2009) Action I.2.2[17]
Feather River	
Minimum flow below Thermalito Diversion Dam	2006 Settlement Agreement (700 / 800 cfs)
Minimum flow below Thermalito Afterbay outlet	1983 DWR, DFG agreement (750 – 1,700 cfs)
Yuba River	
Minimum flow below Daguerre Point Dam	D-1644 Operations (Lower Yuba River Accord)[14]

	2015 Delivery Capability Report Early Long-Term Assumptions[1]
American River	
Minimum flow below Nimbus Dam	American River Flow Management as required by NMFS BO (Jun 2009) Action II.1[17]
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[12], 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 NMFS BO (Jun 2009) Action III.1.2 and III.1.3[17]
Minimum dissolved oxygen	SWRCB D-1422
Merced River	
Minimum flow below Crocker-	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
Updated Tuolumne River	New Don Pedro operations
San Joaquin River	
San Joaquin River below Friant	Full San Joaquin River Restoration flows
Maximum salinity near Vernalis	SWRCB D-1641
Minimum flow near Vernalis	SWRCB D1641. VAMP is turned off since the San Joaquin River
Sacramento-San Joaquin Delta	
Delta Outflow Index (flow and salinity)	SWRCB D-1641 and FWS BO (Dec 2008) Action 417
Delta Cross Channel gate operation	SWRCB D-1641 with additional days closed from Oct 1-Jan 31 based on
South Delta exports (Jones PP and	SWRCB D-1641 export limits as required by NMFS BO (June 2009)
Combined Flow in Old and Middle	FWS BO (Dec 2008) Actions 1-3 and NMFS BO (Jun 2009) Action IV.2.3[17]
OPERATIONS CRITERIA: RIVER-SPECIFIC	
Upper Sacramento River	
Flow objective for navigation (Wilkins Slough)	NMFS BO (Jun 2009) Action I.4[17]; 3,250 – 5,000 cfs based on CVP water supply condition
American River	
Folsom Dam flood control	Variable 400/670 flood control diagram (without outlet modifications)
Feather River	

	2015 Delivery Capability Report Early Long-Term Assumptions[1]
Flow at mouth of Feather River (above Verona)	Maintain the DFG/DWR flow target of 2,800 cfs for Apr - Sep dependent on Oroville inflow and FRSA allocation
Stanislaus River	
Flow below Goodwin Dam	Revised Operations Plan and NMFS BO (Jun 2009) Action III.1.2 and III.1.3[17]
San Joaquin River	
Salinity at Vernalis	Grasslands Bypass Project (full implementation)
OPERATIONS CRITERIA: SYSTEMWIDE	
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. South-of-Delta allocations are additionally limited due to D-1641, FWS BO (Dec 2008), and NMFS BO (Jun 2009) export restrictions[17]
CVP municipal & industrial	100% - 50% based on supply. South-of-Delta allocations are additionally limited due to D-1641, FWS BO (Dec 2008), and NMFS BO (Jun 2009) export restrictions[17]
SWP Water Allocation	
North of Delta (FRSA)	Contract-specific NOD Allocation Settlement Agreement terms for Butte and Yuba[15]
South of Delta (including North Bay Aqueduct)	Based on supply; equal prioritization between Ag and M&I based on Monterey Agreement; allocations are limited due to D-1641, FWS BO (Dec 2008), and NMFS BO (Jun 2009) export restrictions[17] NOD Allocation Settlement Agreement terms for Napa and Solano[15]
CVP/SWP Coordinated Operations	
Sharing of responsibility for in-basin use	1986 Coordinated Operations Agreement (FRWP and EBMUD 2/3 of the North Bay Aqueduct diversions are considered as Delta export, 1/3 of the North Bay Aqueduct diversion is considered as in-basin use) 1986 Coordinated Operations Agreement
Sharing of surplus flows	1986 Coordinated Operations Agreement
Sharing of restricted export capacity for project-specific priority pumping	Equal sharing of export capacity under SWRCB D-1641, FWS BO (Dec 2008), and NMFS BO (Jun 2009) export restrictions[17]
Water transfers	Acquisitions by SWP contractors are wheeled at priority in Banks Pumping Plant over non-SWP users; LYRA included for SWP contractors[19]
Sharing of export capacity for lesser priority and wheeling-related pumping	Cross Valley Canal wheeling (max of 128 TAF/yr), CALFED ROD defined Joint Point of Diversion (JPOD)
San Luis Reservoir	San Luis Reservoir is allowed to operate to a minimum storage of 100 TAF
CVPIA 3406(b)(2)	
Policy decision	Per May 2003 Department of Interior decision
Allocation	800 TAF/yr, 700 TAF/yr in 40-30-30 dry years, and 600 TAF/yr in 40-30-30 critical years

	2015 Delivery Capability Report Early Long-Term Assumptions[1]
Actions	Pre-determined non-discretionary FWS BO (Dec 2008) upstream fish flow objectives (Oct-Jan) for Clear Creek and Keswick Dam, non-discretionary NMFS BO (Jun 2009) actions for the American and Stanislaus Rivers, and NMFS BO (Jun 2009) actions leading to export restrictions[17]
Accounting adjustments	No discretion assumed under FWS BO (Dec 2008) and NMFS BO (Jun 2009)[17], no accounting
WATER MANAGEMENT ACTIONS	
Water Transfer Supplies (long term programs)	
Lower Yuba River Accord[19]	Yuba River acquisitions for reducing impact of NMFS BO export restrictions[17] on SWP
Phase 8	None
Water Transfers (short term or temporary programs)	
Sacramento Valley acquisitions conveyed through Banks PP[21]	Post analysis of available capacity

Notes:

[1]These assumptions have been developed under the direction of the Department of Water Resources and Bureau of Reclamation management team for the BDCP HCP and EIR/EIS. Additional modifications were made by Reclamation for its October 2014 NEPA NAA baselines and by DWR for the 2015 DCR.

[2]The Sacramento Valley hydrology used in the Existing Condition 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 to support Reclamation studies.

[3]CVP contract amounts have been reviewed and updated according to existing and amended contracts, as appropriate. Assumptions regarding CVP agricultural and M&I service contracts and Settlement Contract amounts are documented in the Delivery Specifications attachments to the BDCP CalSim assumptions document.

[4]SWP contract amounts have been updated as appropriate based on recent Table A transfers/agreements. Assumptions regarding SWP agricultural and M&I contract amounts are documented in the Delivery Specifications attachments to the BDCP CalSim assumptions document.

[5]Water needs for Federal refuges have been reviewed and updated, as appropriate. Assumptions regarding firm Level 2 refuge water needs are documented in the Delivery Specifications attachments to the BDCP CalSim assumptions document. Refuge Level 4 (and incremental Level 4) water is not included.

[6]Assumptions regarding American River water rights and CVP contracts are documented in the Delivery Specifications attachments to the BDCP CalSim assumptions document. The Sacramento Area Water Forum agreement, its dry year diversion reductions, Middle Fork Project operations and "mitigation" water is not included.

[7]Demand for rice straw decomposition water from Thermalito Afterbay was added to the model and updated to reflect historical diversion from Thermalito in the October through January period.

[8]The new CalSim II representation of the San Joaquin River has been included in this model package (CalSim II San Joaquin River Model, Reclamation, 2005). Updates to the San Joaquin River have been included since the preliminary model release in August 2005. The model reflects the difficulties of on-going groundwater overdraft problems. The 2030 level of development representation of the San Joaquin River Basin does not make any attempt to offer solutions to groundwater overdraft problems. In addition, a dynamic groundwater simulation is not yet developed for the San Joaquin River Valley. Groundwater extraction/ recharge and stream-groundwater interaction are static assumptions and may not accurately reflect a response to simulated actions. These limitations should be considered in the analysis of result

[9]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 NMFS BO (Jun 2009) Action III.1.3.

[10]The actual amount diverted is reduced because of supplies from the Los Vaqueros project. The existing Los Vaqueros storage capacity is 100 TAF, and future storage capacity is 160 TAF. Associated water rights for Delta excess flows are included.

[11]Under Existing Conditions and the Future No Action baseline, it is assumed that SWP Contractors can take delivery of all Table A allocations and Article 21 supplies. Article 56 provisions are assumed and allow for SWP Contractors to manage storage and delivery conditions such that full Table A allocations can be delivered. Article 21 deliveries are limited in wet years under the assumption that demand is decreased in these conditions. Article 21 deliveries for the NBA are dependent on excess conditions only, all other Article 21 deliveries also require that San Luis Reservoir be at capacity and that Banks PP and the California Aqueduct have available capacity to divert from the Delta for direct delivery.

[12]Mokelumne River flows reflect EBMUD supplies associated with the Freeport Regional Water Project.

[13]The CCWD Alternate Intake Project, an intake at Victoria Canal, which operates as an alternate Delta diversion for Los Vaqueros Reservoir.

[14]D-1644 and the Lower Yuba River Accord are assumed to be implemented for Existing baselines. 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.

[15]This includes draft logic for the updated Allocation Settlement Agreement for four NOD contractors: Butte, Yuba, Napa and Solano.

[16]It is assumed that D-1641 requirements will be in place in 2030, and VAMP is turned off.

[17]In cooperation with Reclamation, National Marine Fisheries Service, Fish and Wildlife Service, and CA Department of Fish and Game, the CA Department of Water Resources has developed assumptions for implementation of the FWS BO (Dec 15 2008) and NMFS BO (June 4 2009) in CalSim II.

[18]Current ACOE permit for Banks PP allows for an average diversion rate of 6,680 cfs in all months. Diversion rate can increase up to 1/3 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.

[19]Acquisitions of Component 1 water under the Lower Yuba River Accord, and use of 500 cfs dedicated capacity at Banks PP during Jul Sep, are assumed to be used to reduce as much of the impact of the Apr-May Delta export actions on SWP contractors as possible.

[20]Delta actions, under USFWS discretionary use of CVPIA 3406(b)(2) allocations, are no longer dynamically operated and accounted for in the CalSim II model. The Combined Old and Middle River Flow and Delta Export restrictions under the FWS BO (Dec 15 2008) and the NMFS BO (June 4 2009) severely limit any discretion that would have been otherwise assumed in selecting Delta actions under the CVPIA 3406(b)(2) accounting criteria. Therefore, it is anticipated that CVPIA 3406(b)(2) account availability for upstream river flows below Whiskeytown, Keswick and Nimbus Dams would be very limited. It appears the integration of BO RPA actions will likely exceed the 3406(b)(2) allocation in all water year types. For these baseline simulations, upstream flows on the Clear Creek and Sacramento River are pre-determined based on CVPIA 3406(b)(2) based operations from the Aug 2008 BA Study 7.0 and Study 8.0 for Existing and Future No Action baselines respectively. The procedures for dynamic operation and accounting of CVPIA 3406(b)(2) are not included in the CalSim II model.

[21]Only acquisitions of Lower Yuba River Accord Component 1 water are included.

3 References

California Department of Water Resources (DWR). 2000. CALSIM Water Resources Simulation Model. Modeling Support Branch, Bay-Delta Office. Sacramento, California. http://modeling.water.ca.gov/hydro/model/index.html

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California Water Commission (CWC). 2016. Water Storage Investment Program Draft Technical Reference. Sacramento, California. August.

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4 Sensitivity Study of Future Conditions Related to the California WaterFix

CalSim modeling is used to characterize the potential effects of the action alternatives related to Existing Conditions and the No Action Alternative. The model results are used for impact analysis of hydrology, hydraulics, and flood control and water supply-related effects. As described in Section 2.1.1 and 2.1.2 above, the Existing Condition and No Action Alternative scenarios are based on the WSIP 2030 and WSIP 2070 scenarios, respectively, which primarily differ from one another due to different hydrological conditions associated with climate change and sea level rise. For this EIS/EIR, the No Action Alternative uses the 2070 scenario and also includes reasonable and foreseeable projects, such as the California Water Fix project. Because WaterFix is no longer reasonably foreseeable, Reclamation and DWR wanted to investigate if the impact findings would change if it were removed from the CalSim modeling.

This section describes comparisons of the WSIP 2030 and WSIP 2070 scenarios, along with the comparison of the Existing Condition and No Action Alternative. The intent of this sensitivity study is to better understand which elements of the No Action Alternative are contributing to impacts (when compared to Existing Conditions). The study also considers if the impacts associated with the action alternatives could change when compared to these baselines (if California WaterFix were removed from the future scenarios).

4.1 Hydrology, Hydraulics, and Flood Control Sensitivity

Chapter 4 in the EIS/EIR includes a comparison of the action alternatives to Existing Condition and No Action Alternative for hydrology, hydraulics, and flood control. In particular, the comparisons between the Existing Condition and No Action Alternative indicate potentially substantial differences for Sacramento River flow to the Yolo Bypass and in the Sacramento River at Freeport in Section 4.3.3.1.1. and Section 4.3.3.1.2. Similar comparisons of the WSIP 2030 and WSIP 2070 scenarios are described below.

4.1.1 Change in occurrence of flows exceeding the maximum existing conditions monthly flow from the Sacramento River into the Yolo Bypass

The maximum monthly flow to the Yolo Bypass under the WSIP 2030 scenario is 133,319 cfs, in February 1998. There would be two months within the WSIP 2070 scenario with monthly average flows greater than 133,319 cfs. While the maximum monthly Existing Condition flow of 136,869 cfs is slightly higher than the maximum monthly WSIP 2030 flow, there are also two months under the No Action Alternative with flows exceeding the maximum monthly Existing Condition flow. This indicates the two months with increased flow under the No Action Alternative are likely a result of climate change and sea level rise rather than the reasonable and foreseeable projects. Changes between the action alternatives and Existing Conditions and the No Action Alternative are negligible, so the changes related to increased flows are also related to climate change and sea level rise. Removal of California WaterFix from the No Action Alternative modeling would not change the findings for this impact.

4.1.2 Change in occurrence of flows exceeding the maximum existing conditions monthly flow in the Sacramento River at Freeport

Similar to the comparison of the monthly maximum flow in the Yolo Bypass described above, while there are two months with flows under the No Action Alternative exceeding the maximum monthly flow under the Existing Conditions of 72,231 cfs, there are two months under the WSIP 2070 scenario where flows exceed the maximum monthly flow under the WSIP 2030 scenario of 75,645 cfs. This similarly implies that two months with increased flow under the No Action Alternative are likely a result of climate change and sea level rise rather than the reasonable and foreseeable projects. Changes between the action alternatives and Existing Conditions and the No Action Alternative are negligible, so the changes related to increased flows are also related to climate change and sea level rise. Removal of California WaterFix from the No Action Alternative modeling would not change the findings for this impact.

4.2 Water Supply Sensitivity

Chapter 5 includes a comparison of the action alternatives to Existing Conditions and the No Action Alternative for water supply. The comparison of the No Action Alternative to Existing Conditions suggests substantial differences in water supply deliveries for the two scenarios. A sensitivity comparison of water supply deliveries between the WSIP 2030 and WSIP 2070 scenarios provides an isolation of the effect of climate change and sea level rise on water supply. Tables 2.2-1 through 2.2-5 show water supply delivery comparisons between the WSIP 2030 and WSIP 2070 scenarios similar to those included in Chapter 5, Section 5.3.3.1.

4.2.1 Changes in CVP Water Supply Deliveries North of Delta

Chapter 5, Section 5.3.3.1.1 in the EIS/EIR shows a comparison of CVP water supply deliveries to CVP contractors and wildlife refuges north of the Delta for the Existing Condition and No Action Alternative. Delivery reductions between the two scenarios were less than five percent in all months; in dry and critical years, delivery reductions were as high as six percent, but the average annual changes was only 2 percent.

Table 2.2-1 shows changes that would occur in CVP deliveries to North of Delta contractors under the WSIP 2070 scenario compared to the WSIP 2030 scenario.

Table 2.2-1. Simulated Monthly Average Water Supply Deliveries and Percent Change in Deliveries to North of Delta Central Valley Project Contractors and Wildlife Refuges under the WSIP 2070 Scenario Compared to the WSIP 2030 Scenario

Month	Average All Years		Dry and Critical Years[1]	
	WSIP 2030 (cfs)	WSIP 2070 Change (cfs [%])	WSIP 2030 (cfs)	WSIP 2070 Change (cfs [%])
October	1,508	-37 (-2%)	1,561	-85 (-5%)
November	727	-20 (-3%)	771	-46 (-6%)
December	389	-9 (-2%)	402	-19 (-5%)
January	234	-11 (-5%)	233	-13 (-5%)
February	245	-11 (-4%)	248	-18 (-7%)

Month	Average All Years		Dry and Critical Years[1]	
	WSIP 2030 (cfs)	WSIP 2070 Change (cfs [%])	WSIP 2030 (cfs)	WSIP 2070 Change (cfs [%])
March	338	-18 (-5%)	415	-31 (-7%)
April	5,117	-112 (-2%)	5,465	-156 (-3%)
May	5,607	-190 (-3%)	5,277	-75 (-1%)
June	7,998	-251 (-3%)	7,385	-79 (-1%)
July	7,945	-355 (-4%)	7,256	-244 (-3%)
August	5,993	-255 (-4%)	5,384	-101 (-2%)
September	2,051	-112 (-5%)	1,800	-90 (-5%)
Total (TAF)	2,313	-84 (-4%)	2,194	-58 (-3%)

Source: CalSim II Output for DEL_CVP_TOTAL_N
Key: cfs = cubic feet-per-second; TAF = thousands of acre-feet
[1]Dry and Critical Years as defined by RD1641 Sacramento Valley Index

Table 2.2-1 shows that reductions in deliveries to CVP contractors and wildlife refuges north of the Delta are greater for a comparison of the WSIP 2070 and WSIP 2030 scenarios than observed between the No Action Alternative and Existing Condition. This indicates the reductions described in Chapter 5 are generally due to climate change and sea level rise, rather than the implementation of reasonable and foreseeable projects. California WaterFix would have negligible changes to North of Delta water deliveries and removing it from the action alternatives and No Action Alternative would not result in a change to the impact findings.

4.2.2 Changes in CVP Water Supply Deliveries South of Delta

Chapter 5, Section 5.3.3.1.2 in the EIS/EIR shows a comparison of CVP water supply deliveries to CVP contractors and wildlife refuges south of the Delta for the Existing Condition and No Action Alternative. Delivery reductions between the two scenarios were as high as 18 percent in some months, with average annual reductions in deliveries of 11 percent; in dry and critical years, delivery reductions were as high as 20 percent, but the average annual changes was only 6 percent.

Table 2.2-2 shows changes that would occur in deliveries to South of Delta CVP contractors and wildlife refuges under the WSIP 2070 Scenario compared to the WSIP 2030 Scenario.

Table 2.2-2. Simulated Monthly Average Water Supply Deliveries and Percent Change in Deliveries to South of Delta CVP Contractors and Wildlife Refuges under the WSIP 2070 Scenario Compared to the WSIP 2030 Scenario

Month	Average All Years		Dry and Critical Years[1]	
	WSIP 2030 (cfs)	WSIP 2070 Change (cfs [%])	WSIP 2030 (cfs)	WSIP 2070 Change (cfs [%])
October	2,674	-157 (-6%)	2,584	-183 (-7%)
November	1,588	-119 (-7%)	1,520	-123 (-8%)
December	1,155	-153 (-13%)	1,072	-160 (-15%)
January	1,280	-255 (-20%)	1,149	-260 (-23%)
February	1,726	-313 (-18%)	1,562	-317 (-20%)

Month	Average All Years		Dry and Critical Years[1]	
	WSIP 2030 (cfs)	WSIP 2070 Change (cfs [%])	WSIP 2030 (cfs)	WSIP 2070 Change (cfs [%])
March	2,086	-196 (-9%)	1,666	-69 (-4%)
April	2,600	-348 (-13%)	1,986	-140 (-7%)
May	3,767	-453 (-12%)	2,873	-183 (-6%)
June	5,466	-762 (-14%)	4,013	-324 (-8%)
July	5,894	-902 (-15%)	4,208	-381 (-9%)
August	5,019	-635 (-13%)	3,800	-261 (-7%)
September	3,419	-248 (-7%)	2,922	-129 (-4%)
Total (TAF)	2,220	-275 (-12%)	1,776	-152 (-9%)

Source: CalSim II Output for DEL_CVP_TOTAL_S
Key: cfs = cubic feet-per-second; TAF = thousands of acre-feet
[1]Dry and Critical Years as defined by RD1641 Sacramento Valley Index

Table 2.2-2 shows that reductions in deliveries to CVP contractors and wildlife refuges south of the Delta are greater for a comparison of the WSIP 2070 and WSIP 2030 scenarios than observed between the No Action Alternative and Existing Condition. This indicates the reductions described in Chapter 5 are generally due to climate change and sea level rise, rather than the implementation of reasonable and foreseeable projects. The action alternatives compare deliveries to the No Action Alternative and Existing Conditions. Early in development of the alternatives, Reclamation analyzed preliminary alternatives using baselines with California WaterFix and without California WaterFix. The modeling indicated that including California WaterFix in the future scenarios would increase the potential for the action alternatives to affect water deliveries south of the Delta (Reclamation 2015). The California WaterFix tunnels would divert water upstream from the point where water in the Yolo Bypass re-enters the Delta, so the action alternatives would have the potential to decrease flows at the WaterFix diversion point and reduce deliveries. Removing WaterFix from the future scenarios would reduce the potential to affect water supply deliveries. The impact findings already indicate less than significant deliveries, and removing WaterFix would further reduce this potential effect.

4.2.3 Changes in SWP Water Supply Deliveries North of Delta

Chapter 5, Section 5.3.3.1.3 in the EIS/EIR shows a comparison of SWP water supply deliveries to SWP contractors north of the Delta for the Existing Condition and No Action Alternative. Delivery reductions between the two scenarios were as high as 10 percent in some months, with average annual reductions of 4 percent; in dry and critical years, delivery reductions were as high as 17 percent, with average annual changes of nine percent.

Table 2.2-3 shows changes that would occur in deliveries to North of Delta SWP contractors under the 2070 WSIP scenario compared to the 2030 WSIP scenario.

Table 2.2-3. Simulated Monthly Average Water Supply Deliveries and Percent Change in Deliveries to North of Delta State Water Project Contractors under the under the WSIP 2070 Scenario Compared to the WSIP 2030 Scenario

Month	Average All Years		Dry and Critical Years[1]	
	WSIP 2030 (cfs)	WSIP 2070 Change (cfs [%])	WSIP 2030 (cfs)	WSIP 2070 Change (cfs [%])
October	1,457	-119 (-8%)	1,490	-152 (-10%)
November	1,474	-138 (-9%)	1,441	-152 (-11%)
December	942	-89 (-9%)	936	-87 (-9%)
January	347	-33 (-10%)	380	-25 (-7%)
February	14	-2 (-11%)	11	-2 (-15%)
March	92	-4 (-4%)	145	-13 (-9%)
April	2,122	-117 (-6%)	2,302	-244 (-11%)
May	2,684	-104 (-4%)	2,455	-135 (-5%)
June	3,217	-126 (-4%)	2,924	-180 (-6%)
July	3,169	-126 (-4%)	2,883	-181 (-6%)
August	2,510	-108 (-4%)	2,252	-156 (-7%)
September	1,874	-70 (-4%)	1,609	-157 (-10%)
Total (TAF)	1,206	-63 (-5%)	1,141	-90 (-8%)

Source: CalSim II Output for DEL_SWP_TOTAL_N
Key: cfs = cubic feet-per-second; TAF = thousands of acre-feet
[1]Dry and Critical Years as defined by RD1641 Sacramento Valley Index

Table 2.2-3 shows that reductions in deliveries to SWP contractors north of the Delta are greater for all years, and slightly lower for dry and critical years for a comparison of the WSIP 2070 and WSIP 2030 scenarios than observed between the No Action Alternative and Existing Condition. This indicates the delivery reductions described in Chapter 5 are generally due to climate change and sea level rise, rather than the implementation of reasonable and foreseeable projects. California WaterFix would have negligible changes to North of Delta water deliveries and removing it from the action alternatives and No Action Alternative would not result in a change to the impact findings.

4.2.4 Changes in SWP Water Supply Deliveries South of Delta

Chapter 5, Section 5.3.3.1.4 in the EIS/EIR shows a comparison of SWP water supply deliveries to SWP contractors south of the Delta for the Existing Condition and No Action Alternative. Monthly reductions in deliveries between the two scenarios were as high as 13 percent in some months, with average annual differences of 0 percent; in dry and critical years, monthly reductions were as high as 21 percent, with average annual changes of ten percent.

Table 2.2-4 shows changes that would occur in deliveries to South of Delta SWP contractors under the 2070 WSIP scenario compared to the 2030 WSIP scenario.

Table 2.2-4. Simulated Monthly Average Water Supply Deliveries and Percent Change in Deliveries to South of Delta SWP Contractors under the WSIP 2070 Scenario Compared to WSIP 2030 Scenario

Month	Average All Years		Dry and Critical Years[1]	
	WSIP 2030 (cfs)	WSIP 2070 Change (cfs [%])	WSIP 2030 (cfs)	WSIP 2070 Change (cfs [%])
October	4,037	-348 (-9%)	3,681	-486 (-13%)

Month	Average All Years		Dry and Critical Years[1]	
	WSIP 2030 (cfs)	WSIP 2070 Change (cfs [%])	WSIP 2030 (cfs)	WSIP 2070 Change (cfs [%])
November	3,405	-226 (-7%)	3,038	-199 (-7%)
December	3,450	-272 (-8%)	3,147	-427 (-14%)
January	460	-73 (-16%)	113	-22 (-19%)
February	780	-120 (-15%)	172	-37 (-21%)
March	1,281	-91 (-7%)	316	36 (11%)
April	2,409	-229 (-10%)	954	-135 (-14%)
May	3,678	-251 (-7%)	2,042	-205 (-10%)
June	5,132	-344 (-7%)	3,403	-313 (-9%)
July	5,625	-345 (-6%)	4,152	-365 (-9%)
August	5,774	-371 (-6%)	4,043	-329 (-8%)
September	4,880	-292 (-6%)	3,413	-255 (-7%)
Total (TAF)	2,480	-179 (-7%)	1,728	-166 (-10%)

Source: CalSim II Output for DEL_SWP_TOTAL_S
Key: cfs = cubic feet-per-second; TAF = thousands of acre-feet

Table 2.2-4 shows that reductions in deliveries to SWP contractors south of the Delta are greater for all years and for dry and critical years for a comparison of the WSIP 2070 and WSIP 2030 scenarios than observed between the No Action Alternative and Existing Condition. This indicates the delivery reductions described in Chapter 5 are generally due to climate change and sea level rise, rather than the implementation of reasonable and foreseeable projects. As discussed for CVP south-of Delta deliveries, removing California WaterFix from the future scenarios would not change the less than significant finding for the action alternatives.

4.2.5 Increase in Incidence of Term 91 Being Initiated

Chapter 5, Section 5.3.3.1.5 in the EIS/EIR shows a comparison of incidences of Term 91 being initiated. There were a total of 115 months when Term 91 was initiated under the Existing Conditions, but not the No Action Alternative, and 84 months when Term 91 was initiated under the No Action Alternative, but not the Existing Condition.

Table 2.2-5 shows a comparison of the number of years Term 91 would be initiated for each month under the 2070 WSIP scenario compared to the 2030 WSIP scenario.

Table 2.2-5. Comparison of the Number of Years Term 91 would be Initiated under the WSIP 2070 Scenario Compared to WSIP 2030 Scenario, or Vice Versa

Month	Incidents of Term 91 Initiation under Existing Conditions but Not Under the No Action Alternative	Incidents of Term 91 Initiation under the No Action Alternative but not under Existing Conditions
January	0	0
February	0	0
March	0	8
April	0	20

May	1	26
June	1	21
July	28	0
August	36	4
September	20	7
October	7	11
November	7	0
December	3	0
Total	103	97

Table 2.2-5 shows that there would be fewer months Term 91 would be initiated under the WSIP 2070 scenario, relative to the WSIP 2030 scenario than under the No Action Alternative compared to the Existing Condition, indicating a reduction in potential benefit due to climate change and sea level rise. Similarly, there would be more months of Term 91 initiated under the WSIP 2070 scenario that it had not been initiated under the WSIP 2030 scenario, indicating an increase in impact due to climate change and sea level rise. This indicates the impacts associated with the initiation of Term 91 described in Chapter 5 are generally due to climate change and sea level rise rather than implementation of reasonable and foreseeable projects.

5 Edits to EIS/EIR Text Pertinent to California WaterFix No Longer a Reasonably Foreseeable Project

Changes to 2.2 No Action and No Project Alternative

Adult fish may move upstream in Tule Canal in response to tidal influence in Cache Slough, flows over Fremont Weir, or when the westside tributaries attract fish. As under existing conditions, fish would either move downstream and migrate back into the Sacramento River, pass over Fremont Weir, pass through the existing fish passage structure at Fremont Weir, become stranded at Fremont Weir, or move to the Wallace Weir Fish Rescue Facility. Other projects in the Yolo Bypass and Sacramento River region would continue to move forward, including California EcoRestore projects, Battle Creek Salmon and Steelhead Restoration project, Environmental Permitting for Operation and Maintenance of flood facilities, Oroville Facilities Federal Energy Regulatory Commission Relicensing and License Implementation, and Sacramento Regional Wastewater Treatment Plant Upgrade. These efforts are described in more detail in Section 3.2.2.1. California WaterFix was included in the No Action Alternative for the Draft EIS/EIR, but it is no longer reasonably foreseeable. Appendix E includes a sensitivity study to consider if removing California WaterFix from the No Action Alternative CalSim modeling would change the impact analysis in the EIS/EIR but finds that it would not change the impact analysis.

Changes to 4.3.1.1.3 CalSim II

The hydrologic analysis conducted for this Environmental Impact Statement (EIS)/Environmental Impact Report (EIR) modified the standard historically based CalSim II input hydrology to represent 2030 and 2070-level climate change based on the CWC Climate Change Water Storage Investment Program modeling (CWC 2016). Additionally, the CalSim II used for this analysis includes representation of 2030 and 2070-level sea level rise to ensure Delta water quality operations are consistent with expected conditions. While the 2030 hydrology scenarios include existing infrastructure, the 2070 hydrology scenarios also assume reasonably foreseeable actions that could occur in the Project area in the future and do not rely on approval or implementation of the Project, including actions with current authorization, secured funding for design and construction, and environmental permitting and compliance activities that are substantially complete. These reasonably foreseeable actions, in addition to changes in regulatory conditions and water supply demands, would result in differences in flows on the Sacramento River and in the Delta between existing conditions and the No Action Alternative. Possible changes include the following:

- Full implementation of the Grassland Bypass Project
- Implementation of the South Bay Aqueduct Improvement and Enlargement Project
- San Joaquin River Restoration Program full restoration flows

Changes to 4.3.3.1 No Action Alternative

Under the No Action Alternative, no additional actions would be taken to increase seasonal floodplain inundation in the lower Sacramento River Basin or to improve fish passage throughout the Yolo Bypass. The Yolo Bypass would continue to be inundated during overtopping events at Fremont Weir. However, additional flows could not pass Fremont Weir when the Sacramento River elevation is below Fremont Weir. Therefore, there would be no construction-related impacts on flood control, hydraulics, and hydrology.

The No Action Alternative assumes reasonably foreseeable actions that could occur in the Project area in the future and do not rely on approval or implementation of the Project, including actions with current authorization, secured funding for design and construction, and environmental permitting and compliance activities that are substantially complete. These reasonably foreseeable actions, in addition to changes in regulatory conditions and water supply demands, would result in differences in flows in the Sacramento River and in the Delta between existing conditions and the No Action Alternative. Appendix E includes more information on the ways that different components of the No Action Alternative contribute to flow changes. Possible changes that could affect flood management (and are included in the modeling) include the following:

- Sea level rise and climate change beyond that in the existing condition;
- Full implementation of the Grassland Bypass Project;
- Implementation of the South Bay Aqueduct Improvement

Changes to 5.1 Environmental Setting/Affected Environment

The Project area for the water supply analysis includes the Sacramento-San Joaquin Delta (Delta) region, areas upstream of the Delta region that may experience changes in operations as a result of changes in flows in the Yolo Bypass, and the State Water Project (SWP) and Central Valley Project (CVP) Export Service Areas.

Shasta, Folsom, and Oroville reservoirs would not be re-operated to inundate the Yolo Bypass. CVP and SWP service areas are described in greater detail below.

Changes to 5.3.1.2 Methodology for Determining Changes in CVP/SWP Deliveries

Changes in CVP and SWP operations as a result of each alternative are analyzed using the CalSim II model. CalSim II models a complex and extensive set of regulatory standards and operations criteria. Descriptions of both are contained in Appendix E, *CalSim II Modeling*. The hydrologic analysis conducted for this EIS/EIR used CalSim II models with 2030 and 2070 conditions from the California Water Commission Climate Change Water Supply Improvement Project modeling to approximate system-wide changes in storage, flow, salinity, and reservoir system reoperation associated with the alternatives. Although CalSim II is the best available tool for simulating system-wide operations, the model also contains simplifying assumptions in its representation of the real system. CalSim II's predictive capability is limited and cannot be readily applied to hourly, daily, or weekly time steps for hydrologic conditions. The model, however, is useful for comparing the relative effects of alternative facilities and operations within the CVP/SWP system on a monthly time step. Reclamation's CalSim II modeling of Existing Conditions and the comparable level of development alternatives assumes 2030 conditions. Future conditions in the CalSim II modeling for the No Action Alternative and future conditions-level of development alternatives assume 2070 conditions, including estimates of climate change and sea level rise. The CalSim II modeling of future scenarios (both No Action and action alternatives) includes the California WaterFix because it was reasonably foreseeable at the time that the modeling was completed. It is no longer foreseeable under the No

Action Alternative, but a sensitivity study indicated that new modeling without WaterFix would not change the impact findings, so the modeling still includes WaterFix.

Deliveries to CVP and SWP water users located south of the Delta do not necessarily correspond to the same volume as the Delta export patterns because a portion of the exported water is stored in San Luis Reservoir and released on a different pattern than Delta exports, possibly even in another water year, so effects on exports are not included in the water supply analysis.

It also should be noted that the monthly CalSim II model results do not represent daily water operations decisions, especially for extreme conditions. For example, in very dry years, the model simulates minimum reservoir volumes (also known as "dead pool conditions") that appear to prevent Reclamation and DWR from meeting their contractual obligations, including water deliveries to CVP Sacramento River Settlement Contractors, CVP San Joaquin River Exchange Contractors, SWP Feather River Service Area Contractors, and Level II refuge water supplies. Such model results are anomalies that reflect the inability of the monthly model to make real-time policy decisions under extreme circumstances. Projected reservoir storage conditions near dead pool conditions should only be considered as an indicator of stressed water supply conditions and not necessarily reflective of actual CVP and SWP operations in the future.

Changes to 5.3.3 Effects and Mitigation Measures

This section provides an evaluation of the direct and indirect effects on surface water supply from implementing the Project alternatives. This analysis is organized by Project alternative, with specific impact topics numbered sequentially under each alternative.

Changes in flow at Fremont Weir could change CVP and SWP operations. Decreases in Jones and Banks exports could lead to decreases in San Luis Reservoir storage and, ultimately, a decrease in CVP and SWP deliveries to water service contractors south of the Delta.

Modeling of Existing Conditions and the comparable-level of development alternatives assumes a 2030 hydrology and sea level rise with existing infrastructure and regulatory conditions. Modeling of the No Action Alternative and the comparable-level of development alternatives assumes a 2070 hydrology and sea level rise and reasonably foreseeable infrastructure and regulatory conditions.

Changes to 5.3.3.1 No Action Alternative

Under the No Action Alternative, no additional actions would be taken to increase seasonal floodplain inundation in the lower Sacramento River Basin or improve fish passage throughout the Yolo Bypass. The Yolo Bypass would continue to be inundated during overtopping events at Fremont Weir, and additional flows would not pass through Fremont Weir when the Sacramento River is below Fremont Weir. Therefore, there would be no construction-related impacts on water supply.

As described in Section 4.3.1.1.3, the No Action Alternative assumes reasonably foreseeable actions in addition to changes in hydrology and sea-level rise relative to Existing Conditions. These reasonably foreseeable actions, in addition to changes in regulatory conditions and water supply demands, would result in differences in flows on the Sacramento River and at the Delta between Existing Conditions and the No Action Alternative. The Appendix E discussion of the California Water Commission (CWC) scenarios (used as the basis for this project's modeling) show that the majority of the differences between Existing Conditions and the No Action Alternative are based on changes in hydrology and sea-level rise.

As discussed above, California WaterFix is included in the No Action Alternative modeling (even though it is no longer foreseeable under the No Action Alternative). The California WaterFix Project, included for 2070-level scenarios, could have a notable influence on the effects of the No Action Alternative relative to the Existing Conditions. A change in diversion through the California WaterFix Project intakes could affect storage in San Luis Reservoir and subsequent deliveries to CVP and SWP contractors south of the Delta. Changes in San Luis Reservoir storage could also result in changes to operations of north-of-Delta reservoirs, such as Shasta, Folsom, and Oroville, to move water supply to fill the reduced San Luis Reservoir storage. **Changes to 6.4.2 Cumulative Impacts**

Cumulative effects with respect to changes in water quality standards include evaluation and potential establishment of water quality criteria and flow objectives that protect beneficial uses on tributaries to the Sacramento River under Phase IV. Additionally, the Staff Report for the Delta Mercury Control Program (Central Valley RWQCB 2010c) proposes a number of changes to water management and storage in and upstream of the Delta. Changes to salinity objectives, dredging and dredge materials disposal and reuse, and changes to flood conveyance flows would be subject to the open water MeHg allocations. As a result, MeHg reductions are likely to comply with allocations by 2030.

The Lower Yolo Restoration Project, aimed at restoring tidal flux to 1,100 acres of existing pasture land, would be expected to have water quality impacts similar to the Project. While cumulative changes in flow within the Delta region are not expected to be substantial enough to cause cumulative impacts to flow, this may increase the load of contaminants of concern, including MeHg loads to the Sacramento River.

While the projects that involve construction would be expected to have significant short-term impacts on the area of analysis, it is expected that these potential impacts would be mitigated to a less than significant level. Additionally, changes in water quality standards that could result from implementation of several projects in the cumulative analysis would be expected to improve water quality within the area of analysis. However, impacts associated with MeHg in the Yolo Bypass may continue to be cumulatively significant, and the increased inundation from the Project **could be cumulatively considerable.**

Changes to 7.4.1 Methodology

This evaluation of cumulative effects considers the effects of the project and how they may combine with the effects of other past, present, and future projects or actions to create significant impacts on groundwater resources. The Project area for these cumulative effects includes both the Yolo, Colusa, and Sutter subbasins. The timeframe for this cumulative analysis includes the past, present, and probable future projects producing related or cumulative impacts that have been identified in the Project area.
This cumulative effects analysis uses the project analysis approach described in detail in Section 3.3, *Cumulative Impacts*. The cumulative projects included in this analysis are:

- Battle Creek Salmon and Steelhead Restoration Project
- California EcoRestore projects
  - Agricultural Road Crossing #4 Fish Passage Improvement Project

  - Cache Slough Area Restoration – Prospect Island
  - Fremont Weir Adult Fish Passage Modification Project
  - Lisbon Weir Modification Project
  - Lower Putah Creek Realignment Project
  - Prospect Island Tidal Habitat Restoration Project
  - Tule Red Tidal Marsh Restoration Project
  - Wallace Weir Fish Rescue Facility Project
- American River Common Features General Reevaluation Report
- Central Valley Flood Management Planning Program
- Delta Plan
- Lower Cache Creek Flood Risk Management Feasibility Study and the Woodland Flood Risk Reduction Project
- Lower Elkhorn Basin Levee Setback Project
- Lower Putah Creek 2 North American Wetlands Conservation Act (NAWCA) Project
- Lower Yolo Restoration Project
- North Bay Aqueduct Alternative Intake Project
- Sacramento River Bank Protection Project
- Sacramento River General Reevaluation Report
- Sites Reservoir Project
- SGMA
- Upstream Sacramento River Fisheries Projects
- Yolo Habitat Conservation Plan/Natural Communities Conservation Plan and the Yolo Local Conservation Plan

Changes to 8.3.3.1 No Action Alternative

Both NEPA and CEQA require the evaluation of a No Action or No Project Alternative, which presents the reasonably foreseeable future conditions in the absence of the project. As previously discussed (see Chapter 2, *Description of Alternatives*), for the purposes of this EIS/EIR, the CEQA No Project Alternative and NEPA No Action Alternative are represented as the same scenario, referred to hereafter as the No Action Alternative.

Under the No Action Alternative, no construction activities would occur to increase seasonal floodplain inundation in the lower Sacramento River Basin or improve fish passage throughout the Yolo Bypass. The Yolo Bypass would continue to be inundated when Sacramento River levels overtop Fremont Weir. Juvenile fish would continue to enter the Yolo Bypass only when Sacramento River flows overtop the Fremont Weir. Continued stranding and mortality of adult green sturgeon and white sturgeon would occur in the Yolo Bypass after cessation of overtopping events of the Fremont Weir. CDFW rescue operations may continue, but rescued sturgeon would still undergo considerable stress and potential injury during capture, which may result in delays in spawning migrations and reduced spawning opportunities. Moreover, green sturgeon and white sturgeon have been shown to abort spawning migrations after rescue (CDFW, unpublished data). The No Action Alternative assumes reasonably foreseeable actions that could occur in the project area in the future and do not rely on approval or implementation of the action alternatives, including actions with current authorization, secured funding for design and construction, and environmental permitting and compliance activities that are substantially complete. These reasonably foreseeable actions, in addition to changes in regulatory conditions and water supply demands, would result in differences in flows on the Sacramento River and in the Delta under the No Action Alternative. Possible changes include the following:

- Sea level rise and climate change
- Full implementation of the Grassland Bypass Project
- Implementation of the South Bay aqueduct improvement and enlargement project
- San Joaquin River Restoration Program Full Restoration Flows

Changes to 8.3.3.1.2 Operations-related Impacts – Evaluation of Substantial Adverse Effects on Fish Species of Focused Evaluation and their Habitat and Movement

Operations-related impacts under the No Action Alternative were evaluated for the Yolo Bypass as well as for the Sacramento River downstream of Fremont Weir, the Delta and downstream habitats, and the SWP/CVP system. Modeling results indicate that mean monthly flows spilling into the Yolo Bypass from the Sacramento River at Fremont Weir under the No Action Alternative relative to Existing Conditions indicate that flows would be lower in November, substantially higher (i.e., higher by 10 percent or more) more often from December through March, and similar under both scenarios over the remainder of the year (see Appendix G6). Increases in flows entering the Yolo Bypass from the Sacramento River primarily would be due to increases in flows from the Sutter Bypass and Feather River. Overall, it is expected that juvenile salmonids and potentially other fish species would be more likely to be entrained into the Yolo Bypass during the winter months under the No Action Alternative. Overall impacts of the No Action Alternative in relation to the impact discussions below were generally evaluated by Reclamation and DWR (2015).

Impact FISH-9: Impacts to Fish Species of Focused Evaluation and Fisheries Habitat Conditions due to Changes in Flows in the Sacramento River

Modeling results indicate that average monthly flows in the Sacramento River downstream of Fremont Weir would be lower in April and May and from July through November; higher from January through March and June; and generally similar in December under the No Action Alternative relative to Existing Conditions (see Appendix G6). During relatively low-flow conditions (i.e., lowest 40 percent of flows over the cumulative monthly probability of exceedance distributions), net increases in flow of 10 percent or more would occur in October, June, and August, whereas net decreases in flow of 10 percent or more would occur in November, July, and September (see Appendix G6). Changes in mean monthly flows under the No Action Alternative relative to Existing Conditions primarily would be due to future climate change and water demands under the future level of development, see Section 2.2 of this appendix for more details.

Changes to 8.3.3.2.2 Operations-related Impacts – Evaluation of Substantial Adverse Effects on Fish Species of Focused Evaluation and their Habitat and Movement

Implementation of the Alternatives would result in Sacramento River flows entering the Yolo Bypass more frequently. Changes in the frequency, magnitude, and duration of flow entering the Yolo Bypass from the Sacramento River could change fish passage conditions to and from the Sacramento River and the Yolo Bypass and fisheries habitat conditions in the Yolo Bypass, Sutter Bypass, and Sacramento River downstream of Fremont Weir relative to the basis of comparison. In addition, changes in the magnitude and timing of flows entering the Delta from the Yolo Bypass and the Sacramento River could change hydrology, water quality, and fisheries habitat conditions in the Delta, Suisun Bay, and other downstream estuarine habitats.

In addition to the potential for direct changes in Sacramento River and Delta hydrology and water quality associated with alternatives, changes in the frequency, magnitude, and duration of flow entering the Yolo Bypass could potentially result in re-operation of the SWP/CVP water export facilities and upstream reservoirs. Shasta, Folsom, and Oroville reservoirs would not be re-operated to inundate the Yolo Bypass, .

Changes to 8.6 References

Reclamation and DWR (United States Bureau of Reclamation and California Department of Water Resources). 2012. *Yolo Bypass Salmonid Habitat Restoration and Fish Passage Implementation Plan.*

———. 2015. *Bay Delta Conservation Plan/California WaterFix Public Review Partially Recirculated Draft Environmental Impact Report/Supplemental Draft Environmental Impact Statement* (RDEIR/SDEIS), Chapter 11: Fish and Aquatic Resources.

Changes to 11.4.1 Methodology

This evaluation of cumulative impacts for land use considers the effects of the Project and how they may combine with the effects of other past, present, and future projects or actions to create significant impacts on specific resources. The area of analysis for these cumulative impacts includes the area surrounding, and including, the Yolo Bypass. The timeframe for this cumulative analysis includes the past, present, and probable future projects producing related or cumulative impacts that have been identified in the area of analysis.

This cumulative impact analysis utilizes the project analysis approach described in detail in Section 3.3, *Cumulative Impacts*.

Projects that would require or result in construction activities, or other actions such as increased flooding, within the Project area have the potential to impact land use and agricultural resources in combination with the Project alternatives. These projects are listed below:

- California EcoRestore projects
  - Agricultural Road Crossing #4 Fish Passage Improvement Project
  - Cache Slough Area Restoration – Prospect Island
  - Fremont Weir Adult Fish Passage Modification Project
  - Lisbon Weir Modification Project
  - Lower Putah Creek Realignment Project
  - Prospect Island Tidal Habitat Restoration Project

  - Tule Red Tidal Marsh Restoration Project
  - Wallace Weir Fish Rescue Facility Project
- Central Valley Flood Protection Plan
- Liberty Island Conservation Bank
- Lower Elkhorn Basin Levee Setback Project
- Lower Yolo Restoration Project
- Sacramento River Bank Protection Project
- Sacramento River General Reevaluation Report

6 2018 COA Sensitivity Analysis

RECLAMATION
Managing Water in the West

U.S. Department of the Interior
Bureau of Reclamation
Denver Technical Service Center
PO Box 25007; 86-68210
Denver, CO 80225-0007

Modeling Documentation

Date: 1/30/2019

To: Maninder Bahia, California Department of Water Resources

From/By: Nancy Parker, US Bureau of Reclamation, Denver TSC

Project: *Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project*

Subject: *Supplemental CalSim Runs with New Coordinated Operations Agreement*

Introduction

The CalSimII planning model was used to depict the effects of four potential Fremont weir gated notch configurations and fish passage options on CVP and SWP operations. Selected CalSim studies performed in previous analysis have been updated to reflect December 2018 revisions to the Coordinated Operations Agreement (COA).

Analysis Scope

The goal of the new studies is to determine whether the revised COA changes the effects of the project alternatives relative to the baseline.

CalSim modeling was previously performed using both the 2030 and 2070 inflow data sets developed for the CWC WSIP analyses. A baseline and Alternative 1 were also previously run using historical hydrology. This exercise introduced the revised COA into the 2030 and historical hydrology studies.

Studies performed with the 2018 COA

- ExistBase – Inflows reflect 2030 CWC
- ExistAlt1 – ExistBase with weir notch Alternative 1 and Fish Passage Facility
- ExistAlt4 – ExistBase with weir notch Alternative 4 and Fish Passage Facility
- ExistAlt5 – ExistBase with weir notch Alternative 5 and Fish Passage Facility
- ExistAlt6 – ExistBase with weir notch Alternative 6 and Fish Passage Facility
- NoCCBase – inflows reflect historical hydrology
- NoCCAlt1 – NoCCBase with weir notch Alternative 1 and Fish Passage Facility

Results and Conclusions

Tables 1-4 below summarize the results of all model runs used for this analysis.

- Table 1 presents the original analysis performed with 2030 hydrology and the 1986 COA
- Table 2 presents the revised analysis performed with 2030 hydrology and the 2018 COA
- Table 3 summarizes model results for the studies performed with historical hydrology
- Table 4 is a view of only the (Alt – Base) differences for all studies

The main effects of the YBSHRFP alternatives on the system are increased flows over Fremont Weir into the Yolo Bypass with commensurate reductions to flow in the lower Sacramento River past Hood. The modified flow pathways result in lower flows through the Delta Cross Channel and equivalently higher flows at Rio Vista.

Effects of the COA scenarios on YBSHRFP alternative impacts are summarized below:

- The new COA has little influence on the performance of the weir notch alternatives.
- Increases in Fremont Weir flows were very similar for all alternatives under the old and new COA operations.
- Effects of the increased weir spills on flows through the Delta were likewise similar.
- Neither of the COA options results in any effect on deliveries to CVP or SWP project water users.
- Neither of the COA options results in any effect on required Delta Outflow
- The perception of Alternative effects on DO for Water Quality is actually a “re-coloring” of excess flow to flow that provides a water quality benefit. This is a flow accounting mechanism within CalSim. Both COA options result in similar “re-coloring” of this flow.

Table 1 - Summary of Model Results for Existing (2030) Condition Scenarios with the **1986 COA** (all values in average annual TAF)

						Differences (Alt - Base)			
	ExistBase	**ExistAlt1**	**ExistAlt4**	**ExistAlt5**	**ExistAlt6**	**ExistAlt1**	**ExistAlt4**	**ExistAlt5**	**ExistAlt6**
Fremont Weir Spill	1933	2112	2051	2056	2246	179	118	123	313
Sacramento Weir Spill	206	202	204	205	199	-4	-1	-1	-7
Sac. R. Flow at Hood	15659	15483	15542	15537	15352	-175	-117	-122	-307
Delta Cross Channel	3649	3626	3634	3633	3609	-23	-15	-16	-40
Sac. R. Flow at Rio Vista	14519	14542	14535	14535	14560	23	15	16	40
Total Delta Outflow	16820	16820	16820	16820	16820	0	0	0	0
Minimum Req'd Delta Outflow	5345	5345	5345	5345	5345	0	0	0	0
Delta Outflow for WQ	253	371	462	374	441	119	209	122	188
X2 location (km)	85	85	85	85	85	0	0	0	0
Total CVP/SWP Exports	4744	4744	4744	4744	4744	0	0	0	0
Jones Pumping Plant	2100	2100	2100	2100	2100	0	0	0	0
Banks Pumping Plant	2643	2643	2643	2643	2643	0	0	0	0
Banks SWP Export	2556	2556	2556	2556	2556	0	0	0	0
Banks CVP Export	54	54	54	54	54	0	0	0	0
Banks Transfer Export	33	33	33	33	33	0	0	0	0
Old/Middle River Flow	-3132	-3132	-3132	-3132	-3132	0	0	0	0
Shasta	2556	2556	2556	2556	2556	0	0	0	0
Oroville	1475	1475	1475	1475	1475	0	0	0	0
Folsom	427	427	427	427	427	0	0	0	0
CVP NOD Delivery	2310	2310	2310	2310	2310	0	0	0	0
CVP SOD Delivery	2214	2214	2214	2214	2214	0	0	0	0
SWP NOD Delivery	1205	1205	1205	1205	1205	0	0	0	0
SWP SOD Delivery	2486	2486	2486	2486	2487	0	0	0	0

Table 2 - Summary of Model Results for Existing (2030) Condition Scenarios with the **2018 COA** (all values in average annual TAF)

						Differences (Alt - Base)			
	ExistBase	ExistAlt1	ExistAlt4	ExistAlt5	ExistAlt6	ExistAlt1	ExistAlt4	ExistAlt5	ExistAlt6
Fremont Weir Spill	1946	2133	2071	2076	2273	186	125	130	327
Sacramento Weir Spill	207	203	205	206	200	-4	-2	-1	-7
Sac. R. Flow at Hood	15643	15461	15520	15515	15323	-182	-123	-128	-320
Delta Cross Channel	3642	3618	3625	3625	3599	-24	-16	-17	-42
Sac. R. Flow at Rio Vista	14527	14551	14543	14544	14569	24	16	17	42
Total Delta Outflow	16854	16854	16854	16854	16854	0	0	0	0
Minimum Req'd Delta Outflow	5350	5350	5350	5350	5350	0	0	0	0
Delta Outflow for WQ	255	379	471	378	446	124	216	122	191
X2 location (km)	85	85	85	85	85	0	0	0	0
Total CVP/SWP Exports	4709	4709	4709	4709	4709	0	0	0	0
Jones Pumping Plant	2162	2162	2162	2162	2162	0	0	0	0
Banks Pumping Plant	2547	2547	2547	2548	2547	0	0	0	0
Banks SWP Export	2459	2459	2459	2459	2459	0	0	0	0
Banks CVP Export	57	57	57	57	57	0	0	0	0
Banks Transfer Export	32	32	32	32	32	0	0	0	0
Old/Middle River Flow	-3100	-3100	-3100	-3100	-3100	0	0	0	0
Shasta	2598	2598	2598	2598	2598	0	0	0	0
Oroville	1481	1481	1481	1481	1481	0	0	0	0
Folsom	432	432	432	432	432	0	0	0	0
CVP NOD Delivery	2319	2319	2319	2319	2319	0	0	0	0
CVP SOD Delivery	2273	2273	2273	2273	2273	0	0	0	0
SWP NOD Delivery	1194	1194	1194	1194	1194	0	0	0	0
SWP SOD Delivery	2399	2399	2399	2399	2399	0	0	0	0

Table 3 - Summary of Model Results for Historical Hydrology Scenarios (all values in average annual TAF)

	1986 COA Studies			2018 COA Studies		
	NoCCBase	NoCCAlt1	Diff (Alt-Base)	NoCCBase	NoCCAlt1	Diff (Alt-Base)
Fremont Weir Spill	1408	1605	198	1412	1609	197
Sacramento Weir Spill	102	99	-3	103	99	-3
Sac. R. Flow at Hood	15692	15498	-195	15687	15493	-194
Delta Cross Channel	3643	3618	-26	3643	3617	-26
Sac. R. Flow at Rio Vista	13920	13946	26	13920	13945	25
Total Delta Outflow	15829	15829	0	15833	15833	0
Minimum Req'd Delta Outflow	5108	5108	0	5105	5105	0
Delta Outflow for WQ	205	280	75	206	292	86
X2 location (km)	85	85	0	86	86	0
Total CVP/SWP Exports	4853	4853	0	4847	4846	0
Jones Pumping Plant	2200	2200	0	2297	2297	-1
Banks Pumping Plant	2653	2653	0	2550	2550	0
Banks SWP Export	2562	2562	0	2450	2450	0
Banks CVP Export	60	60	0	68	68	0
Banks Transfer Export	31	31	0	32	32	0
Old/Middle River Flow	-3375	-3375	0	-3369	-3368	0
Shasta	2696	2696	0	2710	2710	0
Oroville	1761	1761	0	1728	1728	0
Folsom	507	507	0	508	508	0
CVP NOD Delivery	2346	2346	0	2361	2361	0
CVP SOD Delivery	2294	2293	0	2391	2390	-1
SWP NOD Delivery	1211	1211	0	1191	1191	0
SWP SOD Delivery	2487	2487	0	2379	2379	0

Table 4 - Effect of COA Scenarios on Differences (Alt-Base) for All YBSHRFP Studies
Summary of Differences from Tables 1, 2, and 3
All Values in Average Annual TAF

	1986 COA					2018 COA				
	ExistAlt1	ExistAlt4	ExistAlt5	ExistAlt6	NoCCAlt1	ExistAlt1	ExistAlt4	ExistAlt5	ExistAlt6	NoCCAlt1
Fremont Weir Spill	179	118	123	313	198	186	125	130	327	197
Sacramento Weir Spill	-4	-1	-1	-7	-3	-4	-2	-1	-7	-3
Sac. R. Flow at Hood	-175	-117	-122	-307	-195	-182	-123	-128	-320	-194
Delta Cross Channel	-23	-15	-16	-40	-26	-24	-16	-17	-42	-26
Sac. R. Flow at Rio Vista	23	15	16	40	26	24	16	17	42	25
Total Delta Outflow	0	0	0	0	0	0	0	0	0	0
Min Req'd Delta Outflow	0	0	0	0	0	0	0	0	0	0
Delta Outflow for WQ	119	209	122	188	75	124	216	122	191	86
X2 location (km)	0	0	0	0	0	0	0	0	0	0
Total CVP/SWP Exports	0	0	0	0	0	0	0	0	0	0
Jones Pumping Plant	0	0	0	0	0	0	0	0	0	-1
Banks Pumping Plant	0	0	0	0	0	0	0	0	0	0
Banks SWP Export	0	0	0	0	0	0	0	0	0	0
Banks CVP Export	0	0	0	0	0	0	0	0	0	0
Banks Transfer Export	0	0	0	0	0	0	0	0	0	0
Old/Middle River Flow	0	0	0	0	0	0	0	0	0	0
Shasta	0	0	0	0	0	0	0	0	0	0
Oroville	0	0	0	0	0	0	0	0	0	0
Folsom	0	0	0	0	0	0	0	0	0	0
CVP NOD Delivery	0	0	0	0	0	0	0	0	0	0
CVP SOD Delivery	0	0	0	0	0	0	0	0	0	-1
SWP NOD Delivery	0	0	0	0	0	0	0	0	0	0
SWP SOD Delivery	0	0	0	0	0	0	0	0	0	0

Increase in Incidence of Term 91 Being Initiated

Reclamation ran a series of CalSim II scenarios to supplement those scenarios used to conduct the CEQA/NEPA analysis for the Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project Environmental Impact Statement/ Environmental Impact Report (EIS/EIR). These new scenarios were based on two 2030 scenarios used for the EIS/EIR, the Existing Conditions Alternative and Alternatives 1, 4, 5, and 6 scenarios, but with one key modification: the implementation of the Coordinated Operations Agreement (COA) between Reclamation and DWR was revised to reflect the 2018 re-negotiated agreement.

There were a total of 5 new scenarios run using the 2030 hydrology; a Base Case scenario based on the Existing Conditions Alternative, and four scenarios using the Alternative 1, Alternative 4, Alternative 5, and Alternative 6 weir modifications configuration. Each of the alternatives included consistent assumptions as the corresponding 2030 conditions run evaluated in the EIS/EIR.

This section of the memo describes the effects of the four alternatives on Term 91 compared to the Base Case scenario under the 2018 COA. The approach used to evaluate these effects is consistent with the one used as part of the water supply impact evaluation in the EIS/EIR.
A comparison of the number of incidents of Term 91 being initiated was made between the Base Case and the two alternatives. Table 1 shows changes in the occurrences of Term 91 being initiated, by month, for Alternatives 1 and 4 compared to the Base Case.

Table 1. Changes in the Simulated Number of Occurrences Term 91 Would Have Been Initiated under the Alternatives 1 and 4 Scenarios Compared to the Base Case Scenario

Month	Alternative 1 with 2018 COA		Alternative 4 with 2018 COA	
	Term 91 Initiated Under Base Case but Not Under Alternative 1 (Years)	Term 91 Initiated Under Alternative 1 but Not Under Base Case (Years)	Term 91 Initiated Under Base Case but Not Under Alternative 4 (Years)	Term 91 Initiated Under Alternative 4 but Not Under Base Case (Years)
October	0	0	0	0
November	0	0	0	0
December	0	0	0	0
January	0	0	0	0
February	6	3	0	0
March	21	1	0	0
April	2	0	0	0
May	8	3	0	0
June	2	0	0	0
July	0	0	0	0
August	0	0	0	0
September	0	1	0	0
Total	39	8	0	0

Source: Term 91 Calculation

Table 2 shows changes in the occurrences of Term 91 being initiated, by month, for Alternatives 5 and 6 compared to the Base Case.

Table 2. Changes in the Simulated Number of Occurrences Term 91 Would Have Been Initiated under the Alternatives 5 and 6 Scenarios Compared to the Base Case Scenario

Month	Alternative 5 with 2018 COA		Alternative 6 with 2018 COA	
	Term 91 Initiated Under Base Case but Not Under Alternative 5 (Years)	Term 91 Initiated Under Alternative 5 but Not Under Base Case (Years)	Term 91 Initiated Under Base Case but Not Under Alternative 6 (Years)	Term 91 Initiated Under Alternative 6 but Not Under Base Case (Years)
October	0	0	0	0
November	0	0	0	0
December	0	0	0	0
January	0	0	0	0
February	0	0	0	0
March	0	0	0	0
April	0	0	0	0
May	0	0	0	0
June	0	0	0	0
July	0	0	0	0
August	0	0	0	0
September	0	0	0	0
Total	0	0	0	0

Source: Term 91 Calculation

Alternative 1 Under the 2018 COA

Alternative 1 under the 2018 COA would reduce the total incidences of Term 91 being initiated, relative to the Base Case, by 31 occurrences. There would be 39 months within the period of record when Term 91 was initiated under the Base Case, but not under the Alternative scenario. There would be 8 incidences when Term 91 was initiated under the Alternative, but not under the Base Case. However, there is an overall net reduction in occurrences of Term 91 being initiated under Alternative 1.

Alternative 4 Under the 2018 COA

Alternative 4 Under the 2018 COA would maintain the same number of occurrences of Term 91 being initiated, relative to the Base Case. There would be no months in which Term 91 was triggered under either Alternative 4 or the Base Case but not the other.

Alternative 5 Under the 2018 COA

Alternative 5 Under the 2018 COA would maintain the same number of occurrences of Term 91 being initiated, relative to the Base Case. There would be no months in which Term 91 was triggered under either Alternative 5 or the Base Case but not the other.

Alternative 6 Under the 2018 COA

Alternative 6 Under the 2018 COA would maintain the same number of occurrences of Term 91 being initiated, relative to the Base Case. There would be no months in which Term 91 was triggered under either Alternative 6 or the Base Case but not the other.

2018 COA and Climate Change Sensitivity

Reclamation also ran an additional pair of CalSim II scenarios to evaluate both the effect of removing climate change and to evaluate the 2018 COA. These new scenarios were based on two 2030 scenarios used for the EIS/EIR, the Existing Conditions Alternative and Alternatives 1 with several modifications.

- The implementation of the Coordinated Operations Agreement (COA) between Reclamation and DWR was revised to reflect the 2018 re-negotiated agreement.
- The CalSim II input file was updated to reflect only historical hydrology, rather than the historical hydrology with climate change assumptions incorporated.
- The artificial neural network (ANN) used to compute Delta water quality was replaced with one reflecting no sea level rise.

This section of the memo describes the effects of Alternative 1 under the 2018 COA, but without climate change on Term 91 compared to the Base Case scenario without climate change under the 2018 COA. The approach used to evaluate these effects is consistent with the one used as part of the water supply impact evaluation in the EIS/EIR.

Table 3 shows a comparison of the two scenarios without climate change and the 2018 COA.

Table 3. Changes in the Simulated Number of Occurrences Term 91 Would Have Been Initiated under the Alternatives 1 Scenario Compared to the Base Case Scenario

Month	Alternative 1 without Climate Change and With 2018 COA	
	Term 91 Initiated Under Base Case but Not Under Alternative 1 (Years)	Term 91 Initiated Under Alternative 1 but Not Under Base Case (Years)
October	0	0
November	0	0
December	0	0
January	0	0
February	0	0
March	0	0
April	0	0
May	0	0
June	0	0
July	0	0
August	0	0
September	0	0
Total	0	0

Source: Term 91 Analysis

Alternative 1 Under the 2018 COA Without Climate Change

Alternative 1 under the 2018 COA Without Climate Change would maintain the same number of occurrences of Term 91 being initiated, relative to the Base Case. There would be no months in which Term 91 was triggered under either Alternative 1 or the Base Case but not the other.

Appendix F

Assessment of Groundwater Impact on Project Excavation

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Draft Technical Memorandum

Assessment of Groundwater

Yolo Bypass Salmonid Habitat Restoration & Fish Passage Project – Ten Percent Design

Yolo County, CA
February 14, 2017

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YOLO BYPASS SALMONID HABITAT RESTORATION & FISH PASSAGE PROJECT – TEN PERCENT DESIGN

ASSESSMENT OF GROUNDWATER

FEBRUARY 14, 2017

1 PURPOSE AND BACKGROUND

HDR completed a high level assessment of the potential for encountering groundwater during project excavations for the six Environmental Impact Statement and Environmental Impact Report (EIS/EIR) alternatives selected. The information will help inform the evaluation of potential methods, costs, and schedules associated with constructing the alternatives, taking into account potential groundwater conditions. This technical memorandum (TM) presents the approach and findings of the groundwater analyses and is intended to accompany Volume II - 10% Design Drawings.

The six EIS/EIR project alternatives that were selected through the plan formulation process are listed below. The associated key project components are summarized in Table 1, the general alignments in the Yolo Bypass Fremont Weir State Wildlife Area are presented in Figure 1, the general location of the Tule Canal water control structures associated with Alternatives 4 and 5 are presented in Figure 2, and the 10 percent design drawings are contained in Volume II – 10% Design Drawings.

Six project alternatives have been developed:

- Alternative 1 – East Channel, 6,000 cubic feet per second (cfs) Design Flow
- Alternative 2 – Central Channel, 6000 cfs Design Flow
- Alternative 3 – West Channel, 6,000 cfs Design Flow
- Alternative 4 – West Channel, 3,000 cfs Design Flow and Managed Floodplain
- Alternative 5 – Multiple Channels, 3000 cfs Design Flow and Managed Floodplain
- Alternative 6 – West Channel, 12,000 cfs Design Flow and Managed Floodplain

Table 1. Alternative Components

Components	Alt 1 East	Alt 2 Center	Alt 3 West	Alt 4 West	Alt 5 Multiple	Alt 6 West
Peak Design Flow (CFS)	**6,000**	**6,000**	**6,000**	**3,000**	**3,000**	**12,000**
East Channel (Intake Channel, Headworks, & Outlet Channel)	**X**					
Central Channel (Intake Channel, Headworks, & Outlet Channel)		**X**			**X**	
West Channel (Intake Channel, Headworks, & Outlet Channel)			**X**	**X**		**X**
Excavated Fremont Weir Floodplain (Wildlife Area)					**X**	
Supplemental Fish Passage West	**X**	**X**			**X**	
Supplemental Fish Passage East			**X**	**X**		**X**
Downstream Channel	**X**	**X**	**X**	**X**		**X**
Ag Crossing 1	**X**	**X**	**X**	**X**	**X**	**X**
Knaggs Area Improvements				**X**		
Conaway Area Improvements				**X**		
Swanston Area Improvements					**X**	

Figure 1. Yolo Bypass Alternative Alignments within the Fremont Weir Wildlife Area

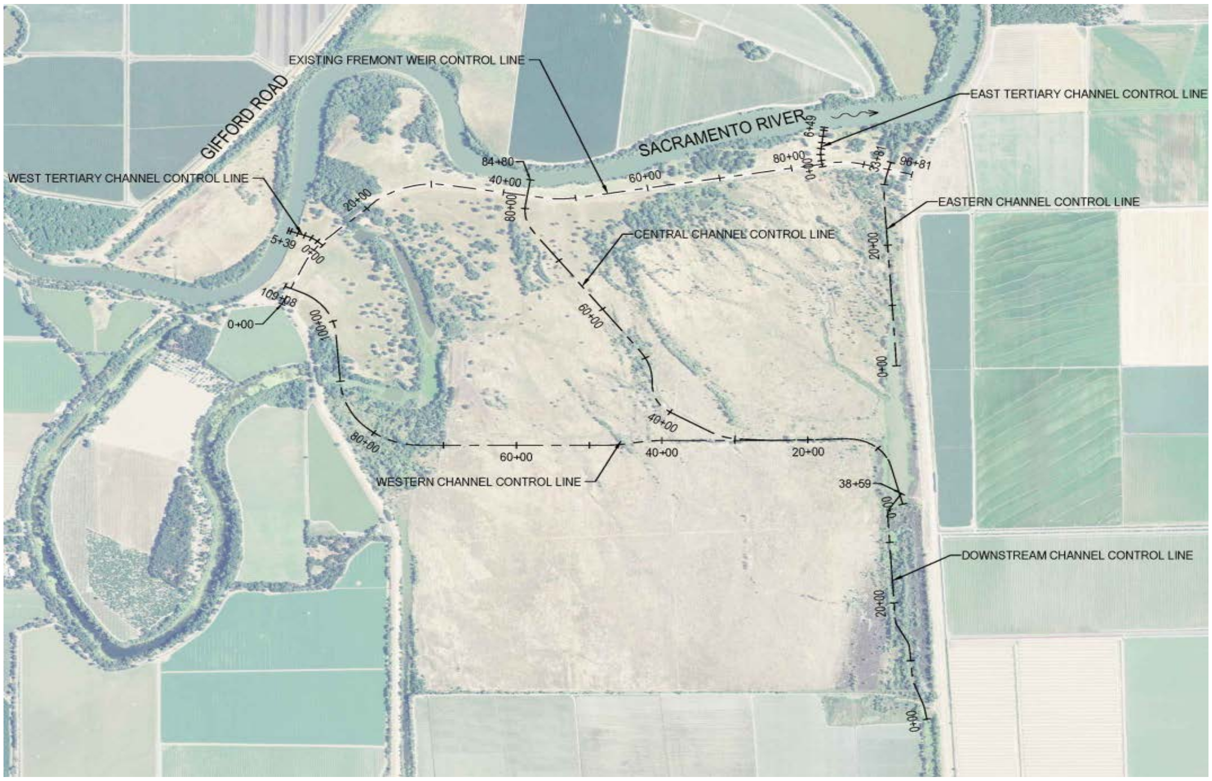
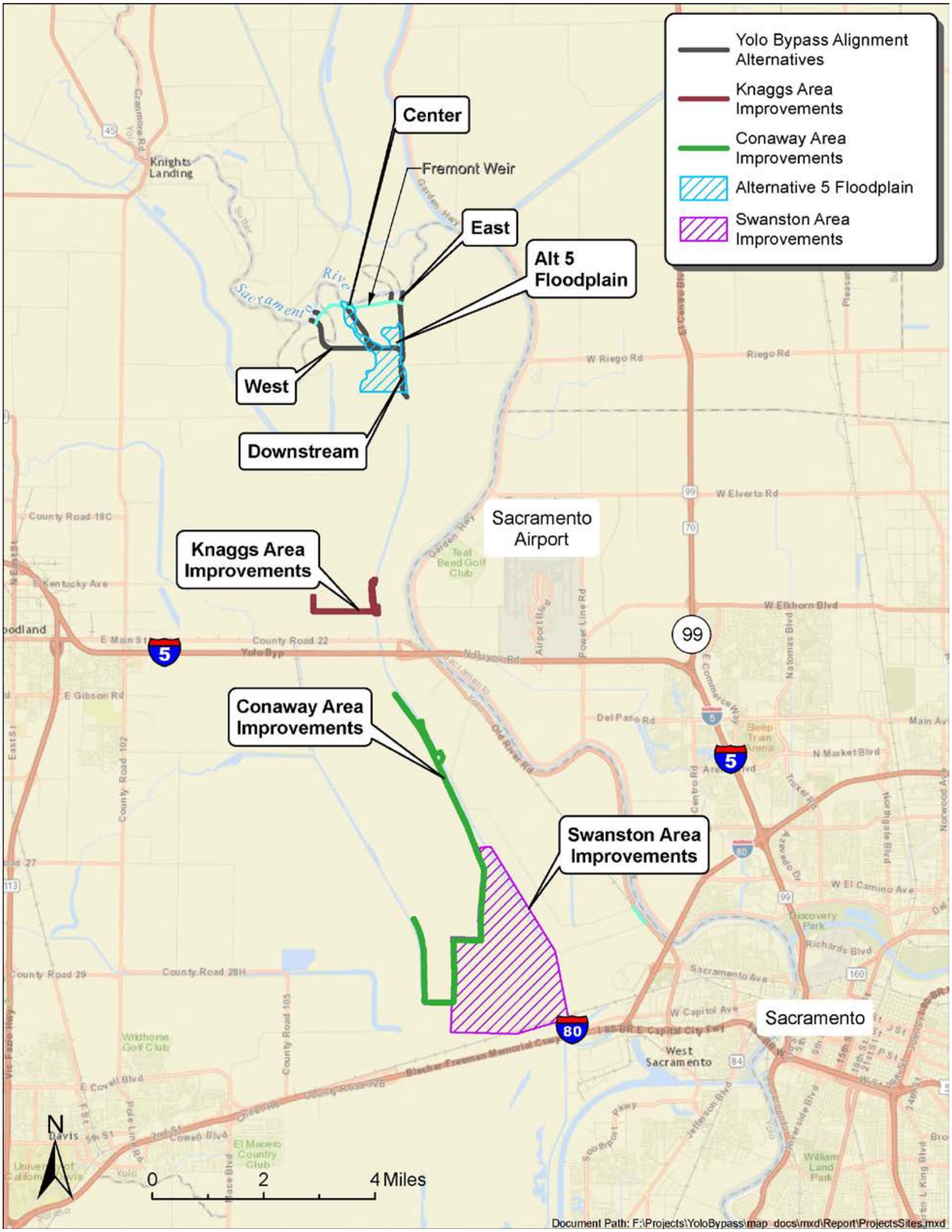


Figure 2. Yolo Bypass Alternatives and Components

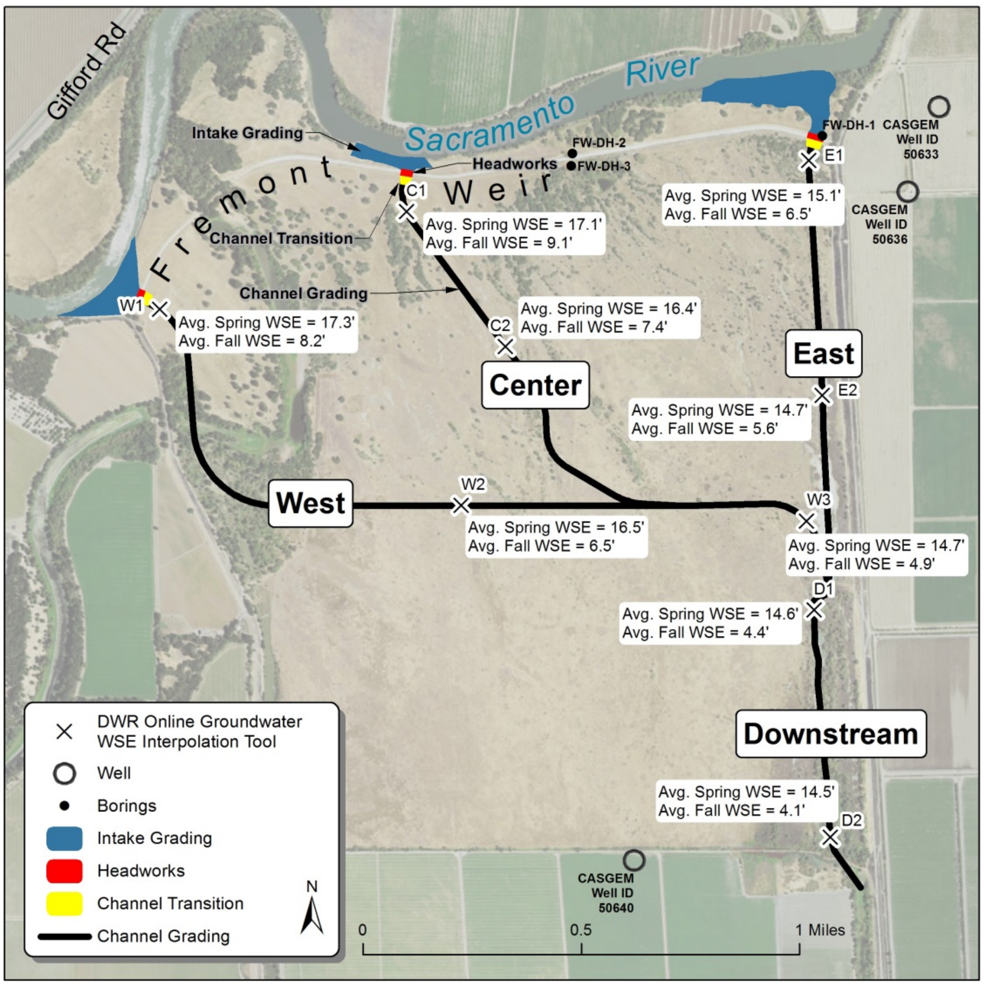


2 GROUNDWATER ELEVATIONS

The majority of the excavation associated with all alternatives would occur within the Freemont Weir Wildlife Area. Therefore, the groundwater assessment focused on this area. Historical groundwater elevations relevant to this project were approximated based on the following groundwater data sources: three bore logs; three voluntary groundwater monitoring/irrigation wells within close proximity to the project site(s); and the Groundwater Information Center's Interactive Map[1] published by the Department of Water Resources (DWR).

Average spring and fall groundwater surface elevations were estimated at points along the alternative alignments, as shown in Figure 3. Review of the data indicates that the groundwater elevations vary significantly between spring and fall, with spring elevations being highest. The levels also tend to decrease with distance from the Sacramento River.

Figure 3. Alternative Alignments, and Groundwater Information



[1] https://gis.water.ca.gov/app/gicima/

The construction window for the project is assumed to be April 15 to November 1 (typical construction season when working on or within a floodway). In general, the groundwater table will be the highest in late spring and lowest in late fall; analyzed data focused on these two periods to estimate expected groundwater elevations likely to be observed during construction.

Historical groundwater data dating back to 2013, and sometimes earlier, can be pulled from the online Groundwater Information Center Interactive Map Application provided by DWR. Table 2shows the groundwater elevations for nine identified locations that were chosen along the project alternatives in order to assess the expected groundwater table during construction. These locations can be seen in Figure 3.

Table 2. Groundwater Elevation Estimates by Location

Season	Year	W1	W2	W3	C1	C2	E1	E2	D1	D2
Spring	**16**	21.0	21.2	17.5	20.8	20.6	17.9	17.4	17.4	17.4
Fall	**15**	9.6	3.9	-0.6	7.4	4.4	3.2	1.3	-2.0	-3.2
Spring	**15**	15.1	14.6	14.6	15.7	15.1	16.0	15.2	14.3	13.5
Fall	**14**	5.5	6.8	10.4	9.0	8.8	12.6	11.6	9.9	8.5
Spring	**14**	14.6	12.8	9.9	13.9	12.5	9.2	9.4	10.0	10.5
Fall	**13**	9.4	8.9	5.0	10.9	9.1	3.8	3.9	5.5	7.0
Spring	**13**	18.5	17.6	16.7	17.9	17.5	17.4	16.9	16.6	16.4
	Avg Spring	17.3	16.5	14.7	17.1	16.4	15.1	14.7	14.6	14.5
	Avg Fall	8.2	6.5	4.9	9.1	7.4	6.5	5.6	4.4	4.1

a – Summary of the last 3 years of WSE for selected locations along each project alignment.

Table 2 shows the elevation at which groundwater was encountered in the three bore logs performed for the Fremont Weir Adult Fish Passage Project. Locations of these bore longs are shown in Table 3. The borings were completed in mid-spring (April) of 2016.

Table 3. Bore Log Groundwater Reported Information

Log ID	Sample Date	GWSE (NAVD88)
FW-DH-1	4/18/2016	15.5
FW-DH-2	4/19/2016	19.6
FW-DH-3	4/20/2016	18

Additionally, there are three monitoring/irrigation wells in close proximity to the project site(s) for which the California Statewide Groundwater Elevation Monitoring (CASGEM) program has historical groundwater information. These three wells are:

- Monitoring/Irrigation Well – 387630N1216325, (CASGEM Well ID 50636)
- Monitoring/Irrigation Well – 387658N1216311, (CASGEM Well ID 50633)
- Monitoring/Irrigation Well – 387408N1216442, (CASGEM Well ID 50640)

Information from these wells dates back to 2009 and is reported in the online database. **Table 4** shows the reported data for each well, with the corresponding sampling dates of April and November (or the closest available when sampling was not performed during that time period). An average groundwater surface elevation was then calculated for both the spring and fall periods.

Table 4. CASGEM Groundwater Surface Elevation Sampling Information

Season	Sample Date	CASGEM Well ID 50636 WSE[3]	Sample Date	CASGEM Well ID 50633 WSE[3]	Sample Date	CASGEM Well ID 50640 WSE[3]
Spring 16	3/17/2016	16.5	3/17/2016	18.3	3/17/2016	21.7
Fall 15	11/16/2015	5.3	11/16/2015	-1.3[1]	11/16/2015	0.2
Spring 15	4/14/2015	12	5/28/2015	-19.5[1]	6/4/2015	3
Fall 14	N/A	N/A	N/A	N/A	N/A	N/A
Spring 14	3/15/2014	8	3/15/2014	8.7	3/15/2014	11
Fall 13	11/8/2013	2	11/1/2013	6.1	11/1/2013	7.6
Spring 13	6/3/2013	5.7	6/3/2013	8.7	6/3/2013	6.2
Fall 10	N/A	N/A	N/A	N/A	N/A	N/A
Spring 10	N/A	N/A	3/4/2010	9.5	N/A	N/A
Fall 09	N/A	N/A	11/4/2009	9.5	11/4/2009	10
Spring 09	N/A	N/A	4/22/2009	9.5	6/30/2009	9
Avg Spring		**10.6**		**10.9**[2]		**10.2**
Avg Fall		**3.7**		**7.8**[2]		**5.9**

1 – Data was noted by CASGEM as a questionable reading as a result of recent pumping.
2 – Averages exclude questionable readings
3 – All elevations are based on NAVD 88

3 COMPARISON OF GROUNDWATER AND EXCAVATION ELEVATIONS

Project construction consists of the excavation of an intake channel, excavation for the purpose of constructing the headworks structure, and excavation of an outlet channel, all within close proximity of the Sacramento River, and to depths below measured groundwater elevations.

The inlet channel will be excavated from an elevation of 12 feet (NAVD 88) at the Sacramento River bank and then sloped up to match the flowline of the headworks structure. Table 5 provides the design flowline elevation of the main channel through the headworks structure for each alignment alternative. Figure 4 and Figure 5 show the conceptual design of the headworks structure foundation. Total excavation depths will vary for each alignment alternative. The deepest anticipated excavation is at the headworks structure for the east alternative, which has a flowline elevation of 14 feet. At a minimum (excluding the excavation needed to construct the sump associated with housing the mechanical equipment, which has not been sized at this time), an additional 7 feet of over excavation is required in order to construct the foundation. This puts the bottom of excavation for the headworks structure at or below an elevation of 7 feet.

Table 5. Headworks Gate Invert Elevation based on Location

Weir Location	Gates Invert. Elev. (ft. NAVD)	Depth of Over Excavation (ft.)	Estimated Average Groundwater Surface Elevation (ft. NAVD)
Alt 1 Eastern	Main:14.0’ Bench:18.0’	7	Spring = 15.1’ Fall = 6.5’
Alt 2 Central	Main:14.8’ Bench:18.8’	7	Spring = 17.1’ Fall = 9.1’
Alt 3 Western	Main:16.1’ Bench:20.1’	7	Spring = 17.3’ Fall = 8.2’
Alt 4 Western Managed	Main:16.1’ Bench:20.1’	7	Spring = Fall =
Alt 5 Central Multiple Gates with Floodplain	Gates A:14’ Gates B:17’ Gates C:18’ Gates D:21’	5	Spring = 17.1’ Fall = 9.1’
Alt 6 Western Large	Main:16.1’ Bench:20.1’	7	Spring = 17.3’ Fall = 8.2’

Figure 4. Headworks Section View (Alts 1-4 and 6)

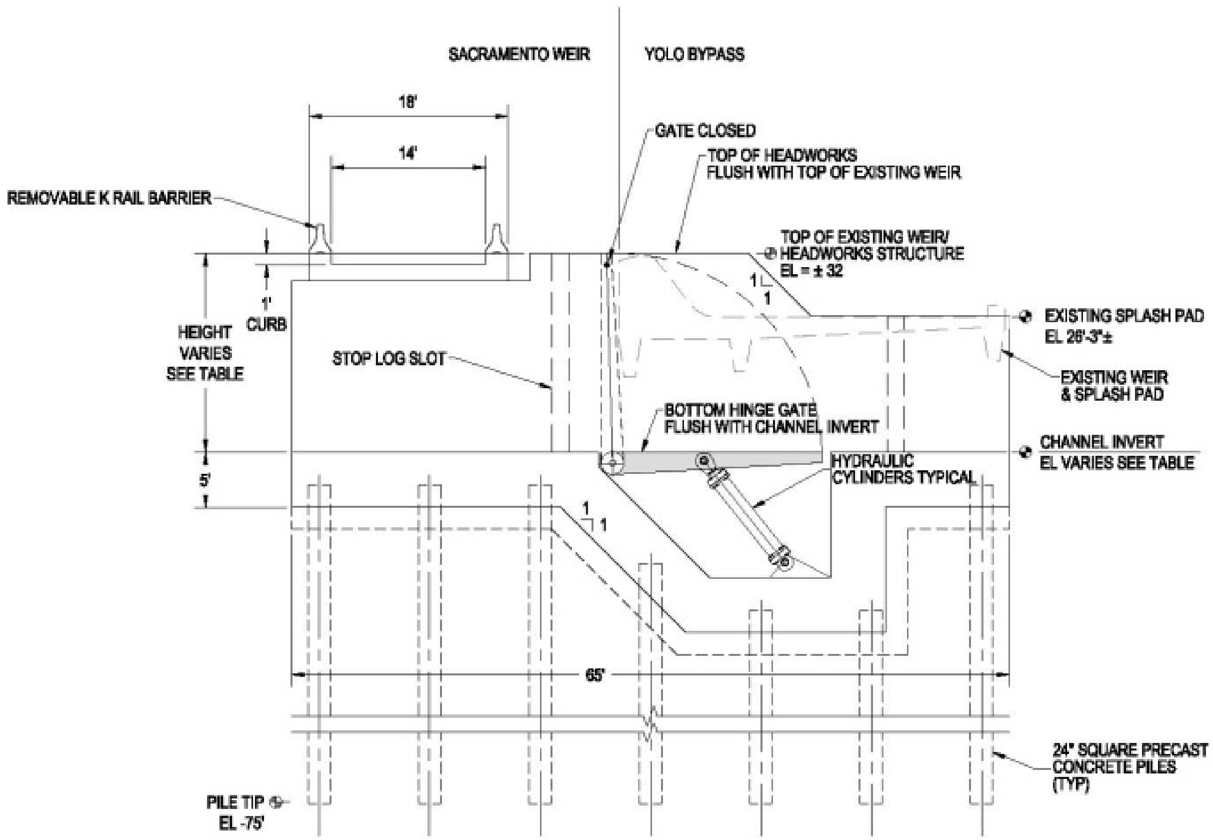
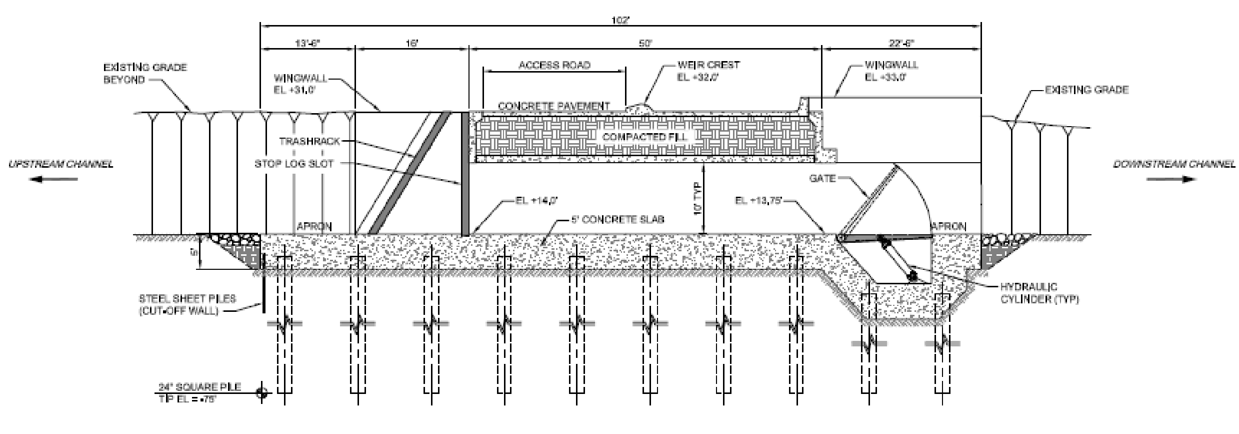
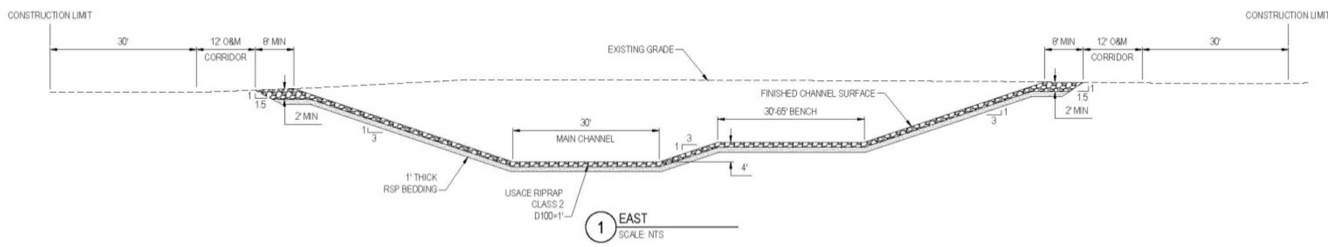


Figure 5. Headworks Section View (Alt 5)



A 100–foot-long concrete channel transition connects the headworks structure to the rock-lined, earthen channel for Alternatives 1-3, 4, and 6, and then flows to Tule Pond. The channel outfalls into Tule Pond at an elevation of 12 feet and requires an additional 2 feet of over-excavation in order to install the revetment and bedding material. This places the bottom of excavation at an elevation of 10 feet. See Figure 6 for typical channel section. For Alternative 5, the headworks transition into three rock-lined, braided channels that converge into one rock-lined channel, roughly 1,000 feet south of the weir/headworks, which then opens up into a large graded floodplain. The floodplain grading ranges from an elevation 16 feet down to an elevation of 12.5 feet. See Volume II - 10% Design Drawings, Alternative 5 for the floodplain grading concept.

Figure 6. Outlet Channel, East Channel Typical Section



The Tule Pond connects the channel alignments for Alternatives 1-3, 4, and 6 to a common downstream channel improvement that outlets to the Tule drain. The downstream channel improvement is also a rock-lined, earthen channel. See Figure 7for a typical channel section. The channel flowline is at an approximate elevation of 12 feet and requires an additional 2 feet of over-excavation required to install the revetment and bedding material. This places the bottom of excavation at an elevation of 10 feet.

Figure 7. Downstream Channel Typical Section

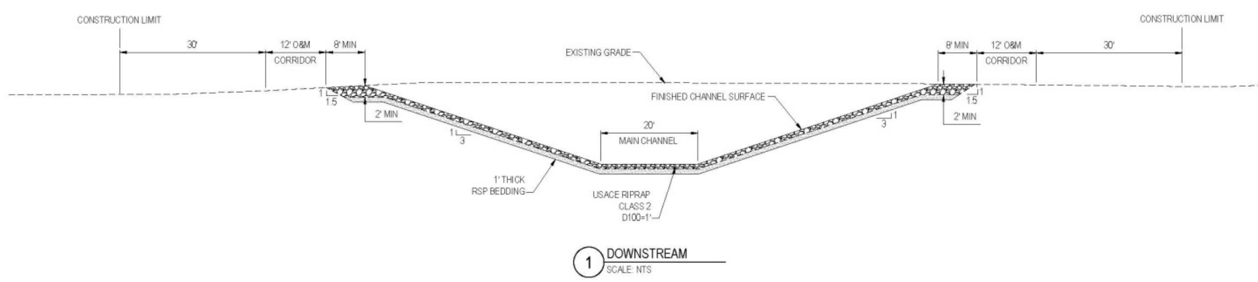


Table 6 summarizes the expected excavation elevations for each component. These elevations will be used to determine the likelihood and magnitude of work performed below the groundwater table.

Table 6. Deepest Estimated Excavation Elevation for each Project Component

Component	Deepest Est. Excavation Elevation (NAVD88)
Intake Shelf	12
Headworks (East)	≤7
Headworks (Center)	≤7.8
Headworks (West)	≤9.1
Outlet Channel (East, Center, West)	10
Downstream	10
Floodplain	12.5

4 ANALYSIS

4.1 INLET SHELF IMPACTS

Based on the data sources used, groundwater elevations at the inlet shelf are anticipated to range between 6 and 17 feet, depending upon the season. Excavation at the inlet shelf is expected to be no deeper than an elevation of 12 feet. As such, it is anticipated that saturated soils would be encountered during inlet shelf excavation. Dewatering is likely needed and may be accomplished by placing a sheet pile wall near the bank of the Sacramento River and a series of pumps and/or wells to lower/dewater the areas of excavation. Even with dewatering efforts in place, it is anticipated that a large portion of the excavation, approximately 40 percent, would be in saturated conditions and would be performed with a large excavator rather than scrappers, as scrappers don't perform well in overly-saturated conditions.

4.2 HEADWORKS STRUCTURE

Based on the data sources used, groundwater elevations at the headworks structure are anticipated to range between 8 and 17 feet, depending upon the season. Excavation at the headworks structure is expected to be at an approximate elevation of 7 feet. As such, it is anticipated that saturated soils would be encountered during headworks excavation. Dewatering is likely to be needed and may be accomplished by placing a sheet pile wall coffer dam, which would surround the site to be excavated and a series of pumps and/or wells to lower/dewater the areas of excavation. Even with dewatering efforts in place, it is anticipated that saturated soils will be encountered and that a mud pad may be needed after the piles have been placed, in order to provide a flat and dry working surface for construction.

4.3 OUTLET, FLOODPLAIN AND DOWNSTREAM CHANNEL IMPACTS

Based on the data sources used, groundwater elevations at the outlet (eastern, central, and western channel location) are anticipated to be between 6 and 15 feet, depending upon the season. Excavations at the outlet, floodplain, and downstream channel are expected to be no deeper than an elevation of 10 feet. As such, it is anticipated that saturated soils would be encountered during channel excavation. It is impractical and cost-prohibitive to dewater the entire footprint of the outlet channel because of the extensive amount of dewatering that would be needed. It is anticipated that, because of the relatively dry soil conditions, the upper portion of the channel excavation (roughly 80 percent) would be completed using scrappers, while the lower portion of the channel excavation (roughly 20 percent) would be completed using large excavators.

It is anticipated that construction of the downstream channel will require dewatering. Dewatering may be accomplished by placing a sheet pile wall near the southern bank of the Tule Pond (the northern point of the downstream channel), and a series of pumps and/or wells to lower/dewater the areas of excavation. Even with dewatering efforts in place, it is anticipated that a large portion of the lower elevation excavation for the downstream channel would be performed with a large excavator rather than scrappers, as scrappers don't perform well in overly-saturated conditions.

4.4 ALTERNATIVES 4 AND 5 ADDITIONAL COMPONENTS

Alternatives 4 and 5 consists of additional improvements further south in the Yolo Bypass ,which include engineered berm improvements, fish bypass channels, and water control structures at three locations: one is referred to as Knaggs, another as Conaway, and a third as Swanston. For reference to these areas please refer to Volume II - 10% Design Drawings for Alternatives 4 & 5. The groundwater impacts of these alternative components were not evaluated for this document, but it is anticipated that similar mitigation and best management practices as what will be employed for Alternatives 1-4 and 6 would also be used for the construction of these facilities to manage groundwater impacts.

5 CONCLUSIONS

Based on the available groundwater elevation information, and the expected excavation depths, it is anticipated that groundwater will be encountered during the various project excavations, regardless of the alternative selected. Excavations are deepest for the East Alternative, followed by the Center Alternative, then lastly the West Alternative. Groundwater elevations vary depending on alternative location. In general, dewatering will be required at deeper elevations for the East Alternative and at shallower elevations for the West Alternative.

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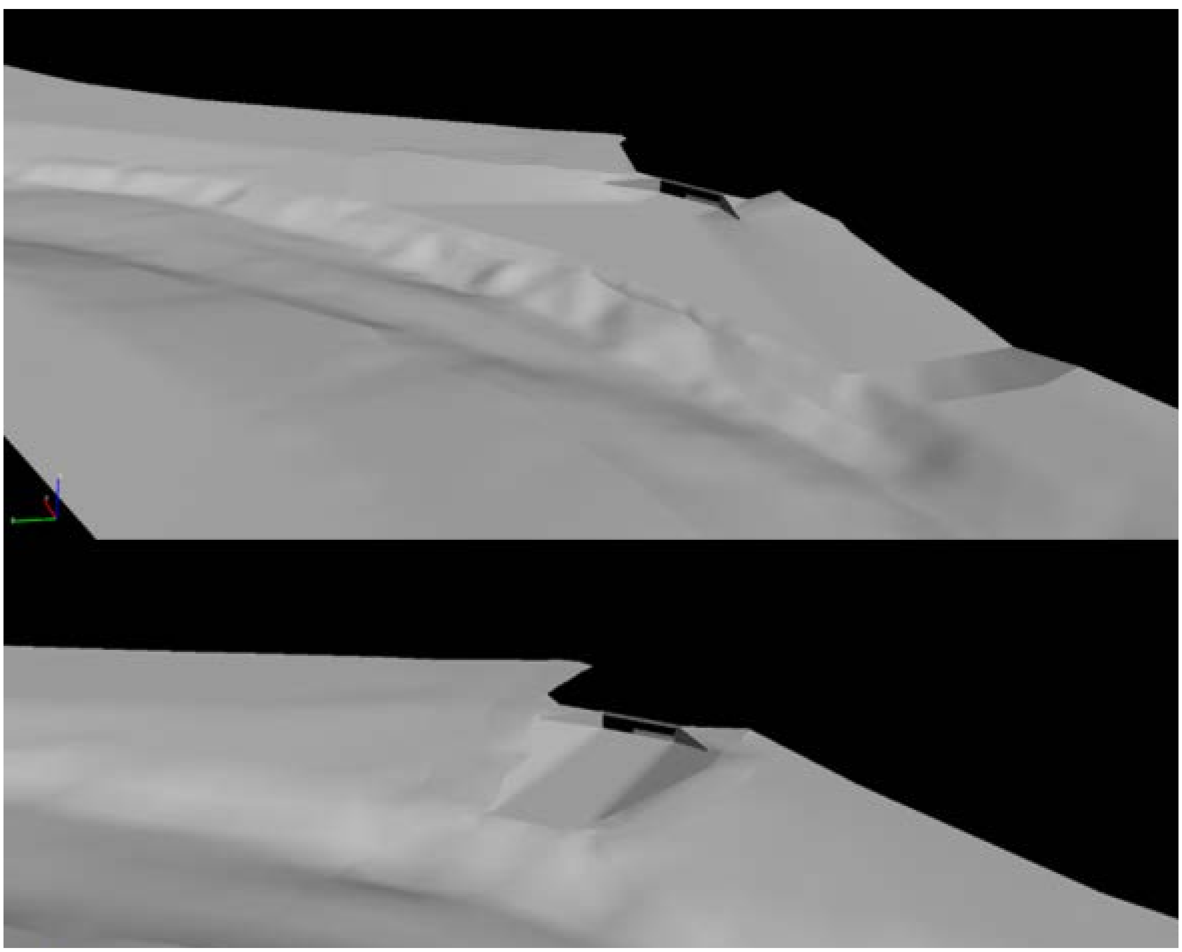
SCENARIO ANALYSIS OF FREMONT WEIR NOTCH – INTEGRATION OF ENGINEERING DESIGNS, TELEMETRY, AND FLOW FIELDS

David L. Smith, Tammy Threadgill, Bertrand Lemasson, Yong Lai, Anna Steel Christa Woodley, Amanda Hines, R. Andrew Goodwin, Josh Israel

July 2017



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11

Abstract

The United States Bureau of Reclamation and the California Department of Water Resources are planning a notch in the Fremont Weir on the Sacramento River. The notch is intended to provide access to the Yolo Bypass floodplain for juvenile salmon across a range of flows and to provide passage for adult anadromous fishes, and to increase floodplain inundation. This study estimated the entrainment rate of 12 separate notch scenarios. Entrainment estimates vary from approximately 1 to 25%. Across all scenarios larger notch flows entrain greater fish numbers, although not proportionally to the volume through the notch. West located notches entrain more fish than central and east and intakes perform better than shelfs. However, intakes and shelfs both performed poorly, regardless of notch flows, when intake channels were angled from the mainstem. Entrainment estimates are comparable to measured entrainment rates elsewhere in the Sacramento River suggesting that the modeled estimates are reasonable. The results further suggest that the approach used is valuable for incorporating structural modifications and evaluating expected outcomes.

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Figures and Tables

Figures.

Tables.

Preface

This study was conducted for the United States Bureau of Reclamation using Interagency Agreement R13PG20203. The technical monitor was Dr. Patrick Deliman.

The work was performed by the Water Quality and Contaminant Modeling Branch (EPW) of the Environmental Processes and Effects Division (EP), US Army Engineer Research and Development Center, Environmental Laboratory. At the time of publication, Mark Noel was Acting Chief, CEERD-EPW; Warren Lorenz was Chief, CEERD-EP; and Pat Deliman, CEERD-EV-E was the Technical Director. The Deputy Director of ERDC-EL was Dr. Jack Davis and the Director was Dr. Beth Fleming.

COL Bryan Green was the Commander of ERDC, and Dr. David Pittman was the Director.

Unit Conversion Factors

Multiply	By	To Obtain
feet	0.3048	Meters
miles (US statute)	1,609.347	Meters

1 Introduction

As California's largest river, the Sacramento River is an important economic, recreational, and ecological resource. The river has an extensive flood control infrastructure that includes a system of dams, levees, and floodways intended to protect agricultural and urban regions. In particular, the metropolitan area of Sacramento with some 2 million residents is protected from flooding by this system. Protection is due to levees but flood events are conveyed out of the river channels and onto floodways such as the Yolo Bypass. In addition to providing protection, the floodways receive sediment and nutrients and thus impact ecosystem processes including those associated with floodplain access by fish [1].

The Yolo Bypass is a 24,000 ha basin protected by levees and inundated during high flow on the Sacramento River. The floodway is 61 km long and is flooded approximately 7 out of 10 years with a peak flow of 14,000 m^3/s. Water is conveyed over the Fremont Weir onto the Yolo Bypass [2].

The Fremont Weir was constructed in 1924 by the U. S. Army Corps of Engineers. It is the first overflow structure on the river's right bank and its two-mile overall length marks the beginning of the Yolo Bypass. It is located about 15 miles northwest of Sacramento and eight miles northeast of Woodland. South of this latitude the Yolo Bypass conveys 80% of the system's maximum flows through Yolo and Solano Counties until it connects to the Sacramento River a few miles upstream of Rio Vista. The Fremont Weir's primary purpose is to release overflow waters of the Sacramento River, Sutter Bypass, and the Feather River into the Yolo Bypass. The crest elevation is approximately 32.0 feet (NAVD88) and the project design capacity of the weir is 343,000 cfs. Adding a notch will change the frequency/duration of water flowing onto the Yolo Bypass via flows through the notch channel, not over the Fremont Weir.

On June 4, 2009, the National Marine Fisheries Service (NMFS) issued its Biological Opinion and Conference Opinion on the Long-term Operation of the Central Valley Project (CVP) and State Water Project (SWP) (NMFS Operation BO). The NMFS Operation BO concluded that, if left unchanged, CVP and SWP operations were likely to jeopardize the continued existence of four federally-listed anadromous fish species: Sacramento

River winter-run Chinook salmon *(Oncorhynchus tshawytscha),* Central Valley spring-run Chinook salmon, California Central Valley steelhead (*O. mykiss*), and Southern Distinct Population Segment (DPS) North American green sturgeon (*Acipenser medirostris*). The NMFS Operation BO sets forth Reasonable and Prudent Alternative (RPA) actions that would allow SWP and CVP operations to remain in compliance with the federal Endangered Species Act (ESA). RPA actions include restoration of floodplain rearing habitat, through a "notched" channel that increases seasonal inundation within the lower Sacramento River basin. A significant component of these risk reduction actions is lowering a section of the Fremont Weir (Figure 1) to allow juvenile fish to enter the bypass and adult fish to more easily return to the Sacramento River. Questions remain on the details of notch implementation (e.g., size, location), fish entrainment efficiency, and species-specific and ontology-based behaviors.

Among actions being considered are alternatives to "increase inundation of publicly and privately owned suitable acreage within the Yolo Bypass." During inundation, the Yolo Bypass has been shown to have beneficial effects on growth of juvenile salmonids (Sommer et al. 2001) due to the favorable rearing conditions (e.g., increased primary productivity, relatively slow water velocities, abundant invertebrates). Entrainment of juvenile salmonids into the bypass routes them around the Delta, thereby minimizing the potential for entrainment by the pumps at the State Water Project and Central Valley Project. Therefore, maximizing entrainment into the bypass, particularly at lower stages, is of particular interest. Uncertainty exists about how the location, approach channel, and notch design and setting influence the effectiveness for entraining juvenile salmonids from the Sacramento River onto the Yolo Bypass.

It is generally recognized that fish are unevenly distributed across a channel cross section and that the position of the fish influences the probability that entrainment occurs [3]. The distribution of fish is in part related to secondary circulations which tend to concentrate passive particles such as sediment away from the channel margins and towards the bank of long radius of a river bend. This conceptual model is often applied to downstream movement of fish such as juvenile salmon in the Sacramento River. Notch entrainment efficiency is potentially improved by placing the notch where fish density is maximized along the outside bend. Of course, the specifics of the fish distribution are related to the unique attributes of each cross section, notch design, and the behavior of fish therein.   The efficiency of an entrainment channel is the most important factor impacting fish benefits based on the Fishery Benefit Model (Hinkelman et al. in review).

In 2015, two-dimensional (2-D) positions were measured for hatchery late-fall and winter-run Chinook along a portion of the Fremont Weir. These tracks provided the basis for this study. The objective of this study was to validate an existing fish behavior model for use on this project, simulate a range of alternate notch designs, and evaluate the sensitivity on entrainment to different locations and designs. Additionally, this modeling approach allowed for exploration of different hypotheses regarding fish behavior and the influence they could have on movement and entrainment through the simulated notches. These results will evaluate the sensitivity on entrainment for different designs and locations along the Fremont Weir.

1.1 Fremont Weir

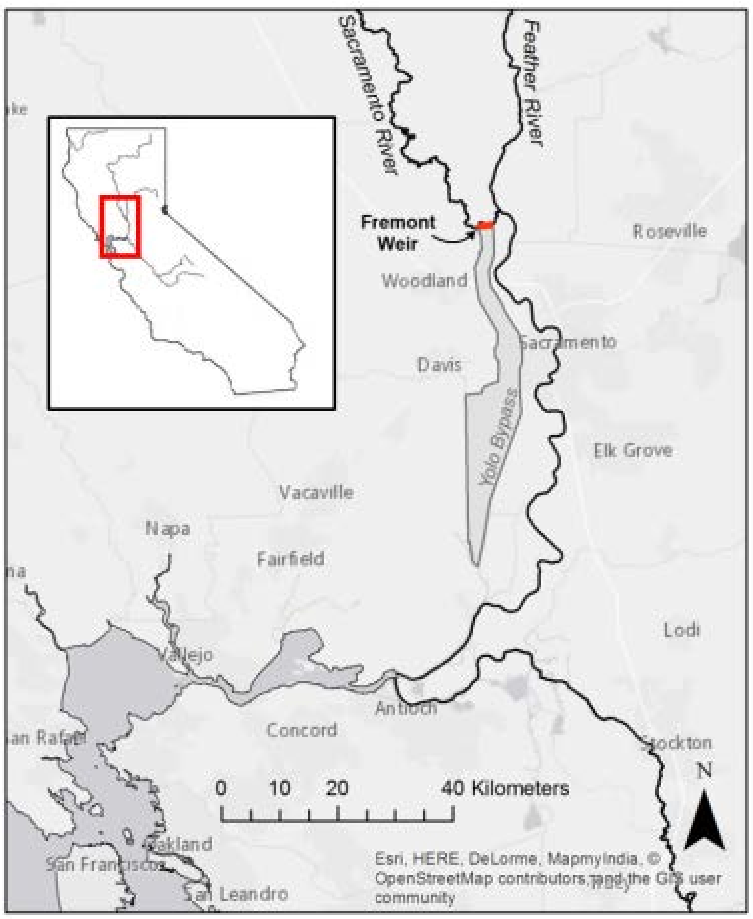
Fremont Weir is a 1.8-mile long flood control structure designed with a concrete, energy-dissipating splash basin, which minimizes scouring during overtopping events at the weir. The splash basin lies just downstream of the crest of the weir and spans the full length of the weir.

When the river stage is sufficiently higher than the weir, all juvenile salmonids that get entrained onto the Yolo Bypass are hypothesized to enter the bypass due to the overwhelming extent of Sacramento River flows being pushed out of the channel and onto the bypass. It is also hypothesized that during lower-stage overtopping events, when the Sacramento River is just barely above the crest of Fremont Weir, this effect is also the predominant cause of entrainment of Sacramento River fish onto the bypass. Overtopping events can vary in duration from just a few hours to several weeks, but are relatively short-lived compared with the resulting flooded footprint of the Yolo Bypass, which persists following the overtopping events. This footprint is a result not just of overtopping at the Fremont Weir, but substantial out-of-channel flows from four westside tributaries: Knights Landing Ridge Cut, Cache Creek, Willow Slough, and Putah Creek.

As part of RPA Action I.6.1, inundation flows from the Sacramento River onto the Yolo Bypass will occur at river flows lower than when the weir is overtopped, while species of interest are migrating past the Fremont Weir reach towards the Delta. It is during this period that the action aims to increase entrainment of salmonids. Acierto et al. (2014) evaluated the potential for entrainment based on proportion of flow entering the bypass and identified that it was potentially limited. Uncertainty exists about how fish utilize the channel for migration and rearing and their relationship to cross-channel flow patterns and secondary circulations. This study evaluates how these bathymetric and hydraulic structures may influence fish entrainment and flow relationships.

As part of Action I.6.1, Fremont Weir will be modified to allow seasonal, partial floodplain inundation in order to provide increased habitat for salmonid rearing and to improve fish passage. The same physical feature used for floodplain inundation flows will be used for juvenile fish entrainment. The primary modification of Fremont Weir will add a notch with one or more bays.

Figure 1. Map of project site.



2 Goals and Objectives

This study analyzes 12 notch scenarios in the Fremont Weir in terms of entrainment of juvenile salmon. The goal is to quantify the relative entrainment rates (between 0 and 1) across the suite of scenarios and to identify possible strategies for enhancing entrainment outcomes. This study does not predict future entrainment as models generally do not predict future outcomes so much as highlight trends. As there is no notch yet built, predictions of absolute entrainment rates risk missing any number of unforeseen variables driving the movement of complex animals like salmon in riverine systems. In a planning context, relative changes across scenarios are an accepted standard practice. The outcomes of this study will be one factor of the overall decision on which alternative is most suited for meeting the larger project objectives. Once the notch is constructed, evaluation studies will provide the opportunity for additional calibration and verification of model output.

The objectives of this study include the following:

- Develop a base fish movement data set under existing conditions (no notch). This work was completed as part of Steel et al (2017).
- Develop a calibrated three dimensional (i.e., U2RANS, a 3D Reynolds Averaged Navier-Stokes solver) and two dimensional (i.e., SRH-2D, Sedimentation and River Hydraulics-Two-Dimension) time varying hydrodynamic model of the project reach. This work was completed as part of Lai (2016).
- Integrate engineering designs of proposed notches into existing bathymetry and landscape (LiDAR) data capturing important differences in locations, widths, invert elevations, and construction techniques.
- Develop two dimensional flow fields for each of the scenarios that capture the hydraulic impacts of each unique notch.
- Calibrate a fish movement model using data from Steel et al (2017) and Lai (2016).
- Apply the calibrated fish movement model to the flow fields produced by each scenario and summarize estimated entrainment rates.
- Make recommendations on next steps and possible improvements.

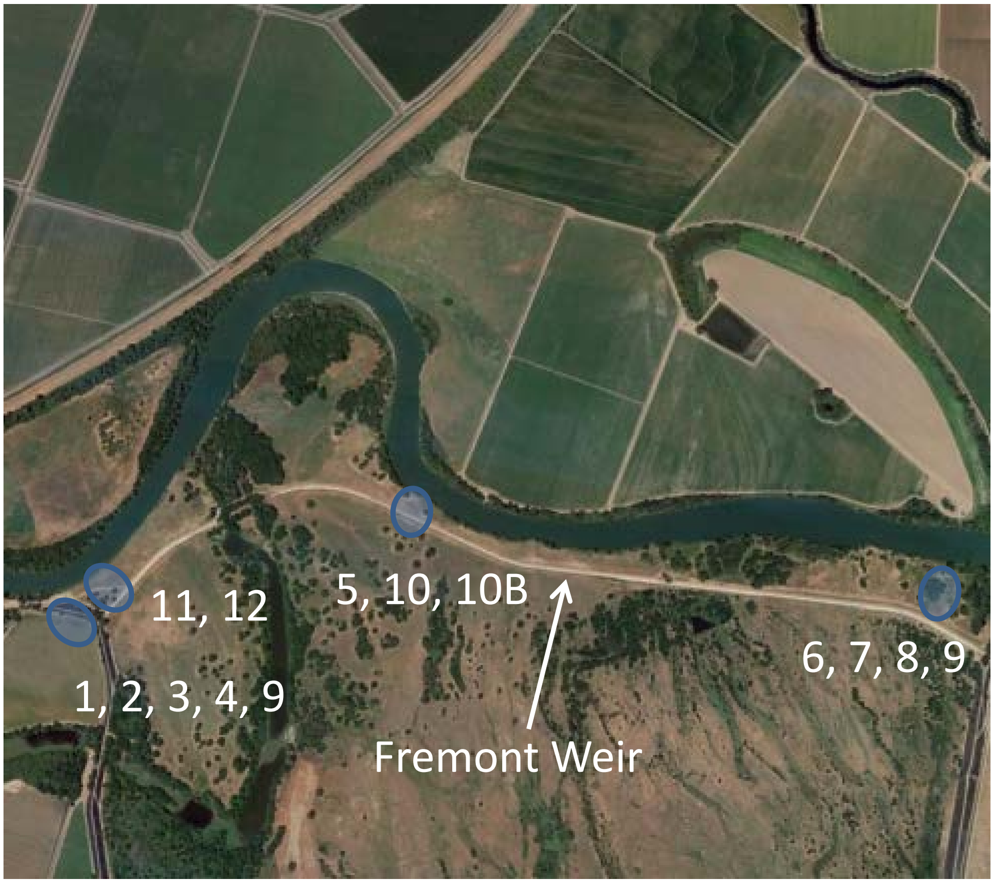
3 Scenario Descriptions and Domain Development

3.1 Scenarios

A suite of twelve notch scenarios was developed by the California Department of Water Resources (DWR) and the United States Bureau of Reclamation (USBR). The scenarios fall into two broad categories: 1) those with an extensive shelf adjacent to the notch and 2) those with a narrow channel or intake leading to the notch headworks. The headworks are where fish will exit the Sacramento River and enter the Yolo Bypass. The shelf based scenarios have a larger project footprint than the intake based scenarios. The primary purpose of the headworks for the shelf and intake configurations is to create a hydraulic connection between the Sacramento River and the Yolo Bypass during lower flows in the Sacramento River than currently exists. The headworks will consist of the inlet transition, the control structure, and the outlet transition, and will control the diversion of flow (up to about 12,000 cfs) from the Sacramento River into the Yolo Bypass.

Scenario notch locations are concentrated in the west, central, and east portion of the Fremont Weir (Figure 2). Table 1 highlights the dimensions captured in the landscape model of each scenario. Each scenario is different in terms of size, location, notch invert elevation, and width. These differences are translated into the 2D simulation of the flow field which, in turn, translates into simulated fish movement.

Figure 2. Scenario notch locations



3.2 Domain development

An IGES (initial graphic exchange specification) file was received from the USBR for each of the scenarios. Upon receipt of these files, each file was loaded into Capstone and an STL (stereolithography) file was created of the intake area. Once the intake area had a mesh associated with it, the original STL file of the river and intake STL file were then merged to create one mesh that represented the mesh used for the scenario. The STL was exported as a 2dm file using Paraview and extraneous faces were removed from the dataset or modified to best work with SRH-2D.

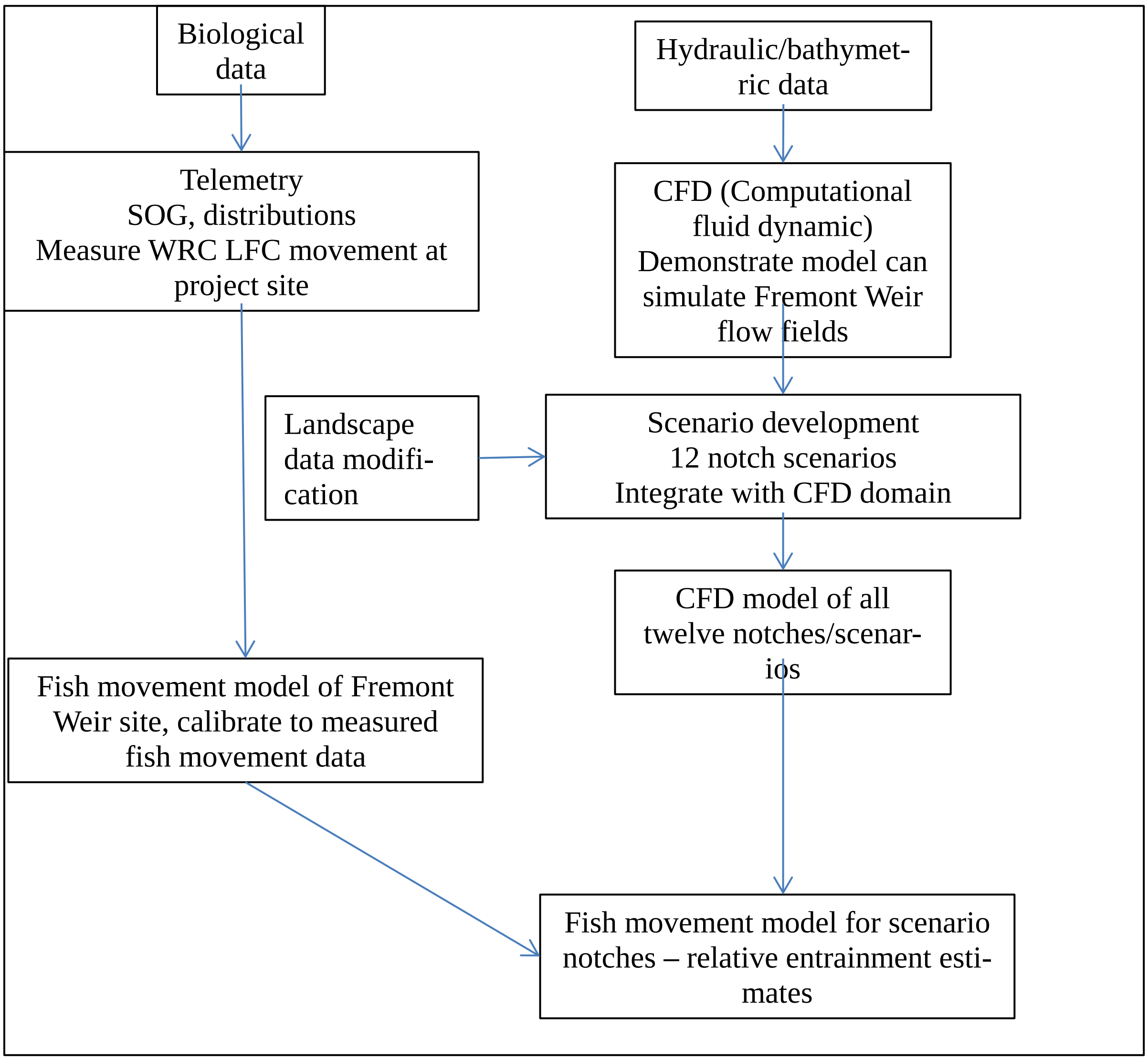
Table 1 Physical properties of modeled scenarios. Notch/River is the ratio of notch flow to river flow.

Scenario	Lower Intake		Upper Intake		# of Points	# of Elements	Notch Flow (cfs)	River Flow (cfs)	Notch/ River
	Elevation	Width	Elevation	Width					
Original	NA	NA	NA	NA					
Scenario 1	14 ft	31 ft	20 ft	44 ft	31200	33924	6000.22	42202.51	0.14
Scenario 2	14 ft	32 ft	20 ft	44 ft	33427	36126	6000.22	42202.51	0.14
Scenario 3	17 ft	21 ft	23 ft	24 ft	32858	35596	3000.11	42202.51	0.07
Scenario 4	22 ft	14 ft	NA	NA	32913	35782	1105.75	48289.31	0.02
Scenario 5	14 ft	31 ft	20 ft	41 ft	31308	33702	5981.18	42202.51	0.14
Scenario 6	14 ft	32 ft	20 ft	43 ft	29238	32313	5952.99	44843.49	0.13
Scenario 7	14 ft	33 ft	20 ft	44 ft	37538	40628	6000.22	47957.43	0.13
Scenario 8	17 ft	21 ft	23 ft	25 ft	31115	33941	3000.11	47029.93	0.06
Scenario 9 – West	17 ft	21 ft	23 ft	37 ft	38372	41453	3000.11	47029.93	0.06
Scenario 9 – East	17 ft	21 ft	23 ft	25 ft			3000.11	47029.93	0.06
Scenario 10 – West (A/B)	14 ft	33 ft	17 ft	35 ft	42119	45016	480.91	30809.31	0.02
Scenario 10 – Central (C)	18 ft	142 ft	-	-	42119	45016	2379.52	30809.31	0.07
Scenario 10 – East (D)	21 ft	146 ft	-	-	42119	45016	542.32	30809.31	0.02
Scenario 11	16 ft	220 ft	-	-	34037	36504	12077.32	44843.49	0.27
Scenario 12	16 ft	40 ft	20 ft	60 ft	33288	35711	6105.22	47029.93	0.13

4 Study Design and Model Application

Developing a fish movement model to assist with scenario evaluation for the Fremont Weir notch requires integration of data and information from several sources and professional disciplines (Figure 3). The report used biological data from a telemetry study, hydrodynamic data and models, and landscape modeling techniques.

Figure 3. Workflow for development of fish movement model. SOG is speed over ground.



4.1 Fish telemetry

In 2015, 250 winter run Chinook (mean fork length of 103 mm) from Livingston Stone Hatchery and 250 late fall run Chinook (mean fork length of 145 mm) from Coleman National fish hatchery were tagged with acoustic tags and released through a detection area at Fremont Weir. The array was in a long sweeping bend located at the head of the upstream end of the Fremont weir. This location was thought to have the best conditions for redistributing fish to the outside bend where susceptibility to entrainment by a future notch would be higher. All fish were released over 24 hour periods at Knights Landing. River discharge was low and stable with gage readings at Fremont weir of approximately 14 ft and flows of approximately 5700 cfs. Analysis suggested little difference in movement between winter run Chinook and late fall run Chinook at Fremont weir. Speeds over grounds and size were not statistically different for winter and late fall run Chinook. The combined mean speed over ground was 0.67 m/s.

Cross-channel spatial distributions were also similar for winter and late fall run Chinook. There was a moderate shift in the spatial distribution to the outside bend of approximately 5 to 8 m away from the channel center. Chanel width is approximately 70 m with the centerline, therefore 35 m away from either bank.

Figure 4. Detection array at Fremont Weir

For more detail please refer to Steel et al. (2017) describes in detail the telemetry study that was completed to support work described in this report.

4.2 2D hydraulic models and landscape modeling

SRH-2D is a 2D depth-averaged hydraulic and sediment transport model for river systems. It was developed at the Technical Service Center, Bureau of Reclamation. The hydraulic flow modeling theory and user manual were documented by Lai (2008; 2010).SRH-2D was used for all hydrodynamic simulations used to support entrainment modeling.

SRH-2D adopts the arbitrarily shaped element method of Lai et al. (2003a, b), the finite-volume discretization method, and an implicit integration scheme. The numerical procedure is very robust so SRH-2D can simulate simultaneously all flow regimes (sub-, super-, and trans-critical flows) and both steady and unsteady flows. A special wetting-drying algorithm makes the model very stable in handling flows over dry surfaces. The mobile-bed sediment transport theory has been documented by Greimann et al. (2008), Lai and Greimann (2010), and Lai et al. (2011). The mobile-bed module predicts vertical stream bed changes by tracking multi-size, non-equilibrium sediment transport for suspended, mixed, and bed loads, and for cohesive and non-cohesive sediments, and on granular, erodible rock, or non-erodible beds. The effects of gravity and secondary flows on the sediment transport are accounted for by displacing the direction of the sediment transport vector from that of the local depth-averaged flow vector.

Major capabilities of SRH-2D are listed below:

- 2D depth-averaged solution of the St. Venant equations (dynamic wave equations) for flow hydraulics;

- An implicit solution scheme for solution robustness and efficiency;

- Hybrid mesh methodology which uses arbitrary mesh cell shapes. In most applications, a combination of quadrilateral and triangular meshes works the best;

- Steady or unsteady flows;

- All flow regimes simulated simultaneously: subcritical, supercritical, or transcritical flows;
- Mobile bed modeling of alluvial rivers with a steady, quasi-unsteady, or unsteady hydrograph.
- Non-cohesive or cohesive sediment transport;
- Non-equilibrium sediment transport;
- Multi-size sediment transport with bed sorting and armoring;
- A single sediment transport governing equation for both bed load, suspended load, and mixed load;
- Effects of gravity and secondary flows at curved bends; and
- Granular bed, erodible rock bed, or non-erodible bed.

SRH-2D is a 2D model, and it is particularly useful for problems where 2D effects are important. Examples include flows with in-stream structures such as weirs, diversion dams, release gates, coffer dams, etc.; bends and point bars; perched rivers; and multi-channel systems. 2D models may also be needed if certain hydraulic characteristics are important such as flow recirculation and eddy patterns; lateral variations; flow overtopping banks and levees; differential flow shears on river banks; and interaction between the main channel, vegetated areas and floodplains. Some of the scenarios listed above may be modeled in 1D, but additional empirical models and input parameters are needed and extra calibration must be carried out with unknown accuracy.

The 2D model was built and calibrated for the same conditions under which fish were released and their locations measured at Fremont Weir in 2015. This served as the base case. Refer to Lai (2016) for model specifics.

We represented each of the twelve scenario notch designs by integrating basic CAD designs into topography and bathymetry data. We used the Capstone software which is part of the DOD CREATE software suite. Capstone is a feature-rich application designed to produce analyzable representations of geometry for use with physics based solvers. In particular the geometry, mesh and associative attribution required for a computational simulation can be produced.

Geometry-related capabilities include:

- Geometry import and export for the IGES and STEP file formats
- Low-level geometry creation
- Edge and face splitting and merging
- Boolean operations
- Lofting, sweeping and extrusion
- Fillet and chamfer
- Various healing and stitching operations

Capstone excels at generating unstructured meshes for complex geometries. Due to the robust topology model, high-quality meshes can be generated for the manifold and non-manifold geometries often required in aerospace applications.

Meshing-related capabilities include:

- Mesh import and export for common formats including STL, CGNS, SURF and UGRID
- Mesh import and export for Create file formats including Kestrel (avm) and Sentri (Exodus)
- Robust and flexible sizing field
- Robust unstructured surface mesh generation
- Unstructured tet-dominant volume mesh generation
- Extruded boundary layer generation via the third-party AFLR volume mesher

- Sliding interfaces
- Mesh manipulation and repair operations
- Mesh export with associated attribution

One of the most important capabilities that Capstone provides is a framework for attributing a mesh based on the underlying geometry. For supported output formats the mesh is exported with associated attributes to be used in a physics-based analysis.

By integrating the CAD designs with existing landscape data and then modeling the 2D flow fields we captured the influence of notch details such as size, angle, step heights and the subsequent influence the local flow field and thus fish distribution and potential for entrainment.

Each of the notch designs are represented in Figure XC. Flows through the notch were represented using rating curves developed by the CA DWR. See Lai (2017)

4.3 Scenario descriptions

4.3.1 Scenario 1 West 6K Shelf

This scenario is located past the west end of the Fremont Weir. It has a minimum invert of 14 feet and a maximum flow of 6000 cfs. A broad shelf starts from the river and tapers toward the notch structure. The location is coincident with the Steel el al. (2017) fish movement study location.

4.3.2 Scenario 2 West 6K Intake

This scenario is located past the west end of Fremont Weir. It has a minimum invert of 14 feet and a maximum flow of 6000 cfs. A narrow intake channel starts from the river and leads toward the notch structure. Comparing Scenarios 1 and 2 allows for direct evaluation of the shelf versus intake approach. The location is coincident with the Steel et al. (2017) fish movement study location.

4.3.3 Scenario 3 West 3K Shelf

This scenario is located past the west end of the Fremont Weir. It has a minimum invert of 17 feet and a maximum flow of 3000 cfs. A broad shelf starts from the river and tapers toward the notch structure. Scenario 3 is most comparable to Scenario 1 with the exception of the minimum invert height. In addition, Scenario 3 and Scenario 1 have different rating curves leading to different notch flows at similar stages (Figure 5). The location is coincident with the Steel et al.(2017) fish movement study location.

4.3.4 Scenario 4 West 1K Shelf

This scenario is located past the west end of the Fremont Weir. It has a minimum invert of 22 feet and a maximum flow of 1,106. A broad shelf starts from the river and tapers toward the notch structure. Scenario 4 is placed in a similar location to Scenarios 1, 2 and 3. It is distinct because of the high minimum invert elevation and low maximum flow. Scenario 4 represents the smallest scenario in terms of concrete.

4.3.5 Scenario 5 Central

This scenario is in the central portion of the Fremont Weir located past the west end of the Fremont Weir. It has a minimum invert of 14 feet and a maximum flow of 6000 cfs. A broad shelf starts from the river and tapers toward the notch structure. Scenario 5 and Scenario 1 are similar in terms of size, have the same rating curve (Figure 5) and therefore allow comparison of the entrainment rate between the west and central positions. However, fish movement data were not collected in the Scenario 5 location in 2015. This reach has some remnant pilings, revetment and may require bank modification if constructed.

4.3.6 Scenario 6 East

This scenario is at the east portion of the Fremont Weir. It has a minimum invert of 14 feet and a maximum flow of 6000 cfs. A broad shelf starts from the river and tapers toward the notch structure. Scenario 6 is comparable to Scenario 1 in terms of terms of size, they have the same rating curve (Figure 5) and therefore allow comparison of the entrainment rate between the west and east positions.

4.3.7 Scenario 7 East

This scenario is in the east portion of the Fremont Weir. It has a minimum invert of 14 feet and a maximum flow of 6,000 cfs. A narrow intake channel broad shelf starts from the river and leads toward the notch structure. Scenario 7 is comparable to Scenario 6 and allows entrainment estimates between a shelf and intake style notch at the east location. In addition, Scenario 7 is comparable to Scenario 2 in terms of terms of size, they have the same rating curve (Figure X) and therefore allow comparison of the entrainment rate between the west and east positions. However, fish movement data were not collected in the Scenario 7 location.

4.3.8 Scenario 8 East

This scenario is in the east portion of the Fremont Weir. It has a minimum invert of 17 feet and a maximum flow of 3000 cfs. A broad shelf starts from the river and tapers toward the notch structure. Scenario 8 and Scenario 3 are comparable in terms of size and rating curves.

4.3.9 Scenario 9 East and West

This scenario has a structure located off of the west end of the Fremont Weir and in the east portion of the Fremont Weir. The east and the west structures are identical with minimum inverts of 17 feet and maximum flows of 3000 cfs each for a total of 6000 cfs. Both structures have a broad shelf that tapers to the notch. Scenario 9 has the same rating curves as Scenario 3 and 8.

4.3.10 Scenario 10 and 10B Central

This scenario has a three structure cluster in the central portion of the Fremont Weir. The structures combine to have a maximum flow of approximately 3400 cfs. The structures have a range of minimum inverts of 14, 18 and 21 feet. The structures are connected to the river with a narrow intake channel. Scenario 10B is structurally the same as 10 with some modifications to the underlying bathymetry and landscape model. Scenarios 10 and 10B are not readily comparable to other scenarios in terms of size, invert elevations and rating curves. Scenario 10 is most comparable to 10B and allows estimating entrainment as a function of terrain modification.

4.3.11 Scenario 11 West

Scenario 11 is located at the west end of Fremont Weir. Unlike Scenarios 1 through 4, which are set off the end of the Fremont weir, Scenario 11 placement is further downstream and intersects the Fremont weir structure. An intake channel leads from the river to the structure. Scenario 11 has a minimum invert of 16 feet and a maximum flow of 12,000 cfs. It is the largest structure in the study.

4.3.12 Scenario 12 West

Scenario 12 is located at the west end of Fremont Weir and like Scenario 11 intersects the Fremont weir structure. An intake channel leads from the river to the structure. Scenario 12 has a minimum invert of 16 feet and a maximum flow of 6,000 cfs. It is comparable to Scenario 1 in terms of size but has a different rating curve.

Figure 5. Rating curves for notches

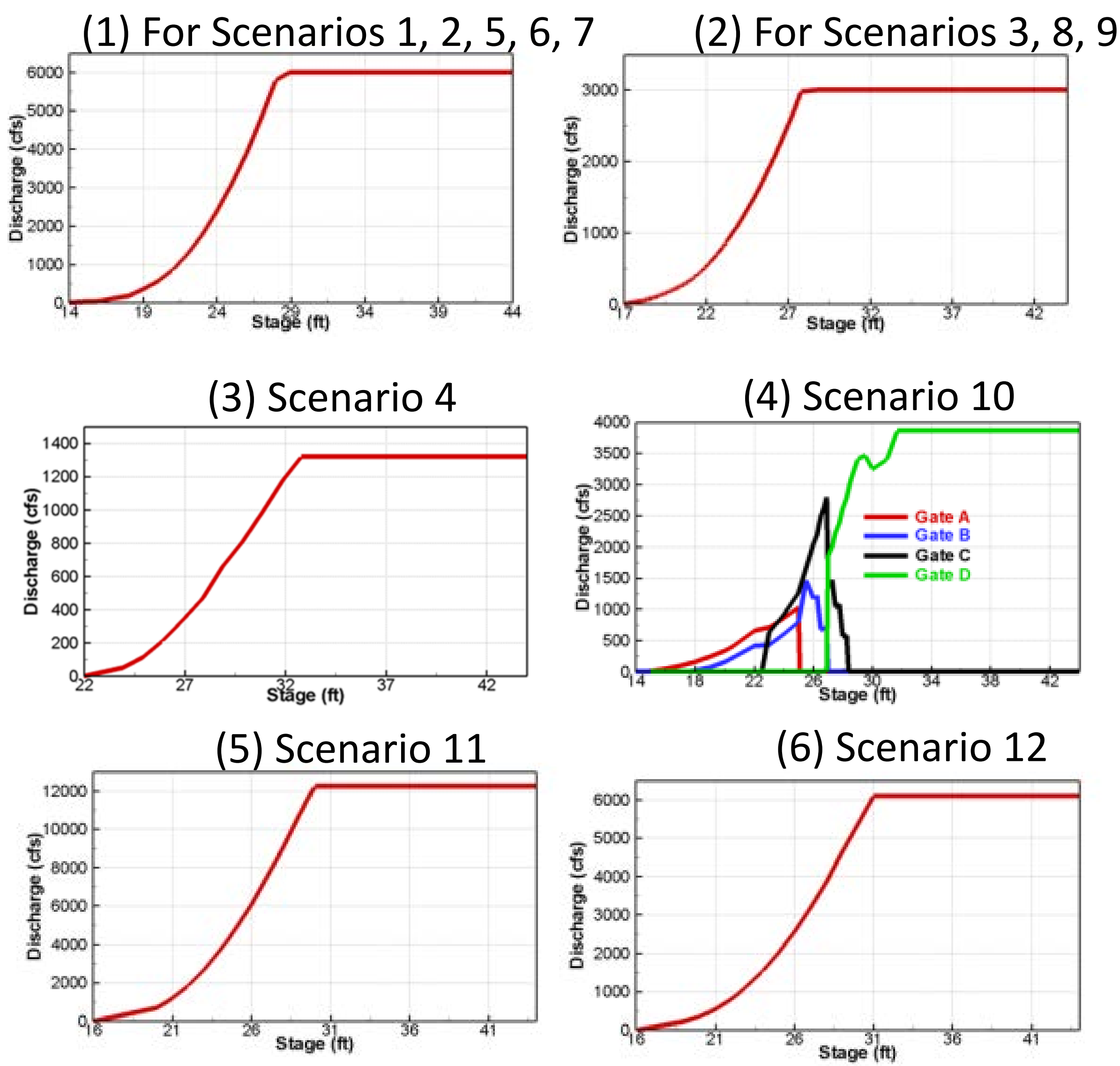


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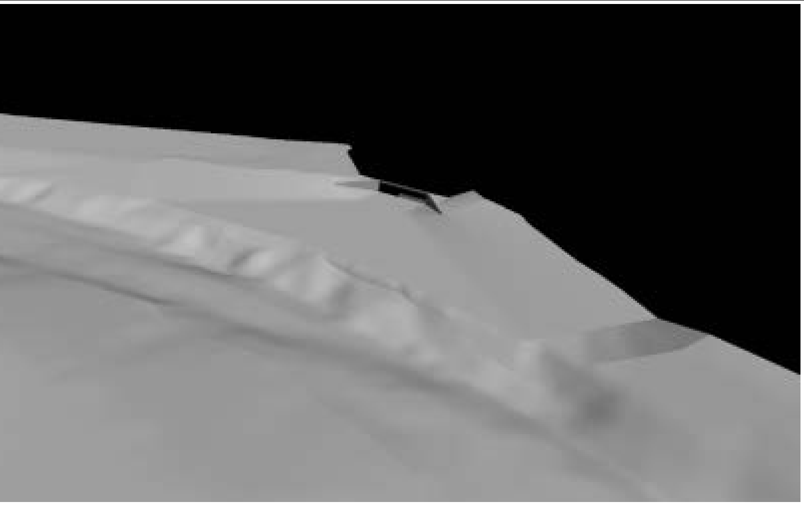
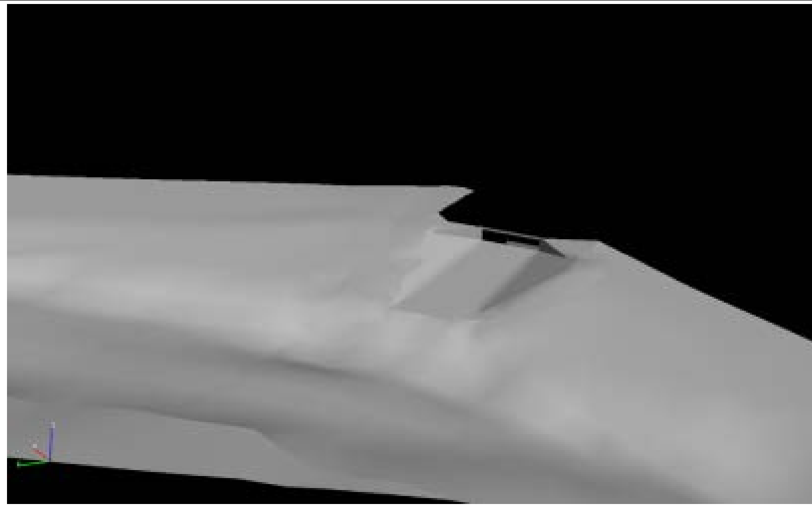
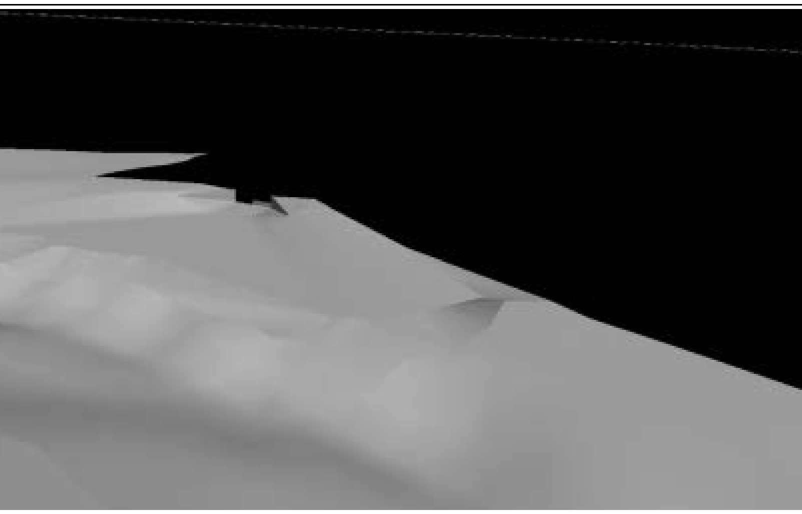
Figure 6. Images of notches as modeled.



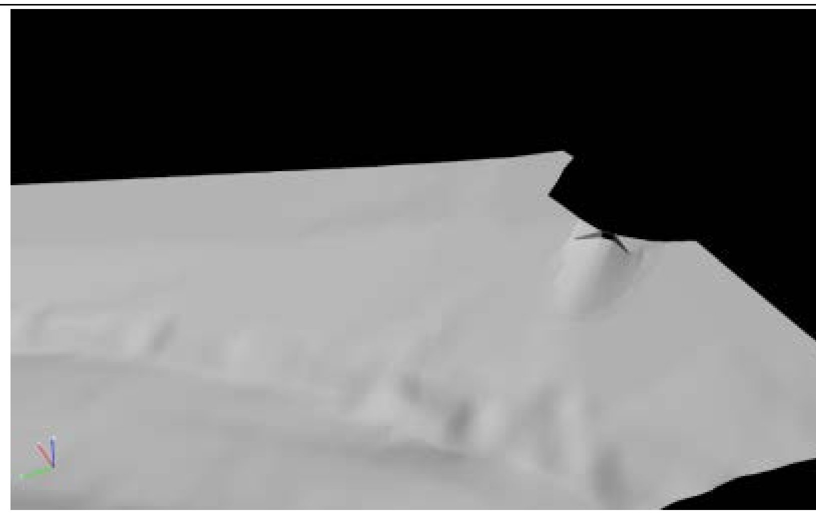
Scenario 1 – West - 6K – Shelf



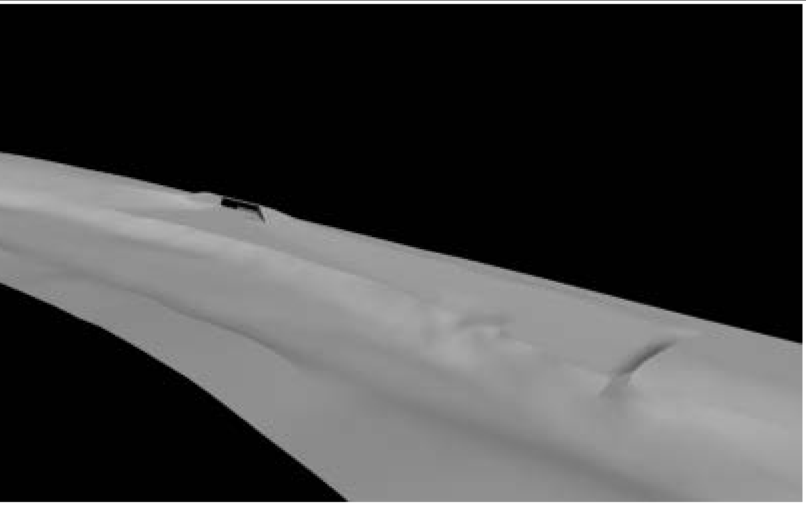
Scenario 2 – West - 6K - Intake



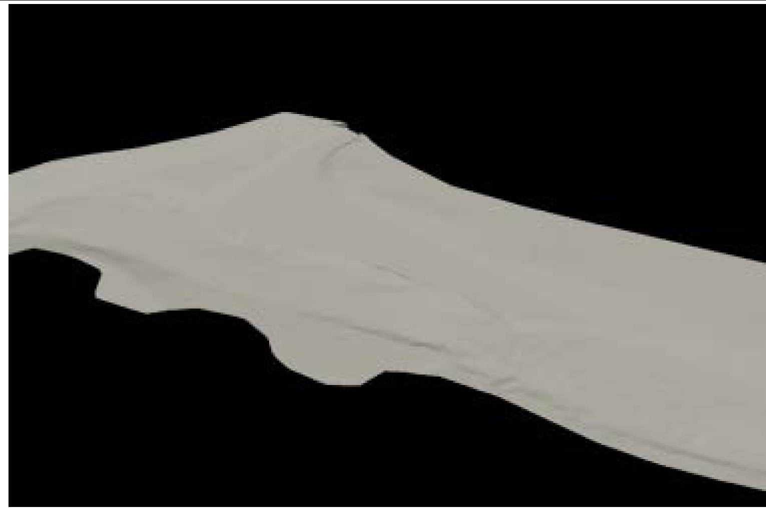
Scenario 3 – West - 3K – Shelf



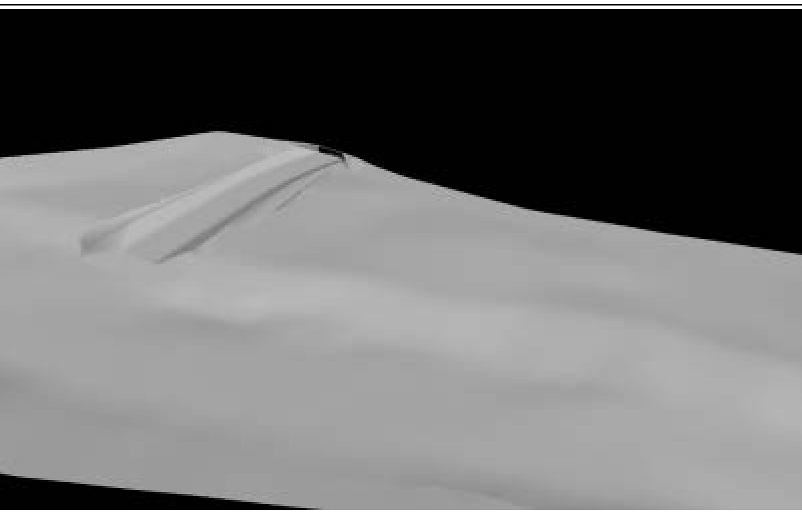
Scenario 4 – West - 1K - Shelf



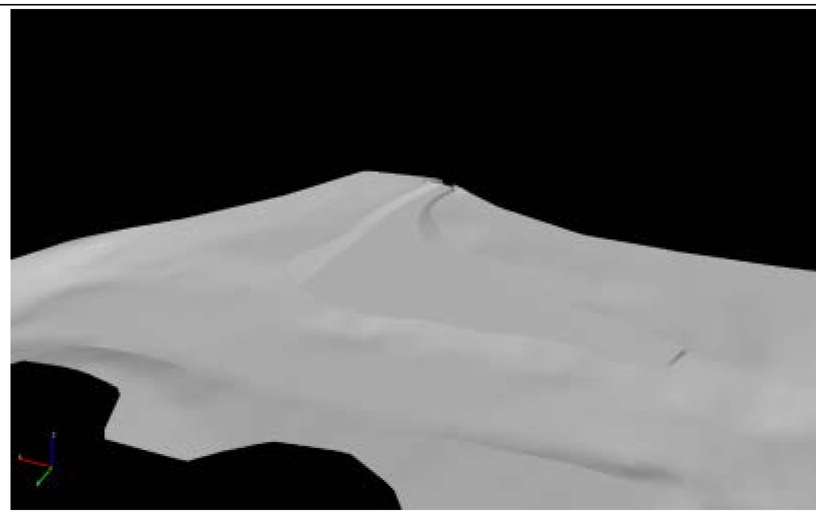
Scenario 5 – Central - 6K – Shelf



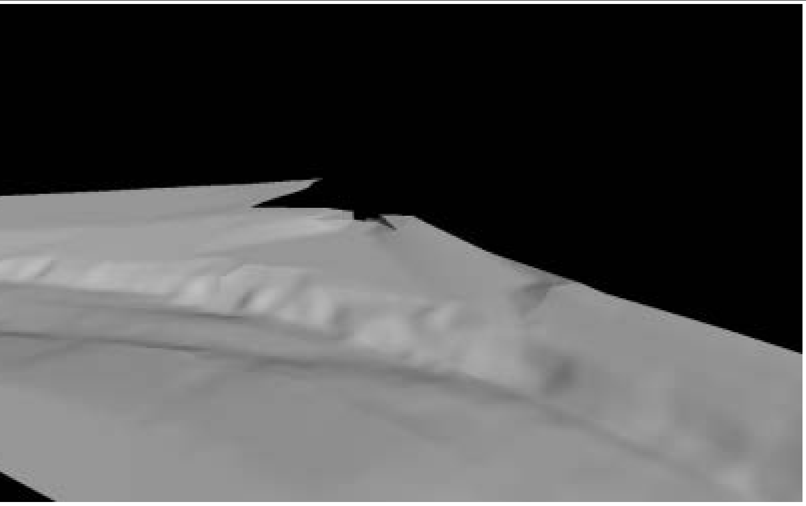
Scenario 6 – East - 6K - Shelf



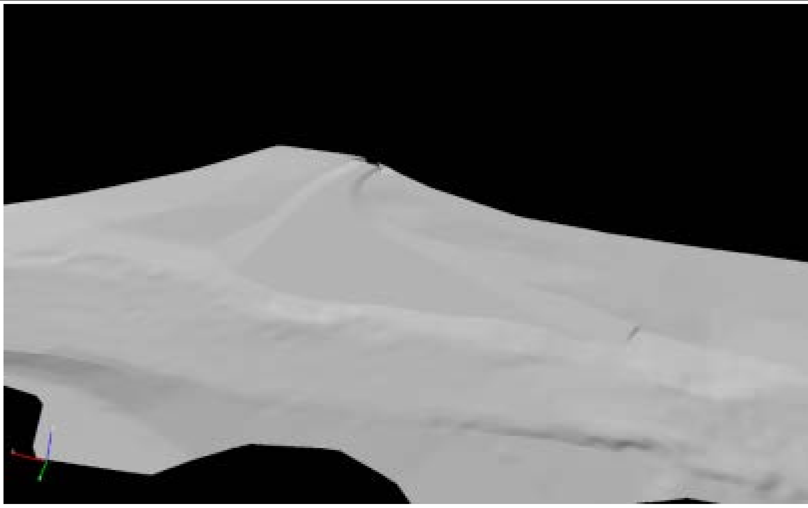
Scenario 7 – East - 6K – Intake



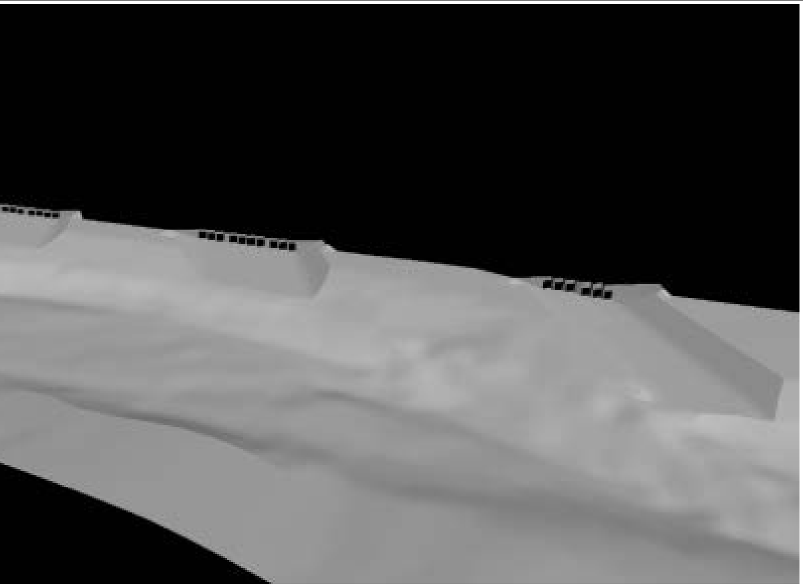
Scenario 8 – East - 3K - Shelf



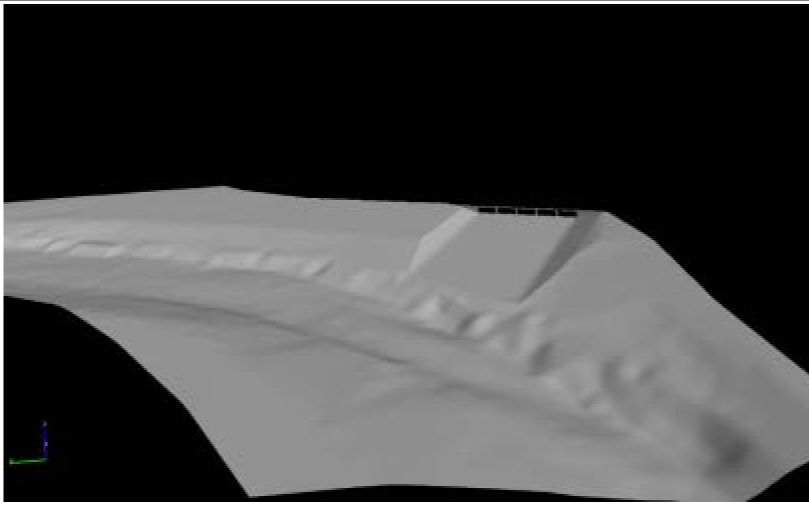
Scenario 9 – West - 3K – Shelf



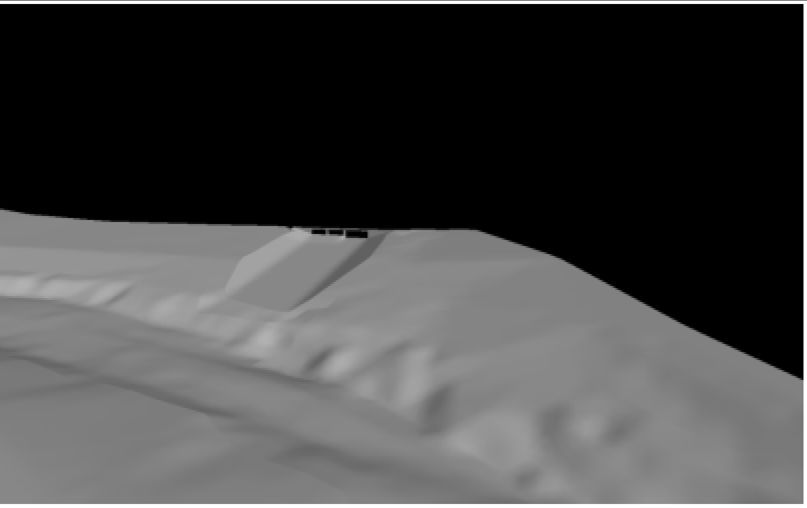
Scenario 9 – East - 3K - Shelf



Scenario 10 – Inundation - Central - 3K



Scenario 11 – Inundation - West - 12K



Scenario 12 – Inundation - West - 6K – Intake

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4.4 ELAM description

The ELAM (Eulerian-Lagrangian-agent Method) is a mechanistic representation of individual fish movement which accounts for local hydraulic patterns represented in computational fluid dynamic models (CFD) such as the 2D models developed for this project. Rule-based behaviors can be implemented within the model to drive fish movement. The model is agent based providing a mathematical means of representing the environment from the perspective of animal perception. The approach is informed by observations of fish movement such as what was collected at Fremont Weir (Steel et al. 2017) but individual tracks are not directly modeled. Rather, statistical properties of the measured tracks are used to guide model coefficient development. The approach supports extension of empirical observations toward unmeasured environmental conditions such as the wide scenario range evaluated as part of this project. The ELAM is documented in a number of publications (Appendix 1).

Hydrodynamic information generated at discrete points in the Eulerian mesh is interpolated to locations anywhere within the physical domain where fish may be. This conversion of information from the Eulerian mesh to a Lagrangian framework allows the generation of directional sensory inputs and movements in a reference framework similar to that perceived by real fish. Movement is treated as a two-step process: first, the fish evaluates agent attributes within the detection range of its sensory system and, second, it executes a response to an agent by moving (Bian 2003). The volume from which a fish acquires decision-making information is represented as a 2-D sensory ovoid. A virtual fish’s sense of direction at each time increment is based on its orientation at the beginning of the time increment. Directional sensory inputs are tracked relative to the horizontal orientation of the fish because fish response to laterally-located versus frontally-located stimuli can be different (Coombs et al. 2000). The sensory ovoid has a vertical reference because fish detect accelerations and gravitation through the otolith of its inner ear (Paxton 2000). It also senses three-dimensional information on motion (Braun and Coombs 2000). In this individual-based model (IBM) a symmetrical (spherical) sensory ovoid is used.

4.4.1 Movement

Two fish swim speeds were used: the drift velocity set at 0.25 BL/s and the cruising velocity of 1.5 BL/s. Fish speed variability was induced by calculating a random seed from a normal distribution centered on 0 with a standard deviation of 1 termed RRR (residual resistivity ratio). Swim speed variability was simulated by first calculating a deviation as

$$\sigma = RRR * Crusie - Drift$$

where cruise is the cruising velocity and drift is the drift velocity. Next the swim speed is computed as

$$Speed = BL * (Crusie + \sigma)$$

Many behaviors can be implemented within the ELAM. For this study only one behavior, a biased random walk in the downstream direction was used. The 2015 Fremont Weir fish movement data suggest no additional behaviors are represented.

The Ornstein-Uhlenbeck (OU) process was used to simulate sensing and orientation in the fish, i.e. how straight or variable a fish track composed of multiple sequential points is. The process was implemented by first calling a random seed from a wrapped uniform distribution. Two coefficients, $lamda\_xy$ and c_xy are used to calibrate computed fish positions using measured fish positions as a guide. Sensing describes the ability of the fish to locate the proper swim direction. For example, $lamda\_xy = 1$ would be perfect sensing ability and the fish would always know which movement direction was correct. On the other hand, c_xy represents the orientating ability with a value of 0 being perfect.

4.5 Fish movement modeling procedure

There were 13 separate hydraulic models representing the base condition and 12 scenarios. The base condition matched the location, discharge, and stage under which late fall and winter run Chinook were tagged and released in 2015. Thus the base condition was used to calibrate the fish movement model. The calibration was done using 2D depth averaged hydraulic models. This was done in lieu of 3D hydraulic models for two reasons: First, the telemetry data is also 2D due to technology limitations of the telemetry gear that was used and second, since there were twelve scenarios to be considered, developing 3D models was time and cost prohibitive. Additional 3D models may be developed in the future if required for particular questions.

For calibration, fish were released in the model at Knights Landing. A total of 500 particles or fish were placed in a lateral cross section. The fish length was set to the mean size of fish released as part of Steel et al. (2017) equaling 124 mm. No differentiation in the fish movement model is made between late fall Chinook and winter run Chinook. Fish moved downstream, passed through the Fremont Weir reach, and exited the model at Verona.

Fish movement model data were post processed to produce speed over ground (SOG) and spatial distributions (kernel densities) using JMP (John's Macintosh Project software) 2012. The estimates were compared to the measured data, adjustments made to model parameters, and the model rerun until measured and computed values were similar. The two coefficients *lamda_xy* and *c_xy* were adjusted to approximate the speed over ground and spatial distribution through the project reach. Coefficient *lamda_xy* was set to 0.1 and *c_xy* was set to 2.0. Speed was insensitive and spatial distribution was sensitive to the parameters.

The calibrated model was then run for the twelve proposed scenarios and the proportion of fish entering the notch versus exiting the model domain at Verona was computed. Ten to thirty runs each with 500 fish were completed in order to estimate model variability. Each run was made with a different random seed to start the model. Higher levels of variability were possible by adjusting calibrated model parameters but results begin to differ from measured results. Thus, for the final runs we only modified the random seed.

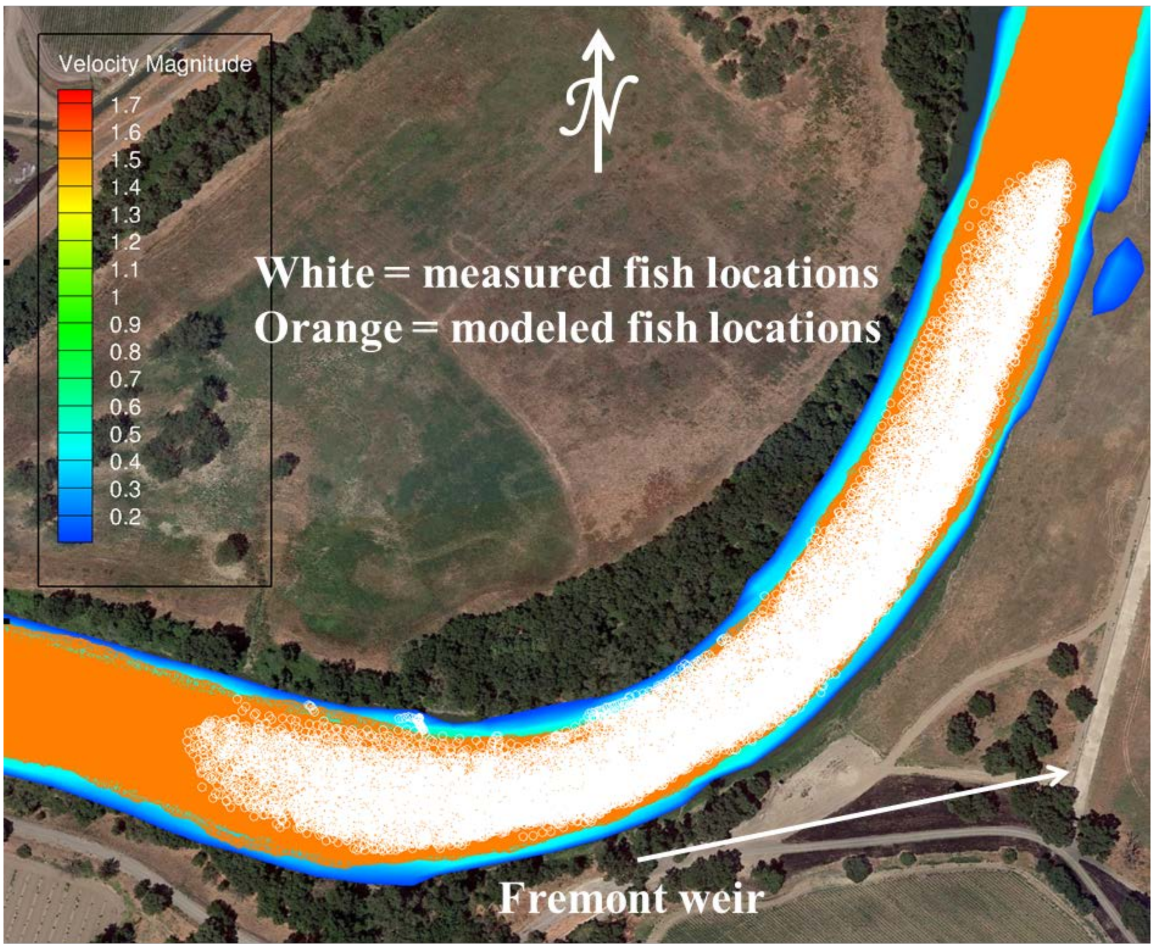
Estimates of entrainment percentages for each scenario were made for the maximum anticipated notch flow ranging from 1,000 to 12,000 cfs. Additional analysis was done for Scenarios 1 and 2 representing an intake and shelf style notch respectively. The analysis required running across a range of anticipated notch flows and estimating the entrainment for each. In addition, Scenarios 10 and 10B involved three separate structures and a complicated rating curve. Additional analysis for 10 and 10B across a range of flows was also done.

5 Results

5.1 Spatial distribution

Spatial distribution was assessed qualitatively by overlying measured fish positions from Steel et al. (2017) with modeled fish tracks (Figure 7). Tracks overlapped and have similar cross channel distributions.

Figure 7. Measured and Modeled Fish Locations

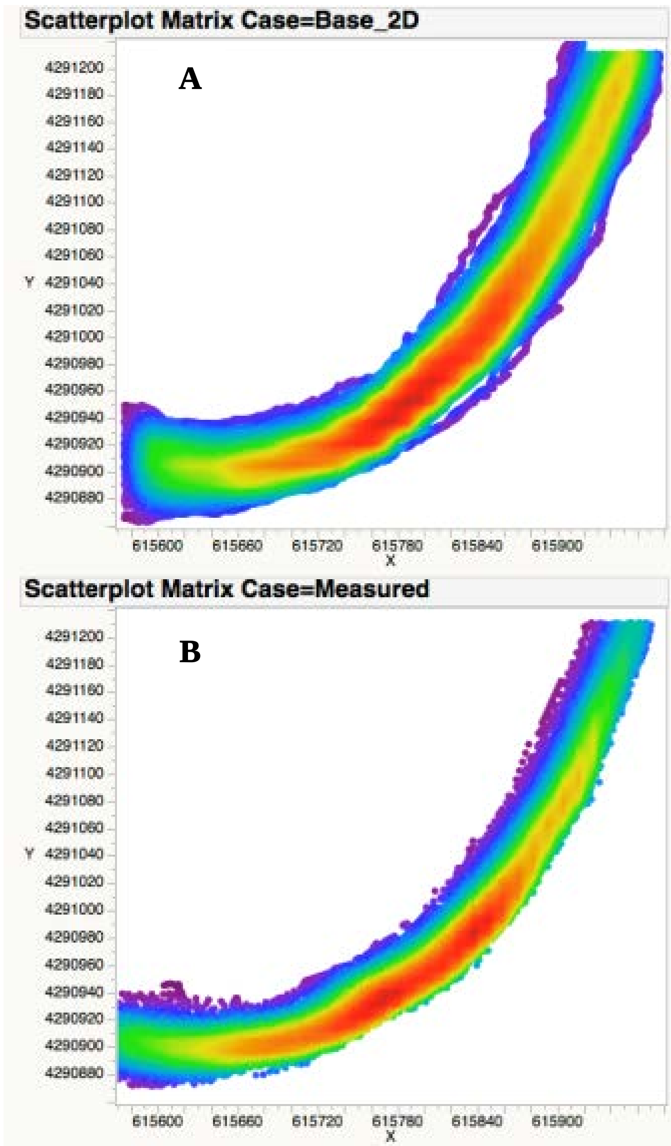


5.2 Kernel density estimates

Kernel densities for the measured and modeled fish distributions were calculated (Figure 8). Bivariate density estimation models a smooth surface that describes how dense the data points are at each point in that surface.

The plot adds a set of contour lines showing the density (Figure 8). Optionally, the contour lines are quantile contours in 5% intervals with thicker lines at the 10% quantile intervals. This means that about 5% of the points are below the lowest contour, 10% are below the next contour, and so forth. The highest contour has about 95% of the points below it.

Figure 8. Contour lines showing the density speed estimates for modeled (A) and measured fish positions (B)

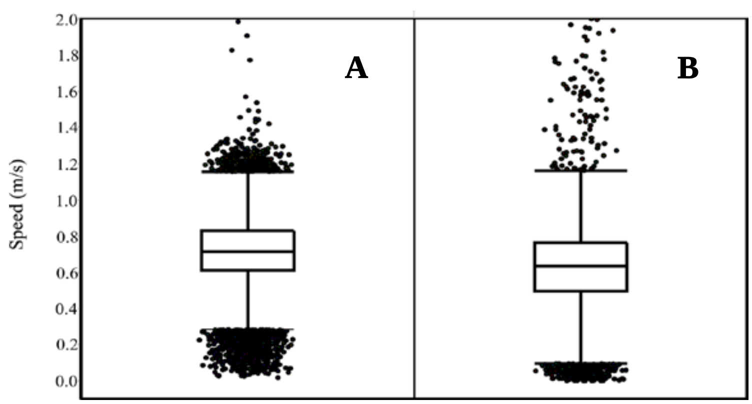


This nonparametric density method requires 1) dividing each axis into 50 binning intervals, for a total of 2,500 bins over the whole surface, 2) counting the points in each bin, 3) decide the smoothing kernel standard deviation (handled in JMP), 4) run a bivariate normal kernel smoother using an FFT (fast Fourier transform) and inverse FFT to do the convolution, and 5) create a contour map on the 2,500 bins using a bilinear surface patch model.

5.3 Speed Estimates

Speed over ground was computed for measured and modeled fish. Modeled fish estimates were based on 500 individual particles. Fish were released at Knights Landing Bridge and exited the domain at Verona. The resulting data set was subsampled to capture track data corresponding to the measured fish position data. Fish speed was computed for each fish and represented as a box plot (Figure 9). Modeled fish speed was 0.71 m/s and measured fish speed was 0.67 m/s with arrange of 0 to 2.o m/s.

Figure 9. Box plot of fish speed for modeled (A) and measured (B) fish speed over ground estimates.



5.4 Entrainment across all scenarios

Entrainment, as depicted in Figure 11, varied as a function of notch type (intake versus shelf), location (west, central, or east weir) and notch flow volume (cfs). Scenarios 1 (shelf) and 2 (intake) had entrainment rates of approximately 8% with Scenario 2 slightly superior to Scenario 1. Both Scenarios 1 and 2 have a maximum notch flow of 6,000 cfs. In contrast, Scenarios 3 and 4, while in the same location as Scenarios 1 and 2, have entrainment estimates of approximately 5 and 1% respectively. However, it is important to note that Scenarios 3 and 4 have higher invert elevations and lower notch flows when compared to Scenarios 1 and 2.

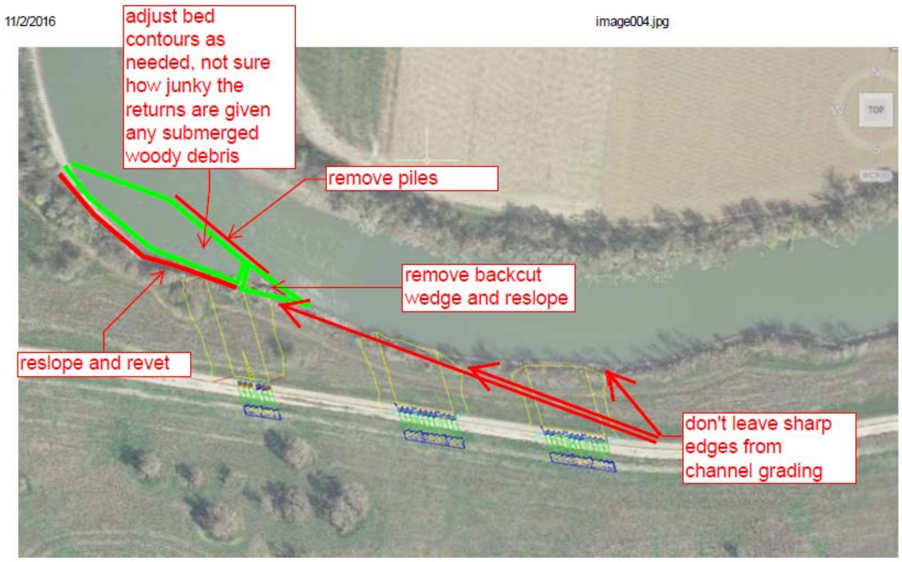
Scenario 5 is located in the central portion of the Fremont Weir but is otherwise similar to Scenario 2. Scenario 5 entrains approximately 4%. Scenario 5 is the only single notch structure evaluated for the central Fremont Weir location. Scenarios 10 and 10B structures are in a similar location and are described below.

Scenarios 6 through 8 are all located on the east portion of Fremont Weir. Scenarios 6 and 7 entrain approximately 5%, and Scenario 8 entrains approximately 2%. Like Scenarios 1 and 2, Scenarios 6 and 7 are a direct comparison of an intake versus shelf. Like Scenarios 1 and 2, Scenarios 6 and 7 have similar entrainment estimates. Compared to Scenarios 1 and 2, Scenarios 6 and 7 have lower entrainment estimates. Scenario 8 is directly comparable to Scenario 3 with the exception of its location on the east portion of Fremont Weir. Both Scenarios 3 and 8 have approximately 2% entrainment.

Scenario 9 is a combination of Scenarios 3 and 6 with one structure located on the west portion and one located on the east portion of Fremont Weir. Scenario 9 has an approximately 2% entrainment rate similar to

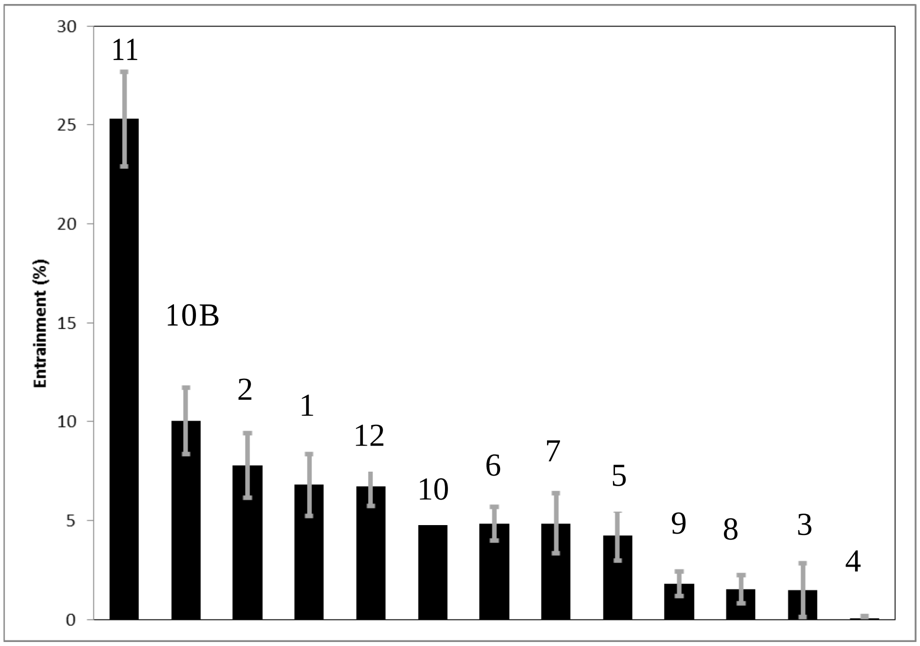
Scenario 3 or Scenario 6 alone.

Figure 10. Modifications completed for Scenario 10B based on email from Josh Urias to David Smith, 12/2/2016



Scenario 10 was similar to Scenarios 5, 6, and 7 at a flow of 3402 cfs. Scenario 10B was modified based on correspondence with Josh Urias, CA DWR (Figure 10). The modification required generating a new spatial model and running the 2D hydraulic model to produce the new flow fields. We attempted to capture as much of the input as possible. We modified the bathymetry and resloped the bank. We flattened the bathymetry signal from the existing piles and we softened the edges of the intake structure to round them. The resulting flow field and subsequent entrainment estimates were improved over Scenario 10 with approximately 10% of the fish entrained at 3402 cfs.

Figure 11. Mean entrainment estimates for each scenario at maximum flow with standard deviations. Scenario number is placed above each error bar.



Scenario 11, with the flow of 12,000 cfs entrained the greatest number of fish at approximately 25%. Scenario 12 is comparable to Scenario 2 as both are intake style notches. Entrainment rates for both are approximately 7%.

5.5 Flow and entrainment relationships

The following figures are all referenced to stage at Fremont Weir (ft, NAVD88). In most cases higher stages mean more notch flow and lower stages mean less notch flow.

For Scenario 1 (shelf) and Scenario 2 (intake) entrainment was modeled for a range of flows to establish the notch entrainment trends over the range of expected operating conditions. Scenarios 1 and 2 were chosen because each is located in the reach where fish were tracked in 2015. The hydrograph from the time period of December 1 to December 30 2015 was used as it contained both low and high river flows (represented as stages from Fremont Weir gage) needed to capture the full range of notch entrainment and was also used for the base model. The figures are entrainment estimates for simulated fish for Scenarios 1 and 2 at Fremont Weir across a range of notch flows and stages. Each data point is the mean entrainment rate at each notch flow. Error bars are the standard deviation based on a minimum of 6 runs of 500 fish each. Entrainment increases with stage for both but the transition from low entrainment (~1%) versus high entrainment (~8%) is slower for the shelf. Both scenarios entrain similar percentages of fish but Scenario 1 (shelf type notch) uses less water to achieve maximum entrainment.

Figure 12. Scenario 1 shelf

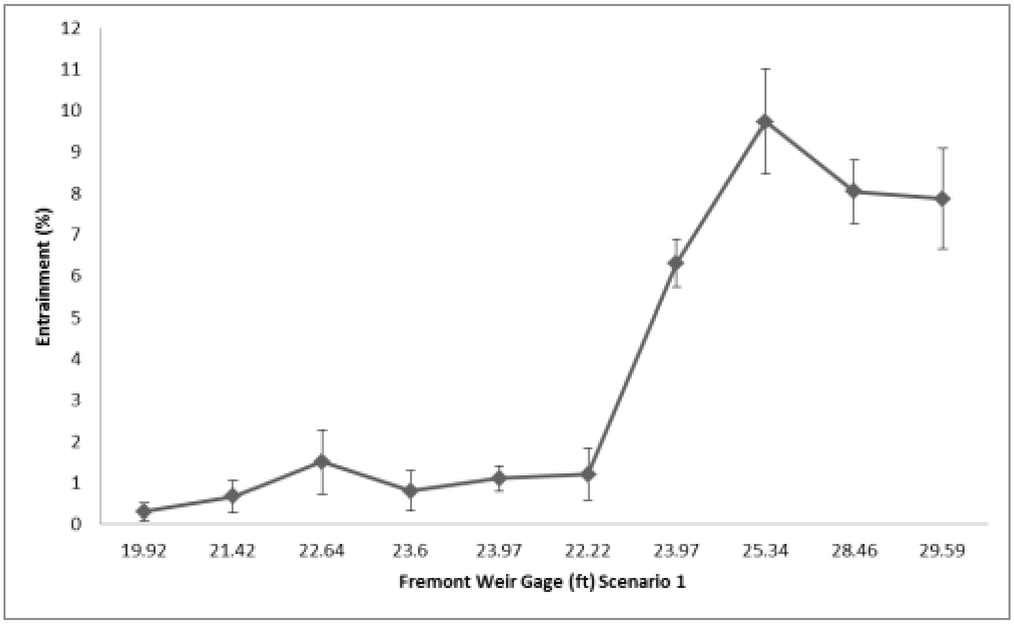
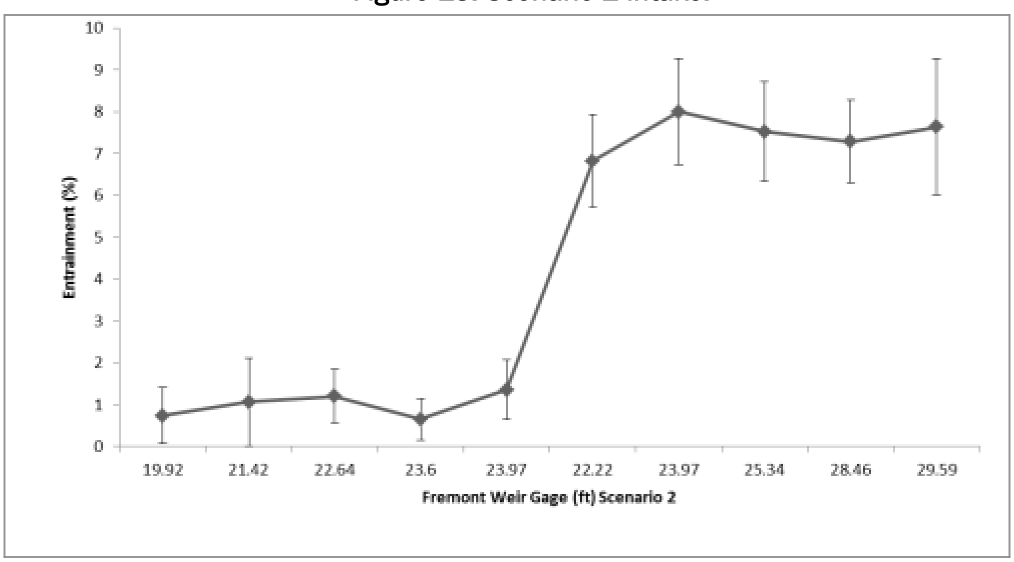
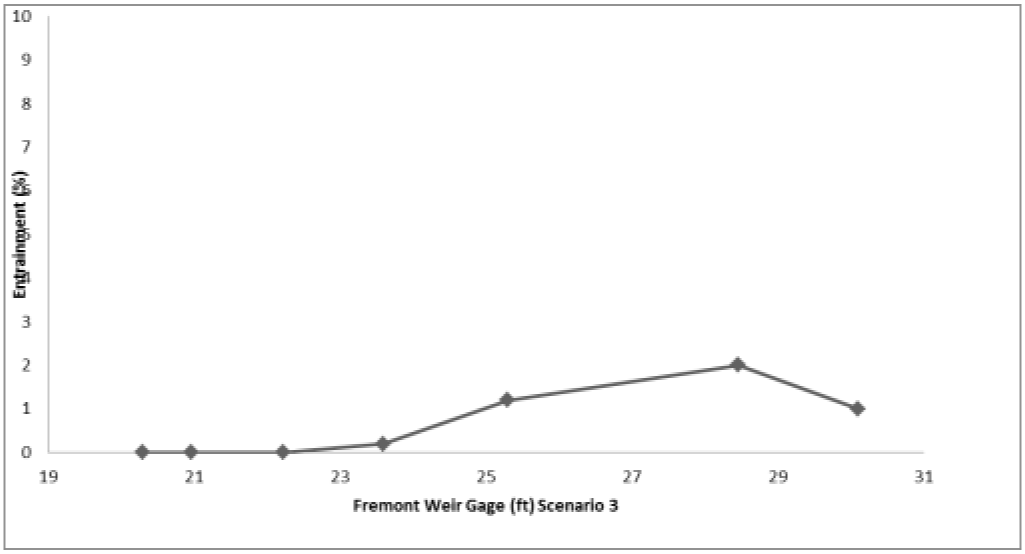


Figure 13. Scenario 2 intake.



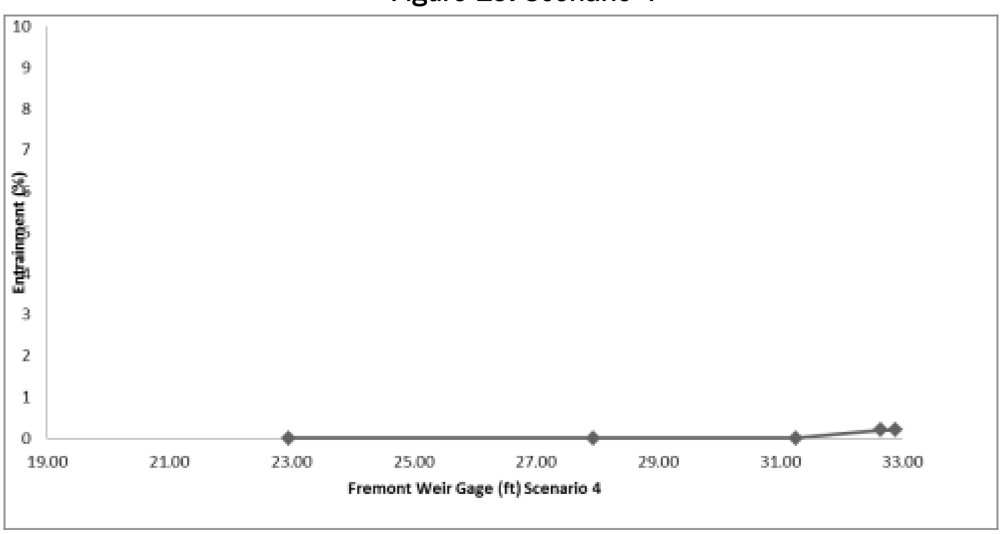
The error bars suggest that the mean estimated entrainment will vary up to approximately 3% based on the standard deviation around the mean. For example, a mean estimate of 10% could have a standard deviation ranging from approximately 13% to 7%. Error estimates for entrainment are not complete due to the late submission of ELAM scenarios. Error bars are expected to be similar to what has already been reported. Scenario 3 (Figure 14) entrains relatively few fish over the range of flows evaluated with the trend suggesting maximum entrainment of approximately 1 to 2% from 1500 to 3000 cfs.

Figure 14. Scenario 3



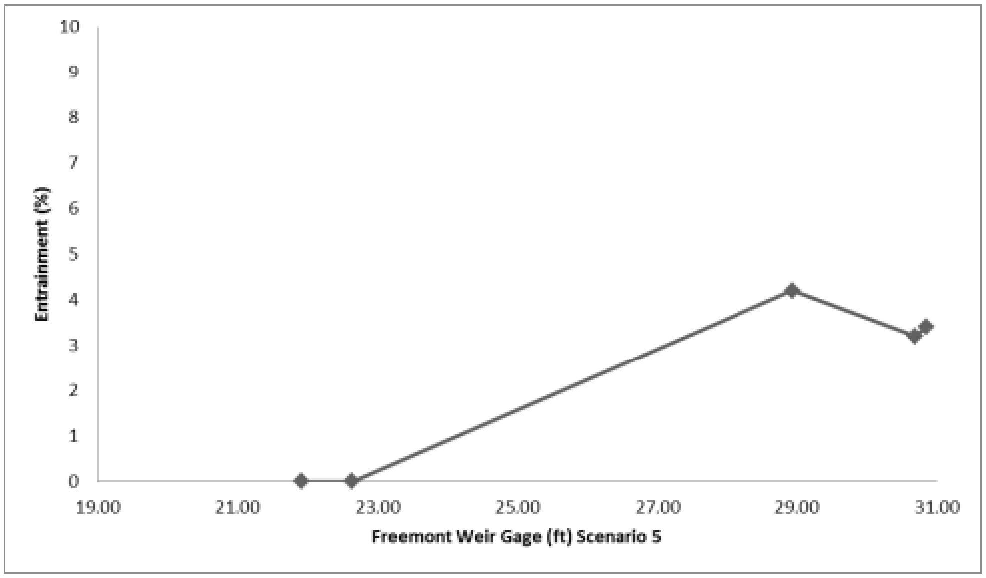
Scenario 4 (Figure 15) provides the lowest flow and entrainment across flows remains below 1%.

Figure 15. Scenario 4



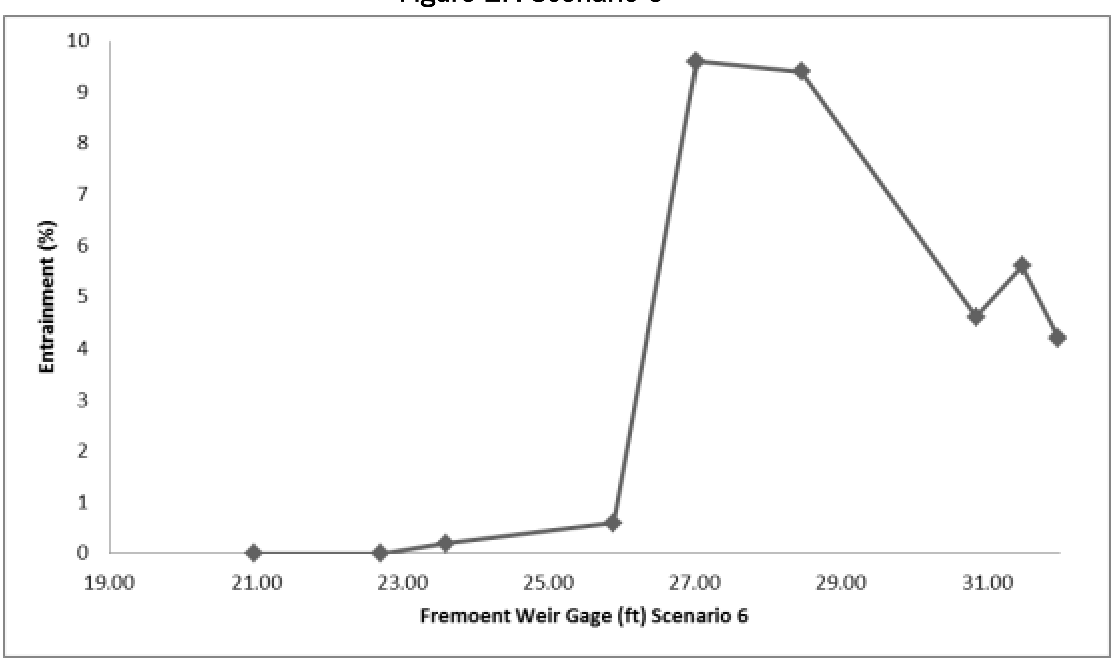
Scenario 5 (Figure 16) has a peak entrainment of approximately 5 % and reaches a plateau near 5000 cfs (approximately 29 ft at Fremont Weir gage)

Figure 16. Scenario 5



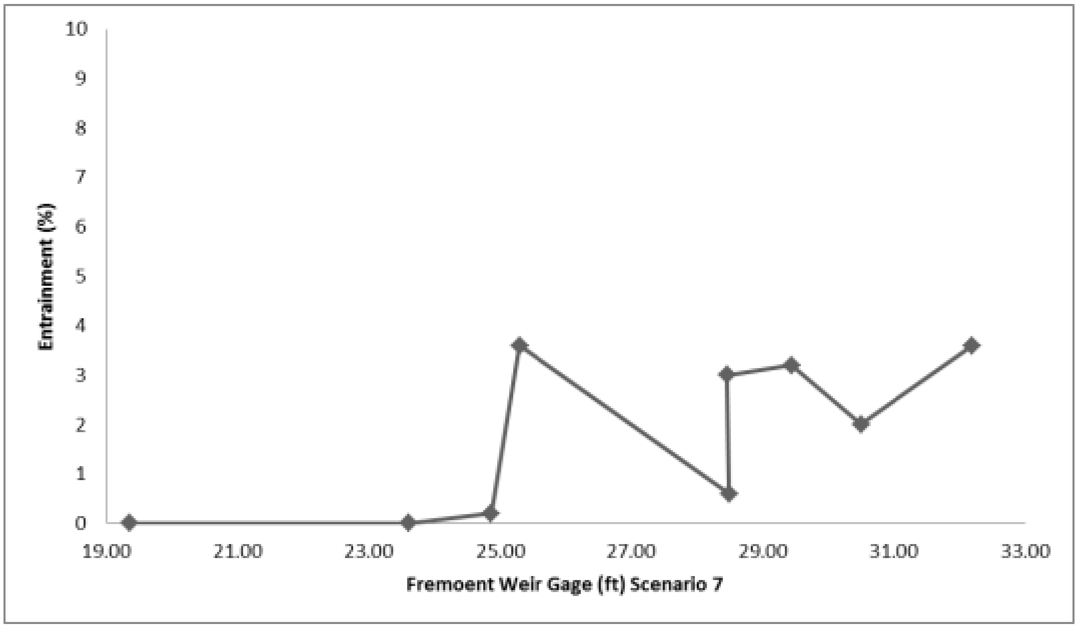
Scenario 6 (Figure 17) reaches a peak entrainment of approximately 10% at approximately 3000 cfs or half of the rated maximum notch flow. This appears to be related to the interaction of the excavated bench and stage that tends to diminish near bank recirculation zones and promote direct streamlines along the bank.

Figure 17. Scenario 6



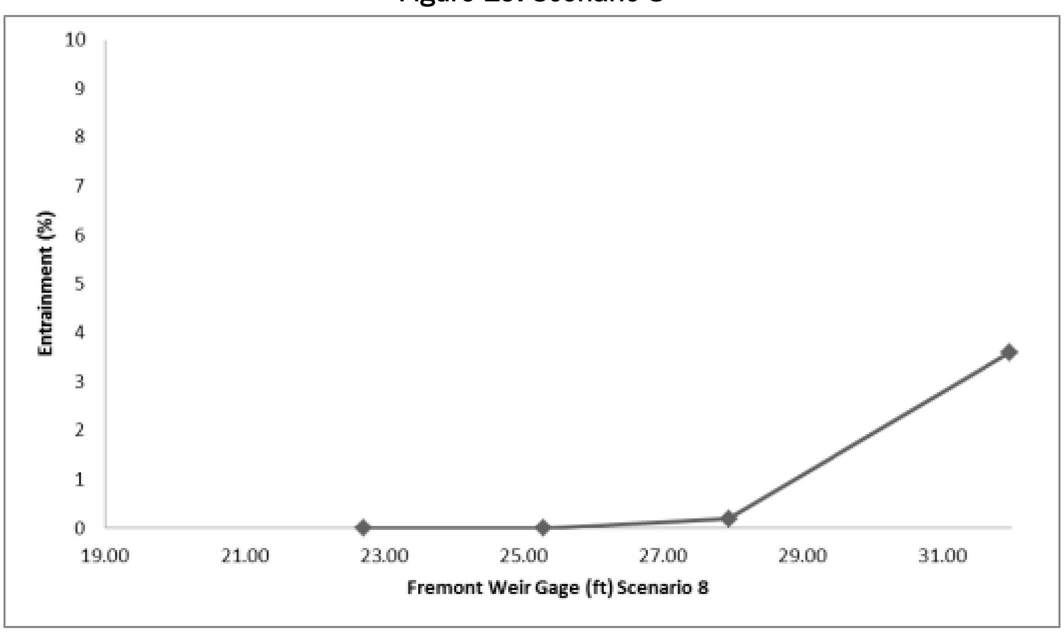
Scenario 7 (Figure 18) entrains approximately 3 to 4% across a wide range of notch flows but has more variability across flows than other scenarios.

Figure 18. Scenario 7



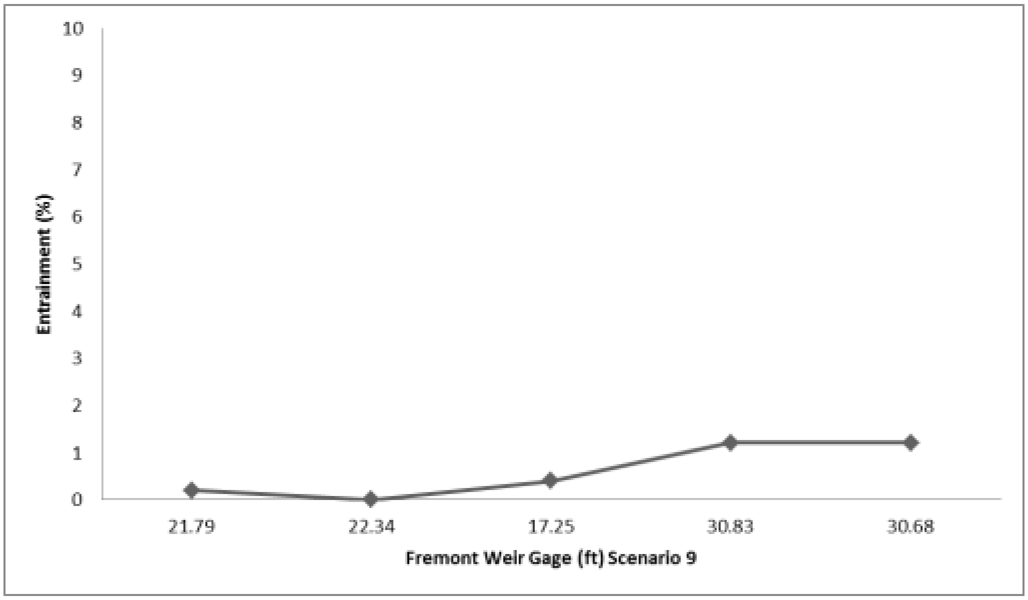
Scenario 8 (Figure 19) entrains approximately 3 to 4% and the entrainment trend suggest that an entrainment plateau has not been reached.

Figure 19. Scenario 8



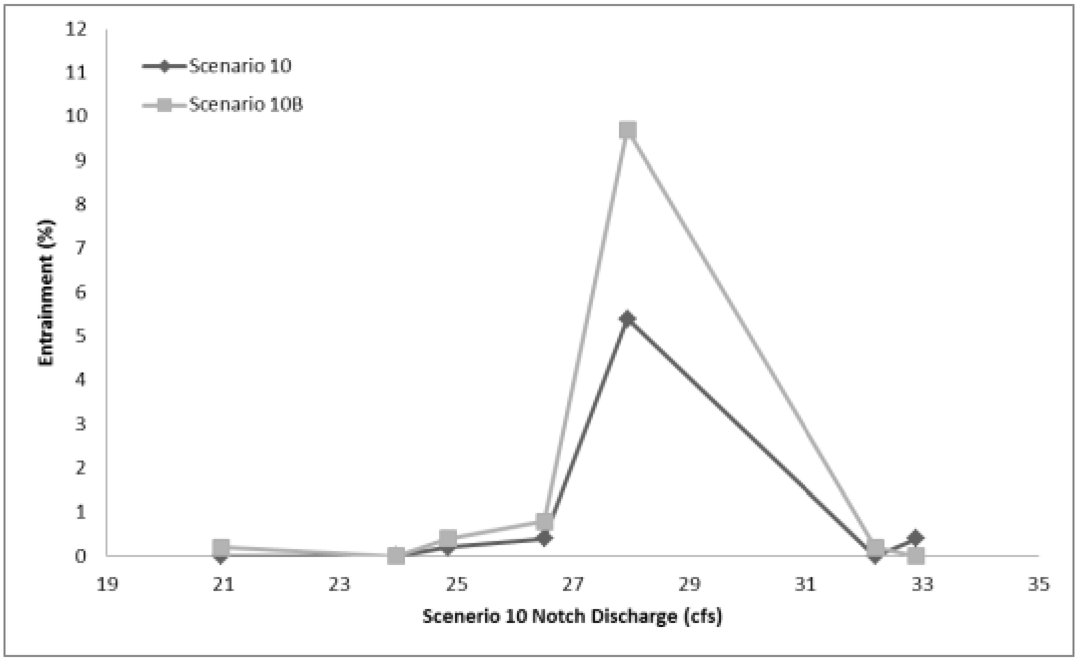
Scenario 9 (Figure 20) entrains approximately 1% and the entrainment trend suggests that an entrainment plateau has been reached. The flow through the notches and estimated entrainment were summed for the combined west and east structures.

Figure 20. Scenario 9



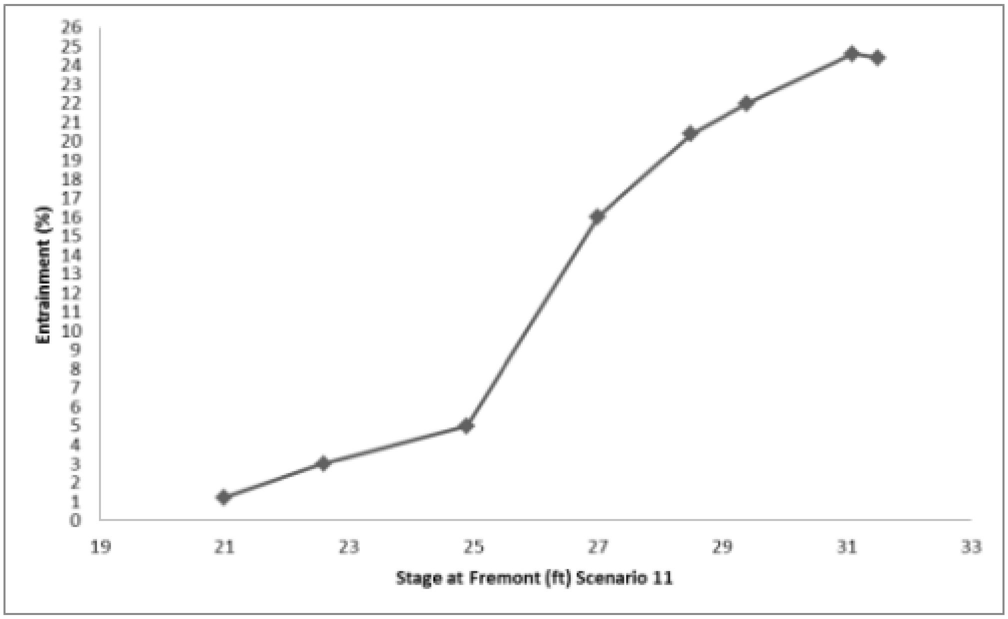
Scenarios 10 and 10B (Figure 21) represent a different notch design on comparison to the other designs. Flows from 37.5 cfs to 3648 cfs (499, 1363, 2098, 2521, 3358, 3402, 3648 cfs) were run incrementally for both Scenarios 10 and 10B covering the range of flows dictated by the rating curve. For both scenarios a flow of 3402 cfs maximized entrainment. All other flows entrained less than 1% of fish. This is likely related to the complicated bank and bathymetry at this location and a recirculation zone that is established in the bend. Please note that there were errors in the notch invert elevations in the original CAD files for Scenario 10 and 10B that were correct in Alterative runs (see Appendix 1).

Figure 21. Scenario 10 and 10B



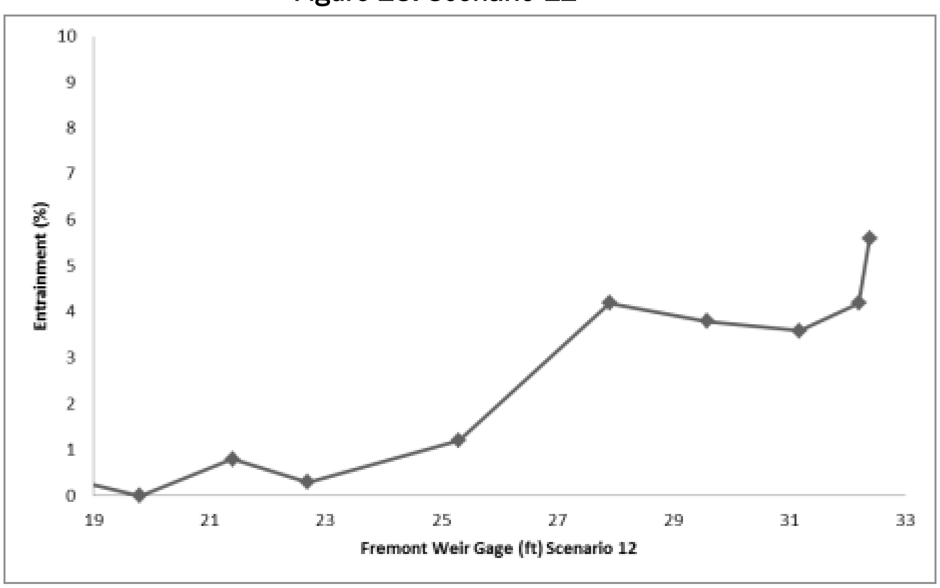
Scenario 11(Figure 22) shows a strong increase in entrainment rates with notch flow and even at the midpoint of flow of 6000 cfs is entraining approximately 15% of the fish and reaching a maximum of approximately 24% at 12000 cfs. Scenarios 11 and 12 are located deeper into the bend than other west scenarios and have a different design lacking a two-step weir and instead relying on a single invert elevation. The width of the structure is wide (220 ft) and it attracts a large cross section of streamlines from the river.

Figure 22. Scenario 11



Scenario 12 (Figure 23) entrains approximately 5% of the fish. The trend suggests a plateau is reached at around 3000 cfs but with an increase suggested at higher stages. This upward trend is likely within the uncertainty of the model.

Figure 23. Scenario 12



We also plot all scenarios on one graph (Figure 24) and provide the plotting data in Table 2. Across all scenarios several trends are suggested.

From stages of 23 to 29 ft there is little meaningful difference in entrainment considering the uncertainty of the point estimates (approximately 3%). Beyond 28 ft there is a decline in entrainment performance for most scenarios with only Scenario 11 clearly deviating from this observation. The decline in entrainment coincides with the approximate elevation of the land surface between the river and the Fremont Weir suggesting a sudden hydrodynamic change that decreases the notch performance. Scenarios 1, 2 and 11 all perform well at stages of approximately 24 to 27 feet with elevated entrainment rates compared to the other scenarios.

Figure 24. Stage at Fremont weir gage and point estimates of entrainment for all ELAM scenarios.

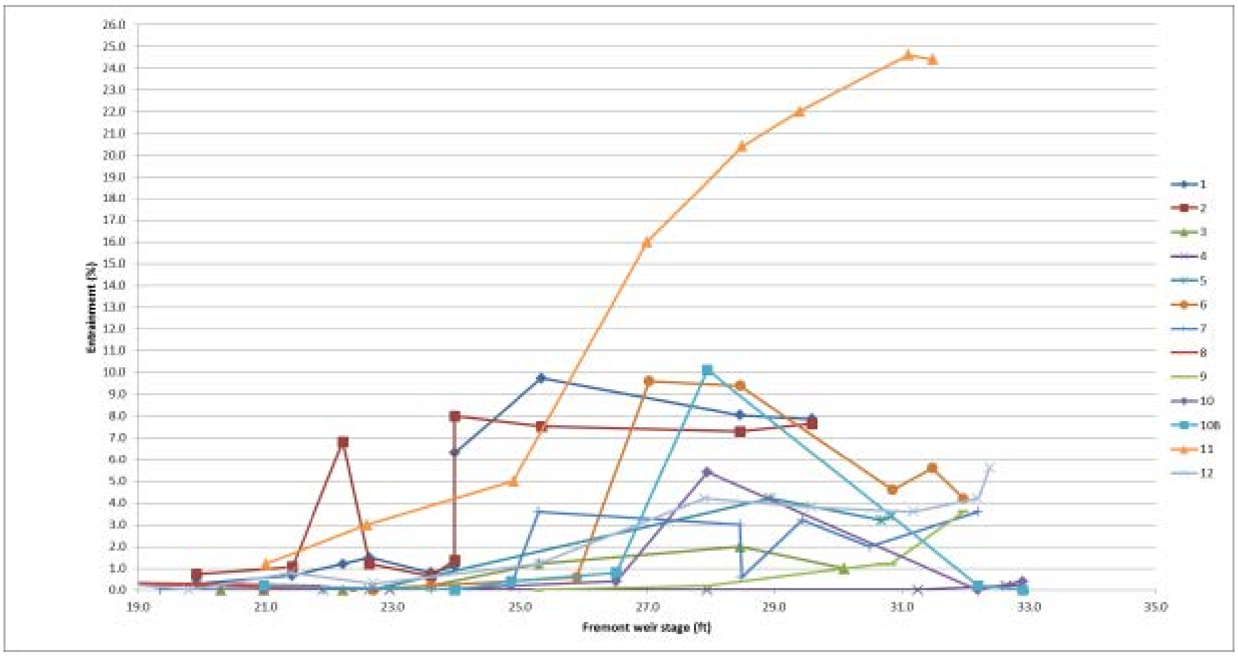
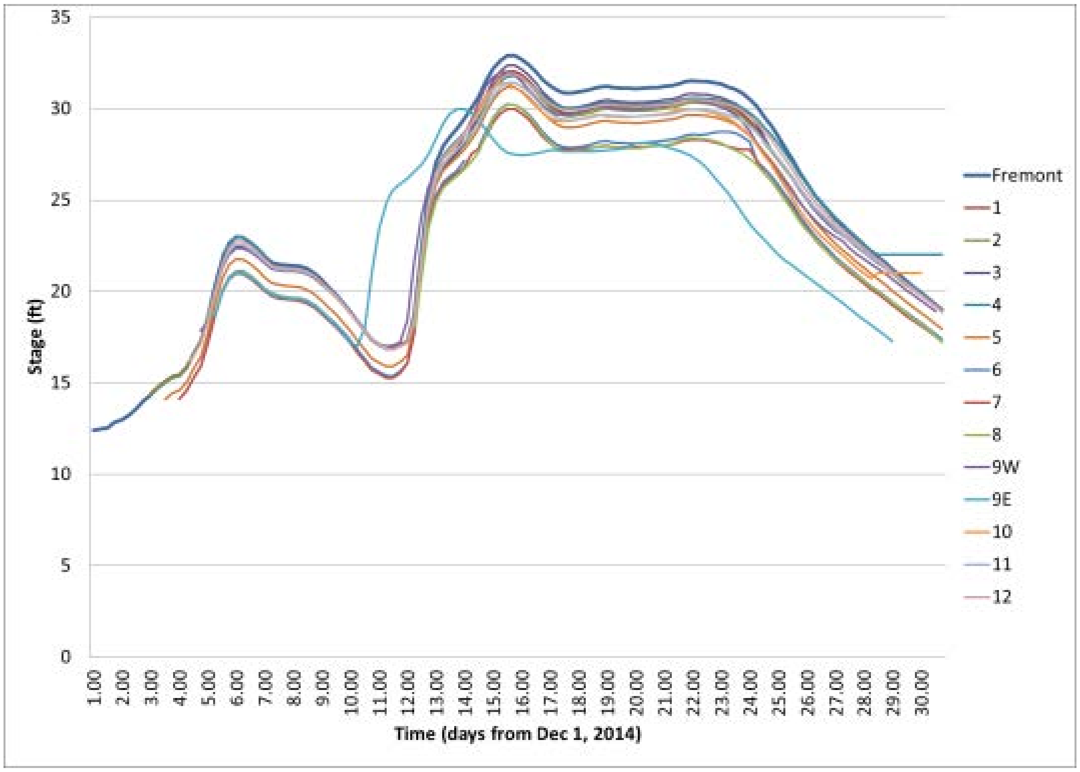


Table 2. Stage at Fremont and point estimates of entrainment for all ELAM scenarios.

Scenario	Fremint stage (ft)	Entrainment (%)	Scenario	Fremont stage (ft)	Entrainment (%)	Scenario	Fremont stage (ft)	Entrainment (%)	Scenario	Fremont stage (ft)	Entrainment (%)
1	19.9	0.3	4	23.0	0.0	8	22.7	0.0	11	21.0	1.2
1	21.4	0.7	4	27.9	0.0	8	17.3	0.4	11	22.6	3.0
1	22.2	1.2	4	31.3	0.0	8	21.8	0.2	11	24.9	5.0
1	22.6	1.5	4	32.6	0.2	8	22.3	0.0	11	27.0	16.0
1	23.6	0.8	4	32.9	0.2	9	25.3	0.0	11	28.5	20.4
1	24.0	1.1	5	21.9	0.0	9	27.9	0.2	11	29.4	22.0
1	24.0	6.3	5	22.6	0.0	9	30.7	1.2	11	31.1	24.6
1	25.3	9.7	5	28.9	4.2	9	30.8	1.2	11	31.5	24.4
1	28.5	8.0	5	30.7	3.2	9	32.0	3.6	12	17.8	0.6
1	29.6	7.9	5	30.9	3.4	10	21.0	0.0	12	19.8	0.0
2	19.9	0.7	6	21.0	0.0	10	24.0	0.0	12	21.4	0.8
2	21.4	1.1	6	22.7	0.0	10	24.9	0.2	12	22.7	0.3
2	22.2	6.8	6	23.6	0.2	10	26.5	0.4	12	25.3	1.2
2	22.6	1.2	6	25.9	0.6	10	27.9	5.4	12	27.9	4.2
2	23.6	0.7	6	27.0	9.6	10	32.2	0.0	12	29.6	3.8
2	24.0	1.4	6	28.5	9.4	10	32.9	0.4	12	31.2	3.6
2	24.0	8.0	6	30.9	4.6	10B	21.0	0.2	12	32.2	4.2
2	25.3	7.5	6	31.5	5.6	10B	24.0	0.0	12	32.4	5.6
2	28.5	7.3	6	32.0	4.2	10B	24.9	0.4			
2	29.6	7.6	7	19.3	0.0	10B	26.5	0.8			
3	20.3	0.0	7	23.6	0.0	10B	27.9	10.1			
3	21.0	0.0	7	24.9	0.2	10B	32.2	0.2			
3	22.2	0.0	7	25.3	3.6	10B	32.9	0.0			
3	23.6	0.2	7	28.5	3.0						
3	25.3	1.2	7	28.5	0.6						
3	28.5	2.0	7	29.4	3.2						
3	30.1	1.0	7	30.5	2.0						
			7	32.2	3.6						

Finally, we plot the modeled stage at Fremont weir and compared it to the modeled stage at each notch across the 12 scenarios for the month of December 2014 (Figure 25). The trend in stage highlights how the gage at Fremont weir, located upstream of the proposed scenarios, is the highest elevation as expected as the distance downstream increases the estimated river stage at the notch also decreases as is expected.

Figure 25. Modeled stage at Fremont Weir compared to stage at each notch entrance in ft, NAVD88.



6 Discussion

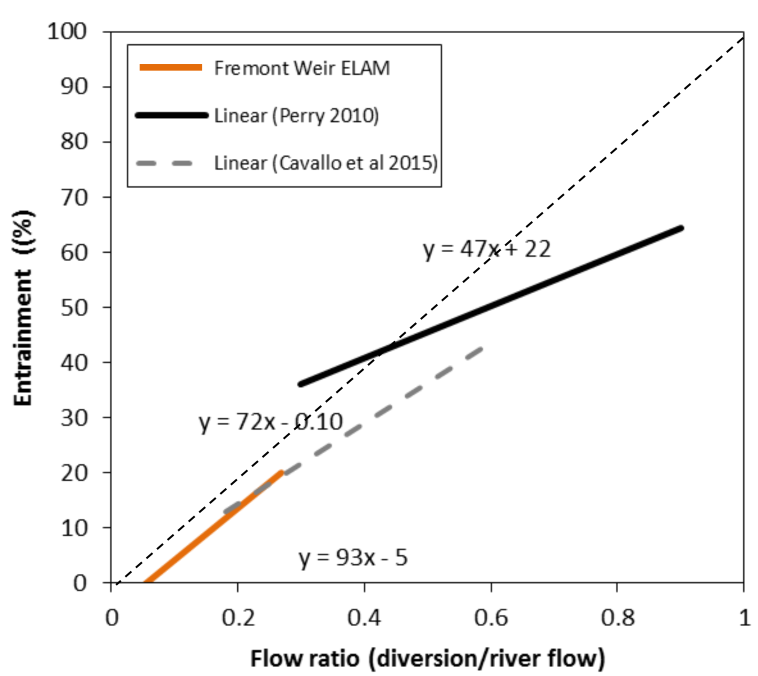
The ELAM was calibrated using fish telemetry data collected in 2015 (Steel et al. 2017) and the CFD simulations (Lai 2016). Once complete, additional CFD runs were made for proposed notches that represented different locations and notch designs (Lai 2017).

The broad pattern of entrainment across all scenarios finds that entrainments estimates vary from a low of approximately 1% to a high of approximately 25%. Ratio of entrainment flow to river flow correspondingly was 2 to 27%. These numbers broadly agree with several studies completed at the Georgianna Slough junction with the Sacramento River. Perry et al. (2014) measured the percentage of fish in 2011 entering Georgianna Slough, which ranged from 1 to 30% with 20 to 30% entering when a non-physical barrier was not operating. The flow split between Georgianna Slough and the Sacramento River was approximately 20% during the study period. Entrainment into Georgianna Slough is strongly dependent on tides and flows. The 2011 year was dominated by high non-reversing flows, conditions under which entrainment probabilities decline dramatically (Perry et al. 2015). Perry et al. (2015) summarized data from a wide range of sources and estimated an entrainment probability from negative to approximately 55% across a number of low flow years. The mean flow ratio between Georgianna Slough and the Sacramento River was 22% with a low of 15 and a high of -17% (more water going down Georgianna Slough than the Sacramento River). Perry (2010) found mean daily flow ratios between Georgianna Slough and the Sacramento River from 2007 to 2009 varied from approximately 30% to 80% and entrainment probabilities 30 to 55%. Finally, Cavallo et al. (2015) summarized data from Sacramento River diversions (Delta Cross Channel, Georgianna Slough, Head of Old River, Sutter Slough, Turner Cut) and concluded entrainment rates varied from 10% to 60% with diversion ratios of approximately 18% to 60%.

We plotted summary data from Perry (2010) and Cavallo et al. (2015) with the ELAM entrainment estimates to contextualize our findings (Figure 26). The data suggest that our entrainment estimates trend well with measured entrainment values within the Sacramento River. However, the diversion ratios proposed at the Fremont Weir notch are generally less than the reported data. In addition the slope relating river diversion ratio to entrainment differs with the ELAM estimates being the most sensitive to river diversion ratio. However, the entrainment estimates we developed overlap suggesting that the ELAM entrainment estimates are reasonable.

The Fremont Weir notch scenarios differ from Georgianna Slough in important ways. First, the proportion of water entrained varies from approximately 1% (Scenario 4) to 27% (Scenario 11). Only Scenario 11 approaches the ratios of flow diverted at Georgianna Slough. The remainder is considerably less. Georgianna Slough is also tidal and the reach has lower current velocities than the Fremont Weir reach which is often around 0.75 m/s. This suggests the exposure time of a fish to the diversion point is less in the Fremont Weir. Finally, cross channel distributions of fish in the Fremont Weir reach and the nearby USACE test reach at river mile 85.6 and 43.7 are relatively insensitive to discharge (Sandstrom et al. 2013, Singer et al. in review, Steel et al. 2017, Woods et al. in review) with most fish tending toward center channel. In comparison, cross channel distributions at Georgianna Slough vary with discharge and stage. Entrainment at any of the Fremont Weir notches may not be as dynamic or of similar magnitude as it is to Georgianna Slough.

Figure 26. Plot of ELAM estimates with comparable estimates from the Sacramento River. Cavallo et al (2015) line estimated by pulling values from graph and thus is an approximation. 1:1 line denotes when entrainment is proportional to entrainment flow.



The difference in slope between the ELAM and the Georgianna Slough may also be partially explained through differences in the river environment. The Fremont Weir is strongly advective and fish movement though this reach reflects that. In comparison, the tidal junction at Georgianna Slough induces upstream movement, station holding along the bank and in general more complicated swim paths. Of the studies, Perry et al. (2014) is the most comparable to the Fremont Weir because reversing flows were rare. The ratio between Georgianna Slough and the Sacramento River was approximately 16% and entrainment was approximately 22% when a non-physical barrier was not operating. This compares with a ratio of 27% flow for 25% entrainment for Scenario 11 (the largest notch evaluated).

We may underestimate entrainment for Scenarios 1, 2, 3, 4, 9, 11, and 12, all located in the western portion of the notch. This is because the spatial distributions of the modeled fish deviate from the measured distribution with the measured fish having a larger outside bend density. Broadly, the kernel density estimates overlap and agree but entrainment is sensitive to lateral position in the channel. The difference is likely due to not representing secondary circulations in the 2D hydraulic model. We believe this is acceptable because of the following reasons. First, developing 3D time varying RANS (Reynolds-averaged Navier–Stokes) simulations for all 12 alternatives was infeasible. Working in 2D allowed all the spatial domains to be represented. Future design work (as opposed to planning work) may need to consider 3D simulations. Second, the bias introduced by the lateral distribution is equal across all alternatives. Third, the ELAM estimates are comparable to other entrainment estimates from the Sacramento River suggesting whatever potential underestimation we report is likely within the range of variation we expect to see within existing measured entrainment data sets.

There are some additional caveats to this study as we presented model results that will apply to future engineering design and analysis.

6.1 Accuracy and precision in planning studies

This study has provided entrainment estimates for a range of scenarios. The results should be viewed cautiously for several reasons. First, there is no fish entrainment data for any notch that was modeled. We simply calibrated to existing conditions (base scenario) and extended that calibration to the 12 notch scenarios. Each notch scenario reported has an error bar associated with it which captures the variability of the entrainment as modified by varying ELAM boundary conditions slightly. Thus each scenario entrainment estimate is an ensemble estimate which is considered a best practice for physical system numerical modeling. However, since the real entrainment rate is unknown the raw estimates should not be viewed as absolute numbers. Rather, the entrainment estimates should be used as relative entrainment rates to highlight differences across scenarios. This is consistent with USACE best practice. Future work should include more detailed modeling and after construction measurement of notch performance.

6.2 Behavior

Fish have a near limitless level of behaviors that can be implemented and our representation is inherently limited by incomplete understanding. The behavior quantified in Steel et al. (2017) was simple but undoubtedly other behaviors which might influence movement were occurring but were not measured. In addition, the notch will change the local environment and expose fish to acceleration gradients in excess of what is found in the river. Elevated acceleration gradients generally repel migrating juvenile salmon.

In addition, data and behavior for fry sized salmon are largely unavailable. USACE studies suggest very limited numbers of fry size salmon near banks. Susceptibility of fry size salmon to a notch may be greater than smolts or, if fry size fish are migrating similarly to parr and smolts then entrainment estimates may correspond to results in this study. Finally, hatchery fish were used for calibrating of this study and may not be a surrogate for wild fish.

6.3 Notch flow and design

Across all scenarios larger notch flows entrain greater fish numbers, although not proportionally to the volume through the notch. West located notches entrain more fish than central and east and intakes perform better than shelfs. However, intakes and shelfs both performed poorly, regardless of notch flows, when intake channels were angled from the mainstem.

A primary exception to notch flows being the most important design criteria is demonstrated with Scenario 10B. Scenario 10B was a late modification of Scenario 10 and those modifications improved notch performance.

These findings highlight the importance of hydrodynamics along the upstream bank and angle of the intake off of the Sacramento River for optimizing fish entrainment. Additionally, the substantial biological response resulting from stakeholder-generated scenario design changes suggest this model can further analyze advance optimization exercises and higher-order design drawings.

6.4 Unknown factors that influence entrainment

When a notch is constructed it may closely resemble the scenarios examined in this study or it may deviate. We captured many details of each scenario including structural changes and bankline, bathymetry, and overbank changes. As the design goes forward additional details will be added and these details may begin to deviate from what was analyzed as part of this study.

6.5 2D data in 3D river

Depth information for fish is unavailable. The measured positions therefore are in 2D. Not having depth information induces uncertainty in the measured positions. As fish move deeper, as may occur in the river bend, the estimated path length measured in 2D diverges from the 3D path length. This bias is inherent in the fish position data used for this study.

6.6 Impact of bank structures on secondary circulations

Secondary circulations are one factor driving the lateral distribution of fish in the Sacramento River with the likely result of shifting fish positions toward the outside bank. When one of the scenarios is implemented and constructed, we would expect that the existing secondary circulation patterns in the vicinity of the notch will change. For example, bend way weirs are put along the outside bends of river expressly to disrupt secondary circulations. The end result may be that the constructed structure diminishes the tendency of to skew lateral distributions to the outside bend.

6.7 Low calibration flow

The 2015 fish telemetry work was completed at a low stage of approximately 14 ft. Additional data was collected in 2016 at much higher flows and as the design process moves forward using a wider range of fish data across more flows would help strengthen the modeling effort and support project completion more fully.

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8 Appendix 1: EIS/EIR Alternatives 1 through 6 Entrainment Estimates

8.1 Reason for Addendum

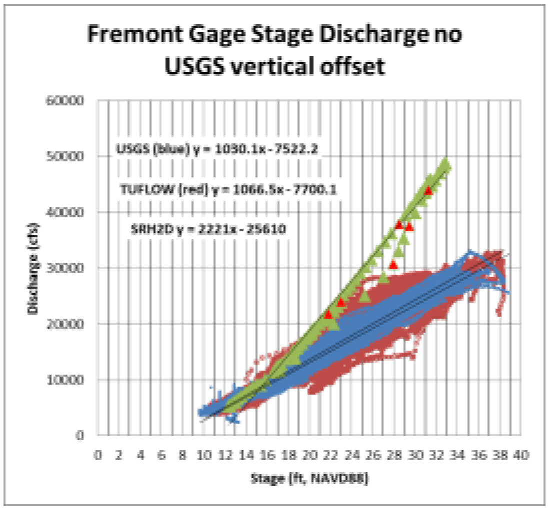
The EIS/EIR alternatives have been under refinement for the duration of the entrainment modeling with six near final concepts provided to the entrainment modeling team in early June 2017. This is long after the previous 12 scenarios had been run and summarized. The project required some additional simulations of the EIS/EIR alternatives to better capture the anticipated alternative differences.

Late input from USGS (mid-June 2017) noted that the 2D model (Lai 2016) likely was putting more water through the Sacramento River than is expected (Figure 27) while accurately representing the stage at Fremont Weir gage. The explanation for this is in Lai (2016) and simply reflects the unknown inflow locations of water flowing from the Sutter Bypass into the Sacramento River.

Reducing the flow in the model to match USGS provided suggestions will influence entrainment estimates because a larger portion of river water will be diverted at a notch for a given stage. The influence will be greater at higher stages. Therefore we reran the EIS/EIR Alternatives using the new flow information and by adjusting the boundary conditions as follows:

We adjusted the boundary conditions as follows. The difference in discharges between the old way and the new USGS way, i.e., Q_at_Fremont_OldWay-Q_at_Fremont_USGS, is added to Sacramento Slough Karnak first (up to 50 cms), and then to the Feather River confluence with the Sacramento River with the remaining flow. This way, the total discharge matches the 2014-2015 recorded discharge hydrograph at the Verona Station and the flows passing the Fremont Weir gage match USGS estimates.

Figure 27. USGS and DWR rating curves and the SRH2D output used for the entrainment estimates for the original 12 scenarios.



To evaluate how this impacts the overall conclusions of the analysis, we developed 36 separate simulations with 6 stages and flow based on the USGS rating curve for the Fremont Weir site. We decided to enhance evaluation across the EIS/EIR alternatives by running the exact same hydro for each alternative (Table 3). Some of these stages and alternatives are represented in the original 12 ELAM scenario analyses but with different flows and sometimes different geometries.

Table 3. New stages and flows used for the EIS/EIR Alternatives.

Stage (ft NAVD88) at Gage	Original Q (cfs) at gage	USGS rating curve Q (cfs)	Upper bound of data envelope (est)	Lower bound of data envelope (est)
21.79	21888	14925	14925	10546
22.99	24074	16161	16161	12800
27.94	30809	21261	27583	19300
24.5	28805	17717	27900	14364
29.44	37635	22806	27915	20200
31.22	45018	24640	28222	22546

With the new boundary conditions applied we found that the model predicted stage at the Fremont Gage (4th column in the Table 3) does not match the "nominal" stage in the first column. The model predicted stages are 1.5 to 2.4 ft lower than the nominal stage. We have matched the recorded stage and discharge at the Verona Station; at the same time we used the discharge through the Fremont Gage according to the USGS rating curve (Table 4). This mismatch suggests something else is going on. We conjecture that the mismatch may be caused by: (1) 2015 flow was towards the high end of the flows through the Fremont Gage area but we used the "average" flow according to the USGS rating curve, and/or, (2) unaccounted flow distribution along the Sutter Bypass flows back to the Sacramento River. Despite the mismatch, this set of new data should provide a new set of possible conditions occurring at the Fremont Weir site that may be used to address the variability issue.

Table 4. Stage and flow used for EIS/EIR Alternatives 1 through 6.

Stage(ft) at Fremont	Q(cms) at Fremont from USGS	Q(cms) at Fremont based on Old Way	Stage(ft) predicted by the model at Fremont
21.79	14952	16063	20.23
22.99	16161	17924	21.16
24.5	17717	20066	22.32
27.94	21261	26601	25.54
29.44	22806	30944	27
31.22	24640	42166	28.83

All entrainment simulations were run using the same boundary conditions as the twelve ELAM scenarios. No ensembles were developed due to time constraints. We anticipate developing the ensembles at a later date.

8.2 Results

Results are shown graphically (Figure 28) and with a Table (Table 5).

Figure 28. Entrainment estimates across flows and stage referenced to Fremont Weir gage.

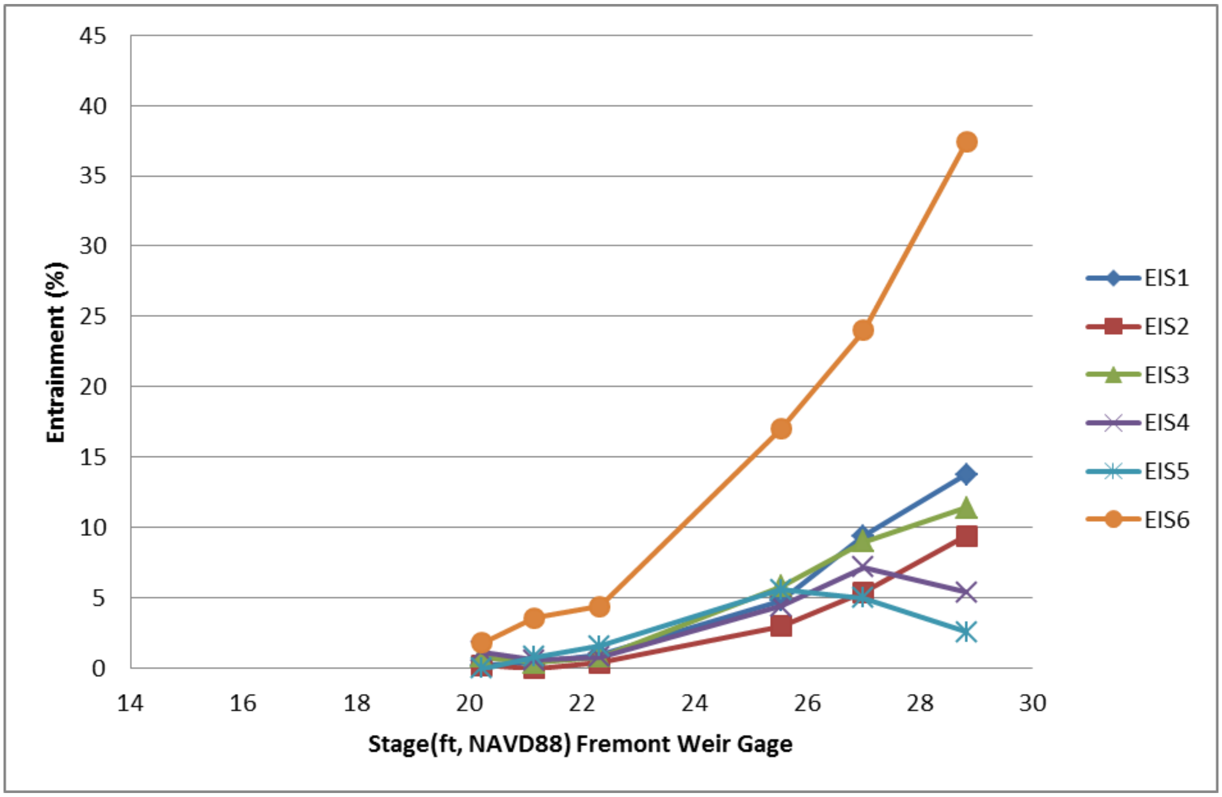


Table 5 .Entrainment estimates across flows and stage referenced to Fremont Weir gage.

Statge (ft) Fremont	Q (cfs) Fremont	EIS/EIR Alt 1	EIS/EIR Alt 2	EIS/EIR Alt 3	EIS/EIR Alt 4	EIS/EIR Alt 5	EIS/EIR Alt 6
20.23	14952	0.2	0.2	0.8	1.2	0	1.8
21.16	16161	0.4	0	0.4	0.6	0.8	3.6
22.32	17717	1	0.4	0.8	0.8	1.6	4.4
25.54	21261	4.8	3	5.8	4.4	5.6	17
27	22806	9.4	5.4	9	7.2	5	24
28.83	24640	13.8	9.4	11.4	5.4	2.6	37.4

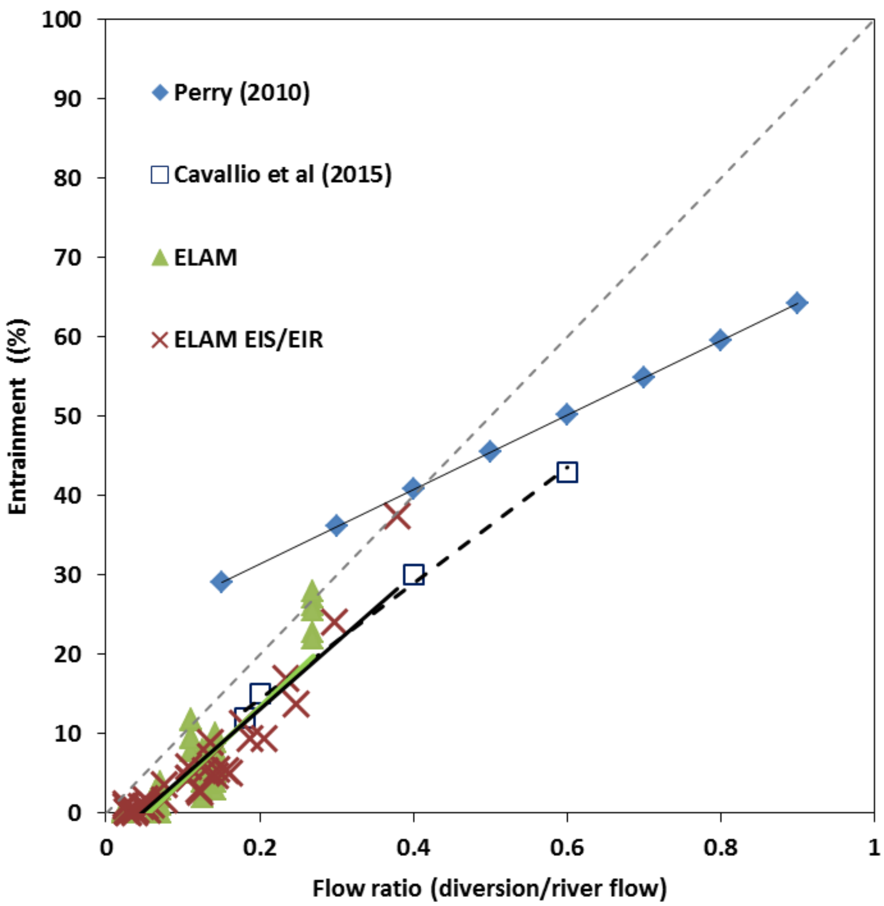
As expected, the lower flows (Column 3, Table 3) compared to the twelve ELAM scenario simulations compared well at the lower stages and flows (20.23 to 25.54 ft). At the higher flows and stages of 27 and 28.83 ft, the EIS/EIR tended to be higher. This is because the ratio of flow between the river and the notch is greater for the EIS/EIR alternatives than for the 12 ELAM scenarios.

Broadly, higher stages and entraining flows result in greater entrainment and entrainment is less than 5% for all alternatives at stages below 25.5 ft (NAVD88) at Fremont Weir gage.

One departure between the twelve ELAM scenarios and the EIS/EIR alternatives is EIS/EIR Alternative 1. EIS/EIR Alternative 1 is similar to Scenario 7. Both are located at the east end of the Fremont Weir and have similar flows with a nominal maximum of 6,000 cfs. However, EIS/EIR alternative 1 entrains approximately 14% of the fish at 6000 cfs while ELAM Scenario 7 entrains approximately 4% of the fish. The differences are attributable to dimensions of the EIS/EIR structure (Table 4).

We checked the entrainment estimates against report entrainments for Sacramento River salmon as a validation of our results (Figure 29). The new EIS/EIR Alternatives 1 through 6 entrainment estimates compare favorably with the twelve ELAM scenarios and also are reasonable when compared to actual entrainment rates in the Sacramento River.

Figure 29. Validation plot of estimated entrainments for the EIS/EIR Alternatives. Grey dashed line is the 1:1 line where entrainment is proportional to flow ratio.



8.3 Conclusions

1. The recommendation to use the entrainment estimates as relative indicators of notch performance when compared across all notches still stands. However, the favorable comparison with measured data comparing entrainment rates elsewhere in the Sacramento is encouraging and adds credibility to the analysis.
2. Broadly, higher stages and entraining flows result in greater entrainment and entrainment is less than 5% for all alternatives at stages below 25.5 ft (NAVD88) at Fremont Weir gage.
3. One departure between the twelve ELAM scenarios and the EIS/EIR alternatives is EIS/EIR Alternative 1. EIS/EIR Alternative 1 is similar to Scenario 7. Both are located at the east end of the Fremont Weir and have similar flows with a nominal maximum of 6,000 cfs. However, EIS/EIR 1 entrains approximately 14% of the fish at 6000 cfs while ELAM Scenario 7 entrains approximately 4%

of the fish. The differences are attributable to dimensions of the EIS/EIR structure (Table 6).

Table 6. Comparison of EIS/EIR Alternative 1 and ELAM Scenario 7 highlighted in green.

ELAM EIR/EIS Alternative Information									
EIR/S Alt	Location	Shelf/ Intake	Max Flow	Main Channel-Gate 1 (Invert) Ft.	Main Channel-Gate 1 (Width) Ft.	Elevated Channel Gates 2&3 (Invert) Ft.	Elevated Channel Gates 2 & 3 (Width) Ft.	Full Intake (Btm Width) Ft.	
1	East	Intake	6,000	14	34	18	27	98	
2	Central	Intake	6,000	14.8	40	18.8	27	104	
3	West	Intake	6,000	16.1	40	20.1	27	104	
4	West	Intake	3,000	16.1	40	20.1	27	104	
5	Central	Intake	3,000	14 (A), 17 (B)	10x3 (A), 10x3 (B)	20 [C], 23 [D]	10x10 [C], 10X11 [D]	75 [A&B], 128 [C], 140 [D]	
6	West	Intake	12,000	16.1	40 x 5	n/a	n/a	220	
ELAM Original Configuration Information									
Config #	Location	Shelf/ Intake	Max Flow	Main Channel-Gate 1 (Invert) Ft.	Main Channel-Gate 1 (Width) Ft.	Elevated Channel Gates 2&3 (Invert) Ft.	Elevated Channel Gates 2 & 3 (Width) Ft.	Full Intake (Btm Width) Ft.	
1	West	Shelf	6,000	14	36	20	23	82	
2	West	Intake	6,000	14	36	20	23	82	
3	West	Shelf	3,000	17	24	23	13	50	
4	West	Shelf	1,000	22	15	n/a	n/a	15	
5	Central	Shelf	6,000	14	36	20	23	82	
6	East	Shelf	6,000	14	36	20	23	82	
7	East	Intake	6,000	14	36	20	23	82	
8	East	Shelf	3,000	17	24	23	13	50	
9	Est&Wst	Shelves	3,000 EA	17	24	23	13	50	
10	Central	Intake	3,000	14 (A), 17 (B)	10x3 (A), 10x3 (B)	18 [C], 21 [D]	10x10 [C], 10X11 [D]	75 [A&B], 128 [C], 140 [D]	
11	West	Intake	12,000	16.1	40 x 5	n/a	n/a	220	
12	West	Intake	6,000	16.1	40	20.1	27	104	

EIS/EIR Alternative 1 is a good example of how using the ELAM approach is useful for project planning and alternative comparisons because the workflow allows preliminary designs to be represented with high fidelity. This assists with maintaining as much of the project details during the planning and ultimately designs phases of the project. The modification of ELAM scenario 7 into EIS/EIR Alternative 1 suggests that the ELAM workflow including the computer representation and subsequent flow field and fish modeling may ultimately result in a cost effective structure.

Finally, this workflow resulted in valuable and accurate spatial domains representing the bathymetry, topography, and structure suitable for subsequent planning and design including finite element modeling and computational fluid dynamics in two and three dimensions.

4. The EIS/EIR Alternatives were run at similar stages but lower flows than the ELAM Scenarios because of recent input from USGS and the stage discharge relationship in the Fremont Weir reach. The analyses of the ELAM 12 scenarios were completed with accurate stage estimates but elevated discharge estimates (Figure 23).

The effect of this is that there are higher river velocities in the model which translates into higher speed over ground estimates for simulated fish. In addition, the ratio of diverted flow to river flow is smaller suggesting that we may have underestimated the proportion of fish entrained. However, the new alternative results suggest that the higher flows did not grossly underestimate entrainment.

A Simulation Method for Combining Hydrodynamic Data and Acoustic Tag Tracks to Predict the Entrainment of Juvenile Salmonids onto the Yolo Bypass Under Future Engineering Scenarios

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July 21, 2017

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1. Executive Summary

During water year 2016 the U.S. Geological Survey California Water Science Center (USGS) collaborated with the California Department of Water Resources (DWR) to conduct a joint hydrodynamic and fisheries study to acquire data that could be used to evaluate the effects of proposed modifications to the Fremont Weir on outmigrating juvenile Chinook salmon. During this study the USGS surgically implanted acoustic tags in juvenile late fall run Chinook salmon from the Coleman National Fish Hatchery, released the acoustically tagged juvenile salmon into the Sacramento River upstream of the Fremont Weir, and tracked their movements as they emigrated past the western end of the Fremont Weir.

The USGS analyzed tracking data from the acoustically tagged juvenile salmon along with detailed hydrodynamic data collected in the Sacramento River during the winter/spring of water year 2016 in the vicinity of the western end of the Fremont Weir to assess the potential for enhancing the entrainment of Sacramento River Chinook salmon onto the Yolo Bypass under six different Fremont Weir modification scenarios. Each modification scenario consists of a notch or multiple notches in the Fremont Weir which are designed to divert a portion of the Sacramento River onto the Yolo Bypass when the Sacramento River is below the crest of the Fremont Weir. The primary goal of this entrainment analysis was to investigate how the location of the notch or notches in each scenario affected the entrainment of juvenile Chinook salmon onto the Yolo Bypass, and to predict the notch location or locations that would result in maximum entrainment under each modification scenario.

Stumpner et al.'s (in review) analysis of hydraulic data collected during the 2016 study period showed that backwater effects in the Sacramento River created significant variability in the relationship between Sacramento River stage and the proportion of the Sacramento River flow that we expect to be diverted onto the Yolo Bypass under the modification scenarios. Because of this variability, accurately evaluating the entrainment potential of possible notch locations for each scenario required combining historic abundance data for juvenile Sacramento River Chinook salmon with historic hydraulic data for the Sacramento River in the vicinity of the Fremont Weir, so that the entrainment estimates would reflect the covariance between Sacramento River stage, Sacramento River discharge, and juvenile salmon abundance within the historic record.

We used a Monte Carlo simulation framework to combine the high resolution hydrodynamic data and acoustic tag track data collected in 2016 with historic juvenile salmon abundance, Sacramento River stage, and Sacramento River discharge data from a period spanning water years 1996-2010 to assess the entrainment potential of different weir modification scenarios under historic conditions. The scenarios we simulated consisted of four single notch configurations, and two multiple notch configurations in the vicinity of the western end of the Fremont Weir. For each notch configuration the 15-water-year entrainment simulation was repeated for 63 possible notch locations in the vicinity of the western end of the Fremont Weir. This approach allowed us to assess the effect of notch location on the entrainment of juvenile salmonids onto the Yolo Bypass for each of the six notch configurations that we evaluated.

The entrainment simulations showed that the location of each notch configuration had a major impact on the entrainment for each scenario; the predicted entrainment of some scenarios varied by as much as 400% based on where the notch (or notches) was (were) located in the study area. All of the single notch scenarios performed best when they were located within a 330 ft (100 meter) long section of the Sacramento River bank adjacent to the western terminus of the Fremont Weir (Table 1). Both of the multiple notch scenarios performed best when their upstream notches were located about 660 ft (200 meters) upstream of the western terminus of the Fremont Weir (Table 1). The results of the entrainment simulations indicated that for each notch configuration the same notch location produced near-maximum entrainment regardless of run abundance timing; this result suggests that there are areas within the study are where a notch (or notches) can be sited to achieve maximum entrainment for all runs (barring significant behavioral or physiological differences between runs). In addition, the simulation results indicate that for each notch configuration the same location is expected to produce near-maximum entrainment for both wet water years and dry water years.

Based on the results of the entrainment simulation we make three general recommendations for strategies to improve the entrainment potential of a notch in the Fremont Weir:

1) Comparisons between the maximum entrainment potential for each scenario suggested that total entrainment of winter run, spring run, and fall run salmon onto the Yolo Bypass can be increased by increasing the amount of water entering a notch when the Sacramento River stage is between 19 ft and 22 ft NAVD88; this could be accomplished by lowering notch invert elevations or by adding a control section to the Sacramento River to raise stage for a given discharge.
2) The relationship between Sacramento River stage and entrainment for each scenario indicated that entrainment efficiency for each scenario declined significantly once Sacramento River stage exceeded bankfull (approximately 28.5 ft NAVD88). This effect was likely due to inundation of the floodplain between the Sacramento River and the Fremont Weir; Stumpner et. al (In Review) have documented a reduction in the strength of the secondary circulation and centralization of the downwelling zone in the Sacramento River when this floodplain is inundated. Therefore, increasing the height of the river right bank of the Sacramento River to coincide with the height of the Fremont Weir is recommended to increase entrainment at higher stages.
3) Bathymetric features upstream of notch openings appeared to have a major impact on the entrainment potential of the simulated notches. For this reason we recommend taking care to avoid siting notches immediately downstream of bank features that alter the sidewall boundary layer, and we expect that smoothing the bank bathymetry upstream of a notch will enhance entrainment.

Finally, we caution that the entrainment simulation was based on the behavior of large hatchery smolts, so it is likely that our results will be sensitive to any differences in behavior and physiology between these hatchery surrogates and naturally migrating juvenile salmon.

Table 1 - Summary of scenario performance

Percent of yearly juvenile salmon abundance entrained onto the Yolo Bypass under each scenario, by run, for the notch locations that resulted in maximum fall run entrainment for each scenario. The mean yearly percent of yearly abundance entrained is given along with 90% bootstrap confidence intervals in parentheses. The final row gives the along-stream coordinate of the notch location that resulted in peak entrainment for fall run under each scenario; see figure 4 for a map showing the along-stream coordinate system in the study area.

	Scenario 1	**Scenario 2**	**Scenario 3**	**Scenario 4**	**Scenario 5**	**Scenario 6**
Fall Run	12% (6%-21%)	9% (2%-21%)	28% (12%-43%)	15% (3%-28%)	6% (2%-12%)	8% (2%-15%)
Spring Run	9% (4%-15%)	7% (4%-14%)	22% (6%-42%)	16% (9%-20%)	5% (1%-11%)	7% (2%-13%)
Winter Run	9% (2%-17%)	7% (2%-15%)	23% (4%-42%)	15% (8%-23%)	5% (2%-11%)	7% (4%-13%)
Late Fall Run	5% (0%-12%)	4% (0%-11%)	11% (0%-38%)	9% (1%-20%)	2% (0%-10%)	3% (0%-12%)
Location of notch at peak entrainment (UTM Zone 10S, m, NAD83)	615849E, 4290952N	615849E, 4290952N	615780E, 4290905N	615849E, 4290952N	615636E, 4290860N	615636E, 4290860N
Along stream coordinate of notch at peak entrainment	495 m	495 m	415 m	495 m	265 m	265 m

2. Acknowledgements

We wish to thank the State and Federal water contractors and the Department of Water Resources (DWR) for their support in funding the 2016 experiment, the analysis of the data and the writing of this draft report. Thanks to Curt Schmutte (DWR, retired) and managers at the Metropolitan Water District (MWD) for their support for this effort. To our DWR program manager, Brett Harvey and our DWR contracting manager Jacob McQuirk: thanks for dealing with all the contracting/purchasing issues associated with doing things on short notice, and in helping to guide the experiment and facilitating interagency coordination/communication. Ted Sommer, DWR, provided insightful comments on the initial draft proposal for this work and, along with Brett Harvey, helped guide the adaptive management of the study.

As always, these experiments involve many dedicated and talented folks spending lots of time in the field under challenging conditions - nasty weather and high water, in this case. None of the results from any of our studies would be possible without our exceptional field teams: the heroic efforts of our fish tagging and release teams, led by Marty Liedtke (USGS Columbia River Research Laboratory), and our instrument programming, deployment, and recovery teams, led by Chris Vallee (USGS California Water Science Center), are gratefully acknowledged.

3. Introduction

During the winter and spring of water year 2016 the U.S. Geological Survey California Water Science Center (USGS) collaborated with the California Department of Water Resources (DWR) to conduct a joint hydrodynamic and fisheries study to acquire data that could be used to evaluate the effects of proposed modifications to the Fremont Weir on outmigrating Chinook salmon. During this study the USGS and CADWR deployed and operated an array of hydrophones in a bend in the Sacramento River upstream of the confluence with the Feather River (figure 1, figure 2), that allowed researchers to track acoustically tagged juvenile Chinook salmon in the horizontal plane as they emigrated through the hydrophone array. During the winter and spring of water year 2016 researchers surgically implanted juvenile late fall run Chinook salmon from the Coleman National Fish Hatchery with acoustic tags and released the fish in small batches upstream of the study area, with the goal of obtaining fish tracks over the range of Sacramento River stage values that were likely to be relevant to the design of weir modifications (Liedtke and Hurst, 2017). During this time period the USGS and CADWR collected high resolution water velocity measurements throughout the study area over a range of Sacramento River stage values. Additionally, the USGS deployed, rated, and operated a temporary index velocity gauge in the vicinity of the study area to estimate the discharge in the Sacramento River entering the study area.

The USGS analysis of the data from the 2016 study was focused on three primary areas:

1) summarizing the information obtained from the acoustic tag tracking array and estimating the spatial distribution of the acoustically tagged study fish;
2) analyzing the hydrodynamic data to improve our understanding of the physical processes in the Sacramento River that may influence the design of weir modifications, and
3) Combining the hydrodynamic analysis with the acoustic tag data to estimate the entrainment potential of notch modification scenarios.

The USGS's hydrodynamic analysis is presented in Stumpner et al., In Review, while this report focuses on combining the fish tracking data with the high resolution hydrodynamic data to evaluate the entrainment potential of weir modification scenarios in order to answer the following questions: (1) Which location or locations resulted in maximum entrainment for each run under each scenario? (2) How robust are these locations to changes in run abundance and water year? (3) What can we learn from the relationship between stage and entrainment for each scenario that may be useful for optimizing weir modifications?

In past studies the USGS has found that the spatial distribution of acoustically tagged fish can be combined with hydrodynamic data to reveal, and in some cases predict, the entrainment rate of juvenile Chinook salmon at tidally forced riverine junctions on the Sacramento River (California Department of Water Resources, 2012, 2015, and 2016). This past research at the Georgiana Slough junction showed that the proportion of water diverted into a junction branch was a key variable affecting the entrainment of acoustically tagged juvenile Chinook salmon transiting a junction (California Department of Water Resources, 2012, 2015, and 2016).

Our analysis of the temporary index velocity gauge data from the Sacramento River upstream of the Fremont Weir (Stumpner et al., In Review) showed that backwater effects in the Sacramento River caused by the Sutter Bypass and the Feather River created substantial variability in the stage-discharge relationship for the Sacramento River at the study area (Figure 3). This variability meant that the proportion of Sacramento River discharge that was expected to be diverted onto the Yolo Bypass under each modification scenario would not be a constant function of Sacramento River stage (The ratio of Sacramento River discharge to notch discharge is called the scenario Discharge Ratio, see Stumpner et al., In Review, for a more detailed discussion). As a result, our expectation was that entrainment under each scenario would vary as a function of Sacramento River backwater condition, because the proportion of the Sacramento River that was diverted onto the Yolo Bypass would be controlled by backwater conditions.

Because of the variation in scenario discharge ratios caused by backwater effects, assessing the entrainment potential of each scenario required an approach that accounted for the structure of the joint probability distribution that describes the probability of a fish belonging to a specific run of Sacramento River Chinook salmon transiting the study area under any possible backwater condition. We addressed this challenge by using a Monte Carlo simulation approach for evaluating the entrainment potential of modification scenarios using historical time series of Sacramento River stage, Sacramento River discharge, and the abundance of fall run, winter run, spring run, and late fall run Chinook salmon. The result of this simulation approach was a time series of estimated entrainment for each run under each modification scenario; when these time series were summed they produced an estimate of total entrainment for a run that was a function of the hydraulic conditions (discharge, stage, backwater condition) during the simulation period weighted by the relative abundance of the run over the range of hydraulic conditions measured during the simulation period. Thus, this approach implicitly accounted for the joint probability of run abundance and backwater condition within the simulation period.

The basic structure of the entrainment simulation was a Monte Carlo bootstrap simulation; at each time step within the simulation a bootstrap sample of acoustic tag tracks for each run was drawn from the pool of all acoustic tag tracks collected during the 2016 study, and then hydrodynamic data collected during the 2016 study period was used to determine which of the tracks in each bootstrap sample were entrained under each modification scenario. The key to the entrainment simulation was that at every time step the bootstrap sample size for each run was determined by the historic abundance data for each run, and the sampling weights used for the bootstrapping were a function of the hydraulic conditions when each acoustic tag passed through the study area relative to the hydraulic conditions for the simulation time step.

The primary goal of the entrainment simulation was to estimate the effect of notch location on the entrainment of juvenile Chinook salmon for each modification scenario in order to provide insights that can be used to aid in site selection for each of the proposed alternatives. Because the cross-stream distribution of discharge at any location within the study area is a function of Sacramento River stage and discharge (see Stumpner et al., In Review for more details), we expect that differences in entrainment between possible scenario locations will also be a function of Sacramento River stage and discharge. As a result, we performed the full Monte Carlo bootstrap simulation process for each run of Sacramento River Chinook salmon under each modification scenario **at each of the 63 alternative scenario locations within the study area** (Figure 5, Appendix A). This approach allowed us to explore the effects of notch location on entrainment over a range of hydraulic conditions given the historic abundance timing for fall run, winter run, spring run, and late fall run Chinook salmon. The entrainment stimulation resulted in an extremely rich dataset that consisted of covariate values and the resulting entrainment estimates for each run, at each location, under each scenario for every time step.

4. Methods

The basic structure of the entrainment simulation was a Monte Carlo bootstrap simulation that performed three fundamental functions at each time step: (1) Estimating covariate values (Sacramento River stage, Sacramento River discharge, notch discharge) and run abundance for each time step, (2) Selecting a bootstrap sample of acoustic tag tracks based on time step covariate values for each run of Chinook salmon, and (3) determining whether each track was entrained under each scenario. In this section we will provide an overview of the simulation with pseudocode summarizing the simulation process, followed by a detailed description of the methods used to perform each of the core simulation functions. The final section of the methods contains a detailed description of the weir modification scenarios included in the entrainment simulation.

4.1. Overview of entrainment simulation process

4.1.1. Along-channel cross-channel coordinate system

We created an along-channel, cross-channel curvilinear coordinate system for the study domain that was used to place each of the 63 scenario evaluation location cross-sections at uniform increments in the along-channel direction. The along-channel axis is roughly parallel to the river right bank of the Sacramento River in the study area at a stage of 28 ft, USGS survey, NAVD88, and the cross-channel axis is defined as always instantaneously normal to the along-channel axis. The along-stream coordinate systems is shown in figure 4, and the 63 notch evaluation cross-sections are shown for a Sacramento River stage of 28.5 ft in figure 5.

4.1.2. Simulation Period

For consistency with other analyses we used Knights Landing catch data provided by the Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project team to estimate abundance for each run of juvenile Chinook salmon within the entrainment simulation (see California Department of Water Resources, 2017). The abundance time series limited the simulation period to water years 1997-2011. Within these water years the simulation only estimated entrainment during the prescribed structural operational window of November 1 through March 15, outside of this period entrainment was set to zero within the simulation. Within this document we refer to the structural operational window as the “notch operation season” or “season”. Within this document notch operation seasons are named by the year in which operations began for the season, so the notch operation season from November 1, 1996 - March 15, 1997 is referred to herein as the 1996 season.

4.1.3. Simulation Time Step

Our analysis of historic data from the Fremont Weir gauge operated by CADWR showed that Sacramento River stage in the vicinity of the Fremont Weir can increase rapidly during the winter and spring freshets associated with juvenile salmon outmigration on the Sacramento River. For example, during the 2016 study period Sacramento River stage increased 13.45 feet over a two day period (Figure 6). Additionally, the Knights Landing rotary screw trap data Catch Per Unit Effort (CPUE) is highly episodic in nature; a large percentage of the yearly CPUE for a run can occur of the course of several days (Figure 7). The combined effect of these two factors is that there are days within the simulation period when there is significant CPUE for a run of Sacramento River Chinook salmon and Sacramento River stage changes rapidly (Figure 8). As a result, we chose a time step of 4 hours for the simulation, because this time step would limit the maximum change in stage between time steps to about 1 foot during days when the yearly fraction of CPUE was much greater than 1%.

4.1.4. Pseudocode summary of entrainment simulation

The core functionality of the entrainment simulation is summarized in pseudocode below:

For every time step

1. Estimate Sacramento River Discharge, Sacramento River Stage and Abundance of each run of Chinook salmon

    For every location in the study area

    1. Estimate the cross stream distribution of discharge at this location, given Sacramento River Stage; F(Sacramento River stage, notch location)

        For every scenario

        (There is another loop nested here for multi notch scenarios that is not shown)

        1. Estimate the discharge through the notch(es) given Sacramento River Stage; F(Sacramento River stage)
        2. Estimate the location of the critical streakline (see Stumpner et al, in review) given Sacramento River discharge, notch discharge, and the cross stream distribution of Sacramento River discharge; F(Sacramento River stage, Sacramento River discharge, notch discharge)

            For every run

            1. Estimate a discrete abundance for this run using the Knights Landing catch data
            2. Draw a weighted random sample of tracks from the pool of observed 2016 tracks with weights determined by the Sacramento River Stage and Sacramento River discharge when each fish

track was collected, based on the time step's Sacramento River Stage and Sacramento River discharge. The size of this sample is determined by the discrete abundance estimated above.

For every track

1. Determine if the track is entrained in the notch; if the track is to the notch side (river right) of the critical streakline at the cross section being evaluated, it is entrained, otherwise it is not entrained.
2. Increment all entrainment logs
3. Store all covariates for this location, run, scenario, and time step.

End All

4.2. Estimating covariate values at every time step

4.2.1. Estimating Sacramento River Stage and Sacramento River Discharge

The methods used to develop time series for the physical covariates used in the entrainment simulation are described in detail in Stumpner et al., In Review. Sacramento River stage in the study area was estimated by applying a correction of -0.5 ft to hourly historical data collected at the Fremont Weir gauge by CADWR, after this historical data had been corrected to the 2016 CADWR NAVD88 datum. The reasons for this correction are discussed in depth in Stumpner et al., In Review; in brief, this correction produced good agreement between the CDEC data and the USGS temporary index velocity gauge measurements (figure 6, lower panel), and this correction improved the agreement between CDEC data and USGS surveys of the water surface elevation. **Within this report and its figures we refer to the USGS estimate of Sacramento River stage at the western end of the Fremont Weir as "USGS survey, NAVD88",** to avoid confusion between the USGS estimates of Sacramento River stage and the CDEC data.

Sacramento River discharge in the study area was estimated using a regression model using historic data from other stage and discharge gauges in the region (see Stumpner et al., In Review for details). This regression model produced hourly discharge estimates that are in good agreement with our 2016 index velocity data (Figure 6, upper panel), however, there were a limited number of time steps (2.3% of simulation time steps during notch operational periods) when the historic data needed for this regression was not available. For these time steps Sacramento River discharge was estimated by means of a weighted random draw on Sacramento River stage using the full range of historic stage and discharge estimates available (Water years 1990-2016). The weights for each draw were calculated using a normal distribution with the distribution mean equal to the time step's stage, and a std of 0.167 ft; this weighting function resulted in ~95% of the randomly drawn discharge samples being selected from historic estimates for time periods when Sacramento River stage was within 4 inches of the stage value for the simulation time step. We used this stochastic approach to fill in missing data in order to assure that the resampled data reflected the historical covariance between Sacramento River stage and Sacramento River discharge at the study site.

4.2.2. Estimating abundance at each time step

At each time step the bootstrap sample size for each of four runs of Sacramento River Chinook salmon (fall run, spring run, winter run, and late fall run) was determined using historic estimates of abundance of these runs. We used the estimated daily percent of yearly catch per unit effort (CPUE) time series from the Knights Landing catch data provided by the Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project team to estimate abundance for each run. The daily percent of yearly CPUE time series for each run normalized each run's daily CPUE by the total CPUE for that run over the trap operational season for each year, so that each water year's CPUE was weighted equally within the simulation; the total abundance for the 15-water-year simulation period sums to 1500% (see California Department of Water Resources, 2017 for more information on this normalization). Using the normalized daily CPUE data assured that the results of the entrainment simulation were not weighted towards years of extremely high CPUE because each water year's daily percent of yearly CPUE summed to 100%. For consistency with other analysis performed by the Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project team we filled in missing values in the Knights Landing daily percent of yearly CPUE data with zeroes.

In order to use the Knights Landing data to calculate a bootstrap sample size for each time step the daily Knights Landing data had to be apportioned between 4 hour time steps. We chose to apportion the daily catch data uniformly between the six time steps that occurred within each day (based on a 4 hour time step), with a new day's catch beginning at the time step that occurred at 00:00 hours on each day. With this approach the catch for time step 1-6 on any day summed to the Knights Landing catch for the entire day (Figure 9). Within the context of the entrainment simulation this approach was analogous to assuming a uniform probability distribution for abundance as a function of hour for each hour within a day; this approach allowed us to run the simulation at a fine enough time scale to capture rapid changes in stage and discharge while maintaining the temporal resolution of the Knights Landing catch data.

The final step in converting the Knights Landing daily percent of yearly CPUE data into a discrete bootstrap sample size for each run was to convert time step proportion of daily percent of yearly CPUE to a discrete sample size. Because daily percent of yearly CPUE could be quite low, we multiplied the time step fraction of daily percent of yearly CPUE by 1000 and rounded the result to the nearest integer to obtain a discrete sample size for each time step (Figure 9). We chose the multiplier of 1000 so that the majority of time steps with low abundance would have a non-zero sample size. This approach resulted in bootstrap sample sizes of one or two tracks for periods of extremely low abundance, sample size of 100-1000 for many of the time steps when abundance was non-zero, and extremely high sample sizes for a small number of time steps when abundance was large (Figure 10). Within this report we refer to the time series of discrete sample sizes for each run at each time step as the "discrete abundance" for each run. These time series summed to slightly less than 1500% for the entire simulation period due to the conversion from continuous catch data to discrete sample sizes. For the purpose of our analyses we used the discrete abundance time series for all entrainment normalizations.

4.3. Drawing the bootstrap sample

At each time step, we drew a discrete sample of acoustic tag tracks to represent the fish available for entrainment for each run based on the discrete abundance time series. For each bootstrap sample tracks were drawn from the pool of all 2016 tracks using weighted random sampling with replacement. Bivariate weights for each of the 2016 tracks were calculated at each time step based on the stage and discharge at the time that each 2016 track entered the study area, given the stage and discharge for each simulation time step. The bivariate weights were calculated using the Matlab ® mvnpdf function (MathWorks ®, Inc. 2017) to estimate a bivariate normal distribution with mean discharge and stage values equal to the time step discharge and stage values, and the covariance matrix computed from a subset of the USGS estimates of historic Sacramento River stage and discharge for water years 1990-2016. The subset of data used to compute the covariance matrix at each time step was defined as all historic data having a stage value within +/- 0.623 ft of the time step stage, and having a discharge value within +/- 638 cfs of the time step discharge. The stage and discharge radii criteria used to select the covariance data for each time step were 1/10th the standard deviation of the stage and discharge values for the entire pool of 2016 fish tracks. The radii criteria was chosen as a balance between the need to maintain diversity in the bootstrap pool against the need to select a bootstrap pool that reflected the covariate values for each time step. Figure 12 and figure 13 illustrate the bivariate weighting function and resulting sampling for two combinations of Sacramento River stage and discharge.

We chose to use a bivariate weighting function because of the variance in the relationship between stage and discharge within simulation period and within the period when the 2016 acoustic tag tracks were collected (figure 11). Because of this variance the relative “suitability” of a track for estimating entrainment should be a function of both the stage and discharge when the track was collected (figure 12, figure 13). By computing the covariance matrix for the weighting function at every time step we allowed the historic covariance between stage and discharge to determine the relative importance of stage and discharge to the weighting function at any point in the stage-discharge space. Finally, the bivariate weighting improved sample selection over univariate approaches (not shown) at locations in the stage-discharge space where the pool of acoustic tag tracks was sparse by allowing the sampling to select tracks based on both stage and discharge (figure 13).   The same bootstrap sample drawn for each run at a given time step was used to evaluate entrainment under each scenario at each of the 63 evaluation locations.

4.4. Determining entrainment of bootstrap sample tracks

For every time step, each track in a run’s bootstrap sample was classified as either entrained or not entrained under each scenario based on the cross-stream location of each fish track relative to the cross-stream location of the critical streakline, at each of the notch evaluation locations shown in figure 5. The techniques used to estimate the location of the critical streakline are discussed in detail in Stumpner et al. (In Review), and the theory behind using the location of the critical streakline to predict the routing of juvenile Chinook salmon in river junctions is covered in detail in California Department of Water Resources, 2016. We present a summary of the critical streakline method below, followed the application of this approach to the methods used in the entrainment simulation. Within these sections we describe the approach to estimating entrainment at a single possible notch location; these steps are repeated for each of the 63 possible notch locations shown in Figure 5. The details of each simulated notch are discussed in section 4.5 below.

4.4.1. Fundamentals of the critical streakline method

For the purpose of this analysis, the critical streakline was the hypothetical cross-stream dividing line upstream of the notch that separated water that would go into the notch from water that would continue down the Sacramento River under each scenario. The cross-stream location of the critical streakline upstream of the notch was estimated from the cross-stream distribution of bathymetry and discharge immediately upstream of the notch, using techniques that the USGS developed for estimating the location of the critical streakline in tidally forced river junctions.

The USGS hydrodynamics group has worked on refining and testing various techniques for estimating the location of the critical streakline in tidally forced river junctions since 2009, and we have worked with members of the USGS Columbia River Research Lab to test whether the location of the critical streakline can be used to predict the fate of fish moving through tidally forced river junctions, using data collected during the CADWR Georgiana Slough studies (CADWR, 2012, 2015, 2016). Our analysis of the 2011, 2012, and 2014 Georgiana Slough barrier studies showed that the cross-stream location of the critical streakline relative the cross stream location of a fish immediately upstream of a junction is a good predictor of an individual fish's fate within the junction, and a very good predictor of aggregate entrainment rates when these predictions are summed over a group of fish (ibid). Based on this body of work, the USGS hydrodynamics group has developed the critical streakline approach to estimating entrainment in tidally forced riverine junctions, which can be simply summarized as follows:

1. Use hydrodynamic data to estimate the location of the critical streakline immediately upstream of a junction (or notch), and
2. Use the cross stream location of the critical streakline to apportion fish mass into the downstream branches of the junction, either in an aggregate sense (using fish density distributions), or on an individual basis (one track at a time).

For the purpose of this analysis we considered the upstream end of each scenario's notch to be a river junction, with the one branch of the junction being the Sacramento River, the other branch of the junction being flow passing through the notch. Fish tracks were classified as either entrained or not entrained based on their cross-channel location relative to the critical streakline when they reached the junction of the notch and the Sacramento River.

4.4.2. General approach to estimating the location of the critical streakline

Over the course of previous Georgiana Slough studies the USGS hydrodynamics group has explored various techniques for estimating the location of the critical streakline (ibid). The most accurate approach (CADWR 2016) developed by the USGS, and the approach used herein, is to integrate an estimate of the two-dimensional cross-stream velocity distribution upstream of the junction to estimate the cross-stream distribution of discharge immediately upstream of the junction. The first step in this approach is to estimate a cross-stream velocity field upstream of the junction.

For this analysis we estimated the cross-stream velocity field at multiple locations in the Sacramento River by combining multiple velocity profiles measured at uniform intervals in the river cross-section using downward-looking ADCPs (see Stumpner et al., In Review) along with extrapolated velocity profiles for unmeasured areas near each bank. We extrapolated velocity profiles using a ⅙-power law for the shape of the horizontal and vertical velocity profile (see Stumpner et al., In Review). The mean location of the critical streakline was then determined by integrating the resulting velocity field from the river bed to the water surface across the channel starting from the river right bank until the discharge from this integration matched the discharge entering the notch. This location was the estimated mean location of the critical streakline; we refer to this location as the “mean location” because in real flows turbulent perturbations to the mean velocity field will result in changes in the instantaneous location of the critical streakline.

4.4.3. Estimating entrainment within the simulation: estimating cross stream distribution of discharge at each location given Sacramento River Stage.

4.4.3.1 Estimating cross-stream distribution of discharge at measured transect locations and stages

During 2015, 2016, and the spring of 2017 the USGS and DWR collected downward looking ADCP transects at 9 transect locations throughout the western end of the study area at multiple Sacramento River stage values (see Stumpner et al., In Review). The USGS then processed this data to develop an estimate of the cross-stream distribution of Sacramento River discharge at each cross-section, for each stage value sampled (ibid).

4.4.3.2 Estimating the cross stream distribution of discharge at unmeasured locations and stages

In order to implement the critical streakline method within the simulation, we needed to use our estimates of the cross-channel distribution of Sacramento River discharge obtained from our ADCP measurements to estimate the cross-channel distribution of Sacramento River discharge over the full range of hydraulic conditions represented in the simulation. Further, we needed to estimate the cross-channel distribution of Sacramento River discharge at all 63 notch evaluation locations in the study area. We accomplished this by using our measurements to perform multidimensional linear interpolation to estimate the cross-stream distribution of discharge for combinations of along-stream location and Sacramento River stage that we did not measure.

Because we could only measure the cross-channel distribution of Sacramento River discharge for a small subset of all possible Sacramento River stage and discharge conditions we could not estimate the location of the critical streakline with a high degree of precision; to account for this limitation we added a stochastic perturbation to our estimated location for the critical streakline (see section 4.4.5). Additionally, we did not perform any hydrodynamic measurements when the weir was overtopping (due to safety concerns), so our estimates of the cross-channel distribution of discharge during overtopping periods contain additional uncertainty. However, our simulated entrainment for all scenarios is extremely low during overtopping events due to low notch discharge ratios when the weir was overtopping, so the overall entrainment for single notch scenarios will not be very sensitive to the estimated cross-channel distribution of Sacramento River discharge during overtopping events (recall that the multiple notch scenarios are closed during overtopping events).

This interpolation was performed as follows: First, the cross-stream discharge distributions obtained from measured data were normalized to give the cross-stream distribution of discharge as a function of fraction of channel width (because channel width varied greatly within the study area). Second, the normalized cross-stream discharge distributions were integrated to create CDFs of the cumulative fraction of Sacramento River discharge as a function of distance from the river right bank expressed as a fraction of channel width. We then combined these CDFs using multidimensional linear interpolation to estimate cumulative fraction of cross-stream discharge as a function of: stage, along-channel coordinate, and fraction of cross-channel width. The multidimensional interpolation was performed via gridded interpolation using the Matlab ® griddedInterpolant function (MathWorks ® , Inc., 2017), and this interpolation allowed us to estimate the cross-channel cumulative fraction of Sacramento River discharge as a function of fraction of channel width for unmeasured combinations of along-channel location and stage.

We did not include Sacramento River discharge as an independent variable in the interpolation because we lacked the measurements needed to explain changes in the cross-channel distribution of Sacramento River discharge at each measurement location as both a function of stage and discharge (recall that there is not a constant relationship between stage and discharge in the study area due to backwater effects). As a result, we modeled the effects of discharge (at any given stage) stochastically as a random effect. We chose a normal distribution to represent the effects of discharge (and other unmeasured covariates) on the location of the critical streakline. This process is described below in Section 4.4.5.

4.4.4. Estimating entrainment within the simulation: estimating the discharge through each notch

We used linear interpolation to estimate discharge through each notch as a function of the estimated stage for each time step based on the stage-discharge relationships for each scenario. The stage discharge relationships for each scenario are discussed in detail below, and are summarized in Table 3.

4.4.5. Estimating entrainment within the simulation: estimating the cross-channel location of the critical streakline

At each time step we divided the notch discharge by the estimated Sacramento River discharge to calculate the notch discharge ratio. The estimated cross-channel discharge CDF obtained from the gridded interpolant was then used to find the cross-channel location where the fraction of Sacramento River discharge equaled the discharge ratio. This was the estimated location of the mean critical streakline. We then added a random perturbation to this location to account for uncertainty in the location of the critical streakline.

The random perturbation was added to account for uncertainty in the location of the critical streakline due to the fact that the hydrodynamic measurements used for this simulation were made during a small subset of all possible Sacramento River stage and discharge conditions. For each time step this perturbation was drawn from an error distribution which we parameterized by measuring the cross-stream distribution of discharge during periods of extreme backwater using vessel based ADCP transects, and then calculating the difference between the measured cross-channel distribution of discharge and the estimated cross-channel distribution of discharge produced by the interpolant described in section 3.4.3.2 at multiple locations within the study area. Based on this approach we modeled the error distribution using a normal distribution with a mean of zero, and a standard deviation of 6.5 ft; see Stumpner et al., In Review for more details on the parameter selection for this distribution.

4.4.6. Estimating entrainment within the simulation: estimating entrainment for each track a bootstrap sample

For each track in each of the bootstrap samples drawn for each run the cross-channel location of the track was computed at the point where the track crossed a line instantaneously normal to the along stream axis at each of the notch evaluation locations (These locations are shown in figure 5). If the track's location was to the river right of the location of the critical streakline, then the track was marked as entrained, if the track was to the river left of the critical streakline, the track was not entrained. There were a few additional details for multiple notch scenarios (scenario 5 and scenario 6)

- Only fish tracks from the bootstrap pool that were not entrained in upstream notches were available for entrainment in subsequent downstream notches, thus, the number of fish tracks available for entrainment in each notch decreases for downstream notches to prevent "double entrainment" for a single fish track.
- Entrainment for all notches in a scenario had to be estimated for each of the 63 evaluation locations. In the case of multiple notch scenarios, we assumed that the center of the upstream-most notch was at the evaluation location being used, and then

compute entrainment for each downstream notch as occurring at a point located in the center of each downstream notch. The location of each downstream notch was based on the spacing of the notches in the engineering drawings provided for Alternative 5, see Appendix C. As the simulation iterated through along stream evaluation locations, the whole multiple notch simulation was shifted downstream.

- The fish tracks in the bootstrap pool were not altered to account for possible effects of the upstream notches on water velocity or fish behavior prior to downstream notches. As a result, entrainment estimates for multiple notch scenarios have an additional source of uncertainty that is not shared by the single notch scenarios, and which may result in a negative bias in our entrainment estimates for these scenarios.

4.4.7. Estimating entrainment within the simulation: estimating entrainment over the Fremont Weir during overtopping events

The purpose of the entrainment simulation was to explore the effects of scenario location and scenario design on the entrainment of juvenile Chinook salmon under each scenario. As a result, the entrainment simulation did not estimate entrainment over the Fremont Weir. During periods when the weir was overtopping entrainment for each scenario was based only on the computations described above, and thus, represents an estimate of the entrainment during overtopping events that would be due to modifications made to the Fremont Weir under each scenario.

4.5. Simulated scenarios

We simulated entrainment onto the Yolo Bypass for six weir modification scenarios that included four single notch configurations and two multiple notch configurations (Table 2). Four of the scenarios (Scenarios 1,2,3, and 5) used notch stage-discharge rating curves based on real design alternatives, the other two scenarios (scenario 4 and 6) used notch stage-discharge rating curves that were created for analytical purposes. The California Department of Water Resources (DWR) provided stage vs discharge rating tables for the notches simulated in Scenario 1,2,3, and 5.

Scenario 4 and scenario 6 were simulated for analytical purposes only, because including these scenarios allowed us to draw inferences about how changing a notch's invert elevation might affect entrainment if the notch rating curve was held constant with respect to the difference between invert elevation and Sacramento River stage. The stage discharge relationships for scenario 4 and scenario 6 were derived by modifying the alternative 3 and the alternative 5 notch rating curves so that scenario 4 and scenario 6 would both begin taking water through the notch at a Sacramento River stage value of 15 ft. Scenario 4 and scenario 6 are not indicative of any alternatives currently under review.

Table 2 summarizes the key parameters of the scenarios analyzed in the entrainment simulation, and Table 3 summarizes the notch rating curves for all scenarios in 1 ft increments from 15 ft to 35 ft, and gives an estimate of the magnitude of the Sacramento River discharge that is likely to occur at each stage value based on the USGS 2016 stage-discharge rating. Because of backwater effects there can be a wide range of Sacramento River discharge values which occur at any Sacramento River stage, so the discharge given in Table 3, Column 1 is only indicative of the order of magnitude of Sacramento River discharge for each stage value. A spreadsheet containing more details on the multi-notch configuration simulated in scenario 5 and scenario 6 is contained in Appendix B.

Table 2 - Summary of scenario parameters

	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6
Notch Configuration	Based on Alternative 3	Based on Alternative 4	Based on Alternative 6	Based on Alternative 4, with a lower invert	Based on Alternative 5	Based on Alternative 5, with a lower invert
Stage when notch flow exceeds 200 cfs	19 ft	19 ft	19.5 ft	15 ft	20 ft	18.5 ft
Stage when maximum notch flow is reached	31 ft	27 ft	30 ft	23 ft	27 ft	24 ft
Maximum notch flow	6,105 cfs	3,166 cfs	12,253 cfs	3,166 cfs	3,400 cfs	3,400 cfs
Notch flow ends at overtopping	No	No	No	No	Yes	Yes
Notes				This scenario was included for analytical purposes only		This scenario was included for analytical purposes only

Table 3- Notch rating curves for simulated scenarios

DWR provided the USGS with notch ratings as a function of Sacramento River stage for scenarios 1, 2, 3, and 5. The USGS developed the ratings for the analytical scenarios (scenarios 4 and 6). In Table 1 the Sacramento River stage and discharge values shown are USGS estimates.

Sacramento River Stage, ft, NAVD88	2016 Stage – Discharge Rating For Sacramento River Discharge, CFS	Scenario 1 Notch Flow, CFS	Scenario 2 Notch Flow, CFS	Scenario 3 Notch Flow, CFS	Scenario 4 Notch Flow, CFS	Scenario 5 Notch Flow, CFS (Total flow through all notches)	Scenario 6 Notch Flow, CFS (Total flow through all notches)
15	8,680	0	0	0	218	0	12
16	9,693	0	0	0	349	0	45
17	10,706	0	0	0	551	35	94
18	11,720	0	0	0	804	79	177
19	12,733	218	218	0	1,142	152	316
20	13,746	349	349	679	1,547	274	498
21	14,759	551	551	1,195	2,013	443	769
22	15,772	804	804	1,831	2,555	678	1,073
23	16,785	1,142	1,142	2,661	3,166	982	1,776
24	17,798	1,547	1,547	3,664	3,166	1,565	2,381
25	18,811	2,013	2,013	4,787	3,166	2,200	3,084
26	19,825	2,555	2,555	6,067	3,166	2,873	3,223
27	20,838	3,166	3,166	7,502	3,166	3,171	3,259
28	21,851	3,845	3,166	9,041	3,166	3,405	3,182

Sacramento River Stage, ft, NAVD88	2016 Stage – Discharge Rating For Sacramento River Discharge, CFS	Scenario 1 Notch Flow, CFS	Scenario 2 Notch Flow, CFS	Scenario 3 Notch Flow, CFS	Scenario 4 Notch Flow, CFS	Scenario 5 Notch Flow, CFS (Total flow through all notches)	Scenario 6 Notch Flow, CFS (Total flow through all notches)
29	22,864	4,624	3,166	10,675	3,166	3,424	3,407
30	23,877	5,365	3,166	12,253	3,166	3,182	3,246
31	24,890	6,105	3,166	12,253	3,166	3,376	3,403
32	25,903	6,105	3,166	12,253	3,166	3,325	3,863
33	26,916	6,105	3,166	12,253	3,166	0	0
34	27,930	6,105	3,166	12,253	3,166	0	0
35	28,943	6,105	3,166	12,253	3,166	0	0

5. Results

5.1. Simulation of entrainment as a function of notch location

The primary goal of this analysis was to understand how the performance of each notch scenario was affected by the location of the notch or notches within the study area given historical relationships between Sacramento River stage, Sacramento River discharge, and run abundance. To this end we used a Monte Carlo simulation to estimate time series of entrainment for each run, for each scenario, at each of 63 locations within the study area spaced 32.8 ft (10 meters) apart in the along stream direction (figure 5, Appendix A). This approach allowed us to use a variety of metrics to compare entrainment at each of the potential locations for the six simulation scenarios. The rich dataset provided by the simulation also allowed us to consider strategies for optimizing entrainment rates in future designs.

The entrainment simulation period (water years 1997 - 2011) included a mix of dry years when the weir did not overtop during the notch operation period (November 1 - March 15), years when the weir overtopped infrequently during the notch operation period, and wet years when the weir frequently overtopped during the notch operation period (Figure 14). Because the simulation period contains a mix of water year types, estimates of the total entrainment and the total entrainment ***rate*** for each location over the course of the simulation provide a good summary of how notch location affects scenario performance in the long run by incorporating a wide range of conditions. Figure 15 shows the overall total entrainment for each run for each scenario at each location in the study area; this data is summarized below in table 4, while Appendix B contains tables showing mean yearly total entrainment with 90% confidence intervals for each run under each scenario at each of the 63 notch evaluation locations.

For this analysis, total entrainment is expressed as the overall fraction of the yearly abundance time series for each run that is entrained in the notch over the period indicated (usually the 15-water-year simulation period); because the yearly abundance time series sums to 100% for each season, entrainment for each year is weighted equally. This Normalization allows between year comparisons. Figure 16 is similar to Figure 15, but expresses scenario performance as overall entrainment rate for each scenario, which is calculated as the fraction of the simulation fish that passed through the study area during the notch performance period when notch flow was greater than zero which were entrained under each scenario. Figure 15 addresses the question "where should a notch be located to maximize the overall entrainment of a run", while Figure 16 addresses the question "where should a notch be located to maximize the entrainment of that proportion of each run that passes through the study area when the notch is operating".

The good news is that the total entrainment and entrainment rate curves for each run show similar trends in scenario performance as a function of notch location. For single notch scenarios (scenarios 1 - 4) notch performance for all run has a peak around 902 ft (275 meters), a sharp decrease in performance between 984 ft (300 meters) and 1,230 ft (375 meters), followed by a broad peak in performance that slowly drops off after 1,640 ft (500 meters). For single notch scenarios the maximum entrainment and entrainment rate for all run is located between 1,312 ft (400 meters) and 1,640 ft (500 meters). Figure 4 shows the along-channel coordinate system for the study area, figure 17 shows the zones of maximum and minimum entrainment described above, and Appendix A provides a table that can be used to convert between along-channel coordinates and UTM.

The relationship between notch locations and performance for multiple notch scenarios (scenario 5 and scenario 6) is similar, but these scenarios had the highest entrainment and entrainment rate for all run between 853 ft (260 meters) and 916 ft (280 meters). For multiple notch scenarios the location indicated on the entrainment and entrainment rate plots is the along-channel location of the center of the first notch, so a peak entrainment listed at 886 ft (270 meters) indicates that peak entrainment occurred for the scenario when the center of the first notch was located 886 ft (270 meters), the center of the second notch was located at 925 ft (282 meters), the center of the third notch was located at 1,410 ft (430 meters), and the center of the fourth notch was located at 1,673 ft (510 meters) (See Appendix C for notch spacing for scenario 5 and scenario 6). The spacing of the notches for the multiple notch scenarios explains why these scenarios reached peak performance when the center of the first notch was located near 885 ft (270 meters), because this location placed all 4 notches in regions where the single notch scenarios had high entrainment.

It is likely that the dramatic drop in entrainment and entrainment rate for all scenarios shown in Figures 15 and 16 around 984 ft (300 meters) is caused by interactions between the study fish's behavior and hydrodynamic effects of the sudden change in bathymetry near the river right bank (Figure 17) in this area of the river. Figure 18 shows the location of the notch evaluation cross-section at 1,198 ft (365 meters) on a bathymetry map of the study area with some example fish tracks; it appears that fish near the river right bank of the study area upstream of the scour hole on the outside of the bend avoid the area around the scour hole. Additionally, it appears that the geometry of the bend interacts with the outmigration behavior of the study fish in a way that resulted in many fish on the river left side of the Sacramento River passing by this portion of the bend (Figure 19). The net result of these effects is that there is a drop in the density of fish tracks in the near-bank area in the vicinity of this scour hole (Figure 20), while the area of peak water velocity moves closer to the bank in the scour hole. Accordingly, a notch located in the vicinity of the scour hole will likely need to entrain a large amount of water to move the critical streakline into locations in the cross-section with high fish densities. The effects of the scour hole on scenario performance suggest that the bathymetry and hydrodynamics immediately upstream of a notch can have significant impacts on the notches entrainment rate.

Because the entrainment simulation is based on tracks of acoustically tagged hatchery late fall run Chinook, the differences between the simulated entrainment for each run are entirely the result of the difference in abundance timing for each run during the simulation period. Thus, differences in scenario performance between run show the expected effect of each run' outmigration timing on the entrainment of hatchery late fall run Chinook, and are not indicative of any behavioral differences between run. Nevertheless, the differences between scenario performance for each run can inform our understanding of how the covariance between abundance timing, Sacramento River stage, Sacramento River discharge and scenario notch rating curves combine to affect entrainment.

The most significant observation from Figures 15-16 is that the entrainment and entrainment rate curves for each run suggest that differences in abundance timing between runs determine the maximum entrainment and entrainment rate for each run under each scenario, but, differences in abundance timing do not significantly alter the relationship between along-channel location and scenario performance. In other words, these results suggest that a notch location that maximizes entrainment for fall run abundance timing is likely to have near maximum entrainment for winter and spring run abundance timing as well. Again, we caution that these results are based only on run abundance timing, and do not incorporate behavioral and physiological differences between runs, nor between the size and degree of smoltification of the juvenile salmon that can vary between years and throughout any given outmigration season.

Table 4 - Summary of scenario performance

Percent of yearly juvenile salmon abundance entrained onto the Yolo Bypass under each scenario, by run, for the notch locations that resulted in maximum fall run entrainment for each scenario. The mean yearly percent of yearly abundance entrained is given along with 90% bootstrap confidence intervals in parentheses. The final row gives the along-stream coordinate of the notch location that resulted in peak entrainment for fall run under each scenario, see figure 4 for a map showing the along-stream coordinate system in the study area.

Run	**Scenario 1**	**Scenario 2**	**Scenario 3**	**Scenario 4**	**Scenario 5**	**Scenario 6**
Fall Run	12% (6%-21%)	9% (2%-21%)	28% (12%-43%)	15% (3%-28%)	6% (2%-12%)	8% (2%-15%)
Spring Run	9% (4%-15%)	7% (4%-14%)	22% (6%-42%)	16% (9%-20%)	5% (1%-11%)	7% (2%-13%)
Winter Run	9% (2%-17%)	7% (2%-15%)	23% (4%-42%)	15% (8%-23%)	5% (2%-11%)	7% (4%-13%)
Late Fall Run	5% (0%-12%)	4% (0%-11%)	11% (0%-38%)	9% (1%-20%)	2% (0%-10%)	3% (0%-12%)
Location of notch at peak entrainment (UTM Zone 10S, m, NAD83)	615849E, 4290952N	615849E, 4290952N	615780E, 4290905N	615849E, 4290952N	615636E, 4290860N	615636E, 4290860N
Along stream coordinate of notch at peak entrainment	495 m	495 m	415 m	495 m	265 m	265 m

5.2. Effects of notch rating curves and run abundance timing on entrainment

While differences in abundance timing between each run did not result in significant differences in the relationship between notch location and notch performance for each run, the differences in abundance timing did have a significant effect on the maximum entrainment rate and maximum total entrainment for each run. With the exception of scenario 4, all scenarios showed the same pattern in the relative entrainment rate between run throughout the study area: fall run had the highest entrainment rate, spring run and winter run had similar entrainment rates that were lower than fall run, and late fall run had the lowest entrainment rates (Figure 16). Scenario 4 is the exception, as all run experienced similar entrainment rates under this scenario (Figure 16, panel 4). Patterns in the relative differences between total entrainment for each run are similar to the patterns in the relative difference between entrainment rate for each run, with scenarios 1,2,3,5, and 6 showing the highest total entrainment for fall run, the lowest entrainment for late fall run, and middle values for spring run and winter run. Again, the exception was scenario 4, which showed similar total entrainment for fall run, spring run, and winter run, and the highest overall entrainment for winter run rather than fall run.

The reason that scenario 4 had the most consistent entrainment rates between runs is that this scenario had the highest notch flows for stages below 22 ft, when a large proportion of spring run, winter run, and fall run were present in the study area during the simulation period (Figure 21). The cumulative distribution functions (CDFs) for each run' simulation abundance as a function of stage shown in figure 21 show that during the simulation period around half of the spring run, winter run, and late fall run yearly abundance passed through the study area when stage was below 22 ft, while only about 30% of fall run abundance passed through the study area when stage was below 22 ft. Additionally, the CDFs for spring run, winter run, and late fall run all show a rapid increase in cumulative abundance between 19 ft and 22 ft that does not occur in the CDF for fall run. This rapid rise in abundance between 19 ft and 22 ft for spring run, winter run, and late fall run suggests that there is some interaction between watershed hydrology and the life history of these run that consistently results in these runs moving through the study area during outflow events that result in Sacramento River stages in the study area between 19 ft and 22 ft. As a result, scenario 4, which entrains about 10% of Sacramento River water at 19 ft, and reaches a peak discharge ratio at 23 ft has the second highest total entrainment for all run. Scenario 3 has higher total entrainment for all run, but, scenario 3 reaches a peak discharge of 12,000 cfs, while scenario 4 has a peak discharge of only 3,166 cfs.

Finally, scenario 4 has similar entrainment rates for all runs, and similar total entrainment for fall run, spring run, and winter run, but lower total entrainment for late fall run. The lower total entrainment for late fall run under scenario 4 (and all other scenarios) is the result of two factors: first, during the simulation period about 25% of late fall run yearly abundance passed through the study area at stages below 16 ft, while only about 10% of other run yearly abundance passed through the study area below 16 ft during the simulation (all scenarios entrained little to no water below 16 ft), and second, during the simulation period, late fall run had lowest proportion of total yearly abundance that occurred during the notch operation period (Table 5). Thus, even though scenario 4 entrained late fall run at the same rate as other run, there was a lower overall proportion of late fall run available for entrainment during periods when the notch was operating.

Table 5 - Percent of simulation abundance for each run that passed through the study area during notch operation periods over the 15-water-year simulation.

Run	Percent of simulation total yearly abundance for the simulation period that transited the study area during notch operation periods (Abundance present during notch operation period / total yearly abundance)*100%
Fall Run	79%
Spring Run	81%
Winter Run	98%
Late Fall Run	68%

5.3. Entrainment rate and entrainment efficiency for each scenario as a function of stage.

As discussed above, the entrainment simulation is only based on acoustic tag tracks from hatchery late fall run Chinook, so the differences in simulated entrainment between run reflects the differences in the frequency of the relative timing of stage, discharge and run abundance during the simulation period. In order to better understand how abundance timing affected entrainment under each scenario we computed stage vs entrainment rate curves for each scenario (Figure 22), and stage vs entrainment efficiency curves for each scenario (Figure 23). Entrainment rate indicates the fraction of the bootstrap sample at each time step that was marked as entrained under each scenario, and entrainment efficiency is the ratio of the time step entrainment rate for each scenario divided by the time step discharge ratio for each scenario. When entrainment efficiency is greater than one a notch is entraining a greater proportion of fish than water.

The underlying stage vs entrainment relationship for each scenario is the same for each run, so we chose to compute the relationship for winter run because the winter run abundance timing resulted in the largest number of entrainment “trials” within the simulation. Because the spatial distribution of discharge and fish tracks changes throughout the study area and, thus, the stage vs entrainment rate/efficiency curves for each scenario change throughout the study area; it is possible to compute a stage-entrainment rate curve for each of the 63 along-channel notch locations evaluated in the simulation. For the sake of brevity, we chose to present curves for the location in the study area that had the highest total entrainment of winter run for each scenario (These locations are shown in Figure 17).

Because of backwater effects in the study area, a range of Sacramento River discharge values occur in the historical record for any Sacramento River stage value (Stumpner et al., in review). As a result, there is a range of notch discharge ratios for each scenario at any stage, and, because of this variability in discharge ratio and variability in behaviors and other environmental covariates, we expect that run of the river fish will experience a range of entrainment rates at any Sacramento River stage under all future notch scenarios. Within the entrainment simulation the range of entrainment rates predicted for any stage is a function of three processes: firstly, the entrainment simulation is driven by historic stage and discharge data, so the historic variance in discharge ratio for each scenario is captured in the simulation. Secondly, there is stochasticity inherent in the bootstrapping approach used to draw the track pools at each timestamp, so any particular stage-discharge pair will not always draw from the same track pool. Thirdly, we add stochastic error to the computed critical streakline location for each scenario at each time step to account for uncertainty in our ability to predict the critical streakline location given the effects of backwater condition on cross-channel velocity distributions within the study area (Stumpner et al., in review). As a result of these three factors the stage vs entrainment rate and stage vs entrainment efficiency curves presented in Figures 22 and 23 are in the form of a 90% confidence interval and median value for scenario entrainment rate as a function of stage. The range of discharge ratios at each stage is shown for each scenario to illustrate the variability in discharge ratio. For the multiple notch scenarios the entrainment rate and median discharge ratio are based on total entrainment of water and fish through all notches operating at any stage value.

The scenario stage vs entrainment rate curves shown in Figure 22 indicate how efficient each scenario is at entraining fish at any stage: when the scenario entrainment rate is greater than the scenario discharge ratio the scenario is entraining proportionally more fish than water, and when the entrainment rate is lower than the discharge ratio the scenario is entraining proportionally more water than fish. Figure 23 shows the range of entrainment efficiency values for all time steps at a particular stage. The entrainment efficiency of each scenario at any location is controlled by the balance between the cross-channel distribution of fish and the cross-channel distribution of flow. Figures 24 and 25 illustrate the cross-channel distribution of fish and flow in the study area. The interaction between fish distribution, flow distribution, and notch rating curves controls entrainment efficiency. This interaction is complex; however, in general, the effects of discharge ratio on entrainment can be summarized for the locations in the study area that produced maximum scenario entrainment as follows:

1. There is a zone very near the river bank where there are few fish, so extremely low discharge ratios produced low entrainment rates for all scenarios.

2. There is a zone a little further from the bank where fish densities are high and water velocities are not the peak within the cross section: increasing the discharge ratio to the point where the critical streakline enters this zone will result in rapid increase in entrainment and entrainment efficiency for all scenarios (this is a highly non-linear

relationship - almost a step function process due to the high gradient in the fish densities).

3. There is a zone beginning at about 49 ft - 82 ft (15-25 meters) from the river right bank (Figure 25) where water velocities reach a peak. A large proportion of the total discharge in the cross-section is contained in this region. Once a scenario's discharge ratio is high enough that the critical streakline reaches this zone, a large increase in discharge ratio is required to move the critical streakline further out into the river cross section, and entrainment efficiency decreased.

4. The spatial distribution of 2016 study fish tracks for periods when Sacramento River was below bankfull (see figure 24) was dramatically different than the spatial distribution of 2016 fish tracks for periods when the Sacramento River was above bankfull (Figures 26, 27). In general, fish tracks collected after the Sacramento River stage exceeded bankfull (28.5 ft) were less concentrated on the outside of the bend, so that at higher stage scenarios needed a very high discharge ratio to entrain many fish. This observation is likely related to the influence of the slow velocity water associated with the overbank region pushing the influence of the sidewall boundary layer into the center of the channel (See Stumpner et al., In Review). It is important to note that the accuracy of the acoustic tag tracking array decreased when the Sacramento River was above bankfull so we cannot be sure of the exact magnitude of the effect, but, the spatial extent of the shift in the observed spatial distribution of tracks between below bankfull conditions and bankfull conditions was large enough that we believe that the effect is due to true changes in the location of study fish.

The entrainment rate and entrainment efficiency curves shown in Figures 22 and 23 reflect these general trends. For all scenarios entrainment efficiency increased rapidly once the discharge ratio exceeded 10%, with most scenarios reaching a peak entrainment efficiency between 25 ft and 27 ft and a discharge ratio of about 15%. Because of the covariance between stage and discharge ratio for all of the scenarios tested, we cannot ascertain whether the location of peak entrainment efficiency is a function of discharge ratio, a result of the spatial distribution of fish and flow at 25 ft - 27 ft of stage, or some combination of the two. In the future, we recommend simulating scenarios with constant discharge ratios which will allow us to explore the effects of stage and discharge ratio independently.

For all scenarios except scenario 3, entrainment rate and entrainment efficiency dropped off rapidly once stage exceeded bankfull. Scenario 3 maintained high entrainment rates and an entrainment efficiency near 1 for stages greater than bankfull because of the high discharge ratio for this scenario places the critical streakline near the center of the river at high stage values. The multiple notch scenarios had lower entrainment rates that scenarios 2 and 4 (which have similar overall notch rating curves), because at many stages the discharge for these scenarios was spread between multiple notches, so the lower discharge ratio for each individual notch (not shown) was less likely to push the critical streakline into the region in the cross-section where fish were more concentrated.

Finally, there are several features of the entrainment rate and entrainment efficiency curves that are a result of the mechanics of the simulation process. First, the dip in the entrainment rate for scenario 4 at 20 ft is a result of the small number of study fish tracks that passed through the study area at 20 ft of stage (figure 11); because of the limited fish tracks collected at this stage the bootstrap samples for stages around 20 ft are heavily influenced by a small number of fish tracks that happened to be far away from the bank at the location which we chose to compute the stage vs entrainment curves. When stage vs entrainment curves are computed for locations where these fish tracks were closer to the bank (not shown) the dip in entrainment is not evident, and the plots showed a smooth entrainment curve for scenario 4 from 15 ft to the peak in entrainment located around 24.5 ft. Secondly, the extremely high entrainment efficiency for scenarios 1,2,5, and 6 at low notch flows are due to the extremely low discharge ratios for these scenarios when the notches first begin to take water. Entrainment efficiency is calculated using discrete numbers and cannot change with the same precision as discharge ratio, which is a continuous variable. As a result, when discharge ratios are very low entrainment of a single fish track can cause the entrainment rate to increase out of proportion with the discharge ratio, and entrainment efficiency becomes large. Note that the two scenarios that took more water at low flows do not indicate the very high entrainment efficiencies at the lowest notch flows.

5.4. Entrainment as a function of water year

Because of the complex relationship between Sacramento River stage, run abundance, and scenario entrainment rate, we wanted to be sure that the along-stream location vs entrainment curves we computed for the entire simulation were not being disproportionately influenced by water years with extremely high or low Sacramento River stage values. To explore the effects of water year on simulated entrainment, we placed each notch operation season (November 1 - March 15) into one of three water year categories based on the number of hours within the operation season that the weir overtopped (Tables 6 and 7), and then computed total entrainment vs along-stream location curves for each water year category (overtopping was defined as Sacramento River stage > 32.3 ft). The operation season classifications are shown in Table 7, and the entrainment vs along-stream location curves for each water year class, run, and scenario are shown in figure 28 through figure 33. The most important result of analysis of the water year entrainment vs along-stream location curves is that these curves suggest that water year type has a large influence on the maximum entrainment for each run under each scenario, but, water year type doesn’t change the overall trends in scenario performance vs along-stream location. This is a positive result because it suggests that the same location in the cross section will produce maximum entrainment for a variety of abundance timing and water years.

The entrainment vs along-stream location curves shown in Figures 28 through 33 show many interesting differences in the maximum entrainment for each water year category for each run and scenario. Some of the most important observations are:

1. Most scenarios entrained the most fall run in seasons when the weir did not overtop. This is because fall run are most likely to be present in the study area at high Sacramento River stage values when entrainment efficiency for most scenarios is lowest; in dry years fall run most likely pass through the study area at lower stages when entrainment efficiency was higher.

2. During years when the weir did not overtop, scenario 4 had the highest peak entrainment for spring run, winter run, and late fall run. This is despite the fact that scenario 3 has maximum notch flows that are nearly 4 times higher than the maximum notch flows for scenario 4. This observation suggests that lowering scenario stage-discharge curves to capture fish passing through the study area between 19 ft and 22 ft could be an efficient way to increase entrainment of these run in dry years.

3. Late fall run tended to experience the highest overall entrainment during wet or moderately wet years, as opposed to the other runs which experienced the highest overall entrainment during dry or moderately wet years.

Table 6 - Water year type classifications based on number of hours that the weir overtopped during each season in the simulation

Number of hours that the weir overtopped per season (Overtopping is defined as Sacramento River stage>32.3 ft, USGS survey, NAVD88)	
0	No overtopping, Category 1
1-200	Few overtopping, Category 2
200 +	Wet, Category 3

Table 7 - Number of hours that the Fremont Weir overtopped during each season in the simulation

Season	Hours of weir overtopping per season	Season classification
1996	1204	Wet
1997	1268	Wet
1998	744	Wet
1999	712	Wet
2000	0	No Overtopping
2001	112	Few Overtopping
2002	156	Few Overtopping
2003	448	Wet
2004	0	No Overtopping
2005	1120	Wet
2006	0	No Overtopping
2007	0	No Overtopping
2008	0	No Overtopping
2009	12	Few Overtopping
2010	36	Few Overtopping

6. Discussion

6.1. Primary sources of uncertainty in the entrainment simulation

The entrainment simulation uses hydrodynamic data and acoustically tagged fish track data collected under a limited range of field conditions to predict entrainment for future weir modification scenarios over a range of hydraulic conditions and run abundance timing scenarios. As a result, we view the entrainment simulation results primarily as a tool for exploring the interaction between factors which we expect to be the primary drivers of scenario efficacy: a scenario's stage-discharge rating, a scenario's location within the study area, the covariance between stage and discharge at the study location, and the timing of salmon run abundance. However, the entrainment simulation was not designed to explore the fifth factor that we expect to control scenario entrainment: the physiology and behavior of naturally migrating juvenile salmon, both smolts and pre-smolts. The entrainment simulation is entirely based on a limited sample of tracks from acoustically tagged hatchery late fall run Chinook salmon smolts. At this time we lack the data to evaluate the suitability of using large (~150mm fork length) hatchery-raised late fall run smolts as surrogates to predict the high resolution movement patterns of juvenile salmon from multiple runs that emigrate as both smolts and pre-smolts, but it is reasonable to expect that the behavior of the hatchery surrogates will not be a good predictor of the behavior of some, or all, of the naturally migrating juvenile salmon that are the focus of this project. Given the physiological differences between naturally migrating winter run and spring run juveniles and the large hatchery origin smolts used for this experiment, we expect that the use of large, hatchery origin smolts to predict the movement patterns of naturally migrating juvenile salmon is the single largest source of uncertainty within the entrainment simulation. Nevertheless, there is little that can be done to directly address this uncertainty in the absence of detailed data on the fine scale movement patterns of the naturally migrating juvenile salmon that will be affected by modifications to the Fremont Weir.

There are additional sources of uncertainty in the entrainment simulation that we view as secondary to the fundamental limitation of using hatchery surrogate fish to predict the movements of naturally migrating juvenile salmonids. These other primary sources of uncertainty are:

1. The limited range of Sacramento River backwater conditions and other covariates represented in the 2016 track data set. The bivariate weighting function used in the bootstrap sample selection process helps to mitigate the limited range of backwater conditions within the 2016 track data set, but given the limited data collection window for the 2016 track data there may be covariates which are first order drivers of entrainment that we do not account for within the entrainment simulation.

2. The possibility that weir modifications will alter the hydrodynamics within the study area. We expect that weir modifications will alter the water velocity patterns within the study area in the immediate vicinity of a notch, but, with the exception of Scenario 3 we do not expect that modifications to the weir will greatly change the cross-channel distribution of

flow at a notch because of the low ratio (0.1-0.2) of notch flow to Sacramento River flow. As a result, we only expect local changes to water velocity patterns to affect entrainment if these velocity changes cause fish to alter their behavior in the vicinity of a notch, and, if water velocities in the vicinity of the notch are low enough for the altered behavior to affect entrainment. Scenario 3 is the exception because it is likely to entrain up to 50% of the flow in the Sacramento River for stage values between 28 ft and the crest of the Fremont Weir; it is difficult to predict the effects of such large notch flows on the cross channel distribution of discharge in the Sacramento River, so the results for Scenario 3 should be viewed with greater skepticism than the results for scenarios with lower peak discharge ratios.

3. The effects of backwater condition on the cross-channel distribution of flow in the study area. We have directly incorporated this uncertainty into the simulation by adding a stochastic perturbation to our estimated location for the mean critical streakline; the uncertainty in the stage-entrainment rate curves for each scenario are a direct result of this stochastic error.

7. Recommendations

The USGS's past analyses of entrainment at the Georgiana Slough junction demonstrated that the location of the critical streakline in a riverine junction is a good predictor of entrainment probabilities for individual acoustically tagged juvenile salmon, and a good predictor of the entrainment rate for aggregated groups of acoustically tagged juvenile salmon (CADWR 2012, 2015, 2016). For this reason, the critical streakline approach was used in the entrainment simulation to estimate entrainment under future scenarios based on fundamental hydrodynamic principles and observed acoustic tag tracks. We view the entrainment simulation as a sophisticated "back of the envelope calculation" that combines physical principals with the observed track data to produce entrainment estimates. We expect that the results of the entrainment simulation are a good order-of-magnitude predictor for the entrainment and entrainment rate of **fish that are physiologically and behaviorally similar to the 2016 study fish** under each scenario. While we caution that the results of the entrainment simulation may not be applicable to naturally migrating fish, the reality is that we lack the high resolution tracking data needed to improve on these estimates for naturally migrating salmonids. Given these limitations, the results of the entrainment simulation suggest the following:

- Locating single notch configurations in a ~100 meter (328 ft) long region adjacent to the western terminus of the Fremont Weir (Figure 17, see Appendix A for UTM locations) will result in near maximum entrainment, and near maximum entrainment rates for all single notch scenarios. Performance of scenarios located in this area will likely be robust to changes in abundance timing and water year type.

- Locating multiple notch configurations with the first notch approximately 705 ft (215 meters) upstream of the western terminus of the Fremont Weir (Figure 17, see Appendix

A for UTM locations) will result in near maximum entrainment, and near maximum entrainment rates for alternatives with notch spacing similar to Alternative 5. Further, the performance of scenarios located in this area will likely be robust to changes in abundance timing and water year type.

- Bathymetry and hydrodynamics upstream of a weir modification could have large impacts on performance. Care should be taken to avoid siting modifications in areas where fish are likely to respond to bathymetric gradient in the along-channel direction. It may be possible to enhance entrainment in a weir modification by altering (reducing) the along channel bathymetric gradients upstream of the modification.

- Either lowering notch invert elevation or installing a control section downstream of a notch will likely increase the entrainment of winter run, spring run, and late fall run, especially during very dry years. Specifically, entrainment of winter run and spring run may be greatly increased by designing a weir modification to enhance entrainment of fish at Sacramento River discharges that currently occur between Sacramento River stage values of 19 ft NAVD88 and 22 ft NAVD88. This result is likely to be robust to differences between naturally migrating salmonids and the hatchery surrogates used in the analysis, because it is primarily driven by run abundance timing. If physical constraints, such as land surface elevations in the Yolo Bypass adjacent to the Fremont Weir, make it impractical to lower the notch invert elevation sufficiently to achieve an adequate notch discharge ratio at 19 ft stage, it may be possible to design a hydraulic control section in the Sacramento River to increase entrainment through notches with higher invert elevations at lower Sacramento River stage values. Specifically, a control section installed downstream of the notch could be used to increase water levels at the notch for Sacramento River discharges that initiate winter run and spring run outmigration during very dry years.

- It is likely that the entrainment efficiency of multiple notch configurations could be improved by optimizing the tradeoff between the number of notches utilized, and the discharge ratio for each notch. Further analysis could be performed to estimate the most efficient discharge ratio for each notch location as a function of stage, and then the total number of notches could be set based on the targeted total discharge as a function of stage.

- The decrease in entrainment efficiency observed for Sacramento River stages above bankfull for all scenarios was likely the result of the hydrodynamic effects of inundation of the floodplain between the Sacramento River and the weir (Stumpner et al., In Review), combined with the study fish's response to these hydrodynamic effects. In another bend on the Sacramento River that lacks a floodplain the USGS has observed increased cross channel velocities towards the outside of the bend (Dinehart and Burau, 2005); in general we would expect increased cross channel velocities to enhance entrainment under most scenarios. For this reason it may be possible to increase entrainment in the study area for most scenarios by extending the Sacramento River levee from the western end of the Fremont Weir to the upstream end of a notch to prevent this floodplain area from inundating prior to weir overtopping.

8. References

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9. Figures

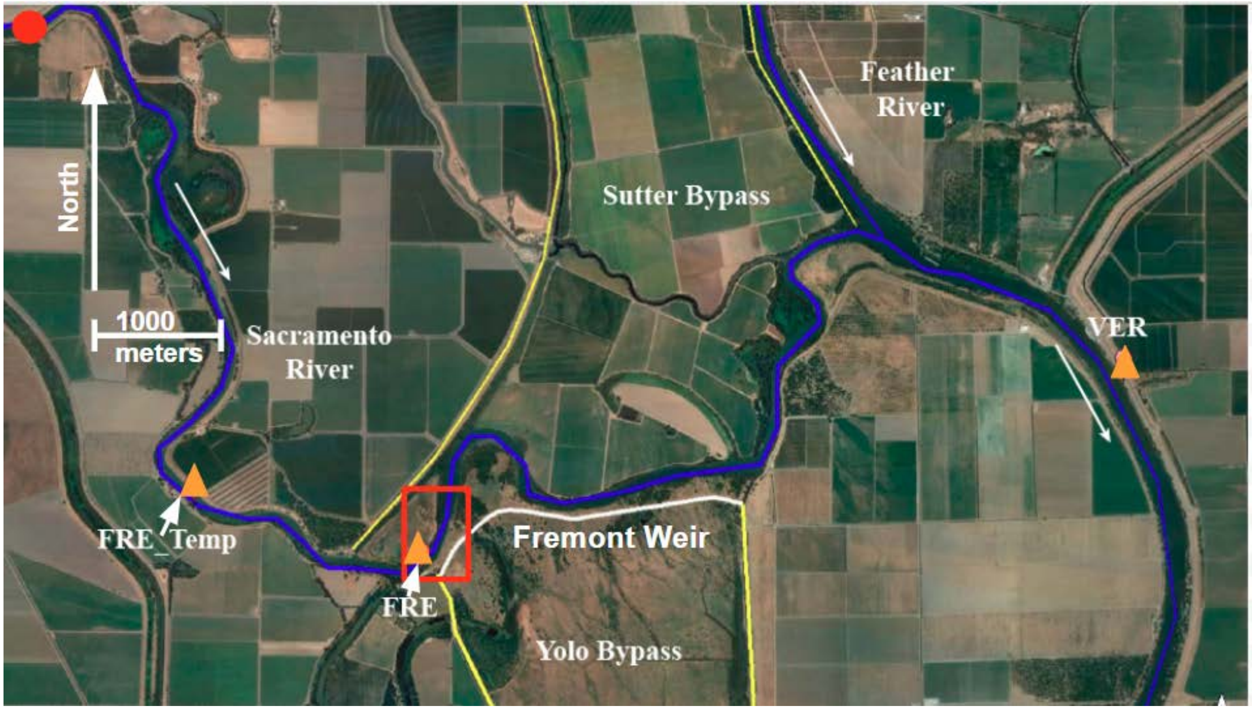

Figure 1 - Aerial photograph showing the approximate boundary of the USGS study area

The portion of the Sacramento River on the western end of the Fremont Weir where the USGS collected water velocity data and high resolution two dimensional acoustic tag tracks is outlined in red. The Fremont weir is highlighted with a thick white line, and the approximate boundary of the northern end of the Yolo Bypass is shown in yellow. The location of gauging locations is indicated with orange triangles; the USGS temporary index velocity gauge is labeled “FRE_Temp”, the location of the DWR gauge at the western end of the Fremont Weir is labeled “FRE”, and the location of the DWR gauge on the Sacramento River at Verona is labeled “VER”. The large red dot in the upper left corner of the image shows the approximate location of the Knights Landing rotary screw traps which provided the abundance timing data used in the simulation.

Figure 2 - Aerial photograph showing the bathymetry and hydrophone locations in study area

Aerial photo showing the portion of the Sacramento River on the western end of the Fremont Weir where the USGS collected water velocity data and high resolution two-dimensional acoustic tag tracks. The photo is overlaid with a bathymetry map in the study area, cooler colors on the bathymetry map denote deeper areas. Hydrophone locations are shown as white circles.

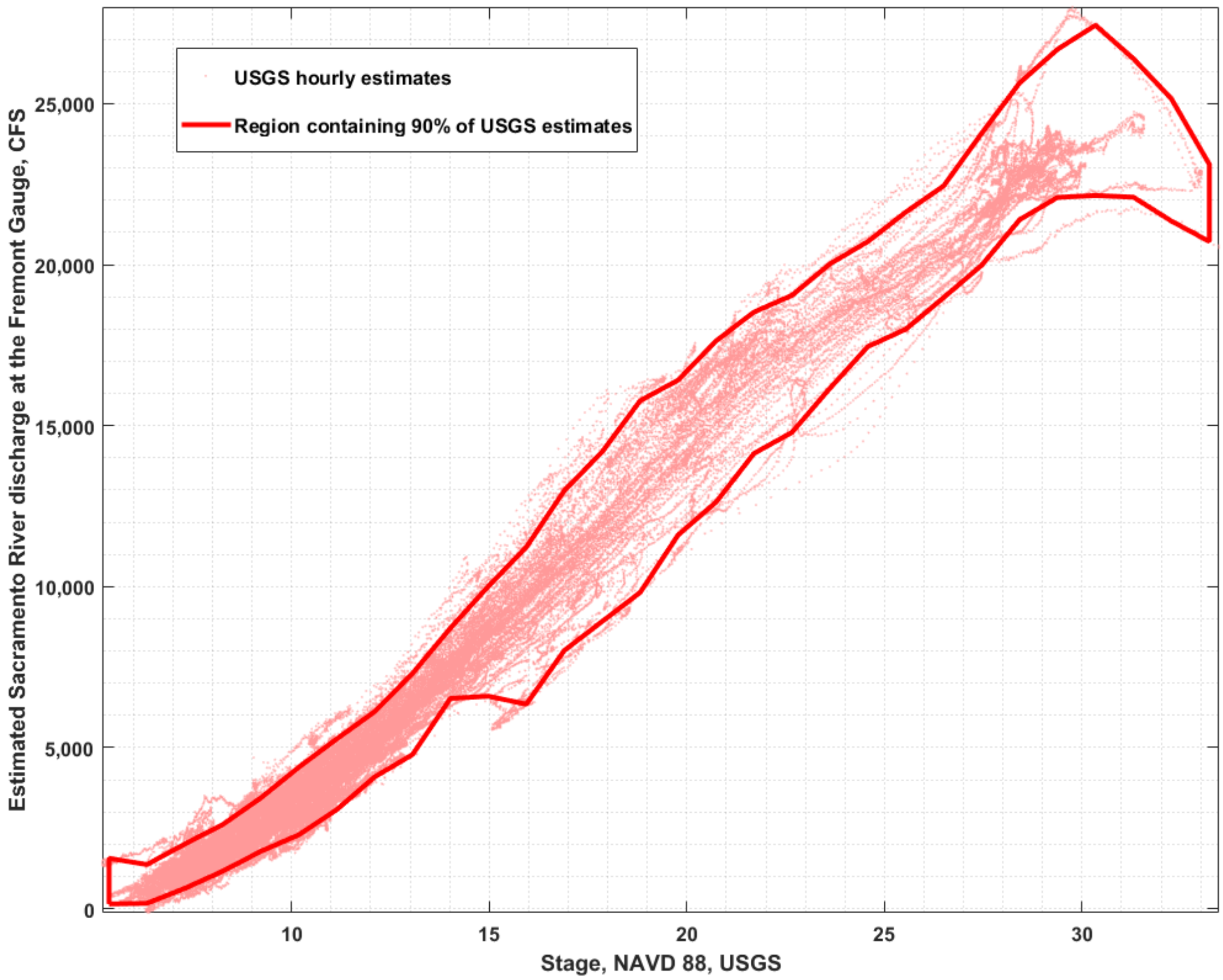

Figure 3 - Plot showing the range of estimated stage-discharge values for the Sacramento River in the vicinity of the western end of the Fremont Weir from 1996 to 2011.

Red dots indicate hourly stage-discharge estimates, and the thick red line indicates the region containing 90% of the discharge observations for any given stage. Because discharge through the proposed notch scenarios will be a function of stage only, the variability in the relationship between Sacramento River stage and Sacramento River discharge will result in variability in the fraction of Sacramento River water diverted under each scenario.

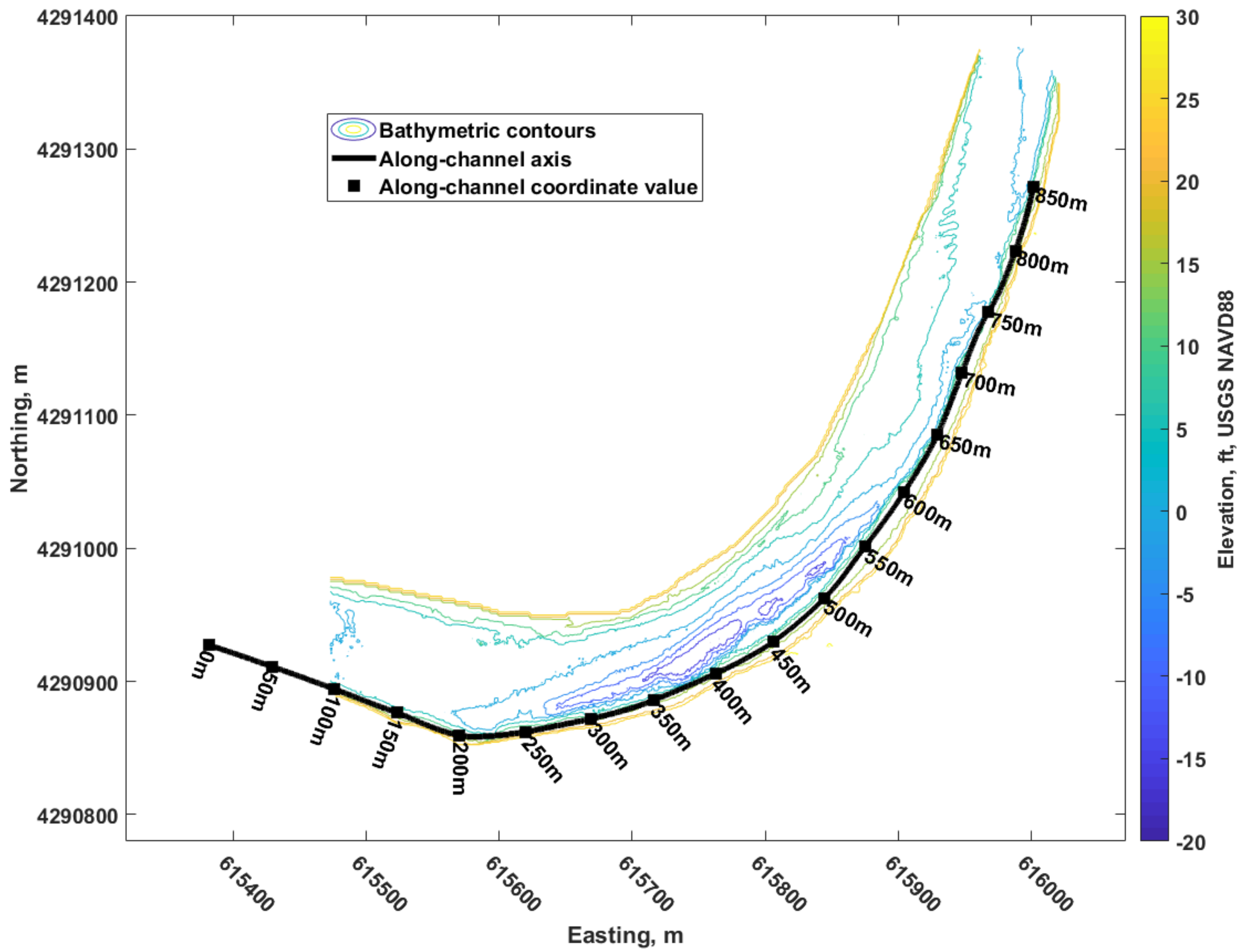

Figure 4 – Along-stream coordinate system

Plot showing the along-stream axis used to locate notch evaluation locations. The thick black line is the along-stream axis, the cross-stream axis is always perpendicular to this line. The black squares on the along-stream axis demarcate 50 meter increments in the along-stream direction. The thin colored lines indicate bathymetric contours.

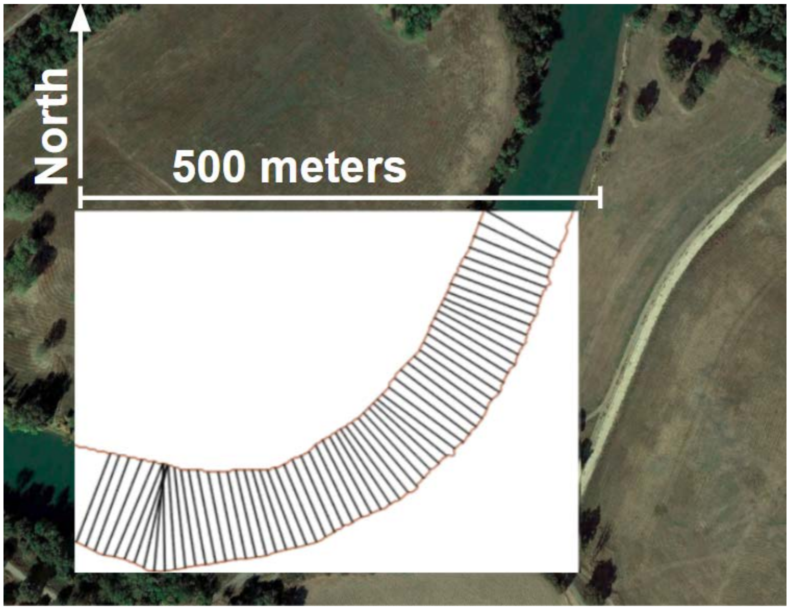

Figure 5 – Notch evaluation locations

The white box indicates the study area for the simulation; the black lines indicate the 63 notch evaluation cross-sections where entrainment was estimated for each scenario at each time step. See Appendix A for UTM coordinates for these locations.

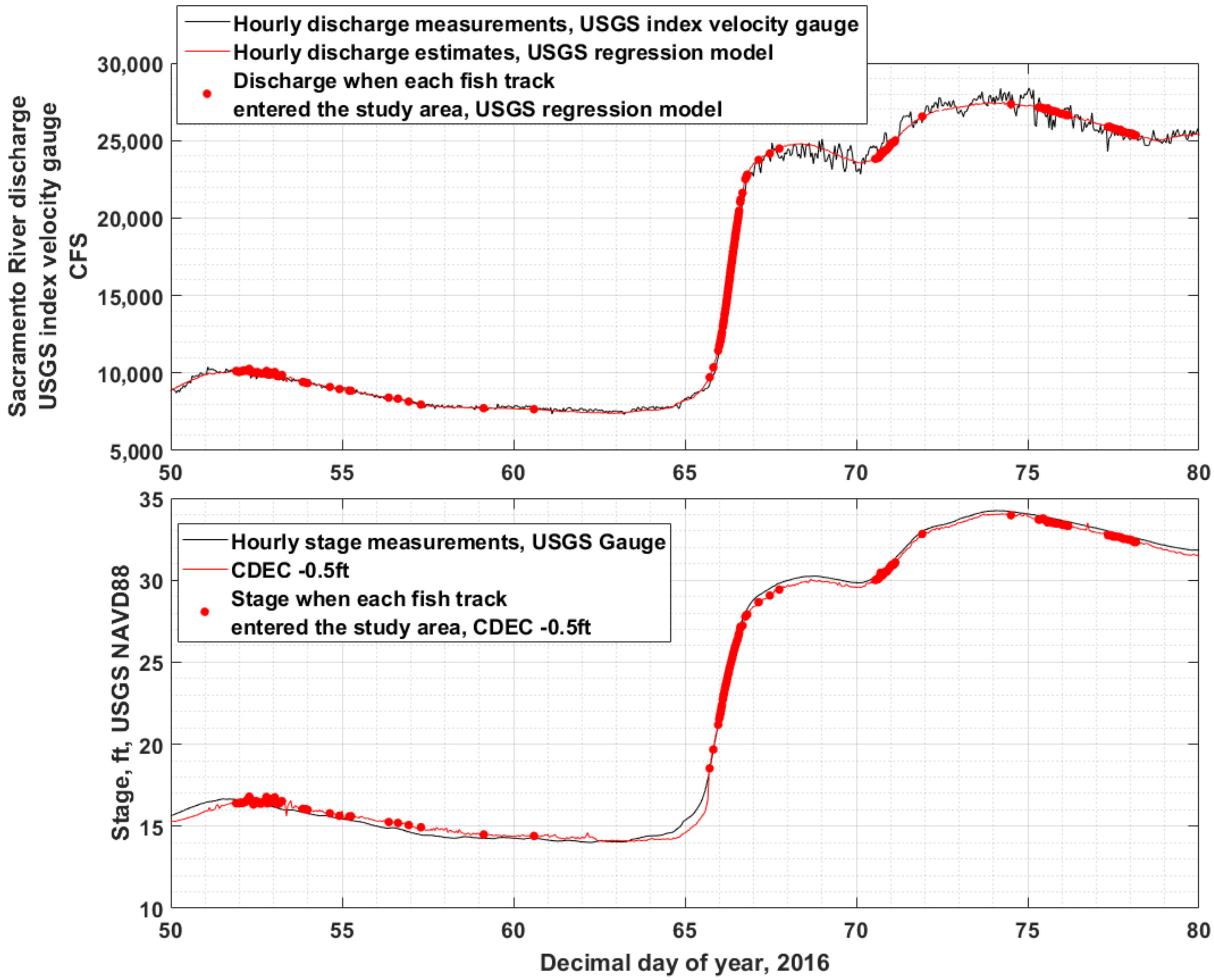

Figure 6 - Plot showing Sacramento River discharge and Sacramento River stage during the time period that 2016 acoustic tag tracks were collected

The top panel shows a time series of Sacramento River discharge based on the temporary index velocity gauge (black line) and the regression equation developed to estimate historic discharge (red line), and the discharge estimates when 2016 acoustic tag tracks were collected (red dots) (See Stumpner et al., in review for details on the discharge estimates). The bottom panel shows time series of Sacramento River stage measurements during time periods when 2016 acoustic tag tracks were collected, and USGS stage estimates when 2016 acoustic tag tracks were collected (red dots). Note the rapid rise in stage and discharge following day 65.

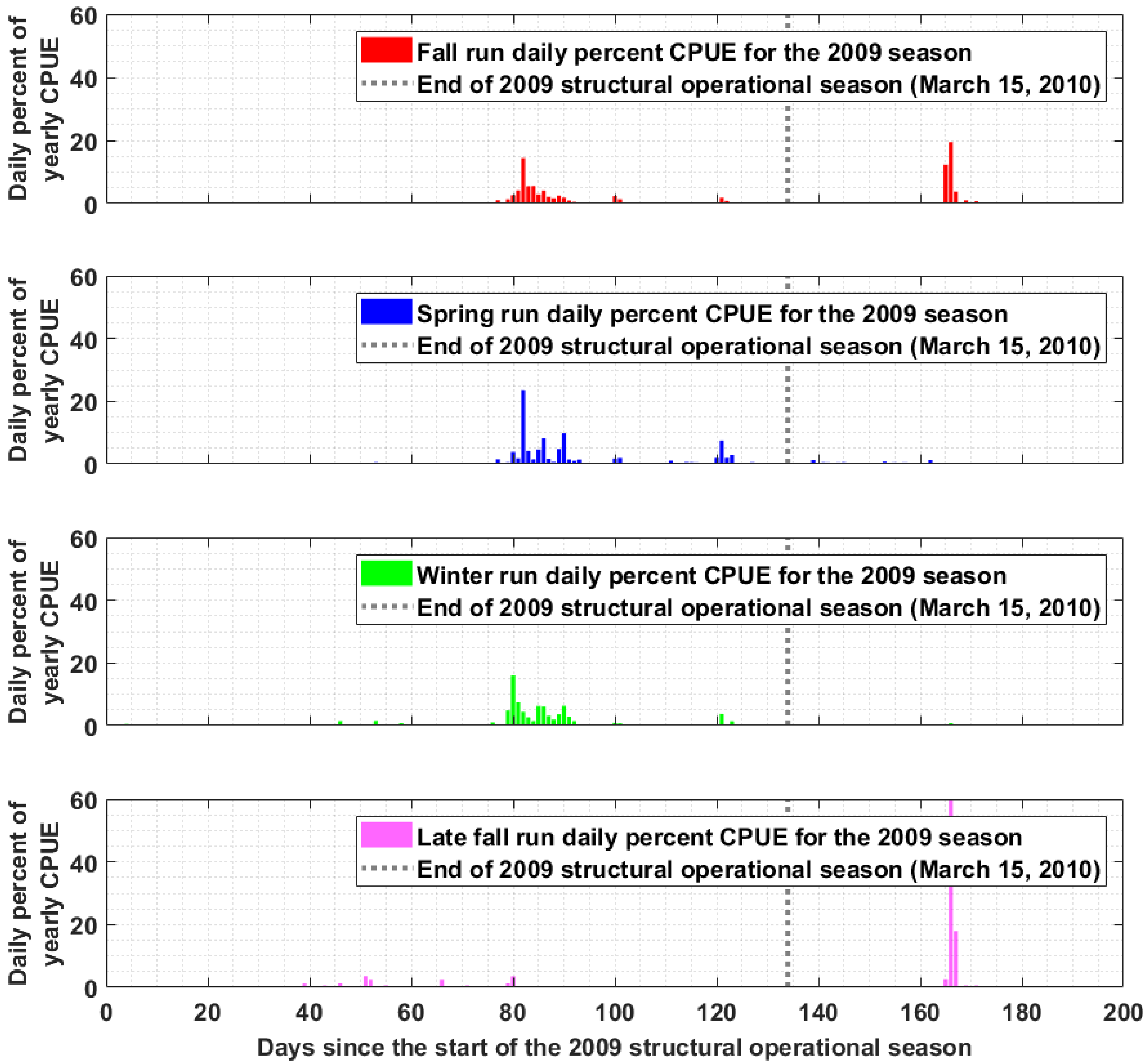

Figure 7 - Daily catch data from the Knights Landing rotary screw trap for the 2009 season (Water year 2010)

Catch is expressed as daily percent of the yearly total Catch Per Unit Effort (CPUE):

Daily percent of yearly CPUE =((Daily Catch/Daily Effort) / (Yearly Catch/Yearly Effort)) *100%

The location of the Knights Landing rotary screw traps is shown in Figure 1.

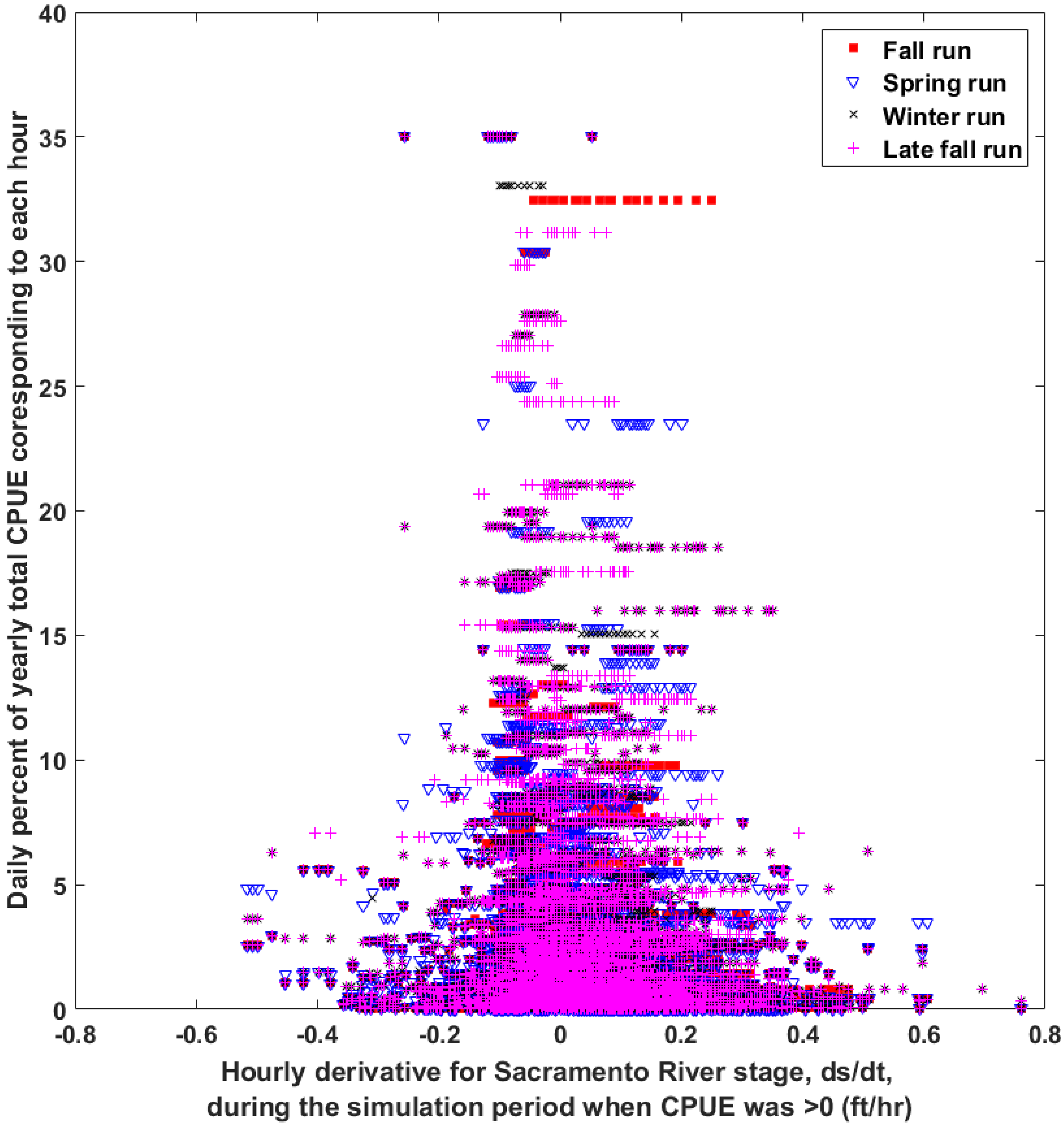

Figure 8 - Plot showing the hourly derivative for Sacramento River stage during the simulation period when Knights Landing catch was greater than zero during the notch operational window (November 1 – March 15).

There are many time steps when Sacramento River stage was changing at a rate faster than 0.2 feet/hr (1 foot change in 5 hours) when naturally migrating fish were likely to be passing the Fremont Weir. Because naturally migrating fish are likely to pass the Fremont Weir during periods when Sacramento River stage changes rapidly we chose to use a 4 hour timestep.

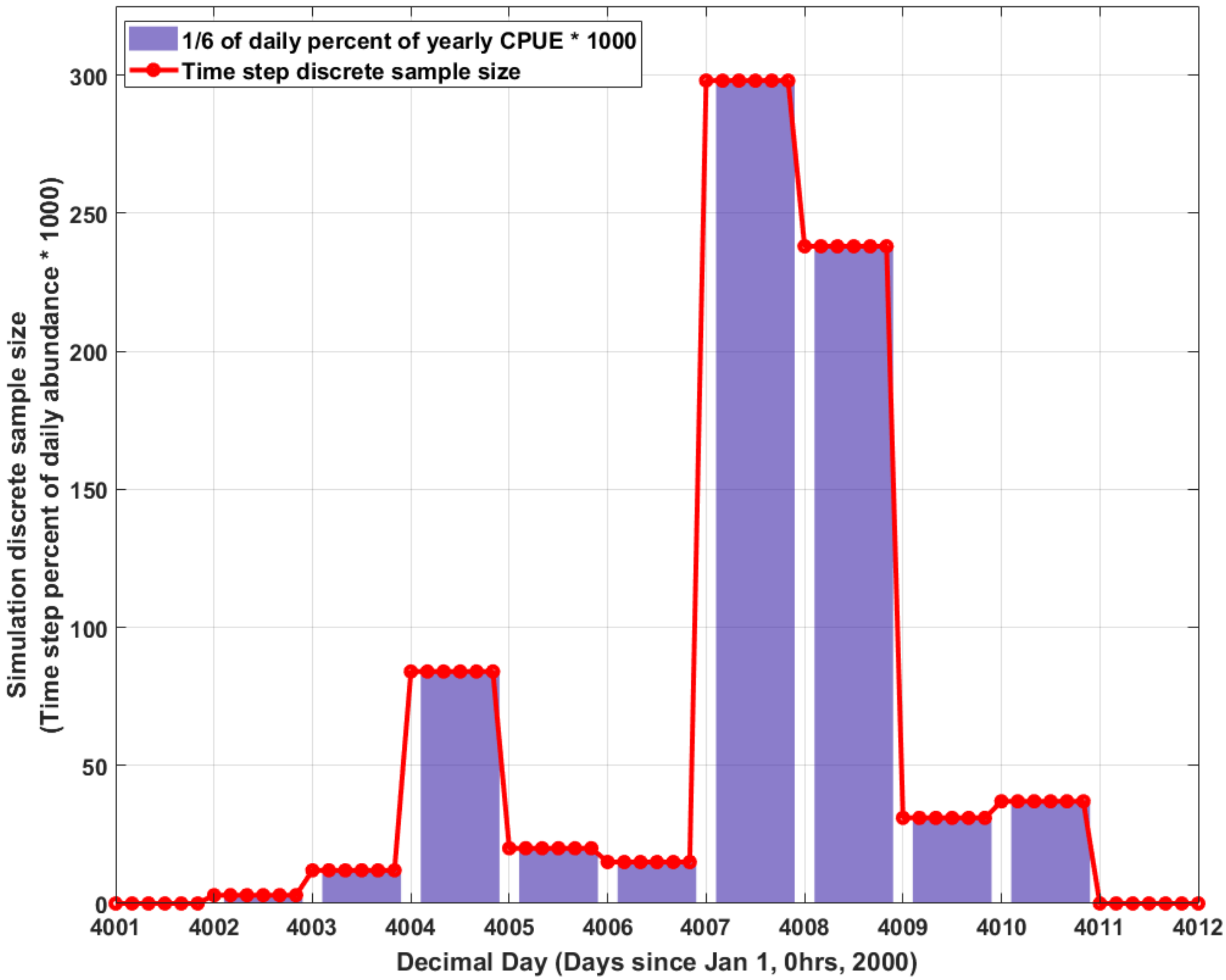

Figure 9 – Daily percent yearly CPUE data converted into discrete sample sizes for each time step.

The blue bars indicate a value that is 1/6 (for a four hour time step) of the daily discrete abundance. Daily discrete abundance is calculated as:

Daily discrete abundance = round(Daily CPUE * 1000)

The red line shows the resulting time series time step discrete abundance showing that each time step within a day has the same abundance.

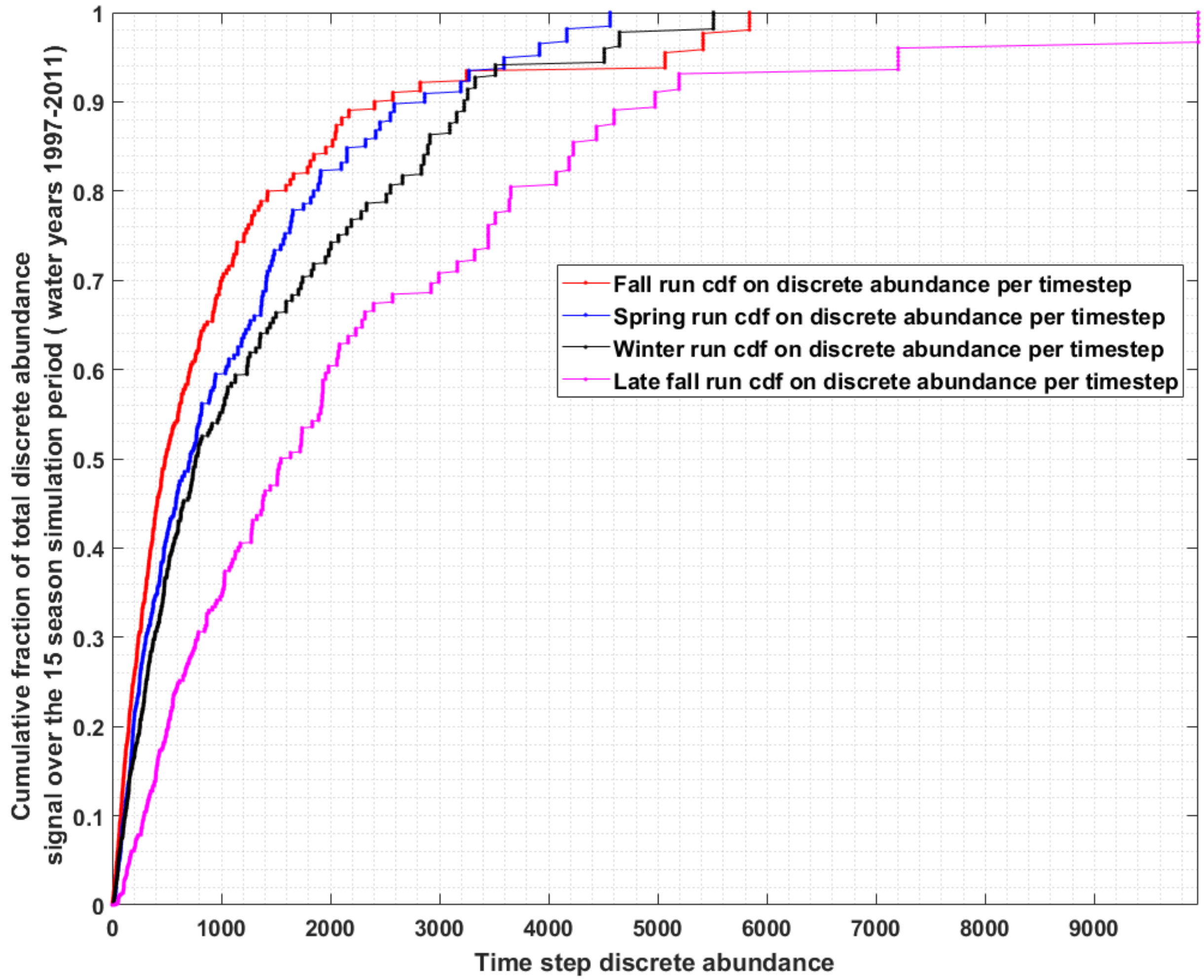

Figure 10 - Plot showing cumulative distribution functions for time step discrete abundance for time steps with non-zero discrete abundance values.

Within the entrainment simulation the size of the bootstrap sample for each time step is set by the discrete abundance for each run at the time step. The lines for each run above indicate the fraction of time steps within the 15-water-year simulation period that had discrete abundance values less than or equal to the sample sizes shown on the x axis; this plot shows the relative frequency of the size of bootstrap sample pools drawn over the simulation period.

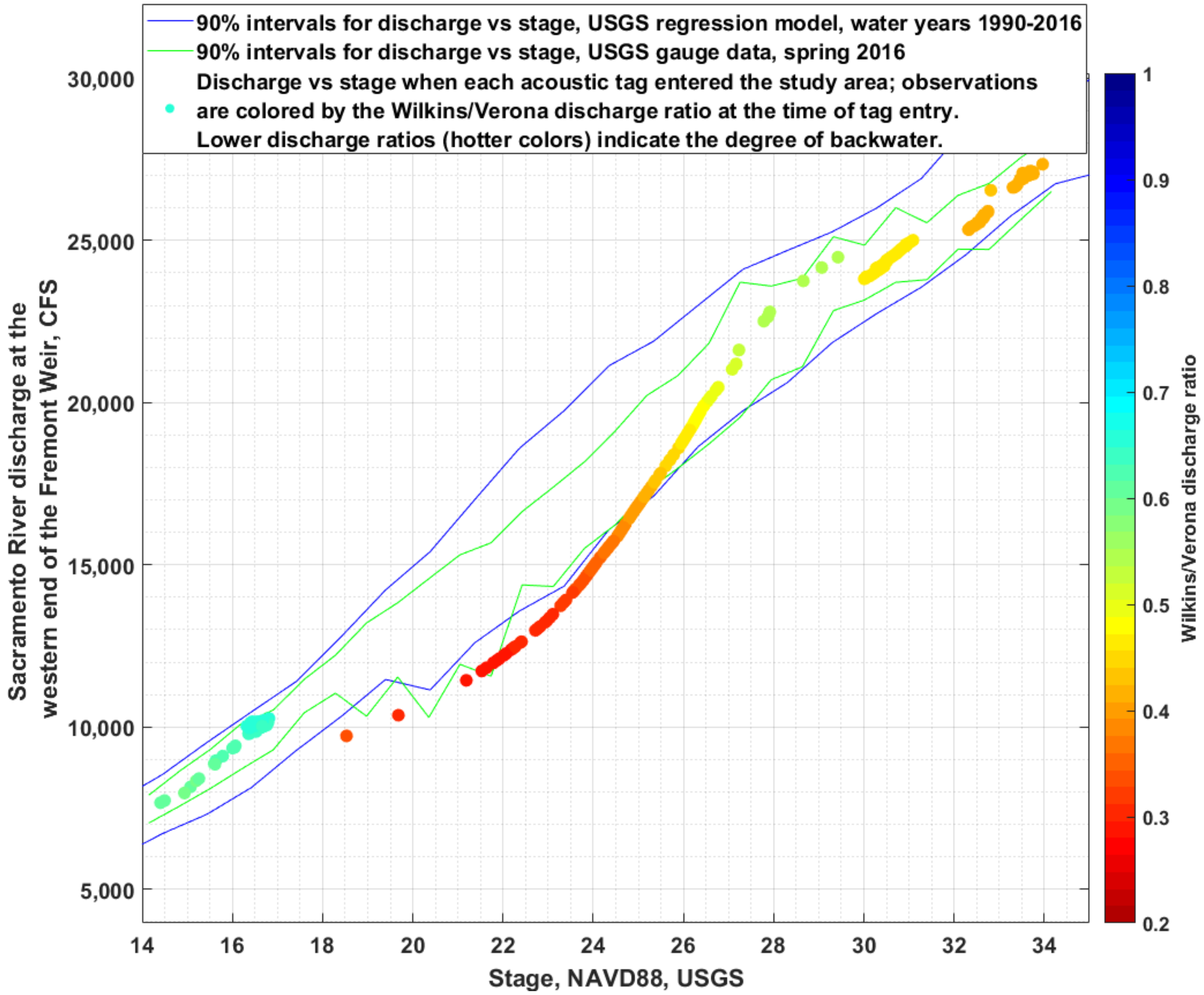

Figure 11 - Plot showing the range of stage and discharge conditions associated with each of the 2016 acoustic tag tracks

The colored lines indicate the 90% intervals (bounded by the 5th and 95th percentiles for discharge vs stage) for the USGS index velocity data (green lines), and the USGS estimate of Sacramento River hourly discharge at the Fremont Weir for water years 1990-2016. The colored dots indicate the stage and discharge value at the time when each acoustic tag entered the study area; the color of the dots indicates the severity of the backwater conditions when each tag entered the study area. Hotter colors indicate more extreme backwater conditions (lower discharge for a given stage). See Stumpner et al., in review, for more details on the Wilkins/Verona discharge ratio.

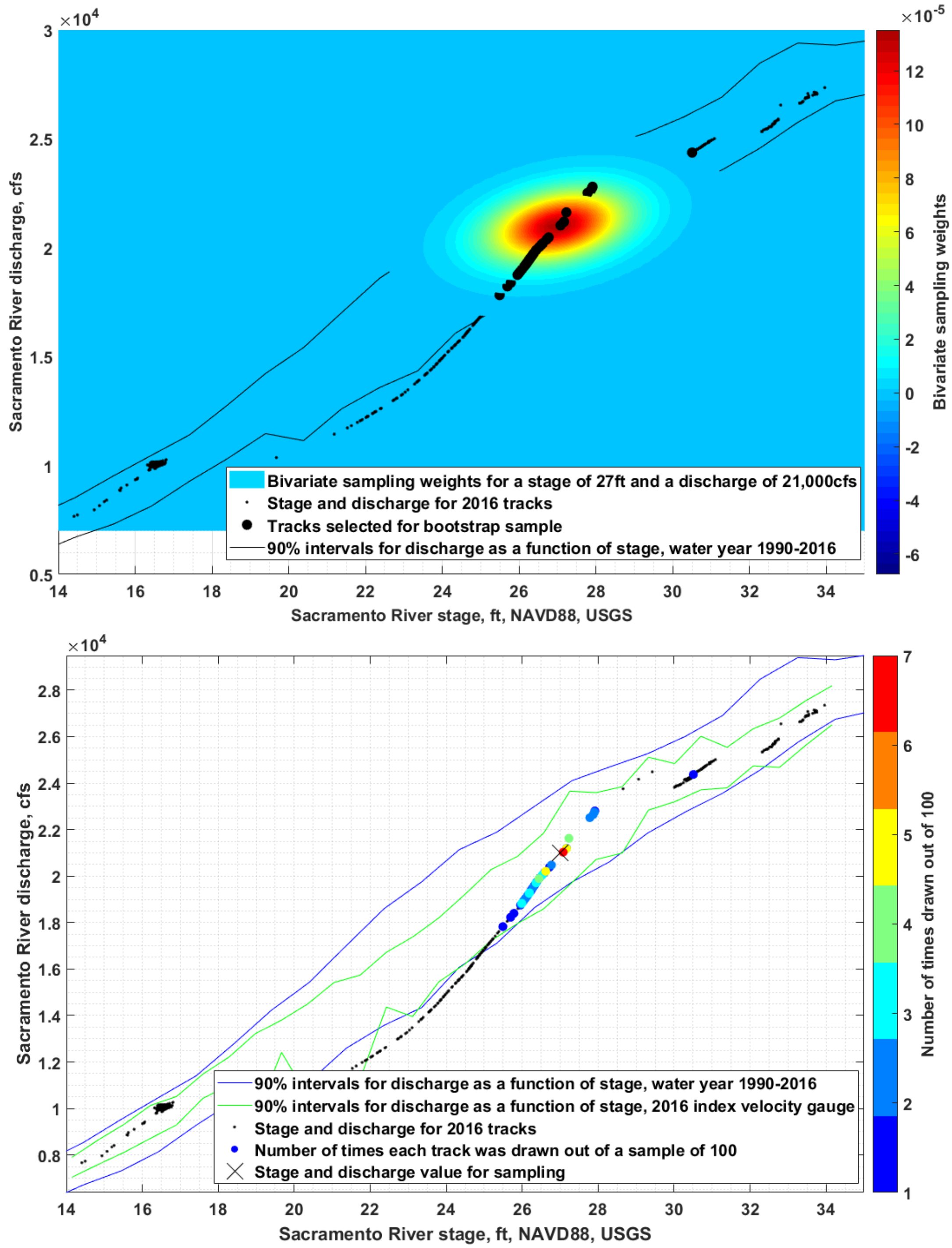

Figure 12 - Plots illustrating the bivariate weighting and the resulting bootstrap sampling for a stage of 27ft and a discharge of 21,000 cfs.

A heat plot indicating the bivariate weighting distribution for this combination of discharge and stage (upper panel), and a scatter plot indicating the frequency of selection for each fish track for a bootstrap sample of 100 tracks (lower panel).

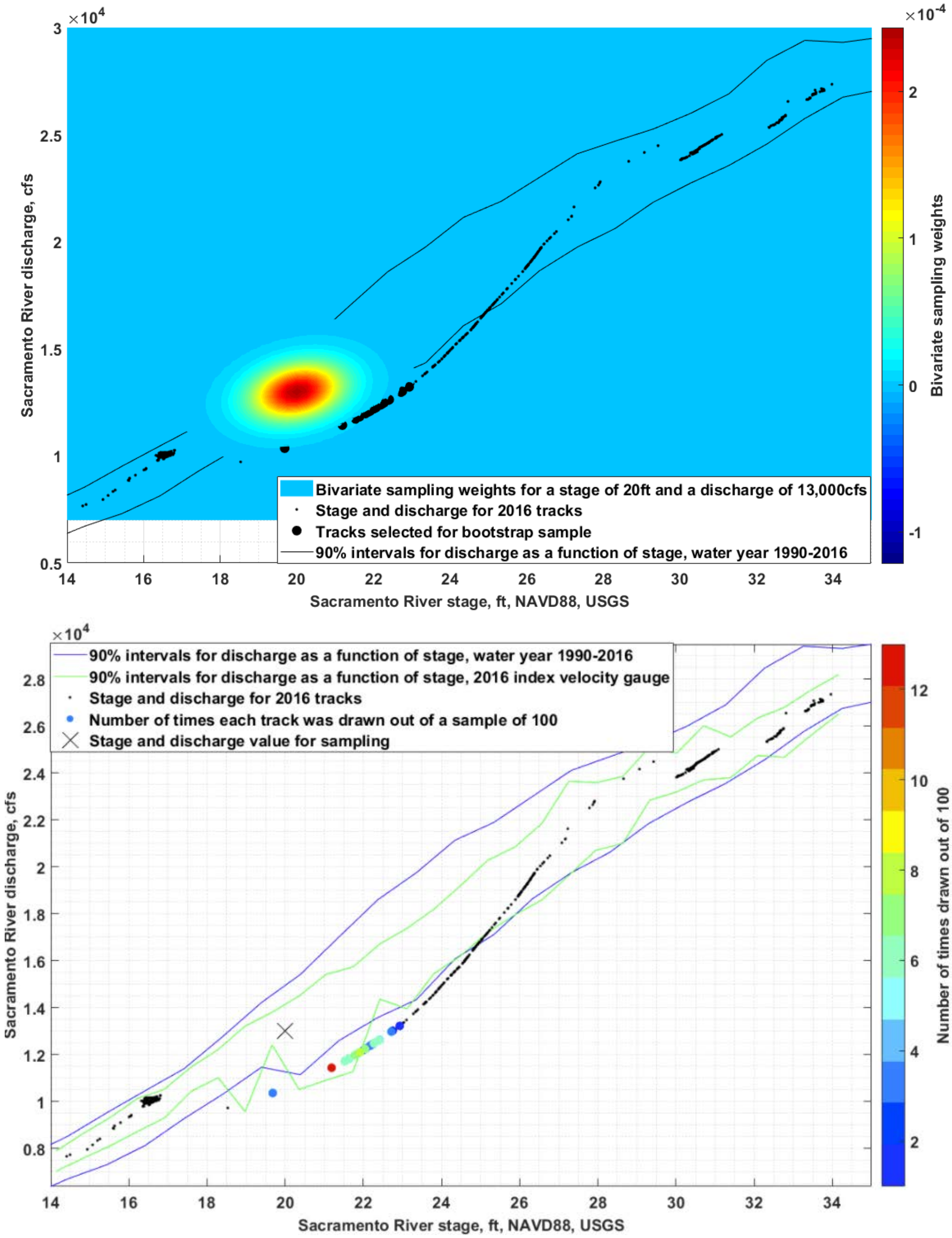

Figure 13 - Plots illustrating the bivariate weighting and the resulting bootstrap sampling for a stage of 20ft and a discharge of 13,000 cfs.

A heat plot indicating the bivariate weighting distribution for this combination of discharge and stage (upper panel), and a scatter plot indicating the frequency of selection for each fish track for a bootstrap sample of 100 tracks (lower panel).

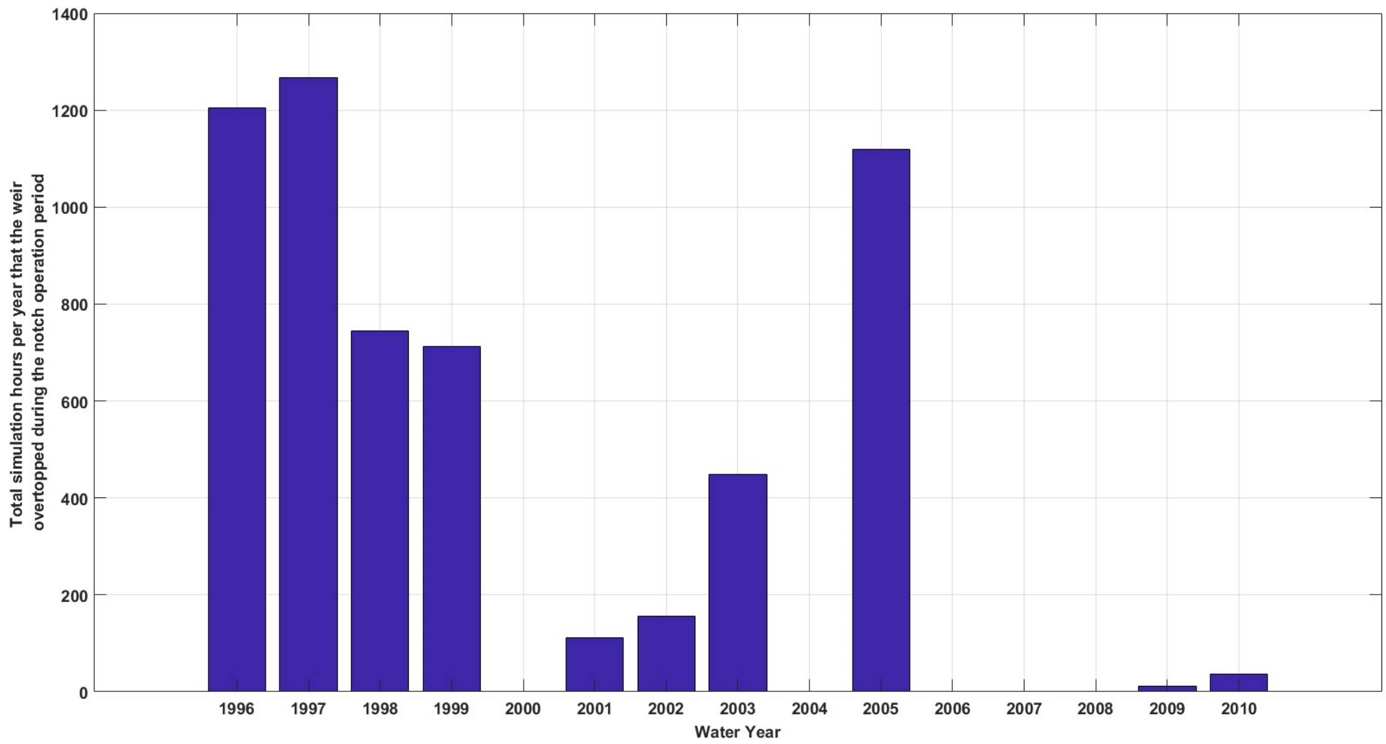

Figure 14 - Number of hours per year that the weir overtopped during the prescribed notch operation period for water years simulated.

The blue bars indicate the number of hours per season that the weir overtopped during the prescribed notch operation period (November 1 - March 15) for water years simulated. Missing bars indicate water years when the weir did not overtop during the simulation. For the purposes of the simulation overtopping is defined as periods when Sacramento River stage is greater than 32.3 ft, USGS survey, NAVD88.

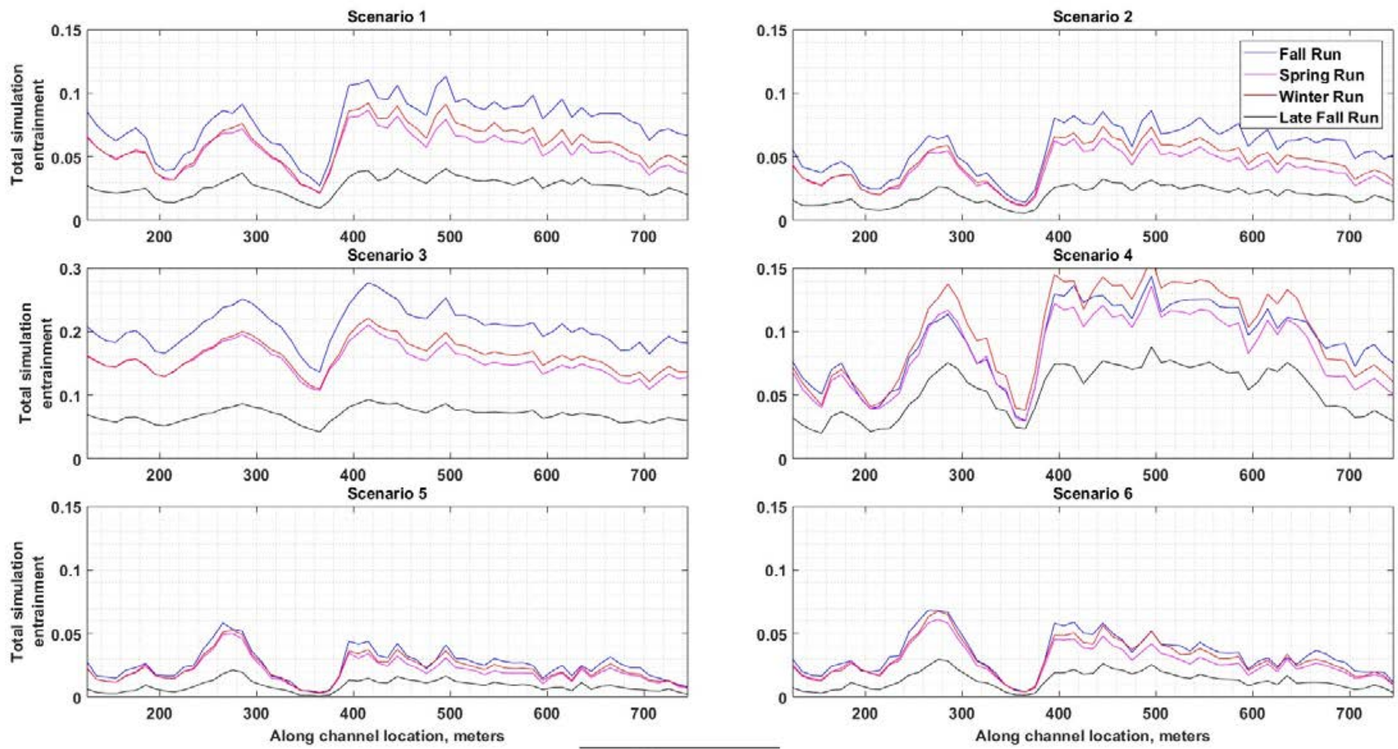

Figure 15 - Total entrainment as a function of notch location for each scenario.

Each panel shows the total entrainment for each scenario at each location in the study area, by run. Total simulation entrainment is expressed as the fraction of the total yearly abundance for the entire simulation period entrained in each scenario location. The blue, pink, orange, and black lines indicate the total entrainment for fall run, spring run, winter run, and late fall run, respectively. Note that the simulation is based on data from acoustically tagged hatchery surrogates, and so differences between run entrainment are entirely driven by differences in the historical timing of run abundance, and are not indicative of behavioral differences evident in the acoustic tag data. Also note that the range of the y axis is greater in panel 3 due to the large notch flows for scenario 3. The along-channel coordinate system referenced on the x axis of these plots is shown in Figure 4.

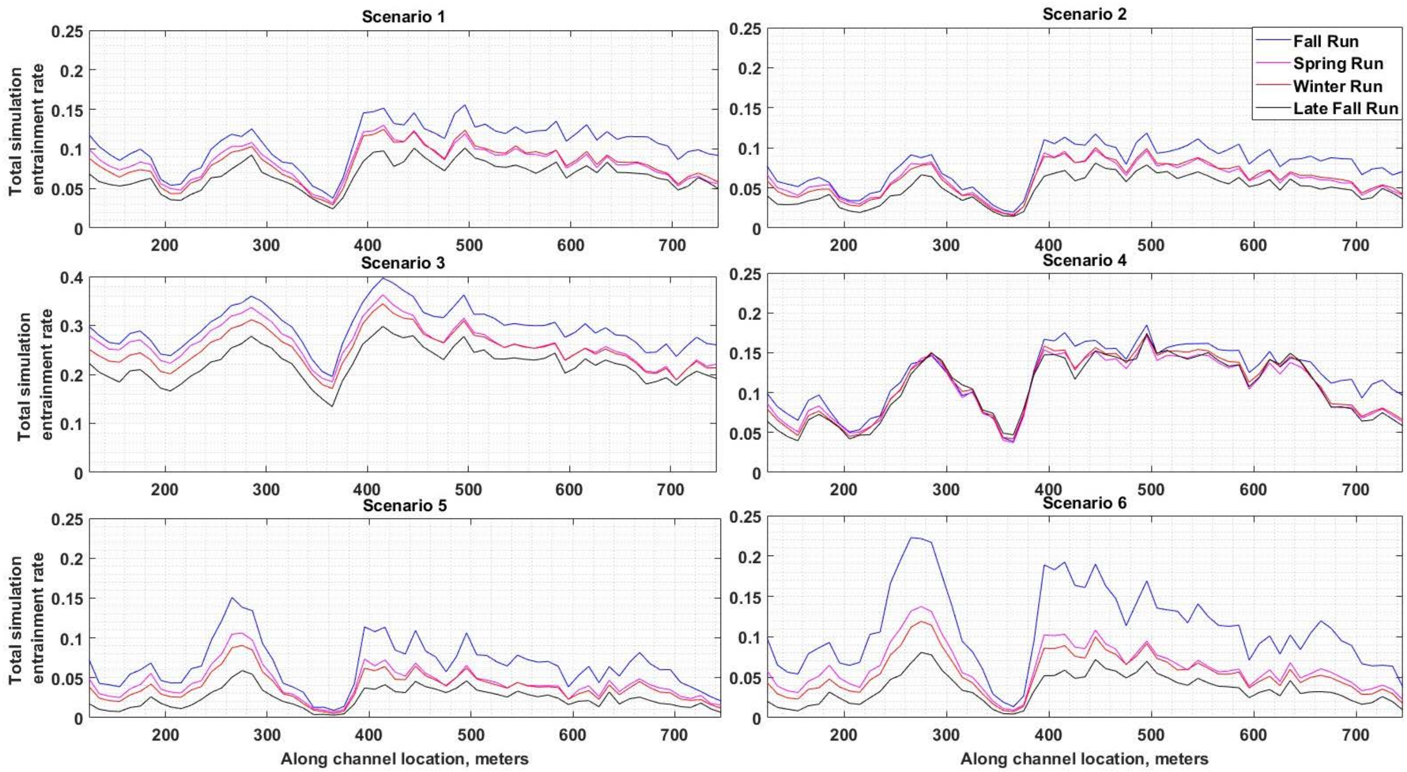

Figure 16 - Entrainment rate as a function of notch location for each scenario

Each panel shows the total entrainment for each scenario at each location in the study area, by run. Entrainment rate is expressed as the fraction of fish passing the notch that are entrained in the notch when notch flow was greater than zero for each scenario. Entrainment rate differs from total entrainment in that entrainment rate reflects the fraction of the fish which are present when the notch is flowing that are entrained, while total entrainment reflects the fraction of the overall yearly abundance that is entrained. The blue, pink, orange, and black lines indicate the total entrainment rate for fall run, spring run, winter run, and late fall run, respectively. Note that the simulation is based on data from acoustically tagged hatchery surrogates, and so differences between run entrainment rates are entirely driven by differences in the historical timing of run abundance, and are not indicative of behavioral differences evident in the acoustic tag data. Also note that the range of the y axis is greater in panel 3 due to the large notch flows for scenario 3. The along-channel coordinate system referenced on the x axis of these plots is shown in Figure 4.

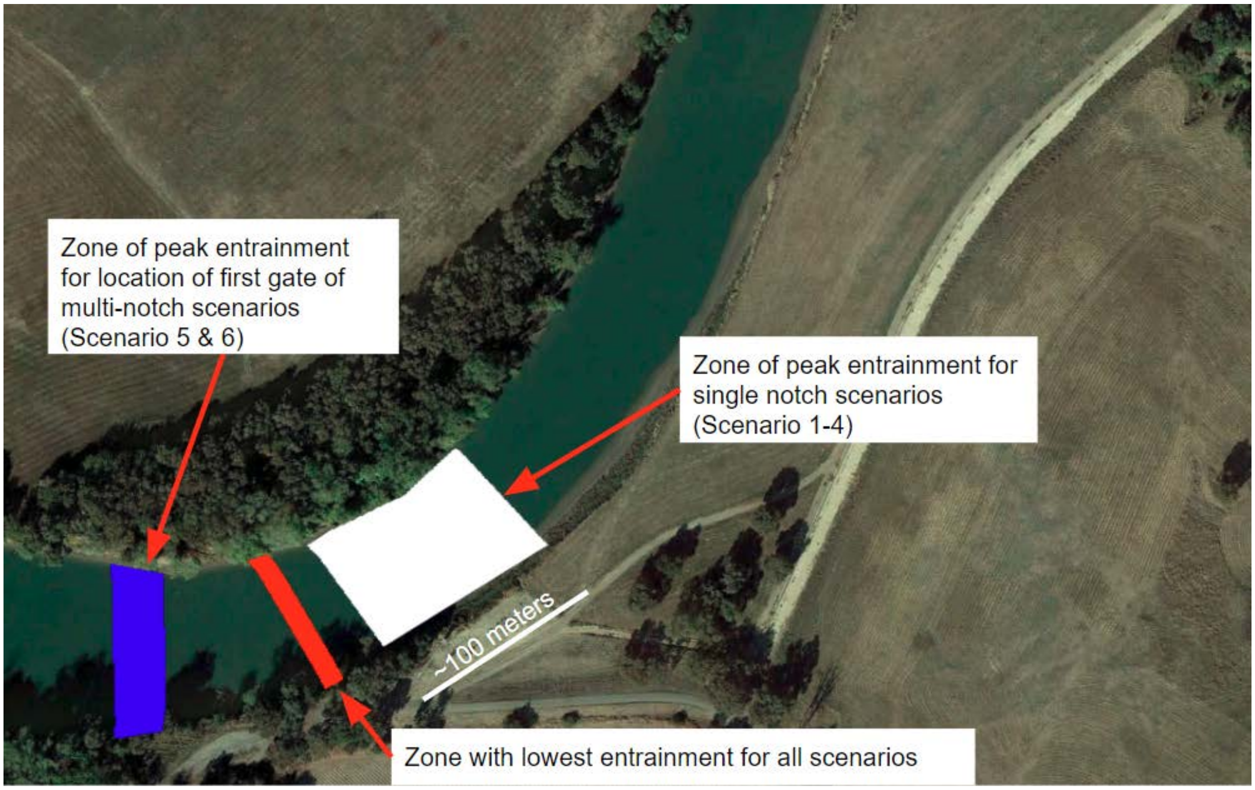

Figure 17 - Figure showing the location of maximum and minimum entrainment for fall run for all scenarios overlaid on an aerial photograph of the study area.

We simulated entrainment under six different weir modification scenarios: scenarios 1 – 4 included a single notch in the Fremont Weir, scenario 5 and 6 included multiple notches in the Fremont Weir. The simulation predicted the highest entrainment under single notch scenarios when the notch was located in the zone indicated by the white box, and the simulation predicted the highest entrainment under multiple notch scenarios when the upstream notch was located in the zone indicated by the blue box. The simulation predicted the lowest entrainment for all scenarios when the notch or upstream most notch was located in the zone indicated by the red box.

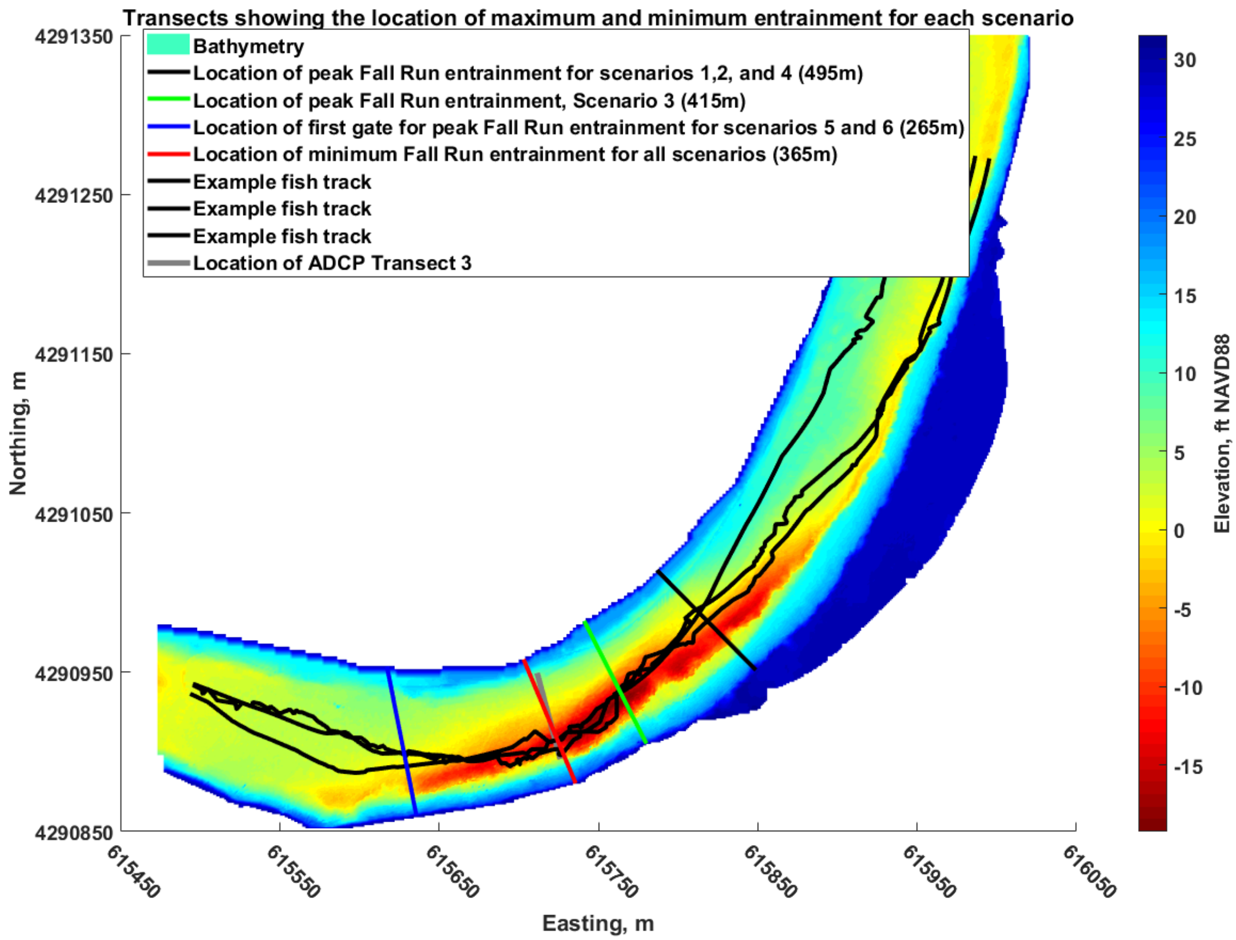

Figure 18 - Plan view of study area showing the location of minimum and maximum entrainment along with example fish tracks.

Colored surface indicates the study area bathymetry, the black lines show fish tracks that entered the study area on the river left half of the Sacramento River and then moved towards the river right bank until encountering a scour feature and moving back towards the river left bank of the Sacramento River. The colored cross section lines indicate locations where the entrainment simulation predicted maximum and minimum fall run entrainment for each scenario.

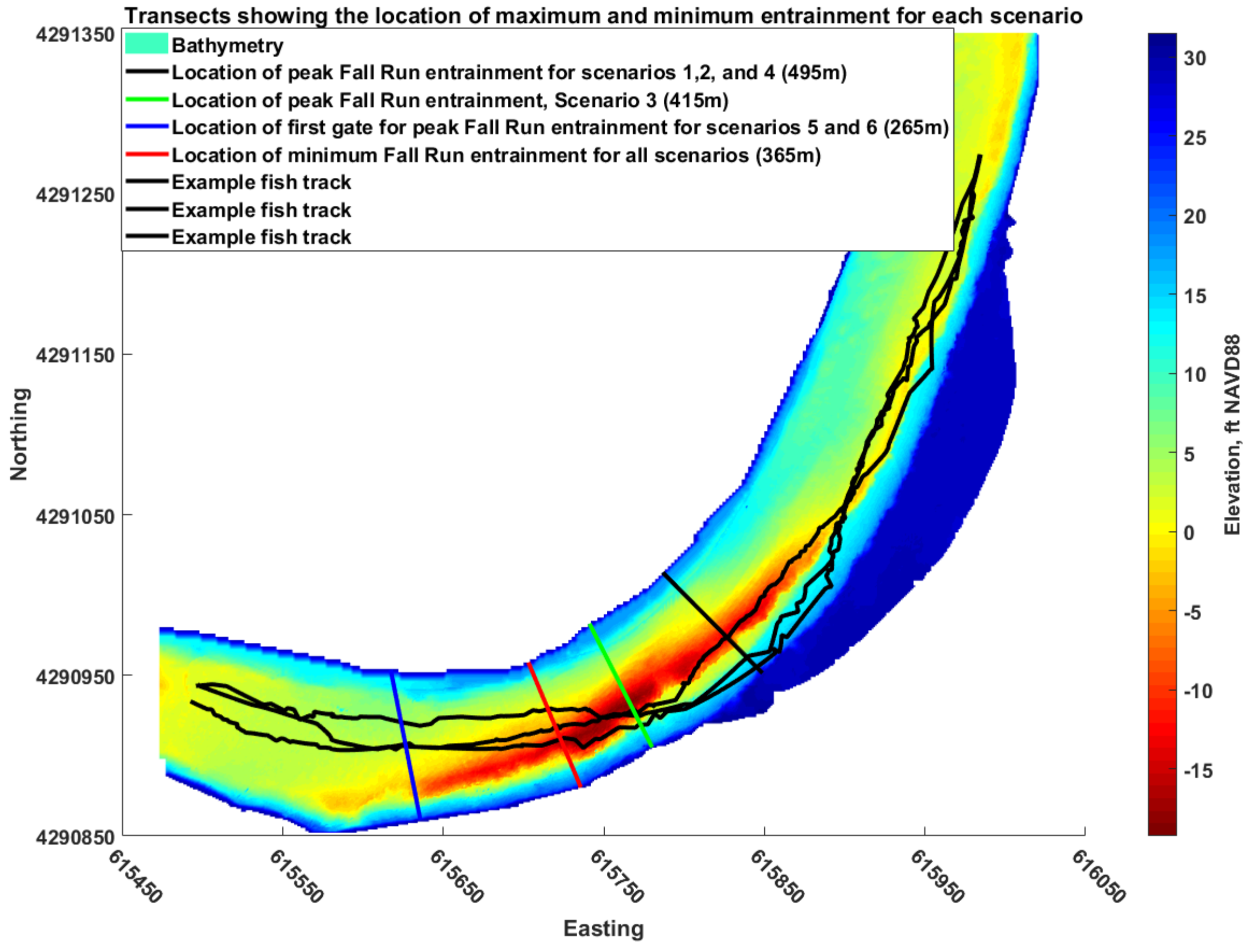

Figure 19 - Plan view of study area showing the location of minimum and maximum entrainment along with example fish tracks.

Colored surface indicates the study area bathymetry, the black lines show fish tracks that entered the study area on the river left half of the Sacramento River and then moved towards the river right bank passing the scoured area corresponding to the lowest predicted notch entrainment. The colored cross section lines indicate locations where the entrainment simulation predicted maximum and minimum fall run entrainment for each scenario.

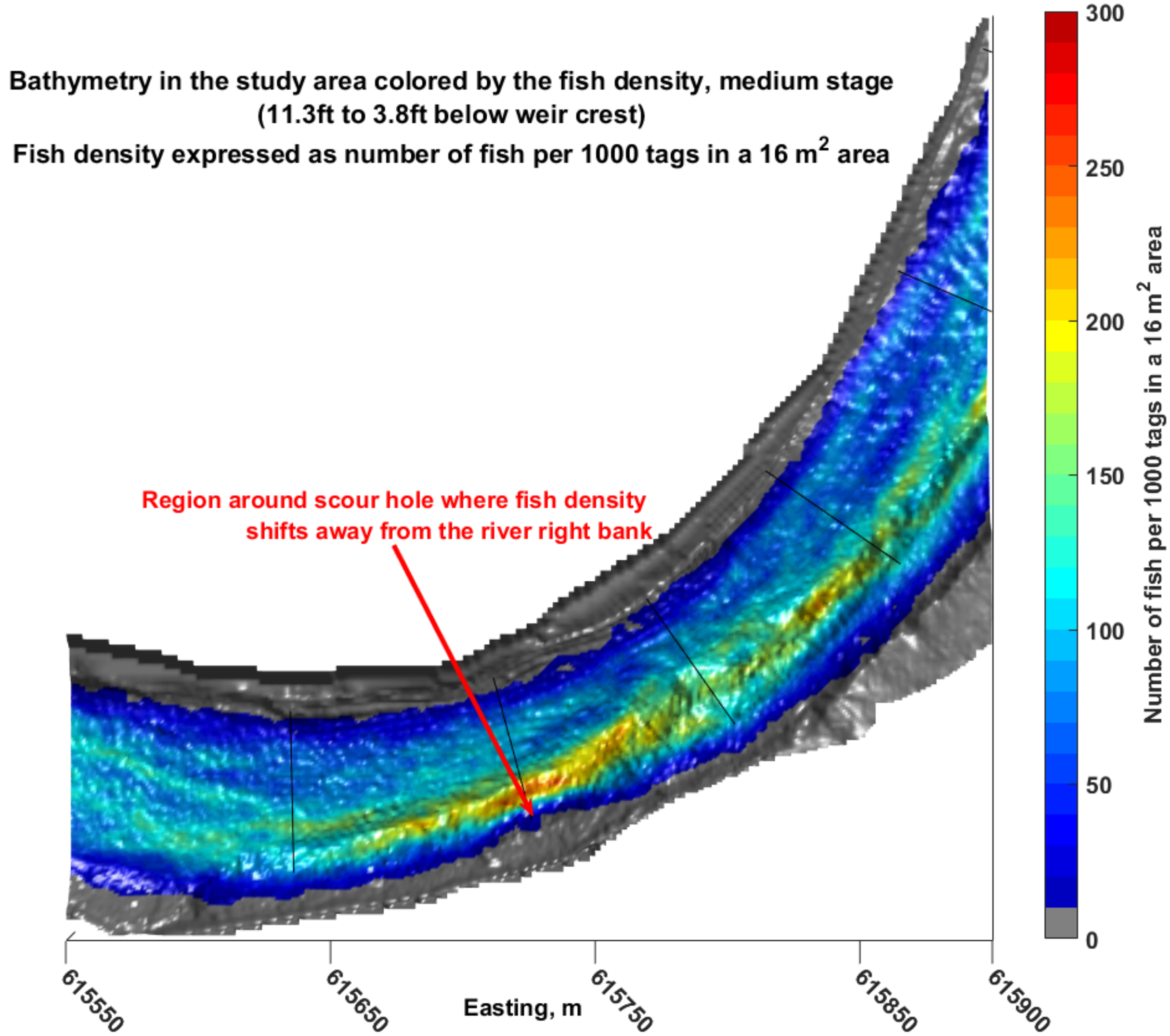

Figure 20 - Plan view of the study area bathymetry colored by fish density

Plan view of a surface representing the study area bathymetry, colored by the spatial density of 2016 fish tracks during medium stage periods. Gray areas on the bathymetry indicate areas where there were no fish tracks. The red arrow indicates the region in the vicinity of along-channel coordinate 370 where fish density near the bank decreases in the vicinity of a scoured section in the levy. Note that in the area around the black arrow the cross-stream gradients in fish density are stronger, and the area where the density colormap transitions from blue (low density) to green (moderate density) shifts towards the center of the channel.

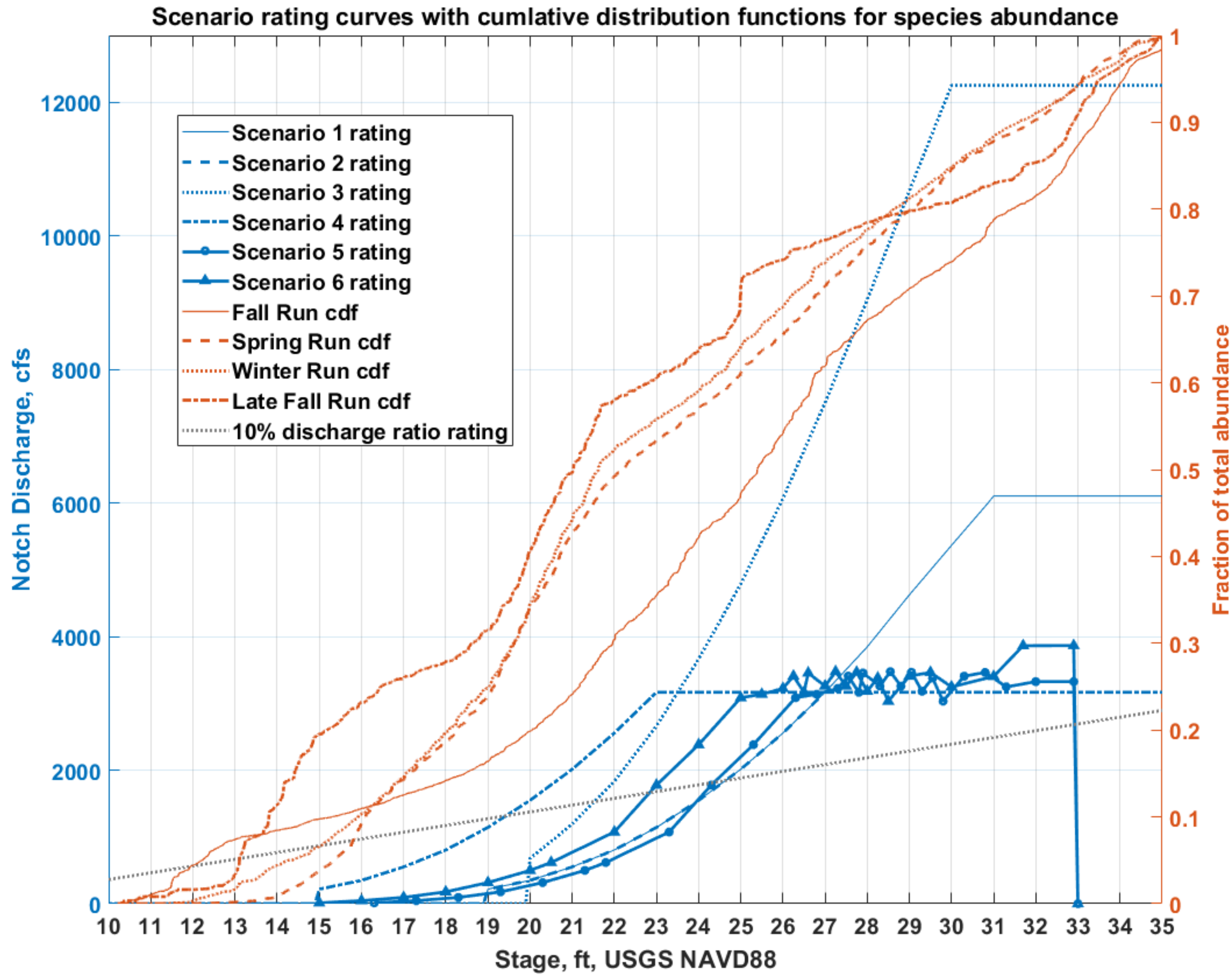

Figure 21 - Stage-discharge curves for each scenario and run abundance CDFs on stage

Stage discharge curves for each scenario are shown in blue, with scenario discharge shown on the left (blue) y-axis. The stage-discharge curves for multiple notch scenarios indicate the total flow through all notches in the scenario at each stage. The rating curves for scenario 1 and scenario 2 overlap for stages below 27 ft. Cumulative distribution functions for the simulation period showing the cumulative fraction of run abundance passing through the study area at each stage in red. These curves show the fraction of each run that pass through the study area at a stage less than or equal to the stage given on the x axis. Note the rapid increase in cumulative abundance between 19 ft and 22 ft for winter run and spring run. The dotted gray line indicates the amount of notch flow that corresponds to 10% of the Sacramento River stage-discharge rating from the 2016 USGS gauge data. The location of each scenario's rating curve relative to the 10% discharge ratio line is an indicator of the fraction of the Sacramento River flow that is passing through the notch at any stage: if the a rating curve is above the grey line at any stage the notch is likely entraining more than 10% of the Sacramento River at that stage.

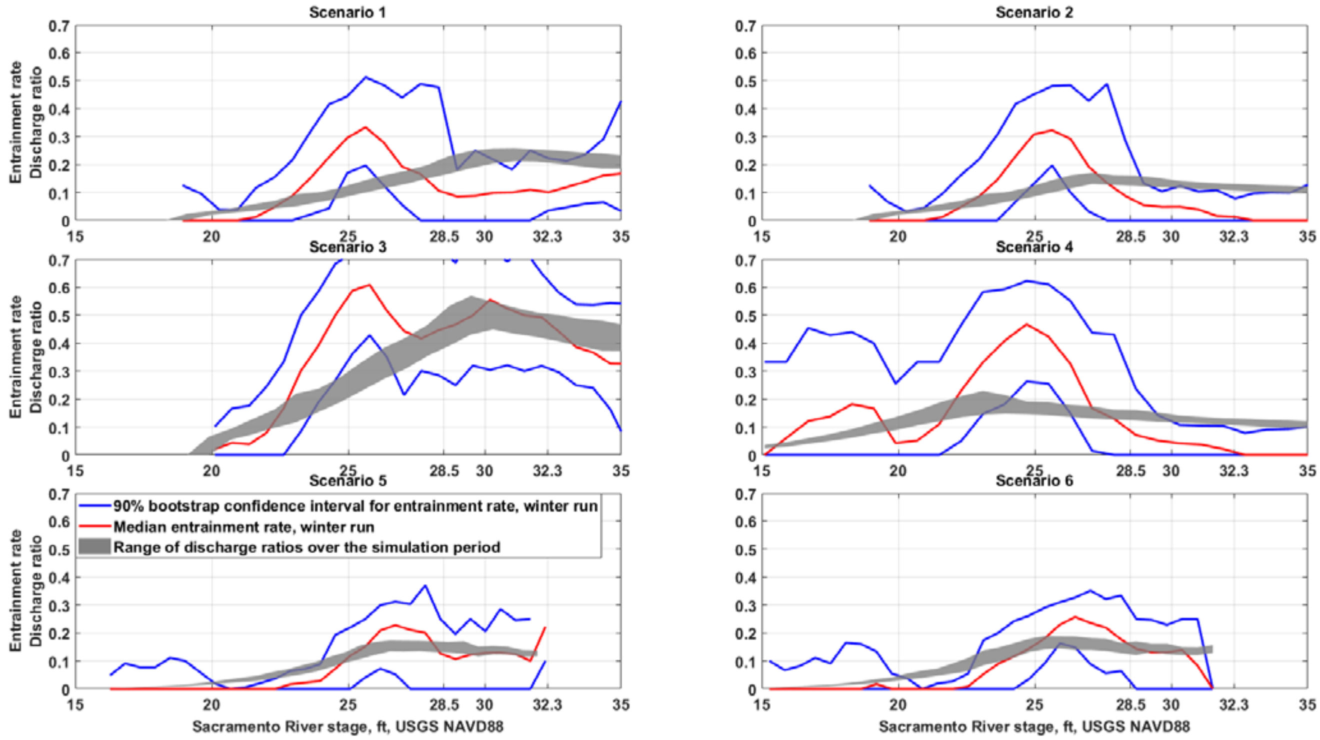

Figure 22 - Entrainment rate and discharge ratio for each scenario as a function of Sacramento River stage.

Panels 1-6 show entrainment rate and discharge ratio as a function of stage for scenarios 1-6, respectively. For each scenario the blue lines indicate the 90% bootstrap confidence interval for entrainment rate at each stage, the red line indicates the bootstrap median entrainment rate for each stage, and the gray region indicates the range of discharge ratios each scenario experienced during the simulation period. The notch discharge ratio indicates the fraction of Sacramento River discharge flowing into each scenario at each stage; because of backwater effects there are a range of possible discharge ratios for each stage, as indicated by the vertical range of the gray band at each stage. When the entrainment rate is greater than the discharge ratio the notch is entraining proportionally more fish than water. Note that the Sacramento River reaches a bankfull state in the study area at a stage value of around 28.5 ft, and the weir overtops at a stage value of 32.3 ft.

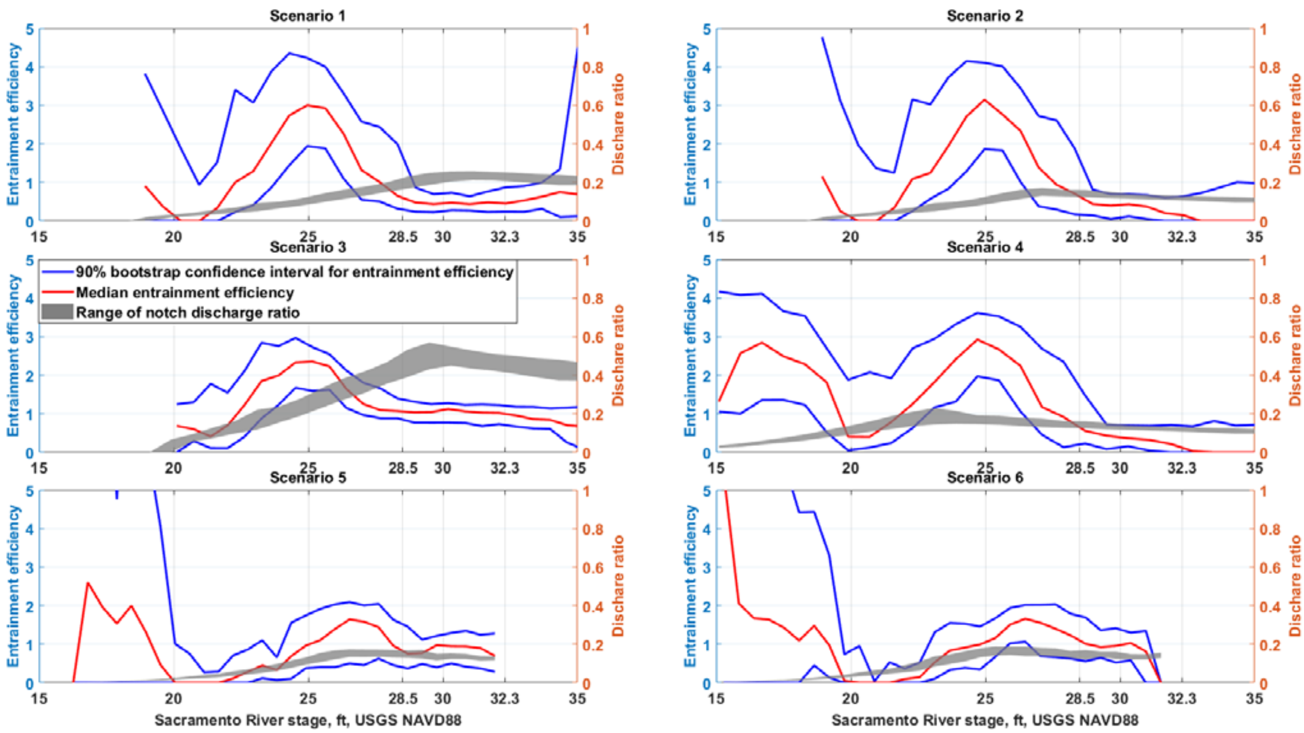

Figure 23 - Entrainment efficiency and discharge ratio for each scenario as a function of Sacramento River stage, with small sample sizes removed.

Panels 1-6 show entrainment efficiency and discharge ratio as a function of stage for scenarios 1-6, respectively, for days when more than 0.5% of the yearly total abundance transited the study area. Removing time steps from days when less than 0.5% of the yearly total abundance transited the study area removed 10% of the time step entrainment data from the fall run entrainment estimates used to produce these curves. The y-axis on the left of each panel (blue) indicates the scale for the entrainment efficiency. The y-axis on the right of each panel (red) indicates the scale for the discharge ratio. For each scenario the blue lines indicate the 90% bootstrap confidence interval for entrainment efficiency for each stage, the red line indicates the bootstrap median entrainment efficiency for each stage, and the gray region indicates the range of discharge ratios each scenario experienced during the simulation period. The notch discharge ratio indicates the fraction of Sacramento River discharge flowing into each scenario at each stage; because of backwater effects there are a range of possible discharge ratios for each stage, as indicated by the vertical range of the gray band. When the entrainment efficiency is greater than one the notch is entraining proportionally more fish than water. Note that the Sacramento River reaches a bankfull state in the study area at a stage value of around 28.5 ft, and the weir overtops at a stage value of 32.3 ft.

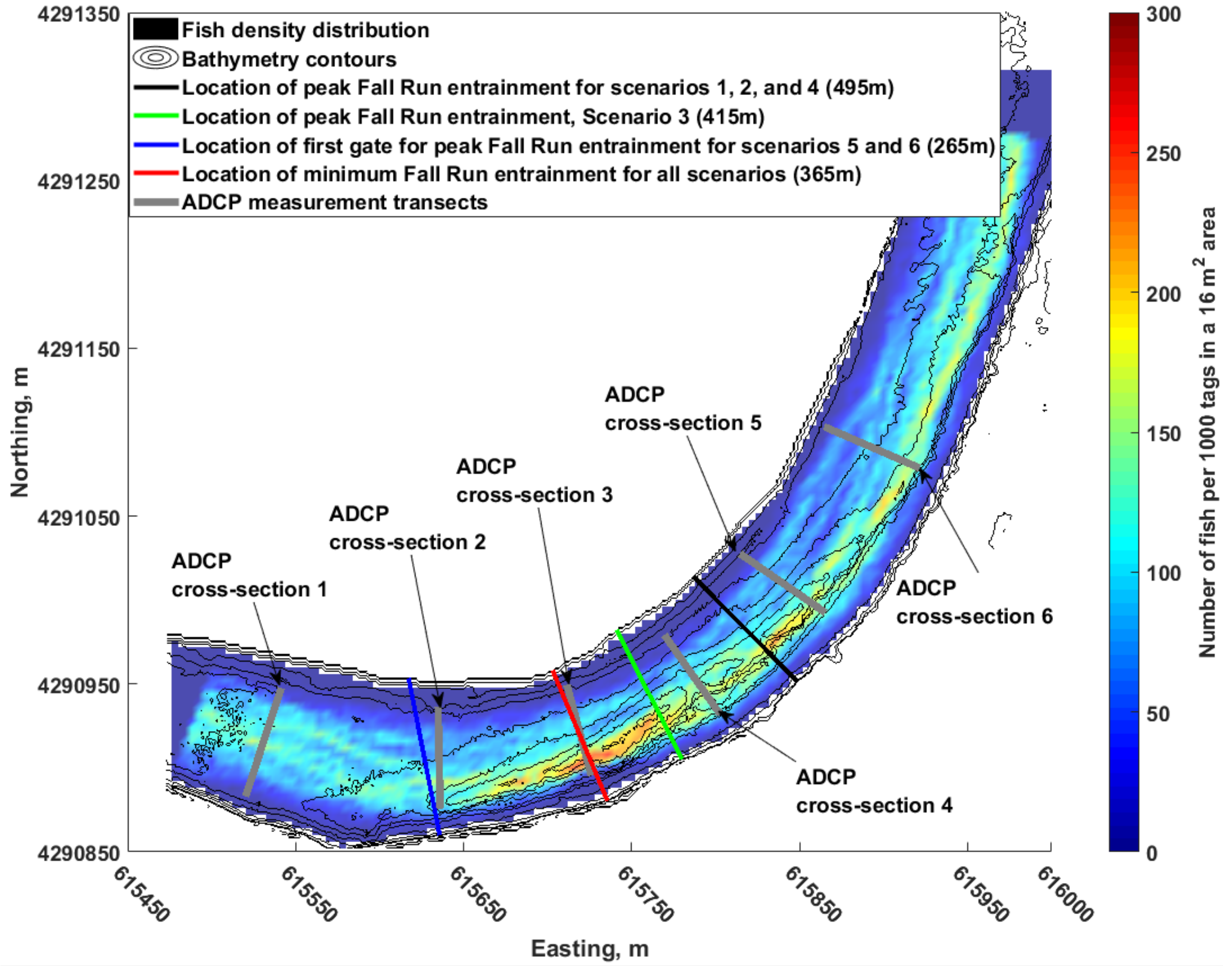

Figure 24 - Figure showing the location of maximum and minimum entrainment for fall run for all scenarios overlaid on fish density distribution for medium stage covariate group.

The colored surface shows the fish density distribution for all acoustic tag tracks recorded during the 2016 study when Sacramento River stage was between 21 ft and 28.5 ft. The location of downward looking ADCP transects are shown as gray lines and labeled, the cross-channel velocity distribution computed from these measurements made at a Sacramento River stage of 24.2 ft are shown on Figure 25. The notch locations corresponding to maximum and minimum entrainment for single notch and multiple notch configurations are shown with colored lines. Note that the Sacramento River reaches bankfull in the study area at around 28.5 ft.

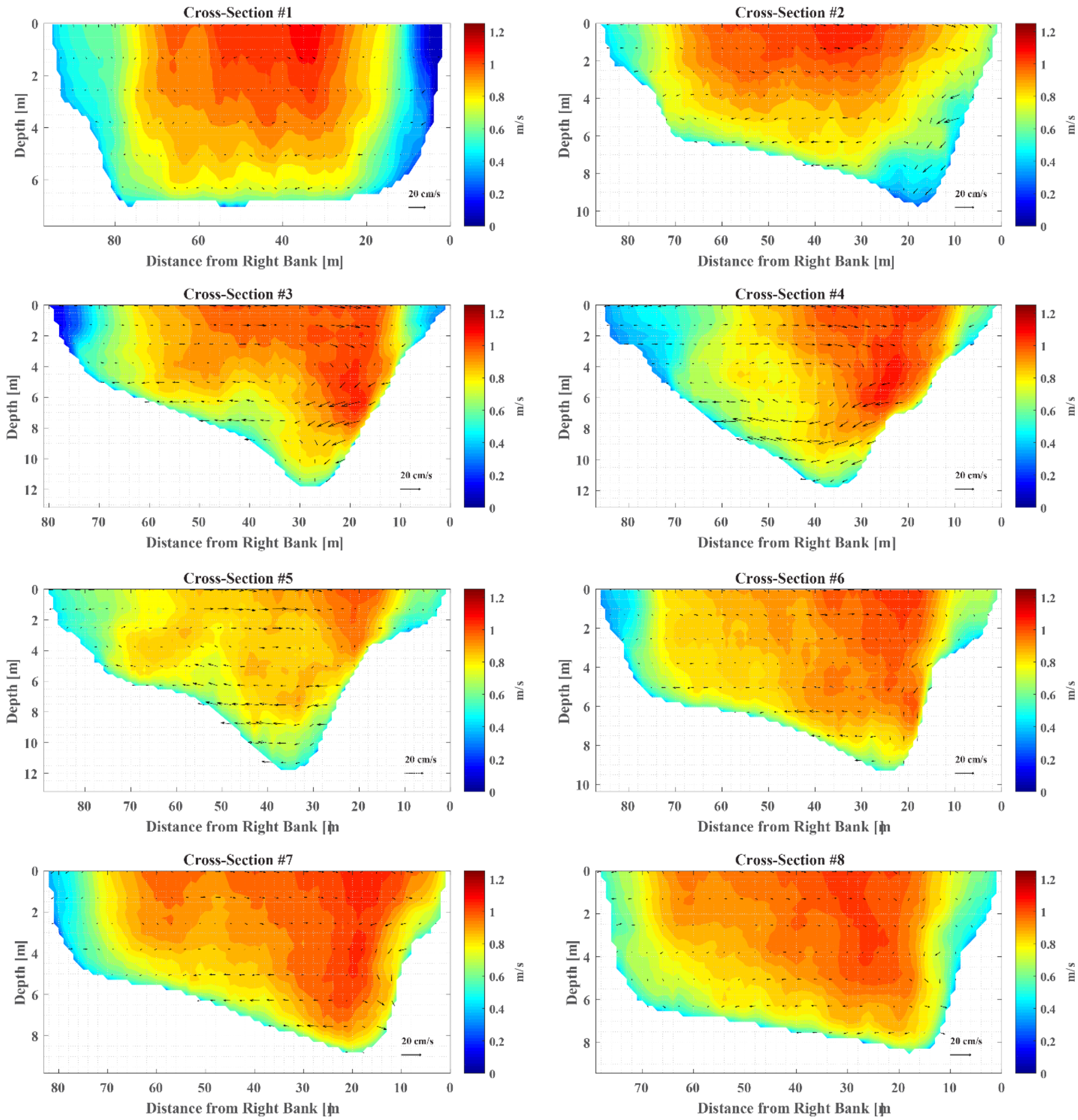

Figure 25 - Figure from cross-channel velocity transect data collected during 2016

Contour plot showing along-stream velocity magnitude and arrows indicating secondary velocity currents for each velocity cross-section (1-8) at a stage of 24.2 ft. and discharge of 15,930 cfs. Taken from Stumpner et al., In Review.

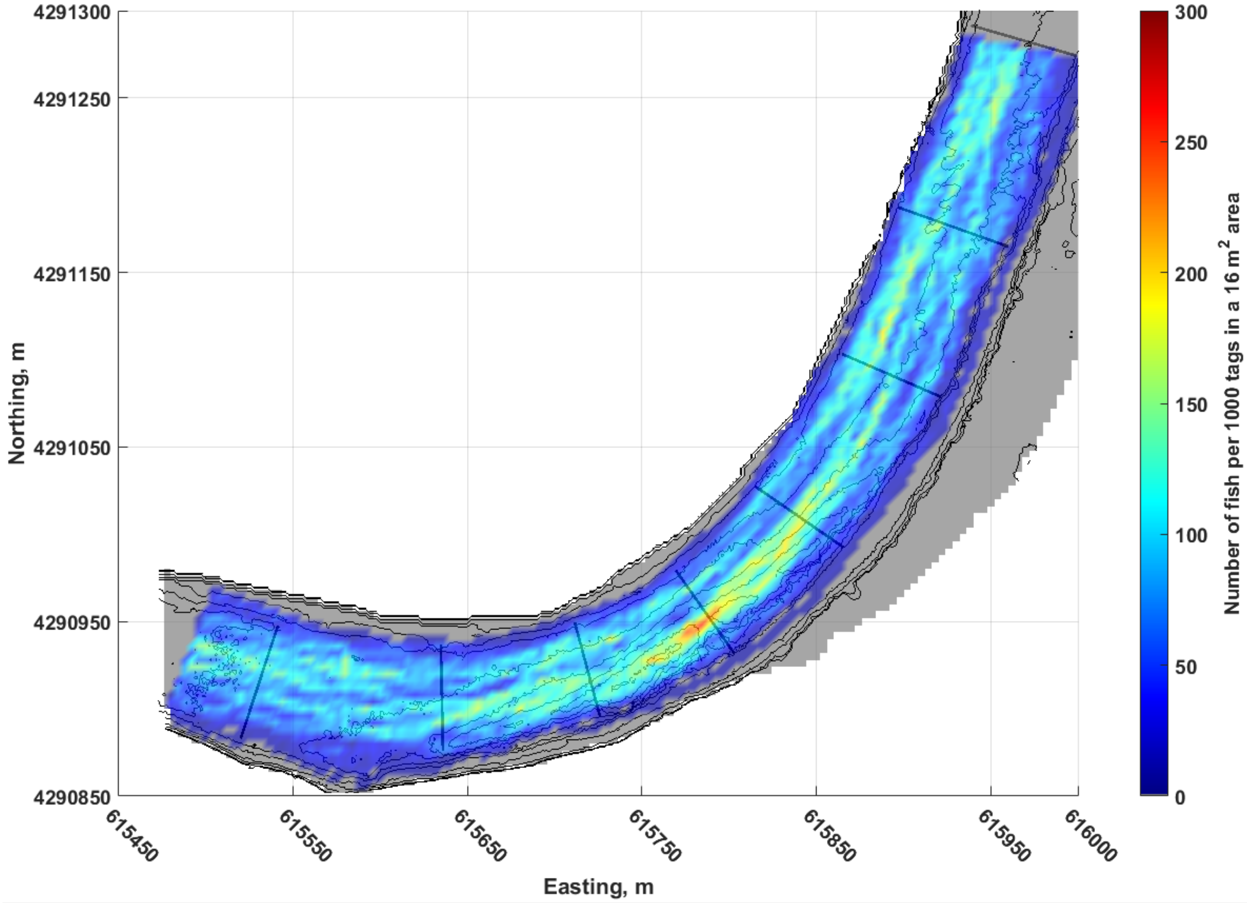

Figure 26 - Spatial distribution of 2016 study fish tracks for periods when Sacramento River was greater than bankfull and below the weir crest.

Plan view of the study area colored by the spatial density of 2016 fish tracks collected when the Sacramento River was above bankfull (28.5 ft), but below the crest of the Fremont Weir. Gray areas on the bathymetry indicate areas where no fish were detected. Thin black lines indicate bathymetric contours.

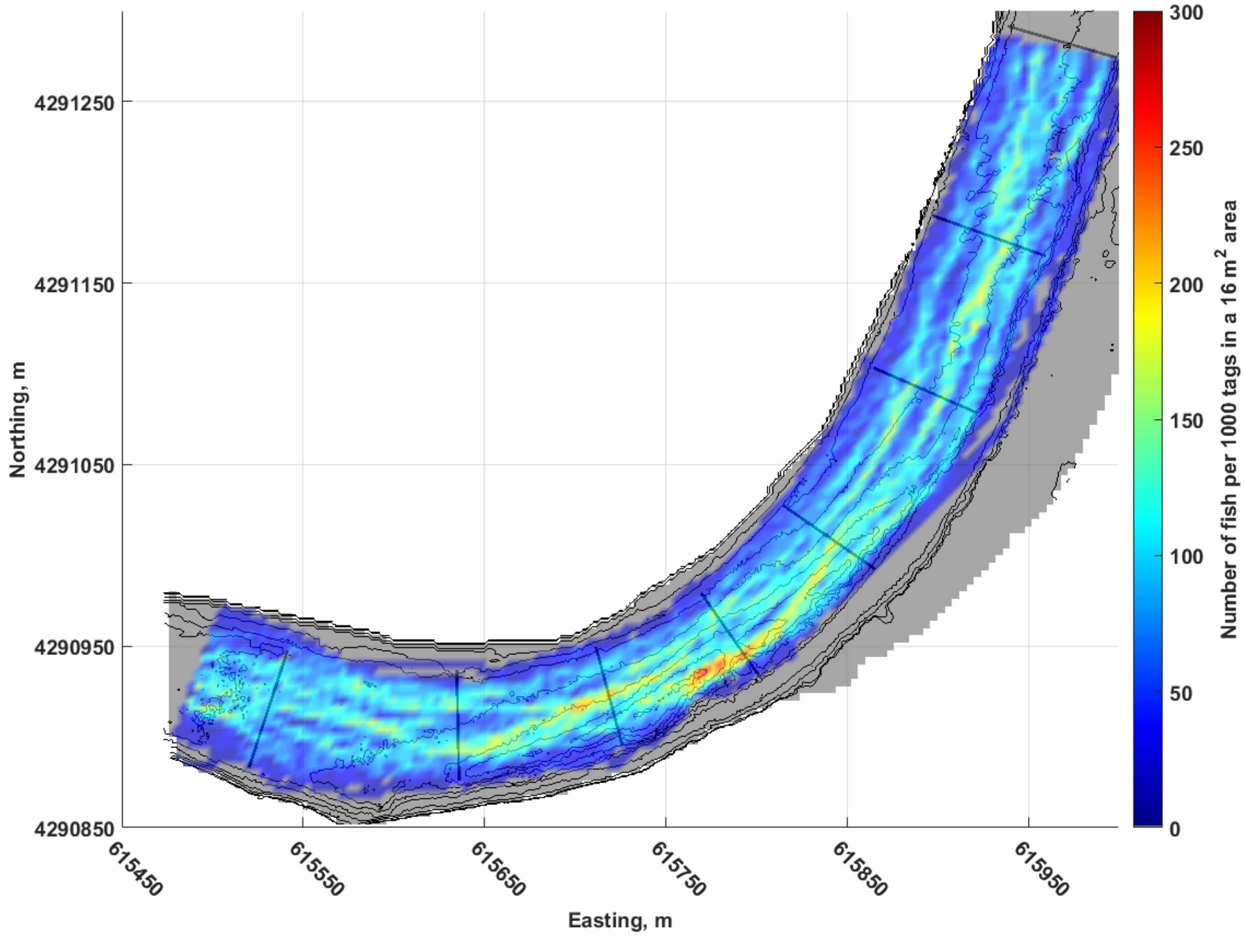

Figure 27 - Spatial distribution of 2016 study fish tracks for periods when the Fremont Weir was overtopping

Plan view of the study area colored by the spatial density of 2016 fish tracks collected when the Fremont Weir was overtopping. Gray areas on the bathymetry indicate areas where no fish were detected. Thin black lines indicate bathymetric contours.

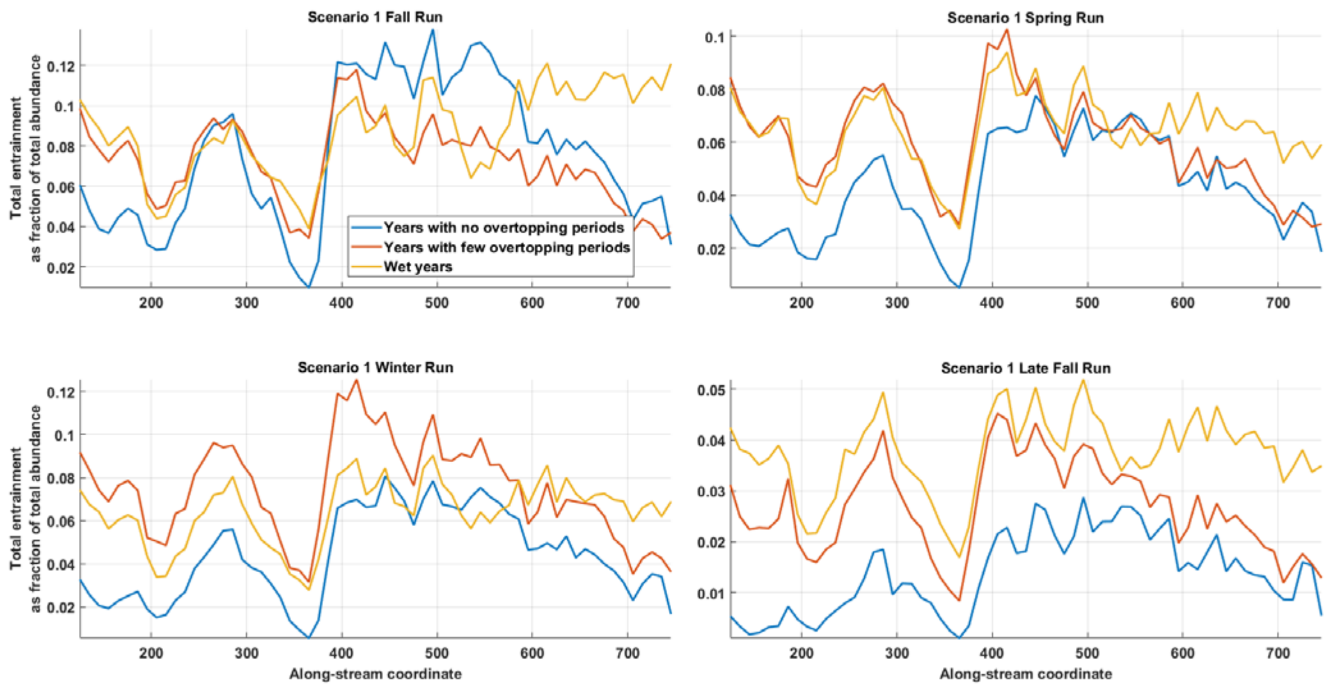

Figure 28- Scenario 1 water year type total entrainment curves.

Plots showing total entrainment for each run as a function of notch along-channel location within the study area calculated for three water year types for scenario 1. The blue lines indicates total entrainment over all seasons when Fremont Weir did not overtop, the red line indicates total entrainment over all seasons when the Fremont Weir overtopped for fewer than 200 hours, and the gold line indicates total entrainment over all seasons when the Fremont Weir overtopped for more than 200 hours (wet years). Each panel shows water year entrainment for a run. For the purposes of the simulation weir overtopping was defined as Sacramento River stage exceeding 32.3 ft, USGS survey, NAVD88. Note that the simulation is based on data from acoustically tagged hatchery surrogates, and so differences between run entrainment are entirely driven by differences in the historical timing of run abundance, and are not indicative of behavioral differences between runs.

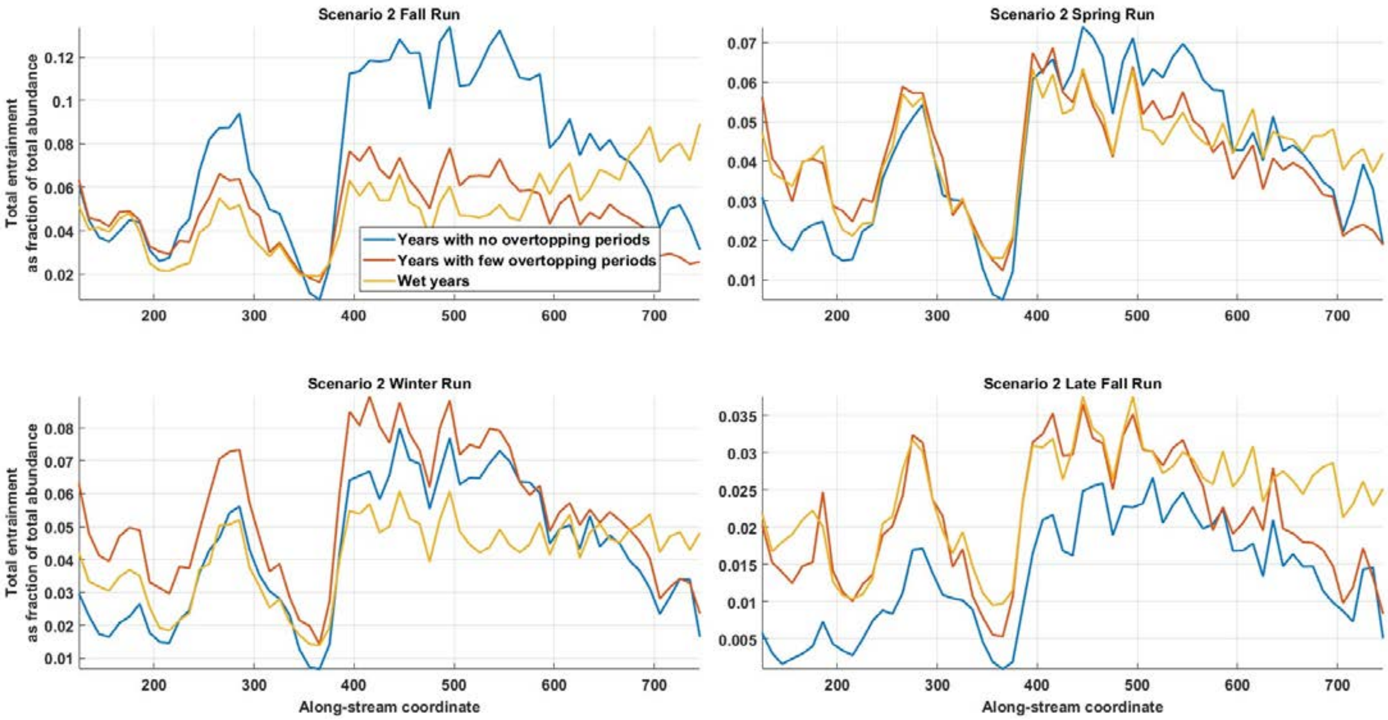

Figure 29- Scenario 2 water year type total entrainment curves.

Plots showing total entrainment for each run as a function of notch along-channel location within the study area calculated for three water year types for scenario 2. The blue lines indicates total entrainment over all seasons when Fremont Weir did not overtop, the red line indicates total entrainment over all seasons when the Fremont Weir overtopped for fewer than 200 hours, and the gold line indicates total entrainment over all seasons when the Fremont Weir overtopped for more than 200 hours (wet years). Each panel shows water year entrainment for a run. For the purposes of the simulation weir overtopping was defined as Sacramento River stage exceeding 32.3 ft, USGS survey, NAVD88. Note that the simulation is based on data from acoustically tagged hatchery surrogates, and so differences between run entrainment are entirely driven by differences in the historical timing of run abundance, and are not indicative of behavioral differences between runs.

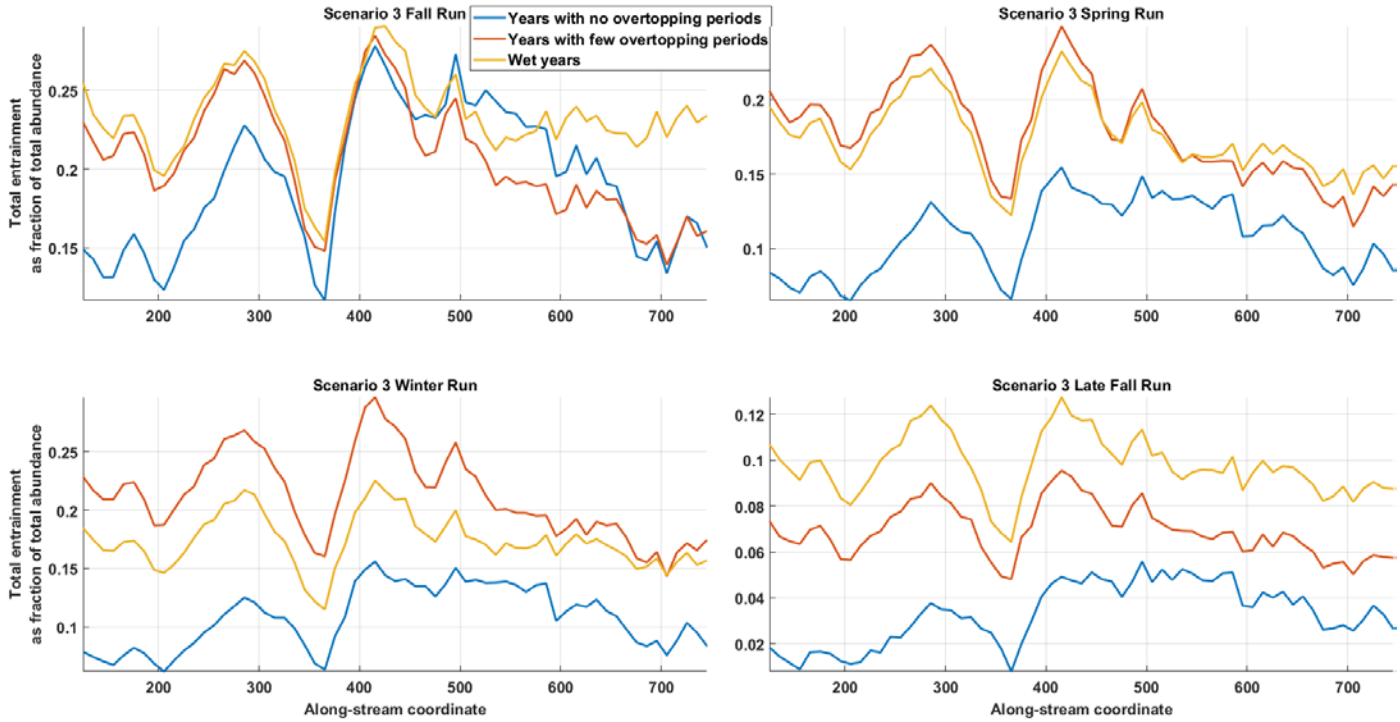

Figure 30- Scenario 3 water year type total entrainment curves

Plots showing total entrainment for each run as a function of notch along-channel location within the study area calculated for three water year types for scenario 3. The blue lines indicates total entrainment over all seasons when Fremont Weir did not overtop, the red line indicates total entrainment over all seasons when the Fremont Weir overtopped for fewer than 200 hours, and the gold line indicates total entrainment over all seasons when the Fremont Weir overtopped for more than 200 hours (wet years). Each panel shows water year entrainment for a run. For the purposes of the simulation weir overtopping was defined as Sacramento River stage exceeding 32.3 ft, USGS survey, NAVD88. Note that the simulation is based on data from acoustically tagged hatchery surrogates, and so differences between run entrainment are entirely driven by differences in the historical timing of run abundance, and are not indicative of behavioral differences between runs

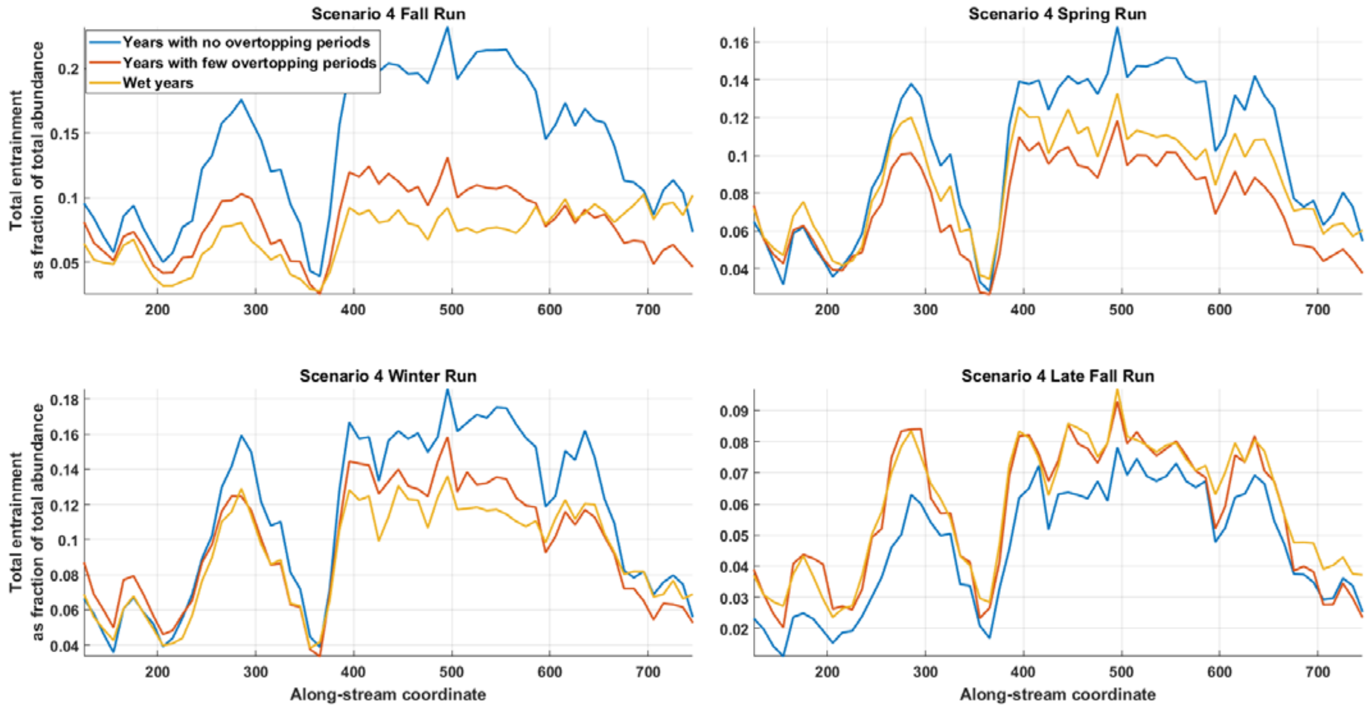

Figure 31- Scenario 4 water year type total entrainment curves

Plots showing total entrainment for each run as a function of notch along-channel location within the study area calculated for three water year types for scenario 4. The blue lines indicates total entrainment over all seasons when Fremont Weir did not overtop, the red line indicates total entrainment over all seasons when the Fremont Weir overtopped for fewer than 200 hours, and the gold line indicates total entrainment over all seasons when the Fremont Weir overtopped for more than 200 hours (wet years). Each panel shows water year entrainment for a run. For the purposes of the simulation weir overtopping was defined as Sacramento River stage exceeding 32.3 ft, USGS survey, NAVD88. Note that the simulation is based on data from acoustically tagged hatchery surrogates, and so differences between run entrainment are entirely driven by differences in the historical timing of run abundance, and are not indicative of behavioral differences between runs.

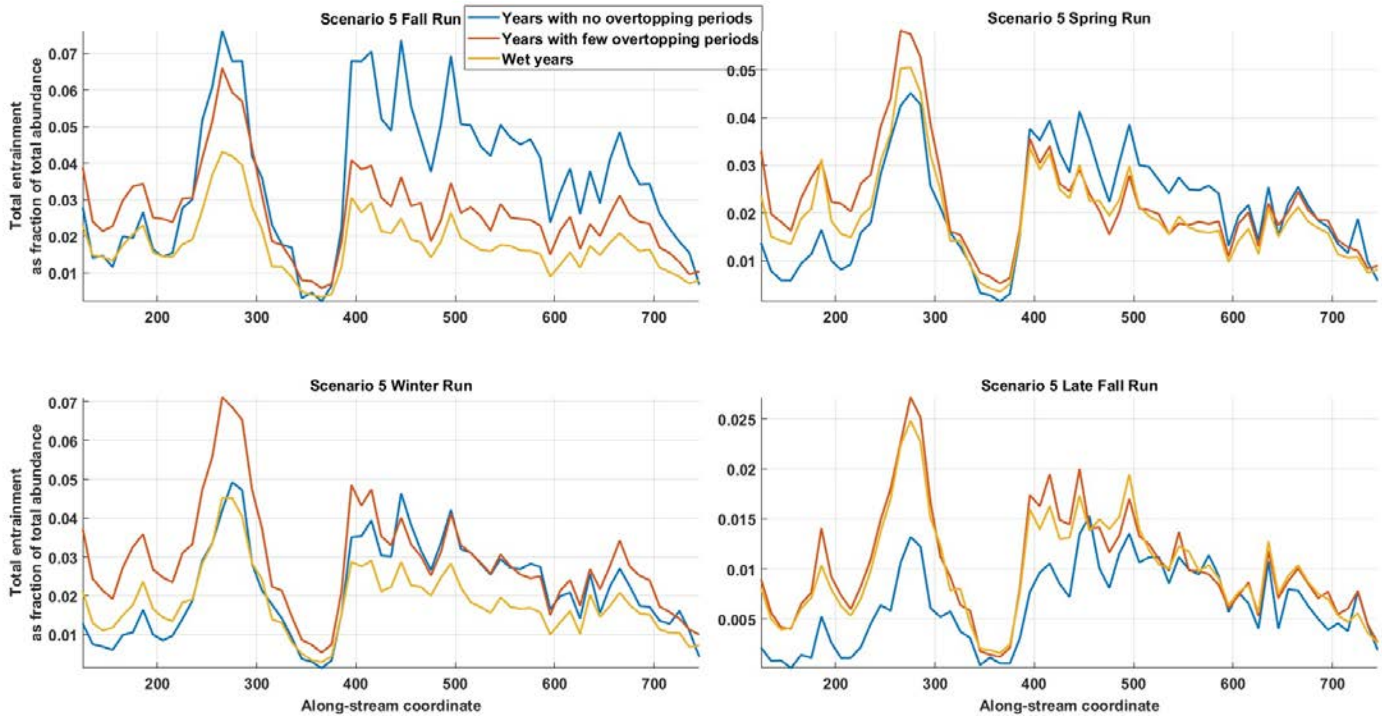

Figure 32- Scenario 5 water year type total entrainment curves

Plots showing total entrainment for each run as a function of notch along-channel location within the study area calculated for three water year types for scenario 5. The blue lines indicates total entrainment over all seasons when Fremont Weir did not overtop, the red line indicates total entrainment over all seasons when the Fremont Weir overtopped for fewer than 200 hours, and the gold line indicates total entrainment over all seasons when the Fremont Weir overtopped for more than 200 hours (wet years). Each panel shows water year entrainment for a run. For the purposes of the simulation weir overtopping was defined as Sacramento River stage exceeding 32.3 ft, USGS survey, NAVD88. Note that the simulation is based on data from acoustically tagged hatchery surrogates, and so differences between run entrainment are entirely driven by differences in the historical timing of run abundance, and are not indicative of behavioral differences between runs.

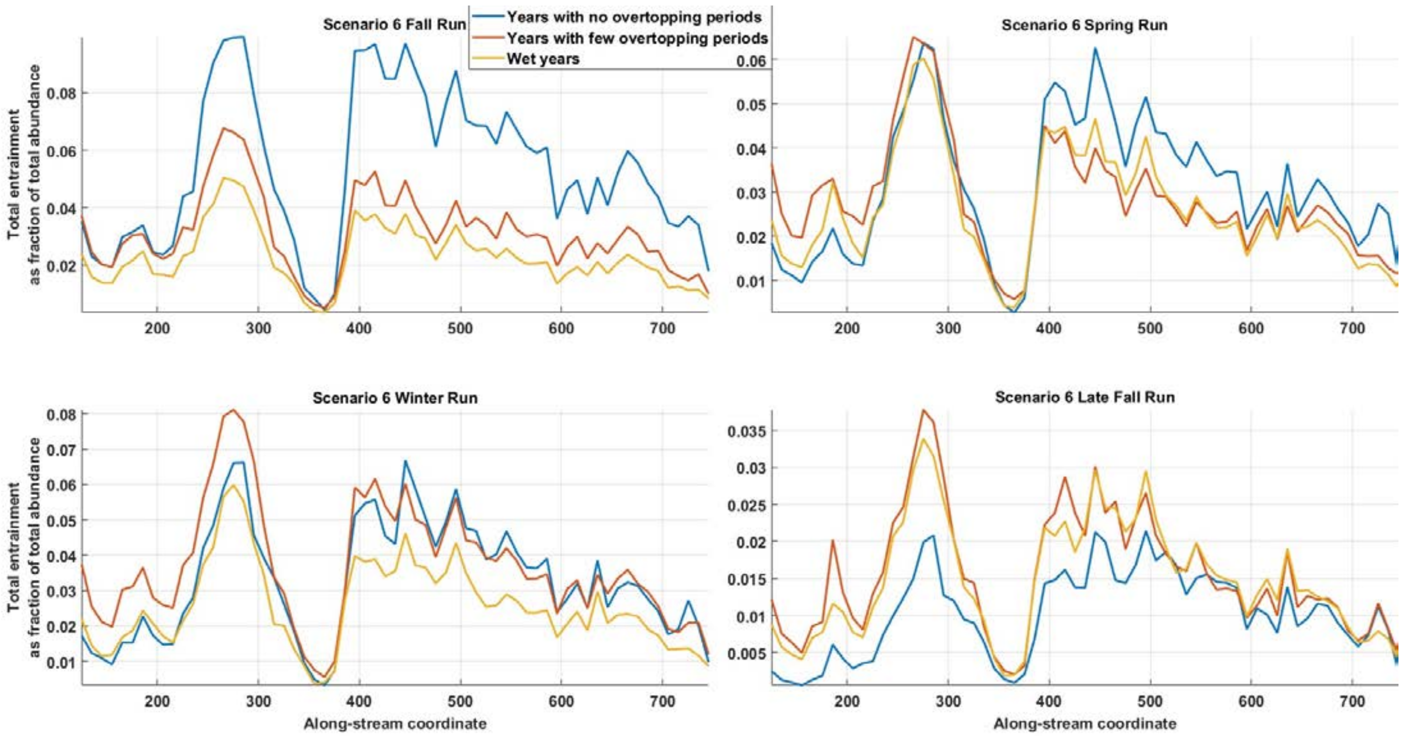

Figure 33- Scenario 6 water year type total entrainment curves

Plots showing total entrainment for each run as a function of notch along-channel location within the study area calculated for three water year types for scenario 6. The blue lines indicates total entrainment over all seasons when Fremont Weir did not overtop, the red line indicates total entrainment over all seasons when the Fremont Weir overtopped for fewer than 200 hours, and the gold line indicates total entrainment over all seasons when the Fremont Weir overtopped for more than 200 hours (wet years). Each panel shows water year entrainment for a run. For the purposes of the simulation weir overtopping was defined as Sacramento River stage exceeding 32.3 ft, USGS survey, NAVD88. Note that the simulation is based on data from acoustically tagged hatchery surrogates, and so differences between run entrainment are entirely driven by differences in the historical timing of run abundance, and are not indicative of behavioral differences between runs.

10. Appendix A - Conversion between along-channel coordinates and UTM for the River Right bank of the Sacramento River

Table A1 - Conversion between along-channel location and UTM coordinates

Table giving the along stream coordinate and UTM coordinates of the river right bank of the Sacramento River at 29 feet stage, USGS survey, NAVD88, from the bathymetric model used in the simulation. The along stream coordinate system is shown in plan view in figure 4.

Notch evaluation location	Along-stream coordinate, m	Easting, UTM Zone 10S, m, NAD83	Northing, UTM Zone 10S, m, NAD83
1	124.9	615497.6	4290880.5
2	134.9	615506.8	4290876.3
3	144.9	615515.8	4290871.8
4	155.0	615524.9	4290868.0
5	165.2	615535.1	4290866.2
6	175.5	615545.3	4290863.8
7	185.6	615555.0	4290860.1
8	195.6	615564.3	4290855.0
9	205.4	615574.7	4290851.9
10	215.3	615585.2	4290852.0

Notch evaluation location	Along-stream coordinate, m	Easting, UTM Zone 10S, m, NAD83	Northing, UTM Zone 10S, m, NAD83
11	225.3	615595.5	4290854.0
12	235.3	615605.6	4290855.1
13	245.3	615615.6	4290857.1
14	255.3	615625.7	4290858.2
15	265.3	615635.7	4290860.0
16	275.4	615645.6	4290861.6
17	285.4	615655.5	4290863.3
18	295.4	615665.6	4290864.3
19	305.4	615675.7	4290865.5
20	315.4	615685.7	4290867.4
21	325.4	615695.4	4290870.7
22	335.3	615705.4	4290873.2
23	345.3	615715.6	4290875.3
24	355.4	615725.6	4290878.1
25	365.4	615735.6	4290880.5
26	375.4	615744.4	4290885.6

Notch evaluation location	Along-stream coordinate, m	Easting, UTM Zone 10S, m, NAD83	Northing, UTM Zone 10S, m, NAD83
27	385.4	615753.4	4290890.3
28	395.4	615761.8	4290896.2
29	405.5	615771.4	4290899.7
30	415.5	615780.0	4290905.4
31	425.5	615789.9	4290908.7
32	435.4	615799.4	4290913.0
33	445.5	615808.6	4290918.1
34	455.4	615818.3	4290922.7
35	465.4	615826.0	4290929.9
36	475.5	615835.5	4290934.8
37	485.6	615841.8	4290943.7
38	495.6	615848.5	4290951.8
39	505.6	615856.9	4290958.3
40	515.5	615864.4	4290965.9
41	525.5	615872.6	4290972.9
42	535.5	615881.0	4290979.3

Notch evaluation location	Along-stream coordinate, m	Easting, UTM Zone 10S, m, NAD83	Northing, UTM Zone 10S, m, NAD83
43	545.6	615887.5	4290986.8
44	555.6	615894.7	4290993.8
45	565.6	615899.9	4291002.6
46	575.6	615904.8	4291011.8
47	585.6	615909.0	4291021.4
48	595.6	615917.0	4291028.5
49	605.6	615920.8	4291038.2
50	615.6	615925.2	4291047.6
51	625.7	615932.2	4291055.5
52	635.7	615935.7	4291065.6
53	645.6	615940.0	4291075.3
54	655.6	615943.3	4291085.4
55	665.6	615947.0	4291095.2
56	675.6	615952.2	4291104.1
57	685.6	615955.0	4291113.7
58	695.6	615957.9	4291123.4

Notch evaluation location	Along-stream coordinate, m	Easting, UTM Zone 10S, m, NAD83	Northing, UTM Zone 10S, m, NAD83
59	705.6	615962.8	4291132.3
60	715.7	615964.9	4291142.1
61	725.7	615967.4	4291151.6
62	735.6	615971.6	4291159.9
63	745.6	615976.1	4291168.1

11. Appendix B - Summary of simulation entrainment at each evaluation location for each run

Table B1 - Percent of yearly fall run abundance entrained under each scenario for each evaluation location

Notch evaluation location	**Percent of yearly abundance entrained. The mean for the 15-year simulation period is given along with the 90% bootstrap confidence interval in parentheses**					
	Scenario 1	**Scenario 2**	**Scenario 3**	**Scenario 4**	**Scenario 5**	**Scenario 6**
1	9% (2%-15%)	6% (1%-10%)	22% (5%-36%)	8% (4%-13%)	3% (1%-6%)	3% (1%-6%)
2	8% (1%-14%)	4% (1%-8%)	20% (5%-33%)	7% (3%-11%)	2% (0%-4%)	2% (0%-5%)

Notch evaluation location	Percent of yearly abundance entrained. The mean for the 15-year simulation period is given along with the 90% bootstrap confidence interval in parentheses					
	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6
3	7% (1%-13%)	4% (1%-7%)	19% (3%-32%)	6% (3%-9%)	2% (0%-3%)	2% (0%-5%)
4	6% (1%-12%)	4% (1%-7%)	19% (4%-32%)	5% (3%-9%)	2% (0%-4%)	2% (0%-4%)
5	7% (1%-12%)	4% (1%-8%)	20% (5%-33%)	7% (4%-11%)	2% (0%-5%)	2% (0%-5%)
6	8% (1%-13%)	5% (1%-8%)	21% (5%-34%)	8% (4%-12%)	2% (0%-5%)	3% (1%-5%)
7	7% (1%-11%)	4% (1%-7%)	19% (5%-31%)	6% (3%-9%)	3% (1%-5%)	3% (1%-6%)
8	5% (1%-8%)	3% (1%-6%)	17% (4%-29%)	5% (2%-7%)	2% (1%-4%)	2% (1%-4%)
9	4% (1%-8%)	3% (1%-4%)	17% (3%-29%)	4% (2%-6%)	2% (1%-4%)	2% (1%-4%)
10	4% (1%-7%)	3% (1%-5%)	18% (4%-30%)	4% (2%-7%)	2% (0%-4%)	2% (0%-4%)
11	5% (1%-9%)	3% (1%-6%)	19% (5%-31%)	5% (1%-11%)	2% (0%-5%)	3% (1%-7%)
12	6% (2%-10%)	3% (1%-7%)	21% (6%-32%)	6% (1%-10%)	3% (1%-5%)	3% (1%-7%)
13	7% (2%-12%)	5% (2%-11%)	22% (7%-34%)	8% (2%-16%)	4% (1%-8%)	5% (1%-12%)

Notch evaluation location	Percent of yearly abundance entrained. The mean for the 15-year simulation period is given along with the 90% bootstrap confidence interval in parentheses					
	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6
14	8% (3%-13%)	6% (2%-13%)	23% (8%-35%)	9% (2%-17%)	5% (1%-10%)	6% (1%-14%)
15	9% (4%-15%)	7% (2%-13%)	24% (8%-38%)	11% (4%-19%)	6% (2%-12%)	7% (1%-15%)
16	9% (4%-14%)	6% (3%-13%)	25% (8%-37%)	11% (4%-19%)	5% (2%-11%)	7% (2%-14%)
17	9% (4%-13%)	7% (2%-14%)	26% (9%-38%)	12% (4%-20%)	5% (2%-11%)	7% (2%-15%)
18	8% (3%-13%)	5% (2%-12%)	25% (10%-37%)	11% (3%-17%)	4% (1%-7%)	6% (1%-13%)
19	7% (3%-11%)	5% (2%-9%)	24% (9%-36%)	9% (2%-17%)	3% (1%-7%)	4% (1%-10%)
20	6% (3%-10%)	4% (2%-7%)	22% (7%-33%)	8% (3%-14%)	2% (1%-3%)	3% (1%-7%)
21	6% (2%-9%)	4% (2%-8%)	21% (8%-32%)	8% (3%-14%)	2% (1%-3%)	3% (1%-6%)
22	5% (2%-9%)	3% (2%-5%)	19% (6%-29%)	6% (2%-12%)	1% (0%-2%)	2% (0%-4%)
23	4% (1%-8%)	2% (1%-4%)	17% (6%-25%)	6% (2%-9%)	1% (0%-1%)	1% (0%-2%)
24	4% (1%-8%)	2% (1%-3%)	15% (4%-23%)	4% (2%-5%)	1% (0%-1%)	1% (0%-2%)

Notch evaluation location	Percent of yearly abundance entrained. The mean for the 15-year simulation period is given along with the 90% bootstrap confidence interval in parentheses					
	Scenario 1	**Scenario 2**	**Scenario 3**	**Scenario 4**	**Scenario 5**	**Scenario 6**
25	3% (0%-6%)	2% (0%-3%)	14% (3%-23%)	3% (2%-4%)	0% (0%-1%)	0% (0%-1%)
26	5% (1%-10%)	2% (1%-5%)	19% (5%-29%)	6% (2%-11%)	1% (0%-1%)	1% (0%-2%)
27	8% (3%-14%)	5% (1%-12%)	22% (9%-34%)	10% (2%-20%)	2% (0%-4%)	3% (1%-7%)
28	11% (4%-20%)	8% (3%-18%)	25% (10%-38%)	13% (4%-25%)	4% (1%-11%)	6% (1%-14%)
29	11% (5%-19%)	8% (2%-17%)	27% (12%-40%)	13% (3%-25%)	4% (1%-11%)	6% (1%-13%)
30	11% (5%-20%)	8% (2%-19%)	28% (12%-43%)	14% (3%-28%)	4% (1%-11%)	6% (1%-14%)
31	10% (4%-18%)	8% (2%-18%)	28% (12%-42%)	13% (3%-25%)	3% (1%-8%)	5% (1%-13%)
32	10% (4%-18%)	8% (2%-20%)	27% (13%-38%)	13% (3%-26%)	3% (0%-7%)	5% (1%-13%)
33	11% (6%-20%)	9% (3%-18%)	26% (13%-37%)	13% (4%-25%)	4% (1%-12%)	6% (1%-13%)
34	9% (4%-18%)	8% (2%-18%)	23% (12%-34%)	12% (3%-24%)	3% (0%-8%)	5% (1%-13%)
35	9% (4%-18%)	7% (2%-19%)	23% (12%-35%)	12% (2%-24%)	3% (0%-8%)	5% (0%-11%)

Notch evaluation location	Percent of yearly abundance entrained. The mean for the 15-year simulation period is given along with the 90% bootstrap confidence interval in parentheses					
	Scenario 1	**Scenario 2**	**Scenario 3**	**Scenario 4**	**Scenario 5**	**Scenario 6**
36	8% (4%-16%)	6% (1%-15%)	23% (12%-34%)	11% (2%-23%)	2% (0%-6%)	4% (0%-9%)
37	11% (6%-18%)	8% (2%-19%)	24% (12%-36%)	13% (2%-26%)	3% (0%-8%)	4% (1%-11%)
38	12% (6%-21%)	9% (2%-21%)	26% (14%-39%)	15% (3%-28%)	4% (0%-11%)	5% (1%-12%)
39	9% (5%-16%)	7% (1%-16%)	23% (12%-37%)	12% (2%-23%)	3% (0%-8%)	4% (1%-10%)
40	10% (6%-17%)	7% (1%-16%)	23% (12%-36%)	13% (2%-24%)	3% (0%-8%)	4% (1%-10%)
41	9% (4%-19%)	7% (1%-18%)	22% (12%-38%)	13% (2%-26%)	3% (0%-7%)	4% (0%-10%)
42	9% (3%-20%)	8% (1%-19%)	21% (12%-37%)	13% (2%-27%)	3% (0%-6%)	4% (0%-9%)
43	9% (3%-19%)	8% (1%-19%)	22% (12%-35%)	13% (2%-26%)	3% (0%-8%)	4% (0%-10%)
44	9% (4%-19%)	7% (1%-18%)	22% (13%-33%)	13% (2%-26%)	3% (0%-7%)	4% (0%-10%)
45	9% (5%-17%)	7% (1%-16%)	21% (13%-32%)	12% (2%-23%)	3% (0%-6%)	4% (0%-8%)
46	9% (5%-15%)	7% (2%-15%)	21% (13%-31%)	12% (3%-23%)	3% (0%-7%)	4% (0%-8%)

Notch evaluation location	Percent of yearly abundance entrained. The mean for the 15-year simulation period is given along with the 90% bootstrap confidence interval in parentheses					
	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6
47	10% (5%-16%)	8% (4%-16%)	22% (12%-32%)	12% (5%-20%)	3% (0%-6%)	4% (0%-9%)
48	8% (4%-13%)	6% (3%-11%)	20% (10%-30%)	10% (4%-17%)	2% (0%-4%)	2% (0%-5%)
49	9% (4%-16%)	7% (3%-12%)	21% (9%-31%)	11% (5%-18%)	2% (0%-5%)	3% (0%-6%)
50	10% (5%-17%)	7% (3%-14%)	22% (11%-33%)	12% (5%-20%)	3% (0%-5%)	3% (0%-7%)
51	8% (4%-15%)	6% (3%-11%)	20% (9%-30%)	11% (4%-18%)	2% (0%-4%)	2% (0%-5%)
52	9% (5%-15%)	6% (3%-12%)	21% (11%-31%)	12% (5%-18%)	3% (1%-5%)	3% (1%-7%)
53	8% (4%-14%)	6% (3%-12%)	20% (10%-29%)	11% (6%-18%)	2% (0%-4%)	3% (1%-6%)
54	9% (4%-14%)	7% (3%-12%)	20% (10%-30%)	11% (5%-19%)	3% (0%-6%)	3% (0%-8%)
55	9% (4%-15%)	6% (3%-11%)	19% (9%-28%)	10% (5%-17%)	3% (0%-7%)	4% (0%-9%)
56	9% (4%-16%)	7% (3%-12%)	18% (8%-28%)	9% (5%-14%)	3% (1%-6%)	3% (0%-8%)
57	8% (3%-17%)	6% (3%-12%)	18% (7%-29%)	9% (5%-15%)	2% (0%-5%)	3% (0%-7%)

Notch evaluation location	Percent of yearly abundance entrained. The mean for the 15-year simulation period is given along with the 90% bootstrap confidence interval in parentheses					
	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6
58	8% (3%-17%)	6% (2%-13%)	19% (7%-30%)	9% (5%-14%)	2% (1%-6%)	3% (0%-7%)
59	7% (2%-16%)	5% (2%-11%)	17% (6%-28%)	8% (4%-12%)	2% (0%-4%)	2% (0%-5%)
60	7% (2%-17%)	6% (2%-12%)	19% (7%-30%)	9% (4%-14%)	2% (0%-3%)	2% (0%-5%)
61	7% (3%-17%)	6% (2%-12%)	20% (9%-30%)	9% (4%-15%)	1% (1%-3%)	2% (1%-5%)
62	7% (2%-16%)	5% (2%-11%)	19% (8%-29%)	8% (4%-13%)	1% (0%-2%)	2% (0%-4%)
63	7% (1%-19%)	5% (1%-15%)	19% (6%-30%)	8% (4%-15%)	1% (0%-2%)	1% (0%-3%)

Table B2 - Percent of yearly spring run abundance entrained under each scenario for each evaluation location

Notch evaluation location	Percent of yearly abundance entrained. The mean for the 15 year simulation period is given along with the 90% bootstrap confidence interval in parenthesis					
	Scenario 1	**Scenario 2**	**Scenario 3**	**Scenario 4**	**Scenario 5**	**Scenario 6**
1	7% (1%-15%)	4% (1%-10%)	16% (2%-34%)	7% (4%-13%)	2% (0%-6%)	2% (0%-7%)
2	6% (0%-13%)	3% (1%-9%)	15% (2%-33%)	6% (4%-10%)	1% (0%-3%)	2% (0%-5%)
3	5% (0%-12%)	3% (0%-8%)	15% (2%-32%)	5% (3%-9%)	1% (0%-3%)	1% (0%-4%)
4	5% (0%-11%)	3% (0%-7%)	15% (2%-32%)	4% (2%-7%)	1% (0%-3%)	1% (0%-4%)
5	5% (1%-12%)	3% (1%-8%)	15% (2%-34%)	7% (4%-11%)	2% (0%-4%)	2% (0%-5%)
6	5% (1%-12%)	4% (1%-8%)	16% (2%-34%)	7% (5%-10%)	2% (0%-5%)	2% (0%-6%)
7	5% (1%-11%)	4% (1%-7%)	15% (2%-33%)	6% (4%-9%)	2% (1%-5%)	3% (1%-5%)
8	4% (1%-8%)	2% (1%-5%)	13% (2%-29%)	5% (4%-7%)	2% (1%-4%)	2% (1%-4%)
9	3% (1%-8%)	2% (1%-5%)	13% (2%-29%)	4% (3%-6%)	2% (0%-4%)	2% (1%-4%)
10	3% (0%-7%)	2% (0%-5%)	14% (2%-31%)	4% (3%-6%)	1% (0%-4%)	2% (0%-4%)

Notch evaluation location	**Percent of yearly abundance entrained. The mean for the 15 year simulation period is given along with the 90% bootstrap confidence interval in parenthesis**					
	Scenario 1	**Scenario 2**	**Scenario 3**	**Scenario 4**	**Scenario 5**	**Scenario 6**
11	4% (1%-9%)	3% (1%-6%)	15% (2%-33%)	5% (3%-8%)	2% (0%-5%)	3% (1%-7%)
12	5% (1%-9%)	3% (1%-6%)	16% (3%-34%)	6% (4%-9%)	2% (1%-5%)	3% (1%-7%)
13	6% (1%-12%)	4% (1%-9%)	17% (3%-37%)	8% (5%-11%)	3% (1%-8%)	4% (2%-10%)
14	6% (2%-14%)	5% (1%-10%)	18% (4%-38%)	10% (7%-13%)	4% (1%-9%)	5% (2%-11%)
15	7% (2%-14%)	5% (2%-12%)	19% (4%-40%)	12% (9%-15%)	5% (2%-11%)	6% (3%-13%)
16	7% (3%-14%)	6% (3%-11%)	19% (5%-40%)	13% (9%-16%)	5% (2%-10%)	7% (4%-12%)
17	8% (3%-14%)	6% (3%-11%)	20% (5%-40%)	14% (10%-18%)	5% (2%-10%)	7% (3%-12%)
18	6% (2%-13%)	4% (2%-9%)	20% (5%-39%)	13% (8%-17%)	3% (1%-6%)	5% (3%-10%)
19	6% (2%-11%)	4% (1%-7%)	18% (4%-37%)	11% (7%-14%)	3% (1%-5%)	4% (2%-7%)
20	5% (2%-9%)	3% (1%-5%)	17% (4%-34%)	9% (6%-13%)	2% (1%-3%)	3% (1%-5%)
21	5% (1%-8%)	3% (1%-5%)	17% (4%-32%)	10% (5%-13%)	2% (1%-3%)	2% (1%-4%)

Notch evaluation location	Percent of yearly abundance entrained. The mean for the 15 year simulation period is given along with the 90% bootstrap confidence interval in parenthesis					
	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6
22	4% (1%-7%)	2% (1%-4%)	15% (3%-28%)	7% (3%-10%)	1% (0%-2%)	2% (1%-2%)
23	3% (1%-6%)	2% (0%-3%)	13% (3%-25%)	7% (3%-9%)	1% (0%-1%)	1% (0%-2%)
24	3% (0%-6%)	1% (0%-3%)	12% (1%-24%)	4% (2%-5%)	0% (0%-1%)	1% (0%-1%)
25	2% (0%-5%)	1% (0%-2%)	11% (2%-23%)	4% (2%-7%)	0% (0%-1%)	0% (0%-1%)
26	4% (0%-9%)	2% (0%-5%)	14% (3%-30%)	7% (4%-10%)	0% (0%-1%)	1% (0%-2%)
27	6% (1%-13%)	5% (1%-10%)	16% (4%-33%)	11% (7%-15%)	2% (1%-3%)	3% (1%-5%)
28	9% (2%-17%)	7% (2%-14%)	20% (5%-38%)	15% (10%-18%)	4% (1%-8%)	5% (2%-10%)
29	9% (3%-17%)	7% (2%-12%)	21% (5%-42%)	14% (8%-18%)	3% (1%-7%)	5% (2%-9%)
30	9% (3%-18%)	7% (2%-13%)	22% (6%-42%)	14% (9%-19%)	4% (1%-7%)	5% (2%-10%)
31	8% (2%-16%)	6% (2%-12%)	21% (5%-39%)	12% (7%-16%)	3% (1%-6%)	4% (2%-8%)
32	8% (3%-15%)	6% (2%-13%)	20% (5%-38%)	13% (8%-18%)	3% (1%-5%)	4% (2%-8%)

Notch evaluation location	Percent of yearly abundance entrained. The mean for the 15 year simulation period is given along with the 90% bootstrap confidence interval in parenthesis					
	Scenario 1	**Scenario 2**	**Scenario 3**	**Scenario 4**	**Scenario 5**	**Scenario 6**
33	9% (4%-15%)	7% (4%-13%)	20% (6%-37%)	14% (9%-19%)	4% (2%-7%)	6% (2%-9%)
34	8% (3%-14%)	7% (3%-12%)	18% (5%-33%)	14% (8%-17%)	3% (2%-5%)	5% (2%-7%)
35	7% (3%-13%)	6% (3%-12%)	18% (5%-31%)	14% (8%-18%)	3% (1%-5%)	4% (2%-7%)
36	6% (3%-11%)	5% (2%-9%)	17% (5%-31%)	13% (7%-16%)	2% (1%-4%)	4% (2%-6%)
37	8% (3%-14%)	6% (3%-12%)	19% (5%-34%)	14% (8%-17%)	3% (1%-5%)	4% (2%-7%)
38	9% (4%-15%)	7% (4%-14%)	20% (6%-37%)	16% (9%-20%)	4% (2%-6%)	5% (2%-8%)
39	8% (4%-13%)	6% (3%-11%)	18% (5%-33%)	13% (8%-18%)	3% (1%-5%)	4% (2%-6%)
40	7% (3%-12%)	6% (3%-11%)	18% (5%-32%)	14% (8%-19%)	3% (1%-5%)	4% (2%-7%)
41	7% (2%-13%)	6% (2%-12%)	17% (5%-30%)	14% (8%-19%)	2% (1%-5%)	3% (1%-6%)
42	7% (2%-14%)	6% (2%-12%)	16% (5%-28%)	14% (8%-19%)	2% (1%-4%)	3% (2%-6%)
43	8% (3%-15%)	7% (2%-13%)	17% (6%-28%)	14% (8%-19%)	3% (1%-4%)	4% (2%-7%)

Notch evaluation location	Percent of yearly abundance entrained. The mean for the 15 year simulation period is given along with the 90% bootstrap confidence interval in parenthesis					
	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6
44	7% (2%-13%)	6% (2%-13%)	17% (5%-28%)	14% (8%-19%)	2% (1%-4%)	3% (1%-6%)
45	7% (2%-13%)	6% (2%-11%)	16% (5%-28%)	13% (8%-18%)	2% (1%-4%)	3% (1%-5%)
46	7% (2%-11%)	6% (2%-10%)	17% (5%-27%)	13% (8%-18%)	2% (1%-4%)	3% (1%-5%)
47	7% (2%-11%)	6% (2%-9%)	17% (6%-28%)	13% (9%-17%)	2% (1%-4%)	3% (1%-6%)
48	6% (2%-10%)	4% (2%-8%)	15% (4%-26%)	10% (7%-13%)	1% (1%-3%)	2% (1%-3%)
49	6% (2%-12%)	5% (2%-9%)	16% (4%-27%)	11% (8%-15%)	2% (1%-3%)	3% (1%-4%)
50	7% (2%-13%)	5% (2%-10%)	16% (5%-28%)	13% (9%-17%)	2% (1%-3%)	3% (1%-5%)
51	6% (2%-10%)	4% (2%-8%)	16% (5%-27%)	12% (8%-16%)	1% (0%-3%)	2% (1%-4%)
52	7% (3%-11%)	5% (3%-7%)	16% (5%-28%)	13% (8%-18%)	2% (1%-4%)	3% (2%-5%)
53	6% (2%-11%)	5% (2%-8%)	16% (4%-27%)	13% (8%-17%)	2% (1%-3%)	2% (1%-5%)
54	6% (2%-10%)	5% (2%-9%)	15% (5%-27%)	11% (8%-14%)	2% (1%-4%)	3% (1%-5%)

Notch evaluation location	Percent of yearly abundance entrained. The mean for the 15 year simulation period is given along with the 90% bootstrap confidence interval in parenthesis					
	Scenario 1	**Scenario 2**	**Scenario 3**	**Scenario 4**	**Scenario 5**	**Scenario 6**
55	6% (2%-11%)	5% (1%-8%)	14% (4%-25%)	10% (7%-13%)	3% (1%-5%)	3% (1%-6%)
56	6% (2%-11%)	5% (2%-8%)	13% (3%-23%)	8% (5%-10%)	2% (1%-5%)	3% (1%-5%)
57	5% (1%-11%)	4% (1%-8%)	13% (3%-23%)	8% (5%-9%)	2% (1%-3%)	2% (1%-5%)
58	5% (1%-11%)	4% (1%-9%)	14% (3%-24%)	8% (5%-11%)	2% (0%-3%)	2% (1%-4%)
59	4% (1%-10%)	3% (1%-7%)	12% (2%-22%)	6% (4%-8%)	1% (0%-3%)	2% (1%-3%)
60	5% (1%-11%)	4% (1%-8%)	14% (3%-24%)	7% (4%-10%)	1% (0%-2%)	2% (1%-3%)
61	5% (2%-11%)	4% (1%-7%)	15% (4%-25%)	7% (4%-10%)	1% (1%-2%)	2% (1%-4%)
62	5% (1%-10%)	4% (1%-7%)	14% (3%-24%)	7% (4%-10%)	1% (0%-2%)	2% (0%-3%)
63	4% (1%-12%)	3% (1%-9%)	14% (2%-26%)	6% (3%-10%)	1% (0%-1%)	1% (0%-2%)

Table B3 - Percent of yearly winter run abundance entrained under each scenario for each evaluation location

Notch evaluation location	Percent of yearly abundance entrained. The mean for the 15 year simulation period is given along with the 90% bootstrap confidence interval in parenthesis					
	Scenario 1	**Scenario 2**	**Scenario 3**	**Scenario 4**	**Scenario 5**	**Scenario 6**
1	3% (0%-15%)	2% (0%-10%)	9% (0%-35%)	4% (0%-11%)	1% (0%-5%)	1% (0%-7%)
2	3% (0%-13%)	2% (0%-7%)	8% (0%-33%)	3% (0%-9%)	1% (0%-3%)	1% (0%-4%)
3	3% (0%-13%)	2% (0%-7%)	8% (0%-33%)	3% (0%-8%)	0% (0%-2%)	1% (0%-4%)
4	3% (0%-13%)	2% (0%-7%)	7% (0%-31%)	2% (0%-8%)	0% (0%-2%)	1% (0%-3%)
5	3% (0%-12%)	2% (0%-7%)	8% (0%-33%)	4% (0%-9%)	1% (0%-3%)	1% (0%-5%)
6	3% (0%-13%)	2% (0%-7%)	8% (0%-33%)	4% (0%-9%)	1% (0%-4%)	1% (0%-5%)
7	3% (0%-12%)	2% (0%-6%)	8% (0%-31%)	4% (0%-8%)	1% (0%-4%)	1% (0%-5%)
8	2% (0%-8%)	1% (0%-4%)	7% (0%-27%)	3% (0%-6%)	1% (0%-3%)	1% (0%-4%)
9	2% (0%-7%)	1% (0%-4%)	7% (0%-27%)	2% (0%-5%)	1% (0%-3%)	1% (0%-4%)
10	2% (0%-7%)	1% (0%-4%)	7% (0%-29%)	3% (0%-5%)	1% (0%-3%)	1% (0%-4%)

Notch evaluation location	Percent of yearly abundance entrained. The mean for the 15 year simulation period is given along with the 90% bootstrap confidence interval in parenthesis					
	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6
11	2% (0%-8%)	1% (0%-5%)	8% (0%-31%)	3% (0%-7%)	1% (0%-4%)	1% (0%-6%)
12	2% (0%-8%)	1% (0%-5%)	8% (0%-32%)	3% (0%-7%)	1% (0%-4%)	1% (0%-5%)
13	3% (0%-11%)	2% (0%-8%)	9% (0%-35%)	5% (0%-11%)	2% (0%-7%)	2% (0%-8%)
14	3% (0%-12%)	2% (0%-8%)	9% (0%-36%)	5% (0%-11%)	2% (0%-8%)	2% (0%-9%)
15	4% (0%-13%)	3% (0%-9%)	10% (0%-37%)	7% (0%-13%)	2% (0%-10%)	3% (0%-11%)
16	4% (0%-12%)	3% (0%-9%)	10% (0%-37%)	7% (0%-14%)	3% (0%-8%)	4% (0%-11%)
17	4% (0%-13%)	3% (0%-9%)	11% (0%-38%)	8% (0%-15%)	2% (0%-9%)	3% (0%-10%)
18	3% (0%-12%)	2% (0%-7%)	10% (0%-36%)	8% (0%-15%)	1% (0%-5%)	3% (0%-9%)
19	3% (0%-10%)	2% (0%-6%)	10% (0%-34%)	6% (0%-13%)	1% (0%-3%)	2% (0%-5%)
20	3% (0%-9%)	2% (0%-4%)	9% (0%-31%)	6% (0%-12%)	1% (0%-2%)	1% (0%-3%)
21	3% (0%-9%)	2% (0%-4%)	8% (0%-30%)	6% (0%-13%)	1% (0%-2%)	1% (0%-3%)

Notch evaluation location	Percent of yearly abundance entrained. The mean for the 15 year simulation period is given along with the 90% bootstrap confidence interval in parenthesis					
	Scenario 1	**Scenario 2**	**Scenario 3**	**Scenario 4**	**Scenario 5**	**Scenario 6**
22	2% (0%-8%)	1% (0%-4%)	7% (0%-26%)	4% (0%-9%)	1% (0%-1%)	1% (0%-2%)
23	2% (0%-7%)	1% (0%-3%)	6% (0%-22%)	4% (0%-8%)	0% (0%-1%)	0% (0%-1%)
24	1% (0%-7%)	1% (0%-3%)	6% (0%-21%)	3% (0%-6%)	0% (0%-1%)	0% (0%-1%)
25	1% (0%-6%)	1% (0%-3%)	5% (0%-22%)	3% (0%-6%)	0% (0%-0%)	0% (0%-1%)
26	2% (0%-8%)	1% (0%-4%)	7% (0%-27%)	4% (0%-8%)	0% (0%-1%)	0% (0%-1%)
27	3% (0%-12%)	2% (0%-7%)	8% (0%-30%)	7% (0%-13%)	1% (0%-3%)	1% (0%-4%)
28	4% (0%-15%)	3% (0%-11%)	10% (0%-33%)	8% (0%-16%)	2% (0%-7%)	2% (0%-8%)
29	5% (0%-15%)	3% (0%-10%)	11% (0%-36%)	8% (0%-17%)	2% (0%-6%)	2% (0%-7%)
30	5% (0%-15%)	3% (0%-11%)	11% (0%-38%)	8% (0%-19%)	2% (0%-6%)	3% (0%-7%)
31	4% (0%-12%)	3% (0%-9%)	11% (0%-36%)	7% (0%-15%)	1% (0%-5%)	2% (0%-7%)
32	4% (0%-13%)	3% (0%-10%)	10% (0%-34%)	7% (0%-17%)	1% (0%-5%)	2% (0%-6%)

Notch evaluation location	Percent of yearly abundance entrained. The mean for the 15 year simulation period is given along with the 90% bootstrap confidence interval in parenthesis					
	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6
33	5% (0%-13%)	4% (0%-10%)	10% (0%-32%)	8% (0%-16%)	2% (0%-5%)	3% (0%-7%)
34	4% (0%-12%)	3% (0%-10%)	9% (0%-29%)	8% (0%-16%)	2% (0%-4%)	2% (0%-6%)
35	4% (0%-10%)	3% (0%-10%)	9% (0%-26%)	8% (0%-16%)	1% (0%-3%)	2% (0%-5%)
36	3% (0%-9%)	3% (0%-7%)	9% (0%-26%)	7% (0%-17%)	1% (0%-2%)	2% (0%-4%)
37	4% (0%-11%)	3% (0%-10%)	10% (0%-30%)	8% (0%-16%)	1% (0%-4%)	2% (0%-5%)
38	5% (0%-12%)	4% (0%-11%)	10% (0%-32%)	9% (1%-20%)	2% (0%-5%)	3% (0%-6%)
39	4% (0%-11%)	3% (0%-9%)	9% (0%-28%)	8% (0%-18%)	1% (0%-4%)	2% (0%-5%)
40	4% (0%-10%)	3% (0%-10%)	9% (0%-27%)	8% (0%-19%)	1% (0%-4%)	2% (0%-6%)
41	4% (0%-10%)	3% (0%-9%)	9% (0%-25%)	8% (0%-18%)	1% (0%-4%)	2% (0%-6%)
42	4% (0%-11%)	3% (0%-10%)	9% (0%-24%)	8% (0%-17%)	1% (0%-3%)	2% (0%-4%)
43	4% (0%-12%)	3% (0%-11%)	9% (0%-25%)	8% (0%-18%)	1% (0%-4%)	2% (0%-5%)

Notch evaluation location	Percent of yearly abundance entrained. The mean for the 15 year simulation period is given along with the 90% bootstrap confidence interval in parenthesis					
	Scenario 1	**Scenario 2**	**Scenario 3**	**Scenario 4**	**Scenario 5**	**Scenario 6**
44	4% (0%-11%)	3% (0%-9%)	9% (0%-24%)	8% (0%-19%)	1% (0%-4%)	2% (0%-5%)
45	3% (0%-9%)	3% (0%-9%)	9% (0%-24%)	8% (0%-17%)	1% (0%-3%)	2% (0%-5%)
46	4% (0%-9%)	3% (0%-7%)	9% (0%-24%)	7% (0%-16%)	1% (0%-4%)	2% (0%-5%)
47	4% (0%-10%)	3% (0%-8%)	9% (0%-26%)	7% (0%-17%)	1% (0%-3%)	2% (0%-4%)
48	3% (0%-9%)	2% (0%-6%)	8% (0%-23%)	6% (0%-13%)	1% (0%-2%)	1% (0%-3%)
49	3% (0%-11%)	3% (0%-7%)	8% (0%-26%)	7% (0%-13%)	1% (0%-3%)	1% (0%-3%)
50	4% (0%-12%)	3% (0%-8%)	9% (0%-27%)	8% (0%-15%)	1% (0%-3%)	2% (0%-4%)
51	3% (0%-10%)	2% (0%-5%)	8% (0%-25%)	7% (0%-15%)	1% (0%-2%)	1% (0%-3%)
52	4% (0%-11%)	3% (0%-7%)	8% (0%-26%)	8% (0%-17%)	1% (0%-3%)	2% (0%-4%)
53	3% (0%-11%)	2% (0%-6%)	8% (0%-26%)	7% (0%-15%)	1% (0%-3%)	1% (0%-4%)
54	3% (0%-10%)	2% (0%-6%)	8% (0%-25%)	6% (0%-14%)	1% (0%-4%)	1% (0%-4%)

Notch evaluation location	Percent of yearly abundance entrained. The mean for the 15 year simulation period is given along with the 90% bootstrap confidence interval in parenthesis					
	Scenario 1	**Scenario 2**	**Scenario 3**	**Scenario 4**	**Scenario 5**	**Scenario 6**
55	3% (0%-11%)	2% (0%-6%)	8% (0%-25%)	5% (0%-12%)	1% (0%-4%)	1% (0%-5%)
56	3% (0%-11%)	2% (0%-6%)	7% (0%-23%)	4% (0%-10%)	1% (0%-3%)	1% (0%-4%)
57	3% (0%-11%)	2% (0%-7%)	7% (0%-25%)	4% (0%-11%)	1% (0%-3%)	1% (0%-4%)
58	3% (0%-12%)	2% (0%-8%)	7% (0%-26%)	4% (0%-10%)	1% (0%-3%)	1% (0%-3%)
59	2% (0%-10%)	2% (0%-6%)	7% (0%-23%)	3% (0%-8%)	1% (0%-2%)	1% (0%-3%)
60	3% (0%-11%)	2% (0%-6%)	7% (0%-26%)	4% (0%-9%)	1% (0%-2%)	1% (0%-3%)
61	3% (0%-12%)	2% (0%-7%)	8% (0%-26%)	4% (0%-10%)	1% (0%-2%)	1% (0%-3%)
62	3% (0%-10%)	2% (0%-7%)	7% (0%-25%)	4% (0%-10%)	0% (0%-1%)	1% (0%-2%)
63	2% (0%-12%)	2% (0%-8%)	7% (0%-27%)	3% (0%-9%)	0% (0%-1%)	0% (0%-1%)

Table B4 - Percent of yearly late fall run abundance entrained under each scenario for each evaluation location

Notch evaluation location	Percent of yearly abundance entrained. The mean for the 15 year simulation period is given along with the 90% bootstrap confidence interval in parenthesis					
	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6
1	7% (1%-16%)	5% (1%-10%)	17% (2%-37%)	7% (3%-12%)	2% (0%-6%)	3% (0%-7%)
2	6% (0%-14%)	4% (0%-8%)	16% (2%-35%)	6% (2%-11%)	1% (0%-4%)	2% (0%-5%)
3	6% (0%-13%)	3% (0%-7%)	16% (1%-34%)	5% (2%-8%)	1% (0%-4%)	2% (0%-4%)
4	5% (0%-12%)	3% (0%-6%)	15% (1%-34%)	4% (1%-7%)	1% (0%-3%)	1% (0%-4%)
5	6% (0%-12%)	4% (0%-7%)	17% (2%-35%)	7% (3%-10%)	2% (0%-5%)	2% (0%-6%)
6	6% (0%-14%)	4% (0%-8%)	17% (2%-35%)	7% (3%-10%)	2% (0%-5%)	2% (0%-6%)
7	6% (1%-12%)	4% (1%-7%)	16% (2%-33%)	6% (2%-8%)	3% (0%-6%)	3% (1%-6%)
8	4% (0%-9%)	3% (0%-5%)	14% (1%-30%)	5% (2%-7%)	2% (0%-4%)	2% (1%-5%)
9	4% (0%-8%)	2% (0%-5%)	14% (1%-30%)	4% (2%-6%)	2% (0%-4%)	2% (0%-4%)
10	3% (0%-8%)	2% (0%-4%)	15% (1%-31%)	4% (2%-6%)	2% (0%-4%)	2% (0%-4%)

Notch evaluation location	Percent of yearly abundance entrained. The mean for the 15 year simulation period is given along with the 90% bootstrap confidence interval in parenthesis					
	Scenario 1	**Scenario 2**	**Scenario 3**	**Scenario 4**	**Scenario 5**	**Scenario 6**
11	4% (1%-9%)	3% (0%-6%)	16% (2%-34%)	5% (2%-9%)	2% (0%-5%)	3% (0%-6%)
12	5% (1%-10%)	3% (1%-5%)	17% (2%-35%)	6% (3%-9%)	2% (0%-5%)	3% (1%-6%)
13	6% (1%-12%)	4% (1%-9%)	18% (2%-37%)	8% (4%-12%)	3% (1%-8%)	5% (1%-10%)
14	7% (1%-13%)	5% (1%-11%)	19% (3%-38%)	9% (5%-14%)	4% (1%-9%)	5% (1%-11%)
15	7% (1%-14%)	6% (1%-11%)	20% (3%-40%)	11% (6%-16%)	5% (1%-11%)	6% (2%-12%)
16	7% (1%-13%)	6% (1%-11%)	20% (3%-39%)	12% (7%-16%)	5% (1%-10%)	7% (2%-12%)
17	8% (1%-13%)	6% (1%-11%)	21% (4%-40%)	12% (7%-17%)	5% (1%-10%)	6% (2%-12%)
18	7% (1%-13%)	5% (1%-9%)	20% (4%-39%)	11% (7%-16%)	3% (1%-7%)	5% (2%-9%)
19	6% (1%-12%)	4% (1%-7%)	19% (3%-38%)	10% (6%-13%)	3% (1%-5%)	4% (1%-7%)
20	5% (1%-10%)	3% (1%-6%)	18% (3%-35%)	8% (4%-12%)	2% (0%-3%)	3% (1%-5%)
21	5% (1%-10%)	3% (1%-6%)	17% (3%-33%)	9% (5%-14%)	2% (0%-3%)	2% (1%-5%)

Notch evaluation location	Percent of yearly abundance entrained. The mean for the 15 year simulation period is given along with the 90% bootstrap confidence interval in parenthesis					
	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6
22	4% (1%-8%)	3% (1%-5%)	15% (3%-30%)	6% (3%-10%)	1% (0%-2%)	2% (1%-3%)
23	3% (0%-7%)	2% (0%-4%)	13% (2%-25%)	6% (3%-11%)	1% (0%-2%)	1% (0%-2%)
24	3% (0%-7%)	1% (0%-3%)	12% (2%-24%)	3% (2%-5%)	0% (0%-1%)	1% (0%-1%)
25	2% (0%-6%)	1% (0%-3%)	12% (1%-24%)	3% (2%-5%)	0% (0%-1%)	0% (0%-1%)
26	4% (0%-10%)	2% (0%-4%)	15% (2%-30%)	6% (3%-9%)	1% (0%-1%)	1% (0%-1%)
27	6% (1%-13%)	5% (1%-10%)	17% (3%-33%)	11% (6%-16%)	2% (0%-4%)	3% (1%-6%)
28	9% (2%-17%)	7% (1%-14%)	20% (4%-36%)	13% (7%-19%)	4% (1%-9%)	5% (1%-10%)
29	9% (2%-16%)	7% (1%-13%)	21% (4%-40%)	13% (6%-20%)	3% (1%-7%)	5% (1%-11%)
30	9% (2%-17%)	7% (2%-13%)	23% (4%-42%)	13% (7%-20%)	4% (1%-8%)	5% (1%-10%)
31	8% (1%-15%)	6% (1%-12%)	21% (4%-40%)	11% (5%-20%)	3% (1%-8%)	4% (1%-9%)
32	8% (2%-15%)	6% (2%-14%)	21% (5%-38%)	12% (6%-20%)	3% (1%-6%)	4% (1%-8%)

Notch evaluation location	Percent of yearly abundance entrained. The mean for the 15 year simulation period is given along with the 90% bootstrap confidence interval in parenthesis					
	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6
33	9% (2%-16%)	7% (2%-14%)	20% (5%-35%)	13% (7%-21%)	4% (1%-7%)	5% (2%-10%)
34	8% (2%-15%)	7% (2%-13%)	18% (4%-31%)	12% (6%-19%)	3% (1%-6%)	4% (2%-8%)
35	7% (2%-14%)	6% (2%-13%)	17% (4%-29%)	12% (6%-20%)	3% (1%-5%)	4% (2%-8%)
36	6% (2%-11%)	5% (2%-11%)	17% (4%-29%)	11% (5%-19%)	2% (1%-4%)	3% (1%-6%)
37	8% (2%-15%)	6% (2%-12%)	18% (5%-32%)	13% (6%-21%)	3% (1%-6%)	4% (1%-8%)
38	9% (2%-17%)	7% (2%-15%)	20% (5%-35%)	15% (8%-23%)	3% (1%-7%)	5% (2%-8%)
39	7% (2%-13%)	6% (2%-11%)	18% (4%-31%)	12% (6%-19%)	3% (1%-6%)	4% (2%-7%)
40	7% (2%-13%)	6% (2%-12%)	18% (4%-31%)	12% (6%-20%)	2% (1%-6%)	4% (1%-7%)
41	7% (2%-14%)	6% (1%-13%)	17% (5%-30%)	12% (6%-20%)	2% (1%-6%)	3% (1%-7%)
42	7% (2%-14%)	6% (1%-13%)	16% (4%-28%)	12% (6%-21%)	2% (1%-5%)	3% (1%-6%)
43	7% (2%-14%)	6% (2%-14%)	17% (5%-29%)	13% (6%-20%)	2% (1%-5%)	4% (1%-7%)

Notch evaluation location	Percent of yearly abundance entrained. The mean for the 15 year simulation period is given along with the 90% bootstrap confidence interval in parenthesis					
	Scenario 1	**Scenario 2**	**Scenario 3**	**Scenario 4**	**Scenario 5**	**Scenario 6**
44	7% (2%-14%)	6% (2%-13%)	16% (5%-27%)	13% (6%-21%)	2% (1%-5%)	3% (1%-6%)
45	7% (2%-13%)	6% (2%-12%)	16% (5%-27%)	12% (6%-19%)	2% (1%-5%)	3% (1%-6%)
46	7% (2%-12%)	5% (2%-11%)	16% (5%-27%)	11% (6%-19%)	2% (1%-5%)	3% (1%-6%)
47	7% (2%-13%)	6% (2%-11%)	17% (5%-28%)	11% (7%-19%)	2% (1%-4%)	3% (1%-5%)
48	5% (2%-9%)	4% (2%-9%)	14% (4%-24%)	9% (5%-14%)	1% (0%-2%)	2% (1%-4%)
49	6% (2%-10%)	5% (2%-8%)	15% (4%-25%)	10% (6%-14%)	2% (1%-4%)	2% (1%-4%)
50	7% (2%-11%)	5% (1%-10%)	16% (4%-27%)	12% (7%-17%)	2% (1%-4%)	3% (1%-5%)
51	6% (1%-9%)	4% (1%-8%)	15% (4%-25%)	10% (6%-15%)	1% (0%-3%)	2% (1%-4%)
52	7% (2%-10%)	5% (2%-9%)	16% (5%-27%)	12% (6%-18%)	2% (1%-4%)	3% (1%-5%)
53	6% (2%-10%)	5% (2%-9%)	15% (4%-26%)	11% (6%-17%)	2% (0%-3%)	2% (1%-4%)
54	6% (2%-9%)	5% (2%-9%)	15% (4%-26%)	10% (6%-16%)	2% (0%-4%)	3% (1%-5%)

Notch evaluation location	Percent of yearly abundance entrained. The mean for the 15 year simulation period is given along with the 90% bootstrap confidence interval in parenthesis					
	Scenario 1	**Scenario 2**	**Scenario 3**	**Scenario 4**	**Scenario 5**	**Scenario 6**
55	6% (2%-10%)	4% (1%-8%)	14% (4%-25%)	9% (5%-13%)	3% (1%-5%)	3% (1%-6%)
56	6% (1%-10%)	4% (2%-8%)	13% (3%-24%)	7% (4%-11%)	2% (0%-5%)	3% (1%-6%)
57	5% (1%-10%)	4% (1%-7%)	13% (3%-24%)	7% (4%-11%)	2% (0%-4%)	2% (1%-5%)
58	5% (1%-10%)	4% (1%-7%)	14% (3%-25%)	7% (4%-11%)	2% (0%-4%)	2% (0%-4%)
59	4% (1%-8%)	3% (1%-5%)	12% (3%-22%)	6% (3%-9%)	1% (0%-3%)	2% (0%-4%)
60	4% (1%-9%)	3% (1%-7%)	13% (3%-25%)	6% (3%-9%)	1% (0%-3%)	2% (1%-4%)
61	5% (1%-9%)	4% (1%-7%)	14% (4%-25%)	7% (4%-12%)	1% (0%-3%)	2% (1%-4%)
62	4% (1%-8%)	3% (1%-6%)	14% (3%-23%)	6% (3%-11%)	1% (0%-2%)	2% (0%-4%)
63	4% (1%-10%)	3% (1%-7%)	14% (2%-26%)	5% (3%-8%)	1% (0%-2%)	1% (0%-2%)

12. Appendix C - Detailed rating curves and drawings for Scenario 5 and Scenario 6

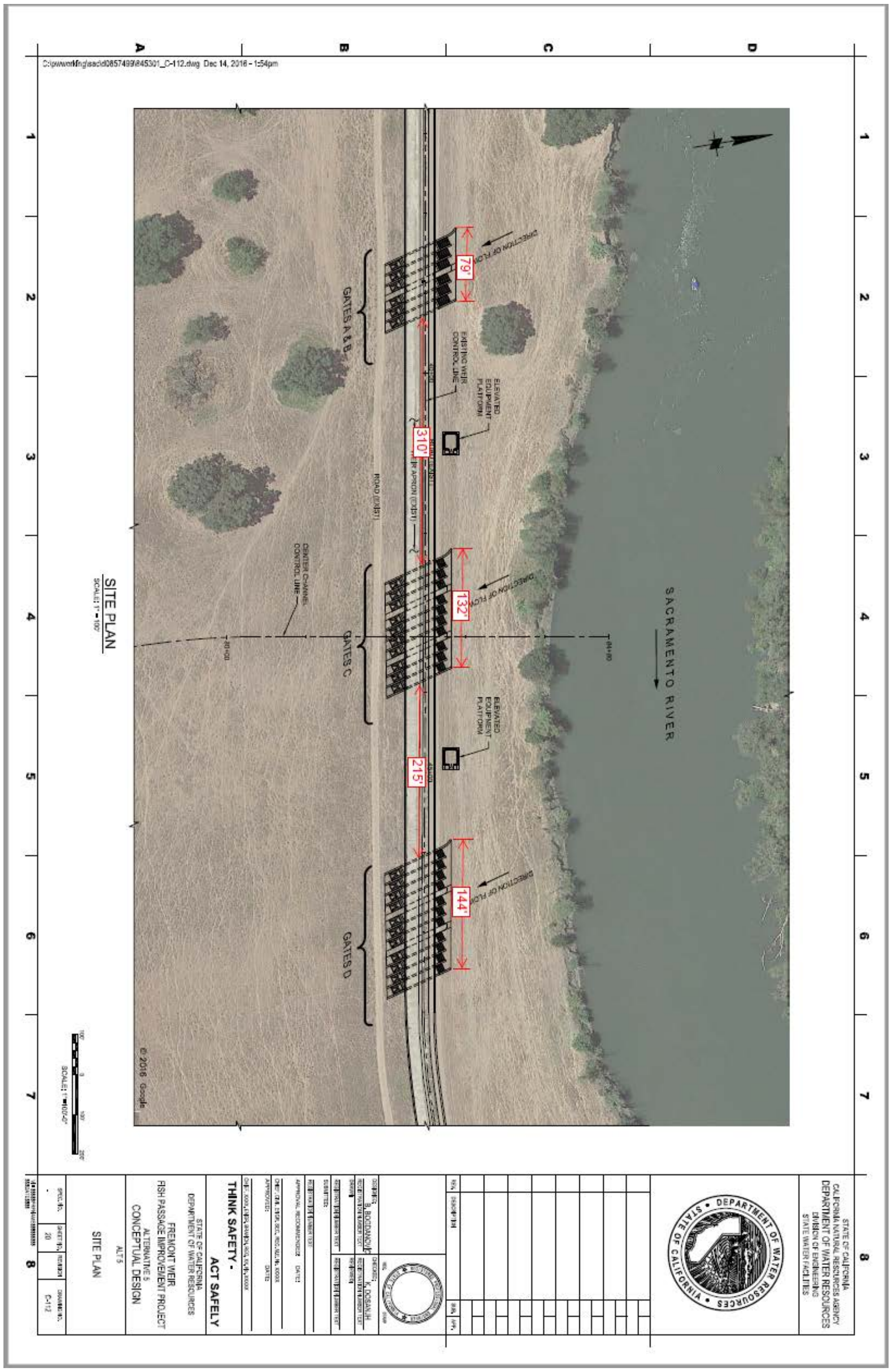

Figure C1 – Plan view of alternative 5 showing the gate spacing used for scenario 5 and scenario 6

Note that alternative 5 is located outside of the 2016 study area, while scenario 5 and scenario 6 evaluated notch locations within the 2016 study area.

Table C1 - Stage - discharge relationships for scenario 5 and scenario 6

Stage, Scenario 6, ft, USGS survey, NAVD88.	Stage, Scenario 5, ft, USGS survey, NAVD88.	Intake A discharge, cfs	Intake B discharge, cfs	Combined Discharge, Intake A and B, cfs	Intake C discharge, cfs	Intake D discharge, cfs
15.00	16.30	12		12		
16.00	17.30	45		45		
17.00	18.30	94	0	94		
18.00	19.30	157	20	177		
19.00	20.30	245	71	316		
20.00	21.30	340	158	498		
20.50	21.80	398	219	617		
22.00	23.30	659	414	1073	0	
23.00	24.30	711	428	1139	636	
24.00	25.30	860	607	1467	915	
25.00	26.30	1025	800	1825	1259	
25.50	26.80	0	1464	1464	1671	
26.00	27.30		1169	1169	2054	
26.25	27.55		1220	1220	2188	

Stage, Scenario 6, ft, USGS survey, NAVD88.	Stage, Scenario 5, ft, USGS survey, NAVD88.	Intake A discharge, cfs	Intake B discharge, cfs	Combined Discharge, Intake A and B, cfs	Intake C discharge, cfs	Intake D discharge, cfs
26.50	27.80		672	672	2493	0
26.60	27.90		0	0	2084	1369
27.00	28.30				1400	1859
27.25	28.55				1476	1998
27.50	28.80				1032	2226
27.75	29.05				1084	2381
28.00	29.30				563	2619
28.25	29.55				589	2790
28.50	29.80				0	3032
29	30.30					3407
29.5	30.80					3463
30	31.30					3246
31	32.00					3325
32.3	32.30					0

Table C2 - Notch spacing for scenario 5 and scenario 6

For scenario 5 and Scenario 6 entrainment for each notch is calculated based on the location of the bootstrap sample fish tracks relative to the location of the critical streakline at the along stream location that corresponds to the center of each notch. The location of the center of the downstream notches (B, C, and D) is calculated by adding the offsets listed below to the along-stream location of Notch A.

Notch	Offset from center of Notch A, meters in the along stream direction
A	0
B	40 ft (12.2 meters)
C	436 ft (133 meters)
D	789 ft (240.5 meters)

State of California
California Natural Resources Agency
Department of Water Resources

Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project

Evaluating Juvenile Chinook Salmon Entrainment Potential for Multiple Modified Fremont Weir Configurations:

Application of *Estimating Juvenile Winter-run and Spring-run Chinook Salmon Entrainment onto the Yolo Bypass over a Notched Fremont Weir* (Acierto et al. 2014)

Draft Technical Memorandum

March 2017 (DRAFT)

Edmund G. Brown Jr.
Governor
State of California

John Laird
Secretary for Resources
Natural Resources Agency

Grant Davis
Director
Department of Water Resources

Suggested Citation

DWR (California Department of Water Resources). 2017. Evaluating juvenile Chinook Salmon entrainment potential for multiple modified Fremont Weir configurations: Application of *Estimating juvenile winter-run and spring-run Chinook Salmon entrainment onto the Yolo Bypass over a notched Fremont Weir, Acierto et al. (2014)*. Technical memorandum for the Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project. Sacramento, California.

State of California
Edmund G. Brown, Jr., Governor

California Natural Resources Agency
John Laird, Secretary for Natural Resources

Department of Water Resources
Grant Davis, Director

Department of Water Resources
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Acronyms and Abbreviations

BDCP	Bay Delta Conservation Plan
CDEC	California Data Exchange Center
CDFW	California Department of Fish and Wildlife
CPUE	Catch per Unit Effort
CV	Central Valley
DWR	California Department of Water Resources
EIR/EIS	Environmental Impact Report/Environmental Impact Statement
JEET	Juvenile Entrainment Evaluation Tool
NAVD88	North American Vertical Datum of 1988
NCRO	California Department of Water Resources North Central Region Office
Reclamation	United States Bureau of Reclamation
RPA	Reasonable and Prudent Alternative
TUFLOW	2014 Yolo Bypass TUFLOW Hydrodynamic Model
USED	United States Engineering Datum
USGS	United States Geological Survey

1. Background

Juvenile Chinook salmon (*Oncorhynchus tshawytscha)* that rear on the Yolo Bypass floodplain during periods of inundation experience enhanced growth and survival when compared to those that remain in the mainstem Sacramento River (Sommer et al. 2001). As a result, the floodplain-reared fish are expected to fare better in their marine environment (Claiborne et al. 2011). In addition to growth-related survival benefits, off-channel rearing provides emigrating salmon with alternate migratory routes and variable timing of ocean entry, further reducing its vulnerability to stressors such as predation and offshore ocean conditions (Schindler et al. 2010). It is likely that drawing more fish onto the Yolo Bypass floodplain would yield a direct increase in adult escapement, population resilience, and further contribute to the recovery of the species (Cramer Fish Sciences 2014). More fish could be drawn onto the Yolo Bypass by making modifications to the Fremont Weir, which is the primary source of inundation for the Yolo Bypass.

As part of the Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project (California Department of Water Resources and the United States Bureau of Reclamation 2012), the California Department of Water Resources (DWR) and the United States Bureau of Reclamation (Reclamation) are working to increase inundation frequency, increase juvenile salmonid access to floodplain habitat, and improve fish passage in the Yolo Bypass. A gated structure (gated notch), or multiple gated structures in the Fremont Weir would allow flows to enter the Yolo Bypass and provide floodplain rearing habitat for juvenile salmonids while also providing upmigrating adult fish with a means of returning to the Sacramento River. This project would assist DWR and Reclamation with satisfying Reasonable and Prudent Alternative (RPA) Action I.6.1 (increased floodplain rearing habitat) and Action I.7 (improved fish passage) of the 2009 National Marine Fisheries Service's Biological Opinion and Conference Opinion on the Long-term Operations of the Central Valley Project and the State Water Project (Biological Opinion).

In 2014, the California Department of Fish and Wildlife (CDFW) developed an approach to evaluate the entrainment of juvenile Chinook salmon onto the Yolo Bypass (Acierto et al. 2014). Specifically, Acierto et al. (2014) used historic flow data and Knights Landing rotary screw trap catch data of juvenile Chinook salmon from 1997 to 2011 to compare existing conditions to a proposed notching of Fremont Weir. DWR has taken this approach with the same observed fish data, modified it to include additional hydrologic data, and organized it into a spreadsheet called the Juvenile Entrainment Evaluation Tool (JEET). The results from the JEET provide a means for comparing potential juvenile salmon entrainment for the proposed gated notch alternatives as part of the development of the Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the project.

This technical memorandum provides a summary of the JEET development, as well as an analysis of the tool's results. This tool is one of several tools that will be used to evaluate the proposed gated notch alternatives, with each tool examining a specific set of parameters. Whereas this tool evaluates the entrainment potential of each alternative based on juvenile Chinook salmon abundance and river flow, additional tools will be used to provide relative comparisons for other important performance metrics for each alternative. For example, The Juvenile Salmon Benefits Model (Hinkelman et al. 2017) includes hydraulic modeling (TUFLOW Classic) to quantify estimates of available habitat, growth, migration rate, and survival.

2. Target Species

The JEET includes an analysis of the potential entrainment of all Central Valley (CV) runs of juvenile Chinook salmon based on data recorded at the Knights Landing rotary screw trap (Acierto et al. 2014). CV steelhead *O. mykiss* are not included in this analysis due to the limited availability of rotary screw trap catch data. Given the similarities in behavior and swimming capabilities amongst juvenile salmonids, it is assumed that steelhead would utilize a modified Fremont Weir in a manner similar to Chinook salmon. The southern distinct population segment of North American Green Sturgeon *Acipenser medirostris* were not included in this analysis because the juvenile life stage of sturgeon is not a component of RPA Action I.6.1.

3. Modeled Scenarios

Six alternatives were developed for evaluation in the Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project EIR/EIS. Existing conditions and each alternative were analyzed to compare differences in potential juvenile entrainment (Table 1). Under existing conditions, entrainment is assumed to occur when the Sacramento River stage exceeds the crest of the Fremont Weir at 32.0' (NAVD88, North American Vertical Datum of 1988)[1] at DWR's North Central Region Office's Surface Water Data Section (NCRO) gauging station located at the west end of the Fremont Weir (#A02170). The gated notch alternatives each allow Sacramento River water to enter the Yolo Bypass beginning at invert elevations ranging from 14.0' to 23.0' (station #A02170). Each alternative has a unique combination of gate and channel

[1] Although the Fremont Weir's crest elevation varies west to east, DWR's California Data Exchange Center (CDEC) documents the crest elevation as 32.0 ft (NAVD88) for station #A02170 (Fremont Weir west end). For modeling purposes and throughout this technical memo, all elevations are recorded in NAVD88.

design and invert elevation. The maximum flow rate for these alternatives ranges from 3,000 cfs to 12,000 cfs. Water years 1997 through 2011 were analyzed during the prescribed structural operational window of November 1 through March 15 (Alternative 4b functions identically to Alternative 4 with an earlier operational end date of March7).

Table 1. Description of alternatives included in the final Juvenile Entrainment Evaluation Tool analysis.

Alternative	Alignment	Gate Dimensions	Gate Invert Elevations	Description	Design Flow (cfs)
1	East	Gate 1: 18' x 34' Gates 2 & 3: 14' x 27'	Gate 1: 14' Gates 2 & 3: 18'	30' bottom width, 30' bench, no levee	6,000
2	Central	Gate 1: 17' x 40' Gates 2 & 3: 13' x 27'	Gate 1: 14.8' Gates 2 & 3: 18.8'	50' bottom width, 30' bench, no levee	6,000
3	West	Gate 1: 16' x 40' Gates 2 & 3: 12' x 27'	Gate 1: 16.1' Gates 2 & 3: 20.1'	60' bottom width, 30' bench, no levee	6,000
4[2]	West	Gate 1: 16' x 40' Gates 2 & 3: 12' x 27'	Gate 1: 16.1' Gates 2 & 3: 20.1'	60' bottom width, 30' bench, no levee, downstream water control structures	3,000
5	Central	27 Gates Intake A, B, & C: 10' x 10' Intake D: 10' x 7'	Intake A: 14' Intake B: 17' Intake C: 20' Intake D: 23'	Intake A & B: 80' bottom width Intake C: 130' bottom width Intake D: 142' bottom width	3,400
6	West	Gates 1-5: 14' x 40'	16.1'	200' bottom width	12,000
Existing Conditions	--	--	--	Flow over existing weir	--

[2] Includes Alternative 4b, which is the same configuration as Alternative 4 with an earlier operational end date of March 7.

Initially, three early project alternatives were modeled using TUFLOW Classic (Table 2). Those modeled results were used as inputs to the JEET, in addition to the Juvenile Salmon Benefits Model and an adult fish passage evaluation tool developed by DWR (California Department of Water Resources 2017a). The early JEET results indicated that increasing notch size was positively correlated with entraining greater quantities of fish onto the floodplain. These results are not surprising as the JEET is designed to examine the influence of flow and fish abundance on entrainment. Fish behavior, such as their cross-channel distribution under varying flows or their response to encountering physical structures, was deliberately omitted from this tool to avoid potentially confounding results as a result of introducing unknown or highly variable behavior (see Section 5. Key Assumptions and Limitations). However, because the gated structures rely on gate operations (a combination of open and closed gates) to limit inflow to 6,000 cfs, the adult fish passage evaluation tool showed that the maximum velocity criteria for adult fish passage (California Department of Water Resources 2017b) was exceeded at river stages well below the Fremont Weir crest, and thus adult fish passage was compromised (Table 3).

Table 2. Original project alternatives evaluated by the Juvenile Entrainment Evaluation Tool.

Alternative	Invert Elevation (NAVD88)	Bottom Width	Side Slope
Large Notch	14’	225’	3:1
Medium Notch	17.5’	225’	3:1
Small Notch	14’	20’	3:1
Existing Conditions	N/A (32.8’ @ crest of Fremont Weir)*	N/A	N/A

Table 3. Fisheries and Engineering Technical Team’s adult fish passage structural design criteria (California Department of Water Resources 2017b). These criteria represent the thresholds at which adult fish passage becomes compromised due to insufficient depth (avoidance behavior) or excessive water velocity.

Structure	Length	Depth Criterion	Velocity Criterion
Gate Structure / Short Channel Transitions	<60’	3’ Minimum	6 ft/sec Maximum
Downstream Channel	>60’	5’ Minimum	4 ft/sec Maximum

Note that the adult fish passage criteria defined in Table 3 was designed for both salmonids and sturgeon. Though salmonids are capable of passing structures that are significantly shallower or of higher velocity than listed in the criteria, the criteria are intended to account for the weakest performing target species (i.e. Green Sturgeon).

The project design team focused on optimizing adult fish passage by reducing velocities in the channel at the gate structure by adjusting the cross-sectional area of the channel to more closely match the downstream channel dimensions. Additionally, channel benches were added to some design alternatives so that when the velocity becomes too high in the main channel, depth and velocity criteria are met on the benches. As the stage rises in the passage channels and the main channel velocities approach the velocity threshold, flow spills out onto the benches providing a lower velocity option for fish to navigate. This design feature will presumably allow depth and velocity criteria to be met over a larger range of river stage and flow conditions. Three additional alternatives were developed incorporating a combination of benches, levees, and water control structures in an attempt to reduce the downstream inundation impact to local stakeholders.

4. Methods

4.1 Juvenile Entrainment Evaluation Tool Components

4.1.1 Fish Data Source

CDFW's Juvenile Salmon Emigration Monitoring Program operates two rotary screw traps in tandem in the Sacramento River at Knights Landing, roughly 5.5 river miles upstream from the Fremont Weir (38° 47' N, 121°, 41' W). CDFW generally operates these traps from October to June for each water year. The close proximity of the trap to the Fremont Weir makes this data source the best approximation for juvenile salmonid run timing at Fremont Weir. Acierto et al. (2014) evaluated the effects of providing increased access to floodplain habitat to Central Valley Chinook salmon via a notch in the Fremont Weir. The study informed Central Valley and Delta projects related to the Yolo Bypass, including this project, the Sacramento River Flood Control Project, and the BDCP.

Acierto et al. (2014) used daily catch and trapping effort data to determine a daily catch per unit effort (CPUE) for Chinook salmon. Run assignments were made based on the length-at-date criteria initially developed by Fisher (1992) and modified by Greene (1992) (Appendix A of del Rosario et al. 2013). CPUE was used instead of raw catch as a means of accounting for inconsistencies in trap operation and efficacy under varying flow conditions and debris load. CPUE accounts for the duration of trap operation and reduces the risk of over- or underestimating daily fish abundance.

Daily CPUE ($CPUE_i$) for each run was derived by:

$CPUE_i = C_i / (E_i/24)$, where C = daily catch, i = daily index, and E = effort (hours).

For the juvenile entrainment analysis, $CPUE_i$ were acquired from Appendix A of Roberts et al. (2013), which is the white paper version of Acierto et al. (2014). $CPUE_i$ was further converted to determine the daily proportion of a given years' total CPUE that was in the river (P_i) at Knights Landing by run (see Section 4.2 for detailed conversion steps). P_i is an estimate of what proportion of the total population of a given run was present in the Sacramento River at Knights Landing on a given day.

$$\mathbf{P_i = CPUE_i / \sum CPUE_i}$$

This daily proportion (P_i) was applied to the total annual observed $CPUE_i$ sum to derive the estimated daily number of fish in-river (for added detail on this application, refer to Section 4.2). Mortality was not estimated for the stretch of river from the Knights Landing rotary screw traps to the Fremont Weir. As a result, P_i at Knights Landing is assumed to equal P_i at Fremont Weir for this evaluation.

4.1.2 Flow Data Source

The proportion of Sacramento River flow diverted into the Yolo Bypass was used to estimate the number of fish likely to enter the Yolo Bypass. To remain consistent with the 1997 through 2011 range of available CDFW fish catch data (Roberts et al., 2013), the same 15-year period of Sacramento River daily stage height was used (provided by NCRO).[3] When there was no flow over the Fremont Weir, this proportion was determined by dividing the flows through the proposed channel by the flows in the Sacramento River.

For flow over the Fremont Weir, the flow portion was calculated based upon the combined Sacramento River and Sutter Bypass flows.

Flows onto the Yolo Bypass were modeled using TUFLOW Classic. The TUFLOW model is designed to provide discharges at a number of locations in the vicinity of Fremont Weir confluence area. Model inflows include the Sacramento River below the Knights Landing Outfall Gates, Sutter Bypass, Feather River, and the Natomas Cross Canal. These flows are balanced by the outflows, which include Fremont Weir overtopping, Sacramento River at Verona, and all project-related channel discharges. For consistency, the flows in the Sacramento River and Sutter Bypass were calculated by subtracting all of the other flows into the confluence area from the flows leaving the confluence area.

[3] Fremont Weir mean daily stage height data were obtained from NCRO in the United States Engineering Datum (USED). Stages were converted from USED to the NAVD88 by subtracting 1.45 feet (Fremont Weir west end gauge only). Note: this conversion is site specific and should not be applied to other gauges.

Flow gauge data was used to the extent available. When actual flow data was not available, flows were estimated using computer/spreadsheet models, estimation techniques, or information from previous studies. California Department of Water Resources (2017c) provides a detailed overview of flow data sources, node locations, flow equations, and TUFLOW model development.

Based upon the discussion above, when there is no flow over the Fremont Weir, the proportion of flow diverted onto the Yolo Bypass is based upon the following equation:

FP = (NOTCH) / (NOTCH + VON - FEA - SUT - NCC)

Where:

FP = Flow proportion

NOTCH = Discharge through the proposed weir "notch" and channel

VON = Discharge in the Sacramento River at Verona

FEA = Discharge in the Feather River

SUT = Discharge in the Sutter Bypass (including Sutter Slough)

NCC = Discharge in the Natomas Cross Canal

During Fremont Weir overtopping, Sacramento River discharge over the Fremont Weir (FRE) was added to both the numerator and the denominator, and the Sutter Bypass discharge was removed from the denominator making the flow proportion based upon the combined Sacramento River flow and the flow in the Sutter Bypass. The proportion of flow (FP) entering the Yolo Bypass during an overtopping event was estimated by modifying the original equation used by Acierto et al. (2014), to exclude flows from the Feather River Basin. The inclusion of flows from the Feather River and the Natomas Cross Canal during overtopping conditions resulted in artificially high total flows being input into the river just upstream of Fremont Weir (the denominator), which would bias the result towards lower estimates for entrainment. Thus, the equation was modified to exclude flows from the Feather River and the Natomas Cross Canal to become:

FP = (NOTCH + FRE) / (NOTCH + FRE + VON – FEA – NCC)

Where:

FRE = Fremont Weir discharge

A detailed synopsis of the TUFLOW modeling effort, including a description of flow inputs and locations, can be found in the Yolo Bypass Salmonid Habitat Restoration and Fish Passage Hydrodynamic Modeling Draft Report (California Department of Water Resources 2017c).

4.2 Approach

Daily flow splits (proportion of flow diverted from the Sacramento River onto the Yolo Bypass) for each alternative were developed (see Section 4.1.2) and coupled with the daily fish presence data derived from Acierto et al. (2014) (see Section 4.1.1). Acierto et al. (2014) used $CPUE_i$ to estimate the daily proportion of each run passing Fremont Weir (fish data came from Knights Landing located 5.5 river miles upstream, and a 100% survival estimate was applied). This was applied to the total annual observed $CPUE_i$ sum of each run to determine the daily estimated number of fish in the proximity of Fremont Weir for each day (Table 4):

Daily # of Fish in River = P_i * Annual $CPUE_i$ Sum

Once the daily number of fish in the vicinity of the weir was determined, entrainment onto the Bypass was estimated using a proportion of flow entrainment hypothesis (Table 5). This hypothesis assumes that fish are distributed in a 1:1 ratio with flow across the Sacramento River at Fremont Weir, and therefore the proportion of flow diverted onto the Bypass is equal to the proportion of the population that is entrained on a given day (See Figure 1 for complete conversion process). For example, if 1,000 juvenile winter-run Chinook salmon are present on a day in which 30% of the flow is drawn onto the Yolo Bypass, then 300 winter-run are entrained onto the Yolo Bypass. This analysis was limited to dates that fell within the proposed project operational window of November 1 – March 15, with the exception of Alternative 4b, which has an operational window of November 1 – March 7.

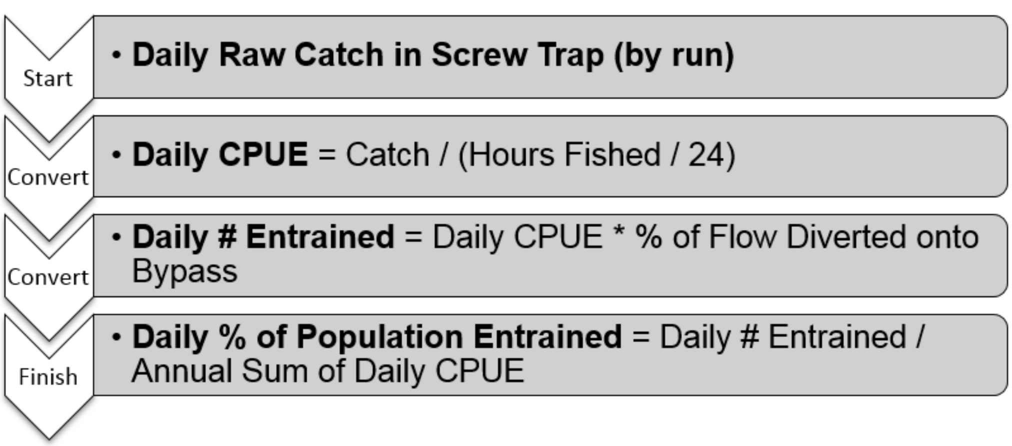

Figure 1. Flow chart of daily screw trap catch data conversion process.

Table 4. Example calculation of the estimated daily number of juvenile Chinook salmon in the Sacramento River at Fremont Weir (by run).

Date	Stage (ft. - NAVD 88)	Annual Sum Fall-Run CPUE	Annual Sum Spring-Run CPUE	Annual Sum Winter-Run CPUE	Annual Sum Late Fall-Run CPUE	Fall-Run CPUE (%)	Daily CPUE Fall-Run	Spring-Run CPUE (%)	Daily CPUE Spring-Run	Winter-Run CPUE (%)	Daily CPUE Winter-Run	Late Fall-Run CPUE (%)	Daily CPUE Late Fall-Run
12/8/1996	20.96	24,089	1,139	162	78	0.00	1	0.15	2	1.77	3	6.62	5
12/9/1996	21.08	24,089	1,139	162	78	0.06	16	0.94	11	2.70	4	4.37	3
12/10/1996	24.14	24,089	1,139	162	78	0.04	11	1.27	15	2.77	5	2.56	2
12/11/1996	28.12	24,089	1,139	162	78	0.44	106	12.91	147	7.47	12	11.00	9
12/12/1996	30.49	24,089	1,139	162	78	1.18	285	13.92	159	5.35	9	2.93	2
12/13/1996	33.14	24,089	1,139	162	78	1.07	259	11.46	131	3.13	5	4.55	4
12/14/1996	33.82	24,089	1,139	162	78	0.38	91	7.24	82	2.34	4	2.08	2
12/15/1996	33.77	24,089	1,139	162	78	0.67	161	11.08	126	2.04	3	3.71	3

Table 5. Example calculation of the daily proportion of the total annual juvenile Chinook salmon population entrained onto the Yolo Bypass with a modified notch in place (by run).

Date	Daily # Fall-Run in River	Daily # Spring-Run in River	Daily # Winter-Run in River	Daily # Late Fall-Run in River	% Sac R flow onto Bypass: Alt. #1	# Fall-Run Entrain	% Fall-Run Entrain	# Spring-Run Entrain	% Spring-Run Entrain	# Winter-Run Entrain	% Winter-Run Entrain	# Late Fall-Run Entrain	% Late Fall-Run Entrain
12/8/1996	1	2	3	5	11%	0	0.001%	0	0.017%	0	0.203%	1	0.758%
12/9/1996	16	11	4	3	11%	2	0.007%	1	0.106%	0	0.305%	0	0.493%
12/10/1996	11	15	5	2	10%	1	0.005%	2	0.134%	0	0.291%	0	0.269%
12/11/1996	106	147	12	9	15%	16	0.064%	22	1.899%	2	1.100%	1	1.618%
12/12/1996	285	159	9	2	20%	57	0.235%	32	2.766%	2	1.064%	0	0.581%
12/13/1996	259	131	5	4	24%	62	0.259%	32	2.769%	1	0.757%	1	1.100%
12/14/1996	91	82	4	2	22%	20	0.082%	18	1.584%	1	0.512%	0	0.456%
12/15/1996	161	126	3	3	53%	86	0.355%	67	5.902%	2	1.087%	2	1.976%

Daily estimates of proportion entrained were summed to derive the estimated annual average proportion of juvenile Chinook salmon entrained onto the Yolo Bypass (by run) for each alternative, as well as under existing conditions. The calculated entrainment of juvenile Chinook salmon under existing conditions (i.e., entrainment only occurs via Fremont Weir overtopping) was used as a benchmark to compare the calculated entrainment values from each gated notch alternative. Using existing conditions as a baseline allows for a standardized, unbiased method of assessing the entrainment potential of each project alternative.

5. Key Assumptions and Limitations

The data input into the JEET have been verified by CDFW and DWR staff. The results are intended to represent the relative entrainment potential across alternatives based on flow and fish abundance. To better understand how fish are actually distributed across the Sacramento River at Fremont Weir and how they might interact with a proposed notch, a multi-agency telemetry study was conducted by the United States Army Corps of Engineers, USGS, Reclamation and DWR in the winter of 2015. The two-dimensional tracks generated by this study were used to validate an existing fish behavior model (Smith et al. 2017) developed for use on the Yolo Bypass notch development. The results of the telemetry study and the associated behavioral model (Smith et al. 2017), the Juvenile Salmon Benefits Model (Hinkelman et al. 2017), and a critical streakline analysis (Blake et al. 2017) will be used to determine fish response to different notch locations and configurations in an effort to optimize the ratio of fish entrained to flow diverted.

The key assumptions and limitations of the JEET are as follows:

- The juvenile entrainment analysis uses the total annual sum of daily CPUE (Roberts et al. 2013) for each run as a surrogate for the entire juvenile population.
    - While these annual sums are substantially lower than their respective juvenile production estimates (JPE), it is an acceptable means of providing a standardized method of evaluating entrainment across multiple years by using empirical catch data.
    - Because this tool uses proportion entrained based on empirical data (i.e., a small percentage of the actual JPE) as the primary metric for evaluating notch alternatives, the total calculated number of individuals entrained is of little importance and is therefore not reported.
    - The proportion of the total population of a given run present in the Sacramento River at Knights Landing on a given day (P_i) is the key input.

P_i is derived from empirical catch data, and provides an accurate means of comparison.
  - Substituting JPE for the annual $CPUE_i$ sum would yield identical entrainment proportions, and is thereby an unnecessary step for the purpose of this evaluation.
- CDFW's rotary screw traps at Knights Landing are not sampled every day. Days in which sampling did not occur include (but are not limited to): weekends, holidays, and high flow events. Similarly, trap efficiency may vary due to debris load, trap malfunctions, etc.
  - Roberts et al. (2013) adjusted daily CPUE to account for gaps in sampling. However, these estimates are extrapolations and are not expected to be 100% accurate. Dates with missing fish CPUE data were eliminated from this analysis.
  - Trap efficiency data are not available; therefore the estimated proportion sampled by the rotary screw traps may not accurately reflect the actual population at large (see Roberts et al. 2013).
  - Rotary screw trap catch data represents a sub-sample of the total daily abundance in-river. The proportion captured is likely to differ day-to-day based on variances in fish distribution across the channel, the presence of predators, boating activity in the vicinity of the trap, or any number of factors contributing to a change in trap efficiency. As a result, fish may have passed the Knights Landing rotary screw traps in abundances greater than or less than the daily values extrapolated from the CPUE conversion.
  - Mortality was not estimated for the stretch of river from the Knights Landing rotary screw traps to the Fremont Weir. This tool assumes that 100% of the fish represented by the Knights Landing screw trap data will make it to the Fremont Weir.
- Fish were assigned to a run based on length-at-date criteria derived from the River Model (Appendix A of del Rosario et al. 2013), which genetic sampling has shown to be less than 100% accurate. Based on genetic analyses, Merz et al. (2014) found that the River Model length-at-date criteria correctly classified fall/late fall-run Chinook salmon about 89% of the time, winter-run Chinook salmon about 77% of the time, and spring-run Chinook salmon about 22% of the time. Fall-run and late fall-run Chinook salmon were lumped together due to similarities in allele frequency. These results were based on fish sampled at the Knights Landing rotary screw traps from 2010 to 2011.
  - Roberts et al. (2013) reclassified several fish that were originally identified as spring-run by the trap servicing crew between April and June. Though the size of these fish met spring-run assignment criteria, hatchery release

records indicate that they were more than likely hatchery-released fall-run Chinook salmon. Central Valley hatchery fall-run Chinook salmon are not all adipose-fin clipped, which makes it difficult to distinguish natural from hatchery origin fish.

- Entrainment onto the Yolo Bypass was estimated using a “proportion of flow” approach. With this approach, it was assumed that fish are entrained onto the floodplain proportional to the amount of flow diverted from the Sacramento River.
    - In other reaches of the Sacramento River, studies have shown that juvenile Chinook salmon are generally not equally entrained in a 1:1 proportion to the flow (Burau et al. 2007). It is hypothesized that salmon distributions concentrate toward the outside of channel bends as a result of the higher flows found in these bends. As a result, the ratio of fish entrained could be greater than the proportion of flow diverted for notches located on the outside of channel bends (Burau et al. 2007).
    - The telemetry study mentioned at the beginning of this section was conducted to better understand how hatchery late fall-run Chinook salmon and hatchery winter-run Chinook salmon are distributed in the river at the western end of the Fremont Weir. Based on preliminary results, distributions of both runs of salmon appeared to follow the bulk flow path and were biased toward the outside of bends more frequently than the inner bend (Steel et al. 2017).
    - The JEET was designed to focus on fish abundance and flow as the primary inputs to evaluate the effects of timing and magnitude of operation on entrainment for each alternative. Fish abundance and flow inputs come from documented, quality-checked field observations. Fish behavior was deliberately excluded as an additional component. The inclusion of a behavioral component is likely to increase the accuracy of results, but could introduce a fair amount of scientific uncertainty which could make it difficult to compare the timing and magnitude of operation between alternatives.

While the results of the model developed by Smith et al. (2017) represent a more accurate predictor of entrainment, the JEET yields a more precise, relative comparison of potential entrainment amongst project alternatives. By taking multiple approaches at evaluating the entrainment potential of each project alternative, the results of each approach can be used to either confirm or deny one another. Similar results would help to confirm the validity of the various analytical approaches, whereas dissimilar findings would help to: a) highlight the influence each potential driver (i.e., flow, fish abundance, location, notch configuration, or fish behavior) has on determining entrainment; or b) identify tool deficiencies that need to be further addressed.

- Alternatives 1, 2, and 3 are essentially the same structure located at different points along the Fremont Weir. To account for the slope of the Sacramento River, the invert elevations for each site had to be adjusted to maintain the same flow pattern (Table 1). Though there is 2.1' of difference in the invert elevation between the eastern- and the western-most alternatives (Alternative 1 and 3, respectively), they each divert the same proportion of flow from the Sacramento River. For the purpose of this report, they are assumed to function the same, and therefore their fish entrainment potentials are assumed to be identical.
    - The actual extent of location-specific entrainment effects will be analyzed by Smith et al. (2017).
- Daily flow splits (the amount of total river flow diverted onto the Yolo Bypass) were developed for each alternative by inputting station gauge data into the TUFLOW model developed for the Sacramento River/Yolo Bypass region. All data was quality-checked for accuracy and consistency by NCRO. Some daily mean stage height data were based on estimates, but the majority of the data were labeled as "good, continuous records" by NCRO.
    - The effects of backwatering from flow coming from the west side tributaries are highly variable and are therefore difficult to account for. Backwatering conditions may impact rating curve development more or less than what has been predicted by the TUFLOW model, though these deviations are unlikely to result in significant variances in notch discharge.
- TUFLOW modeling results included periods of reverse flows for some alternatives. A modified intake channel would slope from the weir towards the Sacramento River, and under periods of rapid stage decrease the model allowed for flows to reverse through the structure and drain into the Sacramento River. Negative flows were changed to zero to more accurately reflect gate operation.
- This tool estimates the relative entrainment potential of various project alternatives, therefore the results should be used as a basis of comparison rather than predicting values.

6. Results

The average annual proportion of juvenile Chinook salmon entrained (by run) for each alternative is one of the principal performance metrics by which alternatives were compared.

Table 6. Calculated average annual proportion of the juvenile Chinook salmon population entrained onto the Yolo Bypass under proposed alternatives and existing conditions (by run).

Run	Existing Conditions	Alt 1 (East 6,000 cfs)	Alt 2 (Central 6,000 cfs)	Alt 3 (West 6,000 cfs)	Alt 4 (West 3,000 cfs)	Alt 4b (Mar 7 end date)	Alt 5 (Central 3,400 cfs)	Alt 6 (West 12,000 cfs)
Fall	7.1%	15.4%	15.4%	15.4%	13.0%	12.6%	13.3%	21.3%
Late Fall	2.6%	5.9%	5.9%	5.9%	5.2%	5.2%	5.4%	8.5%
Winter	3.9%	11.3%	11.3%	11.3%	9.5%	9.2%	9.8%	17.4%
Spring	3.1%	10.3%	10.3%	10.3%	8.4%	8.2%	8.8%	16.1%

Figures 3–6 illustrate how the annual average entrainment values in Table 6 are distributed via boxplots by salmon run. Figure 2 shows how to interpret these box plots, while Helsel and Hirsch (2002) provides a full description on the interpretation and creation of boxplots. Essentially, the diamond shape in each boxplot represents the average annual proportion of a Chinook salmon population entrained onto the Yolo Bypass across water years, as displayed in Table 6.

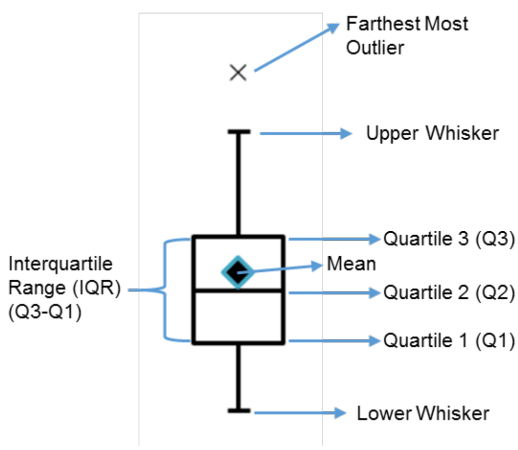

Figure 2. Elements of a boxplot used in this technical memorandum. For Figures 2-5, boxplots are plotted against the proposed alternative on the x-axis and entrainment on the y-axis.

The top and bottom of the box in Figure 2 represents the first and third quartiles (Q1, Q3). Q1 denotes that about 25% of the entrainment calculations are below this value and 75% of the entrainment calculations are above this value. In comparison, Q3 denotes that about 75% of the entrainment calculations are below this value, and 25%

of the values are above this value. For existing conditions in Figures 3–6, Q1 falls on zero (the x-axis), so it appears truncated in the graphics.

The second quartile or the median is represented by the line within the box, while the box itself represents the interquartile range (IQR), which is the difference between the first and third quartile. The IQR represents the middle 50% of the distribution and is used to determine outliers.

The upper and lower whiskers represent the upper or lower 25% of the distribution with the exclusion of outliers. The endpoints of the whiskers represent the minimum (lower whisker) or maximum (upper whisker) annual average entrainment with the exclusion of outliers.

Outliers were determined if the entrainment fell below Q1−1.5 IQR or above Q3+1.5 IQR. For simplicity, this technical memorandum only displays the farthest most outlier in the dataset, which is represented with an “X.” Even so, there were typically no more than two outliers above the upper whisker. There were no outliers below the lower whisker.

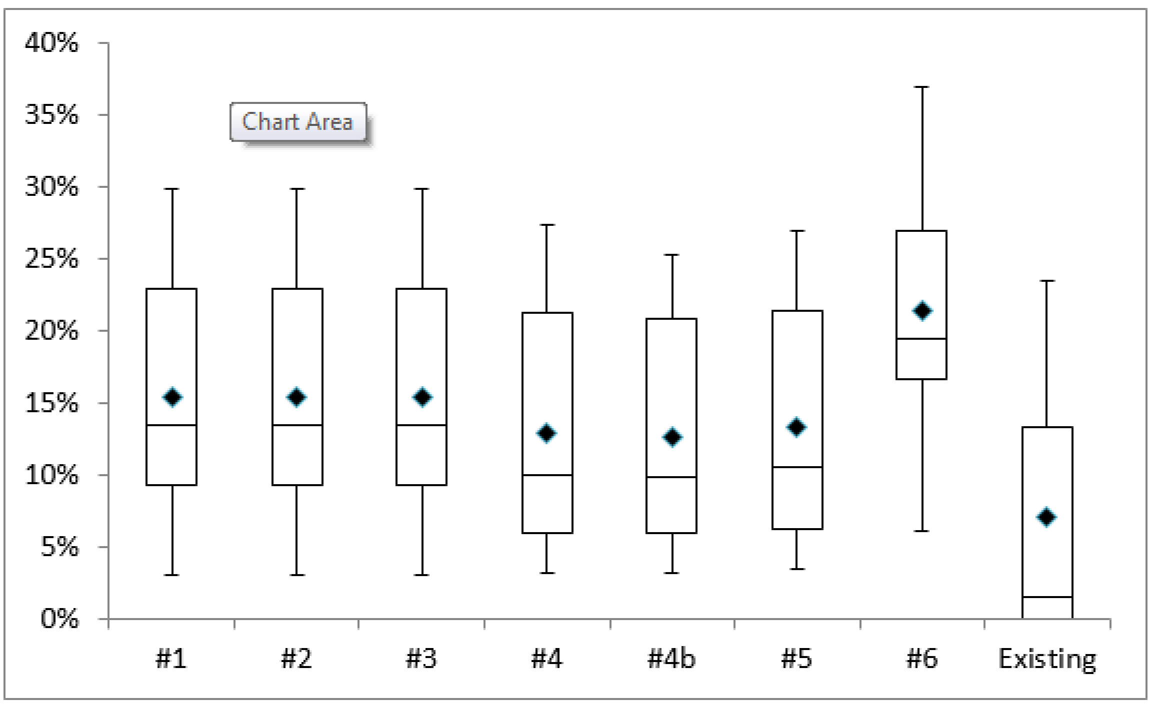

Figure 3. Boxplots of the calculated average annual proportion of the fall-run Chinook salmon population entrained onto the Yolo Bypass under proposed alternatives and existing conditions, water years 1997-2011. Diamond shapes represent the mean, top and bottom of the box represent the first and third quartiles, line inside the box represents the median, and whiskers represent the minimum/maximum.

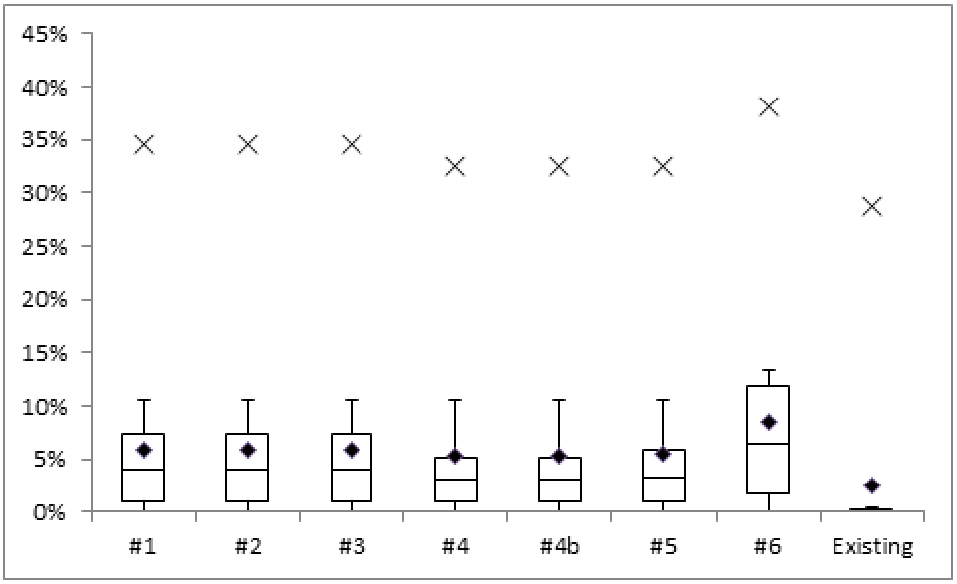

Figure 4. Boxplots of the calculated average annual proportion of the late fall-run Chinook salmon population entrained onto the Yolo Bypass under proposed alternatives and existing conditions, water years 1997-2011. Diamond shapes represent the mean, top and bottom of the box represent the first and third quartiles, line inside the box represents the median, whiskers represent the minimum/maximum (excluding outliers), and X represents the farthest most outlier.

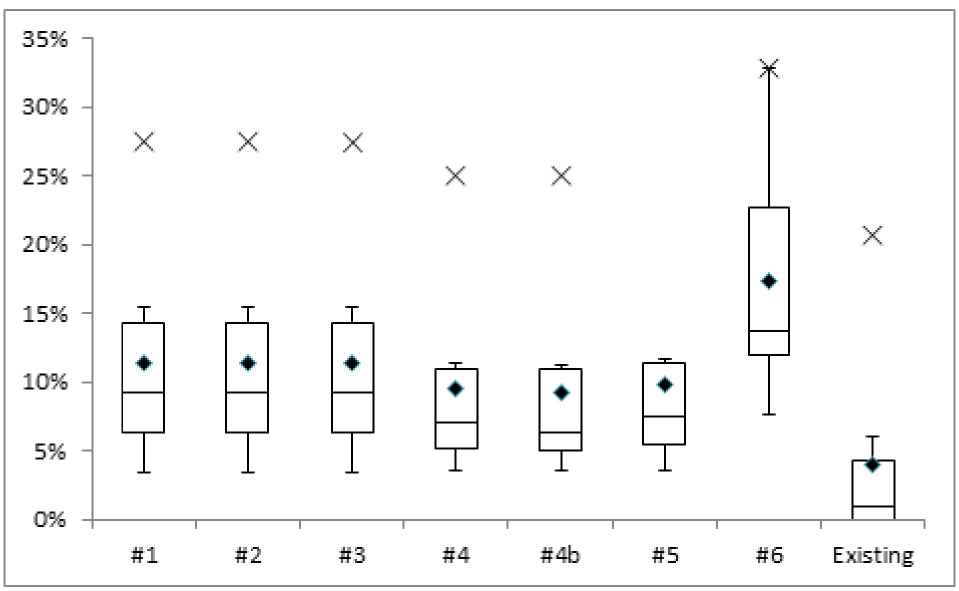

Figure 5. Boxplots of the calculated average annual proportion of the winter-run Chinook salmon population entrained onto the Yolo Bypass under proposed alternatives and existing conditions, water years 1997-2011. Diamond shapes represent the mean, top and bottom of the box represent the first and third quartiles, line inside the box represents the median, whiskers represent the minimum/maximum (excluding outliers), and X represents the farthest most outlier.

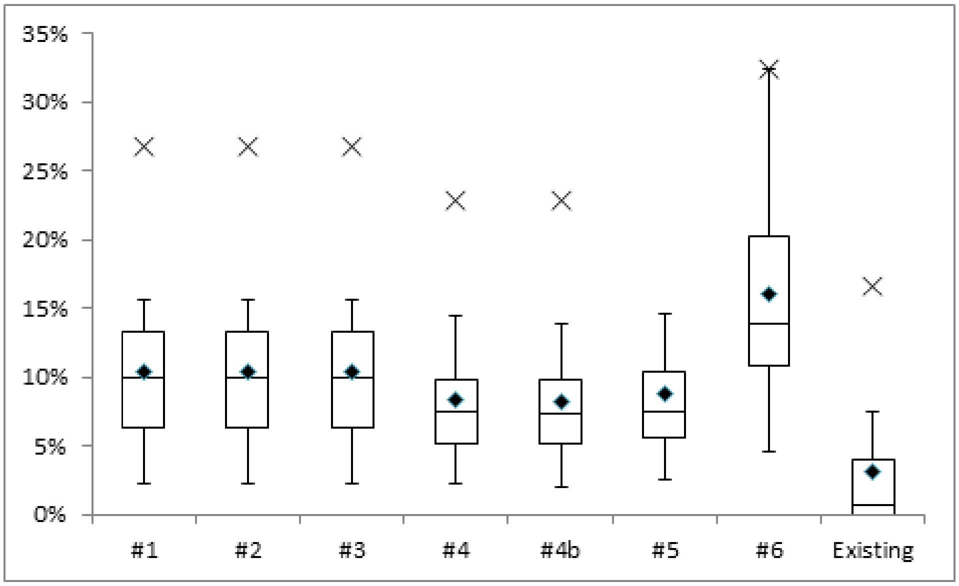

Figure 6. Boxplots of the calculated average annual proportion of the spring-run Chinook salmon population entrained onto the Yolo Bypass under proposed alternatives and existing conditions, water years 1997-2011. Diamond shapes represent the mean, top and bottom of the box represent the first and third quartiles, line inside the box represents the median, whiskers represent the minimum/maximum (excluding outliers), and X represents the farthest most outlier.

Comparing the entrainment potential between existing conditions and each alternative provides the average annual increase in the proportion of the population entrained (Figure 7).

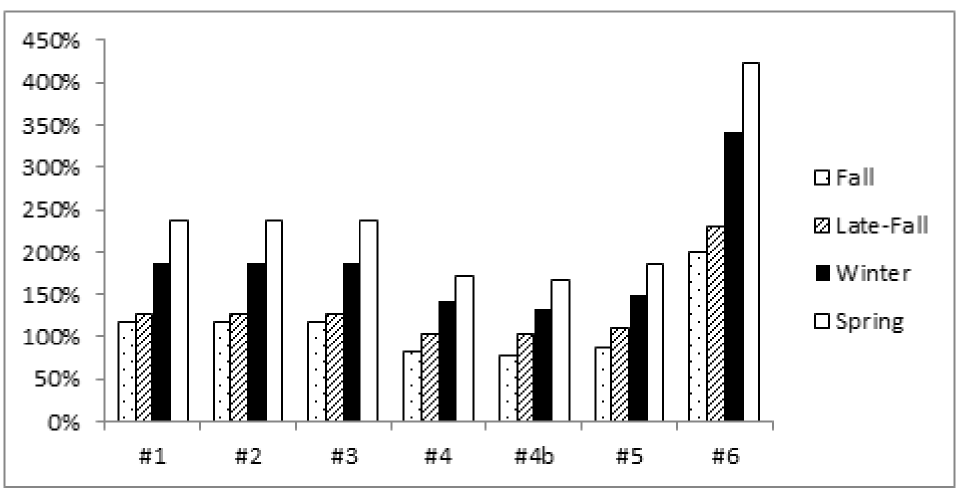

Figure 7. Relative comparison of the calculated mean annual increase in the proportion of the total population of juvenile Chinook salmon entrained onto the Yolo Bypass over existing conditions (by run), water years 1997-2011.

Estimated entrainment was further broken down by water year type as defined in Table 7. Figures 8 and 9 illustrate the calculated mean annual entrainment of juvenile spring-run and winter-run Chinook salmon (respectively) under wet and dry years as defined by the Sacramento Valley Water Year Hydrologic Classification (California Data Exchange Center, 2017). Wet years include years categorized as wet or above normal, and dry years include years categorized as dry or critical.

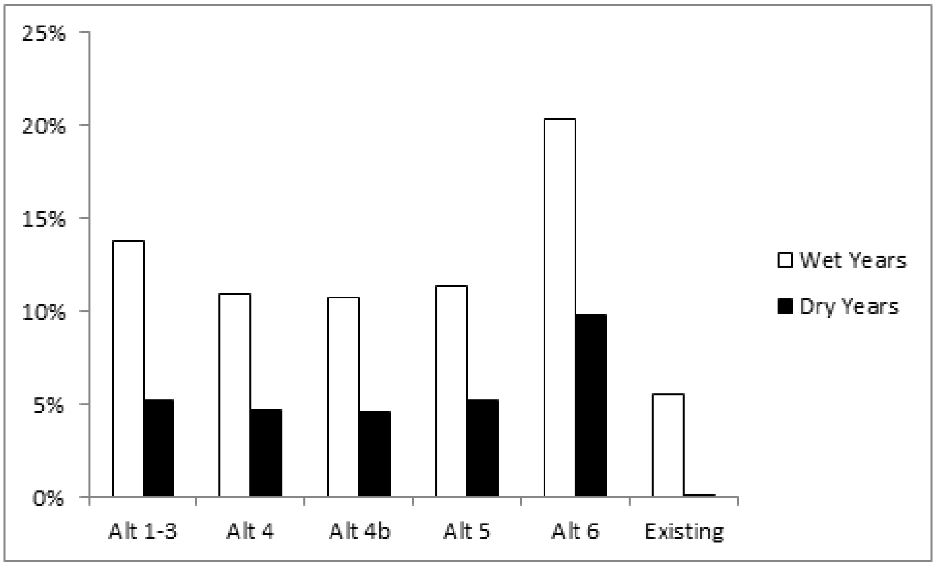

Figure 8. Calculated mean entrainment of juvenile spring-run Chinook salmon onto the Yolo Bypass under proposed alternatives and existing conditions, by water year type. "Wet Years" include years categorized as wet or above normal. "Dry Years" include years categorized as dry or critical.

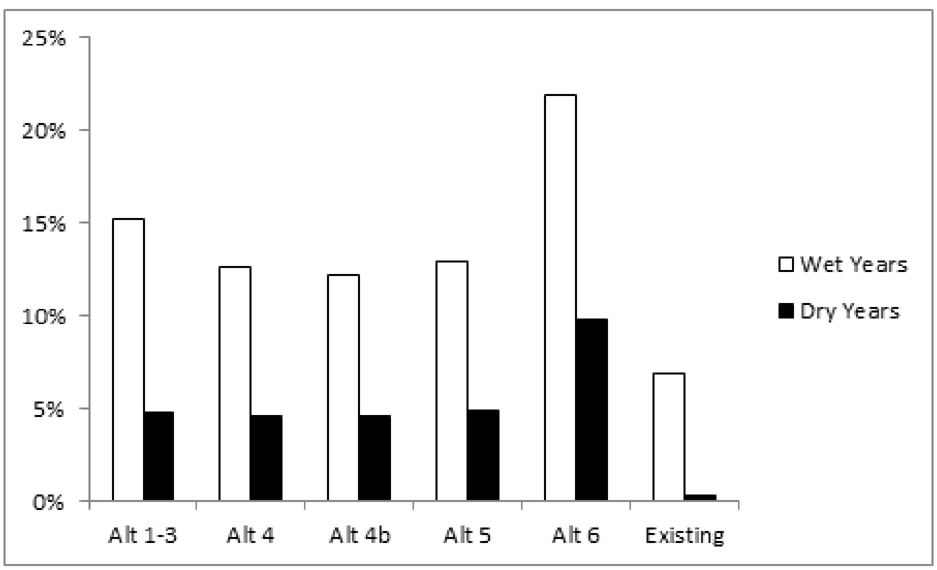

Figure 9. Calculated mean entrainment of juvenile winter-run Chinook salmon onto the Yolo Bypass under proposed alternatives and existing conditions, by water year type. "Wet Years" include years categorized as wet or above normal. "Dry Years" include years categorized as dry or critical.

7. Discussion

Our results indicate that notching the Fremont Weir would greatly increase the proportion of emigrating juvenile Chinook salmon that are entrained onto the Yolo Bypass. While considerable increases in entrainment occurred across all water year types, notch alternatives were particularly effective at increasing entrainment during dry and critical water years (Table 8). During dry and critical years, naturally occurring overtopping events are rare and are often short in duration providing minimal opportunities for juveniles to enter the Yolo Bypass. Though not as high as in dry years, notch entrainment during wet and above normal years was still substantially improved over existing conditions (Table 9).

Table 7. Calculated mean annual increase in the proportion of the total population of juvenile spring- and winter-run Chinook salmon entrained onto the Yolo Bypass over existing conditions during dry and critical water years.

Run	**Alternatives 1-3** 6,000 cfs	**Alternative 4** 3,000 cfs	**Alternative 4b** Mar 7 end date	**Alternative 5** 3,400 cfs	**Alternative 6** 12,000 cfs
Spring	3,474.6%	3,109.9%	3,051.1%	3,478.2%	6,560.4%
Winter	1,677.1%	1,590.9%	1,570.0%	1,716.4%	3,488.3%

Table 8. Calculated mean annual increase in the proportion of the total population of juvenile spring- and winter-run Chinook salmon entrained onto the Yolo Bypass over existing conditions during wet and above normal water years.

Run	**Alternatives 1-3** 6,000 cfs	**Alternative 4** 3,000 cfs	**Alternative 4b** Mar 7 end date	**Alternative 5** 3,400 cfs	**Alternative 6** 12,000 cfs
Spring	148.8%	97.7%	94.8%	105.8%	267.7%
Winter	121.8%	83.8%	77.2%	87.8%	218.6%

The JEET suggests that Alternative 6, because it would divert the largest volume of water from the Sacramento River (12,000 cfs), would have the potential to entrain the most juveniles. In general, alternatives with higher maximum flow capacities outperform those with lower capacities, provided the invert elevation is sufficiently deep to allow the alternative to operate during a broad range of flows. Whereas Alternative 6 unanimously entrains the most fish across all runs, Alternatives 4 and 4b, the alternatives with the lowest design flow (3,000 cfs), almost always entrain the fewest amounts of fish across all runs. This trend is because one of the primary assumptions of the JEET is that the proportion of the juvenile salmonid population entrained is directly related to the proportion of Sacramento River water diverted onto the Yolo Bypass.

However, though fish are unlikely to be entrained at a 1:1 ratio in relation to flow, given the inputs of flow and fish abundance in this analysis, it is reasonable to assume that the entrainment performance between alternatives would more-or-less still hold true (i.e., the alternatives that divert the largest volume will outperform those that divert smaller volumes). Location-specific effects (e.g., high concentration of fish at outside bends, more uniform distribution in straight channels, etc.) would not be accounted for in this analysis, but will be addressed by Smith et al. (2017).

Though fall-run entrainment is higher than all other runs across all notch alternatives (Table 6), spring- and winter-run Chinook salmon are most likely to experience the greatest benefits from this project in terms of increased entrainment over existing conditions (Figure 7). This predicted outcome is due to the timing of spring- and winter-run emigration past Fremont Weir in comparison to fall-run. The majority of the spring- and winter-run juvenile populations typically arrive in the vicinity of the Fremont Weir earlier in the season than their fall-run counterparts (Figure 10). More than half of the winter-run population and a substantial portion of the spring-run population will have already passed the weir by January 1 on average (Table 10). For comparison, only 5.4% of the fall-run population will have passed the weir by January 1 (Table 10). This is significant because the Sacramento River is much more likely to overtop the Fremont Weir after January 1, and fish that arrive prior to this wet period (i.e. large portions of the winter- and spring-run populations) are less likely to be entrained onto the floodplain under existing conditions than fish that arrive later (i.e., fall-run). This highlights the importance of alternatives having sufficiently deep invert elevations to successful entrain the relatively high numbers of target species that migrate early in the season when the Sacramento River stage is low.

On average, 98.0% of winter-run juveniles and 80.8% of spring-run juveniles will have passed the Fremont Weir by the proposed March 15 operational end date compared to 78.8% of fall-run and only 68.3% of late fall-run (Table 10). While most winter-run salmon migrate past the Fremont Weir prior to the proposed March 15 operational end date, spring-run Chinook salmon may experience further benefits by extending the operational end date to late March or early April as conditions permit (Table 10). Late fall-run Chinook salmon typically emigrate as yearlings, meaning they rear in the upstream reaches longer and emigrate at a larger size than other runs. It is unknown how the larger late fall-run fish would benefit from floodplain rearing in comparison to the smaller, more numerous fall-run juveniles given that smolts may be more motivated to continue migrating toward saline environments than to rearing. Therefore, it is possible that late fall-run fish may actually benefit from lower entrainment rates than fall- winter- and spring-run Chinook salmon by being able to stay in the Sacramento River and continue emigrating.

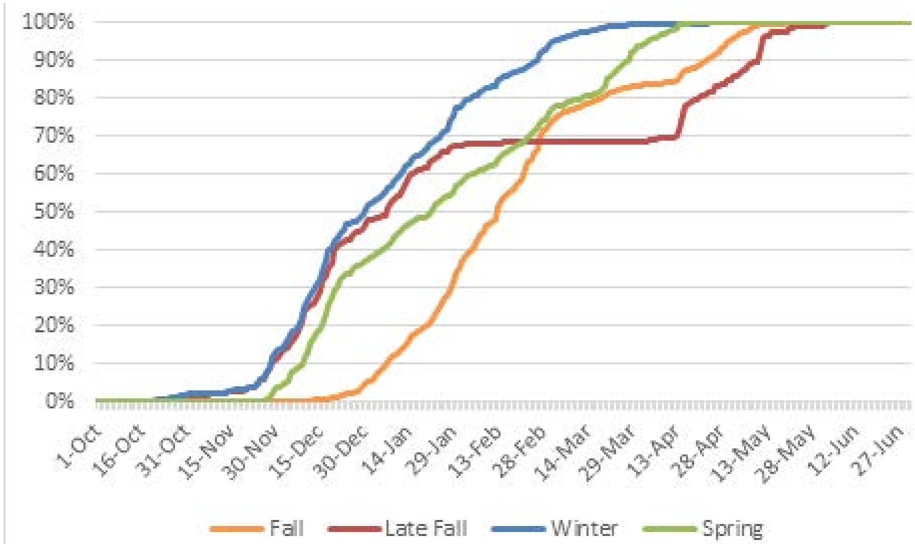

Figure 10. Knights Landing rotary screw trap average annual cumulative catch of juvenile Chinook salmon by run, water years 1997-2011.

Table 9. Summary table of averaged Knights Landing rotary screw trap catch of juvenile Chinook salmon by run, water years 1997-2011. March 7 denotes the operational end date for Alternative 4b. All other alternatives have an operational end date of March 15.

Date	Fall	Late Fall	Winter	Spring
Nov 1	0.0%	1.3%	1.9%	0.0%
Dec 1	0.0%	11.4%	13.5%	3.9%
Jan 1	5.4%	48.1%	52.0%	37.8%
Feb 1	36.8%	67.6%	78.2%	57.8%
Mar 1	73.2%	68.3%	94.4%	76.6%
Mar 7	76.6%	68.3%	96.3%	78.8%
Mar 15	78.8%	68.3%	98.0%	80.8%
Mar 31	83.3%	68.3%	99.4%	93.7%
Apr 30	94.6%	84.7%	99.9%	100.0%

The relative juvenile population size of each run may play an additional role in determining the expected benefit provided to each species as a result of implementing a notch alternative. Winter- and spring-run Chinook salmon entrained onto the Yolo Bypass are likely to experience increased survival by increasing their physical body size as a result of floodplain rearing (Ward et al. 1989, McGurk 1996, Satterthwaite et al. 2014). Though fall-run would also experience this size-related survival increase, they have the additional advantage of being able to overcome significant predation losses by overwhelming predators with their sheer numbers, a luxury not available to the more imperiled winter- and spring-run populations.

The JEET represents a method of comparing the entrainment potential of project alternatives against entrainment potential under existing conditions based on fish abundance and flow, and is not intended to serve as a predictive model. Though many of the assumptions taken in the development of this tool may limit the accuracy of predicted entrainment, they do not necessarily diminish the ability of this tool to provide a meaningful, quantitative comparison of alternatives with a high degree of precision. This tool examines a wide range of flows and fish presence, which provides insight as to how variances in timing and magnitude of operation could affect entrainment across a broad spectrum of conditions.

There are multiple design modifications that could be implemented to guide or divert greater quantities of fish from the river into the Yolo Bypass (e.g., channel geometry modifications, guidance booms, etc.). Location-specific variables notwithstanding (i.e. varying salmonid concentrations at bends vs. in straight sections), most of these modifications could be applied to any one of the alternatives and would therefore not substantially affect the relative comparison of the alternatives analyzed.

It is also important to note that this tool is not intended to address other potential benefits of the different alternatives. For example, some alternatives will increase the frequency and duration of flooding, generating increased habitat benefits for fish. Similarly, the tool does not address other issues, including increased food web subsidies to downstream areas or adult fish passage efficiency. Hence, the current analysis should be considered alongside a full suite of other engineering, fisheries, and food web evaluations.

Finally, the relative differences between alternatives offer some assurance that substantial improvements to entrainment can be made while adjusting the design to meet other objectives, such as adult fish passage. Alternatives will continue to be refined to optimize their ability to pass adult fish without diminishing their capacity to entrain juvenile salmonids or to provide access to rearing habitat (California Department of Water Resources 2017c). As the level of project design advances beyond the conceptual level, further consideration will be given to performance metrics beyond juvenile entrainment and adult fish passage evaluation.

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Supplemental analysis of fry-sized juvenile Chinook salmon entrainment calculations.

Introduction

The Juvenile Entrainment Evaluation Tool (JEET) calculates the entrainment of juvenile Chinook salmon (*Oncorhynchus tshawytscha*) through a suite of proposed Fremont Weir notch alternatives. This version of the JEET calculates the potential entrainment of only fry-sized Chinook salmon (*Oncorhynchus tshawytscha*).

Rationale for Multiple Fry-Sized Fork Length Designations

In order to modify the JEET spreadsheet to evaluate the entrainment of only fry-sized salmon, the team had to select a size range that accurately represented this life stage. Chinook salmon life stages are defined by changes in behavioral traits, physiology, and morphology, and there are no formal length-associated delineations between stages used by State or federal resource agencies. A literature review yielded maximum fork lengths ranging from 45-72 mm for the fry life stage for Chinook salmon in California. The California Salmonid Stream Habitat Restoration Manual (California Department of Fish and Wildlife 2010) and the Anadromous Salmonid Passage Facility Design manual (National Marine Fisheries Service 2008) each use 60 mm as the maximal fork length for fry-sized Chinook salmon. These length designations are intended to categorize swimming performance for fish passage applications.

This analysis calculates entrainment for 3 different size classes of juvenile salmon:

- ≤60 mm
- ≤70 mm
- ≤80 mm

Winter-run fry ≤60 mm make up less than 14% of the catch (Table 1). Those that were observed in the 1997-2011 period of record usually occurred from October to mid-November when the Sacramento River is typically at or near its lowest stage of the year (Figure 1).

Table 1. Size distribution of measured juvenile Chinook salmon captured in the California Department of Fish and Wildlife's Knights Landing rotary screw traps, water years 1997-2011.

Fork Length (mm)	Fall-Run		Late Fall-Run		Winter-Run		Spring-Run	
	Count	%	Count	%	Count	%	Count	%
0-50	177,463	73.36	881	32.44	191	1.86	5,693	62.81
0-60	188,743	78.02	883	32.51	1,420	13.85	6,385	70.44
0-70	199,888	82.63	889	32.73	4,098	39.98	7,362	81.22
0-80	227,619	94.09	897	33.03	6,417	62.60	8,456	93.29
0-90	241,192	99.70	922	33.95	7,975	77.80	8,976	99.03
0-100	241,868	99.98	1,008	37.11	9,037	88.16	9,058	99.93
>100	45	0.02	1,708	62.89	1,214	11.84	6	0.07
Total	**241,913**		**2,716**		**10,251**		**9,064**	

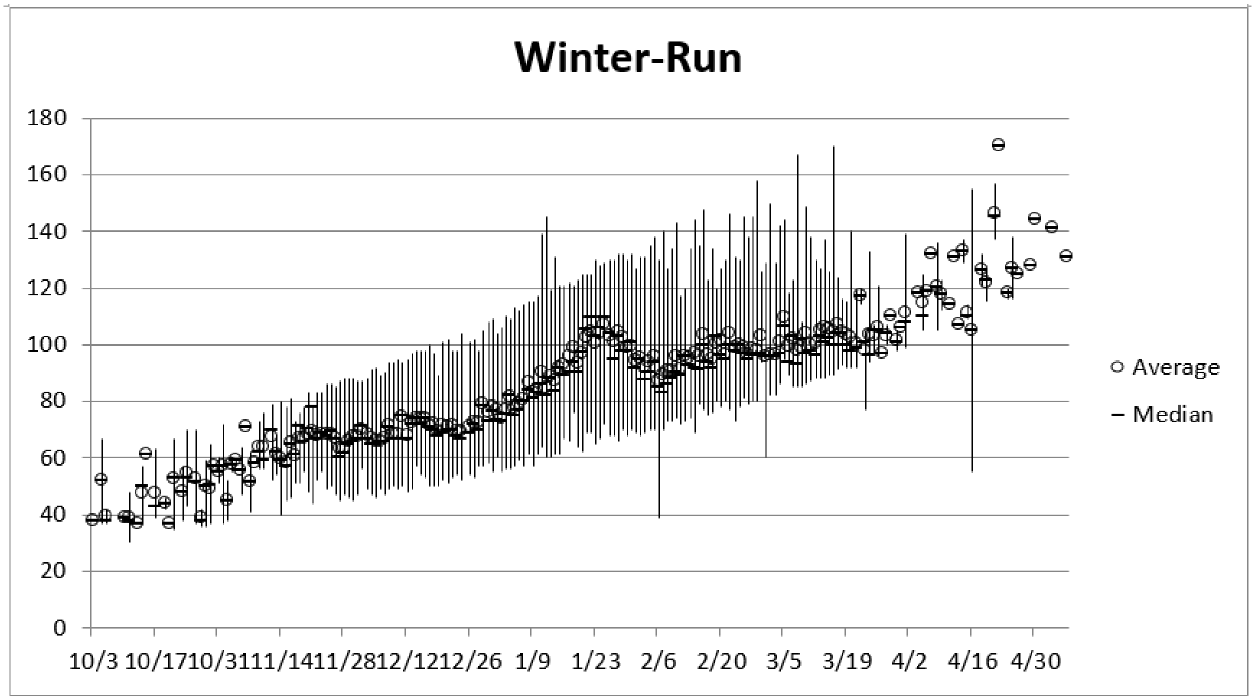

Figure 1. Fork length distribution, in millimeters, of juvenile winter-run Chinook salmon captured in the Knights Landing rotary screw traps by date during water years 1997-2011.

We examined entrainment values for maximum fork lengths of 70, and 80 mm to include slightly larger fish that might be identified as fry or behave similarly to fry.

Methodology

During the JEET development, the California Department of Fish and Wildlife's Juvenile Salmonid Emigration Monitoring Program provided two forms of juvenile Chinook salmon catch data for the period of record: 1) Excel spreadsheets containing quality checked juvenile salmonid daily fork length and run assignment data for all measured fish from the Knights Landing rotary screw traps; and 2) a summary report of daily catch and CPUE calculations for each run (Roberts et al. 2013). The summary reports also included plus-counted fish (fish that were assigned a run but not measured), however there is no way to know the fork lengths for these fish and therefore plus-counted fish were not included in this analysis. All fish included in this analysis were measured (fork length) and assigned a run using the length-at-date criteria described by Del Rosario et al. (2013, Appendix A).

In an effort to calculate entrainment for a specific size class of fish, the JEET had to be modified to include fork length data. Initially, the daily average fork length was used as the input to the JEET. However, using a daily average would not have accurately captured variance in observed daily fork length and would have potentially overestimated or underestimated the number of fry-sized fish.

The next step was to calculate catch per unit effort (CPUE) for each of the size classes. To do this, the JEET has been modified to remove all fish larger than the specified size class. For more details on the methodology refer to Appendix F1 Evaluating Juvenile Chinook salmon Entrainment Potential for Multiple Modified Fremont Weir Configurations.

Additional Assumptions and Limitations

- All assumptions and limitations listed in the previous entrainment analysis technical memorandum apply to this fry entrainment analysis.
- Unlike the original entrainment analysis that included all fish observed in the CDFW Knights Landing rotary screw trap, including "plus-counted" fish that were counted but not measured, this analysis is limited to only include fish that had reliable fork length measurements. Plus counted fish were not included in the analysis.
- This analysis assumes that the CDFW fork length measurements and corresponding run assignments are accurate.
  - The CDFW post-processing effort re-classified several spring-run fish as fall-run to correspond with known hatchery releases.
  - There were minor discrepancies between the daily catch datasheets provided by CDFW and the summary sheets reported in Roberts et al. 2013. In the event of a discrepancy in reporting, the data from the daily catch datasheets was used.

Results

Entrainment results for each run will be reported in three separate sections for the following size classes of juvenile Chinook salmon: ≤60, ≤70, and ≤80 mm. As in the previous entrainment technical memorandum, the combined average annual calculated proportion of the juvenile Chinook salmon population entrained (by run) over the 15-year period of record for each notch alternative and existing conditions will continue to be a metric by which the alternatives are compared.

Finer-scale entrainment figures for late fall-run were omitted from this report. Entrainment of fry-sized late fall-run fish was limited to only one day in water year 2011, and not enough fry-sized late fall-run fish were observed to yield high confidence results (two individuals ≤60 mm, one in the 60-70 mm, and one in the 70-80 mm range).

60 mm Fork Length

Table 2. Calculated average annual proportion of the juvenile Chinook salmon population ≤60 mm entrained onto the Yolo Bypass under proposed alternatives and existing conditions (by run).

Run	Existing Conditions	Alt 1 (East 6,000 cfs)	Alt 2 (Central 6,000 cfs)	Alt 3 (West 6,000 cfs)	Alt 4 (West 3,000 cfs)	Alt 4b (Mar 7 end date)	Alt 5 (Central 3,400 cfs)	Alt 6 (West 12,000 cfs)

Fall	11.0%	18.1%	18.1%	18.1%	16.1%	15.4%	16.4%	23.5%
Late Fall	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.6%
Winter	5.0%	8.8%	8.8%	8.8%	8.2%	8.2%	8.3%	12.1%
Spring	3.8%	12.0%	12.0%	12.0%	9.8%	9.8%	10.4%	18.5%

The following figures containing boxplots illustrate how the annual average entrainment values in Table 2 are distributed via boxplots by salmon run. Similar figures are used in the 70mm and 80mm results section. Figure 2 shows how to interpret these box plots, while Helsel and Hirsch (2002) provides a full description on the interpretation and creation of boxplots. Essentially, the diamond shape in each boxplot represents the average annual proportion of a Chinook salmon population entrained onto the Yolo Bypass across water years, as displayed in Table 2.

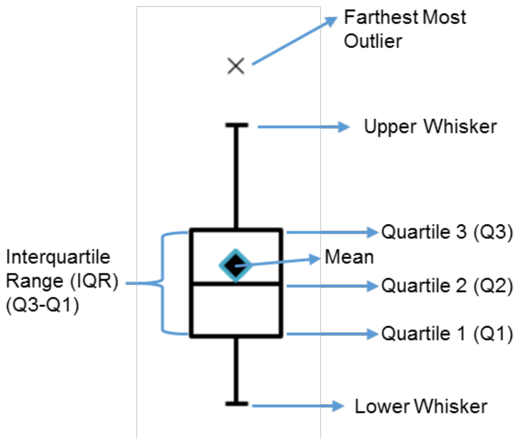

Figure 2. Elements of a boxplot used in this technical memorandum. For the following figures, boxplots are plotted against the proposed alternative on the x-axis and entrainment on the y-axis.

The top and bottom of the box in Figure 2 represents the first and third quartiles (Q1, Q3). Q1 denotes that about 25% of the entrainment calculations are below this value and 75% of the entrainment calculations are above this value. In comparison, Q3 denotes that about 75% of the entrainment calculations are below this value, and 25% of the values are above this value. In the following figures, Q1 may fall on zero (the x-axis), so it appears truncated in the graphics.

The second quartile or the median is represented by the line within the box, while the box itself represents the interquartile range (IQR), which is the difference between the first and third quartile. The IQR represents the middle 50% of the distribution and is used to determine outliers.

The upper and lower whiskers represent the upper or lower 25% of the distribution with the exclusion of outliers. The endpoints of the whiskers represent the minimum (lower whisker) or maximum (upper whisker) annual average entrainment with the exclusion of outliers.

Outliers were determined if the entrainment fell below Q1−1.5 IQR or above Q3+1.5 IQR. For simplicity, this technical memorandum only displays the farthest most outlier in the dataset, which is represented with an "X." Even so, there were typically no more than two outliers above the upper whisker. There were no outliers below the lower whisker.

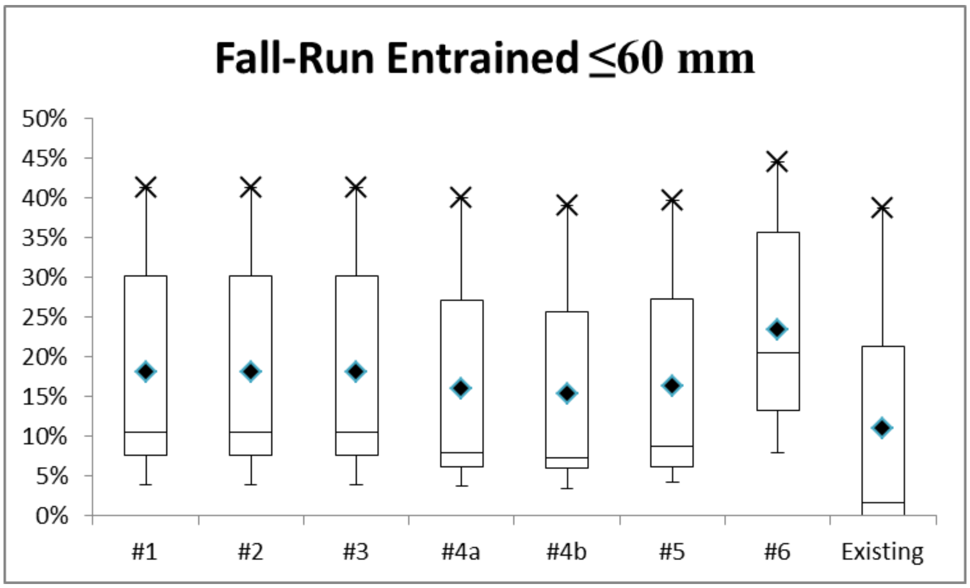

Figure 3. Boxplots of the calculated average annual proportion of the fall-run Chinook salmon population ≤60 mm entrained onto the Yolo Bypass under proposed alternatives and existing conditions, water years 1997-2011. Diamond shapes represent the mean, top and bottom of the box represent the first and third quartiles, line inside the box represents the median, and whiskers represent the minimum/maximum.

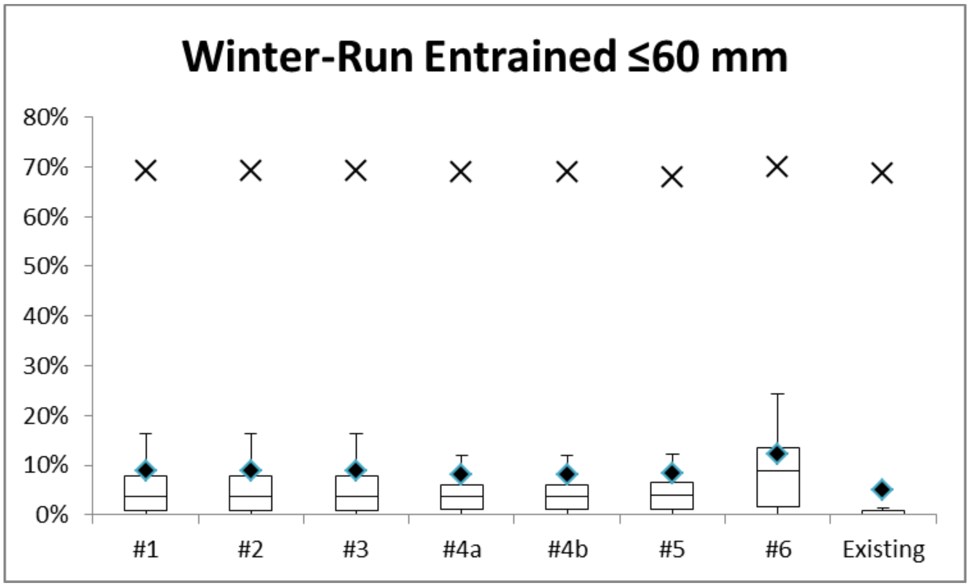

Figure 4. Boxplots of the calculated average annual proportion of the winter-run Chinook salmon population ≤60 mm entrained onto the Yolo Bypass under proposed alternatives and existing conditions, water years 1997-2011. Diamond shapes represent the mean, top and bottom of the box represent the first and third quartiles, line inside the box represents the median, and whiskers represent the minimum/maximum.

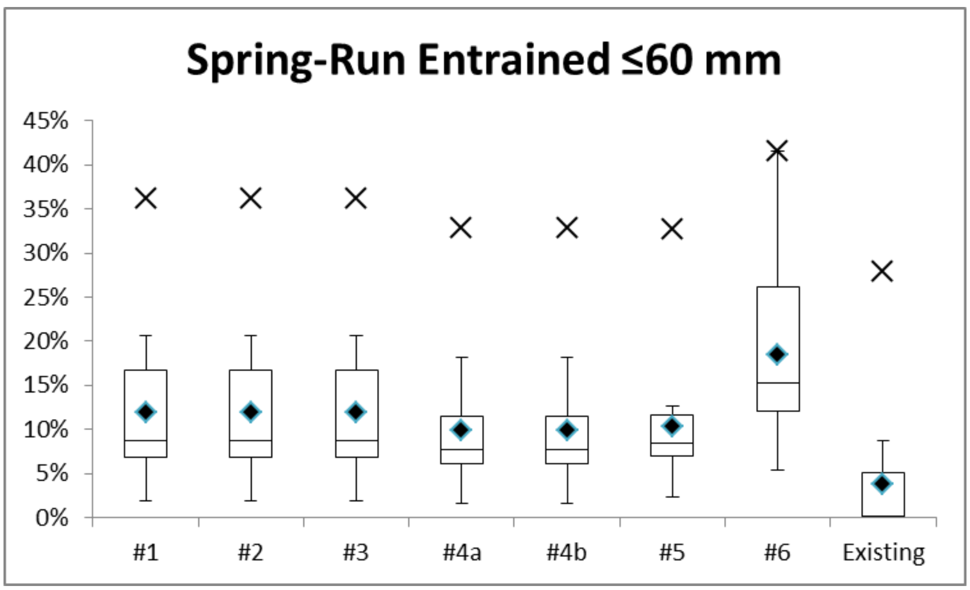

Figure 5. Boxplots of the calculated average annual proportion of the spring-run Chinook salmon population ≤60 mm entrained onto the Yolo Bypass under proposed alternatives and existing conditions, water years 1997-2011. Diamond shapes represent the mean, top and bottom of the box represent the first and third quartiles, line inside the box represents the median, and whiskers represent the minimum/maximum.

Comparing the entrainment potential between existing conditions and each alternative provides the average annual increase in the proportion of the population of juvenile Chinook salmon ≤60 mm that become entrained onto the Yolo Bypass (Figure 6).

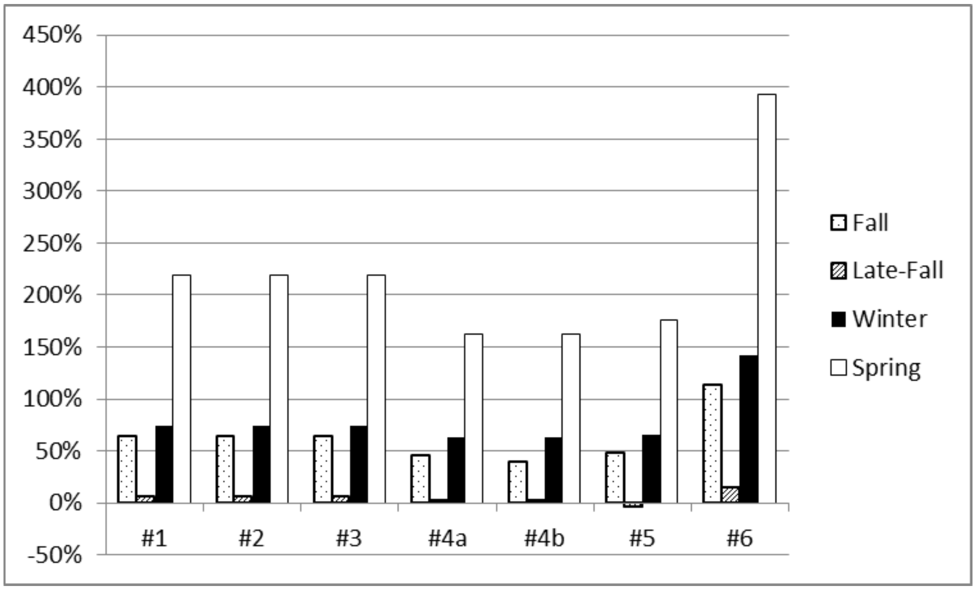

Figure 6. Relative comparison of the calculated mean annual increase in the proportion of the total population of juvenile Chinook salmon ≤60 mm entrained onto the Yolo Bypass over existing conditions (by run), water years 1997-2011.

Estimated entrainment was further broken down by water year type as defined in Figure 7 and Figure 8 illustrate the calculated mean annual entrainment of juvenile spring-run and winter-run Chinook salmon (respectively) under wet and dry years as defined by the Sacramento Valley Water Year Hydrologic Classification (California Data Exchange Center, 2017). Wet years include years categorized as wet or above normal, and dry years include years categorized as dry or critical.

Table 3. Sacramento Valley Water Year Hydrologic Classification (CDEC), where W = Wet, AN = Above Normal, BN = Below Normal, D = Dry, and C = Critical.

Water Year	Water Year Classification
1997	W
1998	W
1999	AN
2000	AN
2001	D
2002	D
2003	BN
2004	D
2005	W
2006	W
2007	C
2008	C
2009	BN
2010	AN
2011	W

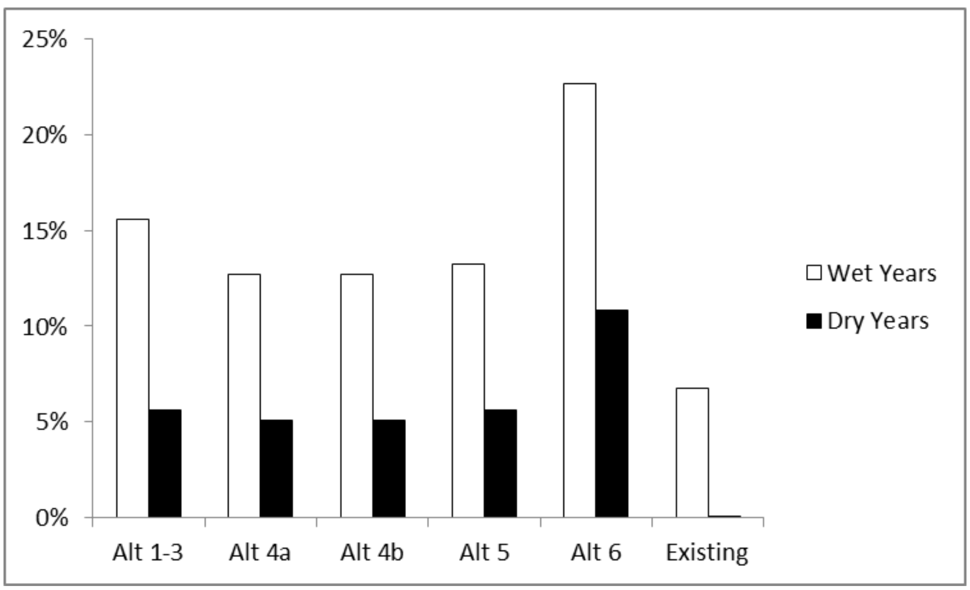

Figure 7. Calculated mean entrainment of juvenile spring-run Chinook salmon ≤60 mm onto the Yolo Bypass under proposed alternatives and existing conditions, by water year type. "Wet Years" include years categorized as wet or above normal. "Dry Years" include years categorized as dry or critical.

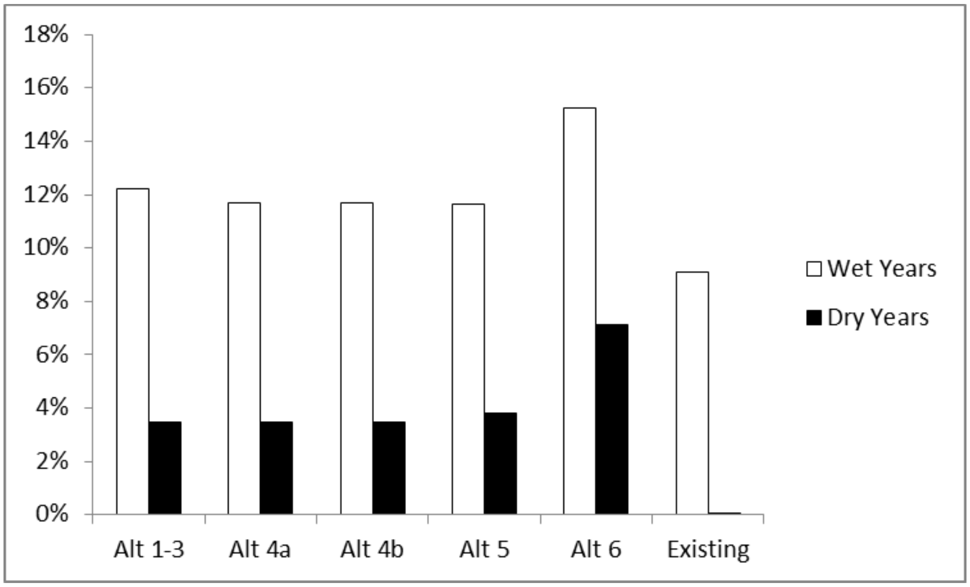

Figure 8. Calculated mean entrainment of juvenile winter-run Chinook salmon ≤60 mm onto the Yolo Bypass under proposed alternatives and existing conditions, by water year type. "Wet Years" include years categorized as wet or above normal. "Dry Years" include years categorized as dry or critical.

70 mm Fork Length

Table 4. Calculated average annual proportion of the juvenile Chinook salmon population ≤70 mm entrained onto the Yolo Bypass under proposed alternatives and existing conditions (by run).

Run	Existing Conditions	Alt 1 (East 6,000 cfs)	Alt 2 (Central 6,000 cfs)	Alt 3 (West 6,000 cfs)	Alt 4 (West 3,000 cfs)	Alt 4b (Mar 7 end date)	Alt 5 (Central 3,400 cfs)	Alt 6 (West 12,000 cfs)
Fall	10.4%	17.2%	17.2%	17.2%	15.2%	14.5%	15.5%	22.4%
Late Fall	1.1%	1.2%	1.2%	1.2%	1.1%	1.1%	1.1%	1.3%
Winter	1.4%	6.7%	6.7%	6.7%	5.5%	5.5%	5.8%	11.1%
Spring	4.1%	12.2%	12.2%	12.2%	10.2%	10.1%	10.8%	18.6%

The following boxplots can be interpreted as displayed in Figure 2 and in the accompanying summary text in the 60 mm Fork Length results.

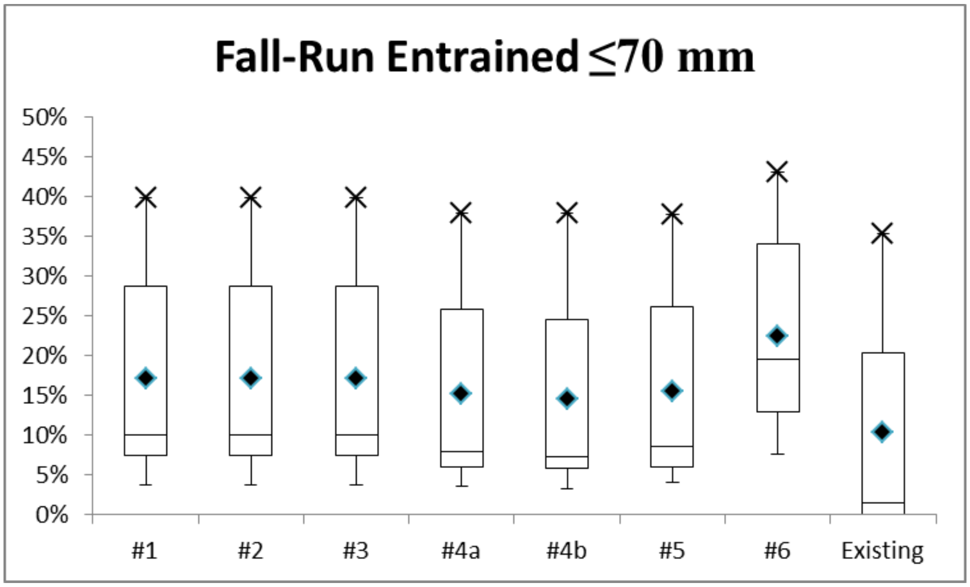

Figure 9. Boxplots of the calculated average annual proportion of the fall-run Chinook salmon population ≤70 mm entrained onto the Yolo Bypass under proposed alternatives and existing conditions, water years 1997-2011. Diamond shapes represent the mean, top and bottom of the box represent the first and third quartiles, line inside the box represents the median, and whiskers represent the minimum/maximum.

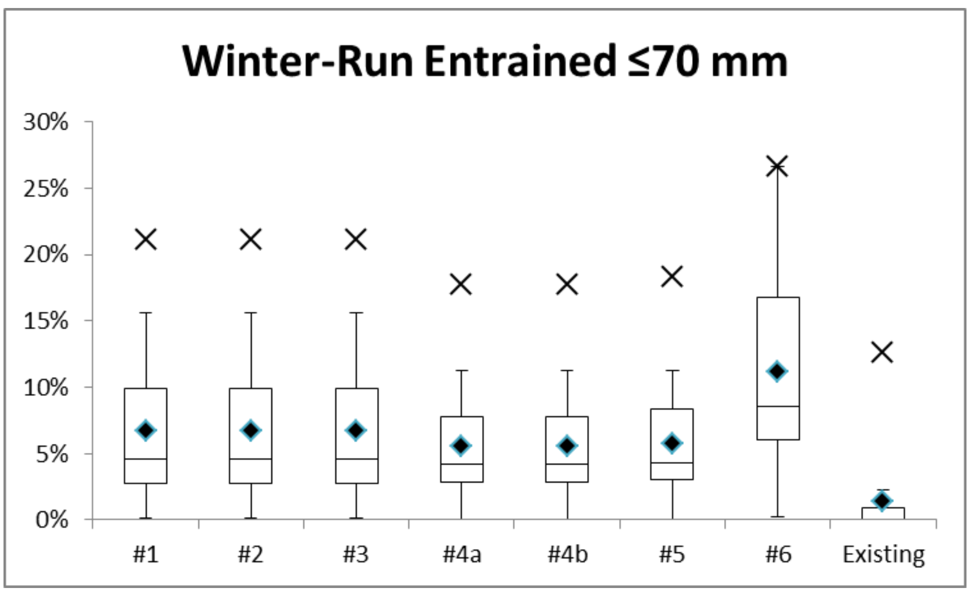

Figure 10. Boxplots of the calculated average annual proportion of the winter-run Chinook salmon population ≤70 mm entrained onto the Yolo Bypass under proposed alternatives and existing conditions, water years 1997-2011. Diamond shapes represent the mean, top and bottom of the box represent the first and third quartiles, line inside the box represents the median, and whiskers represent the minimum/maximum.

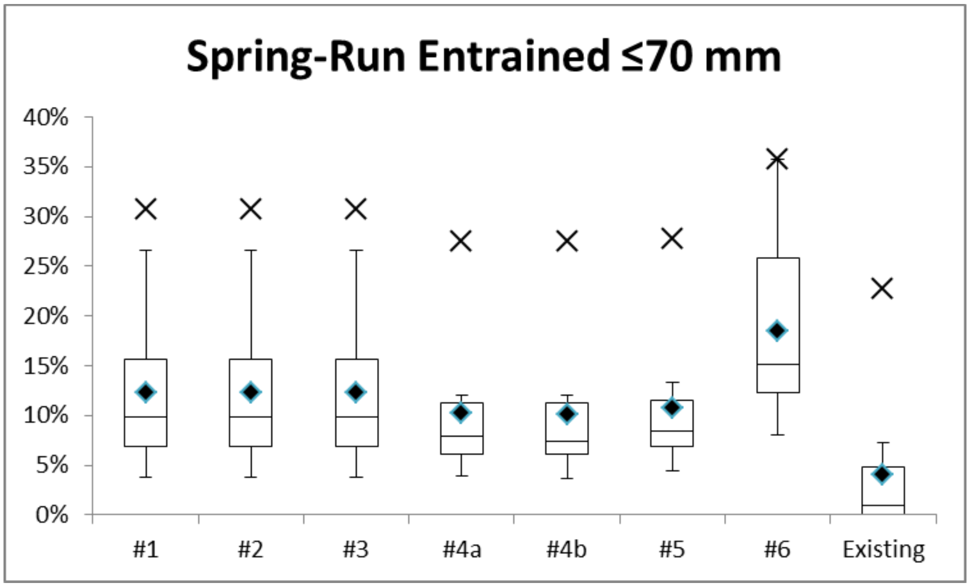

Figure 11. Boxplots of the calculated average annual proportion of the spring-run Chinook salmon population ≤70 mm entrained onto the Yolo Bypass under proposed alternatives and existing conditions, water years 1997-2011. Diamond shapes represent the mean, top and bottom of the box represent the first and third quartiles, line inside the box represents the median, and whiskers represent the minimum/maximum.

Comparing the entrainment potential between existing conditions and each alternative provides the average annual increase in the proportion of the population of juvenile Chinook salmon ≤70 mm that become entrained onto the Yolo Bypass (Figure 12).

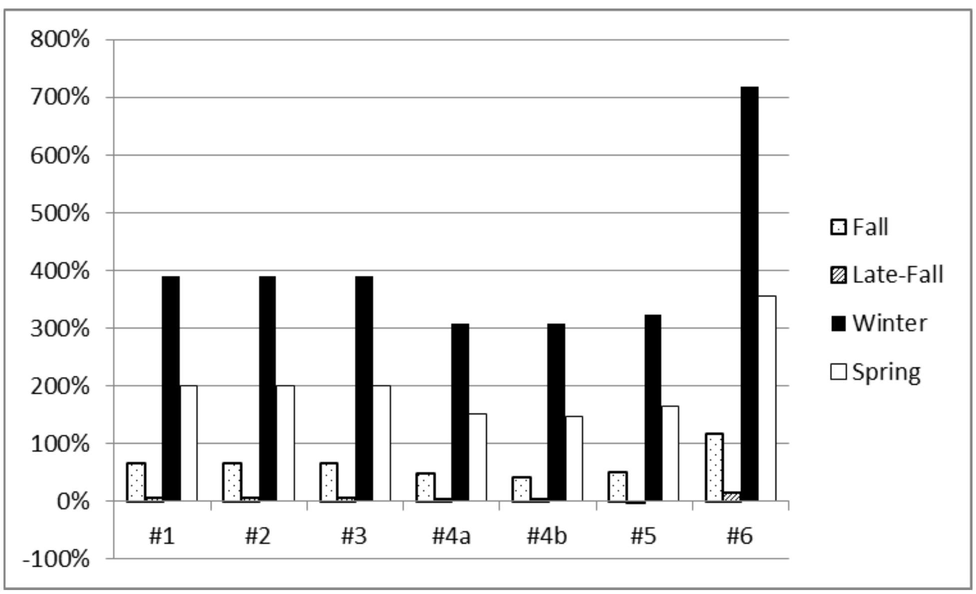

Figure 12. Relative comparison of the calculated mean annual increase in the proportion of the total population of juvenile Chinook salmon ≤70 mm entrained onto the Yolo Bypass over existing conditions (by run), water years 1997-2011.

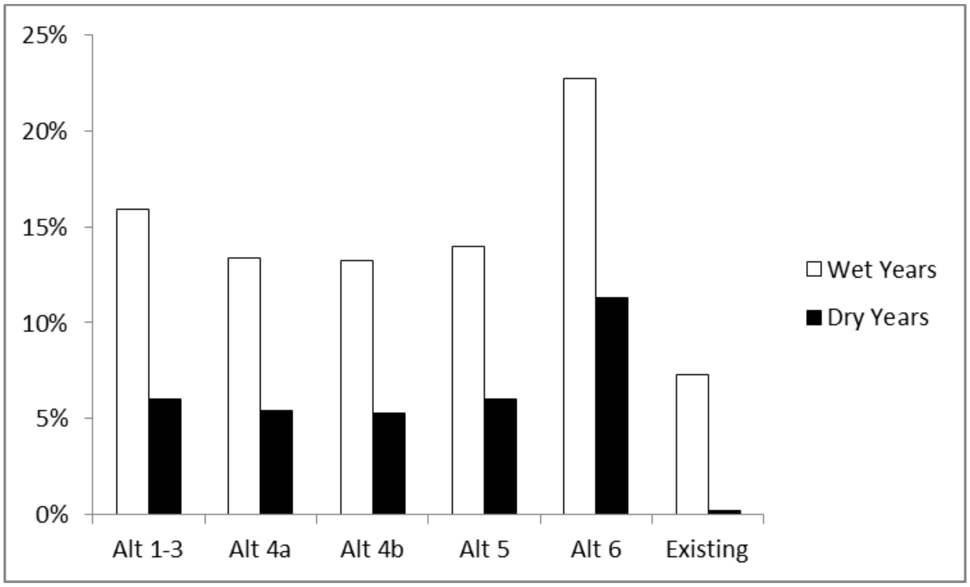

Figure 13. Calculated mean entrainment of juvenile spring-run Chinook salmon ≤70 mm onto the Yolo Bypass under proposed alternatives and existing conditions, by water year type. "Wet Years" include years categorized as wet or above normal. "Dry Years" include years categorized as dry or critical.

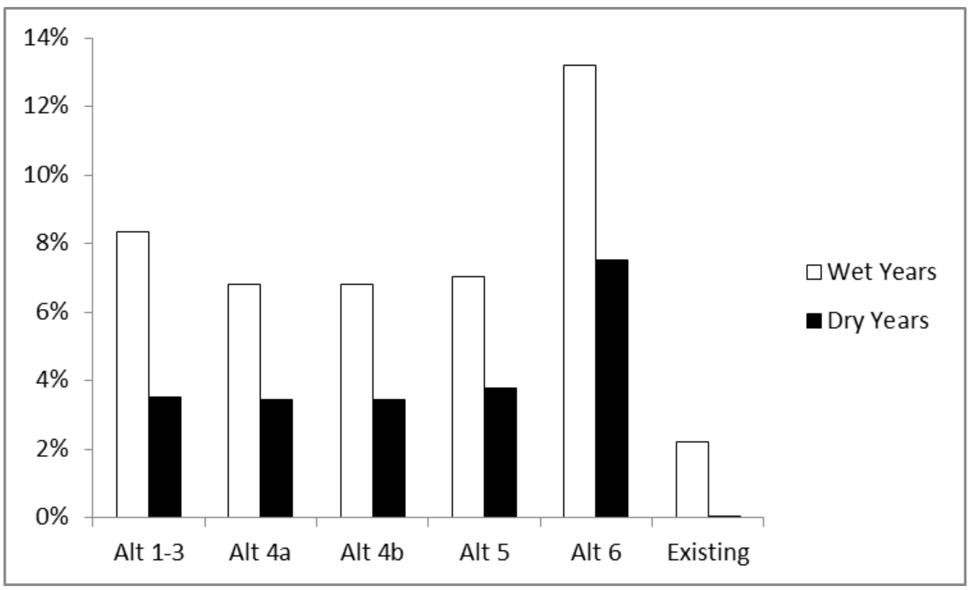

Figure 14. Calculated mean entrainment of juvenile winter-run Chinook salmon ≤70 mm onto the Yolo Bypass under proposed alternatives and existing conditions, by water year type. "Wet Years" include years categorized as wet or above normal. "Dry Years" include years categorized as dry or critical.

80 mm Fork Length

Table 5. Calculated average annual proportion of the juvenile Chinook salmon population ≤80 mm entrained onto the Yolo Bypass under proposed alternatives and existing conditions (by run).

Run	Existing Conditions	Alt 1 (East 6,000 cfs)	Alt 2 (Central 6,000 cfs)	Alt 3 (West 6,000 cfs)	Alt 4 (West 3,000 cfs)	Alt 4b (Mar 7 end date)	Alt 5 (Central 3,400 cfs)	Alt 6 (West 12,000 cfs)
Fall	9.2%	15.3%	15.3%	15.3%	13.6%	12.9%	13.8%	19.9%
Late Fall	1.0%	1.1%	1.1%	1.1%	1.1%	1.1%	1.0%	1.2%
Winter	1.2%	7.1%	7.1%	7.1%	5.9%	5.9%	6.2%	12.0%
Spring	3.6%	10.6%	10.6%	10.6%	8.9%	8.7%	9.4%	16.1%

The following boxplots can be interpreted as displayed in Figure 2 and in the accompanying summary text in the 60 mm Fork Length results.

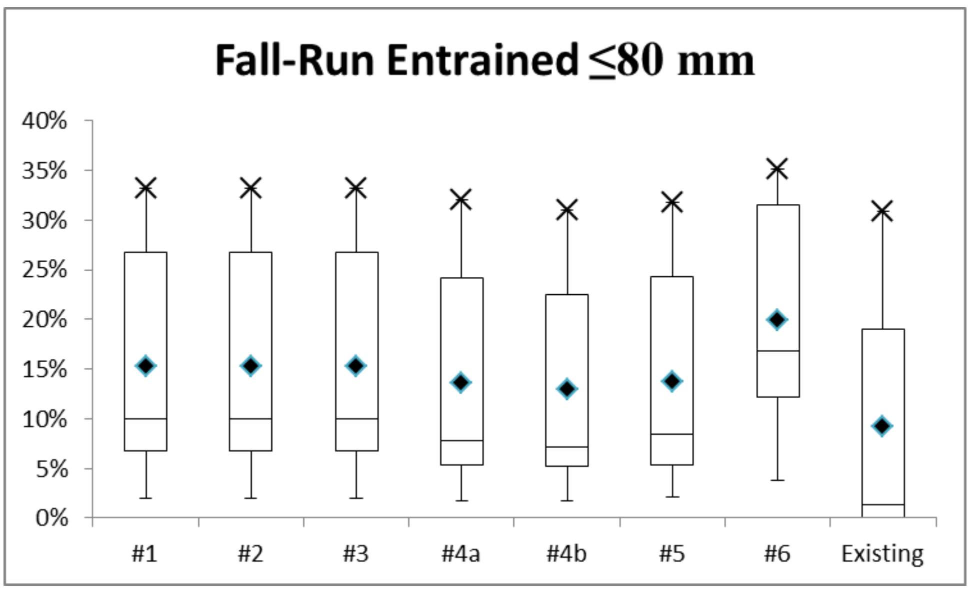

Figure 15. Boxplots of the calculated average annual proportion of the fall-run Chinook salmon population ≤80 mm entrained onto the Yolo Bypass under proposed alternatives and existing conditions, water years 1997-2011. Diamond shapes represent the mean, top and bottom of the box represent the first and third quartiles, line inside the box represents the median, and whiskers represent the minimum/maximum.

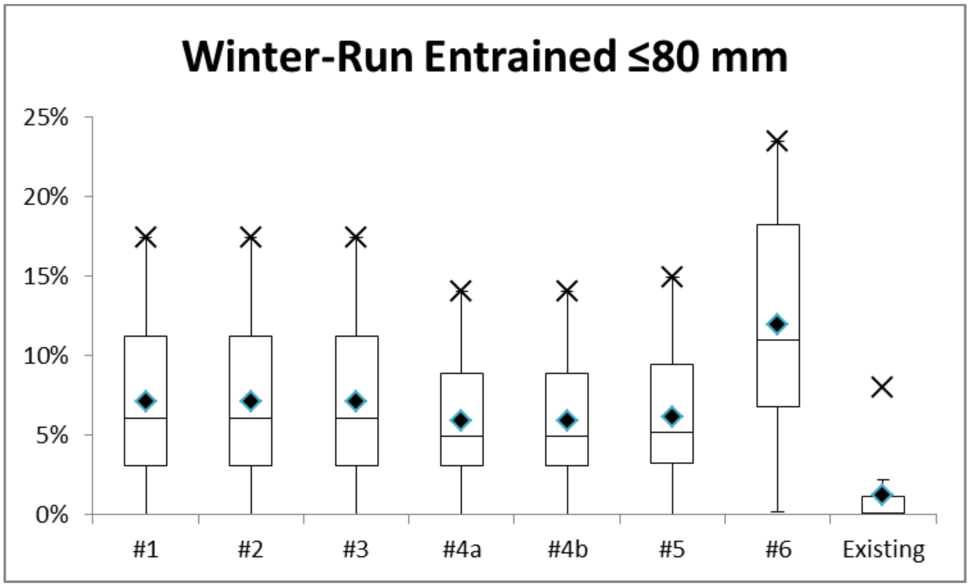

Figure 16. Boxplots of the calculated average annual proportion of the winter-run Chinook salmon population ≤80 mm entrained onto the Yolo Bypass under proposed alternatives and existing conditions, water years 1997-2011. Diamond shapes represent the mean, top and bottom of the box represent the first and third quartiles, line inside the box represents the median, and whiskers represent the minimum/maximum.

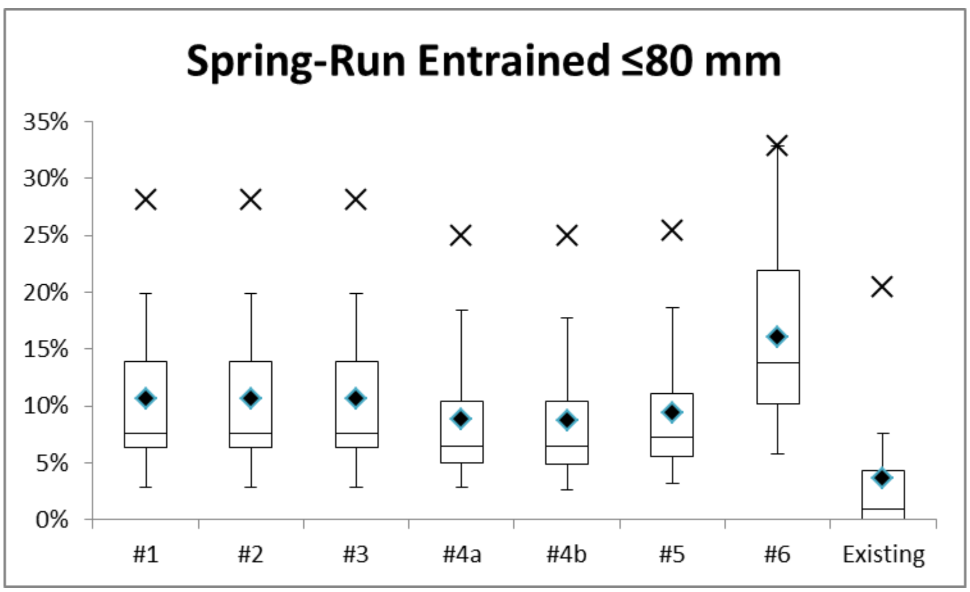

Figure 17. Boxplots of the calculated average annual proportion of the spring-run Chinook salmon population ≤80 mm entrained onto the Yolo Bypass under proposed alternatives and existing conditions, water years 1997-2011. Diamond shapes represent the mean, top and bottom of the box represent the first and third quartiles, line inside the box represents the median, and whiskers represent the minimum/maximum.

Comparing the entrainment potential between existing conditions and each alternative provides the average annual increase in the proportion of the population of juvenile Chinook salmon ≤80 mm that become entrained onto the Yolo Bypass (Figure 18).

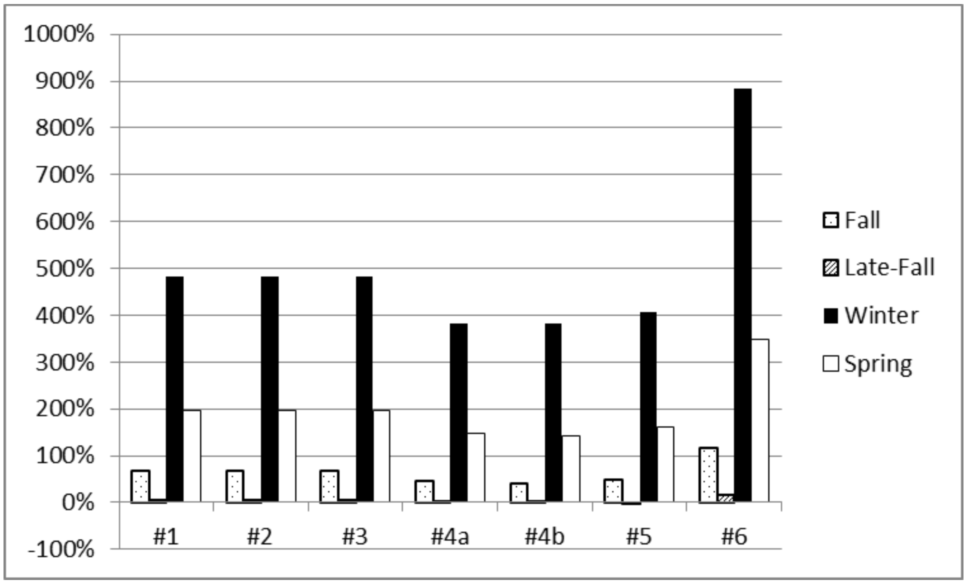

Figure 18. Relative comparison of the calculated mean annual increase in the proportion of the total population of juvenile Chinook salmon ≤80 mm entrained onto the Yolo Bypass over existing conditions (by run), water years 1997-2011.

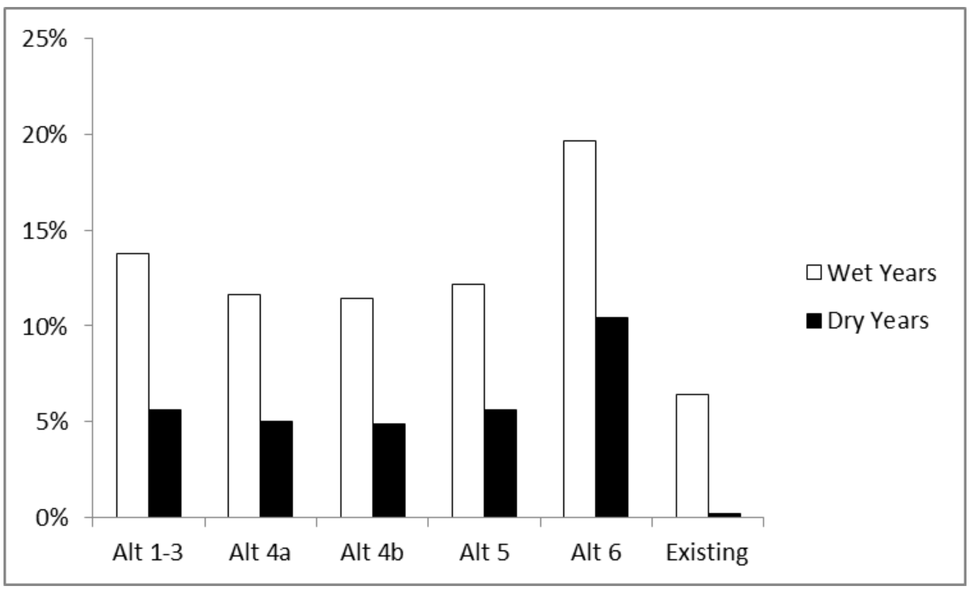

Figure 19. Calculated mean entrainment of juvenile spring-run Chinook salmon ≤80 mm onto the Yolo Bypass under proposed alternatives and existing conditions, by water year type. "Wet Years" include years categorized as wet or above normal. "Dry Years" include years categorized as dry or critical.

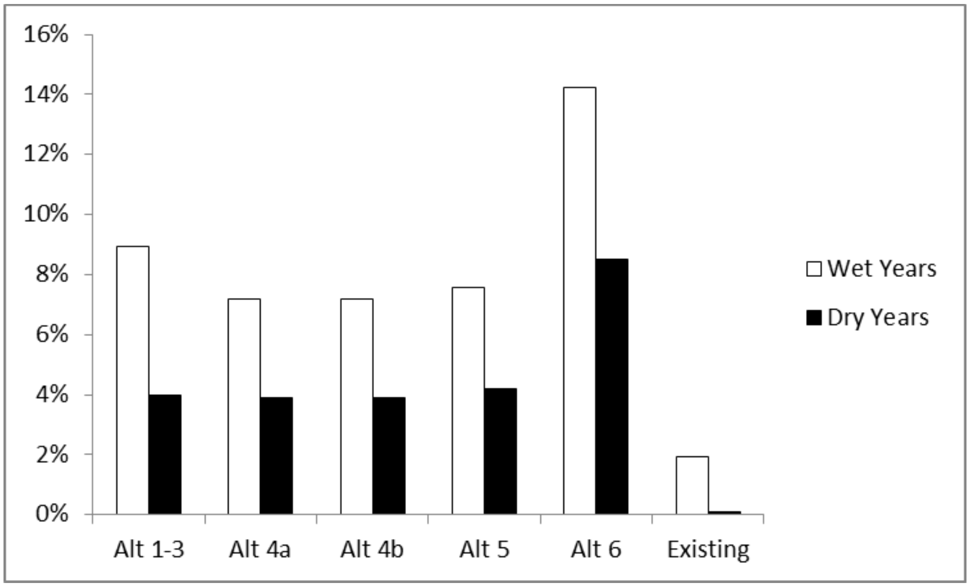

Figure 20. Calculated mean entrainment of juvenile winter-run Chinook salmon ≤80 mm onto the Yolo Bypass under proposed alternatives and existing conditions, by water year type. "Wet Years" include years categorized as wet or above normal. "Dry Years" include years categorized as dry or critical.

Discussion

The results of this fry-sized entrainment analysis indicate that notching the Fremont Weir would lead to an increase in the proportion of emigrating juvenile Chinook salmon fry that are entrained onto the Yolo Bypass for every run except for the late fall-run. This is not surprising, as many late fall-run juveniles rear for several months upriver after emergence before emigrating downstream. Most of the late fall-run Chinook salmon that are in the vicinity of the Fremont Weir during the proposed operational window are typically these larger fish that exceed our 60-80 mm fry-size classification due to having reared over the summer in upstream reaches (Figure 21). The smaller, newly emerged fry that elect to migrate immediately do not tend to arrive until after the operational end date proposed for this project. As a result, very few fry-sized juvenile late fall-run Chinook salmon are predicted to be entrained, with calculated entrainment only being predicted for a single date in water year 2011.

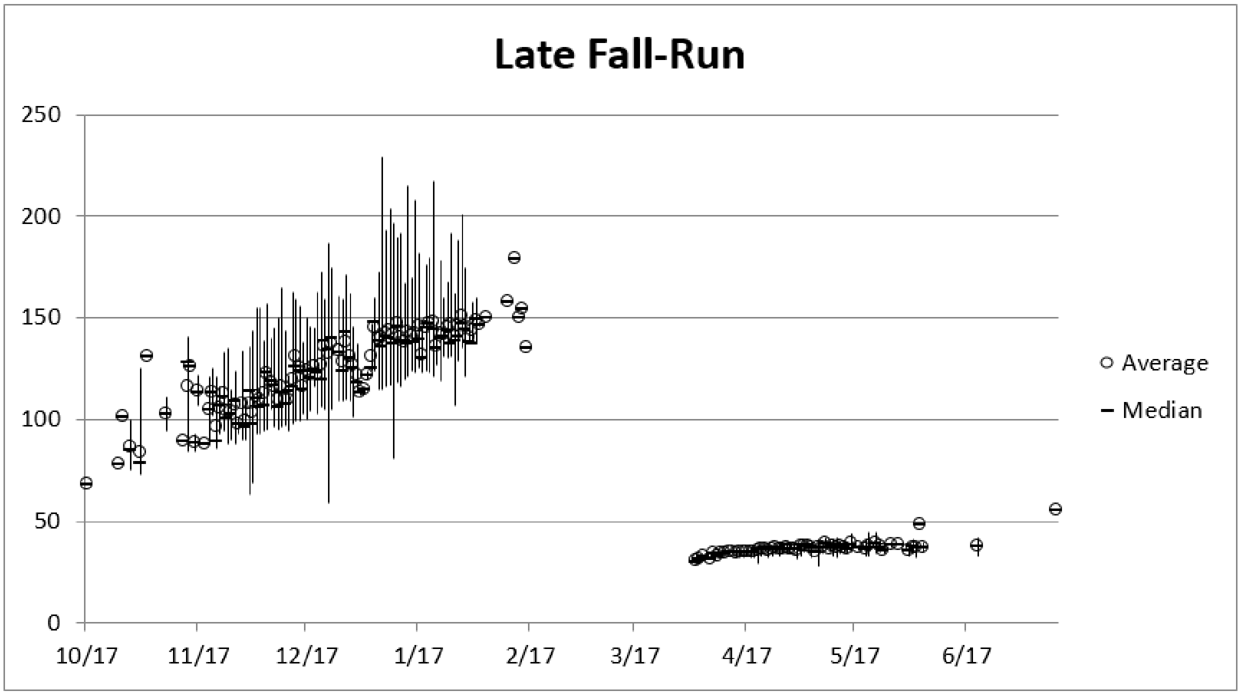

Figure 21. Fork length distribution, in millimeters, of juvenile late fall-run Chinook salmon captured in the Knights Landing rotary screw traps by date during water years 1997-2011.

The results of this analysis indicate that the entrainment of fry-sized fish would increase for all other runs with the construction and operation of any of the six potential notch alternatives when compared to existing conditions.

Alternative 6 is the alternative with the highest calculated entrainment and the greatest increase in entrainment over existing conditions. However, the separation between Alternative 6 and the next best performer is more truncated than in the previous analysis which incorporated all size classes. This truncation particularly evident for the entrainment of winter-run fish ≤60 mm where the alternatives that divert smaller volumes of water, Alternatives 4a/b and 5 (3,000 and 3,500 max cfs, respectively), have entrainment values that are similar to Alternatives 1-3 with a max design flow of 6,000 cfs (Figure 4 and Figure 6). The alternatives perform similarly due to their similar invert elevations that allow them to divert water onto the Yolo Bypass during the lower flow periods that often occur early in the season when the smallest winter-run fish tend to arrive. Still, the rankings follow the same trend displayed in the original analysis where the alternatives that divert the largest volumes of water outperform those that divert smaller volumes.

While considerable increases in entrainment occurred across all water year types, notch alternatives were particularly effective at increasing entrainment during dry and critical water years (Table 6 and Table 7). During dry and critical years, naturally occurring overtopping events are rare and are often short in duration providing minimal opportunities for juveniles to enter the Yolo Bypass. Though not as high as in dry years, notch entrainment during wet and above normal years was still substantially improved over existing conditions.

Table 6. Calculated mean annual increase in the proportion of the total population of juvenile winter-run Chinook salmon ≤60, 70, and 80 mm entrained onto the Yolo Bypass over existing conditions by water year type.

Size	Water Year Type	Alternatives 1-3 6,000 cfs	Alternative 4 3,000 cfs	Alternative 4b Mar 7 end date	Alternative 5 3,400 cfs	Alternative 6 12,000 cfs
60 mm	Wet	34.8%	28.6%	28.6%	28.3%	68.0%
	Dry	31,837.4%	32,130.1%	32,130.1%	35,148.4%	65,534.7%
70 mm	Wet	274.3%	205.3%	205.3%	215.2%	491.5%
	Dry	5,637.6%	5,519.6%	5,519.6%	6,049.7%	12,092.6%
80 mm	Wet	357.2%	267.2%	267.2%	286.1%	628.0%
	Dry	4,798.9%	4,690.0%	4,690.0%	5,031.2%	10,362.0%

Table 7. Calculated mean annual increase in the proportion of the total population of juvenile spring-run Chinook salmon ≤60, 70, and 80 mm entrained onto the Yolo Bypass over existing conditions by water year type.

Size	Water Year Type	Alternatives 1-3 6,000 cfs	Alternative 4 3,000 cfs	Alternative 4b Mar 7 end date	Alternative 5 3,400 cfs	Alternative 6 12,000 cfs
60 mm	Wet	129.7%	87.6%	87.6%	95.4%	233.9%
	Dry	7,813.8%	7,042.8%	7,042.8%	7,848.1%	15,195.5%
70 mm	Wet	118.0%	83.0%	80.6%	90.9%	211.1%
	Dry	2,762.9%	2,470.1%	2425.4%	2,774.5%	5,254.2%
80 mm	Wet	115.0%	81.1%	78.1%	89.6%	206.3%
	Dry	2,643.6%	2,348.6%	2,299.3%	2,642.8%	4,996.4%

References

These references are in addition to those included in the main body of the technical memorandum.

California Department of Fish and Game. 2010. California Salmonid Stream Habitat Restoration Manual, 4th Edition. Habitat Conservation Division.

National Marine Fisheries Service. 2008. Anadromous Salmonid Passage Facility Design. NMFS, Northwest Region, Portland, Oregon.

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Appendix G4

Yolo Bypass Salmon Benefits Model

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YOLO BYPASS SALMON BENEFITS MODEL: MODELING THE BENEFITS OF YOLO BYPASS RESTORATION ACTIONS ON CHINOOK SALMON

Model Documentation, Alternatives Analysis, and Effects Analysis

Prepared for:

United States Bureau of Reclamation and California Department of Water Resources

Prepared by:

Travis M. Hinkelman, Myfanwy Johnston, Joseph E. Merz

August 2, 2017

Applied Research in Fisheries, Restoration, Ecology, and Aquatic Genetics.

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EXECUTIVE SUMMARY

The Yolo Bypass Salmonid Habitat Restoration and Fish Passage Draft Implementation Plan (Implementation Plan) was prepared to evaluate the potential to restore floodplain rearing habitat through increased seasonal inundation within the lower Sacramento River basin, and reduce migratory delays and loss of salmon, steelhead, and sturgeon, through the modification of Fremont Weir and other structures of the Yolo Bypass. Prior to Implementation Plan execution, potential benefits of restoration actions on all four CV Chinook salmon runs are to be evaluated quantitatively through a targeted modeling effort.

The Yolo Bypass Chinook Salmon Benefits Model (SBM) is a mechanistic, deterministic simulation model that quantifies potential benefits of Yolo Bypass restoration actions on CV Chinook salmon runs that spawn upstream of the Yolo Bypass. Five key benefit measurements were identified: juvenile (1) survival, (2) size, (3) size variability, and (4) timing variability at entrance to the marine environment (Chipps Island) and (5) adult returns (escapement). Using the SBM, we quantified lifestage-specific and cumulative impacts of restoration actions on each Chinook salmon run and compared the benefits identified for the runs under each of five Implementation Plan management alternatives.

In the Alternatives Analysis, we found only small differences between alternatives in the benefits metrics. The key exception was Alternative 6 where benefits were consistently greater than for the other alternatives. Alternative 6 has the largest notch, highest max design flows (12,000 cfs), provides the most suitable habitat, and entrains the most fish of the modeled alternatives. Alternative 6 provides access to the Yolo Bypass at lower flows than under existing conditions and, presumably, introduces variability in the accessibility of suitable rearing habitat for fish that, in turn, increases fork length variation and arrival timing variation at Chipps Island.

In the Effects Analysis, we found an interactive effect of the rearing rule and rearing survival value. We suggest that both should be targets for additional investigations, but recognize the challenges in the design of such studies. This includes studies of fall- and spring-run survival through the Yolo Bypass. A better understanding of survival on and carrying capacity of the Yolo Bypass are warranted.

BACKGROUND

Significant modifications have been made to California's Central Valley (CV) floodplains for mining, agriculture, urban development, and (more recently) water supply and flood control purposes. The resulting loss of floodplain rearing habitat, migration corridors, and food web production has significantly impacted native fish species whose life history strategies depend upon seasonally inundated habitat. The Yolo Bypass, which currently experiences at least some flooding in approximately 80% of years, still retains many characteristics of historic floodplain habitat that are favorable to a suite of fish species (CDWR 2012). In approximately 70% of years, the Fremont Weir overtops, joining flows from the Sacramento River with flows entering the Yolo Bypass from western tributaries (CDWR 2012).

Although the primary function of the Yolo Bypass is to provide flood control management for the surrounding metropolitan areas, the Yolo Bypass is also managed as mixed-use, providing land for both private agriculture and public recreation. In recent years, the Yolo Bypass has also been recognized as important rearing, spawning, and migratory habitat for numerous native fish species (CDWR 2012), accessed perennially through a narrow channel that spans the eastern edge of the Yolo Bypass. Studies in the region document favorable outcomes for ecosystem functions and desirable species assemblages as a result of targeted management action (Kiernan et al. 2012, Jeffres et al. 2008, Sommer et al. 2001). When combined with the Yolo Bypass's current role in successful, multi-faceted land uses, this suggests that the floodplain can support human demands without eliminating the processes needed to sustain aquatic species (Opperman et al. 2009). Thus, the Bypass is identified by several state and federal entities as a potential site for habitat restoration, with the goal of benefitting threatened and endangered fish species.

As part of the effort to evaluate the site for restoration, the Yolo Bypass Salmonid Habitat Restoration and Fish Passage Draft Implementation Plan (Implementation Plan) was prepared jointly by the California Department of Water Resources (DWR) and the U.S. Bureau of Reclamation (Reclamation) to address two specific Reasonable and Prudent Alternative (RPA) Actions set forth in the NMFS Operation Biological Opinion:

- RPA Action I.6.1: Restoration of floodplain rearing habitat, through the increase of seasonal inundation within the lower Sacramento River basin; and
- RPA Action I.7: Reduce migratory delays and loss of salmon, steelhead, and sturgeon, through the modification of Fremont Weir and other structures of the Yolo Bypass.

Prior to execution of the Implementation Plan, the potential benefits of restoration actions (via the Implementation Plan) on all four CV Chinook salmon runs will be evaluated quantitatively through a targeted modeling effort. The goals of this modeling effort are as follows:

- Create a mechanistic, simulation model to quantify and visualize the potential benefits of Yolo Bypass restoration actions on CV Chinook salmon runs that spawn upstream of the Yolo Bypass.
- Using the simulation model, quantify lifestage-specific and cumulative impacts of restoration actions on each Chinook salmon run.
- Conduct a comparison of the benefits identified for Chinook salmon runs under each Implementation Plan management alternative.

Study Species

In the CV, Chinook salmon evolved a range of diverse life history strategies (Williams 2006). This "portfolio effect" allowed them to combat the risk posed by highly variable environmental conditions (Carlson and Satterthwaite 2011). Four distinct populations ("runs") of Central Valley Chinook are named for the timing of adult spawning migrations (fall, late-fall, winter, and spring), and are genetically distinguishable. Each run reflects genetically-based adaptations to seasonal conditions in the local environment. Through investment in this diverse portfolio, the species, as a whole, has enormous capacity for resilience and adaptation to local conditions (Carlson and Satterthwaite 2011; Hilborn et al. 2003).

Apart from those runs that remain in freshwater and migrate the following year (as yearlings), most young CV salmon migrate to the ocean during the first few months following emergence. Juveniles may rear in floodplains, mainstem rivers, and/or estuaries for varying lengths of time before entering the ocean at an appropriate size for survival (between 80-170 mm FL, depending on the run). Chinook salmon spend 1-5 years in the ocean before returning to the river as spawning adults, with a small portion of males (precocious) that may never leave freshwater (Foote et al. 1991). These runs and the large populations they once supported (at least 1 to 2 million adults annually; Yoshiyama et al. 1998, 2000) reflect the diverse and productive habitats that historically existed within the region. Over the past 180 years anthropogenic effects—including mining, flood protection, power generation, water development, stream and floodplain conversion, water quality degradation, invasive species, harvest, and hatchery management—have stressed, altered, and depleted these resources (Yoshiyama et al. 1998, 2000; Williams 2006; Israel et al. 2011). Global parameters, such as ocean conditions, have also demonstrated a marked effect on adult escapement (Lindley et al. 2007, 2009). In the past 3 decades, the CV spring and winter runs were listed under the United States Endangered Species Act (ESA) of 1973. Habitat modification on nearly all major CV rivers has resulted in selective loss of habitats, which disproportionately affect certain life history components of each run (Carlson and Satterthwaite 2011; McClure et al. 2008; Lindley et al. 2007).

Study System

The Yolo Bypass Salmon Benefits Model (hereafter SBM) is comprised of the following key locations and systems (Figure 1).

Sacramento River: The mainstem Sacramento River is the primary migratory route for model fish through the system. In the SBM, the only place where fish can choose another route is at Fremont Weir.

Knights Landing: The location of a rotary screw trap on the Sacramento River and the point where fish enter the model.

Fremont Weir: A passive weir, located about 11 km downstream of Knights Landing, that serves as the primary location for flow to enter the Yolo Bypass from the Sacramento River during periods of high flows. The alternative management scenarios involve designing a notch in the Fremont Weir to increase flow management capabilities (see Modeled Alternatives). Model fish are only able to enter the Yolo Bypass via the Fremont Weir.

Verona: Location in Sacramento River, about 3 km downstream of Fremont Weir, where Sacramento River flow is modeled. Because the hydrodynamic properties of the system are complex at Fremont Weir, the proportion of flow entering the Yolo Bypass is estimated partly based on the flow in the Sacramento River at Verona (see Entrainment).

Figure 1. The spatial extent of the Salmon Benefits Model, which tracks Chinook salmon life history from emigrating juveniles to adult escapement, beginning in the mainstem Sacramento River just upstream of Fremont Weir at the location of the Knights Landing screw trap. Circles identify key locations relevant to model functions; stars represent cities.

Feather River: Flow from the Feather River enters the Sacramento River just upstream of Verona and is used in the estimation of flow into the Yolo Bypass at Fremont Weir (see Entrainment).

Canal Complex: The primary migratory pathway through the Yolo Bypass comprised of the Tule Canal and the Toe Drain. The Canal Complex is perennially watered and provides a passage route for juvenile salmon. The route through the Canal Complex is approximately 30 km shorter than staying in the Sacramento River.

Yolo Bypass: Throughout this document, Yolo Bypass is generally used inclusively to refer to the Canal Complex and the adjacent floodplain habitat.

Rio Vista: The approximate location of the confluence between the Canal Complex and the Sacramento River. Model fish from the Sacramento River and Yolo Bypass routes come back together at Rio Vista. However, fish move and survive at route-specific rates despite occupying the same reach. All fish grow at the same rate while migrating from Rio Vista to Chipps Island, though.

Modeling Approach

The primary goal of the SBM is to compare fish benefits among Fremont Weir notch alternatives (see Modeled Alternatives). The goal of the model is **not** to answer if salmon benefit from a notch in Fremont Weir. The secondary goals of the SBM are to hone our intuition about the modeled system and to identify knowledge and data gaps. The SBM cannot predict all possible trajectories of Chinook salmon populations under the proposed management alternatives. Instead, the SBM provides an experimental system in which the consequences of various sets of assumptions can be rigorously examined and the range of outcomes for modeled alternatives can be compared (Peck 2004).

The SBM is a deterministic simulation model. Parameters enter the model as a single value (or series of values) rather being drawn from a distribution of values. We recognize the value of stochastic simulation models. However, the SBM is in an active state of development and working with a deterministic model reduces time in the model development cycle because running the SBM is a computationally intensive process. Although the SBM currently does not include stochasticity, running the model across 15 years provides considerable variation in model behavior. Moreover, the effect of parameters, model rules, and interactions among parameters/rules on model outputs can be evaluated with simulation experiments. We fully expect that future work on the SBM will include the development of a stochastic version of the model.

Unlike a life cycle model, where progeny from one brood year are allowed to influence outcomes of the next, the SBM takes a production model approach to simulation, where individual brood year-classes are tracked separately. The model simulates and tracks key stages of Chinook salmon life history, from the point of freshwater emigration (just upstream of the Yolo Bypass entrance) to the number of returning adults (escapement), and quantifies the potential life stage-specific and cumulative impacts of restoration actions on fish size and abundance. As a general modeling approach, simulation has been successfully applied to evaluate the effects of other restoration actions on CV Chinook salmon populations, including the following:

- The San Joaquin River Emigrating Salmonid Habitat Estimation (ESHE) model to quantify the rearing and emigration habitat needs of future restored populations of fall-run and spring-run Chinook salmon in the San Joaquin River as part of the San Joaquin River Restoration Program (SJRRP 2012).
- The Interactive Object-oriented Simulation (IOS) life cycle model (Zeug et al. 2012) to evaluate the effects of the NMFS alternative scenarios of Central Valley water operations on the life cycle and abundance trends of winter-run Chinook salmon.
- The Delta Passage Model (DPM) to evaluate the effects of Bay Delta Conservation Plan (BDCP) water scenarios on the Delta emigration survival of all Central Valley runs of Chinook salmon (BDCP 2013).

The SBM begins tracking juvenile Chinook salmon in the mainstem Sacramento River just upstream of Fremont Weir, at the location of the Knights Landing screw trap (Figure 1). The model runs on a daily time-step during the CV Chinook salmon juvenile emigration period, from October 2nd until all modeled fish have died or entered the Pacific Ocean, usually by June 30th of the following year. Although the Chinook salmon life cycle occurs over a 2 to 4-year period, the model only explicitly tracks the daily movement and abundance of Chinook salmon until ocean entry (Figure 2). Once modeled fish enter the ocean, the model instantaneously calculates ocean survival and upstream adult migration survival to estimate the number of returning adults. Importantly, the estimates of the number of returning adults for each brood year-class do not influence the number of juveniles entering the model in subsequent years. Finally, the model quantifies the effects of management alternatives on individual life stages to estimate the number of returning adults produced under each alternative.

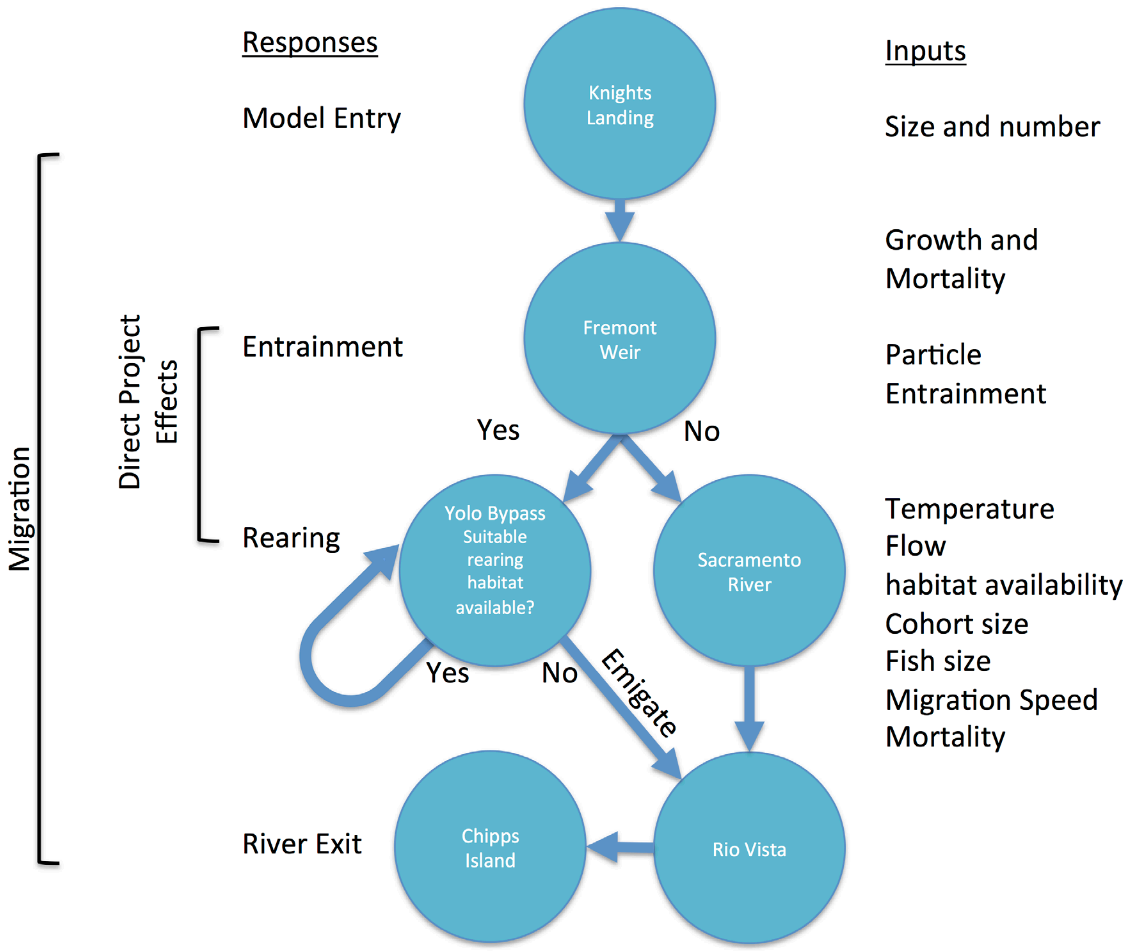

Figure 2. Conceptual overview of Salmon Benefits Model. The input parameters and relationship that affect model components are shown on the right. The potential responses of model fish are shown on the left. The project effects of the alternative management scenarios directly affect the entrainment and rearing responses of model fish.

Modeled Alternatives

The SBM uses the output of the 2D hydrodynamic model TUFLOW (BMT WBM 2013) under existing conditions and five alternatives involving a notch in Fremont Weir (Table 1). The TUFLOW output includes daily raster files (cell size = 50x50') of depth and velocity over a 15-year period (1997-2011) across the entire study area for each alternative. Depth and velocity data were aggregated to a coarser resolution (cell size = 300x300') to reduce computational demands of frequent loading of raster files in the SBM. The TUFLOW output also includes a 15-year time series of flow overtopping Fremont Weir, flow through the notches in the alternatives, Sacramento River flow at Verona, and Feather River flow entering the Sacramento River (just upstream of Verona).

Table 1. Description of alternatives evaluated with the Salmon Benefits Model. The alternatives differ in the design of a notch in Fremont Weir. Alt02 and Alt03 were not provided for analysis in the Salmon Benefits Model.

Alternative	Description	Alignment	Design Flow (cfs)	Closure Date
Alt01	30' bottom width, 30' bench, no levee	East	6,000	March 15th
Alt04	60' bottom width, 30' bench, no levee, downstream water control structures	West	3,000	March 15th
Alt04b				March 7th
Alt05	Intake A & B: 80' bottom width; Intake C: 130' bottom width; Intake D: 142' bottom width	Central	3,900	March 15th
Alt06	200' bottom width	West	12,000	March 15th
Exg	Flow over existing weir	--	--	--

MODEL DOCUMENTATION

Modeling Platform

The SBM was developed in NetLogo, an integrated modeling environment that is a powerful tool for scientific modeling (Lytinen and Railsback 2012). NetLogo is free, open source, and cross platform. The highly readable syntax of the programming language, thorough documentation, and widgets for graphical-user-interface (GUI) elements allow for rapid prototyping of new models in NetLogo.

Model Components

Model Entry

Initial Abundance

To determine the initial juvenile abundances of each Chinook salmon run entering the model, we converted historical spawner abundance estimates from each water year (California Department of Fish and Wildlife GrandTab database) to juvenile emigrants, using Chinook salmon populations that spawn upstream of Fremont Weir in the Sacramento River Basin (Table 2). We achieved this first by converting spawner abundance to number of female spawners, assuming a sex ratio of 0.5. Next, the number of female spawners was converted to number of deposited eggs by multiplying female spawners by run-specific estimates of fecundity (spring-run = 4,900; fall-run = 5,500, late-fall-run = 5,800, winter-run = 3,700; Moyle 2002). Finally, the number of eggs was converted to juveniles by multiplying estimated deposited eggs by 0.25, which is the average egg-fry survival estimate for the Upper Sacramento River (Martin et al. 2001). The resulting numbers of juveniles entering the model for each run are presented in Table 2.

Table 2. Annual run-specific historical estimated escapement values for Chinook salmon populations that spawn upstream of Fremont Weir in the Sacramento River Basin and resulting number of Chinook salmon juveniles of each run entering the Salmon Benefits Model under each water year.

Water Year	Spring-run		Fall-run		Late-fall-run		Winter-run	
	Escapement	Juveniles	Escapement	Juveniles	Escapement	Juveniles	Escapement	Juveniles
1997	2,658	1,628,025	263,653	181,261,438	1,385	1,004,125	1,012	468,050
1998	1,431	876,488	326,558	224,508,625	5,056	3,665,600	836	386,650
1999	23,677	14,502,163	166,380	114,386,250	42,965	31,149,625	2,992	1,383,800
2000	6,092	3,731,350	329,982	226,862,625	15,758	11,424,550	3,288	1,520,700
2001	5,342	3,271,975	329,996	226,872,250	12,883	9,340,175	1,350	624,375
2002	12,952	7,933,100	446,938	307,269,875	21,813	15,814,425	8,224	3,803,600
2003	12,769	7,821,013	702,409	482,906,188	43,017	31,187,325	7,441	3,441,463
2004	8,583	5,257,088	397,094	273,002,125	11,198	8,118,550	8,218	3,800,825
2005	9,562	5,856,725	240,767	165,527,313	15,282	11,079,450	7,869	3,639,413
2006	14,044	8,601,950	329,442	226,491,375	18,614	13,495,150	15,839	7,325,538
2007	8,013	4,907,963	247,739	170,320,563	16,450	11,926,250	17,290	7,996,625
2008	6,755	4,137,438	77,836	53,512,250	13,442	9,745,450	2,541	1,175,213
2009	4,489	2,749,513	63,350	43,553,125	10,483	7,600,175	2,830	1,308,875
2010	2,492	1,526,350	39,385	27,077,188	10,084	7,310,900	4,537	2,098,363
2011	1,904	1,166,200	128,904	88,621,500	10,039	7,278,275	1,596	738,150

Entry Timing and Size

Model entry for Chinook salmon is the location of the Knights Landing (KL) rotary screw trap (RST) operated by the California Department of Fish and Wildlife (CDFW), 11 kilometers upstream of Fremont Weir (River KM 144) on the Sacramento River (Figure 1). Knights Landing RST data were then used to inform the initial entry timing and size of the daily juvenile salmon cohorts entering the model for all 15 water years (1997-2011). Because variation in daily RST catch rates can be highly influenced by variability in capture efficiency, we used catch per unit effort data (CPUE) as summarized by Roberts and Israel (2012). Daily CPUE for each run was divided by the sum of all daily run-specific CPUEs throughout a water year to estimate the daily proportion of each run entering the model each day (Figure 3).

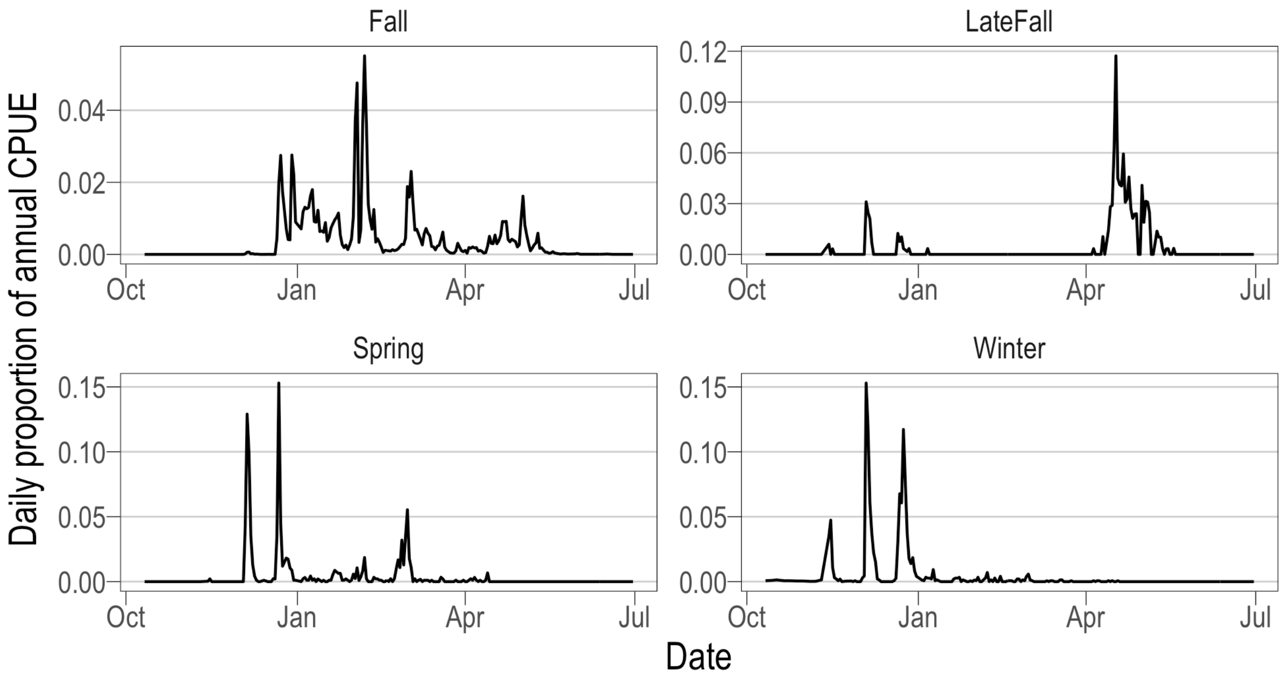

Figure 3. The daily proportion of juvenile Chinook salmon of each run entering the model during water year 2006**.** Note, the y-axes are not all set to the same scale.

We used generalized additive models (GAMs) to fit smooth functions of fork length (FL) versus date for each run and water year. The GAMs were used to estimate the fork length of daily cohorts of each run entering the model and allow for predictions on days where fish were caught in the RST but not measured (Figure 4). There is a strong correlation ($r = 0.98$) between the GAM predictions and the mean daily fork length.

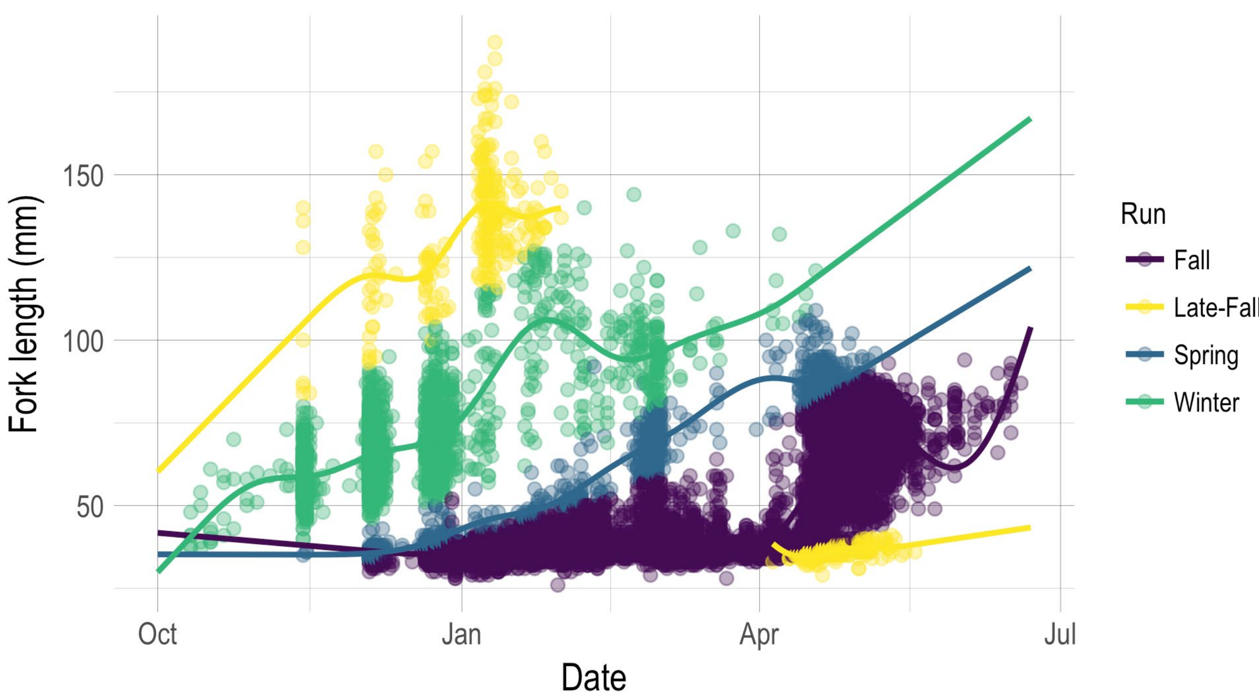

Figure 4. The size of fish captured in the Knights Landing RST (points) and the GAM smooth functions (lines) for water year 2006.

Length-at-date criteria were used to assign fish captured at KL RST to each run. Specifically, fish were assigned to a run using the River Model, which was developed by CDFW to classify individual salmon to temporal runs in the upper Sacramento River (Fisher 1992). The logic behind length-at-date criteria is that CV Chinook salmon runs spawn at different times of year, and if the same growth trajectory is assumed, the size of any run is unique on any date, therefore allowing for differentiation of these stocks.

Entrainment

The daily proportion of juvenile Chinook salmon of each run entrained onto the Yolo Bypass is estimated by multiplying the daily abundance of juvenile salmon of each run arriving at Fremont Weir by the proportion of Sacramento River flow entering the Bypass. We followed the approach of DWR (2017) and calculated the proportion of flow entering the Yolo Bypass (P_{YB}) through the notch as

$$P_{YB} = Q_{Notch}/(Q_{Notch} + Q_{VON} - Q_{FEA} - Q_{SUT} - Q_{NCC}) \qquad \text{(Eq. 1)}$$

where Q_{Notch} is the flow through the proposed notch, Q_{VON} is the Sacramento River discharge at Verona, Q_{FEA} is the Feather River discharge as it enters the Sacramento River (upstream of Verona), Q_{SUT} is the discharge from the Sutter Bypass, and Q_{NCC} is the discharge from the Natomas Cross Canal. When Fremont Weir is overtopping, the proportion of flow entering the Yolo Bypass is calculated as

$$P_{YB} = (Q_{FRE} + Q_{Notch})/(Q_{FRE} + Q_{Notch} + Q_{VON} - Q_{FEA} - Q_{NCC}) \qquad \text{(Eq. 2)}$$

where Q_{FRE} is the flow overtopping Fremont Weir. In this equation, the Sutter Bypass discharge is removed from the denominator, which makes the flow proportion based on the combined flow from the Sacramento River and Sutter Bypass (DWR 2017). Daily values of P_{YB} below zero or above one (based on above calculation) are set to zero and one, respectively. Similar to Roberts and Israel (2012), we assume that juvenile Chinook salmon (regardless of size or abundance) are equally distributed across and throughout the water column and enter the Yolo Bypass in proportion to the flow at the Weir.

Migration

The survival and movement behavior of SBM model juvenile salmon depends on their migratory route and the water year in which the cohort emigrates. Model fish migrating through the Sacramento River do not engage in explicit rearing behavior during their migration. The primary migratory pathway through the Yolo Bypass is the Canal Complex, which remains inundated year-round and provides a passage route for juvenile salmon. Model salmon migrating through the Yolo Bypass will stop their migration and engage in rearing behavior based on the availability of suitable adjacent rearing habitat. After rearing, Yolo Bypass fish move back to the Canal Complex and resume their migration downstream when floodplain habitat recedes or when they experience a migration trigger (see Floodplain Rearing).

There is very little data available on the survival and migratory behavior of juvenile Chinook salmon in the Yolo Bypass. Slightly more data is available for the Sacramento River (see Perry et al. 2010, Michel et al. 2015), but comparison is problematic in the absence of Yolo Bypass estimates in the same years and hydrological conditions. For the SBM, we have incorporated empirical data on migration and survival rates for the three years where data from both the Sacramento River and the Yolo Bypass are available, so that assumptions inherent in extrapolating the empirical data to all 15 modeled water years would be consistently applied throughout the model.

Migration and survival rates are available for both the Sacramento River and the Yolo Bypass in three years: 2012, 2013, and 2016 (Johnston, *unpublished data*, Perry, *unpublished data*). To apply results from these studies across all 15 water years modeled in the SBM, we calculated the Euclidean distance between the Fremont stage (NAVD88) time series in each data year (2012, 2013, 2016) and each modeled water year (1997-2011). The lowest Euclidean distance across data years indicates the best match for a given water year (Table 3). The estimated migration and survival rate values from the data years (see below) were then applied to each modeled water year according to their best matching data year.

Table 3. Euclidean distances for comparisons of Fremont stage time series across modeled water years (1997-2011) and data years (2012, 2013, 2016). The smallest value in a row indicates the best match between the modeled water year and the data year.

Water Year	2012	2013	2016
1997	164.72	132.81	154.50
1998	207.48	219.93	190.63
1999	148.09	145.31	141.59
2000	129.82	150.50	112.48
2001	72.70	95.02	94.15
2002	98.26	66.07	110.51
2003	132.42	128.37	136.30
2004	132.75	120.28	121.46
2005	110.53	110.11	121.98
2006	202.89	205.18	183.72
2007	65.15	81.40	109.03
2008	81.71	93.83	103.75
2009	83.82	111.79	116.34
2010	82.82	117.00	96.14
2011	142.12	145.22	144.17

Migration Rates

Migration rates for emigrating cohorts in each route were calculated from available empirical data from the modeled routes (Table 4). Migration rate data were available for hatchery, late-fall run juvenile Chinook salmon emigrating through the Sacramento River and the Canal Complex in three years: 2012, 2013, and 2016 (Johnston, *unpublished data*, Perry, *unpublished data*). Empirical data on movement rate for these years encompass water discharge – that is, the observed movement rates reflect the speed of fish emigrating in the corresponding flow for those three years. Mean movement rates from the three years of empirical data were then applied to the modeled water years according to similarity in the Fremont stage time series for those years.

Table 4. Mean migration rates (km/day) in the two migratory routes of the SBM, calculated from acoustically-tagged emigrating late-fall run juvenile Chinook salmon.

Year	Sacramento River	Canal Complex
2012	17.4	10.7
2013	11.4	7.5
2016	60.5	21.4

Survival

In the SBM, overall mortality in the Yolo Bypass includes mortality while migrating through the Canal Complex (gauntlet model) and mortality while rearing on the floodplain (exposure model). All fish that migrate through the Canal Complex experience migrating mortality. However, fish that rear on the floodplain also experience rearing mortality. Estimates of migrating survival are based on acoustic telemetry studies of large, late-fall run juvenile Chinook salmon that are not expected to stop to rear while emigrating through the Yolo Bypass. Values of rearing survival are not based on empirical data, but the effect of the rearing survival value is explored in the Effects Analysis. Additionally, only SBM fish that migrate down the Yolo Bypass have the opportunity to engage in rearing. Thus, all mortality for fish migrating down the Sacramento River originates from migration mortality because no explicit rearing takes place along the Sacramento River route in the SBM.

Migrating Survival

In the SBM, cohorts actively migration downstream via either the mainstem Sacramento River, or the Canal Complex in the Yolo Bypass. Survival was estimated with a Bayesian implementation of a Cormack-Jolly-Seber model (adapted from Kery and Schaub 2012) based on empirical survival studies conducted of comparable reaches within the two migratory systems (Johnston, *unpublished data*, Perry, *unpublished data*, Table 5). The survival values were converted to survival per kilometer (S_{km}) as follows:

$$S_{km} = S^{\left(\frac{1}{reach\ length}\right)} \quad \text{(Eq. 3)}$$

Table 5. Survival estimates for reaches available from empirical studies of acoustically-tagged late-fall run juvenile Chinook salmon emigrating in 2012, 2013, and 2016.

Year	Migration Route	Reach	Distance (km)	Survival Estimate	Survival Per Kilometer
2012	Sacramento River	Knights Landing – Above Freeport	46.3	0.720	0.9929
2012	Sacramento River	Above Freeport – Chipps Island	106.2	0.615	0.9954
2013	Sacramento River	Knights Landing – Below Freeport	74.1	0.508	0.9909
2013	Sacramento River	Below Freeport – Chipps Island	78.3	0.453	0.9899
2016	Sacramento River	Verona – Freeport	52.8	0.958	0.9992
2016	Sacramento River	Freeport – Chipps Island	80.8	0.737	0.9962

Year	Migration Route	Reach	Distance (km)	Survival Estimate	Survival Per Kilometer
2012	Yolo Bypass	Hwy I-5 – Chipps	90.1	0.470	0.9897
2013	Yolo Bypass	Hwy I-5 – Chipps	90.1	0.180	0.9795
2016	Yolo Bypass	Hwy I-5 – Chipps	90.1	0.551	0.9933

The estimates of survival per kilometer (Table 5) from the three years of empirical data were then applied to the modeled water years according to similarity in the Fremont stage time series for those years. Applying migration survival on a per kilometer basis is known as a gauntlet model (Anderson et al. 2005) because migrating fish need to move through a gauntlet of predators to reach the ocean and cannot reduce their predation risk by migrating at a faster rate. Thus, migration rate does not affect migrating survival in the SBM.

Rearing Survival

In the SBM, cohorts rearing on the floodplain experience a daily survival of 0.99. A survival model with survival as a function of time is known as an exposure model (Anderson et al. 2005) because the probability of survival is decreased with an increase in time spent rearing and exposure to predators. In the model, fish are trading off increased growth on the floodplain (see Growth) with the additional mortality incurred during rearing (relative to not rearing). [Note, this is not an optimality model; the rearing rules could produce sub-optimal rearing durations depending on the value chosen for rearing survival.] The growth-survival trade-off is reflected in the probability of returning as an adult because ocean survival is modeled as a function of fork length at ocean entry (see Ocean Residence). Floodplain rearing reduces the probability that a juvenile fish reaches the ocean, but the increased size from floodplain rearing increases the probability of surviving during ocean residence. Given the floodplain growth rate and the ocean survival relationship used in the model, and ignoring survival during migration, the minimum daily rearing survival value to make rearing worthwhile (i.e., growth benefit outweighs rearing mortality) is approximately 0.99 (see https://fishsciences.shinyapps.io/yolo-bypass-rearing-survival/). This rearing survival value is not based on empirical data. However, in the Effects Analysis, we explore the implications of lower rearing survival on the conclusions drawn from the SBM.

Floodplain Rearing

Suitable Habitat

We took a simplified approach to movement through the Yolo Bypass. For example, all cohorts move downstream along the eastern edge of the Yolo Bypass in the Canal Complex and movement between the Canal Complex and suitable habitat on the floodplain is instantaneous and incurs no mortality. Also, cohorts have perfect knowledge of the current (but not future) availability of suitable habitat. However, because the Yolo Bypass covers a large geographic extent, we included a spatial constraint and divided the Yolo Bypass into 5 bands that are roughly 14-km long from north to south. Cohorts are only able to access suitable floodplain habitat located within the band that they are currently moving through. The length of the bands (14 km) is longer than the width (~ 3-9 km) of a fully inundated Yolo Bypass. If suitable habitat is available within a band for a given cohort on a given day, the cohort will move onto the available suitable habitat and rear on the floodplain. Habitat suitability criteria for Sacramento River juvenile Chinook salmon (USFWS 2005) were used to define suitable floodplain rearing habitat for fry (<70 mm FL) and smolts (≥70 mm FL; Kjelson et al. 1982). Suitable habitat for fry was characterized as

0.39–4 ft deep with velocities less than 1.6 ft/s, and for smolts as 0.39–8 ft deep with velocities less than 1.6 ft/s (USFWS 2005).

On any given day, the model estimates the daily habitat area requirements of the cohort to determine whether enough suitable floodplain rearing habitat is available to support all or a part of the cohort. The territory size required by each fish is estimated with a linear model on a log-log scale as a function of fish fork length based on data collected for salmonids (Grant and Kramer 1990; Figure 5)

$$\tau = 10^{-5.44+2.61*\log_{10} L} \qquad \text{(Eq. 4)}$$

where τ is territory size (m^2) and L is fork length (mm). The amount of suitable habitat claimed by a given cohort is the sum of the territory sizes of all individuals in the cohort. Suitable habitat is occupied in 900-ft^2 patches by the first cohort that reaches the unoccupied habitat. If there is enough suitable habitat for the full cohort, then the cohort claims the number of habitat patches that it needs. If there is only enough suitable habitat for part of the cohort, then the cohort is split, with part of the cohort claiming the available patches, and the other cohort part continuing to migrate downstream in the Canal Complex. Each day the amount of suitable habitat is updated and the above process is repeated.

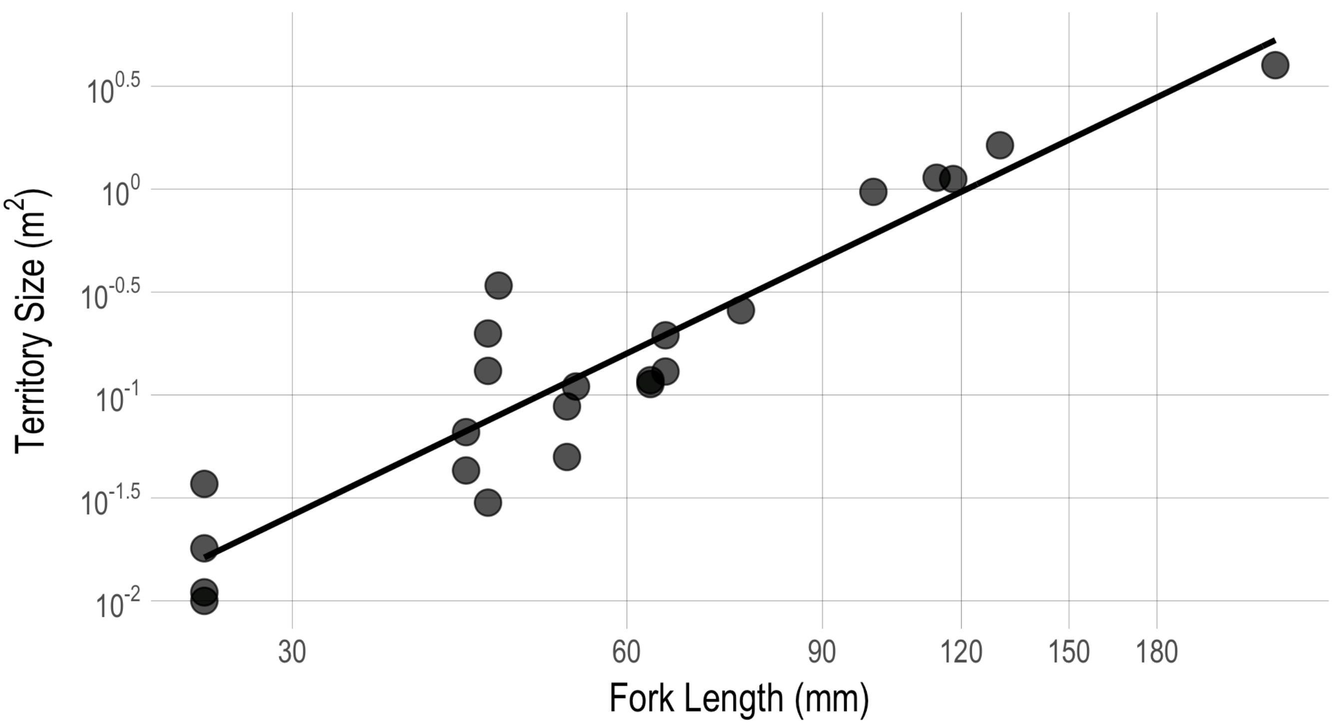

Figure 5. Territory size versus fork length relationship for salmonids based on data from Grant and Kramer (1990). Circles are observations and line is fitted relationship used in the Salmon Benefits Model.

Rearing Rules

Although some precocious males never leave freshwater, we assume the value/numbers of these fish are negligible. Therefore, in the model, Chinook salmon do not rear in freshwater indefinitely, and we incorporated rearing rules that constrain the time that a cohort spends rearing on the floodplain. The model uses these rearing rules to decide whether a cohort migrating through the Canal Complex continues to migrate or whether it will rear in adjacent suitable habitat. The rearing rules are simple heuristics based on temperature, fish size, and time of year.

The water temperature rule is based on daily water temperature data collected by the California Department of Water Resources (DWR) Aquatic Ecology Section RST site located in the Toe Drain near the north-east tip of Little Holland Tract for years 1998-2011. Because both growth rates and smoltification (ATPase activity) of juvenile Chinook salmon have been shown to decrease at water temperatures above 20ºC (Marine 1997; Marine and Cech 2004), the first day that average water temperatures exceeded 20ºC was set as a maximum date that fish would rear on the floodplain. The Toe Drain water temperature data indicated that June was the first month that average daily water temperatures consistently exceeded the 20ºC threshold across nearly every year. Thus, June 1st was set as the date when rearing fish would stop rearing and continue migrating through the Canal Complex.

Under the assumption that there is a theoretical maximum size when fish smoltification and resulting directed movement toward the ocean will occur, the largest Chinook salmon juvenile observed to be entering the ocean in recent years was used to determine a threshold size used to move fish off of the floodplain and back to the Canal Complex to resume downstream migration. The threshold fish size was based on the maximum size of Chinook salmon historically observed to emigrate out of the Central Valley. The maximum fork length of un-marked Chinook salmon observed migrating past Chipps Island in 2010 and 2011 was 120 mm (Speegle et al. 2013). Therefore, modeled fish move back to the Canal Complex and resume downstream migration once reaching a fork length of 120 mm.

One of the main seasonal triggers of smoltification and resulting downstream migration for salmonids is changes in photoperiod as the season progresses (Thorpe 1988). Because photoperiod is tied to time-of-year, a second migration trigger was applied (run timing trigger) that was based on the last dates that each run was observed passing Chipps Island during years 2007-2011 (USFWS 2010; USFWS 2012; Speegle et al. 2013). The last observed dates at Chipps Island were May 15 for winter-run, May 31 for spring-run, July 31 for fall-run, and February 15 for late-fall-run. For each cohort, the model back-calculates the date to stop rearing based on the distance to Chipps Island, migration rate, and run-timing trigger date.

Growth

In the SBM, growth is calculated as

$$L_t = g^t L_0 \qquad \text{(Eq. 5)}$$

where L_t is fork length at time t, L_0 is fork length at time 0, and g is the daily proportional growth rate. The key assumption of this model is that fish of all sizes grow by the same proportion in a day, but larger fish will increase their size by a greater absolute amount. For example, if g is 1.01, a 30-mm fish will grow 0.3 mm in one day, but a 100-mm fish will grow 1.0 mm in one day.

The proportional growth rate can be estimated from empirical studies of fish growth (e.g., Jeffres et al. 2008) by re-arranging the growth equation as follows

$$g = (L\_t / L\_0)\text{^}(1 / t) \qquad \text{(Eq. 6)}$$

We used this equation to estimate growth rates from empirical studies of juvenile Chinook salmon in California's Central Valley (Table 6). In the model, we set daily growth rates at 1.005, 1.006, and 1.012 for the Sacramento River, Canal Complex, and Yolo Bypass floodplain, respectively. We arrived at these values by averaging the values from Table 6. When a study included multiple replicates or treatments within a year, we first averaged across those replicates/treatments and then averaged across all studies and years.

Table 6. Growth rates from empirical studies of juvenile Chinook salmon in California's Central Valley.

Location	Year	Initial Fork Length (mm)	Final Fork Length (mm)	Days	Daily Growth Rate	Notes	Source
Sacramento River	2016	54.8	58.2	21	1.003	--	Jeffres 2016
Toe Drain	2016	54.8	62.0	21	1.006	--	
Yolo Bypass floodplain (Knaggs Ranch)	2016	54.8	76.7	21	1.016	--	
	2014	61.0	81.0	15	1.019	PIT tag study; enclosure 1	Katz et al. 2014
		60.6	81.7	15	1.020	PIT tag study; enclosure 2	
		61.9	81.0	15	1.018	PIT tag study; enclosure 3	
		43.0	77.8	35	1.017	Volitional outmigrant study; hatchery origin	
		33.9	53.5	25	1.018	Volitional outmigrant study; wild origin	
	2013	53.6	92.1	39	1.014	Free-swimming; disc field	Katz et al. 2013
		53.6	90.3	39	1.013	Free-swimming; stubble field	
		53.6	88.4	39	1.013	Free-swimming; fallow field	
		52.2	63.9	16	1.013	Penned; hatchery origin	
		52.4	65.9	16	1.014	Penned; wild origin	
	2012	48.0	75.5	42	1.011	Free-swimming	Katz 2012
		48.0	78.0	42	1.012	Penned	
Cosumnes River floodplain	2004	54.9	71.4	32	1.008	FP Veg	Jeffres et al. 2008
		54.9	72.2	32	1.009	Upper pond	
		54.9	66.2	32	1.006	Lower pond	
	2005	54.0	86.6	56	1.008	FP Veg	
		54.1	79.7	56	1.007	Upper pond	
		54.0	74.6	56	1.006	Lower pond	
Yolo Bypass floodplain	1998	57.5	93.7	46.2	1.011	--	Sommer et al. 2001
	1999	56.8	89.0	58.2	1.008	--	
Sacramento River	1998	57.5	85.7	55.4	1.007	--	
	1999	56.8	82.1	58.6	1.006	--	

Ocean Residence

In the SBM, survival from ocean entry to return at age 3 is modeled as a function of fork length at ocean entry because fish size is positively correlated with ocean survival in salmonids (Ward et al. 1989, McGurk 1996). We were provided a dataset (Will Satterthwaite, *unpublished data*) of juvenile Chinook salmon releases and recoveries that were the basis of Satterthwaite et al. (2014). The dataset contains release weight, but not fork length. Thus, the first step was to convert weights to fork lengths. We used catch of fall-run Chinook salmon at the Knights Landing RST from 2000-2012 (Figure 6) to develop the following relationship.

$$L = 48W^{0.3} \qquad \text{(Eq. 7)}$$

where W is wet weight (g) and L is fork length (mm).

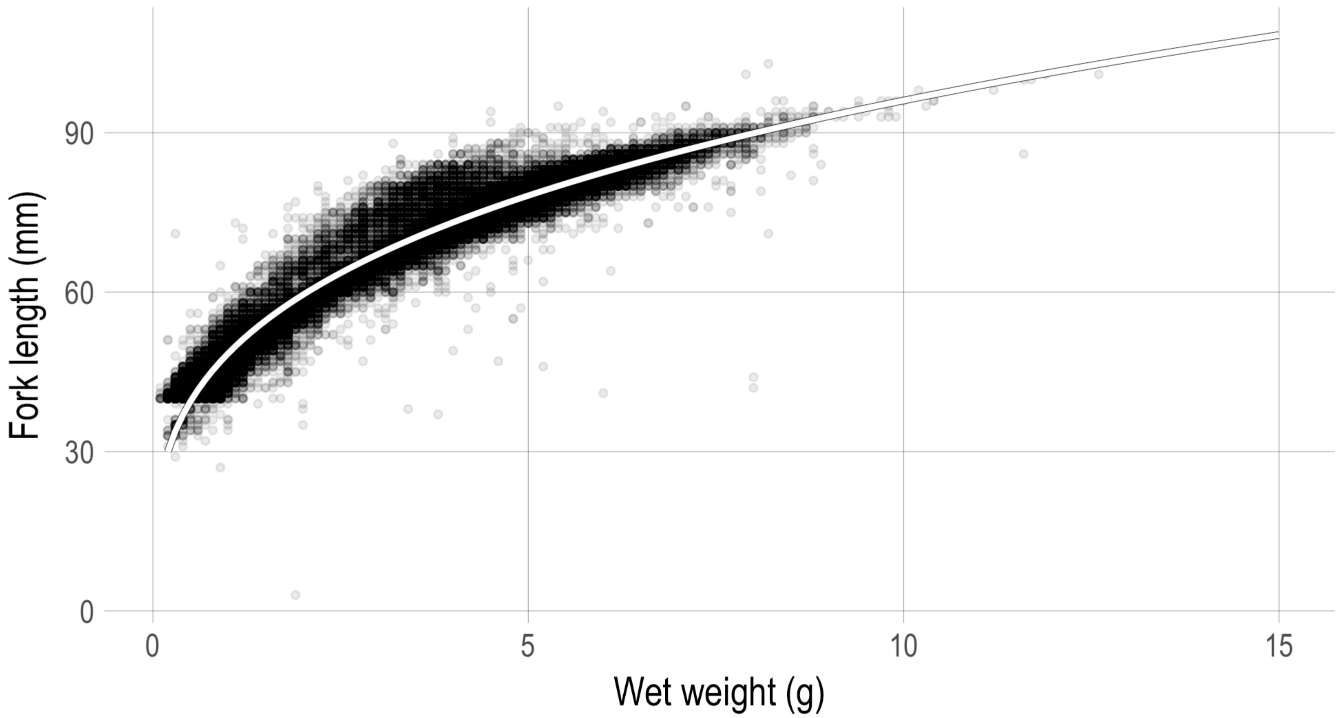

Figure 6. Fork length and wet weight of fall-run Chinook salmon caught at the Knights Landing Rotary Screw Trap from 2000-2012. Circles are observed values and white line is fitted relationship.

Satterthwaite et al. (2014) focused on how release timing in the San Francisco Bay affected ocean survival of fall-run Chinook salmon. They made several decisions about how to filter the dataset to better address their focus on release timing. For our analysis, we excluded fewer records because we wanted a larger size range for fitting a relationship between size at ocean entry and ocean survival. Similar to Satterthwaite et al. (2014), only age-3 recoveries were considered when estimating ocean survival because prior to being caught at age 3, the predominant source of mortality is from natural causes, and recoveries of age 2 and age 4 fish are comparatively rare. We also excluded data from releases in 2006 and 2007 because the fishery was closed in 2008 and 2009, which precluded age-3 recoveries. We fitted a generalized linear model with a quasi-binomial error distribution and a logit link to predict survival, S, at age 3 from fish fork length, L, at release (Figure 7):

$$S = \text{logit}^{-1}(-7.385 + 0.025L) \qquad \text{(Eq. 8)}$$

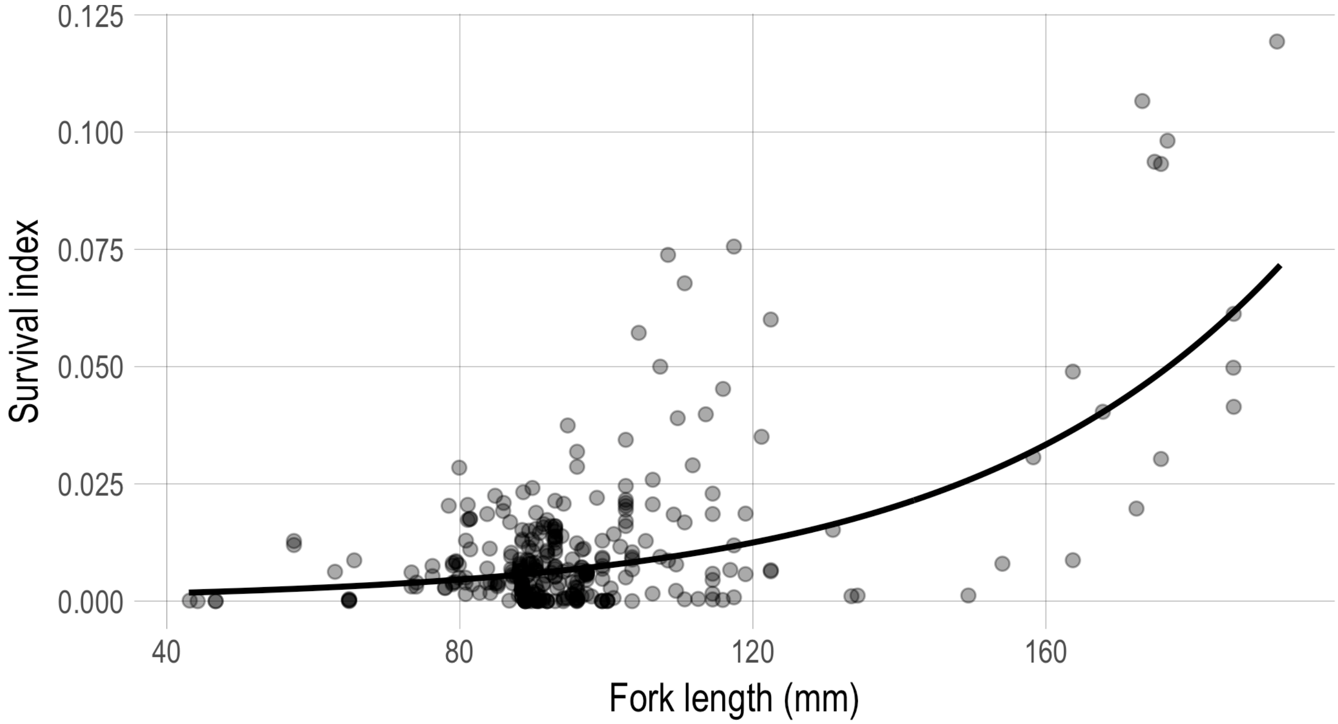

Figure 7. Age 3 survival index versus fish fork length at release for hatchery fall-run juvenile Chinook salmon released in the San Francisco Bay, 1978-2011. Circles are observed values and line is fitted relationship, which is used in the Salmon Benefits Model.

Upstream Migration

Following ocean residence, upstream migration of returning adults from the Bay to Fremont Weir on the Sacramento River was modeled. As a simplifying assumption, the SBM does not include any mortality during the upstream migration of adult returners. In the SBM, we only track the run and number, not size, of returning adults. Thus, upstream migration mortality would not impact comparison of alternatives within a run.

Model Assumptions and Limitations

Due to limited data available for several CV Chinook salmon life stages, traditional statistical estimation models become difficult to apply when attempting to predict outcomes of future management actions (Williams 2006). Unlike predictive models, simulation models can be useful for organizing existing knowledge and identifying gaps in understanding, even if the model predictions are imprecise (Williams 2006). Simulation models should be thought of as experimental systems or aids that are distinct from the "real world" in which the consequences of various sets of assumptions can be examined (Peck 2004). However, model usefulness is measured by how well it captures the interactions of the most important factors and leaves out unimportant ones (Ford 1999), thereby limiting model complexity and simplifying interpretation of results. More complex models can be too dataset-specific and have poor predictive ability, mainly due to estimation error, while simpler models can be too general and incorporate error due to system oversimplification (Astrup et al. 2008). Therefore, we attempted to model the benefits of Yolo Bypass restoration actions on Chinook salmon with a level of complexity that captures the most recent key factors thought to influence fish survival and size, while limiting the inclusion of factors that have low utility for evaluating project effects, or that are unsupported by existing scientific knowledge.

Data Availability

Simulation models depend upon available data to inform model relationships, resulting in a complexity level that matches the depth of knowledge known about a subject (Astrup et al. 2008). When local data is limited, model relationships can often be informed by populations outside the study region, laboratory studies in controlled experimental settings, or artificially raised (hatchery) surrogates. For example, many of our model relationships rely on data from tagged hatchery surrogates. This is because most experimental studies are of hatchery-origin fish, conducted under the assumption that outcomes and behavior are at least similar between fish of different natal origins and animal husbandry. In addition to limited data on naturally-produced fish, many of our relationships are informed by data from a single Chinook salmon run (i.e., fall-run), thereby assuming that all runs move, grow, and survive according to the same rules.

Habitat Suitability

For juvenile salmon to successfully rear, numerous physical requirements must be met including suitable cover (McMahon and Hartman 1989), food availability and water quality (Marine and Cech 2004). Furthermore, flood duration of seasonally inundated habitats can dictate the strength of biotic response to the flood (King et al. 2003). Unfortunately, spatial modeling of water temperature, cover, and biotic production were not available to inform the complex response between Bypass inundation duration and juvenile growth. However, a key assumption of salmonid rearing habitat modeling is that depth and velocity are major predictors of habitat suitability (Raleigh et al. 1986; Keeley and Slaney 1996). Therefore, we simplified our approach and defined suitable habitat based on water depths and velocities alone and modeled juvenile salmon to exhibit an average, consistent growth rate while rearing on the floodplain. We currently assume depth and velocity suitability criteria developed in the adjacent habitat of the Sacramento River (USFWS 2005) is transferable to Yolo floodplain. However, if more information becomes available to inform a more sophisticated relationship between floodplain habitat and juvenile salmon rearing success, model functionality can be changed.

Water Temperature

Water temperature can affect juvenile Chinook salmon survival and health (Marine and Cech 2004), and migratory behavior has been associated with long-term accumulated response to water temperatures, with smoltification rates increasing with increased accumulated thermal units unless the upper threshold is met (ATU; Sykes and Shrimpton 2010; Marine and Cech 2004). However, apart from the water temperature movement trigger, these temperature effects are excluded from the model due to lack of modeled temperature data. The water temperature movement trigger assumes that historical Yolo Bypass water temperatures will likely relate to future water temperatures under the different management alternatives, at least in a very coarse way. If water temperatures are modeled for Yolo Bypass management alternatives in the future, new model functionality could be incorporated to evaluate how different temperature regimes under each alternative affect model outcomes.

Yolo Bypass Entrainment

Models for how juvenile Chinook salmon are distributed in the channel and throughout the water column at the Fremont Weir junction are currently unavailable. Therefore, we assumed that juvenile Chinook salmon are equally distributed across the channel and throughout the water column and enter the Yolo Bypass in proportion to the flow entering the bypass. Similar dispersion assumptions have been used to estimate juvenile salmon entrainment (Kimmerer and Nobriga 2008). However, if more information becomes available to inform a more sophisticated relationship between flow and juvenile salmon entrainment, or if different entrainment alternatives are examined in the future, model functionality can be changed to evaluate alternative mechanisms of entrainment.

Movement

Juvenile salmon movement in the riverine and floodplain portions of the model is greatly simplified and limited by data availability. Modeled fish in the Sacramento River and Canal Complex move one-dimensionally and at an average rate. Migratory behavior in juvenile salmonids is a complex process related to growth, hormonal development, and environmental parameters, all of which may influence habitat use and movement throughout the emigration period (Iwata 1995). While juveniles may shift between rearing and actively migrating during the emigration process (Hoar 1953; Iwata 1995), the mechanisms that inform these complex movements are not well understood or easily modeled. Therefore, we instead modeled the average downstream movement of juvenile Chinook based on simple movement rules. A simplified model was then applied for juveniles rearing on the floodplain. Data is not available to inform model rules for how fish should move across the floodplain in two dimensions, nor is data available to inform simulation of high-resolution territorial behavior on floodplains. Therefore, the model allows fish to immediately colonize proximate habitat, without explicitly modeling individual movement. We assume that all juvenile Chinook set up a territory in the most immediately available and suitable habitat, without prioritization for juveniles of different sizes or runs.

Growth

We assumed that growth rate depends only on fork length and approximate location (i.e., Sacramento River, Canal Complex, floodplain). It is unlikely that growth is homogenous throughout each of these locations, but we assume that our estimates of growth rate reflect average behavior across these locations.

Survival

River

We assumed that juvenile Chinook salmon survive according to a gauntlet model of survival. Survival might be better represented by a survival model that incorporates both distance and time traveled (i.e., XT model; Anderson et al. 2005), but mechanisms underlying the XT model are not yet well understood. We also assumed that mortality was evenly applied from Fremont Weir to Chipps Island along both the Sacramento River and Canal Complex routes. On the Sacramento River route, this is simply an implementation detail because where fish die along that route is not important for the metrics used to evaluate alternatives. On the Canal Complex route, where fish die along the route may have implications for accessing suitable rearing habitat, particularly if most of the mortality occurs from Rio Vista to Chipps Island when fish no longer have access to floodplain. We assumed that survival estimates from studies of large, hatchery, late-fall run Chinook salmon conducted in 2012, 2013, and 2016 apply to wild fish of other runs and sizes in water years 1997-2011. We also assumed that migrating survival is constant throughout the migration season.

Floodplain

We assumed that floodplain survival operates under an exposure model where time spent rearing reduces the overall survival. Other factors that may influence floodplain survival include the behavior (e.g., habitat selection, activity level) and physical attributes of the fish (e.g., size). We also assumed that floodplain survival is the same throughout the migration season, across Chinook salmon runs and years, and over the whole floodplain. The floodplain survival component of the model can be updated as more data becomes available.

Ocean

Studies have shown that juvenile Chinook salmon survival in the ocean can vary due to many factors including entry timing, physical ocean conditions, trophic dynamics, and size or condition of fish upon entry (Satterwaite et al. 2014). However, because we wanted to incorporate a growth-survival trade-off for floodplain rearing in the model, we only incorporated the effect of fish size on ocean survival. The constraint of hatchery release data is that release size is often confounded with release timing. Thus, we may be overestimating the benefit of large size on ocean survival. We are also assuming that the ocean survival relationship, which is based on data from hatchery fall-run Chinook salmon, applies to wild origin fish of all runs.

ALTERNATIVES ANALYSIS

In this section, we present the results of an analysis of alternatives involving different designs for a notch in Fremont Weir (see Modeled Alternatives). The analysis of the SBM focused on five metrics to assess the relative benefits of the management alternatives: (1) juvenile survival from Knights Landing to Chipps Island, (2) mean fork length of fish at Chipps Island, (3) coefficient of variation of fork length of fish at Chipps Island, (4), coefficient of variation of arrival timing at Chipps Island, and (5) number of returning adults.

The benefits metrics consider the population as a whole rather than by route (i.e., Sacramento River and Yolo Bypass). The proportion of the population entrained onto the Yolo Bypass is relatively small and highly variable. Across all years, runs, and alternatives, the average proportion entrained is 13% (range: 0-61%). Thus, big effects on the Yolo Bypass route can be misleading if not placed in context of the whole population.

The benefits metrics are calculated on a yearly time scale. Within-year results are available for additional analysis, but are not presented here. The benefits metrics figures are presented on a relative scale to highlight differences between alternatives.

$$relative\ change = \frac{alternative - existing}{existing} \qquad \text{(Eq. 9)}$$

Percentage change can be calculated by multiplying relative change by 100. The difference between each alternative and existing conditions is calculated on an annual basis because of large inter-annual variation in the benefits metrics. The values used to calculate the relative change in benefits metrics are included as tables in Appendix A.

Juvenile Survival to Estuary Entry

Juvenile survival is calculated as the total number of juvenile Chinook salmon that arrive at Chipps Island divided by the total number that entered the model at Knights Landing for each water year. Juvenile survival is lower under alternatives than existing conditions (Figure 8; Table A-1).

Juvenile fish migrating from Fremont Weir to Chipps Island on the Yolo Bypass route have lower survival in all years than fish migrating through the Sacramento River. Fish that rear on the floodplain during their migration through the Yolo Bypass incur additional mortality while rearing. Relative to existing conditions, the alternatives increase entrainment and generally increase time spent rearing on the floodplain. Late-fall fish experience the lowest relative change (least negative) in juvenile survival because they enter the model at a larger size and exhibit very little rearing behavior.

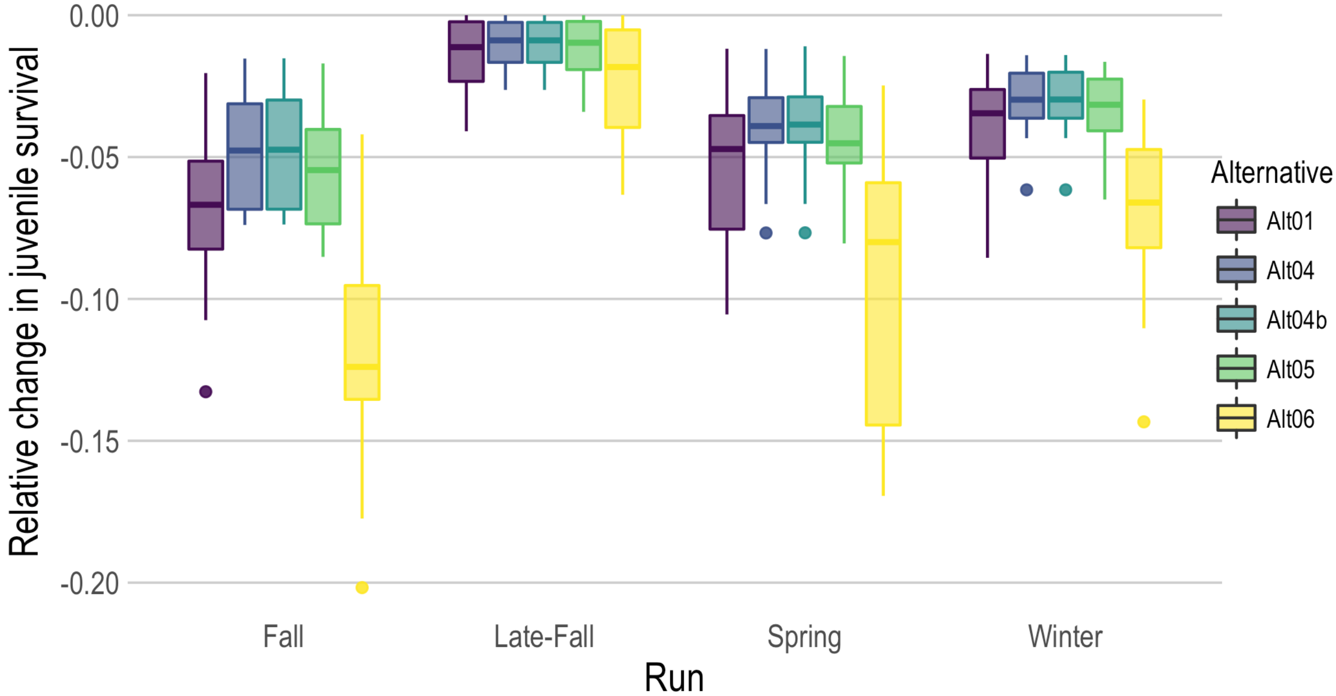

Figure 8. Relative change in juvenile survival from Knights Landing to Chipps Island for 15 years under five alternatives for notches in Fremont Weir. The line near the center of the box is the median, the bottom and top of the box are the 25th and 75th percentiles, respectively, the whiskers show the min/max (unless there are outliers), and the points are outliers (+/- 1.5x interquartile from 75th and 25th percentile, respectively). Note, the y-axis has been truncated to exclude some outliers. See Table A-1 for full set of values.

Juvenile Fork Length at Estuary Entry

Fork length is calculated as the mean fork length of all juvenile Chinook cohorts that arrive at Chipps Island weighted by the abundance of fish in the cohort. Fish grow faster on the floodplain than in the Sacramento River and, thus, mean fork length at Chipps Island is generally higher under the alternatives than under existing conditions (Figure 9; Table A-2). Late-fall fish are the exception because they enter the model at a larger average size, often above the rearing size threshold (120 mm), and do not benefit from the increased floodplain rearing opportunities provided by the alternatives.

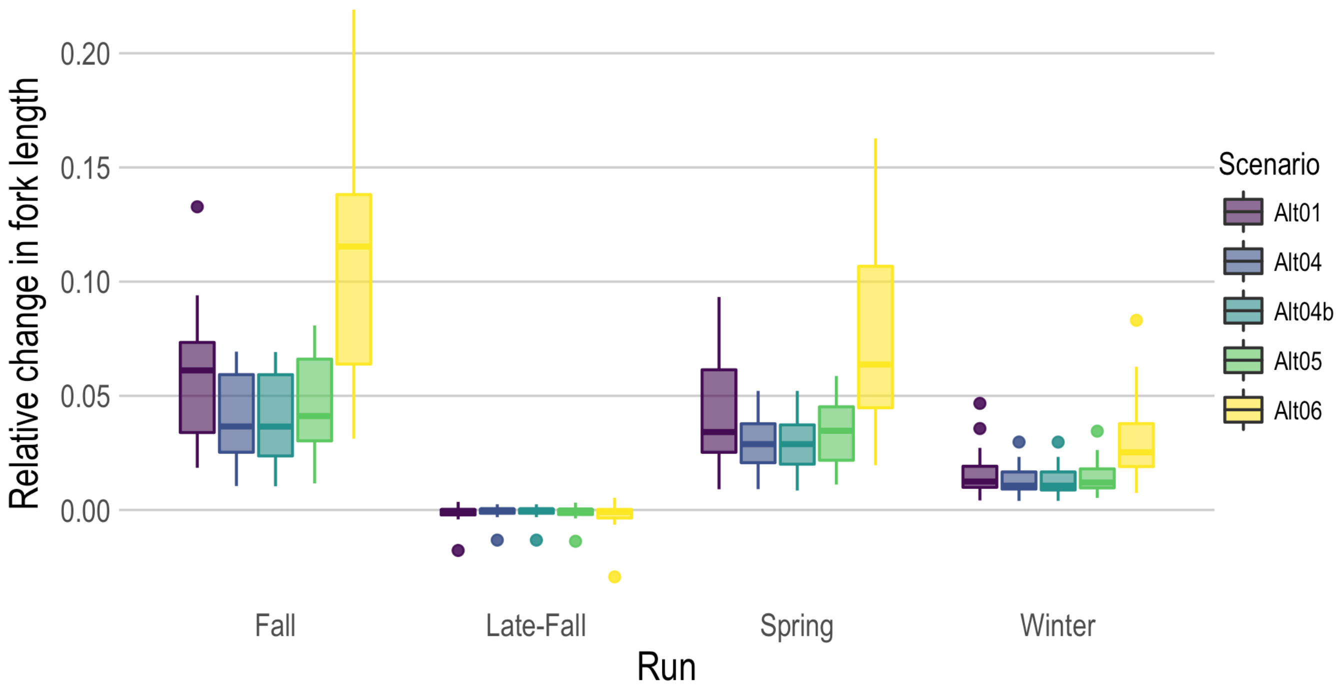

Figure 9. Relative change in mean fork length at Chipps Island for 15 years under five alternatives for notches in Fremont Weir. The line near the center of the box is the median, the bottom and top of the box are the 25th and 75th percentiles, respectively, the whiskers show the min/max (unless there are outliers), and the points are outliers (+/- 1.5x interquartile from 75th and 25th percentile, respectively).

Juvenile Fork Length Variation at Estuary Entry

Fork length variation is calculated as the coefficient of variation in fork length of all cohorts that arrive at Chipps Island weighted by the abundance of fish in the cohort. Using fork length variation as a fish benefits metric reflects the importance of trait variation in ecological dynamics, including those assumed for CV Chinook salmon (Goertler et al. 2016; Bolnick et al. 2011). Fork length variation is higher under alternatives than under existing condition (Figure 10; Table A-3). The alternatives provide access to the Yolo Bypass at lower flows than under existing conditions and, presumably, introduce variability in the accessibility of suitable rearing habitat for fish that, in turn, increases fork length variation at Chipps Island.

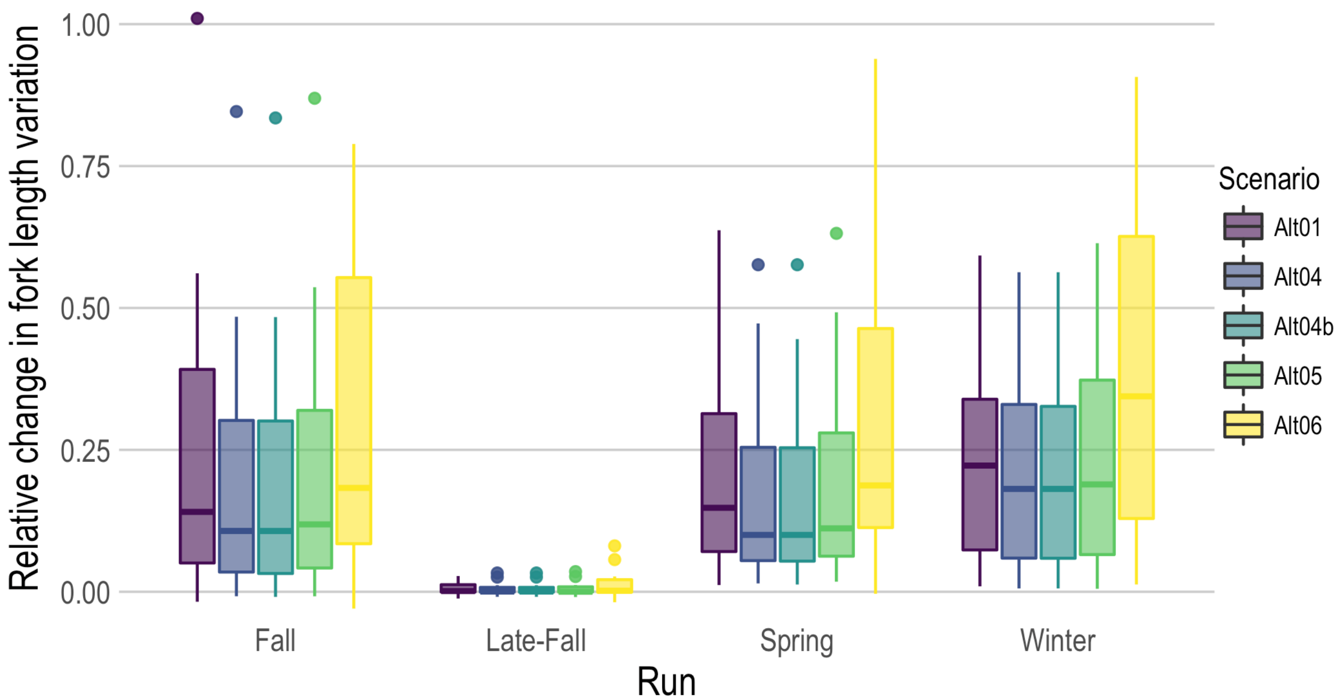

Figure 10. Relative change in coefficient of variation in fork length at Chipps Island for 15 years under five alternatives for notches in Fremont Weir. The line near the center of the box is the median, the bottom and top of the box are the 25th and 75th percentiles, respectively, the whiskers show the min/max (unless there are outliers), and the points are outliers (+/- 1.5x interquartile from 75th and 25th percentile, respectively). Note, the y-axis has been truncated to exclude some outliers. See Table A-3 for full set of values.

Juvenile Timing Variation at Estuary Entry

Entry timing variation is calculated as the coefficient of variation in timing of all cohorts that arrive at Chipps Island weighted by the abundance of fish in the cohort. Timing is measured as day of water year when a cohort arrives at Chipps Island where October 1st is day one. Ocean conditions vary within the migration season (Scheuerell et al. 2009) and variation in estuary entry timing may make the population more resilient to changing ocean conditions. Entry timing variation is higher under alternatives than under existing condition (Figure 11; Table A-4). The alternatives provide access to the Yolo Bypass at lower flows than under existing conditions and, presumably, introduce variability in the accessibility of suitable rearing habitat for fish that, in turn, increases estuary entry timing variation.

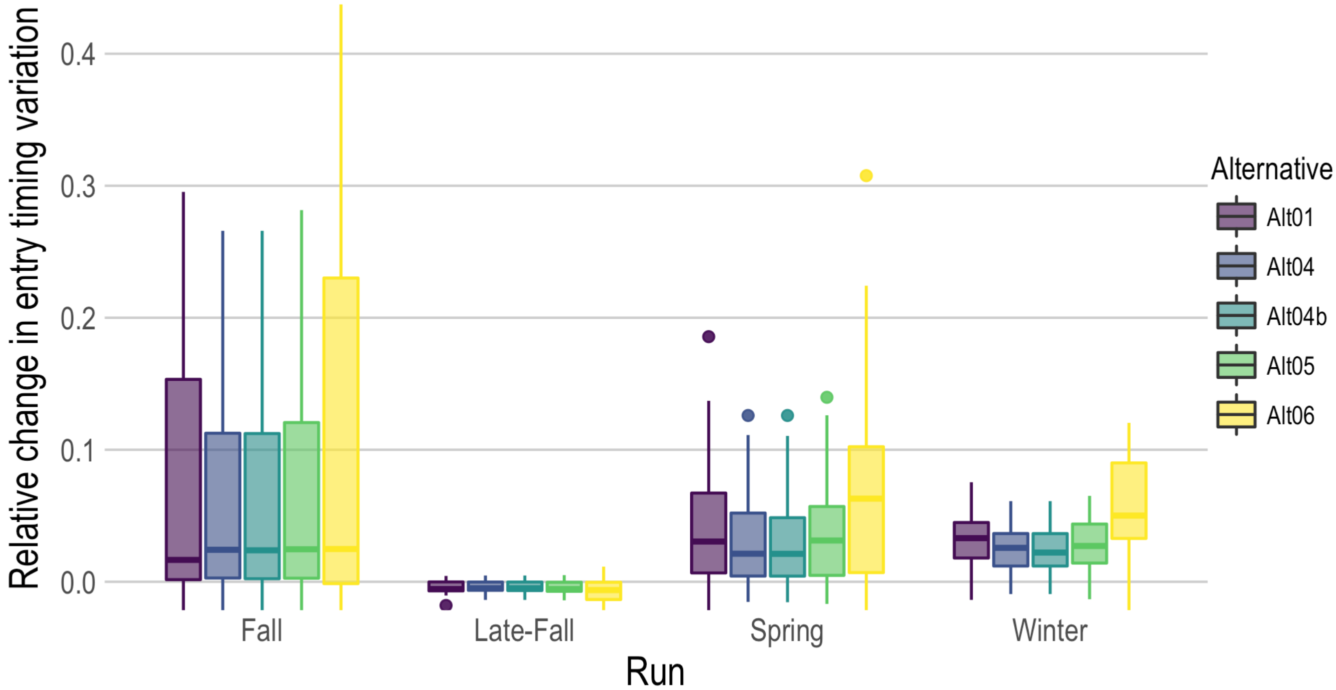

Figure 11. Relative change in coefficient of variation in estuary (Chipps Island) entry timing for 15 years under five alternatives for notches in Fremont Weir. The line near the center of the box is the median, the bottom and top of the box are the 25th and 75th percentiles, respectively, the whiskers show the min/max (unless there are outliers), and the points are outliers (+/- 1.5x interquartile from 75th and 25th percentile, respectively). Note, the y-axis has been truncated to exclude some outliers. See Table A-4 for full set of values.

Returning Adults

The number of returning adult salmon depends on both the number and size of juveniles that arrive at Chipps Island because the ocean survival relationship is a function of size. The returning adults metric shows the combined effect of the juvenile survival and fork length metrics. In other words, the number of returning adults captures the trade-off between floodplain growth and rearing survival. Under most alternatives and years, the alternatives produce more returning adults than existing conditions (Figure 12; Table A-5). Late-fall fish are the exception because they incur the juvenile survival costs of migrating through the Yolo Bypass (Figure 8), but do not reap the growth benefits (Figure 9) provided by access to the floodplain because they enter the model at a larger average size, often above the rearing size threshold (120 mm).

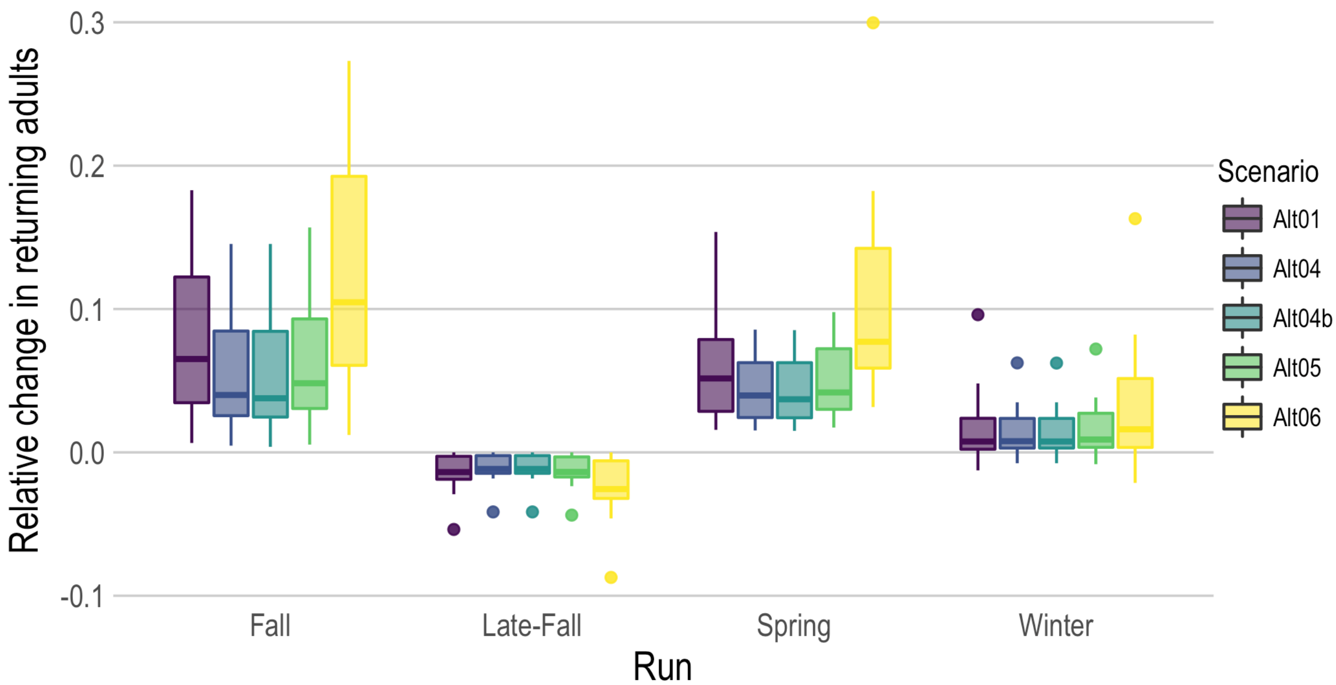

Figure 12. Relative change in number of returning adults for 15 years under five alternatives for notches in Fremont Weir. The line near the center of the box is the median, the bottom and top of the box are the 25th and 75th percentiles, respectively, the whiskers show the min/max (unless there are outliers), and the points are outliers (+/- 1.5x interquartile from 75th and 25th percentile, respectively). Note, the y-axis has been truncated to exclude some outliers. See Table A-5 for full set of values.

Conclusions

In drawing conclusions for the Alternatives Analysis, we focus on three of our fish benefits metrics: returning adults, estuary entry timing variation, and fork length variation. The number of returning adults measures the productivity of the population and incorporates the combined effects of juvenile growth and survival. Moreover, the returning adults metric includes benefits for larger fish in a couple of model components (i.e., growth, ocean survival). In contrast, estuary entry timing variation and fork length variation provide alternative benefits metrics that reflect the value of variation in traits and environmental conditions. Although fish size at ocean entry is a significant predictor of ocean survival, the relationship is noisy (Figure 7) and confounded with estuary entry timing. It's possible that smaller fish may be favored under some ocean conditions, which may increase population stability across years.

For all three focal metrics, Alt06 generated the biggest relative changes. Alt06 has the largest notch and highest max design flows (12,000 cfs) of the modeled alternatives. There is very little difference in the focal metrics among the other alternatives, but Alt01 yields noticeably different relative changes for some runs in some years. Alt01 has the second largest design flow (6,000 cfs) of the notches considered.

The relative change in fork length variation is correlated to relative change in entry timing variation for all runs, except late-fall, with correlation coefficients ranging from 0.72-0.91 across alternatives and runs.

The largest relative changes in returning adults and fork length variation generally do not occur in the same years. For example, for fall- and spring-run in 1999, Alt06 produced a much larger relative change in adult returners than the other alternatives, but there was very little difference among alternatives in fork length variation.

EFFECTS ANALYSIS

The SBM includes numerous modeling decisions derived from best available data, expert opinion, and modeling experience. The conclusions drawn from the model results depend on the details of model implementation and it is an important step in the model development process to explore the implications of changing model rules and input parameters on the model results. If changing a model rule produces little or no change in the results, then it suggests that model component is not particularly important and could be simplified or removed from the model. Conversely, if changing a model rule produces a large change in the results, then it suggests that the model component requires additional investigation and development. In this section, we report on the results of an Effects Analysis to explore how one modeling rule and one input parameter affect the results of the SBM.

Methods

As with the Alternatives Analysis, the Effects Analysis uses the relative change in the response variables, but only includes one alternative. Alt06 was chosen because it consistently showed the largest difference from existing conditions in the Alternatives Analysis. If the Effects Analysis shows a change in the results for Alt06, then we might expect a smaller magnitude change for the other alternatives.

We focused the Effects Analysis on components of the model with the highest uncertainty and largest potential impact on the Alternatives Analysis. In the next few sections, we will briefly describe the model rule used in the analysis of alternatives, which is described in detail in the Model Documentation above, and then we will describe in detail the other rules included in the Effects Analysis.

Rearing Rules

The default rearing rules are based on temperature, fish size, and run timing (see Floodplain Rearing/Rearing Rules). The temperature rule is simply a critical date (June 1st) when temperatures in the Yolo Bypass were likely to be too warm for floodplain rearing. The fish size rule is a threshold size (120 mm) above which model fish do not engage in rearing behavior. The run timing rule triggers fish to stop rearing and start migrating such that they will arrive at Chipps Island by the last date observed at Chipps Island for each run. The run timing rule applies the same date across all years and is not sensitive to changing hydrological conditions. Juvenile Chinook salmon are able to use changing hydrological conditions on the floodplain to determine when to stop rearing and begin moving downstream again (Moyle et al. 2007). In the Effects Analysis, we use changes in the total area inundated on the Yolo Bypass as the proxy measure for cues that fish might use to make rearing decision and contrast the inundation rule with the run timing rule.

The inundation rule requires two decisions: (1) how long of a time period over which to assess changes in inundation and (2) how big of a change in inundation is required to change rearing behavior. We provide a web tool for interested readers to explore the consequence of those decisions: https://fishsciences.shinyapps.io/yolo-bypass-suitable-habitat/. We used juvenile salmonid catch timing on the Yolo Bypass (Takata et al. 2017) to roughly guide our decisions about the change time period and threshold change. In the Effects Analysis, we consider two time periods 30 and 60 days, but only one threshold for each time period (±120 and ±60, respectively). The inundation change is calculated as the slope between inundation on the current day and inundation 30 (or 60) days ago. Only those two time points are used in the calculation of the slope. If the slope is above the upper threshold value, and suitable habitat is available, then a rearing-eligible cohort will start or continue rearing. If the slope is below the lower threshold value, then cohorts will stop rearing and continue migrating through the Canal Complex. If the slope is between the upper and lower threshold values, then fish do not change their current rearing status.

Rearing Survival

The default value of daily rearing survival is 0.99 based on an analysis (see https://fishsciences.shinyapps.io/yolo-bypass-rearing-survival/) of floodplain growth and ocean survival that suggested that 0.99 is an approximate minimum value of rearing survival to make rearing worthwhile (i.e., growth benefits outweigh survival costs of rearing) across the range of fish sizes in the model. In the Effects Analysis, we evaluated two additional levels of rearing survival: 0.97 and 0.95. The levels are chosen to illustrate conditions where rearing is not beneficial for small fish (0.97) and not beneficial for any fish (0.95) based on the supplementary analysis of rearing survival (see https://fishsciences.shinyapps.io/yolo-bypass-rearing-survival/).

Results

We report results of the Effects Analysis for the same five metrics (juvenile survival, fork length, fork length variation, entry timing variation, returning adults) described in the Alternatives Analysis. We also include travel time, not as a fish benefits metric, but as a metric that provides additional information for understanding the fish benefits metrics.

Juvenile Travel Time to Estuary Entry

Travel time is calculated as the mean travel time from Knights Landing to Chipps Island weighted by the abundance of fish in the cohort. For fish migrating through the Yolo Bypass route, travel time also includes time spent rearing. Travel times were longest at high rearing survival under the run timing rearing rule, particularly for fall- and spring-run fish (Figure 13). Fall- and spring-run fish enter the model at the smallest size and have the latest run timing dates, and, thus, have the longest potential rearing times under the run timing rule. If rearing survival is high, more of the fish that spent a long time rearing on the floodplain make it to Chipps Island, which increases the mean travel time. The inundation rearing rules produce shorter travel times under high rearing survival because small spring- and fall-run fish are prompted to resume migration sooner than under the run timing rule. Under the lowest rearing survival, travel times are slightly shorter for the run timing rule for fall- and spring-run fish because the long rearing fish in the run timing rule do not survive to Chipps Island. The travel time patterns for fall-, spring-, and winter-run fish generally do not hold for late-fall fish because many late-fall fish enter the model above the 120 mm threshold and, thus do not rear on the floodplain.

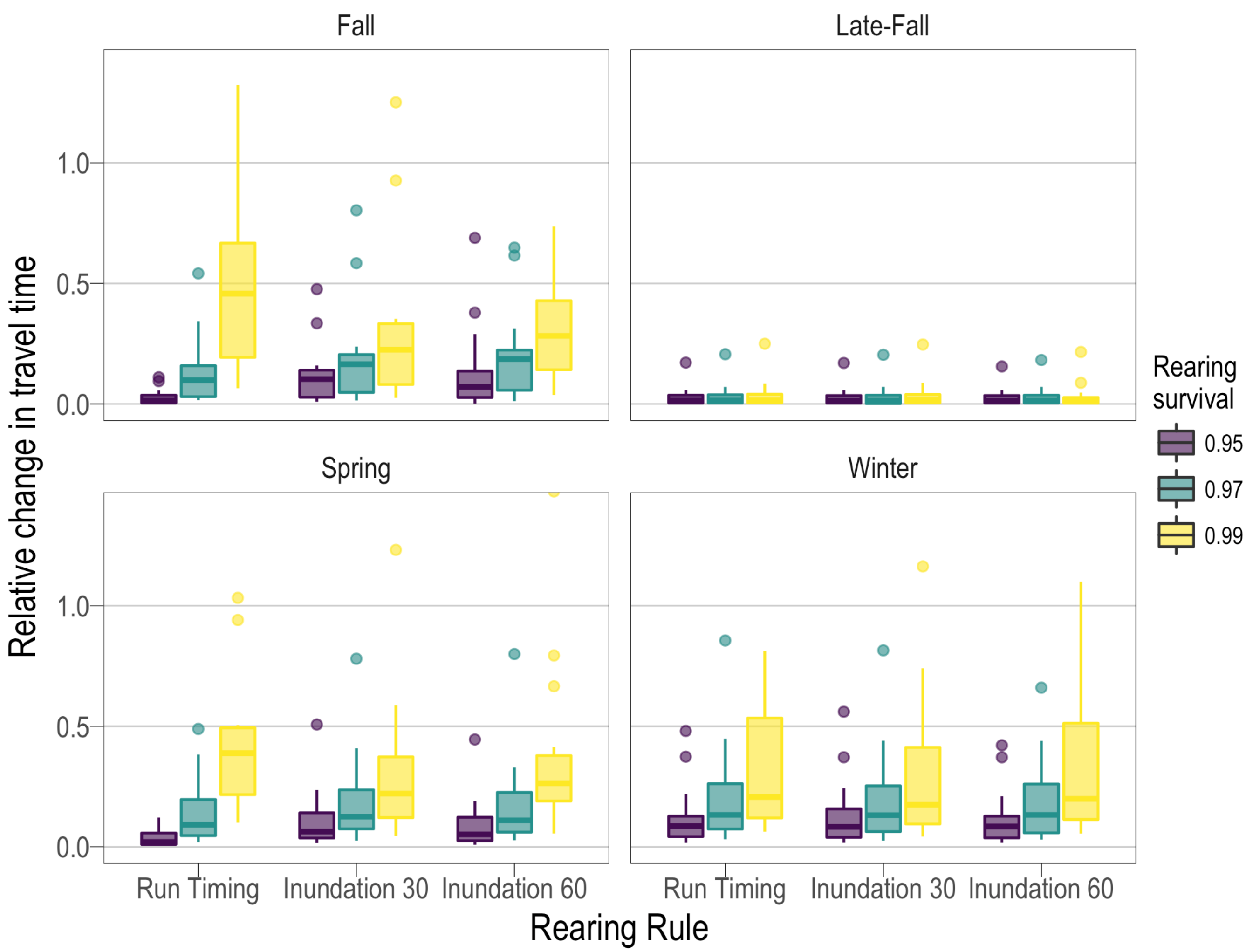

Figure 13. Relative change in mean travel time from Knights Landing to Chipps Island for 15 years under three rearing rule and three levels of rearing survival. The line near the center of the box is the median, the bottom and top of the box are the 25th and 75th percentiles, respectively, the whiskers show the min/max (unless there are outliers), and the points are outliers (+/- 1.5x interquartile from 75th and 25th percentile, respectively).

Juvenile Survival to Estuary Entry

Juvenile survival is calculated as the proportion of fish that survive from Knights Landing to Chipps Island. Because the Canal Complex route has lower migrating survival, and floodplain rearing incurs a survival cost, the increased entrainment of fish onto the Yolo Bypass via a notch in Fremont Weir reduces juvenile survival relative to existing conditions (Figure 14). Late-fall-run fish have the smallest relative change in juvenile survival because most late-fall-run fish enter the model above the size threshold (i.e., they do not rear and incur the cost of rearing).

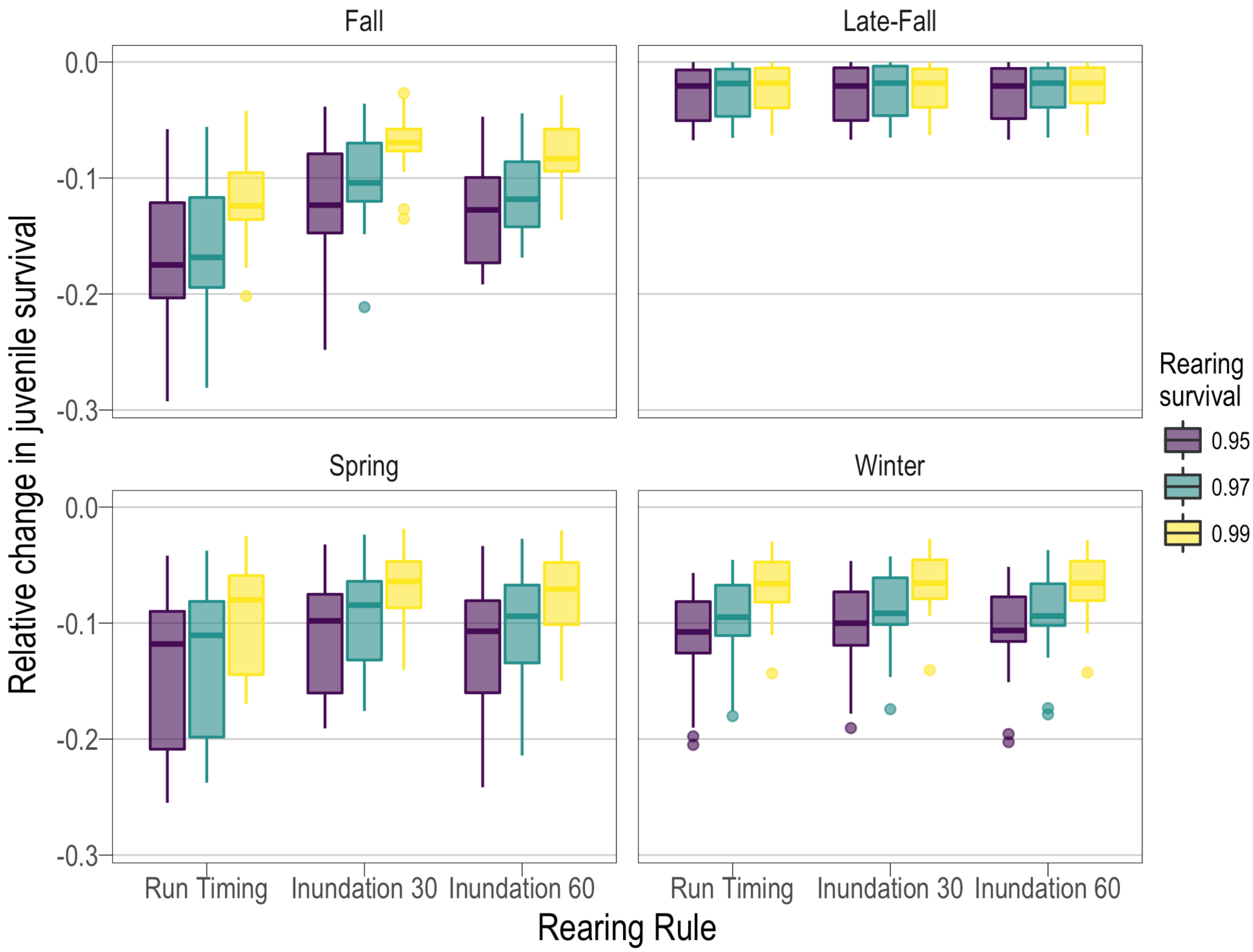

Figure 14. Relative change in juvenile survival from Knights Landing to Chipps Island for 15 years under three rearing rule and three levels of rearing survival. The line near the center of the box is the median, the bottom and top of the box are the 25th and 75th percentiles, respectively, the whiskers show the min/max (unless there are outliers), and the points are outliers (+/- 1.5x interquartile from 75th and 25th percentile, respectively).

Juvenile Fork Length at Estuary Entry

Fork length is calculated as the mean fork length of all cohorts that arrive at Chipps Island weighted by the abundance of fish in the cohort. The patterns in the effects analysis of fork length (Figure 15) resemble the patterns observed for travel time (Figure 13). The underlying mechanisms that create the patterns in travel time (see Juvenile Travel Time) are the same as for fork length.

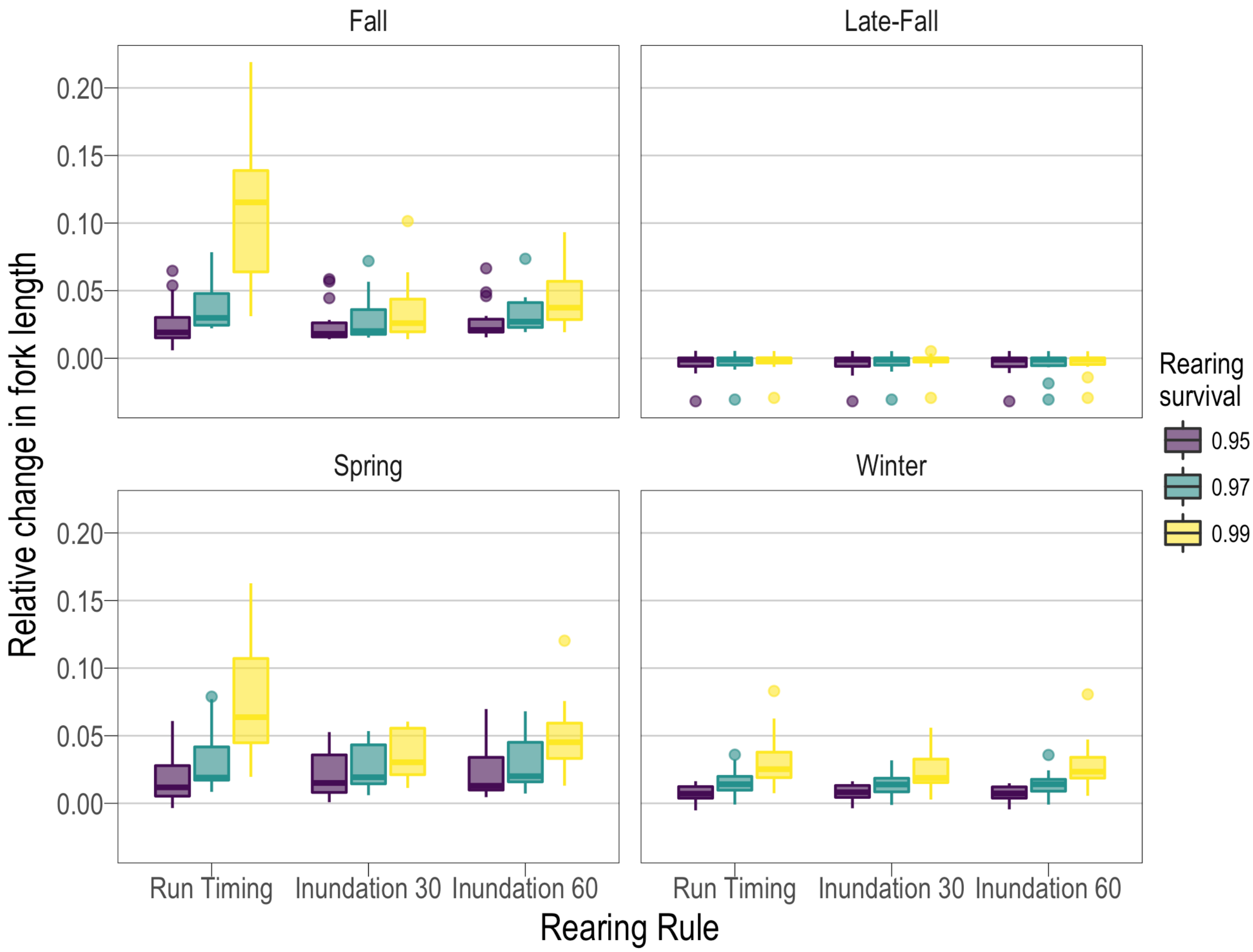

Figure 15. Relative change in mean fork length (mm) at Chipps Island for 15 years under three rearing rule and three levels of rearing survival. The line near the center of the box is the median, the bottom and top of the box are the 25th and 75th percentiles, respectively, the whiskers show the min/max (unless there are outliers), and the points are outliers (+/- 1.5x interquartile from 75th and 25th percentile, respectively).

Juvenile Fork Length Variation at Estuary Entry

Fork length variation is calculated as the coefficient of variation in fork length of all cohorts that arrive at Chipps Island weighted by the abundance of fish in the cohort. Across most effects, runs, and years, fork length variation is higher under the alternative than existing conditions (Figure 16). Late-fall-run fish show small relative change in fork length variation because most late-fall-run fish enter the model above the size threshold and do not rear on the floodplain. Relative change in fork length variation is one metric where you can see the difference between the effects of inundation window length; there is greater variation under the 60-day inundation window for fall- and spring-run. This is likely because fish rear longer under the 60-day rule and differential growth rates result in more variation at estuary entry.

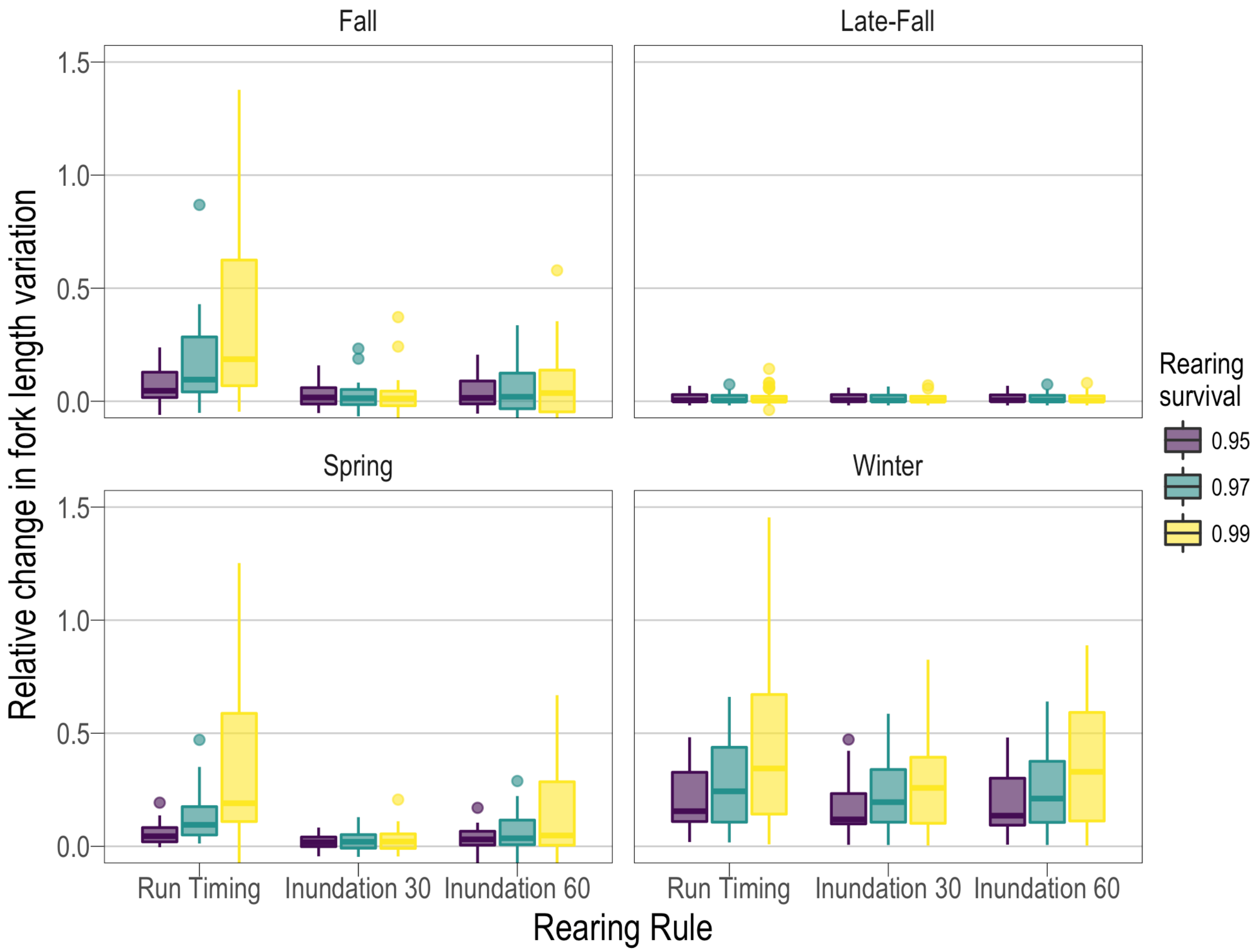

Figure 16. Relative change in coefficient of variation in fork length at Chipps Island for 15 years under three rearing rule and three levels of rearing survival. The line near the center of the box is the median, the bottom and top of the box are the 25th and 75th percentiles, respectively, the whiskers show the min/max (unless there are outliers), and the points are outliers (+/- 1.5x interquartile from 75th and 25th percentile, respectively). Note, the y-axis has been truncated to exclude some outliers. The non-truncated figure is available upon request.

Juvenile Timing Variation at Estuary Entry

Entry timing variation is calculated as the coefficient of variation in timing of all cohorts that arrive at Chipps Island weighted by the abundance of fish in the cohort. Timing is measured as day of water year when a cohort arrives at Chipps Island where October 1st is day one. For winter- and late-fall-run, there are only small effects of rearing rule and rearing survival on entry timing variation (Figure 17). For fall- and spring-run, under the run timing rearing rule, higher rearing survival yields more variation across years in entry timing variation.

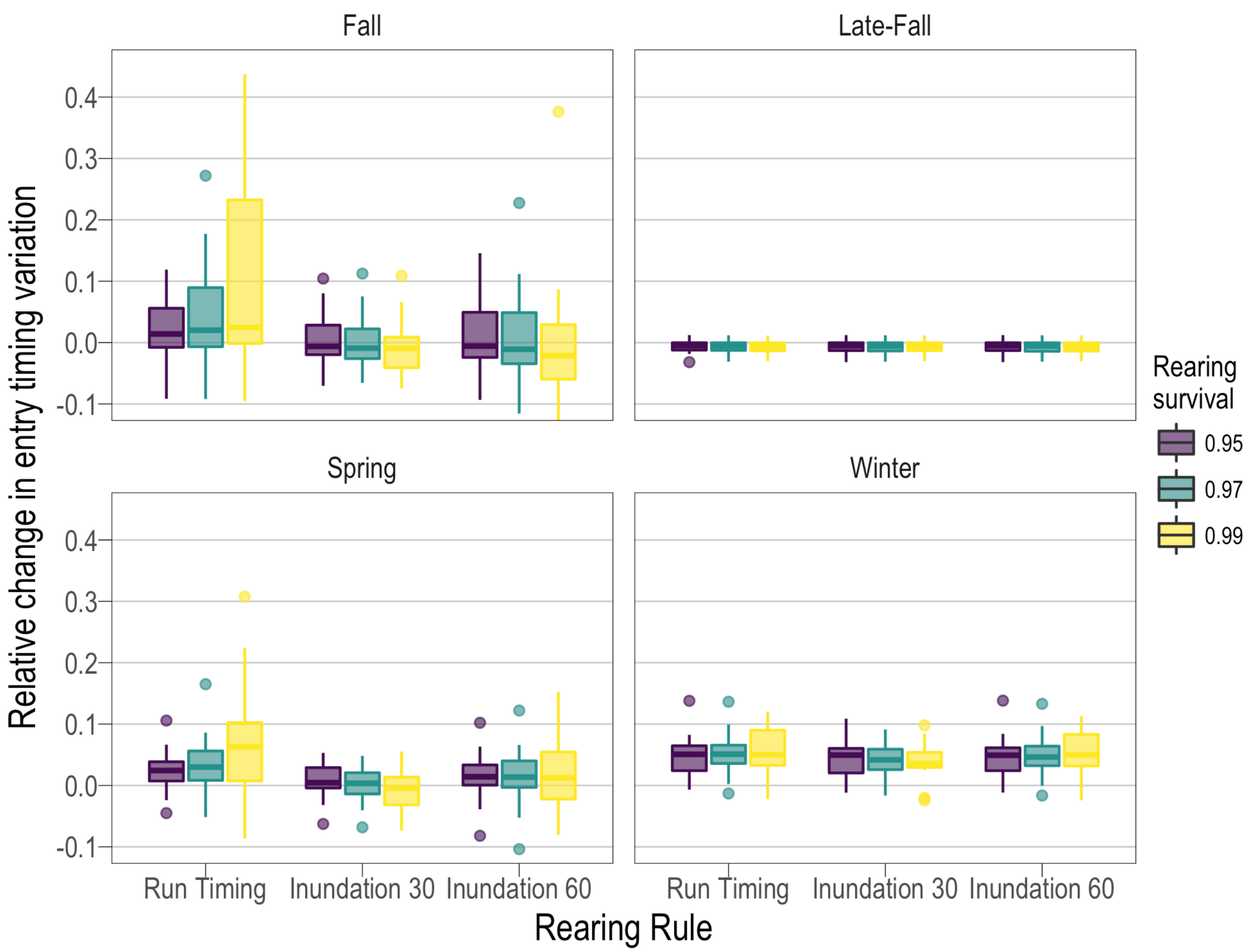

Figure 17. Relative change in coefficient of variation in estuary (Chipps Island) entry timing for 15 years under three rearing rule and three levels of rearing survival. The line near the center of the box is the median, the bottom and top of the box are the 25th and 75th percentiles, respectively, the whiskers show the min/max (unless there are outliers), and the points are outliers (+/- 1.5x interquartile from 75th and 25th percentile, respectively). Note, the y-axis has been truncated to exclude some outliers. The non-truncated figure is available upon request.

Returning Adults

The number of returning adults depends on both the number and size of fish that arrive at Chipps Island because the ocean survival relationship is a function of size. The returning adults metric shows the combined effect of the juvenile survival and fork length metrics. For all runs, except late-fall run, the potential benefits of increased floodplain access provided by the alternative only outweigh the costs of additional time spent rearing under the highest level of rearing survival but not in all years or under all rearing rules (Figure 18). The effect of rearing survival on relative returning adults is strongest for fall- and spring-run fish under the run timing rule. Across all effects and years, late-full-run benefits from the presence of a notch in Fremont Weir, mostly because they enter the model at a large size, which carries benefits throughout the model (e.g., migration survival, growth, and ocean survival). Winter-run fish exhibit the smallest effect of rearing rule, other than late-fall run, presumably because they enter the model at a relatively large size and move through the system at a time of relatively high inundation, i.e., they are most likely triggered to stop rearing by growing to the size threshold (120 mm) than by the run timing or inundation rearing rules.

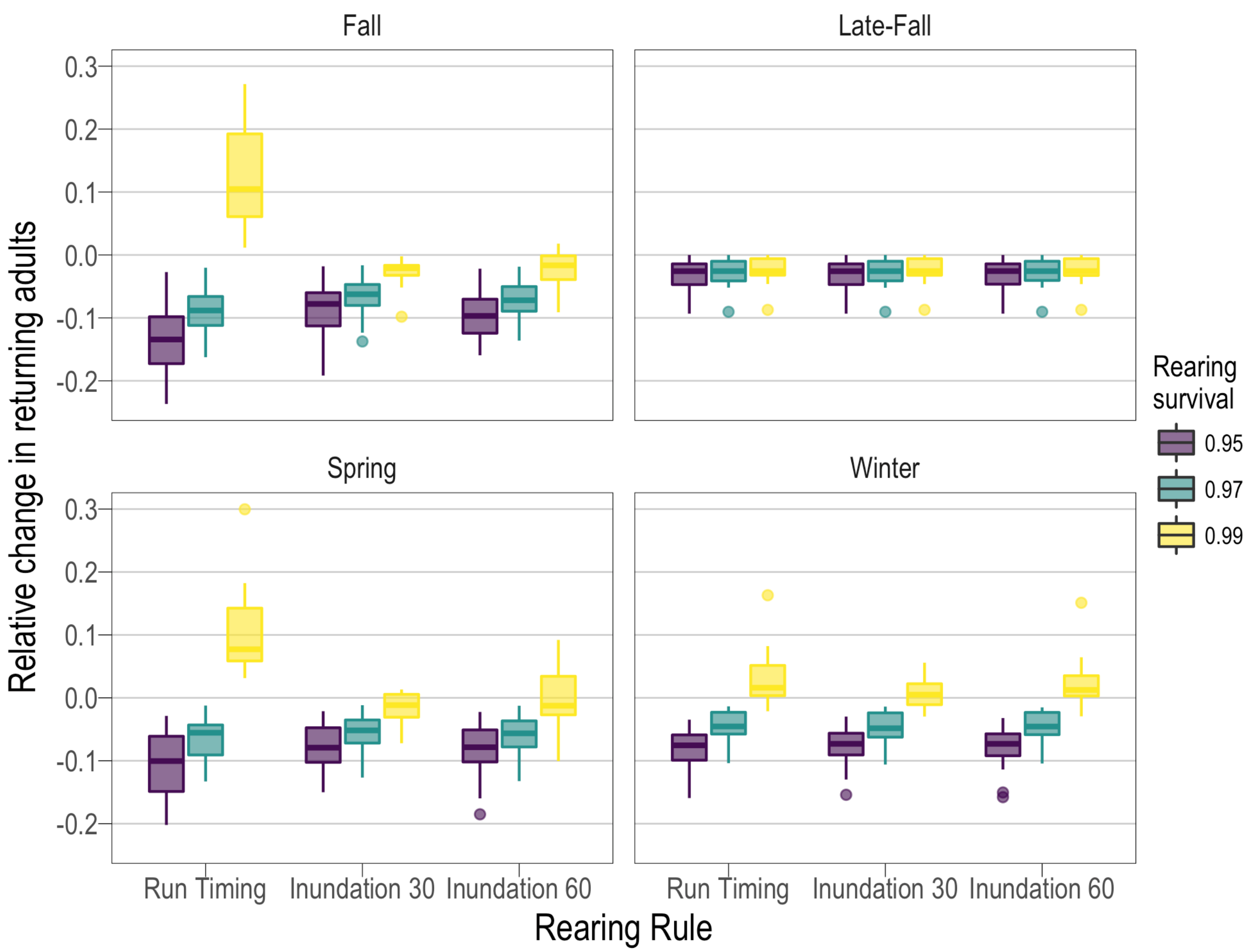

Figure 18. Relative change in number of returning adults for 15 years under three rearing rule and three levels of rearing survival. The line near the center of the box is the median, the bottom and top of the box are the 25th and 75th percentiles, respectively, the whiskers show the min/max (unless there are outliers), and the points are outliers (+/- 1.5x interquartile from 75th and 25th percentile, respectively).

Conclusions

We examined the effect of three rearing rules and three levels of rearing survival on the results produced by the SBM. We focus here on results of these model rules on fork length variation and returning adults. Fork length variation is highly correlated to entry timing variation and may reflect population resilience to changing ocean conditions from year to year. The number of returning adults measures the productivity of the population and incorporates the combined effects of juvenile growth and survival.

For all runs, except late-fall, rearing survival is the key factor in determining the benefit of Alt06; at a value of 0.95, rearing survival on the floodplain is too low to yield a benefit to implementing the Alt06 notch. Because Alt06 exhibited the biggest differences in the Alternatives Analysis, we might expect that the other notches (Alt01, Alt04, Alt04b, Alt05) would not yield a benefit at a rearing survival of 0.95 or 0.97.

There is an interactive effect of the rearing rule and rearing survival value. We suggest that both should be targets for additional study, but recognize the challenges in the design of such studies. For example, acoustic telemetry studies can estimate survival from release at the top of the Yolo Bypass to arrival at Chipps Island, but those studies are not able to partition survival into migrating and rearing components. Furthermore, acoustic telemetry cannot yet accommodate fish smaller than about 74mm FL, missing the ability to evaluate alternative effects on smaller juveniles. Using net pens to study fish on the floodplain can provide estimates of rearing survival, but those estimates are probably lower bounds on actual rearing survival because the pens constrain the juvenile salmons' ability to evade avian predators, find more suitable habitat, or migrate volitionally.

While studies that directly inform modeling rules and parameters are ideal, it is also useful to design studies that provide data to calibrate or validate the model. For example, median survival from Fremont Weir to Chipps Island through the Yolo Bypass was less than 2% for spring- and fall-run under the run timing rearing rule and rearing survival of 0.95. There are no studies of fall- and spring-run survival through the Yolo Bypass, but it seems improbable that overall survival is so low for those runs, which suggests that either 0.95 is too low of a value for rearing survival or the run timing rearing rule does not adequately capture rearing behavior (or both).

The rearing rules examined in this Effects Analysis represent different modeling approaches. The run timing rule limits rearing behavior by placing constraints on rearing that do not change from year to year. The inundation rule allows fish to respond to changing conditions. Because the SBM is not an optimality model, some combinations of the rearing rules and rearing survival potentially yield sub-optimal behavior (e.g., if goal is to optimize probability of returning as an adult).

An earlier version of the SBM identified entrainment as the key factor in maximizing fish benefits from a notch in the Fremont Weir. That version of the model was parameterized such that fish did not incur a survival cost for rearing. Thus, more time spent rearing yielded the benefit of increased growth without the cost of increased mortality. That earlier model also suggested that suitable habitat on the Yolo Bypass, based on depth and velocity, was not often limiting. The combination of high rearing survival and abundant suitable habitat meant that the limiting factor was entrainment onto the Yolo Bypass. If the current version of the model is underestimating rearing survival, or implementing sub-optimal rearing rules, then the importance of entrainment for fish benefits may be underestimated. As it is, addition of rearing mortality to fish entrained on the Yolo Bypass. It is also important to note that while the effects analysis shows a net decrease in juvenile survival across alternatives due to rearing mortality (Figure 14), the juvenile survival effects analysis does not incorporate the presumed survival benefits received for having grown while rearing. These benefits are presumably captured by the effects analysis of rearing rules on adult returns (Figure 18) and fork length variation (Figure 16), which do exhibit some large net positive changes for all runs under Alternative 6.

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APPENDIX A: ALTERNATIVES ANALYSIS TABLES

Tables of Salmon Benefits Metrics

Table A-1. Juvenile survival from Knights Landing to Chipps Island under existing conditions (Exg) and five alternatives for notches in Fremont Weir.

Run	Water Year	Exg	Alt01	Alt04	Alt04b	Alt05	Alt06
Fall	1997	0.177	0.172	0.174	0.174	0.174	0.169
Fall	1998	0.562	0.535	0.547	0.550	0.544	0.520
Fall	1999	0.596	0.517	0.552	0.552	0.545	0.476
Fall	2000	0.620	0.566	0.578	0.578	0.575	0.534
Fall	2001	0.415	0.407	0.406	0.407	0.405	0.398
Fall	2002	0.225	0.216	0.218	0.218	0.216	0.206
Fall	2003	0.219	0.196	0.204	0.204	0.202	0.180
Fall	2004	0.213	0.199	0.202	0.202	0.201	0.190
Fall	2005	0.226	0.214	0.214	0.214	0.213	0.202
Fall	2006	0.505	0.471	0.484	0.484	0.480	0.438
Fall	2007	0.415	0.385	0.391	0.391	0.387	0.368
Fall	2008	0.415	0.383	0.387	0.387	0.385	0.364
Fall	2009	0.415	0.376	0.386	0.386	0.384	0.356
Fall	2010	0.414	0.384	0.399	0.399	0.397	0.360
Fall	2011	0.360	0.338	0.349	0.349	0.345	0.312
Late-Fall	1997	0.184	0.176	0.179	0.179	0.178	0.172
Late-Fall	1998	0.659	0.656	0.656	0.656	0.655	0.651
Late-Fall	1999	0.686	0.669	0.675	0.675	0.673	0.660
Late-Fall	2000	0.686	0.678	0.680	0.680	0.679	0.673
Late-Fall	2001	0.415	0.414	0.414	0.414	0.414	0.414
Late-Fall	2002	0.226	0.224	0.223	0.223	0.222	0.220
Late-Fall	2003	0.226	0.219	0.221	0.221	0.221	0.215
Late-Fall	2004	0.226	0.221	0.221	0.221	0.221	0.213
Late-Fall	2005	0.220	0.220	0.220	0.220	0.220	0.220
Late-Fall	2006	0.486	0.485	0.485	0.485	0.485	0.483
Late-Fall	2007	0.415	0.413	0.413	0.413	0.413	0.410
Late-Fall	2008	0.415	0.408	0.409	0.409	0.407	0.403
Late-Fall	2009	0.415	0.415	0.415	0.415	0.415	0.415
Late-Fall	2010	0.415	0.415	0.415	0.415	0.415	0.415
Late-Fall	2011	0.400	0.389	0.393	0.393	0.392	0.384
Spring	1997	0.187	0.167	0.175	0.175	0.173	0.157

Run	Water Year	Exg	Alt01	Alt04	Alt04b	Alt05	Alt06
Spring	1998	0.653	0.640	0.642	0.642	0.637	0.621
Spring	1999	0.678	0.611	0.639	0.639	0.634	0.570
Spring	2000	0.642	0.618	0.623	0.623	0.621	0.605
Spring	2001	0.415	0.410	0.410	0.411	0.409	0.405
Spring	2002	0.226	0.220	0.220	0.220	0.219	0.213
Spring	2003	0.224	0.202	0.207	0.207	0.206	0.186
Spring	2004	0.225	0.214	0.216	0.216	0.215	0.203
Spring	2005	0.226	0.216	0.218	0.218	0.217	0.208
Spring	2006	0.649	0.613	0.621	0.621	0.616	0.580
Spring	2007	0.415	0.398	0.401	0.401	0.398	0.385
Spring	2008	0.415	0.397	0.399	0.399	0.397	0.383
Spring	2009	0.415	0.402	0.405	0.405	0.404	0.395
Spring	2010	0.413	0.379	0.394	0.394	0.392	0.346
Spring	2011	0.367	0.342	0.352	0.353	0.349	0.319
Winter	1997	0.192	0.182	0.185	0.185	0.184	0.175
Winter	1998	0.671	0.660	0.659	0.659	0.658	0.644
Winter	1999	0.678	0.632	0.648	0.648	0.645	0.604
Winter	2000	0.642	0.617	0.623	0.623	0.622	0.600
Winter	2001	0.415	0.410	0.409	0.409	0.408	0.403
Winter	2002	0.226	0.220	0.221	0.221	0.220	0.215
Winter	2003	0.223	0.204	0.209	0.209	0.208	0.191
Winter	2004	0.225	0.217	0.218	0.218	0.217	0.207
Winter	2005	0.226	0.216	0.218	0.218	0.217	0.208
Winter	2006	0.657	0.633	0.636	0.636	0.634	0.608
Winter	2007	0.415	0.408	0.408	0.408	0.407	0.398
Winter	2008	0.415	0.404	0.405	0.405	0.403	0.395
Winter	2009	0.415	0.402	0.405	0.406	0.405	0.396
Winter	2010	0.415	0.402	0.409	0.409	0.407	0.389
Winter	2011	0.407	0.380	0.389	0.389	0.387	0.362

Table A-2. Mean fork length (mm) at Chipps Island under existing conditions (Exg) and five alternatives for notches in Fremont Weir.

Run	Water Year	Exg	Alt01	Alt04	Alt04b	Alt05	Alt06
Fall	1997	72.8	74.1	73.6	73.6	73.6	75.1
Fall	1998	52.4	54.6	53.6	53.4	53.9	56.0
Fall	1999	47.1	53.4	50.4	50.4	50.9	57.5
Fall	2000	43.1	46.6	45.7	45.7	45.9	48.9
Fall	2001	57.7	58.8	58.9	58.8	59.0	60.0
Fall	2002	52.6	53.9	53.5	53.5	53.8	55.5
Fall	2003	41.9	44.4	43.5	43.5	43.6	46.4
Fall	2004	47.7	49.4	49.0	49.0	49.2	50.8
Fall	2005	45.8	47.3	47.3	47.3	47.3	48.7
Fall	2006	53.6	57.0	55.7	55.7	56.1	60.9
Fall	2007	43.6	46.7	46.1	46.1	46.4	48.6
Fall	2008	41.2	44.3	43.9	43.9	44.2	46.5
Fall	2009	44.2	48.3	47.2	47.1	47.3	50.7
Fall	2010	55.3	59.3	57.3	57.3	57.6	63.1
Fall	2011	53.5	56.7	55.1	55.0	55.6	61.0
Late-Fall	1997	135.3	135.8	135.6	135.6	135.7	136.0
Late-Fall	1998	89.6	89.6	89.7	89.7	89.6	89.6
Late-Fall	1999	97.2	97.1	97.2	97.2	97.1	97.0
Late-Fall	2000	128.8	128.7	128.8	128.8	128.8	128.7
Late-Fall	2001	126.3	126.3	126.3	126.3	126.3	126.2
Late-Fall	2002	121.8	121.8	121.9	121.9	121.8	121.7
Late-Fall	2003	77.1	75.8	76.1	76.1	76.1	74.9
Late-Fall	2004	119.5	119.6	119.7	119.7	119.7	119.9
Late-Fall	2005	46.4	46.2	46.2	46.2	46.2	46.1
Late-Fall	2006	60.9	60.7	60.7	60.7	60.6	60.5
Late-Fall	2007	113.3	113.4	113.4	113.4	113.4	113.6
Late-Fall	2008	138.8	138.9	138.9	138.9	138.9	138.9
Late-Fall	2009	149.0	149.0	149.0	149.0	149.0	149.0
Late-Fall	2010	56.9	56.9	56.9	56.9	56.9	56.8
Late-Fall	2011	90.5	90.2	90.3	90.3	90.3	90.0
Spring	1997	52.1	55.6	54.2	54.2	54.6	57.8
Spring	1998	41.5	42.2	42.1	42.1	42.4	43.3
Spring	1999	52.5	57.4	55.3	55.3	55.6	61.0
Spring	2000	70.7	72.9	72.5	72.5	72.6	74.2

Run	Water Year	Exg	Alt01	Alt04	Alt04b	Alt05	Alt06
Spring	2001	70.1	70.8	70.8	70.7	70.9	71.5
Spring	2002	52.6	53.4	53.4	53.4	53.5	54.2
Spring	2003	46.8	49.6	48.9	48.9	48.9	51.7
Spring	2004	48.2	49.4	49.3	49.3	49.4	50.8
Spring	2005	58.8	60.4	60.1	60.1	60.2	61.6
Spring	2006	49.6	51.7	51.3	51.3	51.6	54.0
Spring	2007	55.6	57.5	57.2	57.2	57.5	59.1
Spring	2008	52.1	54.0	53.9	53.9	54.1	55.7
Spring	2009	72.9	74.8	74.4	74.3	74.5	75.8
Spring	2010	56.8	61.1	59.0	59.0	59.4	66.0
Spring	2011	65.4	69.6	67.8	67.7	68.4	74.1
Winter	1997	104.0	105.6	105.0	105.0	105.3	106.6
Winter	1998	76.4	77.1	77.3	77.3	77.4	78.3
Winter	1999	80.1	82.9	81.9	81.9	82.2	85.1
Winter	2000	103.4	104.8	104.5	104.5	104.5	105.8
Winter	2001	101.4	102.0	102.1	102.0	102.2	102.8
Winter	2002	76.4	76.7	76.8	76.8	76.8	77.0
Winter	2003	83.0	85.2	84.6	84.6	84.7	87.0
Winter	2004	76.2	76.9	76.9	76.9	77.0	78.1
Winter	2005	85.5	86.5	86.3	86.3	86.3	87.2
Winter	2006	71.7	73.4	73.2	73.2	73.4	75.3
Winter	2007	76.8	77.6	77.7	77.7	77.8	78.9
Winter	2008	93.2	94.5	94.5	94.5	94.6	95.7
Winter	2009	104.9	106.2	105.9	105.8	106.0	106.9
Winter	2010	98.4	99.1	98.8	98.8	98.9	99.8
Winter	2011	75.6	79.1	77.9	77.9	78.2	81.9

Table A-3. Coefficient of variation in fork length at Chipps Island under existing conditions (Exg) and five alternatives for notches in Fremont Weir.

Run	Water Year	Exg	Alt01	Alt04	Alt04b	Alt05	Alt06
Fall	1997	0.308	0.302	0.305	0.305	0.305	0.299
Fall	1998	0.472	0.493	0.484	0.479	0.486	0.503
Fall	1999	0.464	0.537	0.514	0.514	0.519	0.549
Fall	2000	0.415	0.512	0.497	0.496	0.501	0.545
Fall	2001	0.366	0.374	0.374	0.374	0.375	0.381
Fall	2002	0.386	0.408	0.403	0.403	0.407	0.426
Fall	2003	0.260	0.403	0.364	0.363	0.371	0.466
Fall	2004	0.348	0.397	0.387	0.387	0.392	0.424
Fall	2005	0.293	0.354	0.353	0.353	0.356	0.397
Fall	2006	0.547	0.556	0.554	0.554	0.555	0.556
Fall	2007	0.269	0.421	0.400	0.400	0.414	0.472
Fall	2008	0.129	0.384	0.367	0.367	0.378	0.461
Fall	2009	0.213	0.427	0.392	0.390	0.397	0.481
Fall	2010	0.357	0.399	0.383	0.382	0.385	0.416
Fall	2011	0.411	0.442	0.429	0.428	0.435	0.459
Late-Fall	1997	0.143	0.143	0.143	0.143	0.143	0.143
Late-Fall	1998	0.511	0.512	0.512	0.512	0.513	0.514
Late-Fall	1999	0.445	0.451	0.449	0.449	0.450	0.454
Late-Fall	2000	0.223	0.224	0.224	0.224	0.224	0.224
Late-Fall	2001	0.131	0.131	0.131	0.131	0.131	0.131
Late-Fall	2002	0.109	0.108	0.108	0.108	0.108	0.108
Late-Fall	2003	0.623	0.633	0.630	0.630	0.630	0.640
Late-Fall	2004	0.045	0.046	0.046	0.046	0.047	0.049
Late-Fall	2005	0.583	0.576	0.578	0.578	0.578	0.572
Late-Fall	2006	0.508	0.508	0.508	0.508	0.508	0.507
Late-Fall	2007	0.067	0.069	0.069	0.069	0.069	0.071
Late-Fall	2008	0.073	0.073	0.073	0.073	0.073	0.073
Late-Fall	2009	0.133	0.133	0.133	0.133	0.133	0.133
Late-Fall	2010	0.962	0.962	0.962	0.962	0.962	0.962
Late-Fall	2011	0.444	0.450	0.448	0.448	0.448	0.454
Spring	1997	0.458	0.495	0.482	0.482	0.486	0.506
Spring	1998	0.395	0.428	0.422	0.422	0.435	0.469
Spring	1999	0.381	0.438	0.420	0.420	0.424	0.452
Spring	2000	0.257	0.271	0.269	0.269	0.269	0.277

Run	Water Year	Exg	Alt01	Alt04	Alt04b	Alt05	Alt06
Spring	2001	0.193	0.208	0.208	0.207	0.211	0.221
Spring	2002	0.350	0.371	0.369	0.369	0.373	0.392
Spring	2003	0.303	0.403	0.381	0.381	0.385	0.450
Spring	2004	0.317	0.370	0.361	0.360	0.365	0.410
Spring	2005	0.327	0.348	0.345	0.345	0.346	0.362
Spring	2006	0.411	0.471	0.457	0.457	0.464	0.511
Spring	2007	0.250	0.324	0.312	0.312	0.322	0.360
Spring	2008	0.175	0.282	0.276	0.276	0.285	0.336
Spring	2009	0.102	0.161	0.150	0.147	0.152	0.181
Spring	2010	0.200	0.328	0.284	0.284	0.293	0.388
Spring	2011	0.432	0.437	0.438	0.437	0.439	0.430
Winter	1997	0.184	0.185	0.185	0.185	0.185	0.186
Winter	1998	0.220	0.231	0.232	0.231	0.233	0.244
Winter	1999	0.197	0.235	0.222	0.222	0.225	0.250
Winter	2000	0.124	0.133	0.131	0.131	0.131	0.138
Winter	2001	0.048	0.063	0.064	0.063	0.065	0.076
Winter	2002	0.192	0.207	0.204	0.204	0.206	0.220
Winter	2003	0.102	0.156	0.142	0.142	0.145	0.182
Winter	2004	0.119	0.151	0.147	0.147	0.150	0.183
Winter	2005	0.123	0.151	0.146	0.146	0.146	0.166
Winter	2006	0.210	0.244	0.239	0.239	0.242	0.272
Winter	2007	0.102	0.135	0.136	0.136	0.141	0.170
Winter	2008	0.058	0.092	0.090	0.090	0.093	0.110
Winter	2009	0.048	0.072	0.068	0.066	0.069	0.081
Winter	2010	0.225	0.234	0.230	0.230	0.231	0.245
Winter	2011	0.187	0.252	0.232	0.232	0.238	0.282

Table A-4. Coefficient of variation in estuary (Chipps Island) entry timing under existing conditions (Exg) and five alternatives for notches in Fremont Weir.

Run	Water Year	Exg	Alt01	Alt04	Alt04b	Alt05	Alt06
Fall	1997	0.205	0.194	0.199	0.199	0.198	0.185
Fall	1998	0.305	0.307	0.306	0.303	0.305	0.308
Fall	1999	0.278	0.288	0.285	0.285	0.286	0.285
Fall	2000	0.207	0.241	0.234	0.234	0.236	0.257
Fall	2001	0.250	0.251	0.251	0.251	0.251	0.250

Run	Water Year	Exg	Alt01	Alt04	Alt04b	Alt05	Alt06
Fall	2002	0.250	0.250	0.251	0.251	0.252	0.249
Fall	2003	0.219	0.249	0.239	0.239	0.241	0.267
Fall	2004	0.233	0.240	0.239	0.239	0.240	0.244
Fall	2005	0.235	0.239	0.241	0.241	0.241	0.245
Fall	2006	0.327	0.330	0.328	0.328	0.329	0.329
Fall	2007	0.183	0.215	0.209	0.209	0.213	0.228
Fall	2008	0.158	0.205	0.200	0.200	0.203	0.228
Fall	2009	0.094	0.153	0.141	0.140	0.143	0.173
Fall	2010	0.263	0.263	0.264	0.264	0.264	0.259
Fall	2011	0.351	0.341	0.349	0.348	0.348	0.320
Late-Fall	1997	0.298	0.298	0.298	0.298	0.298	0.298
Late-Fall	1998	0.524	0.521	0.521	0.521	0.521	0.517
Late-Fall	1999	0.473	0.468	0.469	0.469	0.469	0.465
Late-Fall	2000	0.340	0.342	0.341	0.341	0.342	0.343
Late-Fall	2001	0.260	0.260	0.260	0.260	0.260	0.260
Late-Fall	2002	0.177	0.176	0.176	0.176	0.176	0.176
Late-Fall	2003	0.421	0.414	0.415	0.415	0.415	0.408
Late-Fall	2004	0.124	0.124	0.124	0.124	0.124	0.124
Late-Fall	2005	0.220	0.218	0.218	0.218	0.218	0.217
Late-Fall	2006	0.323	0.321	0.321	0.321	0.320	0.319
Late-Fall	2007	0.212	0.212	0.213	0.213	0.213	0.214
Late-Fall	2008	0.147	0.146	0.146	0.146	0.146	0.146
Late-Fall	2009	0.501	0.501	0.501	0.501	0.501	0.501
Late-Fall	2010	0.294	0.294	0.294	0.294	0.294	0.294
Late-Fall	2011	0.605	0.599	0.600	0.600	0.600	0.596
Spring	1997	0.378	0.382	0.381	0.381	0.381	0.382
Spring	1998	0.378	0.389	0.386	0.386	0.392	0.404
Spring	1999	0.436	0.431	0.435	0.435	0.435	0.419
Spring	2000	0.200	0.196	0.197	0.197	0.197	0.193
Spring	2001	0.173	0.175	0.175	0.174	0.175	0.176
Spring	2002	0.386	0.392	0.391	0.390	0.392	0.398
Spring	2003	0.285	0.312	0.305	0.305	0.306	0.328
Spring	2004	0.352	0.365	0.362	0.362	0.363	0.374
Spring	2005	0.343	0.344	0.343	0.343	0.344	0.344
Spring	2006	0.393	0.413	0.406	0.406	0.409	0.429
Spring	2007	0.281	0.296	0.293	0.293	0.295	0.302

Run	Water Year	Exg	Alt01	Alt04	Alt04b	Alt05	Alt06
Spring	2008	0.182	0.207	0.205	0.205	0.207	0.223
Spring	2009	0.095	0.102	0.101	0.100	0.101	0.105
Spring	2010	0.168	0.199	0.187	0.186	0.189	0.220
Spring	2011	0.336	0.324	0.332	0.331	0.331	0.307
Winter	1997	0.355	0.350	0.351	0.351	0.350	0.347
Winter	1998	0.458	0.457	0.456	0.456	0.457	0.455
Winter	1999	0.415	0.427	0.421	0.421	0.422	0.429
Winter	2000	0.218	0.221	0.219	0.219	0.220	0.223
Winter	2001	0.158	0.160	0.161	0.160	0.161	0.163
Winter	2002	0.308	0.314	0.312	0.313	0.313	0.321
Winter	2003	0.193	0.207	0.202	0.202	0.203	0.216
Winter	2004	0.251	0.260	0.259	0.259	0.259	0.269
Winter	2005	0.262	0.272	0.269	0.269	0.270	0.277
Winter	2006	0.330	0.347	0.344	0.344	0.345	0.364
Winter	2007	0.221	0.229	0.228	0.228	0.230	0.238
Winter	2008	0.121	0.129	0.128	0.128	0.129	0.134
Winter	2009	0.169	0.175	0.173	0.173	0.174	0.178
Winter	2010	0.354	0.360	0.357	0.357	0.358	0.368
Winter	2011	0.338	0.361	0.351	0.351	0.354	0.377

Table A-5. Number of adult returners under existing conditions (Exg) and five alternatives for notches in Fremont Weir.

Run	Water Year	Exg	Alt01	Alt04	Alt04b	Alt05	Alt06
Fall	1997	143,742	144,680	144,412	144,297	144,523	145,488
Fall	1998	379,048	396,574	388,761	385,948	391,001	406,786
Fall	1999	170,935	195,690	184,862	184,848	186,850	208,120
Fall	2000	301,757	334,844	328,261	328,143	329,831	351,424
Fall	2001	280,499	286,800	287,180	287,089	287,969	293,515
Fall	2002	181,353	185,118	184,198	184,189	184,889	188,860
Fall	2003	198,993	211,952	208,020	207,869	208,588	219,830
Fall	2004	133,484	137,955	136,898	136,931	137,442	140,723
Fall	2005	78,117	80,915	80,891	80,890	81,004	83,365
Fall	2006	381,293	401,224	393,892	393,921	396,260	421,107
Fall	2007	136,860	155,337	152,036	152,003	154,179	165,527
Fall	2008	39,065	45,448	44,744	44,744	45,193	49,314

Run	Water Year	Exg	Alt01	Alt04	Alt04b	Alt05	Alt06
Fall	2009	34,818	41,186	39,649	39,568	39,836	44,326
Fall	2010	31,050	34,038	32,642	32,639	32,828	36,503
Fall	2011	89,360	96,260	92,935	92,732	94,139	104,183
Late-Fall	1997	3,634	3,528	3,569	3,569	3,549	3,467
Late-Fall	1998	23,368	23,303	23,327	23,327	23,290	23,220
Late-Fall	1999	223,044	218,800	220,466	220,466	219,787	216,793
Late-Fall	2000	138,849	137,195	137,570	137,570	137,434	136,203
Late-Fall	2001	60,039	59,881	59,876	59,876	59,863	59,714
Late-Fall	2002	48,414	47,749	47,711	47,711	47,583	46,842
Late-Fall	2003	61,203	57,913	58,660	58,660	58,525	55,865
Late-Fall	2004	22,507	22,091	22,096	22,096	22,074	21,480
Late-Fall	2005	6,759	6,646	6,674	6,674	6,667	6,586
Late-Fall	2006	26,839	26,625	26,631	26,631	26,609	26,385
Late-Fall	2007	52,278	52,206	52,187	52,187	52,184	52,078
Late-Fall	2008	81,012	79,707	79,821	79,821	79,617	78,812
Late-Fall	2009	86,388	86,388	86,388	86,388	86,388	86,388
Late-Fall	2010	17,320	17,302	17,316	17,316	17,298	17,275
Late-Fall	2011	24,203	23,666	23,861	23,861	23,803	23,433
Spring	1997	876	914	900	899	903	932
Spring	1998	1,157	1,188	1,183	1,183	1,195	1,234
Spring	1999	26,018	29,016	27,781	27,781	28,006	30,762
Spring	2000	9,692	10,051	9,981	9,978	10,000	10,244
Spring	2001	5,105	5,200	5,201	5,192	5,219	5,299
Spring	2002	4,641	4,714	4,712	4,711	4,722	4,788
Spring	2003	3,783	4,015	3,963	3,960	3,969	4,165
Spring	2004	2,660	2,742	2,730	2,729	2,736	2,821
Spring	2005	3,989	4,081	4,063	4,063	4,067	4,143
Spring	2006	14,137	15,195	14,949	14,948	15,101	16,163
Spring	2007	5,357	5,799	5,723	5,724	5,793	6,114
Spring	2008	4,031	4,385	4,357	4,357	4,399	4,658
Spring	2009	4,434	4,663	4,610	4,598	4,619	4,776
Spring	2010	1,687	1,947	1,832	1,831	1,853	2,193
Spring	2011	1,828	1,949	1,901	1,898	1,920	2,060
Winter	1997	832	821	825	825	825	814
Winter	1998	1,190	1,207	1,211	1,212	1,212	1,232
Winter	1999	4,654	4,878	4,803	4,803	4,822	5,026

Run	Water Year	Exg	Alt01	Alt04	Alt04b	Alt05	Alt06
Winter	2000	8,329	8,363	8,359	8,359	8,359	8,378
Winter	2001	2,028	2,043	2,044	2,043	2,046	2,061
Winter	2002	3,854	3,844	3,856	3,856	3,853	3,832
Winter	2003	3,869	3,898	3,892	3,892	3,891	3,916
Winter	2004	3,650	3,669	3,670	3,672	3,672	3,700
Winter	2005	4,475	4,461	4,462	4,462	4,461	4,451
Winter	2006	19,530	20,311	20,213	20,213	20,278	21,136
Winter	2007	14,268	14,607	14,623	14,623	14,685	15,121
Winter	2008	3,118	3,192	3,188	3,188	3,197	3,253
Winter	2009	4,639	4,692	4,680	4,676	4,682	4,717
Winter	2010	7,017	7,019	7,035	7,035	7,042	7,025
Winter	2011	1,315	1,441	1,397	1,397	1,410	1,529

State of California
California Natural Resources Agency
Department of Water Resources

Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project

Evaluating Adult Salmonid and Sturgeon Passage Potential for Multiple Modified Fremont Weir Configurations:

Application of the *Yolo Bypass Passage for Adult Salmonids and Sturgeon (YBPASS) Tool*

Technical Memorandum

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Acronyms and Abbreviations

2009 Biological Opinion	National Marine Fisheries Service's Biological Opinion and Conference Opinion on the Long-term Operations of the Central Valley Project and the State Water Project
CDEC	Department of Water Resources California Data Exchange Center
CDFG	California Department of Fish and Game
CDFW	California Department of Fish and Wildlife
cfs	cubic feet per second
DPS	distinct population segment
DWR	California Department of Water Resources
EIS/EIR	Environmental Impact Statement/Environmental Impact Report
ESU	evolutionarily significant unit
FETT	Yolo Bypass Fisheries and Engineering Technical Team
HEC-RAS	Hydrologic Engineering Center's River Analysis System
NAVD88	North American Vertical Datum of 1988
NMFS	National Marine Fisheries Service
Project	Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project
Reclamation	United States Department of the Interior, Bureau of Reclamation
RPA	reasonable and prudent alternative
TM	Technical Memorandum
TUFLOW	2014 Yolo Bypass Two-dimensional Unstable Flow Hydrodynamic Model
WY	water year
YBPASS Tool	*Yolo Bypass Passage for Adult Salmonids and Sturgeon Tool*

1. Background

During both flooded and non-flooded conditions, adult salmonids and acipenserids migrate upstream through the Yolo Bypass via the Cache Slough complex (Harrell and Sommer 2003). When the Fremont Weir is not overtopping with Sacramento River flows, these adult anadromous fish do not have access to upstream spawning habitat in the Sacramento River. Through modifications at the Fremont Weir, the California Department of Water Resources (DWR) and the United States Department of the Interior, Bureau of Reclamation (Reclamation) plan to improve connectivity between the Sacramento River and the Yolo Bypass. With improved river-floodplain connectivity, DWR and Reclamation plan to achieve a reduction in migratory delays and loss of federally listed fish species within the Yolo Bypass.

As part of the Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project (Project), DWR and Reclamation are working to improve fish passage and increase floodplain inundation in the Yolo Bypass (DWR and Reclamation 2012). A gated structure (gated notch), or multiple gated structures, in the Fremont Weir would provide adult fish migrating upstream with a means of returning to the Sacramento River while also allowing flows to enter the Yolo Bypass to provide floodplain rearing habitat for juvenile salmonids. The Project would allow DWR and Reclamation to satisfy Reasonable and Prudent Alternative (RPA) Action I.7 (improved fish passage) and Action I.6.1 (increased floodplain rearing habitat) of the 2009 National Marine Fisheries Service’s (NMFS’s) Biological Opinion and Conference Opinion on the Long-term Operations of the Central Valley Project and the State Water Project (2009 Biological Opinion).

The Project will be achieved through the construction of a gated notch, or multiple gated notches, at the Fremont Weir and a new downstream transport channel terminating at the Tule Pond. The Project may also include the construction of water control structures within the Yolo Bypass with bypass channels allowing for fish passage. Although the Project has dual purposes, the emphasis of this Technical Memorandum (TM) is on adult fish passage improvements (RPA Action I.7) rather than juvenile entrainment onto the Yolo Bypass (RPA Action I.6.1).

To evaluate adult fish passage improvements, DWR and Reclamation formed the interagency Yolo Bypass Fisheries and Engineering Technical Team (FETT). Using criteria developed by FETT (DWR 2017), DWR developed the *Yolo Bypass Passage for Adult Salmonids and Sturgeon* (*YBPASS*) *Tool*, which is a compilation of files generated in Microsoft Excel for water years (WYs) 1997–2012. Specifically, the goal of this tool is to use modeled water depths and velocities to determine the frequency that adult fish passage criteria are met for planned facilities at the Fremont Weir.

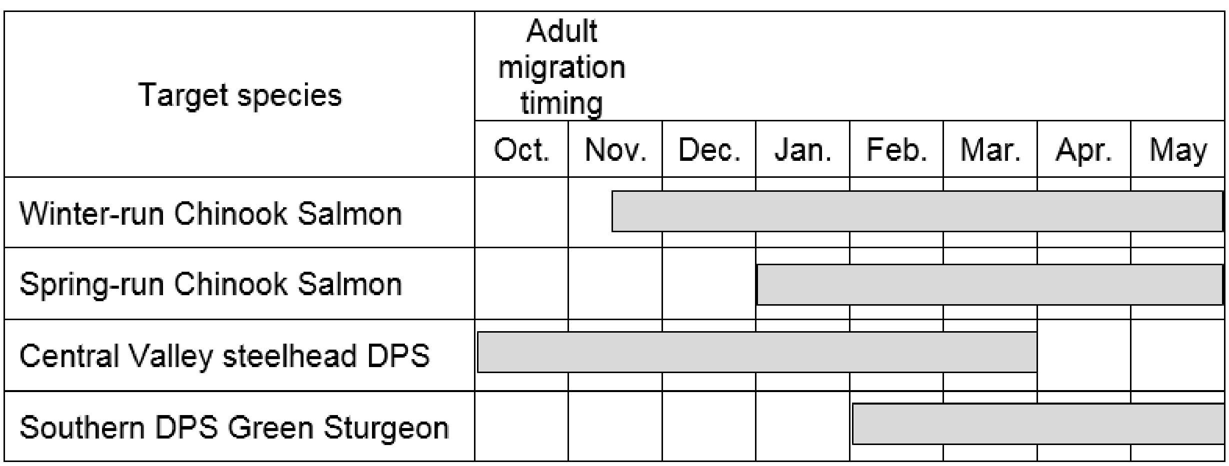
This document provides the methods and results of evaluating adult fish passage performance for the proposed alternatives at the Fremont Weir that are evaluated in the Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the Project. Multiple variations of gated structures, with varying widths and depths, are being explored in an effort to optimize a design for adult fish passage through the Fremont Weir. The broad array of alternatives proposed necessitated the development and use of the *YBPASS Tool* to evaluate adult fish passage criteria for each configuration.

2. Target Species

The NMFS 2009 Biological Opinion focuses on passage constraints in the Yolo Bypass for four federally listed anadromous species: Sacramento River winter-run Chinook salmon evolutionarily significant unit (ESU) *Oncorhynchus tshawytscha*, Central Valley spring-run Chinook salmon ESU *O. tshawytscha*, California Central Valley distinct population segment (DPS) steelhead *O. mykiss*, and Southern DPS of North American Green Sturgeon *Acipenser medirostris*. Under the federal Endangered Species Act, winter-run Chinook salmon are listed as Endangered while the remaining three species are listed as Threatened. Because these species are known to utilize the Yolo Bypass floodplain during adult migration, their passage success at the Fremont Weir will be used to assess the effectiveness of the Project. Therefore, criteria for passage are based on migration timing of these four species.

Migration timing criteria established in the Yolo Bypass Salmonid Habitat Restoration and Fish Passage Implementation Plan and revised by FETT provide distinct timing criteria for each species at the Fremont Weir (Table 1; DWR and Reclamation 2012, FETT 2015, DWR 2017). Literature review of existing data indicates that winter-run Chinook salmon spawning migration occurs between mid-November and May, whereas spring-run migrate between January and mid to late May. In comparison, California Central Valley adult steelhead presence near the Fremont Weir peaks in early October and extends through March, while adult Green Sturgeon migration timing begins in February and ends in early May.

Table 1. Adult fish migration timing in the Sacramento River, near the Fremont Weir, for NMFS (2009) target species.



*sourced from DWR and Reclamation (2012), FETT (2015), and DWR (2017)

Based on these windows for migration, the target species could be present in the Sacramento River near Fremont Weir from October to May. However, October and May are excluded from the operational window for the Project. Although steelhead migration peaks in early fall, October is omitted from this timing window because fall conditions at the Fremont Weir generally exhibit low flow that is not conducive to fish migration. While April accounts for the peak of fish migration within the Sacramento River, May is omitted from the timing window due to similar low flow conditions present in Sacramento River during early fall (Hallock et al. 1957, Hallock and Fisher 1985, Hallock 1989, Heublein et al. 2009, Johnson et al. 2011, DWR and Reclamation 2012).

To accommodate peak migration periods, the operational criteria at the Fremont Weir focus on the time period between November and the end of April. However, the *YBPASS Tool* analyzes adult fish passage potential under the following two different operational windows since the operations of the gated notch will differ from November 1 through April 30:

- November 1 through March 15[1]
  The first operational window occurs when the gated notch will be operated to create floodplain rearing habitat under the maximum design discharge. The end date of March 15 was determined by a series of economic drivers, including the needs of agricultural farmers, which support operations ending on March 15 in order to prevent delays in field preparation and planting.

- March 16 through April 30[1]
  The second operational window occurs when the gated notch will be operated to provide adult fish passage, but with discharge limited to 1,000 cubic feet per second (cfs) in order to avoid major flooding within the Yolo Bypass.

3. Modeling Approach

3.1 Adult Fish Passage Criteria

To evaluate adult fish passage at the Fremont Weir, design criteria developed by FETT for depth, velocity, and width were incorporated into the analysis. As established by the California Department of Fish and Wildlife (CDFW) and NMFS, salmonids require a minimum depth of 1 ft of flow throughout the structure to allow for passage (CDFG 2010, NMFS 2011). Other studies have found that salmonids are capable of passage in depths as low as 0.5 ft; however, multi-species passage requires a structure that allows for species with the most stringent depth requirements (DWR and Reclamation 2012). As larger bodied, benthic swimmers, acipenserids require additional depth to prevent possible delays caused by passage structures. While studies are not available for Green Sturgeon, White Sturgeon *Acipenser transmontanus* of similar size and swimming capabilities were able to pass successfully at depths of 3.3 and 3.0 ft within laboratory swimming flume studies (DWR 2007). Using these findings, FETT (2015) recommends a minimum of 3 ft of depth to facilitate acipenserid passage at fish passage structures and 5 ft of depth in project channels greater than or equal to 60 ft in length (Table 2; NMFS 2011, DWR and Reclamation 2012, DWR 2017). These depths are expected to provide a positive behavioral response for both salmonids and acipenserids, which are more likely to avoid shallow channels.

[1] The first operational window for Alternative 4b occurs between November 1 and March 7 and the second operational window occurs between March 8 and April 30.

Table 2. FETT's design criteria for multi-species adult fish passage structures.

Structure	Project feature length	Depth criterion	Velocity criterion	Width criterion
Gated notch/short channel transitions	< 60 ft	≥ 3 ft	≤ 6 ft/sec	≥ 10 ft
Transport channel	≥ 60 ft	≥ 5 ft	≤ 4 ft/sec	≥ 10 ft

*sourced from DWR (2017)

Velocity criteria also vary among target species, with high velocities acting as barriers to passage once flow exceeds burst speed capabilities of either species. Adult salmonids are able to maintain prolonged swim speeds of 6 ft/sec for up to 30 minutes, with burst speeds as high as 10 ft /sec for 5 seconds (CDFG 2010). By conducting laboratory swimming flume studies, Webber et al. (2007) determined White Sturgeon were able to pass structures at velocities ranging from 2.76 to 8.26 ft/sec. To allow for adult passage under streaming flow conditions, FETT (2015) recommends a maximum velocity criterion of 6 ft/sec at fish passage structures and 4 ft/sec in project channels greater than or equal to 60 ft in length (Table 2; CDFG 2010, DWR 2017). Stable and uniform flow through the structure is necessary to provide efficient passage for larger bodied acipenserids and to prevent injuries caused by salmon jumping.

To provide efficient passage for salmonids and acipenserids, the minimum width of a structure should be considered to prevent potential passage delay or physical injury to the fish. A structure too narrow to pass fish will deter fish from moving upstream and may cause harm to the fish while maneuvering. NMFS (2011) guidelines for salmonid passage specify that fishway entrance widths should be a minimum of 4 ft wide and that pools should be a minimum of 6 ft wide. For larger bodied acipenserids, DWR and Reclamation (2012) suggest using a body length approach, whereby the fishway is designed wide enough to allow for acipenserids to make a complete directional change. Therefore, it is recommended that a minimum width 10 ft be used when designing fish passage structures and project channels (Table 2; Moyle 2002, DWR and Reclamation 2012, DWR 2017). For this TM, alternatives were modeled using the 10-ft width criterion for both the gated notch and the downstream transport channel.

3.2 Model Considerations

For the purpose of this evaluation, fish passage barriers occur when water depth is too shallow or velocity is too high. However, additional considerations are involved with modeling discharge through the gated notch at the Fremont Weir and downstream transport channel.

As stage increases upstream of a structure, the drop in water surfaces creates a velocity barrier, allowing for more rapid flows through the passage structure. Under current conditions, the Sacramento River flows overtop the crest of the Fremont Weir once stage reaches 32 ft North American Vertical Datum 1988 (NAVD88) (West End)[2]. Prolonged overtopping events lead to a backwater effect that reduces velocities through the weir, providing continued fish passage. Therefore, stage associated with high velocities results in barrier to passage until there is sufficient depth (depth criterion of 3 ft for channels less than 60 ft) over the crest of the weir. Therefore, under any modeled scenario, adult fish passage criteria are met once stage is greater than or equal to 35 ft during overtopping events.

Another modeling consideration is to control the volume of flow entering the Yolo Bypass while still providing a hydraulic connection for adult fish passage and juvenile entrainment. Each alternative is modeled to limit discharge by designed dimensions or gate operations. As flow rates increase, gates close to regulate discharge through the passage structure. As the cross-sectional area of the gates is reduced due to gate closure, velocity through the structure increases, causing a barrier to fish passage. Therefore, modeling determines the stage necessary to comply with discharge constraints for each alternative.

3.3 Modeled Scenarios

Since the formation of FETT, several gated notch configurations have been evaluated using the *YBPASS Tool* to help optimize configurations for adult fish passage. Initially, configurations with varying invert elevations were evaluated to determine changes in water surface elevation through the gated notch. Different bottom widths within the structure were also evaluated, allowing for multiple gate designs and operations. Preliminary 2014 Yolo Bypass Two-dimensional Unsteady Flow Hydrodynamic Modeling (TUFLOW) determined that in addition to the gated notch the downstream transport channel needed to be modeled because the head difference at the gates was controlled by the downstream transport channel. As a result, Hydrologic Engineering Center's River Analysis System (HEC-RAS) modeling was then used to evaluate conditions in the downstream transport channel. To reduce velocities through the gates, the cross-sectional area of the gates were adjusted to more closely match the downstream channel dimension. Benches were later proposed to allow for low velocity passage corridors along both sides of the main channel corridor. Once stage rises and velocity reaches the threshold criteria for passage, flow will inundate the benches providing a low velocity option for fish to navigate. Multiple HEC-RAS modeling iterations were completed to provide operational compliance (i.e., depth and velocity criteria) for various configurations, including configurations with benches shifted to one side of the channel. This design combines the cross-sectional area of the benches, while allowing for a lower elevation bench and a higher elevation bench on the same side. A detailed synopsis of the modeling progression for Project alternatives will be documented in the Engineering Hydraulic Analysis TM.

The *YBPASS Tool* TM documents the frequency that adult fish passage criteria are met for the six alternatives that were selected for further analysis in the EIS/EIR. As summarized in Table 3, these six alternatives differ by location, maximum design flow,

[2] Although the Fremont Weir's crest elevation varies west to east, DWR California Data Exchange Center (CDEC) documents the crest elevation as 32 ft NAVD88 for Station Number A02170 (West End). For modeling purposes and throughout this TM, all elevations are recorded in NAVD88.

notch invert elevation, and the bottom width of the transport channel. In general, the first three alternatives in Table 3 all have the ability to bring up to 6,000 cfs into the Yolo Bypass, but differ in terms of where the gated notch and transport channel are placed at the Fremont Weir. Alternatives 1, 2, and 3 each have one bench on the left side (when facing upstream) that is not stepped to include an upper bench.

In comparison, Alternative 4 has the same gated notch configuration as Alternative 3, but limits flow to 3,000 cfs in the Yolo Bypass (Table 3). Because of this, Alternative 4 will divert the same amount of water until the Sacramento River is high enough to allow 3,000 cfs through the gated notch. Once this occurs, the gates will start to close to maintain 3,000 cfs. This alternative will bring in less flow, but there will be water control structures strategically placed throughout the Yolo Bypass with the goal of creating floodplain habitat for a longer period of time. Additional fish passage structures will be necessary for fish to bypass the water control structures during operation. Alternative 4 is comprised of Alternative 4a and 4b, which function identically under different operational windows between November and April (see footnote 1).

Alternative 5 includes the ability to bring up to 3,400 cfs into the Yolo Bypass (Table 3). This configuration includes 27 gates across three channels with the goal to entrain as many juvenile fish as possible. These gates vary in elevation, which gives Alternative 5 the flexibility to operate gates that are at the top of the water column, thereby targeting the greatest concentration of juvenile fish. This design includes multiples gates and transport channels that are expected to have shorter operational ranges.

Lastly, Alternative 6 includes a larger channel bottom width and will allow up to 12,000 cfs through the gated notch (Table 3). By allowing greater flow through the gated notch and allowing gates to remain open during high flows, the goal of this alternative is to improve conditions for adult fish passage and help entrain more juvenile Chinook salmon onto the Yolo Bypass compared to alternatives with lower maximum design discharge.

3.4 Model Components

The *YBPASS Tool* relies on HEC-RAS modeled velocity and depth to inform the dimensions of the proposed alternatives (Table 3). Within each alternative, water depth and velocity were measured as a function of the invert elevation at the weir, the bottom width, and the side slopes. HEC-RAS modeling determined corresponding channel configurations necessary to achieve the proposed maximum design discharges. In addition, velocities were determined by modeling upstream and downstream water surface elevations associated with the proposed alternatives.

To analyze each alternative with the *YBPASS Tool*, TUFLOW modeling determined the modeled Sacramento River stage data at each alternative location (i.e., western, central, and eastern) for WYs 1997–2012. This method was selected because Sacramento River stage data at the Fremont Weir (West End) (CDEC Station Number A02170) only measures stage data for the west end, which is not representative for stage data in the central and eastern locations. Full details on the HEC-RAS and TUFLOW methodology will be documented in the Engineering Hydraulic Analysis TM.

Table 3. Dimensions of the proposed alternatives for fish passage improvements at the Fremont Weir.

Alternative		Maximum design discharge (cfs)	Gated notch description		Transport channel description		
			Dimensions	Invert elevations	Bottom width (ft)	Bench bottom width (ft)	Side slope
1.	Eastern Alignment	6,000	Gate 1: 18 x 34 ft; Gates 2 & 3: 14 x 27 ft	Gate 1: 14-ft; Gates 2 & 3: 18-ft	30	30	3:1
2.	Central Alignment	6,000	Gate 1: 17 x 40 ft; Gates 2 & 3: 13 x 27 ft	Gate 1: 14.8-ft; Gates 2 & 3: 18.8-ft	50	30	3:1
3.	Western Alignment	6,000	Gate 1: 16 x 40 ft; Gates 2 & 3: 12 x 27 ft	Gate 1: 16.1-ft; Gates 2 & 3: 20.1-ft	60	30	3:1
4.[3]	Western Alignment	3,000	Gate 1: 16 x 40 ft; Gates 2 & 3: 12 x 27 ft	Gate 1: 16.1-ft; Gates 2 & 3: 20.1-ft	60	30	3:1
5.	Central Alignment	3,400	27 Gates; Intakes A, B & C: 10 ft x 10 ft; Intake D: 10 ft x 7 ft	Intake A: 14-ft; Intake B: 17-ft; Intake C: 20-ft; Intake D: 23-ft	Intakes A & B: 80; Intake C: 130; Intake D: 142	N/A	3:1
6.	Western Alignment	12,000	Gates 1-5: 14 x 40 ft	16.1-ft Invert	200	N/A	3:1

[3] Alternative 4b has the same configuration as Alternative 4a, but with different operational end dates (see footnote 1).

4. *YBPASS Tool*

4.1 Inputs and Approach

HEC-RAS modeling determined the depth and velocity within each proposed gated notch and transport channel at corresponding stages in the Sacramento River. These data were used to evaluate TUFLOW modeled Sacramento River stage data for each proposed alternative. TUFLOW modeled stage data for WYs 1997–2012 were limited to November 1 through April 30, which is consistent with key periods of adult salmonid and acipenserid presence within the Yolo Bypass. Leap year data (February 29) were removed to allow for uniformity among years. Proposed alternatives were analyzed for compliance with adult fish passage criteria under the following operational windows:

- November 1 through March 15[4]
  Target inundation period under maximum design discharge

- March 16 through April 30[4]
  Target adult fish passage period with the limitation of 1,000 cfs

HEC-RAS modeling determined the minimum Sacramento River stage required to meet the depth criterion (Table 2; 3 ft for channels less than 60 ft and 5 ft for channels greater than or equal to 60 ft) for each proposed alternative's gated notch and transport channel. For alternatives with benches, HEC-RAS modeling also determined the minimum Sacramento River stage required to achieve the 5-ft depth criterion for the left and/or right benches. The minimum Sacramento River stage that still meets depth criterion provides the lower stage threshold for achieving fish passage criteria.

HEC-RAS modeling also determined the maximum Sacramento River stage that does not exceed the velocity criterion (Table 2; 4 ft/sec for channels greater than 60 ft and 6 ft/sec for channels less than or equal to 60 ft) for each of the proposed alternative's gated notch and transport channel. For alternatives with benches, HEC-RAS modeling also determined maximum Sacramento River stage to achieve the 6-ft/sec velocity criterion for the left and/or right benches. The maximum Sacramento River stage that does not exceed the velocity criterion provides the upper stage threshold for meeting fish passage criteria. However, velocity and depth criteria were assumed to be met during an overtopping event in which TUFLOW modeled Sacramento River stage exceeded 35 ft at the Fremont Weir.

In addition to depth and velocity criteria, HEC-RAS modeling determined the Sacramento River stage associated with the maximum designed discharge for each proposed alternative. When TUFLOW modeled Sacramento River stage exceeded this stage, the velocity criterion is assumed to be exceeded due to the requirement of gate closure that will cause increased velocities through the gated notch. The Sacramento River stage that corresponds to the maximum design discharge provides a potential

[4] The first operational window for Alternative 4b occurs between November 1 and March 7 and the second operational window occurs between March 8 and April 30.

upper stage threshold at which point the velocity criterion is exceeded. In order for this stage to be the upper threshold for meeting fish passage criteria, the stage associated with achieving the velocity criterion must be higher.

4.2 Operational Ranges

Table 3 lists the HEC-RAS modeled alternatives currently being evaluated with the *YBPASS Tool*. To determine the operational range for each alternative, TUFLOW modeled stage must meet the minimum depth criterion and not exceed the maximum velocity criterion established for adult fish passage. The minimum Sacramento River stage for depth represents the lower stage threshold for passage and the maximum Sacramento River stage for velocity represents the upper stage threshold for passage. If the lower stage threshold for depth is greater than the upper stage threshold for velocity, the depth criterion for passage is not met before the velocity criterion is exceeded. This lack of overlap results in an inoperable range for adult fish passage. In addition, if the upper stage threshold for velocity is greater than the maximum Sacramento River stage for discharge, the discharge criterion supersedes the velocity criterion. Therefore, stages associated with the threshold of depth, velocity, and discharge criteria correspond to an operational fish passage range for each alternative.

However, operational ranges exist for each location within the modeled alternative, including the gated notch, transport channel, and benches (if benches were proposed). In order to consolidate the ranges into one operational range for the entire alternative, ranges must overlap. In other words, if discharge that exits the gated notch (less stringent adult fish passage criteria) exceeds the passage criteria for the transport channel (more stringent adult fish passage criteria), adult fish passage criteria are not met. If benches are proposed, operational ranges have to be within the operational range of the gated notch in order to meet criteria for passage. By overlapping the operational ranges, the alternative will have one operational range for the gated notch and transport channel. If benches are proposed, an additional operational range for benches can exist if it falls within the operational range of the gated notch. An iterative design process eliminated gaps between the operational ranges for the transport channel and bench(es).

Alternatives 1–4b were modeled using HEC-RAS to determine the operational range for adult fish passage through the gated notch, transport channel, and bench (Table 4; Figure 1). For Alternatives 5 and 6, HEC-RAS modeling determined the operational ranges for the gated notch and transport channel (Table 4; Figure 1). The operational ranges (November 1 through March 15) for Alternatives 1, 2, and 6 do not include the maximum Sacramento River stage for the maximum design discharge. This is because the maximum Sacramento River stage for discharge exceeded the upper stage threshold for the velocity criterion. Alternative 6 does not have an operational range after March 15 due to a velocity barrier once stage reaches the lower stage threshold for fish passage. In other words, when Alternative 6 TUFLOW modeled stage is less than 21.12 ft, the depth criterion is not met and when TUFLOW modeled stage is greater than or equal to 21.12 ft, the velocity criterion is exceeded.

4.2.1 Operational Range for Alternatives 4a and 4b (Western Alignment)

Existing HEC-RAS modeling for Alternatives 4a and 4b (Western Alignment) do not evaluate the proposed downstream water control structures for adult fish passage success. Instead, the operational ranges presented in Table 4 and Figure 1 only accounts for the gated notch and transport channel near Fremont Weir. Once designs are further analyzed, the operational range for Alternatives 4a and 4b will be revised.

Table 4. Operational ranges of the proposed alternatives modeled from HEC-RAS for adult fish passage improvements at the Fremont Weir Station Number A02170 (West End).

Alternative		Maximum design discharge (cfs)	1,000 cfs Discharge criterion exceeded at stages (ft) greater than:	Design discharge criterion exceeded at stages (ft) greater than:	Operational range (ft)	
					November 1–March 15	March 16–April 30
1.	Eastern Alignment	6,000	23.35	29.94	21.14–29.92	21.14–23.35
2.	Central Alignment	6,000	23.06	30.65	21.20–30.57	21.20–23.06
3.	Western Alignment	6,000	22.58	30.87	21.25–30.87	21.25–22.58
4.[5]	Western Alignment	3,000	22.58	26.73	21.25–26.73	21.25–22.58
5.	Central Alignment	3,400	23.86	30.80	21.71–30.80	21.71–23.86
6.	Western Alignment	12,000	20.63	29.84	21.12–28.30	N/A

[5] The first operational window for Alternative 4b occurs between November 1 and March 7 and the second operational window occurs between March 8 and April 30.

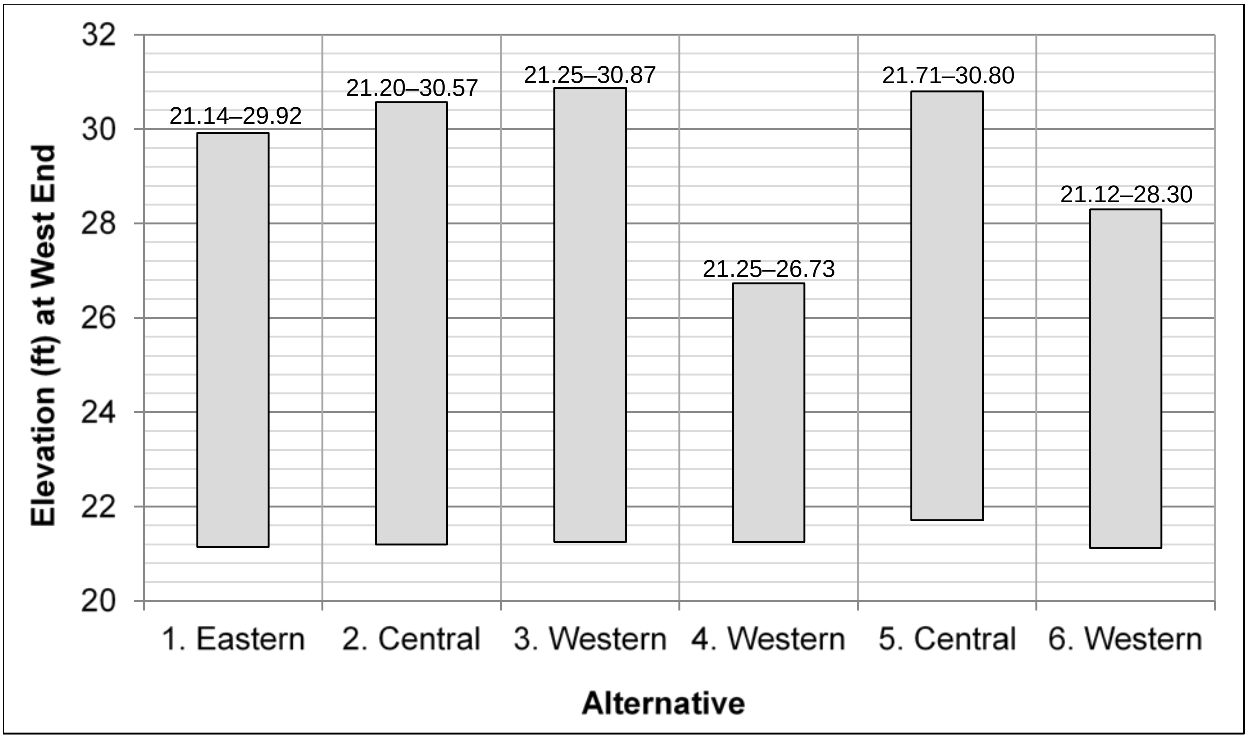


Figure 1. Proposed operational ranges (November 1 to March 15) of the proposed alternatives modeled from HEC-RAS for adult fish passage improvements at the Fremont Weir Station Number A02170 (West End).

4.3 Passage Analysis

For each proposed alternative, both the depth and velocity criteria for adult fish passage were evaluated to determine their individual and combined impact on passage. Compliance with depth and velocity criteria was determined through a series of if-then statements generated from the upper and lower stage thresholds of the operational range (Figure 2).

For each alternative, data were summarized for each WY to include the number of days of insufficient depth, the number of days of excessive velocity, the number of days and percent of season the alternative met criteria, and the last date the alternative met criteria. In addition, the number of days and percent of the month the alternative met criteria were summarized for each WY during the months of February through April, accounting for peak presence of Green Sturgeon in the Yolo Bypass near Fremont Weir. Each summary statistic was averaged across WYs and includes standard deviation.

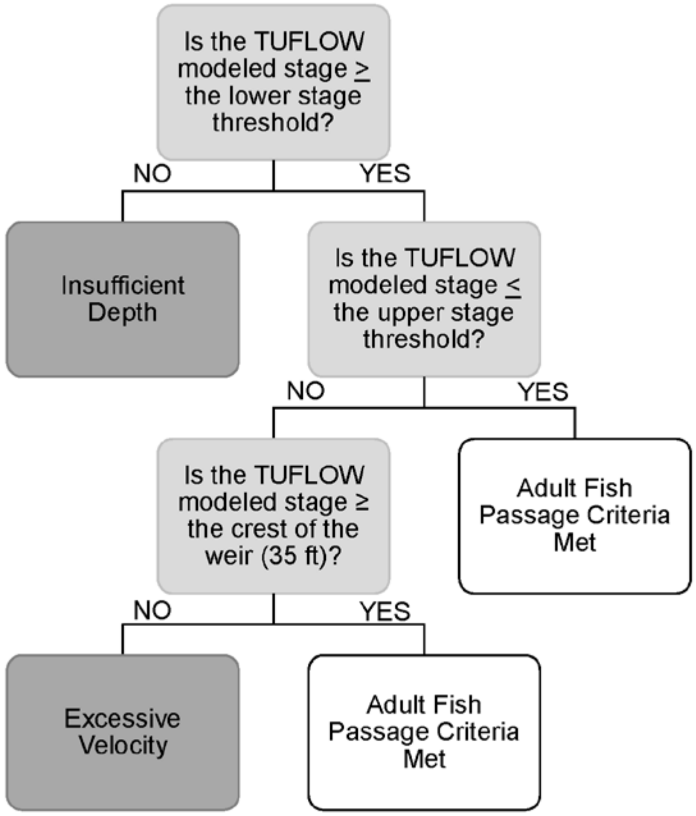


Figure 2. Schematic diagram depicting *YBPASS Tool's* series of if-then statements used to determine compliance with adult fish passage criteria for the proposed alternatives.

5. Model Assumptions and Limitations

Modeling results are subject to the quality of the data used in making assumptions. Often the reliability of the data depends on the best available science to date with relationships taken from laboratory settings and surrogate species. Because Green Sturgeon abundance is relatively low, criteria established for adult White Sturgeon were used in this analysis as a surrogate for adult Green Sturgeon criteria. Although swimming behavior varies between larval/juvenile White and Green sturgeon (Polette et al. 2014, Verhilles et al. 2014), past studies have hypothesized that adult White Sturgeon make appropriate surrogates due to similarities in swimming performance, morphology, and size (DWR 2007). Modeling assumptions made for Green Sturgeon were generated from wild caught White Sturgeon in a laboratory setting (e.g., DWR 2007). Therefore, it is important to note that depth and velocity criteria for acipenserids are not established standards in a natural environment.

The *YBPASS Tool* quantifies compliance with adult fish passage criteria, but does not quantify successful fish passage efficiency. The adult fish passage criteria used for this analysis are purposefully conservative and were generated to account for suitable fish passage conditions for weaker swimming fish belonging to the target species. This conservative approach reduces artificial selection for more adept swimmers. When conditions do not comply with adult fish passage criteria, many fish may still be able to successfully pass through the proposed fish passage structures.

The *YBPASS Tool* only evaluates the effects of depth and velocity on adult fish passage without considering suitable water quality requirements (e.g., water temperature and oxygen). Variations in water quality (including land use impacts) and discharge across seasons are important factors affecting fish migration and resident fish assemblages (Sommer et al. 2013). When water temperatures exceed the known temperature criterion for migratory species (<18.3°C for adult and juvenile salmonids; <24°C for adult Green Sturgeon), fish injury and mortality are possible (Erickson et al. 2002, Moyle et al. 2008, DWR 2013). Although environmental changes are known triggers for changes in fish behavior, environmental changes are not currently evaluated with the *YBPASS Too*l. Environmental conditions are not necessarily evaluation factors. If poor water quality conditions exist at the planned facility, similar conditions would likely exist downstream precluding adult fish from accessing the facility.

Another assumption to consider is the validity of the TUFLOW modeled stage data for each alternative as well as the HEC-RAS modeled operational ranges. In determining fish passage performance, future stream conditions are assumed to mirror historical trends in the Yolo Bypass. Therefore, the use of reliable historical data, either real-time data or modeled data, in all tools is necessary to provide accurate passage predictions for modeled alternatives. The HEC-RAS modeled operational ranges only account for gate operations and dimensions of the transport channel. They do not account for other components of the alternative (e.g., water control structures for Alternatives 4a and 4b). Assumptions made for TUFLOW and HEC-RAS modeling will be summarized in the Engineering Hydraulic Analysis TM.

6. Results

Through the use of the *YBPASS Tool*, adult fish passage for each proposed alternative was determined with consideration for depth and velocity criteria (Table 5). Using 16 years of TUFLOW modeled stage data, Alternative 5 (Central Alignment) provided for the averaged longest passage window of 43 days (24% of season) with the averaged last day of passage as April 1. An average annual of 106 days during the November through April passage season (181 days analyzed with operational ranges found in Table 4) did not meet the depth criterion, whereas an average annual of 32 days did not meet the velocity criterion.

Alternative 1 (Eastern Alignment), Alternative 2 (Central Alignment), and Alternative 3 (Western Alignment) performed comparably with each alternative providing passage 23% of the season. Alternatives 1 and 2 provided passage through April 2, whereas passage for Alternative 3 ended on April 1. Alternative 4a (Western Alignment), Alternative 4b (Western Alignment), and Alternative 6 (Western Alignment) were the lowest performing adult fish passage structures providing passage for only 18%, 18%, and 19% of the season, respectively. The standard deviation of the average passage window (21% of the season) was only 3% across the six alternatives.

The *YBPASS Tool* also determined the number of passable days during the months of February through April, which accounts for the peak presence of Green Sturgeon in the Yolo Bypass near Fremont Weir (Table 6). Alternative 1 (Eastern

Alignment), Alternative 2 (Central Alignment), Alternative 3 (Western Alignment), and Alternative 5 (Central Alignment) performed similarly with an average of 13 days (46% of the month), 7 days (23% of the month), and 2 days (7% of the month) passable during the months of February, March, and April, respectively. Alternative 4a (Western Alignment), Alternative 4b (Western Alignment), and Alternative 6 (Western Alignment) were the lowest performing alternatives during the months of February, March, and April, with Alternative 6 providing no passable days in April.

7. Discussion

Alternative 5 provided for the averaged longest fish passage window (24% of season) when analyzing expected presence using the *YBPASS Tool*. However, the standard deviation of the average passage window (21% of season) was 3% across all six alternatives, which made it difficult to distinguish differences among alternatives. When analyzing the months of February through April independently, Alternatives 1–3 and 5 perform similarly across each month. Alternatives 4a, 4b, and 6 performed slightly lower due to limited operational ranges (Table 4). Specifically, passage performance for Alternative 6 during March and April was reduced because of a lack of operation after March 15 due to depth and velocity barriers.

The *YBPASS Tool* only evaluates fish passage performance in terms of depth and velocity for the gated notch, transport channel, and benches (if benches were proposed). It does not account for other components of the alternatives, such as the water control structures in the Tule Canal for Alternatives 4a and 4b. These structures will be designed to provide adult fish passage, while maintaining floodplain habitat for juveniles; however, HEC-RAS modeling did not evaluate operations at these water control structures. Therefore, *YBPASS Tool* results only reflect operations at the gated notch and transport channel (without water control structures).

Furthermore, the *YBPASS Tool* does not consider fish behavior, nor does it consider the operational reliability of the structure. Based on *YBPASS Tool* results, Alternatives 1–3 and 5 all perform similarly when accounting for expected fish presence. However, the *YBPASS Tool* does not account for the complexity of design for each alternative that could influence fish behavior and thus fish passage efficiency. For instance, Alternatives 1–3 have three gates and one transport channel, whereas Alternative 5 has 27 gates and four transport channels. Because of this complexity, Alternative 5 has a greater possibility to confuse migratory fish. The *YBPASS Tool* only analyzed expected presence for unidirectional movement of adult salmonids and acipenserids through the Yolo Bypass. It does not evaluate the possibility of gate closure and rerouting of fish, nor does it evaluate the potential increase in stranding with the addition of multiple channels. In addition to fish behavior, the operational reliability of the proposed structures could also impact adult fish passage efficiency. For example, the gates could malfunction, or the transport channel could get clogged up with debris, which would reduce fish passage efficiency.

Improved adult fish passage is just one consideration when evaluating alternatives. Other factors should be considered, such as water supply needs and the ability to entrain juvenile Chinook salmon onto the Yolo Bypass. Therefore, the continued use of the *YBPASS Tool*, along with other tools developed for the Project, will be helpful with evaluating alternatives within the Yolo Bypass at the Fremont Weir.

Table 5. *YPBASS Tool* summary results with standard deviation for WYs 1997–2012 assessing adult fish passage for expected presence during November through April for proposed alternatives at the Fremont Weir. Averages and standard deviations were rounded up to the nearest whole number.

Alternative		Average number of days depth barrier exists	Average number of days velocity barrier exists	Average number of days alternative meets criteria	Average percent of season alternative meets criteria	Average last date alternative meets criteria
1.	Eastern Alignment	107 ± 41	32 ± 31	42 ± 15	23%	Apr. 2
2.	Central Alignment	108 ± 41	31 ± 30	42 ± 15	23%	Apr. 2
3.	Western Alignment	109 ± 41	30 ± 29	42 ± 17	23%	Apr. 1
4a.	Western Alignment	109 ± 41	39 ± 32	33 ± 12	18%	Mar. 31
4b.	Western Alignment	109 ± 41	40 ± 32	32 ± 12	18%	Mar. 31
5.	Central Alignment	106 ± 41	32 ± 31	43 ± 16	24%	Apr. 1
6.	Western Alignment	111 ± 41	36 ± 34	34 ± 14	19%	Mar. 3

Table 6. *YPBASS Tool* summary results with standard deviation for WYs 2000–2012 assessing adult Green Sturgeon passage for expected presence during February through April for proposed alternatives at the Fremont Weir. Averages and standard deviations were rounded up to the nearest whole number.

Alternative		February		March		April	
		Average number of days alternative meets criteria	Average percent of month alternative meets criteria	Average number of days alternative meets criteria	Average percent of month alternative meets criteria	Average number of days alternative meets criteria	Average percent of month alternative meets criteria
1.	Eastern Alignment	13 ± 7	46%	7 ± 5	23%	2 ± 5	7%
2.	Central Alignment	13 ± 7	46%	7 ± 6	23%	2 ± 4	7%
3.	Western Alignment	13 ± 7	46%	7 ± 6	23%	2 ± 3	7%
4a.	Western Alignment	11 ± 6	39%	6 ± 6	19%	2 ± 3	7%
4b.	Western Alignment	11 ± 6	39%	5 ± 4	16%	2 ± 3	7%
5.	Central Alignment	13 ± 7	46%	7 ± 6	23%	2 ± 5	7%
6.	Western Alignment	12 ± 6	43%	5 ± 4	16%	0 ± 0	0%

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Appendix G6

CalSim II & Reclamation Water Temperature Model Output

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Long-Term and Water Year-Type Average of Sacramento River Delta Inflow Under Existing - Base and Existing - Alternative 1

	Average Flow (cfs)												
Analysis Period	October	November	December	January	February	March	April	May	June	July	August	September	Total (TAF)
Long-Term													
Full Simulation Period													
Existing - Base	11,300	15,746	24,309	34,221	41,784	35,394	22,062	13,364	12,597	19,584	13,697	16,482	15,659
Existing - Alternative 1	11,300	15,619	23,806	33,300	40,743	34,914	22,062	13,364	12,597	19,584	13,697	16,482	15,476
Difference	0	-128	-503	-921	-1,041	-480	0	0	0	0	0	0	-183
Percent Difference	0%	-1%	-2%	-3%	-2%	-1%	0%	0%	0%	0%	0%	0%	-1%
Water Year-Types													
Wet													
Existing - Base	13,018	22,069	42,432	56,542	64,112	52,430	36,791	18,384	13,640	21,152	15,520	26,010	22,938
Existing - Alternative 1	13,018	21,715	41,187	55,063	62,917	51,855	36,791	18,384	13,639	21,152	15,520	26,010	22,647
Difference	0	-353	-1,245	-1,479	-1,196	-575	0	0	0	0	0	0	-291
Percent Difference	0%	-2%	-3%	-3%	-2%	-1%	0%	0%	0%	0%	0%	0%	-1%
Above Normal													
Existing - Base	11,695	14,566	23,212	43,774	51,354	46,254	22,271	14,655	13,070	22,489	16,033	18,988	17,937
Existing - Alternative 1	11,695	14,526	22,766	42,172	49,573	45,519	22,271	14,655	13,069	22,489	16,033	18,988	17,664
Difference	0	-40	-446	-1,602	-1,781	-735	0	0	-1	0	0	0	-273
Percent Difference	0%	0%	-2%	-4%	-3%	-2%	0%	0%	0%	0%	0%	0%	-2%
Below Normal													
Existing - Base	10,841	14,747	16,484	23,799	32,584	29,126	18,090	11,885	12,782	22,589	15,187	12,013	13,248
Existing - Alternative 1	10,841	14,698	16,298	23,109	31,651	28,574	18,090	11,885	12,782	22,590	15,187	12,013	13,106
Difference	0	-49	-186	-690	-933	-552	0	0	0	0	0	0	-143
Percent Difference	0%	0%	-1%	-3%	-3%	-2%	0%	0%	0%	0%	0%	0%	-1%
Dry													
Existing - Base	10,423	12,567	14,687	17,727	27,798	23,027	11,912	10,212	12,472	17,228	11,469	10,994	10,852
Existing - Alternative 1	10,423	12,547	14,606	17,403	26,909	22,651	11,912	10,212	12,472	17,228	11,469	10,994	10,753
Difference	0	-19	-81	-324	-889	-377	0	-1	0	0	0	0	-99
Percent Difference	0%	0%	-1%	-2%	-3%	-2%	0%	0%	0%	0%	0%	0%	-1%
Critical													
Existing - Base	9,149	9,410	11,565	14,920	17,376	14,410	10,330	7,910	9,857	12,298	8,422	7,772	8,039
Existing - Alternative 1	9,148	9,410	11,537	14,722	17,043	14,349	10,330	7,910	9,857	12,298	8,422	7,772	8,002
Difference	0	0	-28	-199	-333	-62	0	0	0	0	0	0	-37
Percent Difference	0%	0%	0%	-1%	-2%	0%	0%	0%	0%	0%	0%	0%	0%

Sacramento River Delta Inflow

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	14,603	22,010	56,115	71,084	75,521	65,784	49,402	23,850	14,772	24,306	16,775	28,029
20%	13,619	18,623	35,016	61,750	67,715	57,900	35,366	14,647	13,790	23,675	16,437	24,442
30%	12,912	17,392	24,392	45,490	58,539	48,511	24,073	12,554	13,215	23,166	15,988	22,307
40%	12,254	15,897	19,607	34,106	50,381	38,401	16,613	11,092	12,891	22,072	15,543	18,189
50%	11,265	14,221	17,083	26,083	35,167	28,964	13,801	10,661	12,353	20,699	15,010	13,962
60%	10,411	12,217	14,976	20,006	27,645	22,764	12,349	10,122	11,925	19,938	14,452	12,771
70%	8,888	10,901	14,365	15,735	23,924	20,351	11,386	9,739	11,469	18,857	12,942	10,172
80%	7,935	8,613	10,704	13,922	18,176	16,100	10,880	9,315	11,081	14,287	9,192	9,276
90%	6,415	7,211	9,575	11,915	16,074	12,014	9,372	8,228	10,168	12,060	8,272	8,038
Long Term												
Full Simulation Period	11,300	15,746	24,309	34,221	41,784	35,394	22,062	13,364	12,597	19,584	13,697	16,482
Water Year Types												
Wet	13,018	22,069	42,432	56,542	64,112	52,430	36,791	18,384	13,640	21,152	15,520	26,010
Above Normal	11,695	14,566	23,212	43,774	51,354	46,254	22,271	14,655	13,070	22,489	16,033	18,988
Below Normal	10,841	14,747	16,484	23,799	32,584	29,126	18,090	11,885	12,782	22,589	15,187	12,013
Dry	10,423	12,567	14,687	17,727	27,798	23,027	11,912	10,212	12,472	17,228	11,469	10,994
Critical	9,149	9,410	11,565	14,920	17,376	14,410	10,330	7,910	9,857	12,298	8,422	7,772

Existing - Alternative 1

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	14,603	21,765	53,886	69,129	75,429	65,386	49,402	23,850	14,772	24,306	16,775	28,030
20%	13,619	18,581	33,416	58,642	66,079	56,971	35,366	14,647	13,791	23,675	16,437	24,445
30%	12,912	17,383	23,861	43,874	56,915	47,786	24,073	12,554	13,215	23,166	15,989	22,307
40%	12,254	15,874	19,411	32,095	48,037	36,502	16,613	11,092	12,892	22,072	15,543	18,189
50%	11,265	14,206	16,831	25,424	32,956	28,595	13,801	10,661	12,352	20,699	15,010	13,962
60%	10,411	12,216	14,934	19,754	26,826	22,567	12,349	10,119	11,925	19,939	14,452	12,771
70%	8,887	10,901	14,331	15,643	23,336	20,271	11,386	9,739	11,469	18,857	12,942	10,172
80%	7,935	8,613	10,686	13,903	18,047	16,011	10,880	9,315	11,081	14,287	9,192	9,276
90%	6,415	7,211	9,575	11,907	15,981	12,006	9,372	8,228	10,168	12,057	8,273	8,038
Long Term												
Full Simulation Period	11,300	15,619	23,806	33,300	40,743	34,914	22,062	13,364	12,597	19,584	13,697	16,482
Water Year Types												
Wet	13,018	21,715	41,187	55,063	62,917	51,855	36,791	18,384	13,639	21,152	15,520	26,010
Above Normal	11,695	14,526	22,766	42,172	49,573	45,519	22,271	14,655	13,069	22,489	16,033	18,988
Below Normal	10,841	14,698	16,298	23,109	31,651	28,574	18,090	11,885	12,782	22,590	15,187	12,013
Dry	10,423	12,547	14,606	17,403	26,909	22,651	11,912	10,212	12,472	17,228	11,469	10,994
Critical	9,148	9,410	11,537	14,722	17,043	14,349	10,330	7,910	9,857	12,298	8,422	7,772

Existing - Alternative 1 Minus Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	-245	-2,228	-1,956	-92	-398	0	0	0	0	0	0
20%	0	-42	-1,600	-3,107	-1,636	-929	0	0	1	0	0	3
30%	0	-9	-531	-1,617	-1,624	-725	0	0	0	0	1	0
40%	0	-23	-196	-2,012	-2,344	-1,899	0	0	1	1	0	0
50%	0	-15	-252	-659	-2,211	-370	0	0	-1	0	0	0
60%	0	-1	-42	-252	-820	-197	0	-3	0	1	0	0
70%	-1	0	-34	-92	-589	-80	0	0	0	0	0	0
80%	0	0	-18	-19	-129	-89	0	0	0	0	0	0
90%	0	0	0	-7	-92	-8	0	0	0	-3	0	0
Long Term												
Full Simulation Period	0	-128	-503	-921	-1,041	-480	0	0	0	0	0	0
Water Year Types												
Wet	0	-353	-1,245	-1,479	-1,196	-575	0	0	0	0	0	0
Above Normal	0	-40	-446	-1,602	-1,781	-735	0	0	-1	0	0	0
Below Normal	0	-49	-186	-690	-933	-552	0	0	0	0	0	0
Dry	0	-19	-81	-324	-889	-377	0	-1	0	0	0	0
Critical	0	0	-28	-199	-333	-62	0	0	0	0	0	0

Long-Term and Water Year-Type Average of Total CVP Deliveries North of the Delta Under Existing - Base and Existing - Alternative 1

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Existing - Base	1,506	726	389	234	244	337	5,113	5,599	7,987	7,932	5,983	2,046	2,310
Existing - Alternative 1	1,506	726	389	234	244	337	5,113	5,599	7,987	7,932	5,983	2,046	2,310
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
							Water Year-Types						
Wet													
Existing - Base	1,429	662	371	227	244	288	4,682	5,765	8,463	8,473	6,484	2,288	2,388
Existing - Alternative 1	1,429	662	371	227	244	288	4,682	5,765	8,463	8,473	6,484	2,288	2,388
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal													
Existing - Base	1,514	755	372	241	246	248	5,081	5,804	8,436	8,340	6,266	2,355	2,404
Existing - Alternative 1	1,514	755	372	241	246	248	5,081	5,804	8,436	8,340	6,266	2,355	2,404
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal													
Existing - Base	1,527	728	407	242	236	344	5,193	5,744	7,967	7,969	6,039	1,879	2,321
Existing - Alternative 1	1,527	728	407	242	236	344	5,193	5,744	7,967	7,969	6,039	1,879	2,321
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry													
Existing - Base	1,639	783	406	238	254	339	5,398	5,578	7,778	7,583	5,755	1,910	2,283
Existing - Alternative 1	1,639	783	406	238	254	339	5,398	5,578	7,778	7,583	5,755	1,910	2,283
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical													
Existing - Base	1,452	754	396	225	239	517	5,551	4,869	6,853	6,811	4,881	1,649	2,072
Existing - Alternative 1	1,452	754	396	225	239	517	5,551	4,869	6,853	6,811	4,881	1,649	2,072
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Total CVP Deliveries North of the Delta

Existing - Base

					Average Monthly Flow (cfs)							
Statistic	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Probability of Exceedance												
10%	1,875	950	506	303	270	646	6,661	6,327	8,826	8,986	6,821	2,514
20%	1,791	902	457	252	262	436	6,057	6,182	8,524	8,506	6,466	2,380
30%	1,670	825	415	242	253	362	5,755	6,062	8,346	8,239	6,271	2,266
40%	1,605	764	399	236	243	254	5,461	5,909	8,191	8,069	6,139	2,204
50%	1,488	711	379	219	239	243	5,255	5,729	8,016	7,974	6,015	2,112
60%	1,404	638	353	215	238	225	4,910	5,521	7,869	7,870	5,949	1,996
70%	1,351	624	339	213	233	214	4,748	5,297	7,762	7,634	5,741	1,840
80%	1,239	572	311	209	223	212	4,333	5,078	7,482	7,356	5,573	1,735
90%	1,142	543	299	200	206	205	3,074	4,689	7,086	7,108	5,323	1,572
Long Term												
Full Simulation Period	1,506	726	389	234	244	337	5,113	5,599	7,987	7,932	5,983	2,046
Water Year Types												
Wet	1,429	662	371	227	244	288	4,682	5,765	8,463	8,473	6,484	2,288
Above Normal	1,514	755	372	241	246	248	5,081	5,804	8,436	8,340	6,266	2,355
Below Normal	1,527	728	407	242	236	344	5,193	5,744	7,967	7,969	6,039	1,879
Dry	1,639	783	406	238	254	339	5,398	5,578	7,778	7,583	5,755	1,910
Critical	1,452	754	396	225	239	517	5,551	4,869	6,853	6,811	4,881	1,649

Existing - Alternative 1

					Average Monthly Flow (cfs)							
Statistic	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Probability of Exceedance												
10%	1,875	950	506	303	270	646	6,661	6,327	8,826	8,986	6,821	2,514
20%	1,791	902	457	252	262	436	6,057	6,182	8,524	8,506	6,466	2,380
30%	1,670	825	415	242	253	362	5,755	6,062	8,346	8,239	6,271	2,266
40%	1,605	764	399	236	243	254	5,461	5,909	8,191	8,069	6,139	2,204
50%	1,488	711	379	219	239	243	5,255	5,729	8,016	7,974	6,015	2,112
60%	1,404	638	353	215	238	225	4,910	5,521	7,869	7,870	5,949	1,996
70%	1,351	624	339	213	233	214	4,748	5,297	7,762	7,633	5,741	1,840
80%	1,239	572	311	209	223	212	4,333	5,078	7,482	7,356	5,573	1,735
90%	1,142	543	299	200	206	205	3,074	4,689	7,086	7,108	5,323	1,572
Long Term												
Full Simulation Period	1,506	726	389	234	244	337	5,113	5,599	7,987	7,932	5,983	2,046
Water Year Types												
Wet	1,429	662	371	227	244	288	4,682	5,765	8,463	8,473	6,484	2,288
Above Normal	1,514	755	372	241	246	248	5,081	5,804	8,436	8,340	6,266	2,355
Below Normal	1,527	728	407	242	236	344	5,193	5,744	7,967	7,969	6,039	1,879
Dry	1,639	783	406	238	254	339	5,398	5,578	7,778	7,583	5,755	1,910
Critical	1,452	754	396	225	239	517	5,551	4,869	6,853	6,811	4,881	1,649

Existing - Alternative 1 Minus Existing - Base

					Average Monthly Flow (cfs)							
Statistic	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types												
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

Long-Term and Water Year-Type Average of Total CVP Deliveries South of the Delta Under Existing - Base and Existing - Alternative 1

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Existing - Base	2,670	1,585	1,151	1,274	1,718	2,083	2,592	3,755	5,447	5,876	5,010	3,413	2,214
Existing - Alternative 1	2,670	1,585	1,151	1,274	1,718	2,083	2,592	3,755	5,447	5,876	5,010	3,413	2,214
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
							Water Year-Types						
Wet													
Existing - Base	2,755	1,649	1,228	1,396	1,873	2,512	3,205	4,634	6,886	7,631	6,265	3,879	2,659
Existing - Alternative 1	2,755	1,649	1,228	1,396	1,873	2,512	3,205	4,634	6,886	7,631	6,265	3,879	2,659
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal													
Existing - Base	2,740	1,643	1,230	1,404	1,877	2,297	2,904	4,175	6,129	6,509	5,394	3,647	2,418
Existing - Alternative 1	2,740	1,643	1,230	1,404	1,877	2,297	2,904	4,175	6,129	6,509	5,394	3,647	2,418
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal													
Existing - Base	2,645	1,562	1,118	1,218	1,646	1,988	2,471	3,625	5,220	5,601	4,904	3,373	2,141
Existing - Alternative 1	2,645	1,562	1,118	1,218	1,646	1,988	2,471	3,625	5,220	5,601	4,904	3,373	2,141
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry													
Existing - Base	2,688	1,598	1,166	1,297	1,747	1,770	2,122	3,136	4,412	4,658	4,213	3,129	1,932
Existing - Alternative 1	2,688	1,598	1,166	1,297	1,747	1,770	2,122	3,136	4,412	4,658	4,213	3,129	1,932
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical													
Existing - Base	2,437	1,409	938	935	1,297	1,529	1,799	2,517	3,470	3,601	3,225	2,643	1,561
Existing - Alternative 1	2,437	1,409	938	935	1,297	1,529	1,799	2,517	3,470	3,601	3,225	2,643	1,561
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Total CVP Deliveries South of the Delta

Existing - Base

	Average Monthly Flow (cfs)											
Statistic	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Probability of Exceedance												
10%	3,146	1,963	1,635	2,053	2,691	2,610	3,618	5,163	7,758	8,677	7,137	4,150
20%	2,897	1,760	1,366	1,613	2,139	2,431	3,098	4,370	6,449	7,106	5,875	3,750
30%	2,806	1,682	1,266	1,459	1,962	2,286	2,896	4,123	6,046	6,611	5,562	3,619
40%	2,755	1,638	1,209	1,371	1,849	2,177	2,733	3,975	5,804	6,294	5,232	3,541
50%	2,710	1,604	1,162	1,288	1,756	2,076	2,580	3,826	5,555	6,004	5,081	3,470
60%	2,636	1,548	1,084	1,151	1,582	2,023	2,419	3,579	5,143	5,444	4,674	3,353
70%	2,541	1,475	989	1,037	1,429	1,845	2,206	3,268	4,641	4,993	4,281	3,203
80%	2,408	1,363	849	764	1,068	1,596	1,942	2,893	4,010	4,174	3,822	2,995
90%	2,252	1,229	699	587	870	1,506	1,727	2,417	3,277	3,388	3,199	2,749
Long Term												
Full Simulation Period	2,670	1,585	1,151	1,274	1,718	2,083	2,592	3,755	5,447	5,876	5,010	3,413
Water Year Types												
Wet	2,755	1,649	1,228	1,396	1,873	2,512	3,205	4,634	6,886	7,631	6,265	3,879
Above Normal	2,740	1,643	1,230	1,404	1,877	2,297	2,904	4,175	6,129	6,509	5,394	3,647
Below Normal	2,645	1,562	1,118	1,218	1,646	1,988	2,471	3,625	5,220	5,601	4,904	3,373
Dry	2,688	1,598	1,166	1,297	1,747	1,770	2,122	3,136	4,412	4,658	4,213	3,129
Critical	2,437	1,409	938	935	1,297	1,529	1,799	2,517	3,470	3,601	3,225	2,643

Existing - Alternative 1

	Average Monthly Flow (cfs)											
Statistic	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Probability of Exceedance												
10%	3,146	1,963	1,635	2,053	2,691	2,610	3,618	5,163	7,758	8,677	7,137	4,150
20%	2,897	1,760	1,366	1,613	2,139	2,431	3,098	4,370	6,449	7,106	5,875	3,750
30%	2,806	1,682	1,266	1,459	1,962	2,286	2,896	4,123	6,046	6,611	5,562	3,619
40%	2,755	1,638	1,209	1,371	1,849	2,177	2,733	3,975	5,804	6,294	5,232	3,541
50%	2,710	1,604	1,162	1,288	1,756	2,076	2,580	3,826	5,555	6,004	5,080	3,470
60%	2,636	1,548	1,084	1,151	1,582	2,023	2,419	3,579	5,143	5,444	4,674	3,353
70%	2,541	1,475	989	1,037	1,429	1,845	2,206	3,268	4,641	4,993	4,281	3,203
80%	2,408	1,363	849	764	1,068	1,596	1,942	2,893	4,010	4,174	3,822	2,995
90%	2,252	1,229	699	587	870	1,506	1,727	2,417	3,277	3,388	3,199	2,749
Long Term												
Full Simulation Period	2,670	1,585	1,151	1,274	1,718	2,083	2,592	3,755	5,447	5,876	5,010	3,413
Water Year Types												
Wet	2,755	1,649	1,228	1,396	1,873	2,512	3,205	4,634	6,886	7,631	6,265	3,879
Above Normal	2,740	1,643	1,230	1,404	1,877	2,297	2,904	4,175	6,129	6,509	5,394	3,647
Below Normal	2,645	1,562	1,118	1,218	1,646	1,988	2,471	3,625	5,220	5,601	4,904	3,373
Dry	2,688	1,598	1,166	1,297	1,747	1,770	2,122	3,136	4,412	4,658	4,213	3,129
Critical	2,437	1,409	938	935	1,297	1,529	1,799	2,517	3,470	3,601	3,225	2,643

Existing - Alternative 1 Minus Existing - Base

	Average Monthly Flow (cfs)											
Statistic	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	-1	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types												
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

Long-Term and Water Year-Type Average of Total SWP Deliveries North of the Delta Under Existing - Base and Existing - Alternative 1

	Average Flow (cfs)												
Analysis Period	October	November	December	January	February	March	April	May	June	July	August	September	Total (TAF)
							Long-Term						
Full Simulation Period													
Existing - Base	1,449	1,463	935	345	14	92	2,122	2,685	3,217	3,169	2,515	1,874	1,205
Existing - Alternative 1	1,449	1,463	935	345	14	92	2,122	2,685	3,217	3,169	2,515	1,874	1,205
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
							Water Year-Types						
Wet													
Existing - Base	1,349	1,476	900	256	19	65	1,890	2,778	3,378	3,342	2,671	2,067	1,224
Existing - Alternative 1	1,349	1,476	900	256	19	65	1,890	2,778	3,378	3,342	2,671	2,067	1,224
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal													
Existing - Base	1,568	1,578	982	389	16	50	2,034	2,789	3,376	3,298	2,613	2,185	1,266
Existing - Alternative 1	1,568	1,578	982	389	16	50	2,034	2,789	3,376	3,298	2,613	2,185	1,266
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal													
Existing - Base	1,465	1,428	971	390	12	73	2,227	2,850	3,348	3,292	2,628	1,805	1,242
Existing - Alternative 1	1,465	1,428	971	390	12	73	2,227	2,850	3,348	3,292	2,628	1,805	1,242
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry													
Existing - Base	1,586	1,495	979	379	12	111	2,179	2,641	3,158	3,039	2,427	1,938	1,209
Existing - Alternative 1	1,586	1,495	979	379	12	111	2,179	2,641	3,158	3,039	2,427	1,938	1,209
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical													
Existing - Base	1,330	1,326	851	373	11	191	2,466	2,211	2,613	2,676	2,046	1,175	1,047
Existing - Alternative 1	1,330	1,326	851	373	11	191	2,466	2,211	2,613	2,676	2,046	1,175	1,047
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Total SWP Deliveries North of the Delta

Existing - Base

	Average Monthly Flow (cfs)											
Statistic	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Probability of Exceedance												
10%	2,189	2,095	1,377	634	20	199	3,028	3,131	3,658	3,564	2,851	2,296
20%	2,083	1,972	1,311	545	20	129	2,766	3,040	3,510	3,485	2,800	2,233
30%	1,852	1,922	1,250	477	20	46	2,505	2,979	3,442	3,371	2,692	2,181
40%	1,621	1,877	1,169	452	19	45	2,333	2,935	3,374	3,328	2,615	2,122
50%	1,432	1,754	1,079	398	15	45	2,110	2,816	3,323	3,263	2,577	2,061
60%	1,330	1,572	966	310	12	45	1,988	2,686	3,260	3,194	2,542	2,027
70%	1,282	1,409	822	167	11	40	1,822	2,594	3,160	3,138	2,504	1,909
80%	987	797	532	66	4	34	1,421	2,385	3,102	3,076	2,454	1,555
90%	442	188	85	4	3	26	1,141	1,928	2,974	2,941	2,194	1,007
Long Term												
Full Simulation Period	1,449	1,463	935	345	14	92	2,122	2,685	3,217	3,169	2,515	1,874
Water Year Types												
Wet	1,349	1,476	900	256	19	65	1,890	2,778	3,378	3,342	2,671	2,067
Above Normal	1,568	1,578	982	389	16	50	2,034	2,789	3,376	3,298	2,613	2,185
Below Normal	1,465	1,428	971	390	12	73	2,227	2,850	3,348	3,292	2,628	1,805
Dry	1,586	1,495	979	379	12	111	2,179	2,641	3,158	3,039	2,427	1,938
Critical	1,330	1,326	851	373	11	191	2,466	2,211	2,613	2,676	2,046	1,175

Existing - Alternative 1

	Average Monthly Flow (cfs)											
Statistic	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Probability of Exceedance												
10%	2,189	2,095	1,377	634	20	199	3,028	3,131	3,658	3,564	2,851	2,296
20%	2,083	1,972	1,311	545	20	129	2,766	3,040	3,510	3,485	2,800	2,233
30%	1,852	1,922	1,250	477	20	46	2,505	2,979	3,442	3,371	2,692	2,181
40%	1,621	1,877	1,169	452	19	45	2,333	2,935	3,374	3,328	2,615	2,122
50%	1,432	1,754	1,079	398	15	45	2,110	2,816	3,323	3,263	2,577	2,061
60%	1,330	1,572	966	310	12	45	1,988	2,686	3,260	3,194	2,542	2,027
70%	1,282	1,409	822	167	11	40	1,822	2,594	3,160	3,138	2,504	1,909
80%	987	797	532	66	4	34	1,421	2,385	3,102	3,076	2,454	1,555
90%	442	188	85	4	3	26	1,141	1,928	2,974	2,941	2,194	1,007
Long Term												
Full Simulation Period	1,449	1,463	935	345	14	92	2,122	2,685	3,217	3,169	2,515	1,874
Water Year Types												
Wet	1,349	1,476	900	256	19	65	1,890	2,778	3,378	3,342	2,671	2,067
Above Normal	1,568	1,578	982	389	16	50	2,034	2,789	3,376	3,298	2,613	2,185
Below Normal	1,465	1,428	971	390	12	73	2,227	2,850	3,348	3,292	2,628	1,805
Dry	1,586	1,495	979	379	12	111	2,179	2,641	3,158	3,039	2,427	1,938
Critical	1,330	1,326	851	373	11	191	2,466	2,211	2,613	2,676	2,046	1,175

Existing - Alternative 1 Minus Existing - Base

	Average Monthly Flow (cfs)											
Statistic	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types												
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

Long-Term and Water Year-Type Average of Total SWP Deliveries South of the Delta Under Existing - Base and Existing - Alternative 1

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Existing - Base	4,044	3,416	3,459	465	782	1,284	2,414	3,688	5,146	5,640	5,790	4,893	2,486
Existing - Alternative 1	4,044	3,416	3,459	465	782	1,284	2,414	3,688	5,146	5,640	5,790	4,893	2,486
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
							Water Year-Types						
Wet													
Existing - Base	4,429	3,815	3,773	1,079	1,629	2,451	3,750	5,270	6,698	6,801	7,098	5,951	3,194
Existing - Alternative 1	4,429	3,815	3,773	1,079	1,629	2,451	3,750	5,270	6,698	6,801	7,098	5,951	3,194
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal													
Existing - Base	4,055	3,517	3,542	399	1,077	1,692	3,180	4,482	5,926	6,196	6,553	5,555	2,797
Existing - Alternative 1	4,055	3,517	3,542	399	1,077	1,692	3,180	4,482	5,926	6,196	6,553	5,555	2,797
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal													
Existing - Base	4,050	3,353	3,444	191	336	863	2,305	3,477	5,138	5,942	6,158	5,272	2,458
Existing - Alternative 1	4,050	3,353	3,444	191	336	863	2,305	3,477	5,138	5,943	6,158	5,272	2,458
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry													
Existing - Base	3,928	3,199	3,448	125	192	390	1,342	2,452	4,065	4,948	4,911	4,214	2,016
Existing - Alternative 1	3,928	3,199	3,448	125	192	390	1,342	2,452	4,065	4,948	4,911	4,214	2,016
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical													
Existing - Base	3,377	2,862	2,758	95	143	230	451	1,543	2,584	3,159	2,952	2,396	1,369
Existing - Alternative 1	3,377	2,862	2,758	95	143	230	451	1,543	2,584	3,159	2,952	2,396	1,369
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Total SWP Deliveries South of the Delta

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	6,129	4,776	5,541	1,795	2,061	2,896	4,442	6,100	7,671	7,647	7,791	6,656
20%	5,093	4,372	4,331	592	1,846	2,603	3,679	5,031	6,322	6,528	6,826	5,798
30%	4,839	4,258	4,035	298	1,268	2,451	3,368	4,703	5,924	6,380	6,690	5,674
40%	4,678	4,177	3,884	213	393	1,168	3,151	4,543	5,802	6,169	6,549	5,542
50%	4,500	3,770	3,634	162	279	571	2,400	3,888	5,493	6,078	6,448	5,390
60%	4,261	3,432	3,355	142	255	456	1,993	3,117	5,202	5,922	6,287	5,176
70%	3,403	2,780	2,818	114	214	382	1,694	2,408	4,265	5,525	5,649	4,826
80%	2,205	1,907	2,101	92	174	273	473	2,020	3,349	4,041	3,743	3,165
90%	1,545	1,239	1,379	80	110	207	380	1,631	2,705	3,286	3,008	2,186
Long Term												
Full Simulation Period	4,044	3,416	3,459	465	782	1,284	2,414	3,688	5,146	5,640	5,790	4,893
Water Year Types												
Wet	4,429	3,815	3,773	1,079	1,629	2,451	3,750	5,270	6,698	6,801	7,098	5,951
Above Normal	4,055	3,517	3,542	399	1,077	1,692	3,180	4,482	5,926	6,196	6,553	5,555
Below Normal	4,050	3,353	3,444	191	336	863	2,305	3,477	5,138	5,942	6,158	5,272
Dry	3,928	3,199	3,448	125	192	390	1,342	2,452	4,065	4,948	4,911	4,214
Critical	3,377	2,862	2,758	95	143	230	451	1,543	2,584	3,159	2,952	2,396

Existing - Alternative 1

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	6,129	4,776	5,541	1,795	2,061	2,896	4,442	6,100	7,671	7,647	7,791	6,656
20%	5,093	4,372	4,331	593	1,846	2,603	3,679	5,031	6,322	6,528	6,826	5,798
30%	4,839	4,258	4,034	298	1,268	2,451	3,368	4,703	5,924	6,380	6,690	5,674
40%	4,678	4,177	3,884	213	393	1,168	3,151	4,543	5,802	6,169	6,549	5,542
50%	4,500	3,770	3,634	162	279	571	2,400	3,888	5,493	6,078	6,449	5,390
60%	4,261	3,432	3,355	142	255	456	1,993	3,117	5,202	5,922	6,287	5,176
70%	3,403	2,780	2,818	114	214	382	1,694	2,408	4,265	5,525	5,649	4,826
80%	2,204	1,907	2,101	92	174	273	473	2,020	3,349	4,041	3,743	3,165
90%	1,545	1,239	1,379	80	110	207	380	1,631	2,705	3,286	3,008	2,186
Long Term												
Full Simulation Period	4,044	3,416	3,459	465	782	1,284	2,414	3,688	5,146	5,640	5,790	4,893
Water Year Types												
Wet	4,429	3,815	3,773	1,079	1,629	2,451	3,750	5,270	6,698	6,801	7,098	5,951
Above Normal	4,055	3,517	3,542	399	1,077	1,692	3,180	4,482	5,926	6,196	6,553	5,555
Below Normal	4,050	3,353	3,444	191	336	863	2,305	3,477	5,138	5,943	6,158	5,272
Dry	3,928	3,199	3,448	125	192	390	1,342	2,452	4,065	4,948	4,911	4,214
Critical	3,377	2,862	2,758	95	143	230	451	1,543	2,584	3,159	2,952	2,396

Existing - Alternative 1 Minus Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	-1	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types												
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

Long-Term and Water Year-Type Average of Fremont Weir Spill to Yolo Bypass Under Existing - Base and Existing - Alternative 1

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Existing - Base	114	257	2,635	8,485	13,204	6,934	1,024	20	0	0	0	0	1,933
Existing - Alternative 1	114	391	3,150	9,421	14,271	7,423	1,024	20	0	0	0	0	2,120
Difference	0	133	516	936	1,067	489	0	0	0	0	0	0	187
Percent Difference	0%	52%	20%	11%	8%	7%	0%	0%	0%	0%	0%	0%	10%
							Water Year-Types						
Wet													
Existing - Base	374	844	7,678	25,448	36,369	18,505	3,244	64	0	0	0	0	5,472
Existing - Alternative 1	374	1,216	8,962	26,962	37,595	19,098	3,244	64	0	0	0	0	5,772
Difference	0	372	1,284	1,515	1,226	592	0	0	0	0	0	0	299
Percent Difference	0%	44%	17%	6%	3%	3%	0%	0%	0%	0%	0%	0%	5%
Above Normal													
Existing - Base	0	0	2,008	4,550	10,271	7,823	33	0	0	0	0	0	1,470
Existing - Alternative 1	0	40	2,456	6,179	12,099	8,572	33	0	0	0	0	0	1,749
Difference	0	40	448	1,629	1,829	749	0	0	0	0	0	0	279
Percent Difference	0%	0%	22%	36%	18%	10%	0%	0%	0%	0%	0%	0%	19%
Below Normal													
Existing - Base	0	0	0	291	2,453	501	143	0	0	0	0	0	196
Existing - Alternative 1	0	49	186	983	3,420	1,060	143	0	0	0	0	0	341
Difference	0	49	186	693	967	559	0	0	0	0	0	0	145
Percent Difference	0%	0%	0%	238%	39%	112%	0%	0%	0%	0%	0%	0%	74%
Dry													
Existing - Base	0	0	0	0	537	224	0	0	0	0	0	0	44
Existing - Alternative 1	0	19	81	324	1,441	603	0	0	0	0	0	0	144
Difference	0	19	81	324	904	379	0	0	0	0	0	0	100
Percent Difference	0%	0%	0%	128364%	168%	169%	0%	0%	0%	0%	0%	0%	229%
Critical													
Existing - Base	0	0	0	0	1	0	0	0	0	0	0	0	0
Existing - Alternative 1	0	0	28	199	333	62	0	0	0	0	0	0	37
Difference	0	0	28	199	333	62	0	0	0	0	0	0	37
Percent Difference	0%	0%	0%	0%	42911%	0%	0%	0%	0%	0%	0%	0%	82208%

Fremont Weir Spill to Yolo Bypass

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	0	7,950	28,958	47,428	19,929	23	0	0	0	0	0
20%	0	0	17	7,664	20,668	5,676	0	0	0	0	0	0
30%	0	0	0	2,091	7,247	1,385	0	0	0	0	0	0
40%	0	0	0	0	1,768	0	0	0	0	0	0	0
50%	0	0	0	0	23	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	114	257	2,635	8,485	13,204	6,934	1,024	20	0	0	0	0
Water Year Types												
Wet	374	844	7,678	25,448	36,369	18,505	3,244	64	0	0	0	0
Above Normal	0	0	2,008	4,550	10,271	7,823	33	0	0	0	0	0
Below Normal	0	0	0	291	2,453	501	143	0	0	0	0	0
Dry	0	0	0	0	537	224	0	0	0	0	0	0
Critical	0	0	0	0	1	0	0	0	0	0	0	0

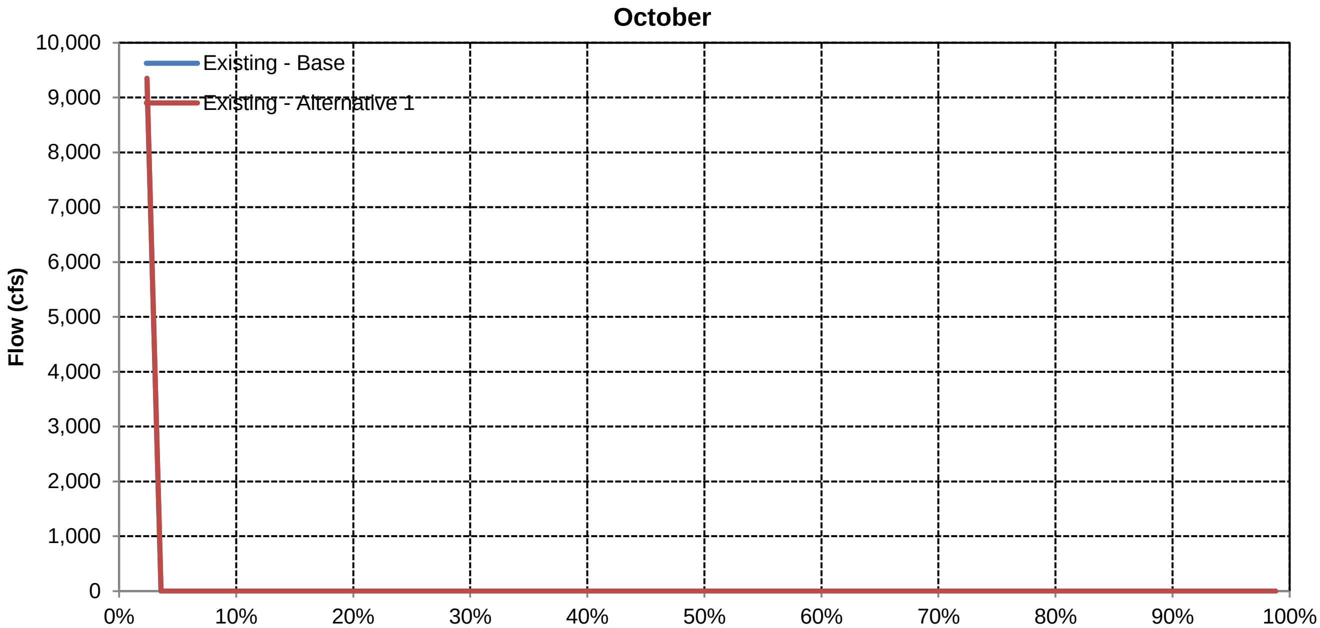
Existing - Alternative 1

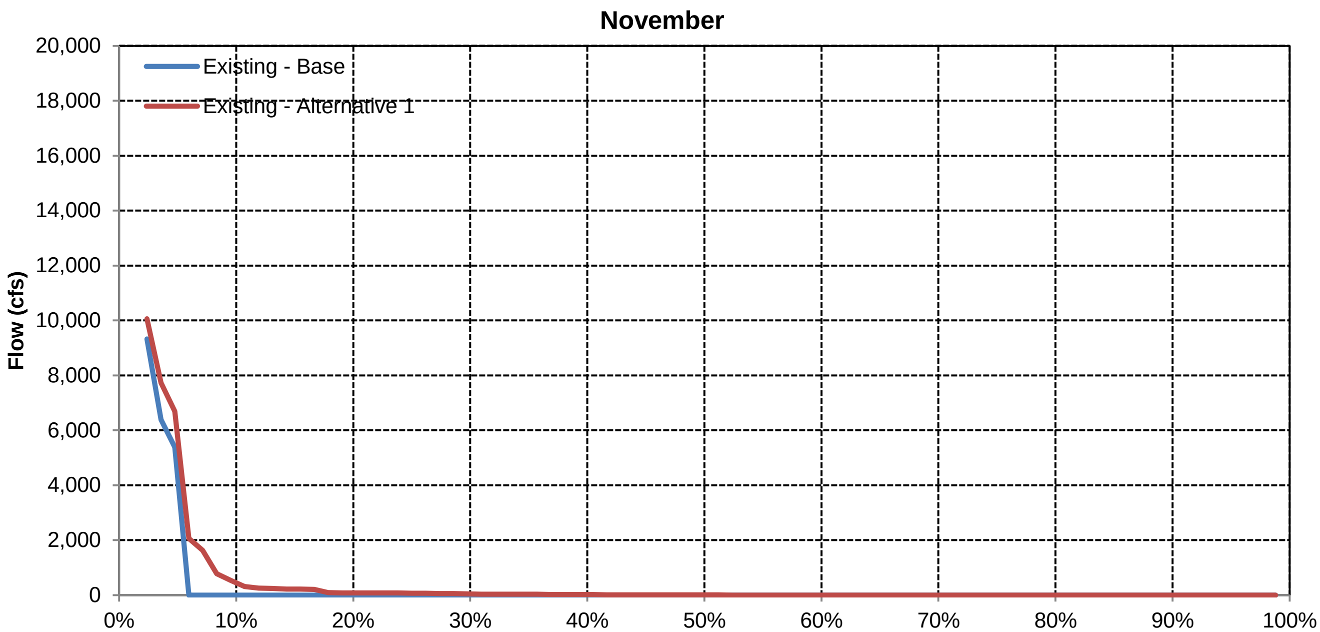
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	297	10,136	30,143	48,857	20,046	23	0	0	0	0	0
20%	0	80	2,082	10,588	22,009	6,577	0	0	0	0	0	0
30%	0	35	618	4,995	9,779	3,176	0	0	0	0	0	0
40%	0	17	248	1,955	4,026	1,632	0	0	0	0	0	0
50%	0	4	138	808	2,733	385	0	0	0	0	0	0
60%	0	0	31	271	1,050	193	0	0	0	0	0	0
70%	0	0	8	84	395	93	0	0	0	0	0	0
80%	0	0	0	27	129	29	0	0	0	0	0	0
90%	0	0	0	7	37	1	0	0	0	0	0	0
Long Term												
Full Simulation Period	114	391	3,150	9,421	14,271	7,423	1,024	20	0	0	0	0
Water Year Types												
Wet	374	1,216	8,962	26,962	37,595	19,098	3,244	64	0	0	0	0
Above Normal	0	40	2,456	6,179	12,099	8,572	33	0	0	0	0	0
Below Normal	0	49	186	983	3,420	1,060	143	0	0	0	0	0
Dry	0	19	81	324	1,441	603	0	0	0	0	0	0
Critical	0	0	28	199	333	62	0	0	0	0	0	0

Existing - Alternative 1 Minus Existing - Base

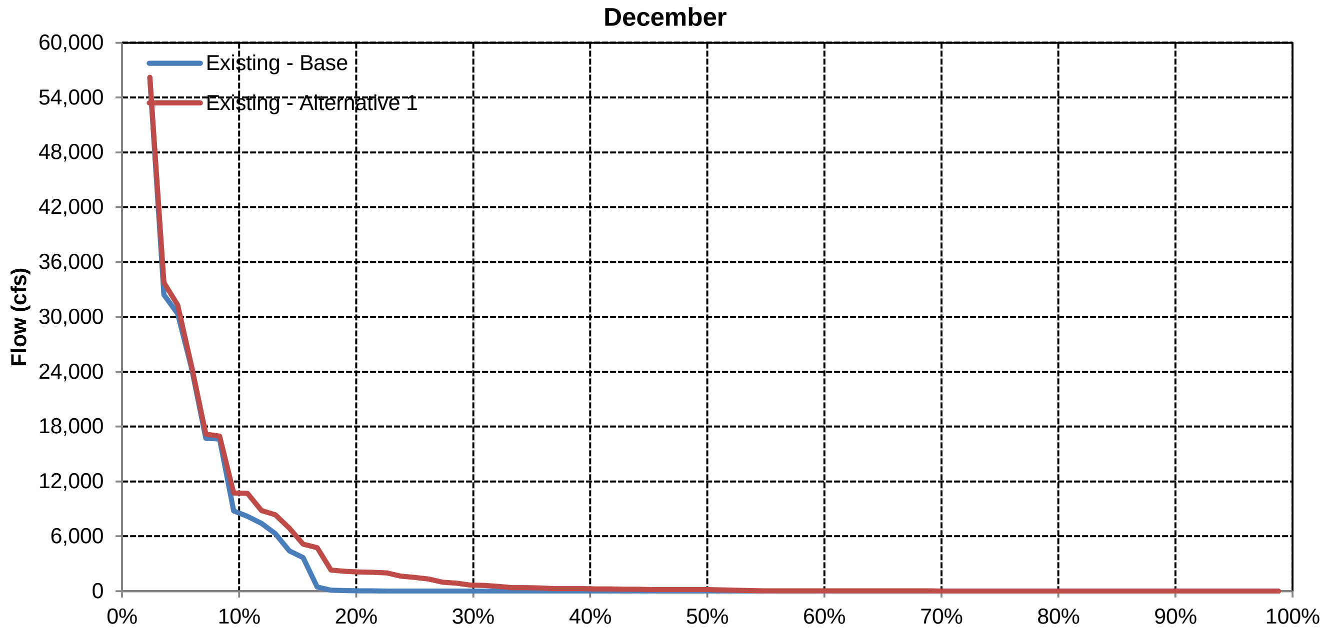
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	297	2,186	1,185	1,429	117	0	0	0	0	0	0
20%	0	80	2,065	2,923	1,341	902	0	0	0	0	0	0
30%	0	35	618	2,904	2,532	1,791	0	0	0	0	0	0
40%	0	17	248	1,955	2,257	1,632	0	0	0	0	0	0
50%	0	4	138	808	2,710	385	0	0	0	0	0	0
60%	0	0	31	271	1,050	193	0	0	0	0	0	0
70%	0	0	8	84	395	93	0	0	0	0	0	0
80%	0	0	0	27	129	29	0	0	0	0	0	0
90%	0	0	0	7	37	1	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	133	516	936	1,067	489	0	0	0	0	0	0
Water Year Types												
Wet	0	372	1,284	1,515	1,226	592	0	0	0	0	0	0
Above Normal	0	40	448	1,629	1,829	749	0	0	0	0	0	0
Below Normal	0	49	186	693	967	559	0	0	0	0	0	0
Dry	0	19	81	324	904	379	0	0	0	0	0	0
Critical	0	0	28	199	333	62	0	0	0	0	0	0

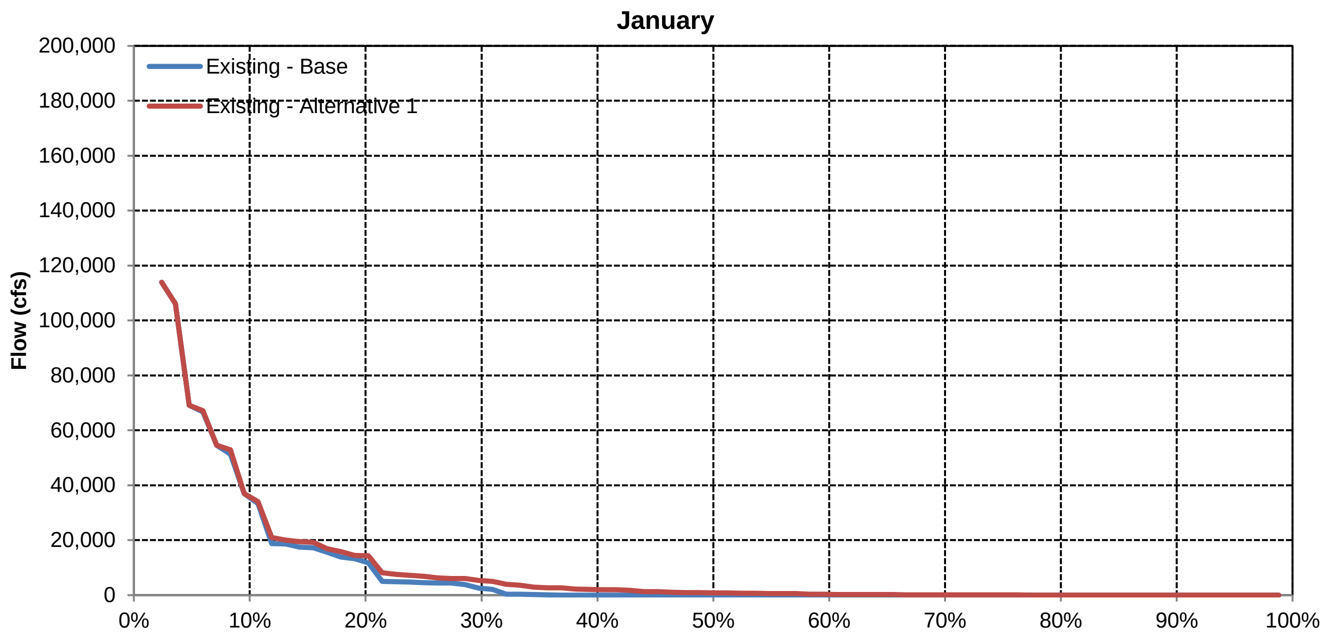
Fremont Weir Spill to Yolo Bypass





Fremont Weir Spill to Yolo Bypass





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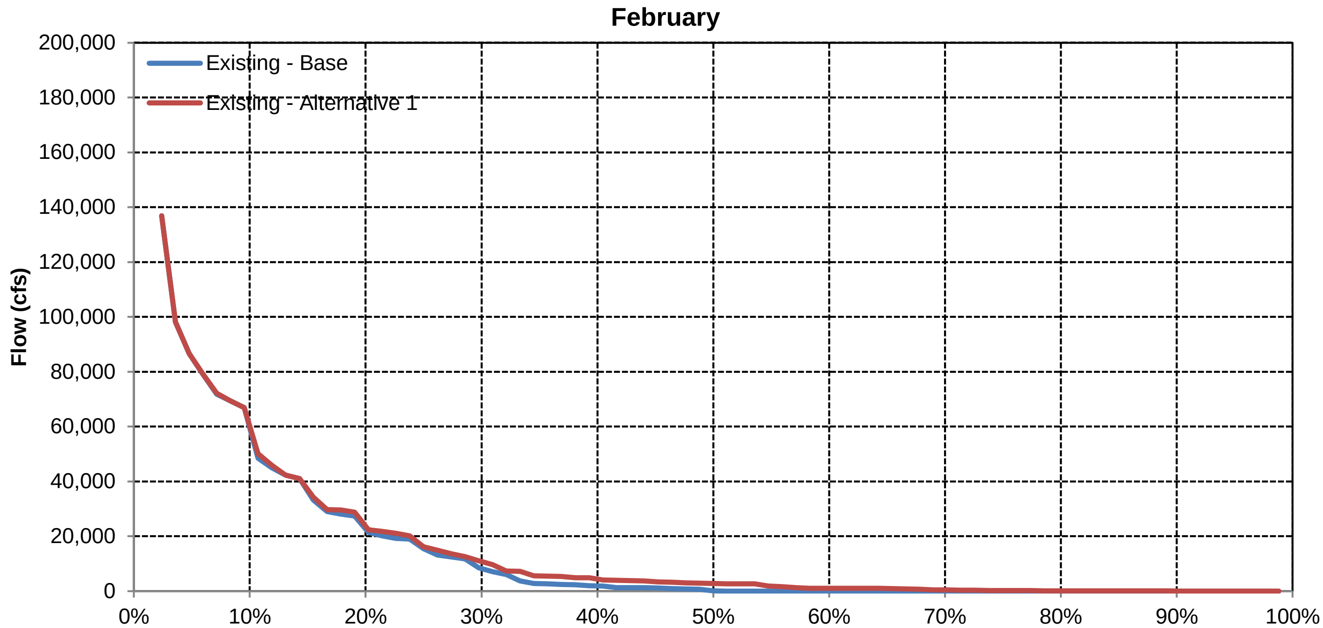

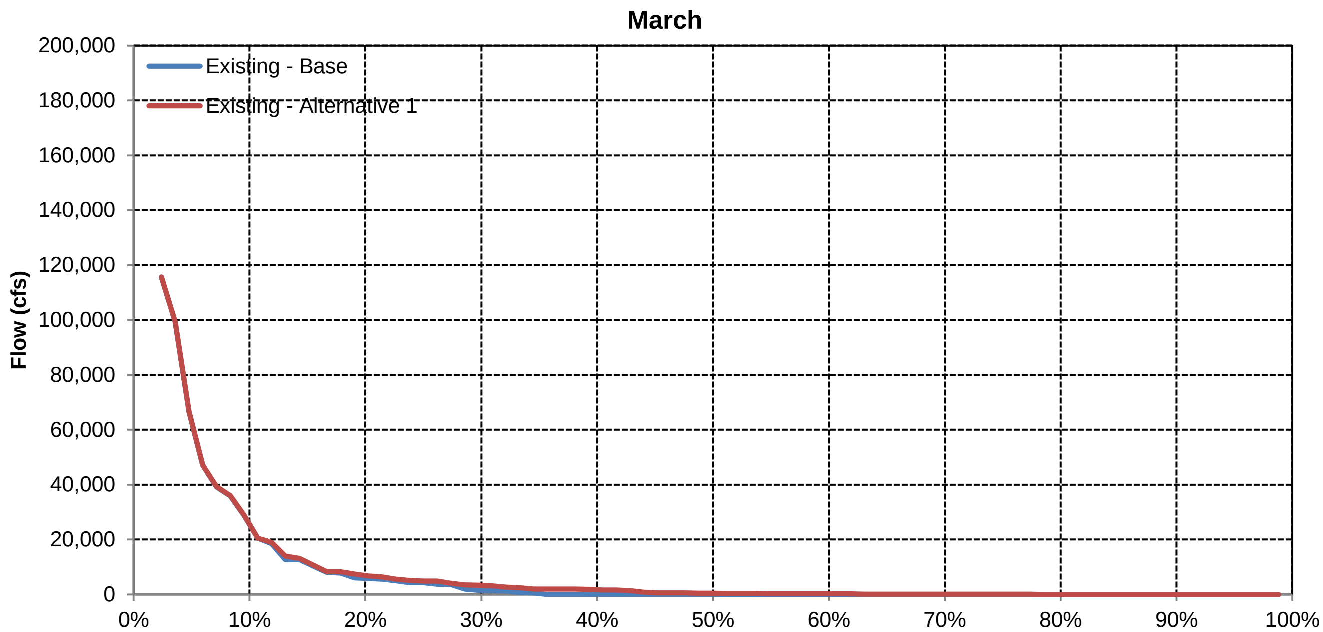

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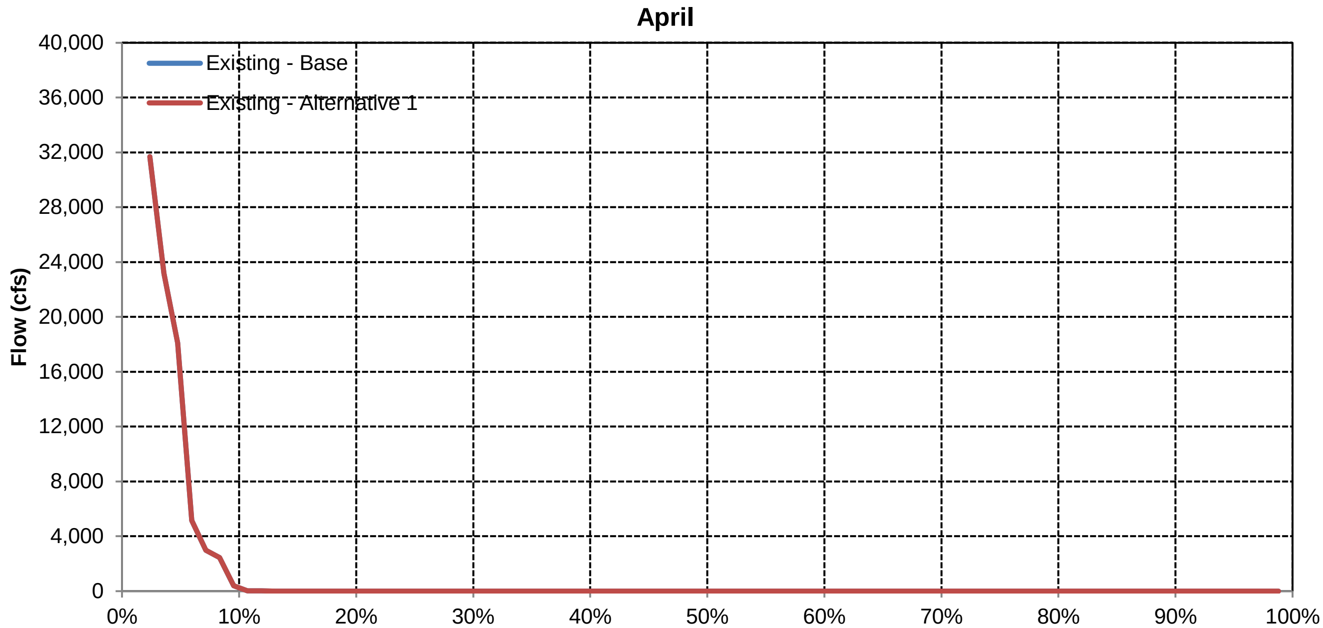
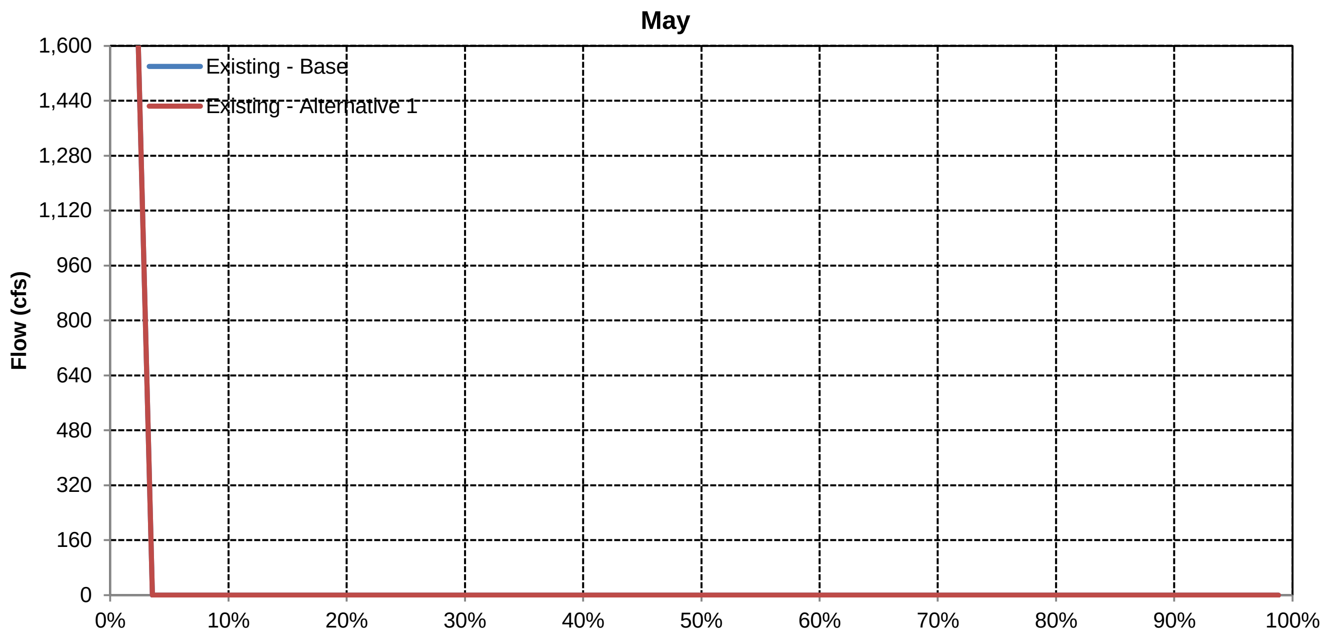
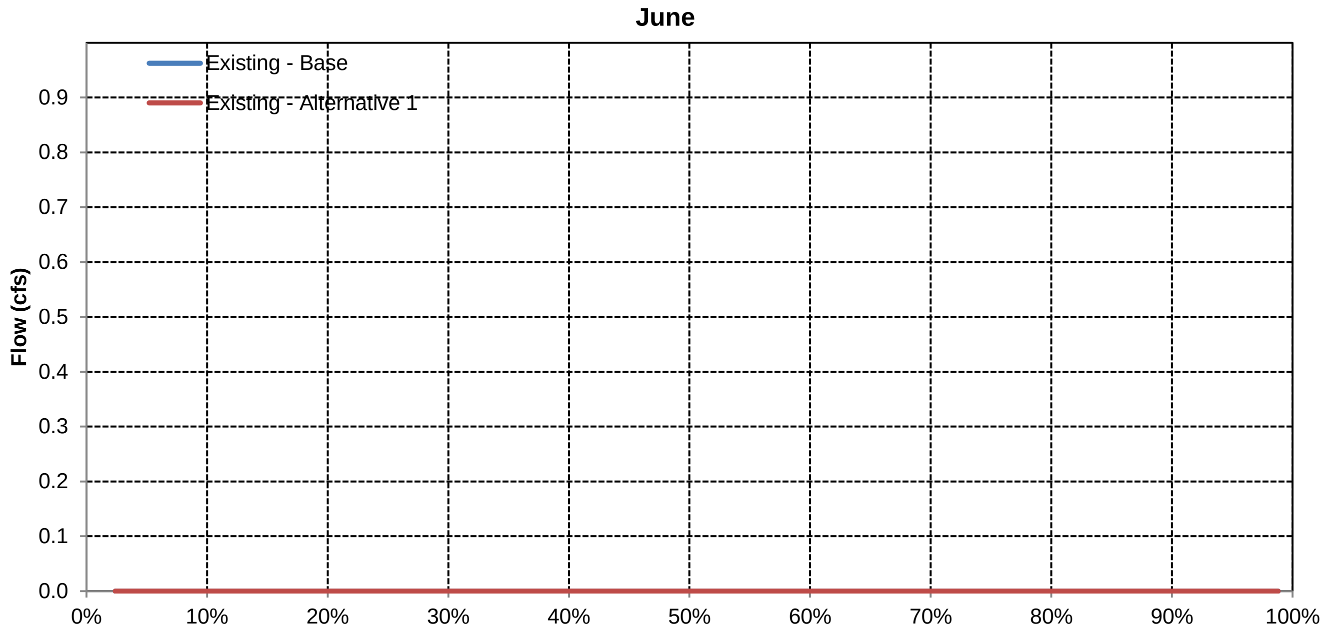
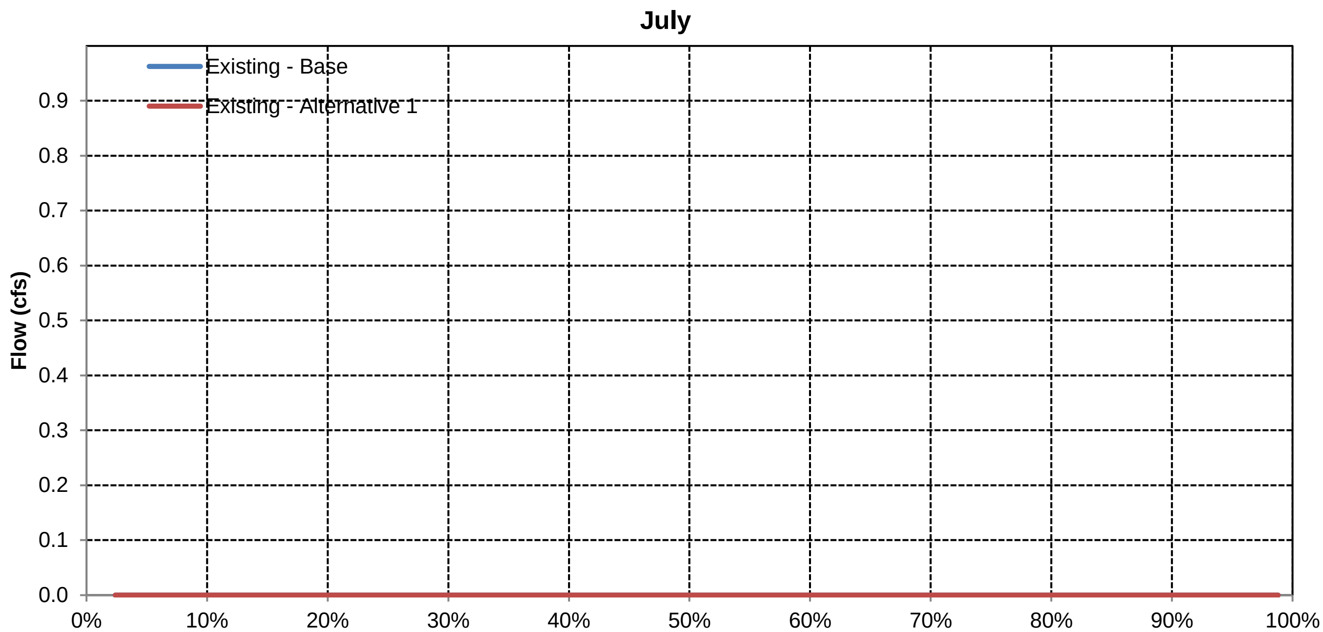


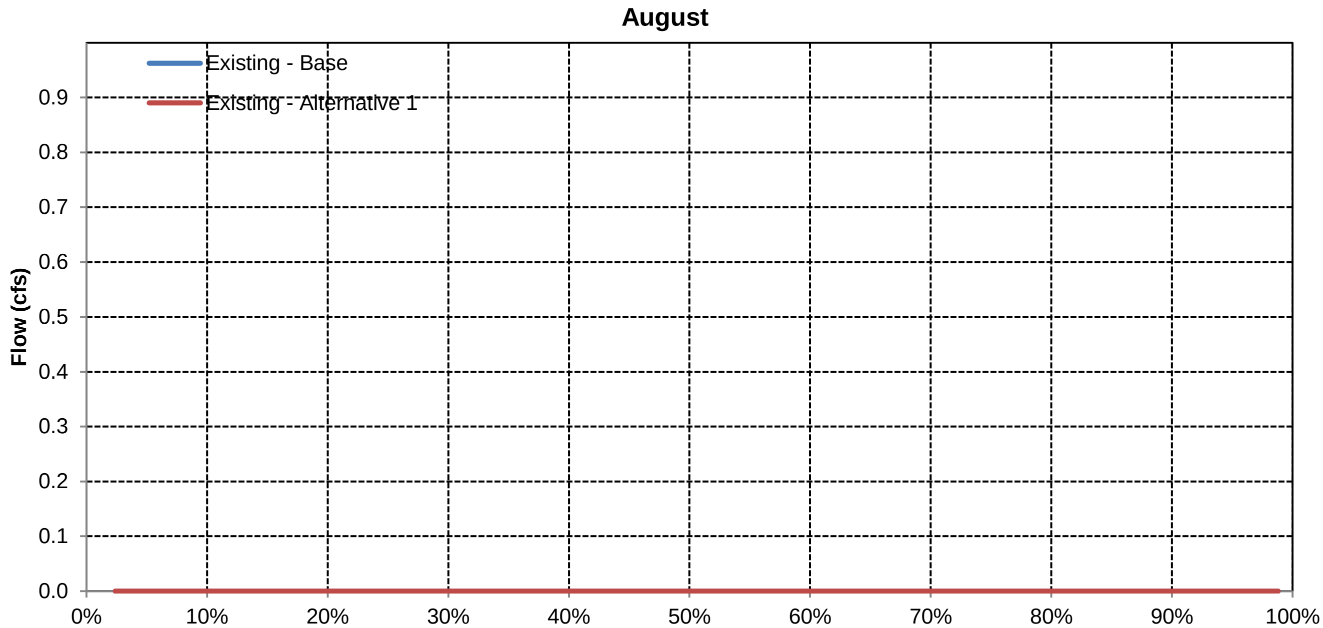


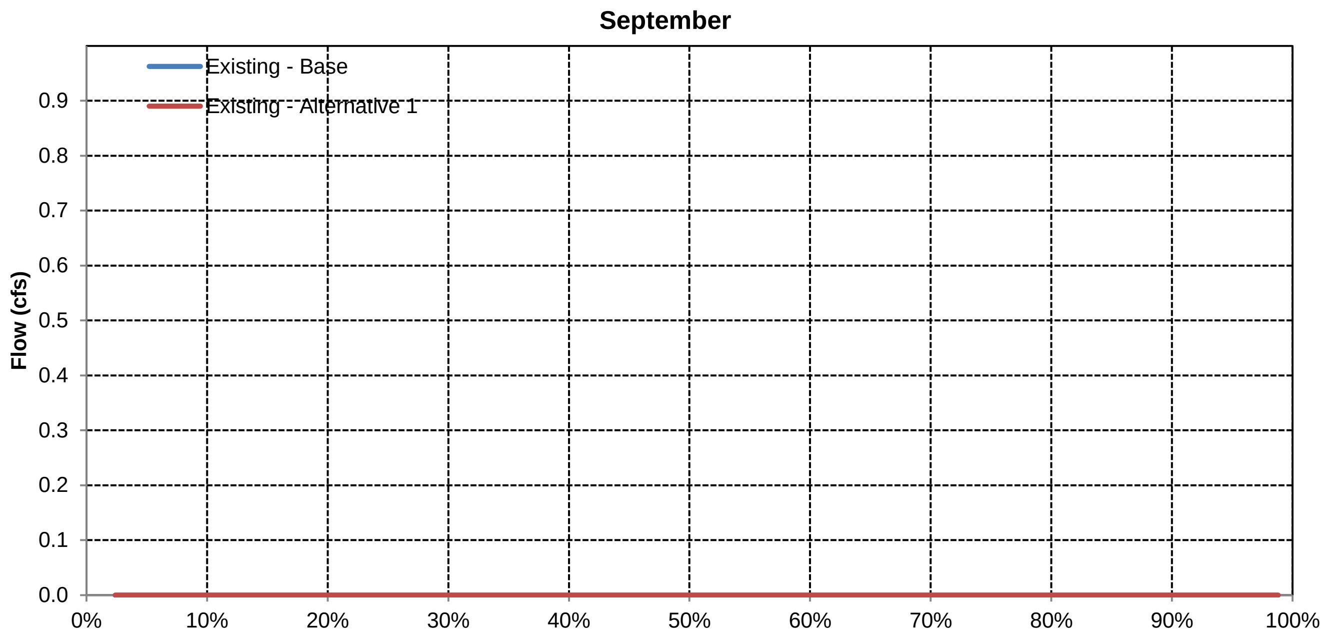
Fremont Weir Spill to Yolo Bypass





Fremont Weir Spill to Yolo Bypass





Long-Term and Water Year-Type Average of Sacramento River below Fremont Weir Under Existing - Base and Existing - Alternative 1

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Existing - Base	9,484	12,510	19,726	28,534	34,880	30,067	18,486	11,524	11,174	16,563	12,346	14,753	13,226
Existing - Alternative 1	9,484	12,377	19,211	27,598	33,813	29,578	18,487	11,524	11,174	16,563	12,346	14,753	13,039
Difference	0	-133	-515	-936	-1,067	-489	0	0	0	0	0	0	-187
Percent Difference	0%	-1%	-3%	-3%	-3%	-2%	0%	0%	0%	0%	0%	0%	-1%
							Water Year-Types						
Wet													
Existing - Base	10,891	17,182	34,594	47,388	54,159	44,817	30,280	15,515	11,984	17,719	13,701	22,821	19,273
Existing - Alternative 1	10,891	16,809	33,311	45,873	52,934	44,225	30,280	15,515	11,984	17,719	13,701	22,821	18,973
Difference	0	-372	-1,284	-1,515	-1,226	-592	0	0	0	0	0	0	-299
Percent Difference	0%	-2%	-4%	-3%	-2%	-1%	0%	0%	0%	0%	0%	0%	-2%
Above Normal													
Existing - Base	9,877	12,058	19,277	36,324	42,867	40,008	19,128	12,828	11,814	18,508	14,754	17,430	15,325
Existing - Alternative 1	9,877	12,018	18,828	34,695	41,038	39,259	19,128	12,828	11,814	18,508	14,754	17,429	15,046
Difference	0	-40	-448	-1,629	-1,829	-749	0	0	-1	0	0	0	-279
Percent Difference	0%	0%	-2%	-4%	-4%	-2%	0%	0%	0%	0%	0%	0%	-2%
Below Normal													
Existing - Base	9,114	11,699	12,901	19,738	26,173	23,730	15,307	10,497	11,507	18,684	13,981	10,737	11,081
Existing - Alternative 1	9,114	11,650	12,715	19,046	25,206	23,171	15,308	10,496	11,507	18,684	13,981	10,737	10,936
Difference	0	-49	-186	-693	-967	-559	0	0	0	0	0	0	-145
Percent Difference	0%	0%	-1%	-4%	-4%	-2%	0%	0%	0%	0%	0%	0%	-1%
Dry													
Existing - Base	8,797	10,284	11,881	14,395	22,880	19,311	9,957	8,686	10,655	14,790	10,143	10,040	9,128
Existing - Alternative 1	8,797	10,264	11,800	14,071	21,977	18,932	9,957	8,685	10,655	14,790	10,143	10,040	9,028
Difference	0	-19	-81	-324	-904	-379	0	-1	0	0	0	0	-100
Percent Difference	0%	0%	-1%	-2%	-4%	-2%	0%	0%	0%	0%	0%	0%	-1%
Critical													
Existing - Base	7,603	7,349	9,332	12,776	15,062	12,715	9,151	7,145	9,068	11,571	7,736	7,241	7,035
Existing - Alternative 1	7,603	7,349	9,304	12,577	14,730	12,654	9,151	7,145	9,068	11,571	7,736	7,241	6,999
Difference	0	0	-28	-199	-333	-62	0	0	0	0	0	0	-37
Percent Difference	0%	0%	0%	-2%	-2%	0%	0%	0%	0%	0%	0%	0%	-1%

Sacramento River below Fremont Weir

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	12,667	17,867	45,100	57,729	61,959	57,591	41,031	20,423	13,312	19,786	15,641	24,263
20%	11,568	15,291	30,157	49,978	58,550	49,208	29,852	12,476	12,632	19,450	14,918	21,584
30%	10,868	14,177	20,670	38,268	45,964	41,694	19,097	10,802	12,207	18,980	14,204	20,190
40%	10,328	12,419	16,827	30,451	40,042	32,187	14,333	9,587	11,482	18,481	13,746	16,796
50%	9,258	11,470	14,375	20,927	29,701	24,238	11,811	9,148	10,870	17,699	13,483	12,593
60%	8,339	10,242	12,138	16,320	24,021	20,650	10,617	8,809	10,372	17,239	13,030	11,383
70%	7,401	8,651	11,421	13,695	18,359	16,099	9,968	8,553	10,029	15,866	11,157	9,527
80%	6,330	6,998	8,557	11,396	14,745	13,147	9,106	7,912	9,548	12,798	8,367	8,339
90%	5,547	6,108	7,167	10,140	12,940	10,022	8,064	7,372	8,384	10,409	7,531	7,435
Long Term												
Full Simulation Period	9,484	12,510	19,726	28,534	34,880	30,067	18,486	11,524	11,174	16,563	12,346	14,753
Water Year Types												
Wet	10,891	17,182	34,594	47,388	54,159	44,817	30,280	15,515	11,984	17,719	13,701	22,821
Above Normal	9,877	12,058	19,277	36,324	42,867	40,008	19,128	12,828	11,814	18,508	14,754	17,430
Below Normal	9,114	11,699	12,901	19,738	26,173	23,730	15,307	10,497	11,507	18,684	13,981	10,737
Dry	8,797	10,284	11,881	14,395	22,880	19,311	9,957	8,686	10,655	14,790	10,143	10,040
Critical	7,603	7,349	9,332	12,776	15,062	12,715	9,151	7,145	9,068	11,571	7,736	7,241

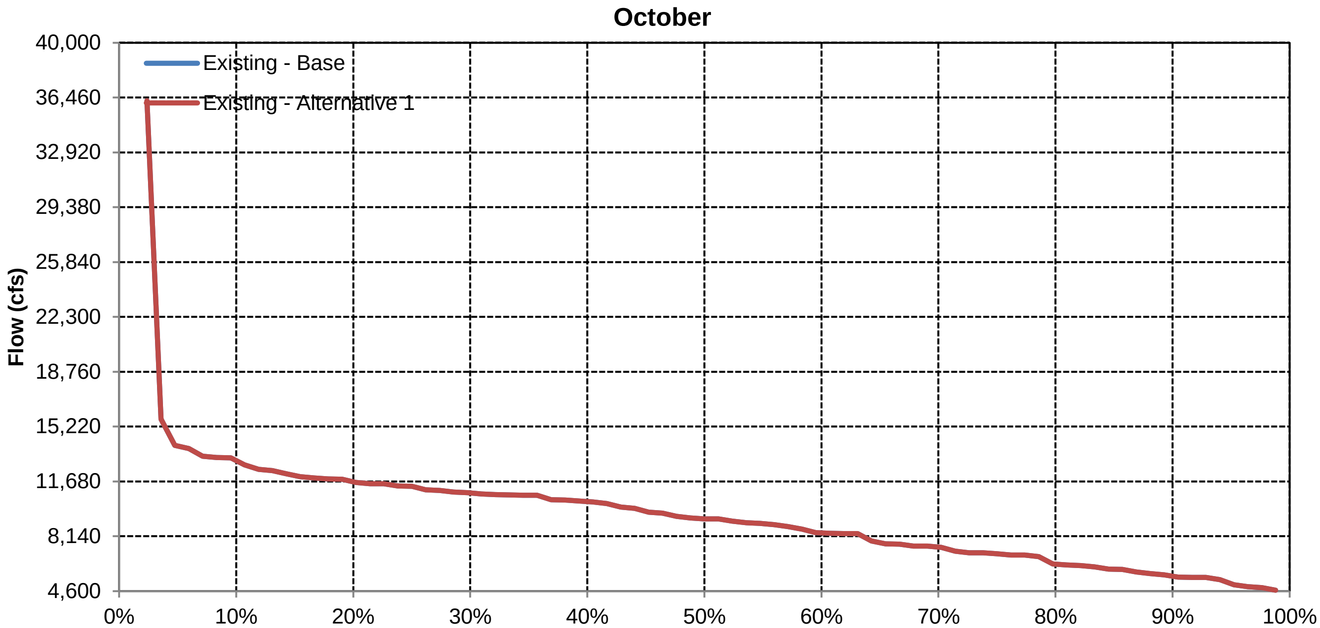
Existing - Alternative 1

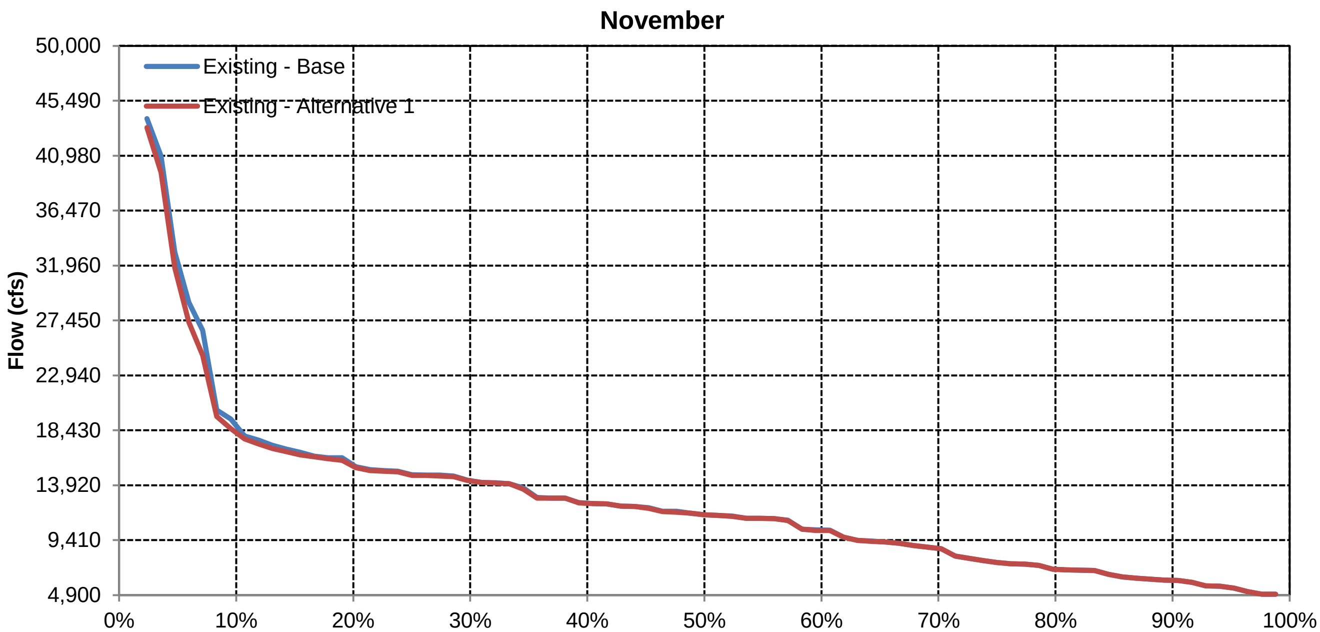
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	12,667	17,599	42,750	56,285	61,959	57,172	41,031	20,423	13,306	19,786	15,640	24,263
20%	11,568	15,215	28,123	48,490	57,226	48,065	29,853	12,476	12,632	19,450	14,919	21,584
30%	10,868	14,167	20,162	35,550	44,580	40,992	19,097	10,802	12,207	18,980	14,204	20,190
40%	10,328	12,416	16,661	28,390	37,195	31,563	14,333	9,587	11,482	18,481	13,746	16,796
50%	9,258	11,471	14,256	20,392	27,779	24,044	11,812	9,148	10,870	17,699	13,483	12,593
60%	8,339	10,205	12,113	16,017	23,028	20,311	10,617	8,809	10,372	17,239	13,028	11,384
70%	7,401	8,651	11,420	13,644	18,113	16,061	9,968	8,552	10,029	15,866	11,157	9,527
80%	6,330	6,998	8,555	11,376	14,656	13,096	9,106	7,912	9,548	12,798	8,367	8,339
90%	5,547	6,108	7,167	10,136	12,908	10,018	8,064	7,372	8,384	10,409	7,531	7,435
Long Term												
Full Simulation Period	9,484	12,377	19,211	27,598	33,813	29,578	18,487	11,524	11,174	16,563	12,346	14,753
Water Year Types												
Wet	10,891	16,809	33,311	45,873	52,934	44,225	30,280	15,515	11,984	17,719	13,701	22,821
Above Normal	9,877	12,018	18,828	34,695	41,038	39,259	19,128	12,828	11,814	18,508	14,754	17,429
Below Normal	9,114	11,650	12,715	19,046	25,206	23,171	15,308	10,496	11,507	18,684	13,981	10,737
Dry	8,797	10,264	11,800	14,071	21,977	18,932	9,957	8,685	10,655	14,790	10,143	10,040
Critical	7,603	7,349	9,304	12,577	14,730	12,654	9,151	7,145	9,068	11,571	7,736	7,241

Existing - Alternative 1 Minus Existing - Base

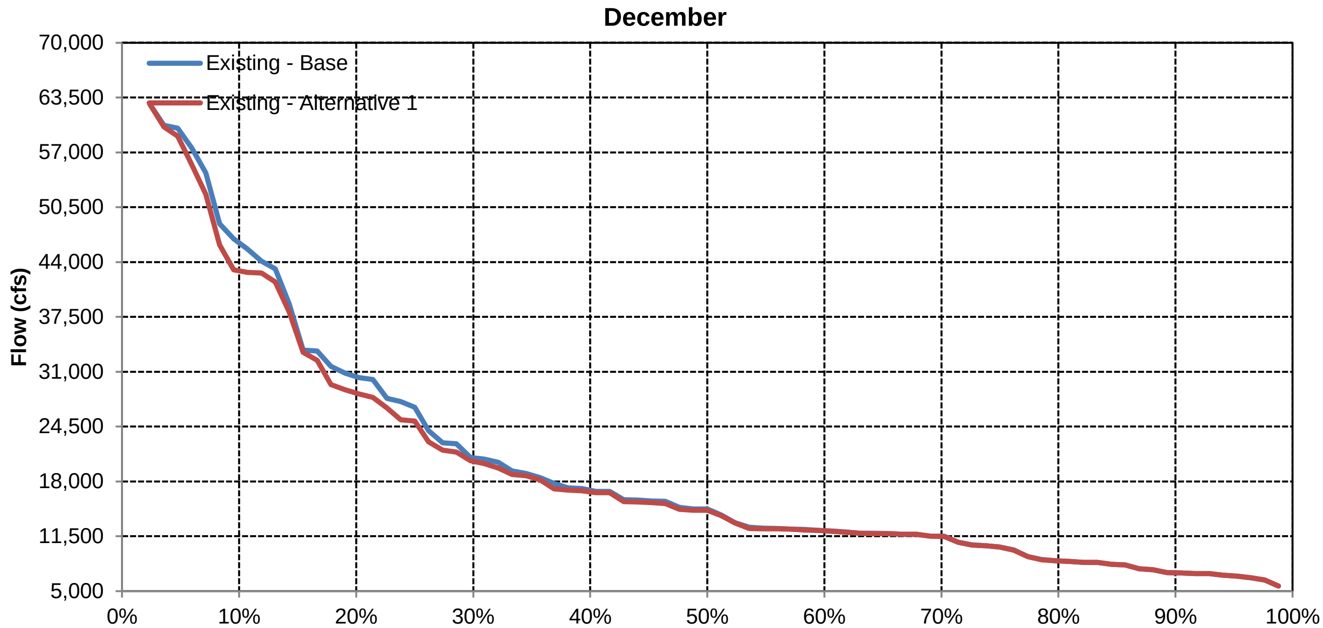
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	-268	-2,351	-1,444	0	-420	0	0	-6	0	0	0
20%	0	-76	-2,034	-1,488	-1,325	-1,143	1	0	0	0	0	0
30%	0	-10	-508	-2,718	-1,384	-702	0	0	0	0	0	0
40%	0	-3	-166	-2,062	-2,847	-624	0	0	0	0	0	0
50%	0	0	-120	-535	-1,923	-194	0	0	0	0	0	0
60%	0	-37	-25	-303	-993	-339	0	0	0	0	-2	0
70%	-1	0	-2	-51	-246	-38	0	0	0	0	0	0
80%	0	0	-2	-20	-89	-51	0	0	0	0	0	0
90%	0	0	0	-4	-32	-3	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	-133	-515	-936	-1,067	-489	0	0	0	0	0	0
Water Year Types												
Wet	0	-372	-1,284	-1,515	-1,226	-592	0	0	0	0	0	0
Above Normal	0	-40	-448	-1,629	-1,829	-749	0	0	-1	0	0	0
Below Normal	0	-49	-186	-693	-967	-559	0	0	0	0	0	0
Dry	0	-19	-81	-324	-904	-379	0	-1	0	0	0	0
Critical	0	0	-28	-199	-333	-62	0	0	0	0	0	0

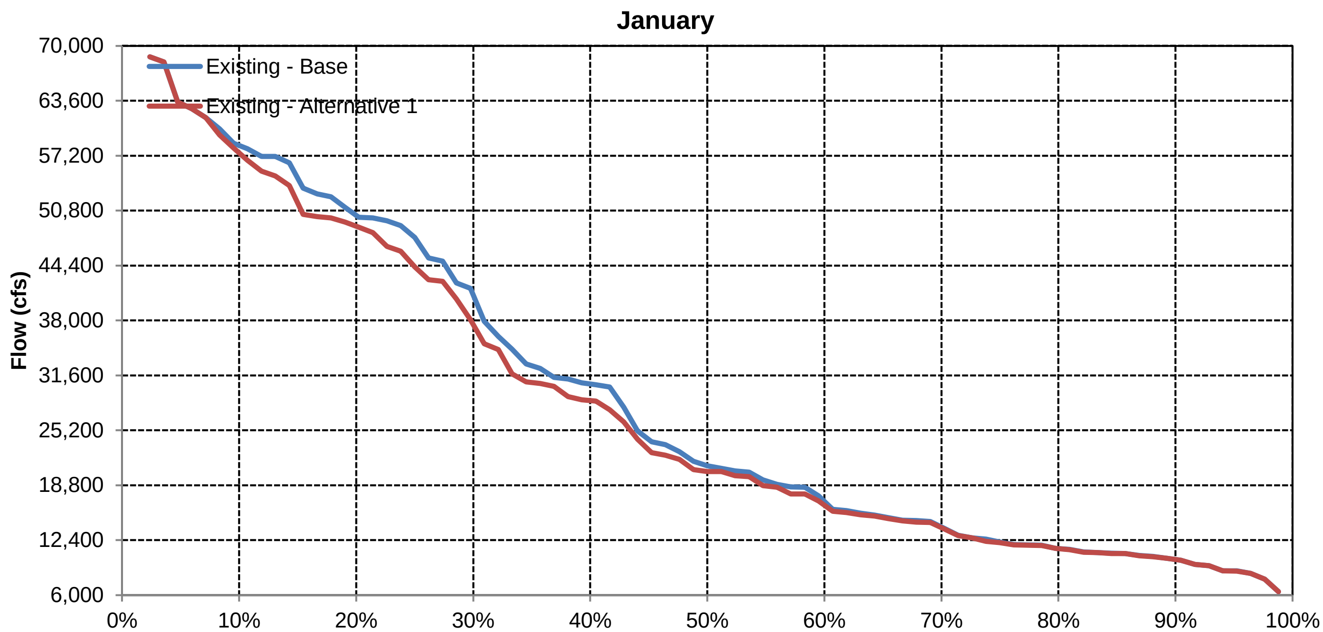
Sacramento River below Fremont Weir



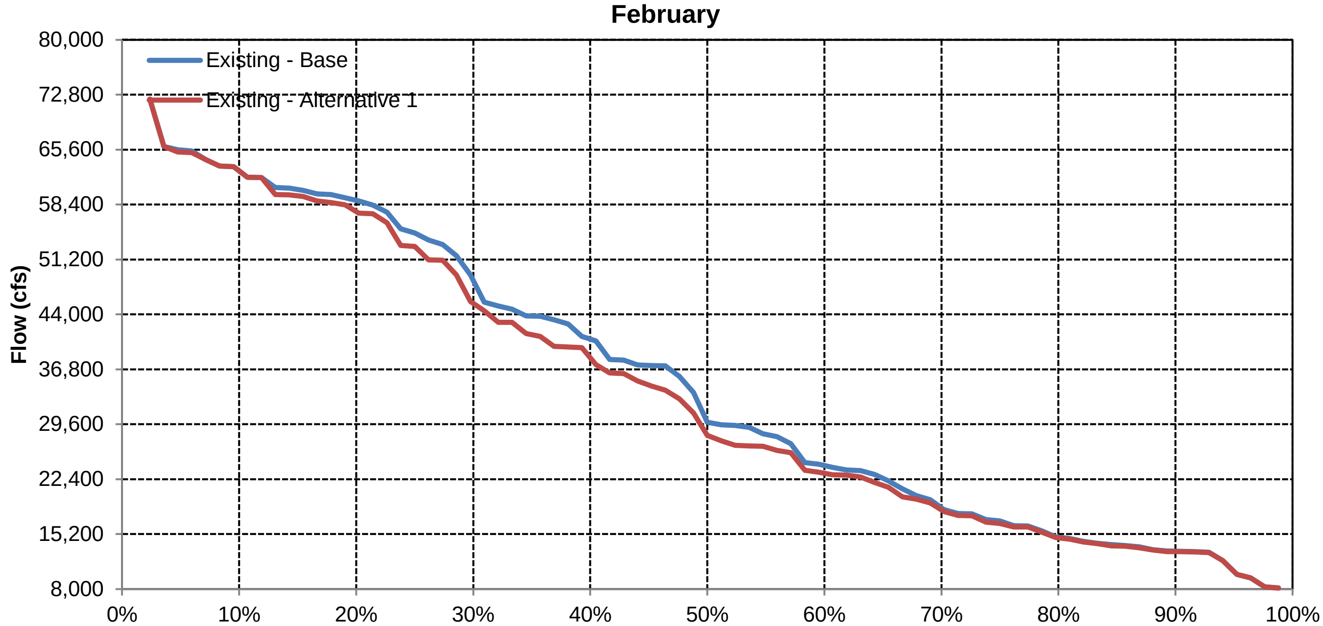


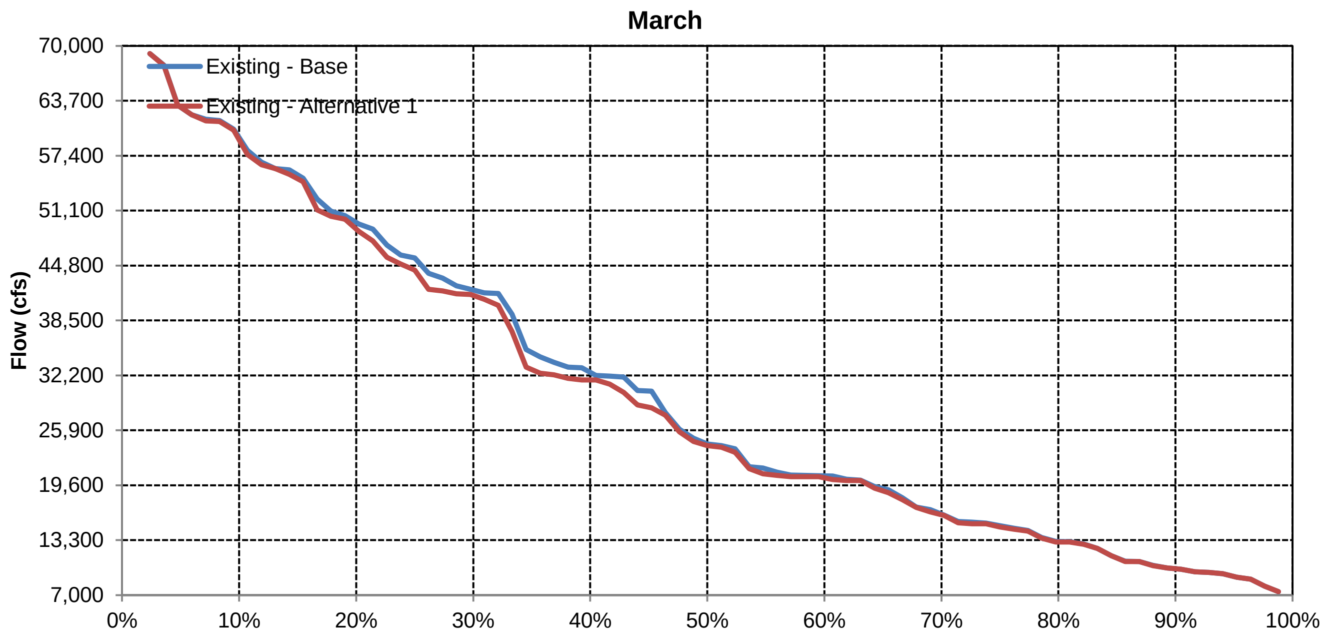
Sacramento River below Fremont Weir



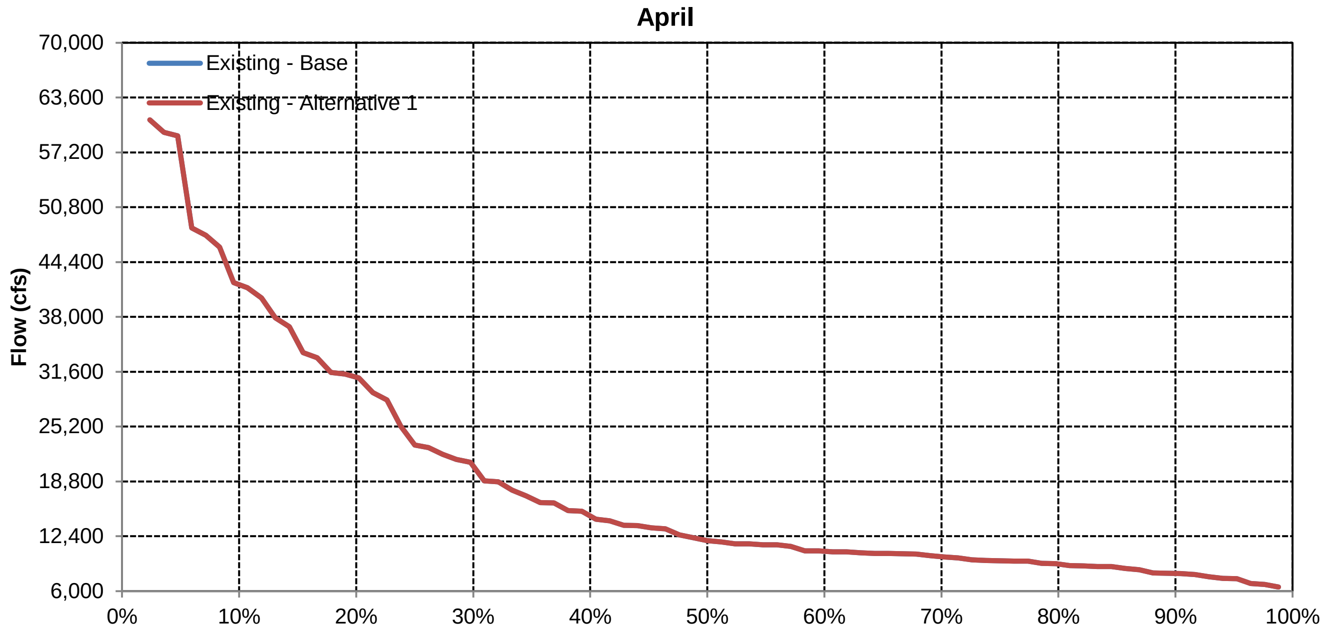


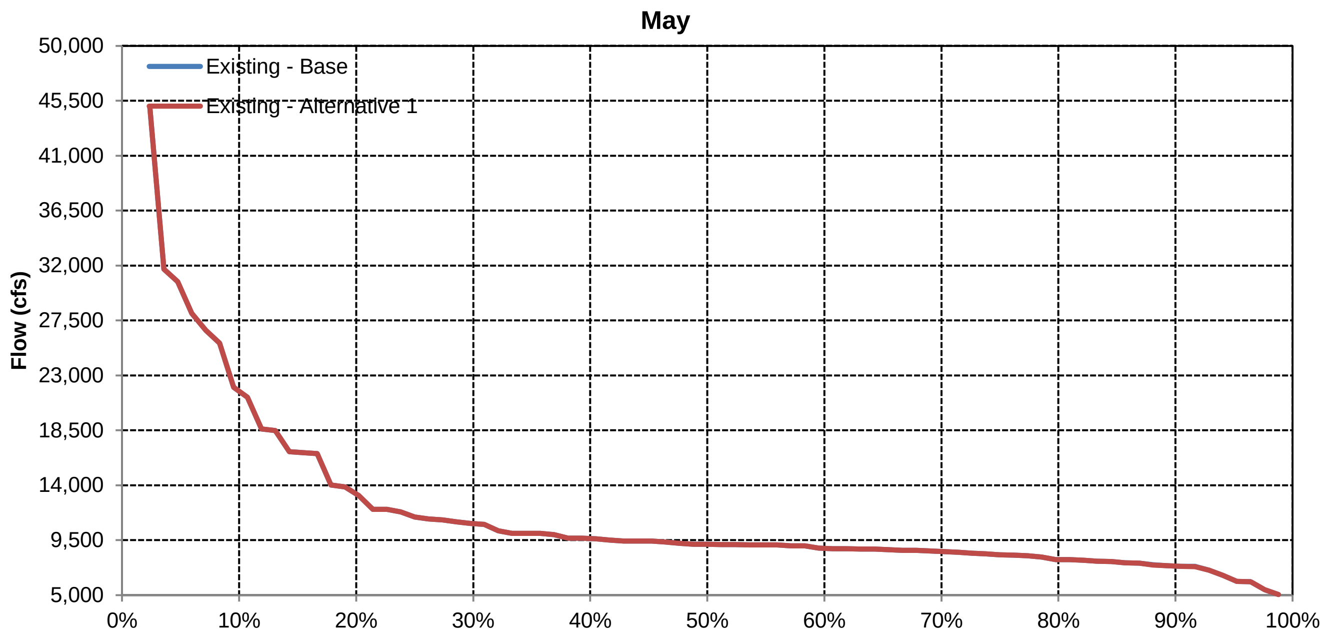
Sacramento River below Fremont Weir



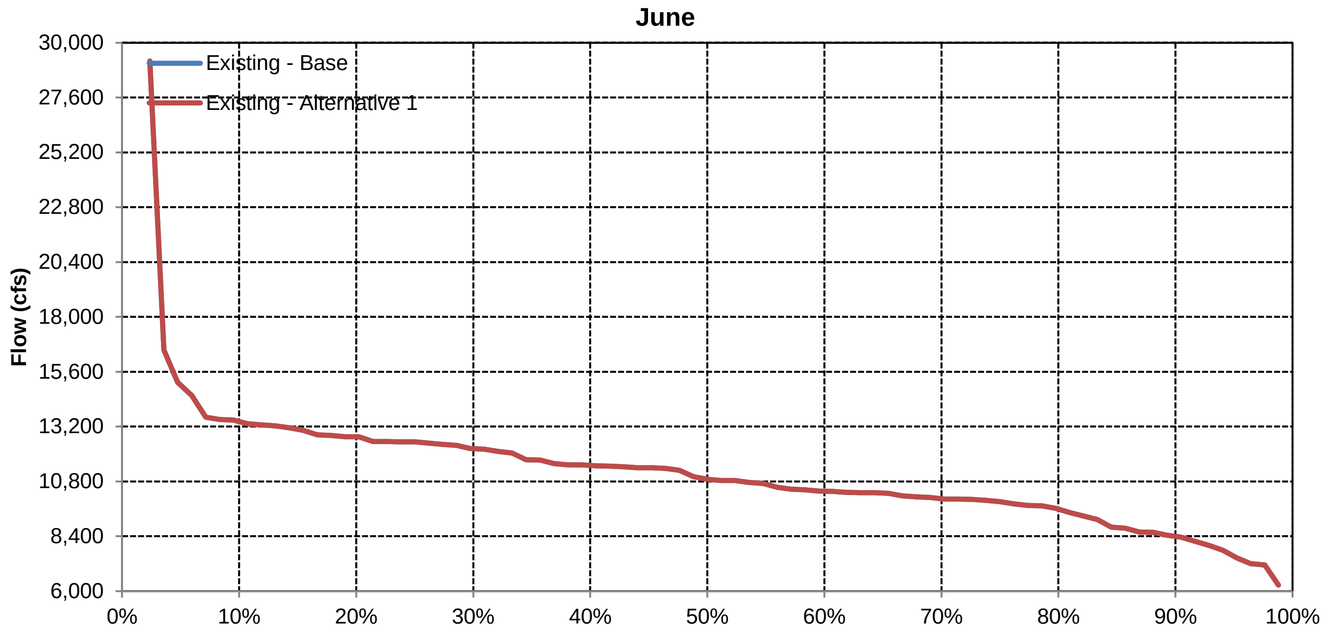


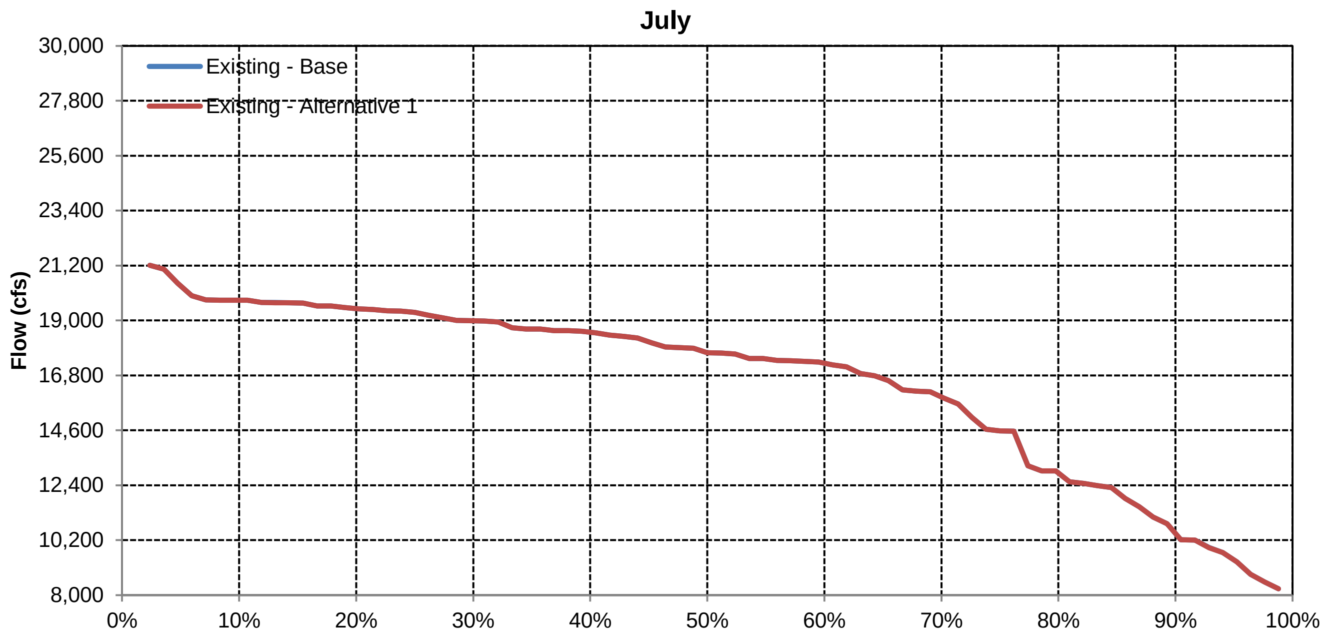
Sacramento River below Fremont Weir



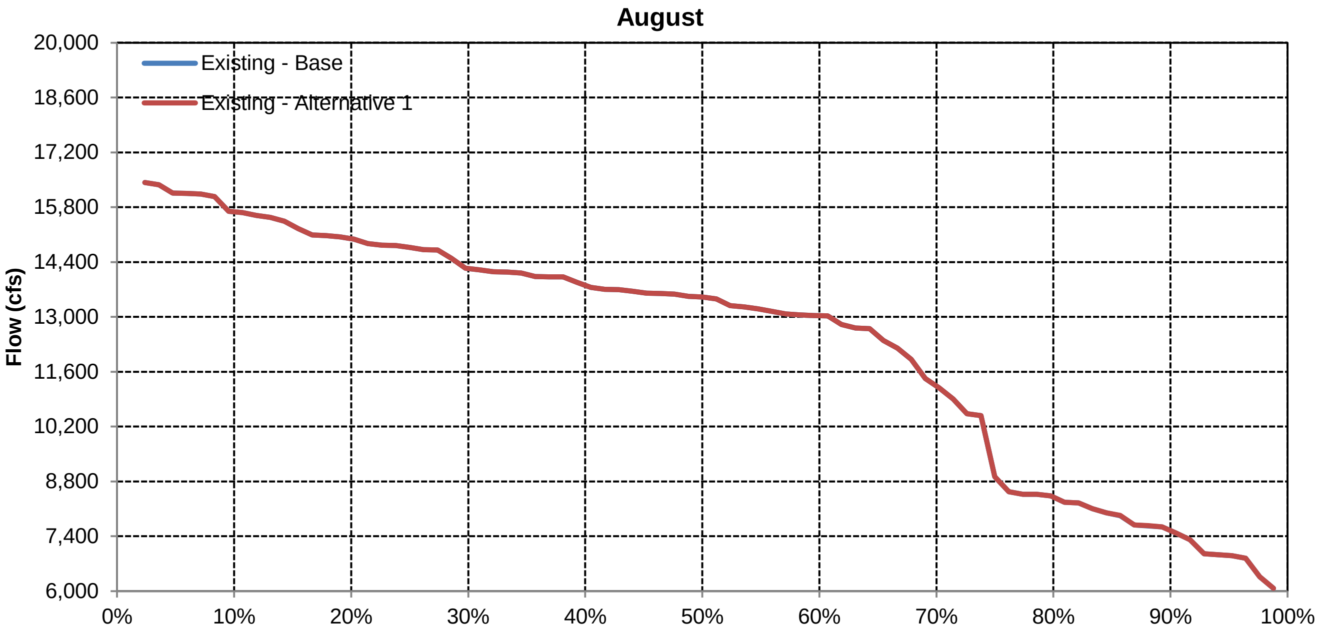


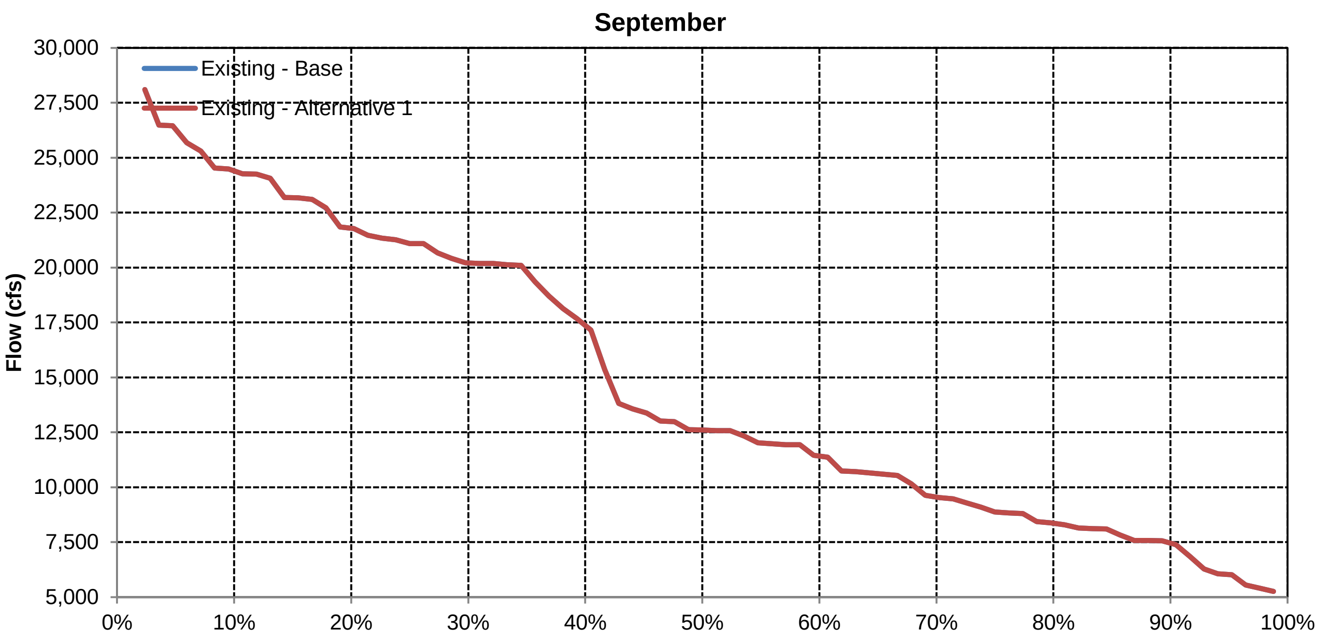
Sacramento River below Fremont Weir





Sacramento River below Fremont Weir





Long-Term and Water Year-Type Average of Trinity Reservoir Under Existing - Base and Existing - Alternative 1

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
						Long-Term						
Full Simulation Period												
Existing - Base	1,276	1,285	1,370	1,501	1,641	1,769	1,902	1,832	1,743	1,596	1,445	1,326
Existing - Alternative 1	1,276	1,285	1,370	1,501	1,641	1,769	1,902	1,832	1,743	1,596	1,445	1,326
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
						Water Year-Types						
Wet												
Existing - Base	1,352	1,401	1,574	1,777	1,943	2,063	2,232	2,168	2,045	1,906	1,771	1,629
Existing - Alternative 1	1,352	1,401	1,574	1,777	1,943	2,063	2,232	2,168	2,045	1,906	1,771	1,629
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal												
Existing - Base	1,354	1,330	1,434	1,642	1,822	1,999	2,154	2,062	1,975	1,816	1,661	1,520
Existing - Alternative 1	1,354	1,330	1,434	1,642	1,822	1,999	2,154	2,062	1,975	1,816	1,661	1,520
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Existing - Base	1,248	1,259	1,287	1,409	1,560	1,708	1,857	1,790	1,716	1,581	1,414	1,315
Existing - Alternative 1	1,248	1,259	1,287	1,409	1,560	1,708	1,857	1,790	1,716	1,581	1,414	1,315
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry												
Existing - Base	1,303	1,288	1,329	1,373	1,484	1,619	1,724	1,640	1,555	1,384	1,220	1,110
Existing - Alternative 1	1,303	1,288	1,329	1,373	1,484	1,619	1,724	1,640	1,555	1,384	1,220	1,110
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical												
Existing - Base	1,041	1,030	1,052	1,087	1,153	1,212	1,267	1,214	1,174	1,038	895	807
Existing - Alternative 1	1,041	1,030	1,052	1,087	1,153	1,212	1,267	1,214	1,174	1,038	895	807
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Trinity Reservoir

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	1,679	1,669	1,832	1,900	2,000	2,100	2,300	2,280	2,180	2,036	1,883	1,739
20%	1,561	1,564	1,651	1,871	2,000	2,100	2,253	2,180	2,061	1,899	1,757	1,620
30%	1,475	1,490	1,571	1,797	1,985	2,093	2,209	2,094	1,982	1,813	1,666	1,533
40%	1,391	1,375	1,503	1,663	1,844	2,014	2,151	2,039	1,892	1,736	1,573	1,442
50%	1,297	1,306	1,436	1,564	1,727	1,841	1,969	1,849	1,751	1,626	1,458	1,332
60%	1,211	1,218	1,325	1,409	1,575	1,748	1,859	1,779	1,680	1,531	1,369	1,247
70%	1,117	1,167	1,222	1,291	1,433	1,586	1,698	1,651	1,591	1,445	1,284	1,148
80%	969	979	1,041	1,144	1,328	1,452	1,593	1,574	1,453	1,293	1,119	1,009
90%	814	826	864	996	1,078	1,182	1,234	1,184	1,172	1,067	940	858
Long Term												
Full Simulation Period	1,276	1,285	1,370	1,501	1,641	1,769	1,902	1,832	1,743	1,596	1,445	1,326
Water Year Types												
Wet	1,352	1,401	1,574	1,777	1,943	2,063	2,232	2,168	2,045	1,906	1,771	1,629
Above Normal	1,354	1,330	1,434	1,642	1,822	1,999	2,154	2,062	1,975	1,816	1,661	1,520
Below Normal	1,248	1,259	1,287	1,409	1,560	1,708	1,857	1,790	1,716	1,581	1,414	1,315
Dry	1,303	1,288	1,329	1,373	1,484	1,619	1,724	1,640	1,555	1,384	1,220	1,110
Critical	1,041	1,030	1,052	1,087	1,153	1,212	1,267	1,214	1,174	1,038	895	807

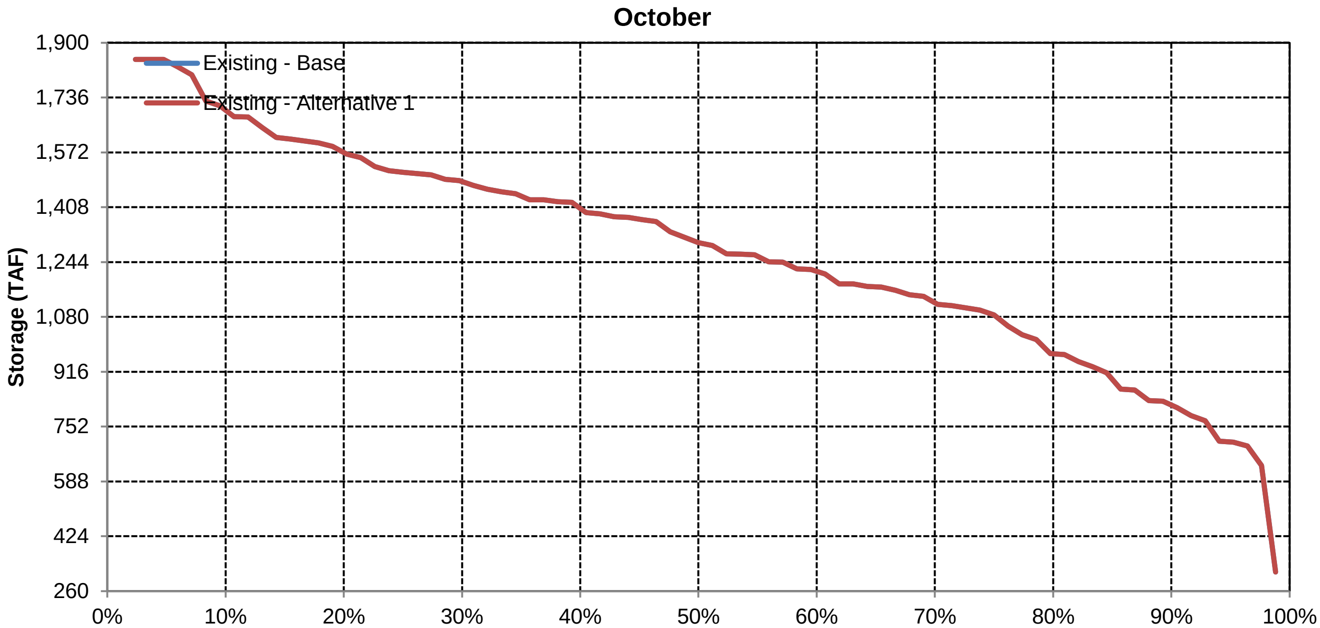
Existing - Alternative 1

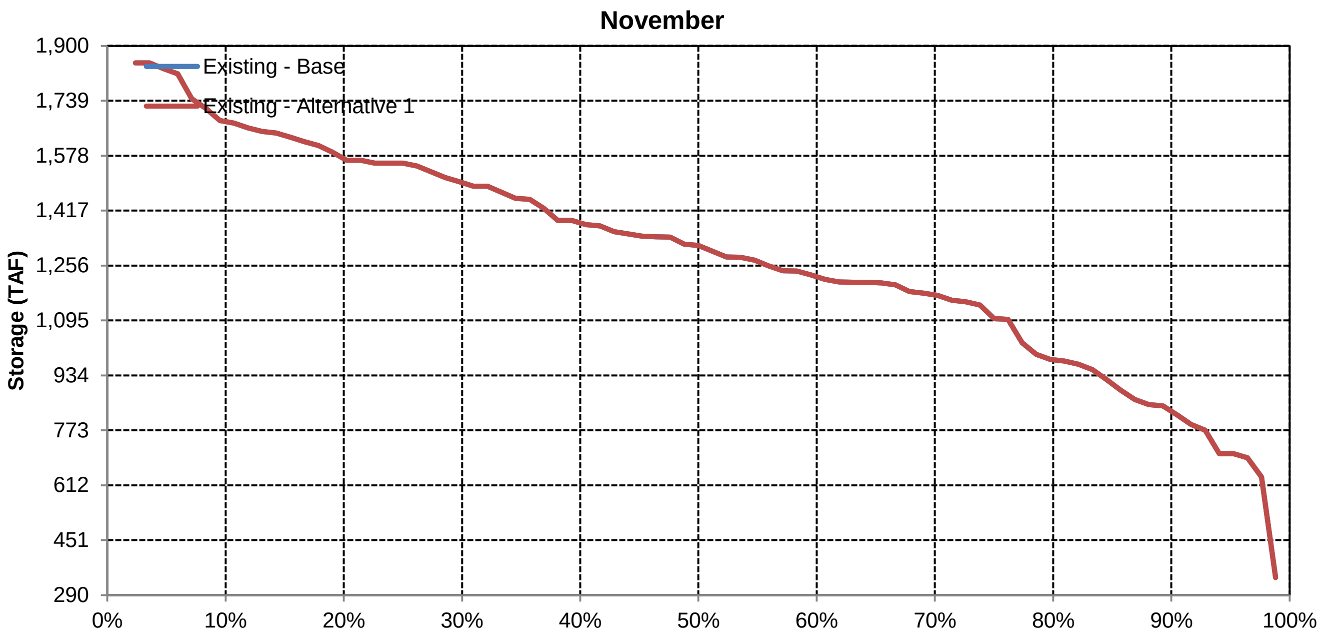
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	1,679	1,669	1,832	1,900	2,000	2,100	2,300	2,280	2,180	2,036	1,883	1,739
20%	1,561	1,564	1,651	1,871	2,000	2,100	2,253	2,180	2,061	1,899	1,757	1,620
30%	1,475	1,490	1,571	1,797	1,985	2,093	2,209	2,094	1,982	1,813	1,666	1,533
40%	1,391	1,375	1,503	1,663	1,844	2,014	2,151	2,039	1,892	1,736	1,573	1,442
50%	1,297	1,306	1,436	1,564	1,727	1,841	1,969	1,849	1,751	1,626	1,458	1,332
60%	1,211	1,218	1,325	1,409	1,575	1,748	1,859	1,779	1,680	1,531	1,369	1,247
70%	1,117	1,167	1,222	1,291	1,433	1,586	1,698	1,651	1,591	1,445	1,284	1,148
80%	969	979	1,041	1,144	1,328	1,452	1,593	1,574	1,453	1,293	1,119	1,009
90%	814	826	864	996	1,078	1,182	1,234	1,184	1,172	1,067	940	858
Long Term												
Full Simulation Period	1,276	1,285	1,370	1,501	1,641	1,769	1,902	1,832	1,743	1,596	1,445	1,326
Water Year Types												
Wet	1,352	1,401	1,574	1,777	1,943	2,063	2,232	2,168	2,045	1,906	1,771	1,629
Above Normal	1,354	1,330	1,434	1,642	1,822	1,999	2,154	2,062	1,975	1,816	1,661	1,520
Below Normal	1,248	1,259	1,287	1,409	1,560	1,708	1,857	1,790	1,716	1,581	1,414	1,315
Dry	1,303	1,288	1,329	1,373	1,484	1,619	1,724	1,640	1,555	1,384	1,220	1,110
Critical	1,041	1,030	1,052	1,087	1,153	1,212	1,267	1,214	1,174	1,038	895	807

Existing - Alternative 1 Minus Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types												
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

Trinity Reservoir





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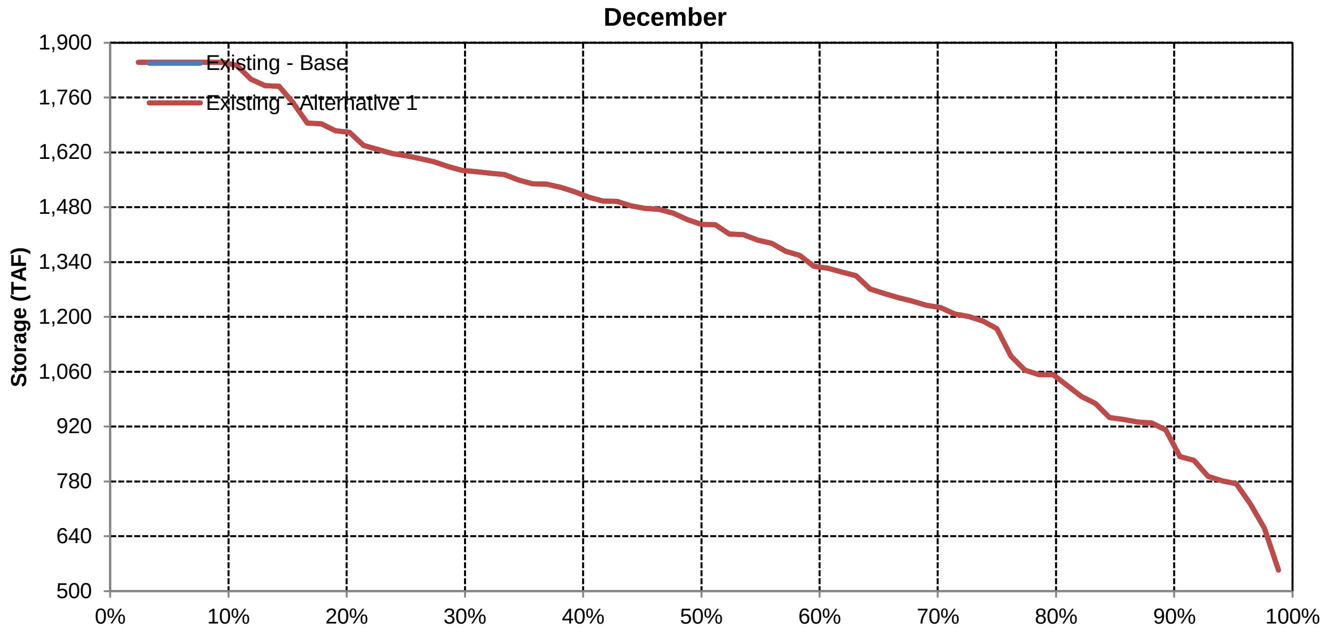

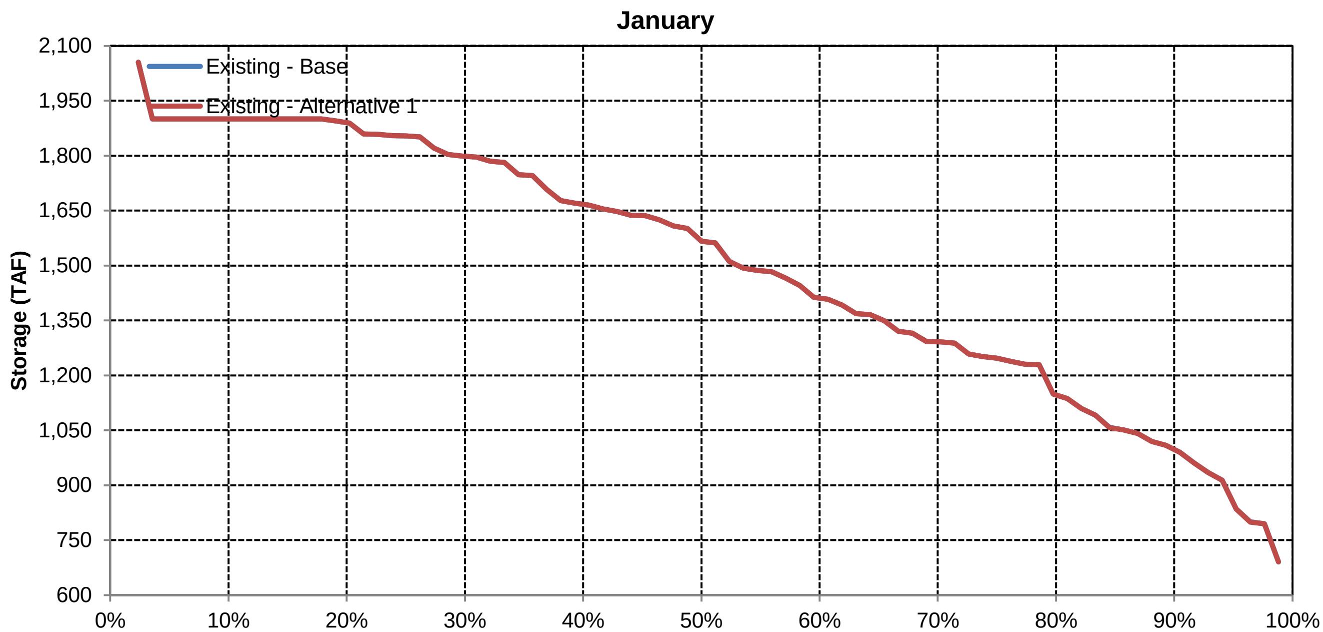

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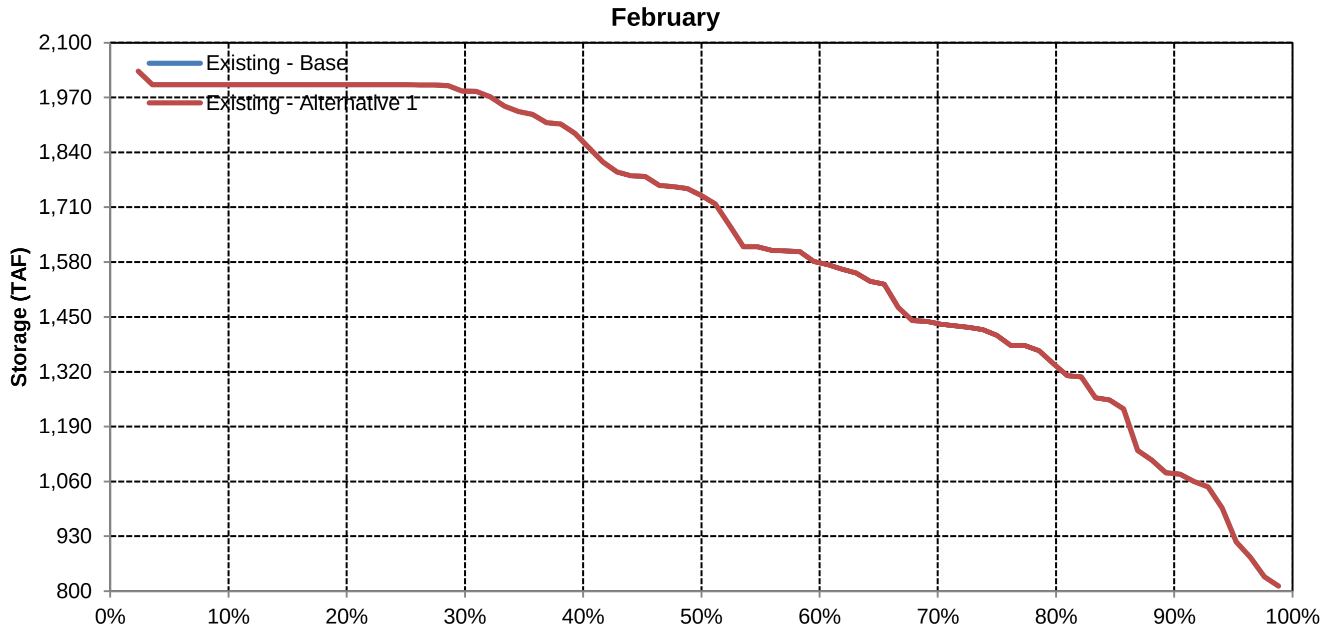
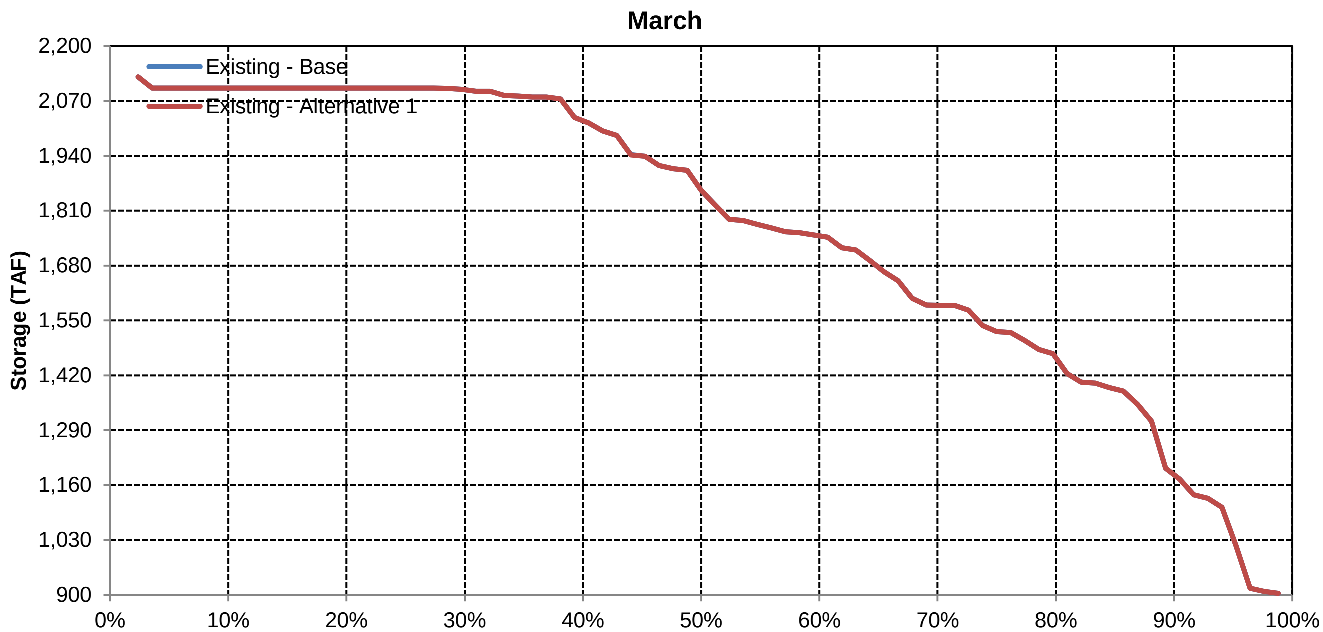
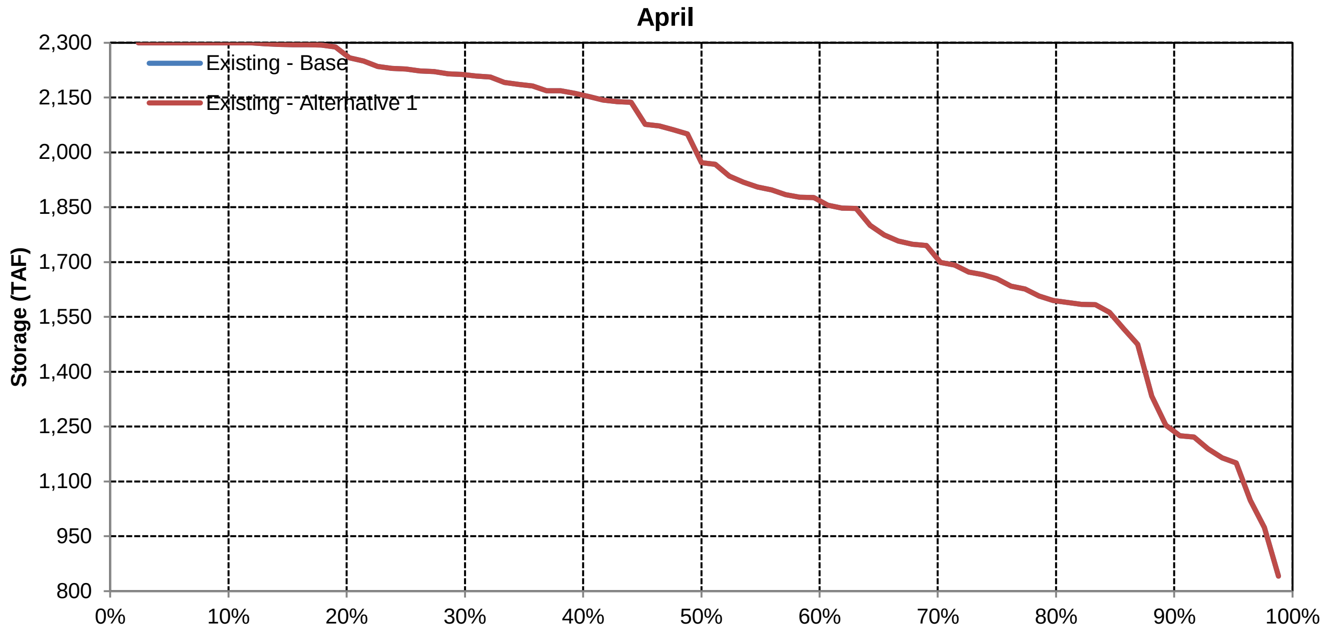
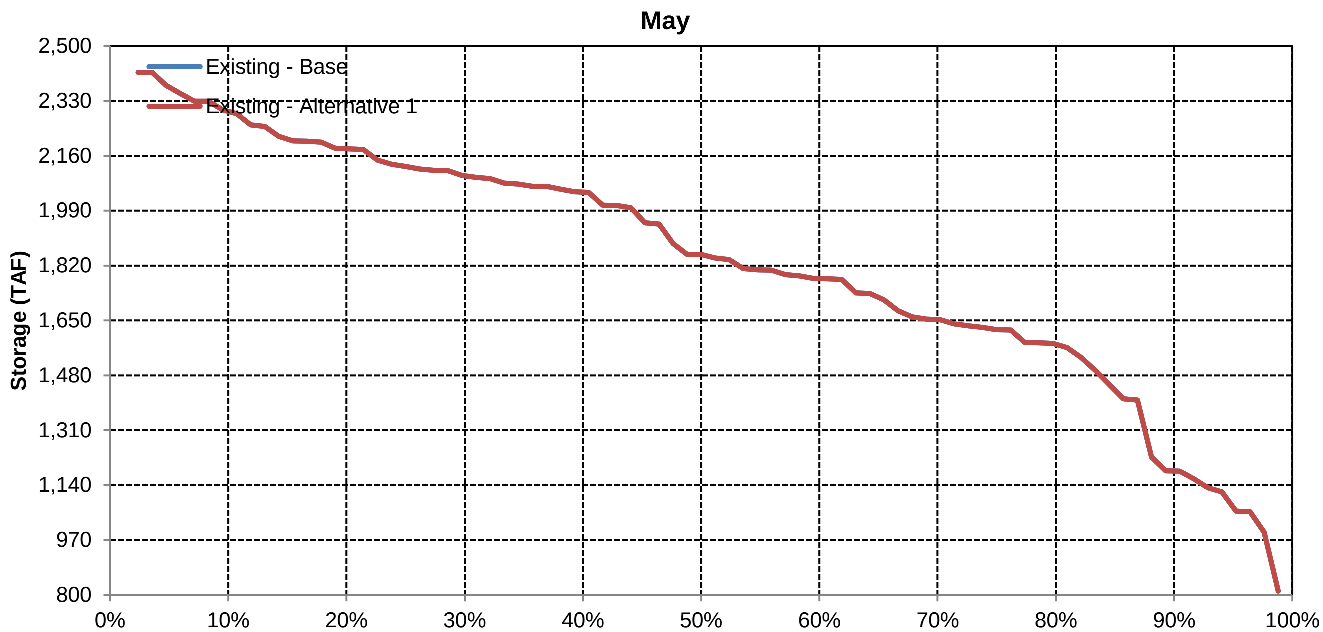


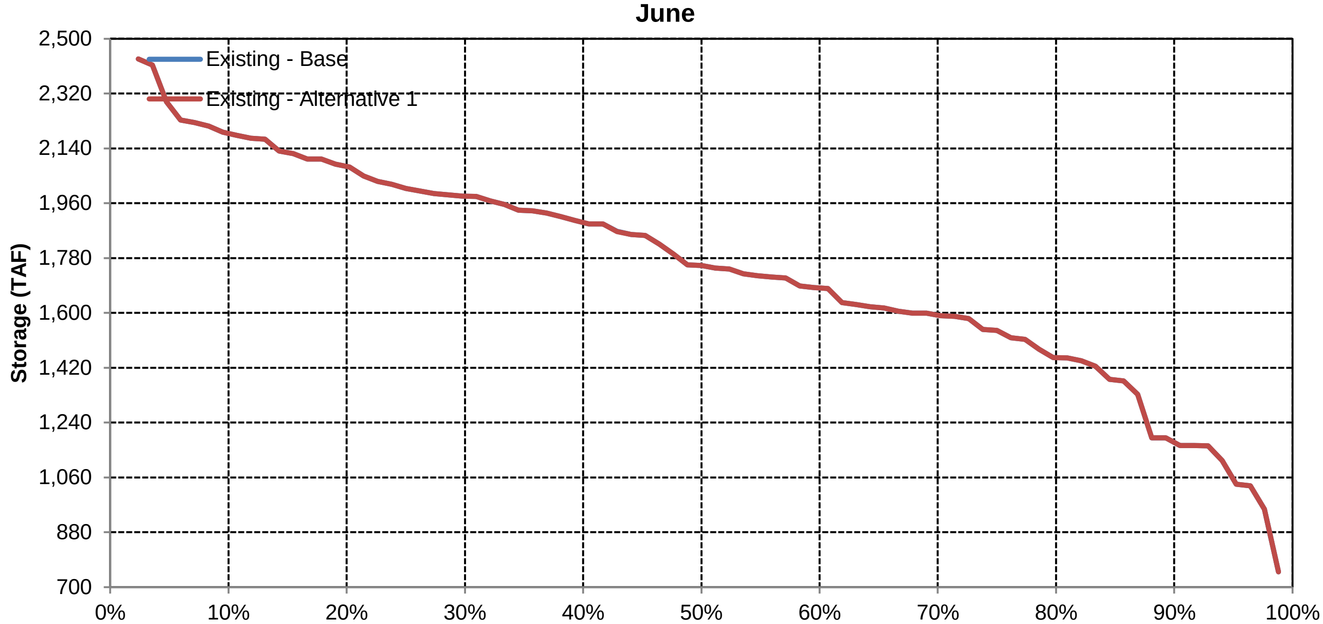


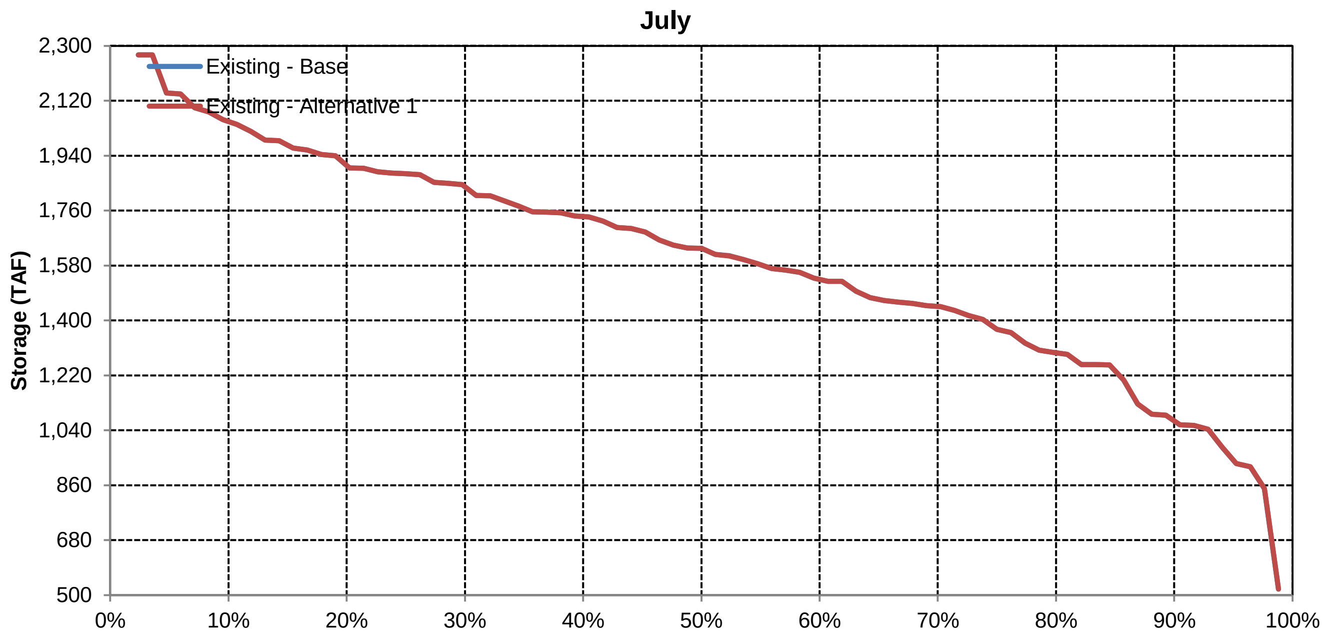
Trinity Reservoir



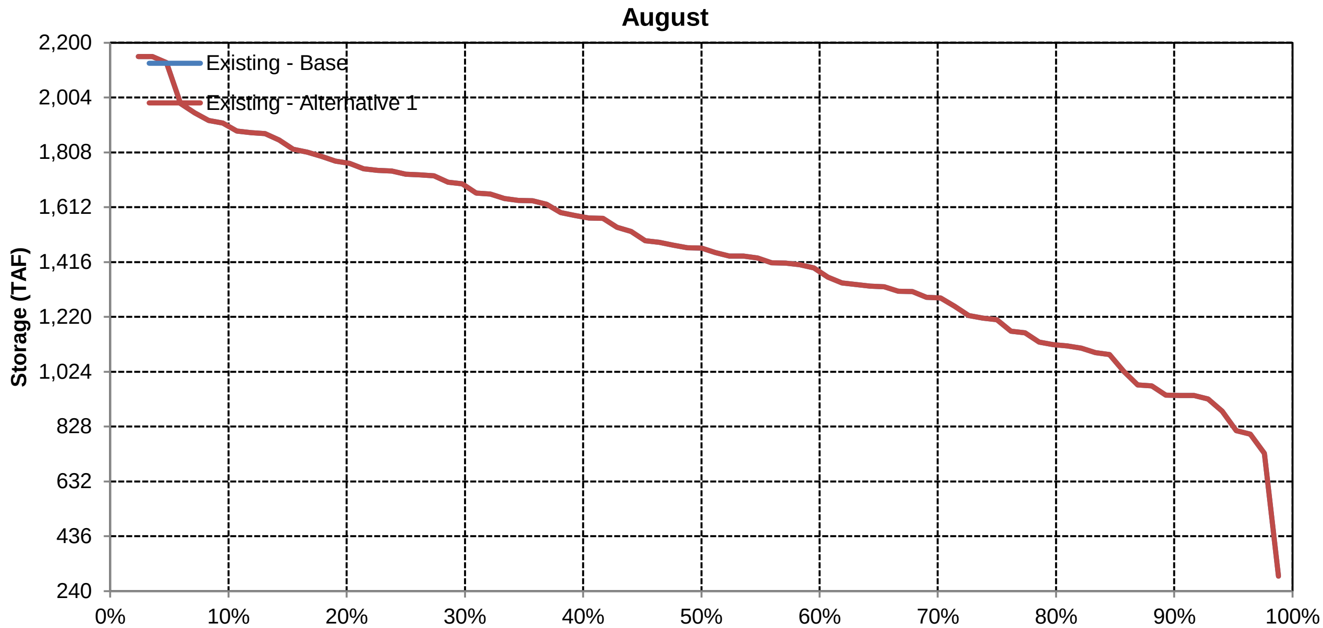


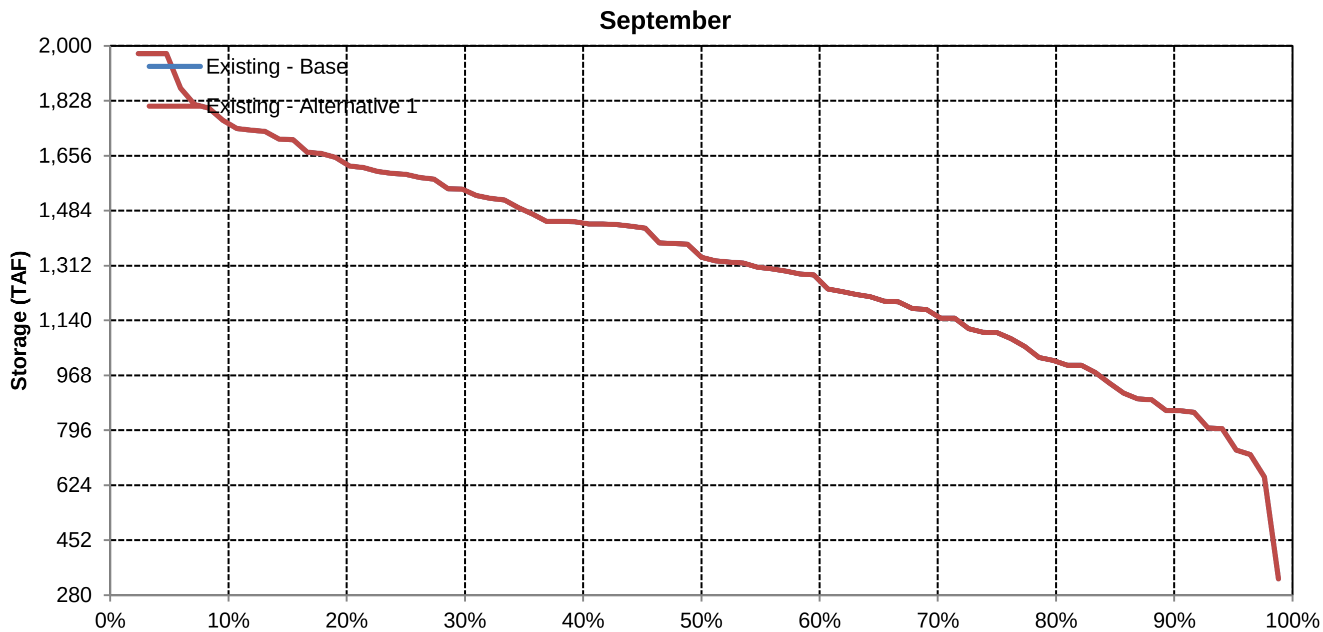
Trinity Reservoir





Trinity Reservoir





Long-Term and Water Year-Type Average of Shasta Reservoir Storage Under Existing - Base and Existing - Alternative 1

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
						Long-Term						
Full Simulation Period												
Existing - Base	2,487	2,504	2,755	3,076	3,374	3,757	3,995	3,956	3,567	3,020	2,727	2,556
Existing - Alternative 1	2,487	2,504	2,755	3,076	3,374	3,757	3,995	3,956	3,567	3,020	2,727	2,556
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
						Water Year-Types						
Wet												
Existing - Base	2,613	2,702	3,100	3,440	3,579	3,865	4,280	4,388	4,084	3,560	3,256	2,842
Existing - Alternative 1	2,613	2,702	3,100	3,440	3,579	3,865	4,280	4,388	4,084	3,560	3,256	2,842
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal												
Existing - Base	2,537	2,485	2,766	3,212	3,572	4,014	4,364	4,325	3,912	3,323	3,009	2,768
Existing - Alternative 1	2,537	2,485	2,766	3,212	3,572	4,014	4,364	4,325	3,912	3,323	3,009	2,768
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Existing - Base	2,369	2,436	2,594	2,989	3,427	3,933	4,220	4,140	3,703	3,083	2,787	2,785
Existing - Alternative 1	2,369	2,436	2,594	2,989	3,427	3,933	4,220	4,140	3,704	3,083	2,787	2,785
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry												
Existing - Base	2,489	2,449	2,648	2,874	3,288	3,732	3,800	3,677	3,263	2,775	2,491	2,466
Existing - Alternative 1	2,489	2,449	2,648	2,874	3,288	3,732	3,800	3,677	3,263	2,775	2,491	2,466
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical												
Existing - Base	2,338	2,278	2,396	2,576	2,786	3,059	2,976	2,802	2,354	1,832	1,572	1,547
Existing - Alternative 1	2,338	2,278	2,396	2,576	2,786	3,059	2,976	2,802	2,354	1,832	1,572	1,547
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Shasta Reservoir Storage

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	3,244	3,235	3,326	3,635	3,894	4,241	4,535	4,552	4,292	3,804	3,449	3,173
20%	2,935	2,986	3,288	3,529	3,740	4,119	4,455	4,528	4,151	3,585	3,339	3,033
30%	2,796	2,765	3,252	3,373	3,662	4,036	4,356	4,434	4,067	3,445	3,153	2,831
40%	2,695	2,654	3,047	3,296	3,552	3,992	4,257	4,293	3,864	3,225	2,891	2,766
50%	2,563	2,574	2,797	3,246	3,471	3,906	4,206	4,183	3,681	3,093	2,805	2,667
60%	2,427	2,461	2,677	3,001	3,300	3,744	4,097	4,057	3,556	2,974	2,699	2,490
70%	2,318	2,318	2,503	2,902	3,251	3,531	3,948	3,837	3,399	2,816	2,509	2,373
80%	2,161	2,218	2,368	2,685	3,077	3,387	3,457	3,270	2,912	2,497	2,253	2,259
90%	1,751	1,763	1,960	2,366	2,766	3,186	3,065	2,980	2,526	2,019	1,715	1,746
Long Term												
Full Simulation Period	2,487	2,504	2,755	3,076	3,374	3,757	3,995	3,956	3,567	3,020	2,727	2,556
Water Year Types												
Wet	2,613	2,702	3,100	3,440	3,579	3,865	4,280	4,388	4,084	3,560	3,256	2,842
Above Normal	2,537	2,485	2,766	3,212	3,572	4,014	4,364	4,325	3,912	3,323	3,009	2,768
Below Normal	2,369	2,436	2,594	2,989	3,427	3,933	4,220	4,140	3,703	3,083	2,787	2,785
Dry	2,489	2,449	2,648	2,874	3,288	3,732	3,800	3,677	3,263	2,775	2,491	2,466
Critical	2,338	2,278	2,396	2,576	2,786	3,059	2,976	2,802	2,354	1,832	1,572	1,547

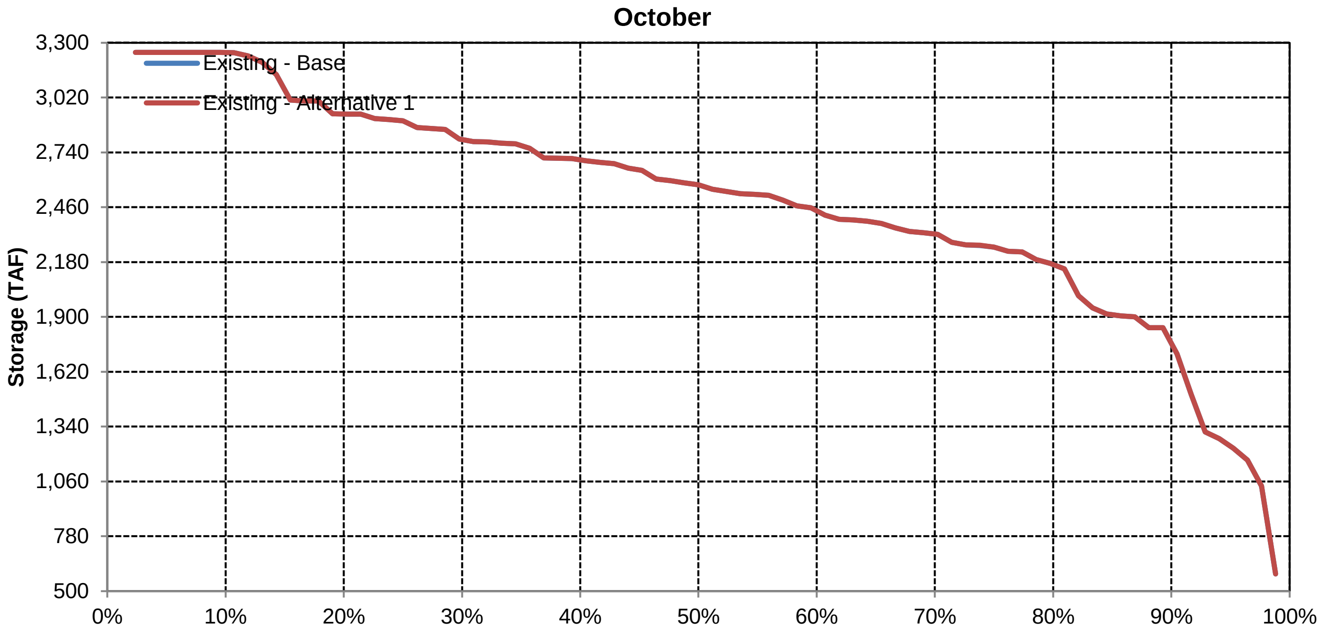
Existing - Alternative 1

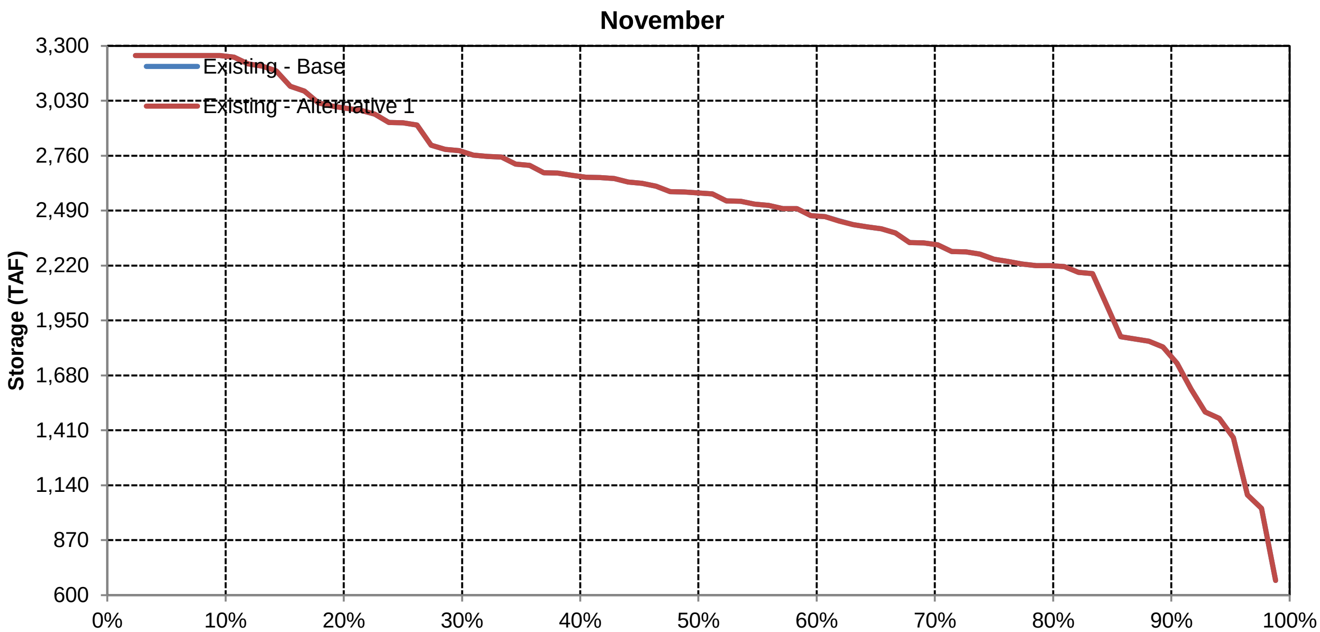
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	3,244	3,235	3,326	3,635	3,894	4,241	4,535	4,552	4,292	3,804	3,449	3,173
20%	2,935	2,986	3,288	3,529	3,740	4,119	4,455	4,528	4,151	3,585	3,339	3,033
30%	2,796	2,765	3,252	3,373	3,662	4,036	4,356	4,434	4,067	3,445	3,153	2,831
40%	2,695	2,654	3,047	3,297	3,552	3,992	4,257	4,293	3,864	3,225	2,891	2,766
50%	2,563	2,574	2,797	3,246	3,471	3,906	4,206	4,183	3,681	3,093	2,805	2,667
60%	2,427	2,462	2,677	3,001	3,300	3,744	4,097	4,057	3,556	2,974	2,699	2,491
70%	2,318	2,318	2,503	2,902	3,251	3,531	3,948	3,837	3,399	2,816	2,509	2,373
80%	2,161	2,218	2,368	2,685	3,077	3,387	3,457	3,270	2,912	2,497	2,253	2,259
90%	1,751	1,763	1,960	2,366	2,766	3,186	3,065	2,980	2,526	2,019	1,715	1,746
Long Term												
Full Simulation Period	2,487	2,504	2,755	3,076	3,374	3,757	3,995	3,956	3,567	3,020	2,727	2,556
Water Year Types												
Wet	2,613	2,702	3,100	3,440	3,579	3,865	4,280	4,388	4,084	3,560	3,256	2,842
Above Normal	2,537	2,485	2,766	3,212	3,572	4,014	4,364	4,325	3,912	3,323	3,009	2,768
Below Normal	2,369	2,436	2,594	2,989	3,427	3,933	4,220	4,140	3,704	3,083	2,787	2,785
Dry	2,489	2,449	2,648	2,874	3,288	3,732	3,800	3,677	3,263	2,775	2,491	2,466
Critical	2,338	2,278	2,396	2,576	2,786	3,059	2,976	2,802	2,354	1,832	1,572	1,547

Existing - Alternative 1 Minus Existing - Base

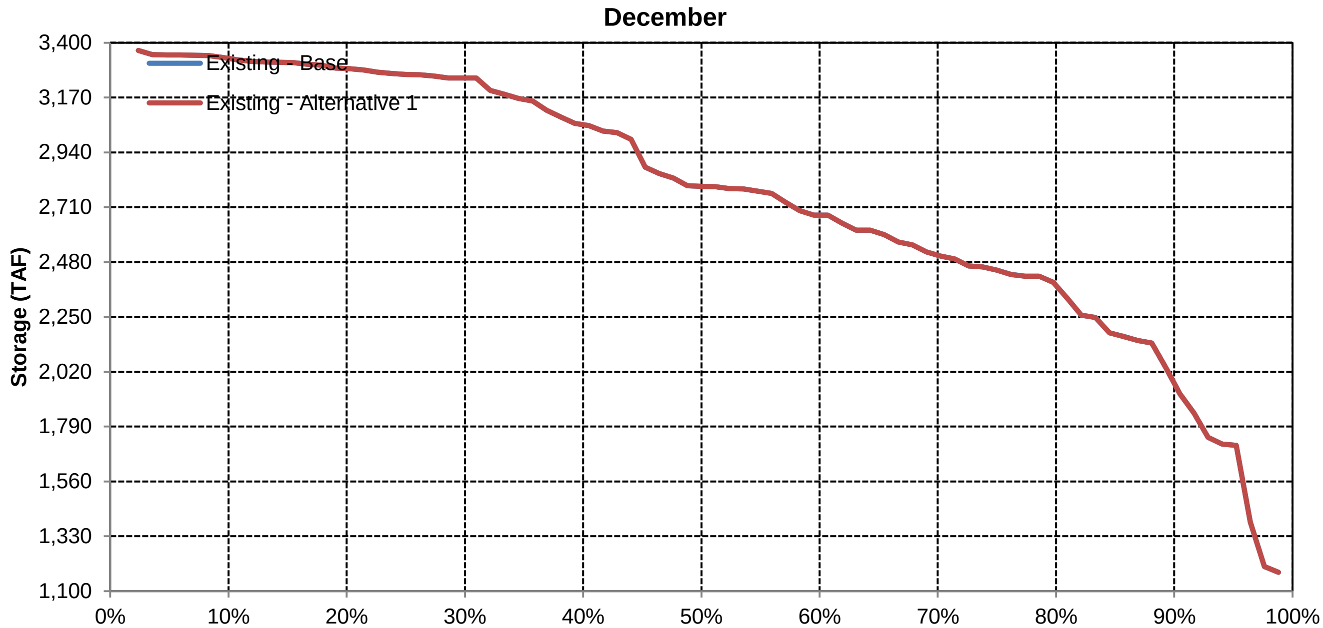
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types												
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

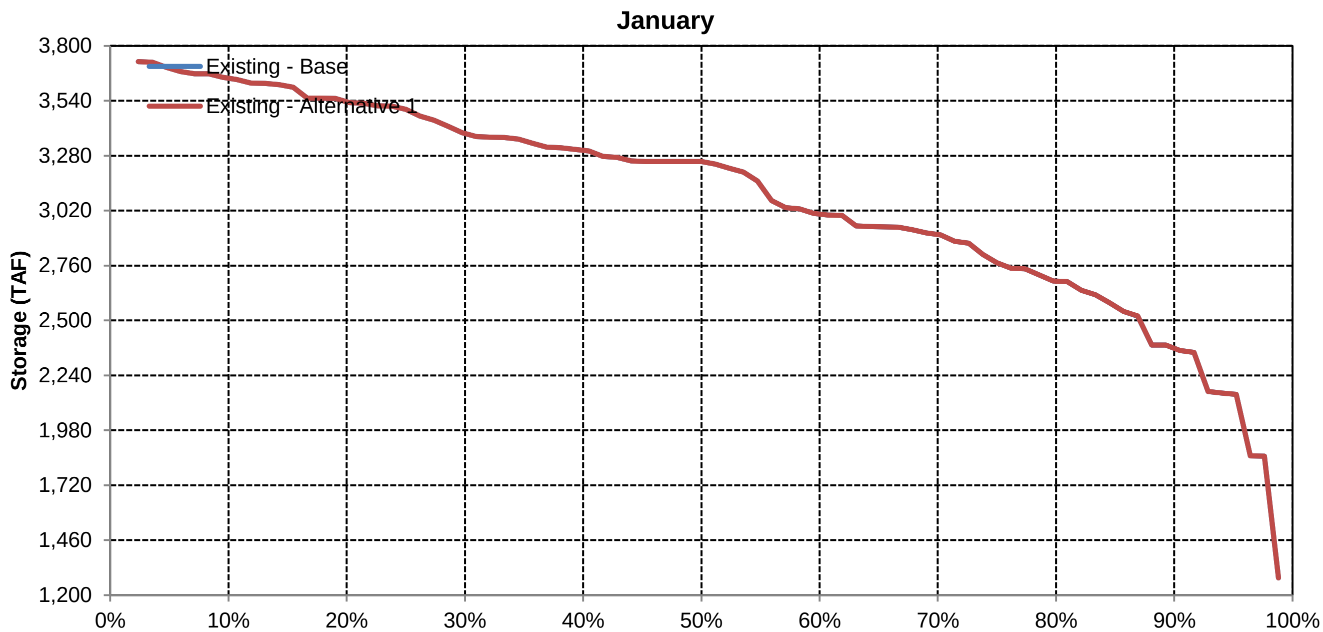
Shasta Reservoir Storage



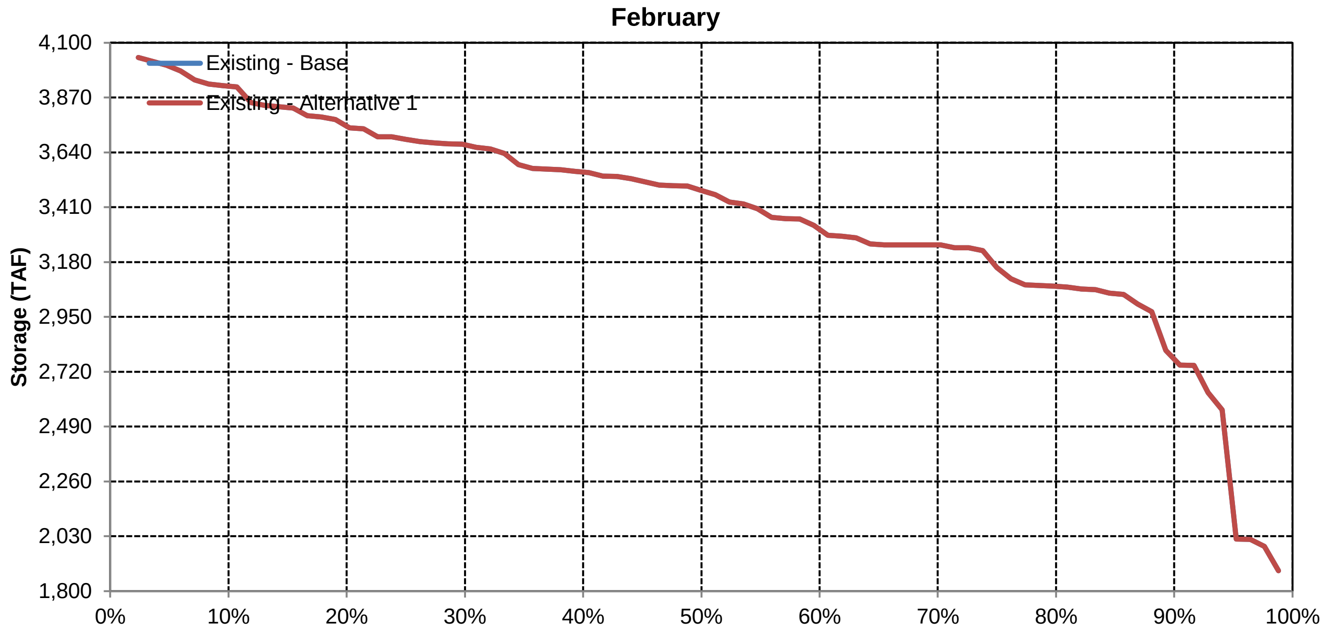


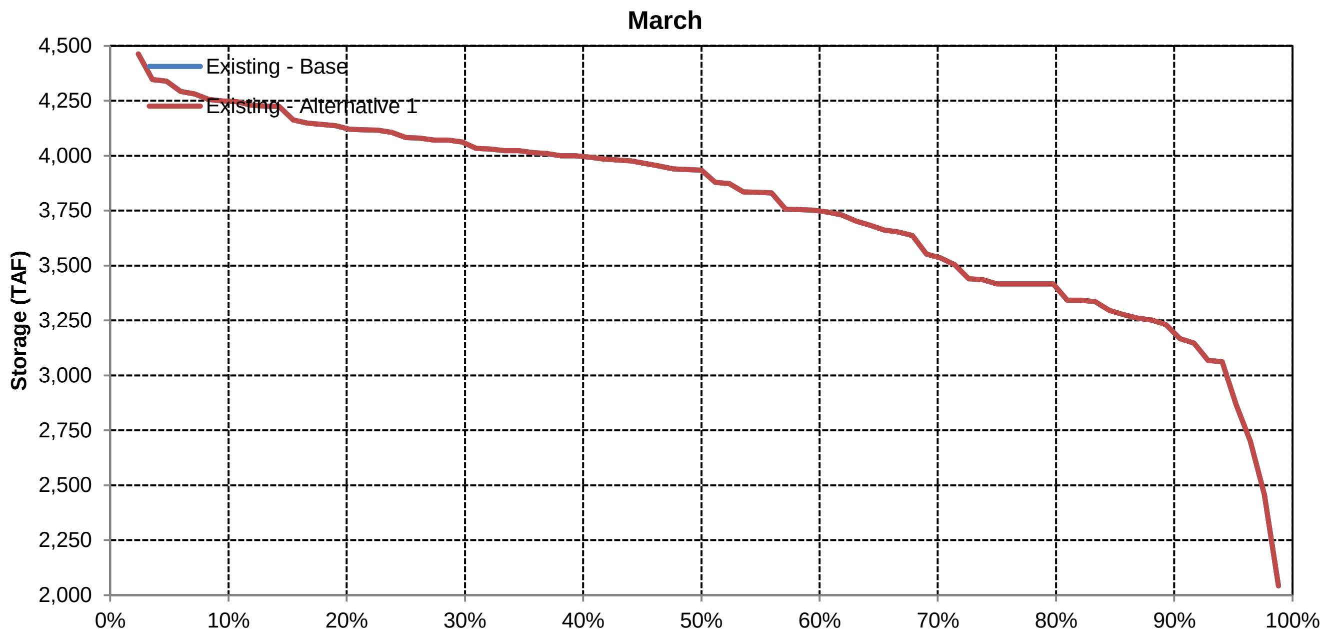
Shasta Reservoir Storage





Shasta Reservoir Storage





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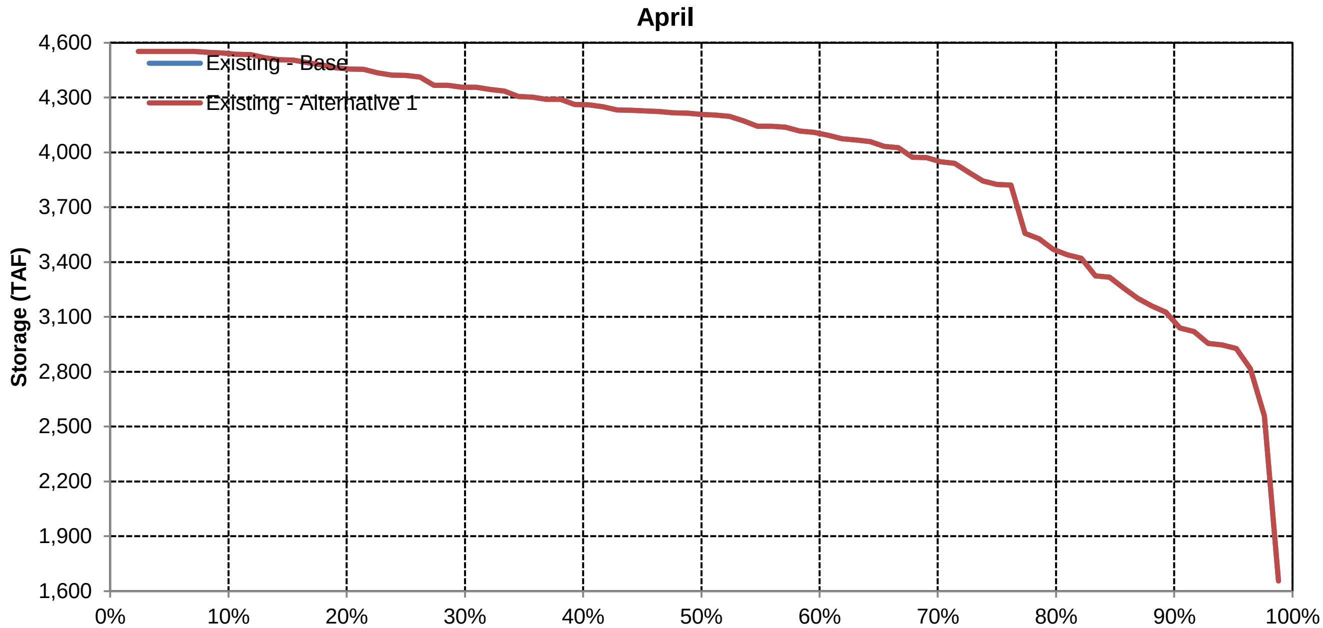
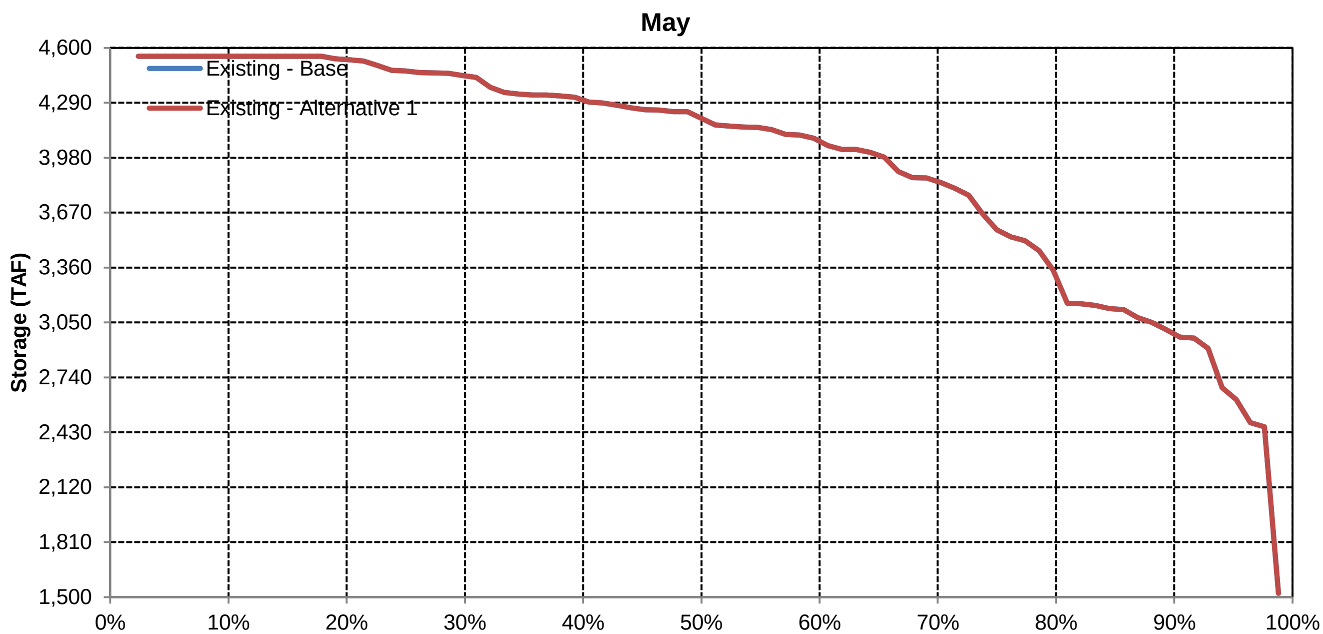
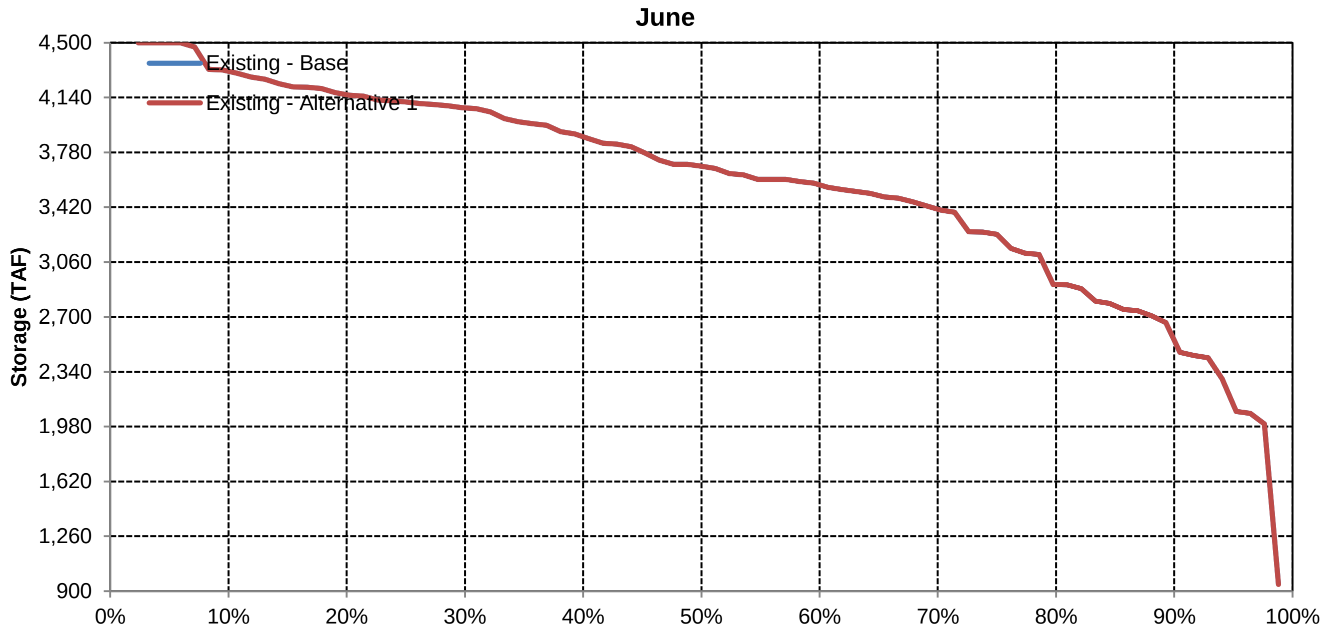
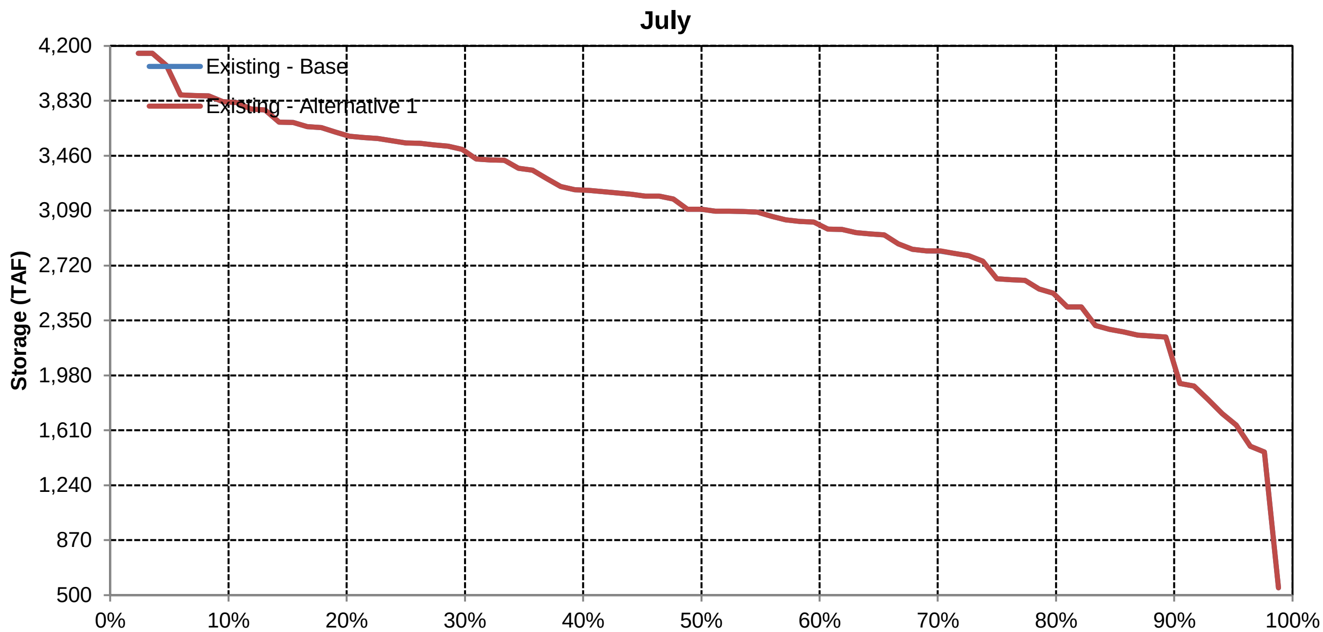


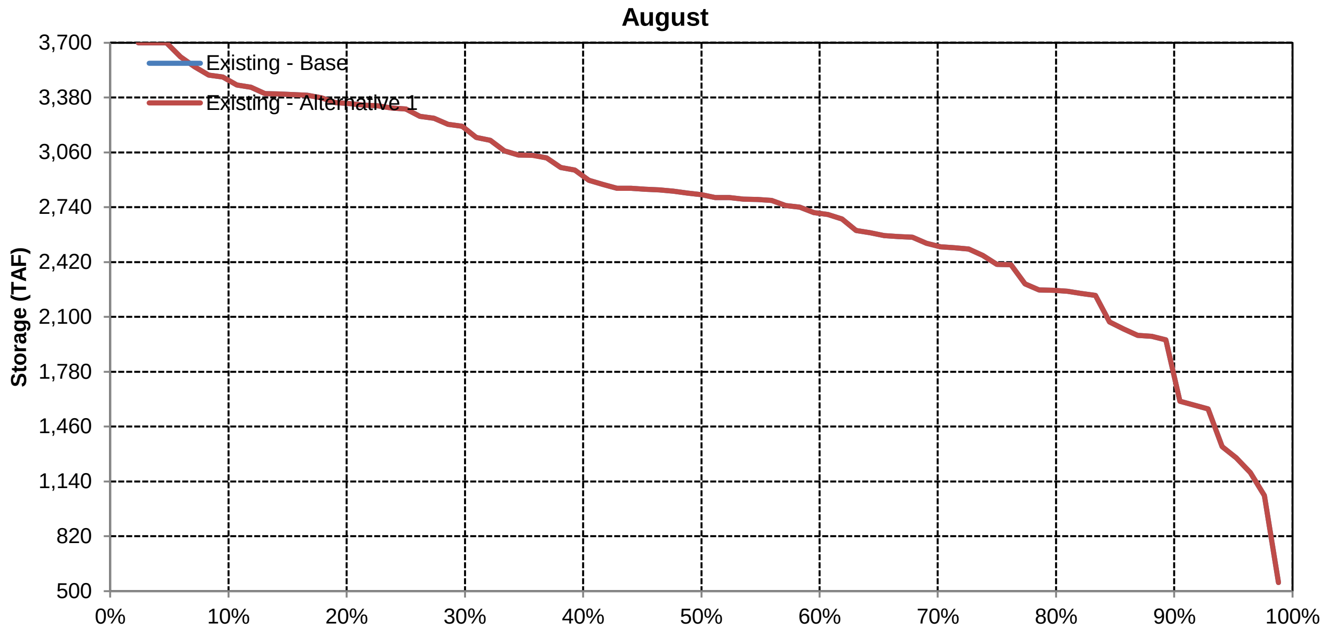


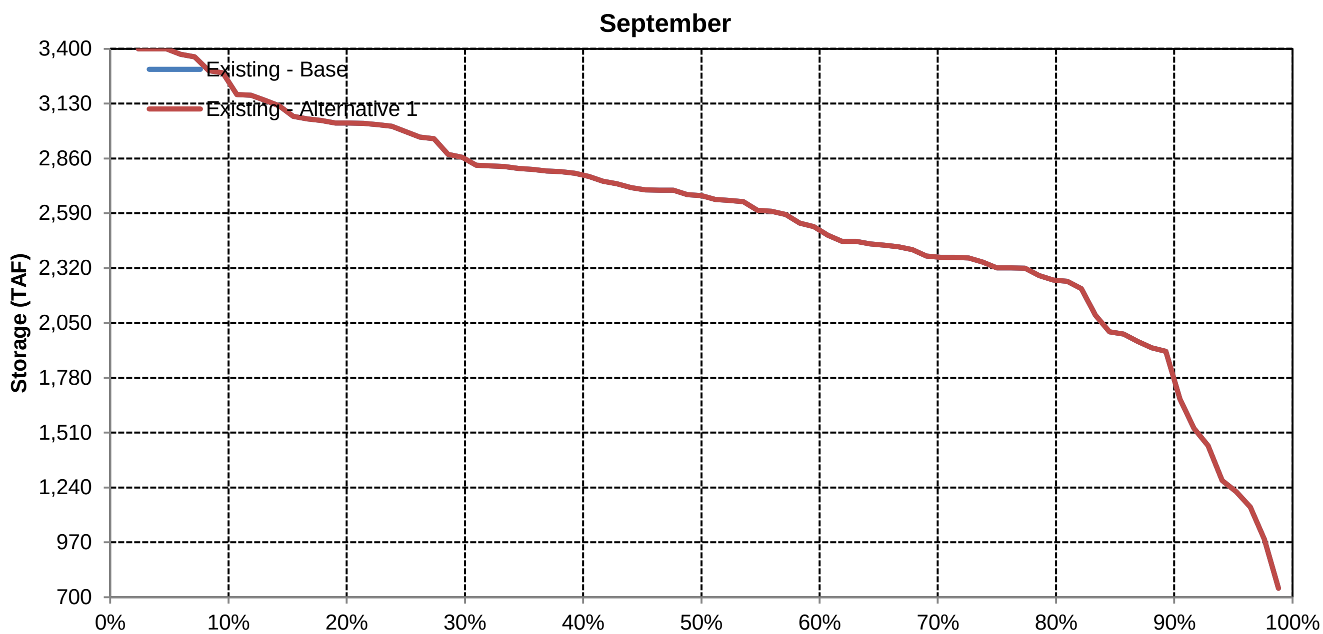
Shasta Reservoir Storage





Shasta Reservoir Storage





Long-Term and Water Year-Type Average of Oroville Reservoir Under Existing - Base and Existing - Alternative 1

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
						Long-Term						
Full Simulation Period												
Existing - Base	1,375	1,426	1,653	1,978	2,289	2,521	2,733	2,764	2,570	2,055	1,720	1,475
Existing - Alternative 1	1,375	1,426	1,653	1,978	2,289	2,521	2,734	2,764	2,570	2,055	1,720	1,475
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
						Water Year-Types						
Wet												
Existing - Base	1,516	1,714	2,247	2,673	2,864	2,952	3,256	3,383	3,246	2,729	2,371	1,947
Existing - Alternative 1	1,517	1,714	2,247	2,673	2,864	2,952	3,256	3,383	3,246	2,729	2,371	1,947
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal												
Existing - Base	1,465	1,439	1,710	2,291	2,764	2,945	3,251	3,314	3,133	2,506	2,052	1,703
Existing - Alternative 1	1,465	1,439	1,710	2,291	2,764	2,945	3,251	3,314	3,133	2,506	2,052	1,703
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Existing - Base	1,400	1,431	1,460	1,738	2,132	2,519	2,765	2,772	2,519	1,889	1,450	1,333
Existing - Alternative 1	1,400	1,432	1,461	1,738	2,132	2,519	2,765	2,772	2,519	1,889	1,450	1,333
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry												
Existing - Base	1,217	1,186	1,283	1,463	1,859	2,221	2,348	2,304	2,058	1,571	1,315	1,149
Existing - Alternative 1	1,217	1,186	1,283	1,463	1,859	2,221	2,348	2,304	2,058	1,571	1,315	1,149
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical												
Existing - Base	1,167	1,125	1,125	1,245	1,411	1,604	1,597	1,528	1,356	1,082	952	901
Existing - Alternative 1	1,167	1,125	1,125	1,245	1,411	1,604	1,597	1,528	1,356	1,082	952	901
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Oroville Reservoir

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	2,048	2,100	2,788	2,852	2,973	3,062	3,347	3,538	3,464	2,932	2,540	2,049
20%	1,690	1,724	2,266	2,788	2,821	2,991	3,279	3,429	3,319	2,720	2,274	1,870
30%	1,557	1,571	1,864	2,609	2,788	2,938	3,234	3,313	3,103	2,478	2,087	1,726
40%	1,418	1,455	1,626	2,184	2,788	2,817	3,162	3,202	2,948	2,271	1,793	1,522
50%	1,255	1,303	1,474	1,911	2,537	2,788	3,042	2,980	2,730	2,097	1,619	1,391
60%	1,195	1,197	1,303	1,674	2,093	2,588	2,813	2,722	2,447	1,842	1,446	1,289
70%	1,027	1,088	1,226	1,470	1,932	2,306	2,344	2,503	2,236	1,596	1,366	1,196
80%	998	1,019	1,128	1,352	1,643	2,058	2,129	2,080	1,885	1,434	1,135	1,012
90%	885	956	992	1,085	1,275	1,582	1,648	1,551	1,356	1,036	898	852
Long Term												
Full Simulation Period	1,375	1,426	1,653	1,978	2,289	2,521	2,733	2,764	2,570	2,055	1,720	1,475
Water Year Types												
Wet	1,516	1,714	2,247	2,673	2,864	2,952	3,256	3,383	3,246	2,729	2,371	1,947
Above Normal	1,465	1,439	1,710	2,291	2,764	2,945	3,251	3,314	3,133	2,506	2,052	1,703
Below Normal	1,400	1,431	1,460	1,738	2,132	2,519	2,765	2,772	2,519	1,889	1,450	1,333
Dry	1,217	1,186	1,283	1,463	1,859	2,221	2,348	2,304	2,058	1,571	1,315	1,149
Critical	1,167	1,125	1,125	1,245	1,411	1,604	1,597	1,528	1,356	1,082	952	901

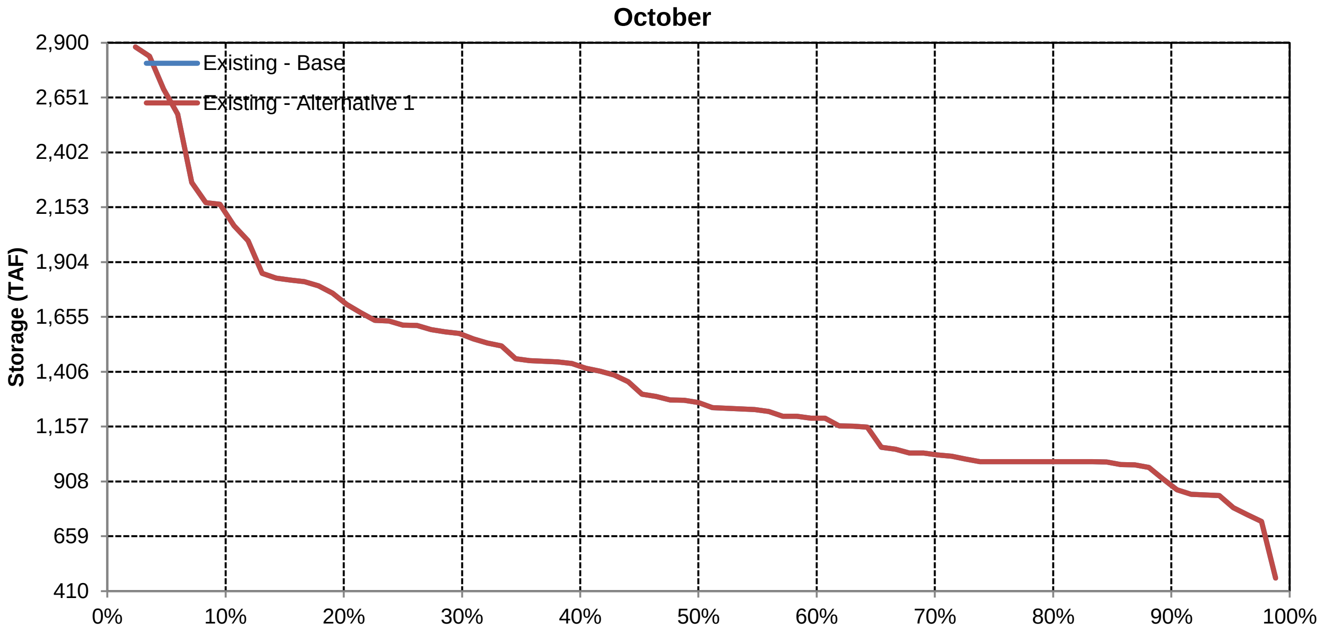
Existing - Alternative 1

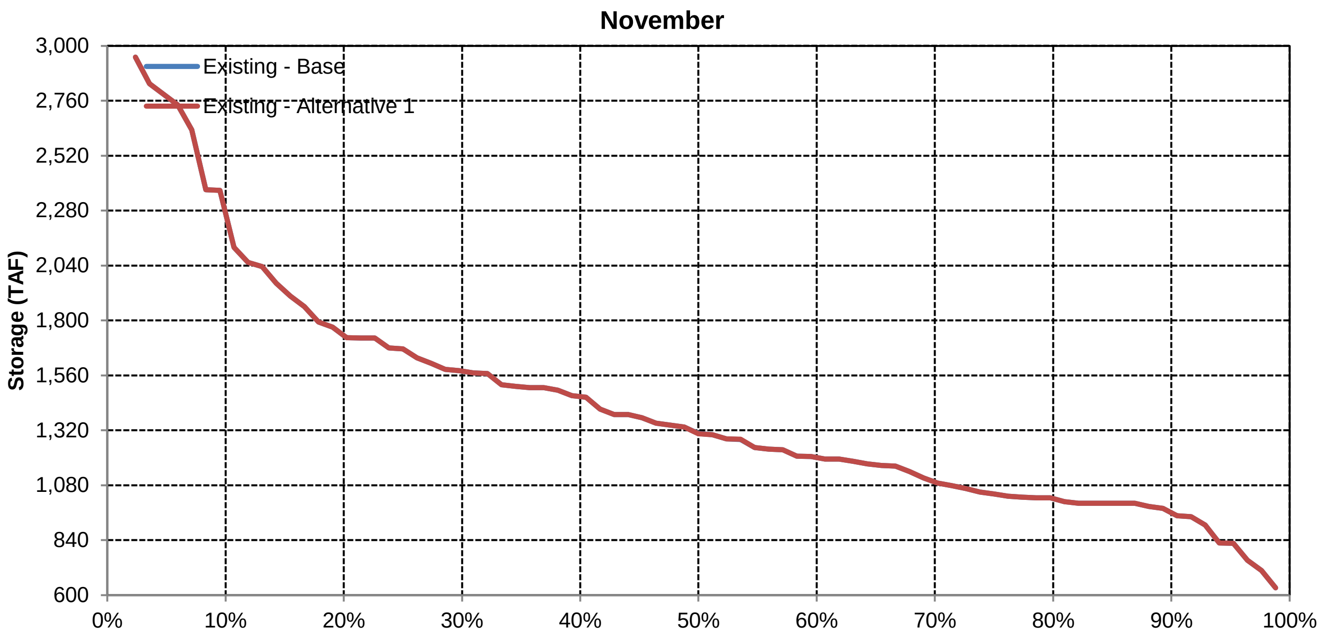
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	2,048	2,100	2,788	2,852	2,973	3,062	3,347	3,538	3,464	2,932	2,540	2,049
20%	1,690	1,724	2,266	2,788	2,821	2,991	3,279	3,429	3,319	2,720	2,274	1,870
30%	1,557	1,571	1,864	2,609	2,788	2,938	3,234	3,313	3,103	2,478	2,087	1,726
40%	1,418	1,455	1,626	2,184	2,788	2,817	3,162	3,202	2,948	2,271	1,793	1,522
50%	1,255	1,303	1,473	1,912	2,537	2,788	3,042	2,980	2,730	2,097	1,619	1,392
60%	1,195	1,197	1,303	1,674	2,093	2,588	2,813	2,722	2,447	1,842	1,446	1,290
70%	1,027	1,088	1,226	1,470	1,932	2,306	2,344	2,503	2,236	1,596	1,366	1,196
80%	998	1,019	1,128	1,352	1,643	2,058	2,129	2,080	1,885	1,434	1,135	1,012
90%	885	956	992	1,085	1,275	1,582	1,648	1,551	1,356	1,036	898	852
Long Term												
Full Simulation Period	1,375	1,426	1,653	1,978	2,289	2,521	2,734	2,764	2,570	2,055	1,720	1,475
Water Year Types												
Wet	1,517	1,714	2,247	2,673	2,864	2,952	3,256	3,383	3,246	2,729	2,371	1,947
Above Normal	1,465	1,439	1,710	2,291	2,764	2,945	3,251	3,314	3,133	2,506	2,052	1,703
Below Normal	1,400	1,432	1,461	1,738	2,132	2,519	2,765	2,772	2,519	1,889	1,450	1,333
Dry	1,217	1,186	1,283	1,463	1,859	2,221	2,348	2,304	2,058	1,571	1,315	1,149
Critical	1,167	1,125	1,125	1,245	1,411	1,604	1,597	1,528	1,356	1,082	952	901

Existing - Alternative 1 Minus Existing - Base

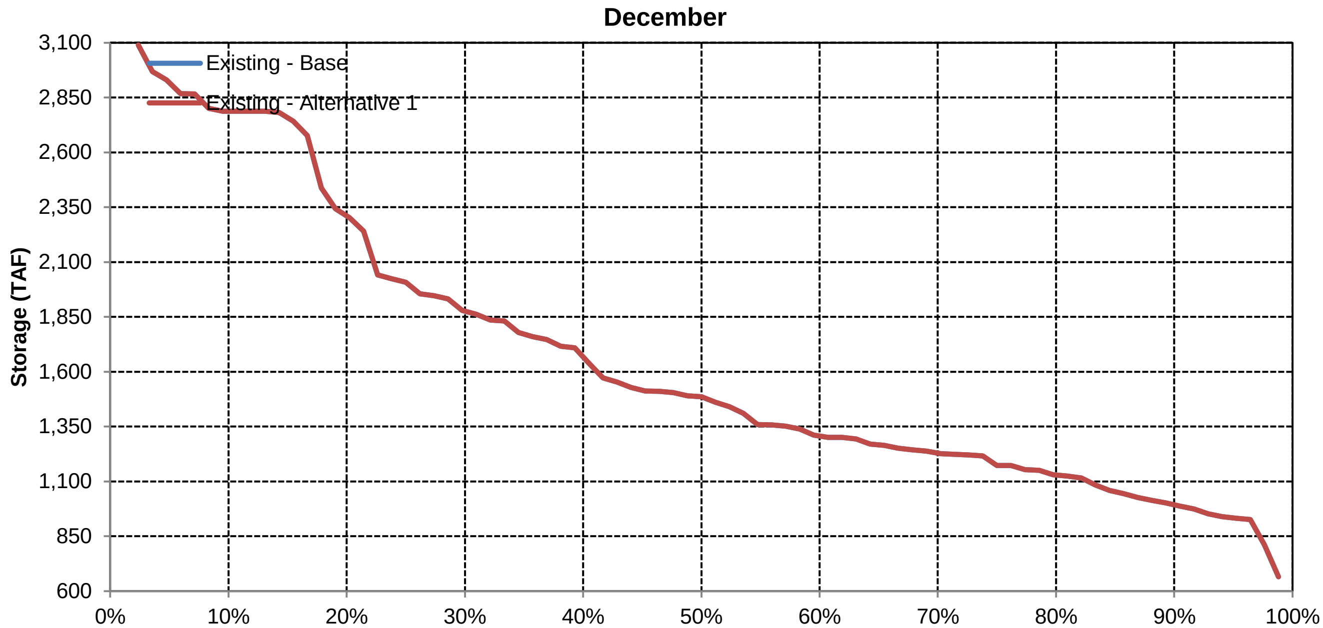
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	1	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types												
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

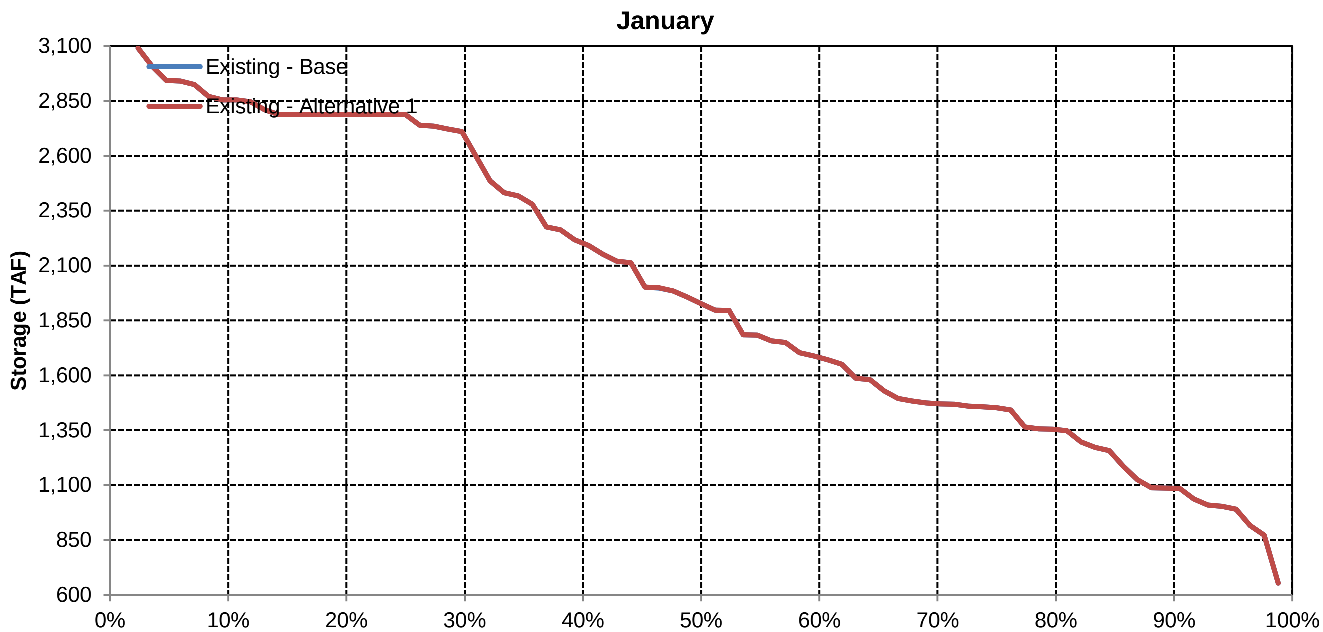
Oroville Reservoir



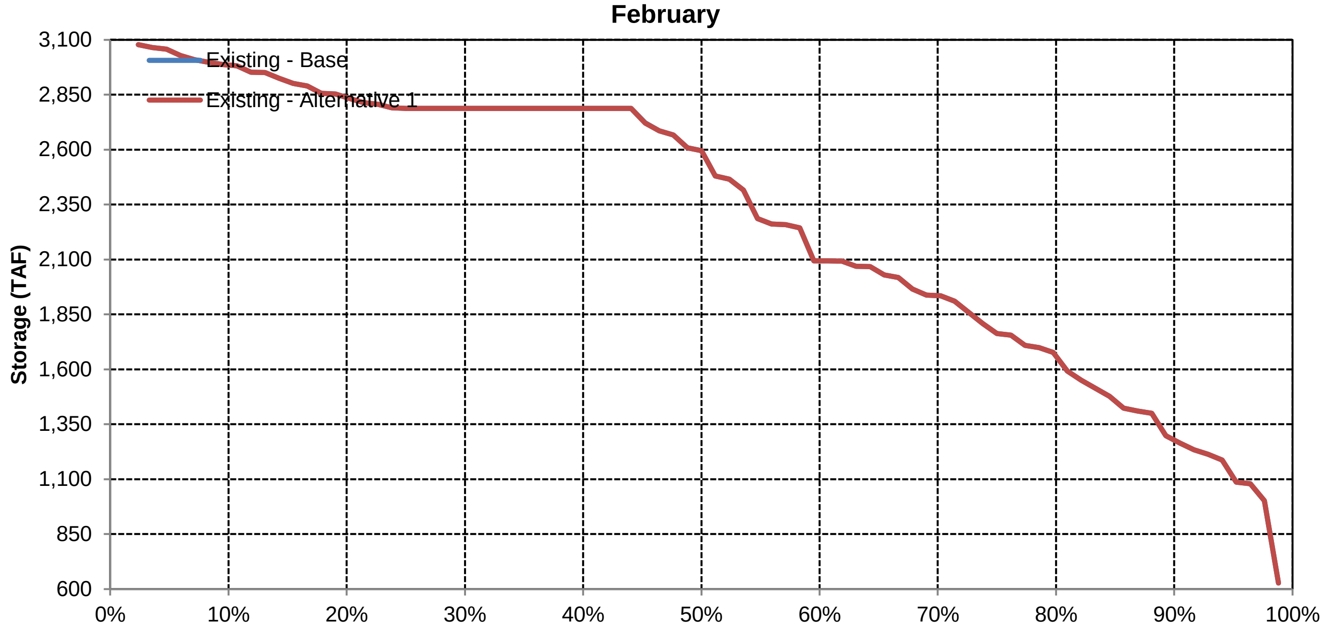


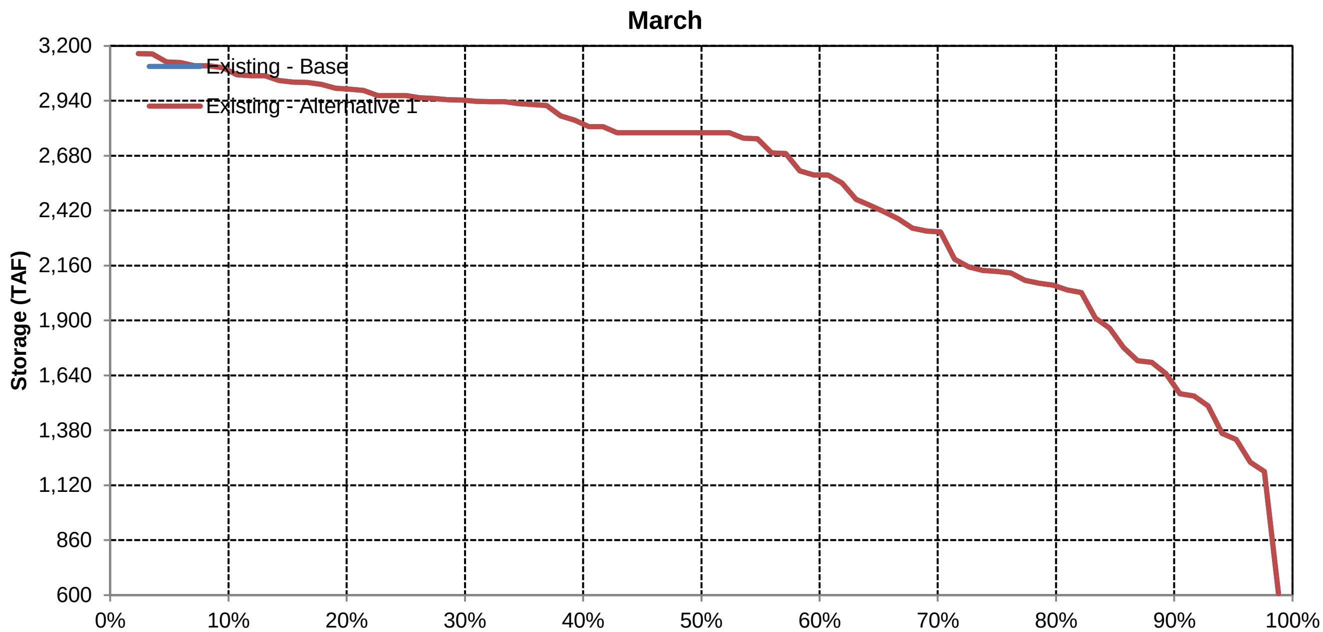
Oroville Reservoir



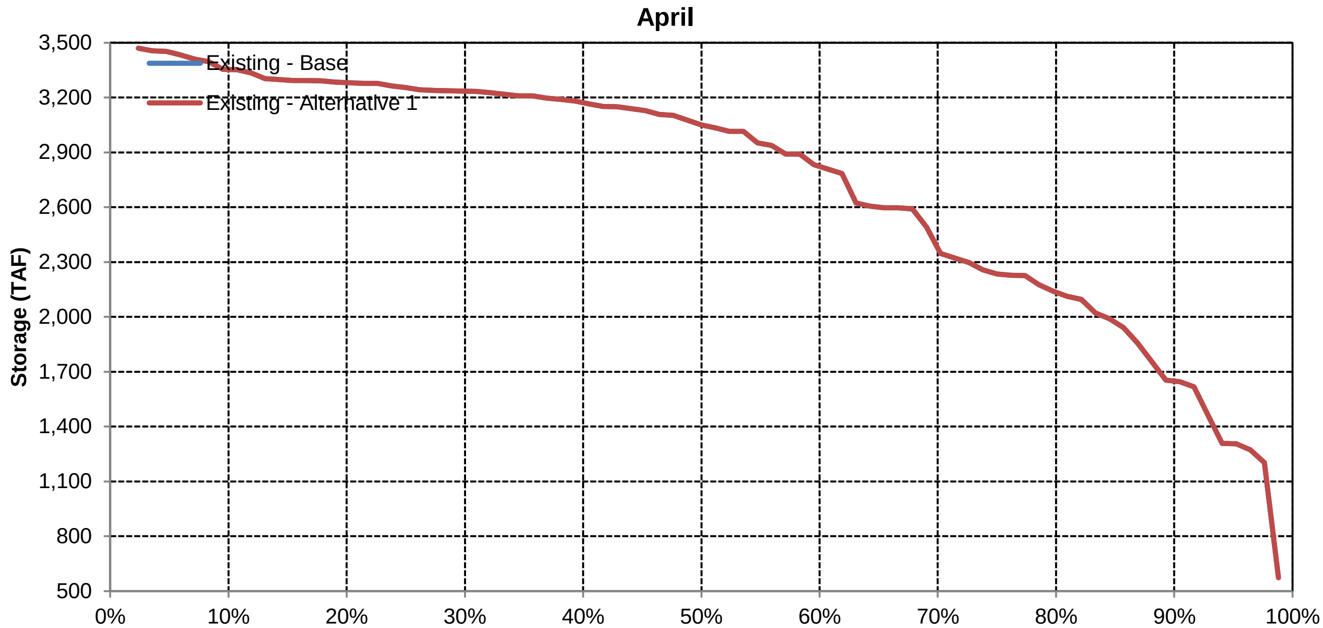


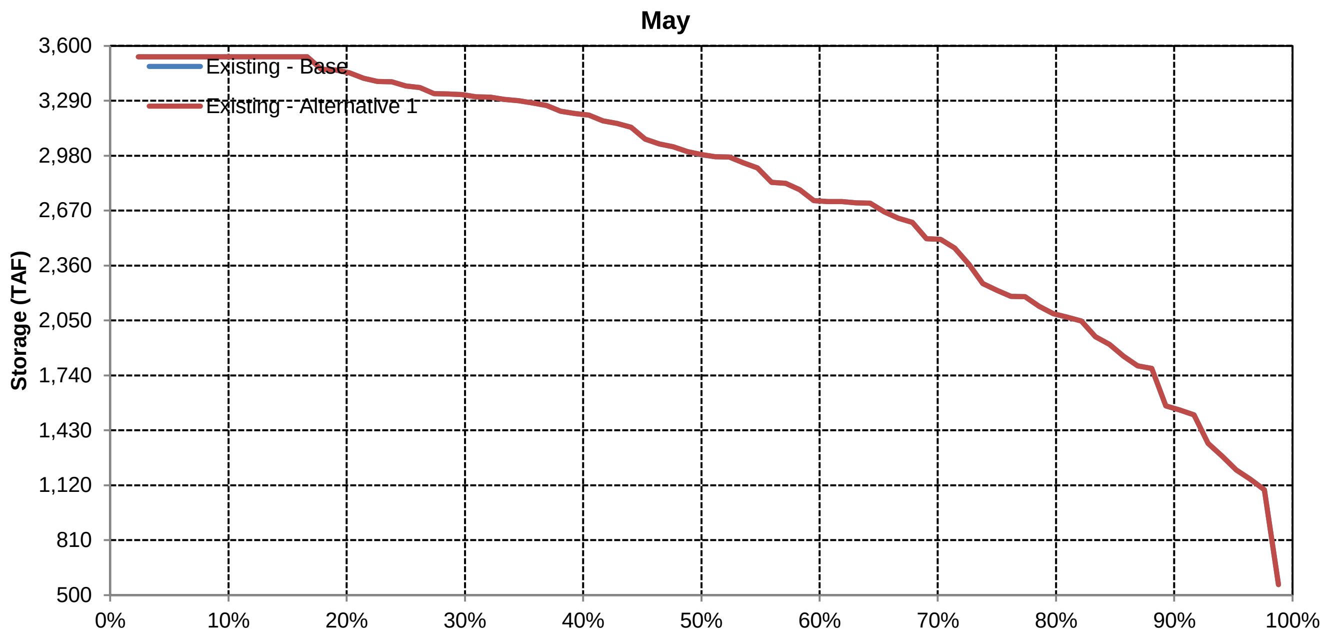
Oroville Reservoir



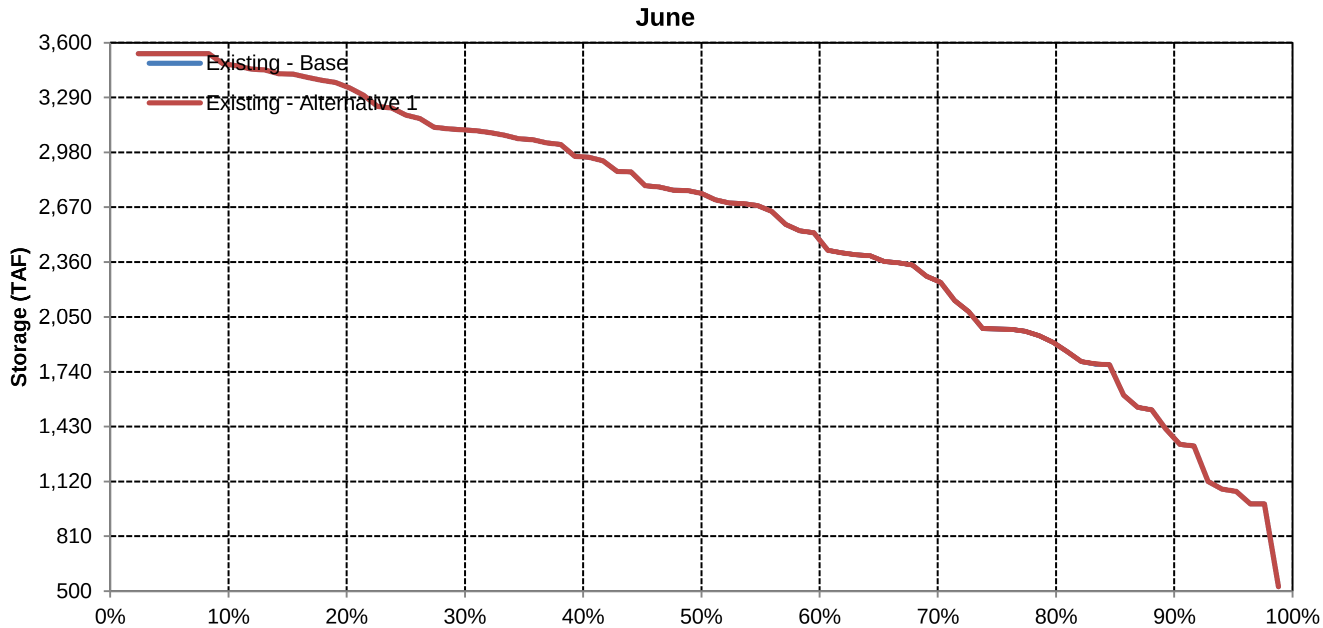


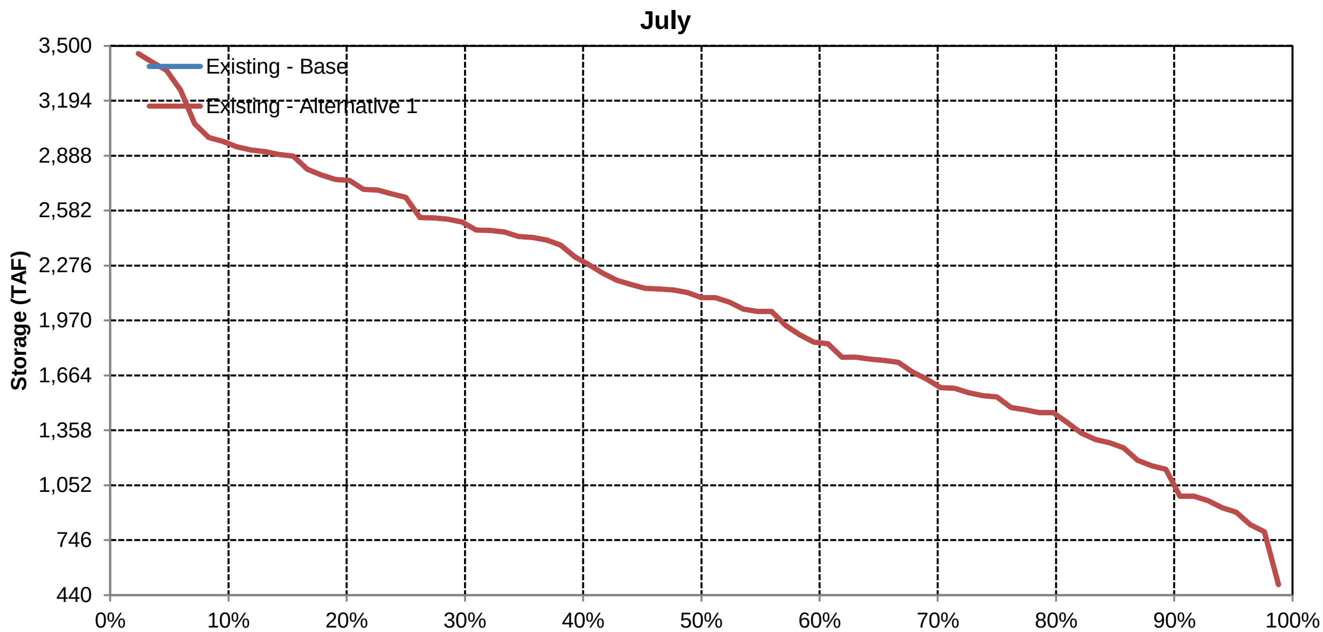
Oroville Reservoir



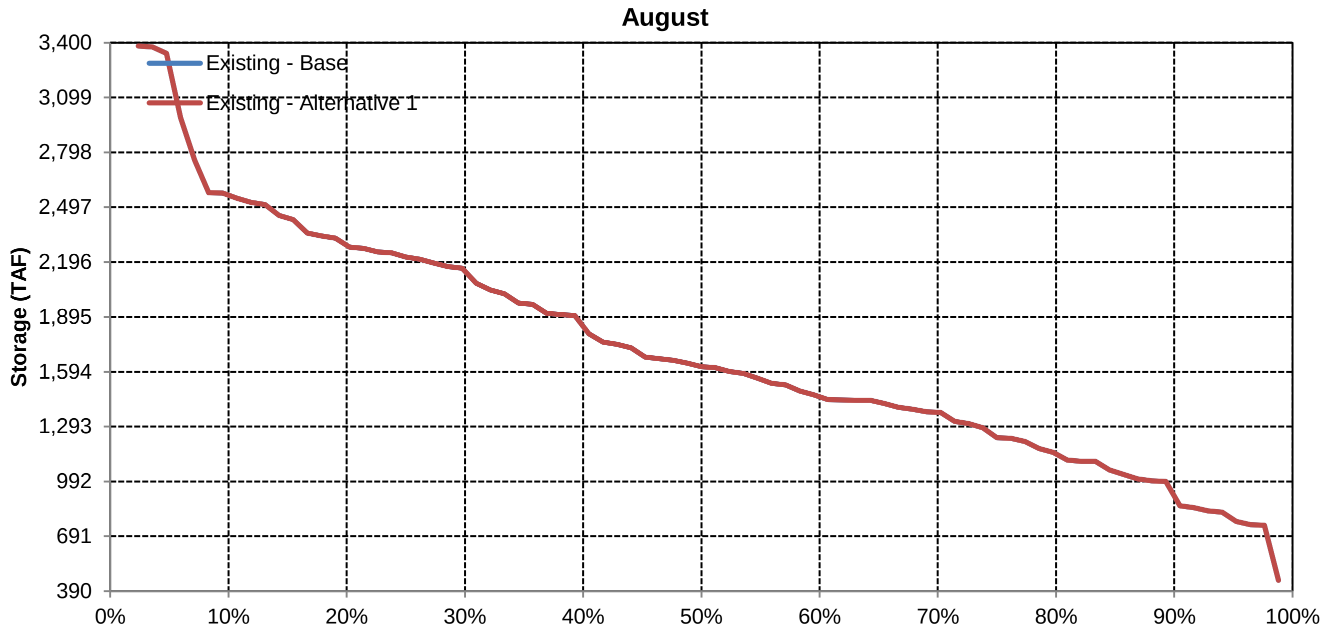


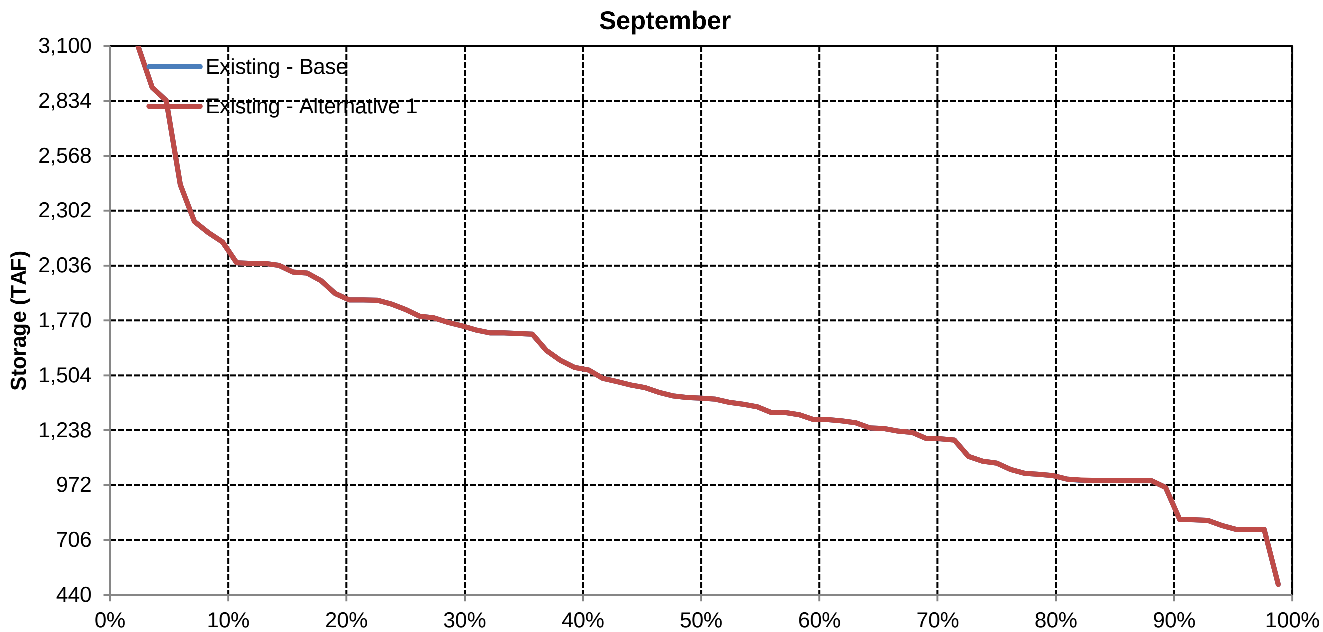
Oroville Reservoir





Oroville Reservoir





Long-Term and Water Year-Type Average of Folsom Reservoir Under Existing - Base and Existing - Alternative 1

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
						Long-Term						
Full Simulation Period												
Existing - Base	391	398	446	474	495	597	712	766	699	522	477	427
Existing - Alternative 1	391	398	446	474	495	597	712	766	699	522	477	427
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
						Water Year-Types						
Wet												
Existing - Base	405	431	511	520	508	626	766	897	851	676	622	507
Existing - Alternative 1	405	431	511	520	508	626	766	897	851	676	622	507
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal												
Existing - Base	406	399	470	532	548	643	777	842	775	540	504	455
Existing - Alternative 1	406	399	470	532	548	643	777	842	775	540	504	455
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Existing - Base	397	414	447	500	536	627	774	792	716	480	445	433
Existing - Alternative 1	397	414	447	500	536	627	774	792	716	480	445	433
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry												
Existing - Base	365	367	398	418	479	593	688	698	596	438	387	376
Existing - Alternative 1	365	367	398	418	479	593	688	698	596	438	387	376
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical												
Existing - Base	372	347	345	357	380	453	480	471	418	351	313	291
Existing - Alternative 1	372	347	345	357	380	453	480	471	418	351	313	291
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Folsom Reservoir

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	590	560	567	567	567	662	792	967	967	815	752	618
20%	495	499	567	567	567	658	792	967	877	709	667	545
30%	433	453	565	566	565	656	792	903	826	590	536	487
40%	399	419	525	557	558	651	792	803	723	530	478	439
50%	358	395	444	544	552	641	792	769	703	474	425	401
60%	339	354	413	474	518	625	758	752	677	438	396	382
70%	320	335	363	427	458	610	725	727	608	405	380	358
80%	295	300	323	365	416	566	609	626	523	374	338	318
90%	261	273	294	284	323	460	479	484	429	331	306	273
Long Term												
Full Simulation Period	391	398	446	474	495	597	712	766	699	522	477	427
Water Year Types												
Wet	405	431	511	520	508	626	766	897	851	676	622	507
Above Normal	406	399	470	532	548	643	777	842	775	540	504	455
Below Normal	397	414	447	500	536	627	774	792	716	480	445	433
Dry	365	367	398	418	479	593	688	698	596	438	387	376
Critical	372	347	345	357	380	453	480	471	418	351	313	291

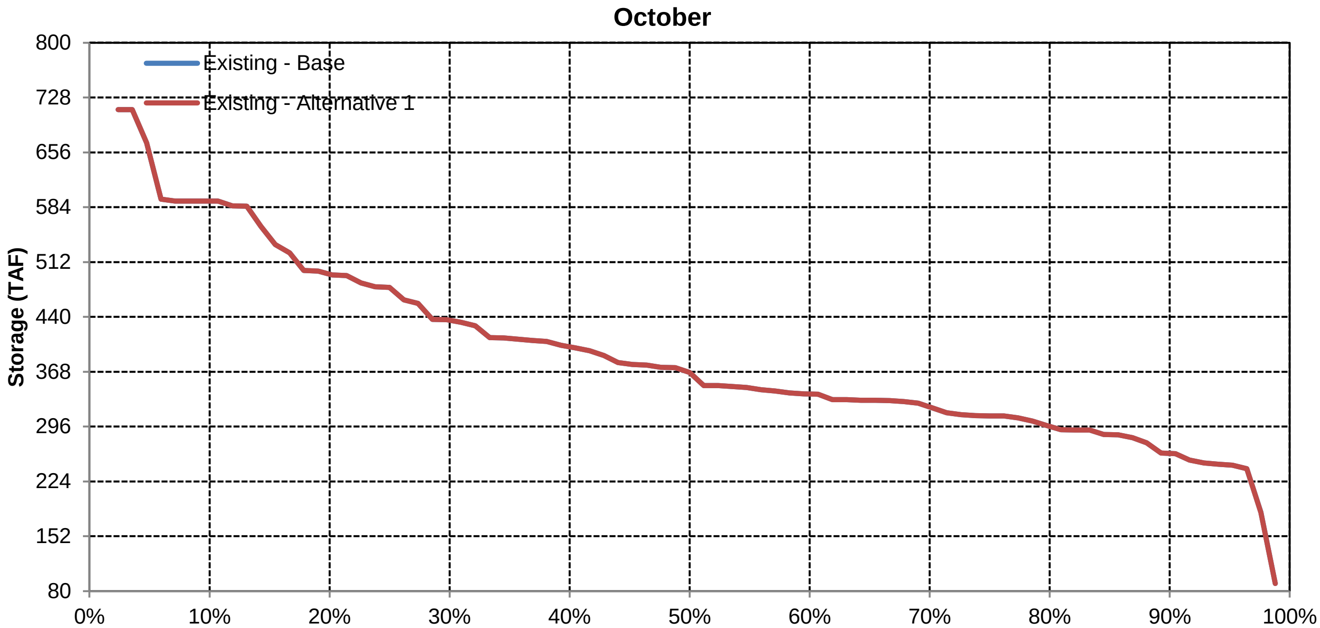
Existing - Alternative 1

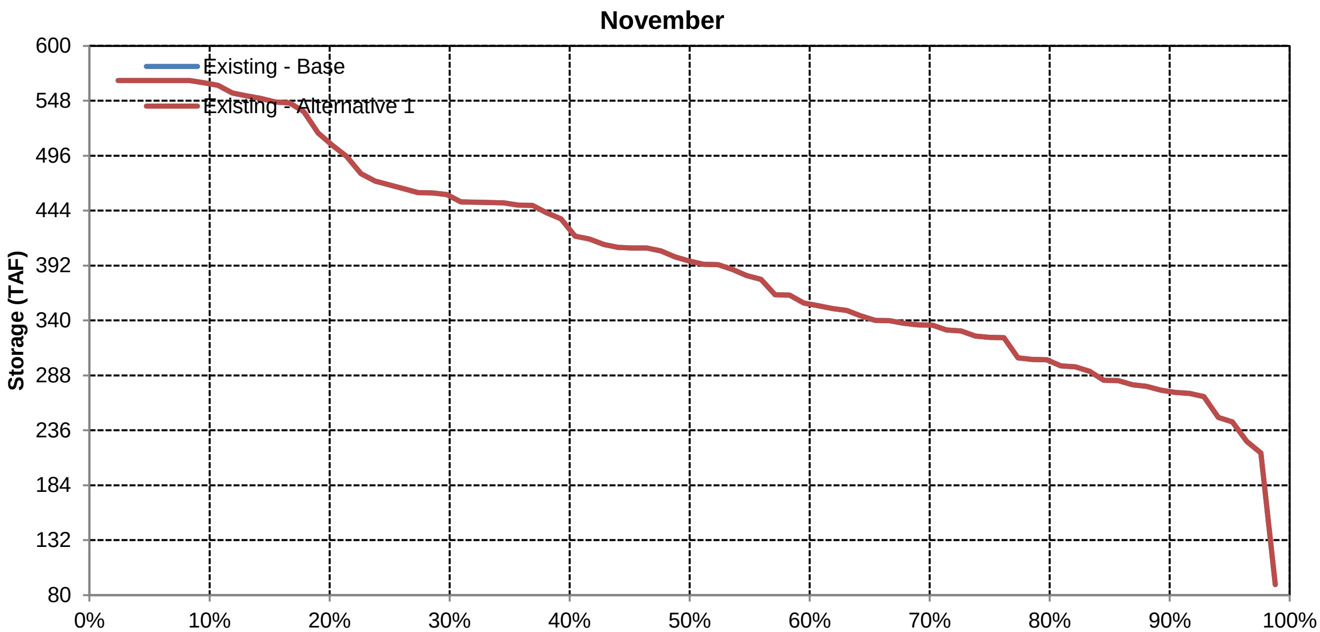
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	590	560	567	567	567	662	792	967	967	815	752	618
20%	495	499	567	567	567	658	792	967	877	709	667	545
30%	433	453	565	566	565	656	792	903	826	590	536	487
40%	399	419	525	557	558	651	792	803	723	530	478	439
50%	358	395	444	544	552	641	792	769	703	474	425	401
60%	339	354	413	474	518	625	758	752	677	438	396	382
70%	320	335	363	427	458	610	725	727	608	405	380	358
80%	295	300	323	365	416	566	609	626	523	374	338	318
90%	261	273	294	284	323	460	479	484	429	331	306	273
Long Term												
Full Simulation Period	391	398	446	474	495	597	712	766	699	522	477	427
Water Year Types												
Wet	405	431	511	520	508	626	766	897	851	676	622	507
Above Normal	406	399	470	532	548	643	777	842	775	540	504	455
Below Normal	397	414	447	500	536	627	774	792	716	480	445	433
Dry	365	367	398	418	479	593	688	698	596	438	387	376
Critical	372	347	345	357	380	453	480	471	418	351	313	291

Existing - Alternative 1 Minus Existing - Base

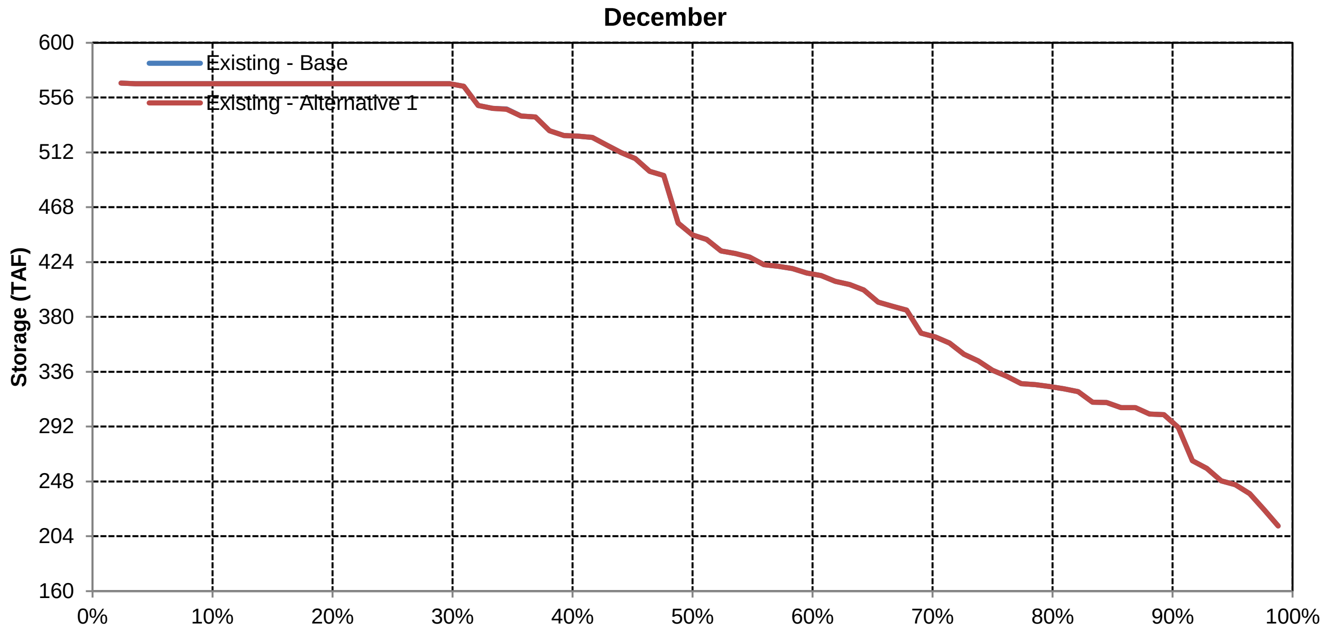
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types												
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

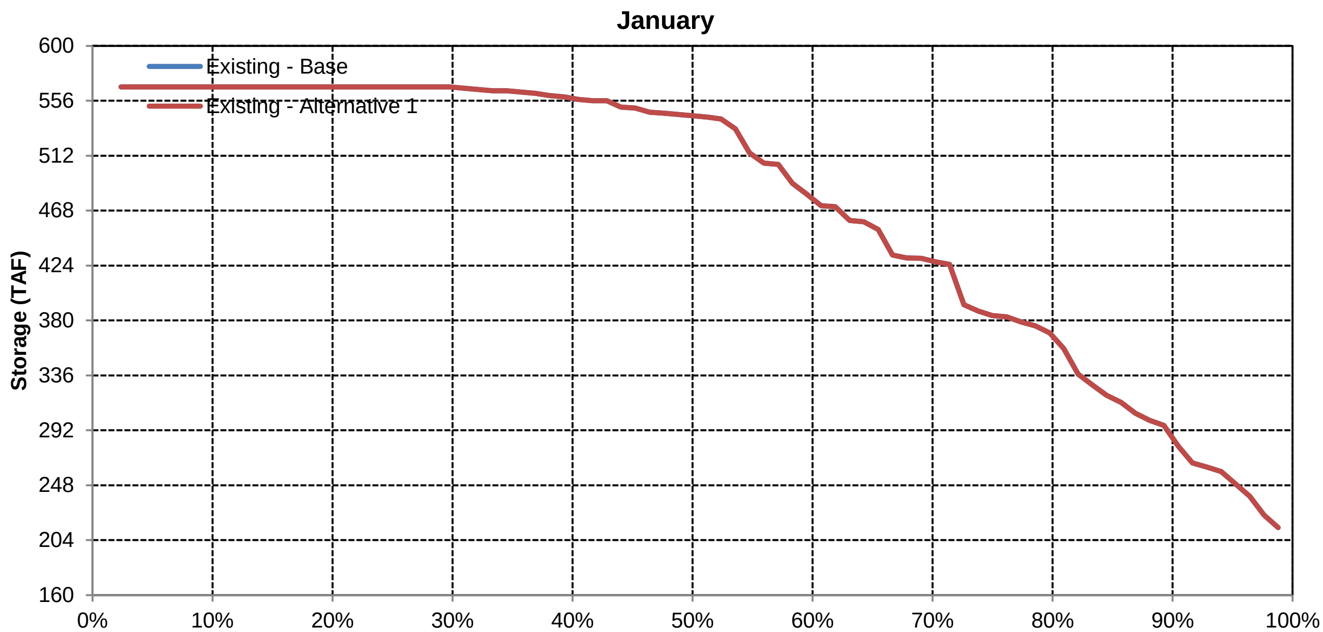
Folsom Reservoir



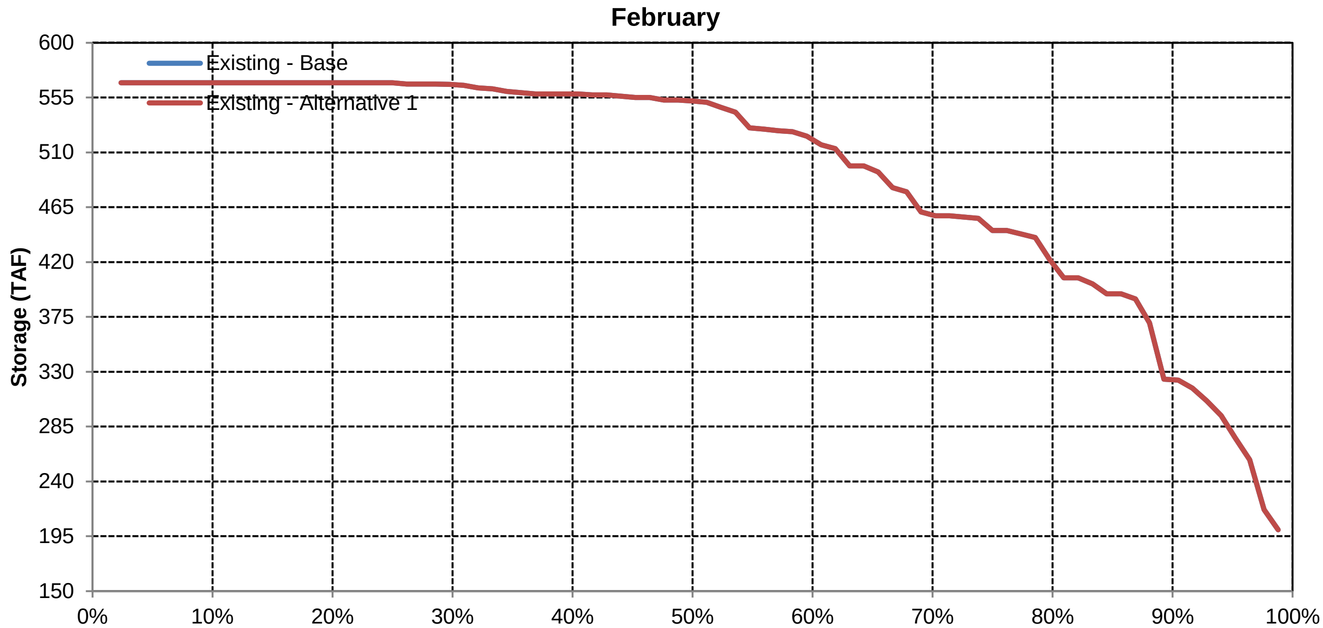


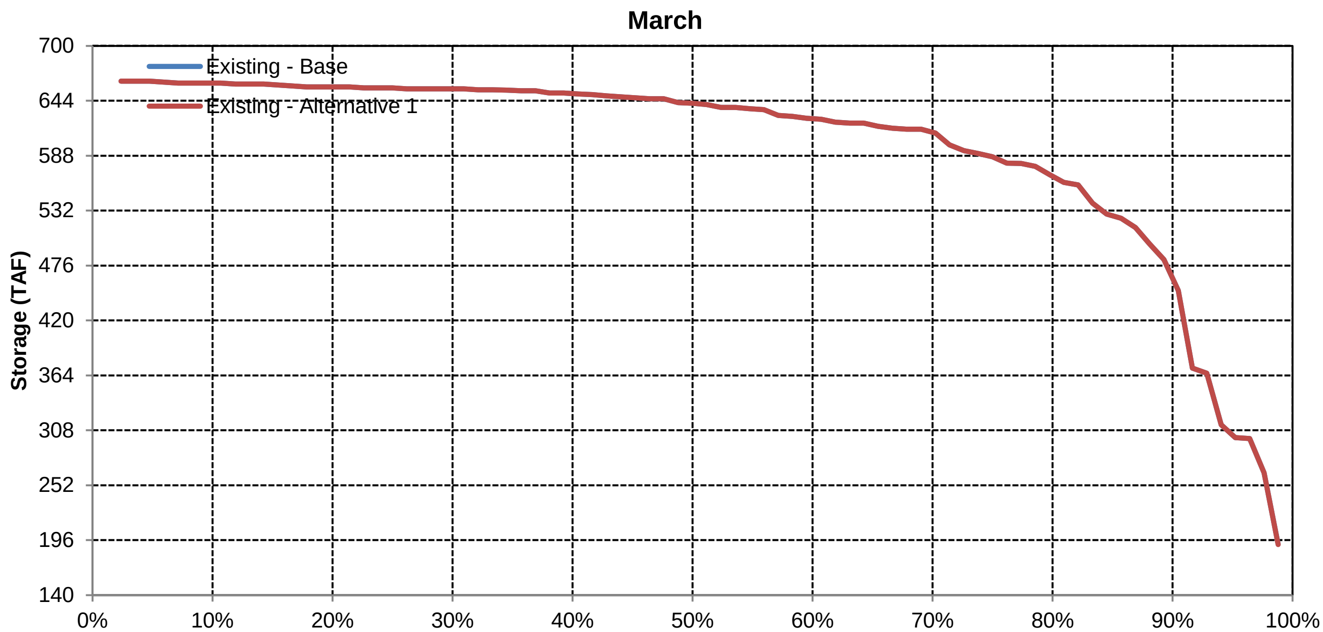
Folsom Reservoir



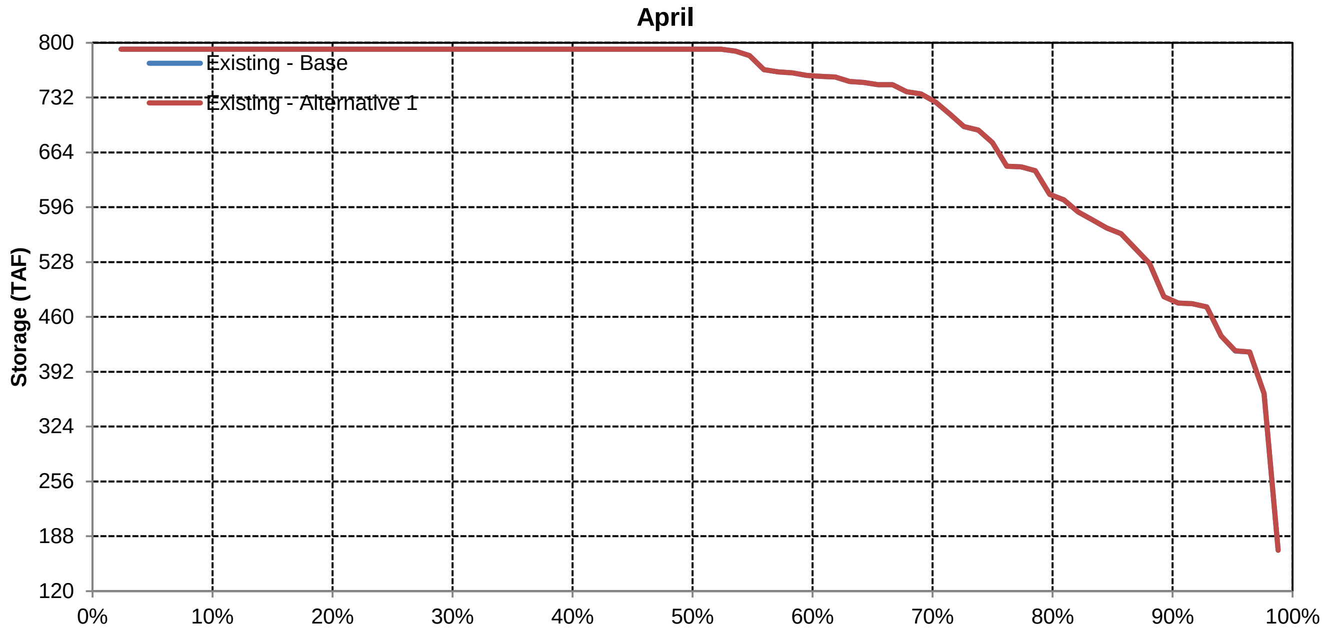


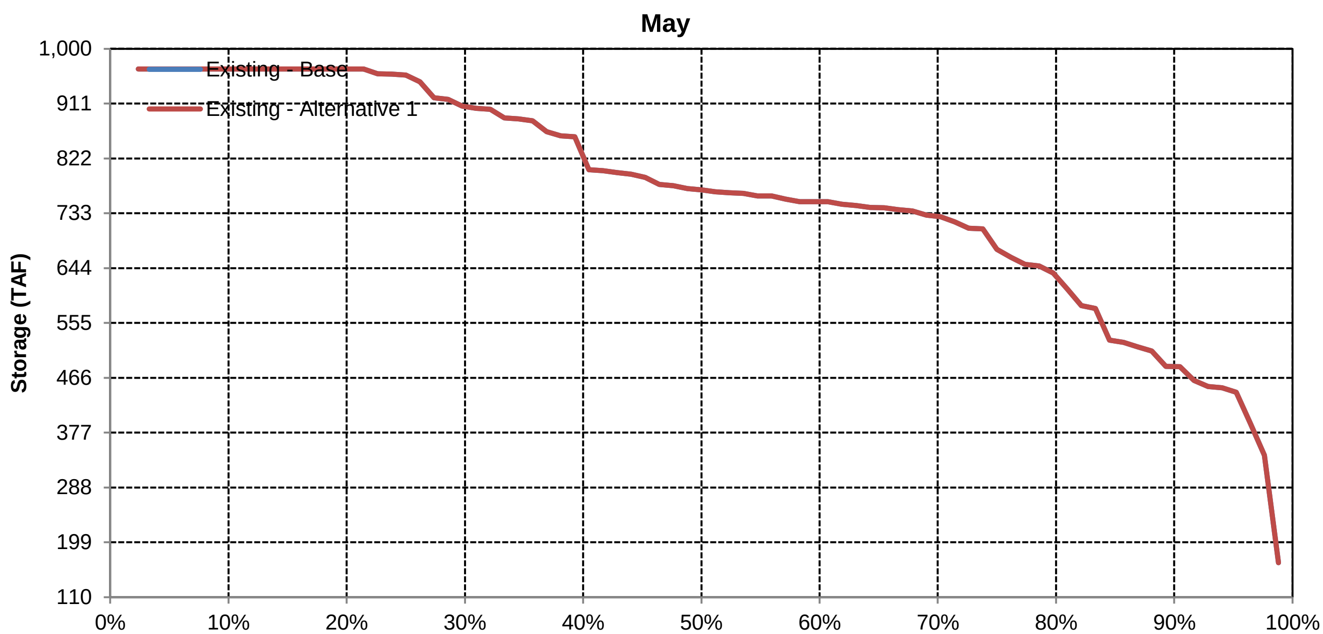
Folsom Reservoir



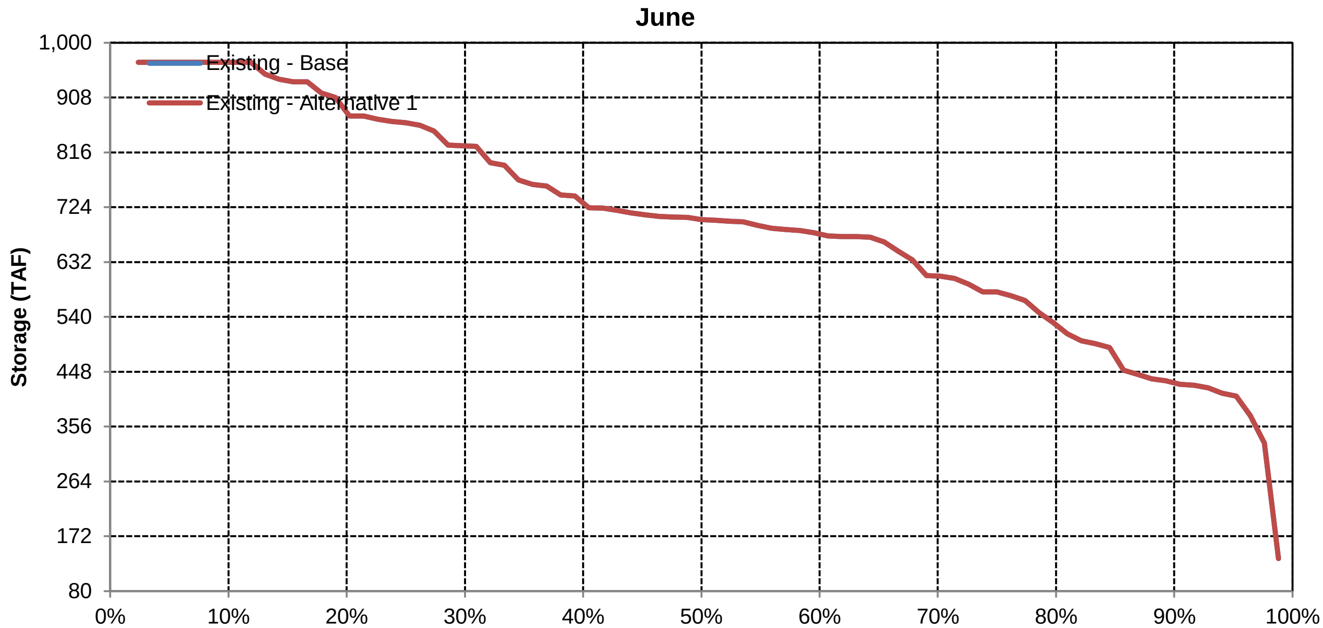


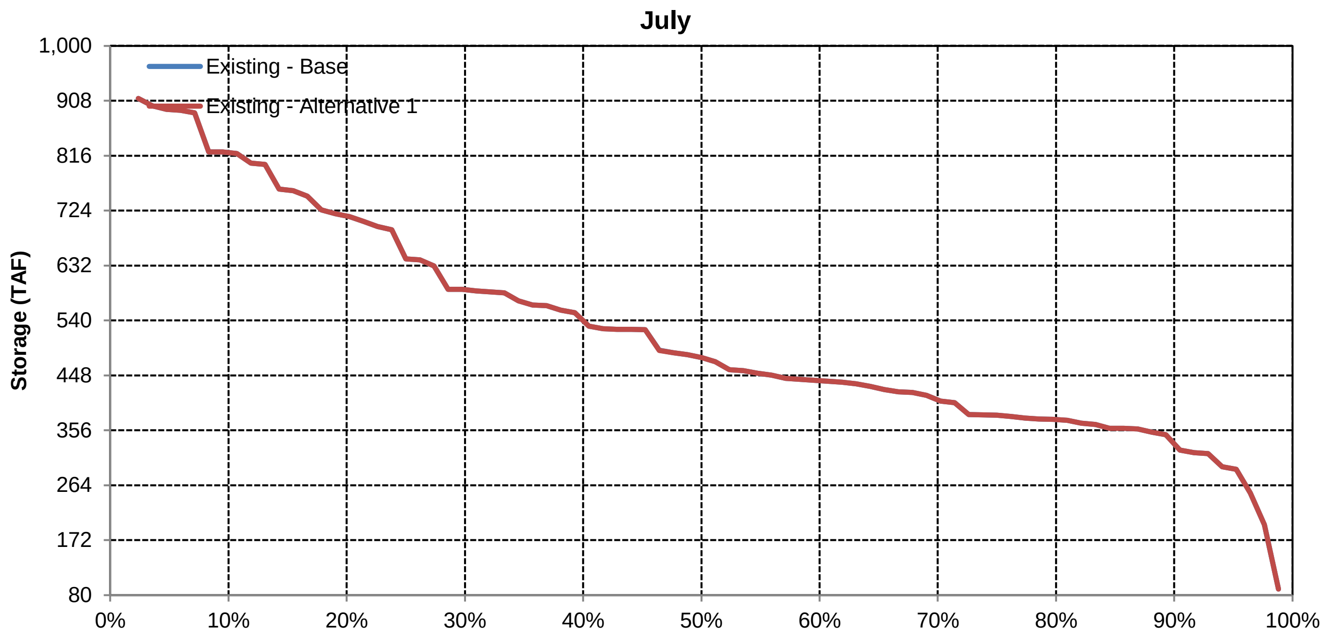
Folsom Reservoir



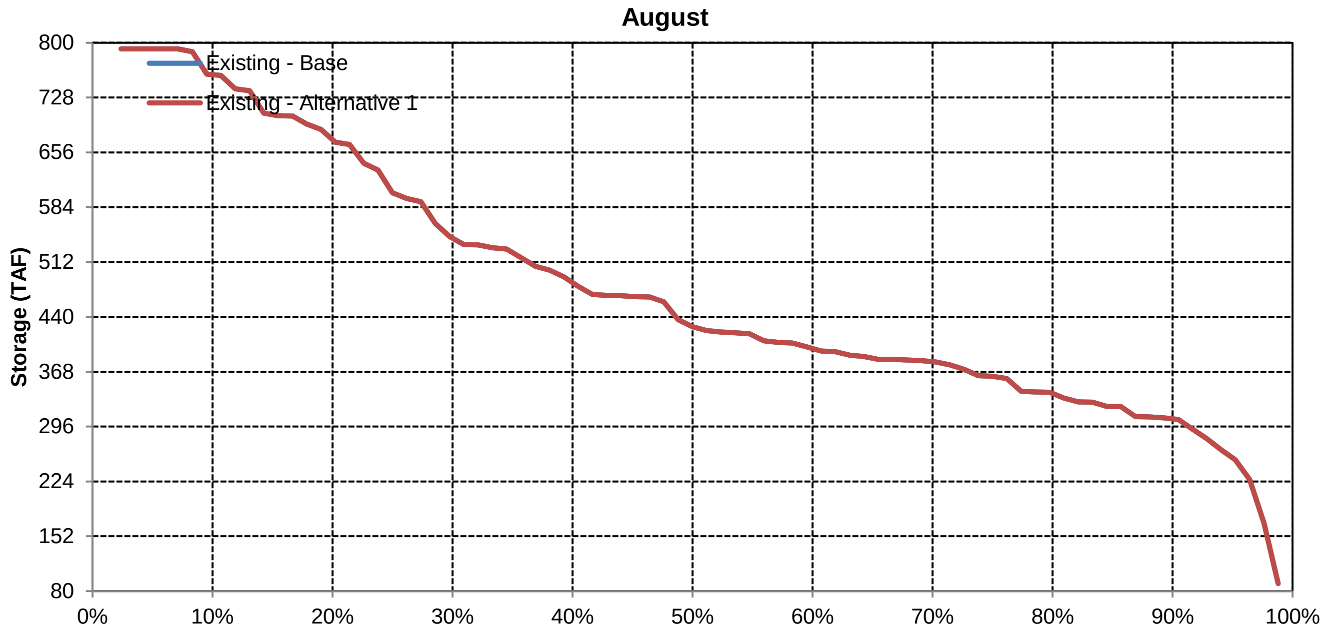


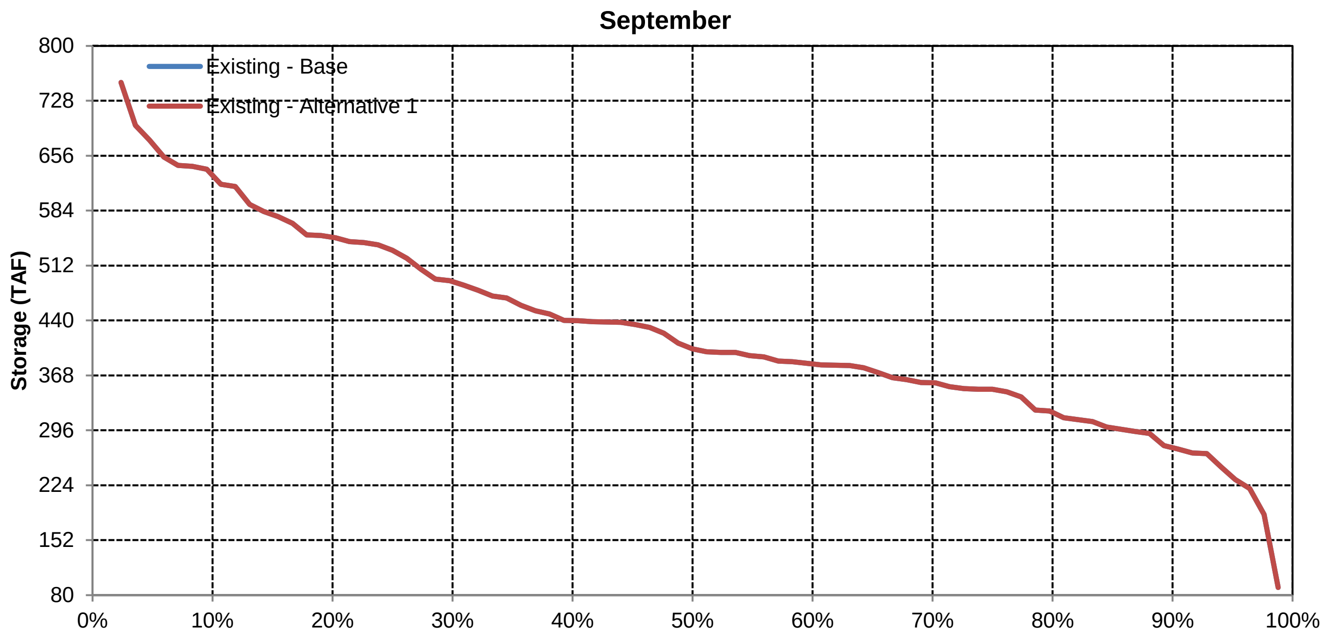
Folsom Reservoir





Folsom Reservoir





Long-Term and Water Year-Type Average of CVP San Luis Reservoir Under Existing - Base and Existing - Alternative 1

	Average Storage (TAF)											
Analysis Period	October	November	December	January	February	March	April	May	June	July	August	September
						Long-Term						
Full Simulation Period												
Existing - Base	217	330	493	616	709	777	712	577	404	261	171	178
Existing - Alternative 1	217	330	493	616	709	777	712	577	404	261	171	178
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
						Water Year-Types						
Wet												
Existing - Base	230	346	525	677	824	925	859	729	581	362	252	241
Existing - Alternative 1	230	346	525	677	824	925	859	729	581	362	252	241
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal												
Existing - Base	231	375	535	653	766	876	790	630	437	201	133	128
Existing - Alternative 1	231	375	535	653	766	876	790	630	437	201	133	128
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Existing - Base	227	343	526	627	701	758	697	561	373	276	187	214
Existing - Alternative 1	227	343	526	627	701	758	697	561	373	276	187	214
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry												
Existing - Base	183	268	424	532	582	636	573	429	249	184	96	121
Existing - Alternative 1	183	268	424	532	582	636	573	429	249	184	96	121
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical												
Existing - Base	208	316	428	546	591	584	532	427	251	194	118	124
Existing - Alternative 1	208	316	428	546	591	584	532	427	251	194	118	124
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

CVP San Luis Reservoir

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	423	528	671	789	972	972	941	862	717	525	378	377
20%	262	388	570	728	885	972	879	758	581	448	308	244
30%	221	367	550	687	804	930	836	701	507	347	205	200
40%	187	347	513	652	763	871	800	630	435	241	143	141
50%	182	327	490	594	719	825	746	582	379	222	107	127
60%	164	294	464	568	651	722	658	487	303	178	90	113
70%	155	274	431	535	596	657	587	441	267	143	63	99
80%	139	209	360	482	541	593	537	392	207	105	45	90
90%	104	148	277	434	489	530	490	352	155	56	45	65
Long Term												
Full Simulation Period	217	330	493	616	709	777	712	577	404	261	171	178
Water Year Types												
Wet	230	346	525	677	824	925	859	729	581	362	252	241
Above Normal	231	375	535	653	766	876	790	630	437	201	133	128
Below Normal	227	343	526	627	701	758	697	561	373	276	187	214
Dry	183	268	424	532	582	636	573	429	249	184	96	121
Critical	208	316	428	546	591	584	532	427	251	194	118	124

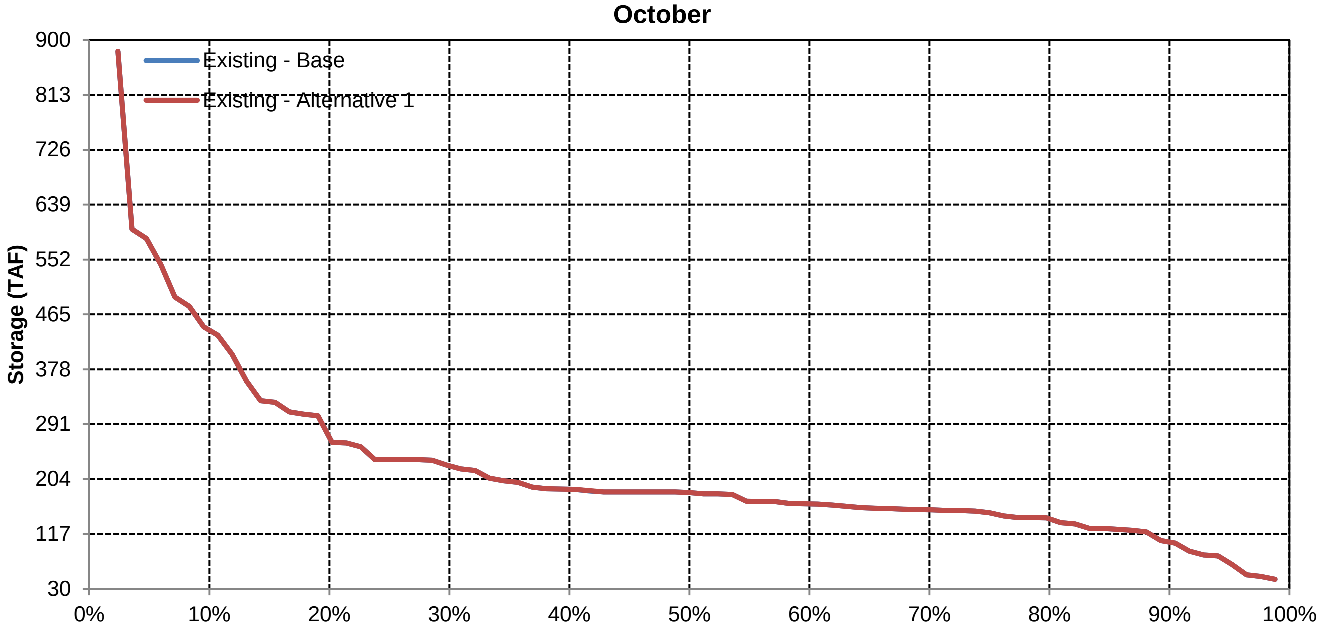
Existing - Alternative 1

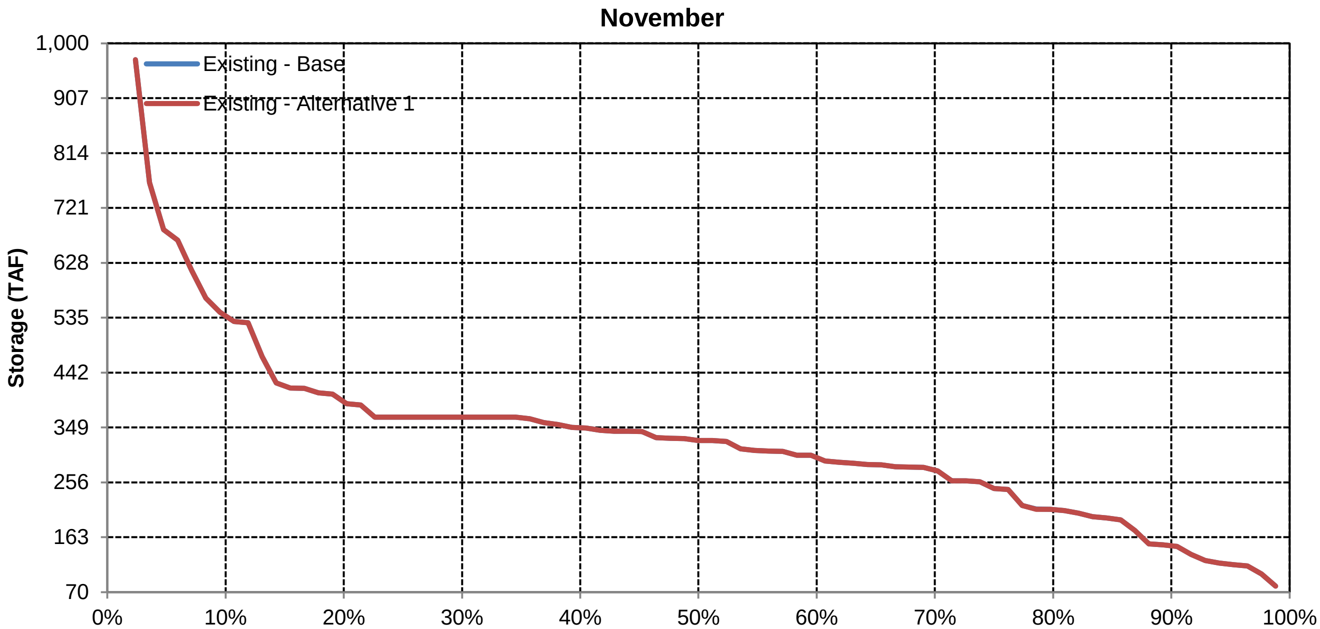
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	423	528	671	789	972	972	941	862	718	525	378	377
20%	262	388	570	728	885	972	879	758	581	448	308	244
30%	221	367	550	687	804	930	836	701	507	347	205	200
40%	187	347	513	652	763	871	800	630	435	241	143	141
50%	182	327	490	594	719	825	746	582	379	222	107	127
60%	164	294	464	568	651	722	658	487	303	178	90	113
70%	155	274	431	535	596	657	587	441	267	143	63	99
80%	139	209	360	482	541	593	537	391	207	105	45	90
90%	104	148	277	434	489	530	490	352	155	56	45	65
Long Term												
Full Simulation Period	217	330	493	616	709	777	712	577	404	261	171	178
Water Year Types												
Wet	230	346	525	677	824	925	859	729	581	362	252	241
Above Normal	231	375	535	653	766	876	790	630	437	201	133	128
Below Normal	227	343	526	627	701	758	697	561	373	276	187	214
Dry	183	268	424	532	582	636	573	429	249	184	96	121
Critical	208	316	428	546	591	584	532	427	251	194	118	124

Existing - Alternative 1 Minus Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types												
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

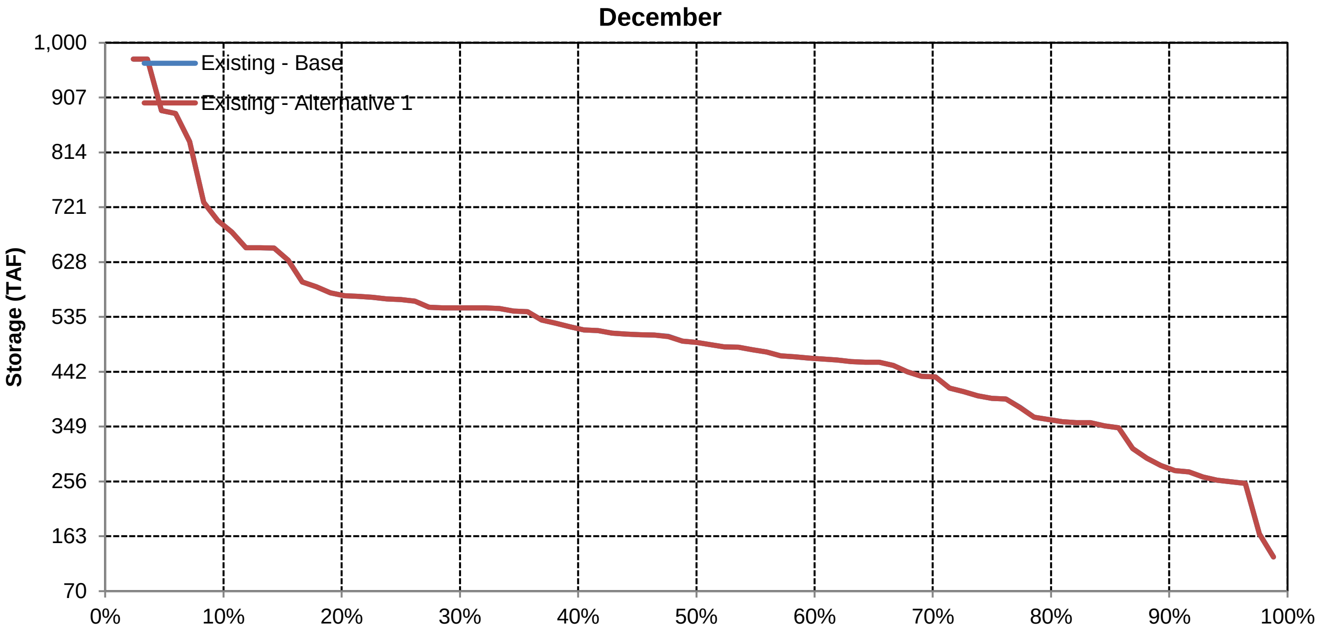
CVP San Luis Reservoir

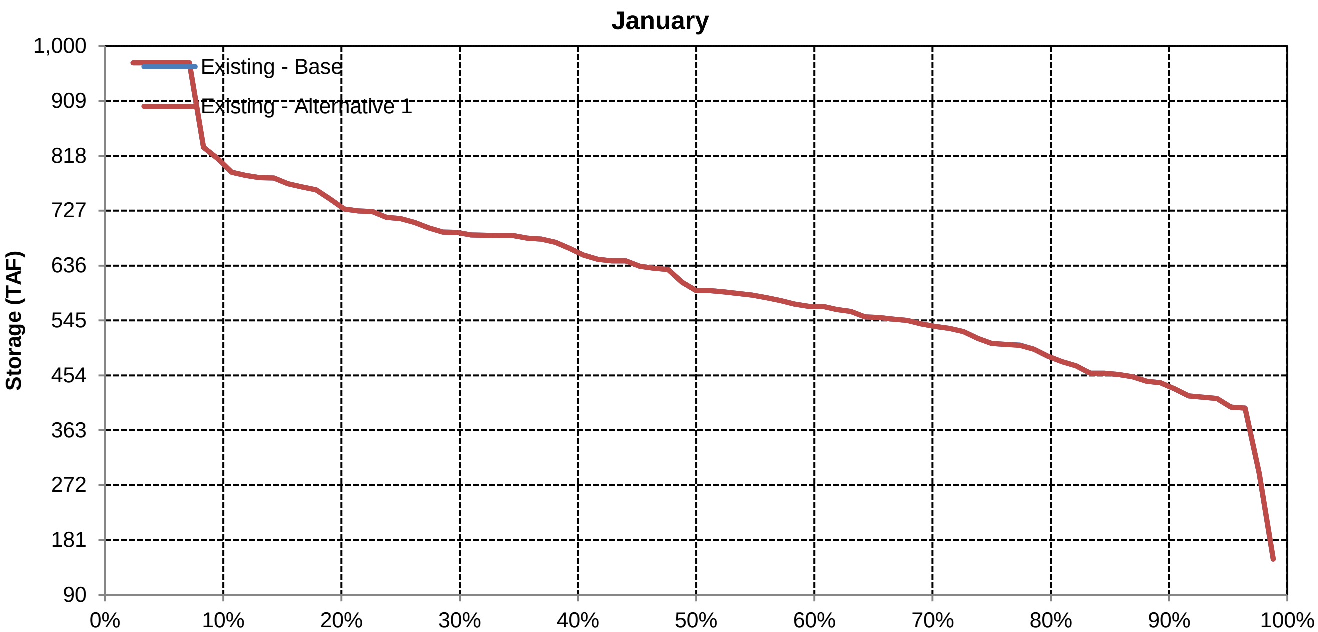




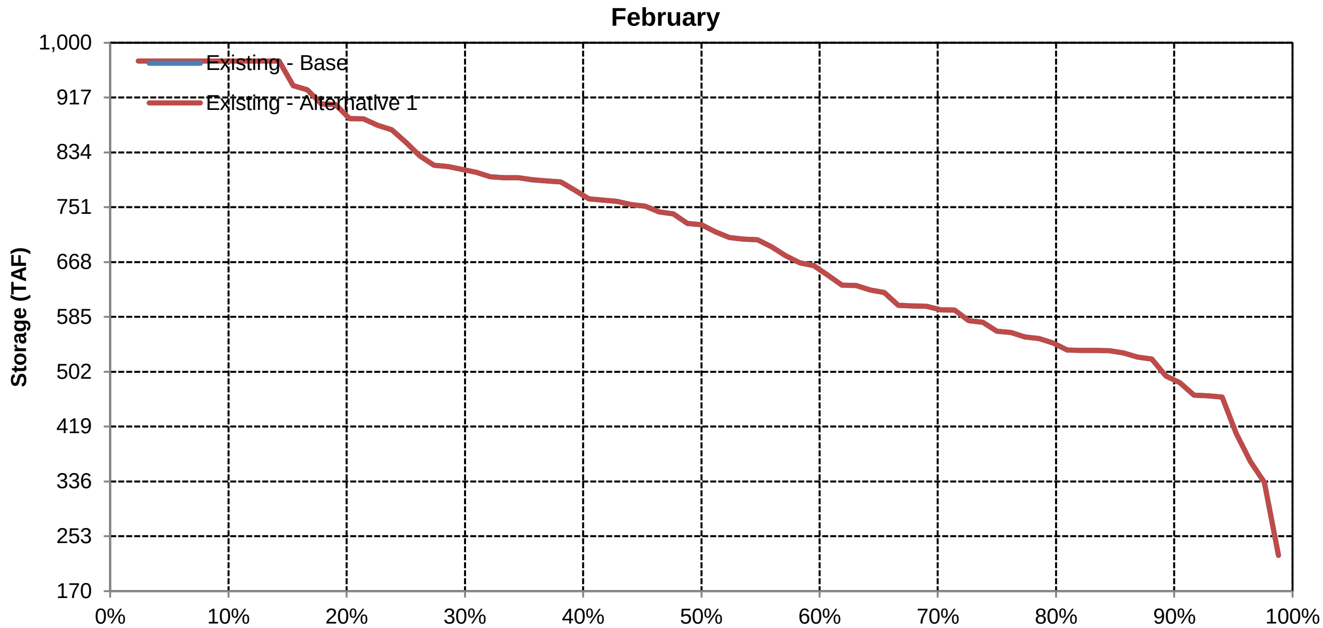
S11

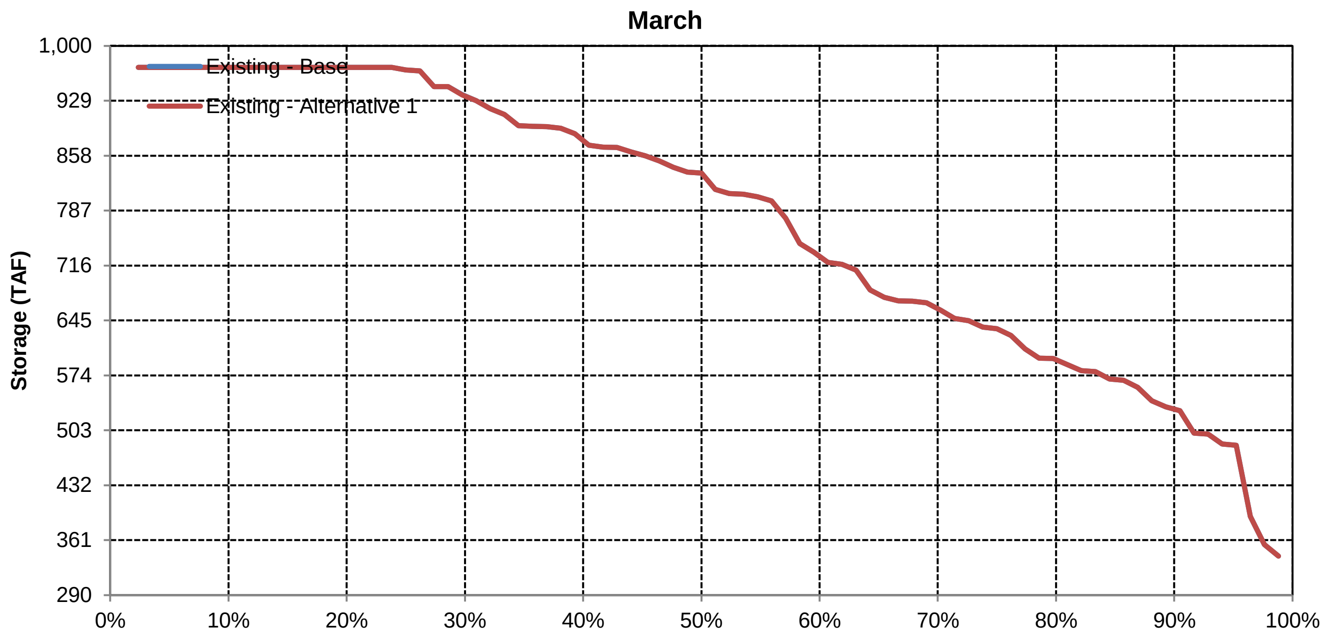
CVP San Luis Reservoir



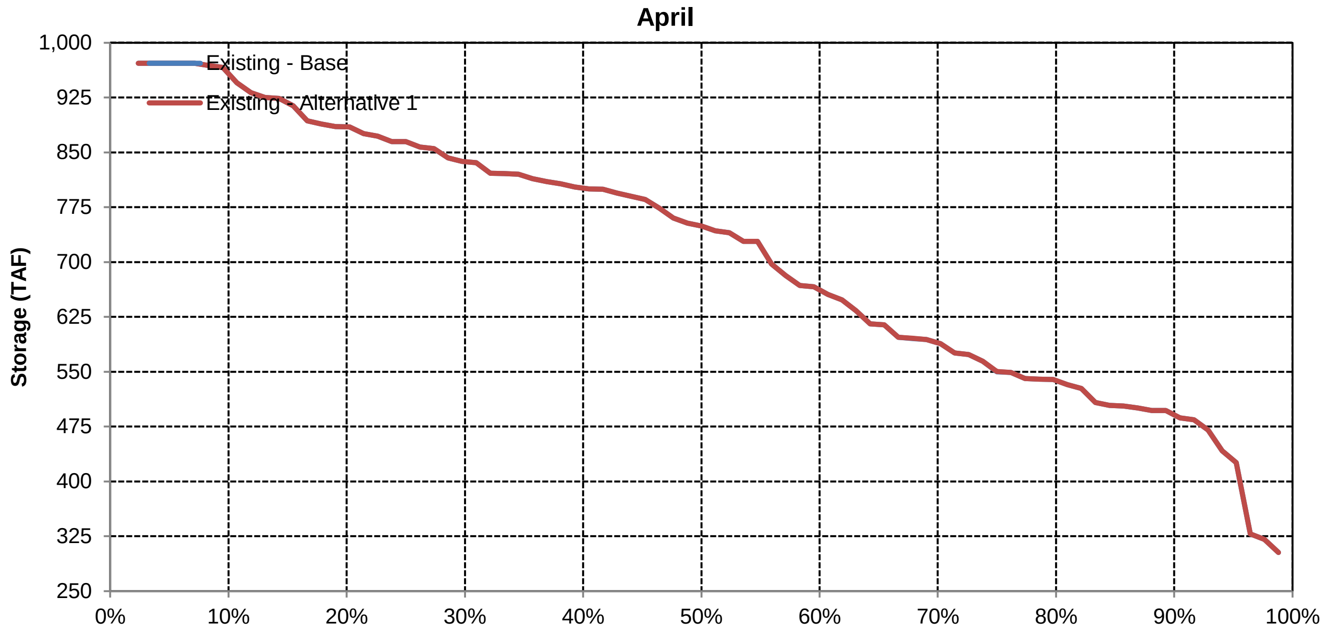


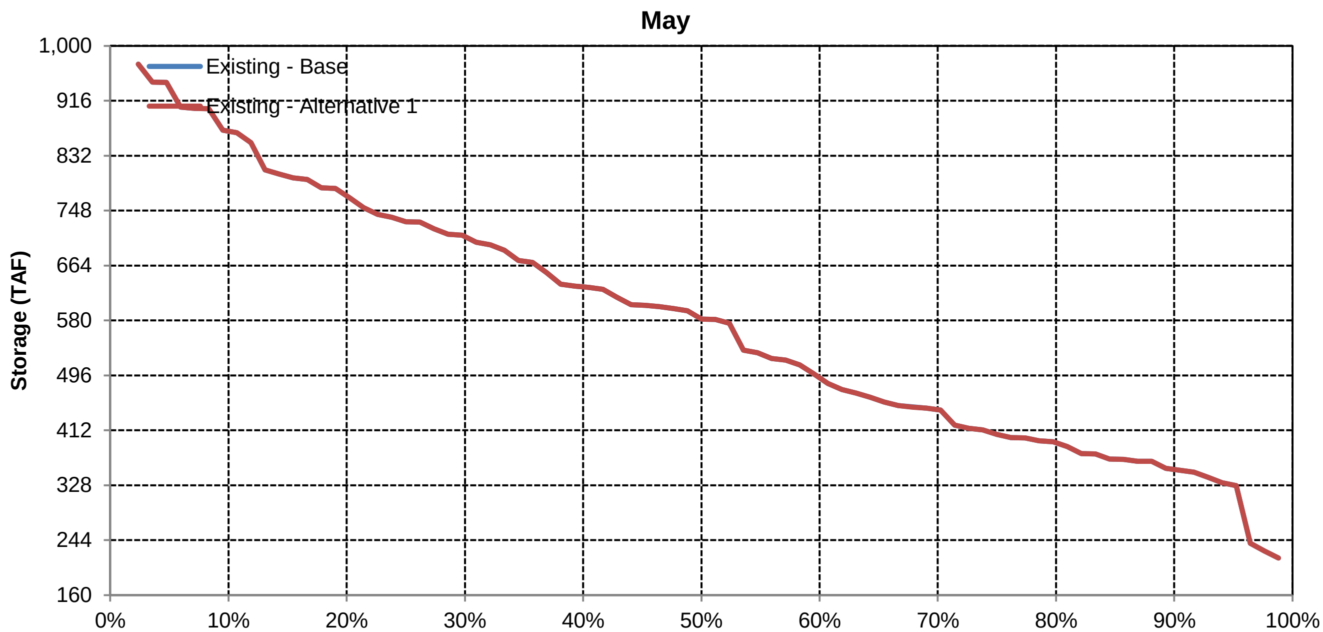
CVP San Luis Reservoir



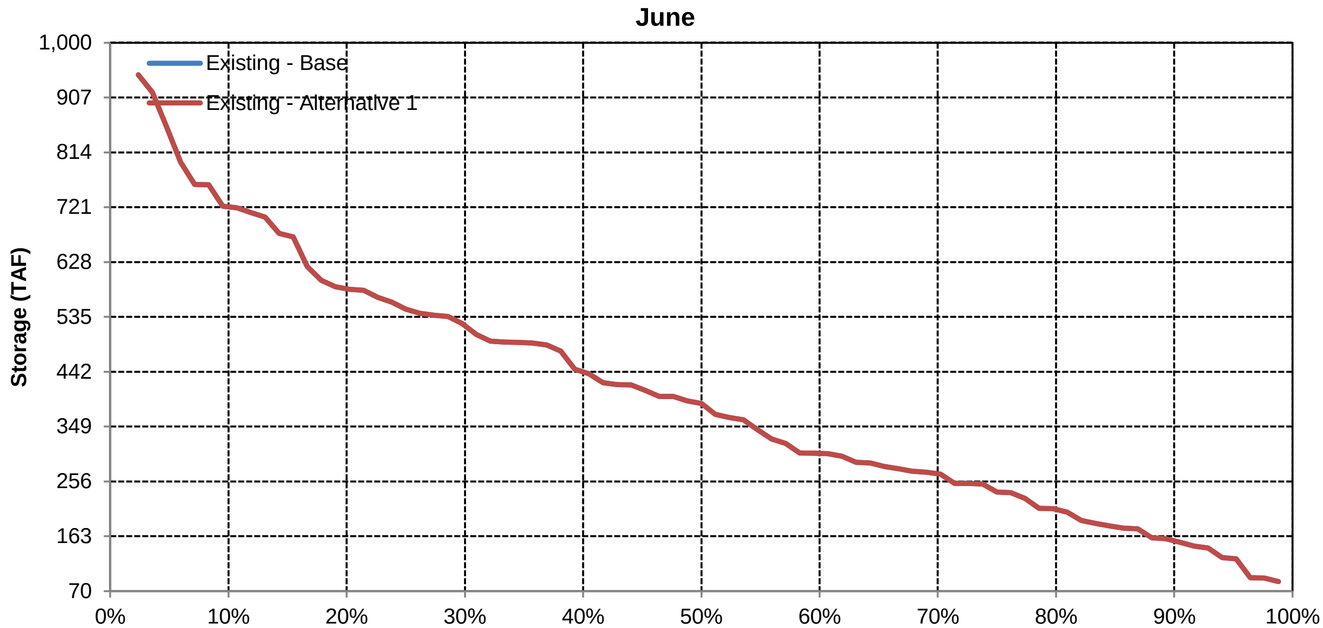


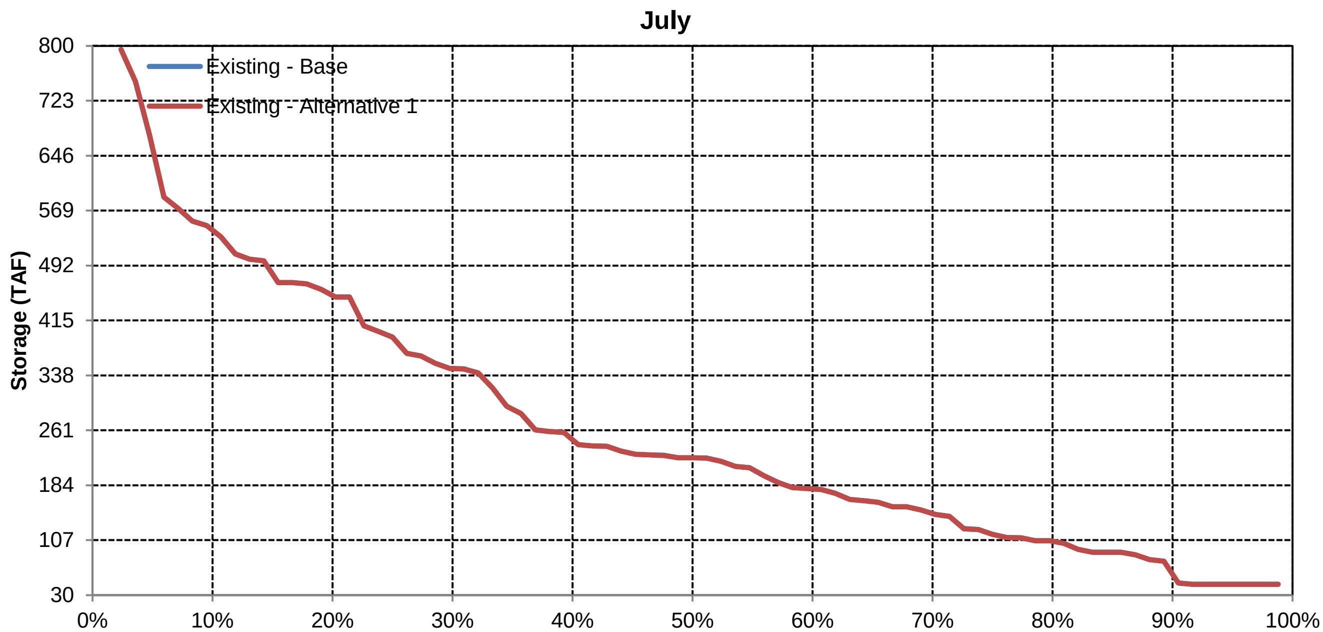
CVP San Luis Reservoir





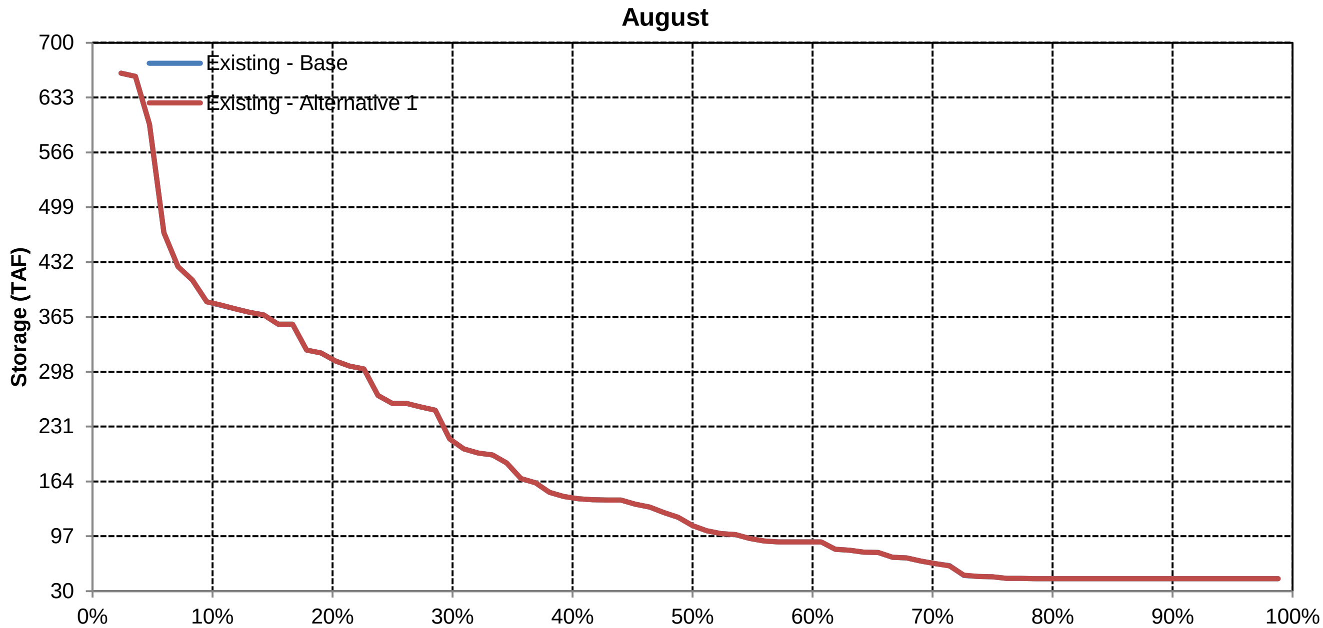
CVP San Luis Reservoir

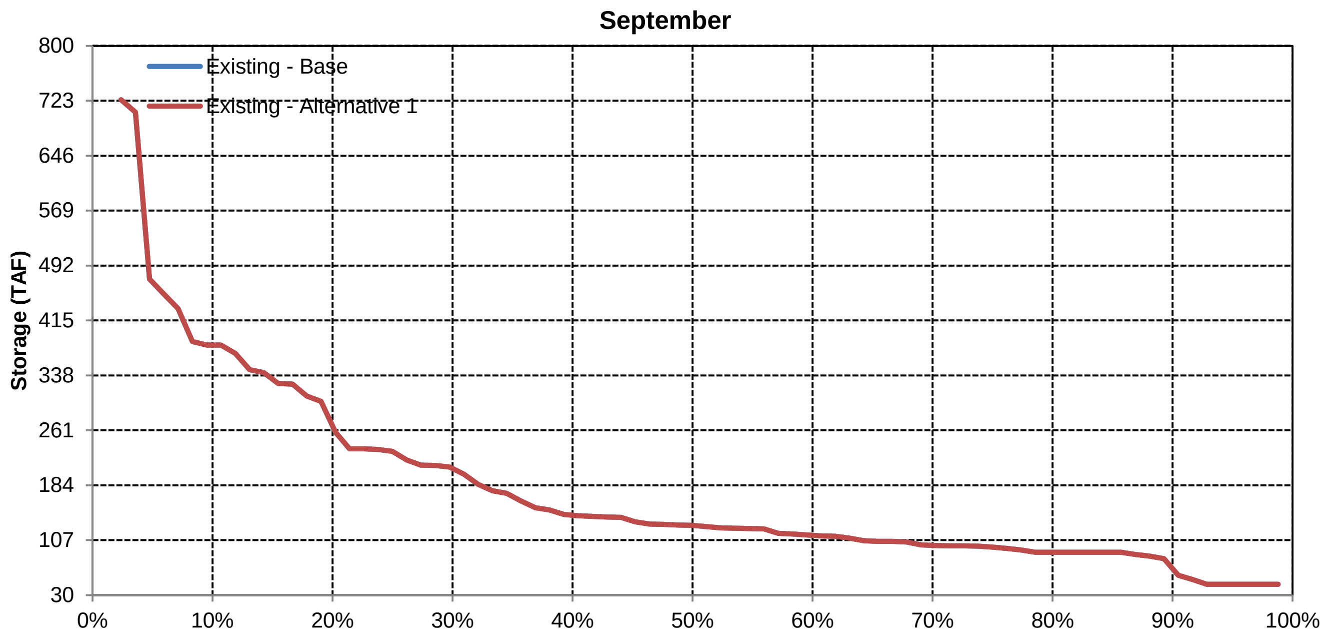




S11

CVP San Luis Reservoir





Long-Term and Water Year-Type Average of SWP San Luis Reservoir Under Existing - Base and Existing - Alternative 1

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
						Long-Term						
Full Simulation Period												
Existing - Base	244	268	372	541	678	802	720	562	380	374	324	288
Existing - Alternative 1	244	268	372	541	678	802	720	562	380	374	324	288
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
						Water Year-Types						
Wet												
Existing - Base	272	333	431	651	850	980	865	667	471	448	428	363
Existing - Alternative 1	272	333	431	651	850	980	865	667	471	448	428	363
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal												
Existing - Base	259	253	386	576	716	886	757	532	307	308	323	276
Existing - Alternative 1	259	253	386	576	716	886	757	532	307	308	323	276
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Existing - Base	220	246	386	500	622	751	675	512	329	374	370	342
Existing - Alternative 1	220	246	386	500	622	751	675	512	329	374	370	342
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry												
Existing - Base	209	219	300	450	552	670	620	509	348	358	229	234
Existing - Alternative 1	209	219	300	450	552	670	620	509	348	358	229	234
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical												
Existing - Base	249	245	312	459	533	591	579	511	376	305	168	137
Existing - Alternative 1	249	245	312	459	533	591	579	511	376	305	168	137
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

SWP San Luis Reservoir

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	454	566	739	973	1,067	1,067	956	791	630	652	562	423
20%	354	407	561	738	914	1,067	931	704	511	491	470	331
30%	313	356	473	654	833	954	863	657	444	447	402	321
40%	255	303	402	546	714	879	804	584	415	402	358	310
50%	218	224	321	495	686	844	737	527	355	358	309	310
60%	199	169	291	431	584	715	642	488	303	309	267	298
70%	163	109	225	389	528	656	584	450	261	255	201	242
80%	121	76	155	325	466	573	528	396	209	231	155	164
90%	55	55	80	262	364	509	458	352	163	166	114	104
Long Term												
Full Simulation Period	244	268	372	541	678	802	720	562	380	374	324	288
Water Year Types												
Wet	272	333	431	651	850	980	865	667	471	448	428	363
Above Normal	259	253	386	576	716	886	757	532	307	308	323	276
Below Normal	220	246	386	500	622	751	675	512	329	374	370	342
Dry	209	219	300	450	552	670	620	509	348	358	229	234
Critical	249	245	312	459	533	591	579	511	376	305	168	137

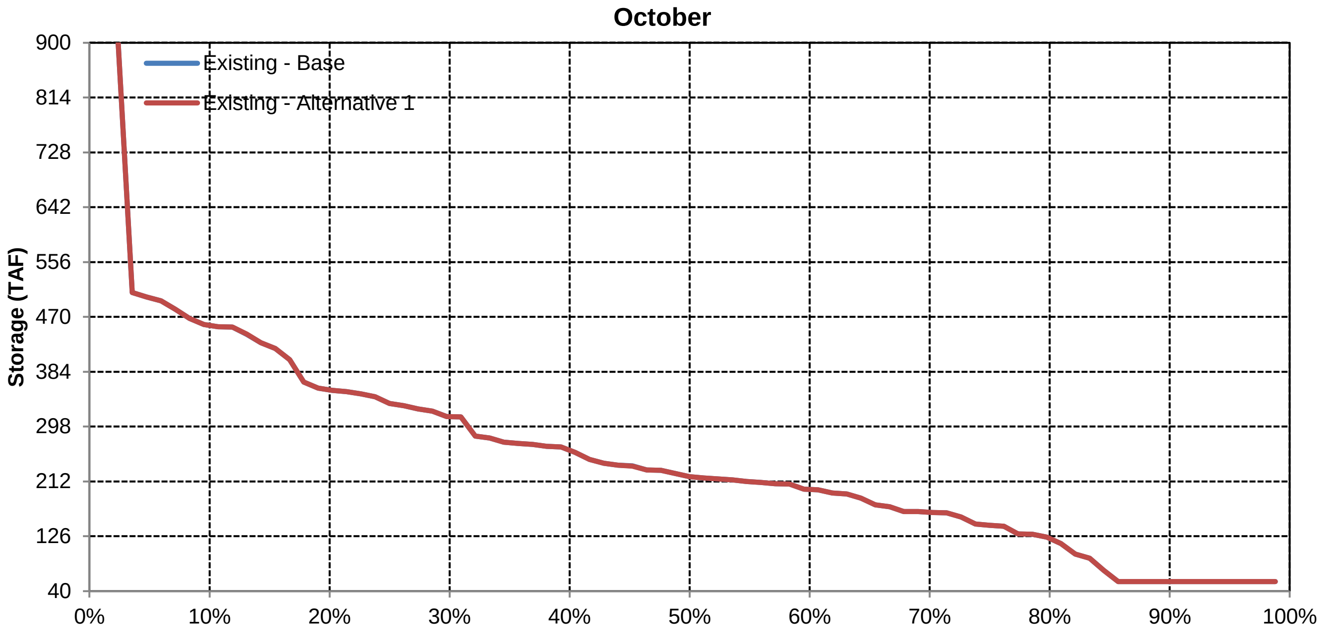
Existing - Alternative 1

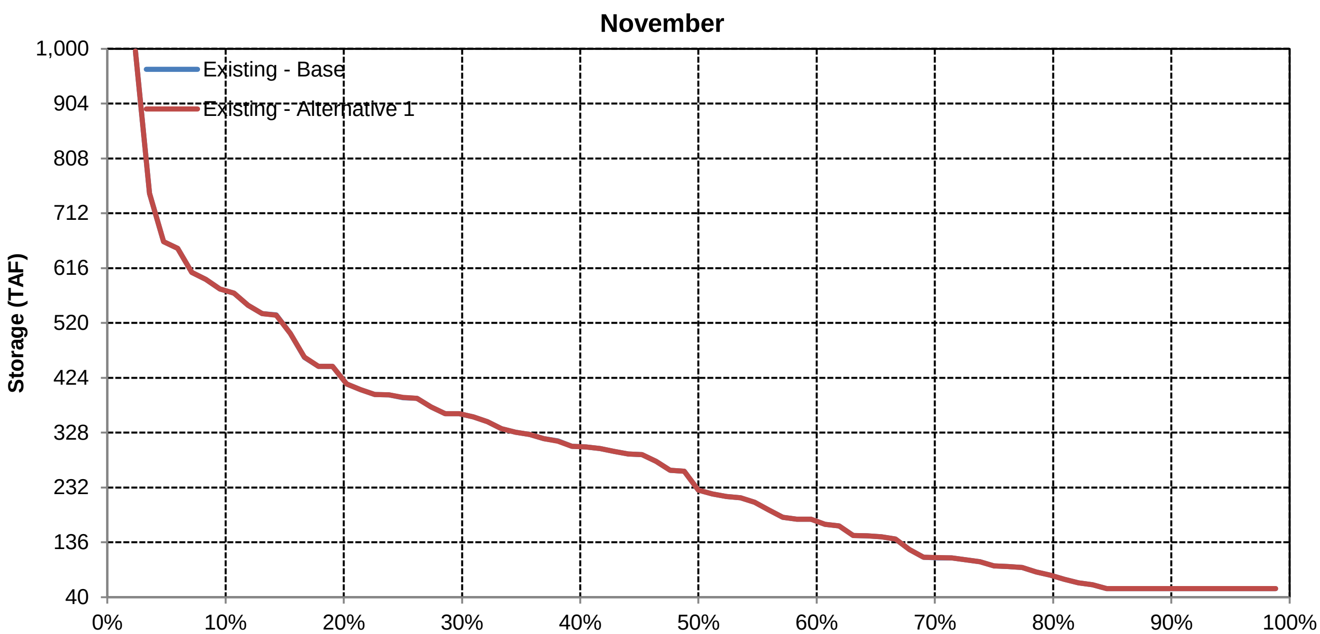
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	454	566	738	973	1,067	1,067	956	791	630	652	562	423
20%	354	407	561	738	914	1,067	931	704	511	491	470	331
30%	313	356	473	654	833	954	863	657	444	447	402	321
40%	255	303	402	546	714	879	804	584	415	402	358	310
50%	218	224	321	495	686	844	737	527	355	358	309	310
60%	199	169	291	431	584	715	642	488	303	309	267	298
70%	163	109	225	389	528	656	584	450	261	255	201	242
80%	121	76	155	325	466	573	528	396	209	231	155	164
90%	55	55	80	262	364	509	458	352	163	166	114	104
Long Term												
Full Simulation Period	244	268	372	541	678	802	720	562	380	374	324	288
Water Year Types												
Wet	272	333	431	651	850	980	865	667	471	448	428	363
Above Normal	259	253	386	576	716	886	757	532	307	308	323	276
Below Normal	220	246	386	500	622	751	675	512	329	374	370	342
Dry	209	219	300	450	552	670	620	509	348	358	229	234
Critical	249	245	312	459	533	591	579	511	376	305	168	137

Existing - Alternative 1 Minus Existing - Base

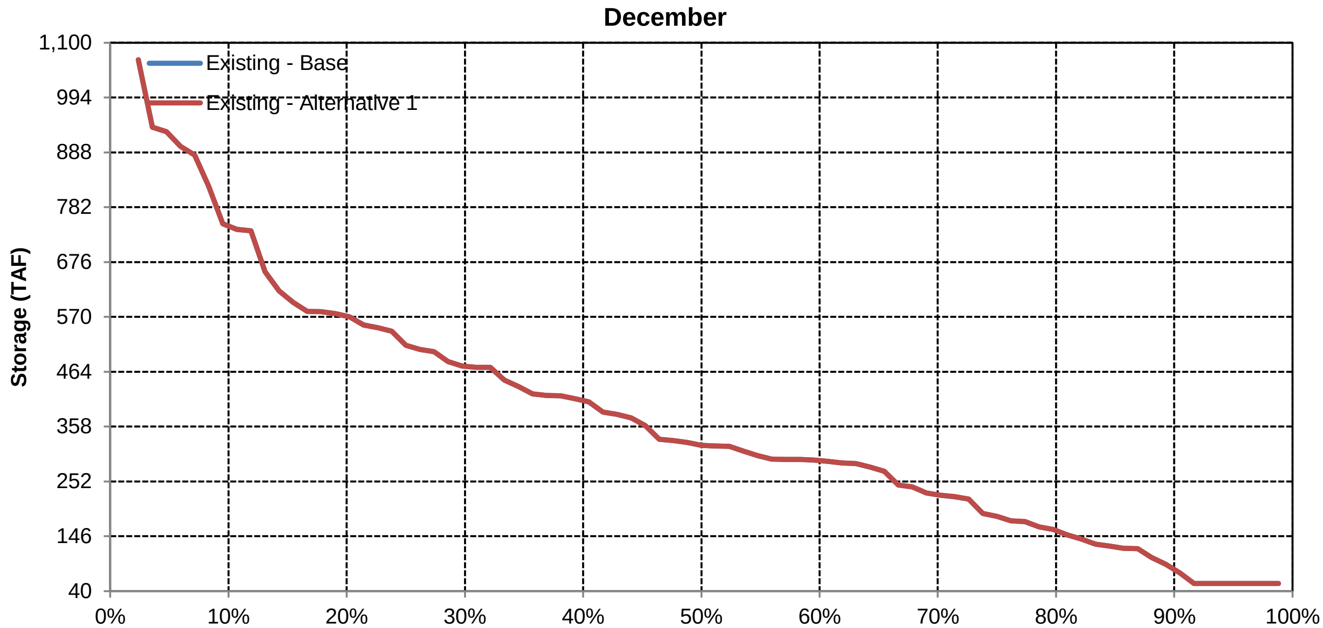
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types												
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

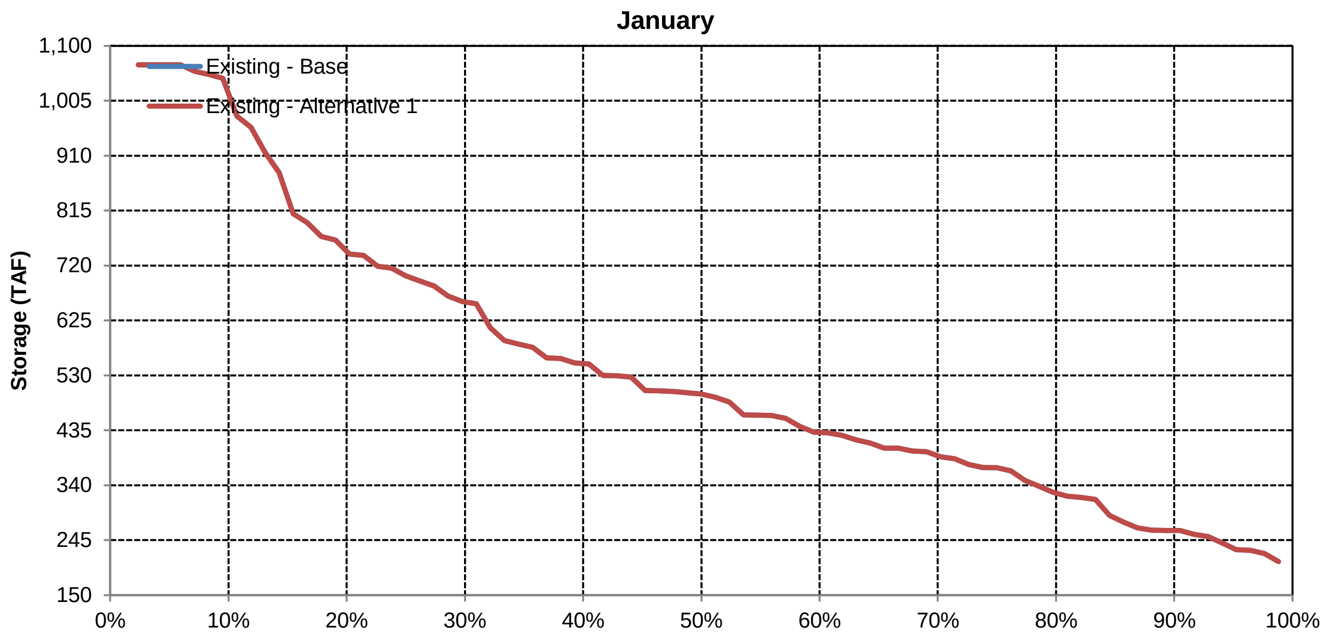
SWP San Luis Reservoir



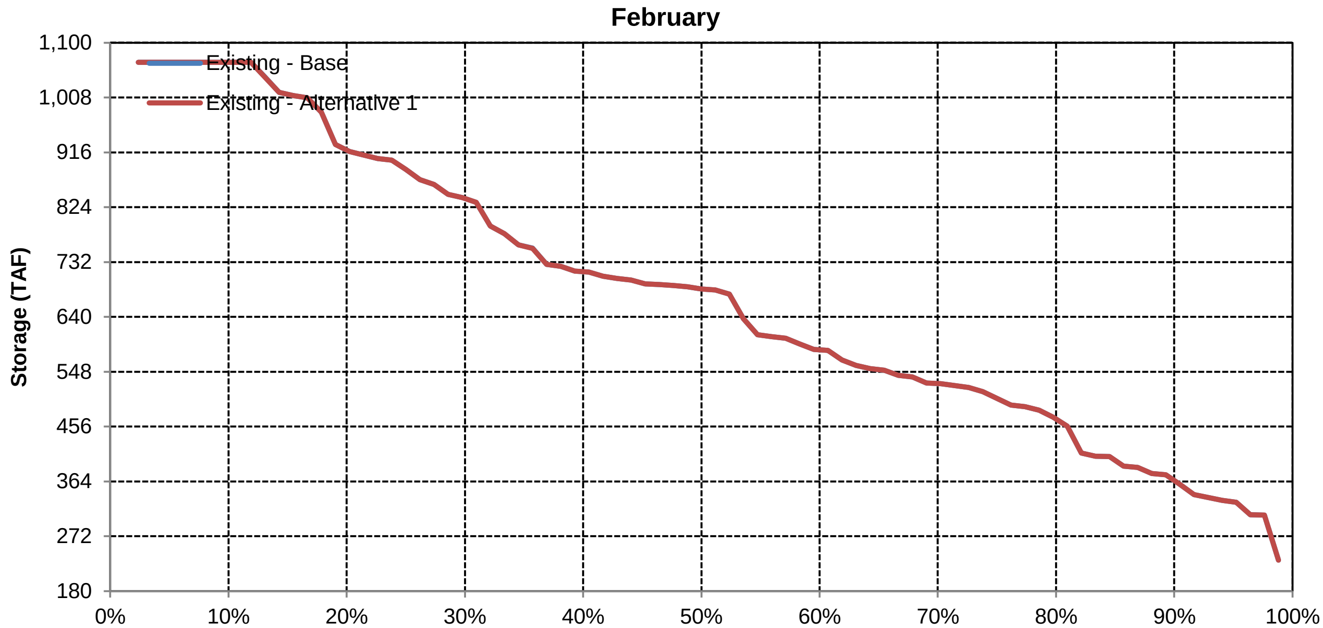


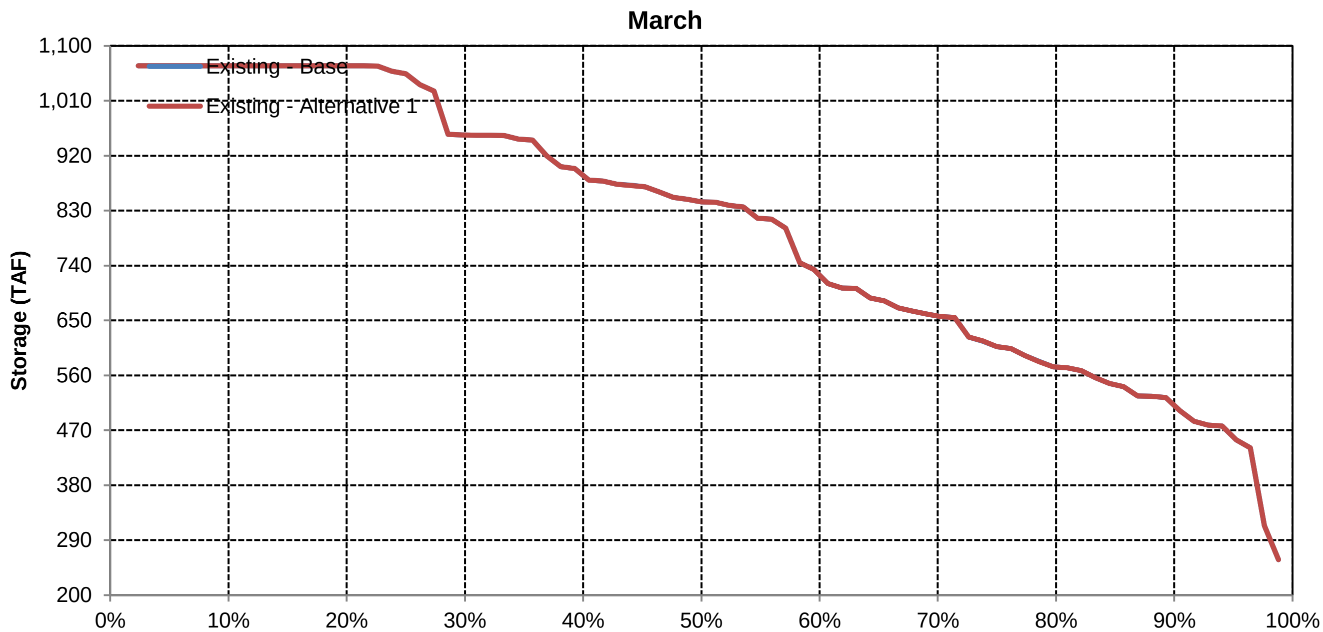
SWP San Luis Reservoir



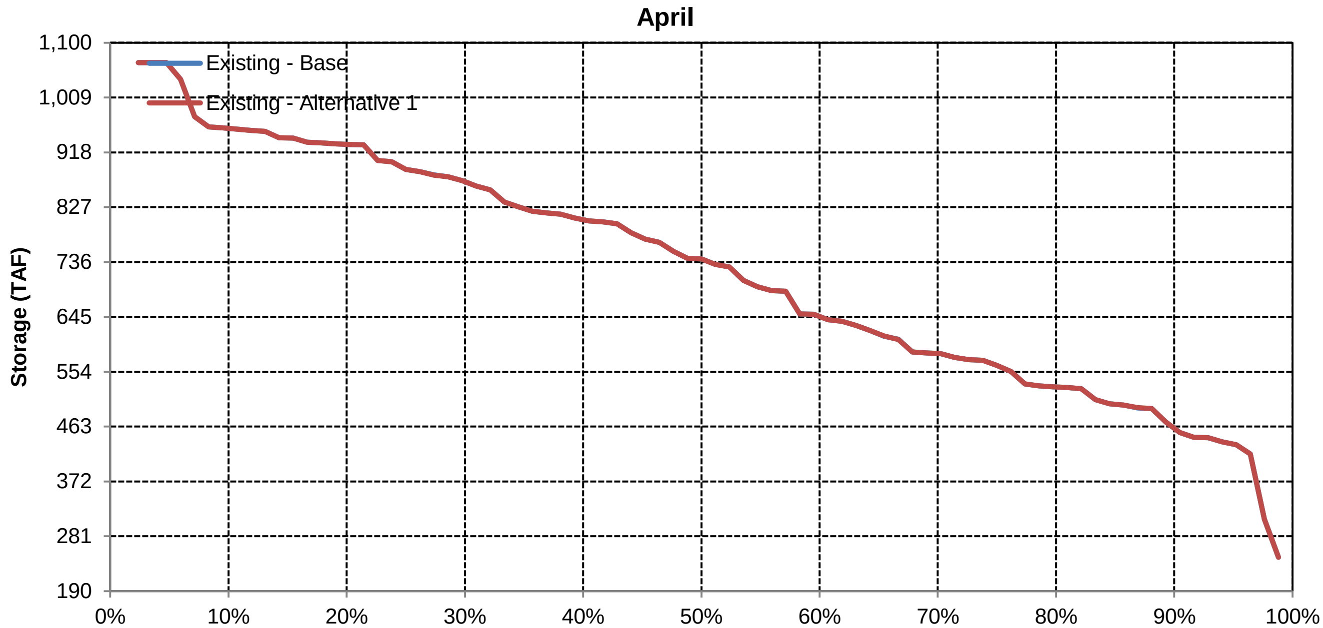


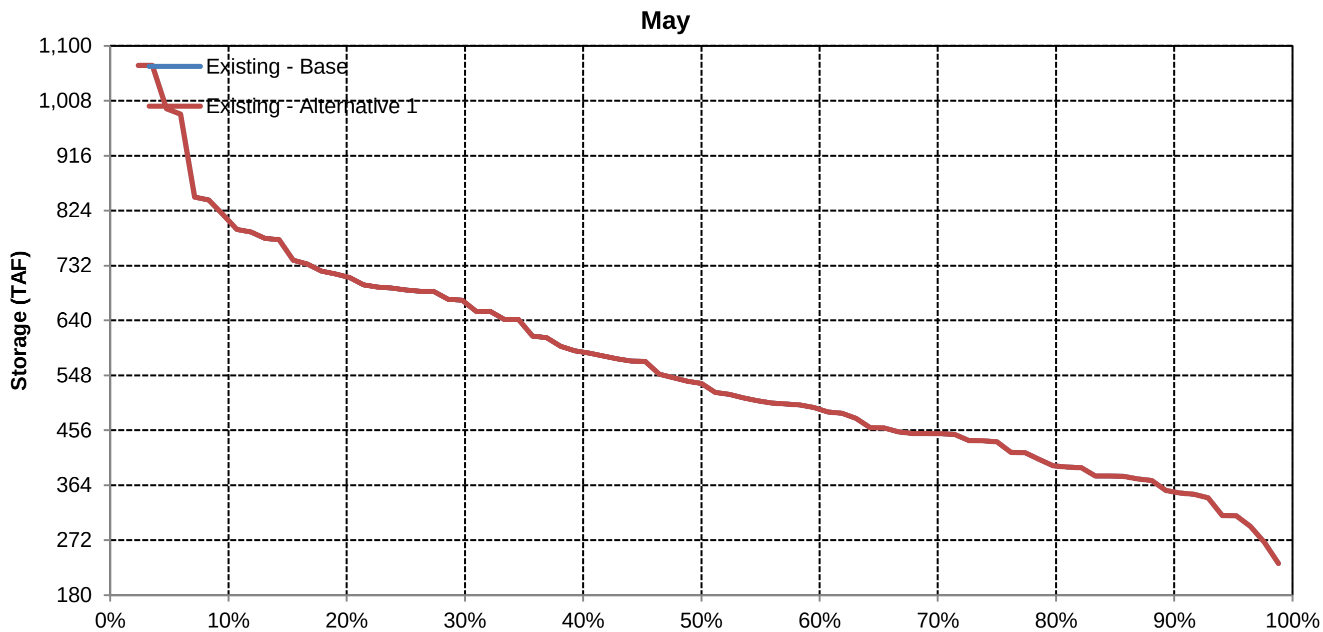
SWP San Luis Reservoir



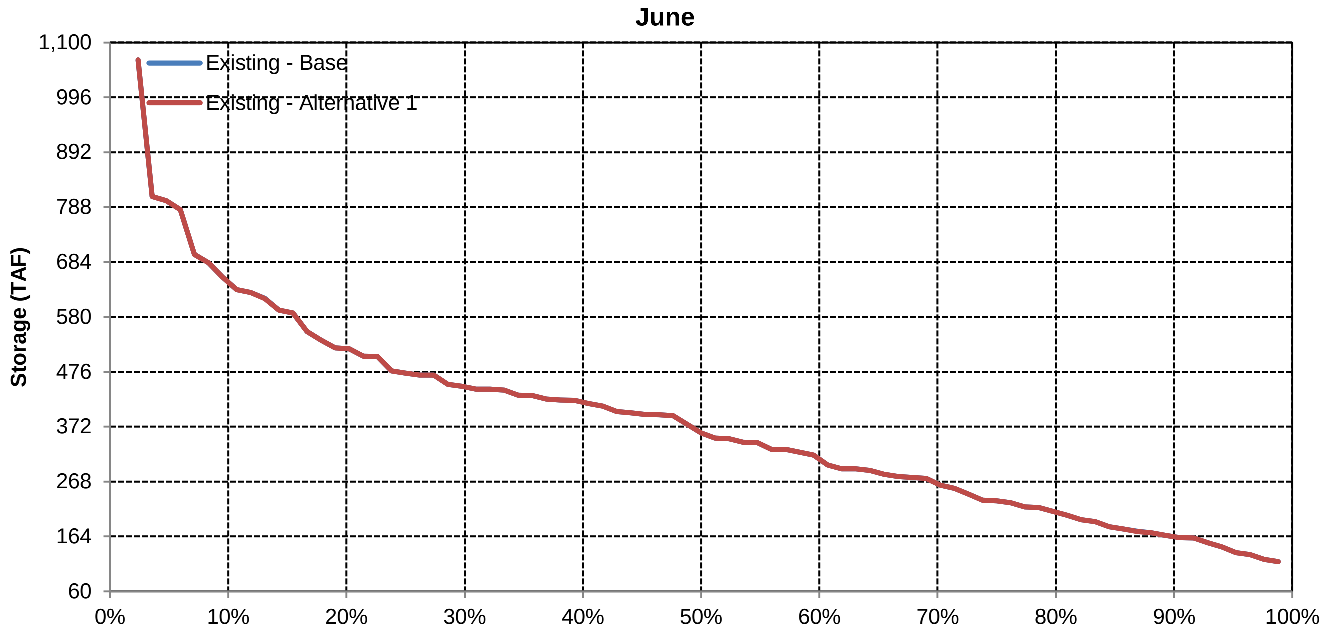


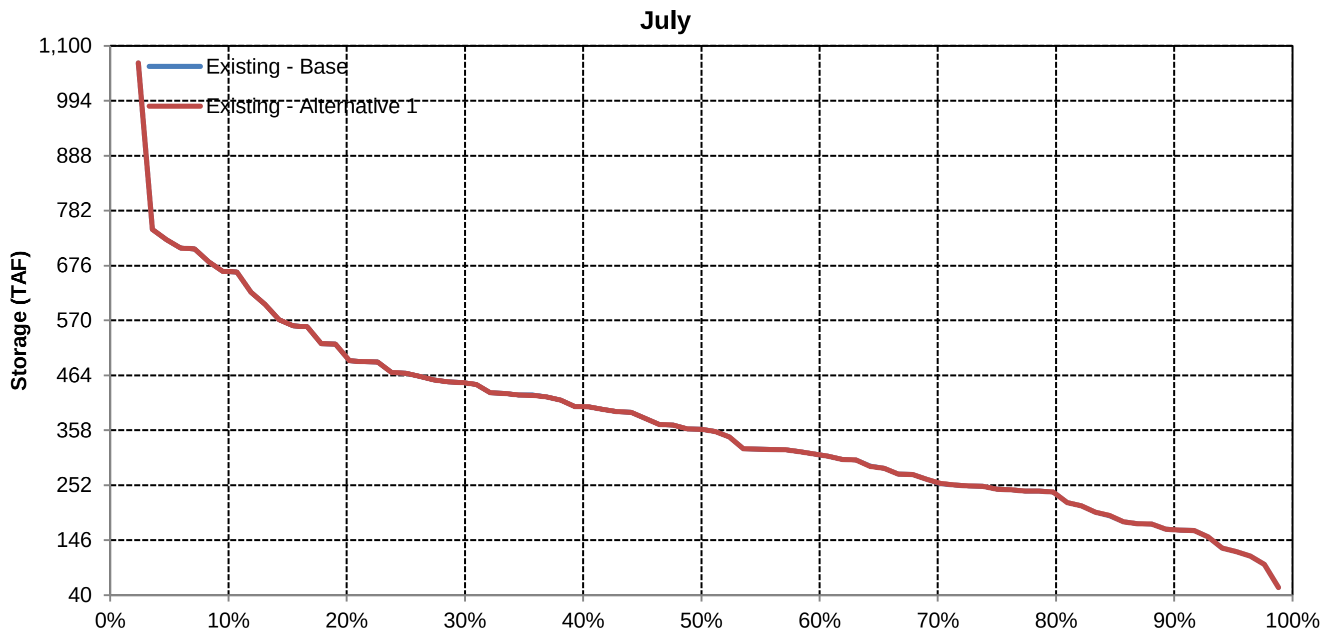
SWP San Luis Reservoir



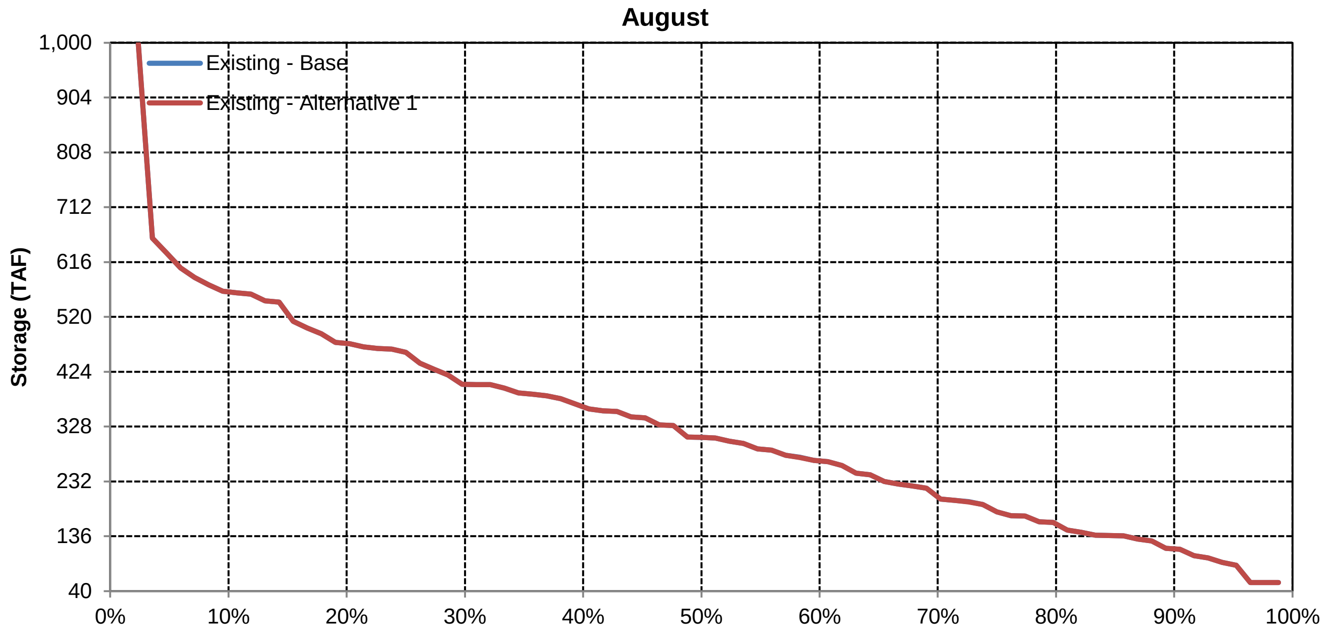


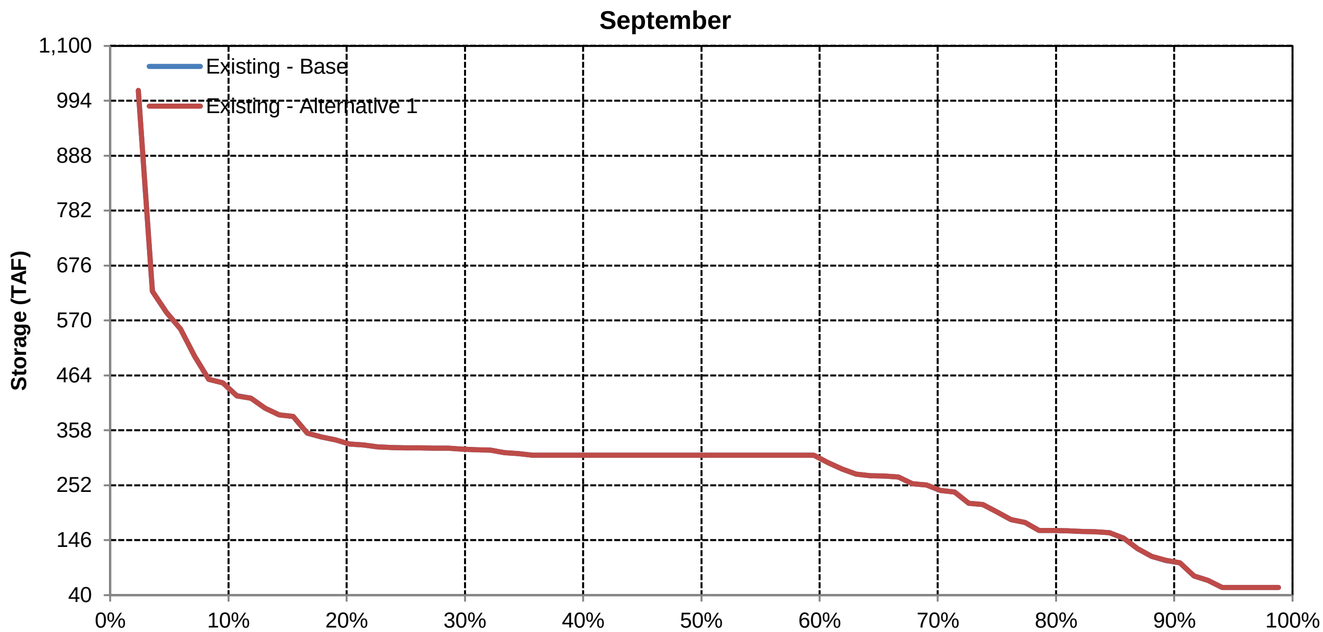
SWP San Luis Reservoir





SWP San Luis Reservoir





S12

Long-Term and Water Year-Type Average of Delta Outflow Under Existing - Base and Existing - Alternative 1

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Existing - Base	6,909	11,530	25,386	48,782	63,791	48,782	30,013	16,104	7,983	8,482	4,062	9,331	16,820
Existing - Alternative 1	6,909	11,530	25,387	48,782	63,791	48,782	30,013	16,104	7,983	8,483	4,062	9,331	16,820
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
							Water Year-Types						
Wet													
Existing - Base	9,275	19,272	57,556	101,579	121,325	88,381	55,563	26,753	10,584	11,022	4,128	19,366	31,372
Existing - Alternative 1	9,275	19,272	57,557	101,579	121,326	88,381	55,563	26,753	10,584	11,023	4,128	19,366	31,372
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal													
Existing - Base	6,741	9,314	21,144	55,453	70,727	61,417	29,722	17,425	7,395	11,464	4,017	11,133	18,336
Existing - Alternative 1	6,741	9,314	21,144	55,453	70,726	61,417	29,722	17,425	7,395	11,464	4,017	11,133	18,336
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal													
Existing - Base	6,527	9,662	10,110	23,902	40,103	31,158	23,270	13,328	6,819	8,808	4,050	3,469	10,847
Existing - Alternative 1	6,527	9,662	10,110	23,902	40,103	31,158	23,270	13,327	6,819	8,808	4,050	3,469	10,847
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry													
Existing - Base	5,825	7,923	8,608	15,426	29,458	22,607	13,161	8,982	7,006	5,274	4,137	3,269	7,873
Existing - Alternative 1	5,824	7,923	8,608	15,426	29,458	22,607	13,161	8,981	7,006	5,274	4,137	3,269	7,873
Difference	0	0	0	0	0	0	0	-1	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical													
Existing - Base	4,133	5,072	6,622	11,837	16,327	13,519	9,101	6,026	6,104	4,027	3,889	3,010	5,383
Existing - Alternative 1	4,133	5,072	6,622	11,837	16,327	13,519	9,101	6,026	6,104	4,027	3,889	3,010	5,383
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Delta Outflow

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	9,977	15,194	83,333	120,592	161,827	97,068	71,454	33,132	11,137	13,270	4,309	19,688
20%	9,531	14,688	37,738	76,978	107,377	74,847	46,407	23,720	7,991	11,709	4,155	19,375
30%	9,094	12,769	20,214	55,546	76,161	60,341	32,656	15,272	7,100	10,714	4,001	17,813
40%	6,875	10,418	14,342	38,012	58,777	38,477	22,321	12,858	7,100	9,084	4,000	10,938
50%	4,346	9,766	11,487	26,488	41,867	31,169	18,044	11,426	7,100	8,603	4,000	3,914
60%	4,000	6,253	6,752	19,211	28,692	22,356	14,643	10,166	6,905	8,000	4,000	3,569
70%	4,000	4,500	5,009	13,355	21,621	17,008	12,821	9,402	6,688	5,591	4,000	3,000
80%	4,000	4,500	4,670	10,293	17,232	14,703	11,016	7,597	6,187	5,000	4,000	3,000
90%	3,000	3,500	4,500	7,972	12,426	10,776	9,604	6,918	5,655	4,000	3,791	3,000
Long Term												
Full Simulation Period	6,909	11,530	25,386	48,782	63,791	48,782	30,013	16,104	7,983	8,482	4,062	9,331
Water Year Types												
Wet	9,275	19,272	57,556	101,579	121,325	88,381	55,563	26,753	10,584	11,022	4,128	19,366
Above Normal	6,741	9,314	21,144	55,453	70,727	61,417	29,722	17,425	7,395	11,464	4,017	11,133
Below Normal	6,527	9,662	10,110	23,902	40,103	31,158	23,270	13,328	6,819	8,808	4,050	3,469
Dry	5,825	7,923	8,608	15,426	29,458	22,607	13,161	8,982	7,006	5,274	4,137	3,269
Critical	4,133	5,072	6,622	11,837	16,327	13,519	9,101	6,026	6,104	4,027	3,889	3,010

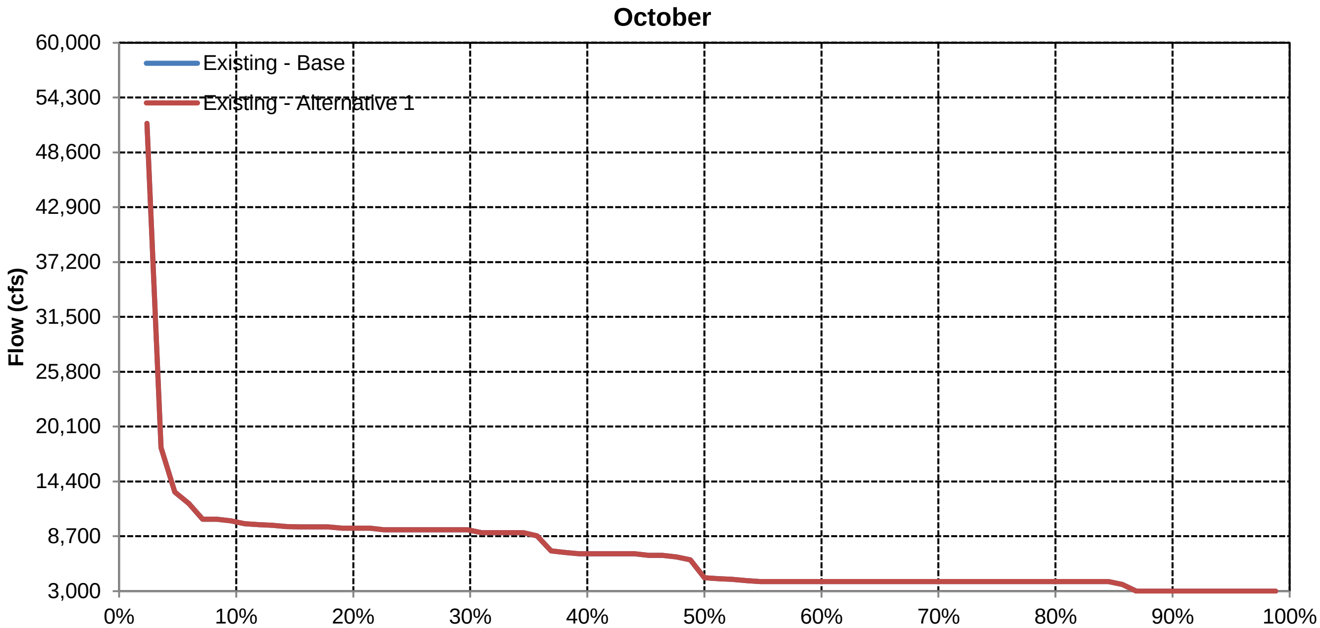
Existing - Alternative 1

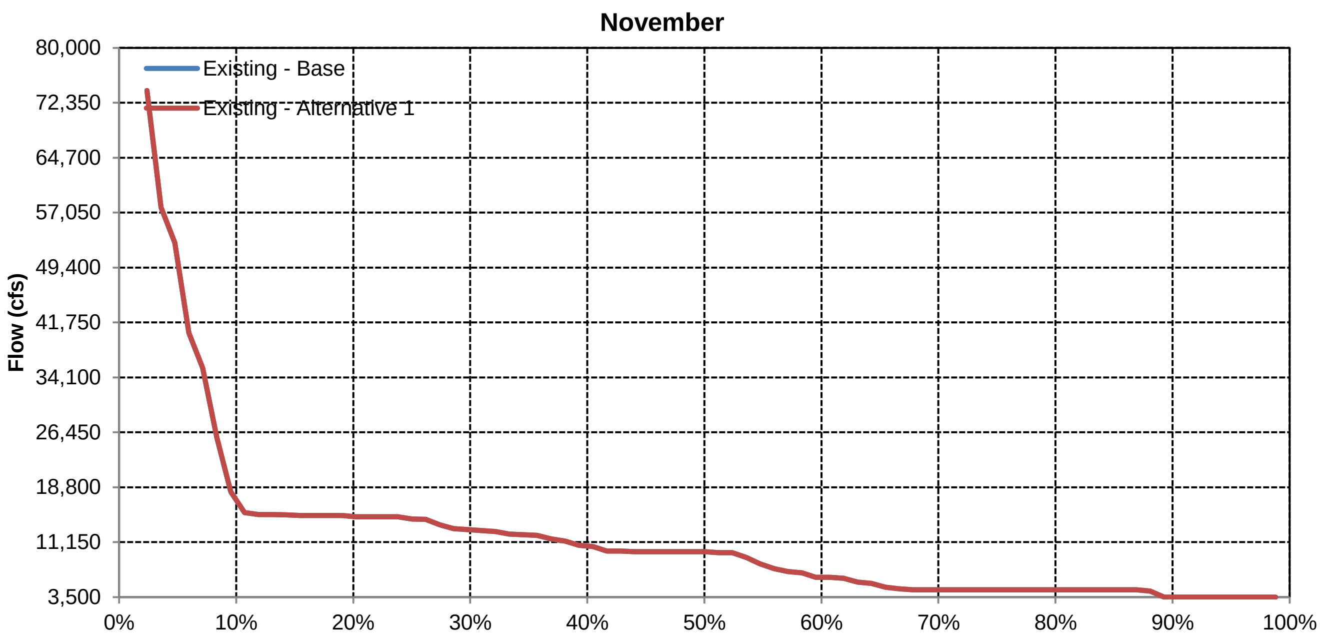
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	9,977	15,194	83,333	120,592	161,827	97,068	71,454	33,132	11,137	13,270	4,308	19,688
20%	9,531	14,688	37,738	76,978	107,377	74,847	46,407	23,720	7,992	11,709	4,155	19,375
30%	9,094	12,769	20,214	55,546	76,161	60,341	32,656	15,272	7,100	10,715	4,001	17,813
40%	6,875	10,418	14,342	38,012	58,776	38,477	22,321	12,858	7,100	9,085	4,000	10,938
50%	4,346	9,766	11,487	26,488	41,868	31,169	18,044	11,426	7,100	8,603	4,000	3,913
60%	4,000	6,253	6,752	19,211	28,692	22,356	14,643	10,166	6,903	8,000	4,000	3,569
70%	4,000	4,500	5,009	13,355	21,621	17,008	12,821	9,402	6,688	5,592	4,000	3,000
80%	4,000	4,500	4,670	10,293	17,232	14,703	11,016	7,596	6,187	5,000	4,000	3,000
90%	3,000	3,500	4,500	7,972	12,426	10,776	9,604	6,918	5,655	4,000	3,791	3,000
Long Term												
Full Simulation Period	6,909	11,530	25,387	48,782	63,791	48,782	30,013	16,104	7,983	8,483	4,062	9,331
Water Year Types												
Wet	9,275	19,272	57,557	101,579	121,326	88,381	55,563	26,753	10,584	11,023	4,128	19,366
Above Normal	6,741	9,314	21,144	55,453	70,726	61,417	29,722	17,425	7,395	11,464	4,017	11,133
Below Normal	6,527	9,662	10,110	23,902	40,103	31,158	23,270	13,327	6,819	8,808	4,050	3,469
Dry	5,824	7,923	8,608	15,426	29,458	22,607	13,161	8,981	7,006	5,274	4,137	3,269
Critical	4,133	5,072	6,622	11,837	16,327	13,519	9,101	6,026	6,104	4,027	3,889	3,010

Existing - Alternative 1 Minus Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	-1	0
20%	0	0	0	0	0	0	0	0	1	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	1	0	0	0	0	0	0	-1
60%	0	0	0	0	0	0	0	0	-2	0	0	0
70%	0	0	0	0	0	0	0	0	0	1	0	0
80%	0	0	0	0	0	0	0	-2	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types												
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	-1	0	0	0	0
Critical	0	0	0	0	0	0	0	0	0	0	0	0

Delta Outflow





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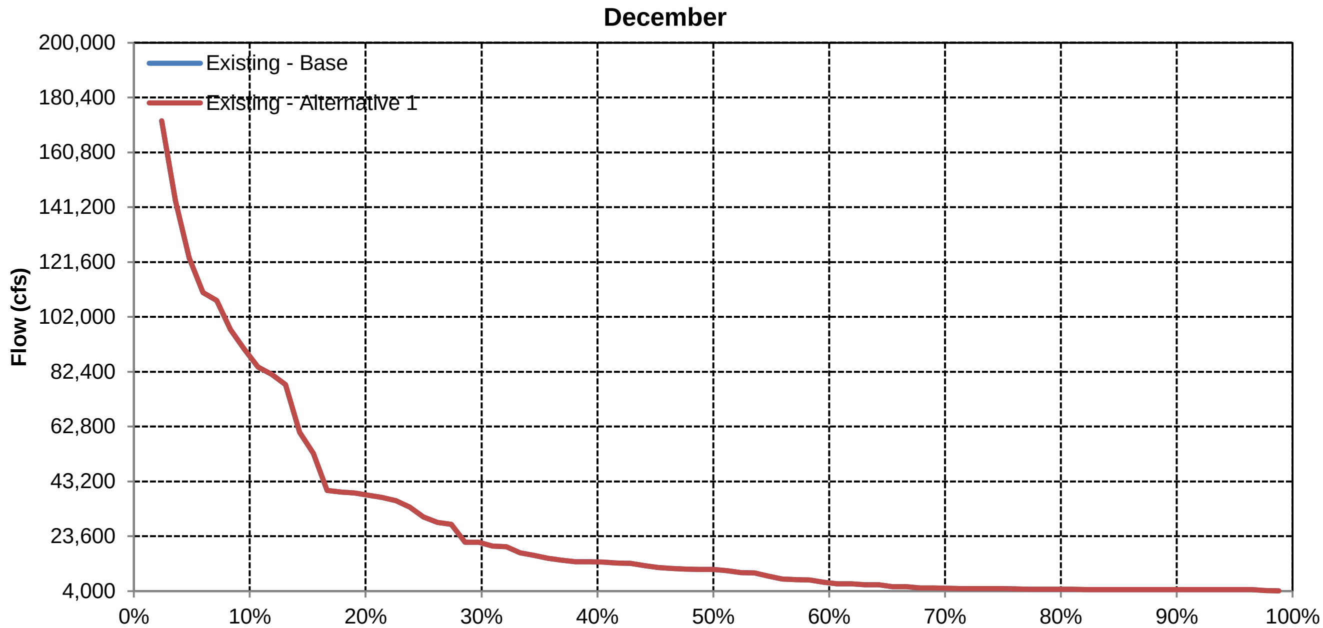

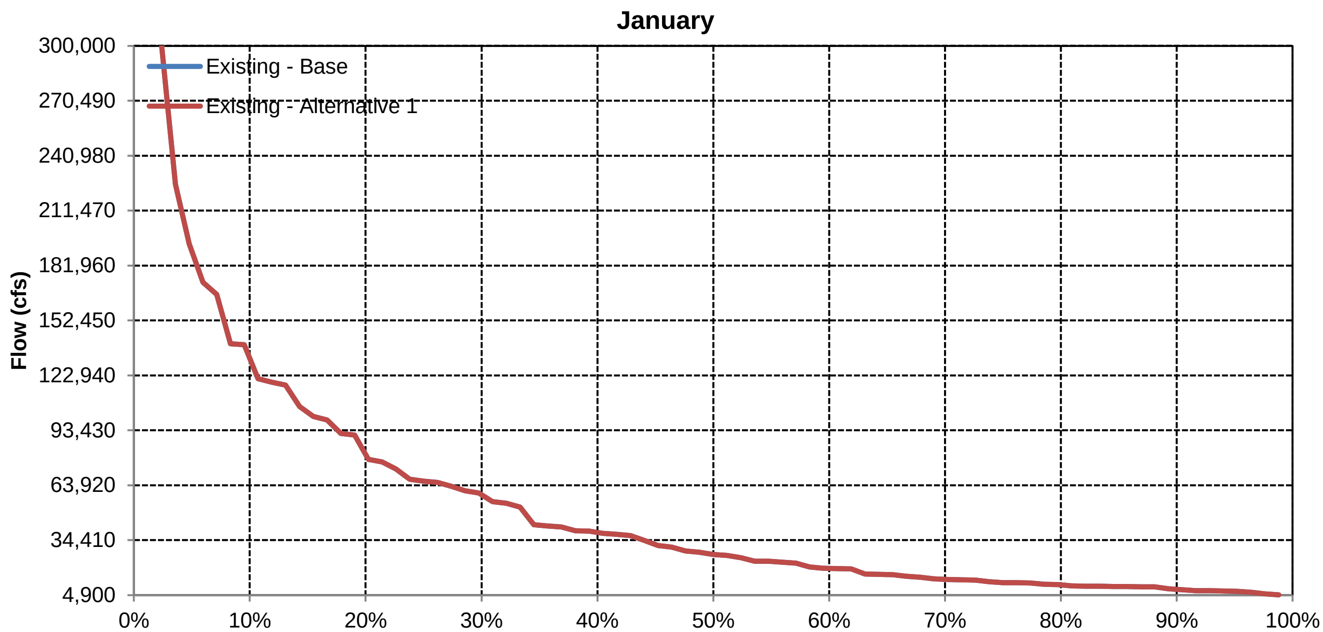

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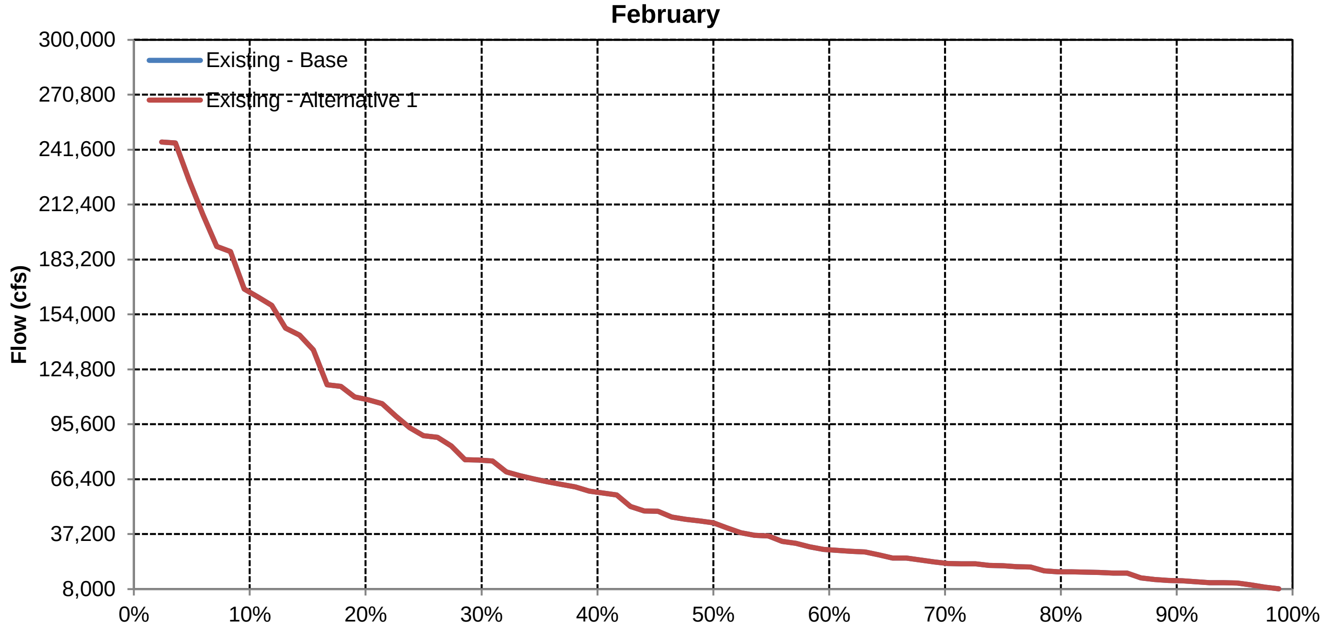
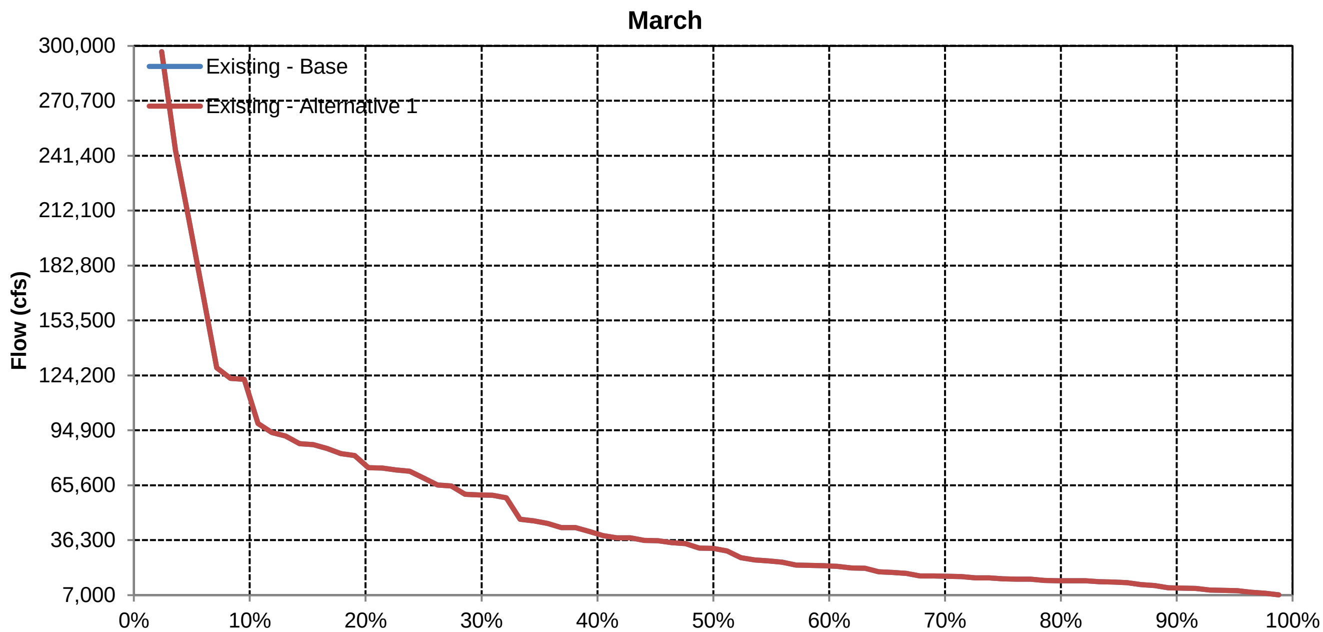
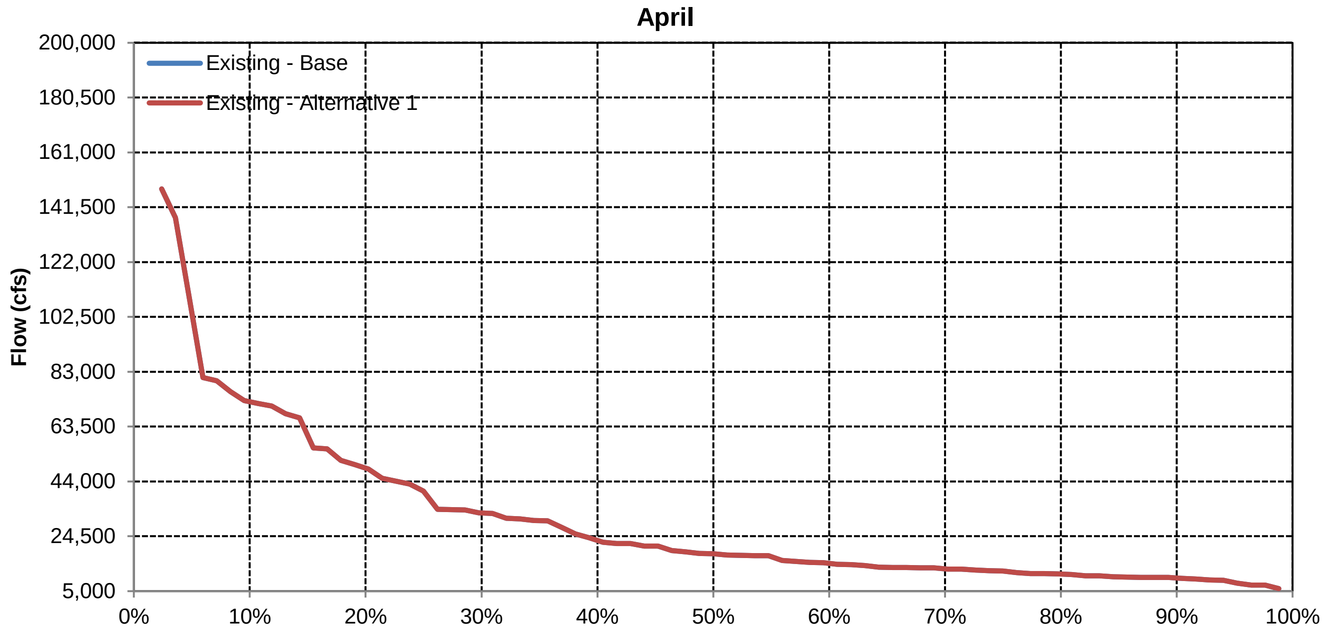
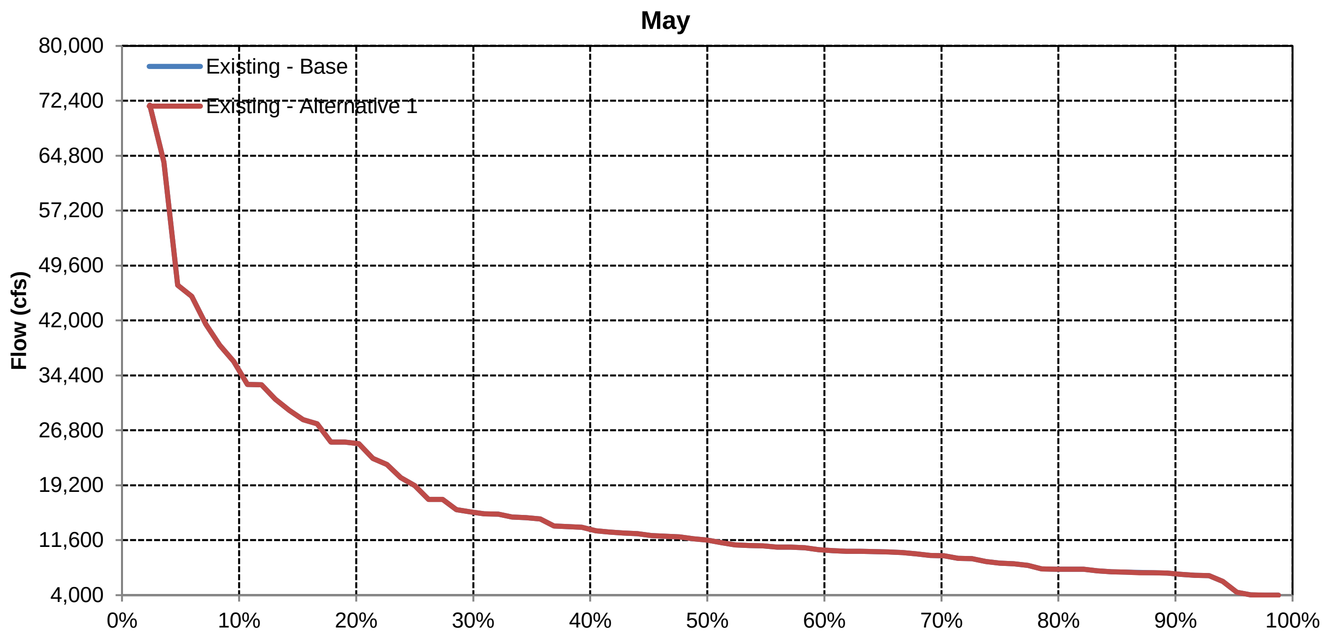


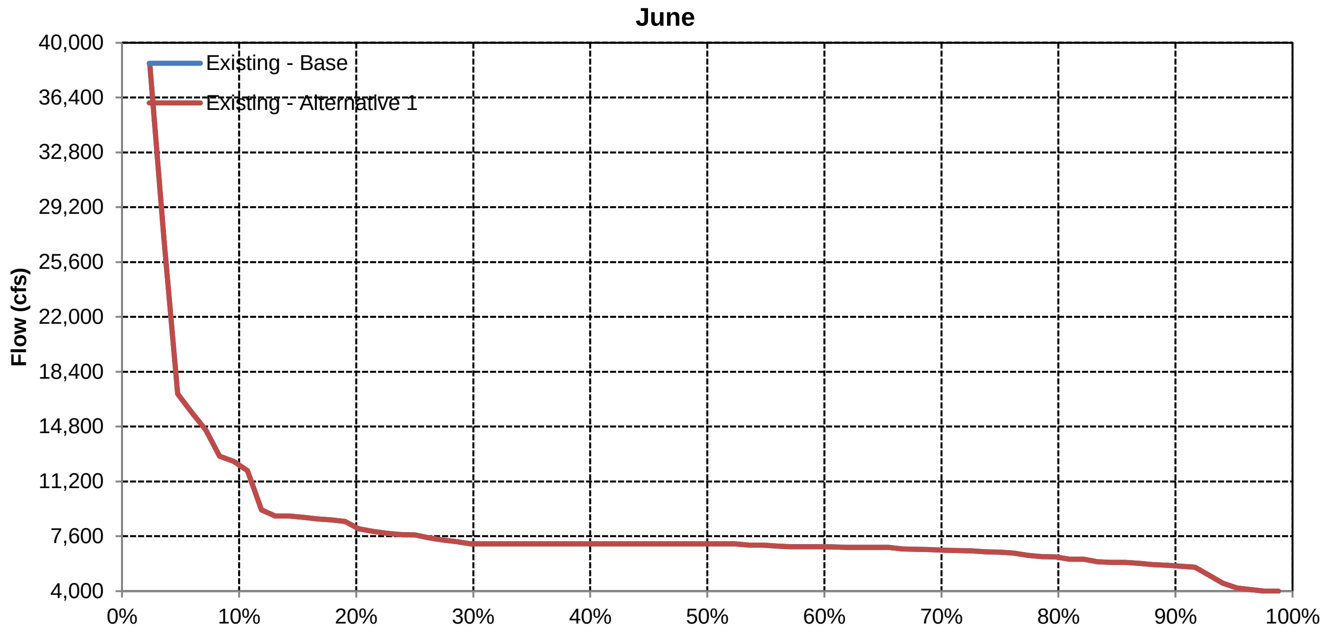


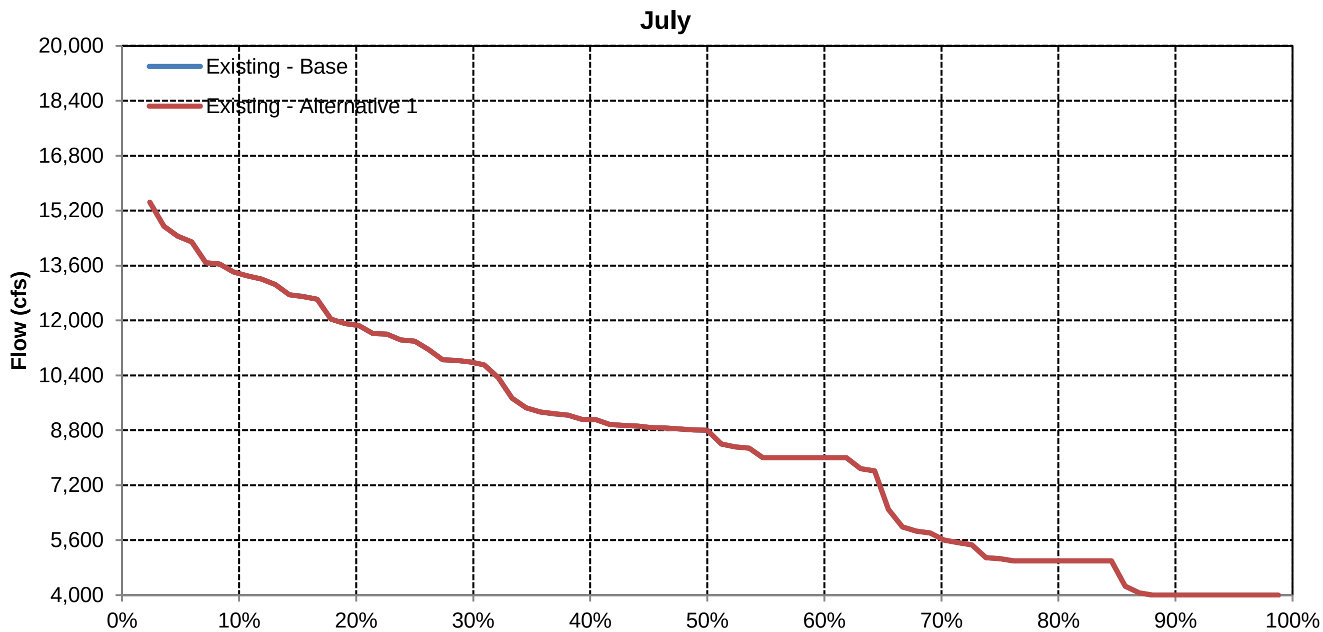
Delta Outflow



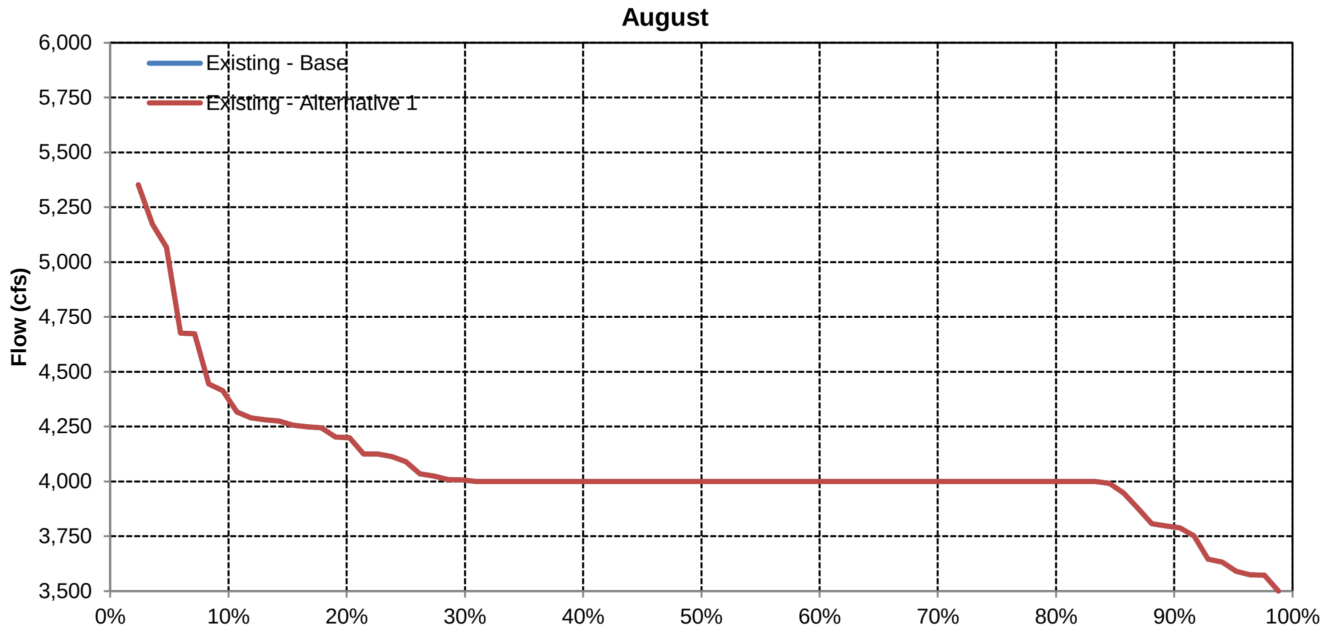


Delta Outflow





Delta Outflow



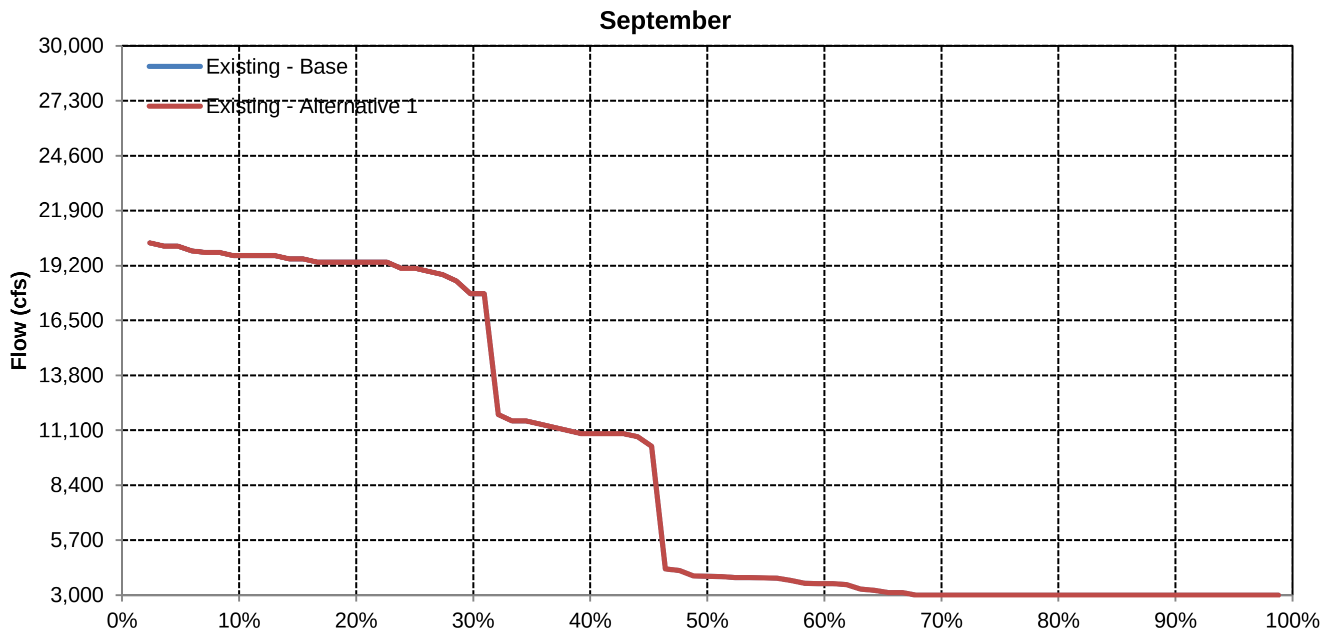


Table 185 Existing Condtions-Alternative 1 (Existing)

Winter-run Chinook Salmon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 1 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration	November through July	Mean Monthly Flow (cfs)	Verona		10	Lower 40%		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
			Freeport		10	Lower 40%		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
		Mean Monthly Water Temperature (°F)	Feather River Confluence	64		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
				68		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
			Freeport	64		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
				68		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Juvenile Rearing and Downstream Movement*	July through March	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	61		All Years	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
				65		All Years	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
			Freeport	61		All Years	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
				65		All Years	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0

Table 186 Existing Condtions-Alternative 1 (Existing)

Spring-run Chinook Salmon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location Description	Metric Value	Metric %	Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration	March through September	Mean Monthly Flow (cfs)	Verona		10	Lower 40%						0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport		10	Lower 40%						0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	64		All Years						0.0	0.0	0.0	0.0	0.0	0.0	0.0
				68		All Years						0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport	64		All Years						0.0	0.0	0.0	0.0	0.0	0.0	0.0
				68		All Years						0.0	0.0	0.0	0.0	0.0	0.0	0.0
Juvenile Rearing (and Downstream Movement)	Year-round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	61		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
				65		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Smolt Emigration	October through May	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
		Mean Monthly Water Temperature (°F)	Feather River Confluence	63		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
			Freeport	63		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				

Net Change in Probability of Exceedance under Alternative 1 (Existing) relative to Existing Condtions (columns Oct–Sep)

Table 187 Existing Condtions-Alternative 1 (Existing)

Fall-run Chinook Salmon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location Description	Metric Value	Metric %	Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Staging	July through December	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0							0.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0							0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	64		All Years	0.0	0.0	0.0							0.0	0.0	0.0
				68		All Years	0.0	0.0	0.0							0.0	0.0	0.0
			Freeport	64		All Years	0.0	0.0	0.0							0.0	0.0	0.0
				68		All Years	0.0	0.0	0.0							0.0	0.0	0.0
Juvenile Rearing and Downstream Movement	December through July	Mean Monthly Flow (cfs)	Verona		10	Lower 40%			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
			Freeport		10	Lower 40%			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
		Mean Monthly Water Temperature (°F)	Freeport	61		All Years			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
				65		All Years			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		

Net Change in Probability of Exceedance under Alternative 1 (Existing) relative to Existing Condtions (Oct–Sep columns)

Table 188 Existing Condtions-Alternative 1 (Existing)

Late Fall-run Chinook Salmon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 1 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Staging	October through April	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
		Mean Monthly Water Temperature (°F)	Feather River Confluence	64		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
			Freeport	64		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
Juvenile Rearing and Downstream Movement	April through December	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Freeport	61		All Years	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
				65		All Years	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0

Table 189 Existing Condtions-Alternative 1 (Existing)

Steelhead in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 1 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration	August through March	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	64		All Years	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0
			Freeport	64		All Years	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0
Juvenile Rearing and Downstream Movement	Year-Round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	65		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Smolt Emigration	January through June	Mean Monthly Flow (cfs)	Verona		10	Lower 40%				0.0	0.0	0.0	0.0	0.0	0.0			
			Freeport		10	Lower 40%				0.0	0.0	0.0	0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Feather River Confluence	52		All Years				0.0	0.0	0.0	0.0	0.0	0.0			
				55		All Years				0.0	0.0	0.0	0.0	0.0	0.0			
			Freeport	52		All Years				0.0	0.0	0.0	0.0	0.0	0.0			
				55		All Years				0.0	0.0	-1.2	0.0	0.0	0.0			

Table 190 Existing Condtions-Alternative 1 (Existing)

Green Sturgeon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location Description	Metric Value	Metric %	Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
							Net Change in Probability of Exceedance under Alternative 1 (Existing) relative to Existing Condtions											
Adult Immigration and Holding	February through July	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%					0.0	0.0	0.0	0.0	0.0	0.0		
		Mean Monthly Water Temperature (°F)	Freeport	61		All Years					0.0	0.0	0.0	0.0	0.0	0.0		
Adult Post-Spawning Holding and Emigration	July through November	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%	0.0	0.0								0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Freeport	61		All Years	0.0	0.0								0.0	0.0	0.0
Juvenile Rearing and Downstream Movement	Year-round	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Freeport	66		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 191 Existing Condtions-Alternative 1 (Existing)

White Sturgeon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 1 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Holding	November through May	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%		0.0	0.0	0.0	0.0	0.0	0.0	0.0				
		Mean Monthly Water Temperature (°F)	Freeport	77		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Spawning and Egg Incubation	February through June	Mean Monthly Flow (cfs)	Verona		10	Lower 40%					0.0	0.0	0.0	0.0	0.0			
			Freeport		10	Lower 40%					0.0	0.0	0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Feather River Confluence	61		All Years					0.0	0.0	0.0	0.0	0.0			
Juvenile Rearing and Downstream Movement	Year-round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	66		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport	66		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 192 Existing Condtions-Alternative 1 (Existing)

River Lamprey in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 1 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration	September through June	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0
		Mean Monthly Water Temperature (°F)	Freeport	42-60		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0
Ammocoete Rearing and Downstream Movement	Year-round	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Freeport	72		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

[1]Water temperature ranges are evaluated by calculating the net change in the probability of water temperatures occurring within the specified range.

Table 193 Existing Condtions-Alternative 1 (Existing)

Pacific Lamprey in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 1 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration	January through June	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%				0.0	0.0	0.0	0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Freeport	42-60		All Years				0.0	0.0	0.0	0.0	0.0	0.0			
Ammocoete Rearing and Downstream Movement	Year-round	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Freeport	72		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

[1]Water temperature ranges are evaluated by calculating the net change in the probability of water temperatures occurring within the specified range.

Table 194 Existing Condtions-Alternative 1 (Existing)

Hardhead in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 1 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adults and Other Lifestages	Year-round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	61-77		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport	61-77		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Adult Spawning	April through June	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%							0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Freeport	59-64		All Years							0.0	0.0	0.0			

[1]Water temperature ranges are evaluated by calculating the net change in the probability of water temperatures occurring within the specified range.

Table 195 Existing Condtions-Alternative 1 (Existing)

American Shad in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 1 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Spawning	April through June	Mean Monthly Flow (cfs)	Verona		10	Lower 40%							0.0	0.0	0.0			
			Freeport		10	Lower 40%							0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Feather River Confluence	60-70		All Years							0.0	0.0	0.0			
			Freeport	60-70		All Years							0.0	0.0	0.0			
Juvenile Rearing and Downstream Movement	Year-Round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	63-77		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport	63-77		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

[1]Water temperature ranges are evaluated by calculating the net change in the probability of water temperatures occurring within the specified range.

Table 196 Existing Condtions-Alternative 1 (Existing)

Striped Bass in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 1 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Spawning	April through June	Mean Monthly Flow (cfs)	Verona		10	Lower 40%							0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Feather River Confluence	59-68		All Years							0.0	0.0	0.0			
Juvenile Rearing and Downstream Movement	Year-round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	61-71		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

[1]Water temperature ranges are evaluated by calculating the net change in the probability of water temperatures occurring within the specified range.

Table 201 Existing Condtions-Alternative 1 (Existing)

Alternative 1 (Existing) vs Existing Condtions
Sacramento River at Verona, Monthly Flow

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
-1.0 < X < 1.0	100.0	84.1	52.4	41.5	32.9	52.4	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	0.0	15.9	45.1	58.5	65.9	41.5	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	-15.9	-45.1	-58.5	-65.9	-41.5	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Low Flows (Upper 40% of Distribution)												
-1.0 < X < 1.0	100.0	100.0	100.0	84.8	54.5	75.8	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	0.0	0.0	0.0	15.2	42.4	15.2	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	0.0	0.0	-15.2	-42.4	-15.2	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 202 Existing Condtions-Alternative 1 (Existing)

Alternative 1 (Existing) vs Existing Condtions
Sacramento River at Freeport, Monthly Flow

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
-1.0 < X < 1.0	100.0	84.1	56.1	41.5	37.8	59.8	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	0.0	14.6	39.0	57.3	61.0	35.4	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	-14.6	-39.0	-57.3	-61.0	-35.4	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Low Flows (Upper 40% of Distribution)												
-1.0 < X < 1.0	100.0	100.0	100.0	84.8	54.5	87.9	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	0.0	0.0	0.0	15.2	42.4	3.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	0.0	0.0	-15.2	-42.4	-3.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Alternative 1 (Existing) vs Existing Condtions

Sacramento River at Feather River, Monthly Temperature

Exceedance of Water Temperature Index Values and Probability of Occurring within the Water Temperature Index Ranges

Existing Condtions

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	98.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	98.0	96.4	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	95.7	92.7	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	81.1	73.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	20.7	4.9	94.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	2.4	1.2	81.7	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	97.8	2.1	1.2	51.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	78.0	1.4	1.2	12.2	87.8	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	58.5	1.2	1.2	4.7	74.6	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	34.1	1.2	1.2	1.4	65.2	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	18.3	1.2	1.2	1.2	41.5	98.3	98.8	98.8	98.8	98.8	98.8
56	98.8	7.6	1.2	1.2	1.2	23.2	95.9	98.8	98.8	98.8	98.8	98.8
57	98.8	2.4	1.2	1.2	1.2	14.0	94.7	98.8	98.8	98.8	98.8	98.8
58	98.8	1.2	1.2	1.2	1.2	5.5	86.6	98.8	98.8	98.8	98.8	98.8
59	96.7	1.2	1.2	1.2	1.2	3.2	77.6	98.8	98.8	98.8	98.8	98.8
60	85.4	1.2	1.2	1.2	1.2	2.4	68.3	98.8	98.8	98.8	98.8	98.8
61	62.8	1.2	1.2	1.2	1.2	1.8	57.3	98.8	98.8	98.8	98.8	98.8
62	44.5	1.2	1.2	1.2	1.2	1.2	43.9	98.0	98.8	98.8	98.8	98.8
63	23.2	1.2	1.2	1.2	1.2	1.2	35.4	96.9	98.8	98.8	98.8	98.8
64	14.6	1.2	1.2	1.2	1.2	1.2	13.3	95.5	98.8	98.8	98.8	98.8
65	7.6	1.2	1.2	1.2	1.2	1.2	10.4	89.6	98.8	98.8	98.8	93.3
66	4.5	1.2	1.2	1.2	1.2	1.2	4.3	85.4	98.8	98.8	98.8	90.2
68	1.5	1.2	1.2	1.2	1.2	1.2	1.2	48.8	98.2	98.8	98.8	65.9
69	1.2	1.2	1.2	1.2	1.2	1.2	1.2	29.3	94.1	98.8	98.8	53.7
70	1.2	1.2	1.2	1.2	1.2	1.2	1.2	13.2	85.4	98.3	97.8	29.9
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	9.8	68.3	93.1	90.2	24.6
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	6.3	37.8	78.0	76.8	13.4
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	2.2	11.0	29.3	42.7	3.5
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.7	3.0	19.5	23.2	2.4
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	4.3	2.1	1.2
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	79.9	72.0	97.6	97.6	97.6	97.1	95.8	79.3	75.6	96.4
50-64	84.2	96.6	0.9	0.0	50.0	97.6	85.5	3.3	0.0	0.0	0.0	0.0
55-56	0.0	10.7	0.0	0.0	0.0	18.3	2.4	0.0	0.0	0.0	0.0	0.0
59-64	82.1	0.0	0.0	0.0	0.0	2.0	64.3	3.3	0.0	0.0	0.0	0.0
59-68	95.2	0.0	0.0	0.0	0.0	2.0	76.4	50.0	0.6	0.0	0.0	32.9
59-75	95.5	0.0	0.0	0.0	0.0	2.0	76.4	97.1	95.8	79.3	75.6	96.4
60-70	84.2	0.0	0.0	0.0	0.0	1.2	67.1	85.6	13.4	0.5	1.0	68.9
61-71	61.6	0.0	0.0	0.0	0.0	0.6	56.1	89.0	30.5	5.7	8.6	74.2
63-69	22.0	0.0	0.0	0.0	0.0	0.0	34.2	67.6	4.7	0.0	0.0	45.1
63-77	22.0	0.0	0.0	0.0	0.0	0.0	34.2	95.7	97.6	94.5	96.7	97.6
65-82	6.4	0.0	0.0	0.0	0.0	0.0	9.2	88.4	97.6	97.6	97.6	92.1
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.0	84.2	97.1	96.6	28.7
42-60	13.4	97.6	96.8	95.2	97.6	96.4	30.5	0.0	0.0	0.0	0.0	0.0
61-77	61.6	0.0	0.0	0.0	0.0	0.6	56.1	97.6	97.6	94.5	96.7	97.6

Alternative 1 (Existing)

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	98.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	98.0	96.4	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	95.7	92.7	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	81.1	73.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	20.7	4.9	94.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	2.4	1.2	81.7	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	97.8	2.1	1.2	51.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	78.0	1.4	1.2	12.2	87.8	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	58.5	1.2	1.2	4.7	74.6	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	34.1	1.2	1.2	1.4	65.2	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	18.3	1.2	1.2	1.2	41.5	98.3	98.8	98.8	98.8	98.8	98.8
56	98.8	7.6	1.2	1.2	1.2	23.2	95.9	98.8	98.8	98.8	98.8	98.8
57	98.8	2.4	1.2	1.2	1.2	14.0	94.7	98.8	98.8	98.8	98.8	98.8
58	98.8	1.2	1.2	1.2	1.2	5.5	86.6	98.8	98.8	98.8	98.8	98.8
59	96.7	1.2	1.2	1.2	1.2	3.2	77.6	98.8	98.8	98.8	98.8	98.8
60	85.4	1.2	1.2	1.2	1.2	2.4	68.3	98.8	98.8	98.8	98.8	98.8
61	62.8	1.2	1.2	1.2	1.2	1.8	57.3	98.8	98.8	98.8	98.8	98.8
62	44.5	1.2	1.2	1.2	1.2	1.2	43.9	98.0	98.8	98.8	98.8	98.8
63	23.2	1.2	1.2	1.2	1.2	1.2	35.4	96.9	98.8	98.8	98.8	98.8
64	14.6	1.2	1.2	1.2	1.2	1.2	13.3	95.5	98.8	98.8	98.8	98.8
65	7.6	1.2	1.2	1.2	1.2	1.2	10.4	89.6	98.8	98.8	98.8	93.3
66	4.5	1.2	1.2	1.2	1.2	1.2	4.3	85.4	98.8	98.8	98.8	90.2
68	1.5	1.2	1.2	1.2	1.2	1.2	1.2	48.8	98.2	98.8	98.8	65.9
69	1.2	1.2	1.2	1.2	1.2	1.2	1.2	29.3	94.1	98.8	98.8	53.7
70	1.2	1.2	1.2	1.2	1.2	1.2	1.2	13.2	85.4	98.3	97.8	29.9
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	9.8	68.3	93.1	90.2	24.6
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	6.3	37.8	78.0	76.8	13.4
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	2.2	11.0	29.3	42.7	3.5
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.7	3.0	19.5	23.2	2.4
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	4.3	2.1	1.2
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	79.9	72.0	97.6	97.6	97.6	97.1	95.8	79.3	75.6	96.4
50-64	84.2	96.6	0.9	0.0	50.0	97.6	85.5	3.3	0.0	0.0	0.0	0.0
55-56	0.0	10.7	0.0	0.0	0.0	18.3	2.4	0.0	0.0	0.0	0.0	0.0
59-64	82.1	0.0	0.0	0.0	0.0	2.0	64.3	3.3	0.0	0.0	0.0	0.0
59-68	95.2	0.0	0.0	0.0	0.0	2.0	76.4	50.0	0.6	0.0	0.0	32.9
59-75	95.5	0.0	0.0	0.0	0.0	2.0	76.4	97.1	95.8	79.3	75.6	96.4
60-70	84.2	0.0	0.0	0.0	0.0	1.2	67.1	85.6	13.4	0.5	1.0	68.9
61-71	61.6	0.0	0.0	0.0	0.0	0.6	56.1	89.0	30.5	5.7	8.6	74.2
63-69	22.0	0.0	0.0	0.0	0.0	0.0	34.2	67.6	4.7	0.0	0.0	45.1
63-77	22.0	0.0	0.0	0.0	0.0	0.0	34.2	95.7	97.6	94.5	96.7	97.6
65-82	6.4	0.0	0.0	0.0	0.0	0.0	9.2	88.4	97.6	97.6	97.6	92.1
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.0	84.2	97.1	96.6	28.7
42-60	13.4	97.6	96.8	95.2	97.6	96.4	30.5	0.0	0.0	0.0	0.0	0.0
61-77	61.6	0.0	0.0	0.0	0.0	0.6	56.1	97.6	97.6	94.5	96.7	97.6

Alternative 1 (Existing) - Existing Condtions

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
43	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
48	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
49	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
52	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
53	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
54	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
56	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
57	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
58	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
62	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
66	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
68	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
72	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
74	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
86	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
88	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
98	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45-75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50-64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55-56	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-68	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60-70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61-71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63-69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
65-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42-60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Alternative 1 (Existing) vs Existing Condtions

Sacramento River at Freeport, Monthly Temperature

Exceedance of Water Temperature Index Values and Probability of Occurring within the Water Temperature Index Ranges

Existing Condtions

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	97.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	97.8	96.4	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	93.9	91.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	79.9	73.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	22.0	5.5	95.3	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	3.0	1.2	80.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	98.0	2.0	1.2	47.6	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	82.9	1.2	1.2	13.4	92.1	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	64.6	1.2	1.2	6.7	75.3	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	39.0	1.2	1.2	2.3	64.6	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	22.8	1.2	1.2	1.2	45.1	98.3	98.8	98.8	98.8	98.8	98.8
56	98.8	11.0	1.2	1.2	1.2	24.4	96.5	98.8	98.8	98.8	98.8	98.8
57	98.8	3.3	1.2	1.2	1.2	14.1	94.2	98.8	98.8	98.8	98.8	98.8
58	98.8	1.2	1.2	1.2	1.2	8.0	86.6	98.8	98.8	98.8	98.8	98.8
59	98.8	1.2	1.2	1.2	1.2	4.5	78.0	98.8	98.8	98.8	98.8	98.8
60	95.1	1.2	1.2	1.2	1.2	3.2	71.2	98.8	98.8	98.8	98.8	98.8
61	74.4	1.2	1.2	1.2	1.2	2.2	57.3	98.8	98.8	98.8	98.8	98.8
62	54.9	1.2	1.2	1.2	1.2	1.4	47.6	98.8	98.8	98.8	98.8	98.8
63	42.7	1.2	1.2	1.2	1.2	1.2	31.7	97.7	98.8	98.8	98.8	98.8
64	20.7	1.2	1.2	1.2	1.2	1.2	20.7	95.1	98.8	98.8	98.8	98.8
65	14.0	1.2	1.2	1.2	1.2	1.2	12.8	92.7	98.8	98.8	98.8	97.6
66	5.5	1.2	1.2	1.2	1.2	1.2	6.7	84.1	98.8	98.8	98.8	94.7
68	1.7	1.2	1.2	1.2	1.2	1.2	1.2	57.3	98.8	98.8	98.8	81.3
69	1.2	1.2	1.2	1.2	1.2	1.2	1.2	30.5	96.9	98.8	98.8	68.3
70	1.2	1.2	1.2	1.2	1.2	1.2	1.2	15.9	89.8	98.8	98.8	47.6
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	11.4	84.1	98.8	97.9	26.8
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	7.0	64.6	97.6	91.5	18.3
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.0	20.7	61.0	57.7	4.3
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	2.4	9.8	34.1	39.0	1.4
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	10.4	7.3	1.2
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	78.7	72.0	97.6	97.6	97.6	96.4	89.0	64.7	59.8	97.4
50-64	78.1	96.8	0.8	0.0	46.4	97.6	78.1	3.7	0.0	0.0	0.0	0.0
55-56	0.0	11.8	0.0	0.0	0.0	20.7	1.8	0.0	0.0	0.0	0.0	0.0
59-64	78.1	0.0	0.0	0.0	0.0	3.3	57.3	3.7	0.0	0.0	0.0	0.0
59-68	97.1	0.0	0.0	0.0	0.0	3.3	76.8	41.5	0.0	0.0	0.0	17.5
59-75	97.6	0.0	0.0	0.0	0.0	3.3	76.8	96.4	89.0	64.7	59.8	97.4
60-70	93.9	0.0	0.0	0.0	0.0	2.0	70.0	82.9	9.0	0.0	0.0	51.2
61-71	73.2	0.0	0.0	0.0	0.0	1.0	56.1	87.4	14.7	0.0	0.9	72.0
63-69	41.5	0.0	0.0	0.0	0.0	0.0	30.5	67.2	1.9	0.0	0.0	30.5
63-77	41.5	0.0	0.0	0.0	0.0	0.0	30.5	96.5	97.6	88.4	91.5	97.6
65-82	12.8	0.0	0.0	0.0	0.0	0.0	11.6	91.5	97.6	97.6	97.6	96.4
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.7	88.6	97.6	97.6	46.4
42-60	3.7	97.6	96.6	95.2	97.6	95.6	27.6	0.0	0.0	0.0	0.0	0.0
61-77	73.2	0.0	0.0	0.0	0.0	1.0	56.1	97.6	97.6	88.4	91.5	97.6

Alternative 1 (Existing)

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	97.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	97.8	96.4	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	93.9	91.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	79.9	73.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	22.0	5.5	95.4	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	3.0	1.2	80.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	98.0	2.0	1.2	47.6	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	82.9	1.2	1.2	13.4	92.1	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	64.6	1.2	1.2	6.8	75.6	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	39.0	1.2	1.2	2.3	64.6	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	22.8	1.2	1.2	1.2	43.9	98.3	98.8	98.8	98.8	98.8	98.8
56	98.8	11.0	1.2	1.2	1.2	24.4	96.5	98.8	98.8	98.8	98.8	98.8
57	98.8	3.3	1.2	1.2	1.2	14.1	94.2	98.8	98.8	98.8	98.8	98.8
58	98.8	1.2	1.2	1.2	1.2	8.2	86.6	98.8	98.8	98.8	98.8	98.8
59	98.8	1.2	1.2	1.2	1.2	4.5	78.0	98.8	98.8	98.8	98.8	98.8
60	95.1	1.2	1.2	1.2	1.2	3.2	71.2	98.8	98.8	98.8	98.8	98.8
61	74.4	1.2	1.2	1.2	1.2	2.2	57.3	98.8	98.8	98.8	98.8	98.8
62	54.9	1.2	1.2	1.2	1.2	1.4	47.6	98.8	98.8	98.8	98.8	98.8
63	42.7	1.2	1.2	1.2	1.2	1.2	31.7	97.7	98.8	98.8	98.8	98.8
64	20.7	1.2	1.2	1.2	1.2	1.2	20.7	95.1	98.8	98.8	98.8	98.8
65	14.0	1.2	1.2	1.2	1.2	1.2	12.8	92.7	98.8	98.8	98.8	97.6
66	5.5	1.2	1.2	1.2	1.2	1.2	6.7	84.1	98.8	98.8	98.8	94.7
68	1.7	1.2	1.2	1.2	1.2	1.2	1.2	57.3	98.8	98.8	98.8	81.3
69	1.2	1.2	1.2	1.2	1.2	1.2	1.2	30.5	96.9	98.8	98.8	68.3
70	1.2	1.2	1.2	1.2	1.2	1.2	1.2	15.9	89.8	98.8	98.8	47.6
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	11.4	84.1	98.8	97.9	26.8
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	7.0	64.6	97.6	91.5	18.3
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.0	20.7	61.0	57.7	4.3
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	2.4	9.8	34.1	39.0	1.4
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	10.4	7.3	1.2
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	78.7	72.0	97.6	97.6	97.6	96.4	89.0	64.7	59.8	97.4
50-64	78.1	96.8	0.8	0.0	46.4	97.6	78.1	3.7	0.0	0.0	0.0	0.0
55-56	0.0	11.8	0.0	0.0	0.0	19.5	1.8	0.0	0.0	0.0	0.0	0.0
59-64	78.1	0.0	0.0	0.0	0.0	3.3	57.3	3.7	0.0	0.0	0.0	0.0
59-68	97.1	0.0	0.0	0.0	0.0	3.3	76.8	41.5	0.0	0.0	0.0	17.5
59-75	97.6	0.0	0.0	0.0	0.0	3.3	76.8	96.4	89.0	64.7	59.8	97.4
60-70	93.9	0.0	0.0	0.0	0.0	2.0	70.0	82.9	9.0	0.0	0.0	51.2
61-71	73.2	0.0	0.0	0.0	0.0	1.0	56.1	87.4	14.7	0.0	0.9	72.0
63-69	41.5	0.0	0.0	0.0	0.0	0.0	30.5	67.2	1.9	0.0	0.0	30.5
63-77	41.5	0.0	0.0	0.0	0.0	0.0	30.5	96.5	97.6	88.4	91.5	97.6
65-82	12.8	0.0	0.0	0.0	0.0	0.0	11.6	91.5	97.6	97.6	97.6	96.4
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.7	88.6	97.6	97.6	46.4
42-60	3.7	97.6	96.6	95.2	97.6	95.6	27.6	0.0	0.0	0.0	0.0	0.0
61-77	73.2	0.0	0.0	0.0	0.0	1.0	56.1	97.6	97.6	88.4	91.5	97.6

Alternative 1 (Existing) - Existing Condtions

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
43	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
48	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
49	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
52	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
53	0.0	0.0	0.0	0.0	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0
54	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55	0.0	0.0	0.0	0.0	0.0	-1.2	0.0	0.0	0.0	0.0	0.0	0.0
56	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
57	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
58	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
59	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
62	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
66	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
68	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
72	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
74	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
86	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
88	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
98	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45-75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50-64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55-56	0.0	0.0	0.0	0.0	0.0	-1.2	0.0	0.0	0.0	0.0	0.0	0.0
59-64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-68	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60-70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61-71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63-69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
65-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42-60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 227 Existing Condtions-Alternative 1 (Existing)

Delta Smelt in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 1 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult	December through May	Mean Monthly Water Temperature (°F)	Sacramento River at Freeport	59-68		All Years			0.0	0.0	0.0	0.0	0.0	0.0				
		Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years			65.9	72.0	61.0	73.2	0.0	0.0				
	September through November	Mean Monthly X_2 (RKm)	X_2 between 74 km and 81 km	74-81		Wet and Above Normal Water Years	0.0	0.0										0.0
	December through February	Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<-5000 cfs		All Years			0.0	0.0	0.0							
Egg and Embryo	February through May	Mean Monthly Water Temperature (°F)	Sacramento River at Freeport	59-68		All Years					0.0	0.0	0.0	0.0				
Larval	March through June	Mean Monthly Water Temperature (°F)	Sacramento River at Freeport	59-68		All Years						0.0	0.0	0.0	0.0			
		Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<-1500 cfs		Dry and Critical Water Years						0.0	0.0	0.0	0.0			
		Mean Monthly Delta Outflow (cfs)	Delta		10	All Years						0.0	0.0	0.0	0.0			
Juvenile	May through July	Mean Monthly Water Temperature (°F)	Sacramento River at Freeport	59-68		All Years								0.0	0.0	0.0		
		Mean Monthly X_2 (RKm)	Changes in X_2 between RKm 65 and 80	0.5 RKm		All Years								0.0	0.0	0.0		

Table 228 Existing Condtions-Alternative 1 (Existing)

Longfin Smelt in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 1 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult	December through March	Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<-5000 cfs		All Years			0.0	0.0	0.0	0.0						
Larvae and Juvenile	April and May	Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<-1500 cfs		Dry and Critical Water Years							0.0	0.0				
				< 0 cfs		Dry and Critical Water Years							0.0	0.0				
	January through June	Mean Monthly X_2 (RKm)	X_2	< 75 RKm		All Years				0.0	0.0	0.0	0.0	0.0	0.0			
				< 75 RKm		Dry and Critical Water Years				0.0	0.0	0.0	0.0	0.0	0.0			

Table 229 Existing Condtions-Alternative 1 (Existing)

Winter-run Chinook Salmon in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 1 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	November through May	Mean Monthly Flow (cfs)	Rio Vista		10	Lower 40%		0.0	0.0	0.0	0.0	0.0	0.0	0.0				
		Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years		67.1	65.9	72.0	61.0	73.2	0.0	0.0				
		Mean Monthly Delta Outflow (cfs)	Delta		10	All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0				
		Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<2500 cfs		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0				

Table 230 Existing Condtions-Alternative 1 (Existing)

Spring-run Chinook Salmon in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 1 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	November through June	Mean Monthly Flow (cfs)	Rio Vista		10	Lower 40%		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
		Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years		67.1	65.9	72.0	61.0	73.2	0.0	0.0	0.0			
		Mean Monthly Delta Outflow (cfs)	Delta		10	All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
		Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<2500 cfs		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			

Table 231 Existing Condtions-Alternative 1 (Existing)

Fall- and Late Fall-run Chinook Salmon in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 1 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	November through June	Mean Monthly Flow (cfs)	Rio Vista		10	Lower 40%		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
		Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years		67.1	65.9	72.0	61.0	73.2	0.0	0.0	0.0			
		Mean Monthly Delta Outflow (cfs)	Delta		10	All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
		Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<2500 cfs		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Adult (San Joaquin River)	December through February	Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<-5000 cfs		All Years			0.0	0.0	0.0							

Table 232 Existing Condtions-Alternative 1 (Existing)

Steelhead in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 1 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	October through July	Mean Monthly Flow (cfs)	Rio Vista		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
		Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years	0.0	67.1	65.9	72.0	61.0	73.2	0.0	0.0	0.0	0.0		
		Mean Monthly Delta Outflow (cfs)	Delta		10	All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
		Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<2500 cfs		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		

Table 233 Existing Condtions-Alternative 1 (Existing)

Green Sturgeon in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 1 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	Year-round	Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years	0.0	67.1	65.9	72.0	61.0	73.2	0.0	0.0	0.0	0.0	0.0	0.0

Table 234 Existing Condtions-Alternative 1 (Existing)

White Sturgeon in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 1 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	April through June	Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years							0.0	0.0	0.0			

Table 235 Existing Condtions-Alternative 1 (Existing)

Splittail in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 1 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Spawning and Embryo Incubation	February through May	Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years					61.0	73.2	0.0	0.0				
Juvenile Rearing and Emigration	April through July	Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years							0.0	0.0	0.0	0.0		

Table 236 Existing Condtions-Alternative 1 (Existing)

American Shad in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 1 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Egg and Larvae	April through June	Mean Monthly X_2 (RKm)	Changes in X_2	1 RKm		All Years							0.0	0.0	0.0			

Table 237 Existing Condtions-Alternative 1 (Existing)

Striped Bass in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 1 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Egg and Larvae	April through June	Mean Monthly X_2 (RKm)	Changes in X_2	1 RKm		All Years							0.0	0.0	0.0			

Alternative 1 (Existing) vs Existing Condtions

Sacramento River at Freeport, Monthly Temperature

Exceedance of Water Temperature Index Values and Probability of Occurring within the Water Temperature Index Ranges

Existing Condtions

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	97.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	97.8	96.4	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	93.9	91.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	79.9	73.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	22.0	5.5	95.3	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	3.0	1.2	80.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	98.0	2.0	1.2	47.6	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	82.9	1.2	1.2	13.4	92.1	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	64.6	1.2	1.2	6.7	75.3	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	39.0	1.2	1.2	2.3	64.6	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	22.8	1.2	1.2	1.2	45.1	98.3	98.8	98.8	98.8	98.8	98.8
56	98.8	11.0	1.2	1.2	1.2	24.4	96.5	98.8	98.8	98.8	98.8	98.8
57	98.8	3.3	1.2	1.2	1.2	14.1	94.2	98.8	98.8	98.8	98.8	98.8
58	98.8	1.2	1.2	1.2	1.2	8.0	86.6	98.8	98.8	98.8	98.8	98.8
59	98.8	1.2	1.2	1.2	1.2	4.5	78.0	98.8	98.8	98.8	98.8	98.8
60	95.1	1.2	1.2	1.2	1.2	3.2	71.2	98.8	98.8	98.8	98.8	98.8
61	74.4	1.2	1.2	1.2	1.2	2.2	57.3	98.8	98.8	98.8	98.8	98.8
62	54.9	1.2	1.2	1.2	1.2	1.4	47.6	98.8	98.8	98.8	98.8	98.8
63	42.7	1.2	1.2	1.2	1.2	1.2	31.7	97.7	98.8	98.8	98.8	98.8
64	20.7	1.2	1.2	1.2	1.2	1.2	20.7	95.1	98.8	98.8	98.8	98.8
65	14.0	1.2	1.2	1.2	1.2	1.2	12.8	92.7	98.8	98.8	98.8	97.6
66	5.5	1.2	1.2	1.2	1.2	1.2	6.7	84.1	98.8	98.8	98.8	94.7
68	1.7	1.2	1.2	1.2	1.2	1.2	1.2	57.3	98.8	98.8	98.8	81.3
69	1.2	1.2	1.2	1.2	1.2	1.2	1.2	30.5	96.9	98.8	98.8	68.3
70	1.2	1.2	1.2	1.2	1.2	1.2	1.2	15.9	89.8	98.8	98.8	47.6
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	11.4	84.1	98.8	97.9	26.8
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	7.0	64.6	97.6	91.5	18.3
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.0	20.7	61.0	57.7	4.3
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	2.4	9.8	34.1	39.0	1.4
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	10.4	7.3	1.2
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	78.7	72.0	97.6	97.6	97.6	96.4	89.0	64.7	59.8	97.4
50-64	78.1	96.8	0.8	0.0	46.4	97.6	78.1	3.7	0.0	0.0	0.0	0.0
55-56	0.0	11.8	0.0	0.0	0.0	20.7	1.8	0.0	0.0	0.0	0.0	0.0
59-64	78.1	0.0	0.0	0.0	0.0	3.3	57.3	3.7	0.0	0.0	0.0	0.0
59-68	97.1	0.0	0.0	0.0	0.0	3.3	76.8	41.5	0.0	0.0	0.0	17.5
59-75	97.6	0.0	0.0	0.0	0.0	3.3	76.8	96.4	89.0	64.7	59.8	97.4
60-70	93.9	0.0	0.0	0.0	0.0	2.0	70.0	82.9	9.0	0.0	0.0	51.2
61-71	73.2	0.0	0.0	0.0	0.0	1.0	56.1	87.4	14.7	0.0	0.9	72.0
63-69	41.5	0.0	0.0	0.0	0.0	0.0	30.5	67.2	1.9	0.0	0.0	30.5
63-77	41.5	0.0	0.0	0.0	0.0	0.0	30.5	96.5	97.6	88.4	91.5	97.6
65-82	12.8	0.0	0.0	0.0	0.0	0.0	11.6	91.5	97.6	97.6	97.6	96.4
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.7	88.6	97.6	97.6	46.4
42-60	3.7	97.6	96.6	95.2	97.6	95.6	27.6	0.0	0.0	0.0	0.0	0.0
61-77	73.2	0.0	0.0	0.0	0.0	1.0	56.1	97.6	97.6	88.4	91.5	97.6

Alternative 1 (Existing)

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	97.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	97.8	96.4	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	93.9	91.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	79.9	73.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	22.0	5.5	95.4	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	3.0	1.2	80.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	98.0	2.0	1.2	47.6	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	82.9	1.2	1.2	13.4	92.1	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	64.6	1.2	1.2	6.8	75.6	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	39.0	1.2	1.2	2.3	64.6	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	22.8	1.2	1.2	1.2	43.9	98.3	98.8	98.8	98.8	98.8	98.8
56	98.8	11.0	1.2	1.2	1.2	24.4	96.5	98.8	98.8	98.8	98.8	98.8
57	98.8	3.3	1.2	1.2	1.2	14.1	94.2	98.8	98.8	98.8	98.8	98.8
58	98.8	1.2	1.2	1.2	1.2	8.2	86.6	98.8	98.8	98.8	98.8	98.8
59	98.8	1.2	1.2	1.2	1.2	4.5	78.0	98.8	98.8	98.8	98.8	98.8
60	95.1	1.2	1.2	1.2	1.2	3.2	71.2	98.8	98.8	98.8	98.8	98.8
61	74.4	1.2	1.2	1.2	1.2	2.2	57.3	98.8	98.8	98.8	98.8	98.8
62	54.9	1.2	1.2	1.2	1.2	1.4	47.6	98.8	98.8	98.8	98.8	98.8
63	42.7	1.2	1.2	1.2	1.2	1.2	31.7	97.7	98.8	98.8	98.8	98.8
64	20.7	1.2	1.2	1.2	1.2	1.2	20.7	95.1	98.8	98.8	98.8	98.8
65	14.0	1.2	1.2	1.2	1.2	1.2	12.8	92.7	98.8	98.8	98.8	97.6
66	5.5	1.2	1.2	1.2	1.2	1.2	6.7	84.1	98.8	98.8	98.8	94.7
68	1.7	1.2	1.2	1.2	1.2	1.2	1.2	57.3	98.8	98.8	98.8	81.3
69	1.2	1.2	1.2	1.2	1.2	1.2	1.2	30.5	96.9	98.8	98.8	68.3
70	1.2	1.2	1.2	1.2	1.2	1.2	1.2	15.9	89.8	98.8	98.8	47.6
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	11.4	84.1	98.8	97.9	26.8
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	7.0	64.6	97.6	91.5	18.3
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.0	20.7	61.0	57.7	4.3
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	2.4	9.8	34.1	39.0	1.4
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	10.4	7.3	1.2
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	78.7	72.0	97.6	97.6	97.6	96.4	89.0	64.7	59.8	97.4
50-64	78.1	96.8	0.8	0.0	46.4	97.6	78.1	3.7	0.0	0.0	0.0	0.0
55-56	0.0	11.8	0.0	0.0	0.0	19.5	1.8	0.0	0.0	0.0	0.0	0.0
59-64	78.1	0.0	0.0	0.0	0.0	3.3	57.3	3.7	0.0	0.0	0.0	0.0
59-68	97.1	0.0	0.0	0.0	0.0	3.3	76.8	41.5	0.0	0.0	0.0	17.5
59-75	97.6	0.0	0.0	0.0	0.0	3.3	76.8	96.4	89.0	64.7	59.8	97.4
60-70	93.9	0.0	0.0	0.0	0.0	2.0	70.0	82.9	9.0	0.0	0.0	51.2
61-71	73.2	0.0	0.0	0.0	0.0	1.0	56.1	87.4	14.7	0.0	0.9	72.0
63-69	41.5	0.0	0.0	0.0	0.0	0.0	30.5	67.2	1.9	0.0	0.0	30.5
63-77	41.5	0.0	0.0	0.0	0.0	0.0	30.5	96.5	97.6	88.4	91.5	97.6
65-82	12.8	0.0	0.0	0.0	0.0	0.0	11.6	91.5	97.6	97.6	97.6	96.4
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.7	88.6	97.6	97.6	46.4
42-60	3.7	97.6	96.6	95.2	97.6	95.6	27.6	0.0	0.0	0.0	0.0	0.0
61-77	73.2	0.0	0.0	0.0	0.0	1.0	56.1	97.6	97.6	88.4	91.5	97.6

Alternative 1 (Existing) - Existing Condtions

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
43	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
48	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
49	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
52	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
53	0.0	0.0	0.0	0.0	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0
54	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55	0.0	0.0	0.0	0.0	0.0	-1.2	0.0	0.0	0.0	0.0	0.0	0.0
56	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
57	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
58	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
59	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
62	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
66	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
68	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
72	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
74	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
86	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
88	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
98	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45-75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50-64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55-56	0.0	0.0	0.0	0.0	0.0	-1.2	0.0	0.0	0.0	0.0	0.0	0.0
59-64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-68	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60-70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61-71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63-69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
65-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42-60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 239 Existing Condtions-Alternative 1 (Existing)

Alternative 1 (Existing) vs Existing Condtions
Sacramento River at Rio Vista, Monthly Flow

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
-1.0 < X < 1.0	100.0	100.0	97.6	95.1	92.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	0.0	0.0	1.2	1.2	4.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	0.0	1.2	1.2	4.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Low Flows (Upper 40% of Distribution)												
-1.0 < X < 1.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 240 Existing Condtions-Alternative 1 (Existing)

Alternative 1 (Existing) vs Existing Condtions
Yolo Bypass, Monthly Flow

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
-1.0 < X < 1.0	100.0	30.5	29.3	17.1	23.2	15.9	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	67.1	65.9	72.0	61.0	73.2	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	0.0	69.5	70.7	82.9	75.6	84.1	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	69.5	70.7	82.9	75.6	84.1	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	67.1	65.9	72.0	61.0	73.2	0.0	0.0	0.0	0.0	0.0	0.0
Low Flows (Upper 40% of Distribution)												
-1.0 < X < 1.0	100.0	75.8	63.6	24.2	30.3	15.2	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	24.2	36.4	75.8	69.7	84.8	0.0	0.0	0.0	0.0	0.0	0.0
X>1 (Total %)	0.0	24.2	36.4	75.8	69.7	84.8	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	24.2	36.4	75.8	69.7	84.8	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	24.2	36.4	75.8	69.7	84.8	0.0	0.0	0.0	0.0	0.0	0.0

Table 241 Existing Condtions-Alternative 1 (Existing)

Alternative 1 (Existing) vs Existing Condtions
Delta Outflow, Monthly Flow

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
-1.0 < X < 1.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Low Flows (Upper 40% of Distribution)												
-1.0 < X < 1.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Long-Term and Water Year-Type Average of Sacramento River Delta Inflow Under Existing - Base and Existing - Alternative 1

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Existing - Base	11,300	15,746	24,309	34,221	41,784	35,394	22,062	13,364	12,597	19,584	13,697	16,482	15,659
Existing - Alternative 1	11,300	15,619	23,806	33,300	40,743	34,914	22,062	13,364	12,597	19,584	13,697	16,482	15,476
Difference	0	-128	-503	-921	-1,041	-480	0	0	0	0	0	0	-183
Percent Difference	0%	-1%	-2%	-3%	-2%	-1%	0%	0%	0%	0%	0%	0%	-1%
							Water Year-Types						
Wet													
Existing - Base	13,018	22,069	42,432	56,542	64,112	52,430	36,791	18,384	13,640	21,152	15,520	26,010	22,938
Existing - Alternative 1	13,018	21,715	41,187	55,063	62,917	51,855	36,791	18,384	13,639	21,152	15,520	26,010	22,647
Difference	0	-353	-1,245	-1,479	-1,196	-575	0	0	0	0	0	0	-291
Percent Difference	0%	-2%	-3%	-3%	-2%	-1%	0%	0%	0%	0%	0%	0%	-1%
Above Normal													
Existing - Base	11,695	14,566	23,212	43,774	51,354	46,254	22,271	14,655	13,070	22,489	16,033	18,988	17,937
Existing - Alternative 1	11,695	14,526	22,766	42,172	49,573	45,519	22,271	14,655	13,069	22,489	16,033	18,988	17,664
Difference	0	-40	-446	-1,602	-1,781	-735	0	0	-1	0	0	0	-273
Percent Difference	0%	0%	-2%	-4%	-3%	-2%	0%	0%	0%	0%	0%	0%	-2%
Below Normal													
Existing - Base	10,841	14,747	16,484	23,799	32,584	29,126	18,090	11,885	12,782	22,589	15,187	12,013	13,248
Existing - Alternative 1	10,841	14,698	16,298	23,109	31,651	28,574	18,090	11,885	12,782	22,590	15,187	12,013	13,106
Difference	0	-49	-186	-690	-933	-552	0	0	0	0	0	0	-143
Percent Difference	0%	0%	-1%	-3%	-3%	-2%	0%	0%	0%	0%	0%	0%	-1%
Dry													
Existing - Base	10,423	12,567	14,687	17,727	27,798	23,027	11,912	10,212	12,472	17,228	11,469	10,994	10,852
Existing - Alternative 1	10,423	12,547	14,606	17,403	26,909	22,651	11,912	10,212	12,472	17,228	11,469	10,994	10,753
Difference	0	-19	-81	-324	-889	-377	0	-1	0	0	0	0	-99
Percent Difference	0%	0%	-1%	-2%	-3%	-2%	0%	0%	0%	0%	0%	0%	-1%
Critical													
Existing - Base	9,149	9,410	11,565	14,920	17,376	14,410	10,330	7,910	9,857	12,298	8,422	7,772	8,039
Existing - Alternative 1	9,148	9,410	11,537	14,722	17,043	14,349	10,330	7,910	9,857	12,298	8,422	7,772	8,002
Difference	0	0	-28	-199	-333	-62	0	0	0	0	0	0	-37
Percent Difference	0%	0%	0%	-1%	-2%	0%	0%	0%	0%	0%	0%	0%	0%

Sacramento River Delta Inflow

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	14,603	22,010	56,115	71,084	75,521	65,784	49,402	23,850	14,772	24,306	16,775	28,029
20%	13,619	18,623	35,016	61,750	67,715	57,900	35,366	14,647	13,790	23,675	16,437	24,442
30%	12,912	17,392	24,392	45,490	58,539	48,511	24,073	12,554	13,215	23,166	15,988	22,307
40%	12,254	15,897	19,607	34,106	50,381	38,401	16,613	11,092	12,891	22,072	15,543	18,189
50%	11,265	14,221	17,083	26,083	35,167	28,964	13,801	10,661	12,353	20,699	15,010	13,962
60%	10,411	12,217	14,976	20,006	27,645	22,764	12,349	10,122	11,925	19,938	14,452	12,771
70%	8,888	10,901	14,365	15,735	23,924	20,351	11,386	9,739	11,469	18,857	12,942	10,172
80%	7,935	8,613	10,704	13,922	18,176	16,100	10,880	9,315	11,081	14,287	9,192	9,276
90%	6,415	7,211	9,575	11,915	16,074	12,014	9,372	8,228	10,168	12,060	8,272	8,038
Long Term												
Full Simulation Period	11,300	15,746	24,309	34,221	41,784	35,394	22,062	13,364	12,597	19,584	13,697	16,482
Water Year Types												
Wet	13,018	22,069	42,432	56,542	64,112	52,430	36,791	18,384	13,640	21,152	15,520	26,010
Above Normal	11,695	14,566	23,212	43,774	51,354	46,254	22,271	14,655	13,070	22,489	16,033	18,988
Below Normal	10,841	14,747	16,484	23,799	32,584	29,126	18,090	11,885	12,782	22,589	15,187	12,013
Dry	10,423	12,567	14,687	17,727	27,798	23,027	11,912	10,212	12,472	17,228	11,469	10,994
Critical	9,149	9,410	11,565	14,920	17,376	14,410	10,330	7,910	9,857	12,298	8,422	7,772

Existing - Alternative 1

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	14,603	21,765	53,886	69,129	75,429	65,386	49,402	23,850	14,772	24,306	16,775	28,030
20%	13,619	18,581	33,416	58,642	66,079	56,971	35,366	14,647	13,791	23,675	16,437	24,445
30%	12,912	17,383	23,861	43,874	56,915	47,786	24,073	12,554	13,215	23,166	15,989	22,307
40%	12,254	15,874	19,411	32,095	48,037	36,502	16,613	11,092	12,892	22,072	15,543	18,189
50%	11,265	14,206	16,831	25,424	32,956	28,595	13,801	10,661	12,352	20,699	15,010	13,962
60%	10,411	12,216	14,934	19,754	26,826	22,567	12,349	10,119	11,925	19,939	14,452	12,771
70%	8,887	10,901	14,331	15,643	23,336	20,271	11,386	9,739	11,469	18,857	12,942	10,172
80%	7,935	8,613	10,686	13,903	18,047	16,011	10,880	9,315	11,081	14,287	9,192	9,276
90%	6,415	7,211	9,575	11,907	15,981	12,006	9,372	8,228	10,168	12,057	8,273	8,038
Long Term												
Full Simulation Period	11,300	15,619	23,806	33,300	40,743	34,914	22,062	13,364	12,597	19,584	13,697	16,482
Water Year Types												
Wet	13,018	21,715	41,187	55,063	62,917	51,855	36,791	18,384	13,639	21,152	15,520	26,010
Above Normal	11,695	14,526	22,766	42,172	49,573	45,519	22,271	14,655	13,069	22,489	16,033	18,988
Below Normal	10,841	14,698	16,298	23,109	31,651	28,574	18,090	11,885	12,782	22,590	15,187	12,013
Dry	10,423	12,547	14,606	17,403	26,909	22,651	11,912	10,212	12,472	17,228	11,469	10,994
Critical	9,148	9,410	11,537	14,722	17,043	14,349	10,330	7,910	9,857	12,298	8,422	7,772

Existing - Alternative 1 Minus Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	-245	-2,228	-1,956	-92	-398	0	0	0	0	0	0
20%	0	-42	-1,600	-3,107	-1,636	-929	0	0	1	0	0	3
30%	0	-9	-531	-1,617	-1,624	-725	0	0	0	0	1	0
40%	0	-23	-196	-2,012	-2,344	-1,899	0	0	1	1	0	0
50%	0	-15	-252	-659	-2,211	-370	0	0	-1	0	0	0
60%	0	-1	-42	-252	-820	-197	0	-3	0	1	0	0
70%	-1	0	-34	-92	-589	-80	0	0	0	0	0	0
80%	0	0	-18	-19	-129	-89	0	0	0	0	0	0
90%	0	0	0	-7	-92	-8	0	0	0	-3	0	0
Long Term												
Full Simulation Period	0	-128	-503	-921	-1,041	-480	0	0	0	0	0	0
Water Year Types												
Wet	0	-353	-1,245	-1,479	-1,196	-575	0	0	0	0	0	0
Above Normal	0	-40	-446	-1,602	-1,781	-735	0	0	-1	0	0	0
Below Normal	0	-49	-186	-690	-933	-552	0	0	0	0	0	0
Dry	0	-19	-81	-324	-889	-377	0	-1	0	0	0	0
Critical	0	0	-28	-199	-333	-62	0	0	0	0	0	0

Long-Term and Water Year-Type Average of Total CVP Deliveries North of the Delta Under Existing - Base and Existing - Alternative 1

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Existing - Base	1,506	726	389	234	244	337	5,113	5,599	7,987	7,932	5,983	2,046	2,310
Existing - Alternative 1	1,506	726	389	234	244	337	5,113	5,599	7,987	7,932	5,983	2,046	2,310
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
							Water Year-Types						
Wet													
Existing - Base	1,429	662	371	227	244	288	4,682	5,765	8,463	8,473	6,484	2,288	2,388
Existing - Alternative 1	1,429	662	371	227	244	288	4,682	5,765	8,463	8,473	6,484	2,288	2,388
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal													
Existing - Base	1,514	755	372	241	246	248	5,081	5,804	8,436	8,340	6,266	2,355	2,404
Existing - Alternative 1	1,514	755	372	241	246	248	5,081	5,804	8,436	8,340	6,266	2,355	2,404
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal													
Existing - Base	1,527	728	407	242	236	344	5,193	5,744	7,967	7,969	6,039	1,879	2,321
Existing - Alternative 1	1,527	728	407	242	236	344	5,193	5,744	7,967	7,969	6,039	1,879	2,321
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry													
Existing - Base	1,639	783	406	238	254	339	5,398	5,578	7,778	7,583	5,755	1,910	2,283
Existing - Alternative 1	1,639	783	406	238	254	339	5,398	5,578	7,778	7,583	5,755	1,910	2,283
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical													
Existing - Base	1,452	754	396	225	239	517	5,551	4,869	6,853	6,811	4,881	1,649	2,072
Existing - Alternative 1	1,452	754	396	225	239	517	5,551	4,869	6,853	6,811	4,881	1,649	2,072
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Total CVP Deliveries North of the Delta

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	1,875	950	506	303	270	646	6,661	6,327	8,826	8,986	6,821	2,514
20%	1,791	902	457	252	262	436	6,057	6,182	8,524	8,506	6,466	2,380
30%	1,670	825	415	242	253	362	5,755	6,062	8,346	8,239	6,271	2,266
40%	1,605	764	399	236	243	254	5,461	5,909	8,191	8,069	6,139	2,204
50%	1,488	711	379	219	239	243	5,255	5,729	8,016	7,974	6,015	2,112
60%	1,404	638	353	215	238	225	4,910	5,521	7,869	7,870	5,949	1,996
70%	1,351	624	339	213	233	214	4,748	5,297	7,762	7,634	5,741	1,840
80%	1,239	572	311	209	223	212	4,333	5,078	7,482	7,356	5,573	1,735
90%	1,142	543	299	200	206	205	3,074	4,689	7,086	7,108	5,323	1,572
Long Term												
Full Simulation Period	1,506	726	389	234	244	337	5,113	5,599	7,987	7,932	5,983	2,046
Water Year Types												
Wet	1,429	662	371	227	244	288	4,682	5,765	8,463	8,473	6,484	2,288
Above Normal	1,514	755	372	241	246	248	5,081	5,804	8,436	8,340	6,266	2,355
Below Normal	1,527	728	407	242	236	344	5,193	5,744	7,967	7,969	6,039	1,879
Dry	1,639	783	406	238	254	339	5,398	5,578	7,778	7,583	5,755	1,910
Critical	1,452	754	396	225	239	517	5,551	4,869	6,853	6,811	4,881	1,649

Existing - Alternative 1

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	1,875	950	506	303	270	646	6,661	6,327	8,826	8,986	6,821	2,514
20%	1,791	902	457	252	262	436	6,057	6,182	8,524	8,506	6,466	2,380
30%	1,670	825	415	242	253	362	5,755	6,062	8,346	8,239	6,271	2,266
40%	1,605	764	399	236	243	254	5,461	5,909	8,191	8,069	6,139	2,204
50%	1,488	711	379	219	239	243	5,255	5,729	8,016	7,974	6,015	2,112
60%	1,404	638	353	215	238	225	4,910	5,521	7,869	7,870	5,949	1,996
70%	1,351	624	339	213	233	214	4,748	5,297	7,762	7,633	5,741	1,840
80%	1,239	572	311	209	223	212	4,333	5,078	7,482	7,356	5,573	1,735
90%	1,142	543	299	200	206	205	3,074	4,689	7,086	7,108	5,323	1,572
Long Term												
Full Simulation Period	1,506	726	389	234	244	337	5,113	5,599	7,987	7,932	5,983	2,046
Water Year Types												
Wet	1,429	662	371	227	244	288	4,682	5,765	8,463	8,473	6,484	2,288
Above Normal	1,514	755	372	241	246	248	5,081	5,804	8,436	8,340	6,266	2,355
Below Normal	1,527	728	407	242	236	344	5,193	5,744	7,967	7,969	6,039	1,879
Dry	1,639	783	406	238	254	339	5,398	5,578	7,778	7,583	5,755	1,910
Critical	1,452	754	396	225	239	517	5,551	4,869	6,853	6,811	4,881	1,649

Existing - Alternative 1 Minus Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types												
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

Long-Term and Water Year-Type Average of Total CVP Deliveries South of the Delta Under Existing - Base and Existing - Alternative 1

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Existing - Base	2,670	1,585	1,151	1,274	1,718	2,083	2,592	3,755	5,447	5,876	5,010	3,413	2,214
Existing - Alternative 1	2,670	1,585	1,151	1,274	1,718	2,083	2,592	3,755	5,447	5,876	5,010	3,413	2,214
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
							Water Year-Types						
Wet													
Existing - Base	2,755	1,649	1,228	1,396	1,873	2,512	3,205	4,634	6,886	7,631	6,265	3,879	2,659
Existing - Alternative 1	2,755	1,649	1,228	1,396	1,873	2,512	3,205	4,634	6,886	7,631	6,265	3,879	2,659
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal													
Existing - Base	2,740	1,643	1,230	1,404	1,877	2,297	2,904	4,175	6,129	6,509	5,394	3,647	2,418
Existing - Alternative 1	2,740	1,643	1,230	1,404	1,877	2,297	2,904	4,175	6,129	6,509	5,394	3,647	2,418
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal													
Existing - Base	2,645	1,562	1,118	1,218	1,646	1,988	2,471	3,625	5,220	5,601	4,904	3,373	2,141
Existing - Alternative 1	2,645	1,562	1,118	1,218	1,646	1,988	2,471	3,625	5,220	5,601	4,904	3,373	2,141
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry													
Existing - Base	2,688	1,598	1,166	1,297	1,747	1,770	2,122	3,136	4,412	4,658	4,213	3,129	1,932
Existing - Alternative 1	2,688	1,598	1,166	1,297	1,747	1,770	2,122	3,136	4,412	4,658	4,213	3,129	1,932
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical													
Existing - Base	2,437	1,409	938	935	1,297	1,529	1,799	2,517	3,470	3,601	3,225	2,643	1,561
Existing - Alternative 1	2,437	1,409	938	935	1,297	1,529	1,799	2,517	3,470	3,601	3,225	2,643	1,561
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Total CVP Deliveries South of the Delta

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	3,146	1,963	1,635	2,053	2,691	2,610	3,618	5,163	7,758	8,677	7,137	4,150
20%	2,897	1,760	1,366	1,613	2,139	2,431	3,098	4,370	6,449	7,106	5,875	3,750
30%	2,806	1,682	1,266	1,459	1,962	2,286	2,896	4,123	6,046	6,611	5,562	3,619
40%	2,755	1,638	1,209	1,371	1,849	2,177	2,733	3,975	5,804	6,294	5,232	3,541
50%	2,710	1,604	1,162	1,288	1,756	2,076	2,580	3,826	5,555	6,004	5,081	3,470
60%	2,636	1,548	1,084	1,151	1,582	2,023	2,419	3,579	5,143	5,444	4,674	3,353
70%	2,541	1,475	989	1,037	1,429	1,845	2,206	3,268	4,641	4,993	4,281	3,203
80%	2,408	1,363	849	764	1,068	1,596	1,942	2,893	4,010	4,174	3,822	2,995
90%	2,252	1,229	699	587	870	1,506	1,727	2,417	3,277	3,388	3,199	2,749
Long Term												
Full Simulation Period	2,670	1,585	1,151	1,274	1,718	2,083	2,592	3,755	5,447	5,876	5,010	3,413
Water Year Types												
Wet	2,755	1,649	1,228	1,396	1,873	2,512	3,205	4,634	6,886	7,631	6,265	3,879
Above Normal	2,740	1,643	1,230	1,404	1,877	2,297	2,904	4,175	6,129	6,509	5,394	3,647
Below Normal	2,645	1,562	1,118	1,218	1,646	1,988	2,471	3,625	5,220	5,601	4,904	3,373
Dry	2,688	1,598	1,166	1,297	1,747	1,770	2,122	3,136	4,412	4,658	4,213	3,129
Critical	2,437	1,409	938	935	1,297	1,529	1,799	2,517	3,470	3,601	3,225	2,643

Existing - Alternative 1

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	3,146	1,963	1,635	2,053	2,691	2,610	3,618	5,163	7,758	8,677	7,137	4,150
20%	2,897	1,760	1,366	1,613	2,139	2,431	3,098	4,370	6,449	7,106	5,875	3,750
30%	2,806	1,682	1,266	1,459	1,962	2,286	2,896	4,123	6,046	6,611	5,562	3,619
40%	2,755	1,638	1,209	1,371	1,849	2,177	2,733	3,975	5,804	6,294	5,232	3,541
50%	2,710	1,604	1,162	1,288	1,756	2,076	2,580	3,826	5,555	6,004	5,080	3,470
60%	2,636	1,548	1,084	1,151	1,582	2,023	2,419	3,579	5,143	5,444	4,674	3,353
70%	2,541	1,475	989	1,037	1,429	1,845	2,206	3,268	4,641	4,993	4,281	3,203
80%	2,408	1,363	849	764	1,068	1,596	1,942	2,893	4,010	4,174	3,822	2,995
90%	2,252	1,229	699	587	870	1,506	1,727	2,417	3,277	3,388	3,199	2,749
Long Term												
Full Simulation Period	2,670	1,585	1,151	1,274	1,718	2,083	2,592	3,755	5,447	5,876	5,010	3,413
Water Year Types												
Wet	2,755	1,649	1,228	1,396	1,873	2,512	3,205	4,634	6,886	7,631	6,265	3,879
Above Normal	2,740	1,643	1,230	1,404	1,877	2,297	2,904	4,175	6,129	6,509	5,394	3,647
Below Normal	2,645	1,562	1,118	1,218	1,646	1,988	2,471	3,625	5,220	5,601	4,904	3,373
Dry	2,688	1,598	1,166	1,297	1,747	1,770	2,122	3,136	4,412	4,658	4,213	3,129
Critical	2,437	1,409	938	935	1,297	1,529	1,799	2,517	3,470	3,601	3,225	2,643

Existing - Alternative 1 Minus Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	-1	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types												
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

Long-Term and Water Year-Type Average of Total SWP Deliveries North of the Delta Under Existing - Base and Existing - Alternative 1

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Existing - Base	1,449	1,463	935	345	14	92	2,122	2,685	3,217	3,169	2,515	1,874	1,205
Existing - Alternative 1	1,449	1,463	935	345	14	92	2,122	2,685	3,217	3,169	2,515	1,874	1,205
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
							Water Year-Types						
Wet													
Existing - Base	1,349	1,476	900	256	19	65	1,890	2,778	3,378	3,342	2,671	2,067	1,224
Existing - Alternative 1	1,349	1,476	900	256	19	65	1,890	2,778	3,378	3,342	2,671	2,067	1,224
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal													
Existing - Base	1,568	1,578	982	389	16	50	2,034	2,789	3,376	3,298	2,613	2,185	1,266
Existing - Alternative 1	1,568	1,578	982	389	16	50	2,034	2,789	3,376	3,298	2,613	2,185	1,266
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal													
Existing - Base	1,465	1,428	971	390	12	73	2,227	2,850	3,348	3,292	2,628	1,805	1,242
Existing - Alternative 1	1,465	1,428	971	390	12	73	2,227	2,850	3,348	3,292	2,628	1,805	1,242
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry													
Existing - Base	1,586	1,495	979	379	12	111	2,179	2,641	3,158	3,039	2,427	1,938	1,209
Existing - Alternative 1	1,586	1,495	979	379	12	111	2,179	2,641	3,158	3,039	2,427	1,938	1,209
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical													
Existing - Base	1,330	1,326	851	373	11	191	2,466	2,211	2,613	2,676	2,046	1,175	1,047
Existing - Alternative 1	1,330	1,326	851	373	11	191	2,466	2,211	2,613	2,676	2,046	1,175	1,047
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Total SWP Deliveries North of the Delta

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	2,189	2,095	1,377	634	20	199	3,028	3,131	3,658	3,564	2,851	2,296
20%	2,083	1,972	1,311	545	20	129	2,766	3,040	3,510	3,485	2,800	2,233
30%	1,852	1,922	1,250	477	20	46	2,505	2,979	3,442	3,371	2,692	2,181
40%	1,621	1,877	1,169	452	19	45	2,333	2,935	3,374	3,328	2,615	2,122
50%	1,432	1,754	1,079	398	15	45	2,110	2,816	3,323	3,263	2,577	2,061
60%	1,330	1,572	966	310	12	45	1,988	2,686	3,260	3,194	2,542	2,027
70%	1,282	1,409	822	167	11	40	1,822	2,594	3,160	3,138	2,504	1,909
80%	987	797	532	66	4	34	1,421	2,385	3,102	3,076	2,454	1,555
90%	442	188	85	4	3	26	1,141	1,928	2,974	2,941	2,194	1,007
Long Term												
Full Simulation Period	1,449	1,463	935	345	14	92	2,122	2,685	3,217	3,169	2,515	1,874
Water Year Types												
Wet	1,349	1,476	900	256	19	65	1,890	2,778	3,378	3,342	2,671	2,067
Above Normal	1,568	1,578	982	389	16	50	2,034	2,789	3,376	3,298	2,613	2,185
Below Normal	1,465	1,428	971	390	12	73	2,227	2,850	3,348	3,292	2,628	1,805
Dry	1,586	1,495	979	379	12	111	2,179	2,641	3,158	3,039	2,427	1,938
Critical	1,330	1,326	851	373	11	191	2,466	2,211	2,613	2,676	2,046	1,175

Existing - Alternative 1

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	2,189	2,095	1,377	634	20	199	3,028	3,131	3,658	3,564	2,851	2,296
20%	2,083	1,972	1,311	545	20	129	2,766	3,040	3,510	3,485	2,800	2,233
30%	1,852	1,922	1,250	477	20	46	2,505	2,979	3,442	3,371	2,692	2,181
40%	1,621	1,877	1,169	452	19	45	2,333	2,935	3,374	3,328	2,615	2,122
50%	1,432	1,754	1,079	398	15	45	2,110	2,816	3,323	3,263	2,577	2,061
60%	1,330	1,572	966	310	12	45	1,988	2,686	3,260	3,194	2,542	2,027
70%	1,282	1,409	822	167	11	40	1,822	2,594	3,160	3,138	2,504	1,909
80%	987	797	532	66	4	34	1,421	2,385	3,102	3,076	2,454	1,555
90%	442	188	85	4	3	26	1,141	1,928	2,974	2,941	2,194	1,007
Long Term												
Full Simulation Period	1,449	1,463	935	345	14	92	2,122	2,685	3,217	3,169	2,515	1,874
Water Year Types												
Wet	1,349	1,476	900	256	19	65	1,890	2,778	3,378	3,342	2,671	2,067
Above Normal	1,568	1,578	982	389	16	50	2,034	2,789	3,376	3,298	2,613	2,185
Below Normal	1,465	1,428	971	390	12	73	2,227	2,850	3,348	3,292	2,628	1,805
Dry	1,586	1,495	979	379	12	111	2,179	2,641	3,158	3,039	2,427	1,938
Critical	1,330	1,326	851	373	11	191	2,466	2,211	2,613	2,676	2,046	1,175

Existing - Alternative 1 Minus Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types												
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

Long-Term and Water Year-Type Average of Total SWP Deliveries South of the Delta Under Existing - Base and Existing - Alternative 1

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Existing - Base	4,044	3,416	3,459	465	782	1,284	2,414	3,688	5,146	5,640	5,790	4,893	2,486
Existing - Alternative 1	4,044	3,416	3,459	465	782	1,284	2,414	3,688	5,146	5,640	5,790	4,893	2,486
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
							Water Year-Types						
Wet													
Existing - Base	4,429	3,815	3,773	1,079	1,629	2,451	3,750	5,270	6,698	6,801	7,098	5,951	3,194
Existing - Alternative 1	4,429	3,815	3,773	1,079	1,629	2,451	3,750	5,270	6,698	6,801	7,098	5,951	3,194
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal													
Existing - Base	4,055	3,517	3,542	399	1,077	1,692	3,180	4,482	5,926	6,196	6,553	5,555	2,797
Existing - Alternative 1	4,055	3,517	3,542	399	1,077	1,692	3,180	4,482	5,926	6,196	6,553	5,555	2,797
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal													
Existing - Base	4,050	3,353	3,444	191	336	863	2,305	3,477	5,138	5,942	6,158	5,272	2,458
Existing - Alternative 1	4,050	3,353	3,444	191	336	863	2,305	3,477	5,138	5,943	6,158	5,272	2,458
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry													
Existing - Base	3,928	3,199	3,448	125	192	390	1,342	2,452	4,065	4,948	4,911	4,214	2,016
Existing - Alternative 1	3,928	3,199	3,448	125	192	390	1,342	2,452	4,065	4,948	4,911	4,214	2,016
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical													
Existing - Base	3,377	2,862	2,758	95	143	230	451	1,543	2,584	3,159	2,952	2,396	1,369
Existing - Alternative 1	3,377	2,862	2,758	95	143	230	451	1,543	2,584	3,159	2,952	2,396	1,369
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Total SWP Deliveries South of the Delta

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	6,129	4,776	5,541	1,795	2,061	2,896	4,442	6,100	7,671	7,647	7,791	6,656
20%	5,093	4,372	4,331	592	1,846	2,603	3,679	5,031	6,322	6,528	6,826	5,798
30%	4,839	4,258	4,035	298	1,268	2,451	3,368	4,703	5,924	6,380	6,690	5,674
40%	4,678	4,177	3,884	213	393	1,168	3,151	4,543	5,802	6,169	6,549	5,542
50%	4,500	3,770	3,634	162	279	571	2,400	3,888	5,493	6,078	6,448	5,390
60%	4,261	3,432	3,355	142	255	456	1,993	3,117	5,202	5,922	6,287	5,176
70%	3,403	2,780	2,818	114	214	382	1,694	2,408	4,265	5,525	5,649	4,826
80%	2,205	1,907	2,101	92	174	273	473	2,020	3,349	4,041	3,743	3,165
90%	1,545	1,239	1,379	80	110	207	380	1,631	2,705	3,286	3,008	2,186
Long Term												
Full Simulation Period	4,044	3,416	3,459	465	782	1,284	2,414	3,688	5,146	5,640	5,790	4,893
Water Year Types												
Wet	4,429	3,815	3,773	1,079	1,629	2,451	3,750	5,270	6,698	6,801	7,098	5,951
Above Normal	4,055	3,517	3,542	399	1,077	1,692	3,180	4,482	5,926	6,196	6,553	5,555
Below Normal	4,050	3,353	3,444	191	336	863	2,305	3,477	5,138	5,942	6,158	5,272
Dry	3,928	3,199	3,448	125	192	390	1,342	2,452	4,065	4,948	4,911	4,214
Critical	3,377	2,862	2,758	95	143	230	451	1,543	2,584	3,159	2,952	2,396

Existing - Alternative 1

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	6,129	4,776	5,541	1,795	2,061	2,896	4,442	6,100	7,671	7,647	7,791	6,656
20%	5,093	4,372	4,331	593	1,846	2,603	3,679	5,031	6,322	6,528	6,826	5,798
30%	4,839	4,258	4,034	298	1,268	2,451	3,368	4,703	5,924	6,380	6,690	5,674
40%	4,678	4,177	3,884	213	393	1,168	3,151	4,543	5,802	6,169	6,549	5,542
50%	4,500	3,770	3,634	162	279	571	2,400	3,888	5,493	6,078	6,449	5,390
60%	4,261	3,432	3,355	142	255	456	1,993	3,117	5,202	5,922	6,287	5,176
70%	3,403	2,780	2,818	114	214	382	1,694	2,408	4,265	5,525	5,649	4,826
80%	2,204	1,907	2,101	92	174	273	473	2,020	3,349	4,041	3,743	3,165
90%	1,545	1,239	1,379	80	110	207	380	1,631	2,705	3,286	3,008	2,186
Long Term												
Full Simulation Period	4,044	3,416	3,459	465	782	1,284	2,414	3,688	5,146	5,640	5,790	4,893
Water Year Types												
Wet	4,429	3,815	3,773	1,079	1,629	2,451	3,750	5,270	6,698	6,801	7,098	5,951
Above Normal	4,055	3,517	3,542	399	1,077	1,692	3,180	4,482	5,926	6,196	6,553	5,555
Below Normal	4,050	3,353	3,444	191	336	863	2,305	3,477	5,138	5,943	6,158	5,272
Dry	3,928	3,199	3,448	125	192	390	1,342	2,452	4,065	4,948	4,911	4,214
Critical	3,377	2,862	2,758	95	143	230	451	1,543	2,584	3,159	2,952	2,396

Existing - Alternative 1 Minus Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	-1	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types												
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

Long-Term and Water Year-Type Average of Fremont Weir Spill to Yolo Bypass Under Existing - Base and Existing - Alternative 1

	Average Flow (cfs)												
Analysis Period	October	November	December	January	February	March	April	May	June	July	August	September	Total (TAF)
							Long-Term						
Full Simulation Period													
Existing - Base	114	257	2,635	8,485	13,204	6,934	1,024	20	0	0	0	0	1,933
Existing - Alternative 1	114	391	3,150	9,421	14,271	7,423	1,024	20	0	0	0	0	2,120
Difference	0	133	516	936	1,067	489	0	0	0	0	0	0	187
Percent Difference	0%	52%	20%	11%	8%	7%	0%	0%	0%	0%	0%	0%	10%
							Water Year-Types						
Wet													
Existing - Base	374	844	7,678	25,448	36,369	18,505	3,244	64	0	0	0	0	5,472
Existing - Alternative 1	374	1,216	8,962	26,962	37,595	19,098	3,244	64	0	0	0	0	5,772
Difference	0	372	1,284	1,515	1,226	592	0	0	0	0	0	0	299
Percent Difference	0%	44%	17%	6%	3%	3%	0%	0%	0%	0%	0%	0%	5%
Above Normal													
Existing - Base	0	0	2,008	4,550	10,271	7,823	33	0	0	0	0	0	1,470
Existing - Alternative 1	0	40	2,456	6,179	12,099	8,572	33	0	0	0	0	0	1,749
Difference	0	40	448	1,629	1,829	749	0	0	0	0	0	0	279
Percent Difference	0%	0%	22%	36%	18%	10%	0%	0%	0%	0%	0%	0%	19%
Below Normal													
Existing - Base	0	0	0	291	2,453	501	143	0	0	0	0	0	196
Existing - Alternative 1	0	49	186	983	3,420	1,060	143	0	0	0	0	0	341
Difference	0	49	186	693	967	559	0	0	0	0	0	0	145
Percent Difference	0%	0%	0%	238%	39%	112%	0%	0%	0%	0%	0%	0%	74%
Dry													
Existing - Base	0	0	0	0	537	224	0	0	0	0	0	0	44
Existing - Alternative 1	0	19	81	324	1,441	603	0	0	0	0	0	0	144
Difference	0	19	81	324	904	379	0	0	0	0	0	0	100
Percent Difference	0%	0%	0%	128364%	168%	169%	0%	0%	0%	0%	0%	0%	229%
Critical													
Existing - Base	0	0	0	0	1	0	0	0	0	0	0	0	0
Existing - Alternative 1	0	0	28	199	333	62	0	0	0	0	0	0	37
Difference	0	0	28	199	333	62	0	0	0	0	0	0	37
Percent Difference	0%	0%	0%	0%	42911%	0%	0%	0%	0%	0%	0%	0%	82208%

Fremont Weir Spill to Yolo Bypass

Existing - Base

	Average Monthly Flow (cfs)											
Statistic	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Probability of Exceedance												
10%	0	0	7,950	28,958	47,428	19,929	23	0	0	0	0	0
20%	0	0	17	7,664	20,668	5,676	0	0	0	0	0	0
30%	0	0	0	2,091	7,247	1,385	0	0	0	0	0	0
40%	0	0	0	0	1,768	0	0	0	0	0	0	0
50%	0	0	0	0	23	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	114	257	2,635	8,485	13,204	6,934	1,024	20	0	0	0	0
Water Year Types												
Wet	374	844	7,678	25,448	36,369	18,505	3,244	64	0	0	0	0
Above Normal	0	0	2,008	4,550	10,271	7,823	33	0	0	0	0	0
Below Normal	0	0	0	291	2,453	501	143	0	0	0	0	0
Dry	0	0	0	0	537	224	0	0	0	0	0	0
Critical	0	0	0	0	1	0	0	0	0	0	0	0

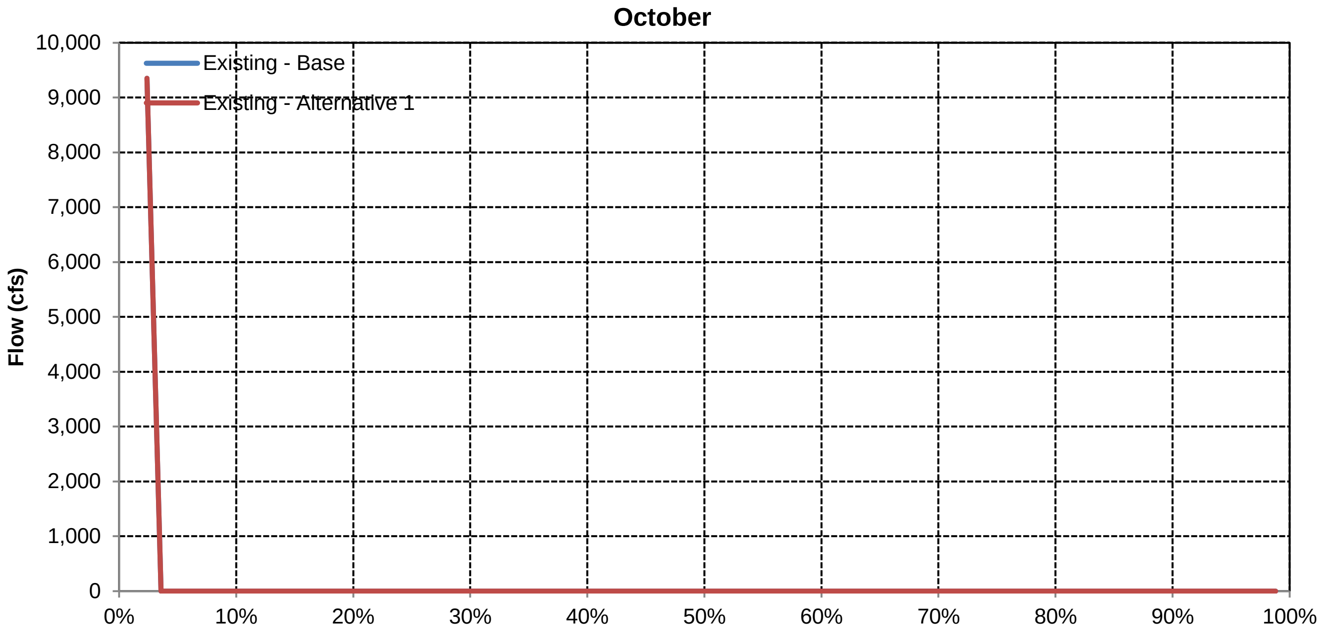
Existing - Alternative 1

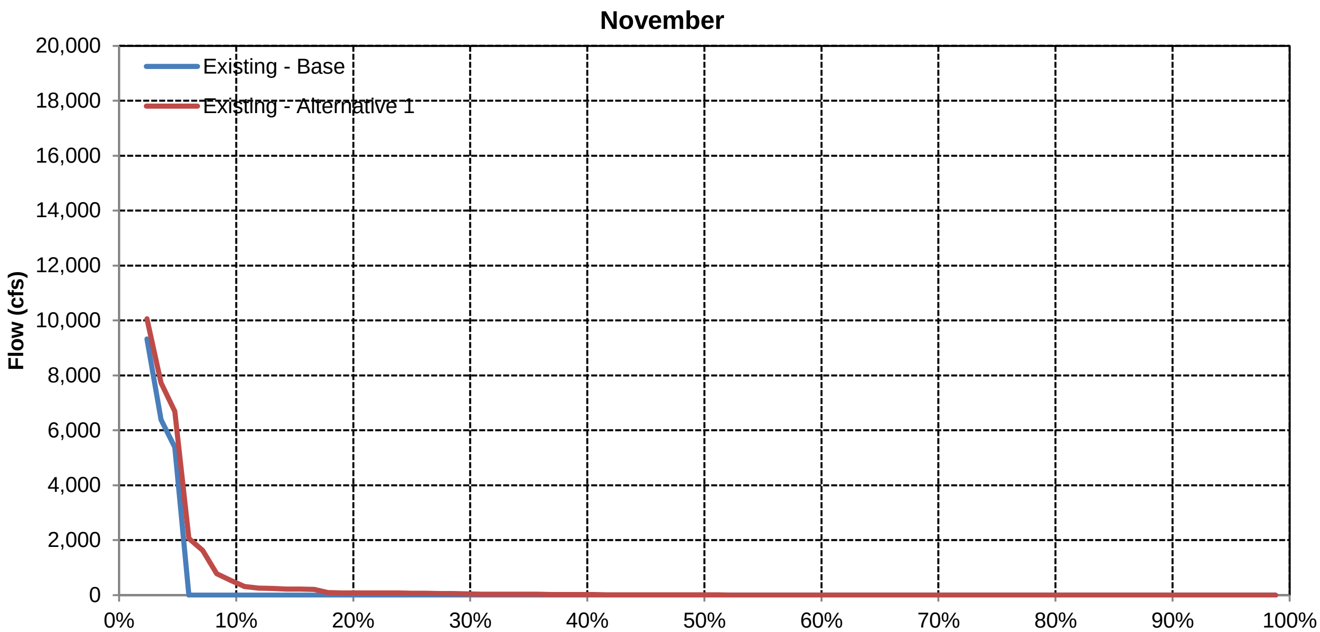
	Average Monthly Flow (cfs)											
Statistic	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Probability of Exceedance												
10%	0	297	10,136	30,143	48,857	20,046	23	0	0	0	0	0
20%	0	80	2,082	10,588	22,009	6,577	0	0	0	0	0	0
30%	0	35	618	4,995	9,779	3,176	0	0	0	0	0	0
40%	0	17	248	1,955	4,026	1,632	0	0	0	0	0	0
50%	0	4	138	808	2,733	385	0	0	0	0	0	0
60%	0	0	31	271	1,050	193	0	0	0	0	0	0
70%	0	0	8	84	395	93	0	0	0	0	0	0
80%	0	0	0	27	129	29	0	0	0	0	0	0
90%	0	0	0	7	37	1	0	0	0	0	0	0
Long Term												
Full Simulation Period	114	391	3,150	9,421	14,271	7,423	1,024	20	0	0	0	0
Water Year Types												
Wet	374	1,216	8,962	26,962	37,595	19,098	3,244	64	0	0	0	0
Above Normal	0	40	2,456	6,179	12,099	8,572	33	0	0	0	0	0
Below Normal	0	49	186	983	3,420	1,060	143	0	0	0	0	0
Dry	0	19	81	324	1,441	603	0	0	0	0	0	0
Critical	0	0	28	199	333	62	0	0	0	0	0	0

Existing - Alternative 1 Minus Existing - Base

	Average Monthly Flow (cfs)											
Statistic	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Probability of Exceedance												
10%	0	297	2,186	1,185	1,429	117	0	0	0	0	0	0
20%	0	80	2,065	2,923	1,341	902	0	0	0	0	0	0
30%	0	35	618	2,904	2,532	1,791	0	0	0	0	0	0
40%	0	17	248	1,955	2,257	1,632	0	0	0	0	0	0
50%	0	4	138	808	2,710	385	0	0	0	0	0	0
60%	0	0	31	271	1,050	193	0	0	0	0	0	0
70%	0	0	8	84	395	93	0	0	0	0	0	0
80%	0	0	0	27	129	29	0	0	0	0	0	0
90%	0	0	0	7	37	1	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	133	516	936	1,067	489	0	0	0	0	0	0
Water Year Types												
Wet	0	372	1,284	1,515	1,226	592	0	0	0	0	0	0
Above Normal	0	40	448	1,629	1,829	749	0	0	0	0	0	0
Below Normal	0	49	186	693	967	559	0	0	0	0	0	0
Dry	0	19	81	324	904	379	0	0	0	0	0	0
Critical	0	0	28	199	333	62	0	0	0	0	0	0

Fremont Weir Spill to Yolo Bypass





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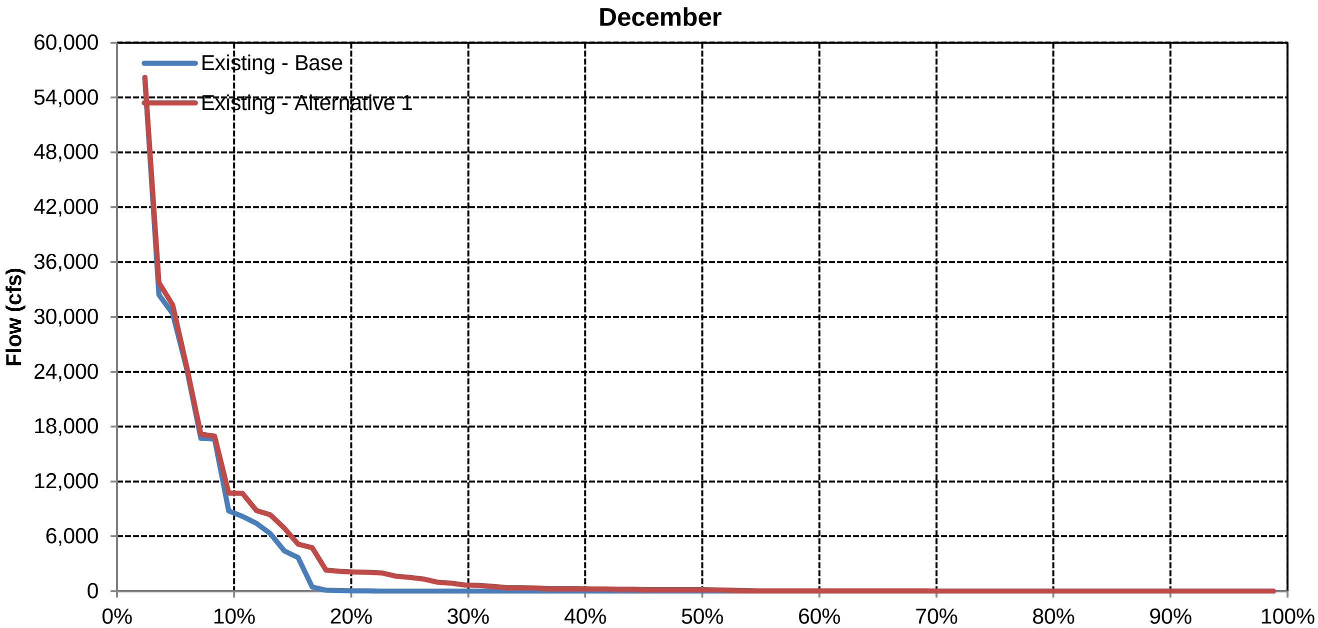

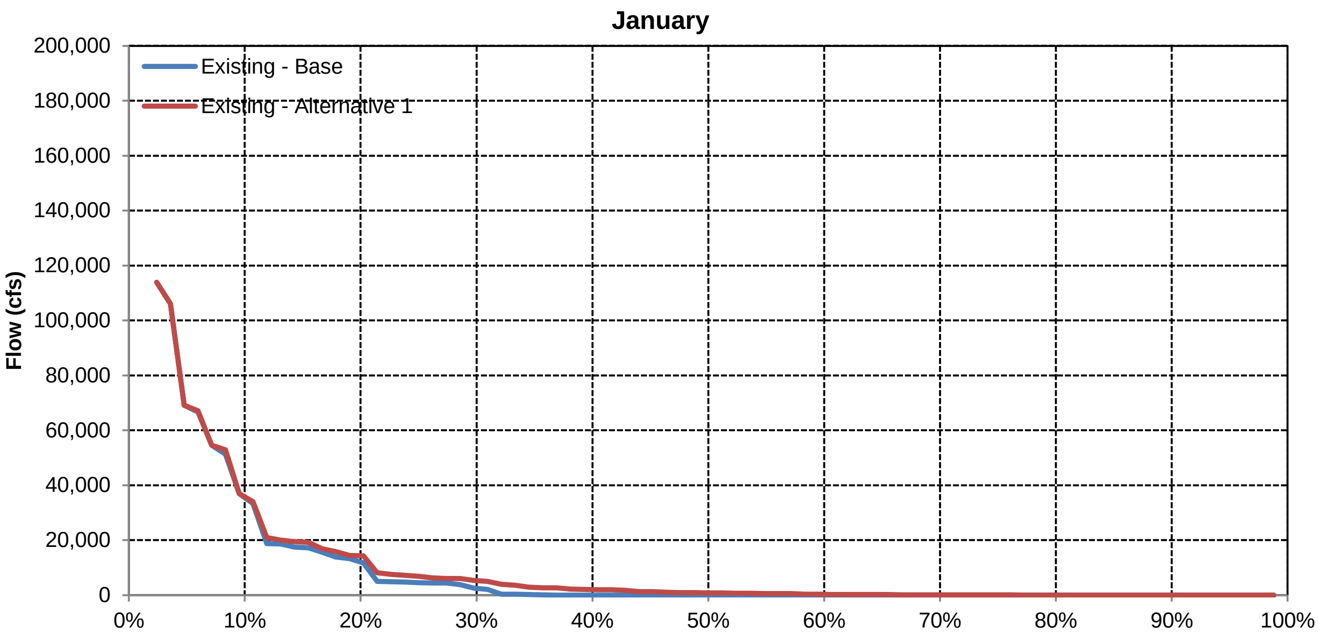

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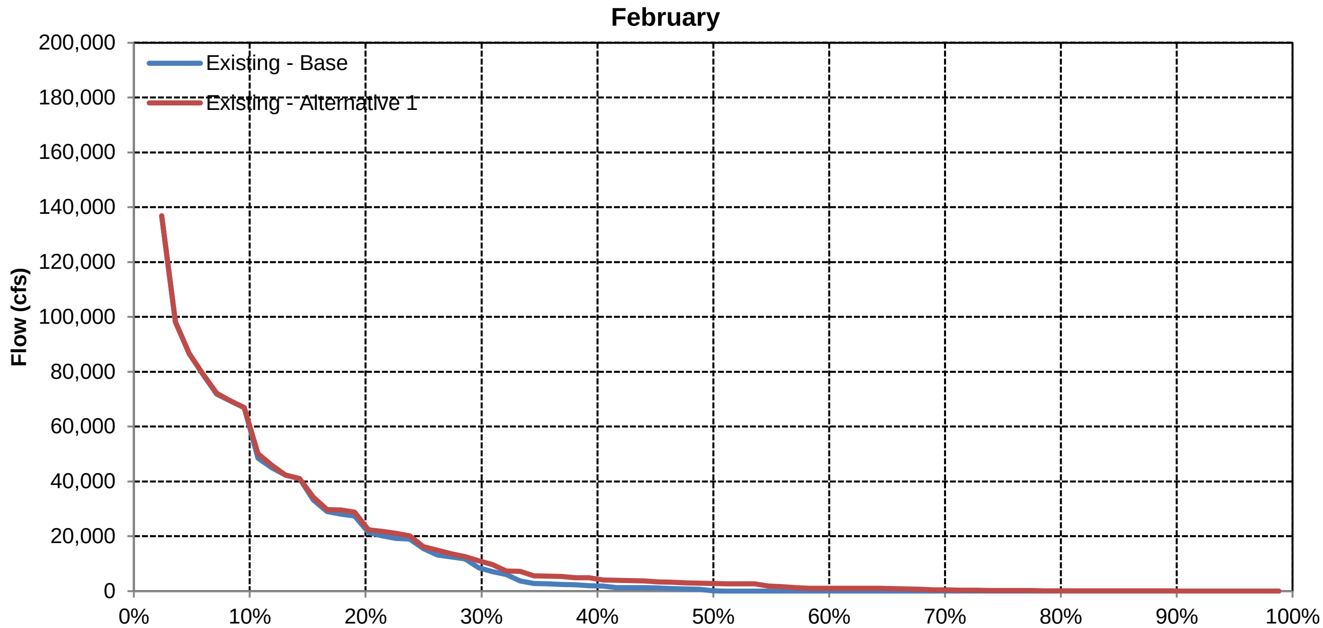
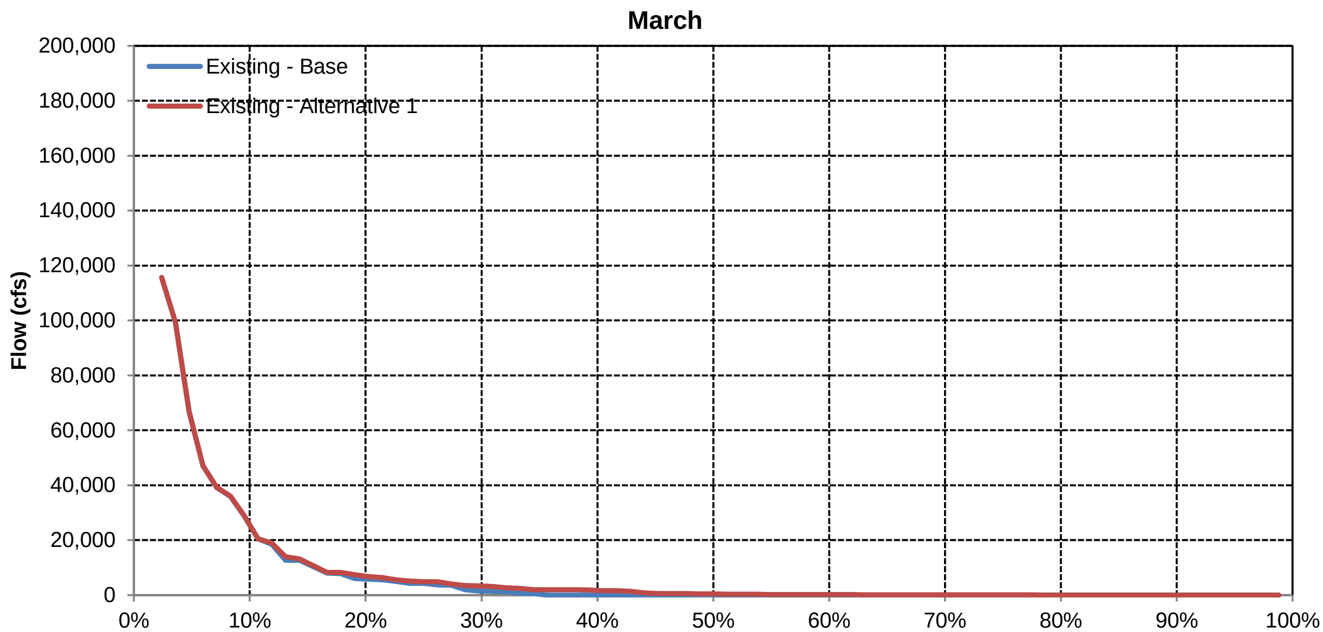
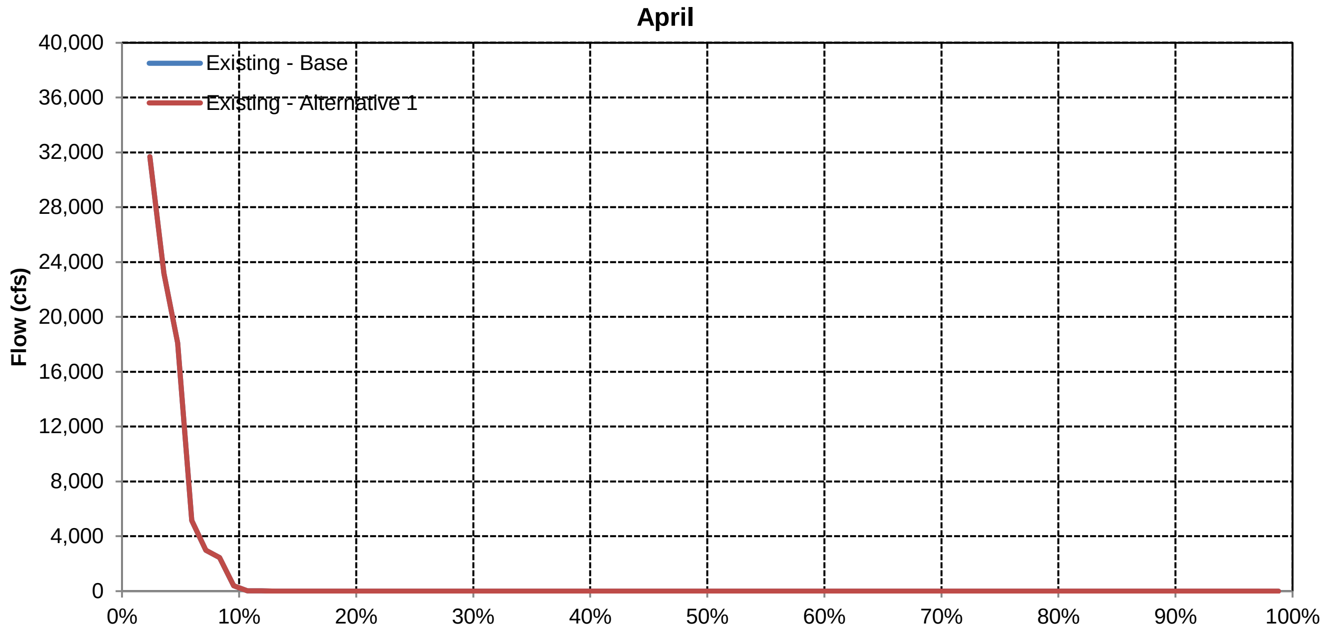
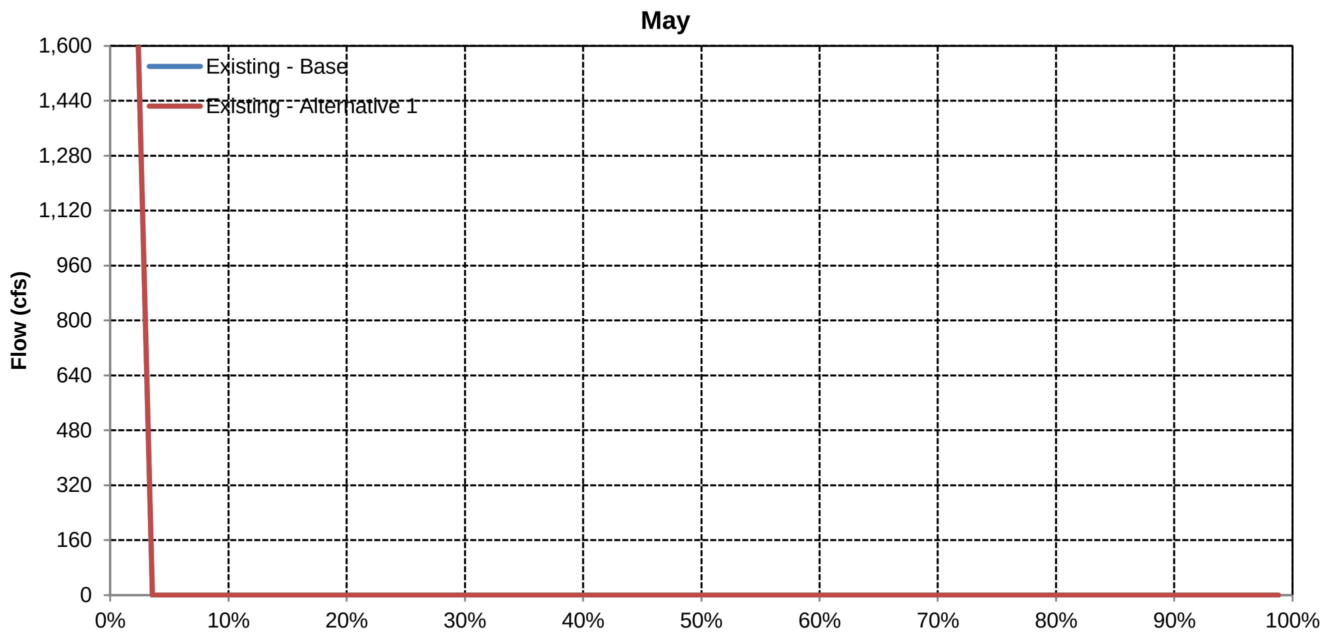


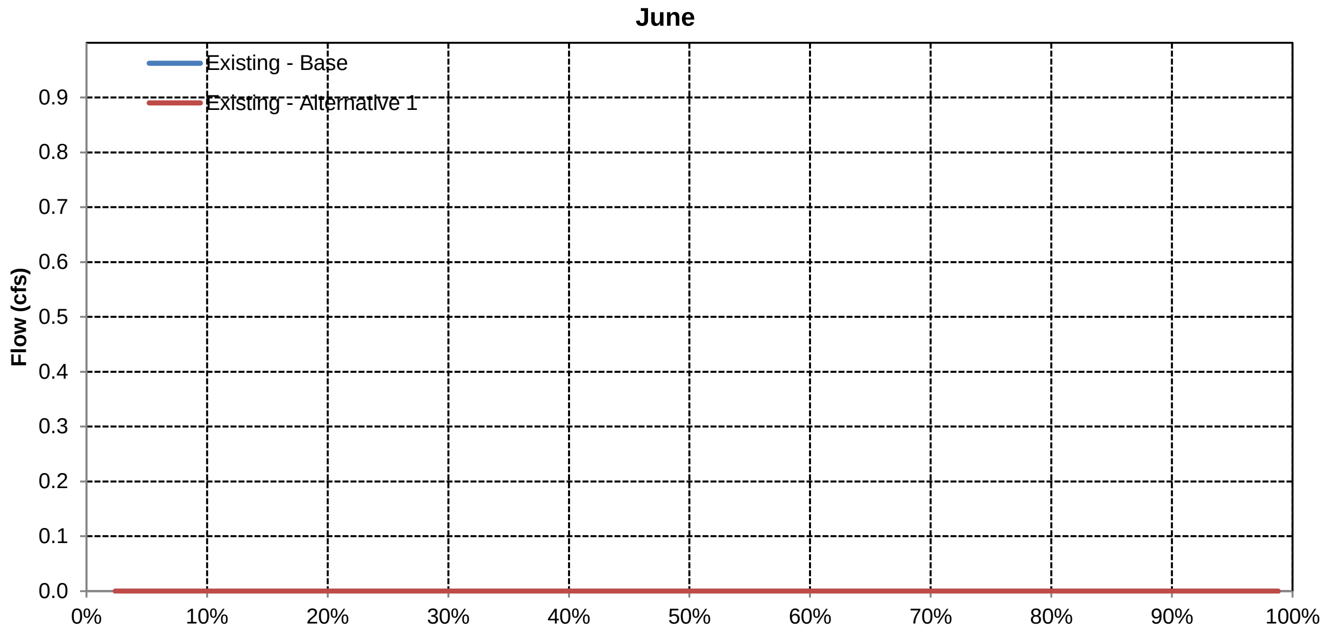


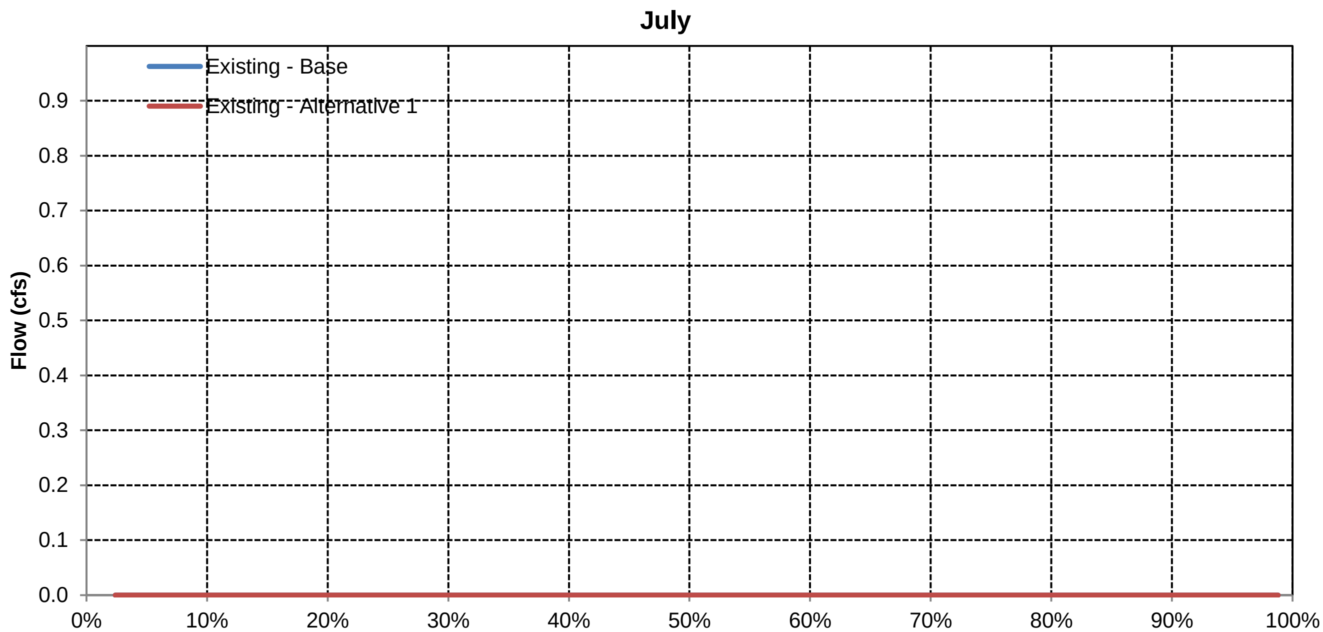
Fremont Weir Spill to Yolo Bypass



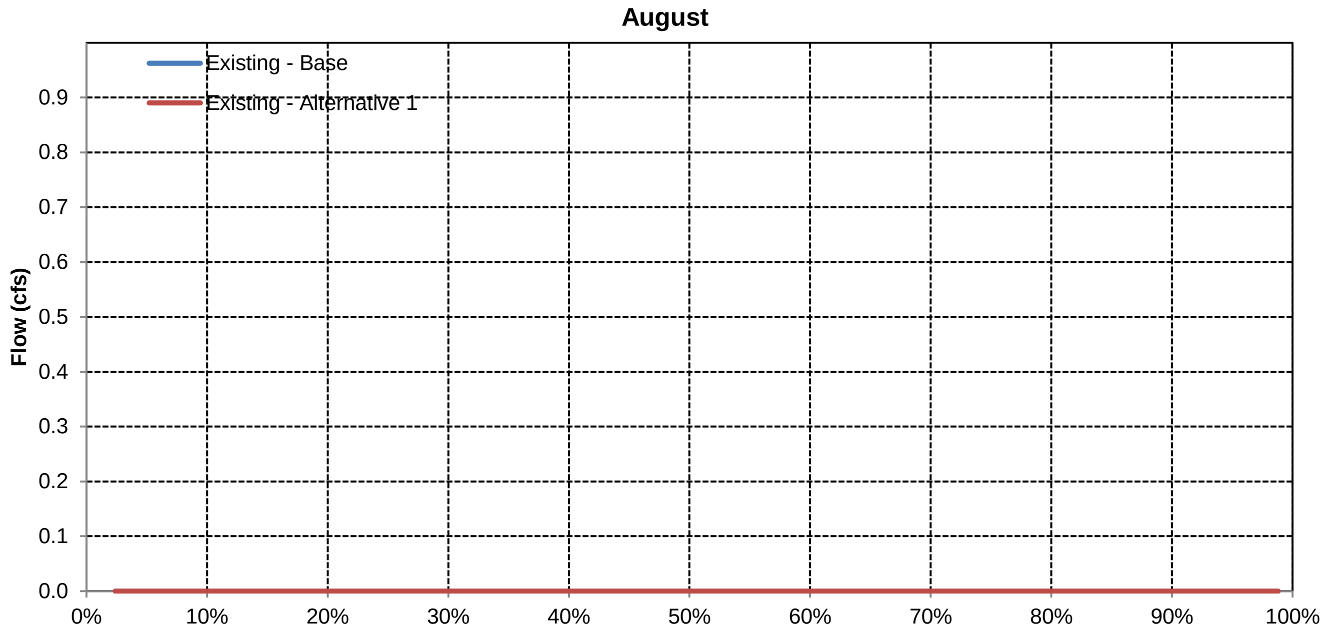


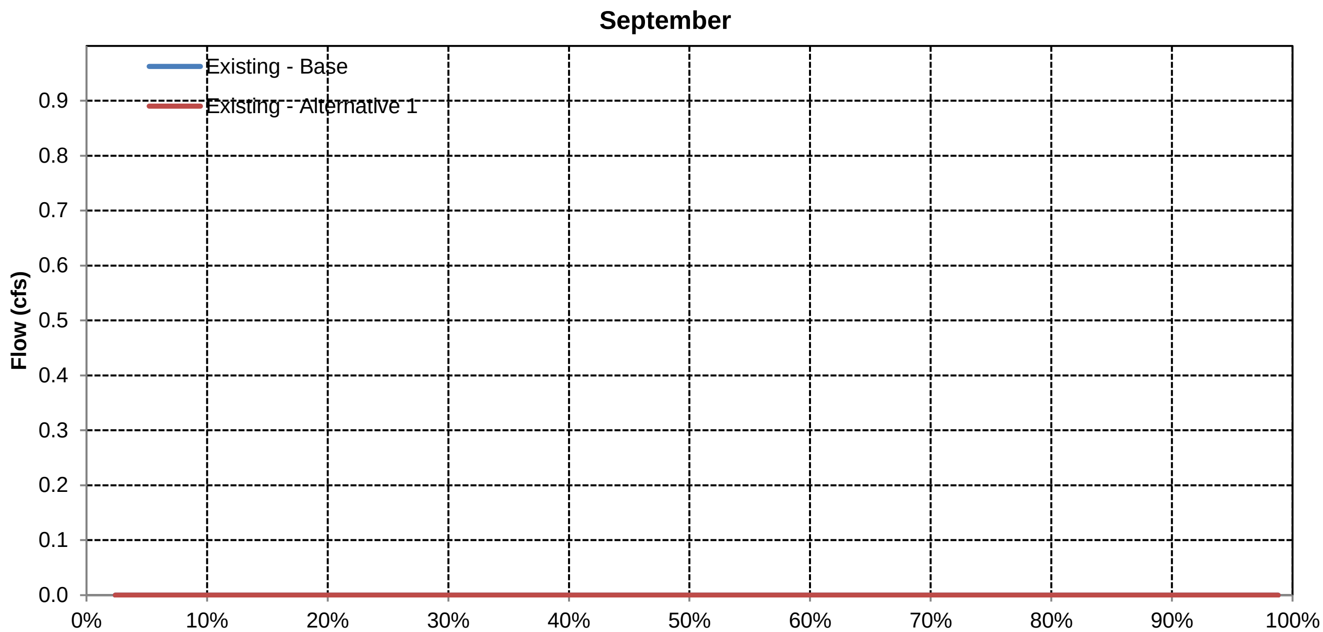
Fremont Weir Spill to Yolo Bypass





Fremont Weir Spill to Yolo Bypass





Long-Term and Water Year-Type Average of Sacramento River below Fremont Weir Under Existing - Base and Existing - Alternative 1

	Average Flow (cfs)												
Analysis Period	October	November	December	January	February	March	April	May	June	July	August	September	Total (TAF)
							Long-Term						
Full Simulation Period													
Existing - Base	9,484	12,510	19,726	28,534	34,880	30,067	18,486	11,524	11,174	16,563	12,346	14,753	13,226
Existing - Alternative 1	9,484	12,377	19,211	27,598	33,813	29,578	18,487	11,524	11,174	16,563	12,346	14,753	13,039
Difference	0	-133	-515	-936	-1,067	-489	0	0	0	0	0	0	-187
Percent Difference	0%	-1%	-3%	-3%	-3%	-2%	0%	0%	0%	0%	0%	0%	-1%
							Water Year-Types						
Wet													
Existing - Base	10,891	17,182	34,594	47,388	54,159	44,817	30,280	15,515	11,984	17,719	13,701	22,821	19,273
Existing - Alternative 1	10,891	16,809	33,311	45,873	52,934	44,225	30,280	15,515	11,984	17,719	13,701	22,821	18,973
Difference	0	-372	-1,284	-1,515	-1,226	-592	0	0	0	0	0	0	-299
Percent Difference	0%	-2%	-4%	-3%	-2%	-1%	0%	0%	0%	0%	0%	0%	-2%
Above Normal													
Existing - Base	9,877	12,058	19,277	36,324	42,867	40,008	19,128	12,828	11,814	18,508	14,754	17,430	15,325
Existing - Alternative 1	9,877	12,018	18,828	34,695	41,038	39,259	19,128	12,828	11,814	18,508	14,754	17,429	15,046
Difference	0	-40	-448	-1,629	-1,829	-749	0	0	-1	0	0	0	-279
Percent Difference	0%	0%	-2%	-4%	-4%	-2%	0%	0%	0%	0%	0%	0%	-2%
Below Normal													
Existing - Base	9,114	11,699	12,901	19,738	26,173	23,730	15,307	10,497	11,507	18,684	13,981	10,737	11,081
Existing - Alternative 1	9,114	11,650	12,715	19,046	25,206	23,171	15,308	10,496	11,507	18,684	13,981	10,737	10,936
Difference	0	-49	-186	-693	-967	-559	0	0	0	0	0	0	-145
Percent Difference	0%	0%	-1%	-4%	-4%	-2%	0%	0%	0%	0%	0%	0%	-1%
Dry													
Existing - Base	8,797	10,284	11,881	14,395	22,880	19,311	9,957	8,686	10,655	14,790	10,143	10,040	9,128
Existing - Alternative 1	8,797	10,264	11,800	14,071	21,977	18,932	9,957	8,685	10,655	14,790	10,143	10,040	9,028
Difference	0	-19	-81	-324	-904	-379	0	-1	0	0	0	0	-100
Percent Difference	0%	0%	-1%	-2%	-4%	-2%	0%	0%	0%	0%	0%	0%	-1%
Critical													
Existing - Base	7,603	7,349	9,332	12,776	15,062	12,715	9,151	7,145	9,068	11,571	7,736	7,241	7,035
Existing - Alternative 1	7,603	7,349	9,304	12,577	14,730	12,654	9,151	7,145	9,068	11,571	7,736	7,241	6,999
Difference	0	0	-28	-199	-333	-62	0	0	0	0	0	0	-37
Percent Difference	0%	0%	0%	-2%	-2%	0%	0%	0%	0%	0%	0%	0%	-1%

Existing - Base

	Average Monthly Flow (cfs)											
Statistic	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Probability of Exceedance												
10%	12,667	17,867	45,100	57,729	61,959	57,591	41,031	20,423	13,312	19,786	15,641	24,263
20%	11,568	15,291	30,157	49,978	58,550	49,208	29,852	12,476	12,632	19,450	14,918	21,584
30%	10,868	14,177	20,670	38,268	45,964	41,694	19,097	10,802	12,207	18,980	14,204	20,190
40%	10,328	12,419	16,827	30,451	40,042	32,187	14,333	9,587	11,482	18,481	13,746	16,796
50%	9,258	11,470	14,375	20,927	29,701	24,238	11,811	9,148	10,870	17,699	13,483	12,593
60%	8,339	10,242	12,138	16,320	24,021	20,650	10,617	8,809	10,372	17,239	13,030	11,383
70%	7,401	8,651	11,421	13,695	18,359	16,099	9,968	8,553	10,029	15,866	11,157	9,527
80%	6,330	6,998	8,557	11,396	14,745	13,147	9,106	7,912	9,548	12,798	8,367	8,339
90%	5,547	6,108	7,167	10,140	12,940	10,022	8,064	7,372	8,384	10,409	7,531	7,435
Long Term												
Full Simulation Period	9,484	12,510	19,726	28,534	34,880	30,067	18,486	11,524	11,174	16,563	12,346	14,753
Water Year Types												
Wet	10,891	17,182	34,594	47,388	54,159	44,817	30,280	15,515	11,984	17,719	13,701	22,821
Above Normal	9,877	12,058	19,277	36,324	42,867	40,008	19,128	12,828	11,814	18,508	14,754	17,430
Below Normal	9,114	11,699	12,901	19,738	26,173	23,730	15,307	10,497	11,507	18,684	13,981	10,737
Dry	8,797	10,284	11,881	14,395	22,880	19,311	9,957	8,686	10,655	14,790	10,143	10,040
Critical	7,603	7,349	9,332	12,776	15,062	12,715	9,151	7,145	9,068	11,571	7,736	7,241

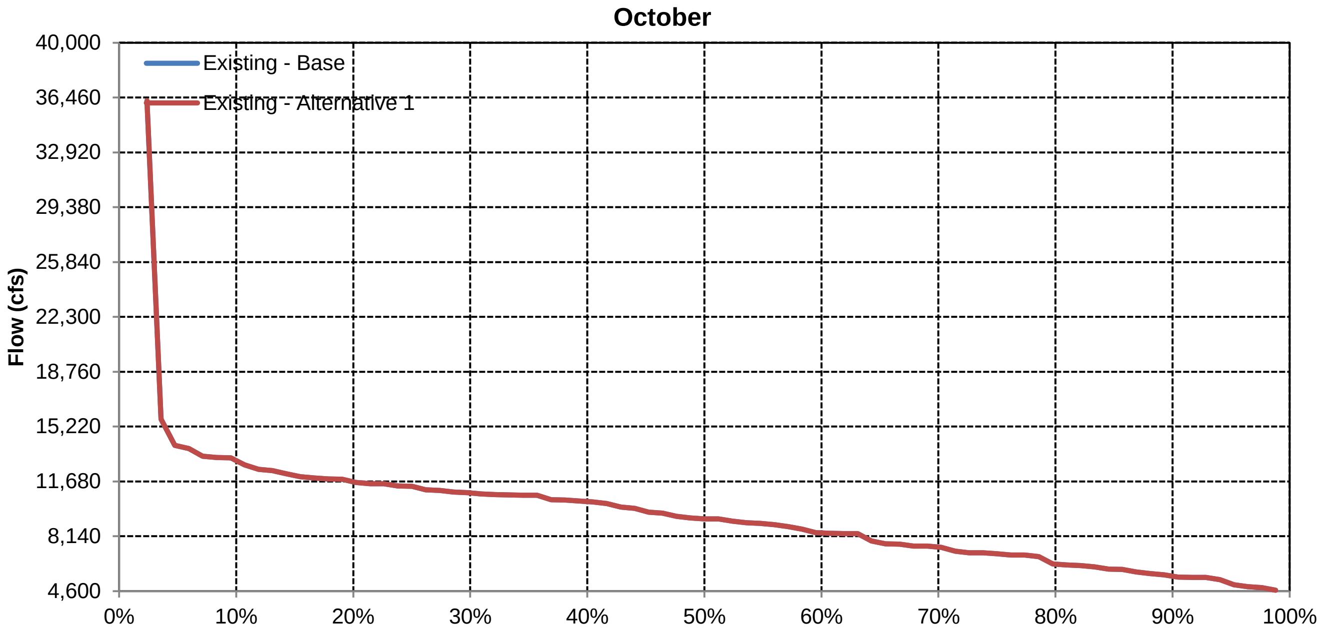
Existing - Alternative 1

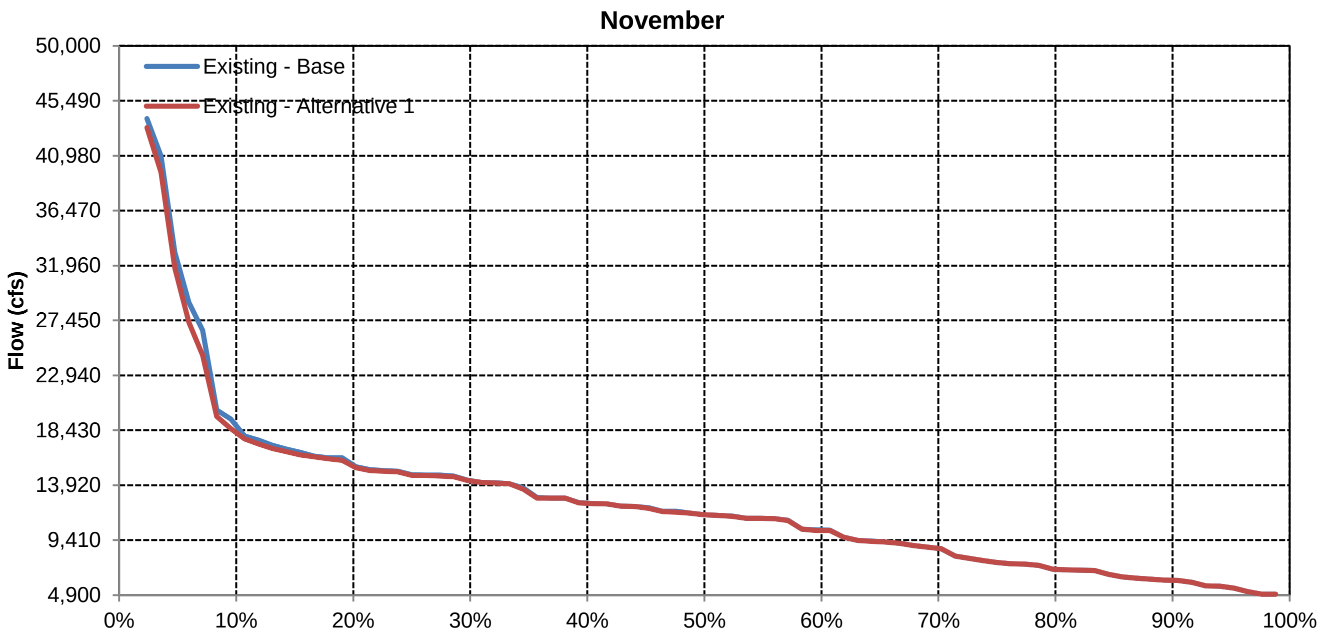
	Average Monthly Flow (cfs)											
Statistic	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Probability of Exceedance												
10%	12,667	17,599	42,750	56,285	61,959	57,172	41,031	20,423	13,306	19,786	15,640	24,263
20%	11,568	15,215	28,123	48,490	57,226	48,065	29,853	12,476	12,632	19,450	14,919	21,584
30%	10,868	14,167	20,162	35,550	44,580	40,992	19,097	10,802	12,207	18,980	14,204	20,190
40%	10,328	12,416	16,661	28,390	37,195	31,563	14,333	9,587	11,482	18,481	13,746	16,796
50%	9,258	11,471	14,256	20,392	27,779	24,044	11,812	9,148	10,870	17,699	13,483	12,593
60%	8,339	10,205	12,113	16,017	23,028	20,311	10,617	8,809	10,372	17,239	13,028	11,384
70%	7,401	8,651	11,420	13,644	18,113	16,061	9,968	8,552	10,029	15,866	11,157	9,527
80%	6,330	6,998	8,555	11,376	14,656	13,096	9,106	7,912	9,548	12,798	8,367	8,339
90%	5,547	6,108	7,167	10,136	12,908	10,018	8,064	7,372	8,384	10,409	7,531	7,435
Long Term												
Full Simulation Period	9,484	12,377	19,211	27,598	33,813	29,578	18,487	11,524	11,174	16,563	12,346	14,753
Water Year Types												
Wet	10,891	16,809	33,311	45,873	52,934	44,225	30,280	15,515	11,984	17,719	13,701	22,821
Above Normal	9,877	12,018	18,828	34,695	41,038	39,259	19,128	12,828	11,814	18,508	14,754	17,429
Below Normal	9,114	11,650	12,715	19,046	25,206	23,171	15,308	10,496	11,507	18,684	13,981	10,737
Dry	8,797	10,264	11,800	14,071	21,977	18,932	9,957	8,685	10,655	14,790	10,143	10,040
Critical	7,603	7,349	9,304	12,577	14,730	12,654	9,151	7,145	9,068	11,571	7,736	7,241

Existing - Alternative 1 Minus Existing - Base

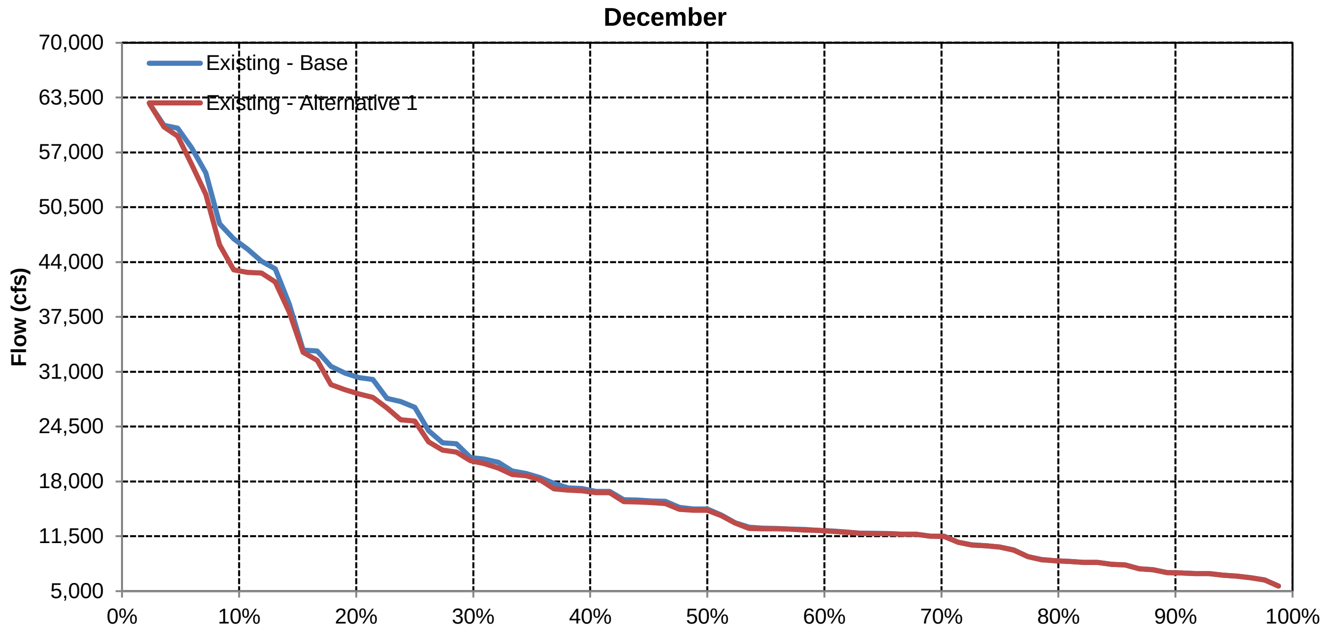
	Average Monthly Flow (cfs)											
Statistic	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Probability of Exceedance												
10%	0	-268	-2,351	-1,444	0	-420	0	0	-6	0	0	0
20%	0	-76	-2,034	-1,488	-1,325	-1,143	1	0	0	0	0	0
30%	0	-10	-508	-2,718	-1,384	-702	0	0	0	0	0	0
40%	0	-3	-166	-2,062	-2,847	-624	0	0	0	0	0	0
50%	0	0	-120	-535	-1,923	-194	0	0	0	0	0	0
60%	0	-37	-25	-303	-993	-339	0	0	0	0	-2	0
70%	-1	0	-2	-51	-246	-38	0	0	0	0	0	0
80%	0	0	-2	-20	-89	-51	0	0	0	0	0	0
90%	0	0	0	-4	-32	-3	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	-133	-515	-936	-1,067	-489	0	0	0	0	0	0
Water Year Types												
Wet	0	-372	-1,284	-1,515	-1,226	-592	0	0	0	0	0	0
Above Normal	0	-40	-448	-1,629	-1,829	-749	0	0	-1	0	0	0
Below Normal	0	-49	-186	-693	-967	-559	0	0	0	0	0	0
Dry	0	-19	-81	-324	-904	-379	0	-1	0	0	0	0
Critical	0	0	-28	-199	-333	-62	0	0	0	0	0	0

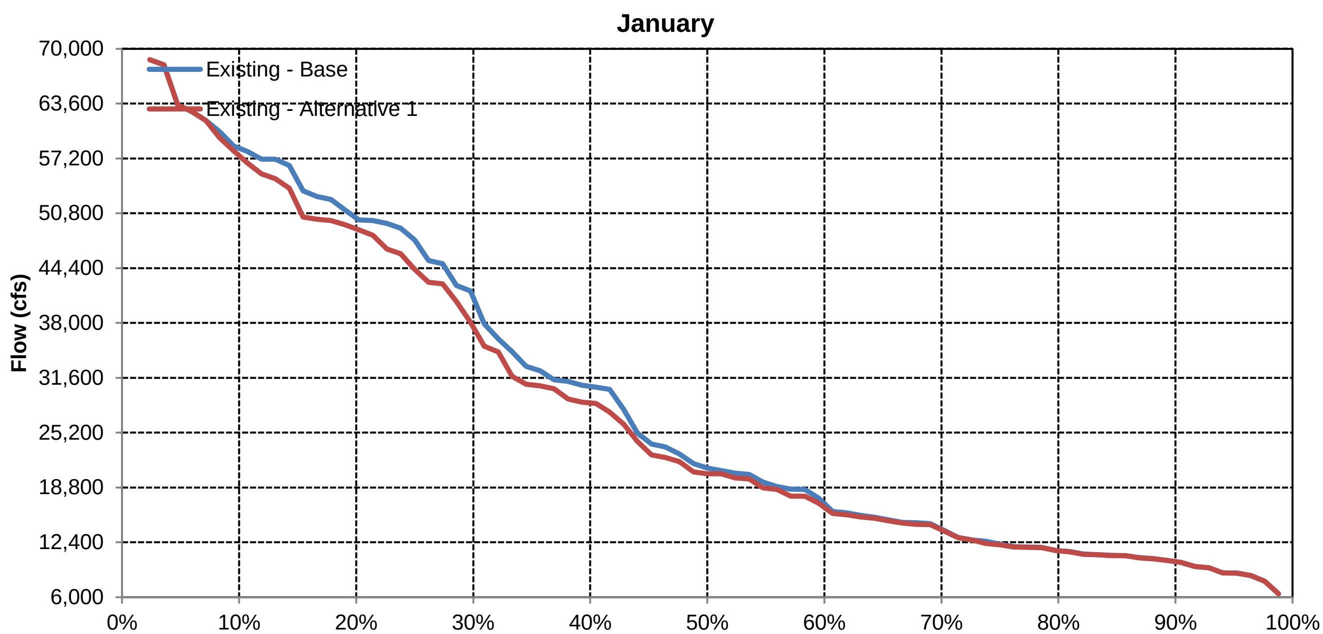
Sacramento River below Fremont Weir



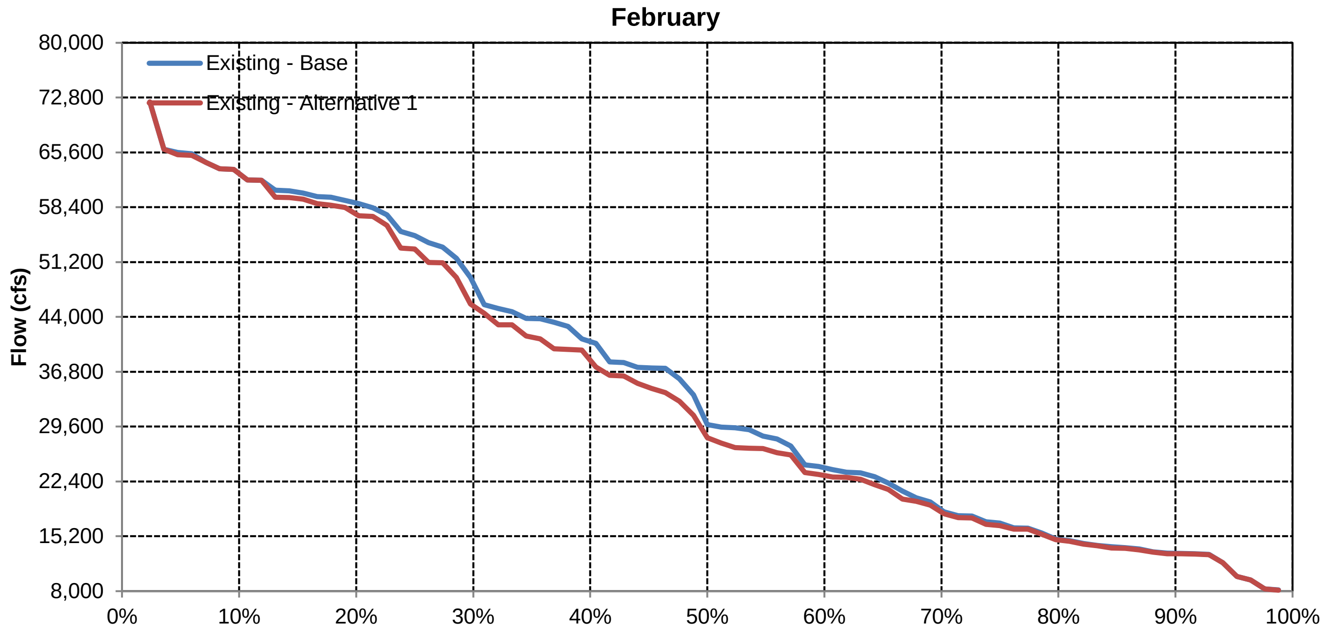


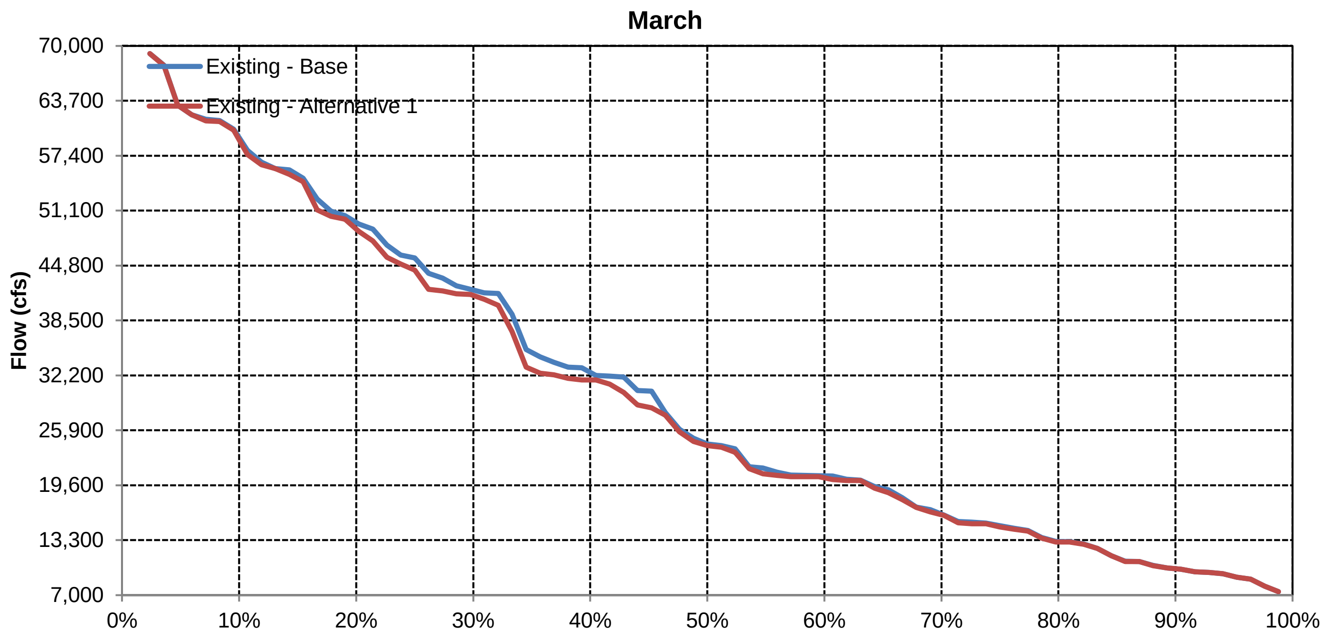
Sacramento River below Fremont Weir



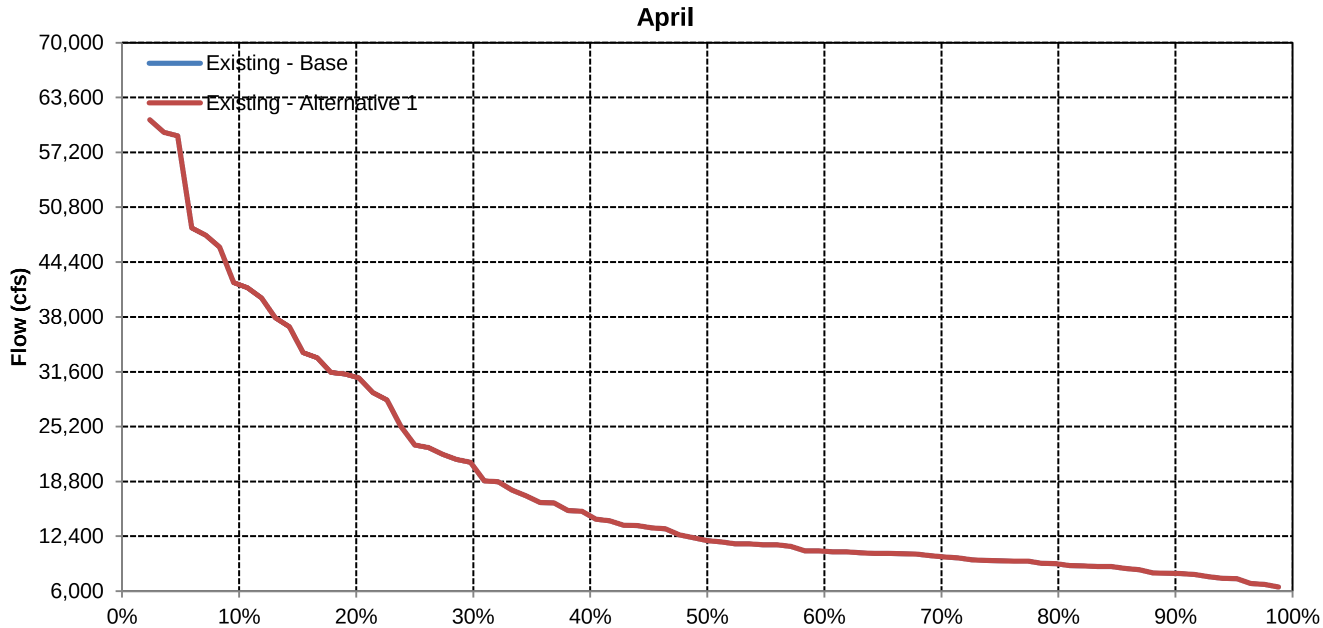


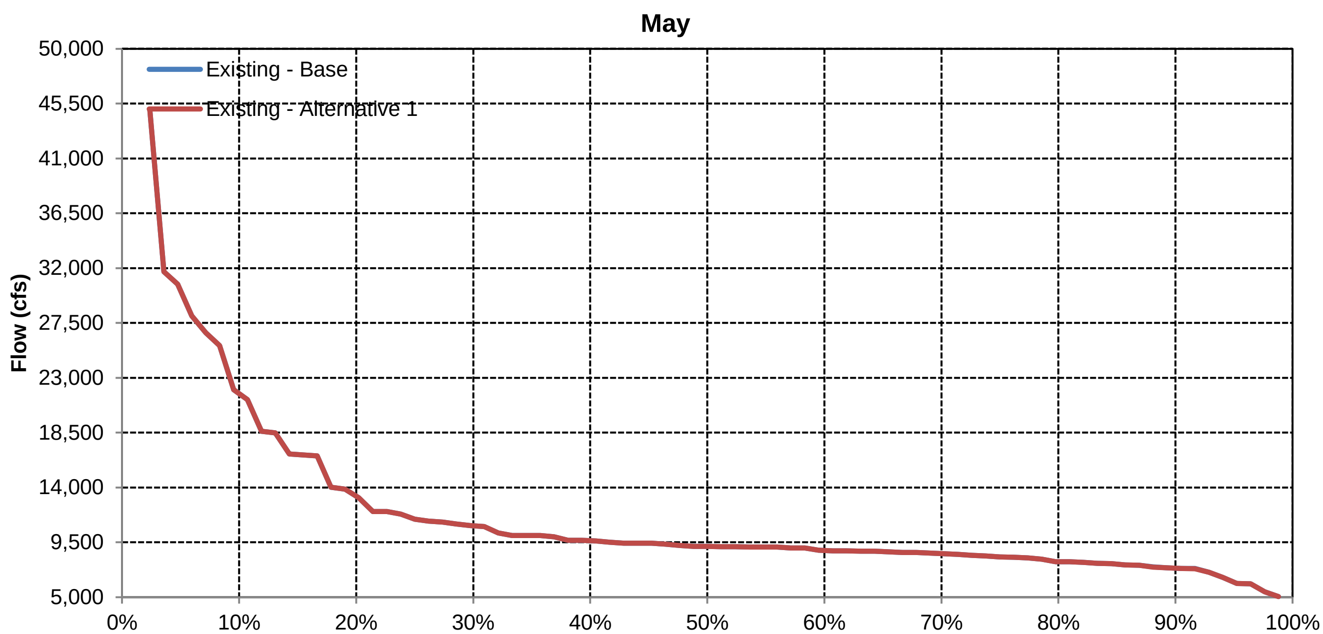
Sacramento River below Fremont Weir



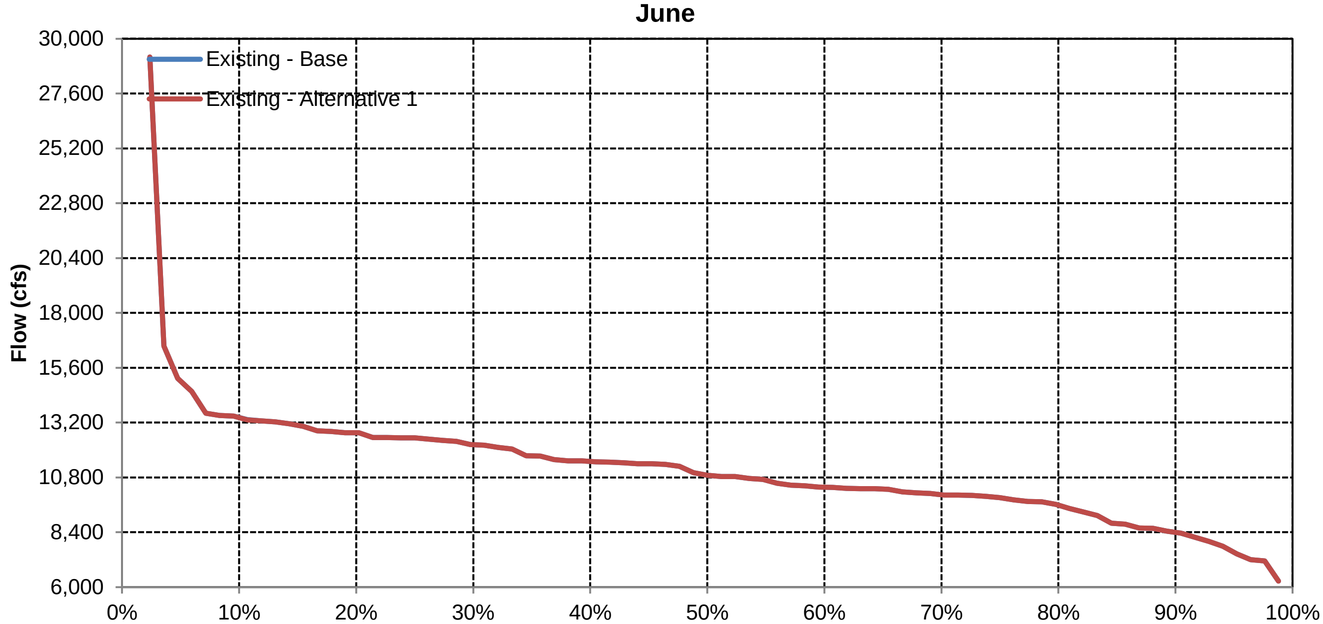


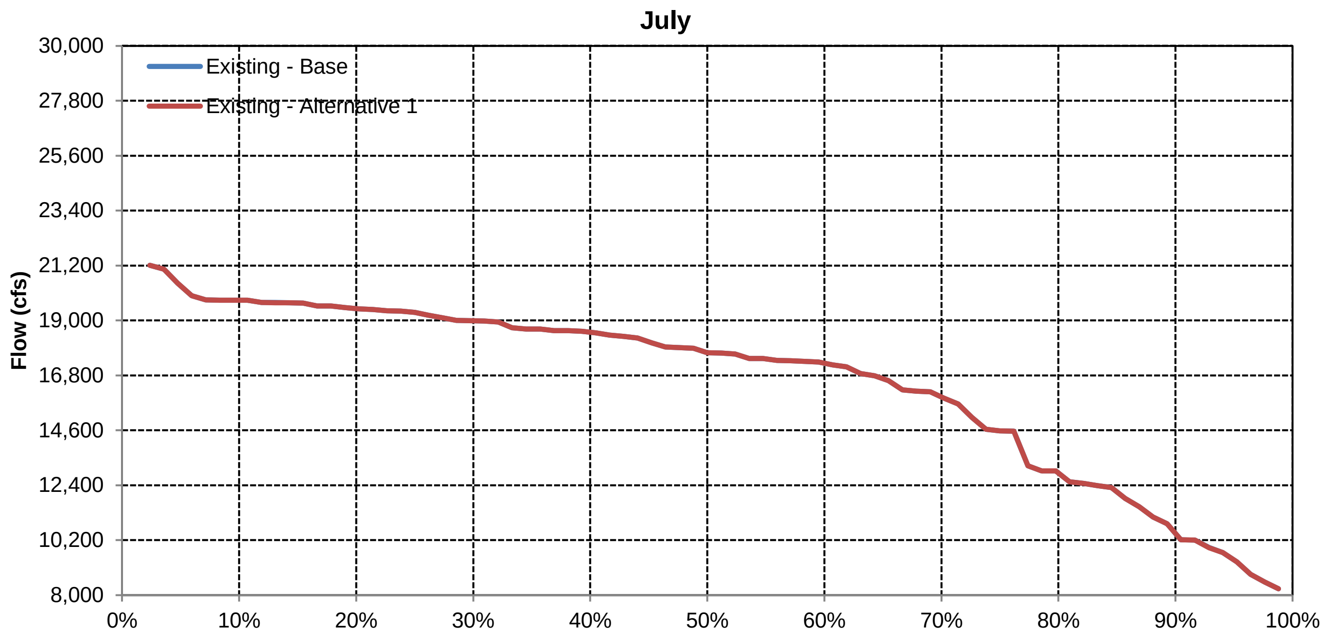
Sacramento River below Fremont Weir



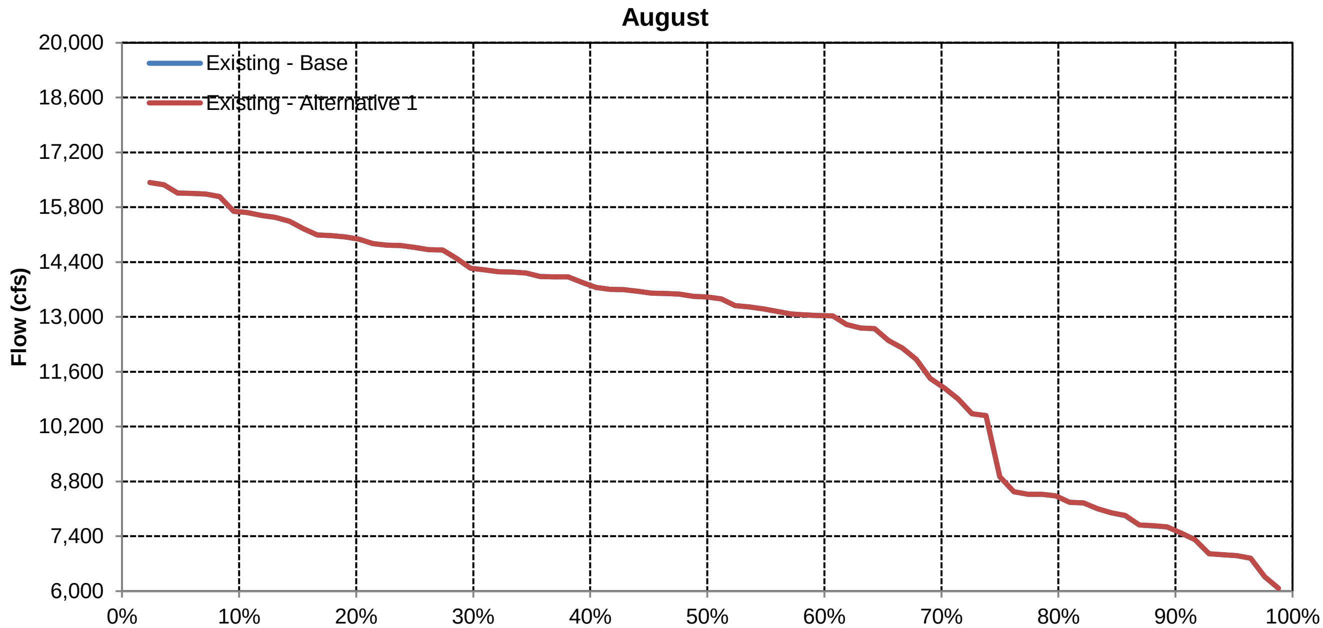


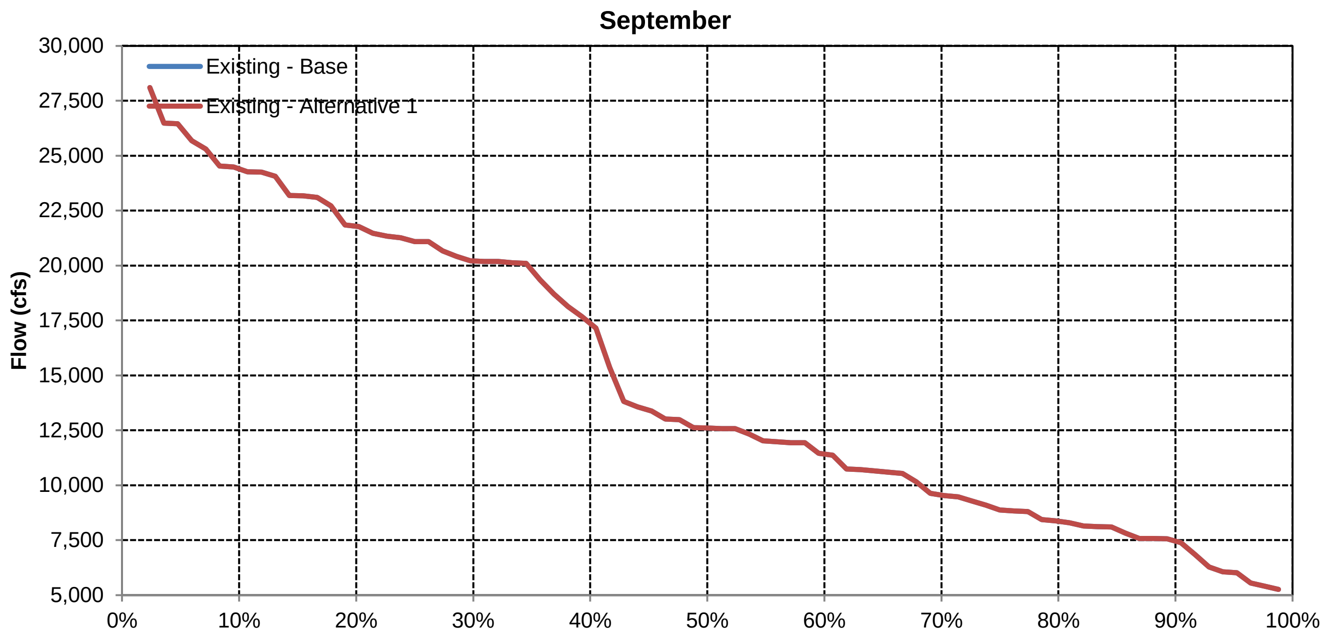
Sacramento River below Fremont Weir





Sacramento River below Fremont Weir





Long-Term and Water Year-Type Average of Trinity Reservoir Under Existing - Base and Existing - Alternative 1

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
						Long-Term						
Full Simulation Period												
Existing - Base	1,276	1,285	1,370	1,501	1,641	1,769	1,902	1,832	1,743	1,596	1,445	1,326
Existing - Alternative 1	1,276	1,285	1,370	1,501	1,641	1,769	1,902	1,832	1,743	1,596	1,445	1,326
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
						Water Year-Types						
Wet												
Existing - Base	1,352	1,401	1,574	1,777	1,943	2,063	2,232	2,168	2,045	1,906	1,771	1,629
Existing - Alternative 1	1,352	1,401	1,574	1,777	1,943	2,063	2,232	2,168	2,045	1,906	1,771	1,629
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal												
Existing - Base	1,354	1,330	1,434	1,642	1,822	1,999	2,154	2,062	1,975	1,816	1,661	1,520
Existing - Alternative 1	1,354	1,330	1,434	1,642	1,822	1,999	2,154	2,062	1,975	1,816	1,661	1,520
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Existing - Base	1,248	1,259	1,287	1,409	1,560	1,708	1,857	1,790	1,716	1,581	1,414	1,315
Existing - Alternative 1	1,248	1,259	1,287	1,409	1,560	1,708	1,857	1,790	1,716	1,581	1,414	1,315
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry												
Existing - Base	1,303	1,288	1,329	1,373	1,484	1,619	1,724	1,640	1,555	1,384	1,220	1,110
Existing - Alternative 1	1,303	1,288	1,329	1,373	1,484	1,619	1,724	1,640	1,555	1,384	1,220	1,110
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical												
Existing - Base	1,041	1,030	1,052	1,087	1,153	1,212	1,267	1,214	1,174	1,038	895	807
Existing - Alternative 1	1,041	1,030	1,052	1,087	1,153	1,212	1,267	1,214	1,174	1,038	895	807
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Trinity Reservoir

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	1,679	1,669	1,832	1,900	2,000	2,100	2,300	2,280	2,180	2,036	1,883	1,739
20%	1,561	1,564	1,651	1,871	2,000	2,100	2,253	2,180	2,061	1,899	1,757	1,620
30%	1,475	1,490	1,571	1,797	1,985	2,093	2,209	2,094	1,982	1,813	1,666	1,533
40%	1,391	1,375	1,503	1,663	1,844	2,014	2,151	2,039	1,892	1,736	1,573	1,442
50%	1,297	1,306	1,436	1,564	1,727	1,841	1,969	1,849	1,751	1,626	1,458	1,332
60%	1,211	1,218	1,325	1,409	1,575	1,748	1,859	1,779	1,680	1,531	1,369	1,247
70%	1,117	1,167	1,222	1,291	1,433	1,586	1,698	1,651	1,591	1,445	1,284	1,148
80%	969	979	1,041	1,144	1,328	1,452	1,593	1,574	1,453	1,293	1,119	1,009
90%	814	826	864	996	1,078	1,182	1,234	1,184	1,172	1,067	940	858
Long Term												
Full Simulation Period	1,276	1,285	1,370	1,501	1,641	1,769	1,902	1,832	1,743	1,596	1,445	1,326
Water Year Types												
Wet	1,352	1,401	1,574	1,777	1,943	2,063	2,232	2,168	2,045	1,906	1,771	1,629
Above Normal	1,354	1,330	1,434	1,642	1,822	1,999	2,154	2,062	1,975	1,816	1,661	1,520
Below Normal	1,248	1,259	1,287	1,409	1,560	1,708	1,857	1,790	1,716	1,581	1,414	1,315
Dry	1,303	1,288	1,329	1,373	1,484	1,619	1,724	1,640	1,555	1,384	1,220	1,110
Critical	1,041	1,030	1,052	1,087	1,153	1,212	1,267	1,214	1,174	1,038	895	807

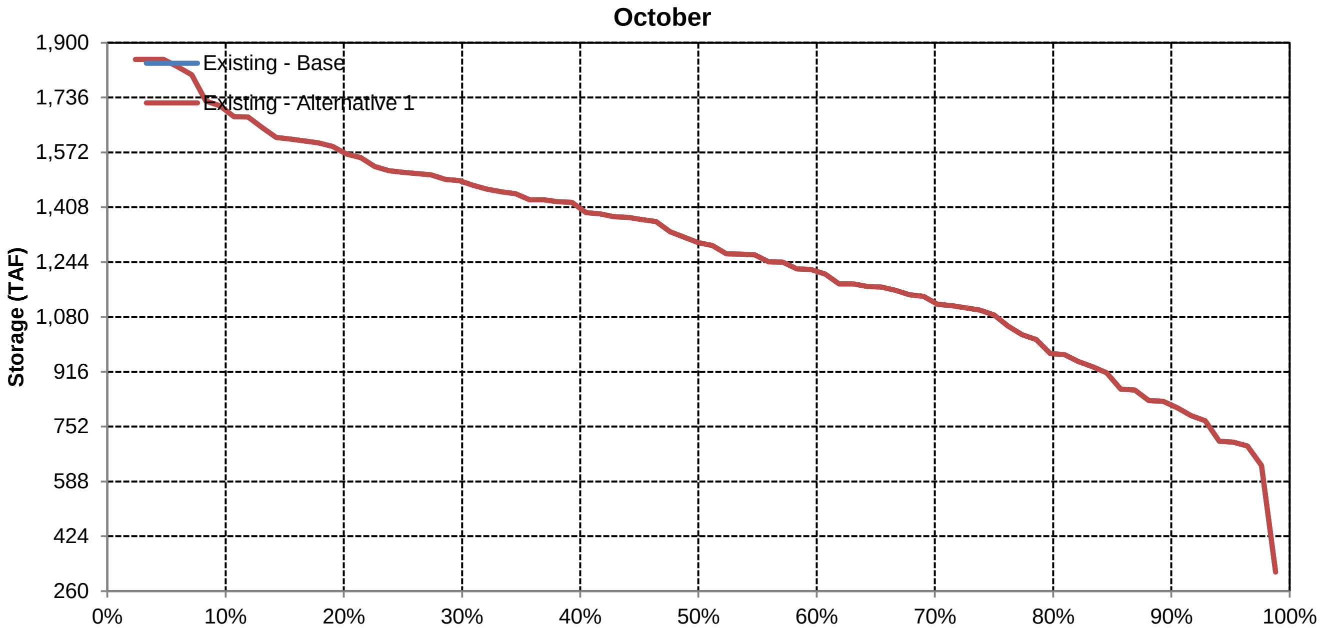
Existing - Alternative 1

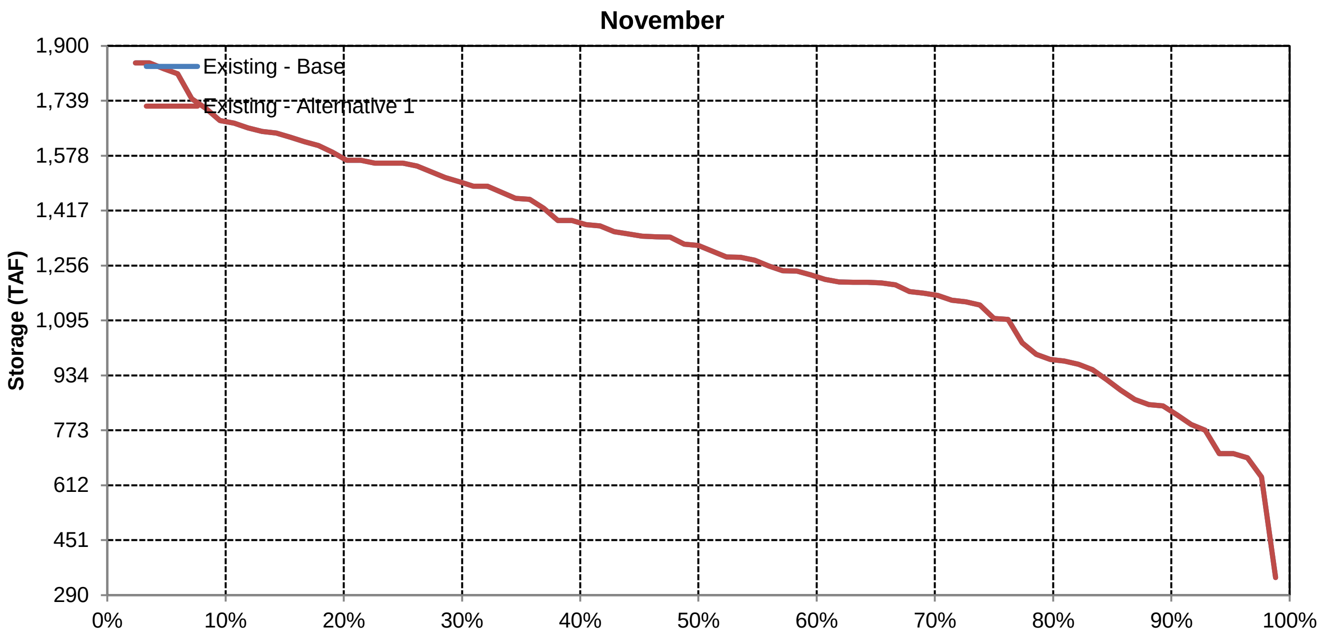
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	1,679	1,669	1,832	1,900	2,000	2,100	2,300	2,280	2,180	2,036	1,883	1,739
20%	1,561	1,564	1,651	1,871	2,000	2,100	2,253	2,180	2,061	1,899	1,757	1,620
30%	1,475	1,490	1,571	1,797	1,985	2,093	2,209	2,094	1,982	1,813	1,666	1,533
40%	1,391	1,375	1,503	1,663	1,844	2,014	2,151	2,039	1,892	1,736	1,573	1,442
50%	1,297	1,306	1,436	1,564	1,727	1,841	1,969	1,849	1,751	1,626	1,458	1,332
60%	1,211	1,218	1,325	1,409	1,575	1,748	1,859	1,779	1,680	1,531	1,369	1,247
70%	1,117	1,167	1,222	1,291	1,433	1,586	1,698	1,651	1,591	1,445	1,284	1,148
80%	969	979	1,041	1,144	1,328	1,452	1,593	1,574	1,453	1,293	1,119	1,009
90%	814	826	864	996	1,078	1,182	1,234	1,184	1,172	1,067	940	858
Long Term												
Full Simulation Period	1,276	1,285	1,370	1,501	1,641	1,769	1,902	1,832	1,743	1,596	1,445	1,326
Water Year Types												
Wet	1,352	1,401	1,574	1,777	1,943	2,063	2,232	2,168	2,045	1,906	1,771	1,629
Above Normal	1,354	1,330	1,434	1,642	1,822	1,999	2,154	2,062	1,975	1,816	1,661	1,520
Below Normal	1,248	1,259	1,287	1,409	1,560	1,708	1,857	1,790	1,716	1,581	1,414	1,315
Dry	1,303	1,288	1,329	1,373	1,484	1,619	1,724	1,640	1,555	1,384	1,220	1,110
Critical	1,041	1,030	1,052	1,087	1,153	1,212	1,267	1,214	1,174	1,038	895	807

Existing - Alternative 1 Minus Existing - Base

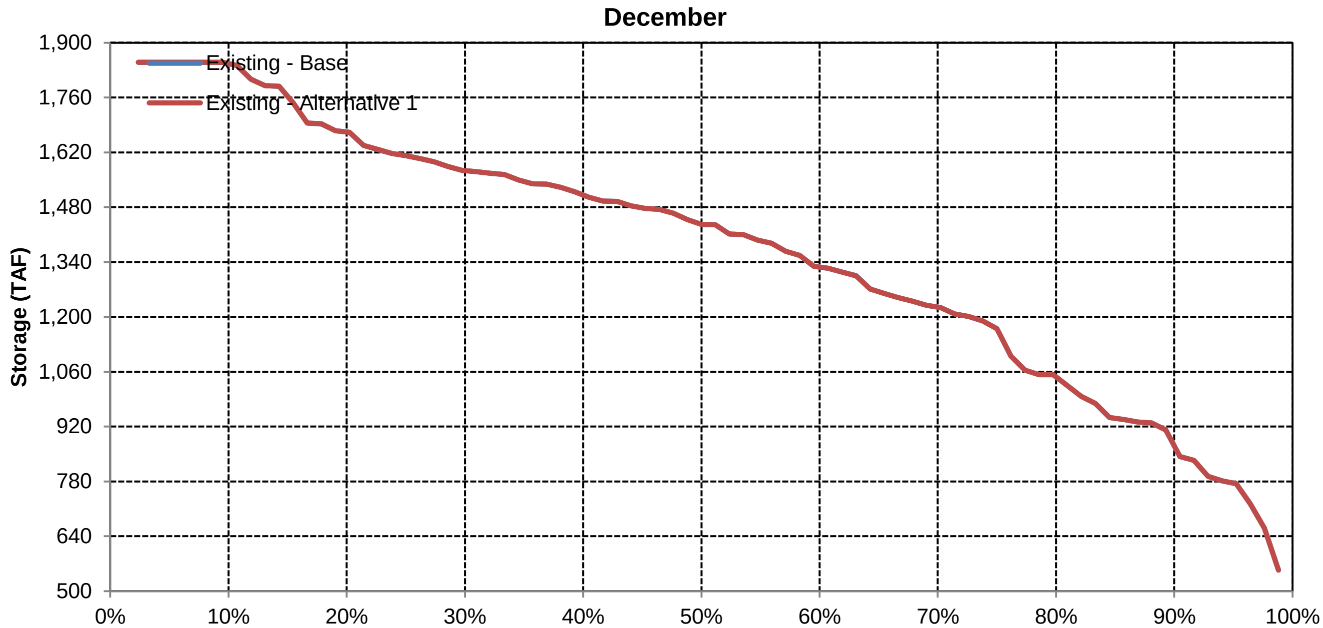
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types												
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

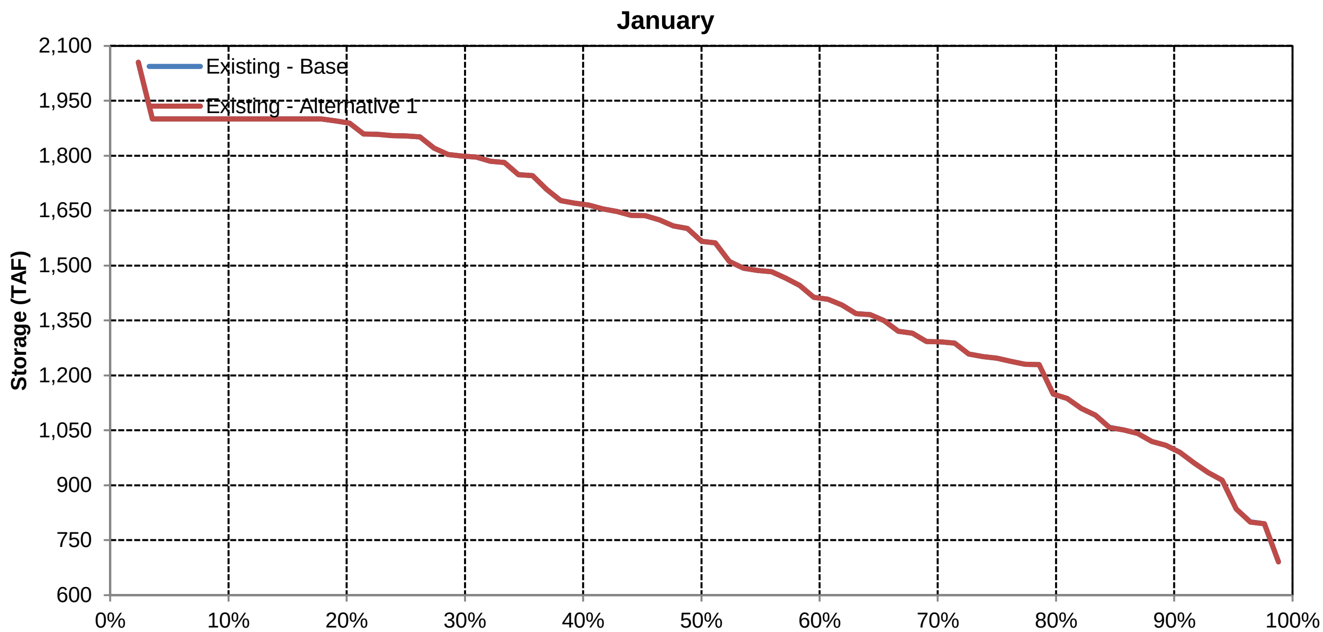
Trinity Reservoir





Trinity Reservoir





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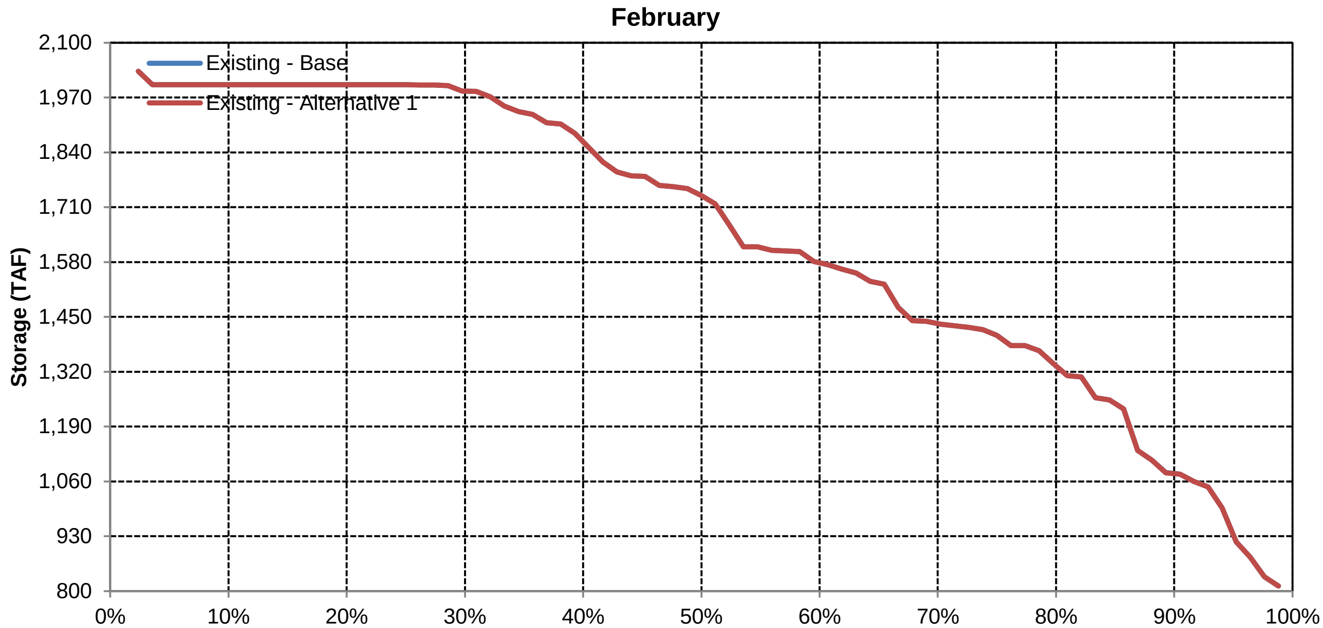

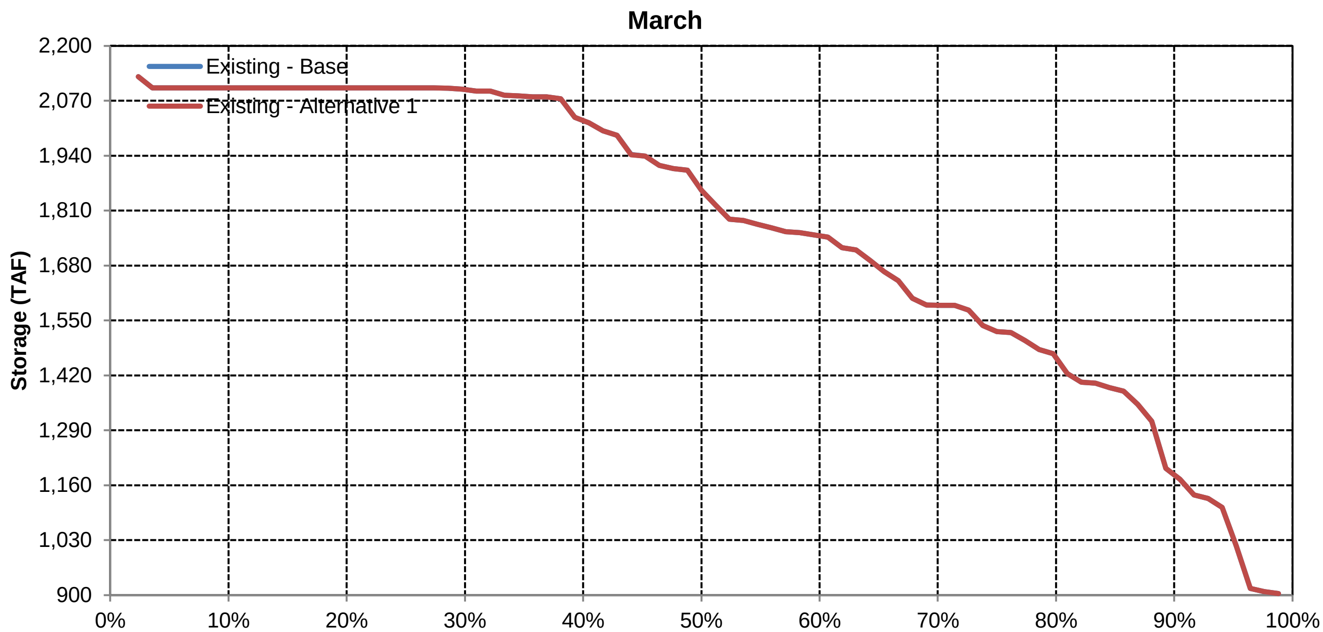

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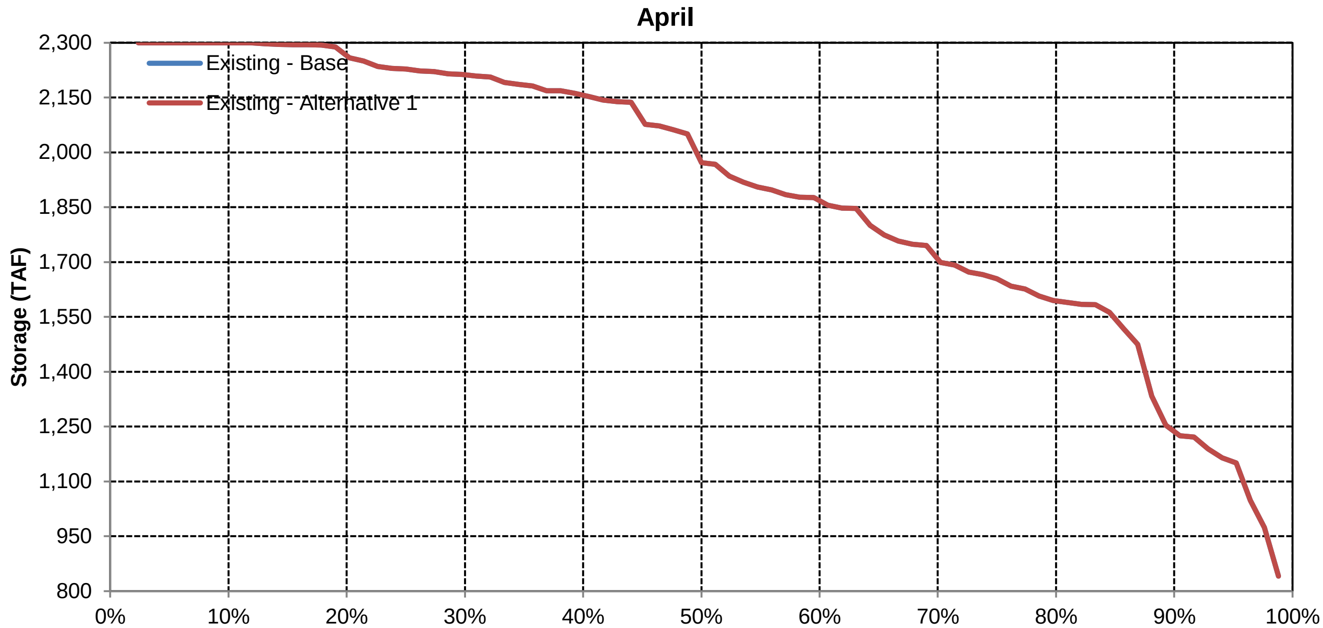

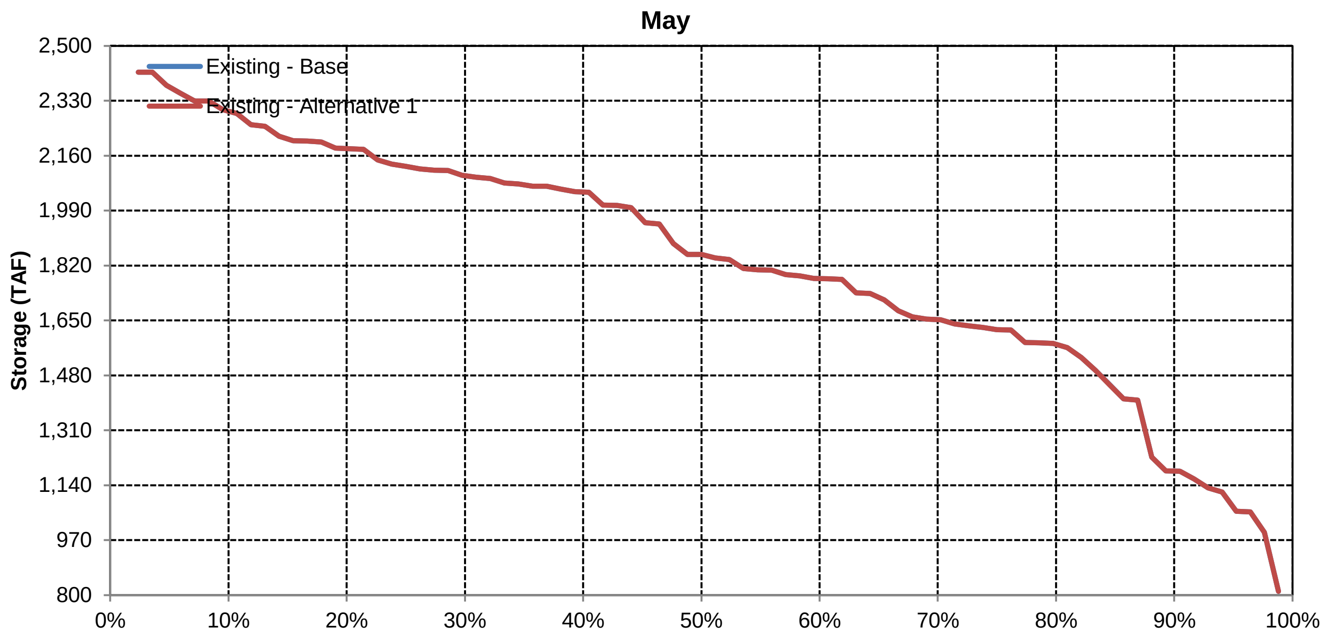

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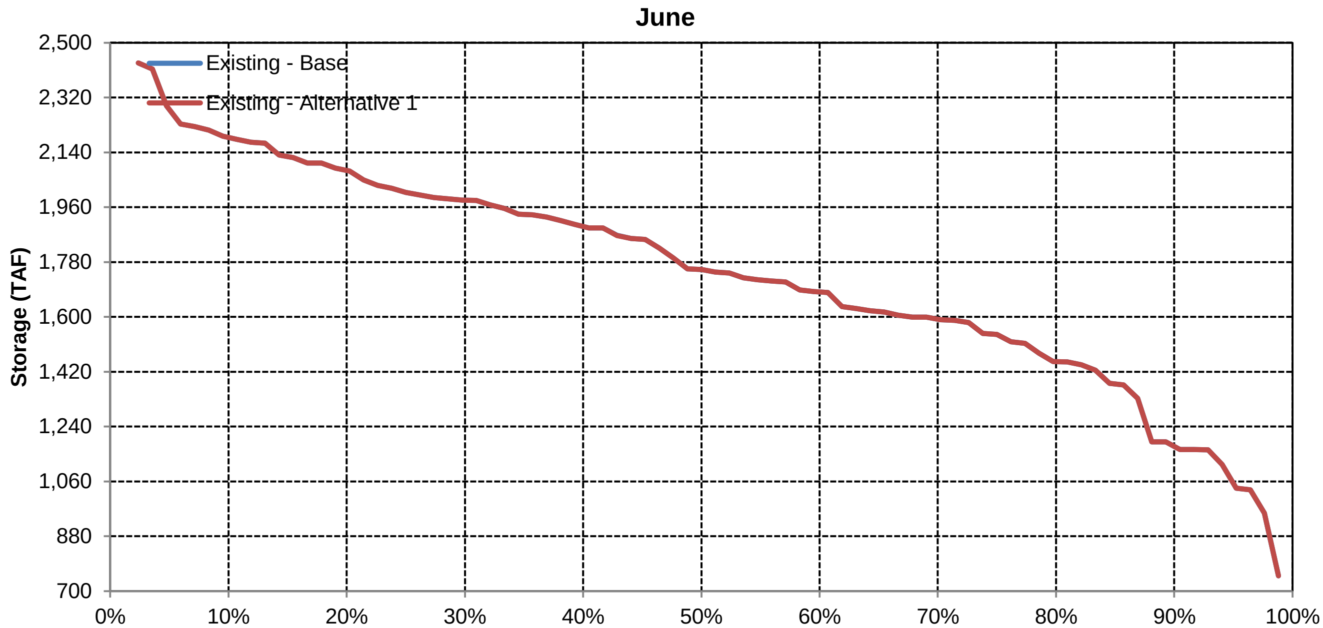
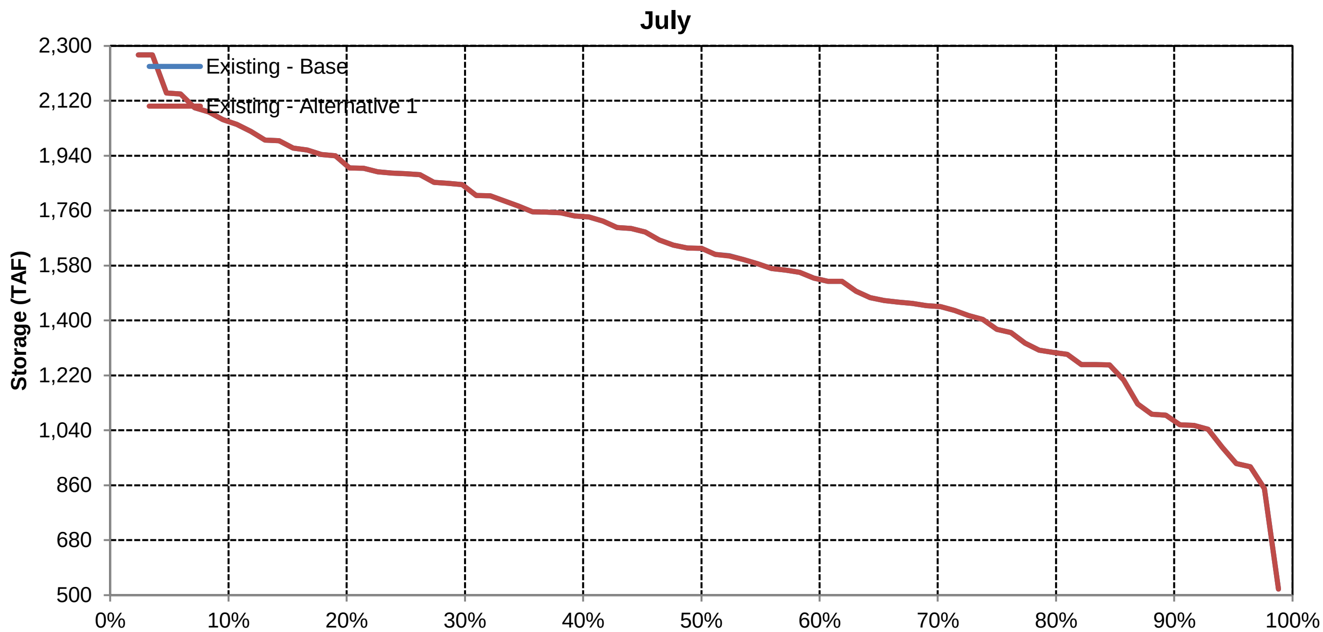
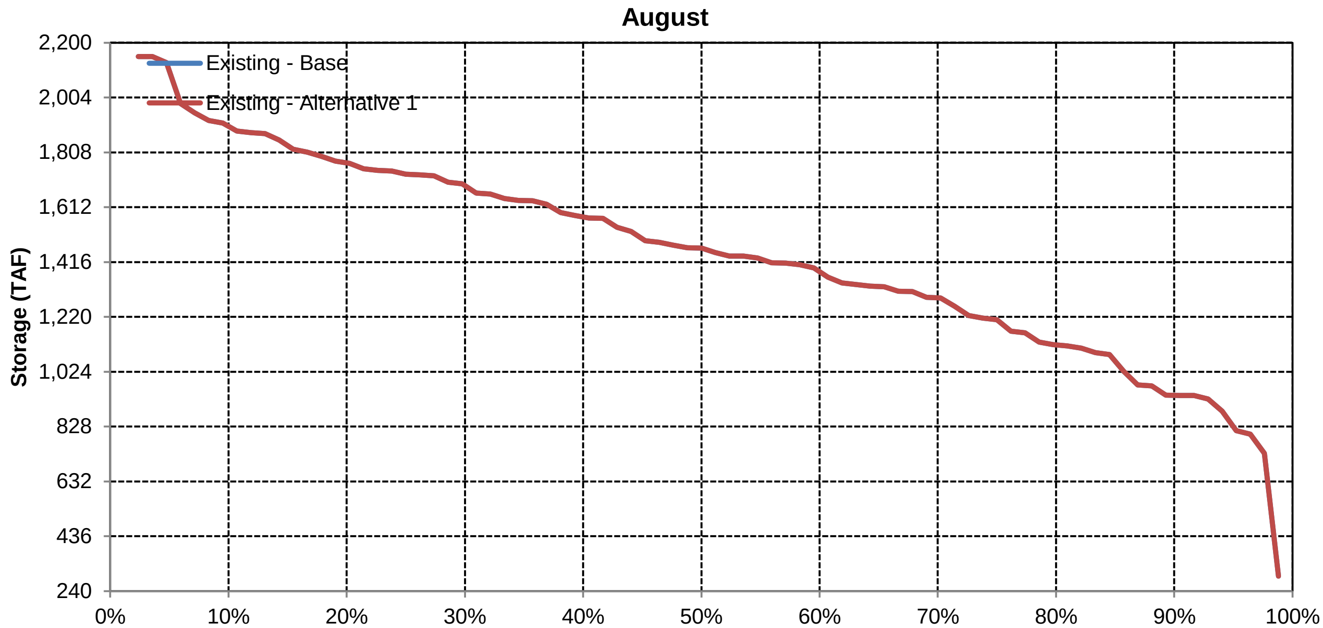
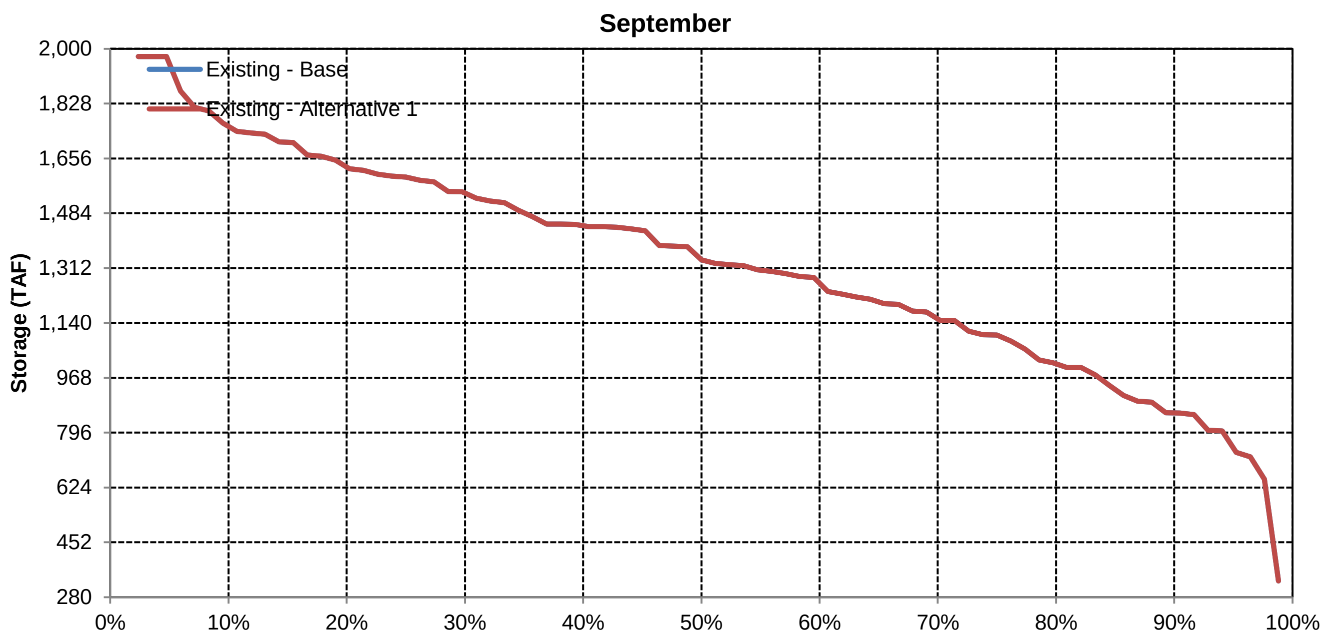




Trinity Reservoir





Long-Term and Water Year-Type Average of Shasta Reservoir Storage Under Existing - Base and Existing - Alternative 1

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
						Long-Term						
Full Simulation Period												
Existing - Base	2,487	2,504	2,755	3,076	3,374	3,757	3,995	3,956	3,567	3,020	2,727	2,556
Existing - Alternative 1	2,487	2,504	2,755	3,076	3,374	3,757	3,995	3,956	3,567	3,020	2,727	2,556
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
						Water Year-Types						
Wet												
Existing - Base	2,613	2,702	3,100	3,440	3,579	3,865	4,280	4,388	4,084	3,560	3,256	2,842
Existing - Alternative 1	2,613	2,702	3,100	3,440	3,579	3,865	4,280	4,388	4,084	3,560	3,256	2,842
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal												
Existing - Base	2,537	2,485	2,766	3,212	3,572	4,014	4,364	4,325	3,912	3,323	3,009	2,768
Existing - Alternative 1	2,537	2,485	2,766	3,212	3,572	4,014	4,364	4,325	3,912	3,323	3,009	2,768
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Existing - Base	2,369	2,436	2,594	2,989	3,427	3,933	4,220	4,140	3,703	3,083	2,787	2,785
Existing - Alternative 1	2,369	2,436	2,594	2,989	3,427	3,933	4,220	4,140	3,704	3,083	2,787	2,785
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry												
Existing - Base	2,489	2,449	2,648	2,874	3,288	3,732	3,800	3,677	3,263	2,775	2,491	2,466
Existing - Alternative 1	2,489	2,449	2,648	2,874	3,288	3,732	3,800	3,677	3,263	2,775	2,491	2,466
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical												
Existing - Base	2,338	2,278	2,396	2,576	2,786	3,059	2,976	2,802	2,354	1,832	1,572	1,547
Existing - Alternative 1	2,338	2,278	2,396	2,576	2,786	3,059	2,976	2,802	2,354	1,832	1,572	1,547
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Shasta Reservoir Storage

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	3,244	3,235	3,326	3,635	3,894	4,241	4,535	4,552	4,292	3,804	3,449	3,173
20%	2,935	2,986	3,288	3,529	3,740	4,119	4,455	4,528	4,151	3,585	3,339	3,033
30%	2,796	2,765	3,252	3,373	3,662	4,036	4,356	4,434	4,067	3,445	3,153	2,831
40%	2,695	2,654	3,047	3,296	3,552	3,992	4,257	4,293	3,864	3,225	2,891	2,766
50%	2,563	2,574	2,797	3,246	3,471	3,906	4,206	4,183	3,681	3,093	2,805	2,667
60%	2,427	2,461	2,677	3,001	3,300	3,744	4,097	4,057	3,556	2,974	2,699	2,490
70%	2,318	2,318	2,503	2,902	3,251	3,531	3,948	3,837	3,399	2,816	2,509	2,373
80%	2,161	2,218	2,368	2,685	3,077	3,387	3,457	3,270	2,912	2,497	2,253	2,259
90%	1,751	1,763	1,960	2,366	2,766	3,186	3,065	2,980	2,526	2,019	1,715	1,746
Long Term												
Full Simulation Period	2,487	2,504	2,755	3,076	3,374	3,757	3,995	3,956	3,567	3,020	2,727	2,556
Water Year Types												
Wet	2,613	2,702	3,100	3,440	3,579	3,865	4,280	4,388	4,084	3,560	3,256	2,842
Above Normal	2,537	2,485	2,766	3,212	3,572	4,014	4,364	4,325	3,912	3,323	3,009	2,768
Below Normal	2,369	2,436	2,594	2,989	3,427	3,933	4,220	4,140	3,703	3,083	2,787	2,785
Dry	2,489	2,449	2,648	2,874	3,288	3,732	3,800	3,677	3,263	2,775	2,491	2,466
Critical	2,338	2,278	2,396	2,576	2,786	3,059	2,976	2,802	2,354	1,832	1,572	1,547

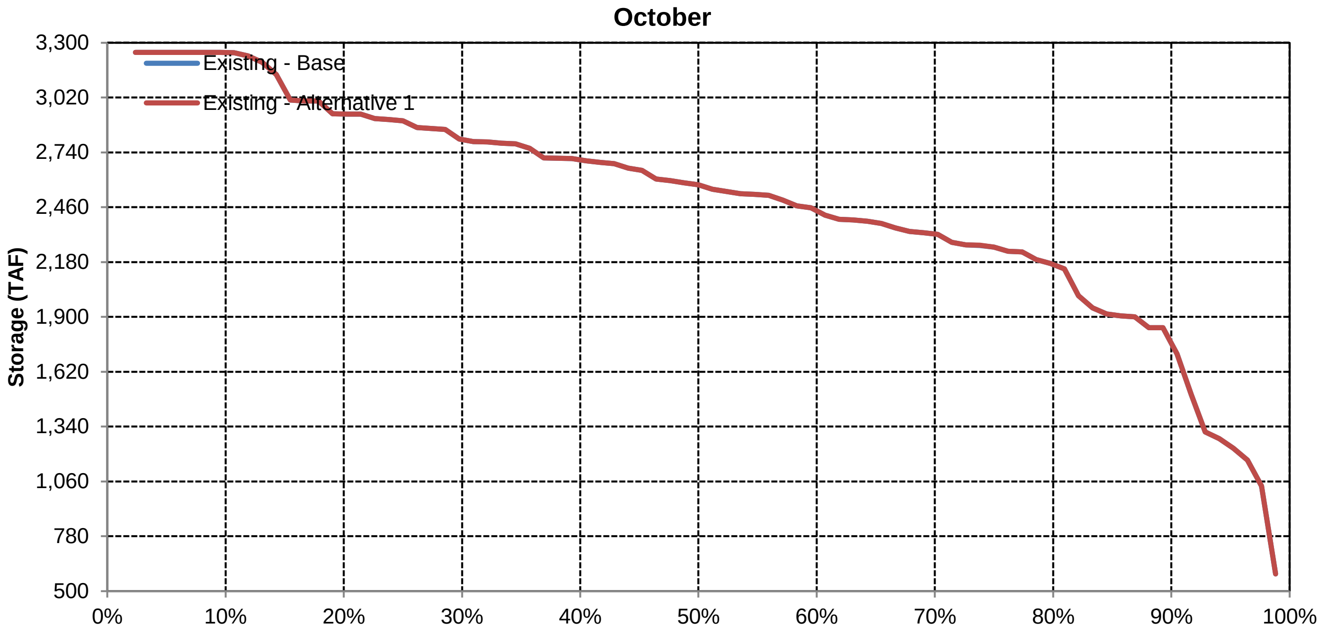
Existing - Alternative 1

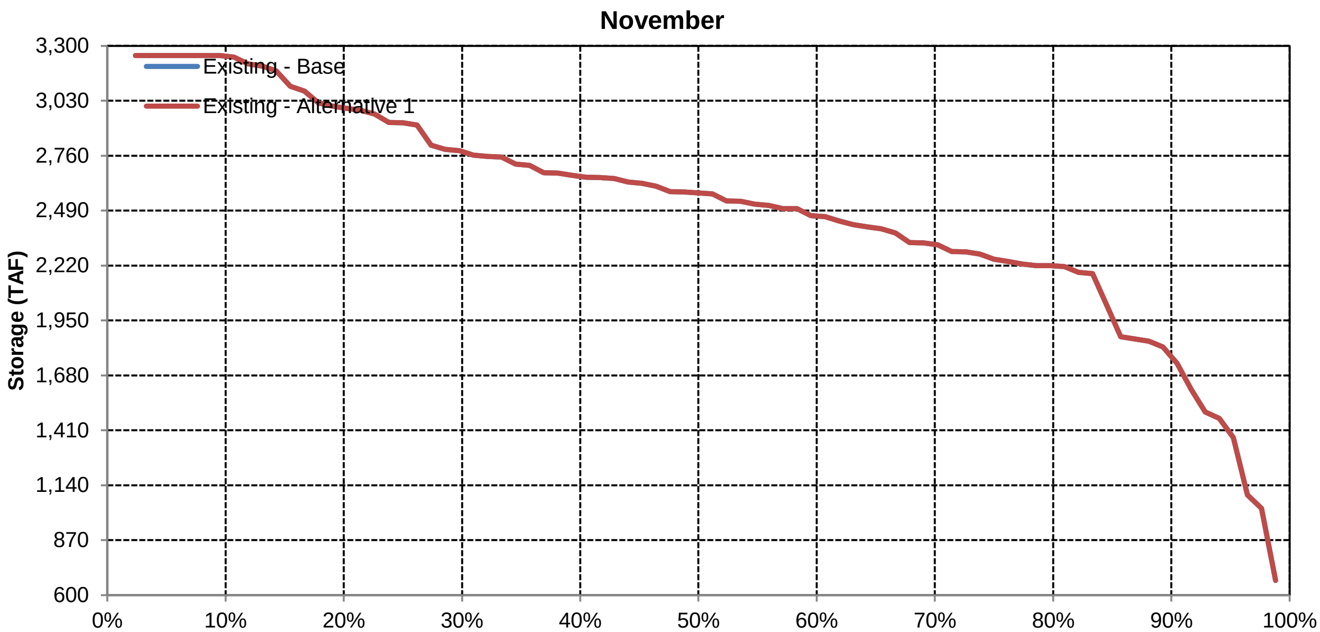
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	3,244	3,235	3,326	3,635	3,894	4,241	4,535	4,552	4,292	3,804	3,449	3,173
20%	2,935	2,986	3,288	3,529	3,740	4,119	4,455	4,528	4,151	3,585	3,339	3,033
30%	2,796	2,765	3,252	3,373	3,662	4,036	4,356	4,434	4,067	3,445	3,153	2,831
40%	2,695	2,654	3,047	3,297	3,552	3,992	4,257	4,293	3,864	3,225	2,891	2,766
50%	2,563	2,574	2,797	3,246	3,471	3,906	4,206	4,183	3,681	3,093	2,805	2,667
60%	2,427	2,462	2,677	3,001	3,300	3,744	4,097	4,057	3,556	2,974	2,699	2,491
70%	2,318	2,318	2,503	2,902	3,251	3,531	3,948	3,837	3,399	2,816	2,509	2,373
80%	2,161	2,218	2,368	2,685	3,077	3,387	3,457	3,270	2,912	2,497	2,253	2,259
90%	1,751	1,763	1,960	2,366	2,766	3,186	3,065	2,980	2,526	2,019	1,715	1,746
Long Term												
Full Simulation Period	2,487	2,504	2,755	3,076	3,374	3,757	3,995	3,956	3,567	3,020	2,727	2,556
Water Year Types												
Wet	2,613	2,702	3,100	3,440	3,579	3,865	4,280	4,388	4,084	3,560	3,256	2,842
Above Normal	2,537	2,485	2,766	3,212	3,572	4,014	4,364	4,325	3,912	3,323	3,009	2,768
Below Normal	2,369	2,436	2,594	2,989	3,427	3,933	4,220	4,140	3,704	3,083	2,787	2,785
Dry	2,489	2,449	2,648	2,874	3,288	3,732	3,800	3,677	3,263	2,775	2,491	2,466
Critical	2,338	2,278	2,396	2,576	2,786	3,059	2,976	2,802	2,354	1,832	1,572	1,547

Existing - Alternative 1 Minus Existing - Base

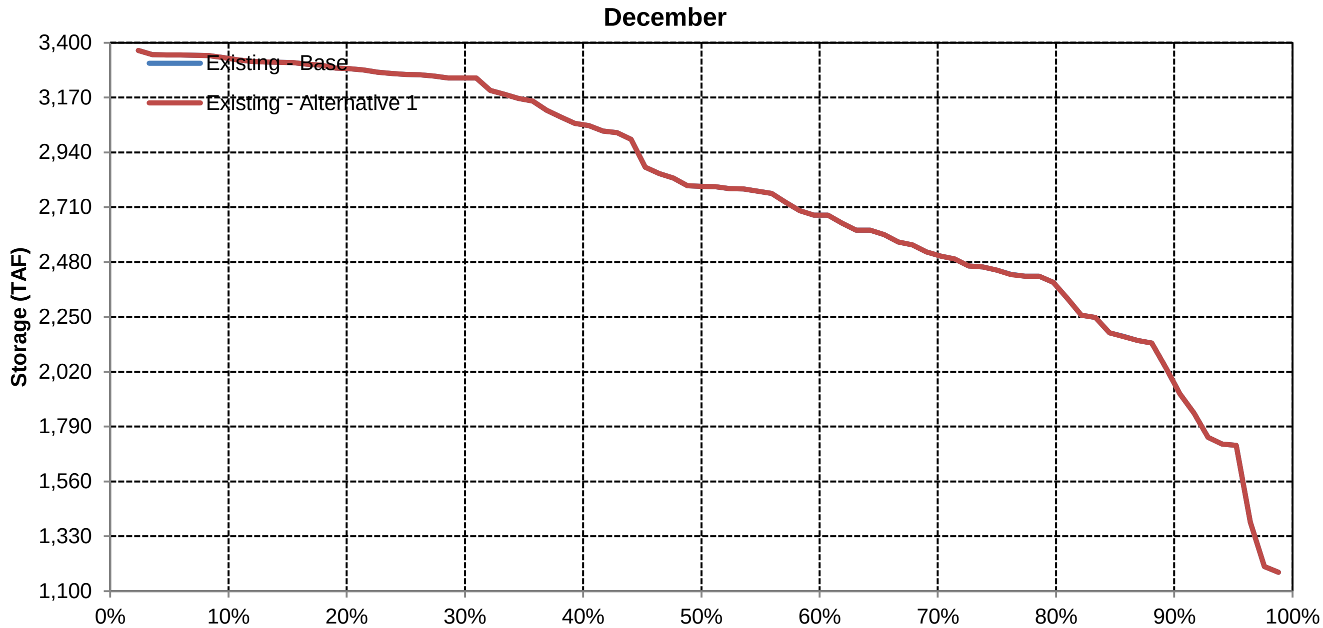
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types												
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

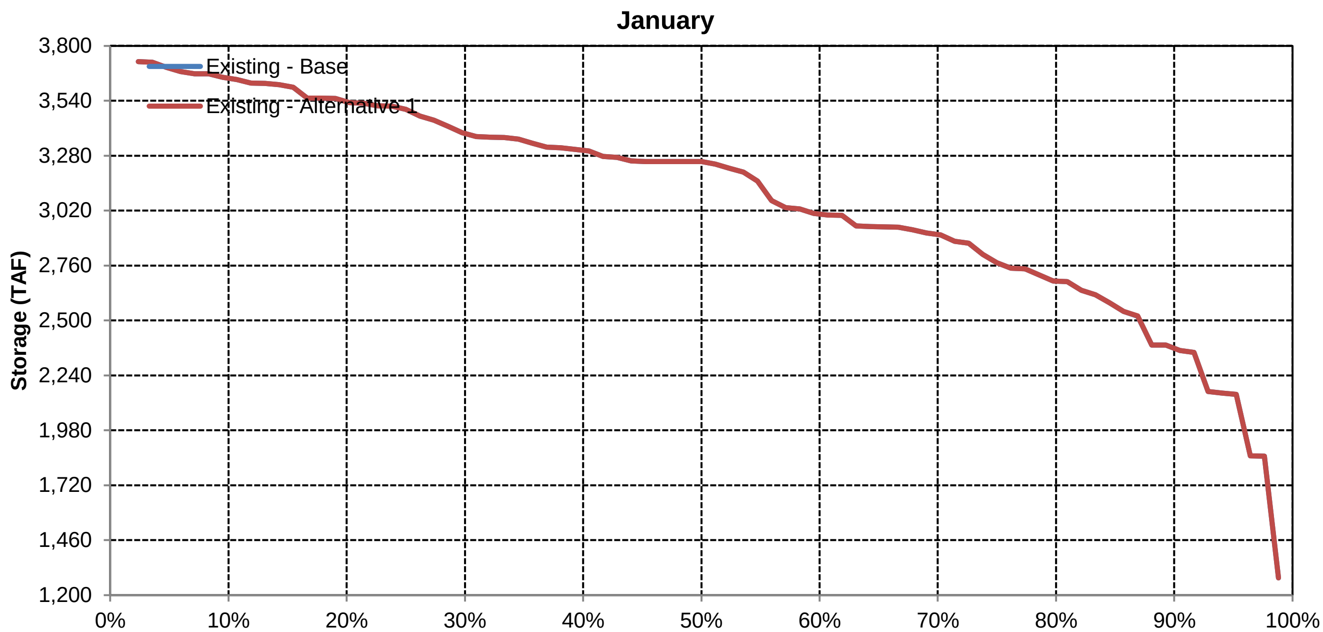
Shasta Reservoir Storage





Shasta Reservoir Storage





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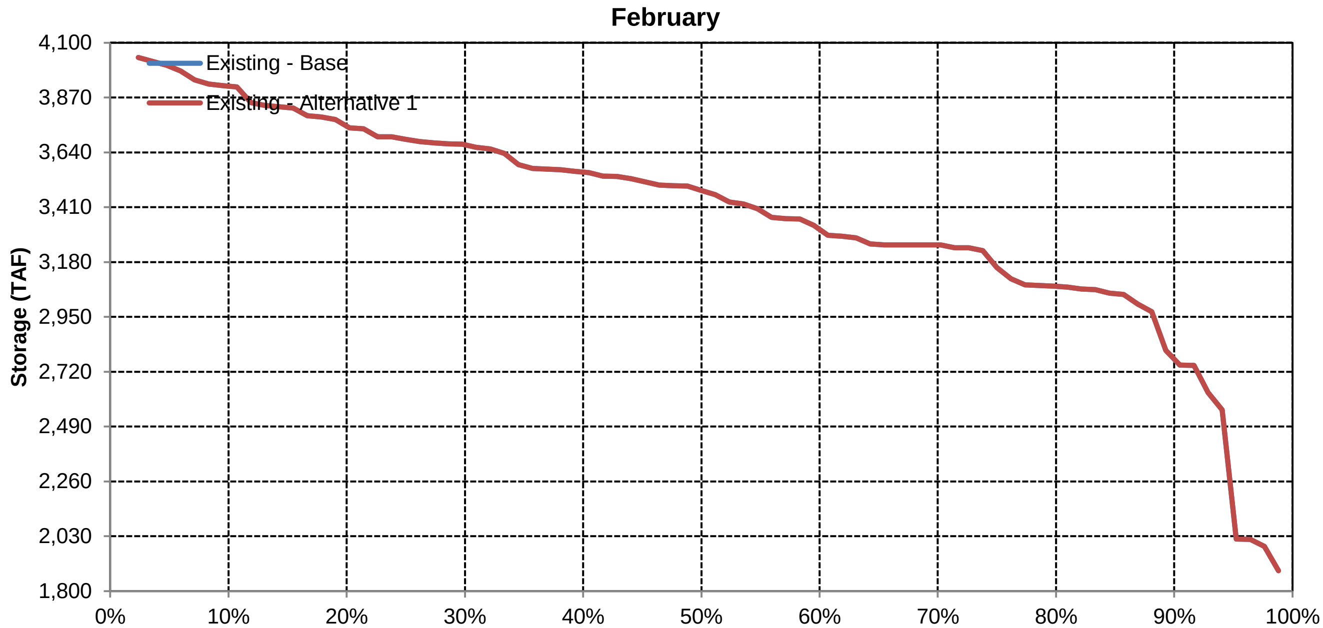

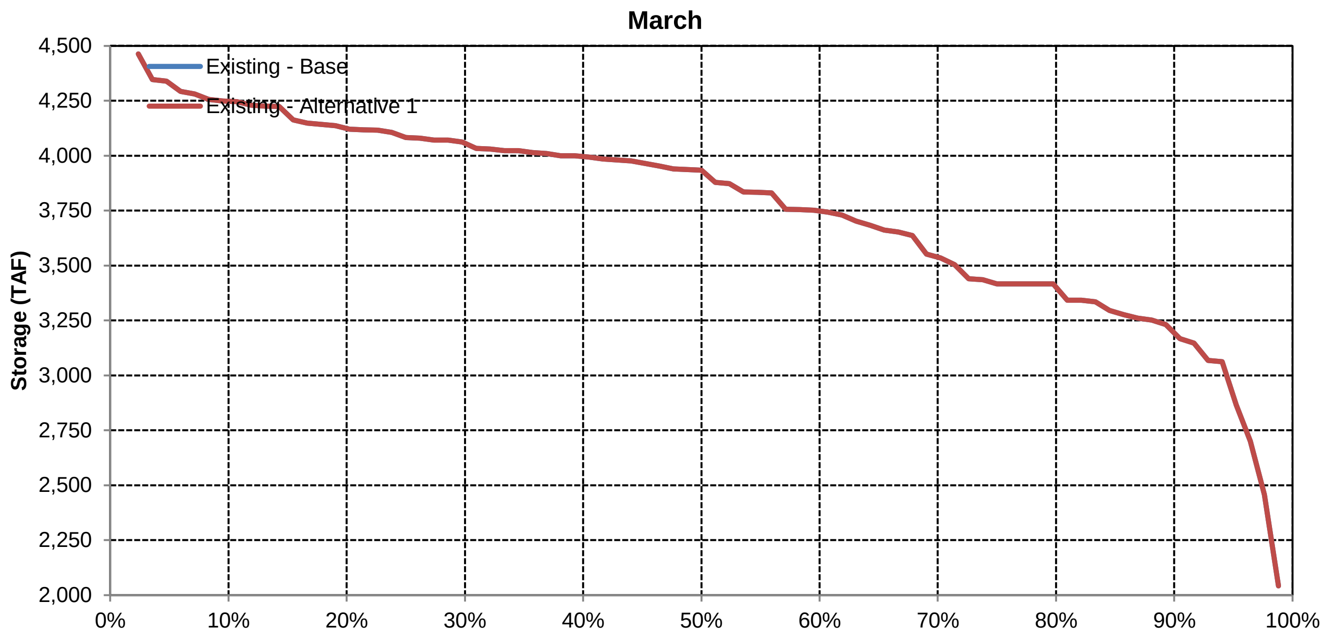

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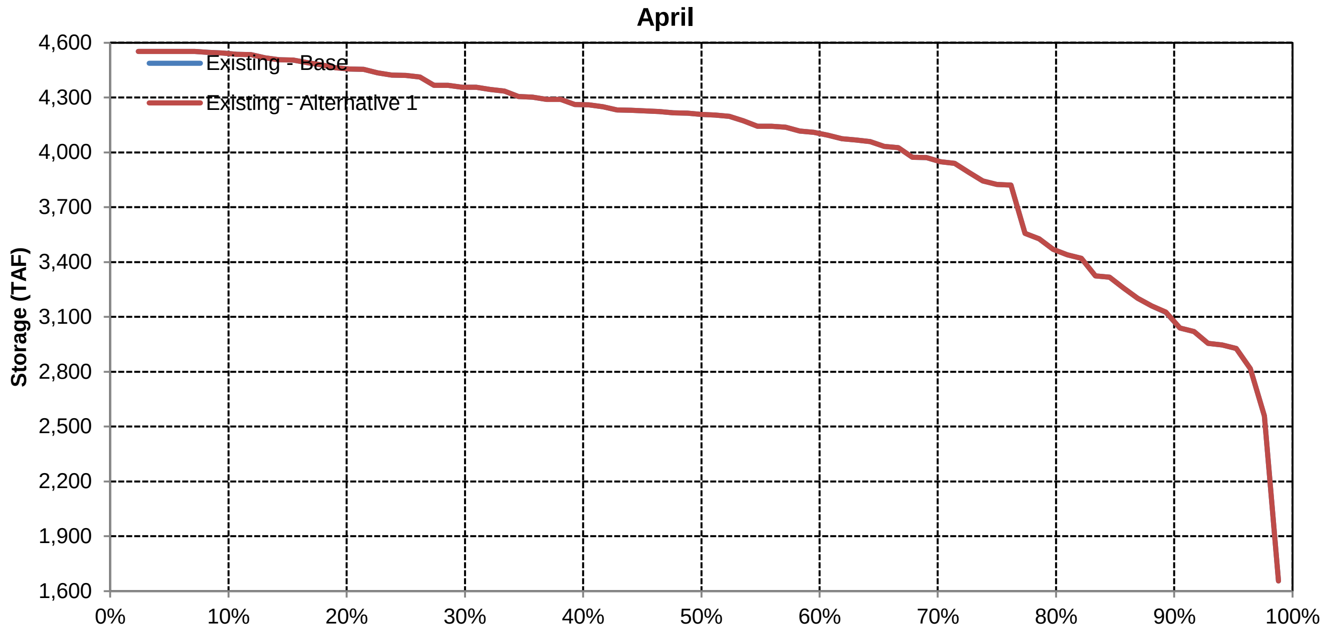

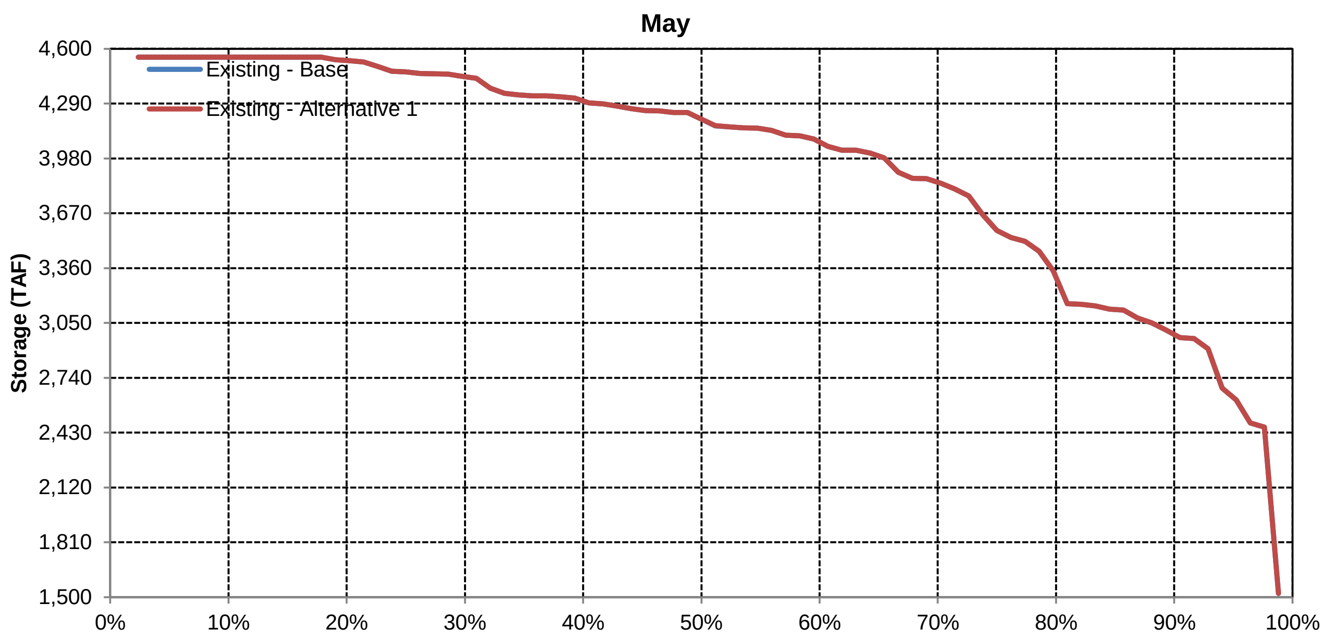

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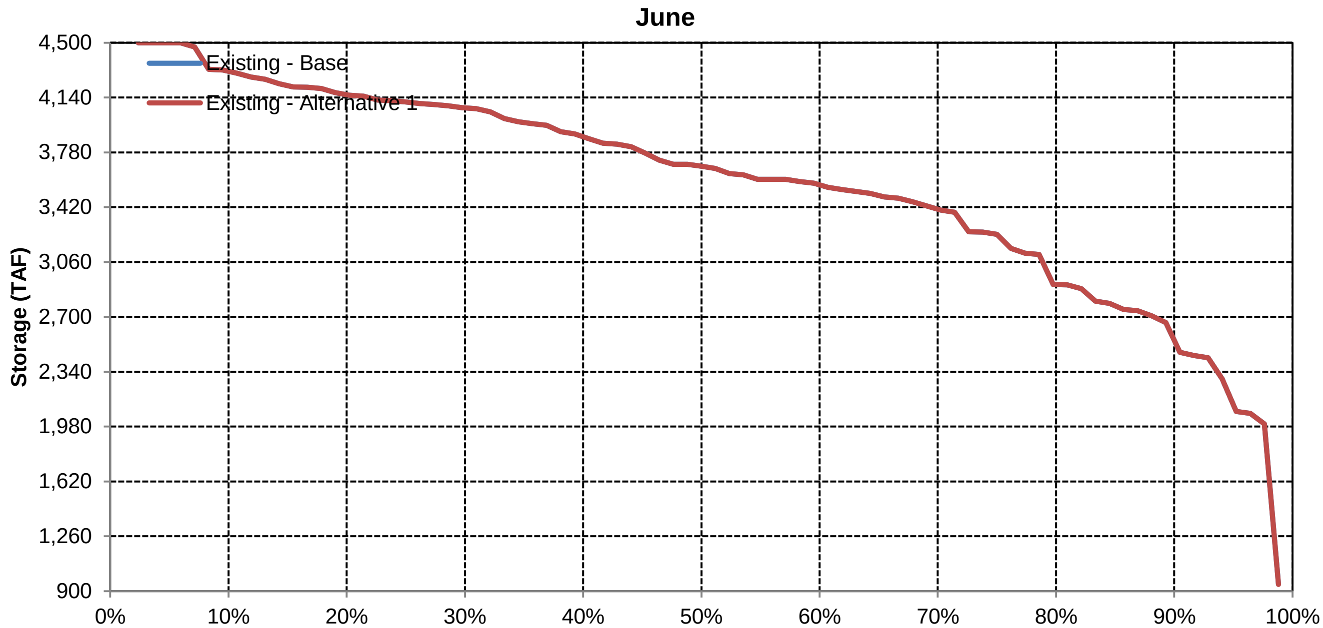

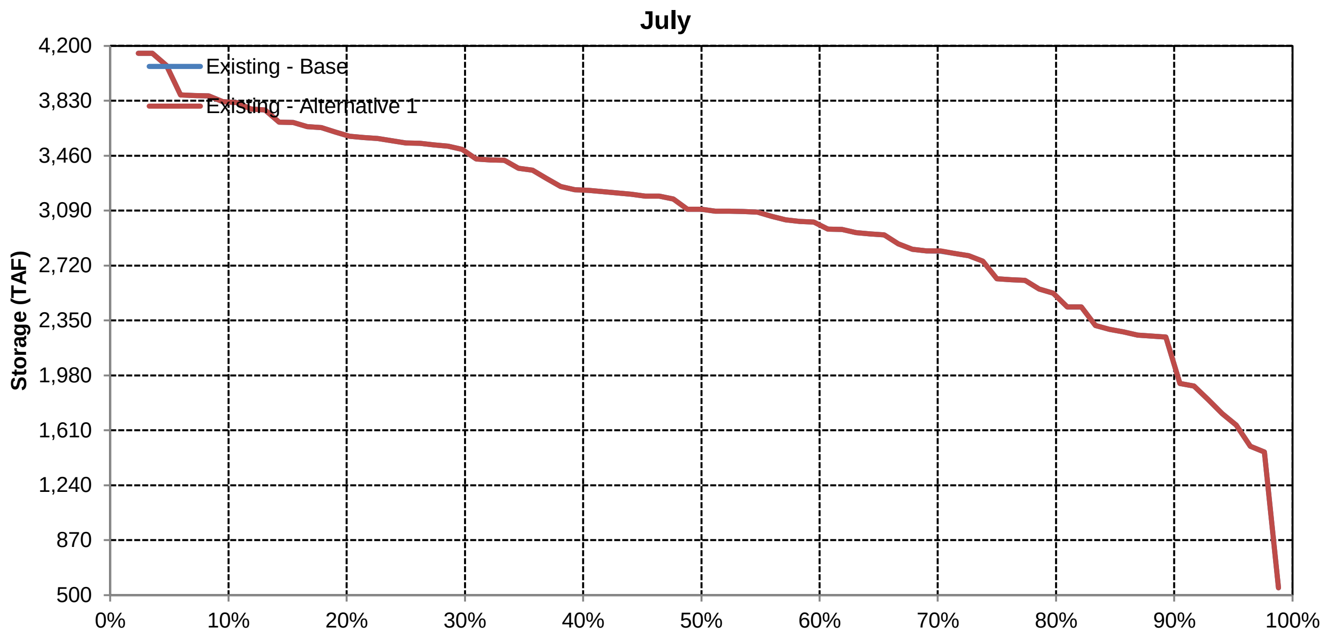

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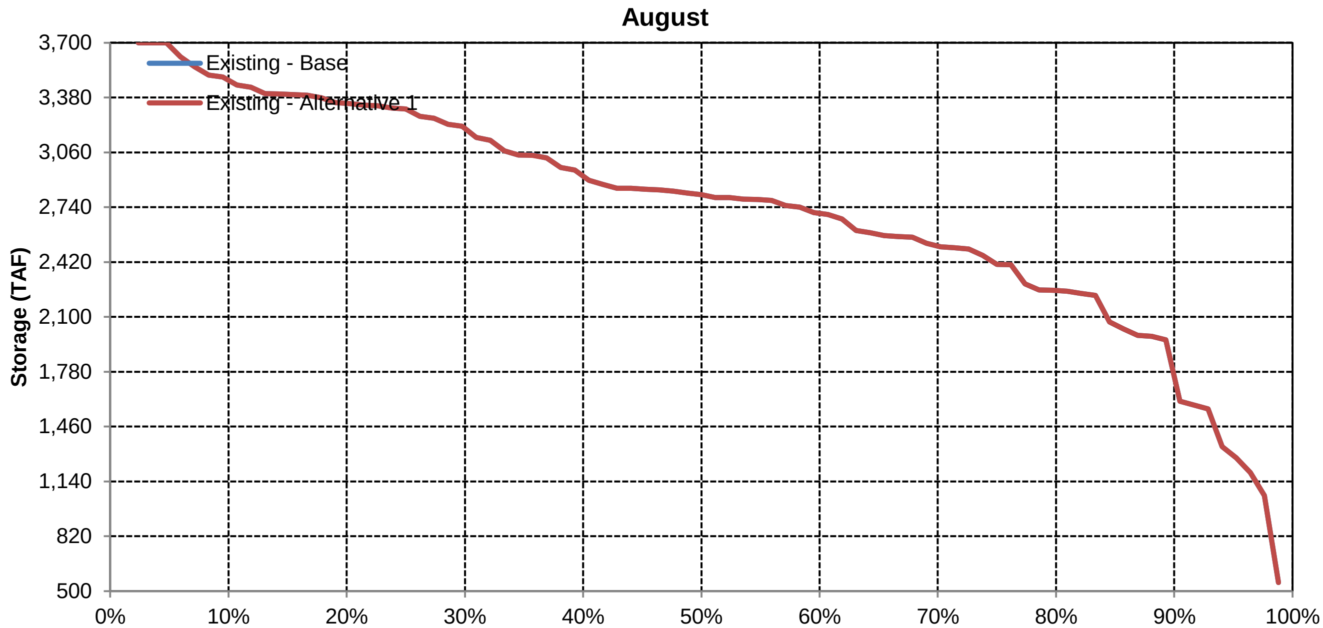
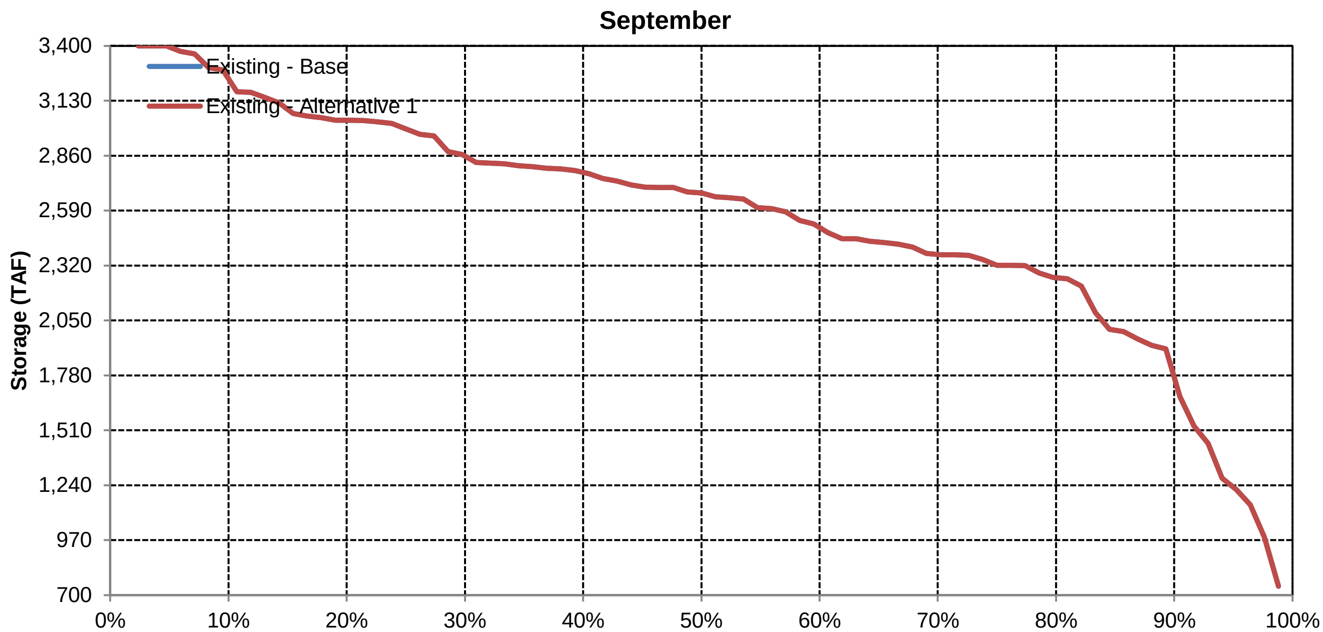




Long-Term and Water Year-Type Average of Oroville Reservoir Under Existing - Base and Existing - Alternative 1

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
						Long-Term						
Full Simulation Period												
Existing - Base	1,375	1,426	1,653	1,978	2,289	2,521	2,733	2,764	2,570	2,055	1,720	1,475
Existing - Alternative 1	1,375	1,426	1,653	1,978	2,289	2,521	2,734	2,764	2,570	2,055	1,720	1,475
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
						Water Year-Types						
Wet												
Existing - Base	1,516	1,714	2,247	2,673	2,864	2,952	3,256	3,383	3,246	2,729	2,371	1,947
Existing - Alternative 1	1,517	1,714	2,247	2,673	2,864	2,952	3,256	3,383	3,246	2,729	2,371	1,947
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal												
Existing - Base	1,465	1,439	1,710	2,291	2,764	2,945	3,251	3,314	3,133	2,506	2,052	1,703
Existing - Alternative 1	1,465	1,439	1,710	2,291	2,764	2,945	3,251	3,314	3,133	2,506	2,052	1,703
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Existing - Base	1,400	1,431	1,460	1,738	2,132	2,519	2,765	2,772	2,519	1,889	1,450	1,333
Existing - Alternative 1	1,400	1,432	1,461	1,738	2,132	2,519	2,765	2,772	2,519	1,889	1,450	1,333
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry												
Existing - Base	1,217	1,186	1,283	1,463	1,859	2,221	2,348	2,304	2,058	1,571	1,315	1,149
Existing - Alternative 1	1,217	1,186	1,283	1,463	1,859	2,221	2,348	2,304	2,058	1,571	1,315	1,149
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical												
Existing - Base	1,167	1,125	1,125	1,245	1,411	1,604	1,597	1,528	1,356	1,082	952	901
Existing - Alternative 1	1,167	1,125	1,125	1,245	1,411	1,604	1,597	1,528	1,356	1,082	952	901
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Oroville Reservoir

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	2,048	2,100	2,788	2,852	2,973	3,062	3,347	3,538	3,464	2,932	2,540	2,049
20%	1,690	1,724	2,266	2,788	2,821	2,991	3,279	3,429	3,319	2,720	2,274	1,870
30%	1,557	1,571	1,864	2,609	2,788	2,938	3,234	3,313	3,103	2,478	2,087	1,726
40%	1,418	1,455	1,626	2,184	2,788	2,817	3,162	3,202	2,948	2,271	1,793	1,522
50%	1,255	1,303	1,474	1,911	2,537	2,788	3,042	2,980	2,730	2,097	1,619	1,391
60%	1,195	1,197	1,303	1,674	2,093	2,588	2,813	2,722	2,447	1,842	1,446	1,289
70%	1,027	1,088	1,226	1,470	1,932	2,306	2,344	2,503	2,236	1,596	1,366	1,196
80%	998	1,019	1,128	1,352	1,643	2,058	2,129	2,080	1,885	1,434	1,135	1,012
90%	885	956	992	1,085	1,275	1,582	1,648	1,551	1,356	1,036	898	852
Long Term												
Full Simulation Period	1,375	1,426	1,653	1,978	2,289	2,521	2,733	2,764	2,570	2,055	1,720	1,475
Water Year Types												
Wet	1,516	1,714	2,247	2,673	2,864	2,952	3,256	3,383	3,246	2,729	2,371	1,947
Above Normal	1,465	1,439	1,710	2,291	2,764	2,945	3,251	3,314	3,133	2,506	2,052	1,703
Below Normal	1,400	1,431	1,460	1,738	2,132	2,519	2,765	2,772	2,519	1,889	1,450	1,333
Dry	1,217	1,186	1,283	1,463	1,859	2,221	2,348	2,304	2,058	1,571	1,315	1,149
Critical	1,167	1,125	1,125	1,245	1,411	1,604	1,597	1,528	1,356	1,082	952	901

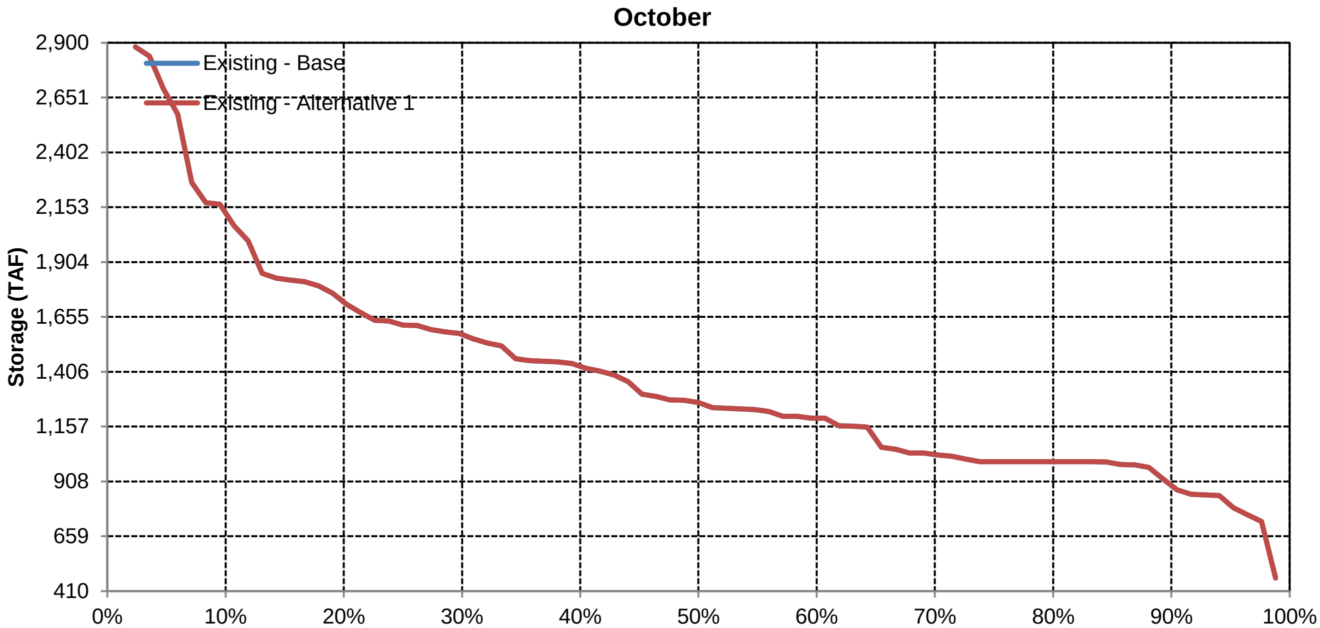
Existing - Alternative 1

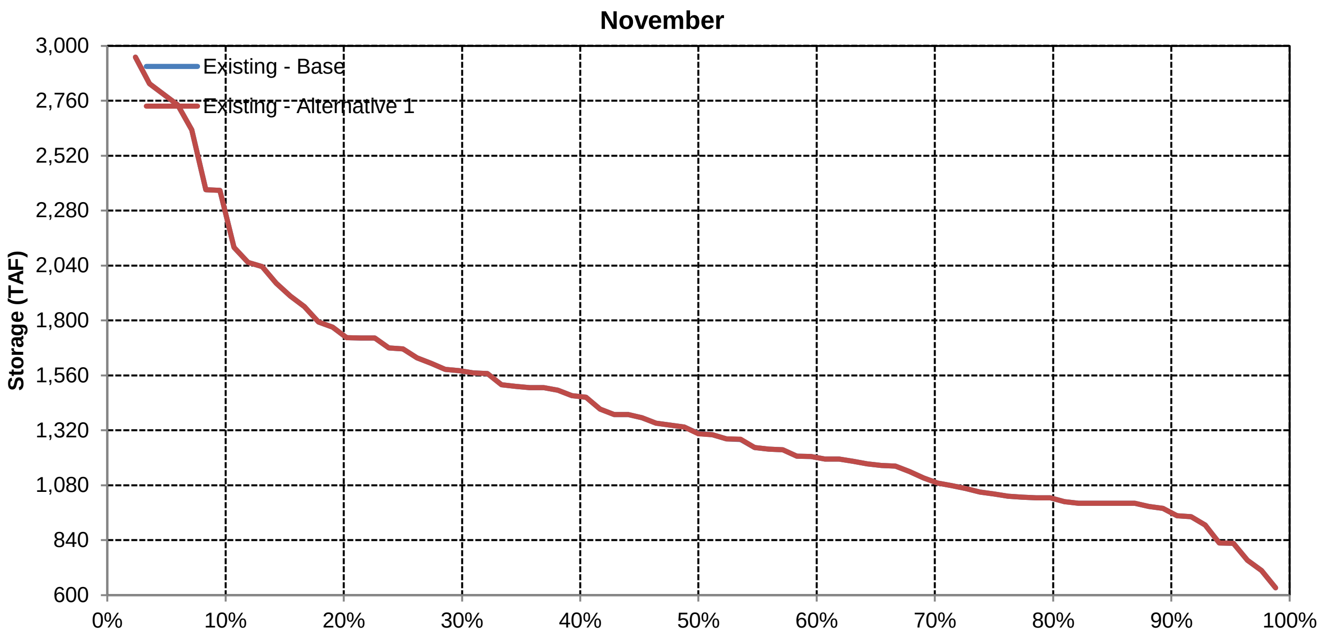
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	2,048	2,100	2,788	2,852	2,973	3,062	3,347	3,538	3,464	2,932	2,540	2,049
20%	1,690	1,724	2,266	2,788	2,821	2,991	3,279	3,429	3,319	2,720	2,274	1,870
30%	1,557	1,571	1,864	2,609	2,788	2,938	3,234	3,313	3,103	2,478	2,087	1,726
40%	1,418	1,455	1,626	2,184	2,788	2,817	3,162	3,202	2,948	2,271	1,793	1,522
50%	1,255	1,303	1,473	1,912	2,537	2,788	3,042	2,980	2,730	2,097	1,619	1,392
60%	1,195	1,197	1,303	1,674	2,093	2,588	2,813	2,722	2,447	1,842	1,446	1,290
70%	1,027	1,088	1,226	1,470	1,932	2,306	2,344	2,503	2,236	1,596	1,366	1,196
80%	998	1,019	1,128	1,352	1,643	2,058	2,129	2,080	1,885	1,434	1,135	1,012
90%	885	956	992	1,085	1,275	1,582	1,648	1,551	1,356	1,036	898	852
Long Term												
Full Simulation Period	1,375	1,426	1,653	1,978	2,289	2,521	2,734	2,764	2,570	2,055	1,720	1,475
Water Year Types												
Wet	1,517	1,714	2,247	2,673	2,864	2,952	3,256	3,383	3,246	2,729	2,371	1,947
Above Normal	1,465	1,439	1,710	2,291	2,764	2,945	3,251	3,314	3,133	2,506	2,052	1,703
Below Normal	1,400	1,432	1,461	1,738	2,132	2,519	2,765	2,772	2,519	1,889	1,450	1,333
Dry	1,217	1,186	1,283	1,463	1,859	2,221	2,348	2,304	2,058	1,571	1,315	1,149
Critical	1,167	1,125	1,125	1,245	1,411	1,604	1,597	1,528	1,356	1,082	952	901

Existing - Alternative 1 Minus Existing - Base

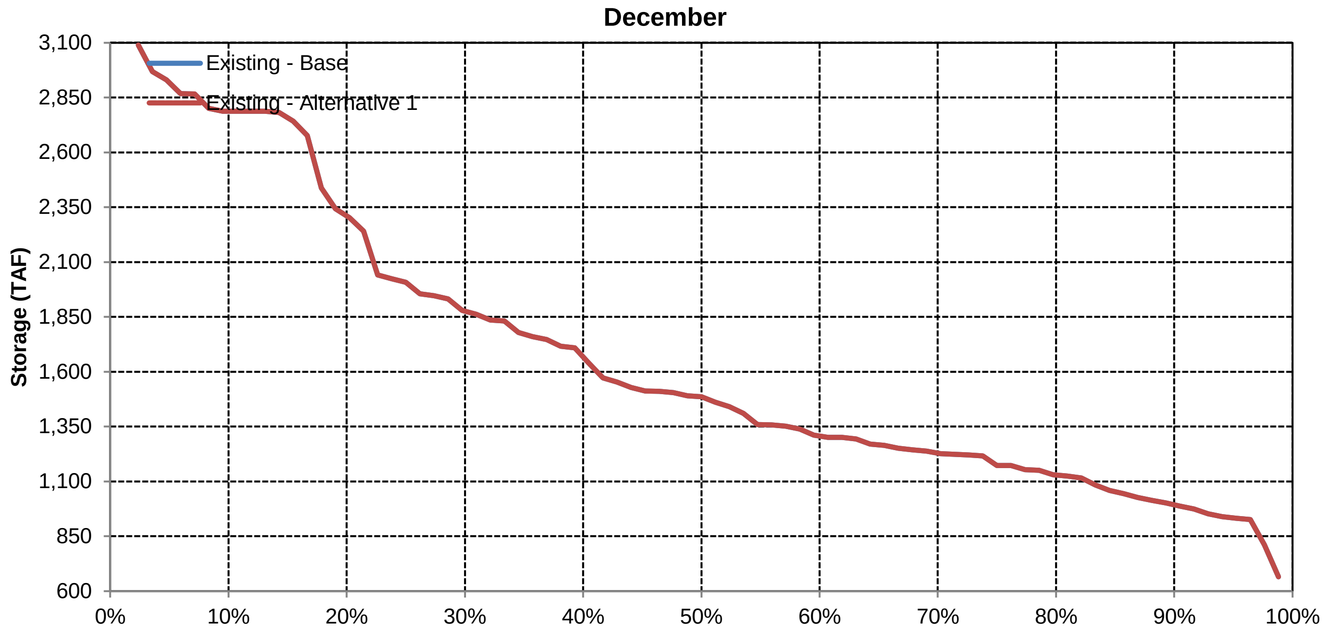
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	1	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types												
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

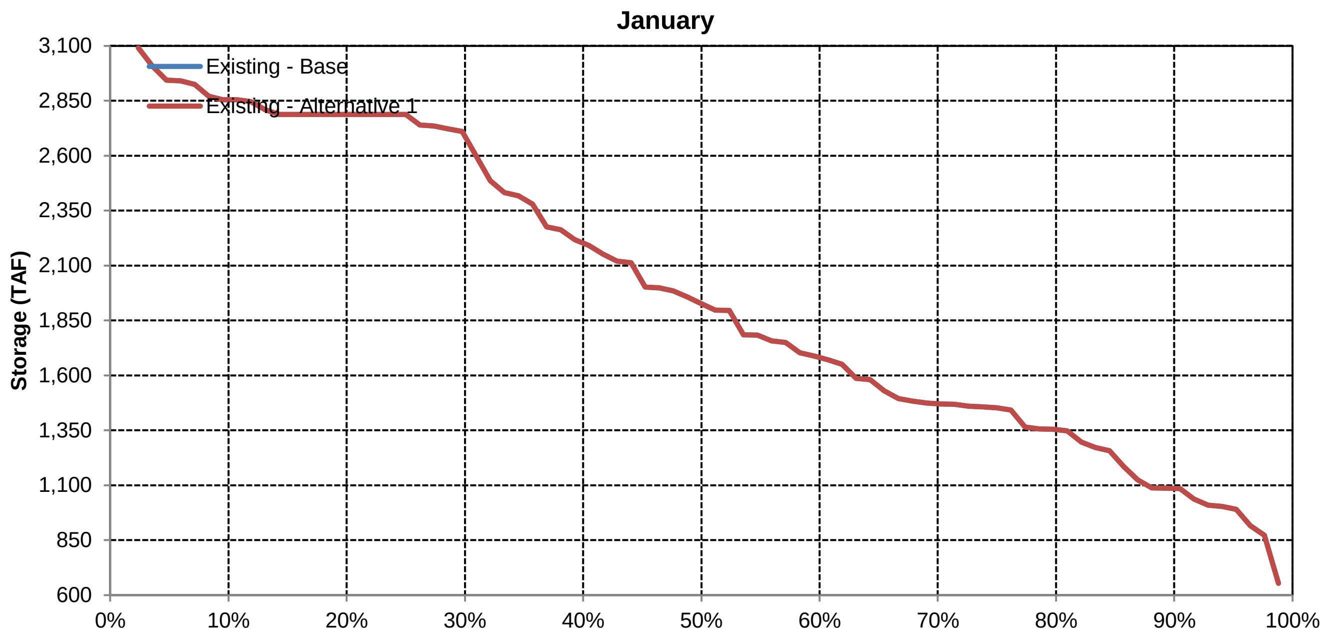
Oroville Reservoir



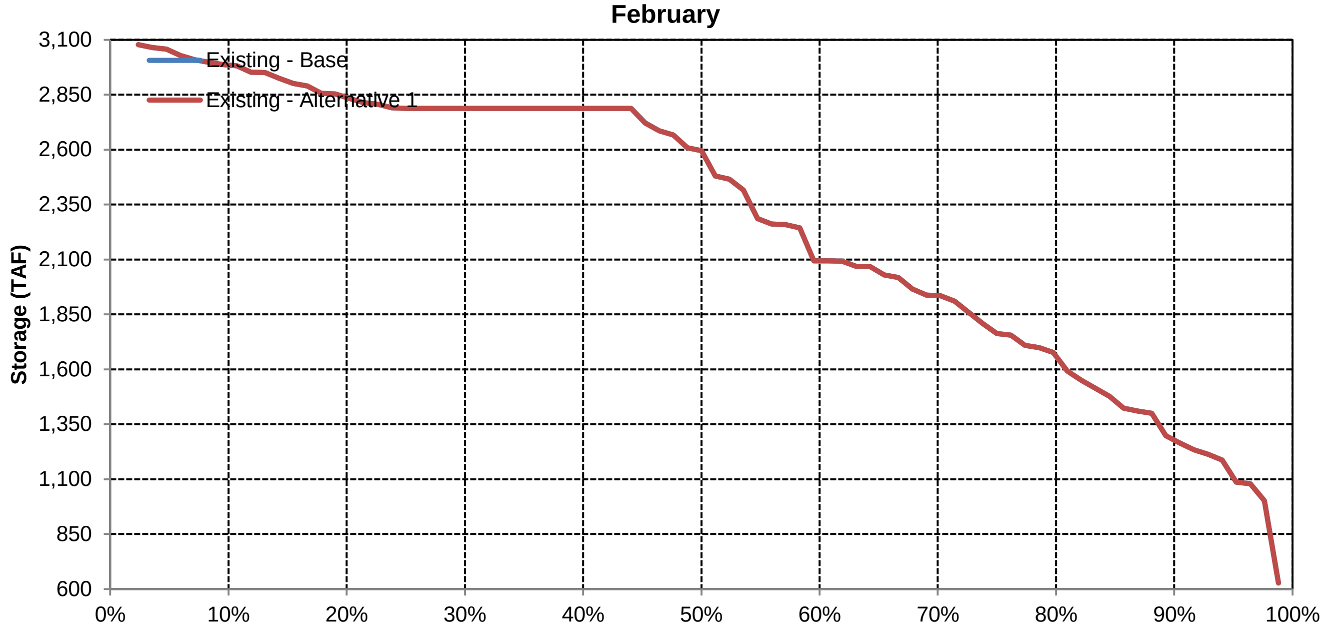


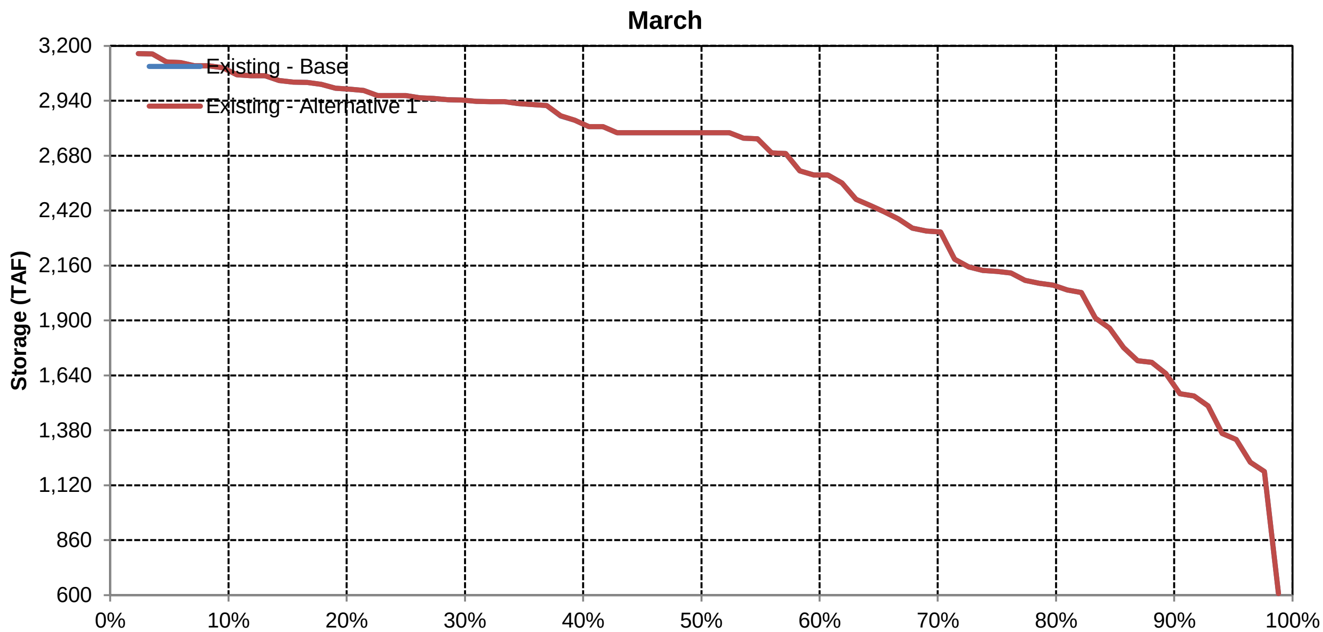
Oroville Reservoir



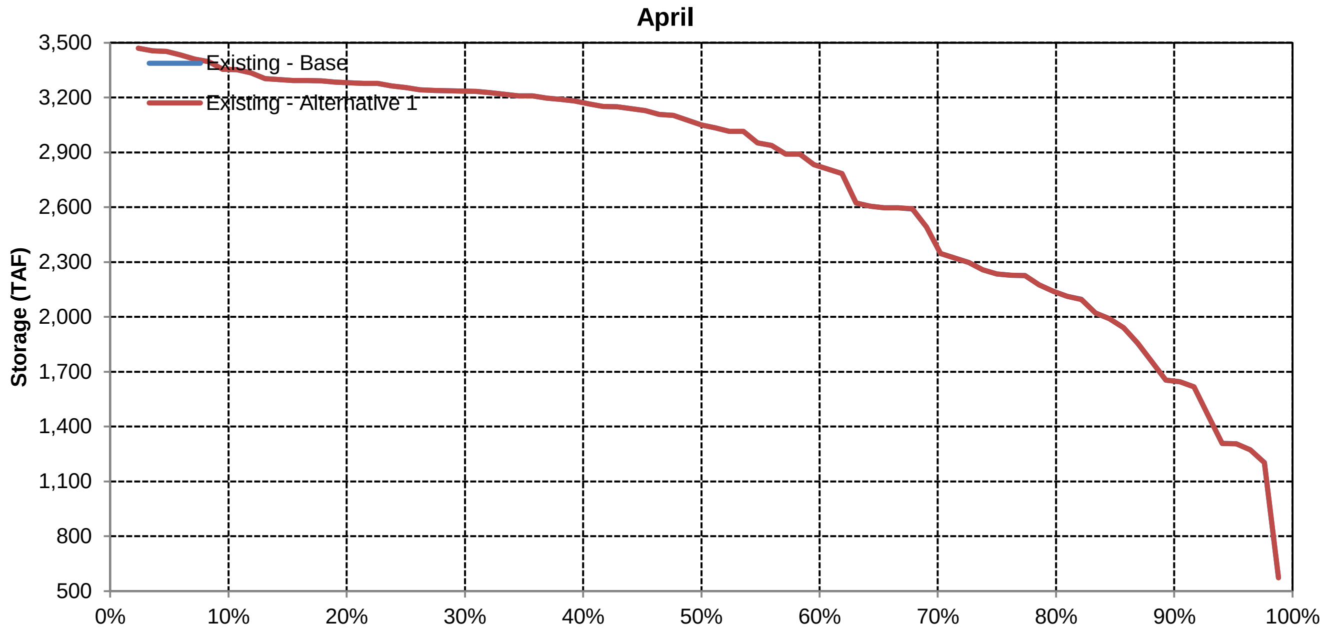


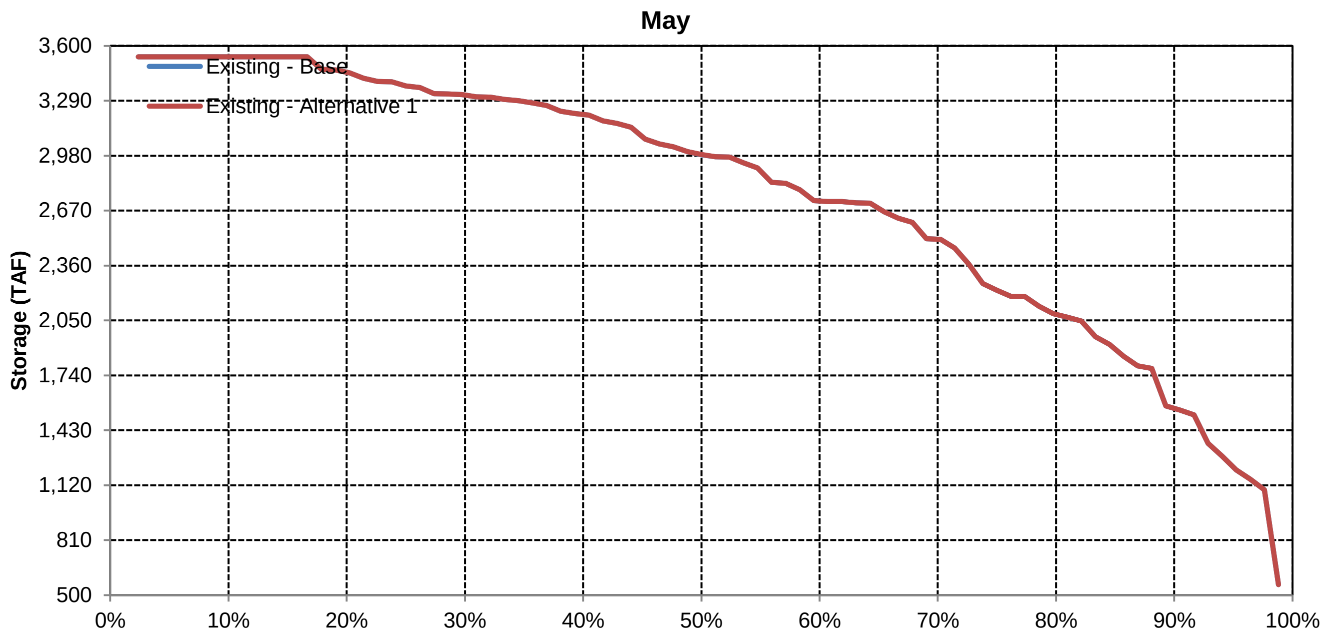
Oroville Reservoir



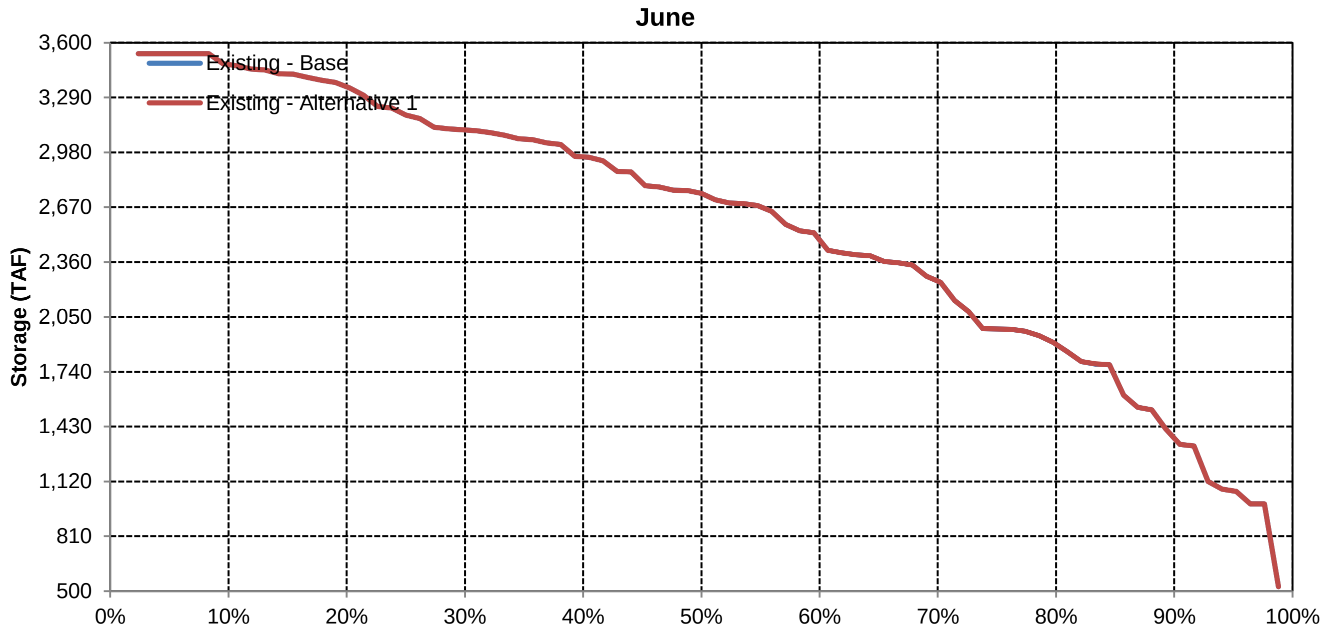


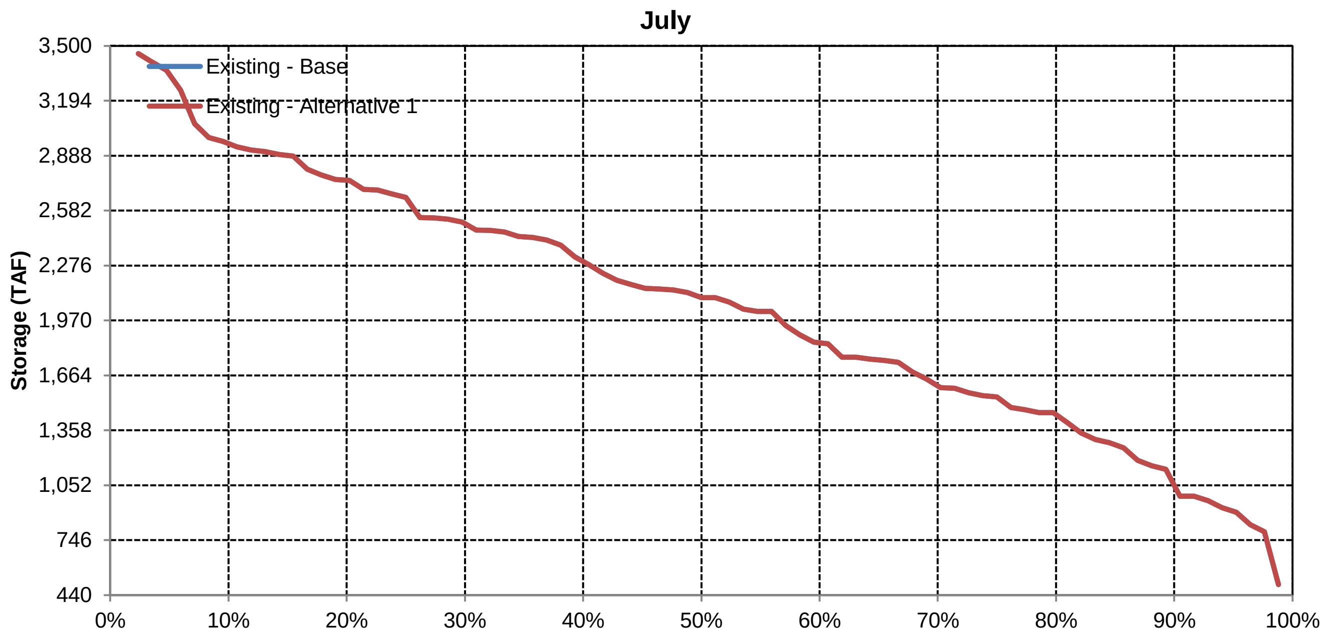
Oroville Reservoir



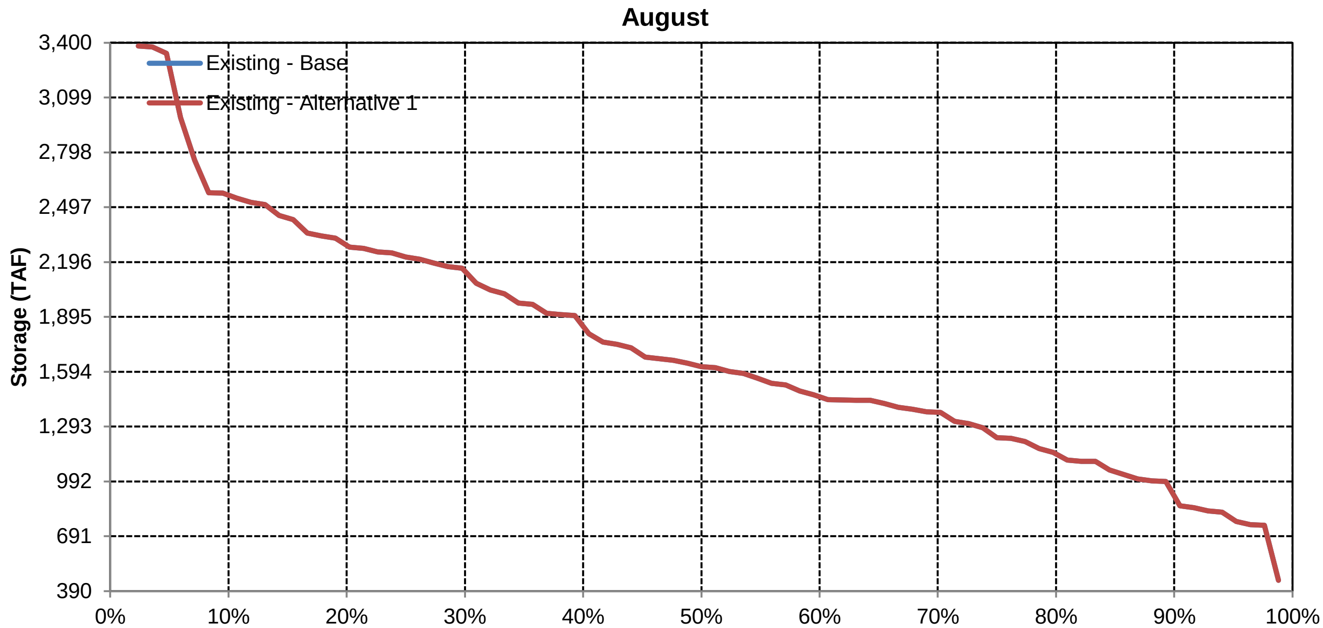


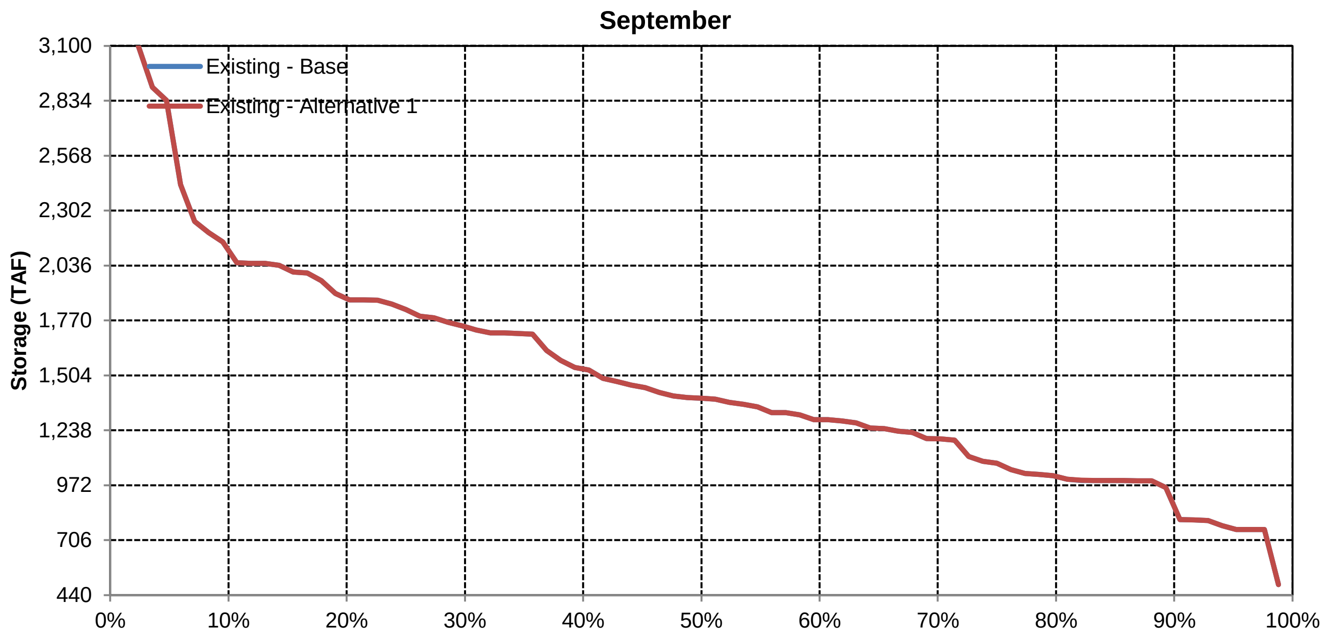
Oroville Reservoir





Oroville Reservoir





Long-Term and Water Year-Type Average of Folsom Reservoir Under Existing - Base and Existing - Alternative 1

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
						Long-Term						
Full Simulation Period												
Existing - Base	391	398	446	474	495	597	712	766	699	522	477	427
Existing - Alternative 1	391	398	446	474	495	597	712	766	699	522	477	427
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
						Water Year-Types						
Wet												
Existing - Base	405	431	511	520	508	626	766	897	851	676	622	507
Existing - Alternative 1	405	431	511	520	508	626	766	897	851	676	622	507
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal												
Existing - Base	406	399	470	532	548	643	777	842	775	540	504	455
Existing - Alternative 1	406	399	470	532	548	643	777	842	775	540	504	455
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Existing - Base	397	414	447	500	536	627	774	792	716	480	445	433
Existing - Alternative 1	397	414	447	500	536	627	774	792	716	480	445	433
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry												
Existing - Base	365	367	398	418	479	593	688	698	596	438	387	376
Existing - Alternative 1	365	367	398	418	479	593	688	698	596	438	387	376
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical												
Existing - Base	372	347	345	357	380	453	480	471	418	351	313	291
Existing - Alternative 1	372	347	345	357	380	453	480	471	418	351	313	291
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Folsom Reservoir

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	590	560	567	567	567	662	792	967	967	815	752	618
20%	495	499	567	567	567	658	792	967	877	709	667	545
30%	433	453	565	566	565	656	792	903	826	590	536	487
40%	399	419	525	557	558	651	792	803	723	530	478	439
50%	358	395	444	544	552	641	792	769	703	474	425	401
60%	339	354	413	474	518	625	758	752	677	438	396	382
70%	320	335	363	427	458	610	725	727	608	405	380	358
80%	295	300	323	365	416	566	609	626	523	374	338	318
90%	261	273	294	284	323	460	479	484	429	331	306	273
Long Term												
Full Simulation Period	391	398	446	474	495	597	712	766	699	522	477	427
Water Year Types												
Wet	405	431	511	520	508	626	766	897	851	676	622	507
Above Normal	406	399	470	532	548	643	777	842	775	540	504	455
Below Normal	397	414	447	500	536	627	774	792	716	480	445	433
Dry	365	367	398	418	479	593	688	698	596	438	387	376
Critical	372	347	345	357	380	453	480	471	418	351	313	291

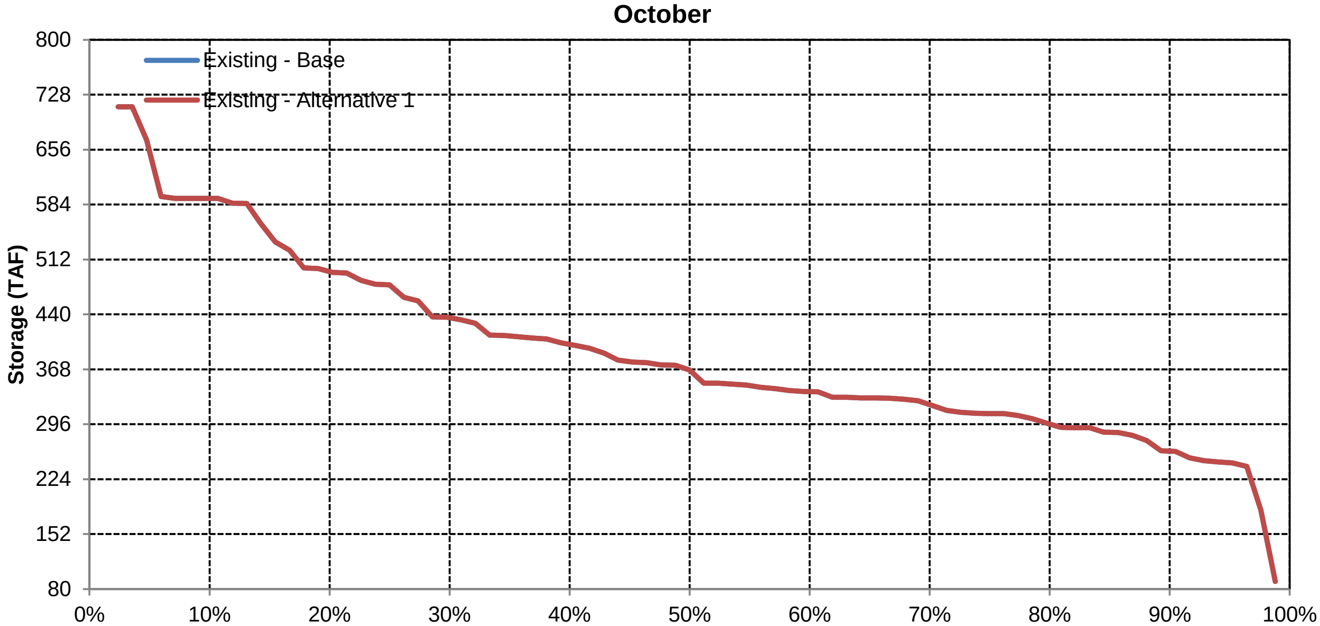
Existing - Alternative 1

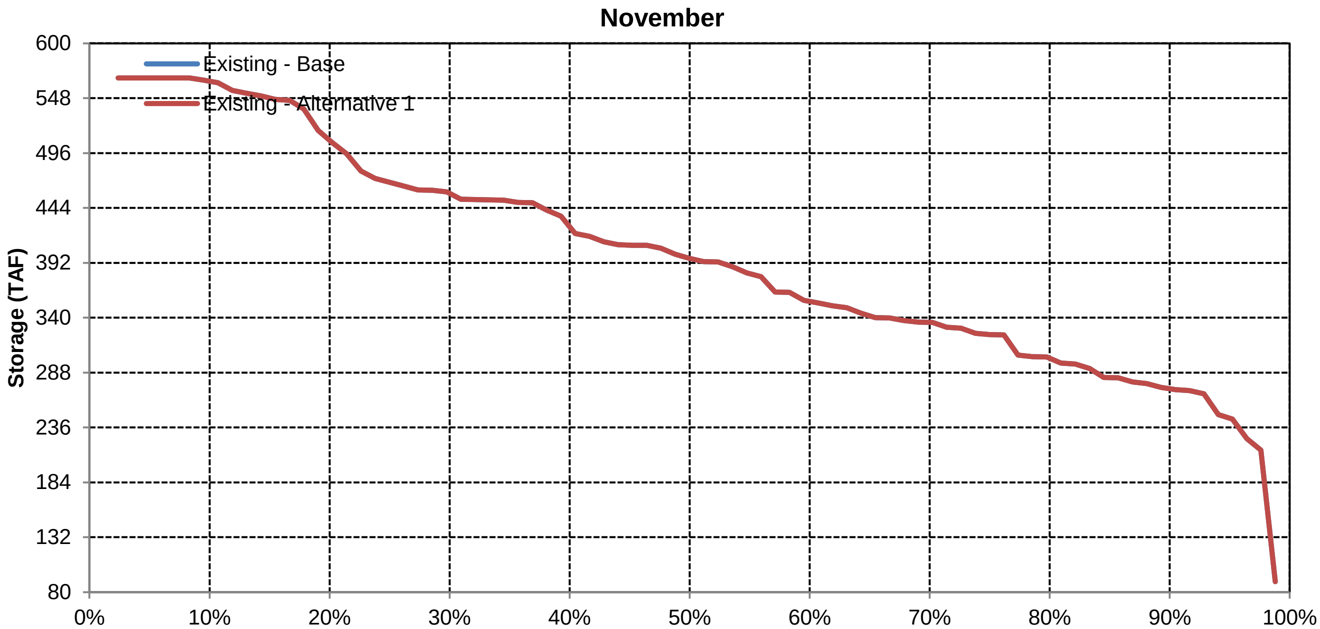
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	590	560	567	567	567	662	792	967	967	815	752	618
20%	495	499	567	567	567	658	792	967	877	709	667	545
30%	433	453	565	566	565	656	792	903	826	590	536	487
40%	399	419	525	557	558	651	792	803	723	530	478	439
50%	358	395	444	544	552	641	792	769	703	474	425	401
60%	339	354	413	474	518	625	758	752	677	438	396	382
70%	320	335	363	427	458	610	725	727	608	405	380	358
80%	295	300	323	365	416	566	609	626	523	374	338	318
90%	261	273	294	284	323	460	479	484	429	331	306	273
Long Term												
Full Simulation Period	391	398	446	474	495	597	712	766	699	522	477	427
Water Year Types												
Wet	405	431	511	520	508	626	766	897	851	676	622	507
Above Normal	406	399	470	532	548	643	777	842	775	540	504	455
Below Normal	397	414	447	500	536	627	774	792	716	480	445	433
Dry	365	367	398	418	479	593	688	698	596	438	387	376
Critical	372	347	345	357	380	453	480	471	418	351	313	291

Existing - Alternative 1 Minus Existing - Base

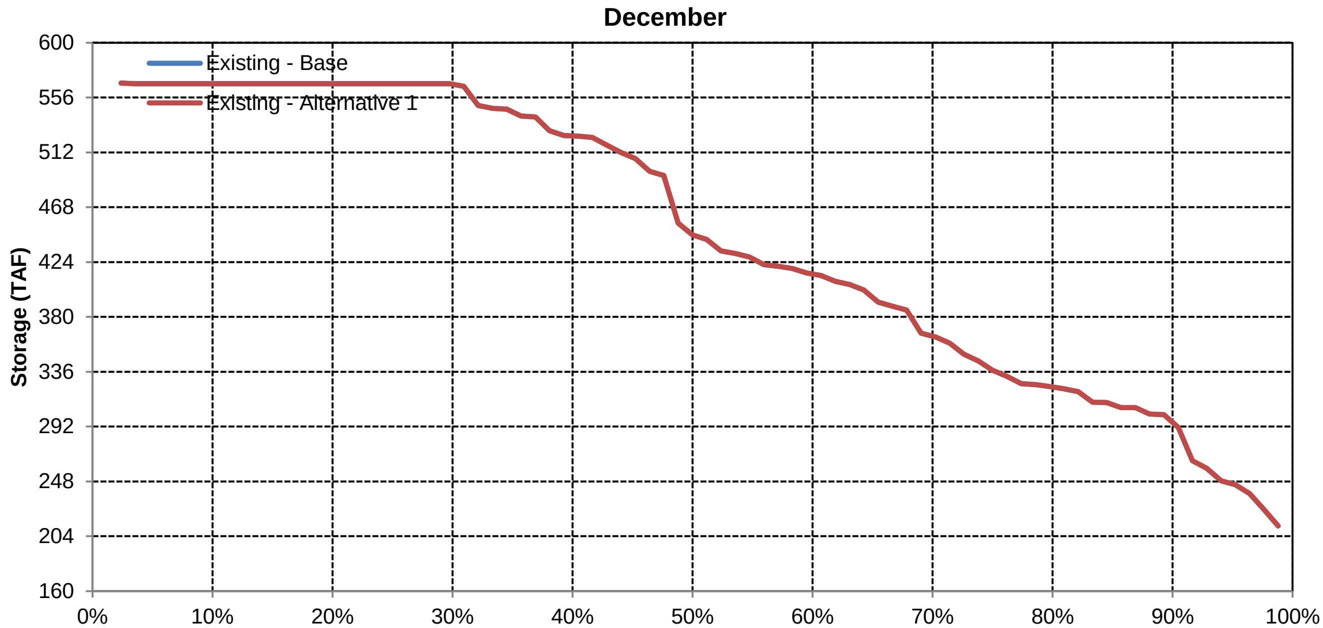
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types												
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

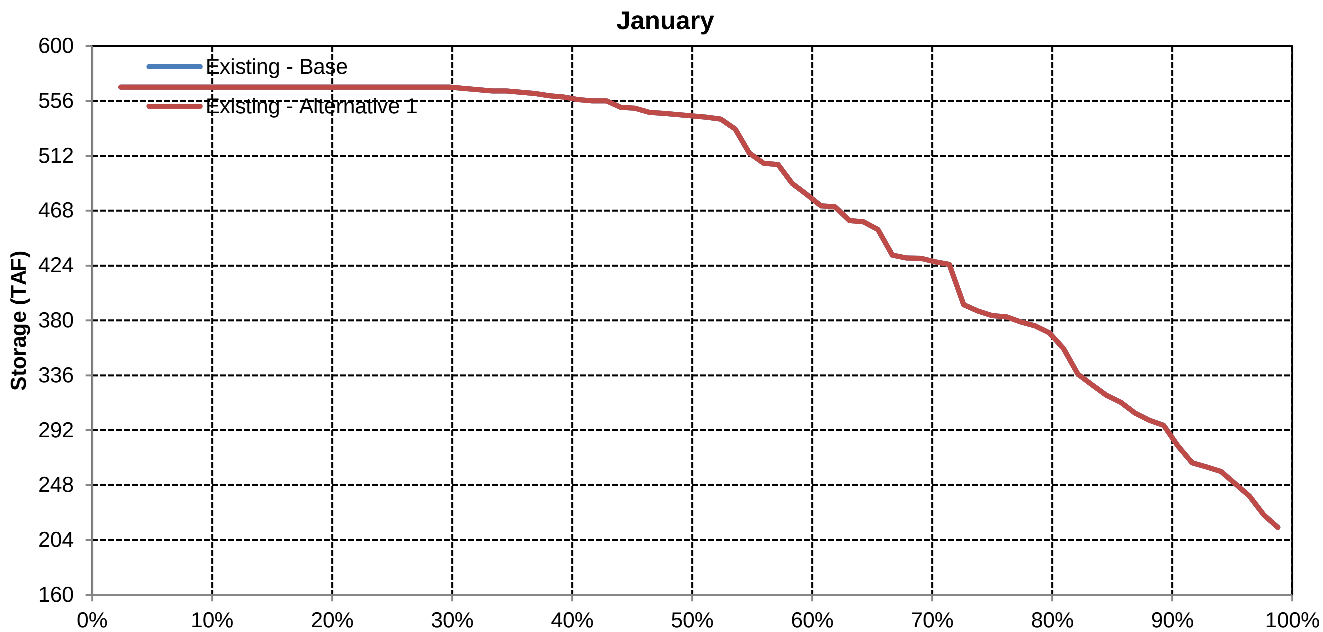
Folsom Reservoir



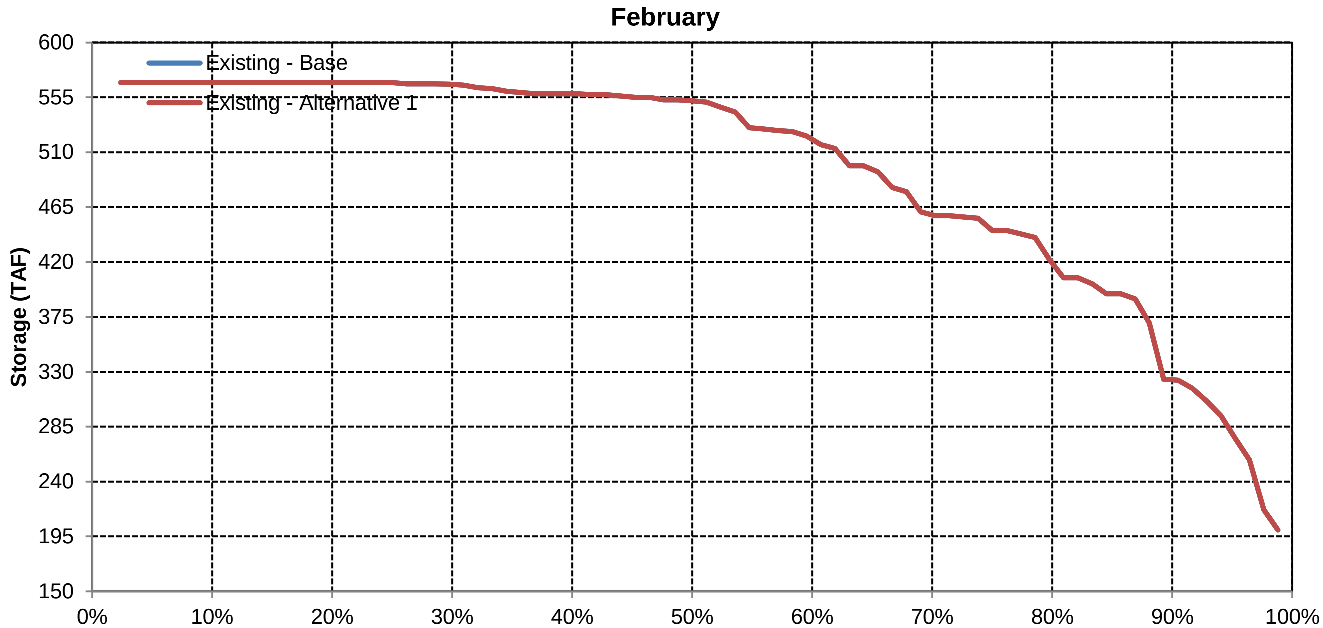


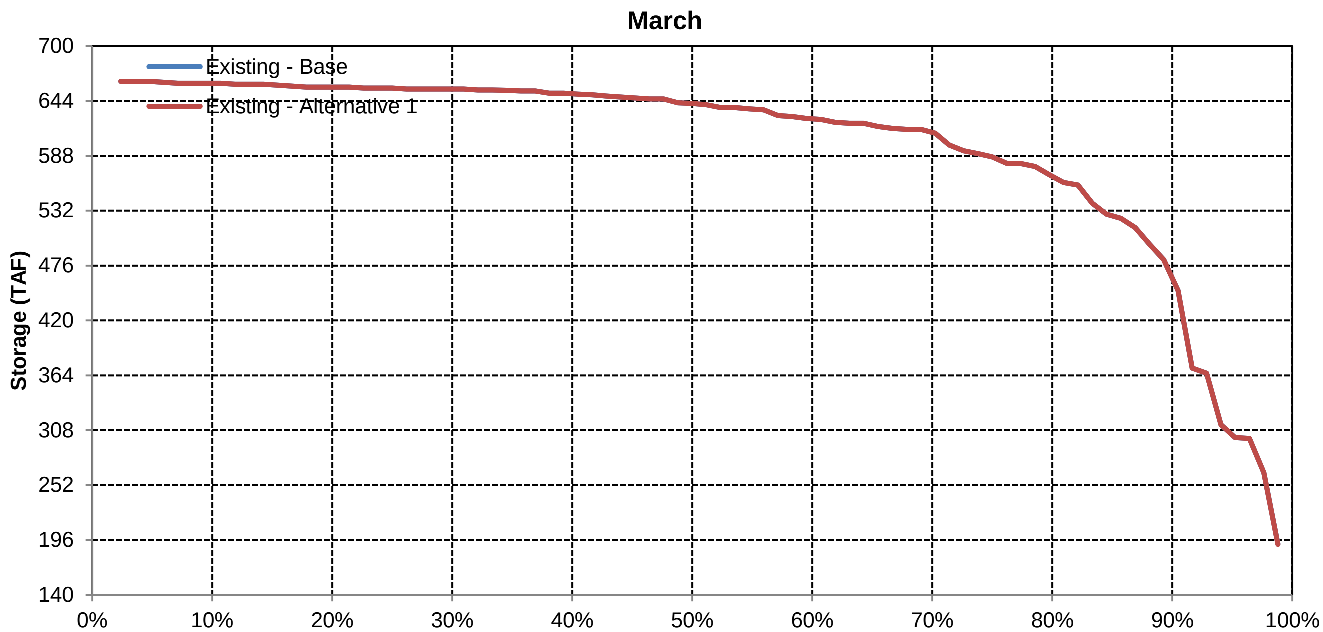
Folsom Reservoir



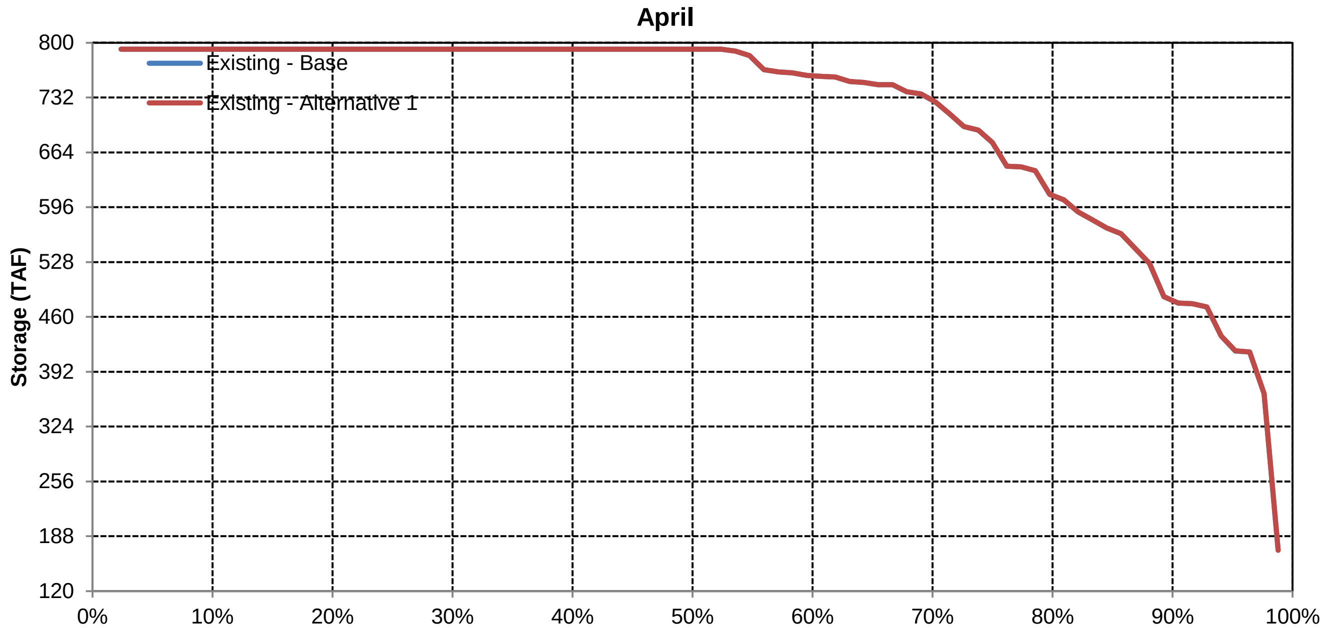


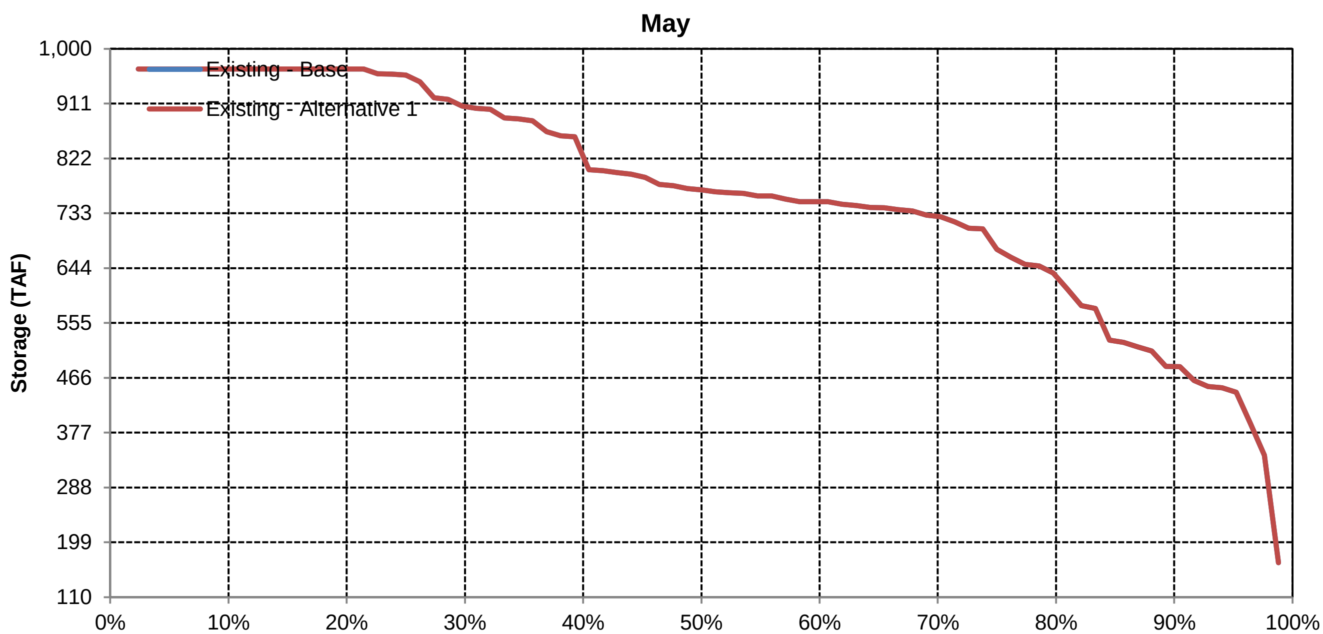
Folsom Reservoir



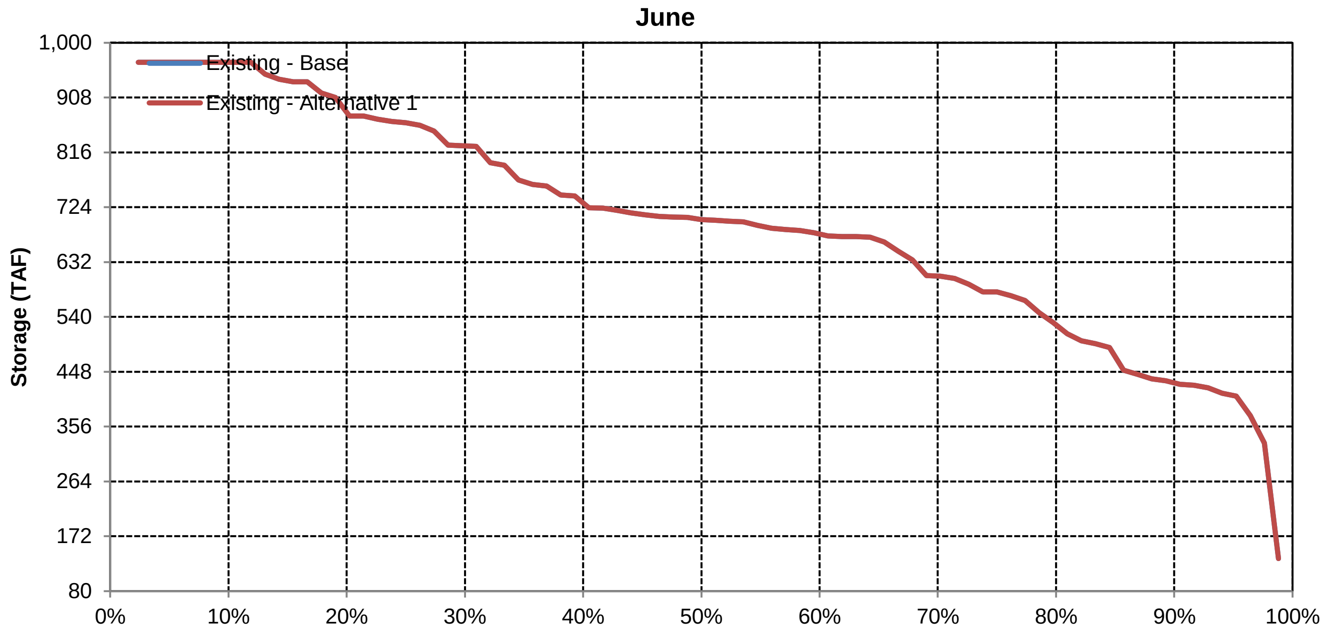


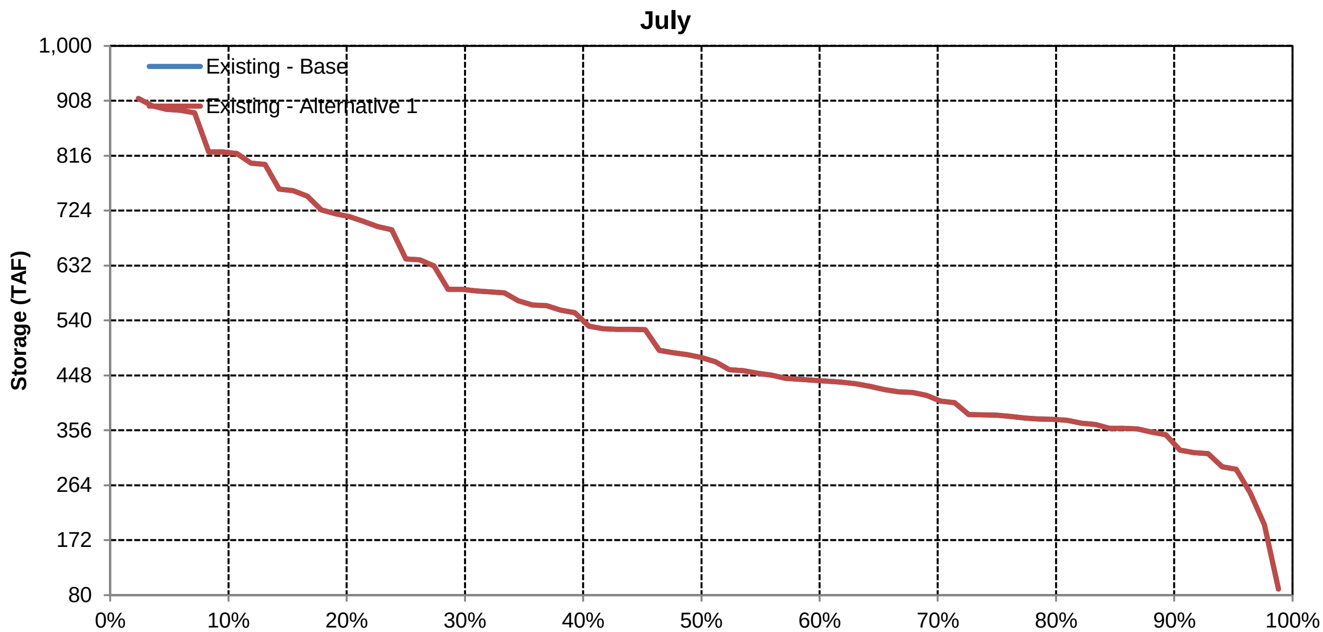
Folsom Reservoir



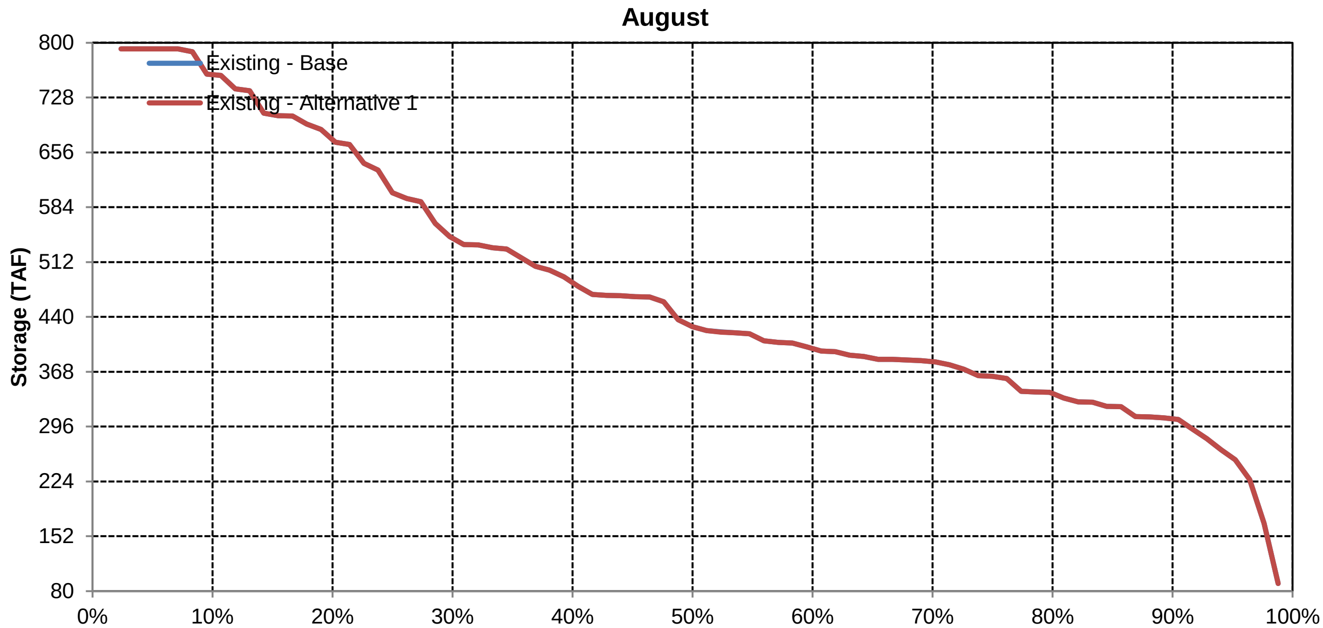


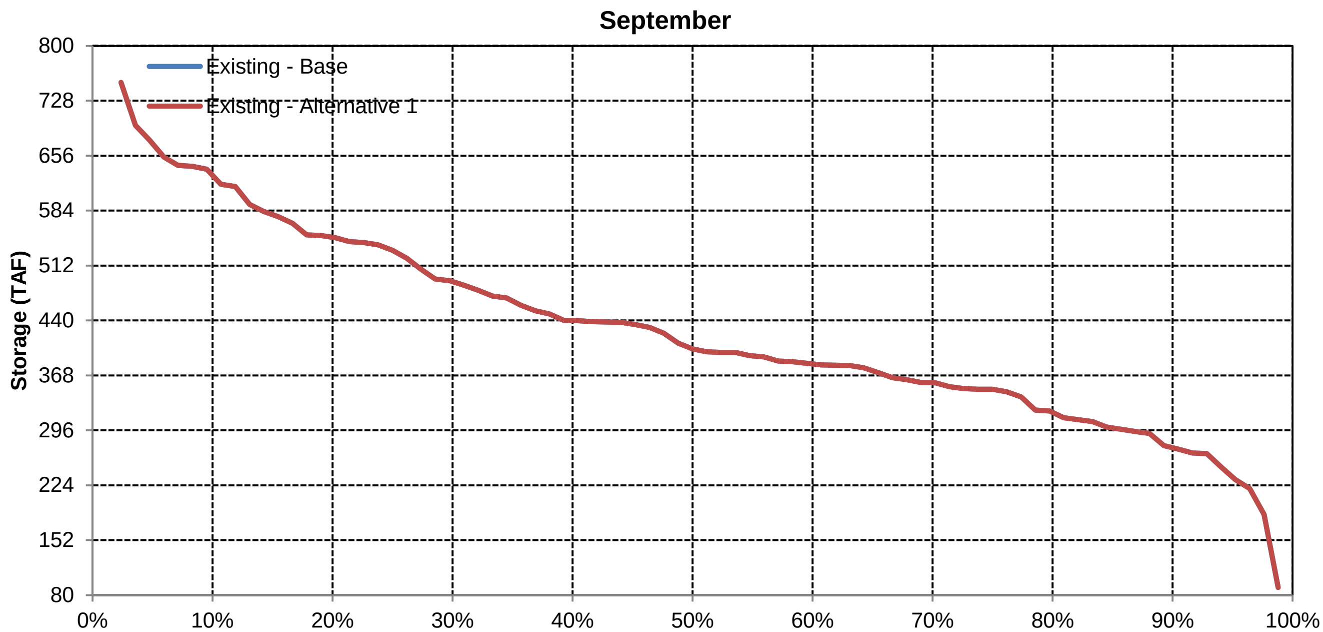
Folsom Reservoir





Folsom Reservoir





Long-Term and Water Year-Type Average of CVP San Luis Reservoir Under Existing - Base and Existing - Alternative 1

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
						Long-Term						
Full Simulation Period												
Existing - Base	217	330	493	616	709	777	712	577	404	261	171	178
Existing - Alternative 1	217	330	493	616	709	777	712	577	404	261	171	178
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
						Water Year-Types						
Wet												
Existing - Base	230	346	525	677	824	925	859	729	581	362	252	241
Existing - Alternative 1	230	346	525	677	824	925	859	729	581	362	252	241
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal												
Existing - Base	231	375	535	653	766	876	790	630	437	201	133	128
Existing - Alternative 1	231	375	535	653	766	876	790	630	437	201	133	128
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Existing - Base	227	343	526	627	701	758	697	561	373	276	187	214
Existing - Alternative 1	227	343	526	627	701	758	697	561	373	276	187	214
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry												
Existing - Base	183	268	424	532	582	636	573	429	249	184	96	121
Existing - Alternative 1	183	268	424	532	582	636	573	429	249	184	96	121
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical												
Existing - Base	208	316	428	546	591	584	532	427	251	194	118	124
Existing - Alternative 1	208	316	428	546	591	584	532	427	251	194	118	124
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

CVP San Luis Reservoir

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	423	528	671	789	972	972	941	862	717	525	378	377
20%	262	388	570	728	885	972	879	758	581	448	308	244
30%	221	367	550	687	804	930	836	701	507	347	205	200
40%	187	347	513	652	763	871	800	630	435	241	143	141
50%	182	327	490	594	719	825	746	582	379	222	107	127
60%	164	294	464	568	651	722	658	487	303	178	90	113
70%	155	274	431	535	596	657	587	441	267	143	63	99
80%	139	209	360	482	541	593	537	392	207	105	45	90
90%	104	148	277	434	489	530	490	352	155	56	45	65
Long Term												
Full Simulation Period	217	330	493	616	709	777	712	577	404	261	171	178
Water Year Types												
Wet	230	346	525	677	824	925	859	729	581	362	252	241
Above Normal	231	375	535	653	766	876	790	630	437	201	133	128
Below Normal	227	343	526	627	701	758	697	561	373	276	187	214
Dry	183	268	424	532	582	636	573	429	249	184	96	121
Critical	208	316	428	546	591	584	532	427	251	194	118	124

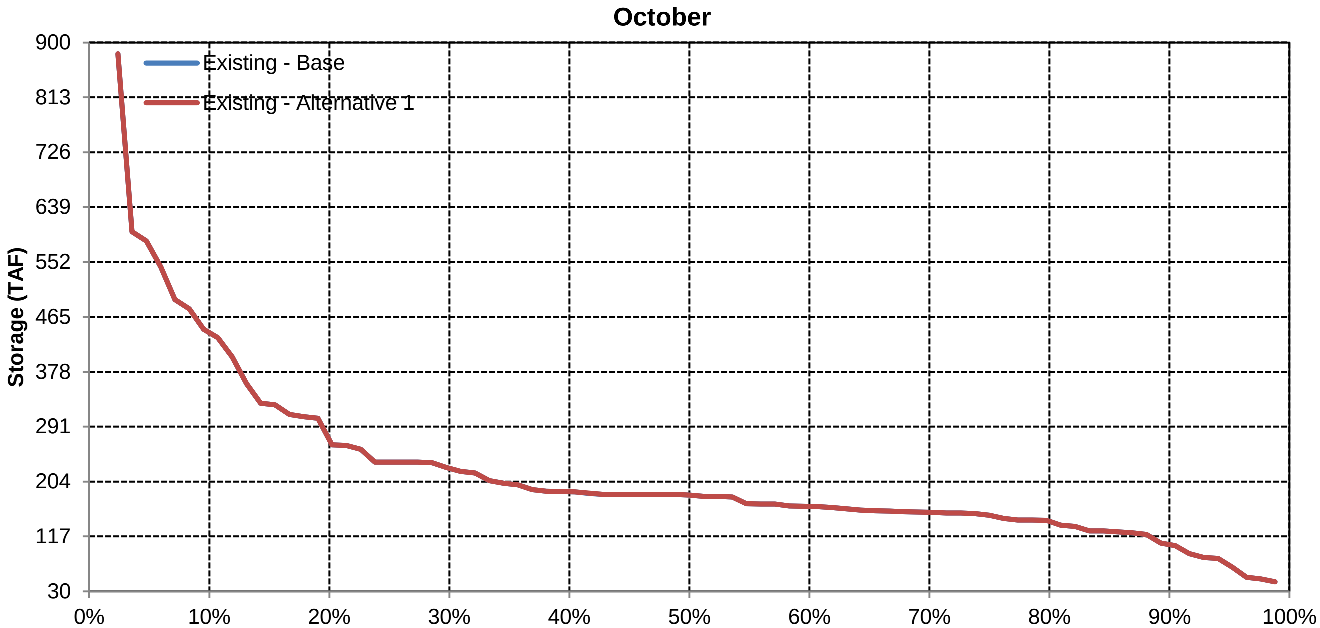
Existing - Alternative 1

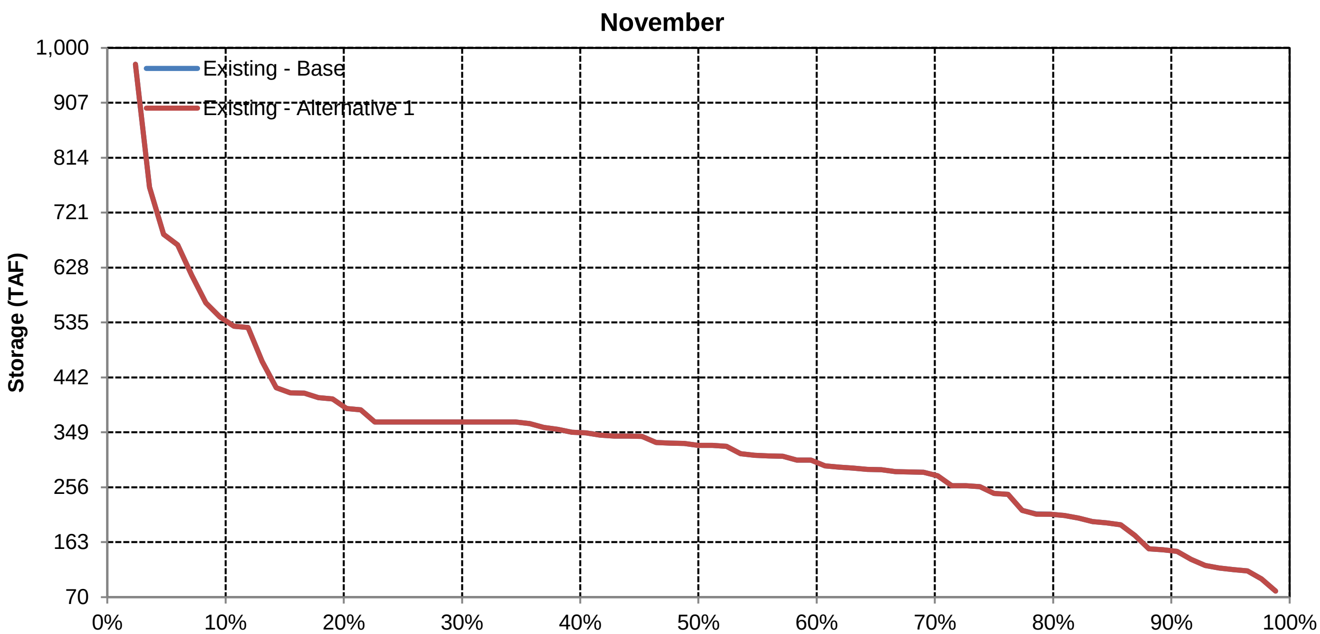
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	423	528	671	789	972	972	941	862	718	525	378	377
20%	262	388	570	728	885	972	879	758	581	448	308	244
30%	221	367	550	687	804	930	836	701	507	347	205	200
40%	187	347	513	652	763	871	800	630	435	241	143	141
50%	182	327	490	594	719	825	746	582	379	222	107	127
60%	164	294	464	568	651	722	658	487	303	178	90	113
70%	155	274	431	535	596	657	587	441	267	143	63	99
80%	139	209	360	482	541	593	537	391	207	105	45	90
90%	104	148	277	434	489	530	490	352	155	56	45	65
Long Term												
Full Simulation Period	217	330	493	616	709	777	712	577	404	261	171	178
Water Year Types												
Wet	230	346	525	677	824	925	859	729	581	362	252	241
Above Normal	231	375	535	653	766	876	790	630	437	201	133	128
Below Normal	227	343	526	627	701	758	697	561	373	276	187	214
Dry	183	268	424	532	582	636	573	429	249	184	96	121
Critical	208	316	428	546	591	584	532	427	251	194	118	124

Existing - Alternative 1 Minus Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types												
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

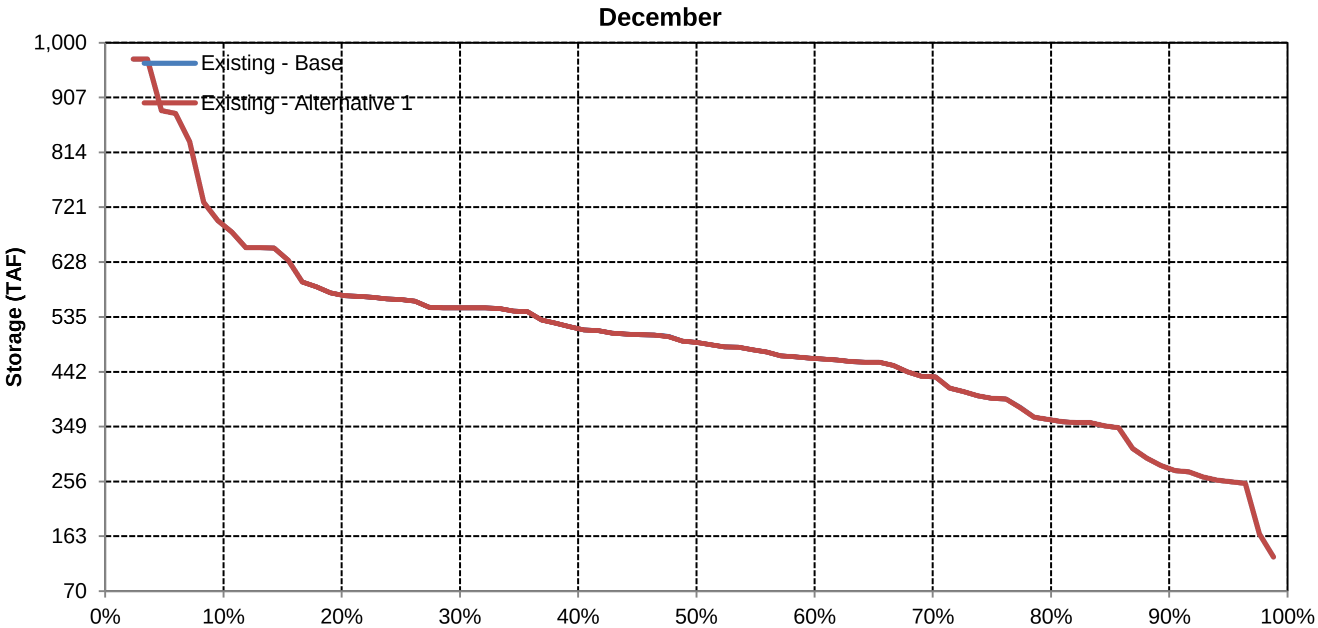
CVP San Luis Reservoir

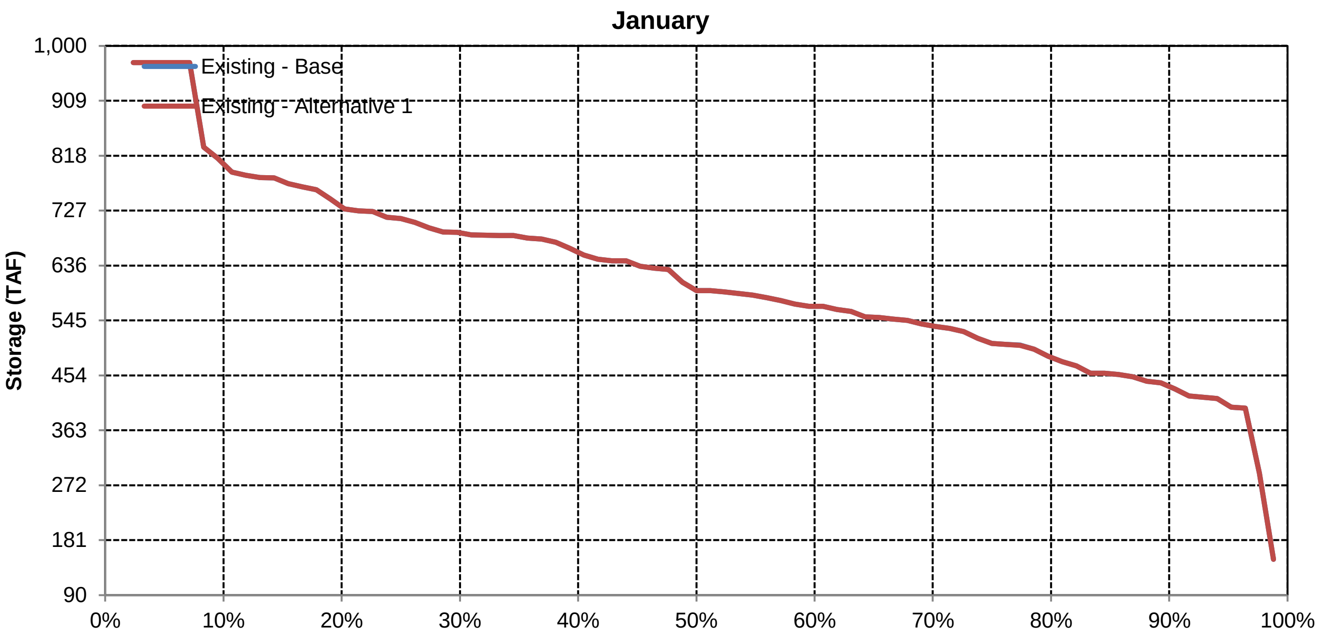




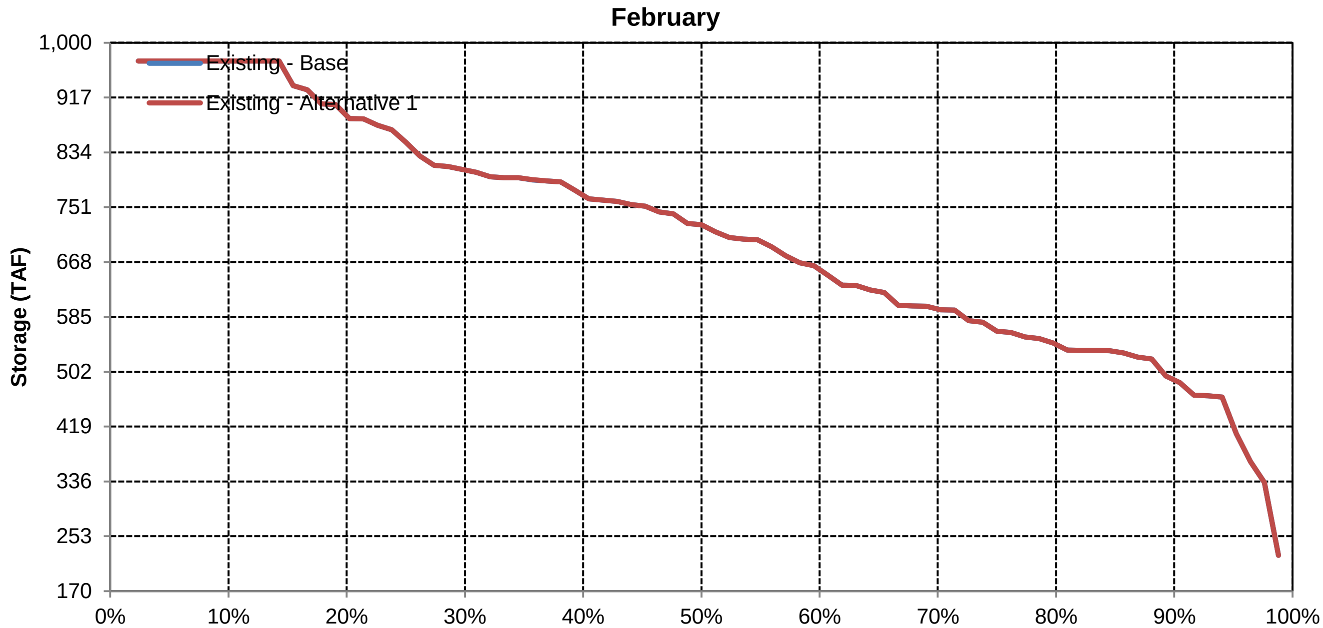
S11

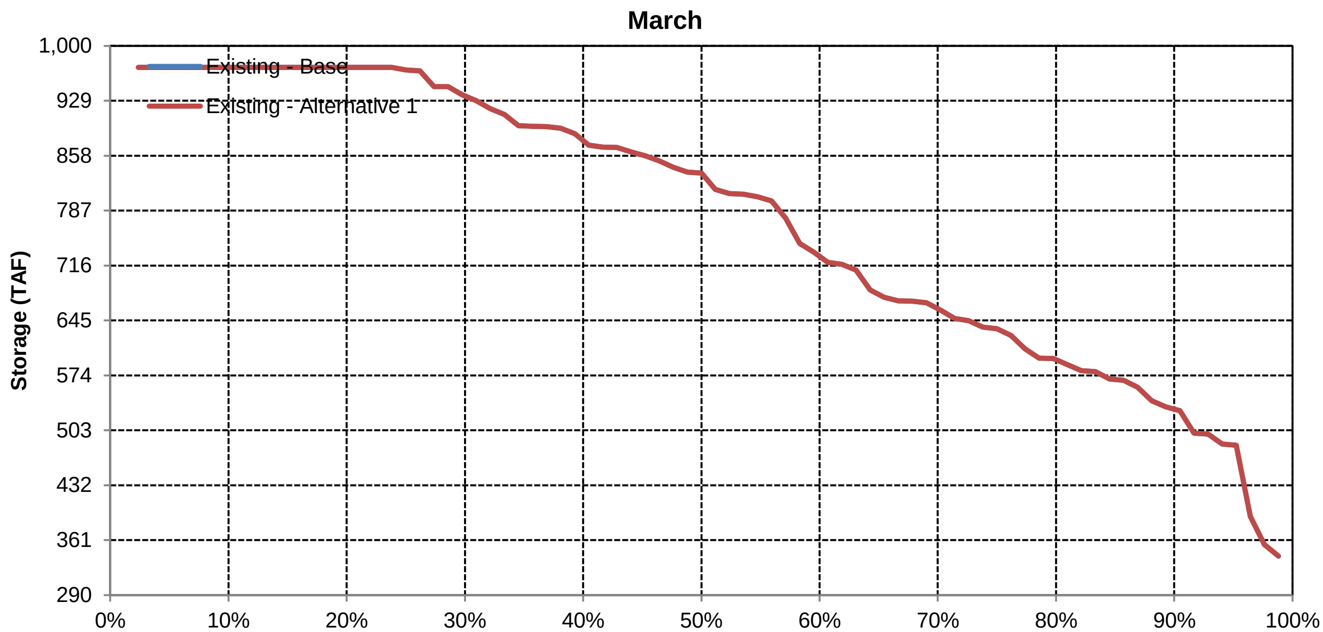
CVP San Luis Reservoir



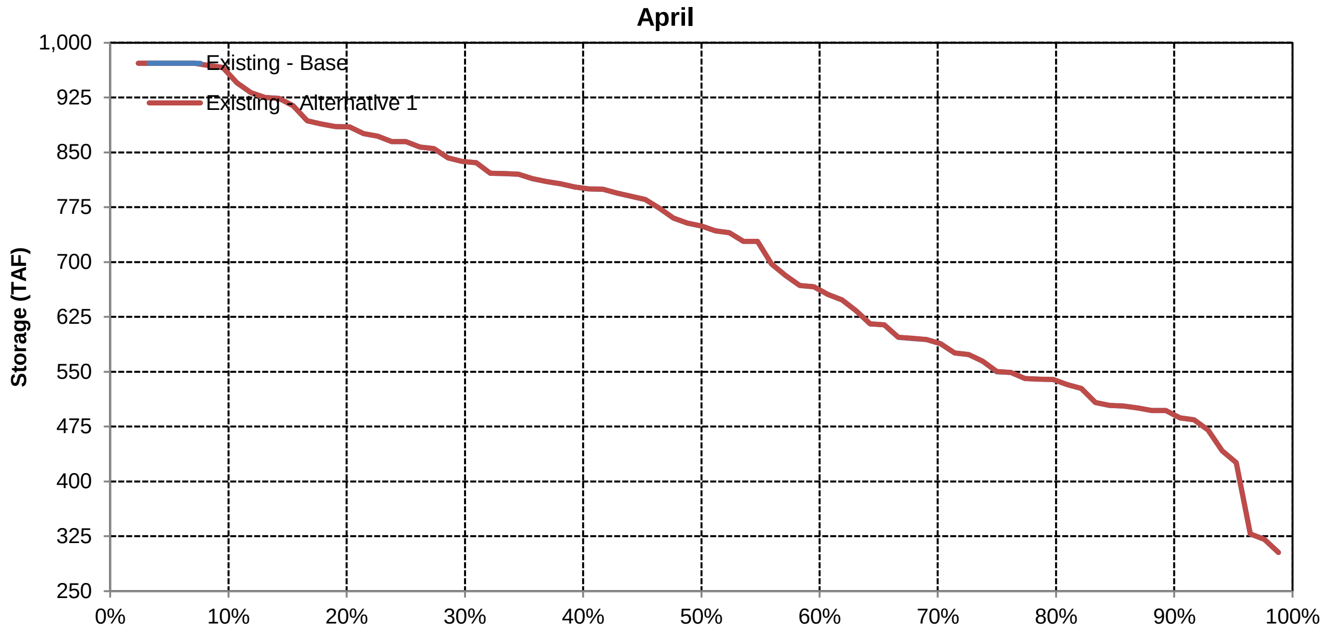


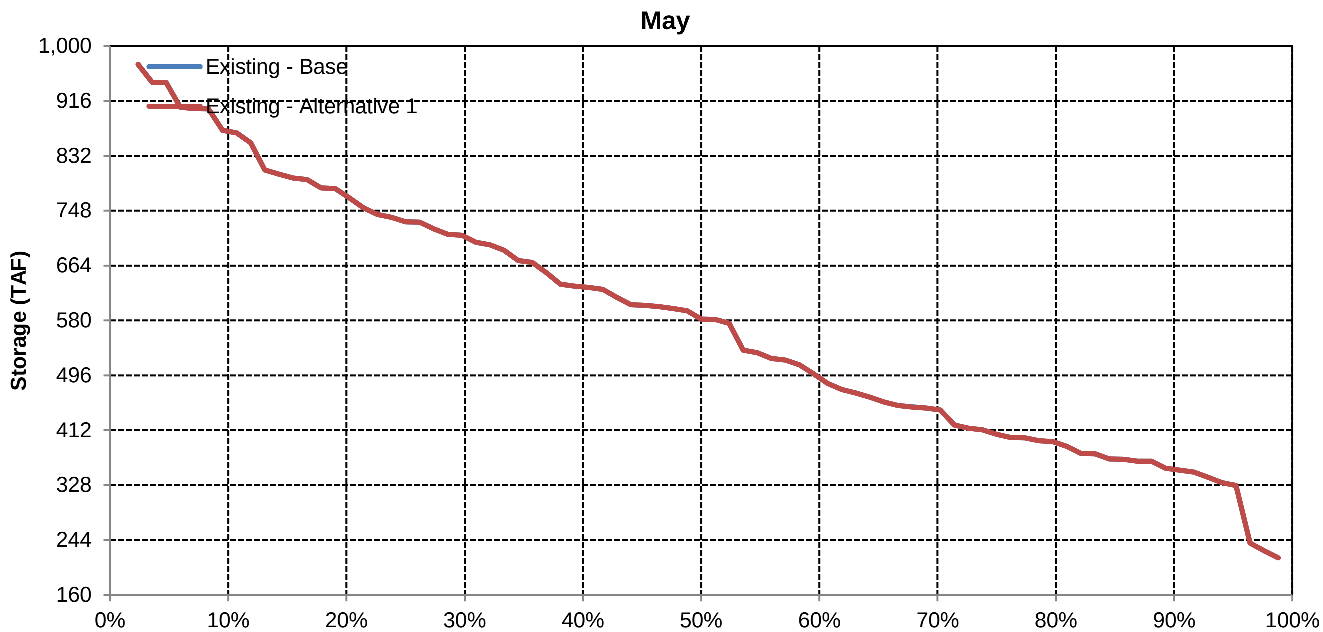
CVP San Luis Reservoir



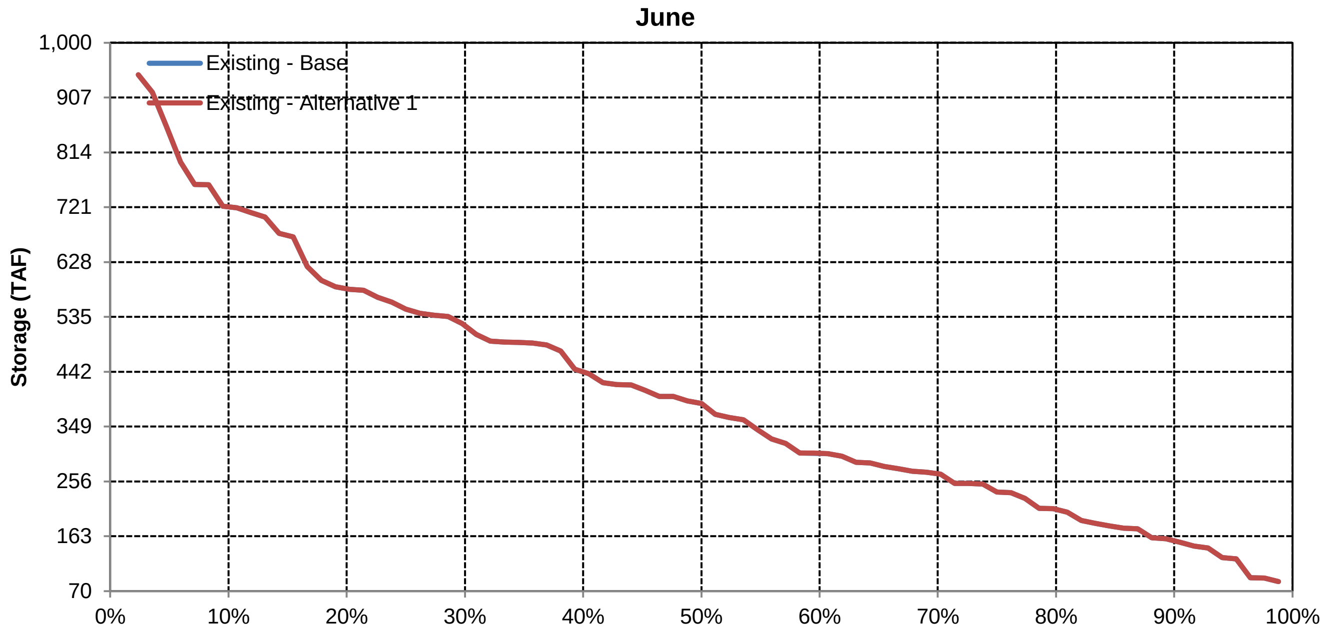


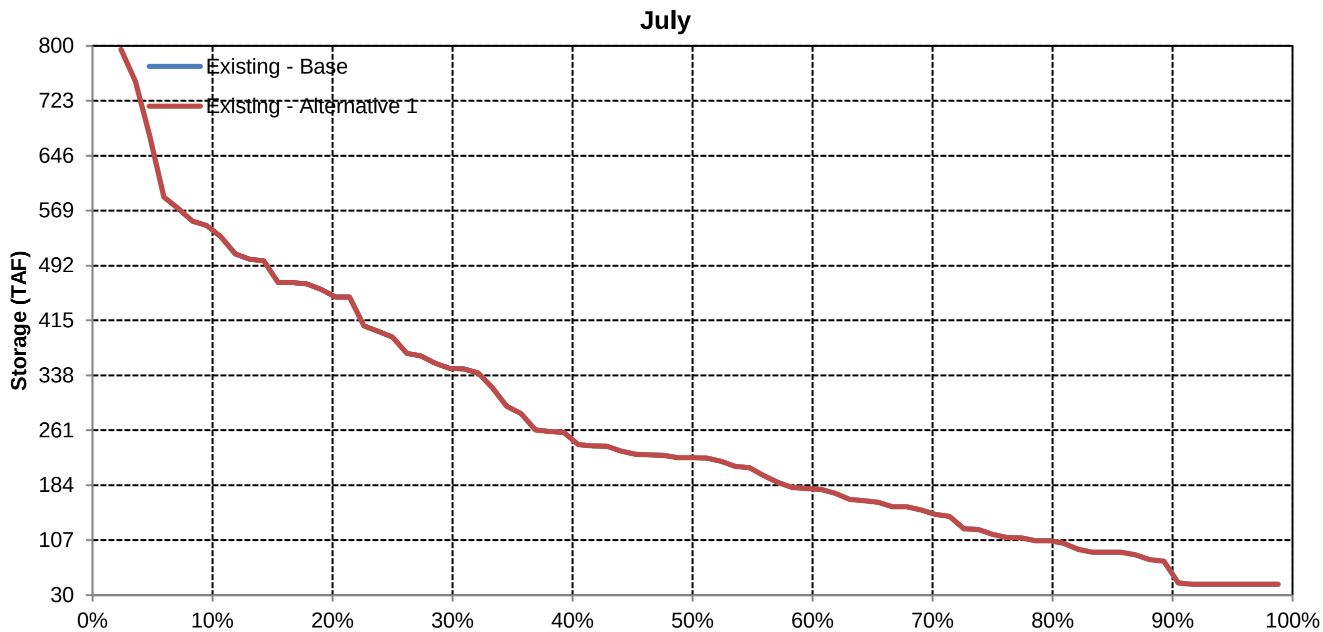
CVP San Luis Reservoir



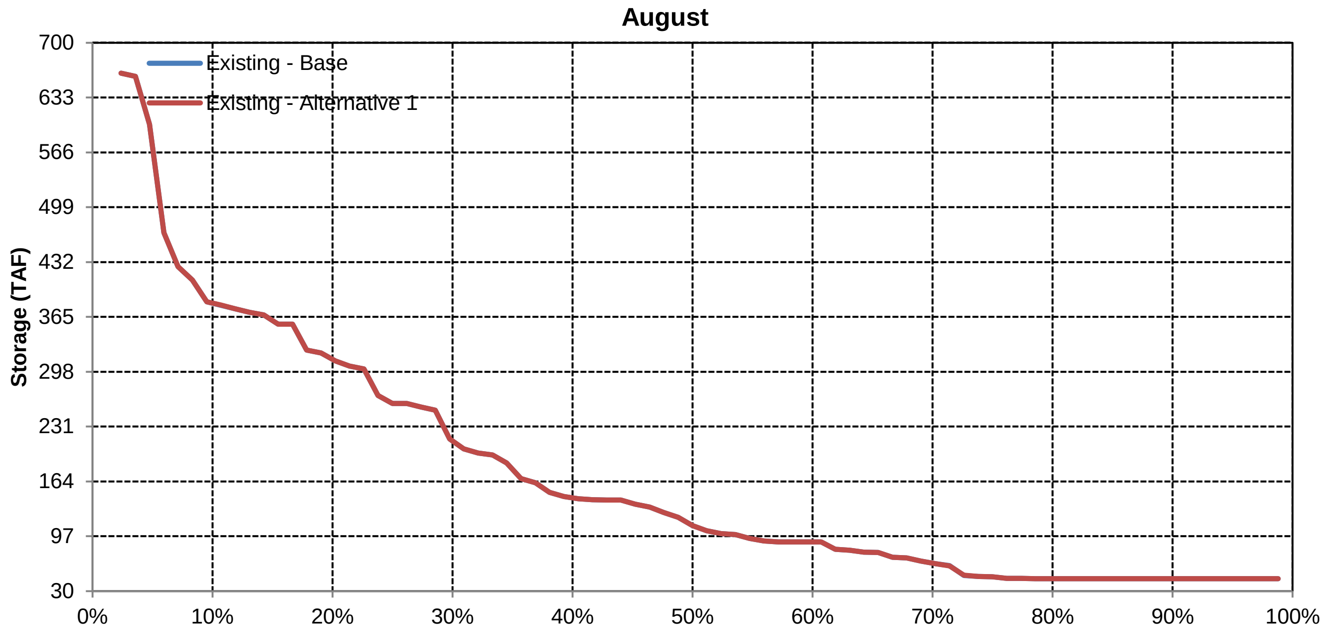


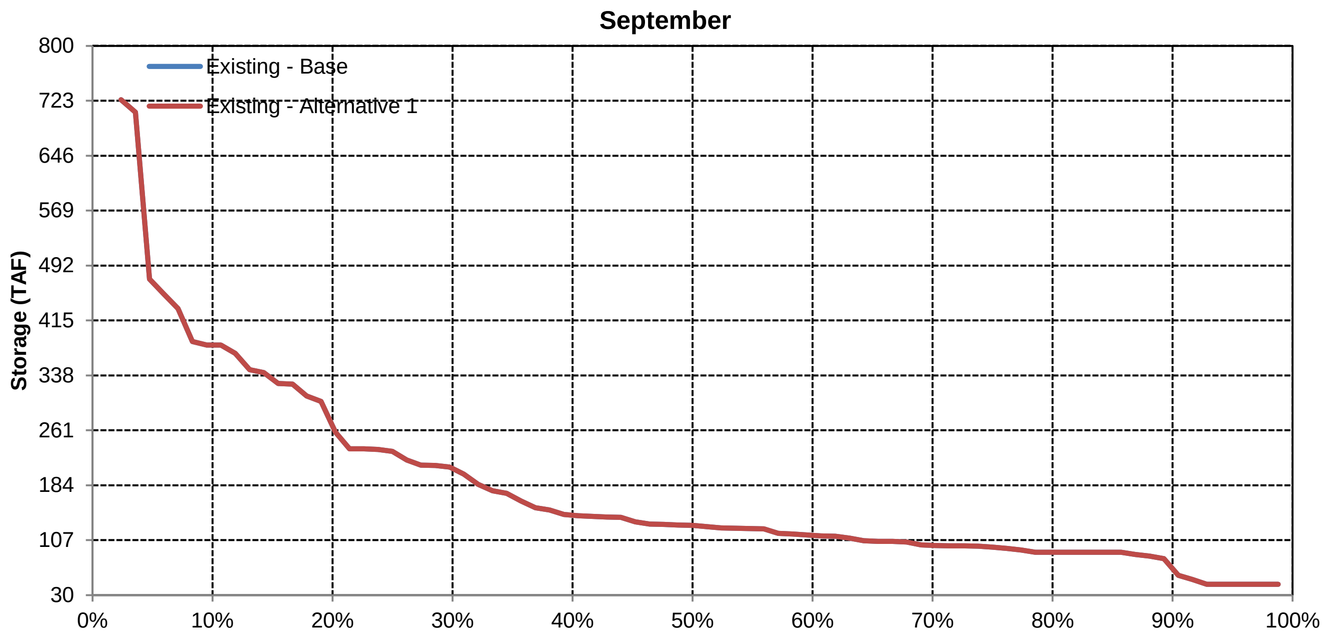
CVP San Luis Reservoir





CVP San Luis Reservoir





Long-Term and Water Year-Type Average of SWP San Luis Reservoir Under Existing - Base and Existing - Alternative 1

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
						Long-Term						
Full Simulation Period												
Existing - Base	244	268	372	541	678	802	720	562	380	374	324	288
Existing - Alternative 1	244	268	372	541	678	802	720	562	380	374	324	288
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
						Water Year-Types						
Wet												
Existing - Base	272	333	431	651	850	980	865	667	471	448	428	363
Existing - Alternative 1	272	333	431	651	850	980	865	667	471	448	428	363
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal												
Existing - Base	259	253	386	576	716	886	757	532	307	308	323	276
Existing - Alternative 1	259	253	386	576	716	886	757	532	307	308	323	276
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Existing - Base	220	246	386	500	622	751	675	512	329	374	370	342
Existing - Alternative 1	220	246	386	500	622	751	675	512	329	374	370	342
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry												
Existing - Base	209	219	300	450	552	670	620	509	348	358	229	234
Existing - Alternative 1	209	219	300	450	552	670	620	509	348	358	229	234
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical												
Existing - Base	249	245	312	459	533	591	579	511	376	305	168	137
Existing - Alternative 1	249	245	312	459	533	591	579	511	376	305	168	137
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

SWP San Luis Reservoir

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	454	566	739	973	1,067	1,067	956	791	630	652	562	423
20%	354	407	561	738	914	1,067	931	704	511	491	470	331
30%	313	356	473	654	833	954	863	657	444	447	402	321
40%	255	303	402	546	714	879	804	584	415	402	358	310
50%	218	224	321	495	686	844	737	527	355	358	309	310
60%	199	169	291	431	584	715	642	488	303	309	267	298
70%	163	109	225	389	528	656	584	450	261	255	201	242
80%	121	76	155	325	466	573	528	396	209	231	155	164
90%	55	55	80	262	364	509	458	352	163	166	114	104
Long Term												
Full Simulation Period	244	268	372	541	678	802	720	562	380	374	324	288
Water Year Types												
Wet	272	333	431	651	850	980	865	667	471	448	428	363
Above Normal	259	253	386	576	716	886	757	532	307	308	323	276
Below Normal	220	246	386	500	622	751	675	512	329	374	370	342
Dry	209	219	300	450	552	670	620	509	348	358	229	234
Critical	249	245	312	459	533	591	579	511	376	305	168	137

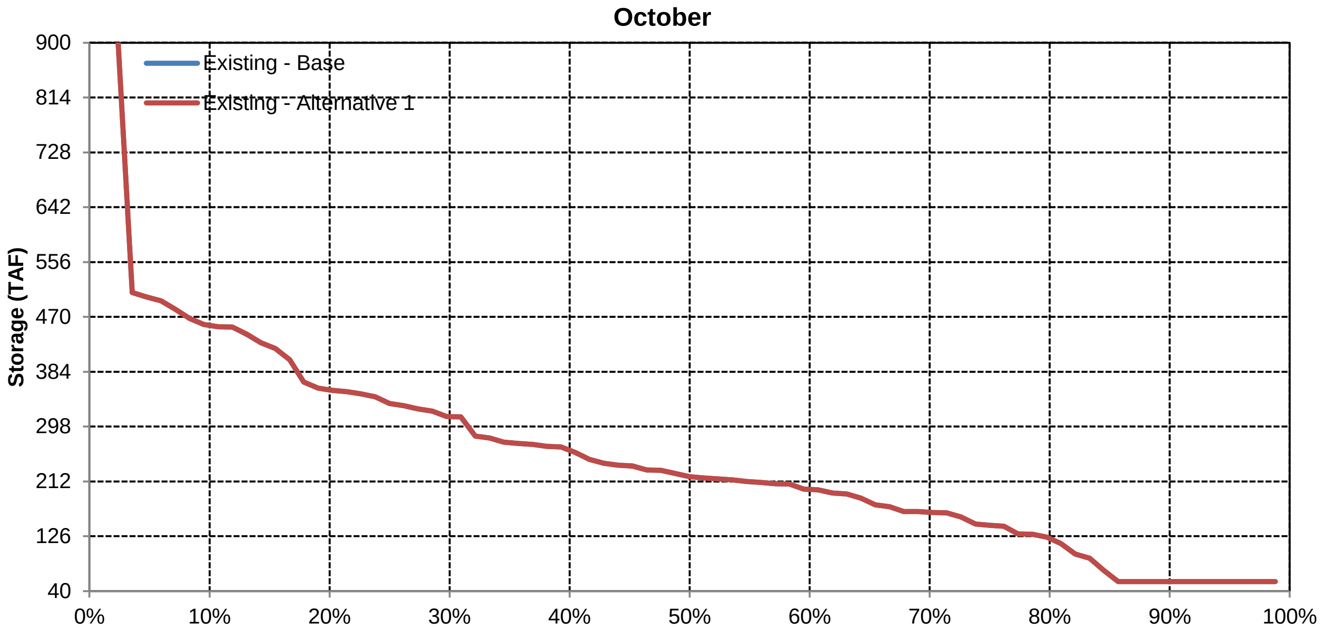
Existing - Alternative 1

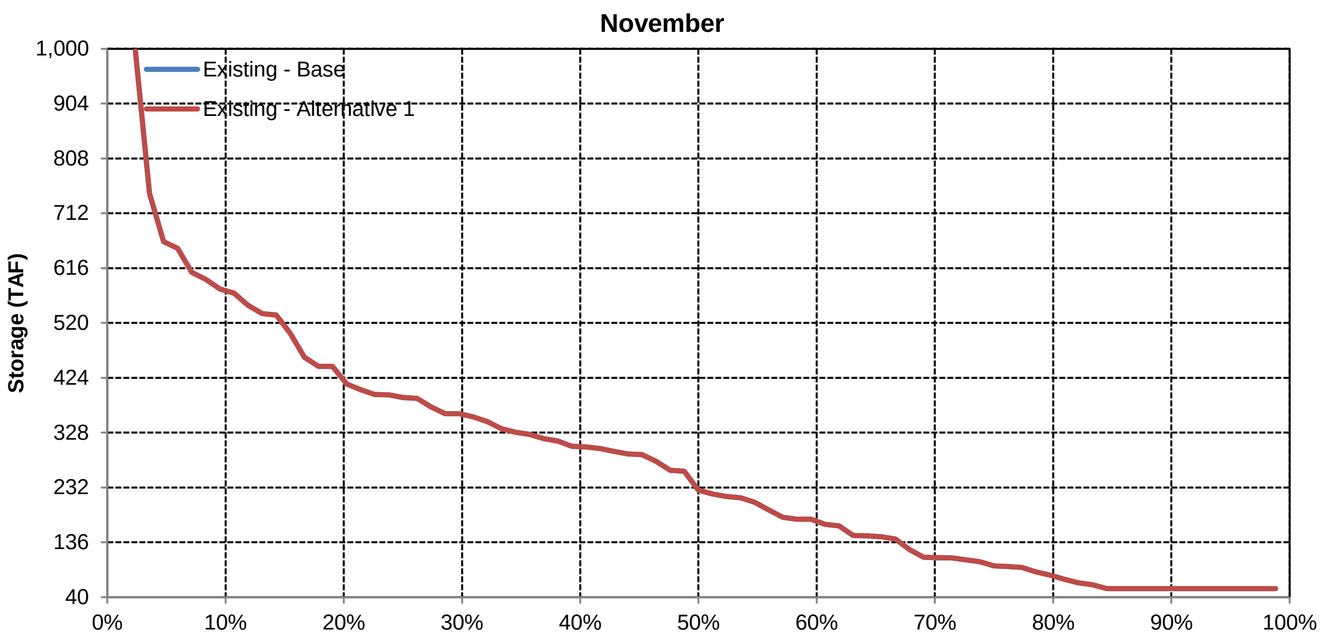
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	454	566	738	973	1,067	1,067	956	791	630	652	562	423
20%	354	407	561	738	914	1,067	931	704	511	491	470	331
30%	313	356	473	654	833	954	863	657	444	447	402	321
40%	255	303	402	546	714	879	804	584	415	402	358	310
50%	218	224	321	495	686	844	737	527	355	358	309	310
60%	199	169	291	431	584	715	642	488	303	309	267	298
70%	163	109	225	389	528	656	584	450	261	255	201	242
80%	121	76	155	325	466	573	528	396	209	231	155	164
90%	55	55	80	262	364	509	458	352	163	166	114	104
Long Term												
Full Simulation Period	244	268	372	541	678	802	720	562	380	374	324	288
Water Year Types												
Wet	272	333	431	651	850	980	865	667	471	448	428	363
Above Normal	259	253	386	576	716	886	757	532	307	308	323	276
Below Normal	220	246	386	500	622	751	675	512	329	374	370	342
Dry	209	219	300	450	552	670	620	509	348	358	229	234
Critical	249	245	312	459	533	591	579	511	376	305	168	137

Existing - Alternative 1 Minus Existing - Base

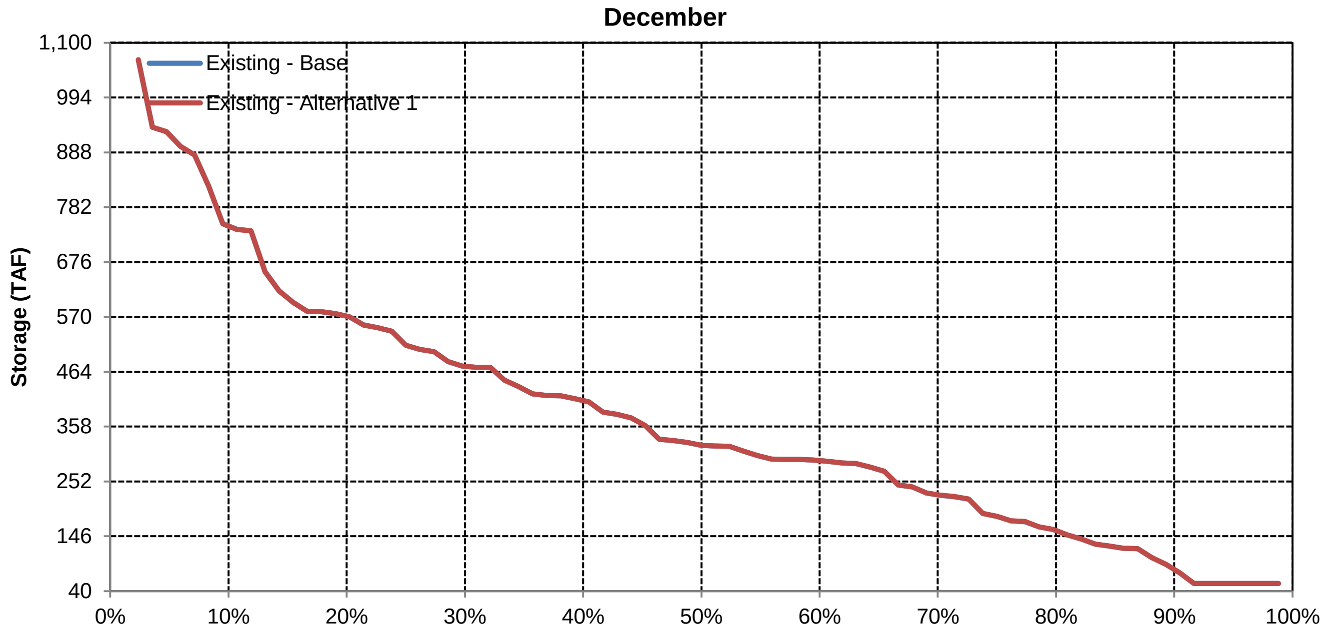
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types												
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

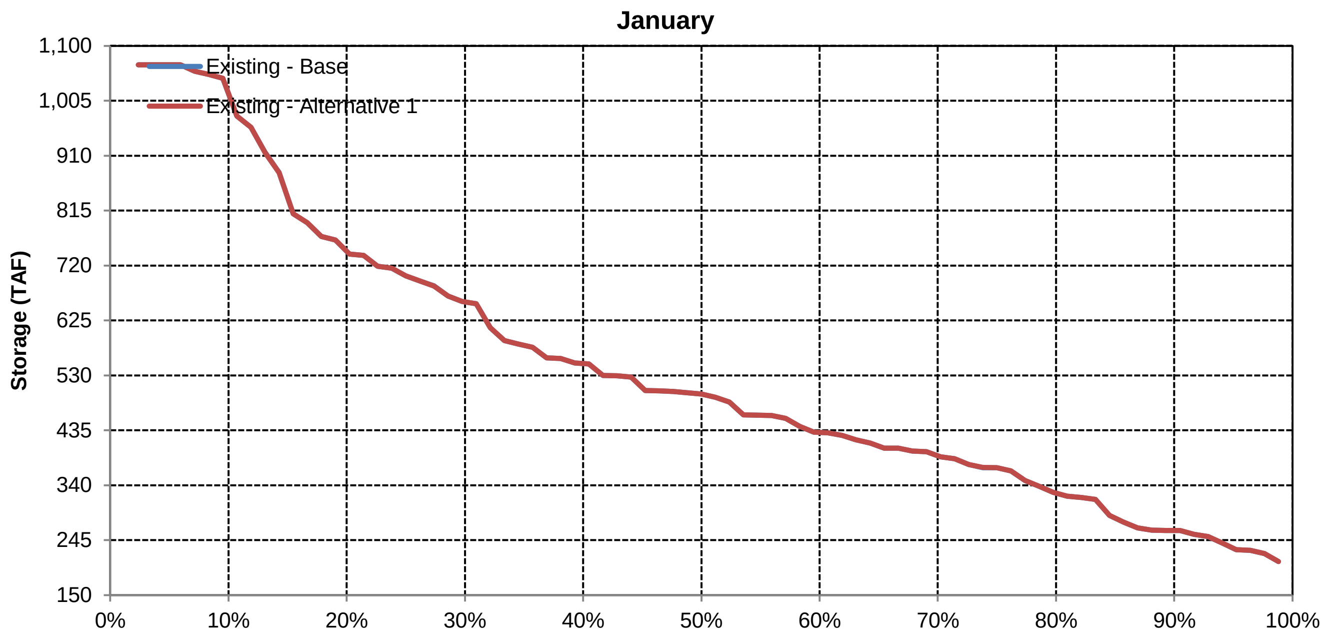
SWP San Luis Reservoir





SWP San Luis Reservoir





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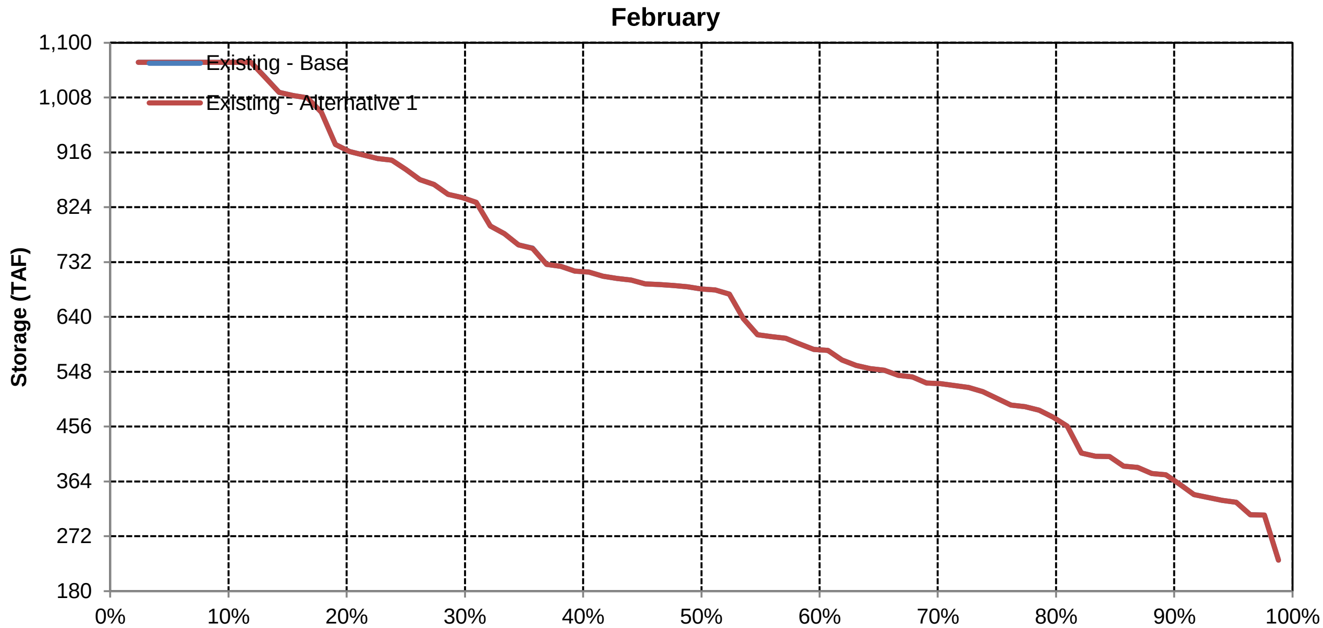
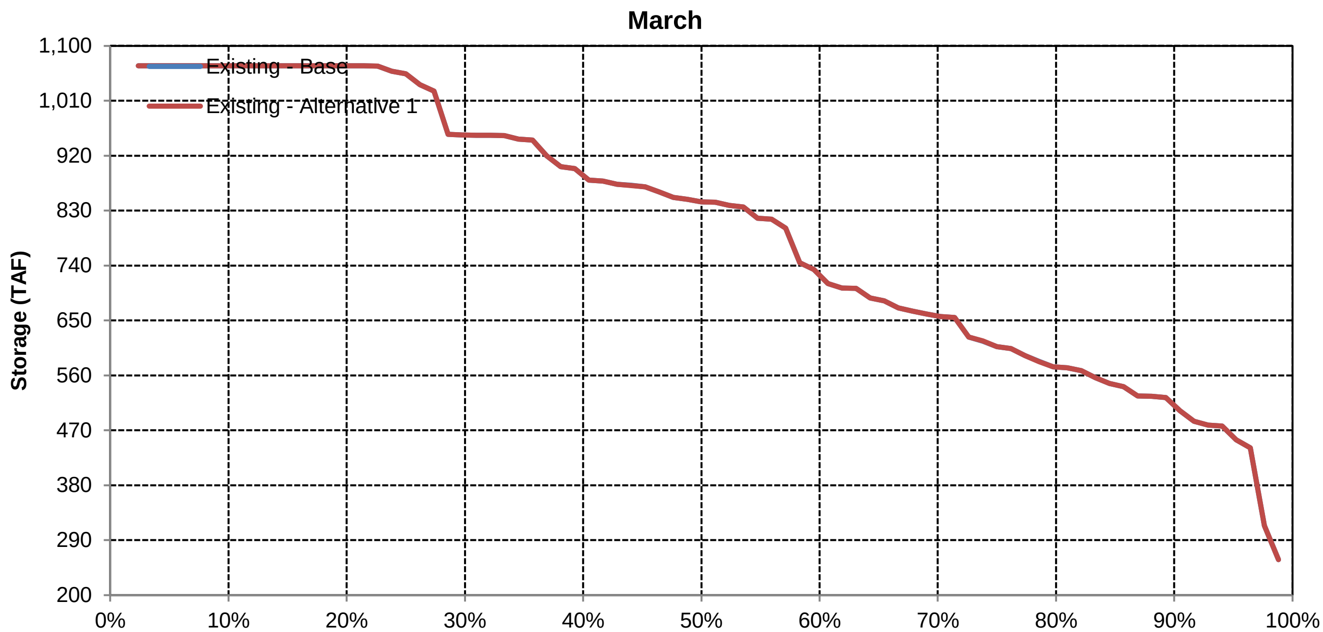
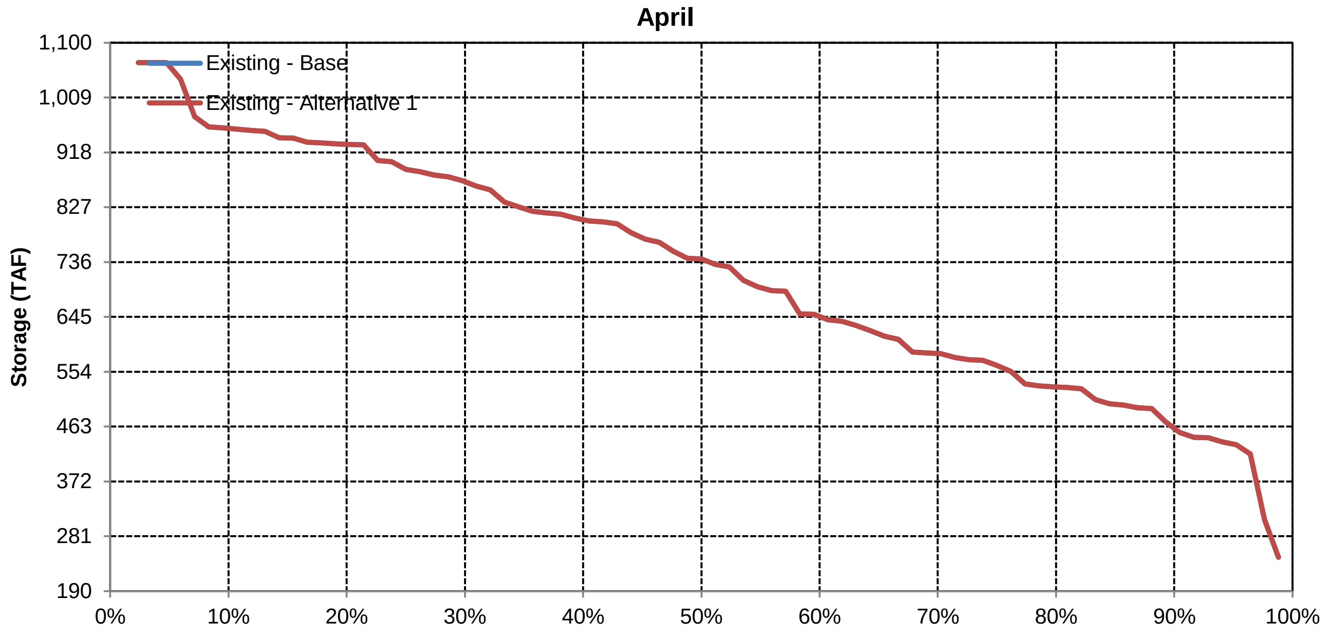
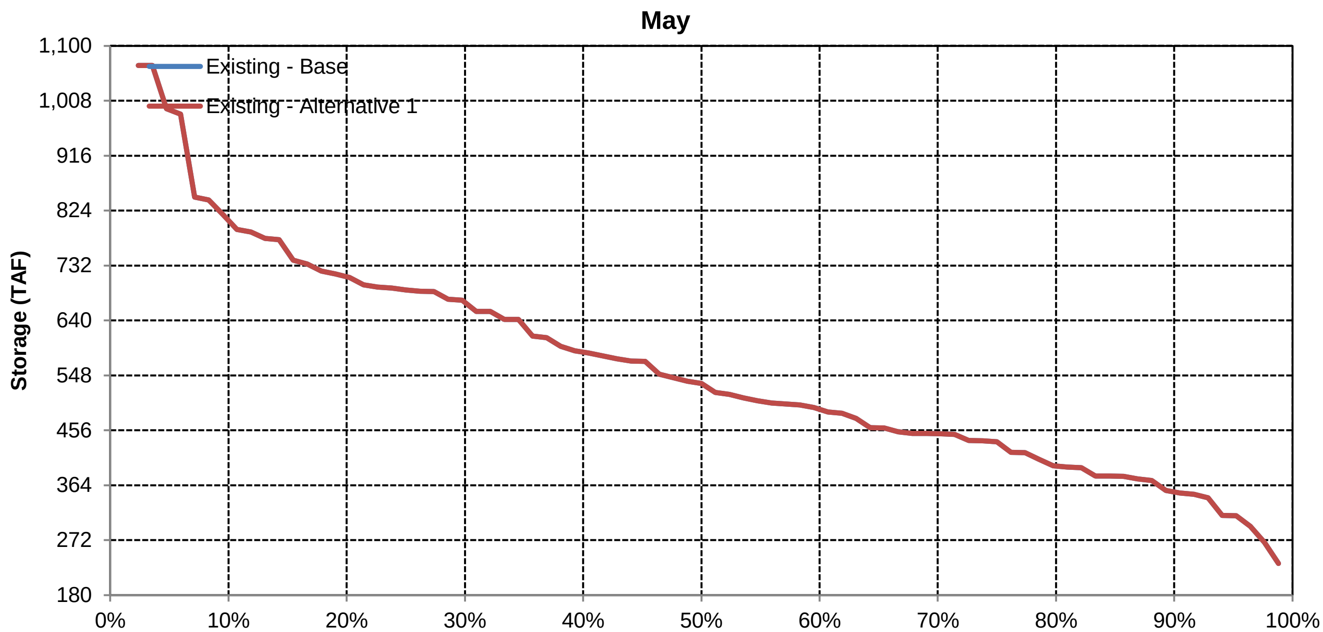




S12

SWP San Luis Reservoir





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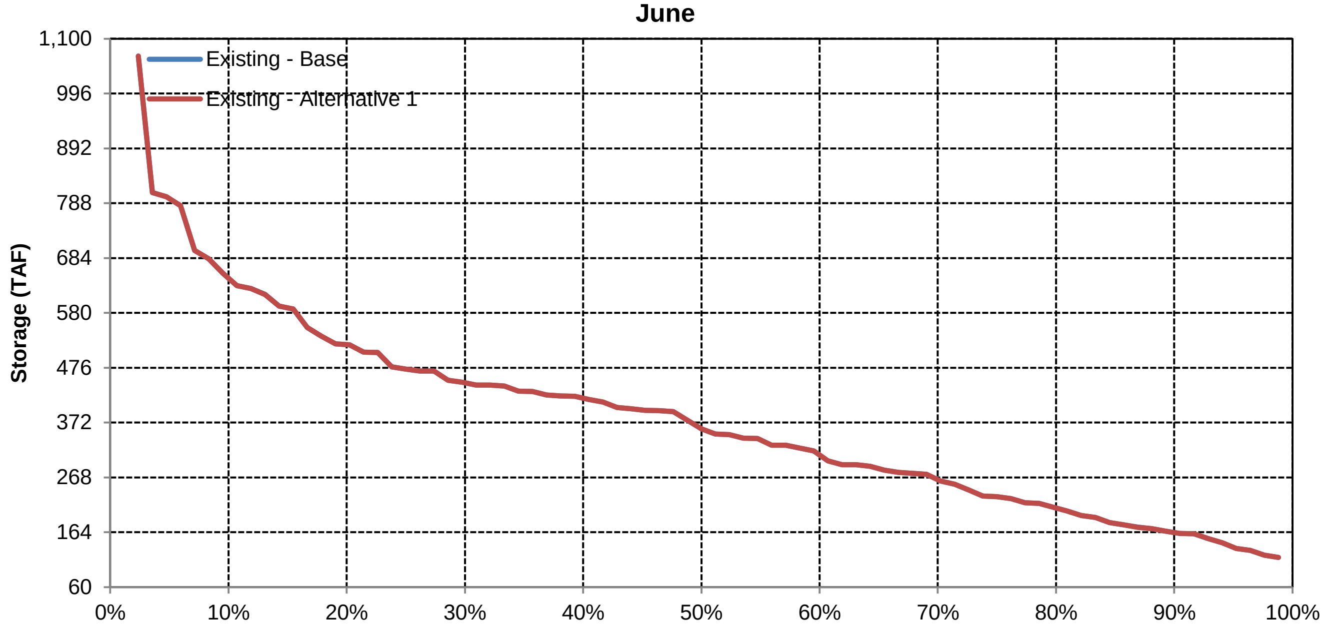
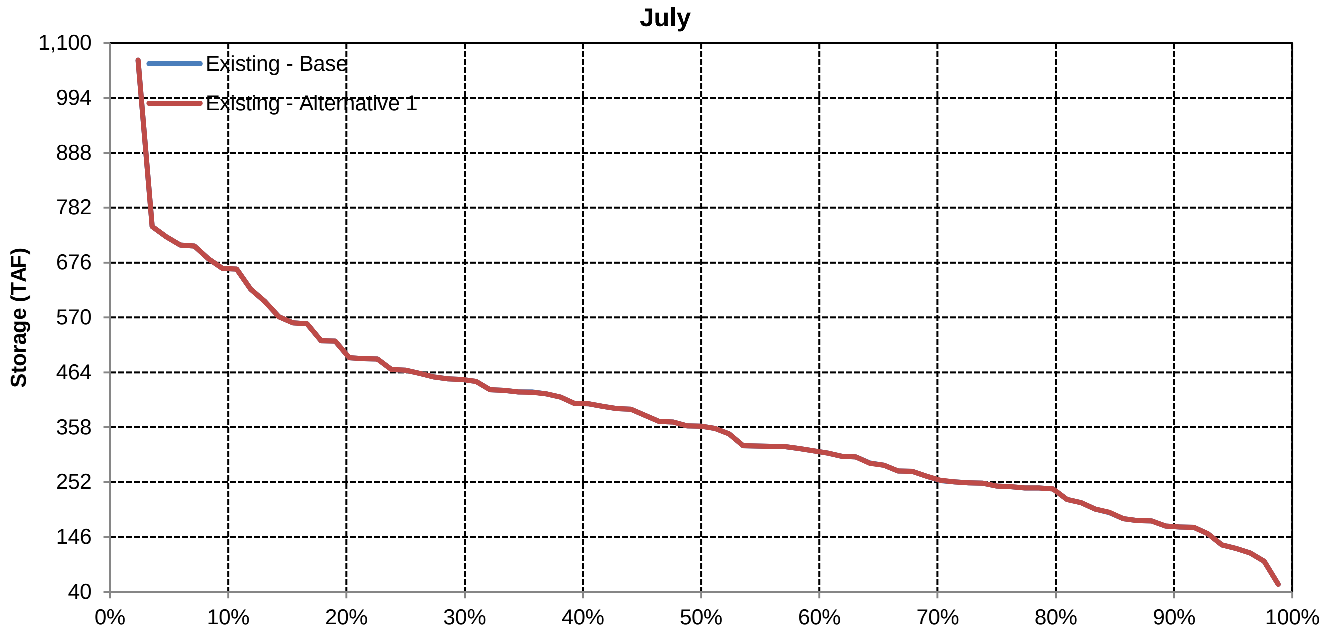
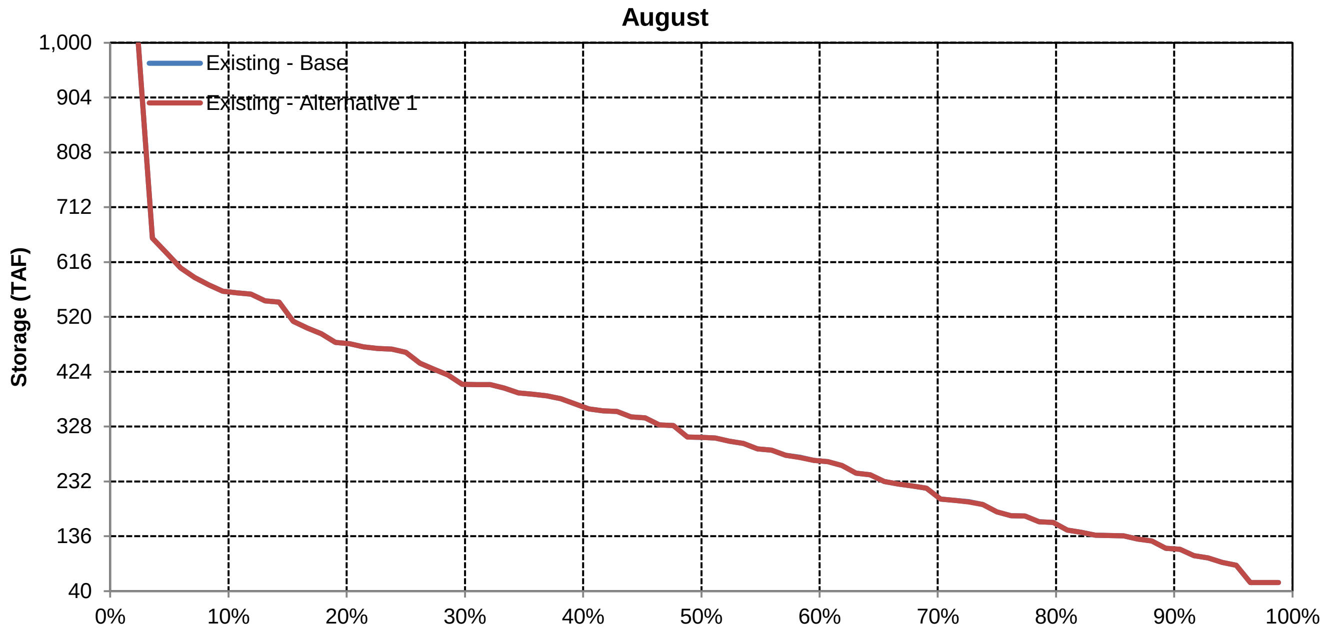
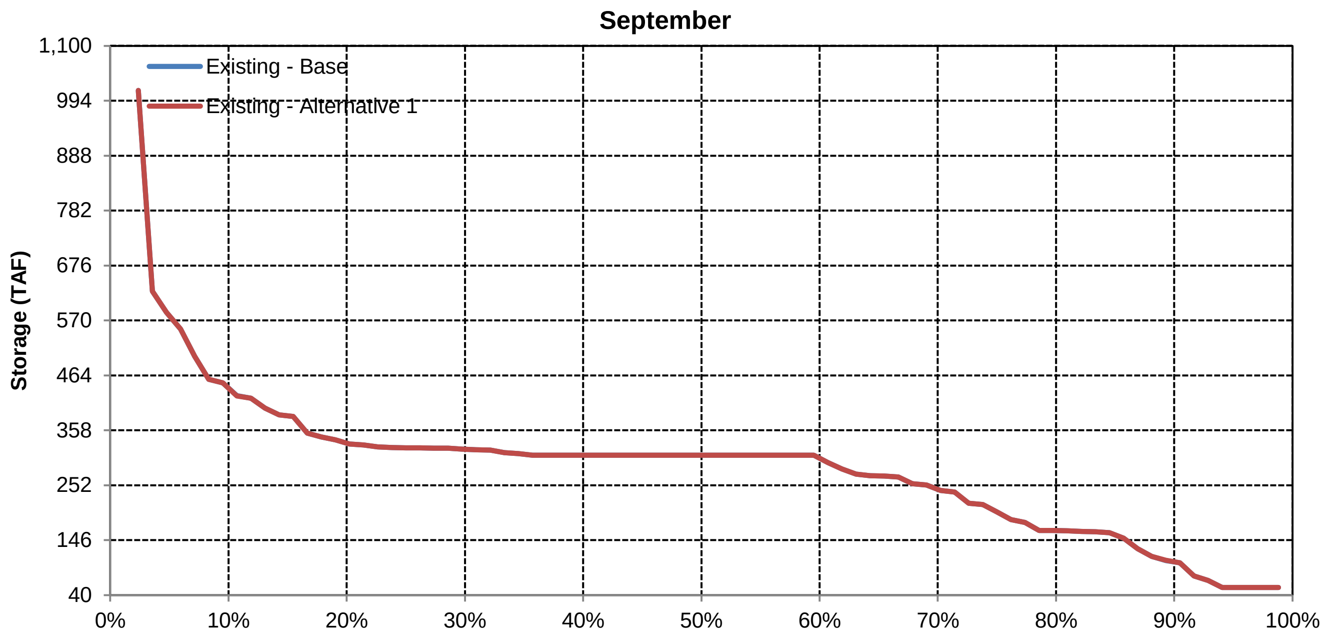




SWP San Luis Reservoir





Long-Term and Water Year-Type Average of Delta Outflow Under Existing - Base and Existing - Alternative 1

Analysis Period	October	November	December	January	February	March	April	May	June	July	August	September	Total (TAF)
						Average Flow (cfs)							
							Long-Term						
Full Simulation Period													
Existing - Base	6,909	11,530	25,386	48,782	63,791	48,782	30,013	16,104	7,983	8,482	4,062	9,331	16,820
Existing - Alternative 1	6,909	11,530	25,387	48,782	63,791	48,782	30,013	16,104	7,983	8,483	4,062	9,331	16,820
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
							Water Year-Types						
Wet													
Existing - Base	9,275	19,272	57,556	101,579	121,325	88,381	55,563	26,753	10,584	11,022	4,128	19,366	31,372
Existing - Alternative 1	9,275	19,272	57,557	101,579	121,326	88,381	55,563	26,753	10,584	11,023	4,128	19,366	31,372
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal													
Existing - Base	6,741	9,314	21,144	55,453	70,727	61,417	29,722	17,425	7,395	11,464	4,017	11,133	18,336
Existing - Alternative 1	6,741	9,314	21,144	55,453	70,726	61,417	29,722	17,425	7,395	11,464	4,017	11,133	18,336
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal													
Existing - Base	6,527	9,662	10,110	23,902	40,103	31,158	23,270	13,328	6,819	8,808	4,050	3,469	10,847
Existing - Alternative 1	6,527	9,662	10,110	23,902	40,103	31,158	23,270	13,327	6,819	8,808	4,050	3,469	10,847
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry													
Existing - Base	5,825	7,923	8,608	15,426	29,458	22,607	13,161	8,982	7,006	5,274	4,137	3,269	7,873
Existing - Alternative 1	5,824	7,923	8,608	15,426	29,458	22,607	13,161	8,981	7,006	5,274	4,137	3,269	7,873
Difference	0	0	0	0	0	0	0	-1	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical													
Existing - Base	4,133	5,072	6,622	11,837	16,327	13,519	9,101	6,026	6,104	4,027	3,889	3,010	5,383
Existing - Alternative 1	4,133	5,072	6,622	11,837	16,327	13,519	9,101	6,026	6,104	4,027	3,889	3,010	5,383
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Delta Outflow

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	9,977	15,194	83,333	120,592	161,827	97,068	71,454	33,132	11,137	13,270	4,309	19,688
20%	9,531	14,688	37,738	76,978	107,377	74,847	46,407	23,720	7,991	11,709	4,155	19,375
30%	9,094	12,769	20,214	55,546	76,161	60,341	32,656	15,272	7,100	10,714	4,001	17,813
40%	6,875	10,418	14,342	38,012	58,777	38,477	22,321	12,858	7,100	9,084	4,000	10,938
50%	4,346	9,766	11,487	26,488	41,867	31,169	18,044	11,426	7,100	8,603	4,000	3,914
60%	4,000	6,253	6,752	19,211	28,692	22,356	14,643	10,166	6,905	8,000	4,000	3,569
70%	4,000	4,500	5,009	13,355	21,621	17,008	12,821	9,402	6,688	5,591	4,000	3,000
80%	4,000	4,500	4,670	10,293	17,232	14,703	11,016	7,597	6,187	5,000	4,000	3,000
90%	3,000	3,500	4,500	7,972	12,426	10,776	9,604	6,918	5,655	4,000	3,791	3,000
Long Term												
Full Simulation Period	6,909	11,530	25,386	48,782	63,791	48,782	30,013	16,104	7,983	8,482	4,062	9,331
Water Year Types												
Wet	9,275	19,272	57,556	101,579	121,325	88,381	55,563	26,753	10,584	11,022	4,128	19,366
Above Normal	6,741	9,314	21,144	55,453	70,727	61,417	29,722	17,425	7,395	11,464	4,017	11,133
Below Normal	6,527	9,662	10,110	23,902	40,103	31,158	23,270	13,328	6,819	8,808	4,050	3,469
Dry	5,825	7,923	8,608	15,426	29,458	22,607	13,161	8,982	7,006	5,274	4,137	3,269
Critical	4,133	5,072	6,622	11,837	16,327	13,519	9,101	6,026	6,104	4,027	3,889	3,010

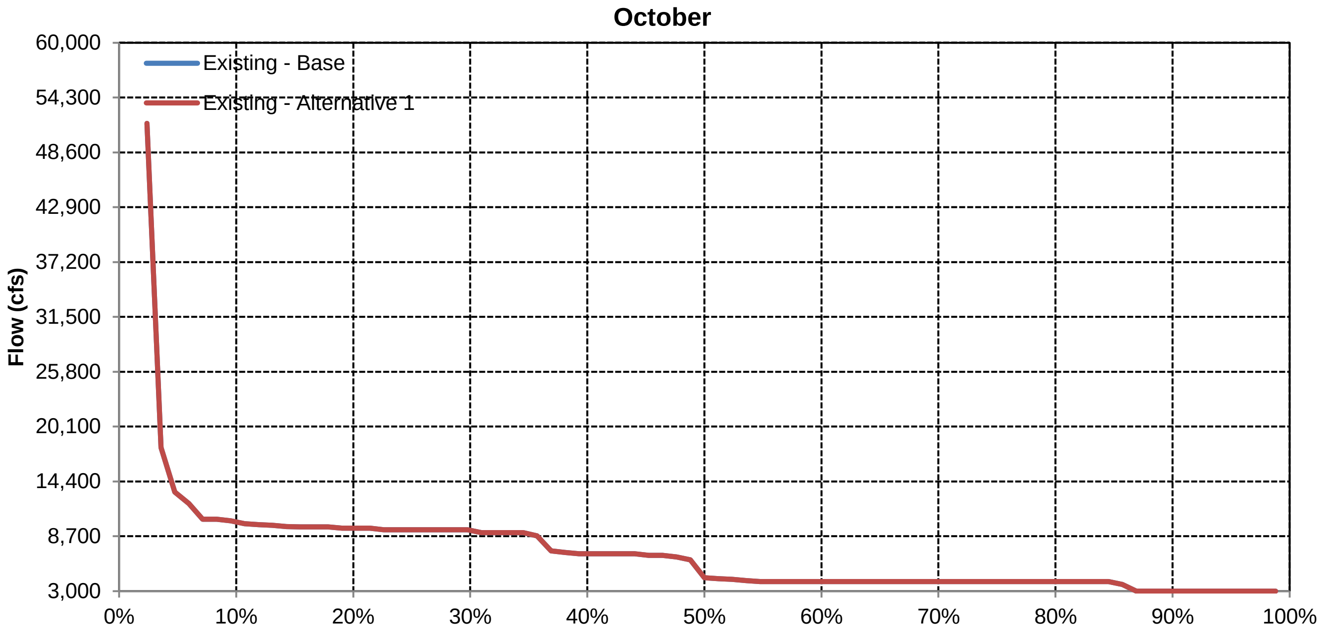
Existing - Alternative 1

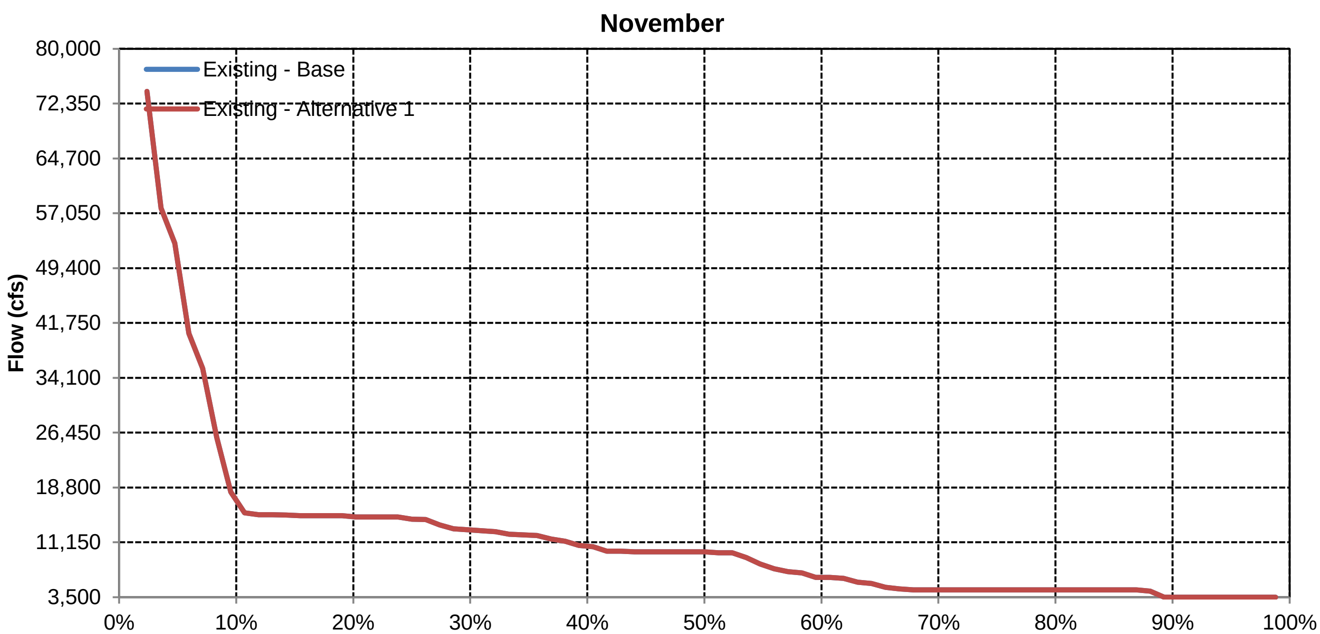
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	9,977	15,194	83,333	120,592	161,827	97,068	71,454	33,132	11,137	13,270	4,308	19,688
20%	9,531	14,688	37,738	76,978	107,377	74,847	46,407	23,720	7,992	11,709	4,155	19,375
30%	9,094	12,769	20,214	55,546	76,161	60,341	32,656	15,272	7,100	10,715	4,001	17,813
40%	6,875	10,418	14,342	38,012	58,776	38,477	22,321	12,858	7,100	9,085	4,000	10,938
50%	4,346	9,766	11,487	26,488	41,868	31,169	18,044	11,426	7,100	8,603	4,000	3,913
60%	4,000	6,253	6,752	19,211	28,692	22,356	14,643	10,166	6,903	8,000	4,000	3,569
70%	4,000	4,500	5,009	13,355	21,621	17,008	12,821	9,402	6,688	5,592	4,000	3,000
80%	4,000	4,500	4,670	10,293	17,232	14,703	11,016	7,596	6,187	5,000	4,000	3,000
90%	3,000	3,500	4,500	7,972	12,426	10,776	9,604	6,918	5,655	4,000	3,791	3,000
Long Term												
Full Simulation Period	6,909	11,530	25,387	48,782	63,791	48,782	30,013	16,104	7,983	8,483	4,062	9,331
Water Year Types												
Wet	9,275	19,272	57,557	101,579	121,326	88,381	55,563	26,753	10,584	11,023	4,128	19,366
Above Normal	6,741	9,314	21,144	55,453	70,726	61,417	29,722	17,425	7,395	11,464	4,017	11,133
Below Normal	6,527	9,662	10,110	23,902	40,103	31,158	23,270	13,327	6,819	8,808	4,050	3,469
Dry	5,824	7,923	8,608	15,426	29,458	22,607	13,161	8,981	7,006	5,274	4,137	3,269
Critical	4,133	5,072	6,622	11,837	16,327	13,519	9,101	6,026	6,104	4,027	3,889	3,010

Existing - Alternative 1 Minus Existing - Base

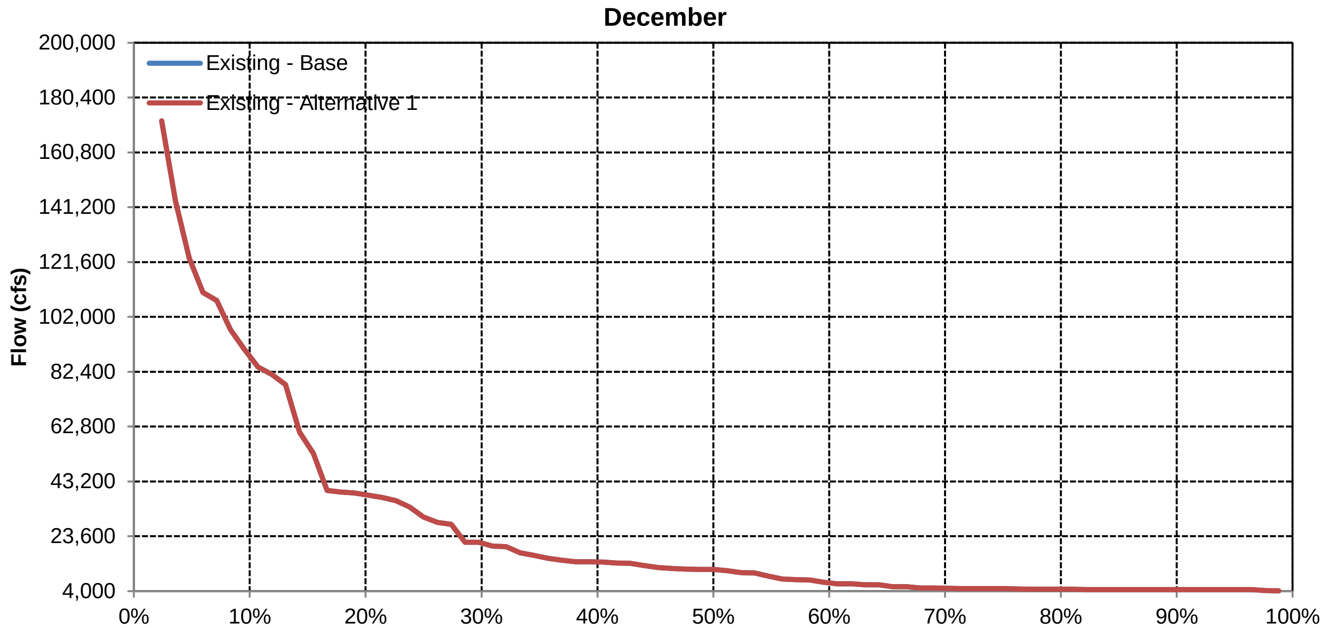
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	-1	0
20%	0	0	0	0	0	0	0	0	1	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	1	0	0	0	0	0	0	-1
60%	0	0	0	0	0	0	0	0	-2	0	0	0
70%	0	0	0	0	0	0	0	0	0	1	0	0
80%	0	0	0	0	0	0	0	-2	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types												
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	-1	0	0	0	0
Critical	0	0	0	0	0	0	0	0	0	0	0	0

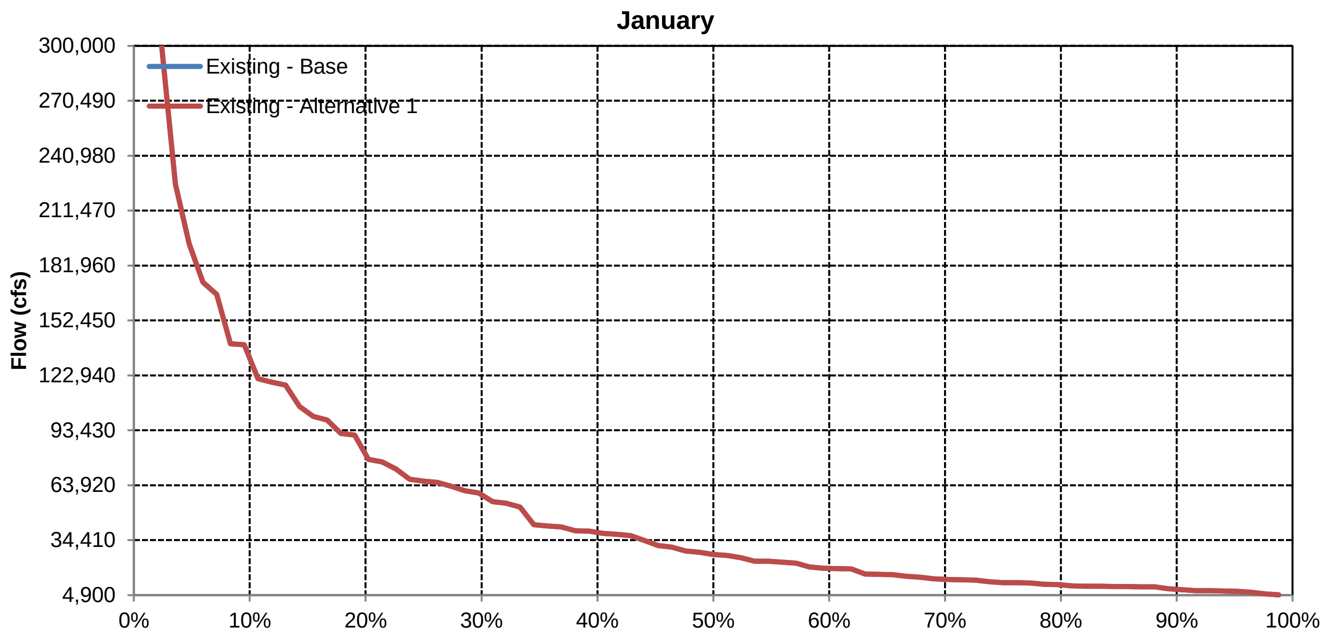
Delta Outflow



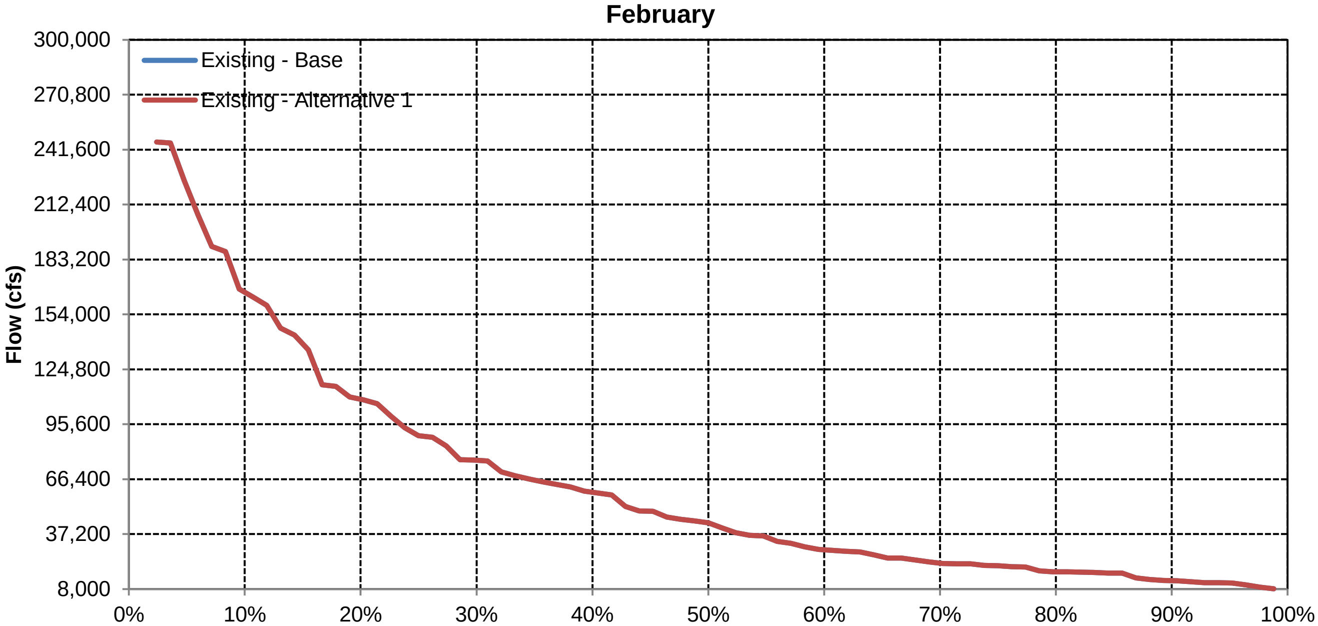


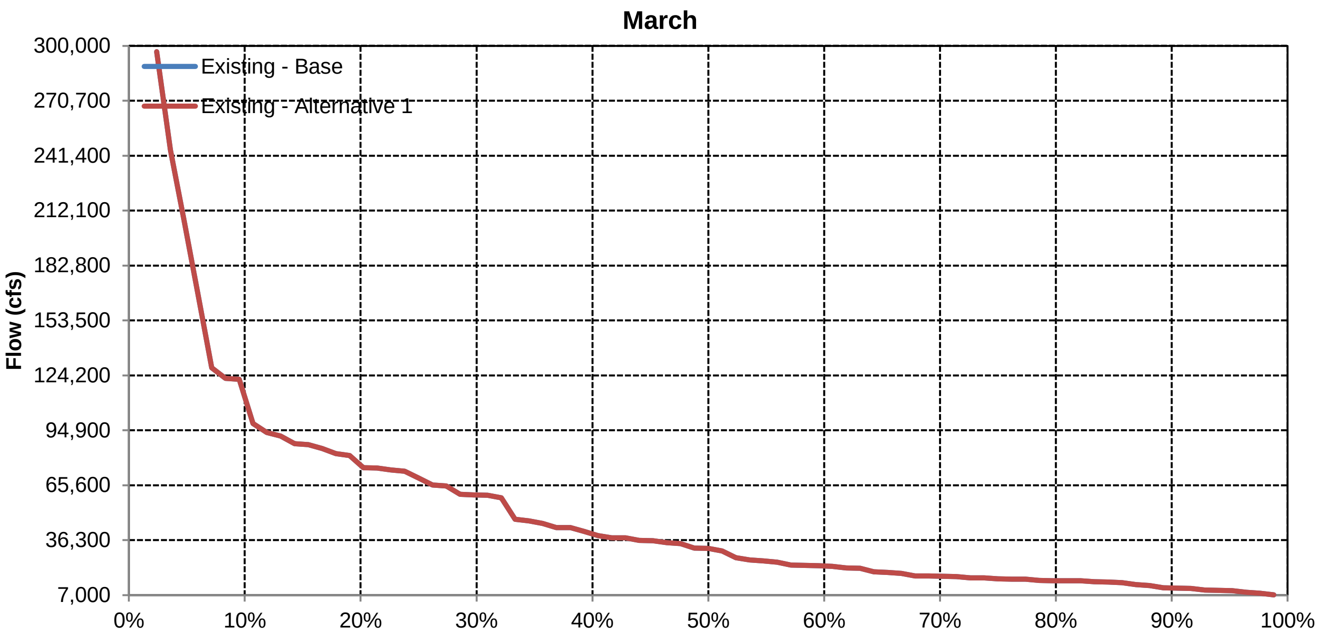
Delta Outflow





Delta Outflow





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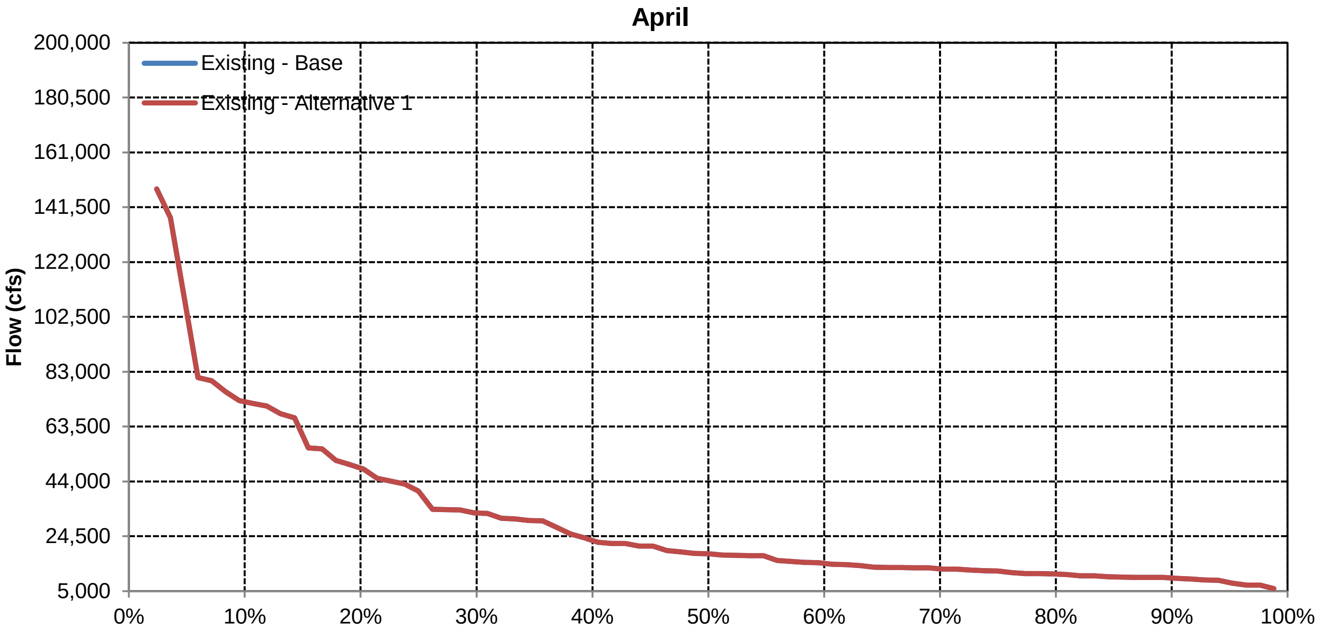
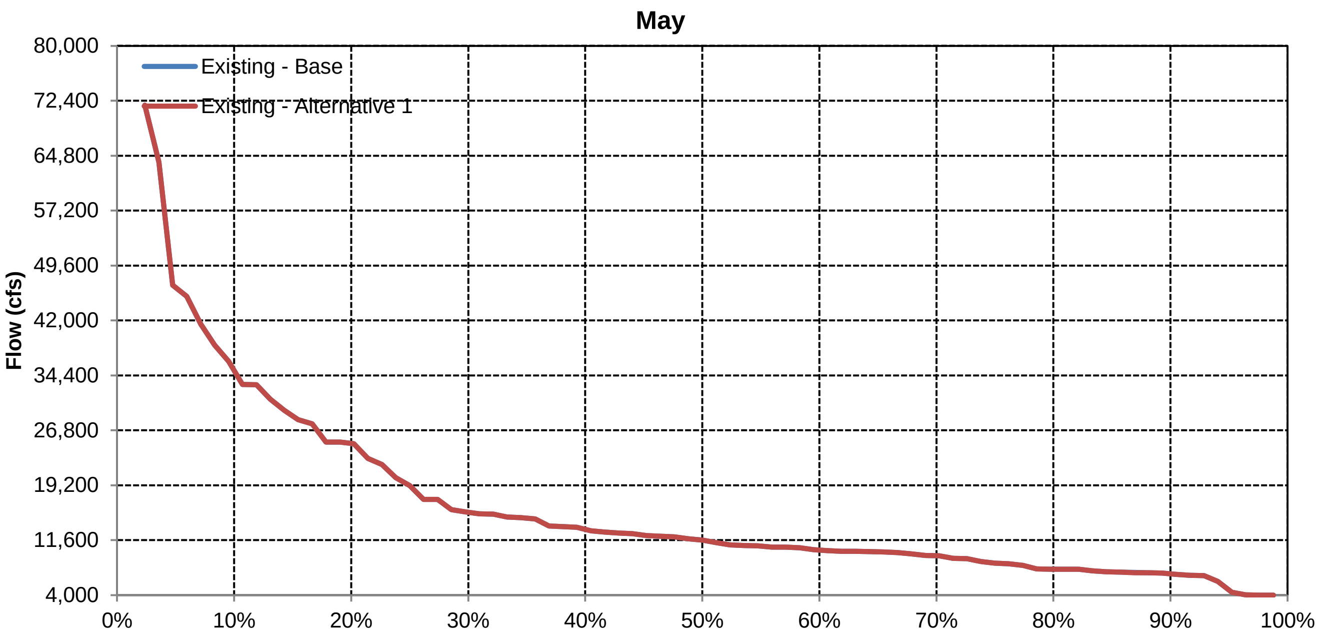
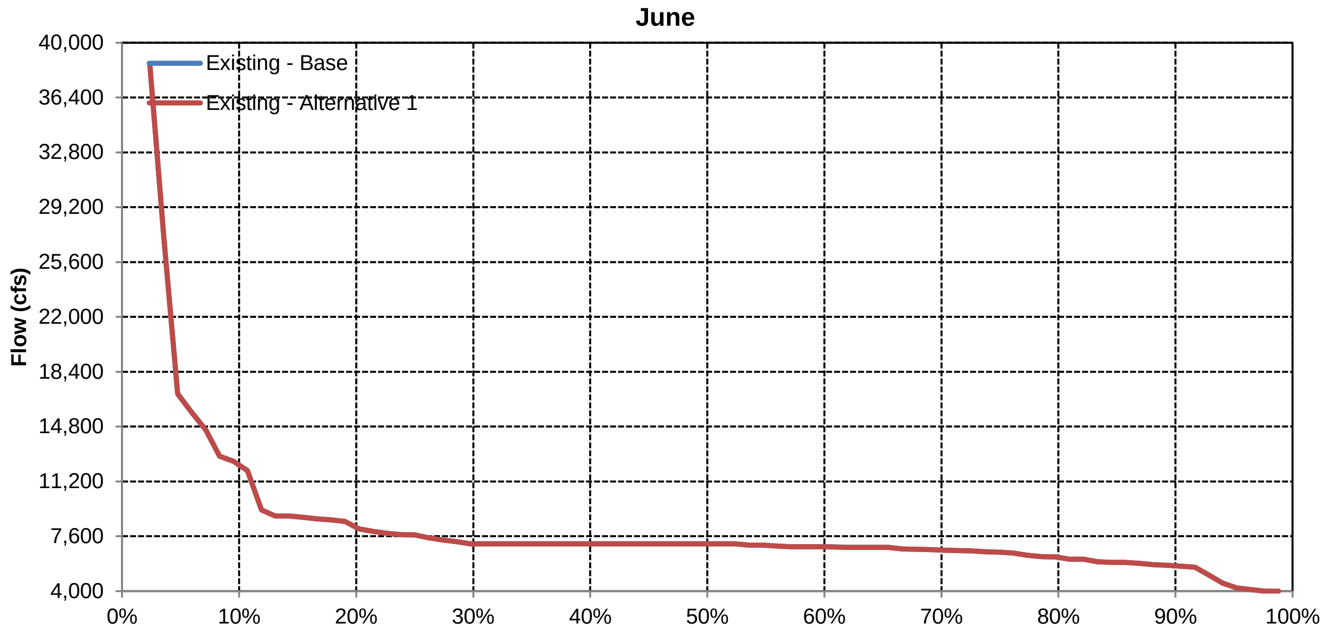
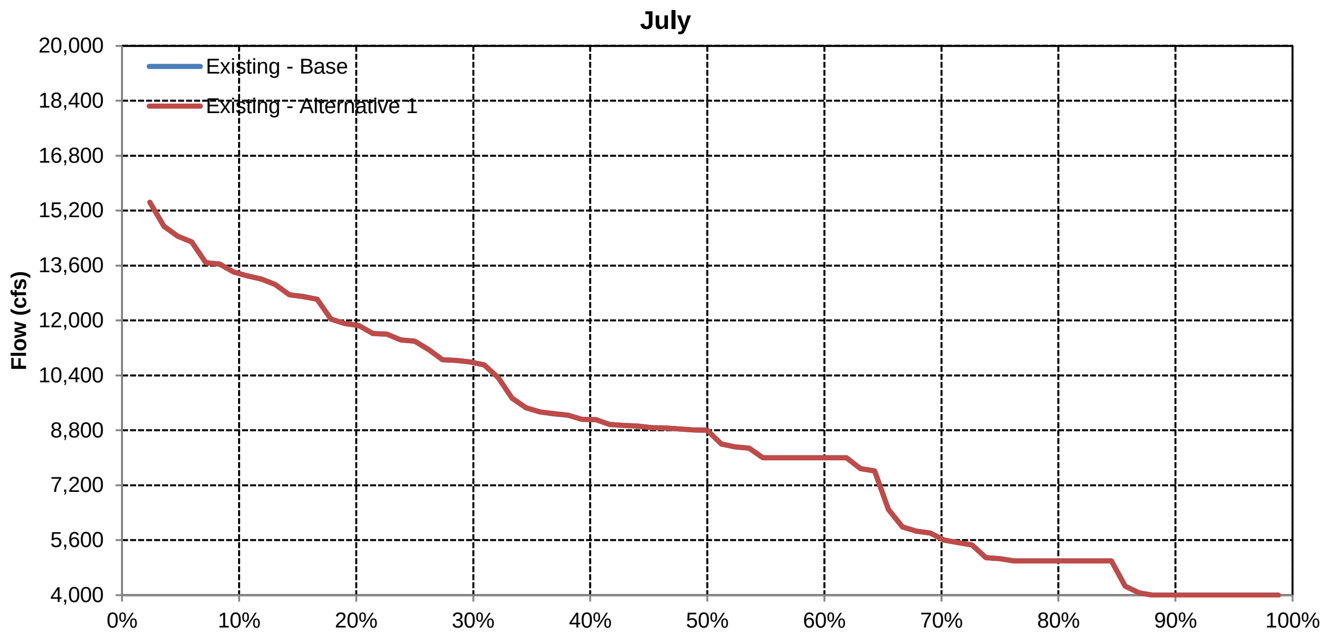


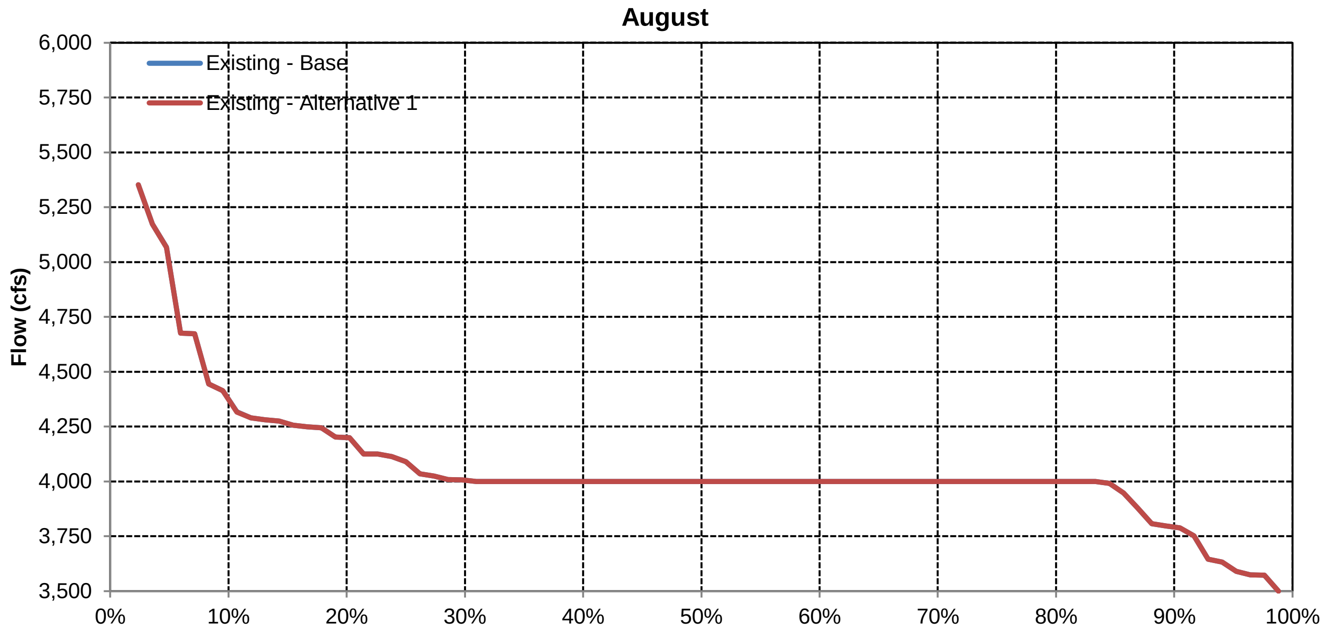


Delta Outflow





Delta Outflow



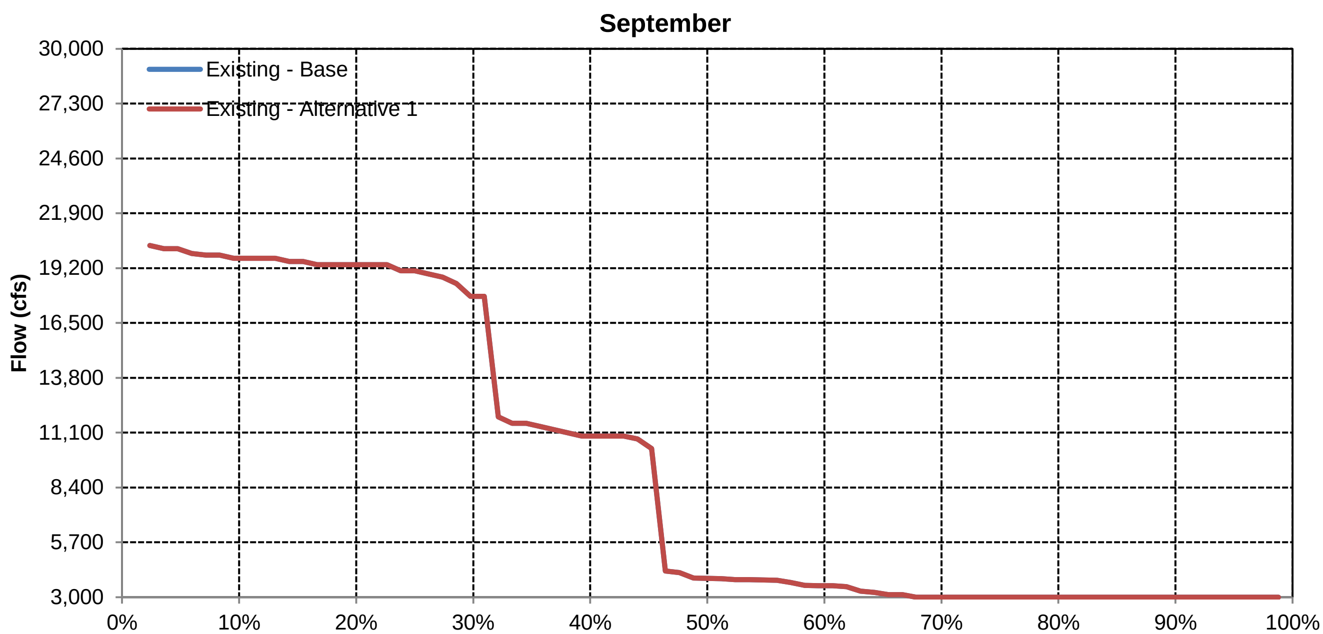


Table 185 Existing Condtions-Alternative 4 (Existing)

Winter-run Chinook Salmon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 4 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration	November through July	Mean Monthly Flow (cfs)	Verona		10	Lower 40%		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
			Freeport		10	Lower 40%		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
		Mean Monthly Water Temperature (°F)	Feather River Confluence	64		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
				68		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
			Freeport	64		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
				68		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Juvenile Rearing and Downstream Movement*	July through March	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	61		All Years	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
				65		All Years	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
			Freeport	61		All Years	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
				65		All Years	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0

Table 186 Existing Condtions-Alternative 4 (Existing)

Spring-run Chinook Salmon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 4 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration	March through September	Mean Monthly Flow (cfs)	Verona		10	Lower 40%						0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport		10	Lower 40%						0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	64		All Years						0.0	0.0	0.0	0.0	0.0	0.0	0.0
				68		All Years						0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport	64		All Years						0.0	0.0	0.0	0.0	0.0	0.0	0.0
				68		All Years						0.0	0.0	0.0	0.0	0.0	0.0	0.0
Juvenile Rearing (and Downstream Movement)	Year-round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	61		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
				65		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Smolt Emigration	October through May	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
		Mean Monthly Water Temperature (°F)	Feather River Confluence	63		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
			Freeport	63		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				

Table 187 Existing Condtions-Alternative 4 (Existing)

Fall-run Chinook Salmon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location Description	Metric Value	Metric %	Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Staging	July through December	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0							0.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0							0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	64		All Years	0.0	0.0	0.0							0.0	0.0	0.0
				68		All Years	0.0	0.0	0.0							0.0	0.0	0.0
			Freeport	64		All Years	0.0	0.0	0.0							0.0	0.0	0.0
				68		All Years	0.0	0.0	0.0							0.0	0.0	0.0
Juvenile Rearing and Downstream Movement	December through July	Mean Monthly Flow (cfs)	Verona		10	Lower 40%			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
			Freeport		10	Lower 40%			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
		Mean Monthly Water Temperature (°F)	Freeport	61		All Years			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
				65		All Years			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		

Net Change in Probability of Exceedance under Alternative 4 (Existing) relative to Existing Condtions (Oct–Sep columns)

Table 188 Existing Condtions-Alternative 4 (Existing)

Late Fall-run Chinook Salmon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location Description	Metric Value	Metric %	Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Staging	October through April	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
		Mean Monthly Water Temperature (°F)	Feather River Confluence	64		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
			Freeport	64		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
Juvenile Rearing and Downstream Movement	April through December	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Freeport	61		All Years	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
				65		All Years	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0

Net Change in Probability of Exceedance under Alternative 4 (Existing) relative to Existing Condtions (columns Oct–Sep)

Table 189 Existing Condtions-Alternative 4 (Existing)

Steelhead in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 4 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration	August through March	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	64		All Years	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0
			Freeport	64		All Years	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0
Juvenile Rearing and Downstream Movement	Year-Round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	65		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Smolt Emigration	January through June	Mean Monthly Flow (cfs)	Verona		10	Lower 40%				0.0	0.0	0.0	0.0	0.0	0.0			
			Freeport		10	Lower 40%				0.0	0.0	0.0	0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Feather River Confluence	52		All Years				0.0	0.0	0.0	0.0	0.0	0.0			
				55		All Years				0.0	0.0	0.0	0.0	0.0	0.0			
			Freeport	52		All Years				0.0	0.0	0.0	0.0	0.0	0.0			
				55		All Years				0.0	0.0	-1.2	0.0	0.0	0.0			

Table 190 Existing Condtions-Alternative 4 (Existing)

Green Sturgeon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 4 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Holding	February through July	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%					0.0	0.0	0.0	0.0	0.0	0.0		
		Mean Monthly Water Temperature (°F)	Freeport	61		All Years					0.0	0.0	0.0	0.0	0.0	0.0		
Adult Post-Spawning Holding and Emigration	July through November	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%	0.0	0.0								0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Freeport	61		All Years	0.0	0.0								0.0	0.0	0.0
Juvenile Rearing and Downstream Movement	Year-round	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Freeport	66		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 191 Existing Condtions-Alternative 4 (Existing)

White Sturgeon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 4 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Holding	November through May	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%		0.0	0.0	0.0	0.0	0.0	0.0	0.0				
		Mean Monthly Water Temperature (°F)	Freeport	77		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Spawning and Egg Incubation	February through June	Mean Monthly Flow (cfs)	Verona		10	Lower 40%					0.0	0.0	0.0	0.0	0.0			
			Freeport		10	Lower 40%					0.0	0.0	0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Feather River Confluence	61		All Years					0.0	0.0	0.0	0.0	0.0			
Juvenile Rearing and Downstream Movement	Year-round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	66		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport	66		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 192 Existing Condtions-Alternative 4 (Existing)

River Lamprey in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 4 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration	September through June	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0
Adult Immigration	September through June	Mean Monthly Water Temperature (°F)	Freeport	42-60		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0
Ammocoete Rearing and Downstream Movement	Year-round	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ammocoete Rearing and Downstream Movement	Year-round	Mean Monthly Water Temperature (°F)	Freeport	72		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

[1] Water temperature ranges are evaluated by calculating the net change in the probability of water temperatures occurring within the specified range.

Table 193 Existing Condtions-Alternative 4 (Existing)

Pacific Lamprey in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 4 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration	January through June	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%				0.0	0.0	0.0	0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Freeport	42-60		All Years				0.0	0.0	0.0	0.0	0.0	0.0			
Ammocoete Rearing and Downstream Movement	Year-round	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Freeport	72		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

[1]Water temperature ranges are evaluated by calculating the net change in the probability of water temperatures occurring within the specified range.

Table 194 Existing Condtions-Alternative 4 (Existing)

Hardhead in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 4 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adults and Other Lifestages	Year-round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	61-77		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport	61-77		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Adult Spawning	April through June	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%							0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Freeport	59-64		All Years							0.0	0.0	0.0			

[1]Water temperature ranges are evaluated by calculating the net change in the probability of water temperatures occurring within the specified range.

Table 195 Existing Condtions-Alternative 4 (Existing)

American Shad in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 4 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Spawning	April through June	Mean Monthly Flow (cfs)	Verona		10	Lower 40%							0.0	0.0	0.0			
			Freeport		10	Lower 40%							0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Feather River Confluence	60-70		All Years							0.0	0.0	0.0			
			Freeport	60-70		All Years							0.0	0.0	0.0			
Juvenile Rearing and Downstream Movement	Year-Round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	63-77		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport	63-77		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

[1]Water temperature ranges are evaluated by calculating the net change in the probability of water temperatures occurring within the specified range.

Table 196 Existing Condtions-Alternative 4 (Existing)

Striped Bass in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 4 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Spawning	April through June	Mean Monthly Flow (cfs)	Verona		10	Lower 40%							0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Feather River Confluence	59-68		All Years							0.0	0.0	0.0			
Juvenile Rearing and Downstream Movement	Year-round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	61-71		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

[1]Water temperature ranges are evaluated by calculating the net change in the probability of water temperatures occurring within the specified range.

Table 201 Existing Condtions-Alternative 4 (Existing)

Alternative 4 (Existing) vs Existing Condtions
Sacramento River at Verona, Monthly Flow

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
-1.0 < X < 1.0	100.0	85.4	54.9	43.9	39.0	56.1	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	0.0	14.6	43.9	56.1	58.5	37.8	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	-14.6	-43.9	-56.1	-58.5	-37.8	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Low Flows (Upper 40% of Distribution)												
-1.0 < X < 1.0	100.0	100.0	100.0	84.8	48.5	75.8	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	0.0	0.0	0.0	15.2	45.5	18.2	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	0.0	0.0	-15.2	-45.5	-18.2	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 202 Existing Condtions-Alternative 4 (Existing)

Alternative 4 (Existing) vs Existing Condtions
Sacramento River at Freeport, Monthly Flow

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
-1.0 < X < 1.0	100.0	84.1	58.5	45.1	42.7	64.6	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	0.0	14.6	41.5	54.9	54.9	30.5	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	-14.6	-41.5	-54.9	-54.9	-30.5	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Low Flows (Upper 40% of Distribution)												
-1.0 < X < 1.0	100.0	100.0	100.0	84.8	54.5	87.9	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	0.0	0.0	0.0	15.2	42.4	3.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	0.0	0.0	-15.2	-42.4	-3.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Alternative 4 (Existing) vs Existing Condtions

Sacramento River at Feather River, Monthly Temperature

Exceedance of Water Temperature Index Values and Probability of Occurring within the Water Temperature Index Ranges

Existing Condtions

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	98.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	98.0	96.4	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	95.7	92.7	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	81.1	73.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	20.7	4.9	94.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	2.4	1.2	81.7	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	97.8	2.1	1.2	51.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	78.0	1.4	1.2	12.2	87.8	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	58.5	1.2	1.2	4.7	74.6	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	34.1	1.2	1.2	1.4	65.2	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	18.3	1.2	1.2	1.2	41.5	98.3	98.8	98.8	98.8	98.8	98.8
56	98.8	7.6	1.2	1.2	1.2	23.2	95.9	98.8	98.8	98.8	98.8	98.8
57	98.8	2.4	1.2	1.2	1.2	14.0	94.7	98.8	98.8	98.8	98.8	98.8
58	98.8	1.2	1.2	1.2	1.2	5.5	86.6	98.8	98.8	98.8	98.8	98.8
59	96.7	1.2	1.2	1.2	1.2	3.2	77.6	98.8	98.8	98.8	98.8	98.8
60	85.4	1.2	1.2	1.2	1.2	2.4	68.3	98.8	98.8	98.8	98.8	98.8
61	62.8	1.2	1.2	1.2	1.2	1.8	57.3	98.8	98.8	98.8	98.8	98.8
62	44.5	1.2	1.2	1.2	1.2	1.2	43.9	98.0	98.8	98.8	98.8	98.8
63	23.2	1.2	1.2	1.2	1.2	1.2	35.4	96.9	98.8	98.8	98.8	98.8
64	14.6	1.2	1.2	1.2	1.2	1.2	13.3	95.5	98.8	98.8	98.8	98.8
65	7.6	1.2	1.2	1.2	1.2	1.2	10.4	89.6	98.8	98.8	98.8	93.3
66	4.5	1.2	1.2	1.2	1.2	1.2	4.3	85.4	98.8	98.8	98.8	90.2
68	1.5	1.2	1.2	1.2	1.2	1.2	1.2	48.8	98.2	98.8	98.8	65.9
69	1.2	1.2	1.2	1.2	1.2	1.2	1.2	29.3	94.1	98.8	98.8	53.7
70	1.2	1.2	1.2	1.2	1.2	1.2	1.2	13.2	85.4	98.3	97.8	29.9
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	9.8	68.3	93.1	90.2	24.6
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	6.3	37.8	78.0	76.8	13.4
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	2.2	11.0	29.3	42.7	3.5
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.7	3.0	19.5	23.2	2.4
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	4.3	2.1	1.2
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	79.9	72.0	97.6	97.6	97.6	97.1	95.8	79.3	75.6	96.4
50-64	84.2	96.6	0.9	0.0	50.0	97.6	85.5	3.3	0.0	0.0	0.0	0.0
55-56	0.0	10.7	0.0	0.0	0.0	18.3	2.4	0.0	0.0	0.0	0.0	0.0
59-64	82.1	0.0	0.0	0.0	0.0	2.0	64.3	3.3	0.0	0.0	0.0	0.0
59-68	95.2	0.0	0.0	0.0	0.0	2.0	76.4	50.0	0.6	0.0	0.0	32.9
59-75	95.5	0.0	0.0	0.0	0.0	2.0	76.4	97.1	95.8	79.3	75.6	96.4
60-70	84.2	0.0	0.0	0.0	0.0	1.2	67.1	85.6	13.4	0.5	1.0	68.9
61-71	61.6	0.0	0.0	0.0	0.0	0.6	56.1	89.0	30.5	5.7	8.6	74.2
63-69	22.0	0.0	0.0	0.0	0.0	0.0	34.2	67.6	4.7	0.0	0.0	45.1
63-77	22.0	0.0	0.0	0.0	0.0	0.0	34.2	95.7	97.6	94.5	96.7	97.6
65-82	6.4	0.0	0.0	0.0	0.0	0.0	9.2	88.4	97.6	97.6	97.6	92.1
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.0	84.2	97.1	96.6	28.7
42-60	13.4	97.6	96.8	95.2	97.6	96.4	30.5	0.0	0.0	0.0	0.0	0.0
61-77	61.6	0.0	0.0	0.0	0.0	0.6	56.1	97.6	97.6	94.5	96.7	97.6

Alternative 4 (Existing)

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	98.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	98.0	96.4	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	95.7	92.7	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	81.1	73.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	20.7	4.9	94.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	2.4	1.2	81.7	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	97.8	2.1	1.2	51.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	78.0	1.4	1.2	12.2	87.8	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	58.5	1.2	1.2	4.7	74.6	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	34.1	1.2	1.2	1.4	65.2	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	18.3	1.2	1.2	1.2	41.5	98.3	98.8	98.8	98.8	98.8	98.8
56	98.8	7.6	1.2	1.2	1.2	23.2	95.9	98.8	98.8	98.8	98.8	98.8
57	98.8	2.4	1.2	1.2	1.2	14.0	94.7	98.8	98.8	98.8	98.8	98.8
58	98.8	1.2	1.2	1.2	1.2	5.5	86.6	98.8	98.8	98.8	98.8	98.8
59	96.7	1.2	1.2	1.2	1.2	3.2	77.6	98.8	98.8	98.8	98.8	98.8
60	85.4	1.2	1.2	1.2	1.2	2.4	68.3	98.8	98.8	98.8	98.8	98.8
61	62.8	1.2	1.2	1.2	1.2	1.8	57.3	98.8	98.8	98.8	98.8	98.8
62	44.5	1.2	1.2	1.2	1.2	1.2	43.9	98.0	98.8	98.8	98.8	98.8
63	23.2	1.2	1.2	1.2	1.2	1.2	35.4	96.9	98.8	98.8	98.8	98.8
64	14.6	1.2	1.2	1.2	1.2	1.2	13.3	95.5	98.8	98.8	98.8	98.8
65	7.6	1.2	1.2	1.2	1.2	1.2	10.4	89.6	98.8	98.8	98.8	93.3
66	4.5	1.2	1.2	1.2	1.2	1.2	4.3	85.4	98.8	98.8	98.8	90.2
68	1.5	1.2	1.2	1.2	1.2	1.2	1.2	48.8	98.2	98.8	98.8	65.9
69	1.2	1.2	1.2	1.2	1.2	1.2	1.2	29.3	94.1	98.8	98.8	53.7
70	1.2	1.2	1.2	1.2	1.2	1.2	1.2	13.2	85.4	98.3	97.8	29.9
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	9.8	68.3	93.1	90.2	24.6
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	6.3	37.8	78.0	76.8	13.4
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	2.2	11.0	29.3	42.7	3.5
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.7	3.0	19.5	23.2	2.4
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	4.3	2.1	1.2
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	79.9	72.0	97.6	97.6	97.6	97.1	95.8	79.3	75.6	96.4
50-64	84.2	96.6	0.9	0.0	50.0	97.6	85.5	3.3	0.0	0.0	0.0	0.0
55-56	0.0	10.7	0.0	0.0	0.0	18.3	2.4	0.0	0.0	0.0	0.0	0.0
59-64	82.1	0.0	0.0	0.0	0.0	2.0	64.3	3.3	0.0	0.0	0.0	0.0
59-68	95.2	0.0	0.0	0.0	0.0	2.0	76.4	50.0	0.6	0.0	0.0	32.9
59-75	95.5	0.0	0.0	0.0	0.0	2.0	76.4	97.1	95.8	79.3	75.6	96.4
60-70	84.2	0.0	0.0	0.0	0.0	1.2	67.1	85.6	13.4	0.5	1.0	68.9
61-71	61.6	0.0	0.0	0.0	0.0	0.6	56.1	89.0	30.5	5.7	8.6	74.2
63-69	22.0	0.0	0.0	0.0	0.0	0.0	34.2	67.6	4.7	0.0	0.0	45.1
63-77	22.0	0.0	0.0	0.0	0.0	0.0	34.2	95.7	97.6	94.5	96.7	97.6
65-82	6.4	0.0	0.0	0.0	0.0	0.0	9.2	88.4	97.6	97.6	97.6	92.1
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.0	84.2	97.1	96.6	28.7
42-60	13.4	97.6	96.8	95.2	97.6	96.4	30.5	0.0	0.0	0.0	0.0	0.0
61-77	61.6	0.0	0.0	0.0	0.0	0.6	56.1	97.6	97.6	94.5	96.7	97.6

Alternative 4 (Existing) - Existing Condtions

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
43	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
48	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
49	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
52	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
53	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
54	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
56	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
57	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
58	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
62	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
66	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
68	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
72	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
74	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
86	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
88	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
98	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45-75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50-64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55-56	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-68	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60-70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61-71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63-69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
65-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42-60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Alternative 4 (Existing) vs Existing Condtions

Sacramento River at Freeport, Monthly Temperature

Exceedance of Water Temperature Index Values and Probability of Occurring within the Water Temperature Index Ranges

Existing Condtions

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	97.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	97.8	96.4	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	93.9	91.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	79.9	73.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	22.0	5.5	95.3	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	3.0	1.2	80.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	98.0	2.0	1.2	47.6	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	82.9	1.2	1.2	13.4	92.1	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	64.6	1.2	1.2	6.7	75.3	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	39.0	1.2	1.2	2.3	64.6	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	22.8	1.2	1.2	1.2	45.1	98.3	98.8	98.8	98.8	98.8	98.8
56	98.8	11.0	1.2	1.2	1.2	24.4	96.5	98.8	98.8	98.8	98.8	98.8
57	98.8	3.3	1.2	1.2	1.2	14.1	94.2	98.8	98.8	98.8	98.8	98.8
58	98.8	1.2	1.2	1.2	1.2	8.0	86.6	98.8	98.8	98.8	98.8	98.8
59	98.8	1.2	1.2	1.2	1.2	4.5	78.0	98.8	98.8	98.8	98.8	98.8
60	95.1	1.2	1.2	1.2	1.2	3.2	71.2	98.8	98.8	98.8	98.8	98.8
61	74.4	1.2	1.2	1.2	1.2	2.2	57.3	98.8	98.8	98.8	98.8	98.8
62	54.9	1.2	1.2	1.2	1.2	1.4	47.6	98.8	98.8	98.8	98.8	98.8
63	42.7	1.2	1.2	1.2	1.2	1.2	31.7	97.7	98.8	98.8	98.8	98.8
64	20.7	1.2	1.2	1.2	1.2	1.2	20.7	95.1	98.8	98.8	98.8	98.8
65	14.0	1.2	1.2	1.2	1.2	1.2	12.8	92.7	98.8	98.8	98.8	97.6
66	5.5	1.2	1.2	1.2	1.2	1.2	6.7	84.1	98.8	98.8	98.8	94.7
68	1.7	1.2	1.2	1.2	1.2	1.2	1.2	57.3	98.8	98.8	98.8	81.3
69	1.2	1.2	1.2	1.2	1.2	1.2	1.2	30.5	96.9	98.8	98.8	68.3
70	1.2	1.2	1.2	1.2	1.2	1.2	1.2	15.9	89.8	98.8	98.8	47.6
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	11.4	84.1	98.8	97.9	26.8
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	7.0	64.6	97.6	91.5	18.3
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.0	20.7	61.0	57.7	4.3
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	2.4	9.8	34.1	39.0	1.4
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	10.4	7.3	1.2
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	78.7	72.0	97.6	97.6	97.6	96.4	89.0	64.7	59.8	97.4
50-64	78.1	96.8	0.8	0.0	46.4	97.6	78.1	3.7	0.0	0.0	0.0	0.0
55-56	0.0	11.8	0.0	0.0	0.0	20.7	1.8	0.0	0.0	0.0	0.0	0.0
59-64	78.1	0.0	0.0	0.0	0.0	3.3	57.3	3.7	0.0	0.0	0.0	0.0
59-68	97.1	0.0	0.0	0.0	0.0	3.3	76.8	41.5	0.0	0.0	0.0	17.5
59-75	97.6	0.0	0.0	0.0	0.0	3.3	76.8	96.4	89.0	64.7	59.8	97.4
60-70	93.9	0.0	0.0	0.0	0.0	2.0	70.0	82.9	9.0	0.0	0.0	51.2
61-71	73.2	0.0	0.0	0.0	0.0	1.0	56.1	87.4	14.7	0.0	0.9	72.0
63-69	41.5	0.0	0.0	0.0	0.0	0.0	30.5	67.2	1.9	0.0	0.0	30.5
63-77	41.5	0.0	0.0	0.0	0.0	0.0	30.5	96.5	97.6	88.4	91.5	97.6
65-82	12.8	0.0	0.0	0.0	0.0	0.0	11.6	91.5	97.6	97.6	97.6	96.4
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.7	88.6	97.6	97.6	46.4
42-60	3.7	97.6	96.6	95.2	97.6	95.6	27.6	0.0	0.0	0.0	0.0	0.0
61-77	73.2	0.0	0.0	0.0	0.0	1.0	56.1	97.6	97.6	88.4	91.5	97.6

Alternative 4 (Existing)

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	97.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	97.8	96.4	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	93.9	91.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	79.9	73.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	22.0	5.5	95.4	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	3.0	1.2	80.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	98.0	2.0	1.2	47.6	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	82.9	1.2	1.2	13.4	92.1	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	64.6	1.2	1.2	6.7	75.6	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	39.0	1.2	1.2	2.3	64.6	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	22.8	1.2	1.2	1.2	43.9	98.3	98.8	98.8	98.8	98.8	98.8
56	98.8	11.0	1.2	1.2	1.2	24.4	96.5	98.8	98.8	98.8	98.8	98.8
57	98.8	3.3	1.2	1.2	1.2	14.1	94.2	98.8	98.8	98.8	98.8	98.8
58	98.8	1.2	1.2	1.2	1.2	8.2	86.6	98.8	98.8	98.8	98.8	98.8
59	98.8	1.2	1.2	1.2	1.2	4.5	78.0	98.8	98.8	98.8	98.8	98.8
60	95.1	1.2	1.2	1.2	1.2	3.2	71.2	98.8	98.8	98.8	98.8	98.8
61	74.4	1.2	1.2	1.2	1.2	2.2	57.3	98.8	98.8	98.8	98.8	98.8
62	54.9	1.2	1.2	1.2	1.2	1.4	47.6	98.8	98.8	98.8	98.8	98.8
63	42.7	1.2	1.2	1.2	1.2	1.2	31.7	97.7	98.8	98.8	98.8	98.8
64	20.7	1.2	1.2	1.2	1.2	1.2	20.7	95.1	98.8	98.8	98.8	98.8
65	14.0	1.2	1.2	1.2	1.2	1.2	12.8	92.7	98.8	98.8	98.8	97.6
66	5.5	1.2	1.2	1.2	1.2	1.2	6.7	84.1	98.8	98.8	98.8	94.7
68	1.7	1.2	1.2	1.2	1.2	1.2	1.2	57.3	98.8	98.8	98.8	81.3
69	1.2	1.2	1.2	1.2	1.2	1.2	1.2	30.5	96.9	98.8	98.8	68.3
70	1.2	1.2	1.2	1.2	1.2	1.2	1.2	15.9	89.8	98.8	98.8	47.6
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	11.4	84.1	98.8	97.9	26.8
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	7.0	64.6	97.6	91.5	18.3
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.0	20.7	61.0	57.7	4.3
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	2.4	9.8	34.1	39.0	1.4
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	10.4	7.3	1.2
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	78.7	72.0	97.6	97.6	97.6	96.4	89.0	64.7	59.8	97.4
50-64	78.1	96.8	0.8	0.0	46.4	97.6	78.1	3.7	0.0	0.0	0.0	0.0
55-56	0.0	11.8	0.0	0.0	0.0	19.5	1.8	0.0	0.0	0.0	0.0	0.0
59-64	78.1	0.0	0.0	0.0	0.0	3.3	57.3	3.7	0.0	0.0	0.0	0.0
59-68	97.1	0.0	0.0	0.0	0.0	3.3	76.8	41.5	0.0	0.0	0.0	17.5
59-75	97.6	0.0	0.0	0.0	0.0	3.3	76.8	96.4	89.0	64.7	59.8	97.4
60-70	93.9	0.0	0.0	0.0	0.0	2.0	70.0	82.9	9.0	0.0	0.0	51.2
61-71	73.2	0.0	0.0	0.0	0.0	1.0	56.1	87.4	14.7	0.0	0.9	72.0
63-69	41.5	0.0	0.0	0.0	0.0	0.0	30.5	67.2	1.9	0.0	0.0	30.5
63-77	41.5	0.0	0.0	0.0	0.0	0.0	30.5	96.5	97.6	88.4	91.5	97.6
65-82	12.8	0.0	0.0	0.0	0.0	0.0	11.6	91.5	97.6	97.6	97.6	96.4
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.7	88.6	97.6	97.6	46.4
42-60	3.7	97.6	96.6	95.2	97.6	95.6	27.6	0.0	0.0	0.0	0.0	0.0
61-77	73.2	0.0	0.0	0.0	0.0	1.0	56.1	97.6	97.6	88.4	91.5	97.6

Alternative 4 (Existing) - Existing Condtions

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
43	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
48	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
49	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
52	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
53	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
54	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55	0.0	0.0	0.0	0.0	0.0	-1.2	0.0	0.0	0.0	0.0	0.0	0.0
56	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
57	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
58	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
59	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
62	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
66	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
68	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
72	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
74	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
86	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
88	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
98	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45-75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50-64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55-56	0.0	0.0	0.0	0.0	0.0	-1.2	0.0	0.0	0.0	0.0	0.0	0.0
59-64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-68	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60-70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61-71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63-69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
65-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42-60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 227 Existing Conditions-Alternative 4 (Existing)

Delta Smelt in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 4 (Existing) relative to Existing Conditions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult	December through May	Mean Monthly Water Temperature (°F)	Sacramento River at Freeport	59-68		All Years			0.0	0.0	0.0	0.0	0.0	0.0				
		Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years			63.4	69.5	58.5	67.1	0.0	0.0				
	September through November	Mean Monthly X_2 (RKm)	X_2 between 74 km and 81 km	74-81		Wet and Above Normal Water Years	0.0	0.0										0.0
	December through February	Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<-5000 cfs		All Years			0.0	0.0	0.0							
Egg and Embryo	February through May	Mean Monthly Water Temperature (°F)	Sacramento River at Freeport	59-68		All Years					0.0	0.0	0.0	0.0				
Larval	March through June	Mean Monthly Water Temperature (°F)	Sacramento River at Freeport	59-68		All Years						0.0	0.0	0.0	0.0			
		Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<-1500 cfs		Dry and Critical Water Years						0.0	0.0	0.0	0.0			
		Mean Monthly Delta Outflow (cfs)	Delta		10	All Years						0.0	0.0	0.0	0.0			
Juvenile	May through July	Mean Monthly Water Temperature (°F)	Sacramento River at Freeport	59-68		All Years								0.0	0.0	0.0		
		Mean Monthly X_2 (RKm)	Changes in X_2 between RKm 65 and 80	0.5 RKm		All Years								0.0	0.0	0.0		

Table 228 Existing Conditions-Alternative 4 (Existing)

Longfin Smelt in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 4 (Existing) relative to Existing Conditions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult	December through March	Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<-5000 cfs		All Years			0.0	0.0	0.0	0.0						
Larvae and Juvenile	April and May	Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<-1500 cfs		Dry and Critical Water Years							0.0	0.0				
				< 0 cfs		Dry and Critical Water Years							0.0	0.0				
	January through June	Mean Monthly X_2 (RKm)	X_2	< 75 RKm		All Years				0.0	0.0	0.0	0.0	0.0	0.0			
				< 75 RKm		Dry and Critical Water Years				0.0	0.0	0.0	0.0	0.0	0.0			

Table 229 Existing Conditions-Alternative 4 (Existing)

Winter-run Chinook Salmon in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 4 (Existing) relative to Existing Conditions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	November through May	Mean Monthly Flow (cfs)	Rio Vista		10	Lower 40%		0.0	0.0	0.0	0.0	0.0	0.0	0.0				
		Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years		67.1	63.4	69.5	58.5	67.1	0.0	0.0				
		Mean Monthly Delta Outflow (cfs)	Delta		10	All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0				
		Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<2500 cfs		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0				

Table 230 Existing Conditions-Alternative 4 (Existing)

Spring-run Chinook Salmon in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 4 (Existing) relative to Existing Conditions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	November through June	Mean Monthly Flow (cfs)	Rio Vista		10	Lower 40%		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
		Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years		67.1	63.4	69.5	58.5	67.1	0.0	0.0	0.0			
		Mean Monthly Delta Outflow (cfs)	Delta		10	All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
		Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<2500 cfs		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			

Table 231 Existing Conditions-Alternative 4 (Existing)

Fall- and Late Fall-run Chinook Salmon in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 4 (Existing) relative to Existing Conditions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	November through June	Mean Monthly Flow (cfs)	Rio Vista		10	Lower 40%		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
		Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years		67.1	63.4	69.5	58.5	67.1	0.0	0.0	0.0			
		Mean Monthly Delta Outflow (cfs)	Delta		10	All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
		Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<2500 cfs		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Adult (San Joaquin River)	December through February	Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<-5000 cfs		All Years			0.0	0.0	0.0							

Table 232 Existing Conditions-Alternative 4 (Existing)

Steelhead in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 4 (Existing) relative to Existing Conditions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	October through July	Mean Monthly Flow (cfs)	Rio Vista		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
		Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years	0.0	67.1	63.4	69.5	58.5	67.1	0.0	0.0	0.0	0.0		
		Mean Monthly Delta Outflow (cfs)	Delta		10	All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
		Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<2500 cfs		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		

Table 233 Existing Conditions-Alternative 4 (Existing)

Green Sturgeon in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 4 (Existing) relative to Existing Conditions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	Year-round	Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years	0.0	67.1	63.4	69.5	58.5	67.1	0.0	0.0	0.0	0.0	0.0	0.0

Table 234 Existing Conditions-Alternative 4 (Existing)

White Sturgeon in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 4 (Existing) relative to Existing Conditions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	April through June	Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years							0.0	0.0	0.0			

Table 235 Existing Conditions-Alternative 4 (Existing)

Splittail in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 4 (Existing) relative to Existing Conditions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Spawning and Embryo Incubation	February through May	Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years					58.5	67.1	0.0	0.0				
Juvenile Rearing and Emigration	April through July	Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years							0.0	0.0	0.0	0.0		

Table 236 Existing Conditions-Alternative 4 (Existing)

American Shad in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 4 (Existing) relative to Existing Conditions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Egg and Larvae	April through June	Mean Monthly X_2 (RKm)	Changes in X_2	1 RKm		All Years							0.0	0.0	0.0			

Table 237 Existing Conditions-Alternative 4 (Existing)

Striped Bass in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 4 (Existing) relative to Existing Conditions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Egg and Larvae	April through June	Mean Monthly X_2 (RKm)	Changes in X_2	1 RKm		All Years							0.0	0.0	0.0			

Alternative 4 (Existing) vs Existing Conditions

Sacramento River at Freeport, Monthly Temperature

Exceedance of Water Temperature Index Values and Probability of Occurring within the Water Temperature Index Ranges

Existing Conditions

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	97.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	97.8	96.4	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	93.9	91.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	79.9	73.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	22.0	5.5	95.3	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	3.0	1.2	80.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	98.0	2.0	1.2	47.6	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	82.9	1.2	1.2	13.4	92.1	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	64.6	1.2	1.2	6.7	75.3	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	39.0	1.2	1.2	2.3	64.6	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	22.8	1.2	1.2	1.2	45.1	98.3	98.8	98.8	98.8	98.8	98.8
56	98.8	11.0	1.2	1.2	1.2	24.4	96.5	98.8	98.8	98.8	98.8	98.8
57	98.8	3.3	1.2	1.2	1.2	14.1	94.2	98.8	98.8	98.8	98.8	98.8
58	98.8	1.2	1.2	1.2	1.2	8.0	86.6	98.8	98.8	98.8	98.8	98.8
59	98.8	1.2	1.2	1.2	1.2	4.5	78.0	98.8	98.8	98.8	98.8	98.8
60	95.1	1.2	1.2	1.2	1.2	3.2	71.2	98.8	98.8	98.8	98.8	98.8
61	74.4	1.2	1.2	1.2	1.2	2.2	57.3	98.8	98.8	98.8	98.8	98.8
62	54.9	1.2	1.2	1.2	1.2	1.4	47.6	98.8	98.8	98.8	98.8	98.8
63	42.7	1.2	1.2	1.2	1.2	1.2	31.7	97.7	98.8	98.8	98.8	98.8
64	20.7	1.2	1.2	1.2	1.2	1.2	20.7	95.1	98.8	98.8	98.8	98.8
65	14.0	1.2	1.2	1.2	1.2	1.2	12.8	92.7	98.8	98.8	98.8	97.6
66	5.5	1.2	1.2	1.2	1.2	1.2	6.7	84.1	98.8	98.8	98.8	94.7
68	1.7	1.2	1.2	1.2	1.2	1.2	1.2	57.3	98.8	98.8	98.8	81.3
69	1.2	1.2	1.2	1.2	1.2	1.2	1.2	30.5	96.9	98.8	98.8	68.3
70	1.2	1.2	1.2	1.2	1.2	1.2	1.2	15.9	89.8	98.8	98.8	47.6
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	11.4	84.1	98.8	97.9	26.8
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	7.0	64.6	97.6	91.5	18.3
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.0	20.7	61.0	57.7	4.3
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	2.4	9.8	34.1	39.0	1.4
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	10.4	7.3	1.2
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	78.7	72.0	97.6	97.6	97.6	96.4	89.0	64.7	59.8	97.4
50-64	78.1	96.8	0.8	0.0	46.4	97.6	78.1	3.7	0.0	0.0	0.0	0.0
55-56	0.0	11.8	0.0	0.0	0.0	20.7	1.8	0.0	0.0	0.0	0.0	0.0
59-64	78.1	0.0	0.0	0.0	0.0	3.3	57.3	3.7	0.0	0.0	0.0	0.0
59-68	97.1	0.0	0.0	0.0	0.0	3.3	76.8	41.5	0.0	0.0	0.0	17.5
59-75	97.6	0.0	0.0	0.0	0.0	3.3	76.8	96.4	89.0	64.7	59.8	97.4
60-70	93.9	0.0	0.0	0.0	0.0	2.0	70.0	82.9	9.0	0.0	0.0	51.2
61-71	73.2	0.0	0.0	0.0	0.0	1.0	56.1	87.4	14.7	0.0	0.9	72.0
63-69	41.5	0.0	0.0	0.0	0.0	0.0	30.5	67.2	1.9	0.0	0.0	30.5
63-77	41.5	0.0	0.0	0.0	0.0	0.0	30.5	96.5	97.6	88.4	91.5	97.6
65-82	12.8	0.0	0.0	0.0	0.0	0.0	11.6	91.5	97.6	97.6	97.6	96.4
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.7	88.6	97.6	97.6	46.4
42-60	3.7	97.6	96.6	95.2	97.6	95.6	27.6	0.0	0.0	0.0	0.0	0.0
61-77	73.2	0.0	0.0	0.0	0.0	1.0	56.1	97.6	97.6	88.4	91.5	97.6

Alternative 4 (Existing)

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	97.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	97.8	96.4	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	93.9	91.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	79.9	73.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	22.0	5.5	95.4	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	3.0	1.2	80.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	98.0	2.0	1.2	47.6	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	82.9	1.2	1.2	13.4	92.1	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	64.6	1.2	1.2	6.7	75.6	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	39.0	1.2	1.2	2.3	64.6	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	22.8	1.2	1.2	1.2	43.9	98.3	98.8	98.8	98.8	98.8	98.8
56	98.8	11.0	1.2	1.2	1.2	24.4	96.5	98.8	98.8	98.8	98.8	98.8
57	98.8	3.3	1.2	1.2	1.2	14.1	94.2	98.8	98.8	98.8	98.8	98.8
58	98.8	1.2	1.2	1.2	1.2	8.2	86.6	98.8	98.8	98.8	98.8	98.8
59	98.8	1.2	1.2	1.2	1.2	4.5	78.0	98.8	98.8	98.8	98.8	98.8
60	95.1	1.2	1.2	1.2	1.2	3.2	71.2	98.8	98.8	98.8	98.8	98.8
61	74.4	1.2	1.2	1.2	1.2	2.2	57.3	98.8	98.8	98.8	98.8	98.8
62	54.9	1.2	1.2	1.2	1.2	1.4	47.6	98.8	98.8	98.8	98.8	98.8
63	42.7	1.2	1.2	1.2	1.2	1.2	31.7	97.7	98.8	98.8	98.8	98.8
64	20.7	1.2	1.2	1.2	1.2	1.2	20.7	95.1	98.8	98.8	98.8	98.8
65	14.0	1.2	1.2	1.2	1.2	1.2	12.8	92.7	98.8	98.8	98.8	97.6
66	5.5	1.2	1.2	1.2	1.2	1.2	6.7	84.1	98.8	98.8	98.8	94.7
68	1.7	1.2	1.2	1.2	1.2	1.2	1.2	57.3	98.8	98.8	98.8	81.3
69	1.2	1.2	1.2	1.2	1.2	1.2	1.2	30.5	96.9	98.8	98.8	68.3
70	1.2	1.2	1.2	1.2	1.2	1.2	1.2	15.9	89.8	98.8	98.8	47.6
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	11.4	84.1	98.8	97.9	26.8
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	7.0	64.6	97.6	91.5	18.3
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.0	20.7	61.0	57.7	4.3
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	2.4	9.8	34.1	39.0	1.4
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	10.4	7.3	1.2
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	78.7	72.0	97.6	97.6	97.6	96.4	89.0	64.7	59.8	97.4
50-64	78.1	96.8	0.8	0.0	46.4	97.6	78.1	3.7	0.0	0.0	0.0	0.0
55-56	0.0	11.8	0.0	0.0	0.0	19.5	1.8	0.0	0.0	0.0	0.0	0.0
59-64	78.1	0.0	0.0	0.0	0.0	3.3	57.3	3.7	0.0	0.0	0.0	0.0
59-68	97.1	0.0	0.0	0.0	0.0	3.3	76.8	41.5	0.0	0.0	0.0	17.5
59-75	97.6	0.0	0.0	0.0	0.0	3.3	76.8	96.4	89.0	64.7	59.8	97.4
60-70	93.9	0.0	0.0	0.0	0.0	2.0	70.0	82.9	9.0	0.0	0.0	51.2
61-71	73.2	0.0	0.0	0.0	0.0	1.0	56.1	87.4	14.7	0.0	0.9	72.0
63-69	41.5	0.0	0.0	0.0	0.0	0.0	30.5	67.2	1.9	0.0	0.0	30.5
63-77	41.5	0.0	0.0	0.0	0.0	0.0	30.5	96.5	97.6	88.4	91.5	97.6
65-82	12.8	0.0	0.0	0.0	0.0	0.0	11.6	91.5	97.6	97.6	97.6	96.4
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.7	88.6	97.6	97.6	46.4
42-60	3.7	97.6	96.6	95.2	97.6	95.6	27.6	0.0	0.0	0.0	0.0	0.0
61-77	73.2	0.0	0.0	0.0	0.0	1.0	56.1	97.6	97.6	88.4	91.5	97.6

Alternative 4 (Existing) - Existing Conditions

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
43	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
48	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
49	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
52	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
53	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
54	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55	0.0	0.0	0.0	0.0	0.0	-1.2	0.0	0.0	0.0	0.0	0.0	0.0
56	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
57	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
58	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
59	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
62	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
66	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
68	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
72	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
74	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
86	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
88	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
98	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45-75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50-64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55-56	0.0	0.0	0.0	0.0	0.0	-1.2	0.0	0.0	0.0	0.0	0.0	0.0
59-64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-68	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60-70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61-71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63-69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
65-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42-60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 239 Existing Conditions-Alternative 4 (Existing)

Alternative 4 (Existing) vs Existing Conditions
Sacramento River at Rio Vista, Monthly Flow

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
-1.0 < X < 1.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Low Flows (Upper 40% of Distribution)												
-1.0 < X < 1.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 240 Existing Conditions-Alternative 4 (Existing)

Alternative 4 (Existing) vs Existing Conditions
Yolo Bypass, Monthly Flow

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
-1.0 < X < 1.0	100.0	30.5	30.5	18.3	28.0	20.7	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	67.1	63.4	69.5	58.5	67.1	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	0.0	69.5	69.5	81.7	72.0	78.0	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	69.5	69.5	81.7	72.0	78.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	67.1	63.4	69.5	58.5	67.1	0.0	0.0	0.0	0.0	0.0	0.0
Low Flows (Upper 40% of Distribution)												
-1.0 < X < 1.0	100.0	75.8	63.6	24.2	30.3	15.2	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	24.2	36.4	75.8	69.7	84.8	0.0	0.0	0.0	0.0	0.0	0.0
X>1 (Total %)	0.0	24.2	36.4	75.8	69.7	84.8	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	24.2	36.4	75.8	69.7	84.8	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	24.2	36.4	75.8	69.7	84.8	0.0	0.0	0.0	0.0	0.0	0.0

Table 241 Existing Conditions-Alternative 4 (Existing)

Alternative 4 (Existing) vs Existing Conditions
Delta Outflow, Monthly Flow

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
-1.0 < X < 1.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Low Flows (Upper 40% of Distribution)												
-1.0 < X < 1.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Long-Term and Water Year-Type Average of Sacramento River Delta Inflow Under Existing - Base and Existing - Alternative 5

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Existing - Base	11,300	15,746	24,309	34,221	41,784	35,394	22,062	13,364	12,597	19,584	13,697	16,482	15,659
Existing - Alternative 5	11,300	15,639	23,940	33,568	41,092	35,060	22,062	13,364	12,597	19,584	13,697	16,482	15,530
Difference	0	-107	-369	-653	-691	-334	0	0	0	0	0	0	-128
Percent Difference	0%	-1%	-2%	-2%	-2%	-1%	0%	0%	0%	0%	0%	0%	-1%
							Water Year-Types						
Wet													
Existing - Base	13,018	22,069	42,432	56,542	64,112	52,430	36,791	18,384	13,640	21,152	15,520	26,010	22,938
Existing - Alternative 5	13,018	21,792	41,580	55,599	63,384	52,076	36,791	18,384	13,640	21,152	15,520	26,010	22,749
Difference	0	-276	-851	-943	-728	-354	0	0	0	0	0	0	-189
Percent Difference	0%	-1%	-2%	-2%	-1%	-1%	0%	0%	0%	0%	0%	0%	-1%
Above Normal													
Existing - Base	11,695	14,566	23,212	43,774	51,354	46,254	22,271	14,655	13,070	22,489	16,033	18,988	17,937
Existing - Alternative 5	11,695	14,525	22,872	42,737	50,223	45,799	22,271	14,655	13,070	22,489	16,033	18,988	17,759
Difference	0	-41	-340	-1,037	-1,131	-454	0	0	0	0	0	0	-178
Percent Difference	0%	0%	-1%	-2%	-2%	-1%	0%	0%	0%	0%	0%	0%	-1%
Below Normal													
Existing - Base	10,841	14,747	16,484	23,799	32,584	29,126	18,090	11,885	12,782	22,589	15,187	12,013	13,248
Existing - Alternative 5	10,841	14,689	16,299	23,176	31,930	28,698	18,090	11,885	12,782	22,589	15,187	12,013	13,132
Difference	0	-58	-186	-623	-653	-428	0	0	0	0	0	0	-116
Percent Difference	0%	0%	-1%	-3%	-2%	-1%	0%	0%	0%	0%	0%	0%	-1%
Dry													
Existing - Base	10,423	12,567	14,687	17,727	27,798	23,027	11,912	10,212	12,472	17,228	11,469	10,994	10,852
Existing - Alternative 5	10,423	12,542	14,599	17,439	27,132	22,711	11,912	10,212	12,472	17,228	11,469	10,994	10,771
Difference	0	-24	-87	-289	-666	-316	0	-1	0	0	0	0	-81
Percent Difference	0%	0%	-1%	-2%	-2%	-1%	0%	0%	0%	0%	0%	0%	-1%
Critical													
Existing - Base	9,149	9,410	11,565	14,920	17,376	14,410	10,330	7,910	9,857	12,298	8,422	7,772	8,039
Existing - Alternative 5	9,148	9,407	11,534	14,731	17,114	14,346	10,330	7,910	9,857	12,298	8,422	7,772	8,007
Difference	0	-3	-31	-189	-261	-64	0	0	0	0	0	0	-32
Percent Difference	0%	0%	0%	-1%	-2%	0%	0%	0%	0%	0%	0%	0%	0%

Sacramento River Delta Inflow

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	14,603	22,010	56,115	71,084	75,521	65,784	49,402	23,850	14,772	24,306	16,775	28,029
20%	13,619	18,623	35,016	61,750	67,715	57,900	35,366	14,647	13,790	23,675	16,437	24,442
30%	12,912	17,392	24,392	45,490	58,539	48,511	24,073	12,554	13,215	23,166	15,988	22,307
40%	12,254	15,897	19,607	34,106	50,381	38,401	16,613	11,092	12,891	22,072	15,543	18,189
50%	11,265	14,221	17,083	26,083	35,167	28,964	13,801	10,661	12,353	20,699	15,010	13,962
60%	10,411	12,217	14,976	20,006	27,645	22,764	12,349	10,122	11,925	19,938	14,452	12,771
70%	8,888	10,901	14,365	15,735	23,924	20,351	11,386	9,739	11,469	18,857	12,942	10,172
80%	7,935	8,613	10,704	13,922	18,176	16,100	10,880	9,315	11,081	14,287	9,192	9,276
90%	6,415	7,211	9,575	11,915	16,074	12,014	9,372	8,228	10,168	12,060	8,272	8,038
Long Term												
Full Simulation Period	11,300	15,746	24,309	34,221	41,784	35,394	22,062	13,364	12,597	19,584	13,697	16,482
Water Year Types												
Wet	13,018	22,069	42,432	56,542	64,112	52,430	36,791	18,384	13,640	21,152	15,520	26,010
Above Normal	11,695	14,566	23,212	43,774	51,354	46,254	22,271	14,655	13,070	22,489	16,033	18,988
Below Normal	10,841	14,747	16,484	23,799	32,584	29,126	18,090	11,885	12,782	22,589	15,187	12,013
Dry	10,423	12,567	14,687	17,727	27,798	23,027	11,912	10,212	12,472	17,228	11,469	10,994
Critical	9,149	9,410	11,565	14,920	17,376	14,410	10,330	7,910	9,857	12,298	8,422	7,772

Existing - Alternative 5

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	14,603	21,714	54,922	70,190	75,521	65,700	49,402	23,850	14,772	24,306	16,775	28,030
20%	13,619	18,592	33,852	60,070	66,938	57,360	35,366	14,647	13,791	23,675	16,437	24,444
30%	12,912	17,379	23,897	44,605	57,609	47,841	24,073	12,554	13,215	23,166	15,989	22,307
40%	12,254	15,868	19,393	32,648	49,149	37,016	16,613	11,092	12,891	22,072	15,543	18,189
50%	11,265	14,201	16,798	25,416	33,482	28,585	13,801	10,661	12,352	20,699	15,010	13,962
60%	10,411	12,212	14,925	19,740	26,933	22,580	12,349	10,119	11,925	19,939	14,452	12,771
70%	8,887	10,897	14,324	15,631	23,368	20,261	11,386	9,739	11,469	18,857	12,942	10,172
80%	7,935	8,610	10,692	13,904	18,039	16,002	10,880	9,315	11,081	14,287	9,192	9,276
90%	6,415	7,209	9,572	11,908	15,970	12,004	9,372	8,228	10,168	12,059	8,273	8,038
Long Term												
Full Simulation Period	11,300	15,639	23,940	33,568	41,092	35,060	22,062	13,364	12,597	19,584	13,697	16,482
Water Year Types												
Wet	13,018	21,792	41,580	55,599	63,384	52,076	36,791	18,384	13,640	21,152	15,520	26,010
Above Normal	11,695	14,525	22,872	42,737	50,223	45,799	22,271	14,655	13,070	22,489	16,033	18,988
Below Normal	10,841	14,689	16,299	23,176	31,930	28,698	18,090	11,885	12,782	22,589	15,187	12,013
Dry	10,423	12,542	14,599	17,439	27,132	22,711	11,912	10,212	12,472	17,228	11,469	10,994
Critical	9,148	9,407	11,534	14,731	17,114	14,346	10,330	7,910	9,857	12,298	8,422	7,772

Existing - Alternative 5 Minus Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	-296	-1,193	-894	0	-85	0	0	0	0	0	0
20%	0	-31	-1,164	-1,680	-777	-540	0	0	1	0	0	2
30%	0	-13	-495	-885	-930	-670	0	0	0	0	1	0
40%	0	-29	-213	-1,458	-1,232	-1,385	0	0	0	0	0	0
50%	0	-19	-285	-667	-1,685	-380	0	0	-1	0	0	0
60%	0	-5	-51	-266	-713	-184	0	-3	0	1	0	0
70%	0	-3	-41	-104	-557	-90	0	0	0	0	0	0
80%	0	-3	-12	-17	-137	-97	0	0	0	0	0	0
90%	0	-2	-3	-7	-104	-9	0	0	0	-1	0	0
Long Term												
Full Simulation Period	0	-107	-369	-653	-691	-334	0	0	0	0	0	0
Water Year Types												
Wet	0	-276	-851	-943	-728	-354	0	0	0	0	0	0
Above Normal	0	-41	-340	-1,037	-1,131	-454	0	0	0	0	0	0
Below Normal	0	-58	-186	-623	-653	-428	0	0	0	0	0	0
Dry	0	-24	-87	-289	-666	-316	0	-1	0	0	0	0
Critical	0	-3	-31	-189	-261	-64	0	0	0	0	0	0

Long-Term and Water Year-Type Average of Total CVP Deliveries North of the Delta Under Existing - Base and Existing - Alternative 5

	Average Flow (cfs)												
Analysis Period	October	November	December	January	February	March	April	May	June	July	August	September	Total (TAF)
							Long-Term						
Full Simulation Period													
Existing - Base	1,506	726	389	234	244	337	5,113	5,599	7,987	7,932	5,983	2,046	2,310
Existing - Alternative 5	1,506	726	389	234	244	337	5,113	5,599	7,987	7,932	5,983	2,046	2,310
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
							Water Year-Types						
Wet													
Existing - Base	1,429	662	371	227	244	288	4,682	5,765	8,463	8,473	6,484	2,288	2,388
Existing - Alternative 5	1,429	662	371	227	244	288	4,682	5,765	8,463	8,473	6,484	2,288	2,388
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal													
Existing - Base	1,514	755	372	241	246	248	5,081	5,804	8,436	8,340	6,266	2,355	2,404
Existing - Alternative 5	1,514	755	372	241	246	248	5,081	5,804	8,436	8,340	6,266	2,355	2,404
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal													
Existing - Base	1,527	728	407	242	236	344	5,193	5,744	7,967	7,969	6,039	1,879	2,321
Existing - Alternative 5	1,527	728	407	242	236	344	5,193	5,744	7,967	7,969	6,039	1,879	2,321
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry													
Existing - Base	1,639	783	406	238	254	339	5,398	5,578	7,778	7,583	5,755	1,910	2,283
Existing - Alternative 5	1,639	783	406	238	254	339	5,398	5,578	7,778	7,583	5,755	1,910	2,283
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical													
Existing - Base	1,452	754	396	225	239	517	5,551	4,869	6,853	6,811	4,881	1,649	2,072
Existing - Alternative 5	1,452	754	396	225	239	517	5,551	4,869	6,853	6,811	4,881	1,649	2,072
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Total CVP Deliveries North of the Delta

Existing - Base

	Average Monthly Flow (cfs)											
Statistic	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Probability of Exceedance												
10%	1,875	950	506	303	270	646	6,661	6,327	8,826	8,986	6,821	2,514
20%	1,791	902	457	252	262	436	6,057	6,182	8,524	8,506	6,466	2,380
30%	1,670	825	415	242	253	362	5,755	6,062	8,346	8,239	6,271	2,266
40%	1,605	764	399	236	243	254	5,461	5,909	8,191	8,069	6,139	2,204
50%	1,488	711	379	219	239	243	5,255	5,729	8,016	7,974	6,015	2,112
60%	1,404	638	353	215	238	225	4,910	5,521	7,869	7,870	5,949	1,996
70%	1,351	624	339	213	233	214	4,748	5,297	7,762	7,634	5,741	1,840
80%	1,239	572	311	209	223	212	4,333	5,078	7,482	7,356	5,573	1,735
90%	1,142	543	299	200	206	205	3,074	4,689	7,086	7,108	5,323	1,572
Long Term												
Full Simulation Period	1,506	726	389	234	244	337	5,113	5,599	7,987	7,932	5,983	2,046
Water Year Types												
Wet	1,429	662	371	227	244	288	4,682	5,765	8,463	8,473	6,484	2,288
Above Normal	1,514	755	372	241	246	248	5,081	5,804	8,436	8,340	6,266	2,355
Below Normal	1,527	728	407	242	236	344	5,193	5,744	7,967	7,969	6,039	1,879
Dry	1,639	783	406	238	254	339	5,398	5,578	7,778	7,583	5,755	1,910
Critical	1,452	754	396	225	239	517	5,551	4,869	6,853	6,811	4,881	1,649

Existing - Alternative 5

	Average Monthly Flow (cfs)											
Statistic	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Probability of Exceedance												
10%	1,875	950	506	303	270	646	6,661	6,327	8,826	8,986	6,821	2,514
20%	1,791	902	457	252	262	436	6,057	6,182	8,524	8,506	6,466	2,380
30%	1,670	825	415	242	253	362	5,755	6,062	8,346	8,239	6,271	2,266
40%	1,605	764	399	236	243	254	5,461	5,909	8,191	8,069	6,139	2,204
50%	1,488	711	379	219	239	243	5,255	5,729	8,016	7,974	6,015	2,112
60%	1,404	638	353	215	238	225	4,910	5,521	7,869	7,870	5,949	1,996
70%	1,351	624	339	213	233	214	4,748	5,297	7,762	7,633	5,741	1,840
80%	1,239	572	311	209	223	212	4,333	5,078	7,482	7,356	5,573	1,735
90%	1,142	543	299	200	206	205	3,074	4,689	7,086	7,108	5,323	1,572
Long Term												
Full Simulation Period	1,506	726	389	234	244	337	5,113	5,599	7,987	7,932	5,983	2,046
Water Year Types												
Wet	1,429	662	371	227	244	288	4,682	5,765	8,463	8,473	6,484	2,288
Above Normal	1,514	755	372	241	246	248	5,081	5,804	8,436	8,340	6,266	2,355
Below Normal	1,527	728	407	242	236	344	5,193	5,744	7,967	7,969	6,039	1,879
Dry	1,639	783	406	238	254	339	5,398	5,578	7,778	7,583	5,755	1,910
Critical	1,452	754	396	225	239	517	5,551	4,869	6,853	6,811	4,881	1,649

Existing - Alternative 5 Minus Existing - Base

	Average Monthly Flow (cfs)											
Statistic	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types												
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

Long-Term and Water Year-Type Average of Total CVP Deliveries South of the Delta Under Existing - Base and Existing - Alternative 5

	Average Flow (cfs)												
Analysis Period	October	November	December	January	February	March	April	May	June	July	August	September	Total (TAF)
							Long-Term						
Full Simulation Period													
Existing - Base	2,670	1,585	1,151	1,274	1,718	2,083	2,592	3,755	5,447	5,876	5,010	3,413	2,214
Existing - Alternative 5	2,670	1,585	1,151	1,274	1,718	2,083	2,592	3,755	5,447	5,876	5,010	3,413	2,214
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
							Water Year-Types						
Wet													
Existing - Base	2,755	1,649	1,228	1,396	1,873	2,512	3,205	4,634	6,886	7,631	6,265	3,879	2,659
Existing - Alternative 5	2,755	1,649	1,228	1,396	1,873	2,512	3,205	4,634	6,886	7,631	6,265	3,879	2,659
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal													
Existing - Base	2,740	1,643	1,230	1,404	1,877	2,297	2,904	4,175	6,129	6,509	5,394	3,647	2,418
Existing - Alternative 5	2,740	1,643	1,230	1,404	1,877	2,297	2,904	4,175	6,129	6,509	5,394	3,647	2,418
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal													
Existing - Base	2,645	1,562	1,118	1,218	1,646	1,988	2,471	3,625	5,220	5,601	4,904	3,373	2,141
Existing - Alternative 5	2,645	1,562	1,118	1,218	1,646	1,988	2,471	3,625	5,220	5,601	4,904	3,373	2,141
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry													
Existing - Base	2,688	1,598	1,166	1,297	1,747	1,770	2,122	3,136	4,412	4,658	4,213	3,129	1,932
Existing - Alternative 5	2,688	1,598	1,166	1,297	1,747	1,770	2,122	3,136	4,412	4,658	4,213	3,129	1,932
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical													
Existing - Base	2,437	1,409	938	935	1,297	1,529	1,799	2,517	3,470	3,601	3,225	2,643	1,561
Existing - Alternative 5	2,437	1,409	938	935	1,297	1,529	1,799	2,517	3,470	3,601	3,225	2,643	1,561
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Total CVP Deliveries South of the Delta

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	3,146	1,963	1,635	2,053	2,691	2,610	3,618	5,163	7,758	8,677	7,137	4,150
20%	2,897	1,760	1,366	1,613	2,139	2,431	3,098	4,370	6,449	7,106	5,875	3,750
30%	2,806	1,682	1,266	1,459	1,962	2,286	2,896	4,123	6,046	6,611	5,562	3,619
40%	2,755	1,638	1,209	1,371	1,849	2,177	2,733	3,975	5,804	6,294	5,232	3,541
50%	2,710	1,604	1,162	1,288	1,756	2,076	2,580	3,826	5,555	6,004	5,081	3,470
60%	2,636	1,548	1,084	1,151	1,582	2,023	2,419	3,579	5,143	5,444	4,674	3,353
70%	2,541	1,475	989	1,037	1,429	1,845	2,206	3,268	4,641	4,993	4,281	3,203
80%	2,408	1,363	849	764	1,068	1,596	1,942	2,893	4,010	4,174	3,822	2,995
90%	2,252	1,229	699	587	870	1,506	1,727	2,417	3,277	3,388	3,199	2,749
Long Term												
Full Simulation Period	2,670	1,585	1,151	1,274	1,718	2,083	2,592	3,755	5,447	5,876	5,010	3,413
Water Year Types												
Wet	2,755	1,649	1,228	1,396	1,873	2,512	3,205	4,634	6,886	7,631	6,265	3,879
Above Normal	2,740	1,643	1,230	1,404	1,877	2,297	2,904	4,175	6,129	6,509	5,394	3,647
Below Normal	2,645	1,562	1,118	1,218	1,646	1,988	2,471	3,625	5,220	5,601	4,904	3,373
Dry	2,688	1,598	1,166	1,297	1,747	1,770	2,122	3,136	4,412	4,658	4,213	3,129
Critical	2,437	1,409	938	935	1,297	1,529	1,799	2,517	3,470	3,601	3,225	2,643

Existing - Alternative 5

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	3,146	1,963	1,635	2,053	2,691	2,610	3,618	5,163	7,758	8,677	7,137	4,150
20%	2,897	1,760	1,366	1,613	2,139	2,431	3,098	4,370	6,449	7,106	5,875	3,750
30%	2,806	1,682	1,266	1,459	1,962	2,286	2,896	4,123	6,046	6,611	5,562	3,619
40%	2,755	1,638	1,209	1,371	1,849	2,177	2,733	3,975	5,804	6,294	5,232	3,541
50%	2,710	1,604	1,162	1,288	1,756	2,076	2,580	3,826	5,555	6,004	5,080	3,470
60%	2,636	1,548	1,084	1,151	1,582	2,023	2,419	3,579	5,143	5,444	4,674	3,353
70%	2,541	1,475	989	1,037	1,429	1,845	2,206	3,268	4,641	4,993	4,281	3,203
80%	2,408	1,363	849	764	1,068	1,596	1,942	2,893	4,010	4,174	3,822	2,995
90%	2,252	1,229	699	587	870	1,506	1,727	2,417	3,277	3,388	3,199	2,749
Long Term												
Full Simulation Period	2,670	1,585	1,151	1,274	1,718	2,083	2,592	3,755	5,447	5,876	5,010	3,413
Water Year Types												
Wet	2,755	1,649	1,228	1,396	1,873	2,512	3,205	4,634	6,886	7,631	6,265	3,879
Above Normal	2,740	1,643	1,230	1,404	1,877	2,297	2,904	4,175	6,129	6,509	5,394	3,647
Below Normal	2,645	1,562	1,118	1,218	1,646	1,988	2,471	3,625	5,220	5,601	4,904	3,373
Dry	2,688	1,598	1,166	1,297	1,747	1,770	2,122	3,136	4,412	4,658	4,213	3,129
Critical	2,437	1,409	938	935	1,297	1,529	1,799	2,517	3,470	3,601	3,225	2,643

Existing - Alternative 5 Minus Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	-1	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types												
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

Long-Term and Water Year-Type Average of Total SWP Deliveries North of the Delta Under Existing - Base and Existing - Alternative 5

Analysis Period	October	November	December	January	February	March	April	May	June	July	August	September	Total (TAF)
						Average Flow (cfs)							
							Long-Term						
Full Simulation Period													
Existing - Base	1,449	1,463	935	345	14	92	2,122	2,685	3,217	3,169	2,515	1,874	1,205
Existing - Alternative 5	1,449	1,463	935	345	14	92	2,122	2,685	3,217	3,169	2,515	1,874	1,205
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
							Water Year-Types						
Wet													
Existing - Base	1,349	1,476	900	256	19	65	1,890	2,778	3,378	3,342	2,671	2,067	1,224
Existing - Alternative 5	1,349	1,476	900	256	19	65	1,890	2,778	3,378	3,342	2,671	2,067	1,224
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal													
Existing - Base	1,568	1,578	982	389	16	50	2,034	2,789	3,376	3,298	2,613	2,185	1,266
Existing - Alternative 5	1,568	1,578	982	389	16	50	2,034	2,789	3,376	3,298	2,613	2,185	1,266
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal													
Existing - Base	1,465	1,428	971	390	12	73	2,227	2,850	3,348	3,292	2,628	1,805	1,242
Existing - Alternative 5	1,465	1,428	971	390	12	73	2,227	2,850	3,348	3,292	2,628	1,805	1,242
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry													
Existing - Base	1,586	1,495	979	379	12	111	2,179	2,641	3,158	3,039	2,427	1,938	1,209
Existing - Alternative 5	1,586	1,495	979	379	12	111	2,179	2,641	3,158	3,039	2,427	1,938	1,209
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical													
Existing - Base	1,330	1,326	851	373	11	191	2,466	2,211	2,613	2,676	2,046	1,175	1,047
Existing - Alternative 5	1,330	1,326	851	373	11	191	2,466	2,211	2,613	2,676	2,046	1,175	1,047
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Total SWP Deliveries North of the Delta

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	2,189	2,095	1,377	634	20	199	3,028	3,131	3,658	3,564	2,851	2,296
20%	2,083	1,972	1,311	545	20	129	2,766	3,040	3,510	3,485	2,800	2,233
30%	1,852	1,922	1,250	477	20	46	2,505	2,979	3,442	3,371	2,692	2,181
40%	1,621	1,877	1,169	452	19	45	2,333	2,935	3,374	3,328	2,615	2,122
50%	1,432	1,754	1,079	398	15	45	2,110	2,816	3,323	3,263	2,577	2,061
60%	1,330	1,572	966	310	12	45	1,988	2,686	3,260	3,194	2,542	2,027
70%	1,282	1,409	822	167	11	40	1,822	2,594	3,160	3,138	2,504	1,909
80%	987	797	532	66	4	34	1,421	2,385	3,102	3,076	2,454	1,555
90%	442	188	85	4	3	26	1,141	1,928	2,974	2,941	2,194	1,007
Long Term												
Full Simulation Period	1,449	1,463	935	345	14	92	2,122	2,685	3,217	3,169	2,515	1,874
Water Year Types												
Wet	1,349	1,476	900	256	19	65	1,890	2,778	3,378	3,342	2,671	2,067
Above Normal	1,568	1,578	982	389	16	50	2,034	2,789	3,376	3,298	2,613	2,185
Below Normal	1,465	1,428	971	390	12	73	2,227	2,850	3,348	3,292	2,628	1,805
Dry	1,586	1,495	979	379	12	111	2,179	2,641	3,158	3,039	2,427	1,938
Critical	1,330	1,326	851	373	11	191	2,466	2,211	2,613	2,676	2,046	1,175

Existing - Alternative 5

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	2,189	2,095	1,377	634	20	199	3,028	3,131	3,658	3,564	2,851	2,296
20%	2,083	1,972	1,311	545	20	129	2,766	3,040	3,510	3,485	2,800	2,233
30%	1,852	1,922	1,250	477	20	46	2,505	2,979	3,442	3,371	2,692	2,181
40%	1,621	1,877	1,169	452	19	45	2,333	2,935	3,374	3,328	2,615	2,122
50%	1,432	1,754	1,079	398	15	45	2,110	2,816	3,323	3,263	2,577	2,061
60%	1,330	1,572	966	310	12	45	1,988	2,686	3,260	3,194	2,542	2,027
70%	1,282	1,409	822	167	11	40	1,822	2,594	3,160	3,138	2,504	1,909
80%	987	797	532	66	4	34	1,421	2,385	3,102	3,076	2,454	1,555
90%	442	188	85	4	3	26	1,141	1,928	2,974	2,941	2,194	1,007
Long Term												
Full Simulation Period	1,449	1,463	935	345	14	92	2,122	2,685	3,217	3,169	2,515	1,874
Water Year Types												
Wet	1,349	1,476	900	256	19	65	1,890	2,778	3,378	3,342	2,671	2,067
Above Normal	1,568	1,578	982	389	16	50	2,034	2,789	3,376	3,298	2,613	2,185
Below Normal	1,465	1,428	971	390	12	73	2,227	2,850	3,348	3,292	2,628	1,805
Dry	1,586	1,495	979	379	12	111	2,179	2,641	3,158	3,039	2,427	1,938
Critical	1,330	1,326	851	373	11	191	2,466	2,211	2,613	2,676	2,046	1,175

Existing - Alternative 5 Minus Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types												
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

Long-Term and Water Year-Type Average of Total SWP Deliveries South of the Delta Under Existing - Base and Existing - Alternative 5

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Existing - Base	4,044	3,416	3,459	465	782	1,284	2,414	3,688	5,146	5,640	5,790	4,893	2,486
Existing - Alternative 5	4,044	3,416	3,460	465	782	1,284	2,414	3,688	5,146	5,640	5,790	4,893	2,486
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
							Water Year-Types						
Wet													
Existing - Base	4,429	3,815	3,773	1,079	1,629	2,451	3,750	5,270	6,698	6,801	7,098	5,951	3,194
Existing - Alternative 5	4,429	3,815	3,773	1,079	1,629	2,451	3,750	5,270	6,698	6,801	7,098	5,951	3,194
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal													
Existing - Base	4,055	3,517	3,542	399	1,077	1,692	3,180	4,482	5,926	6,196	6,553	5,555	2,797
Existing - Alternative 5	4,055	3,517	3,542	399	1,077	1,692	3,180	4,482	5,926	6,196	6,553	5,555	2,797
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal													
Existing - Base	4,050	3,353	3,444	191	336	863	2,305	3,477	5,138	5,942	6,158	5,272	2,458
Existing - Alternative 5	4,050	3,353	3,446	191	336	863	2,305	3,477	5,138	5,943	6,158	5,272	2,458
Difference	0	0	2	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry													
Existing - Base	3,928	3,199	3,448	125	192	390	1,342	2,452	4,065	4,948	4,911	4,214	2,016
Existing - Alternative 5	3,928	3,199	3,448	125	192	390	1,342	2,452	4,065	4,948	4,911	4,214	2,016
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical													
Existing - Base	3,377	2,862	2,758	95	143	230	451	1,543	2,584	3,159	2,952	2,396	1,369
Existing - Alternative 5	3,377	2,862	2,758	95	143	230	451	1,543	2,584	3,159	2,952	2,396	1,369
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Total SWP Deliveries South of the Delta

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	6,129	4,776	5,541	1,795	2,061	2,896	4,442	6,100	7,671	7,647	7,791	6,656
20%	5,093	4,372	4,331	592	1,846	2,603	3,679	5,031	6,322	6,528	6,826	5,798
30%	4,839	4,258	4,035	298	1,268	2,451	3,368	4,703	5,924	6,380	6,690	5,674
40%	4,678	4,177	3,884	213	393	1,168	3,151	4,543	5,802	6,169	6,549	5,542
50%	4,500	3,770	3,634	162	279	571	2,400	3,888	5,493	6,078	6,448	5,390
60%	4,261	3,432	3,355	142	255	456	1,993	3,117	5,202	5,922	6,287	5,176
70%	3,403	2,780	2,818	114	214	382	1,694	2,408	4,265	5,525	5,649	4,826
80%	2,205	1,907	2,101	92	174	273	473	2,020	3,349	4,041	3,743	3,165
90%	1,545	1,239	1,379	80	110	207	380	1,631	2,705	3,286	3,008	2,186
Long Term												
Full Simulation Period	4,044	3,416	3,459	465	782	1,284	2,414	3,688	5,146	5,640	5,790	4,893
Water Year Types												
Wet	4,429	3,815	3,773	1,079	1,629	2,451	3,750	5,270	6,698	6,801	7,098	5,951
Above Normal	4,055	3,517	3,542	399	1,077	1,692	3,180	4,482	5,926	6,196	6,553	5,555
Below Normal	4,050	3,353	3,444	191	336	863	2,305	3,477	5,138	5,942	6,158	5,272
Dry	3,928	3,199	3,448	125	192	390	1,342	2,452	4,065	4,948	4,911	4,214
Critical	3,377	2,862	2,758	95	143	230	451	1,543	2,584	3,159	2,952	2,396

Existing - Alternative 5

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	6,129	4,776	5,541	1,795	2,061	2,896	4,442	6,100	7,671	7,647	7,791	6,656
20%	5,093	4,372	4,331	593	1,846	2,603	3,679	5,031	6,322	6,528	6,826	5,798
30%	4,839	4,258	4,034	298	1,268	2,451	3,368	4,703	5,924	6,380	6,690	5,674
40%	4,678	4,177	3,884	213	393	1,168	3,151	4,543	5,802	6,169	6,549	5,542
50%	4,500	3,770	3,634	162	279	571	2,400	3,888	5,493	6,078	6,449	5,390
60%	4,261	3,432	3,355	142	255	456	1,993	3,117	5,202	5,922	6,287	5,176
70%	3,403	2,780	2,818	114	214	382	1,694	2,408	4,265	5,525	5,649	4,826
80%	2,205	1,907	2,101	92	174	273	473	2,020	3,349	4,041	3,743	3,165
90%	1,545	1,239	1,379	80	110	207	380	1,631	2,705	3,286	3,008	2,186
Long Term												
Full Simulation Period	4,044	3,416	3,460	465	782	1,284	2,414	3,688	5,146	5,640	5,790	4,893
Water Year Types												
Wet	4,429	3,815	3,773	1,079	1,629	2,451	3,750	5,270	6,698	6,801	7,098	5,951
Above Normal	4,055	3,517	3,542	399	1,077	1,692	3,180	4,482	5,926	6,196	6,553	5,555
Below Normal	4,050	3,353	3,446	191	336	863	2,305	3,477	5,138	5,943	6,158	5,272
Dry	3,928	3,199	3,448	125	192	390	1,342	2,452	4,065	4,948	4,911	4,214
Critical	3,377	2,862	2,758	95	143	230	451	1,543	2,584	3,159	2,952	2,396

Existing - Alternative 5 Minus Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types												
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	2	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

Long-Term and Water Year-Type Average of Fremont Weir Spill to Yolo Bypass Under Existing - Base and Existing - Alternative 5

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Existing - Base	114	257	2,635	8,485	13,204	6,934	1,024	20	0	0	0	0	1,933
Existing - Alternative 5	114	368	3,007	9,142	13,903	7,270	1,024	20	0	0	0	0	2,062
Difference	0	111	373	657	699	336	0	0	0	0	0	0	130
Percent Difference	0%	43%	14%	8%	5%	5%	0%	0%	0%	0%	0%	0%	7%
							Water Year-Types						
Wet													
Existing - Base	374	844	7,678	25,448	36,369	18,505	3,244	64	0	0	0	0	5,472
Existing - Alternative 5	374	1,132	8,540	26,404	37,106	18,861	3,244	64	0	0	0	0	5,664
Difference	0	288	862	957	737	355	0	0	0	0	0	0	192
Percent Difference	0%	34%	11%	4%	2%	2%	0%	0%	0%	0%	0%	0%	4%
Above Normal													
Existing - Base	0	0	2,008	4,550	10,271	7,823	33	0	0	0	0	0	1,470
Existing - Alternative 5	0	41	2,348	5,592	11,415	8,281	33	0	0	0	0	0	1,650
Difference	0	41	340	1,042	1,145	458	0	0	0	0	0	0	180
Percent Difference	0%	0%	17%	23%	11%	6%	0%	0%	0%	0%	0%	0%	12%
Below Normal													
Existing - Base	0	0	0	291	2,453	501	143	0	0	0	0	0	196
Existing - Alternative 5	0	58	186	915	3,117	932	143	0	0	0	0	0	313
Difference	0	58	186	624	664	431	0	0	0	0	0	0	117
Percent Difference	0%	0%	0%	215%	27%	86%	0%	0%	0%	0%	0%	0%	60%
Dry													
Existing - Base	0	0	0	0	537	224	0	0	0	0	0	0	44
Existing - Alternative 5	0	24	87	289	1,207	541	0	0	0	0	0	0	125
Difference	0	24	87	289	670	316	0	0	0	0	0	0	82
Percent Difference	0%	0%	0%	114410%	125%	141%	0%	0%	0%	0%	0%	0%	187%
Critical													
Existing - Base	0	0	0	0	1	0	0	0	0	0	0	0	0
Existing - Alternative 5	0	4	31	189	262	64	0	0	0	0	0	0	33
Difference	0	4	31	189	261	64	0	0	0	0	0	0	32
Percent Difference	0%	0%	0%	0%	33713%	0%	0%	0%	0%	0%	0%	0%	72799%

Fremont Weir Spill to Yolo Bypass

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	0	7,950	28,958	47,428	19,929	23	0	0	0	0	0
20%	0	0	17	7,664	20,668	5,676	0	0	0	0	0	0
30%	0	0	0	2,091	7,247	1,385	0	0	0	0	0	0
40%	0	0	0	0	1,768	0	0	0	0	0	0	0
50%	0	0	0	0	23	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	114	257	2,635	8,485	13,204	6,934	1,024	20	0	0	0	0
Water Year Types												
Wet	374	844	7,678	25,448	36,369	18,505	3,244	64	0	0	0	0
Above Normal	0	0	2,008	4,550	10,271	7,823	33	0	0	0	0	0
Below Normal	0	0	0	291	2,453	501	143	0	0	0	0	0
Dry	0	0	0	0	537	224	0	0	0	0	0	0
Critical	0	0	0	0	1	0	0	0	0	0	0	0

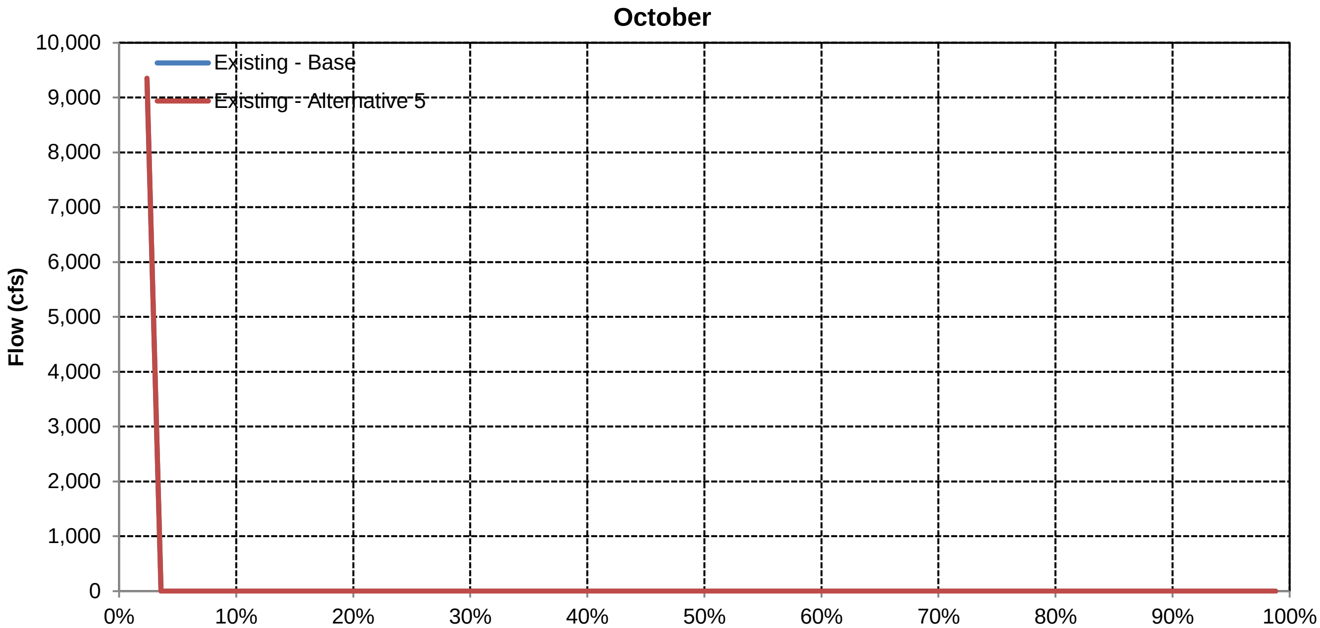
Existing - Alternative 5

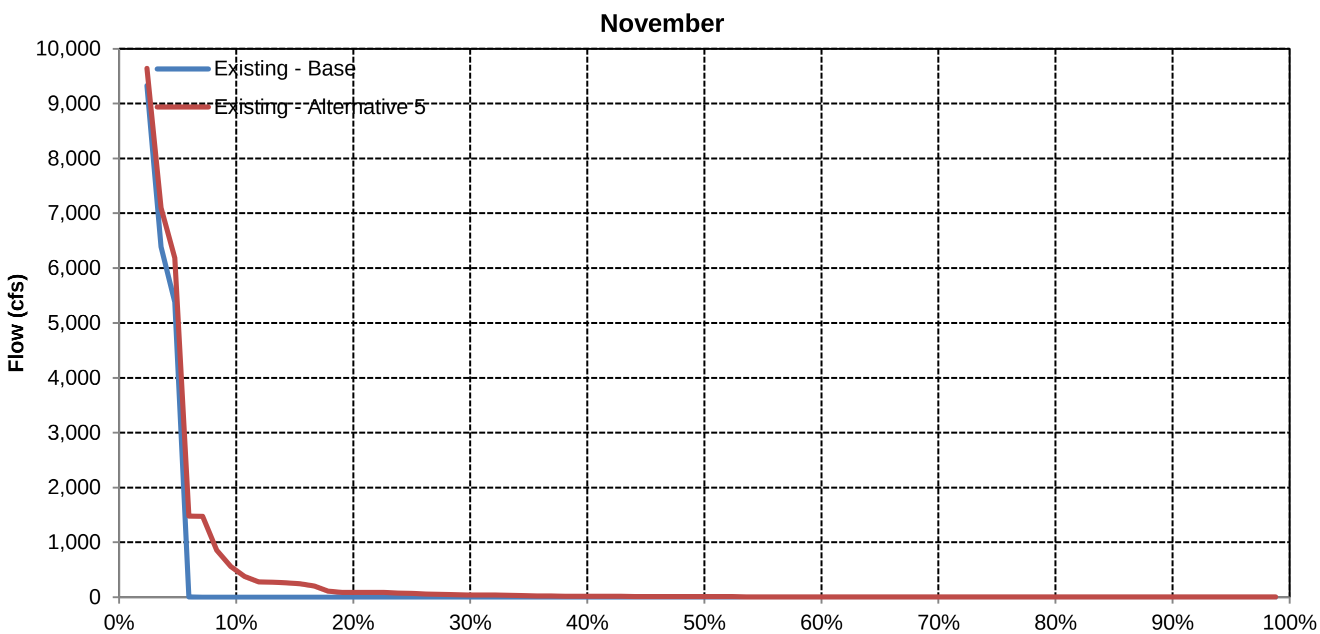
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	347	8,872	29,387	48,130	20,014	23	0	0	0	0	0
20%	0	85	1,517	9,074	21,411	6,267	0	0	0	0	0	0
30%	0	38	584	4,207	8,545	2,044	0	0	0	0	0	0
40%	0	16	280	1,759	3,388	1,378	0	0	0	0	0	0
50%	0	9	143	694	2,114	408	0	0	0	0	0	0
60%	0	5	26	293	978	216	0	0	0	0	0	0
70%	0	4	13	75	421	102	0	0	0	0	0	0
80%	0	3	6	24	133	25	0	0	0	0	0	0
90%	0	3	3	9	22	4	0	0	0	0	0	0
Long Term												
Full Simulation Period	114	368	3,007	9,142	13,903	7,270	1,024	20	0	0	0	0
Water Year Types												
Wet	374	1,132	8,540	26,404	37,106	18,861	3,244	64	0	0	0	0
Above Normal	0	41	2,348	5,592	11,415	8,281	33	0	0	0	0	0
Below Normal	0	58	186	915	3,117	932	143	0	0	0	0	0
Dry	0	24	87	289	1,207	541	0	0	0	0	0	0
Critical	0	4	31	189	262	64	0	0	0	0	0	0

Existing - Alternative 5 Minus Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	347	923	429	702	85	0	0	0	0	0	0
20%	0	85	1,500	1,410	743	591	0	0	0	0	0	0
30%	0	38	584	2,116	1,298	659	0	0	0	0	0	0
40%	0	16	280	1,759	1,619	1,378	0	0	0	0	0	0
50%	0	9	143	694	2,090	408	0	0	0	0	0	0
60%	0	5	26	293	978	216	0	0	0	0	0	0
70%	0	4	13	75	421	102	0	0	0	0	0	0
80%	0	3	6	24	133	25	0	0	0	0	0	0
90%	0	3	3	9	22	4	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	111	373	657	699	336	0	0	0	0	0	0
Water Year Types												
Wet	0	288	862	957	737	355	0	0	0	0	0	0
Above Normal	0	41	340	1,042	1,145	458	0	0	0	0	0	0
Below Normal	0	58	186	624	664	431	0	0	0	0	0	0
Dry	0	24	87	289	670	316	0	0	0	0	0	0
Critical	0	4	31	189	261	64	0	0	0	0	0	0

Fremont Weir Spill to Yolo Bypass





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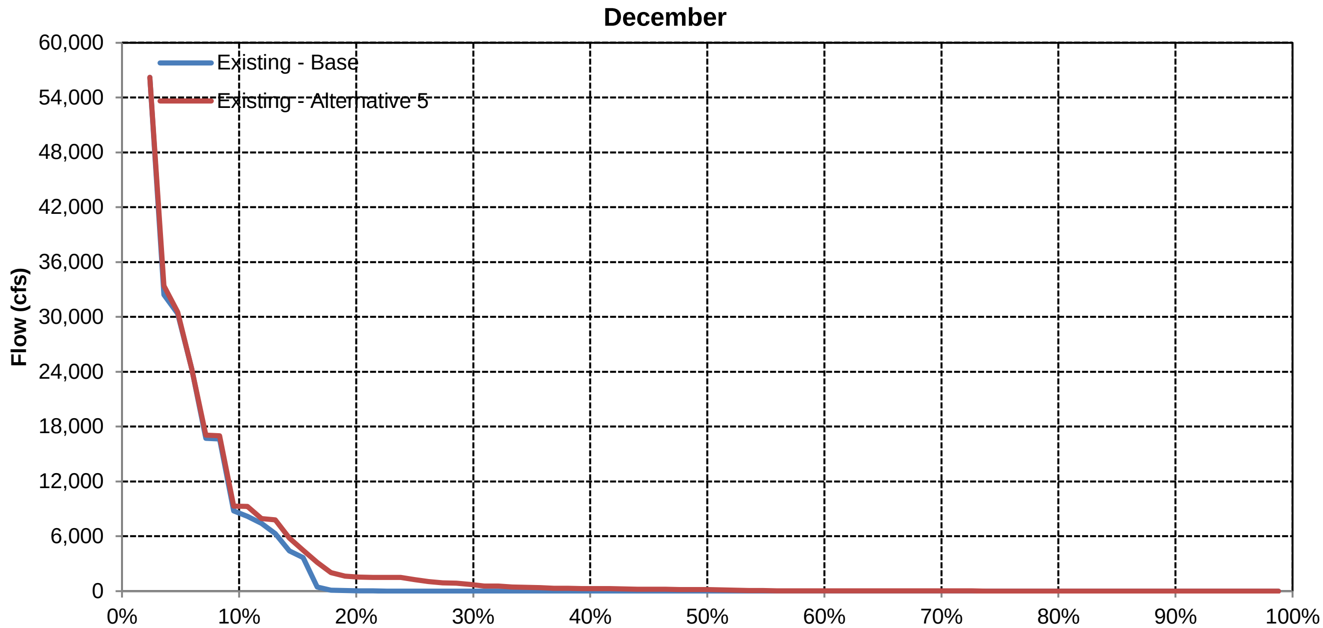

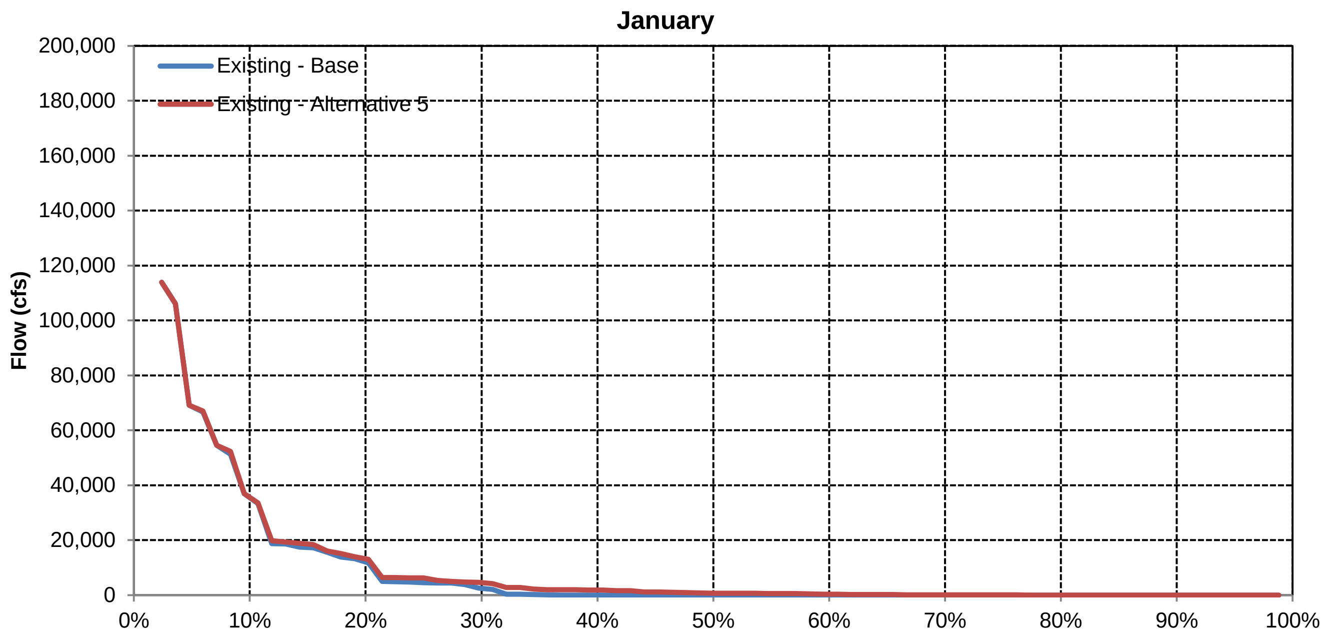

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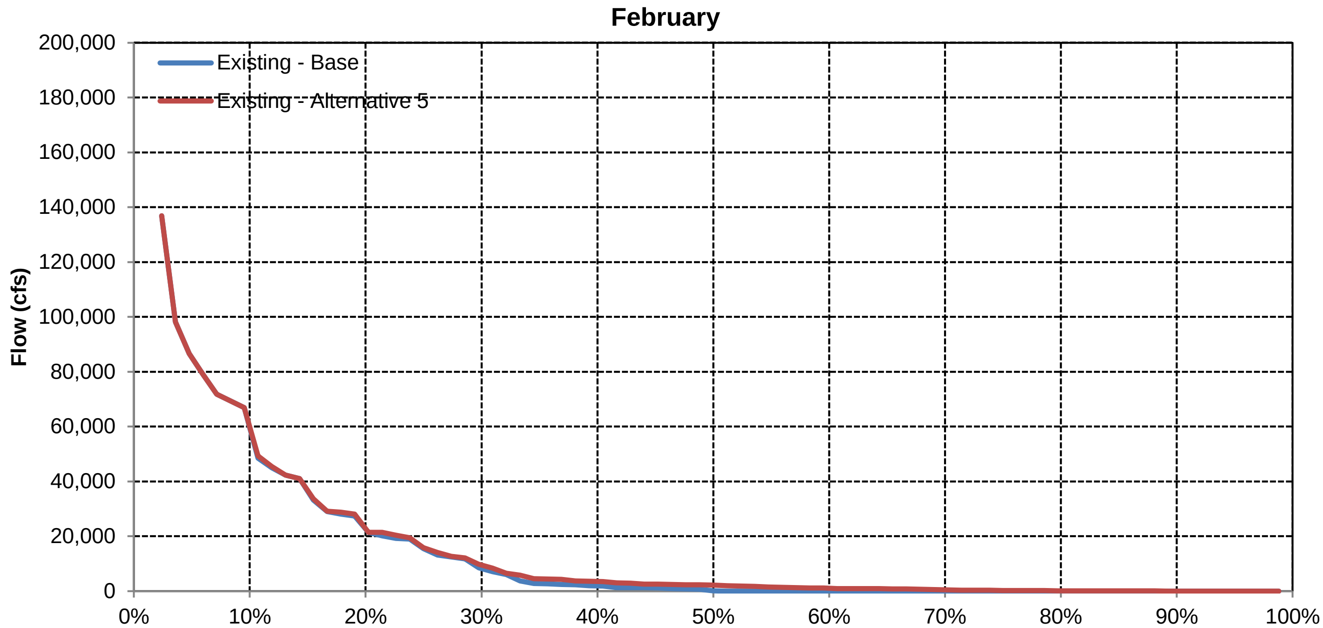

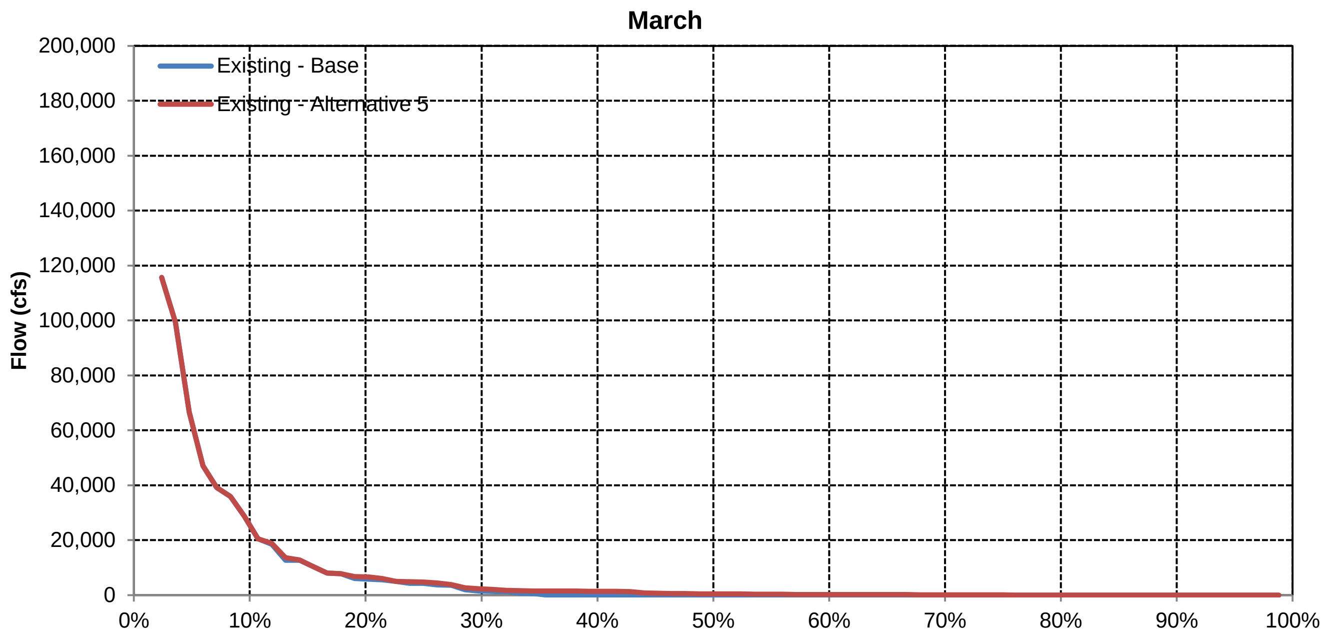

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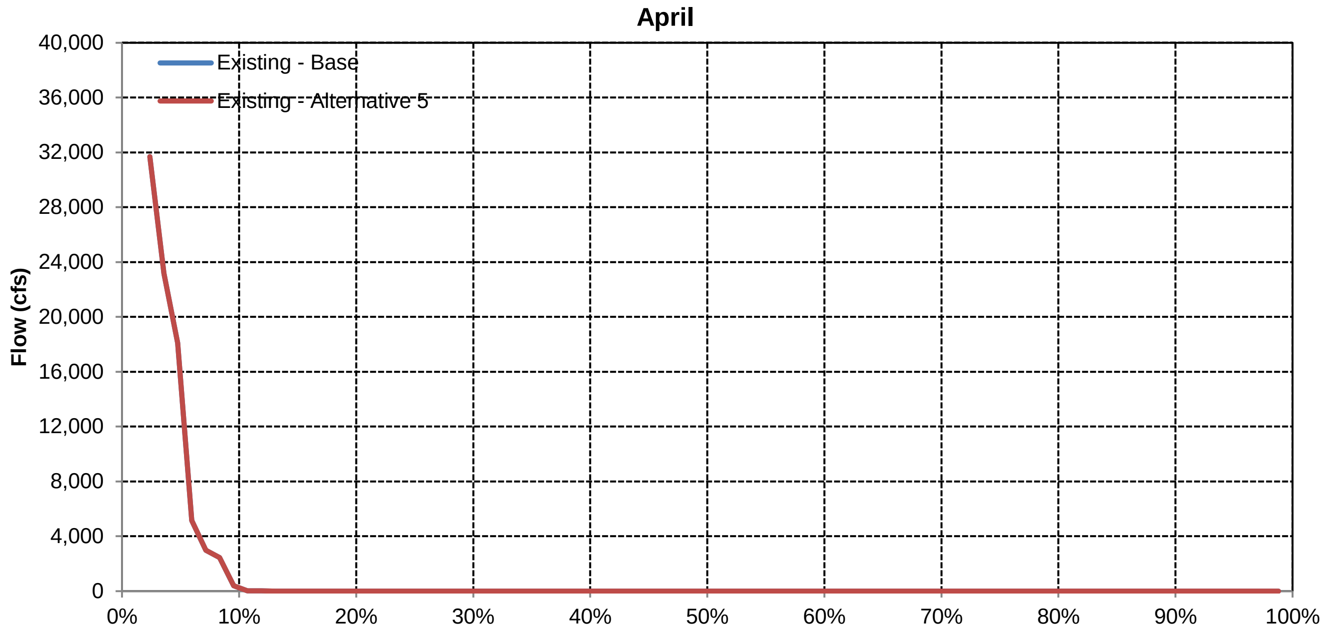

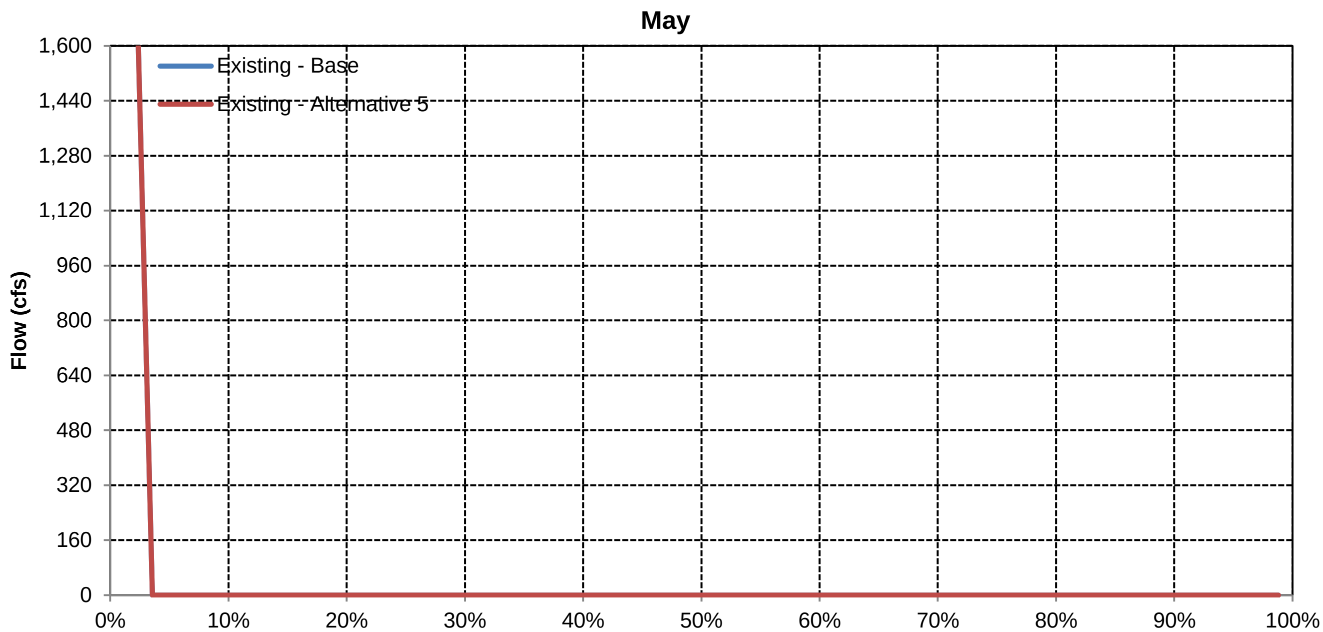

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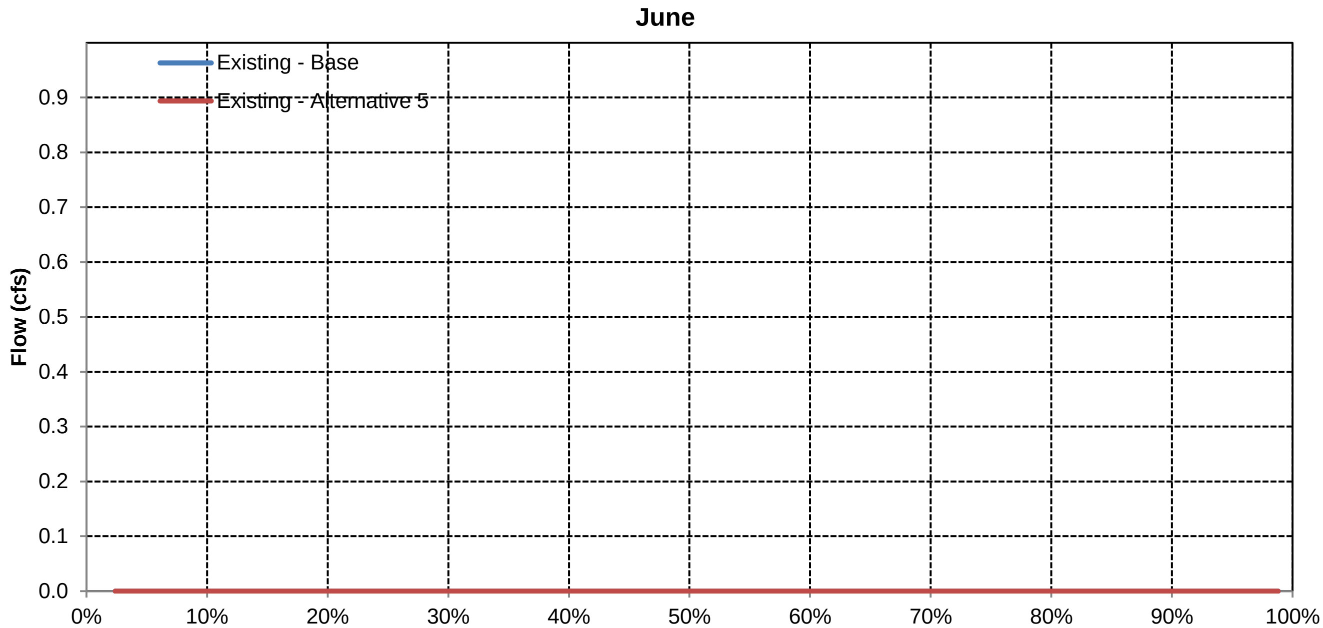

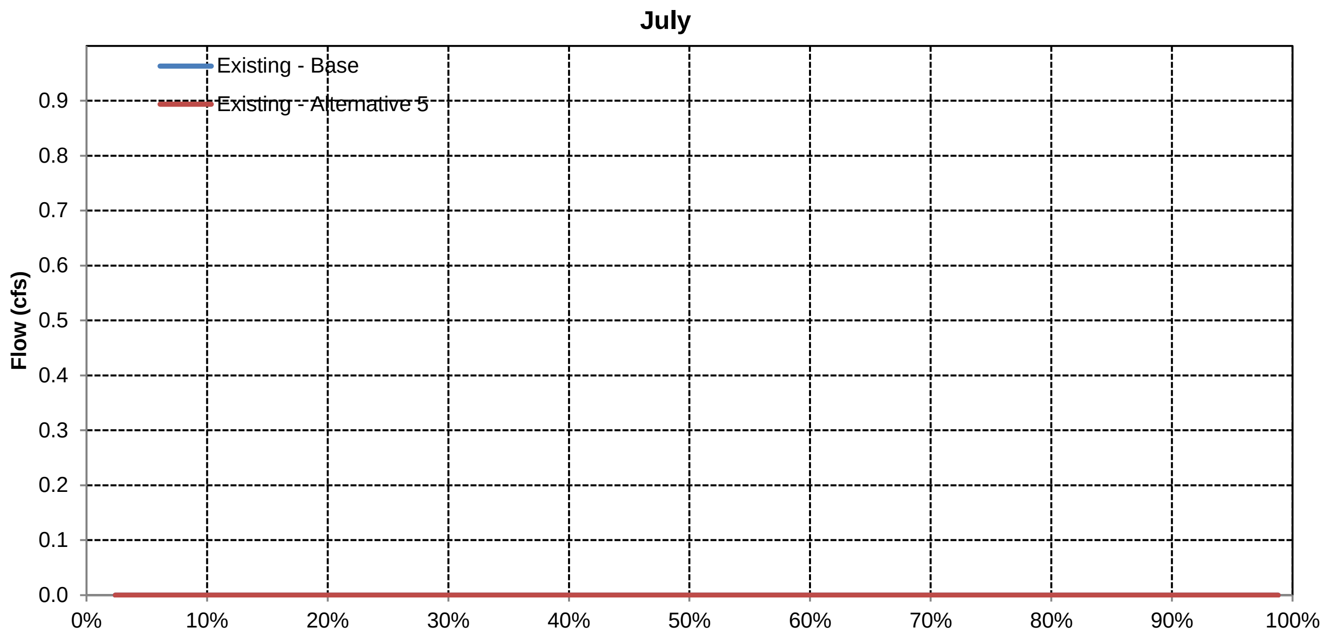

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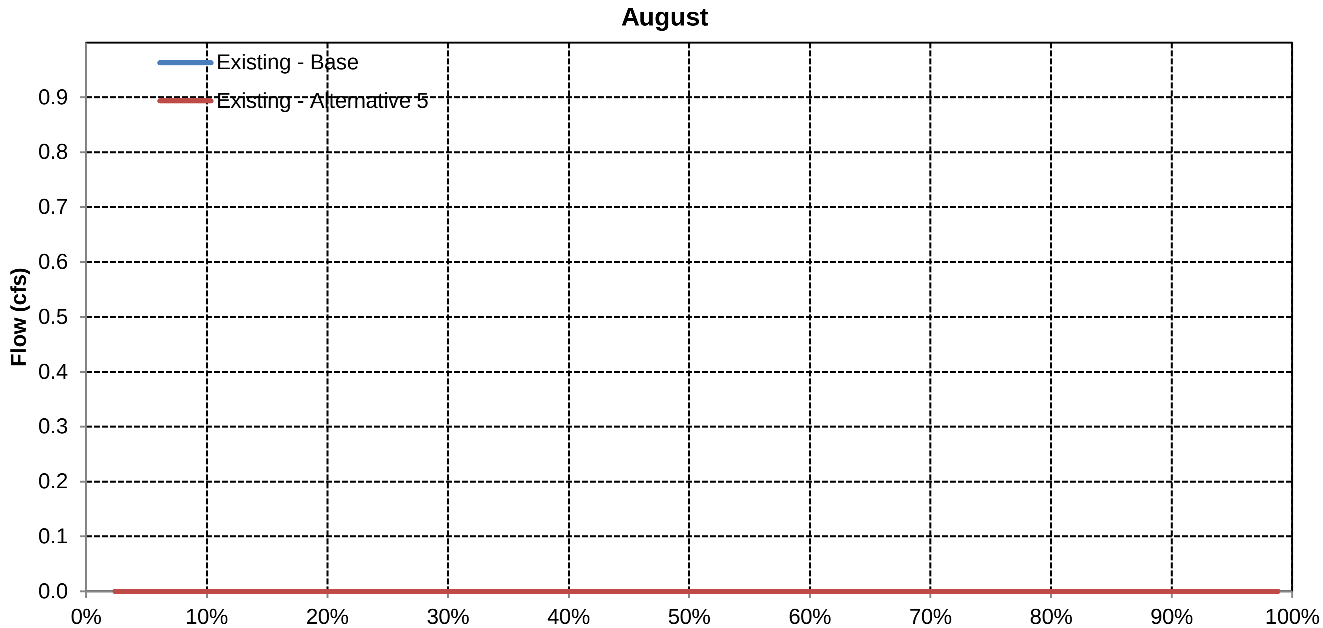
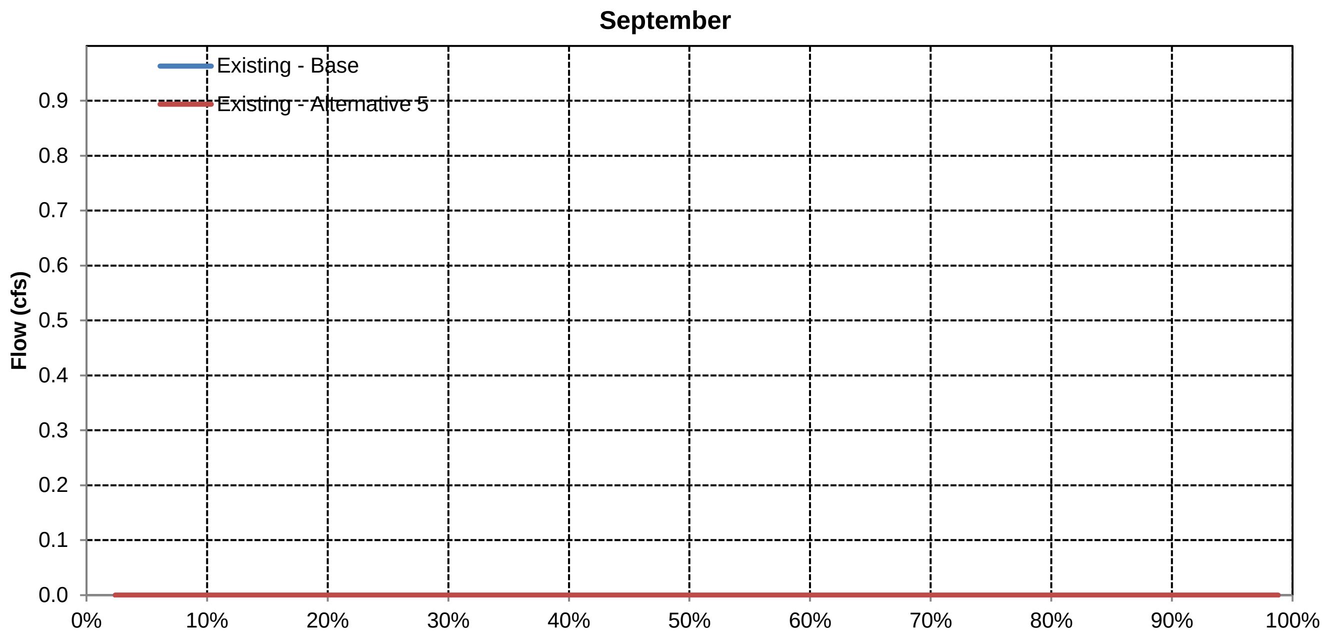




Long-Term and Water Year-Type Average of Sacramento River below Fremont Weir Under Existing - Base and Existing - Alternative 5

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Existing - Base	9,484	12,510	19,726	28,534	34,880	30,067	18,486	11,524	11,174	16,563	12,346	14,753	13,226
Existing - Alternative 5	9,484	12,399	19,354	27,876	34,181	29,731	18,487	11,524	11,174	16,563	12,346	14,753	13,097
Difference	0	-111	-372	-657	-699	-336	0	0	0	0	0	0	-130
Percent Difference	0%	-1%	-2%	-2%	-2%	-1%	0%	0%	0%	0%	0%	0%	-1%
							Water Year-Types						
Wet													
Existing - Base	10,891	17,182	34,594	47,388	54,159	44,817	30,280	15,515	11,984	17,719	13,701	22,821	19,273
Existing - Alternative 5	10,891	16,894	33,733	46,432	53,422	44,462	30,280	15,515	11,984	17,719	13,701	22,821	19,081
Difference	0	-288	-862	-957	-737	-355	0	0	0	0	0	0	-192
Percent Difference	0%	-2%	-2%	-2%	-1%	-1%	0%	0%	0%	0%	0%	0%	-1%
Above Normal													
Existing - Base	9,877	12,058	19,277	36,324	42,867	40,008	19,128	12,828	11,814	18,508	14,754	17,430	15,325
Existing - Alternative 5	9,877	12,016	18,937	35,283	41,722	39,549	19,128	12,828	11,814	18,508	14,754	17,430	15,145
Difference	0	-41	-340	-1,042	-1,145	-458	0	0	0	0	0	0	-180
Percent Difference	0%	0%	-2%	-3%	-3%	-1%	0%	0%	0%	0%	0%	0%	-1%
Below Normal													
Existing - Base	9,114	11,699	12,901	19,738	26,173	23,730	15,307	10,497	11,507	18,684	13,981	10,737	11,081
Existing - Alternative 5	9,114	11,641	12,715	19,114	25,509	23,299	15,308	10,497	11,507	18,684	13,981	10,737	10,964
Difference	0	-58	-186	-624	-664	-431	0	0	0	0	0	0	-117
Percent Difference	0%	0%	-1%	-3%	-3%	-2%	0%	0%	0%	0%	0%	0%	-1%
Dry													
Existing - Base	8,797	10,284	11,881	14,395	22,880	19,311	9,957	8,686	10,655	14,790	10,143	10,040	9,128
Existing - Alternative 5	8,797	10,259	11,794	14,106	22,210	18,995	9,957	8,685	10,655	14,790	10,143	10,040	9,046
Difference	0	-24	-87	-289	-670	-316	0	-1	0	0	0	0	-82
Percent Difference	0%	0%	-1%	-2%	-3%	-2%	0%	0%	0%	0%	0%	0%	-1%
Critical													
Existing - Base	7,603	7,349	9,332	12,776	15,062	12,715	9,151	7,145	9,068	11,571	7,736	7,241	7,035
Existing - Alternative 5	7,603	7,346	9,301	12,587	14,801	12,651	9,151	7,145	9,068	11,571	7,736	7,241	7,003
Difference	0	-3	-31	-189	-261	-64	0	0	0	0	0	0	-32
Percent Difference	0%	0%	0%	-1%	-2%	-1%	0%	0%	0%	0%	0%	0%	0%

Sacramento River below Fremont Weir

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	12,667	17,867	45,100	57,729	61,959	57,591	41,031	20,423	13,312	19,786	15,641	24,263
20%	11,568	15,291	30,157	49,978	58,550	49,208	29,852	12,476	12,632	19,450	14,918	21,584
30%	10,868	14,177	20,670	38,268	45,964	41,694	19,097	10,802	12,207	18,980	14,204	20,190
40%	10,328	12,419	16,827	30,451	40,042	32,187	14,333	9,587	11,482	18,481	13,746	16,796
50%	9,258	11,470	14,375	20,927	29,701	24,238	11,811	9,148	10,870	17,699	13,483	12,593
60%	8,339	10,242	12,138	16,320	24,021	20,650	10,617	8,809	10,372	17,239	13,030	11,383
70%	7,401	8,651	11,421	13,695	18,359	16,099	9,968	8,553	10,029	15,866	11,157	9,527
80%	6,330	6,998	8,557	11,396	14,745	13,147	9,106	7,912	9,548	12,798	8,367	8,339
90%	5,547	6,108	7,167	10,140	12,940	10,022	8,064	7,372	8,384	10,409	7,531	7,435
Long Term												
Full Simulation Period	9,484	12,510	19,726	28,534	34,880	30,067	18,486	11,524	11,174	16,563	12,346	14,753
Water Year Types												
Wet	10,891	17,182	34,594	47,388	54,159	44,817	30,280	15,515	11,984	17,719	13,701	22,821
Above Normal	9,877	12,058	19,277	36,324	42,867	40,008	19,128	12,828	11,814	18,508	14,754	17,430
Below Normal	9,114	11,699	12,901	19,738	26,173	23,730	15,307	10,497	11,507	18,684	13,981	10,737
Dry	8,797	10,284	11,881	14,395	22,880	19,311	9,957	8,686	10,655	14,790	10,143	10,040
Critical	7,603	7,349	9,332	12,776	15,062	12,715	9,151	7,145	9,068	11,571	7,736	7,241

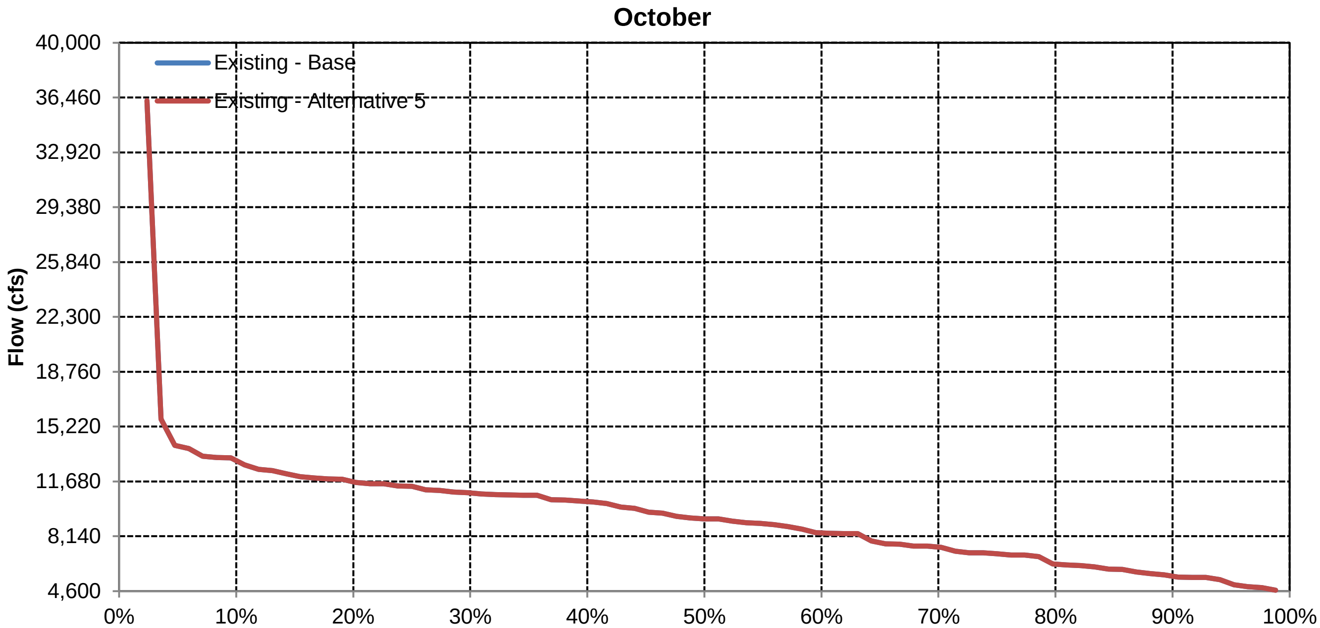
Existing - Alternative 5

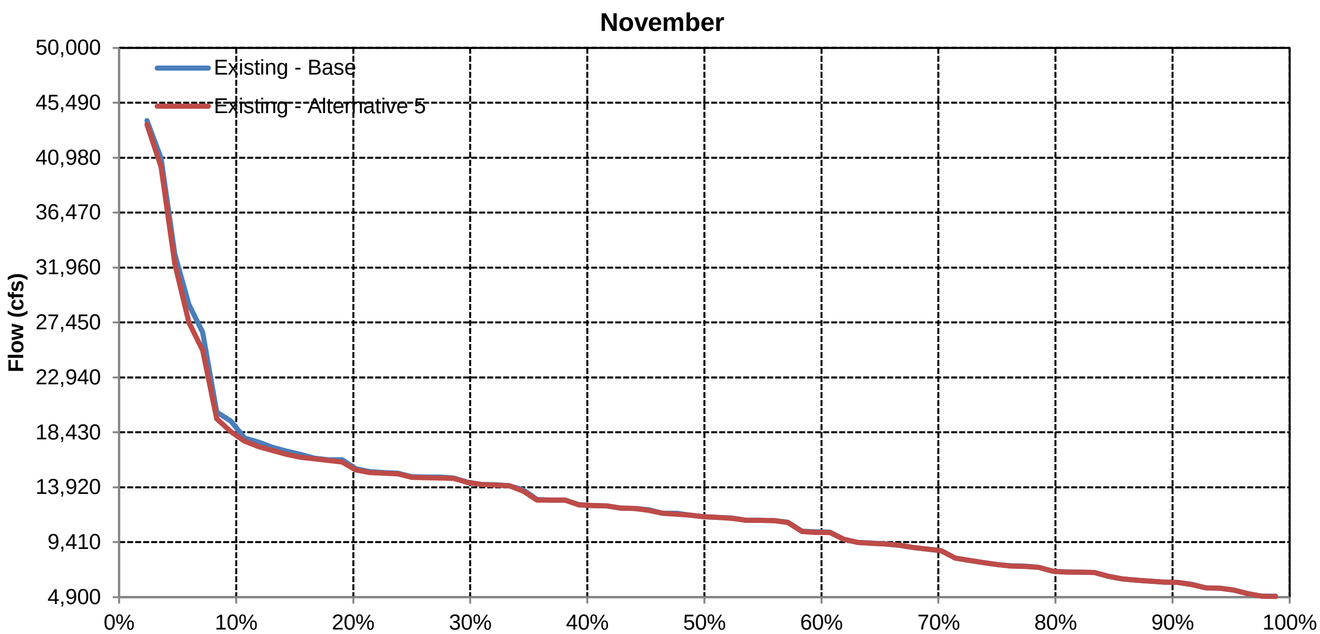
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	12,667	17,558	43,477	57,069	61,959	57,529	41,031	20,423	13,309	19,786	15,641	24,263
20%	11,568	15,206	28,614	48,677	58,150	48,784	29,853	12,476	12,632	19,450	14,919	21,584
30%	10,868	14,163	20,121	35,952	45,022	40,984	19,097	10,802	12,207	18,980	14,204	20,190
40%	10,328	12,411	16,652	28,721	38,139	31,683	14,333	9,587	11,482	18,481	13,746	16,796
50%	9,258	11,465	14,245	20,361	28,486	24,023	11,812	9,148	10,870	17,699	13,483	12,593
60%	8,339	10,198	12,118	15,998	23,161	20,266	10,617	8,809	10,372	17,239	13,029	11,383
70%	7,401	8,648	11,412	13,655	18,084	16,063	9,968	8,553	10,029	15,866	11,157	9,527
80%	6,330	6,995	8,552	11,373	14,658	13,098	9,106	7,912	9,548	12,798	8,367	8,339
90%	5,547	6,106	7,164	10,133	12,911	10,017	8,064	7,372	8,384	10,409	7,531	7,435
Long Term												
Full Simulation Period	9,484	12,399	19,354	27,876	34,181	29,731	18,487	11,524	11,174	16,563	12,346	14,753
Water Year Types												
Wet	10,891	16,894	33,733	46,432	53,422	44,462	30,280	15,515	11,984	17,719	13,701	22,821
Above Normal	9,877	12,016	18,937	35,283	41,722	39,549	19,128	12,828	11,814	18,508	14,754	17,430
Below Normal	9,114	11,641	12,715	19,114	25,509	23,299	15,308	10,497	11,507	18,684	13,981	10,737
Dry	8,797	10,259	11,794	14,106	22,210	18,995	9,957	8,685	10,655	14,790	10,143	10,040
Critical	7,603	7,346	9,301	12,587	14,801	12,651	9,151	7,145	9,068	11,571	7,736	7,241

Existing - Alternative 5 Minus Existing - Base

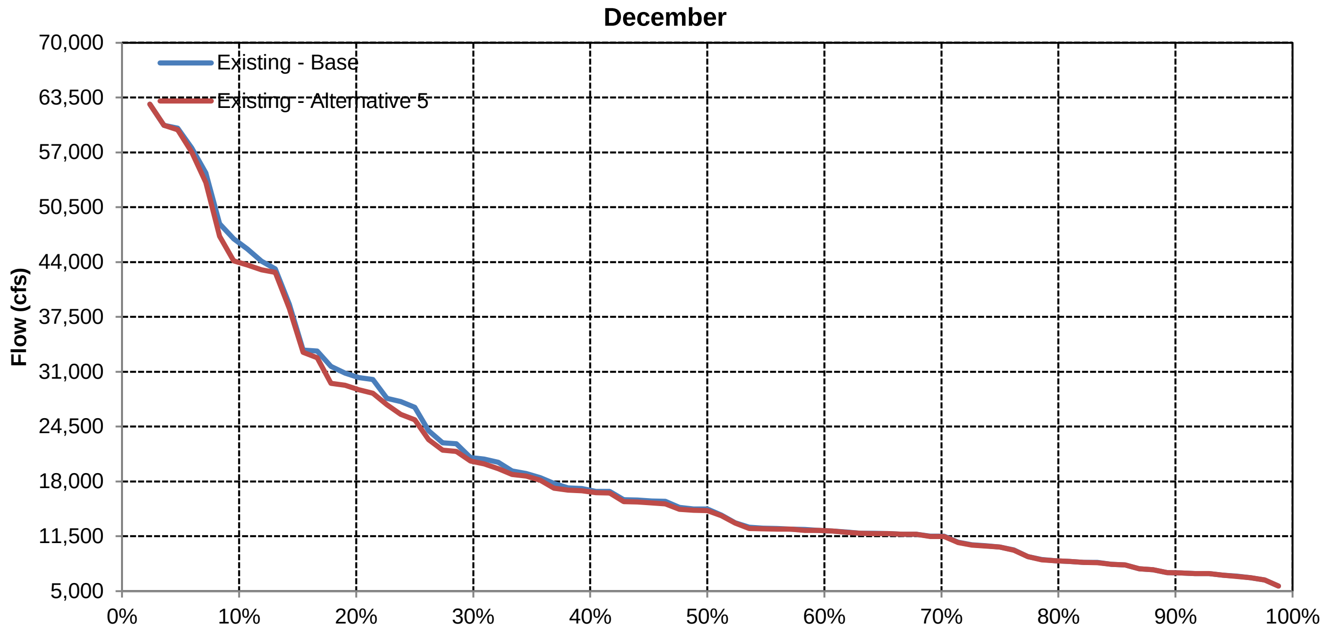
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	-308	-1,623	-659	0	-62	0	0	-3	0	0	0
20%	0	-85	-1,543	-1,301	-400	-424	1	0	0	0	0	0
30%	0	-14	-549	-2,316	-942	-709	0	0	0	0	0	0
40%	0	-8	-175	-1,730	-1,903	-504	0	0	0	0	0	0
50%	0	-5	-130	-566	-1,215	-216	0	0	0	0	0	0
60%	0	-44	-19	-322	-860	-384	0	0	0	0	-2	0
70%	0	-4	-10	-41	-275	-36	0	0	0	0	0	0
80%	0	-3	-5	-23	-87	-49	0	0	0	0	0	0
90%	0	-2	-3	-7	-29	-5	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	-111	-372	-657	-699	-336	0	0	0	0	0	0
Water Year Types												
Wet	0	-288	-862	-957	-737	-355	0	0	0	0	0	0
Above Normal	0	-41	-340	-1,042	-1,145	-458	0	0	0	0	0	0
Below Normal	0	-58	-186	-624	-664	-431	0	0	0	0	0	0
Dry	0	-24	-87	-289	-670	-316	0	-1	0	0	0	0
Critical	0	-3	-31	-189	-261	-64	0	0	0	0	0	0

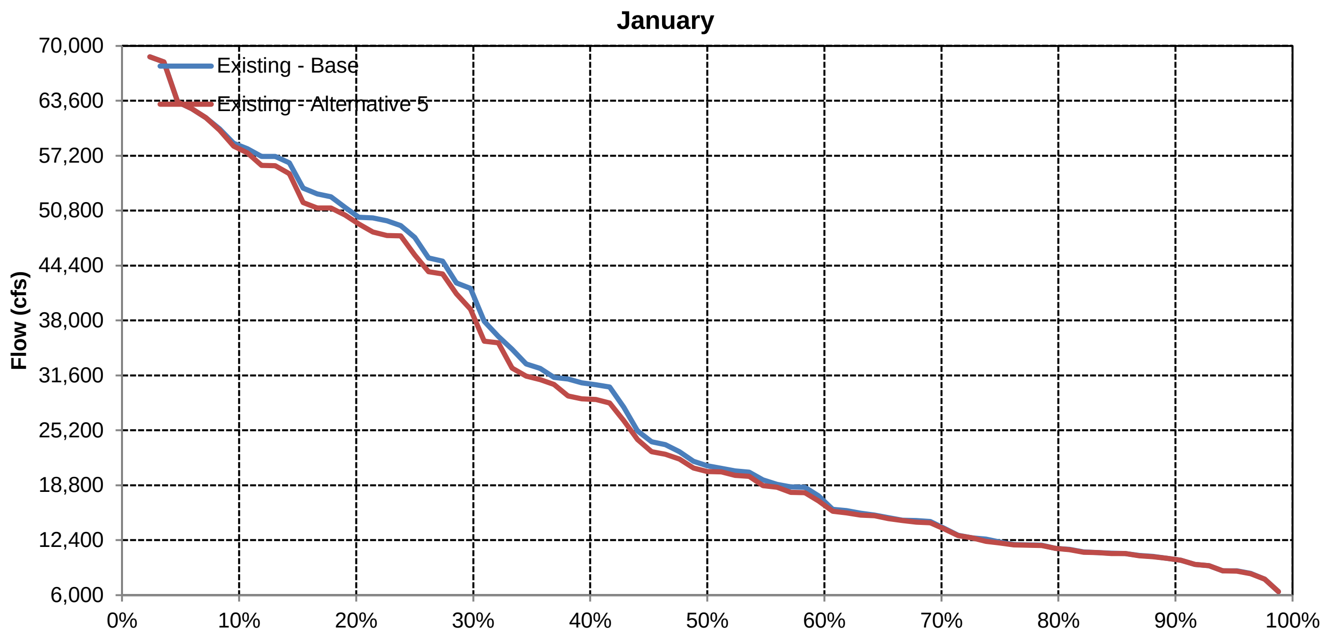
Sacramento River below Fremont Weir



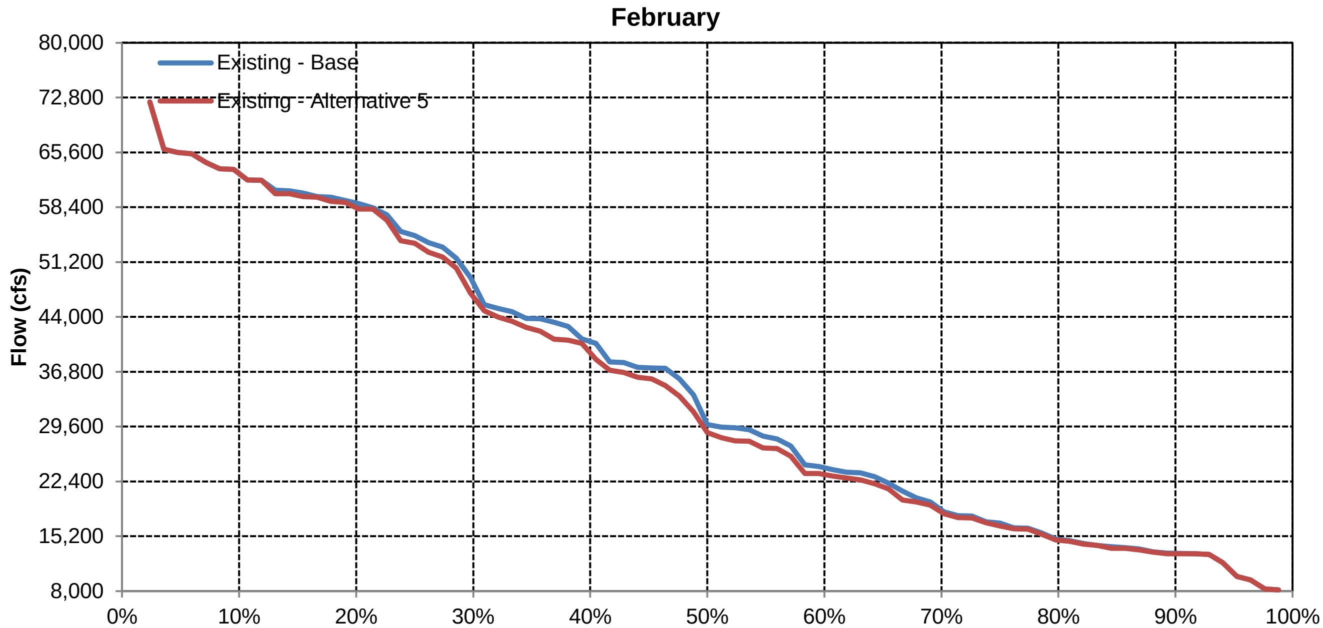


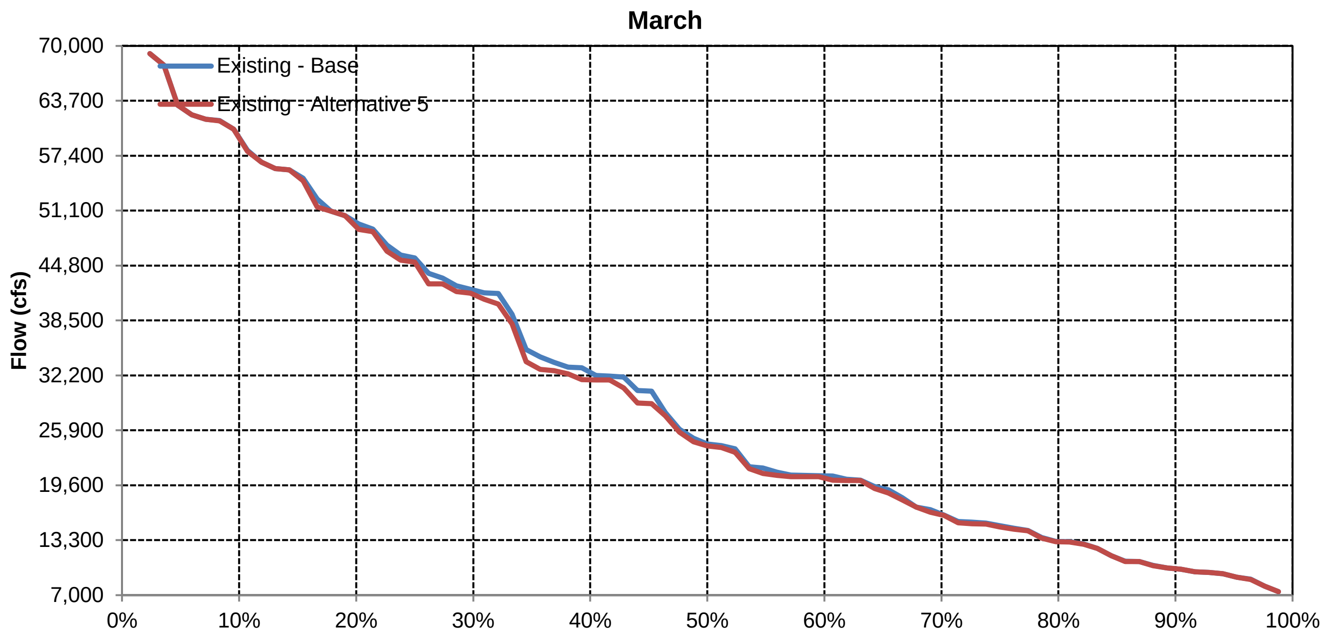
Sacramento River below Fremont Weir



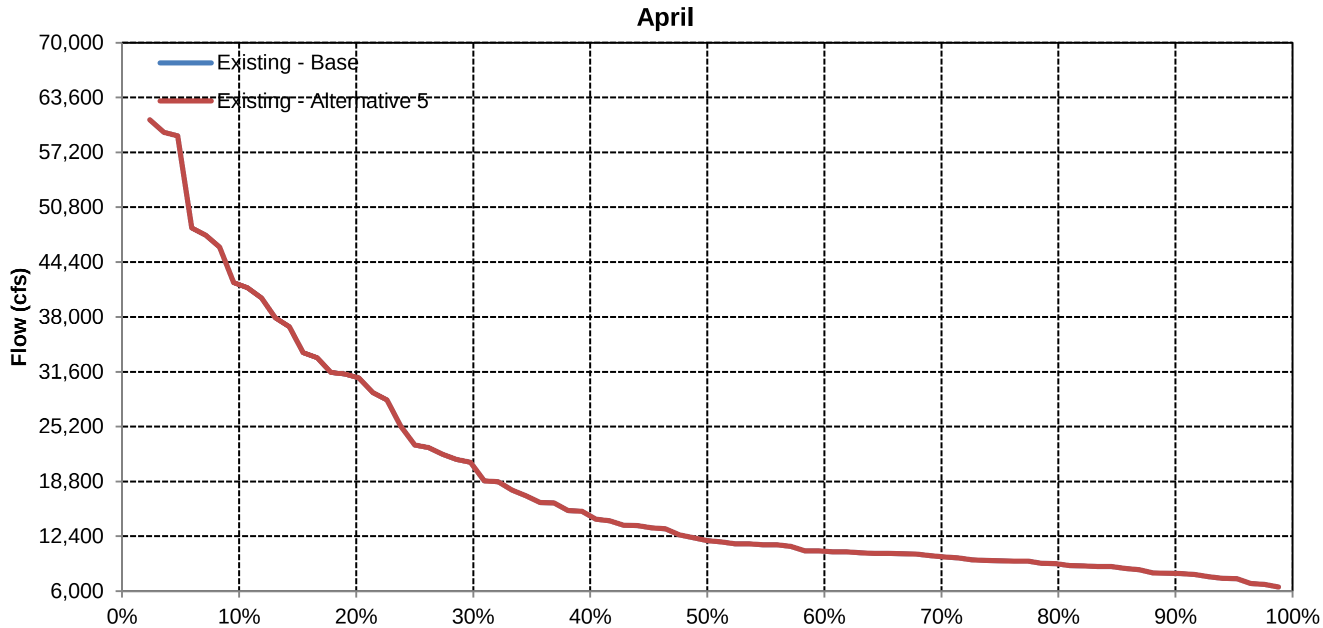


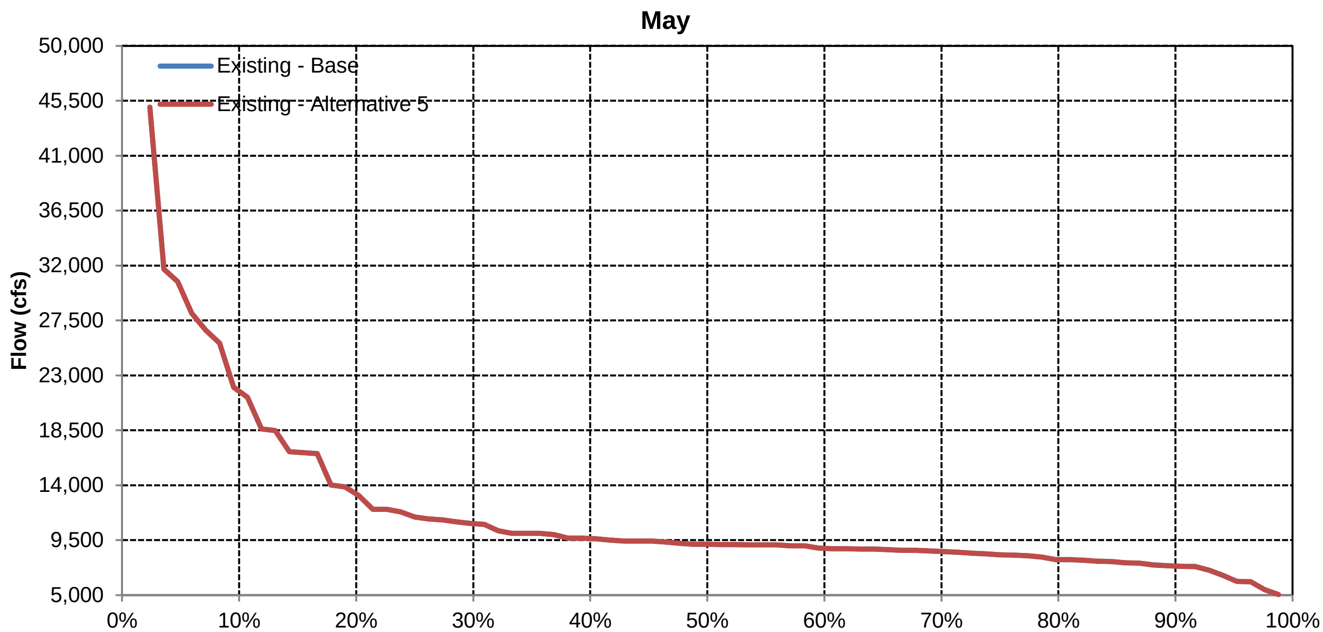
Sacramento River below Fremont Weir



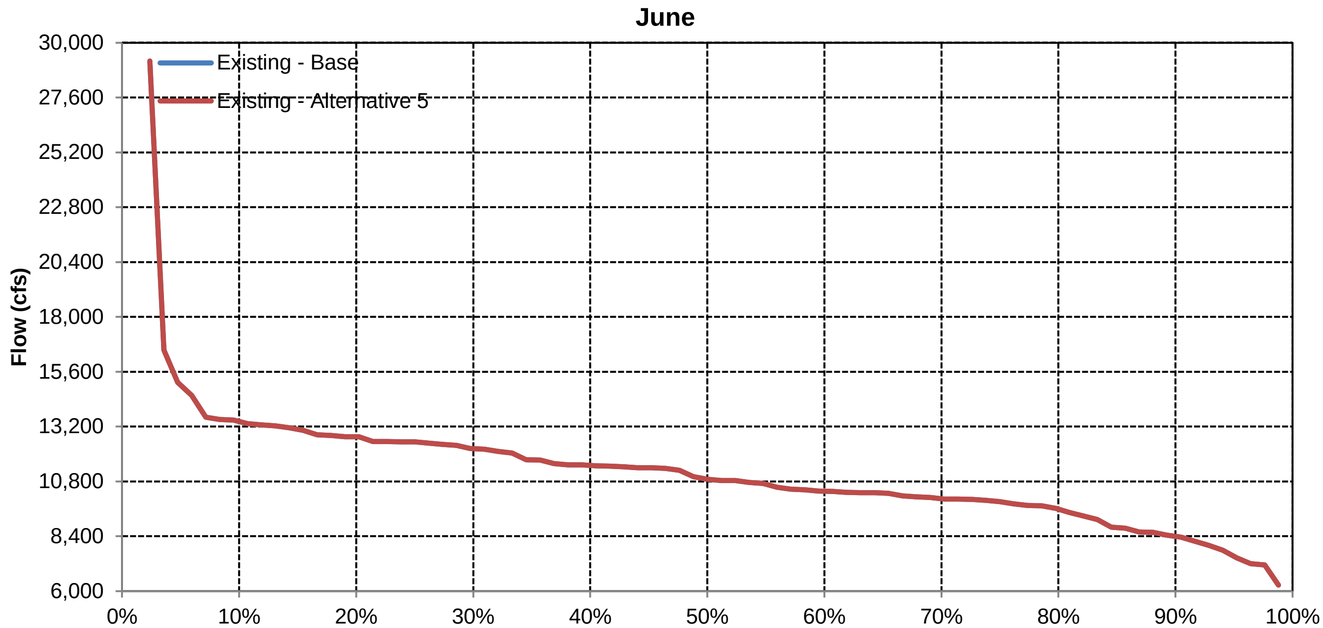


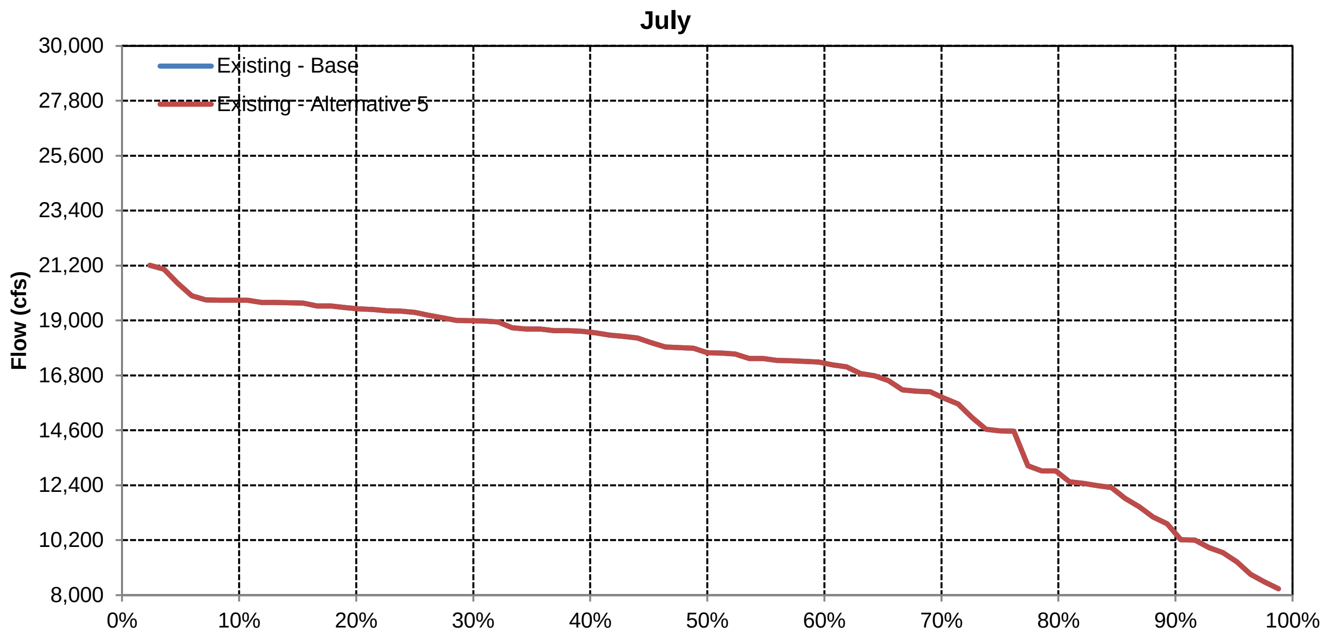
Sacramento River below Fremont Weir



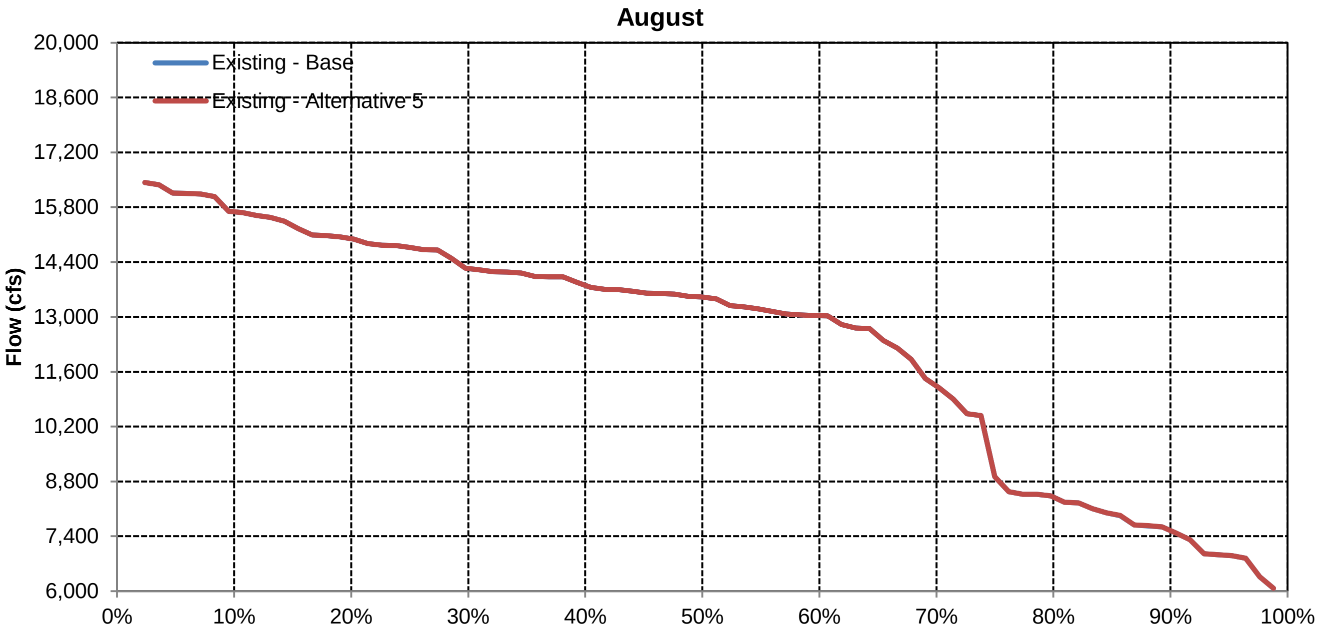


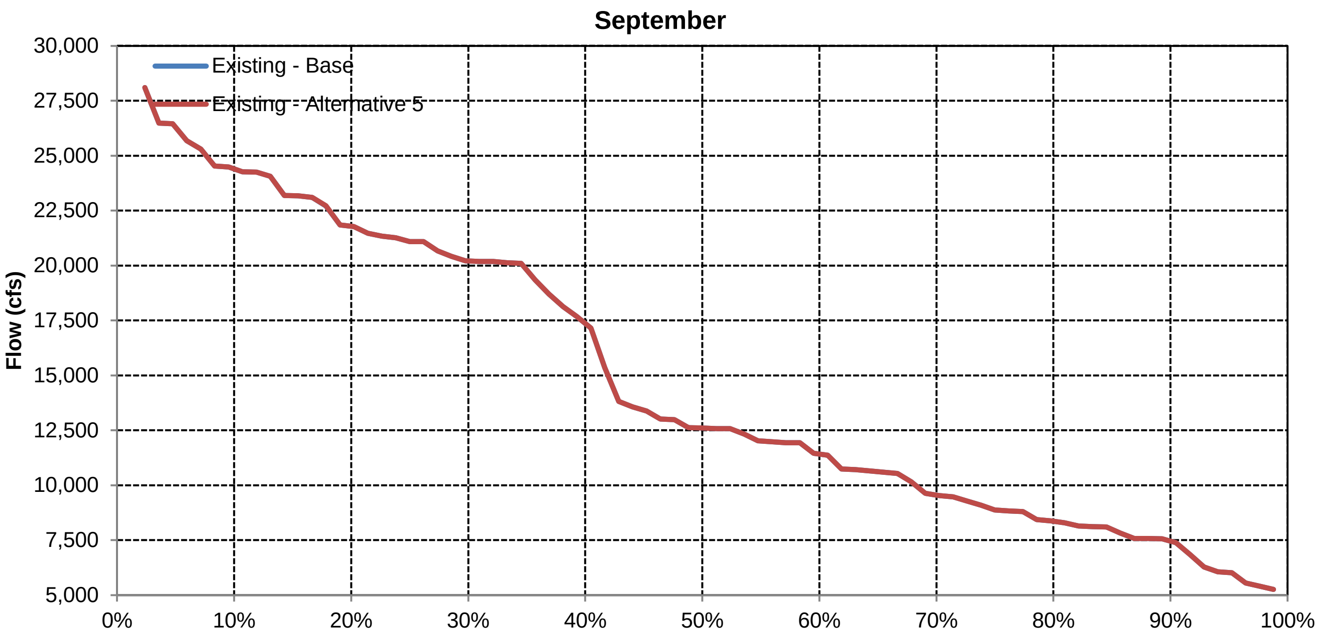
Sacramento River below Fremont Weir





Sacramento River below Fremont Weir





Long-Term and Water Year-Type Average of Trinity Reservoir Under Existing - Base and Existing - Alternative 5

Analysis Period	October	November	December	January	February	March	April	May	June	July	August	September
					Average Storage (TAF)							
						Long-Term						
Full Simulation Period												
Existing - Base	1,276	1,285	1,370	1,501	1,641	1,769	1,902	1,832	1,743	1,596	1,445	1,326
Existing - Alternative 5	1,276	1,285	1,370	1,501	1,641	1,769	1,902	1,832	1,743	1,596	1,445	1,326
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
						Water Year-Types						
Wet												
Existing - Base	1,352	1,401	1,574	1,777	1,943	2,063	2,232	2,168	2,045	1,906	1,771	1,629
Existing - Alternative 5	1,352	1,401	1,574	1,777	1,943	2,063	2,232	2,168	2,045	1,906	1,771	1,629
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal												
Existing - Base	1,354	1,330	1,434	1,642	1,822	1,999	2,154	2,062	1,975	1,816	1,661	1,520
Existing - Alternative 5	1,354	1,330	1,434	1,642	1,822	1,999	2,154	2,062	1,975	1,816	1,661	1,520
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Existing - Base	1,248	1,259	1,287	1,409	1,560	1,708	1,857	1,790	1,716	1,581	1,414	1,315
Existing - Alternative 5	1,248	1,259	1,287	1,409	1,560	1,708	1,857	1,790	1,716	1,581	1,414	1,315
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry												
Existing - Base	1,303	1,288	1,329	1,373	1,484	1,619	1,724	1,640	1,555	1,384	1,220	1,110
Existing - Alternative 5	1,303	1,288	1,329	1,373	1,484	1,619	1,724	1,640	1,555	1,384	1,220	1,110
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical												
Existing - Base	1,041	1,030	1,052	1,087	1,153	1,212	1,267	1,214	1,174	1,038	895	807
Existing - Alternative 5	1,041	1,030	1,052	1,087	1,153	1,212	1,267	1,214	1,174	1,038	895	807
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	1,679	1,669	1,832	1,900	2,000	2,100	2,300	2,280	2,180	2,036	1,883	1,739
20%	1,561	1,564	1,651	1,871	2,000	2,100	2,253	2,180	2,061	1,899	1,757	1,620
30%	1,475	1,490	1,571	1,797	1,985	2,093	2,209	2,094	1,982	1,813	1,666	1,533
40%	1,391	1,375	1,503	1,663	1,844	2,014	2,151	2,039	1,892	1,736	1,573	1,442
50%	1,297	1,306	1,436	1,564	1,727	1,841	1,969	1,849	1,751	1,626	1,458	1,332
60%	1,211	1,218	1,325	1,409	1,575	1,748	1,859	1,779	1,680	1,531	1,369	1,247
70%	1,117	1,167	1,222	1,291	1,433	1,586	1,698	1,651	1,591	1,445	1,284	1,148
80%	969	979	1,041	1,144	1,328	1,452	1,593	1,574	1,453	1,293	1,119	1,009
90%	814	826	864	996	1,078	1,182	1,234	1,184	1,172	1,067	940	858
Long Term												
Full Simulation Period	1,276	1,285	1,370	1,501	1,641	1,769	1,902	1,832	1,743	1,596	1,445	1,326
Water Year Types												
Wet	1,352	1,401	1,574	1,777	1,943	2,063	2,232	2,168	2,045	1,906	1,771	1,629
Above Normal	1,354	1,330	1,434	1,642	1,822	1,999	2,154	2,062	1,975	1,816	1,661	1,520
Below Normal	1,248	1,259	1,287	1,409	1,560	1,708	1,857	1,790	1,716	1,581	1,414	1,315
Dry	1,303	1,288	1,329	1,373	1,484	1,619	1,724	1,640	1,555	1,384	1,220	1,110
Critical	1,041	1,030	1,052	1,087	1,153	1,212	1,267	1,214	1,174	1,038	895	807

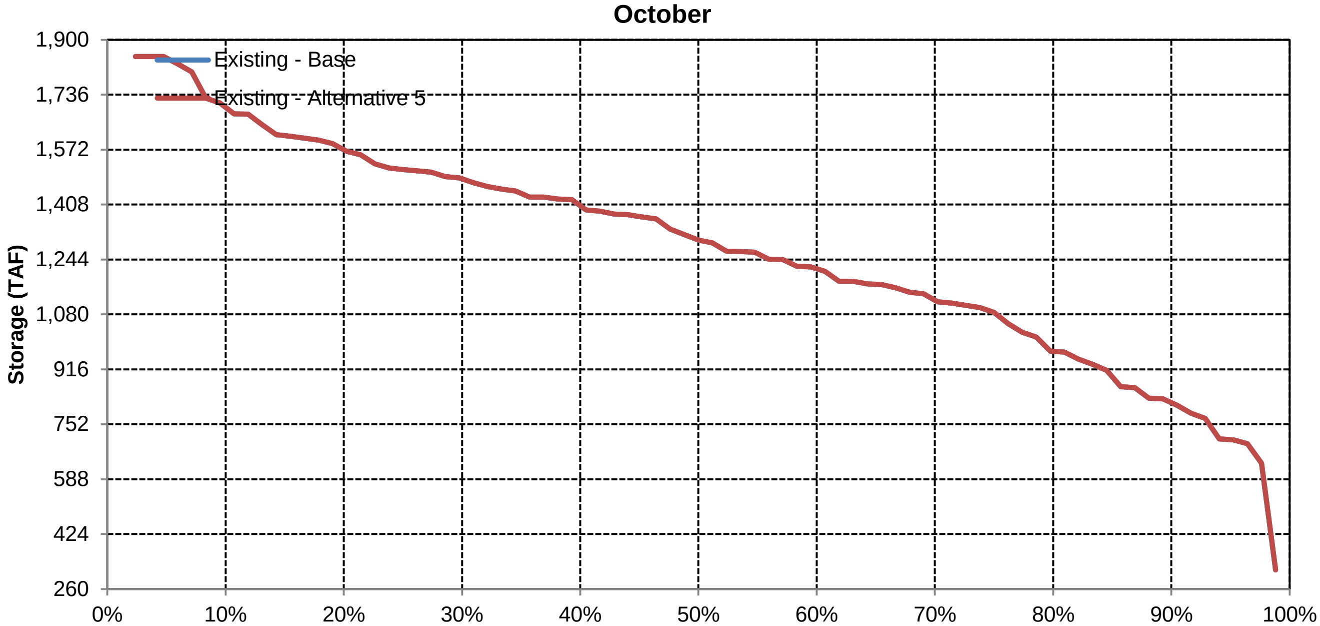
Existing - Alternative 5

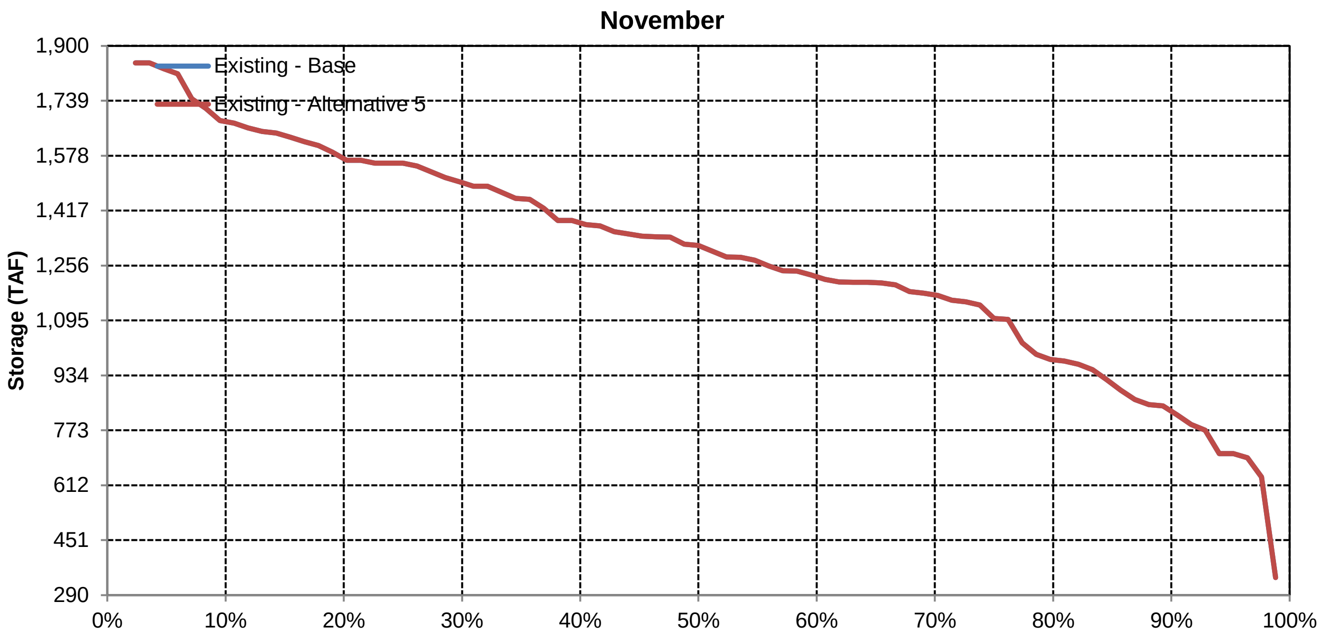
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	1,679	1,669	1,832	1,900	2,000	2,100	2,300	2,280	2,180	2,036	1,883	1,739
20%	1,561	1,564	1,651	1,871	2,000	2,100	2,253	2,180	2,061	1,899	1,757	1,620
30%	1,475	1,490	1,571	1,797	1,985	2,093	2,209	2,094	1,982	1,813	1,666	1,533
40%	1,391	1,375	1,503	1,663	1,844	2,014	2,151	2,039	1,892	1,736	1,573	1,442
50%	1,297	1,306	1,436	1,564	1,727	1,841	1,969	1,849	1,751	1,626	1,458	1,332
60%	1,211	1,218	1,325	1,409	1,575	1,748	1,859	1,779	1,680	1,531	1,369	1,247
70%	1,117	1,167	1,222	1,291	1,433	1,586	1,698	1,651	1,591	1,445	1,284	1,148
80%	969	979	1,041	1,144	1,328	1,452	1,593	1,574	1,453	1,293	1,119	1,009
90%	814	826	864	996	1,078	1,182	1,234	1,184	1,172	1,067	940	858
Long Term												
Full Simulation Period	1,276	1,285	1,370	1,501	1,641	1,769	1,902	1,832	1,743	1,596	1,445	1,326
Water Year Types												
Wet	1,352	1,401	1,574	1,777	1,943	2,063	2,232	2,168	2,045	1,906	1,771	1,629
Above Normal	1,354	1,330	1,434	1,642	1,822	1,999	2,154	2,062	1,975	1,816	1,661	1,520
Below Normal	1,248	1,259	1,287	1,409	1,560	1,708	1,857	1,790	1,716	1,581	1,414	1,315
Dry	1,303	1,288	1,329	1,373	1,484	1,619	1,724	1,640	1,555	1,384	1,220	1,110
Critical	1,041	1,030	1,052	1,087	1,153	1,212	1,267	1,214	1,174	1,038	895	807

Existing - Alternative 5 Minus Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types												
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

Trinity Reservoir





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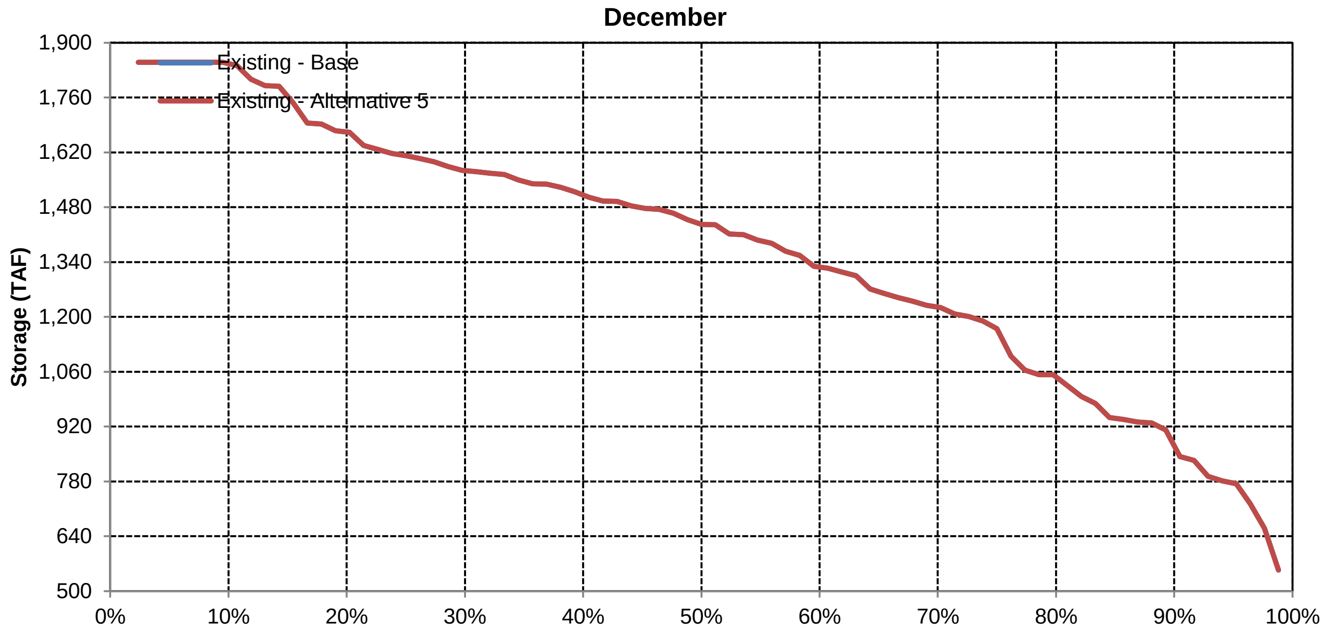

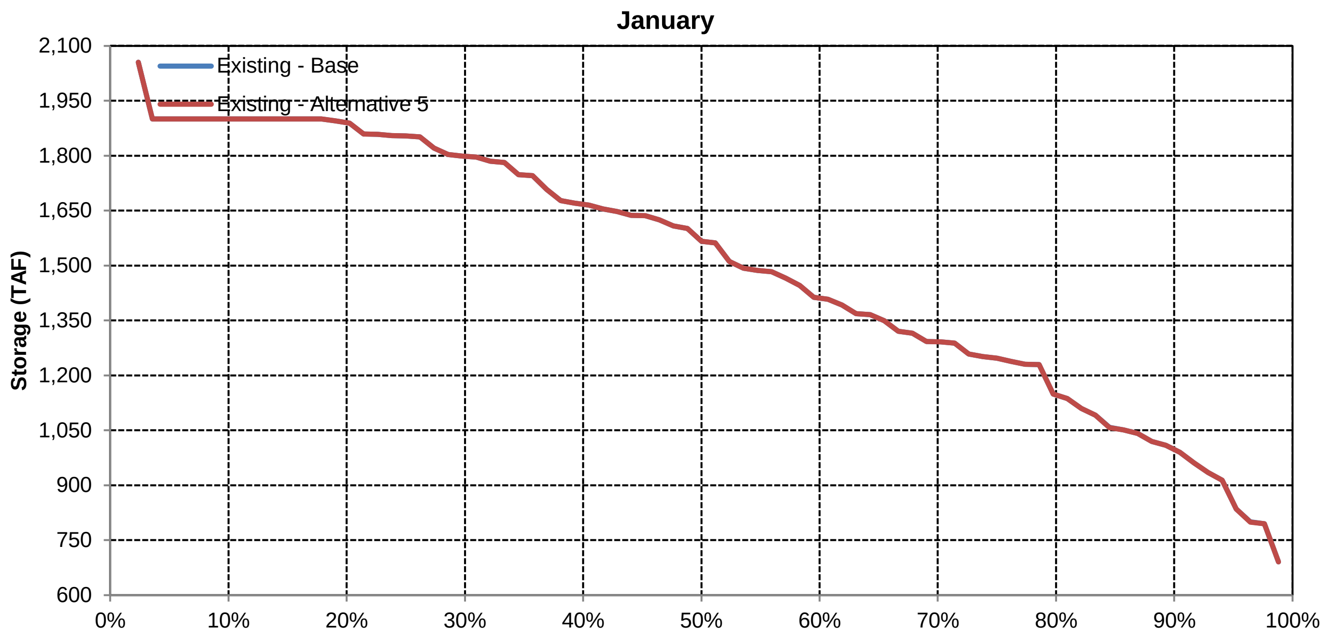

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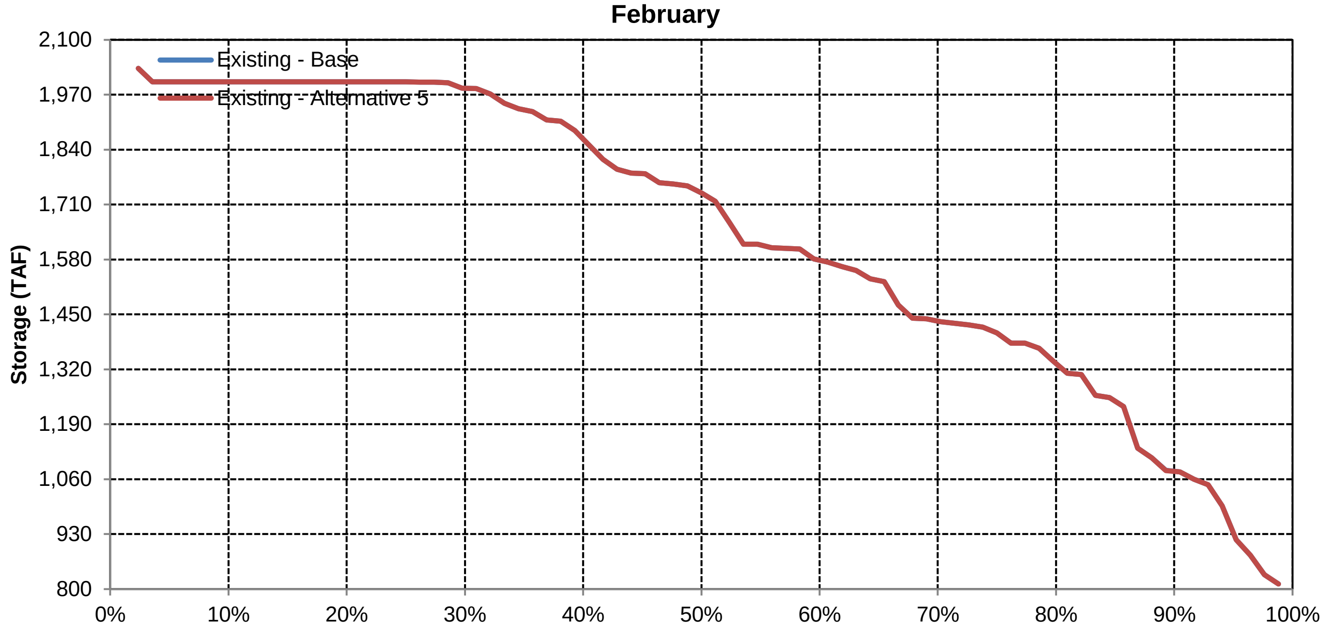

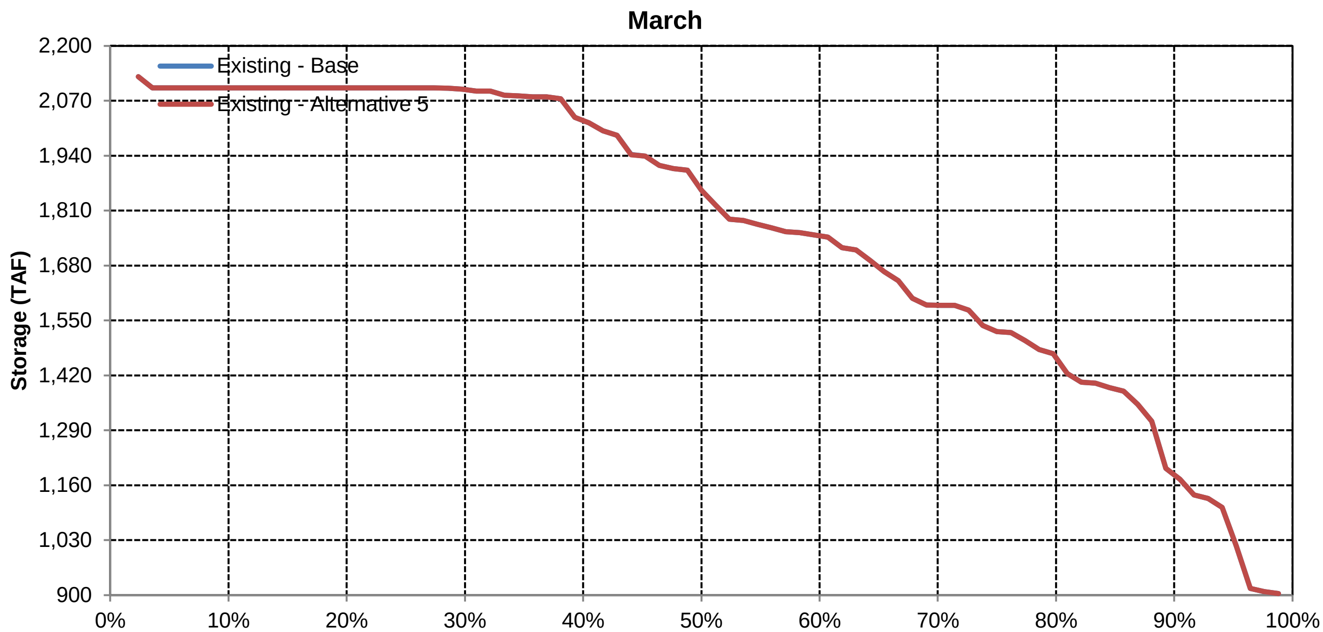

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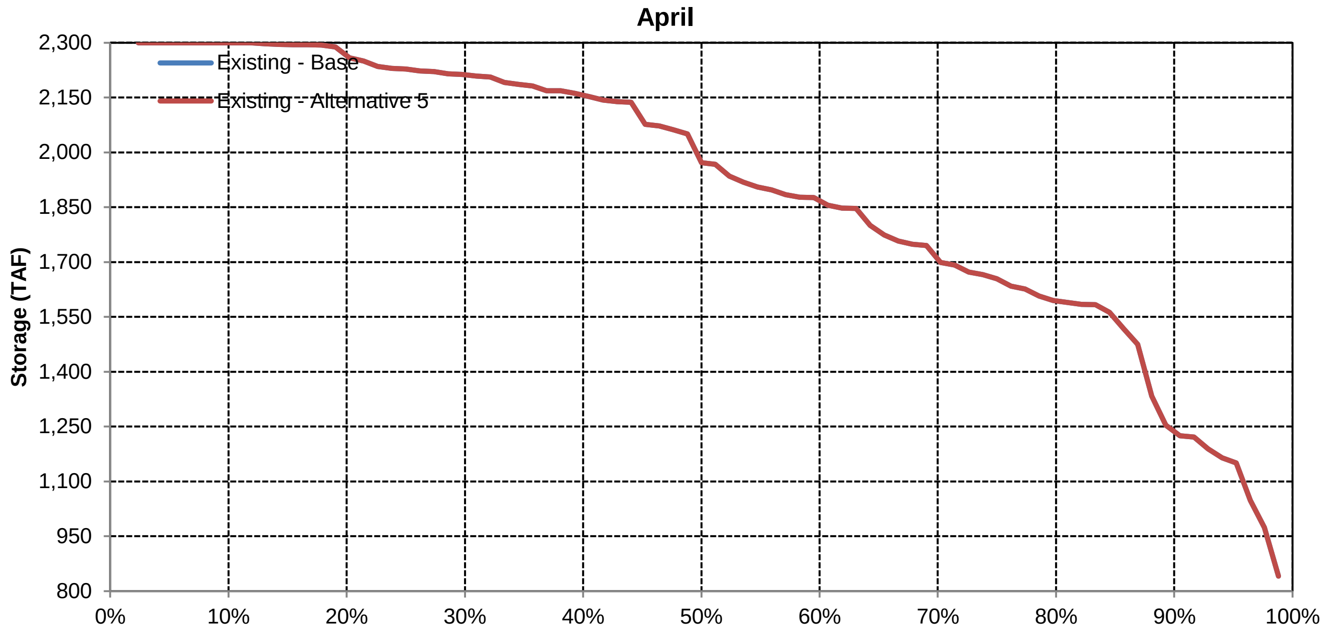

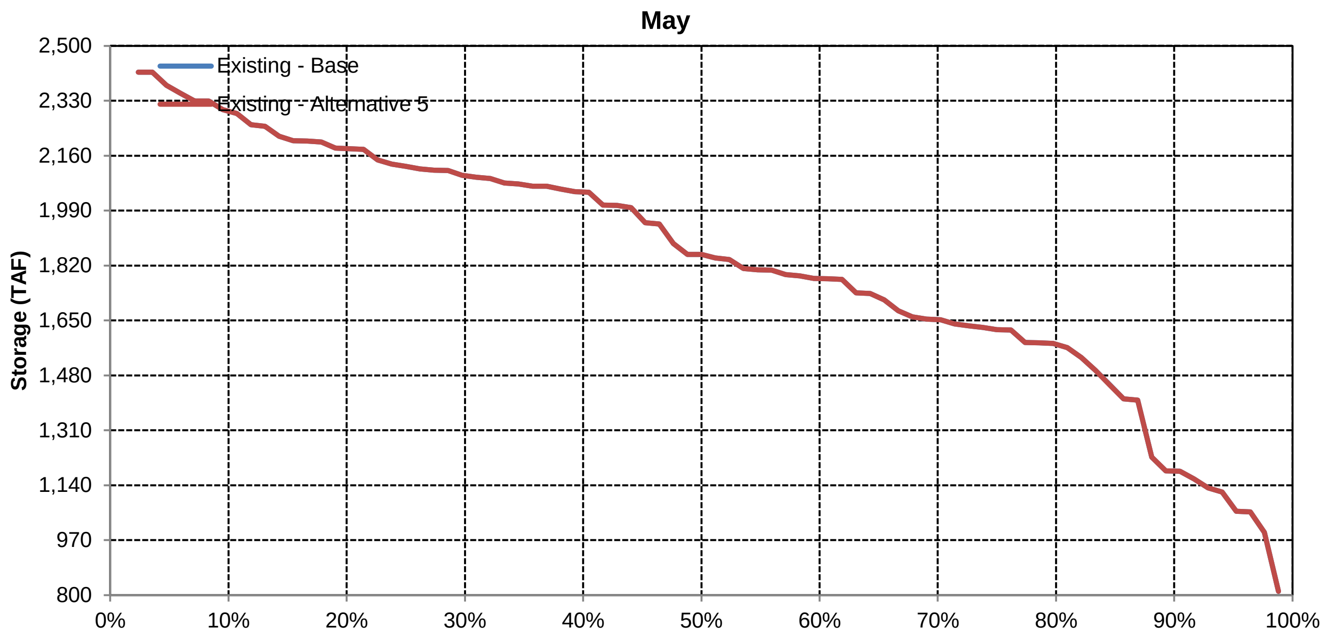

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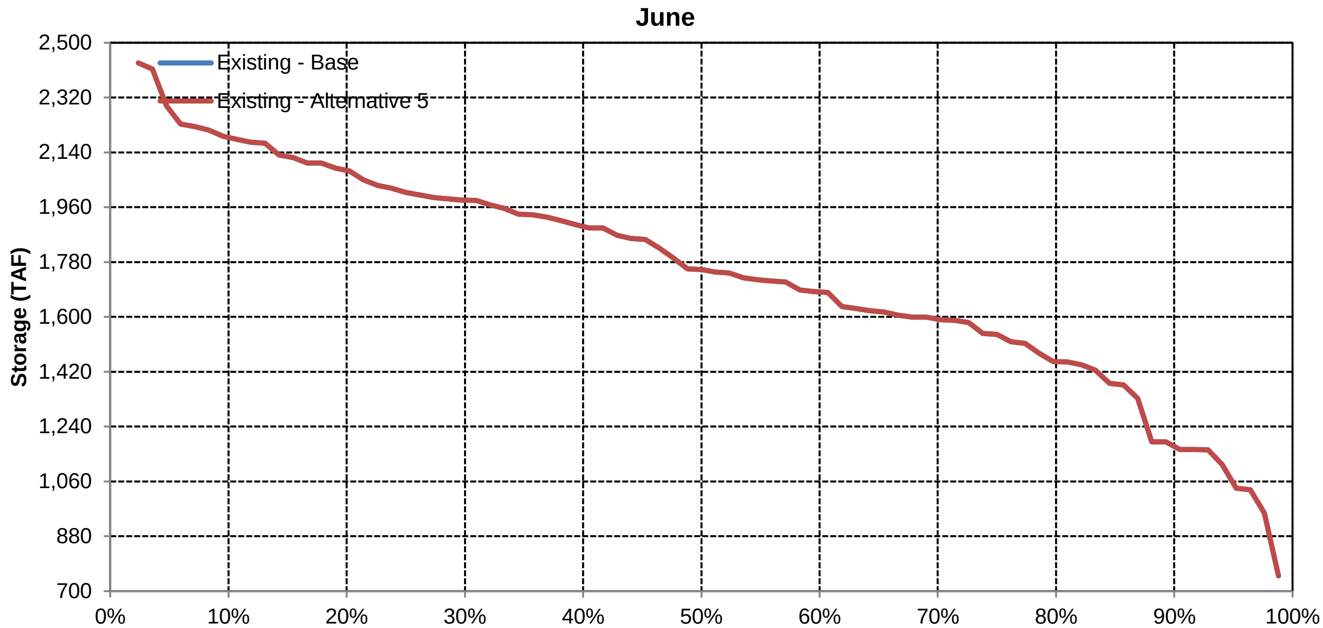

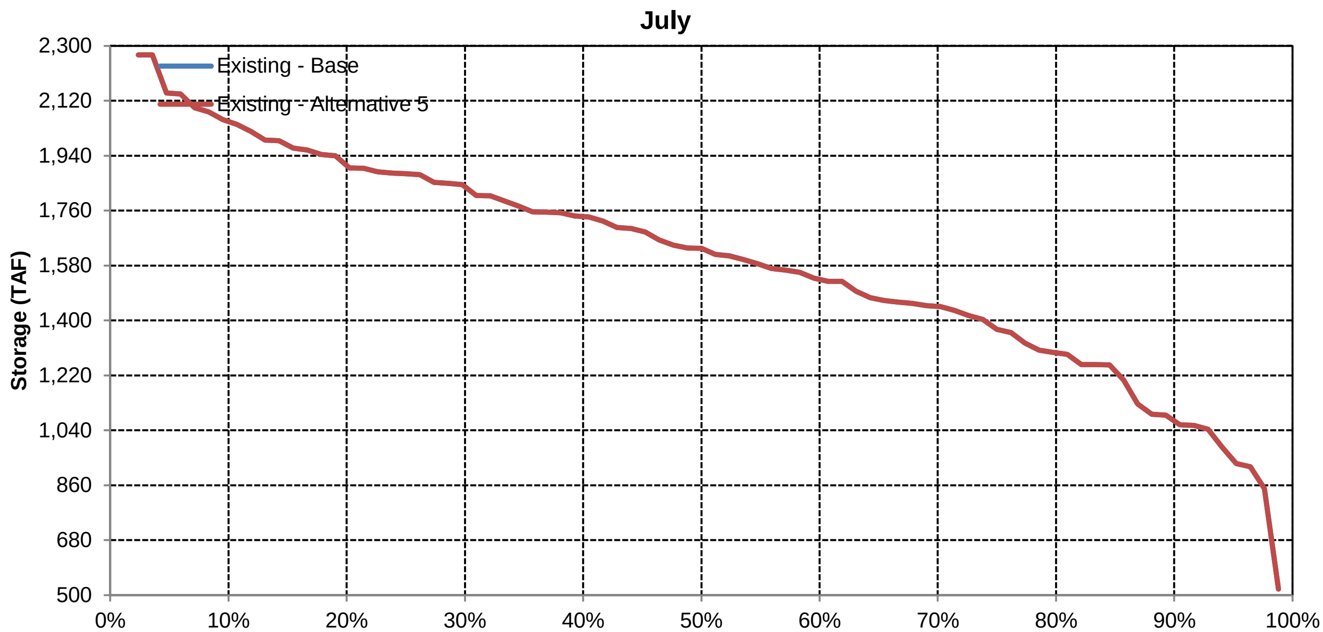

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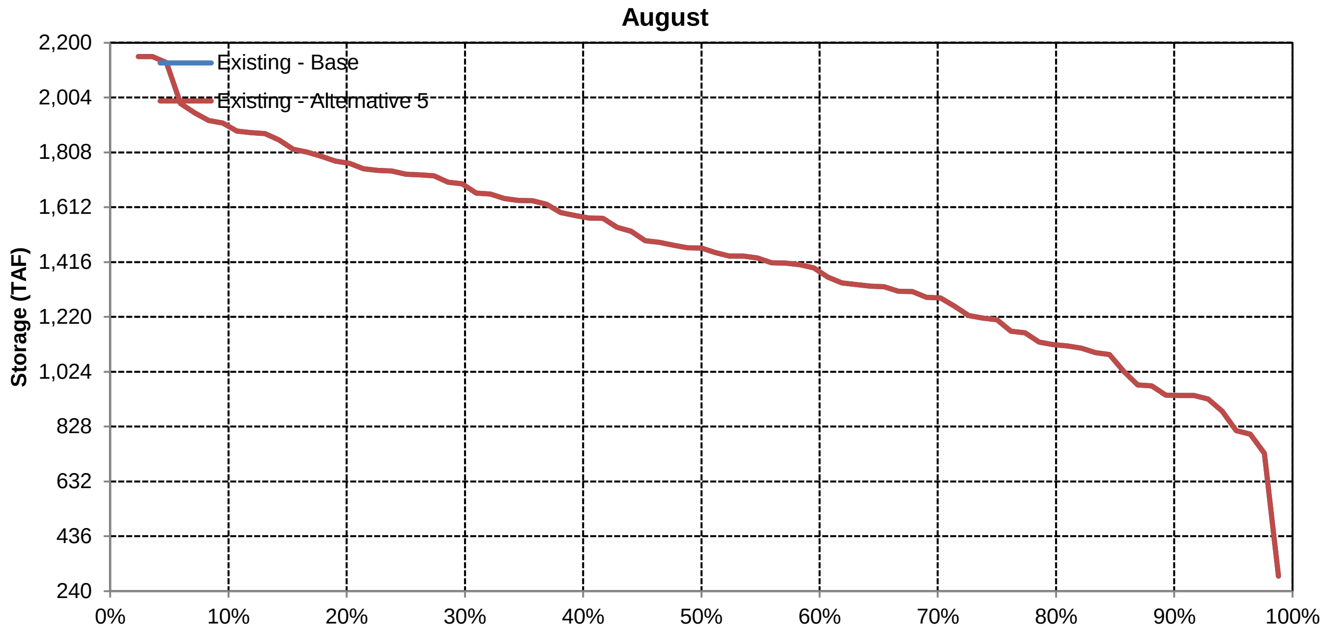
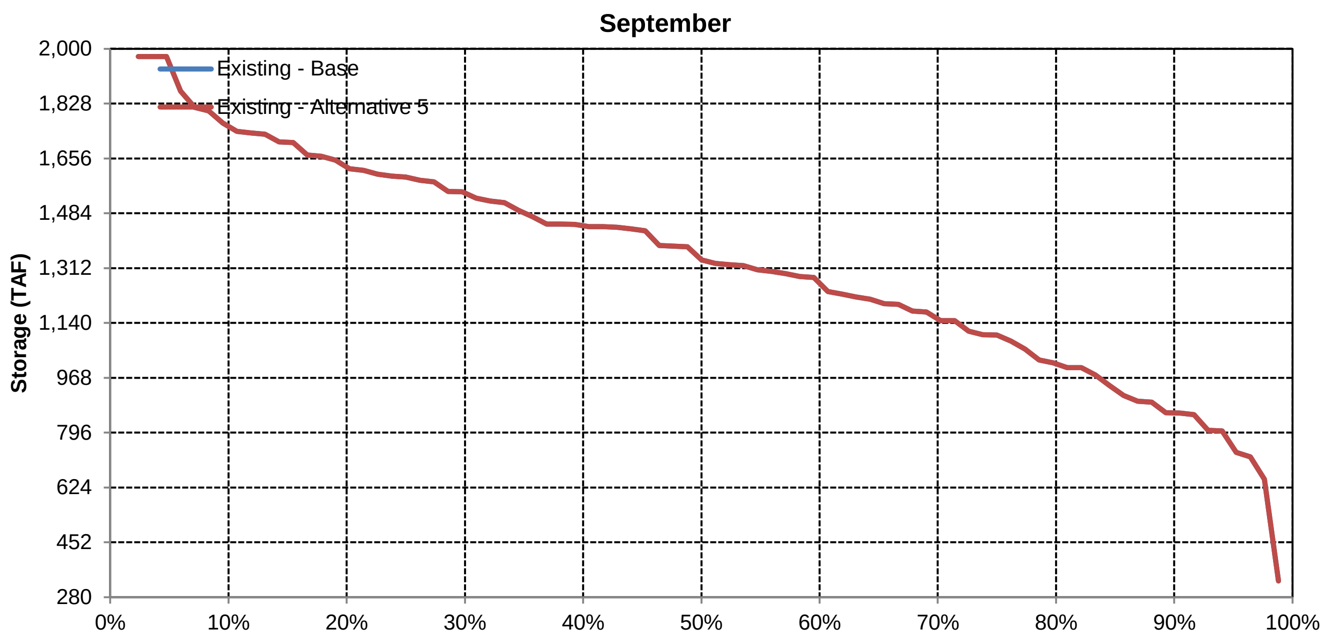




Long-Term and Water Year-Type Average of Shasta Reservoir Storage Under Existing - Base and Existing - Alternative 5

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
						Long-Term						
Full Simulation Period												
Existing - Base	2,487	2,504	2,755	3,076	3,374	3,757	3,995	3,956	3,567	3,020	2,727	2,556
Existing - Alternative 5	2,487	2,504	2,755	3,076	3,374	3,757	3,995	3,956	3,567	3,020	2,727	2,556
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
						Water Year-Types						
Wet												
Existing - Base	2,613	2,702	3,100	3,440	3,579	3,865	4,280	4,388	4,084	3,560	3,256	2,842
Existing - Alternative 5	2,613	2,702	3,100	3,440	3,579	3,865	4,280	4,388	4,084	3,560	3,256	2,842
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal												
Existing - Base	2,537	2,485	2,766	3,212	3,572	4,014	4,364	4,325	3,912	3,323	3,009	2,768
Existing - Alternative 5	2,537	2,485	2,766	3,212	3,572	4,014	4,364	4,325	3,912	3,323	3,009	2,768
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Existing - Base	2,369	2,436	2,594	2,989	3,427	3,933	4,220	4,140	3,703	3,083	2,787	2,785
Existing - Alternative 5	2,369	2,436	2,594	2,989	3,427	3,933	4,220	4,140	3,704	3,083	2,787	2,785
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry												
Existing - Base	2,489	2,449	2,648	2,874	3,288	3,732	3,800	3,677	3,263	2,775	2,491	2,466
Existing - Alternative 5	2,489	2,449	2,648	2,874	3,288	3,732	3,800	3,677	3,263	2,775	2,491	2,466
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical												
Existing - Base	2,338	2,278	2,396	2,576	2,786	3,059	2,976	2,802	2,354	1,832	1,572	1,547
Existing - Alternative 5	2,338	2,278	2,396	2,576	2,786	3,059	2,976	2,802	2,354	1,832	1,572	1,547
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Shasta Reservoir Storage

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	3,244	3,235	3,326	3,635	3,894	4,241	4,535	4,552	4,292	3,804	3,449	3,173
20%	2,935	2,986	3,288	3,529	3,740	4,119	4,455	4,528	4,151	3,585	3,339	3,033
30%	2,796	2,765	3,252	3,373	3,662	4,036	4,356	4,434	4,067	3,445	3,153	2,831
40%	2,695	2,654	3,047	3,296	3,552	3,992	4,257	4,293	3,864	3,225	2,891	2,766
50%	2,563	2,574	2,797	3,246	3,471	3,906	4,206	4,183	3,681	3,093	2,805	2,667
60%	2,427	2,461	2,677	3,001	3,300	3,744	4,097	4,057	3,556	2,974	2,699	2,490
70%	2,318	2,318	2,503	2,902	3,251	3,531	3,948	3,837	3,399	2,816	2,509	2,373
80%	2,161	2,218	2,368	2,685	3,077	3,387	3,457	3,270	2,912	2,497	2,253	2,259
90%	1,751	1,763	1,960	2,366	2,766	3,186	3,065	2,980	2,526	2,019	1,715	1,746
Long Term												
Full Simulation Period	2,487	2,504	2,755	3,076	3,374	3,757	3,995	3,956	3,567	3,020	2,727	2,556
Water Year Types												
Wet	2,613	2,702	3,100	3,440	3,579	3,865	4,280	4,388	4,084	3,560	3,256	2,842
Above Normal	2,537	2,485	2,766	3,212	3,572	4,014	4,364	4,325	3,912	3,323	3,009	2,768
Below Normal	2,369	2,436	2,594	2,989	3,427	3,933	4,220	4,140	3,703	3,083	2,787	2,785
Dry	2,489	2,449	2,648	2,874	3,288	3,732	3,800	3,677	3,263	2,775	2,491	2,466
Critical	2,338	2,278	2,396	2,576	2,786	3,059	2,976	2,802	2,354	1,832	1,572	1,547

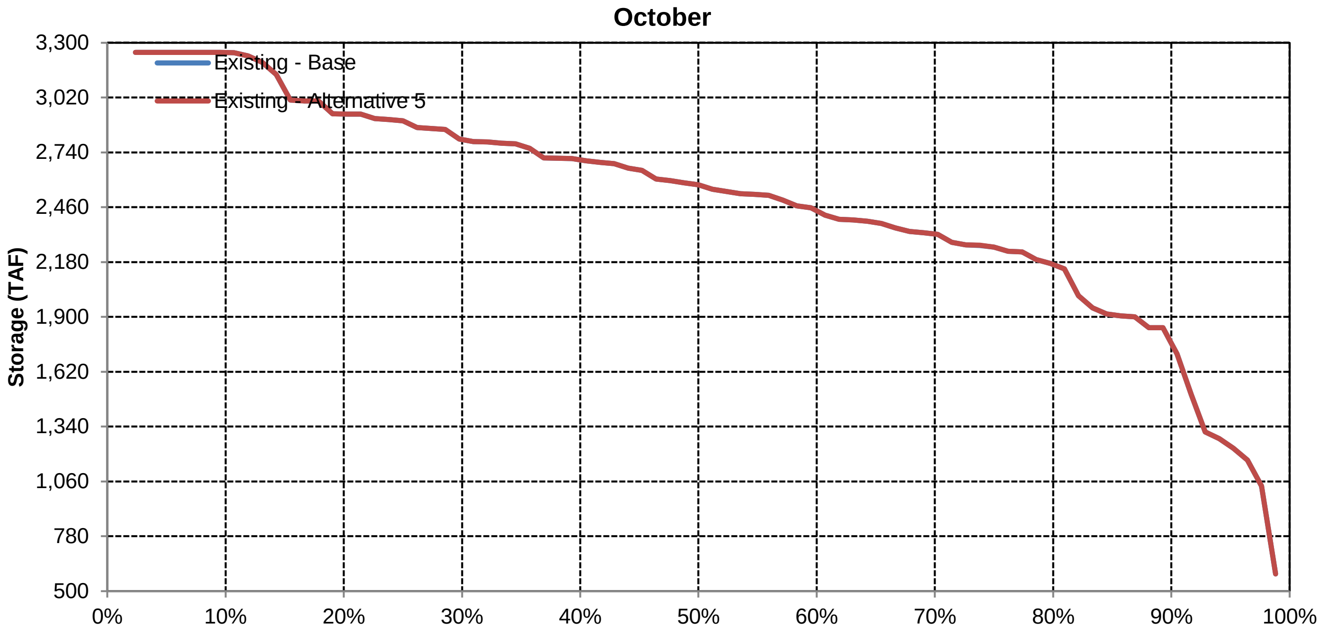
Existing - Alternative 5

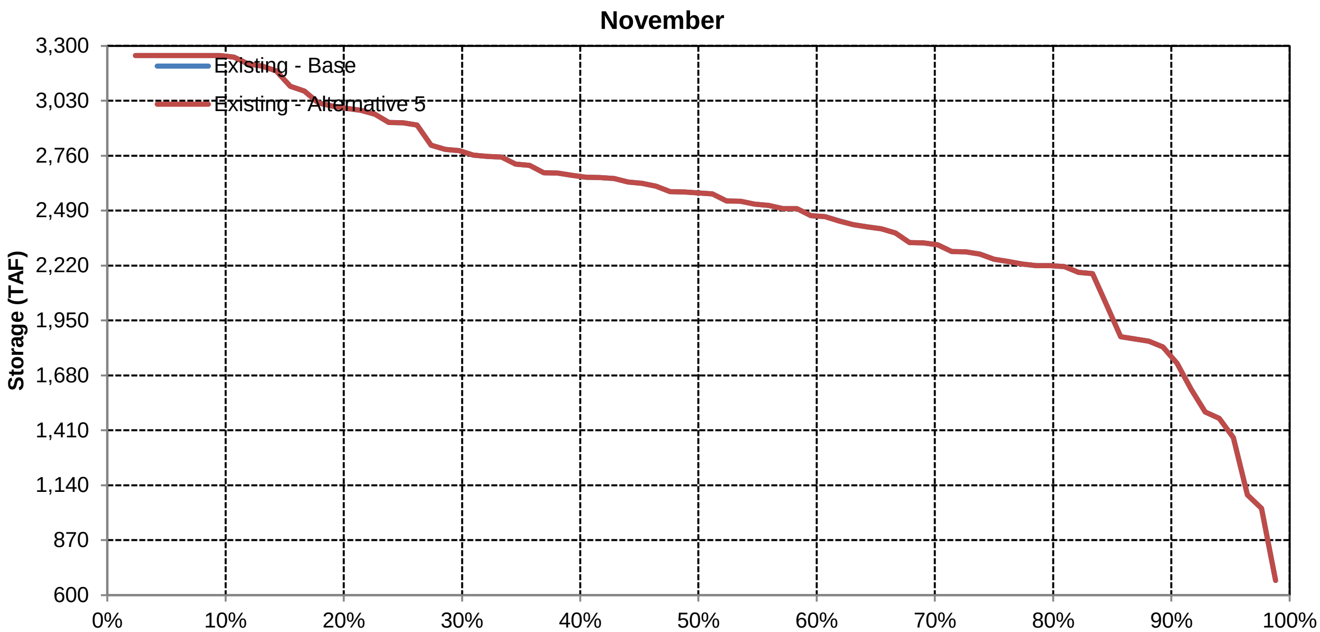
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	3,244	3,235	3,326	3,635	3,894	4,241	4,535	4,552	4,292	3,804	3,449	3,173
20%	2,935	2,986	3,288	3,529	3,740	4,119	4,455	4,528	4,151	3,585	3,339	3,033
30%	2,796	2,765	3,252	3,373	3,662	4,036	4,356	4,434	4,067	3,445	3,153	2,831
40%	2,695	2,654	3,047	3,297	3,552	3,992	4,257	4,293	3,864	3,225	2,891	2,766
50%	2,563	2,574	2,797	3,246	3,471	3,906	4,206	4,183	3,681	3,093	2,805	2,667
60%	2,427	2,462	2,677	3,001	3,300	3,744	4,097	4,057	3,556	2,974	2,699	2,491
70%	2,318	2,318	2,503	2,902	3,251	3,531	3,948	3,837	3,399	2,816	2,509	2,373
80%	2,161	2,218	2,368	2,685	3,077	3,387	3,457	3,270	2,912	2,497	2,253	2,259
90%	1,751	1,763	1,960	2,366	2,766	3,186	3,065	2,980	2,526	2,019	1,715	1,746
Long Term												
Full Simulation Period	2,487	2,504	2,755	3,076	3,374	3,757	3,995	3,956	3,567	3,020	2,727	2,556
Water Year Types												
Wet	2,613	2,702	3,100	3,440	3,579	3,865	4,280	4,388	4,084	3,560	3,256	2,842
Above Normal	2,537	2,485	2,766	3,212	3,572	4,014	4,364	4,325	3,912	3,323	3,009	2,768
Below Normal	2,369	2,436	2,594	2,989	3,427	3,933	4,220	4,140	3,704	3,083	2,787	2,785
Dry	2,489	2,449	2,648	2,874	3,288	3,732	3,800	3,677	3,263	2,775	2,491	2,466
Critical	2,338	2,278	2,396	2,576	2,786	3,059	2,976	2,802	2,354	1,832	1,572	1,547

Existing - Alternative 5 Minus Existing - Base

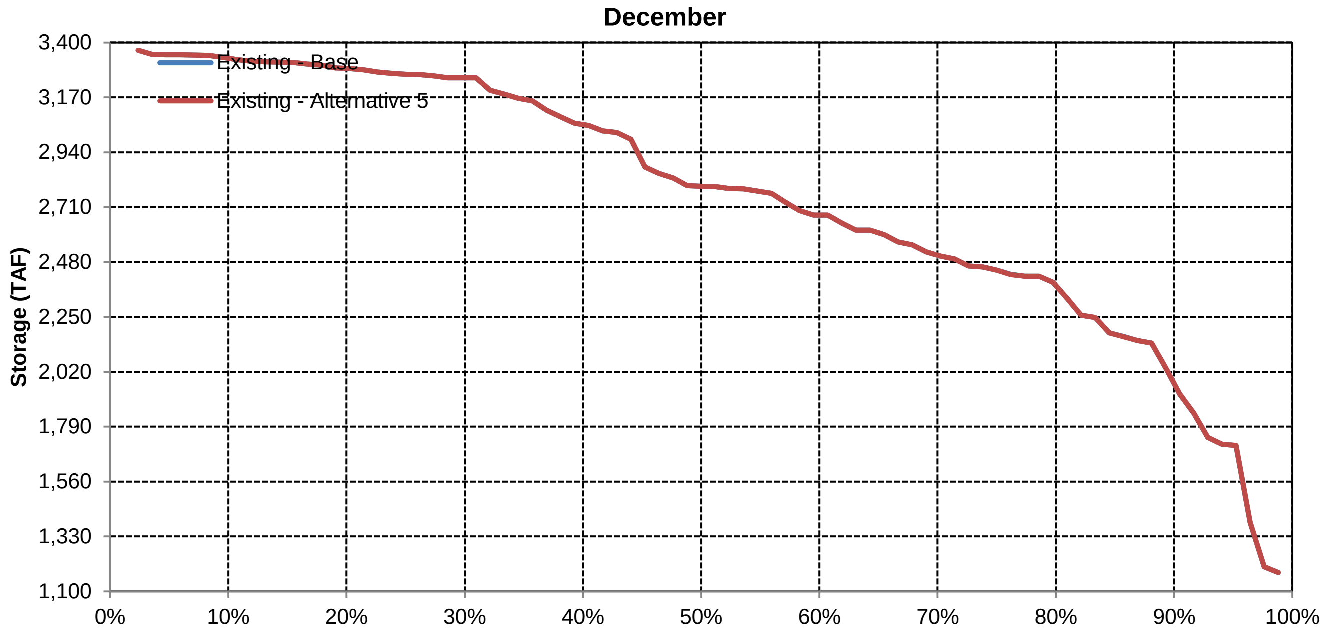
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types												
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

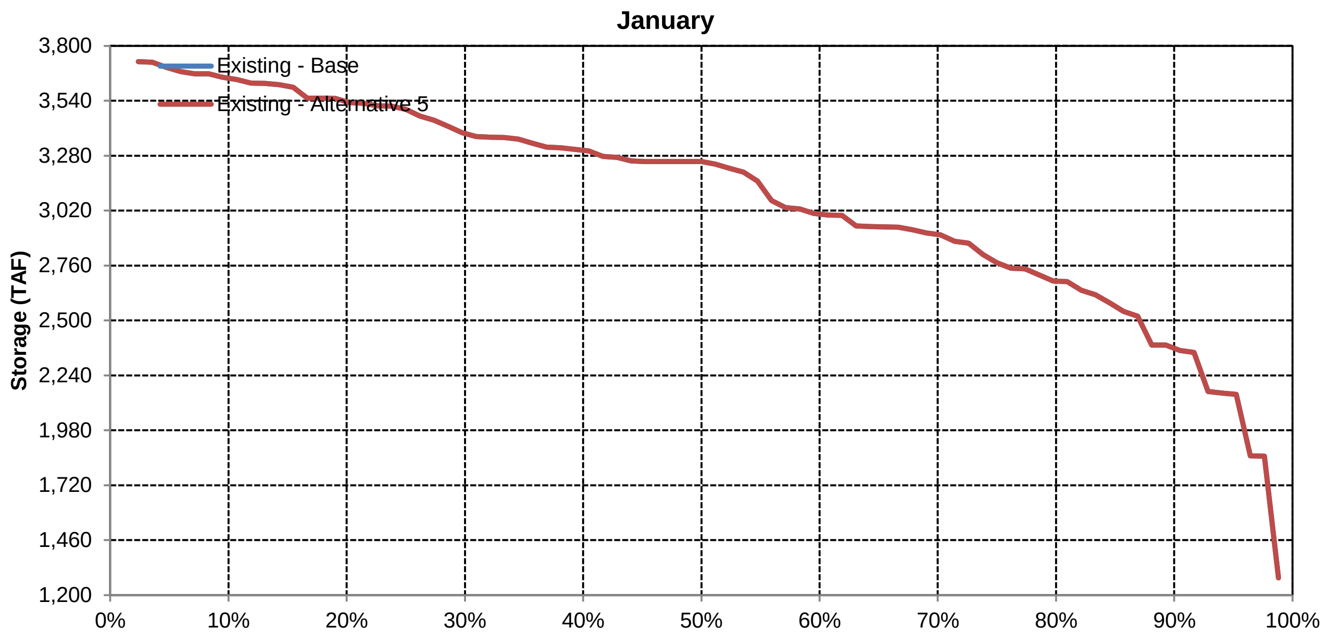
Shasta Reservoir Storage





Shasta Reservoir Storage





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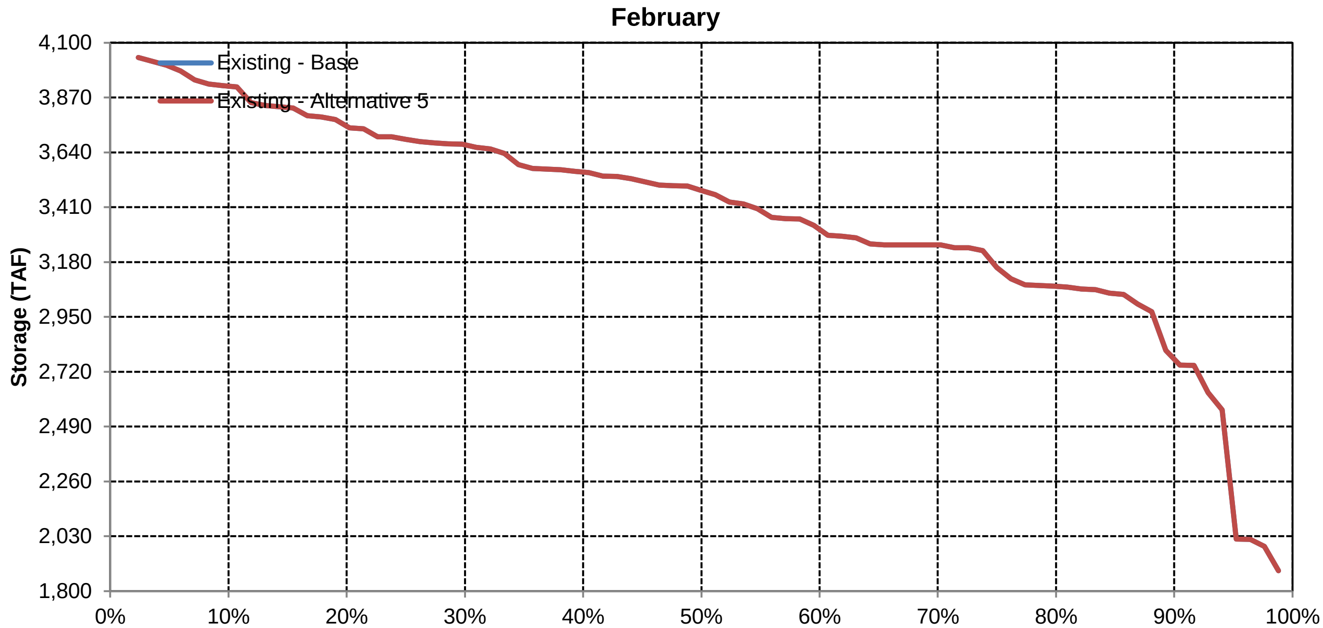
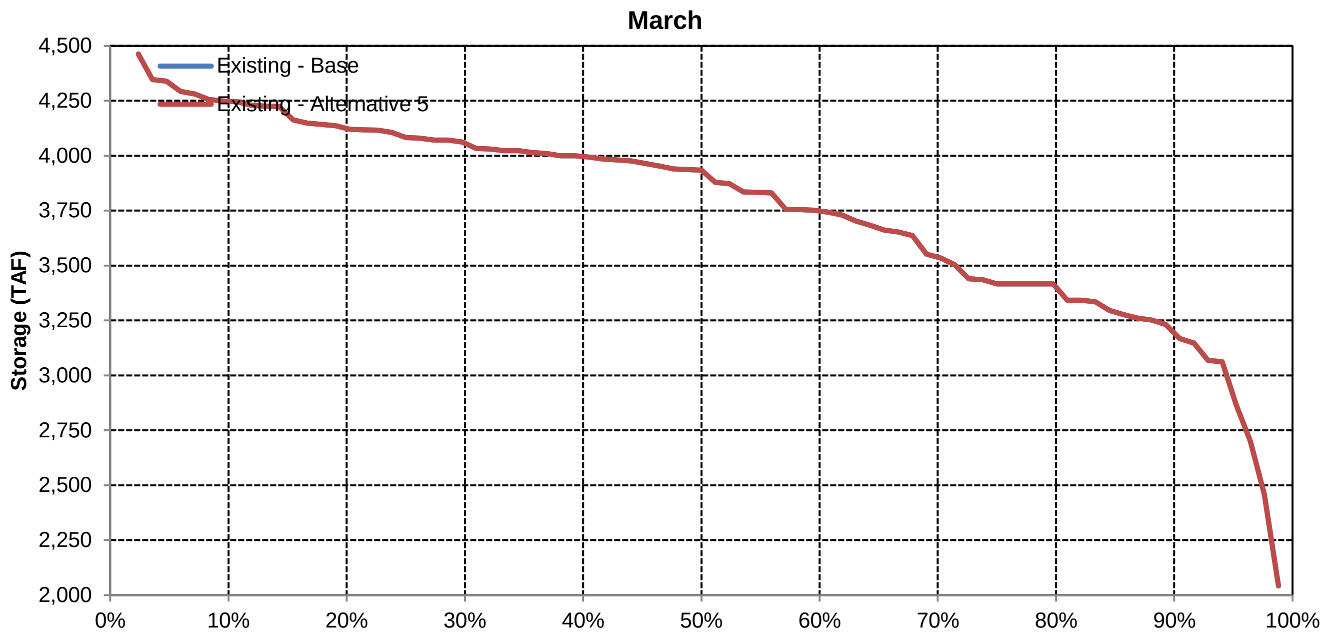
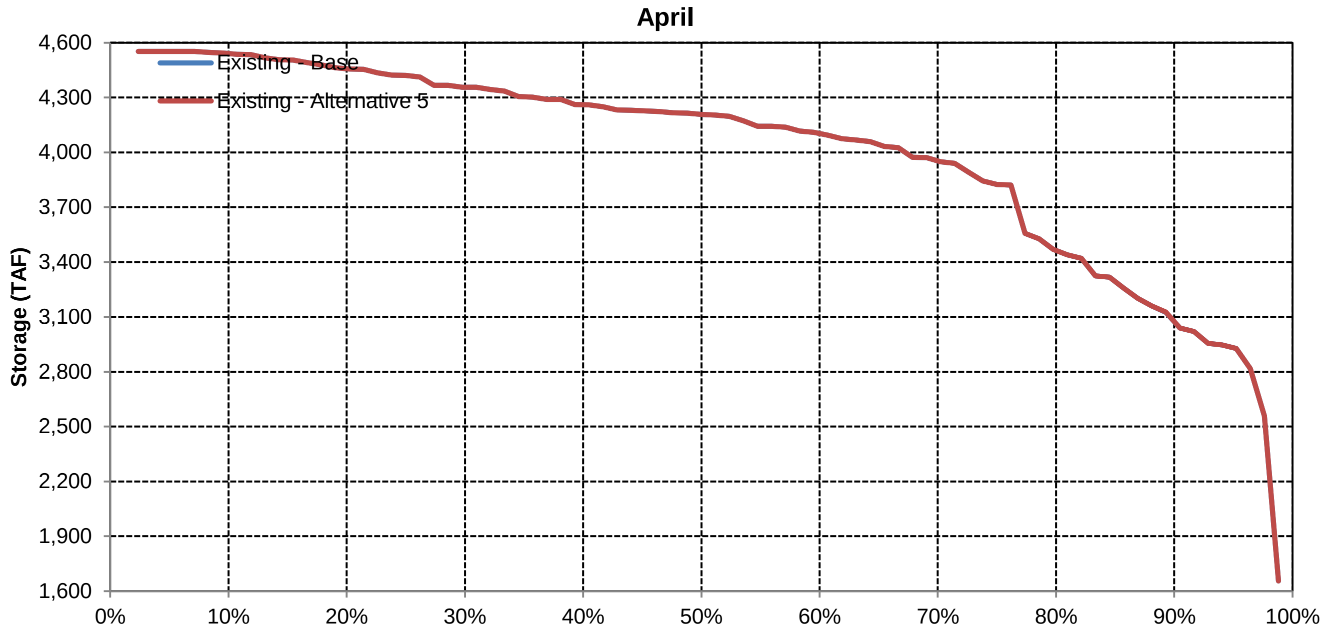
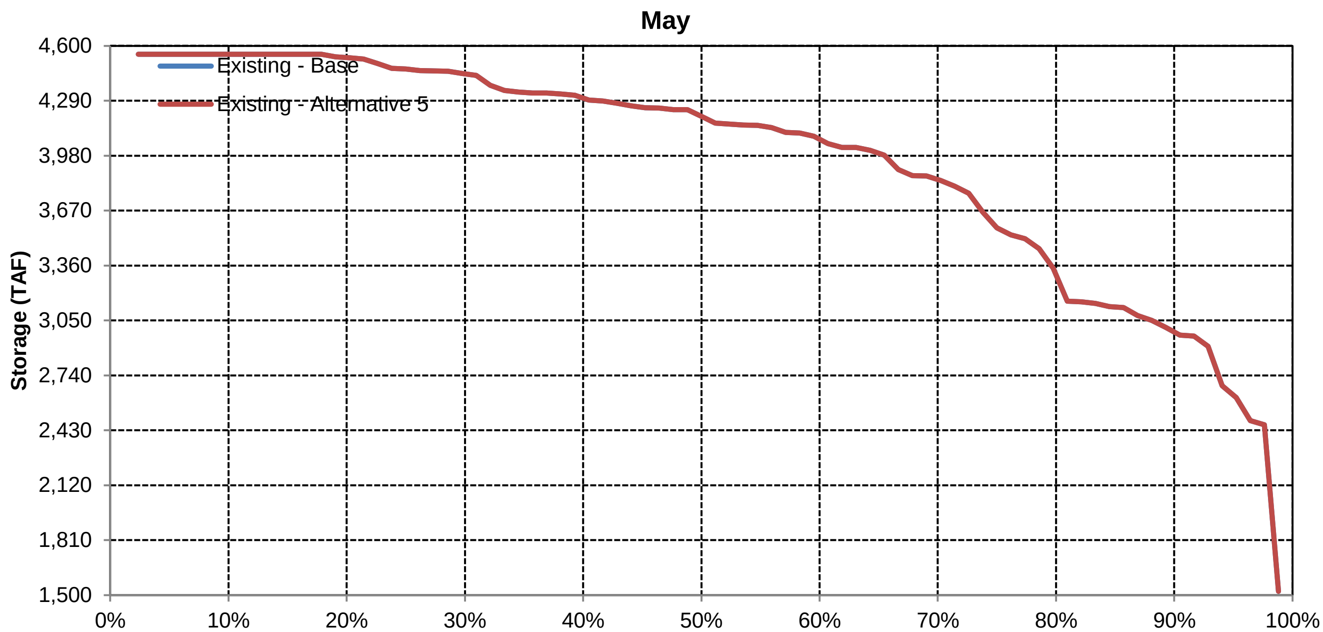


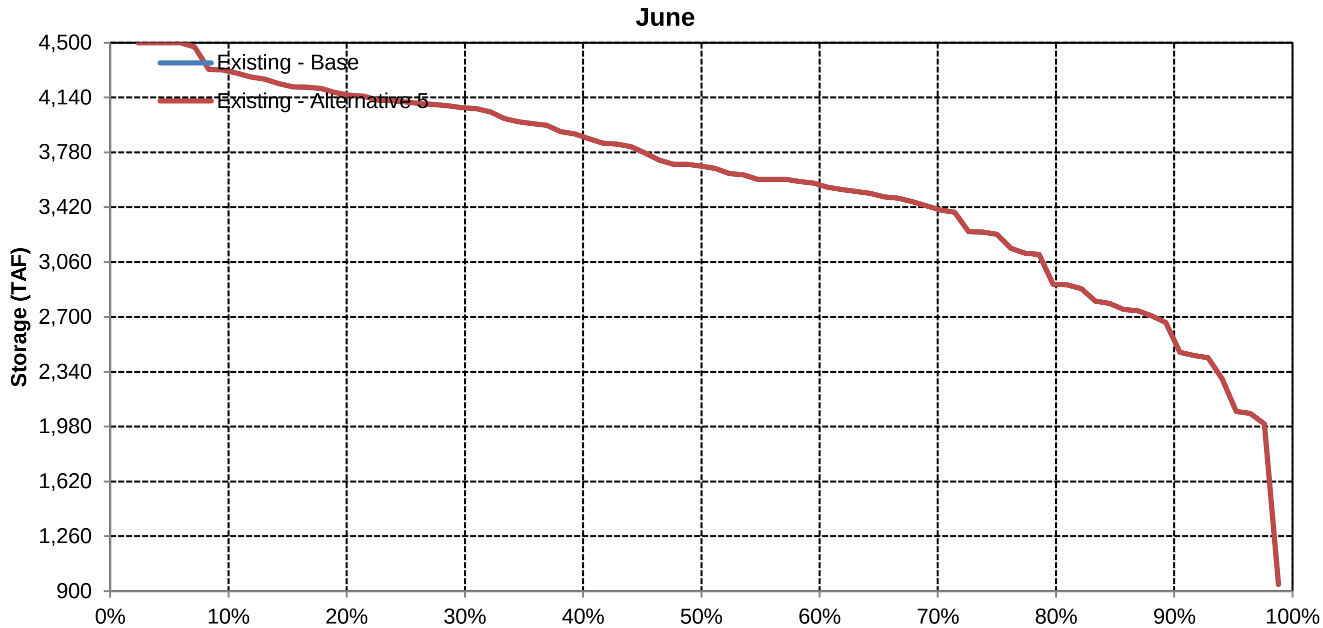


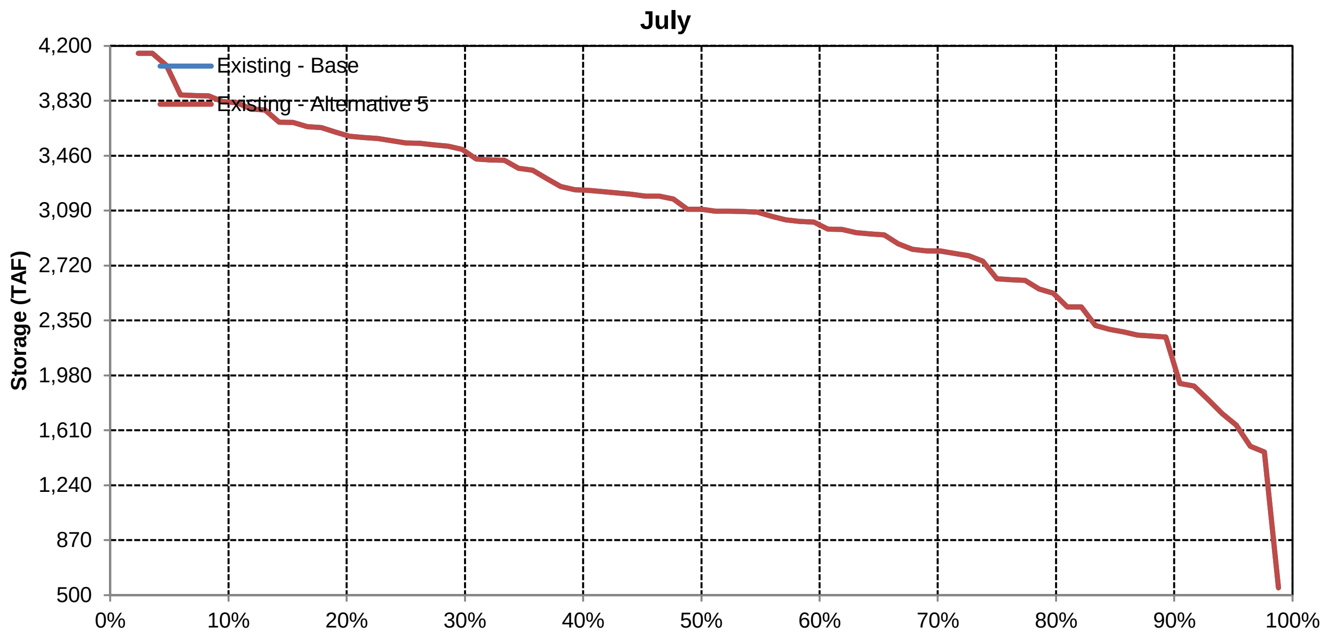
Shasta Reservoir Storage



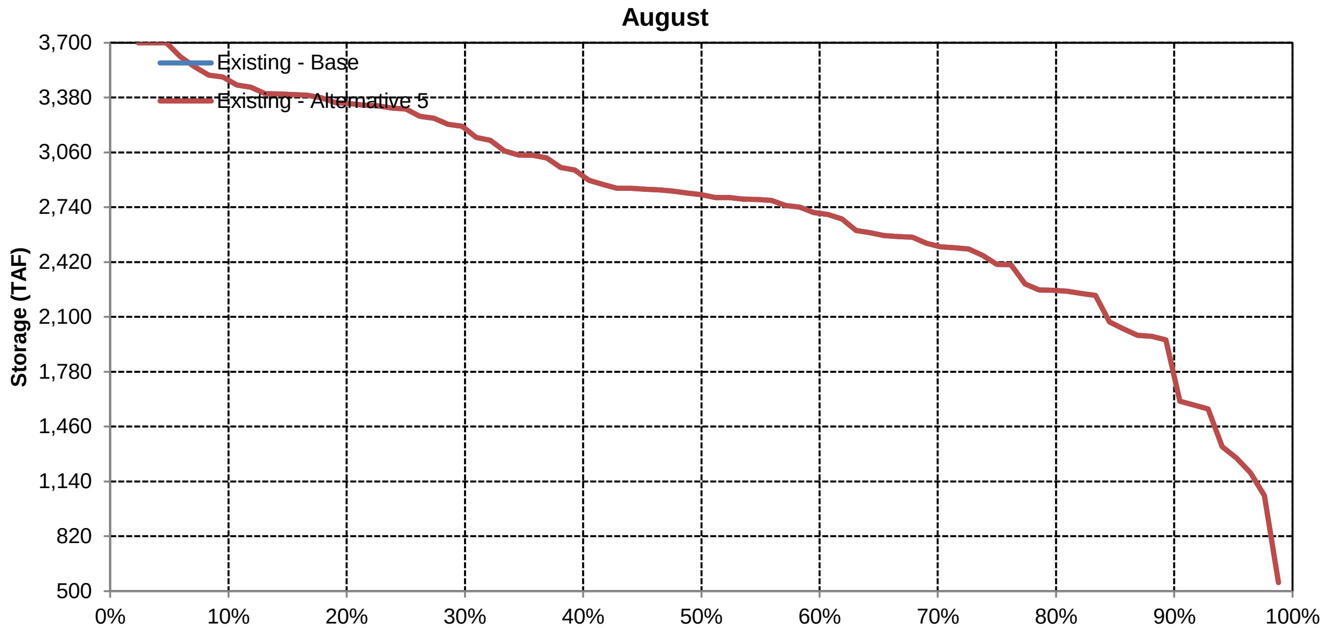


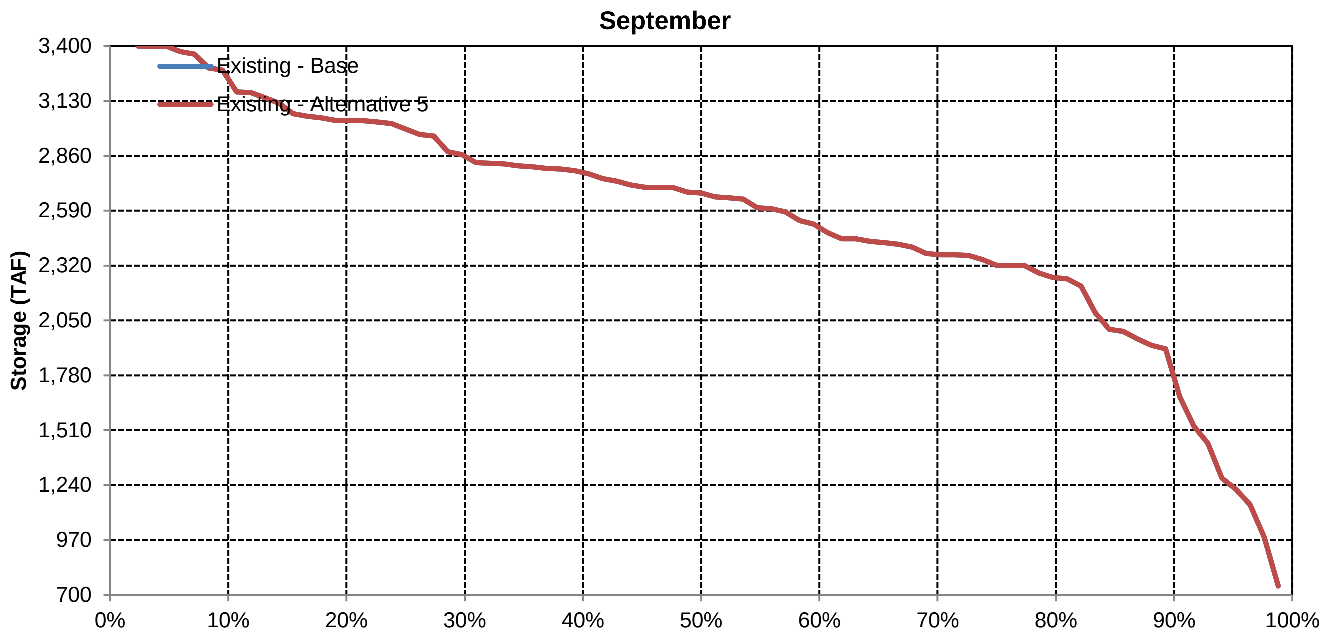
Shasta Reservoir Storage





Shasta Reservoir Storage





Long-Term and Water Year-Type Average of Oroville Reservoir Under Existing - Base and Existing - Alternative 5

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
						Long-Term						
Full Simulation Period												
Existing - Base	1,375	1,426	1,653	1,978	2,289	2,521	2,733	2,764	2,570	2,055	1,720	1,475
Existing - Alternative 5	1,375	1,426	1,653	1,978	2,289	2,521	2,733	2,764	2,570	2,055	1,720	1,475
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
						Water Year-Types						
Wet												
Existing - Base	1,516	1,714	2,247	2,673	2,864	2,952	3,256	3,383	3,246	2,729	2,371	1,947
Existing - Alternative 5	1,517	1,714	2,247	2,673	2,864	2,952	3,256	3,383	3,246	2,729	2,371	1,947
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal												
Existing - Base	1,465	1,439	1,710	2,291	2,764	2,945	3,251	3,314	3,133	2,506	2,052	1,703
Existing - Alternative 5	1,465	1,439	1,710	2,291	2,764	2,945	3,251	3,314	3,133	2,506	2,052	1,703
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Existing - Base	1,400	1,431	1,460	1,738	2,132	2,519	2,765	2,772	2,519	1,889	1,450	1,333
Existing - Alternative 5	1,400	1,432	1,461	1,738	2,132	2,519	2,765	2,772	2,519	1,889	1,450	1,333
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry												
Existing - Base	1,217	1,186	1,283	1,463	1,859	2,221	2,348	2,304	2,058	1,571	1,315	1,149
Existing - Alternative 5	1,217	1,186	1,283	1,463	1,859	2,221	2,348	2,304	2,058	1,571	1,315	1,149
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical												
Existing - Base	1,167	1,125	1,125	1,245	1,411	1,604	1,597	1,528	1,356	1,082	952	901
Existing - Alternative 5	1,167	1,125	1,125	1,245	1,411	1,604	1,597	1,528	1,356	1,082	952	901
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Oroville Reservoir

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	2,048	2,100	2,788	2,852	2,973	3,062	3,347	3,538	3,464	2,932	2,540	2,049
20%	1,690	1,724	2,266	2,788	2,821	2,991	3,279	3,429	3,319	2,720	2,274	1,870
30%	1,557	1,571	1,864	2,609	2,788	2,938	3,234	3,313	3,103	2,478	2,087	1,726
40%	1,418	1,455	1,626	2,184	2,788	2,817	3,162	3,202	2,948	2,271	1,793	1,522
50%	1,255	1,303	1,474	1,911	2,537	2,788	3,042	2,980	2,730	2,097	1,619	1,391
60%	1,195	1,197	1,303	1,674	2,093	2,588	2,813	2,722	2,447	1,842	1,446	1,289
70%	1,027	1,088	1,226	1,470	1,932	2,306	2,344	2,503	2,236	1,596	1,366	1,196
80%	998	1,019	1,128	1,352	1,643	2,058	2,129	2,080	1,885	1,434	1,135	1,012
90%	885	956	992	1,085	1,275	1,582	1,648	1,551	1,356	1,036	898	852
Long Term												
Full Simulation Period	1,375	1,426	1,653	1,978	2,289	2,521	2,733	2,764	2,570	2,055	1,720	1,475
Water Year Types												
Wet	1,516	1,714	2,247	2,673	2,864	2,952	3,256	3,383	3,246	2,729	2,371	1,947
Above Normal	1,465	1,439	1,710	2,291	2,764	2,945	3,251	3,314	3,133	2,506	2,052	1,703
Below Normal	1,400	1,431	1,460	1,738	2,132	2,519	2,765	2,772	2,519	1,889	1,450	1,333
Dry	1,217	1,186	1,283	1,463	1,859	2,221	2,348	2,304	2,058	1,571	1,315	1,149
Critical	1,167	1,125	1,125	1,245	1,411	1,604	1,597	1,528	1,356	1,082	952	901

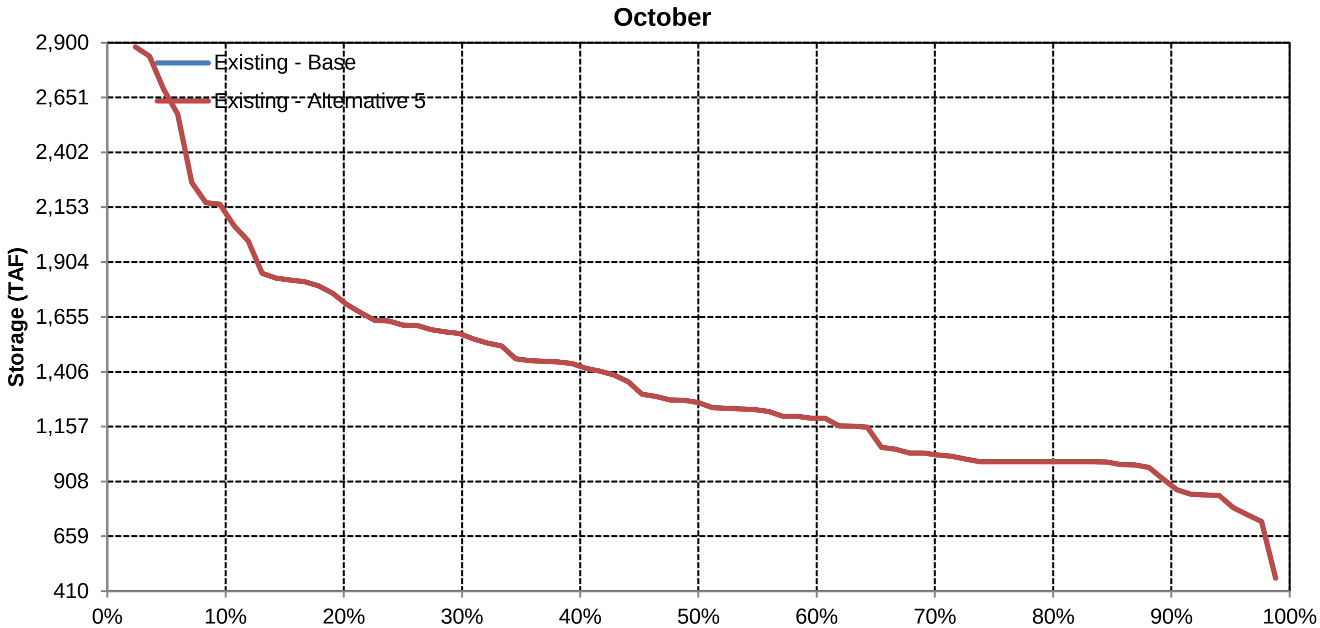
Existing - Alternative 5

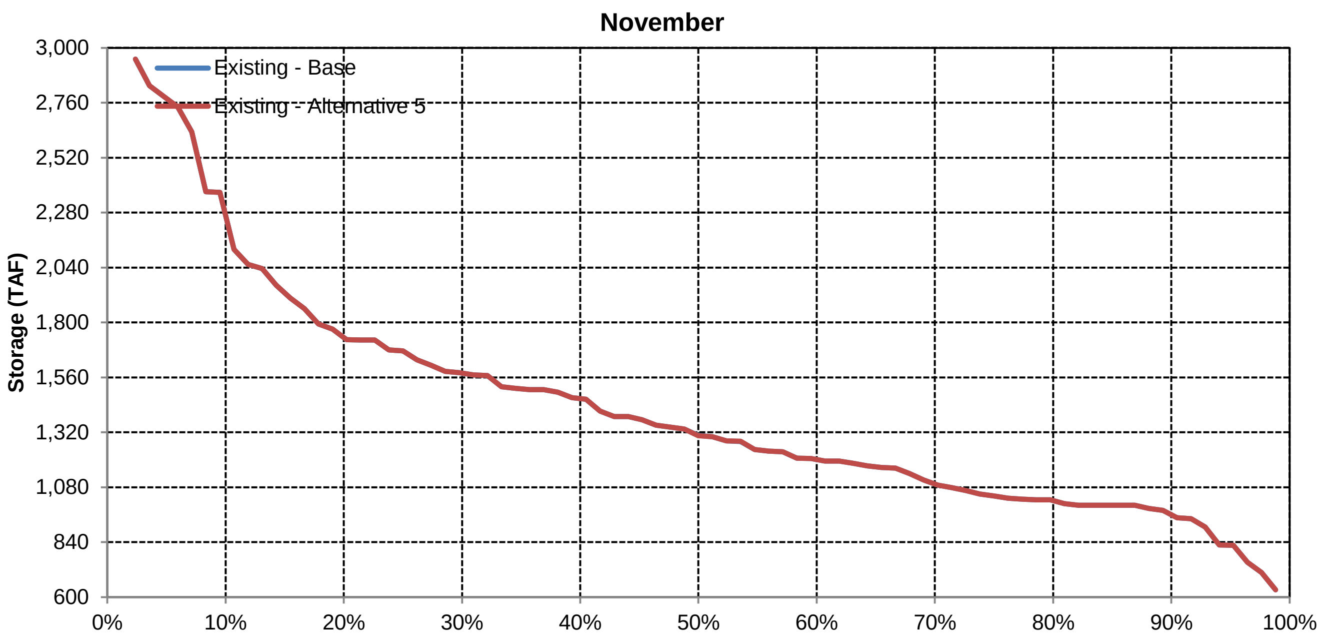
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	2,048	2,100	2,788	2,852	2,973	3,062	3,347	3,538	3,464	2,932	2,540	2,049
20%	1,690	1,724	2,266	2,788	2,821	2,991	3,279	3,429	3,319	2,720	2,274	1,870
30%	1,557	1,571	1,864	2,609	2,788	2,938	3,234	3,313	3,103	2,478	2,087	1,726
40%	1,418	1,455	1,626	2,184	2,788	2,817	3,162	3,202	2,948	2,271	1,793	1,522
50%	1,255	1,303	1,473	1,912	2,537	2,788	3,042	2,980	2,730	2,097	1,619	1,391
60%	1,195	1,197	1,303	1,674	2,093	2,588	2,813	2,722	2,447	1,842	1,446	1,289
70%	1,027	1,088	1,226	1,470	1,932	2,306	2,344	2,503	2,236	1,596	1,366	1,196
80%	998	1,019	1,128	1,352	1,643	2,058	2,129	2,080	1,885	1,434	1,135	1,012
90%	885	956	992	1,085	1,275	1,582	1,648	1,551	1,356	1,036	898	852
Long Term												
Full Simulation Period	1,375	1,426	1,653	1,978	2,289	2,521	2,733	2,764	2,570	2,055	1,720	1,475
Water Year Types												
Wet	1,517	1,714	2,247	2,673	2,864	2,952	3,256	3,383	3,246	2,729	2,371	1,947
Above Normal	1,465	1,439	1,710	2,291	2,764	2,945	3,251	3,314	3,133	2,506	2,052	1,703
Below Normal	1,400	1,432	1,461	1,738	2,132	2,519	2,765	2,772	2,519	1,889	1,450	1,333
Dry	1,217	1,186	1,283	1,463	1,859	2,221	2,348	2,304	2,058	1,571	1,315	1,149
Critical	1,167	1,125	1,125	1,245	1,411	1,604	1,597	1,528	1,356	1,082	952	901

Existing - Alternative 5 Minus Existing - Base

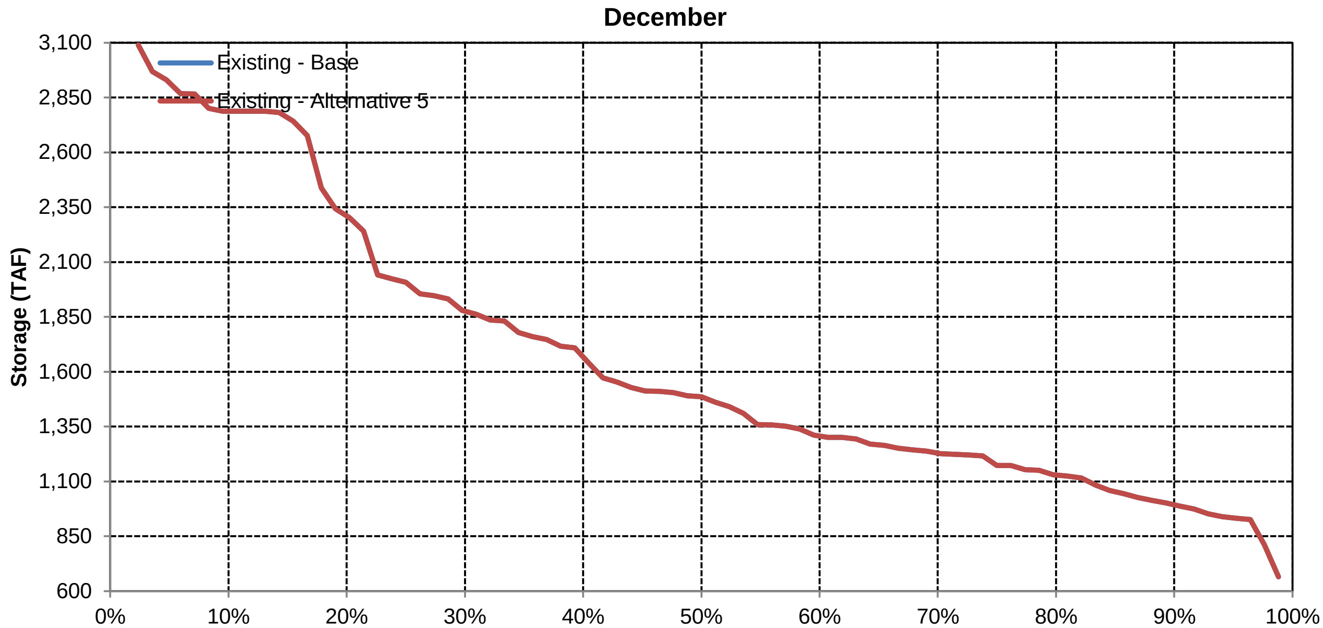
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types												
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

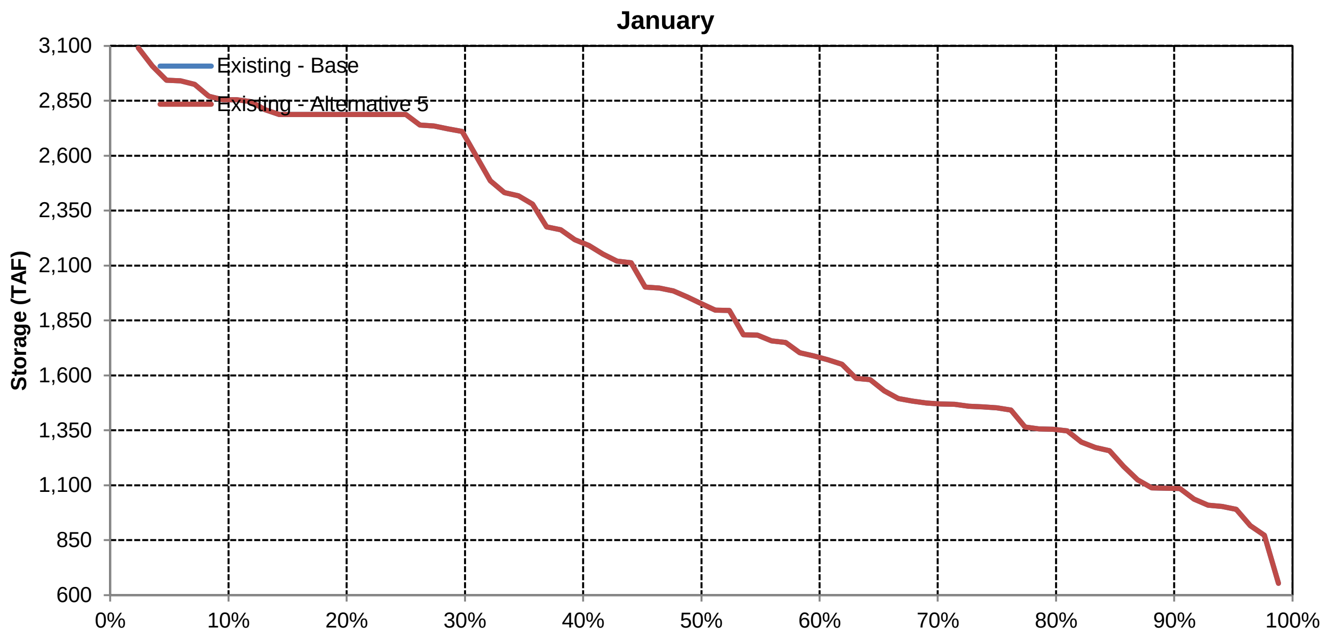
Oroville Reservoir



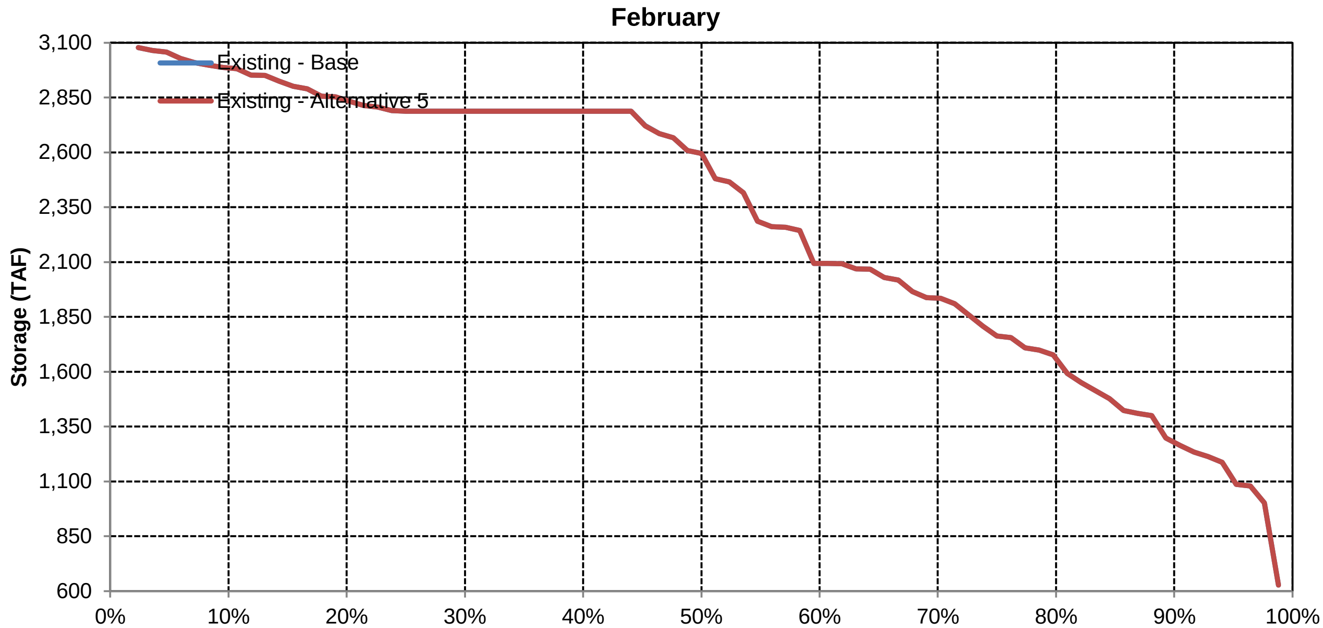


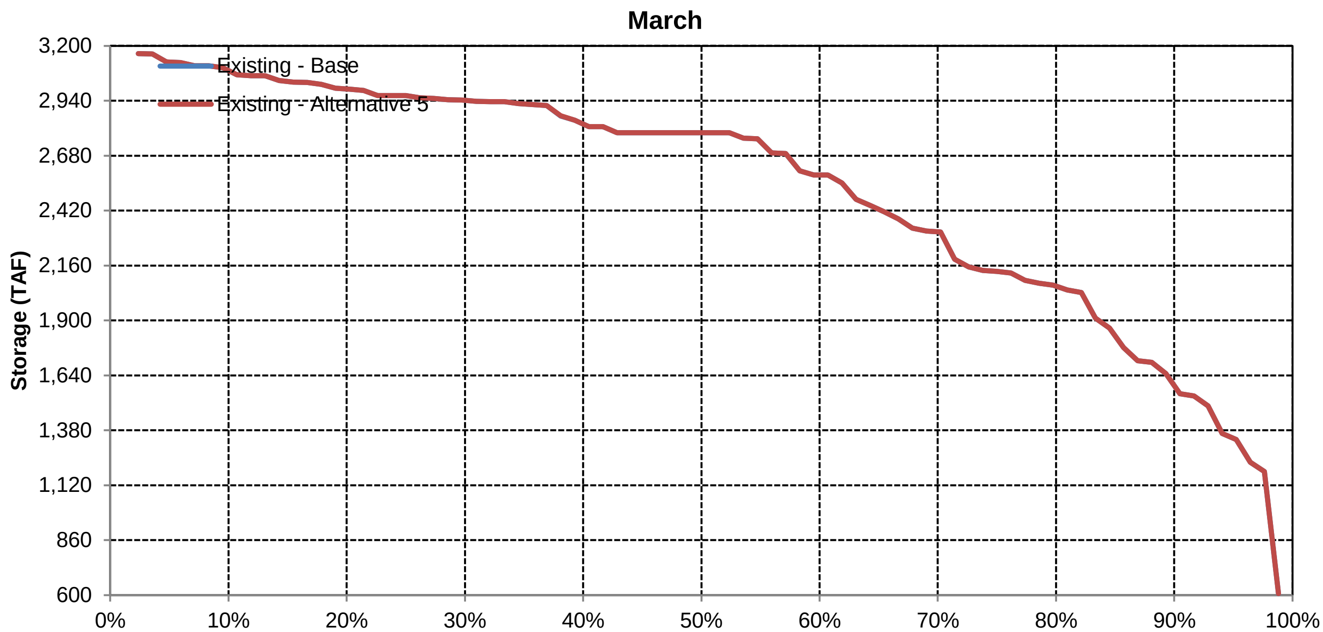
Oroville Reservoir



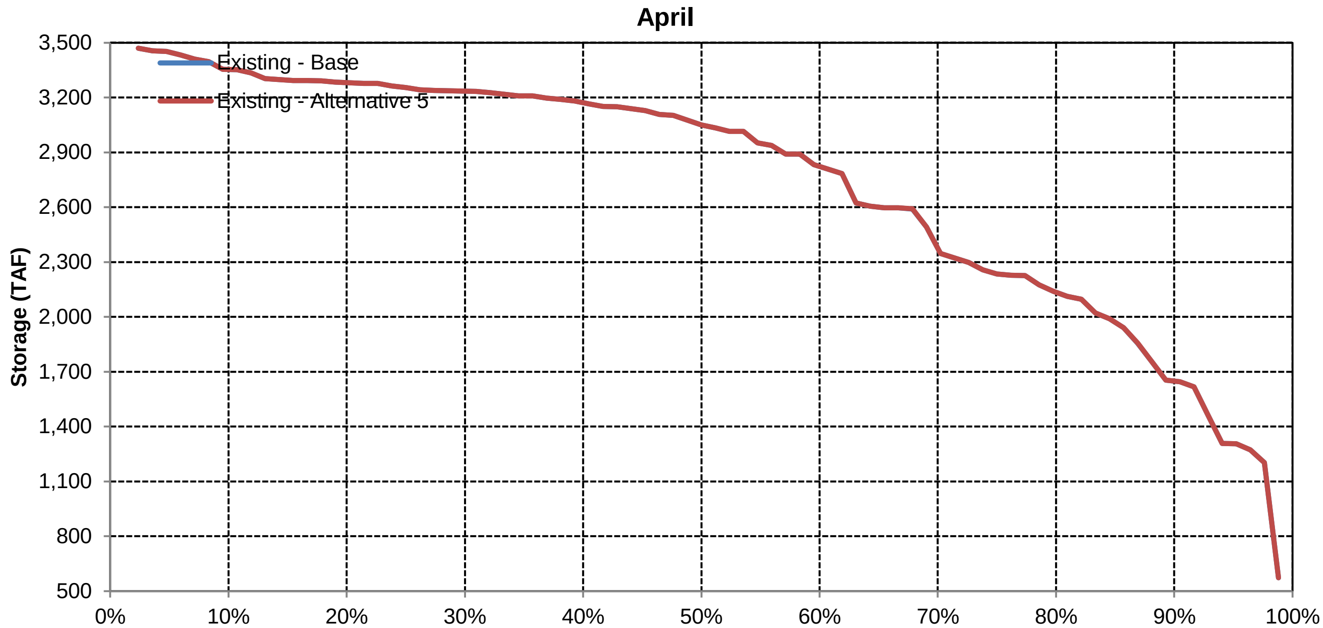


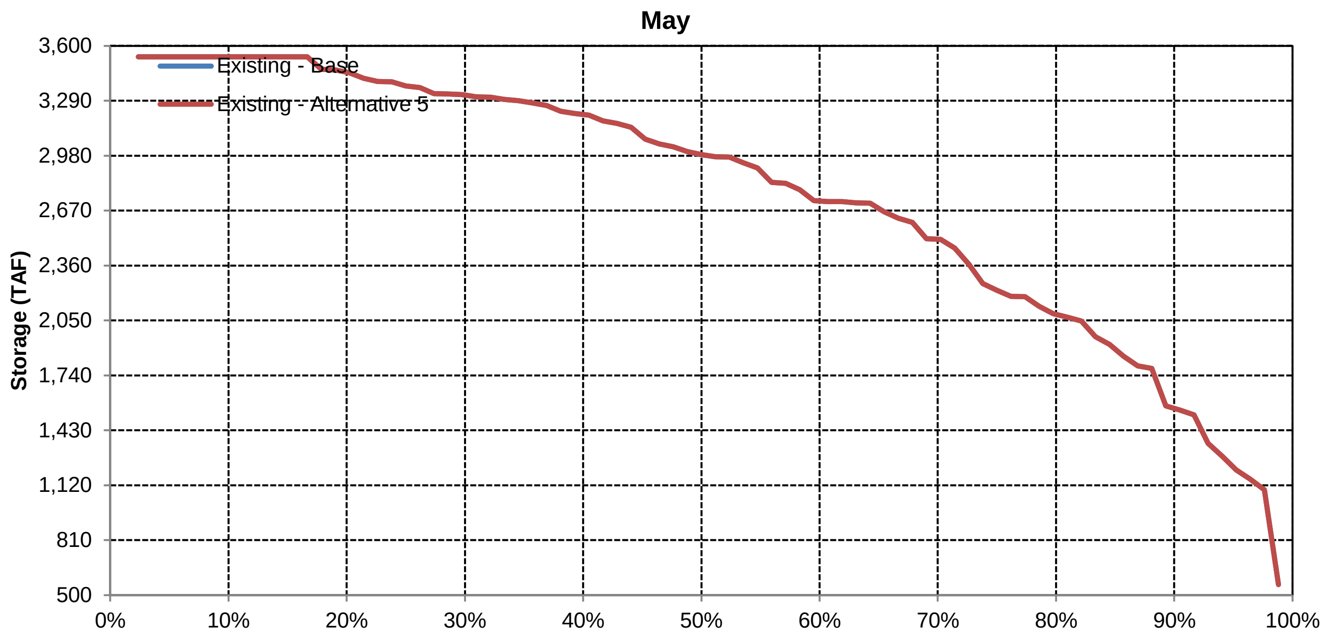
Oroville Reservoir



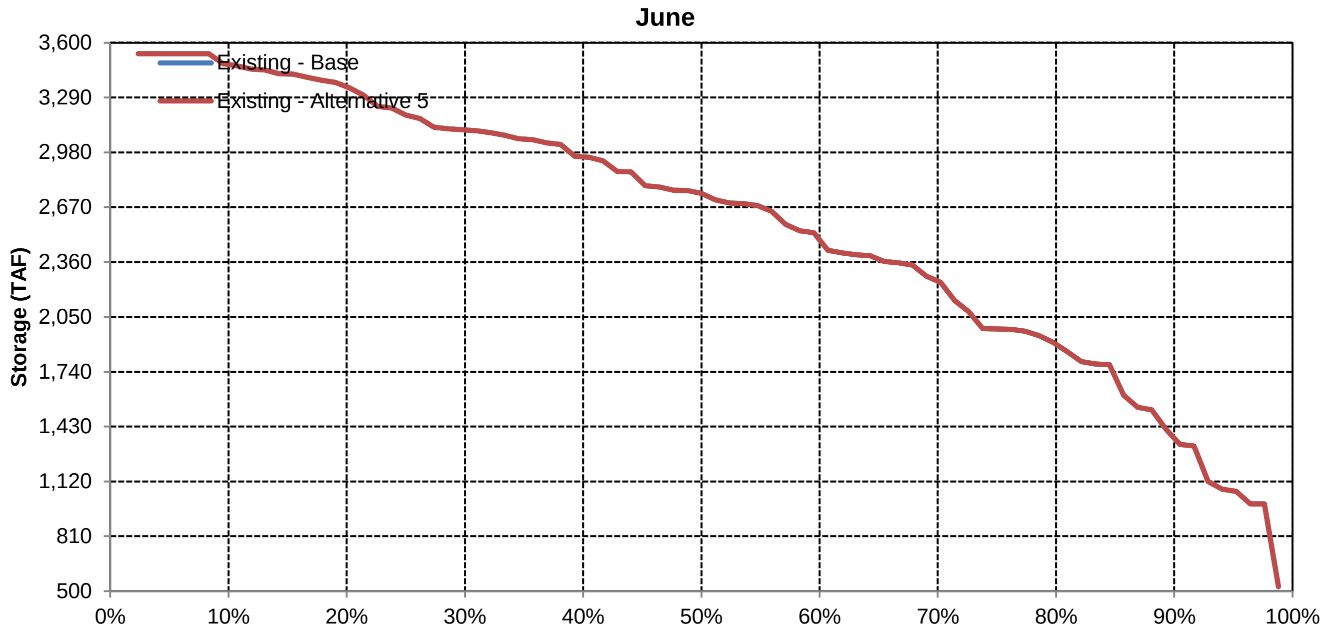


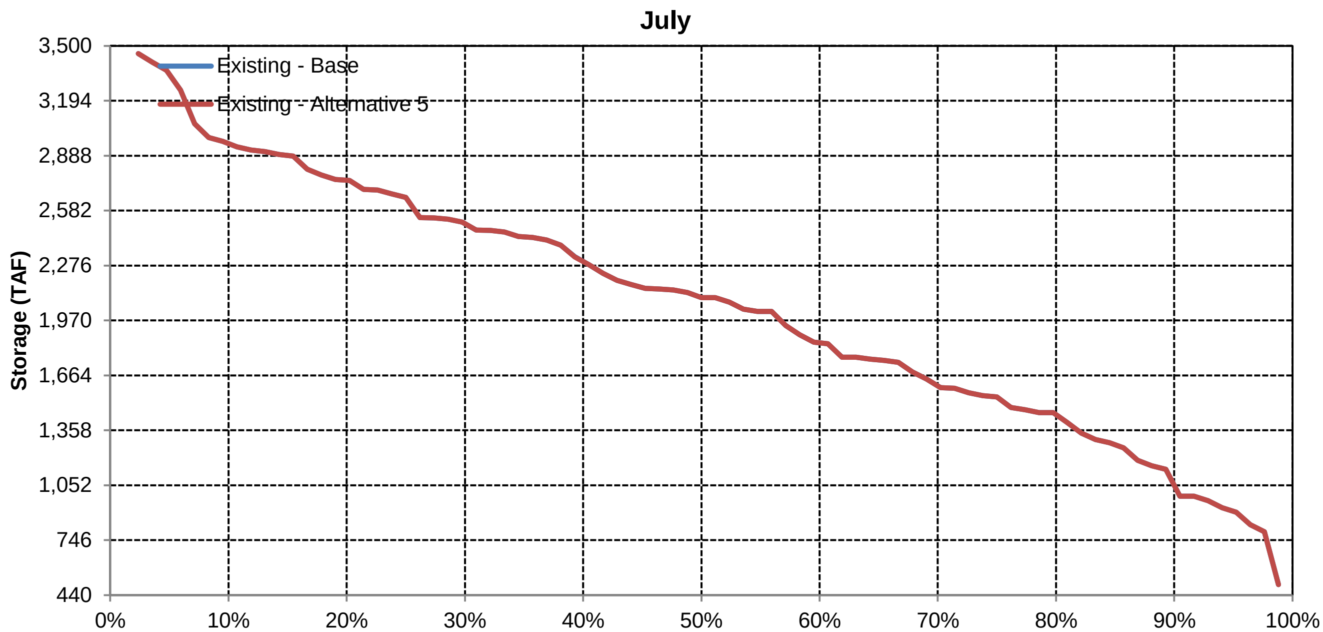
Oroville Reservoir



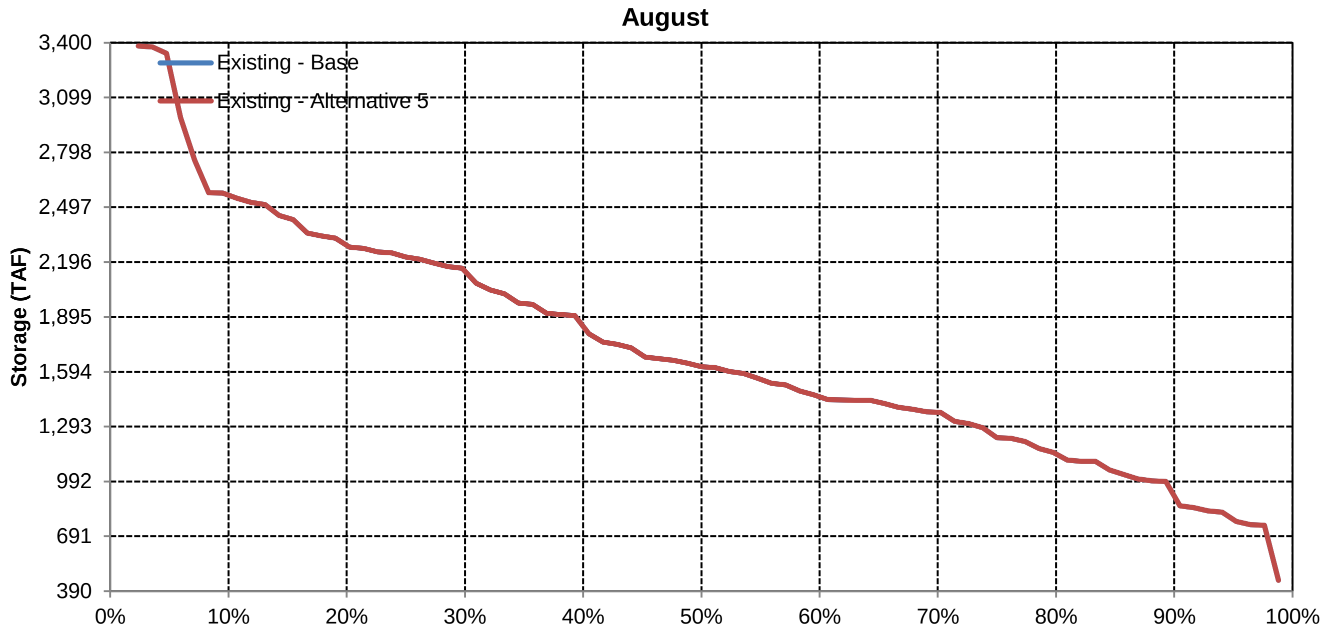


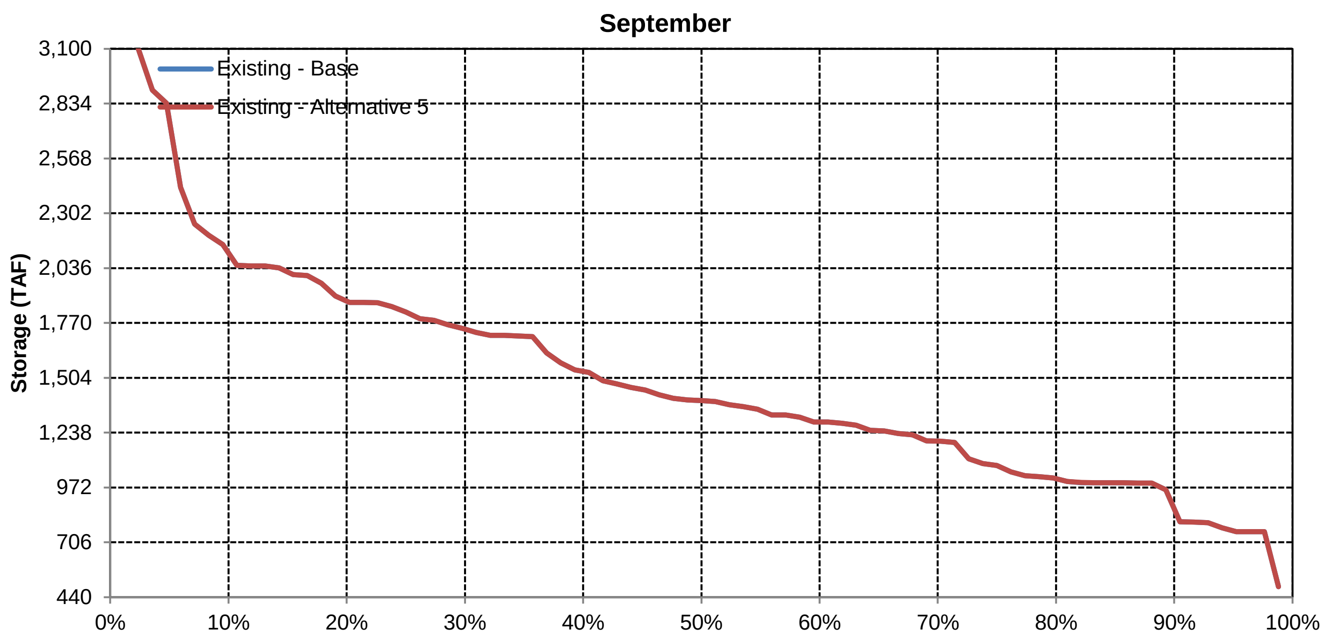
Oroville Reservoir





Oroville Reservoir





Long-Term and Water Year-Type Average of Folsom Reservoir Under Existing - Base and Existing - Alternative 5

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
						Long-Term						
Full Simulation Period												
Existing - Base	391	398	446	474	495	597	712	766	699	522	477	427
Existing - Alternative 5	391	398	446	474	495	597	712	766	699	522	477	427
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
						Water Year-Types						
Wet												
Existing - Base	405	431	511	520	508	626	766	897	851	676	622	507
Existing - Alternative 5	405	431	511	520	508	626	766	897	851	676	622	507
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal												
Existing - Base	406	399	470	532	548	643	777	842	775	540	504	455
Existing - Alternative 5	406	399	470	532	548	643	777	842	775	540	504	455
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Existing - Base	397	414	447	500	536	627	774	792	716	480	445	433
Existing - Alternative 5	397	414	447	500	536	627	774	792	716	480	445	433
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry												
Existing - Base	365	367	398	418	479	593	688	698	596	438	387	376
Existing - Alternative 5	365	367	398	418	479	593	688	698	596	438	387	376
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical												
Existing - Base	372	347	345	357	380	453	480	471	418	351	313	291
Existing - Alternative 5	372	347	345	357	380	453	480	471	418	351	313	291
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Folsom Reservoir

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	590	560	567	567	567	662	792	967	967	815	752	618
20%	495	499	567	567	567	658	792	967	877	709	667	545
30%	433	453	565	566	565	656	792	903	826	590	536	487
40%	399	419	525	557	558	651	792	803	723	530	478	439
50%	358	395	444	544	552	641	792	769	703	474	425	401
60%	339	354	413	474	518	625	758	752	677	438	396	382
70%	320	335	363	427	458	610	725	727	608	405	380	358
80%	295	300	323	365	416	566	609	626	523	374	338	318
90%	261	273	294	284	323	460	479	484	429	331	306	273
Long Term												
Full Simulation Period	391	398	446	474	495	597	712	766	699	522	477	427
Water Year Types												
Wet	405	431	511	520	508	626	766	897	851	676	622	507
Above Normal	406	399	470	532	548	643	777	842	775	540	504	455
Below Normal	397	414	447	500	536	627	774	792	716	480	445	433
Dry	365	367	398	418	479	593	688	698	596	438	387	376
Critical	372	347	345	357	380	453	480	471	418	351	313	291

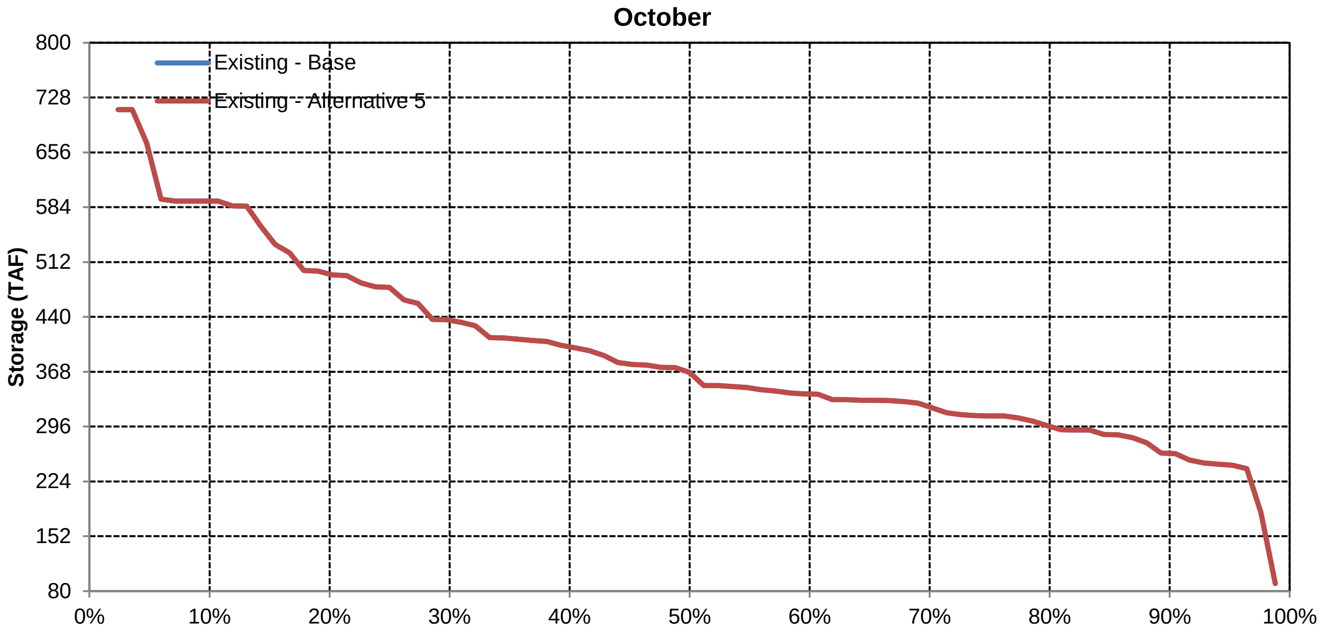
Existing - Alternative 5

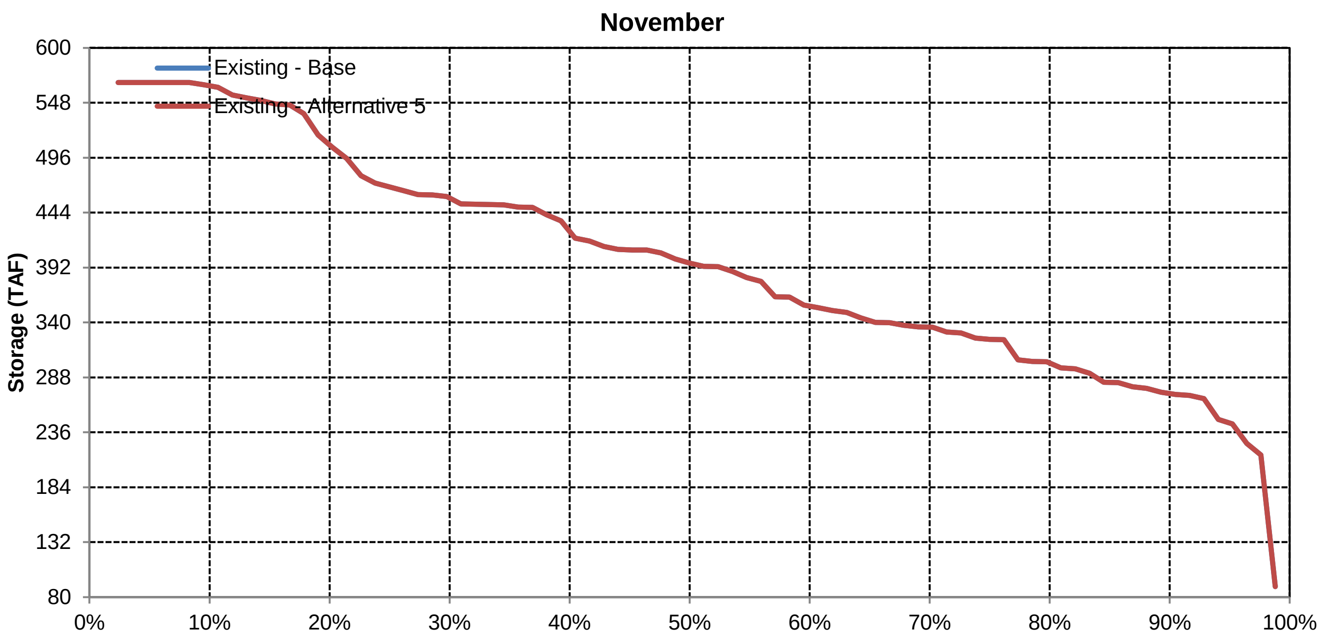
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	590	560	567	567	567	662	792	967	967	815	752	618
20%	495	499	567	567	567	658	792	967	877	709	667	545
30%	433	453	565	566	565	656	792	903	826	590	536	487
40%	399	419	525	557	558	651	792	803	723	530	478	439
50%	358	395	444	544	552	641	792	769	703	474	425	401
60%	339	354	413	474	518	625	758	752	677	438	396	382
70%	320	335	363	427	458	610	725	727	608	405	380	358
80%	295	300	323	365	416	566	609	626	523	374	338	318
90%	261	273	294	284	323	460	479	484	429	331	306	273
Long Term												
Full Simulation Period	391	398	446	474	495	597	712	766	699	522	477	427
Water Year Types												
Wet	405	431	511	520	508	626	766	897	851	676	622	507
Above Normal	406	399	470	532	548	643	777	842	775	540	504	455
Below Normal	397	414	447	500	536	627	774	792	716	480	445	433
Dry	365	367	398	418	479	593	688	698	596	438	387	376
Critical	372	347	345	357	380	453	480	471	418	351	313	291

Existing - Alternative 5 Minus Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types												
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

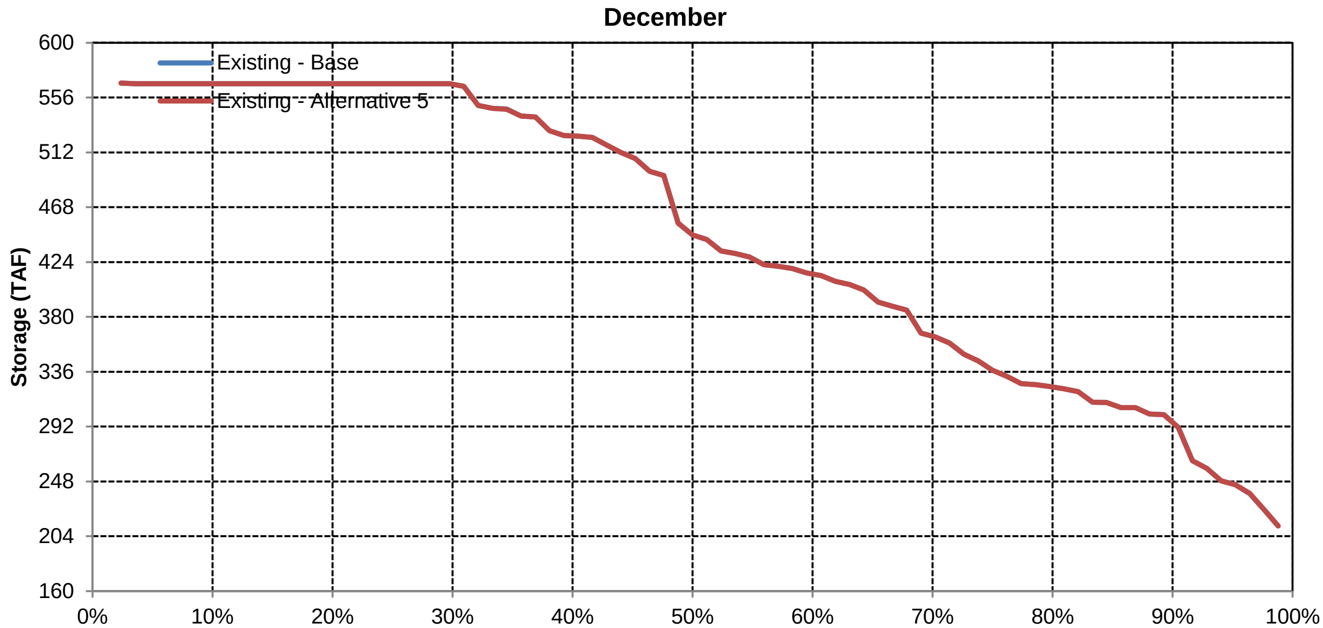
Folsom Reservoir

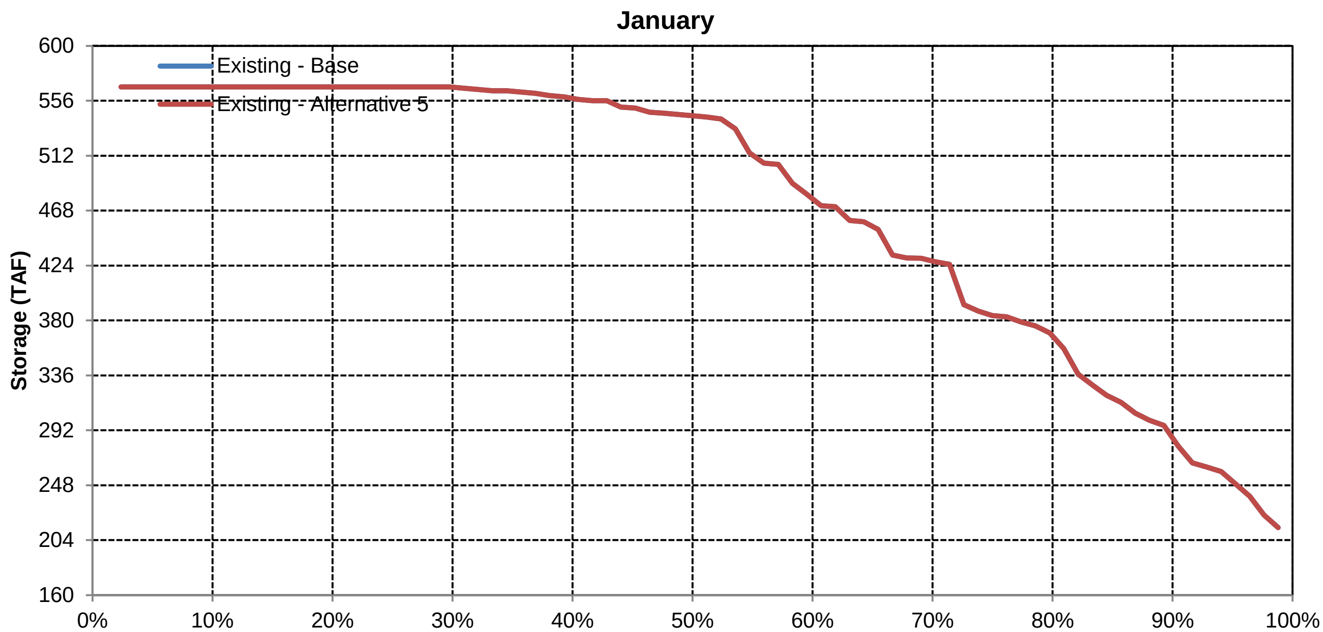




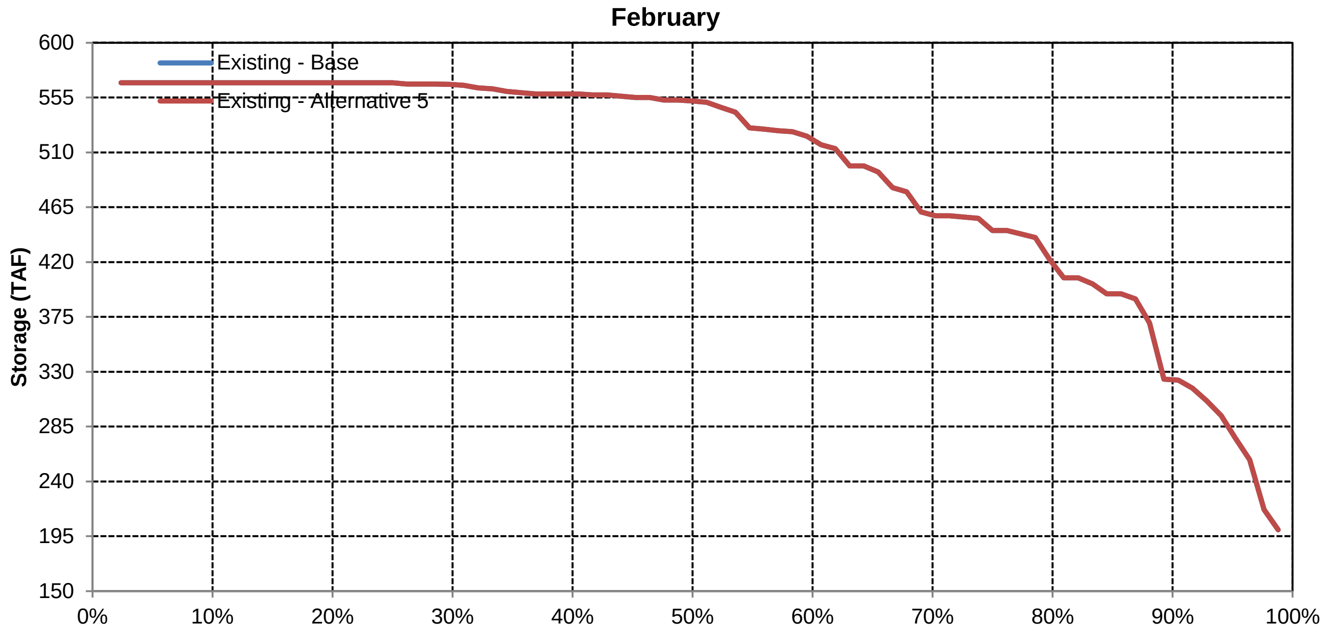
S8

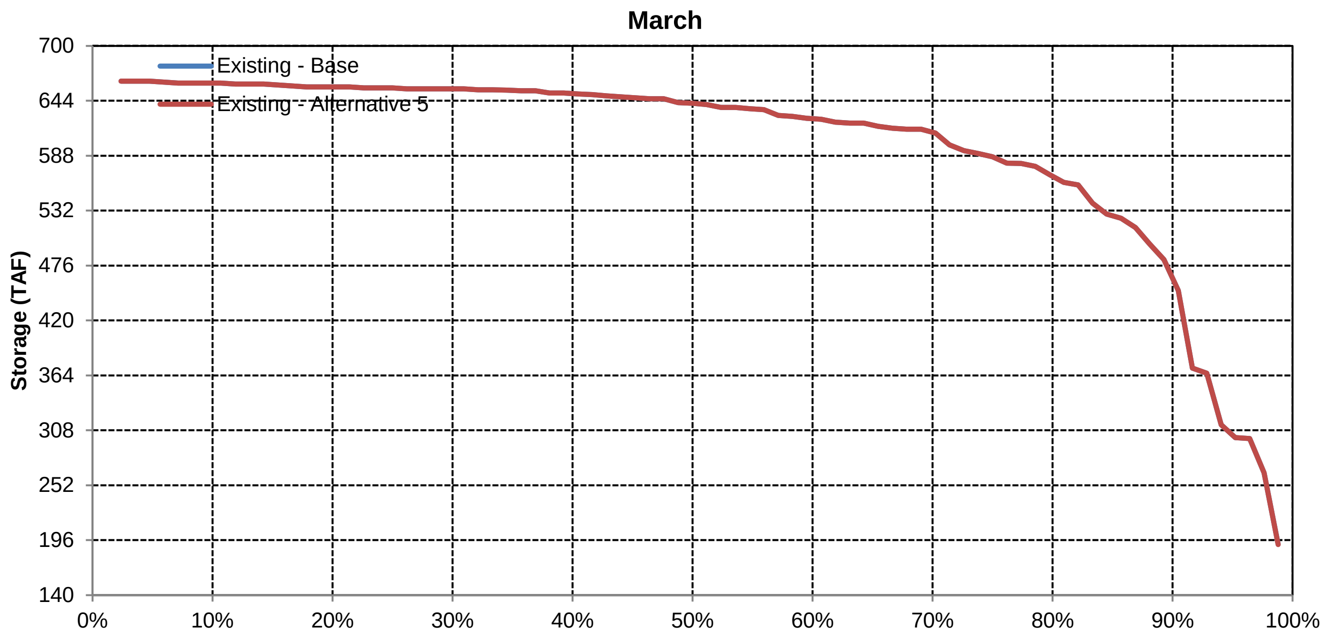
Folsom Reservoir



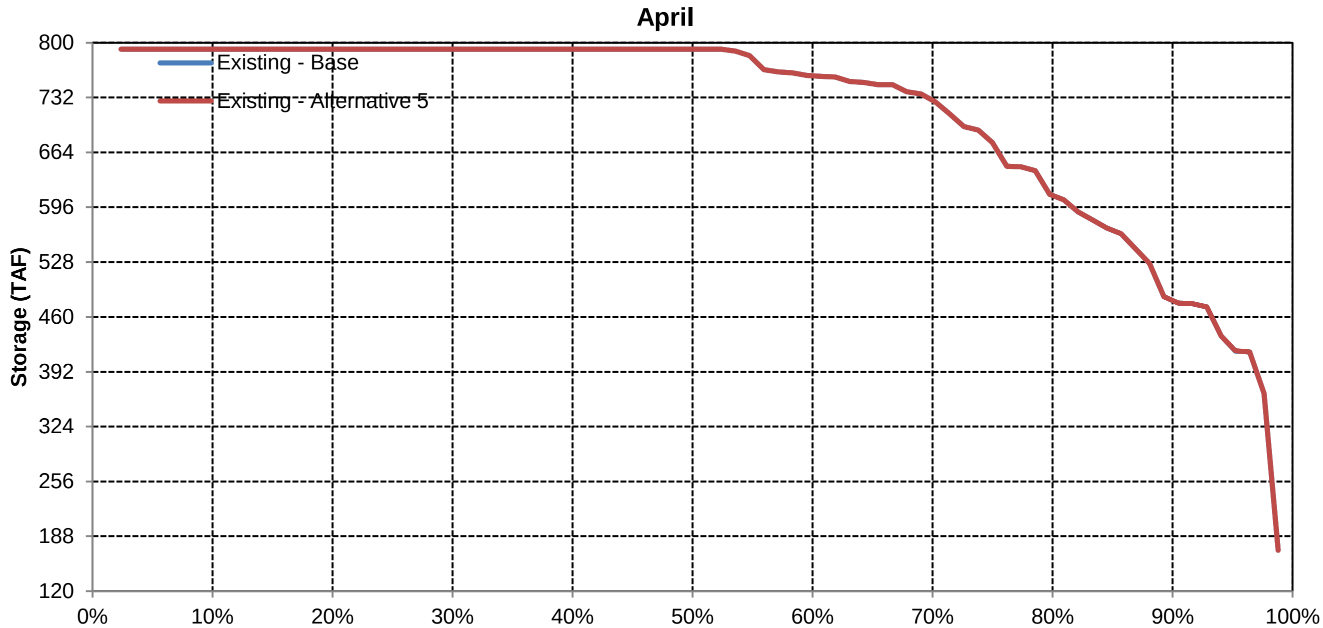


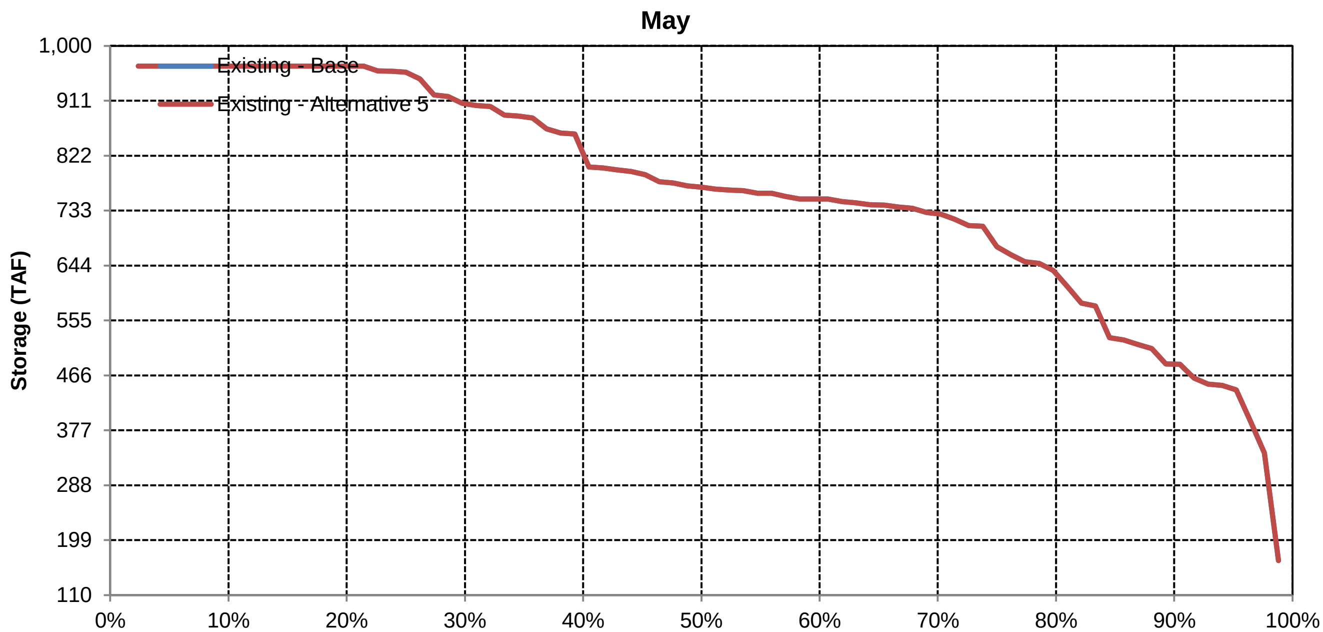
Folsom Reservoir



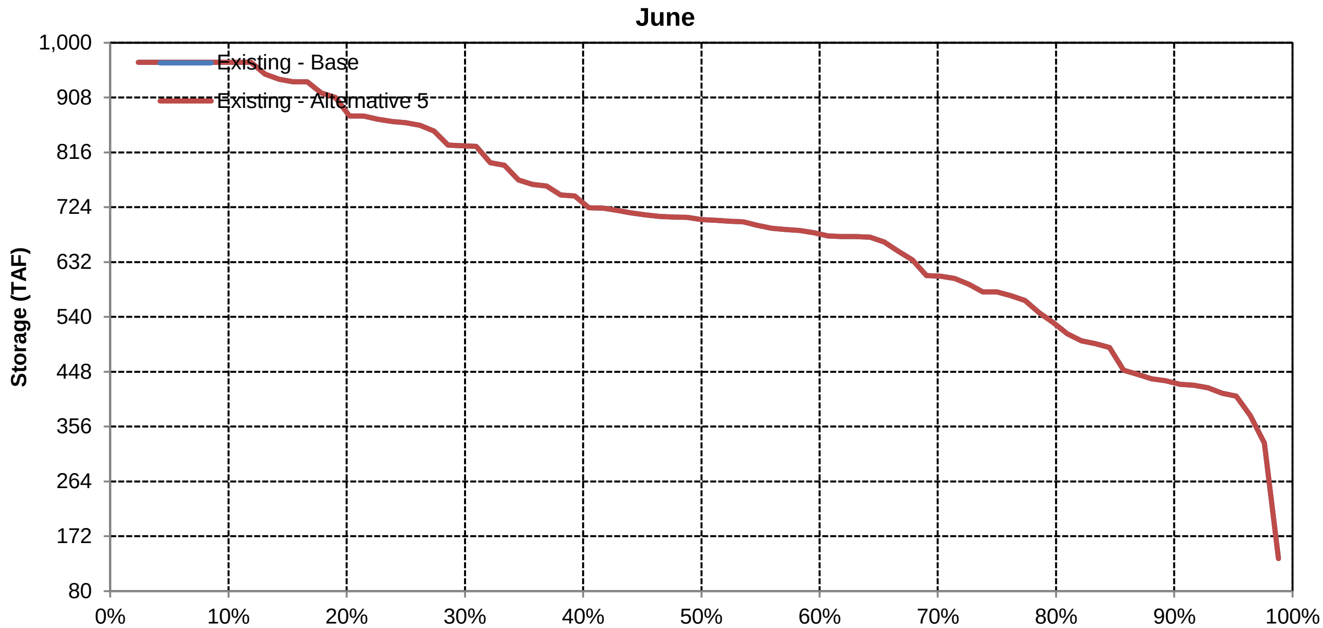


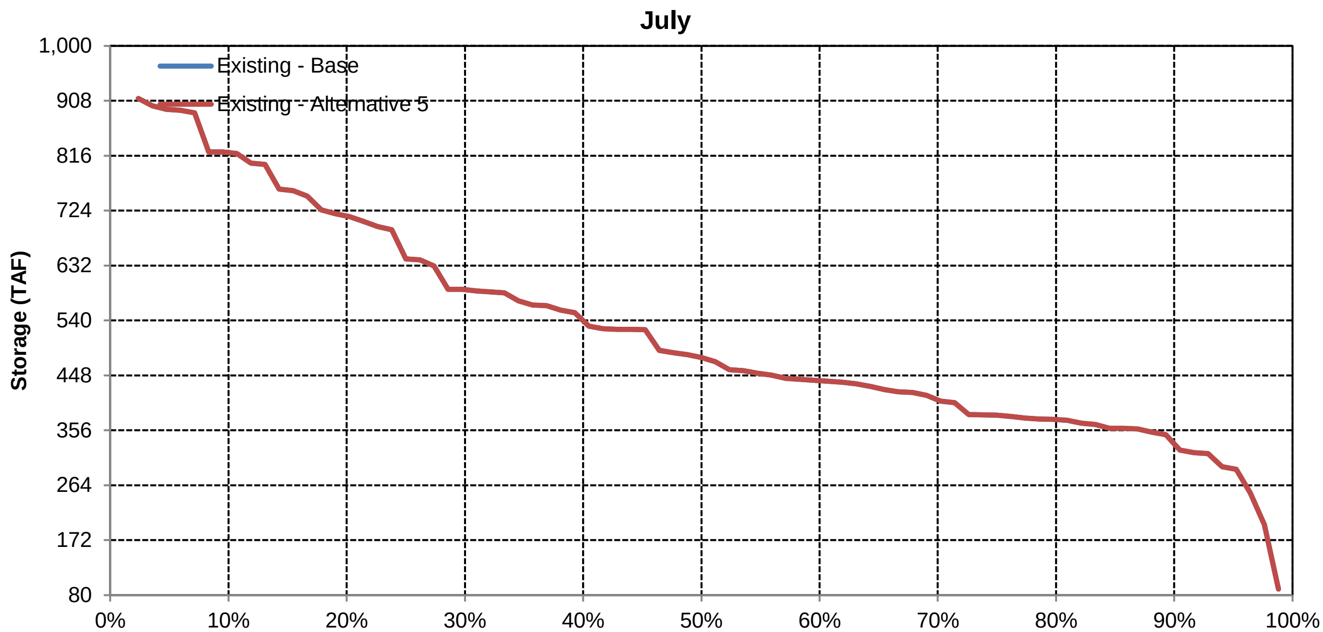
Folsom Reservoir



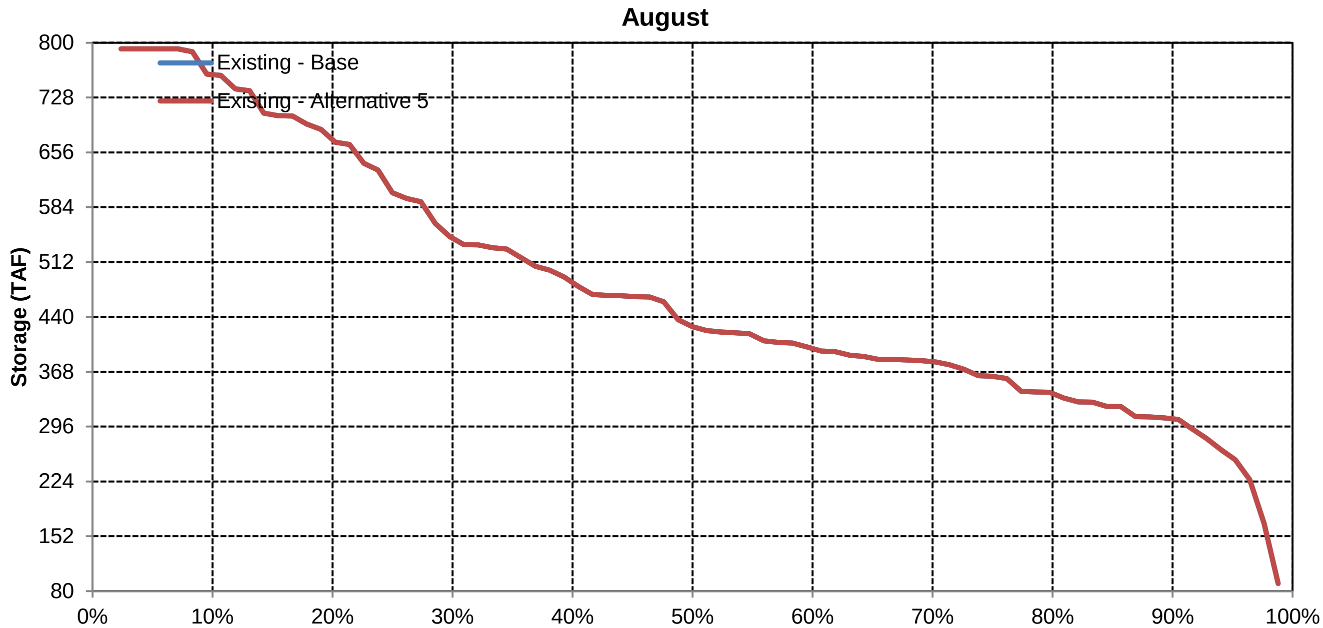


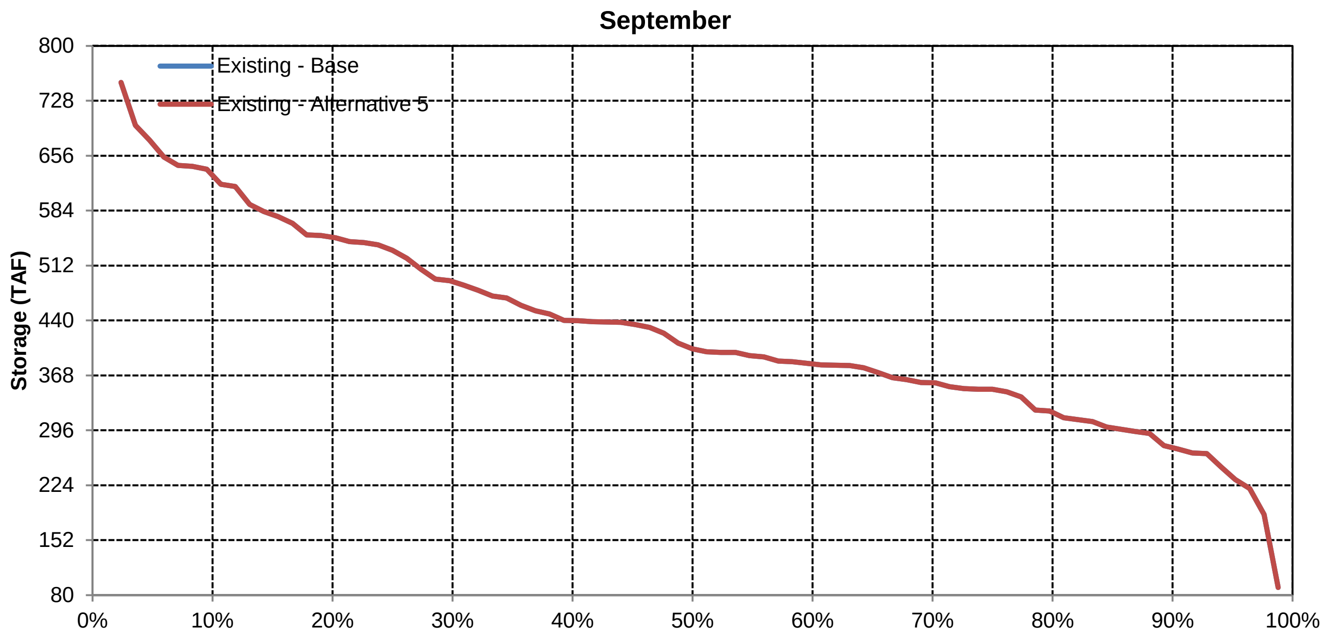
Folsom Reservoir





Folsom Reservoir





Long-Term and Water Year-Type Average of CVP San Luis Reservoir Under Existing - Base and Existing - Alternative 5

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
						Long-Term						
Full Simulation Period												
Existing - Base	217	330	493	616	709	777	712	577	404	261	171	178
Existing - Alternative 5	217	330	493	616	709	777	712	577	404	261	171	178
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
						Water Year-Types						
Wet												
Existing - Base	230	346	525	677	824	925	859	729	581	362	252	241
Existing - Alternative 5	230	346	525	677	824	925	859	729	581	362	252	241
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal												
Existing - Base	231	375	535	653	766	876	790	630	437	201	133	128
Existing - Alternative 5	231	375	535	653	766	876	790	630	437	201	133	128
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Existing - Base	227	343	526	627	701	758	697	561	373	276	187	214
Existing - Alternative 5	227	343	526	627	701	758	697	561	373	276	187	214
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry												
Existing - Base	183	268	424	532	582	636	573	429	249	184	96	121
Existing - Alternative 5	183	268	424	532	582	636	573	429	249	184	96	121
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical												
Existing - Base	208	316	428	546	591	584	532	427	251	194	118	124
Existing - Alternative 5	208	316	428	546	591	584	532	427	251	194	118	124
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

CVP San Luis Reservoir

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	423	528	671	789	972	972	941	862	717	525	378	377
20%	262	388	570	728	885	972	879	758	581	448	308	244
30%	221	367	550	687	804	930	836	701	507	347	205	200
40%	187	347	513	652	763	871	800	630	435	241	143	141
50%	182	327	490	594	719	825	746	582	379	222	107	127
60%	164	294	464	568	651	722	658	487	303	178	90	113
70%	155	274	431	535	596	657	587	441	267	143	63	99
80%	139	209	360	482	541	593	537	392	207	105	45	90
90%	104	148	277	434	489	530	490	352	155	56	45	65
Long Term												
Full Simulation Period	217	330	493	616	709	777	712	577	404	261	171	178
Water Year Types												
Wet	230	346	525	677	824	925	859	729	581	362	252	241
Above Normal	231	375	535	653	766	876	790	630	437	201	133	128
Below Normal	227	343	526	627	701	758	697	561	373	276	187	214
Dry	183	268	424	532	582	636	573	429	249	184	96	121
Critical	208	316	428	546	591	584	532	427	251	194	118	124

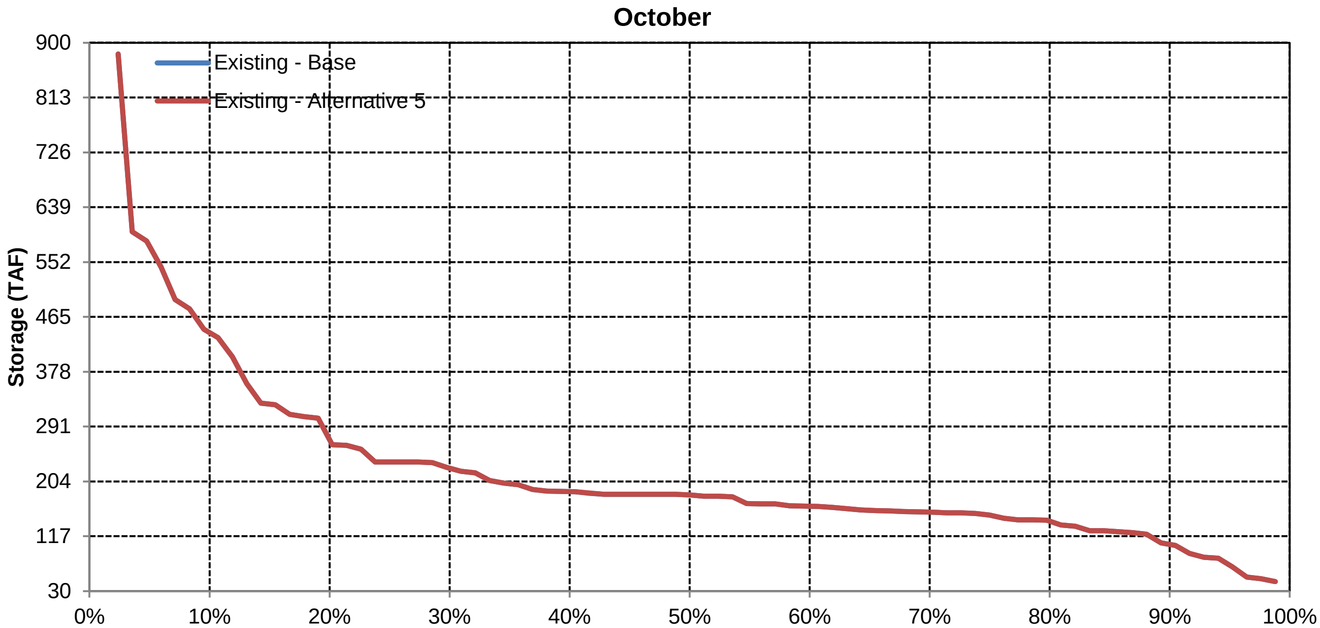
Existing - Alternative 5

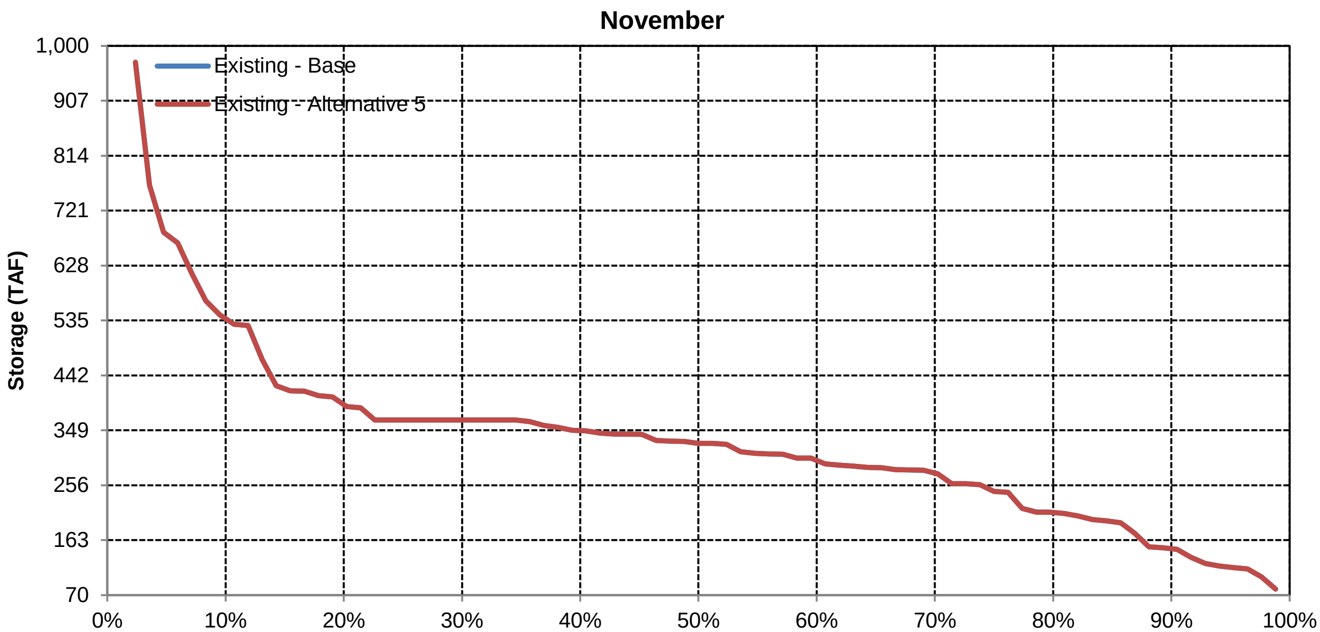
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	423	528	671	789	972	972	941	862	718	525	378	377
20%	262	388	570	728	885	972	879	758	581	448	308	244
30%	221	367	550	687	804	930	836	701	507	347	205	200
40%	187	347	513	652	763	871	800	630	435	241	143	141
50%	182	327	490	594	719	825	746	582	379	222	107	127
60%	164	294	464	568	651	722	658	487	303	178	90	113
70%	155	274	431	535	596	657	587	441	267	143	63	99
80%	139	209	360	482	541	593	537	391	207	105	45	90
90%	104	148	277	434	489	530	490	352	155	56	45	65
Long Term												
Full Simulation Period	217	330	493	616	709	777	712	577	404	261	171	178
Water Year Types												
Wet	230	346	525	677	824	925	859	729	581	362	252	241
Above Normal	231	375	535	653	766	876	790	630	437	201	133	128
Below Normal	227	343	526	627	701	758	697	561	373	276	187	214
Dry	183	268	424	532	582	636	573	429	249	184	96	121
Critical	208	316	428	546	591	584	532	427	251	194	118	124

Existing - Alternative 5 Minus Existing - Base

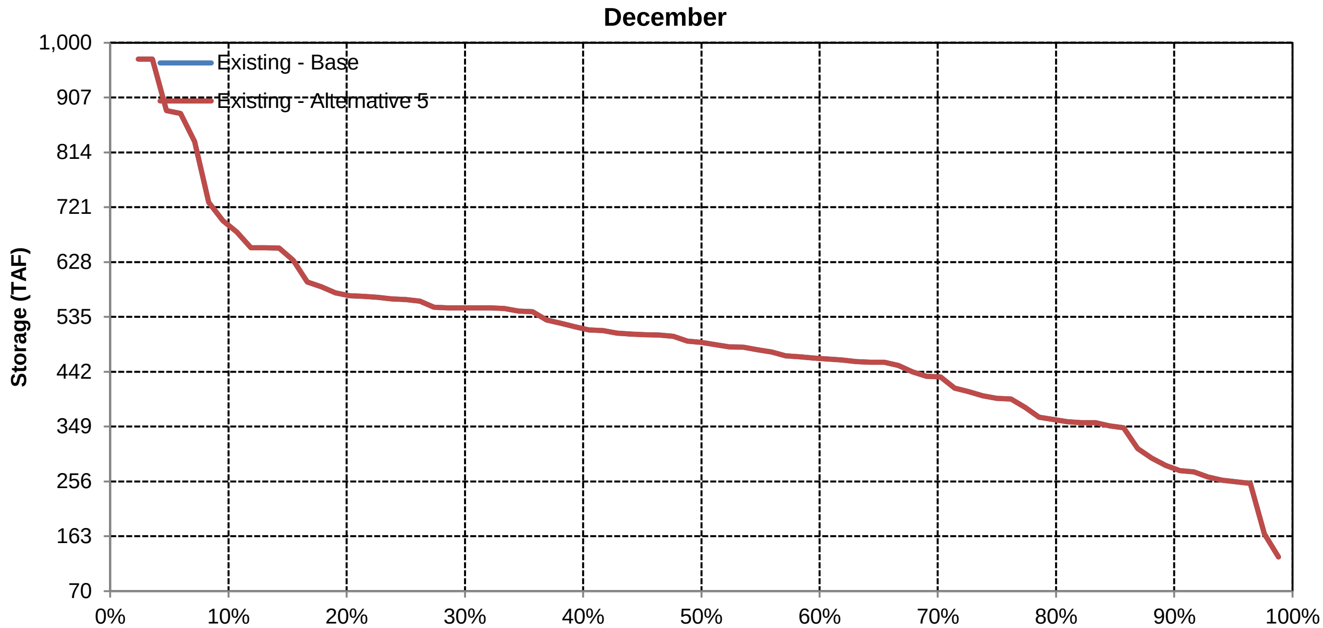
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types												
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

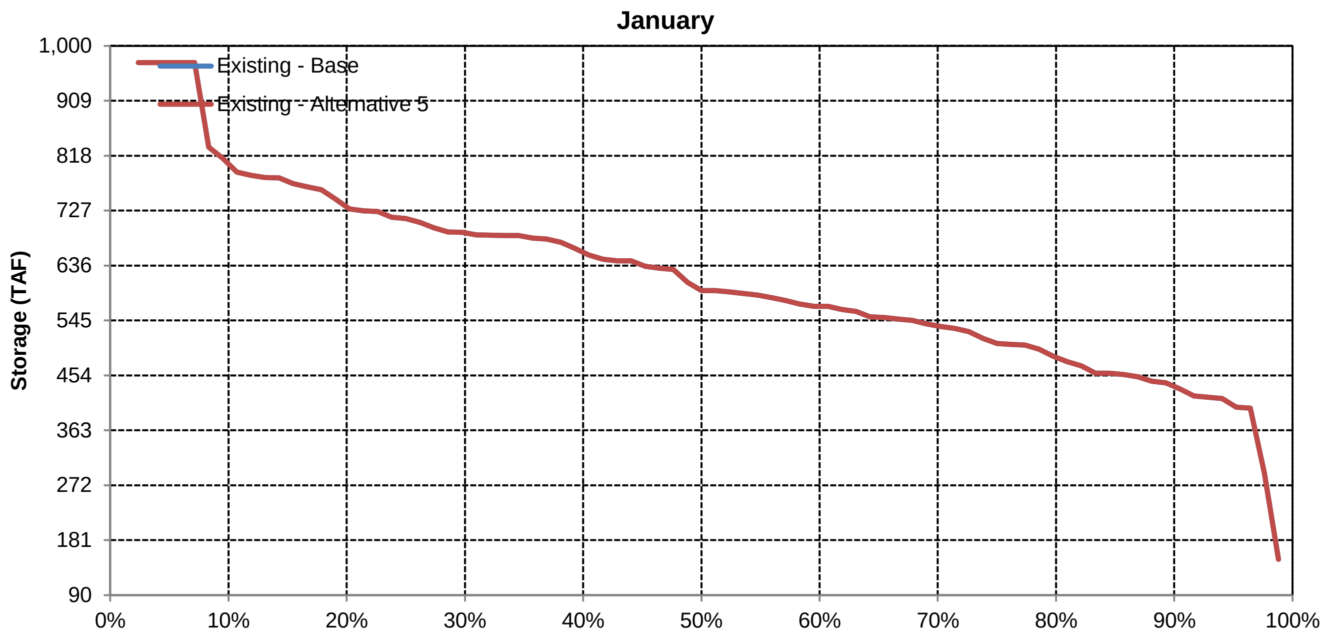
CVP San Luis Reservoir



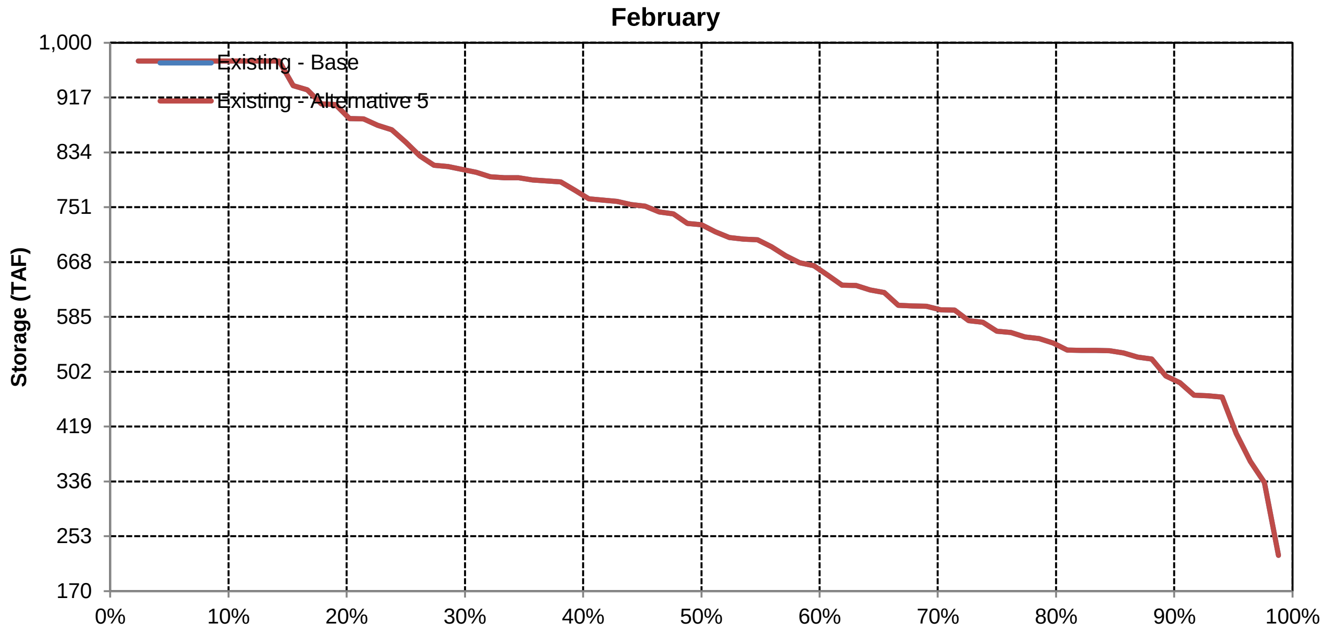


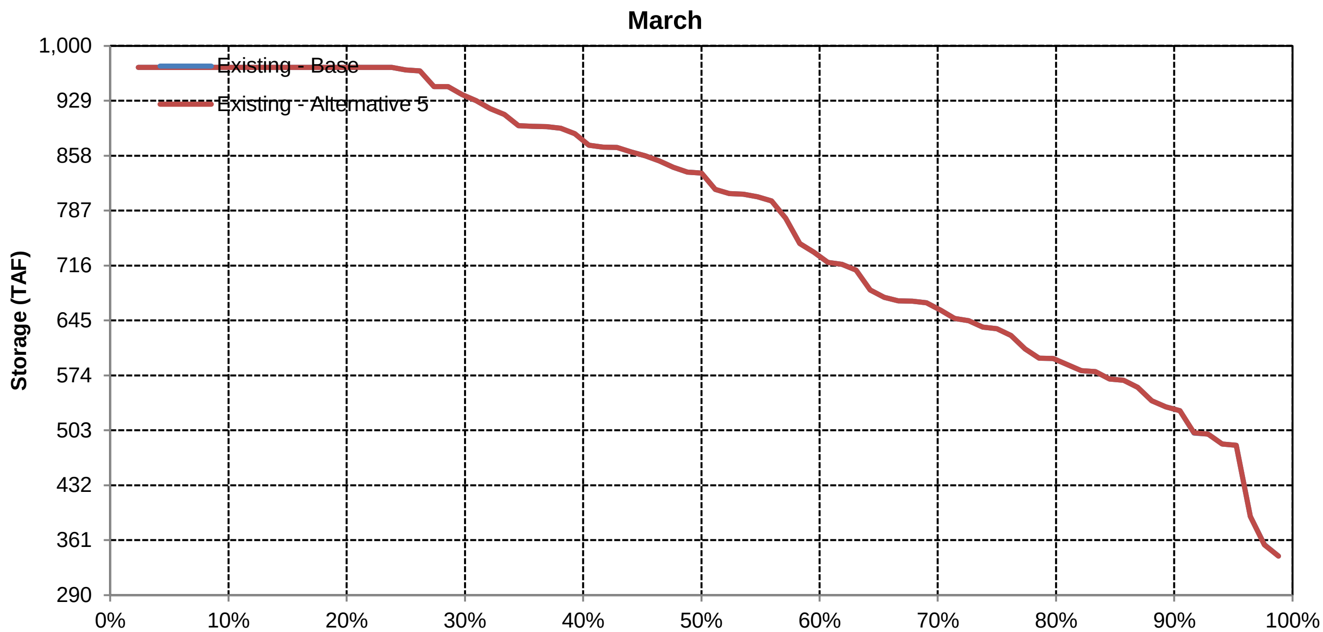
CVP San Luis Reservoir



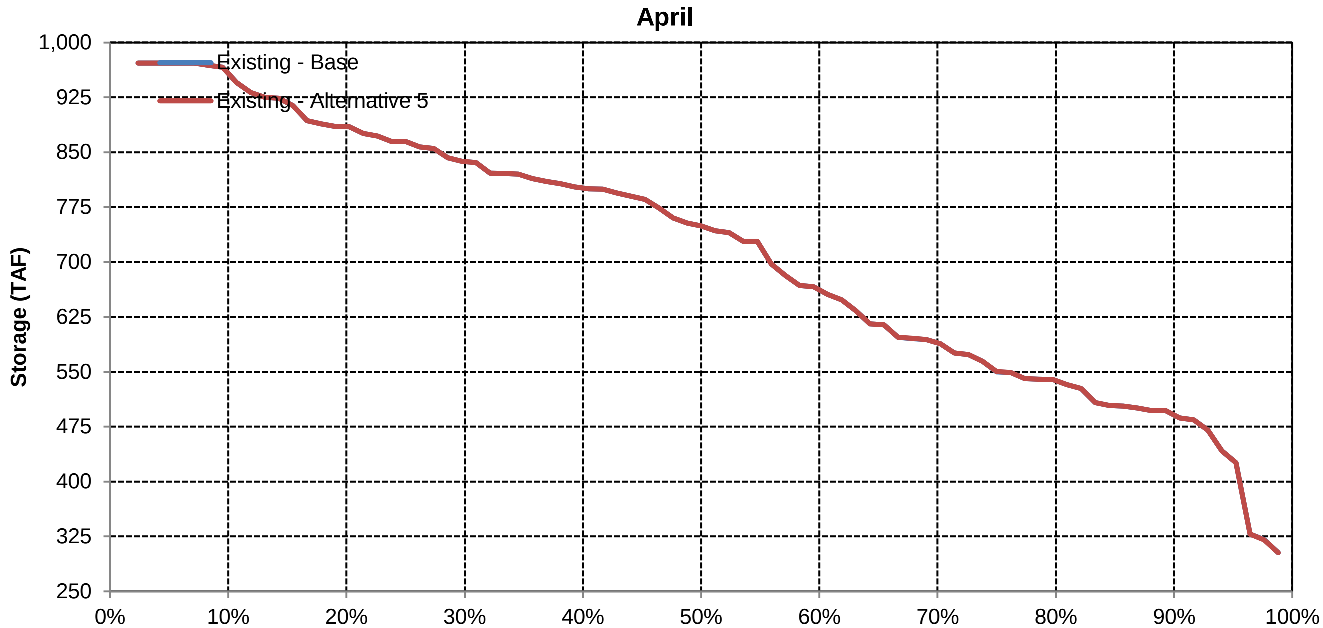


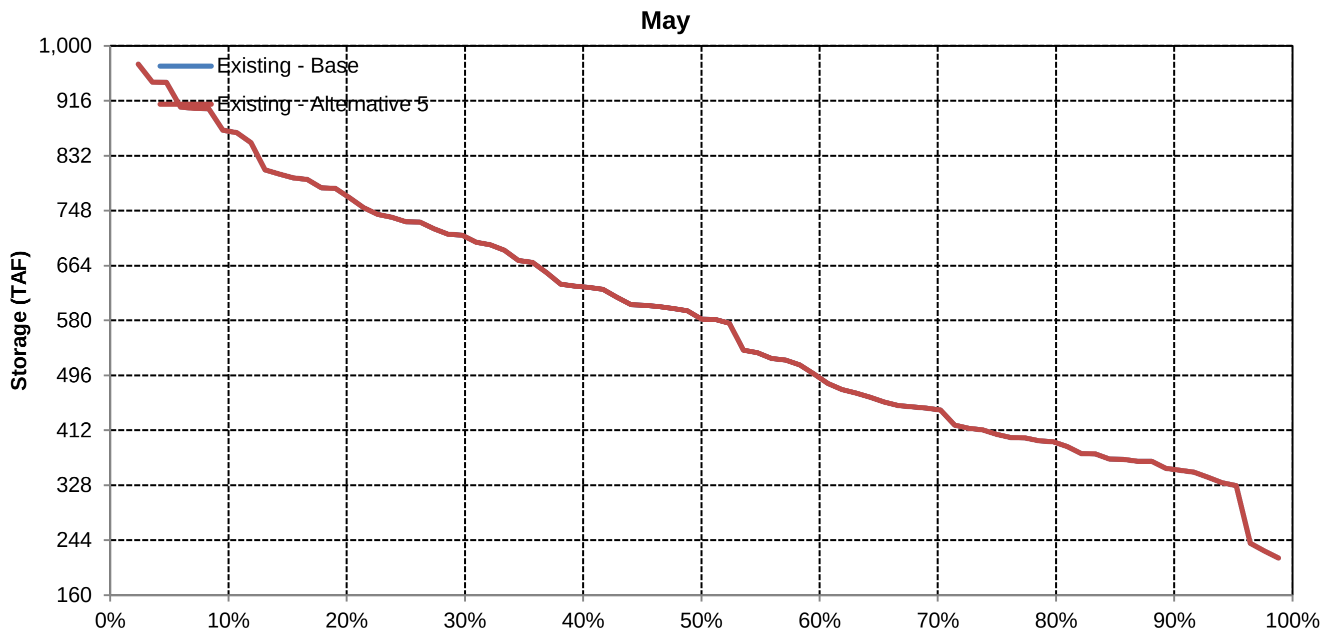
CVP San Luis Reservoir



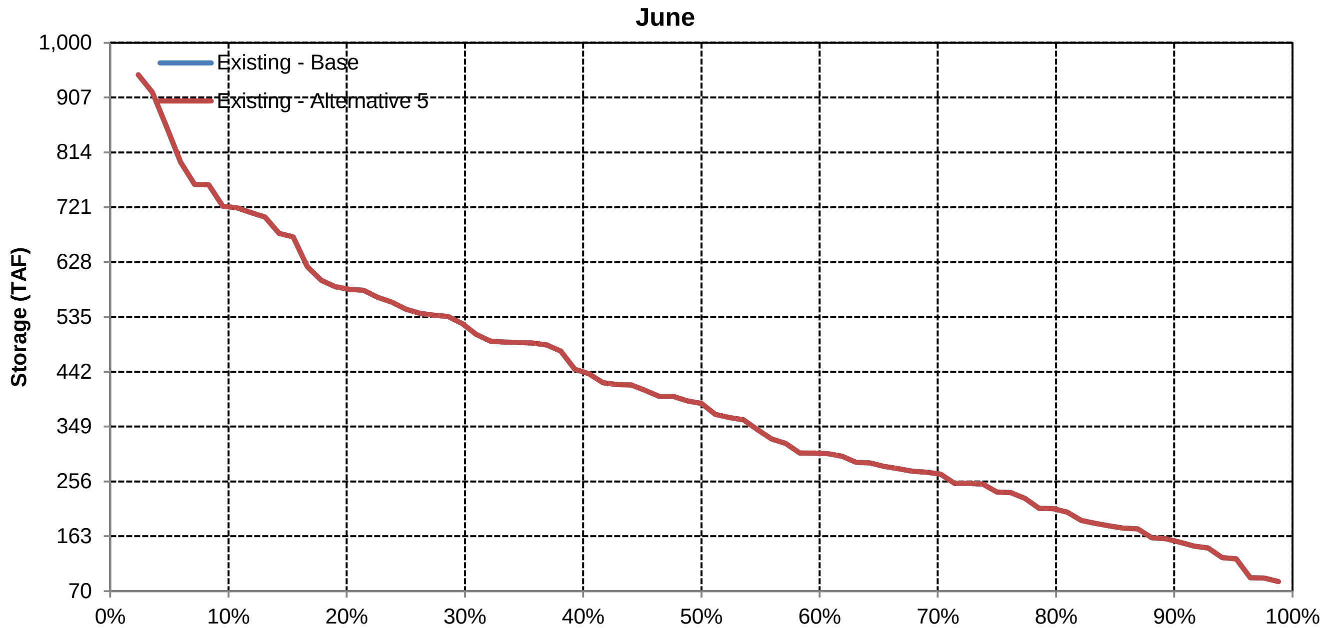


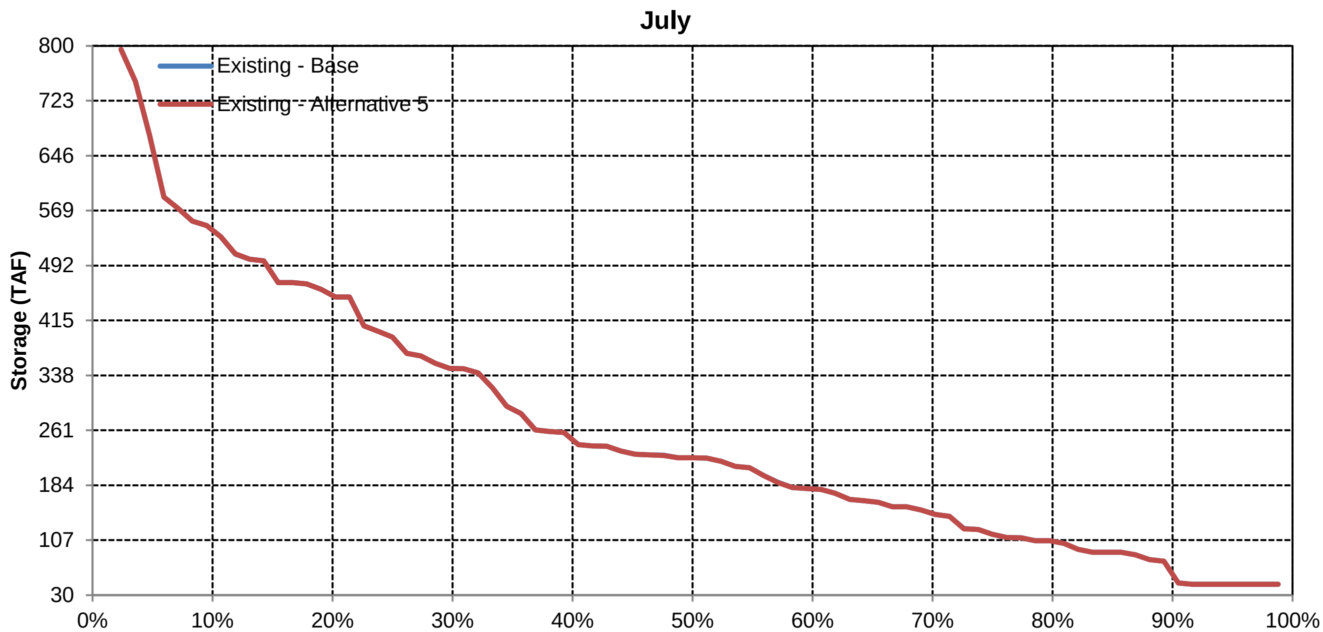
CVP San Luis Reservoir



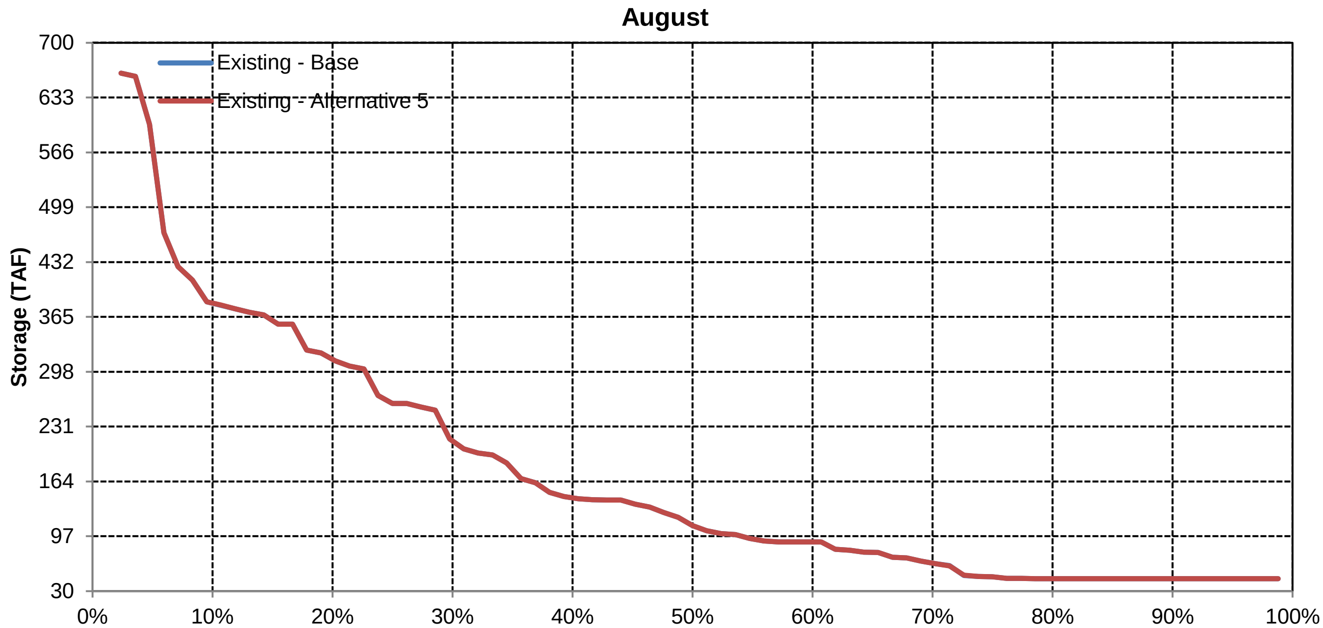


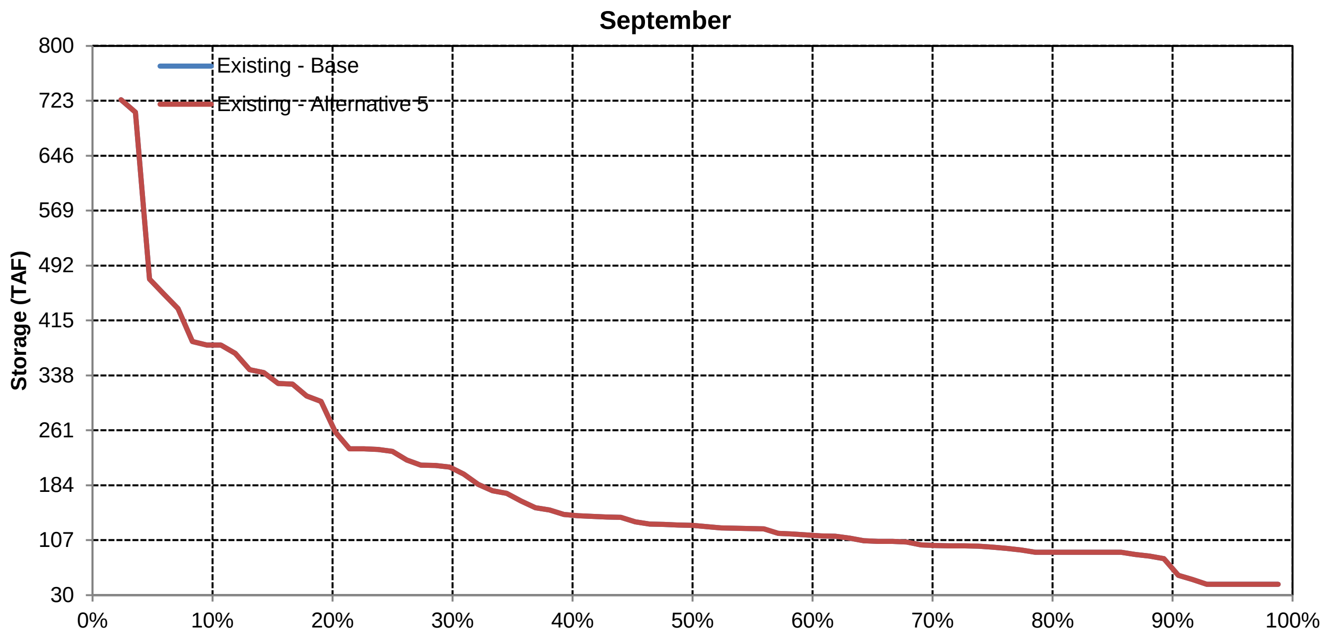
CVP San Luis Reservoir





CVP San Luis Reservoir





Long-Term and Water Year-Type Average of SWP San Luis Reservoir Under Existing - Base and Existing - Alternative 5

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
						Long-Term						
Full Simulation Period												
Existing - Base	244	268	372	541	678	802	720	562	380	374	324	288
Existing - Alternative 5	244	268	372	541	678	802	720	562	380	374	324	288
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
						Water Year-Types						
Wet												
Existing - Base	272	333	431	651	850	980	865	667	471	448	428	363
Existing - Alternative 5	272	333	431	651	850	980	865	667	471	448	428	363
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal												
Existing - Base	259	253	386	576	716	886	757	532	307	308	323	276
Existing - Alternative 5	259	253	386	576	716	886	757	532	307	308	323	276
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Existing - Base	220	246	386	500	622	751	675	512	329	374	370	342
Existing - Alternative 5	220	246	386	500	622	751	675	512	329	374	370	342
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry												
Existing - Base	209	219	300	450	552	670	620	509	348	358	229	234
Existing - Alternative 5	209	219	300	450	552	670	620	509	348	358	229	234
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical												
Existing - Base	249	245	312	459	533	591	579	511	376	305	168	137
Existing - Alternative 5	249	245	312	459	533	591	579	511	376	305	168	137
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

SWP San Luis Reservoir

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	454	566	739	973	1,067	1,067	956	791	630	652	562	423
20%	354	407	561	738	914	1,067	931	704	511	491	470	331
30%	313	356	473	654	833	954	863	657	444	447	402	321
40%	255	303	402	546	714	879	804	584	415	402	358	310
50%	218	224	321	495	686	844	737	527	355	358	309	310
60%	199	169	291	431	584	715	642	488	303	309	267	298
70%	163	109	225	389	528	656	584	450	261	255	201	242
80%	121	76	155	325	466	573	528	396	209	231	155	164
90%	55	55	80	262	364	509	458	352	163	166	114	104
Long Term												
Full Simulation Period	244	268	372	541	678	802	720	562	380	374	324	288
Water Year Types												
Wet	272	333	431	651	850	980	865	667	471	448	428	363
Above Normal	259	253	386	576	716	886	757	532	307	308	323	276
Below Normal	220	246	386	500	622	751	675	512	329	374	370	342
Dry	209	219	300	450	552	670	620	509	348	358	229	234
Critical	249	245	312	459	533	591	579	511	376	305	168	137

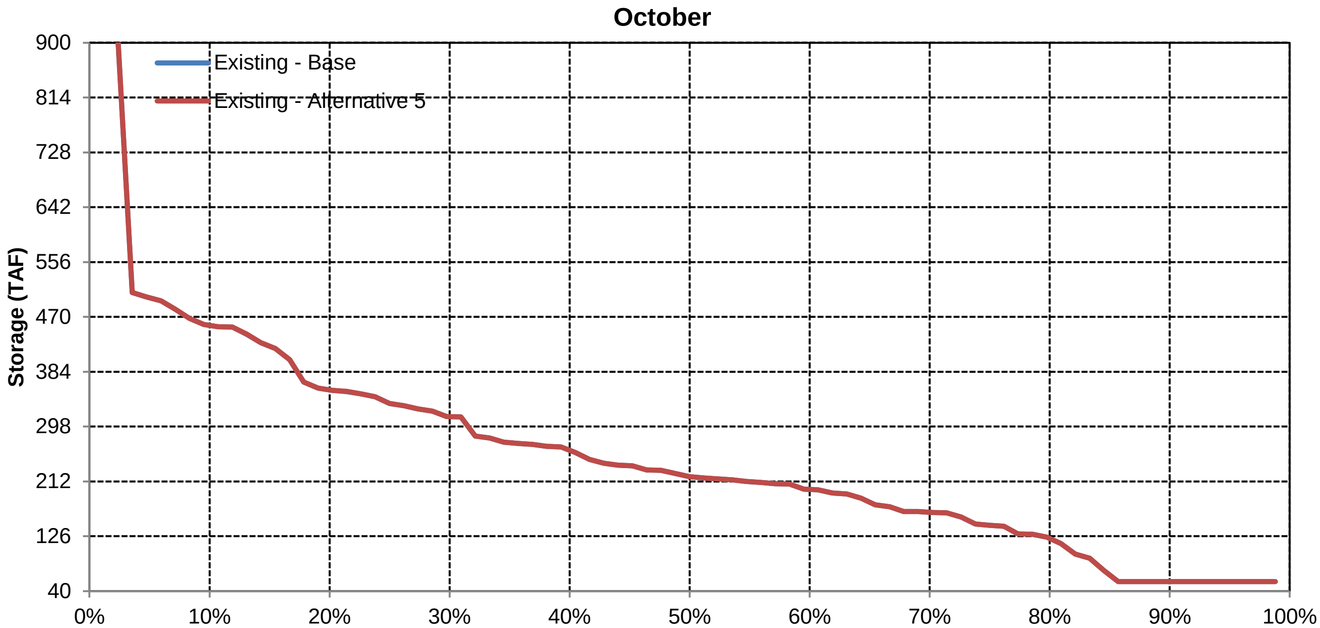
Existing - Alternative 5

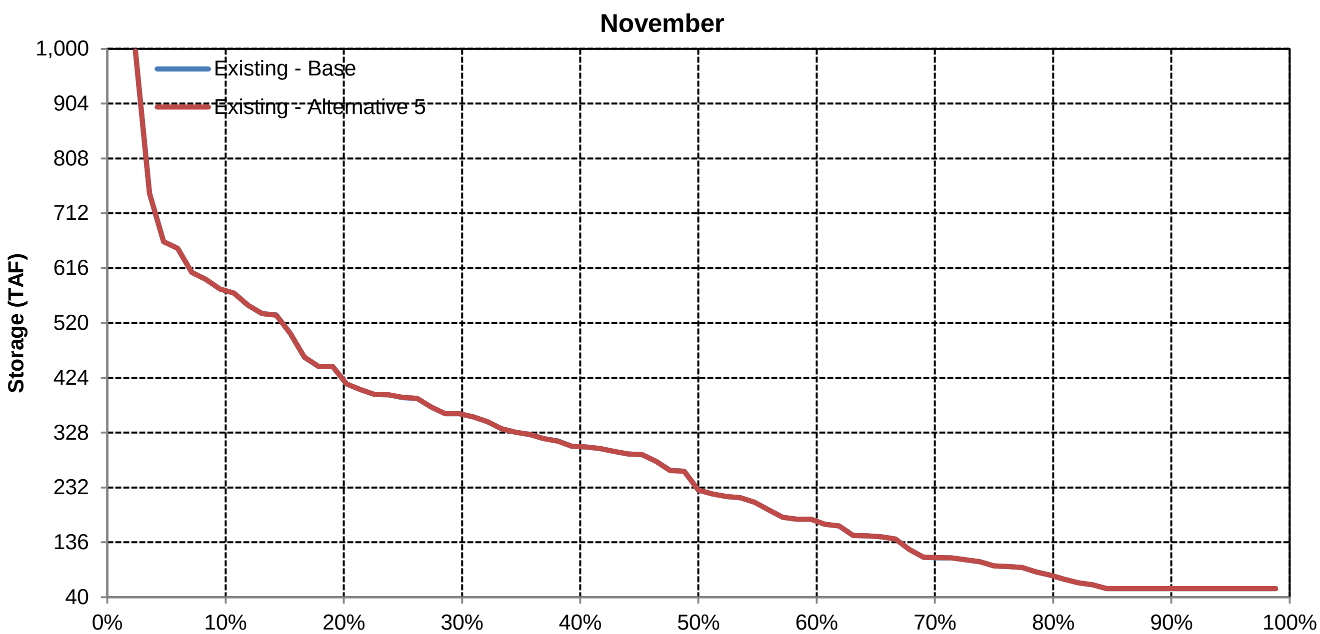
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	454	566	738	973	1,067	1,067	956	791	630	652	562	423
20%	354	407	561	738	914	1,067	931	704	511	491	470	331
30%	313	356	473	654	833	954	863	657	444	447	402	321
40%	255	303	402	546	714	879	804	584	415	402	358	310
50%	218	224	321	495	686	844	737	527	355	358	309	310
60%	199	169	291	431	584	715	642	488	303	309	267	298
70%	163	109	225	389	528	656	584	450	261	255	201	242
80%	121	76	155	325	466	573	528	396	209	231	155	164
90%	55	55	80	262	364	509	458	352	163	166	114	104
Long Term												
Full Simulation Period	244	268	372	541	678	802	720	562	380	374	324	288
Water Year Types												
Wet	272	333	431	651	850	980	865	667	471	448	428	363
Above Normal	259	253	386	576	716	886	757	532	307	308	323	276
Below Normal	220	246	386	500	622	751	675	512	329	374	370	342
Dry	209	219	300	450	552	670	620	509	348	358	229	234
Critical	249	245	312	459	533	591	579	511	376	305	168	137

Existing - Alternative 5 Minus Existing - Base

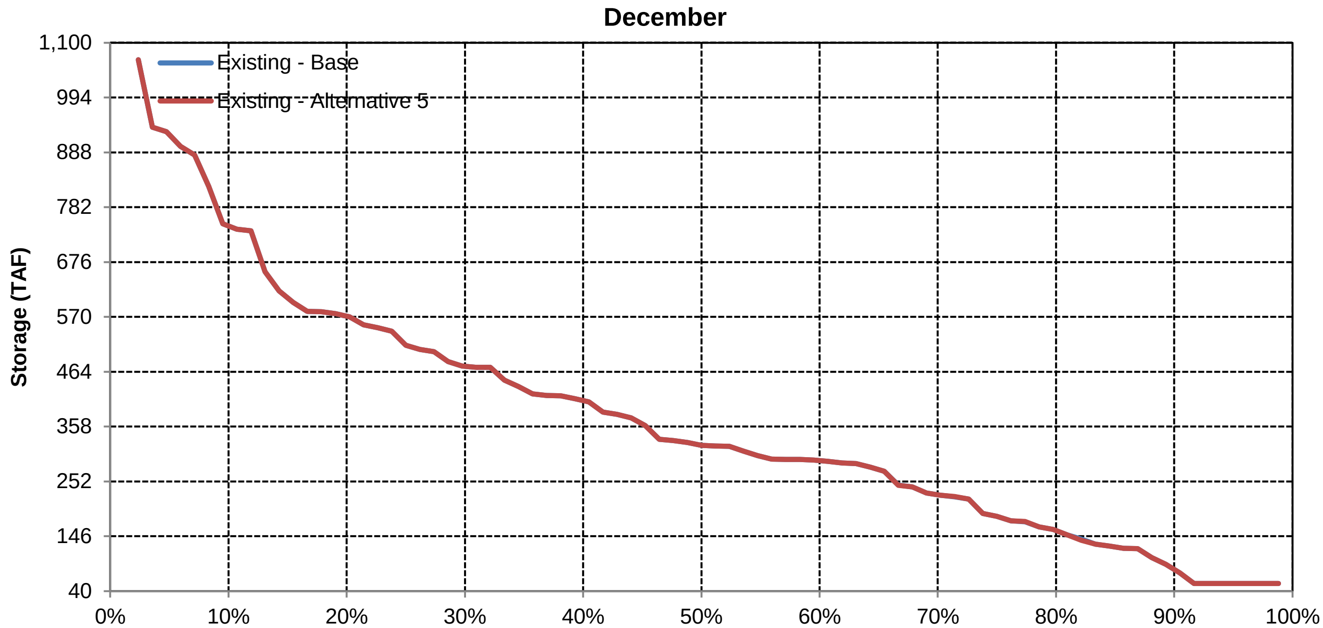
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types												
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

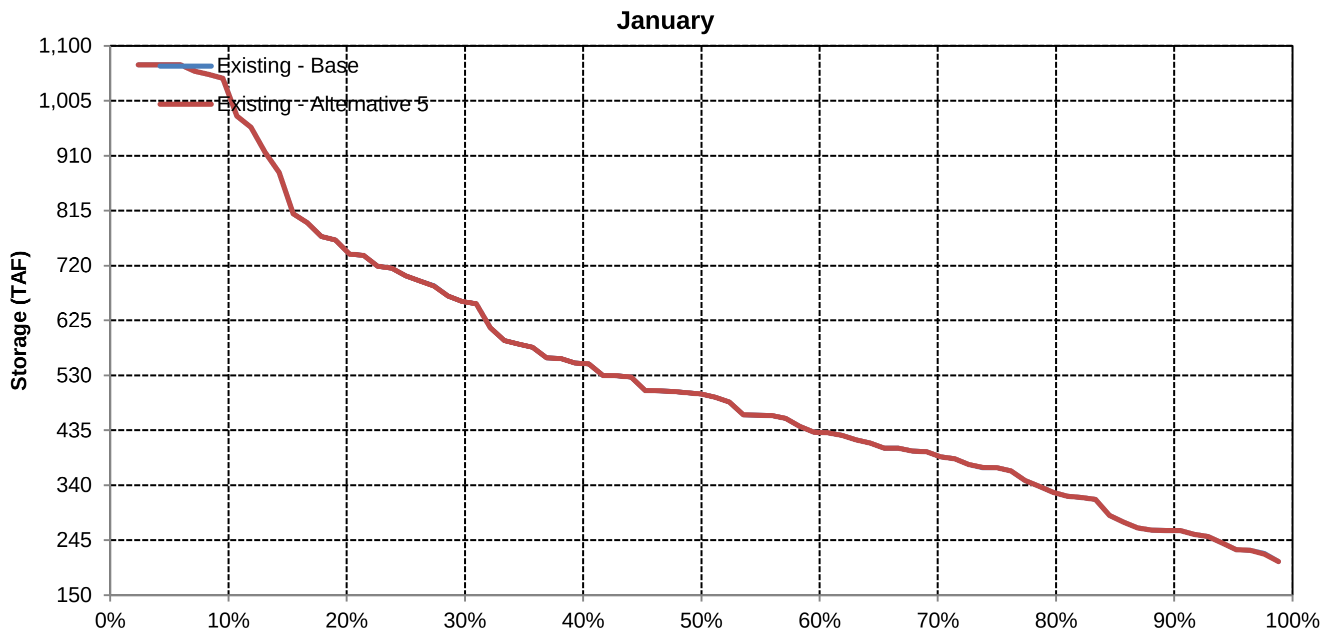
SWP San Luis Reservoir





SWP San Luis Reservoir





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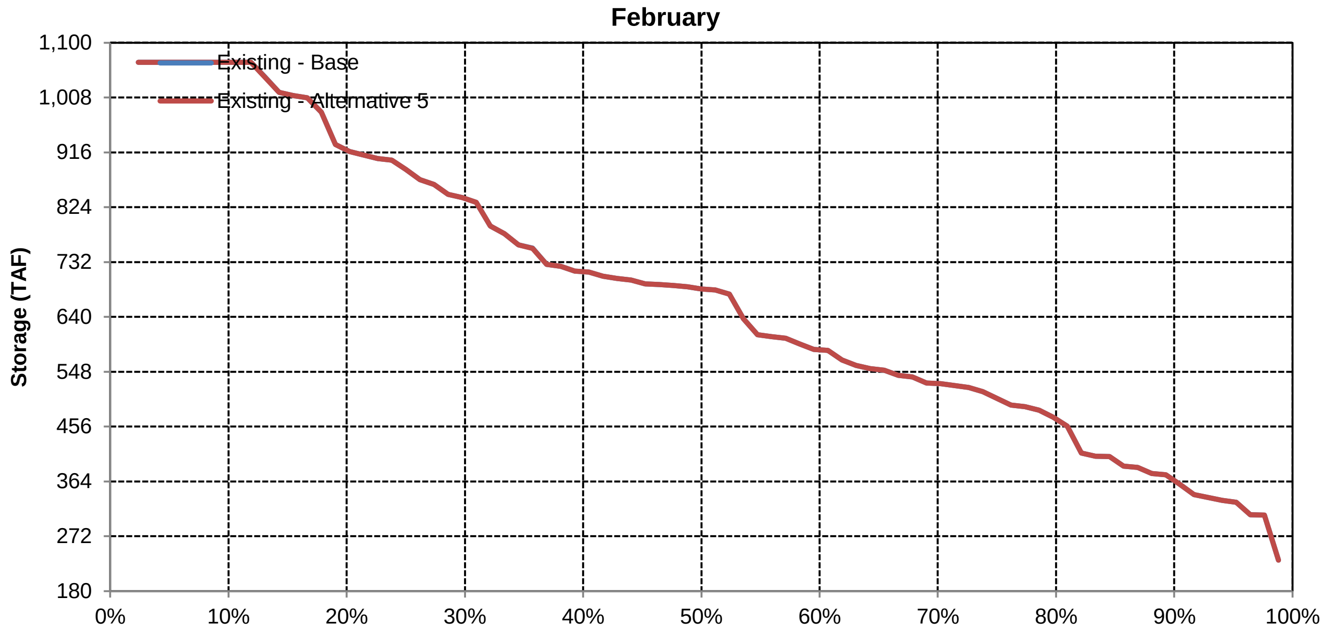

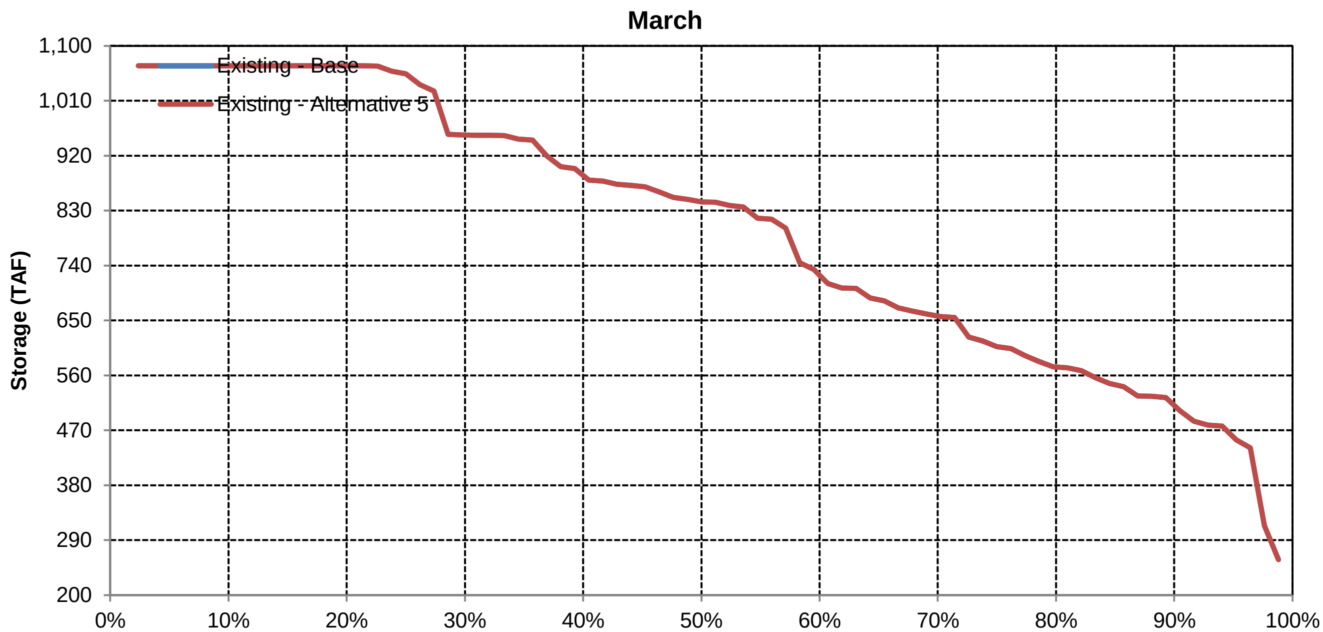

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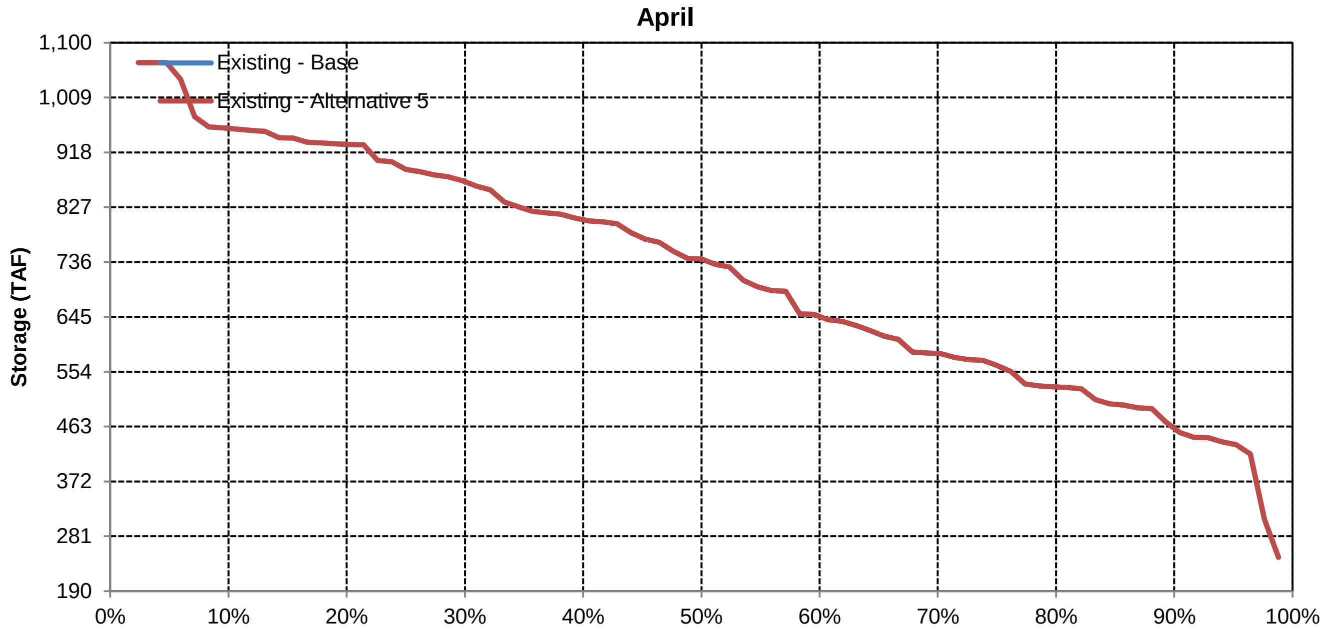

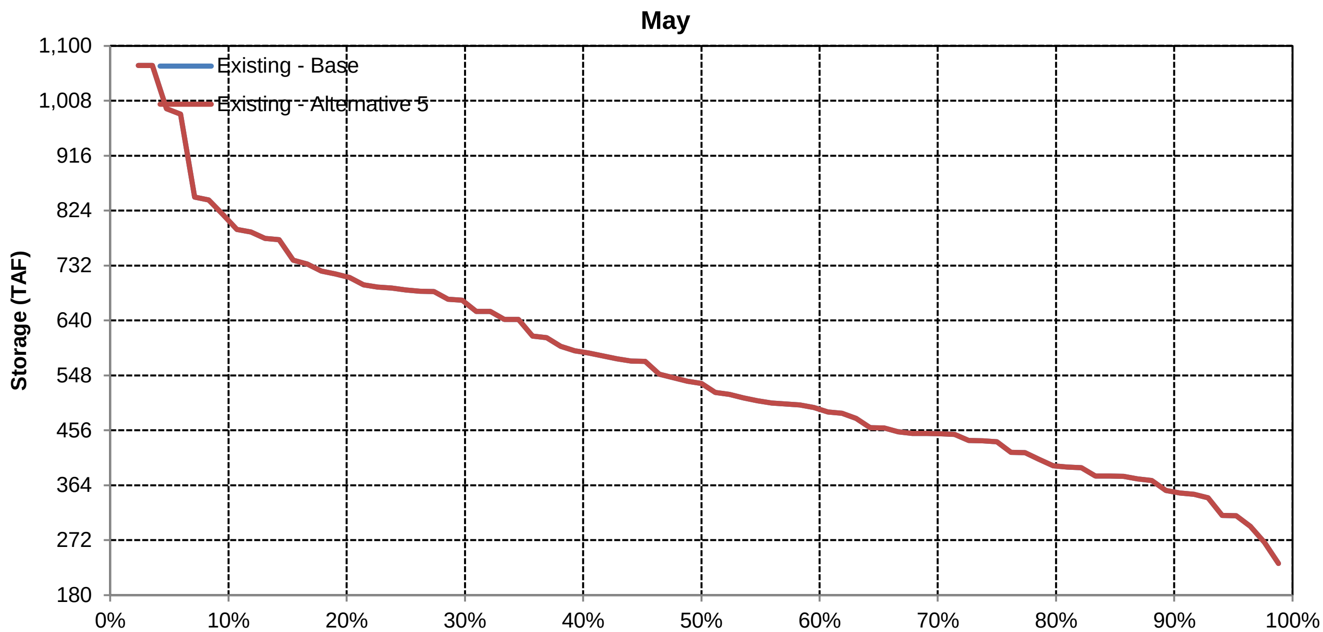

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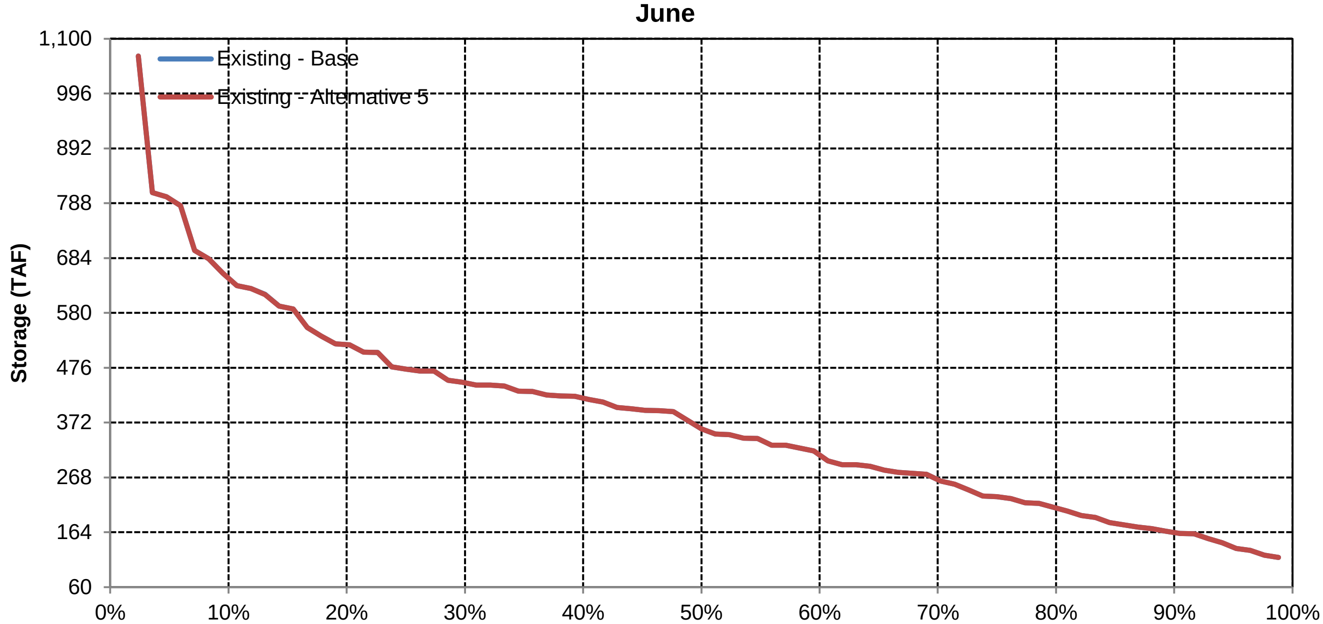

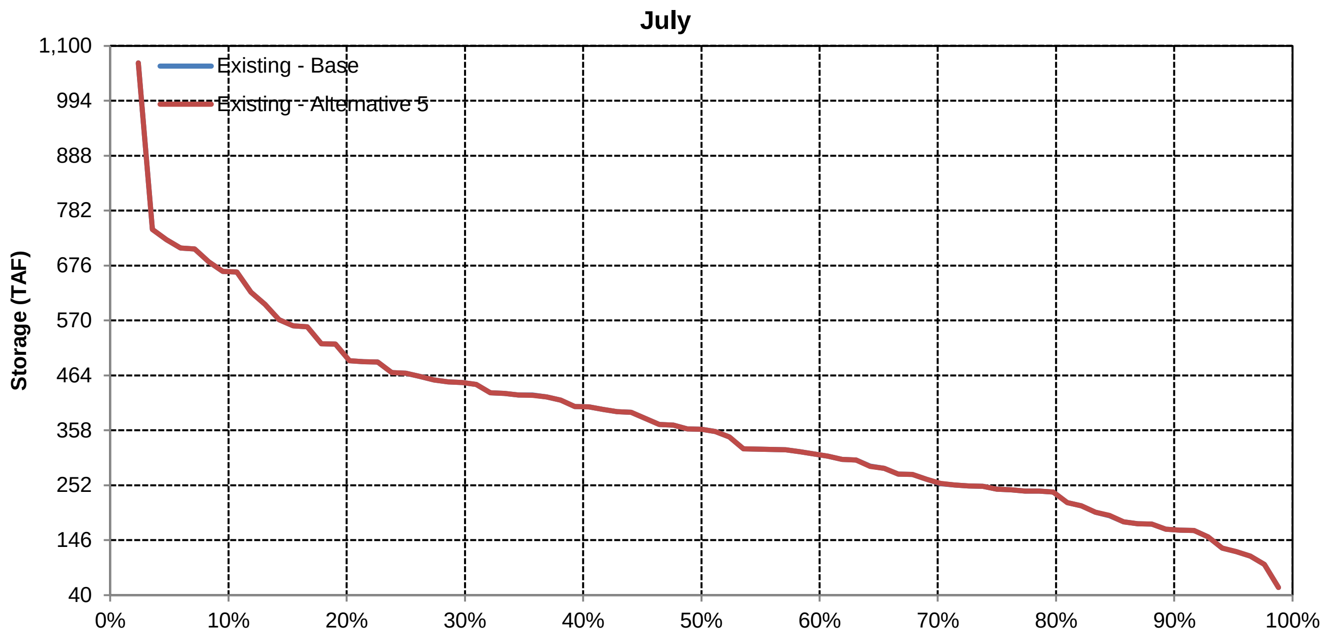

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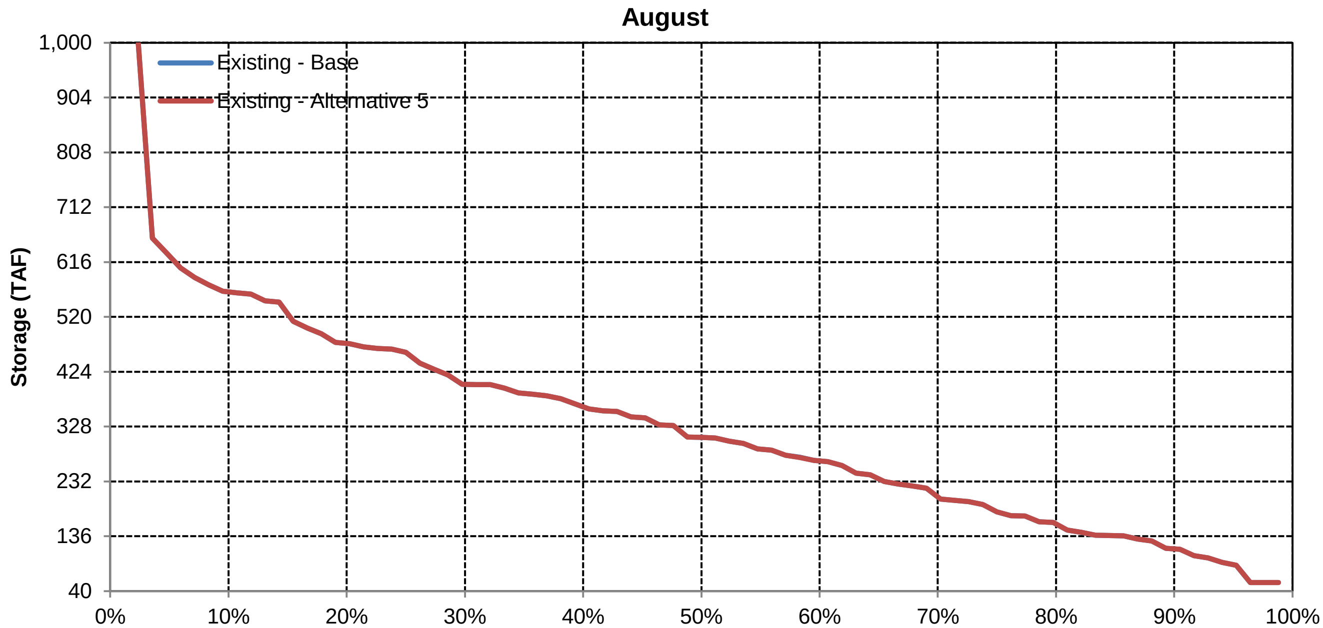
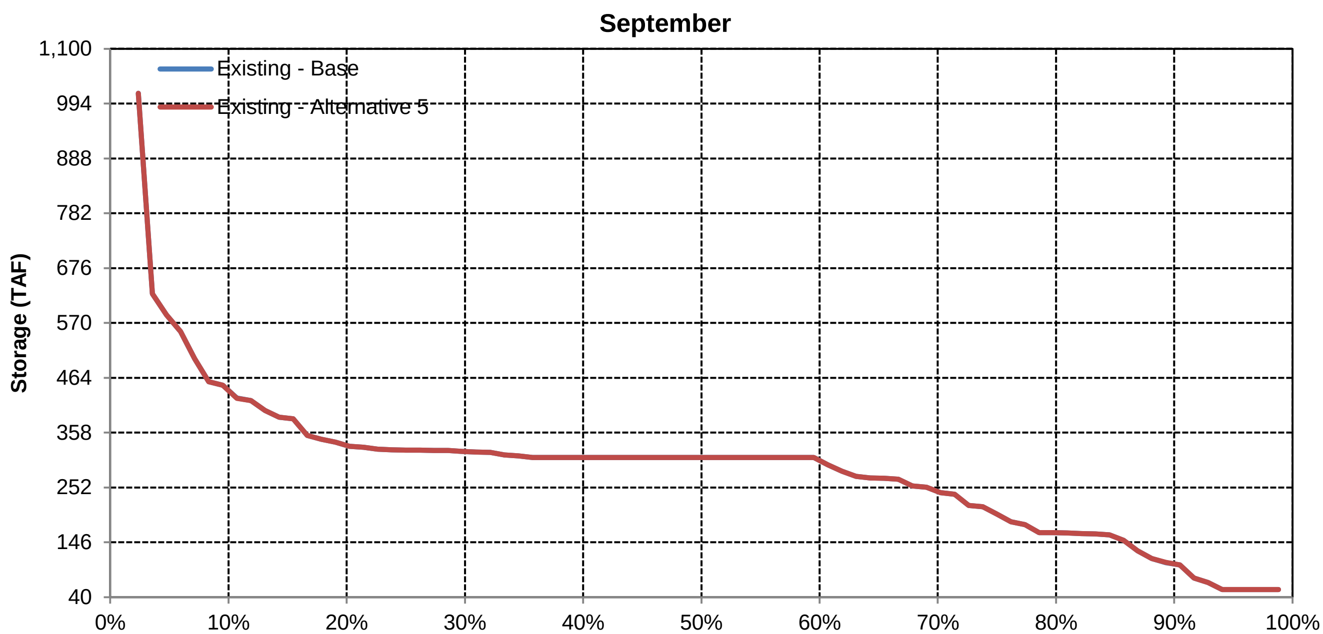




Long-Term and Water Year-Type Average of Delta Outflow Under Existing - Base and Existing - Alternative 5

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Existing - Base	6,909	11,530	25,386	48,782	63,791	48,782	30,013	16,104	7,983	8,482	4,062	9,331	16,820
Existing - Alternative 5	6,909	11,530	25,387	48,782	63,791	48,782	30,013	16,104	7,983	8,483	4,062	9,331	16,820
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
							Water Year-Types						
Wet													
Existing - Base	9,275	19,272	57,556	101,579	121,325	88,381	55,563	26,753	10,584	11,022	4,128	19,366	31,372
Existing - Alternative 5	9,275	19,272	57,557	101,579	121,326	88,381	55,563	26,753	10,584	11,023	4,128	19,366	31,372
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal													
Existing - Base	6,741	9,314	21,144	55,453	70,727	61,417	29,722	17,425	7,395	11,464	4,017	11,133	18,336
Existing - Alternative 5	6,741	9,314	21,144	55,453	70,726	61,417	29,722	17,425	7,395	11,464	4,017	11,133	18,336
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal													
Existing - Base	6,527	9,662	10,110	23,902	40,103	31,158	23,270	13,328	6,819	8,808	4,050	3,469	10,847
Existing - Alternative 5	6,527	9,662	10,110	23,902	40,103	31,158	23,270	13,327	6,819	8,808	4,050	3,469	10,847
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry													
Existing - Base	5,825	7,923	8,608	15,426	29,458	22,607	13,161	8,982	7,006	5,274	4,137	3,269	7,873
Existing - Alternative 5	5,825	7,923	8,608	15,426	29,458	22,607	13,161	8,981	7,006	5,274	4,137	3,269	7,873
Difference	0	0	0	0	0	0	0	-1	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical													
Existing - Base	4,133	5,072	6,622	11,837	16,327	13,519	9,101	6,026	6,104	4,027	3,889	3,010	5,383
Existing - Alternative 5	4,133	5,072	6,622	11,837	16,327	13,519	9,101	6,026	6,104	4,027	3,889	3,010	5,383
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	9,977	15,194	83,333	120,592	161,827	97,068	71,454	33,132	11,137	13,270	4,309	19,688
20%	9,531	14,688	37,738	76,978	107,377	74,847	46,407	23,720	7,991	11,709	4,155	19,375
30%	9,094	12,769	20,214	55,546	76,161	60,341	32,656	15,272	7,100	10,714	4,001	17,813
40%	6,875	10,418	14,342	38,012	58,777	38,477	22,321	12,858	7,100	9,084	4,000	10,938
50%	4,346	9,766	11,487	26,488	41,867	31,169	18,044	11,426	7,100	8,603	4,000	3,914
60%	4,000	6,253	6,752	19,211	28,692	22,356	14,643	10,166	6,905	8,000	4,000	3,569
70%	4,000	4,500	5,009	13,355	21,621	17,008	12,821	9,402	6,688	5,591	4,000	3,000
80%	4,000	4,500	4,670	10,293	17,232	14,703	11,016	7,597	6,187	5,000	4,000	3,000
90%	3,000	3,500	4,500	7,972	12,426	10,776	9,604	6,918	5,655	4,000	3,791	3,000
Long Term												
Full Simulation Period	6,909	11,530	25,386	48,782	63,791	48,782	30,013	16,104	7,983	8,482	4,062	9,331
Water Year Types												
Wet	9,275	19,272	57,556	101,579	121,325	88,381	55,563	26,753	10,584	11,022	4,128	19,366
Above Normal	6,741	9,314	21,144	55,453	70,727	61,417	29,722	17,425	7,395	11,464	4,017	11,133
Below Normal	6,527	9,662	10,110	23,902	40,103	31,158	23,270	13,328	6,819	8,808	4,050	3,469
Dry	5,825	7,923	8,608	15,426	29,458	22,607	13,161	8,982	7,006	5,274	4,137	3,269
Critical	4,133	5,072	6,622	11,837	16,327	13,519	9,101	6,026	6,104	4,027	3,889	3,010

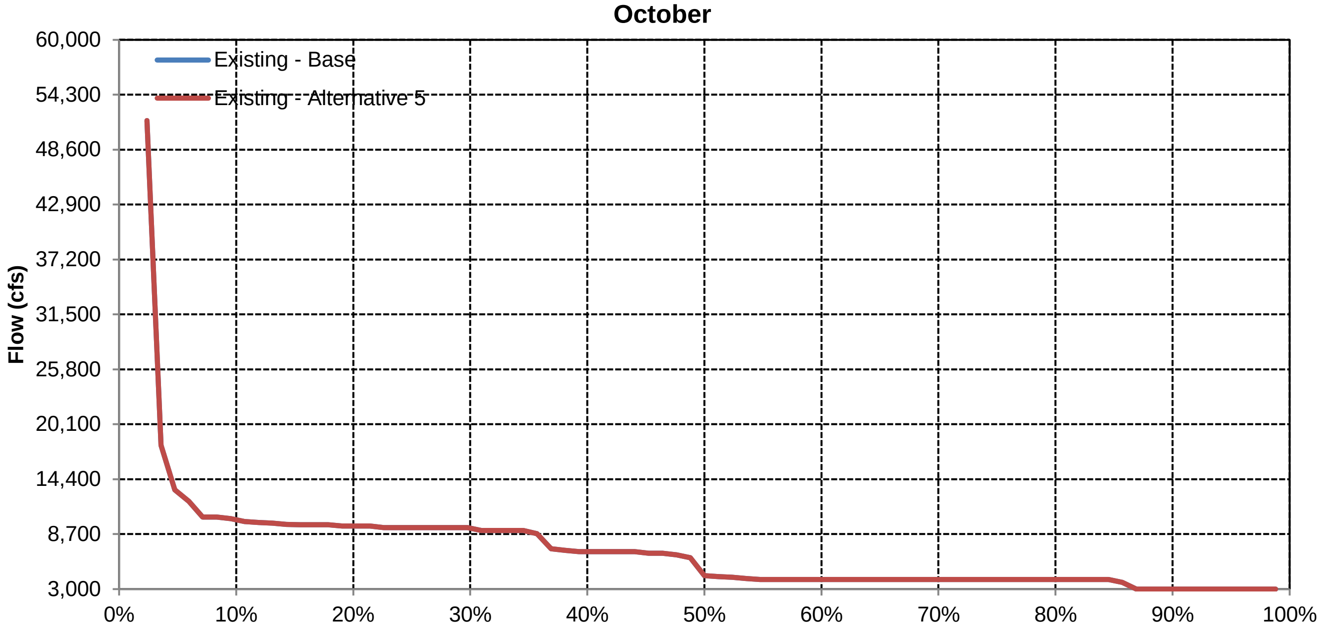
Existing - Alternative 5

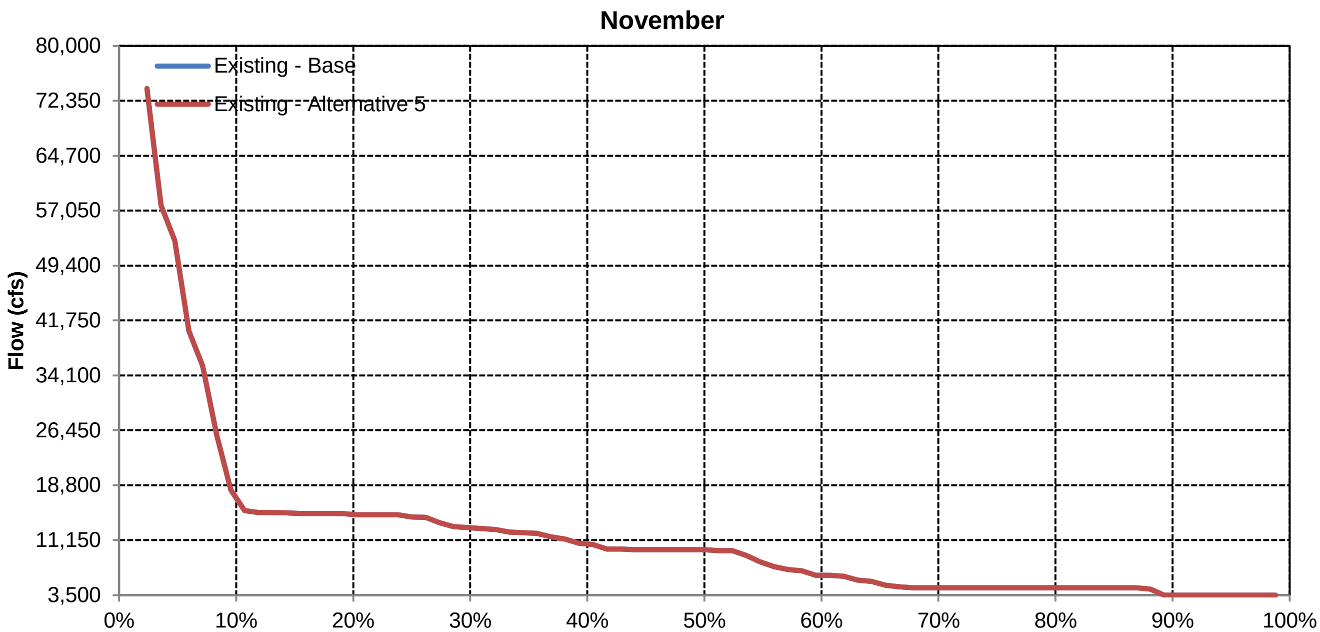
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	9,977	15,194	83,333	120,592	161,827	97,068	71,454	33,132	11,137	13,270	4,308	19,688
20%	9,531	14,688	37,738	76,978	107,377	74,847	46,407	23,720	7,992	11,709	4,155	19,375
30%	9,094	12,769	20,214	55,546	76,161	60,341	32,656	15,272	7,100	10,714	4,001	17,813
40%	6,875	10,418	14,342	38,012	58,776	38,477	22,321	12,858	7,100	9,085	4,000	10,938
50%	4,346	9,766	11,487	26,488	41,867	31,169	18,044	11,426	7,100	8,603	4,000	3,913
60%	4,000	6,253	6,753	19,211	28,692	22,356	14,643	10,166	6,903	8,000	4,000	3,569
70%	4,000	4,500	5,009	13,355	21,621	17,008	12,821	9,402	6,688	5,592	4,000	3,000
80%	4,000	4,500	4,670	10,293	17,232	14,703	11,016	7,596	6,187	5,000	4,000	3,000
90%	3,000	3,500	4,500	7,972	12,426	10,776	9,604	6,918	5,655	4,000	3,791	3,000
Long Term												
Full Simulation Period	6,909	11,530	25,387	48,782	63,791	48,782	30,013	16,104	7,983	8,483	4,062	9,331
Water Year Types												
Wet	9,275	19,272	57,557	101,579	121,326	88,381	55,563	26,753	10,584	11,023	4,128	19,366
Above Normal	6,741	9,314	21,144	55,453	70,726	61,417	29,722	17,425	7,395	11,464	4,017	11,133
Below Normal	6,527	9,662	10,110	23,902	40,103	31,158	23,270	13,327	6,819	8,808	4,050	3,469
Dry	5,825	7,923	8,608	15,426	29,458	22,607	13,161	8,981	7,006	5,274	4,137	3,269
Critical	4,133	5,072	6,622	11,837	16,327	13,519	9,101	6,026	6,104	4,027	3,889	3,010

Existing - Alternative 5 Minus Existing - Base

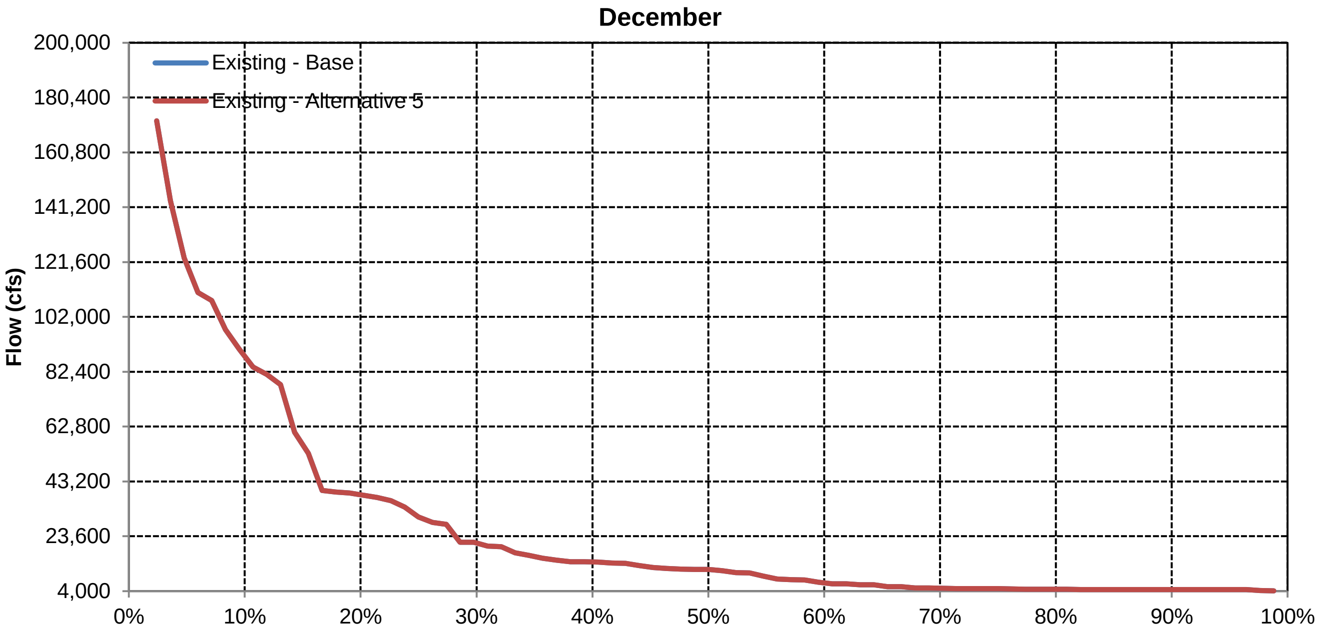
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	-1	0
20%	0	0	0	0	0	0	0	0	1	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	-1
60%	0	0	0	0	0	0	0	0	-1	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	-1	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types												
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	-1	0	0	0	0
Critical	0	0	0	0	0	0	0	0	0	0	0	0

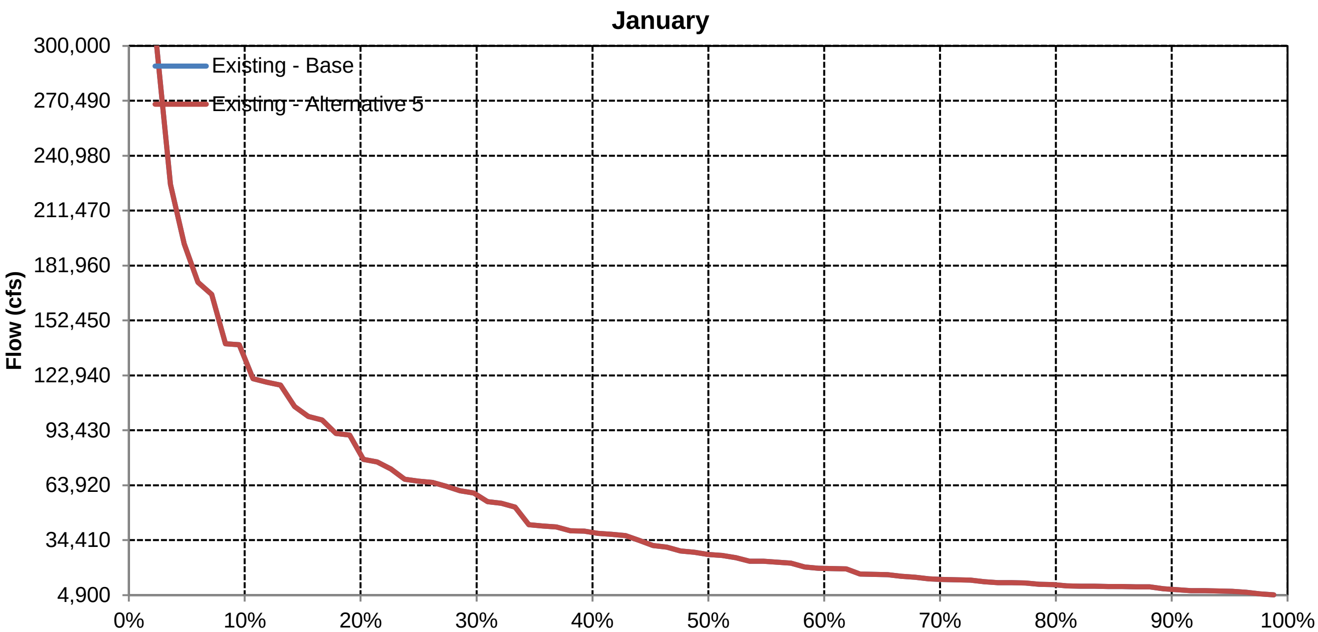
Delta Outflow





Delta Outflow





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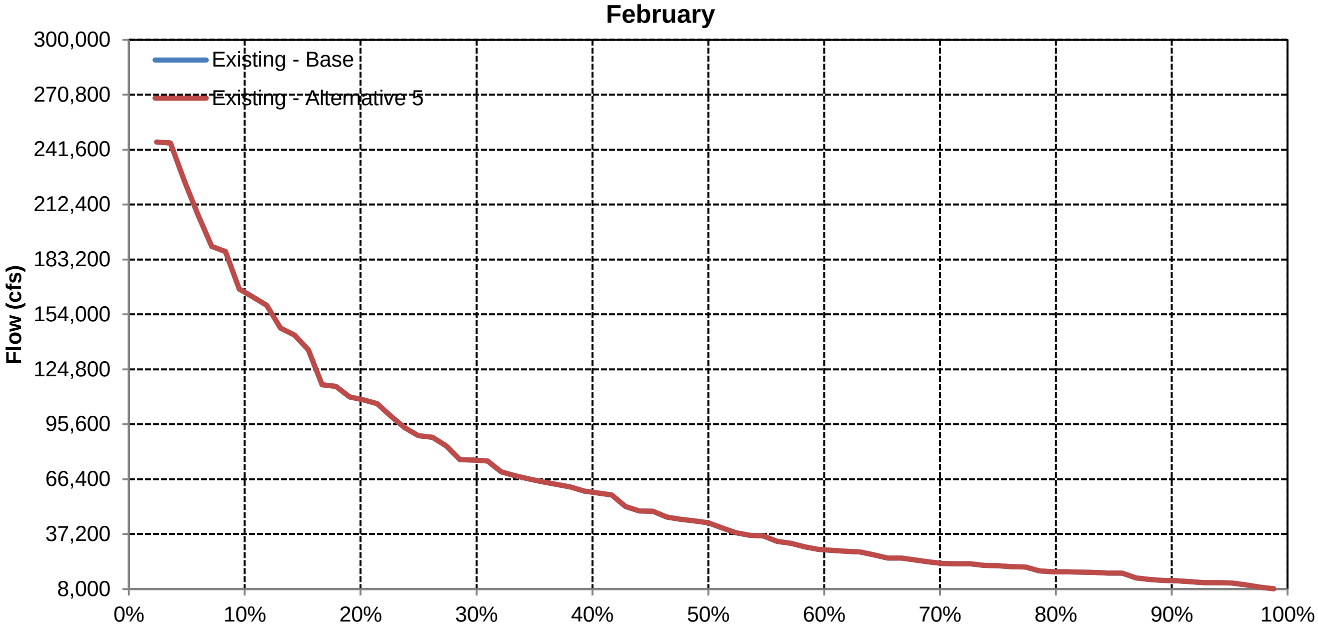

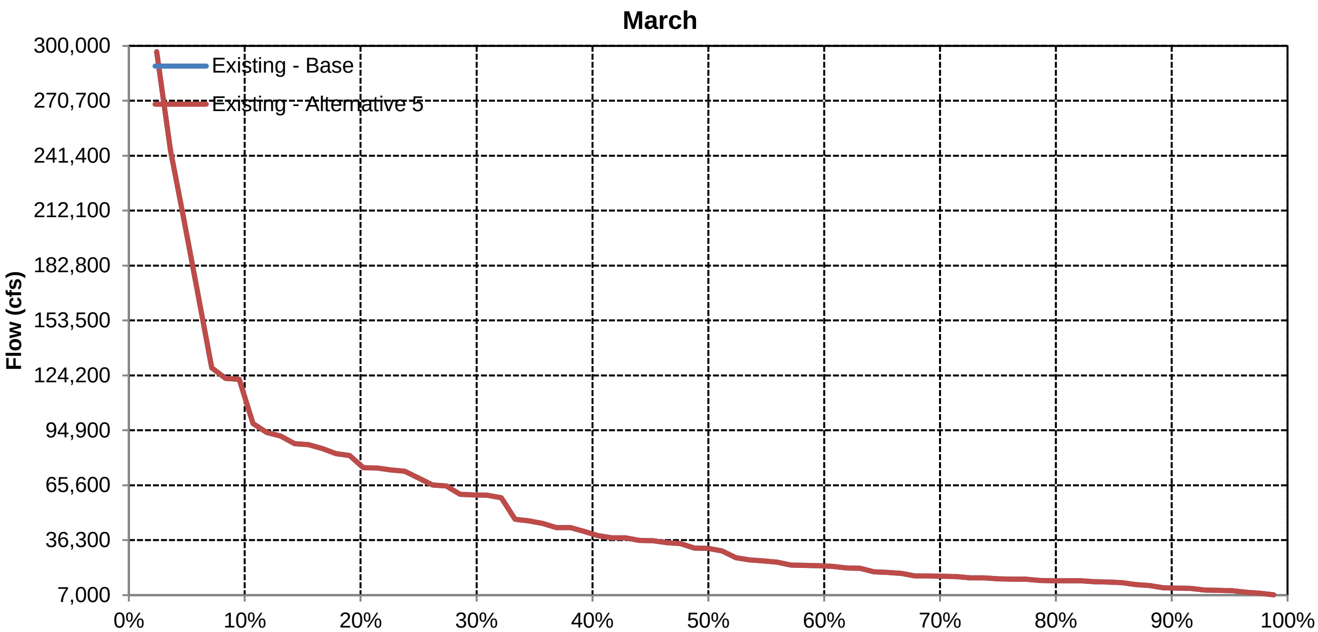

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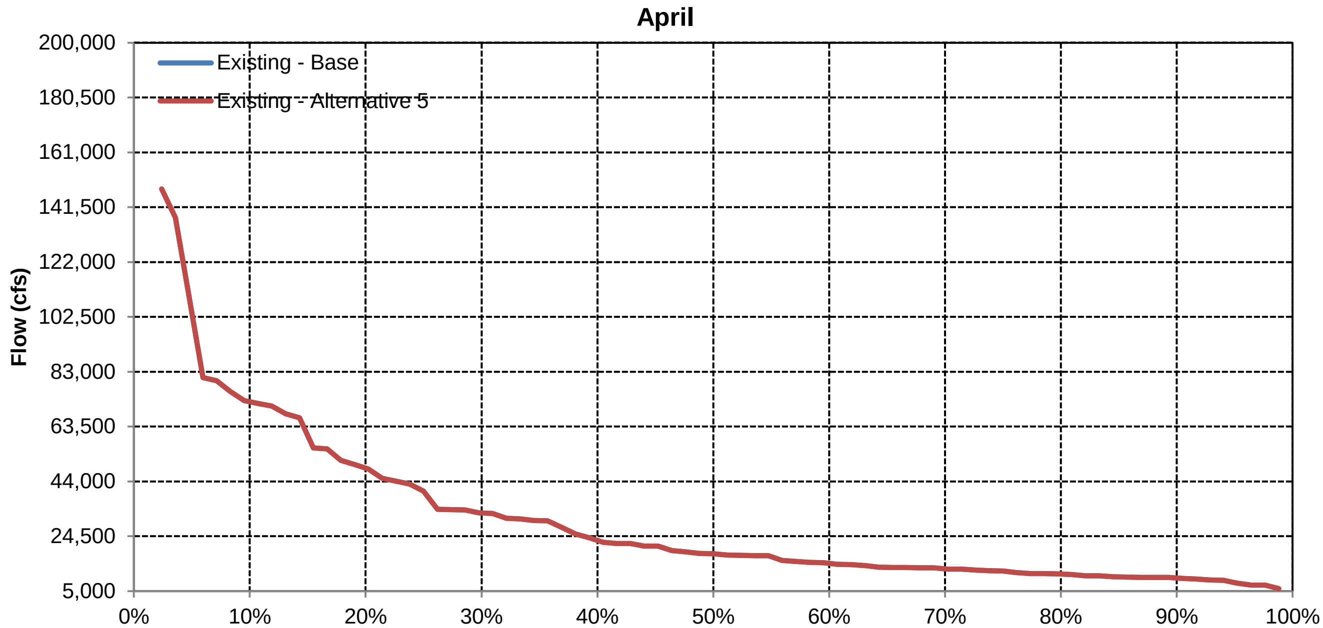

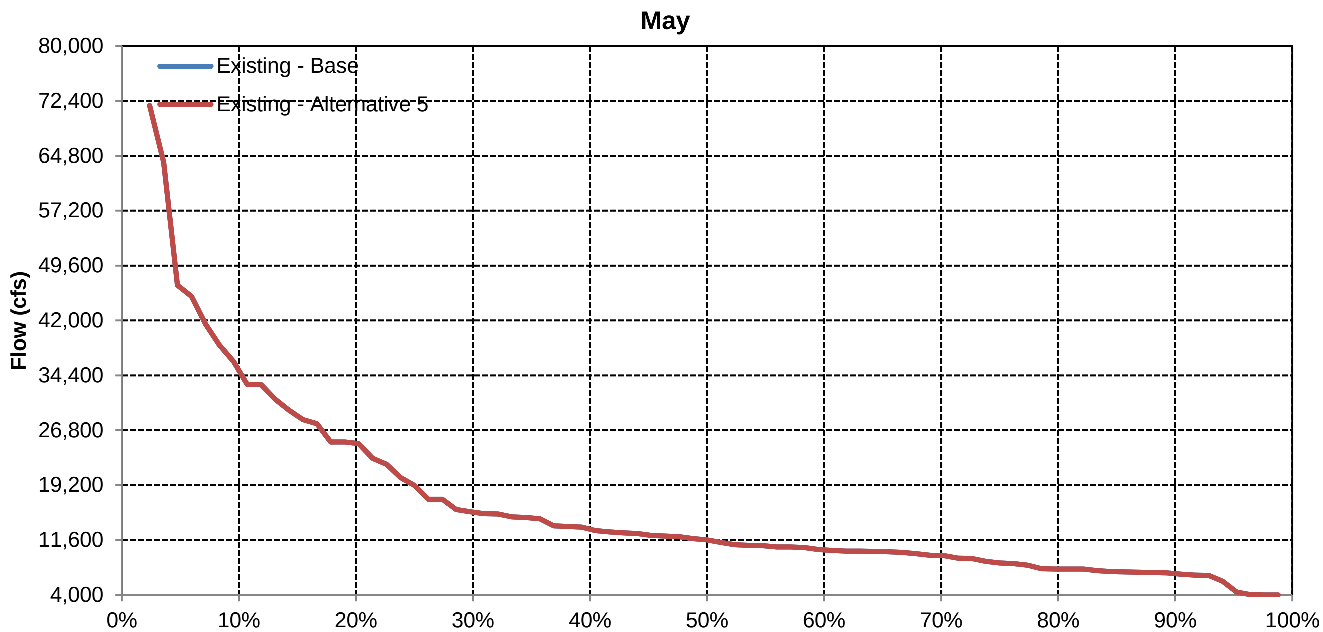

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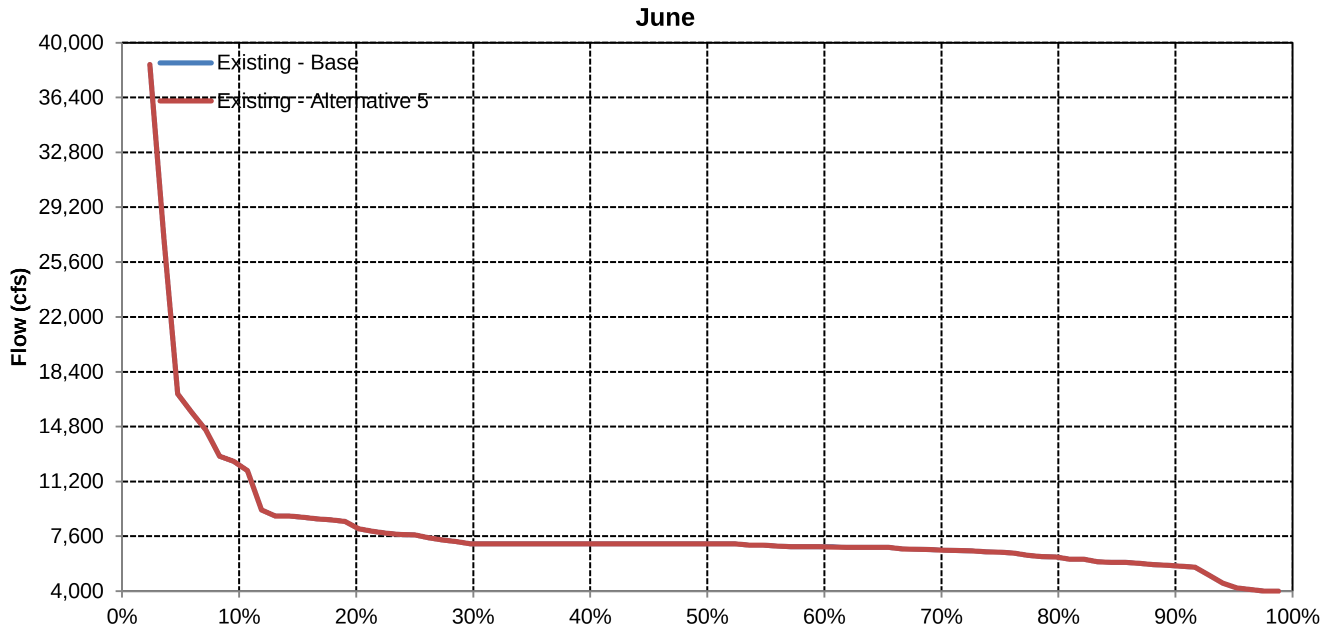
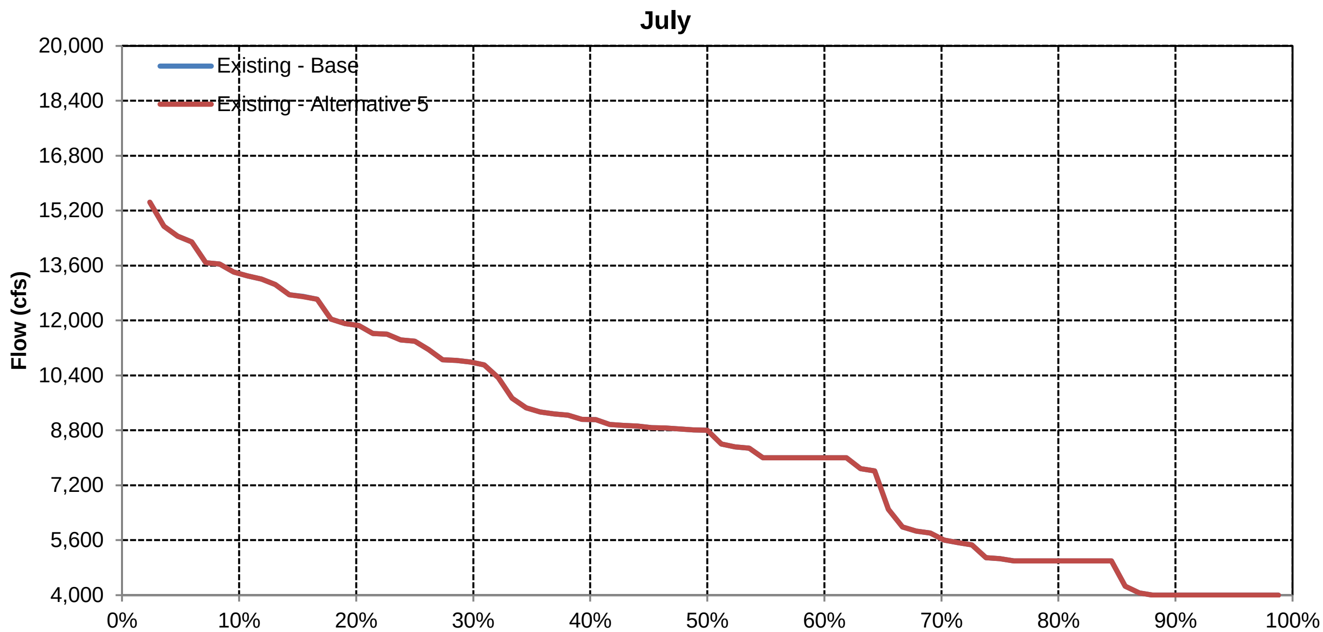
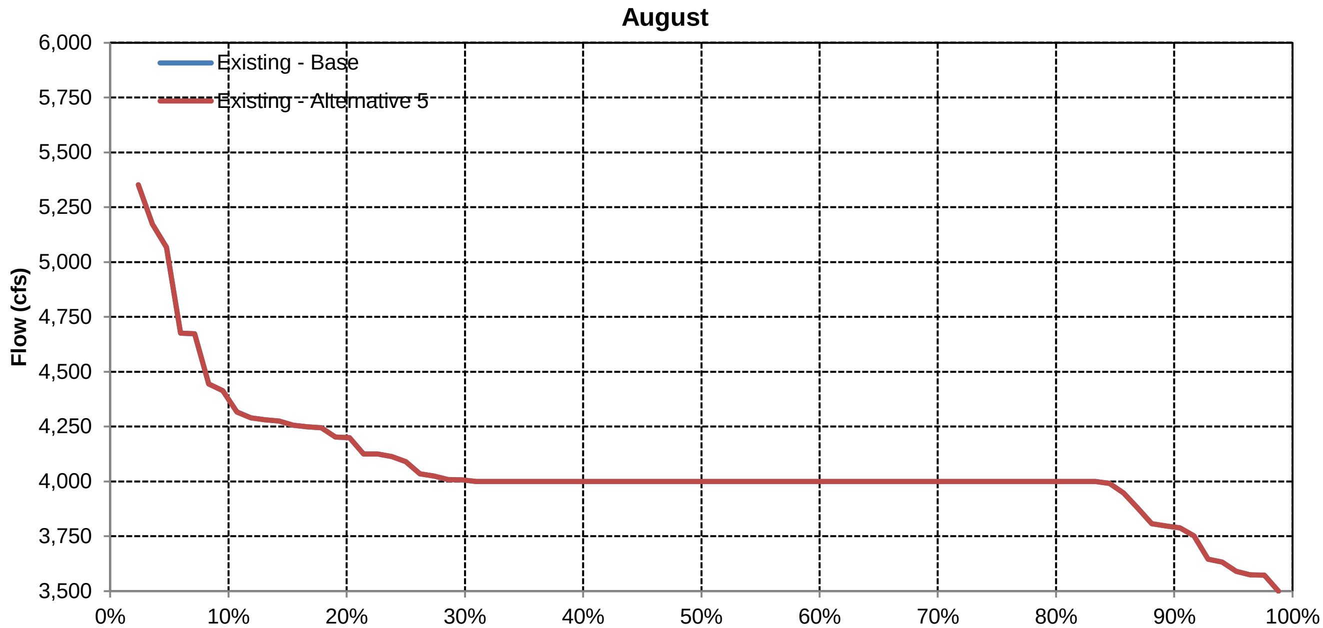




Delta Outflow



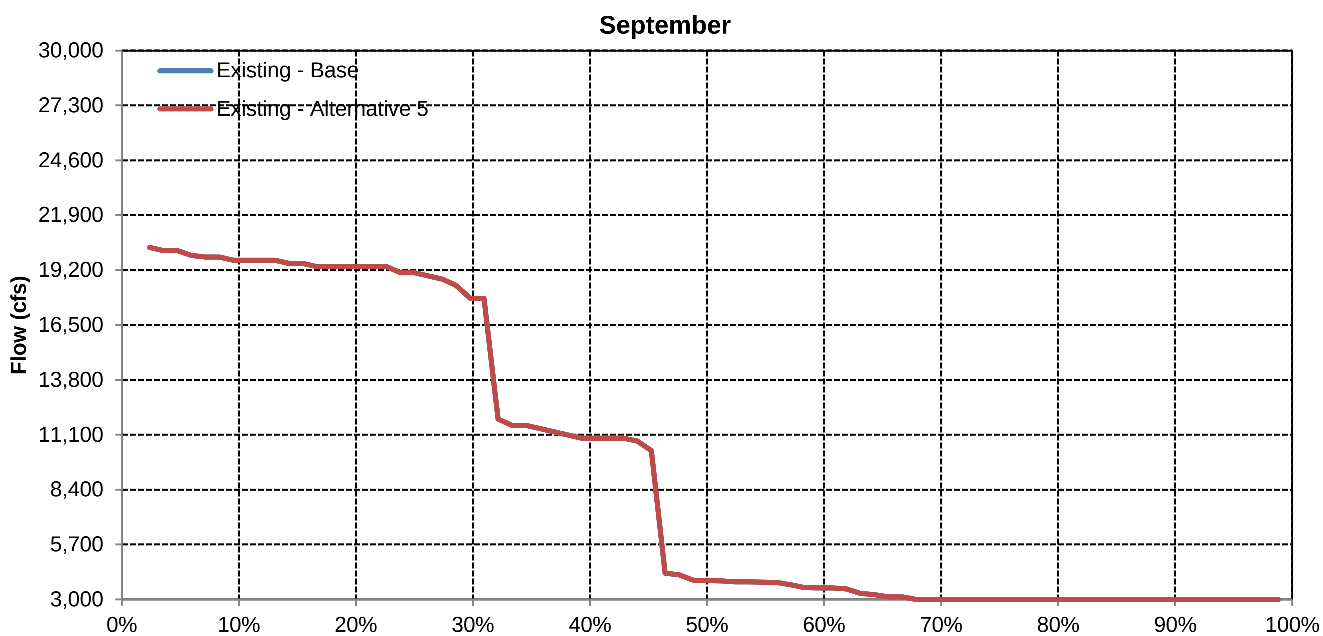


Table 185 Existing Condtions-Alternative 5 (Existing)

Winter-run Chinook Salmon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 5 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration	November through July	Mean Monthly Flow (cfs)	Verona		10	Lower 40%		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
			Freeport		10	Lower 40%		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
		Mean Monthly Water Temperature (°F)	Feather River Confluence	64		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
				68		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
			Freeport	64		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
				68		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Juvenile Rearing and Downstream Movement*	July through March	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	61		All Years	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
				65		All Years	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
			Freeport	61		All Years	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
				65		All Years	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0

Table 186 Existing Condtions-Alternative 5 (Existing)

Spring-run Chinook Salmon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location Description	Metric Value	Metric %	Range	Net Change in Probability of Exceedance under Alternative 5 (Existing) relative to Existing Condtions: Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration	March through September	Mean Monthly Flow (cfs)	Verona		10	Lower 40%						0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport		10	Lower 40%						0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	64		All Years						0.0	0.0	0.0	0.0	0.0	0.0	0.0
				68		All Years						0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport	64		All Years						0.0	0.0	0.0	0.0	0.0	0.0	0.0
				68		All Years						0.0	0.0	0.0	0.0	0.0	0.0	0.0
Juvenile Rearing (and Downstream Movement)	Year-round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	61		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
				65		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Smolt Emigration	October through May	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
		Mean Monthly Water Temperature (°F)	Feather River Confluence	63		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
			Freeport	63		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				

Table 187 Existing Condtions-Alternative 5 (Existing)

Fall-run Chinook Salmon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 5 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Staging	July through December	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0							0.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0							0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	64		All Years	0.0	0.0	0.0							0.0	0.0	0.0
				68		All Years	0.0	0.0	0.0							0.0	0.0	0.0
			Freeport	64		All Years	0.0	0.0	0.0							0.0	0.0	0.0
				68		All Years	0.0	0.0	0.0							0.0	0.0	0.0
Juvenile Rearing and Downstream Movement	December through July	Mean Monthly Flow (cfs)	Verona		10	Lower 40%			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
			Freeport		10	Lower 40%			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
		Mean Monthly Water Temperature (°F)	Freeport	61		All Years			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
				65		All Years			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		

Table 188 Existing Condtions-Alternative 5 (Existing)

Late Fall-run Chinook Salmon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 5 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Staging	October through April	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
		Mean Monthly Water Temperature (°F)	Feather River Confluence	64		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
			Freeport	64		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
Juvenile Rearing and Downstream Movement	April through December	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Freeport	61		All Years	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
				65		All Years	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0

Table 189 Existing Condtions-Alternative 5 (Existing)

Steelhead in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 5 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration	August through March	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	64		All Years	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0
			Freeport	64		All Years	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0
Juvenile Rearing and Downstream Movement	Year-Round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	65		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Smolt Emigration	January through June	Mean Monthly Flow (cfs)	Verona		10	Lower 40%				0.0	0.0	0.0	0.0	0.0	0.0			
			Freeport		10	Lower 40%				0.0	0.0	0.0	0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Feather River Confluence	52		All Years				0.0	0.0	0.0	0.0	0.0	0.0			
				55		All Years				0.0	0.0	0.0	0.0	0.0	0.0			
			Freeport	52		All Years				0.0	0.0	0.0	0.0	0.0	0.0			
				55		All Years				0.0	0.0	-1.2	0.0	0.0	0.0			

Table 190 Existing Condtions-Alternative 5 (Existing)

Green Sturgeon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 5 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Holding	February through July	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%					0.0	0.0	0.0	0.0	0.0	0.0		
		Mean Monthly Water Temperature (°F)	Freeport	61		All Years					0.0	0.0	0.0	0.0	0.0	0.0		
Adult Post-Spawning Holding and Emigration	July through November	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%	0.0	0.0								0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Freeport	61		All Years	0.0	0.0								0.0	0.0	0.0
Juvenile Rearing and Downstream Movement	Year-round	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Freeport	66		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 191 Existing Condtions-Alternative 5 (Existing)

White Sturgeon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 5 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Holding	November through May	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%		0.0	0.0	0.0	0.0	0.0	0.0	0.0				
		Mean Monthly Water Temperature (°F)	Freeport	77		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Spawning and Egg Incubation	February through June	Mean Monthly Flow (cfs)	Verona		10	Lower 40%					0.0	0.0	0.0	0.0	0.0			
			Freeport		10	Lower 40%					0.0	0.0	0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Feather River Confluence	61		All Years					0.0	0.0	0.0	0.0	0.0			
Juvenile Rearing and Downstream Movement	Year-round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	66		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport	66		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 192 Existing Condtions-Alternative 5 (Existing)

River Lamprey in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 5 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration	September through June	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0
		Mean Monthly Water Temperature (°F)	Freeport	42-60		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0
Ammocoete Rearing and Downstream Movement	Year-round	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Freeport	72		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

[1]Water temperature ranges are evaluated by calculating the net change in the probability of water temperatures occurring within the specified range.

Table 193 Existing Condtions-Alternative 5 (Existing)

Pacific Lamprey in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 5 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration	January through June	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%				0.0	0.0	0.0	0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Freeport	42-60		All Years				0.0	0.0	0.0	0.0	0.0	0.0			
Ammocoete Rearing and Downstream Movement	Year-round	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Freeport	72		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

[1]Water temperature ranges are evaluated by calculating the net change in the probability of water temperatures occurring within the specified range.

Table 194 Existing Condtions-Alternative 5 (Existing)

Hardhead in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 5 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adults and Other Lifestages	Year-round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	61-77		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport	61-77		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Adult Spawning	April through June	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%							0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Freeport	59-64		All Years							0.0	0.0	0.0			

[1]Water temperature ranges are evaluated by calculating the net change in the probability of water temperatures occurring within the specified range.

Table 195 Existing Condtions-Alternative 5 (Existing)

American Shad in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 5 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Spawning	April through June	Mean Monthly Flow (cfs)	Verona		10	Lower 40%							0.0	0.0	0.0			
			Freeport		10	Lower 40%							0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Feather River Confluence	60-70		All Years							0.0	0.0	0.0			
			Freeport	60-70		All Years							0.0	0.0	0.0			
Juvenile Rearing and Downstream Movement	Year-Round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	63-77		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport	63-77		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

[1]Water temperature ranges are evaluated by calculating the net change in the probability of water temperatures occurring within the specified range.

Table 196 Existing Condtions-Alternative 5 (Existing)

Striped Bass in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 5 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Spawning	April through June	Mean Monthly Flow (cfs)	Verona		10	Lower 40%							0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Feather River Confluence	59-68		All Years							0.0	0.0	0.0			
Juvenile Rearing and Downstream Movement	Year-round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	61-71		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

[1]Water temperature ranges are evaluated by calculating the net change in the probability of water temperatures occurring within the specified range.

Table 201 Existing Condtions-Alternative 5 (Existing)

Alternative 5 (Existing) vs Existing Condtions
Sacramento River at Verona, Monthly Flow

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
-1.0 < X < 1.0	100.0	85.4	54.9	43.9	41.5	54.9	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	0.0	14.6	42.7	56.1	56.1	41.5	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	-14.6	-42.7	-56.1	-56.1	-41.5	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Low Flows (Upper 40% of Distribution)												
-1.0 < X < 1.0	100.0	100.0	100.0	84.8	54.5	75.8	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	0.0	0.0	0.0	15.2	39.4	21.2	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	0.0	0.0	-15.2	-39.4	-21.2	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 202 Existing Condtions-Alternative 5 (Existing)

Alternative 5 (Existing) vs Existing Condtions
Sacramento River at Freeport, Monthly Flow

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
-1.0 < X < 1.0	100.0	84.1	58.5	45.1	43.9	63.4	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	0.0	14.6	40.2	54.9	54.9	30.5	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	-14.6	-40.2	-54.9	-54.9	-30.5	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Low Flows (Upper 40% of Distribution)												
-1.0 < X < 1.0	100.0	100.0	100.0	84.8	57.6	90.9	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	0.0	0.0	0.0	15.2	42.4	6.1	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	0.0	0.0	-15.2	-42.4	-6.1	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Alternative 5 (Existing) vs Existing Condtions

Sacramento River at Feather River, Monthly Temperature

Exceedance of Water Temperature Index Values and Probability of Occurring within the Water Temperature Index Ranges

Existing Condtions

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	98.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	98.0	96.4	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	95.7	92.7	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	81.1	73.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	20.7	4.9	94.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	2.4	1.2	81.7	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	97.8	2.1	1.2	51.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	78.0	1.4	1.2	12.2	87.8	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	58.5	1.2	1.2	4.7	74.6	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	34.1	1.2	1.2	1.4	65.2	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	18.3	1.2	1.2	1.2	41.5	98.3	98.8	98.8	98.8	98.8	98.8
56	98.8	7.6	1.2	1.2	1.2	23.2	95.9	98.8	98.8	98.8	98.8	98.8
57	98.8	2.4	1.2	1.2	1.2	14.0	94.7	98.8	98.8	98.8	98.8	98.8
58	98.8	1.2	1.2	1.2	1.2	5.5	86.6	98.8	98.8	98.8	98.8	98.8
59	96.7	1.2	1.2	1.2	1.2	3.2	77.6	98.8	98.8	98.8	98.8	98.8
60	85.4	1.2	1.2	1.2	1.2	2.4	68.3	98.8	98.8	98.8	98.8	98.8
61	62.8	1.2	1.2	1.2	1.2	1.8	57.3	98.8	98.8	98.8	98.8	98.8
62	44.5	1.2	1.2	1.2	1.2	1.2	43.9	98.0	98.8	98.8	98.8	98.8
63	23.2	1.2	1.2	1.2	1.2	1.2	35.4	96.9	98.8	98.8	98.8	98.8
64	14.6	1.2	1.2	1.2	1.2	1.2	13.3	95.5	98.8	98.8	98.8	98.8
65	7.6	1.2	1.2	1.2	1.2	1.2	10.4	89.6	98.8	98.8	98.8	93.3
66	4.5	1.2	1.2	1.2	1.2	1.2	4.3	85.4	98.8	98.8	98.8	90.2
68	1.5	1.2	1.2	1.2	1.2	1.2	1.2	48.8	98.2	98.8	98.8	65.9
69	1.2	1.2	1.2	1.2	1.2	1.2	1.2	29.3	94.1	98.8	98.8	53.7
70	1.2	1.2	1.2	1.2	1.2	1.2	1.2	13.2	85.4	98.3	97.8	29.9
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	9.8	68.3	93.1	90.2	24.6
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	6.3	37.8	78.0	76.8	13.4
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	2.2	11.0	29.3	42.7	3.5
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.7	3.0	19.5	23.2	2.4
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	4.3	2.1	1.2
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	79.9	72.0	97.6	97.6	97.6	97.1	95.8	79.3	75.6	96.4
50-64	84.2	96.6	0.9	0.0	50.0	97.6	85.5	3.3	0.0	0.0	0.0	0.0
55-56	0.0	10.7	0.0	0.0	0.0	18.3	2.4	0.0	0.0	0.0	0.0	0.0
59-64	82.1	0.0	0.0	0.0	0.0	2.0	64.3	3.3	0.0	0.0	0.0	0.0
59-68	95.2	0.0	0.0	0.0	0.0	2.0	76.4	50.0	0.6	0.0	0.0	32.9
59-75	95.5	0.0	0.0	0.0	0.0	2.0	76.4	97.1	95.8	79.3	75.6	96.4
60-70	84.2	0.0	0.0	0.0	0.0	1.2	67.1	85.6	13.4	0.5	1.0	68.9
61-71	61.6	0.0	0.0	0.0	0.0	0.6	56.1	89.0	30.5	5.7	8.6	74.2
63-69	22.0	0.0	0.0	0.0	0.0	0.0	34.2	67.6	4.7	0.0	0.0	45.1
63-77	22.0	0.0	0.0	0.0	0.0	0.0	34.2	95.7	97.6	94.5	96.7	97.6
65-82	6.4	0.0	0.0	0.0	0.0	0.0	9.2	88.4	97.6	97.6	97.6	92.1
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.0	84.2	97.1	96.6	28.7
42-60	13.4	97.6	96.8	95.2	97.6	96.4	30.5	0.0	0.0	0.0	0.0	0.0
61-77	61.6	0.0	0.0	0.0	0.0	0.6	56.1	97.6	97.6	94.5	96.7	97.6

Alternative 5 (Existing)

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	98.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	98.0	96.4	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	95.7	92.7	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	81.1	73.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	20.7	4.9	94.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	2.4	1.2	81.7	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	97.8	2.1	1.2	51.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	78.0	1.4	1.2	12.2	87.8	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	58.5	1.2	1.2	4.7	74.6	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	34.1	1.2	1.2	1.4	65.2	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	18.3	1.2	1.2	1.2	41.5	98.3	98.8	98.8	98.8	98.8	98.8
56	98.8	7.6	1.2	1.2	1.2	23.2	95.9	98.8	98.8	98.8	98.8	98.8
57	98.8	2.4	1.2	1.2	1.2	14.0	94.7	98.8	98.8	98.8	98.8	98.8
58	98.8	1.2	1.2	1.2	1.2	5.5	86.6	98.8	98.8	98.8	98.8	98.8
59	96.7	1.2	1.2	1.2	1.2	3.2	77.6	98.8	98.8	98.8	98.8	98.8
60	85.4	1.2	1.2	1.2	1.2	2.4	68.3	98.8	98.8	98.8	98.8	98.8
61	62.8	1.2	1.2	1.2	1.2	1.8	57.3	98.8	98.8	98.8	98.8	98.8
62	44.5	1.2	1.2	1.2	1.2	1.2	43.9	98.0	98.8	98.8	98.8	98.8
63	23.2	1.2	1.2	1.2	1.2	1.2	35.4	96.9	98.8	98.8	98.8	98.8
64	14.6	1.2	1.2	1.2	1.2	1.2	13.3	95.5	98.8	98.8	98.8	98.8
65	7.6	1.2	1.2	1.2	1.2	1.2	10.4	89.6	98.8	98.8	98.8	93.3
66	4.5	1.2	1.2	1.2	1.2	1.2	4.3	85.4	98.8	98.8	98.8	90.2
68	1.5	1.2	1.2	1.2	1.2	1.2	1.2	48.8	98.2	98.8	98.8	65.9
69	1.2	1.2	1.2	1.2	1.2	1.2	1.2	29.3	94.1	98.8	98.8	53.7
70	1.2	1.2	1.2	1.2	1.2	1.2	1.2	13.2	85.4	98.3	97.8	29.9
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	9.8	68.3	93.1	90.2	24.6
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	6.3	37.8	78.0	76.8	13.4
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	2.2	11.0	29.3	42.7	3.5
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.7	3.0	19.5	23.2	2.4
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	4.3	2.1	1.2
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	79.9	72.0	97.6	97.6	97.6	97.1	95.8	79.3	75.6	96.4
50-64	84.2	96.6	0.9	0.0	50.0	97.6	85.5	3.3	0.0	0.0	0.0	0.0
55-56	0.0	10.7	0.0	0.0	0.0	18.3	2.4	0.0	0.0	0.0	0.0	0.0
59-64	82.1	0.0	0.0	0.0	0.0	2.0	64.3	3.3	0.0	0.0	0.0	0.0
59-68	95.2	0.0	0.0	0.0	0.0	2.0	76.4	50.0	0.6	0.0	0.0	32.9
59-75	95.5	0.0	0.0	0.0	0.0	2.0	76.4	97.1	95.8	79.3	75.6	96.4
60-70	84.2	0.0	0.0	0.0	0.0	1.2	67.1	85.6	13.4	0.5	1.0	68.9
61-71	61.6	0.0	0.0	0.0	0.0	0.6	56.1	89.0	30.5	5.7	8.6	74.2
63-69	22.0	0.0	0.0	0.0	0.0	0.0	34.2	67.6	4.7	0.0	0.0	45.1
63-77	22.0	0.0	0.0	0.0	0.0	0.0	34.2	95.7	97.6	94.5	96.7	97.6
65-82	6.4	0.0	0.0	0.0	0.0	0.0	9.2	88.4	97.6	97.6	97.6	92.1
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.0	84.2	97.1	96.6	28.7
42-60	13.4	97.6	96.8	95.2	97.6	96.4	30.5	0.0	0.0	0.0	0.0	0.0
61-77	61.6	0.0	0.0	0.0	0.0	0.6	56.1	97.6	97.6	94.5	96.7	97.6

Alternative 5 (Existing) - Existing Condtions

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
43	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
48	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
49	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
52	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
53	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
54	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
56	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
57	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
58	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
62	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
66	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
68	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
72	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
74	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
86	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
88	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
98	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45-75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50-64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55-56	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-68	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60-70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61-71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63-69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
65-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42-60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Alternative 5 (Existing) vs Existing Condtions

Sacramento River at Freeport, Monthly Temperature

Exceedance of Water Temperature Index Values and Probability of Occurring within the Water Temperature Index Ranges

Existing Condtions

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	97.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	97.8	96.4	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	93.9	91.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	79.9	73.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	22.0	5.5	95.3	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	3.0	1.2	80.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	98.0	2.0	1.2	47.6	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	82.9	1.2	1.2	13.4	92.1	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	64.6	1.2	1.2	6.7	75.3	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	39.0	1.2	1.2	2.3	64.6	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	22.8	1.2	1.2	1.2	45.1	98.3	98.8	98.8	98.8	98.8	98.8
56	98.8	11.0	1.2	1.2	1.2	24.4	96.5	98.8	98.8	98.8	98.8	98.8
57	98.8	3.3	1.2	1.2	1.2	14.1	94.2	98.8	98.8	98.8	98.8	98.8
58	98.8	1.2	1.2	1.2	1.2	8.0	86.6	98.8	98.8	98.8	98.8	98.8
59	98.8	1.2	1.2	1.2	1.2	4.5	78.0	98.8	98.8	98.8	98.8	98.8
60	95.1	1.2	1.2	1.2	1.2	3.2	71.2	98.8	98.8	98.8	98.8	98.8
61	74.4	1.2	1.2	1.2	1.2	2.2	57.3	98.8	98.8	98.8	98.8	98.8
62	54.9	1.2	1.2	1.2	1.2	1.4	47.6	98.8	98.8	98.8	98.8	98.8
63	42.7	1.2	1.2	1.2	1.2	1.2	31.7	97.7	98.8	98.8	98.8	98.8
64	20.7	1.2	1.2	1.2	1.2	1.2	20.7	95.1	98.8	98.8	98.8	98.8
65	14.0	1.2	1.2	1.2	1.2	1.2	12.8	92.7	98.8	98.8	98.8	97.6
66	5.5	1.2	1.2	1.2	1.2	1.2	6.7	84.1	98.8	98.8	98.8	94.7
68	1.7	1.2	1.2	1.2	1.2	1.2	1.2	57.3	98.8	98.8	98.8	81.3
69	1.2	1.2	1.2	1.2	1.2	1.2	1.2	30.5	96.9	98.8	98.8	68.3
70	1.2	1.2	1.2	1.2	1.2	1.2	1.2	15.9	89.8	98.8	98.8	47.6
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	11.4	84.1	98.8	97.9	26.8
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	7.0	64.6	97.6	91.5	18.3
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.0	20.7	61.0	57.7	4.3
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	2.4	9.8	34.1	39.0	1.4
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	10.4	7.3	1.2
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	78.7	72.0	97.6	97.6	97.6	96.4	89.0	64.7	59.8	97.4
50-64	78.1	96.8	0.8	0.0	46.4	97.6	78.1	3.7	0.0	0.0	0.0	0.0
55-56	0.0	11.8	0.0	0.0	0.0	20.7	1.8	0.0	0.0	0.0	0.0	0.0
59-64	78.1	0.0	0.0	0.0	0.0	3.3	57.3	3.7	0.0	0.0	0.0	0.0
59-68	97.1	0.0	0.0	0.0	0.0	3.3	76.8	41.5	0.0	0.0	0.0	17.5
59-75	97.6	0.0	0.0	0.0	0.0	3.3	76.8	96.4	89.0	64.7	59.8	97.4
60-70	93.9	0.0	0.0	0.0	0.0	2.0	70.0	82.9	9.0	0.0	0.0	51.2
61-71	73.2	0.0	0.0	0.0	0.0	1.0	56.1	87.4	14.7	0.0	0.9	72.0
63-69	41.5	0.0	0.0	0.0	0.0	0.0	30.5	67.2	1.9	0.0	0.0	30.5
63-77	41.5	0.0	0.0	0.0	0.0	0.0	30.5	96.5	97.6	88.4	91.5	97.6
65-82	12.8	0.0	0.0	0.0	0.0	0.0	11.6	91.5	97.6	97.6	97.6	96.4
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.7	88.6	97.6	97.6	46.4
42-60	3.7	97.6	96.6	95.2	97.6	95.6	27.6	0.0	0.0	0.0	0.0	0.0
61-77	73.2	0.0	0.0	0.0	0.0	1.0	56.1	97.6	97.6	88.4	91.5	97.6

Alternative 5 (Existing)

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	97.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	97.8	96.4	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	93.9	91.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	79.9	73.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	22.0	5.5	95.4	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	3.0	1.2	80.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	98.0	2.0	1.2	47.6	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	82.9	1.2	1.2	13.4	92.1	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	64.6	1.2	1.2	6.7	75.3	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	39.0	1.2	1.2	2.3	64.6	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	22.8	1.2	1.2	1.2	43.9	98.3	98.8	98.8	98.8	98.8	98.8
56	98.8	11.0	1.2	1.2	1.2	24.4	96.5	98.8	98.8	98.8	98.8	98.8
57	98.8	3.3	1.2	1.2	1.2	14.1	94.2	98.8	98.8	98.8	98.8	98.8
58	98.8	1.2	1.2	1.2	1.2	8.2	86.6	98.8	98.8	98.8	98.8	98.8
59	98.8	1.2	1.2	1.2	1.2	4.5	78.0	98.8	98.8	98.8	98.8	98.8
60	95.1	1.2	1.2	1.2	1.2	3.2	71.2	98.8	98.8	98.8	98.8	98.8
61	74.4	1.2	1.2	1.2	1.2	2.2	57.3	98.8	98.8	98.8	98.8	98.8
62	54.9	1.2	1.2	1.2	1.2	1.4	47.6	98.8	98.8	98.8	98.8	98.8
63	42.7	1.2	1.2	1.2	1.2	1.2	31.7	97.7	98.8	98.8	98.8	98.8
64	20.7	1.2	1.2	1.2	1.2	1.2	20.7	95.1	98.8	98.8	98.8	98.8
65	14.0	1.2	1.2	1.2	1.2	1.2	12.8	92.7	98.8	98.8	98.8	97.6
66	5.5	1.2	1.2	1.2	1.2	1.2	6.7	84.1	98.8	98.8	98.8	94.7
68	1.7	1.2	1.2	1.2	1.2	1.2	1.2	57.3	98.8	98.8	98.8	81.3
69	1.2	1.2	1.2	1.2	1.2	1.2	1.2	30.5	96.9	98.8	98.8	68.3
70	1.2	1.2	1.2	1.2	1.2	1.2	1.2	15.9	89.8	98.8	98.8	47.6
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	11.4	84.1	98.8	97.9	26.8
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	7.0	64.6	97.6	91.5	18.3
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.0	20.7	61.0	57.7	4.3
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	2.4	9.8	34.1	39.0	1.4
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	10.4	7.3	1.2
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	78.7	72.0	97.6	97.6	97.6	96.4	89.0	64.7	59.8	97.4
50-64	78.1	96.8	0.8	0.0	46.4	97.6	78.1	3.7	0.0	0.0	0.0	0.0
55-56	0.0	11.8	0.0	0.0	0.0	19.5	1.8	0.0	0.0	0.0	0.0	0.0
59-64	78.1	0.0	0.0	0.0	0.0	3.3	57.3	3.7	0.0	0.0	0.0	0.0
59-68	97.1	0.0	0.0	0.0	0.0	3.3	76.8	41.5	0.0	0.0	0.0	17.5
59-75	97.6	0.0	0.0	0.0	0.0	3.3	76.8	96.4	89.0	64.7	59.8	97.4
60-70	93.9	0.0	0.0	0.0	0.0	2.0	70.0	82.9	9.0	0.0	0.0	51.2
61-71	73.2	0.0	0.0	0.0	0.0	1.0	56.1	87.4	14.7	0.0	0.9	72.0
63-69	41.5	0.0	0.0	0.0	0.0	0.0	30.5	67.2	1.9	0.0	0.0	30.5
63-77	41.5	0.0	0.0	0.0	0.0	0.0	30.5	96.5	97.6	88.4	91.5	97.6
65-82	12.8	0.0	0.0	0.0	0.0	0.0	11.6	91.5	97.6	97.6	97.6	96.4
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.7	88.6	97.6	97.6	46.4
42-60	3.7	97.6	96.6	95.2	97.6	95.6	27.6	0.0	0.0	0.0	0.0	0.0
61-77	73.2	0.0	0.0	0.0	0.0	1.0	56.1	97.6	97.6	88.4	91.5	97.6

Alternative 5 (Existing) - Existing Condtions

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
43	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
48	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
49	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
52	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
53	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
54	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55	0.0	0.0	0.0	0.0	0.0	-1.2	0.0	0.0	0.0	0.0	0.0	0.0
56	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
57	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
58	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
59	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
62	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
66	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
68	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
72	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
74	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
86	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
88	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
98	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45-75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50-64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55-56	0.0	0.0	0.0	0.0	0.0	-1.2	0.0	0.0	0.0	0.0	0.0	0.0
59-64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-68	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60-70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61-71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63-69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
65-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42-60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 227 Existing Condtions-Alternative 5 (Existing)

Delta Smelt in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 5 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult	December through May	Mean Monthly Water Temperature (°F)	Sacramento River at Freeport	59-68		All Years			0.0	0.0	0.0	0.0	0.0	0.0				
		Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years			63.4	69.5	58.5	65.9	0.0	0.0				
	September through November	Mean Monthly X_2 (RKm)	X_2 between 74 km and 81 km	74-81		Wet and Above Normal Water Years	0.0	0.0										0.0
	December through February	Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<-5000 cfs		All Years			0.0	0.0	0.0							
Egg and Embryo	February through May	Mean Monthly Water Temperature (°F)	Sacramento River at Freeport	59-68		All Years					0.0	0.0	0.0	0.0				
Larval	March through June	Mean Monthly Water Temperature (°F)	Sacramento River at Freeport	59-68		All Years						0.0	0.0	0.0	0.0			
		Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<-1500 cfs		Dry and Critical Water Years						0.0	0.0	0.0	0.0			
		Mean Monthly Delta Outflow (cfs)	Delta		10	All Years						0.0	0.0	0.0	0.0			
Juvenile	May through July	Mean Monthly Water Temperature (°F)	Sacramento River at Freeport	59-68		All Years								0.0	0.0	0.0		
		Mean Monthly X_2 (RKm)	Changes in X_2 between RKm 65 and 80	0.5 RKm		All Years								0.0	0.0	0.0		

Table 228 Existing Condtions-Alternative 5 (Existing)

Longfin Smelt in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 5 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult	December through March	Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<-5000 cfs		All Years			0.0	0.0	0.0	0.0						
Larvae and Juvenile	April and May	Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<-1500 cfs		Dry and Critical Water Years							0.0	0.0				
				< 0 cfs		Dry and Critical Water Years							0.0	0.0				
	January through June	Mean Monthly X_2 (RKm)	X_2	< 75 RKm		All Years				0.0	0.0	0.0	0.0	0.0	0.0			
				< 75 RKm		Dry and Critical Water Years				0.0	0.0	0.0	0.0	0.0	0.0			

Table 229 Existing Condtions-Alternative 5 (Existing)

Winter-run Chinook Salmon in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 5 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	November through May	Mean Monthly Flow (cfs)	Rio Vista		10	Lower 40%		0.0	0.0	0.0	0.0	0.0	0.0	0.0				
		Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years		67.1	63.4	69.5	58.5	65.9	0.0	0.0				
		Mean Monthly Delta Outflow (cfs)	Delta		10	All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0				
		Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<2500 cfs		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0				

Table 230 Existing Condtions-Alternative 5 (Existing)

Spring-run Chinook Salmon in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 5 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	November through June	Mean Monthly Flow (cfs)	Rio Vista		10	Lower 40%		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
		Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years		67.1	63.4	69.5	58.5	65.9	0.0	0.0	0.0			
		Mean Monthly Delta Outflow (cfs)	Delta		10	All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
		Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<2500 cfs		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			

Table 231 Existing Condtions-Alternative 5 (Existing)

Fall- and Late Fall-run Chinook Salmon in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 5 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	November through June	Mean Monthly Flow (cfs)	Rio Vista		10	Lower 40%		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
		Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years		67.1	63.4	69.5	58.5	65.9	0.0	0.0	0.0			
		Mean Monthly Delta Outflow (cfs)	Delta		10	All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
		Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<2500 cfs		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Adult (San Joaquin River)	December through February	Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<-5000 cfs		All Years			0.0	0.0	0.0							

Table 232 Existing Condtions-Alternative 5 (Existing)

Steelhead in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 5 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	October through July	Mean Monthly Flow (cfs)	Rio Vista		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
		Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years	0.0	67.1	63.4	69.5	58.5	65.9	0.0	0.0	0.0	0.0		
		Mean Monthly Delta Outflow (cfs)	Delta		10	All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
		Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<2500 cfs		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		

Table 233 Existing Condtions-Alternative 5 (Existing)

Green Sturgeon in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 5 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	Year-round	Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years	0.0	67.1	63.4	69.5	58.5	65.9	0.0	0.0	0.0	0.0	0.0	0.0

Table 234 Existing Condtions-Alternative 5 (Existing)

White Sturgeon in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 5 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	April through June	Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years							0.0	0.0	0.0			

Table 235 Existing Condtions-Alternative 5 (Existing)

Splittail in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 5 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Spawning and Embryo Incubation	February through May	Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years					58.5	65.9	0.0	0.0				
Juvenile Rearing and Emigration	April through July	Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years							0.0	0.0	0.0	0.0		

Table 236 Existing Condtions-Alternative 5 (Existing)

American Shad in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 5 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Egg and Larvae	April through June	Mean Monthly X_2 (RKm)	Changes in X_2	1 RKm		All Years							0.0	0.0	0.0			

Table 237 Existing Condtions-Alternative 5 (Existing)

Striped Bass in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 5 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Egg and Larvae	April through June	Mean Monthly X_2 (RKm)	Changes in X_2	1 RKm		All Years							0.0	0.0	0.0			

Alternative 5 (Existing) vs Existing Condtions

Sacramento River at Freeport, Monthly Temperature

Exceedance of Water Temperature Index Values and Probability of Occurring within the Water Temperature Index Ranges

Existing Condtions

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	97.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	97.8	96.4	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	93.9	91.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	79.9	73.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	22.0	5.5	95.3	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	3.0	1.2	80.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	98.0	2.0	1.2	47.6	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	82.9	1.2	1.2	13.4	92.1	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	64.6	1.2	1.2	6.7	75.3	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	39.0	1.2	1.2	2.3	64.6	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	22.8	1.2	1.2	1.2	45.1	98.3	98.8	98.8	98.8	98.8	98.8
56	98.8	11.0	1.2	1.2	1.2	24.4	96.5	98.8	98.8	98.8	98.8	98.8
57	98.8	3.3	1.2	1.2	1.2	14.1	94.2	98.8	98.8	98.8	98.8	98.8
58	98.8	1.2	1.2	1.2	1.2	8.0	86.6	98.8	98.8	98.8	98.8	98.8
59	98.8	1.2	1.2	1.2	1.2	4.5	78.0	98.8	98.8	98.8	98.8	98.8
60	95.1	1.2	1.2	1.2	1.2	3.2	71.2	98.8	98.8	98.8	98.8	98.8
61	74.4	1.2	1.2	1.2	1.2	2.2	57.3	98.8	98.8	98.8	98.8	98.8
62	54.9	1.2	1.2	1.2	1.2	1.4	47.6	98.8	98.8	98.8	98.8	98.8
63	42.7	1.2	1.2	1.2	1.2	1.2	31.7	97.7	98.8	98.8	98.8	98.8
64	20.7	1.2	1.2	1.2	1.2	1.2	20.7	95.1	98.8	98.8	98.8	98.8
65	14.0	1.2	1.2	1.2	1.2	1.2	12.8	92.7	98.8	98.8	98.8	97.6
66	5.5	1.2	1.2	1.2	1.2	1.2	6.7	84.1	98.8	98.8	98.8	94.7
68	1.7	1.2	1.2	1.2	1.2	1.2	1.2	57.3	98.8	98.8	98.8	81.3
69	1.2	1.2	1.2	1.2	1.2	1.2	1.2	30.5	96.9	98.8	98.8	68.3
70	1.2	1.2	1.2	1.2	1.2	1.2	1.2	15.9	89.8	98.8	98.8	47.6
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	11.4	84.1	98.8	97.9	26.8
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	7.0	64.6	97.6	91.5	18.3
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.0	20.7	61.0	57.7	4.3
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	2.4	9.8	34.1	39.0	1.4
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	10.4	7.3	1.2
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	78.7	72.0	97.6	97.6	97.6	96.4	89.0	64.7	59.8	97.4
50-64	78.1	96.8	0.8	0.0	46.4	97.6	78.1	3.7	0.0	0.0	0.0	0.0
55-56	0.0	11.8	0.0	0.0	0.0	20.7	1.8	0.0	0.0	0.0	0.0	0.0
59-64	78.1	0.0	0.0	0.0	0.0	3.3	57.3	3.7	0.0	0.0	0.0	0.0
59-68	97.1	0.0	0.0	0.0	0.0	3.3	76.8	41.5	0.0	0.0	0.0	17.5
59-75	97.6	0.0	0.0	0.0	0.0	3.3	76.8	96.4	89.0	64.7	59.8	97.4
60-70	93.9	0.0	0.0	0.0	0.0	2.0	70.0	82.9	9.0	0.0	0.0	51.2
61-71	73.2	0.0	0.0	0.0	0.0	1.0	56.1	87.4	14.7	0.0	0.9	72.0
63-69	41.5	0.0	0.0	0.0	0.0	0.0	30.5	67.2	1.9	0.0	0.0	30.5
63-77	41.5	0.0	0.0	0.0	0.0	0.0	30.5	96.5	97.6	88.4	91.5	97.6
65-82	12.8	0.0	0.0	0.0	0.0	0.0	11.6	91.5	97.6	97.6	97.6	96.4
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.7	88.6	97.6	97.6	46.4
42-60	3.7	97.6	96.6	95.2	97.6	95.6	27.6	0.0	0.0	0.0	0.0	0.0
61-77	73.2	0.0	0.0	0.0	0.0	1.0	56.1	97.6	97.6	88.4	91.5	97.6

Alternative 5 (Existing)

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	97.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	97.8	96.4	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	93.9	91.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	79.9	73.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	22.0	5.5	95.4	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	3.0	1.2	80.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	98.0	2.0	1.2	47.6	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	82.9	1.2	1.2	13.4	92.1	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	64.6	1.2	1.2	6.7	75.3	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	39.0	1.2	1.2	2.3	64.6	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	22.8	1.2	1.2	1.2	43.9	98.3	98.8	98.8	98.8	98.8	98.8
56	98.8	11.0	1.2	1.2	1.2	24.4	96.5	98.8	98.8	98.8	98.8	98.8
57	98.8	3.3	1.2	1.2	1.2	14.1	94.2	98.8	98.8	98.8	98.8	98.8
58	98.8	1.2	1.2	1.2	1.2	8.2	86.6	98.8	98.8	98.8	98.8	98.8
59	98.8	1.2	1.2	1.2	1.2	4.5	78.0	98.8	98.8	98.8	98.8	98.8
60	95.1	1.2	1.2	1.2	1.2	3.2	71.2	98.8	98.8	98.8	98.8	98.8
61	74.4	1.2	1.2	1.2	1.2	2.2	57.3	98.8	98.8	98.8	98.8	98.8
62	54.9	1.2	1.2	1.2	1.2	1.4	47.6	98.8	98.8	98.8	98.8	98.8
63	42.7	1.2	1.2	1.2	1.2	1.2	31.7	97.7	98.8	98.8	98.8	98.8
64	20.7	1.2	1.2	1.2	1.2	1.2	20.7	95.1	98.8	98.8	98.8	98.8
65	14.0	1.2	1.2	1.2	1.2	1.2	12.8	92.7	98.8	98.8	98.8	97.6
66	5.5	1.2	1.2	1.2	1.2	1.2	6.7	84.1	98.8	98.8	98.8	94.7
68	1.7	1.2	1.2	1.2	1.2	1.2	1.2	57.3	98.8	98.8	98.8	81.3
69	1.2	1.2	1.2	1.2	1.2	1.2	1.2	30.5	96.9	98.8	98.8	68.3
70	1.2	1.2	1.2	1.2	1.2	1.2	1.2	15.9	89.8	98.8	98.8	47.6
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	11.4	84.1	98.8	97.9	26.8
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	7.0	64.6	97.6	91.5	18.3
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.0	20.7	61.0	57.7	4.3
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	2.4	9.8	34.1	39.0	1.4
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	10.4	7.3	1.2
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	78.7	72.0	97.6	97.6	97.6	96.4	89.0	64.7	59.8	97.4
50-64	78.1	96.8	0.8	0.0	46.4	97.6	78.1	3.7	0.0	0.0	0.0	0.0
55-56	0.0	11.8	0.0	0.0	0.0	19.5	1.8	0.0	0.0	0.0	0.0	0.0
59-64	78.1	0.0	0.0	0.0	0.0	3.3	57.3	3.7	0.0	0.0	0.0	0.0
59-68	97.1	0.0	0.0	0.0	0.0	3.3	76.8	41.5	0.0	0.0	0.0	17.5
59-75	97.6	0.0	0.0	0.0	0.0	3.3	76.8	96.4	89.0	64.7	59.8	97.4
60-70	93.9	0.0	0.0	0.0	0.0	2.0	70.0	82.9	9.0	0.0	0.0	51.2
61-71	73.2	0.0	0.0	0.0	0.0	1.0	56.1	87.4	14.7	0.0	0.9	72.0
63-69	41.5	0.0	0.0	0.0	0.0	0.0	30.5	67.2	1.9	0.0	0.0	30.5
63-77	41.5	0.0	0.0	0.0	0.0	0.0	30.5	96.5	97.6	88.4	91.5	97.6
65-82	12.8	0.0	0.0	0.0	0.0	0.0	11.6	91.5	97.6	97.6	97.6	96.4
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.7	88.6	97.6	97.6	46.4
42-60	3.7	97.6	96.6	95.2	97.6	95.6	27.6	0.0	0.0	0.0	0.0	0.0
61-77	73.2	0.0	0.0	0.0	0.0	1.0	56.1	97.6	97.6	88.4	91.5	97.6

Alternative 5 (Existing) - Existing Condtions

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
43	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
48	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
49	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
52	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
53	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
54	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55	0.0	0.0	0.0	0.0	0.0	-1.2	0.0	0.0	0.0	0.0	0.0	0.0
56	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
57	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
58	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
59	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
62	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
66	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
68	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
72	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
74	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
86	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
88	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
98	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45-75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50-64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55-56	0.0	0.0	0.0	0.0	0.0	-1.2	0.0	0.0	0.0	0.0	0.0	0.0
59-64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-68	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60-70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61-71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63-69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
65-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42-60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 239 Existing Condtions-Alternative 5 (Existing)

Alternative 5 (Existing) vs Existing Condtions
Sacramento River at Rio Vista, Monthly Flow

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
-1.0 < X < 1.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Low Flows (Upper 40% of Distribution)												
-1.0 < X < 1.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 240 Existing Condtions-Alternative 5 (Existing)

Alternative 5 (Existing) vs Existing Condtions
Yolo Bypass, Monthly Flow

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
-1.0 < X < 1.0	100.0	30.5	30.5	18.3	28.0	22.0	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	67.1	63.4	69.5	58.5	65.9	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	0.0	69.5	69.5	81.7	72.0	78.0	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	69.5	69.5	81.7	72.0	78.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	67.1	63.4	69.5	58.5	65.9	0.0	0.0	0.0	0.0	0.0	0.0
Low Flows (Upper 40% of Distribution)												
-1.0 < X < 1.0	100.0	75.8	63.6	24.2	30.3	15.2	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	24.2	36.4	75.8	69.7	84.8	0.0	0.0	0.0	0.0	0.0	0.0
X>1 (Total %)	0.0	24.2	36.4	75.8	69.7	84.8	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	24.2	36.4	75.8	69.7	84.8	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	24.2	36.4	75.8	69.7	84.8	0.0	0.0	0.0	0.0	0.0	0.0

Table 241 Existing Condtions-Alternative 5 (Existing)

Alternative 5 (Existing) vs Existing Condtions
Delta Outflow, Monthly Flow

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
-1.0 < X < 1.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Low Flows (Upper 40% of Distribution)												
-1.0 < X < 1.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Long-Term and Water Year-Type Average of Sacramento River Delta Inflow Under Existing - Base and Existing - Alternative 6

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Existing - Base	11,300	15,746	24,309	34,221	41,784	35,394	22,062	13,364	12,597	19,584	13,697	16,482	15,659
Existing - Alternative 6	11,300	15,505	23,414	32,641	39,954	34,546	22,062	13,363	12,597	19,584	13,697	16,482	15,338
Difference	0	-241	-895	-1,580	-1,830	-848	0	0	0	0	0	0	-321
Percent Difference	0%	-2%	-4%	-5%	-4%	-2%	0%	0%	0%	0%	0%	0%	-2%
							Water Year-Types						
Wet													
Existing - Base	13,018	22,069	42,432	56,542	64,112	52,430	36,791	18,384	13,640	21,152	15,520	26,010	22,938
Existing - Alternative 6	13,018	21,442	40,245	53,999	62,030	51,412	36,791	18,384	13,639	21,152	15,520	26,010	22,431
Difference	0	-626	-2,186	-2,543	-2,083	-1,018	0	0	0	0	0	0	-507
Percent Difference	0%	-3%	-5%	-4%	-3%	-2%	0%	0%	0%	0%	0%	0%	-2%
Above Normal													
Existing - Base	11,695	14,566	23,212	43,774	51,354	46,254	22,271	14,655	13,070	22,489	16,033	18,988	17,937
Existing - Alternative 6	11,695	14,463	22,434	41,027	48,230	44,900	22,271	14,655	13,069	22,489	16,033	18,988	17,456
Difference	0	-104	-778	-2,747	-3,123	-1,354	0	0	-1	0	0	0	-481
Percent Difference	0%	-1%	-3%	-6%	-6%	-3%	0%	0%	0%	0%	0%	0%	-3%
Below Normal													
Existing - Base	10,841	14,747	16,484	23,799	32,584	29,126	18,090	11,885	12,782	22,589	15,187	12,013	13,248
Existing - Alternative 6	10,841	14,630	16,145	22,633	30,897	28,166	18,090	11,885	12,782	22,590	15,188	12,014	12,995
Difference	0	-117	-339	-1,166	-1,687	-960	0	-1	0	0	0	0	-253
Percent Difference	0%	-1%	-2%	-5%	-5%	-3%	0%	0%	0%	0%	0%	0%	-2%
Dry													
Existing - Base	10,423	12,567	14,687	17,727	27,798	23,027	11,912	10,212	12,472	17,228	11,469	10,994	10,852
Existing - Alternative 6	10,423	12,516	14,511	17,165	26,243	22,399	11,912	10,211	12,472	17,228	11,469	10,994	10,678
Difference	0	-51	-175	-562	-1,555	-628	0	-1	0	0	0	0	-174
Percent Difference	0%	0%	-1%	-3%	-6%	-3%	0%	0%	0%	0%	0%	0%	-2%
Critical													
Existing - Base	9,149	9,410	11,565	14,920	17,376	14,410	10,330	7,910	9,857	12,298	8,422	7,772	8,039
Existing - Alternative 6	9,148	9,403	11,495	14,570	16,800	14,286	10,330	7,910	9,857	12,298	8,421	7,772	7,972
Difference	0	-7	-70	-350	-576	-125	0	0	0	0	-1	0	-67
Percent Difference	0%	0%	-1%	-2%	-3%	-1%	0%	0%	0%	0%	0%	0%	-1%

Sacramento River Delta Inflow

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	14,603	22,010	56,115	71,084	75,521	65,784	49,402	23,850	14,772	24,306	16,775	28,029
20%	13,619	18,623	35,016	61,750	67,715	57,900	35,366	14,647	13,790	23,675	16,437	24,442
30%	12,912	17,392	24,392	45,490	58,539	48,511	24,073	12,554	13,215	23,166	15,988	22,307
40%	12,254	15,897	19,607	34,106	50,381	38,401	16,613	11,092	12,891	22,072	15,543	18,189
50%	11,265	14,221	17,083	26,083	35,167	28,964	13,801	10,661	12,353	20,699	15,010	13,962
60%	10,411	12,217	14,976	20,006	27,645	22,764	12,349	10,122	11,925	19,938	14,452	12,771
70%	8,888	10,901	14,365	15,735	23,924	20,351	11,386	9,739	11,469	18,857	12,942	10,172
80%	7,935	8,613	10,704	13,922	18,176	16,100	10,880	9,315	11,081	14,287	9,192	9,276
90%	6,415	7,211	9,575	11,915	16,074	12,014	9,372	8,228	10,168	12,060	8,272	8,038
Long Term												
Full Simulation Period	11,300	15,746	24,309	34,221	41,784	35,394	22,062	13,364	12,597	19,584	13,697	16,482
Water Year Types												
Wet	13,018	22,069	42,432	56,542	64,112	52,430	36,791	18,384	13,640	21,152	15,520	26,010
Above Normal	11,695	14,566	23,212	43,774	51,354	46,254	22,271	14,655	13,070	22,489	16,033	18,988
Below Normal	10,841	14,747	16,484	23,799	32,584	29,126	18,090	11,885	12,782	22,589	15,187	12,013
Dry	10,423	12,567	14,687	17,727	27,798	23,027	11,912	10,212	12,472	17,228	11,469	10,994
Critical	9,149	9,410	11,565	14,920	17,376	14,410	10,330	7,910	9,857	12,298	8,422	7,772

Existing - Alternative 6

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	14,603	21,484	52,453	67,804	75,312	64,986	49,402	23,850	14,772	24,306	16,775	28,030
20%	13,619	18,502	32,316	56,215	65,001	56,368	35,366	14,647	13,791	23,675	16,437	24,446
30%	12,912	17,334	23,252	42,165	55,865	47,029	24,073	12,554	13,215	23,166	15,989	22,307
40%	12,254	15,835	19,192	30,893	45,967	35,820	16,613	11,092	12,892	22,073	15,543	18,188
50%	11,265	14,175	16,600	24,743	31,640	28,307	13,801	10,661	12,351	20,700	15,010	13,962
60%	10,411	12,206	14,826	19,477	26,106	22,397	12,349	10,117	11,925	19,940	14,452	12,772
70%	8,886	10,894	14,270	15,523	22,746	20,118	11,386	9,739	11,469	18,857	12,942	10,172
80%	7,935	8,607	10,647	13,864	17,889	15,910	10,880	9,315	11,081	14,287	9,192	9,276
90%	6,414	7,207	9,569	11,886	15,859	11,991	9,372	8,227	10,168	12,056	8,273	8,038
Long Term												
Full Simulation Period	11,300	15,505	23,414	32,641	39,954	34,546	22,062	13,363	12,597	19,584	13,697	16,482
Water Year Types												
Wet	13,018	21,442	40,245	53,999	62,030	51,412	36,791	18,384	13,639	21,152	15,520	26,010
Above Normal	11,695	14,463	22,434	41,027	48,230	44,900	22,271	14,655	13,069	22,489	16,033	18,988
Below Normal	10,841	14,630	16,145	22,633	30,897	28,166	18,090	11,885	12,782	22,590	15,188	12,014
Dry	10,423	12,516	14,511	17,165	26,243	22,399	11,912	10,211	12,472	17,228	11,469	10,994
Critical	9,148	9,403	11,495	14,570	16,800	14,286	10,330	7,910	9,857	12,298	8,421	7,772

Existing - Alternative 6 Minus Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	-526	-3,662	-3,280	-209	-798	0	0	0	0	0	0
20%	0	-121	-2,700	-5,535	-2,714	-1,533	0	0	1	0	0	4
30%	0	-57	-1,140	-3,326	-2,675	-1,481	0	0	0	0	1	0
40%	0	-62	-414	-3,213	-4,414	-2,581	0	0	1	1	0	-1
50%	0	-45	-483	-1,340	-3,527	-658	0	0	-1	0	0	0
60%	0	-11	-149	-529	-1,539	-366	0	-5	0	2	0	0
70%	-1	-7	-95	-212	-1,179	-233	0	0	0	0	0	0
80%	0	-6	-56	-58	-287	-189	0	0	0	1	0	0
90%	-1	-4	-7	-29	-215	-23	0	-1	0	-4	0	0
Long Term												
Full Simulation Period	0	-241	-895	-1,580	-1,830	-848	0	0	0	0	0	0
Water Year Types												
Wet	0	-626	-2,186	-2,543	-2,083	-1,018	0	0	0	0	0	0
Above Normal	0	-104	-778	-2,747	-3,123	-1,354	0	0	-1	0	0	0
Below Normal	0	-117	-339	-1,166	-1,687	-960	0	-1	0	0	0	1
Dry	0	-51	-175	-562	-1,555	-628	0	-1	0	0	0	0
Critical	0	-7	-70	-350	-576	-125	0	0	0	0	-1	0

Long-Term and Water Year-Type Average of Total CVP Deliveries North of the Delta Under Existing - Base and Existing - Alternative 6

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Existing - Base	1,506	726	389	234	244	337	5,113	5,599	7,987	7,932	5,983	2,046	2,310
Existing - Alternative 6	1,506	726	389	234	244	337	5,113	5,599	7,987	7,932	5,983	2,046	2,310
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
							Water Year-Types						
Wet													
Existing - Base	1,429	662	371	227	244	288	4,682	5,765	8,463	8,473	6,484	2,288	2,388
Existing - Alternative 6	1,429	662	371	227	244	288	4,682	5,765	8,463	8,473	6,484	2,288	2,388
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal													
Existing - Base	1,514	755	372	241	246	248	5,081	5,804	8,436	8,340	6,266	2,355	2,404
Existing - Alternative 6	1,514	755	372	241	246	248	5,081	5,804	8,436	8,340	6,266	2,355	2,404
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal													
Existing - Base	1,527	728	407	242	236	344	5,193	5,744	7,967	7,969	6,039	1,879	2,321
Existing - Alternative 6	1,527	728	407	242	236	344	5,193	5,744	7,967	7,969	6,039	1,879	2,321
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry													
Existing - Base	1,639	783	406	238	254	339	5,398	5,578	7,778	7,583	5,755	1,910	2,283
Existing - Alternative 6	1,639	783	406	238	254	339	5,399	5,578	7,778	7,583	5,755	1,910	2,283
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical													
Existing - Base	1,452	754	396	225	239	517	5,551	4,869	6,853	6,811	4,881	1,649	2,072
Existing - Alternative 6	1,452	754	396	225	239	517	5,551	4,869	6,853	6,811	4,881	1,649	2,072
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Total CVP Deliveries North of the Delta

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	1,875	950	506	303	270	646	6,661	6,327	8,826	8,986	6,821	2,514
20%	1,791	902	457	252	262	436	6,057	6,182	8,524	8,506	6,466	2,380
30%	1,670	825	415	242	253	362	5,755	6,062	8,346	8,239	6,271	2,266
40%	1,605	764	399	236	243	254	5,461	5,909	8,191	8,069	6,139	2,204
50%	1,488	711	379	219	239	243	5,255	5,729	8,016	7,974	6,015	2,112
60%	1,404	638	353	215	238	225	4,910	5,521	7,869	7,870	5,949	1,996
70%	1,351	624	339	213	233	214	4,748	5,297	7,762	7,634	5,741	1,840
80%	1,239	572	311	209	223	212	4,333	5,078	7,482	7,356	5,573	1,735
90%	1,142	543	299	200	206	205	3,074	4,689	7,086	7,108	5,323	1,572
Long Term												
Full Simulation Period	1,506	726	389	234	244	337	5,113	5,599	7,987	7,932	5,983	2,046
Water Year Types												
Wet	1,429	662	371	227	244	288	4,682	5,765	8,463	8,473	6,484	2,288
Above Normal	1,514	755	372	241	246	248	5,081	5,804	8,436	8,340	6,266	2,355
Below Normal	1,527	728	407	242	236	344	5,193	5,744	7,967	7,969	6,039	1,879
Dry	1,639	783	406	238	254	339	5,398	5,578	7,778	7,583	5,755	1,910
Critical	1,452	754	396	225	239	517	5,551	4,869	6,853	6,811	4,881	1,649

Existing - Alternative 6

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	1,875	950	506	303	270	646	6,661	6,327	8,826	8,986	6,821	2,514
20%	1,791	902	457	252	262	436	6,057	6,182	8,524	8,506	6,466	2,380
30%	1,670	825	415	242	253	362	5,755	6,062	8,346	8,239	6,271	2,266
40%	1,605	764	399	236	243	254	5,461	5,909	8,191	8,069	6,139	2,204
50%	1,488	711	379	219	239	243	5,255	5,729	8,016	7,974	6,015	2,112
60%	1,404	638	353	215	238	225	4,910	5,521	7,869	7,870	5,949	1,996
70%	1,351	624	339	213	233	214	4,748	5,297	7,762	7,633	5,741	1,840
80%	1,239	572	311	209	223	212	4,333	5,078	7,482	7,356	5,573	1,735
90%	1,142	543	299	200	206	205	3,074	4,689	7,086	7,108	5,323	1,572
Long Term												
Full Simulation Period	1,506	726	389	234	244	337	5,113	5,599	7,987	7,932	5,983	2,046
Water Year Types												
Wet	1,429	662	371	227	244	288	4,682	5,765	8,463	8,473	6,484	2,288
Above Normal	1,514	755	372	241	246	248	5,081	5,804	8,436	8,340	6,266	2,355
Below Normal	1,527	728	407	242	236	344	5,193	5,744	7,967	7,969	6,039	1,879
Dry	1,639	783	406	238	254	339	5,399	5,578	7,778	7,583	5,755	1,910
Critical	1,452	754	396	225	239	517	5,551	4,869	6,853	6,811	4,881	1,649

Existing - Alternative 6 Minus Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types												
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

Long-Term and Water Year-Type Average of Total CVP Deliveries South of the Delta Under Existing - Base and Existing - Alternative 6

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Existing - Base	2,670	1,585	1,151	1,274	1,718	2,083	2,592	3,755	5,447	5,876	5,010	3,413	2,214
Existing - Alternative 6	2,670	1,585	1,151	1,274	1,718	2,083	2,592	3,755	5,447	5,876	5,010	3,413	2,214
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
							Water Year-Types						
Wet													
Existing - Base	2,755	1,649	1,228	1,396	1,873	2,512	3,205	4,634	6,886	7,631	6,265	3,879	2,659
Existing - Alternative 6	2,755	1,649	1,228	1,396	1,873	2,512	3,205	4,634	6,886	7,631	6,265	3,879	2,659
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal													
Existing - Base	2,740	1,643	1,230	1,404	1,877	2,297	2,904	4,175	6,129	6,509	5,394	3,647	2,418
Existing - Alternative 6	2,740	1,643	1,230	1,404	1,877	2,297	2,904	4,175	6,129	6,509	5,394	3,647	2,418
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal													
Existing - Base	2,645	1,562	1,118	1,218	1,646	1,988	2,471	3,625	5,220	5,601	4,904	3,373	2,141
Existing - Alternative 6	2,645	1,562	1,118	1,218	1,646	1,988	2,471	3,625	5,220	5,601	4,904	3,373	2,141
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry													
Existing - Base	2,688	1,598	1,166	1,297	1,747	1,770	2,122	3,136	4,412	4,658	4,213	3,129	1,932
Existing - Alternative 6	2,688	1,598	1,166	1,297	1,747	1,770	2,122	3,136	4,412	4,658	4,213	3,129	1,932
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical													
Existing - Base	2,437	1,409	938	935	1,297	1,529	1,799	2,517	3,470	3,601	3,225	2,643	1,561
Existing - Alternative 6	2,437	1,409	938	935	1,297	1,530	1,799	2,517	3,470	3,601	3,225	2,643	1,561
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Total CVP Deliveries South of the Delta

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	3,146	1,963	1,635	2,053	2,691	2,610	3,618	5,163	7,758	8,677	7,137	4,150
20%	2,897	1,760	1,366	1,613	2,139	2,431	3,098	4,370	6,449	7,106	5,875	3,750
30%	2,806	1,682	1,266	1,459	1,962	2,286	2,896	4,123	6,046	6,611	5,562	3,619
40%	2,755	1,638	1,209	1,371	1,849	2,177	2,733	3,975	5,804	6,294	5,232	3,541
50%	2,710	1,604	1,162	1,288	1,756	2,076	2,580	3,826	5,555	6,004	5,081	3,470
60%	2,636	1,548	1,084	1,151	1,582	2,023	2,419	3,579	5,143	5,444	4,674	3,353
70%	2,541	1,475	989	1,037	1,429	1,845	2,206	3,268	4,641	4,993	4,281	3,203
80%	2,408	1,363	849	764	1,068	1,596	1,942	2,893	4,010	4,174	3,822	2,995
90%	2,252	1,229	699	587	870	1,506	1,727	2,417	3,277	3,388	3,199	2,749
Long Term												
Full Simulation Period	2,670	1,585	1,151	1,274	1,718	2,083	2,592	3,755	5,447	5,876	5,010	3,413
Water Year Types												
Wet	2,755	1,649	1,228	1,396	1,873	2,512	3,205	4,634	6,886	7,631	6,265	3,879
Above Normal	2,740	1,643	1,230	1,404	1,877	2,297	2,904	4,175	6,129	6,509	5,394	3,647
Below Normal	2,645	1,562	1,118	1,218	1,646	1,988	2,471	3,625	5,220	5,601	4,904	3,373
Dry	2,688	1,598	1,166	1,297	1,747	1,770	2,122	3,136	4,412	4,658	4,213	3,129
Critical	2,437	1,409	938	935	1,297	1,529	1,799	2,517	3,470	3,601	3,225	2,643

Existing - Alternative 6

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	3,146	1,963	1,635	2,053	2,691	2,610	3,618	5,163	7,758	8,677	7,137	4,150
20%	2,897	1,760	1,366	1,613	2,139	2,432	3,098	4,370	6,449	7,106	5,875	3,750
30%	2,806	1,682	1,266	1,459	1,962	2,286	2,896	4,123	6,046	6,611	5,562	3,619
40%	2,755	1,638	1,209	1,371	1,849	2,177	2,733	3,975	5,804	6,294	5,232	3,541
50%	2,710	1,604	1,162	1,288	1,756	2,076	2,580	3,826	5,555	6,004	5,080	3,470
60%	2,636	1,548	1,084	1,151	1,582	2,023	2,419	3,579	5,142	5,444	4,674	3,353
70%	2,541	1,475	989	1,038	1,429	1,845	2,206	3,268	4,641	4,993	4,281	3,203
80%	2,408	1,363	849	764	1,068	1,596	1,942	2,893	4,010	4,174	3,822	2,995
90%	2,252	1,229	699	587	870	1,506	1,727	2,417	3,277	3,388	3,199	2,749
Long Term												
Full Simulation Period	2,670	1,585	1,151	1,274	1,718	2,083	2,592	3,755	5,447	5,876	5,010	3,413
Water Year Types												
Wet	2,755	1,649	1,228	1,396	1,873	2,512	3,205	4,634	6,886	7,631	6,265	3,879
Above Normal	2,740	1,643	1,230	1,404	1,877	2,297	2,904	4,175	6,129	6,509	5,394	3,647
Below Normal	2,645	1,562	1,118	1,218	1,646	1,988	2,471	3,625	5,220	5,601	4,904	3,373
Dry	2,688	1,598	1,166	1,297	1,747	1,770	2,122	3,136	4,412	4,658	4,213	3,129
Critical	2,437	1,409	938	935	1,297	1,530	1,799	2,517	3,470	3,601	3,225	2,643

Existing - Alternative 6 Minus Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	-1	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types												
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

Long-Term and Water Year-Type Average of Total SWP Deliveries North of the Delta Under Existing - Base and Existing - Alternative 6

	Average Flow (cfs)												
Analysis Period	October	November	December	January	February	March	April	May	June	July	August	September	Total (TAF)
							Long-Term						
Full Simulation Period													
Existing - Base	1,449	1,463	935	345	14	92	2,122	2,685	3,217	3,169	2,515	1,874	1,205
Existing - Alternative 6	1,449	1,463	935	345	14	92	2,122	2,685	3,217	3,169	2,515	1,874	1,205
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
							Water Year-Types						
Wet													
Existing - Base	1,349	1,476	900	256	19	65	1,890	2,778	3,378	3,342	2,671	2,067	1,224
Existing - Alternative 6	1,349	1,476	900	256	19	65	1,890	2,778	3,378	3,342	2,671	2,067	1,224
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal													
Existing - Base	1,568	1,578	982	389	16	50	2,034	2,789	3,376	3,298	2,613	2,185	1,266
Existing - Alternative 6	1,568	1,578	982	389	16	50	2,034	2,789	3,376	3,298	2,613	2,185	1,266
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal													
Existing - Base	1,465	1,428	971	390	12	73	2,227	2,850	3,348	3,292	2,628	1,805	1,242
Existing - Alternative 6	1,465	1,428	971	390	12	73	2,227	2,850	3,348	3,292	2,628	1,805	1,242
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry													
Existing - Base	1,586	1,495	979	379	12	111	2,179	2,641	3,158	3,039	2,427	1,938	1,209
Existing - Alternative 6	1,586	1,495	979	379	12	111	2,179	2,641	3,158	3,039	2,427	1,938	1,209
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical													
Existing - Base	1,330	1,326	851	373	11	191	2,466	2,211	2,613	2,676	2,046	1,175	1,047
Existing - Alternative 6	1,330	1,326	851	373	11	191	2,466	2,211	2,613	2,676	2,046	1,175	1,047
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Total SWP Deliveries North of the Delta

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	2,189	2,095	1,377	634	20	199	3,028	3,131	3,658	3,564	2,851	2,296
20%	2,083	1,972	1,311	545	20	129	2,766	3,040	3,510	3,485	2,800	2,233
30%	1,852	1,922	1,250	477	20	46	2,505	2,979	3,442	3,371	2,692	2,181
40%	1,621	1,877	1,169	452	19	45	2,333	2,935	3,374	3,328	2,615	2,122
50%	1,432	1,754	1,079	398	15	45	2,110	2,816	3,323	3,263	2,577	2,061
60%	1,330	1,572	966	310	12	45	1,988	2,686	3,260	3,194	2,542	2,027
70%	1,282	1,409	822	167	11	40	1,822	2,594	3,160	3,138	2,504	1,909
80%	987	797	532	66	4	34	1,421	2,385	3,102	3,076	2,454	1,555
90%	442	188	85	4	3	26	1,141	1,928	2,974	2,941	2,194	1,007
Long Term												
Full Simulation Period	1,449	1,463	935	345	14	92	2,122	2,685	3,217	3,169	2,515	1,874
Water Year Types												
Wet	1,349	1,476	900	256	19	65	1,890	2,778	3,378	3,342	2,671	2,067
Above Normal	1,568	1,578	982	389	16	50	2,034	2,789	3,376	3,298	2,613	2,185
Below Normal	1,465	1,428	971	390	12	73	2,227	2,850	3,348	3,292	2,628	1,805
Dry	1,586	1,495	979	379	12	111	2,179	2,641	3,158	3,039	2,427	1,938
Critical	1,330	1,326	851	373	11	191	2,466	2,211	2,613	2,676	2,046	1,175

Existing - Alternative 6

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	2,189	2,095	1,377	634	20	199	3,028	3,131	3,658	3,564	2,851	2,296
20%	2,083	1,972	1,311	545	20	129	2,766	3,040	3,510	3,485	2,800	2,233
30%	1,852	1,922	1,250	477	20	46	2,505	2,979	3,442	3,371	2,692	2,181
40%	1,621	1,877	1,169	452	19	45	2,333	2,935	3,374	3,328	2,615	2,122
50%	1,432	1,754	1,079	398	15	45	2,110	2,816	3,323	3,263	2,577	2,061
60%	1,330	1,572	966	310	12	45	1,988	2,686	3,260	3,194	2,542	2,027
70%	1,282	1,409	822	167	11	40	1,822	2,594	3,160	3,138	2,504	1,909
80%	987	797	532	66	4	34	1,421	2,385	3,102	3,076	2,454	1,555
90%	442	188	85	4	3	26	1,141	1,928	2,974	2,941	2,194	1,007
Long Term												
Full Simulation Period	1,449	1,463	935	345	14	92	2,122	2,685	3,217	3,169	2,515	1,874
Water Year Types												
Wet	1,349	1,476	900	256	19	65	1,890	2,778	3,378	3,342	2,671	2,067
Above Normal	1,568	1,578	982	389	16	50	2,034	2,789	3,376	3,298	2,613	2,185
Below Normal	1,465	1,428	971	390	12	73	2,227	2,850	3,348	3,292	2,628	1,805
Dry	1,586	1,495	979	379	12	111	2,179	2,641	3,158	3,039	2,427	1,938
Critical	1,330	1,326	851	373	11	191	2,466	2,211	2,613	2,676	2,046	1,175

Existing - Alternative 6 Minus Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types												
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

Long-Term and Water Year-Type Average of Total SWP Deliveries South of the Delta Under Existing - Base and Existing - Alternative 6

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Existing - Base	4,044	3,416	3,459	465	782	1,284	2,414	3,688	5,146	5,640	5,790	4,893	2,486
Existing - Alternative 6	4,044	3,416	3,459	465	782	1,284	2,414	3,688	5,146	5,640	5,790	4,893	2,486
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
							Water Year-Types						
Wet													
Existing - Base	4,429	3,815	3,773	1,079	1,629	2,451	3,750	5,270	6,698	6,801	7,098	5,951	3,194
Existing - Alternative 6	4,429	3,815	3,773	1,079	1,629	2,451	3,750	5,270	6,698	6,801	7,098	5,951	3,194
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal													
Existing - Base	4,055	3,517	3,542	399	1,077	1,692	3,180	4,482	5,926	6,196	6,553	5,555	2,797
Existing - Alternative 6	4,055	3,517	3,542	399	1,077	1,692	3,180	4,482	5,926	6,196	6,553	5,555	2,797
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal													
Existing - Base	4,050	3,353	3,444	191	336	863	2,305	3,477	5,138	5,942	6,158	5,272	2,458
Existing - Alternative 6	4,050	3,353	3,444	191	336	863	2,305	3,477	5,138	5,943	6,158	5,272	2,458
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry													
Existing - Base	3,928	3,199	3,448	125	192	390	1,342	2,452	4,065	4,948	4,911	4,214	2,016
Existing - Alternative 6	3,928	3,199	3,448	125	192	390	1,342	2,452	4,065	4,947	4,911	4,214	2,016
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical													
Existing - Base	3,377	2,862	2,758	95	143	230	451	1,543	2,584	3,159	2,952	2,396	1,369
Existing - Alternative 6	3,377	2,862	2,758	95	143	230	451	1,543	2,584	3,159	2,952	2,396	1,369
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Total SWP Deliveries South of the Delta

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	6,129	4,776	5,541	1,795	2,061	2,896	4,442	6,100	7,671	7,647	7,791	6,656
20%	5,093	4,372	4,331	592	1,846	2,603	3,679	5,031	6,322	6,528	6,826	5,798
30%	4,839	4,258	4,035	298	1,268	2,451	3,368	4,703	5,924	6,380	6,690	5,674
40%	4,678	4,177	3,884	213	393	1,168	3,151	4,543	5,802	6,169	6,549	5,542
50%	4,500	3,770	3,634	162	279	571	2,400	3,888	5,493	6,078	6,448	5,390
60%	4,261	3,432	3,355	142	255	456	1,993	3,117	5,202	5,922	6,287	5,176
70%	3,403	2,780	2,818	114	214	382	1,694	2,408	4,265	5,525	5,649	4,826
80%	2,205	1,907	2,101	92	174	273	473	2,020	3,349	4,041	3,743	3,165
90%	1,545	1,239	1,379	80	110	207	380	1,631	2,705	3,286	3,008	2,186
Long Term												
Full Simulation Period	4,044	3,416	3,459	465	782	1,284	2,414	3,688	5,146	5,640	5,790	4,893
Water Year Types												
Wet	4,429	3,815	3,773	1,079	1,629	2,451	3,750	5,270	6,698	6,801	7,098	5,951
Above Normal	4,055	3,517	3,542	399	1,077	1,692	3,180	4,482	5,926	6,196	6,553	5,555
Below Normal	4,050	3,353	3,444	191	336	863	2,305	3,477	5,138	5,942	6,158	5,272
Dry	3,928	3,199	3,448	125	192	390	1,342	2,452	4,065	4,948	4,911	4,214
Critical	3,377	2,862	2,758	95	143	230	451	1,543	2,584	3,159	2,952	2,396

Existing - Alternative 6

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	6,129	4,776	5,541	1,795	2,061	2,896	4,442	6,100	7,671	7,647	7,791	6,656
20%	5,093	4,372	4,331	593	1,846	2,603	3,679	5,031	6,322	6,528	6,826	5,798
30%	4,839	4,258	4,034	298	1,268	2,451	3,368	4,703	5,924	6,380	6,690	5,674
40%	4,678	4,177	3,884	213	393	1,168	3,151	4,543	5,802	6,169	6,549	5,542
50%	4,500	3,770	3,634	162	279	571	2,400	3,888	5,492	6,078	6,449	5,390
60%	4,261	3,432	3,355	142	255	456	1,994	3,117	5,202	5,922	6,287	5,176
70%	3,403	2,780	2,818	114	214	382	1,694	2,408	4,265	5,525	5,649	4,826
80%	2,203	1,907	2,101	92	174	273	473	2,020	3,349	4,041	3,743	3,165
90%	1,545	1,239	1,379	80	110	207	380	1,631	2,705	3,286	3,008	2,186
Long Term												
Full Simulation Period	4,044	3,416	3,459	465	782	1,284	2,414	3,688	5,146	5,640	5,790	4,893
Water Year Types												
Wet	4,429	3,815	3,773	1,079	1,629	2,451	3,750	5,270	6,698	6,801	7,098	5,951
Above Normal	4,055	3,517	3,542	399	1,077	1,692	3,180	4,482	5,926	6,196	6,553	5,555
Below Normal	4,050	3,353	3,444	191	336	863	2,305	3,477	5,138	5,943	6,158	5,272
Dry	3,928	3,199	3,448	125	192	390	1,342	2,452	4,065	4,947	4,911	4,214
Critical	3,377	2,862	2,758	95	143	230	451	1,543	2,584	3,159	2,952	2,396

Existing - Alternative 6 Minus Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	1	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	-2	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types												
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

Long-Term and Water Year-Type Average of Fremont Weir Spill to Yolo Bypass Under Existing - Base and Existing - Alternative 6

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Existing - Base	114	257	2,635	8,485	13,204	6,934	1,024	20	0	0	0	0	1,933
Existing - Alternative 6	114	507	3,551	10,090	15,081	7,799	1,024	20	0	0	0	0	2,261
Difference	0	250	917	1,606	1,876	864	0	0	0	0	0	0	328
Percent Difference	0%	97%	35%	19%	14%	12%	0%	0%	0%	0%	0%	0%	17%
							Water Year-Types						
Wet													
Existing - Base	374	844	7,678	25,448	36,369	18,505	3,244	64	0	0	0	0	5,472
Existing - Alternative 6	374	1,497	9,932	28,049	38,497	19,557	3,244	64	0	0	0	0	5,993
Difference	0	653	2,255	2,602	2,129	1,051	0	0	0	0	0	0	521
Percent Difference	0%	77%	29%	10%	6%	6%	0%	0%	0%	0%	0%	0%	10%
Above Normal													
Existing - Base	0	0	2,008	4,550	10,271	7,823	33	0	0	0	0	0	1,470
Existing - Alternative 6	0	103	2,792	7,345	13,485	9,196	33	0	0	0	0	0	1,961
Difference	0	103	784	2,795	3,215	1,373	0	0	0	0	0	0	491
Percent Difference	0%	0%	39%	61%	31%	18%	0%	0%	0%	0%	0%	0%	33%
Below Normal													
Existing - Base	0	0	0	291	2,453	501	143	0	0	0	0	0	196
Existing - Alternative 6	0	117	339	1,461	4,209	1,472	143	0	0	0	0	0	454
Difference	0	117	339	1,171	1,756	972	0	0	0	0	0	0	258
Percent Difference	0%	0%	0%	403%	72%	194%	0%	0%	0%	0%	0%	0%	132%
Dry													
Existing - Base	0	0	0	0	537	224	0	0	0	0	0	0	44
Existing - Alternative 6	0	51	176	562	2,117	856	0	0	0	0	0	0	219
Difference	0	51	176	562	1,580	632	0	0	0	0	0	0	176
Percent Difference	0%	0%	0%	222716%	294%	282%	0%	0%	0%	0%	0%	0%	403%
Critical													
Existing - Base	0	0	0	0	1	0	0	0	0	0	0	0	0
Existing - Alternative 6	0	8	70	350	577	125	0	0	0	0	0	0	67
Difference	0	8	70	350	576	125	0	0	0	0	0	0	67
Percent Difference	0%	0%	0%	0%	74286%	0%	0%	0%	0%	0%	0%	0%	149387%

Fremont Weir Spill to Yolo Bypass

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	0	7,950	28,958	47,428	19,929	23	0	0	0	0	0
20%	0	0	17	7,664	20,668	5,676	0	0	0	0	0	0
30%	0	0	0	2,091	7,247	1,385	0	0	0	0	0	0
40%	0	0	0	0	1,768	0	0	0	0	0	0	0
50%	0	0	0	0	23	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	114	257	2,635	8,485	13,204	6,934	1,024	20	0	0	0	0
Water Year Types												
Wet	374	844	7,678	25,448	36,369	18,505	3,244	64	0	0	0	0
Above Normal	0	0	2,008	4,550	10,271	7,823	33	0	0	0	0	0
Below Normal	0	0	0	291	2,453	501	143	0	0	0	0	0
Dry	0	0	0	0	537	224	0	0	0	0	0	0
Critical	0	0	0	0	1	0	0	0	0	0	0	0

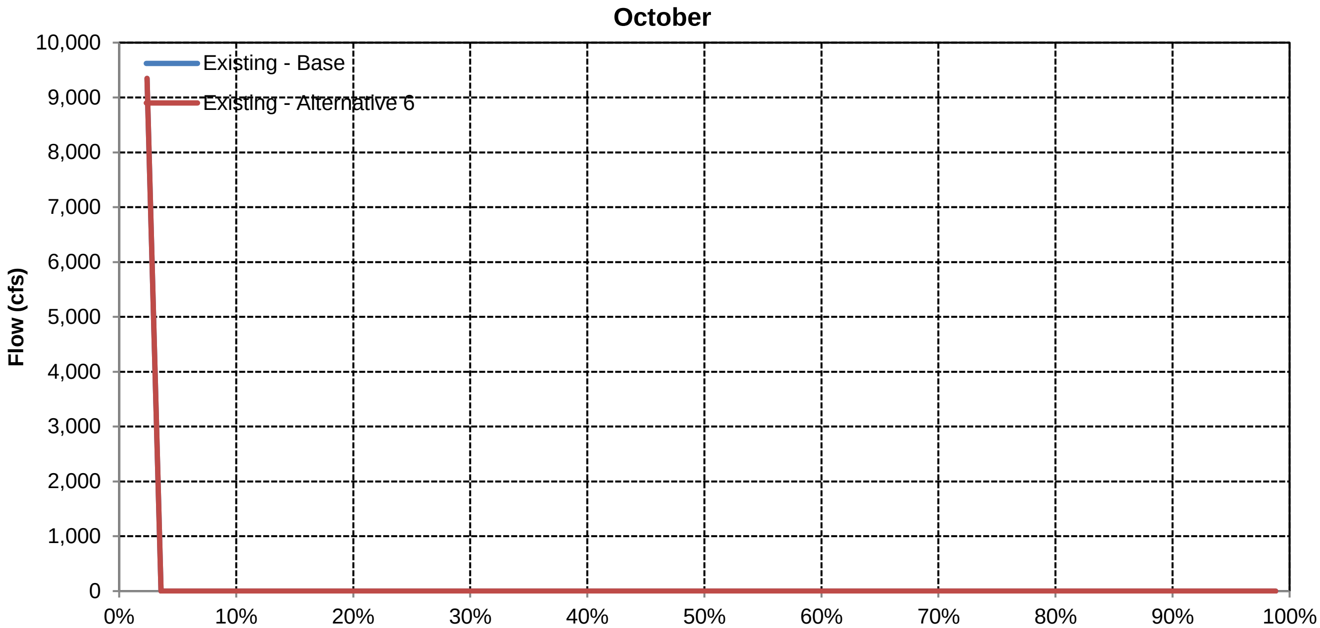
Existing - Alternative 6

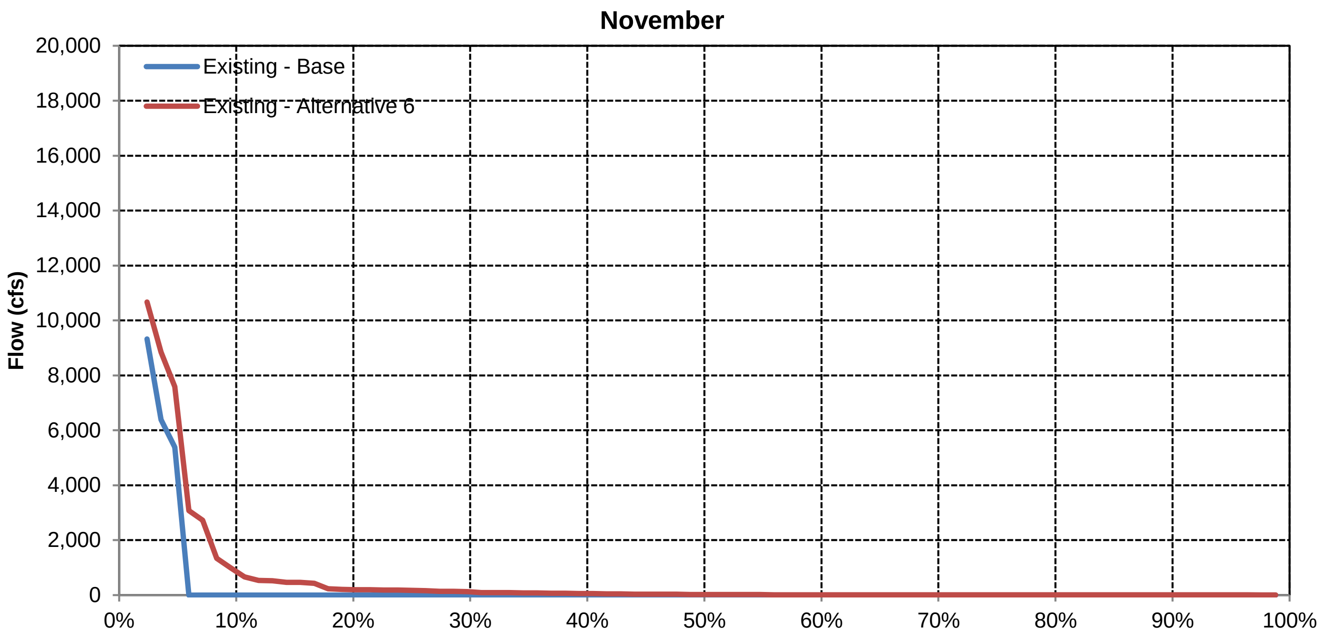
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	624	12,110	31,351	49,960	20,134	23	0	0	0	0	0
20%	0	195	3,340	12,547	22,976	7,102	0	0	0	0	0	0
30%	0	99	1,016	6,219	12,030	4,607	0	0	0	0	0	0
40%	0	58	518	3,145	6,235	2,401	0	0	0	0	0	0
50%	0	22	311	1,294	4,069	684	0	0	0	0	0	0
60%	0	9	83	529	1,759	410	0	0	0	0	0	0
70%	0	8	35	213	779	212	0	0	0	0	0	0
80%	0	6	12	76	297	80	0	0	0	0	0	0
90%	0	6	7	31	114	9	0	0	0	0	0	0
Long Term												
Full Simulation Period	114	507	3,551	10,090	15,081	7,799	1,024	20	0	0	0	0
Water Year Types												
Wet	374	1,497	9,932	28,049	38,497	19,557	3,244	64	0	0	0	0
Above Normal	0	103	2,792	7,345	13,485	9,196	33	0	0	0	0	0
Below Normal	0	117	339	1,461	4,209	1,472	143	0	0	0	0	0
Dry	0	51	176	562	2,117	856	0	0	0	0	0	0
Critical	0	8	70	350	577	125	0	0	0	0	0	0

Existing - Alternative 6 Minus Existing - Base

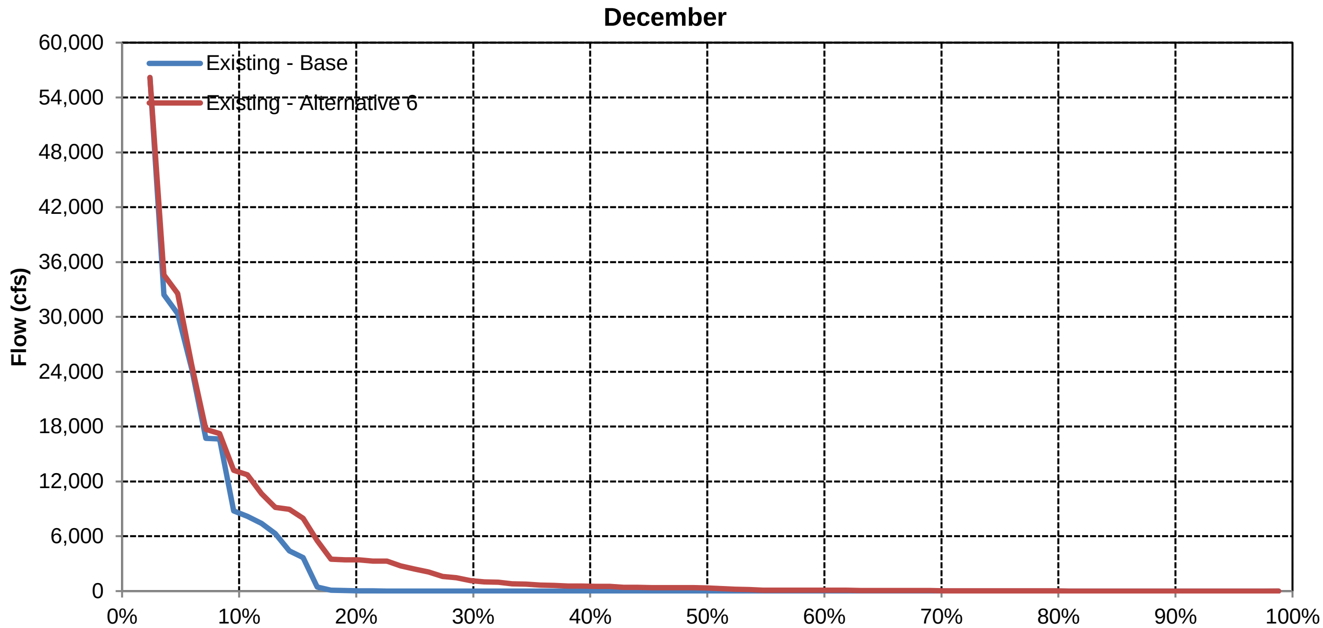
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	624	4,160	2,393	2,531	205	0	0	0	0	0	0
20%	0	195	3,323	4,882	2,308	1,426	0	0	0	0	0	0
30%	0	99	1,016	4,128	4,784	3,223	0	0	0	0	0	0
40%	0	58	518	3,145	4,467	2,401	0	0	0	0	0	0
50%	0	22	311	1,294	4,046	684	0	0	0	0	0	0
60%	0	9	83	529	1,759	410	0	0	0	0	0	0
70%	0	8	35	213	779	212	0	0	0	0	0	0
80%	0	6	12	76	297	80	0	0	0	0	0	0
90%	0	6	7	31	114	9	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	250	917	1,606	1,876	864	0	0	0	0	0	0
Water Year Types												
Wet	0	653	2,255	2,602	2,129	1,051	0	0	0	0	0	0
Above Normal	0	103	784	2,795	3,215	1,373	0	0	0	0	0	0
Below Normal	0	117	339	1,171	1,756	972	0	0	0	0	0	0
Dry	0	51	176	562	1,580	632	0	0	0	0	0	0
Critical	0	8	70	350	576	125	0	0	0	0	0	0

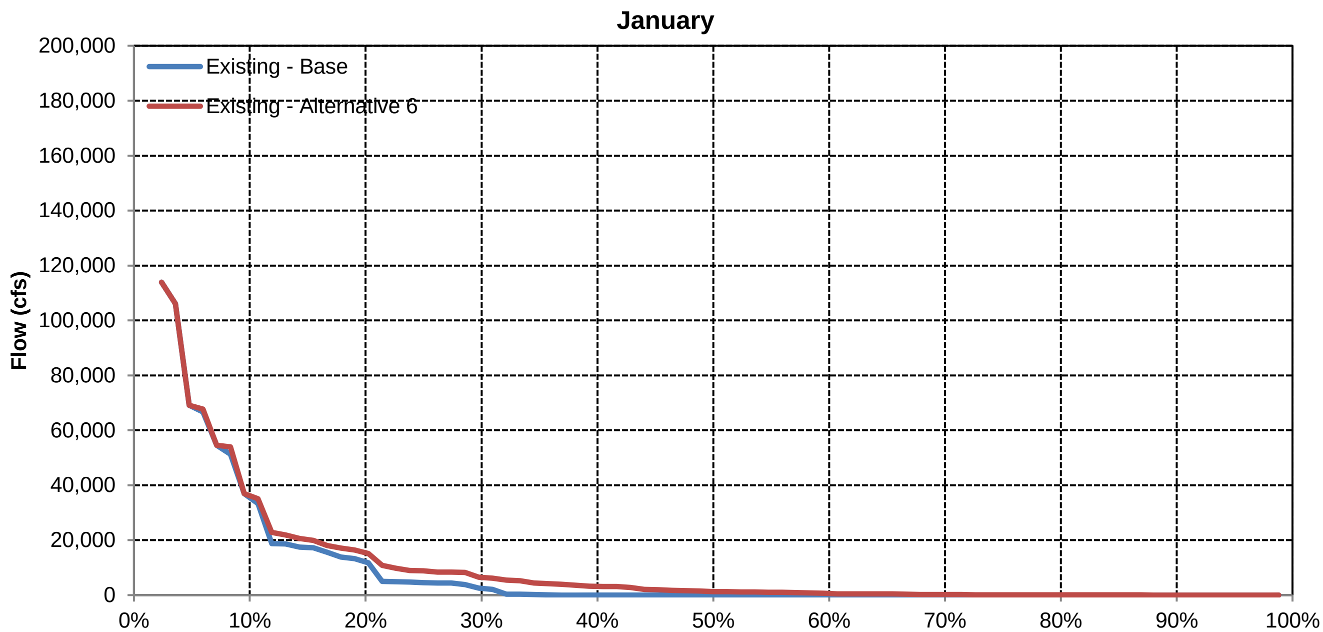
Fremont Weir Spill to Yolo Bypass



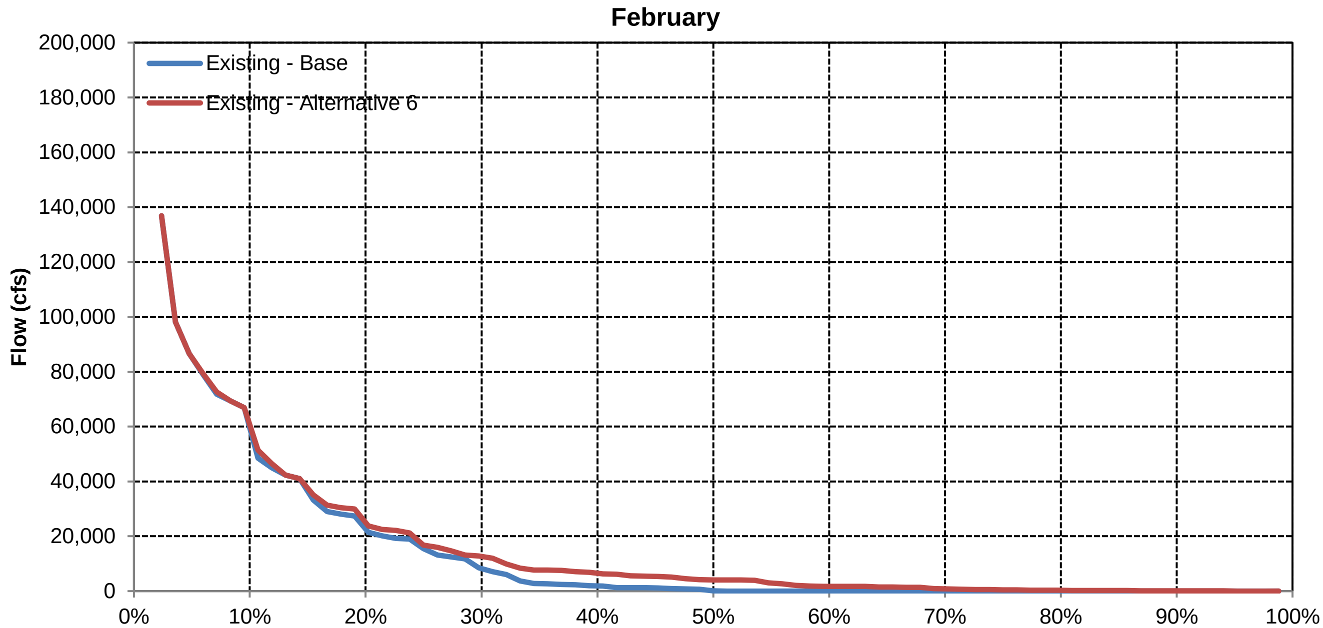


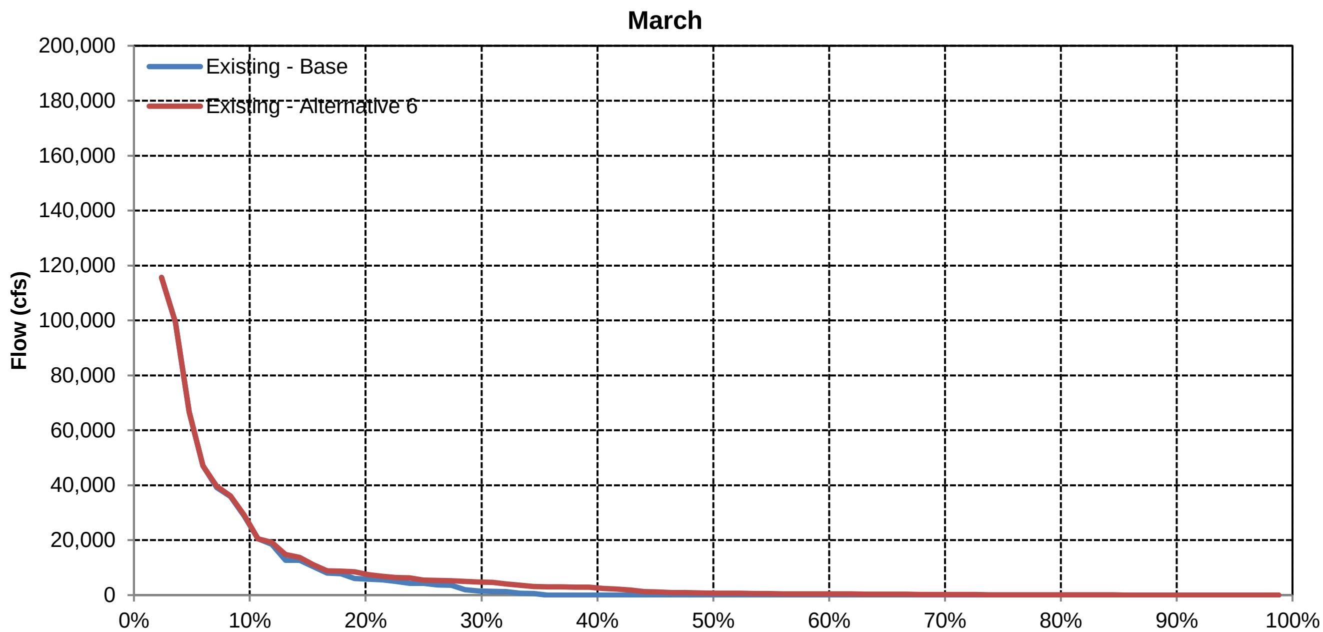
Fremont Weir Spill to Yolo Bypass



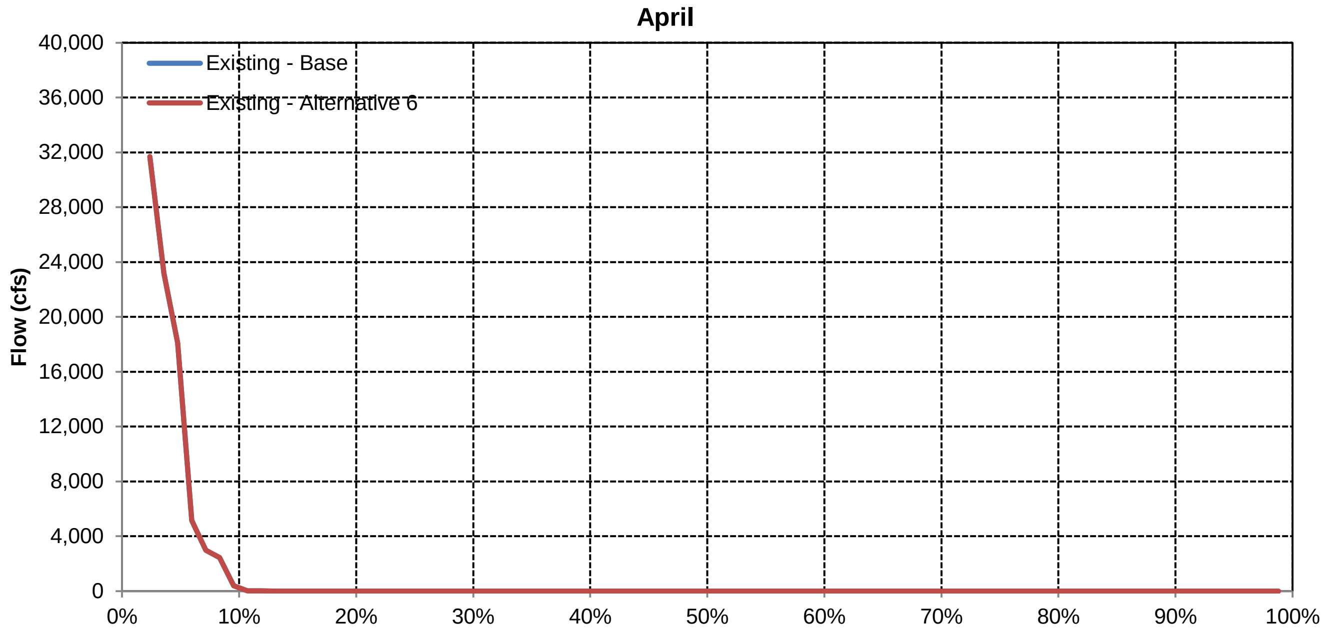


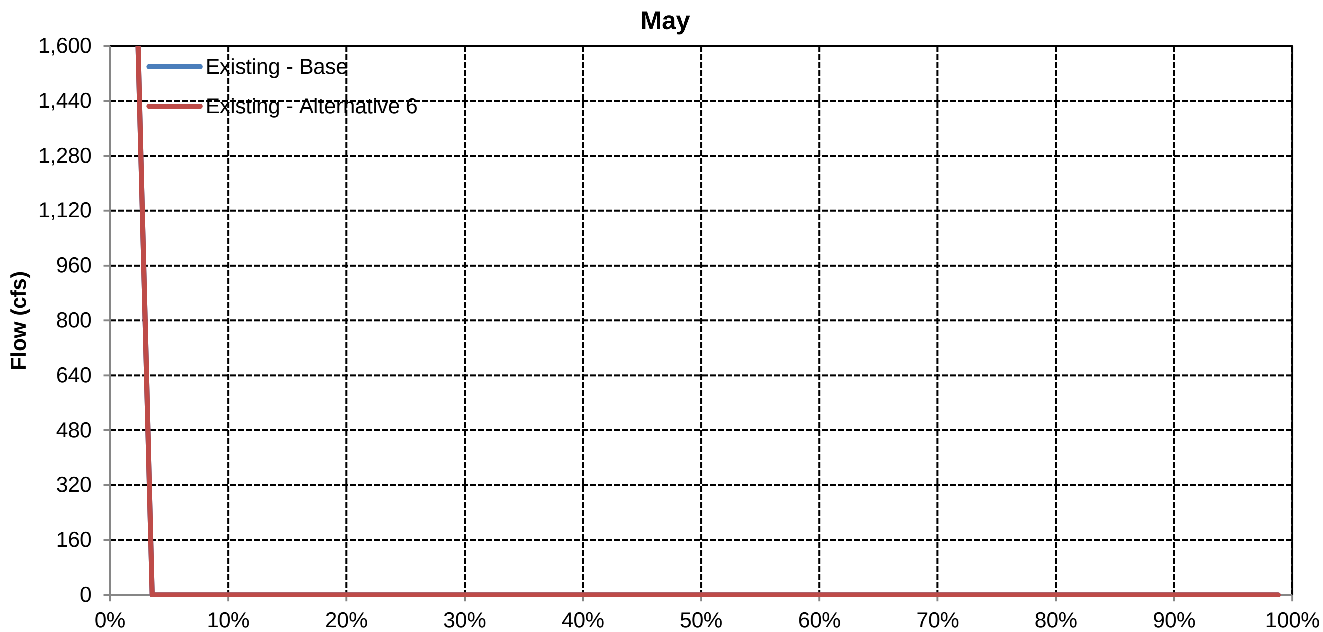
Fremont Weir Spill to Yolo Bypass



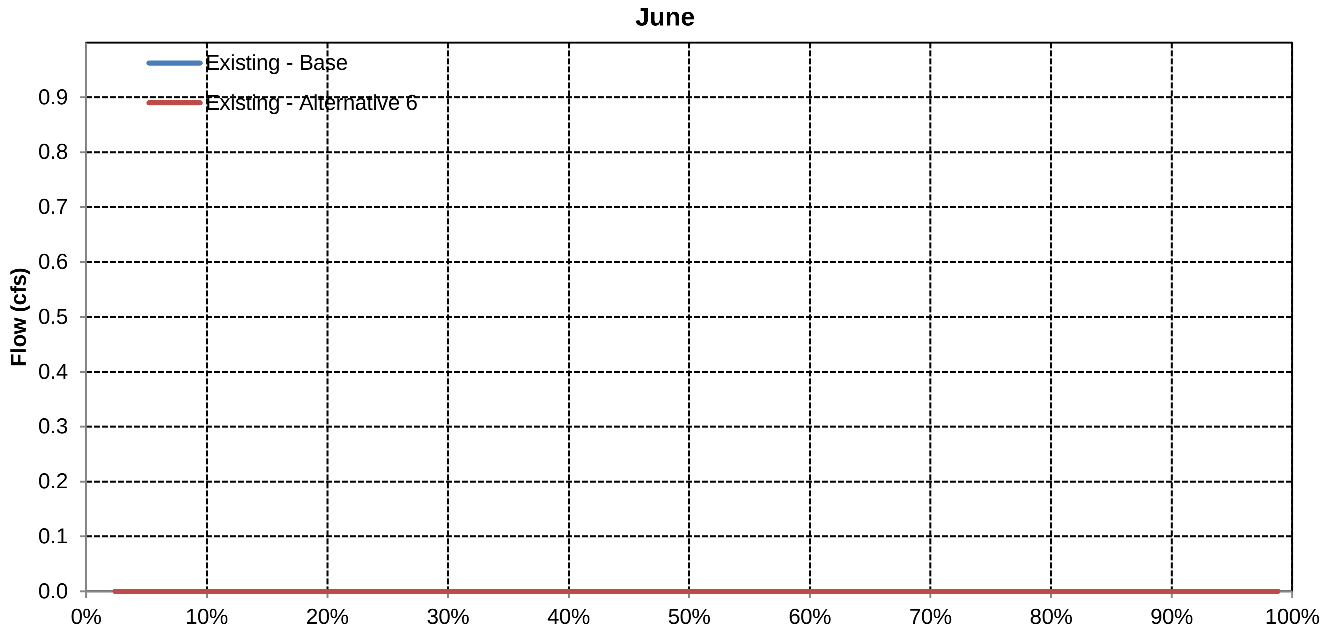


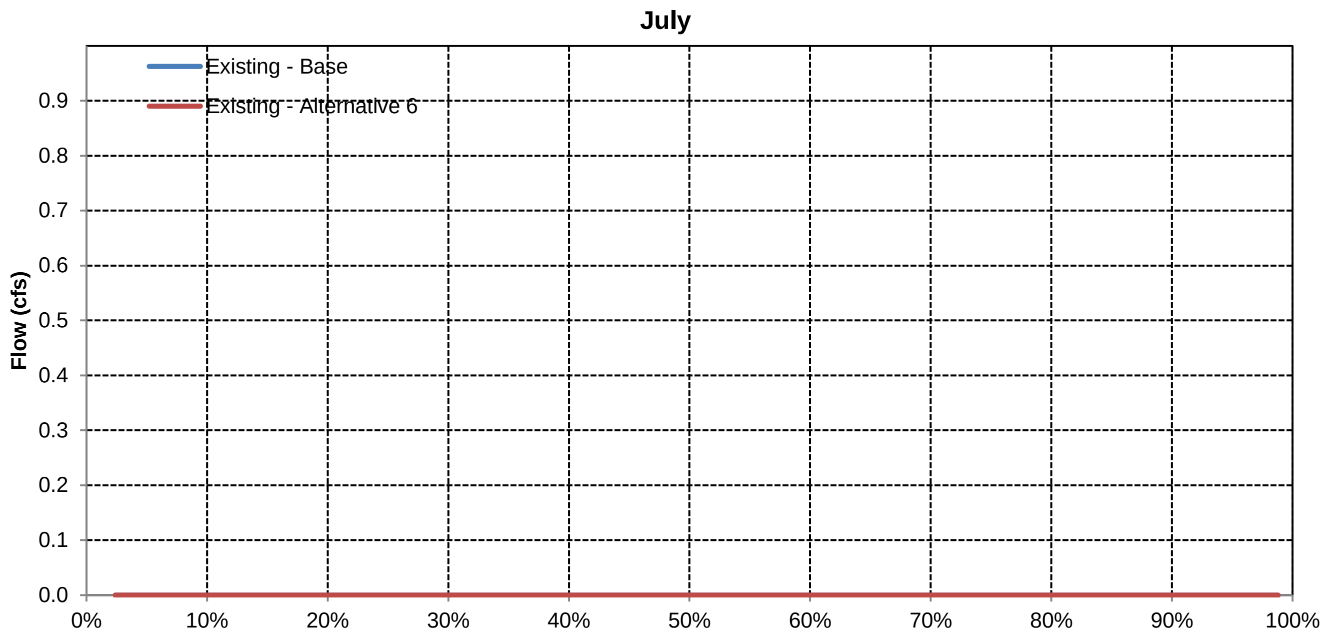
Fremont Weir Spill to Yolo Bypass



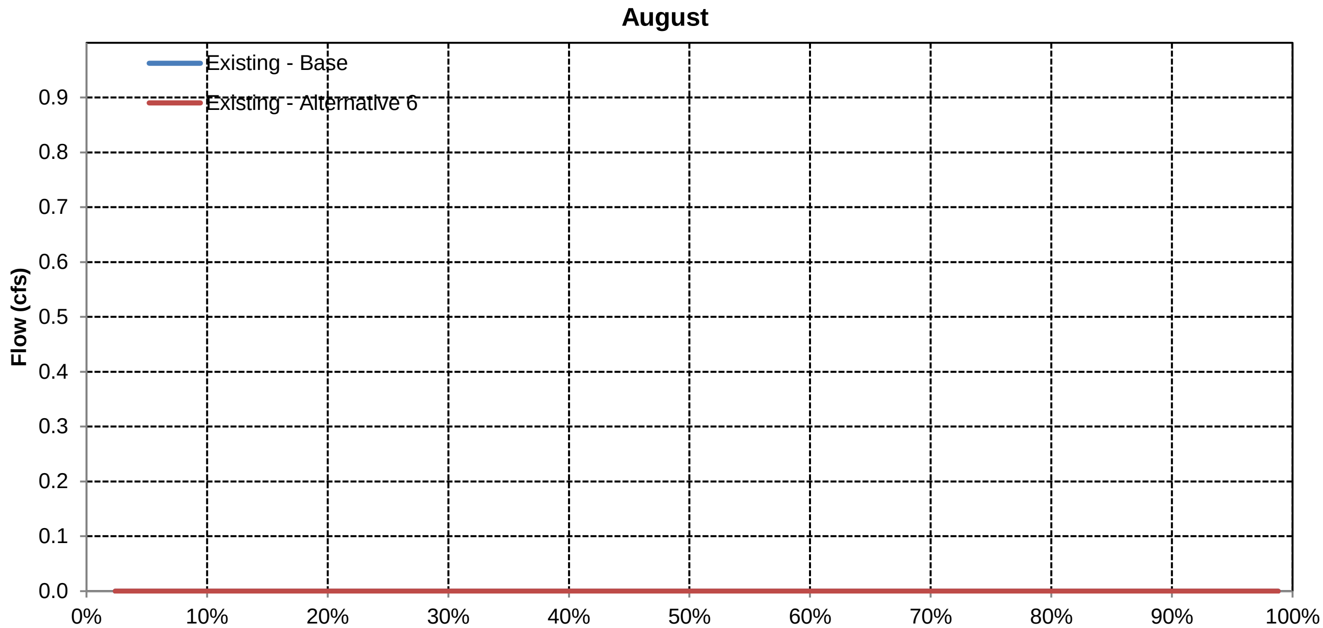


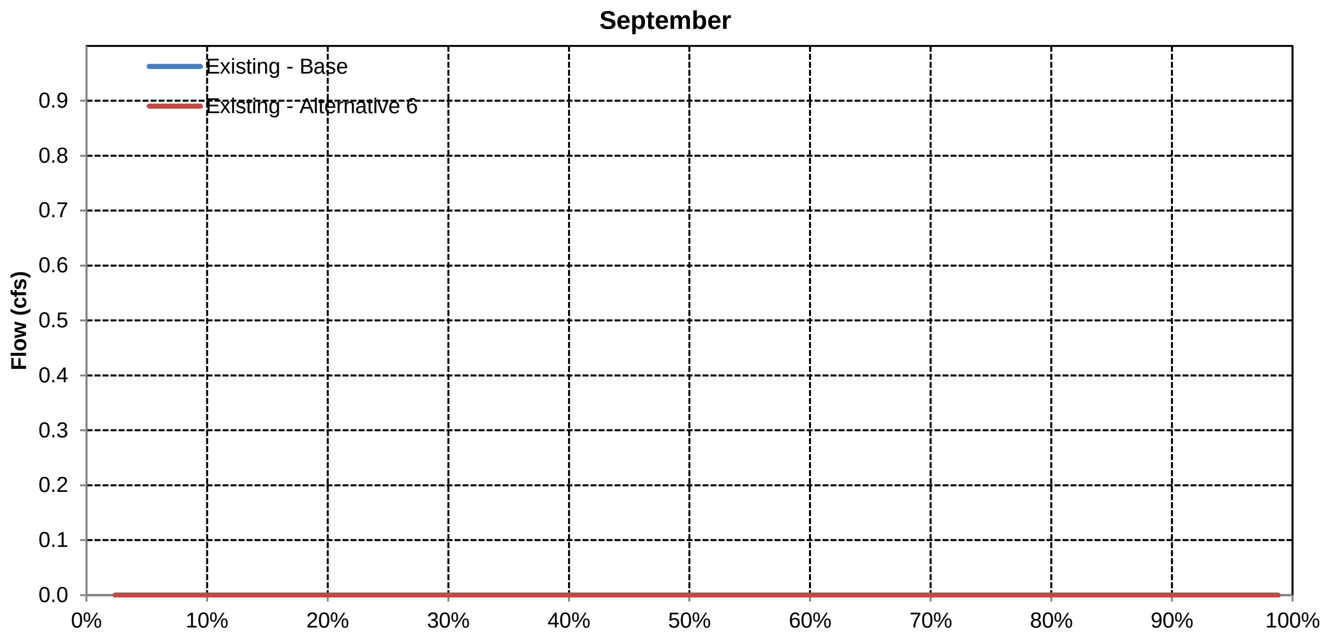
Fremont Weir Spill to Yolo Bypass





Fremont Weir Spill to Yolo Bypass





Long-Term and Water Year-Type Average of Sacramento River below Fremont Weir Under Existing - Base and Existing - Alternative 6

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Existing - Base	9,484	12,510	19,726	28,534	34,880	30,067	18,486	11,524	11,174	16,563	12,346	14,753	13,226
Existing - Alternative 6	9,484	12,261	18,810	26,928	33,004	29,203	18,487	11,524	11,174	16,563	12,346	14,753	12,898
Difference	0	-250	-917	-1,606	-1,876	-864	0	0	0	0	0	0	-328
Percent Difference	0%	-2%	-5%	-6%	-5%	-3%	0%	0%	0%	0%	0%	0%	-2%
							Water Year-Types						
Wet													
Existing - Base	10,891	17,182	34,594	47,388	54,159	44,817	30,280	15,515	11,984	17,719	13,701	22,821	19,273
Existing - Alternative 6	10,891	16,528	32,341	44,786	52,031	43,766	30,280	15,515	11,984	17,719	13,701	22,821	18,751
Difference	0	-654	-2,254	-2,602	-2,128	-1,051	0	0	0	0	0	0	-521
Percent Difference	0%	-4%	-7%	-5%	-4%	-2%	0%	0%	0%	0%	0%	0%	-3%
Above Normal													
Existing - Base	9,877	12,058	19,277	36,324	42,867	40,008	19,128	12,828	11,814	18,508	14,754	17,430	15,325
Existing - Alternative 6	9,877	11,954	18,493	33,529	39,652	38,635	19,128	12,828	11,813	18,508	14,754	17,429	14,834
Difference	0	-103	-784	-2,795	-3,215	-1,373	0	0	-1	0	0	0	-491
Percent Difference	0%	-1%	-4%	-8%	-8%	-3%	0%	0%	0%	0%	0%	0%	-3%
Below Normal													
Existing - Base	9,114	11,699	12,901	19,738	26,173	23,730	15,307	10,497	11,507	18,684	13,981	10,737	11,081
Existing - Alternative 6	9,114	11,582	12,562	18,568	24,417	22,758	15,308	10,496	11,506	18,684	13,981	10,737	10,823
Difference	0	-117	-339	-1,171	-1,756	-972	0	-1	0	0	0	0	-258
Percent Difference	0%	-1%	-3%	-6%	-7%	-4%	0%	0%	0%	0%	0%	0%	-2%
Dry													
Existing - Base	8,797	10,284	11,881	14,395	22,880	19,311	9,957	8,686	10,655	14,790	10,143	10,040	9,128
Existing - Alternative 6	8,797	10,233	11,706	13,833	21,300	18,679	9,957	8,685	10,655	14,789	10,143	10,040	8,952
Difference	0	-51	-175	-562	-1,580	-632	0	-1	0	0	0	0	-176
Percent Difference	0%	0%	-1%	-4%	-7%	-3%	0%	0%	0%	0%	0%	0%	-2%
Critical													
Existing - Base	7,603	7,349	9,332	12,776	15,062	12,715	9,151	7,145	9,068	11,571	7,736	7,241	7,035
Existing - Alternative 6	7,603	7,342	9,262	12,426	14,486	12,591	9,151	7,145	9,068	11,570	7,735	7,241	6,969
Difference	0	-7	-70	-350	-576	-125	0	0	0	0	-1	0	-67
Percent Difference	0%	0%	-1%	-3%	-4%	-1%	0%	0%	0%	0%	0%	0%	-1%

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	12,667	17,867	45,100	57,729	61,959	57,591	41,031	20,423	13,312	19,786	15,641	24,263
20%	11,568	15,291	30,157	49,978	58,550	49,208	29,852	12,476	12,632	19,450	14,918	21,584
30%	10,868	14,177	20,670	38,268	45,964	41,694	19,097	10,802	12,207	18,980	14,204	20,190
40%	10,328	12,419	16,827	30,451	40,042	32,187	14,333	9,587	11,482	18,481	13,746	16,796
50%	9,258	11,470	14,375	20,927	29,701	24,238	11,811	9,148	10,870	17,699	13,483	12,593
60%	8,339	10,242	12,138	16,320	24,021	20,650	10,617	8,809	10,372	17,239	13,030	11,383
70%	7,401	8,651	11,421	13,695	18,359	16,099	9,968	8,553	10,029	15,866	11,157	9,527
80%	6,330	6,998	8,557	11,396	14,745	13,147	9,106	7,912	9,548	12,798	8,367	8,339
90%	5,547	6,108	7,167	10,140	12,940	10,022	8,064	7,372	8,384	10,409	7,531	7,435
Long Term												
Full Simulation Period	9,484	12,510	19,726	28,534	34,880	30,067	18,486	11,524	11,174	16,563	12,346	14,753
Water Year Types												
Wet	10,891	17,182	34,594	47,388	54,159	44,817	30,280	15,515	11,984	17,719	13,701	22,821
Above Normal	9,877	12,058	19,277	36,324	42,867	40,008	19,128	12,828	11,814	18,508	14,754	17,430
Below Normal	9,114	11,699	12,901	19,738	26,173	23,730	15,307	10,497	11,507	18,684	13,981	10,737
Dry	8,797	10,284	11,881	14,395	22,880	19,311	9,957	8,686	10,655	14,790	10,143	10,040
Critical	7,603	7,349	9,332	12,776	15,062	12,715	9,151	7,145	9,068	11,571	7,736	7,241

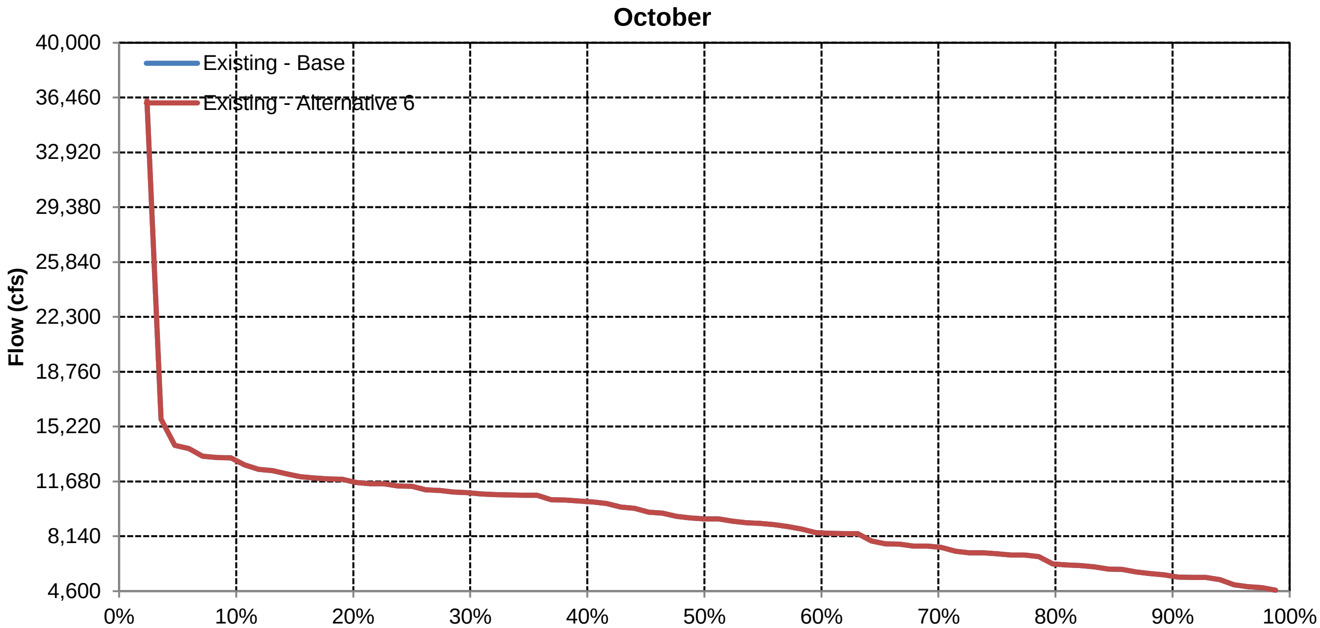
Existing - Alternative 6

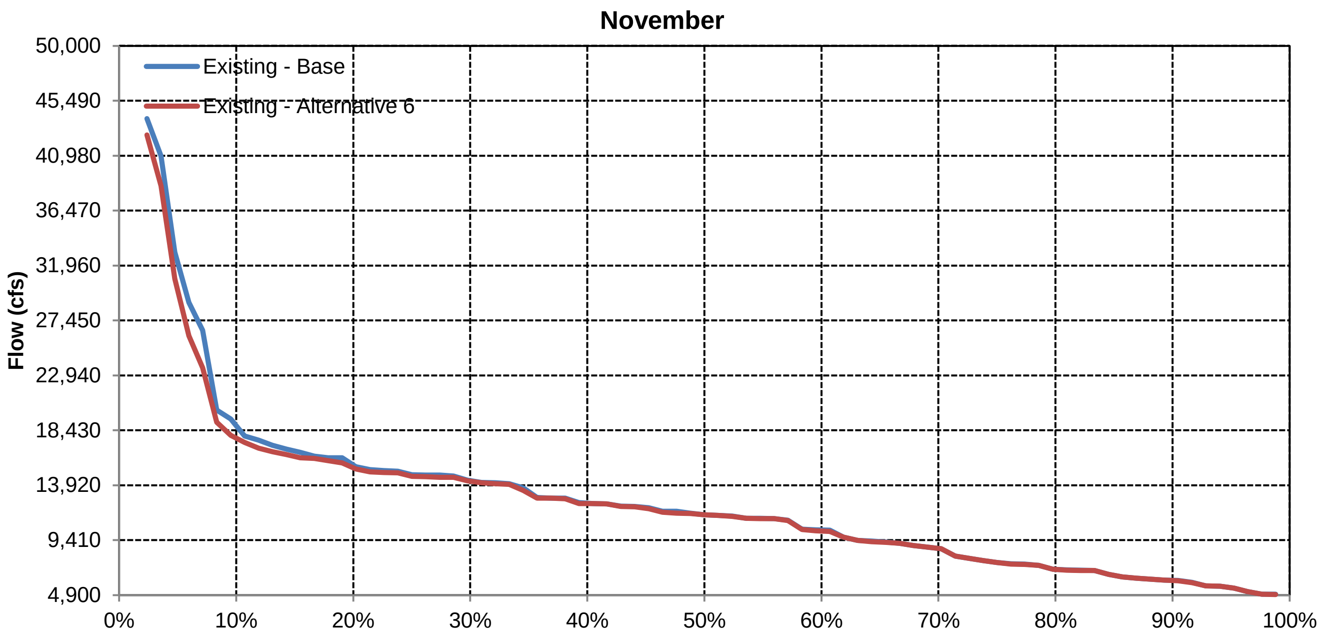
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	12,667	17,296	41,657	55,206	61,959	56,675	41,031	20,423	13,301	19,786	15,640	24,263
20%	11,568	15,109	26,897	47,538	55,811	46,916	29,854	12,476	12,632	19,450	14,919	21,584
30%	10,868	14,136	19,689	34,506	43,140	40,469	19,097	10,802	12,207	18,980	14,204	20,190
40%	10,328	12,400	16,441	27,178	35,114	30,619	14,333	9,587	11,482	18,481	13,746	16,795
50%	9,258	11,461	14,106	19,916	26,573	23,837	11,812	9,148	10,871	17,699	13,483	12,593
60%	8,339	10,134	12,051	15,732	22,334	20,073	10,617	8,809	10,372	17,239	13,027	11,384
70%	7,400	8,644	11,375	13,552	17,812	16,006	9,968	8,552	10,029	15,867	11,157	9,527
80%	6,330	6,992	8,544	11,338	14,522	13,026	9,106	7,912	9,548	12,798	8,366	8,339
90%	5,547	6,104	7,160	10,122	12,833	10,007	8,063	7,372	8,384	10,409	7,530	7,435
Long Term												
Full Simulation Period	9,484	12,261	18,810	26,928	33,004	29,203	18,487	11,524	11,174	16,563	12,346	14,753
Water Year Types												
Wet	10,891	16,528	32,341	44,786	52,031	43,766	30,280	15,515	11,984	17,719	13,701	22,821
Above Normal	9,877	11,954	18,493	33,529	39,652	38,635	19,128	12,828	11,813	18,508	14,754	17,429
Below Normal	9,114	11,582	12,562	18,568	24,417	22,758	15,308	10,496	11,506	18,684	13,981	10,737
Dry	8,797	10,233	11,706	13,833	21,300	18,679	9,957	8,685	10,655	14,789	10,143	10,040
Critical	7,603	7,342	9,262	12,426	14,486	12,591	9,151	7,145	9,068	11,570	7,735	7,241

Existing - Alternative 6 Minus Existing - Base

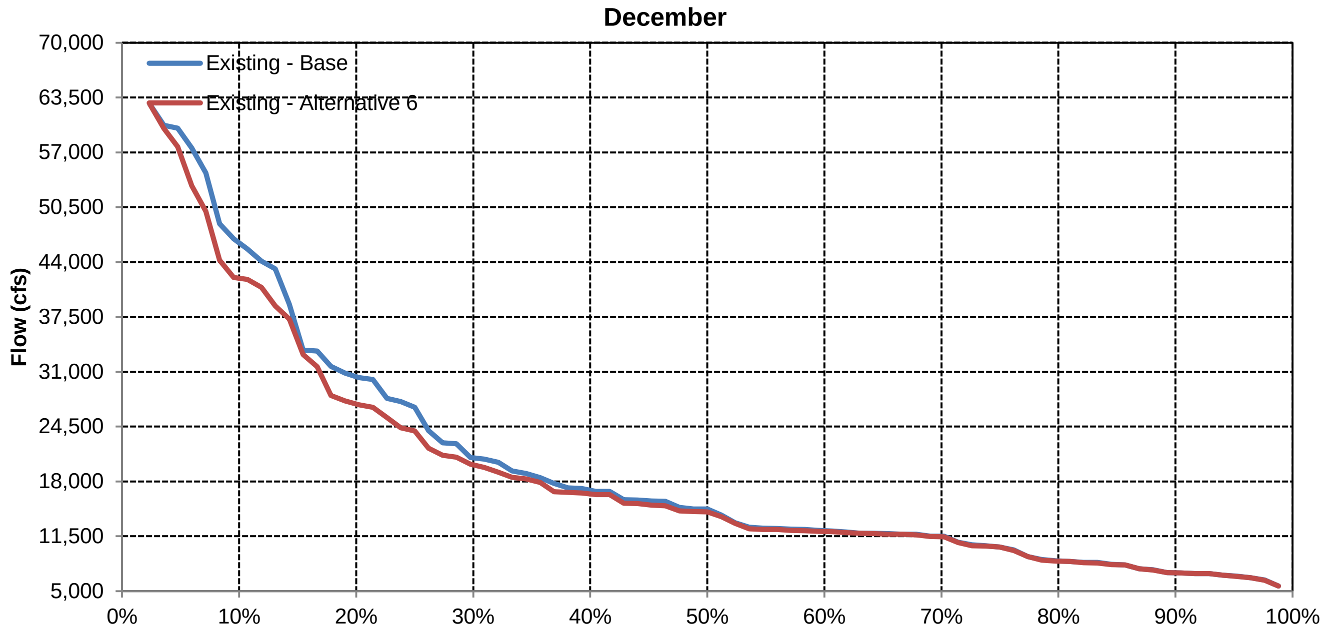
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	-571	-3,443	-2,523	0	-916	0	0	-11	0	0	0
20%	0	-182	-3,261	-2,440	-2,740	-2,292	2	0	0	0	1	0
30%	0	-41	-981	-3,762	-2,824	-1,224	0	0	-1	0	0	0
40%	0	-19	-385	-3,274	-4,929	-1,568	0	0	0	0	0	0
50%	0	-9	-269	-1,011	-3,129	-401	1	0	0	0	0	0
60%	0	-109	-87	-588	-1,687	-577	0	0	0	0	-3	0
70%	-1	-7	-46	-143	-547	-93	0	0	0	1	0	0
80%	0	-6	-13	-58	-224	-121	0	0	0	0	0	0
90%	0	-4	-7	-18	-107	-15	-1	0	0	0	0	0
Long Term												
Full Simulation Period	0	-250	-917	-1,606	-1,876	-864	0	0	0	0	0	0
Water Year Types												
Wet	0	-654	-2,254	-2,602	-2,128	-1,051	0	0	0	0	0	0
Above Normal	0	-103	-784	-2,795	-3,215	-1,373	0	0	-1	0	0	0
Below Normal	0	-117	-339	-1,171	-1,756	-972	0	-1	0	0	0	1
Dry	0	-51	-175	-562	-1,580	-632	0	-1	0	0	0	0
Critical	0	-7	-70	-350	-576	-125	0	0	0	0	-1	0

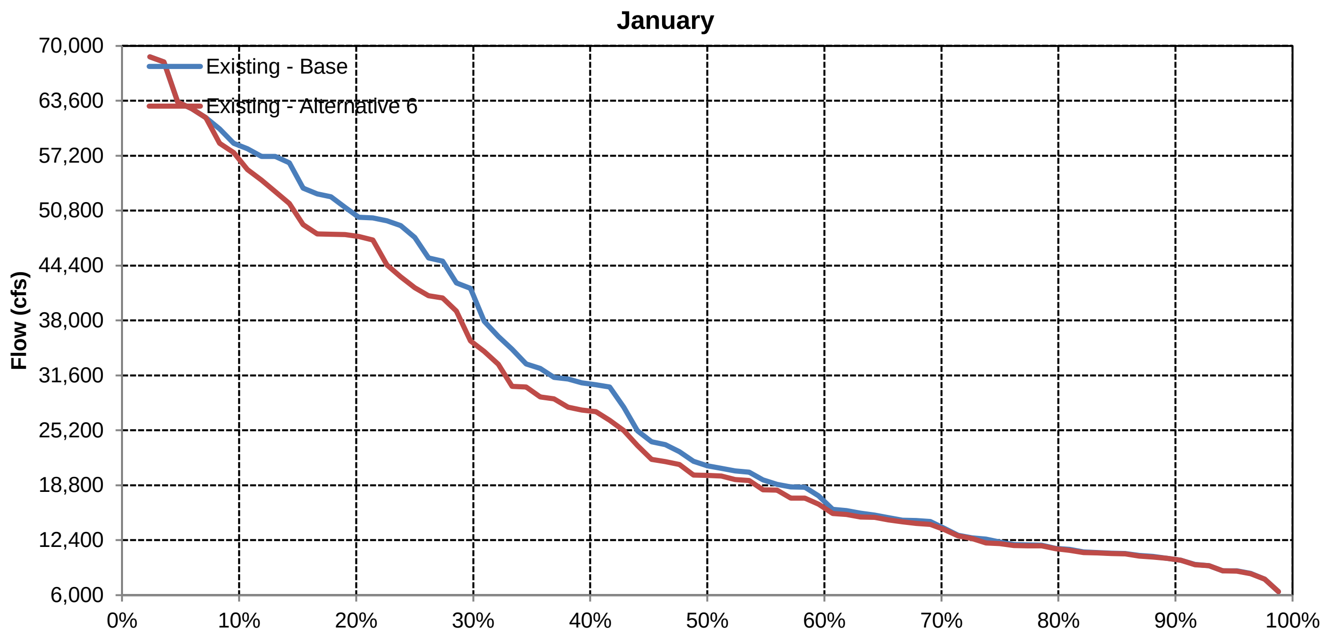
Sacramento River below Fremont Weir



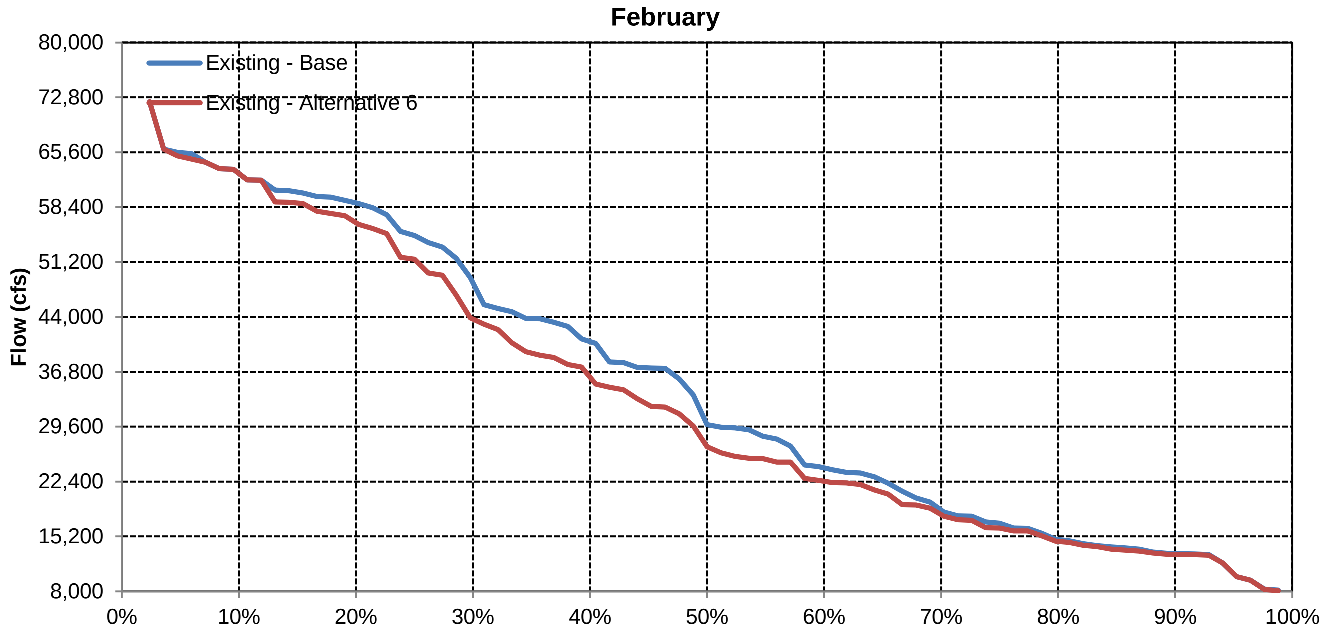


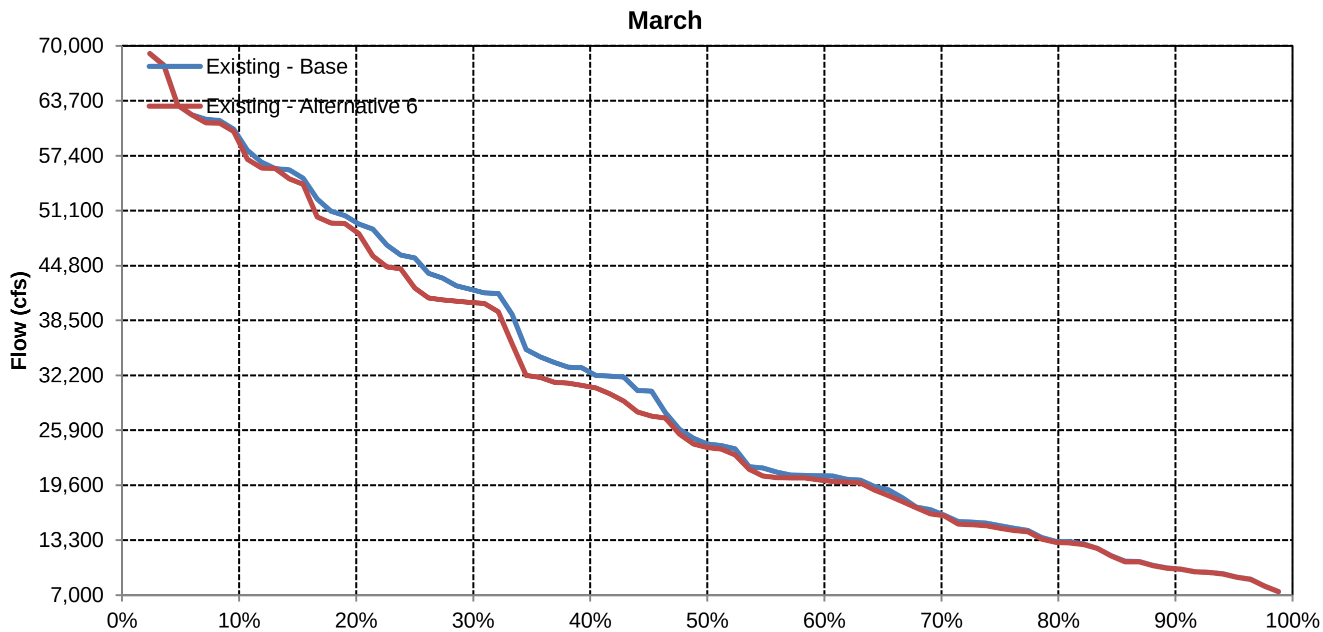
Sacramento River below Fremont Weir



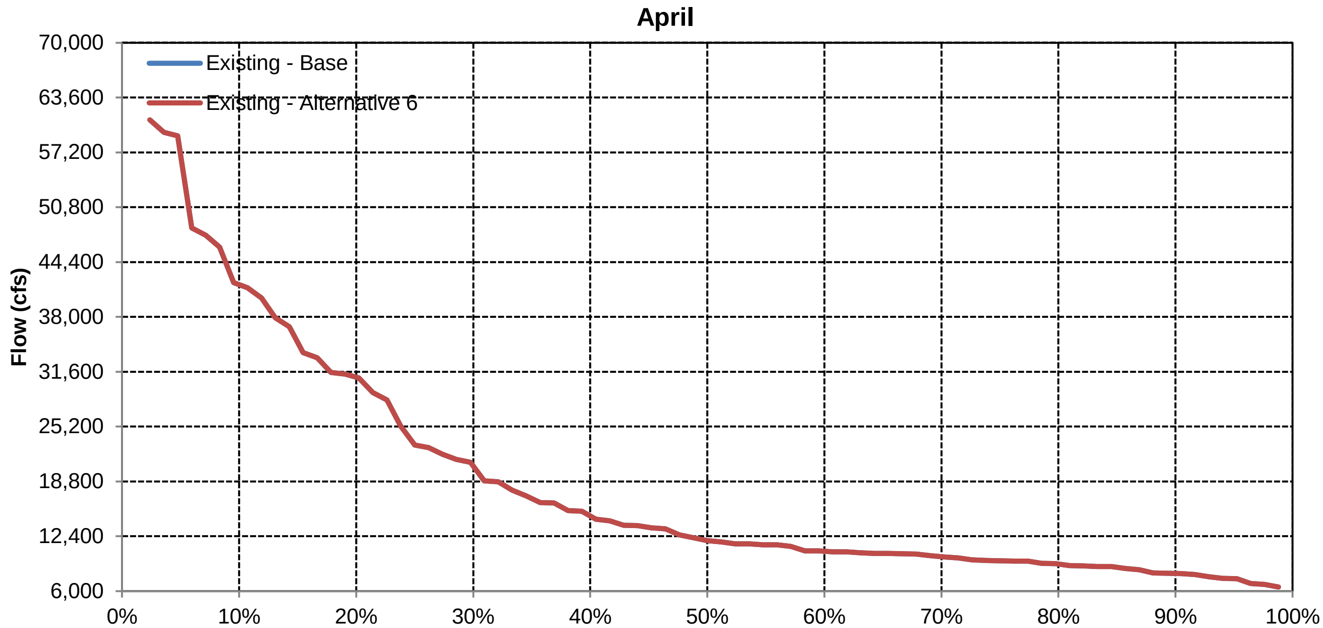


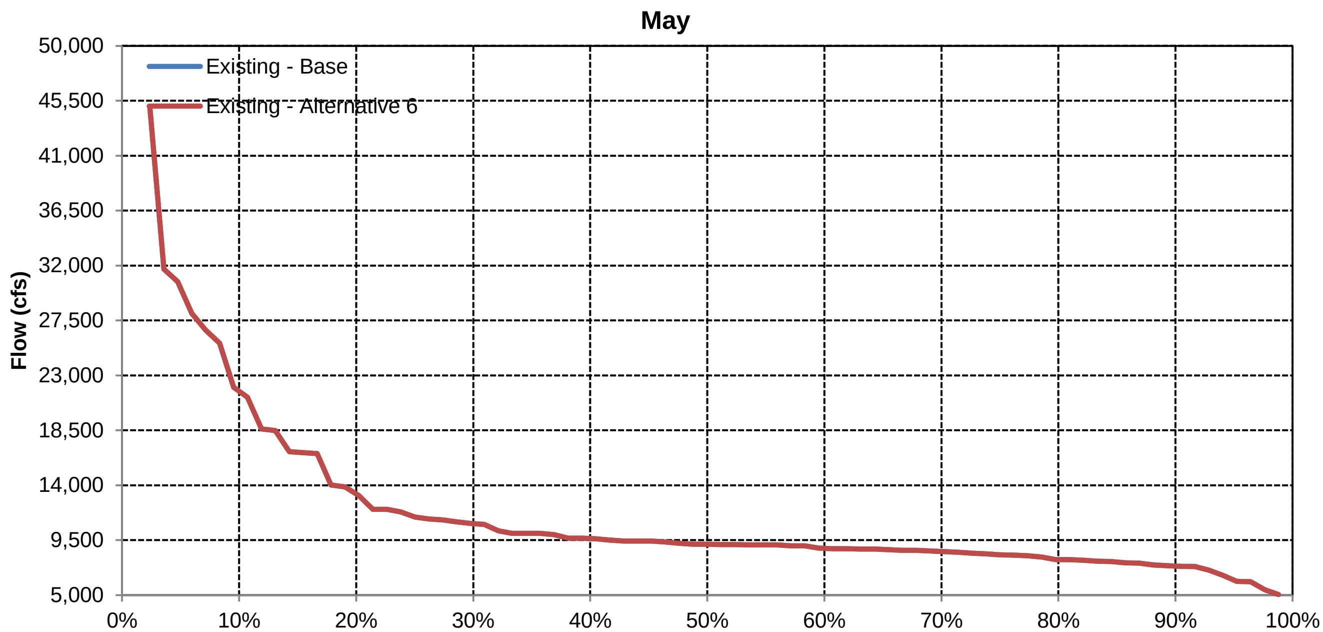
Sacramento River below Fremont Weir



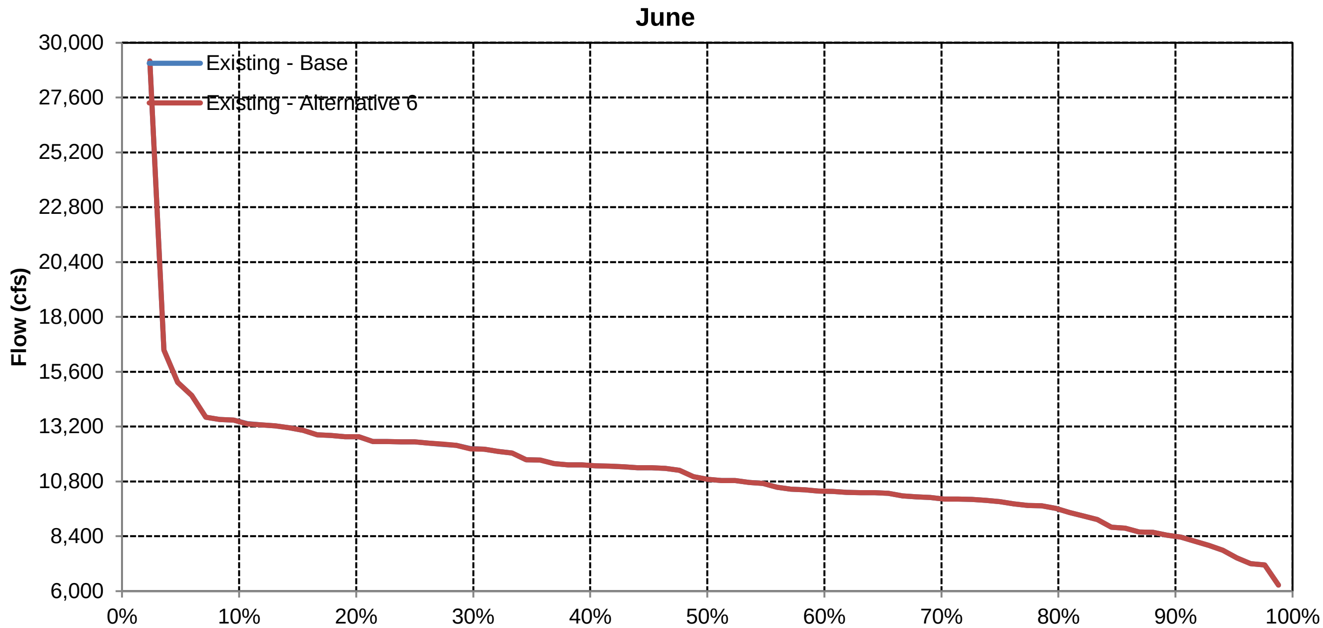


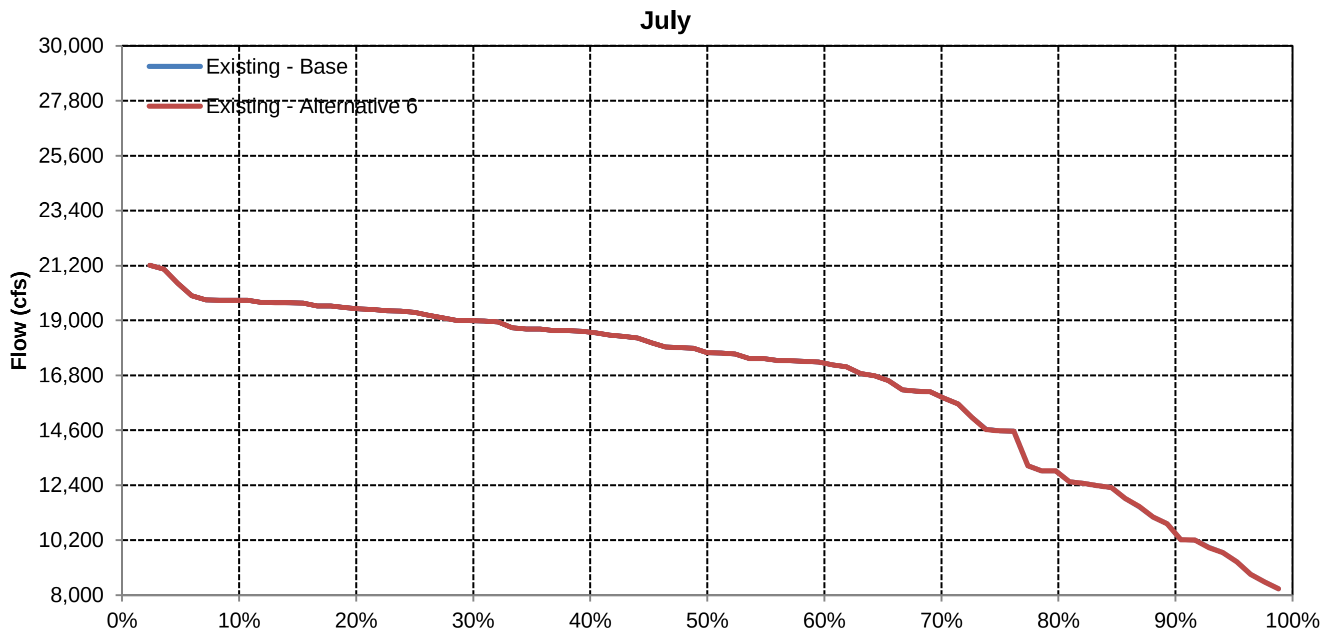
Sacramento River below Fremont Weir



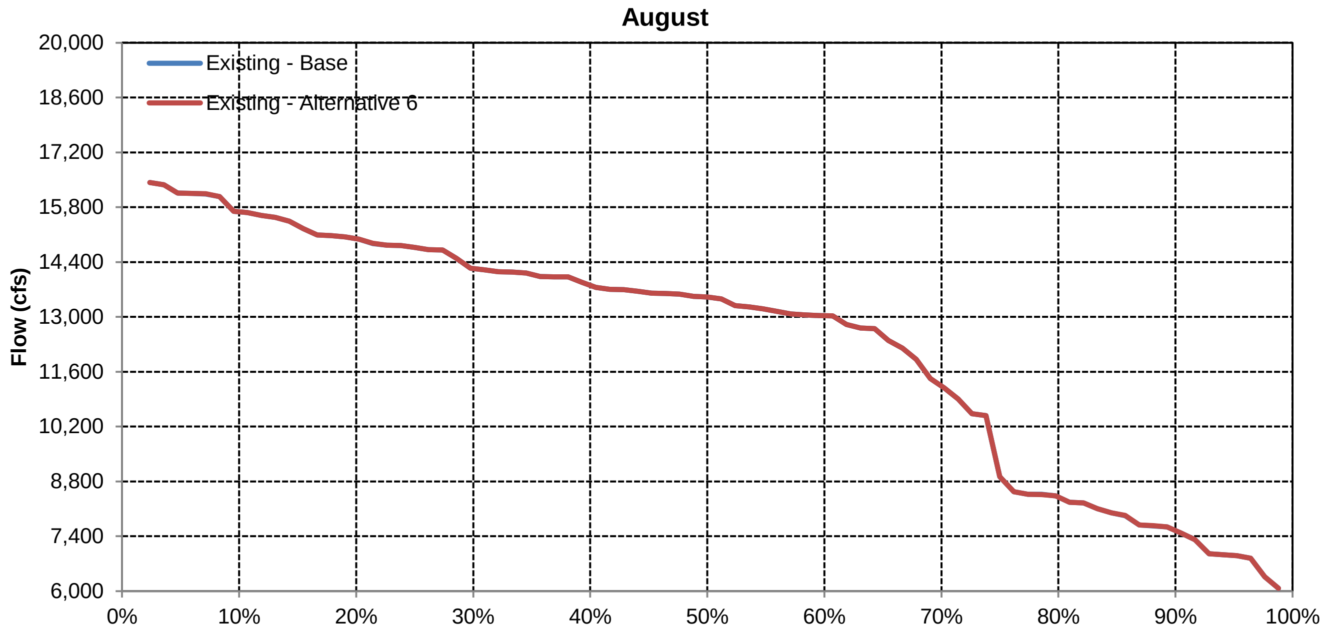


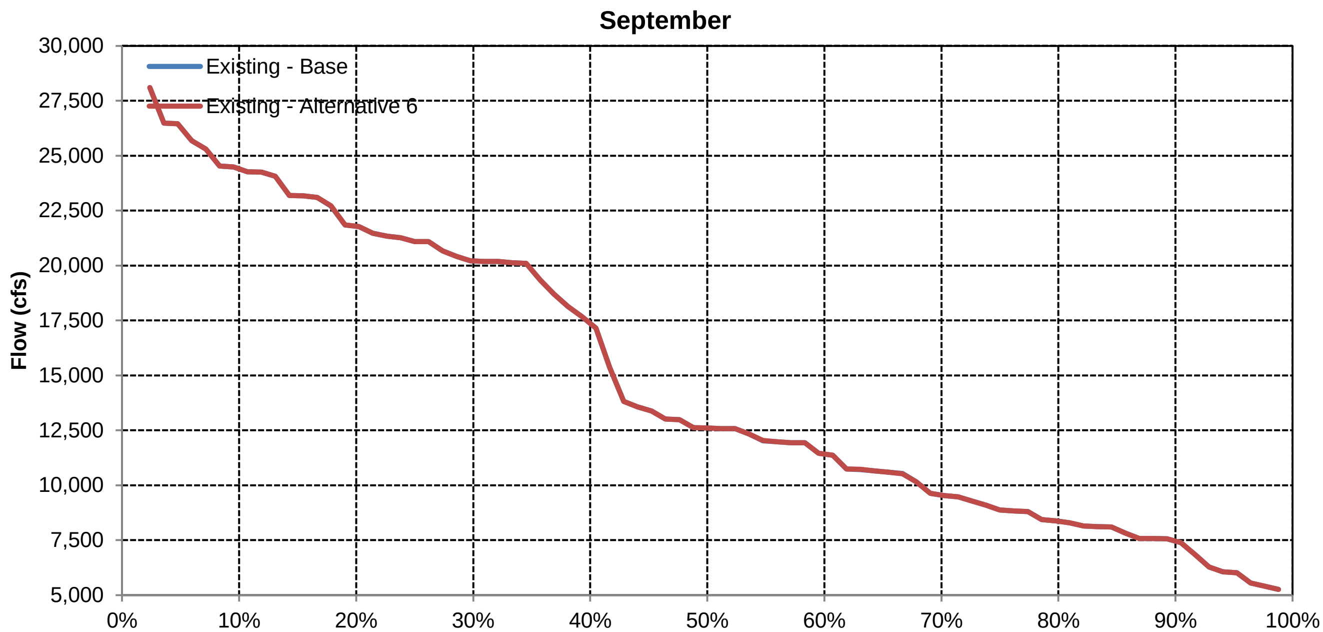
Sacramento River below Fremont Weir





Sacramento River below Fremont Weir





C160

Long-Term and Water Year-Type Average of Trinity Reservoir Under Existing - Base and Existing - Alternative 6

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
						Long-Term						
Full Simulation Period												
Existing - Base	1,276	1,285	1,370	1,501	1,641	1,769	1,902	1,832	1,743	1,596	1,445	1,326
Existing - Alternative 6	1,276	1,285	1,370	1,501	1,641	1,769	1,902	1,832	1,743	1,596	1,445	1,326
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
						Water Year-Types						
Wet												
Existing - Base	1,352	1,401	1,574	1,777	1,943	2,063	2,232	2,168	2,045	1,906	1,771	1,629
Existing - Alternative 6	1,352	1,401	1,574	1,777	1,943	2,063	2,232	2,168	2,045	1,906	1,771	1,629
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal												
Existing - Base	1,354	1,330	1,434	1,642	1,822	1,999	2,154	2,062	1,975	1,816	1,661	1,520
Existing - Alternative 6	1,354	1,330	1,434	1,642	1,822	1,999	2,154	2,062	1,975	1,816	1,661	1,520
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Existing - Base	1,248	1,259	1,287	1,409	1,560	1,708	1,857	1,790	1,716	1,581	1,414	1,315
Existing - Alternative 6	1,248	1,259	1,286	1,409	1,560	1,708	1,857	1,790	1,716	1,581	1,414	1,315
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry												
Existing - Base	1,303	1,288	1,329	1,373	1,484	1,619	1,724	1,640	1,555	1,384	1,220	1,110
Existing - Alternative 6	1,303	1,288	1,329	1,373	1,484	1,619	1,724	1,640	1,555	1,384	1,220	1,110
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical												
Existing - Base	1,041	1,030	1,052	1,087	1,153	1,212	1,267	1,214	1,174	1,038	895	807
Existing - Alternative 6	1,041	1,030	1,052	1,087	1,153	1,212	1,267	1,214	1,174	1,038	895	807
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Trinity Reservoir

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	1,679	1,669	1,832	1,900	2,000	2,100	2,300	2,280	2,180	2,036	1,883	1,739
20%	1,561	1,564	1,651	1,871	2,000	2,100	2,253	2,180	2,061	1,899	1,757	1,620
30%	1,475	1,490	1,571	1,797	1,985	2,093	2,209	2,094	1,982	1,813	1,666	1,533
40%	1,391	1,375	1,503	1,663	1,844	2,014	2,151	2,039	1,892	1,736	1,573	1,442
50%	1,297	1,306	1,436	1,564	1,727	1,841	1,969	1,849	1,751	1,626	1,458	1,332
60%	1,211	1,218	1,325	1,409	1,575	1,748	1,859	1,779	1,680	1,531	1,369	1,247
70%	1,117	1,167	1,222	1,291	1,433	1,586	1,698	1,651	1,591	1,445	1,284	1,148
80%	969	979	1,041	1,144	1,328	1,452	1,593	1,574	1,453	1,293	1,119	1,009
90%	814	826	864	996	1,078	1,182	1,234	1,184	1,172	1,067	940	858
Long Term												
Full Simulation Period	1,276	1,285	1,370	1,501	1,641	1,769	1,902	1,832	1,743	1,596	1,445	1,326
Water Year Types												
Wet	1,352	1,401	1,574	1,777	1,943	2,063	2,232	2,168	2,045	1,906	1,771	1,629
Above Normal	1,354	1,330	1,434	1,642	1,822	1,999	2,154	2,062	1,975	1,816	1,661	1,520
Below Normal	1,248	1,259	1,287	1,409	1,560	1,708	1,857	1,790	1,716	1,581	1,414	1,315
Dry	1,303	1,288	1,329	1,373	1,484	1,619	1,724	1,640	1,555	1,384	1,220	1,110
Critical	1,041	1,030	1,052	1,087	1,153	1,212	1,267	1,214	1,174	1,038	895	807

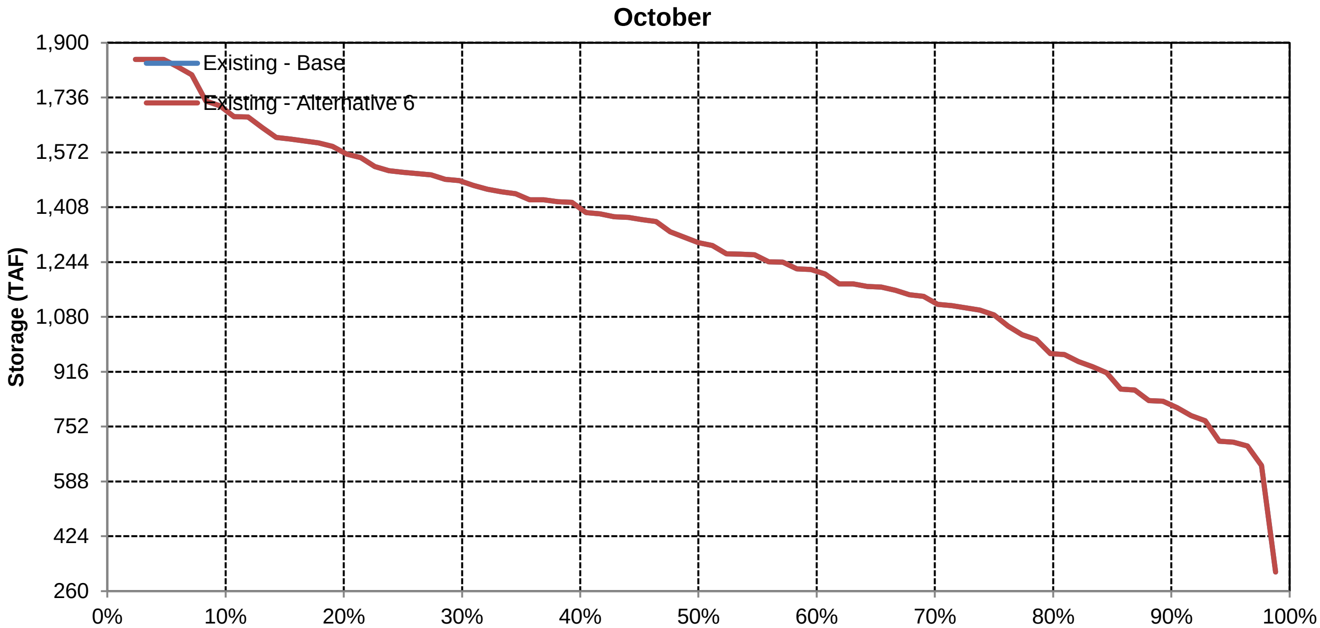
Existing - Alternative 6

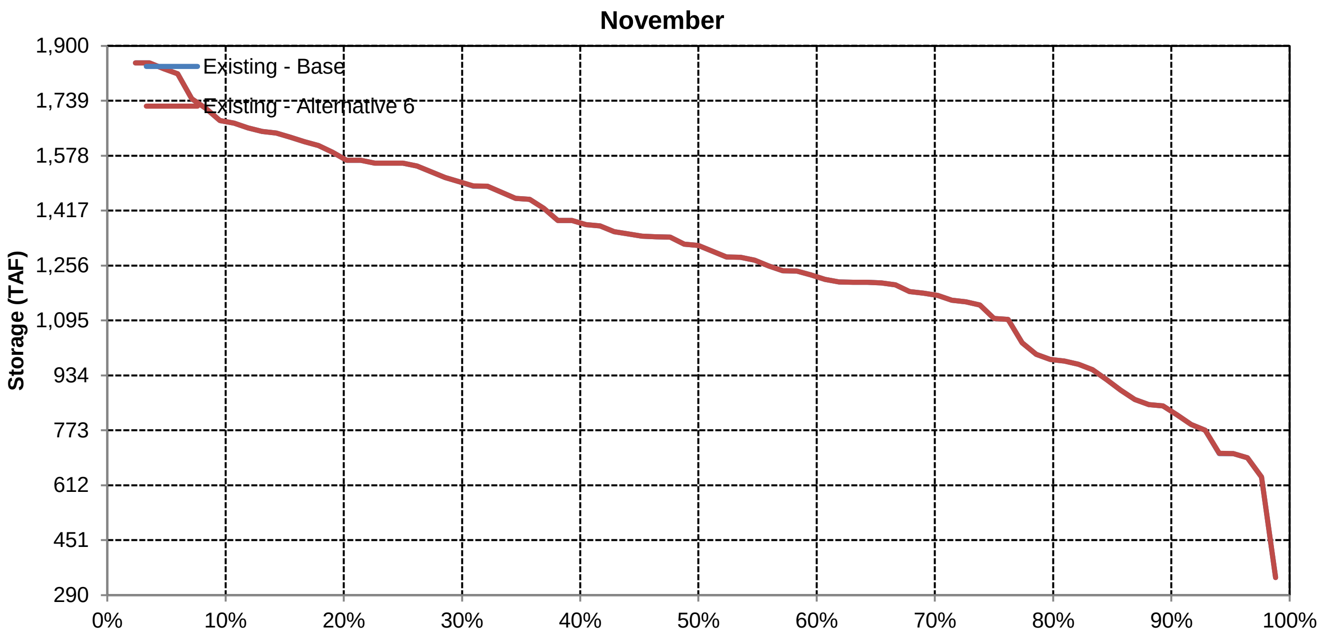
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	1,679	1,669	1,832	1,900	2,000	2,100	2,300	2,280	2,180	2,036	1,883	1,739
20%	1,561	1,564	1,651	1,871	2,000	2,100	2,253	2,180	2,061	1,899	1,757	1,620
30%	1,475	1,490	1,571	1,797	1,985	2,093	2,209	2,094	1,982	1,813	1,666	1,533
40%	1,391	1,375	1,503	1,663	1,844	2,014	2,151	2,039	1,892	1,736	1,573	1,442
50%	1,297	1,306	1,436	1,564	1,727	1,841	1,969	1,849	1,751	1,626	1,458	1,332
60%	1,211	1,218	1,325	1,409	1,575	1,748	1,859	1,779	1,681	1,531	1,369	1,247
70%	1,117	1,167	1,222	1,291	1,433	1,586	1,698	1,651	1,591	1,445	1,284	1,148
80%	969	979	1,041	1,144	1,328	1,453	1,593	1,574	1,453	1,293	1,119	1,009
90%	814	826	864	996	1,078	1,182	1,234	1,184	1,172	1,067	940	858
Long Term												
Full Simulation Period	1,276	1,285	1,370	1,501	1,641	1,769	1,902	1,832	1,743	1,596	1,445	1,326
Water Year Types												
Wet	1,352	1,401	1,574	1,777	1,943	2,063	2,232	2,168	2,045	1,906	1,771	1,629
Above Normal	1,354	1,330	1,434	1,642	1,822	1,999	2,154	2,062	1,975	1,816	1,661	1,520
Below Normal	1,248	1,259	1,286	1,409	1,560	1,708	1,857	1,790	1,716	1,581	1,414	1,315
Dry	1,303	1,288	1,329	1,373	1,484	1,619	1,724	1,640	1,555	1,384	1,220	1,110
Critical	1,041	1,030	1,052	1,087	1,153	1,212	1,267	1,214	1,174	1,038	895	807

Existing - Alternative 6 Minus Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types												
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

Trinity Reservoir





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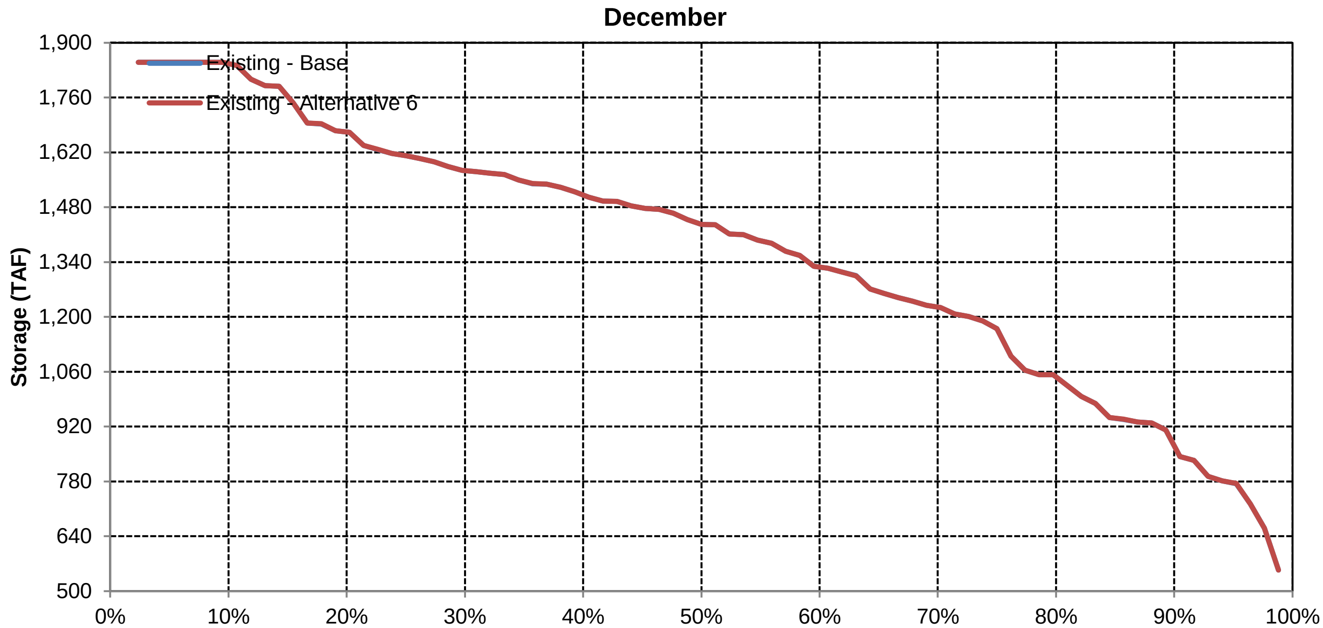
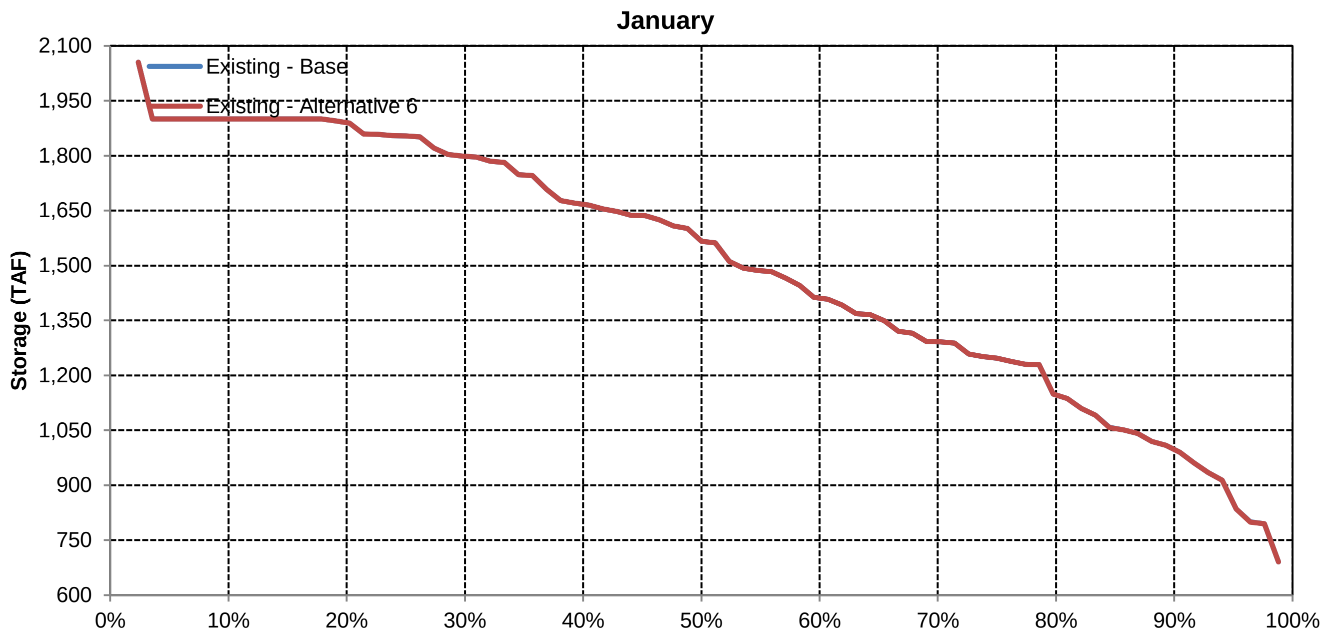
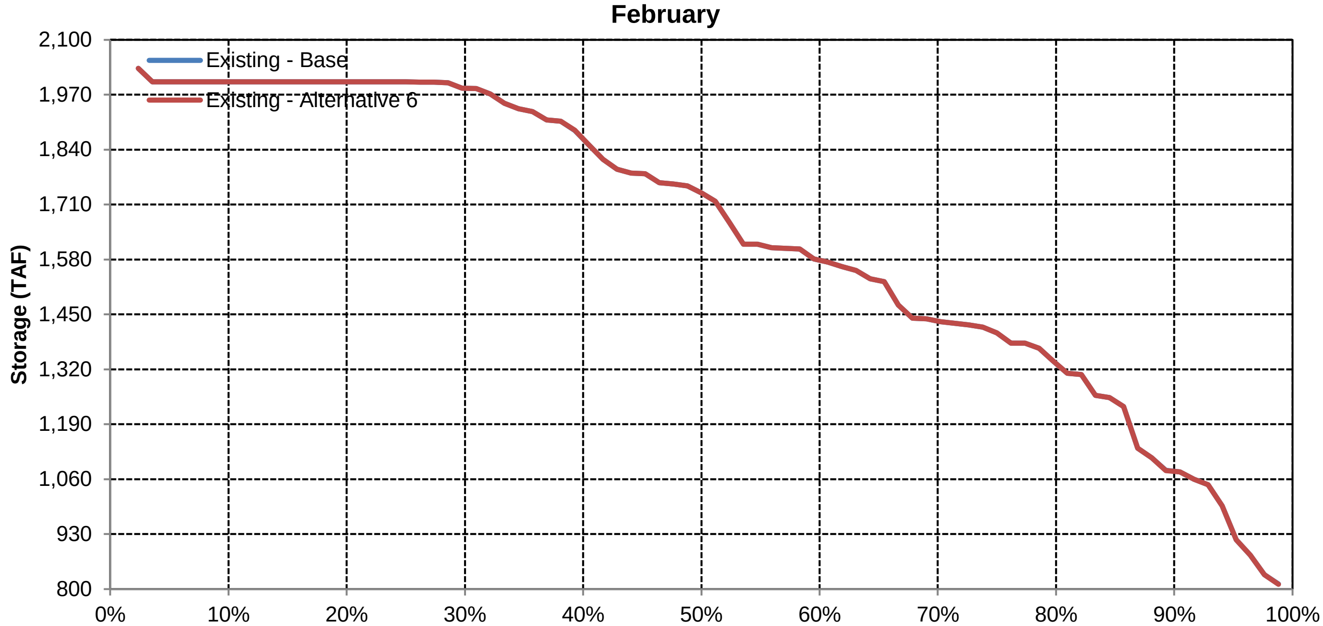
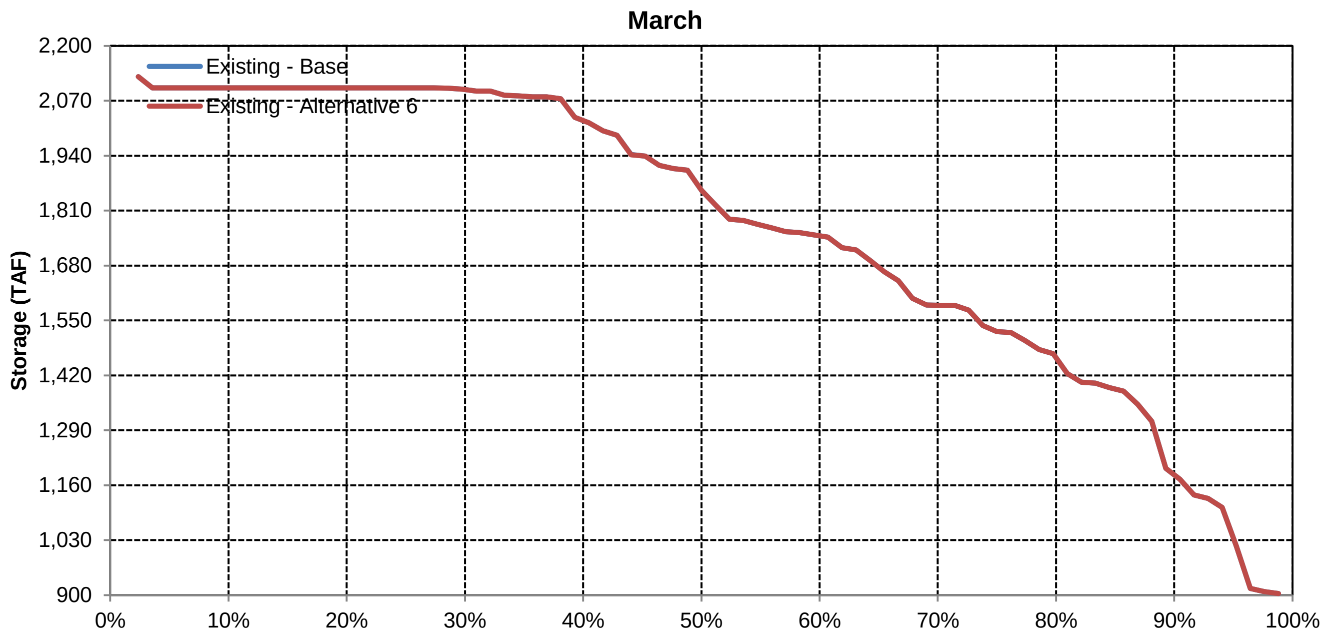




S1

Trinity Reservoir





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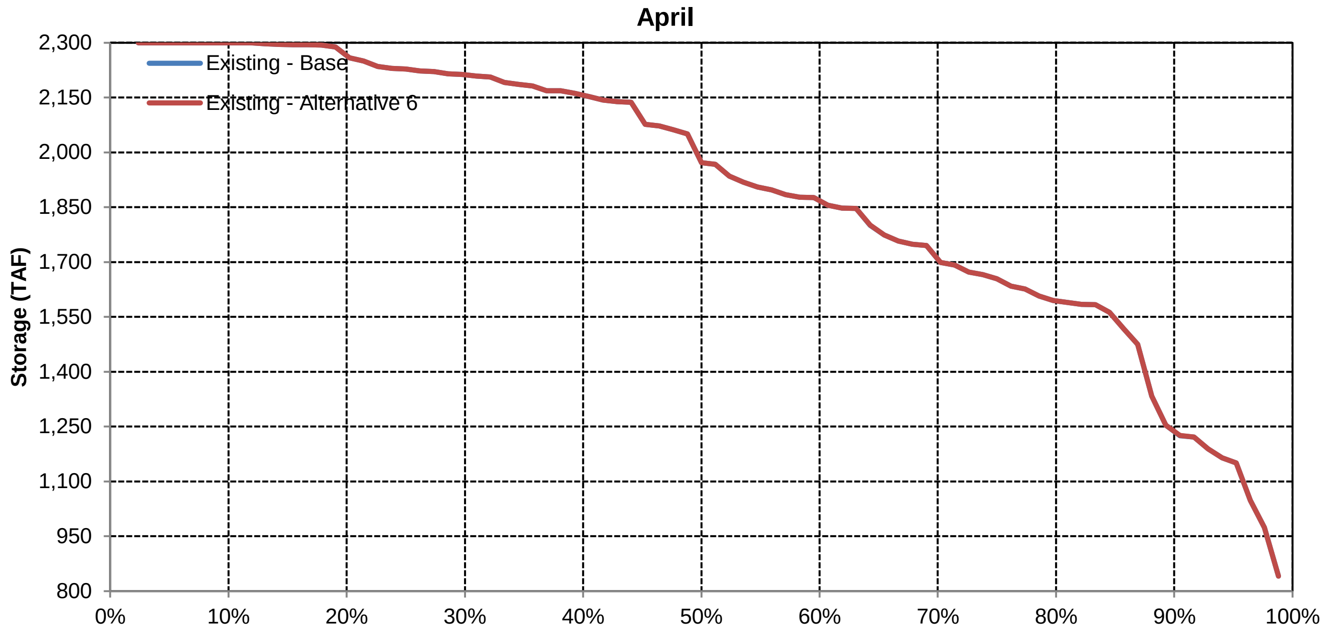

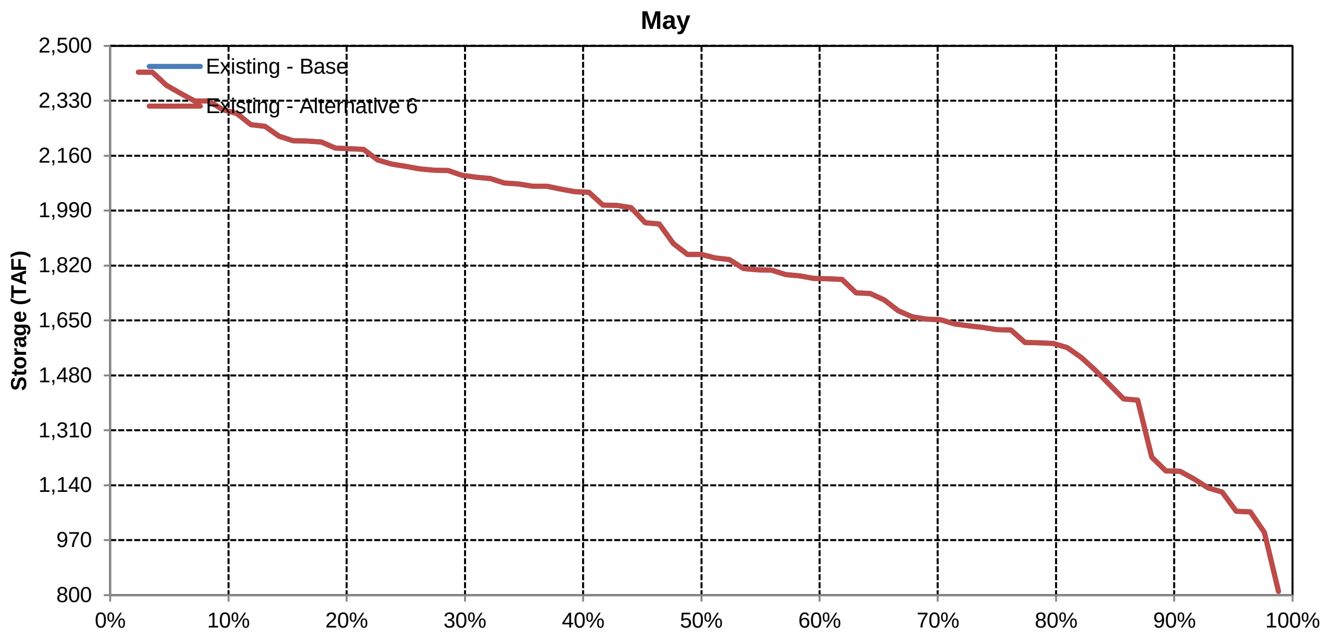

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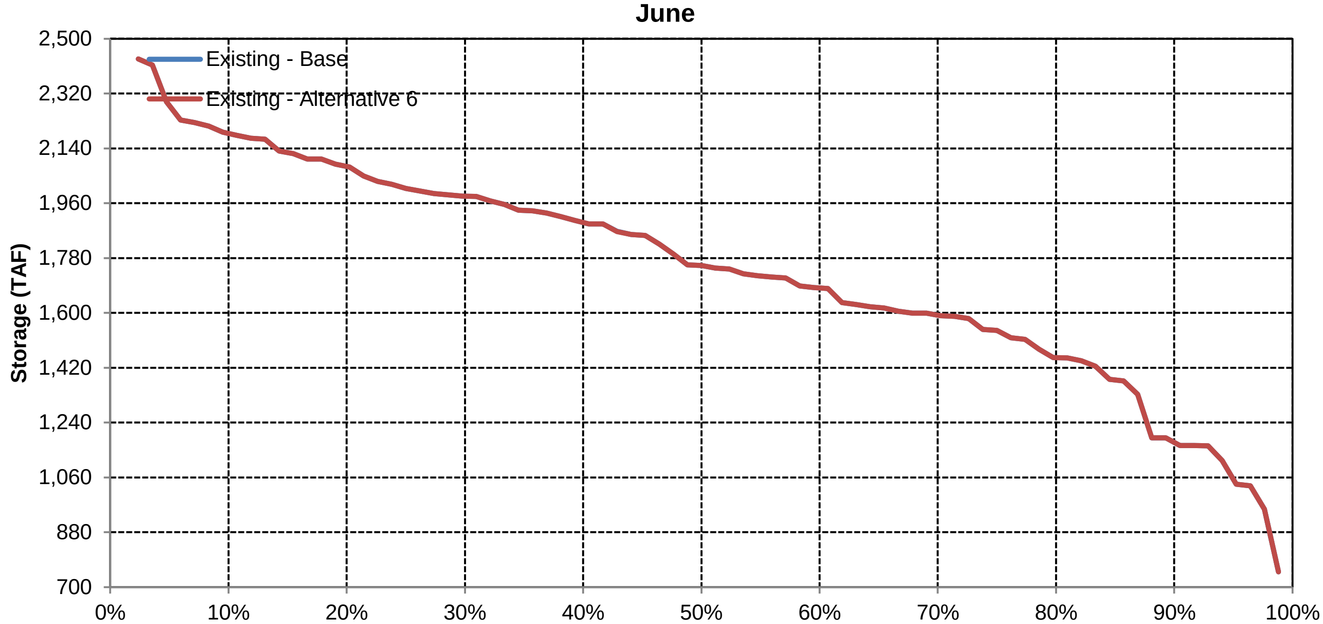

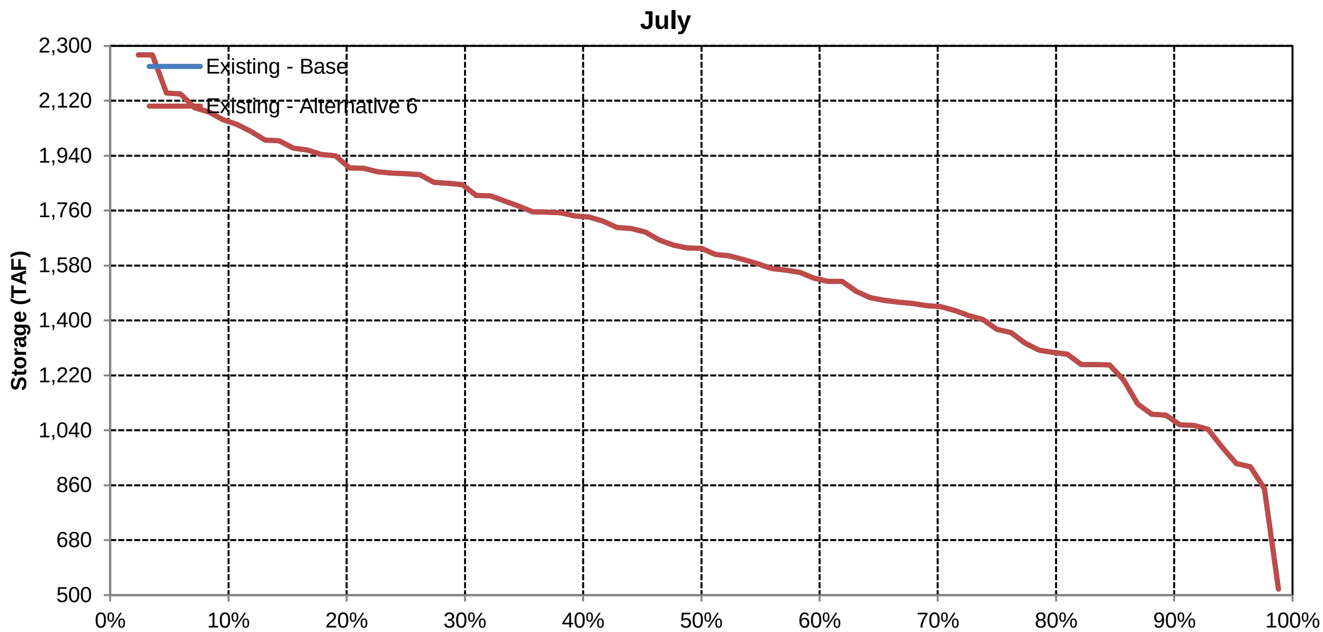

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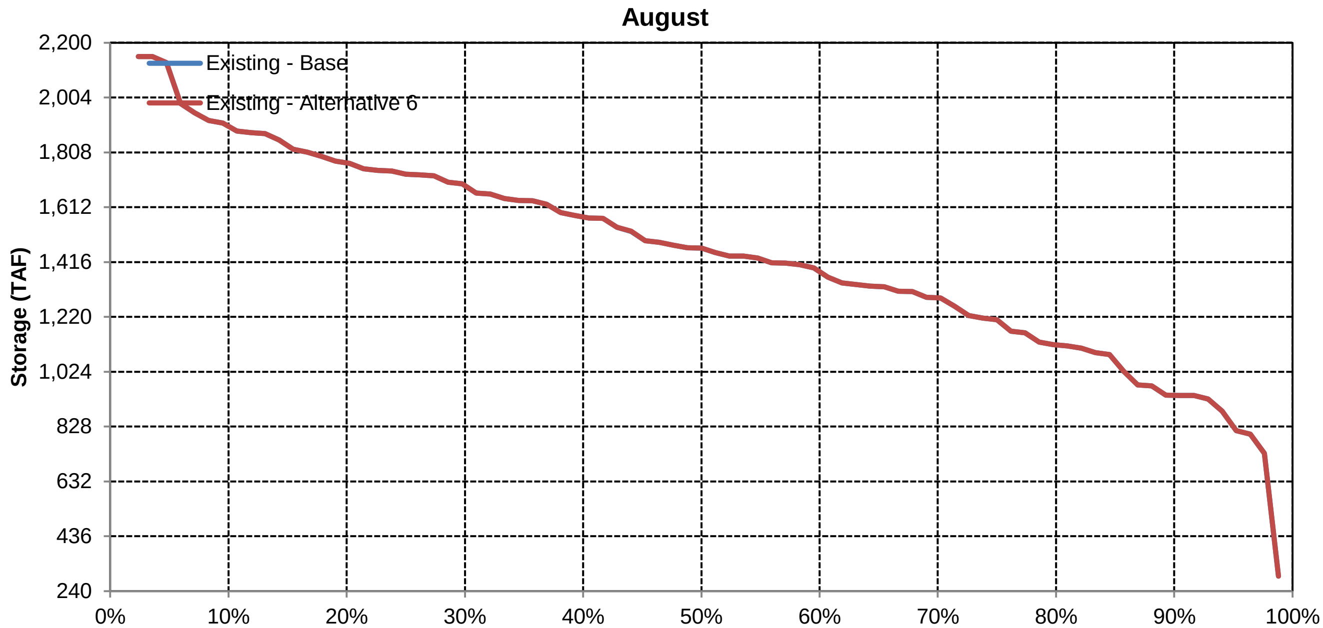
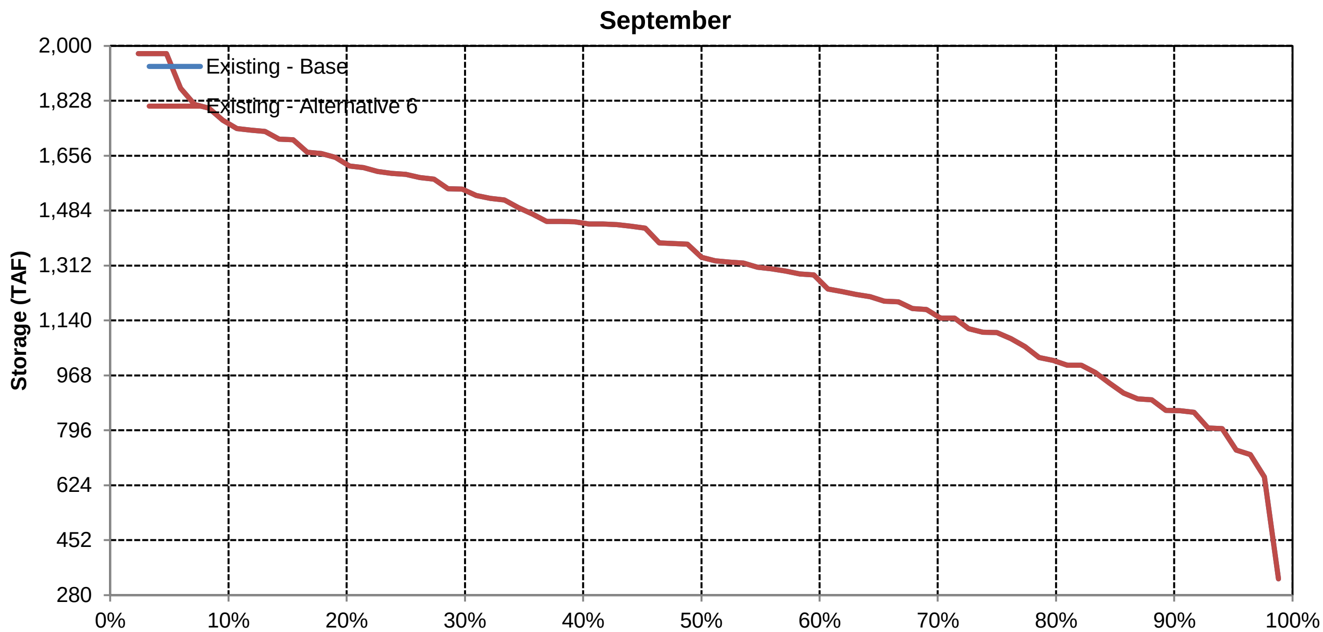




Long-Term and Water Year-Type Average of Shasta Reservoir Storage Under Existing - Base and Existing - Alternative 6

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
						Long-Term						
Full Simulation Period												
Existing - Base	2,487	2,504	2,755	3,076	3,374	3,757	3,995	3,956	3,567	3,020	2,727	2,556
Existing - Alternative 6	2,487	2,504	2,755	3,076	3,374	3,757	3,995	3,956	3,567	3,020	2,727	2,556
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
						Water Year-Types						
Wet												
Existing - Base	2,613	2,702	3,100	3,440	3,579	3,865	4,280	4,388	4,084	3,560	3,256	2,842
Existing - Alternative 6	2,613	2,702	3,100	3,440	3,579	3,865	4,280	4,388	4,084	3,560	3,256	2,842
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal												
Existing - Base	2,537	2,485	2,766	3,212	3,572	4,014	4,364	4,325	3,912	3,323	3,009	2,768
Existing - Alternative 6	2,537	2,485	2,766	3,212	3,572	4,014	4,364	4,325	3,912	3,323	3,009	2,768
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Existing - Base	2,369	2,436	2,594	2,989	3,427	3,933	4,220	4,140	3,703	3,083	2,787	2,785
Existing - Alternative 6	2,369	2,436	2,594	2,989	3,427	3,933	4,220	4,140	3,704	3,083	2,787	2,785
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry												
Existing - Base	2,489	2,449	2,648	2,874	3,288	3,732	3,800	3,677	3,263	2,775	2,491	2,466
Existing - Alternative 6	2,489	2,449	2,648	2,874	3,288	3,732	3,800	3,677	3,263	2,775	2,491	2,466
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical												
Existing - Base	2,338	2,278	2,396	2,576	2,786	3,059	2,976	2,802	2,354	1,832	1,572	1,547
Existing - Alternative 6	2,338	2,278	2,396	2,576	2,786	3,059	2,976	2,802	2,354	1,832	1,572	1,547
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Shasta Reservoir Storage

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	3,244	3,235	3,326	3,635	3,894	4,241	4,535	4,552	4,292	3,804	3,449	3,173
20%	2,935	2,986	3,288	3,529	3,740	4,119	4,455	4,528	4,151	3,585	3,339	3,033
30%	2,796	2,765	3,252	3,373	3,662	4,036	4,356	4,434	4,067	3,445	3,153	2,831
40%	2,695	2,654	3,047	3,296	3,552	3,992	4,257	4,293	3,864	3,225	2,891	2,766
50%	2,563	2,574	2,797	3,246	3,471	3,906	4,206	4,183	3,681	3,093	2,805	2,667
60%	2,427	2,461	2,677	3,001	3,300	3,744	4,097	4,057	3,556	2,974	2,699	2,490
70%	2,318	2,318	2,503	2,902	3,251	3,531	3,948	3,837	3,399	2,816	2,509	2,373
80%	2,161	2,218	2,368	2,685	3,077	3,387	3,457	3,270	2,912	2,497	2,253	2,259
90%	1,751	1,763	1,960	2,366	2,766	3,186	3,065	2,980	2,526	2,019	1,715	1,746
Long Term												
Full Simulation Period	2,487	2,504	2,755	3,076	3,374	3,757	3,995	3,956	3,567	3,020	2,727	2,556
Water Year Types												
Wet	2,613	2,702	3,100	3,440	3,579	3,865	4,280	4,388	4,084	3,560	3,256	2,842
Above Normal	2,537	2,485	2,766	3,212	3,572	4,014	4,364	4,325	3,912	3,323	3,009	2,768
Below Normal	2,369	2,436	2,594	2,989	3,427	3,933	4,220	4,140	3,703	3,083	2,787	2,785
Dry	2,489	2,449	2,648	2,874	3,288	3,732	3,800	3,677	3,263	2,775	2,491	2,466
Critical	2,338	2,278	2,396	2,576	2,786	3,059	2,976	2,802	2,354	1,832	1,572	1,547

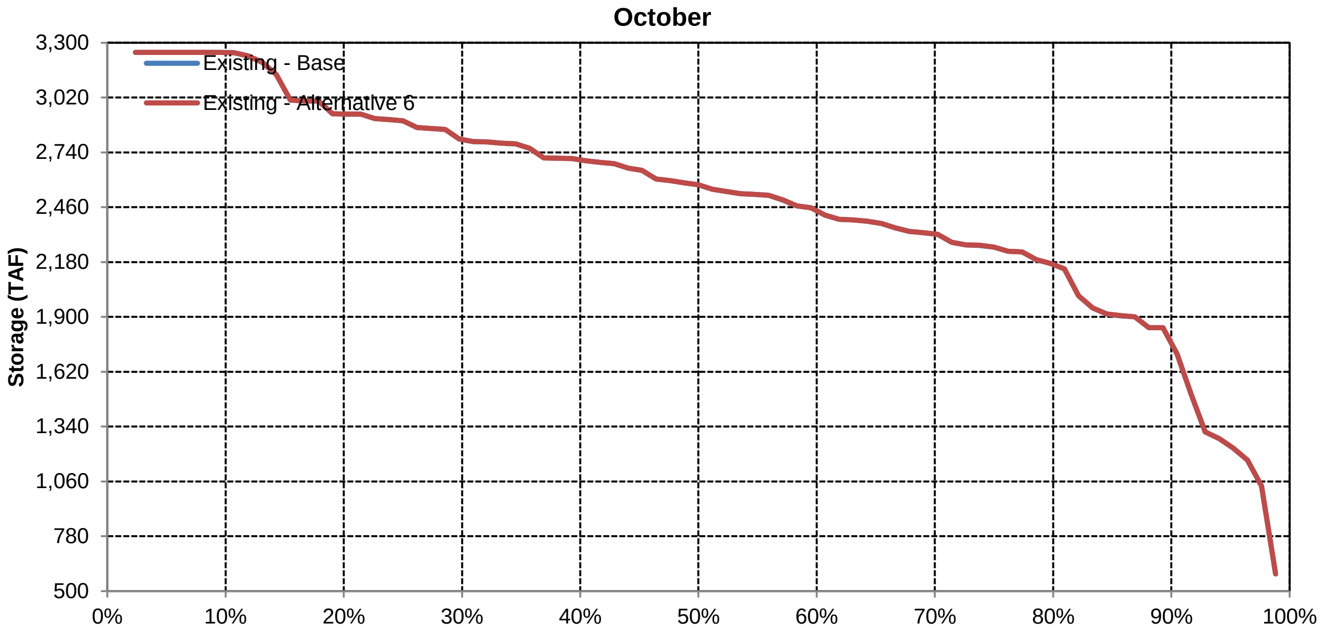
Existing - Alternative 6

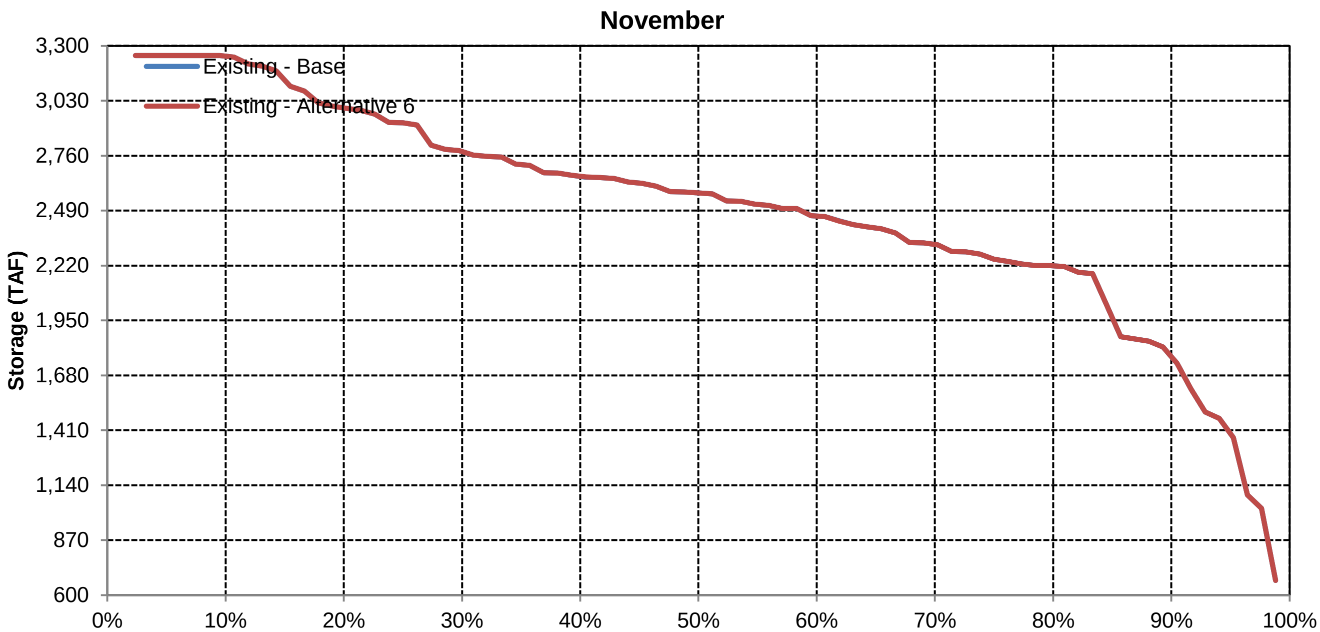
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	3,244	3,235	3,326	3,635	3,894	4,241	4,535	4,552	4,292	3,804	3,449	3,173
20%	2,935	2,986	3,288	3,529	3,740	4,119	4,455	4,528	4,151	3,585	3,339	3,033
30%	2,796	2,765	3,252	3,373	3,662	4,036	4,356	4,434	4,067	3,445	3,153	2,831
40%	2,695	2,654	3,047	3,297	3,552	3,992	4,257	4,293	3,864	3,225	2,891	2,766
50%	2,563	2,574	2,797	3,246	3,471	3,906	4,206	4,183	3,681	3,093	2,805	2,667
60%	2,427	2,462	2,677	3,001	3,300	3,744	4,097	4,057	3,556	2,974	2,699	2,491
70%	2,318	2,318	2,503	2,902	3,251	3,531	3,948	3,837	3,399	2,816	2,509	2,373
80%	2,161	2,218	2,369	2,685	3,077	3,387	3,457	3,270	2,912	2,497	2,253	2,259
90%	1,751	1,763	1,960	2,366	2,766	3,186	3,065	2,980	2,526	2,019	1,715	1,746
Long Term												
Full Simulation Period	2,487	2,504	2,755	3,076	3,374	3,757	3,995	3,956	3,567	3,020	2,727	2,556
Water Year Types												
Wet	2,613	2,702	3,100	3,440	3,579	3,865	4,280	4,388	4,084	3,560	3,256	2,842
Above Normal	2,537	2,485	2,766	3,212	3,572	4,014	4,364	4,325	3,912	3,323	3,009	2,768
Below Normal	2,369	2,436	2,594	2,989	3,427	3,933	4,220	4,140	3,704	3,083	2,787	2,785
Dry	2,489	2,449	2,648	2,874	3,288	3,732	3,800	3,677	3,263	2,775	2,491	2,466
Critical	2,338	2,278	2,396	2,576	2,786	3,059	2,976	2,802	2,354	1,832	1,572	1,547

Existing - Alternative 6 Minus Existing - Base

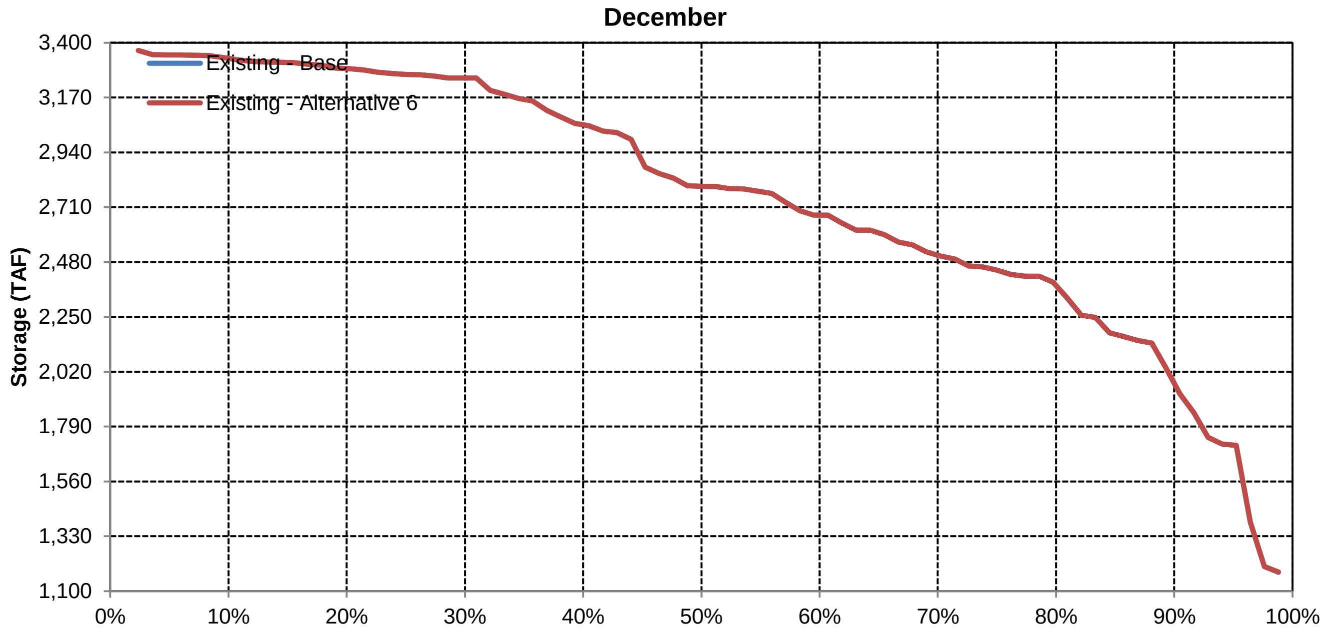
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types												
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

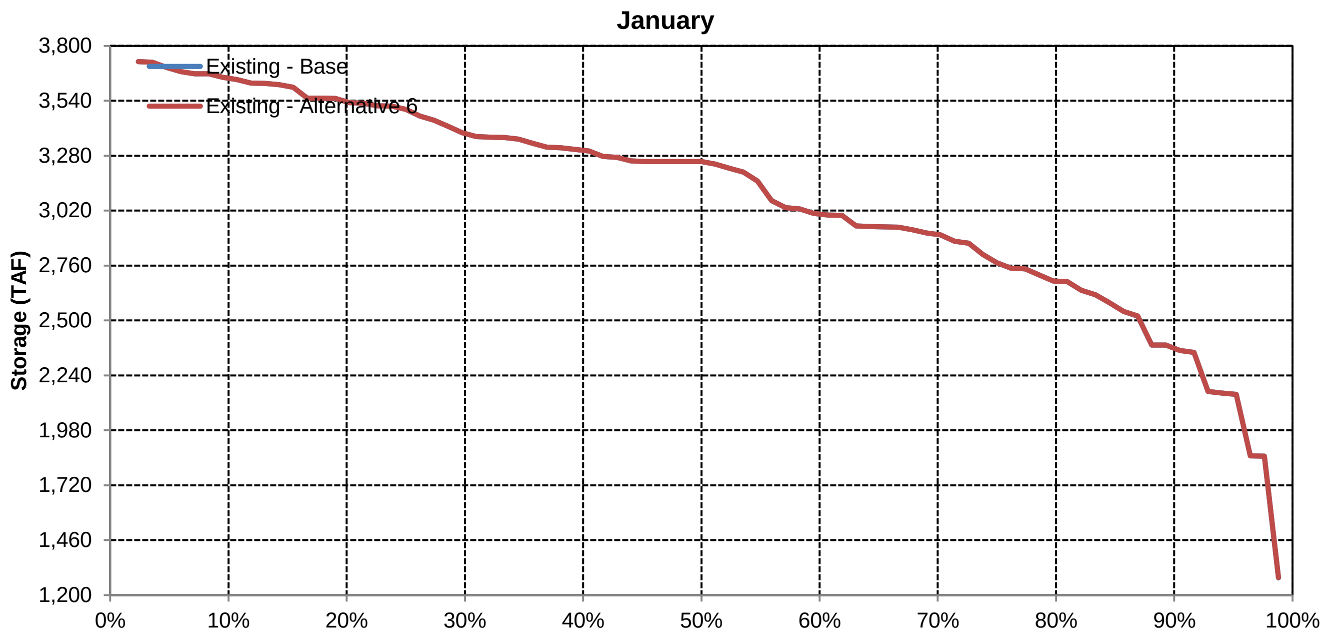
Shasta Reservoir Storage





Shasta Reservoir Storage





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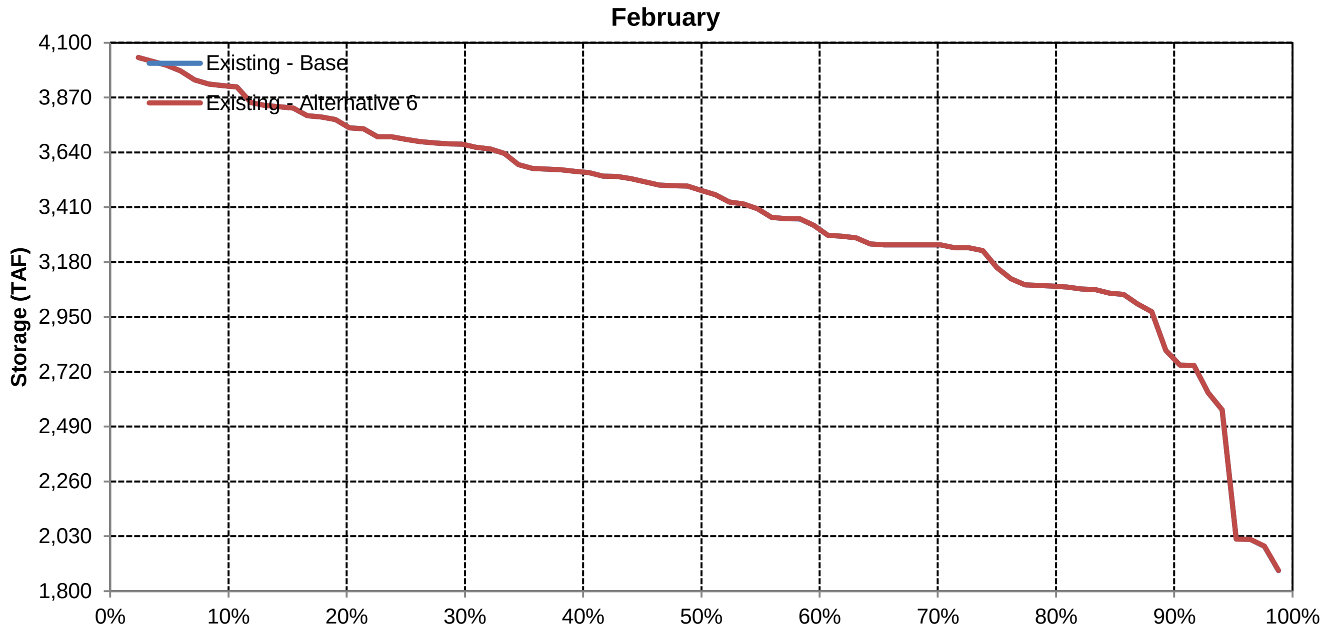

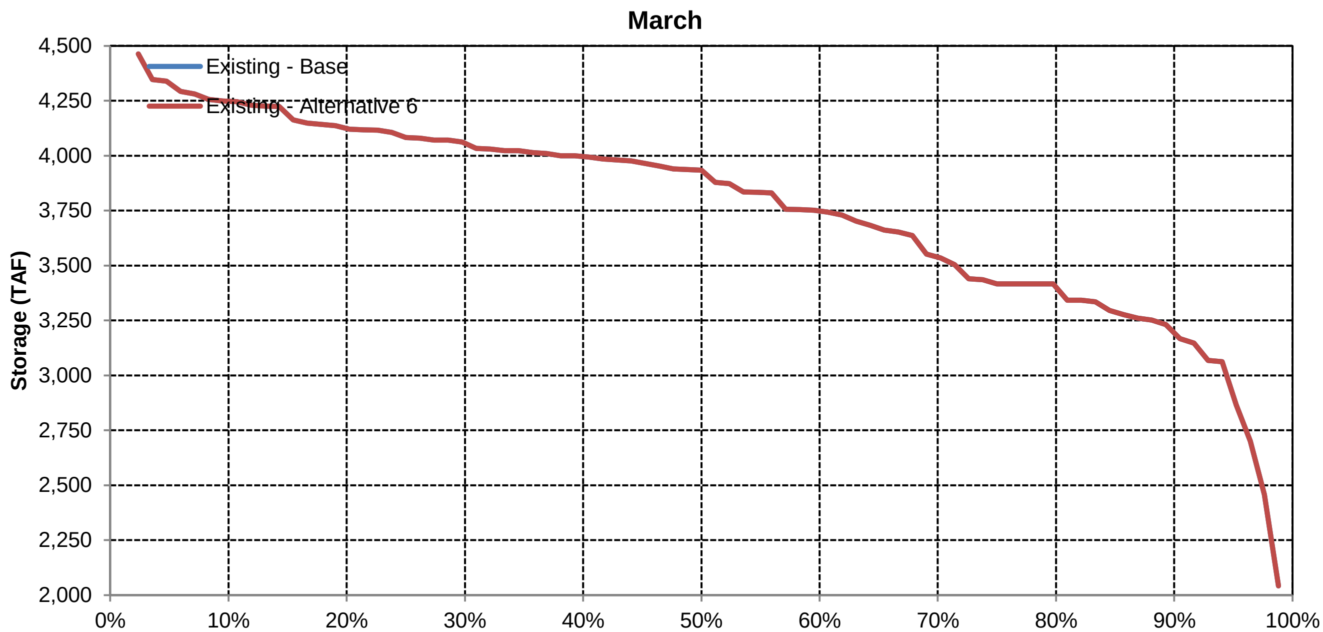

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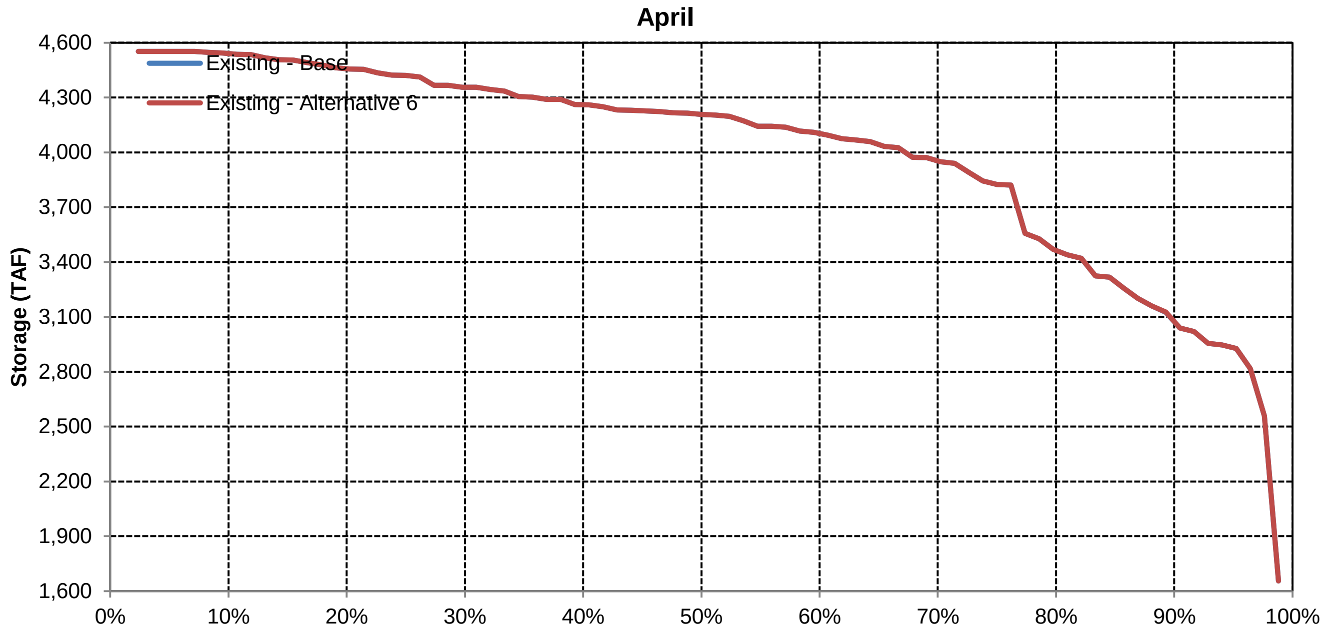

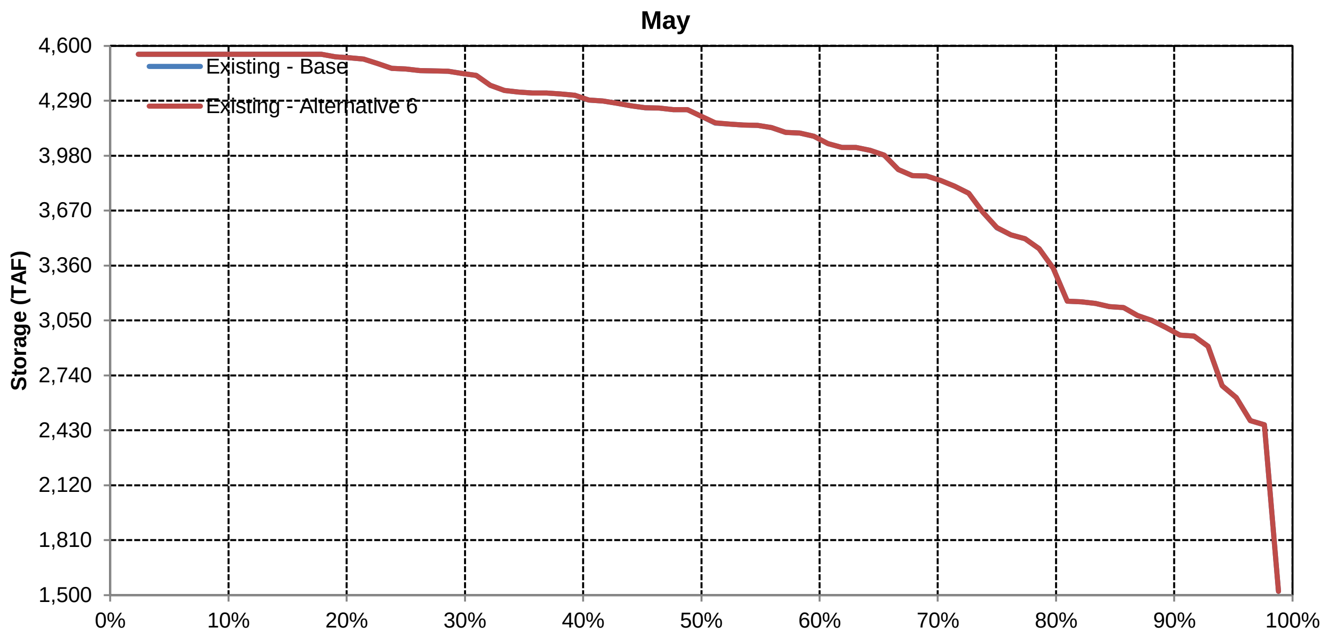

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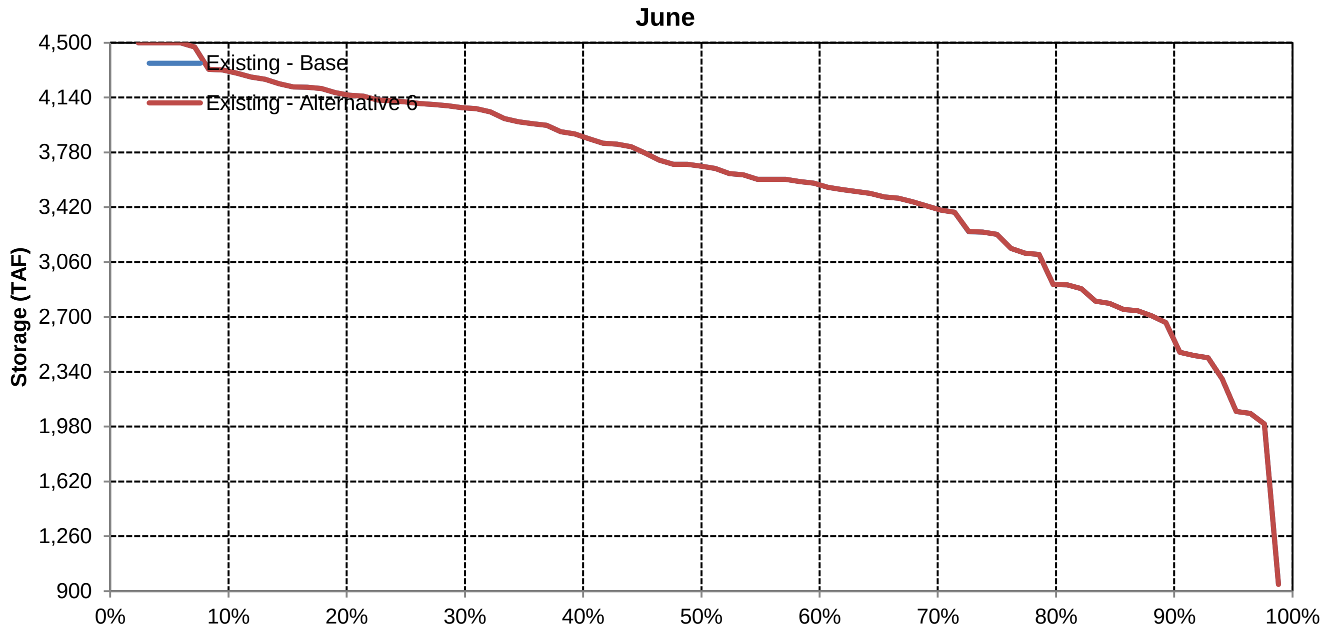
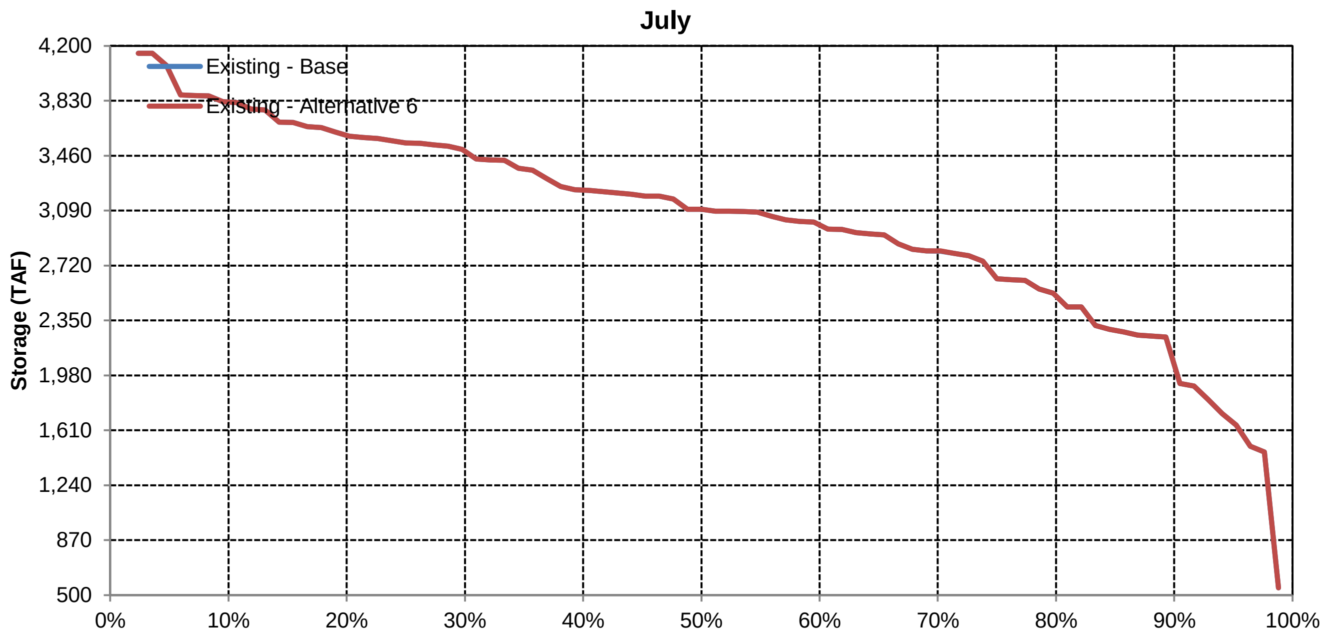
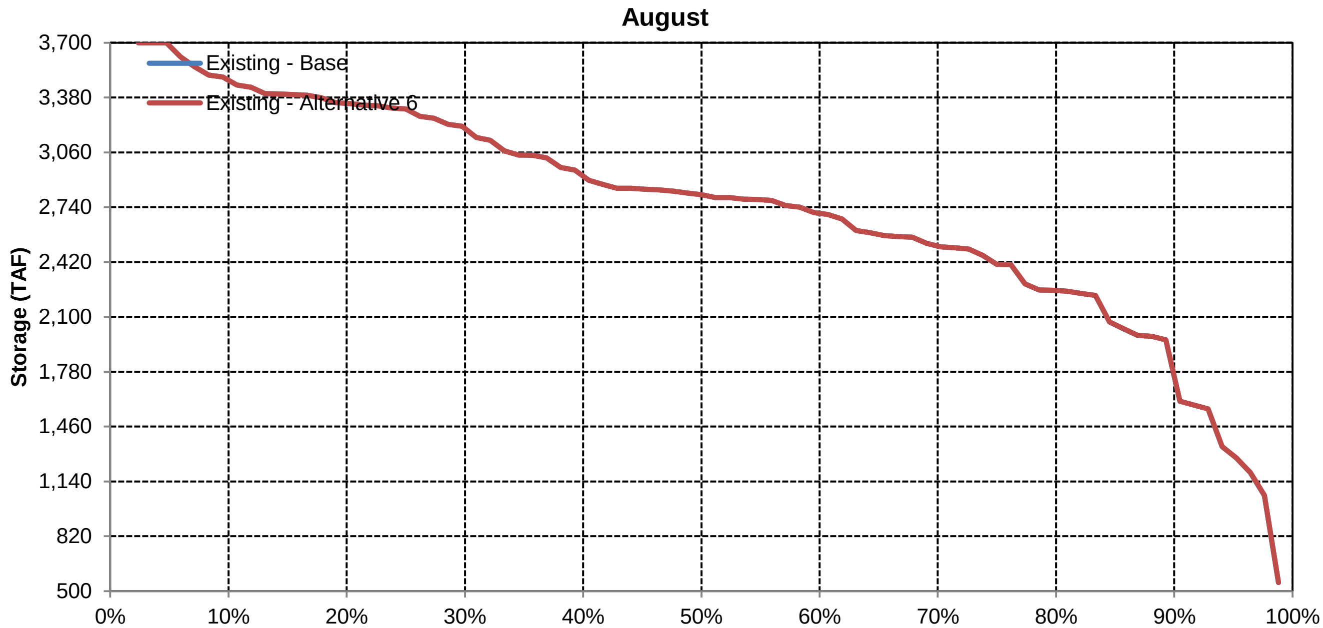
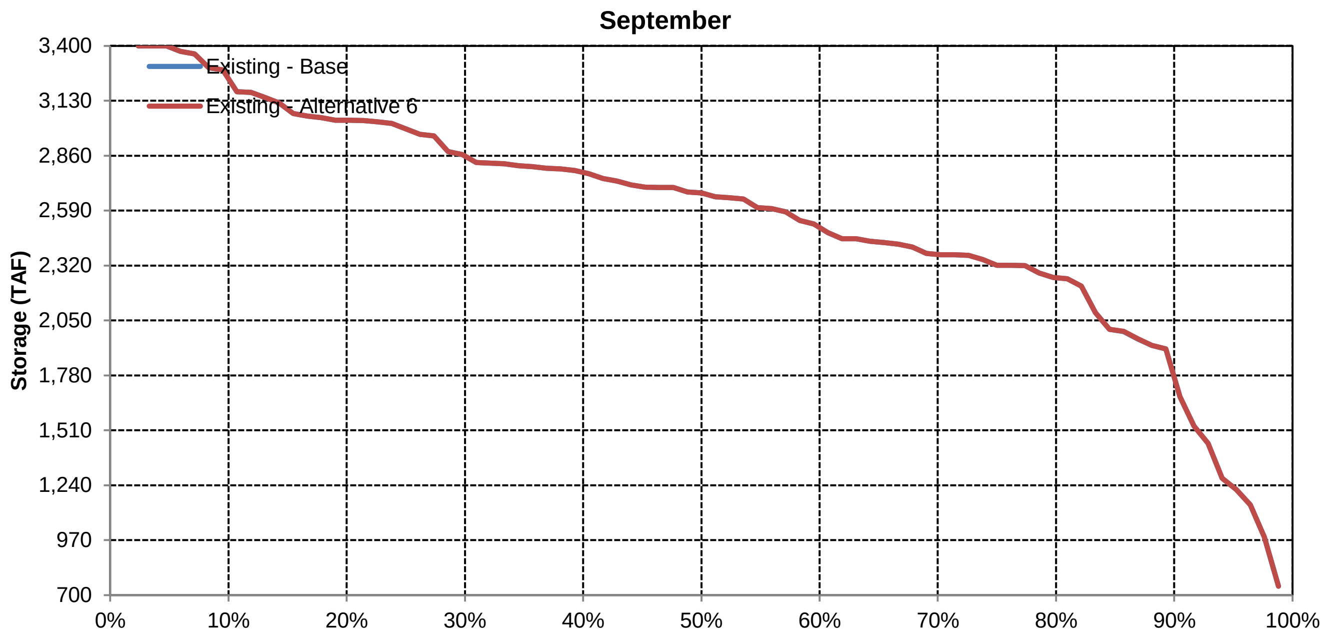




Shasta Reservoir Storage





Long-Term and Water Year-Type Average of Oroville Reservoir Under Existing - Base and Existing - Alternative 6

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
						Long-Term						
Full Simulation Period												
Existing - Base	1,375	1,426	1,653	1,978	2,289	2,521	2,733	2,764	2,570	2,055	1,720	1,475
Existing - Alternative 6	1,375	1,426	1,653	1,978	2,289	2,521	2,734	2,764	2,570	2,055	1,720	1,475
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
						Water Year-Types						
Wet												
Existing - Base	1,516	1,714	2,247	2,673	2,864	2,952	3,256	3,383	3,246	2,729	2,371	1,947
Existing - Alternative 6	1,517	1,714	2,247	2,673	2,864	2,952	3,256	3,383	3,246	2,729	2,371	1,947
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal												
Existing - Base	1,465	1,439	1,710	2,291	2,764	2,945	3,251	3,314	3,133	2,506	2,052	1,703
Existing - Alternative 6	1,465	1,439	1,710	2,291	2,764	2,945	3,251	3,314	3,133	2,506	2,052	1,703
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Existing - Base	1,400	1,431	1,460	1,738	2,132	2,519	2,765	2,772	2,519	1,889	1,450	1,333
Existing - Alternative 6	1,400	1,432	1,461	1,739	2,132	2,519	2,765	2,772	2,519	1,889	1,450	1,333
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry												
Existing - Base	1,217	1,186	1,283	1,463	1,859	2,221	2,348	2,304	2,058	1,571	1,315	1,149
Existing - Alternative 6	1,218	1,186	1,283	1,463	1,859	2,221	2,348	2,304	2,059	1,571	1,315	1,149
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical												
Existing - Base	1,167	1,125	1,125	1,245	1,411	1,604	1,597	1,528	1,356	1,082	952	901
Existing - Alternative 6	1,167	1,125	1,125	1,245	1,411	1,604	1,597	1,528	1,356	1,082	952	901
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Oroville Reservoir

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	2,048	2,100	2,788	2,852	2,973	3,062	3,347	3,538	3,464	2,932	2,540	2,049
20%	1,690	1,724	2,266	2,788	2,821	2,991	3,279	3,429	3,319	2,720	2,274	1,870
30%	1,557	1,571	1,864	2,609	2,788	2,938	3,234	3,313	3,103	2,478	2,087	1,726
40%	1,418	1,455	1,626	2,184	2,788	2,817	3,162	3,202	2,948	2,271	1,793	1,522
50%	1,255	1,303	1,474	1,911	2,537	2,788	3,042	2,980	2,730	2,097	1,619	1,391
60%	1,195	1,197	1,303	1,674	2,093	2,588	2,813	2,722	2,447	1,842	1,446	1,289
70%	1,027	1,088	1,226	1,470	1,932	2,306	2,344	2,503	2,236	1,596	1,366	1,196
80%	998	1,019	1,128	1,352	1,643	2,058	2,129	2,080	1,885	1,434	1,135	1,012
90%	885	956	992	1,085	1,275	1,582	1,648	1,551	1,356	1,036	898	852
Long Term												
Full Simulation Period	1,375	1,426	1,653	1,978	2,289	2,521	2,733	2,764	2,570	2,055	1,720	1,475
Water Year Types												
Wet	1,516	1,714	2,247	2,673	2,864	2,952	3,256	3,383	3,246	2,729	2,371	1,947
Above Normal	1,465	1,439	1,710	2,291	2,764	2,945	3,251	3,314	3,133	2,506	2,052	1,703
Below Normal	1,400	1,431	1,460	1,738	2,132	2,519	2,765	2,772	2,519	1,889	1,450	1,333
Dry	1,217	1,186	1,283	1,463	1,859	2,221	2,348	2,304	2,058	1,571	1,315	1,149
Critical	1,167	1,125	1,125	1,245	1,411	1,604	1,597	1,528	1,356	1,082	952	901

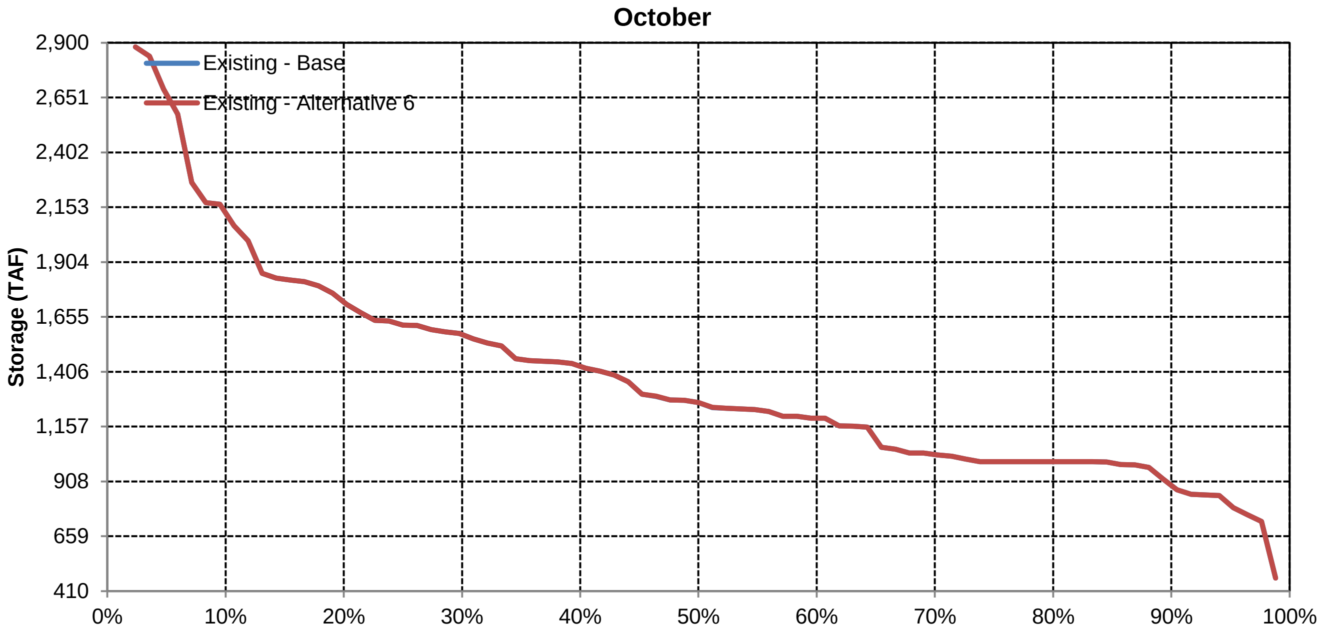
Existing - Alternative 6

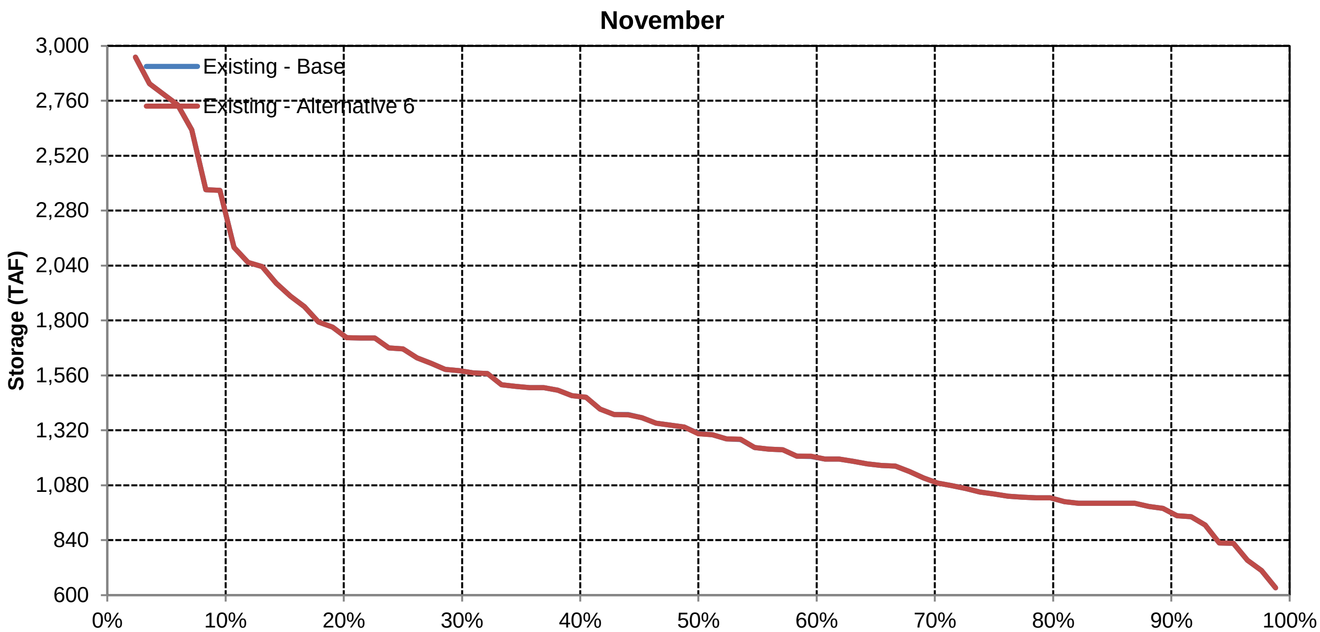
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	2,048	2,100	2,788	2,852	2,973	3,062	3,347	3,538	3,464	2,932	2,540	2,049
20%	1,690	1,724	2,265	2,788	2,821	2,991	3,279	3,429	3,319	2,720	2,274	1,870
30%	1,557	1,571	1,864	2,609	2,788	2,938	3,234	3,313	3,103	2,478	2,087	1,726
40%	1,418	1,455	1,626	2,184	2,788	2,817	3,162	3,202	2,948	2,271	1,793	1,522
50%	1,255	1,303	1,473	1,912	2,537	2,788	3,042	2,980	2,730	2,097	1,619	1,392
60%	1,195	1,197	1,303	1,674	2,093	2,588	2,813	2,722	2,447	1,842	1,446	1,290
70%	1,027	1,088	1,226	1,470	1,932	2,306	2,344	2,503	2,236	1,596	1,366	1,197
80%	998	1,019	1,128	1,352	1,643	2,058	2,129	2,080	1,885	1,434	1,135	1,012
90%	885	956	992	1,085	1,275	1,582	1,648	1,551	1,356	1,036	898	852
Long Term												
Full Simulation Period	1,375	1,426	1,653	1,978	2,289	2,521	2,734	2,764	2,570	2,055	1,720	1,475
Water Year Types												
Wet	1,517	1,714	2,247	2,673	2,864	2,952	3,256	3,383	3,246	2,729	2,371	1,947
Above Normal	1,465	1,439	1,710	2,291	2,764	2,945	3,251	3,314	3,133	2,506	2,052	1,703
Below Normal	1,400	1,432	1,461	1,739	2,132	2,519	2,765	2,772	2,519	1,889	1,450	1,333
Dry	1,218	1,186	1,283	1,463	1,859	2,221	2,348	2,304	2,059	1,571	1,315	1,149
Critical	1,167	1,125	1,125	1,245	1,411	1,604	1,597	1,528	1,356	1,082	952	901

Existing - Alternative 6 Minus Existing - Base

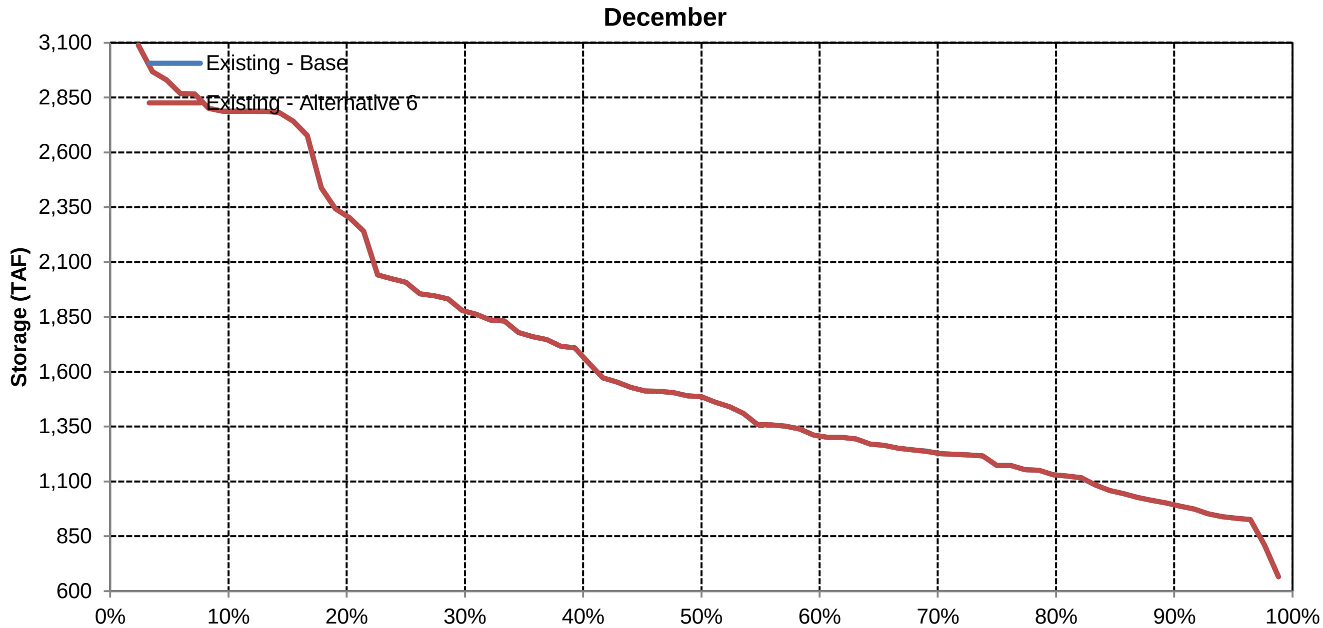
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	1
60%	0	0	0	0	0	0	0	0	0	0	1	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types												
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

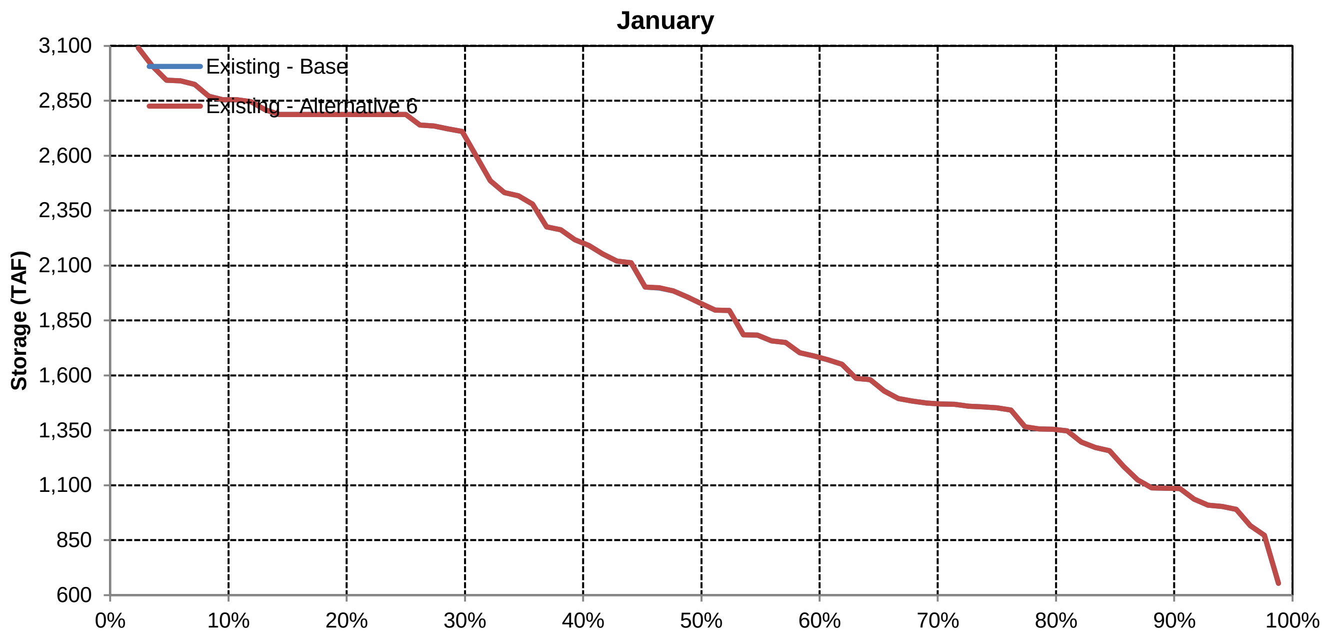
Oroville Reservoir



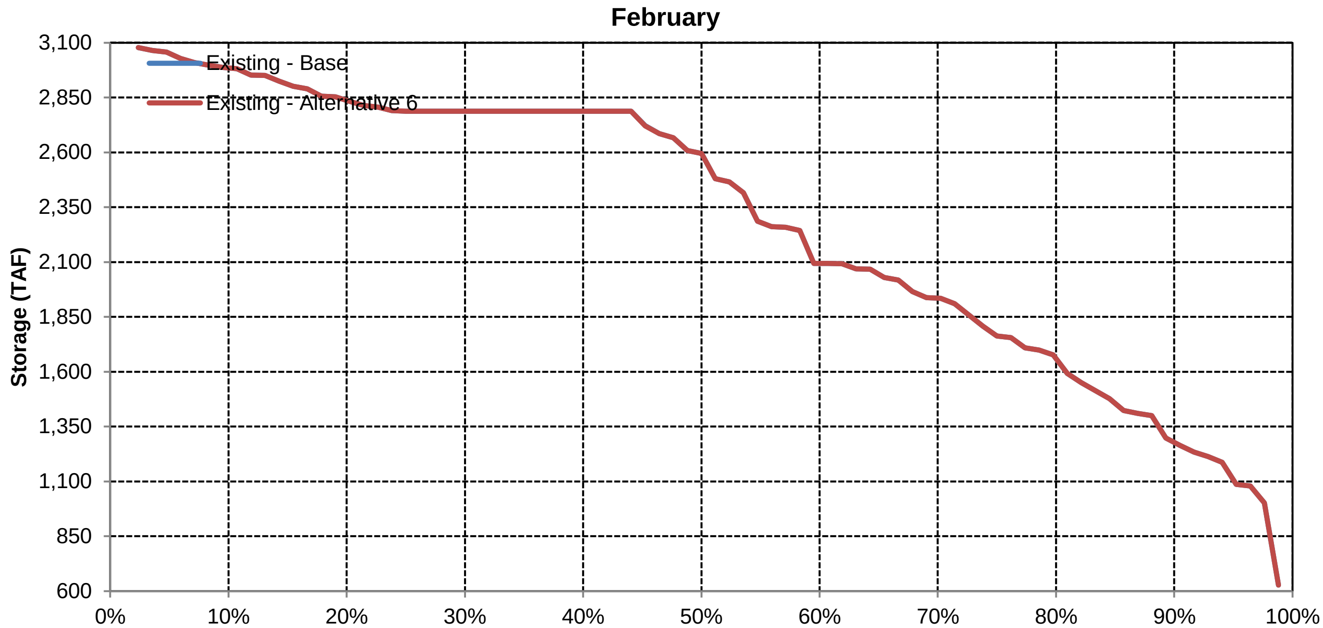


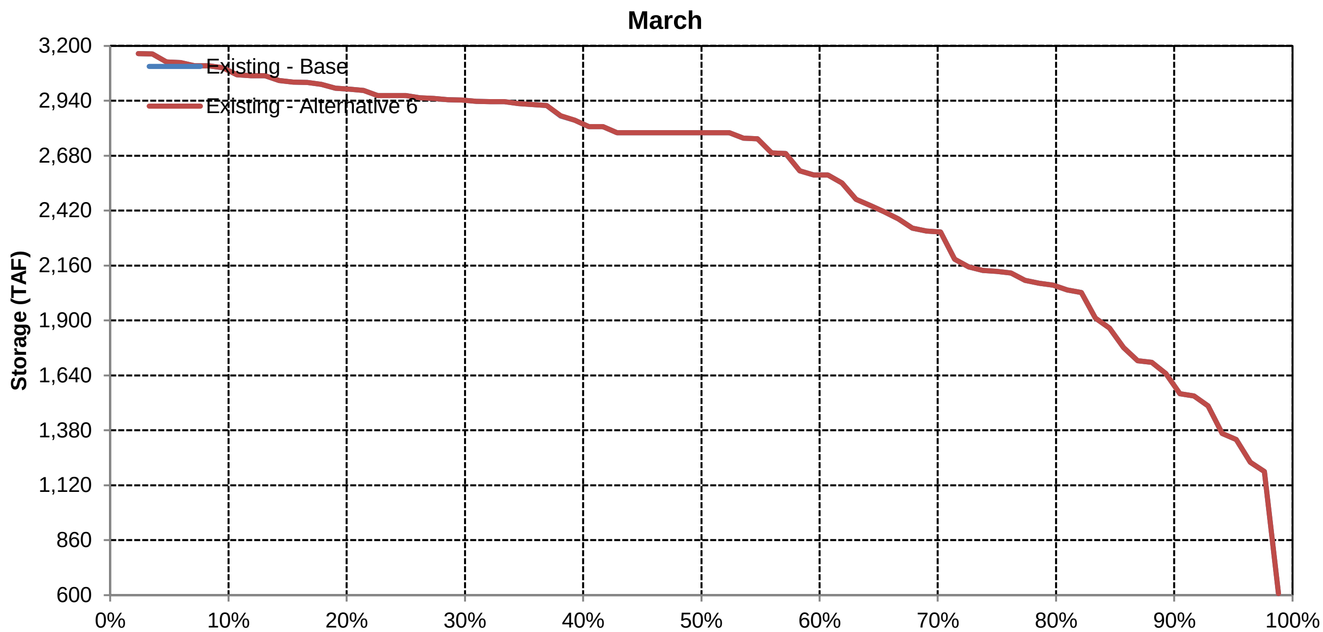
Oroville Reservoir



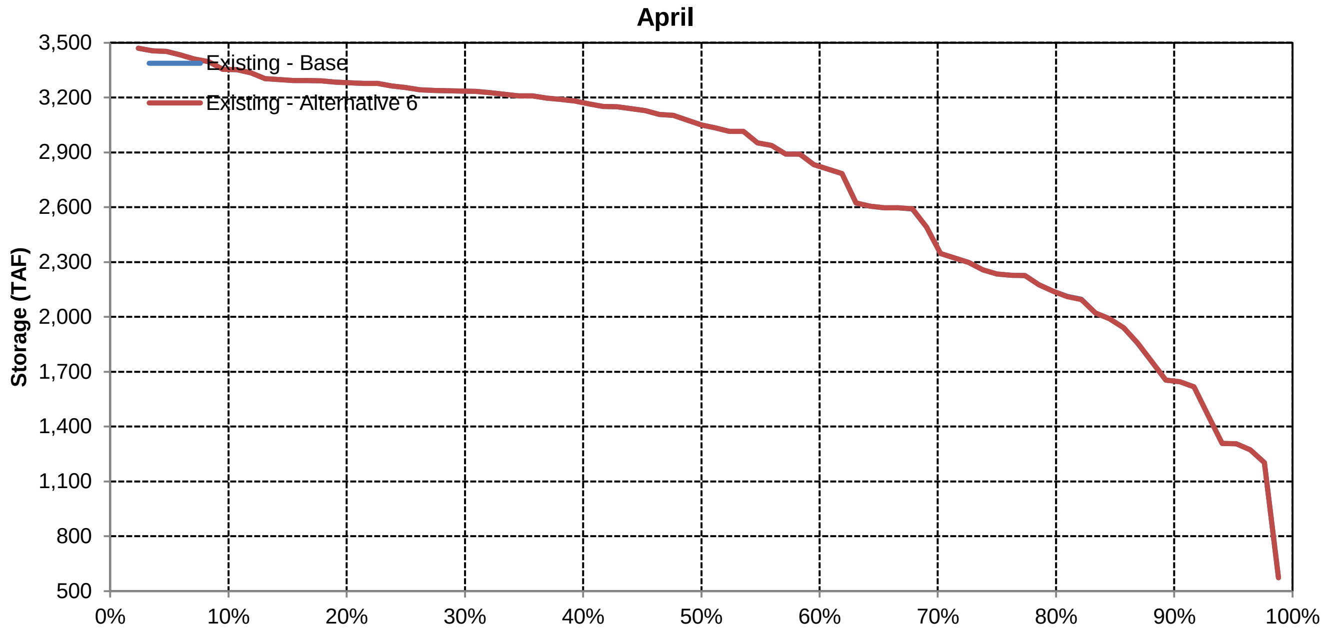


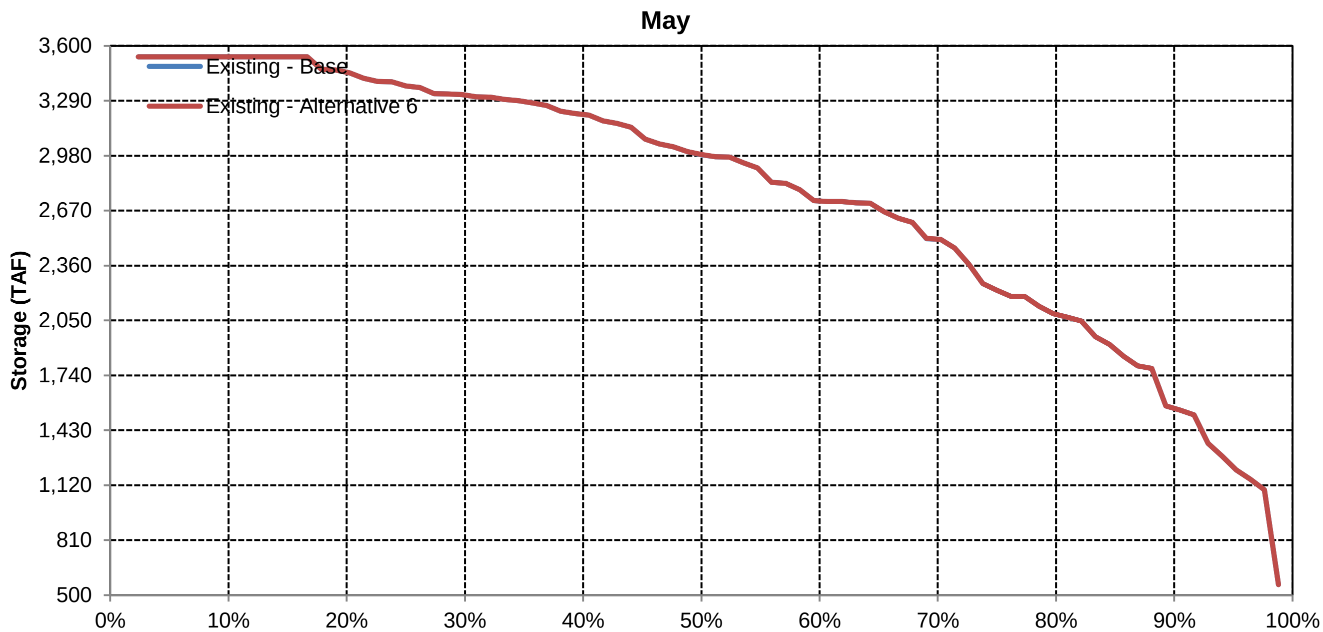
Oroville Reservoir



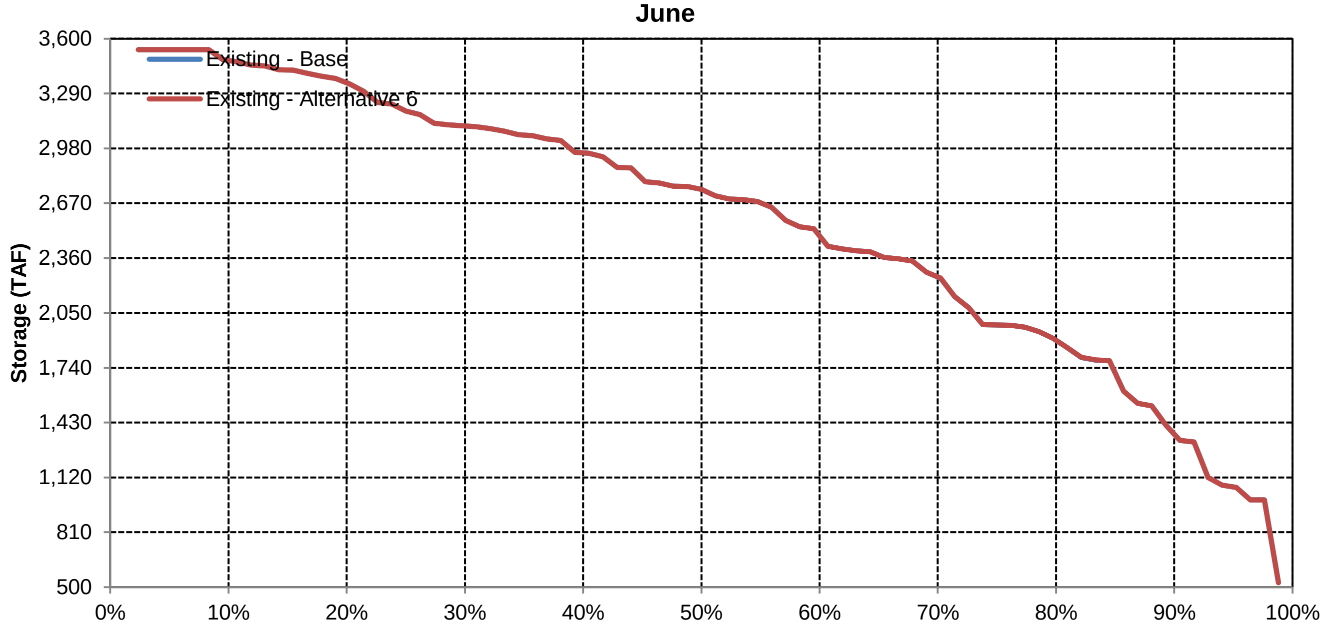


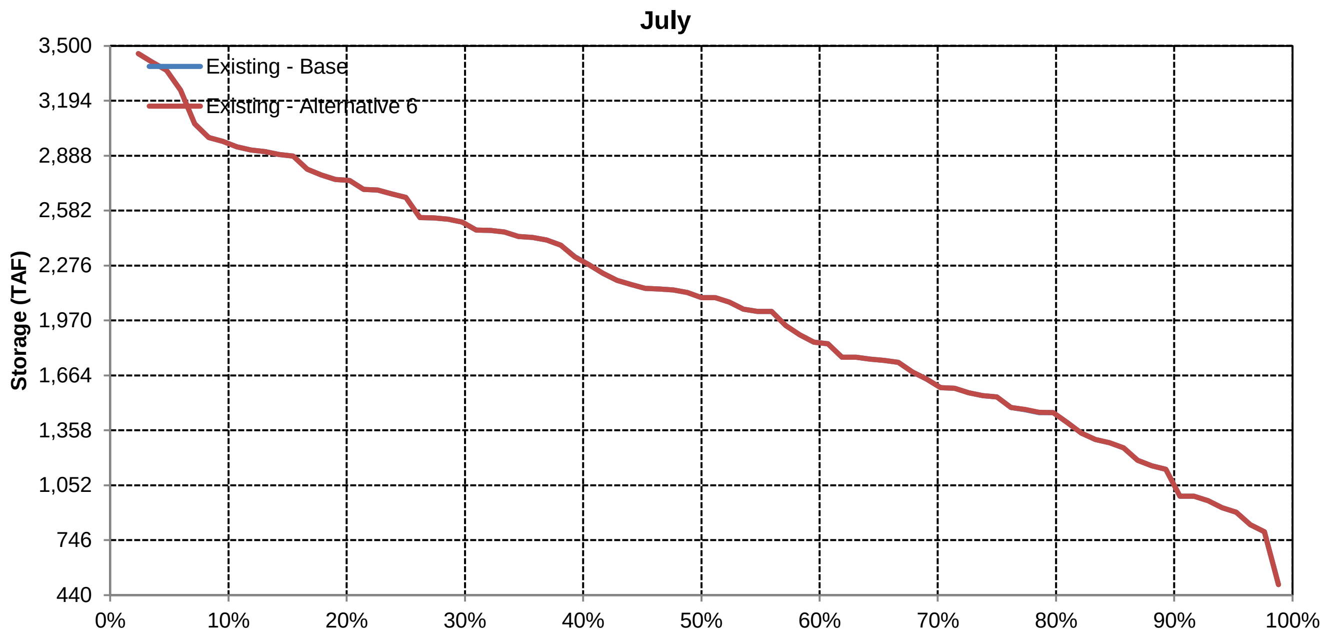
Oroville Reservoir



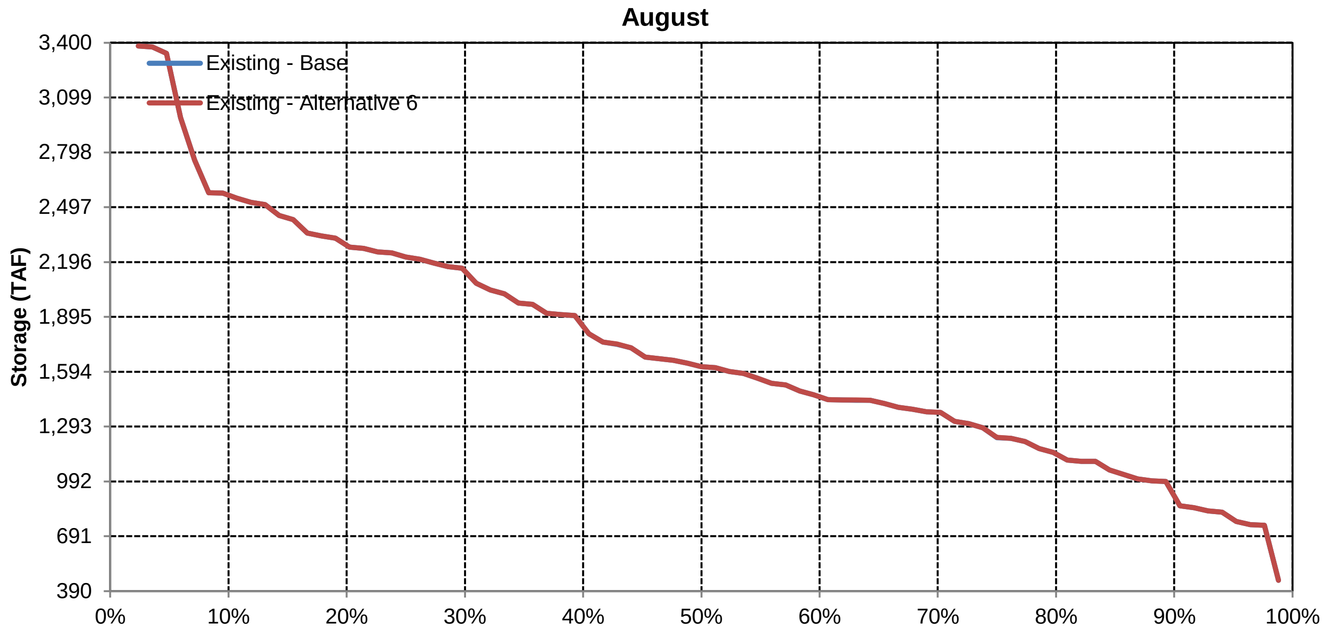


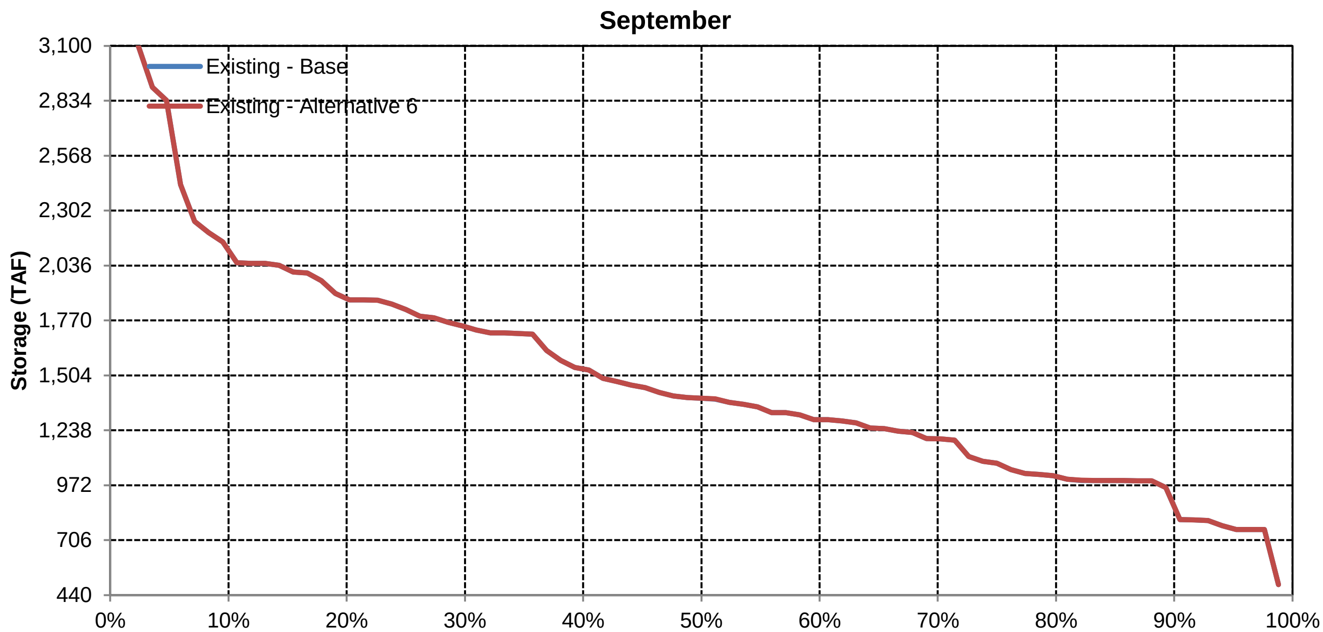
Oroville Reservoir





Oroville Reservoir





Long-Term and Water Year-Type Average of Folsom Reservoir Under Existing - Base and Existing - Alternative 6

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
						Long-Term						
Full Simulation Period												
Existing - Base	391	398	446	474	495	597	712	766	699	522	477	427
Existing - Alternative 6	391	398	446	474	495	597	712	766	699	522	477	427
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
						Water Year-Types						
Wet												
Existing - Base	405	431	511	520	508	626	766	897	851	676	622	507
Existing - Alternative 6	405	431	511	520	508	626	766	897	851	676	622	507
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal												
Existing - Base	406	399	470	532	548	643	777	842	775	540	504	455
Existing - Alternative 6	406	399	470	532	548	643	777	842	775	540	504	455
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Existing - Base	397	414	447	500	536	627	774	792	716	480	445	433
Existing - Alternative 6	397	414	447	500	536	627	774	792	716	480	445	433
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry												
Existing - Base	365	367	398	418	479	593	688	698	596	438	387	376
Existing - Alternative 6	365	367	398	418	479	593	688	698	596	438	388	376
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical												
Existing - Base	372	347	345	357	380	453	480	471	418	351	313	291
Existing - Alternative 6	372	347	345	357	380	453	480	471	418	351	313	291
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Existing - Base

	End-of-Month Storage (TAF)											
Statistic	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Probability of Exceedance												
10%	590	560	567	567	567	662	792	967	967	815	752	618
20%	495	499	567	567	567	658	792	967	877	709	667	545
30%	433	453	565	566	565	656	792	903	826	590	536	487
40%	399	419	525	557	558	651	792	803	723	530	478	439
50%	358	395	444	544	552	641	792	769	703	474	425	401
60%	339	354	413	474	518	625	758	752	677	438	396	382
70%	320	335	363	427	458	610	725	727	608	405	380	358
80%	295	300	323	365	416	566	609	626	523	374	338	318
90%	261	273	294	284	323	460	479	484	429	331	306	273
Long Term												
Full Simulation Period	391	398	446	474	495	597	712	766	699	522	477	427
Water Year Types												
Wet	405	431	511	520	508	626	766	897	851	676	622	507
Above Normal	406	399	470	532	548	643	777	842	775	540	504	455
Below Normal	397	414	447	500	536	627	774	792	716	480	445	433
Dry	365	367	398	418	479	593	688	698	596	438	387	376
Critical	372	347	345	357	380	453	480	471	418	351	313	291

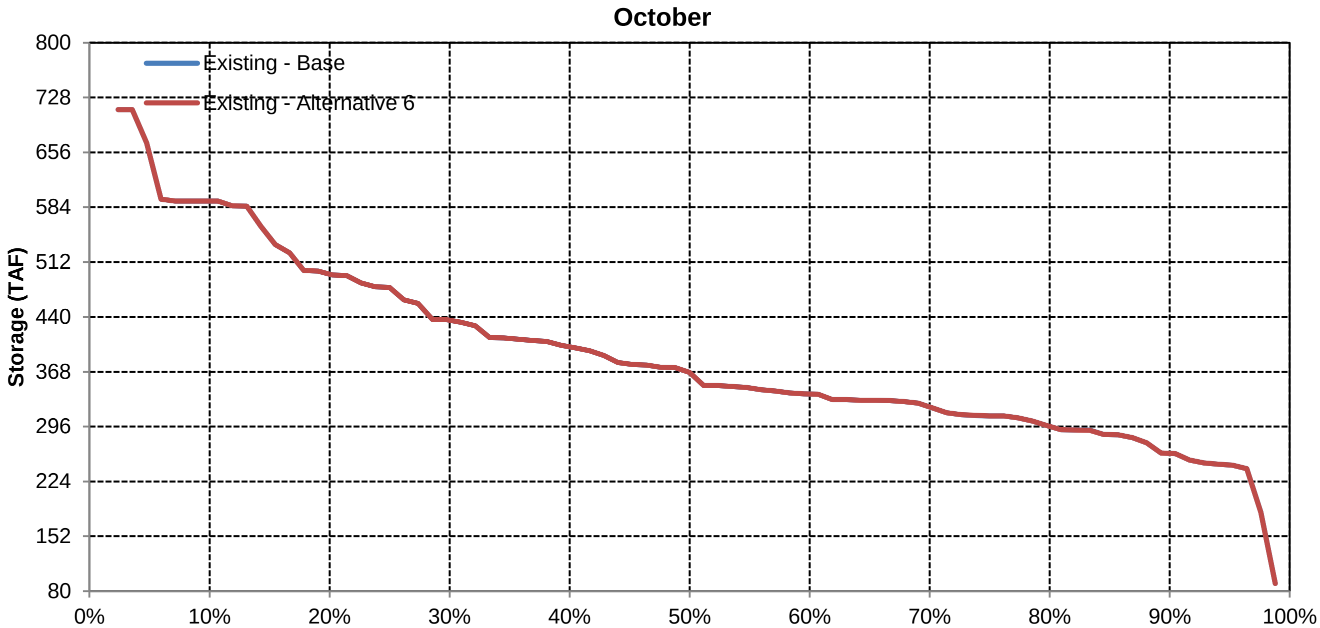
Existing - Alternative 6

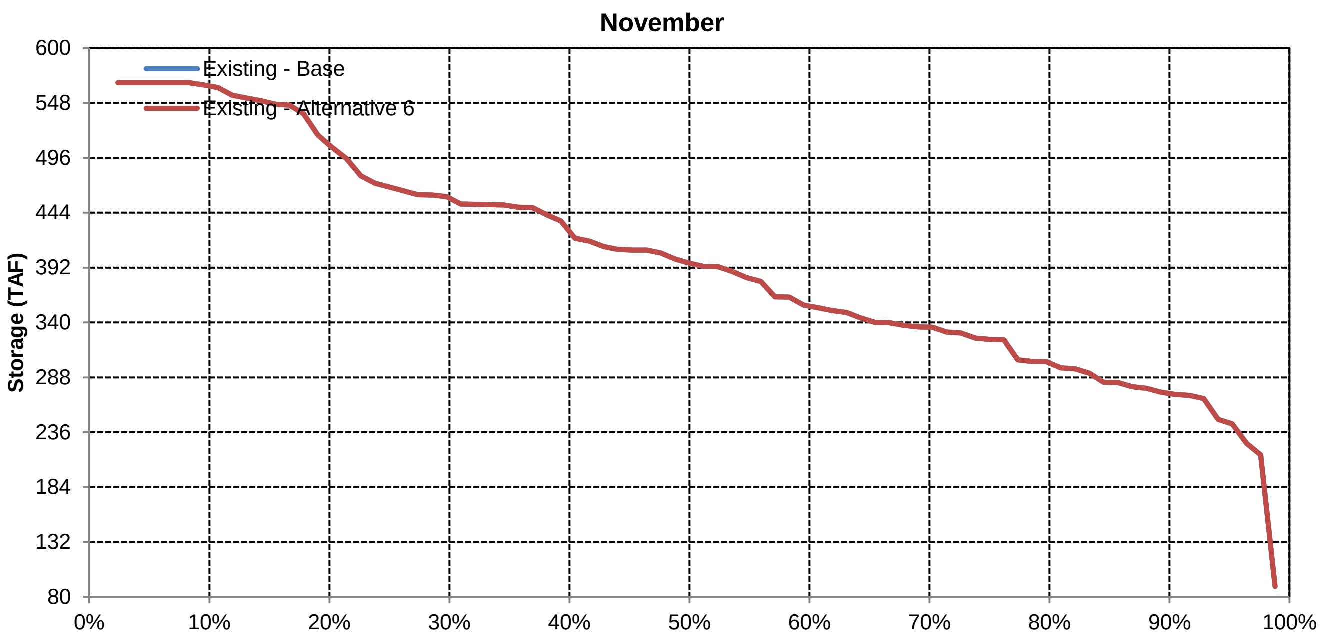
	End-of-Month Storage (TAF)											
Statistic	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Probability of Exceedance												
10%	590	560	567	567	567	662	792	967	967	815	752	618
20%	495	499	567	567	567	658	792	967	877	709	667	545
30%	433	453	565	566	565	656	792	903	826	590	536	487
40%	399	419	525	557	558	651	792	803	723	530	478	439
50%	358	395	444	544	552	641	792	769	703	474	425	401
60%	339	354	413	474	518	625	758	752	677	438	396	382
70%	320	335	363	427	458	610	725	727	608	405	380	358
80%	295	300	323	365	416	566	609	626	523	374	338	318
90%	261	273	294	284	323	460	479	484	429	331	306	273
Long Term												
Full Simulation Period	391	398	446	474	495	597	712	766	699	522	477	427
Water Year Types												
Wet	405	431	511	520	508	626	766	897	851	676	622	507
Above Normal	406	399	470	532	548	643	777	842	775	540	504	455
Below Normal	397	414	447	500	536	627	774	792	716	480	445	433
Dry	365	367	398	418	479	593	688	698	596	438	388	376
Critical	372	347	345	357	380	453	480	471	418	351	313	291

Existing - Alternative 6 Minus Existing - Base

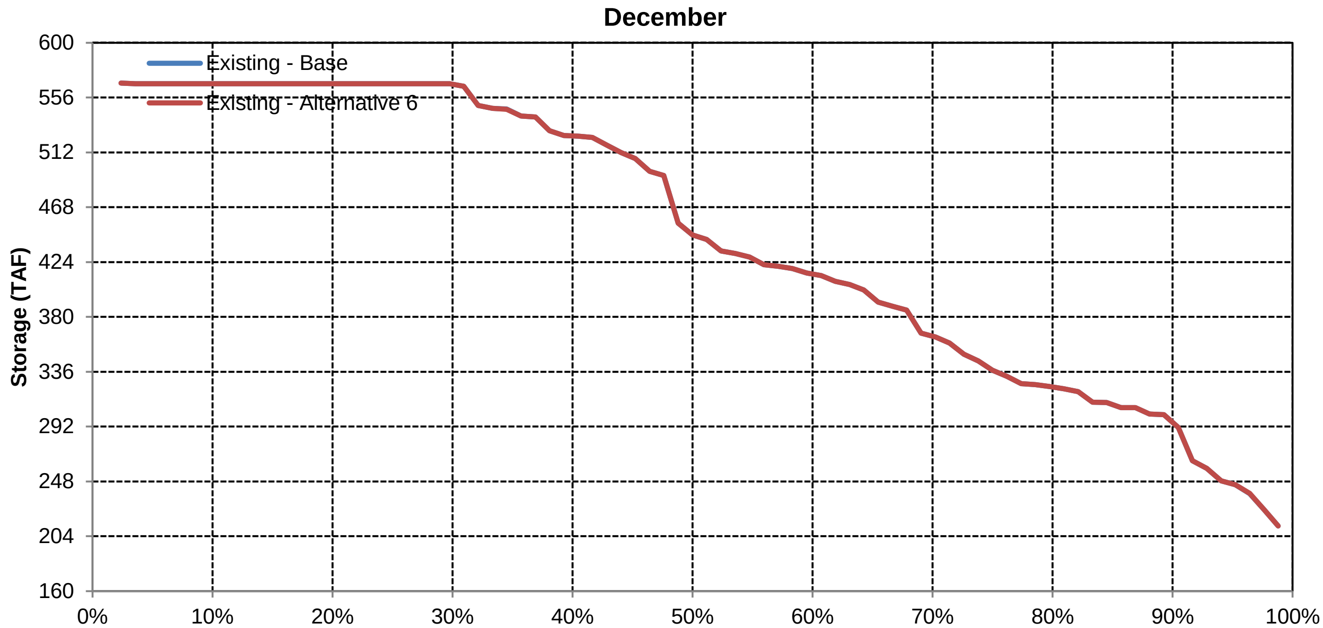
	End-of-Month Storage (TAF)											
Statistic	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types												
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

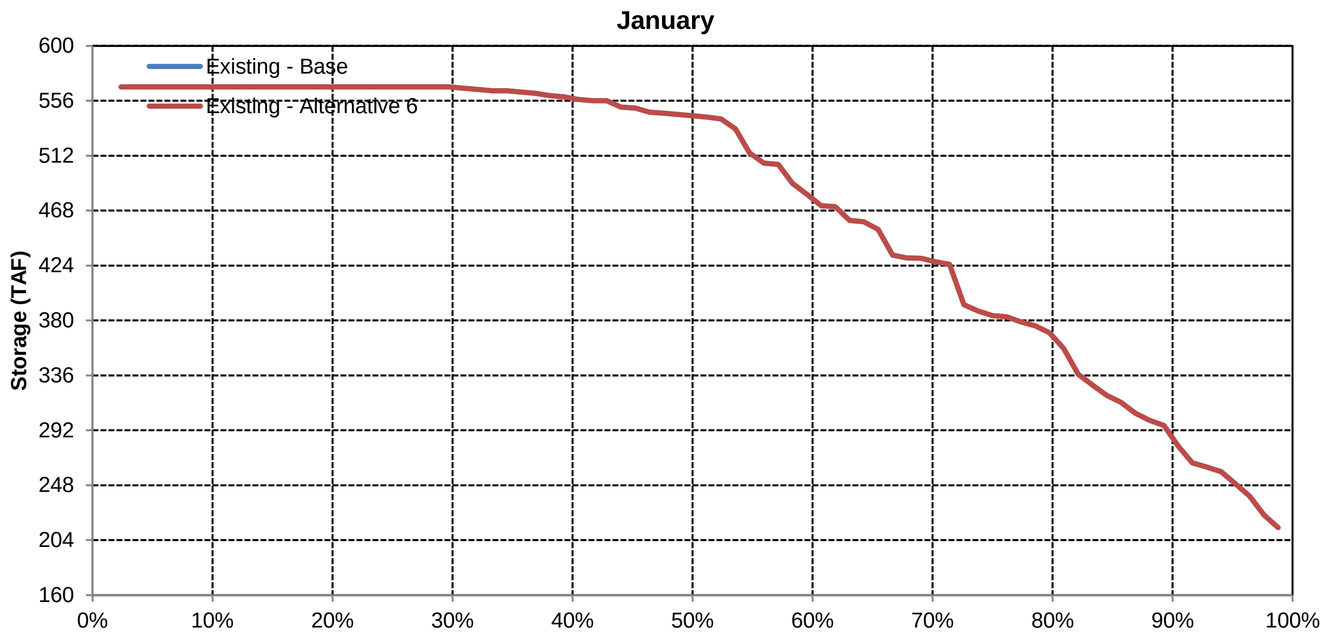
Folsom Reservoir



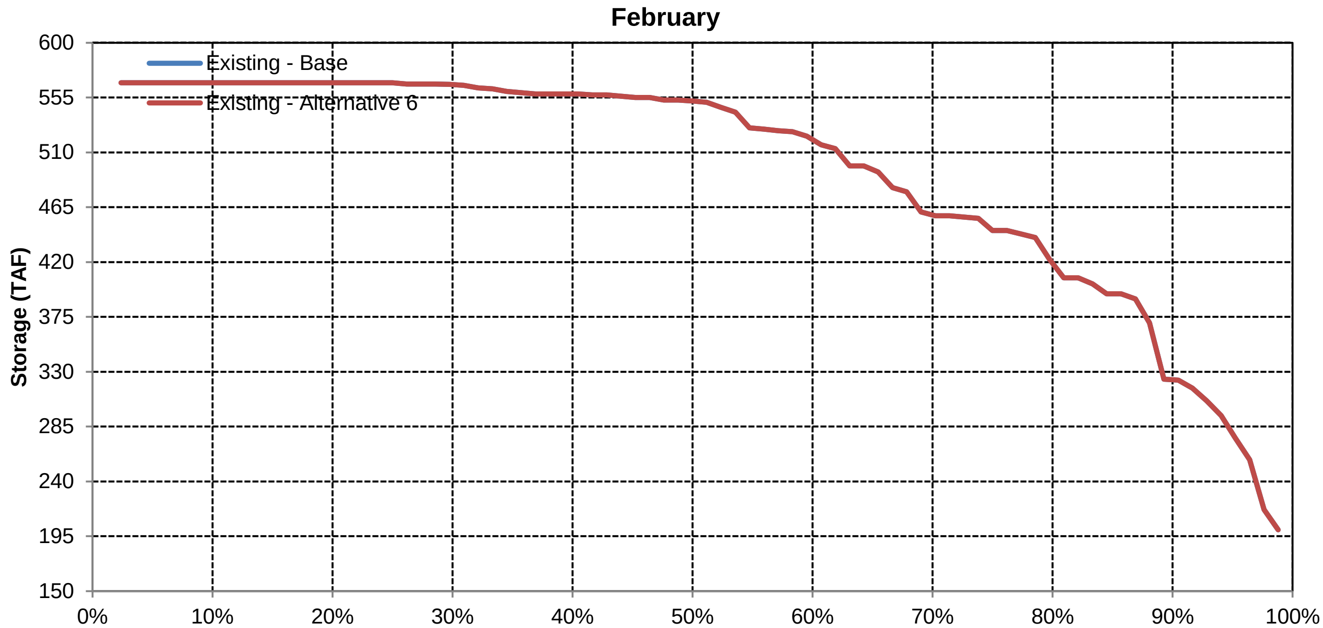


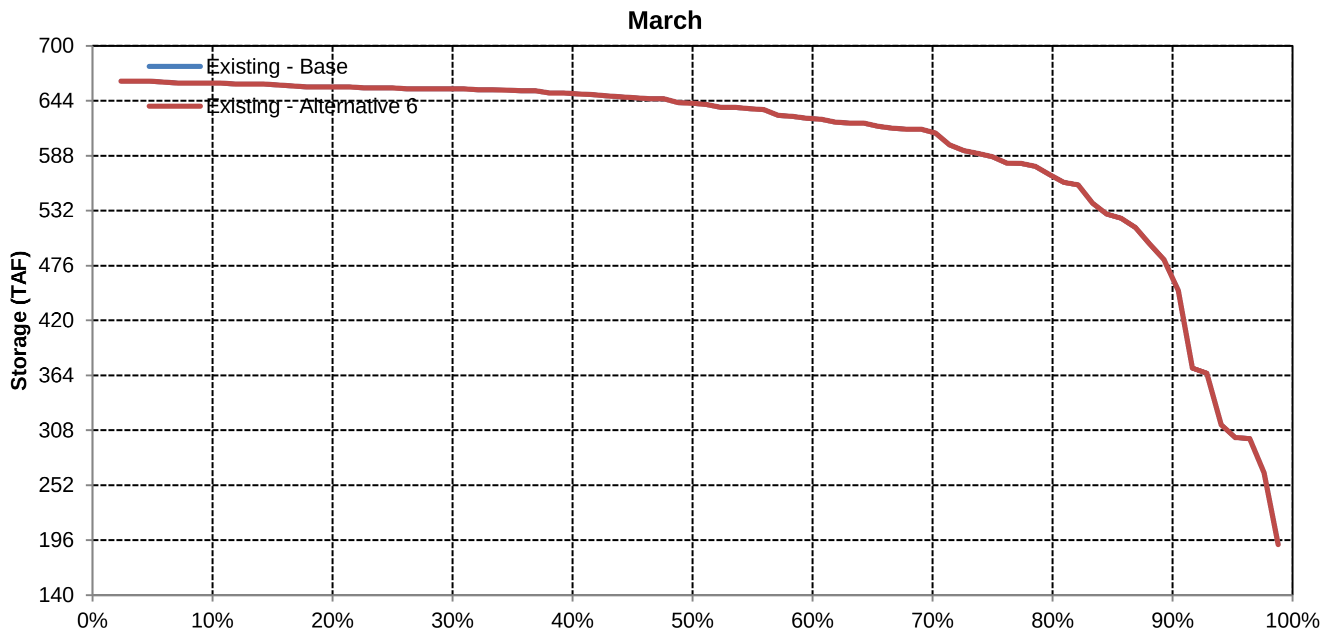
Folsom Reservoir





Folsom Reservoir





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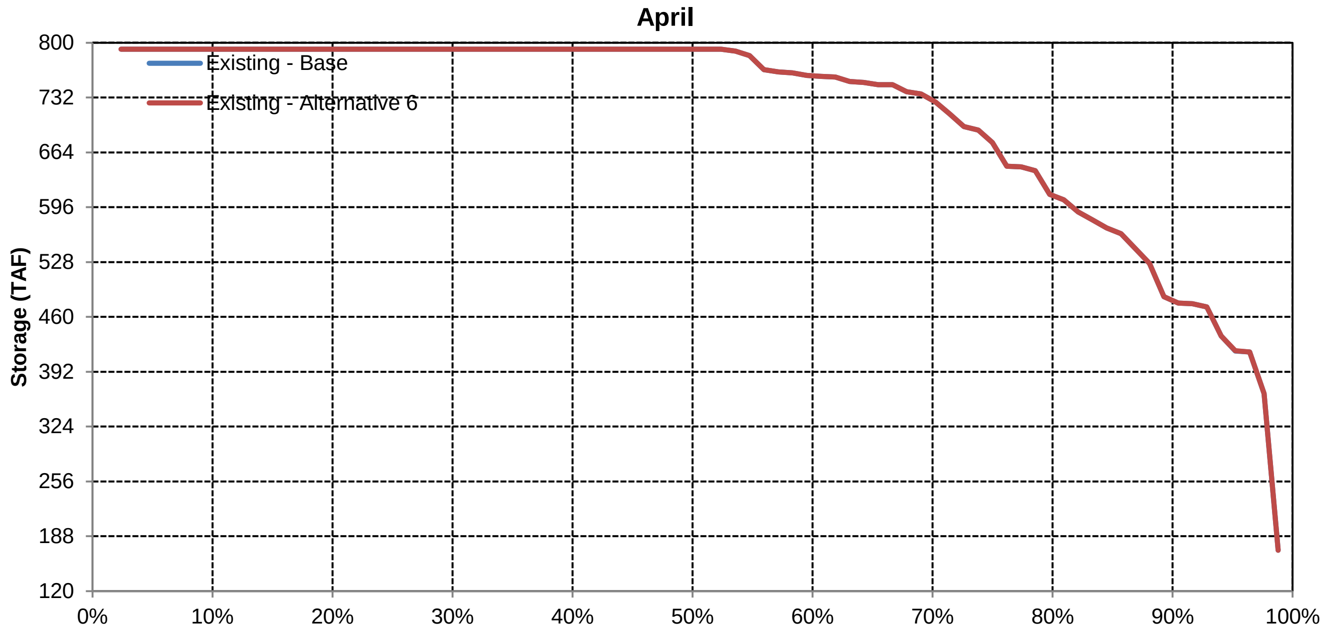

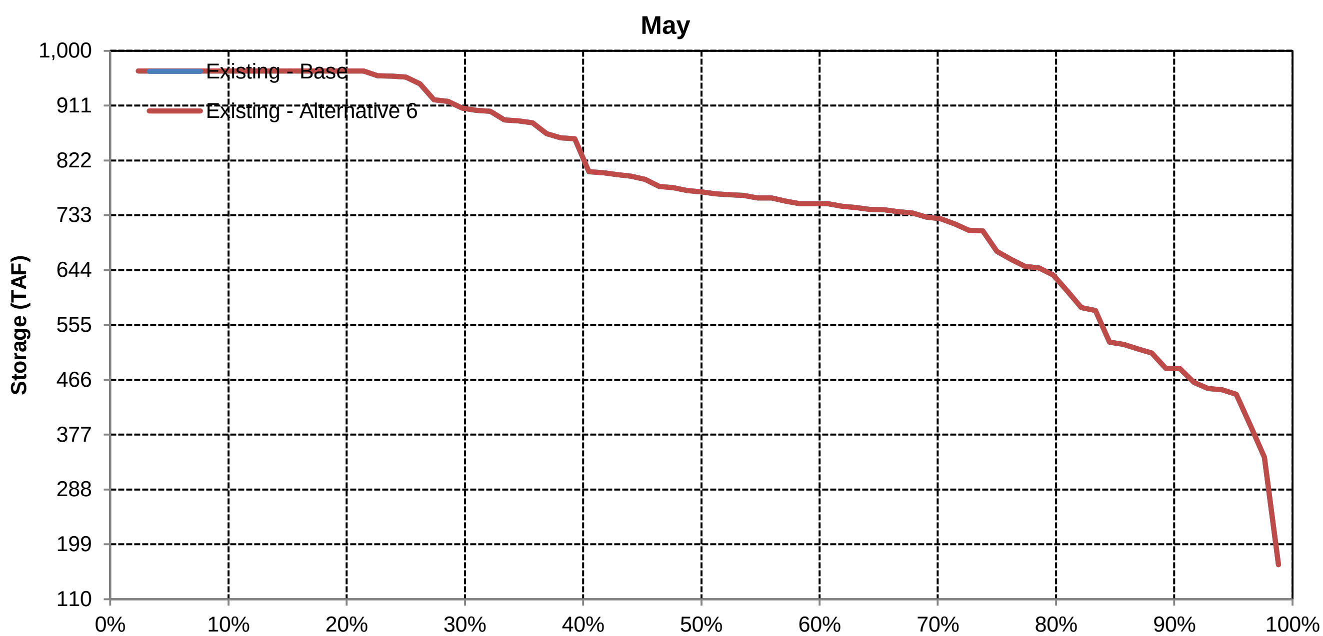

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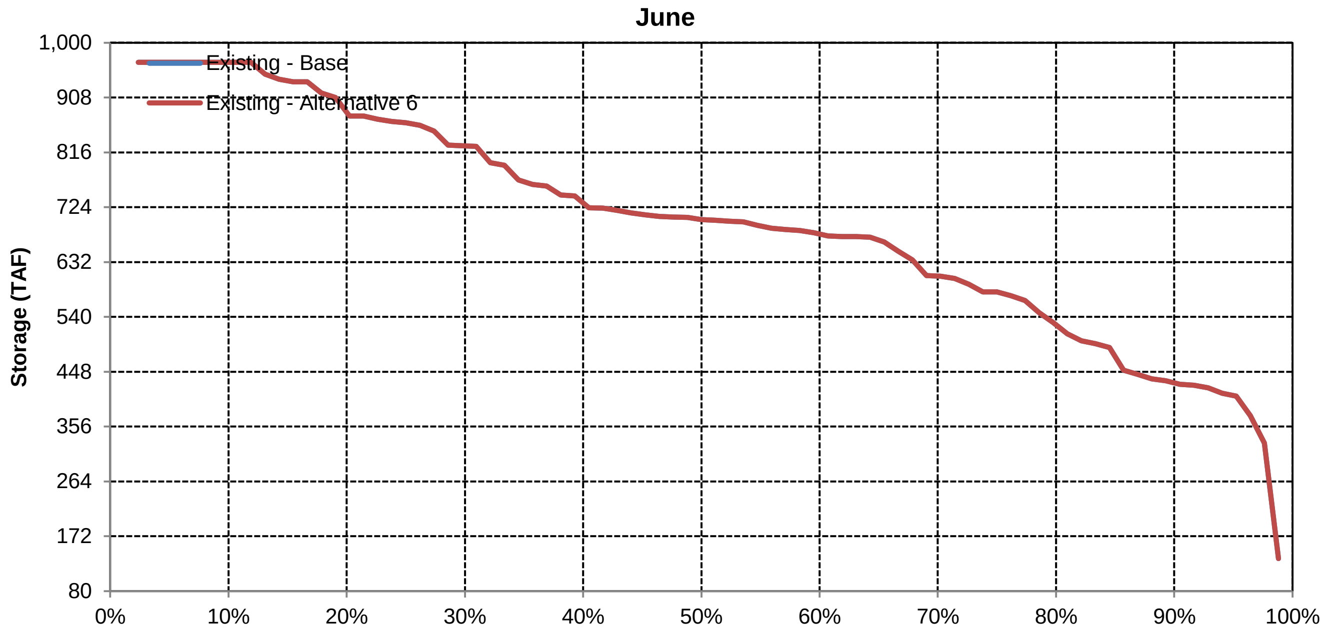
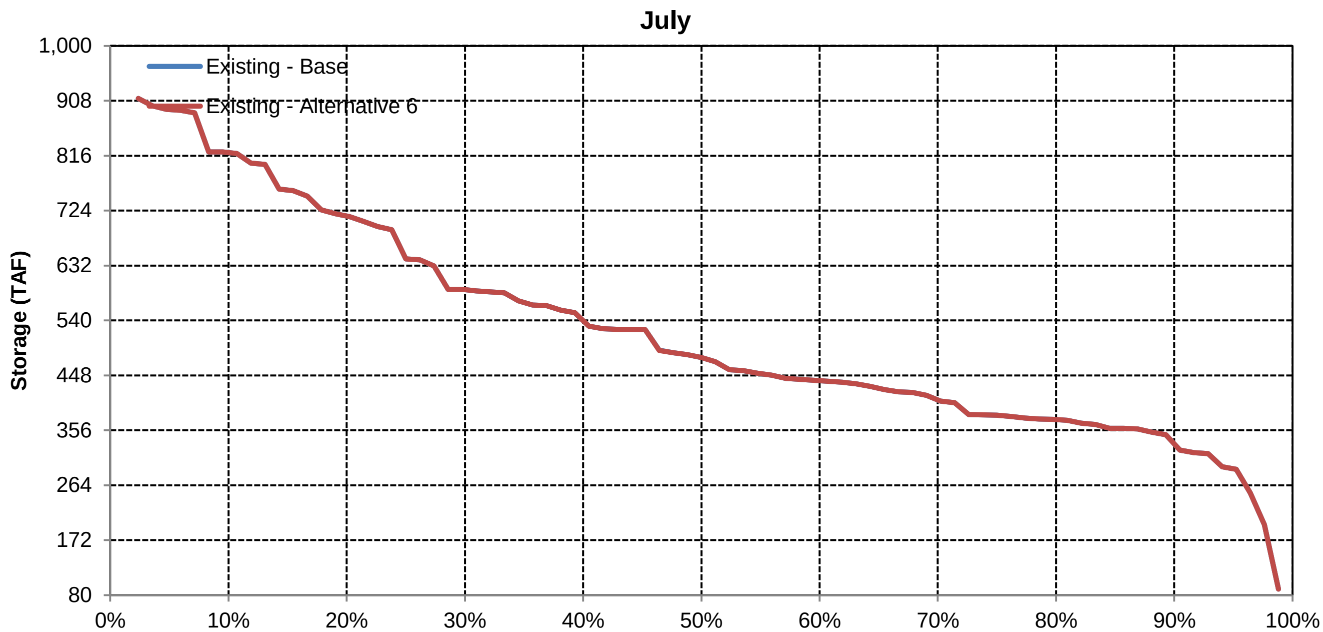
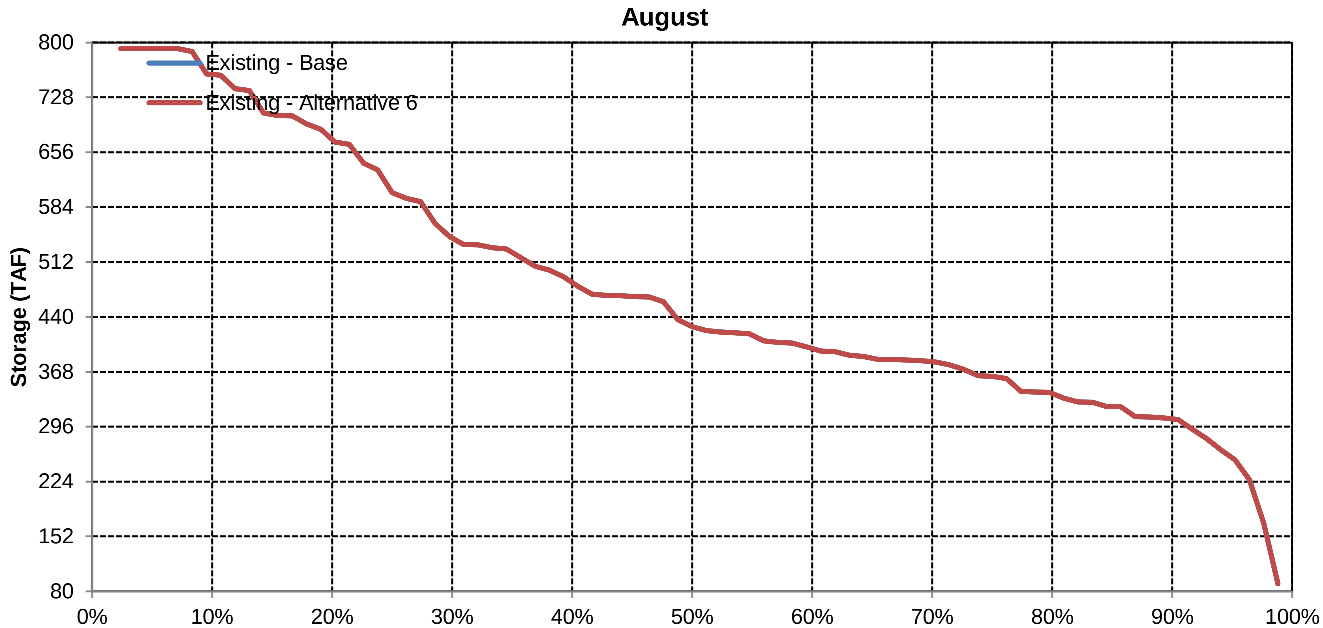
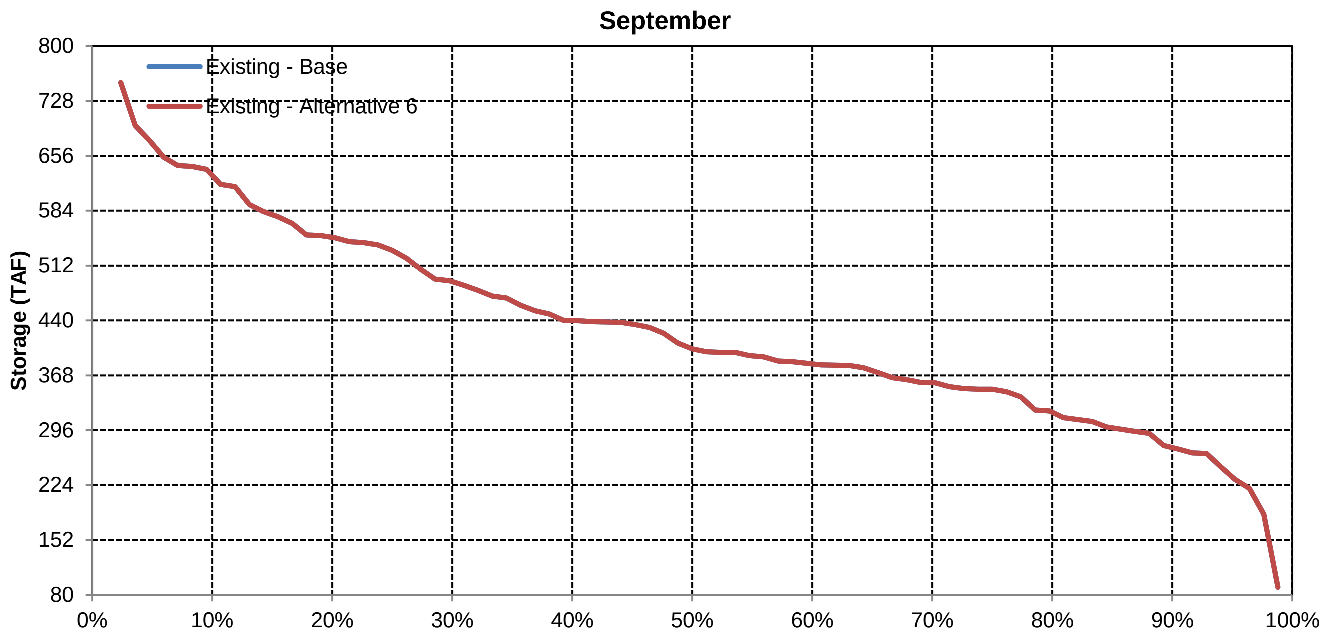




Folsom Reservoir





Long-Term and Water Year-Type Average of CVP San Luis Reservoir Under Existing - Base and Existing - Alternative 6

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
						Long-Term						
Full Simulation Period												
Existing - Base	217	330	493	616	709	777	712	577	404	261	171	178
Existing - Alternative 6	217	330	493	616	709	777	712	577	404	261	171	178
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
						Water Year-Types						
Wet												
Existing - Base	230	346	525	677	824	925	859	729	581	362	252	241
Existing - Alternative 6	230	346	525	677	824	925	859	729	581	362	252	241
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal												
Existing - Base	231	375	535	653	766	876	790	630	437	201	133	128
Existing - Alternative 6	231	375	535	653	766	876	790	630	437	201	133	128
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Existing - Base	227	343	526	627	701	758	697	561	373	276	187	214
Existing - Alternative 6	227	343	526	627	701	758	697	561	373	276	187	214
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry												
Existing - Base	183	268	424	532	582	636	573	429	249	184	96	121
Existing - Alternative 6	183	268	424	532	582	636	573	429	249	184	96	121
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical												
Existing - Base	208	316	428	546	591	584	532	427	251	194	118	124
Existing - Alternative 6	208	316	428	546	591	584	532	427	251	194	118	124
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

CVP San Luis Reservoir

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	423	528	671	789	972	972	941	862	717	525	378	377
20%	262	388	570	728	885	972	879	758	581	448	308	244
30%	221	367	550	687	804	930	836	701	507	347	205	200
40%	187	347	513	652	763	871	800	630	435	241	143	141
50%	182	327	490	594	719	825	746	582	379	222	107	127
60%	164	294	464	568	651	722	658	487	303	178	90	113
70%	155	274	431	535	596	657	587	441	267	143	63	99
80%	139	209	360	482	541	593	537	392	207	105	45	90
90%	104	148	277	434	489	530	490	352	155	56	45	65
Long Term												
Full Simulation Period	217	330	493	616	709	777	712	577	404	261	171	178
Water Year Types												
Wet	230	346	525	677	824	925	859	729	581	362	252	241
Above Normal	231	375	535	653	766	876	790	630	437	201	133	128
Below Normal	227	343	526	627	701	758	697	561	373	276	187	214
Dry	183	268	424	532	582	636	573	429	249	184	96	121
Critical	208	316	428	546	591	584	532	427	251	194	118	124

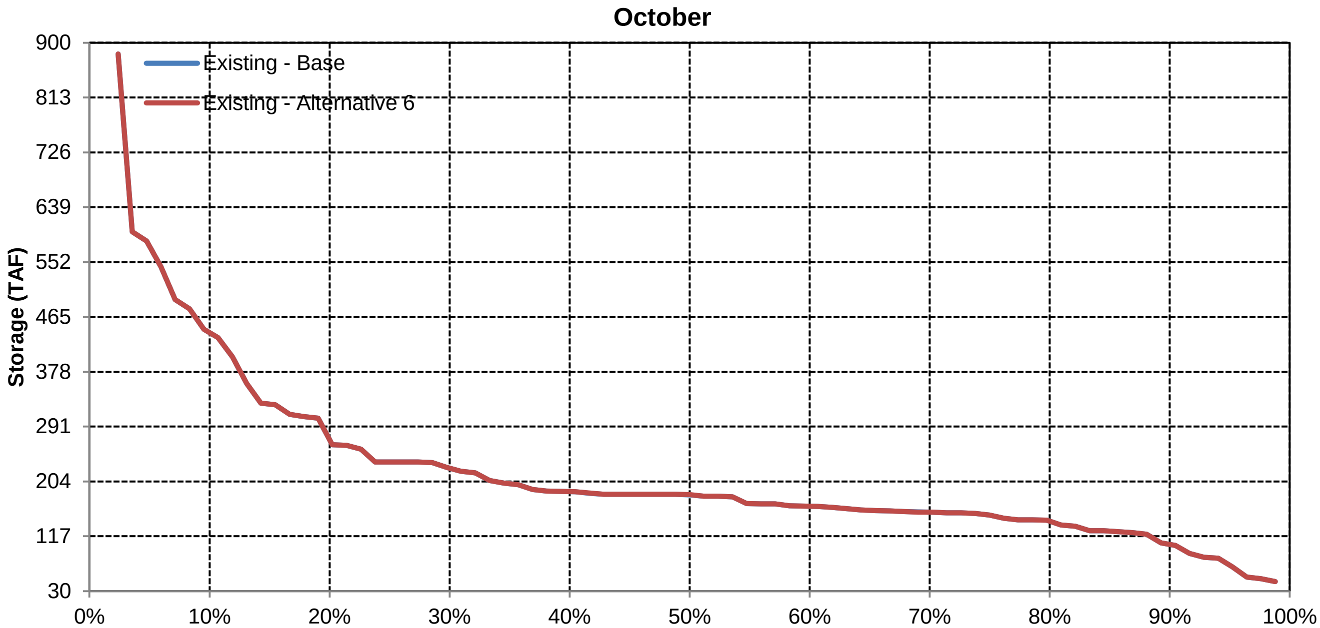
Existing - Alternative 6

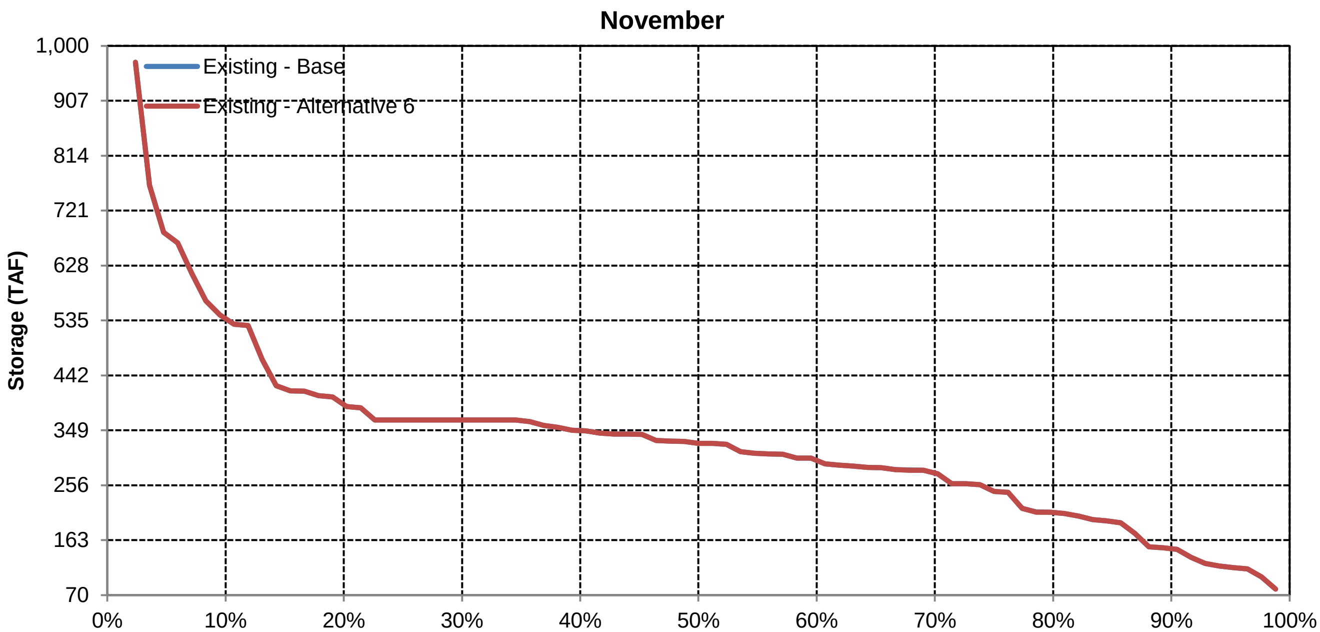
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	423	528	671	789	972	972	941	862	718	525	378	377
20%	262	388	570	728	885	972	879	758	581	448	308	244
30%	221	367	550	687	804	930	836	701	507	347	205	200
40%	187	347	513	652	763	871	800	630	435	241	143	141
50%	182	327	490	594	719	825	746	582	379	222	107	127
60%	164	294	464	568	651	722	658	487	303	178	90	113
70%	155	274	431	535	596	657	587	441	267	143	63	99
80%	139	210	360	482	541	593	537	391	207	105	45	90
90%	104	148	277	434	489	530	490	352	155	56	45	65
Long Term												
Full Simulation Period	217	330	493	616	709	777	712	577	404	261	171	178
Water Year Types												
Wet	230	346	525	677	824	925	859	729	581	362	252	241
Above Normal	231	375	535	653	766	876	790	630	437	201	133	128
Below Normal	227	343	526	627	701	758	697	561	373	276	187	214
Dry	183	268	424	532	582	636	573	429	249	184	96	121
Critical	208	316	428	546	591	584	532	427	251	194	118	124

Existing - Alternative 6 Minus Existing - Base

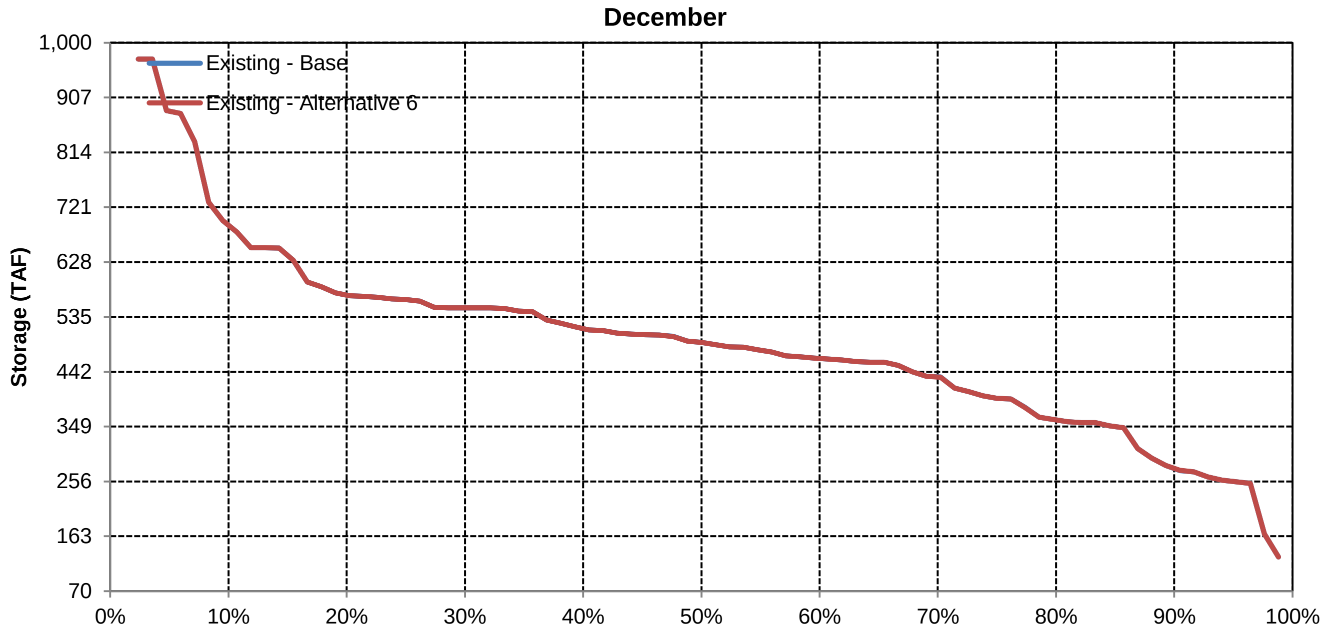
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types												
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

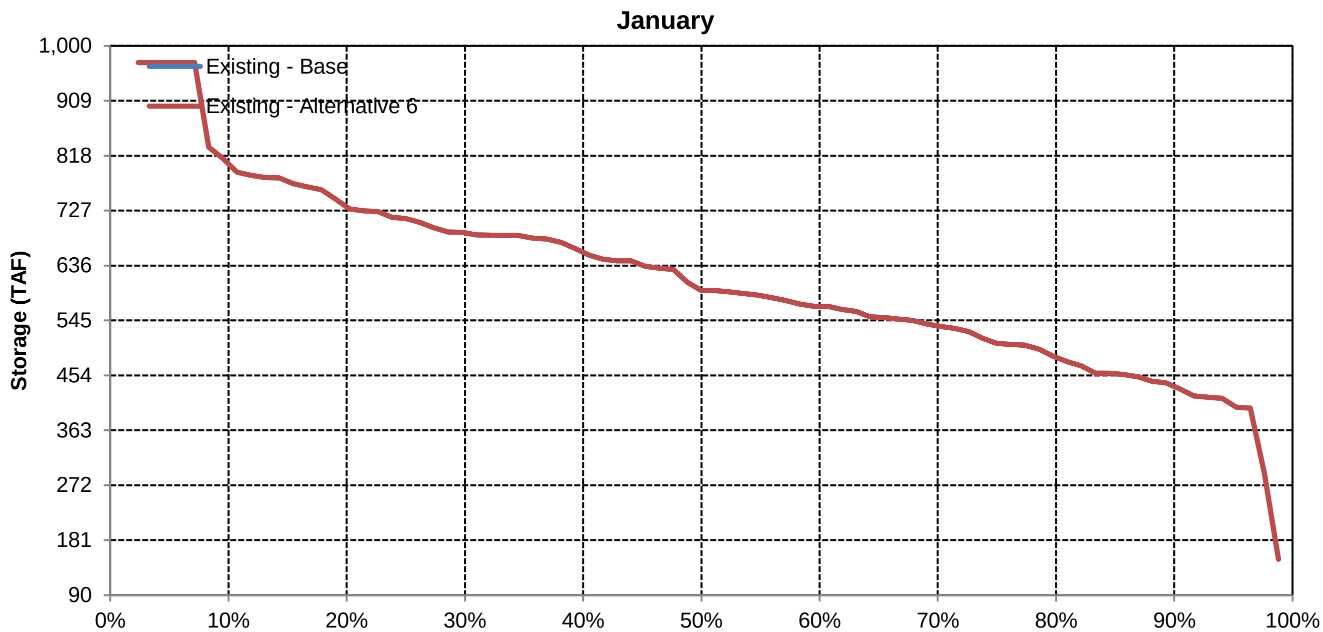
CVP San Luis Reservoir



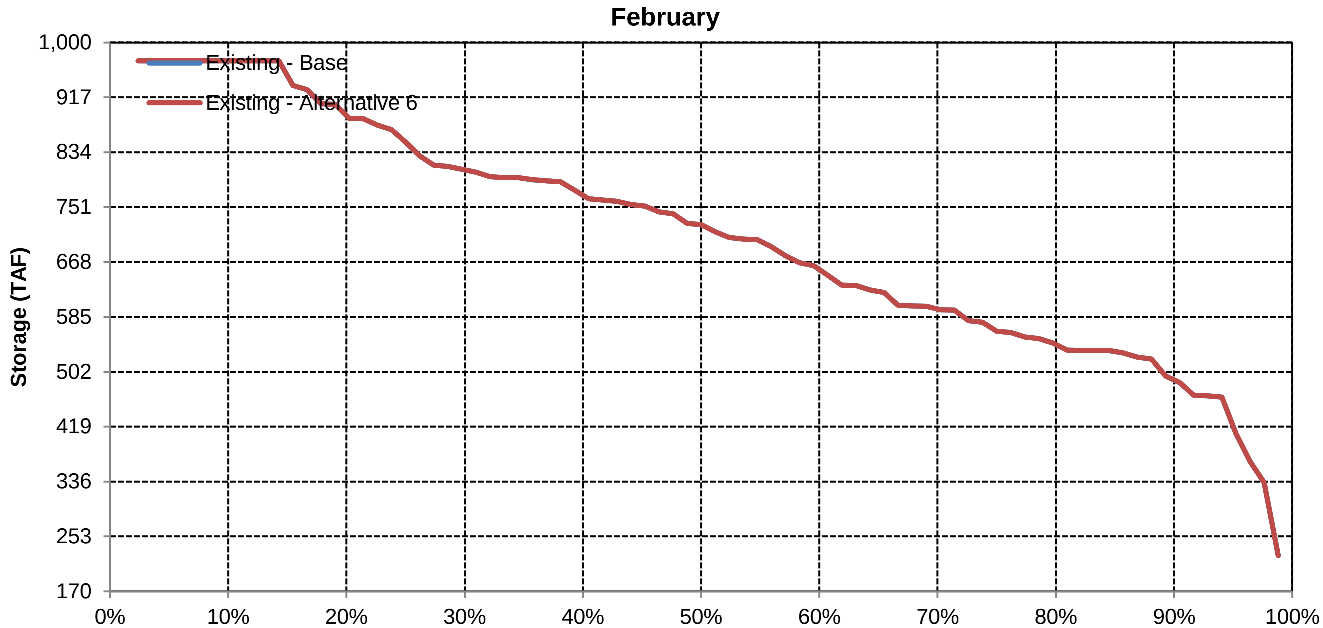


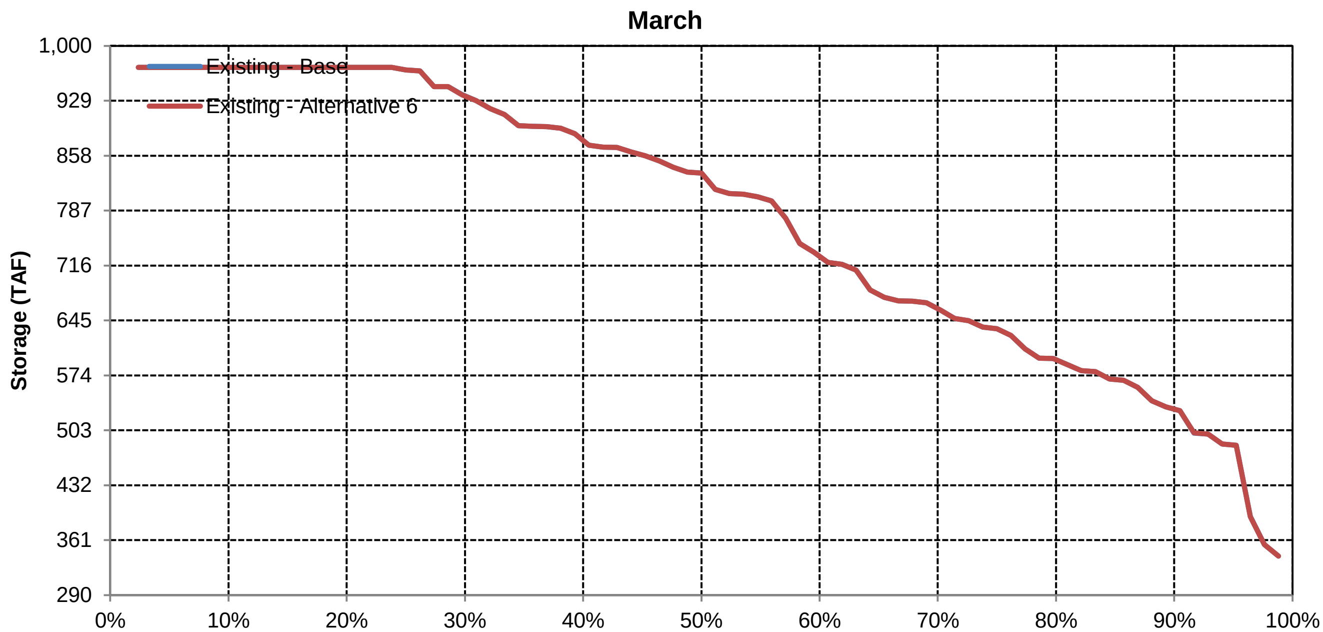
CVP San Luis Reservoir



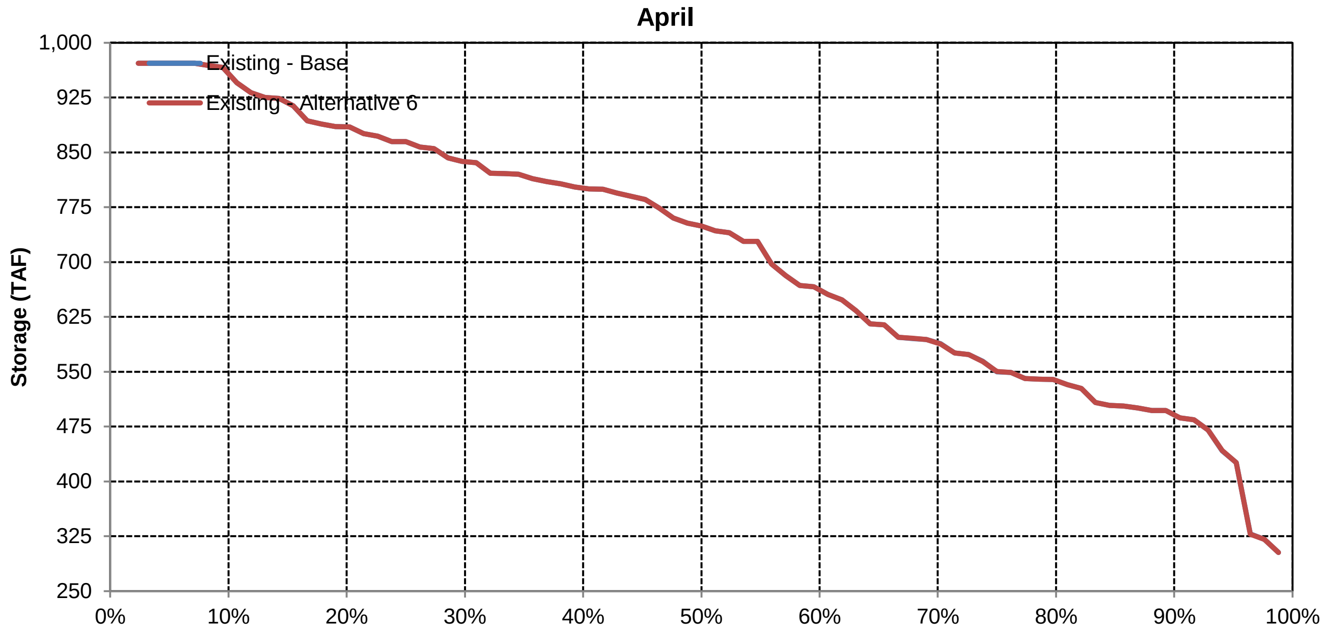


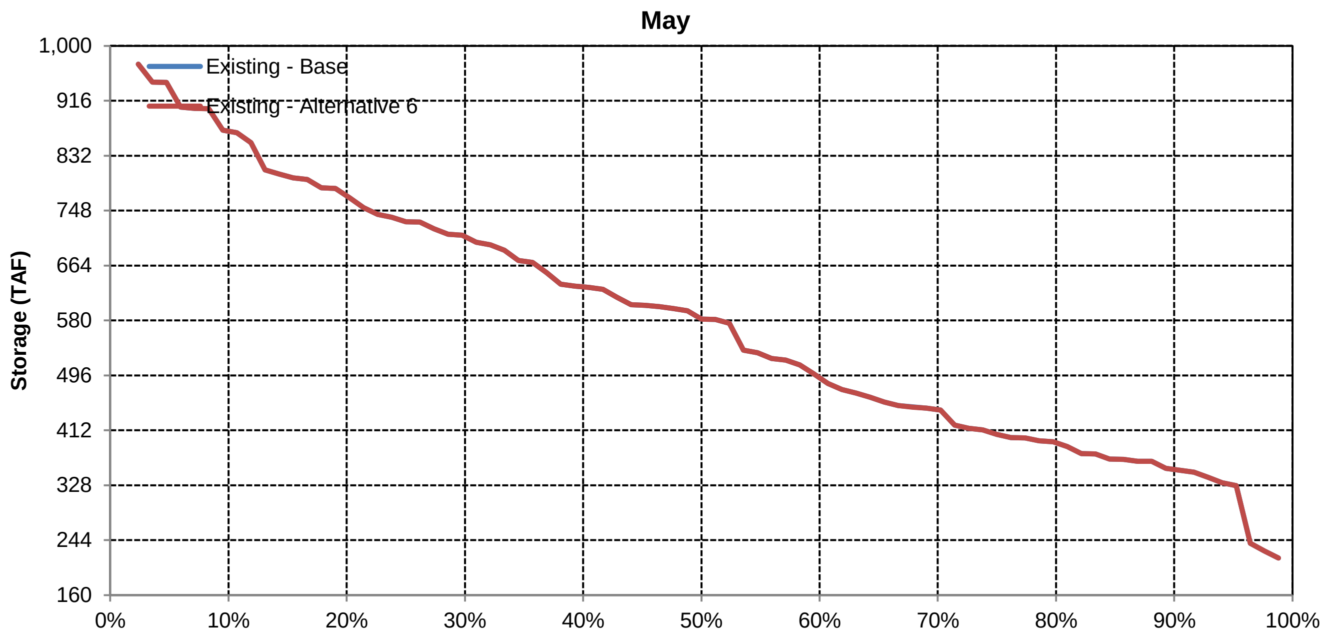
CVP San Luis Reservoir



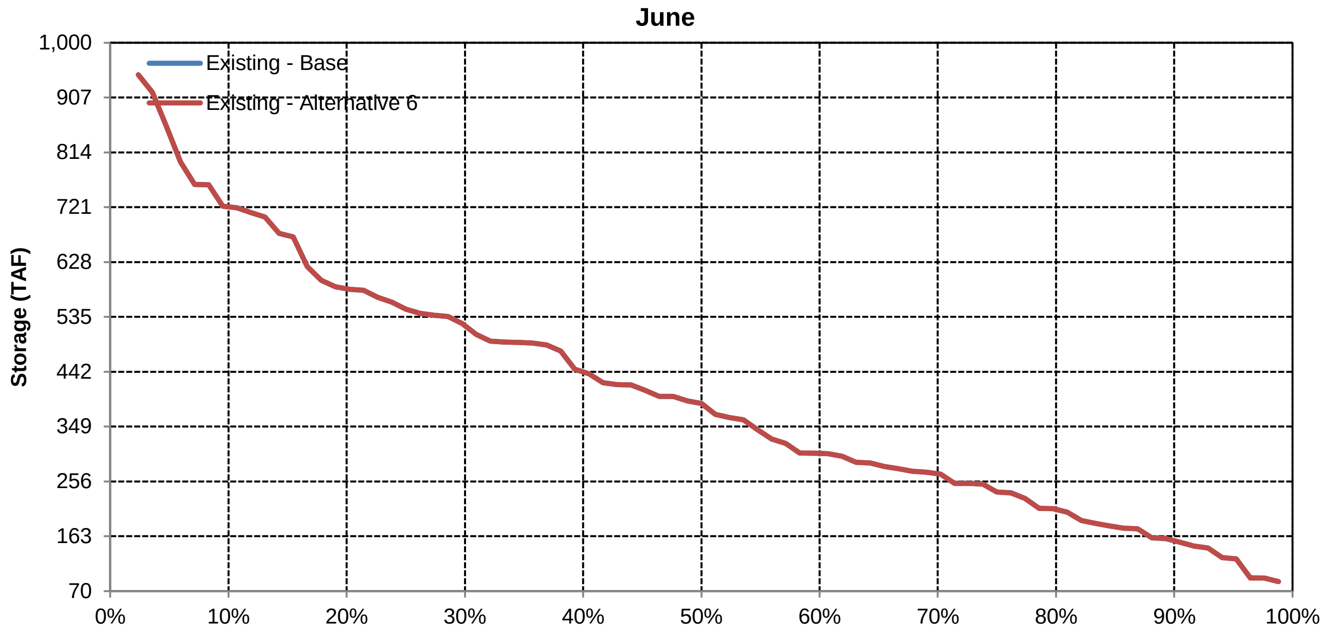


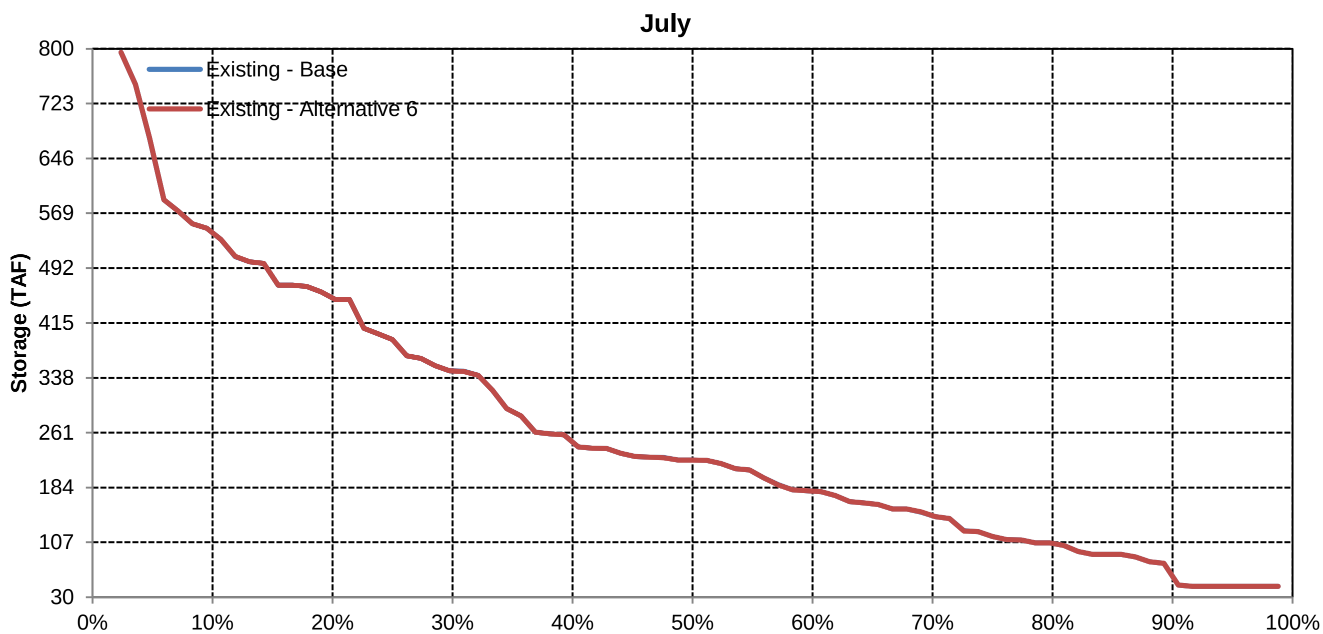
CVP San Luis Reservoir



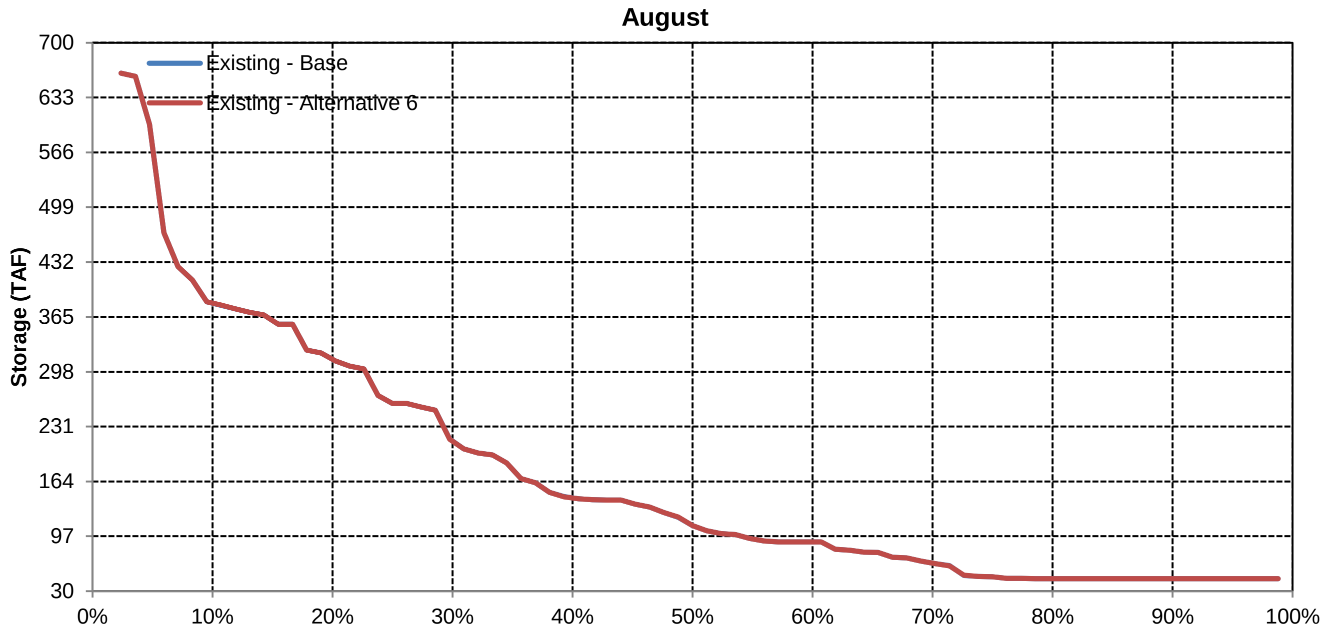


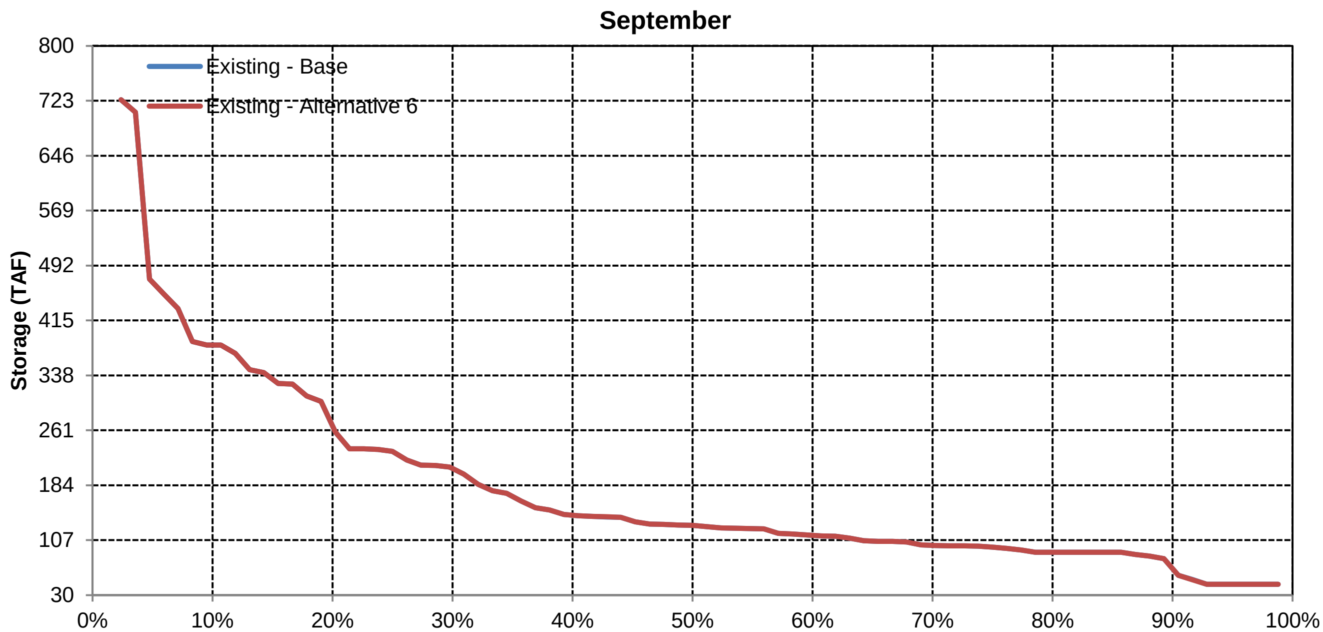
CVP San Luis Reservoir





CVP San Luis Reservoir





Long-Term and Water Year-Type Average of SWP San Luis Reservoir Under Existing - Base and Existing - Alternative 6

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
						Long-Term						
Full Simulation Period												
Existing - Base	244	268	372	541	678	802	720	562	380	374	324	288
Existing - Alternative 6	244	268	372	541	678	802	720	562	380	374	324	288
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
						Water Year-Types						
Wet												
Existing - Base	272	333	431	651	850	980	865	667	471	448	428	363
Existing - Alternative 6	272	333	431	651	850	980	865	667	471	448	428	363
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal												
Existing - Base	259	253	386	576	716	886	757	532	307	308	323	276
Existing - Alternative 6	259	253	386	576	716	886	757	532	307	308	322	276
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Existing - Base	220	246	386	500	622	751	675	512	329	374	370	342
Existing - Alternative 6	220	246	386	500	622	751	675	512	329	374	370	342
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry												
Existing - Base	209	219	300	450	552	670	620	509	348	358	229	234
Existing - Alternative 6	209	219	300	450	552	670	620	509	348	358	229	234
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical												
Existing - Base	249	245	312	459	533	591	579	511	376	305	168	137
Existing - Alternative 6	249	245	312	459	533	591	579	511	376	305	168	137
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	454	566	739	973	1,067	1,067	956	791	630	652	562	423
20%	354	407	561	738	914	1,067	931	704	511	491	470	331
30%	313	356	473	654	833	954	863	657	444	447	402	321
40%	255	303	402	546	714	879	804	584	415	402	358	310
50%	218	224	321	495	686	844	737	527	355	358	309	310
60%	199	169	291	431	584	715	642	488	303	309	267	298
70%	163	109	225	389	528	656	584	450	261	255	201	242
80%	121	76	155	325	466	573	528	396	209	231	155	164
90%	55	55	80	262	364	509	458	352	163	166	114	104
Long Term												
Full Simulation Period	244	268	372	541	678	802	720	562	380	374	324	288
Water Year Types												
Wet	272	333	431	651	850	980	865	667	471	448	428	363
Above Normal	259	253	386	576	716	886	757	532	307	308	323	276
Below Normal	220	246	386	500	622	751	675	512	329	374	370	342
Dry	209	219	300	450	552	670	620	509	348	358	229	234
Critical	249	245	312	459	533	591	579	511	376	305	168	137

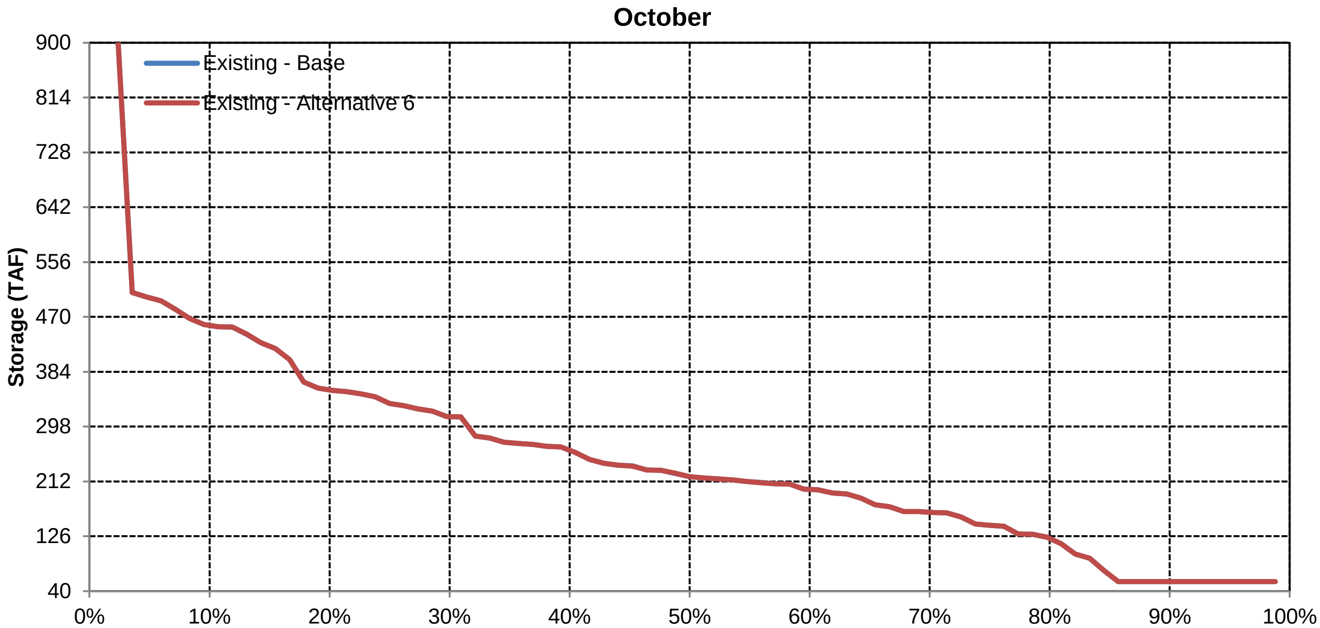
Existing - Alternative 6

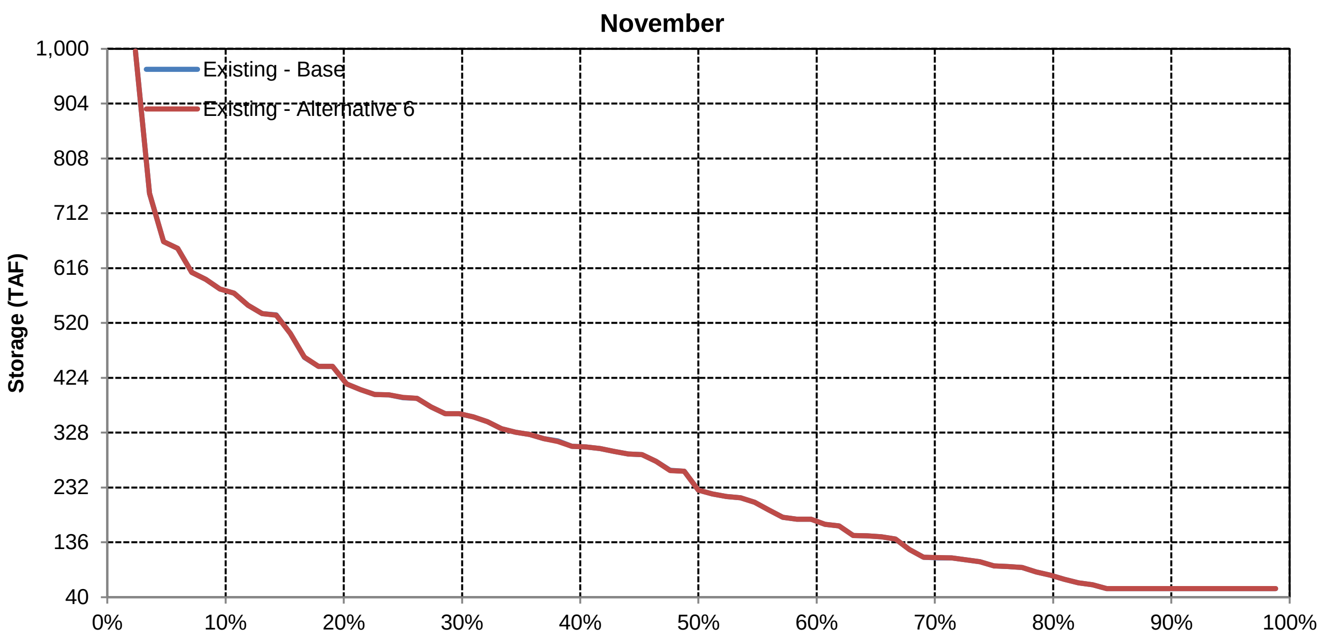
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	454	566	738	973	1,067	1,067	956	791	630	652	562	423
20%	354	407	561	738	914	1,067	931	704	511	491	470	331
30%	313	356	473	654	833	954	863	657	444	447	402	321
40%	255	303	402	546	714	879	804	584	415	402	358	310
50%	218	224	321	495	686	844	737	527	355	358	309	310
60%	199	169	291	431	584	715	642	488	303	309	267	298
70%	163	109	225	389	528	656	584	450	261	255	201	241
80%	121	76	155	325	466	573	528	396	209	231	155	164
90%	55	55	80	262	364	509	458	352	163	166	114	104
Long Term												
Full Simulation Period	244	268	372	541	678	802	720	562	380	374	324	288
Water Year Types												
Wet	272	333	431	651	850	980	865	667	471	448	428	363
Above Normal	259	253	386	576	716	886	757	532	307	308	322	276
Below Normal	220	246	386	500	622	751	675	512	329	374	370	342
Dry	209	219	300	450	552	670	620	509	348	358	229	234
Critical	249	245	312	459	533	591	579	511	376	305	168	137

Existing - Alternative 6 Minus Existing - Base

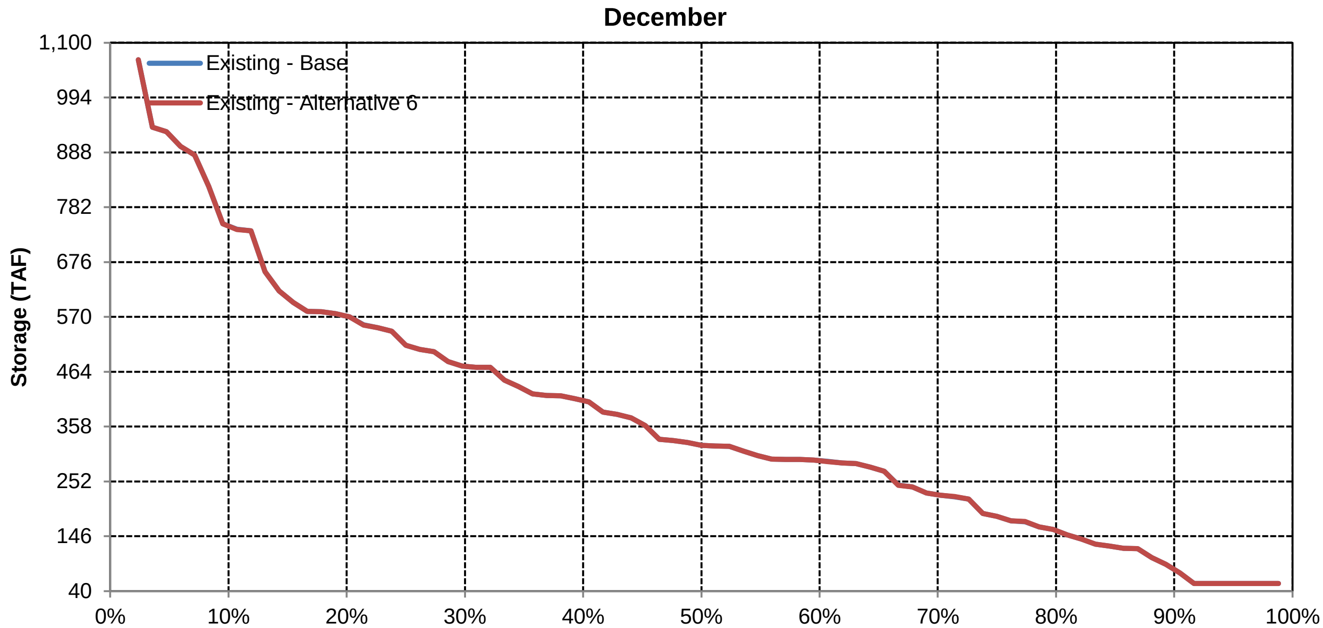
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types												
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

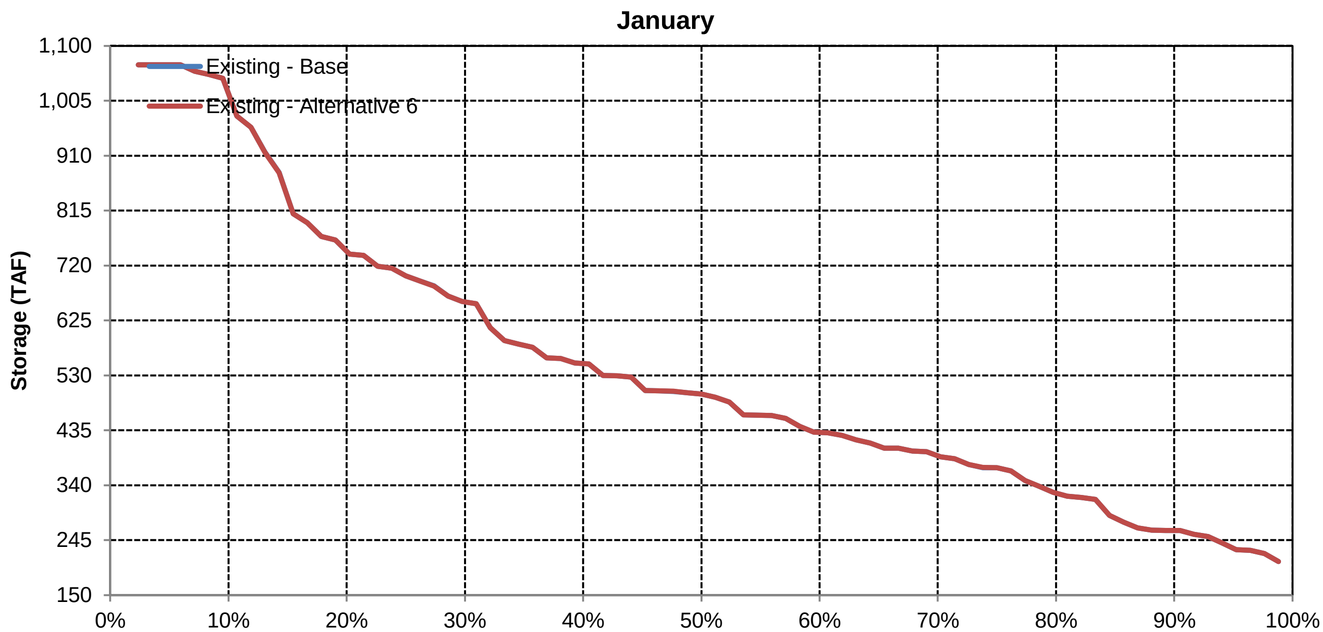
SWP San Luis Reservoir



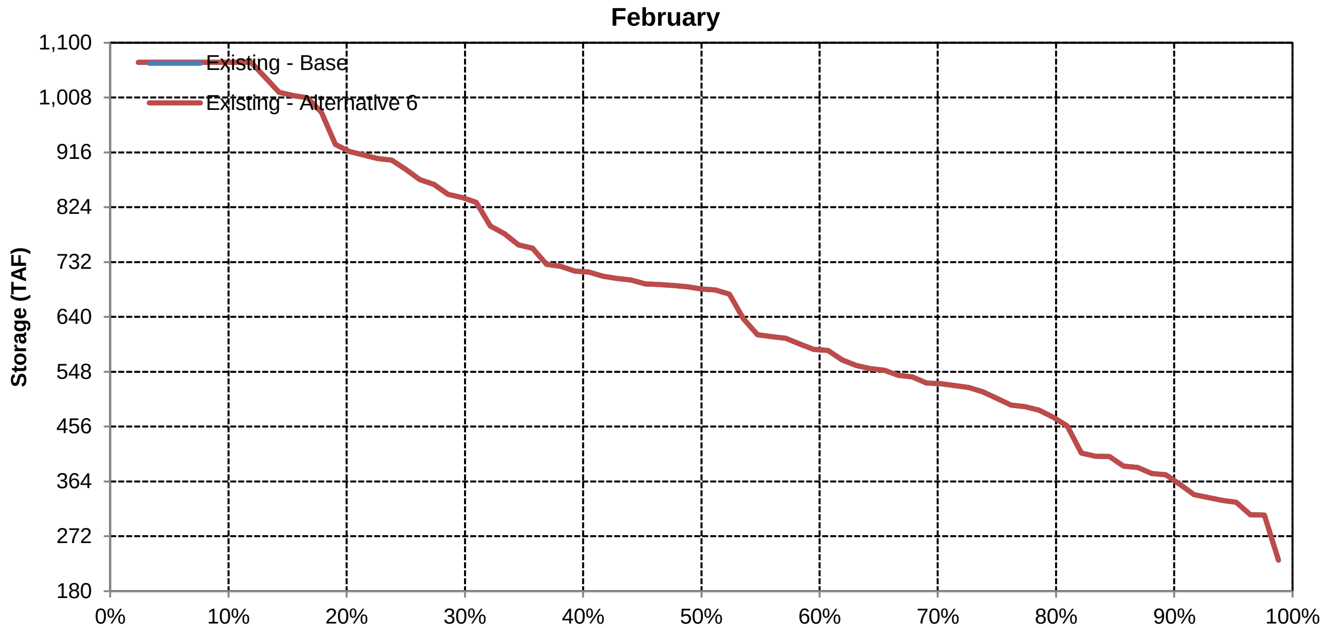


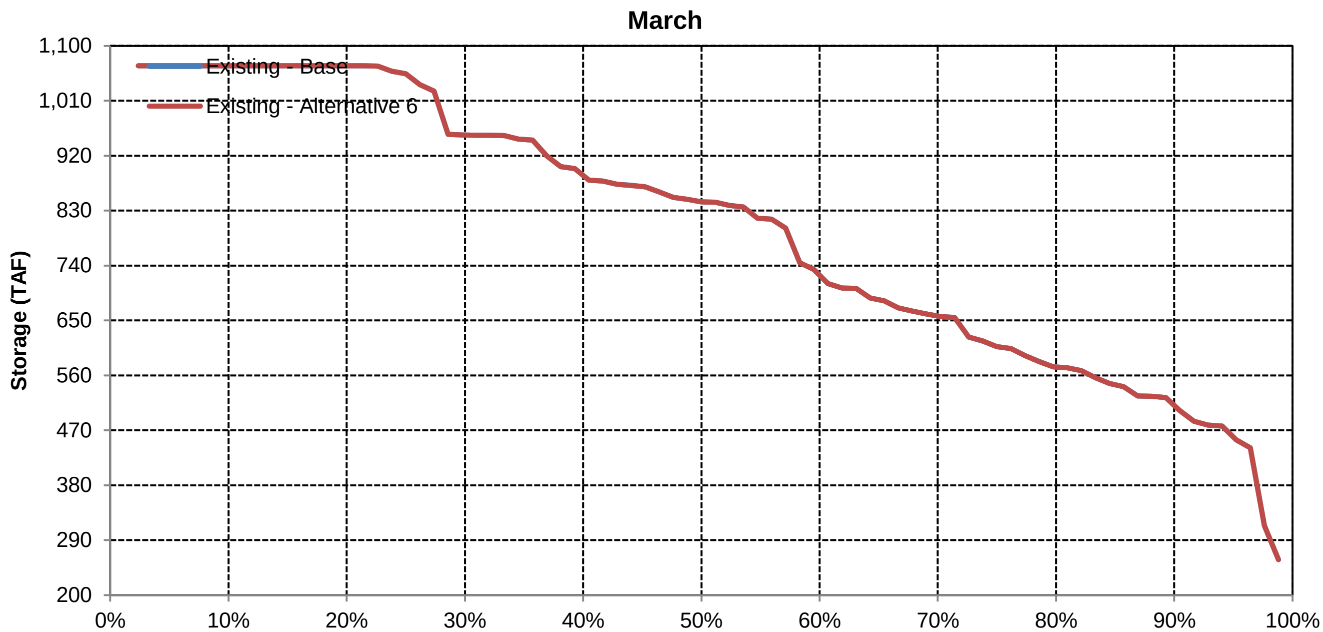
SWP San Luis Reservoir





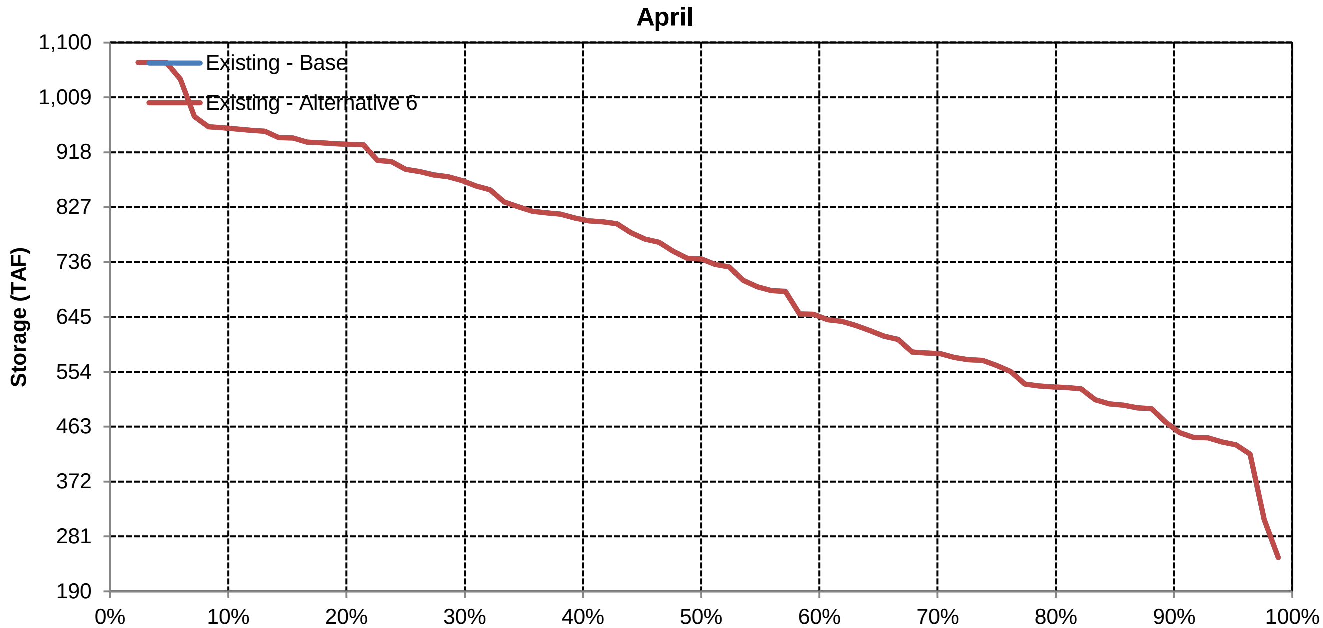
SWP San Luis Reservoir

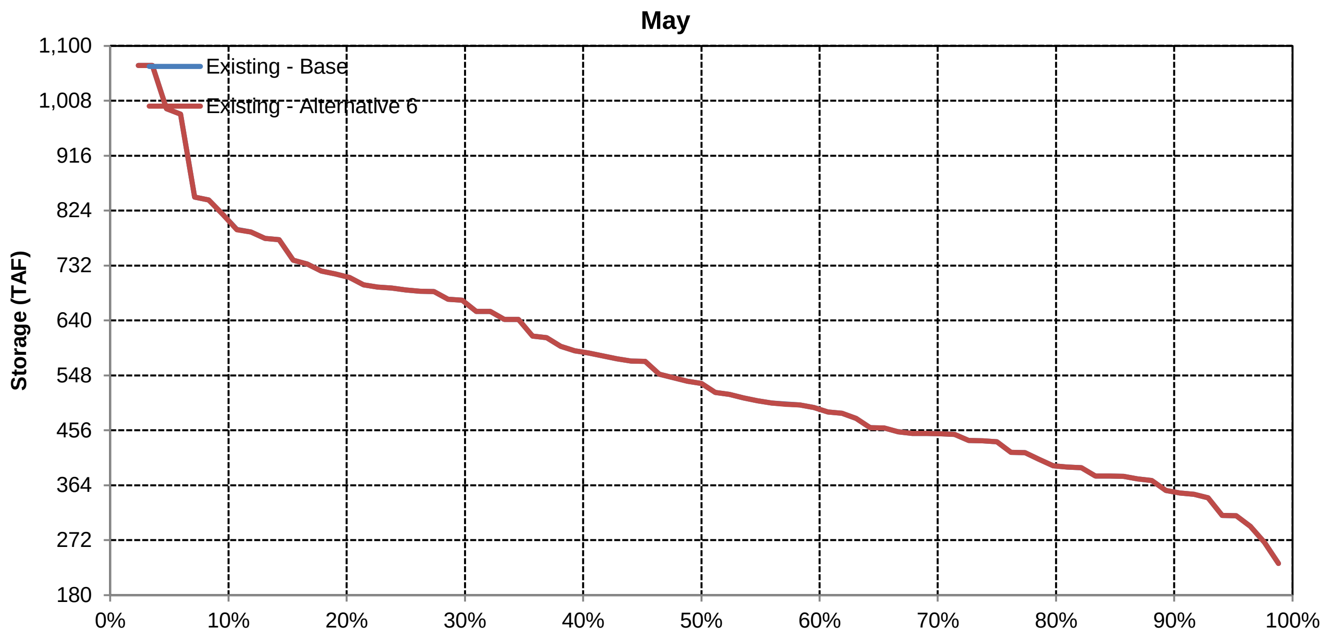




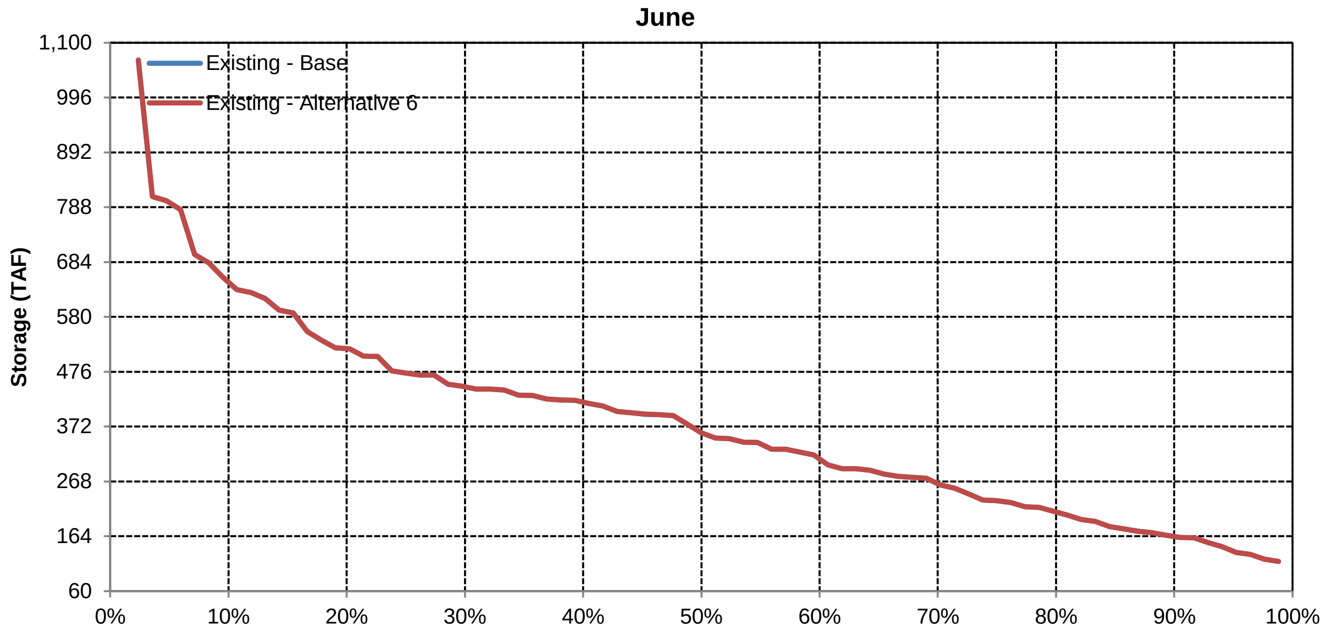
S12

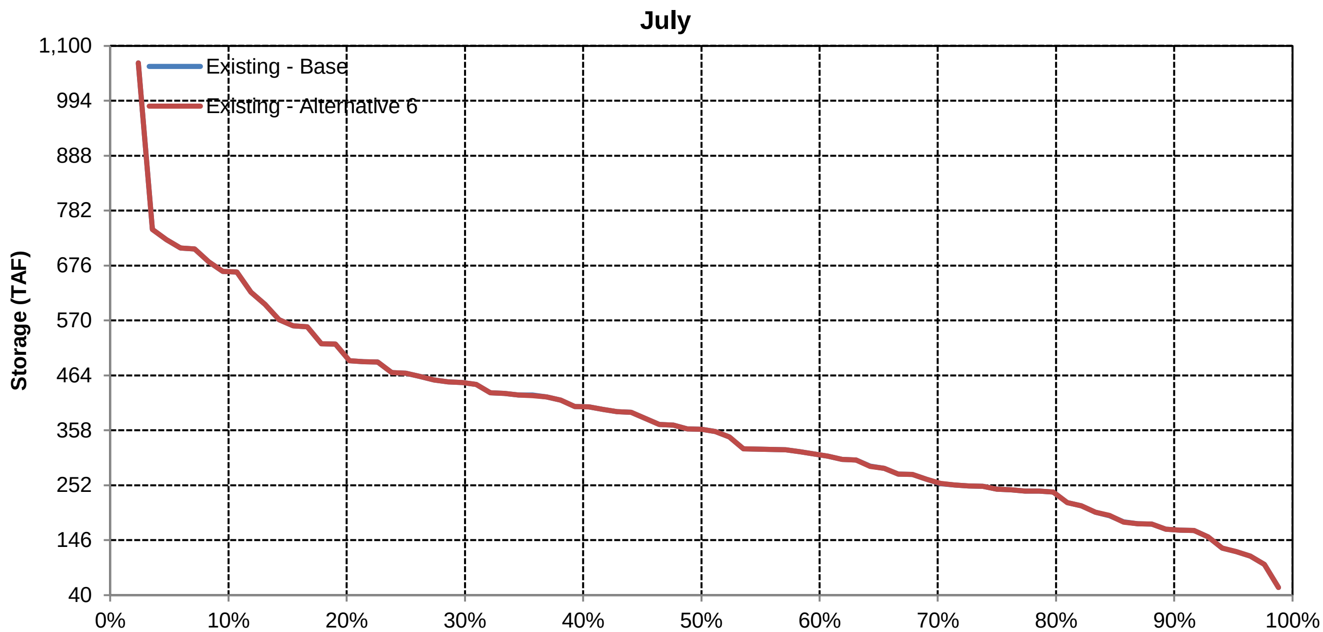
SWP San Luis Reservoir



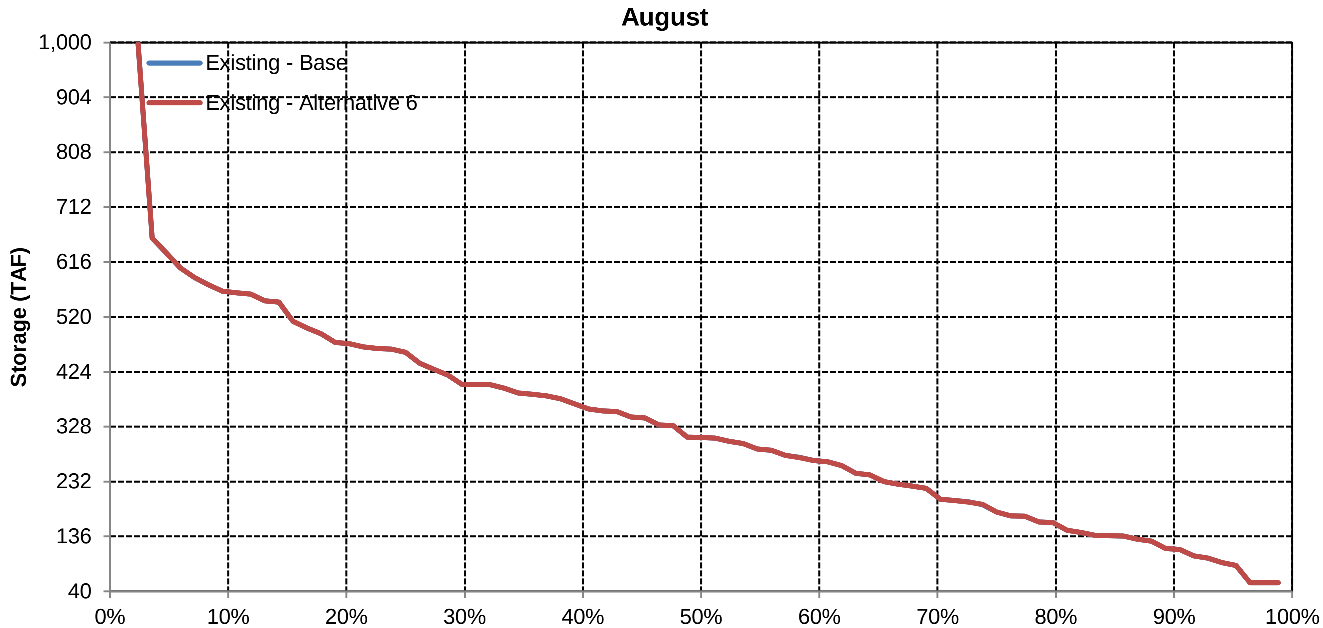


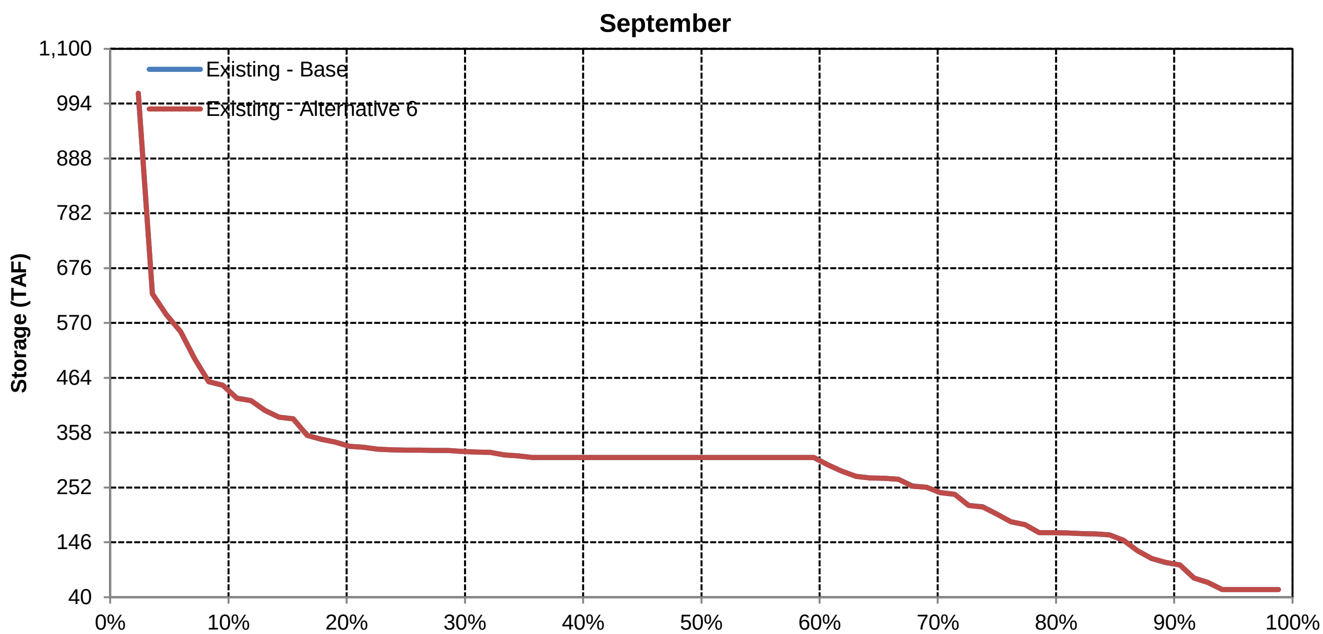
SWP San Luis Reservoir





SWP San Luis Reservoir





Long-Term and Water Year-Type Average of Delta Outflow Under Existing - Base and Existing - Alternative 6

Analysis Period	October	November	December	January	February	March	April	May	June	July	August	September	Total (TAF)
						Average Flow (cfs)							
							Long-Term						
Full Simulation Period													
Existing - Base	6,909	11,530	25,386	48,782	63,791	48,782	30,013	16,104	7,983	8,482	4,062	9,331	16,820
Existing - Alternative 6	6,908	11,530	25,387	48,782	63,791	48,782	30,013	16,104	7,983	8,483	4,062	9,331	16,820
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
							Water Year-Types						
Wet													
Existing - Base	9,275	19,272	57,556	101,579	121,325	88,381	55,563	26,753	10,584	11,022	4,128	19,366	31,372
Existing - Alternative 6	9,275	19,272	57,557	101,579	121,326	88,381	55,563	26,753	10,584	11,023	4,128	19,366	31,372
Difference	0	0	1	0	0	0	0	0	0	1	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal													
Existing - Base	6,741	9,314	21,144	55,453	70,727	61,417	29,722	17,425	7,395	11,464	4,017	11,133	18,336
Existing - Alternative 6	6,741	9,314	21,144	55,453	70,726	61,417	29,722	17,425	7,394	11,464	4,017	11,133	18,336
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal													
Existing - Base	6,527	9,662	10,110	23,902	40,103	31,158	23,270	13,328	6,819	8,808	4,050	3,469	10,847
Existing - Alternative 6	6,527	9,662	10,110	23,902	40,103	31,158	23,270	13,327	6,819	8,808	4,050	3,469	10,847
Difference	0	0	0	0	0	0	0	-1	0	1	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry													
Existing - Base	5,825	7,923	8,608	15,426	29,458	22,607	13,161	8,982	7,006	5,274	4,137	3,269	7,873
Existing - Alternative 6	5,824	7,923	8,608	15,426	29,458	22,607	13,161	8,981	7,006	5,274	4,137	3,269	7,873
Difference	0	0	0	0	0	0	0	-1	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical													
Existing - Base	4,133	5,072	6,622	11,837	16,327	13,519	9,101	6,026	6,104	4,027	3,889	3,010	5,383
Existing - Alternative 6	4,133	5,072	6,622	11,837	16,327	13,519	9,101	6,026	6,104	4,027	3,888	3,010	5,383
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Delta Outflow

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	9,977	15,194	83,333	120,592	161,827	97,068	71,454	33,132	11,137	13,270	4,309	19,688
20%	9,531	14,688	37,738	76,978	107,377	74,847	46,407	23,720	7,991	11,709	4,155	19,375
30%	9,094	12,769	20,214	55,546	76,161	60,341	32,656	15,272	7,100	10,714	4,001	17,813
40%	6,875	10,418	14,342	38,012	58,777	38,477	22,321	12,858	7,100	9,084	4,000	10,938
50%	4,346	9,766	11,487	26,488	41,867	31,169	18,044	11,426	7,100	8,603	4,000	3,914
60%	4,000	6,253	6,752	19,211	28,692	22,356	14,643	10,166	6,905	8,000	4,000	3,569
70%	4,000	4,500	5,009	13,355	21,621	17,008	12,821	9,402	6,688	5,591	4,000	3,000
80%	4,000	4,500	4,670	10,293	17,232	14,703	11,016	7,597	6,187	5,000	4,000	3,000
90%	3,000	3,500	4,500	7,972	12,426	10,776	9,604	6,918	5,655	4,000	3,791	3,000
Long Term												
Full Simulation Period	6,909	11,530	25,386	48,782	63,791	48,782	30,013	16,104	7,983	8,482	4,062	9,331
Water Year Types												
Wet	9,275	19,272	57,556	101,579	121,325	88,381	55,563	26,753	10,584	11,022	4,128	19,366
Above Normal	6,741	9,314	21,144	55,453	70,727	61,417	29,722	17,425	7,395	11,464	4,017	11,133
Below Normal	6,527	9,662	10,110	23,902	40,103	31,158	23,270	13,328	6,819	8,808	4,050	3,469
Dry	5,825	7,923	8,608	15,426	29,458	22,607	13,161	8,982	7,006	5,274	4,137	3,269
Critical	4,133	5,072	6,622	11,837	16,327	13,519	9,101	6,026	6,104	4,027	3,889	3,010

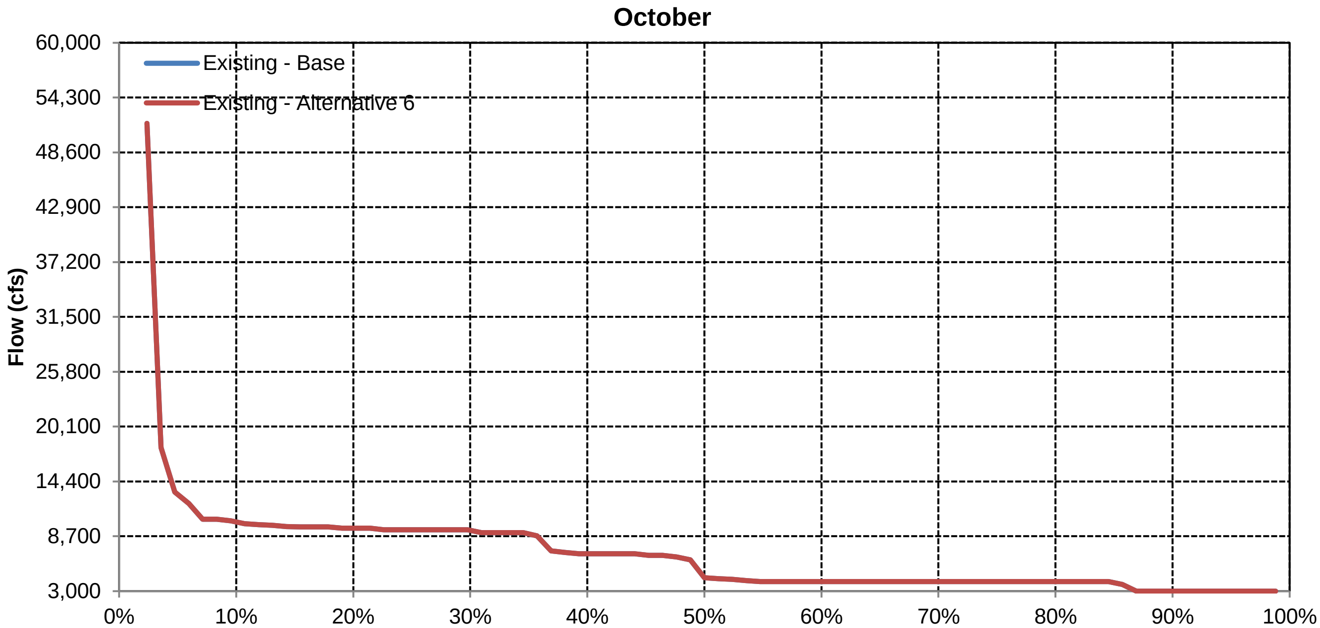
Existing - Alternative 6

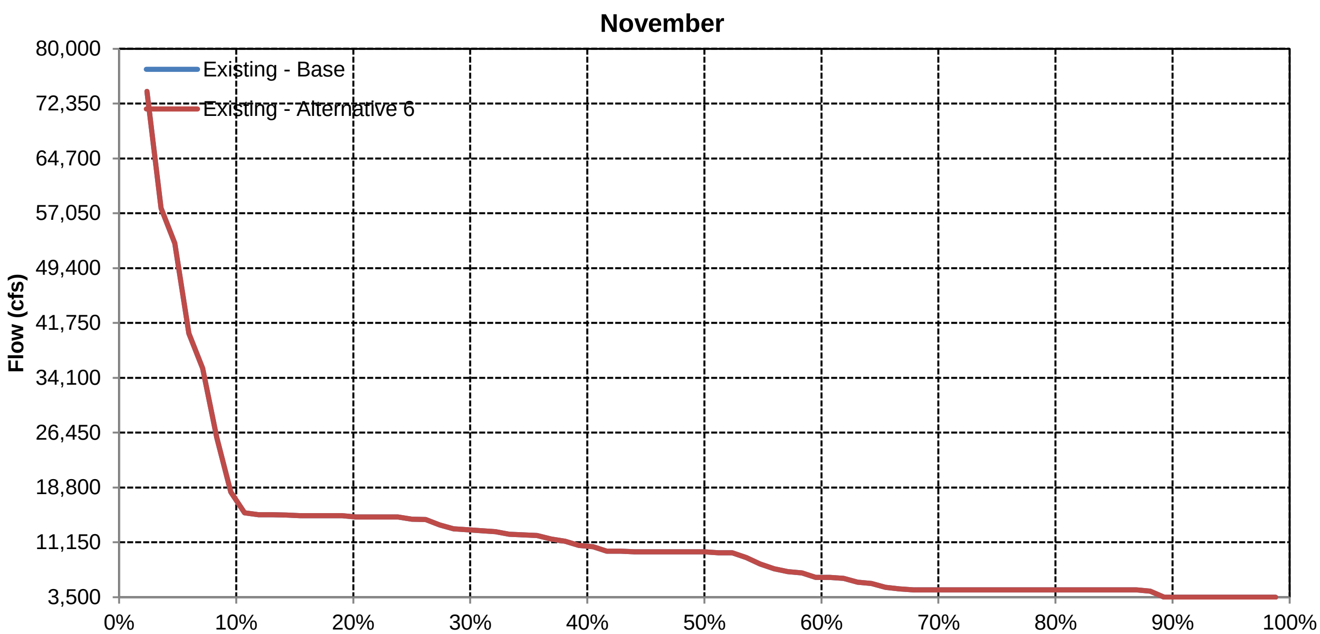
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	9,977	15,194	83,333	120,591	161,827	97,068	71,455	33,132	11,137	13,270	4,308	19,688
20%	9,531	14,688	37,738	76,978	107,377	74,847	46,407	23,720	7,993	11,709	4,155	19,375
30%	9,094	12,769	20,214	55,547	76,162	60,341	32,656	15,272	7,100	10,715	4,001	17,813
40%	6,875	10,418	14,342	38,012	58,776	38,477	22,321	12,858	7,100	9,085	4,000	10,938
50%	4,346	9,766	11,487	26,488	41,868	31,169	18,044	11,426	7,100	8,603	4,000	3,912
60%	4,000	6,253	6,753	19,211	28,692	22,356	14,643	10,166	6,901	8,000	4,000	3,570
70%	4,000	4,500	5,009	13,355	21,621	17,008	12,821	9,402	6,688	5,592	4,000	3,000
80%	4,000	4,500	4,670	10,293	17,232	14,703	11,016	7,595	6,187	5,000	4,000	3,000
90%	3,000	3,500	4,500	7,972	12,426	10,776	9,604	6,918	5,655	4,000	3,791	3,000
Long Term												
Full Simulation Period	6,908	11,530	25,387	48,782	63,791	48,782	30,013	16,104	7,983	8,483	4,062	9,331
Water Year Types												
Wet	9,275	19,272	57,557	101,579	121,326	88,381	55,563	26,753	10,584	11,023	4,128	19,366
Above Normal	6,741	9,314	21,144	55,453	70,726	61,417	29,722	17,425	7,394	11,464	4,017	11,133
Below Normal	6,527	9,662	10,110	23,902	40,103	31,158	23,270	13,327	6,819	8,808	4,050	3,469
Dry	5,824	7,923	8,608	15,426	29,458	22,607	13,161	8,981	7,006	5,274	4,137	3,269
Critical	4,133	5,072	6,622	11,837	16,327	13,519	9,101	6,026	6,104	4,027	3,888	3,010

Existing - Alternative 6 Minus Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	0	0	0	-1	0	0	0	0	0	-1	0
20%	0	0	0	0	0	0	0	0	1	0	0	0
30%	0	0	0	0	0	0	0	0	0	1	0	0
40%	0	0	0	0	-1	0	0	0	0	1	0	0
50%	-1	0	0	0	1	0	0	0	0	0	0	-1
60%	0	0	0	0	0	0	0	0	-4	0	0	0
70%	0	0	0	0	0	0	0	0	0	1	0	0
80%	0	0	0	0	0	0	0	-3	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types												
Wet	0	0	1	0	0	0	0	0	0	1	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	-1	0	1	0	0
Dry	0	0	0	0	0	0	0	-1	0	0	0	0
Critical	0	0	0	0	0	0	0	0	0	0	0	0

Delta Outflow





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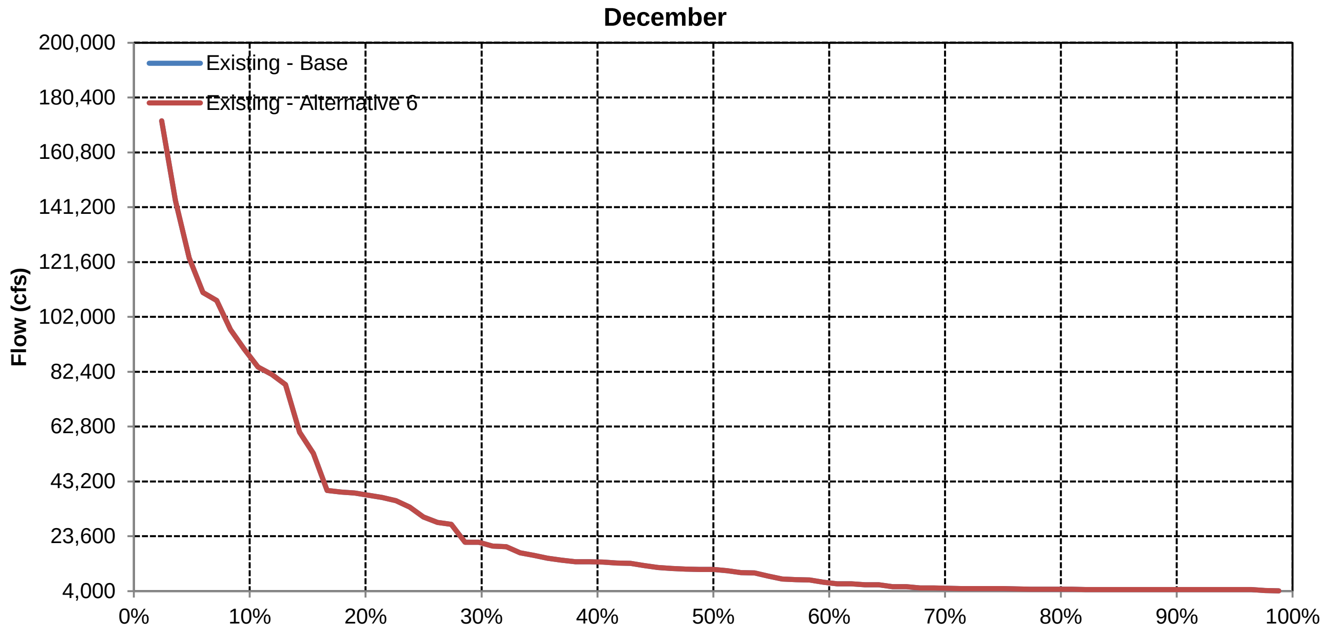

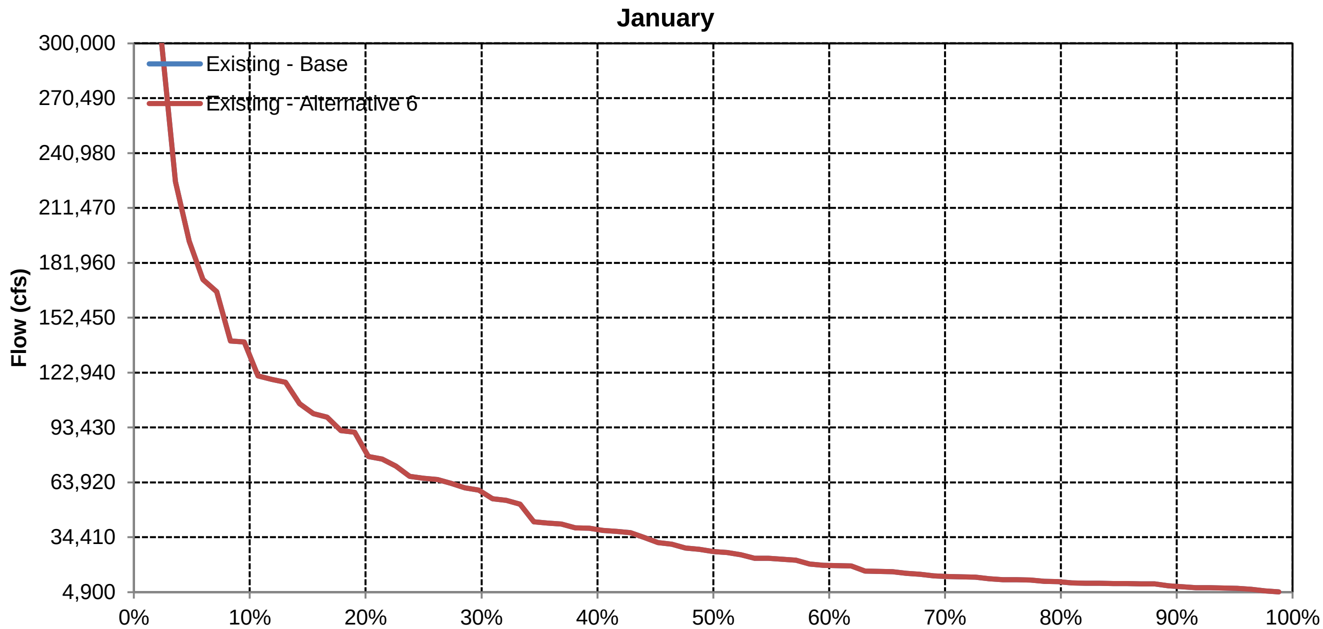

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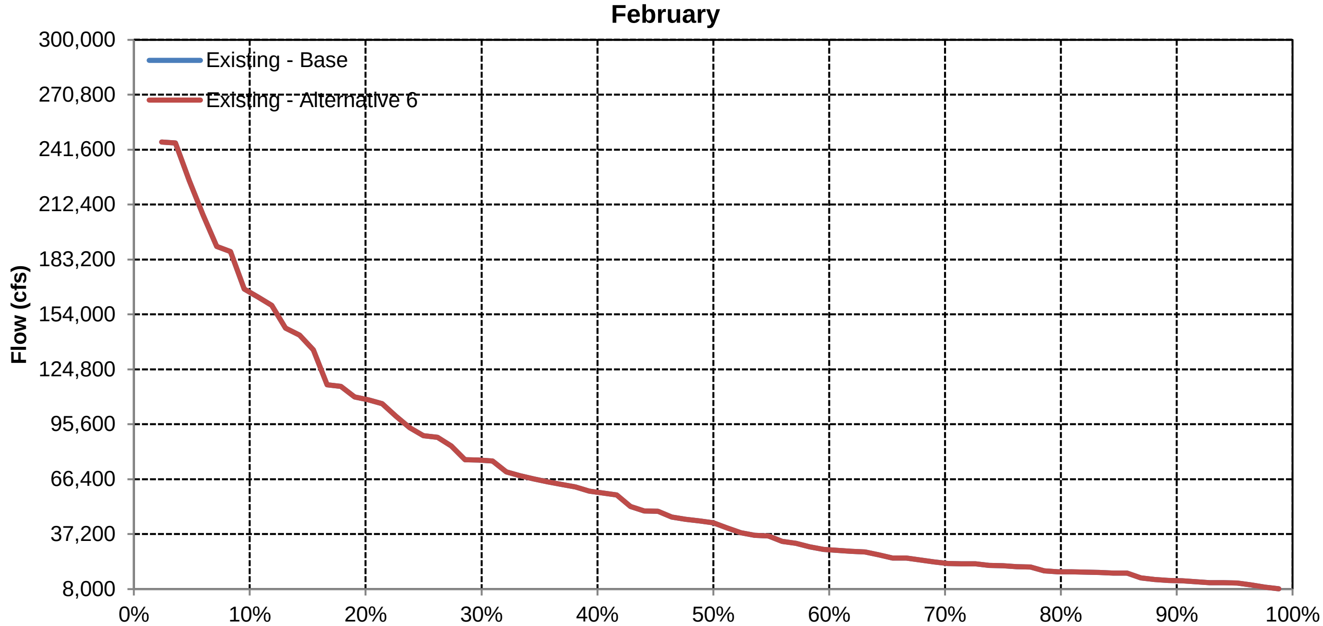

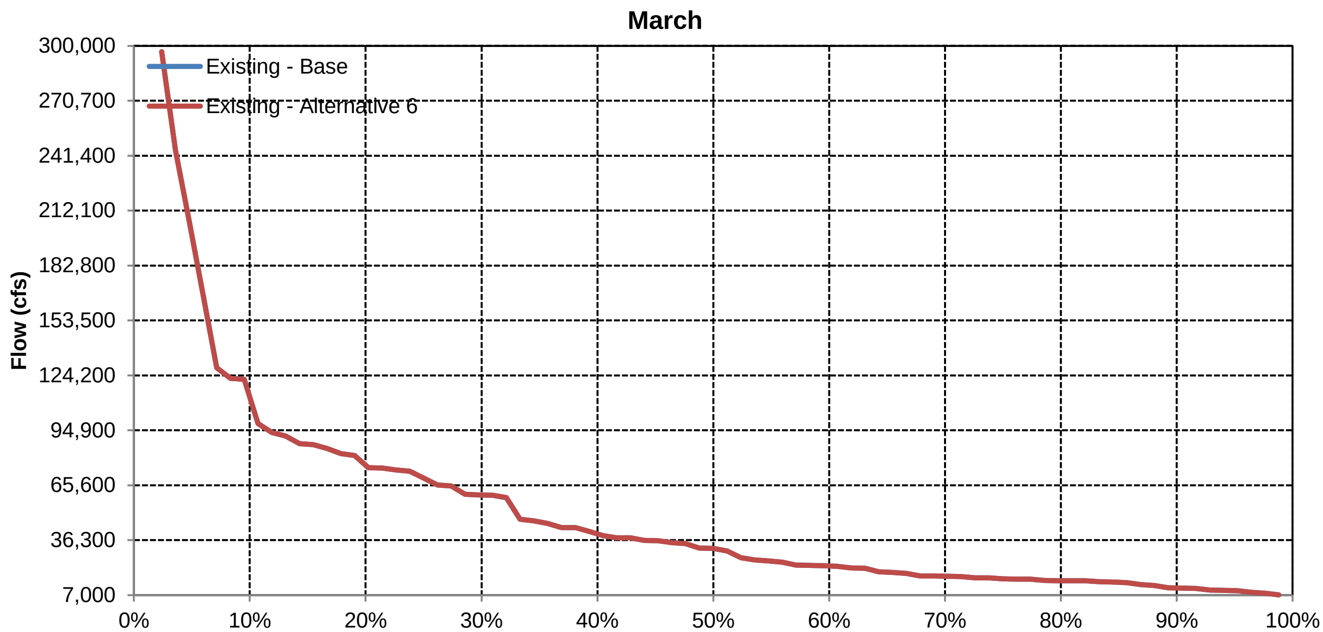

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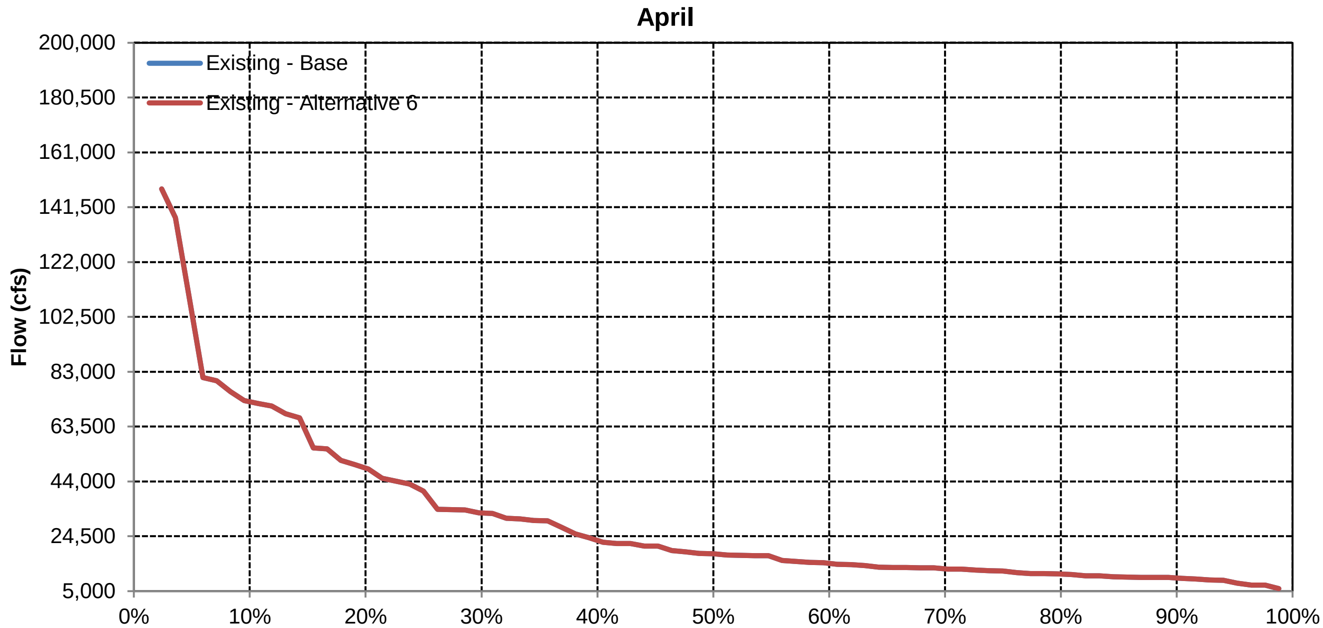

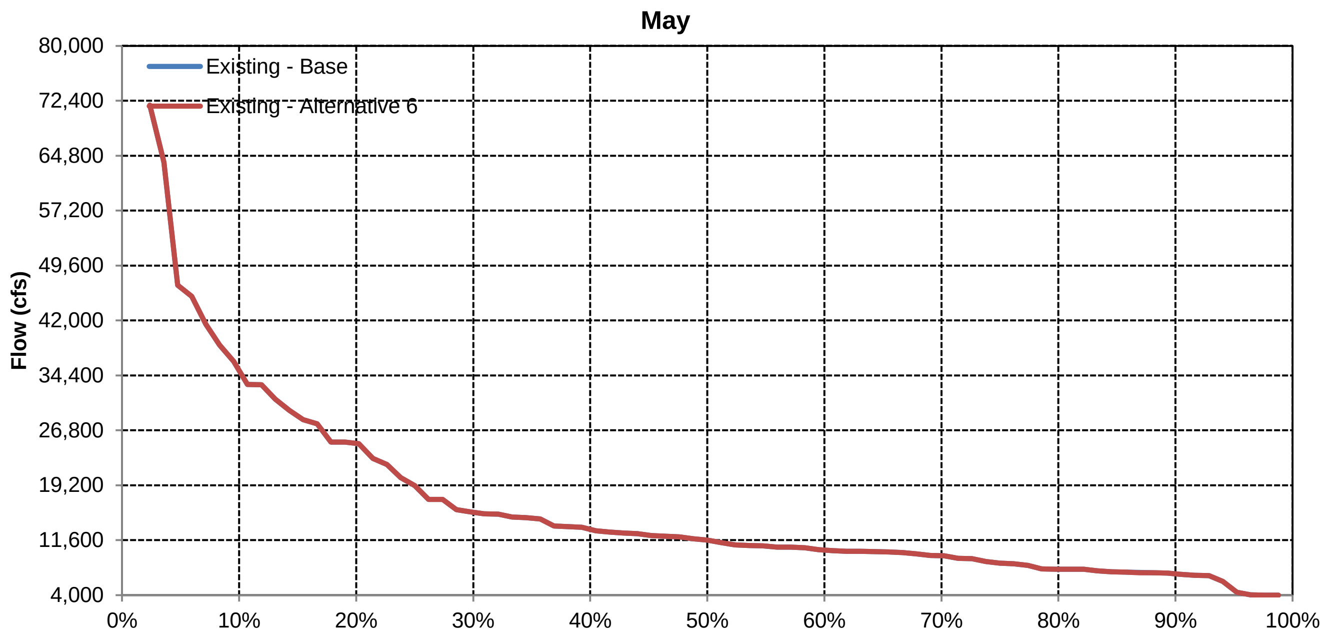

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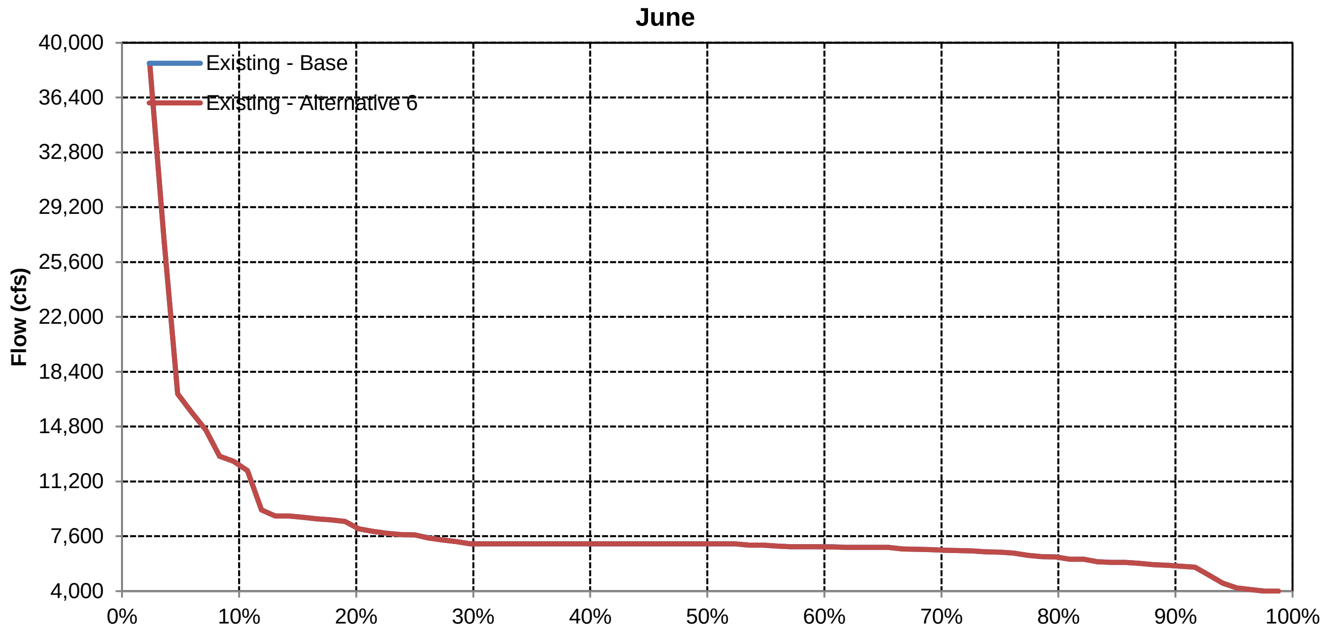

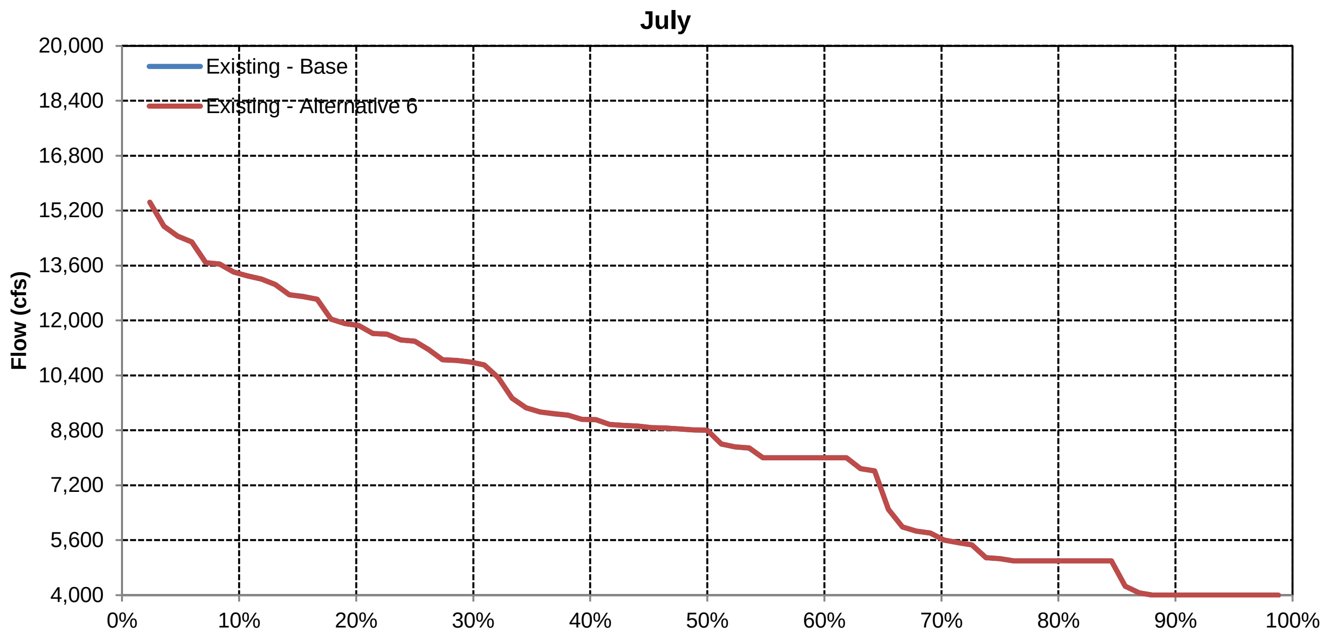

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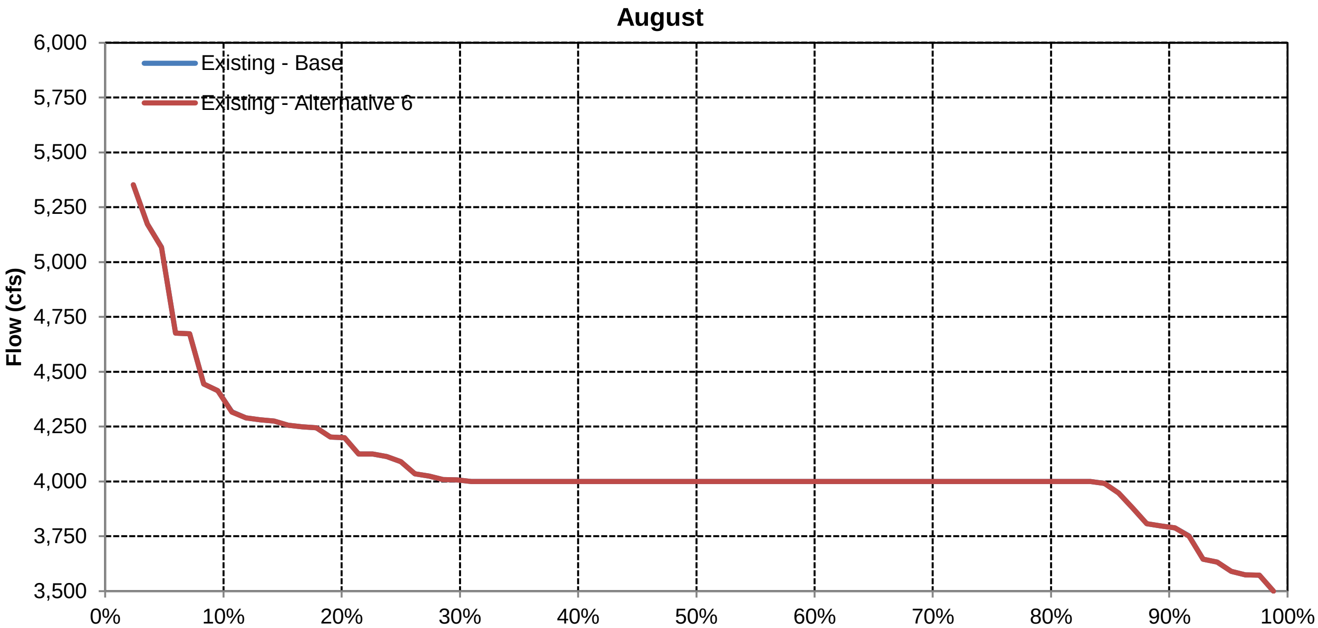


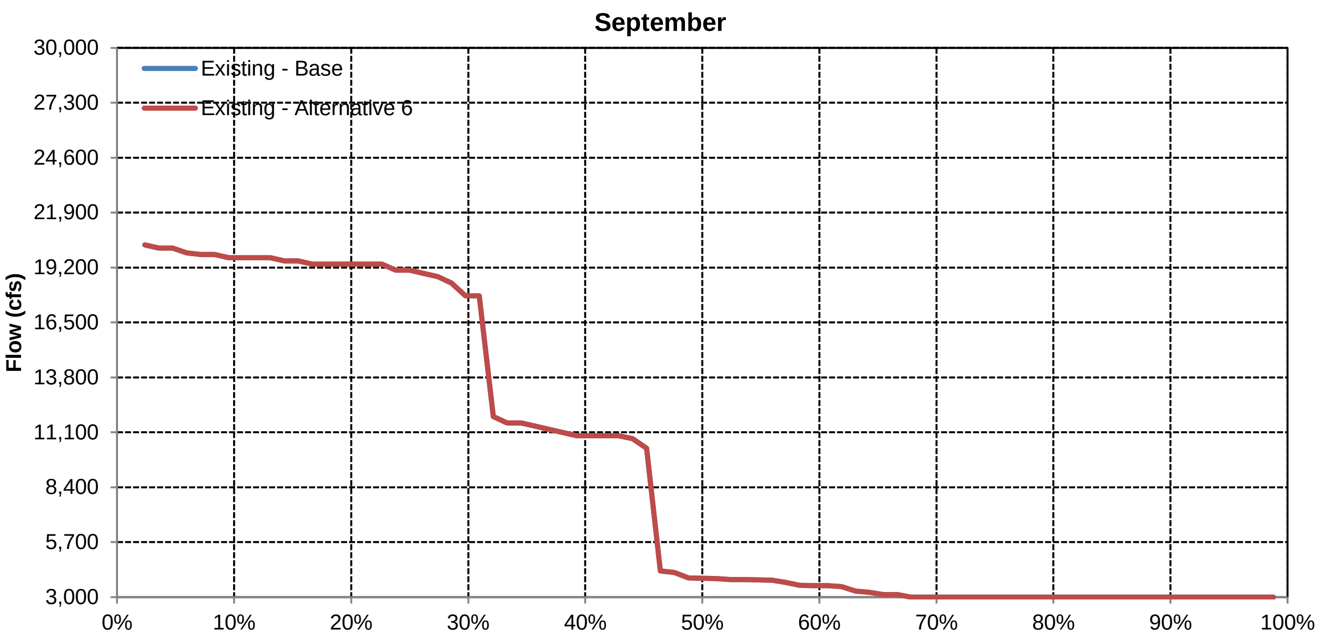


Table 185 Existing Condtions-Alternative 6 (Existing)

Winter-run Chinook Salmon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 6 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration	November through July	Mean Monthly Flow (cfs)	Verona		10	Lower 40%		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
			Freeport		10	Lower 40%		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
		Mean Monthly Water Temperature (°F)	Feather River Confluence	64		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
				68		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
			Freeport	64		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
				68		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Juvenile Rearing and Downstream Movement*	July through March	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	61		All Years	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
				65		All Years	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
			Freeport	61		All Years	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
				65		All Years	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0

Table 186 Existing Condtions-Alternative 6 (Existing)

Spring-run Chinook Salmon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 6 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration	March through September	Mean Monthly Flow (cfs)	Verona		10	Lower 40%						0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport		10	Lower 40%						0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	64		All Years						0.0	0.0	0.0	0.0	0.0	0.0	0.0
				68		All Years						0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport	64		All Years						0.0	0.0	0.0	0.0	0.0	0.0	0.0
				68		All Years						0.0	0.0	0.0	0.0	0.0	0.0	0.0
Juvenile Rearing (and Downstream Movement)	Year-round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	61		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
				65		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Smolt Emigration	October through May	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
		Mean Monthly Water Temperature (°F)	Feather River Confluence	63		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
			Freeport	63		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				

Table 187 Existing Condtions-Alternative 6 (Existing)

Fall-run Chinook Salmon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 6 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Staging	July through December	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0							0.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0							0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	64		All Years	0.0	0.0	0.0							0.0	0.0	0.0
				68		All Years	0.0	0.0	0.0							0.0	0.0	0.0
			Freeport	64		All Years	0.0	0.0	0.0							0.0	0.0	0.0
				68		All Years	0.0	0.0	0.0							0.0	0.0	0.0
Juvenile Rearing and Downstream Movement	December through July	Mean Monthly Flow (cfs)	Verona		10	Lower 40%			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
			Freeport		10	Lower 40%			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
		Mean Monthly Water Temperature (°F)	Freeport	61		All Years			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
				65		All Years			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		

Table 188 Existing Condtions-Alternative 6 (Existing)

Late Fall-run Chinook Salmon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 6 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Staging	October through April	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
		Mean Monthly Water Temperature (°F)	Feather River Confluence	64		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
			Freeport	64		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
Juvenile Rearing and Downstream Movement	April through December	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Freeport	61		All Years	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
				65		All Years	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0

Table 189 Existing Condtions-Alternative 6 (Existing)

Steelhead in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 6 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration	August through March	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	64		All Years	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0
			Freeport	64		All Years	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0
Juvenile Rearing and Downstream Movement	Year-Round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	65		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Smolt Emigration	January through June	Mean Monthly Flow (cfs)	Verona		10	Lower 40%				0.0	0.0	0.0	0.0	0.0	0.0			
			Freeport		10	Lower 40%				0.0	0.0	0.0	0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Feather River Confluence	52		All Years				0.0	0.0	0.0	0.0	0.0	0.0			
				55		All Years				0.0	0.0	0.0	0.0	0.0	0.0			
			Freeport	52		All Years				0.0	0.0	0.0	0.0	0.0	0.0			
				55		All Years				0.0	0.0	-1.2	0.0	0.0	0.0			

Table 190 Existing Condtions-Alternative 6 (Existing)

Green Sturgeon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 6 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Holding	February through July	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%					0.0	0.0	0.0	0.0	0.0	0.0		
		Mean Monthly Water Temperature (°F)	Freeport	61		All Years					0.0	0.0	0.0	0.0	0.0	0.0		
Adult Post-Spawning Holding and Emigration	July through November	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%	0.0	0.0								0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Freeport	61		All Years	0.0	0.0								0.0	0.0	0.0
Juvenile Rearing and Downstream Movement	Year-round	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Freeport	66		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 191 Existing Condtions-Alternative 6 (Existing)

White Sturgeon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 6 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Holding	November through May	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%		0.0	0.0	0.0	0.0	0.0	0.0	0.0				
		Mean Monthly Water Temperature (°F)	Freeport	77		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Spawning and Egg Incubation	February through June	Mean Monthly Flow (cfs)	Verona		10	Lower 40%					0.0	0.0	0.0	0.0	0.0			
			Freeport		10	Lower 40%					0.0	0.0	0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Feather River Confluence	61		All Years					0.0	0.0	0.0	0.0	0.0			
Juvenile Rearing and Downstream Movement	Year-round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	66		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport	66		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 192 Existing Condtions-Alternative 6 (Existing)

River Lamprey in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 6 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration	September through June	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0
		Mean Monthly Water Temperature (°F)	Freeport	42-60		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0
Ammocoete Rearing and Downstream Movement	Year-round	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Freeport	72		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

[1]Water temperature ranges are evaluated by calculating the net change in the probability of water temperatures occurring within the specified range.

Table 193 Existing Condtions-Alternative 6 (Existing)

Pacific Lamprey in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 6 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration	January through June	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%				0.0	0.0	0.0	0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Freeport	42-60		All Years				0.0	0.0	0.0	0.0	0.0	0.0			
Ammocoete Rearing and Downstream Movement	Year-round	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Freeport	72		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

[1]Water temperature ranges are evaluated by calculating the net change in the probability of water temperatures occurring within the specified range.

Table 194 Existing Condtions-Alternative 6 (Existing)

Hardhead in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location Description	Metric Value	Metric %	Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adults and Other Lifestages	Year-round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	61-77		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport	61-77		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Adult Spawning	April through June	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%							0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Freeport	59-64		All Years							0.0	0.0	0.0			

Net Change in Probability of Exceedance under Alternative 6 (Existing) relative to Existing Condtions (Oct–Sep columns)

[1]Water temperature ranges are evaluated by calculating the net change in the probability of water temperatures occurring within the specified range.

Table 195 Existing Condtions-Alternative 6 (Existing)

American Shad in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 6 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Spawning	April through June	Mean Monthly Flow (cfs)	Verona		10	Lower 40%							0.0	0.0	0.0			
			Freeport		10	Lower 40%							0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Feather River Confluence	60-70		All Years							0.0	0.0	0.0			
			Freeport	60-70		All Years							0.0	0.0	0.0			
Juvenile Rearing and Downstream Movement	Year-Round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	63-77		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport	63-77		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

[1]Water temperature ranges are evaluated by calculating the net change in the probability of water temperatures occurring within the specified range.

Table 196 Existing Condtions-Alternative 6 (Existing)

Striped Bass in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 6 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Spawning	April through June	Mean Monthly Flow (cfs)	Verona		10	Lower 40%							0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Feather River Confluence	59-68		All Years							0.0	0.0	0.0			
Juvenile Rearing and Downstream Movement	Year-round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	61-71		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

[1]Water temperature ranges are evaluated by calculating the net change in the probability of water temperatures occurring within the specified range.

Table 201 Existing Condtions-Alternative 6 (Existing)

Alternative 6 (Existing) vs Existing Condtions
Sacramento River at Verona, Monthly Flow

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
-1.0 < X < 1.0	100.0	73.2	45.1	31.7	20.7	32.9	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	1.2	8.5	12.2	19.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	0.0	26.8	52.4	67.1	76.8	67.1	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	-26.8	-52.4	-67.1	-76.8	-67.1	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	-1.2	-8.5	-12.2	-19.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Low Flows (Upper 40% of Distribution)												
-1.0 < X < 1.0	100.0	97.0	97.0	63.6	27.3	57.6	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	0.0	3.0	0.0	33.3	66.7	42.4	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	-3.0	0.0	-33.3	-66.7	-42.4	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 202 Existing Condtions-Alternative 6 (Existing)

Alternative 6 (Existing) vs Existing Condtions
Sacramento River at Freeport, Monthly Flow

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
-1.0 < X < 1.0	100.0	78.0	48.8	32.9	23.2	35.4	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	2.4	4.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	0.0	19.5	50.0	65.9	75.6	61.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	-19.5	-50.0	-65.9	-75.6	-61.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	-2.4	-4.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Low Flows (Upper 40% of Distribution)												
-1.0 < X < 1.0	100.0	100.0	93.9	66.7	30.3	60.6	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	0.0	0.0	6.1	30.3	66.7	36.4	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	0.0	-6.1	-30.3	-66.7	-36.4	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Alternative 6 (Existing) vs Existing Condtions

Sacramento River at Feather River, Monthly Temperature

Exceedance of Water Temperature Index Values and Probability of Occurring within the Water Temperature Index Ranges

Existing Condtions

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	98.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	98.0	96.4	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	95.7	92.7	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	81.1	73.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	20.7	4.9	94.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	2.4	1.2	81.7	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	97.8	2.1	1.2	51.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	78.0	1.4	1.2	12.2	87.8	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	58.5	1.2	1.2	4.7	74.6	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	34.1	1.2	1.2	1.4	65.2	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	18.3	1.2	1.2	1.2	41.5	98.3	98.8	98.8	98.8	98.8	98.8
56	98.8	7.6	1.2	1.2	1.2	23.2	95.9	98.8	98.8	98.8	98.8	98.8
57	98.8	2.4	1.2	1.2	1.2	14.0	94.7	98.8	98.8	98.8	98.8	98.8
58	98.8	1.2	1.2	1.2	1.2	5.5	86.6	98.8	98.8	98.8	98.8	98.8
59	96.7	1.2	1.2	1.2	1.2	3.2	77.6	98.8	98.8	98.8	98.8	98.8
60	85.4	1.2	1.2	1.2	1.2	2.4	68.3	98.8	98.8	98.8	98.8	98.8
61	62.8	1.2	1.2	1.2	1.2	1.8	57.3	98.8	98.8	98.8	98.8	98.8
62	44.5	1.2	1.2	1.2	1.2	1.2	43.9	98.0	98.8	98.8	98.8	98.8
63	23.2	1.2	1.2	1.2	1.2	1.2	35.4	96.9	98.8	98.8	98.8	98.8
64	14.6	1.2	1.2	1.2	1.2	1.2	13.3	95.5	98.8	98.8	98.8	98.8
65	7.6	1.2	1.2	1.2	1.2	1.2	10.4	89.6	98.8	98.8	98.8	93.3
66	4.5	1.2	1.2	1.2	1.2	1.2	4.3	85.4	98.8	98.8	98.8	90.2
68	1.5	1.2	1.2	1.2	1.2	1.2	1.2	48.8	98.2	98.8	98.8	65.9
69	1.2	1.2	1.2	1.2	1.2	1.2	1.2	29.3	94.1	98.8	98.8	53.7
70	1.2	1.2	1.2	1.2	1.2	1.2	1.2	13.2	85.4	98.3	97.8	29.9
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	9.8	68.3	93.1	90.2	24.6
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	6.3	37.8	78.0	76.8	13.4
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	2.2	11.0	29.3	42.7	3.5
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.7	3.0	19.5	23.2	2.4
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	4.3	2.1	1.2
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	79.9	72.0	97.6	97.6	97.6	97.1	95.8	79.3	75.6	96.4
50-64	84.2	96.6	0.9	0.0	50.0	97.6	85.5	3.3	0.0	0.0	0.0	0.0
55-56	0.0	10.7	0.0	0.0	0.0	18.3	2.4	0.0	0.0	0.0	0.0	0.0
59-64	82.1	0.0	0.0	0.0	0.0	2.0	64.3	3.3	0.0	0.0	0.0	0.0
59-68	95.2	0.0	0.0	0.0	0.0	2.0	76.4	50.0	0.6	0.0	0.0	32.9
59-75	95.5	0.0	0.0	0.0	0.0	2.0	76.4	97.1	95.8	79.3	75.6	96.4
60-70	84.2	0.0	0.0	0.0	0.0	1.2	67.1	85.6	13.4	0.5	1.0	68.9
61-71	61.6	0.0	0.0	0.0	0.0	0.6	56.1	89.0	30.5	5.7	8.6	74.2
63-69	22.0	0.0	0.0	0.0	0.0	0.0	34.2	67.6	4.7	0.0	0.0	45.1
63-77	22.0	0.0	0.0	0.0	0.0	0.0	34.2	95.7	97.6	94.5	96.7	97.6
65-82	6.4	0.0	0.0	0.0	0.0	0.0	9.2	88.4	97.6	97.6	97.6	92.1
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.0	84.2	97.1	96.6	28.7
42-60	13.4	97.6	96.8	95.2	97.6	96.4	30.5	0.0	0.0	0.0	0.0	0.0
61-77	61.6	0.0	0.0	0.0	0.0	0.6	56.1	97.6	97.6	94.5	96.7	97.6

Alternative 6 (Existing)

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	98.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	98.0	96.4	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	95.7	92.7	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	81.1	73.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	20.7	4.9	94.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	2.4	1.2	81.7	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	97.8	2.1	1.2	51.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	78.0	1.4	1.2	12.2	87.8	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	58.5	1.2	1.2	4.7	74.6	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	34.1	1.2	1.2	1.4	65.2	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	18.3	1.2	1.2	1.2	41.5	98.3	98.8	98.8	98.8	98.8	98.8
56	98.8	7.6	1.2	1.2	1.2	23.2	95.9	98.8	98.8	98.8	98.8	98.8
57	98.8	2.4	1.2	1.2	1.2	14.0	94.7	98.8	98.8	98.8	98.8	98.8
58	98.8	1.2	1.2	1.2	1.2	5.5	86.6	98.8	98.8	98.8	98.8	98.8
59	96.7	1.2	1.2	1.2	1.2	3.2	77.6	98.8	98.8	98.8	98.8	98.8
60	85.4	1.2	1.2	1.2	1.2	2.4	68.3	98.8	98.8	98.8	98.8	98.8
61	62.8	1.2	1.2	1.2	1.2	1.8	57.3	98.8	98.8	98.8	98.8	98.8
62	44.5	1.2	1.2	1.2	1.2	1.2	43.9	98.0	98.8	98.8	98.8	98.8
63	23.2	1.2	1.2	1.2	1.2	1.2	35.4	96.9	98.8	98.8	98.8	98.8
64	14.6	1.2	1.2	1.2	1.2	1.2	13.3	95.5	98.8	98.8	98.8	98.8
65	7.6	1.2	1.2	1.2	1.2	1.2	10.4	89.6	98.8	98.8	98.8	93.3
66	4.5	1.2	1.2	1.2	1.2	1.2	4.3	85.4	98.8	98.8	98.8	90.2
68	1.5	1.2	1.2	1.2	1.2	1.2	1.2	48.8	98.2	98.8	98.8	65.9
69	1.2	1.2	1.2	1.2	1.2	1.2	1.2	29.3	94.1	98.8	98.8	53.7
70	1.2	1.2	1.2	1.2	1.2	1.2	1.2	13.2	85.4	98.3	97.8	29.9
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	9.8	68.3	93.1	90.2	24.6
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	6.3	37.8	78.0	76.8	13.4
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	2.2	11.0	29.3	42.7	3.5
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.7	3.0	19.5	23.2	2.4
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	4.3	2.1	1.2
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	79.9	72.0	97.6	97.6	97.6	97.1	95.8	79.3	75.6	96.4
50-64	84.2	96.6	0.9	0.0	50.0	97.6	85.5	3.3	0.0	0.0	0.0	0.0
55-56	0.0	10.7	0.0	0.0	0.0	18.3	2.4	0.0	0.0	0.0	0.0	0.0
59-64	82.1	0.0	0.0	0.0	0.0	2.0	64.3	3.3	0.0	0.0	0.0	0.0
59-68	95.2	0.0	0.0	0.0	0.0	2.0	76.4	50.0	0.6	0.0	0.0	32.9
59-75	95.5	0.0	0.0	0.0	0.0	2.0	76.4	97.1	95.8	79.3	75.6	96.4
60-70	84.2	0.0	0.0	0.0	0.0	1.2	67.1	85.6	13.4	0.5	1.0	68.9
61-71	61.6	0.0	0.0	0.0	0.0	0.6	56.1	89.0	30.5	5.7	8.6	74.2
63-69	22.0	0.0	0.0	0.0	0.0	0.0	34.2	67.6	4.7	0.0	0.0	45.1
63-77	22.0	0.0	0.0	0.0	0.0	0.0	34.2	95.7	97.6	94.5	96.7	97.6
65-82	6.4	0.0	0.0	0.0	0.0	0.0	9.2	88.4	97.6	97.6	97.6	92.1
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.0	84.2	97.1	96.6	28.7
42-60	13.4	97.6	96.8	95.2	97.6	96.4	30.5	0.0	0.0	0.0	0.0	0.0
61-77	61.6	0.0	0.0	0.0	0.0	0.6	56.1	97.6	97.6	94.5	96.7	97.6

Alternative 6 (Existing) - Existing Condtions

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
43	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
48	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
49	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
52	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
53	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
54	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
56	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
57	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
58	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
62	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
66	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
68	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
72	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
74	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
86	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
88	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
98	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45-75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50-64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55-56	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-68	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60-70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61-71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63-69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
65-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42-60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Alternative 6 (Existing) vs Existing Condtions

Sacramento River at Freeport, Monthly Temperature

Exceedance of Water Temperature Index Values and Probability of Occurring within the Water Temperature Index Ranges

Existing Condtions

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	97.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	97.8	96.4	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	93.9	91.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	79.9	73.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	22.0	5.5	95.3	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	3.0	1.2	80.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	98.0	2.0	1.2	47.6	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	82.9	1.2	1.2	13.4	92.1	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	64.6	1.2	1.2	6.7	75.3	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	39.0	1.2	1.2	2.3	64.6	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	22.8	1.2	1.2	1.2	45.1	98.3	98.8	98.8	98.8	98.8	98.8
56	98.8	11.0	1.2	1.2	1.2	24.4	96.5	98.8	98.8	98.8	98.8	98.8
57	98.8	3.3	1.2	1.2	1.2	14.1	94.2	98.8	98.8	98.8	98.8	98.8
58	98.8	1.2	1.2	1.2	1.2	8.0	86.6	98.8	98.8	98.8	98.8	98.8
59	98.8	1.2	1.2	1.2	1.2	4.5	78.0	98.8	98.8	98.8	98.8	98.8
60	95.1	1.2	1.2	1.2	1.2	3.2	71.2	98.8	98.8	98.8	98.8	98.8
61	74.4	1.2	1.2	1.2	1.2	2.2	57.3	98.8	98.8	98.8	98.8	98.8
62	54.9	1.2	1.2	1.2	1.2	1.4	47.6	98.8	98.8	98.8	98.8	98.8
63	42.7	1.2	1.2	1.2	1.2	1.2	31.7	97.7	98.8	98.8	98.8	98.8
64	20.7	1.2	1.2	1.2	1.2	1.2	20.7	95.1	98.8	98.8	98.8	98.8
65	14.0	1.2	1.2	1.2	1.2	1.2	12.8	92.7	98.8	98.8	98.8	97.6
66	5.5	1.2	1.2	1.2	1.2	1.2	6.7	84.1	98.8	98.8	98.8	94.7
68	1.7	1.2	1.2	1.2	1.2	1.2	1.2	57.3	98.8	98.8	98.8	81.3
69	1.2	1.2	1.2	1.2	1.2	1.2	1.2	30.5	96.9	98.8	98.8	68.3
70	1.2	1.2	1.2	1.2	1.2	1.2	1.2	15.9	89.8	98.8	98.8	47.6
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	11.4	84.1	98.8	97.9	26.8
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	7.0	64.6	97.6	91.5	18.3
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.0	20.7	61.0	57.7	4.3
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	2.4	9.8	34.1	39.0	1.4
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	10.4	7.3	1.2
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	78.7	72.0	97.6	97.6	97.6	96.4	89.0	64.7	59.8	97.4
50-64	78.1	96.8	0.8	0.0	46.4	97.6	78.1	3.7	0.0	0.0	0.0	0.0
55-56	0.0	11.8	0.0	0.0	0.0	20.7	1.8	0.0	0.0	0.0	0.0	0.0
59-64	78.1	0.0	0.0	0.0	0.0	3.3	57.3	3.7	0.0	0.0	0.0	0.0
59-68	97.1	0.0	0.0	0.0	0.0	3.3	76.8	41.5	0.0	0.0	0.0	17.5
59-75	97.6	0.0	0.0	0.0	0.0	3.3	76.8	96.4	89.0	64.7	59.8	97.4
60-70	93.9	0.0	0.0	0.0	0.0	2.0	70.0	82.9	9.0	0.0	0.0	51.2
61-71	73.2	0.0	0.0	0.0	0.0	1.0	56.1	87.4	14.7	0.0	0.9	72.0
63-69	41.5	0.0	0.0	0.0	0.0	0.0	30.5	67.2	1.9	0.0	0.0	30.5
63-77	41.5	0.0	0.0	0.0	0.0	0.0	30.5	96.5	97.6	88.4	91.5	97.6
65-82	12.8	0.0	0.0	0.0	0.0	0.0	11.6	91.5	97.6	97.6	97.6	96.4
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.7	88.6	97.6	97.6	46.4
42-60	3.7	97.6	96.6	95.2	97.6	95.6	27.6	0.0	0.0	0.0	0.0	0.0
61-77	73.2	0.0	0.0	0.0	0.0	1.0	56.1	97.6	97.6	88.4	91.5	97.6

Alternative 6 (Existing)

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	97.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	97.8	96.4	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	93.9	91.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	79.9	73.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	22.0	6.1	95.4	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	3.0	1.2	80.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	98.0	2.0	1.2	48.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	82.9	1.2	1.2	13.4	92.1	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	64.6	1.2	1.2	6.8	75.6	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	39.0	1.2	1.2	2.3	64.0	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	22.8	1.2	1.2	1.2	43.9	98.3	98.8	98.8	98.8	98.8	98.8
56	98.8	11.0	1.2	1.2	1.2	24.4	96.5	98.8	98.8	98.8	98.8	98.8
57	98.8	3.3	1.2	1.2	1.2	14.1	94.2	98.8	98.8	98.8	98.8	98.8
58	98.8	1.2	1.2	1.2	1.2	8.3	86.6	98.8	98.8	98.8	98.8	98.8
59	98.8	1.2	1.2	1.2	1.2	4.5	78.0	98.8	98.8	98.8	98.8	98.8
60	95.1	1.2	1.2	1.2	1.2	3.2	71.2	98.8	98.8	98.8	98.8	98.8
61	74.4	1.2	1.2	1.2	1.2	2.2	57.3	98.8	98.8	98.8	98.8	98.8
62	54.9	1.2	1.2	1.2	1.2	1.4	47.6	98.8	98.8	98.8	98.8	98.8
63	42.7	1.2	1.2	1.2	1.2	1.2	31.7	97.7	98.8	98.8	98.8	98.8
64	20.7	1.2	1.2	1.2	1.2	1.2	20.7	95.1	98.8	98.8	98.8	98.8
65	14.0	1.2	1.2	1.2	1.2	1.2	12.8	92.7	98.8	98.8	98.8	97.6
66	5.5	1.2	1.2	1.2	1.2	1.2	6.7	84.1	98.8	98.8	98.8	94.7
68	1.7	1.2	1.2	1.2	1.2	1.2	1.2	57.3	98.8	98.8	98.8	81.3
69	1.2	1.2	1.2	1.2	1.2	1.2	1.2	30.5	96.9	98.8	98.8	68.3
70	1.2	1.2	1.2	1.2	1.2	1.2	1.2	15.9	89.8	98.8	98.8	47.6
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	11.4	84.1	98.8	97.9	26.8
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	7.0	64.6	97.6	91.5	18.3
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.0	20.7	61.0	57.7	4.3
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	2.4	9.8	34.1	39.0	1.4
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	10.4	7.3	1.2
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	78.7	72.0	97.6	97.6	97.6	96.4	89.0	64.7	59.8	97.4
50-64	78.1	96.8	0.8	0.0	47.6	97.6	78.1	3.7	0.0	0.0	0.0	0.0
55-56	0.0	11.8	0.0	0.0	0.0	19.5	1.8	0.0	0.0	0.0	0.0	0.0
59-64	78.1	0.0	0.0	0.0	0.0	3.3	57.3	3.7	0.0	0.0	0.0	0.0
59-68	97.1	0.0	0.0	0.0	0.0	3.3	76.8	41.5	0.0	0.0	0.0	17.5
59-75	97.6	0.0	0.0	0.0	0.0	3.3	76.8	96.4	89.0	64.7	59.8	97.4
60-70	93.9	0.0	0.0	0.0	0.0	2.0	70.0	82.9	9.0	0.0	0.0	51.2
61-71	73.2	0.0	0.0	0.0	0.0	1.0	56.1	87.4	14.7	0.0	0.9	72.0
63-69	41.5	0.0	0.0	0.0	0.0	0.0	30.5	67.2	1.9	0.0	0.0	30.5
63-77	41.5	0.0	0.0	0.0	0.0	0.0	30.5	96.5	97.6	88.4	91.5	97.6
65-82	12.8	0.0	0.0	0.0	0.0	0.0	11.6	91.5	97.6	97.6	97.6	96.4
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.7	88.6	97.6	97.6	46.4
42-60	3.7	97.6	96.6	95.2	97.6	95.6	27.6	0.0	0.0	0.0	0.0	0.0
61-77	73.2	0.0	0.0	0.0	0.0	1.0	56.1	97.6	97.6	88.4	91.5	97.6

Alternative 6 (Existing) - Existing Condtions

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
43	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
48	0.0	0.0	0.0	0.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
49	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
52	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
53	0.0	0.0	0.0	0.0	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0
54	0.0	0.0	0.0	0.0	0.0	-0.6	0.0	0.0	0.0	0.0	0.0	0.0
55	0.0	0.0	0.0	0.0	0.0	-1.2	0.0	0.0	0.0	0.0	0.0	0.0
56	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
57	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
58	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
59	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
62	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
66	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
68	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
72	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
74	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
86	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
88	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
98	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45-75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50-64	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55-56	0.0	0.0	0.0	0.0	0.0	-1.2	0.0	0.0	0.0	0.0	0.0	0.0
59-64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-68	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60-70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61-71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63-69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
65-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42-60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 227 Existing Condtions-Alternative 6 (Existing)

Delta Smelt in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 6 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult	December through May	Mean Monthly Water Temperature (°F)	Sacramento River at Freeport	59-68		All Years			0.0	0.0	0.0	0.0	0.0	0.0				
		Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years			67.1	79.3	67.1	79.3	0.0	0.0				
	September through November	Mean Monthly X_2 (RKm)	X_2 between 74 km and 81 km	74-81		Wet and Above Normal Water Years	0.0	0.0										0.0
	December through February	Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<-5000 cfs		All Years			0.0	0.0	0.0							
Egg and Embryo	February through May	Mean Monthly Water Temperature (°F)	Sacramento River at Freeport	59-68		All Years					0.0	0.0	0.0	0.0				
Larval	March through June	Mean Monthly Water Temperature (°F)	Sacramento River at Freeport	59-68		All Years						0.0	0.0	0.0	0.0			
		Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<-1500 cfs		Dry and Critical Water Years						0.0	0.0	0.0	0.0			
		Mean Monthly Delta Outflow (cfs)	Delta		10	All Years						0.0	0.0	0.0	0.0			
Juvenile	May through July	Mean Monthly Water Temperature (°F)	Sacramento River at Freeport	59-68		All Years								0.0	0.0	0.0		
		Mean Monthly X_2 (RKm)	Changes in X_2 between RKm 65 and 80	0.5 RKm		All Years								0.0	0.0	0.0		

Table 228 Existing Condtions-Alternative 6 (Existing)

Longfin Smelt in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 6 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult	December through March	Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<-5000 cfs		All Years			0.0	0.0	0.0	0.0						
Larvae and Juvenile	April and May	Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<-1500 cfs		Dry and Critical Water Years							0.0	0.0				
				< 0 cfs		Dry and Critical Water Years							0.0	0.0				
	January through June	Mean Monthly X_2 (RKm)	X_2	< 75 RKm		All Years				0.0	0.0	0.0	0.0	0.0	0.0			
				< 75 RKm		Dry and Critical Water Years				0.0	0.0	0.0	0.0	0.0	0.0			

Table 229 Existing Condtions-Alternative 6 (Existing)

Winter-run Chinook Salmon in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 6 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	November through May	Mean Monthly Flow (cfs)	Rio Vista		10	Lower 40%		0.0	0.0	0.0	0.0	0.0	0.0	0.0				
		Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years		69.5	67.1	79.3	67.1	79.3	0.0	0.0				
		Mean Monthly Delta Outflow (cfs)	Delta		10	All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0				
		Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<2500 cfs		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0				

Table 230 Existing Condtions-Alternative 6 (Existing)

Spring-run Chinook Salmon in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 6 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	November through June	Mean Monthly Flow (cfs)	Rio Vista		10	Lower 40%		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
		Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years		69.5	67.1	79.3	67.1	79.3	0.0	0.0	0.0			
		Mean Monthly Delta Outflow (cfs)	Delta		10	All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
		Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<2500 cfs		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			

Table 231 Existing Condtions-Alternative 6 (Existing)

Fall- and Late Fall-run Chinook Salmon in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 6 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	November through June	Mean Monthly Flow (cfs)	Rio Vista		10	Lower 40%		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
		Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years		69.5	67.1	79.3	67.1	79.3	0.0	0.0	0.0			
		Mean Monthly Delta Outflow (cfs)	Delta		10	All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
		Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<2500 cfs		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Adult (San Joaquin River)	December through February	Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<-5000 cfs		All Years			0.0	0.0	0.0							

Table 232 Existing Condtions-Alternative 6 (Existing)

Steelhead in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 6 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	October through July	Mean Monthly Flow (cfs)	Rio Vista		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
		Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years	0.0	69.5	67.1	79.3	67.1	79.3	0.0	0.0	0.0	0.0		
		Mean Monthly Delta Outflow (cfs)	Delta		10	All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
		Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<2500 cfs		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		

Table 233 Existing Condtions-Alternative 6 (Existing)

Green Sturgeon in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 6 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	Year-round	Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years	0.0	69.5	67.1	79.3	67.1	79.3	0.0	0.0	0.0	0.0	0.0	0.0

Table 234 Existing Condtions-Alternative 6 (Existing)

White Sturgeon in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 6 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	April through June	Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years							0.0	0.0	0.0			

Table 235 Existing Condtions-Alternative 6 (Existing)

Splittail in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 6 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Spawning and Embryo Incubation	February through May	Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years					67.1	79.3	0.0	0.0				
Juvenile Rearing and Emigration	April through July	Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years							0.0	0.0	0.0	0.0		

Table 236 Existing Condtions-Alternative 6 (Existing)

American Shad in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 6 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Egg and Larvae	April through June	Mean Monthly X_2 (RKm)	Changes in X_2	1 RKm		All Years							0.0	0.0	0.0			

Table 237 Existing Condtions-Alternative 6 (Existing)

Striped Bass in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 6 (Existing) relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Egg and Larvae	April through June	Mean Monthly X_2 (RKm)	Changes in X_2	1 RKm		All Years							0.0	0.0	0.0			

Alternative 6 (Existing) vs Existing Condtions

Sacramento River at Freeport, Monthly Temperature

Exceedance of Water Temperature Index Values and Probability of Occurring within the Water Temperature Index Ranges

Existing Condtions

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	97.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	97.8	96.4	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	93.9	91.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	79.9	73.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	22.0	5.5	95.3	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	3.0	1.2	80.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	98.0	2.0	1.2	47.6	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	82.9	1.2	1.2	13.4	92.1	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	64.6	1.2	1.2	6.7	75.3	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	39.0	1.2	1.2	2.3	64.6	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	22.8	1.2	1.2	1.2	45.1	98.3	98.8	98.8	98.8	98.8	98.8
56	98.8	11.0	1.2	1.2	1.2	24.4	96.5	98.8	98.8	98.8	98.8	98.8
57	98.8	3.3	1.2	1.2	1.2	14.1	94.2	98.8	98.8	98.8	98.8	98.8
58	98.8	1.2	1.2	1.2	1.2	8.0	86.6	98.8	98.8	98.8	98.8	98.8
59	98.8	1.2	1.2	1.2	1.2	4.5	78.0	98.8	98.8	98.8	98.8	98.8
60	95.1	1.2	1.2	1.2	1.2	3.2	71.2	98.8	98.8	98.8	98.8	98.8
61	74.4	1.2	1.2	1.2	1.2	2.2	57.3	98.8	98.8	98.8	98.8	98.8
62	54.9	1.2	1.2	1.2	1.2	1.4	47.6	98.8	98.8	98.8	98.8	98.8
63	42.7	1.2	1.2	1.2	1.2	1.2	31.7	97.7	98.8	98.8	98.8	98.8
64	20.7	1.2	1.2	1.2	1.2	1.2	20.7	95.1	98.8	98.8	98.8	98.8
65	14.0	1.2	1.2	1.2	1.2	1.2	12.8	92.7	98.8	98.8	98.8	97.6
66	5.5	1.2	1.2	1.2	1.2	1.2	6.7	84.1	98.8	98.8	98.8	94.7
68	1.7	1.2	1.2	1.2	1.2	1.2	1.2	57.3	98.8	98.8	98.8	81.3
69	1.2	1.2	1.2	1.2	1.2	1.2	1.2	30.5	96.9	98.8	98.8	68.3
70	1.2	1.2	1.2	1.2	1.2	1.2	1.2	15.9	89.8	98.8	98.8	47.6
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	11.4	84.1	98.8	97.9	26.8
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	7.0	64.6	97.6	91.5	18.3
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.0	20.7	61.0	57.7	4.3
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	2.4	9.8	34.1	39.0	1.4
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	10.4	7.3	1.2
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	78.7	72.0	97.6	97.6	97.6	96.4	89.0	64.7	59.8	97.4
50-64	78.1	96.8	0.8	0.0	46.4	97.6	78.1	3.7	0.0	0.0	0.0	0.0
55-56	0.0	11.8	0.0	0.0	0.0	20.7	1.8	0.0	0.0	0.0	0.0	0.0
59-64	78.1	0.0	0.0	0.0	0.0	3.3	57.3	3.7	0.0	0.0	0.0	0.0
59-68	97.1	0.0	0.0	0.0	0.0	3.3	76.8	41.5	0.0	0.0	0.0	17.5
59-75	97.6	0.0	0.0	0.0	0.0	3.3	76.8	96.4	89.0	64.7	59.8	97.4
60-70	93.9	0.0	0.0	0.0	0.0	2.0	70.0	82.9	9.0	0.0	0.0	51.2
61-71	73.2	0.0	0.0	0.0	0.0	1.0	56.1	87.4	14.7	0.0	0.9	72.0
63-69	41.5	0.0	0.0	0.0	0.0	0.0	30.5	67.2	1.9	0.0	0.0	30.5
63-77	41.5	0.0	0.0	0.0	0.0	0.0	30.5	96.5	97.6	88.4	91.5	97.6
65-82	12.8	0.0	0.0	0.0	0.0	0.0	11.6	91.5	97.6	97.6	97.6	96.4
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.7	88.6	97.6	97.6	46.4
42-60	3.7	97.6	96.6	95.2	97.6	95.6	27.6	0.0	0.0	0.0	0.0	0.0
61-77	73.2	0.0	0.0	0.0	0.0	1.0	56.1	97.6	97.6	88.4	91.5	97.6

Alternative 6 (Existing)

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	97.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	97.8	96.4	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	93.9	91.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	79.9	73.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	22.0	6.1	95.4	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	3.0	1.2	80.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	98.0	2.0	1.2	48.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	82.9	1.2	1.2	13.4	92.1	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	64.6	1.2	1.2	6.8	75.6	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	39.0	1.2	1.2	2.3	64.0	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	22.8	1.2	1.2	1.2	43.9	98.3	98.8	98.8	98.8	98.8	98.8
56	98.8	11.0	1.2	1.2	1.2	24.4	96.5	98.8	98.8	98.8	98.8	98.8
57	98.8	3.3	1.2	1.2	1.2	14.1	94.2	98.8	98.8	98.8	98.8	98.8
58	98.8	1.2	1.2	1.2	1.2	8.3	86.6	98.8	98.8	98.8	98.8	98.8
59	98.8	1.2	1.2	1.2	1.2	4.5	78.0	98.8	98.8	98.8	98.8	98.8
60	95.1	1.2	1.2	1.2	1.2	3.2	71.2	98.8	98.8	98.8	98.8	98.8
61	74.4	1.2	1.2	1.2	1.2	2.2	57.3	98.8	98.8	98.8	98.8	98.8
62	54.9	1.2	1.2	1.2	1.2	1.4	47.6	98.8	98.8	98.8	98.8	98.8
63	42.7	1.2	1.2	1.2	1.2	1.2	31.7	97.7	98.8	98.8	98.8	98.8
64	20.7	1.2	1.2	1.2	1.2	1.2	20.7	95.1	98.8	98.8	98.8	98.8
65	14.0	1.2	1.2	1.2	1.2	1.2	12.8	92.7	98.8	98.8	98.8	97.6
66	5.5	1.2	1.2	1.2	1.2	1.2	6.7	84.1	98.8	98.8	98.8	94.7
68	1.7	1.2	1.2	1.2	1.2	1.2	1.2	57.3	98.8	98.8	98.8	81.3
69	1.2	1.2	1.2	1.2	1.2	1.2	1.2	30.5	96.9	98.8	98.8	68.3
70	1.2	1.2	1.2	1.2	1.2	1.2	1.2	15.9	89.8	98.8	98.8	47.6
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	11.4	84.1	98.8	97.9	26.8
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	7.0	64.6	97.6	91.5	18.3
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.0	20.7	61.0	57.7	4.3
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	2.4	9.8	34.1	39.0	1.4
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	10.4	7.3	1.2
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	78.7	72.0	97.6	97.6	97.6	96.4	89.0	64.7	59.8	97.4
50-64	78.1	96.8	0.8	0.0	47.6	97.6	78.1	3.7	0.0	0.0	0.0	0.0
55-56	0.0	11.8	0.0	0.0	0.0	19.5	1.8	0.0	0.0	0.0	0.0	0.0
59-64	78.1	0.0	0.0	0.0	0.0	3.3	57.3	3.7	0.0	0.0	0.0	0.0
59-68	97.1	0.0	0.0	0.0	0.0	3.3	76.8	41.5	0.0	0.0	0.0	17.5
59-75	97.6	0.0	0.0	0.0	0.0	3.3	76.8	96.4	89.0	64.7	59.8	97.4
60-70	93.9	0.0	0.0	0.0	0.0	2.0	70.0	82.9	9.0	0.0	0.0	51.2
61-71	73.2	0.0	0.0	0.0	0.0	1.0	56.1	87.4	14.7	0.0	0.9	72.0
63-69	41.5	0.0	0.0	0.0	0.0	0.0	30.5	67.2	1.9	0.0	0.0	30.5
63-77	41.5	0.0	0.0	0.0	0.0	0.0	30.5	96.5	97.6	88.4	91.5	97.6
65-82	12.8	0.0	0.0	0.0	0.0	0.0	11.6	91.5	97.6	97.6	97.6	96.4
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.7	88.6	97.6	97.6	46.4
42-60	3.7	97.6	96.6	95.2	97.6	95.6	27.6	0.0	0.0	0.0	0.0	0.0
61-77	73.2	0.0	0.0	0.0	0.0	1.0	56.1	97.6	97.6	88.4	91.5	97.6

Alternative 6 (Existing) - Existing Condtions

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
43	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
48	0.0	0.0	0.0	0.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
49	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
52	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
53	0.0	0.0	0.0	0.0	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0
54	0.0	0.0	0.0	0.0	0.0	-0.6	0.0	0.0	0.0	0.0	0.0	0.0
55	0.0	0.0	0.0	0.0	0.0	-1.2	0.0	0.0	0.0	0.0	0.0	0.0
56	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
57	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
58	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
59	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
62	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
66	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
68	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
72	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
74	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
86	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
88	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
98	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45-75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50-64	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55-56	0.0	0.0	0.0	0.0	0.0	-1.2	0.0	0.0	0.0	0.0	0.0	0.0
59-64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-68	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60-70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61-71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63-69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
65-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42-60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 239 Existing Condtions-Alternative 6 (Existing)

Alternative 6 (Existing) vs Existing Condtions
Sacramento River at Rio Vista, Monthly Flow

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
-1.0 < X < 1.0	100.0	98.8	87.8	79.3	74.4	91.5	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	0.0	1.2	9.8	18.3	23.2	7.3	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	1.2	9.8	18.3	23.2	7.3	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Low Flows (Upper 40% of Distribution)												
-1.0 < X < 1.0	100.0	100.0	100.0	100.0	93.9	100.0	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1 (Total %)	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 240 Existing Condtions-Alternative 6 (Existing)

Alternative 6 (Existing) vs Existing Condtions
Yolo Bypass, Monthly Flow

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
-1.0 < X < 1.0	100.0	30.5	26.8	15.9	23.2	15.9	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	69.5	67.1	79.3	67.1	79.3	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	0.0	69.5	73.2	84.1	76.8	84.1	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	69.5	73.2	84.1	76.8	84.1	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	69.5	67.1	79.3	67.1	79.3	0.0	0.0	0.0	0.0	0.0	0.0
Low Flows (Upper 40% of Distribution)												
-1.0 < X < 1.0	100.0	75.8	63.6	24.2	30.3	15.2	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	24.2	36.4	75.8	69.7	84.8	0.0	0.0	0.0	0.0	0.0	0.0
X>1 (Total %)	0.0	24.2	36.4	75.8	69.7	84.8	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	24.2	36.4	75.8	69.7	84.8	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	24.2	36.4	75.8	69.7	84.8	0.0	0.0	0.0	0.0	0.0	0.0

Table 241 Existing Condtions-Alternative 6 (Existing)

Alternative 6 (Existing) vs Existing Condtions
Delta Outflow, Monthly Flow

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
-1.0 < X < 1.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Low Flows (Upper 40% of Distribution)												
-1.0 < X < 1.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Long-Term and Water Year-Type Average of Sacramento River Delta Inflow Under Existing - Base and Future - Base

Analysis Period	October	November	December	January	February	March	April	May	June	July	August	September	Total (TAF)
						Average Flow (cfs)							
							Long-Term						
Full Simulation Period													
Existing - Base	11,300	15,746	24,309	34,221	41,784	35,394	22,062	13,364	12,597	19,584	13,697	16,482	15,659
Future - Base	8,350	10,798	22,082	31,475	37,498	30,725	19,501	11,009	11,566	13,675	9,771	13,116	13,187
Difference	-2,950	-4,949	-2,227	-2,745	-4,285	-4,669	-2,561	-2,355	-1,031	-5,910	-3,925	-3,366	-2,472
Percent Difference	-26%	-31%	-9%	-8%	-10%	-13%	-12%	-18%	-8%	-30%	-29%	-20%	-16%
							Water Year-Types						
Wet													
Existing - Base	13,018	22,069	42,432	56,542	64,112	52,430	36,791	18,384	13,640	21,152	15,520	26,010	22,938
Future - Base	8,996	14,634	37,088	51,035	56,945	47,194	30,753	12,279	11,846	17,045	8,777	23,150	19,185
Difference	-4,022	-7,434	-5,344	-5,508	-7,167	-5,236	-6,038	-6,105	-1,794	-4,107	-6,743	-2,860	-3,753
Percent Difference	-31%	-34%	-13%	-10%	-11%	-10%	-16%	-33%	-13%	-19%	-43%	-11%	-16%
Above Normal													
Existing - Base	11,695	14,566	23,212	43,774	51,354	46,254	22,271	14,655	13,070	22,489	16,033	18,988	17,937
Future - Base	9,290	10,029	19,595	40,534	52,912	37,168	18,221	12,048	12,038	14,830	9,005	15,709	15,067
Difference	-2,405	-4,538	-3,617	-3,240	1,558	-9,085	-4,051	-2,607	-1,032	-7,659	-7,028	-3,279	-2,870
Percent Difference	-21%	-31%	-16%	-7%	3%	-20%	-18%	-18%	-8%	-34%	-44%	-17%	-16%
Below Normal													
Existing - Base	10,841	14,747	16,484	23,799	32,584	29,126	18,090	11,885	12,782	22,589	15,187	12,013	13,248
Future - Base	8,183	9,236	16,398	24,715	25,957	23,572	16,492	11,386	12,357	12,801	10,142	6,570	10,705
Difference	-2,658	-5,511	-86	916	-6,626	-5,554	-1,598	-499	-425	-9,789	-5,045	-5,443	-2,544
Percent Difference	-25%	-37%	-1%	4%	-20%	-19%	-9%	-4%	-3%	-43%	-33%	-45%	-19%
Dry													
Existing - Base	10,423	12,567	14,687	17,727	27,798	23,027	11,912	10,212	12,472	17,228	11,469	10,994	10,852
Future - Base	7,696	9,129	14,297	16,142	24,160	21,042	12,961	10,471	11,580	11,715	11,004	6,583	9,426
Difference	-2,727	-3,438	-390	-1,586	-3,638	-1,986	1,049	258	-892	-5,513	-465	-4,411	-1,426
Percent Difference	-26%	-27%	-3%	-9%	-13%	-9%	9%	3%	-7%	-32%	-4%	-40%	-13%
Critical													
Existing - Base	9,149	9,410	11,565	14,920	17,376	14,410	10,330	7,910	9,857	12,298	8,422	7,772	8,039
Future - Base	7,362	7,663	10,980	13,674	15,968	13,022	10,454	7,796	9,644	9,526	10,173	6,975	7,426
Difference	-1,786	-1,747	-585	-1,247	-1,408	-1,388	124	-114	-213	-2,771	1,751	-797	-613
Percent Difference	-20%	-19%	-5%	-8%	-8%	-10%	1%	-1%	-2%	-23%	21%	-10%	-8%

Sacramento River Delta Inflow

Existing - Base

					Average Monthly Flow (cfs)							
Statistic	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Probability of Exceedance												
10%	14,603	22,010	56,115	71,084	75,521	65,784	49,402	23,850	14,772	24,306	16,775	28,029
20%	13,619	18,623	35,016	61,750	67,715	57,900	35,366	14,647	13,790	23,675	16,437	24,442
30%	12,912	17,392	24,392	45,490	58,539	48,511	24,073	12,554	13,215	23,166	15,988	22,307
40%	12,254	15,897	19,607	34,106	50,381	38,401	16,613	11,092	12,891	22,072	15,543	18,189
50%	11,265	14,221	17,083	26,083	35,167	28,964	13,801	10,661	12,353	20,699	15,010	13,962
60%	10,411	12,217	14,976	20,006	27,645	22,764	12,349	10,122	11,925	19,938	14,452	12,771
70%	8,888	10,901	14,365	15,735	23,924	20,351	11,386	9,739	11,469	18,857	12,942	10,172
80%	7,935	8,613	10,704	13,922	18,176	16,100	10,880	9,315	11,081	14,287	9,192	9,276
90%	6,415	7,211	9,575	11,915	16,074	12,014	9,372	8,228	10,168	12,060	8,272	8,038
Long Term												
Full Simulation Period	11,300	15,746	24,309	34,221	41,784	35,394	22,062	13,364	12,597	19,584	13,697	16,482
Water Year Types												
Wet	13,018	22,069	42,432	56,542	64,112	52,430	36,791	18,384	13,640	21,152	15,520	26,010
Above Normal	11,695	14,566	23,212	43,774	51,354	46,254	22,271	14,655	13,070	22,489	16,033	18,988
Below Normal	10,841	14,747	16,484	23,799	32,584	29,126	18,090	11,885	12,782	22,589	15,187	12,013
Dry	10,423	12,567	14,687	17,727	27,798	23,027	11,912	10,212	12,472	17,228	11,469	10,994
Critical	9,149	9,410	11,565	14,920	17,376	14,410	10,330	7,910	9,857	12,298	8,422	7,772

Future - Base

					Average Monthly Flow (cfs)							
Statistic	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Probability of Exceedance												
10%	9,235	17,027	51,654	65,553	69,785	60,402	45,827	14,062	14,775	19,566	11,080	23,931
20%	8,769	12,121	31,691	57,934	63,984	51,170	26,603	12,353	13,371	17,266	10,982	23,302
30%	8,164	10,380	21,194	41,318	55,940	41,821	18,011	11,604	12,742	14,296	10,796	21,171
40%	7,981	9,237	17,702	28,066	43,996	30,782	15,285	11,092	11,853	13,342	10,577	15,579
50%	7,891	8,609	16,336	22,928	32,847	22,574	13,363	10,364	11,233	12,636	10,333	6,896
60%	7,870	7,940	13,685	19,586	22,299	17,435	12,171	9,646	10,701	12,343	9,683	6,650
70%	7,816	7,863	12,583	14,988	18,509	15,725	11,343	9,037	10,289	11,773	8,734	6,595
80%	7,655	7,666	9,913	12,874	16,673	13,489	10,154	8,418	9,791	11,041	8,421	6,535
90%	6,420	6,929	9,262	10,998	14,384	11,578	8,911	7,956	8,712	9,884	7,899	6,418
Long Term												
Full Simulation Period	8,350	10,798	22,082	31,475	37,498	30,725	19,501	11,009	11,566	13,675	9,771	13,116
Water Year Types												
Wet	8,996	14,634	37,088	51,035	56,945	47,194	30,753	12,279	11,846	17,045	8,777	23,150
Above Normal	9,290	10,029	19,595	40,534	52,912	37,168	18,221	12,048	12,038	14,830	9,005	15,709
Below Normal	8,183	9,236	16,398	24,715	25,957	23,572	16,492	11,386	12,357	12,801	10,142	6,570
Dry	7,696	9,129	14,297	16,142	24,160	21,042	12,961	10,471	11,580	11,715	11,004	6,583
Critical	7,362	7,663	10,980	13,674	15,968	13,022	10,454	7,796	9,644	9,526	10,173	6,975

Future - Base Minus Existing - Base

					Average Monthly Flow (cfs)							
Statistic	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Probability of Exceedance												
10%	-5,368	-4,984	-4,461	-5,532	-5,736	-5,382	-3,575	-9,788	3	-4,739	-5,695	-4,098
20%	-4,850	-6,502	-3,324	-3,816	-3,731	-6,730	-8,764	-2,294	-419	-6,409	-5,455	-1,140
30%	-4,748	-7,012	-3,198	-4,172	-2,599	-6,690	-6,062	-951	-472	-8,870	-5,193	-1,136
40%	-4,273	-6,660	-1,905	-6,041	-6,385	-7,619	-1,328	0	-1,038	-8,730	-4,966	-2,610
50%	-3,373	-5,612	-747	-3,154	-2,320	-6,391	-438	-297	-1,120	-8,063	-4,677	-7,066
60%	-2,541	-4,277	-1,290	-421	-5,346	-5,329	-178	-477	-1,224	-7,595	-4,769	-6,121
70%	-1,072	-3,037	-1,782	-747	-5,415	-4,626	-43	-702	-1,180	-7,084	-4,207	-3,577
80%	-279	-947	-790	-1,047	-1,503	-2,611	-726	-898	-1,291	-3,245	-771	-2,741
90%	5	-282	-314	-917	-1,690	-436	-461	-272	-1,456	-2,176	-373	-1,620
Long Term												
Full Simulation Period	-2,950	-4,949	-2,227	-2,745	-4,285	-4,669	-2,561	-2,355	-1,031	-5,910	-3,925	-3,366
Water Year Types												
Wet	-4,022	-7,434	-5,344	-5,508	-7,167	-5,236	-6,038	-6,105	-1,794	-4,107	-6,743	-2,860
Above Normal	-2,405	-4,538	-3,617	-3,240	1,558	-9,085	-4,051	-2,607	-1,032	-7,659	-7,028	-3,279
Below Normal	-2,658	-5,511	-86	916	-6,626	-5,554	-1,598	-499	-425	-9,789	-5,045	-5,443
Dry	-2,727	-3,438	-390	-1,586	-3,638	-1,986	1,049	258	-892	-5,513	-465	-4,411
Critical	-1,786	-1,747	-585	-1,247	-1,408	-1,388	124	-114	-213	-2,771	1,751	-797

Long-Term and Water Year-Type Average of Total CVP Deliveries North of the Delta Under Existing - Base and Future - Base

Analysis Period	October	November	December	January	February	March	April	May	June	July	August	September	Total (TAF)
						Average Flow (cfs)							
							Long-Term						
Full Simulation Period													
Existing - Base	1,506	726	389	234	244	337	5,113	5,599	7,987	7,932	5,983	2,046	2,310
Future - Base	1,473	705	382	224	236	323	5,015	5,427	7,762	7,605	5,752	1,944	2,234
Difference	-33	-22	-7	-10	-8	-14	-98	-172	-225	-327	-231	-102	-76
Percent Difference	-2%	-3%	-2%	-4%	-3%	-4%	-2%	-3%	-3%	-4%	-4%	-5%	-3%
							Water Year-Types						
Wet													
Existing - Base	1,429	662	371	227	244	288	4,682	5,765	8,463	8,473	6,484	2,288	2,388
Future - Base	1,422	667	363	222	239	272	4,539	5,521	8,164	8,101	6,181	2,142	2,294
Difference	-7	5	-8	-4	-5	-16	-143	-245	-299	-372	-304	-147	-94
Percent Difference	0%	1%	-2%	-2%	-2%	-6%	-3%	-4%	-4%	-4%	-5%	-6%	-4%
Above Normal													
Existing - Base	1,514	755	372	241	246	248	5,081	5,804	8,436	8,340	6,266	2,355	2,404
Future - Base	1,457	694	376	226	237	239	4,896	5,545	7,962	7,972	5,945	2,186	2,288
Difference	-58	-61	4	-15	-10	-9	-185	-259	-474	-368	-321	-168	-116
Percent Difference	-4%	-8%	1%	-6%	-4%	-4%	-4%	-4%	-6%	-4%	-5%	-7%	-5%
Below Normal													
Existing - Base	1,527	728	407	242	236	344	5,193	5,744	7,967	7,969	6,039	1,879	2,321
Future - Base	1,574	746	411	234	233	328	5,295	5,621	7,827	7,667	5,800	1,881	2,280
Difference	47	18	4	-8	-4	-16	102	-123	-140	-302	-239	2	-40
Percent Difference	3%	3%	1%	-3%	-1%	-5%	2%	-2%	-2%	-4%	-4%	0%	-2%
Dry													
Existing - Base	1,639	783	406	238	254	339	5,398	5,578	7,778	7,583	5,755	1,910	2,283
Future - Base	1,508	709	382	229	237	331	5,227	5,486	7,679	7,543	5,719	1,793	2,233
Difference	-131	-74	-24	-9	-17	-8	-171	-92	-99	-41	-36	-117	-49
Percent Difference	-8%	-9%	-6%	-4%	-7%	-2%	-3%	-2%	-1%	-1%	-1%	-6%	-2%
Critical													
Existing - Base	1,452	754	396	225	239	517	5,551	4,869	6,853	6,811	4,881	1,649	2,072
Future - Base	1,430	744	395	208	229	491	5,500	4,805	6,777	6,232	4,651	1,613	2,004
Difference	-22	-10	-1	-17	-10	-26	-51	-64	-76	-579	-230	-36	-69
Percent Difference	-1%	-1%	0%	-8%	-4%	-5%	-1%	-1%	-1%	-8%	-5%	-2%	-3%

Total CVP Deliveries North of the Delta

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	1,875	950	506	303	270	646	6,661	6,327	8,826	8,986	6,821	2,514
20%	1,791	902	457	252	262	436	6,057	6,182	8,524	8,506	6,466	2,380
30%	1,670	825	415	242	253	362	5,755	6,062	8,346	8,239	6,271	2,266
40%	1,605	764	399	236	243	254	5,461	5,909	8,191	8,069	6,139	2,204
50%	1,488	711	379	219	239	243	5,255	5,729	8,016	7,974	6,015	2,112
60%	1,404	638	353	215	238	225	4,910	5,521	7,869	7,870	5,949	1,996
70%	1,351	624	339	213	233	214	4,748	5,297	7,762	7,634	5,741	1,840
80%	1,239	572	311	209	223	212	4,333	5,078	7,482	7,356	5,573	1,735
90%	1,142	543	299	200	206	205	3,074	4,689	7,086	7,108	5,323	1,572
Long Term												
Full Simulation Period	1,506	726	389	234	244	337	5,113	5,599	7,987	7,932	5,983	2,046
Water Year Types												
Wet	1,429	662	371	227	244	288	4,682	5,765	8,463	8,473	6,484	2,288
Above Normal	1,514	755	372	241	246	248	5,081	5,804	8,436	8,340	6,266	2,355
Below Normal	1,527	728	407	242	236	344	5,193	5,744	7,967	7,969	6,039	1,879
Dry	1,639	783	406	238	254	339	5,398	5,578	7,778	7,583	5,755	1,910
Critical	1,452	754	396	225	239	517	5,551	4,869	6,853	6,811	4,881	1,649

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	1,805	942	487	299	267	609	6,547	6,089	8,526	8,483	6,489	2,345
20%	1,755	883	457	252	247	417	5,972	5,927	8,171	8,021	6,143	2,197
30%	1,658	800	416	226	238	324	5,606	5,855	8,035	7,830	5,984	2,126
40%	1,589	744	392	214	238	246	5,384	5,734	7,885	7,765	5,908	2,076
50%	1,479	674	372	213	238	223	5,166	5,604	7,789	7,720	5,830	1,992
60%	1,378	629	349	213	232	214	4,809	5,360	7,687	7,626	5,729	1,927
70%	1,309	601	337	211	230	212	4,680	5,116	7,576	7,431	5,626	1,790
80%	1,217	552	310	198	212	212	4,277	4,968	7,405	7,212	5,449	1,713
90%	1,119	511	297	183	206	199	3,070	4,539	7,117	7,088	5,246	1,500
Long Term												
Full Simulation Period	1,473	705	382	224	236	323	5,015	5,427	7,762	7,605	5,752	1,944
Water Year Types												
Wet	1,422	667	363	222	239	272	4,539	5,521	8,164	8,101	6,181	2,142
Above Normal	1,457	694	376	226	237	239	4,896	5,545	7,962	7,972	5,945	2,186
Below Normal	1,574	746	411	234	233	328	5,295	5,621	7,827	7,667	5,800	1,881
Dry	1,508	709	382	229	237	331	5,227	5,486	7,679	7,543	5,719	1,793
Critical	1,430	744	395	208	229	491	5,500	4,805	6,777	6,232	4,651	1,613

Future - Base Minus Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	-70	-8	-19	-3	-3	-37	-115	-238	-301	-503	-332	-169
20%	-36	-20	0	0	-16	-20	-85	-255	-353	-485	-323	-183
30%	-12	-24	1	-17	-15	-38	-149	-207	-310	-408	-288	-140
40%	-16	-20	-7	-22	-5	-8	-77	-175	-307	-303	-231	-128
50%	-9	-37	-7	-5	-2	-20	-89	-126	-227	-253	-185	-120
60%	-26	-9	-4	-2	-6	-11	-101	-161	-182	-244	-220	-69
70%	-42	-23	-2	-2	-3	-2	-68	-182	-186	-202	-115	-50
80%	-22	-20	-1	-11	-11	0	-56	-109	-77	-144	-124	-22
90%	-23	-32	-2	-17	0	-6	-4	-151	31	-20	-76	-72
Long Term												
Full Simulation Period	-33	-22	-7	-10	-8	-14	-98	-172	-225	-327	-231	-102
Water Year Types												
Wet	-7	5	-8	-4	-5	-16	-143	-245	-299	-372	-304	-147
Above Normal	-58	-61	4	-15	-10	-9	-185	-259	-474	-368	-321	-168
Below Normal	47	18	4	-8	-4	-16	102	-123	-140	-302	-239	2
Dry	-131	-74	-24	-9	-17	-8	-171	-92	-99	-41	-36	-117
Critical	-22	-10	-1	-17	-10	-26	-51	-64	-76	-579	-230	-36

Long-Term and Water Year-Type Average of Total CVP Deliveries South of the Delta Under Existing - Base and Future - Base

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Existing - Base	2,670	1,585	1,151	1,274	1,718	2,083	2,592	3,755	5,447	5,876	5,010	3,413	2,214
Future - Base	2,541	1,483	1,013	1,043	1,435	1,900	2,274	3,350	4,776	5,105	4,521	3,213	1,977
Difference	-129	-102	-138	-230	-283	-184	-317	-405	-671	-771	-489	-200	-237
Percent Difference	-5%	-6%	-12%	-18%	-16%	-9%	-12%	-11%	-12%	-13%	-10%	-6%	-11%
							Water Year-Types						
Wet													
Existing - Base	2,755	1,649	1,228	1,396	1,873	2,512	3,205	4,634	6,886	7,631	6,265	3,879	2,659
Future - Base	2,628	1,550	1,095	1,170	1,593	2,232	2,721	3,999	5,835	6,367	5,454	3,566	2,313
Difference	-127	-99	-134	-226	-280	-280	-484	-635	-1,052	-1,264	-811	-313	-345
Percent Difference	-5%	-6%	-11%	-16%	-15%	-11%	-15%	-14%	-15%	-17%	-13%	-8%	-13%
Above Normal													
Existing - Base	2,740	1,643	1,230	1,404	1,877	2,297	2,904	4,175	6,129	6,509	5,394	3,647	2,418
Future - Base	2,596	1,530	1,079	1,152	1,565	2,038	2,507	3,669	5,292	5,715	4,982	3,398	2,150
Difference	-144	-114	-151	-252	-312	-259	-396	-505	-837	-794	-412	-249	-267
Percent Difference	-5%	-7%	-12%	-18%	-17%	-11%	-14%	-12%	-14%	-12%	-8%	-7%	-11%
Below Normal													
Existing - Base	2,645	1,562	1,118	1,218	1,646	1,988	2,471	3,625	5,220	5,601	4,904	3,373	2,141
Future - Base	2,569	1,496	1,013	1,030	1,414	1,790	2,113	3,233	4,568	4,845	4,352	3,183	1,913
Difference	-76	-67	-105	-188	-232	-198	-358	-392	-652	-756	-552	-190	-228
Percent Difference	-3%	-4%	-9%	-15%	-14%	-10%	-14%	-11%	-12%	-13%	-11%	-6%	-11%
Dry													
Existing - Base	2,688	1,598	1,166	1,297	1,747	1,770	2,122	3,136	4,412	4,658	4,213	3,129	1,932
Future - Base	2,498	1,450	976	989	1,372	1,737	2,052	3,009	4,201	4,404	4,029	3,068	1,802
Difference	-190	-148	-189	-308	-375	-32	-69	-127	-211	-254	-184	-62	-129
Percent Difference	-7%	-9%	-16%	-24%	-21%	-2%	-3%	-4%	-5%	-5%	-4%	-2%	-7%
Critical													
Existing - Base	2,437	1,409	938	935	1,297	1,529	1,799	2,517	3,470	3,601	3,225	2,643	1,561
Future - Base	2,345	1,334	839	773	1,100	1,443	1,639	2,349	3,196	3,259	3,082	2,556	1,447
Difference	-92	-75	-99	-162	-197	-87	-161	-168	-274	-342	-143	-86	-114
Percent Difference	-4%	-5%	-11%	-17%	-15%	-6%	-9%	-7%	-8%	-9%	-4%	-3%	-7%

Total CVP Deliveries South of the Delta

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	3,146	1,963	1,635	2,053	2,691	2,610	3,618	5,163	7,758	8,677	7,137	4,150
20%	2,897	1,760	1,366	1,613	2,139	2,431	3,098	4,370	6,449	7,106	5,875	3,750
30%	2,806	1,682	1,266	1,459	1,962	2,286	2,896	4,123	6,046	6,611	5,562	3,619
40%	2,755	1,638	1,209	1,371	1,849	2,177	2,733	3,975	5,804	6,294	5,232	3,541
50%	2,710	1,604	1,162	1,288	1,756	2,076	2,580	3,826	5,555	6,004	5,081	3,470
60%	2,636	1,548	1,084	1,151	1,582	2,023	2,419	3,579	5,143	5,444	4,674	3,353
70%	2,541	1,475	989	1,037	1,429	1,845	2,206	3,268	4,641	4,993	4,281	3,203
80%	2,408	1,363	849	764	1,068	1,596	1,942	2,893	4,010	4,174	3,822	2,995
90%	2,252	1,229	699	587	870	1,506	1,727	2,417	3,277	3,388	3,199	2,749
Long Term												
Full Simulation Period	2,670	1,585	1,151	1,274	1,718	2,083	2,592	3,755	5,447	5,876	5,010	3,413
Water Year Types												
Wet	2,755	1,649	1,228	1,396	1,873	2,512	3,205	4,634	6,886	7,631	6,265	3,879
Above Normal	2,740	1,643	1,230	1,404	1,877	2,297	2,904	4,175	6,129	6,509	5,394	3,647
Below Normal	2,645	1,562	1,118	1,218	1,646	1,988	2,471	3,625	5,220	5,601	4,904	3,373
Dry	2,688	1,598	1,166	1,297	1,747	1,770	2,122	3,136	4,412	4,658	4,213	3,129
Critical	2,437	1,409	938	935	1,297	1,529	1,799	2,517	3,470	3,601	3,225	2,643

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	2,941	1,798	1,415	1,688	2,240	2,237	2,991	4,427	6,543	7,218	6,075	3,780
20%	2,680	1,582	1,131	1,233	1,686	2,097	2,545	3,727	5,389	5,832	5,065	3,423
30%	2,638	1,550	1,086	1,155	1,563	2,032	2,485	3,587	5,156	5,552	4,863	3,357
40%	2,592	1,514	1,037	1,069	1,461	1,991	2,369	3,431	4,896	5,239	4,638	3,283
50%	2,558	1,488	1,001	1,006	1,392	1,953	2,330	3,318	4,708	5,013	4,475	3,229
60%	2,543	1,477	986	979	1,342	1,867	2,220	3,270	4,627	4,915	4,405	3,206
70%	2,503	1,445	943	909	1,280	1,698	2,023	3,147	4,424	4,671	4,227	3,144
80%	2,317	1,285	758	649	946	1,506	1,789	2,595	3,551	3,699	3,435	2,852
90%	2,252	1,229	666	483	770	1,506	1,565	2,402	3,208	3,212	3,156	2,749
Long Term												
Full Simulation Period	2,541	1,483	1,013	1,043	1,435	1,900	2,274	3,350	4,776	5,105	4,521	3,213
Water Year Types												
Wet	2,628	1,550	1,095	1,170	1,593	2,232	2,721	3,999	5,835	6,367	5,454	3,566
Above Normal	2,596	1,530	1,079	1,152	1,565	2,038	2,507	3,669	5,292	5,715	4,982	3,398
Below Normal	2,569	1,496	1,013	1,030	1,414	1,790	2,113	3,233	4,568	4,845	4,352	3,183
Dry	2,498	1,450	976	989	1,372	1,737	2,052	3,009	4,201	4,404	4,029	3,068
Critical	2,345	1,334	839	773	1,100	1,443	1,639	2,349	3,196	3,259	3,082	2,556

Future - Base Minus Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	-205	-165	-220	-365	-451	-373	-627	-736	-1,215	-1,460	-1,061	-370
20%	-217	-178	-235	-380	-453	-334	-553	-644	-1,060	-1,274	-810	-327
30%	-168	-133	-179	-303	-398	-254	-411	-536	-890	-1,059	-699	-262
40%	-163	-124	-172	-302	-388	-186	-364	-544	-907	-1,055	-594	-258
50%	-152	-116	-161	-282	-363	-123	-249	-508	-847	-991	-606	-241
60%	-93	-71	-98	-172	-240	-156	-199	-309	-516	-529	-269	-147
70%	-38	-31	-46	-128	-149	-147	-183	-121	-217	-322	-54	-59
80%	-91	-78	-90	-115	-122	-90	-153	-298	-458	-475	-386	-143
90%	0	0	-32	-104	-101	0	-162	-14	-69	-175	-43	0
Long Term												
Full Simulation Period	-129	-102	-138	-230	-283	-184	-317	-405	-671	-771	-489	-200
Water Year Types												
Wet	-127	-99	-134	-226	-280	-280	-484	-635	-1,052	-1,264	-811	-313
Above Normal	-144	-114	-151	-252	-312	-259	-396	-505	-837	-794	-412	-249
Below Normal	-76	-67	-105	-188	-232	-198	-358	-392	-652	-756	-552	-190
Dry	-190	-148	-189	-308	-375	-32	-69	-127	-211	-254	-184	-62
Critical	-92	-75	-99	-162	-197	-87	-161	-168	-274	-342	-143	-86

Long-Term and Water Year-Type Average of Total SWP Deliveries North of the Delta Under Existing - Base and Future - Base

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Existing - Base	1,449	1,463	935	345	14	92	2,122	2,685	3,217	3,169	2,515	1,874	1,205
Future - Base	1,383	1,394	894	328	13	89	2,005	2,578	3,092	3,044	2,413	1,806	1,154
Difference	-66	-69	-41	-17	-1	-3	-117	-106	-125	-125	-101	-68	-51
Percent Difference	-5%	-5%	-4%	-5%	-10%	-3%	-5%	-4%	-4%	-4%	-4%	-4%	-4%
							Water Year-Types						
Wet													
Existing - Base	1,349	1,476	900	256	19	65	1,890	2,778	3,378	3,342	2,671	2,067	1,224
Future - Base	1,303	1,401	853	242	19	65	1,869	2,776	3,389	3,342	2,672	2,074	1,213
Difference	-46	-75	-47	-14	0	0	-22	-2	11	-1	1	7	-11
Percent Difference	-3%	-5%	-5%	-5%	0%	-1%	-1%	0%	0%	0%	0%	0%	-1%
Above Normal													
Existing - Base	1,568	1,578	982	389	16	50	2,034	2,789	3,376	3,298	2,613	2,185	1,266
Future - Base	1,565	1,622	1,055	408	15	50	2,031	2,790	3,335	3,327	2,627	2,204	1,275
Difference	-3	44	73	19	-2	0	-4	1	-41	29	14	19	9
Percent Difference	0%	3%	7%	5%	-11%	0%	0%	0%	-1%	1%	1%	1%	1%
Below Normal													
Existing - Base	1,465	1,428	971	390	12	73	2,227	2,850	3,348	3,292	2,628	1,805	1,242
Future - Base	1,651	1,640	1,087	417	9	64	2,125	2,653	3,143	3,043	2,435	1,792	1,216
Difference	186	212	116	27	-3	-10	-102	-197	-205	-249	-193	-13	-26
Percent Difference	13%	15%	12%	7%	-26%	-13%	-5%	-7%	-6%	-8%	-7%	-1%	-2%
Dry													
Existing - Base	1,586	1,495	979	379	12	111	2,179	2,641	3,158	3,039	2,427	1,938	1,209
Future - Base	1,337	1,248	830	347	9	103	2,053	2,604	3,083	2,985	2,385	1,750	1,136
Difference	-248	-247	-149	-32	-2	-8	-126	-37	-75	-54	-42	-187	-73
Percent Difference	-16%	-17%	-15%	-9%	-20%	-7%	-6%	-1%	-2%	-2%	-2%	-10%	-6%
Critical													
Existing - Base	1,330	1,326	851	373	11	191	2,466	2,211	2,613	2,676	2,046	1,175	1,047
Future - Base	1,172	1,146	734	313	9	182	2,067	1,833	2,185	2,240	1,680	967	881
Difference	-159	-180	-117	-61	-1	-9	-398	-379	-429	-436	-366	-207	-166
Percent Difference	-12%	-14%	-14%	-16%	-13%	-5%	-16%	-17%	-16%	-16%	-18%	-18%	-16%

Total SWP Deliveries North of the Delta

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	2,189	2,095	1,377	634	20	199	3,028	3,131	3,658	3,564	2,851	2,296
20%	2,083	1,972	1,311	545	20	129	2,766	3,040	3,510	3,485	2,800	2,233
30%	1,852	1,922	1,250	477	20	46	2,505	2,979	3,442	3,371	2,692	2,181
40%	1,621	1,877	1,169	452	19	45	2,333	2,935	3,374	3,328	2,615	2,122
50%	1,432	1,754	1,079	398	15	45	2,110	2,816	3,323	3,263	2,577	2,061
60%	1,330	1,572	966	310	12	45	1,988	2,686	3,260	3,194	2,542	2,027
70%	1,282	1,409	822	167	11	40	1,822	2,594	3,160	3,138	2,504	1,909
80%	987	797	532	66	4	34	1,421	2,385	3,102	3,076	2,454	1,555
90%	442	188	85	4	3	26	1,141	1,928	2,974	2,941	2,194	1,007
Long Term												
Full Simulation Period	1,449	1,463	935	345	14	92	2,122	2,685	3,217	3,169	2,515	1,874
Water Year Types												
Wet	1,349	1,476	900	256	19	65	1,890	2,778	3,378	3,342	2,671	2,067
Above Normal	1,568	1,578	982	389	16	50	2,034	2,789	3,376	3,298	2,613	2,185
Below Normal	1,465	1,428	971	390	12	73	2,227	2,850	3,348	3,292	2,628	1,805
Dry	1,586	1,495	979	379	12	111	2,179	2,641	3,158	3,039	2,427	1,938
Critical	1,330	1,326	851	373	11	191	2,466	2,211	2,613	2,676	2,046	1,175

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	2,163	2,065	1,372	614	20	198	2,860	3,128	3,657	3,561	2,846	2,296
20%	2,011	1,961	1,290	520	20	128	2,556	3,038	3,510	3,477	2,800	2,233
30%	1,827	1,898	1,219	469	20	45	2,378	2,974	3,442	3,369	2,687	2,175
40%	1,653	1,843	1,157	443	19	45	2,110	2,899	3,373	3,302	2,608	2,118
50%	1,404	1,703	1,024	383	15	45	2,006	2,738	3,312	3,227	2,577	2,049
60%	1,320	1,495	940	266	11	45	1,845	2,648	3,201	3,168	2,531	1,963
70%	1,203	1,193	681	154	4	45	1,739	2,470	3,116	3,106	2,484	1,662
80%	861	570	347	60	3	32	1,397	1,931	2,987	2,952	2,290	1,247
90%	277	53	12	11	2	20	1,141	1,669	1,927	1,929	1,506	987
Long Term												
Full Simulation Period	1,383	1,394	894	328	13	89	2,005	2,578	3,092	3,044	2,413	1,806
Water Year Types												
Wet	1,303	1,401	853	242	19	65	1,869	2,776	3,389	3,342	2,672	2,074
Above Normal	1,565	1,622	1,055	408	15	50	2,031	2,790	3,335	3,327	2,627	2,204
Below Normal	1,651	1,640	1,087	417	9	64	2,125	2,653	3,143	3,043	2,435	1,792
Dry	1,337	1,248	830	347	9	103	2,053	2,604	3,083	2,985	2,385	1,750
Critical	1,172	1,146	734	313	9	182	2,067	1,833	2,185	2,240	1,680	967

Future - Base Minus Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	-27	-30	-5	-20	0	-1	-167	-3	-1	-3	-5	0
20%	-72	-11	-20	-25	0	0	-210	-2	0	-8	0	0
30%	-25	-24	-31	-8	0	0	-127	-6	0	-2	-5	-6
40%	31	-35	-12	-9	0	0	-222	-36	-1	-25	-7	-4
50%	-29	-52	-55	-15	0	0	-104	-78	-11	-35	0	-12
60%	-10	-77	-26	-44	-1	0	-142	-38	-59	-26	-11	-64
70%	-78	-216	-141	-13	-8	4	-83	-123	-43	-32	-20	-247
80%	-127	-227	-185	-7	-1	-3	-23	-454	-115	-124	-163	-308
90%	-165	-135	-73	7	-1	-6	0	-259	-1,047	-1,012	-688	-20
Long Term												
Full Simulation Period	-66	-69	-41	-17	-1	-3	-117	-106	-125	-125	-101	-68
Water Year Types												
Wet	-46	-75	-47	-14	0	0	-22	-2	11	-1	1	7
Above Normal	-3	44	73	19	-2	0	-4	1	-41	29	14	19
Below Normal	186	212	116	27	-3	-10	-102	-197	-205	-249	-193	-13
Dry	-248	-247	-149	-32	-2	-8	-126	-37	-75	-54	-42	-187
Critical	-159	-180	-117	-61	-1	-9	-398	-379	-429	-436	-366	-207

Long-Term and Water Year-Type Average of Total SWP Deliveries South of the Delta Under Existing - Base and Future - Base

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Existing - Base	4,044	3,416	3,459	465	782	1,284	2,414	3,688	5,146	5,640	5,790	4,893	2,486
Future - Base	4,043	2,984	3,596	472	840	1,531	2,542	3,813	5,165	5,535	5,706	4,829	2,489
Difference	-1	-432	137	7	58	248	128	125	19	-105	-84	-64	3
Percent Difference	0%	-13%	4%	1%	7%	19%	5%	3%	0%	-2%	-1%	-1%	0%
							Water Year-Types						
Wet													
Existing - Base	4,429	3,815	3,773	1,079	1,629	2,451	3,750	5,270	6,698	6,801	7,098	5,951	3,194
Future - Base	4,344	2,993	4,138	1,107	1,816	2,666	3,835	5,364	6,773	6,814	7,151	6,006	3,210
Difference	-84	-822	366	29	187	215	85	95	75	13	53	55	16
Percent Difference	-2%	-22%	10%	3%	11%	9%	2%	2%	1%	0%	1%	1%	1%
Above Normal													
Existing - Base	4,055	3,517	3,542	399	1,077	1,692	3,180	4,482	5,926	6,196	6,553	5,555	2,797
Future - Base	4,230	3,445	3,981	275	949	2,295	3,530	4,967	6,244	6,377	6,711	5,656	2,949
Difference	175	-72	439	-124	-128	602	350	485	318	180	158	101	152
Percent Difference	4%	-2%	12%	-31%	-12%	36%	11%	11%	5%	3%	2%	2%	5%
Below Normal													
Existing - Base	4,050	3,353	3,444	191	336	863	2,305	3,477	5,138	5,942	6,158	5,272	2,458
Future - Base	4,466	3,200	3,761	277	460	940	2,653	3,955	5,476	6,029	6,261	5,329	2,596
Difference	416	-153	317	85	124	77	348	478	337	86	103	57	138
Percent Difference	10%	-5%	9%	45%	37%	9%	15%	14%	7%	1%	2%	1%	6%
Dry													
Existing - Base	3,928	3,199	3,448	125	192	390	1,342	2,452	4,065	4,948	4,911	4,214	2,016
Future - Base	3,825	2,760	3,103	122	199	821	1,523	2,587	4,084	4,826	4,854	4,140	1,994
Difference	-103	-439	-345	-3	7	431	182	135	19	-122	-57	-74	-22
Percent Difference	-3%	-14%	-10%	-3%	4%	110%	14%	5%	0%	-2%	-1%	-2%	-1%
Critical													
Existing - Base	3,377	2,862	2,758	95	143	230	451	1,543	2,584	3,159	2,952	2,396	1,369
Future - Base	3,125	2,678	2,710	71	105	198	415	1,284	2,155	2,635	2,470	2,132	1,213
Difference	-252	-184	-48	-24	-38	-32	-36	-259	-429	-524	-482	-264	-156
Percent Difference	-7%	-6%	-2%	-25%	-27%	-14%	-8%	-17%	-17%	-17%	-16%	-11%	-11%

Total SWP Deliveries South of the Delta

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	6,129	4,776	5,541	1,795	2,061	2,896	4,442	6,100	7,671	7,647	7,791	6,656
20%	5,093	4,372	4,331	592	1,846	2,603	3,679	5,031	6,322	6,528	6,826	5,798
30%	4,839	4,258	4,035	298	1,268	2,451	3,368	4,703	5,924	6,380	6,690	5,674
40%	4,678	4,177	3,884	213	393	1,168	3,151	4,543	5,802	6,169	6,549	5,542
50%	4,500	3,770	3,634	162	279	571	2,400	3,888	5,493	6,078	6,448	5,390
60%	4,261	3,432	3,355	142	255	456	1,993	3,117	5,202	5,922	6,287	5,176
70%	3,403	2,780	2,818	114	214	382	1,694	2,408	4,265	5,525	5,649	4,826
80%	2,205	1,907	2,101	92	174	273	473	2,020	3,349	4,041	3,743	3,165
90%	1,545	1,239	1,379	80	110	207	380	1,631	2,705	3,286	3,008	2,186
Long Term												
Full Simulation Period	4,044	3,416	3,459	465	782	1,284	2,414	3,688	5,146	5,640	5,790	4,893
Water Year Types												
Wet	4,429	3,815	3,773	1,079	1,629	2,451	3,750	5,270	6,698	6,801	7,098	5,951
Above Normal	4,055	3,517	3,542	399	1,077	1,692	3,180	4,482	5,926	6,196	6,553	5,555
Below Normal	4,050	3,353	3,444	191	336	863	2,305	3,477	5,138	5,942	6,158	5,272
Dry	3,928	3,199	3,448	125	192	390	1,342	2,452	4,065	4,948	4,911	4,214
Critical	3,377	2,862	2,758	95	143	230	451	1,543	2,584	3,159	2,952	2,396

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	6,024	4,586	5,669	1,962	2,014	2,905	4,303	5,987	7,491	7,386	7,710	6,606
20%	5,428	4,361	5,320	595	1,939	2,706	3,782	5,413	6,881	7,045	7,177	6,208
30%	5,007	4,042	4,484	231	1,754	2,547	3,546	4,855	6,162	6,469	6,763	5,710
40%	4,894	3,793	4,121	172	634	2,500	3,396	4,756	6,020	6,231	6,634	5,517
50%	4,695	3,368	3,879	145	305	1,970	3,227	4,579	5,814	6,154	6,532	5,440
60%	4,383	2,362	3,600	104	193	456	2,566	3,547	5,530	5,944	6,369	5,228
70%	2,920	2,054	2,708	91	137	337	1,514	2,544	4,505	5,640	5,920	4,934
80%	2,451	1,296	1,887	72	112	220	520	2,078	3,482	4,247	3,946	3,332
90%	1,299	897	964	56	55	146	301	1,184	1,956	2,357	2,163	1,854
Long Term												
Full Simulation Period	4,043	2,984	3,596	472	840	1,531	2,542	3,813	5,165	5,535	5,706	4,829
Water Year Types												
Wet	4,344	2,993	4,138	1,107	1,816	2,666	3,835	5,364	6,773	6,814	7,151	6,006
Above Normal	4,230	3,445	3,981	275	949	2,295	3,530	4,967	6,244	6,377	6,711	5,656
Below Normal	4,466	3,200	3,761	277	460	940	2,653	3,955	5,476	6,029	6,261	5,329
Dry	3,825	2,760	3,103	122	199	821	1,523	2,587	4,084	4,826	4,854	4,140
Critical	3,125	2,678	2,710	71	105	198	415	1,284	2,155	2,635	2,470	2,132

Future - Base Minus Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	-105	-190	129	166	-47	9	-139	-113	-180	-261	-81	-50
20%	335	-11	989	3	93	102	103	383	559	518	351	410
30%	168	-216	450	-67	485	96	178	152	238	89	72	37
40%	216	-384	237	-42	241	1,332	245	213	218	62	86	-25
50%	194	-402	245	-18	25	1,399	826	691	321	77	84	50
60%	123	-1,070	246	-38	-62	0	573	430	328	22	82	52
70%	-483	-726	-110	-23	-77	-45	-179	136	240	115	271	108
80%	246	-611	-214	-20	-63	-53	47	58	133	207	203	167
90%	-246	-343	-414	-24	-56	-61	-79	-447	-749	-930	-845	-332
Long Term												
Full Simulation Period	-1	-432	137	7	58	248	128	125	19	-105	-84	-64
Water Year Types												
Wet	-84	-822	366	29	187	215	85	95	75	13	53	55
Above Normal	175	-72	439	-124	-128	602	350	485	318	180	158	101
Below Normal	416	-153	317	85	124	77	348	478	337	86	103	57
Dry	-103	-439	-345	-3	7	431	182	135	19	-122	-57	-74
Critical	-252	-184	-48	-24	-38	-32	-36	-259	-429	-524	-482	-264

Long-Term and Water Year-Type Average of Fremont Weir Spill to Yolo Bypass Under Existing - Base and Future - Base

Analysis Period	October	November	December	January	February	March	April	May	June	July	August	September	Total (TAF)
	Average Flow (cfs)												
							Long-Term						
Full Simulation Period													
Existing - Base	114	257	2,635	8,485	13,204	6,934	1,024	20	0	0	0	0	1,933
Future - Base	43	57	2,754	12,157	16,930	8,465	1,050	3	0	0	0	0	2,453
Difference	-71	-200	120	3,673	3,725	1,531	26	-16	0	0	0	0	521
Percent Difference	-62%	-78%	5%	43%	28%	22%	3%	-84%	0%	0%	0%	0%	27%
							Water Year-Types						
Wet													
Existing - Base	374	844	7,678	25,448	36,369	18,505	3,244	64	0	0	0	0	5,472
Future - Base	135	180	7,592	34,147	41,220	23,151	3,236	10	0	0	0	0	6,503
Difference	-239	-664	-86	8,700	4,851	4,645	-9	-54	0	0	0	0	1,030
Percent Difference	-64%	-79%	-1%	34%	13%	25%	0%	-84%	0%	0%	0%	0%	19%
Above Normal													
Existing - Base	0	0	2,008	4,550	10,271	7,823	33	0	0	0	0	0	1,470
Future - Base	0	0	946	9,205	25,241	6,208	14	0	0	0	0	0	2,432
Difference	0	0	-1,062	4,655	14,971	-1,615	-20	0	0	0	0	0	962
Percent Difference	0%	0%	-53%	102%	146%	-21%	-59%	0%	0%	0%	0%	0%	65%
Below Normal													
Existing - Base	0	0	0	291	2,453	501	143	0	0	0	0	0	196
Future - Base	0	0	1,390	583	1,456	737	137	0	0	0	0	0	257
Difference	0	0	1,390	292	-996	236	-6	0	0	0	0	0	61
Percent Difference	0%	0%	0%	101%	-41%	47%	-4%	0%	0%	0%	0%	0%	31%
Dry													
Existing - Base	0	0	0	0	537	224	0	0	0	0	0	0	44
Future - Base	0	0	0	11	981	717	0	0	0	0	0	0	99
Difference	0	0	0	11	444	493	0	0	0	0	0	0	56
Percent Difference	0%	0%	0%	4184%	83%	220%	0%	0%	0%	0%	0%	0%	128%
Critical													
Existing - Base	0	0	0	0	1	0	0	0	0	0	0	0	0
Future - Base	0	0	0	0	26	0	0	0	0	0	0	0	1
Difference	0	0	0	0	25	0	0	0	0	0	0	0	1
Percent Difference	0%	0%	0%	0%	3260%	0%	0%	0%	0%	0%	0%	0%	3260%

Fremont Weir Spill to Yolo Bypass

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	0	7,950	28,958	47,428	19,929	23	0	0	0	0	0
20%	0	0	17	7,664	20,668	5,676	0	0	0	0	0	0
30%	0	0	0	2,091	7,247	1,385	0	0	0	0	0	0
40%	0	0	0	0	1,768	0	0	0	0	0	0	0
50%	0	0	0	0	23	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	114	257	2,635	8,485	13,204	6,934	1,024	20	0	0	0	0
Water Year Types												
Wet	374	844	7,678	25,448	36,369	18,505	3,244	64	0	0	0	0
Above Normal	0	0	2,008	4,550	10,271	7,823	33	0	0	0	0	0
Below Normal	0	0	0	291	2,453	501	143	0	0	0	0	0
Dry	0	0	0	0	537	224	0	0	0	0	0	0
Critical	0	0	0	0	1	0	0	0	0	0	0	0

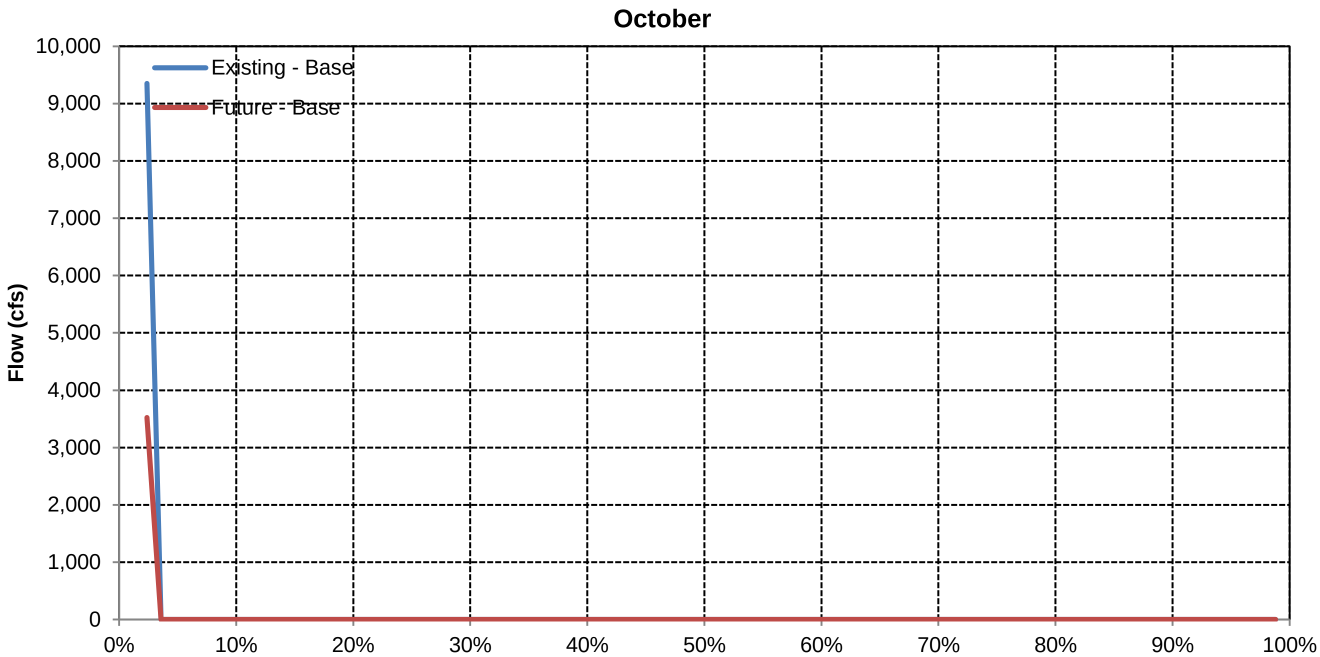
Future - Base

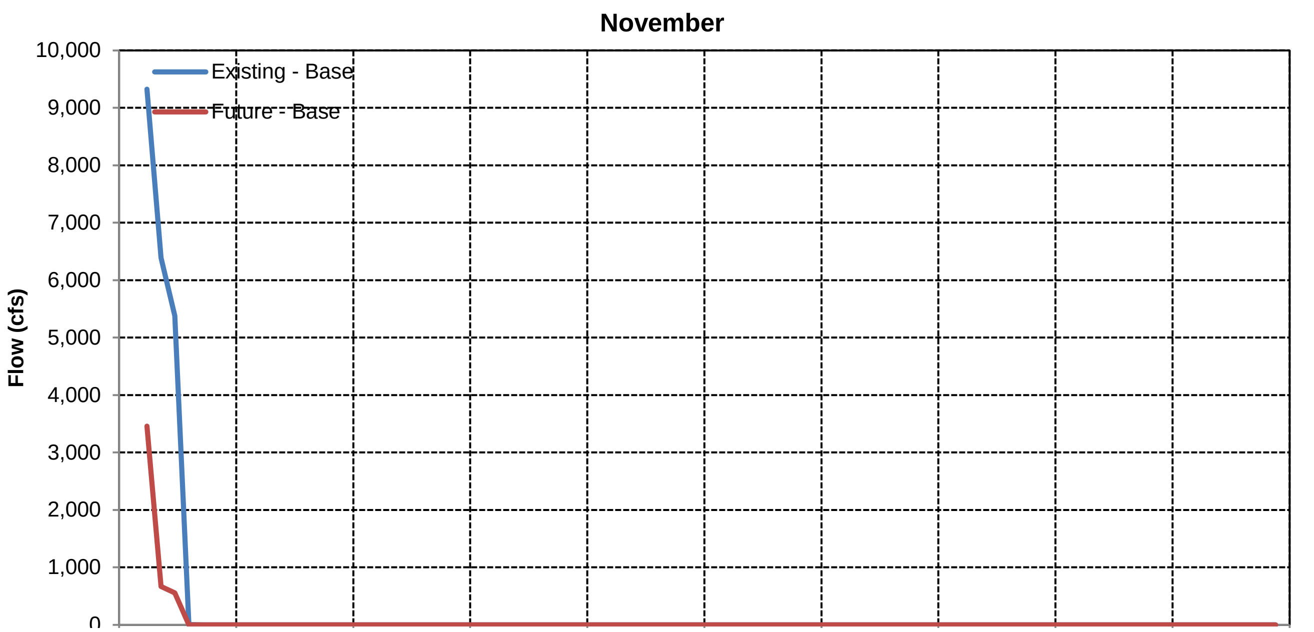
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	0	9,636	45,653	68,479	26,076	480	0	0	0	0	0
20%	0	0	417	14,794	32,134	7,332	2	0	0	0	0	0
30%	0	0	0	2,685	10,131	3,487	0	0	0	0	0	0
40%	0	0	0	83	4,103	180	0	0	0	0	0	0
50%	0	0	0	0	501	0	0	0	0	0	0	0
60%	0	0	0	0	3	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	43	57	2,754	12,157	16,930	8,465	1,050	3	0	0	0	0
Water Year Types												
Wet	135	180	7,592	34,147	41,220	23,151	3,236	10	0	0	0	0
Above Normal	0	0	946	9,205	25,241	6,208	14	0	0	0	0	0
Below Normal	0	0	1,390	583	1,456	737	137	0	0	0	0	0
Dry	0	0	0	11	981	717	0	0	0	0	0	0
Critical	0	0	0	0	26	0	0	0	0	0	0	0

Future - Base Minus Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	0	1,686	16,695	21,051	6,147	458	0	0	0	0	0
20%	0	0	400	7,129	11,466	1,656	2	0	0	0	0	0
30%	0	0	0	595	2,885	2,103	0	0	0	0	0	0
40%	0	0	0	83	2,335	180	0	0	0	0	0	0
50%	0	0	0	0	478	0	0	0	0	0	0	0
60%	0	0	0	0	3	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	-71	-200	120	3,673	3,725	1,531	26	-16	0	0	0	0
Water Year Types												
Wet	-239	-664	-86	8,700	4,851	4,645	-9	-54	0	0	0	0
Above Normal	0	0	-1,062	4,655	14,971	-1,615	-20	0	0	0	0	0
Below Normal	0	0	1,390	292	-996	236	-6	0	0	0	0	0
Dry	0	0	0	11	444	493	0	0	0	0	0	0
Critical	0	0	0	0	25	0	0	0	0	0	0	0

Fremont Weir Spill to Yolo Bypass





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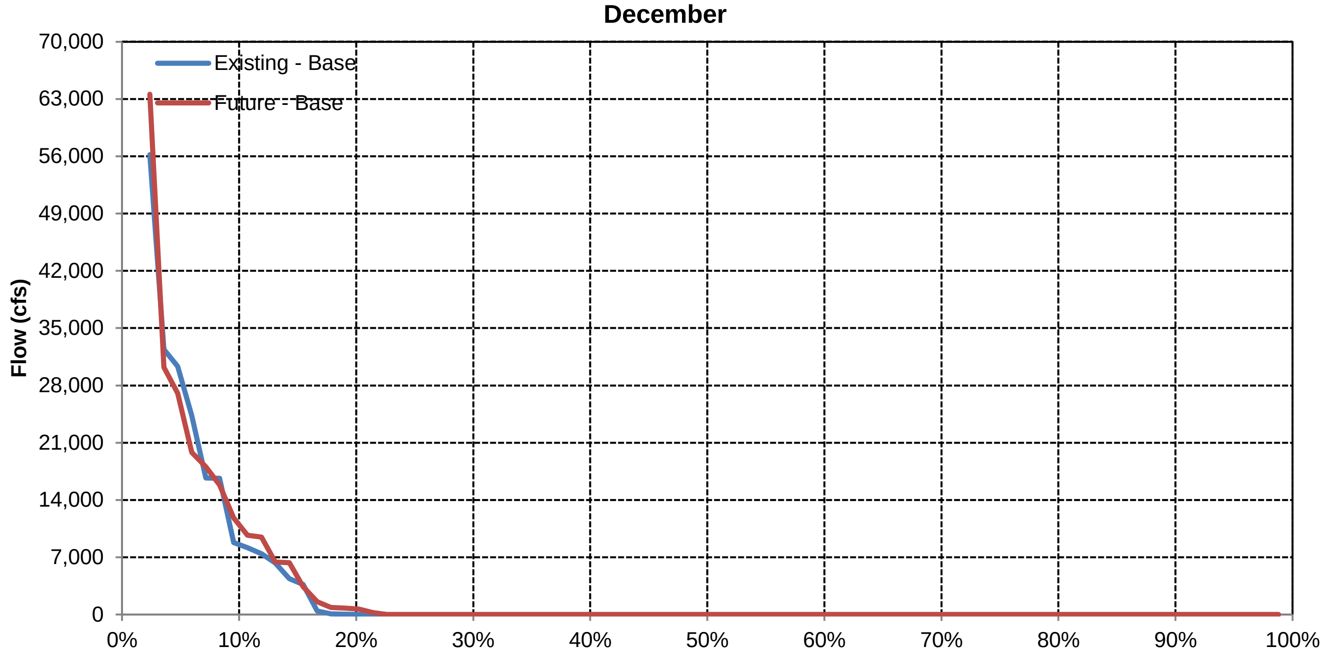

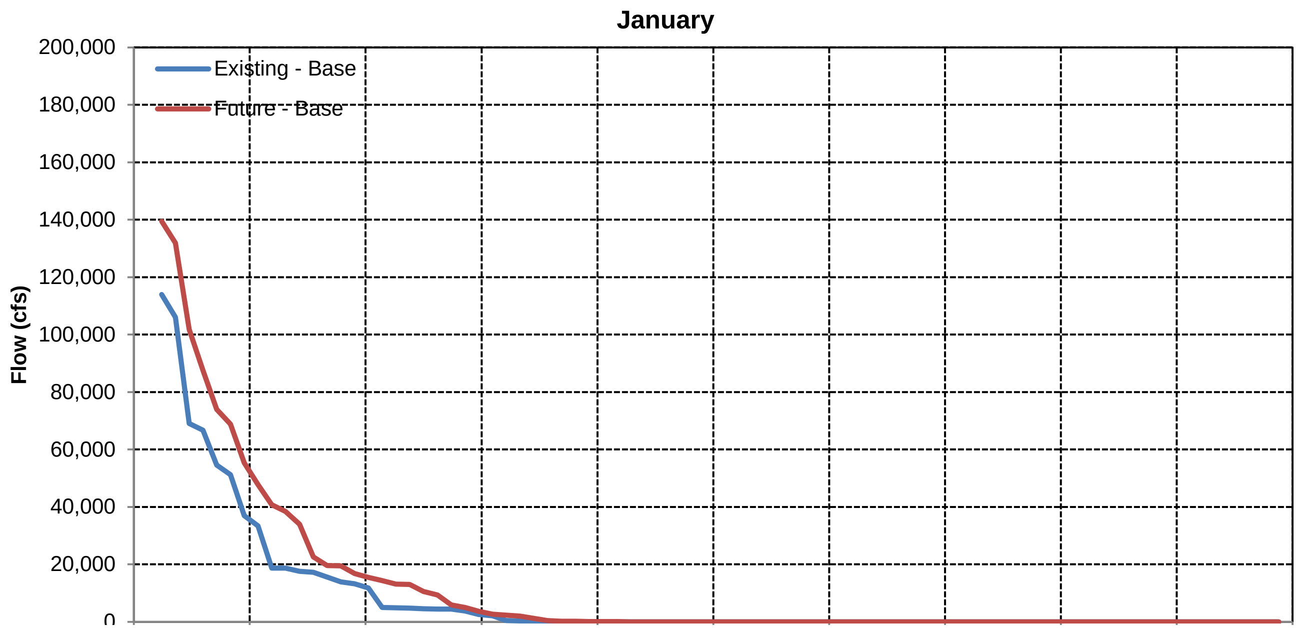

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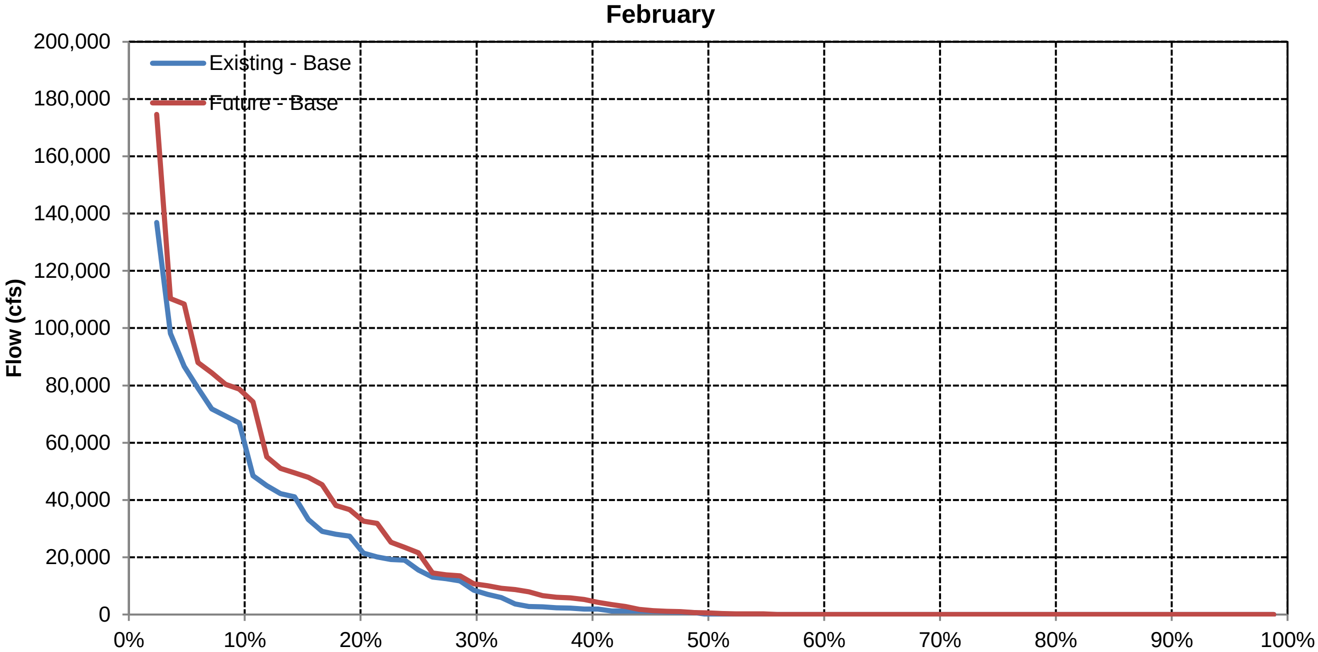

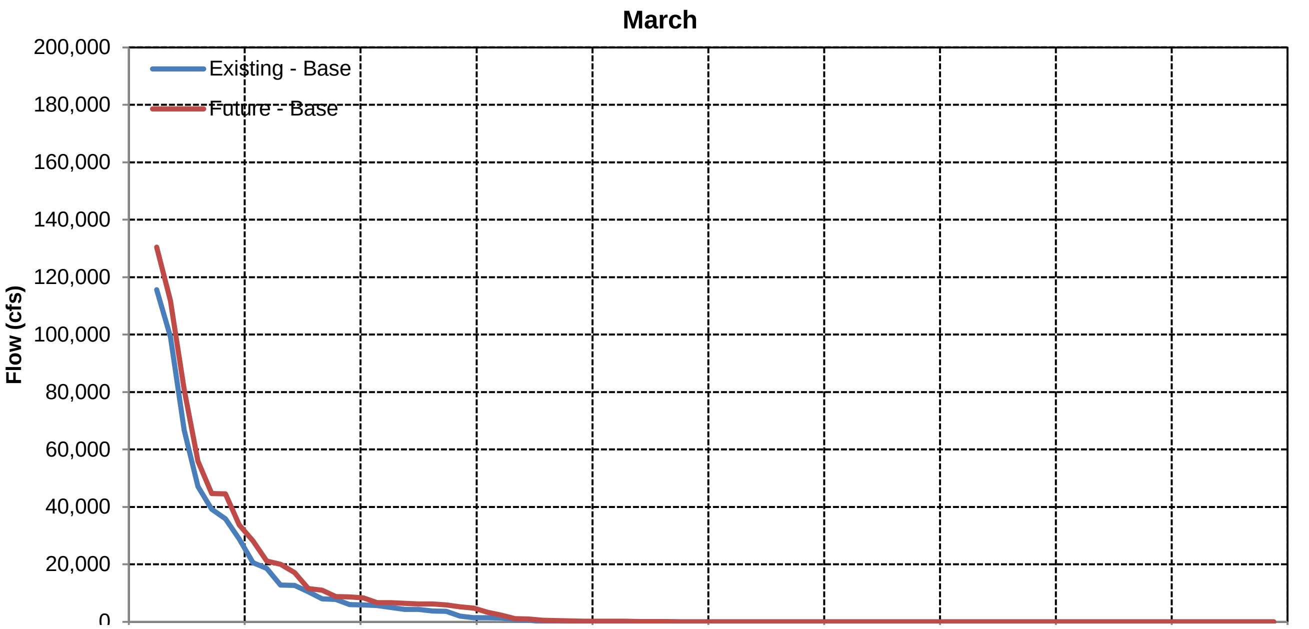

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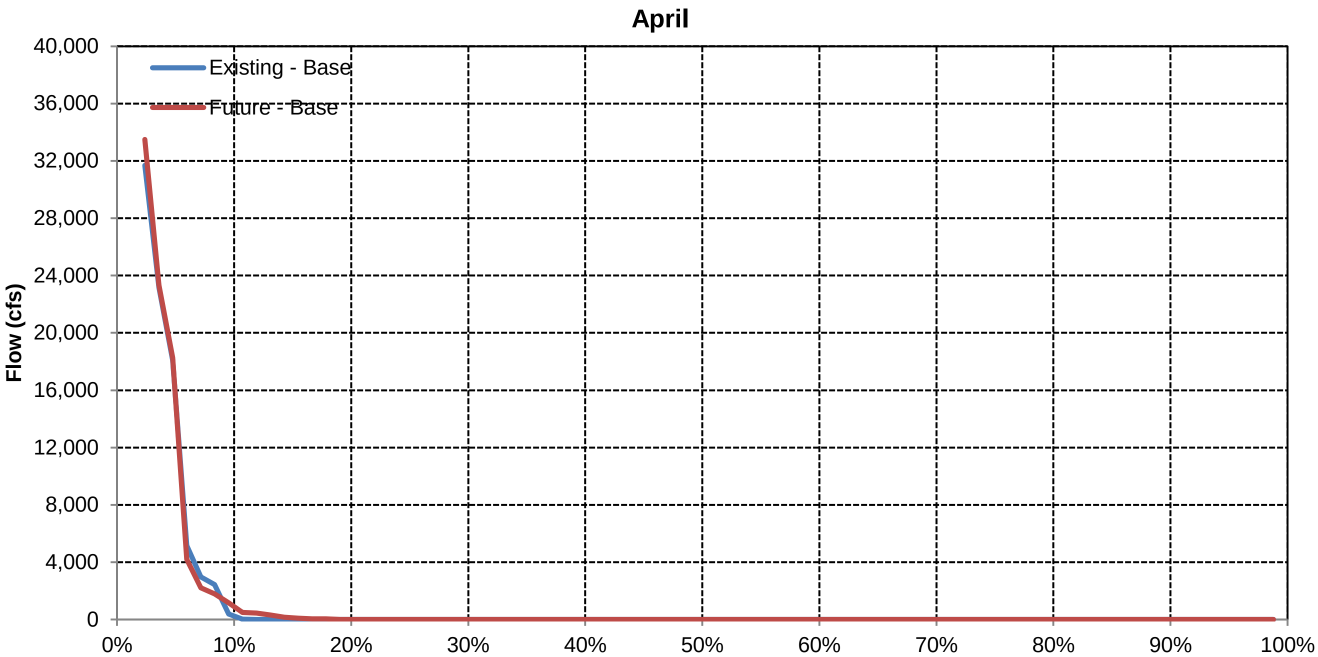
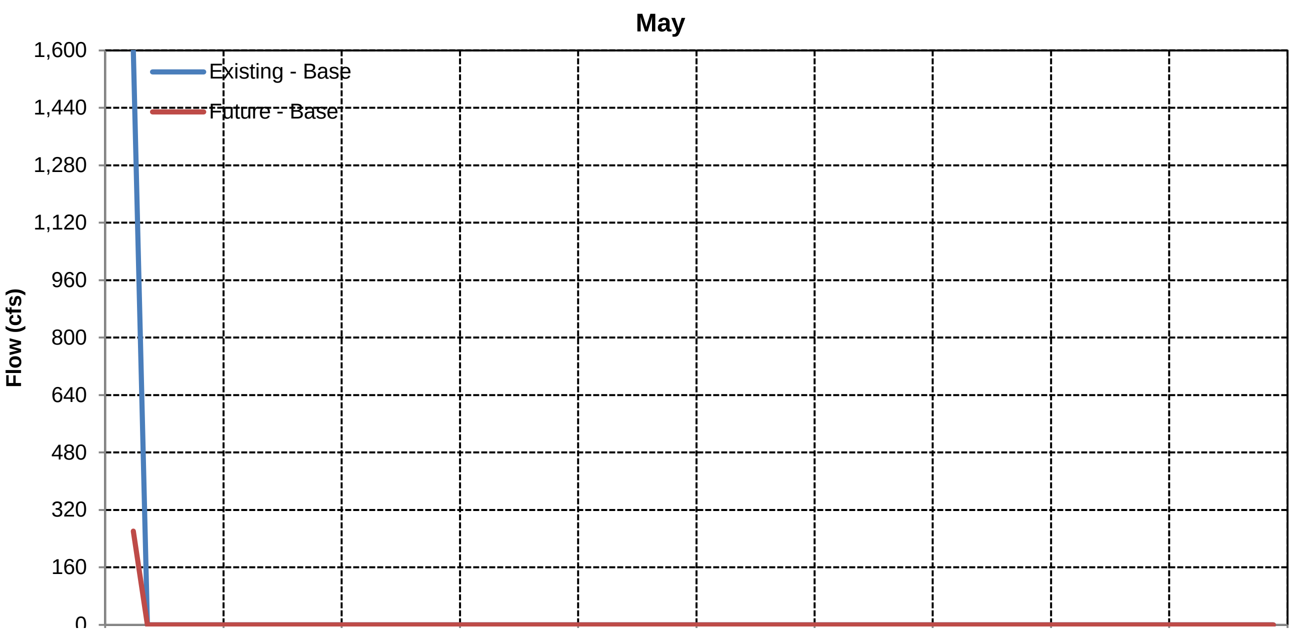
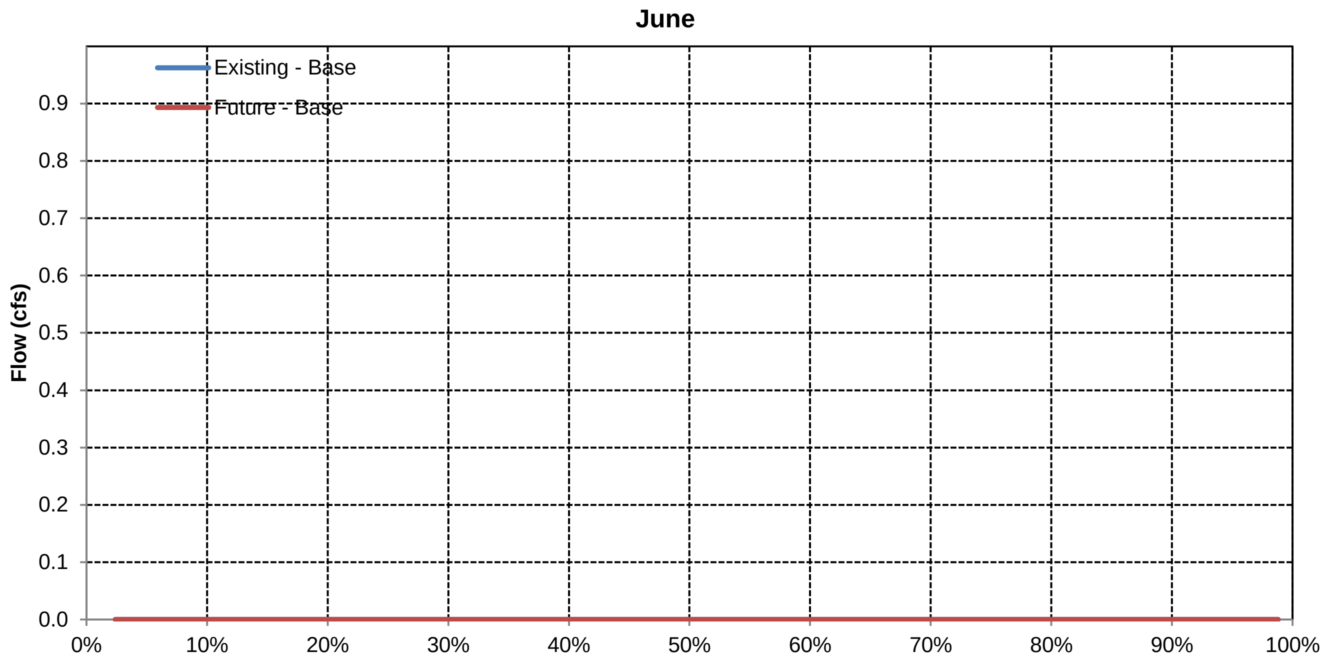
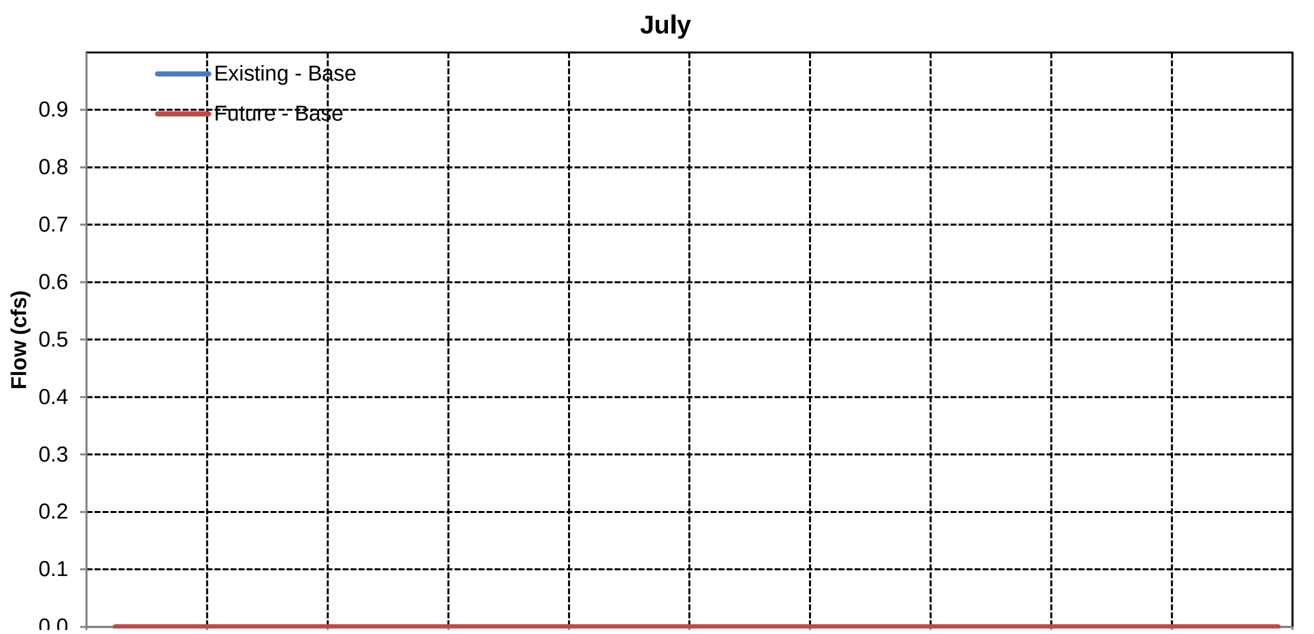


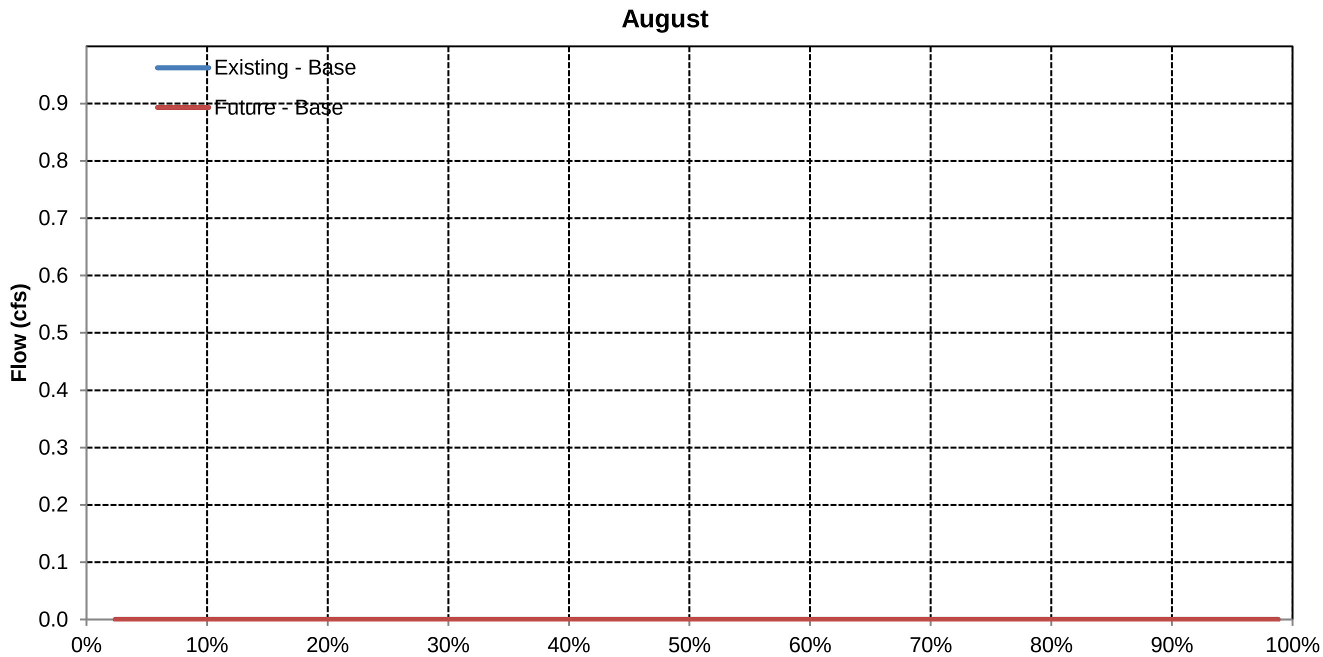


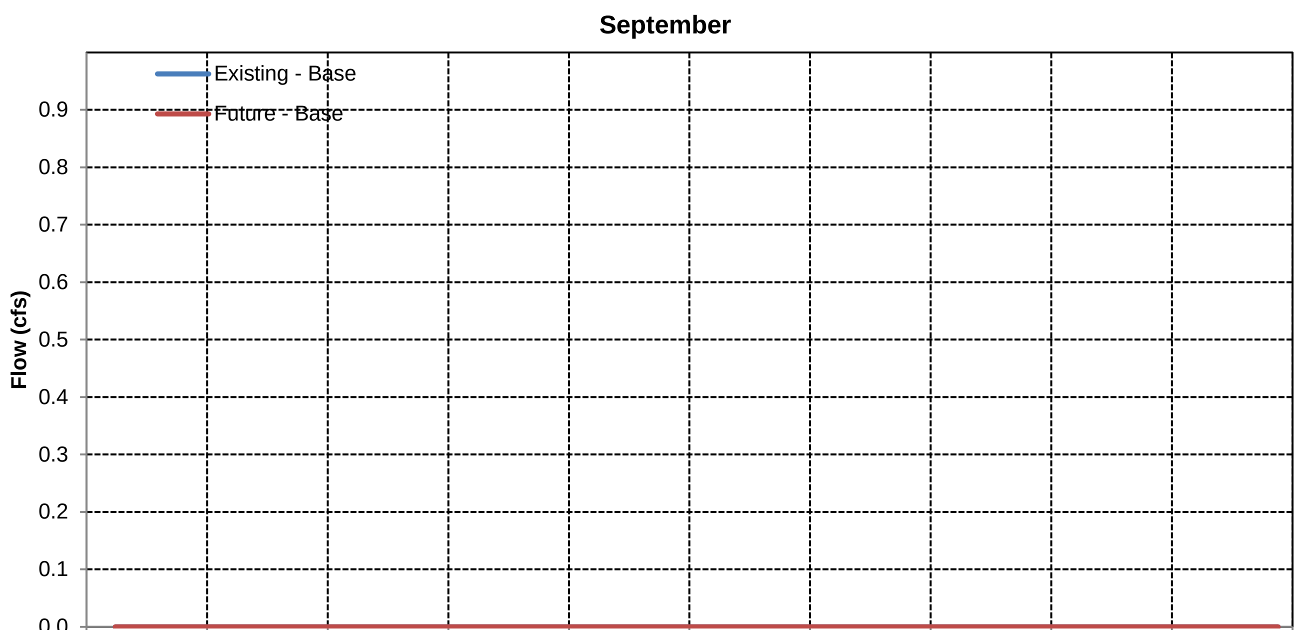
Fremont Weir Spill to Yolo Bypass





Fremont Weir Spill to Yolo Bypass





Long-Term and Water Year-Type Average of Sacramento River below Fremont Weir Under Existing - Base and Future - Base

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Existing - Base	9,484	12,510	19,726	28,534	34,880	30,067	18,486	11,524	11,174	16,563	12,346	14,753	13,226
Future - Base	9,206	10,728	19,728	30,030	35,978	31,028	17,571	10,459	13,675	15,358	11,273	13,824	13,150
Difference	-279	-1,783	1	1,496	1,098	961	-915	-1,065	2,501	-1,205	-1,073	-929	-77
Percent Difference	-3%	-14%	0%	5%	3%	3%	-5%	-9%	22%	-7%	-9%	-6%	-1%
							Water Year-Types						
Wet													
Existing - Base	10,891	17,182	34,594	47,388	54,159	44,817	30,280	15,515	11,984	17,719	13,701	22,821	19,273
Future - Base	10,316	14,168	33,582	49,490	54,700	46,345	27,848	12,029	14,178	18,965	12,787	23,425	19,081
Difference	-574	-3,014	-1,013	2,102	541	1,528	-2,432	-3,487	2,194	1,246	-914	604	-192
Percent Difference	-5%	-18%	-3%	4%	1%	3%	-8%	-22%	18%	7%	-7%	3%	-1%
Above Normal													
Existing - Base	9,877	12,058	19,277	36,324	42,867	40,008	19,128	12,828	11,814	18,508	14,754	17,430	15,325
Future - Base	10,180	10,600	18,133	38,066	50,270	39,380	16,639	11,646	16,362	17,891	12,383	16,466	15,480
Difference	303	-1,458	-1,144	1,741	7,403	-628	-2,489	-1,183	4,547	-616	-2,371	-964	155
Percent Difference	3%	-12%	-6%	5%	17%	-2%	-13%	-9%	38%	-3%	-16%	-6%	1%
Below Normal													
Existing - Base	9,114	11,699	12,901	19,738	26,173	23,730	15,307	10,497	11,507	18,684	13,981	10,737	11,081
Future - Base	9,254	9,797	13,924	23,209	25,545	24,426	14,615	10,760	14,962	15,443	10,464	8,153	10,869
Difference	140	-1,902	1,023	3,471	-628	696	-693	263	3,456	-3,241	-3,517	-2,584	-212
Percent Difference	2%	-16%	8%	18%	-2%	3%	-5%	3%	30%	-17%	-25%	-24%	-2%
Dry													
Existing - Base	8,797	10,284	11,881	14,395	22,880	19,311	9,957	8,686	10,655	14,790	10,143	10,040	9,128
Future - Base	8,186	9,309	12,579	14,935	22,880	21,608	11,530	9,425	13,173	12,523	10,169	7,654	9,257
Difference	-610	-974	698	540	0	2,297	1,573	739	2,518	-2,267	26	-2,386	129
Percent Difference	-7%	-9%	6%	4%	0%	12%	16%	9%	24%	-15%	0%	-24%	1%
Critical													
Existing - Base	7,603	7,349	9,332	12,776	15,062	12,715	9,151	7,145	9,068	11,571	7,736	7,241	7,035
Future - Base	7,552	6,764	9,375	13,050	15,447	13,038	9,429	7,372	9,565	9,855	9,692	7,025	7,121
Difference	-51	-585	43	274	385	323	278	226	497	-1,715	1,957	-216	86
Percent Difference	-1%	-8%	0%	2%	3%	3%	3%	3%	5%	-15%	25%	-3%	1%

Sacramento River below Fremont Weir

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	12,667	17,867	45,100	57,729	61,959	57,591	41,031	20,423	13,312	19,786	15,641	24,263
20%	11,568	15,291	30,157	49,978	58,550	49,208	29,852	12,476	12,632	19,450	14,918	21,584
30%	10,868	14,177	20,670	38,268	45,964	41,694	19,097	10,802	12,207	18,980	14,204	20,190
40%	10,328	12,419	16,827	30,451	40,042	32,187	14,333	9,587	11,482	18,481	13,746	16,796
50%	9,258	11,470	14,375	20,927	29,701	24,238	11,811	9,148	10,870	17,699	13,483	12,593
60%	8,339	10,242	12,138	16,320	24,021	20,650	10,617	8,809	10,372	17,239	13,030	11,383
70%	7,401	8,651	11,421	13,695	18,359	16,099	9,968	8,553	10,029	15,866	11,157	9,527
80%	6,330	6,998	8,557	11,396	14,745	13,147	9,106	7,912	9,548	12,798	8,367	8,339
90%	5,547	6,108	7,167	10,140	12,940	10,022	8,064	7,372	8,384	10,409	7,531	7,435
Long Term												
Full Simulation Period	9,484	12,510	19,726	28,534	34,880	30,067	18,486	11,524	11,174	16,563	12,346	14,753
Water Year Types												
Wet	10,891	17,182	34,594	47,388	54,159	44,817	30,280	15,515	11,984	17,719	13,701	22,821
Above Normal	9,877	12,058	19,277	36,324	42,867	40,008	19,128	12,828	11,814	18,508	14,754	17,430
Below Normal	9,114	11,699	12,901	19,738	26,173	23,730	15,307	10,497	11,507	18,684	13,981	10,737
Dry	8,797	10,284	11,881	14,395	22,880	19,311	9,957	8,686	10,655	14,790	10,143	10,040
Critical	7,603	7,349	9,332	12,776	15,062	12,715	9,151	7,145	9,068	11,571	7,736	7,241

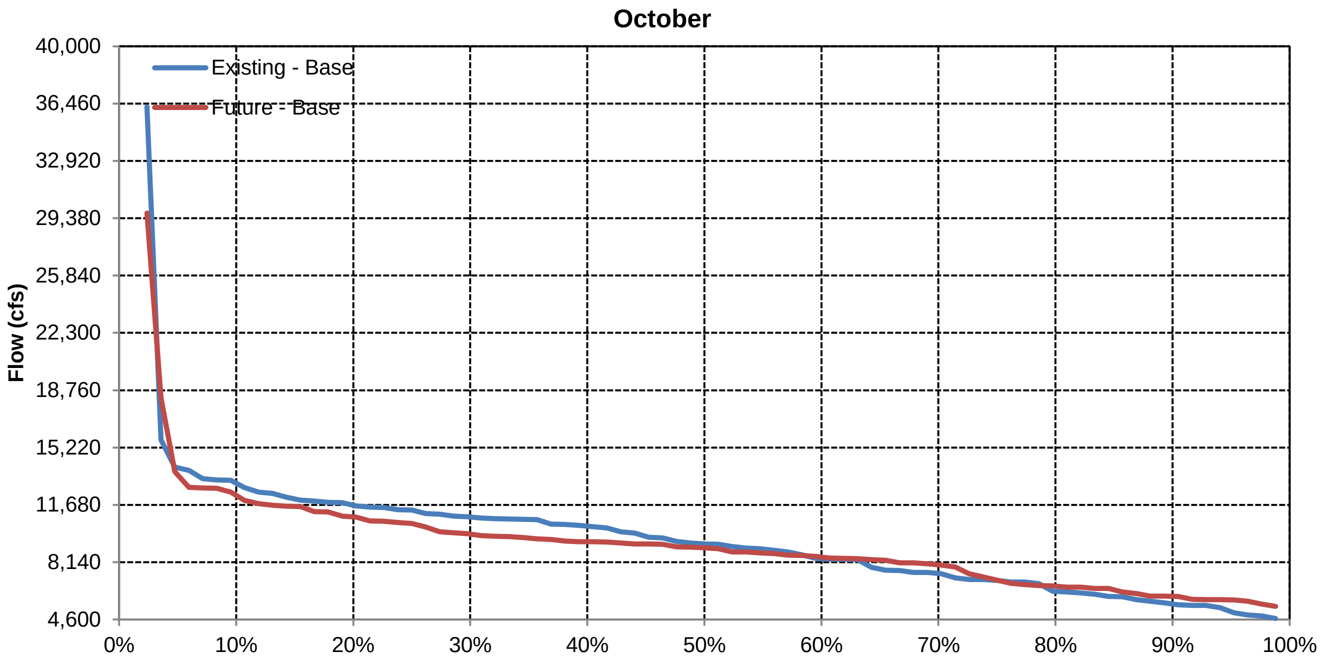
Future - Base

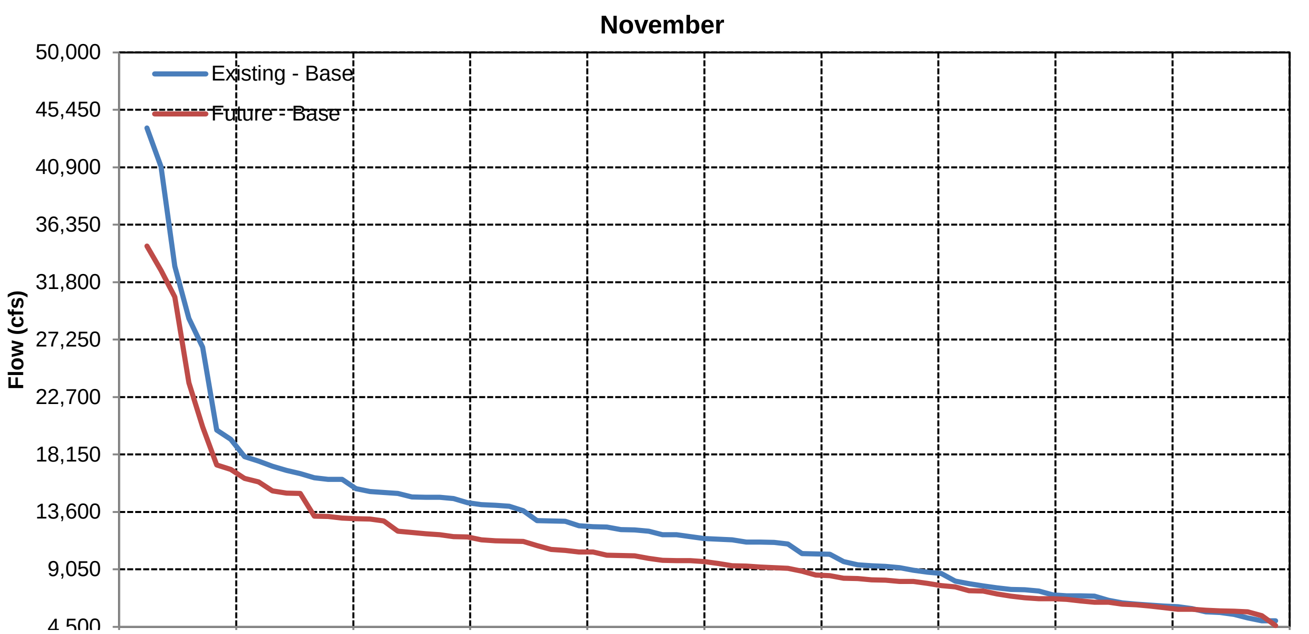
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	11,897	16,169	45,741	61,582	63,120	58,501	40,381	14,264	19,317	20,306	15,937	23,746
20%	10,789	13,042	30,986	52,000	59,936	50,976	24,134	12,203	18,036	19,458	13,060	23,231
30%	9,787	11,409	19,616	42,207	50,229	42,750	16,494	11,100	17,030	17,789	11,135	21,443
40%	9,396	10,373	16,258	31,518	42,508	33,844	14,502	10,319	14,771	17,206	10,721	14,835
50%	9,004	9,580	14,683	22,826	32,845	25,125	12,720	9,227	12,760	16,197	10,366	9,351
60%	8,421	8,564	12,034	17,536	23,964	20,148	10,605	8,847	11,697	14,641	10,117	8,213
70%	7,953	7,746	10,580	14,086	19,326	17,034	9,863	8,329	10,907	12,994	9,872	7,627
80%	6,644	6,697	8,469	11,527	15,457	13,796	9,349	7,855	9,488	11,435	9,571	7,237
90%	6,027	5,916	7,135	10,183	12,838	10,799	8,626	7,207	8,168	9,224	9,229	6,510
Long Term												
Full Simulation Period	9,206	10,728	19,728	30,030	35,978	31,028	17,571	10,459	13,675	15,358	11,273	13,824
Water Year Types												
Wet	10,316	14,168	33,582	49,490	54,700	46,345	27,848	12,029	14,178	18,965	12,787	23,425
Above Normal	10,180	10,600	18,133	38,066	50,270	39,380	16,639	11,646	16,362	17,891	12,383	16,466
Below Normal	9,254	9,797	13,924	23,209	25,545	24,426	14,615	10,760	14,962	15,443	10,464	8,153
Dry	8,186	9,309	12,579	14,935	22,880	21,608	11,530	9,425	13,173	12,523	10,169	7,654
Critical	7,552	6,764	9,375	13,050	15,447	13,038	9,429	7,372	9,565	9,855	9,692	7,025

Future - Base Minus Existing - Base

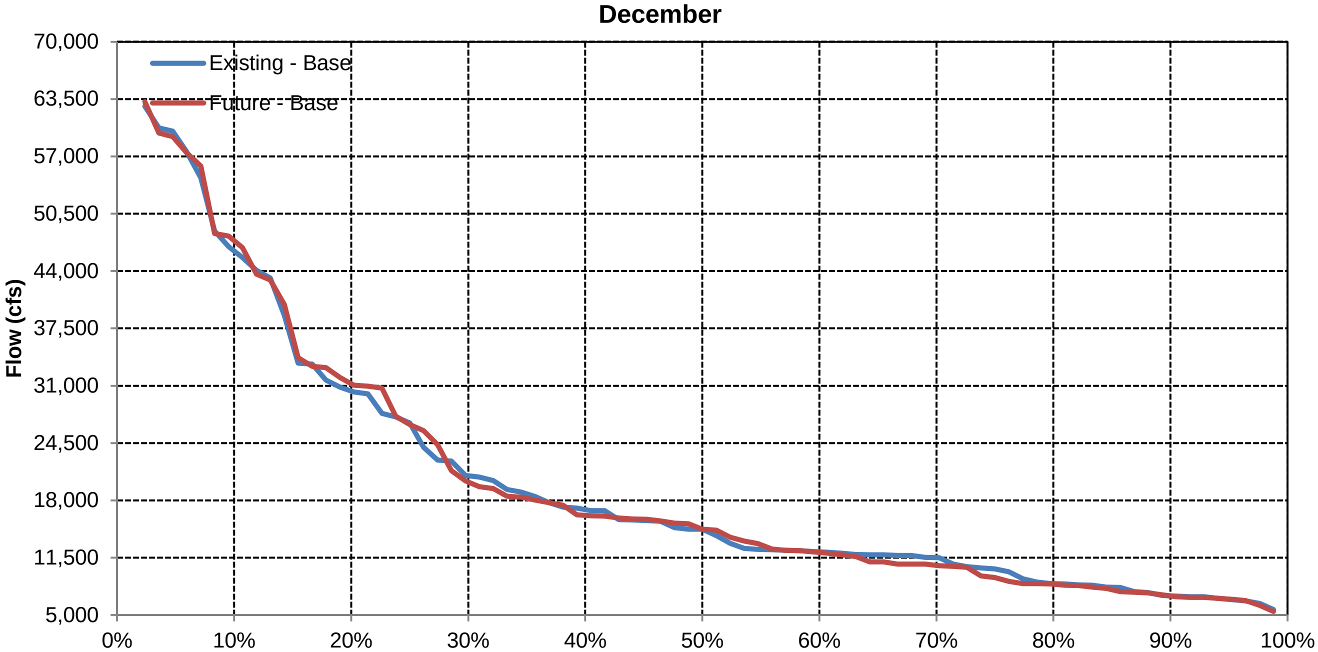
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	-771	-1,697	641	3,853	1,161	910	-651	-6,159	6,005	521	296	-517
20%	-779	-2,249	829	2,022	1,385	1,768	-5,718	-274	5,403	8	-1,859	1,647
30%	-1,081	-2,768	-1,054	3,939	4,265	1,056	-2,603	298	4,822	-1,191	-3,069	1,253
40%	-932	-2,046	-568	1,067	2,465	1,657	169	732	3,289	-1,275	-3,025	-1,961
50%	-254	-1,891	308	1,900	3,144	886	909	79	1,890	-1,502	-3,117	-3,242
60%	82	-1,678	-103	1,216	-57	-502	-12	38	1,325	-2,598	-2,913	-3,171
70%	551	-906	-841	390	967	935	-105	-224	878	-2,872	-1,285	-1,900
80%	314	-301	-87	131	712	649	244	-57	-60	-1,363	1,204	-1,102
90%	480	-193	-32	43	-101	778	562	-164	-216	-1,185	1,698	-926
Long Term												
Full Simulation Period	-279	-1,783	1	1,496	1,098	961	-915	-1,065	2,501	-1,205	-1,073	-929
Water Year Types												
Wet	-574	-3,014	-1,013	2,102	541	1,528	-2,432	-3,487	2,194	1,246	-914	604
Above Normal	303	-1,458	-1,144	1,741	7,403	-628	-2,489	-1,183	4,547	-616	-2,371	-964
Below Normal	140	-1,902	1,023	3,471	-628	696	-693	263	3,456	-3,241	-3,517	-2,584
Dry	-610	-974	698	540	0	2,297	1,573	739	2,518	-2,267	26	-2,386
Critical	-51	-585	43	274	385	323	278	226	497	-1,715	1,957	-216

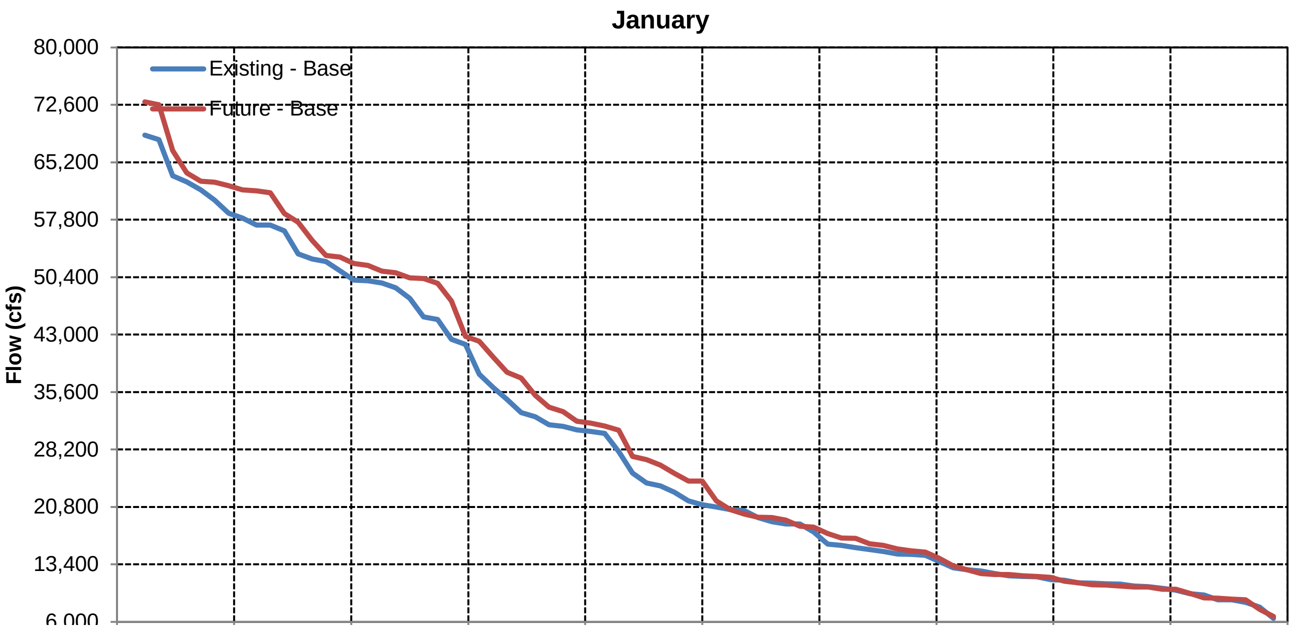
Sacramento River below Fremont Weir



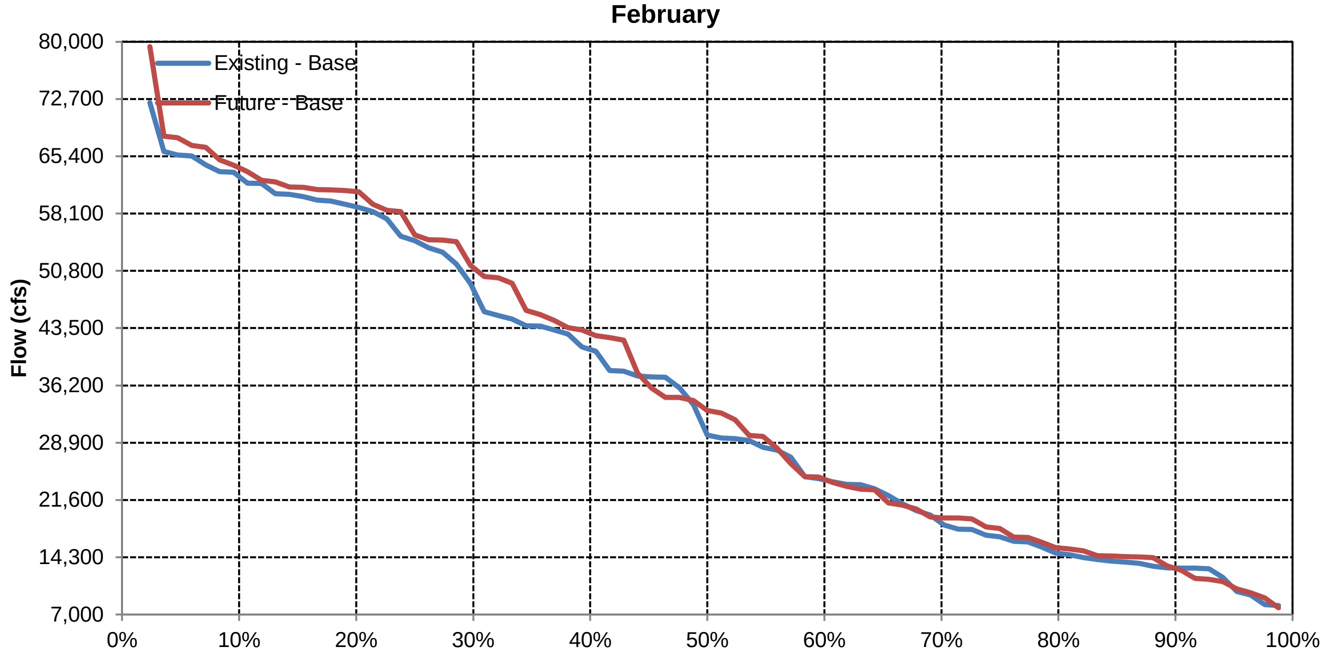


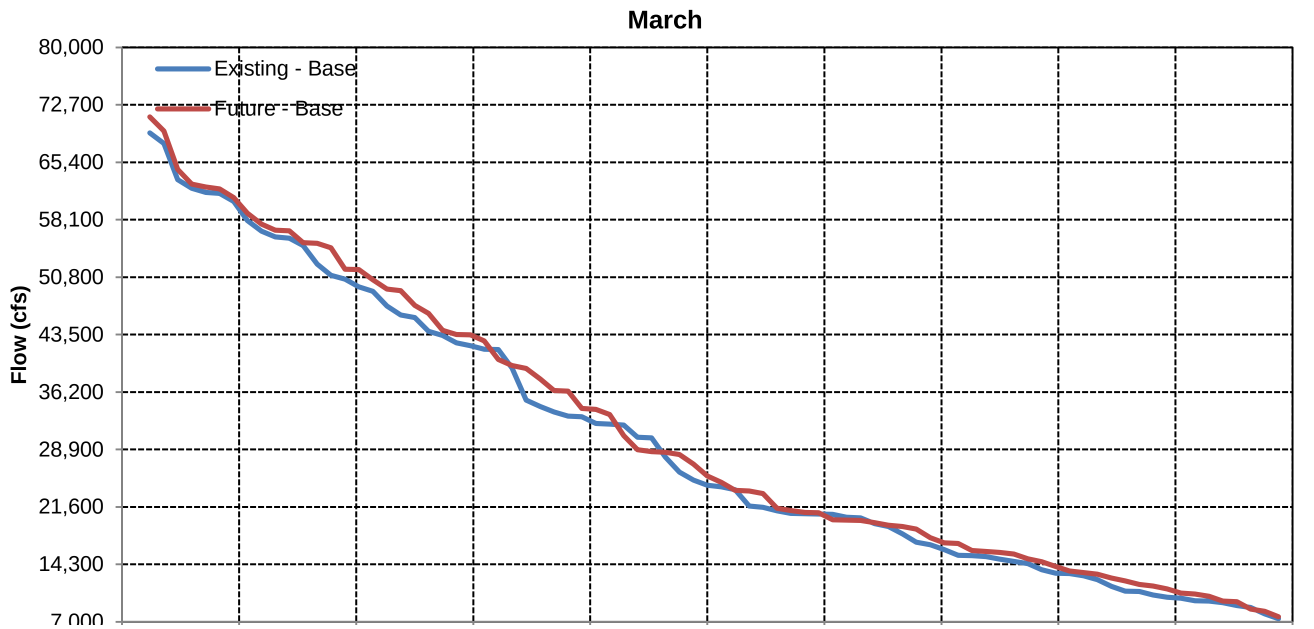
Sacramento River below Fremont Weir



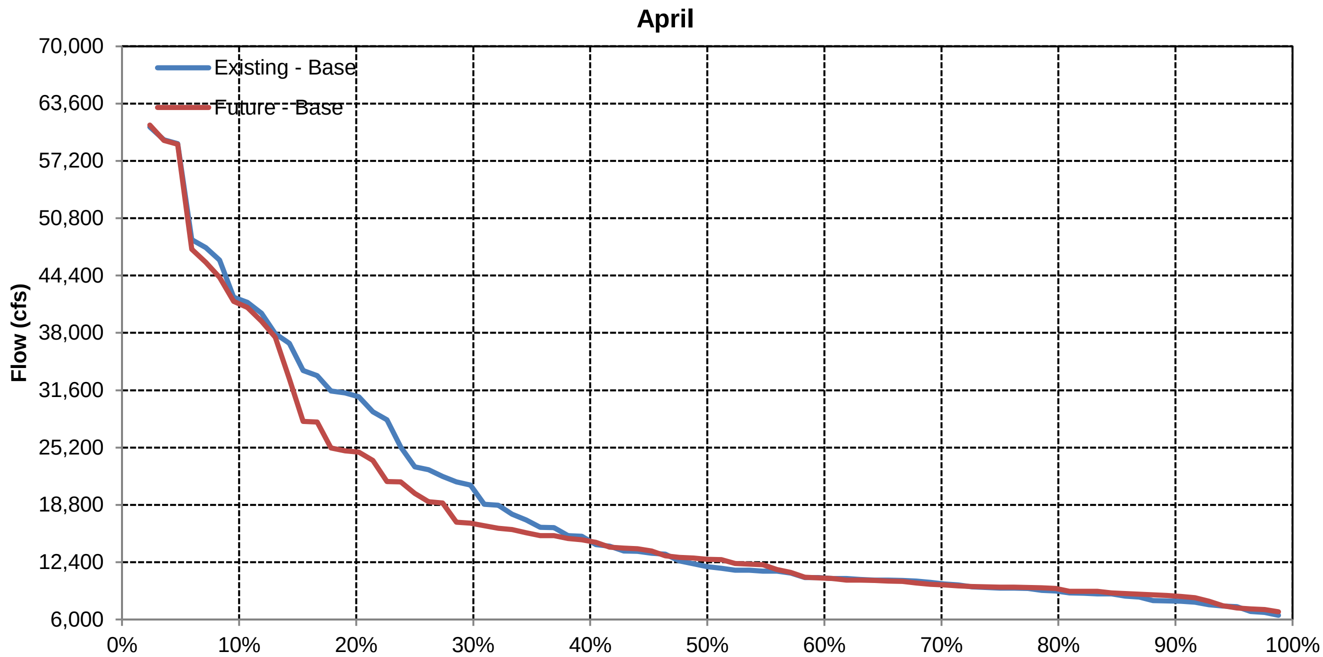


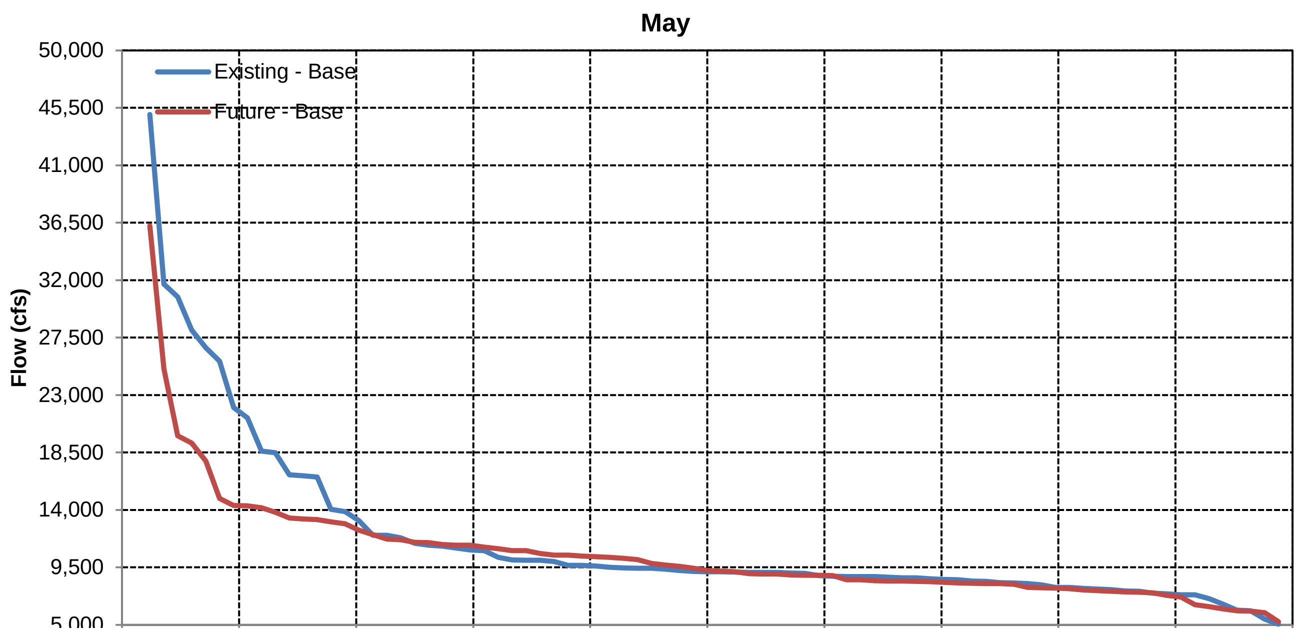
Sacramento River below Fremont Weir



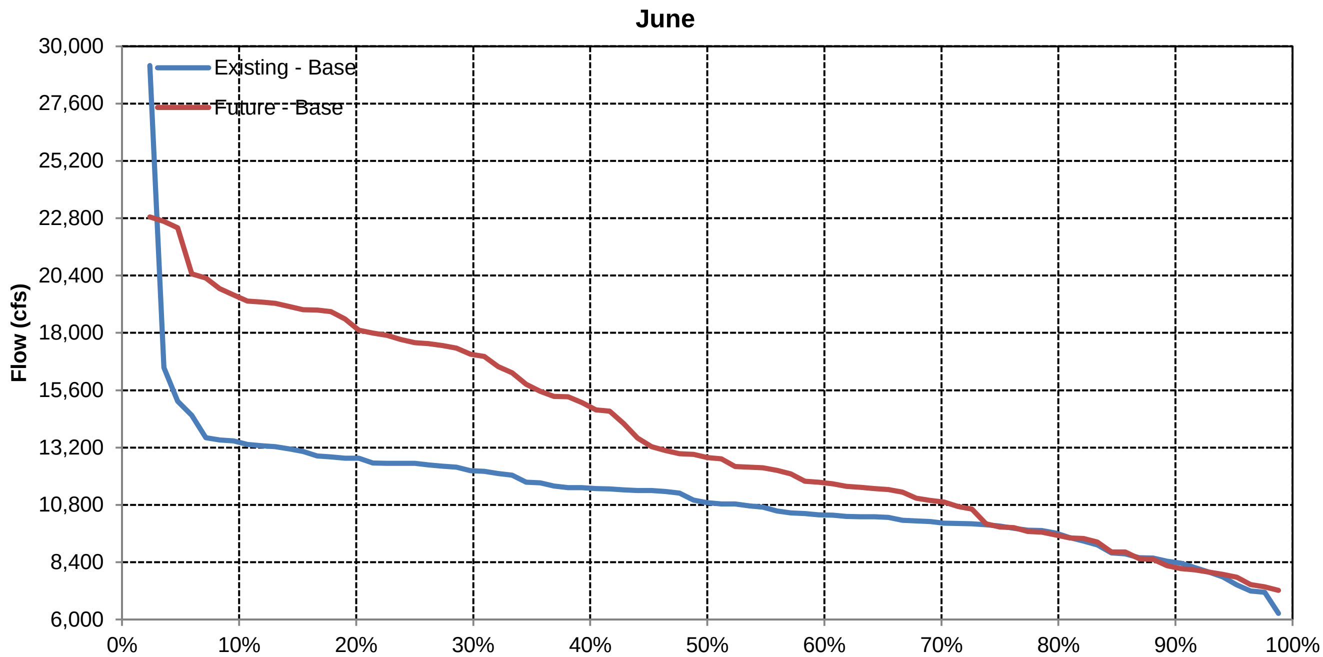


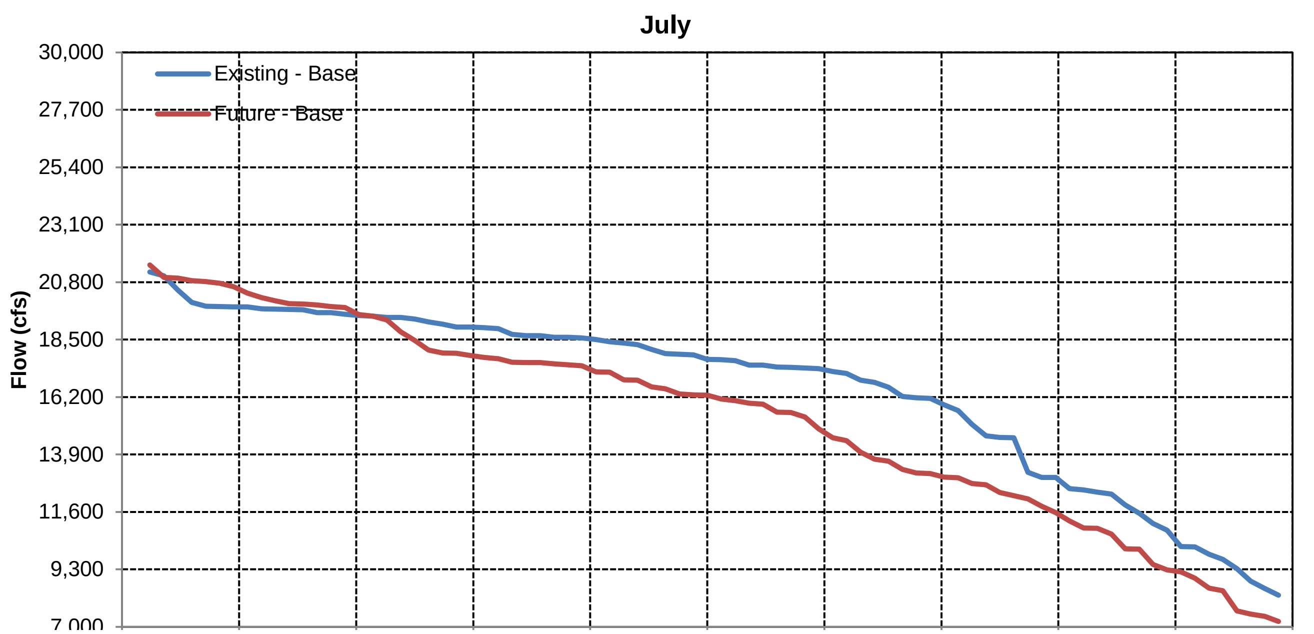
Sacramento River below Fremont Weir



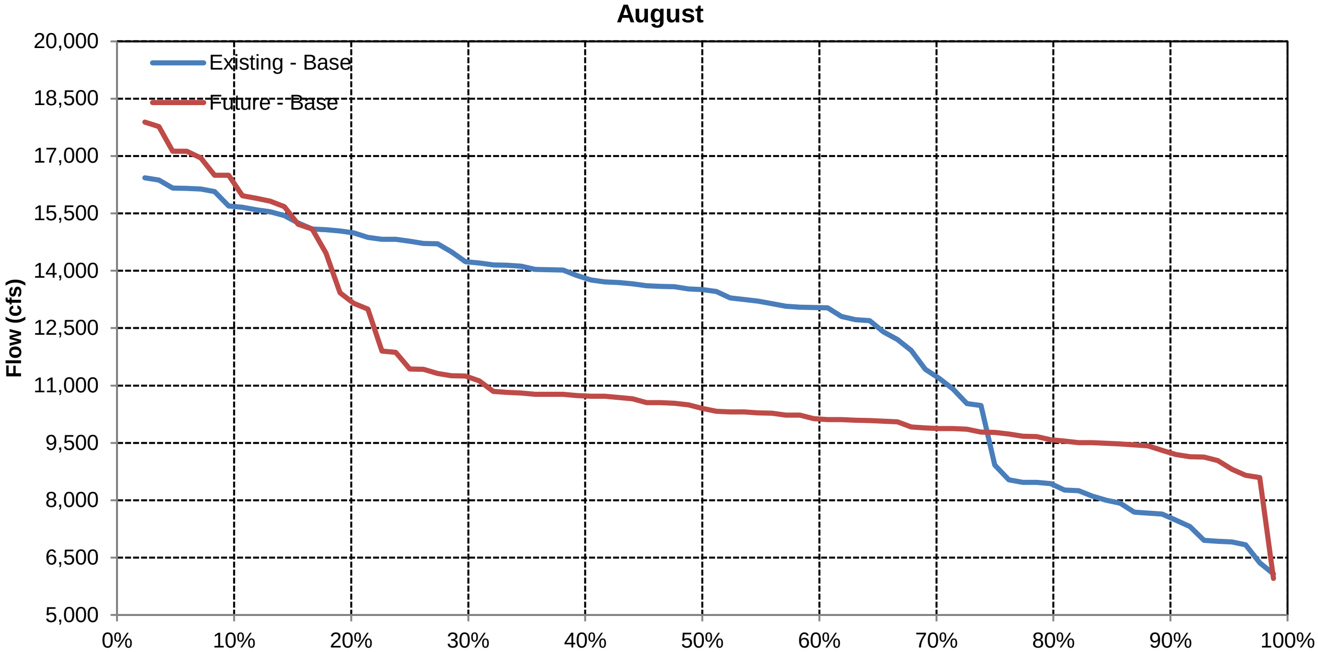


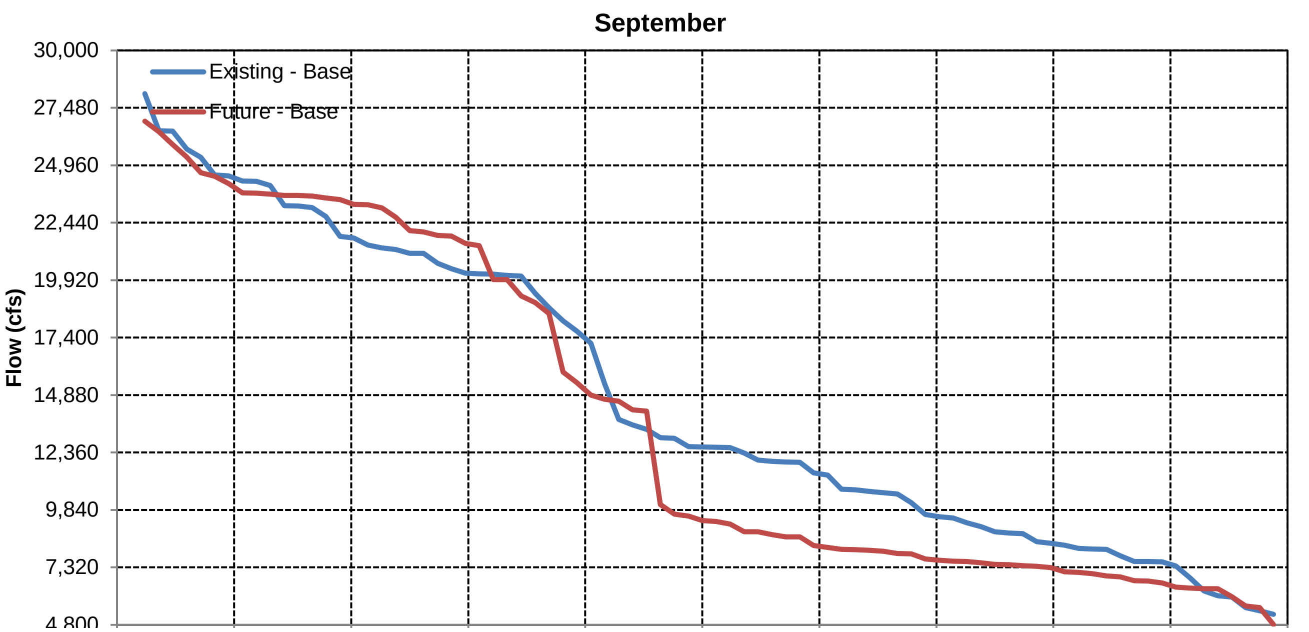
Sacramento River below Fremont Weir





Sacramento River below Fremont Weir





C160

Long-Term and Water Year-Type Average of Trinity Reservoir Under Existing - Base and Future - Base

	Average Storage (TAF)											
Analysis Period	October	November	December	January	February	March	April	May	June	July	August	September
Long-Term												
Full Simulation Period												
Existing - Base	1,276	1,285	1,370	1,501	1,641	1,769	1,902	1,832	1,743	1,596	1,445	1,326
Future - Base	1,111	1,121	1,232	1,403	1,575	1,712	1,826	1,701	1,582	1,421	1,271	1,160
Difference	-165	-164	-138	-98	-66	-57	-76	-131	-161	-175	-174	-167
Percent Difference	-13%	-13%	-10%	-6%	-4%	-3%	-4%	-7%	-9%	-11%	-12%	-13%
Water Year-Types												
Wet												
Existing - Base	1,352	1,401	1,574	1,777	1,943	2,063	2,232	2,168	2,045	1,906	1,771	1,629
Future - Base	1,184	1,226	1,437	1,697	1,906	2,037	2,189	2,064	1,903	1,750	1,604	1,455
Difference	-168	-175	-137	-80	-37	-26	-42	-104	-142	-156	-167	-174
Percent Difference	-12%	-12%	-9%	-5%	-2%	-1%	-2%	-5%	-7%	-8%	-9%	-11%
Above Normal												
Existing - Base	1,354	1,330	1,434	1,642	1,822	1,999	2,154	2,062	1,975	1,816	1,661	1,520
Future - Base	1,184	1,161	1,273	1,559	1,813	1,988	2,142	1,982	1,871	1,704	1,558	1,426
Difference	-170	-169	-161	-83	-10	-11	-12	-80	-104	-112	-103	-94
Percent Difference	-13%	-13%	-11%	-5%	-1%	-1%	-1%	-4%	-5%	-6%	-6%	-6%
Below Normal												
Existing - Base	1,248	1,259	1,287	1,409	1,560	1,708	1,857	1,790	1,716	1,581	1,414	1,315
Future - Base	1,148	1,147	1,220	1,391	1,539	1,694	1,829	1,709	1,610	1,441	1,284	1,186
Difference	-100	-112	-66	-18	-22	-13	-29	-81	-106	-139	-131	-129
Percent Difference	-8%	-9%	-5%	-1%	-1%	-1%	-2%	-5%	-6%	-9%	-9%	-10%
Dry												
Existing - Base	1,303	1,288	1,329	1,373	1,484	1,619	1,724	1,640	1,555	1,384	1,220	1,110
Future - Base	1,094	1,097	1,151	1,222	1,376	1,529	1,615	1,477	1,361	1,178	1,006	915
Difference	-209	-190	-178	-151	-108	-90	-110	-164	-194	-206	-214	-195
Percent Difference	-16%	-15%	-13%	-11%	-7%	-6%	-6%	-10%	-12%	-15%	-18%	-18%
Critical												
Existing - Base	1,041	1,030	1,052	1,087	1,153	1,212	1,267	1,214	1,174	1,038	895	807
Future - Base	875	866	898	942	1,012	1,077	1,102	1,022	960	834	714	656
Difference	-166	-164	-154	-145	-142	-135	-165	-192	-213	-204	-181	-151
Percent Difference	-16%	-16%	-15%	-13%	-12%	-11%	-13%	-16%	-18%	-20%	-20%	-19%

Trinity Reservoir

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	1,679	1,669	1,832	1,900	2,000	2,100	2,300	2,280	2,180	2,036	1,883	1,739
20%	1,561	1,564	1,651	1,871	2,000	2,100	2,253	2,180	2,061	1,899	1,757	1,620
30%	1,475	1,490	1,571	1,797	1,985	2,093	2,209	2,094	1,982	1,813	1,666	1,533
40%	1,391	1,375	1,503	1,663	1,844	2,014	2,151	2,039	1,892	1,736	1,573	1,442
50%	1,297	1,306	1,436	1,564	1,727	1,841	1,969	1,849	1,751	1,626	1,458	1,332
60%	1,211	1,218	1,325	1,409	1,575	1,748	1,859	1,779	1,680	1,531	1,369	1,247
70%	1,117	1,167	1,222	1,291	1,433	1,586	1,698	1,651	1,591	1,445	1,284	1,148
80%	969	979	1,041	1,144	1,328	1,452	1,593	1,574	1,453	1,293	1,119	1,009
90%	814	826	864	996	1,078	1,182	1,234	1,184	1,172	1,067	940	858
Long Term												
Full Simulation Period	1,276	1,285	1,370	1,501	1,641	1,769	1,902	1,832	1,743	1,596	1,445	1,326
Water Year Types												
Wet	1,352	1,401	1,574	1,777	1,943	2,063	2,232	2,168	2,045	1,906	1,771	1,629
Above Normal	1,354	1,330	1,434	1,642	1,822	1,999	2,154	2,062	1,975	1,816	1,661	1,520
Below Normal	1,248	1,259	1,287	1,409	1,560	1,708	1,857	1,790	1,716	1,581	1,414	1,315
Dry	1,303	1,288	1,329	1,373	1,484	1,619	1,724	1,640	1,555	1,384	1,220	1,110
Critical	1,041	1,030	1,052	1,087	1,153	1,212	1,267	1,214	1,174	1,038	895	807

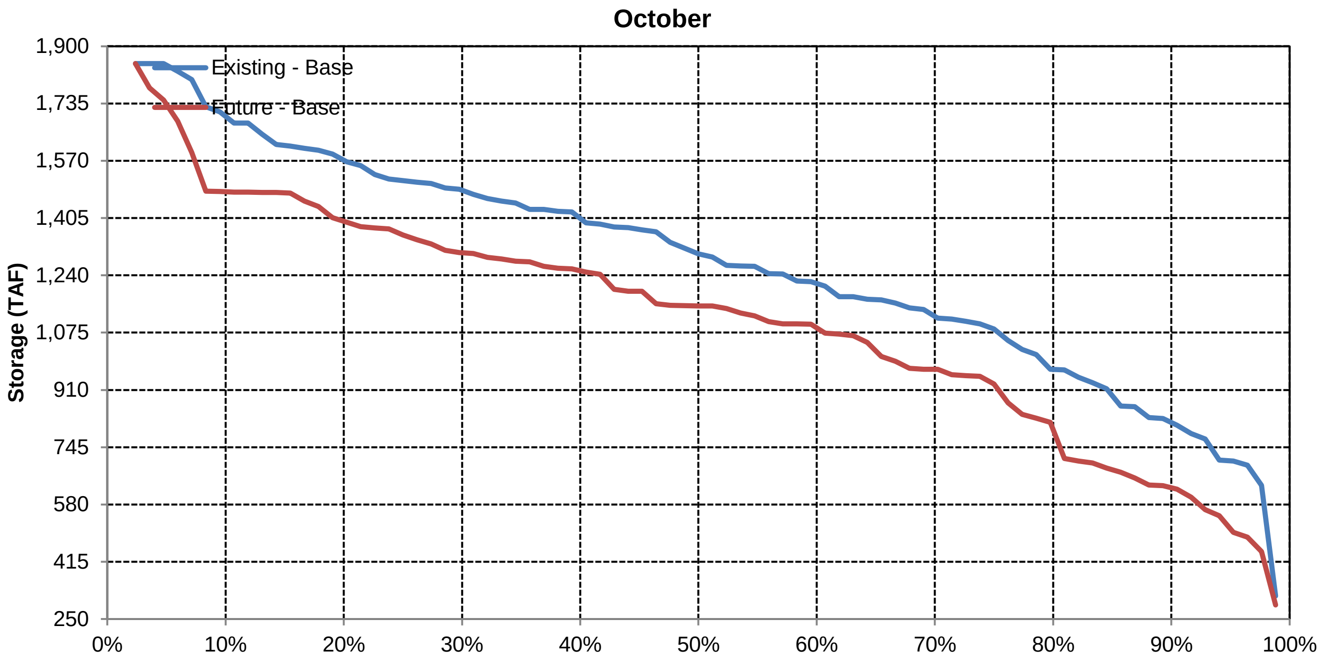
Future - Base

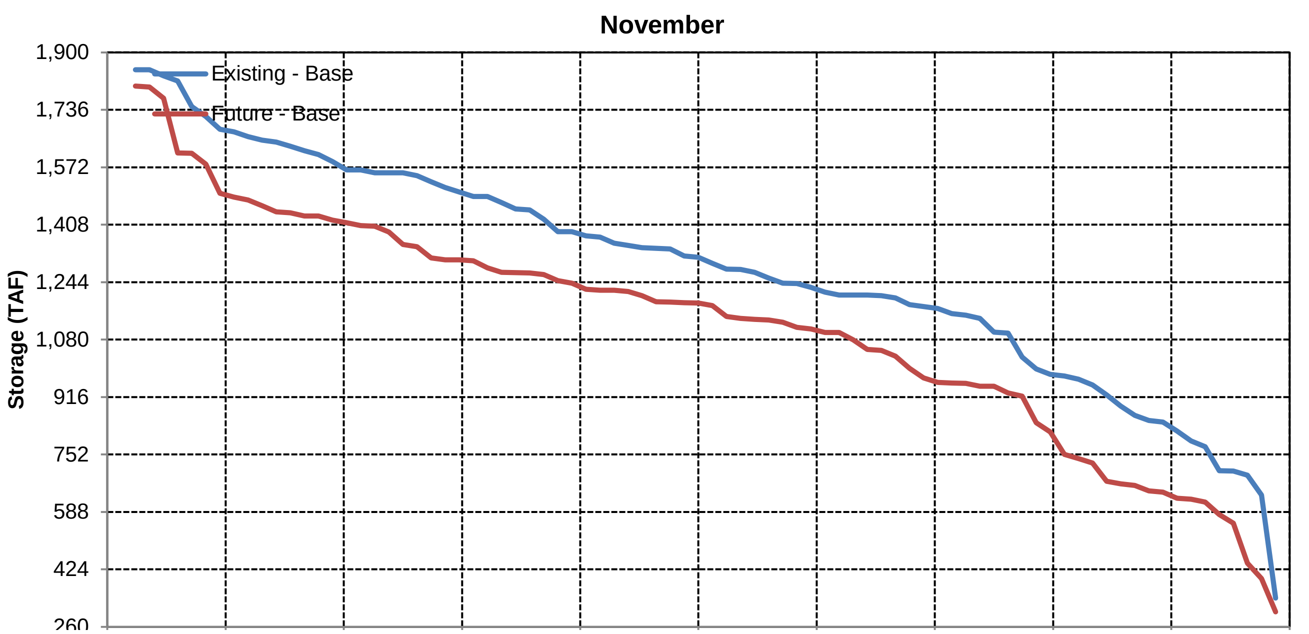
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	1,479	1,484	1,672	1,900	2,000	2,100	2,298	2,170	1,995	1,863	1,717	1,564
20%	1,385	1,408	1,506	1,818	2,000	2,100	2,233	2,088	1,943	1,791	1,642	1,492
30%	1,303	1,305	1,445	1,638	1,926	2,068	2,167	2,006	1,865	1,697	1,520	1,382
40%	1,248	1,223	1,368	1,593	1,752	1,981	2,113	1,903	1,752	1,562	1,407	1,270
50%	1,152	1,181	1,273	1,421	1,599	1,771	1,933	1,771	1,616	1,443	1,289	1,178
60%	1,079	1,102	1,198	1,304	1,496	1,662	1,745	1,636	1,564	1,378	1,236	1,106
70%	968	957	1,102	1,205	1,371	1,486	1,591	1,531	1,412	1,229	1,083	1,000
80%	775	791	913	1,023	1,256	1,390	1,496	1,376	1,279	1,090	931	846
90%	627	632	678	825	933	1,013	1,056	1,036	957	837	680	625
Long Term												
Full Simulation Period	1,111	1,121	1,232	1,403	1,575	1,712	1,826	1,701	1,582	1,421	1,271	1,160
Water Year Types												
Wet	1,184	1,226	1,437	1,697	1,906	2,037	2,189	2,064	1,903	1,750	1,604	1,455
Above Normal	1,184	1,161	1,273	1,559	1,813	1,988	2,142	1,982	1,871	1,704	1,558	1,426
Below Normal	1,148	1,147	1,220	1,391	1,539	1,694	1,829	1,709	1,610	1,441	1,284	1,186
Dry	1,094	1,097	1,151	1,222	1,376	1,529	1,615	1,477	1,361	1,178	1,006	915
Critical	875	866	898	942	1,012	1,077	1,102	1,022	960	834	714	656

Future - Base Minus Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	-199	-185	-159	0	0	0	-2	-110	-185	-173	-165	-175
20%	-175	-156	-145	-54	0	0	-21	-92	-118	-108	-115	-128
30%	-171	-185	-126	-159	-58	-26	-42	-88	-117	-116	-146	-151
40%	-143	-152	-135	-69	-92	-33	-38	-136	-140	-173	-167	-172
50%	-145	-126	-163	-143	-129	-70	-36	-78	-135	-183	-169	-154
60%	-132	-116	-127	-105	-79	-86	-114	-143	-116	-152	-133	-141
70%	-149	-210	-121	-87	-62	-100	-107	-120	-179	-216	-202	-148
80%	-194	-188	-129	-121	-73	-63	-97	-198	-174	-203	-188	-163
90%	-187	-194	-185	-171	-145	-169	-178	-147	-215	-230	-259	-233
Long Term												
Full Simulation Period	-165	-164	-138	-98	-66	-57	-76	-131	-161	-175	-174	-167
Water Year Types												
Wet	-168	-175	-137	-80	-37	-26	-42	-104	-142	-156	-167	-174
Above Normal	-170	-169	-161	-83	-10	-11	-12	-80	-104	-112	-103	-94
Below Normal	-100	-112	-66	-18	-22	-13	-29	-81	-106	-139	-131	-129
Dry	-209	-190	-178	-151	-108	-90	-110	-164	-194	-206	-214	-195
Critical	-166	-164	-154	-145	-142	-135	-165	-192	-213	-204	-181	-151

Trinity Reservoir





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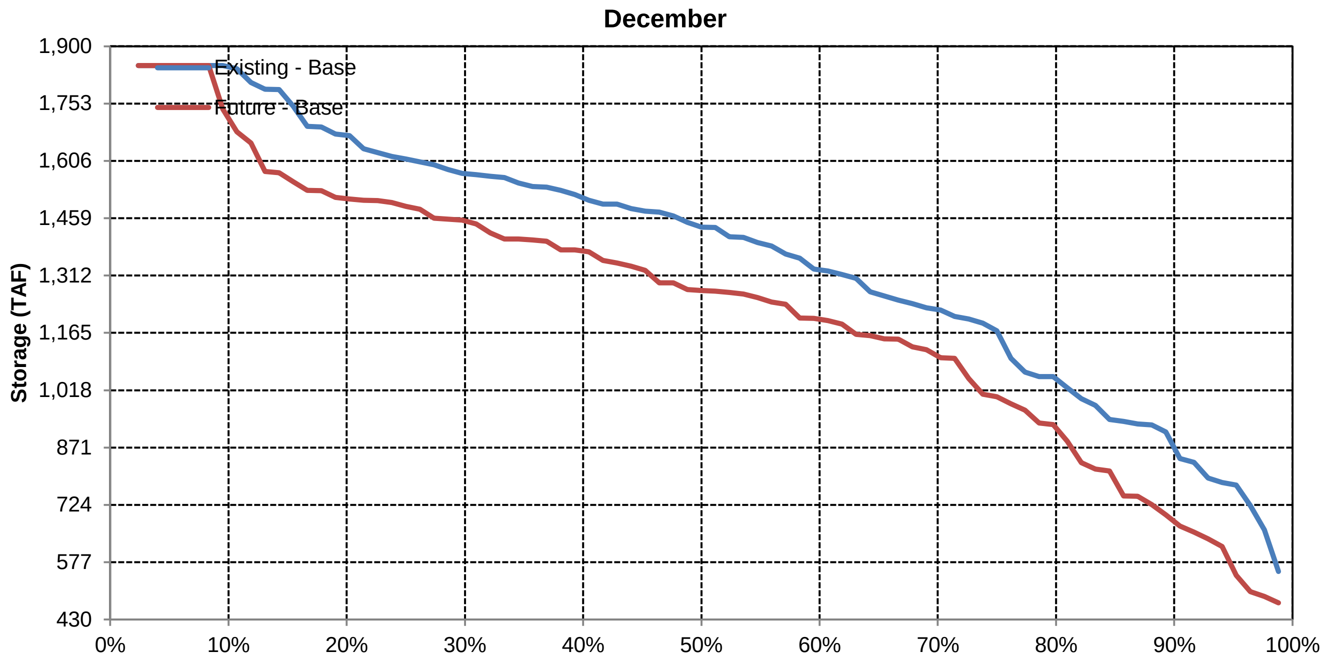
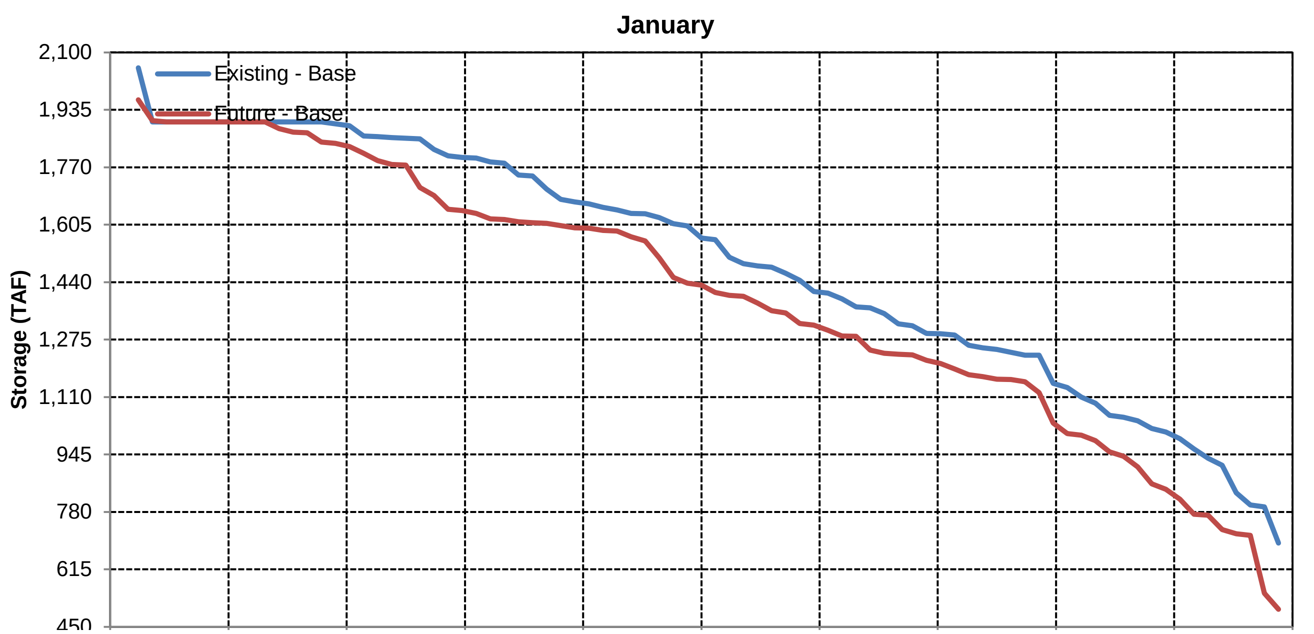
Trinity Reservoir





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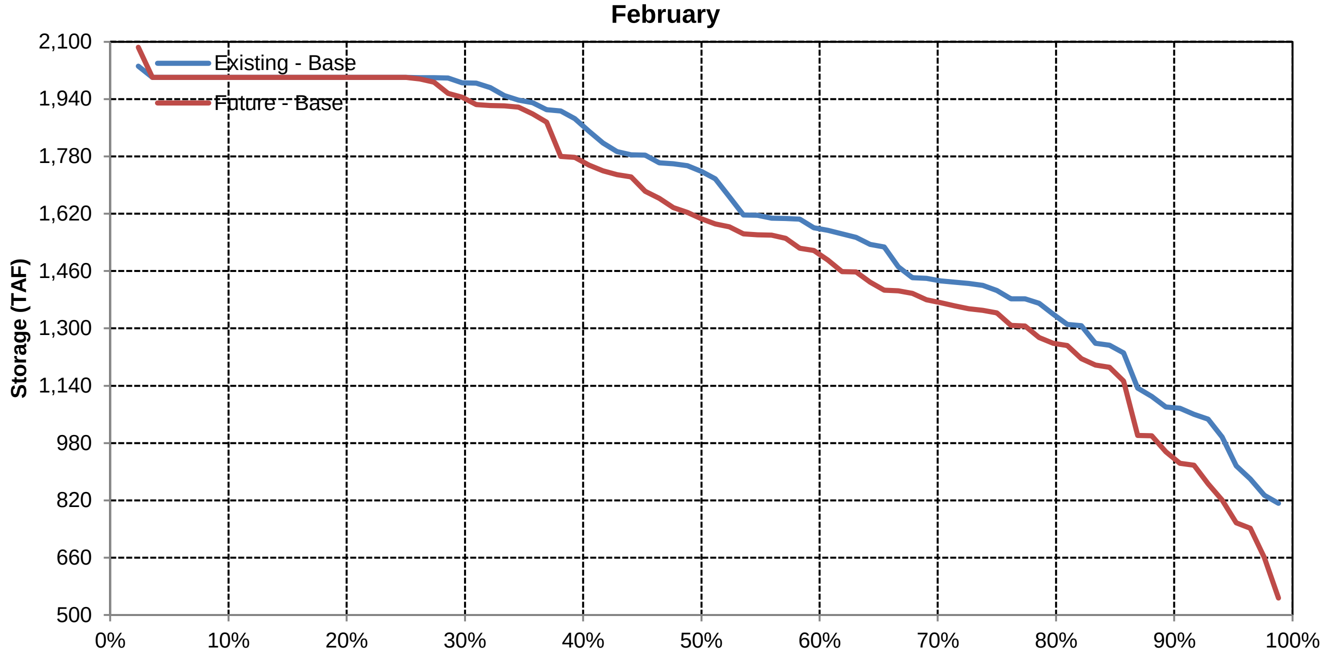

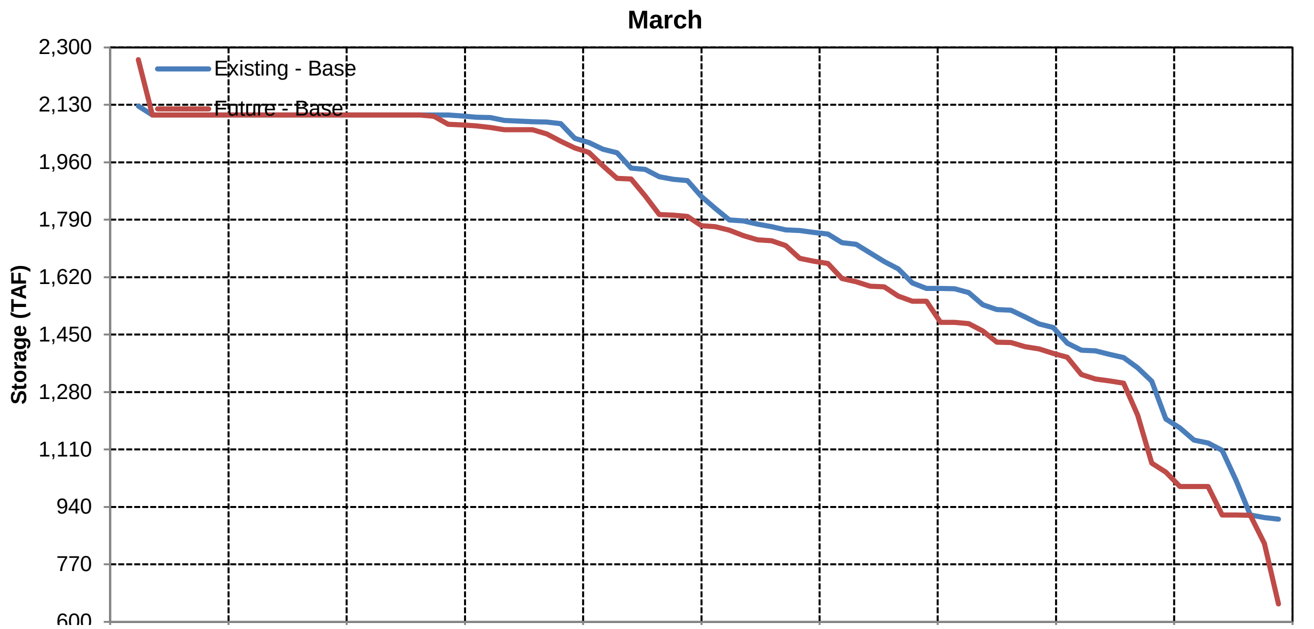

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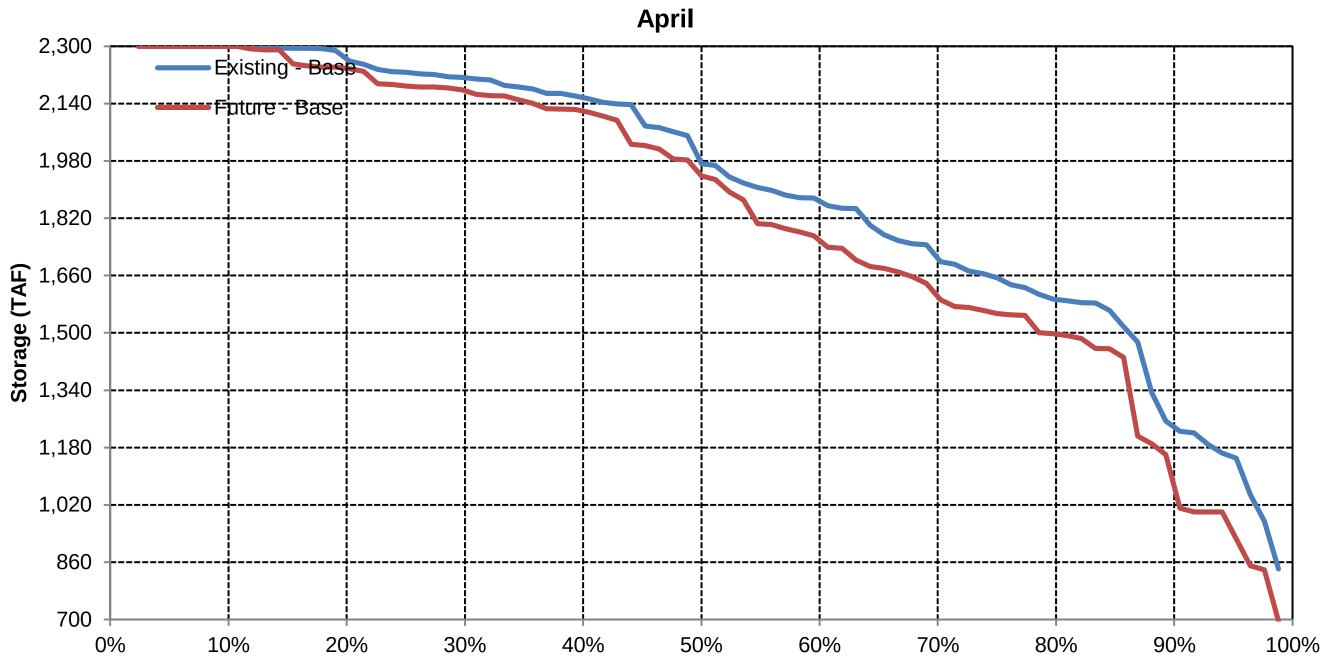

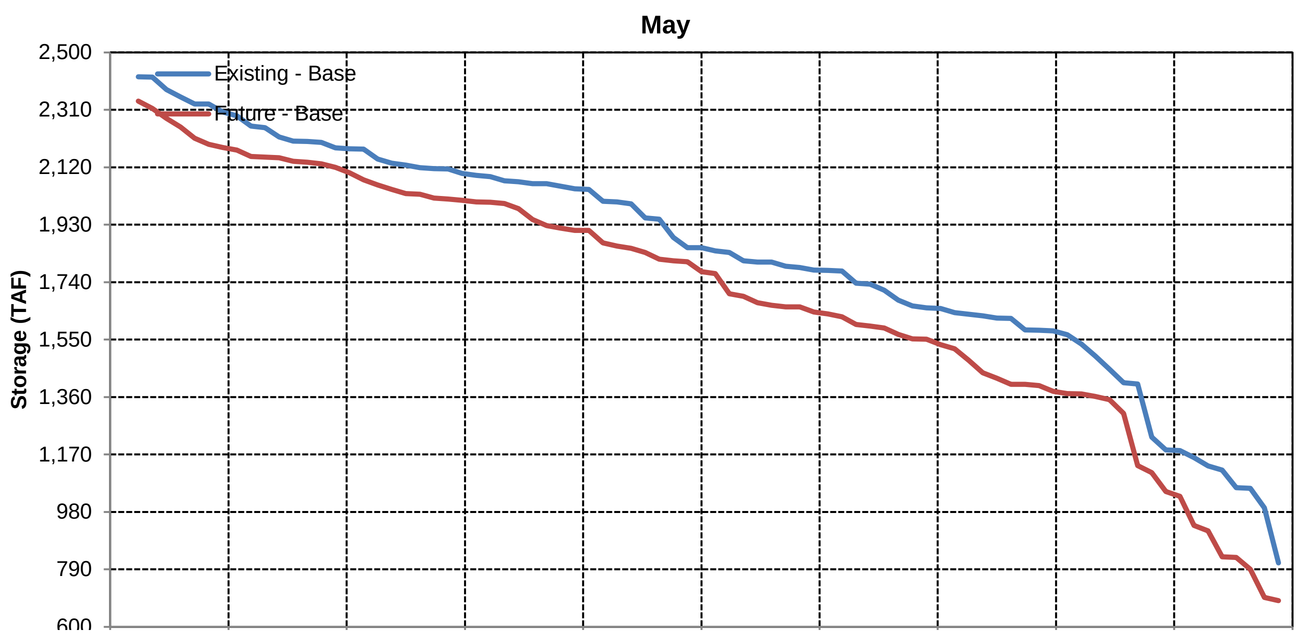

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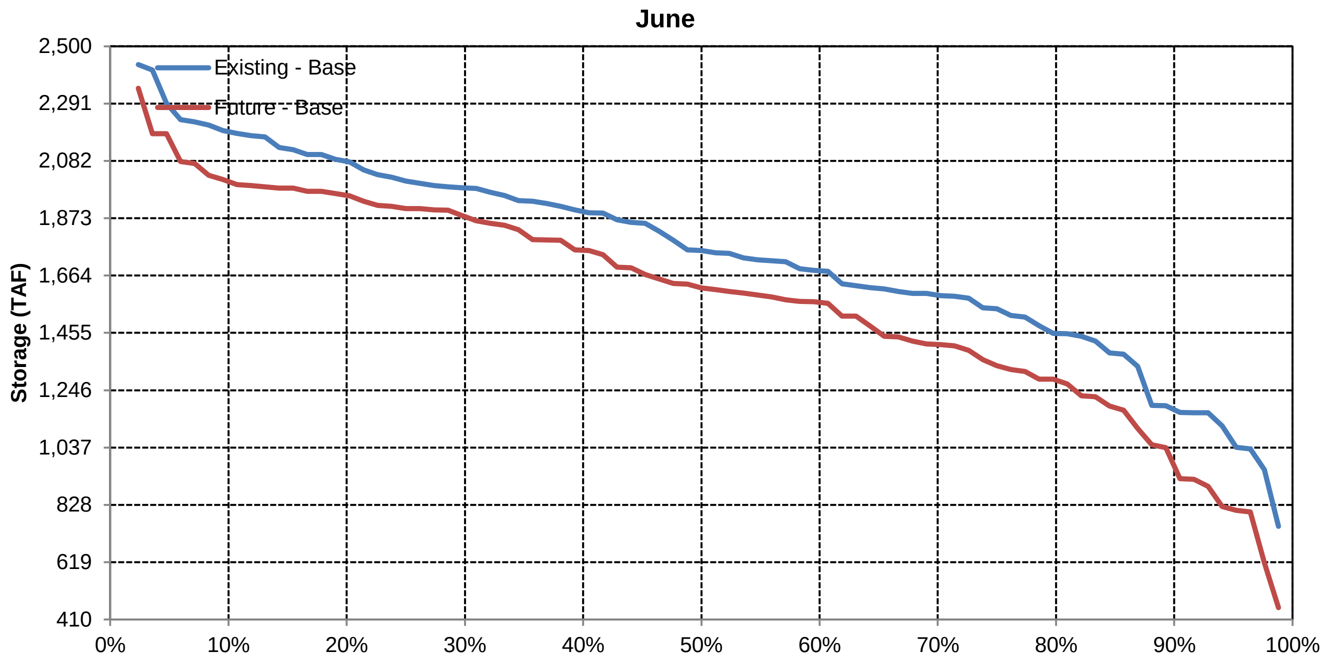
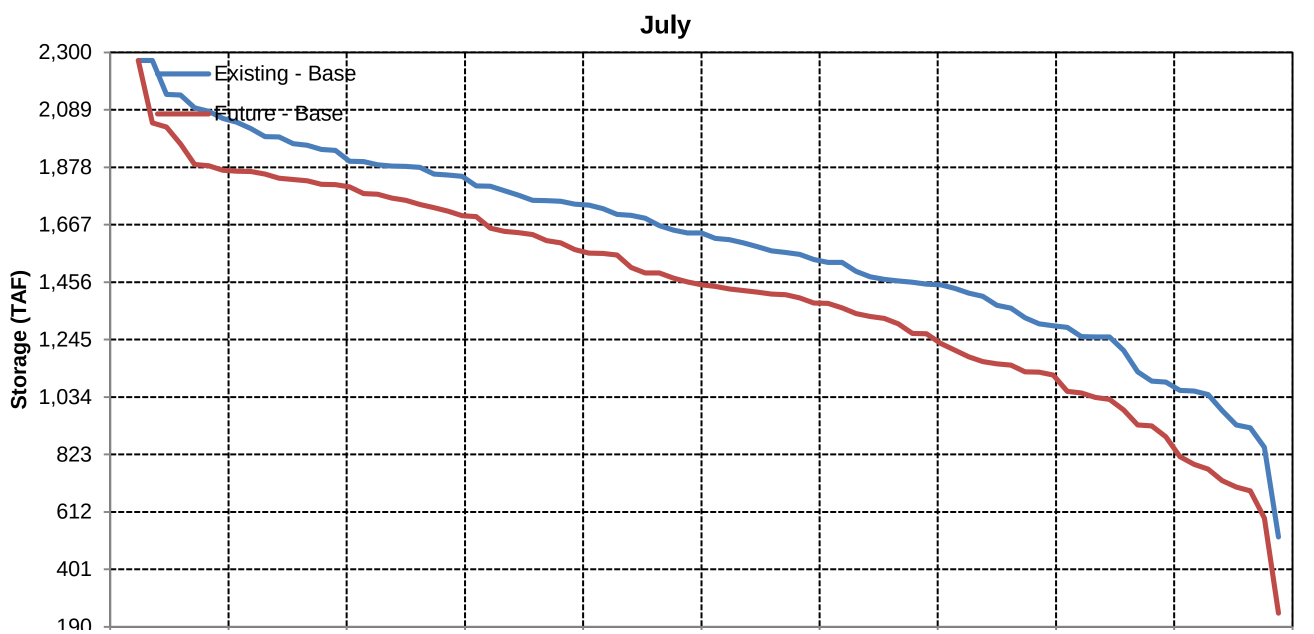
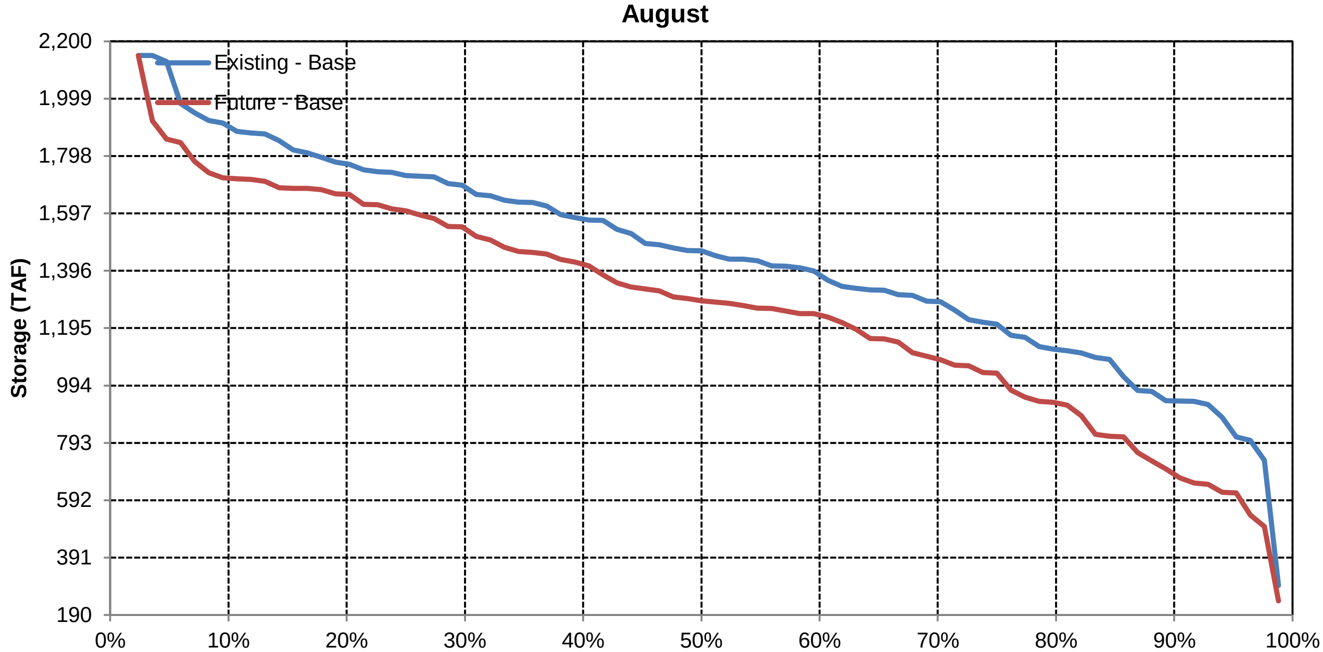
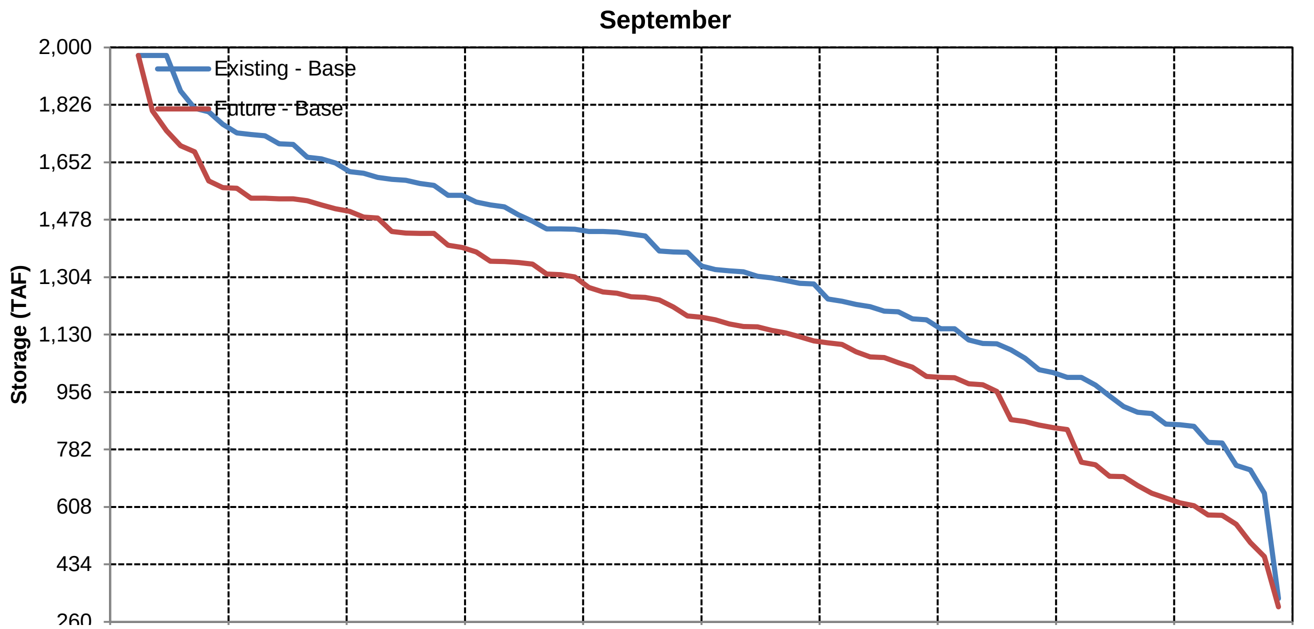




Trinity Reservoir





Long-Term and Water Year-Type Average of Shasta Reservoir Storage Under Existing - Base and Future - Base

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
						Long-Term						
Full Simulation Period												
Existing - Base	2,487	2,504	2,755	3,076	3,374	3,757	3,995	3,956	3,567	3,020	2,727	2,556
Future - Base	2,225	2,278	2,586	2,961	3,277	3,633	3,825	3,712	3,230	2,717	2,459	2,291
Difference	-262	-226	-169	-116	-97	-124	-170	-244	-337	-304	-268	-266
Percent Difference	-11%	-9%	-6%	-4%	-3%	-3%	-4%	-6%	-9%	-10%	-10%	-10%
						Water Year-Types						
Wet												
Existing - Base	2,613	2,702	3,100	3,440	3,579	3,865	4,280	4,388	4,084	3,560	3,256	2,842
Future - Base	2,396	2,480	2,989	3,394	3,578	3,842	4,228	4,235	3,803	3,242	2,994	2,526
Difference	-217	-222	-111	-46	-1	-23	-52	-153	-281	-318	-261	-317
Percent Difference	-8%	-8%	-4%	-1%	0%	-1%	-1%	-3%	-7%	-9%	-8%	-11%
Above Normal												
Existing - Base	2,537	2,485	2,766	3,212	3,572	4,014	4,364	4,325	3,912	3,323	3,009	2,768
Future - Base	2,332	2,398	2,734	3,276	3,538	4,067	4,380	4,287	3,779	3,188	2,931	2,693
Difference	-205	-87	-32	64	-34	53	16	-38	-133	-136	-78	-75
Percent Difference	-8%	-4%	-1%	2%	-1%	1%	0%	-1%	-3%	-4%	-3%	-3%
Below Normal												
Existing - Base	2,369	2,436	2,594	2,989	3,427	3,933	4,220	4,140	3,703	3,083	2,787	2,785
Future - Base	2,275	2,333	2,490	3,019	3,412	3,836	4,073	3,949	3,396	2,900	2,674	2,743
Difference	-94	-103	-105	30	-15	-97	-147	-192	-307	-183	-112	-42
Percent Difference	-4%	-4%	-4%	1%	0%	-2%	-3%	-5%	-8%	-6%	-4%	-2%
Dry												
Existing - Base	2,489	2,449	2,648	2,874	3,288	3,732	3,800	3,677	3,263	2,775	2,491	2,466
Future - Base	2,104	2,169	2,417	2,659	3,189	3,593	3,618	3,403	2,899	2,449	2,182	2,205
Difference	-386	-280	-231	-214	-99	-139	-182	-274	-364	-325	-308	-261
Percent Difference	-15%	-11%	-9%	-7%	-3%	-4%	-5%	-7%	-11%	-12%	-12%	-11%
Critical												
Existing - Base	2,338	2,278	2,396	2,576	2,786	3,059	2,976	2,802	2,354	1,832	1,572	1,547
Future - Base	1,906	1,851	1,965	2,171	2,385	2,631	2,519	2,310	1,855	1,394	1,094	1,067
Difference	-432	-427	-431	-405	-401	-428	-457	-492	-500	-438	-477	-480
Percent Difference	-18%	-19%	-18%	-16%	-14%	-14%	-15%	-18%	-21%	-24%	-30%	-31%

Shasta Reservoir Storage

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	3,244	3,235	3,326	3,635	3,894	4,241	4,535	4,552	4,292	3,804	3,449	3,173
20%	2,935	2,986	3,288	3,529	3,740	4,119	4,455	4,528	4,151	3,585	3,339	3,033
30%	2,796	2,765	3,252	3,373	3,662	4,036	4,356	4,434	4,067	3,445	3,153	2,831
40%	2,695	2,654	3,047	3,296	3,552	3,992	4,257	4,293	3,864	3,225	2,891	2,766
50%	2,563	2,574	2,797	3,246	3,471	3,906	4,206	4,183	3,681	3,093	2,805	2,667
60%	2,427	2,461	2,677	3,001	3,300	3,744	4,097	4,057	3,556	2,974	2,699	2,490
70%	2,318	2,318	2,503	2,902	3,251	3,531	3,948	3,837	3,399	2,816	2,509	2,373
80%	2,161	2,218	2,368	2,685	3,077	3,387	3,457	3,270	2,912	2,497	2,253	2,259
90%	1,751	1,763	1,960	2,366	2,766	3,186	3,065	2,980	2,526	2,019	1,715	1,746
Long Term												
Full Simulation Period	2,487	2,504	2,755	3,076	3,374	3,757	3,995	3,956	3,567	3,020	2,727	2,556
Water Year Types												
Wet	2,613	2,702	3,100	3,440	3,579	3,865	4,280	4,388	4,084	3,560	3,256	2,842
Above Normal	2,537	2,485	2,766	3,212	3,572	4,014	4,364	4,325	3,912	3,323	3,009	2,768
Below Normal	2,369	2,436	2,594	2,989	3,427	3,933	4,220	4,140	3,703	3,083	2,787	2,785
Dry	2,489	2,449	2,648	2,874	3,288	3,732	3,800	3,677	3,263	2,775	2,491	2,466
Critical	2,338	2,278	2,396	2,576	2,786	3,059	2,976	2,802	2,354	1,832	1,572	1,547

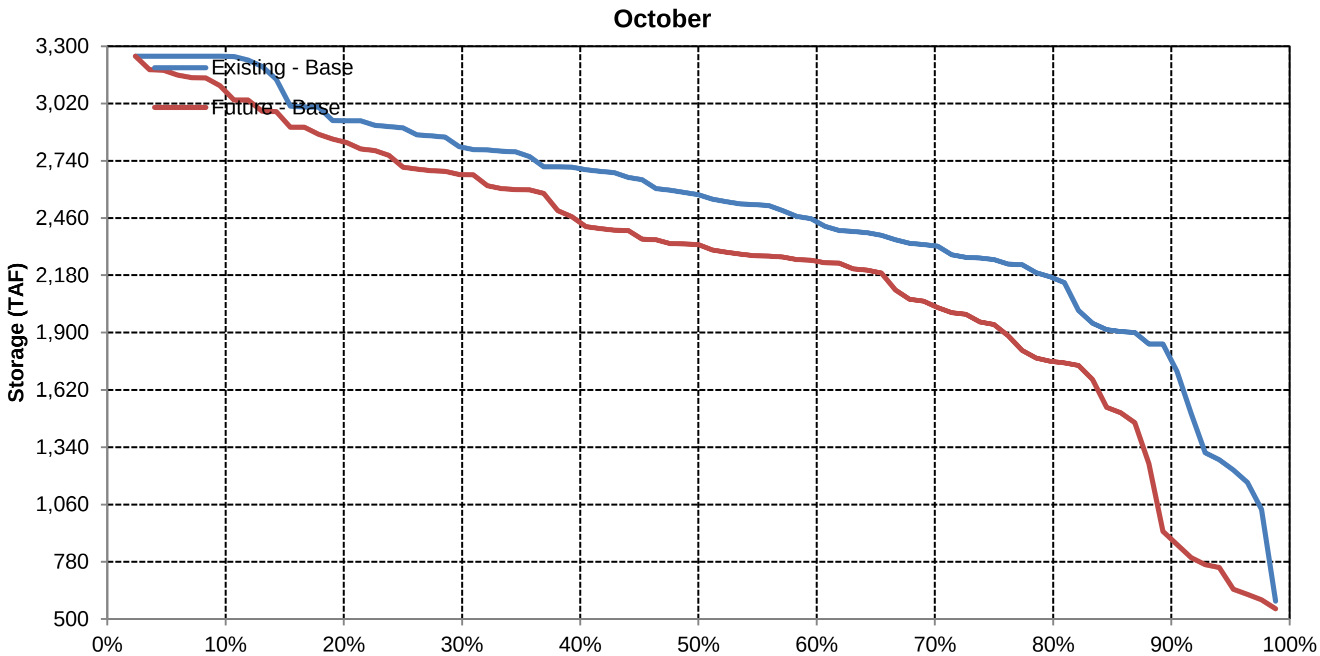
Future - Base

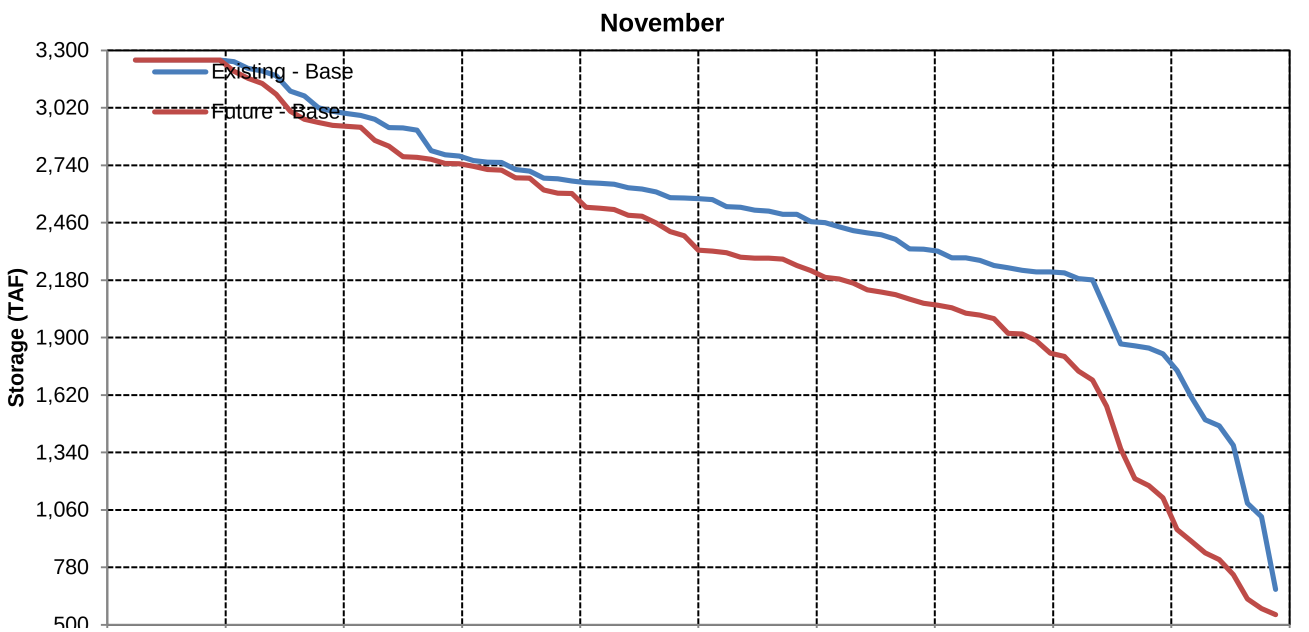
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	3,037	3,187	3,321	3,635	3,916	4,241	4,482	4,552	4,171	3,512	3,194	2,972
20%	2,810	2,927	3,266	3,539	3,777	4,102	4,372	4,324	3,882	3,302	3,029	2,858
30%	2,671	2,735	3,191	3,403	3,662	4,022	4,251	4,224	3,719	3,170	2,942	2,679
40%	2,416	2,533	2,985	3,335	3,537	3,963	4,176	4,142	3,568	3,039	2,823	2,536
50%	2,317	2,324	2,754	3,252	3,445	3,839	4,109	3,953	3,350	2,880	2,669	2,439
60%	2,245	2,200	2,545	2,973	3,289	3,597	4,009	3,839	3,203	2,755	2,499	2,338
70%	2,020	2,057	2,269	2,767	3,252	3,417	3,756	3,608	3,154	2,594	2,360	2,110
80%	1,757	1,817	2,045	2,429	2,913	3,266	3,216	2,997	2,618	2,141	1,806	1,824
90%	884	1,011	1,336	1,917	2,378	2,633	2,534	2,407	1,951	1,420	978	956
Long Term												
Full Simulation Period	2,225	2,278	2,586	2,961	3,277	3,633	3,825	3,712	3,230	2,717	2,459	2,291
Water Year Types												
Wet	2,396	2,480	2,989	3,394	3,578	3,842	4,228	4,235	3,803	3,242	2,994	2,526
Above Normal	2,332	2,398	2,734	3,276	3,538	4,067	4,380	4,287	3,779	3,188	2,931	2,693
Below Normal	2,275	2,333	2,490	3,019	3,412	3,836	4,073	3,949	3,396	2,900	2,674	2,743
Dry	2,104	2,169	2,417	2,659	3,189	3,593	3,618	3,403	2,899	2,449	2,182	2,205
Critical	1,906	1,851	1,965	2,171	2,385	2,631	2,519	2,310	1,855	1,394	1,094	1,067

Future - Base Minus Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	-207	-48	-5	-1	22	0	-54	0	-122	-292	-254	-201
20%	-125	-59	-22	10	37	-17	-83	-204	-269	-283	-310	-175
30%	-125	-29	-61	30	0	-14	-105	-209	-347	-274	-210	-151
40%	-279	-121	-62	39	-15	-29	-81	-151	-296	-186	-69	-231
50%	-246	-251	-42	6	-26	-67	-97	-230	-331	-212	-136	-228
60%	-182	-262	-132	-28	-12	-147	-88	-218	-354	-219	-200	-152
70%	-297	-262	-234	-136	1	-114	-192	-229	-245	-221	-149	-264
80%	-404	-401	-324	-257	-164	-121	-240	-273	-294	-356	-447	-435
90%	-866	-752	-625	-448	-388	-553	-531	-573	-575	-599	-737	-790
Long Term												
Full Simulation Period	-262	-226	-169	-116	-97	-124	-170	-244	-337	-304	-268	-266
Water Year Types												
Wet	-217	-222	-111	-46	-1	-23	-52	-153	-281	-318	-261	-317
Above Normal	-205	-87	-32	64	-34	53	16	-38	-133	-136	-78	-75
Below Normal	-94	-103	-105	30	-15	-97	-147	-192	-307	-183	-112	-42
Dry	-386	-280	-231	-214	-99	-139	-182	-274	-364	-325	-308	-261
Critical	-432	-427	-431	-405	-401	-428	-457	-492	-500	-438	-477	-480

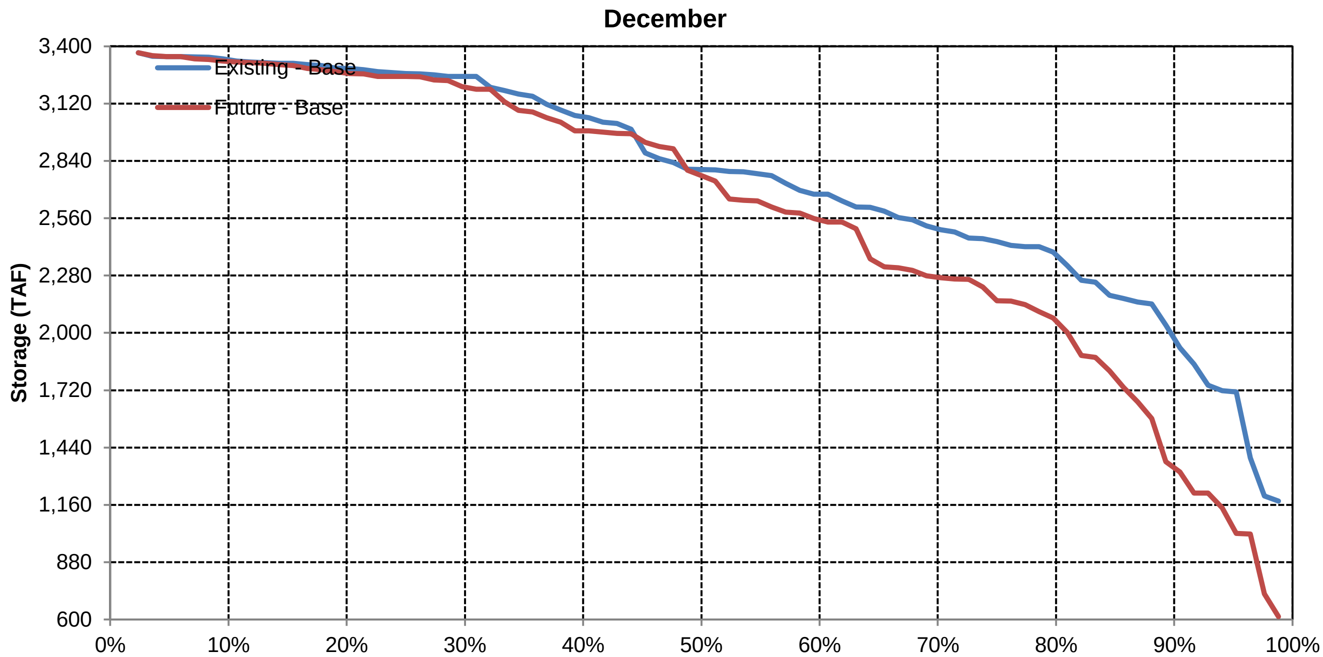
Shasta Reservoir Storage

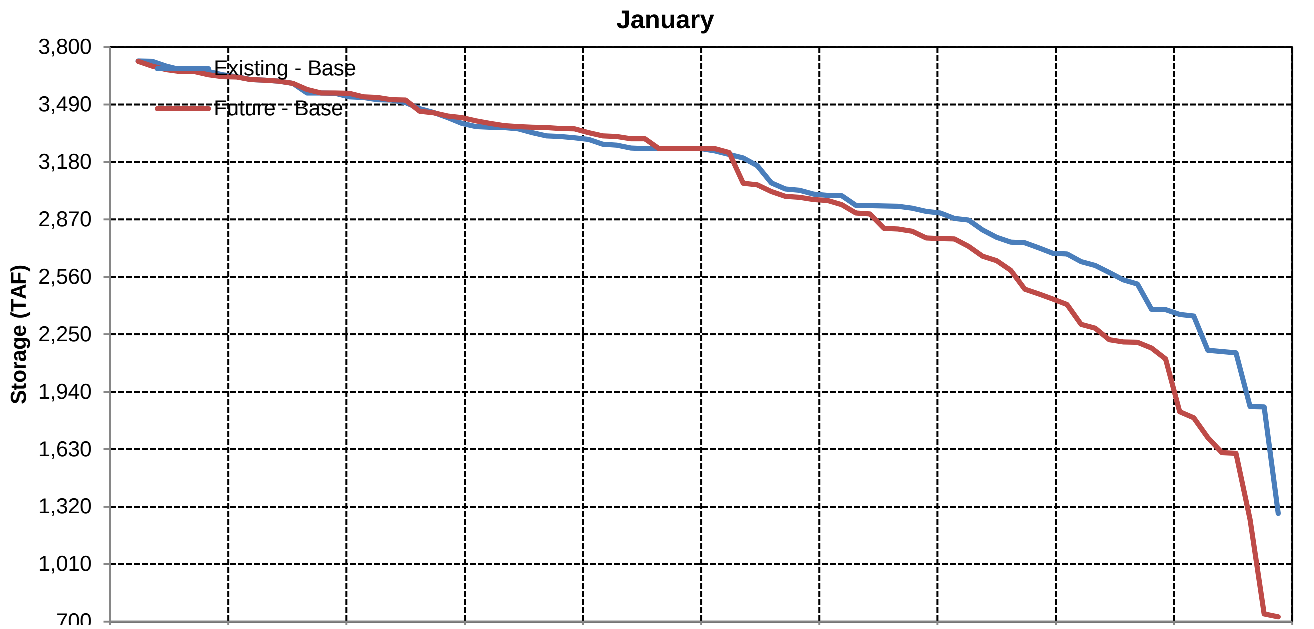




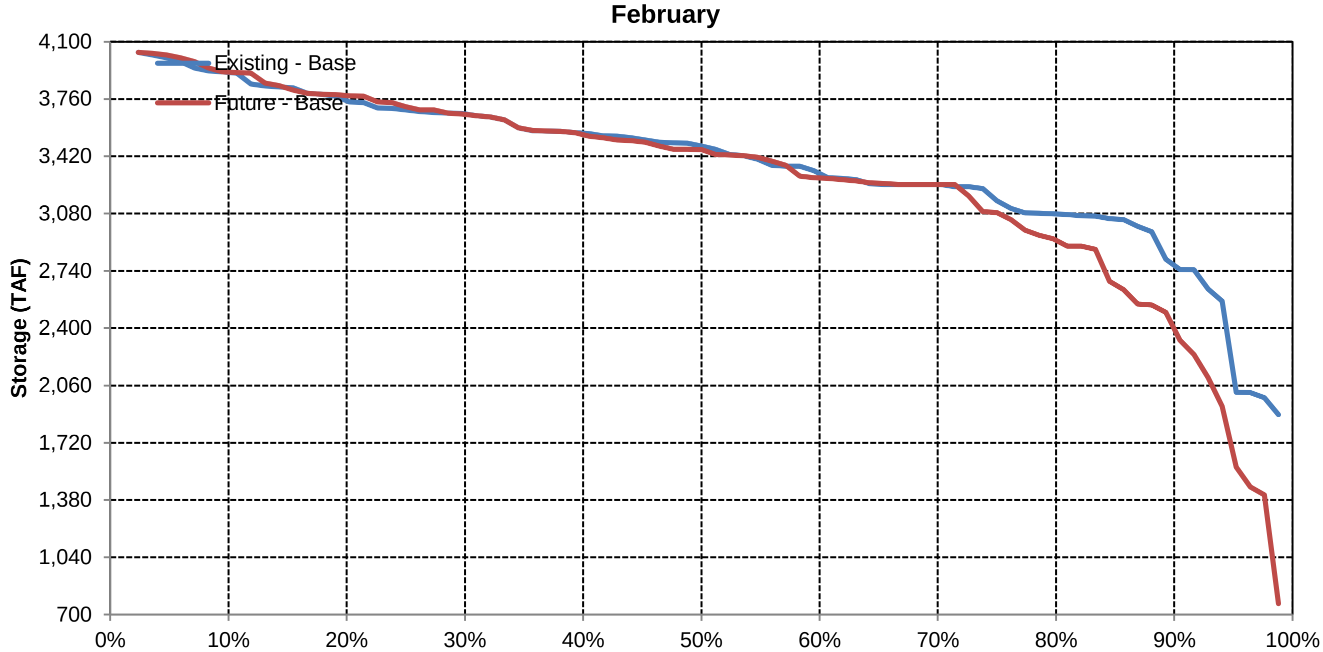
S4

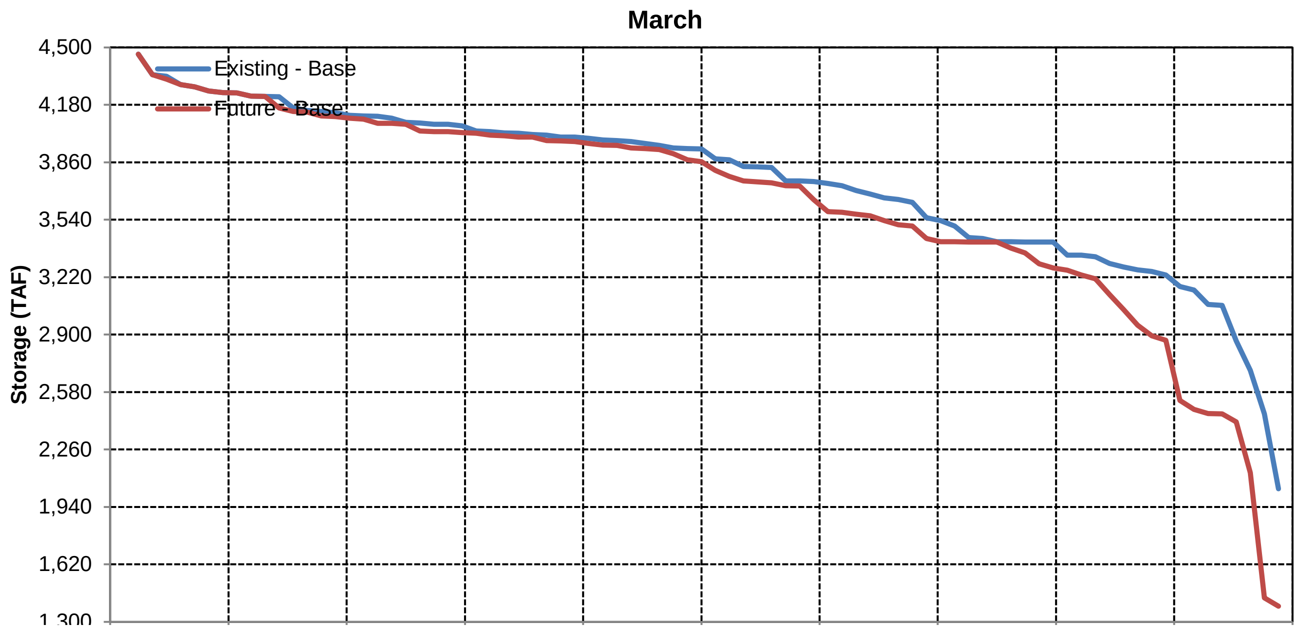
Shasta Reservoir Storage



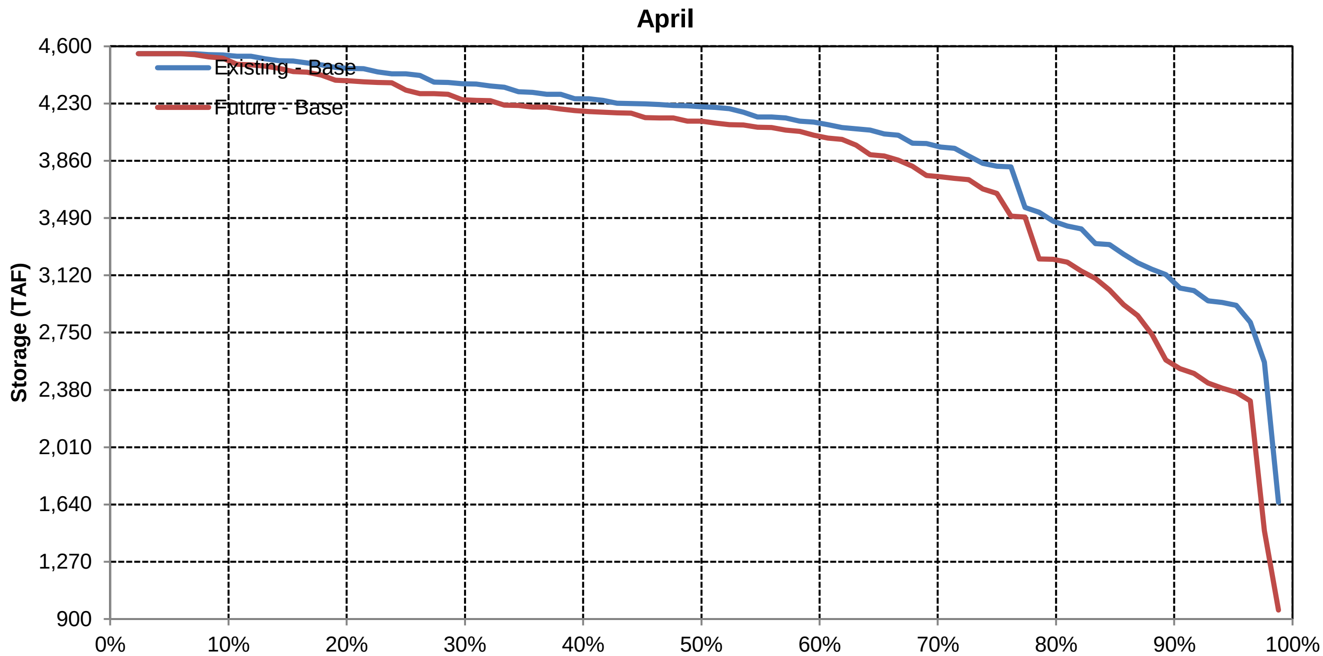


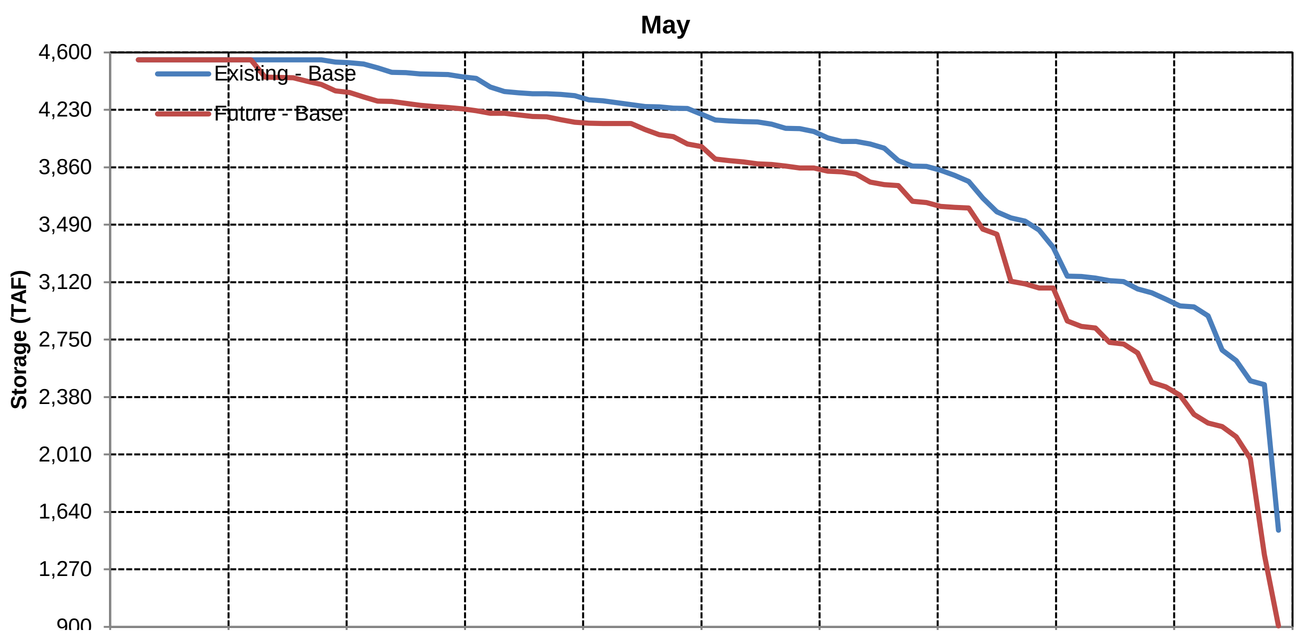
Shasta Reservoir Storage





Shasta Reservoir Storage





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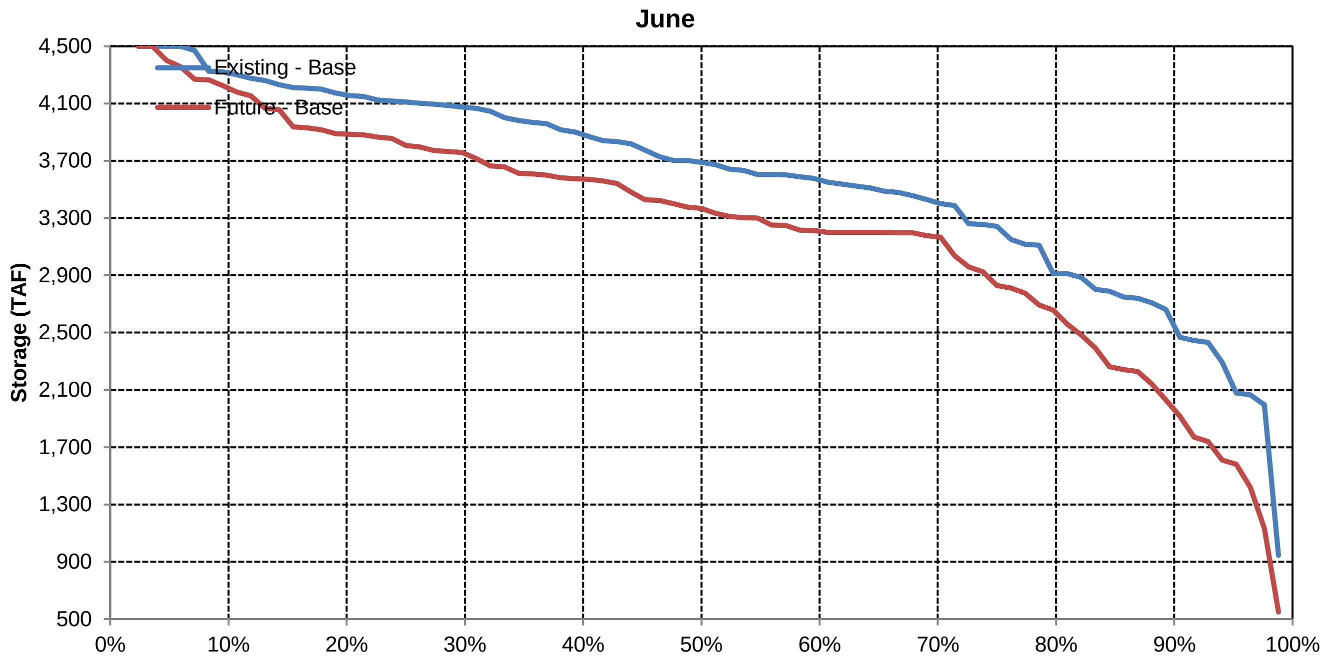
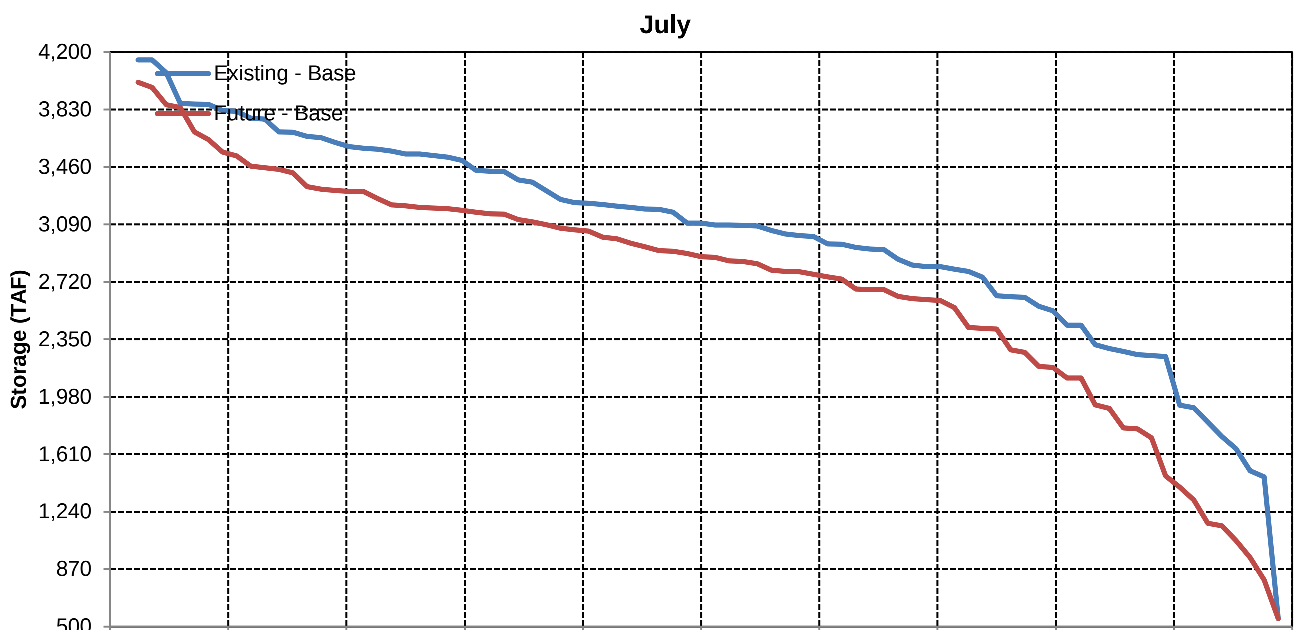
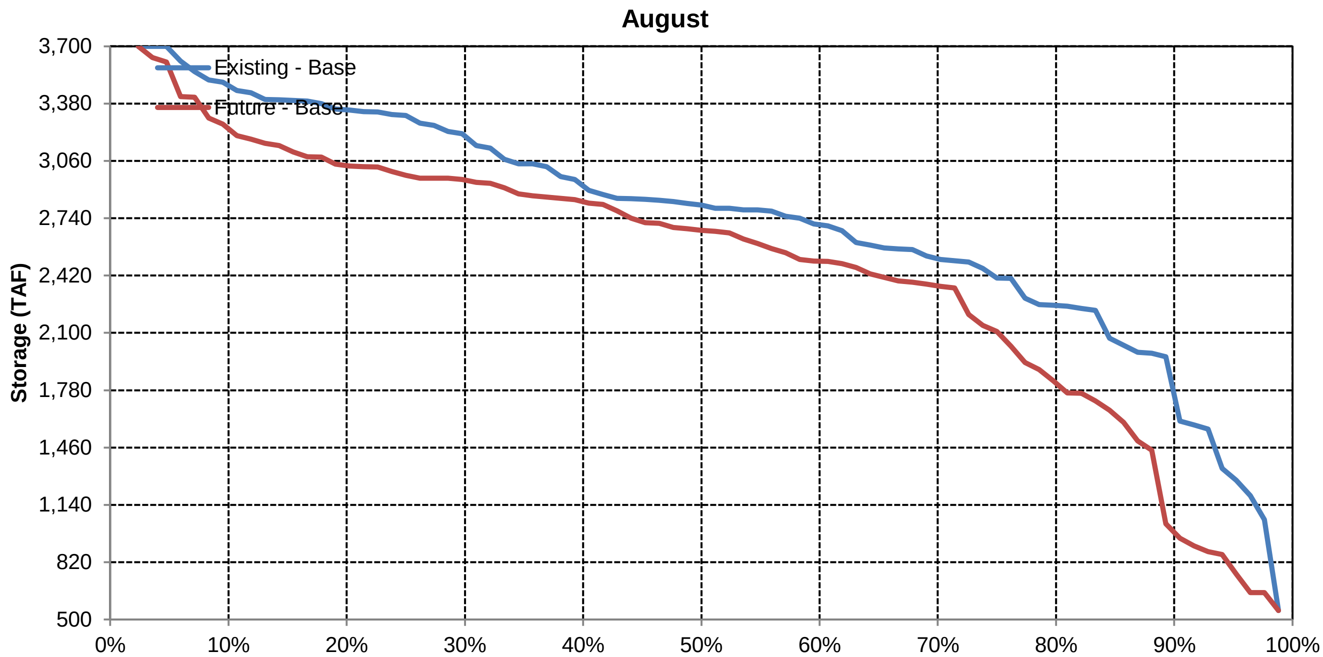
Shasta Reservoir Storage

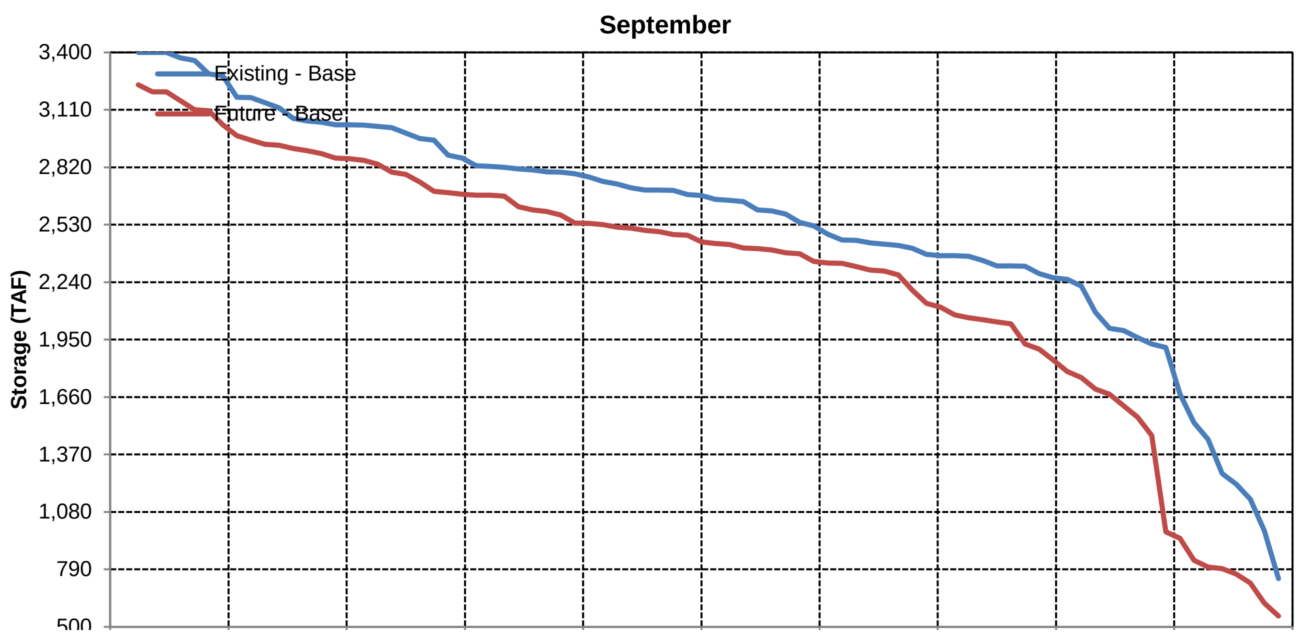




S4

Shasta Reservoir Storage





Long-Term and Water Year-Type Average of Oroville Reservoir Under Existing - Base and Future - Base

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
						Long-Term						
Full Simulation Period												
Existing - Base	1,375	1,426	1,653	1,978	2,289	2,521	2,733	2,764	2,570	2,055	1,720	1,475
Future - Base	1,244	1,285	1,585	1,975	2,295	2,515	2,665	2,627	2,322	1,842	1,548	1,355
Difference	-131	-141	-68	-3	6	-6	-68	-137	-249	-213	-172	-120
Percent Difference	-10%	-10%	-4%	0%	0%	0%	-2%	-5%	-10%	-10%	-10%	-8%
						Water Year-Types						
Wet												
Existing - Base	1,516	1,714	2,247	2,673	2,864	2,952	3,256	3,383	3,246	2,729	2,371	1,947
Future - Base	1,339	1,496	2,168	2,719	2,891	2,940	3,223	3,257	2,987	2,389	2,023	1,633
Difference	-178	-218	-78	46	27	-12	-33	-126	-259	-341	-348	-314
Percent Difference	-12%	-13%	-3%	2%	1%	0%	-1%	-4%	-8%	-12%	-15%	-16%
Above Normal												
Existing - Base	1,465	1,439	1,710	2,291	2,764	2,945	3,251	3,314	3,133	2,506	2,052	1,703
Future - Base	1,447	1,447	1,640	2,269	2,768	2,962	3,196	3,169	2,777	2,174	1,831	1,539
Difference	-18	8	-70	-22	4	17	-55	-145	-355	-332	-222	-164
Percent Difference	-1%	1%	-4%	-1%	0%	1%	-2%	-4%	-11%	-13%	-11%	-10%
Below Normal												
Existing - Base	1,400	1,431	1,460	1,738	2,132	2,519	2,765	2,772	2,519	1,889	1,450	1,333
Future - Base	1,249	1,221	1,348	1,711	2,121	2,564	2,712	2,662	2,276	1,745	1,468	1,397
Difference	-150	-211	-112	-28	-11	44	-53	-110	-243	-144	18	64
Percent Difference	-11%	-15%	-8%	-2%	0%	2%	-2%	-4%	-10%	-8%	1%	5%
Dry												
Existing - Base	1,217	1,186	1,283	1,463	1,859	2,221	2,348	2,304	2,058	1,571	1,315	1,149
Future - Base	1,100	1,111	1,253	1,469	1,902	2,247	2,284	2,176	1,845	1,457	1,207	1,161
Difference	-117	-74	-30	7	43	26	-64	-128	-213	-114	-108	12
Percent Difference	-10%	-6%	-2%	0%	2%	1%	-3%	-6%	-10%	-7%	-8%	1%
Critical												
Existing - Base	1,167	1,125	1,125	1,245	1,411	1,604	1,597	1,528	1,356	1,082	952	901
Future - Base	1,087	1,038	1,079	1,222	1,410	1,580	1,555	1,479	1,306	1,102	916	863
Difference	-80	-88	-46	-23	0	-24	-42	-50	-50	20	-37	-37
Percent Difference	-7%	-8%	-4%	-2%	0%	-1%	-3%	-3%	-4%	2%	-4%	-4%

Oroville Reservoir

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	2,048	2,100	2,788	2,852	2,973	3,062	3,347	3,538	3,464	2,932	2,540	2,049
20%	1,690	1,724	2,266	2,788	2,821	2,991	3,279	3,429	3,319	2,720	2,274	1,870
30%	1,557	1,571	1,864	2,609	2,788	2,938	3,234	3,313	3,103	2,478	2,087	1,726
40%	1,418	1,455	1,626	2,184	2,788	2,817	3,162	3,202	2,948	2,271	1,793	1,522
50%	1,255	1,303	1,474	1,911	2,537	2,788	3,042	2,980	2,730	2,097	1,619	1,391
60%	1,195	1,197	1,303	1,674	2,093	2,588	2,813	2,722	2,447	1,842	1,446	1,289
70%	1,027	1,088	1,226	1,470	1,932	2,306	2,344	2,503	2,236	1,596	1,366	1,196
80%	998	1,019	1,128	1,352	1,643	2,058	2,129	2,080	1,885	1,434	1,135	1,012
90%	885	956	992	1,085	1,275	1,582	1,648	1,551	1,356	1,036	898	852
Long Term												
Full Simulation Period	1,375	1,426	1,653	1,978	2,289	2,521	2,733	2,764	2,570	2,055	1,720	1,475
Water Year Types												
Wet	1,516	1,714	2,247	2,673	2,864	2,952	3,256	3,383	3,246	2,729	2,371	1,947
Above Normal	1,465	1,439	1,710	2,291	2,764	2,945	3,251	3,314	3,133	2,506	2,052	1,703
Below Normal	1,400	1,431	1,460	1,738	2,132	2,519	2,765	2,772	2,519	1,889	1,450	1,333
Dry	1,217	1,186	1,283	1,463	1,859	2,221	2,348	2,304	2,058	1,571	1,315	1,149
Critical	1,167	1,125	1,125	1,245	1,411	1,604	1,597	1,528	1,356	1,082	952	901

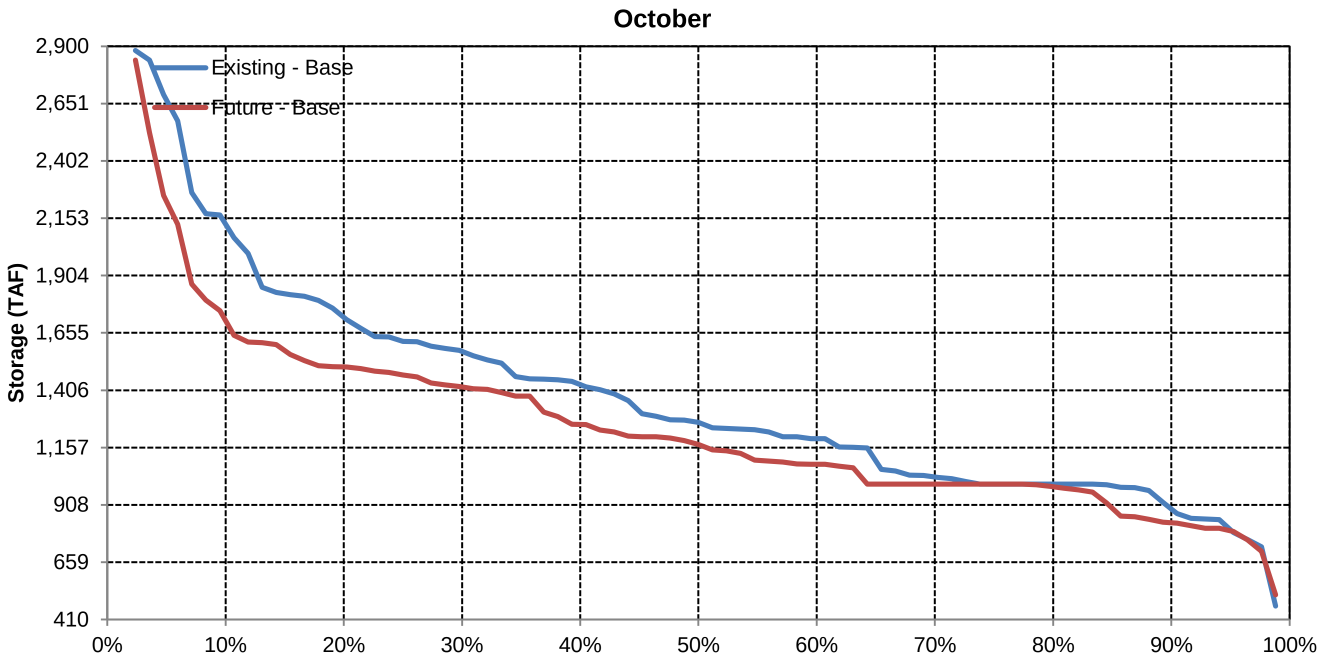
Future - Base

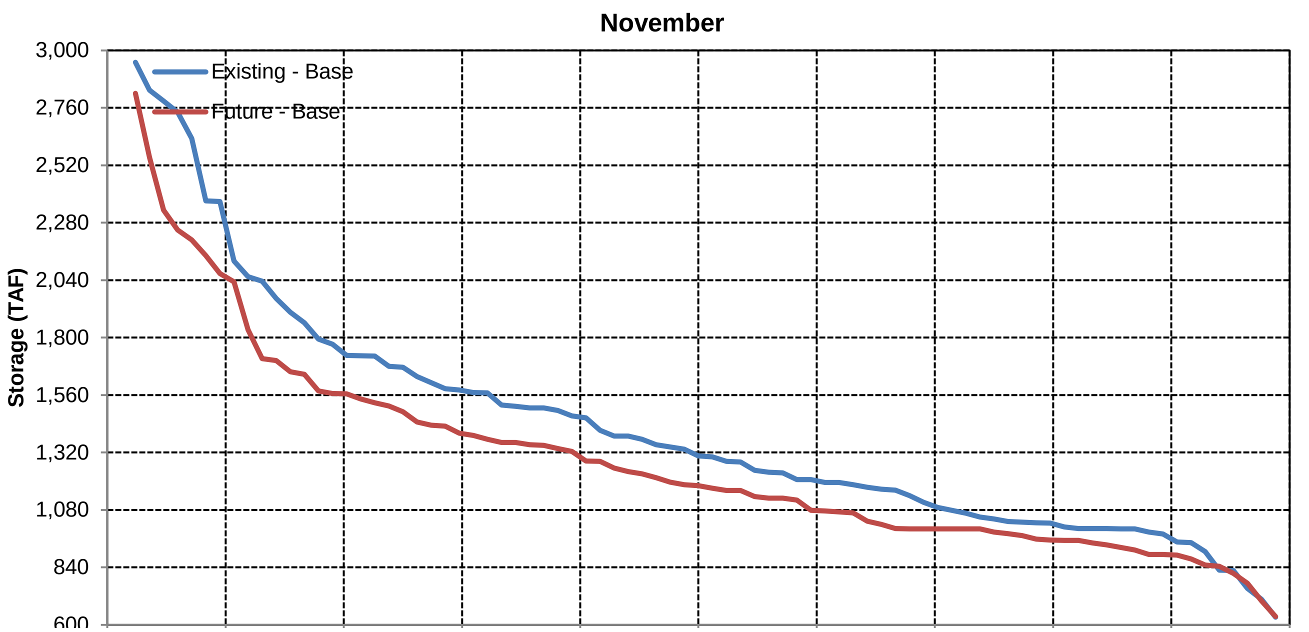
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	1,636	1,973	2,788	2,854	2,994	3,059	3,347	3,446	3,357	2,744	2,228	1,836
20%	1,502	1,552	2,259	2,788	2,856	2,991	3,237	3,254	3,034	2,401	2,003	1,666
30%	1,413	1,392	1,723	2,787	2,788	2,938	3,180	3,142	2,680	2,176	1,819	1,572
40%	1,252	1,284	1,473	2,185	2,788	2,833	3,081	3,034	2,528	1,958	1,679	1,439
50%	1,159	1,175	1,411	1,820	2,492	2,788	2,979	2,790	2,386	1,840	1,570	1,325
60%	1,084	1,076	1,258	1,613	2,165	2,539	2,672	2,667	2,222	1,693	1,307	1,222
70%	998	1,001	1,180	1,458	1,946	2,268	2,297	2,185	1,924	1,499	1,201	1,097
80%	985	953	1,002	1,258	1,538	1,950	2,026	1,954	1,706	1,328	1,052	995
90%	829	891	941	1,010	1,262	1,594	1,557	1,411	1,216	1,006	916	879
Long Term												
Full Simulation Period	1,244	1,285	1,585	1,975	2,295	2,515	2,665	2,627	2,322	1,842	1,548	1,355
Water Year Types												
Wet	1,339	1,496	2,168	2,719	2,891	2,940	3,223	3,257	2,987	2,389	2,023	1,633
Above Normal	1,447	1,447	1,640	2,269	2,768	2,962	3,196	3,169	2,777	2,174	1,831	1,539
Below Normal	1,249	1,221	1,348	1,711	2,121	2,564	2,712	2,662	2,276	1,745	1,468	1,397
Dry	1,100	1,111	1,253	1,469	1,902	2,247	2,284	2,176	1,845	1,457	1,207	1,161
Critical	1,087	1,038	1,079	1,222	1,410	1,580	1,555	1,479	1,306	1,102	916	863

Future - Base Minus Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	-412	-127	0	2	21	-3	0	-92	-107	-188	-311	-213
20%	-187	-172	-6	0	35	0	-42	-175	-285	-319	-271	-204
30%	-144	-179	-141	178	0	0	-54	-171	-423	-302	-268	-154
40%	-167	-170	-152	1	0	16	-81	-168	-421	-313	-114	-83
50%	-95	-128	-62	-91	-46	0	-64	-190	-344	-258	-49	-67
60%	-111	-121	-45	-61	72	-49	-141	-55	-224	-149	-138	-67
70%	-29	-87	-46	-12	14	-38	-47	-318	-312	-96	-166	-99
80%	-13	-65	-126	-94	-105	-108	-104	-126	-179	-106	-83	-17
90%	-56	-65	-51	-75	-13	12	-92	-140	-140	-30	19	26
Long Term												
Full Simulation Period	-131	-141	-68	-3	6	-6	-68	-137	-249	-213	-172	-120
Water Year Types												
Wet	-178	-218	-78	46	27	-12	-33	-126	-259	-341	-348	-314
Above Normal	-18	8	-70	-22	4	17	-55	-145	-355	-332	-222	-164
Below Normal	-150	-211	-112	-28	-11	44	-53	-110	-243	-144	18	64
Dry	-117	-74	-30	7	43	26	-64	-128	-213	-114	-108	12
Critical	-80	-88	-46	-23	0	-24	-42	-50	-50	20	-37	-37

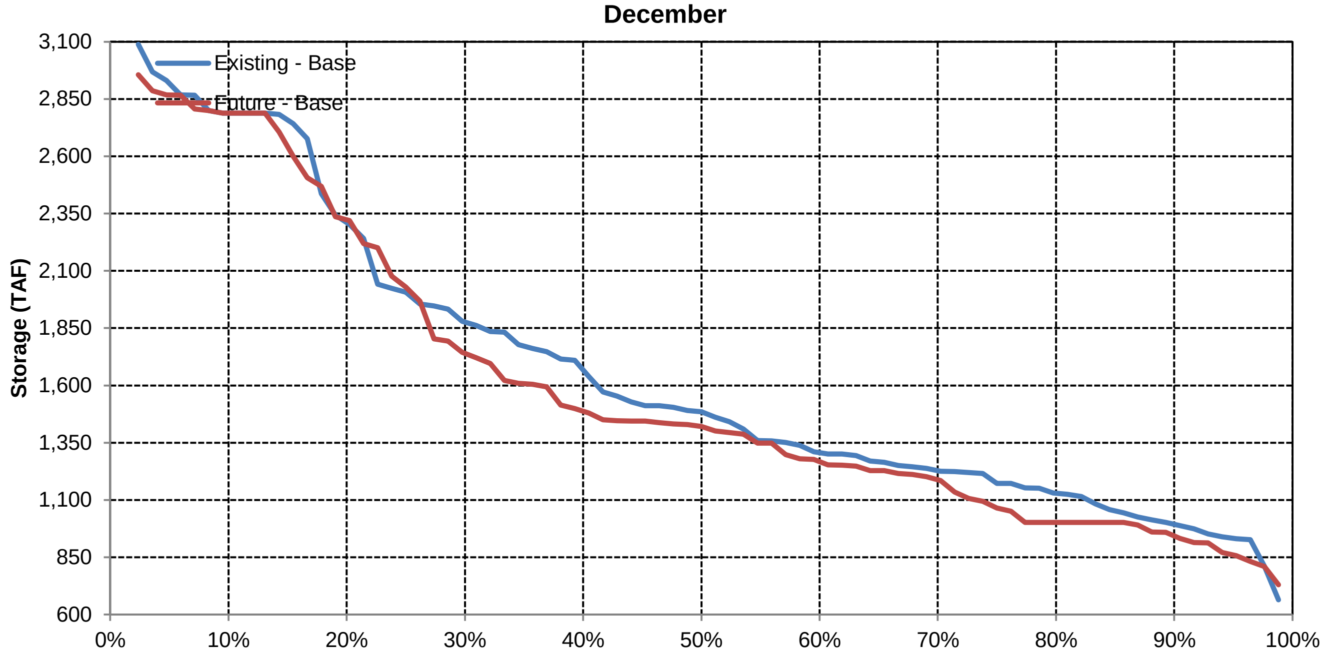
Oroville Reservoir

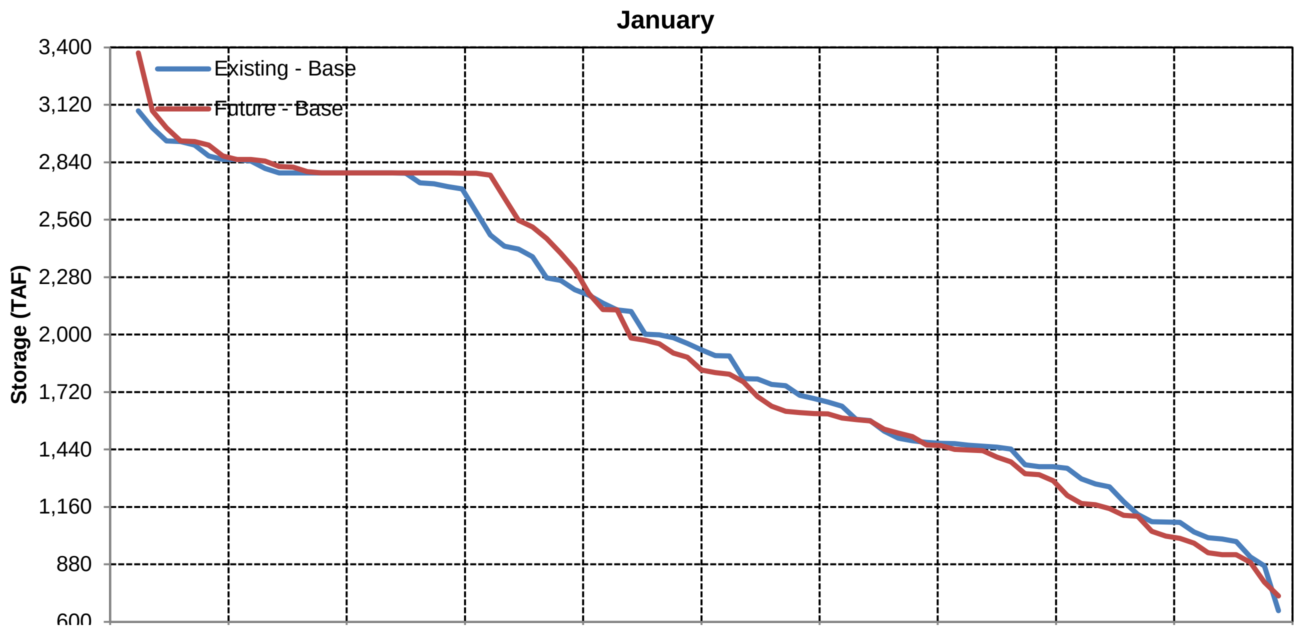




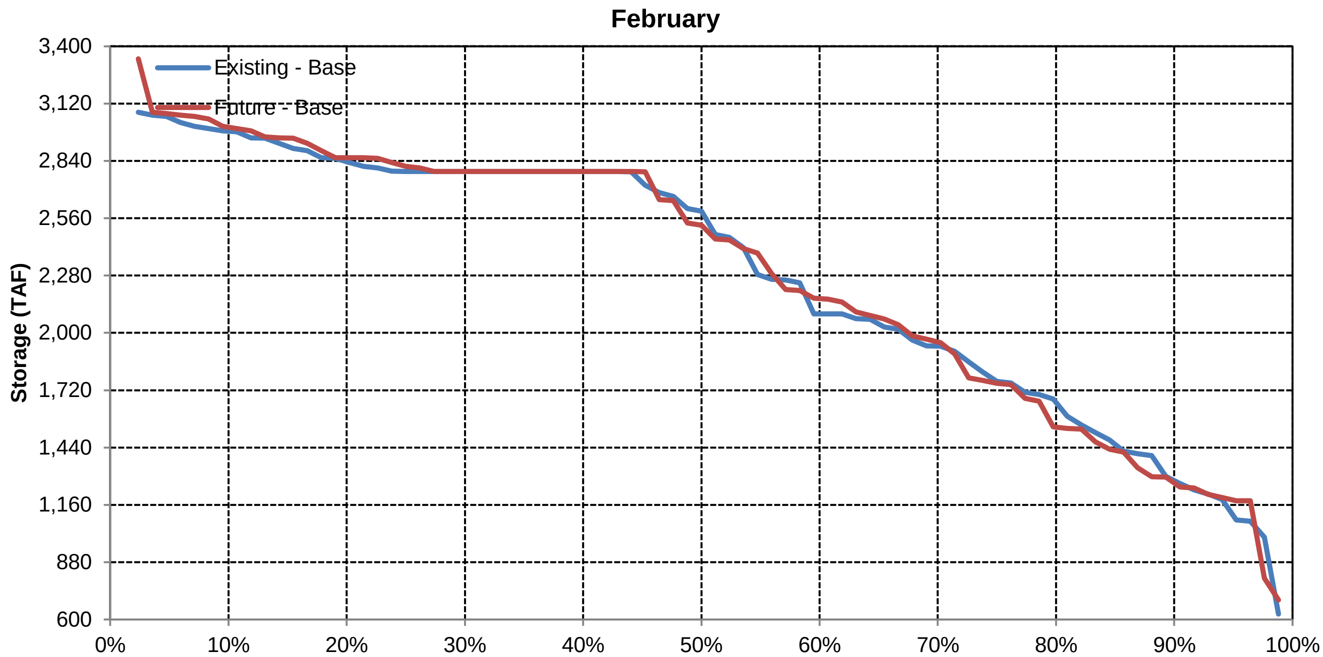
S6

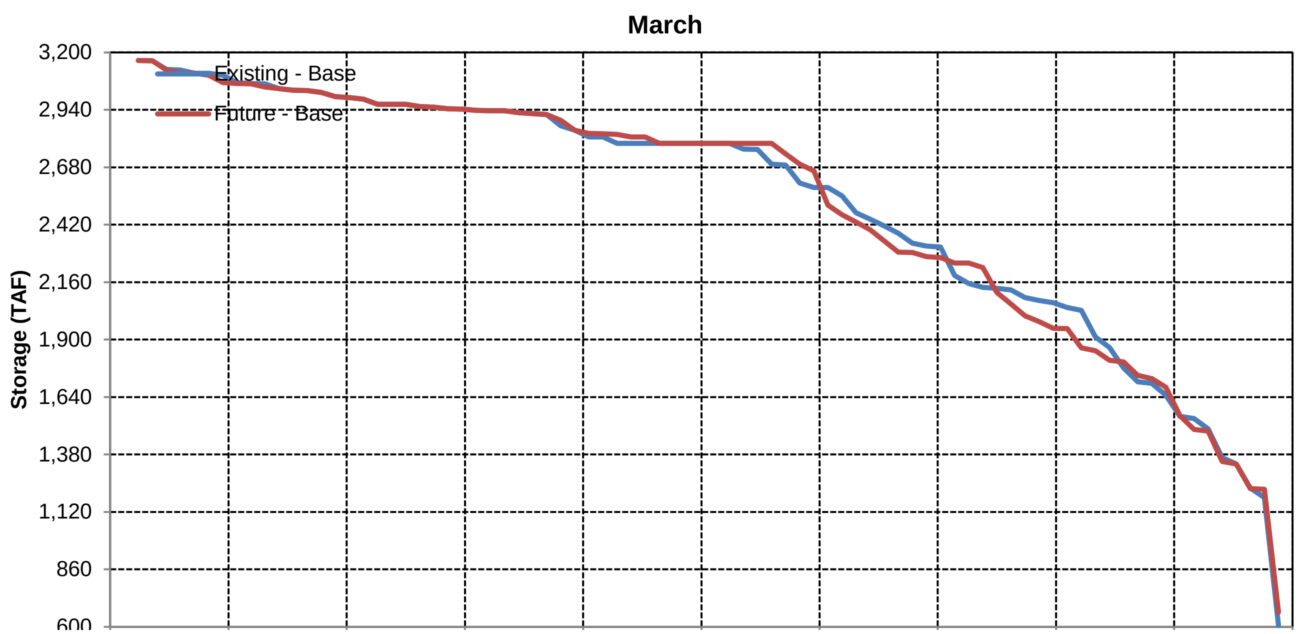
Oroville Reservoir



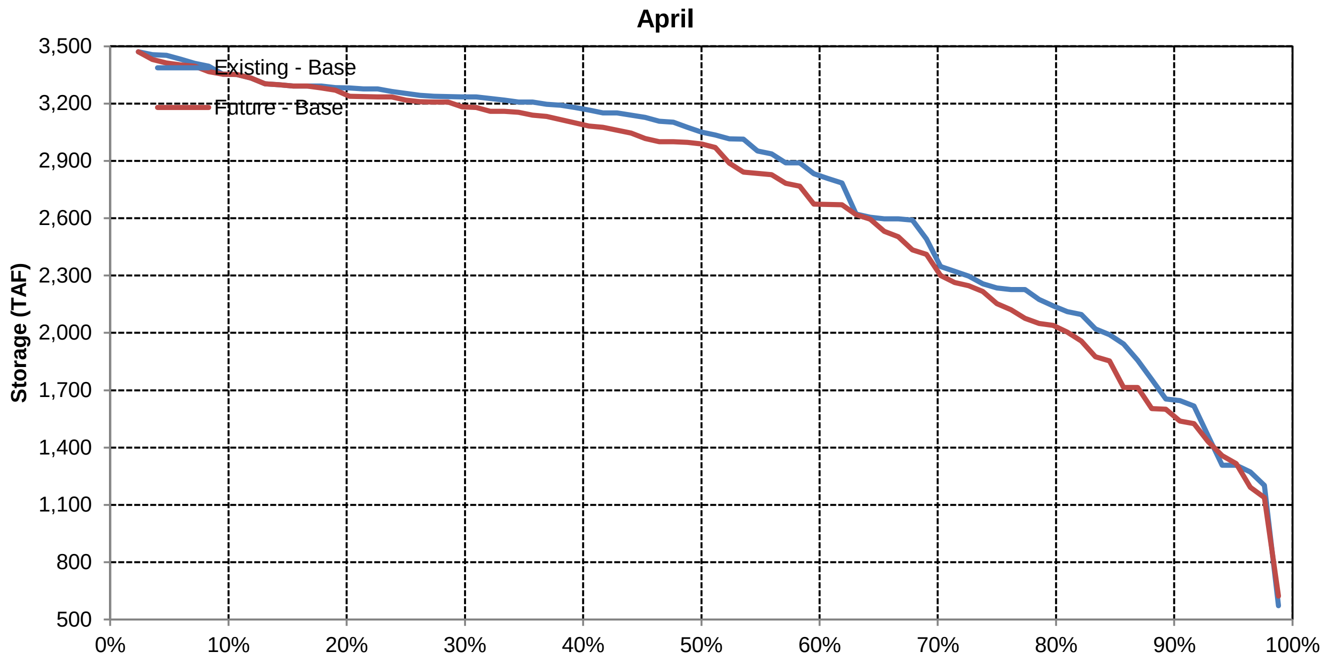


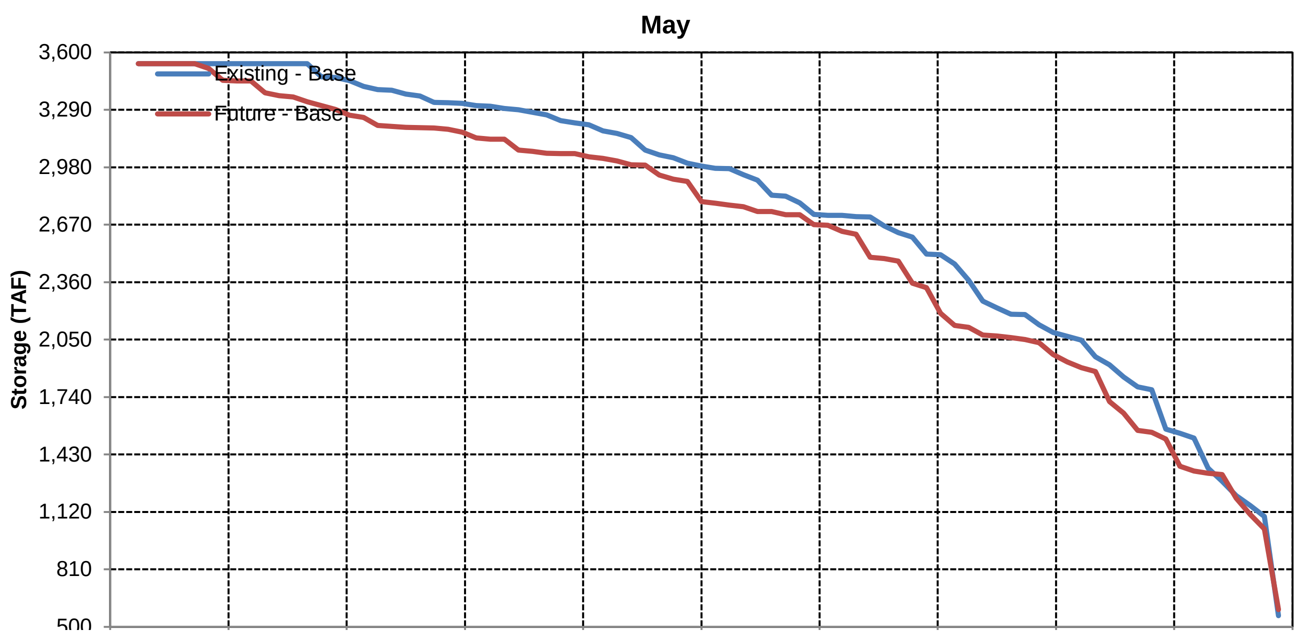
Oroville Reservoir





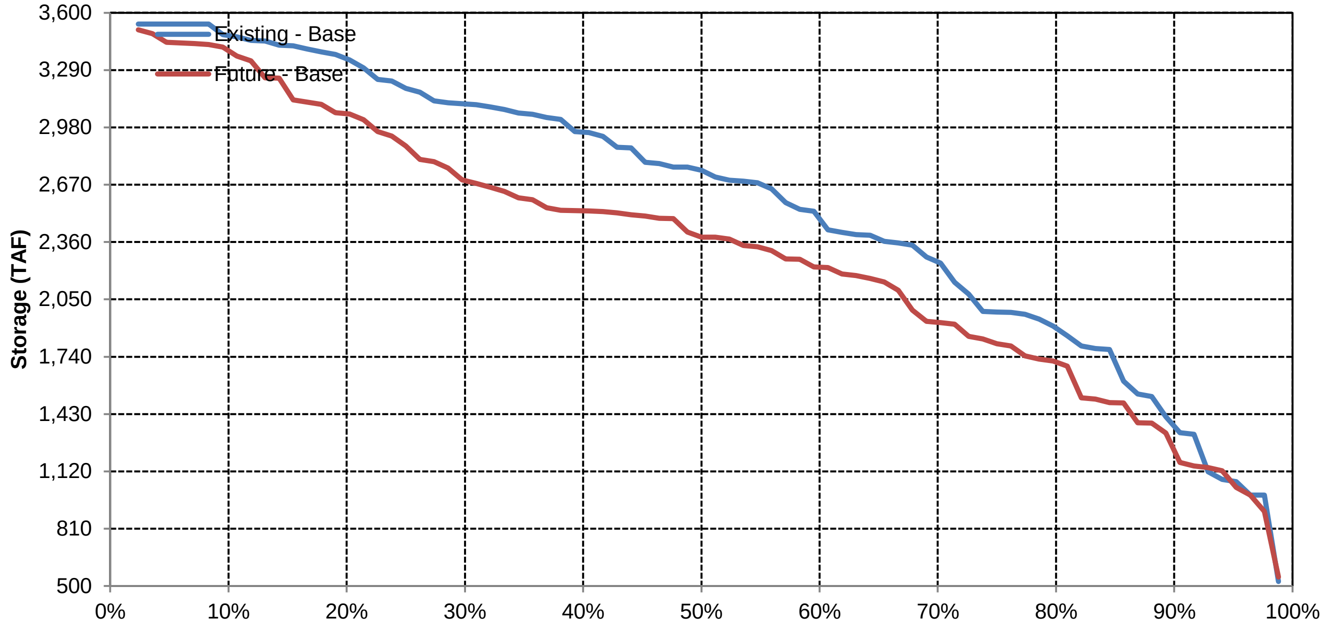
Oroville Reservoir





Oroville Reservoir

June



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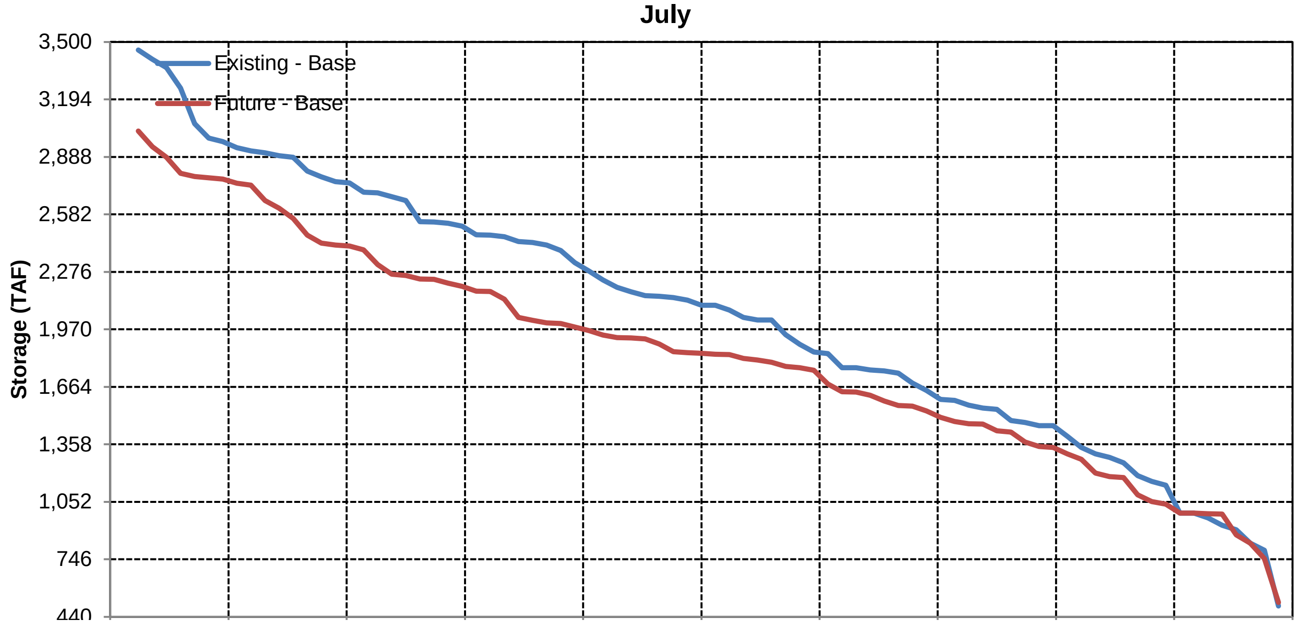
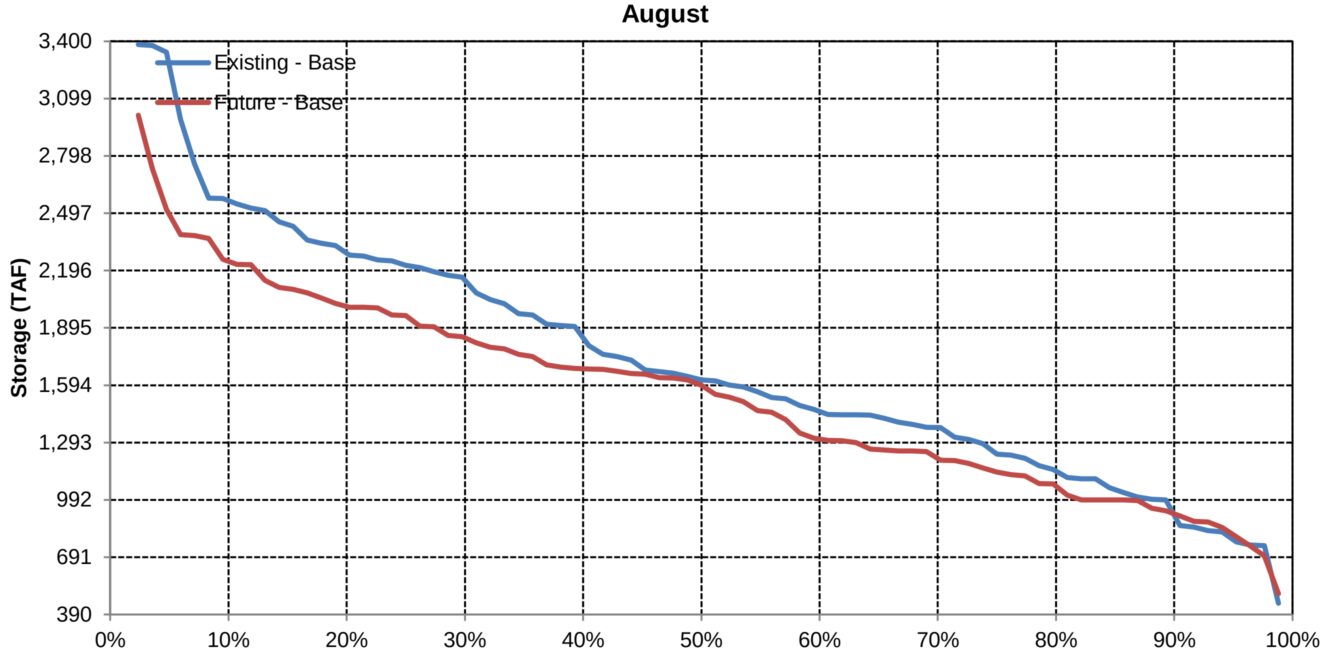
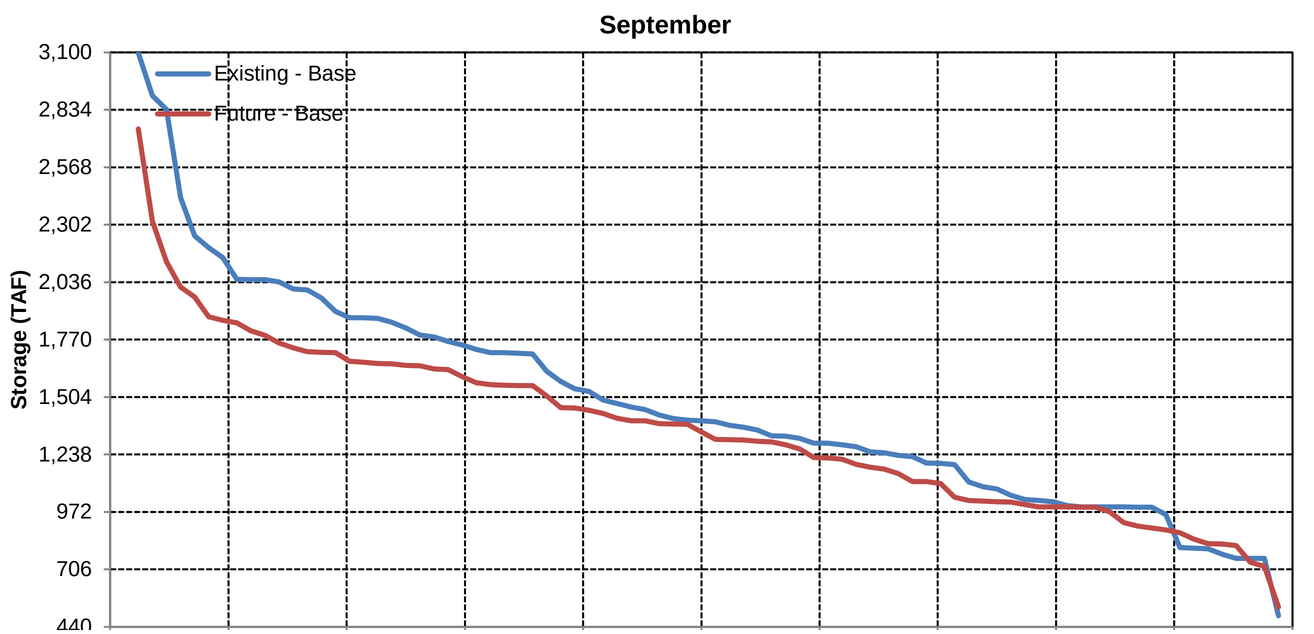


S6

Oroville Reservoir





Long-Term and Water Year-Type Average of Folsom Reservoir Under Existing - Base and Future - Base

Analysis Period	October	November	December	January	February	March	April	May	June	July	August	September
	Average Storage (TAF)											
Long-Term												
Full Simulation Period												
Existing - Base	391	398	446	474	495	597	712	766	699	522	477	427
Future - Base	354	352	404	454	482	592	680	678	580	460	427	390
Difference	-37	-46	-42	-20	-13	-5	-32	-88	-119	-61	-50	-37
Percent Difference	-10%	-12%	-9%	-4%	-3%	-1%	-4%	-11%	-17%	-12%	-10%	-9%
Water Year-Types												
Wet												
Existing - Base	405	431	511	520	508	626	766	897	851	676	622	507
Future - Base	368	385	480	522	509	624	760	806	699	547	509	430
Difference	-37	-46	-31	1	1	-2	-6	-91	-151	-128	-113	-77
Percent Difference	-9%	-11%	-6%	0%	0%	0%	-1%	-10%	-18%	-19%	-18%	-15%
Above Normal												
Existing - Base	406	399	470	532	548	643	777	842	775	540	504	455
Future - Base	363	358	415	512	550	644	766	766	668	492	471	427
Difference	-43	-41	-55	-20	2	0	-12	-77	-107	-48	-33	-28
Percent Difference	-11%	-10%	-12%	-4%	0%	0%	-2%	-9%	-14%	-9%	-6%	-6%
Below Normal												
Existing - Base	397	414	447	500	536	627	774	792	716	480	445	433
Future - Base	375	361	399	471	508	624	727	714	609	493	465	455
Difference	-23	-52	-48	-28	-28	-3	-47	-77	-107	13	20	22
Percent Difference	-6%	-13%	-11%	-6%	-5%	0%	-6%	-10%	-15%	3%	5%	5%
Dry												
Existing - Base	365	367	398	418	479	593	688	698	596	438	387	376
Future - Base	336	332	372	411	477	592	646	596	489	395	356	357
Difference	-29	-35	-26	-8	-2	-1	-42	-102	-106	-44	-31	-19
Percent Difference	-8%	-10%	-7%	-2%	0%	0%	-6%	-15%	-18%	-10%	-8%	-5%
Critical												
Existing - Base	372	347	345	357	380	453	480	471	418	351	313	291
Future - Base	321	298	288	306	341	440	436	418	360	317	287	256
Difference	-51	-49	-57	-51	-39	-14	-44	-52	-58	-34	-27	-35
Percent Difference	-14%	-14%	-17%	-14%	-10%	-3%	-9%	-11%	-14%	-10%	-9%	-12%

Folsom Reservoir

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	590	560	567	567	567	662	792	967	967	815	752	618
20%	495	499	567	567	567	658	792	967	877	709	667	545
30%	433	453	565	566	565	656	792	903	826	590	536	487
40%	399	419	525	557	558	651	792	803	723	530	478	439
50%	358	395	444	544	552	641	792	769	703	474	425	401
60%	339	354	413	474	518	625	758	752	677	438	396	382
70%	320	335	363	427	458	610	725	727	608	405	380	358
80%	295	300	323	365	416	566	609	626	523	374	338	318
90%	261	273	294	284	323	460	479	484	429	331	306	273
Long Term												
Full Simulation Period	391	398	446	474	495	597	712	766	699	522	477	427
Water Year Types												
Wet	405	431	511	520	508	626	766	897	851	676	622	507
Above Normal	406	399	470	532	548	643	777	842	775	540	504	455
Below Normal	397	414	447	500	536	627	774	792	716	480	445	433
Dry	365	367	398	418	479	593	688	698	596	438	387	376
Critical	372	347	345	357	380	453	480	471	418	351	313	291

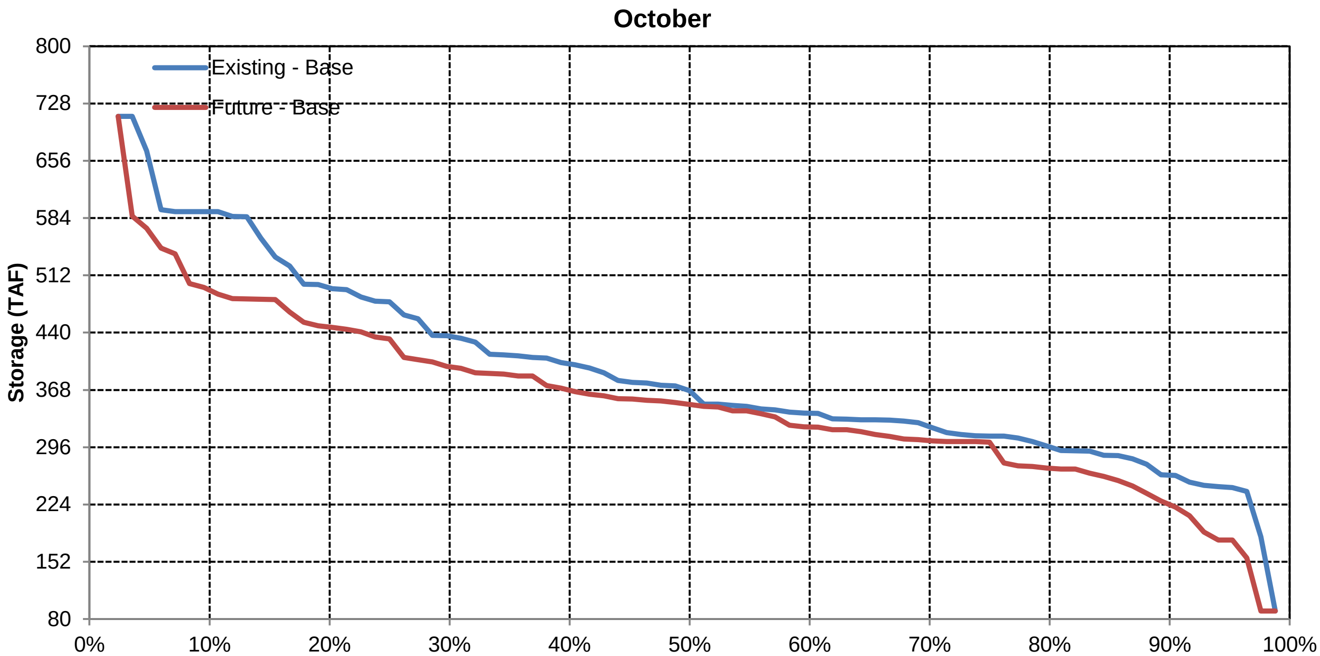
Future - Base

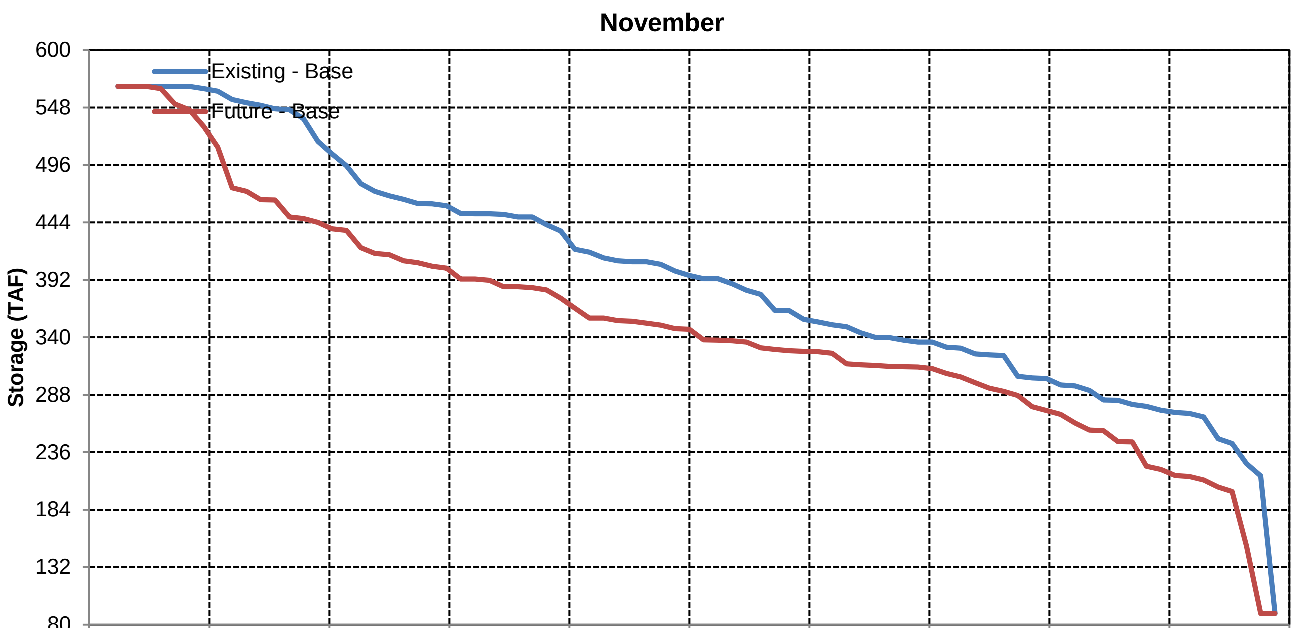
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	487	501	567	567	567	662	792	939	828	636	580	540
20%	445	437	566	567	567	656	792	820	729	587	548	504
30%	395	394	498	564	563	652	792	763	694	549	519	455
40%	365	365	432	556	557	645	791	745	621	495	483	417
50%	349	342	392	507	549	629	766	706	592	443	413	396
60%	321	327	352	454	495	616	701	656	538	418	388	360
70%	304	311	319	372	443	590	635	600	500	383	356	333
80%	269	272	302	305	386	565	554	498	404	332	305	295
90%	223	217	252	260	302	426	437	426	355	311	276	231
Long Term												
Full Simulation Period	354	352	404	454	482	592	680	678	580	460	427	390
Water Year Types												
Wet	368	385	480	522	509	624	760	806	699	547	509	430
Above Normal	363	358	415	512	550	644	766	766	668	492	471	427
Below Normal	375	361	399	471	508	624	727	714	609	493	465	455
Dry	336	332	372	411	477	592	646	596	489	395	356	357
Critical	321	298	288	306	341	440	436	418	360	317	287	256

Future - Base Minus Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	-103	-59	0	0	0	0	0	-28	-139	-179	-171	-77
20%	-50	-62	-1	0	0	-2	0	-147	-148	-122	-120	-42
30%	-38	-59	-67	-2	-2	-4	0	-140	-132	-41	-17	-32
40%	-33	-54	-93	-1	-1	-6	-1	-59	-101	-34	5	-23
50%	-10	-52	-52	-37	-3	-12	-26	-63	-111	-32	-12	-5
60%	-17	-27	-61	-19	-23	-9	-58	-95	-139	-20	-8	-22
70%	-16	-24	-45	-55	-15	-20	-90	-127	-107	-21	-24	-24
80%	-26	-28	-21	-60	-30	-1	-55	-128	-119	-41	-33	-23
90%	-37	-56	-43	-24	-22	-34	-42	-58	-74	-20	-30	-42
Long Term												
Full Simulation Period	-37	-46	-42	-20	-13	-5	-32	-88	-119	-61	-50	-37
Water Year Types												
Wet	-37	-46	-31	1	1	-2	-6	-91	-151	-128	-113	-77
Above Normal	-43	-41	-55	-20	2	0	-12	-77	-107	-48	-33	-28
Below Normal	-23	-52	-48	-28	-28	-3	-47	-77	-107	13	20	22
Dry	-29	-35	-26	-8	-2	-1	-42	-102	-106	-44	-31	-19
Critical	-51	-49	-57	-51	-39	-14	-44	-52	-58	-34	-27	-35

Folsom Reservoir





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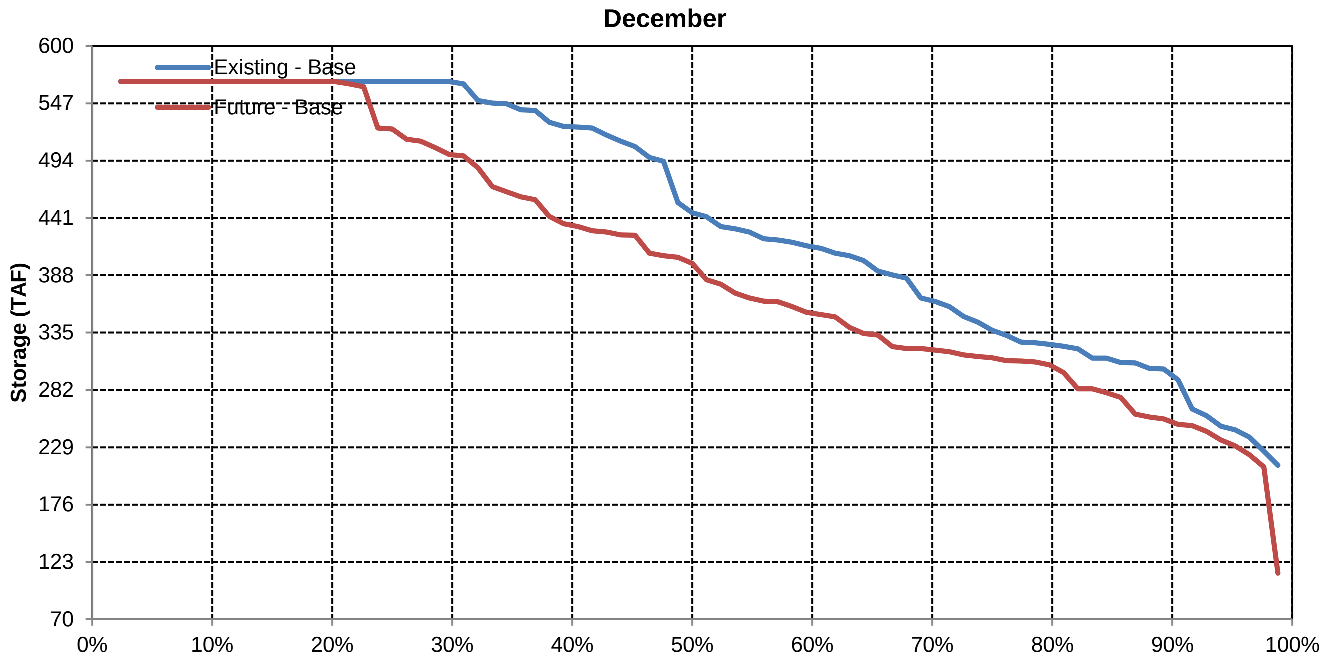
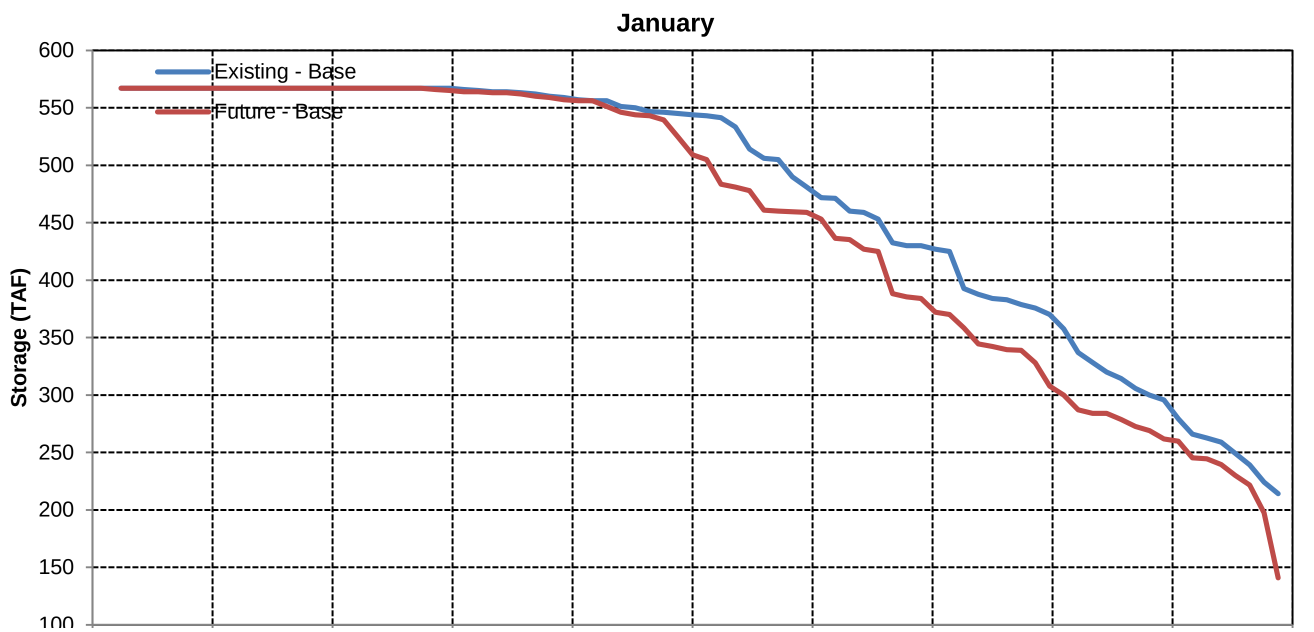
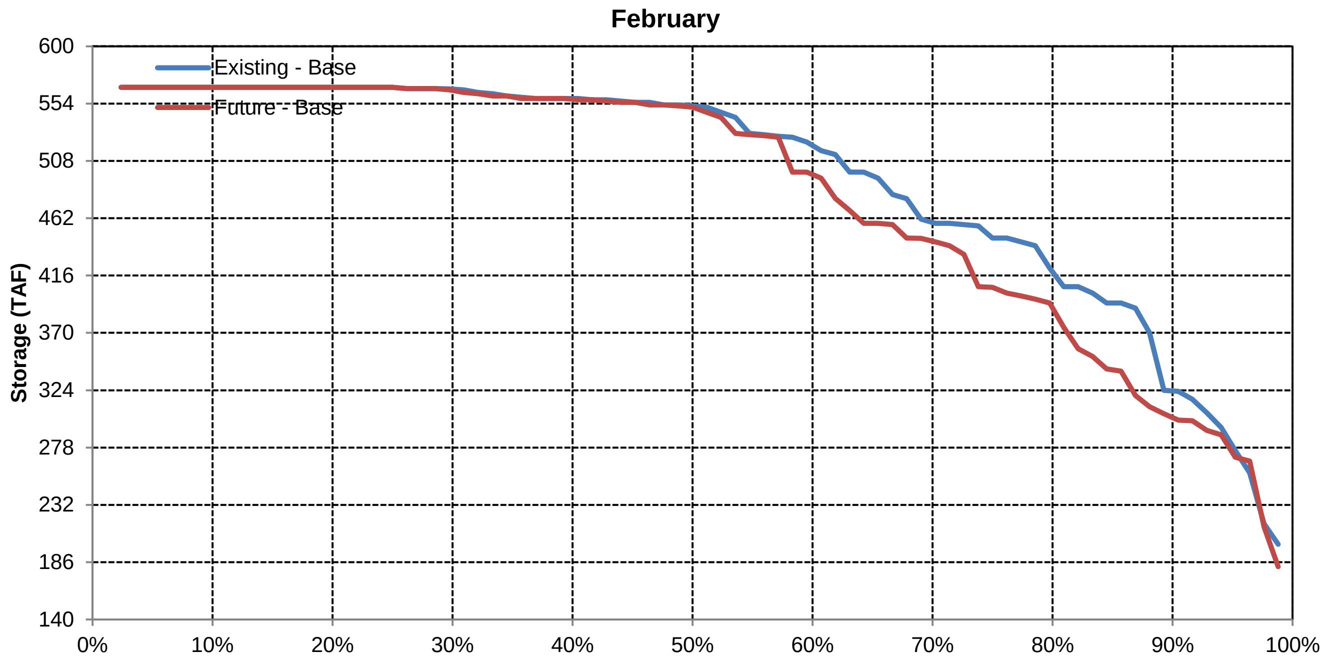
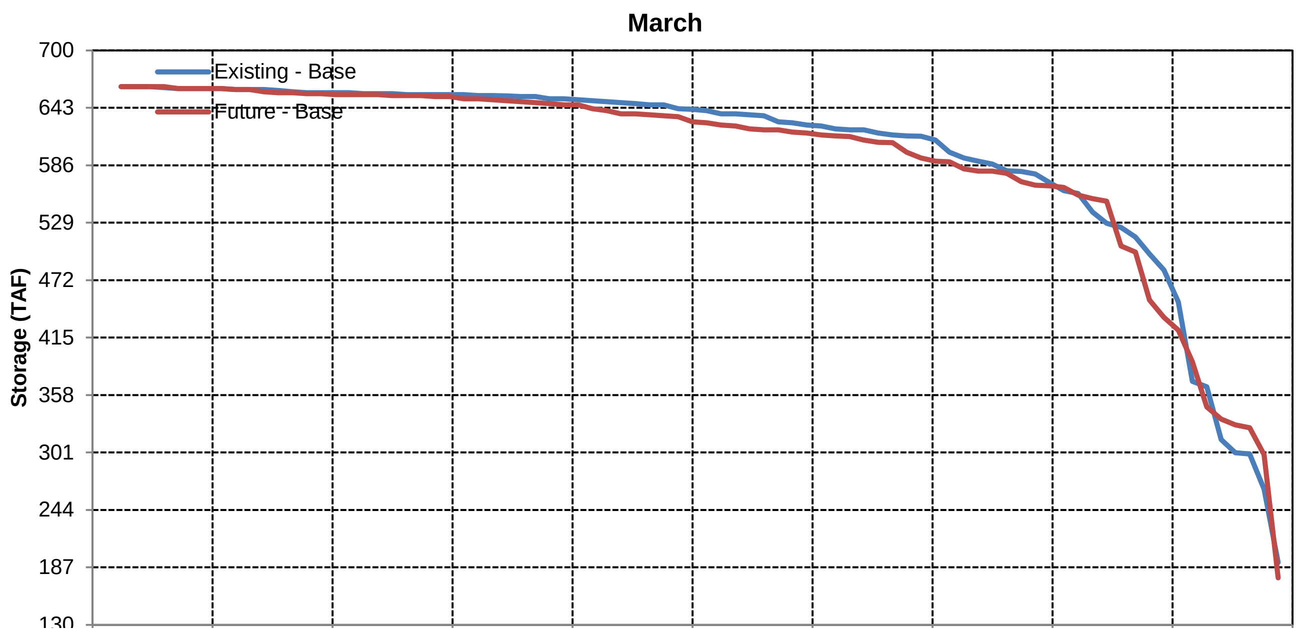




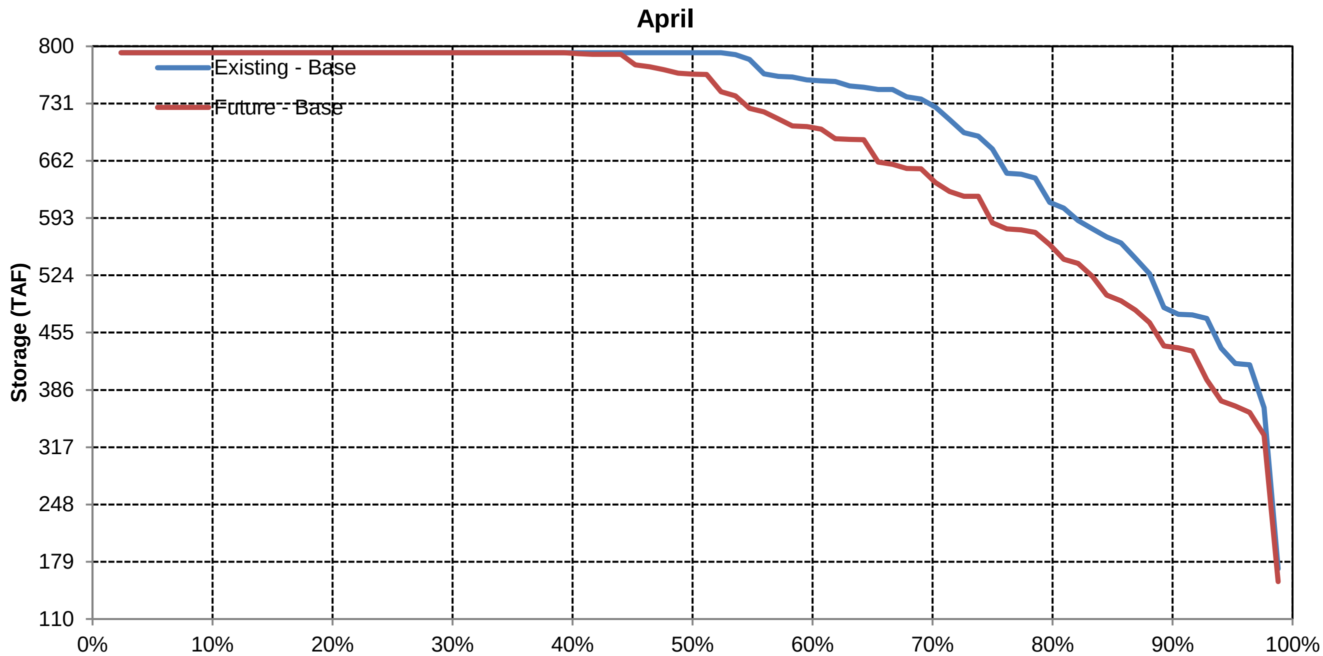
S8

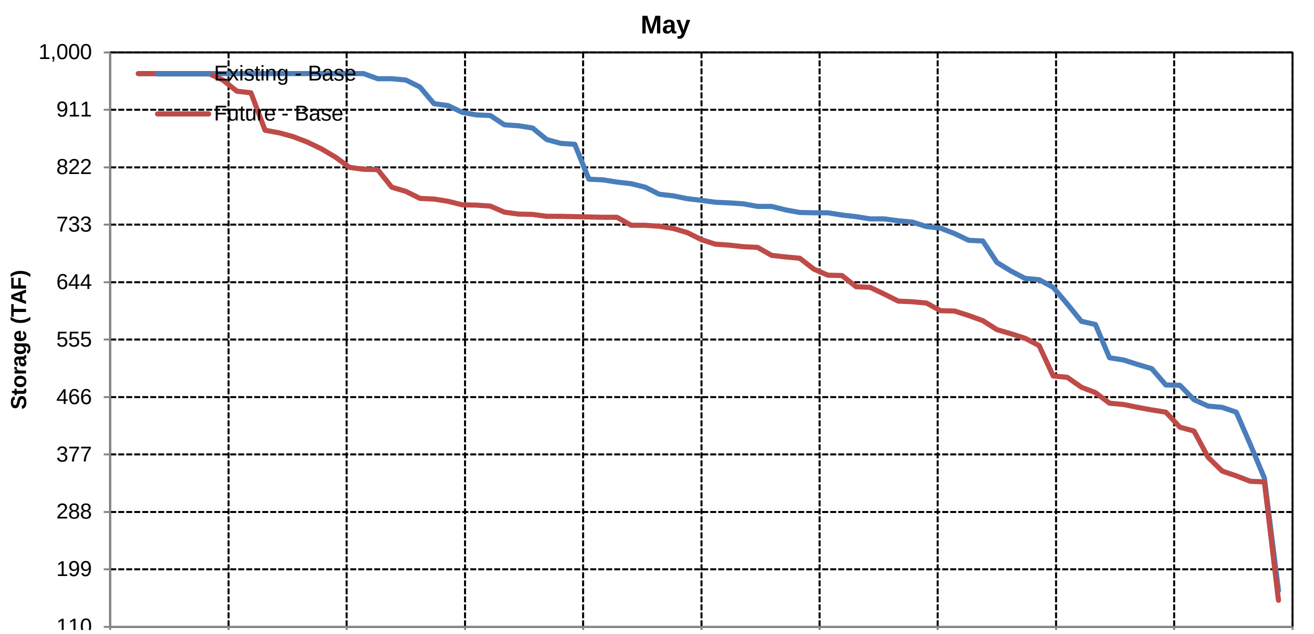
Folsom Reservoir





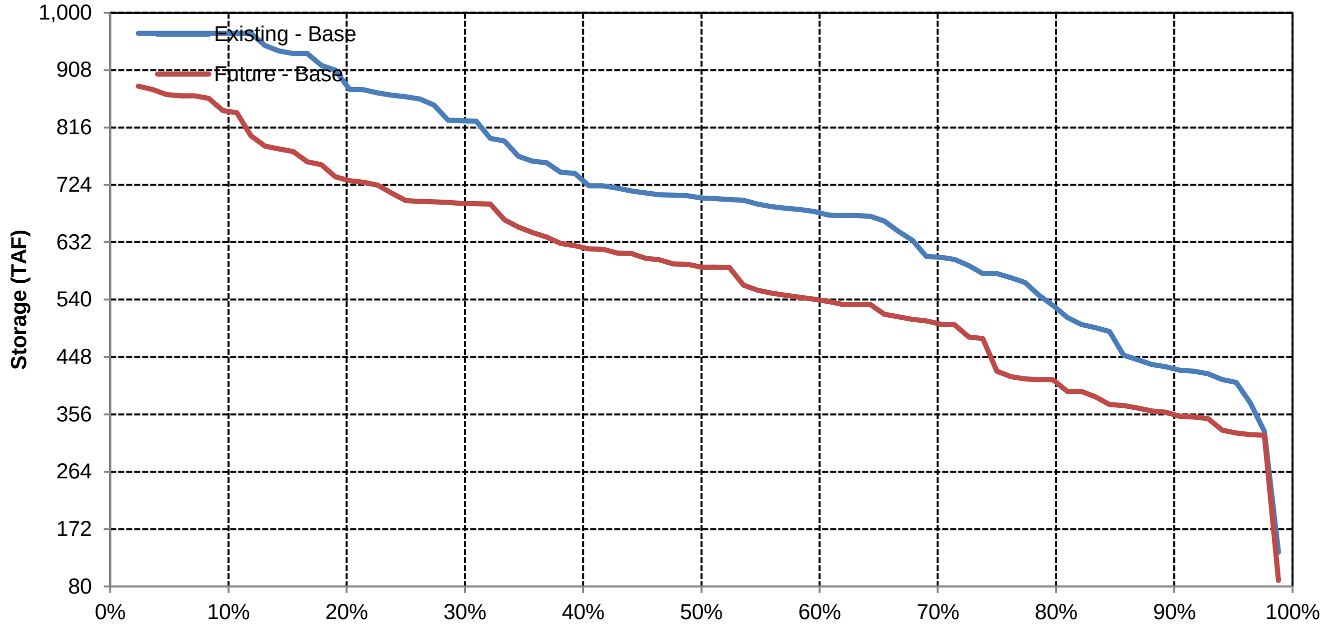
Folsom Reservoir





Folsom Reservoir

June



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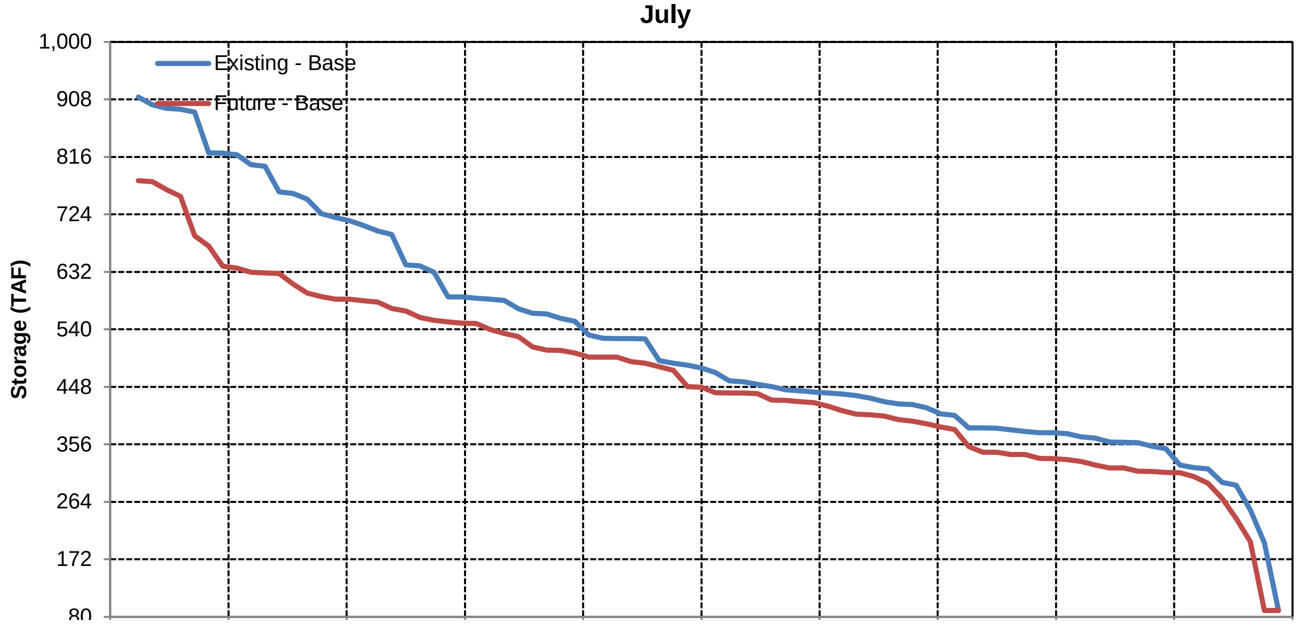
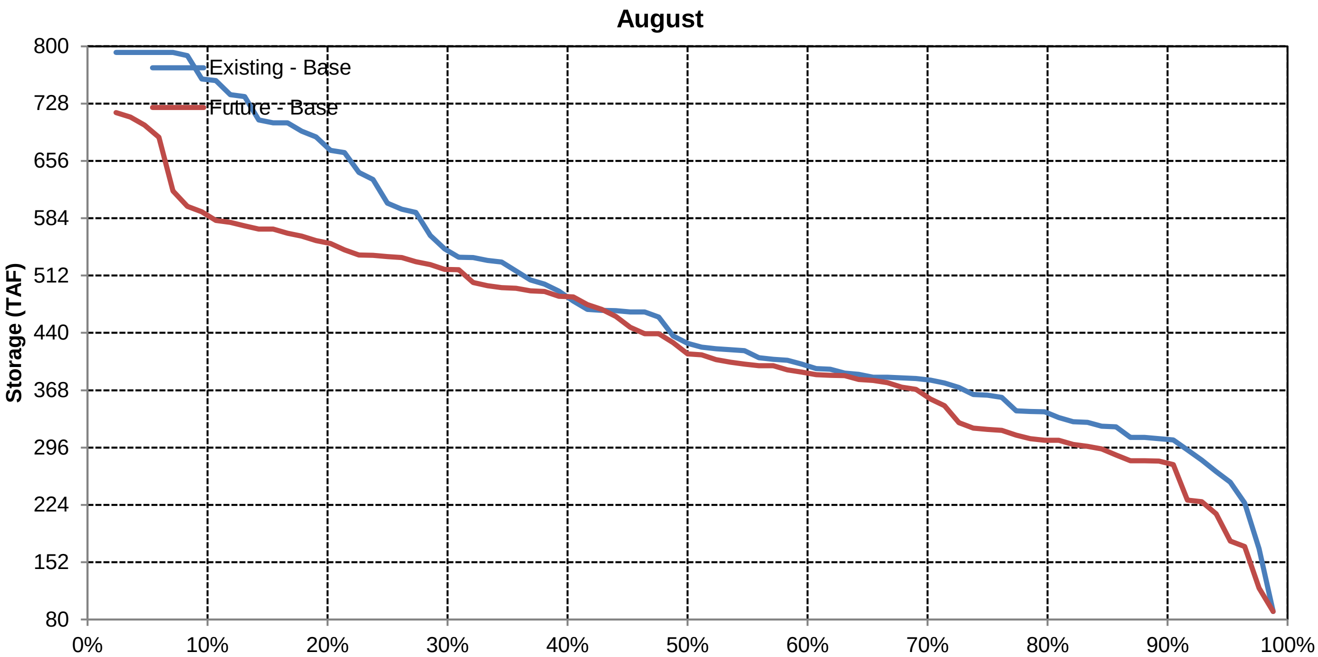
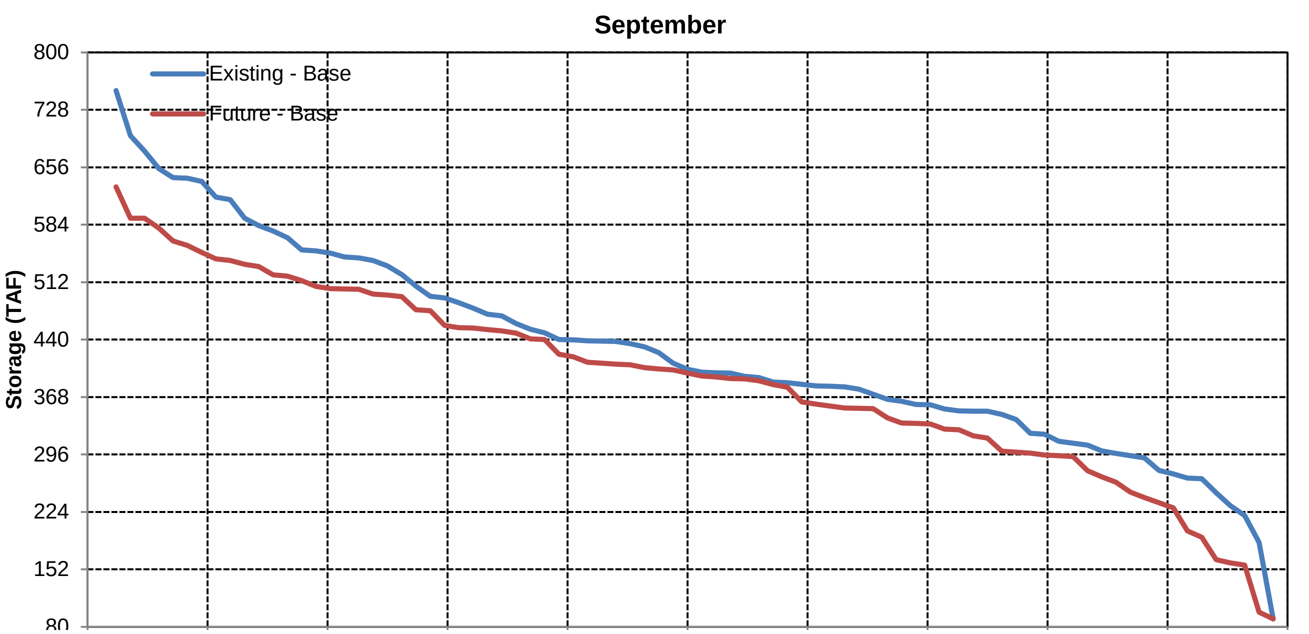


Folsom Reservoir





Long-Term and Water Year-Type Average of CVP San Luis Reservoir Under Existing - Base and Future - Base

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
						Long-Term						
Full Simulation Period												
Existing - Base	217	330	493	616	709	777	712	577	404	261	171	178
Future - Base	218	294	461	615	743	823	788	682	578	413	314	270
Difference	0	-36	-32	-1	34	46	76	105	174	152	143	91
Percent Difference	0%	-11%	-6%	0%	5%	6%	11%	18%	43%	58%	84%	51%
						Water Year-Types						
Wet												
Existing - Base	230	346	525	677	824	925	859	729	581	362	252	241
Future - Base	203	294	487	682	836	918	880	792	678	499	390	304
Difference	-27	-51	-39	4	12	-7	21	62	96	138	138	63
Percent Difference	-12%	-15%	-7%	1%	1%	-1%	2%	9%	17%	38%	55%	26%
Above Normal												
Existing - Base	231	375	535	653	766	876	790	630	437	201	133	128
Future - Base	215	289	456	607	754	844	802	668	594	409	303	202
Difference	-16	-86	-79	-46	-12	-32	12	37	157	209	170	74
Percent Difference	-7%	-23%	-15%	-7%	-2%	-4%	1%	6%	36%	104%	127%	58%
Below Normal												
Existing - Base	227	343	526	627	701	758	697	561	373	276	187	214
Future - Base	237	280	459	588	713	836	815	706	632	430	313	312
Difference	10	-64	-66	-39	12	77	117	145	259	154	127	97
Percent Difference	4%	-19%	-13%	-6%	2%	10%	17%	26%	70%	56%	68%	45%
Dry												
Existing - Base	183	268	424	532	582	636	573	429	249	184	96	121
Future - Base	211	284	442	576	689	772	742	621	516	359	253	240
Difference	28	16	18	44	107	136	169	192	267	175	157	119
Percent Difference	16%	6%	4%	8%	18%	21%	30%	45%	107%	95%	163%	99%
Critical												
Existing - Base	208	316	428	546	591	584	532	427	251	194	118	124
Future - Base	242	329	444	571	654	666	621	536	395	302	263	262
Difference	34	12	15	26	64	82	89	109	144	108	145	138
Percent Difference	16%	4%	4%	5%	11%	14%	17%	26%	57%	56%	123%	112%

CVP San Luis Reservoir

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	423	528	671	789	972	972	941	862	717	525	378	377
20%	262	388	570	728	885	972	879	758	581	448	308	244
30%	221	367	550	687	804	930	836	701	507	347	205	200
40%	187	347	513	652	763	871	800	630	435	241	143	141
50%	182	327	490	594	719	825	746	582	379	222	107	127
60%	164	294	464	568	651	722	658	487	303	178	90	113
70%	155	274	431	535	596	657	587	441	267	143	63	99
80%	139	209	360	482	541	593	537	392	207	105	45	90
90%	104	148	277	434	489	530	490	352	155	56	45	65
Long Term												
Full Simulation Period	217	330	493	616	709	777	712	577	404	261	171	178
Water Year Types												
Wet	230	346	525	677	824	925	859	729	581	362	252	241
Above Normal	231	375	535	653	766	876	790	630	437	201	133	128
Below Normal	227	343	526	627	701	758	697	561	373	276	187	214
Dry	183	268	424	532	582	636	573	429	249	184	96	121
Critical	208	316	428	546	591	584	532	427	251	194	118	124

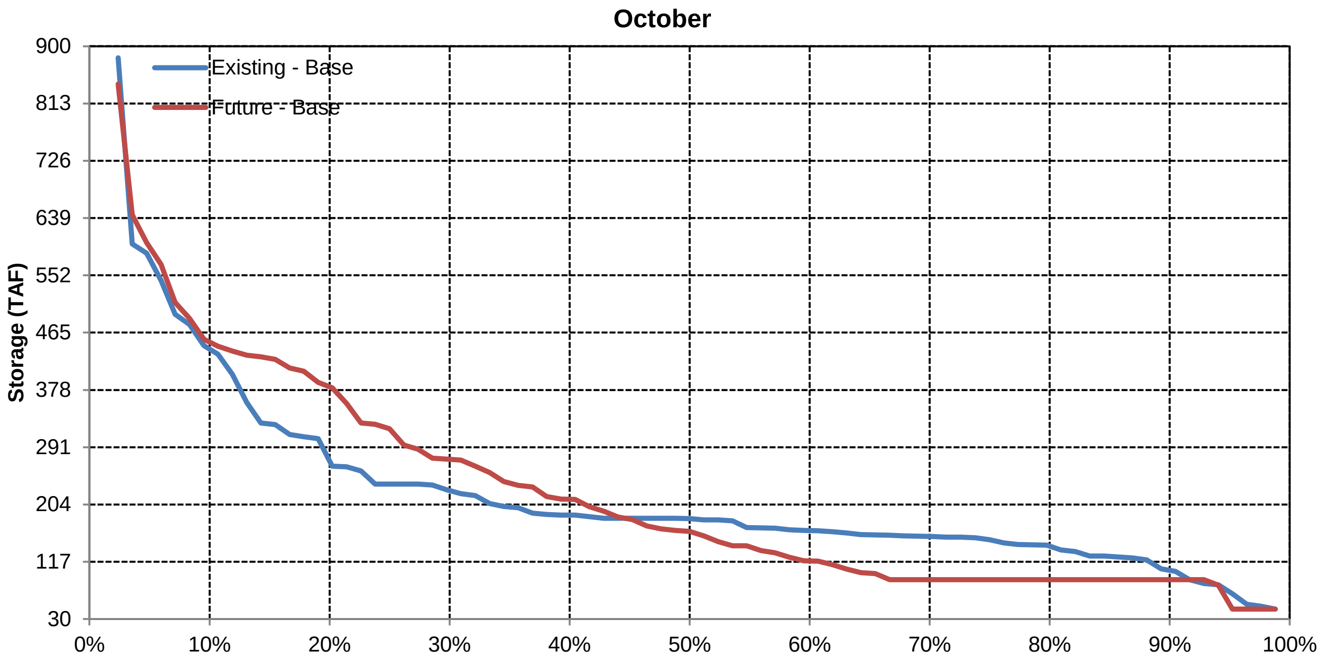
Future - Base

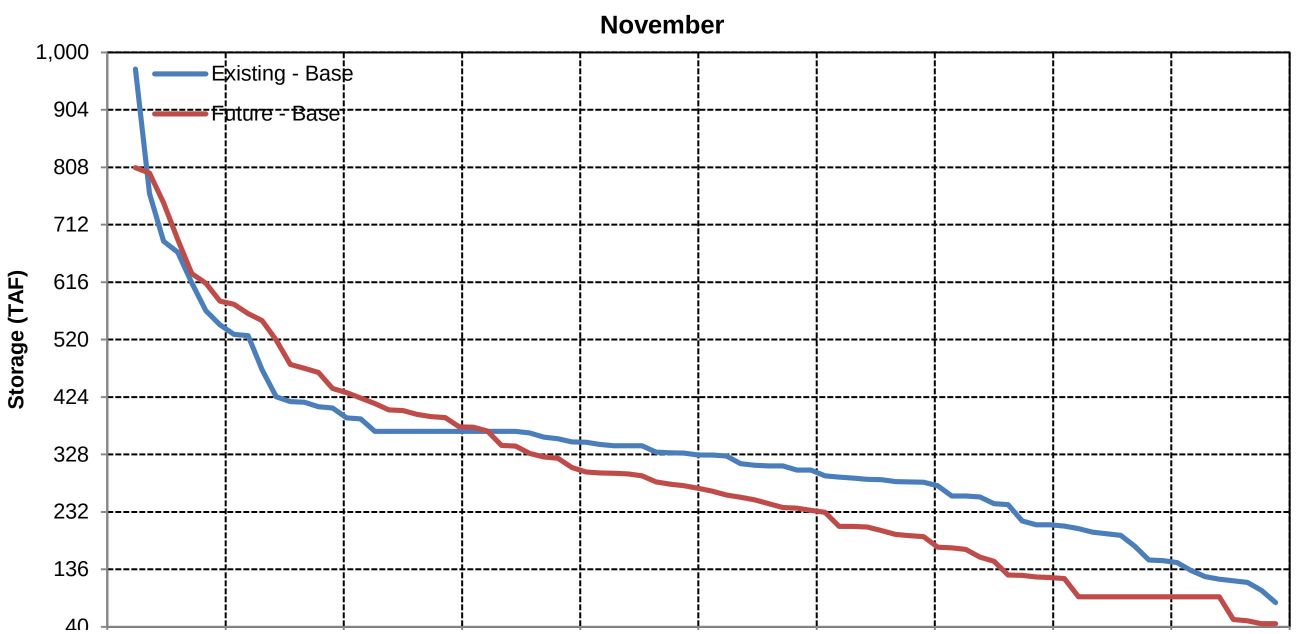
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	442	574	764	972	972	972	972	909	861	675	596	517
20%	367	426	607	826	972	972	958	858	767	563	489	434
30%	272	373	528	720	942	972	913	806	702	492	413	347
40%	209	298	476	659	826	967	889	768	647	455	316	289
50%	160	269	425	581	736	883	869	715	609	394	256	223
60%	118	232	369	521	682	833	793	636	539	340	226	161
70%	90	173	327	477	630	718	665	571	458	287	190	132
80%	90	122	284	432	554	658	611	480	404	238	140	91
90%	90	90	246	370	439	573	531	393	274	197	110	90
Long Term												
Full Simulation Period	218	294	461	615	743	823	788	682	578	413	314	270
Water Year Types												
Wet	203	294	487	682	836	918	880	792	678	499	390	304
Above Normal	215	289	456	607	754	844	802	668	594	409	303	202
Below Normal	237	280	459	588	713	836	815	706	632	430	313	312
Dry	211	284	442	576	689	772	742	621	516	359	253	240
Critical	242	329	444	571	654	666	621	536	395	302	263	262

Future - Base Minus Existing - Base

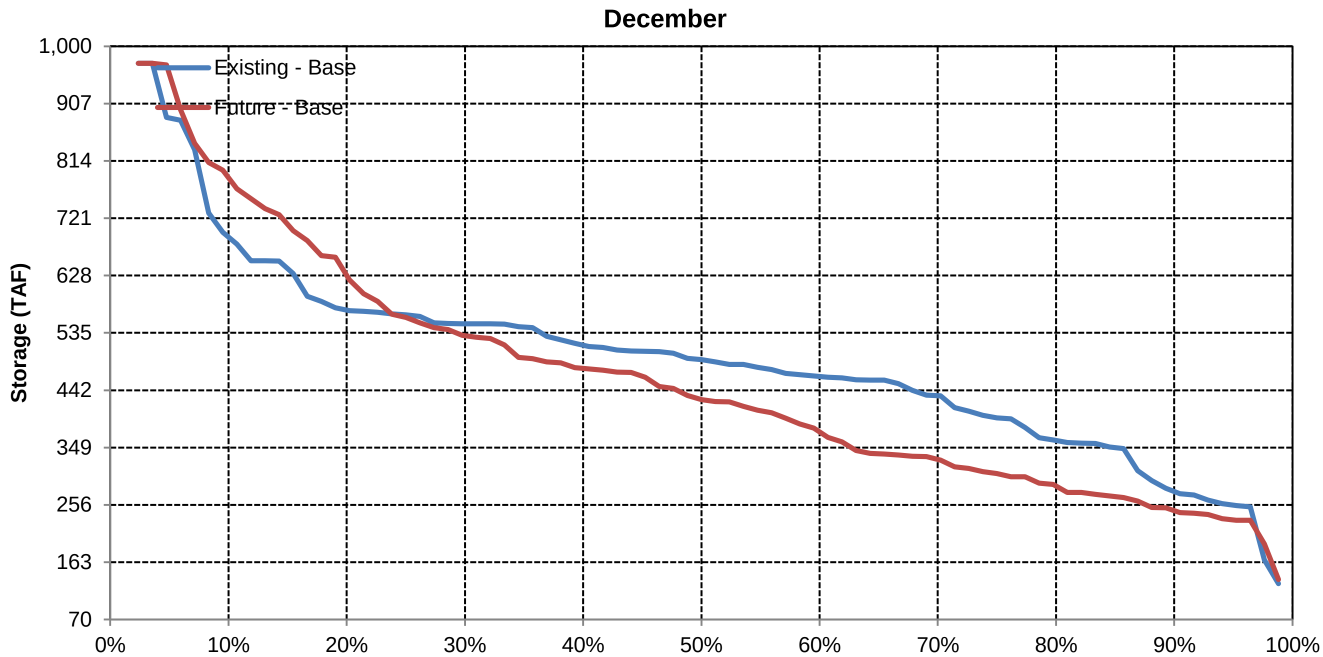
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	19	47	93	183	0	0	31	47	143	150	218	140
20%	105	38	37	99	87	0	79	100	186	115	182	190
30%	51	7	-22	32	137	42	77	106	194	145	208	147
40%	22	-49	-36	7	62	97	89	138	212	215	173	147
50%	-22	-58	-65	-14	17	59	123	133	230	172	149	96
60%	-46	-63	-95	-48	31	110	135	150	236	161	136	48
70%	-65	-101	-104	-58	34	60	78	130	191	145	126	33
80%	-49	-88	-76	-50	13	66	74	88	196	133	95	1
90%	-14	-58	-31	-64	-50	43	41	42	119	141	65	25
Long Term												
Full Simulation Period	0	-36	-32	-1	34	46	76	105	174	152	143	91
Water Year Types												
Wet	-27	-51	-39	4	12	-7	21	62	96	138	138	63
Above Normal	-16	-86	-79	-46	-12	-32	12	37	157	209	170	74
Below Normal	10	-64	-66	-39	12	77	117	145	259	154	127	97
Dry	28	16	18	44	107	136	169	192	267	175	157	119
Critical	34	12	15	26	64	82	89	109	144	108	145	138

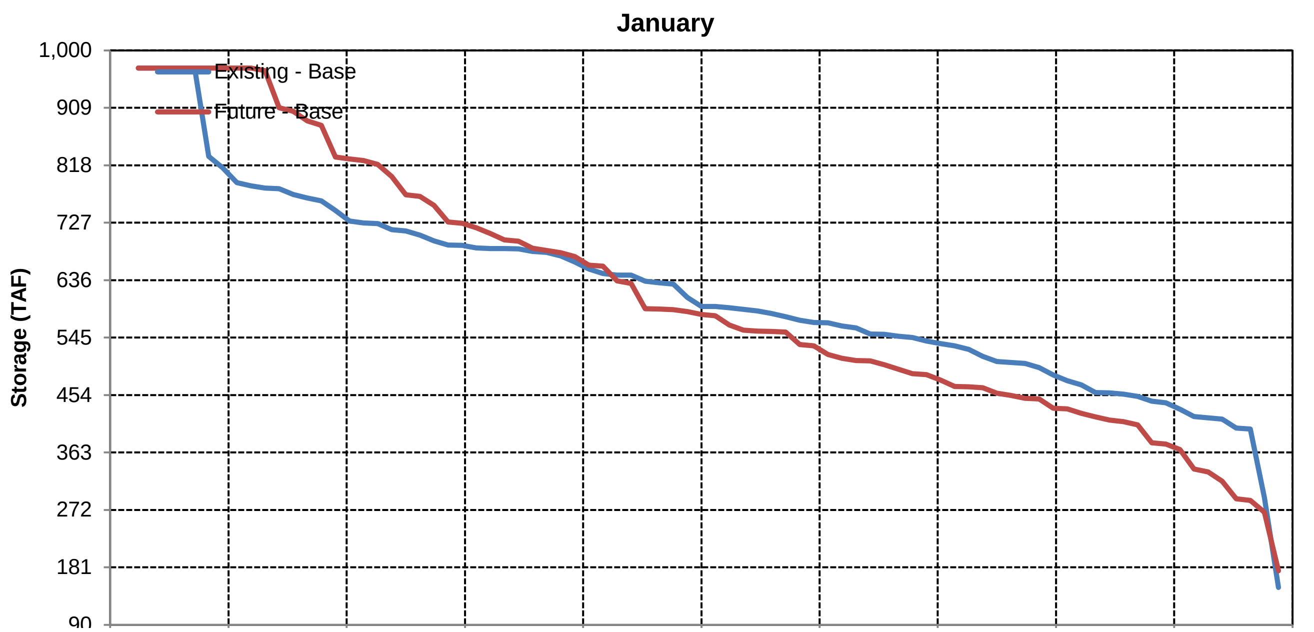
CVP San Luis Reservoir



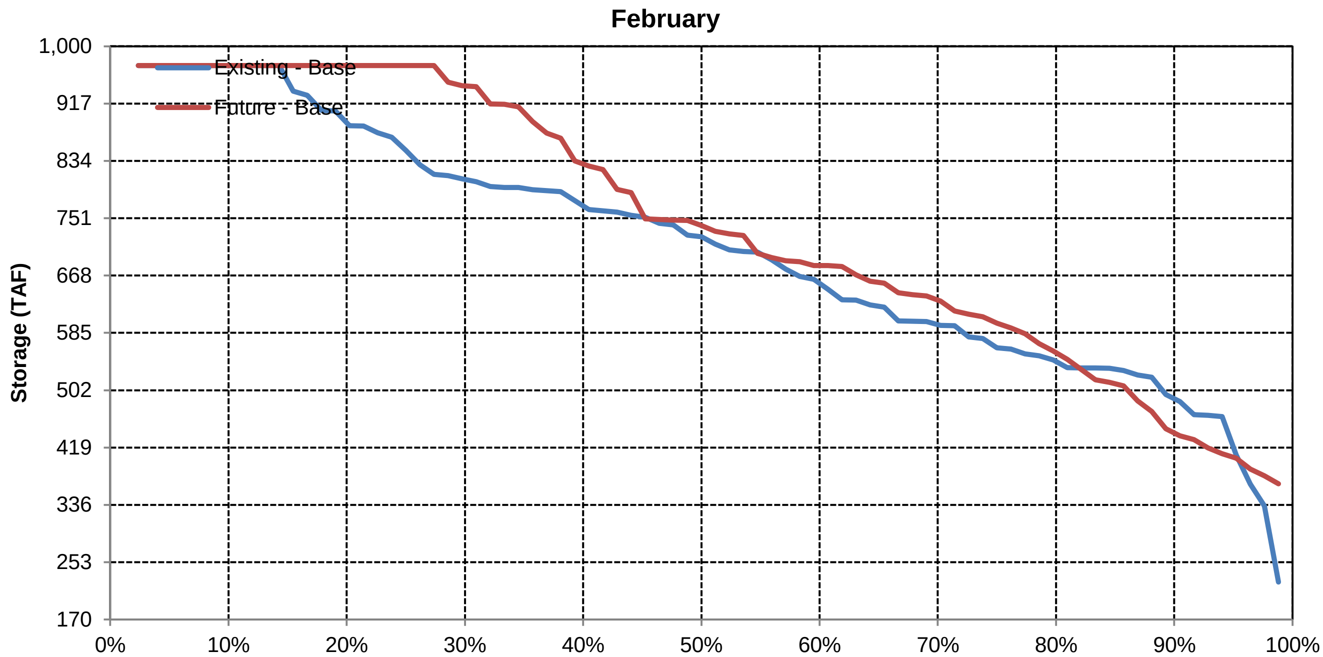


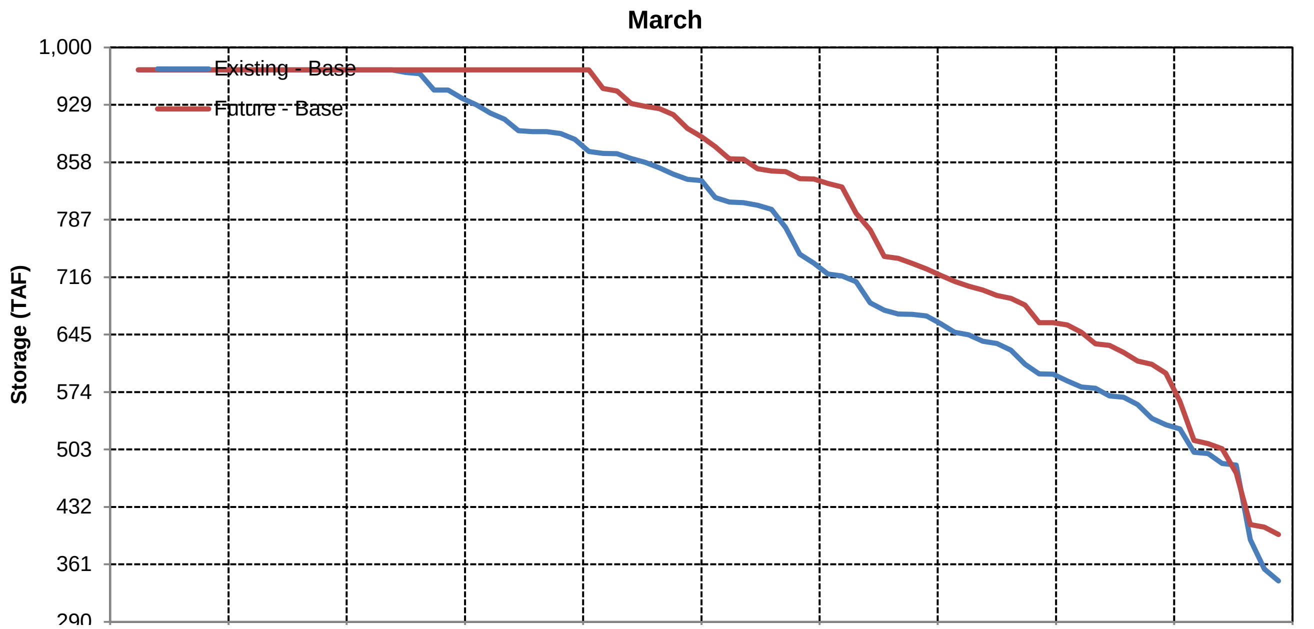
CVP San Luis Reservoir





CVP San Luis Reservoir





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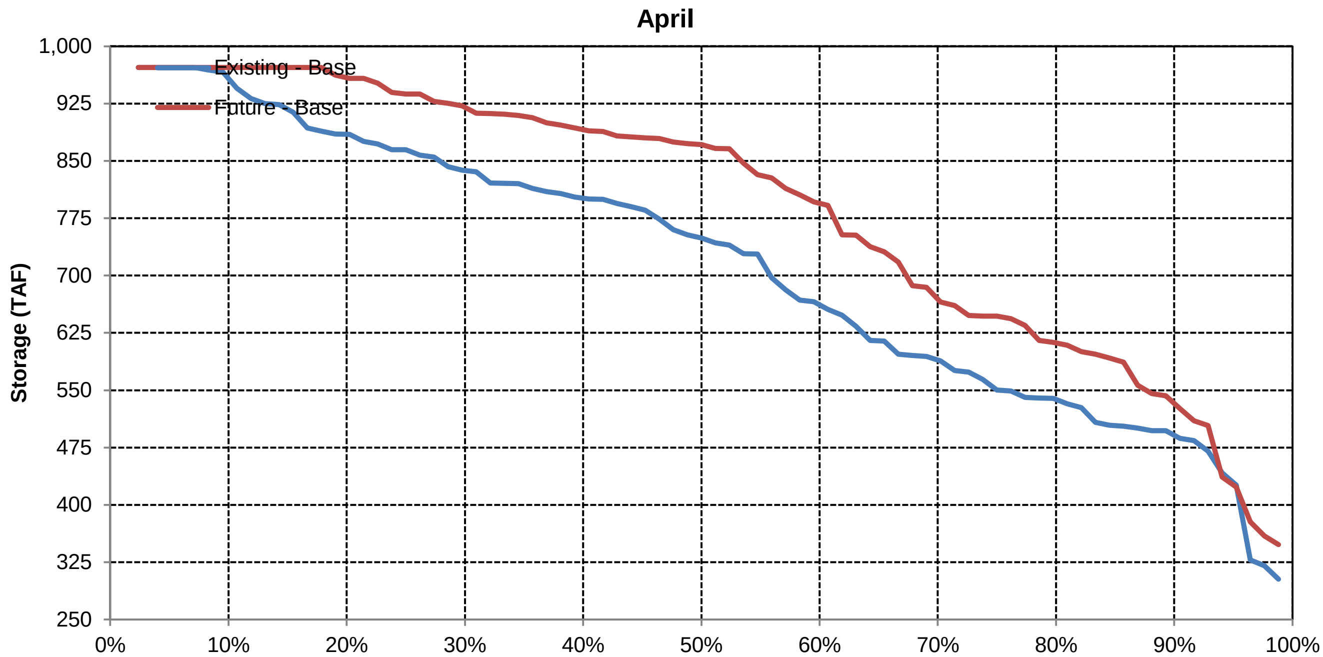
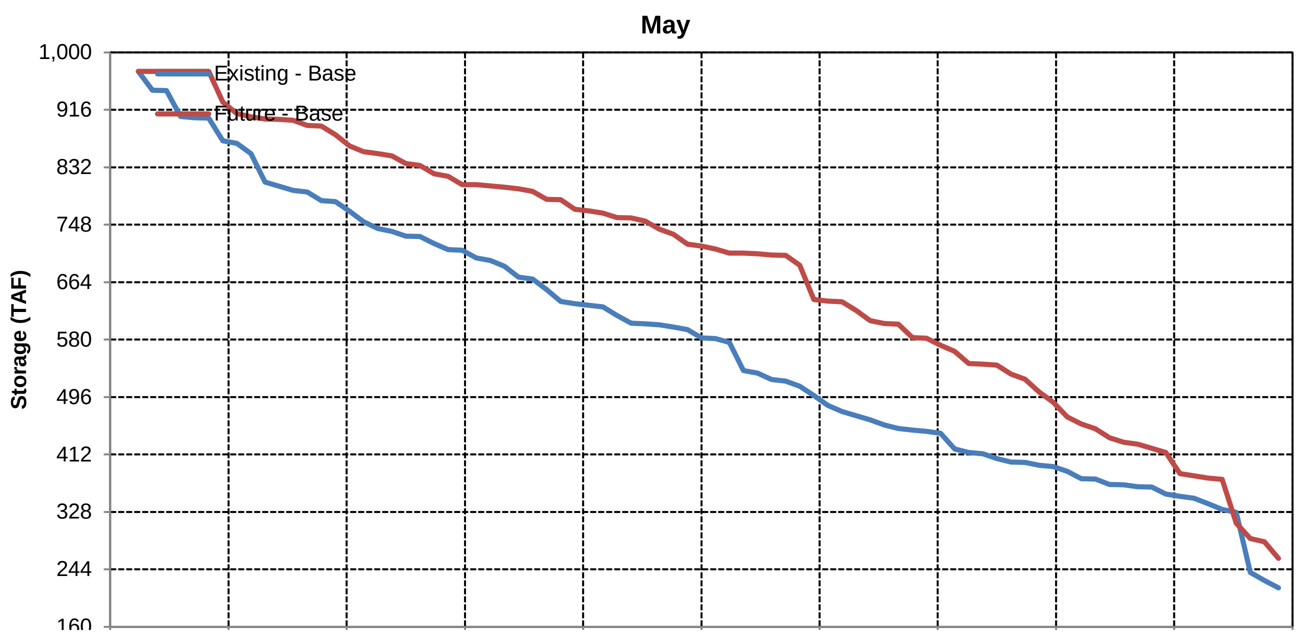
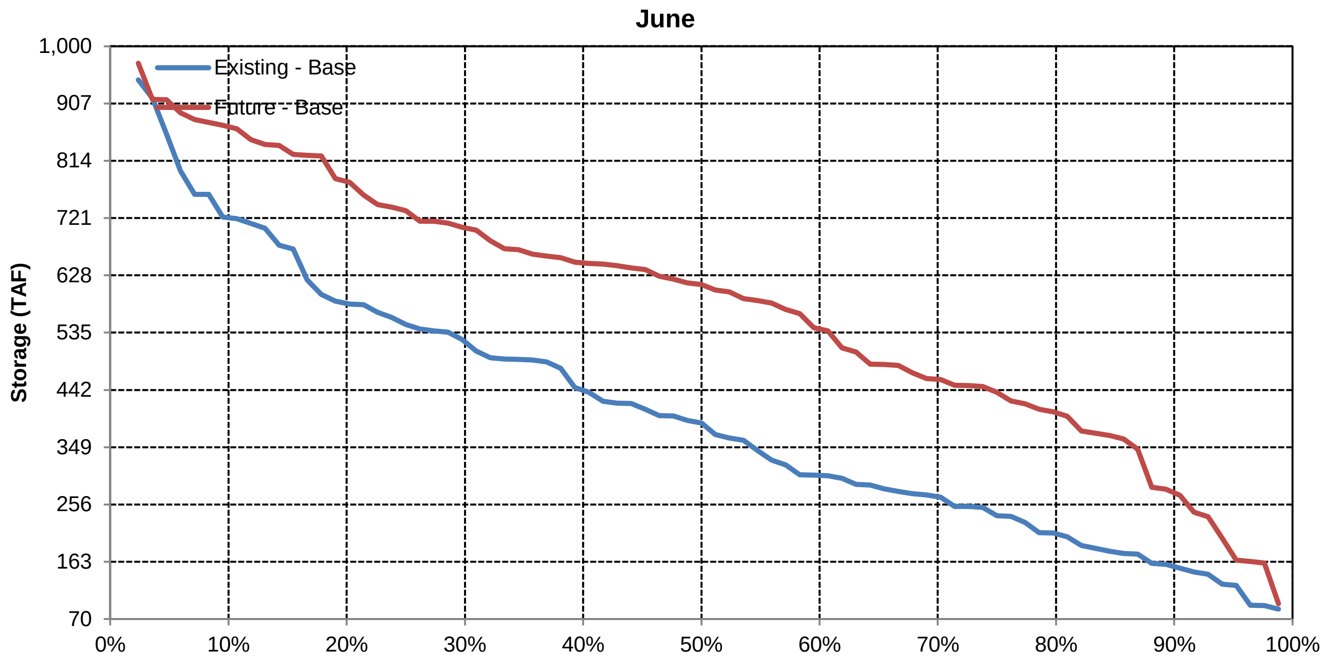
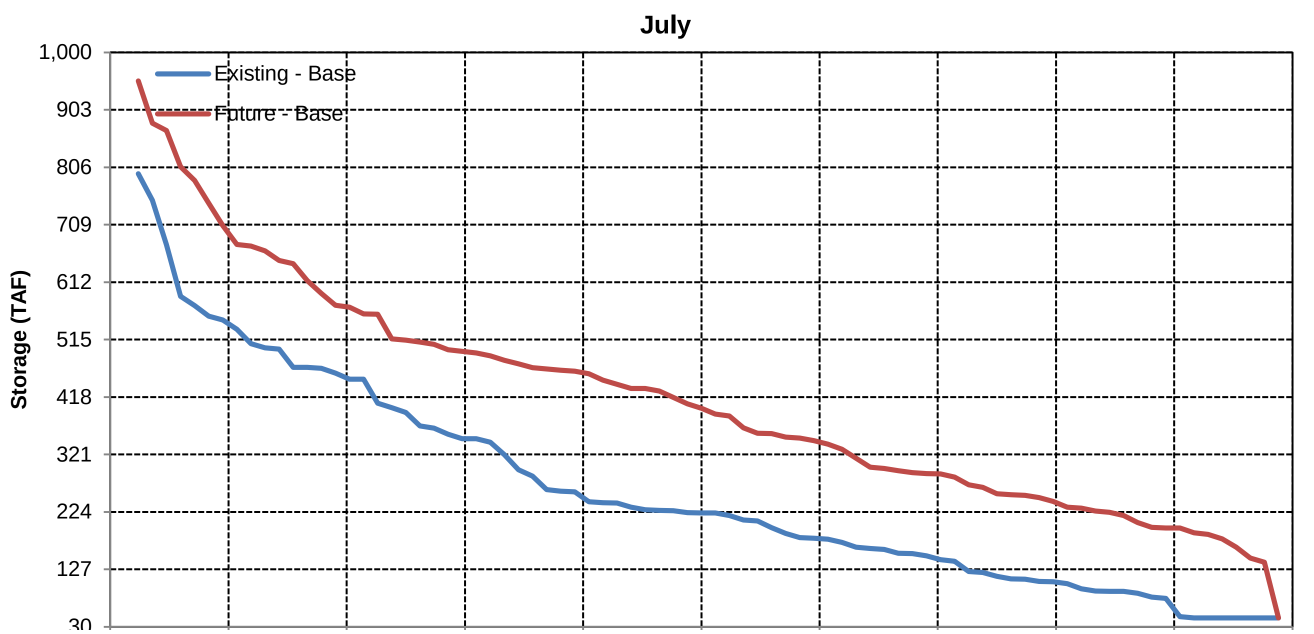




CVP San Luis Reservoir





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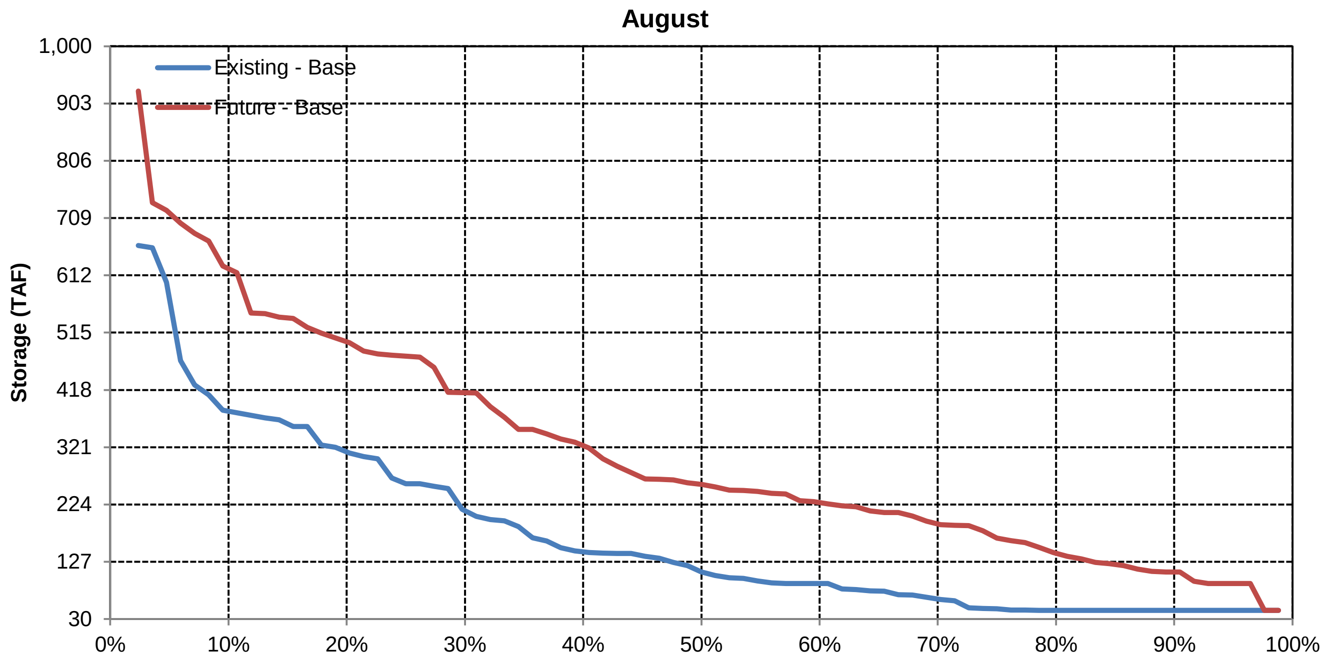
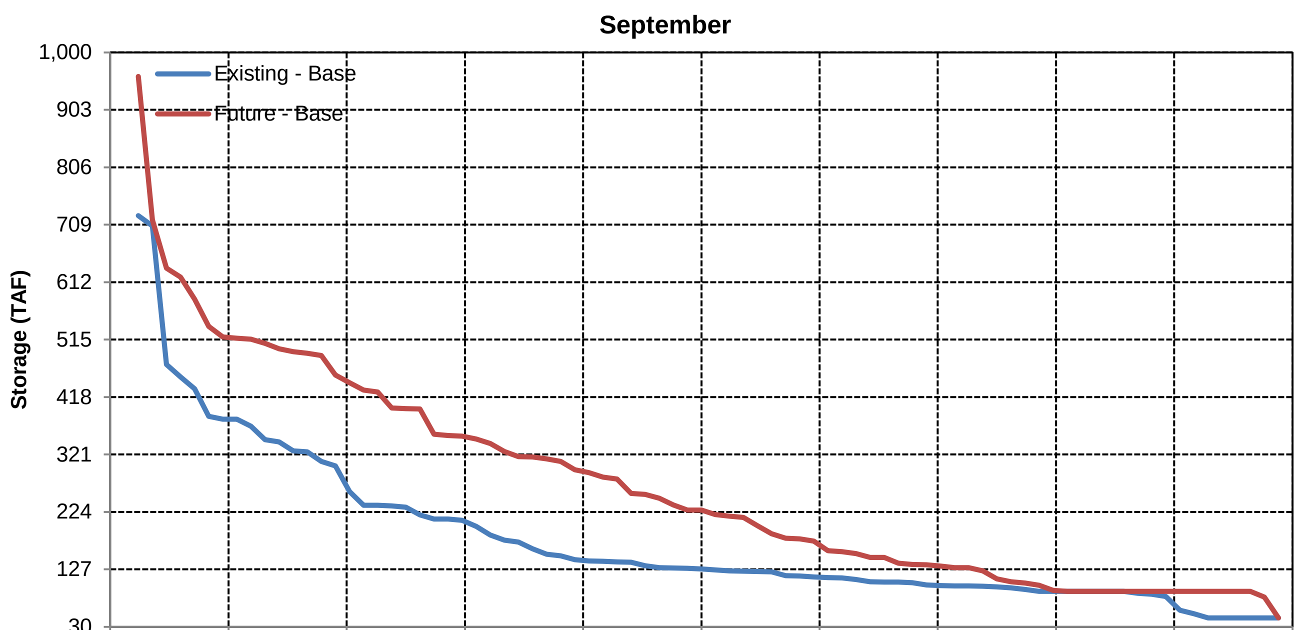
CVP San Luis Reservoir





Long-Term and Water Year-Type Average of SWP San Luis Reservoir Under Existing - Base and Future - Base

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
						Long-Term						
Full Simulation Period												
Existing - Base	244	268	372	541	678	802	720	562	380	374	324	288
Future - Base	181	218	351	573	767	885	811	640	506	467	355	257
Difference	-63	-50	-21	32	89	83	91	79	126	93	31	-31
Percent Difference	-26%	-19%	-6%	6%	13%	10%	13%	14%	33%	25%	10%	-11%
						Water Year-Types						
Wet												
Existing - Base	272	333	431	651	850	980	865	667	471	448	428	363
Future - Base	203	282	505	823	1,011	1,058	951	746	542	550	458	320
Difference	-69	-51	74	171	161	78	86	79	71	102	30	-43
Percent Difference	-26%	-15%	17%	26%	19%	8%	10%	12%	15%	23%	7%	-12%
Above Normal												
Existing - Base	259	253	386	576	716	886	757	532	307	308	323	276
Future - Base	154	177	288	602	890	1,035	904	639	536	533	415	285
Difference	-105	-76	-98	26	175	149	147	107	229	225	92	9
Percent Difference	-41%	-30%	-25%	4%	24%	17%	19%	20%	75%	73%	29%	3%
Below Normal												
Existing - Base	220	246	386	500	622	751	675	512	329	374	370	342
Future - Base	158	169	276	398	650	887	815	629	522	492	321	226
Difference	-61	-77	-110	-102	28	136	141	117	193	118	-49	-116
Percent Difference	-28%	-31%	-29%	-20%	4%	18%	21%	23%	59%	31%	-13%	-34%
Dry												
Existing - Base	209	219	300	450	552	670	620	509	348	358	229	234
Future - Base	169	206	304	453	620	767	724	597	504	425	286	210
Difference	-41	-13	4	3	68	97	104	88	156	67	57	-24
Percent Difference	-19%	-6%	1%	1%	12%	14%	17%	17%	45%	19%	25%	-10%
Critical												
Existing - Base	249	245	312	459	533	591	579	511	376	305	168	137
Future - Base	203	190	237	399	497	565	563	496	384	272	225	207
Difference	-46	-55	-74	-59	-35	-26	-16	-15	7	-33	57	70
Percent Difference	-18%	-23%	-24%	-13%	-7%	-4%	-3%	-3%	2%	-11%	34%	51%

SWP San Luis Reservoir

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	454	566	739	973	1,067	1,067	956	791	630	652	562	423
20%	354	407	561	738	914	1,067	931	704	511	491	470	331
30%	313	356	473	654	833	954	863	657	444	447	402	321
40%	255	303	402	546	714	879	804	584	415	402	358	310
50%	218	224	321	495	686	844	737	527	355	358	309	310
60%	199	169	291	431	584	715	642	488	303	309	267	298
70%	163	109	225	389	528	656	584	450	261	255	201	242
80%	121	76	155	325	466	573	528	396	209	231	155	164
90%	55	55	80	262	364	509	458	352	163	166	114	104
Long Term												
Full Simulation Period	244	268	372	541	678	802	720	562	380	374	324	288
Water Year Types												
Wet	272	333	431	651	850	980	865	667	471	448	428	363
Above Normal	259	253	386	576	716	886	757	532	307	308	323	276
Below Normal	220	246	386	500	622	751	675	512	329	374	370	342
Dry	209	219	300	450	552	670	620	509	348	358	229	234
Critical	249	245	312	459	533	591	579	511	376	305	168	137

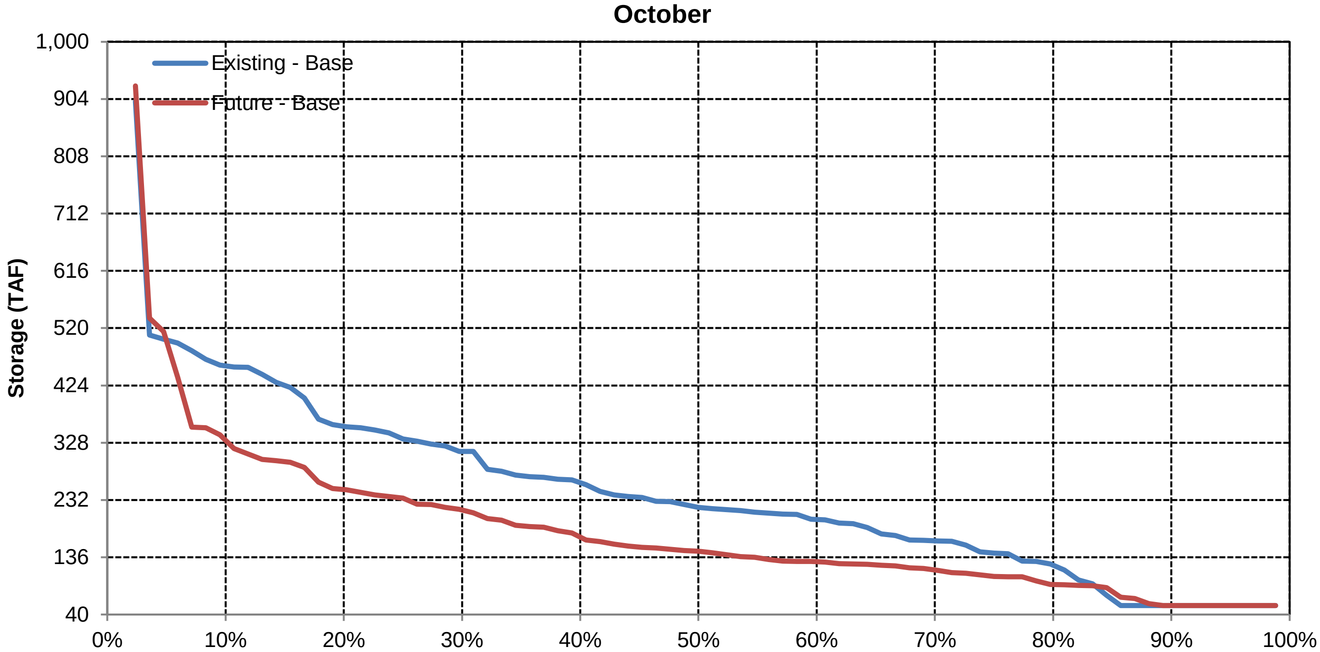
Future - Base

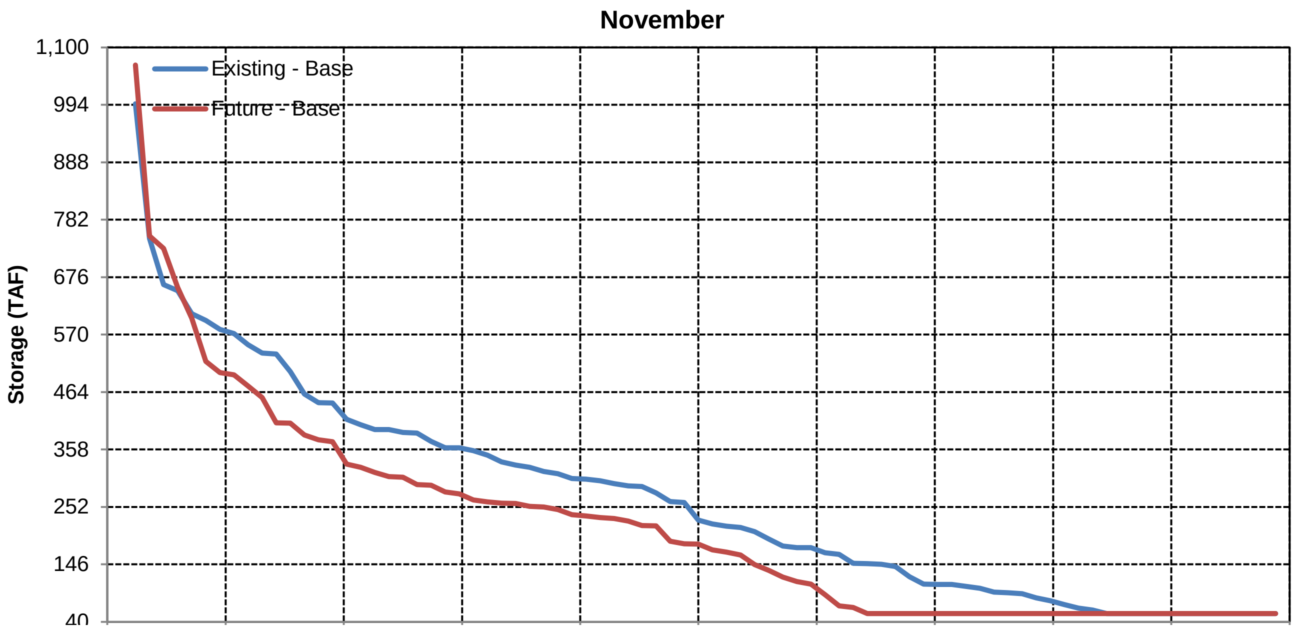
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	315	489	775	1,067	1,067	1,067	1,021	828	699	642	503	311
20%	247	327	590	954	1,067	1,067	959	755	649	601	410	291
30%	211	266	394	761	1,067	1,067	945	701	621	551	383	268
40%	165	235	339	664	984	1,067	921	680	601	539	371	243
50%	145	178	282	538	818	1,067	897	643	567	505	355	237
60%	128	94	223	455	664	944	869	621	492	462	333	225
70%	114	55	183	369	597	745	733	586	381	341	315	210
80%	90	55	116	243	482	636	621	505	332	279	229	196
90%	55	55	59	155	322	485	503	404	248	235	165	156
Long Term												
Full Simulation Period	181	218	351	573	767	885	811	640	506	467	355	257
Water Year Types												
Wet	203	282	505	823	1,011	1,058	951	746	542	550	458	320
Above Normal	154	177	288	602	890	1,035	904	639	536	533	415	285
Below Normal	158	169	276	398	650	887	815	629	522	492	321	226
Dry	169	206	304	453	620	767	724	597	504	425	286	210
Critical	203	190	237	399	497	565	563	496	384	272	225	207

Future - Base Minus Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	-139	-76	36	94	0	0	66	37	69	-10	-59	-112
20%	-107	-80	29	215	153	0	29	51	138	110	-60	-40
30%	-103	-90	-78	107	234	113	82	44	177	104	-18	-52
40%	-91	-68	-63	118	270	188	117	96	186	137	13	-67
50%	-74	-46	-39	43	132	223	160	116	212	147	46	-73
60%	-71	-76	-68	24	80	229	227	133	189	154	66	-73
70%	-50	-54	-42	-20	70	89	150	136	120	86	115	-32
80%	-31	-21	-39	-83	16	62	93	110	123	49	74	32
90%	0	0	-21	-107	-42	-23	45	52	85	69	51	53
Long Term												
Full Simulation Period	-63	-50	-21	32	89	83	91	79	126	93	31	-31
Water Year Types												
Wet	-69	-51	74	171	161	78	86	79	71	102	30	-43
Above Normal	-105	-76	-98	26	175	149	147	107	229	225	92	9
Below Normal	-61	-77	-110	-102	28	136	141	117	193	118	-49	-116
Dry	-41	-13	4	3	68	97	104	88	156	67	57	-24
Critical	-46	-55	-74	-59	-35	-26	-16	-15	7	-33	57	70

SWP San Luis Reservoir





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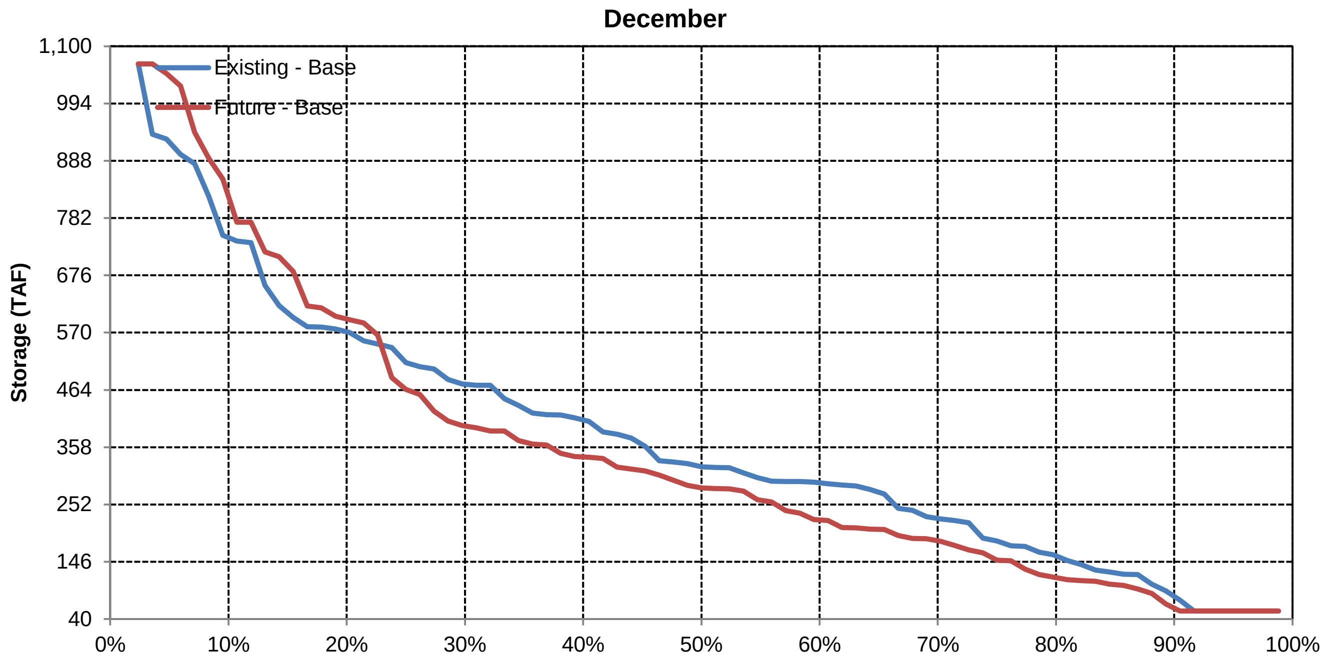
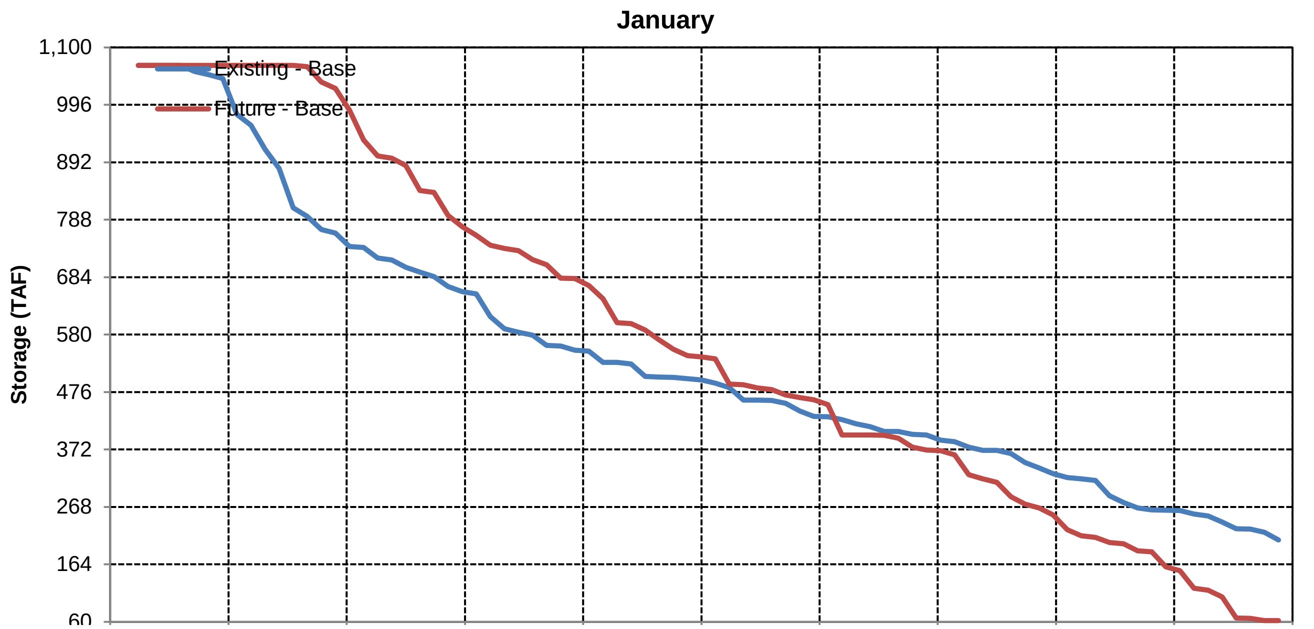
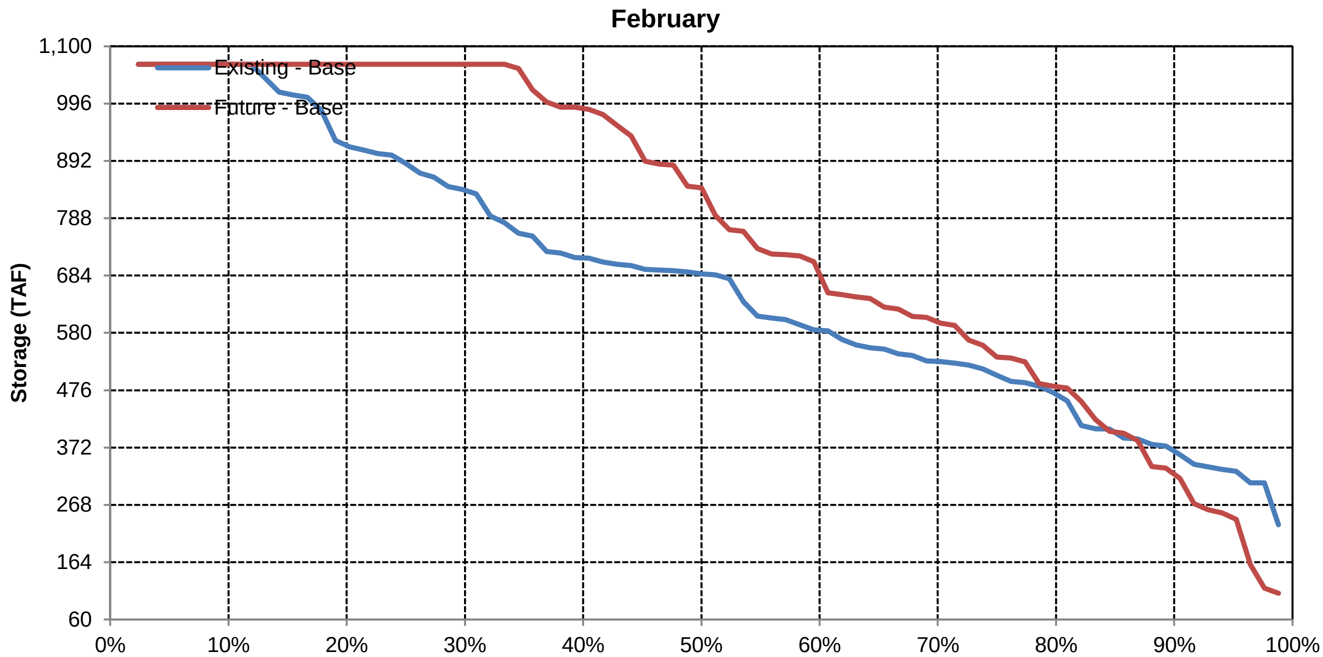
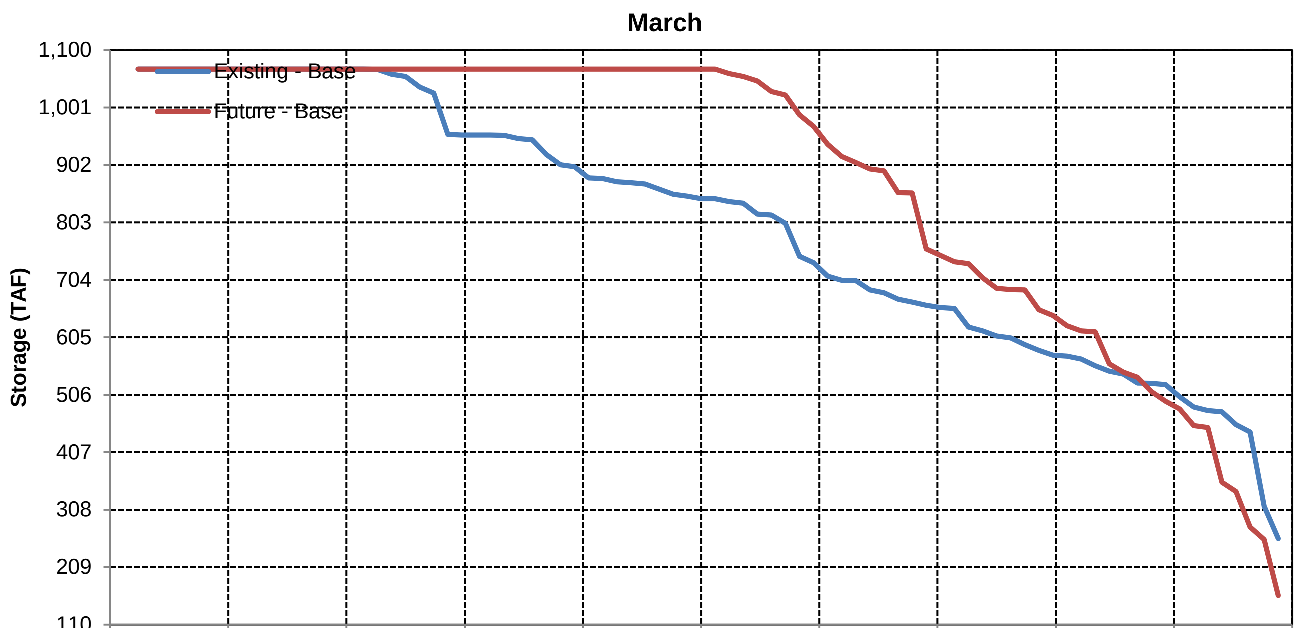
SWP San Luis Reservoir





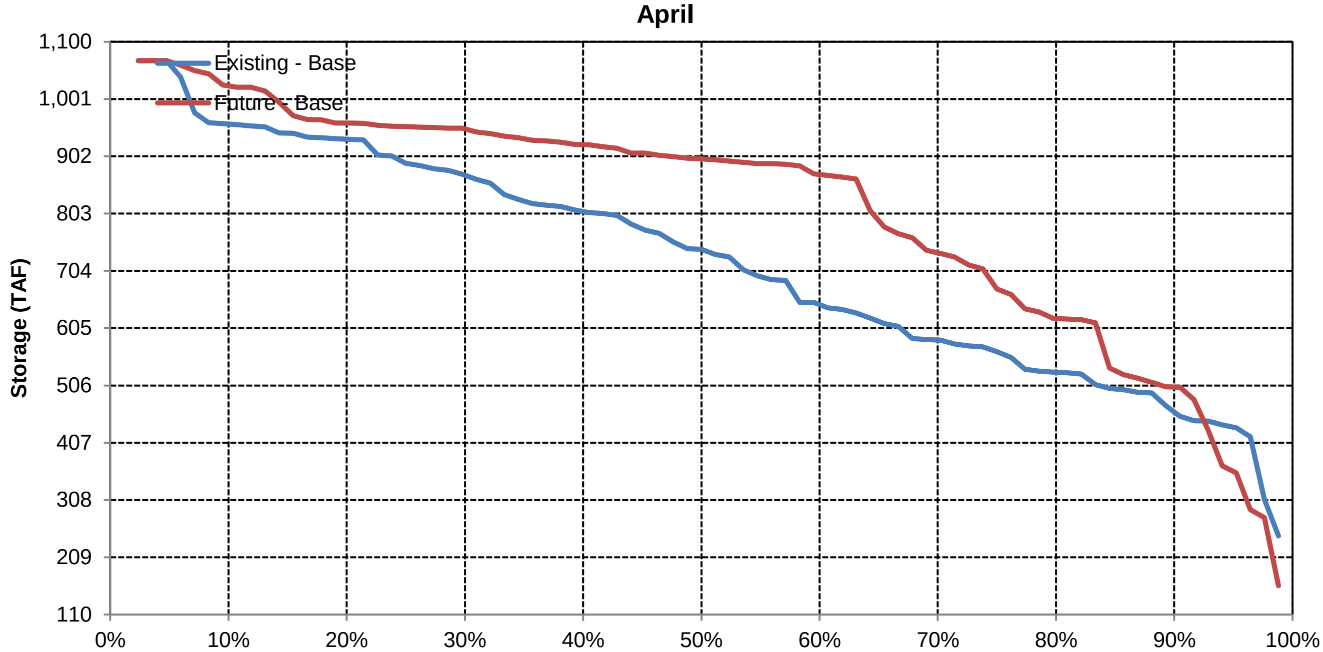
SWP San Luis Reservoir

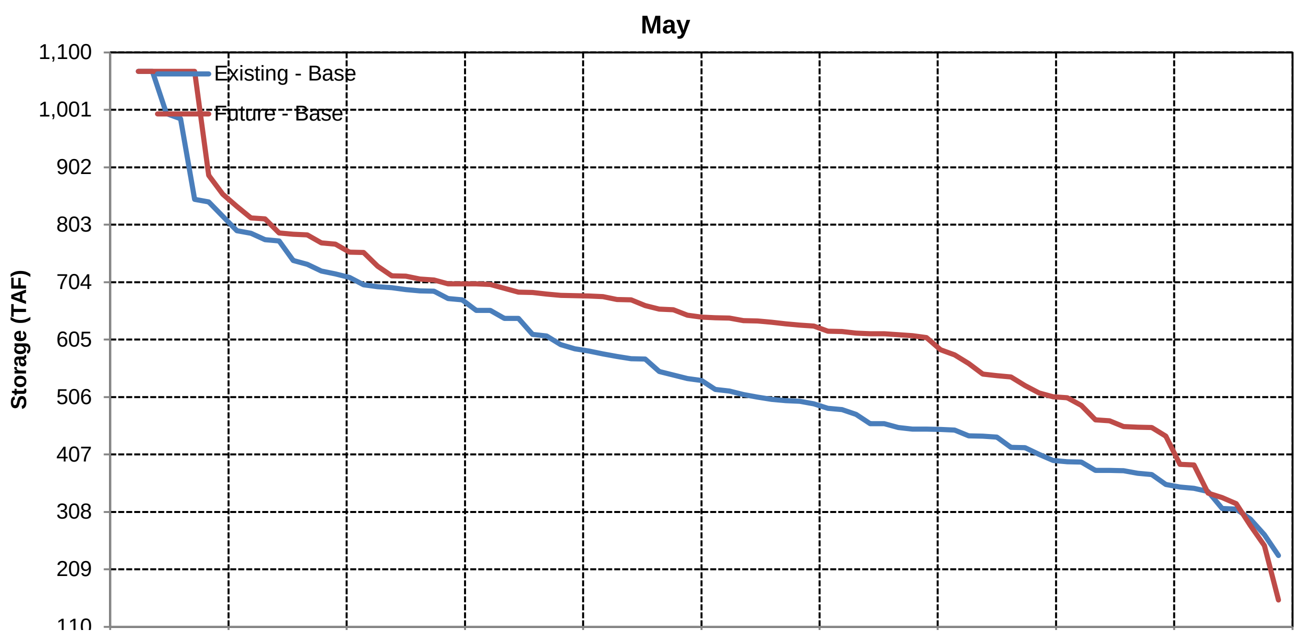




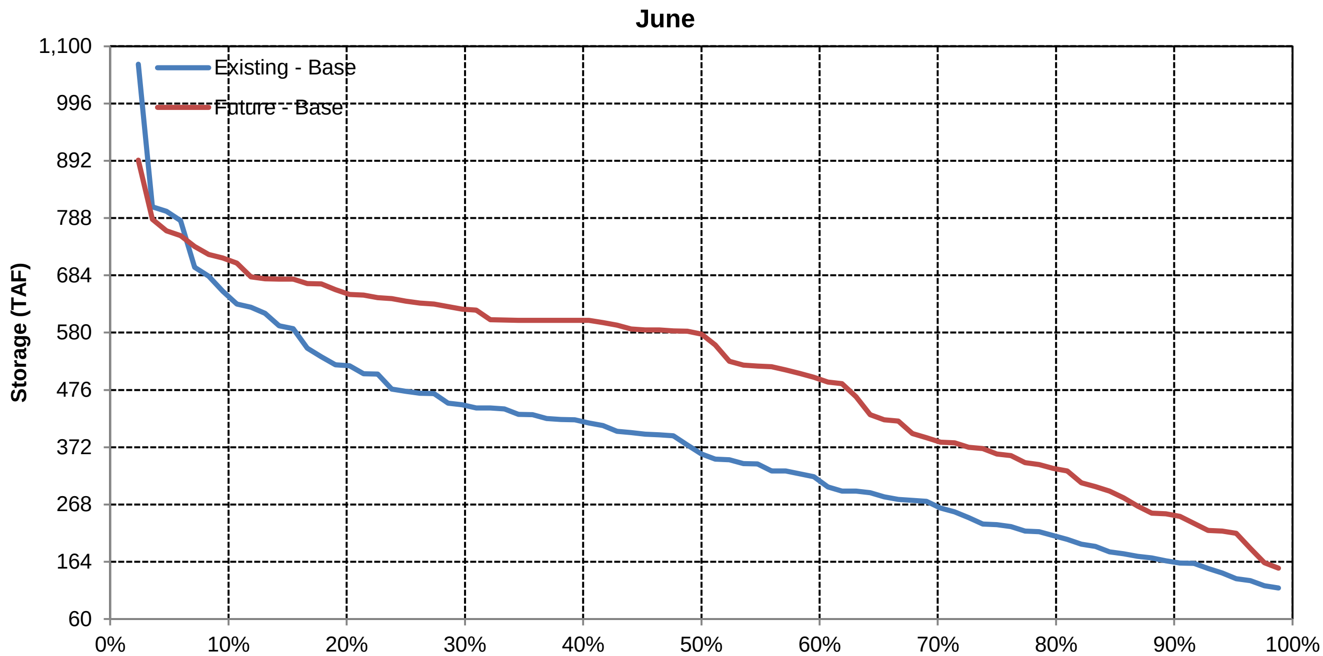
S12

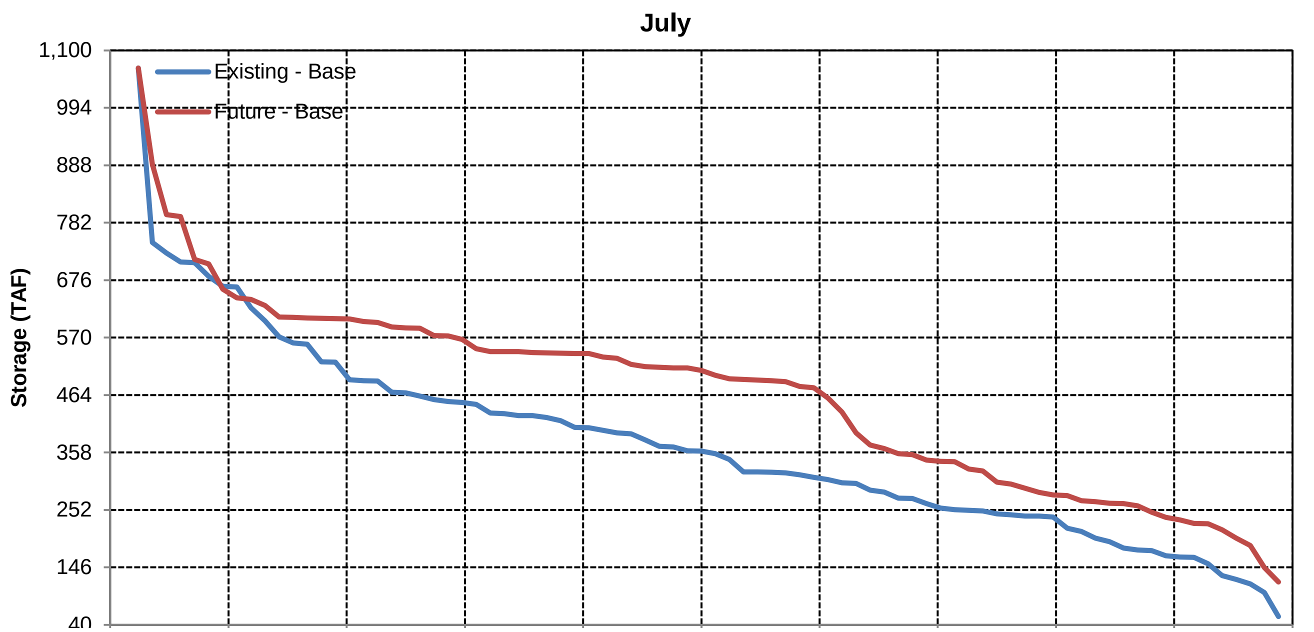
SWP San Luis Reservoir



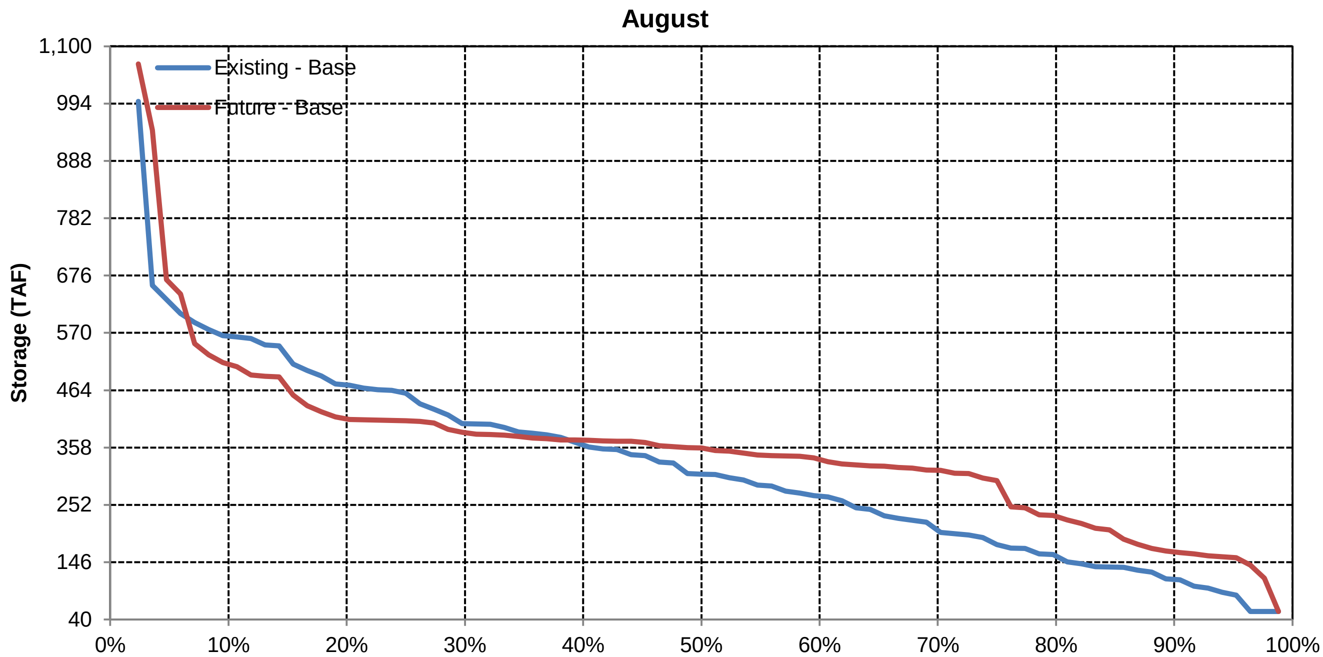


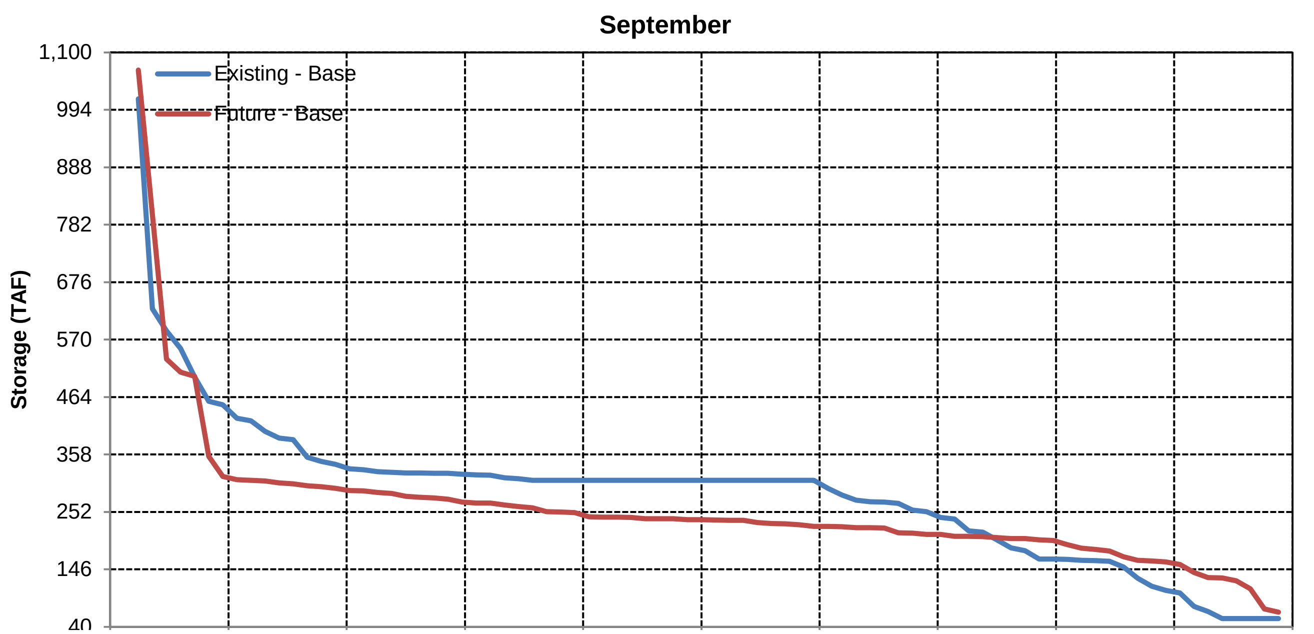
SWP San Luis Reservoir





SWP San Luis Reservoir





Long-Term and Water Year-Type Average of Delta Outflow Under Existing - Base and Future - Base

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Existing - Base	6,909	11,530	25,386	48,782	63,791	48,782	30,013	16,104	7,983	8,482	4,062	9,331	16,820
Future - Base	8,408	10,099	24,888	54,896	70,049	52,500	29,061	14,179	8,605	7,157	4,274	10,294	17,604
Difference	1,500	-1,431	-498	6,115	6,258	3,718	-953	-1,925	622	-1,326	212	963	784
Percent Difference	22%	-12%	-2%	13%	10%	8%	-3%	-12%	8%	-16%	5%	10%	5%
							Water Year-Types						
Wet													
Existing - Base	9,275	19,272	57,556	101,579	121,325	88,381	55,563	26,753	10,584	11,022	4,128	19,366	31,372
Future - Base	9,541	15,088	53,646	115,984	131,904	102,001	53,280	21,075	11,285	9,709	4,000	21,635	32,826
Difference	266	-4,184	-3,910	14,405	10,578	13,620	-2,283	-5,678	701	-1,314	-128	2,269	1,454
Percent Difference	3%	-22%	-7%	14%	9%	15%	-4%	-21%	7%	-12%	-3%	12%	5%
Above Normal													
Existing - Base	6,741	9,314	21,144	55,453	70,727	61,417	29,722	17,425	7,395	11,464	4,017	11,133	18,336
Future - Base	9,036	8,854	16,293	59,685	102,404	57,212	27,004	15,829	8,580	8,899	4,000	13,224	19,718
Difference	2,294	-461	-4,851	4,232	31,678	-4,205	-2,719	-1,596	1,185	-2,565	-17	2,092	1,382
Percent Difference	34%	-5%	-23%	8%	45%	-7%	-9%	-9%	16%	-22%	0%	19%	8%
Below Normal													
Existing - Base	6,527	9,662	10,110	23,902	40,103	31,158	23,270	13,328	6,819	8,808	4,050	3,469	10,847
Future - Base	8,461	9,070	13,804	28,415	31,537	29,246	21,994	12,973	7,605	6,655	4,139	3,000	10,623
Difference	1,934	-591	3,695	4,513	-8,566	-1,912	-1,276	-355	786	-2,153	88	-469	-224
Percent Difference	30%	-6%	37%	19%	-21%	-6%	-5%	-3%	12%	-24%	2%	-14%	-2%
Dry													
Existing - Base	5,825	7,923	8,608	15,426	29,458	22,607	13,161	8,982	7,006	5,274	4,137	3,269	7,873
Future - Base	7,611	7,891	10,135	15,901	29,451	24,322	15,139	9,861	7,158	5,000	4,785	3,000	8,395
Difference	1,786	-32	1,527	475	-7	1,715	1,978	879	152	-274	648	-269	522
Percent Difference	31%	0%	18%	3%	0%	8%	15%	10%	2%	-5%	16%	-8%	7%
Critical													
Existing - Base	4,133	5,072	6,622	11,837	16,327	13,519	9,101	6,026	6,104	4,027	3,889	3,010	5,383
Future - Base	6,653	5,227	7,054	11,831	15,756	13,084	9,330	6,228	6,318	4,170	4,415	3,092	5,600
Difference	2,521	155	432	-6	-571	-434	230	203	214	143	527	81	217
Percent Difference	61%	3%	7%	0%	-3%	-3%	3%	3%	3%	4%	14%	3%	4%

Delta Outflow

Existing - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	9,977	15,194	83,333	120,592	161,827	97,068	71,454	33,132	11,137	13,270	4,309	19,688
20%	9,531	14,688	37,738	76,978	107,377	74,847	46,407	23,720	7,991	11,709	4,155	19,375
30%	9,094	12,769	20,214	55,546	76,161	60,341	32,656	15,272	7,100	10,714	4,001	17,813
40%	6,875	10,418	14,342	38,012	58,777	38,477	22,321	12,858	7,100	9,084	4,000	10,938
50%	4,346	9,766	11,487	26,488	41,867	31,169	18,044	11,426	7,100	8,603	4,000	3,914
60%	4,000	6,253	6,752	19,211	28,692	22,356	14,643	10,166	6,905	8,000	4,000	3,569
70%	4,000	4,500	5,009	13,355	21,621	17,008	12,821	9,402	6,688	5,591	4,000	3,000
80%	4,000	4,500	4,670	10,293	17,232	14,703	11,016	7,597	6,187	5,000	4,000	3,000
90%	3,000	3,500	4,500	7,972	12,426	10,776	9,604	6,918	5,655	4,000	3,791	3,000
Long Term												
Full Simulation Period	6,909	11,530	25,386	48,782	63,791	48,782	30,013	16,104	7,983	8,482	4,062	9,331
Water Year Types												
Wet	9,275	19,272	57,556	101,579	121,325	88,381	55,563	26,753	10,584	11,022	4,128	19,366
Above Normal	6,741	9,314	21,144	55,453	70,727	61,417	29,722	17,425	7,395	11,464	4,017	11,133
Below Normal	6,527	9,662	10,110	23,902	40,103	31,158	23,270	13,328	6,819	8,808	4,050	3,469
Dry	5,825	7,923	8,608	15,426	29,458	22,607	13,161	8,982	7,006	5,274	4,137	3,269
Critical	4,133	5,072	6,622	11,837	16,327	13,519	9,101	6,026	6,104	4,027	3,889	3,010

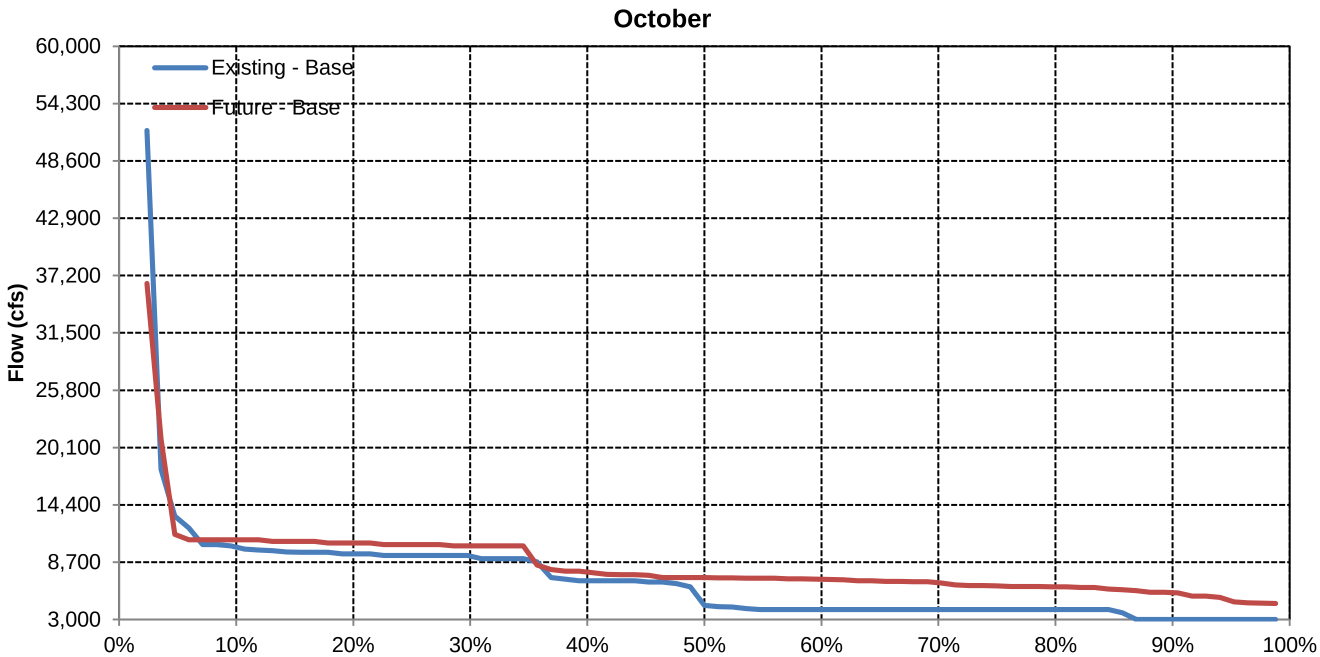
Future - Base

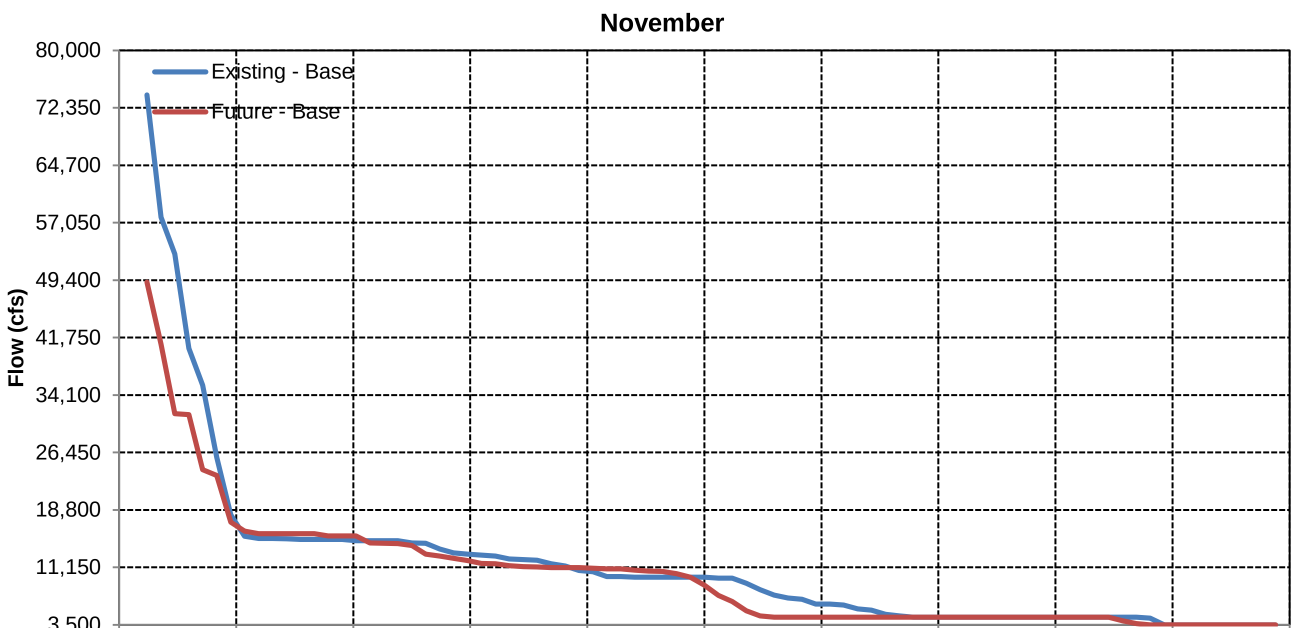
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	10,938	15,863	79,058	151,208	180,010	107,880	70,644	27,159	11,545	10,516	4,885	21,875
20%	10,625	14,764	33,428	92,252	125,923	89,027	38,581	18,353	10,462	9,612	4,709	21,563
30%	10,313	11,693	17,489	56,706	77,981	62,254	28,814	14,204	8,749	9,048	4,349	20,938
40%	7,625	11,004	14,366	33,893	58,622	40,886	20,594	12,808	8,409	8,000	4,217	13,062
50%	7,160	8,104	11,802	26,142	43,165	27,471	17,579	11,253	7,899	6,666	4,000	3,000
60%	6,994	4,500	8,257	19,228	24,986	20,728	15,558	10,174	7,418	6,500	4,000	3,000
70%	6,613	4,500	5,323	14,908	20,687	17,661	13,640	9,584	7,100	5,000	4,000	3,000
80%	6,259	4,500	4,500	13,125	16,723	14,481	11,153	8,460	7,100	5,000	4,000	3,000
90%	5,678	3,500	4,500	8,401	12,239	11,400	10,016	7,100	6,799	4,065	4,000	3,000
Long Term												
Full Simulation Period	8,408	10,099	24,888	54,896	70,049	52,500	29,061	14,179	8,605	7,157	4,274	10,294
Water Year Types												
Wet	9,541	15,088	53,646	115,984	131,904	102,001	53,280	21,075	11,285	9,709	4,000	21,635
Above Normal	9,036	8,854	16,293	59,685	102,404	57,212	27,004	15,829	8,580	8,899	4,000	13,224
Below Normal	8,461	9,070	13,804	28,415	31,537	29,246	21,994	12,973	7,605	6,655	4,139	3,000
Dry	7,611	7,891	10,135	15,901	29,451	24,322	15,139	9,861	7,158	5,000	4,785	3,000
Critical	6,653	5,227	7,054	11,831	15,756	13,084	9,330	6,228	6,318	4,170	4,415	3,092

Future - Base Minus Existing - Base

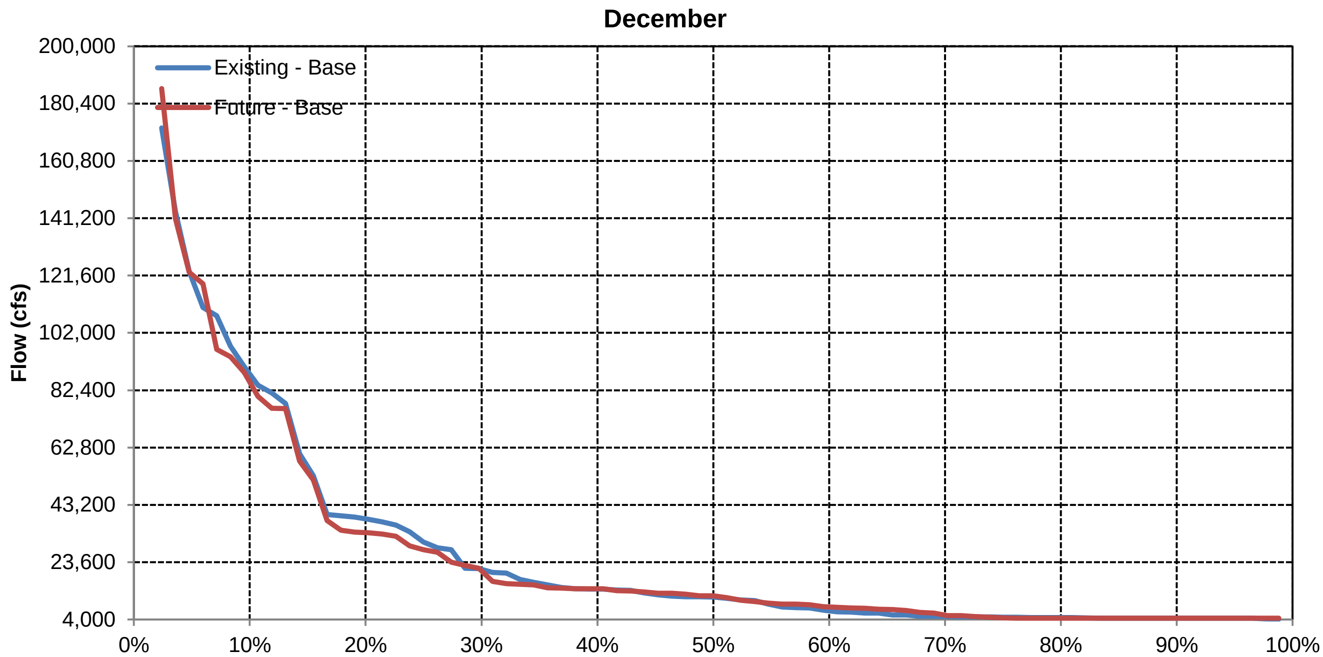
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	961	669	-4,275	30,616	18,183	10,812	-811	-5,973	408	-2,755	576	2,188
20%	1,094	76	-4,310	15,274	18,546	14,180	-7,826	-5,367	2,471	-2,096	553	2,188
30%	1,219	-1,076	-2,725	1,160	1,819	1,912	-3,842	-1,068	1,649	-1,667	348	3,125
40%	750	586	24	-4,119	-154	2,409	-1,727	-50	1,309	-1,084	217	2,125
50%	2,814	-1,662	316	-346	1,298	-3,699	-465	-173	799	-1,937	0	-914
60%	2,994	-1,753	1,504	17	-3,706	-1,628	915	8	514	-1,500	0	-569
70%	2,613	0	314	1,553	-934	654	819	182	412	-591	0	0
80%	2,259	0	-170	2,832	-510	-221	137	862	913	0	0	0
90%	2,678	0	0	429	-187	624	412	182	1,144	65	209	0
Long Term												
Full Simulation Period	1,500	-1,431	-498	6,115	6,258	3,718	-953	-1,925	622	-1,326	212	963
Water Year Types												
Wet	266	-4,184	-3,910	14,405	10,578	13,620	-2,283	-5,678	701	-1,314	-128	2,269
Above Normal	2,294	-461	-4,851	4,232	31,678	-4,205	-2,719	-1,596	1,185	-2,565	-17	2,092
Below Normal	1,934	-591	3,695	4,513	-8,566	-1,912	-1,276	-355	786	-2,153	88	-469
Dry	1,786	-32	1,527	475	-7	1,715	1,978	879	152	-274	648	-269
Critical	2,521	155	432	-6	-571	-434	230	203	214	143	527	81

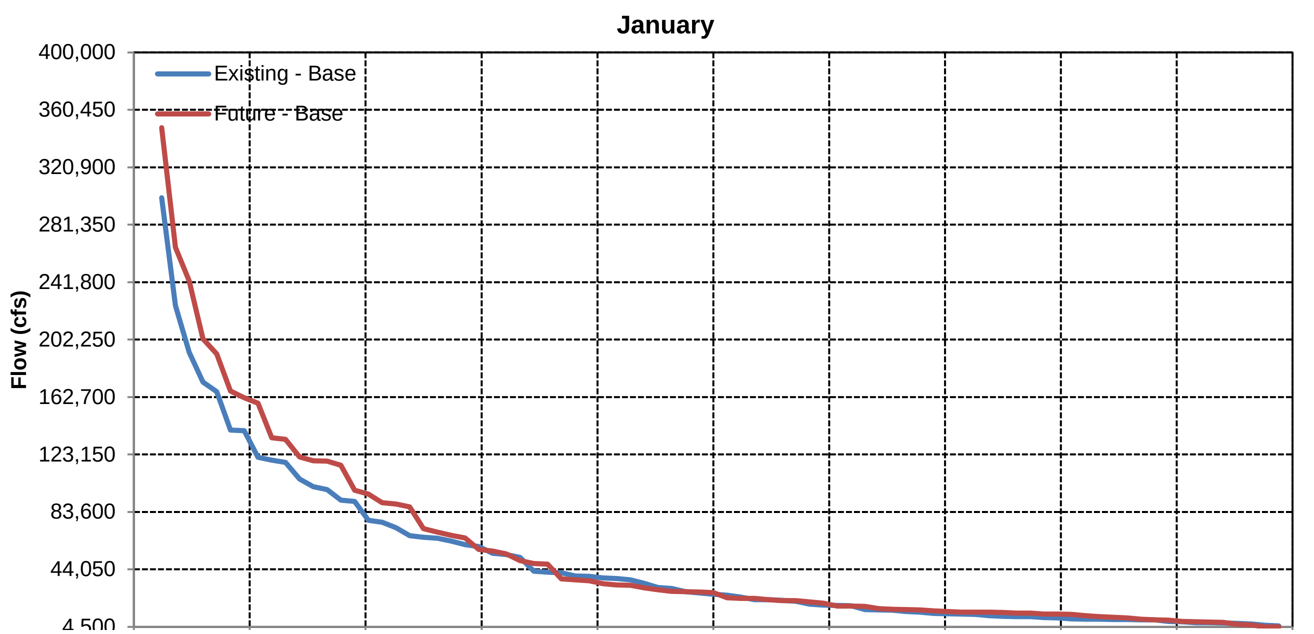
Delta Outflow





Delta Outflow





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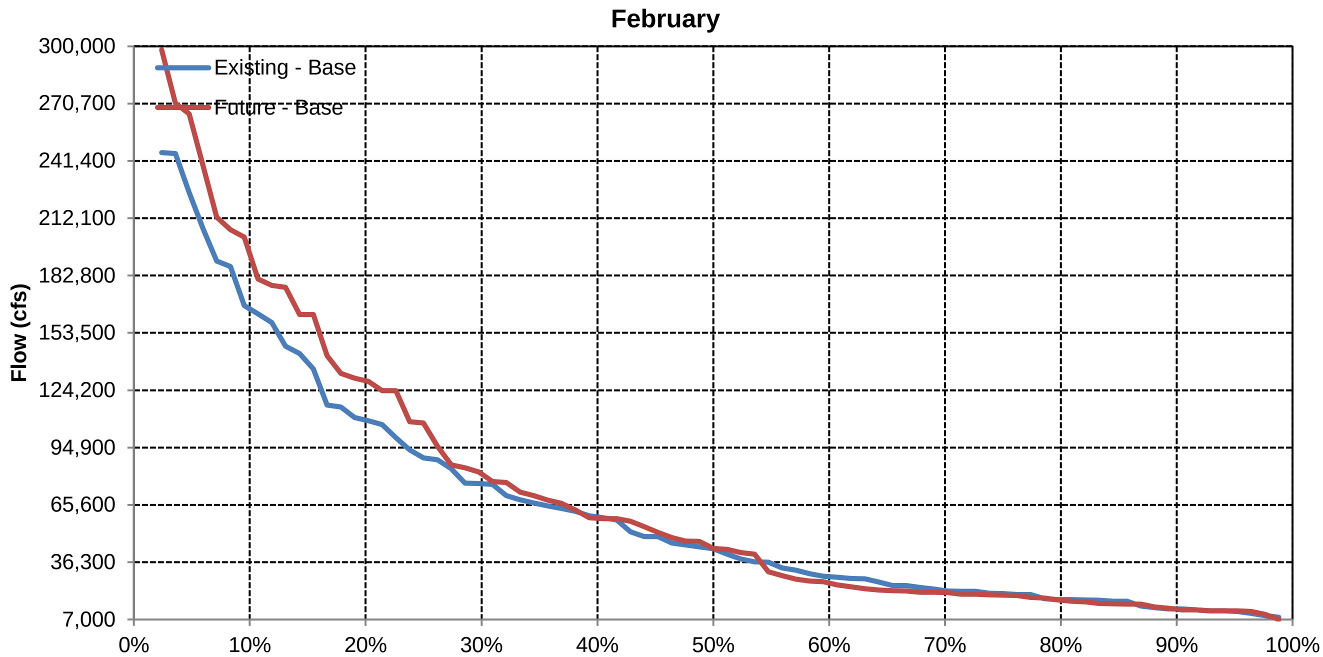

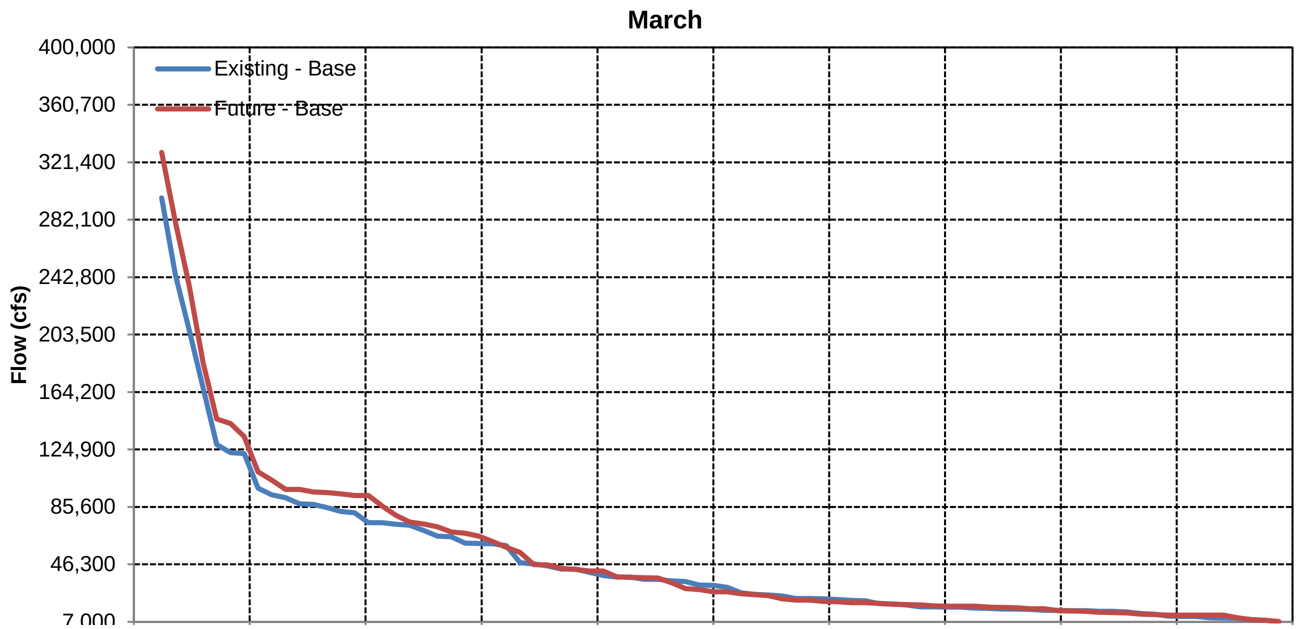

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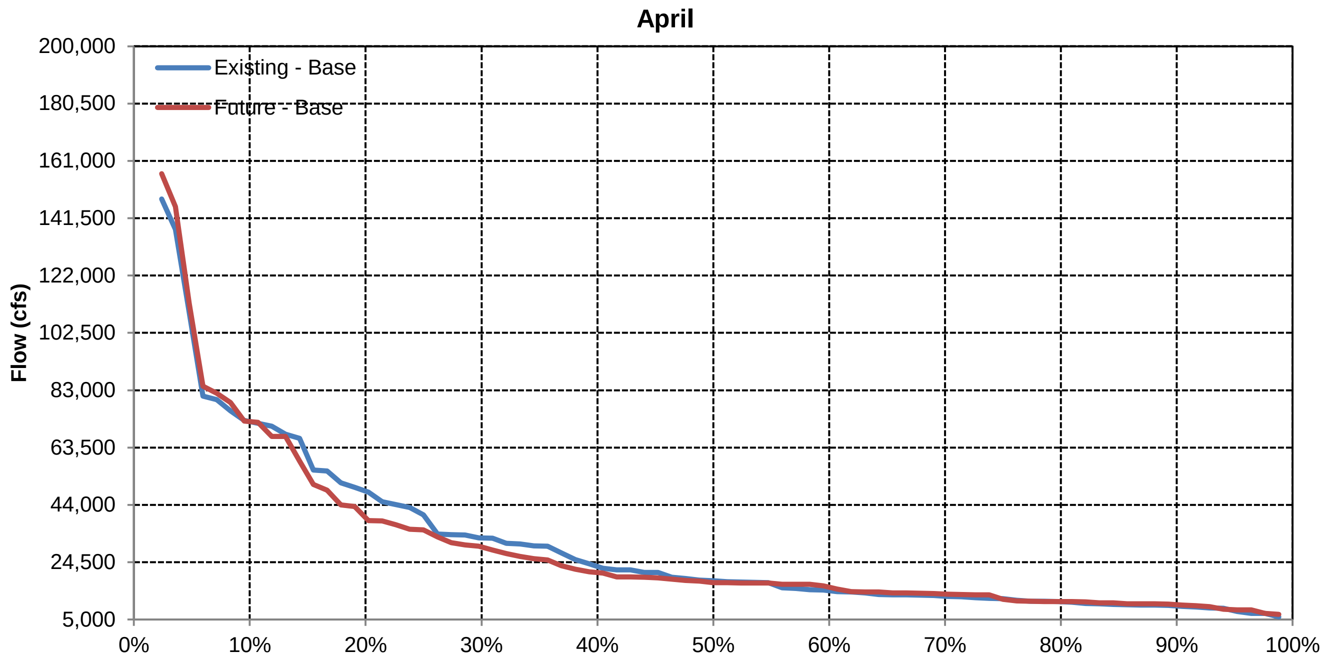

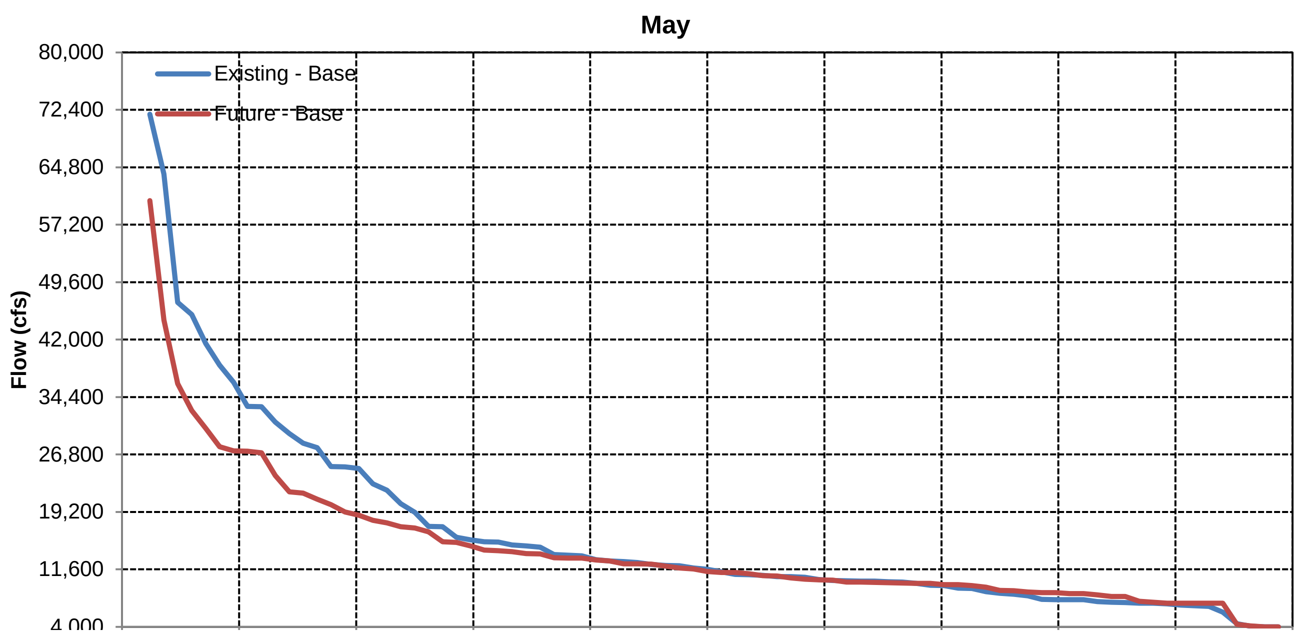

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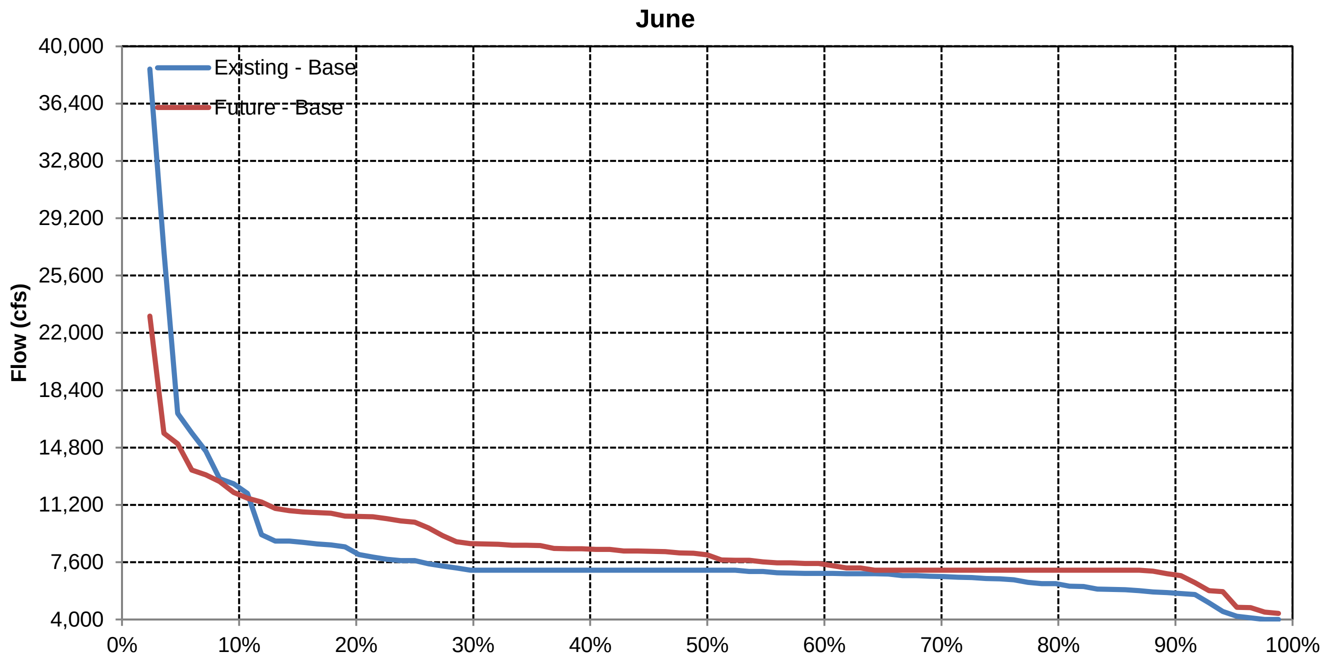

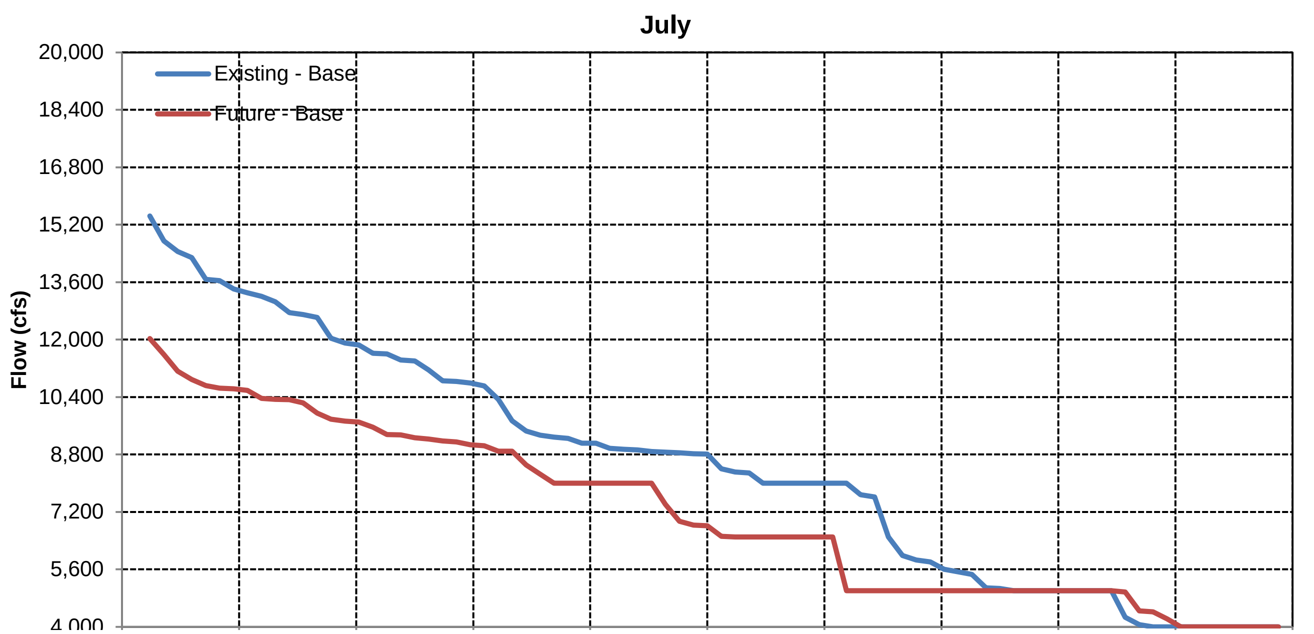

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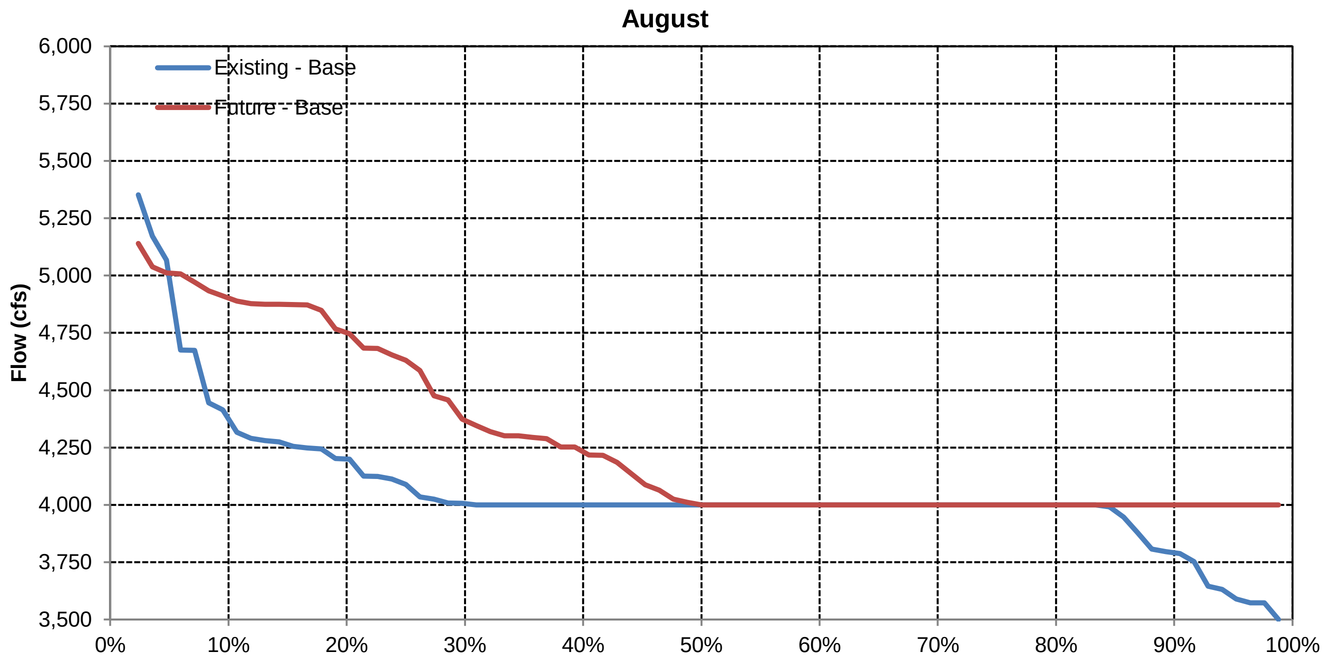


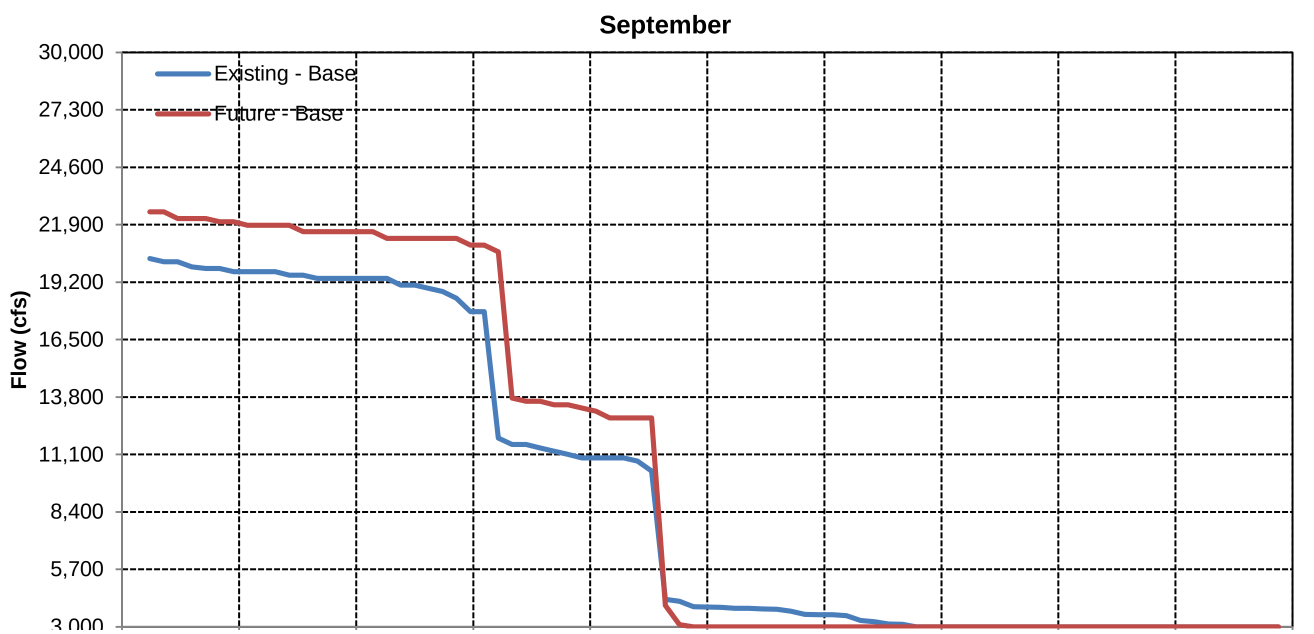


Table 185 Existing Condtions-No Action Alternative

Winter-run Chinook Salmon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under No Action Alternative relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration	November through July	Mean Monthly Flow (cfs)	Verona		10	Lower 40%		-27.3	-3.0	0.0	-3.0	9.1	0.0	-3.0	21.2	-90.9		
			Freeport		10	Lower 40%		-21.2	0.0	0.0	0.0	9.1	3.0	0.0	12.1	-87.9		
		Mean Monthly Water Temperature (°F)	Feather River Confluence	64		All Years		0.0	0.0	0.0	0.0	0.0	21.2	2.5	0.0	0.0		
				68		All Years		0.0	0.0	0.0	0.0	0.0	0.0	16.4	-1.7	0.0		
			Freeport	64		All Years		0.0	0.0	0.0	0.0	0.0	11.6	3.3	0.0	0.0		
				68		All Years		0.0	0.0	0.0	0.0	0.0	0.0	21.4	0.0	0.0		
Juvenile Rearing and Downstream Movement*	July through March	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	12.1	-27.3	-3.0	0.0	-3.0	9.1				-90.9	30.3	-78.8
			Freeport		10	Lower 40%	6.1	-21.2	0.0	0.0	0.0	9.1				-87.9	24.2	-72.7
		Mean Monthly Water Temperature (°F)	Feather River Confluence	61		All Years	29.3	0.0	0.0	0.0	0.0	0.2				0.0	0.0	0.0
				65		All Years	15.6	0.0	0.0	0.0	0.0	0.0				0.0	0.0	5.5
			Freeport	61		All Years	23.6	0.0	0.0	0.0	0.0	0.2				0.0	0.0	0.0
				65		All Years	21.4	0.0	0.0	0.0	0.0	0.0				0.0	0.0	1.2

Table 186 Existing Condtions-No Action Alternative

Spring-run Chinook Salmon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location Description	Metric Value	Metric %	Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
							Net Change in Probability of Exceedance under No Action Alternative relative to Existing Condtions											
Adult Immigration	March through September	Mean Monthly Flow (cfs)	Verona		10	Lower 40%						9.1	0.0	-3.0	21.2	-90.9	30.3	-78.8
			Freeport		10	Lower 40%						9.1	3.0	0.0	12.1	-87.9	24.2	-72.7
		Mean Monthly Water Temperature (°F)	Feather River Confluence	64		All Years						0.0	21.2	2.5	0.0	0.0	0.0	0.0
				68		All Years						0.0	0.0	16.4	-1.7	0.0	0.0	23.7
			Freeport	64		All Years						0.0	11.6	3.3	0.0	0.0	0.0	0.0
				68		All Years						0.0	0.0	21.4	0.0	0.0	0.0	14.0
Juvenile Rearing (and Downstream Movement)	Year-round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	12.1	-27.3	-3.0	0.0	-3.0	9.1	0.0	-3.0	21.2	-90.9	30.3	-78.8
		Mean Monthly Water Temperature (°F)	Feather River Confluence	61		All Years	29.3	0.0	0.0	0.0	0.0	0.2	17.1	0.0	0.0	0.0	0.0	0.0
				65		All Years	15.6	0.0	0.0	0.0	0.0	0.0	12.8	6.7	0.0	0.0	0.0	5.5
Smolt Emigration	October through May	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	12.1	-27.3	-3.0	0.0	-3.0	9.1	0.0	-3.0				
			Freeport		10	Lower 40%	6.1	-21.2	0.0	0.0	0.0	9.1	3.0	0.0				
		Mean Monthly Water Temperature (°F)	Feather River Confluence	63		All Years	29.6	0.0	0.0	0.0	0.0	0.0	14.6	1.7				
				68		All Years	2.6	0.0	0.0	0.0	0.0	0.0	0.0	16.4				
			Freeport	63		All Years	20.7	0.0	0.0	0.0	0.0	0.1	17.7	1.1				
				68		All Years	3.0	0.0	0.0	0.0	0.0	0.0	0.0	21.4				

Table 187 Existing Condtions-No Action Alternative

Fall-run Chinook Salmon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under No Action Alternative relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Staging	July through December	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	12.1	-27.3	-3.0							-90.9	30.3	-78.8
			Freeport		10	Lower 40%	6.1	-21.2	0.0							-87.9	24.2	-72.7
		Mean Monthly Water Temperature (°F)	Feather River Confluence	64		All Years	26.9	0.0	0.0							0.0	0.0	0.0
				68		All Years	2.6	0.0	0.0							0.0	0.0	23.7
			Freeport	64		All Years	31.7	0.0	0.0							0.0	0.0	0.0
				68		All Years	3.0	0.0	0.0							0.0	0.0	14.0
Juvenile Rearing and Downstream Movement	December through July	Mean Monthly Flow (cfs)	Verona		10	Lower 40%			-3.0	0.0	-3.0	9.1	0.0	-3.0	21.2	-90.9		
			Freeport		10	Lower 40%			0.0	0.0	0.0	9.1	3.0	0.0	12.1	-87.9		
		Mean Monthly Water Temperature (°F)	Freeport	61		All Years			0.0	0.0	0.0	0.2	16.7	0.0	0.0	0.0		
				65		All Years			0.0	0.0	0.0	0.0	14.8	4.3	0.0	0.0		

Table 188 Existing Condtions-No Action Alternative

Late Fall-run Chinook Salmon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under No Action Alternative relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Staging	October through April	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	12.1	-27.3	-3.0	0.0	-3.0	9.1	0.0					
			Freeport		10	Lower 40%	6.1	-21.2	0.0	0.0	0.0	9.1	3.0					
		Mean Monthly Water Temperature (°F)	Feather River Confluence	64		All Years	26.9	0.0	0.0	0.0	0.0	0.0	21.2					
				68		All Years	2.6	0.0	0.0	0.0	0.0	0.0	0.0					
			Freeport	64		All Years	31.7	0.0	0.0	0.0	0.0	0.0	11.6					
				68		All Years	3.0	0.0	0.0	0.0	0.0	0.0	0.0					
Juvenile Rearing and Downstream Movement	April through December	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	12.1	-27.3	-3.0				0.0	-3.0	21.2	-90.9	30.3	-78.8
			Freeport		10	Lower 40%	6.1	-21.2	0.0				3.0	0.0	12.1	-87.9	24.2	-72.7
		Mean Monthly Water Temperature (°F)	Freeport	61		All Years	23.6	0.0	0.0				16.7	0.0	0.0	0.0	0.0	0.0
				65		All Years	21.4	0.0	0.0				14.8	4.3	0.0	0.0	0.0	1.2

Table 189 Existing Condtions-No Action Alternative

Steelhead in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under No Action Alternative relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration	August through March	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	12.1	-27.3	-3.0	0.0	-3.0	9.1					30.3	-78.8
			Freeport		10	Lower 40%	6.1	-21.2	0.0	0.0	0.0	9.1					24.2	-72.7
		Mean Monthly Water Temperature (°F)	Feather River Confluence	64		All Years	26.9	0.0	0.0	0.0	0.0	0.0					0.0	0.0
				68		All Years	2.6	0.0	0.0	0.0	0.0	0.0					0.0	23.7
			Freeport	64		All Years	31.7	0.0	0.0	0.0	0.0	0.0					0.0	0.0
				68		All Years	3.0	0.0	0.0	0.0	0.0	0.0					0.0	14.0
Juvenile Rearing and Downstream Movement	Year-Round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	12.1	-27.3	-3.0	0.0	-3.0	9.1	0.0	-3.0	21.2	-90.9	30.3	-78.8
		Mean Monthly Water Temperature (°F)	Feather River Confluence	65		All Years	15.6	0.0	0.0	0.0	0.0	0.0	12.8	6.7	0.0	0.0	0.0	5.5
				68		All Years	2.6	0.0	0.0	0.0	0.0	0.0	0.0	16.4	-1.7	0.0	0.0	23.7
Smolt Emigration	January through June	Mean Monthly Flow (cfs)	Verona		10	Lower 40%				0.0	-3.0	9.1	0.0	-3.0	21.2			
			Freeport		10	Lower 40%				0.0	0.0	9.1	3.0	0.0	12.1			
		Mean Monthly Water Temperature (°F)	Feather River Confluence	52		All Years				0.0	17.9	9.5	0.0	0.0	0.0			
				55		All Years				0.0	1.9	19.5	0.4	0.0	0.0			
			Freeport	52		All Years				0.0	15.9	6.7	0.0	0.0	0.0			
				55		All Years				0.0	3.4	18.3	0.5	0.0	0.0			

Table 190 Existing Condtions-No Action Alternative

Green Sturgeon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under No Action Alternative relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Holding	February through July	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%					0.0	9.1	3.0	0.0	12.1	-87.9		
		Mean Monthly Water Temperature (°F)	Freeport	61		All Years					0.0	0.2	16.7	0.0	0.0	0.0		
Adult Post-Spawning Holding and Emigration	July through November	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%	6.1	-21.2								-87.9	24.2	-72.7
		Mean Monthly Water Temperature (°F)	Freeport	61		All Years	23.6	0.0								0.0	0.0	0.0
Juvenile Rearing and Downstream Movement	Year-round	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%	6.1	-21.2	0.0	0.0	0.0	9.1	3.0	0.0	12.1	-87.9	24.2	-72.7
		Mean Monthly Water Temperature (°F)	Freeport	66		All Years	15.8	0.0	0.0	0.0	0.0	0.0	10.4	8.2	0.0	0.0	0.0	4.1

Table 191 Existing Condtions-No Action Alternative

White Sturgeon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location Description	Metric Value	Metric %	Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Holding	November through May	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%		-21.2	0.0	0.0	0.0	9.1	3.0	0.0				
		Mean Monthly Water Temperature (°F)	Freeport	77		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Spawning and Egg Incubation	February through June	Mean Monthly Flow (cfs)	Verona		10	Lower 40%					-3.0	9.1	0.0	-3.0	21.2			
			Freeport		10	Lower 40%					0.0	9.1	3.0	0.0	12.1			
		Mean Monthly Water Temperature (°F)	Feather River Confluence	61		All Years					0.0	0.2	17.1	0.0	0.0			
Juvenile Rearing and Downstream Movement	Year-round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	12.1	-27.3	-3.0	0.0	-3.0	9.1	0.0	-3.0	21.2	-90.9	30.3	-78.8
			Freeport		10	Lower 40%	6.1	-21.2	0.0	0.0	0.0	9.1	3.0	0.0	12.1	-87.9	24.2	-72.7
		Mean Monthly Water Temperature (°F)	Feather River Confluence	66		All Years	10.7	0.0	0.0	0.0	0.0	0.0	6.1	5.3	0.0	0.0	0.0	7.2
			Freeport	66		All Years	15.8	0.0	0.0	0.0	0.0	0.0	10.4	8.2	0.0	0.0	0.0	4.1

Net Change in Probability of Exceedance under No Action Alternative relative to Existing Condtions (columns Oct–Sep)

Table 192 Existing Condtions-No Action Alternative

River Lamprey in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under No Action Alternative relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration	September through June	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%	6.1	-21.2	0.0	0.0	0.0	9.1	3.0	0.0	12.1			-72.7
		Mean Monthly Water Temperature (°F)	Freeport	42-60		All Years	-3.7	0.0	1.0	0.6	0.0	-1.7	-10.5	0.0	0.0			0.0
Ammocoete Rearing and Downstream Movement	Year-round	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%	6.1	-21.2	0.0	0.0	0.0	9.1	3.0	0.0	12.1	-87.9	24.2	-72.7
		Mean Monthly Water Temperature (°F)	Freeport	72		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0	17.1	1.2	7.3	35.4

[1]Water temperature ranges are evaluated by calculating the net change in the probability of water temperatures occurring within the specified range.

Table 193 Existing Condtions-No Action Alternative

Pacific Lamprey in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under No Action Alternative relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration	January through June	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%				0.0	0.0	9.1	3.0	0.0	12.1			
		Mean Monthly Water Temperature (°F)	Freeport	42-60		All Years				0.6	0.0	-1.7	-10.5	0.0	0.0			
Ammocoete Rearing and Downstream Movement	Year-round	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%	6.1	-21.2	0.0	0.0	0.0	9.1	3.0	0.0	12.1	-87.9	24.2	-72.7
		Mean Monthly Water Temperature (°F)	Freeport	72		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0	17.1	1.2	7.3	35.4

[1]Water temperature ranges are evaluated by calculating the net change in the probability of water temperatures occurring within the specified range.

Table 194 Existing Condtions-No Action Alternative

Hardhead in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under No Action Alternative relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adults and Other Lifestages	Year-round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	12.1	-27.3	-3.0	0.0	-3.0	9.1	0.0	-3.0	21.2	-90.9	30.3	-78.8
			Freeport		10	Lower 40%	6.1	-21.2	0.0	0.0	0.0	9.1	3.0	0.0	12.1	-87.9	24.2	-72.7
		Mean Monthly Water Temperature (°F)	Feather River Confluence	61-77		All Years	29.3	0.0	0.0	0.0	0.0	0.2	17.1	0.0	0.0	-14.0	-28.4	-1.8
			Freeport	61-77		All Years	23.6	0.0	0.0	0.0	0.0	0.2	16.7	0.0	0.0	-28.6	-36.6	-0.9
Adult Spawning	April through June	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%							3.0	0.0	12.1			
		Mean Monthly Water Temperature (°F)	Freeport	59-64		All Years							-1.6	-3.3	0.0			

[1]Water temperature ranges are evaluated by calculating the net change in the probability of water temperatures occurring within the specified range.

Table 195 Existing Condtions-No Action Alternative

American Shad in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under No Action Alternative relative to Existing Condtions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Spawning	April through June	Mean Monthly Flow (cfs)	Verona		10	Lower 40%							0.0	-3.0	21.2			
			Freeport		10	Lower 40%							3.0	0.0	12.1			
		Mean Monthly Water Temperature (°F)	Feather River Confluence	60-70		All Years							12.8	-15.5	-1.2			
			Freeport	60-70		All Years							10.5	-22.3	-5.4			
Juvenile Rearing and Downstream Movement	Year-Round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	12.1	-27.3	-3.0	0.0	-3.0	9.1	0.0	-3.0	21.2	-90.9	30.3	-78.8
			Freeport		10	Lower 40%	6.1	-21.2	0.0	0.0	0.0	9.1	3.0	0.0	12.1	-87.9	24.2	-72.7
		Mean Monthly Water Temperature (°F)	Feather River Confluence	63-77		All Years	29.6	0.0	0.0	0.0	0.0	0.0	14.6	1.7	0.0	-14.0	-28.4	-1.8
			Freeport	63-77		All Years	20.7	0.0	0.0	0.0	0.0	0.1	17.7	1.1	0.0	-28.6	-36.6	-0.9

[1]Water temperature ranges are evaluated by calculating the net change in the probability of water temperatures occurring within the specified range.

Table 196 Existing Condtions-No Action Alternative

Striped Bass in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location Description	Metric Value	Metric %	Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Spawning	April through June	Mean Monthly Flow (cfs)	Verona		10	Lower 40%							0.0	-3.0	21.2			
		Mean Monthly Water Temperature (°F)	Feather River Confluence	59-68		All Years							8.1	-16.4	1.7			
Juvenile Rearing and Downstream Movement	Year-round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	12.1	-27.3	-3.0	0.0	-3.0	9.1	0.0	-3.0	21.2	-90.9	30.3	-78.8
		Mean Monthly Water Temperature (°F)	Feather River Confluence	61-71		All Years	29.3	0.0	0.0	0.0	0.0	0.2	17.1	-6.1	-3.7	-5.7	-8.6	-33.1

Column group header: Net Change in Probability of Exceedance under No Action Alternative relative to Existing Condtions (Oct–Sep)

[1]Water temperature ranges are evaluated by calculating the net change in the probability of water temperatures occurring within the specified range.

Table 201 Existing Condtions-No Action Alternative

No Action Alternative vs Existing Condtions
Sacramento River at Verona, Monthly Flow

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
-1.0 < X < 1.0	6.1	1.2	26.8	13.4	8.5	12.2	19.5	15.9	14.6	4.9	2.4	4.9
X>=10.0	6.1	0.0	1.2	15.9	8.5	6.1	0.0	0.0	67.1	0.0	23.2	0.0
X>1.0 (Total %)	34.1	6.1	25.6	73.2	75.6	78.0	35.4	26.8	80.5	17.1	37.8	26.8
X<=-10.0	6.1	65.9	1.2	0.0	2.4	0.0	19.5	17.1	1.2	41.5	53.7	50.0
X<-1.0 (Total %)	59.8	91.5	39.0	11.0	14.6	9.8	42.7	56.1	4.9	78.0	59.8	68.3
Net Change in % Exceedance:	-25.6	-85.4	-13.4	62.2	61.0	68.3	-7.3	-29.3	75.6	-61.0	-22.0	-41.5
Net Change in 10% Exceedance	0.0	-65.9	0.0	15.9	6.1	6.1	-19.5	-17.1	65.9	-41.5	-30.5	-50.0
Low Flows (Upper 40% of Distribution)												
-1.0 < X < 1.0	12.1	3.0	21.2	27.3	9.1	6.1	27.3	24.2	36.4	0.0	0.0	3.0
X>=10.0	12.1	0.0	0.0	0.0	3.0	9.1	0.0	0.0	21.2	0.0	57.6	0.0
X>1.0 (Total %)	78.8	15.2	0.0	45.5	63.6	81.8	51.5	6.1	54.5	0.0	60.6	12.1
X<=-10.0	0.0	27.3	3.0	0.0	6.1	0.0	0.0	3.0	0.0	90.9	27.3	78.8
X<-1.0 (Total %)	9.1	78.8	66.7	21.2	24.2	12.1	18.2	69.7	9.1	100.0	39.4	84.8
Net Change in % Exceedance:	69.7	-63.6	-66.7	24.2	39.4	69.7	33.3	-63.6	45.5	-100.0	21.2	-72.7
Net Change in 10% Exceedance	12.1	-27.3	-3.0	0.0	-3.0	9.1	0.0	-3.0	21.2	-90.9	30.3	-78.8

Table 202 Existing Condtions-No Action Alternative

No Action Alternative vs Existing Condtions
Sacramento River at Freeport, Monthly Flow

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
-1.0 < X < 1.0	7.3	3.7	26.8	13.4	6.1	22.0	13.4	12.2	11.0	0.0	1.2	3.7
X>=10.0	3.7	0.0	0.0	13.4	4.9	9.8	3.7	0.0	57.3	0.0	23.2	2.4
X>1.0 (Total %)	30.5	8.5	17.1	70.7	75.6	68.3	51.2	22.0	80.5	1.2	37.8	18.3
X<=-10.0	2.4	65.9	0.0	0.0	0.0	0.0	23.2	19.5	1.2	68.3	56.1	46.3
X<-1.0 (Total %)	59.8	87.8	54.9	15.9	15.9	9.8	32.9	65.9	3.7	98.8	61.0	78.0
Net Change in % Exceedance:	-29.3	-79.3	-37.8	54.9	59.8	58.5	18.3	-43.9	76.8	-97.6	-23.2	-59.8
Net Change in 10% Exceedance	1.2	-65.9	0.0	13.4	4.9	9.8	-19.5	-19.5	56.1	-68.3	-32.9	-43.9
Low Flows (Upper 40% of Distribution)												
-1.0 < X < 1.0	18.2	9.1	9.1	27.3	9.1	33.3	21.2	9.1	27.3	0.0	0.0	3.0
X>=10.0	6.1	0.0	0.0	0.0	0.0	9.1	3.0	0.0	12.1	0.0	57.6	0.0
X>1.0 (Total %)	72.7	21.2	9.1	36.4	45.5	60.6	66.7	6.1	54.5	0.0	63.6	0.0
X<=-10.0	0.0	21.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	87.9	33.3	72.7
X<-1.0 (Total %)	6.1	69.7	81.8	36.4	39.4	6.1	9.1	84.8	6.1	100.0	36.4	97.0
Net Change in % Exceedance:	66.7	-48.5	-72.7	0.0	6.1	54.5	57.6	-78.8	48.5	-100.0	27.3	-97.0
Net Change in 10% Exceedance	6.1	-21.2	0.0	0.0	0.0	9.1	3.0	0.0	12.1	-87.9	24.2	-72.7

Table 209 Existing Condtions-No Action Alternative

No Action Alternative vs Existing Condtions

Sacramento River at Feather River, Monthly Temperature

Exceedance of Water Temperature Index Values and Probability of Occurring within the Water Temperature Index Ranges

Existing Condtions

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	98.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	98.0	96.4	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	95.7	92.7	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	81.1	73.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	20.7	4.9	94.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	2.4	1.2	81.7	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	97.8	2.1	1.2	51.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	78.0	1.4	1.2	12.2	87.8	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	58.5	1.2	1.2	4.7	74.6	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	34.1	1.2	1.2	1.4	65.2	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	18.3	1.2	1.2	1.2	41.5	98.3	98.8	98.8	98.8	98.8	98.8
56	98.8	7.6	1.2	1.2	1.2	23.2	95.9	98.8	98.8	98.8	98.8	98.8
57	98.8	2.4	1.2	1.2	1.2	14.0	94.7	98.8	98.8	98.8	98.8	98.8
58	98.8	1.2	1.2	1.2	1.2	5.5	86.6	98.8	98.8	98.8	98.8	98.8
59	96.7	1.2	1.2	1.2	1.2	3.2	77.6	98.8	98.8	98.8	98.8	98.8
60	85.4	1.2	1.2	1.2	1.2	2.4	68.3	98.8	98.8	98.8	98.8	98.8
61	62.8	1.2	1.2	1.2	1.2	1.8	57.3	98.8	98.8	98.8	98.8	98.8
62	44.5	1.2	1.2	1.2	1.2	1.2	43.9	98.0	98.8	98.8	98.8	98.8
63	23.2	1.2	1.2	1.2	1.2	1.2	35.4	96.9	98.8	98.8	98.8	98.8
64	14.6	1.2	1.2	1.2	1.2	1.2	13.3	95.5	98.8	98.8	98.8	98.8
65	7.6	1.2	1.2	1.2	1.2	1.2	10.4	89.6	98.8	98.8	98.8	93.3
66	4.5	1.2	1.2	1.2	1.2	1.2	4.3	85.4	98.8	98.8	98.8	90.2
68	1.5	1.2	1.2	1.2	1.2	1.2	1.2	48.8	98.2	98.8	98.8	65.9
69	1.2	1.2	1.2	1.2	1.2	1.2	1.2	29.3	94.1	98.8	98.8	53.7
70	1.2	1.2	1.2	1.2	1.2	1.2	1.2	13.2	85.4	98.3	97.8	29.9
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	9.8	68.3	93.1	90.2	24.6
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	6.3	37.8	78.0	76.8	13.4
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	2.2	11.0	29.3	42.7	3.5
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.7	3.0	19.5	23.2	2.4
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	4.3	2.1	1.2
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	79.9	72.0	97.6	97.6	97.6	97.1	95.8	79.3	75.6	96.4
50-64	84.2	96.6	0.9	0.0	50.0	97.6	85.5	3.3	0.0	0.0	0.0	0.0
55-56	0.0	10.7	0.0	0.0	0.0	18.3	2.4	0.0	0.0	0.0	0.0	0.0
59-64	82.1	0.0	0.0	0.0	0.0	2.0	64.3	3.3	0.0	0.0	0.0	0.0
59-68	95.2	0.0	0.0	0.0	0.0	2.0	76.4	50.0	0.6	0.0	0.0	32.9
59-75	95.5	0.0	0.0	0.0	0.0	2.0	76.4	97.1	95.8	79.3	75.6	96.4
60-70	84.2	0.0	0.0	0.0	0.0	1.2	67.1	85.6	13.4	0.5	1.0	68.9
61-71	61.6	0.0	0.0	0.0	0.0	0.6	56.1	89.0	30.5	5.7	8.6	74.2
63-69	22.0	0.0	0.0	0.0	0.0	0.0	34.2	67.6	4.7	0.0	0.0	45.1
63-77	22.0	0.0	0.0	0.0	0.0	0.0	34.2	95.7	97.6	94.5	96.7	97.6
65-82	6.4	0.0	0.0	0.0	0.0	0.0	9.2	88.4	97.6	97.6	97.6	92.1
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.0	84.2	97.1	96.6	28.7
42-60	13.4	97.6	96.8	95.2	97.6	96.4	30.5	0.0	0.0	0.0	0.0	0.0
61-77	61.6	0.0	0.0	0.0	0.0	0.6	56.1	97.6	97.6	94.5	96.7	97.6

No Action Alternative

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	98.2	96.4	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	91.9	87.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	40.2	23.2	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	22.0	5.5	90.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	98.8	8.5	1.2	73.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	95.1	1.7	1.2	30.1	97.3	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	87.8	1.2	1.2	12.0	86.0	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	67.1	1.2	1.2	6.1	74.4	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	42.7	1.2	1.2	3.1	61.0	98.7	98.8	98.8	98.8	98.8	98.8
56	98.8	26.8	1.2	1.2	1.2	39.0	97.6	98.8	98.8	98.8	98.8	98.8
57	98.8	14.0	1.2	1.2	1.2	23.2	96.7	98.8	98.8	98.8	98.8	98.8
58	98.8	5.5	1.2	1.2	1.2	12.8	91.2	98.8	98.8	98.8	98.8	98.8
59	98.8	1.2	1.2	1.2	1.2	7.3	85.7	98.8	98.8	98.8	98.8	98.8
60	98.8	1.2	1.2	1.2	1.2	2.7	81.1	98.8	98.8	98.8	98.8	98.8
61	92.1	1.2	1.2	1.2	1.2	2.0	74.4	98.8	98.8	98.8	98.8	98.8
62	74.4	1.2	1.2	1.2	1.2	1.4	61.0	98.8	98.8	98.8	98.8	98.8
63	52.8	1.2	1.2	1.2	1.2	1.2	50.0	98.6	98.8	98.8	98.8	98.8
64	41.5	1.2	1.2	1.2	1.2	1.2	34.5	98.0	98.8	98.8	98.8	98.8
65	23.2	1.2	1.2	1.2	1.2	1.2	23.2	96.3	98.8	98.8	98.8	98.8
66	15.2	1.2	1.2	1.2	1.2	1.2	10.4	90.7	98.8	98.8	98.8	97.4
68	4.1	1.2	1.2	1.2	1.2	1.2	1.2	65.2	96.5	98.8	98.8	89.6
69	2.1	1.2	1.2	1.2	1.2	1.2	1.2	45.1	95.3	98.8	98.8	78.9
70	1.4	1.2	1.2	1.2	1.2	1.2	1.2	28.7	86.6	98.8	98.8	70.7
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	15.9	72.0	98.8	98.8	57.7
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	10.4	57.3	97.6	95.9	46.3
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.3	23.2	74.4	84.1	18.3
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	2.6	11.0	54.9	69.5	9.8
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	18.3	30.5	3.0
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	90.7	86.6	97.6	97.6	97.6	96.2	87.8	43.9	29.3	89.0
50-64	57.3	97.6	7.3	0.0	72.0	97.6	64.3	0.8	0.0	0.0	0.0	0.0
55-56	0.0	15.9	0.0	0.0	1.9	22.0	1.1	0.0	0.0	0.0	0.0	0.0
59-64	57.3	0.0	0.0	0.0	0.0	6.1	51.2	0.8	0.0	0.0	0.0	0.0
59-68	94.7	0.0	0.0	0.0	0.0	6.1	84.5	33.6	2.3	0.0	0.0	9.2
59-75	97.6	0.0	0.0	0.0	0.0	6.1	84.5	96.2	87.8	43.9	29.3	89.0
60-70	97.4	0.0	0.0	0.0	0.0	1.5	79.9	70.1	12.2	0.0	0.0	28.1
61-71	90.9	0.0	0.0	0.0	0.0	0.8	73.2	82.9	26.8	0.0	0.0	41.1
63-69	50.7	0.0	0.0	0.0	0.0	0.0	48.8	53.5	3.5	0.0	0.0	19.9
63-77	51.6	0.0	0.0	0.0	0.0	0.0	48.8	97.4	97.6	80.5	68.3	95.8
65-82	22.0	0.0	0.0	0.0	0.0	0.0	22.0	95.1	97.6	97.6	97.6	97.6
70-82	0.2	0.0	0.0	0.0	0.0	0.0	0.0	27.5	85.4	97.6	97.6	69.5
42-60	0.0	97.6	97.6	95.8	97.6	96.1	17.7	0.0	0.0	0.0	0.0	0.0
61-77	90.9	0.0	0.0	0.0	0.0	0.8	73.2	97.6	97.6	80.5	68.3	95.8

No Action Alternative - Existing Condtions

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42	0.0	0.0	0.8	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
43	0.0	0.0	2.5	3.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45	0.0	0.0	10.8	14.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
48	0.0	0.0	19.5	18.3	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
49	0.0	0.0	19.6	4.3	8.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50	0.0	1.0	6.4	0.0	22.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
52	0.0	17.1	0.3	0.0	17.9	9.5	0.0	0.0	0.0	0.0	0.0	0.0
53	0.0	29.3	0.0	0.0	7.3	11.4	0.0	0.0	0.0	0.0	0.0	0.0
54	0.0	33.0	0.0	0.0	4.7	9.2	0.0	0.0	0.0	0.0	0.0	0.0
55	0.0	24.4	0.0	0.0	1.9	19.5	0.4	0.0	0.0	0.0	0.0	0.0
56	0.0	19.2	0.0	0.0	0.0	15.8	1.7	0.0	0.0	0.0	0.0	0.0
57	0.0	11.6	0.0	0.0	0.0	9.2	2.0	0.0	0.0	0.0	0.0	0.0
58	0.0	4.3	0.0	0.0	0.0	7.3	4.6	0.0	0.0	0.0	0.0	0.0
59	2.1	0.0	0.0	0.0	0.0	4.1	8.1	0.0	0.0	0.0	0.0	0.0
60	13.4	0.0	0.0	0.0	0.0	0.3	12.8	0.0	0.0	0.0	0.0	0.0
61	29.3	0.0	0.0	0.0	0.0	0.2	17.1	0.0	0.0	0.0	0.0	0.0
62	29.9	0.0	0.0	0.0	0.0	0.2	17.1	0.8	0.0	0.0	0.0	0.0
63	29.6	0.0	0.0	0.0	0.0	0.0	14.6	1.7	0.0	0.0	0.0	0.0
64	26.9	0.0	0.0	0.0	0.0	0.0	21.2	2.5	0.0	0.0	0.0	0.0
65	15.6	0.0	0.0	0.0	0.0	0.0	12.8	6.7	0.0	0.0	0.0	5.5
66	10.7	0.0	0.0	0.0	0.0	0.0	6.1	5.3	0.0	0.0	0.0	7.2
68	2.6	0.0	0.0	0.0	0.0	0.0	0.0	16.4	-1.7	0.0	0.0	23.7
69	0.9	0.0	0.0	0.0	0.0	0.0	0.0	15.8	1.2	0.0	0.0	25.2
70	0.2	0.0	0.0	0.0	0.0	0.0	0.0	15.5	1.2	0.5	1.0	40.8
71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.1	3.7	5.7	8.6	33.1
72	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.1	19.5	19.6	19.1	32.9
74	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	12.2	45.1	41.4	14.8
75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	8.0	35.4	46.3	7.4
77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.0	28.4	1.8
82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
86	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
88	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
98	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45-75	0.0	0.0	10.8	14.6	0.0	0.0	0.0	-0.9	-8.0	-35.4	-46.3	-7.4
50-64	-26.9	1.0	6.4	0.0	22.0	0.0	-21.2	-2.5	0.0	0.0	0.0	0.0
55-56	0.0	5.2	0.0	0.0	1.9	3.7	-1.3	0.0	0.0	0.0	0.0	0.0
59-64	-24.8	0.0	0.0	0.0	0.0	4.1	-13.1	-2.5	0.0	0.0	0.0	0.0
59-68	-0.5	0.0	0.0	0.0	0.0	4.1	8.1	-16.4	1.7	0.0	0.0	-23.7
59-75	2.1	0.0	0.0	0.0	0.0	4.1	8.1	-0.9	-8.0	-35.4	-46.3	-7.4
60-70	13.2	0.0	0.0	0.0	0.0	0.3	12.8	-15.5	-1.2	-0.5	-1.0	-40.8
61-71	29.3	0.0	0.0	0.0	0.0	0.2	17.1	-6.1	-3.7	-5.7	-8.6	-33.1
63-69	28.7	0.0	0.0	0.0	0.0	0.0	14.6	-14.1	-1.2	0.0	0.0	-25.2
63-77	29.6	0.0	0.0	0.0	0.0	0.0	14.6	1.7	0.0	-14.0	-28.4	-1.8
65-82	15.6	0.0	0.0	0.0	0.0	0.0	12.8	6.7	0.0	0.0	0.0	5.5
70-82	0.2	0.0	0.0	0.0	0.0	0.0	0.0	15.5	1.2	0.5	1.0	40.8
42-60	-13.4	0.0	0.8	0.6	0.0	-0.3	-12.8	0.0	0.0	0.0	0.0	0.0
61-77	29.3	0.0	0.0	0.0	0.0	0.2	17.1	0.0	0.0	-14.0	-28.4	-1.8

No Action Alternative vs Existing Condtions

Sacramento River at Freeport, Monthly Temperature

Exceedance of Water Temperature Index Values and Probability of Occurring within the Water Temperature Index Ranges

Existing Condtions

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	97.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	97.8	96.4	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	93.9	91.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	79.9	73.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	22.0	5.5	95.3	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	3.0	1.2	80.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	98.0	2.0	1.2	47.6	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	82.9	1.2	1.2	13.4	92.1	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	64.6	1.2	1.2	6.7	75.3	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	39.0	1.2	1.2	2.3	64.6	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	22.8	1.2	1.2	1.2	45.1	98.3	98.8	98.8	98.8	98.8	98.8
56	98.8	11.0	1.2	1.2	1.2	24.4	96.5	98.8	98.8	98.8	98.8	98.8
57	98.8	3.3	1.2	1.2	1.2	14.1	94.2	98.8	98.8	98.8	98.8	98.8
58	98.8	1.2	1.2	1.2	1.2	8.0	86.6	98.8	98.8	98.8	98.8	98.8
59	98.8	1.2	1.2	1.2	1.2	4.5	78.0	98.8	98.8	98.8	98.8	98.8
60	95.1	1.2	1.2	1.2	1.2	3.2	71.2	98.8	98.8	98.8	98.8	98.8
61	74.4	1.2	1.2	1.2	1.2	2.2	57.3	98.8	98.8	98.8	98.8	98.8
62	54.9	1.2	1.2	1.2	1.2	1.4	47.6	98.8	98.8	98.8	98.8	98.8
63	42.7	1.2	1.2	1.2	1.2	1.2	31.7	97.7	98.8	98.8	98.8	98.8
64	20.7	1.2	1.2	1.2	1.2	1.2	20.7	95.1	98.8	98.8	98.8	98.8
65	14.0	1.2	1.2	1.2	1.2	1.2	12.8	92.7	98.8	98.8	98.8	97.6
66	5.5	1.2	1.2	1.2	1.2	1.2	6.7	84.1	98.8	98.8	98.8	94.7
68	1.7	1.2	1.2	1.2	1.2	1.2	1.2	57.3	98.8	98.8	98.8	81.3
69	1.2	1.2	1.2	1.2	1.2	1.2	1.2	30.5	96.9	98.8	98.8	68.3
70	1.2	1.2	1.2	1.2	1.2	1.2	1.2	15.9	89.8	98.8	98.8	47.6
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	11.4	84.1	98.8	97.9	26.8
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	7.0	64.6	97.6	91.5	18.3
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.0	20.7	61.0	57.7	4.3
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	2.4	9.8	34.1	39.0	1.4
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	10.4	7.3	1.2
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	78.7	72.0	97.6	97.6	97.6	96.4	89.0	64.7	59.8	97.4
50-64	78.1	96.8	0.8	0.0	46.4	97.6	78.1	3.7	0.0	0.0	0.0	0.0
55-56	0.0	11.8	0.0	0.0	0.0	20.7	1.8	0.0	0.0	0.0	0.0	0.0
59-64	78.1	0.0	0.0	0.0	0.0	3.3	57.3	3.7	0.0	0.0	0.0	0.0
59-68	97.1	0.0	0.0	0.0	0.0	3.3	76.8	41.5	0.0	0.0	0.0	17.5
59-75	97.6	0.0	0.0	0.0	0.0	3.3	76.8	96.4	89.0	64.7	59.8	97.4
60-70	93.9	0.0	0.0	0.0	0.0	2.0	70.0	82.9	9.0	0.0	0.0	51.2
61-71	73.2	0.0	0.0	0.0	0.0	1.0	56.1	87.4	14.7	0.0	0.9	72.0
63-69	41.5	0.0	0.0	0.0	0.0	0.0	30.5	67.2	1.9	0.0	0.0	30.5
63-77	41.5	0.0	0.0	0.0	0.0	0.0	30.5	96.5	97.6	88.4	91.5	97.6
65-82	12.8	0.0	0.0	0.0	0.0	0.0	11.6	91.5	97.6	97.6	97.6	96.4
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.7	88.6	97.6	97.6	46.4
42-60	3.7	97.6	96.6	95.2	97.6	95.6	27.6	0.0	0.0	0.0	0.0	0.0
61-77	73.2	0.0	0.0	0.0	0.0	1.0	56.1	97.6	97.6	88.4	91.5	97.6

No Action Alternative

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	98.3	96.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	90.2	86.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	43.9	26.2	97.6	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	26.2	8.5	92.7	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	98.8	9.8	1.2	78.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	97.8	1.5	1.2	29.3	98.8	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	90.2	1.2	1.2	15.6	90.2	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	70.7	1.2	1.2	7.0	75.6	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	50.0	1.2	1.2	4.6	63.4	98.8	98.8	98.8	98.8	98.8	98.8
56	98.8	31.7	1.2	1.2	2.0	43.9	97.8	98.8	98.8	98.8	98.8	98.8
57	98.8	22.0	1.2	1.2	1.2	27.4	96.6	98.8	98.8	98.8	98.8	98.8
58	98.8	6.1	1.2	1.2	1.2	18.9	92.4	98.8	98.8	98.8	98.8	98.8
59	98.8	2.4	1.2	1.2	1.2	7.3	88.0	98.8	98.8	98.8	98.8	98.8
60	98.8	1.2	1.2	1.2	1.2	4.9	81.7	98.8	98.8	98.8	98.8	98.8
61	98.0	1.2	1.2	1.2	1.2	2.4	74.0	98.8	98.8	98.8	98.8	98.8
62	89.6	1.2	1.2	1.2	1.2	1.9	62.8	98.8	98.8	98.8	98.8	98.8
63	63.4	1.2	1.2	1.2	1.2	1.3	49.4	98.8	98.8	98.8	98.8	98.8
64	52.4	1.2	1.2	1.2	1.2	1.2	32.3	98.4	98.8	98.8	98.8	98.8
65	35.4	1.2	1.2	1.2	1.2	1.2	27.6	97.0	98.8	98.8	98.8	98.8
66	21.3	1.2	1.2	1.2	1.2	1.2	17.1	92.3	98.8	98.8	98.8	98.8
68	4.7	1.2	1.2	1.2	1.2	1.2	1.2	78.7	98.8	98.8	98.8	95.3
69	2.7	1.2	1.2	1.2	1.2	1.2	1.2	54.9	96.6	98.8	98.8	89.8
70	1.6	1.2	1.2	1.2	1.2	1.2	1.2	38.2	95.2	98.8	98.8	78.0
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	21.3	86.9	98.8	98.8	70.1
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	13.0	81.7	98.8	98.8	53.7
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.6	39.6	91.5	88.7	22.0
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.1	20.1	78.7	81.7	9.8
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	39.0	43.9	2.1
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	89.0	84.8	97.6	97.6	97.6	95.7	78.7	20.1	17.1	89.0
50-64	46.4	97.6	8.6	0.0	76.8	97.6	66.5	0.4	0.0	0.0	0.0	0.0
55-56	0.0	18.3	0.0	0.0	2.6	19.5	1.0	0.0	0.0	0.0	0.0	0.0
59-64	46.4	1.2	0.0	0.0	0.0	6.1	55.7	0.4	0.0	0.0	0.0	0.0
59-68	94.1	1.2	0.0	0.0	0.0	6.1	86.8	20.1	0.0	0.0	0.0	3.5
59-75	97.6	1.2	0.0	0.0	0.0	6.1	86.8	95.7	78.7	20.1	17.1	89.0
60-70	97.2	0.0	0.0	0.0	0.0	3.7	80.5	60.6	3.6	0.0	0.0	20.8
61-71	96.8	0.0	0.0	0.0	0.0	1.2	72.8	77.5	11.9	0.0	0.0	28.7
63-69	60.7	0.0	0.0	0.0	0.0	0.1	48.2	43.9	2.2	0.0	0.0	9.0
63-77	62.2	0.0	0.0	0.0	0.0	0.1	48.2	97.6	97.6	59.8	54.9	96.7
65-82	34.2	0.0	0.0	0.0	0.0	0.0	26.4	95.8	97.6	97.6	97.6	97.6
70-82	0.4	0.0	0.0	0.0	0.0	0.0	0.0	37.0	94.0	97.6	97.6	76.8
42-60	0.0	97.6	97.6	95.8	97.6	93.9	17.1	0.0	0.0	0.0	0.0	0.0
61-77	96.8	0.0	0.0	0.0	0.0	1.2	72.8	97.6	97.6	59.8	54.9	96.7

No Action Alternative - Existing Condtions

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42	0.0	0.0	1.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
43	0.0	0.0	4.4	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45	0.0	0.0	10.3	12.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
48	0.0	0.0	21.9	20.7	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
49	0.0	0.0	23.2	7.3	12.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50	0.0	0.8	7.8	0.0	30.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
52	0.0	14.9	0.3	0.0	15.9	6.7	0.0	0.0	0.0	0.0	0.0	0.0
53	0.0	25.6	0.0	0.0	8.9	14.9	0.0	0.0	0.0	0.0	0.0	0.0
54	0.0	31.7	0.0	0.0	4.7	11.0	0.0	0.0	0.0	0.0	0.0	0.0
55	0.0	27.2	0.0	0.0	3.4	18.3	0.5	0.0	0.0	0.0	0.0	0.0
56	0.0	20.7	0.0	0.0	0.8	19.5	1.3	0.0	0.0	0.0	0.0	0.0
57	0.0	18.7	0.0	0.0	0.0	13.3	2.4	0.0	0.0	0.0	0.0	0.0
58	0.0	4.9	0.0	0.0	0.0	10.9	5.8	0.0	0.0	0.0	0.0	0.0
59	0.0	1.2	0.0	0.0	0.0	2.8	10.0	0.0	0.0	0.0	0.0	0.0
60	3.7	0.0	0.0	0.0	0.0	1.7	10.5	0.0	0.0	0.0	0.0	0.0
61	23.6	0.0	0.0	0.0	0.0	0.2	16.7	0.0	0.0	0.0	0.0	0.0
62	34.7	0.0	0.0	0.0	0.0	0.5	15.2	0.0	0.0	0.0	0.0	0.0
63	20.7	0.0	0.0	0.0	0.0	0.1	17.7	1.1	0.0	0.0	0.0	0.0
64	31.7	0.0	0.0	0.0	0.0	0.0	11.6	3.3	0.0	0.0	0.0	0.0
65	21.4	0.0	0.0	0.0	0.0	0.0	14.8	4.3	0.0	0.0	0.0	1.2
66	15.8	0.0	0.0	0.0	0.0	0.0	10.4	8.2	0.0	0.0	0.0	4.1
68	3.0	0.0	0.0	0.0	0.0	0.0	0.0	21.4	0.0	0.0	0.0	14.0
69	1.5	0.0	0.0	0.0	0.0	0.0	0.0	24.4	-0.3	0.0	0.0	21.5
70	0.4	0.0	0.0	0.0	0.0	0.0	0.0	22.3	5.4	0.0	0.0	30.4
71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.9	2.8	0.0	0.9	43.3
72	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0	17.1	1.2	7.3	35.4
74	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	18.9	30.5	31.0	17.7
75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	10.3	44.6	42.7	8.4
77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.6	36.6	0.9
82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
86	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
88	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
98	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45-75	0.0	0.0	10.3	12.8	0.0	0.0	0.0	-0.7	-10.3	-44.6	-42.7	-8.4
50-64	-31.7	0.8	7.8	0.0	30.4	0.0	-11.6	-3.3	0.0	0.0	0.0	0.0
55-56	0.0	6.5	0.0	0.0	2.6	-1.2	-0.8	0.0	0.0	0.0	0.0	0.0
59-64	-31.7	1.2	0.0	0.0	0.0	2.8	-1.6	-3.3	0.0	0.0	0.0	0.0
59-68	-3.0	1.2	0.0	0.0	0.0	2.8	10.0	-21.4	0.0	0.0	0.0	-14.0
59-75	0.0	1.2	0.0	0.0	0.0	2.8	10.0	-0.7	-10.3	-44.6	-42.7	-8.4
60-70	3.3	0.0	0.0	0.0	0.0	1.7	10.5	-22.3	-5.4	0.0	0.0	-30.4
61-71	23.6	0.0	0.0	0.0	0.0	0.2	16.7	-9.9	-2.8	0.0	-0.9	-43.3
63-69	19.2	0.0	0.0	0.0	0.0	0.1	17.7	-23.3	0.3	0.0	0.0	-21.5
63-77	20.7	0.0	0.0	0.0	0.0	0.1	17.7	1.1	0.0	-28.6	-36.6	-0.9
65-82	21.4	0.0	0.0	0.0	0.0	0.0	14.8	4.3	0.0	0.0	0.0	1.2
70-82	0.4	0.0	0.0	0.0	0.0	0.0	0.0	22.3	5.4	0.0	0.0	30.4
42-60	-3.7	0.0	1.0	0.6	0.0	-1.7	-10.5	0.0	0.0	0.0	0.0	0.0
61-77	23.6	0.0	0.0	0.0	0.0	0.2	16.7	0.0	0.0	-28.6	-36.6	-0.9

Table 227 Existing Conditions-No Action Alternative

Delta Smelt in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under No Action Alternative relative to Existing Conditions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult	December through May	Mean Monthly Water Temperature (°F)	Sacramento River at Freeport	59-68		All Years			0.0	0.0	0.0	2.8	10.0	-21.4				
		Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years			-29.3	17.1	62.2	54.9	-48.8	-8.5				
	September through November	Mean Monthly X_2 (RKm)	X_2 between 74 km and 81 km	74-81		Wet and Above Normal Water Years	-7.9	0.0										-7.9
	December through February	Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<-5000 cfs		All Years			-14.6	0.0	0.0							
Egg and Embryo	February through May	Mean Monthly Water Temperature (°F)	Sacramento River at Freeport	59-68		All Years					0.0	2.8	10.0	-21.4				
Larval	March through June	Mean Monthly Water Temperature (°F)	Sacramento River at Freeport	59-68		All Years						2.8	10.0	-21.4	0.0			
		Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<-1500 cfs		Dry and Critical Water Years						-23.3	20.0	6.7	-23.3			
		Mean Monthly Delta Outflow (cfs)	Delta		10	All Years						19.5	-20.7	-15.9	56.1			
Juvenile	May through July	Mean Monthly Water Temperature (°F)	Sacramento River at Freeport	59-68		All Years								-21.4	0.0	0.0		
		Mean Monthly X_2 (RKm)	Changes in X_2 between RKm 65 and 80	0.5 RKm		All Years								45.1	56.1	36.6		

Table 228 Existing Conditions-No Action Alternative

Longfin Smelt in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location Description	Metric Value	Metric %	Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
							Net Change in Probability of Exceedance under No Action Alternative relative to Existing Conditions											
Adult	December through March	Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<-5000 cfs		All Years			-14.6	0.0	0.0	0.0						
Larvae and Juvenile	April and May	Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<-1500 cfs		Dry and Critical Water Years							20.0	6.7				
				< 0 cfs		Dry and Critical Water Years							3.3	0.0				
	January through June	Mean Monthly X_2 (RKm)	X_2	< 75 RKm		All Years				-6.1	0.0	-1.2	-4.9	-4.9	-4.9			
				< 75 RKm		Dry and Critical Water Years				0.0	0.0	0.0	0.0	0.0	0.0			

Table 229 Existing Conditions-No Action Alternative

Winter-run Chinook Salmon in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under No Action Alternative relative to Existing Conditions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	November through May	Mean Monthly Flow (cfs)	Rio Vista		10	Lower 40%		-57.6	-45.5	-12.1	-69.7	-63.6	-6.1	-45.5				
		Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years		-8.5	-29.3	17.1	62.2	54.9	-48.8	-8.5				
		Mean Monthly Delta Outflow (cfs)	Delta		10	All Years		-23.2	2.4	37.8	14.6	19.5	-20.7	-15.9				
		Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<2500 cfs		All Years		0.0	-1.2	-8.5	-17.1	-18.3	-11.0	-2.4				

Table 230 Existing Conditions-No Action Alternative

Spring-run Chinook Salmon in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under No Action Alternative relative to Existing Conditions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	November through June	Mean Monthly Flow (cfs)	Rio Vista		10	Lower 40%		-57.6	-45.5	-12.1	-69.7	-63.6	-6.1	-45.5	-84.8			
		Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years		-8.5	-29.3	17.1	62.2	54.9	-48.8	-8.5	-1.2			
		Mean Monthly Delta Outflow (cfs)	Delta		10	All Years		-23.2	2.4	37.8	14.6	19.5	-20.7	-15.9	56.1			
		Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<2500 cfs		All Years		0.0	-1.2	-8.5	-17.1	-18.3	-11.0	-2.4	0.0			

Table 231 Existing Conditions-No Action Alternative

Fall- and Late Fall-run Chinook Salmon in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under No Action Alternative relative to Existing Conditions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	November through June	Mean Monthly Flow (cfs)	Rio Vista		10	Lower 40%		-57.6	-45.5	-12.1	-69.7	-63.6	-6.1	-45.5	-84.8			
		Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years		-8.5	-29.3	17.1	62.2	54.9	-48.8	-8.5	-1.2			
		Mean Monthly Delta Outflow (cfs)	Delta		10	All Years		-23.2	2.4	37.8	14.6	19.5	-20.7	-15.9	56.1			
		Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<2500 cfs		All Years		0.0	-1.2	-8.5	-17.1	-18.3	-11.0	-2.4	0.0			
Adult (San Joaquin River)	December through February	Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<-5000 cfs		All Years			-53.7	-72.0	-14.6							

Table 232 Existing Conditions-No Action Alternative

Steelhead in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under No Action Alternative relative to Existing Conditions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	October through July	Mean Monthly Flow (cfs)	Rio Vista		10	Lower 40%	-27.3	-57.6	-45.5	-12.1	-69.7	-63.6	-6.1	-45.5	-84.8	-97.0		
		Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years	32.9	-8.5	-29.3	17.1	62.2	54.9	-48.8	-8.5	-1.2	0.0		
		Mean Monthly Delta Outflow (cfs)	Delta		10	All Years	79.3	-23.2	2.4	37.8	14.6	19.5	-20.7	-15.9	56.1	-65.9		
		Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<2500 cfs		All Years	0.0	0.0	-1.2	-8.5	-17.1	-18.3	-11.0	-2.4	0.0	0.0		

Table 233 Existing Conditions-No Action Alternative

Green Sturgeon in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under No Action Alternative relative to Existing Conditions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	Year-round	Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years	32.9	-8.5	-29.3	17.1	62.2	54.9	-48.8	-8.5	-1.2	0.0	-9.8	23.2

Table 234 Existing Conditions-No Action Alternative

White Sturgeon in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under No Action Alternative relative to Existing Conditions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	April through June	Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years							-48.8	-8.5	-1.2			

Table 235 Existing Conditions-No Action Alternative

Splittail in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under No Action Alternative relative to Existing Conditions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Spawning and Embryo Incubation	February through May	Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years					62.2	54.9	-48.8	-8.5				
Juvenile Rearing and Emigration	April through July	Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years							-48.8	-8.5	-1.2	0.0		

Table 236 Existing Conditions-No Action Alternative

American Shad in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under No Action Alternative relative to Existing Conditions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Egg and Larvae	April through June	Mean Monthly X_2 (RKm)	Changes in X_2	1 RKm		All Years							100.0	82.9	79.3			

Table 237 Existing Conditions-No Action Alternative

Striped Bass in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under No Action Alternative relative to Existing Conditions											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Egg and Larvae	April through June	Mean Monthly X_2 (RKm)	Changes in X_2	1 RKm		All Years							100.0	82.9	79.3			

Table 238 Existing Conditions-No Action Alternative

No Action Alternative vs Existing Conditions

Sacramento River at Freeport, Monthly Temperature

Exceedance of Water Temperature Index Values and Probability of Occurring within the Water Temperature Index Ranges

Existing Conditions

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	97.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	97.8	96.4	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	93.9	91.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	79.9	73.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	22.0	5.5	95.3	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	3.0	1.2	80.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	98.0	2.0	1.2	47.6	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	82.9	1.2	1.2	13.4	92.1	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	64.6	1.2	1.2	6.7	75.3	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	39.0	1.2	1.2	2.3	64.6	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	22.8	1.2	1.2	1.2	45.1	98.3	98.8	98.8	98.8	98.8	98.8
56	98.8	11.0	1.2	1.2	1.2	24.4	96.5	98.8	98.8	98.8	98.8	98.8
57	98.8	3.3	1.2	1.2	1.2	14.1	94.2	98.8	98.8	98.8	98.8	98.8
58	98.8	1.2	1.2	1.2	1.2	8.0	86.6	98.8	98.8	98.8	98.8	98.8
59	98.8	1.2	1.2	1.2	1.2	4.5	78.0	98.8	98.8	98.8	98.8	98.8
60	95.1	1.2	1.2	1.2	1.2	3.2	71.2	98.8	98.8	98.8	98.8	98.8
61	74.4	1.2	1.2	1.2	1.2	2.2	57.3	98.8	98.8	98.8	98.8	98.8
62	54.9	1.2	1.2	1.2	1.2	1.4	47.6	98.8	98.8	98.8	98.8	98.8
63	42.7	1.2	1.2	1.2	1.2	1.2	31.7	97.7	98.8	98.8	98.8	98.8
64	20.7	1.2	1.2	1.2	1.2	1.2	20.7	95.1	98.8	98.8	98.8	98.8
65	14.0	1.2	1.2	1.2	1.2	1.2	12.8	92.7	98.8	98.8	98.8	97.6
66	5.5	1.2	1.2	1.2	1.2	1.2	6.7	84.1	98.8	98.8	98.8	94.7
68	1.7	1.2	1.2	1.2	1.2	1.2	1.2	57.3	98.8	98.8	98.8	81.3
69	1.2	1.2	1.2	1.2	1.2	1.2	1.2	30.5	96.9	98.8	98.8	68.3
70	1.2	1.2	1.2	1.2	1.2	1.2	1.2	15.9	89.8	98.8	98.8	47.6
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	11.4	84.1	98.8	97.9	26.8
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	7.0	64.6	97.6	91.5	18.3
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.0	20.7	61.0	57.7	4.3
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	2.4	9.8	34.1	39.0	1.4
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	10.4	7.3	1.2
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	78.7	72.0	97.6	97.6	97.6	96.4	89.0	64.7	59.8	97.4
50-64	78.1	96.8	0.8	0.0	46.4	97.6	78.1	3.7	0.0	0.0	0.0	0.0
55-56	0.0	11.8	0.0	0.0	0.0	20.7	1.8	0.0	0.0	0.0	0.0	0.0
59-64	78.1	0.0	0.0	0.0	0.0	3.3	57.3	3.7	0.0	0.0	0.0	0.0
59-68	97.1	0.0	0.0	0.0	0.0	3.3	76.8	41.5	0.0	0.0	0.0	17.5
59-75	97.6	0.0	0.0	0.0	0.0	3.3	76.8	96.4	89.0	64.7	59.8	97.4
60-70	93.9	0.0	0.0	0.0	0.0	2.0	70.0	82.9	9.0	0.0	0.0	51.2
61-71	73.2	0.0	0.0	0.0	0.0	1.0	56.1	87.4	14.7	0.0	0.9	72.0
63-69	41.5	0.0	0.0	0.0	0.0	0.0	30.5	67.2	1.9	0.0	0.0	30.5
63-77	41.5	0.0	0.0	0.0	0.0	0.0	30.5	96.5	97.6	88.4	91.5	97.6
65-82	12.8	0.0	0.0	0.0	0.0	0.0	11.6	91.5	97.6	97.6	97.6	96.4
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.7	88.6	97.6	97.6	46.4
42-60	3.7	97.6	96.6	95.2	97.6	95.6	27.6	0.0	0.0	0.0	0.0	0.0
61-77	73.2	0.0	0.0	0.0	0.0	1.0	56.1	97.6	97.6	88.4	91.5	97.6

No Action Alternative

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	98.3	96.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	90.2	86.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	43.9	26.2	97.6	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	26.2	8.5	92.7	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	98.8	9.8	1.2	78.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	97.8	1.5	1.2	29.3	98.8	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	90.2	1.2	1.2	15.6	90.2	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	70.7	1.2	1.2	7.0	75.6	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	50.0	1.2	1.2	4.6	63.4	98.8	98.8	98.8	98.8	98.8	98.8
56	98.8	31.7	1.2	1.2	2.0	43.9	97.8	98.8	98.8	98.8	98.8	98.8
57	98.8	22.0	1.2	1.2	1.2	27.4	96.6	98.8	98.8	98.8	98.8	98.8
58	98.8	6.1	1.2	1.2	1.2	18.9	92.4	98.8	98.8	98.8	98.8	98.8
59	98.8	2.4	1.2	1.2	1.2	7.3	88.0	98.8	98.8	98.8	98.8	98.8
60	98.8	1.2	1.2	1.2	1.2	4.9	81.7	98.8	98.8	98.8	98.8	98.8
61	98.0	1.2	1.2	1.2	1.2	2.4	74.0	98.8	98.8	98.8	98.8	98.8
62	89.6	1.2	1.2	1.2	1.2	1.9	62.8	98.8	98.8	98.8	98.8	98.8
63	63.4	1.2	1.2	1.2	1.2	1.3	49.4	98.8	98.8	98.8	98.8	98.8
64	52.4	1.2	1.2	1.2	1.2	1.2	32.3	98.4	98.8	98.8	98.8	98.8
65	35.4	1.2	1.2	1.2	1.2	1.2	27.6	97.0	98.8	98.8	98.8	98.8
66	21.3	1.2	1.2	1.2	1.2	1.2	17.1	92.3	98.8	98.8	98.8	98.8
68	4.7	1.2	1.2	1.2	1.2	1.2	1.2	78.7	98.8	98.8	98.8	95.3
69	2.7	1.2	1.2	1.2	1.2	1.2	1.2	54.9	96.6	98.8	98.8	89.8
70	1.6	1.2	1.2	1.2	1.2	1.2	1.2	38.2	95.2	98.8	98.8	78.0
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	21.3	86.9	98.8	98.8	70.1
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	13.0	81.7	98.8	98.8	53.7
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.6	39.6	91.5	88.7	22.0
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.1	20.1	78.7	81.7	9.8
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	39.0	43.9	2.1
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	89.0	84.8	97.6	97.6	97.6	95.7	78.7	20.1	17.1	89.0
50-64	46.4	97.6	8.6	0.0	76.8	97.6	66.5	0.4	0.0	0.0	0.0	0.0
55-56	0.0	18.3	0.0	0.0	2.6	19.5	1.0	0.0	0.0	0.0	0.0	0.0
59-64	46.4	1.2	0.0	0.0	0.0	6.1	55.7	0.4	0.0	0.0	0.0	0.0
59-68	94.1	1.2	0.0	0.0	0.0	6.1	86.8	20.1	0.0	0.0	0.0	3.5
59-75	97.6	1.2	0.0	0.0	0.0	6.1	86.8	95.7	78.7	20.1	17.1	89.0
60-70	97.2	0.0	0.0	0.0	0.0	3.7	80.5	60.6	3.6	0.0	0.0	20.8
61-71	96.8	0.0	0.0	0.0	0.0	1.2	72.8	77.5	11.9	0.0	0.0	28.7
63-69	60.7	0.0	0.0	0.0	0.0	0.1	48.2	43.9	2.2	0.0	0.0	9.0
63-77	62.2	0.0	0.0	0.0	0.0	0.1	48.2	97.6	97.6	59.8	54.9	96.7
65-82	34.2	0.0	0.0	0.0	0.0	0.0	26.4	95.8	97.6	97.6	97.6	97.6
70-82	0.4	0.0	0.0	0.0	0.0	0.0	0.0	37.0	94.0	97.6	97.6	76.8
42-60	0.0	97.6	97.6	95.8	97.6	93.9	17.1	0.0	0.0	0.0	0.0	0.0
61-77	96.8	0.0	0.0	0.0	0.0	1.2	72.8	97.6	97.6	59.8	54.9	96.7

No Action Alternative - Existing Conditions

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42	0.0	0.0	1.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
43	0.0	0.0	4.4	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45	0.0	0.0	10.3	12.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
48	0.0	0.0	21.9	20.7	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
49	0.0	0.0	23.2	7.3	12.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50	0.0	0.8	7.8	0.0	30.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
52	0.0	14.9	0.3	0.0	15.9	6.7	0.0	0.0	0.0	0.0	0.0	0.0
53	0.0	25.6	0.0	0.0	8.9	14.9	0.0	0.0	0.0	0.0	0.0	0.0
54	0.0	31.7	0.0	0.0	4.7	11.0	0.0	0.0	0.0	0.0	0.0	0.0
55	0.0	27.2	0.0	0.0	3.4	18.3	0.5	0.0	0.0	0.0	0.0	0.0
56	0.0	20.7	0.0	0.0	0.8	19.5	1.3	0.0	0.0	0.0	0.0	0.0
57	0.0	18.7	0.0	0.0	0.0	13.3	2.4	0.0	0.0	0.0	0.0	0.0
58	0.0	4.9	0.0	0.0	0.0	10.9	5.8	0.0	0.0	0.0	0.0	0.0
59	0.0	1.2	0.0	0.0	0.0	2.8	10.0	0.0	0.0	0.0	0.0	0.0
60	3.7	0.0	0.0	0.0	0.0	1.7	10.5	0.0	0.0	0.0	0.0	0.0
61	23.6	0.0	0.0	0.0	0.0	0.2	16.7	0.0	0.0	0.0	0.0	0.0
62	34.7	0.0	0.0	0.0	0.0	0.5	15.2	0.0	0.0	0.0	0.0	0.0
63	20.7	0.0	0.0	0.0	0.0	0.1	17.7	1.1	0.0	0.0	0.0	0.0
64	31.7	0.0	0.0	0.0	0.0	0.0	11.6	3.3	0.0	0.0	0.0	0.0
65	21.4	0.0	0.0	0.0	0.0	0.0	14.8	4.3	0.0	0.0	0.0	1.2
66	15.8	0.0	0.0	0.0	0.0	0.0	10.4	8.2	0.0	0.0	0.0	4.1
68	3.0	0.0	0.0	0.0	0.0	0.0	0.0	21.4	0.0	0.0	0.0	14.0
69	1.5	0.0	0.0	0.0	0.0	0.0	0.0	24.4	-0.3	0.0	0.0	21.5
70	0.4	0.0	0.0	0.0	0.0	0.0	0.0	22.3	5.4	0.0	0.0	30.4
71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.9	2.8	0.0	0.9	43.3
72	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0	17.1	1.2	7.3	35.4
74	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	18.9	30.5	31.0	17.7
75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	10.3	44.6	42.7	8.4
77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.6	36.6	0.9
82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
86	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
88	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
98	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45-75	0.0	0.0	10.3	12.8	0.0	0.0	0.0	-0.7	-10.3	-44.6	-42.7	-8.4
50-64	-31.7	0.8	7.8	0.0	30.4	0.0	-11.6	-3.3	0.0	0.0	0.0	0.0
55-56	0.0	6.5	0.0	0.0	2.6	-1.2	-0.8	0.0	0.0	0.0	0.0	0.0
59-64	-31.7	1.2	0.0	0.0	0.0	2.8	-1.6	-3.3	0.0	0.0	0.0	0.0
59-68	-3.0	1.2	0.0	0.0	0.0	2.8	10.0	-21.4	0.0	0.0	0.0	-14.0
59-75	0.0	1.2	0.0	0.0	0.0	2.8	10.0	-0.7	-10.3	-44.6	-42.7	-8.4
60-70	3.3	0.0	0.0	0.0	0.0	1.7	10.5	-22.3	-5.4	0.0	0.0	-30.4
61-71	23.6	0.0	0.0	0.0	0.0	0.2	16.7	-9.9	-2.8	0.0	-0.9	-43.3
63-69	19.2	0.0	0.0	0.0	0.0	0.1	17.7	-23.3	0.3	0.0	0.0	-21.5
63-77	20.7	0.0	0.0	0.0	0.0	0.1	17.7	1.1	0.0	-28.6	-36.6	-0.9
65-82	21.4	0.0	0.0	0.0	0.0	0.0	14.8	4.3	0.0	0.0	0.0	1.2
70-82	0.4	0.0	0.0	0.0	0.0	0.0	0.0	22.3	5.4	0.0	0.0	30.4
42-60	-3.7	0.0	1.0	0.6	0.0	-1.7	-10.5	0.0	0.0	0.0	0.0	0.0
61-77	23.6	0.0	0.0	0.0	0.0	0.2	16.7	0.0	0.0	-28.6	-36.6	-0.9

Table 239 Existing Conditions-No Action Alternative

No Action Alternative vs Existing Conditions
Sacramento River at Rio Vista, Monthly Flow

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
-1.0 < X < 1.0	23.2	1.2	2.4	2.4	3.7	4.9	9.8	6.1	1.2	0.0	1.2	7.3
X>=10.0	2.4	0.0	0.0	17.1	9.8	0.0	0.0	0.0	1.2	0.0	0.0	0.0
X>1.0 (Total %)	4.9	8.5	4.9	24.4	29.3	13.4	3.7	0.0	4.9	0.0	3.7	2.4
X<=-10.0	70.7	82.9	40.2	20.7	35.4	51.2	30.5	46.3	57.3	98.8	80.5	76.8
X<-1.0 (Total %)	72.0	89.0	92.7	73.2	67.1	81.7	84.1	93.9	93.9	100.0	95.1	90.2
Net Change in % Exceedance:	-67.1	-80.5	-87.8	-48.8	-37.8	-68.3	-80.5	-93.9	-89.0	-100.0	-91.5	-87.8
Net Change in 10% Exceedance	-68.3	-82.9	-40.2	-3.7	-25.6	-51.2	-30.5	-46.3	-56.1	-98.8	-80.5	-76.8
Low Flows (Upper 40% of Distribution)												
-1.0 < X < 1.0	57.6	3.0	0.0	3.0	0.0	3.0	15.2	0.0	0.0	0.0	3.0	9.1
X>=10.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0
X>1 (Total %)	9.1	21.2	6.1	3.0	3.0	6.1	3.0	0.0	12.1	0.0	9.1	0.0
X<=-10.0	30.3	57.6	45.5	12.1	69.7	63.6	6.1	45.5	87.9	97.0	51.5	84.8
X<-1 (Total %)	33.3	72.7	93.9	93.9	97.0	90.9	81.8	100.0	87.9	100.0	87.9	90.9
Net Change in % Exceedance:	-24.2	-51.5	-87.9	-90.9	-93.9	-84.8	-78.8	-100.0	-75.8	-100.0	-78.8	-90.9
Net Change in 10% Exceedance	-27.3	-57.6	-45.5	-12.1	-69.7	-63.6	-6.1	-45.5	-84.8	-97.0	-51.5	-84.8

Table 240 Existing Conditions-No Action Alternative

No Action Alternative vs Existing Conditions
Yolo Bypass, Monthly Flow

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
-1.0 < X < 1.0	23.2	86.6	36.6	28.0	25.6	23.2	1.2	62.2	98.8	100.0	84.1	57.3
X>=10.0	34.1	0.0	9.8	36.6	62.2	56.1	0.0	0.0	0.0	0.0	1.2	24.4
X>1.0 (Total %)	75.6	0.0	14.6	40.2	73.2	73.2	8.5	0.0	0.0	0.0	2.4	39.0
X<=-10.0	1.2	8.5	39.0	19.5	0.0	1.2	48.8	8.5	1.2	0.0	11.0	1.2
X<-1.0 (Total %)	1.2	13.4	48.8	31.7	0.0	3.7	90.2	36.6	1.2	0.0	13.4	1.2
Net Change in % Exceedance:	74.4	-13.4	-34.1	8.5	73.2	69.5	-81.7	-36.6	-1.2	0.0	-11.0	37.8
Net Change in 10% Exceedance	32.9	-8.5	-29.3	17.1	62.2	54.9	-48.8	-8.5	-1.2	0.0	-9.8	23.2
Low Flows (Upper 40% of Distribution)												
-1.0 < X < 1.0	9.1	90.9	66.7	33.3	60.6	30.3	0.0	54.5	100.0	100.0	100.0	57.6
X>=10.0	75.8	0.0	0.0	3.0	24.2	42.4	0.0	0.0	0.0	0.0	0.0	0.0
X>1 (Total %)	90.9	0.0	0.0	3.0	36.4	69.7	0.0	0.0	0.0	0.0	0.0	36.4
X<=-10.0	0.0	3.0	24.2	48.5	0.0	0.0	30.3	6.1	0.0	0.0	0.0	0.0
X<-1 (Total %)	0.0	9.1	33.3	63.6	0.0	0.0	100.0	42.4	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	90.9	-9.1	-33.3	-60.6	36.4	69.7	-100.0	-42.4	0.0	0.0	0.0	36.4
Net Change in 10% Exceedance	75.8	-3.0	-24.2	-45.5	24.2	42.4	-30.3	-6.1	0.0	0.0	0.0	0.0

Table 241 Existing Conditions-No Action Alternative

No Action Alternative vs Existing Conditions
Delta Outflow, Monthly Flow

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
-1.0 < X < 1.0	0.0	30.5	20.7	6.1	6.1	8.5	9.8	15.9	0.0	19.5	39.0	32.9
X>=10.0	81.7	2.4	14.6	45.1	29.3	23.2	3.7	9.8	62.2	2.4	28.0	43.9
X>1.0 (Total %)	95.1	20.7	34.1	70.7	58.5	62.2	42.7	28.0	90.2	4.9	57.3	45.1
X<=-10.0	2.4	25.6	12.2	7.3	14.6	3.7	24.4	25.6	6.1	68.3	0.0	15.9
X<-1.0 (Total %)	4.9	48.8	42.7	23.2	35.4	29.3	47.6	54.9	9.8	75.6	3.7	22.0
Net Change in % Exceedance:	90.2	-28.0	-8.5	47.6	23.2	32.9	-4.9	-26.8	80.5	-70.7	53.7	23.2
Net Change in 10% Exceedance	79.3	-23.2	2.4	37.8	14.6	19.5	-20.7	-15.9	56.1	-65.9	28.0	28.0
Low Flows (Upper 40% of Distribution)												
-1.0 < X < 1.0	0.0	72.7	36.4	3.0	9.1	9.1	15.2	15.2	0.0	48.5	63.6	81.8
X>=10.0	100.0	0.0	24.2	51.5	0.0	6.1	6.1	24.2	54.5	6.1	15.2	0.0
X>1 (Total %)	100.0	0.0	39.4	78.8	21.2	57.6	75.8	63.6	100.0	12.1	36.4	0.0
X<=-10.0	0.0	21.2	0.0	9.1	24.2	0.0	0.0	0.0	0.0	27.3	0.0	6.1
X<-1 (Total %)	0.0	27.3	24.2	18.2	69.7	33.3	9.1	18.2	0.0	39.4	0.0	18.2
Net Change in % Exceedance:	100.0	-27.3	15.2	60.6	-48.5	24.2	66.7	45.5	100.0	-27.3	36.4	-18.2
Net Change in 10% Exceedance	100.0	-21.2	24.2	42.4	-24.2	6.1	6.1	24.2	54.5	-21.2	15.2	-6.1

Long-Term and Water Year-Type Average of Sacramento River Delta Inflow Under Future - Base and Future - Alternative 1

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Future - Base	8,350	10,798	22,082	31,475	37,498	30,725	19,501	11,009	11,566	13,675	9,771	13,116	13,187
Future - Alternative 1	8,372	10,654	21,585	30,619	36,539	30,283	19,495	11,006	11,563	13,692	9,769	13,114	13,016
Difference	22	-144	-497	-857	-959	-441	-6	-3	-3	18	-2	-1	-171
Percent Difference	0%	-1%	-2%	-3%	-3%	-1%	0%	0%	0%	0%	0%	0%	-1%
							Water Year-Types						
Wet													
Future - Base	8,996	14,634	37,088	51,035	56,945	47,194	30,753	12,279	11,846	17,045	8,777	23,150	19,185
Future - Alternative 1	8,999	14,259	35,976	49,761	55,734	46,710	30,783	12,274	11,847	17,045	8,760	23,146	18,919
Difference	4	-375	-1,112	-1,273	-1,212	-484	30	-5	1	1	-17	-4	-266
Percent Difference	0%	-3%	-3%	-2%	-2%	-1%	0%	0%	0%	0%	0%	0%	-1%
Above Normal													
Future - Base	9,290	10,029	19,595	40,534	52,912	37,168	18,221	12,048	12,038	14,830	9,005	15,709	15,067
Future - Alternative 1	9,461	9,947	19,076	39,186	51,782	36,457	18,223	12,048	12,037	14,830	9,002	15,709	14,850
Difference	170	-81	-519	-1,348	-1,130	-712	2	0	-1	0	-3	0	-216
Percent Difference	2%	-1%	-3%	-3%	-2%	-2%	0%	0%	0%	0%	0%	0%	-1%
Below Normal													
Future - Base	8,183	9,236	16,398	24,715	25,957	23,572	16,492	11,386	12,357	12,801	10,142	6,570	10,705
Future - Alternative 1	8,181	9,213	16,176	23,754	24,959	23,015	16,493	11,384	12,371	12,797	10,143	6,570	10,541
Difference	-2	-23	-222	-962	-998	-557	0	-2	14	-4	1	0	-164
Percent Difference	0%	0%	-1%	-4%	-4%	-2%	0%	0%	0%	0%	0%	0%	-2%
Dry													
Future - Base	7,696	9,129	14,297	16,142	24,160	21,042	12,961	10,471	11,580	11,715	11,004	6,583	9,426
Future - Alternative 1	7,696	9,091	14,205	15,798	23,371	20,639	12,907	10,465	11,587	11,722	11,002	6,583	9,325
Difference	0	-38	-92	-344	-789	-403	-54	-6	6	7	-2	0	-101
Percent Difference	0%	0%	-1%	-2%	-3%	-2%	0%	0%	0%	0%	0%	0%	-1%
Critical													
Future - Base	7,362	7,663	10,980	13,674	15,968	13,022	10,454	7,796	9,644	9,526	10,173	6,975	7,426
Future - Alternative 1	7,349	7,655	10,864	13,430	15,472	12,982	10,438	7,800	9,595	9,638	10,201	6,974	7,377
Difference	-13	-8	-115	-244	-496	-40	-16	5	-49	111	28	-1	-49
Percent Difference	0%	0%	-1%	-2%	-3%	0%	0%	0%	-1%	1%	0%	0%	-1%

Sacramento River Delta Inflow

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	9,235	17,027	51,654	65,553	69,785	60,402	45,827	14,062	14,775	19,566	11,080	23,931
20%	8,769	12,121	31,691	57,934	63,984	51,170	26,603	12,353	13,371	17,266	10,982	23,302
30%	8,164	10,380	21,194	41,318	55,940	41,821	18,011	11,604	12,742	14,296	10,796	21,171
40%	7,981	9,237	17,702	28,066	43,996	30,782	15,285	11,092	11,853	13,342	10,577	15,579
50%	7,891	8,609	16,336	22,928	32,847	22,574	13,363	10,364	11,233	12,636	10,333	6,896
60%	7,870	7,940	13,685	19,586	22,299	17,435	12,171	9,646	10,701	12,343	9,683	6,650
70%	7,816	7,863	12,583	14,988	18,509	15,725	11,343	9,037	10,289	11,773	8,734	6,595
80%	7,655	7,666	9,913	12,874	16,673	13,489	10,154	8,418	9,791	11,041	8,421	6,535
90%	6,420	6,929	9,262	10,998	14,384	11,578	8,911	7,956	8,712	9,884	7,899	6,418
Long Term												
Full Simulation Period	8,350	10,798	22,082	31,475	37,498	30,725	19,501	11,009	11,566	13,675	9,771	13,116
Water Year Types												
Wet	8,996	14,634	37,088	51,035	56,945	47,194	30,753	12,279	11,846	17,045	8,777	23,150
Above Normal	9,290	10,029	19,595	40,534	52,912	37,168	18,221	12,048	12,038	14,830	9,005	15,709
Below Normal	8,183	9,236	16,398	24,715	25,957	23,572	16,492	11,386	12,357	12,801	10,142	6,570
Dry	7,696	9,129	14,297	16,142	24,160	21,042	12,961	10,471	11,580	11,715	11,004	6,583
Critical	7,362	7,663	10,980	13,674	15,968	13,022	10,454	7,796	9,644	9,526	10,173	6,975

Future - Alternative 1

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	9,257	16,738	49,566	65,223	69,804	60,343	45,828	14,062	14,777	19,564	11,070	23,922
20%	8,823	12,099	29,549	55,977	63,174	50,743	26,619	12,351	13,380	17,266	10,980	23,303
30%	8,221	10,350	20,604	38,072	53,107	41,162	18,011	11,602	12,750	14,294	10,796	21,171
40%	7,981	9,223	17,551	26,118	42,281	28,768	15,285	11,098	11,854	13,338	10,578	15,580
50%	7,891	8,586	16,207	22,219	31,049	22,146	13,361	10,364	11,211	12,637	10,278	6,896
60%	7,852	7,929	13,665	19,174	21,223	17,332	12,171	9,646	10,718	12,342	9,683	6,650
70%	7,814	7,852	12,537	14,907	18,151	15,647	11,132	9,037	10,289	11,777	8,734	6,595
80%	7,655	7,661	9,898	12,832	16,531	13,436	10,281	8,418	9,790	11,212	8,455	6,535
90%	6,455	6,924	9,257	10,979	14,362	11,579	8,998	7,949	8,711	9,954	7,901	6,418
Long Term												
Full Simulation Period	8,372	10,654	21,585	30,619	36,539	30,283	19,495	11,006	11,563	13,692	9,769	13,114
Water Year Types												
Wet	8,999	14,259	35,976	49,761	55,734	46,710	30,783	12,274	11,847	17,045	8,760	23,146
Above Normal	9,461	9,947	19,076	39,186	51,782	36,457	18,223	12,048	12,037	14,830	9,002	15,709
Below Normal	8,181	9,213	16,176	23,754	24,959	23,015	16,493	11,384	12,371	12,797	10,143	6,570
Dry	7,696	9,091	14,205	15,798	23,371	20,639	12,907	10,465	11,587	11,722	11,002	6,583
Critical	7,349	7,655	10,864	13,430	15,472	12,982	10,438	7,800	9,595	9,638	10,201	6,974

Future - Alternative 1 Minus Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	23	-289	-2,088	-330	19	-59	1	0	2	-2	-10	-9
20%	54	-22	-2,142	-1,957	-811	-428	16	-2	9	0	-2	2
30%	58	-30	-591	-3,246	-2,833	-659	0	-2	8	-2	1	0
40%	0	-14	-151	-1,948	-1,715	-2,014	0	6	1	-3	0	0
50%	0	-23	-129	-709	-1,798	-427	-2	0	-22	1	-55	-1
60%	-18	-11	-20	-412	-1,077	-103	0	0	17	-1	0	0
70%	-2	-12	-46	-82	-358	-78	-211	0	0	5	0	0
80%	0	-5	-16	-42	-142	-52	127	0	0	171	33	0
90%	35	-5	-5	-19	-22	2	88	-7	-1	70	1	0
Long Term												
Full Simulation Period	22	-144	-497	-857	-959	-441	-6	-3	-3	18	-2	-1
Water Year Types												
Wet	4	-375	-1,112	-1,273	-1,212	-484	30	-5	1	1	-17	-4
Above Normal	170	-81	-519	-1,348	-1,130	-712	2	0	-1	0	-3	0
Below Normal	-2	-23	-222	-962	-998	-557	0	-2	14	-4	1	0
Dry	0	-38	-92	-344	-789	-403	-54	-6	6	7	-2	0
Critical	-13	-8	-115	-244	-496	-40	-16	5	-49	111	28	-1

Long-Term and Water Year-Type Average of Total CVP Deliveries North of the Delta Under Future - Base and Future - Alternative 1

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Future - Base	1,473	705	382	224	236	323	5,015	5,427	7,762	7,605	5,752	1,944	2,234
Future - Alternative 1	1,473	705	382	224	235	323	5,015	5,427	7,762	7,613	5,752	1,944	2,234
Difference	0	0	0	0	-1	0	0	0	0	8	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
							Water Year-Types						
Wet													
Future - Base	1,422	667	363	222	239	272	4,539	5,521	8,164	8,101	6,181	2,142	2,294
Future - Alternative 1	1,422	667	363	222	239	272	4,539	5,521	8,164	8,101	6,181	2,142	2,294
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal													
Future - Base	1,457	694	376	226	237	239	4,896	5,545	7,962	7,972	5,945	2,186	2,288
Future - Alternative 1	1,455	694	376	226	236	239	4,896	5,545	7,962	7,972	5,944	2,186	2,288
Difference	-2	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal													
Future - Base	1,574	746	411	234	233	328	5,295	5,621	7,827	7,667	5,800	1,881	2,280
Future - Alternative 1	1,574	746	411	234	227	327	5,295	5,621	7,826	7,666	5,800	1,881	2,280
Difference	0	0	0	0	-6	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	-3%	0%	0%	0%	0%	0%	0%	0%	0%
Dry													
Future - Base	1,508	709	382	229	237	331	5,227	5,486	7,679	7,543	5,719	1,793	2,233
Future - Alternative 1	1,508	709	382	229	237	331	5,227	5,486	7,678	7,542	5,719	1,793	2,233
Difference	0	0	0	0	0	0	0	0	-1	-1	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical													
Future - Base	1,430	744	395	208	229	491	5,500	4,805	6,777	6,232	4,651	1,613	2,004
Future - Alternative 1	1,430	744	395	208	229	491	5,500	4,805	6,777	6,287	4,651	1,613	2,007
Difference	0	0	0	0	0	0	0	0	0	55	0	0	3
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%

Total CVP Deliveries North of the Delta

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	Average Monthly Flow (cfs)											
Probability of Exceedance												
10%	1,805	942	487	299	267	609	6,547	6,089	8,526	8,483	6,489	2,345
20%	1,755	883	457	252	247	417	5,972	5,927	8,171	8,021	6,143	2,197
30%	1,658	800	416	226	238	324	5,606	5,855	8,035	7,830	5,984	2,126
40%	1,589	744	392	214	238	246	5,384	5,734	7,885	7,765	5,908	2,076
50%	1,479	674	372	213	238	223	5,166	5,604	7,789	7,720	5,830	1,992
60%	1,378	629	349	213	232	214	4,809	5,360	7,687	7,626	5,729	1,927
70%	1,309	601	337	211	230	212	4,680	5,116	7,576	7,431	5,626	1,790
80%	1,217	552	310	198	212	212	4,277	4,968	7,405	7,212	5,449	1,713
90%	1,119	511	297	183	206	199	3,070	4,539	7,117	7,088	5,246	1,500
Long Term												
Full Simulation Period	1,473	705	382	224	236	323	5,015	5,427	7,762	7,605	5,752	1,944
Water Year Types												
Wet	1,422	667	363	222	239	272	4,539	5,521	8,164	8,101	6,181	2,142
Above Normal	1,457	694	376	226	237	239	4,896	5,545	7,962	7,972	5,945	2,186
Below Normal	1,574	746	411	234	233	328	5,295	5,621	7,827	7,667	5,800	1,881
Dry	1,508	709	382	229	237	331	5,227	5,486	7,679	7,543	5,719	1,793
Critical	1,430	744	395	208	229	491	5,500	4,805	6,777	6,232	4,651	1,613

Future - Alternative 1

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	Average Monthly Flow (cfs)											
Probability of Exceedance												
10%	1,804	942	487	299	267	609	6,547	6,089	8,527	8,483	6,489	2,345
20%	1,755	883	457	252	247	416	5,972	5,927	8,171	8,021	6,143	2,197
30%	1,658	800	416	226	238	324	5,606	5,854	8,035	7,830	5,984	2,126
40%	1,589	744	392	214	238	246	5,384	5,734	7,885	7,765	5,907	2,076
50%	1,479	674	372	213	238	223	5,166	5,603	7,789	7,720	5,831	1,993
60%	1,379	629	349	213	231	214	4,809	5,360	7,687	7,626	5,728	1,927
70%	1,309	601	337	211	230	212	4,680	5,116	7,576	7,428	5,626	1,789
80%	1,217	552	310	198	210	212	4,277	4,968	7,402	7,210	5,449	1,713
90%	1,119	511	297	183	203	199	3,070	4,539	7,117	7,088	5,246	1,499
Long Term												
Full Simulation Period	1,473	705	382	224	235	323	5,015	5,427	7,762	7,613	5,752	1,944
Water Year Types												
Wet	1,422	667	363	222	239	272	4,539	5,521	8,164	8,101	6,181	2,142
Above Normal	1,455	694	376	226	236	239	4,896	5,545	7,962	7,972	5,944	2,186
Below Normal	1,574	746	411	234	227	327	5,295	5,621	7,826	7,666	5,800	1,881
Dry	1,508	709	382	229	237	331	5,227	5,486	7,678	7,542	5,719	1,793
Critical	1,430	744	395	208	229	491	5,500	4,805	6,777	6,287	4,651	1,613

Future - Alternative 1 Minus Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	Average Monthly Flow (cfs)											
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	1	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	-1	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	-1	-1	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	-1	0
70%	0	0	0	0	0	0	0	0	0	-3	0	0
80%	0	0	0	0	-3	0	0	-1	-2	-1	0	0
90%	0	0	0	0	-3	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	-1	0	0	0	0	8	0	0
Water Year Types												
Wet	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal	-2	0	0	0	0	0	0	0	0	0	0	0
Below Normal	0	0	0	0	-6	0	0	0	0	0	0	0
Dry	0	0	0	0	0	0	0	0	-1	-1	0	0
Critical	0	0	0	0	0	0	0	0	0	55	0	0

Long-Term and Water Year-Type Average of Total CVP Deliveries South of the Delta Under Future - Base and Future - Alternative 1

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Future - Base	2,541	1,483	1,013	1,043	1,435	1,900	2,274	3,350	4,776	5,105	4,521	3,213	1,977
Future - Alternative 1	2,541	1,483	1,013	1,043	1,434	1,899	2,274	3,350	4,775	5,104	4,520	3,213	1,976
Difference	0	0	0	0	0	0	0	-1	-1	-1	-1	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
							Water Year-Types						
Wet													
Future - Base	2,628	1,550	1,095	1,170	1,593	2,232	2,721	3,999	5,835	6,367	5,454	3,566	2,313
Future - Alternative 1	2,627	1,550	1,094	1,170	1,592	2,232	2,720	3,998	5,834	6,366	5,453	3,565	2,313
Difference	0	0	0	0	-1	0	0	0	-1	-1	-1	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal													
Future - Base	2,596	1,530	1,079	1,152	1,565	2,038	2,507	3,669	5,292	5,715	4,982	3,398	2,150
Future - Alternative 1	2,596	1,530	1,079	1,152	1,565	2,038	2,507	3,669	5,291	5,714	4,982	3,398	2,150
Difference	0	0	0	0	0	1	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal													
Future - Base	2,569	1,496	1,013	1,030	1,414	1,790	2,113	3,233	4,568	4,845	4,352	3,183	1,913
Future - Alternative 1	2,569	1,495	1,013	1,030	1,414	1,789	2,112	3,231	4,566	4,843	4,350	3,182	1,913
Difference	0	0	0	0	-1	-1	-1	-1	-2	-3	-2	-1	-1
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry													
Future - Base	2,498	1,450	976	989	1,372	1,737	2,052	3,009	4,201	4,404	4,029	3,068	1,802
Future - Alternative 1	2,498	1,450	976	989	1,371	1,737	2,051	3,008	4,199	4,402	4,028	3,067	1,802
Difference	0	0	0	0	0	-1	-1	-1	-2	-2	-1	-1	-1
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical													
Future - Base	2,345	1,334	839	773	1,100	1,443	1,639	2,349	3,196	3,259	3,082	2,556	1,447
Future - Alternative 1	2,345	1,334	839	773	1,100	1,443	1,639	2,349	3,196	3,262	3,082	2,556	1,447
Difference	0	0	0	0	0	0	0	0	0	3	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Total CVP Deliveries South of the Delta

Future - Base

					Average Monthly Flow (cfs)							
Statistic	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Probability of Exceedance												
10%	2,941	1,798	1,415	1,688	2,240	2,237	2,991	4,427	6,543	7,218	6,075	3,780
20%	2,680	1,582	1,131	1,233	1,686	2,097	2,545	3,727	5,389	5,832	5,065	3,423
30%	2,638	1,550	1,086	1,155	1,563	2,032	2,485	3,587	5,156	5,552	4,863	3,357
40%	2,592	1,514	1,037	1,069	1,461	1,991	2,369	3,431	4,896	5,239	4,638	3,283
50%	2,558	1,488	1,001	1,006	1,392	1,953	2,330	3,318	4,708	5,013	4,475	3,229
60%	2,543	1,477	986	979	1,342	1,867	2,220	3,270	4,627	4,915	4,405	3,206
70%	2,503	1,445	943	909	1,280	1,698	2,023	3,147	4,424	4,671	4,227	3,144
80%	2,317	1,285	758	649	946	1,506	1,789	2,595	3,551	3,699	3,435	2,852
90%	2,252	1,229	666	483	770	1,506	1,565	2,402	3,208	3,212	3,156	2,749
Long Term												
Full Simulation Period	2,541	1,483	1,013	1,043	1,435	1,900	2,274	3,350	4,776	5,105	4,521	3,213
Water Year Types												
Wet	2,628	1,550	1,095	1,170	1,593	2,232	2,721	3,999	5,835	6,367	5,454	3,566
Above Normal	2,596	1,530	1,079	1,152	1,565	2,038	2,507	3,669	5,292	5,715	4,982	3,398
Below Normal	2,569	1,496	1,013	1,030	1,414	1,790	2,113	3,233	4,568	4,845	4,352	3,183
Dry	2,498	1,450	976	989	1,372	1,737	2,052	3,009	4,201	4,404	4,029	3,068
Critical	2,345	1,334	839	773	1,100	1,443	1,639	2,349	3,196	3,259	3,082	2,556

Future - Alternative 1

					Average Monthly Flow (cfs)							
Statistic	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Probability of Exceedance												
10%	2,941	1,798	1,415	1,688	2,240	2,237	2,989	4,427	6,543	7,217	6,075	3,780
20%	2,680	1,582	1,131	1,233	1,686	2,097	2,545	3,727	5,389	5,832	5,065	3,423
30%	2,638	1,550	1,086	1,155	1,563	2,032	2,486	3,587	5,156	5,552	4,863	3,357
40%	2,592	1,514	1,037	1,069	1,461	1,991	2,369	3,431	4,896	5,239	4,638	3,283
50%	2,558	1,488	1,001	1,006	1,393	1,955	2,329	3,318	4,707	5,012	4,474	3,229
60%	2,543	1,477	986	979	1,342	1,867	2,219	3,270	4,627	4,915	4,405	3,206
70%	2,503	1,444	943	909	1,279	1,698	2,023	3,145	4,422	4,669	4,225	3,143
80%	2,316	1,284	758	649	946	1,506	1,789	2,593	3,547	3,696	3,432	2,850
90%	2,252	1,229	666	483	770	1,506	1,565	2,402	3,208	3,212	3,156	2,749
Long Term												
Full Simulation Period	2,541	1,483	1,013	1,043	1,434	1,899	2,274	3,350	4,775	5,104	4,520	3,213
Water Year Types												
Wet	2,627	1,550	1,094	1,170	1,592	2,232	2,720	3,998	5,834	6,366	5,453	3,565
Above Normal	2,596	1,530	1,079	1,152	1,565	2,038	2,507	3,669	5,291	5,714	4,982	3,398
Below Normal	2,569	1,495	1,013	1,030	1,414	1,789	2,112	3,231	4,566	4,843	4,350	3,182
Dry	2,498	1,450	976	989	1,371	1,737	2,051	3,008	4,199	4,402	4,028	3,067
Critical	2,345	1,334	839	773	1,100	1,443	1,639	2,349	3,196	3,262	3,082	2,556

Future - Alternative 1 Minus Future - Base

					Average Monthly Flow (cfs)							
Statistic	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Probability of Exceedance												
10%	0	0	0	0	0	0	-1	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	1	2	-1	0	-1	-1	-1	0
60%	0	0	0	0	-1	0	-1	0	0	0	0	0
70%	0	0	0	-1	-1	0	0	-1	-2	-2	-2	-1
80%	-1	-1	-1	0	0	0	0	-2	-4	-3	-4	-1
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	-1	-1	-1	-1	0
Water Year Types												
Wet	0	0	0	0	-1	0	0	0	-1	-1	-1	0
Above Normal	0	0	0	0	0	1	0	0	0	0	0	0
Below Normal	0	0	0	0	-1	-1	-1	-1	-2	-3	-2	-1
Dry	0	0	0	0	0	-1	-1	-1	-2	-2	-1	-1
Critical	0	0	0	0	0	0	0	0	0	3	0	0

Long-Term and Water Year-Type Average of Total SWP Deliveries North of the Delta Under Future - Base and Future - Alternative 1

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Future - Base	1,383	1,394	894	328	13	89	2,005	2,578	3,092	3,044	2,413	1,806	1,154
Future - Alternative 1	1,387	1,399	897	328	13	89	2,005	2,578	3,092	3,044	2,413	1,806	1,155
Difference	4	5	3	0	0	0	0	0	0	0	0	0	1
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
							Water Year-Types						
Wet													
Future - Base	1,303	1,401	853	242	19	65	1,869	2,776	3,389	3,342	2,672	2,074	1,213
Future - Alternative 1	1,316	1,417	863	242	19	65	1,869	2,776	3,389	3,342	2,672	2,074	1,215
Difference	13	16	10	0	0	0	0	0	0	0	0	0	2
Percent Difference	1%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal													
Future - Base	1,565	1,622	1,055	408	15	50	2,031	2,790	3,335	3,327	2,627	2,204	1,275
Future - Alternative 1	1,565	1,622	1,055	408	15	50	2,031	2,790	3,335	3,327	2,627	2,204	1,275
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal													
Future - Base	1,651	1,640	1,087	417	9	64	2,125	2,653	3,143	3,043	2,435	1,792	1,216
Future - Alternative 1	1,651	1,639	1,087	417	9	64	2,125	2,653	3,143	3,043	2,435	1,792	1,216
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry													
Future - Base	1,337	1,248	830	347	9	103	2,053	2,604	3,083	2,985	2,385	1,750	1,136
Future - Alternative 1	1,337	1,248	830	347	9	103	2,053	2,604	3,082	2,985	2,385	1,750	1,136
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical													
Future - Base	1,172	1,146	734	313	9	182	2,067	1,833	2,185	2,240	1,680	967	881
Future - Alternative 1	1,172	1,146	734	313	9	182	2,067	1,832	2,185	2,240	1,680	967	881
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Total SWP Deliveries North of the Delta

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	2,163	2,065	1,372	614	20	198	2,860	3,128	3,657	3,561	2,846	2,296
20%	2,011	1,961	1,290	520	20	128	2,556	3,038	3,510	3,477	2,800	2,233
30%	1,827	1,898	1,219	469	20	45	2,378	2,974	3,442	3,369	2,687	2,175
40%	1,653	1,843	1,157	443	19	45	2,110	2,899	3,373	3,302	2,608	2,118
50%	1,404	1,703	1,024	383	15	45	2,006	2,738	3,312	3,227	2,577	2,049
60%	1,320	1,495	940	266	11	45	1,845	2,648	3,201	3,168	2,531	1,963
70%	1,203	1,193	681	154	4	45	1,739	2,470	3,116	3,106	2,484	1,662
80%	861	570	347	60	3	32	1,397	1,931	2,987	2,952	2,290	1,247
90%	277	53	12	11	2	20	1,141	1,669	1,927	1,929	1,506	987
Long Term												
Full Simulation Period	1,383	1,394	894	328	13	89	2,005	2,578	3,092	3,044	2,413	1,806
Water Year Types												
Wet	1,303	1,401	853	242	19	65	1,869	2,776	3,389	3,342	2,672	2,074
Above Normal	1,565	1,622	1,055	408	15	50	2,031	2,790	3,335	3,327	2,627	2,204
Below Normal	1,651	1,640	1,087	417	9	64	2,125	2,653	3,143	3,043	2,435	1,792
Dry	1,337	1,248	830	347	9	103	2,053	2,604	3,083	2,985	2,385	1,750
Critical	1,172	1,146	734	313	9	182	2,067	1,833	2,185	2,240	1,680	967

Future - Alternative 1

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	2,163	2,065	1,372	614	20	198	2,860	3,128	3,657	3,561	2,846	2,296
20%	2,011	1,961	1,290	520	20	128	2,556	3,039	3,510	3,477	2,800	2,233
30%	1,827	1,898	1,219	469	20	45	2,378	2,974	3,442	3,369	2,686	2,175
40%	1,653	1,843	1,157	443	19	45	2,110	2,899	3,373	3,302	2,608	2,118
50%	1,404	1,703	1,024	383	15	45	2,006	2,738	3,312	3,227	2,577	2,049
60%	1,320	1,495	940	266	11	45	1,845	2,648	3,201	3,168	2,531	1,963
70%	1,203	1,193	681	154	4	45	1,739	2,470	3,116	3,106	2,484	1,662
80%	861	570	347	60	3	32	1,397	1,931	2,987	2,952	2,290	1,247
90%	311	79	12	11	2	20	1,141	1,669	1,927	1,929	1,506	987
Long Term												
Full Simulation Period	1,387	1,399	897	328	13	89	2,005	2,578	3,092	3,044	2,413	1,806
Water Year Types												
Wet	1,316	1,417	863	242	19	65	1,869	2,776	3,389	3,342	2,672	2,074
Above Normal	1,565	1,622	1,055	408	15	50	2,031	2,790	3,335	3,327	2,627	2,204
Below Normal	1,651	1,639	1,087	417	9	64	2,125	2,653	3,143	3,043	2,435	1,792
Dry	1,337	1,248	830	347	9	103	2,053	2,604	3,082	2,985	2,385	1,750
Critical	1,172	1,146	734	313	9	182	2,067	1,832	2,185	2,240	1,680	967

Future - Alternative 1 Minus Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	34	26	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	4	5	3	0	0	0	0	0	0	0	0	0
Water Year Types												
Wet	13	16	10	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

Long-Term and Water Year-Type Average of Total SWP Deliveries South of the Delta Under Future - Base and Future - Alternative 1

Analysis Period	October	November	December	January	February	March	April	May	June	July	August	September	Total (TAF)
						Average Flow (cfs)							
							Long-Term						
Full Simulation Period													
Future - Base	4,043	2,984	3,596	472	840	1,531	2,542	3,813	5,165	5,535	5,706	4,829	2,489
Future - Alternative 1	4,040	2,980	3,580	469	840	1,528	2,538	3,806	5,156	5,527	5,697	4,819	2,484
Difference	-3	-4	-16	-3	0	-4	-5	-7	-9	-8	-9	-10	-5
Percent Difference	0%	0%	0%	-1%	0%	0%	0%	0%	0%	0%	0%	0%	0%
							Water Year-Types						
Wet													
Future - Base	4,344	2,993	4,138	1,107	1,816	2,666	3,835	5,364	6,773	6,814	7,151	6,006	3,210
Future - Alternative 1	4,345	2,991	4,102	1,106	1,816	2,664	3,834	5,363	6,771	6,812	7,149	6,004	3,207
Difference	1	-3	-37	-1	0	-1	-1	-2	-2	-2	-2	-2	-3
Percent Difference	0%	0%	-1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal													
Future - Base	4,230	3,445	3,981	275	949	2,295	3,530	4,967	6,244	6,377	6,711	5,656	2,949
Future - Alternative 1	4,221	3,439	3,973	253	948	2,291	3,528	4,964	6,240	6,372	6,708	5,652	2,945
Difference	-9	-6	-8	-22	-1	-3	-2	-3	-4	-4	-4	-3	-4
Percent Difference	0%	0%	0%	-8%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal													
Future - Base	4,466	3,200	3,761	277	460	940	2,653	3,955	5,476	6,029	6,261	5,329	2,596
Future - Alternative 1	4,459	3,195	3,755	277	459	927	2,646	3,952	5,471	6,022	6,251	5,321	2,592
Difference	-7	-4	-6	0	0	-14	-7	-3	-5	-7	-10	-8	-4
Percent Difference	0%	0%	0%	0%	0%	-1%	0%	0%	0%	0%	0%	0%	0%
Dry													
Future - Base	3,825	2,760	3,103	122	199	821	1,523	2,587	4,084	4,826	4,854	4,140	1,994
Future - Alternative 1	3,822	2,755	3,099	122	198	820	1,517	2,575	4,074	4,820	4,848	4,135	1,990
Difference	-3	-5	-5	0	-1	-1	-7	-12	-10	-6	-5	-5	-4
Percent Difference	0%	0%	0%	0%	-1%	0%	0%	0%	0%	0%	0%	0%	0%
Critical													
Future - Base	3,125	2,678	2,710	71	105	198	415	1,284	2,155	2,635	2,470	2,132	1,213
Future - Alternative 1	3,121	2,675	2,704	71	105	196	406	1,265	2,123	2,609	2,438	2,088	1,203
Difference	-4	-4	-6	0	0	-2	-9	-18	-32	-27	-31	-44	-11
Percent Difference	0%	0%	0%	0%	0%	-1%	-2%	-1%	-1%	-1%	-1%	-2%	-1%

Total SWP Deliveries South of the Delta

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	6,024	4,586	5,669	1,962	2,014	2,905	4,303	5,987	7,491	7,386	7,710	6,606
20%	5,428	4,361	5,320	595	1,939	2,706	3,782	5,413	6,881	7,045	7,177	6,208
30%	5,007	4,042	4,484	231	1,754	2,547	3,546	4,855	6,162	6,469	6,763	5,710
40%	4,894	3,793	4,121	172	634	2,500	3,396	4,756	6,020	6,231	6,634	5,517
50%	4,695	3,368	3,879	145	305	1,970	3,227	4,579	5,814	6,154	6,532	5,440
60%	4,383	2,362	3,600	104	193	456	2,566	3,547	5,530	5,944	6,369	5,228
70%	2,920	2,054	2,708	91	137	337	1,514	2,544	4,505	5,640	5,920	4,934
80%	2,451	1,296	1,887	72	112	220	520	2,078	3,482	4,247	3,946	3,332
90%	1,299	897	964	56	55	146	301	1,184	1,956	2,357	2,163	1,854
Long Term												
Full Simulation Period	4,043	2,984	3,596	472	840	1,531	2,542	3,813	5,165	5,535	5,706	4,829
Water Year Types												
Wet	4,344	2,993	4,138	1,107	1,816	2,666	3,835	5,364	6,773	6,814	7,151	6,006
Above Normal	4,230	3,445	3,981	275	949	2,295	3,530	4,967	6,244	6,377	6,711	5,656
Below Normal	4,466	3,200	3,761	277	460	940	2,653	3,955	5,476	6,029	6,261	5,329
Dry	3,825	2,760	3,103	122	199	821	1,523	2,587	4,084	4,826	4,854	4,140
Critical	3,125	2,678	2,710	71	105	198	415	1,284	2,155	2,635	2,470	2,132

Future - Alternative 1

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	6,027	4,585	5,670	1,963	2,014	2,905	4,305	5,989	7,493	7,390	7,707	6,606
20%	5,429	4,362	5,319	595	1,939	2,681	3,783	5,413	6,881	7,037	7,166	6,209
30%	5,007	4,042	4,484	233	1,748	2,584	3,547	4,855	6,161	6,426	6,762	5,712
40%	4,894	3,772	4,118	172	615	2,487	3,396	4,756	6,020	6,233	6,635	5,522
50%	4,683	3,357	3,869	145	309	1,945	3,227	4,570	5,805	6,155	6,532	5,437
60%	4,354	2,381	3,594	108	193	456	2,549	3,510	5,530	5,940	6,350	5,226
70%	2,959	2,042	2,496	91	137	335	1,464	2,535	4,489	5,641	5,902	4,935
80%	2,446	1,298	1,884	74	112	221	520	2,077	3,481	4,245	3,941	3,325
90%	1,282	873	957	56	55	142	297	1,173	1,938	2,335	2,143	1,848
Long Term												
Full Simulation Period	4,040	2,980	3,580	469	840	1,528	2,538	3,806	5,156	5,527	5,697	4,819
Water Year Types												
Wet	4,345	2,991	4,102	1,106	1,816	2,664	3,834	5,363	6,771	6,812	7,149	6,004
Above Normal	4,221	3,439	3,973	253	948	2,291	3,528	4,964	6,240	6,372	6,708	5,652
Below Normal	4,459	3,195	3,755	277	459	927	2,646	3,952	5,471	6,022	6,251	5,321
Dry	3,822	2,755	3,099	122	198	820	1,517	2,575	4,074	4,820	4,848	4,135
Critical	3,121	2,675	2,704	71	105	196	406	1,265	2,123	2,609	2,438	2,088

Future - Alternative 1 Minus Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	3	0	1	2	0	0	3	2	2	4	-2	0
20%	1	0	-1	-1	0	-25	0	0	1	-9	-11	1
30%	0	0	0	2	-6	37	1	-1	-1	-43	-1	2
40%	0	-21	-3	0	-19	-14	0	0	0	2	1	5
50%	-12	-11	-10	1	4	-25	0	-9	-9	1	0	-3
60%	-29	18	-6	4	0	0	-17	-37	0	-4	-19	-2
70%	39	-12	-213	0	0	-2	-50	-9	-16	2	-18	1
80%	-5	2	-3	1	0	0	-1	-1	0	-3	-5	-7
90%	-17	-24	-7	0	0	-5	-3	-11	-18	-22	-20	-6
Long Term												
Full Simulation Period	-3	-4	-16	-3	0	-4	-5	-7	-9	-8	-9	-10
Water Year Types												
Wet	1	-3	-37	-1	0	-1	-1	-2	-2	-2	-2	-2
Above Normal	-9	-6	-8	-22	-1	-3	-2	-3	-4	-4	-4	-3
Below Normal	-7	-4	-6	0	0	-14	-7	-3	-5	-7	-10	-8
Dry	-3	-5	-5	0	-1	-1	-7	-12	-10	-6	-5	-5
Critical	-4	-4	-6	0	0	-2	-9	-18	-32	-27	-31	-44

Long-Term and Water Year-Type Average of Fremont Weir Spill to Yolo Bypass Under Future - Base and Future - Alternative 1

Analysis Period	October	November	December	January	February	March	April	May	June	July	August	September	Total (TAF)
	Average Flow (cfs)												
	Long-Term												
Full Simulation Period													
Future - Base	43	57	2,754	12,157	16,930	8,465	1,050	3	0	0	0	0	2,453
Future - Alternative 1	43	201	3,254	13,056	17,951	8,938	1,050	3	0	0	0	0	2,634
Difference	0	144	499	899	1,022	472	0	0	0	0	0	0	181
Percent Difference	0%	253%	18%	7%	6%	6%	0%	0%	0%	0%	0%	0%	7%
	Water Year-Types												
Wet													
Future - Base	135	180	7,592	34,147	41,220	23,151	3,236	10	0	0	0	0	6,503
Future - Alternative 1	135	564	8,785	35,497	42,525	23,655	3,236	10	0	0	0	0	6,786
Difference	0	384	1,193	1,350	1,305	505	0	0	0	0	0	0	283
Percent Difference	0%	213%	16%	4%	3%	2%	0%	0%	0%	0%	0%	0%	4%
Above Normal													
Future - Base	0	0	946	9,205	25,241	6,208	14	0	0	0	0	0	2,432
Future - Alternative 1	0	70	1,318	10,536	26,533	6,976	14	0	0	0	0	0	2,661
Difference	0	70	373	1,330	1,292	768	0	0	0	0	0	0	228
Percent Difference	0%	0%	39%	14%	5%	12%	0%	0%	0%	0%	0%	0%	9%
Below Normal													
Future - Base	0	0	1,390	583	1,456	737	137	0	0	0	0	0	257
Future - Alternative 1	0	24	1,624	1,598	2,529	1,331	137	0	0	0	0	0	431
Difference	0	24	234	1,015	1,073	594	0	0	0	0	0	0	175
Percent Difference	0%	0%	17%	174%	74%	81%	0%	0%	0%	0%	0%	0%	68%
Dry													
Future - Base	0	0	0	11	981	717	0	0	0	0	0	0	99
Future - Alternative 1	0	34	113	390	1,852	1,151	0	0	0	0	0	0	207
Difference	0	34	113	379	872	434	0	0	0	0	0	0	108
Percent Difference	0%	0%	0%	3507%	89%	60%	0%	0%	0%	0%	0%	0%	108%
Critical													
Future - Base	0	0	0	0	26	0	0	0	0	0	0	0	1
Future - Alternative 1	0	8	42	265	381	65	0	0	0	0	0	0	45
Difference	0	8	42	265	355	65	0	0	0	0	0	0	44
Percent Difference	0%	0%	0%	0%	1362%	0%	0%	0%	0%	0%	0%	0%	2904%

Fremont Weir Spill to Yolo Bypass

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	0	9,636	45,653	68,479	26,076	480	0	0	0	0	0
20%	0	0	417	14,794	32,134	7,332	2	0	0	0	0	0
30%	0	0	0	2,685	10,131	3,487	0	0	0	0	0	0
40%	0	0	0	83	4,103	180	0	0	0	0	0	0
50%	0	0	0	0	501	0	0	0	0	0	0	0
60%	0	0	0	0	3	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	43	57	2,754	12,157	16,930	8,465	1,050	3	0	0	0	0
Water Year Types												
Wet	135	180	7,592	34,147	41,220	23,151	3,236	10	0	0	0	0
Above Normal	0	0	946	9,205	25,241	6,208	14	0	0	0	0	0
Below Normal	0	0	1,390	583	1,456	737	137	0	0	0	0	0
Dry	0	0	0	11	981	717	0	0	0	0	0	0
Critical	0	0	0	0	26	0	0	0	0	0	0	0

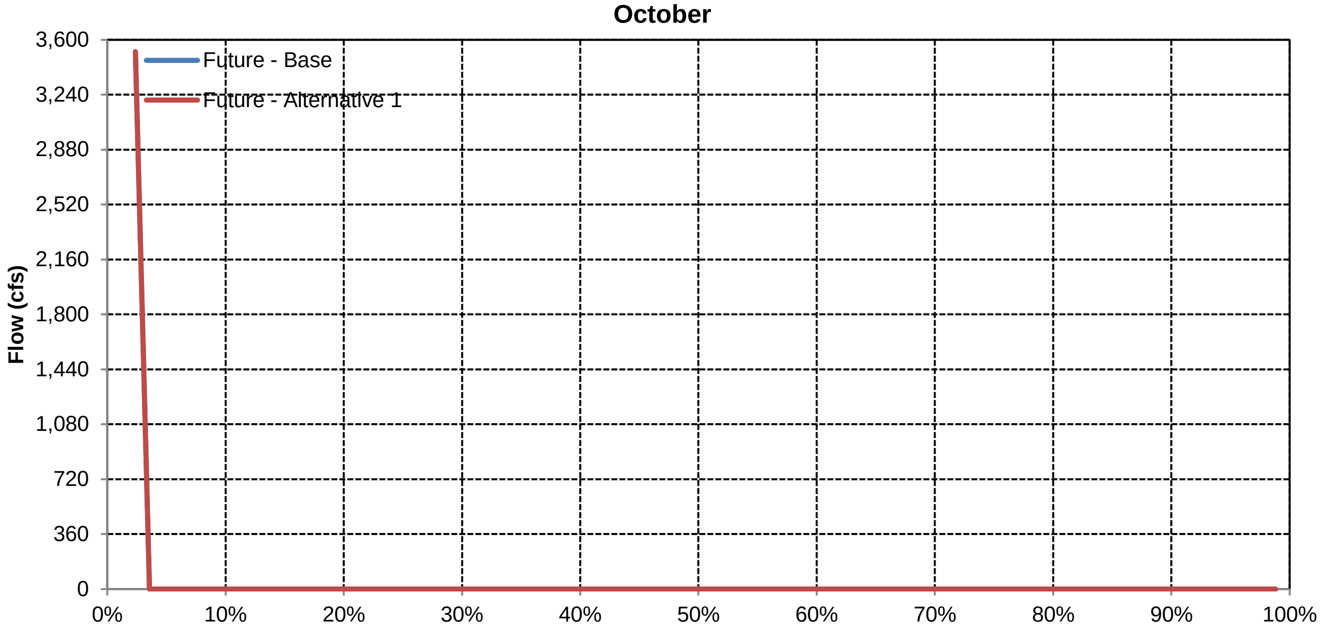
Future - Alternative 1

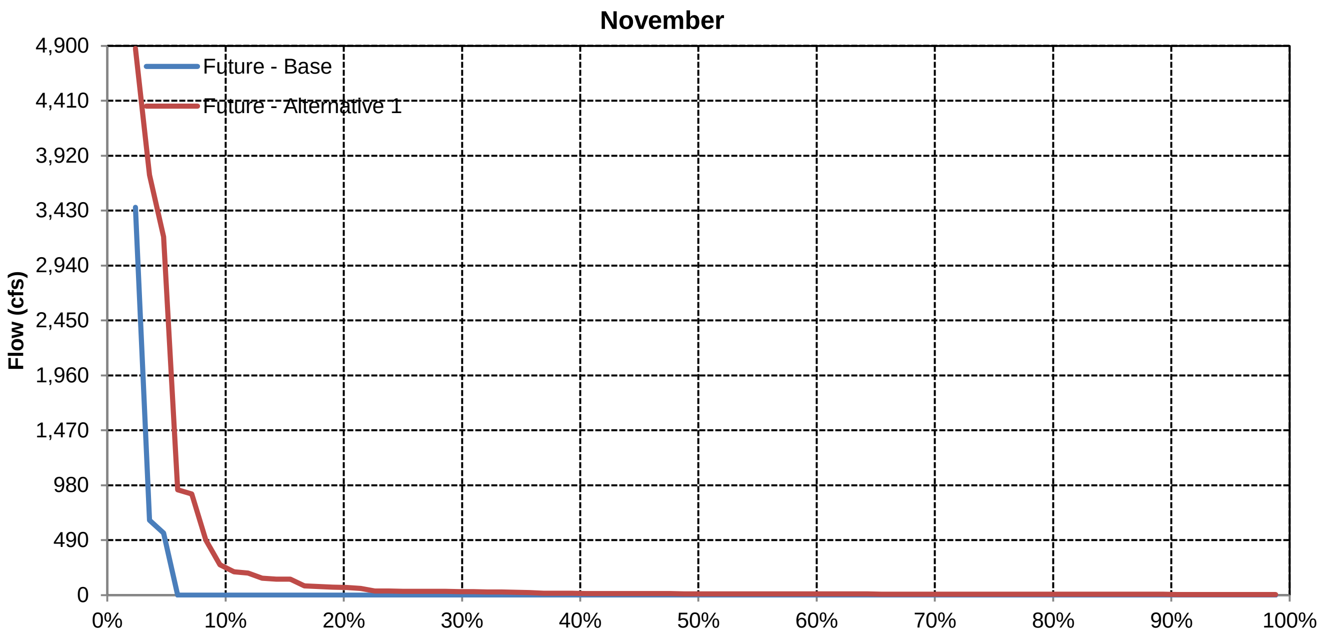
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	204	10,818	45,855	68,863	26,477	480	0	0	0	0	0
20%	0	63	2,382	16,585	32,803	8,186	2	0	0	0	0	0
30%	0	31	432	6,412	12,402	4,102	0	0	0	0	0	0
40%	0	14	234	2,342	6,510	1,790	0	0	0	0	0	0
50%	0	11	128	1,029	3,077	467	0	0	0	0	0	0
60%	0	10	41	423	1,150	209	0	0	0	0	0	0
70%	0	9	14	102	380	118	0	0	0	0	0	0
80%	0	7	10	32	165	31	0	0	0	0	0	0
90%	0	7	8	17	39	8	0	0	0	0	0	0
Long Term												
Full Simulation Period	43	201	3,254	13,056	17,951	8,938	1,050	3	0	0	0	0
Water Year Types												
Wet	135	564	8,785	35,497	42,525	23,655	3,236	10	0	0	0	0
Above Normal	0	70	1,318	10,536	26,533	6,976	14	0	0	0	0	0
Below Normal	0	24	1,624	1,598	2,529	1,331	137	0	0	0	0	0
Dry	0	34	113	390	1,852	1,151	0	0	0	0	0	0
Critical	0	8	42	265	381	65	0	0	0	0	0	0

Future - Alternative 1 Minus Future - Base

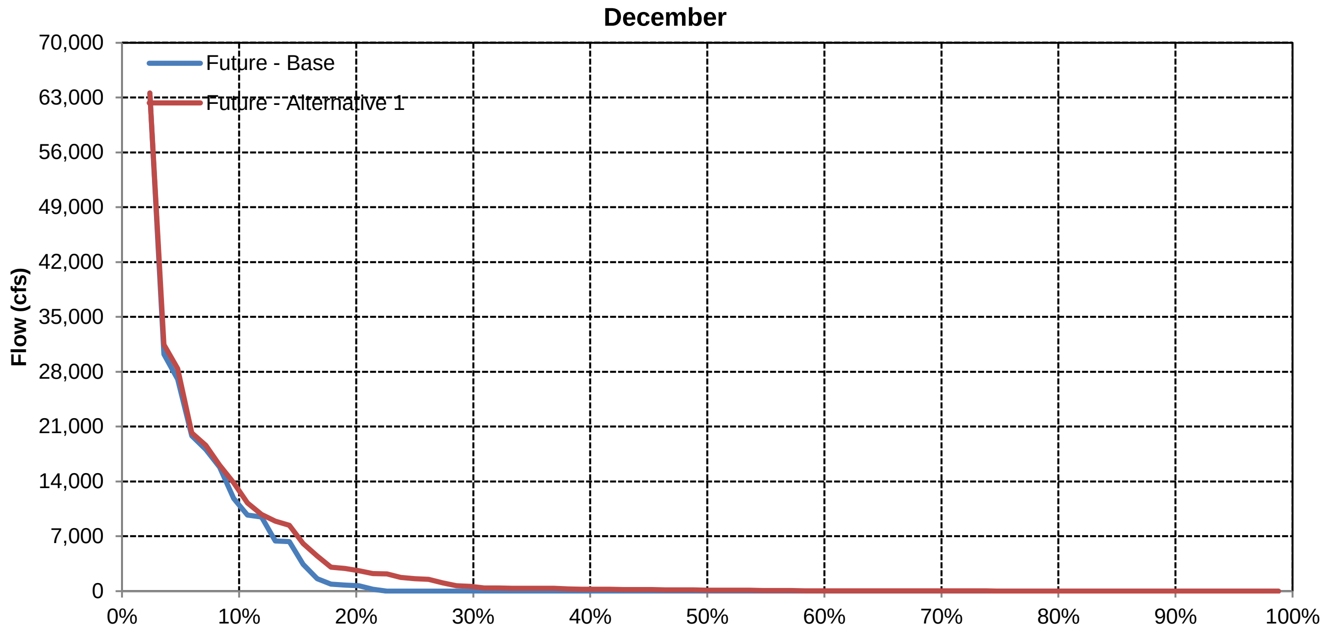
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	204	1,182	202	385	400	0	0	0	0	0	0
20%	0	63	1,965	1,792	669	854	0	0	0	0	0	0
30%	0	31	432	3,727	2,271	614	0	0	0	0	0	0
40%	0	14	234	2,259	2,406	1,610	0	0	0	0	0	0
50%	0	11	128	1,029	2,576	467	0	0	0	0	0	0
60%	0	10	41	423	1,147	209	0	0	0	0	0	0
70%	0	9	14	102	380	118	0	0	0	0	0	0
80%	0	7	10	32	165	31	0	0	0	0	0	0
90%	0	7	8	17	39	8	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	144	499	899	1,022	472	0	0	0	0	0	0
Water Year Types												
Wet	0	384	1,193	1,350	1,305	505	0	0	0	0	0	0
Above Normal	0	70	373	1,330	1,292	768	0	0	0	0	0	0
Below Normal	0	24	234	1,015	1,073	594	0	0	0	0	0	0
Dry	0	34	113	379	872	434	0	0	0	0	0	0
Critical	0	8	42	265	355	65	0	0	0	0	0	0

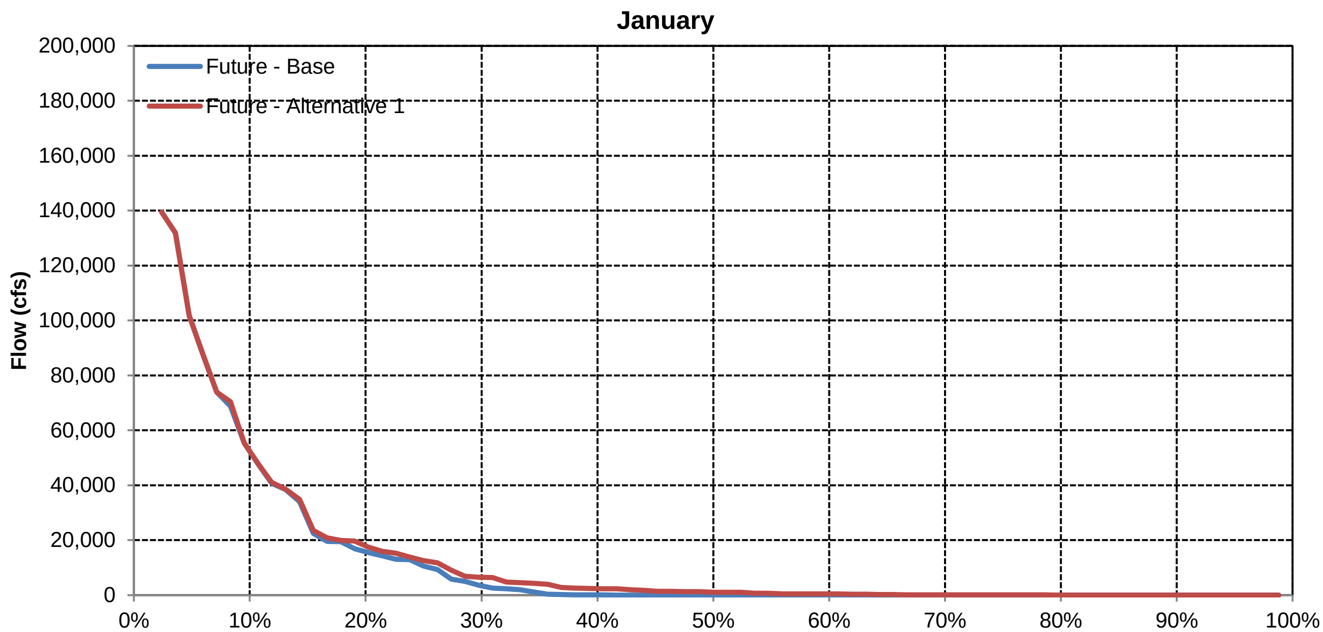
Fremont Weir Spill to Yolo Bypass



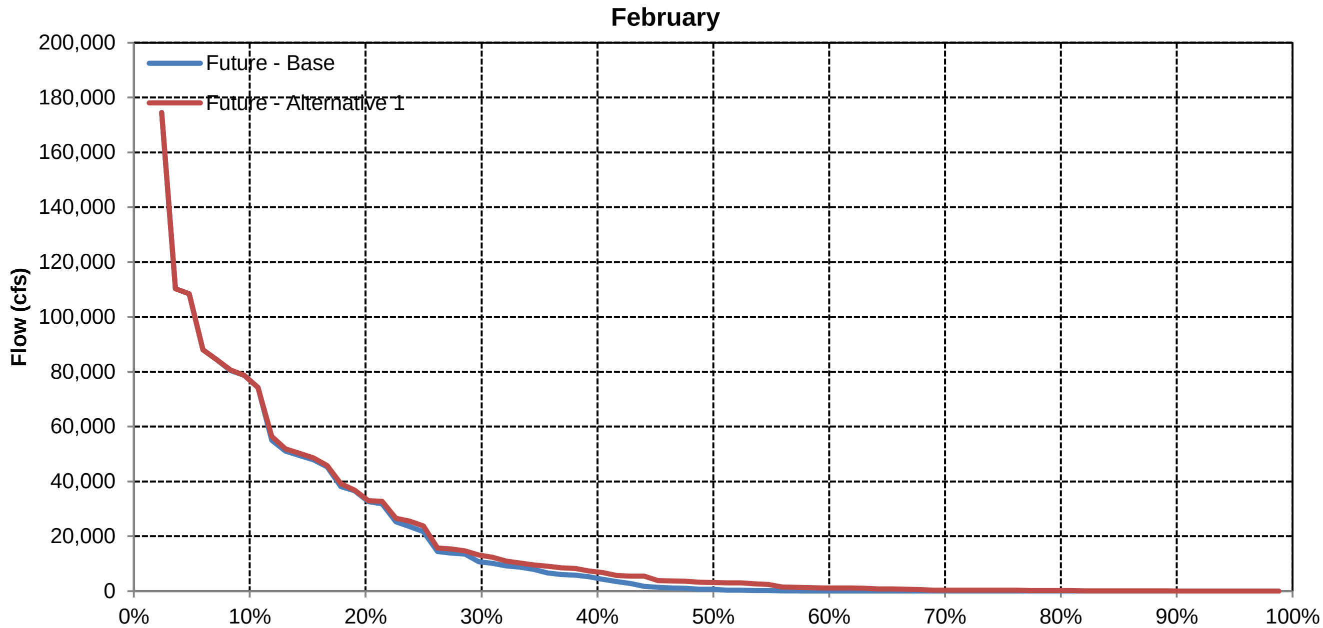


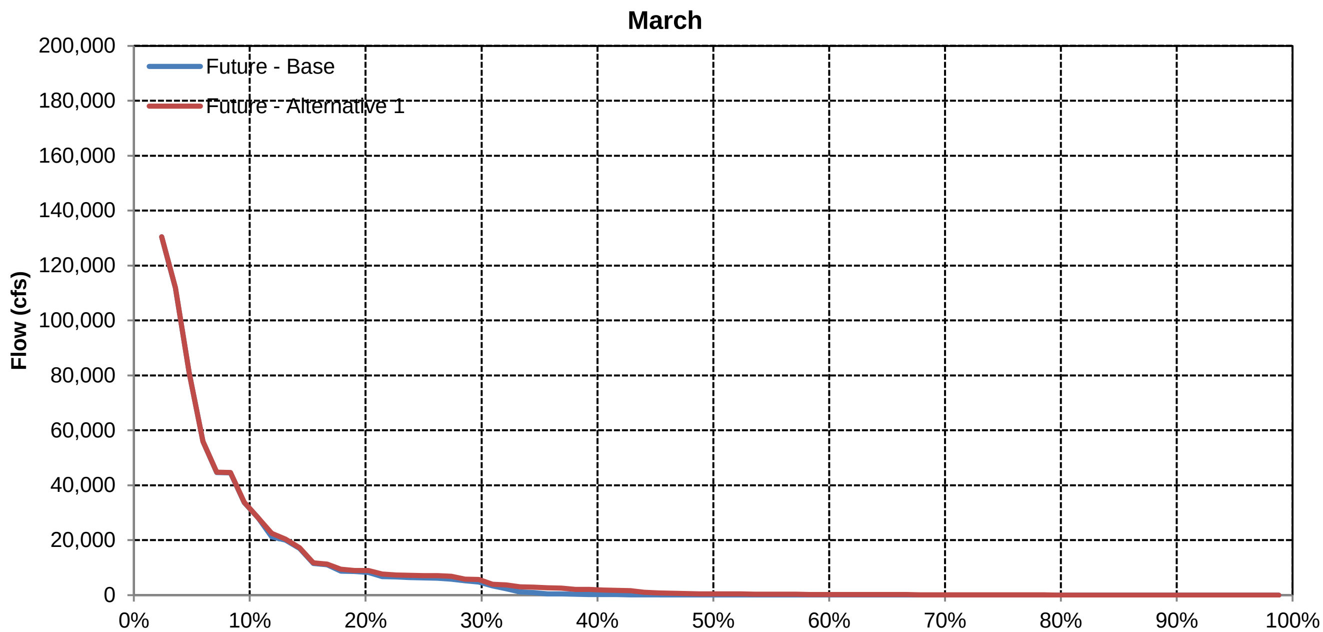
Fremont Weir Spill to Yolo Bypass



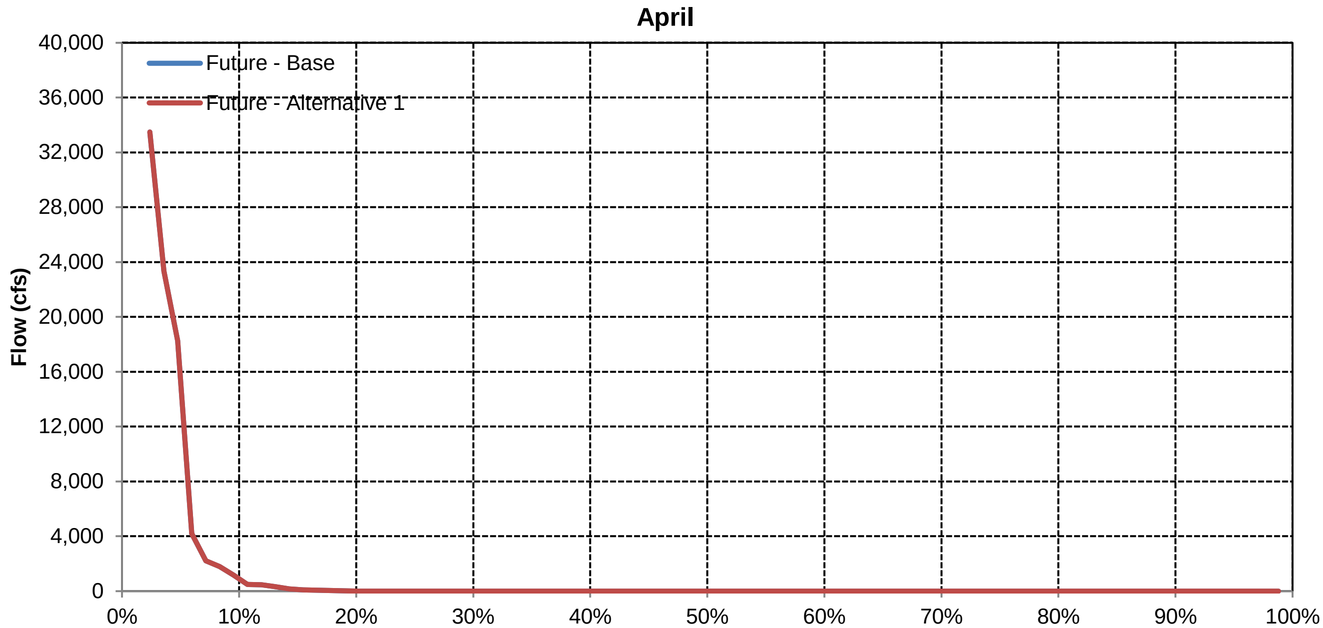


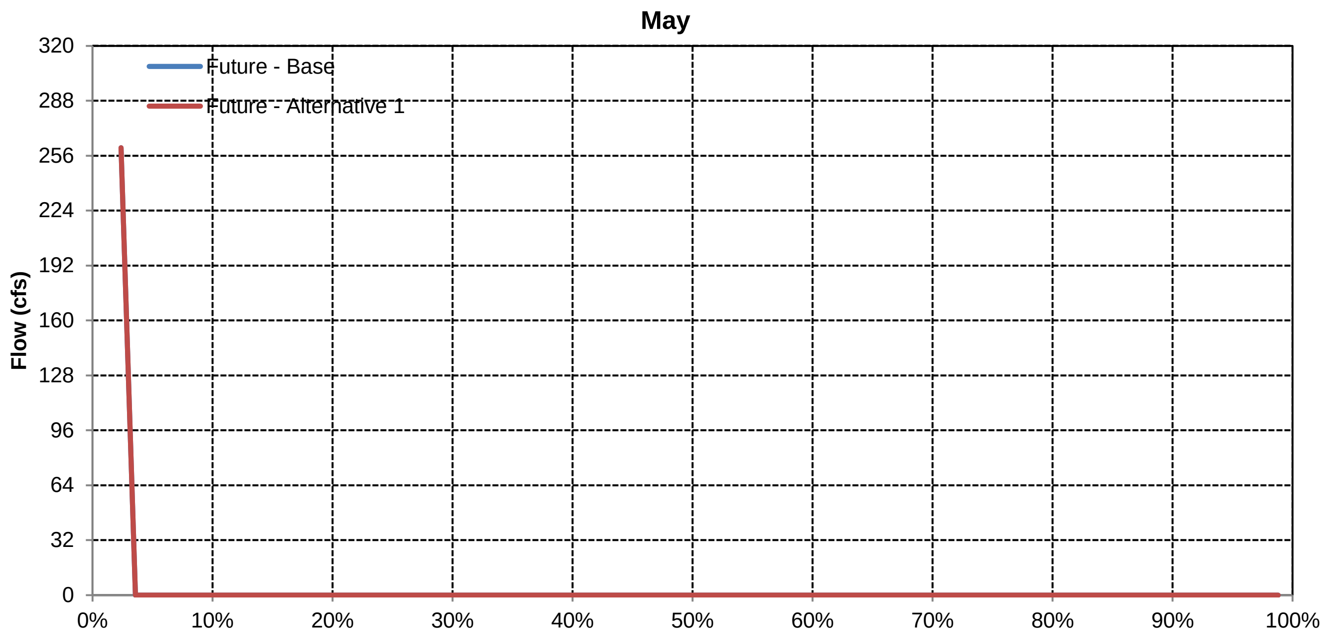
Fremont Weir Spill to Yolo Bypass



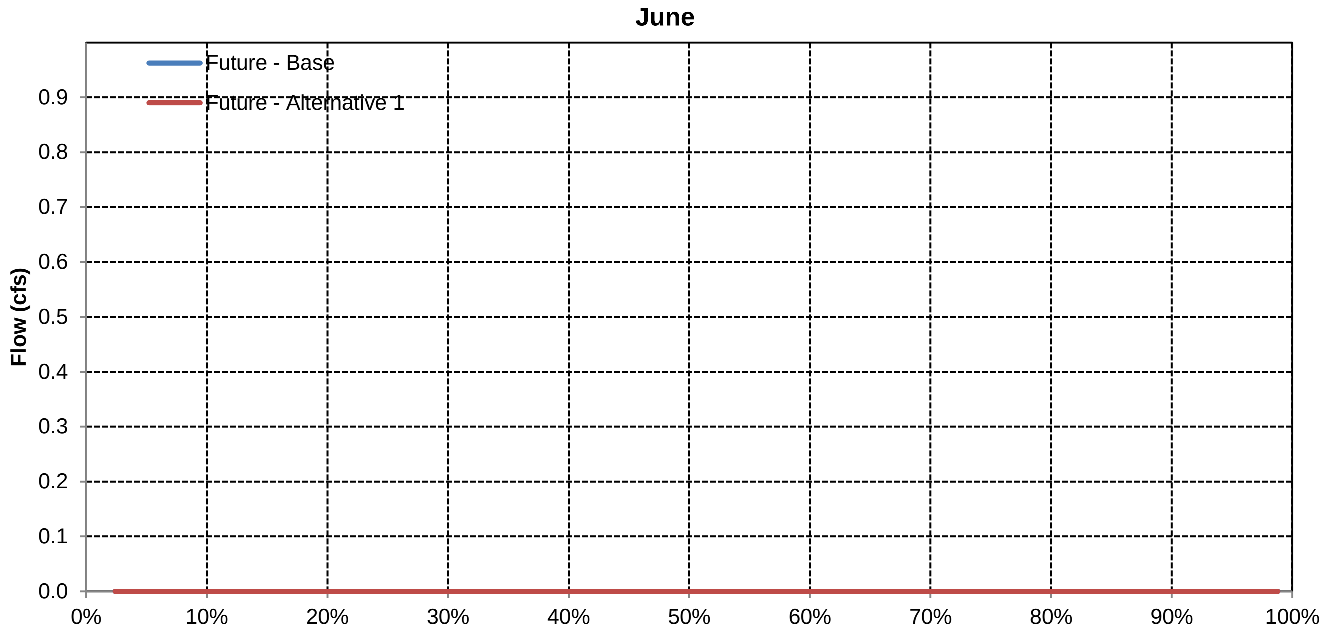


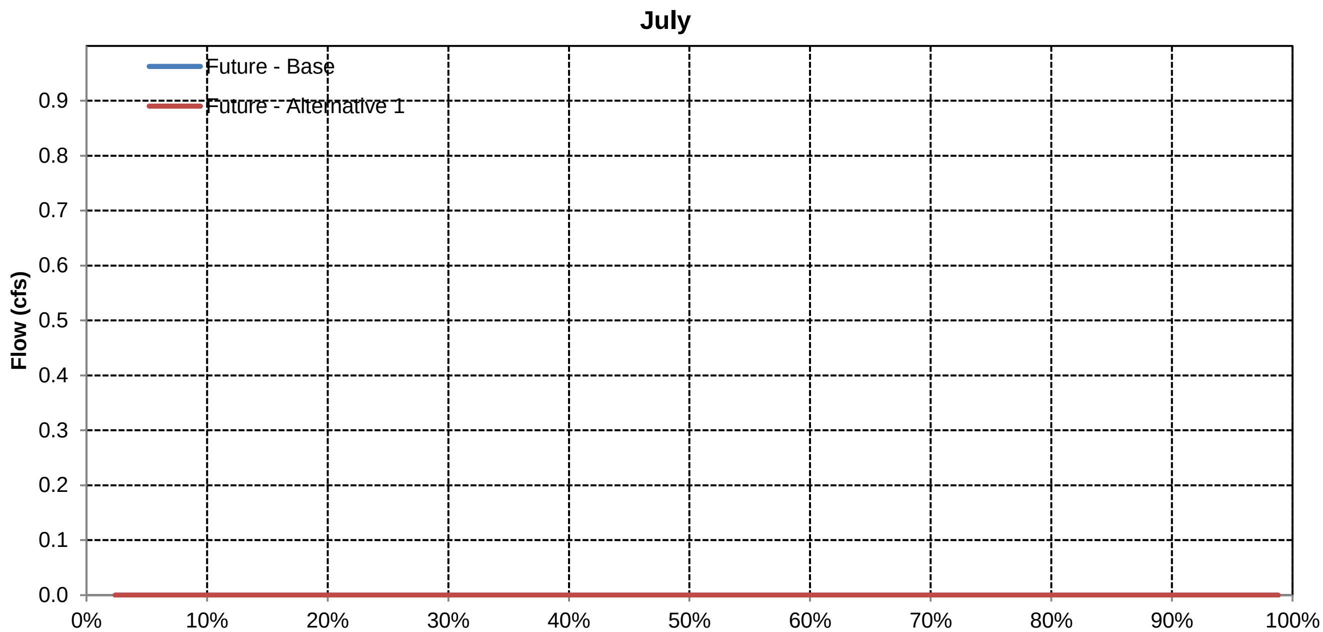
Fremont Weir Spill to Yolo Bypass



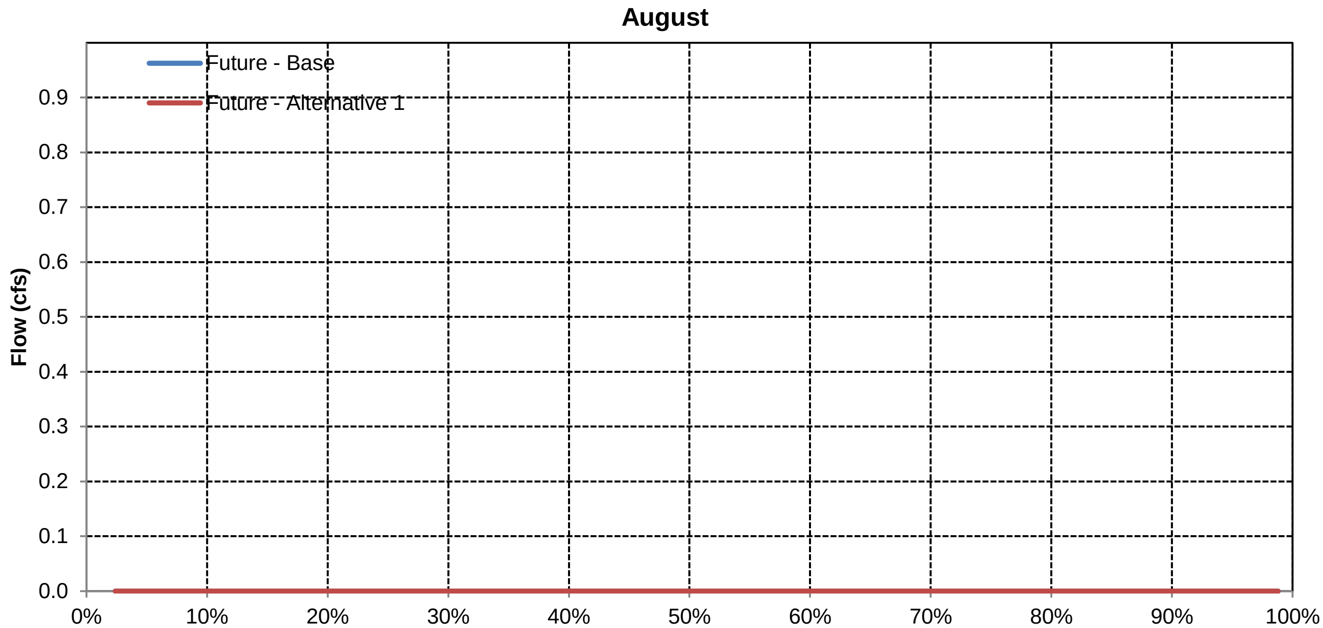


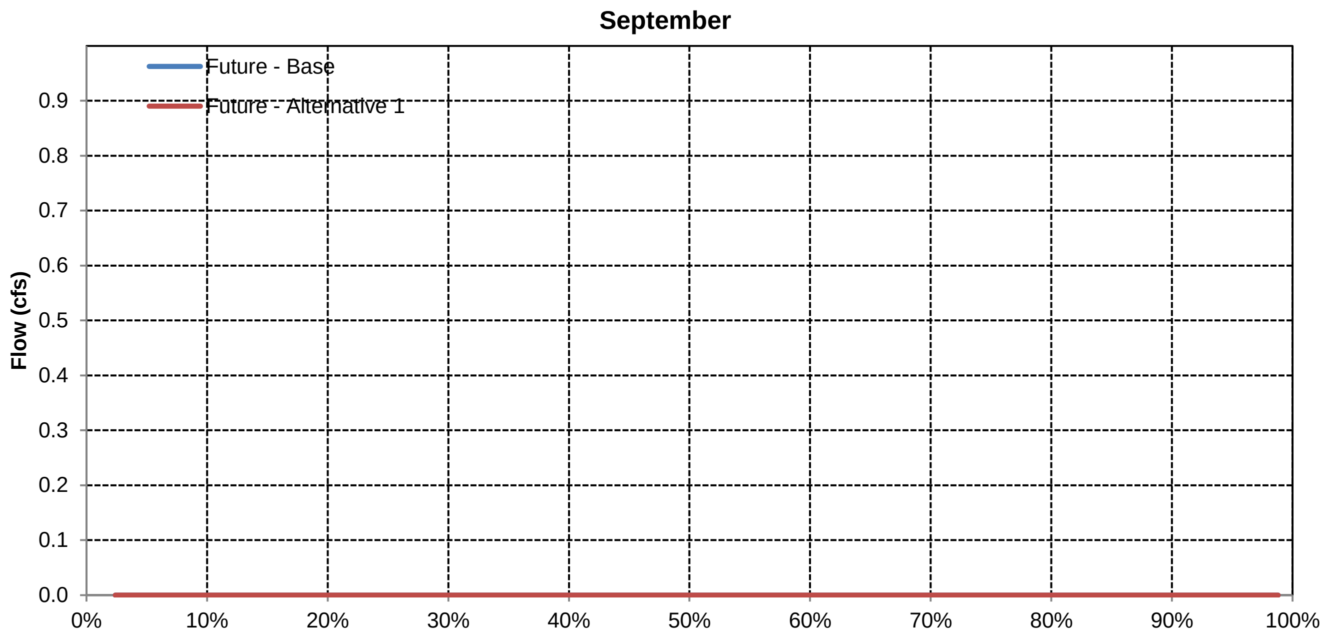
Fremont Weir Spill to Yolo Bypass





Fremont Weir Spill to Yolo Bypass





Long-Term and Water Year-Type Average of Sacramento River below Fremont Weir Under Future - Base and Future - Alternative 1

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Future - Base	9,206	10,728	19,728	30,030	35,978	31,028	17,571	10,459	13,675	15,358	11,273	13,824	13,150
Future - Alternative 1	9,244	10,582	19,188	29,119	34,956	30,555	17,573	10,455	13,669	15,378	11,273	13,822	12,968
Difference	38	-145	-540	-911	-1,023	-473	2	-5	-6	20	0	-1	-181
Percent Difference	0%	-1%	-3%	-3%	-3%	-2%	0%	0%	0%	0%	0%	0%	-1%
							Water Year-Types						
Wet													
Future - Base	10,316	14,168	33,582	49,490	54,700	46,345	27,848	12,029	14,178	18,965	12,787	23,425	19,081
Future - Alternative 1	10,325	13,785	32,381	48,129	53,444	45,845	27,849	12,025	14,178	18,964	12,761	23,424	18,798
Difference	9	-382	-1,200	-1,361	-1,257	-500	1	-3	0	-1	-26	-2	-283
Percent Difference	0%	-3%	-4%	-3%	-2%	-1%	0%	0%	0%	0%	0%	0%	-1%
Above Normal													
Future - Base	10,180	10,600	18,133	38,066	50,270	39,380	16,639	11,646	16,362	17,891	12,383	16,466	15,480
Future - Alternative 1	10,391	10,520	17,560	36,661	49,080	38,620	16,642	11,646	16,366	17,887	12,379	16,467	15,253
Difference	211	-80	-573	-1,405	-1,190	-759	2	0	4	-4	-4	1	-227
Percent Difference	2%	-1%	-3%	-4%	-2%	-2%	0%	0%	0%	0%	0%	0%	-1%
Below Normal													
Future - Base	9,254	9,797	13,924	23,209	25,545	24,426	14,615	10,760	14,962	15,443	10,464	8,153	10,869
Future - Alternative 1	9,253	9,773	13,689	22,198	24,473	23,834	14,615	10,738	14,973	15,449	10,461	8,153	10,694
Difference	-1	-24	-235	-1,011	-1,072	-593	0	-21	10	7	-3	0	-175
Percent Difference	0%	0%	-2%	-4%	-4%	-2%	0%	0%	0%	0%	0%	0%	-2%
Dry													
Future - Base	8,186	9,309	12,579	14,935	22,880	21,608	11,530	9,425	13,173	12,523	10,169	7,654	9,257
Future - Alternative 1	8,206	9,274	12,473	14,556	22,010	21,175	11,525	9,422	13,183	12,526	10,166	7,652	9,151
Difference	20	-35	-106	-379	-870	-434	-5	-3	10	3	-3	-1	-106
Percent Difference	0%	0%	-1%	-3%	-4%	-2%	0%	0%	0%	0%	0%	0%	-1%
Critical													
Future - Base	7,552	6,764	9,375	13,050	15,447	13,038	9,429	7,372	9,565	9,855	9,692	7,025	7,121
Future - Alternative 1	7,569	6,757	9,244	12,790	14,883	12,952	9,444	7,373	9,490	9,988	9,760	7,022	7,069
Difference	17	-8	-131	-260	-564	-86	15	1	-75	133	68	-3	-52
Percent Difference	0%	0%	-1%	-2%	-4%	-1%	0%	0%	-1%	1%	1%	0%	-1%

Sacramento River below Fremont Weir

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	11,897	16,169	45,741	61,582	63,120	58,501	40,381	14,264	19,317	20,306	15,937	23,746
20%	10,789	13,042	30,986	52,000	59,936	50,976	24,134	12,203	18,036	19,458	13,060	23,231
30%	9,787	11,409	19,616	42,207	50,229	42,750	16,494	11,100	17,030	17,789	11,135	21,443
40%	9,396	10,373	16,258	31,518	42,508	33,844	14,502	10,319	14,771	17,206	10,721	14,835
50%	9,004	9,580	14,683	22,826	32,845	25,125	12,720	9,227	12,760	16,197	10,366	9,351
60%	8,421	8,564	12,034	17,536	23,964	20,148	10,605	8,847	11,697	14,641	10,117	8,213
70%	7,953	7,746	10,580	14,086	19,326	17,034	9,863	8,329	10,907	12,994	9,872	7,627
80%	6,644	6,697	8,469	11,527	15,457	13,796	9,349	7,855	9,488	11,435	9,571	7,237
90%	6,027	5,916	7,135	10,183	12,838	10,799	8,626	7,207	8,168	9,224	9,229	6,510
Long Term												
Full Simulation Period	9,206	10,728	19,728	30,030	35,978	31,028	17,571	10,459	13,675	15,358	11,273	13,824
Water Year Types												
Wet	10,316	14,168	33,582	49,490	54,700	46,345	27,848	12,029	14,178	18,965	12,787	23,425
Above Normal	10,180	10,600	18,133	38,066	50,270	39,380	16,639	11,646	16,362	17,891	12,383	16,466
Below Normal	9,254	9,797	13,924	23,209	25,545	24,426	14,615	10,760	14,962	15,443	10,464	8,153
Dry	8,186	9,309	12,579	14,935	22,880	21,608	11,530	9,425	13,173	12,523	10,169	7,654
Critical	7,552	6,764	9,375	13,050	15,447	13,038	9,429	7,372	9,565	9,855	9,692	7,025

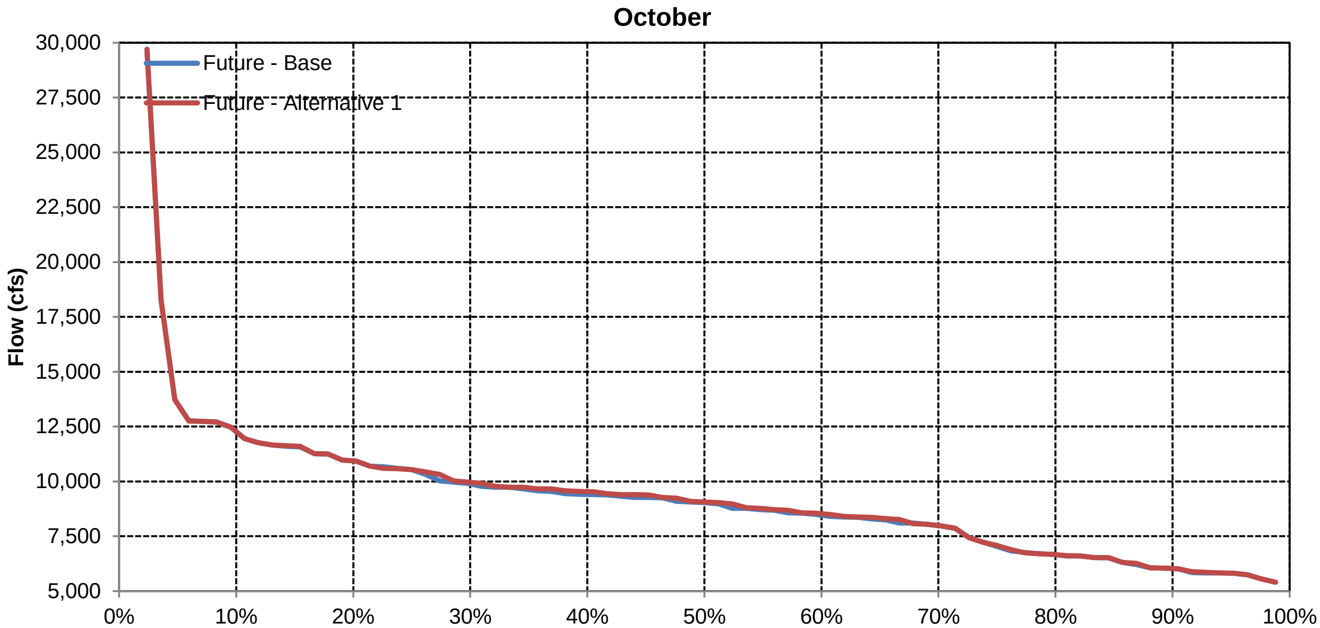
Future - Alternative 1

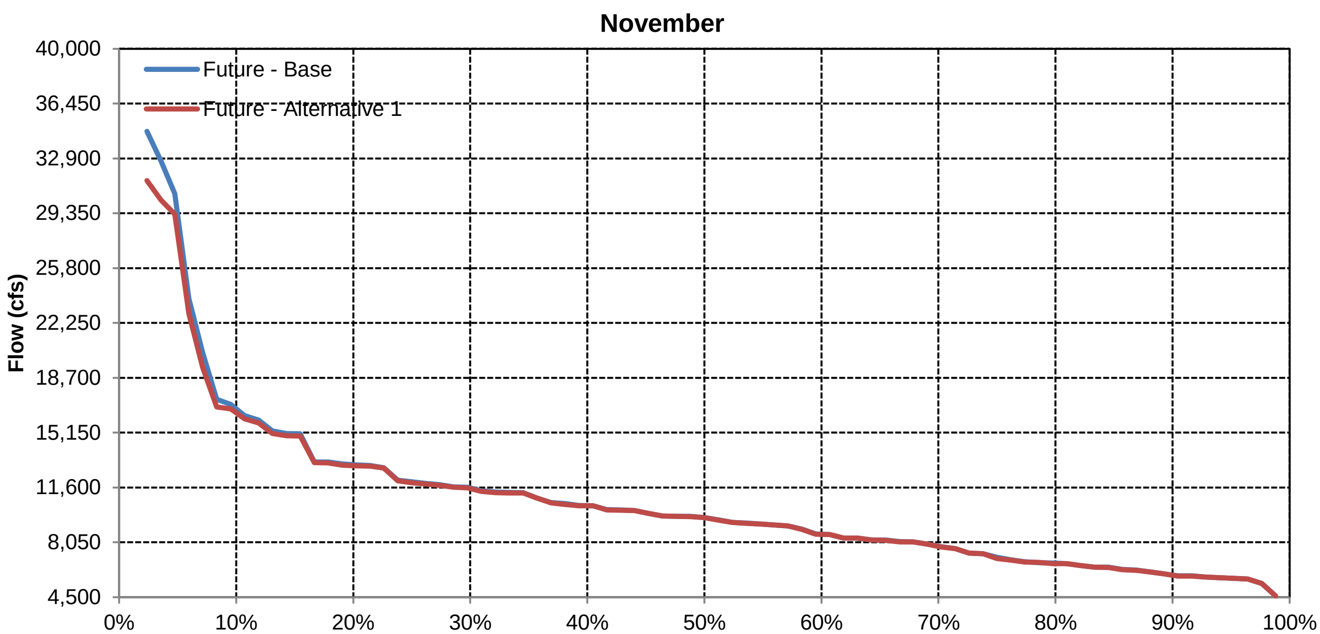
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	11,897	15,966	43,002	61,231	63,132	58,359	40,381	14,264	19,319	20,310	15,938	23,749
20%	10,789	12,988	29,145	49,775	59,214	50,486	24,150	12,203	18,043	19,460	13,054	23,234
30%	9,909	11,377	19,209	39,294	47,202	41,611	16,491	11,077	17,029	17,844	11,138	21,442
40%	9,519	10,361	16,040	29,198	40,823	31,653	14,502	10,320	14,942	17,364	10,722	14,834
50%	9,045	9,569	14,491	21,677	30,212	24,825	12,720	9,212	12,759	16,199	10,358	9,340
60%	8,510	8,553	11,991	17,086	22,821	19,922	10,605	8,847	11,599	14,709	10,121	8,203
70%	7,953	7,736	10,687	14,030	18,945	16,862	9,863	8,328	10,907	12,997	9,881	7,627
80%	6,652	6,671	8,352	11,512	15,329	13,734	9,359	7,855	9,491	11,437	9,571	7,234
90%	6,027	5,909	7,128	10,164	12,813	10,787	8,652	7,207	8,338	9,226	9,229	6,510
Long Term												
Full Simulation Period	9,244	10,582	19,188	29,119	34,956	30,555	17,573	10,455	13,669	15,378	11,273	13,822
Water Year Types												
Wet	10,325	13,785	32,381	48,129	53,444	45,845	27,849	12,025	14,178	18,964	12,761	23,424
Above Normal	10,391	10,520	17,560	36,661	49,080	38,620	16,642	11,646	16,366	17,887	12,379	16,467
Below Normal	9,253	9,773	13,689	22,198	24,473	23,834	14,615	10,738	14,973	15,449	10,461	8,153
Dry	8,206	9,274	12,473	14,556	22,010	21,175	11,525	9,422	13,183	12,526	10,166	7,652
Critical	7,569	6,757	9,244	12,790	14,883	12,952	9,444	7,373	9,490	9,988	9,760	7,022

Future - Alternative 1 Minus Future - Base

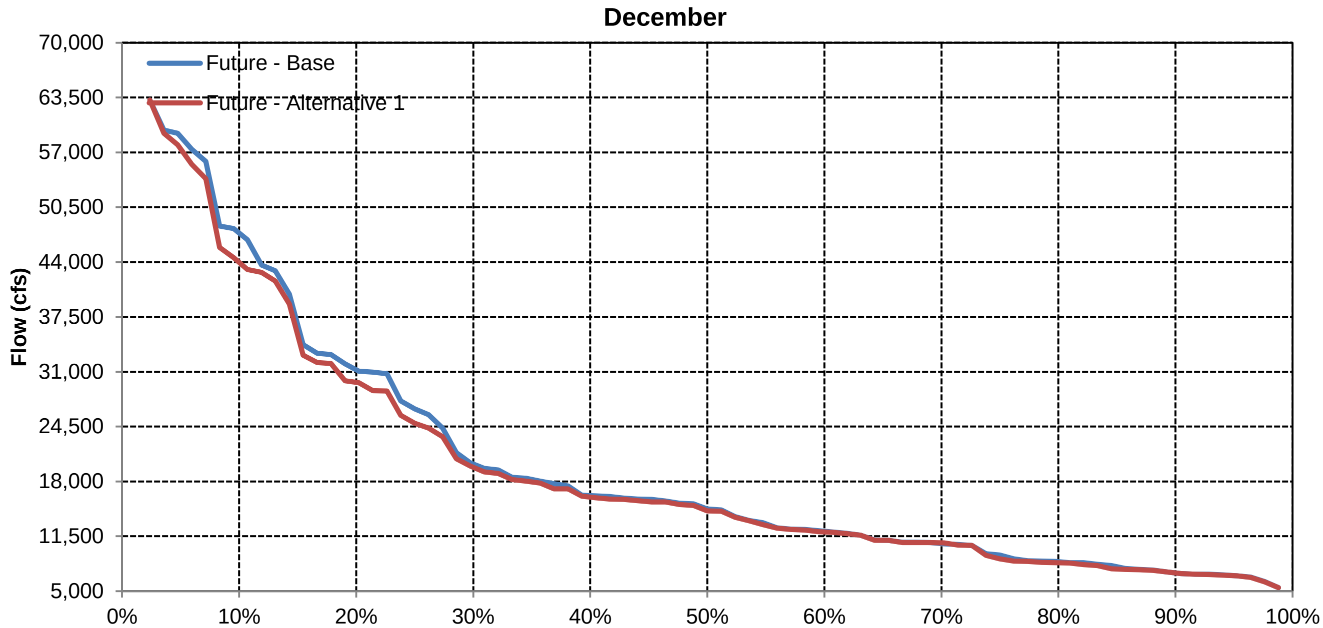
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	-204	-2,739	-350	12	-142	0	0	2	3	1	3
20%	0	-54	-1,842	-2,225	-722	-490	16	0	7	2	-6	4
30%	122	-32	-407	-2,913	-3,027	-1,139	-3	-24	0	55	3	-2
40%	123	-12	-218	-2,321	-1,685	-2,190	-1	1	172	159	0	-1
50%	41	-11	-193	-1,149	-2,633	-300	0	-15	-1	1	-8	-11
60%	89	-11	-44	-449	-1,143	-226	1	0	-98	68	3	-10
70%	1	-9	107	-56	-381	-171	0	0	0	3	9	0
80%	8	-26	-117	-15	-128	-62	9	0	3	2	0	-3
90%	0	-7	-7	-19	-26	-13	25	0	170	2	1	0
Long Term												
Full Simulation Period	38	-145	-540	-911	-1,023	-473	2	-5	-6	20	0	-1
Water Year Types												
Wet	9	-382	-1,200	-1,361	-1,257	-500	1	-3	0	-1	-26	-2
Above Normal	211	-80	-573	-1,405	-1,190	-759	2	0	4	-4	-4	1
Below Normal	-1	-24	-235	-1,011	-1,072	-593	0	-21	10	7	-3	0
Dry	20	-35	-106	-379	-870	-434	-5	-3	10	3	-3	-1
Critical	17	-8	-131	-260	-564	-86	15	1	-75	133	68	-3

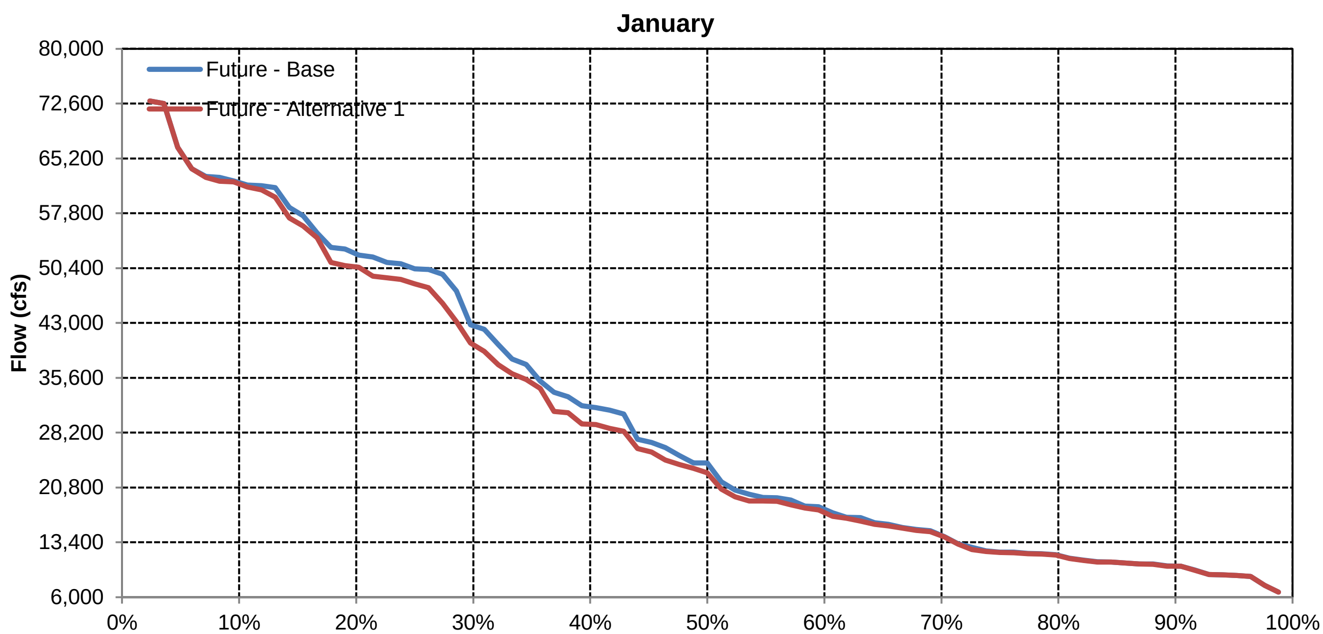
Sacramento River below Fremont Weir



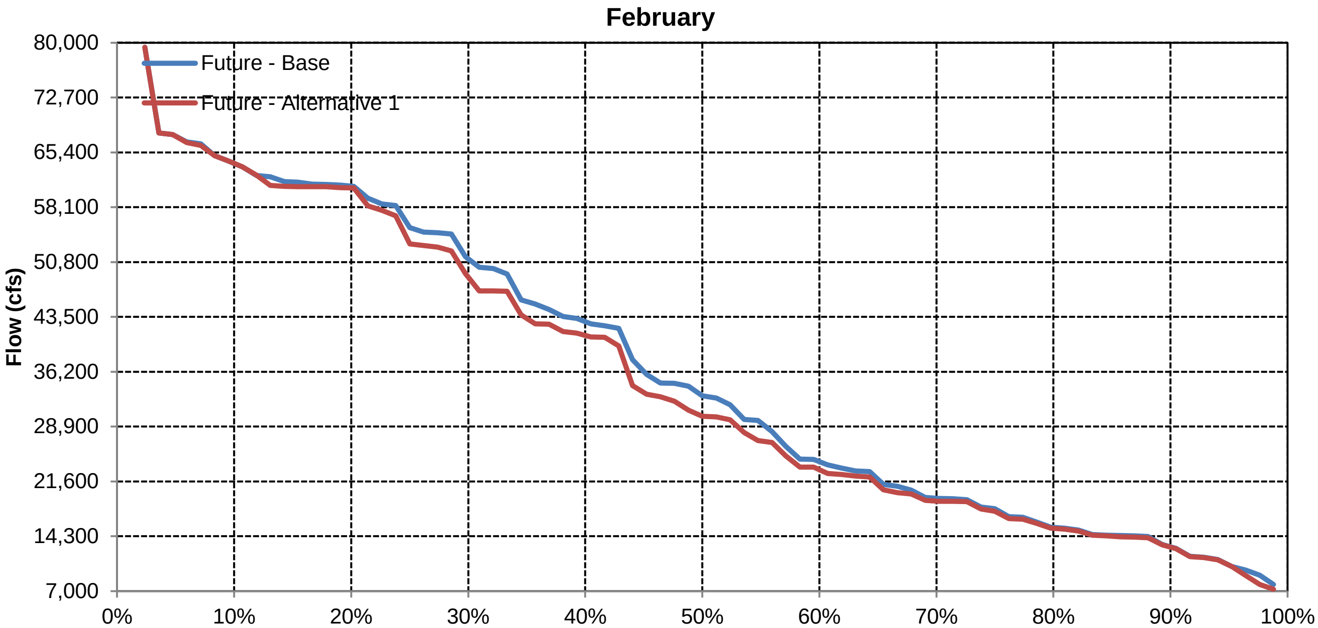


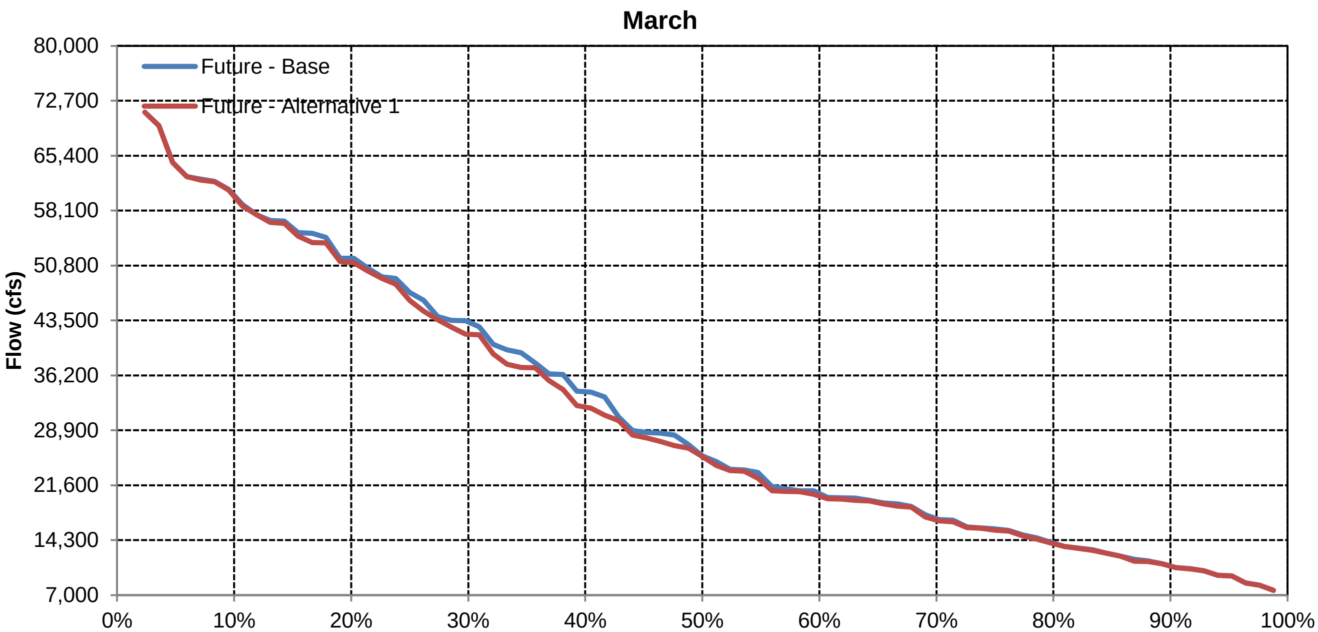
Sacramento River below Fremont Weir



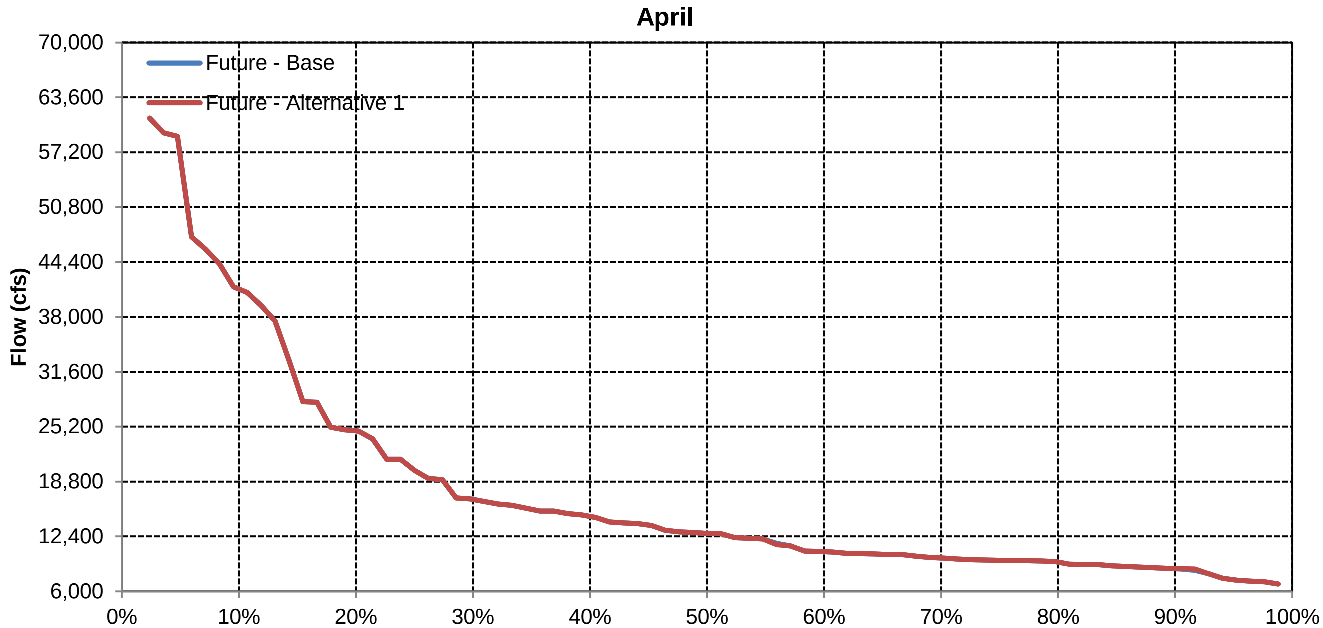


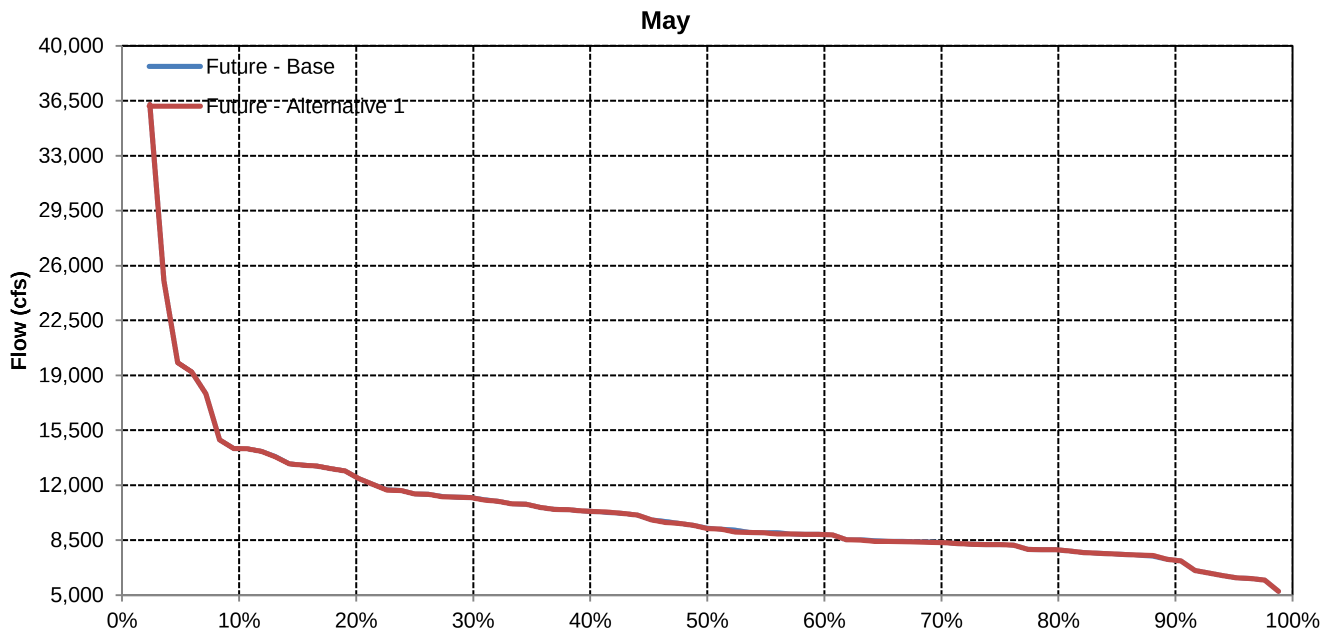
Sacramento River below Fremont Weir



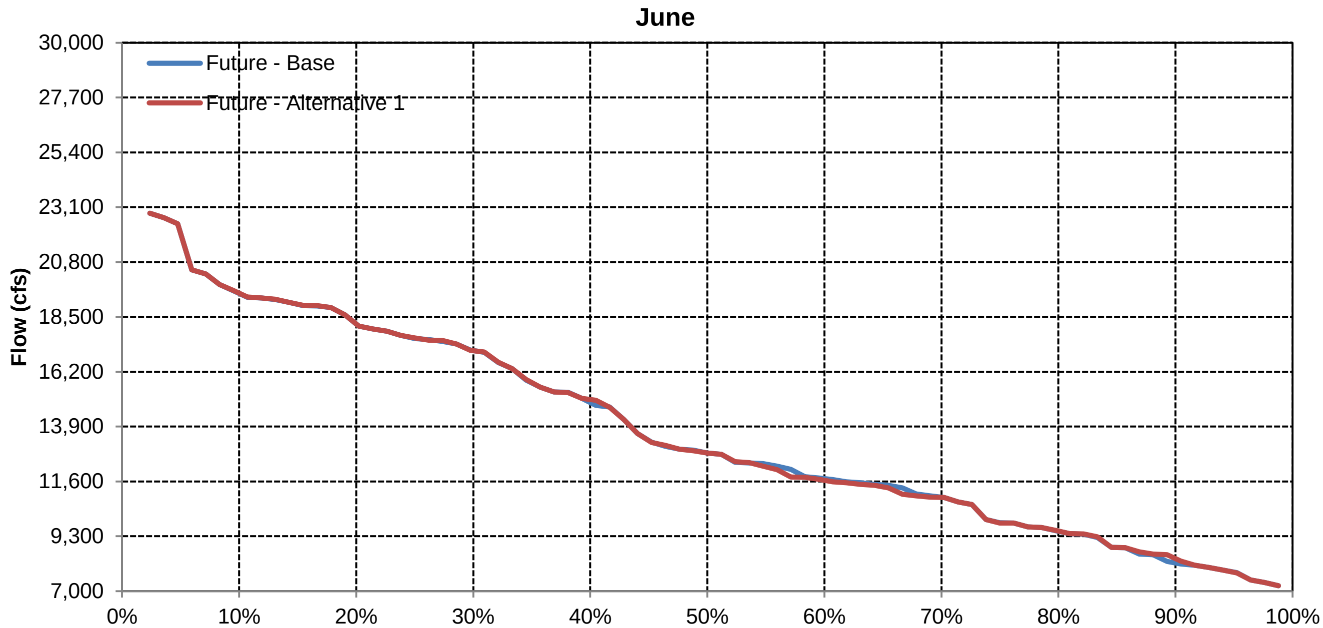


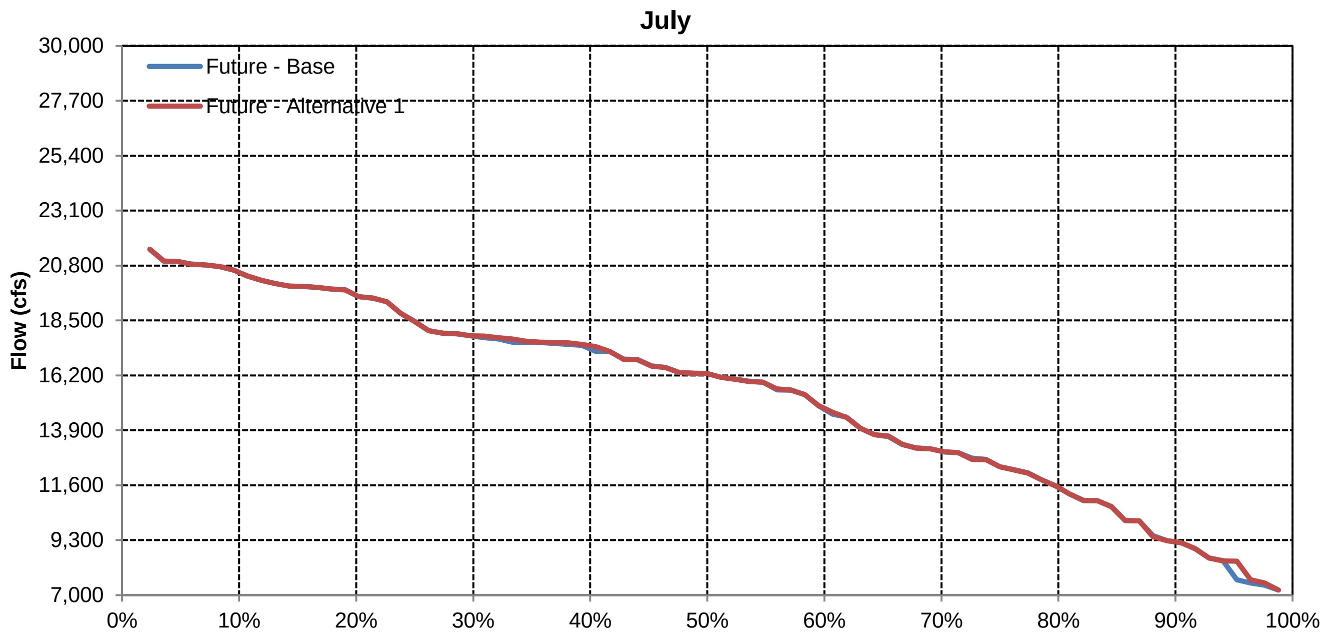
Sacramento River below Fremont Weir



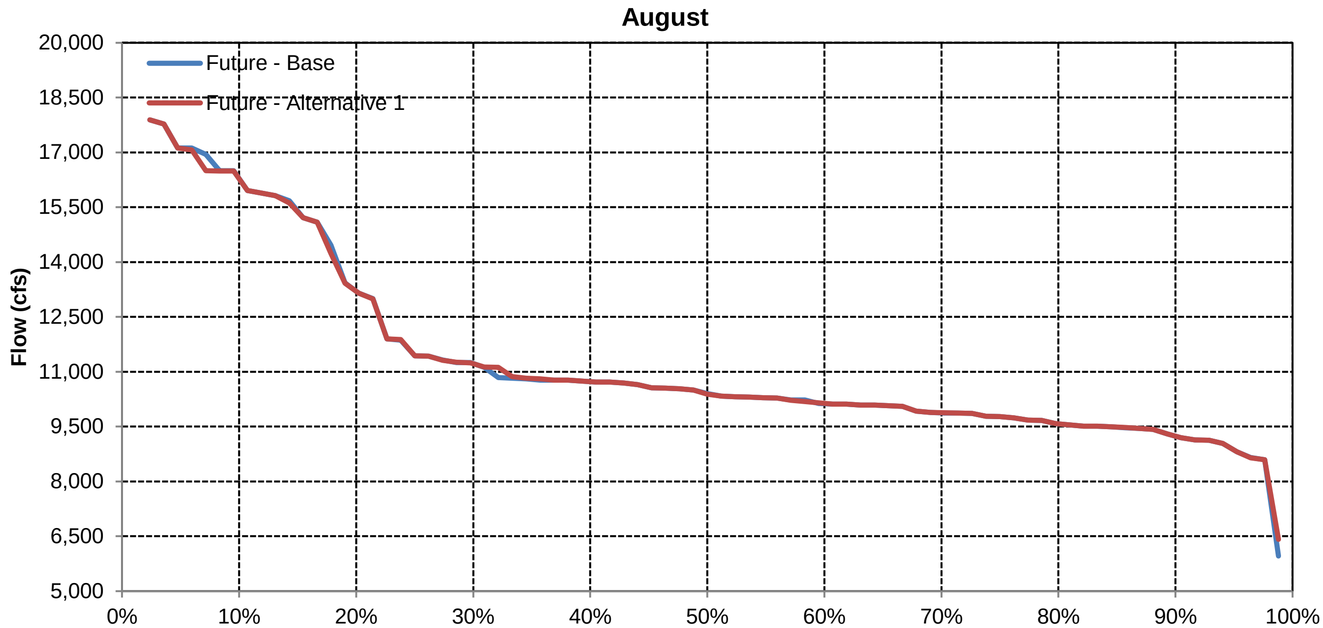


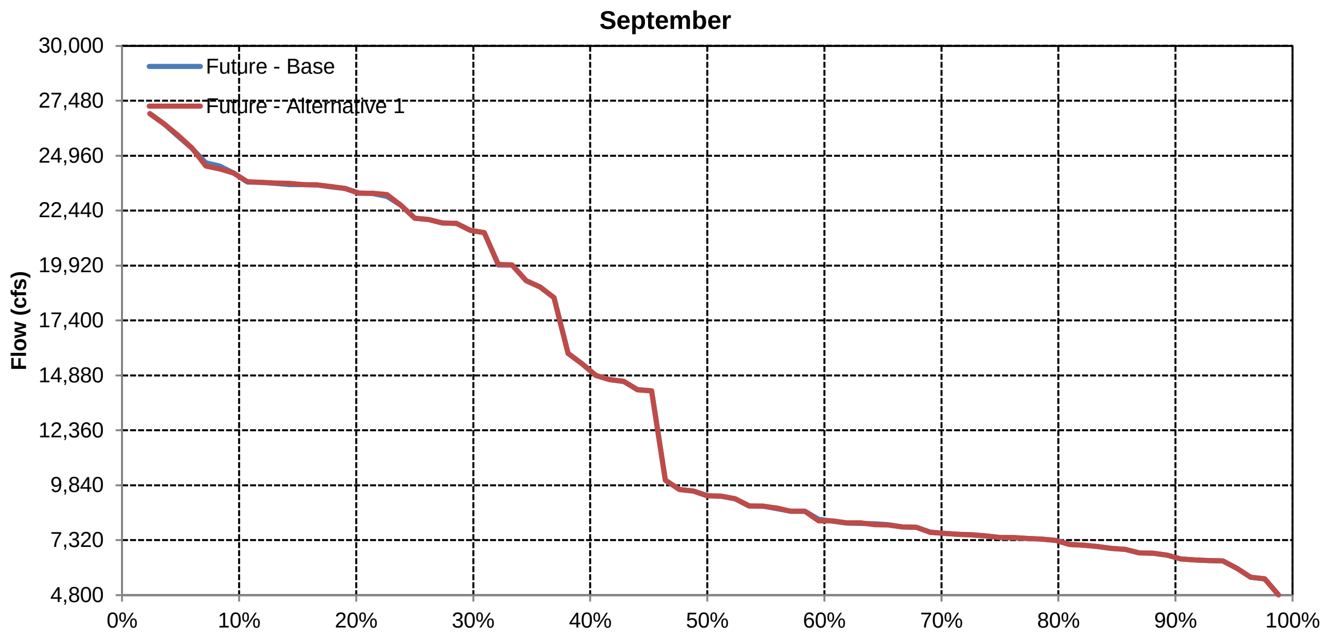
Sacramento River below Fremont Weir





Sacramento River below Fremont Weir





Long-Term and Water Year-Type Average of Trinity Reservoir Under Future - Base and Future - Alternative 1

	Average Storage (TAF)											
Analysis Period	October	November	December	January	February	March	April	May	June	July	August	September
Long-Term												
Full Simulation Period												
Future - Base	1,111	1,121	1,232	1,403	1,575	1,712	1,826	1,701	1,582	1,421	1,271	1,160
Future - Alternative 1	1,111	1,120	1,232	1,403	1,575	1,712	1,826	1,701	1,582	1,421	1,271	1,160
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Water Year-Types												
Wet												
Future - Base	1,184	1,226	1,437	1,697	1,906	2,037	2,189	2,064	1,903	1,750	1,604	1,455
Future - Alternative 1	1,184	1,225	1,437	1,696	1,906	2,037	2,189	2,064	1,903	1,750	1,604	1,455
Difference	-1	-1	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal												
Future - Base	1,184	1,161	1,273	1,559	1,813	1,988	2,142	1,982	1,871	1,704	1,558	1,426
Future - Alternative 1	1,184	1,161	1,273	1,559	1,813	1,988	2,141	1,981	1,870	1,703	1,557	1,426
Difference	0	0	0	0	0	0	-1	-1	-1	-1	-1	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Future - Base	1,148	1,147	1,220	1,391	1,539	1,694	1,829	1,709	1,610	1,441	1,284	1,186
Future - Alternative 1	1,147	1,147	1,219	1,390	1,538	1,694	1,828	1,709	1,609	1,441	1,283	1,185
Difference	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry												
Future - Base	1,094	1,097	1,151	1,222	1,376	1,529	1,615	1,477	1,361	1,178	1,006	915
Future - Alternative 1	1,094	1,097	1,151	1,222	1,376	1,529	1,614	1,476	1,361	1,177	1,005	915
Difference	0	0	0	0	0	-1	-1	-1	-1	-1	-1	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical												
Future - Base	875	866	898	942	1,012	1,077	1,102	1,022	960	834	714	656
Future - Alternative 1	875	866	898	942	1,012	1,078	1,102	1,025	965	838	714	656
Difference	0	0	0	0	0	1	1	3	4	3	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Trinity Reservoir

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	1,479	1,484	1,672	1,900	2,000	2,100	2,298	2,170	1,995	1,863	1,717	1,564
20%	1,385	1,408	1,506	1,818	2,000	2,100	2,233	2,088	1,943	1,791	1,642	1,492
30%	1,303	1,305	1,445	1,638	1,926	2,068	2,167	2,006	1,865	1,697	1,520	1,382
40%	1,248	1,223	1,368	1,593	1,752	1,981	2,113	1,903	1,752	1,562	1,407	1,270
50%	1,152	1,181	1,273	1,421	1,599	1,771	1,933	1,771	1,616	1,443	1,289	1,178
60%	1,079	1,102	1,198	1,304	1,496	1,662	1,745	1,636	1,564	1,378	1,236	1,106
70%	968	957	1,102	1,205	1,371	1,486	1,591	1,531	1,412	1,229	1,083	1,000
80%	775	791	913	1,023	1,256	1,390	1,496	1,376	1,279	1,090	931	846
90%	627	632	678	825	933	1,013	1,056	1,036	957	837	680	625
Long Term												
Full Simulation Period	1,111	1,121	1,232	1,403	1,575	1,712	1,826	1,701	1,582	1,421	1,271	1,160
Water Year Types												
Wet	1,184	1,226	1,437	1,697	1,906	2,037	2,189	2,064	1,903	1,750	1,604	1,455
Above Normal	1,184	1,161	1,273	1,559	1,813	1,988	2,142	1,982	1,871	1,704	1,558	1,426
Below Normal	1,148	1,147	1,220	1,391	1,539	1,694	1,829	1,709	1,610	1,441	1,284	1,186
Dry	1,094	1,097	1,151	1,222	1,376	1,529	1,615	1,477	1,361	1,178	1,006	915
Critical	875	866	898	942	1,012	1,077	1,102	1,022	960	834	714	656

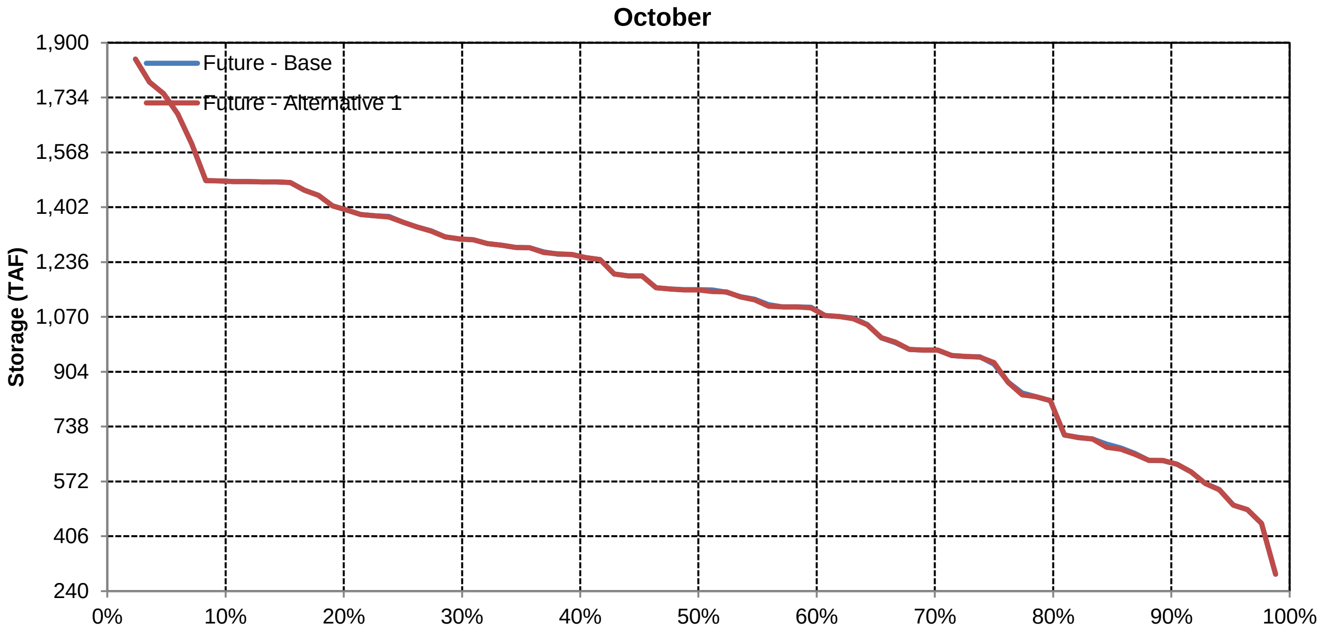
Future - Alternative 1

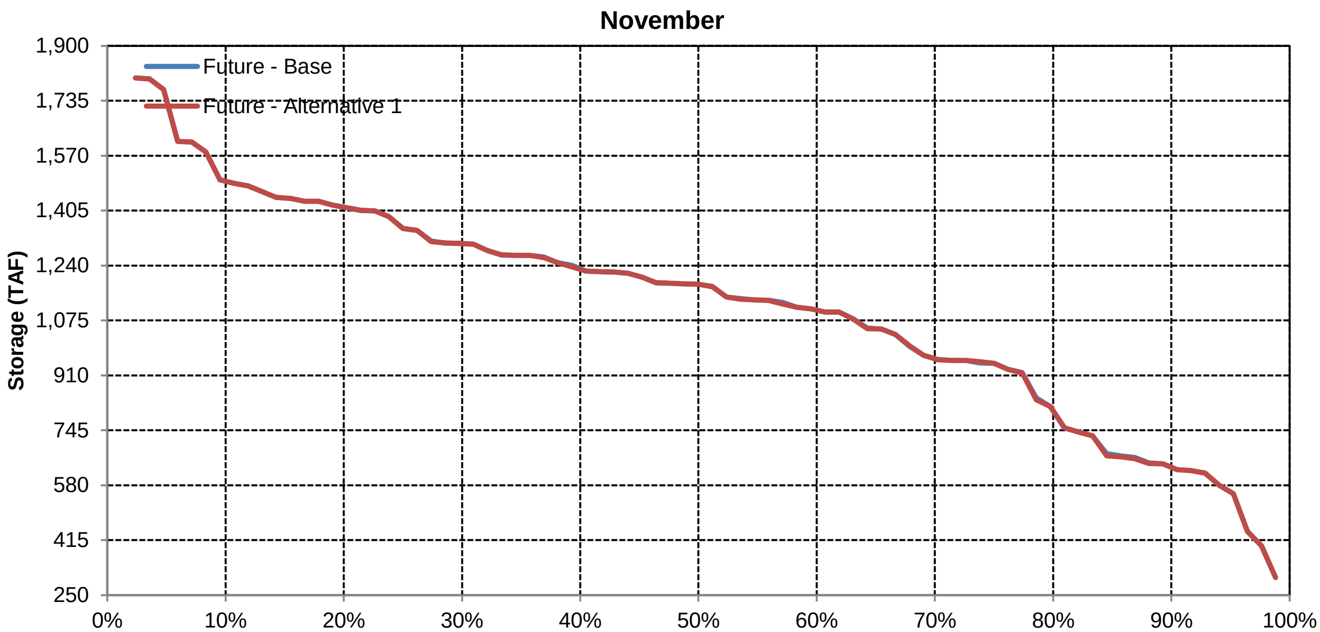
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	1,480	1,484	1,672	1,900	2,000	2,100	2,298	2,170	1,995	1,863	1,717	1,564
20%	1,385	1,409	1,506	1,817	2,000	2,100	2,233	2,088	1,944	1,791	1,642	1,492
30%	1,303	1,305	1,440	1,638	1,926	2,068	2,167	2,006	1,866	1,697	1,520	1,382
40%	1,248	1,223	1,368	1,594	1,752	1,981	2,113	1,903	1,752	1,562	1,407	1,270
50%	1,149	1,180	1,273	1,421	1,599	1,770	1,933	1,771	1,615	1,443	1,289	1,178
60%	1,079	1,102	1,197	1,304	1,494	1,661	1,746	1,636	1,564	1,375	1,233	1,107
70%	968	957	1,101	1,204	1,370	1,491	1,591	1,531	1,412	1,230	1,083	1,000
80%	775	791	910	1,021	1,252	1,390	1,498	1,375	1,279	1,090	929	846
90%	627	632	679	825	934	1,013	1,057	1,038	958	837	680	625
Long Term												
Full Simulation Period	1,111	1,120	1,232	1,403	1,575	1,712	1,826	1,701	1,582	1,421	1,271	1,160
Water Year Types												
Wet	1,184	1,225	1,437	1,696	1,906	2,037	2,189	2,064	1,903	1,750	1,604	1,455
Above Normal	1,184	1,161	1,273	1,559	1,813	1,988	2,141	1,981	1,870	1,703	1,557	1,426
Below Normal	1,147	1,147	1,219	1,390	1,538	1,694	1,828	1,709	1,609	1,441	1,283	1,185
Dry	1,094	1,097	1,151	1,222	1,376	1,529	1,614	1,476	1,361	1,177	1,005	915
Critical	875	866	898	942	1,012	1,078	1,102	1,025	965	838	714	656

Future - Alternative 1 Minus Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	1	0	0	0
30%	0	0	-5	0	0	0	0	0	0	0	0	0
40%	0	0	0	1	0	0	0	0	0	0	0	0
50%	-3	0	0	0	0	-1	0	0	0	0	0	0
60%	0	0	-1	0	-2	-1	1	-1	0	-3	-2	0
70%	0	0	0	-1	-1	5	0	0	0	1	0	0
80%	0	0	-2	-2	-3	0	2	0	0	0	-2	1
90%	0	0	1	0	1	0	1	1	1	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types												
Wet	-1	-1	0	0	0	0	0	0	0	0	0	0
Above Normal	0	0	0	0	0	0	-1	-1	-1	-1	-1	0
Below Normal	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
Dry	0	0	0	0	0	-1	-1	-1	-1	-1	-1	0
Critical	0	0	0	0	0	1	1	3	4	3	0	0

Trinity Reservoir





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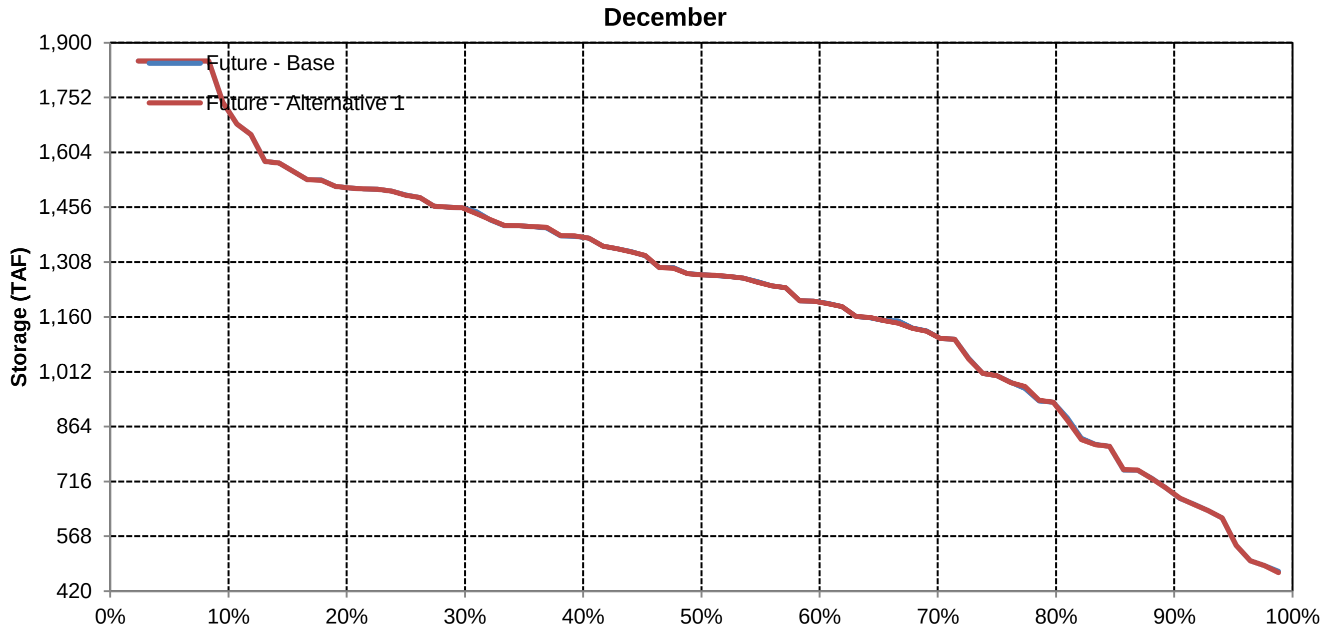

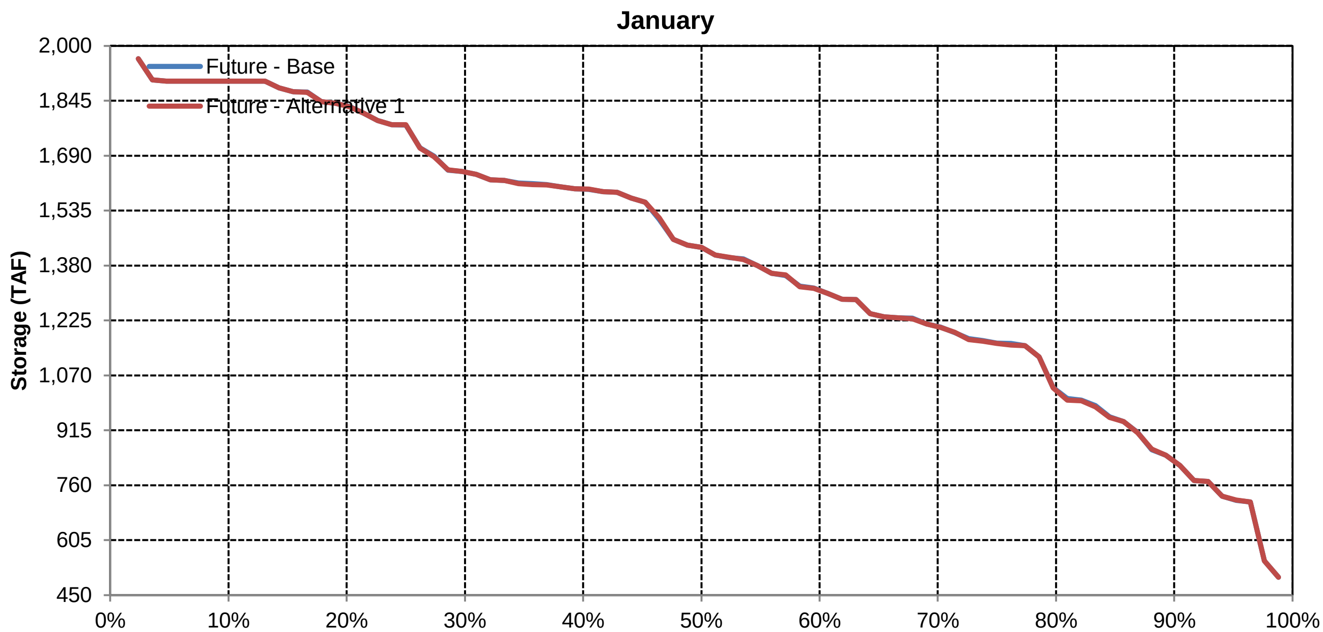

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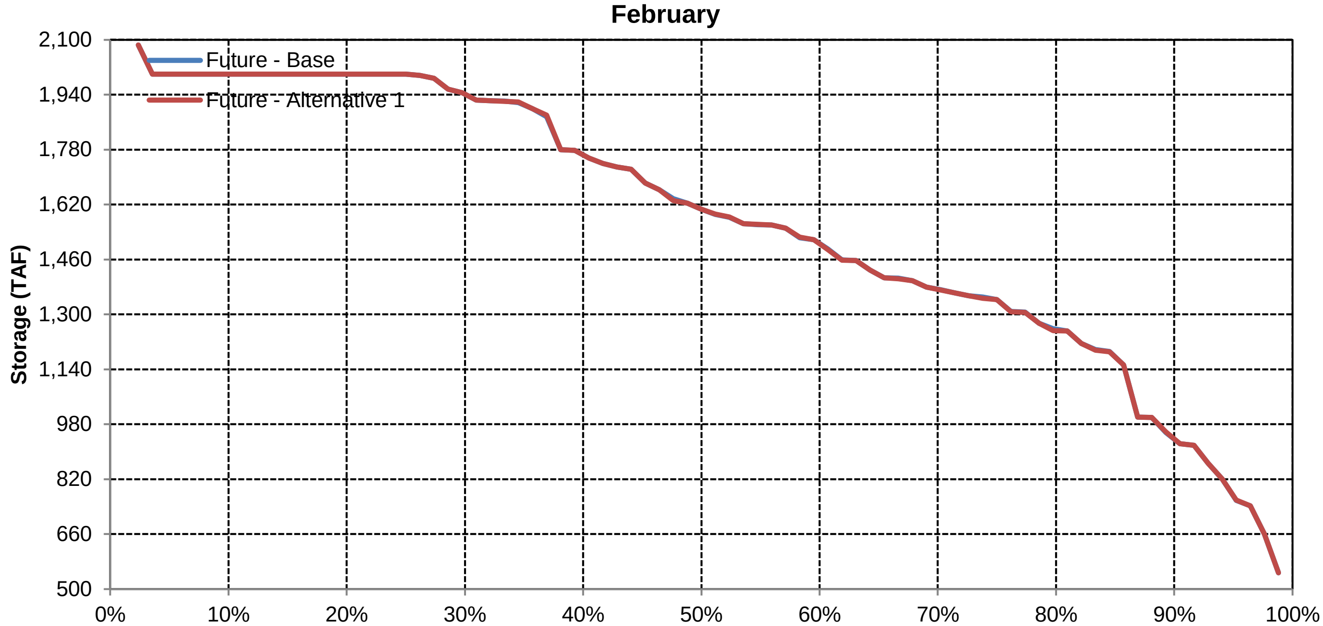
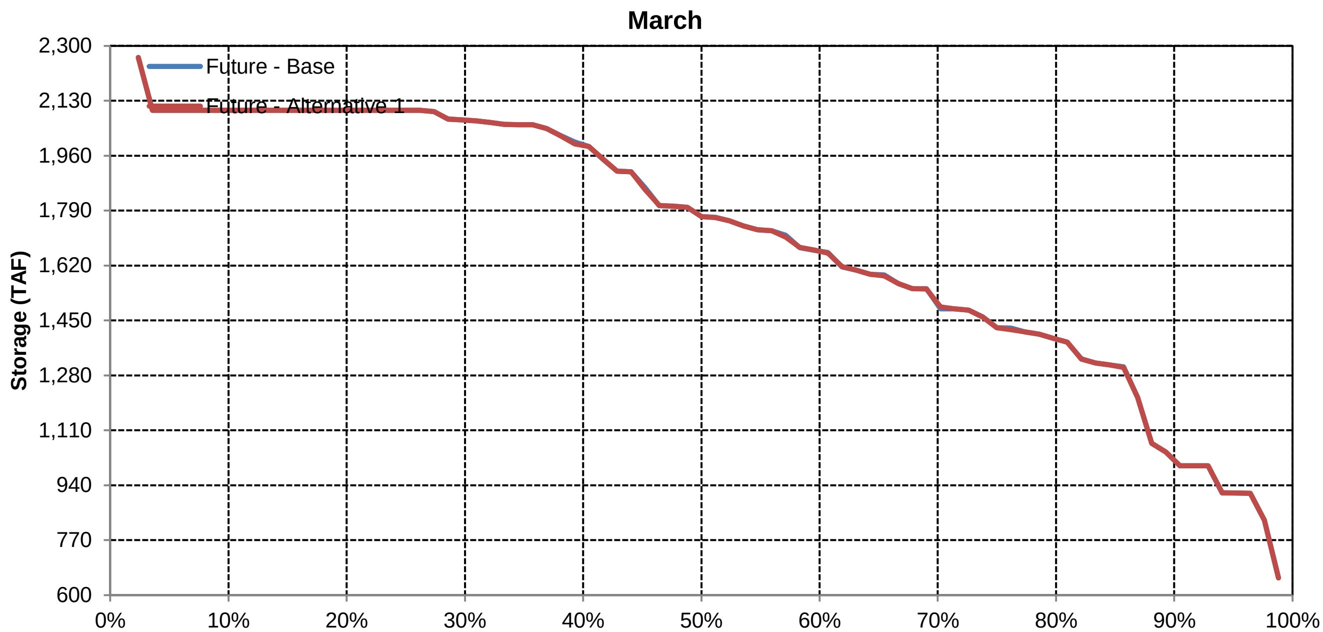
Trinity Reservoir





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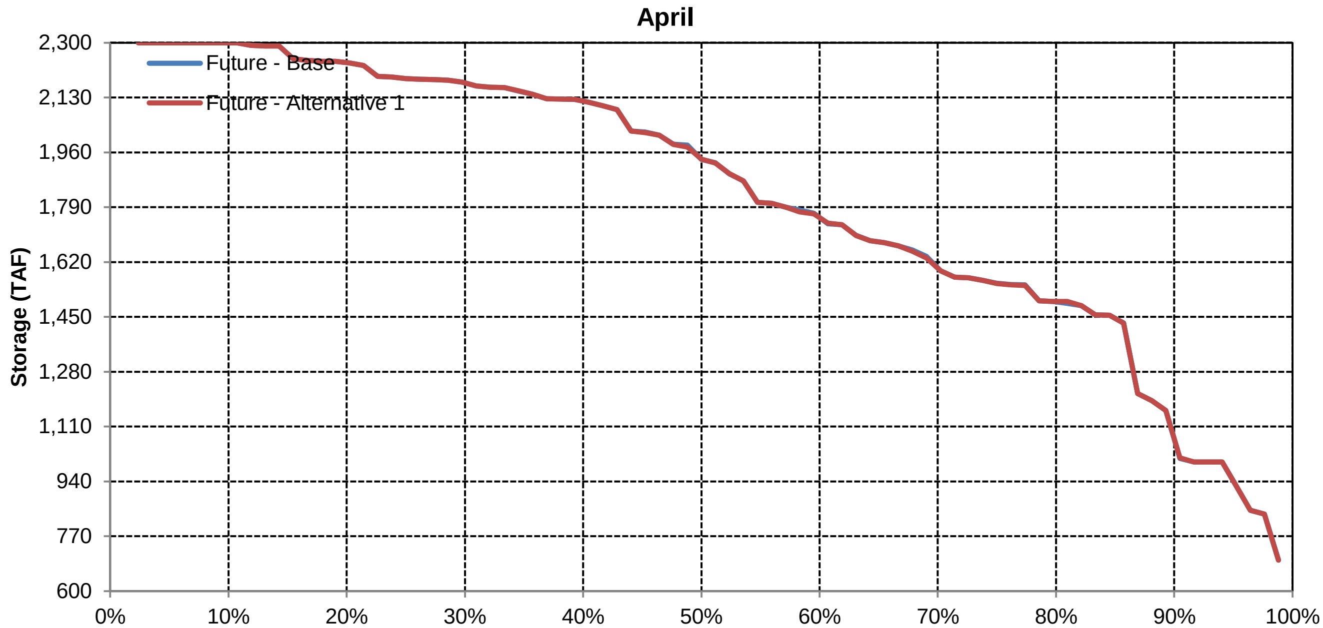

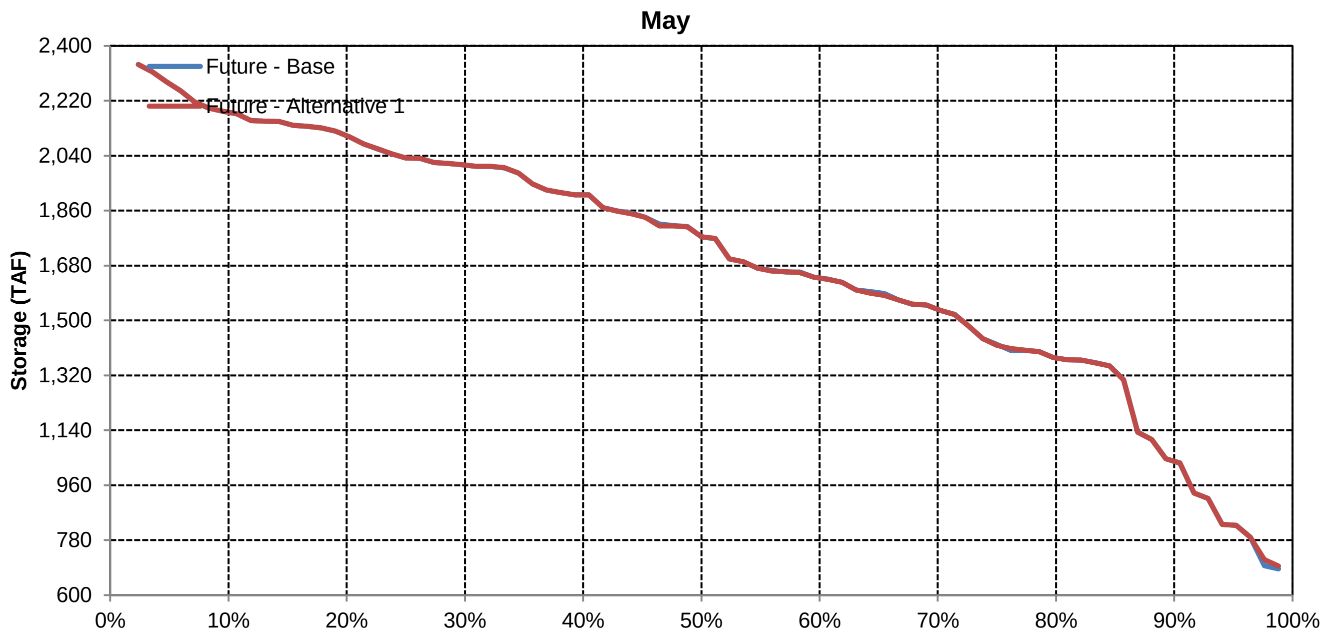

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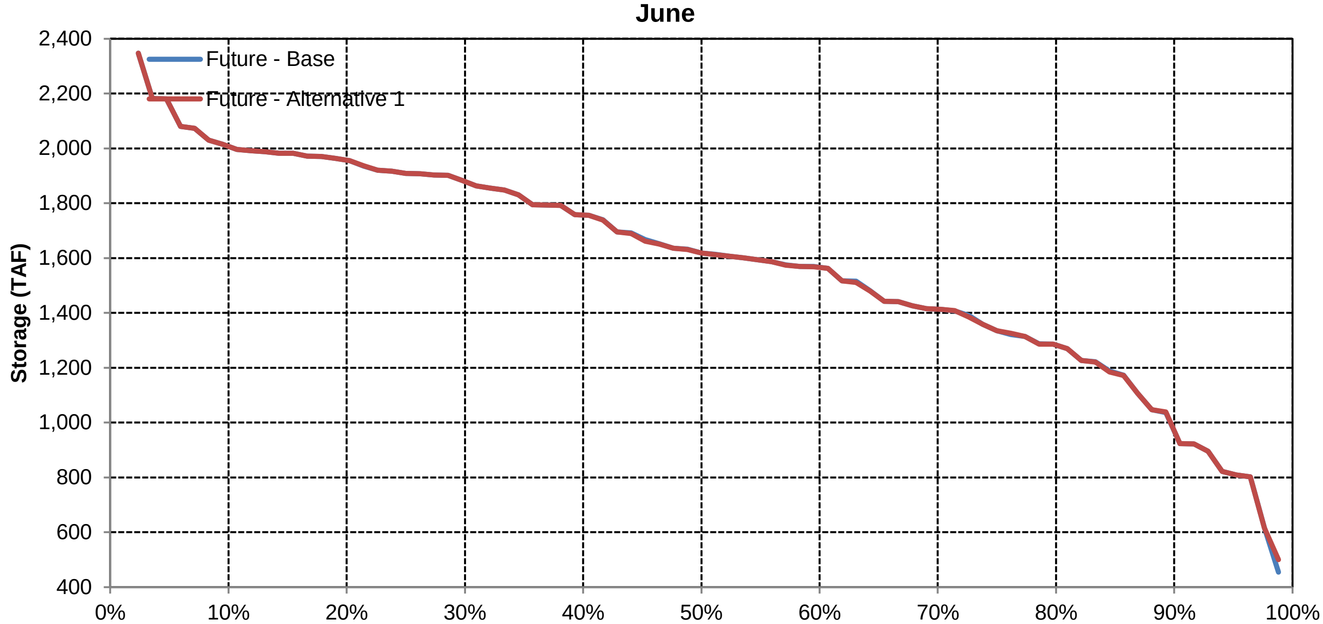

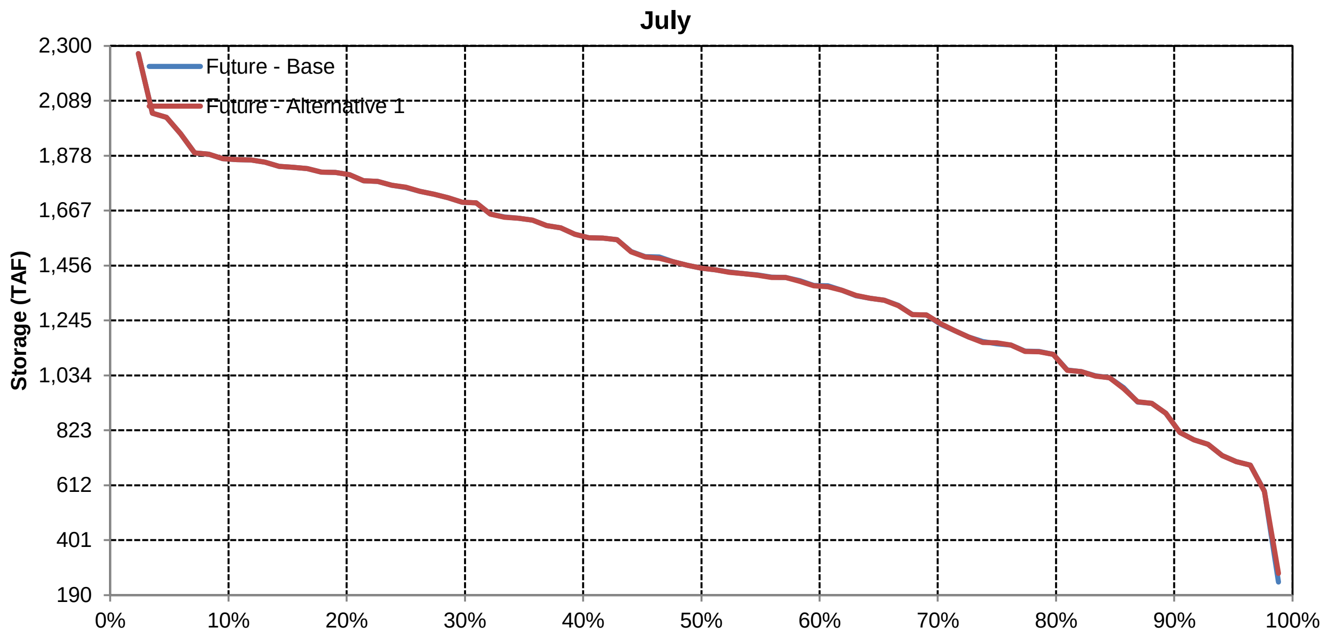

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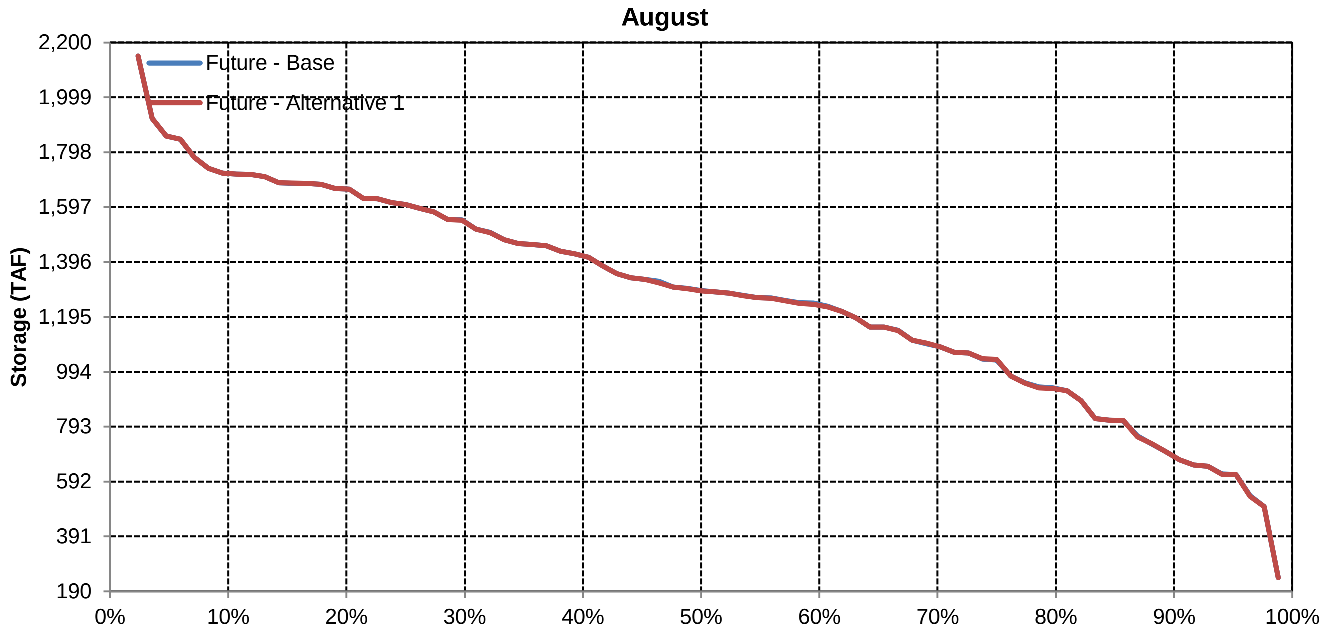
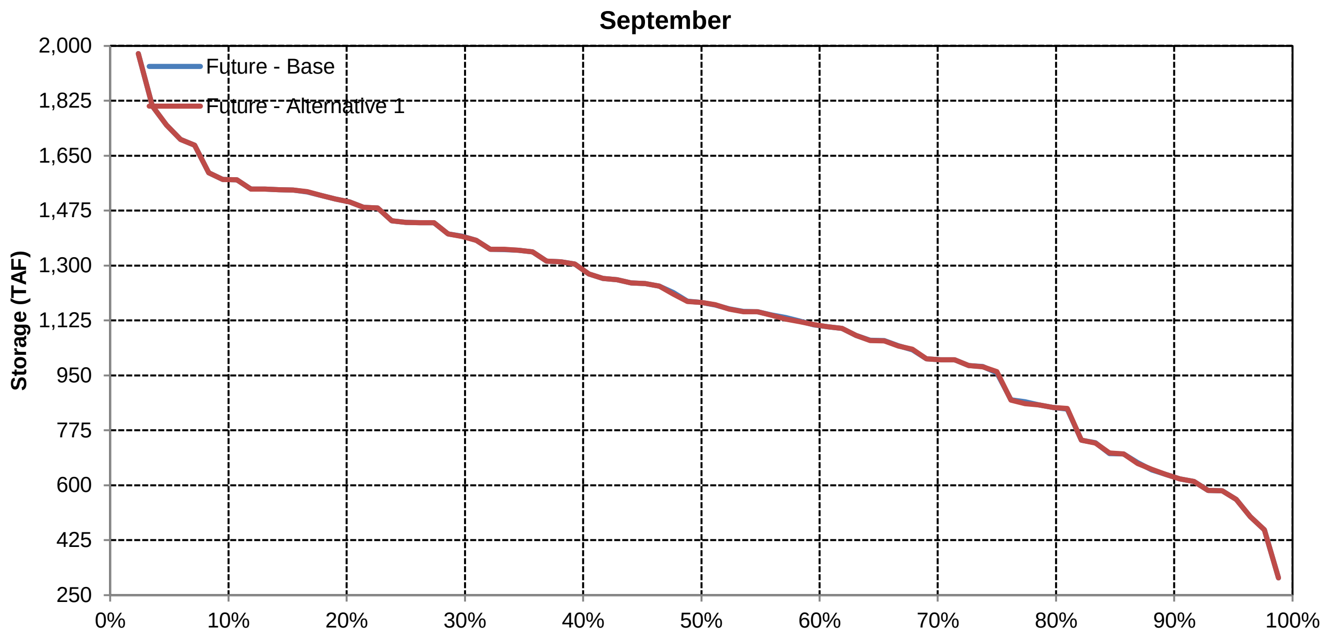
Trinity Reservoir





Long-Term and Water Year-Type Average of Shasta Reservoir Storage Under Future - Base and Future - Alternative 1

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
						Long-Term						
Full Simulation Period												
Future - Base	2,225	2,278	2,586	2,961	3,277	3,633	3,825	3,712	3,230	2,717	2,459	2,291
Future - Alternative 1	2,224	2,277	2,587	2,961	3,279	3,635	3,827	3,714	3,230	2,716	2,459	2,291
Difference	-1	-1	0	0	2	2	2	2	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
						Water Year-Types						
Wet												
Future - Base	2,396	2,480	2,989	3,394	3,578	3,842	4,228	4,235	3,803	3,242	2,994	2,526
Future - Alternative 1	2,396	2,480	2,989	3,394	3,578	3,842	4,228	4,235	3,803	3,242	2,994	2,525
Difference	0	0	-1	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal												
Future - Base	2,332	2,398	2,734	3,276	3,538	4,067	4,380	4,287	3,779	3,188	2,931	2,693
Future - Alternative 1	2,325	2,391	2,734	3,276	3,538	4,067	4,380	4,288	3,780	3,188	2,932	2,693
Difference	-6	-6	0	0	0	0	1	1	0	0	0	1
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Future - Base	2,275	2,333	2,490	3,019	3,412	3,836	4,073	3,949	3,396	2,900	2,674	2,743
Future - Alternative 1	2,275	2,334	2,491	3,019	3,413	3,837	4,073	3,949	3,396	2,900	2,674	2,743
Difference	1	1	1	1	1	1	1	1	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry												
Future - Base	2,104	2,169	2,417	2,659	3,189	3,593	3,618	3,403	2,899	2,449	2,182	2,205
Future - Alternative 1	2,103	2,169	2,416	2,659	3,188	3,592	3,618	3,403	2,899	2,449	2,182	2,205
Difference	-1	-1	-1	-1	-1	-1	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical												
Future - Base	1,906	1,851	1,965	2,171	2,385	2,631	2,519	2,310	1,855	1,394	1,094	1,067
Future - Alternative 1	1,904	1,850	1,969	2,175	2,399	2,646	2,533	2,321	1,855	1,393	1,094	1,067
Difference	-1	-1	4	4	14	15	14	11	0	-1	0	0
Percent Difference	0%	0%	0%	0%	1%	1%	1%	0%	0%	0%	0%	0%

Shasta Reservoir Storage

Future - Base

	End-of-Month Storage (TAF)											
Statistic	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Probability of Exceedance												
10%	3,037	3,187	3,321	3,635	3,916	4,241	4,482	4,552	4,171	3,512	3,194	2,972
20%	2,810	2,927	3,266	3,539	3,777	4,102	4,372	4,324	3,882	3,302	3,029	2,858
30%	2,671	2,735	3,191	3,403	3,662	4,022	4,251	4,224	3,719	3,170	2,942	2,679
40%	2,416	2,533	2,985	3,335	3,537	3,963	4,176	4,142	3,568	3,039	2,823	2,536
50%	2,317	2,324	2,754	3,252	3,445	3,839	4,109	3,953	3,350	2,880	2,669	2,439
60%	2,245	2,200	2,545	2,973	3,289	3,597	4,009	3,839	3,203	2,755	2,499	2,338
70%	2,020	2,057	2,269	2,767	3,252	3,417	3,756	3,608	3,154	2,594	2,360	2,110
80%	1,757	1,817	2,045	2,429	2,913	3,266	3,216	2,997	2,618	2,141	1,806	1,824
90%	884	1,011	1,336	1,917	2,378	2,633	2,534	2,407	1,951	1,420	978	956
Long Term												
Full Simulation Period	2,225	2,278	2,586	2,961	3,277	3,633	3,825	3,712	3,230	2,717	2,459	2,291
Water Year Types												
Wet	2,396	2,480	2,989	3,394	3,578	3,842	4,228	4,235	3,803	3,242	2,994	2,526
Above Normal	2,332	2,398	2,734	3,276	3,538	4,067	4,380	4,287	3,779	3,188	2,931	2,693
Below Normal	2,275	2,333	2,490	3,019	3,412	3,836	4,073	3,949	3,396	2,900	2,674	2,743
Dry	2,104	2,169	2,417	2,659	3,189	3,593	3,618	3,403	2,899	2,449	2,182	2,205
Critical	1,906	1,851	1,965	2,171	2,385	2,631	2,519	2,310	1,855	1,394	1,094	1,067

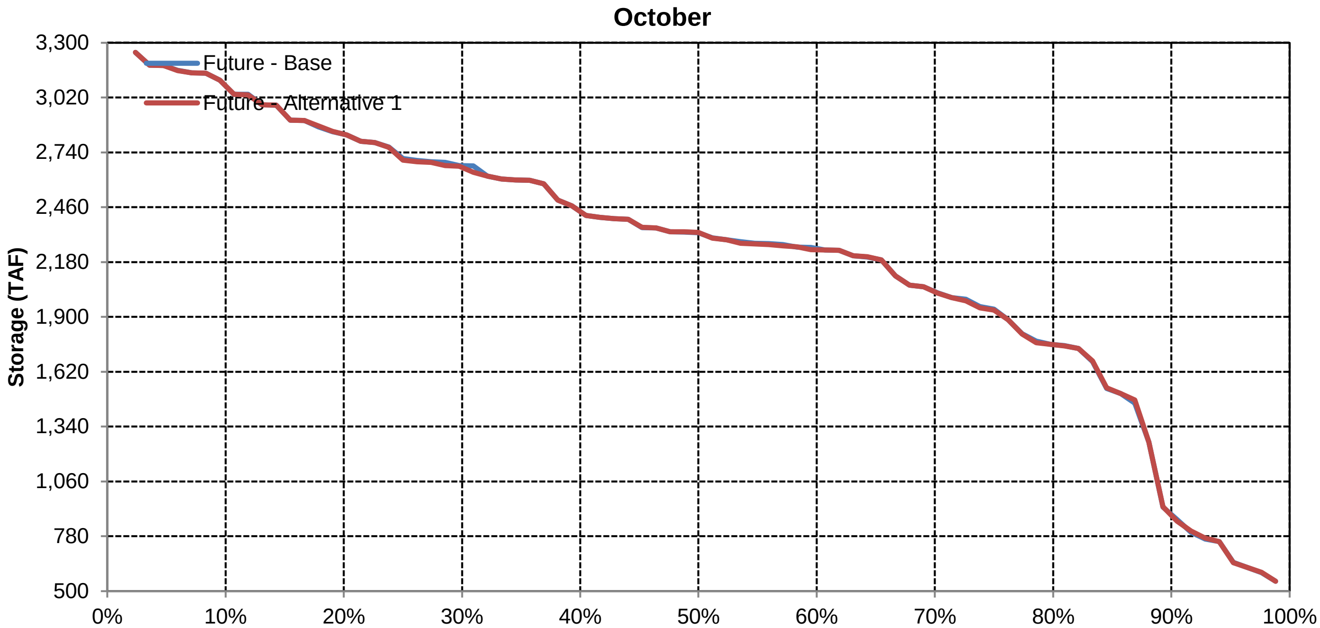
Future - Alternative 1

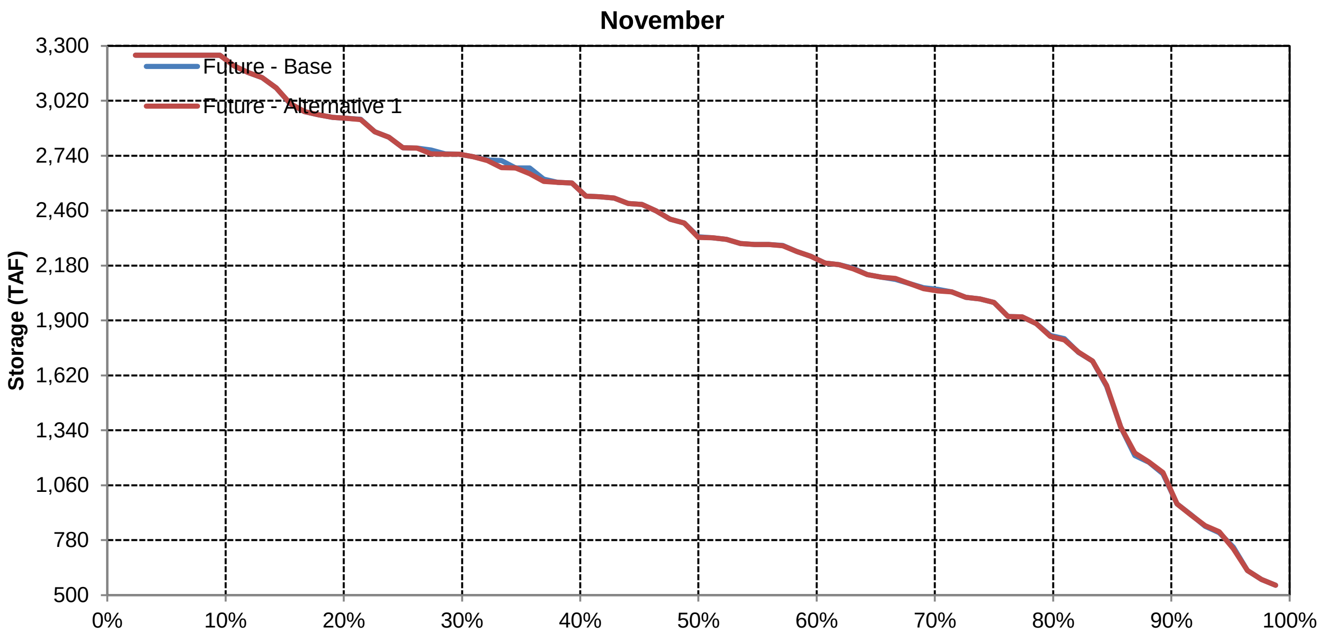
	End-of-Month Storage (TAF)											
Statistic	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Probability of Exceedance												
10%	3,036	3,187	3,321	3,635	3,916	4,241	4,487	4,552	4,171	3,512	3,194	2,972
20%	2,810	2,927	3,266	3,539	3,777	4,102	4,372	4,324	3,882	3,302	3,029	2,858
30%	2,641	2,736	3,191	3,403	3,662	4,022	4,251	4,225	3,719	3,170	2,942	2,679
40%	2,416	2,533	2,980	3,335	3,537	3,963	4,176	4,146	3,568	3,043	2,823	2,535
50%	2,317	2,323	2,754	3,252	3,445	3,840	4,110	3,953	3,352	2,881	2,669	2,439
60%	2,242	2,200	2,545	2,974	3,283	3,597	4,009	3,839	3,203	2,754	2,499	2,338
70%	2,019	2,050	2,268	2,765	3,252	3,417	3,757	3,606	3,155	2,594	2,361	2,108
80%	1,757	1,811	2,045	2,428	2,913	3,265	3,216	2,992	2,614	2,141	1,807	1,823
90%	879	1,013	1,342	1,923	2,372	2,627	2,536	2,409	1,953	1,421	977	955
Long Term												
Full Simulation Period	2,224	2,277	2,587	2,961	3,279	3,635	3,827	3,714	3,230	2,716	2,459	2,291
Water Year Types												
Wet	2,396	2,480	2,989	3,394	3,578	3,842	4,228	4,235	3,803	3,242	2,994	2,525
Above Normal	2,325	2,391	2,734	3,276	3,538	4,067	4,380	4,288	3,780	3,188	2,932	2,693
Below Normal	2,275	2,334	2,491	3,019	3,413	3,837	4,073	3,949	3,396	2,900	2,674	2,743
Dry	2,103	2,169	2,416	2,659	3,188	3,592	3,618	3,403	2,899	2,449	2,182	2,205
Critical	1,904	1,850	1,969	2,175	2,399	2,646	2,533	2,321	1,855	1,393	1,094	1,067

Future - Alternative 1 Minus Future - Base

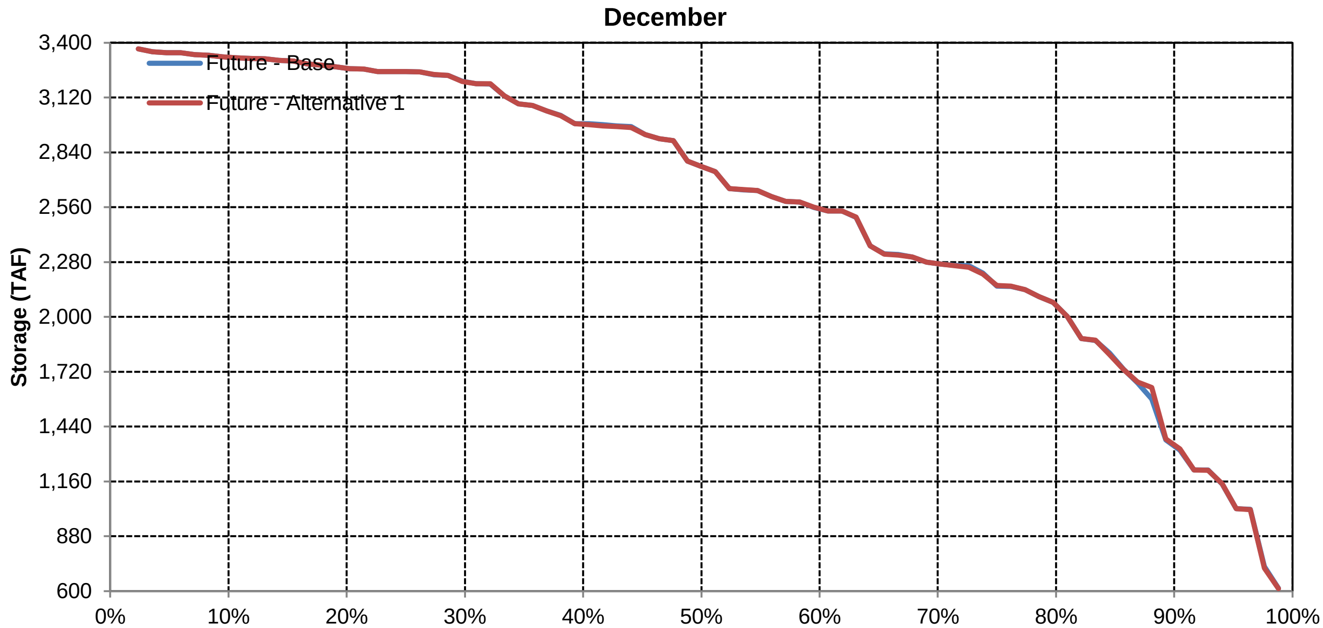
	End-of-Month Storage (TAF)											
Statistic	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Probability of Exceedance												
10%	-1	0	0	1	0	0	5	0	0	0	0	0
20%	0	-1	0	0	0	0	0	0	0	0	0	0
30%	-30	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	-6	0	0	0	0	4	0	4	0	0
50%	0	-1	0	0	0	0	1	0	2	0	0	0
60%	-2	0	0	1	-5	0	0	0	0	0	0	0
70%	-2	-7	-1	-2	0	0	1	-2	1	0	1	-2
80%	0	-6	0	0	0	-1	-1	-5	-4	0	1	-1
90%	-5	2	6	6	-6	-6	2	2	2	0	-1	-1
Long Term												
Full Simulation Period	-1	-1	0	0	2	2	2	2	0	0	0	0
Water Year Types												
Wet	0	0	-1	0	0	0	0	0	0	0	0	0
Above Normal	-6	-6	0	0	0	0	1	1	0	0	0	1
Below Normal	1	1	1	1	1	1	1	1	0	0	0	0
Dry	-1	-1	-1	-1	-1	-1	0	0	0	0	0	0
Critical	-1	-1	4	4	14	15	14	11	0	-1	0	0

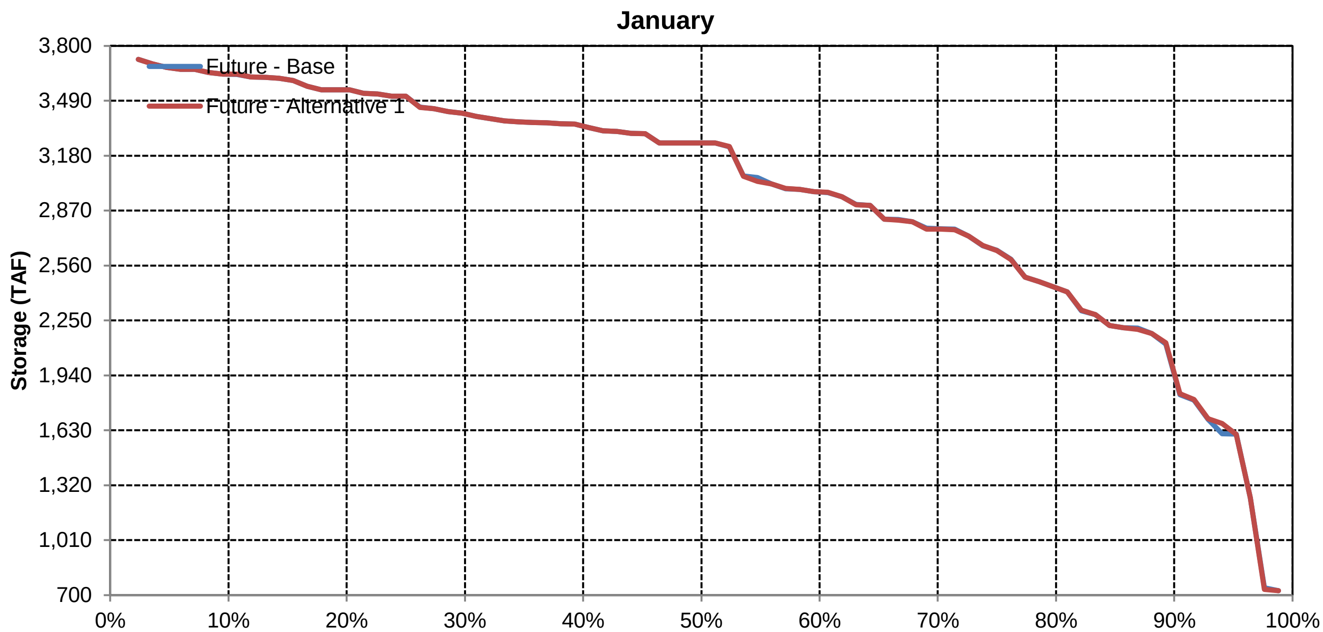
Shasta Reservoir Storage



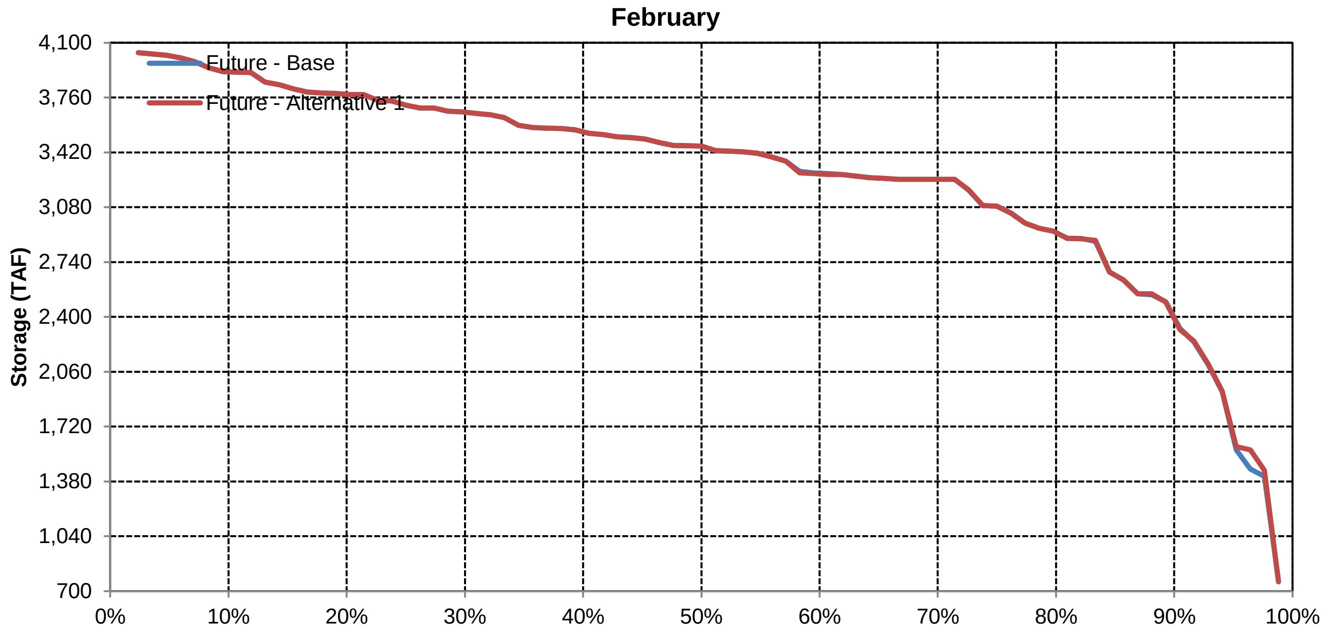


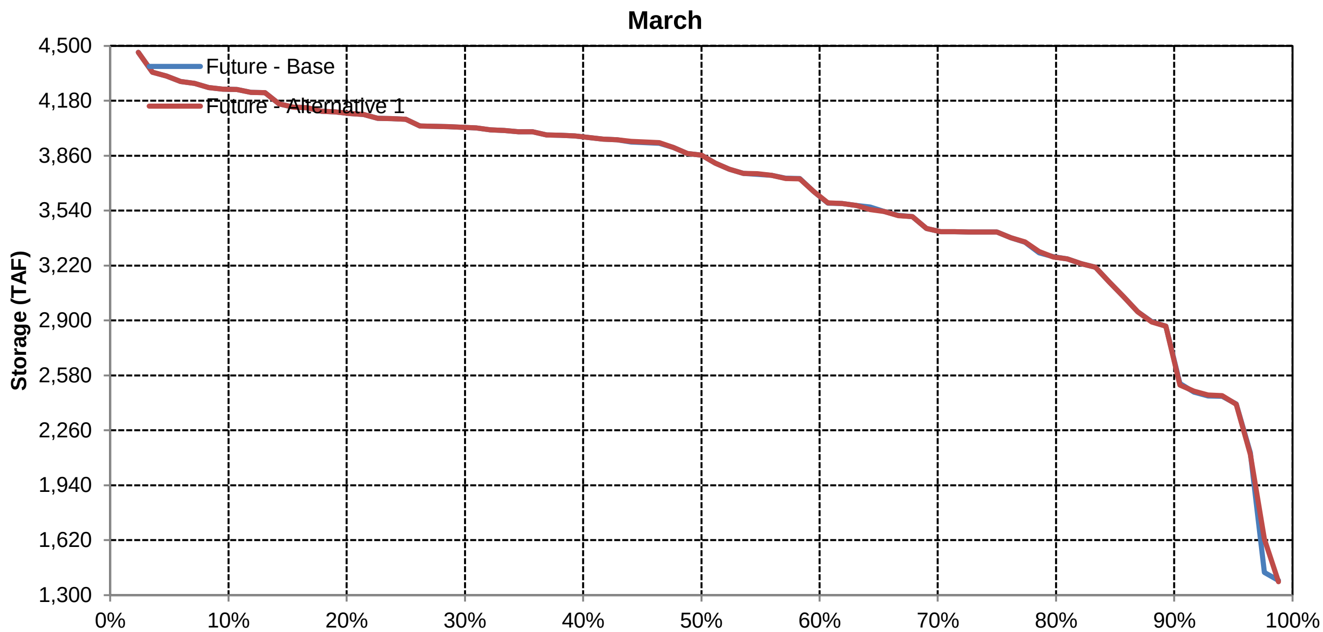
Shasta Reservoir Storage





Shasta Reservoir Storage





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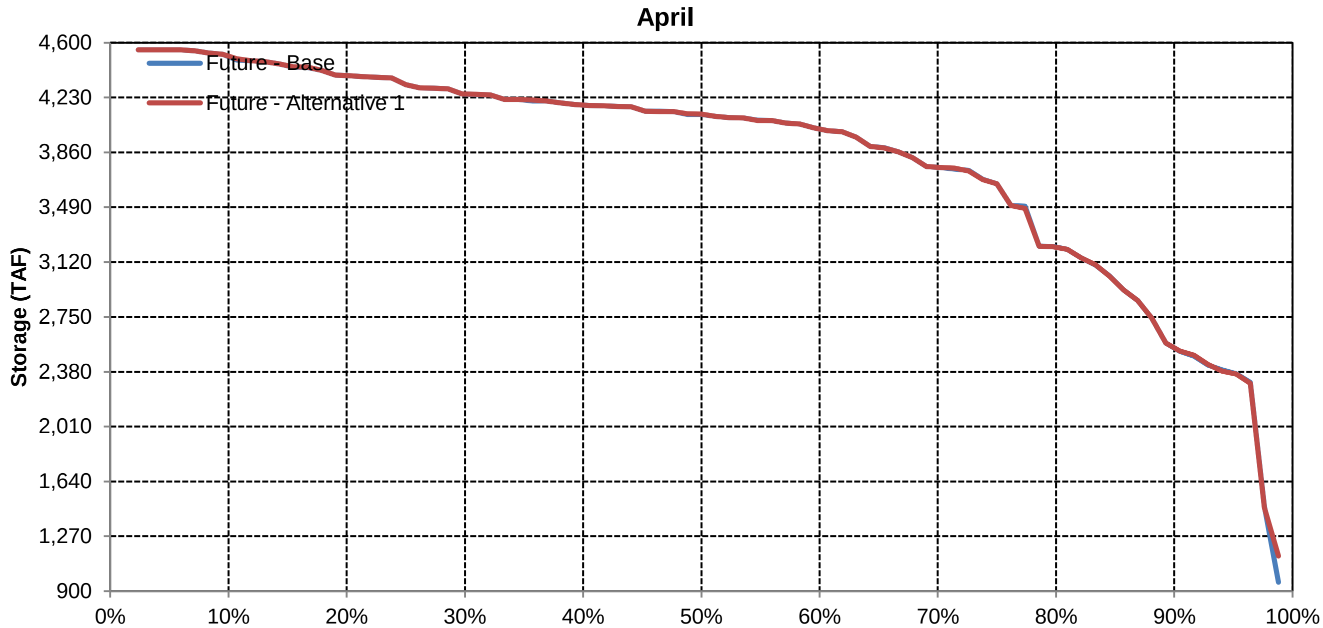
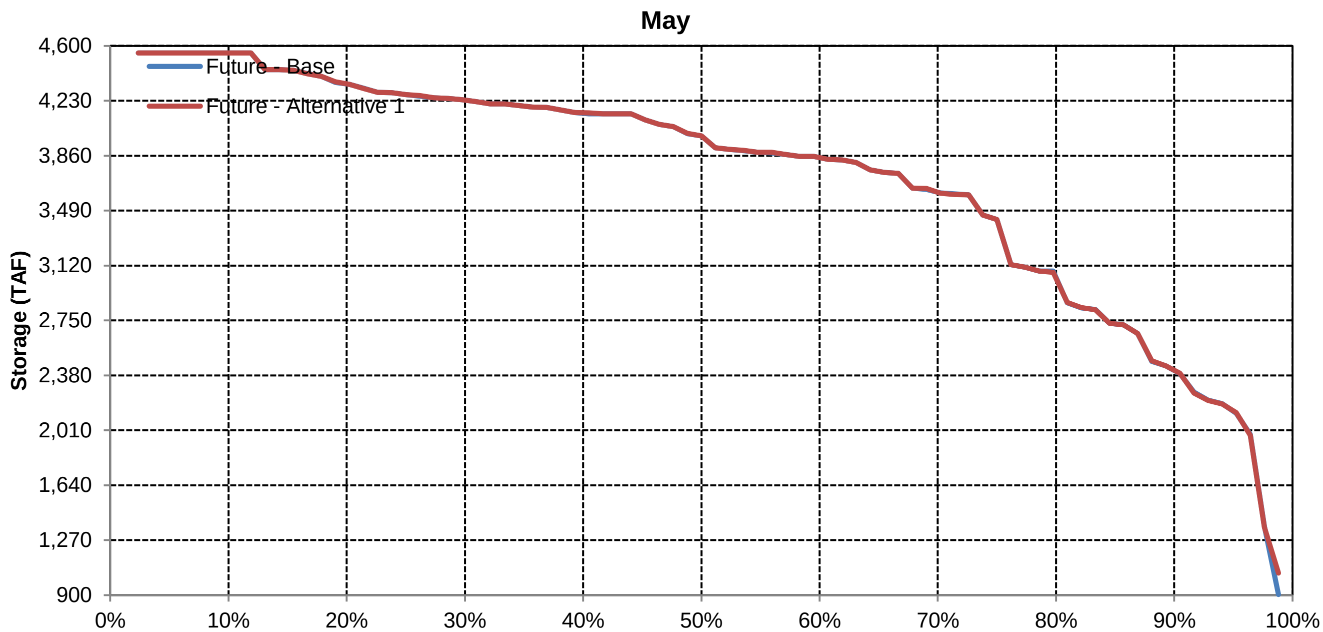
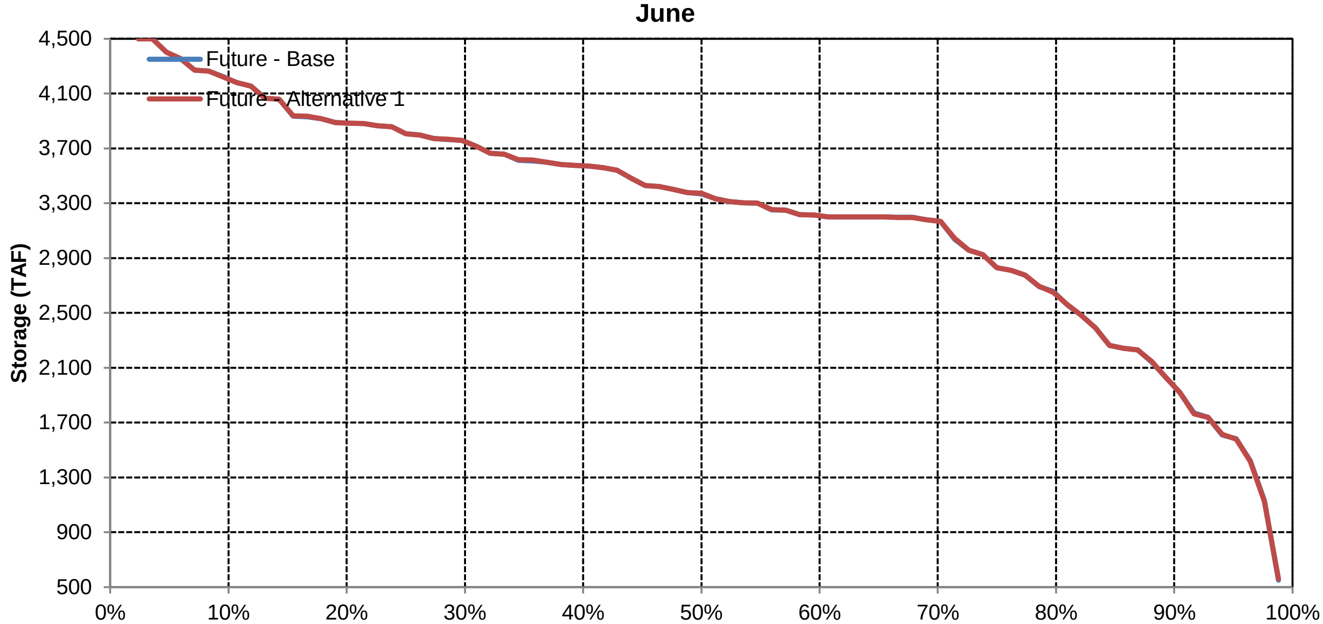
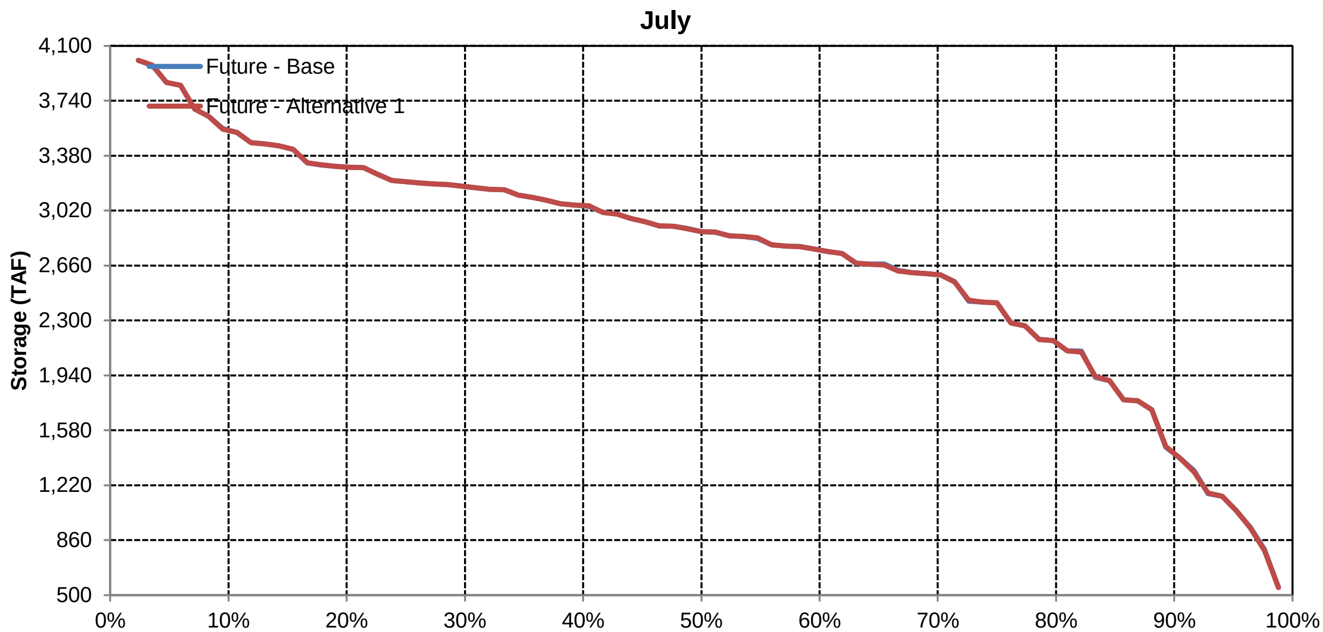


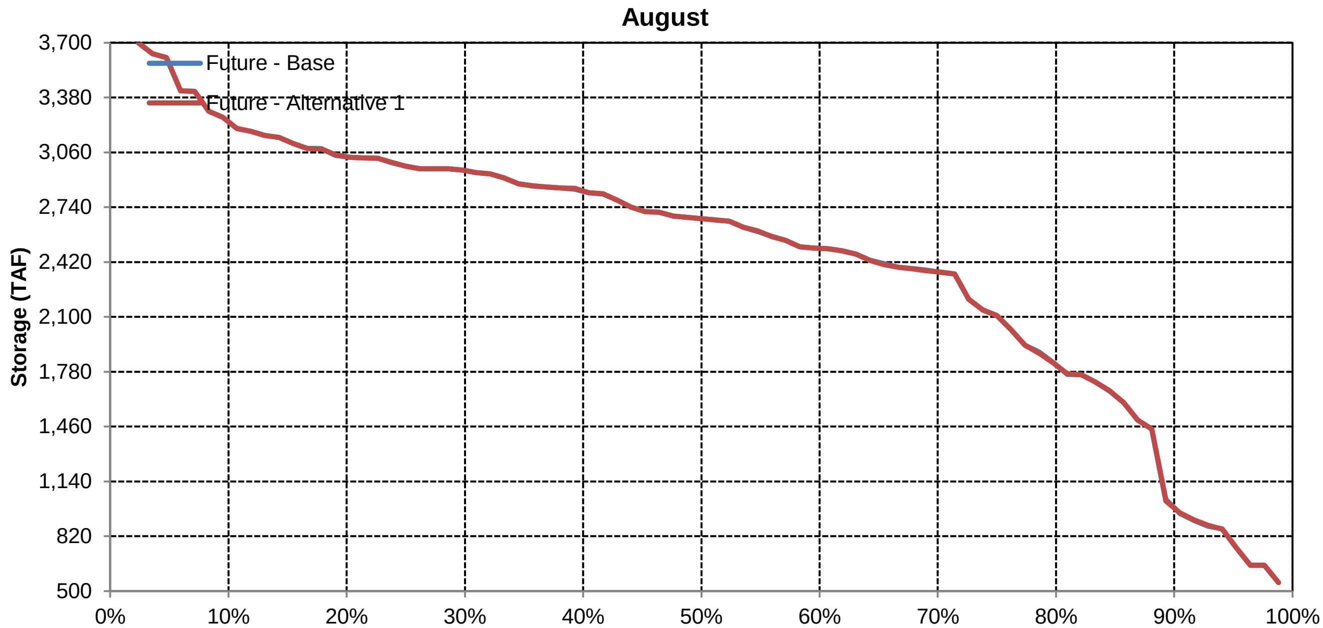


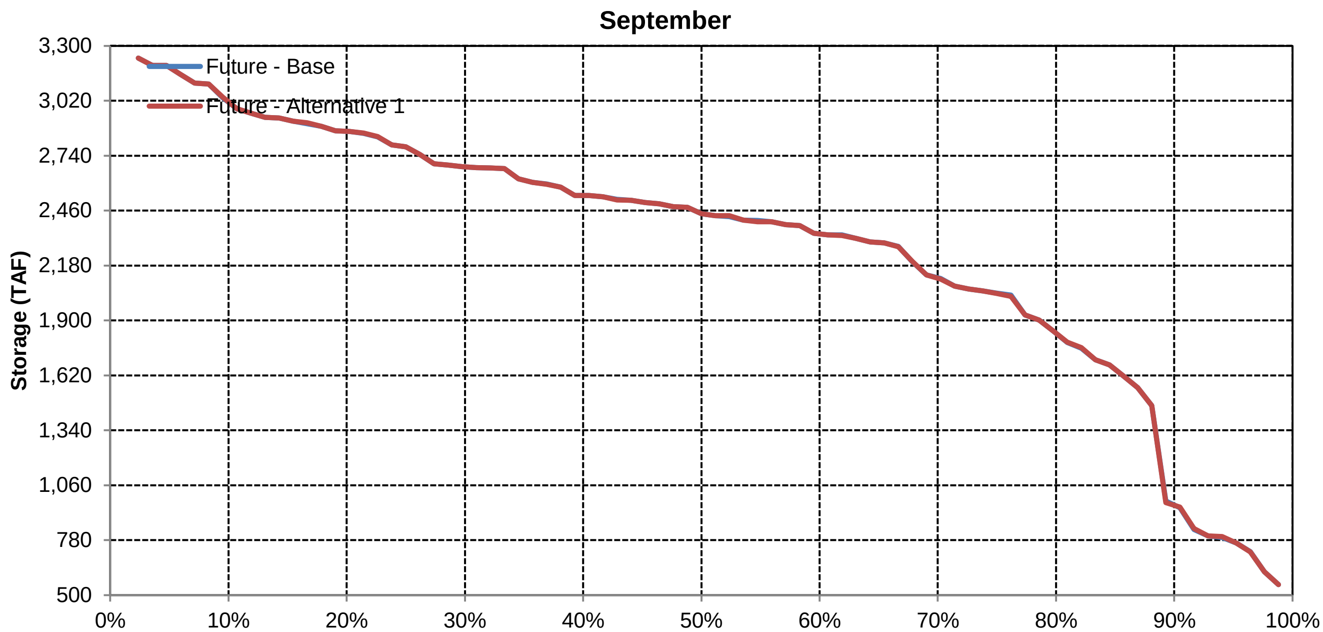
Shasta Reservoir Storage





Shasta Reservoir Storage





Long-Term and Water Year-Type Average of Oroville Reservoir Under Future - Base and Future - Alternative 1

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
						Long-Term						
Full Simulation Period												
Future - Base	1,244	1,285	1,585	1,975	2,295	2,515	2,665	2,627	2,322	1,842	1,548	1,355
Future - Alternative 1	1,244	1,285	1,585	1,976	2,295	2,515	2,666	2,627	2,323	1,843	1,549	1,357
Difference	0	0	1	2	0	0	0	1	1	1	1	1
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
						Water Year-Types						
Wet												
Future - Base	1,339	1,496	2,168	2,719	2,891	2,940	3,223	3,257	2,987	2,389	2,023	1,633
Future - Alternative 1	1,341	1,497	2,169	2,720	2,891	2,940	3,223	3,257	2,987	2,389	2,025	1,635
Difference	2	1	0	2	0	0	0	0	0	0	2	2
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal												
Future - Base	1,447	1,447	1,640	2,269	2,768	2,962	3,196	3,169	2,777	2,174	1,831	1,539
Future - Alternative 1	1,442	1,443	1,641	2,275	2,769	2,962	3,196	3,169	2,777	2,174	1,831	1,539
Difference	-5	-5	1	6	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Future - Base	1,249	1,221	1,348	1,711	2,121	2,564	2,712	2,662	2,276	1,745	1,468	1,397
Future - Alternative 1	1,250	1,221	1,348	1,711	2,121	2,564	2,712	2,663	2,277	1,746	1,469	1,398
Difference	0	0	0	0	0	0	0	1	1	1	1	1
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry												
Future - Base	1,100	1,111	1,253	1,469	1,902	2,247	2,284	2,176	1,845	1,457	1,207	1,161
Future - Alternative 1	1,101	1,112	1,253	1,470	1,903	2,247	2,284	2,176	1,845	1,457	1,207	1,161
Difference	1	1	1	1	1	1	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical												
Future - Base	1,087	1,038	1,079	1,222	1,410	1,580	1,555	1,479	1,306	1,102	916	863
Future - Alternative 1	1,087	1,038	1,080	1,223	1,412	1,582	1,557	1,480	1,315	1,107	917	867
Difference	0	0	1	1	2	2	2	2	9	6	1	4
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%	0%	0%

Oroville Reservoir

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	1,636	1,973	2,788	2,854	2,994	3,059	3,347	3,446	3,357	2,744	2,228	1,836
20%	1,502	1,552	2,259	2,788	2,856	2,991	3,237	3,254	3,034	2,401	2,003	1,666
30%	1,413	1,392	1,723	2,787	2,788	2,938	3,180	3,142	2,680	2,176	1,819	1,572
40%	1,252	1,284	1,473	2,185	2,788	2,833	3,081	3,034	2,528	1,958	1,679	1,439
50%	1,159	1,175	1,411	1,820	2,492	2,788	2,979	2,790	2,386	1,840	1,570	1,325
60%	1,084	1,076	1,258	1,613	2,165	2,539	2,672	2,667	2,222	1,693	1,307	1,222
70%	998	1,001	1,180	1,458	1,946	2,268	2,297	2,185	1,924	1,499	1,201	1,097
80%	985	953	1,002	1,258	1,538	1,950	2,026	1,954	1,706	1,328	1,052	995
90%	829	891	941	1,010	1,262	1,594	1,557	1,411	1,216	1,006	916	879
Long Term												
Full Simulation Period	1,244	1,285	1,585	1,975	2,295	2,515	2,665	2,627	2,322	1,842	1,548	1,355
Water Year Types												
Wet	1,339	1,496	2,168	2,719	2,891	2,940	3,223	3,257	2,987	2,389	2,023	1,633
Above Normal	1,447	1,447	1,640	2,269	2,768	2,962	3,196	3,169	2,777	2,174	1,831	1,539
Below Normal	1,249	1,221	1,348	1,711	2,121	2,564	2,712	2,662	2,276	1,745	1,468	1,397
Dry	1,100	1,111	1,253	1,469	1,902	2,247	2,284	2,176	1,845	1,457	1,207	1,161
Critical	1,087	1,038	1,079	1,222	1,410	1,580	1,555	1,479	1,306	1,102	916	863

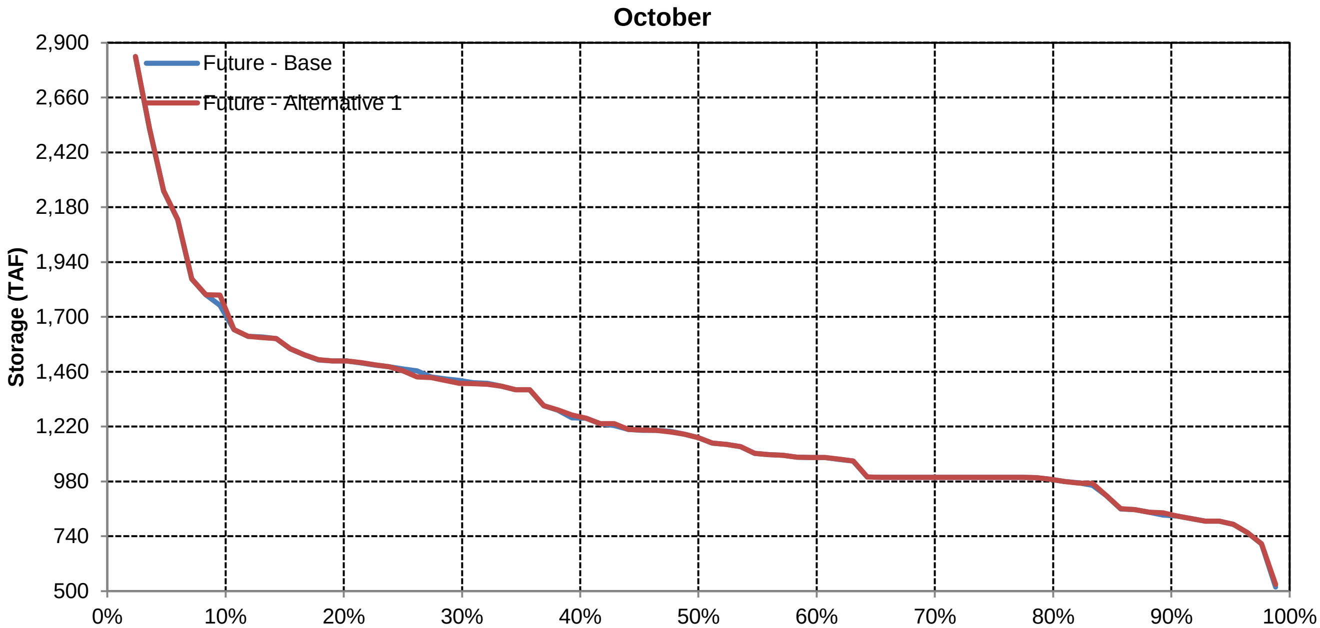
Future - Alternative 1

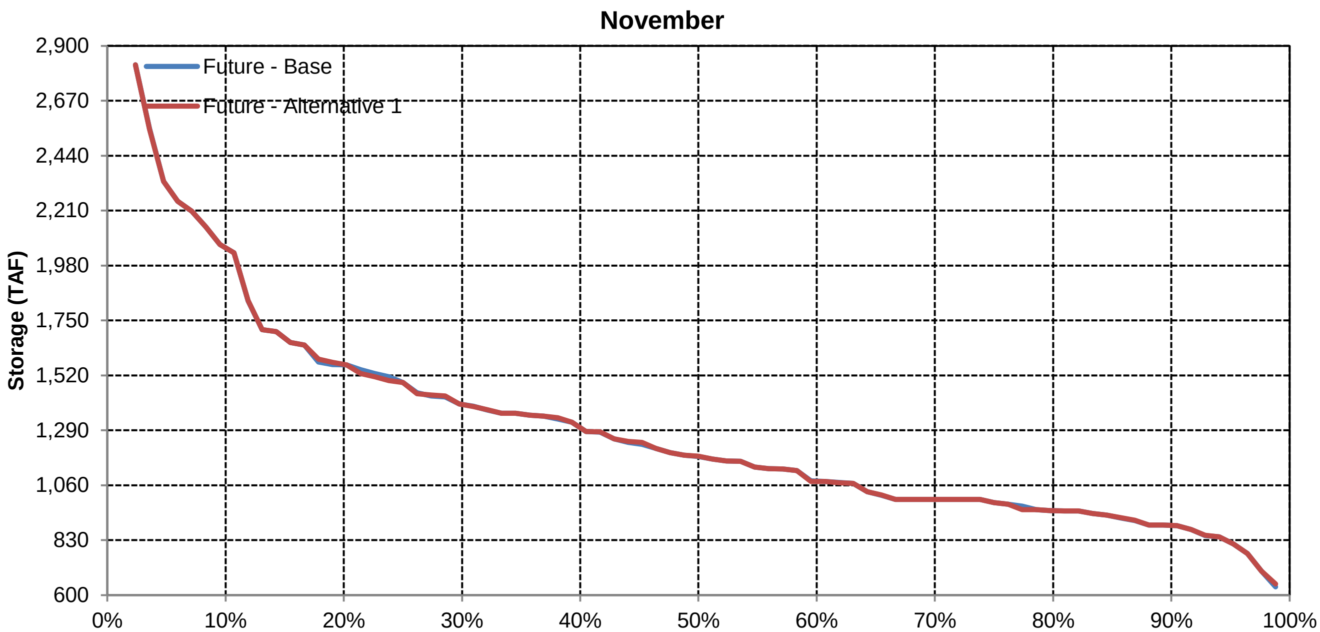
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	1,636	1,973	2,788	2,854	2,994	3,059	3,347	3,446	3,357	2,744	2,228	1,835
20%	1,502	1,542	2,259	2,788	2,856	2,991	3,237	3,254	3,034	2,401	2,003	1,669
30%	1,408	1,391	1,700	2,787	2,788	2,938	3,180	3,142	2,679	2,176	1,819	1,573
40%	1,252	1,285	1,474	2,185	2,788	2,833	3,081	3,034	2,529	1,958	1,679	1,439
50%	1,160	1,176	1,412	1,821	2,494	2,788	2,979	2,790	2,386	1,843	1,570	1,323
60%	1,084	1,076	1,258	1,614	2,165	2,540	2,672	2,667	2,222	1,693	1,311	1,222
70%	998	1,001	1,181	1,458	1,948	2,269	2,298	2,185	1,925	1,499	1,199	1,096
80%	986	953	1,002	1,258	1,541	1,950	2,026	1,954	1,712	1,325	1,046	995
90%	833	891	941	1,010	1,262	1,594	1,558	1,413	1,216	1,007	917	879
Long Term												
Full Simulation Period	1,244	1,285	1,585	1,976	2,295	2,515	2,666	2,627	2,323	1,843	1,549	1,357
Water Year Types												
Wet	1,341	1,497	2,169	2,720	2,891	2,940	3,223	3,257	2,987	2,389	2,025	1,635
Above Normal	1,442	1,443	1,641	2,275	2,769	2,962	3,196	3,169	2,777	2,174	1,831	1,539
Below Normal	1,250	1,221	1,348	1,711	2,121	2,564	2,712	2,663	2,277	1,746	1,469	1,398
Dry	1,101	1,112	1,253	1,470	1,903	2,247	2,284	2,176	1,845	1,457	1,207	1,161
Critical	1,087	1,038	1,080	1,223	1,412	1,582	1,557	1,480	1,315	1,107	917	867

Future - Alternative 1 Minus Future - Base

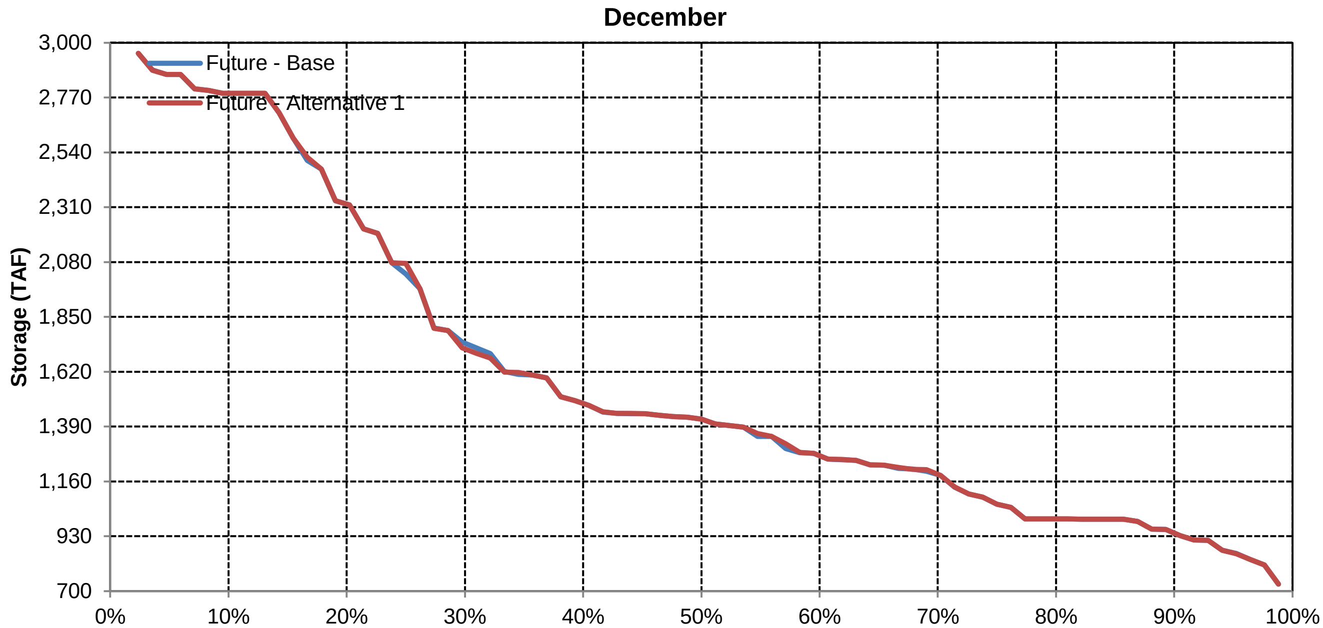
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	-1
20%	0	-10	0	0	0	0	0	0	0	0	0	3
30%	-5	-1	-23	0	0	0	0	0	0	0	0	0
40%	0	1	1	0	0	0	0	0	1	0	0	0
50%	0	1	0	0	2	0	0	0	0	4	0	-1
60%	0	0	0	0	0	1	0	0	0	0	4	0
70%	0	0	1	1	1	1	0	0	1	0	-2	-2
80%	0	0	0	0	3	1	0	1	6	-3	-6	0
90%	3	0	0	0	0	0	2	2	0	1	0	0
Long Term												
Full Simulation Period	0	0	1	2	0	0	0	1	1	1	1	1
Water Year Types												
Wet	2	1	0	2	0	0	0	0	0	0	2	2
Above Normal	-5	-5	1	6	0	0	0	0	0	0	0	0
Below Normal	0	0	0	0	0	0	0	1	1	1	1	1
Dry	1	1	1	1	1	1	0	0	0	0	0	0
Critical	0	0	1	1	2	2	2	2	9	6	1	4

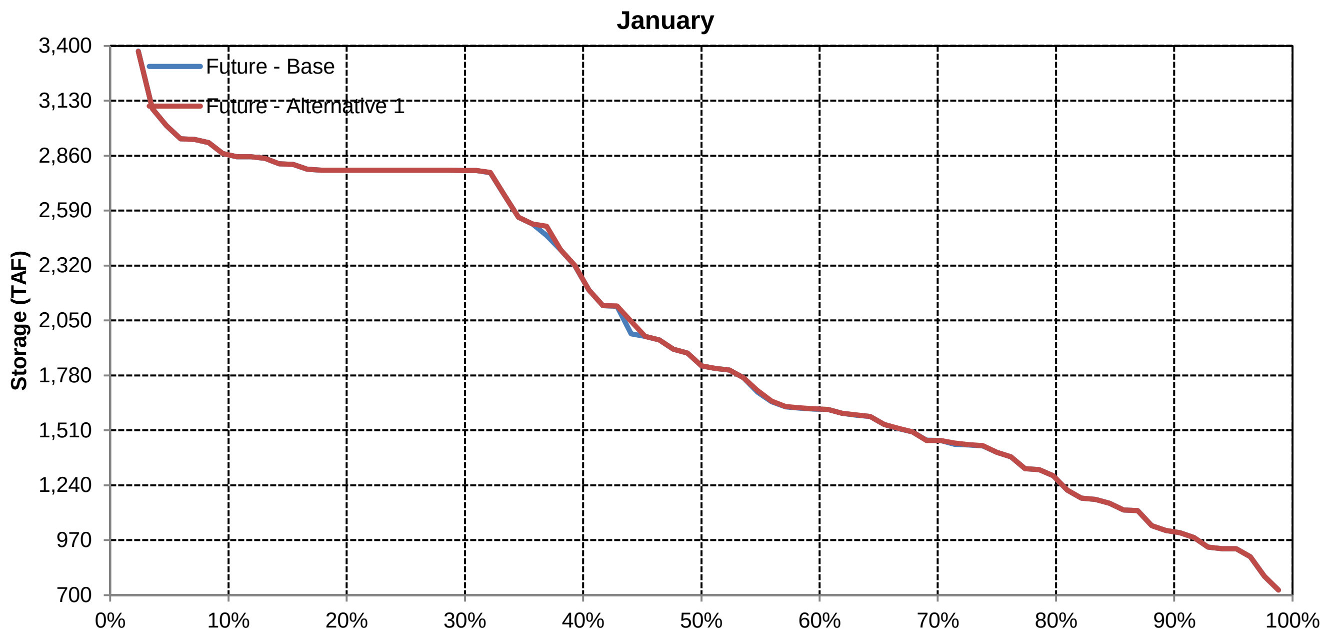
Oroville Reservoir



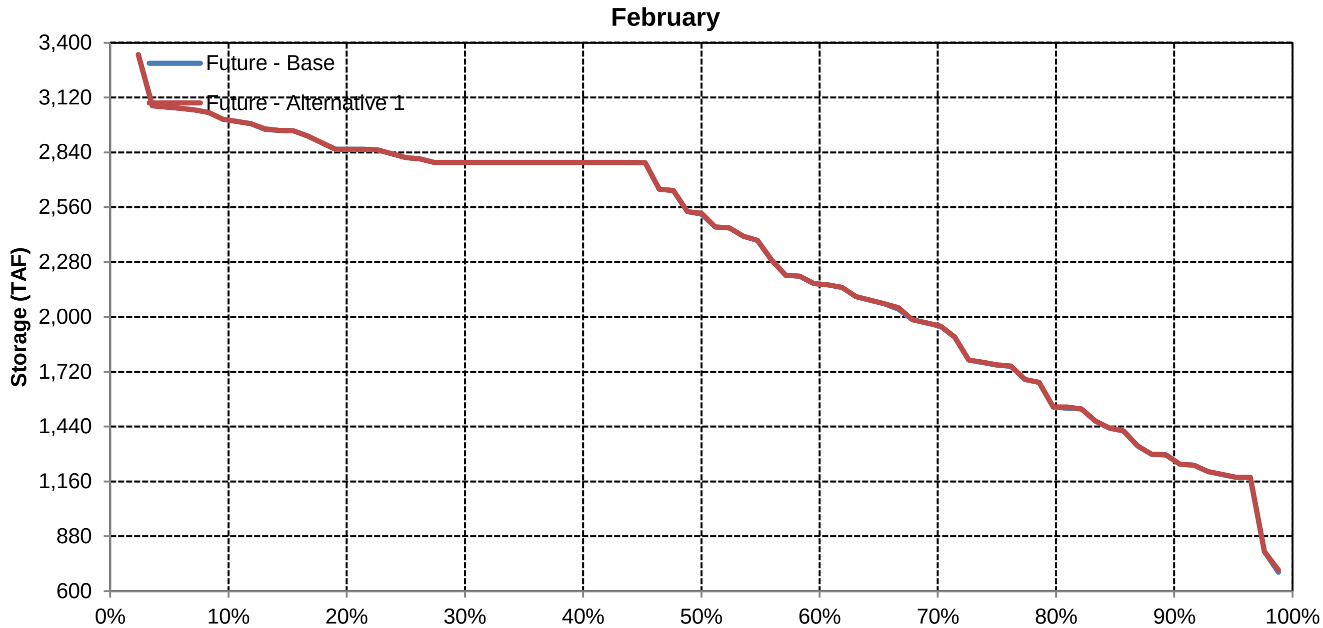


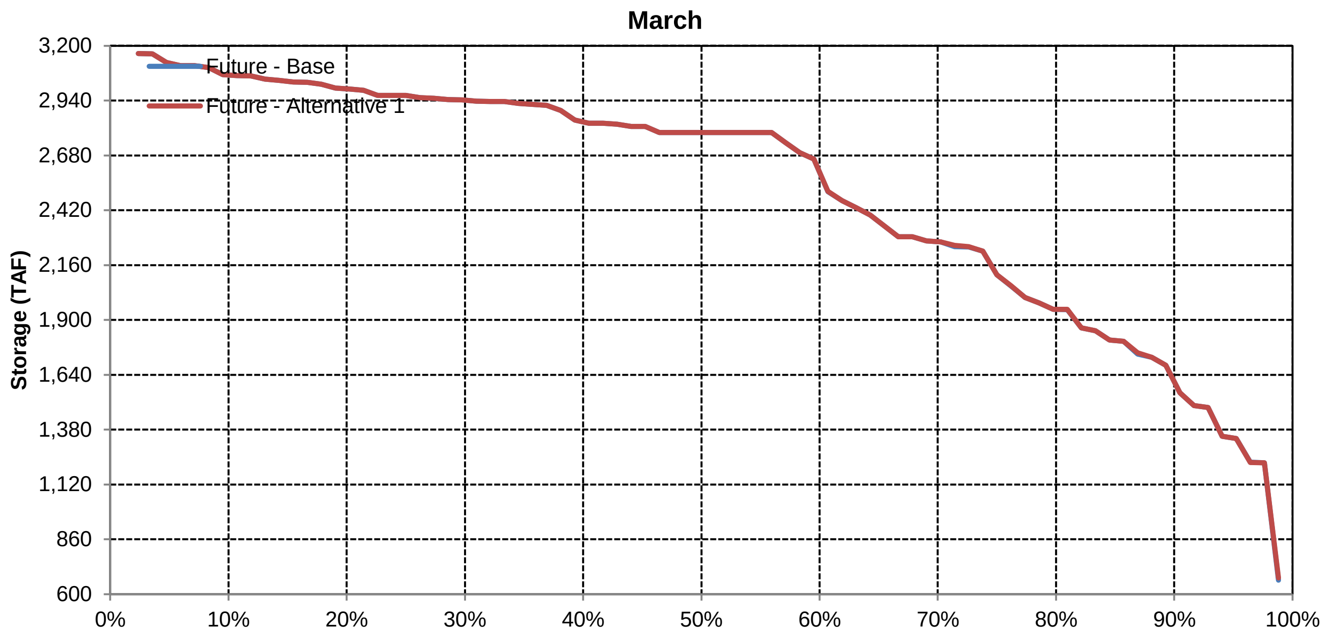
Oroville Reservoir



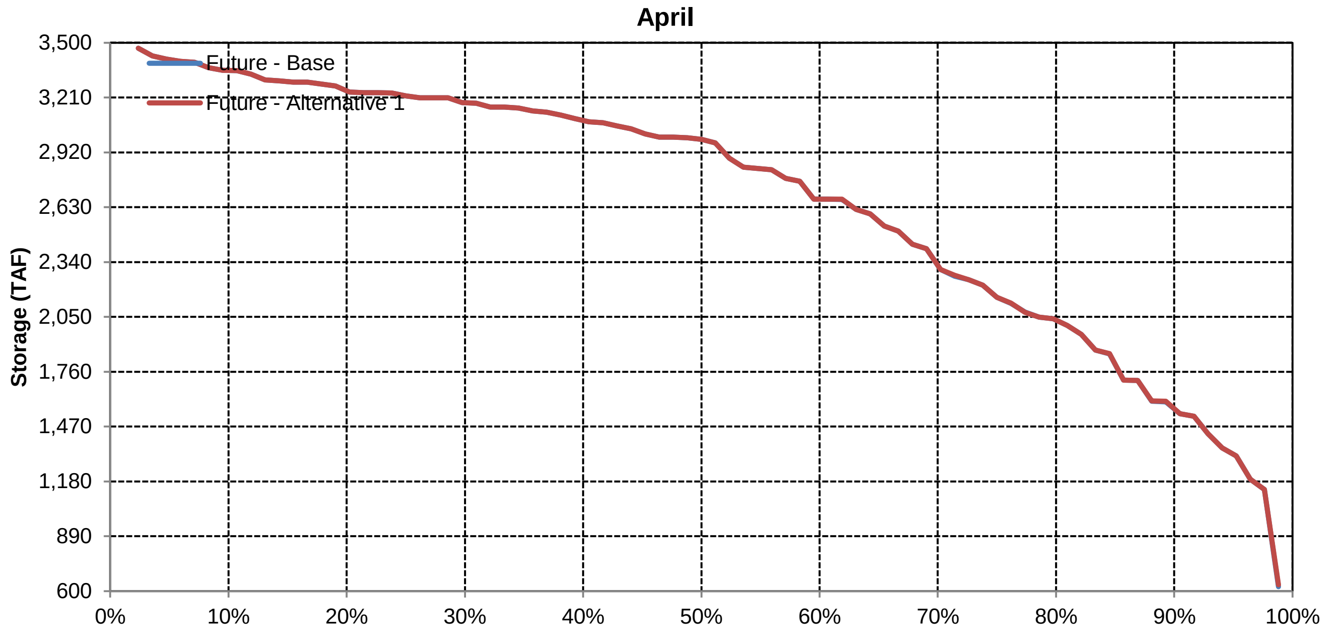


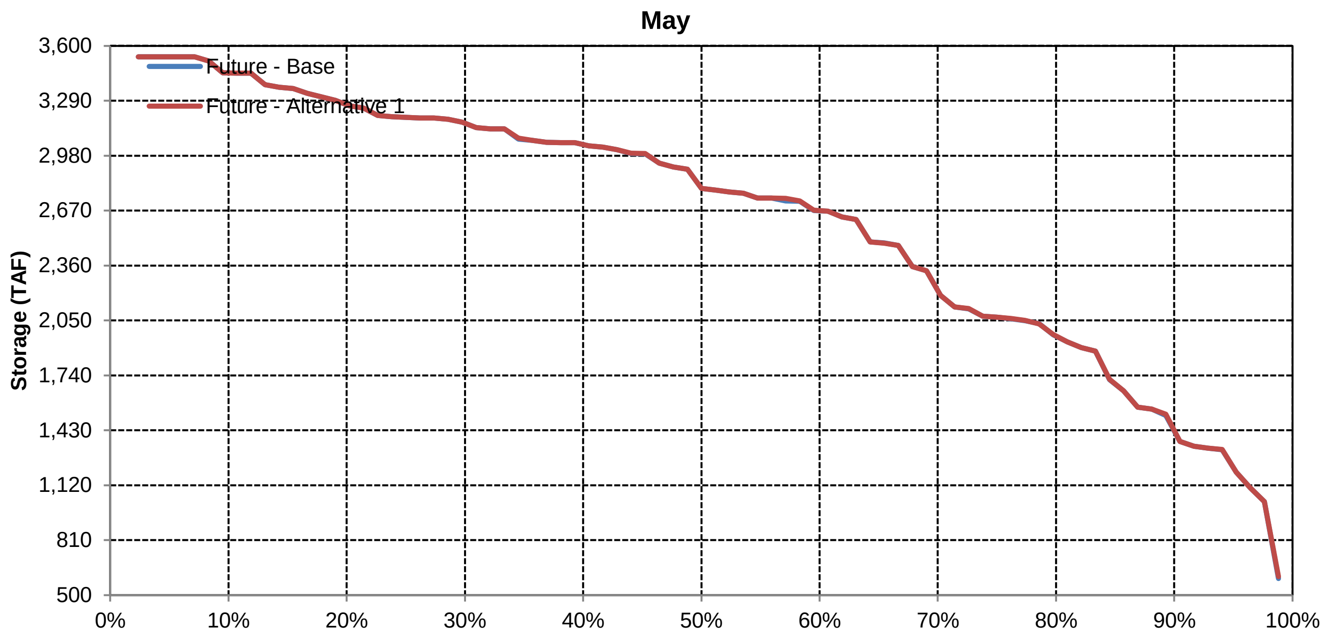
Oroville Reservoir



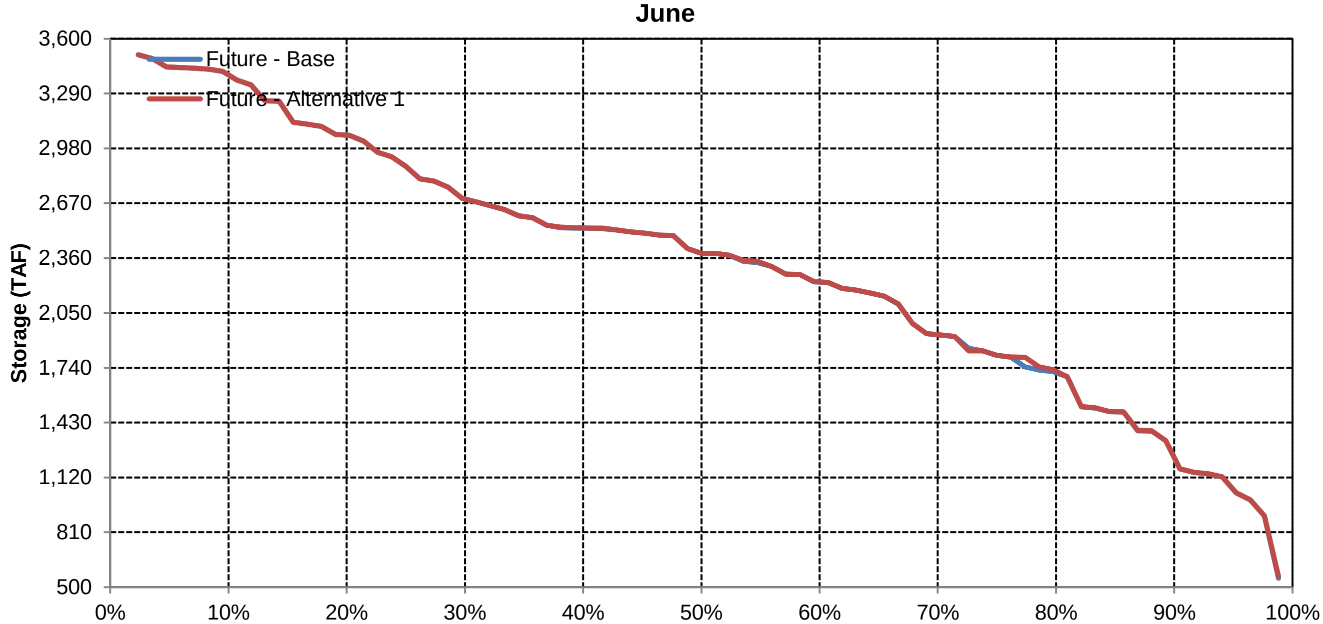


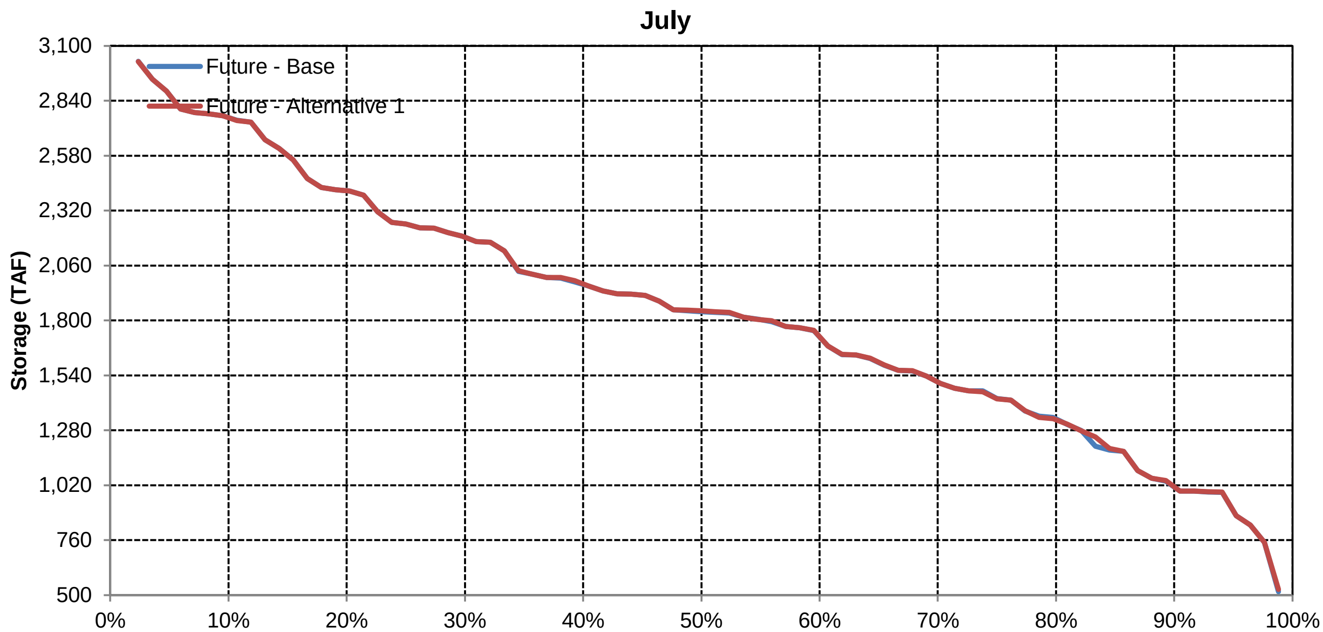
Oroville Reservoir



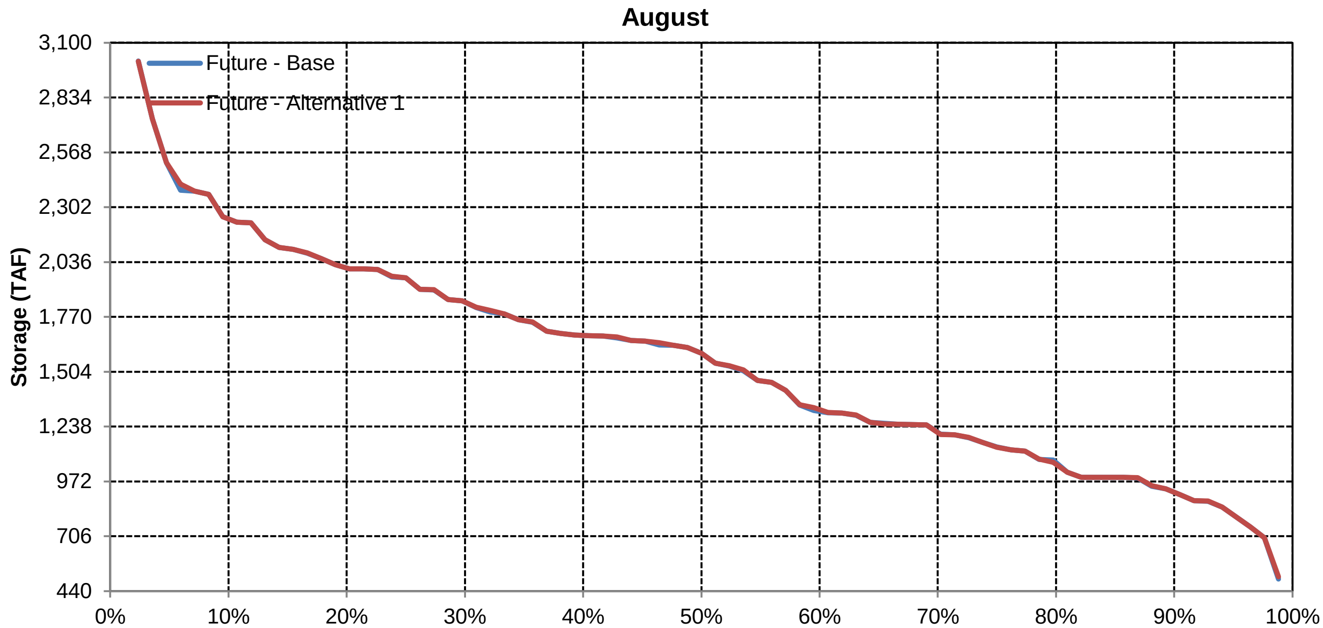


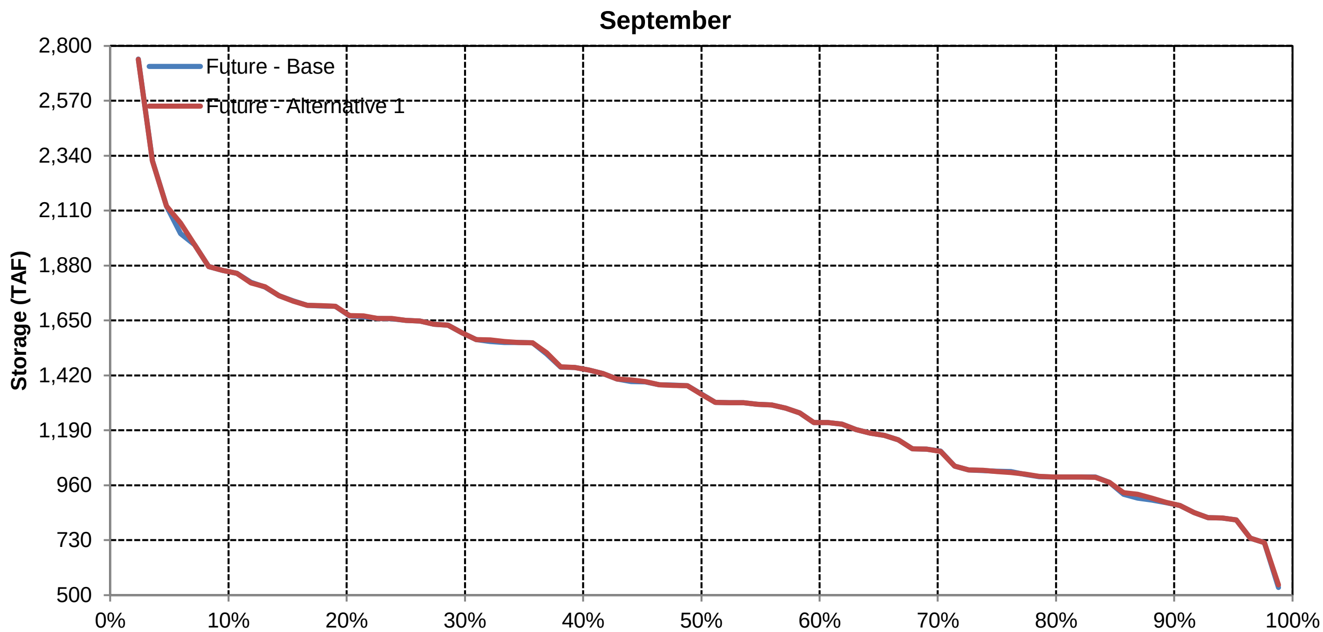
Oroville Reservoir





Oroville Reservoir





Long-Term and Water Year-Type Average of Folsom Reservoir Under Future - Base and Future - Alternative 1

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
						Long-Term						
Full Simulation Period												
Future - Base	354	352	404	454	482	592	680	678	580	460	427	390
Future - Alternative 1	353	352	404	454	482	592	680	678	580	460	427	390
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
						Water Year-Types						
Wet												
Future - Base	368	385	480	522	509	624	760	806	699	547	509	430
Future - Alternative 1	368	385	480	522	509	624	760	806	699	547	508	429
Difference	0	0	0	0	0	0	0	0	0	-1	-1	-1
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal												
Future - Base	363	358	415	512	550	644	766	766	668	492	471	427
Future - Alternative 1	362	357	415	512	550	644	766	766	668	492	471	427
Difference	-1	-1	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Future - Base	375	361	399	471	508	624	727	714	609	493	465	455
Future - Alternative 1	375	361	399	471	508	624	727	714	608	493	465	455
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry												
Future - Base	336	332	372	411	477	592	646	596	489	395	356	357
Future - Alternative 1	335	331	371	411	477	592	647	596	489	394	356	357
Difference	-1	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical												
Future - Base	321	298	288	306	341	440	436	418	360	317	287	256
Future - Alternative 1	321	297	288	306	341	439	436	418	362	317	287	255
Difference	0	0	0	0	0	0	0	0	2	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%

Folsom Reservoir

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	487	501	567	567	567	662	792	939	828	636	580	540
20%	445	437	566	567	567	656	792	820	729	587	548	504
30%	395	394	498	564	563	652	792	763	694	549	519	455
40%	365	365	432	556	557	645	791	745	621	495	483	417
50%	349	342	392	507	549	629	766	706	592	443	413	396
60%	321	327	352	454	495	616	701	656	538	418	388	360
70%	304	311	319	372	443	590	635	600	500	383	356	333
80%	269	272	302	305	386	565	554	498	404	332	305	295
90%	223	217	252	260	302	426	437	426	355	311	276	231
Long Term												
Full Simulation Period	354	352	404	454	482	592	680	678	580	460	427	390
Water Year Types												
Wet	368	385	480	522	509	624	760	806	699	547	509	430
Above Normal	363	358	415	512	550	644	766	766	668	492	471	427
Below Normal	375	361	399	471	508	624	727	714	609	493	465	455
Dry	336	332	372	411	477	592	646	596	489	395	356	357
Critical	321	298	288	306	341	440	436	418	360	317	287	256

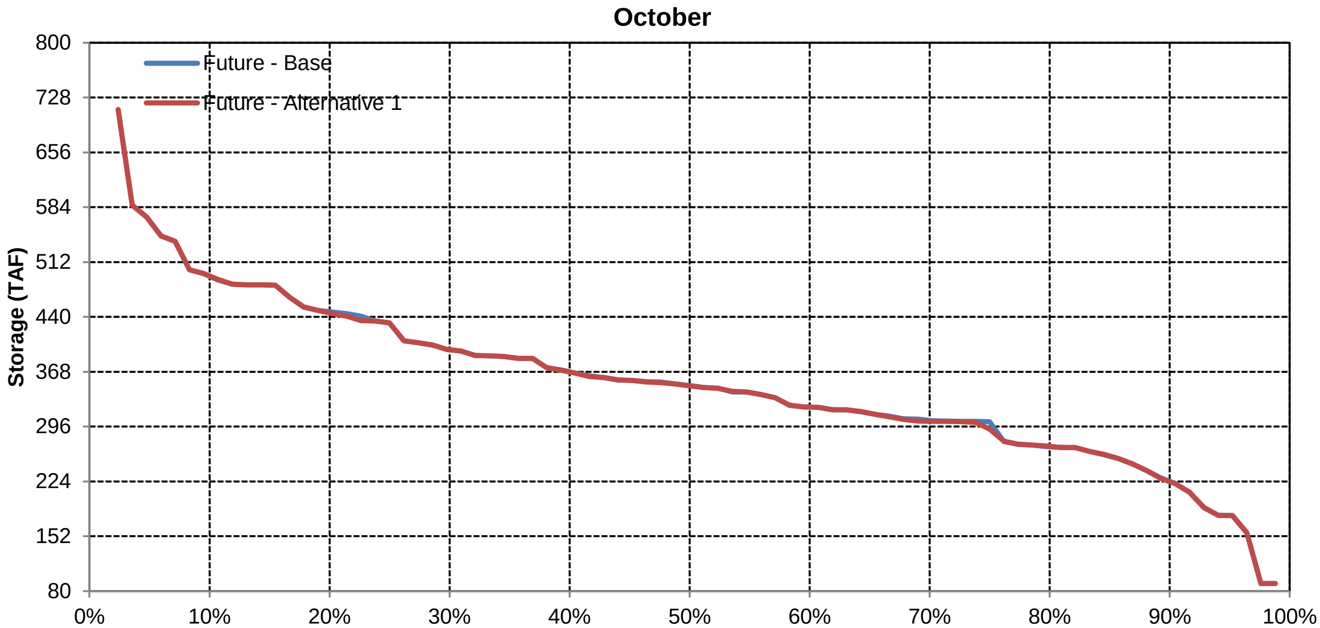
Future - Alternative 1

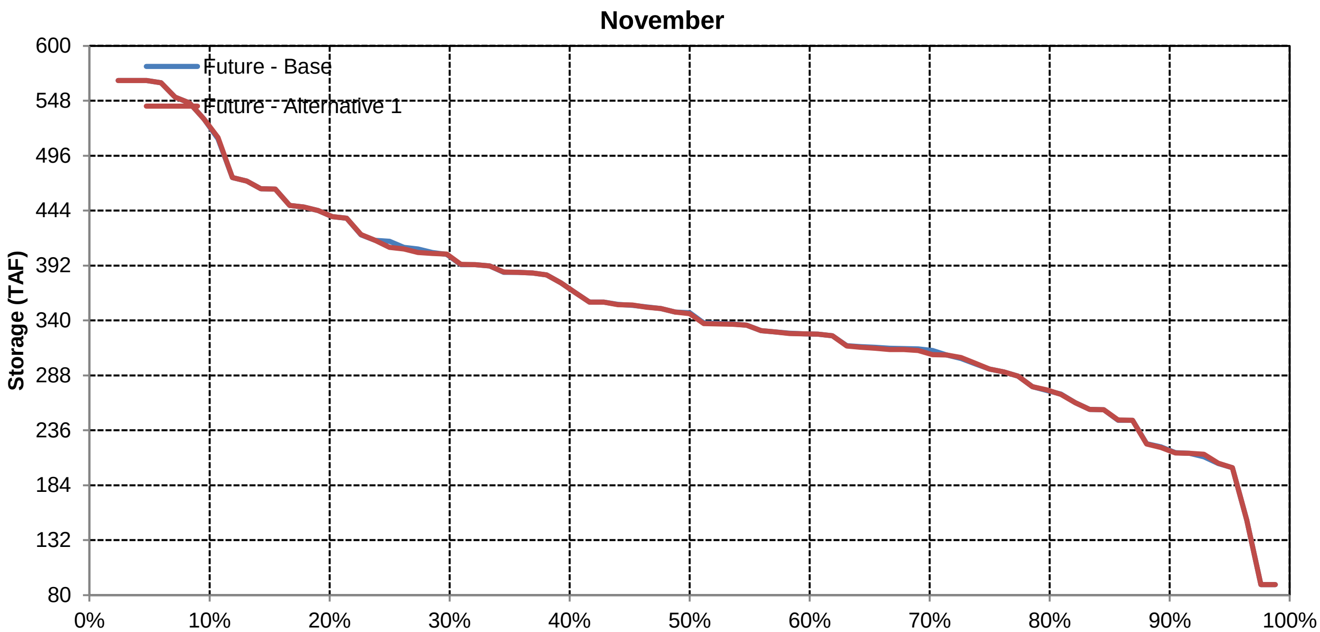
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	487	502	567	567	567	662	792	939	829	636	581	541
20%	442	437	566	567	567	656	792	820	729	587	548	503
30%	395	394	498	564	563	652	792	763	694	549	519	455
40%	365	365	432	556	557	645	791	745	621	495	483	416
50%	348	342	392	507	549	629	766	706	592	443	412	396
60%	321	327	352	454	495	616	701	656	537	418	388	360
70%	303	308	318	372	443	590	635	600	500	378	350	331
80%	270	273	302	305	386	565	554	498	404	331	305	295
90%	223	216	252	260	302	426	439	426	355	311	276	231
Long Term												
Full Simulation Period	353	352	404	454	482	592	680	678	580	460	427	390
Water Year Types												
Wet	368	385	480	522	509	624	760	806	699	547	508	429
Above Normal	362	357	415	512	550	644	766	766	668	492	471	427
Below Normal	375	361	399	471	508	624	727	714	608	493	465	455
Dry	335	331	371	411	477	592	647	596	489	394	356	357
Critical	321	297	288	306	341	439	436	418	362	317	287	255

Future - Alternative 1 Minus Future - Base

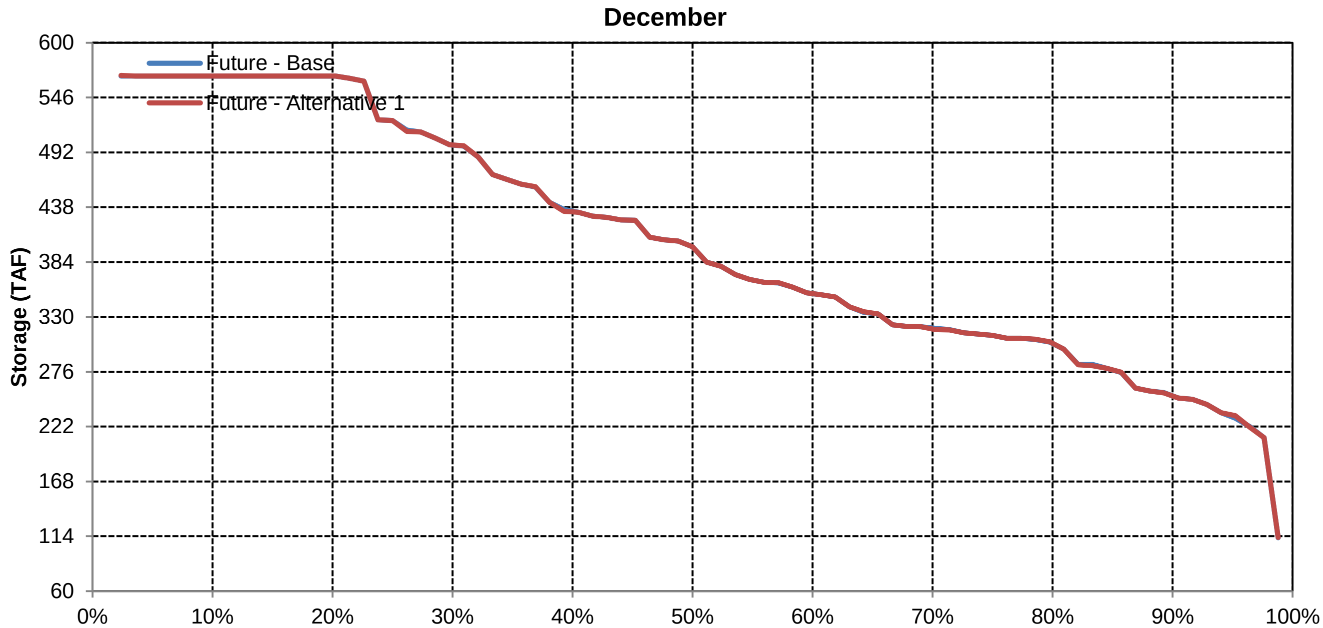
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	1	1	0	0	0	0	0	0	0	0	1	1
20%	-3	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	-1
50%	0	-1	0	0	0	0	0	0	0	0	-1	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	-1	-4	-1	0	0	0	0	0	0	-5	-6	-2
80%	0	0	0	0	-1	0	0	0	0	-2	0	0
90%	0	0	0	0	0	0	2	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types												
Wet	0	0	0	0	0	0	0	0	0	-1	-1	-1
Above Normal	-1	-1	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	-1	0	0	0	0	0	0	0	0	0	0	0
Critical	0	0	0	0	0	0	0	0	2	0	0	0

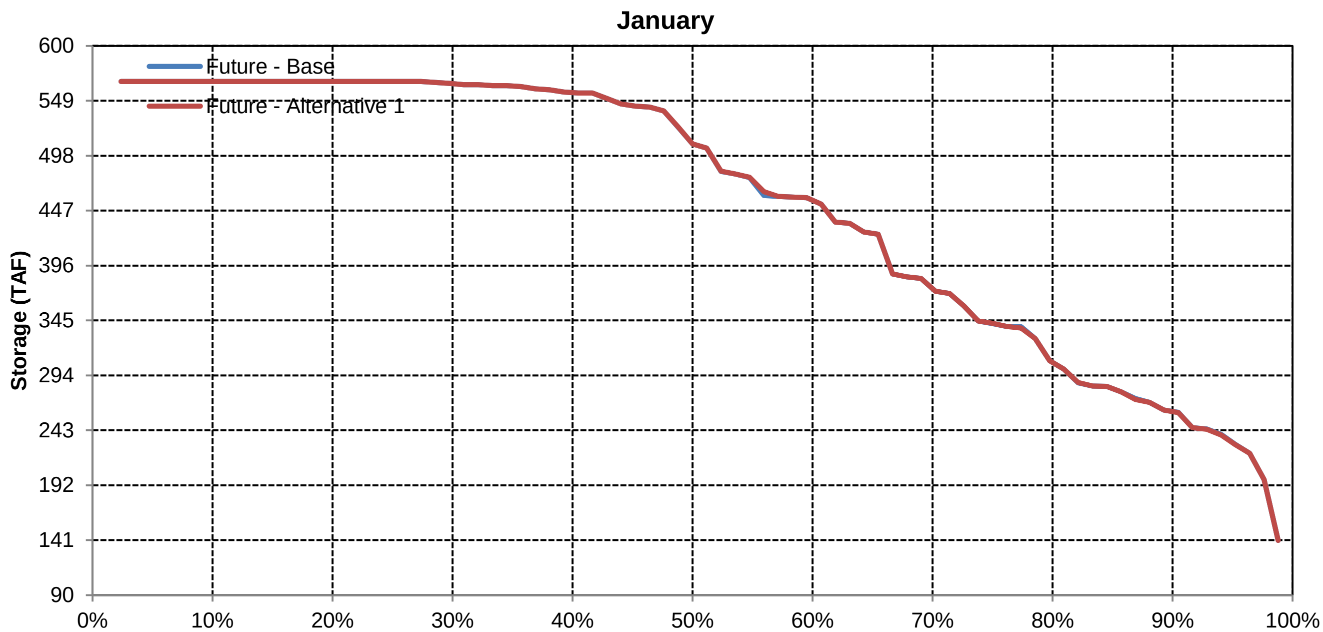
Folsom Reservoir



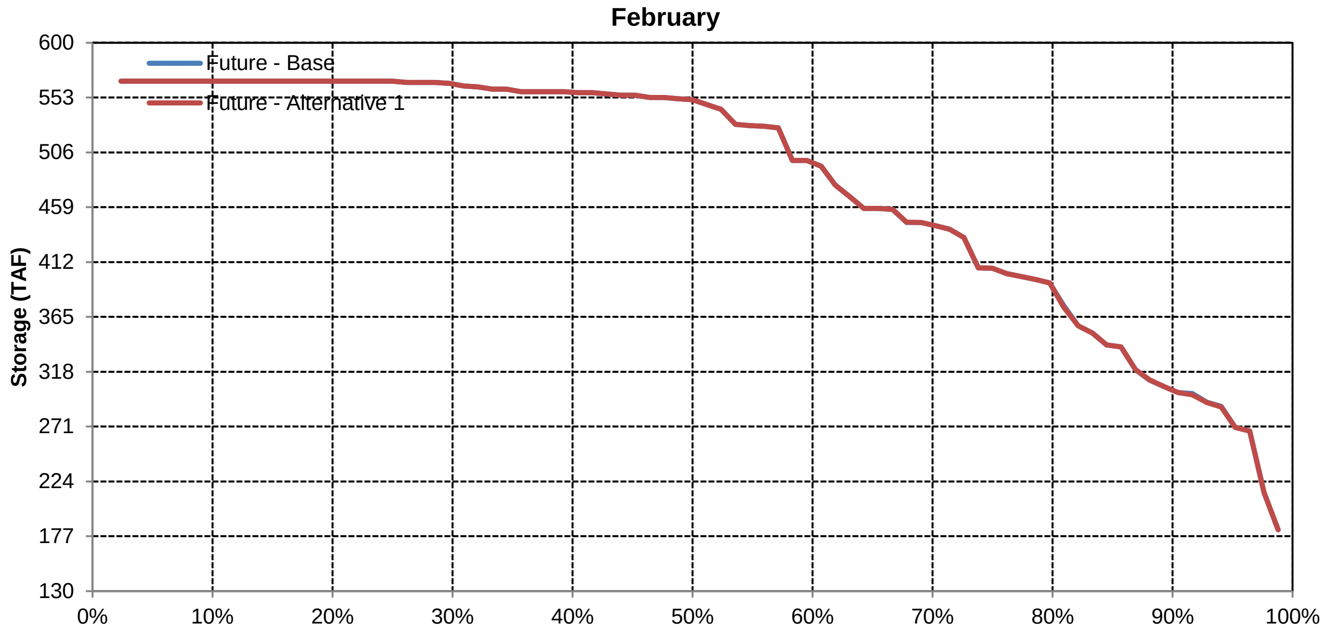


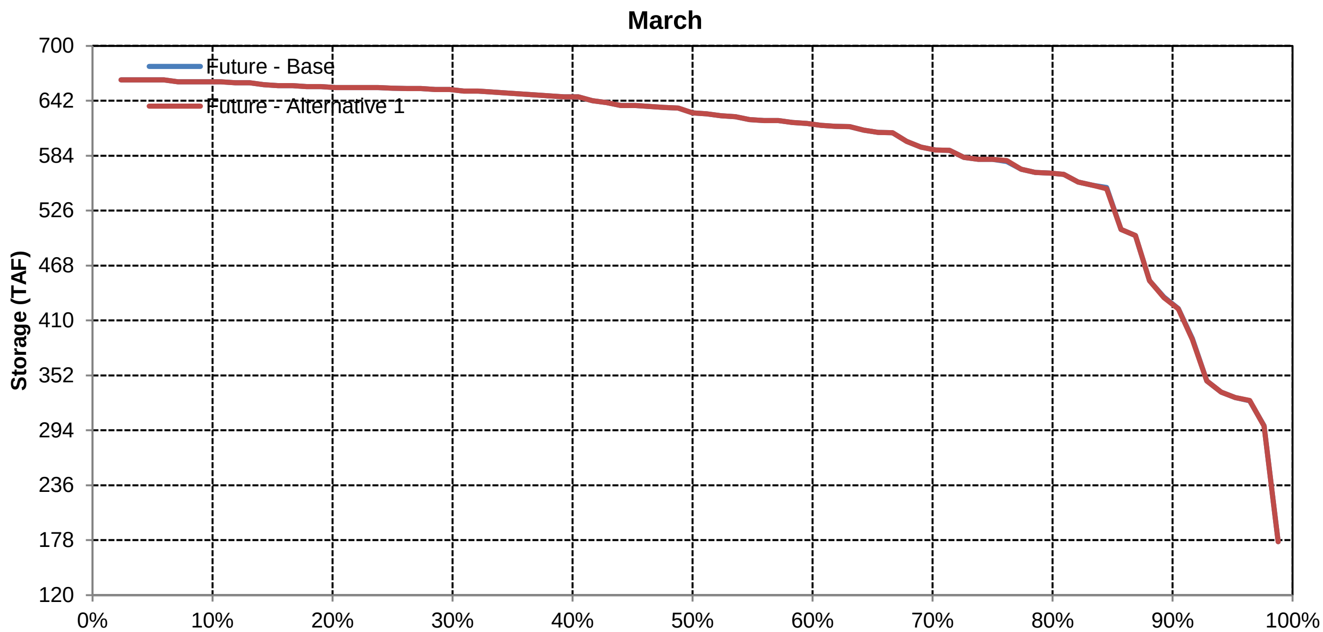
Folsom Reservoir



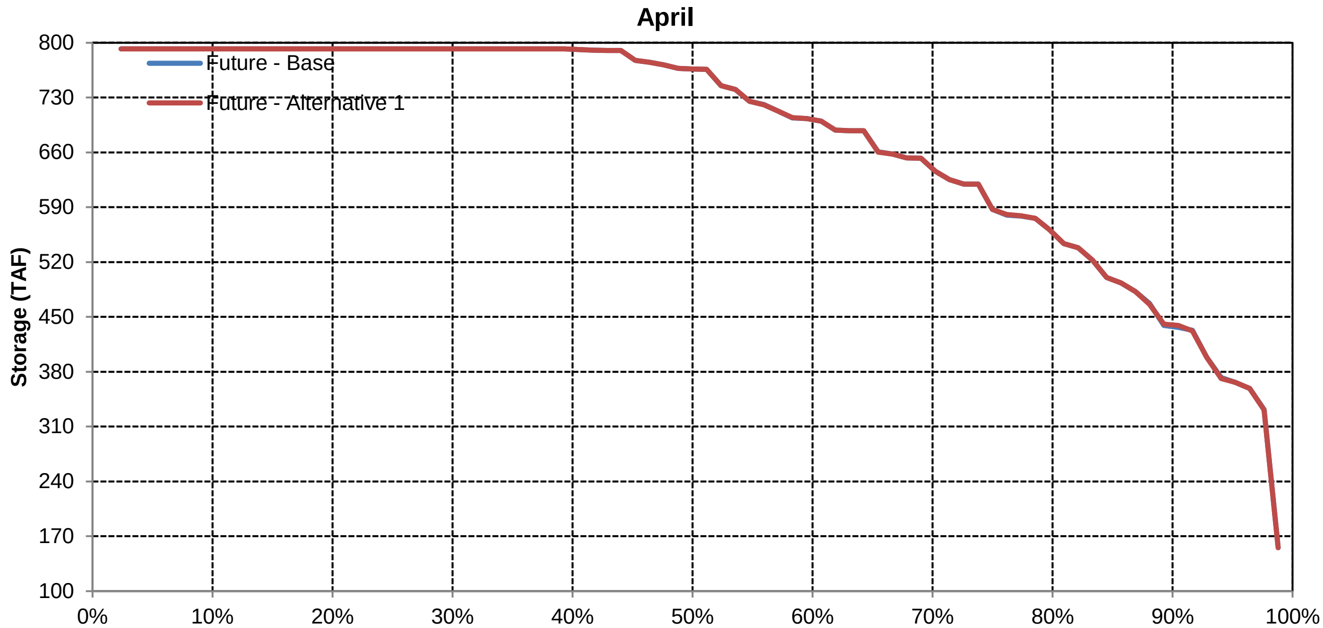


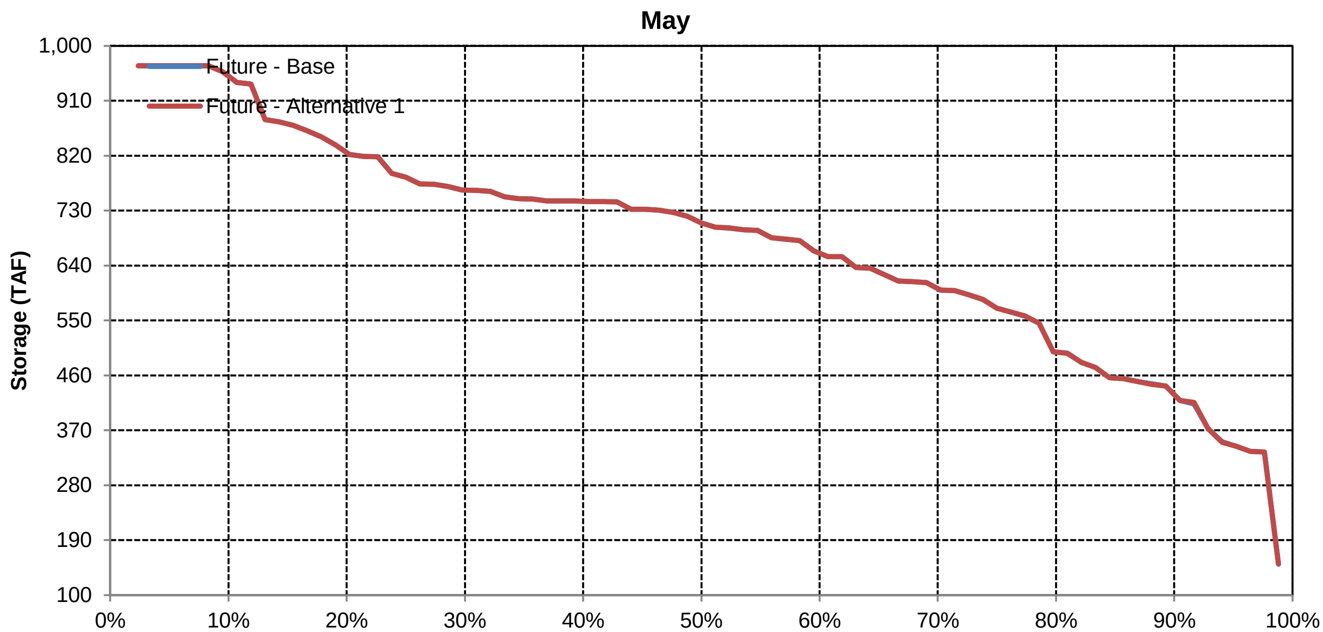
Folsom Reservoir





Folsom Reservoir





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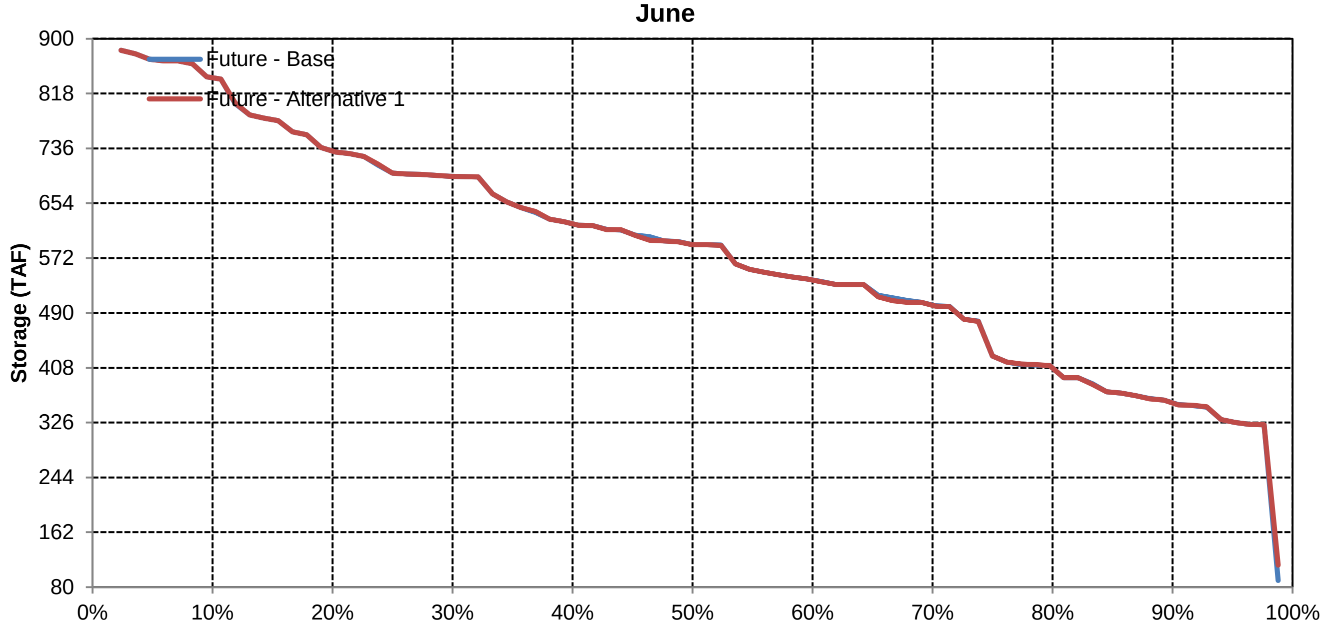
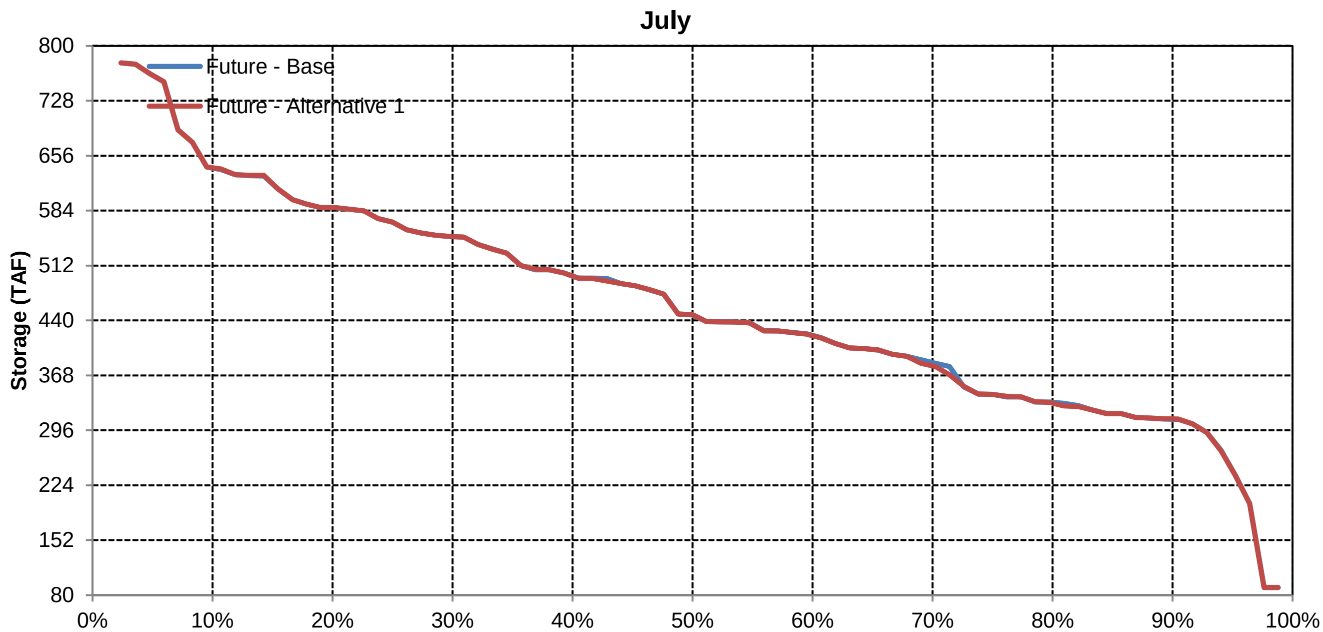
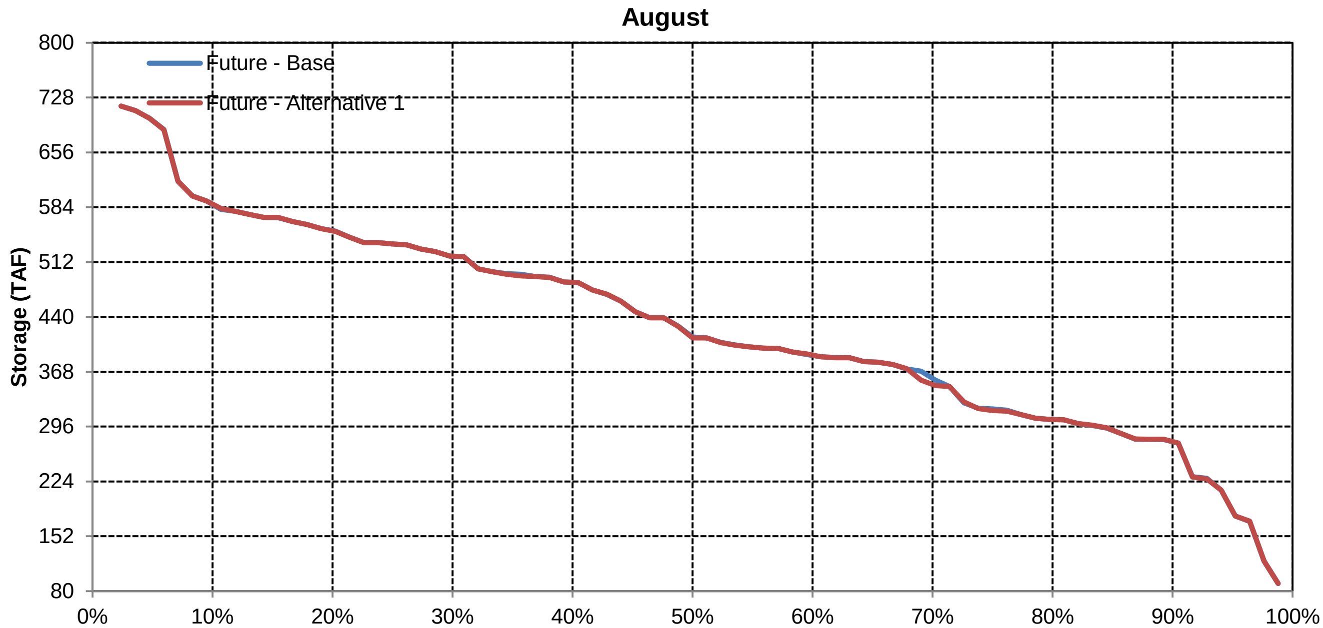
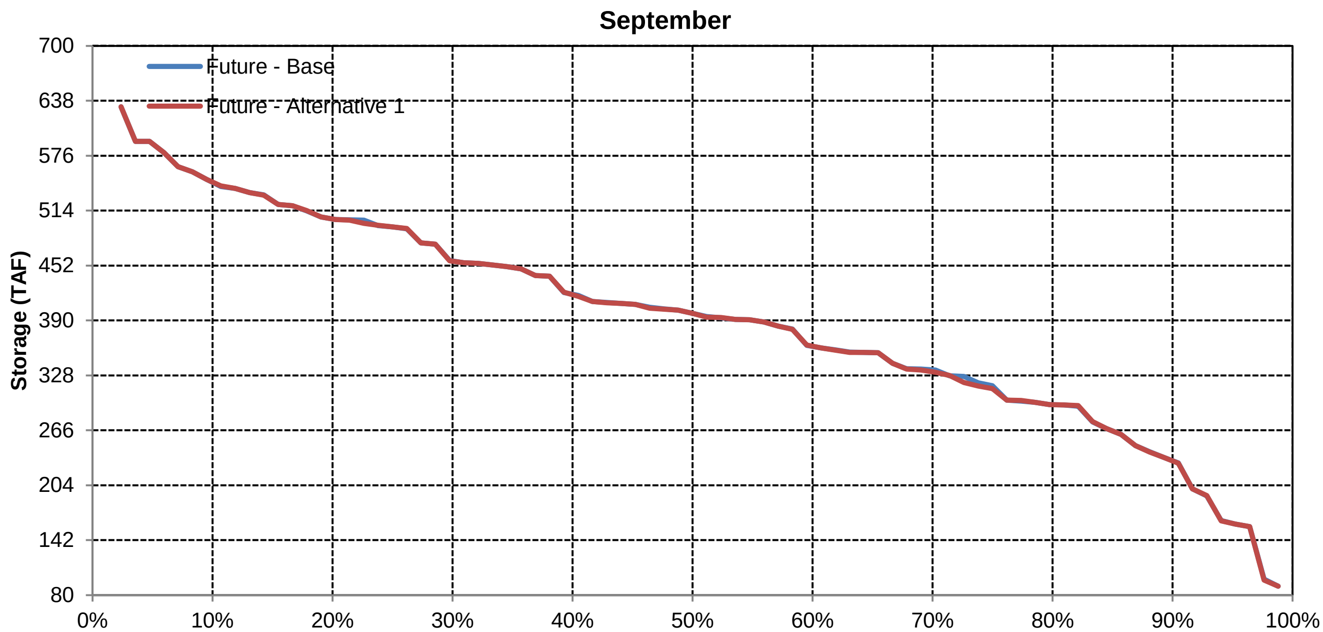




Folsom Reservoir





Long-Term and Water Year-Type Average of CVP San Luis Reservoir Under Future - Base and Future - Alternative 1

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
						Long-Term						
Full Simulation Period												
Future - Base	218	294	461	615	743	823	788	682	578	413	314	270
Future - Alternative 1	217	293	459	612	742	821	786	680	576	412	313	269
Difference	0	-1	-2	-3	-1	-2	-2	-2	-2	-1	-1	-1
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
						Water Year-Types						
Wet												
Future - Base	203	294	487	682	836	918	880	792	678	499	390	304
Future - Alternative 1	200	291	482	679	835	918	879	790	675	497	388	302
Difference	-3	-3	-5	-3	0	0	-2	-2	-3	-2	-2	-2
Percent Difference	-1%	-1%	-1%	0%	0%	0%	0%	0%	0%	0%	-1%	-1%
Above Normal												
Future - Base	215	289	456	607	754	844	802	668	594	409	303	202
Future - Alternative 1	225	299	463	614	757	844	801	667	594	409	303	202
Difference	10	10	7	7	3	0	0	0	0	0	0	0
Percent Difference	5%	3%	2%	1%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Future - Base	237	280	459	588	713	836	815	706	632	430	313	312
Future - Alternative 1	234	277	456	583	712	835	813	705	631	430	314	312
Difference	-3	-3	-3	-5	-1	-1	-1	-1	0	1	0	0
Percent Difference	-1%	-1%	-1%	-1%	0%	0%	0%	0%	0%	0%	0%	0%
Dry												
Future - Base	211	284	442	576	689	772	742	621	516	359	253	240
Future - Alternative 1	209	281	439	573	689	771	741	620	515	359	253	239
Difference	-3	-3	-2	-3	0	-1	-1	-1	-1	0	0	0
Percent Difference	-1%	-1%	-1%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical												
Future - Base	242	329	444	571	654	666	621	536	395	302	263	262
Future - Alternative 1	243	330	443	563	646	658	614	529	388	300	260	259
Difference	1	1	0	-8	-8	-8	-7	-7	-7	-2	-2	-2
Percent Difference	0%	0%	0%	-1%	-1%	-1%	-1%	-1%	-2%	-1%	-1%	-1%

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	442	574	764	972	972	972	972	909	861	675	596	517
20%	367	426	607	826	972	972	958	858	767	563	489	434
30%	272	373	528	720	942	972	913	806	702	492	413	347
40%	209	298	476	659	826	967	889	768	647	455	316	289
50%	160	269	425	581	736	883	869	715	609	394	256	223
60%	118	232	369	521	682	833	793	636	539	340	226	161
70%	90	173	327	477	630	718	665	571	458	287	190	132
80%	90	122	284	432	554	658	611	480	404	238	140	91
90%	90	90	246	370	439	573	531	393	274	197	110	90
Long Term												
Full Simulation Period	218	294	461	615	743	823	788	682	578	413	314	270
Water Year Types												
Wet	203	294	487	682	836	918	880	792	678	499	390	304
Above Normal	215	289	456	607	754	844	802	668	594	409	303	202
Below Normal	237	280	459	588	713	836	815	706	632	430	313	312
Dry	211	284	442	576	689	772	742	621	516	359	253	240
Critical	242	329	444	571	654	666	621	536	395	302	263	262

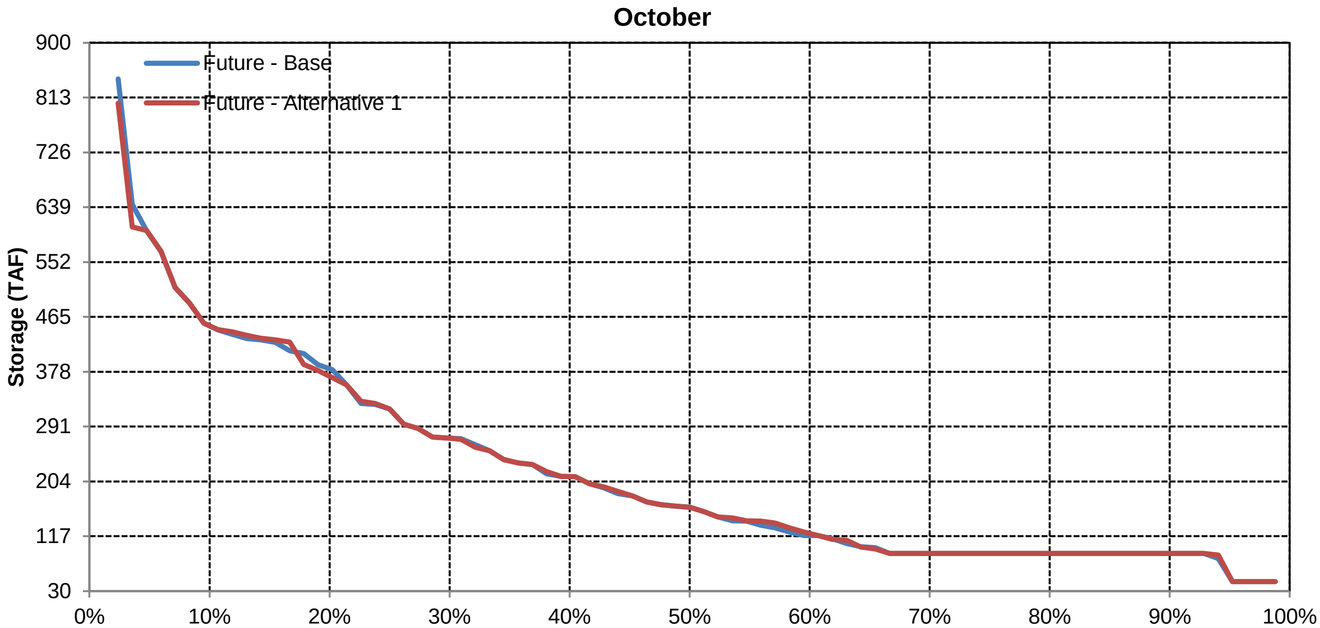
Future - Alternative 1

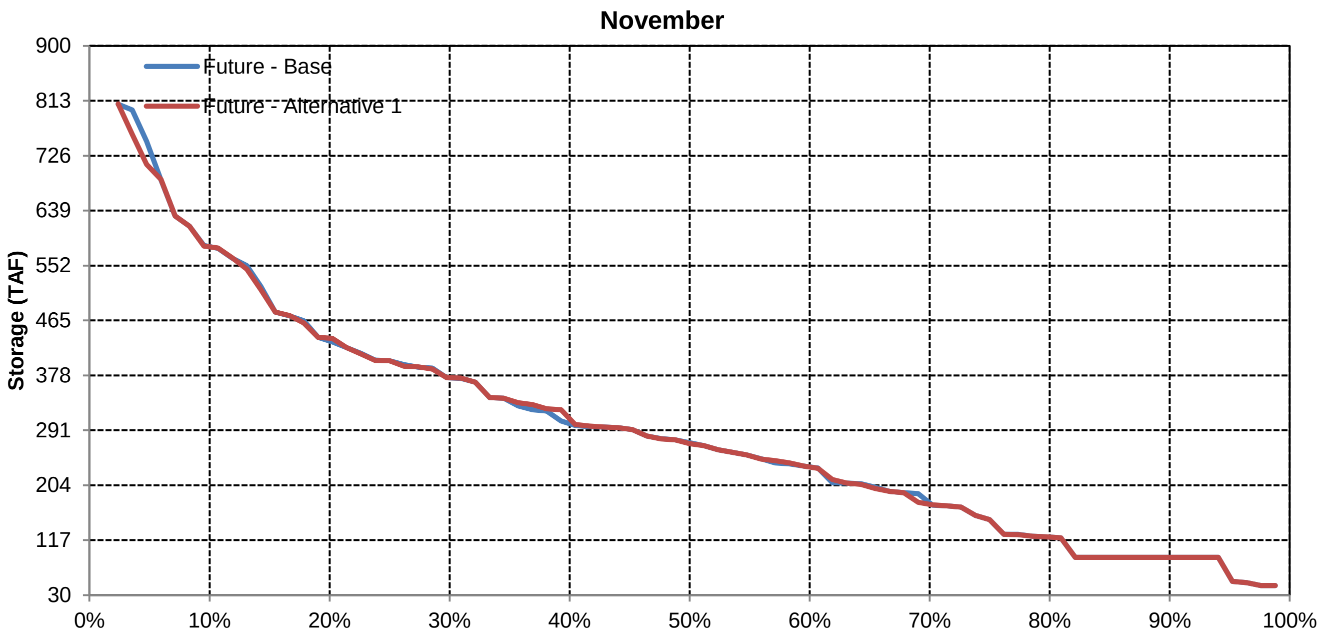
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	444	575	765	972	972	972	972	909	860	674	596	517
20%	362	428	589	827	972	972	958	858	767	563	490	432
30%	271	374	532	724	944	972	913	806	702	492	392	346
40%	209	300	473	657	825	968	887	767	644	454	316	289
50%	160	268	428	581	729	881	866	711	609	394	256	220
60%	119	232	368	513	682	832	796	641	537	340	224	166
70%	90	173	327	477	629	718	661	568	454	284	193	132
80%	90	122	275	435	552	656	610	479	402	239	140	91
90%	90	90	248	350	433	575	528	391	274	196	109	90
Long Term												
Full Simulation Period	217	293	459	612	742	821	786	680	576	412	313	269
Water Year Types												
Wet	200	291	482	679	835	918	879	790	675	497	388	302
Above Normal	225	299	463	614	757	844	801	667	594	409	303	202
Below Normal	234	277	456	583	712	835	813	705	631	430	314	312
Dry	209	281	439	573	689	771	741	620	515	359	253	239
Critical	243	330	443	563	646	658	614	529	388	300	260	259

Future - Alternative 1 Minus Future - Base

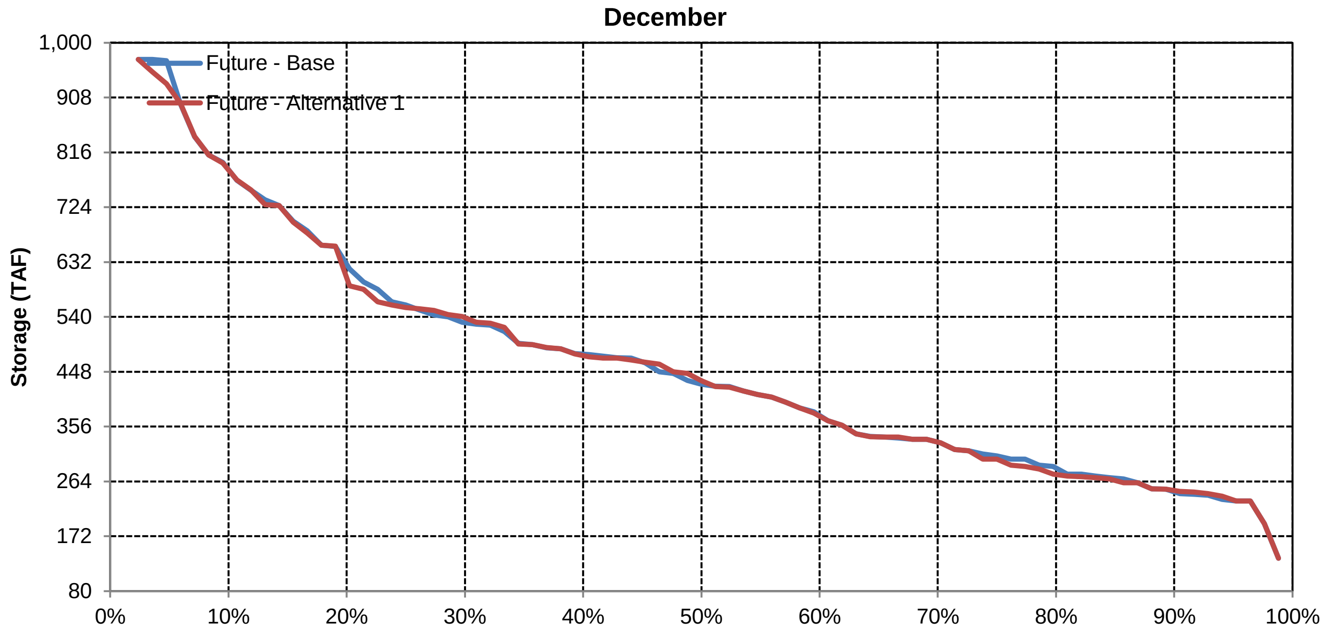
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	2	1	1	0	0	0	0	0	0	0	0	0
20%	-5	2	-19	1	0	0	0	0	0	0	0	-2
30%	-1	0	4	4	2	0	0	0	0	0	-21	-1
40%	0	2	-4	-2	0	1	-2	0	-3	-1	0	0
50%	0	-1	3	0	-8	-2	-3	-4	1	0	0	-3
60%	1	0	0	-8	-1	0	4	5	-2	1	-2	4
70%	0	0	0	0	0	0	-4	-3	-4	-3	3	0
80%	0	0	-9	3	-2	-3	-1	-1	-1	1	0	0
90%	0	0	3	-21	-6	3	-3	-2	0	0	-1	0
Long Term												
Full Simulation Period	0	-1	-2	-3	-1	-2	-2	-2	-2	-1	-1	-1
Water Year Types												
Wet	-3	-3	-5	-3	0	0	-2	-2	-3	-2	-2	-2
Above Normal	10	10	7	7	3	0	0	0	0	0	0	0
Below Normal	-3	-3	-3	-5	-1	-1	-1	-1	0	1	0	0
Dry	-3	-3	-2	-3	0	-1	-1	-1	-1	0	0	0
Critical	1	1	0	-8	-8	-8	-7	-7	-7	-2	-2	-2

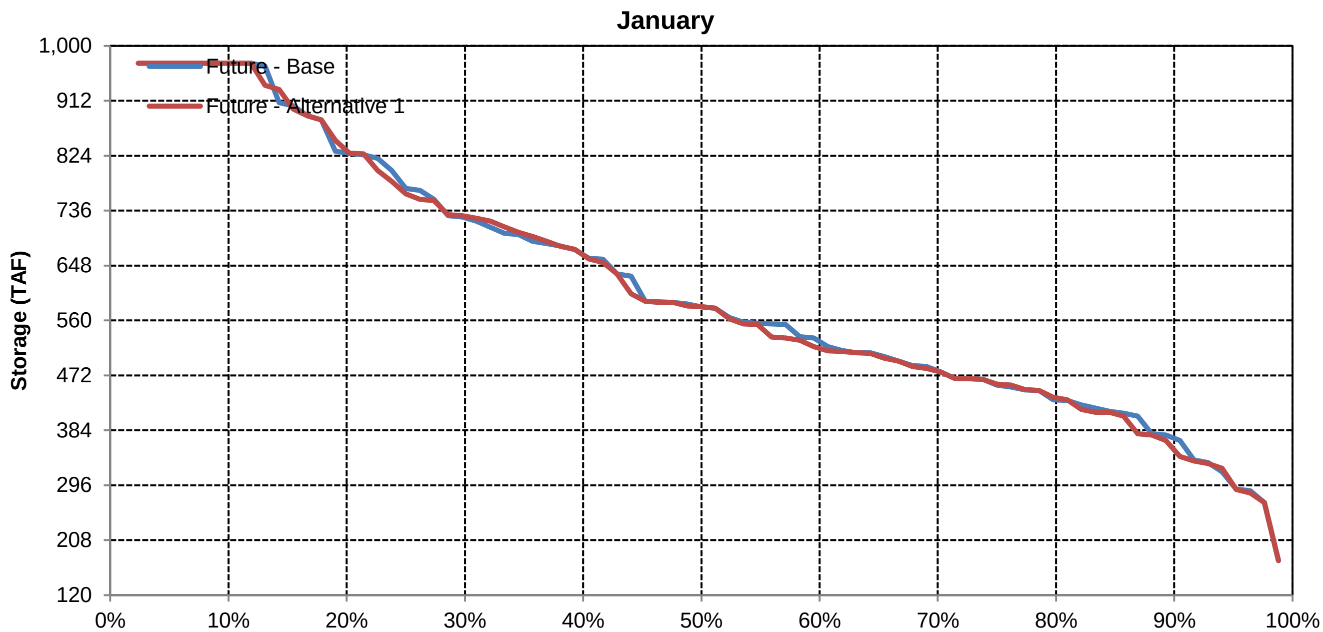
CVP San Luis Reservoir



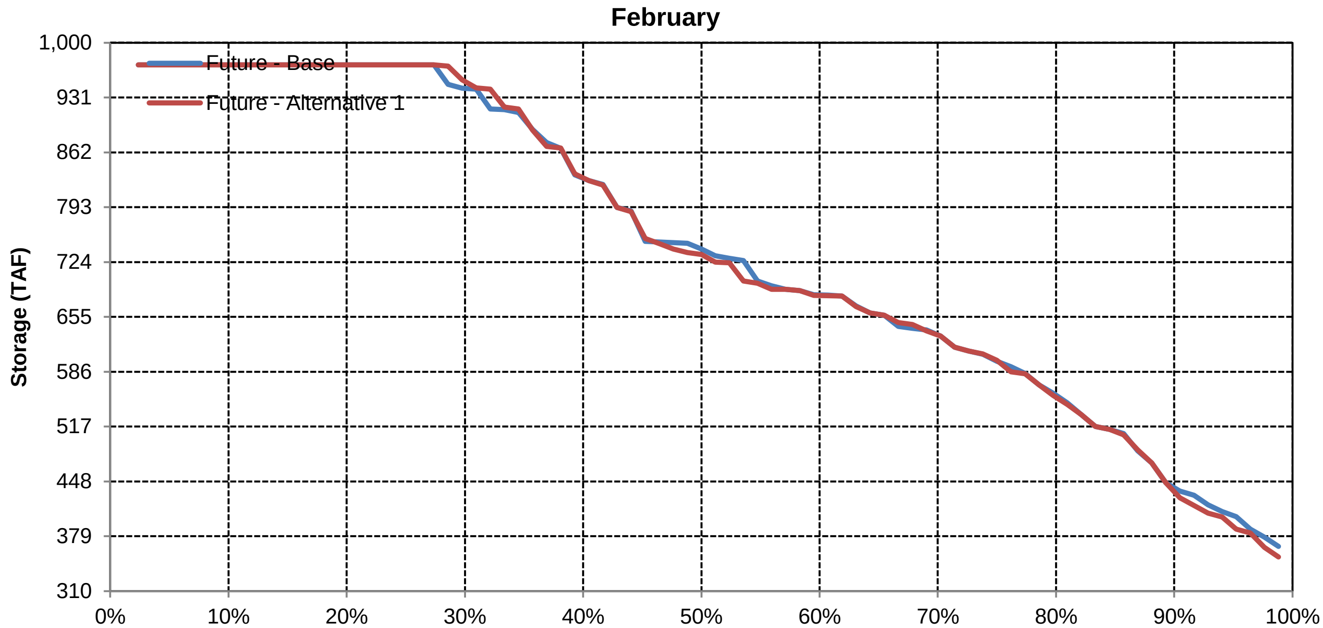


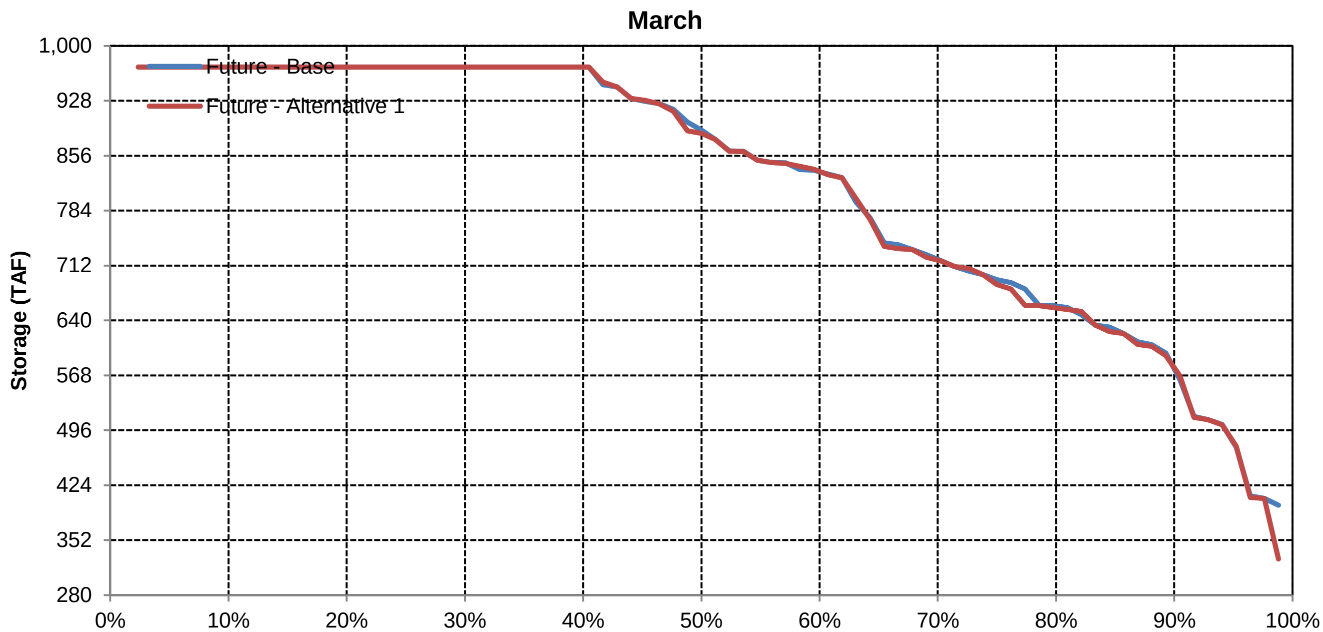
CVP San Luis Reservoir





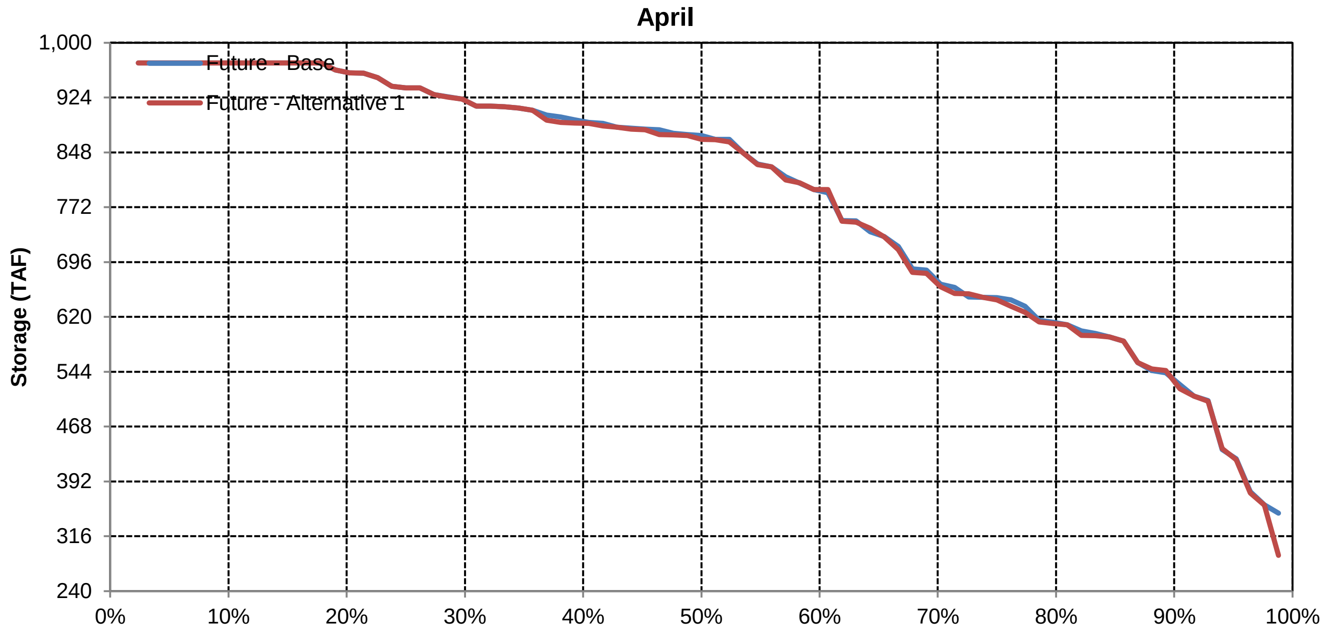
CVP San Luis Reservoir

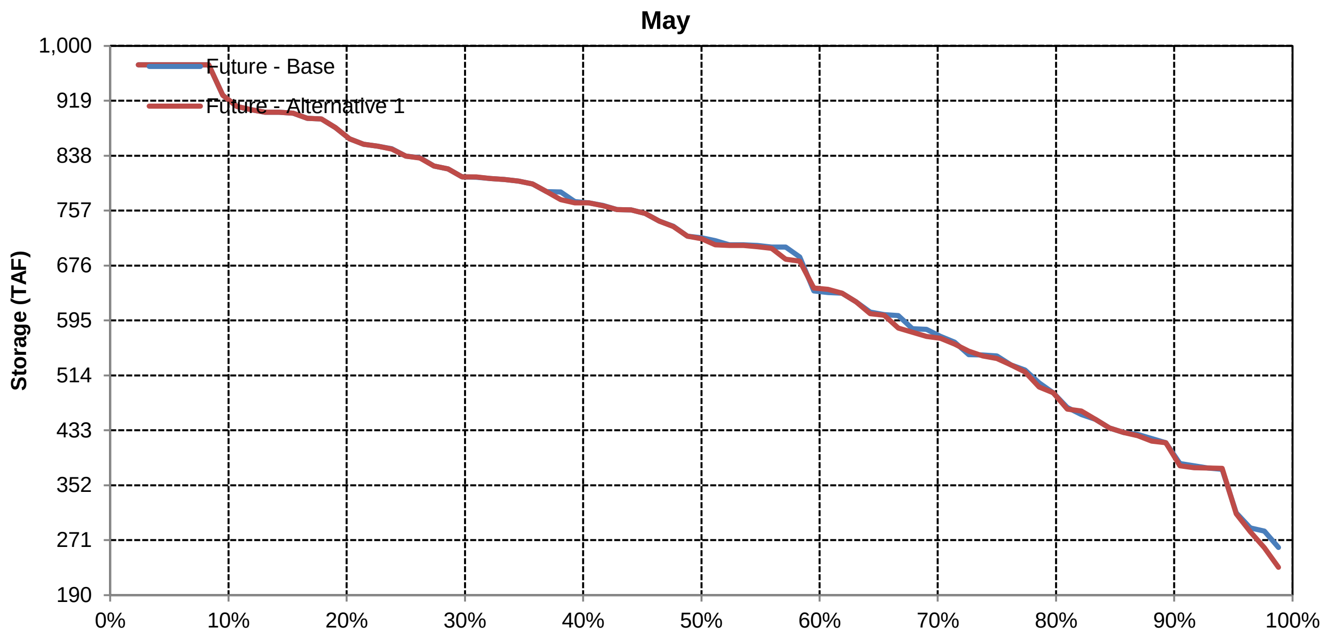




S11

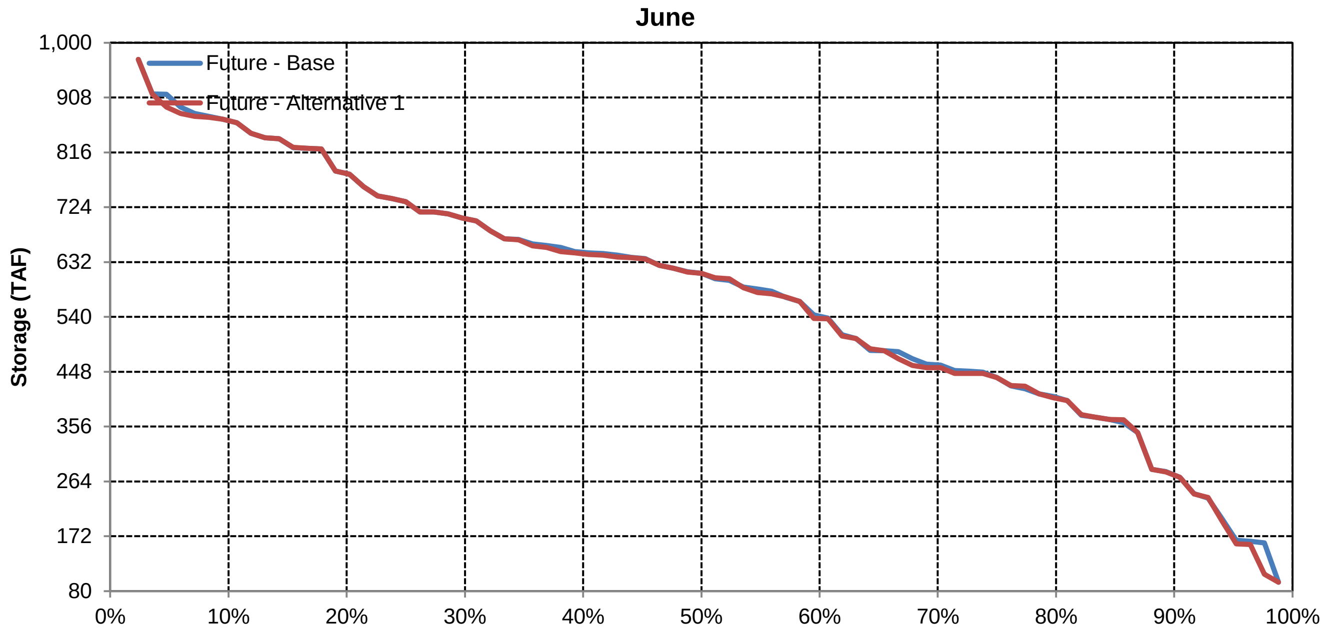
CVP San Luis Reservoir

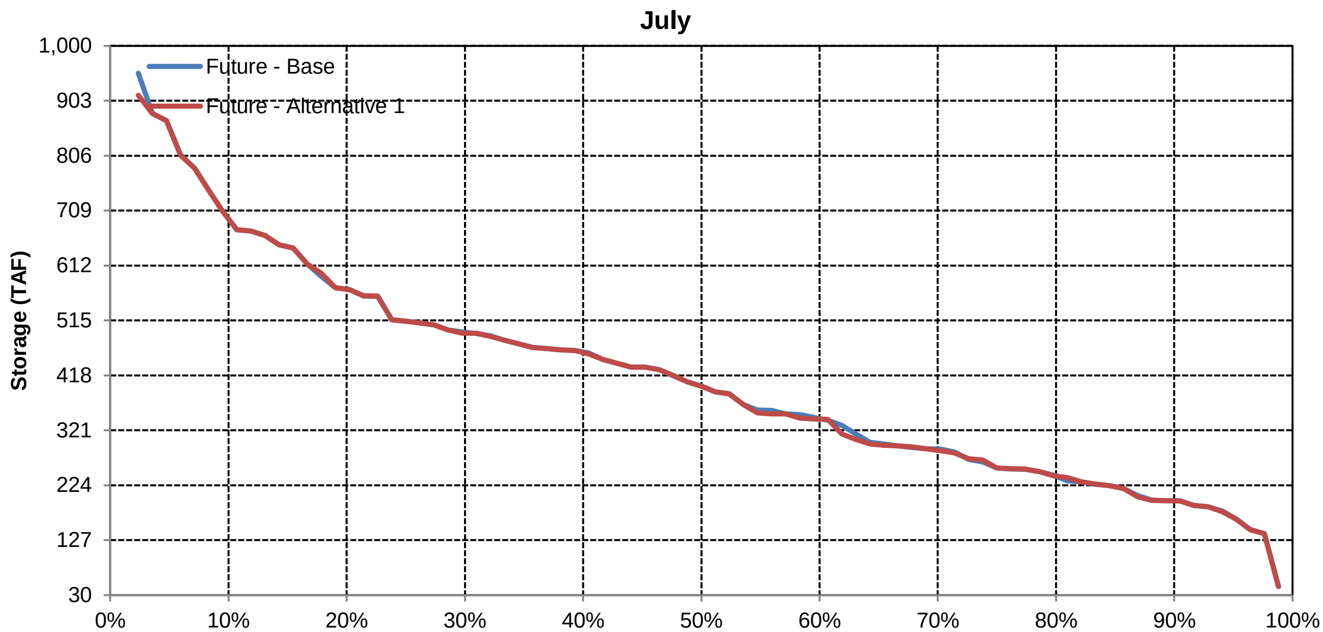




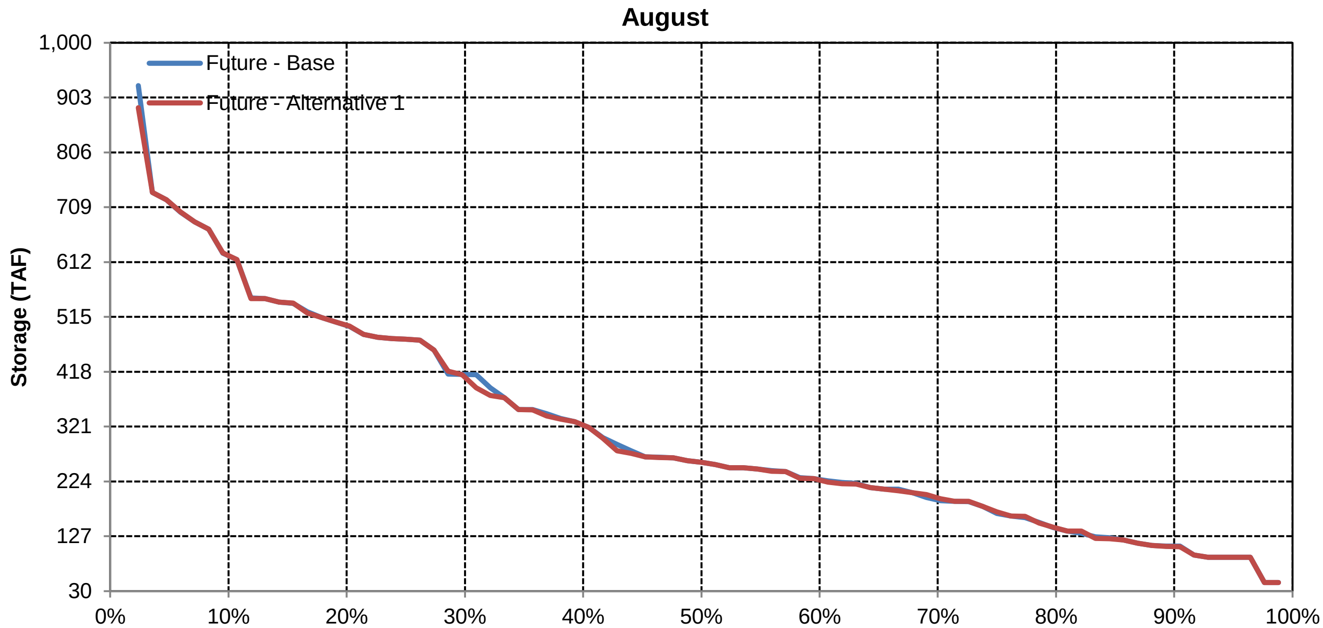
S11

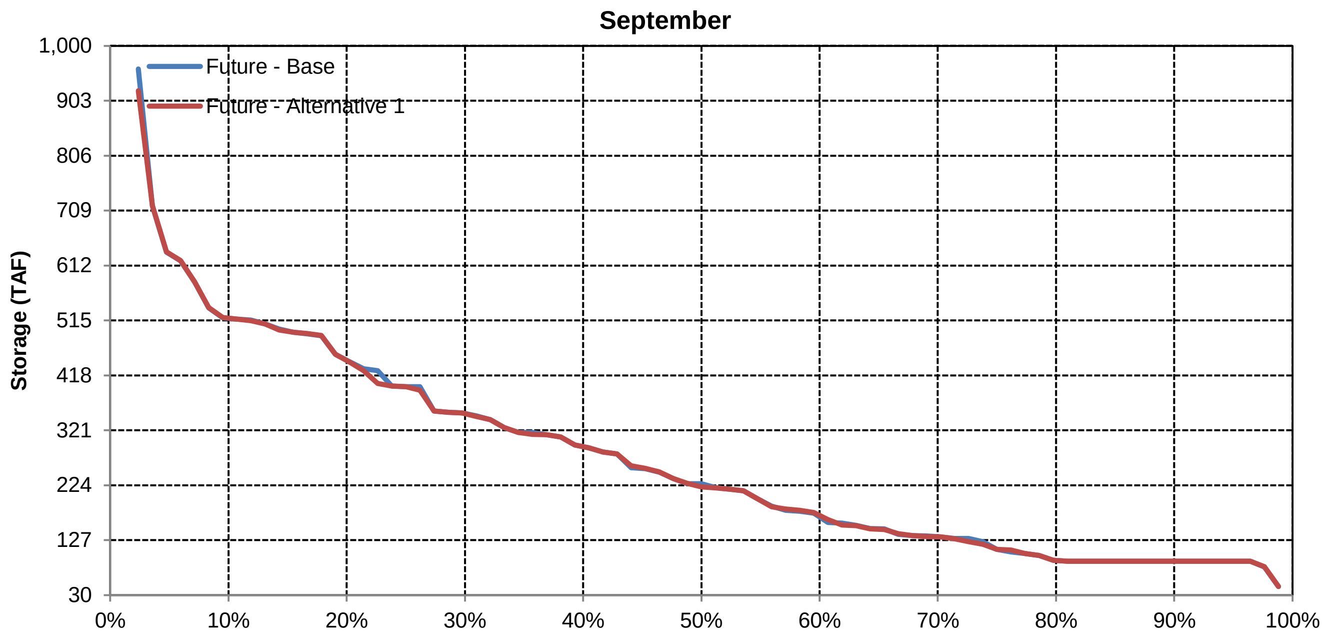
CVP San Luis Reservoir





CVP San Luis Reservoir





Long-Term and Water Year-Type Average of SWP San Luis Reservoir Under Future - Base and Future - Alternative 1

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
						Long-Term						
Full Simulation Period												
Future - Base	181	218	351	573	767	885	811	640	506	467	355	257
Future - Alternative 1	181	218	350	571	764	882	808	638	504	467	354	257
Difference	0	0	-1	-3	-3	-3	-3	-2	-2	-1	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
						Water Year-Types						
Wet												
Future - Base	203	282	505	823	1,011	1,058	951	746	542	550	458	320
Future - Alternative 1	205	285	507	822	1,009	1,058	950	746	543	551	458	319
Difference	2	3	2	0	-2	0	-1	-1	1	1	0	-1
Percent Difference	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal												
Future - Base	154	177	288	602	890	1,035	904	639	536	533	415	285
Future - Alternative 1	151	174	278	594	887	1,032	902	637	535	532	413	284
Difference	-3	-3	-10	-8	-4	-2	-2	-2	-1	-1	-1	-1
Percent Difference	-2%	-2%	-4%	-1%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Future - Base	158	169	276	398	650	887	815	629	522	492	321	226
Future - Alternative 1	159	170	277	397	647	885	813	627	520	490	320	225
Difference	0	1	1	-1	-3	-2	-2	-2	-2	-2	-1	-1
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry												
Future - Base	169	206	304	453	620	767	724	597	504	425	286	210
Future - Alternative 1	168	206	303	450	617	764	721	596	504	424	286	210
Difference	0	0	-1	-2	-3	-3	-3	-2	-1	0	0	0
Percent Difference	0%	0%	0%	-1%	0%	0%	0%	0%	0%	0%	0%	0%
Critical												
Future - Base	203	190	237	399	497	565	563	496	384	272	225	207
Future - Alternative 1	203	189	237	394	489	556	554	489	374	269	226	211
Difference	-1	0	0	-6	-8	-9	-9	-7	-9	-3	1	4
Percent Difference	0%	0%	0%	-1%	-2%	-2%	-2%	-1%	-2%	-1%	0%	2%

SWP San Luis Reservoir

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	315	489	775	1,067	1,067	1,067	1,021	828	699	642	503	311
20%	247	327	590	954	1,067	1,067	959	755	649	601	410	291
30%	211	266	394	761	1,067	1,067	945	701	621	551	383	268
40%	165	235	339	664	984	1,067	921	680	601	539	371	243
50%	145	178	282	538	818	1,067	897	643	567	505	355	237
60%	128	94	223	455	664	944	869	621	492	462	333	225
70%	114	55	183	369	597	745	733	586	381	341	315	210
80%	90	55	116	243	482	636	621	505	332	279	229	196
90%	55	55	59	155	322	485	503	404	248	235	165	156
Long Term												
Full Simulation Period	181	218	351	573	767	885	811	640	506	467	355	257
Water Year Types												
Wet	203	282	505	823	1,011	1,058	951	746	542	550	458	320
Above Normal	154	177	288	602	890	1,035	904	639	536	533	415	285
Below Normal	158	169	276	398	650	887	815	629	522	492	321	226
Dry	169	206	304	453	620	767	724	597	504	425	286	210
Critical	203	190	237	399	497	565	563	496	384	272	225	207

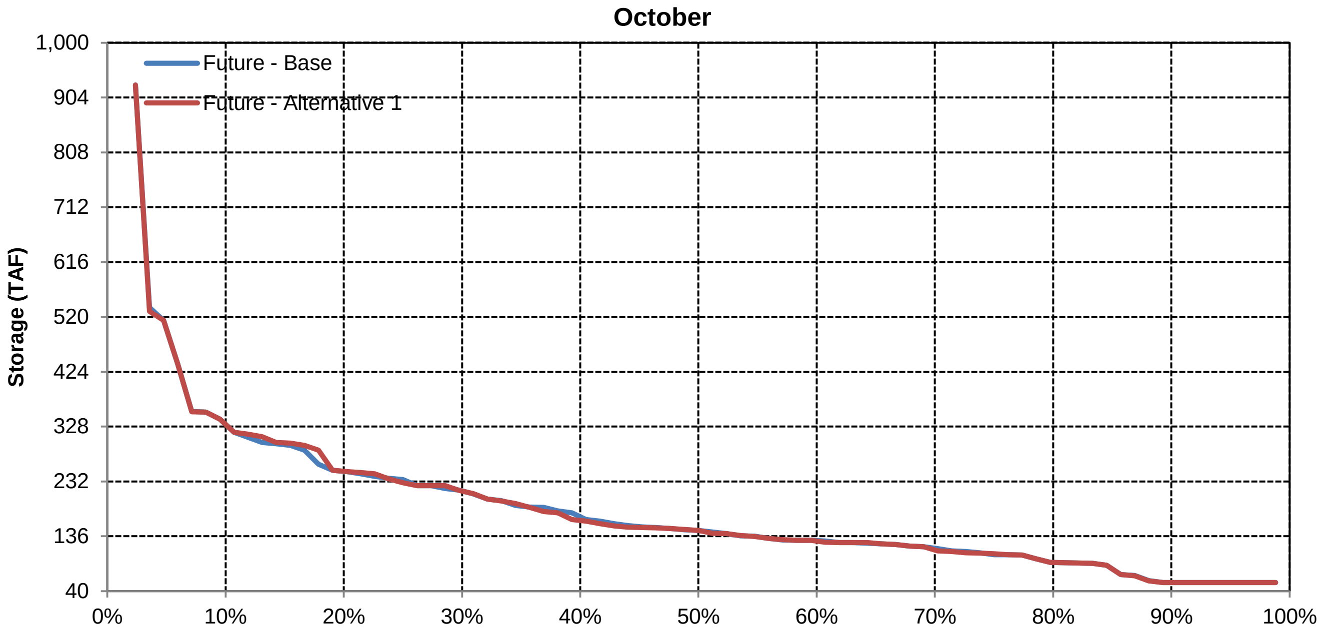
Future - Alternative 1

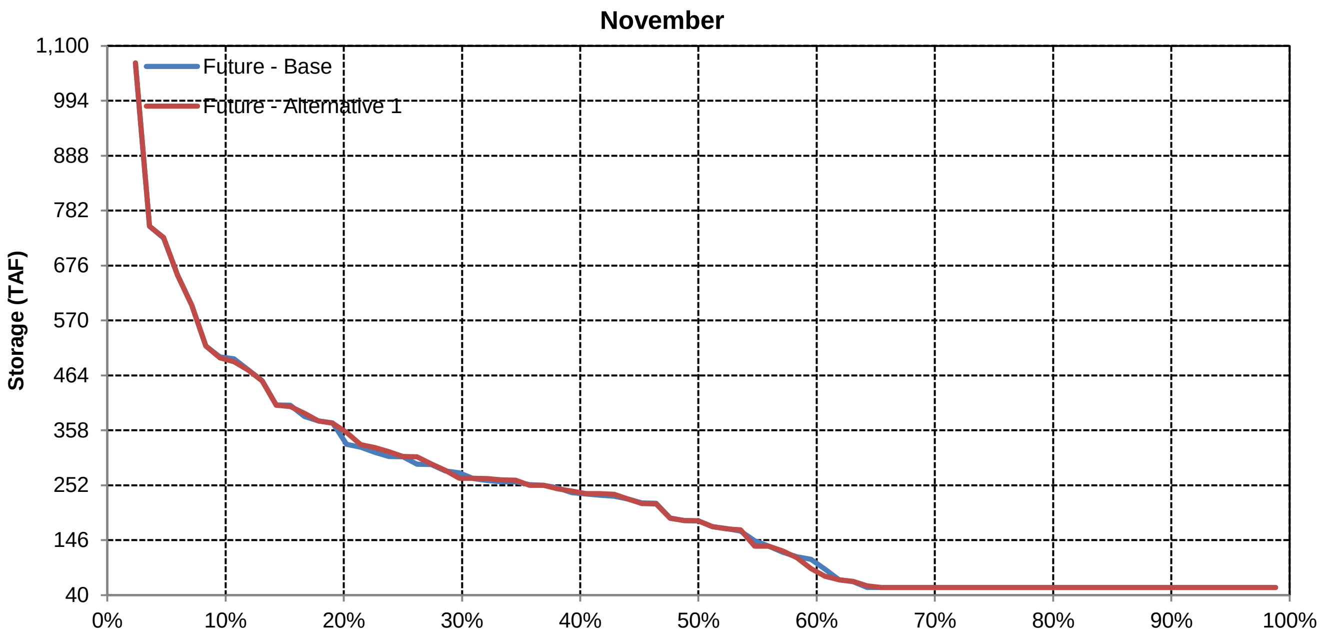
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	317	485	780	1,067	1,067	1,067	1,019	829	698	638	505	316
20%	248	340	588	972	1,067	1,067	957	755	642	602	411	291
30%	211	265	402	744	1,067	1,067	945	700	621	552	383	269
40%	161	236	334	641	985	1,067	915	679	598	539	371	243
50%	144	178	284	528	810	1,067	897	643	566	505	354	237
60%	126	79	212	413	664	945	867	621	486	462	335	225
70%	110	55	173	360	586	743	732	586	381	342	315	210
80%	90	55	117	240	470	626	612	490	311	278	224	196
90%	55	55	59	154	316	468	487	396	248	230	167	153
Long Term												
Full Simulation Period	181	218	350	571	764	882	808	638	504	467	354	257
Water Year Types												
Wet	205	285	507	822	1,009	1,058	950	746	543	551	458	319
Above Normal	151	174	278	594	887	1,032	902	637	535	532	413	284
Below Normal	159	170	277	397	647	885	813	627	520	490	320	225
Dry	168	206	303	450	617	764	721	596	504	424	286	210
Critical	203	189	237	394	489	556	554	489	374	269	226	211

Future - Alternative 1 Minus Future - Base

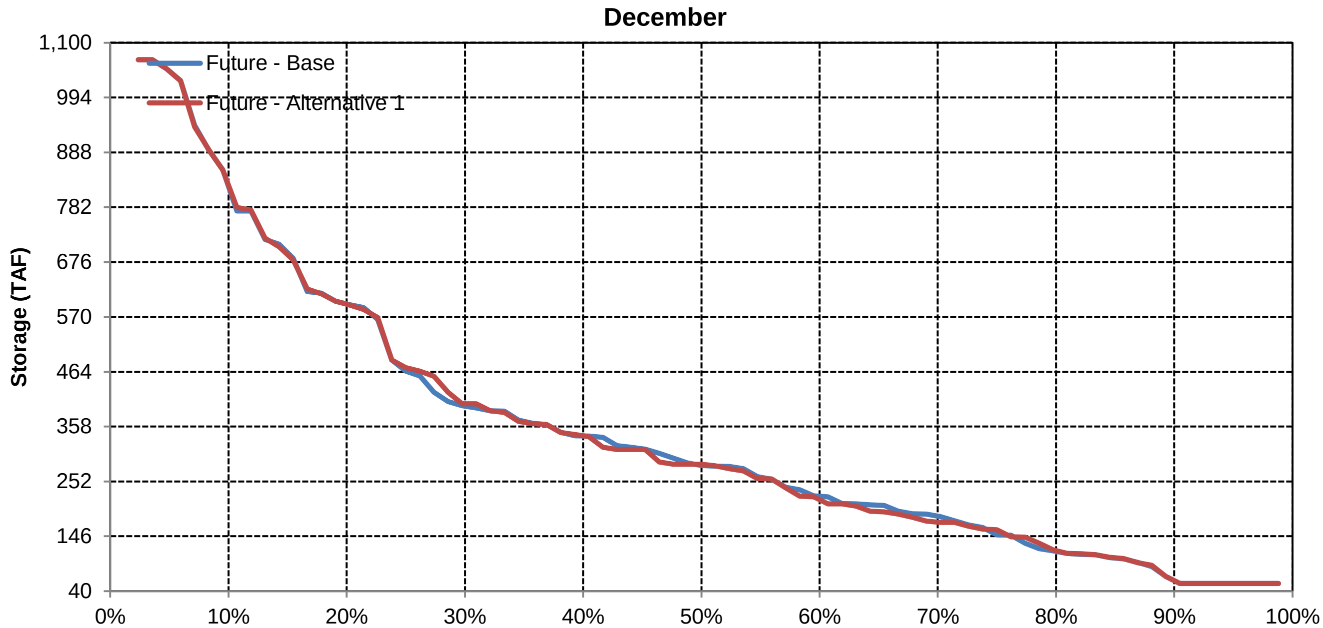
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	2	-4	5	0	0	0	-2	0	0	-4	3	5
20%	1	12	-3	18	0	0	-2	0	-6	0	1	0
30%	0	-1	8	-18	0	0	0	-1	0	1	0	0
40%	-3	1	-5	-23	1	0	-6	-1	-4	0	0	0
50%	-1	0	1	-10	-8	0	0	0	-1	0	-1	-1
60%	-2	-14	-11	-42	0	1	-2	0	-6	0	2	0
70%	-4	0	-10	-9	-12	-2	-2	0	0	1	0	0
80%	0	0	1	-2	-12	-10	-10	-16	-21	-1	-5	0
90%	0	0	0	0	-6	-17	-16	-9	0	-5	2	-3
Long Term												
Full Simulation Period	0	0	-1	-3	-3	-3	-3	-2	-2	-1	0	0
Water Year Types												
Wet	2	3	2	0	-2	0	-1	-1	1	1	0	-1
Above Normal	-3	-3	-10	-8	-4	-2	-2	-2	-1	-1	-1	-1
Below Normal	0	1	1	-1	-3	-2	-2	-2	-2	-2	-1	-1
Dry	0	0	-1	-2	-3	-3	-3	-2	-1	0	0	0
Critical	-1	0	0	-6	-8	-9	-9	-7	-9	-3	1	4

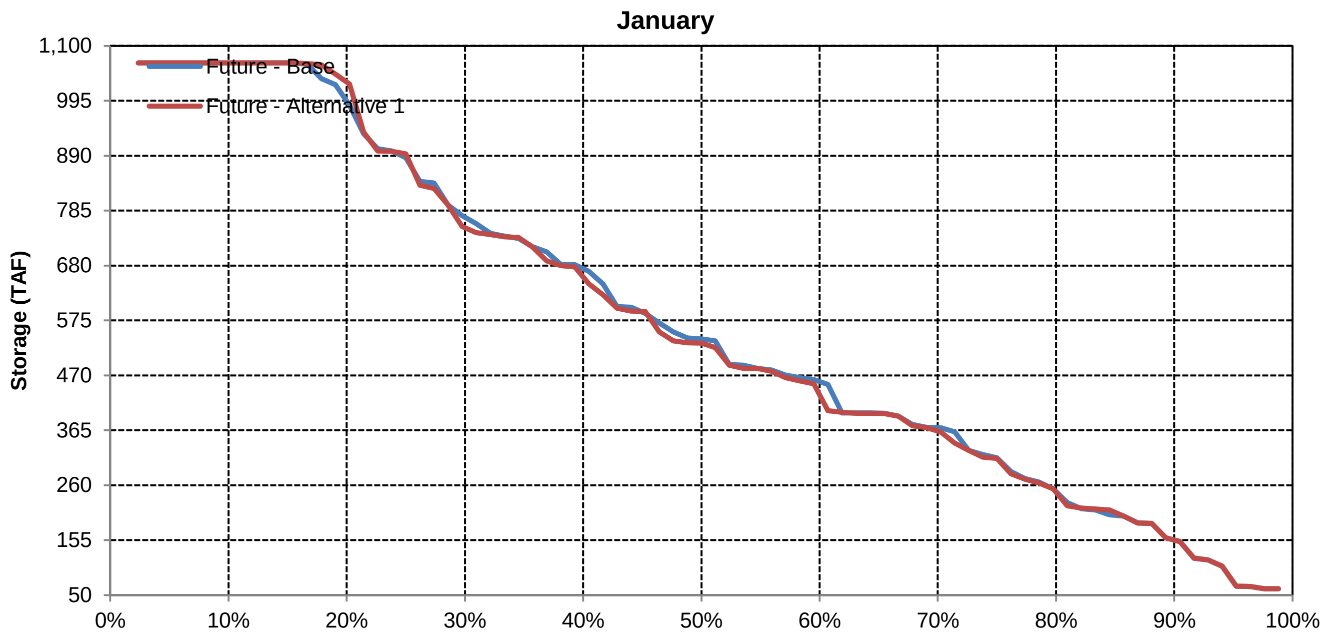
SWP San Luis Reservoir



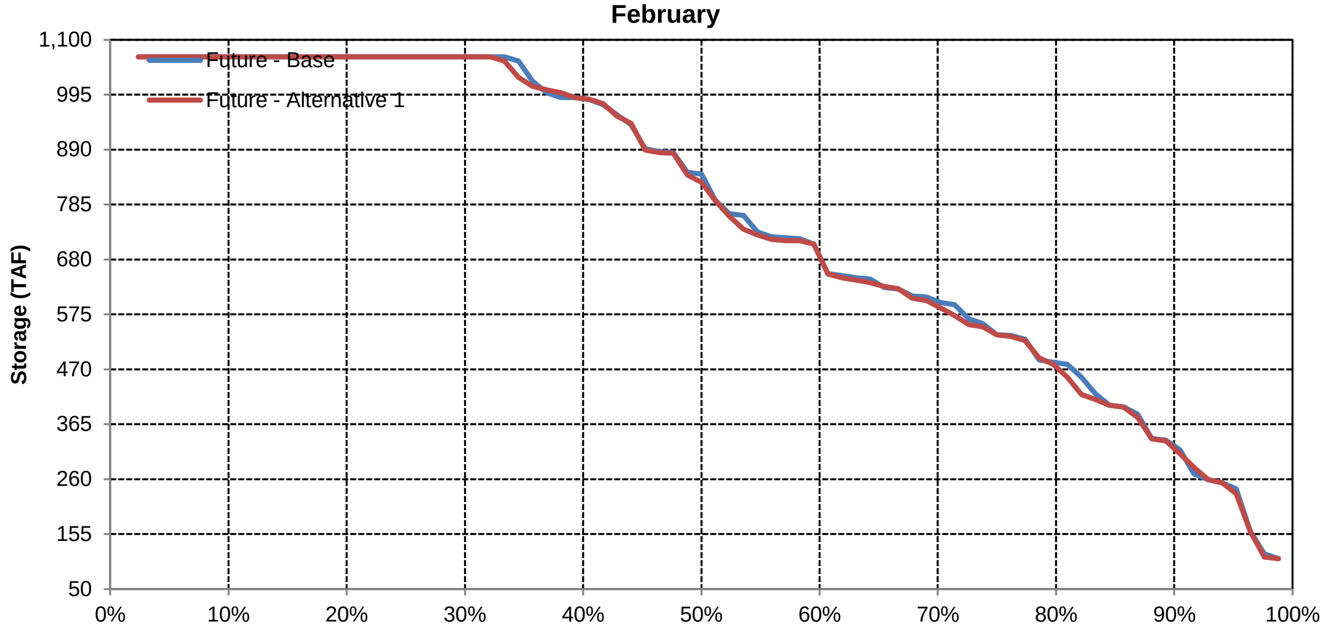


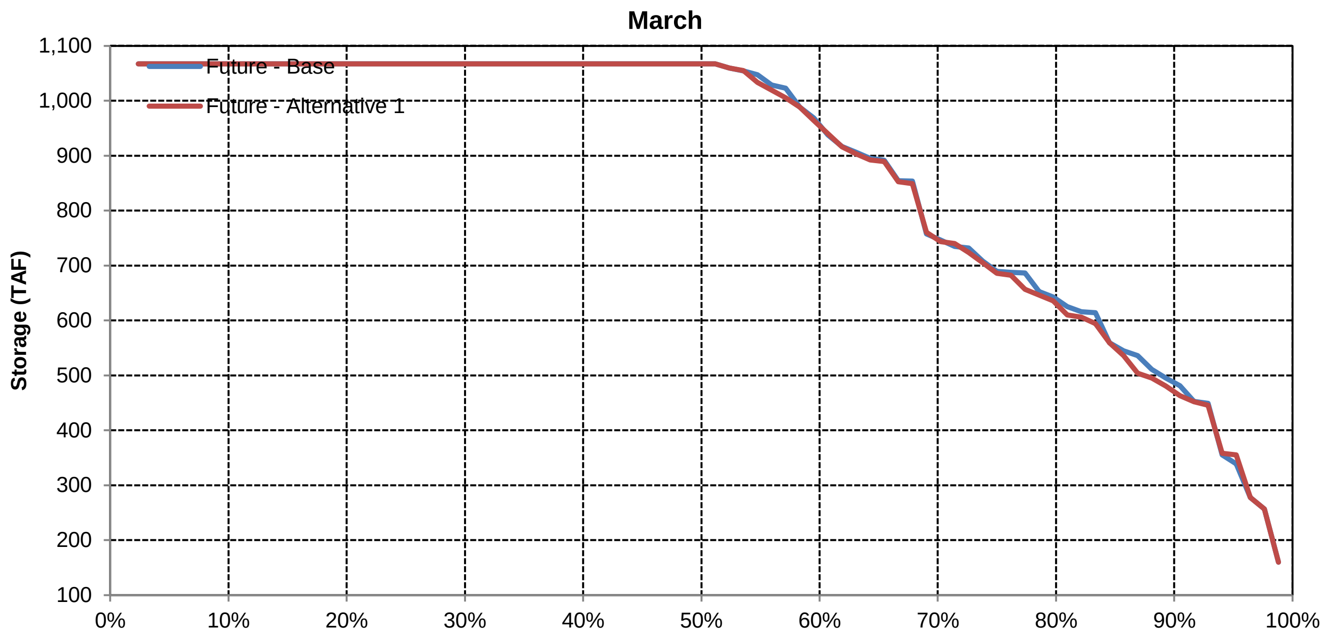
SWP San Luis Reservoir





SWP San Luis Reservoir





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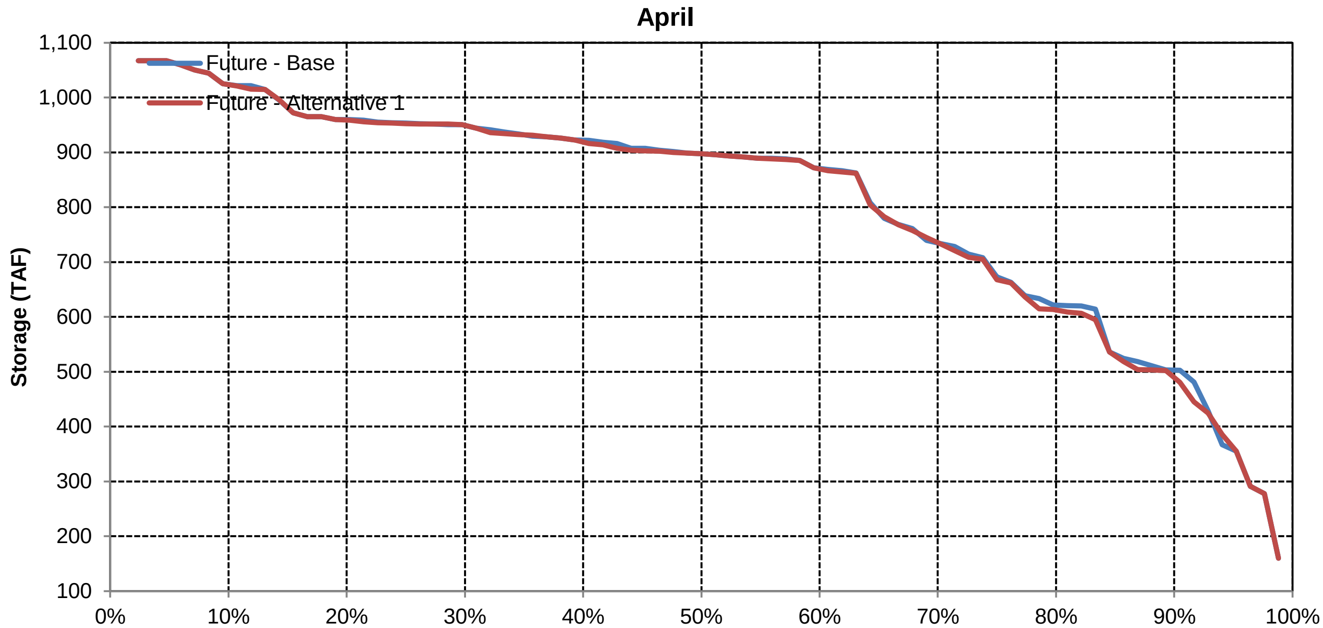
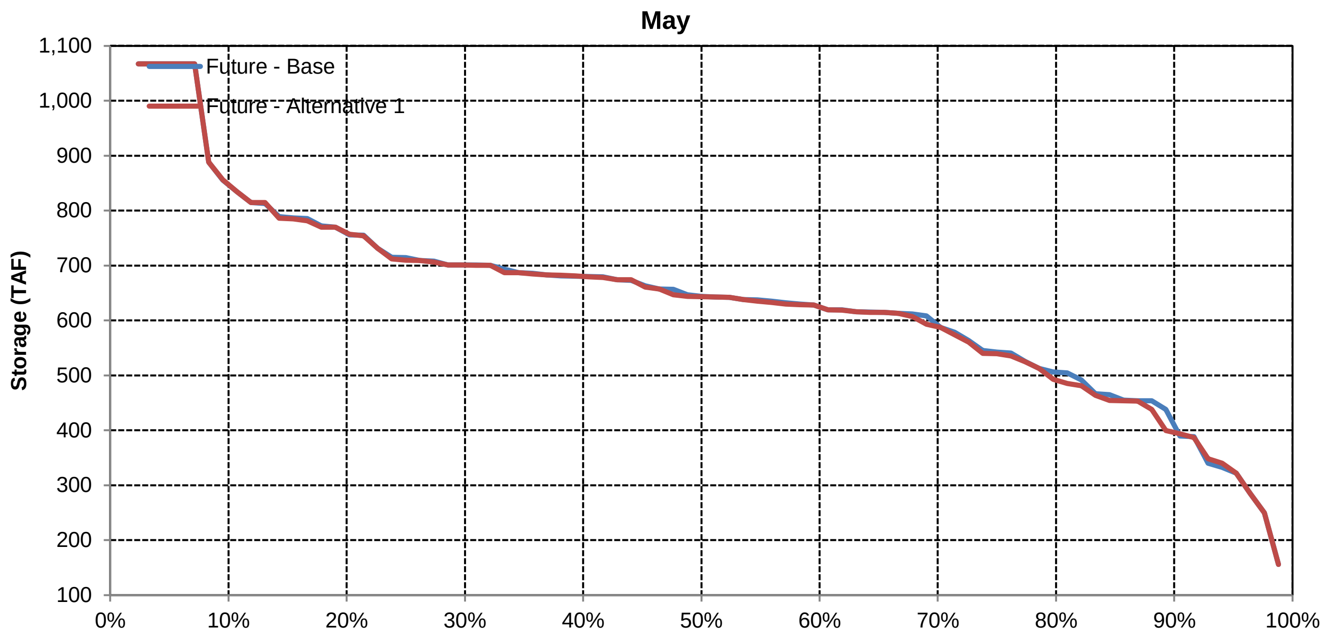
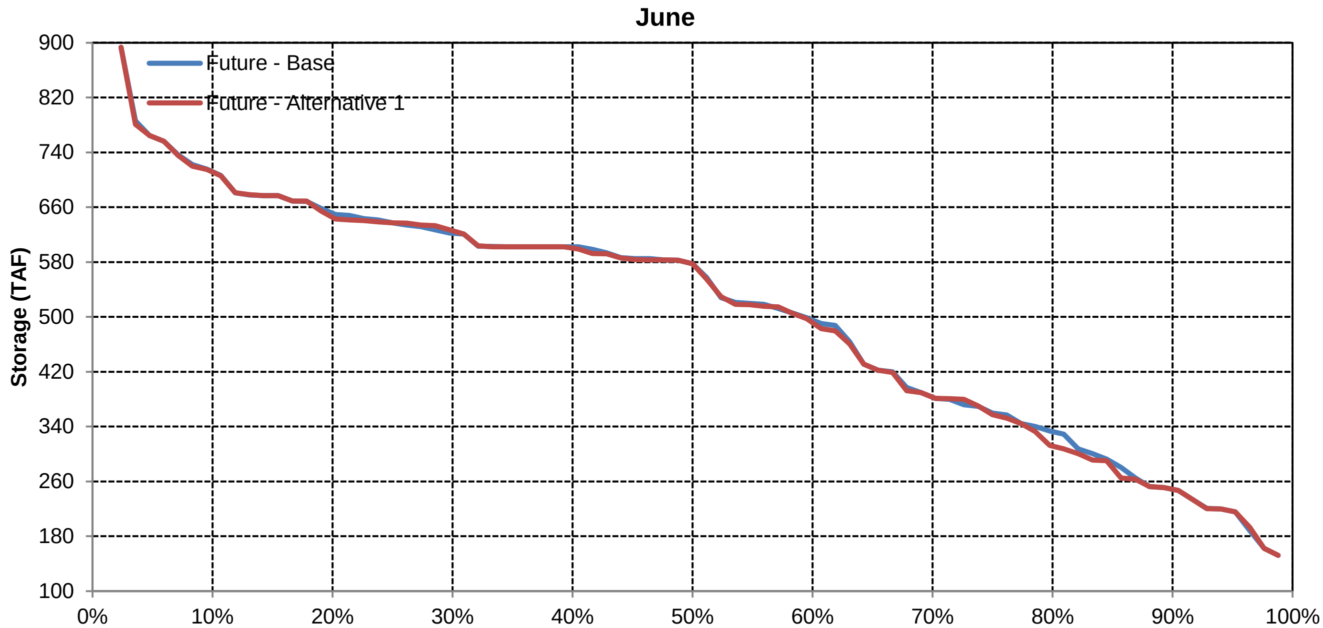
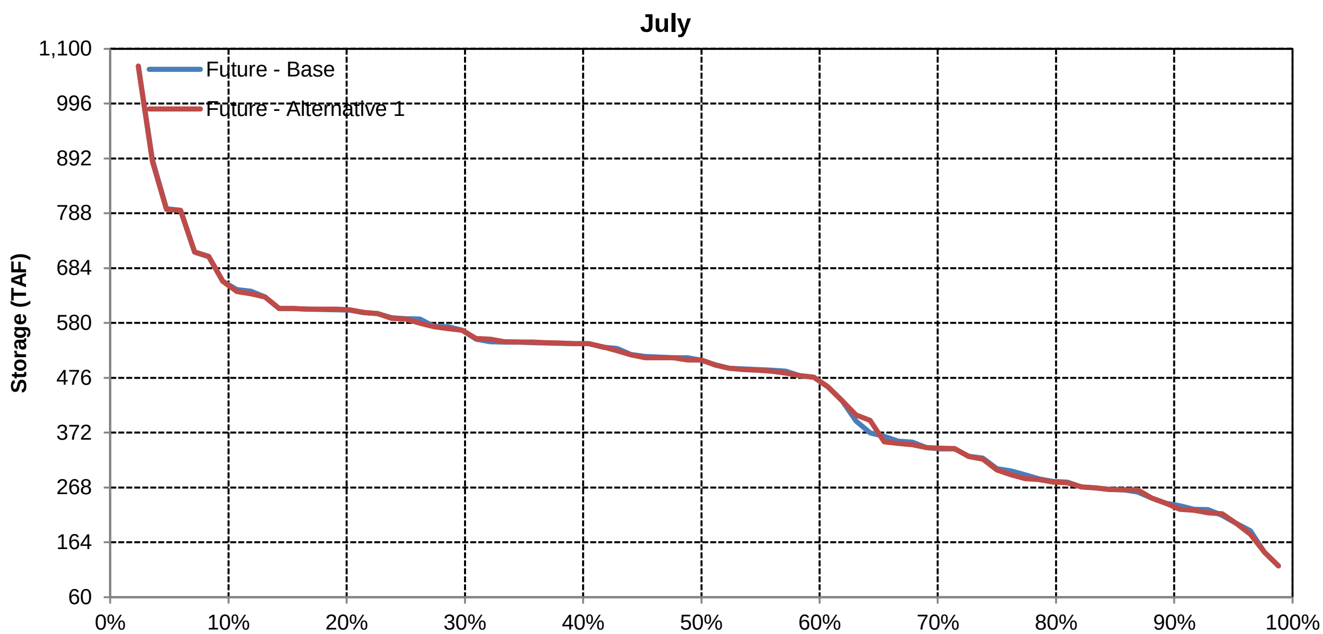




SWP San Luis Reservoir





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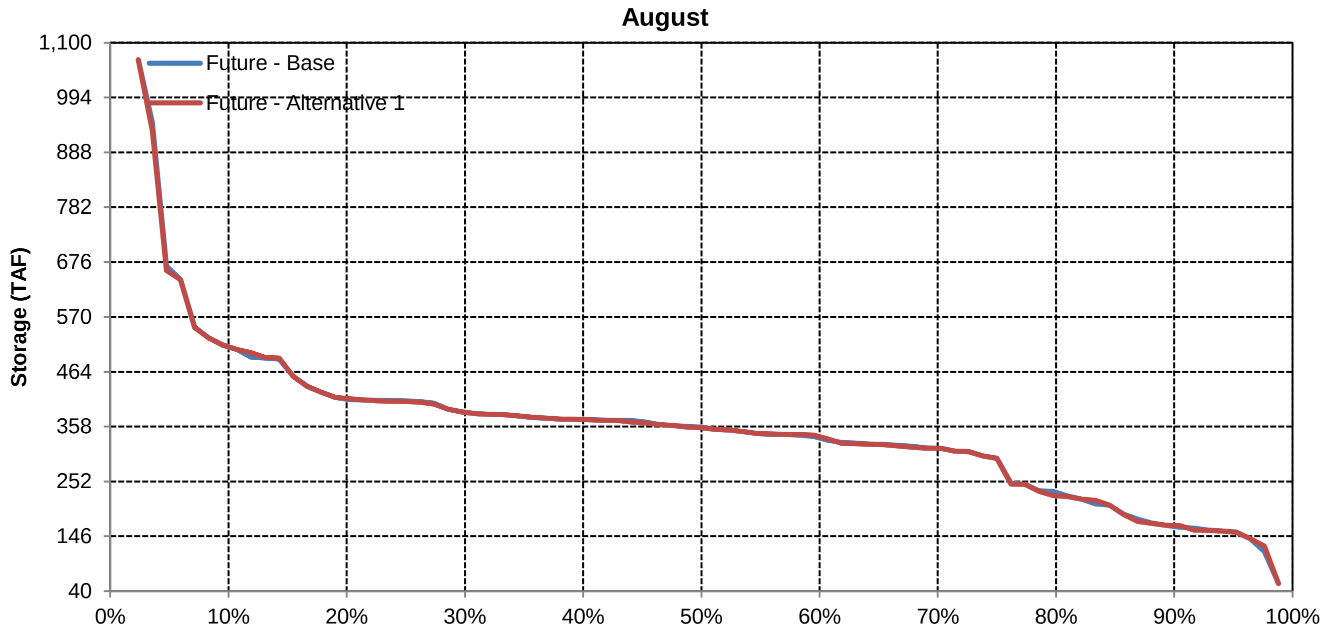
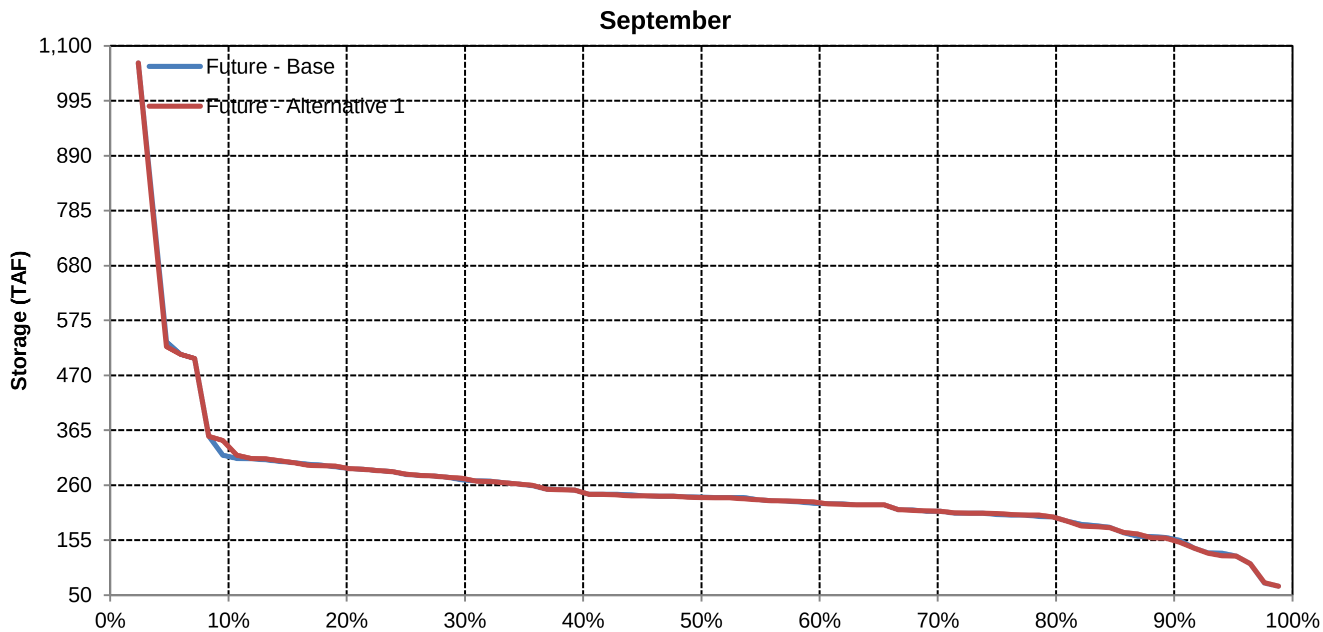




S12

Long-Term and Water Year-Type Average of Delta Outflow Under Future - Base and Future - Alternative 1

Analysis Period	October	November	December	January	February	March	April	May	June	July	August	September	Total (TAF)
	Average Flow (cfs)												
	Long-Term												
Full Simulation Period													
Future - Base	8,408	10,099	24,888	54,896	70,049	52,500	29,061	14,179	8,605	7,157	4,274	10,294	17,604
Future - Alternative 1	8,444	10,100	24,898	54,941	70,070	52,511	29,068	14,174	8,600	7,152	4,279	10,293	17,612
Difference	36	0	10	45	21	11	7	-5	-5	-5	5	0	7
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Water Year-Types												
Wet													
Future - Base	9,541	15,088	53,646	115,984	131,904	102,001	53,280	21,075	11,285	9,709	4,000	21,635	32,826
Future - Alternative 1	9,556	15,089	53,715	115,999	131,965	101,994	53,311	21,072	11,286	9,708	4,000	21,635	32,836
Difference	15	1	69	16	61	-7	30	-3	1	0	0	0	11
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal													
Future - Base	9,036	8,854	16,293	59,685	102,404	57,212	27,004	15,829	8,580	8,899	4,000	13,224	19,718
Future - Alternative 1	9,170	8,854	16,253	59,644	102,582	57,254	27,006	15,829	8,579	8,900	4,000	13,224	19,734
Difference	134	0	-40	-41	178	43	2	0	-1	1	0	0	16
Percent Difference	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal													
Future - Base	8,461	9,070	13,804	28,415	31,537	29,246	21,994	12,973	7,605	6,655	4,139	3,000	10,623
Future - Alternative 1	8,507	9,076	13,803	28,457	31,522	29,264	21,994	12,951	7,619	6,651	4,140	3,000	10,628
Difference	47	6	-1	43	-15	18	0	-21	13	-4	1	0	5
Percent Difference	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry													
Future - Base	7,611	7,891	10,135	15,901	29,451	24,322	15,139	9,861	7,158	5,000	4,785	3,000	8,395
Future - Alternative 1	7,610	7,888	10,145	15,935	29,460	24,346	15,132	9,857	7,158	5,000	4,786	3,000	8,399
Difference	0	-3	10	34	9	24	-7	-3	0	0	2	0	4
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical													
Future - Base	6,653	5,227	7,054	11,831	15,756	13,084	9,330	6,228	6,318	4,170	4,415	3,092	5,600
Future - Alternative 1	6,693	5,227	6,992	12,040	15,602	13,078	9,319	6,228	6,268	4,142	4,447	3,091	5,600
Difference	39	0	-62	209	-154	-6	-11	0	-49	-28	32	-1	-1
Percent Difference	1%	0%	-1%	2%	-1%	0%	0%	0%	-1%	-1%	1%	0%	0%

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	10,938	15,863	79,058	151,208	180,010	107,880	70,644	27,159	11,545	10,516	4,885	21,875
20%	10,625	14,764	33,428	92,252	125,923	89,027	38,581	18,353	10,462	9,612	4,709	21,563
30%	10,313	11,693	17,489	56,706	77,981	62,254	28,814	14,204	8,749	9,048	4,349	20,938
40%	7,625	11,004	14,366	33,893	58,622	40,886	20,594	12,808	8,409	8,000	4,217	13,062
50%	7,160	8,104	11,802	26,142	43,165	27,471	17,579	11,253	7,899	6,666	4,000	3,000
60%	6,994	4,500	8,257	19,228	24,986	20,728	15,558	10,174	7,418	6,500	4,000	3,000
70%	6,613	4,500	5,323	14,908	20,687	17,661	13,640	9,584	7,100	5,000	4,000	3,000
80%	6,259	4,500	4,500	13,125	16,723	14,481	11,153	8,460	7,100	5,000	4,000	3,000
90%	5,678	3,500	4,500	8,401	12,239	11,400	10,016	7,100	6,799	4,065	4,000	3,000
Long Term												
Full Simulation Period	8,408	10,099	24,888	54,896	70,049	52,500	29,061	14,179	8,605	7,157	4,274	10,294
Water Year Types												
Wet	9,541	15,088	53,646	115,984	131,904	102,001	53,280	21,075	11,285	9,709	4,000	21,635
Above Normal	9,036	8,854	16,293	59,685	102,404	57,212	27,004	15,829	8,580	8,899	4,000	13,224
Below Normal	8,461	9,070	13,804	28,415	31,537	29,246	21,994	12,973	7,605	6,655	4,139	3,000
Dry	7,611	7,891	10,135	15,901	29,451	24,322	15,139	9,861	7,158	5,000	4,785	3,000
Critical	6,653	5,227	7,054	11,831	15,756	13,084	9,330	6,228	6,318	4,170	4,415	3,092

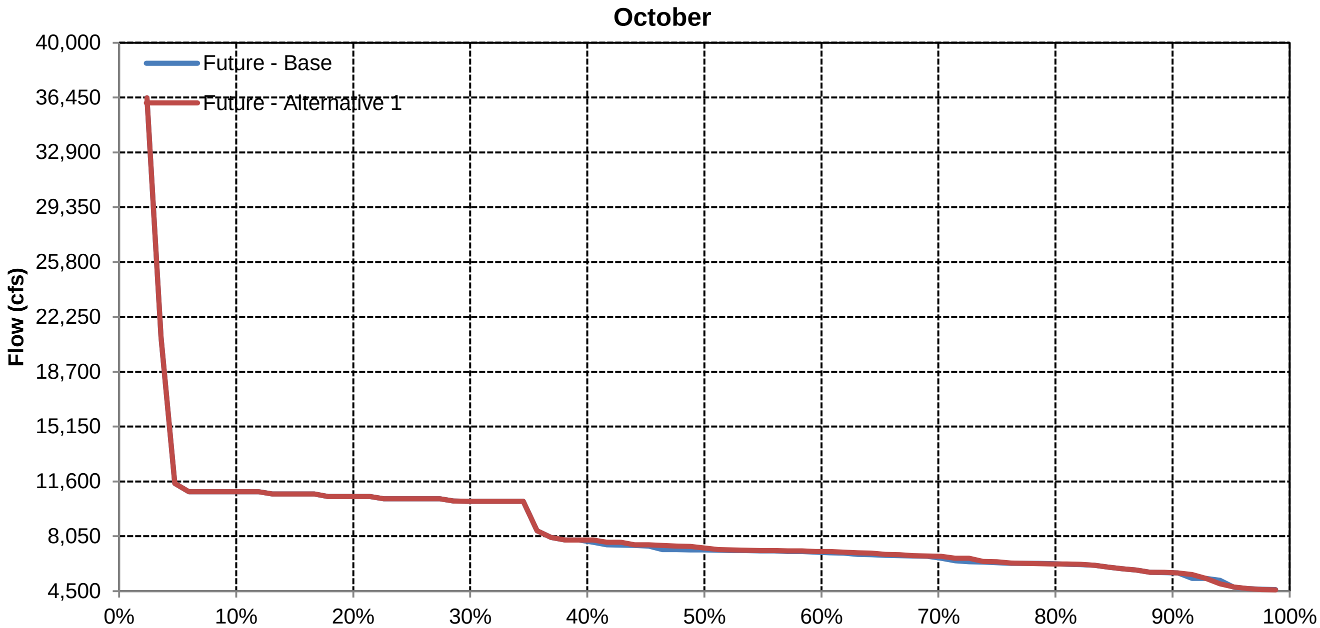
Future - Alternative 1

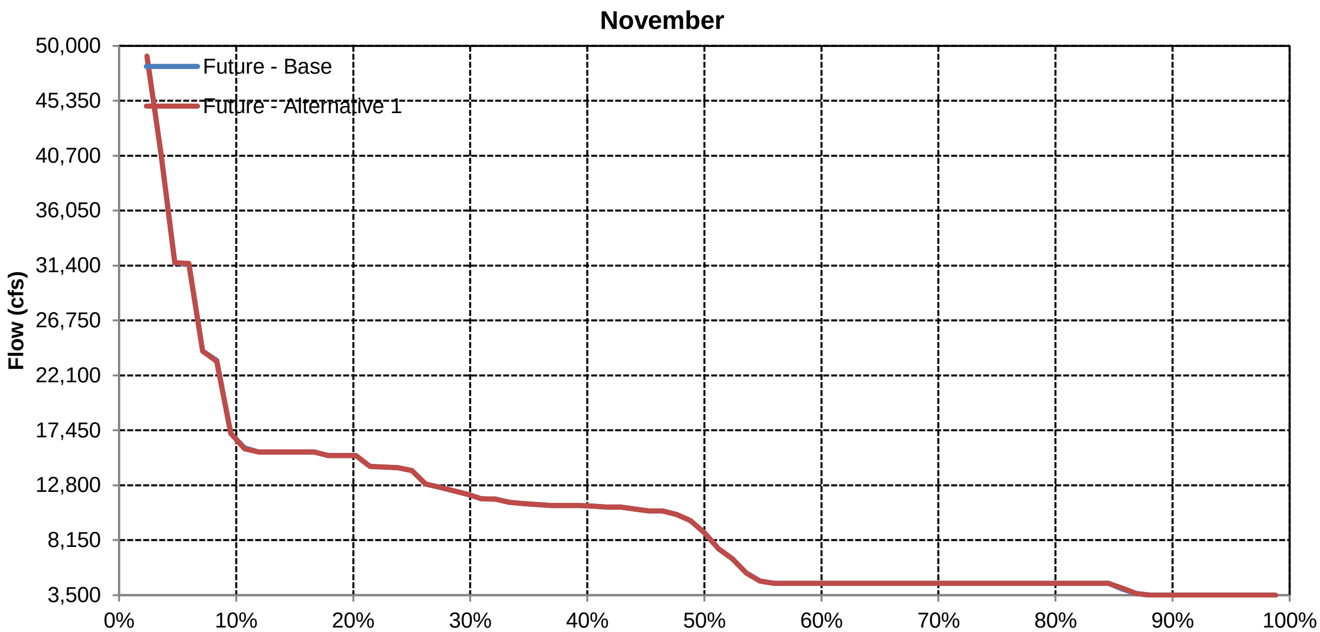
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	10,938	15,805	79,087	151,209	179,971	108,171	70,643	27,173	11,545	10,516	4,907	21,875
20%	10,625	14,764	33,591	91,746	126,757	88,804	38,582	18,353	10,470	9,613	4,709	21,563
30%	10,313	11,693	17,495	57,148	77,981	62,844	28,814	14,204	8,749	9,047	4,357	20,938
40%	7,773	11,004	14,388	33,911	58,623	40,826	20,594	12,808	8,408	8,000	4,215	13,062
50%	7,235	8,104	11,812	26,159	43,223	27,471	17,697	11,253	7,963	6,664	4,007	3,000
60%	7,056	4,500	7,916	19,271	25,090	20,735	15,558	10,169	7,277	6,500	4,000	3,000
70%	6,738	4,500	5,739	14,953	20,716	17,661	13,640	9,571	7,100	5,000	4,000	3,000
80%	6,259	4,500	4,500	13,125	16,774	14,504	11,115	8,469	7,100	5,000	4,000	3,000
90%	5,690	3,500	4,500	8,403	12,280	11,400	10,026	7,100	6,799	4,065	4,000	3,000
Long Term												
Full Simulation Period	8,444	10,100	24,898	54,941	70,070	52,511	29,068	14,174	8,600	7,152	4,279	10,293
Water Year Types												
Wet	9,556	15,089	53,715	115,999	131,965	101,994	53,311	21,072	11,286	9,708	4,000	21,635
Above Normal	9,170	8,854	16,253	59,644	102,582	57,254	27,006	15,829	8,579	8,900	4,000	13,224
Below Normal	8,507	9,076	13,803	28,457	31,522	29,264	21,994	12,951	7,619	6,651	4,140	3,000
Dry	7,610	7,888	10,145	15,935	29,460	24,346	15,132	9,857	7,158	5,000	4,786	3,000
Critical	6,693	5,227	6,992	12,040	15,602	13,078	9,319	6,228	6,268	4,142	4,447	3,091

Future - Alternative 1 Minus Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	-58	30	2	-40	291	0	14	0	0	22	0
20%	0	0	163	-507	834	-223	0	0	8	0	0	0
30%	0	0	7	442	0	590	0	0	0	0	8	0
40%	148	0	23	18	0	-60	1	0	0	0	-2	0
50%	75	1	10	18	58	0	118	0	64	-3	7	0
60%	61	0	-340	43	104	7	0	-5	-141	0	0	0
70%	125	0	416	45	29	0	0	-13	0	0	0	0
80%	0	0	0	0	51	23	-39	9	0	0	0	0
90%	12	0	0	2	41	0	10	0	0	0	0	0
Long Term												
Full Simulation Period	36	0	10	45	21	11	7	-5	-5	-5	5	0
Water Year Types												
Wet	15	1	69	16	61	-7	30	-3	1	0	0	0
Above Normal	134	0	-40	-41	178	43	2	0	-1	1	0	0
Below Normal	47	6	-1	43	-15	18	0	-21	13	-4	1	0
Dry	0	-3	10	34	9	24	-7	-3	0	0	2	0
Critical	39	0	-62	209	-154	-6	-11	0	-49	-28	32	-1

Delta Outflow





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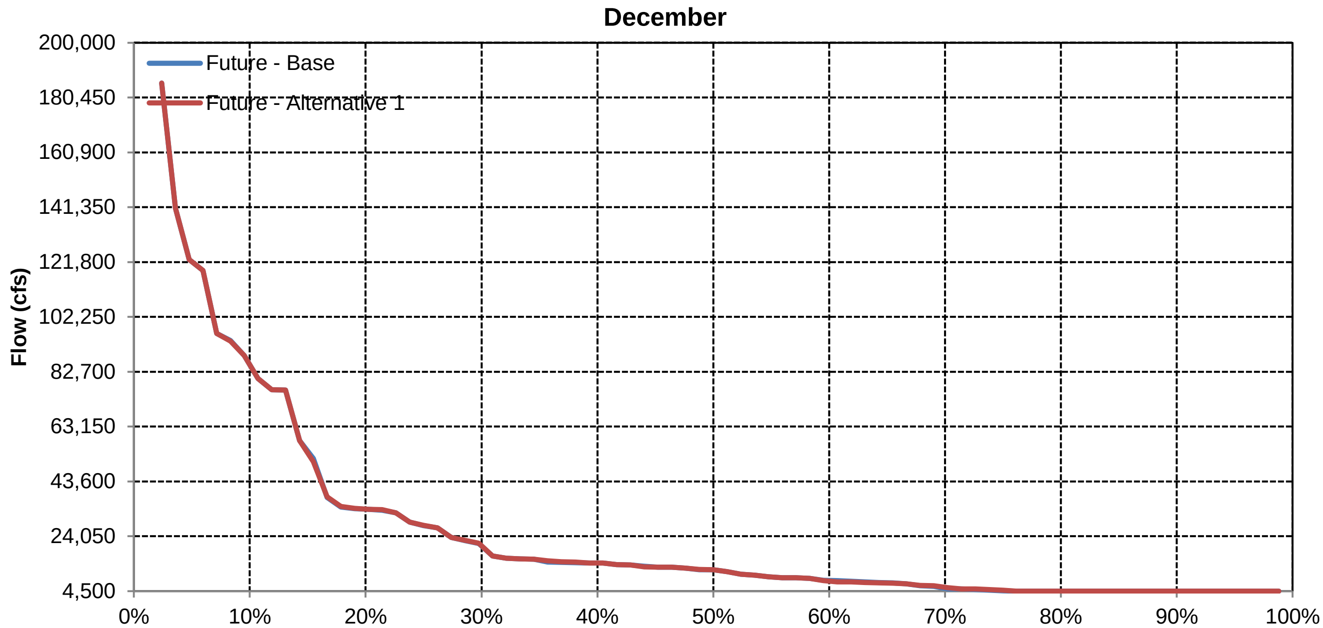

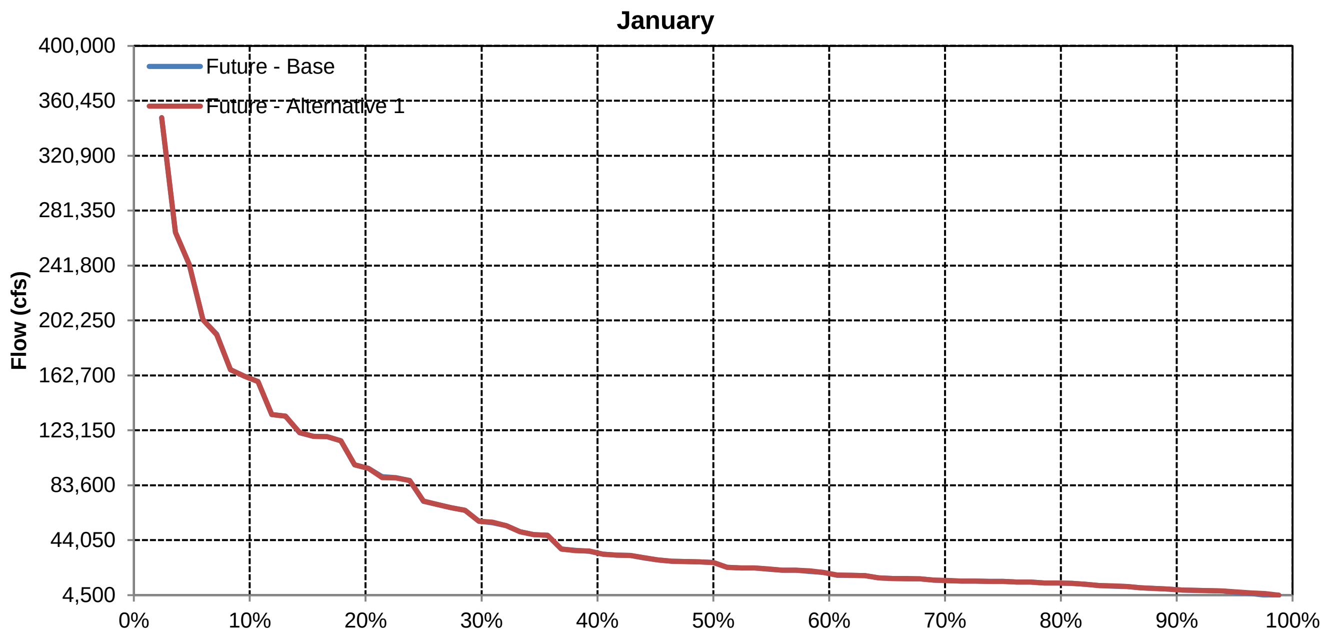

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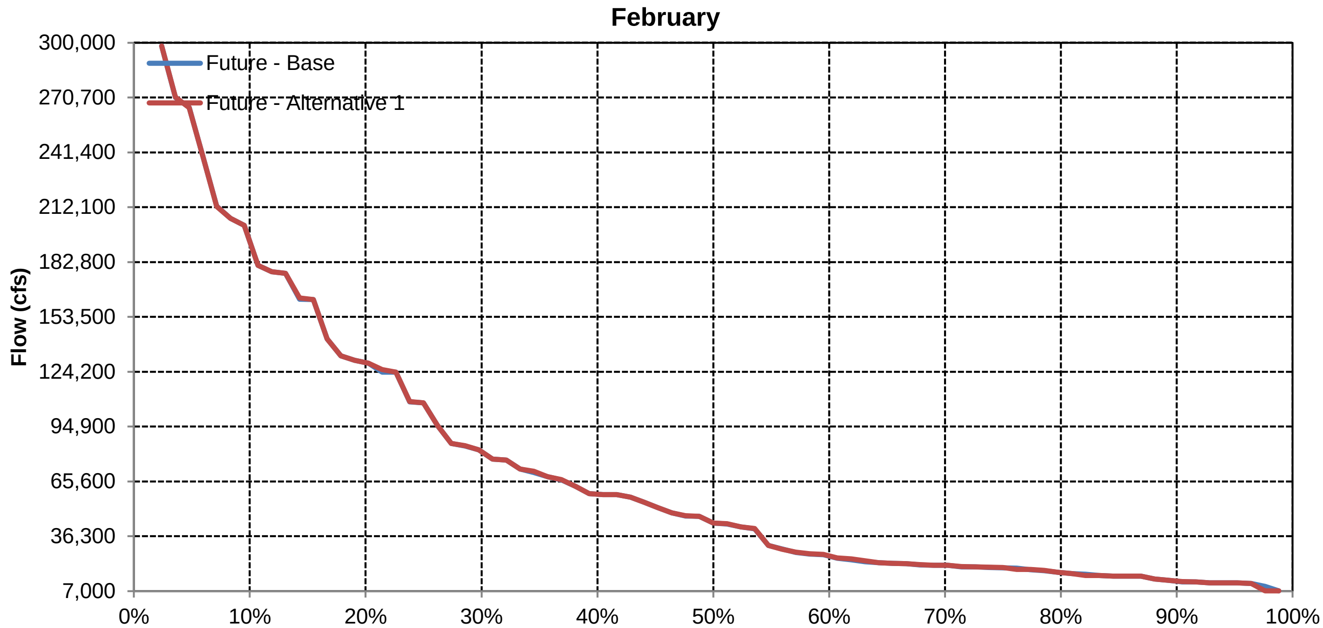

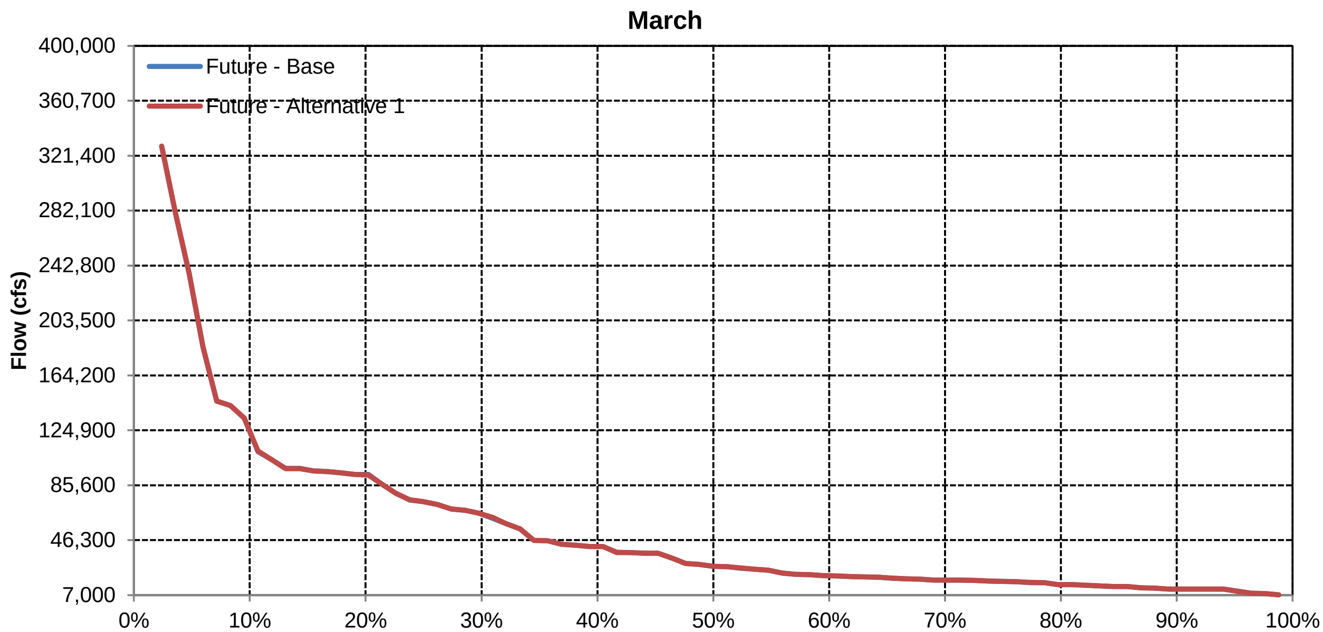

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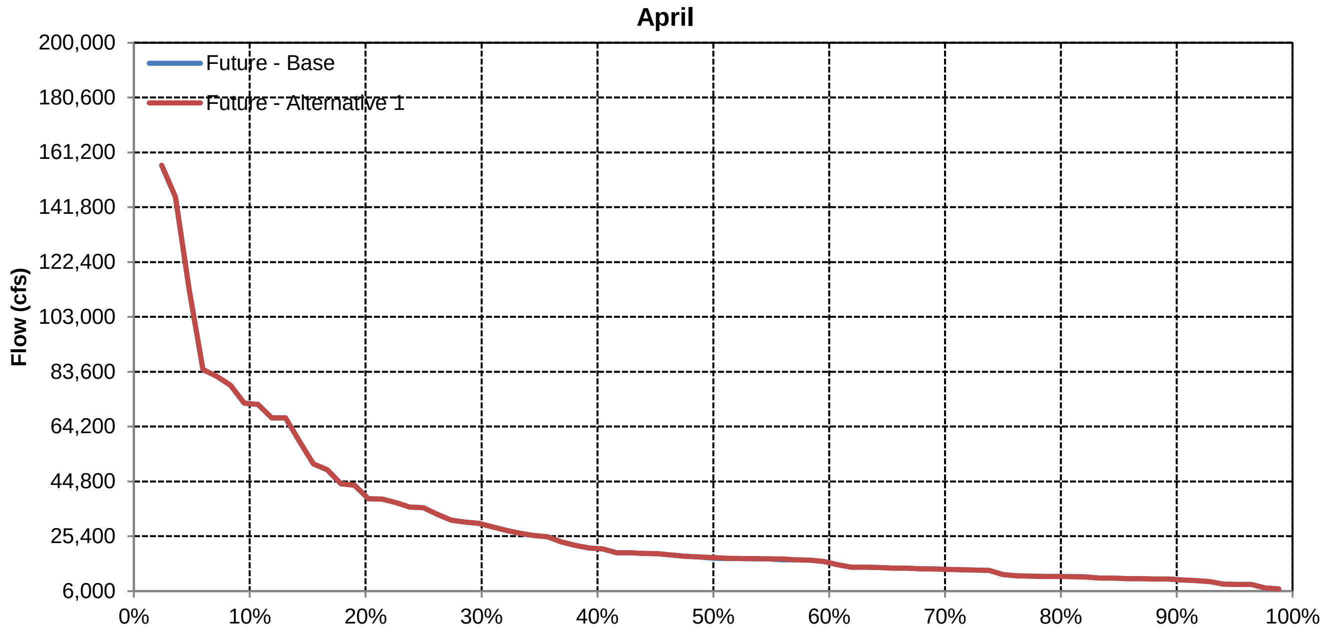

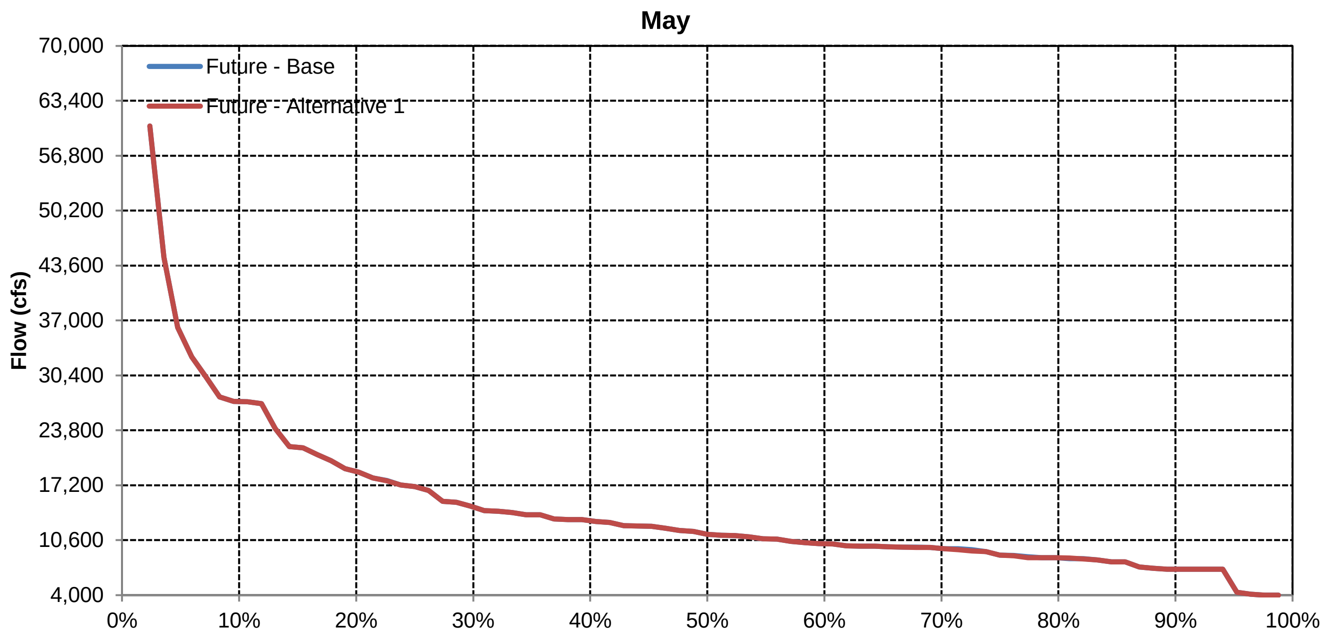

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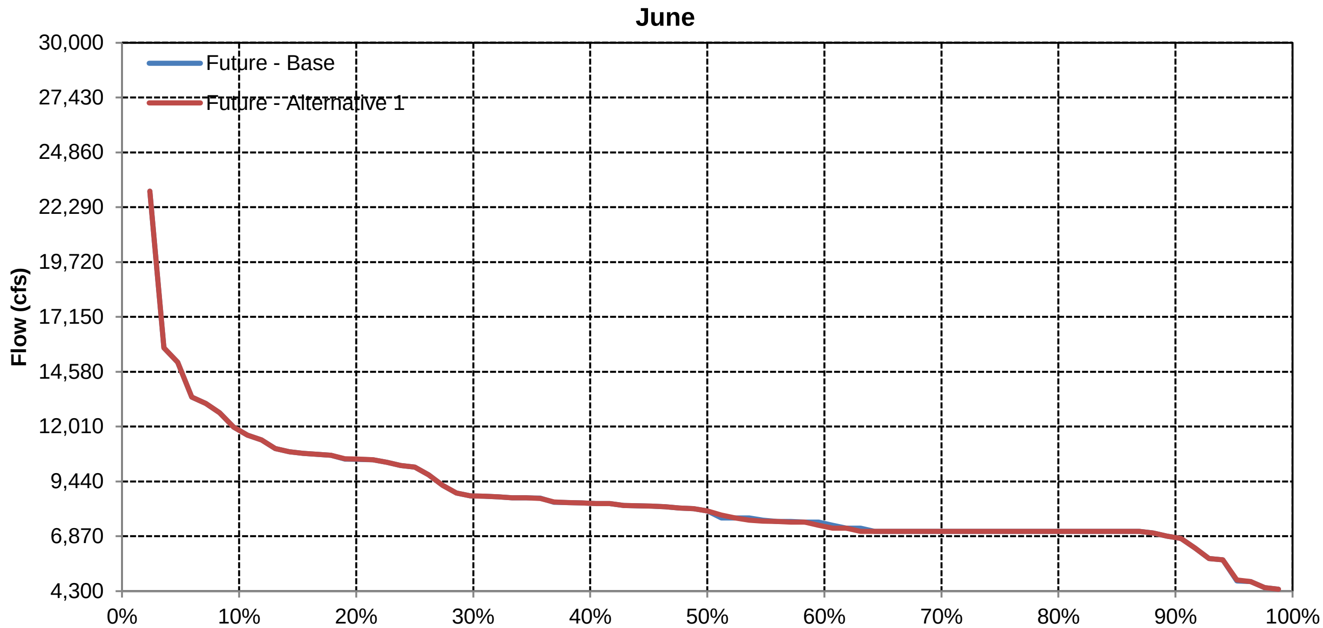

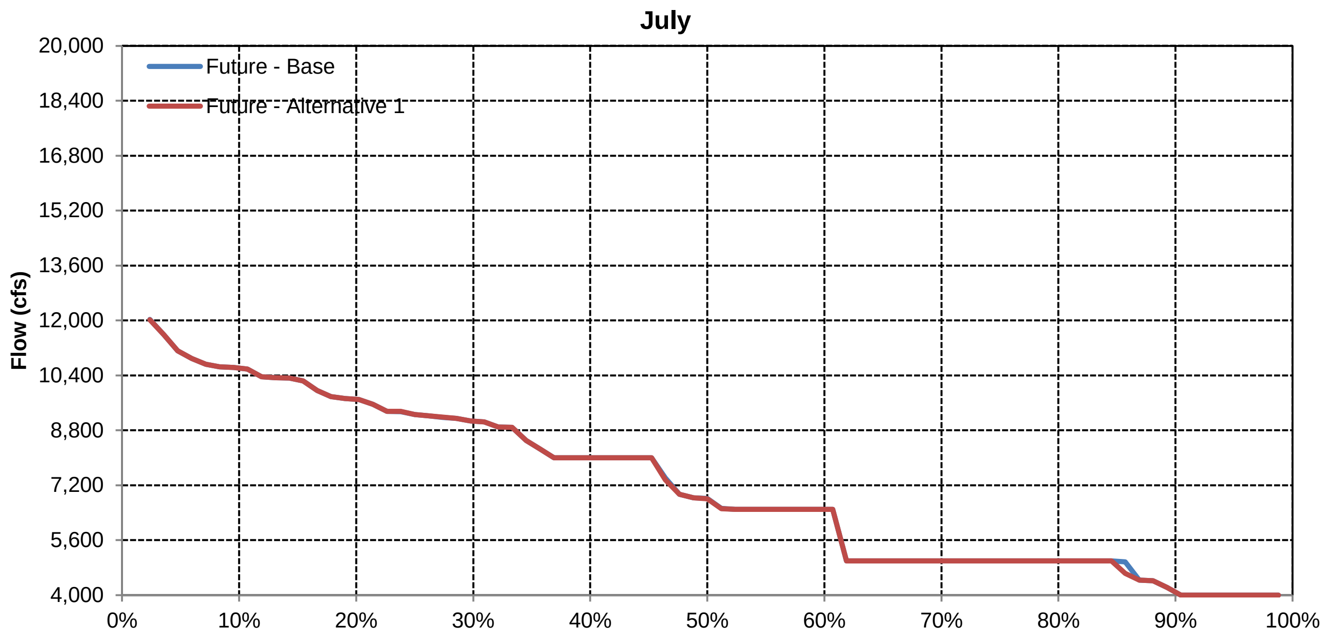

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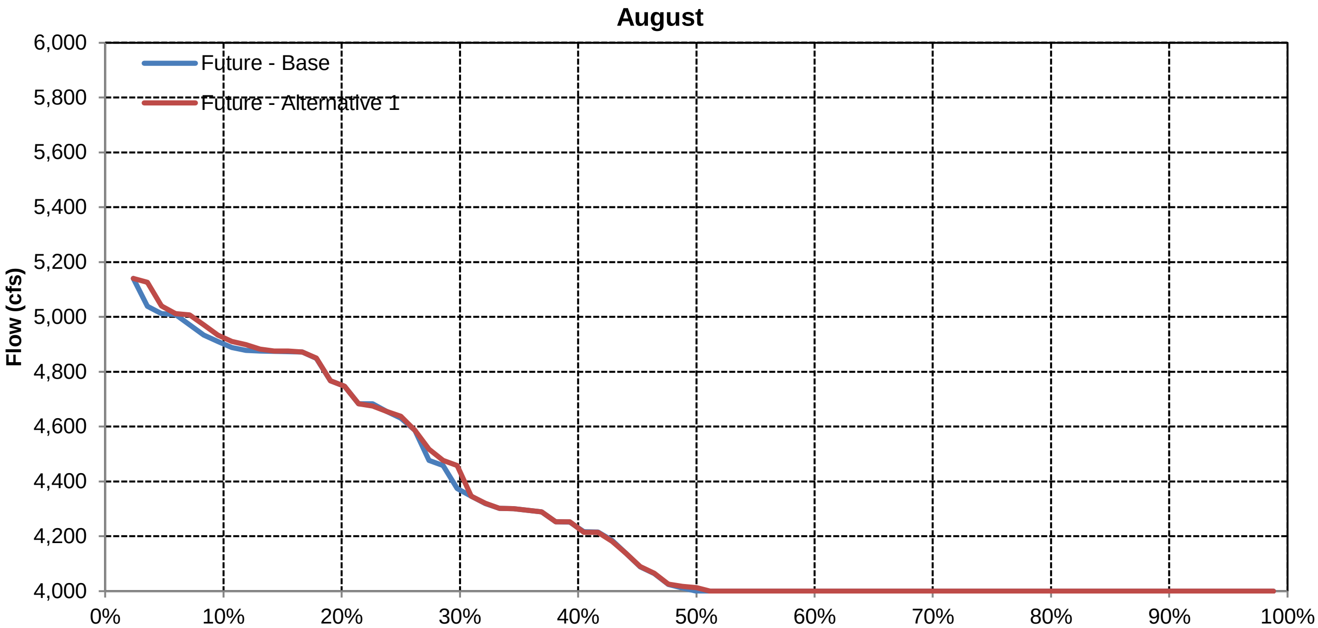


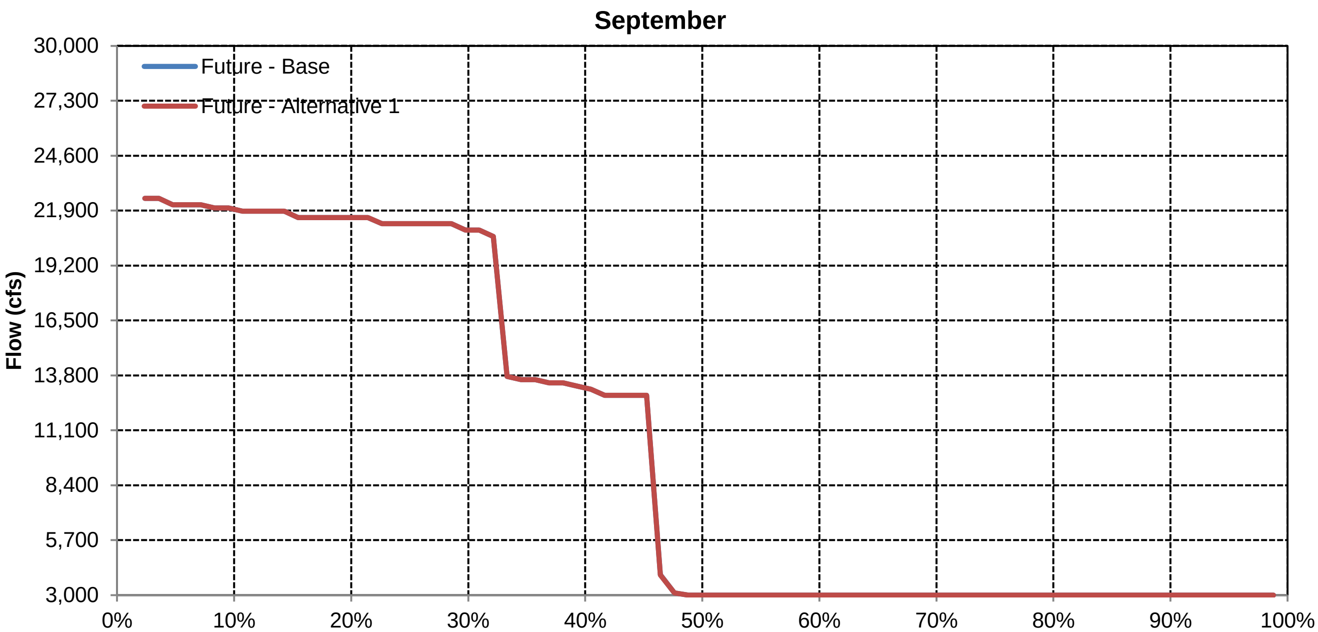


Table 185 No Action Alternative-Alternative 1 (Future)

Winter-run Chinook Salmon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 1 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration	November through July	Mean Monthly Flow (cfs)	Verona		10	Lower 40%		0.0	0.0	0.0	-3.0	0.0	0.0	0.0	0.0	3.0		
			Freeport		10	Lower 40%		0.0	0.0	0.0	-3.0	0.0	0.0	0.0	0.0	0.0		
		Mean Monthly Water Temperature (°F)	Feather River Confluence	64		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
				68		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
			Freeport	64		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
				68		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Juvenile Rearing and Downstream Movement*	July through March	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	-3.0	0.0				3.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	-3.0	0.0				0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	61		All Years	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
				65		All Years	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
			Freeport	61		All Years	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
				65		All Years	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0

Table 186 No Action Alternative-Alternative 1 (Future)

Spring-run Chinook Salmon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location Description	Metric Value	Metric %	Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration	March through September	Mean Monthly Flow (cfs)	Verona		10	Lower 40%						0.0	0.0	0.0	0.0	3.0	0.0	0.0
			Freeport		10	Lower 40%						0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	64		All Years						0.0	0.0	0.0	0.0	0.0	0.0	0.0
				68		All Years						0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport	64		All Years						0.0	0.0	0.0	0.0	0.0	0.0	0.0
				68		All Years						0.0	0.0	0.0	0.0	0.0	0.0	0.0
Juvenile Rearing (and Downstream Movement)	Year-round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	-3.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	61		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
				65		All Years	0.0	0.0	0.0	0.0	0.0	0.0	-1.2	0.0	0.0	0.0	0.0	0.0
Smolt Emigration	October through May	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	-3.0	0.0	0.0	0.0				
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	-3.0	0.0	0.0	0.0				
		Mean Monthly Water Temperature (°F)	Feather River Confluence	63		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
			Freeport	63		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				

Net Change in Probability of Exceedance under Alternative 1 (Future) relative to No Action Alternative (columns Oct–Sep)

Table 187 No Action Alternative-Alternative 1 (Future)

Fall-run Chinook Salmon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 1 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Staging	July through December	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0							3.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0							0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	64		All Years	0.0	0.0	0.0							0.0	0.0	0.0
				68		All Years	0.0	0.0	0.0							0.0	0.0	0.0
			Freeport	64		All Years	0.0	0.0	0.0							0.0	0.0	0.0
				68		All Years	0.0	0.0	0.0							0.0	0.0	0.0
Juvenile Rearing and Downstream Movement	December through July	Mean Monthly Flow (cfs)	Verona		10	Lower 40%			0.0	0.0	-3.0	0.0	0.0	0.0	0.0	3.0		
			Freeport		10	Lower 40%			0.0	0.0	-3.0	0.0	0.0	0.0	0.0	0.0		
		Mean Monthly Water Temperature (°F)	Freeport	61		All Years			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
				65		All Years			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		

Table 188 No Action Alternative-Alternative 1 (Future)

Late Fall-run Chinook Salmon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location Description	Metric Value	Metric %	Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Staging	October through April	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	-3.0	0.0	0.0					
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	-3.0	0.0	0.0					
		Mean Monthly Water Temperature (°F)	Feather River Confluence	64		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
			Freeport	64		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
Juvenile Rearing and Downstream Movement	April through December	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0				0.0	0.0	0.0	3.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Freeport	61		All Years	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
				65		All Years	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0

Net Change in Probability of Exceedance under Alternative 1 (Future) relative to No Action Alternative (columns Oct–Sep)

Table 189 No Action Alternative-Alternative 1 (Future)

Steelhead in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location Description	Metric Value	Metric %	Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration	August through March	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	-3.0	0.0					0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	-3.0	0.0					0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	64		All Years	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0
			Freeport	64		All Years	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0
Juvenile Rearing and Downstream Movement	Year-Round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	-3.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	65		All Years	0.0	0.0	0.0	0.0	0.0	0.0	-1.2	0.0	0.0	0.0	0.0	0.0
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Smolt Emigration	January through June	Mean Monthly Flow (cfs)	Verona		10	Lower 40%				0.0	-3.0	0.0	0.0	0.0	0.0			
			Freeport		10	Lower 40%				0.0	-3.0	0.0	0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Feather River Confluence	52		All Years				0.0	0.0	0.0	0.0	0.0	0.0			
				55		All Years				0.0	0.0	0.0	0.0	0.0	0.0			
			Freeport	52		All Years				0.0	0.0	0.0	0.0	0.0	0.0			
				55		All Years				0.0	0.0	0.0	0.0	0.0	0.0			

Net Change in Probability of Exceedance under Alternative 1 (Future) relative to No Action Alternative (columns Oct–Sep)

Table 190 No Action Alternative-Alternative 1 (Future)

Green Sturgeon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 1 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Holding	February through July	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%					-3.0	0.0	0.0	0.0	0.0	0.0		
		Mean Monthly Water Temperature (°F)	Freeport	61		All Years					0.0	0.0	0.0	0.0	0.0	0.0		
Adult Post-Spawning Holding and Emigration	July through November	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%	0.0	0.0								0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Freeport	61		All Years	0.0	0.0								0.0	0.0	0.0
Juvenile Rearing and Downstream Movement	Year-round	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Freeport	66		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 191 No Action Alternative-Alternative 1 (Future)

White Sturgeon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location Description	Metric Value	Metric %	Range	Net Change in Probability of Exceedance under Alternative 1 (Future) relative to No Action Alternative: Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Holding	November through May	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%		0.0	0.0	0.0	-3.0	0.0	0.0	0.0				
		Mean Monthly Water Temperature (°F)	Freeport	77		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Spawning and Egg Incubation	February through June	Mean Monthly Flow (cfs)	Verona		10	Lower 40%					-3.0	0.0	0.0	0.0	0.0			
			Freeport		10	Lower 40%					-3.0	0.0	0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Feather River Confluence	61		All Years					0.0	0.0	0.0	0.0	0.0			
Juvenile Rearing and Downstream Movement	Year-round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	-3.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	66		All Years	-0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport	66		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 192 No Action Alternative-Alternative 1 (Future)

River Lamprey in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 1 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration	September through June	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	-3.0	0.0	0.0	0.0	0.0			0.0
		Mean Monthly Water Temperature (°F)	Freeport	42-60		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0
Ammocoete Rearing and Downstream Movement	Year-round	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Freeport	72		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

[1]Water temperature ranges are evaluated by calculating the net change in the probability of water temperatures occurring within the specified range.

Table 193 No Action Alternative-Alternative 1 (Future)

Pacific Lamprey in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location Description	Metric Value	Metric %	Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
							Net Change in Probability of Exceedance under Alternative 1 (Future) relative to No Action Alternative											
Adult Immigration	January through June	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%				0.0	-3.0	0.0	0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Freeport	42-60		All Years				0.0	0.0	0.0	0.0	0.0	0.0			
Ammocoete Rearing and Downstream Movement	Year-round	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Freeport	72		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

[1]Water temperature ranges are evaluated by calculating the net change in the probability of water temperatures occurring within the specified range.

Table 194 No Action Alternative-Alternative 1 (Future)

Hardhead in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 1 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adults and Other Lifestages	Year-round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	-3.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	61-77		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.6	0.0	0.0
			Freeport	61-77		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.4	0.0	1.2	0.0
Adult Spawning	April through June	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%							0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Freeport	59-64		All Years							0.0	0.0	0.0			

[1]Water temperature ranges are evaluated by calculating the net change in the probability of water temperatures occurring within the specified range.

Table 195 No Action Alternative-Alternative 1 (Future)

American Shad in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 1 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Spawning	April through June	Mean Monthly Flow (cfs)	Verona		10	Lower 40%							0.0	0.0	0.0			
			Freeport		10	Lower 40%							0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Feather River Confluence	60-70		All Years							0.0	0.0	0.0			
			Freeport	60-70		All Years							0.0	0.0	0.0			
Juvenile Rearing and Downstream Movement	Year-Round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	-3.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	63-77		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.6	0.0	0.0
			Freeport	63-77		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.4	0.0	1.2	0.0

[1]Water temperature ranges are evaluated by calculating the net change in the probability of water temperatures occurring within the specified range.

Table 196 No Action Alternative-Alternative 1 (Future)

Striped Bass in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 1 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Spawning	April through June	Mean Monthly Flow (cfs)	Verona		10	Lower 40%							0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Feather River Confluence	59-68		All Years							0.0	0.0	0.0			
Juvenile Rearing and Downstream Movement	Year-round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	-3.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	61-71		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0

[1]Water temperature ranges are evaluated by calculating the net change in the probability of water temperatures occurring within the specified range.

Table 201 No Action Alternative-Alternative 1 (Future)

Alternative 1 (Future) vs No Action Alternative
Sacramento River at Verona, Monthly Flow

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
-1.0 < X < 1.0	81.7	86.6	40.2	45.1	28.0	53.7	97.6	98.8	91.5	95.1	95.1	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0
X>1.0 (Total %)	18.3	0.0	1.2	0.0	0.0	0.0	1.2	0.0	4.9	4.9	2.4	0.0
X<=-10.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	0.0	12.2	57.3	54.9	68.3	43.9	1.2	1.2	3.7	0.0	2.4	0.0
Net Change in % Exceedance:	18.3	-12.2	-56.1	-54.9	-68.3	-43.9	0.0	-1.2	1.2	4.9	0.0	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	-1.2	0.0	0.0	0.0	0.0	1.2	0.0	0.0
Low Flows (Upper 40% of Distribution)												
-1.0 < X < 1.0	90.9	97.0	69.7	84.8	30.3	75.8	97.0	100.0	87.9	90.9	97.0	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0
X>1.0 (Total %)	9.1	0.0	3.0	0.0	0.0	0.0	3.0	0.0	9.1	9.1	3.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	0.0	3.0	27.3	15.2	66.7	21.2	0.0	0.0	3.0	0.0	0.0	0.0
Net Change in % Exceedance:	9.1	-3.0	-24.2	-15.2	-66.7	-21.2	3.0	0.0	6.1	9.1	3.0	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	-3.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0

Table 202 No Action Alternative-Alternative 1 (Future)

Alternative 1 (Future) vs No Action Alternative
Sacramento River at Freeport, Monthly Flow

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
-1.0 < X < 1.0	84.1	90.2	46.3	46.3	34.1	61.0	98.8	98.8	95.1	93.9	96.3	98.8
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	15.9	0.0	0.0	0.0	0.0	0.0	1.2	0.0	1.2	4.9	1.2	0.0
X<=-10.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	0.0	8.5	50.0	52.4	63.4	36.6	0.0	1.2	3.7	0.0	2.4	0.0
Net Change in % Exceedance:	15.9	-8.5	-50.0	-52.4	-63.4	-36.6	1.2	-1.2	-2.4	4.9	-1.2	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	-1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Low Flows (Upper 40% of Distribution)												
-1.0 < X < 1.0	87.9	100.0	81.8	84.8	42.4	81.8	97.0	97.0	90.9	90.9	97.0	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	12.1	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	6.1	3.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	0.0	0.0	15.2	15.2	54.5	12.1	0.0	3.0	9.1	0.0	0.0	0.0
Net Change in % Exceedance:	12.1	0.0	-15.2	-15.2	-54.5	-12.1	3.0	-3.0	-9.1	6.1	3.0	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Alternative 1 (Future) vs No Action Alternative

Sacramento River at Feather River, Monthly Temperature

Exceedance of Water Temperature Index Values and Probability of Occurring within the Water Temperature Index Ranges

No Action Alternative

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	98.2	96.4	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	91.9	87.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	40.2	23.2	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	22.0	5.5	90.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	98.8	8.5	1.2	73.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	95.1	1.7	1.2	30.1	97.3	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	87.8	1.2	1.2	12.0	86.0	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	67.1	1.2	1.2	6.1	74.4	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	42.7	1.2	1.2	3.1	61.0	98.7	98.8	98.8	98.8	98.8	98.8
56	98.8	26.8	1.2	1.2	1.2	39.0	97.6	98.8	98.8	98.8	98.8	98.8
57	98.8	14.0	1.2	1.2	1.2	23.2	96.7	98.8	98.8	98.8	98.8	98.8
58	98.8	5.5	1.2	1.2	1.2	12.8	91.2	98.8	98.8	98.8	98.8	98.8
59	98.8	1.2	1.2	1.2	1.2	7.3	85.7	98.8	98.8	98.8	98.8	98.8
60	98.8	1.2	1.2	1.2	1.2	2.7	81.1	98.8	98.8	98.8	98.8	98.8
61	92.1	1.2	1.2	1.2	1.2	2.0	74.4	98.8	98.8	98.8	98.8	98.8
62	74.4	1.2	1.2	1.2	1.2	1.4	61.0	98.8	98.8	98.8	98.8	98.8
63	52.8	1.2	1.2	1.2	1.2	1.2	50.0	98.6	98.8	98.8	98.8	98.8
64	41.5	1.2	1.2	1.2	1.2	1.2	34.5	98.0	98.8	98.8	98.8	98.8
65	23.2	1.2	1.2	1.2	1.2	1.2	23.2	96.3	98.8	98.8	98.8	98.8
66	15.2	1.2	1.2	1.2	1.2	1.2	10.4	90.7	98.8	98.8	98.8	97.4
68	4.1	1.2	1.2	1.2	1.2	1.2	1.2	65.2	96.5	98.8	98.8	89.6
69	2.1	1.2	1.2	1.2	1.2	1.2	1.2	45.1	95.3	98.8	98.8	78.9
70	1.4	1.2	1.2	1.2	1.2	1.2	1.2	28.7	86.6	98.8	98.8	70.7
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	15.9	72.0	98.8	98.8	57.7
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	10.4	57.3	97.6	95.9	46.3
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.3	23.2	74.4	84.1	18.3
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	2.6	11.0	54.9	69.5	9.8
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	18.3	30.5	3.0
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	90.7	86.6	97.6	97.6	97.6	96.2	87.8	43.9	29.3	89.0
50-64	57.3	97.6	7.3	0.0	72.0	97.6	64.3	0.8	0.0	0.0	0.0	0.0
55-56	0.0	15.9	0.0	0.0	1.9	22.0	1.1	0.0	0.0	0.0	0.0	0.0
59-64	57.3	0.0	0.0	0.0	0.0	6.1	51.2	0.8	0.0	0.0	0.0	0.0
59-68	94.7	0.0	0.0	0.0	0.0	6.1	84.5	33.6	2.3	0.0	0.0	9.2
59-75	97.6	0.0	0.0	0.0	0.0	6.1	84.5	96.2	87.8	43.9	29.3	89.0
60-70	97.4	0.0	0.0	0.0	0.0	1.5	79.9	70.1	12.2	0.0	0.0	28.1
61-71	90.9	0.0	0.0	0.0	0.0	0.8	73.2	82.9	26.8	0.0	0.0	41.1
63-69	50.7	0.0	0.0	0.0	0.0	0.0	48.8	53.5	3.5	0.0	0.0	19.9
63-77	51.6	0.0	0.0	0.0	0.0	0.0	48.8	97.4	97.6	80.5	68.3	95.8
65-82	22.0	0.0	0.0	0.0	0.0	0.0	22.0	95.1	97.6	97.6	97.6	97.6
70-82	0.2	0.0	0.0	0.0	0.0	0.0	0.0	27.5	85.4	97.6	97.6	69.5
42-60	0.0	97.6	97.6	95.8	97.6	96.1	17.7	0.0	0.0	0.0	0.0	0.0
61-77	90.9	0.0	0.0	0.0	0.0	0.8	73.2	97.6	97.6	80.5	68.3	95.8

Alternative 1 (Future)

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	98.2	96.4	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	91.9	87.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	40.2	23.2	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	20.7	5.5	90.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	98.8	8.5	1.2	73.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	95.1	1.7	1.2	30.1	97.3	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	87.8	1.2	1.2	12.0	86.0	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	67.1	1.2	1.2	6.1	74.4	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	42.7	1.2	1.2	3.1	61.0	98.7	98.8	98.8	98.8	98.8	98.8
56	98.8	26.8	1.2	1.2	1.2	39.0	97.6	98.8	98.8	98.8	98.8	98.8
57	98.8	14.0	1.2	1.2	1.2	23.2	96.7	98.8	98.8	98.8	98.8	98.8
58	98.8	5.5	1.2	1.2	1.2	12.8	91.2	98.8	98.8	98.8	98.8	98.8
59	98.8	1.2	1.2	1.2	1.2	7.3	85.7	98.8	98.8	98.8	98.8	98.8
60	98.8	1.2	1.2	1.2	1.2	2.7	81.1	98.8	98.8	98.8	98.8	98.8
61	92.1	1.2	1.2	1.2	1.2	2.0	74.4	98.8	98.8	98.8	98.8	98.8
62	74.4	1.2	1.2	1.2	1.2	1.4	61.0	98.8	98.8	98.8	98.8	98.8
63	52.8	1.2	1.2	1.2	1.2	1.2	50.0	98.6	98.8	98.8	98.8	98.8
64	41.5	1.2	1.2	1.2	1.2	1.2	34.5	98.0	98.8	98.8	98.8	98.8
65	23.2	1.2	1.2	1.2	1.2	1.2	22.0	96.3	98.8	98.8	98.8	98.8
66	14.6	1.2	1.2	1.2	1.2	1.2	10.4	90.7	98.8	98.8	98.8	97.4
68	4.1	1.2	1.2	1.2	1.2	1.2	1.2	65.2	96.5	98.8	98.8	89.6
69	2.1	1.2	1.2	1.2	1.2	1.2	1.2	45.1	95.3	98.8	98.8	78.9
70	1.4	1.2	1.2	1.2	1.2	1.2	1.2	28.7	86.6	98.8	98.8	70.7
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	15.9	70.7	98.8	98.8	57.7
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	10.4	57.3	97.6	95.9	46.3
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.3	23.2	74.4	84.1	18.3
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	2.6	11.0	54.9	69.5	9.8
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	18.9	30.5	3.0
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	90.7	86.6	97.6	97.6	97.6	96.2	87.8	43.9	29.3	89.0
50-64	57.3	97.6	7.3	0.0	72.0	97.6	64.3	0.8	0.0	0.0	0.0	0.0
55-56	0.0	15.9	0.0	0.0	1.9	22.0	1.1	0.0	0.0	0.0	0.0	0.0
59-64	57.3	0.0	0.0	0.0	0.0	6.1	51.2	0.8	0.0	0.0	0.0	0.0
59-68	94.7	0.0	0.0	0.0	0.0	6.1	84.5	33.6	2.3	0.0	0.0	9.2
59-75	97.6	0.0	0.0	0.0	0.0	6.1	84.5	96.2	87.8	43.9	29.3	89.0
60-70	97.4	0.0	0.0	0.0	0.0	1.5	79.9	70.1	12.2	0.0	0.0	28.1
61-71	90.9	0.0	0.0	0.0	0.0	0.8	73.2	82.9	28.1	0.0	0.0	41.1
63-69	50.7	0.0	0.0	0.0	0.0	0.0	48.8	53.5	3.5	0.0	0.0	19.9
63-77	51.6	0.0	0.0	0.0	0.0	0.0	48.8	97.4	97.6	79.9	68.3	95.8
65-82	22.0	0.0	0.0	0.0	0.0	0.0	20.8	95.1	97.6	97.6	97.6	97.6
70-82	0.2	0.0	0.0	0.0	0.0	0.0	0.0	27.5	85.4	97.6	97.6	69.5
42-60	0.0	97.6	97.6	95.8	97.6	96.1	17.7	0.0	0.0	0.0	0.0	0.0
61-77	90.9	0.0	0.0	0.0	0.0	0.8	73.2	97.6	97.6	79.9	68.3	95.8

Alternative 1 (Future) - No Action Alternative

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
43	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
48	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
49	0.0	0.0	-1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
52	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
53	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
54	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
56	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
57	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
58	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
62	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
65	0.0	0.0	0.0	0.0	0.0	0.0	-1.2	0.0	0.0	0.0	0.0	0.0
66	-0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
68	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.3	0.0	0.0	0.0
72	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
74	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0
82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
86	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
88	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
98	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45-75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50-64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55-56	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-68	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60-70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61-71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0
63-69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.6	0.0	0.0
65-82	0.0	0.0	0.0	0.0	0.0	0.0	-1.2	0.0	0.0	0.0	0.0	0.0
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42-60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.6	0.0	0.0

Alternative 1 (Future) vs No Action Alternative

Sacramento River at Freeport, Monthly Temperature

Exceedance of Water Temperature Index Values and Probability of Occurring within the Water Temperature Index Ranges

No Action Alternative

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	98.3	96.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	90.2	86.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	43.9	26.2	97.6	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	26.2	8.5	92.7	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	98.8	9.8	1.2	78.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	97.8	1.5	1.2	29.3	98.8	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	90.2	1.2	1.2	15.6	90.2	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	70.7	1.2	1.2	7.0	75.6	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	50.0	1.2	1.2	4.6	63.4	98.8	98.8	98.8	98.8	98.8	98.8
56	98.8	31.7	1.2	1.2	2.0	43.9	97.8	98.8	98.8	98.8	98.8	98.8
57	98.8	22.0	1.2	1.2	1.2	27.4	96.6	98.8	98.8	98.8	98.8	98.8
58	98.8	6.1	1.2	1.2	1.2	18.9	92.4	98.8	98.8	98.8	98.8	98.8
59	98.8	2.4	1.2	1.2	1.2	7.3	88.0	98.8	98.8	98.8	98.8	98.8
60	98.8	1.2	1.2	1.2	1.2	4.9	81.7	98.8	98.8	98.8	98.8	98.8
61	98.0	1.2	1.2	1.2	1.2	2.4	74.0	98.8	98.8	98.8	98.8	98.8
62	89.6	1.2	1.2	1.2	1.2	1.9	62.8	98.8	98.8	98.8	98.8	98.8
63	63.4	1.2	1.2	1.2	1.2	1.3	49.4	98.8	98.8	98.8	98.8	98.8
64	52.4	1.2	1.2	1.2	1.2	1.2	32.3	98.4	98.8	98.8	98.8	98.8
65	35.4	1.2	1.2	1.2	1.2	1.2	27.6	97.0	98.8	98.8	98.8	98.8
66	21.3	1.2	1.2	1.2	1.2	1.2	17.1	92.3	98.8	98.8	98.8	98.8
68	4.7	1.2	1.2	1.2	1.2	1.2	1.2	78.7	98.8	98.8	98.8	95.3
69	2.7	1.2	1.2	1.2	1.2	1.2	1.2	54.9	96.6	98.8	98.8	89.8
70	1.6	1.2	1.2	1.2	1.2	1.2	1.2	38.2	95.2	98.8	98.8	78.0
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	21.3	86.9	98.8	98.8	70.1
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	13.0	81.7	98.8	98.8	53.7
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.6	39.6	91.5	88.7	22.0
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.1	20.1	78.7	81.7	9.8
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	39.0	43.9	2.1
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	89.0	84.8	97.6	97.6	97.6	95.7	78.7	20.1	17.1	89.0
50-64	46.4	97.6	8.6	0.0	76.8	97.6	66.5	0.4	0.0	0.0	0.0	0.0
55-56	0.0	18.3	0.0	0.0	2.6	19.5	1.0	0.0	0.0	0.0	0.0	0.0
59-64	46.4	1.2	0.0	0.0	0.0	6.1	55.7	0.4	0.0	0.0	0.0	0.0
59-68	94.1	1.2	0.0	0.0	0.0	6.1	86.8	20.1	0.0	0.0	0.0	3.5
59-75	97.6	1.2	0.0	0.0	0.0	6.1	86.8	95.7	78.7	20.1	17.1	89.0
60-70	97.2	0.0	0.0	0.0	0.0	3.7	80.5	60.6	3.6	0.0	0.0	20.8
61-71	96.8	0.0	0.0	0.0	0.0	1.2	72.8	77.5	11.9	0.0	0.0	28.7
63-69	60.7	0.0	0.0	0.0	0.0	0.1	48.2	43.9	2.2	0.0	0.0	9.0
63-77	62.2	0.0	0.0	0.0	0.0	0.1	48.2	97.6	97.6	59.8	54.9	96.7
65-82	34.2	0.0	0.0	0.0	0.0	0.0	26.4	95.8	97.6	97.6	97.6	97.6
70-82	0.4	0.0	0.0	0.0	0.0	0.0	0.0	37.0	94.0	97.6	97.6	76.8
42-60	0.0	97.6	97.6	95.8	97.6	93.9	17.1	0.0	0.0	0.0	0.0	0.0
61-77	96.8	0.0	0.0	0.0	0.0	1.2	72.8	97.6	97.6	59.8	54.9	96.7

Alternative 1 (Future)

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	98.3	96.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	90.2	86.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	43.9	26.2	97.6	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	25.6	8.5	92.7	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	98.8	8.5	1.2	78.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	97.8	1.5	1.2	29.3	98.8	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	90.7	1.2	1.2	15.9	90.2	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	70.7	1.2	1.2	6.8	75.6	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	50.0	1.2	1.2	4.6	63.4	98.8	98.8	98.8	98.8	98.8	98.8
56	98.8	31.7	1.2	1.2	2.1	43.9	97.8	98.8	98.8	98.8	98.8	98.8
57	98.8	22.0	1.2	1.2	1.2	27.4	96.6	98.8	98.8	98.8	98.8	98.8
58	98.8	6.1	1.2	1.2	1.2	18.9	92.4	98.8	98.8	98.8	98.8	98.8
59	98.8	2.3	1.2	1.2	1.2	7.3	88.0	98.8	98.8	98.8	98.8	98.8
60	98.8	1.2	1.2	1.2	1.2	4.9	81.7	98.8	98.8	98.8	98.8	98.8
61	98.0	1.2	1.2	1.2	1.2	2.4	74.0	98.8	98.8	98.8	98.8	98.8
62	89.6	1.2	1.2	1.2	1.2	1.9	62.8	98.8	98.8	98.8	98.8	98.8
63	63.4	1.2	1.2	1.2	1.2	1.3	49.4	98.8	98.8	98.8	98.8	98.8
64	52.4	1.2	1.2	1.2	1.2	1.2	32.3	98.4	98.8	98.8	98.8	98.8
65	35.4	1.2	1.2	1.2	1.2	1.2	27.6	97.0	98.8	98.8	98.8	98.8
66	21.3	1.2	1.2	1.2	1.2	1.2	17.1	92.3	98.8	98.8	98.8	98.8
68	4.7	1.2	1.2	1.2	1.2	1.2	1.2	78.7	98.8	98.8	98.8	95.3
69	2.7	1.2	1.2	1.2	1.2	1.2	1.2	54.9	96.6	98.8	98.8	89.8
70	1.6	1.2	1.2	1.2	1.2	1.2	1.2	38.2	95.2	98.8	98.8	78.0
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	21.3	86.9	98.8	98.8	70.1
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	13.0	81.7	98.8	98.8	53.7
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.6	39.6	91.5	88.7	22.0
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.1	20.3	78.7	82.3	9.8
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.6	39.0	42.7	2.1
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	89.0	84.8	97.6	97.6	97.6	95.7	78.5	20.1	16.5	89.0
50-64	46.4	97.6	7.3	0.0	76.8	97.6	66.5	0.4	0.0	0.0	0.0	0.0
55-56	0.0	18.3	0.0	0.0	2.5	19.5	1.0	0.0	0.0	0.0	0.0	0.0
59-64	46.4	1.1	0.0	0.0	0.0	6.1	55.7	0.4	0.0	0.0	0.0	0.0
59-68	94.1	1.1	0.0	0.0	0.0	6.1	86.8	20.1	0.0	0.0	0.0	3.5
59-75	97.6	1.1	0.0	0.0	0.0	6.1	86.8	95.7	78.5	20.1	16.5	89.0
60-70	97.2	0.0	0.0	0.0	0.0	3.7	80.5	60.6	3.6	0.0	0.0	20.8
61-71	96.8	0.0	0.0	0.0	0.0	1.2	72.8	77.5	11.9	0.0	0.0	28.7
63-69	60.7	0.0	0.0	0.0	0.0	0.1	48.2	43.9	2.2	0.0	0.0	9.0
63-77	62.2	0.0	0.0	0.0	0.0	0.1	48.2	97.6	97.2	59.8	56.1	96.7
65-82	34.2	0.0	0.0	0.0	0.0	0.0	26.4	95.8	97.6	97.6	97.6	97.6
70-82	0.4	0.0	0.0	0.0	0.0	0.0	0.0	37.0	94.0	97.6	97.6	76.8
42-60	0.0	97.6	97.6	95.8	97.6	93.9	17.1	0.0	0.0	0.0	0.0	0.0
61-77	96.8	0.0	0.0	0.0	0.0	1.2	72.8	97.6	97.2	59.8	56.1	96.7

Alternative 1 (Future) - No Action Alternative

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
43	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
48	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
49	0.0	0.0	-0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50	0.0	0.0	-1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
52	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
53	0.0	0.5	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
54	0.0	0.0	0.0	0.0	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
56	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
57	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
58	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
62	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
66	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
68	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
72	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
74	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.6	0.0
77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	-1.2	0.0
82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
86	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
88	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
98	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45-75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.2	0.0	-0.6	0.0
50-64	0.0	0.0	-1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55-56	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-64	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-68	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-75	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	-0.2	0.0	-0.6	0.0
60-70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61-71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63-69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.4	0.0	1.2	0.0
65-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42-60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.4	0.0	1.2	0.0

Table 227 No Action Alternative -Alternative 1 (Future)

Delta Smelt in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 1 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult	December through May	Mean Monthly Water Temperature (°F)	Sacramento River at Freeport	59-68		All Years			0.0	0.0	0.0	0.0	0.0	0.0				
		Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years			61.0	57.3	59.8	69.5	0.0	0.0				
	September through November	Mean Monthly X_2 (RKm)	X_2 between 74 km and 81 km	74-81		Wet and Above Normal Water Years	0.0	0.0										0.0
	December through February	Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<-5000 cfs		All Years			-1.2	0.0	0.0							
Egg and Embryo	February through May	Mean Monthly Water Temperature (°F)	Sacramento River at Freeport	59-68		All Years					0.0	0.0	0.0	0.0				
Larval	March through June	Mean Monthly Water Temperature (°F)	Sacramento River at Freeport	59-68		All Years						0.0	0.0	0.0	0.0			
		Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<-1500 cfs		Dry and Critical Water Years						0.0	-3.3	0.0	0.0			
		Mean Monthly Delta Outflow (cfs)	Delta		10	All Years						0.0	0.0	0.0	0.0			
Juvenile	May through July	Mean Monthly Water Temperature (°F)	Sacramento River at Freeport	59-68		All Years								0.0	0.0	0.0		
		Mean Monthly X_2 (RKm)	Changes in X_2 between RKm 65 and 80	0.5 RKm		All Years								0.0	0.0	0.0		

Table 228 No Action Alternative -Alternative 1 (Future)

Longfin Smelt in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location Description	Metric Value	Metric %	Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult	December through March	Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<-5000 cfs		All Years			-1.2	0.0	0.0	0.0						
Larvae and Juvenile	April and May	Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<-1500 cfs		Dry and Critical Water Years							-3.3	0.0				
				< 0 cfs		Dry and Critical Water Years							0.0	0.0				
	January through June	Mean Monthly X_2 (RKm)	X_2	< 75 RKm		All Years				0.0	0.0	0.0	1.2	0.0	0.0			
				< 75 RKm		Dry and Critical Water Years				0.0	0.0	0.0	0.0	0.0	0.0			

Table 229 No Action Alternative -Alternative 1 (Future)

Winter-run Chinook Salmon in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 1 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	November through May	Mean Monthly Flow (cfs)	Rio Vista		10	Lower 40%		0.0	-3.0	0.0	-3.0	0.0	0.0	0.0				
		Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years		68.3	61.0	57.3	59.8	69.5	0.0	0.0				
		Mean Monthly Delta Outflow (cfs)	Delta		10	All Years		0.0	0.0	2.4	-1.2	0.0	0.0	0.0				
		Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<2500 cfs		All Years		0.0	0.0	0.0	-1.2	0.0	0.0	0.0				

Table 230 No Action Alternative -Alternative 1 (Future)

Spring-run Chinook Salmon in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 1 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	November through June	Mean Monthly Flow (cfs)	Rio Vista		10	Lower 40%		0.0	-3.0	0.0	-3.0	0.0	0.0	0.0	0.0			
		Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years		68.3	61.0	57.3	59.8	69.5	0.0	0.0	0.0			
		Mean Monthly Delta Outflow (cfs)	Delta		10	All Years		0.0	0.0	2.4	-1.2	0.0	0.0	0.0	0.0			
		Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<2500 cfs		All Years		0.0	0.0	0.0	-1.2	0.0	0.0	0.0	0.0			

Table 231 No Action Alternative -Alternative 1 (Future)

Fall- and Late Fall-run Chinook Salmon in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 1 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	November through June	Mean Monthly Flow (cfs)	Rio Vista		10	Lower 40%		0.0	-3.0	0.0	-3.0	0.0	0.0	0.0	0.0			
		Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years		68.3	61.0	57.3	59.8	69.5	0.0	0.0	0.0			
		Mean Monthly Delta Outflow (cfs)	Delta		10	All Years		0.0	0.0	2.4	-1.2	0.0	0.0	0.0	0.0			
		Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<2500 cfs		All Years		0.0	0.0	0.0	-1.2	0.0	0.0	0.0	0.0			
Adult (San Joaquin River)	December through February	Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<-5000 cfs		All Years			0.0	0.0	-1.2							

Table 232 No Action Alternative -Alternative 1 (Future)

Steelhead in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 1 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	October through July	Mean Monthly Flow (cfs)	Rio Vista		10	Lower 40%	0.0	0.0	-3.0	0.0	-3.0	0.0	0.0	0.0	0.0	3.0		
		Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years	0.0	68.3	61.0	57.3	59.8	69.5	0.0	0.0	0.0	0.0		
		Mean Monthly Delta Outflow (cfs)	Delta		10	All Years	0.0	0.0	0.0	2.4	-1.2	0.0	0.0	0.0	0.0	0.0		
		Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<2500 cfs		All Years	0.0	0.0	0.0	0.0	-1.2	0.0	0.0	0.0	0.0	0.0		

Table 233 No Action Alternative -Alternative 1 (Future)

Green Sturgeon in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 1 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	Year-round	Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years	0.0	68.3	61.0	57.3	59.8	69.5	0.0	0.0	0.0	0.0	0.0	0.0

Table 234 No Action Alternative -Alternative 1 (Future)

White Sturgeon in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 1 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	April through June	Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years							0.0	0.0	0.0			

Table 235 No Action Alternative -Alternative 1 (Future)

Splittail in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 1 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Spawning and Embryo Incubation	February through May	Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years					59.8	69.5	0.0	0.0				
Juvenile Rearing and Emigration	April through July	Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years							0.0	0.0	0.0	0.0		

Table 236 No Action Alternative -Alternative 1 (Future)

American Shad in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 1 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Egg and Larvae	April through June	Mean Monthly X_2 (RKm)	Changes in X_2	1 RKm		All Years							1.2	0.0	0.0			

Table 237 No Action Alternative -Alternative 1 (Future)

Striped Bass in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 1 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Egg and Larvae	April through June	Mean Monthly X_2 (RKm)	Changes in X_2	1 RKm		All Years							1.2	0.0	0.0			

Alternative 1 (Future) vs No Action Alternative

Sacramento River at Freeport, Monthly Temperature

Exceedance of Water Temperature Index Values and Probability of Occurring within the Water Temperature Index Ranges

No Action Alternative

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	98.3	96.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	90.2	86.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	43.9	26.2	97.6	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	26.2	8.5	92.7	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	98.8	9.8	1.2	78.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	97.8	1.5	1.2	29.3	98.8	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	90.2	1.2	1.2	15.6	90.2	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	70.7	1.2	1.2	7.0	75.6	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	50.0	1.2	1.2	4.6	63.4	98.8	98.8	98.8	98.8	98.8	98.8
56	98.8	31.7	1.2	1.2	2.0	43.9	97.8	98.8	98.8	98.8	98.8	98.8
57	98.8	22.0	1.2	1.2	1.2	27.4	96.6	98.8	98.8	98.8	98.8	98.8
58	98.8	6.1	1.2	1.2	1.2	18.9	92.4	98.8	98.8	98.8	98.8	98.8
59	98.8	2.4	1.2	1.2	1.2	7.3	88.0	98.8	98.8	98.8	98.8	98.8
60	98.8	1.2	1.2	1.2	1.2	4.9	81.7	98.8	98.8	98.8	98.8	98.8
61	98.0	1.2	1.2	1.2	1.2	2.4	74.0	98.8	98.8	98.8	98.8	98.8
62	89.6	1.2	1.2	1.2	1.2	1.9	62.8	98.8	98.8	98.8	98.8	98.8
63	63.4	1.2	1.2	1.2	1.2	1.3	49.4	98.8	98.8	98.8	98.8	98.8
64	52.4	1.2	1.2	1.2	1.2	1.2	32.3	98.4	98.8	98.8	98.8	98.8
65	35.4	1.2	1.2	1.2	1.2	1.2	27.6	97.0	98.8	98.8	98.8	98.8
66	21.3	1.2	1.2	1.2	1.2	1.2	17.1	92.3	98.8	98.8	98.8	98.8
68	4.7	1.2	1.2	1.2	1.2	1.2	1.2	78.7	98.8	98.8	98.8	95.3
69	2.7	1.2	1.2	1.2	1.2	1.2	1.2	54.9	96.6	98.8	98.8	89.8
70	1.6	1.2	1.2	1.2	1.2	1.2	1.2	38.2	95.2	98.8	98.8	78.0
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	21.3	86.9	98.8	98.8	70.1
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	13.0	81.7	98.8	98.8	53.7
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.6	39.6	91.5	88.7	22.0
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.1	20.1	78.7	81.7	9.8
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	39.0	43.9	2.1
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	89.0	84.8	97.6	97.6	97.6	95.7	78.7	20.1	17.1	89.0
50-64	46.4	97.6	8.6	0.0	76.8	97.6	66.5	0.4	0.0	0.0	0.0	0.0
55-56	0.0	18.3	0.0	0.0	2.6	19.5	1.0	0.0	0.0	0.0	0.0	0.0
59-64	46.4	1.2	0.0	0.0	0.0	6.1	55.7	0.4	0.0	0.0	0.0	0.0
59-68	94.1	1.2	0.0	0.0	0.0	6.1	86.8	20.1	0.0	0.0	0.0	3.5
59-75	97.6	1.2	0.0	0.0	0.0	6.1	86.8	95.7	78.7	20.1	17.1	89.0
60-70	97.2	0.0	0.0	0.0	0.0	3.7	80.5	60.6	3.6	0.0	0.0	20.8
61-71	96.8	0.0	0.0	0.0	0.0	1.2	72.8	77.5	11.9	0.0	0.0	28.7
63-69	60.7	0.0	0.0	0.0	0.0	0.1	48.2	43.9	2.2	0.0	0.0	9.0
63-77	62.2	0.0	0.0	0.0	0.0	0.1	48.2	97.6	97.6	59.8	54.9	96.7
65-82	34.2	0.0	0.0	0.0	0.0	0.0	26.4	95.8	97.6	97.6	97.6	97.6
70-82	0.4	0.0	0.0	0.0	0.0	0.0	0.0	37.0	94.0	97.6	97.6	76.8
42-60	0.0	97.6	97.6	95.8	97.6	93.9	17.1	0.0	0.0	0.0	0.0	0.0
61-77	96.8	0.0	0.0	0.0	0.0	1.2	72.8	97.6	97.6	59.8	54.9	96.7

Alternative 1 (Future)

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	98.3	96.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	90.2	86.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	43.9	26.2	97.6	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	25.6	8.5	92.7	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	98.8	8.5	1.2	78.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	97.8	1.5	1.2	29.3	98.8	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	90.7	1.2	1.2	15.9	90.2	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	70.7	1.2	1.2	6.8	75.6	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	50.0	1.2	1.2	4.6	63.4	98.8	98.8	98.8	98.8	98.8	98.8
56	98.8	31.7	1.2	1.2	2.1	43.9	97.8	98.8	98.8	98.8	98.8	98.8
57	98.8	22.0	1.2	1.2	1.2	27.4	96.6	98.8	98.8	98.8	98.8	98.8
58	98.8	6.1	1.2	1.2	1.2	18.9	92.4	98.8	98.8	98.8	98.8	98.8
59	98.8	2.3	1.2	1.2	1.2	7.3	88.0	98.8	98.8	98.8	98.8	98.8
60	98.8	1.2	1.2	1.2	1.2	4.9	81.7	98.8	98.8	98.8	98.8	98.8
61	98.0	1.2	1.2	1.2	1.2	2.4	74.0	98.8	98.8	98.8	98.8	98.8
62	89.6	1.2	1.2	1.2	1.2	1.9	62.8	98.8	98.8	98.8	98.8	98.8
63	63.4	1.2	1.2	1.2	1.2	1.3	49.4	98.8	98.8	98.8	98.8	98.8
64	52.4	1.2	1.2	1.2	1.2	1.2	32.3	98.4	98.8	98.8	98.8	98.8
65	35.4	1.2	1.2	1.2	1.2	1.2	27.6	97.0	98.8	98.8	98.8	98.8
66	21.3	1.2	1.2	1.2	1.2	1.2	17.1	92.3	98.8	98.8	98.8	98.8
68	4.7	1.2	1.2	1.2	1.2	1.2	1.2	78.7	98.8	98.8	98.8	95.3
69	2.7	1.2	1.2	1.2	1.2	1.2	1.2	54.9	96.6	98.8	98.8	89.8
70	1.6	1.2	1.2	1.2	1.2	1.2	1.2	38.2	95.2	98.8	98.8	78.0
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	21.3	86.9	98.8	98.8	70.1
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	13.0	81.7	98.8	98.8	53.7
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.6	39.6	91.5	88.7	22.0
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.1	20.3	78.7	82.3	9.8
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.6	39.0	42.7	2.1
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	89.0	84.8	97.6	97.6	97.6	95.7	78.5	20.1	16.5	89.0
50-64	46.4	97.6	7.3	0.0	76.8	97.6	66.5	0.4	0.0	0.0	0.0	0.0
55-56	0.0	18.3	0.0	0.0	2.5	19.5	1.0	0.0	0.0	0.0	0.0	0.0
59-64	46.4	1.1	0.0	0.0	0.0	6.1	55.7	0.4	0.0	0.0	0.0	0.0
59-68	94.1	1.1	0.0	0.0	0.0	6.1	86.8	20.1	0.0	0.0	0.0	3.5
59-75	97.6	1.1	0.0	0.0	0.0	6.1	86.8	95.7	78.5	20.1	16.5	89.0
60-70	97.2	0.0	0.0	0.0	0.0	3.7	80.5	60.6	3.6	0.0	0.0	20.8
61-71	96.8	0.0	0.0	0.0	0.0	1.2	72.8	77.5	11.9	0.0	0.0	28.7
63-69	60.7	0.0	0.0	0.0	0.0	0.1	48.2	43.9	2.2	0.0	0.0	9.0
63-77	62.2	0.0	0.0	0.0	0.0	0.1	48.2	97.6	97.2	59.8	56.1	96.7
65-82	34.2	0.0	0.0	0.0	0.0	0.0	26.4	95.8	97.6	97.6	97.6	97.6
70-82	0.4	0.0	0.0	0.0	0.0	0.0	0.0	37.0	94.0	97.6	97.6	76.8
42-60	0.0	97.6	97.6	95.8	97.6	93.9	17.1	0.0	0.0	0.0	0.0	0.0
61-77	96.8	0.0	0.0	0.0	0.0	1.2	72.8	97.6	97.2	59.8	56.1	96.7

Alternative 1 (Future) - No Action Alternative

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
43	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
48	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
49	0.0	0.0	-0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50	0.0	0.0	-1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
52	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
53	0.0	0.5	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
54	0.0	0.0	0.0	0.0	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
56	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
57	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
58	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
62	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
66	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
68	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
72	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
74	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.6	0.0
77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	-1.2	0.0
82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
86	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
88	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
98	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45-75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.2	0.0	-0.6	0.0
50-64	0.0	0.0	-1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55-56	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-64	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-68	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-75	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	-0.2	0.0	-0.6	0.0
60-70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61-71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63-69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.4	0.0	1.2	0.0
65-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42-60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.4	0.0	1.2	0.0

Table 239 No Action Alternative -Alternative 1 (Future)

Alternative 1 (Future) vs No Action Alternative
Sacramento River at Rio Vista, Monthly Flow

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
-1.0 < X < 1.0	76.8	97.6	84.1	80.5	79.3	92.7	89.0	95.1	95.1	92.7	95.1	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0
X>1.0 (Total %)	22.0	1.2	7.3	18.3	17.1	4.9	6.1	1.2	1.2	7.3	1.2	0.0
X<=-10.0	0.0	0.0	1.2	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	0.0	1.2	4.9	0.0	2.4	1.2	4.9	3.7	2.4	0.0	1.2	0.0
Net Change in % Exceedance:	22.0	0.0	2.4	18.3	14.6	3.7	1.2	-2.4	-1.2	7.3	0.0	0.0
Net Change in 10% Exceedance	0.0	0.0	-1.2	0.0	-1.2	0.0	0.0	0.0	0.0	1.2	0.0	0.0
Low Flows (Upper 40% of Distribution)												
-1.0 < X < 1.0	93.9	97.0	87.9	100.0	81.8	93.9	81.8	97.0	100.0	81.8	90.9	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0
X>1 (Total %)	6.1	0.0	3.0	0.0	9.1	3.0	15.2	0.0	0.0	18.2	3.0	0.0
X<=-10.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1 (Total %)	0.0	3.0	9.1	0.0	6.1	0.0	3.0	3.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	6.1	-3.0	-6.1	0.0	3.0	3.0	12.1	-3.0	0.0	18.2	3.0	0.0
Net Change in 10% Exceedance	0.0	0.0	-3.0	0.0	-3.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0

Table 240 No Action Alternative -Alternative 1 (Future)

Alternative 1 (Future) vs No Action Alternative
Yolo Bypass, Monthly Flow

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
-1.0 < X < 1.0	100.0	30.5	31.7	30.5	25.6	14.6	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	68.3	61.0	57.3	59.8	69.5	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	0.0	69.5	68.3	69.5	74.4	84.1	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	69.5	68.3	69.5	74.4	84.1	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	68.3	61.0	57.3	59.8	69.5	0.0	0.0	0.0	0.0	0.0	0.0
Low Flows (Upper 40% of Distribution)												
-1.0 < X < 1.0	100.0	75.8	69.7	48.5	30.3	12.1	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	24.2	30.3	51.5	69.7	87.9	0.0	0.0	0.0	0.0	0.0	0.0
X>1 (Total %)	0.0	24.2	30.3	51.5	69.7	87.9	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	24.2	30.3	51.5	69.7	87.9	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	24.2	30.3	51.5	69.7	87.9	0.0	0.0	0.0	0.0	0.0	0.0

Table 241 No Action Alternative -Alternative 1 (Future)

Alternative 1 (Future) vs No Action Alternative
Delta Outflow, Monthly Flow

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
-1.0 < X < 1.0	78.0	98.8	81.7	93.9	92.7	95.1	97.6	96.3	93.9	98.8	97.6	100.0
X>=10.0	0.0	0.0	0.0	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	17.1	1.2	9.8	6.1	3.7	2.4	2.4	0.0	1.2	0.0	2.4	0.0
X<=-10.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	1.2	0.0	8.5	0.0	3.7	1.2	0.0	3.7	4.9	1.2	0.0	0.0
Net Change in % Exceedance:	15.9	1.2	1.2	6.1	0.0	1.2	2.4	-3.7	-3.7	-1.2	2.4	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	2.4	-1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Low Flows (Upper 40% of Distribution)												
-1.0 < X < 1.0	69.7	97.0	72.7	90.9	84.8	90.9	100.0	90.9	93.9	97.0	100.0	100.0
X>=10.0	0.0	0.0	0.0	6.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1 (Total %)	18.2	3.0	15.2	9.1	6.1	3.0	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1 (Total %)	3.0	0.0	12.1	0.0	9.1	3.0	0.0	9.1	6.1	3.0	0.0	0.0
Net Change in % Exceedance:	15.2	3.0	3.0	9.1	-3.0	0.0	0.0	-9.1	-6.1	-3.0	0.0	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	6.1	-3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Long-Term and Water Year-Type Average of Sacramento River Delta Inflow Under Future - Base and Future - Alternative 4

Analysis Period	October	November	December	January	February	March	April	May	June	July	August	September	Total (TAF)
						Average Flow (cfs)							
							Long-Term						
Full Simulation Period													
Future - Base	8,350	10,798	22,082	31,475	37,498	30,725	19,501	11,009	11,566	13,675	9,771	13,116	13,187
Future - Alternative 4	8,376	10,692	21,736	30,909	36,932	30,416	19,492	10,995	11,560	13,681	9,764	13,114	13,074
Difference	26	-105	-346	-566	-567	-309	-9	-14	-6	7	-7	-1	-113
Percent Difference	0%	-1%	-2%	-2%	-2%	-1%	0%	0%	0%	0%	0%	0%	-1%
							Water Year-Types						
Wet													
Future - Base	8,996	14,634	37,088	51,035	56,945	47,194	30,753	12,279	11,846	17,045	8,777	23,150	19,185
Future - Alternative 4	8,995	14,380	36,385	50,268	56,246	46,883	30,782	12,270	11,847	17,046	8,759	23,146	19,021
Difference	-1	-254	-703	-766	-700	-310	29	-9	1	2	-18	-4	-164
Percent Difference	0%	-2%	-2%	-2%	-1%	-1%	0%	0%	0%	0%	0%	0%	-1%
Above Normal													
Future - Base	9,290	10,029	19,595	40,534	52,912	37,168	18,221	12,048	12,038	14,830	9,005	15,709	15,067
Future - Alternative 4	9,456	9,969	19,218	39,648	52,255	36,592	18,222	12,047	12,037	14,831	9,004	15,709	14,923
Difference	166	-59	-377	-886	-656	-577	2	0	-1	0	-1	0	-143
Percent Difference	2%	-1%	-2%	-2%	-1%	-2%	0%	0%	0%	0%	0%	0%	-1%
Below Normal													
Future - Base	8,183	9,236	16,398	24,715	25,957	23,572	16,492	11,386	12,357	12,801	10,142	6,570	10,705
Future - Alternative 4	8,181	9,209	16,212	24,018	25,270	23,226	16,438	11,349	12,359	12,790	10,143	6,570	10,583
Difference	-2	-27	-186	-697	-687	-346	-55	-37	2	-10	1	0	-122
Percent Difference	0%	0%	-1%	-3%	-3%	-1%	0%	0%	0%	0%	0%	0%	-1%
Dry													
Future - Base	7,696	9,129	14,297	16,142	24,160	21,042	12,961	10,471	11,580	11,715	11,004	6,583	9,426
Future - Alternative 4	7,696	9,087	14,200	15,874	23,685	20,743	12,940	10,458	11,587	11,719	11,004	6,583	9,355
Difference	0	-42	-97	-268	-475	-298	-21	-13	7	4	0	0	-71
Percent Difference	0%	0%	-1%	-2%	-2%	-1%	0%	0%	0%	0%	0%	0%	-1%
Critical													
Future - Base	7,362	7,663	10,980	13,674	15,968	13,022	10,454	7,796	9,644	9,526	10,173	6,975	7,426
Future - Alternative 4	7,390	7,648	10,851	13,479	15,750	12,984	10,422	7,779	9,589	9,573	10,166	6,975	7,389
Difference	28	-15	-129	-194	-217	-38	-31	-17	-55	47	-7	0	-37
Percent Difference	0%	0%	-1%	-1%	-1%	0%	0%	0%	-1%	0%	0%	0%	-1%

Sacramento River Delta Inflow

Future - Base

	Average Monthly Flow (cfs)											
Statistic	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Probability of Exceedance												
10%	9,235	17,027	51,654	65,553	69,785	60,402	45,827	14,062	14,775	19,566	11,080	23,931
20%	8,769	12,121	31,691	57,934	63,984	51,170	26,603	12,353	13,371	17,266	10,982	23,302
30%	8,164	10,380	21,194	41,318	55,940	41,821	18,011	11,604	12,742	14,296	10,796	21,171
40%	7,981	9,237	17,702	28,066	43,996	30,782	15,285	11,092	11,853	13,342	10,577	15,579
50%	7,891	8,609	16,336	22,928	32,847	22,574	13,363	10,364	11,233	12,636	10,333	6,896
60%	7,870	7,940	13,685	19,586	22,299	17,435	12,171	9,646	10,701	12,343	9,683	6,650
70%	7,816	7,863	12,583	14,988	18,509	15,725	11,343	9,037	10,289	11,773	8,734	6,595
80%	7,655	7,666	9,913	12,874	16,673	13,489	10,154	8,418	9,791	11,041	8,421	6,535
90%	6,420	6,929	9,262	10,998	14,384	11,578	8,911	7,956	8,712	9,884	7,899	6,418
Long Term												
Full Simulation Period	8,350	10,798	22,082	31,475	37,498	30,725	19,501	11,009	11,566	13,675	9,771	13,116
Water Year Types												
Wet	8,996	14,634	37,088	51,035	56,945	47,194	30,753	12,279	11,846	17,045	8,777	23,150
Above Normal	9,290	10,029	19,595	40,534	52,912	37,168	18,221	12,048	12,038	14,830	9,005	15,709
Below Normal	8,183	9,236	16,398	24,715	25,957	23,572	16,492	11,386	12,357	12,801	10,142	6,570
Dry	7,696	9,129	14,297	16,142	24,160	21,042	12,961	10,471	11,580	11,715	11,004	6,583
Critical	7,362	7,663	10,980	13,674	15,968	13,022	10,454	7,796	9,644	9,526	10,173	6,975

Future - Alternative 4

	Average Monthly Flow (cfs)											
Statistic	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Probability of Exceedance												
10%	9,257	16,733	50,833	65,393	69,788	60,190	45,827	14,129	14,731	19,568	11,077	23,922
20%	8,823	12,093	30,469	56,647	63,679	51,046	26,618	12,350	13,404	17,266	10,975	23,303
30%	8,221	10,341	20,645	39,177	54,445	40,790	18,008	11,602	12,749	14,295	10,796	21,171
40%	7,981	9,218	17,528	26,812	43,227	29,473	15,158	11,014	11,854	13,339	10,577	15,580
50%	7,891	8,582	16,200	22,369	31,905	22,219	13,360	10,364	11,209	12,643	10,269	6,896
60%	7,853	7,926	13,659	19,210	21,436	17,325	12,171	9,635	10,718	12,342	9,683	6,650
70%	7,816	7,848	12,534	14,898	18,147	15,643	11,132	9,037	10,289	11,776	8,734	6,595
80%	7,655	7,659	9,893	12,827	16,530	13,428	10,281	8,418	9,790	11,225	8,421	6,535
90%	6,477	6,922	9,143	10,975	14,356	11,576	8,911	7,949	8,712	9,830	7,901	6,418
Long Term												
Full Simulation Period	8,376	10,692	21,736	30,909	36,932	30,416	19,492	10,995	11,560	13,681	9,764	13,114
Water Year Types												
Wet	8,995	14,380	36,385	50,268	56,246	46,883	30,782	12,270	11,847	17,046	8,759	23,146
Above Normal	9,456	9,969	19,218	39,648	52,255	36,592	18,222	12,047	12,037	14,831	9,004	15,709
Below Normal	8,181	9,209	16,212	24,018	25,270	23,226	16,438	11,349	12,359	12,790	10,143	6,570
Dry	7,696	9,087	14,200	15,874	23,685	20,743	12,940	10,458	11,587	11,719	11,004	6,583
Critical	7,390	7,648	10,851	13,479	15,750	12,984	10,422	7,779	9,589	9,573	10,166	6,975

Future - Alternative 4 Minus Future - Base

	Average Monthly Flow (cfs)											
Statistic	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Probability of Exceedance												
10%	23	-294	-821	-160	3	-213	0	67	-44	2	-3	-9
20%	54	-29	-1,223	-1,287	-305	-124	16	-2	33	0	-6	1
30%	58	-39	-549	-2,141	-1,495	-1,031	-3	-2	7	-1	1	0
40%	0	-19	-174	-1,253	-770	-1,309	-127	-78	1	-2	0	0
50%	0	-27	-136	-559	-941	-355	-3	0	-24	7	-63	-1
60%	-17	-15	-26	-376	-863	-110	0	-11	17	-1	0	0
70%	0	-16	-49	-90	-363	-82	-211	0	0	4	0	0
80%	0	-7	-21	-47	-143	-60	127	0	0	184	0	0
90%	57	-7	-119	-23	-28	-2	0	-7	0	-54	1	0
Long Term												
Full Simulation Period	26	-105	-346	-566	-567	-309	-9	-14	-6	7	-7	-1
Water Year Types												
Wet	-1	-254	-703	-766	-700	-310	29	-9	1	2	-18	-4
Above Normal	166	-59	-377	-886	-656	-577	2	0	-1	0	-1	0
Below Normal	-2	-27	-186	-697	-687	-346	-55	-37	2	-10	1	0
Dry	0	-42	-97	-268	-475	-298	-21	-13	7	4	0	0
Critical	28	-15	-129	-194	-217	-38	-31	-17	-55	47	-7	0

Long-Term and Water Year-Type Average of Total CVP Deliveries North of the Delta Under Future - Base and Future - Alternative 4

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Future - Base	1,473	705	382	224	236	323	5,015	5,427	7,762	7,605	5,752	1,944	2,234
Future - Alternative 4	1,473	705	382	224	235	323	5,015	5,427	7,762	7,605	5,752	1,944	2,234
Difference	0	1	0	0	-1	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
							Water Year-Types						
Wet													
Future - Base	1,422	667	363	222	239	272	4,539	5,521	8,164	8,101	6,181	2,142	2,294
Future - Alternative 4	1,422	667	363	222	239	272	4,539	5,521	8,164	8,101	6,180	2,142	2,294
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal													
Future - Base	1,457	694	376	226	237	239	4,896	5,545	7,962	7,972	5,945	2,186	2,288
Future - Alternative 4	1,459	700	376	226	236	239	4,896	5,545	7,962	7,972	5,945	2,186	2,288
Difference	3	5	0	0	0	0	0	0	0	1	1	0	1
Percent Difference	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal													
Future - Base	1,574	746	411	234	233	328	5,295	5,621	7,827	7,667	5,800	1,881	2,280
Future - Alternative 4	1,574	746	411	234	227	327	5,295	5,620	7,826	7,666	5,799	1,881	2,280
Difference	0	0	0	0	-6	0	0	-1	-1	-1	-1	0	-1
Percent Difference	0%	0%	0%	0%	-3%	0%	0%	0%	0%	0%	0%	0%	0%
Dry													
Future - Base	1,508	709	382	229	237	331	5,227	5,486	7,679	7,543	5,719	1,793	2,233
Future - Alternative 4	1,508	709	382	229	237	331	5,227	5,485	7,678	7,542	5,719	1,792	2,233
Difference	0	0	0	0	0	0	-1	-1	-1	-1	-1	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical													
Future - Base	1,430	744	395	208	229	491	5,500	4,805	6,777	6,232	4,651	1,613	2,004
Future - Alternative 4	1,430	744	395	208	229	491	5,501	4,806	6,778	6,233	4,652	1,614	2,004
Difference	0	0	0	0	0	0	0	0	1	1	1	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Total CVP Deliveries North of the Delta

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	1,805	942	487	299	267	609	6,547	6,089	8,526	8,483	6,489	2,345
20%	1,755	883	457	252	247	417	5,972	5,927	8,171	8,021	6,143	2,197
30%	1,658	800	416	226	238	324	5,606	5,855	8,035	7,830	5,984	2,126
40%	1,589	744	392	214	238	246	5,384	5,734	7,885	7,765	5,908	2,076
50%	1,479	674	372	213	238	223	5,166	5,604	7,789	7,720	5,830	1,992
60%	1,378	629	349	213	232	214	4,809	5,360	7,687	7,626	5,729	1,927
70%	1,309	601	337	211	230	212	4,680	5,116	7,576	7,431	5,626	1,790
80%	1,217	552	310	198	212	212	4,277	4,968	7,405	7,212	5,449	1,713
90%	1,119	511	297	183	206	199	3,070	4,539	7,117	7,088	5,246	1,500
Long Term												
Full Simulation Period	1,473	705	382	224	236	323	5,015	5,427	7,762	7,605	5,752	1,944
Water Year Types												
Wet	1,422	667	363	222	239	272	4,539	5,521	8,164	8,101	6,181	2,142
Above Normal	1,457	694	376	226	237	239	4,896	5,545	7,962	7,972	5,945	2,186
Below Normal	1,574	746	411	234	233	328	5,295	5,621	7,827	7,667	5,800	1,881
Dry	1,508	709	382	229	237	331	5,227	5,486	7,679	7,543	5,719	1,793
Critical	1,430	744	395	208	229	491	5,500	4,805	6,777	6,232	4,651	1,613

Future - Alternative 4

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	1,804	942	487	299	267	609	6,547	6,089	8,526	8,483	6,488	2,347
20%	1,755	883	457	252	247	416	5,972	5,927	8,171	8,021	6,145	2,197
30%	1,657	800	416	226	238	324	5,606	5,852	8,035	7,830	5,984	2,126
40%	1,591	744	392	214	238	246	5,383	5,734	7,885	7,765	5,907	2,076
50%	1,479	674	372	213	238	223	5,167	5,603	7,789	7,721	5,830	1,993
60%	1,379	629	349	213	231	214	4,809	5,360	7,685	7,626	5,735	1,926
70%	1,309	606	337	211	230	212	4,680	5,116	7,576	7,427	5,626	1,788
80%	1,217	552	310	198	210	212	4,277	4,968	7,402	7,209	5,449	1,713
90%	1,119	511	297	183	203	199	3,070	4,541	7,116	7,088	5,246	1,499
Long Term												
Full Simulation Period	1,473	705	382	224	235	323	5,015	5,427	7,762	7,605	5,752	1,944
Water Year Types												
Wet	1,422	667	363	222	239	272	4,539	5,521	8,164	8,101	6,180	2,142
Above Normal	1,459	700	376	226	236	239	4,896	5,545	7,962	7,972	5,945	2,186
Below Normal	1,574	746	411	234	227	327	5,295	5,620	7,826	7,666	5,799	1,881
Dry	1,508	709	382	229	237	331	5,227	5,485	7,678	7,542	5,719	1,792
Critical	1,430	744	395	208	229	491	5,501	4,806	6,778	6,233	4,652	1,614

Future - Alternative 4 Minus Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	-1	2
20%	0	0	0	0	0	0	0	0	0	0	2	0
30%	-1	0	0	0	0	0	0	-3	0	0	0	0
40%	2	0	0	0	0	0	0	0	0	-1	-1	0
50%	0	0	0	0	0	0	1	-1	0	0	0	1
60%	0	0	0	0	0	0	0	0	-2	0	6	-1
70%	0	5	0	0	0	0	0	0	0	-4	0	-2
80%	0	0	0	0	-3	0	0	-1	-3	-2	0	0
90%	0	0	0	0	-3	0	0	2	0	0	0	0
Long Term												
Full Simulation Period	0	1	0	0	-1	0	0	0	0	0	0	0
Water Year Types												
Wet	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal	3	5	0	0	0	0	0	0	0	1	1	0
Below Normal	0	0	0	0	-6	0	0	-1	-1	-1	-1	0
Dry	0	0	0	0	0	0	-1	-1	-1	-1	-1	0
Critical	0	0	0	0	0	0	0	0	1	1	1	0

Long-Term and Water Year-Type Average of Total CVP Deliveries South of the Delta Under Future - Base and Future - Alternative 4

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Future - Base	2,541	1,483	1,013	1,043	1,435	1,900	2,274	3,350	4,776	5,105	4,521	3,213	1,977
Future - Alternative 4	2,541	1,483	1,013	1,043	1,434	1,899	2,274	3,350	4,775	5,103	4,520	3,213	1,976
Difference	0	0	0	0	0	0	0	-1	-1	-1	-1	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
							Water Year-Types						
Wet													
Future - Base	2,628	1,550	1,095	1,170	1,593	2,232	2,721	3,999	5,835	6,367	5,454	3,566	2,313
Future - Alternative 4	2,628	1,550	1,095	1,170	1,592	2,232	2,720	3,998	5,833	6,365	5,453	3,565	2,313
Difference	0	0	0	0	0	0	0	-1	-1	-1	-1	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal													
Future - Base	2,596	1,530	1,079	1,152	1,565	2,038	2,507	3,669	5,292	5,715	4,982	3,398	2,150
Future - Alternative 4	2,596	1,530	1,079	1,152	1,565	2,038	2,508	3,671	5,294	5,717	4,984	3,399	2,151
Difference	0	0	0	0	0	0	1	1	2	2	2	1	1
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal													
Future - Base	2,569	1,496	1,013	1,030	1,414	1,790	2,113	3,233	4,568	4,845	4,352	3,183	1,913
Future - Alternative 4	2,569	1,495	1,013	1,030	1,414	1,789	2,112	3,231	4,565	4,841	4,349	3,182	1,912
Difference	0	0	0	-1	-1	-1	-1	-2	-3	-4	-3	-1	-1
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry													
Future - Base	2,498	1,450	976	989	1,372	1,737	2,052	3,009	4,201	4,404	4,029	3,068	1,802
Future - Alternative 4	2,498	1,449	976	989	1,371	1,736	2,051	3,007	4,198	4,400	4,027	3,067	1,801
Difference	0	0	0	-1	-1	-1	-1	-2	-3	-4	-3	-1	-1
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical													
Future - Base	2,345	1,334	839	773	1,100	1,443	1,639	2,349	3,196	3,259	3,082	2,556	1,447
Future - Alternative 4	2,345	1,335	839	774	1,100	1,443	1,640	2,350	3,198	3,262	3,084	2,557	1,448
Difference	0	0	0	0	0	0	1	1	2	3	2	1	1
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Total CVP Deliveries South of the Delta

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	2,941	1,798	1,415	1,688	2,240	2,237	2,991	4,427	6,543	7,218	6,075	3,780
20%	2,680	1,582	1,131	1,233	1,686	2,097	2,545	3,727	5,389	5,832	5,065	3,423
30%	2,638	1,550	1,086	1,155	1,563	2,032	2,485	3,587	5,156	5,552	4,863	3,357
40%	2,592	1,514	1,037	1,069	1,461	1,991	2,369	3,431	4,896	5,239	4,638	3,283
50%	2,558	1,488	1,001	1,006	1,392	1,953	2,330	3,318	4,708	5,013	4,475	3,229
60%	2,543	1,477	986	979	1,342	1,867	2,220	3,270	4,627	4,915	4,405	3,206
70%	2,503	1,445	943	909	1,280	1,698	2,023	3,147	4,424	4,671	4,227	3,144
80%	2,317	1,285	758	649	946	1,506	1,789	2,595	3,551	3,699	3,435	2,852
90%	2,252	1,229	666	483	770	1,506	1,565	2,402	3,208	3,212	3,156	2,749
Long Term												
Full Simulation Period	2,541	1,483	1,013	1,043	1,435	1,900	2,274	3,350	4,776	5,105	4,521	3,213
Water Year Types												
Wet	2,628	1,550	1,095	1,170	1,593	2,232	2,721	3,999	5,835	6,367	5,454	3,566
Above Normal	2,596	1,530	1,079	1,152	1,565	2,038	2,507	3,669	5,292	5,715	4,982	3,398
Below Normal	2,569	1,496	1,013	1,030	1,414	1,790	2,113	3,233	4,568	4,845	4,352	3,183
Dry	2,498	1,450	976	989	1,372	1,737	2,052	3,009	4,201	4,404	4,029	3,068
Critical	2,345	1,334	839	773	1,100	1,443	1,639	2,349	3,196	3,259	3,082	2,556

Future - Alternative 4

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	2,941	1,798	1,415	1,688	2,240	2,237	2,989	4,427	6,543	7,217	6,075	3,780
20%	2,683	1,584	1,133	1,238	1,692	2,097	2,545	3,735	5,404	5,850	5,078	3,427
30%	2,638	1,550	1,086	1,155	1,563	2,032	2,485	3,587	5,156	5,552	4,863	3,357
40%	2,592	1,514	1,037	1,069	1,461	1,991	2,369	3,431	4,896	5,239	4,638	3,283
50%	2,557	1,488	1,001	1,005	1,391	1,953	2,329	3,317	4,706	5,010	4,473	3,229
60%	2,543	1,477	986	979	1,341	1,867	2,219	3,270	4,627	4,915	4,405	3,206
70%	2,503	1,444	943	909	1,279	1,699	2,023	3,145	4,422	4,669	4,225	3,143
80%	2,316	1,284	758	647	944	1,506	1,789	2,592	3,547	3,693	3,431	2,850
90%	2,252	1,229	666	483	770	1,506	1,565	2,402	3,208	3,212	3,156	2,749
Long Term												
Full Simulation Period	2,541	1,483	1,013	1,043	1,434	1,899	2,274	3,350	4,775	5,103	4,520	3,213
Water Year Types												
Wet	2,628	1,550	1,095	1,170	1,592	2,232	2,720	3,998	5,833	6,365	5,453	3,565
Above Normal	2,596	1,530	1,079	1,152	1,565	2,038	2,508	3,671	5,294	5,717	4,984	3,399
Below Normal	2,569	1,495	1,013	1,030	1,414	1,789	2,112	3,231	4,565	4,841	4,349	3,182
Dry	2,498	1,449	976	989	1,371	1,736	2,051	3,007	4,198	4,400	4,027	3,067
Critical	2,345	1,335	839	774	1,100	1,443	1,640	2,350	3,198	3,262	3,084	2,557

Future - Alternative 4 Minus Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	0	0	0	0	0	-1	0	0	0	0	0
20%	3	2	3	5	6	0	0	9	15	18	13	4
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	-1	-1	0	-1	-1	-2	-3	-2	-1
60%	0	0	0	0	-1	0	-1	0	0	0	0	0
70%	0	0	0	-1	-1	1	0	-1	-2	-3	-2	-1
80%	-1	-1	-1	-2	-2	0	0	-3	-4	-6	-4	-1
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	-1	-1	-1	-1	0
Water Year Types												
Wet	0	0	0	0	0	0	0	-1	-1	-1	-1	0
Above Normal	0	0	0	0	0	0	1	1	2	2	2	1
Below Normal	0	0	0	-1	-1	-1	-1	-2	-3	-4	-3	-1
Dry	0	0	0	-1	-1	-1	-1	-2	-3	-4	-3	-1
Critical	0	0	0	0	0	0	1	1	2	3	2	1

Long-Term and Water Year-Type Average of Total SWP Deliveries North of the Delta Under Future - Base and Future - Alternative 4

Analysis Period	October	November	December	January	February	March	April	May	June	July	August	September	Total (TAF)
						Average Flow (cfs)							
							Long-Term						
Full Simulation Period													
Future - Base	1,383	1,394	894	328	13	89	2,005	2,578	3,092	3,044	2,413	1,806	1,154
Future - Alternative 4	1,386	1,399	897	327	13	89	2,005	2,578	3,092	3,044	2,413	1,806	1,155
Difference	4	5	3	-1	0	0	0	0	0	0	0	0	1
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
							Water Year-Types						
Wet													
Future - Base	1,303	1,401	853	242	19	65	1,869	2,776	3,389	3,342	2,672	2,074	1,213
Future - Alternative 4	1,316	1,417	863	242	19	65	1,869	2,776	3,389	3,342	2,672	2,074	1,215
Difference	13	16	10	0	0	0	0	0	0	0	0	0	2
Percent Difference	1%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal													
Future - Base	1,565	1,622	1,055	408	15	50	2,031	2,790	3,335	3,327	2,627	2,204	1,275
Future - Alternative 4	1,565	1,622	1,055	408	15	50	2,031	2,790	3,335	3,327	2,627	2,204	1,275
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal													
Future - Base	1,651	1,640	1,087	417	9	64	2,125	2,653	3,143	3,043	2,435	1,792	1,216
Future - Alternative 4	1,651	1,639	1,087	417	9	64	2,125	2,653	3,143	3,043	2,435	1,792	1,216
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry													
Future - Base	1,337	1,248	830	347	9	103	2,053	2,604	3,083	2,985	2,385	1,750	1,136
Future - Alternative 4	1,337	1,248	830	347	9	103	2,053	2,604	3,082	2,985	2,385	1,750	1,136
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical													
Future - Base	1,172	1,146	734	313	9	182	2,067	1,833	2,185	2,240	1,680	967	881
Future - Alternative 4	1,170	1,147	731	307	9	183	2,068	1,833	2,185	2,240	1,681	967	880
Difference	-1	0	-3	-6	0	1	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	-2%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Total SWP Deliveries North of the Delta

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	2,163	2,065	1,372	614	20	198	2,860	3,128	3,657	3,561	2,846	2,296
20%	2,011	1,961	1,290	520	20	128	2,556	3,038	3,510	3,477	2,800	2,233
30%	1,827	1,898	1,219	469	20	45	2,378	2,974	3,442	3,369	2,687	2,175
40%	1,653	1,843	1,157	443	19	45	2,110	2,899	3,373	3,302	2,608	2,118
50%	1,404	1,703	1,024	383	15	45	2,006	2,738	3,312	3,227	2,577	2,049
60%	1,320	1,495	940	266	11	45	1,845	2,648	3,201	3,168	2,531	1,963
70%	1,203	1,193	681	154	4	45	1,739	2,470	3,116	3,106	2,484	1,662
80%	861	570	347	60	3	32	1,397	1,931	2,987	2,952	2,290	1,247
90%	277	53	12	11	2	20	1,141	1,669	1,927	1,929	1,506	987
Long Term												
Full Simulation Period	1,383	1,394	894	328	13	89	2,005	2,578	3,092	3,044	2,413	1,806
Water Year Types												
Wet	1,303	1,401	853	242	19	65	1,869	2,776	3,389	3,342	2,672	2,074
Above Normal	1,565	1,622	1,055	408	15	50	2,031	2,790	3,335	3,327	2,627	2,204
Below Normal	1,651	1,640	1,087	417	9	64	2,125	2,653	3,143	3,043	2,435	1,792
Dry	1,337	1,248	830	347	9	103	2,053	2,604	3,083	2,985	2,385	1,750
Critical	1,172	1,146	734	313	9	182	2,067	1,833	2,185	2,240	1,680	967

Future - Alternative 4

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	2,163	2,065	1,372	614	20	198	2,860	3,128	3,657	3,561	2,846	2,296
20%	2,011	1,961	1,290	520	20	128	2,556	3,038	3,510	3,477	2,800	2,233
30%	1,827	1,898	1,219	469	20	45	2,378	2,974	3,442	3,369	2,686	2,175
40%	1,653	1,843	1,157	443	19	45	2,110	2,899	3,373	3,302	2,608	2,118
50%	1,405	1,703	1,024	384	15	45	2,006	2,738	3,314	3,227	2,577	2,049
60%	1,330	1,533	940	280	11	45	1,845	2,648	3,201	3,168	2,531	1,963
70%	1,215	1,211	792	140	4	45	1,739	2,470	3,116	3,107	2,488	1,662
80%	731	570	347	49	3	31	1,397	1,932	2,987	2,952	2,290	1,247
90%	311	53	11	5	2	20	1,141	1,669	1,927	1,925	1,506	987
Long Term												
Full Simulation Period	1,386	1,399	897	327	13	89	2,005	2,578	3,092	3,044	2,413	1,806
Water Year Types												
Wet	1,316	1,417	863	242	19	65	1,869	2,776	3,389	3,342	2,672	2,074
Above Normal	1,565	1,622	1,055	408	15	50	2,031	2,790	3,335	3,327	2,627	2,204
Below Normal	1,651	1,639	1,087	417	9	64	2,125	2,653	3,143	3,043	2,435	1,792
Dry	1,337	1,248	830	347	9	103	2,053	2,604	3,082	2,985	2,385	1,750
Critical	1,170	1,147	731	307	9	183	2,068	1,833	2,185	2,240	1,681	967

Future - Alternative 4 Minus Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	1	0	0	1	0	0	0	0	2	0	0	0
60%	10	37	0	15	0	0	0	0	0	0	0	0
70%	11	19	111	-14	0	0	0	0	0	1	4	0
80%	-129	0	0	-11	0	0	0	0	0	0	0	0
90%	34	1	-1	-6	0	0	0	0	0	-4	0	0
Long Term												
Full Simulation Period	4	5	3	-1	0	0	0	0	0	0	0	0
Water Year Types												
Wet	13	16	10	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	0	-3	-6	0	1	0	0	0	0	0	0

Long-Term and Water Year-Type Average of Total SWP Deliveries South of the Delta Under Future - Base and Future - Alternative 4

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Future - Base	4,043	2,984	3,596	472	840	1,531	2,542	3,813	5,165	5,535	5,706	4,829	2,489
Future - Alternative 4	4,043	2,980	3,582	469	839	1,528	2,535	3,805	5,159	5,533	5,702	4,826	2,486
Difference	0	-4	-14	-3	-1	-3	-7	-8	-6	-2	-3	-4	-3
Percent Difference	0%	0%	0%	-1%	0%	0%	0%	0%	0%	0%	0%	0%	0%
							Water Year-Types						
Wet													
Future - Base	4,344	2,993	4,138	1,107	1,816	2,666	3,835	5,364	6,773	6,814	7,151	6,006	3,210
Future - Alternative 4	4,354	2,993	4,106	1,106	1,814	2,665	3,834	5,363	6,771	6,812	7,149	6,004	3,208
Difference	10	-1	-32	-1	-2	0	-1	-2	-2	-2	-2	-2	-2
Percent Difference	0%	0%	-1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal													
Future - Base	4,230	3,445	3,981	275	949	2,295	3,530	4,967	6,244	6,377	6,711	5,656	2,949
Future - Alternative 4	4,235	3,448	3,983	253	947	2,291	3,528	4,964	6,239	6,372	6,708	5,652	2,947
Difference	5	3	2	-21	-1	-4	-2	-3	-5	-5	-4	-4	-2
Percent Difference	0%	0%	0%	-8%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal													
Future - Base	4,466	3,200	3,761	277	460	940	2,653	3,955	5,476	6,029	6,261	5,329	2,596
Future - Alternative 4	4,459	3,194	3,756	277	459	926	2,645	3,951	5,470	6,023	6,251	5,321	2,592
Difference	-7	-5	-5	0	0	-15	-8	-4	-5	-6	-10	-8	-4
Percent Difference	0%	0%	0%	0%	0%	-2%	0%	0%	0%	0%	0%	0%	0%
Dry													
Future - Base	3,825	2,760	3,103	122	199	821	1,523	2,587	4,084	4,826	4,854	4,140	1,994
Future - Alternative 4	3,822	2,753	3,098	122	201	818	1,503	2,559	4,067	4,826	4,851	4,135	1,988
Difference	-3	-7	-5	0	1	-2	-20	-28	-17	0	-2	-5	-5
Percent Difference	0%	0%	0%	0%	1%	0%	-1%	-1%	0%	0%	0%	0%	0%
Critical													
Future - Base	3,125	2,678	2,710	71	105	198	415	1,284	2,155	2,635	2,470	2,132	1,213
Future - Alternative 4	3,113	2,669	2,700	71	106	199	412	1,288	2,159	2,638	2,468	2,130	1,212
Difference	-12	-10	-10	0	0	1	-3	4	4	3	-1	-1	-2
Percent Difference	0%	0%	0%	0%	0%	0%	-1%	0%	0%	0%	0%	0%	0%

Total SWP Deliveries South of the Delta

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	6,024	4,586	5,669	1,962	2,014	2,905	4,303	5,987	7,491	7,386	7,710	6,606
20%	5,428	4,361	5,320	595	1,939	2,706	3,782	5,413	6,881	7,045	7,177	6,208
30%	5,007	4,042	4,484	231	1,754	2,547	3,546	4,855	6,162	6,469	6,763	5,710
40%	4,894	3,793	4,121	172	634	2,500	3,396	4,756	6,020	6,231	6,634	5,517
50%	4,695	3,368	3,879	145	305	1,970	3,227	4,579	5,814	6,154	6,532	5,440
60%	4,383	2,362	3,600	104	193	456	2,566	3,547	5,530	5,944	6,369	5,228
70%	2,920	2,054	2,708	91	137	337	1,514	2,544	4,505	5,640	5,920	4,934
80%	2,451	1,296	1,887	72	112	220	520	2,078	3,482	4,247	3,946	3,332
90%	1,299	897	964	56	55	146	301	1,184	1,956	2,357	2,163	1,854
Long Term												
Full Simulation Period	4,043	2,984	3,596	472	840	1,531	2,542	3,813	5,165	5,535	5,706	4,829
Water Year Types												
Wet	4,344	2,993	4,138	1,107	1,816	2,666	3,835	5,364	6,773	6,814	7,151	6,006
Above Normal	4,230	3,445	3,981	275	949	2,295	3,530	4,967	6,244	6,377	6,711	5,656
Below Normal	4,466	3,200	3,761	277	460	940	2,653	3,955	5,476	6,029	6,261	5,329
Dry	3,825	2,760	3,103	122	199	821	1,523	2,587	4,084	4,826	4,854	4,140
Critical	3,125	2,678	2,710	71	105	198	415	1,284	2,155	2,635	2,470	2,132

Future - Alternative 4

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	6,026	4,586	5,670	1,965	2,014	2,905	4,305	5,989	7,492	7,389	7,708	6,606
20%	5,429	4,362	5,320	595	1,939	2,681	3,783	5,413	6,881	7,036	7,166	6,209
30%	5,008	4,042	4,484	233	1,748	2,597	3,547	4,856	6,161	6,496	6,777	5,712
40%	4,894	3,772	4,118	171	613	2,486	3,397	4,756	6,020	6,232	6,635	5,523
50%	4,683	3,357	3,869	145	309	1,944	3,227	4,570	5,804	6,155	6,532	5,437
60%	4,356	2,381	3,526	108	193	456	2,514	3,443	5,489	5,940	6,350	5,226
70%	2,959	2,035	2,487	91	137	334	1,451	2,534	4,487	5,639	5,900	4,933
80%	2,445	1,300	1,882	72	111	231	521	2,079	3,484	4,244	3,939	3,323
90%	1,300	894	957	56	56	142	301	1,186	1,957	2,354	2,163	1,858
Long Term												
Full Simulation Period	4,043	2,980	3,582	469	839	1,528	2,535	3,805	5,159	5,533	5,702	4,826
Water Year Types												
Wet	4,354	2,993	4,106	1,106	1,814	2,665	3,834	5,363	6,771	6,812	7,149	6,004
Above Normal	4,235	3,448	3,983	253	947	2,291	3,528	4,964	6,239	6,372	6,708	5,652
Below Normal	4,459	3,194	3,756	277	459	926	2,645	3,951	5,470	6,023	6,251	5,321
Dry	3,822	2,753	3,098	122	201	818	1,503	2,559	4,067	4,826	4,851	4,135
Critical	3,113	2,669	2,700	71	106	199	412	1,288	2,159	2,638	2,468	2,130

Future - Alternative 4 Minus Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	3	0	1	3	0	0	3	1	1	3	-2	0
20%	1	0	0	-1	0	-25	0	0	1	-9	-12	1
30%	1	0	0	2	-6	49	1	0	-1	27	14	2
40%	0	-21	-4	0	-21	-14	0	0	0	1	1	6
50%	-12	-11	-10	0	4	-27	0	-9	-10	1	0	-3
60%	-27	18	-75	4	0	0	-52	-104	-41	-4	-19	-2
70%	39	-19	-221	0	0	-2	-63	-10	-18	0	-20	0
80%	-6	4	-6	0	0	10	0	0	3	-3	-7	-9
90%	1	-2	-8	0	1	-5	0	2	1	-3	0	4
Long Term												
Full Simulation Period	0	-4	-14	-3	-1	-3	-7	-8	-6	-2	-3	-4
Water Year Types												
Wet	10	-1	-32	-1	-2	0	-1	-2	-2	-2	-2	-2
Above Normal	5	3	2	-21	-1	-4	-2	-3	-5	-5	-4	-4
Below Normal	-7	-5	-5	0	0	-15	-8	-4	-5	-6	-10	-8
Dry	-3	-7	-5	0	1	-2	-20	-28	-17	0	-2	-5
Critical	-12	-10	-10	0	0	1	-3	4	4	3	-1	-1

Long-Term and Water Year-Type Average of Fremont Weir Spill to Yolo Bypass Under Future - Base and Future - Alternative 4

	Average Flow (cfs)												
Analysis Period	October	November	December	January	February	March	April	May	June	July	August	September	Total (TAF)
Long-Term													
Full Simulation Period													
Future - Base	43	57	2,754	12,157	16,930	8,465	1,050	3	0	0	0	0	2,453
Future - Alternative 4	43	162	3,093	12,754	17,585	8,789	1,050	3	0	0	0	0	2,574
Difference	0	105	338	597	656	324	0	0	0	0	0	0	120
Percent Difference	0%	185%	12%	5%	4%	4%	0%	0%	0%	0%	0%	0%	5%
Water Year-Types													
Wet													
Future - Base	135	180	7,592	34,147	41,220	23,151	3,236	10	0	0	0	0	6,503
Future - Alternative 4	135	432	8,343	34,966	41,986	23,469	3,235	10	0	0	0	0	6,677
Difference	0	252	751	819	767	319	0	0	0	0	0	0	174
Percent Difference	0%	140%	10%	2%	2%	1%	0%	0%	0%	0%	0%	0%	3%
Above Normal													
Future - Base	0	0	946	9,205	25,241	6,208	14	0	0	0	0	0	2,432
Future - Alternative 4	0	75	1,188	10,057	26,047	6,710	14	0	0	0	0	0	2,580
Difference	0	75	242	852	806	501	0	0	0	0	0	0	148
Percent Difference	0%	0%	26%	9%	3%	8%	0%	0%	0%	0%	0%	0%	6%
Below Normal													
Future - Base	0	0	1,390	583	1,456	737	137	0	0	0	0	0	257
Future - Alternative 4	0	29	1,588	1,330	2,209	1,155	137	0	0	0	0	0	384
Difference	0	29	198	747	753	418	0	0	0	0	0	0	128
Percent Difference	0%	0%	14%	128%	52%	57%	0%	0%	0%	0%	0%	0%	50%
Dry													
Future - Base	0	0	0	11	981	717	0	0	0	0	0	0	99
Future - Alternative 4	0	38	122	315	1,575	1,045	0	0	0	0	0	0	181
Difference	0	38	122	305	594	327	0	0	0	0	0	0	82
Percent Difference	0%	0%	0%	2817%	61%	46%	0%	0%	0%	0%	0%	0%	82%
Critical													
Future - Base	0	0	0	0	26	0	0	0	0	0	0	0	1
Future - Alternative 4	0	10	46	209	300	63	0	0	0	0	0	0	37
Difference	0	10	46	209	274	63	0	0	0	0	0	0	36
Percent Difference	0%	0%	0%	0%	1052%	0%	0%	0%	0%	0%	0%	0%	2387%

Fremont Weir Spill to Yolo Bypass

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	0	9,636	45,653	68,479	26,076	480	0	0	0	0	0
20%	0	0	417	14,794	32,134	7,332	2	0	0	0	0	0
30%	0	0	0	2,685	10,131	3,487	0	0	0	0	0	0
40%	0	0	0	83	4,103	180	0	0	0	0	0	0
50%	0	0	0	0	501	0	0	0	0	0	0	0
60%	0	0	0	0	3	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	43	57	2,754	12,157	16,930	8,465	1,050	3	0	0	0	0
Water Year Types												
Wet	135	180	7,592	34,147	41,220	23,151	3,236	10	0	0	0	0
Above Normal	0	0	946	9,205	25,241	6,208	14	0	0	0	0	0
Below Normal	0	0	1,390	583	1,456	737	137	0	0	0	0	0
Dry	0	0	0	11	981	717	0	0	0	0	0	0
Critical	0	0	0	0	26	0	0	0	0	0	0	0

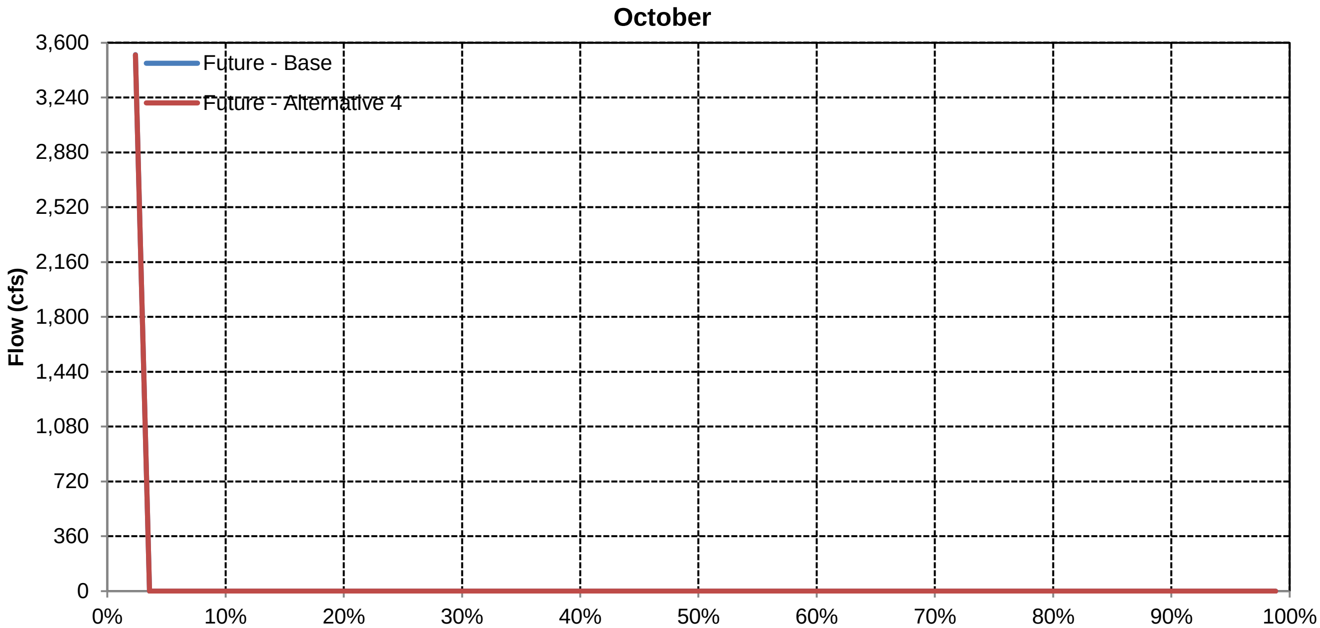
Future - Alternative 4

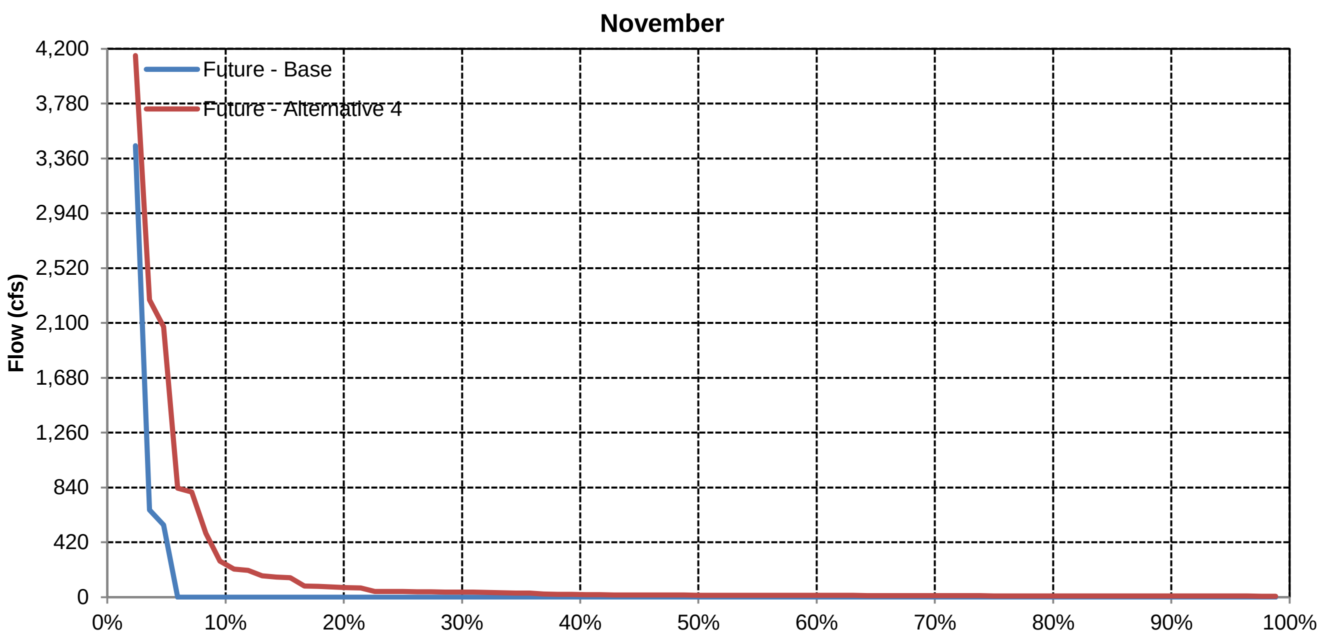
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	211	9,907	45,683	68,628	26,332	480	0	0	0	0	0
20%	0	72	1,887	15,750	32,706	7,623	2	0	0	0	0	0
30%	0	38	431	4,653	11,460	3,972	0	0	0	0	0	0
40%	0	19	259	1,744	5,331	1,421	0	0	0	0	0	0
50%	0	15	148	749	2,114	419	0	0	0	0	0	0
60%	0	14	51	422	936	223	0	0	0	0	0	0
70%	0	12	19	118	388	131	0	0	0	0	0	0
80%	0	10	14	38	173	39	0	0	0	0	0	0
90%	0	9	11	23	48	11	0	0	0	0	0	0
Long Term												
Full Simulation Period	43	162	3,093	12,754	17,585	8,789	1,050	3	0	0	0	0
Water Year Types												
Wet	135	432	8,343	34,966	41,986	23,469	3,235	10	0	0	0	0
Above Normal	0	75	1,188	10,057	26,047	6,710	14	0	0	0	0	0
Below Normal	0	29	1,588	1,330	2,209	1,155	137	0	0	0	0	0
Dry	0	38	122	315	1,575	1,045	0	0	0	0	0	0
Critical	0	10	46	209	300	63	0	0	0	0	0	0

Future - Alternative 4 Minus Future - Base

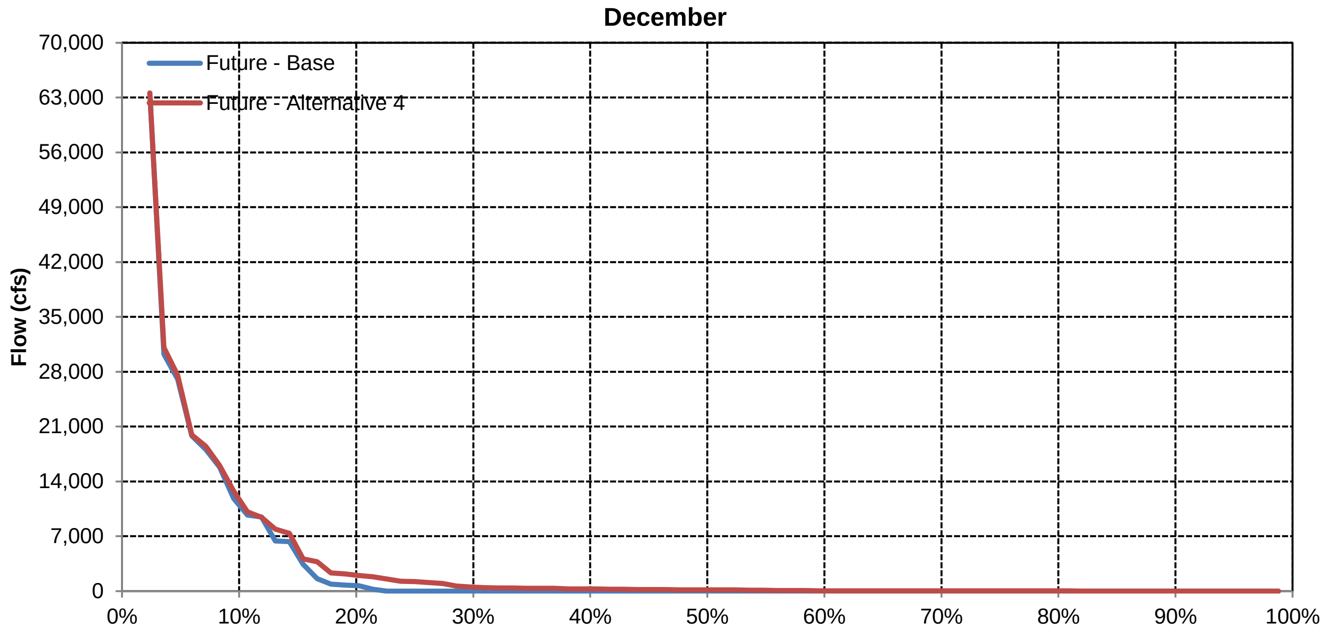
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	211	271	31	150	256	0	0	0	0	0	0
20%	0	72	1,470	957	572	291	0	0	0	0	0	0
30%	0	38	431	1,967	1,329	484	0	0	0	0	0	0
40%	0	19	259	1,661	1,227	1,241	0	0	0	0	0	0
50%	0	15	148	749	1,613	419	0	0	0	0	0	0
60%	0	14	51	422	933	223	0	0	0	0	0	0
70%	0	12	19	118	388	131	0	0	0	0	0	0
80%	0	10	14	38	173	39	0	0	0	0	0	0
90%	0	9	11	23	48	11	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	105	338	597	656	324	0	0	0	0	0	0
Water Year Types												
Wet	0	252	751	819	767	319	0	0	0	0	0	0
Above Normal	0	75	242	852	806	501	0	0	0	0	0	0
Below Normal	0	29	198	747	753	418	0	0	0	0	0	0
Dry	0	38	122	305	594	327	0	0	0	0	0	0
Critical	0	10	46	209	274	63	0	0	0	0	0	0

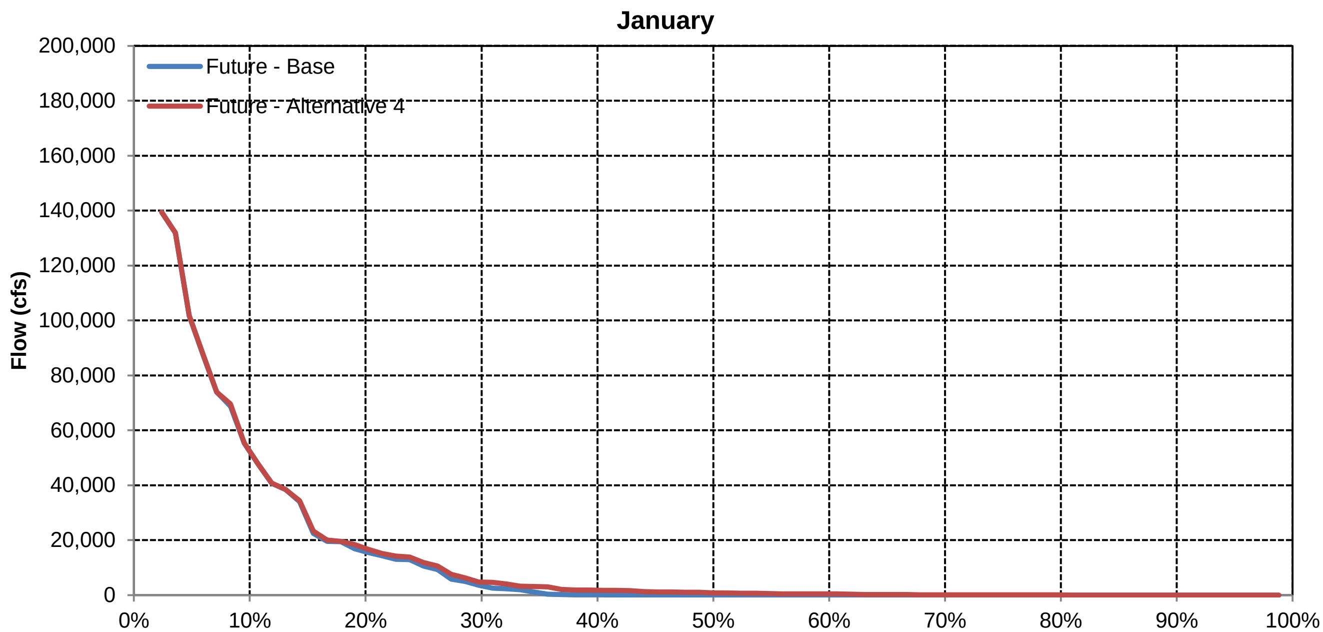
Fremont Weir Spill to Yolo Bypass





Fremont Weir Spill to Yolo Bypass





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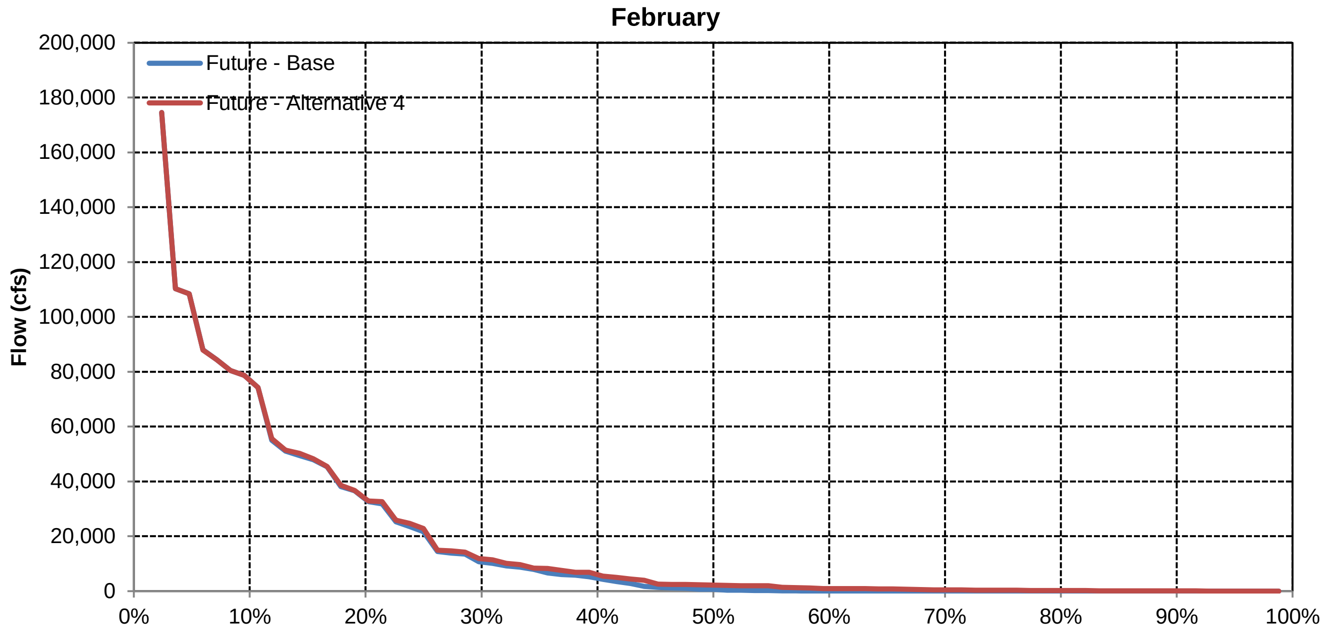

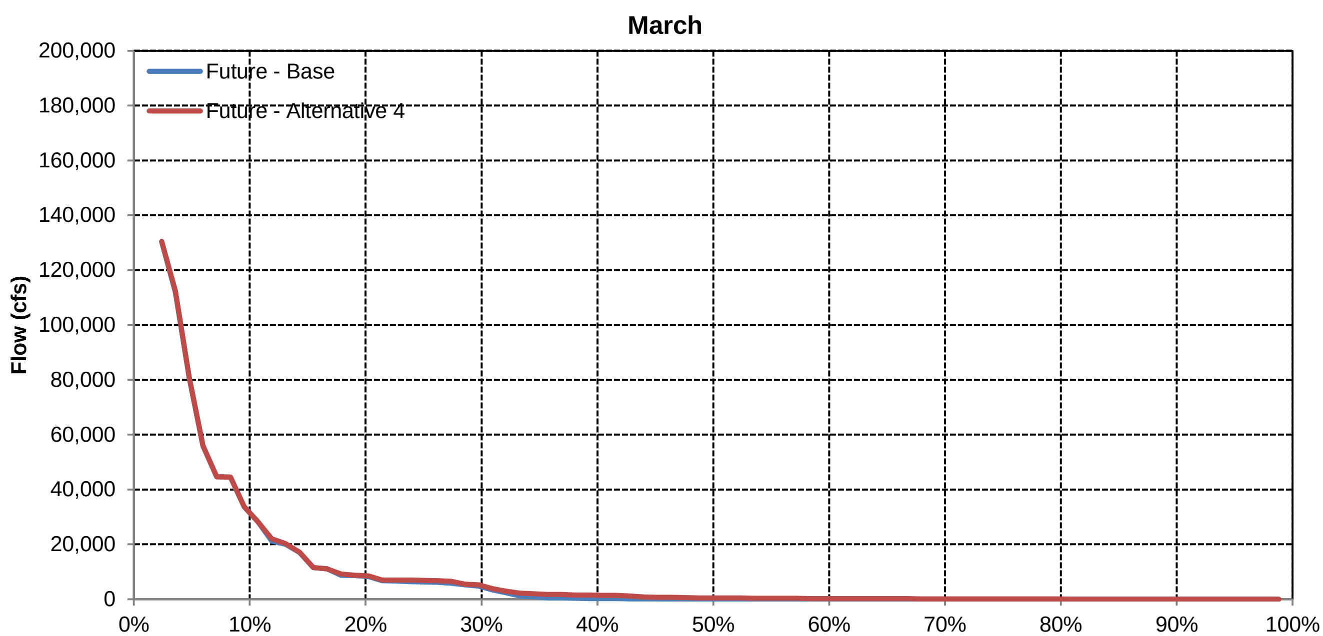

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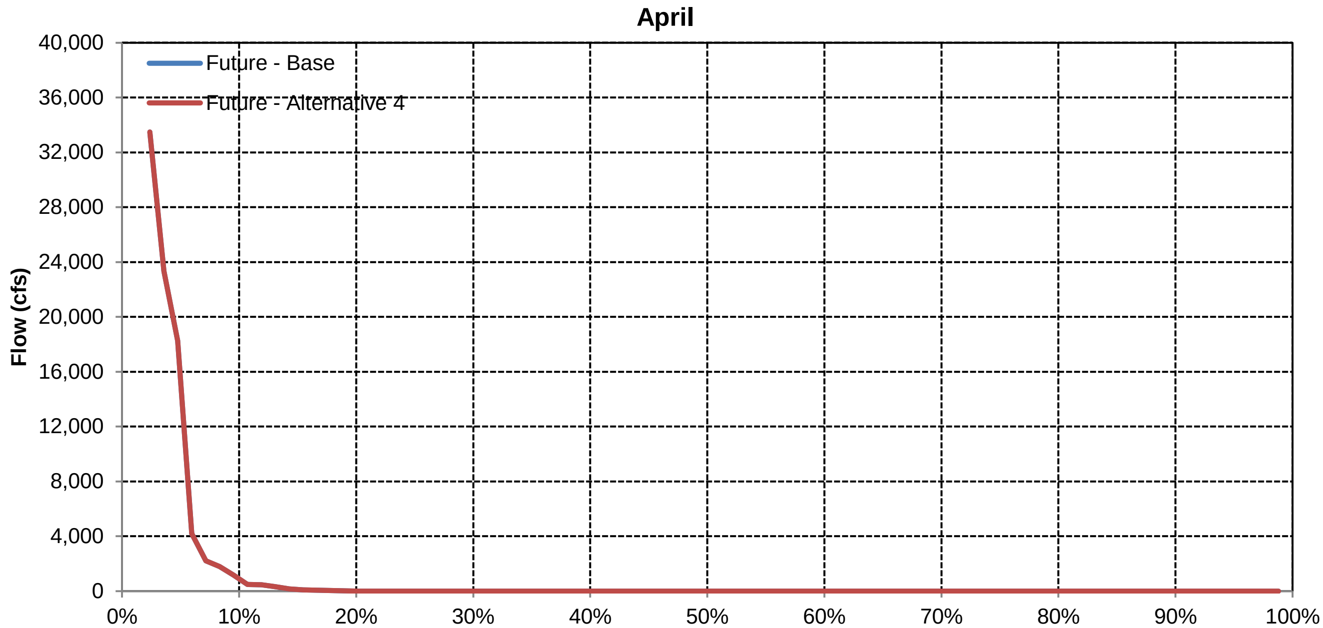

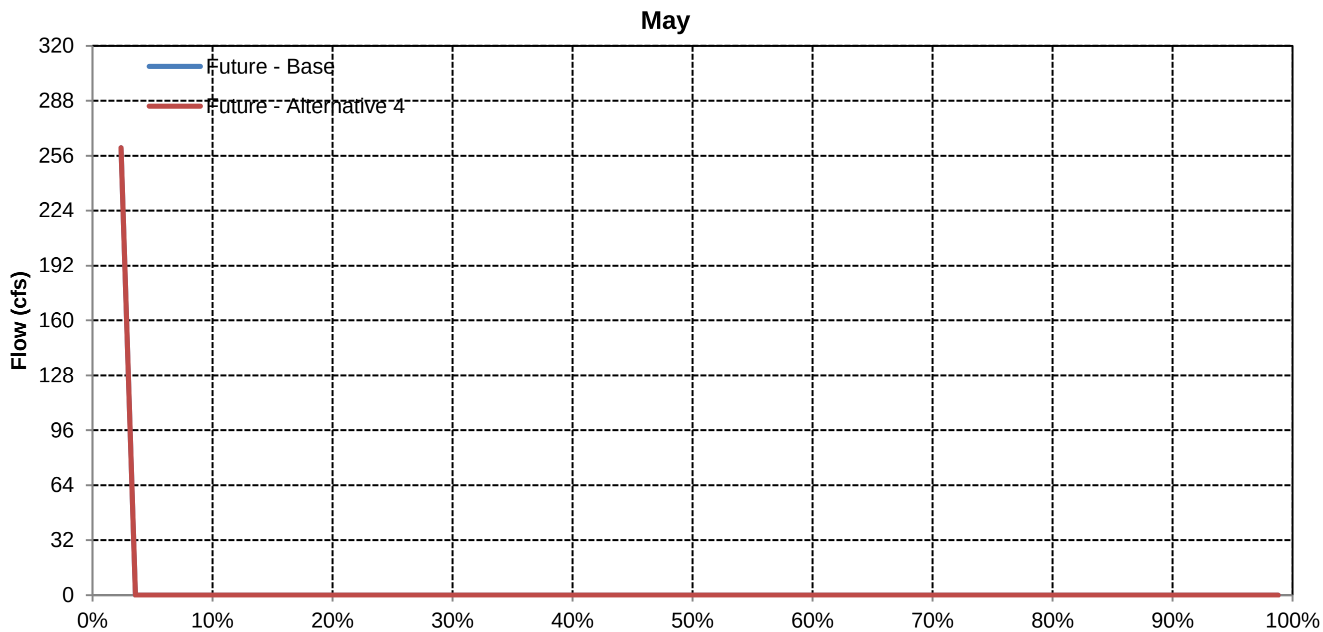

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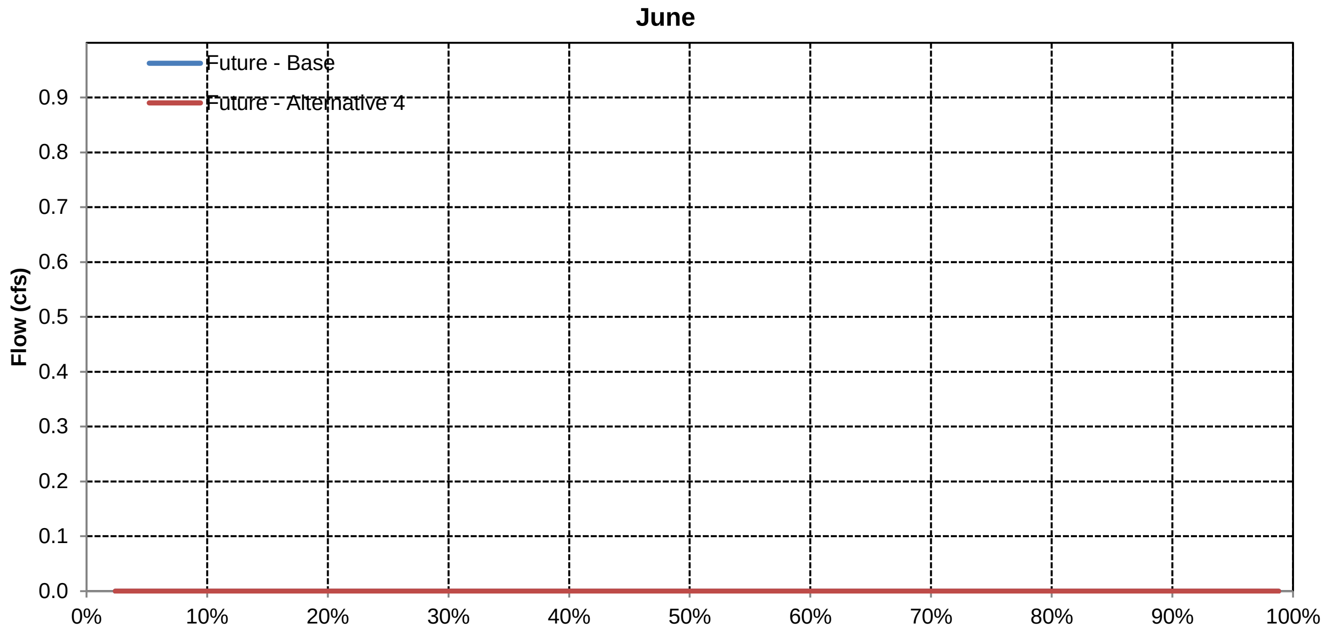
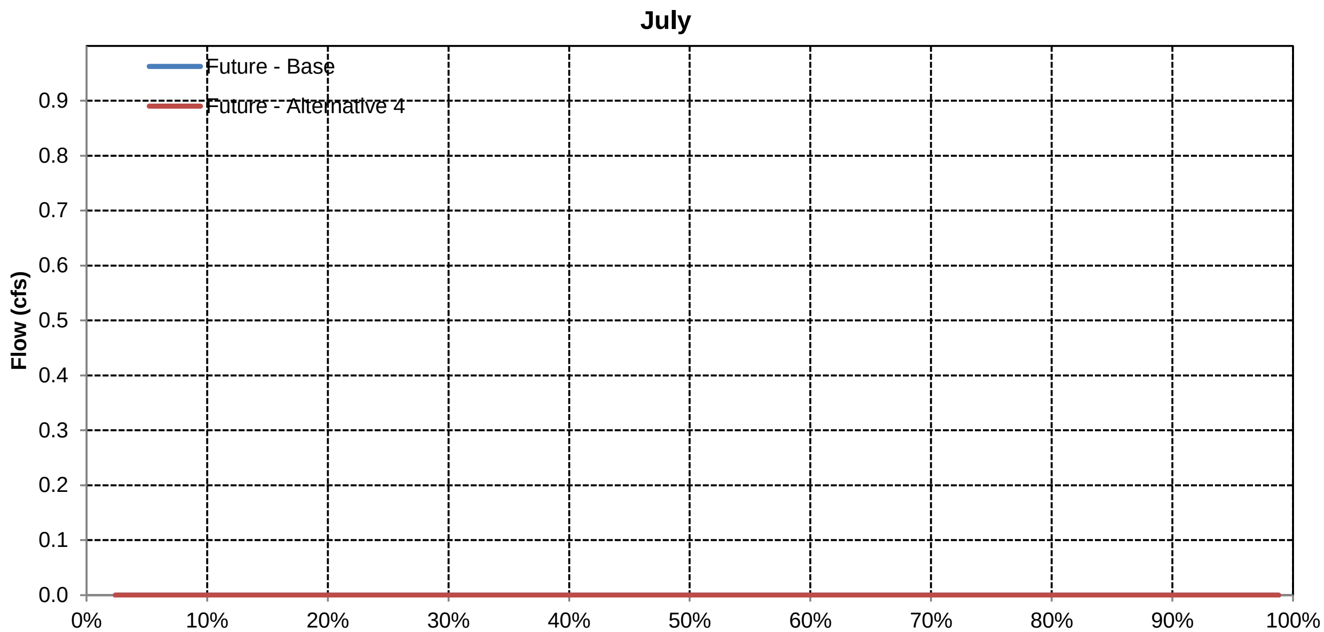
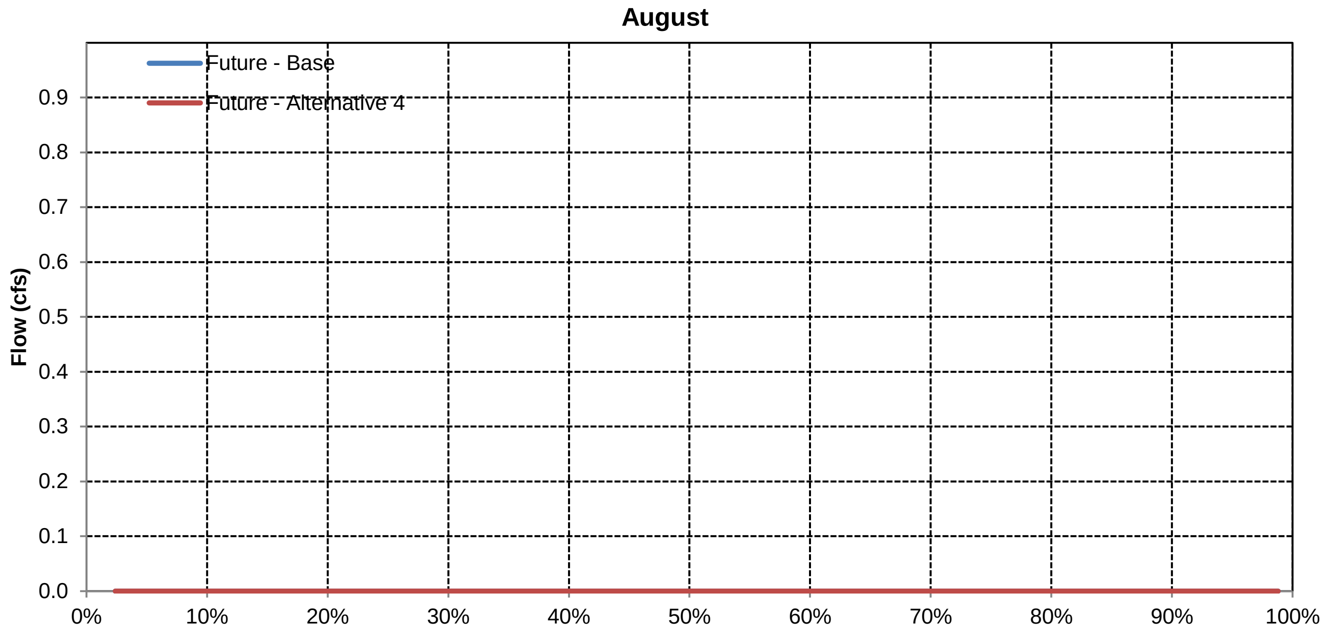
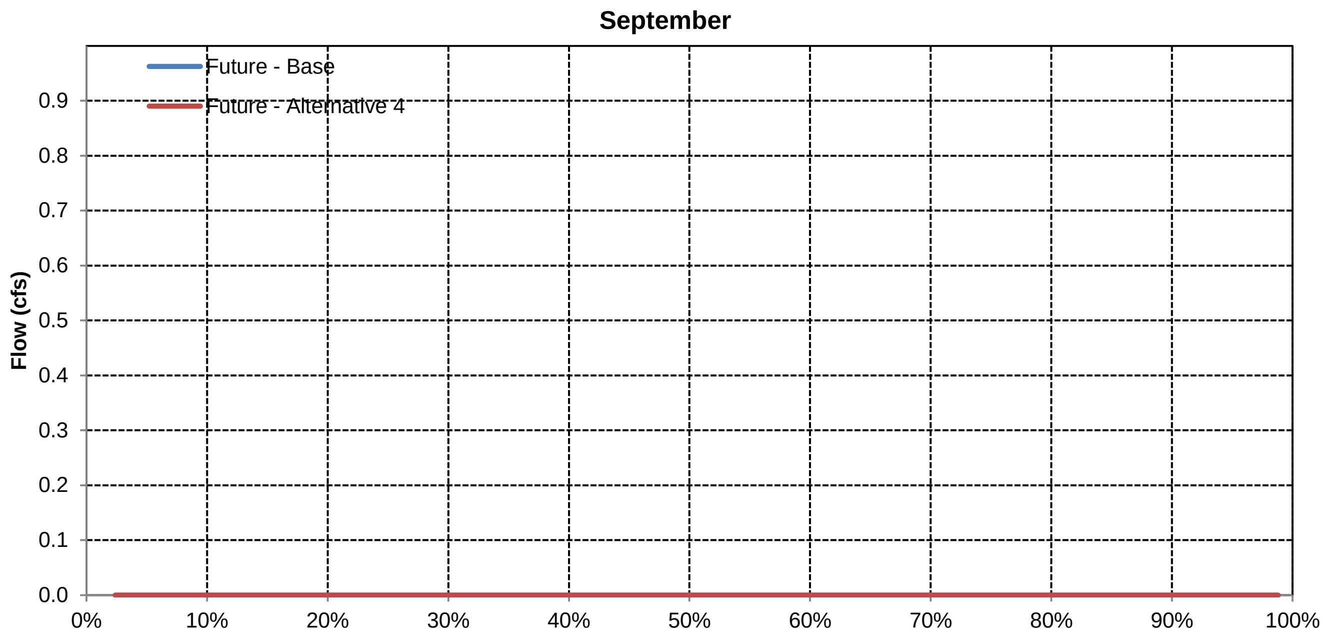




Fremont Weir Spill to Yolo Bypass





Long-Term and Water Year-Type Average of Sacramento River below Fremont Weir Under Future - Base and Future - Alternative 4

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Future - Base	9,206	10,728	19,728	30,030	35,978	31,028	17,571	10,459	13,675	15,358	11,273	13,824	13,150
Future - Alternative 4	9,242	10,614	19,354	29,420	35,351	30,710	17,569	10,440	13,680	15,366	11,261	13,830	13,029
Difference	36	-114	-373	-610	-628	-318	-2	-19	5	8	-12	6	-121
Percent Difference	0%	-1%	-2%	-2%	-2%	-1%	0%	0%	0%	0%	0%	0%	-1%
							Water Year-Types						
Wet													
Future - Base	10,316	14,168	33,582	49,490	54,700	46,345	27,848	12,029	14,178	18,965	12,787	23,425	19,081
Future - Alternative 4	10,323	13,902	32,816	48,663	53,980	46,051	27,848	12,025	14,178	18,964	12,760	23,423	18,907
Difference	7	-265	-766	-827	-721	-295	0	-4	0	-1	-27	-3	-174
Percent Difference	0%	-2%	-2%	-2%	-1%	-1%	0%	0%	0%	0%	0%	0%	-1%
Above Normal													
Future - Base	10,180	10,600	18,133	38,066	50,270	39,380	16,639	11,646	16,362	17,891	12,383	16,466	15,480
Future - Alternative 4	10,363	10,479	17,695	37,137	49,573	38,885	16,641	11,645	16,364	17,886	12,383	16,467	15,330
Difference	182	-120	-438	-929	-697	-495	2	0	2	-5	0	2	-149
Percent Difference	2%	-1%	-2%	-2%	-1%	-1%	0%	0%	0%	0%	0%	0%	-1%
Below Normal													
Future - Base	9,254	9,797	13,924	23,209	25,545	24,426	14,615	10,760	14,962	15,443	10,464	8,153	10,869
Future - Alternative 4	9,282	9,768	13,726	22,466	24,793	24,009	14,615	10,698	15,036	15,462	10,449	8,146	10,744
Difference	28	-29	-198	-743	-752	-417	0	-62	74	20	-15	-7	-125
Percent Difference	0%	0%	-1%	-3%	-3%	-2%	0%	-1%	0%	0%	0%	0%	-1%
Dry													
Future - Base	8,186	9,309	12,579	14,935	22,880	21,608	11,530	9,425	13,173	12,523	10,169	7,654	9,257
Future - Alternative 4	8,206	9,271	12,466	14,630	22,280	21,278	11,522	9,423	13,218	12,531	10,162	7,640	9,178
Difference	19	-39	-113	-305	-600	-330	-8	-1	45	8	-7	-13	-79
Percent Difference	0%	0%	-1%	-2%	-3%	-2%	0%	0%	0%	0%	0%	0%	-1%
Critical													
Future - Base	7,552	6,764	9,375	13,050	15,447	13,038	9,429	7,372	9,565	9,855	9,692	7,025	7,121
Future - Alternative 4	7,552	6,769	9,288	12,838	15,172	12,957	9,428	7,318	9,442	9,884	9,698	7,100	7,078
Difference	0	5	-87	-212	-275	-80	-1	-53	-123	29	5	75	-43
Percent Difference	0%	0%	-1%	-2%	-2%	-1%	0%	-1%	-1%	0%	0%	1%	-1%

Sacramento River below Fremont Weir

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	11,897	16,169	45,741	61,582	63,120	58,501	40,381	14,264	19,317	20,306	15,937	23,746
20%	10,789	13,042	30,986	52,000	59,936	50,976	24,134	12,203	18,036	19,458	13,060	23,231
30%	9,787	11,409	19,616	42,207	50,229	42,750	16,494	11,100	17,030	17,789	11,135	21,443
40%	9,396	10,373	16,258	31,518	42,508	33,844	14,502	10,319	14,771	17,206	10,721	14,835
50%	9,004	9,580	14,683	22,826	32,845	25,125	12,720	9,227	12,760	16,197	10,366	9,351
60%	8,421	8,564	12,034	17,536	23,964	20,148	10,605	8,847	11,697	14,641	10,117	8,213
70%	7,953	7,746	10,580	14,086	19,326	17,034	9,863	8,329	10,907	12,994	9,872	7,627
80%	6,644	6,697	8,469	11,527	15,457	13,796	9,349	7,855	9,488	11,435	9,571	7,237
90%	6,027	5,916	7,135	10,183	12,838	10,799	8,626	7,207	8,168	9,224	9,229	6,510
Long Term												
Full Simulation Period	9,206	10,728	19,728	30,030	35,978	31,028	17,571	10,459	13,675	15,358	11,273	13,824
Water Year Types												
Wet	10,316	14,168	33,582	49,490	54,700	46,345	27,848	12,029	14,178	18,965	12,787	23,425
Above Normal	10,180	10,600	18,133	38,066	50,270	39,380	16,639	11,646	16,362	17,891	12,383	16,466
Below Normal	9,254	9,797	13,924	23,209	25,545	24,426	14,615	10,760	14,962	15,443	10,464	8,153
Dry	8,186	9,309	12,579	14,935	22,880	21,608	11,530	9,425	13,173	12,523	10,169	7,654
Critical	7,552	6,764	9,375	13,050	15,447	13,038	9,429	7,372	9,565	9,855	9,692	7,025

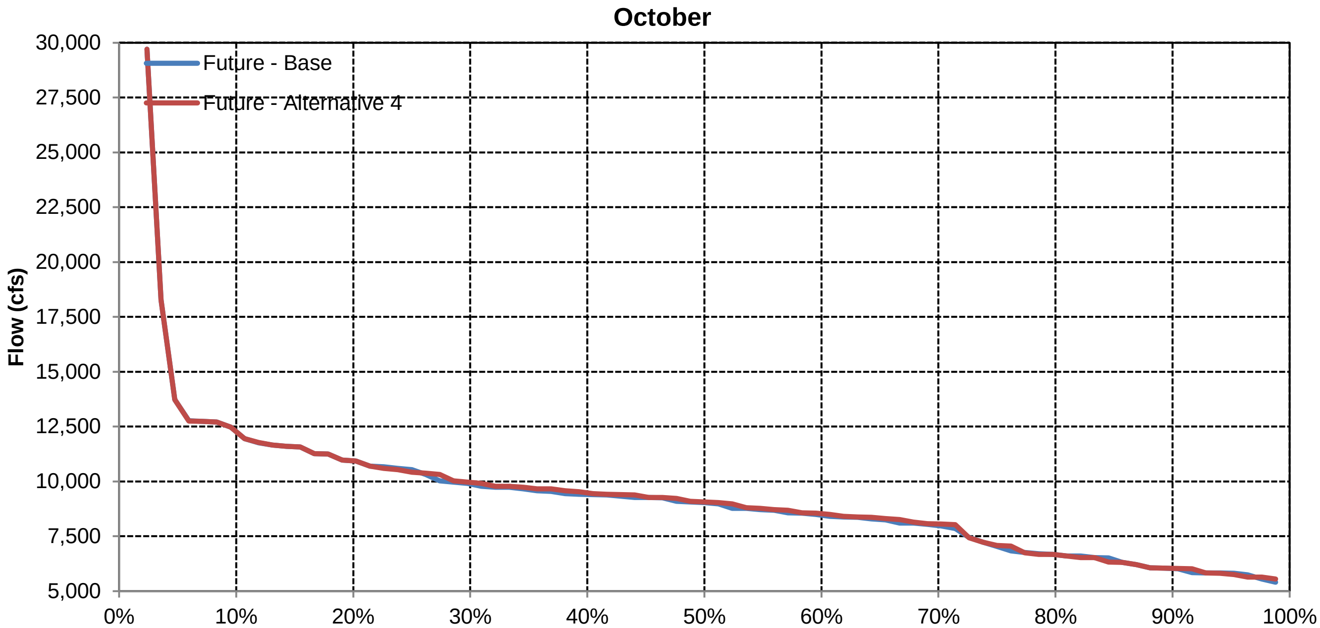
Future - Alternative 4

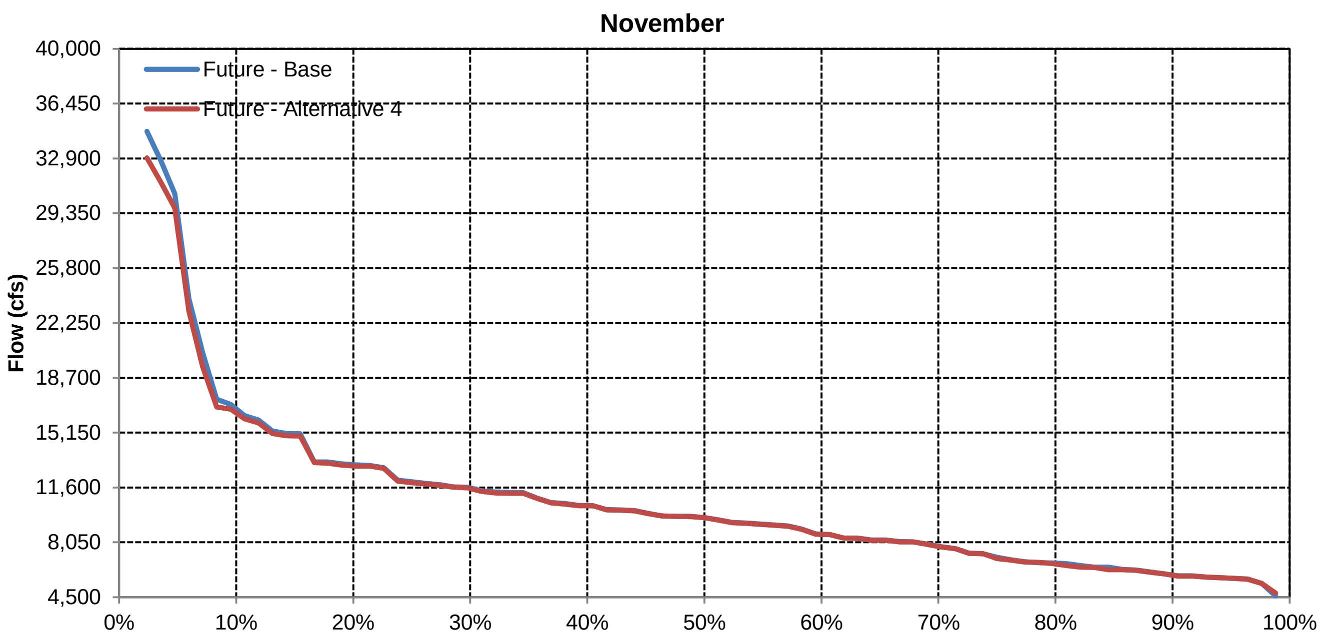
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	11,898	15,959	44,499	61,377	63,132	58,462	40,380	14,264	19,318	20,306	15,938	23,749
20%	10,789	12,983	29,910	50,589	59,670	50,837	24,148	12,203	18,232	19,460	13,059	23,234
30%	9,909	11,370	19,197	40,676	48,625	41,918	16,489	10,978	17,029	17,828	11,206	21,443
40%	9,437	10,358	16,030	29,759	41,372	32,409	14,501	10,319	15,001	17,363	10,714	14,834
50%	9,045	9,565	14,483	21,914	30,974	24,853	12,720	9,104	12,755	16,201	10,323	9,341
60%	8,510	8,550	11,984	17,103	23,048	19,935	10,605	8,820	11,599	14,829	10,130	8,300
70%	8,059	7,734	10,710	14,014	18,936	16,865	9,863	8,328	10,736	12,996	9,885	7,627
80%	6,642	6,613	8,375	11,506	15,314	13,728	9,358	7,855	9,488	11,434	9,571	7,237
90%	6,037	5,907	7,125	10,160	12,806	10,776	8,626	7,207	8,180	9,233	9,228	6,509
Long Term												
Full Simulation Period	9,242	10,614	19,354	29,420	35,351	30,710	17,569	10,440	13,680	15,366	11,261	13,830
Water Year Types												
Wet	10,323	13,902	32,816	48,663	53,980	46,051	27,848	12,025	14,178	18,964	12,760	23,423
Above Normal	10,363	10,479	17,695	37,137	49,573	38,885	16,641	11,645	16,364	17,886	12,383	16,467
Below Normal	9,282	9,768	13,726	22,466	24,793	24,009	14,615	10,698	15,036	15,462	10,449	8,146
Dry	8,206	9,271	12,466	14,630	22,280	21,278	11,522	9,423	13,218	12,531	10,162	7,640
Critical	7,552	6,769	9,288	12,838	15,172	12,957	9,428	7,318	9,442	9,884	9,698	7,100

Future - Alternative 4 Minus Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	1	-210	-1,242	-204	12	-40	0	0	1	0	1	4
20%	0	-59	-1,077	-1,411	-265	-139	14	0	197	2	0	3
30%	122	-39	-419	-1,531	-1,603	-832	-6	-123	0	39	71	0
40%	41	-15	-228	-1,759	-1,135	-1,435	-1	0	230	157	-8	-1
50%	41	-14	-200	-913	-1,871	-272	0	-123	-5	3	-43	-10
60%	89	-14	-51	-432	-916	-213	0	-27	-98	188	13	88
70%	106	-11	130	-72	-391	-169	0	0	-171	2	13	0
80%	-2	-84	-94	-21	-143	-68	8	0	0	-1	0	0
90%	10	-9	-10	-23	-32	-23	0	0	13	8	-1	-1
Long Term												
Full Simulation Period	36	-114	-373	-610	-628	-318	-2	-19	5	8	-12	6
Water Year Types												
Wet	7	-265	-766	-827	-721	-295	0	-4	0	-1	-27	-3
Above Normal	182	-120	-438	-929	-697	-495	2	0	2	-5	0	2
Below Normal	28	-29	-198	-743	-752	-417	0	-62	74	20	-15	-7
Dry	19	-39	-113	-305	-600	-330	-8	-1	45	8	-7	-13
Critical	0	5	-87	-212	-275	-80	-1	-53	-123	29	5	75

Sacramento River below Fremont Weir





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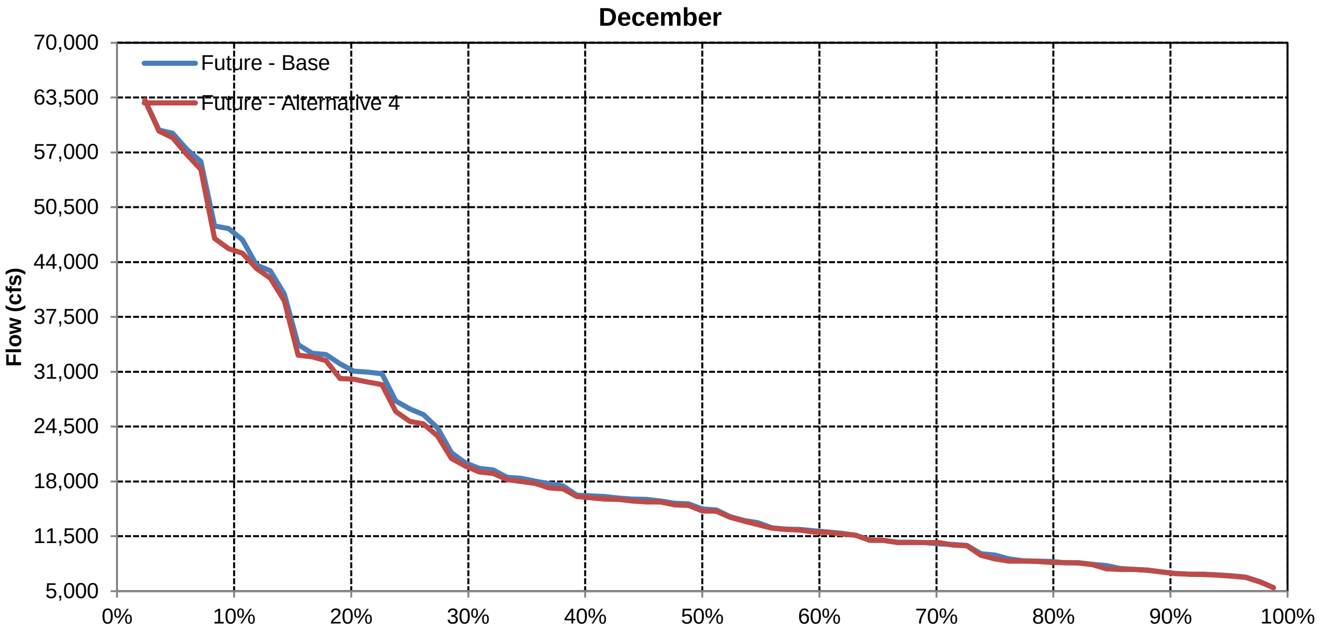

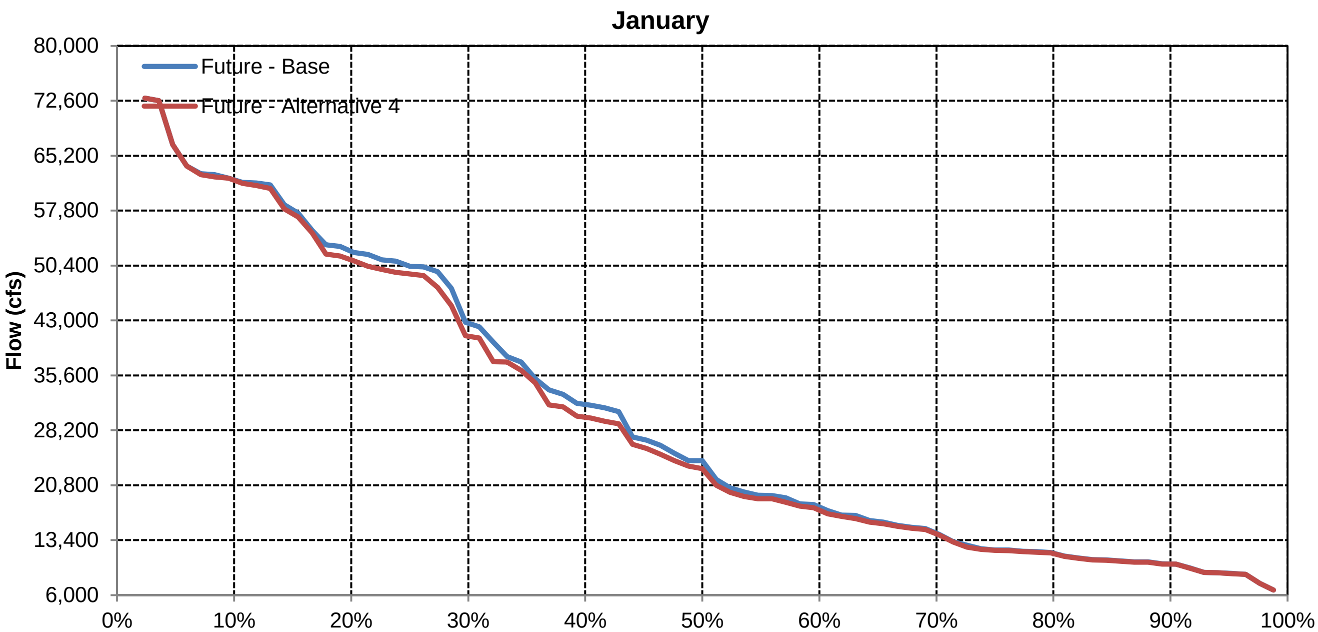

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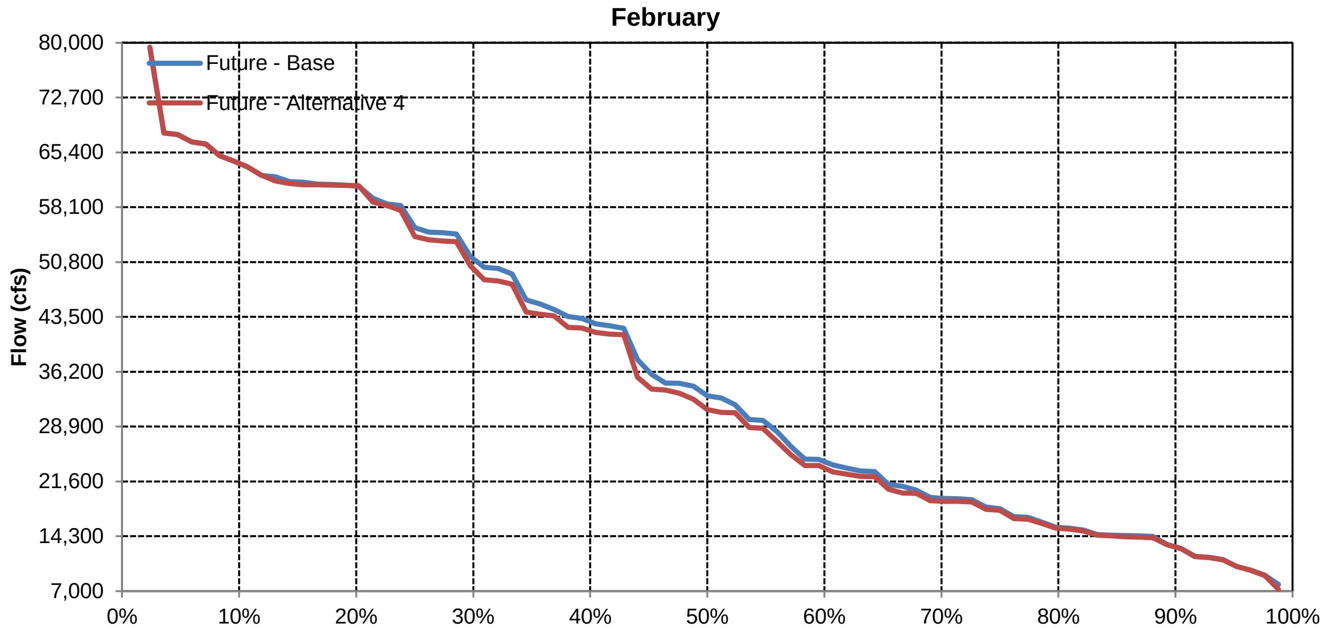

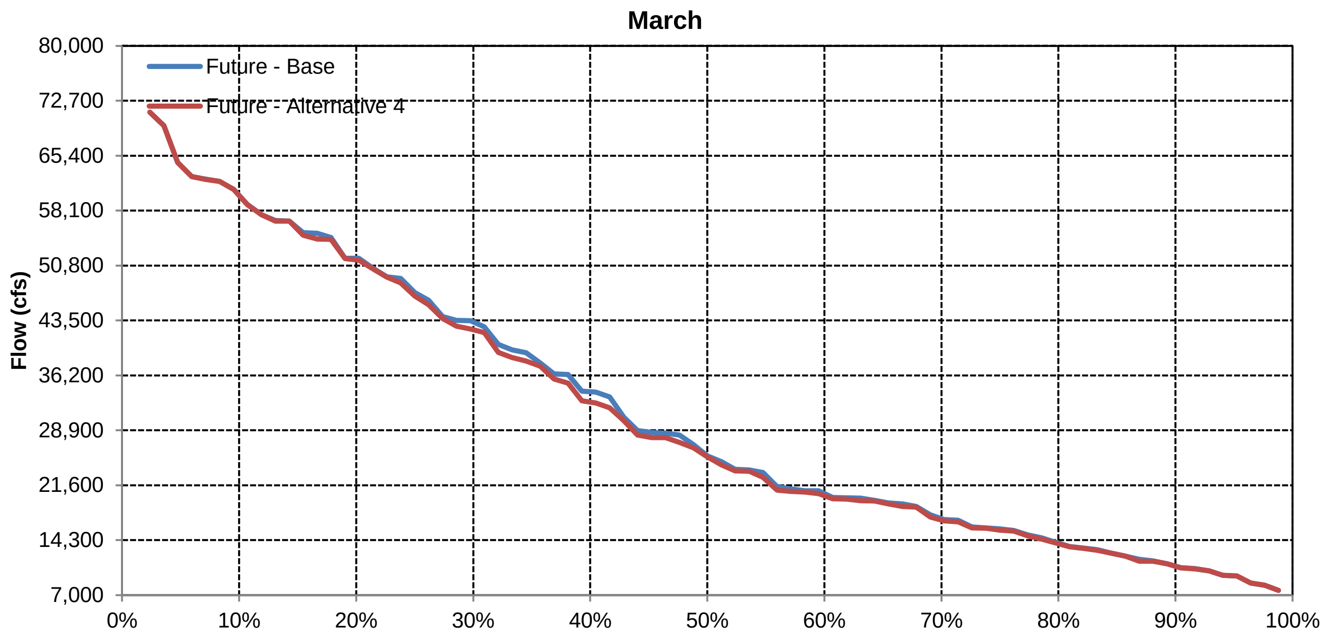

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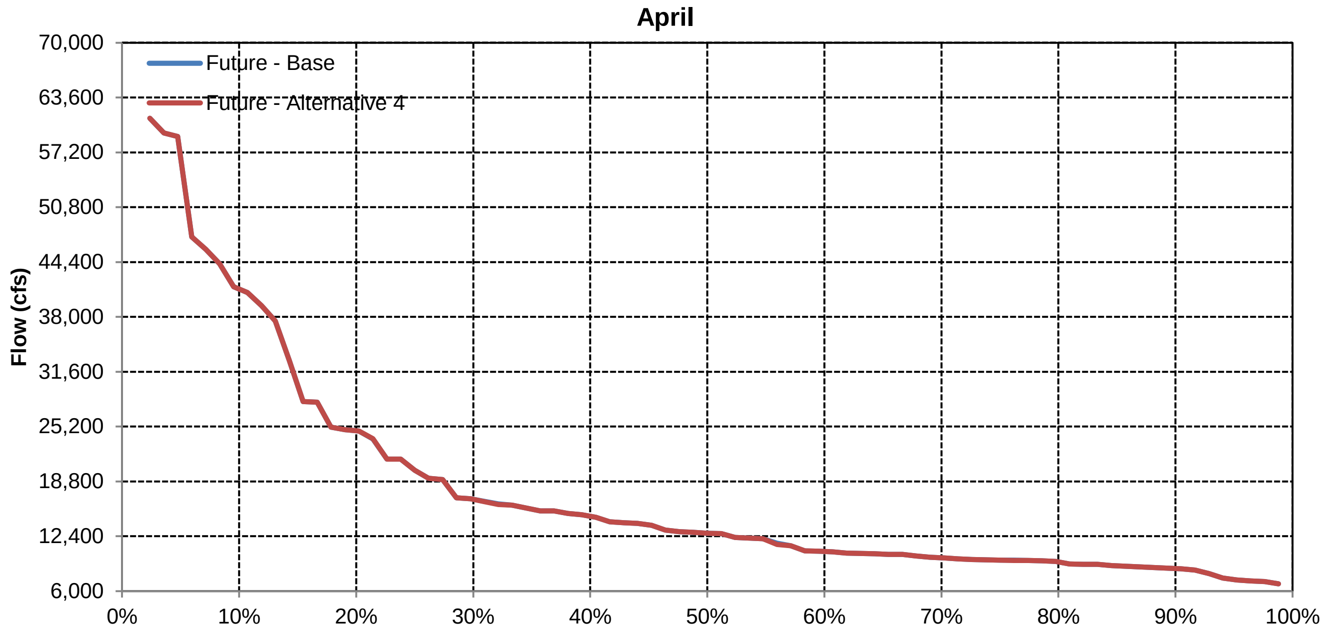
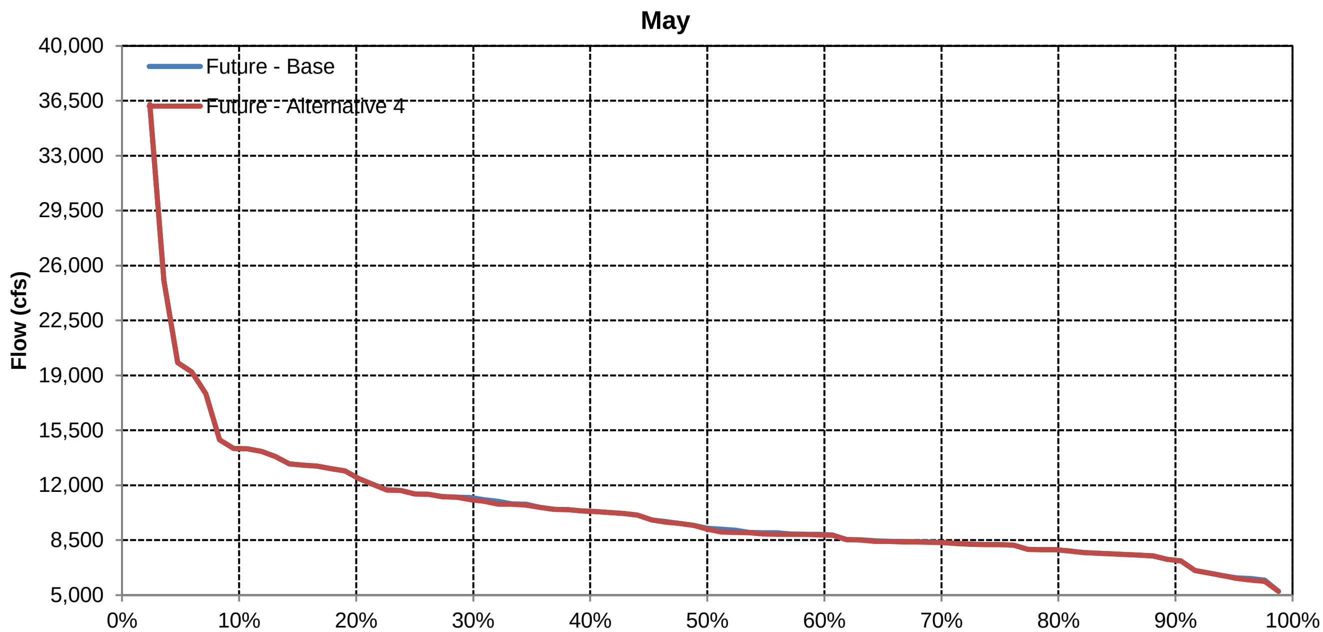
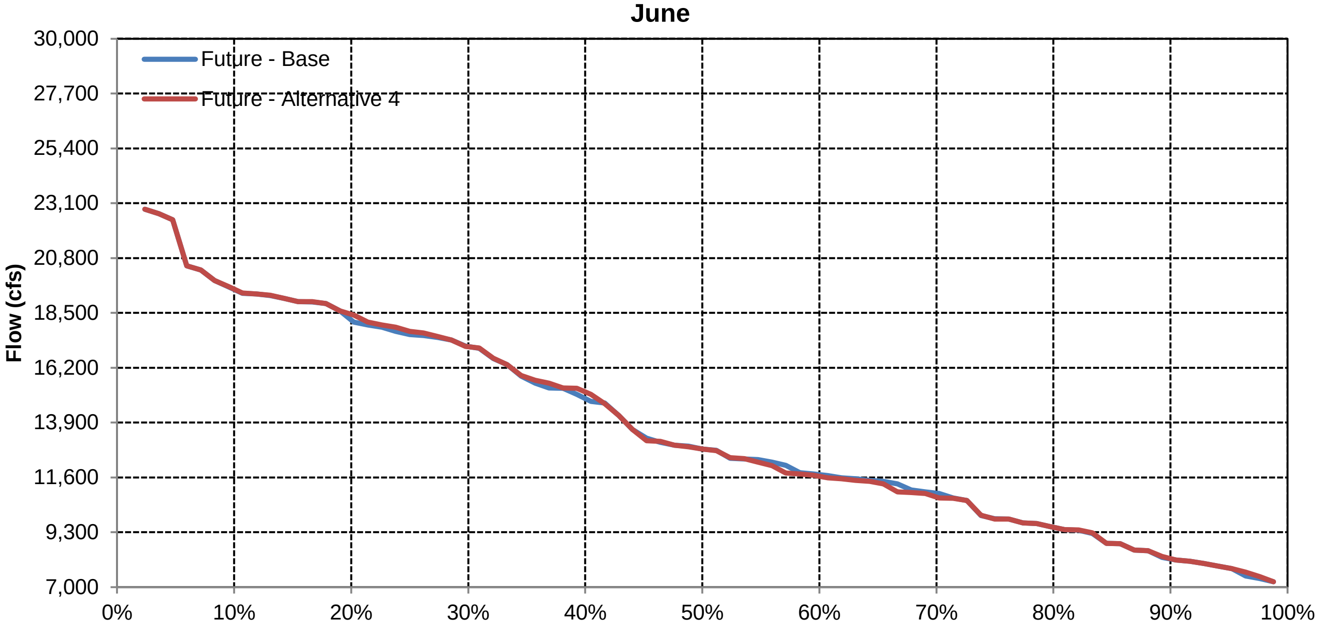
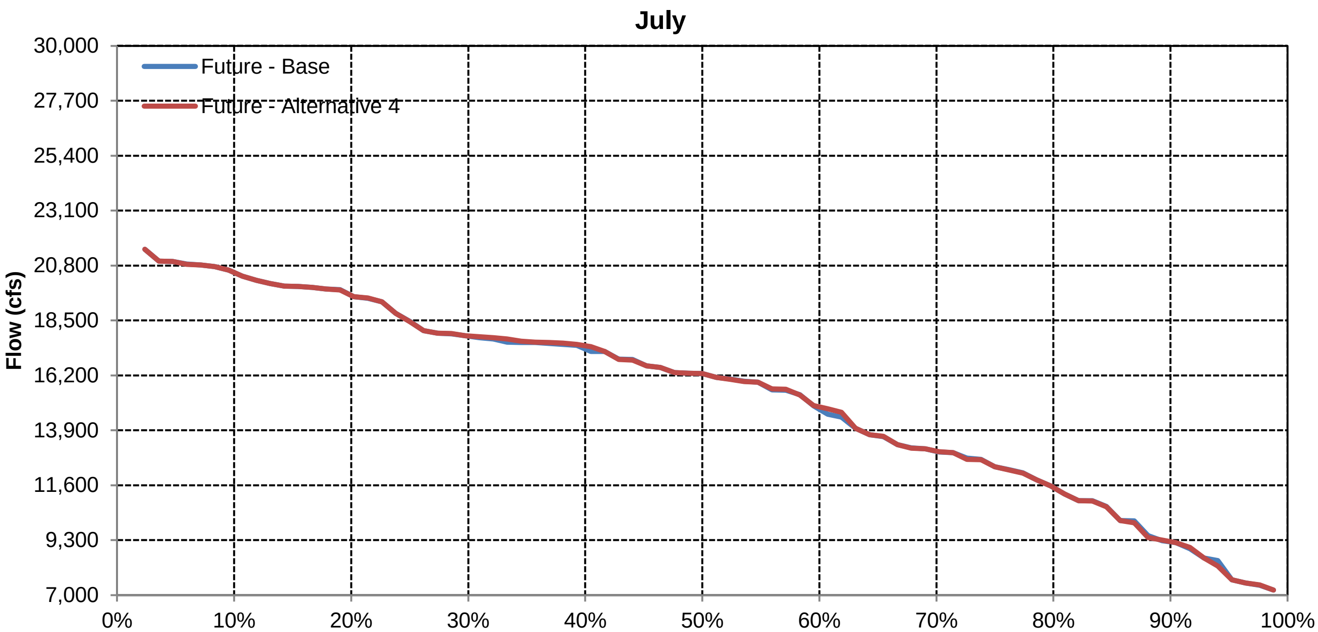


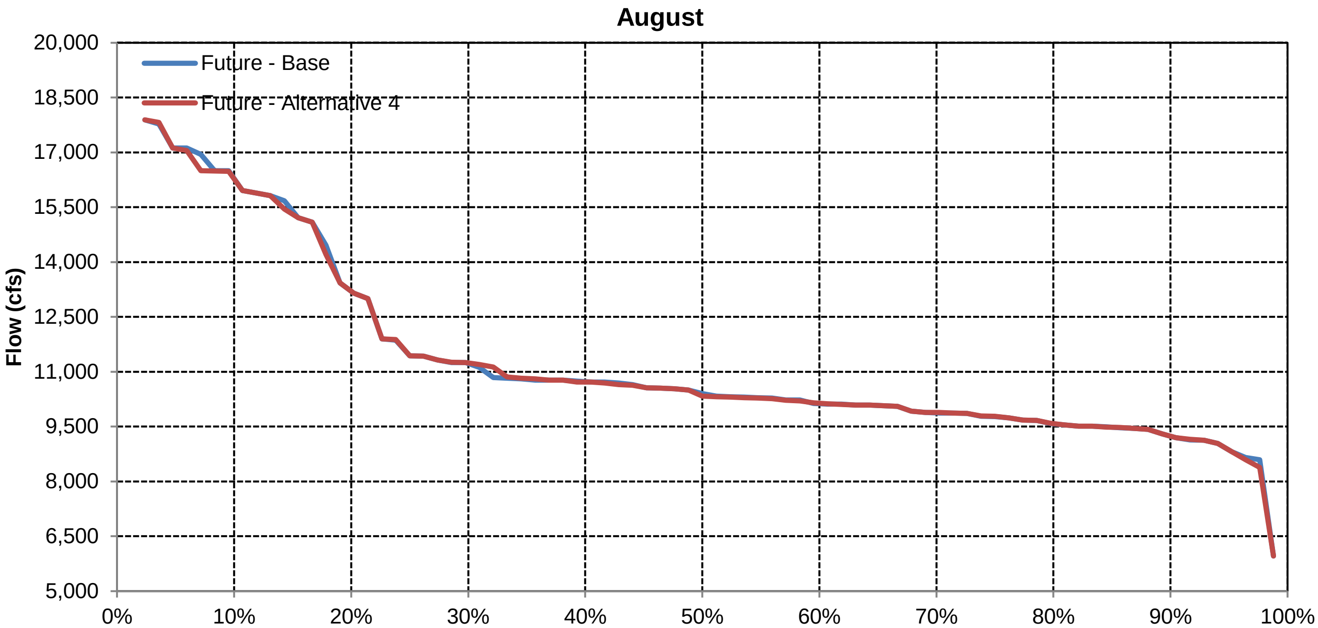


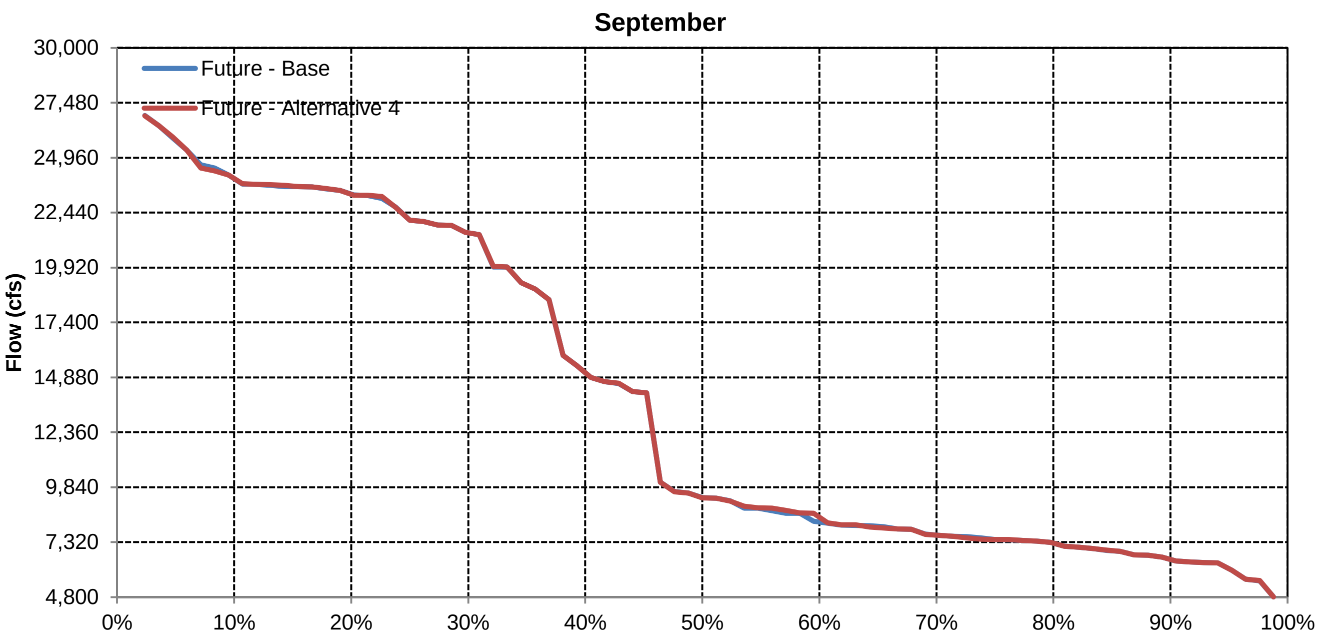
Sacramento River below Fremont Weir





Sacramento River below Fremont Weir





Long-Term and Water Year-Type Average of Trinity Reservoir Under Future - Base and Future - Alternative 4

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
						Long-Term						
Full Simulation Period												
Future - Base	1,111	1,121	1,232	1,403	1,575	1,712	1,826	1,701	1,582	1,421	1,271	1,160
Future - Alternative 4	1,112	1,122	1,233	1,405	1,577	1,713	1,827	1,702	1,583	1,423	1,273	1,161
Difference	1	1	1	1	1	1	1	1	1	1	2	1
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
						Water Year-Types						
Wet												
Future - Base	1,184	1,226	1,437	1,697	1,906	2,037	2,189	2,064	1,903	1,750	1,604	1,455
Future - Alternative 4	1,185	1,226	1,438	1,697	1,907	2,037	2,189	2,064	1,903	1,751	1,605	1,455
Difference	1	0	1	1	1	-1	0	0	0	1	1	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal												
Future - Base	1,184	1,161	1,273	1,559	1,813	1,988	2,142	1,982	1,871	1,704	1,558	1,426
Future - Alternative 4	1,184	1,168	1,279	1,566	1,819	1,995	2,148	1,988	1,877	1,710	1,564	1,433
Difference	0	7	7	7	7	7	7	7	7	7	7	7
Percent Difference	0%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Future - Base	1,148	1,147	1,220	1,391	1,539	1,694	1,829	1,709	1,610	1,441	1,284	1,186
Future - Alternative 4	1,147	1,147	1,220	1,391	1,538	1,694	1,828	1,709	1,610	1,441	1,283	1,186
Difference	-1	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry												
Future - Base	1,094	1,097	1,151	1,222	1,376	1,529	1,615	1,477	1,361	1,178	1,006	915
Future - Alternative 4	1,093	1,096	1,150	1,220	1,374	1,527	1,613	1,475	1,359	1,176	1,004	914
Difference	-1	-2	-1	-2	-1	-2	-2	-2	-2	-2	-2	-2
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical												
Future - Base	875	866	898	942	1,012	1,077	1,102	1,022	960	834	714	656
Future - Alternative 4	881	871	902	946	1,016	1,082	1,106	1,027	964	838	721	659
Difference	7	5	4	4	5	5	5	5	4	4	8	4
Percent Difference	1%	1%	1%	0%	0%	0%	0%	0%	0%	0%	1%	1%

Trinity Reservoir

Future - Base

	End-of-Month Storage (TAF)											
Statistic	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Probability of Exceedance												
10%	1,479	1,484	1,672	1,900	2,000	2,100	2,298	2,170	1,995	1,863	1,717	1,564
20%	1,385	1,408	1,506	1,818	2,000	2,100	2,233	2,088	1,943	1,791	1,642	1,492
30%	1,303	1,305	1,445	1,638	1,926	2,068	2,167	2,006	1,865	1,697	1,520	1,382
40%	1,248	1,223	1,368	1,593	1,752	1,981	2,113	1,903	1,752	1,562	1,407	1,270
50%	1,152	1,181	1,273	1,421	1,599	1,771	1,933	1,771	1,616	1,443	1,289	1,178
60%	1,079	1,102	1,198	1,304	1,496	1,662	1,745	1,636	1,564	1,378	1,236	1,106
70%	968	957	1,102	1,205	1,371	1,486	1,591	1,531	1,412	1,229	1,083	1,000
80%	775	791	913	1,023	1,256	1,390	1,496	1,376	1,279	1,090	931	846
90%	627	632	678	825	933	1,013	1,056	1,036	957	837	680	625
Long Term												
Full Simulation Period	1,111	1,121	1,232	1,403	1,575	1,712	1,826	1,701	1,582	1,421	1,271	1,160
Water Year Types												
Wet	1,184	1,226	1,437	1,697	1,906	2,037	2,189	2,064	1,903	1,750	1,604	1,455
Above Normal	1,184	1,161	1,273	1,559	1,813	1,988	2,142	1,982	1,871	1,704	1,558	1,426
Below Normal	1,148	1,147	1,220	1,391	1,539	1,694	1,829	1,709	1,610	1,441	1,284	1,186
Dry	1,094	1,097	1,151	1,222	1,376	1,529	1,615	1,477	1,361	1,178	1,006	915
Critical	875	866	898	942	1,012	1,077	1,102	1,022	960	834	714	656

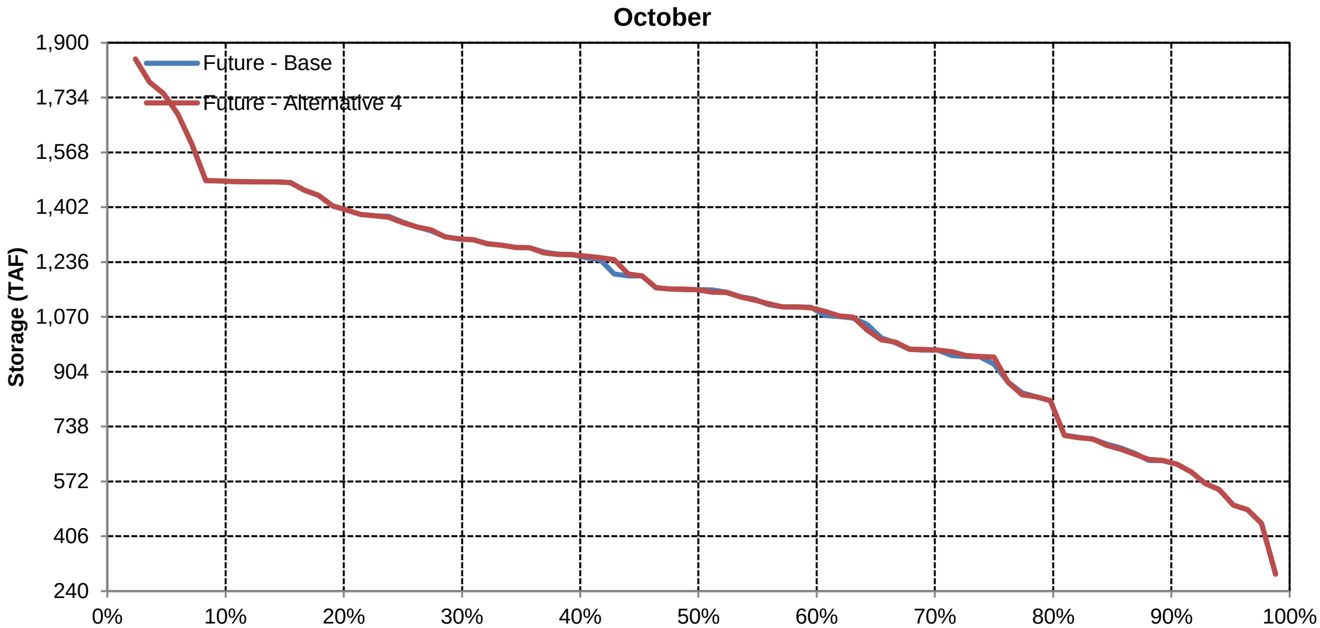
Future - Alternative 4

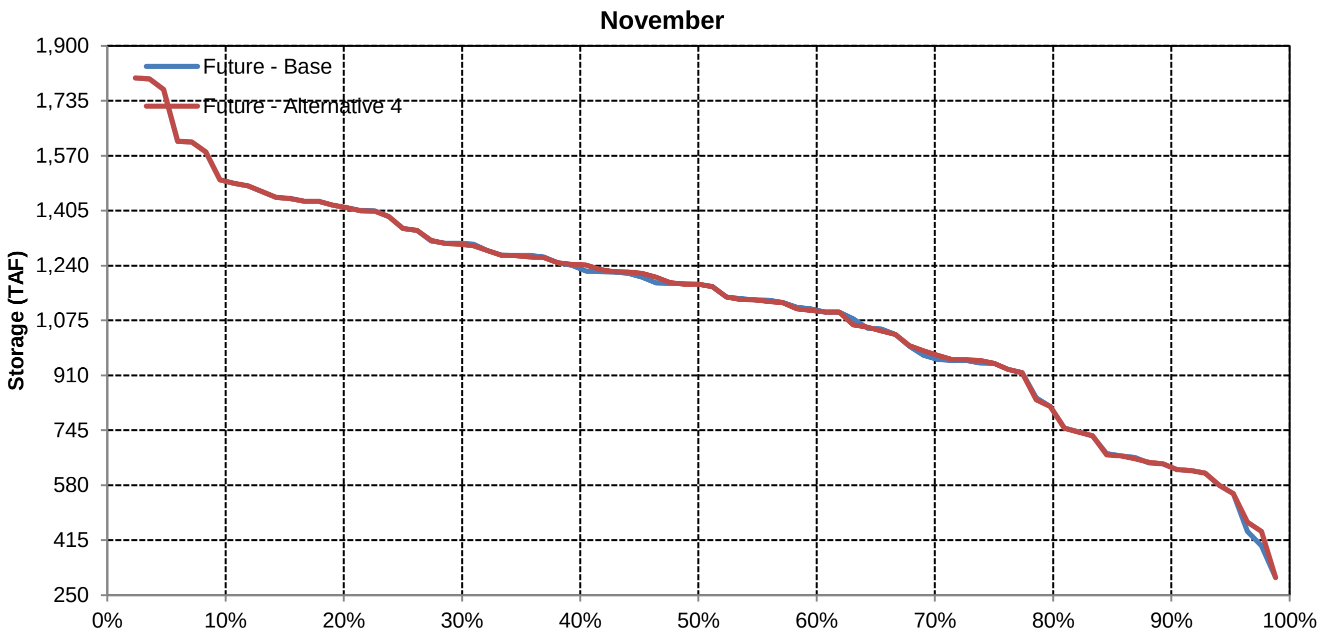
	End-of-Month Storage (TAF)											
Statistic	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Probability of Exceedance												
10%	1,479	1,484	1,672	1,900	2,000	2,100	2,298	2,170	1,995	1,863	1,717	1,564
20%	1,385	1,408	1,506	1,817	2,000	2,100	2,233	2,088	1,940	1,791	1,642	1,492
30%	1,303	1,300	1,447	1,637	1,926	2,068	2,167	2,006	1,865	1,697	1,520	1,382
40%	1,253	1,239	1,368	1,592	1,752	1,980	2,112	1,903	1,753	1,562	1,412	1,299
50%	1,148	1,180	1,275	1,421	1,596	1,772	1,934	1,770	1,615	1,443	1,288	1,178
60%	1,089	1,101	1,197	1,306	1,494	1,660	1,746	1,630	1,549	1,385	1,234	1,108
70%	969	969	1,100	1,203	1,364	1,532	1,590	1,531	1,412	1,230	1,084	1,002
80%	774	790	910	1,021	1,257	1,390	1,526	1,390	1,278	1,090	929	846
90%	628	632	682	845	936	1,013	1,061	1,042	960	837	680	625
Long Term												
Full Simulation Period	1,112	1,122	1,233	1,405	1,577	1,713	1,827	1,702	1,583	1,423	1,273	1,161
Water Year Types												
Wet	1,185	1,226	1,438	1,697	1,907	2,037	2,189	2,064	1,903	1,751	1,605	1,455
Above Normal	1,184	1,168	1,279	1,566	1,819	1,995	2,148	1,988	1,877	1,710	1,564	1,433
Below Normal	1,147	1,147	1,220	1,391	1,538	1,694	1,828	1,709	1,610	1,441	1,283	1,186
Dry	1,093	1,096	1,150	1,220	1,374	1,527	1,613	1,475	1,359	1,176	1,004	914
Critical	881	871	902	946	1,016	1,082	1,106	1,027	964	838	721	659

Future - Alternative 4 Minus Future - Base

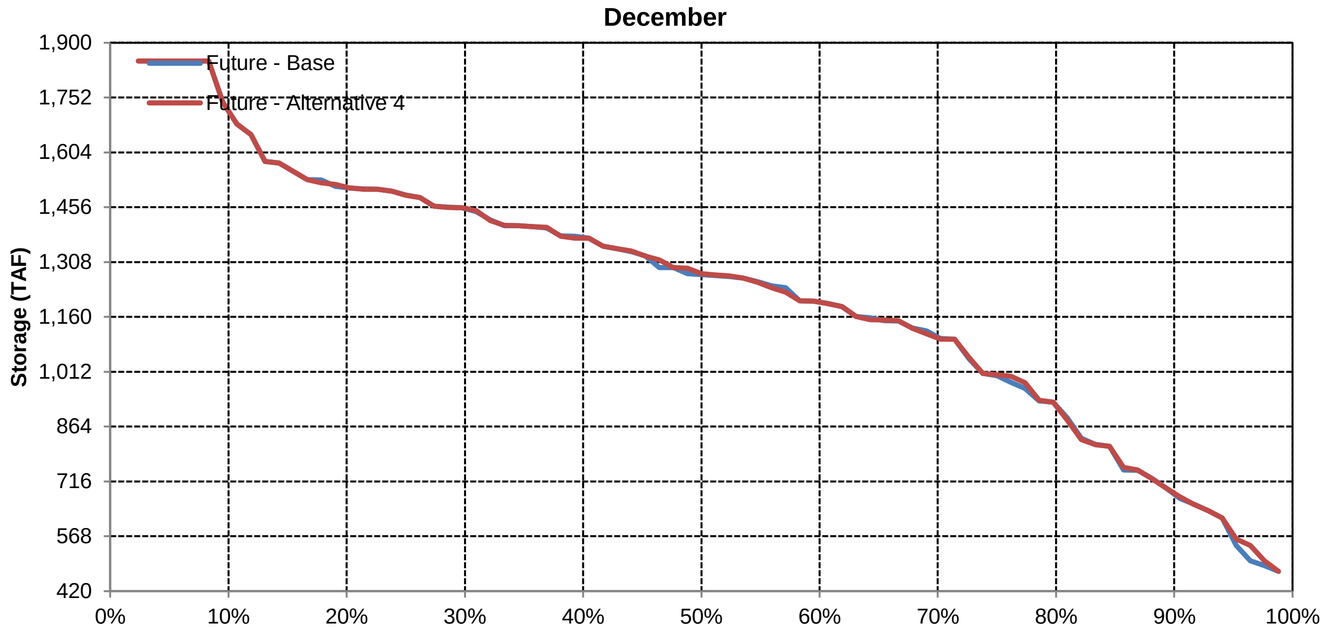
	End-of-Month Storage (TAF)											
Statistic	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	-1	0	0	0	0	0	0	-3	0	0	0
30%	0	-5	2	-1	0	0	0	0	-1	0	0	0
40%	5	16	0	-1	-1	0	-1	0	0	0	5	28
50%	-4	0	2	0	-3	1	0	-1	0	0	-1	-1
60%	10	-1	-1	1	-2	-1	1	-6	-15	6	-2	1
70%	1	12	-2	-1	-7	46	-1	0	0	1	1	2
80%	0	0	-2	-2	1	0	30	14	-1	0	-2	1
90%	0	0	3	20	2	0	5	5	2	0	0	0
Long Term												
Full Simulation Period	1	1	1	1	1	1	1	1	1	1	2	1
Water Year Types												
Wet	1	0	1	1	1	-1	0	0	0	1	1	0
Above Normal	0	7	7	7	7	7	7	7	7	7	7	7
Below Normal	-1	0	0	0	0	0	0	0	0	0	0	0
Dry	-1	-2	-1	-2	-1	-2	-2	-2	-2	-2	-2	-2
Critical	7	5	4	4	5	5	5	5	4	4	8	4

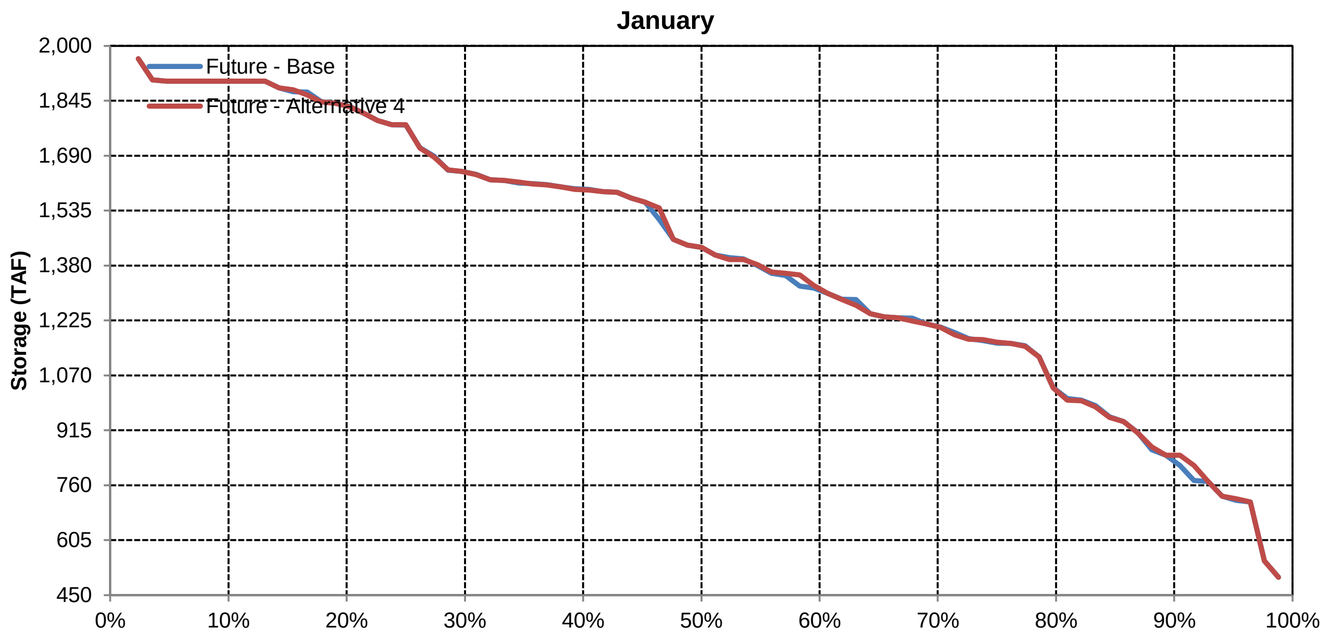
Trinity Reservoir





Trinity Reservoir





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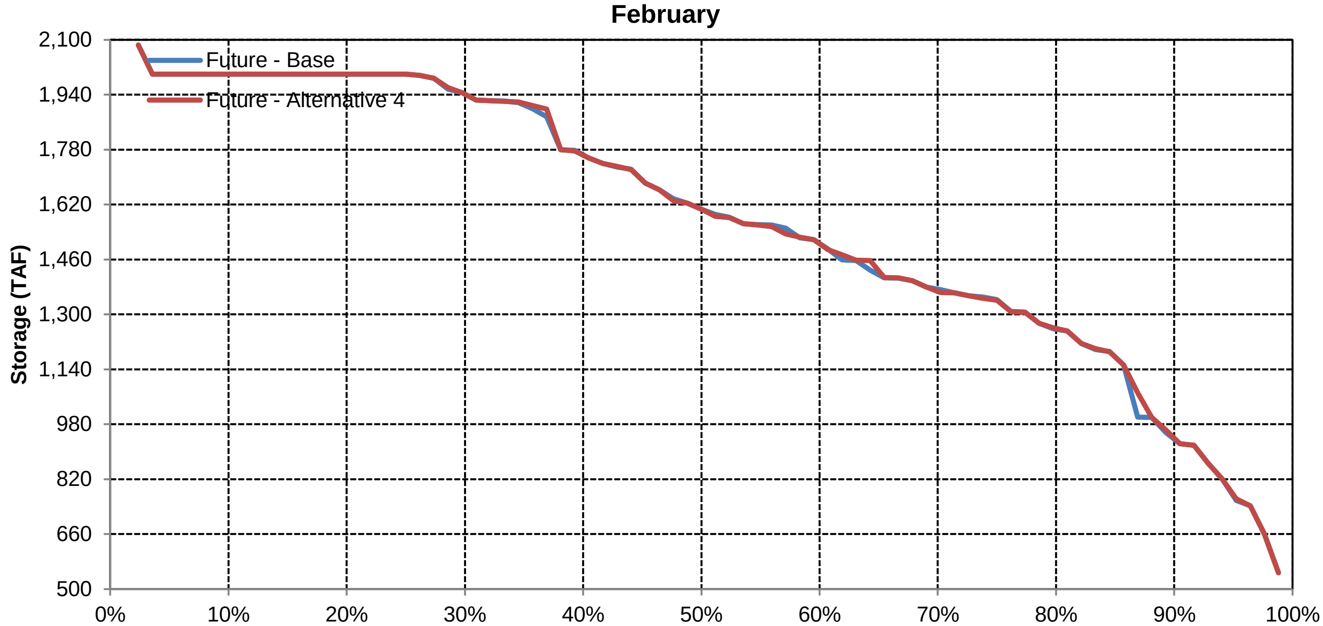
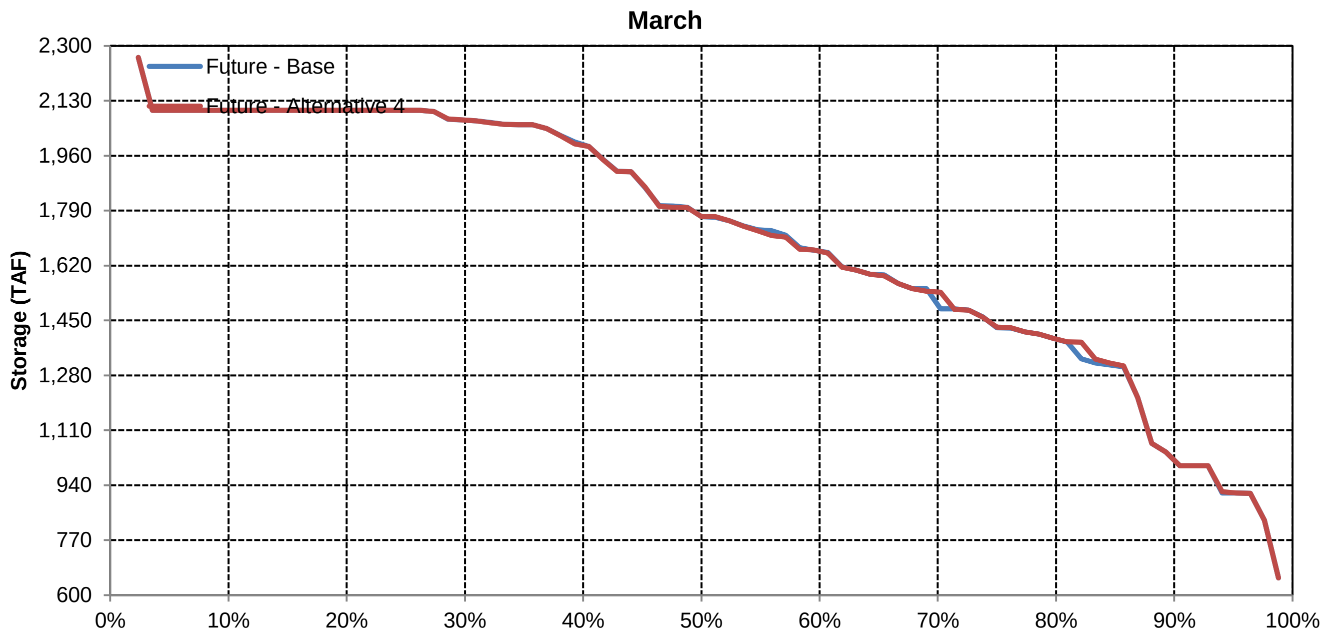
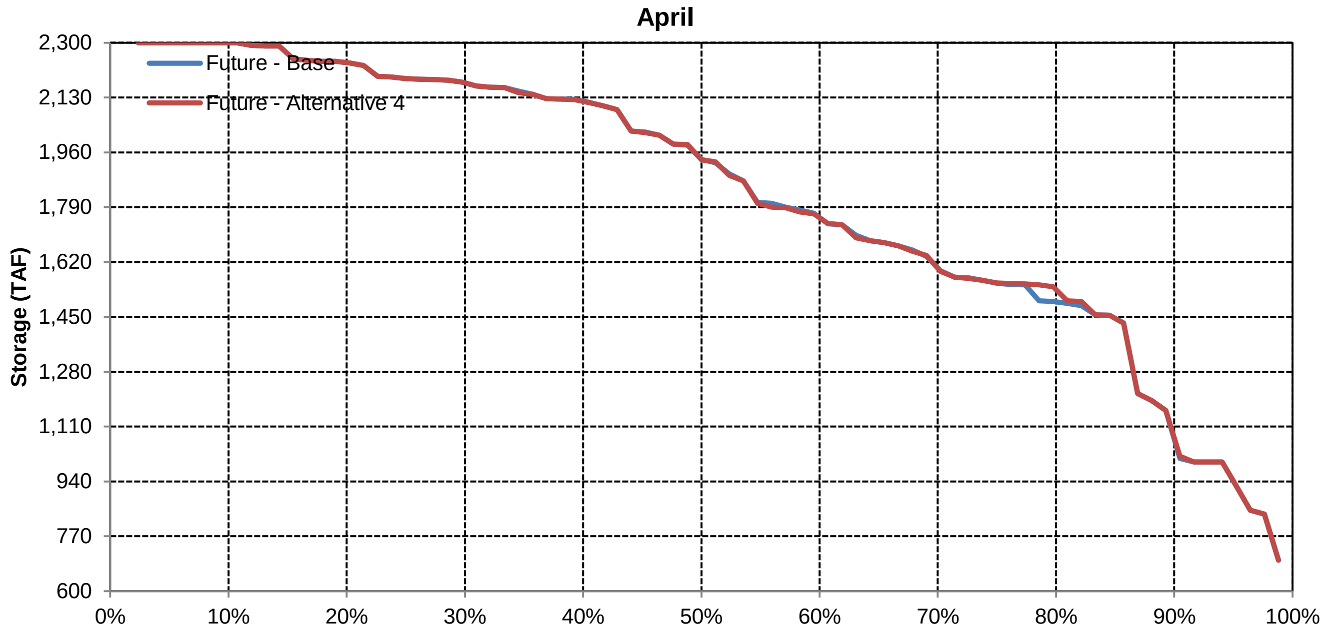
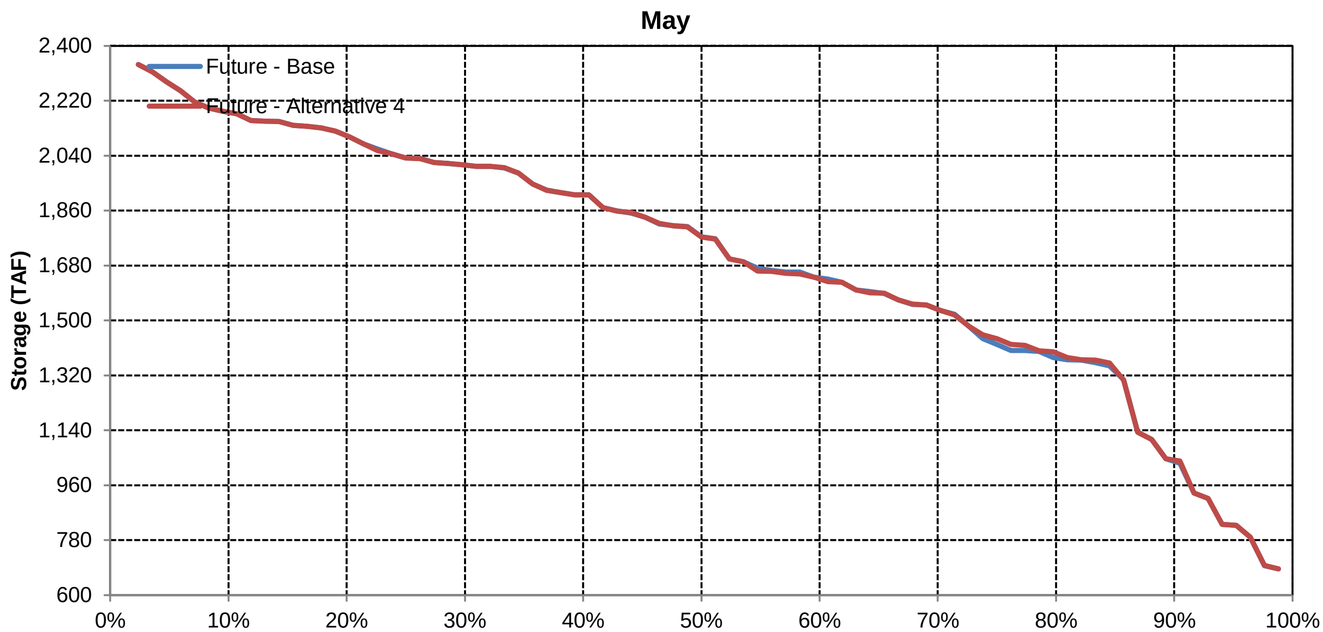




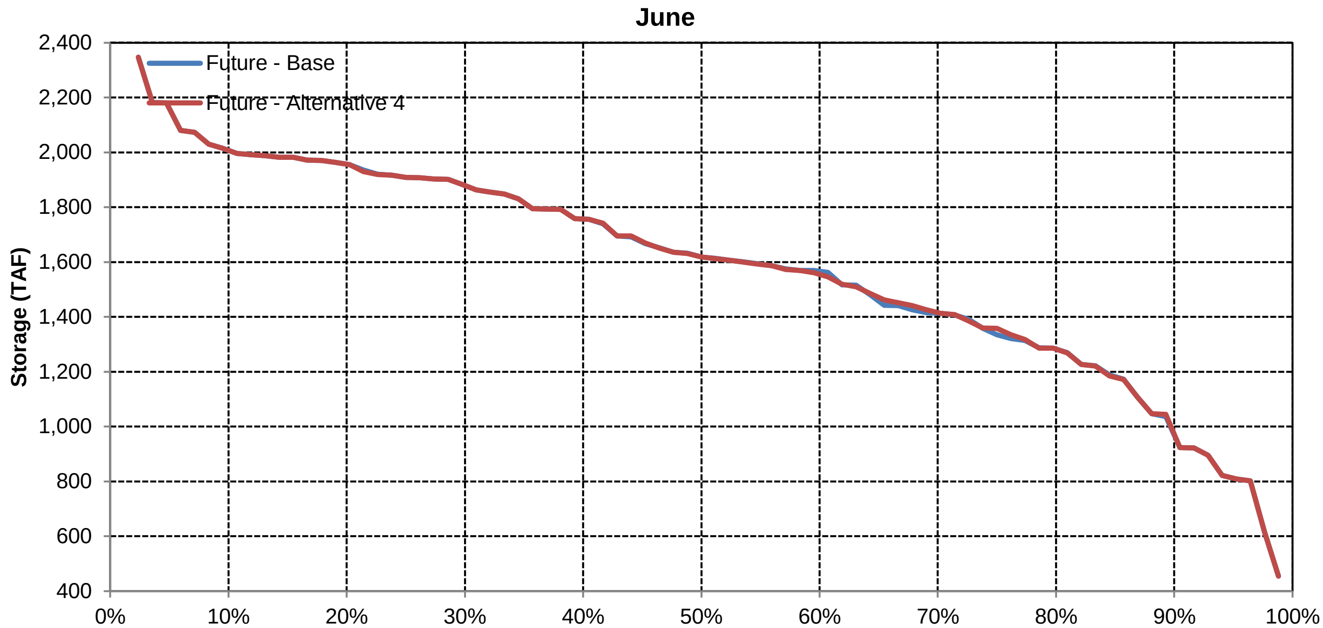
Trinity Reservoir

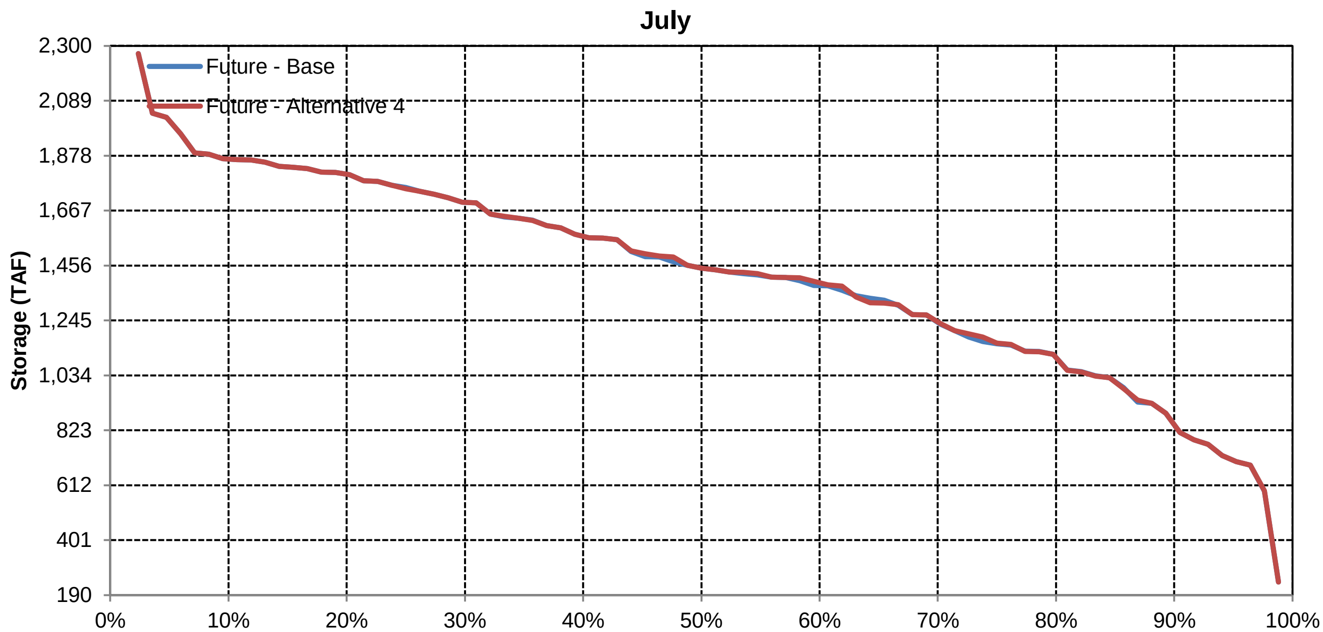




S1

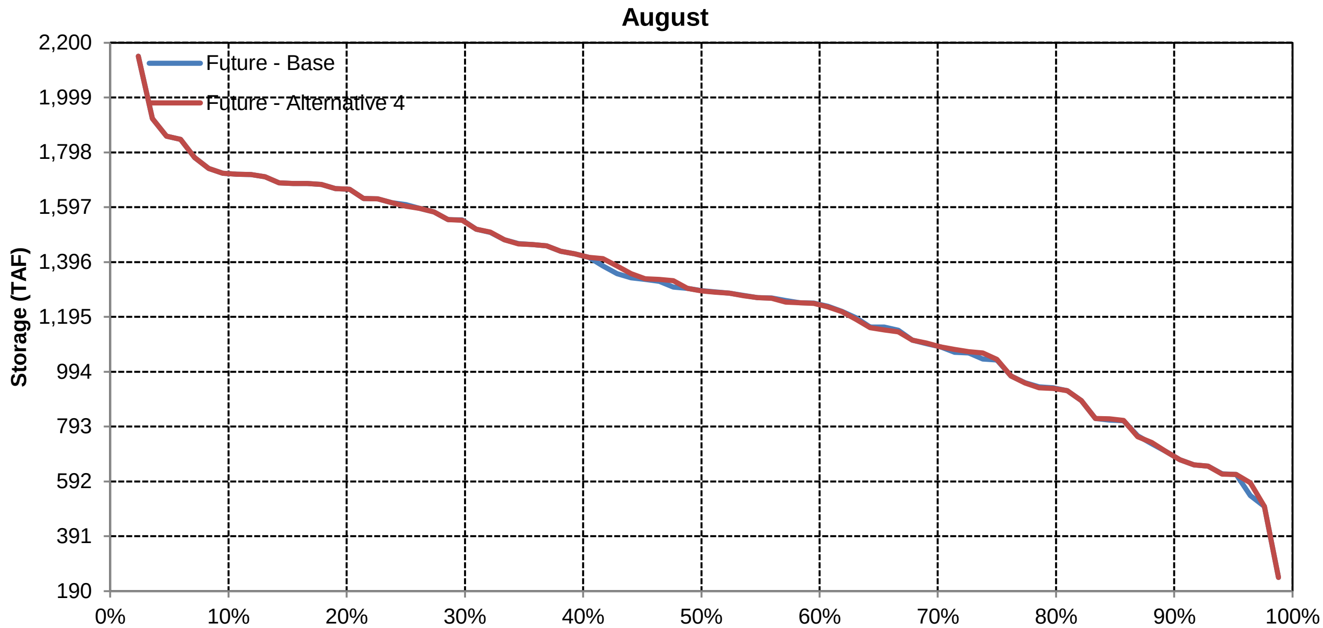
Trinity Reservoir

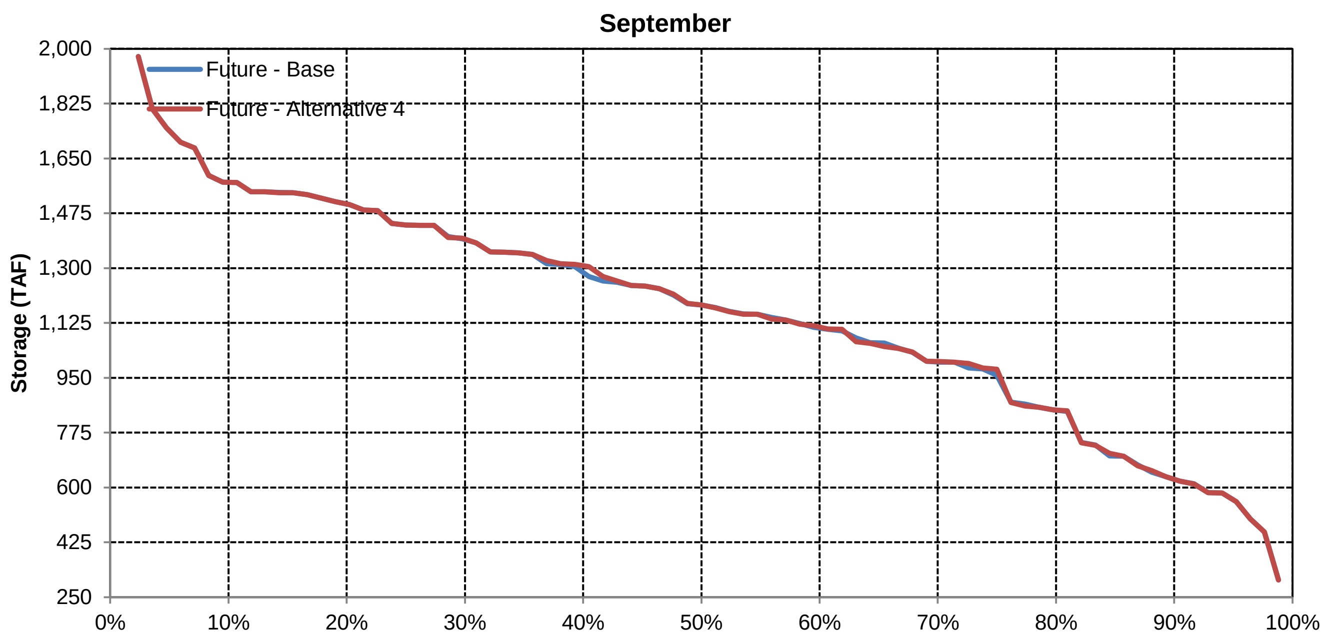




S1

Trinity Reservoir





Long-Term and Water Year-Type Average of Shasta Reservoir Storage Under Future - Base and Future - Alternative 4

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
						Long-Term						
Full Simulation Period												
Future - Base	2,225	2,278	2,586	2,961	3,277	3,633	3,825	3,712	3,230	2,717	2,459	2,291
Future - Alternative 4	2,224	2,277	2,586	2,960	3,277	3,633	3,825	3,713	3,231	2,717	2,459	2,291
Difference	-1	-1	0	0	0	0	0	1	1	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
						Water Year-Types						
Wet												
Future - Base	2,396	2,480	2,989	3,394	3,578	3,842	4,228	4,235	3,803	3,242	2,994	2,526
Future - Alternative 4	2,395	2,480	2,990	3,394	3,578	3,842	4,228	4,235	3,803	3,241	2,993	2,525
Difference	-1	0	0	0	0	0	0	0	0	-1	-1	-1
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal												
Future - Base	2,332	2,398	2,734	3,276	3,538	4,067	4,380	4,287	3,779	3,188	2,931	2,693
Future - Alternative 4	2,326	2,391	2,734	3,276	3,538	4,067	4,380	4,287	3,779	3,188	2,931	2,693
Difference	-5	-6	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Future - Base	2,275	2,333	2,490	3,019	3,412	3,836	4,073	3,949	3,396	2,900	2,674	2,743
Future - Alternative 4	2,274	2,333	2,490	3,018	3,412	3,836	4,072	3,948	3,394	2,897	2,672	2,741
Difference	0	0	0	0	0	0	0	-1	-3	-4	-3	-2
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry												
Future - Base	2,104	2,169	2,417	2,659	3,189	3,593	3,618	3,403	2,899	2,449	2,182	2,205
Future - Alternative 4	2,102	2,168	2,415	2,658	3,187	3,592	3,617	3,403	2,900	2,448	2,181	2,203
Difference	-2	-1	-2	-2	-2	-1	-1	0	1	-1	-2	-1
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical												
Future - Base	1,906	1,851	1,965	2,171	2,385	2,631	2,519	2,310	1,855	1,394	1,094	1,067
Future - Alternative 4	1,908	1,856	1,968	2,174	2,389	2,636	2,523	2,316	1,863	1,404	1,103	1,075
Difference	3	5	3	3	3	5	4	6	9	10	9	8
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%	1%

Shasta Reservoir Storage

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	3,037	3,187	3,321	3,635	3,916	4,241	4,482	4,552	4,171	3,512	3,194	2,972
20%	2,810	2,927	3,266	3,539	3,777	4,102	4,372	4,324	3,882	3,302	3,029	2,858
30%	2,671	2,735	3,191	3,403	3,662	4,022	4,251	4,224	3,719	3,170	2,942	2,679
40%	2,416	2,533	2,985	3,335	3,537	3,963	4,176	4,142	3,568	3,039	2,823	2,536
50%	2,317	2,324	2,754	3,252	3,445	3,839	4,109	3,953	3,350	2,880	2,669	2,439
60%	2,245	2,200	2,545	2,973	3,289	3,597	4,009	3,839	3,203	2,755	2,499	2,338
70%	2,020	2,057	2,269	2,767	3,252	3,417	3,756	3,608	3,154	2,594	2,360	2,110
80%	1,757	1,817	2,045	2,429	2,913	3,266	3,216	2,997	2,618	2,141	1,806	1,824
90%	884	1,011	1,336	1,917	2,378	2,633	2,534	2,407	1,951	1,420	978	956
Long Term												
Full Simulation Period	2,225	2,278	2,586	2,961	3,277	3,633	3,825	3,712	3,230	2,717	2,459	2,291
Water Year Types												
Wet	2,396	2,480	2,989	3,394	3,578	3,842	4,228	4,235	3,803	3,242	2,994	2,526
Above Normal	2,332	2,398	2,734	3,276	3,538	4,067	4,380	4,287	3,779	3,188	2,931	2,693
Below Normal	2,275	2,333	2,490	3,019	3,412	3,836	4,073	3,949	3,396	2,900	2,674	2,743
Dry	2,104	2,169	2,417	2,659	3,189	3,593	3,618	3,403	2,899	2,449	2,182	2,205
Critical	1,906	1,851	1,965	2,171	2,385	2,631	2,519	2,310	1,855	1,394	1,094	1,067

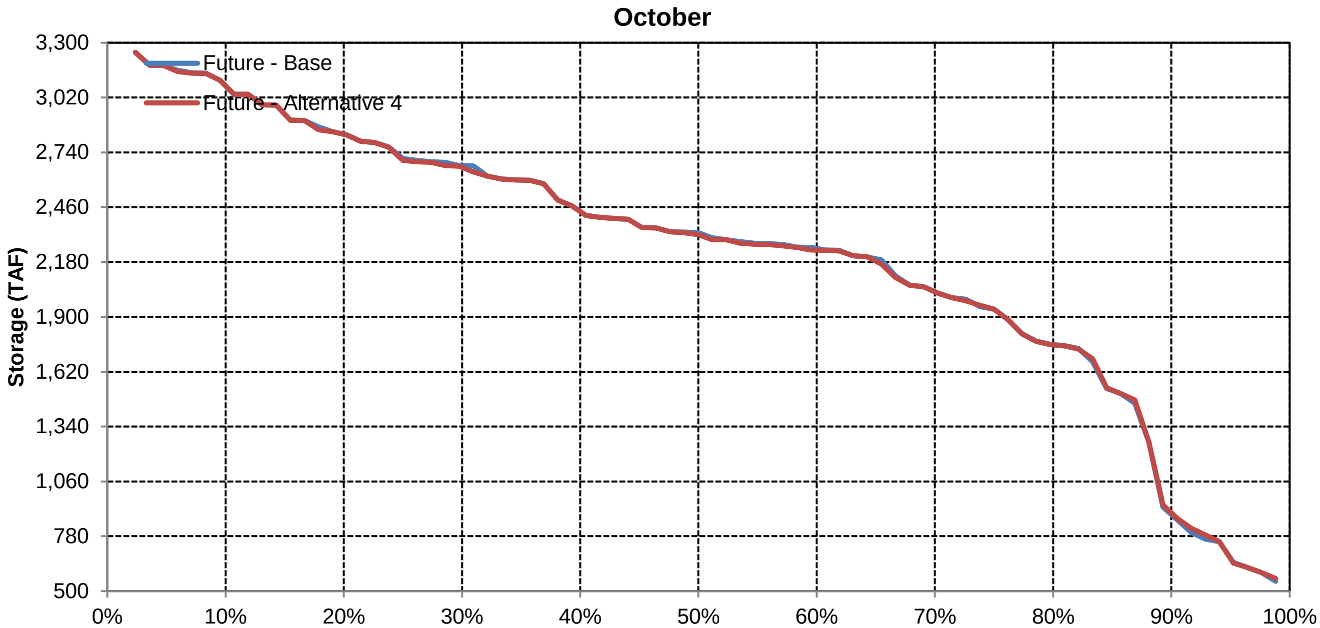
Future - Alternative 4

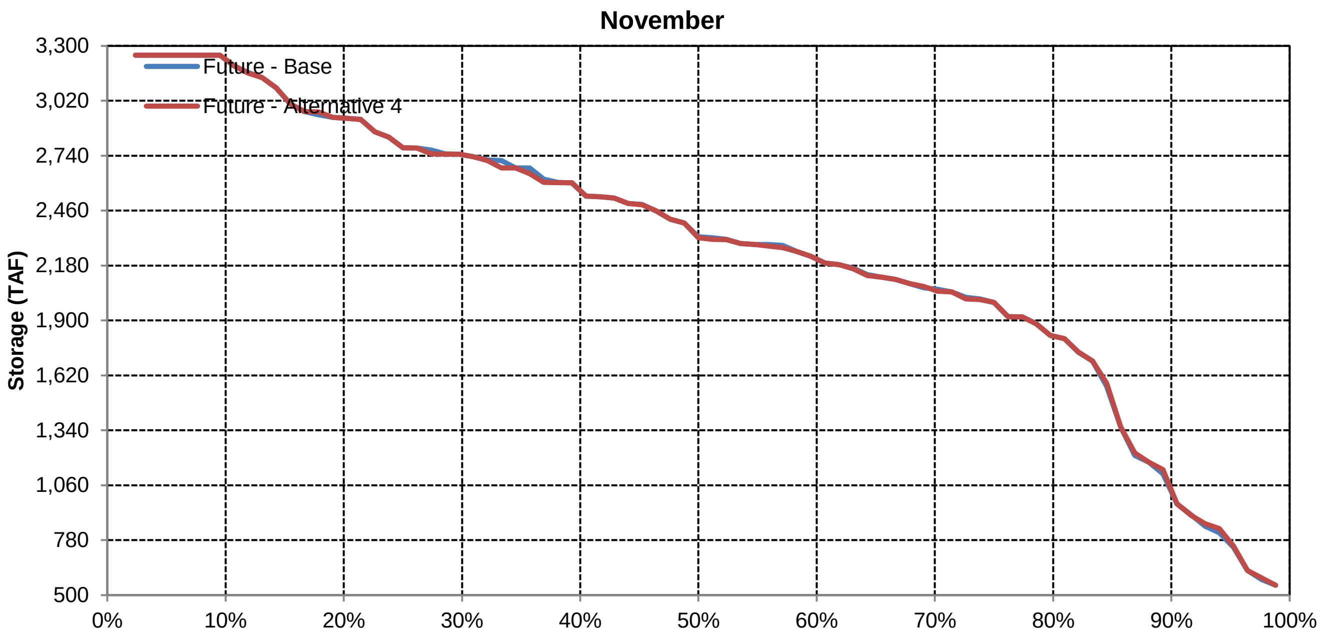
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	3,037	3,186	3,321	3,635	3,916	4,241	4,487	4,552	4,171	3,512	3,194	2,972
20%	2,810	2,927	3,266	3,539	3,777	4,102	4,372	4,324	3,882	3,302	3,029	2,858
30%	2,642	2,736	3,205	3,403	3,662	4,012	4,251	4,224	3,719	3,170	2,943	2,679
40%	2,416	2,533	2,980	3,335	3,535	3,965	4,176	4,148	3,568	3,027	2,823	2,535
50%	2,306	2,317	2,755	3,252	3,445	3,839	4,109	3,953	3,350	2,880	2,669	2,439
60%	2,241	2,200	2,543	2,973	3,283	3,597	4,009	3,836	3,202	2,753	2,499	2,338
70%	2,019	2,049	2,267	2,761	3,252	3,417	3,757	3,599	3,158	2,573	2,355	2,126
80%	1,756	1,817	2,037	2,428	2,913	3,258	3,215	2,992	2,612	2,141	1,811	1,823
90%	893	1,017	1,357	1,939	2,377	2,632	2,542	2,415	1,960	1,425	987	965
Long Term												
Full Simulation Period	2,224	2,277	2,586	2,960	3,277	3,633	3,825	3,713	3,231	2,717	2,459	2,291
Water Year Types												
Wet	2,395	2,480	2,990	3,394	3,578	3,842	4,228	4,235	3,803	3,241	2,993	2,525
Above Normal	2,326	2,391	2,734	3,276	3,538	4,067	4,380	4,287	3,779	3,188	2,931	2,693
Below Normal	2,274	2,333	2,490	3,018	3,412	3,836	4,072	3,948	3,394	2,897	2,672	2,741
Dry	2,102	2,168	2,415	2,658	3,187	3,592	3,617	3,403	2,900	2,448	2,181	2,203
Critical	1,908	1,856	1,968	2,174	2,389	2,636	2,523	2,316	1,863	1,404	1,103	1,075

Future - Alternative 4 Minus Future - Base

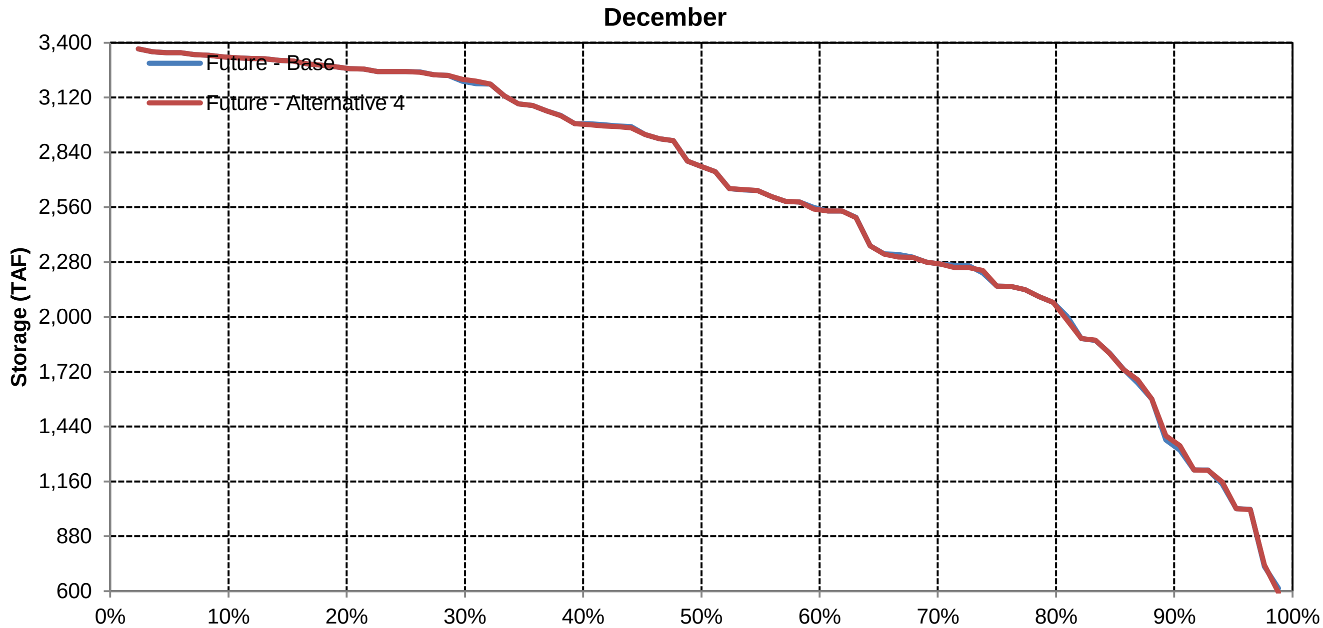
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	0	-1	0	0	0	0	5	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	-29	0	13	0	0	-11	0	0	0	0	0	0
40%	0	0	-6	0	-2	2	0	6	0	-12	0	0
50%	-10	-6	0	0	0	0	0	0	0	0	0	0
60%	-4	0	-1	0	-6	0	0	-3	-1	-2	0	0
70%	-2	-8	-2	-6	0	0	1	-9	4	-21	-5	17
80%	-1	0	-8	0	0	-8	-1	-5	-6	-1	5	-1
90%	9	6	22	22	-1	-1	8	8	9	5	9	9
Long Term												
Full Simulation Period	-1	-1	0	0	0	0	0	1	1	0	0	0
Water Year Types												
Wet	-1	0	0	0	0	0	0	0	0	-1	-1	-1
Above Normal	-5	-6	0	0	0	0	0	0	0	0	0	0
Below Normal	0	0	0	0	0	0	0	-1	-3	-4	-3	-2
Dry	-2	-1	-2	-2	-2	-1	-1	0	1	-1	-2	-1
Critical	3	5	3	3	3	5	4	6	9	10	9	8

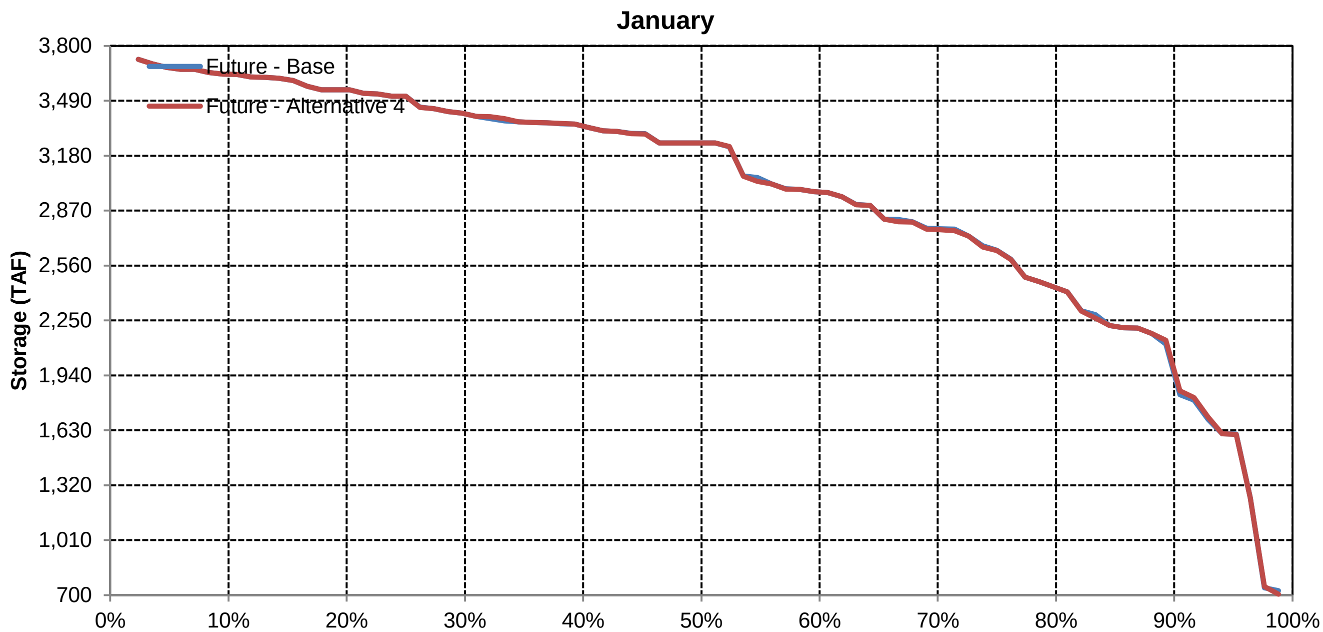
Shasta Reservoir Storage



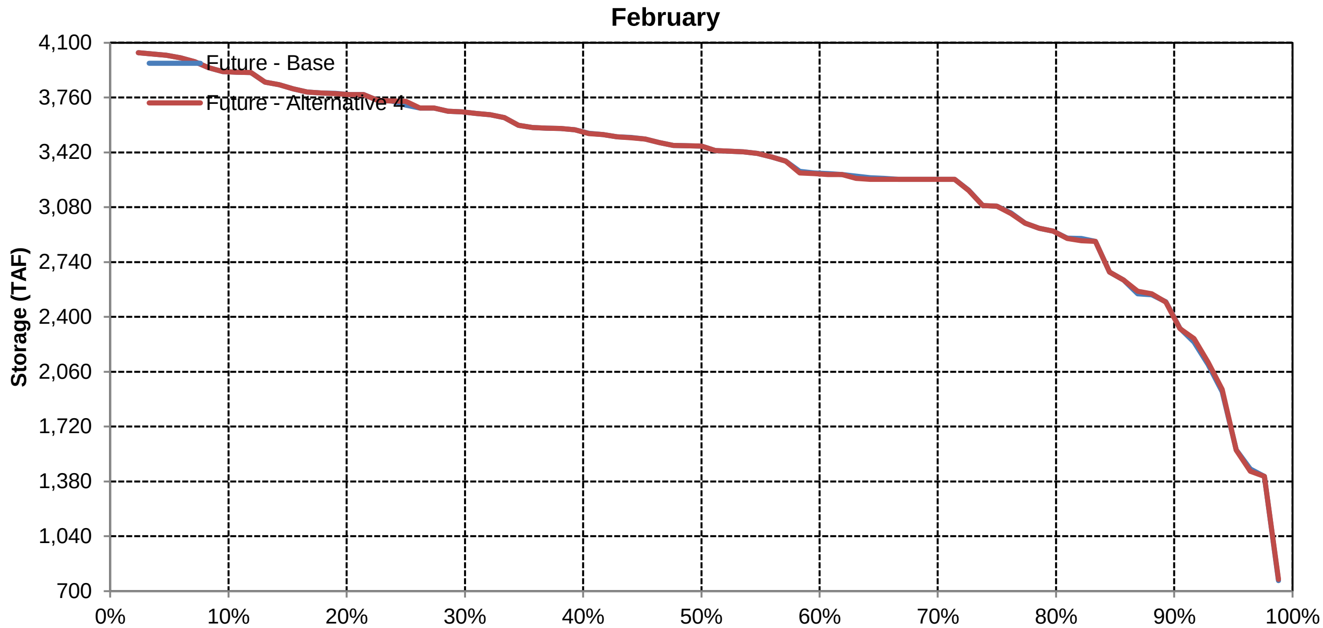


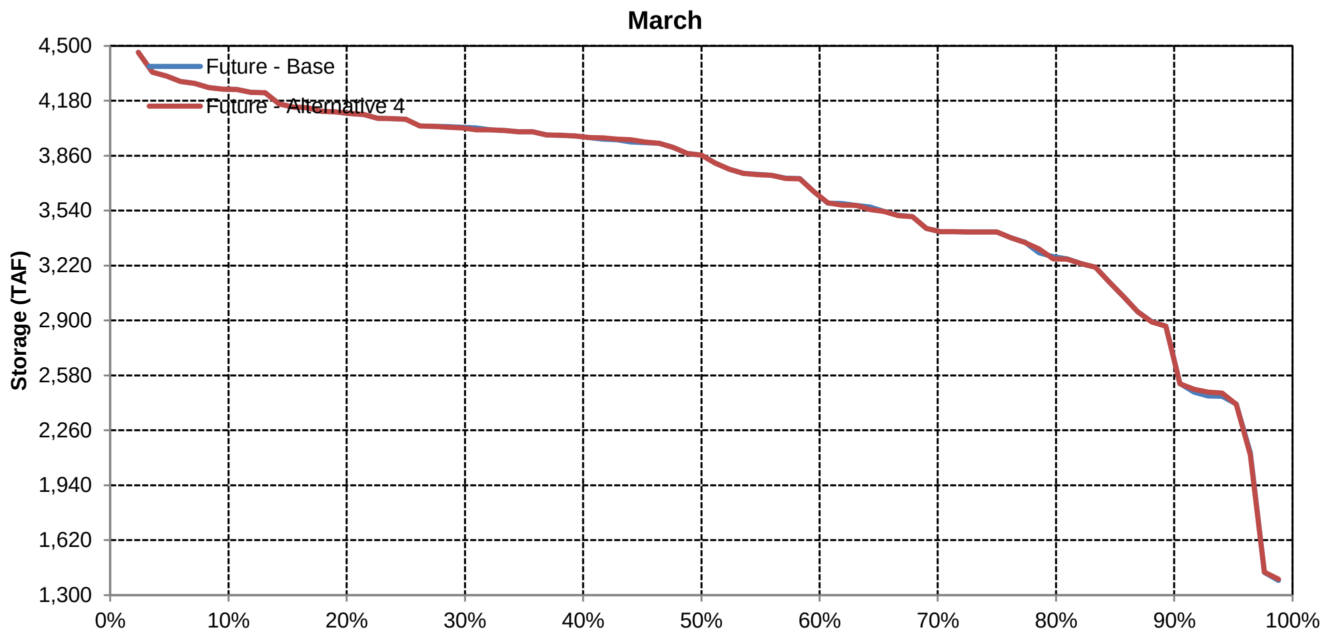
Shasta Reservoir Storage





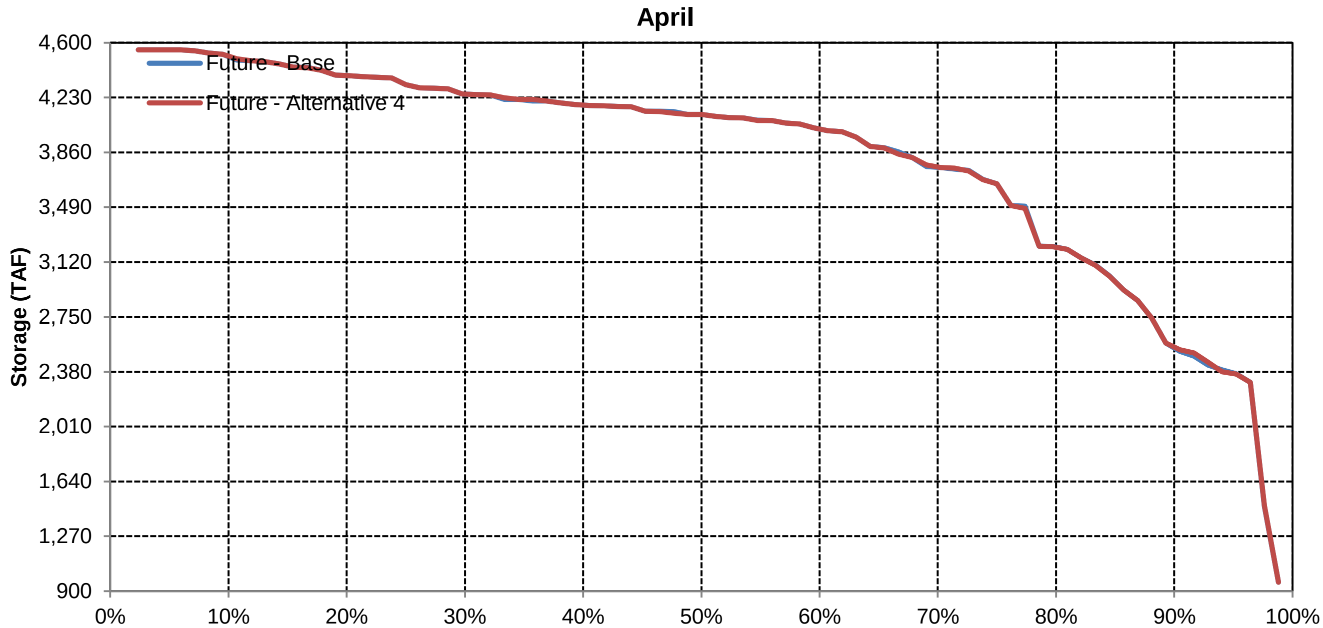
Shasta Reservoir Storage

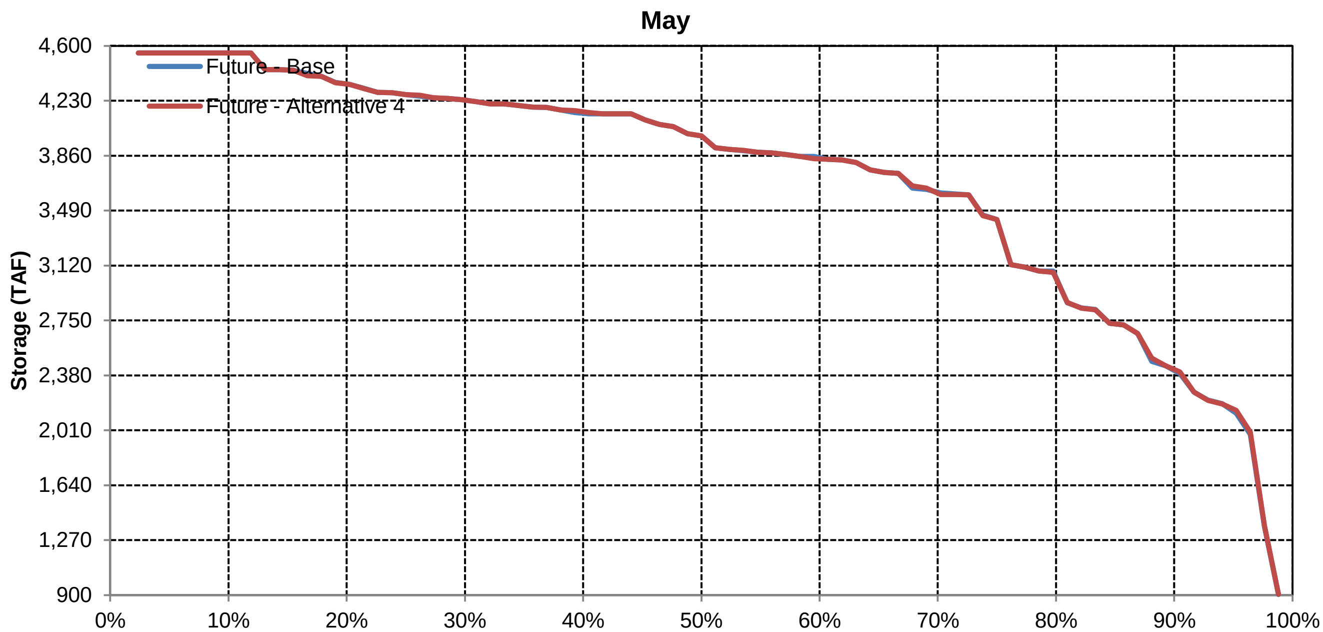




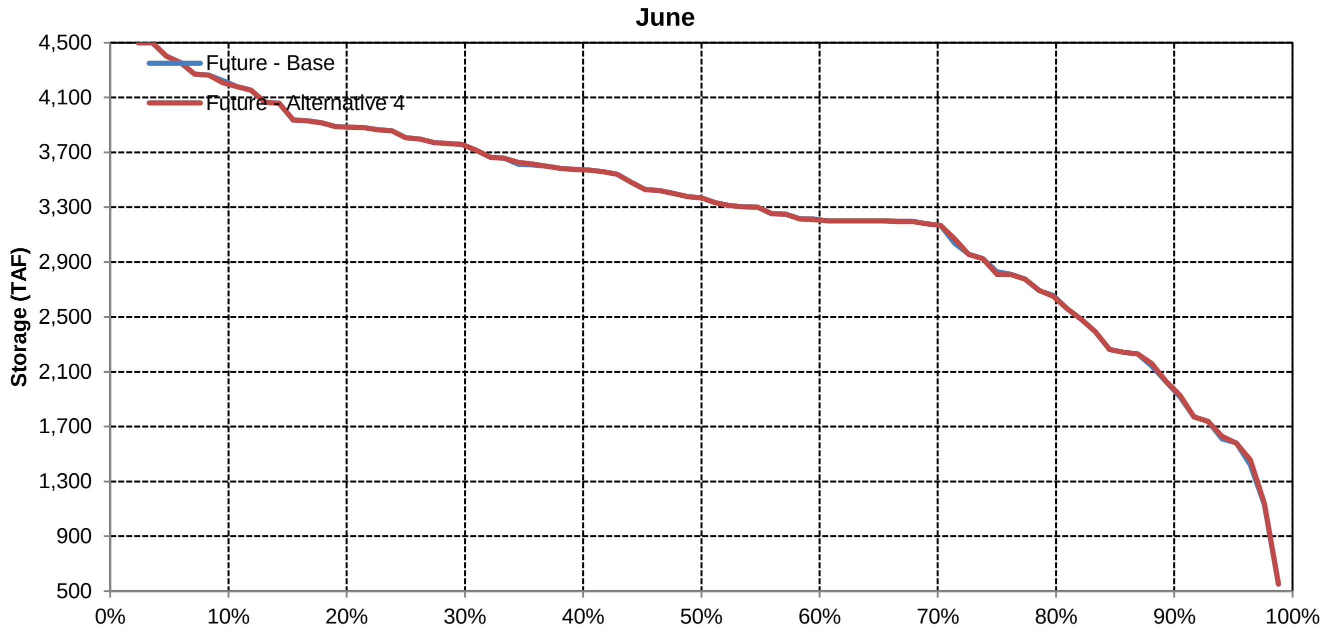
S4

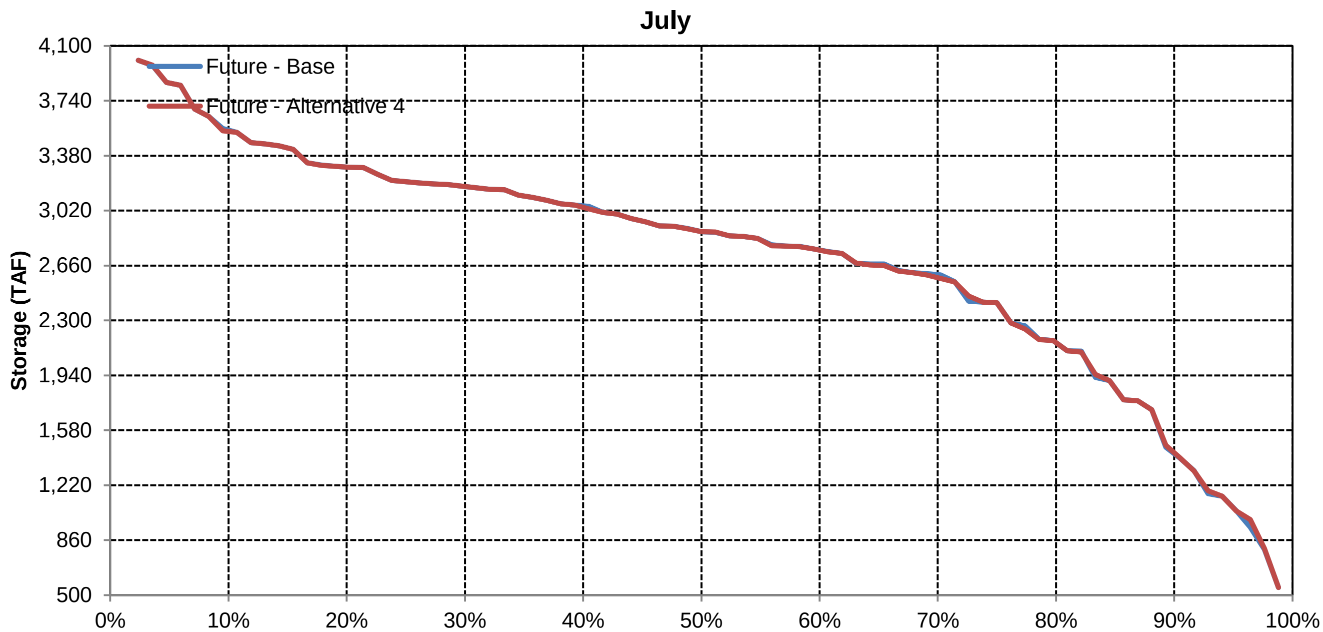
Shasta Reservoir Storage



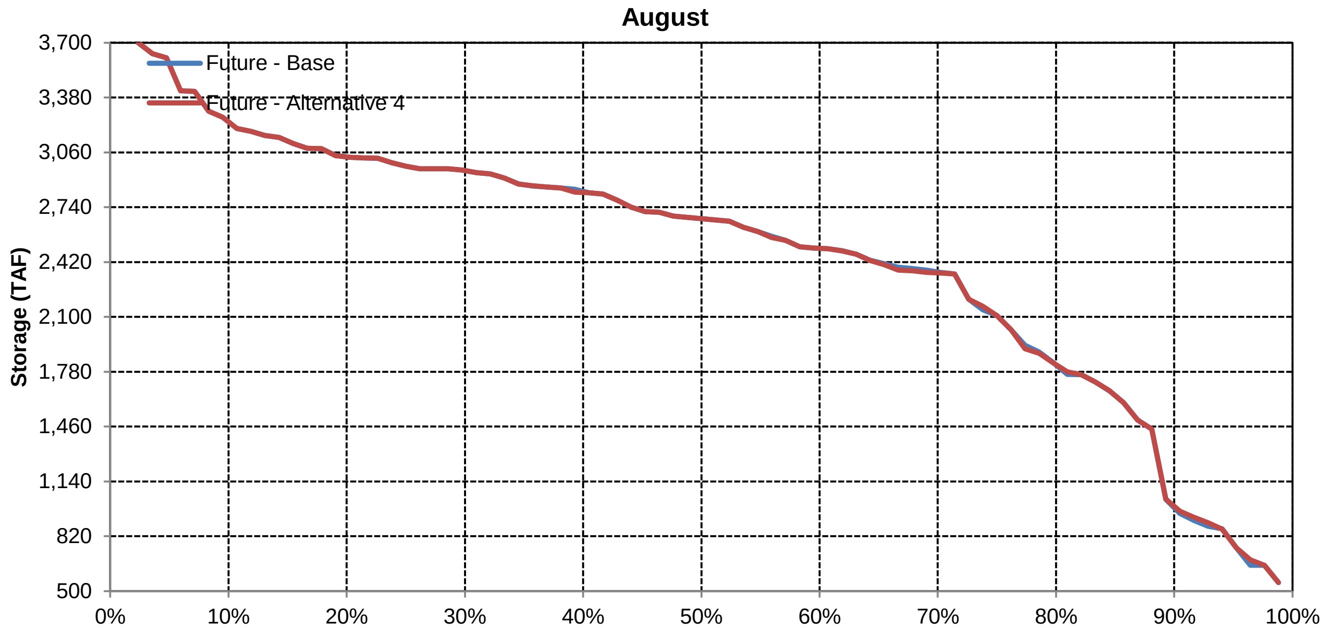


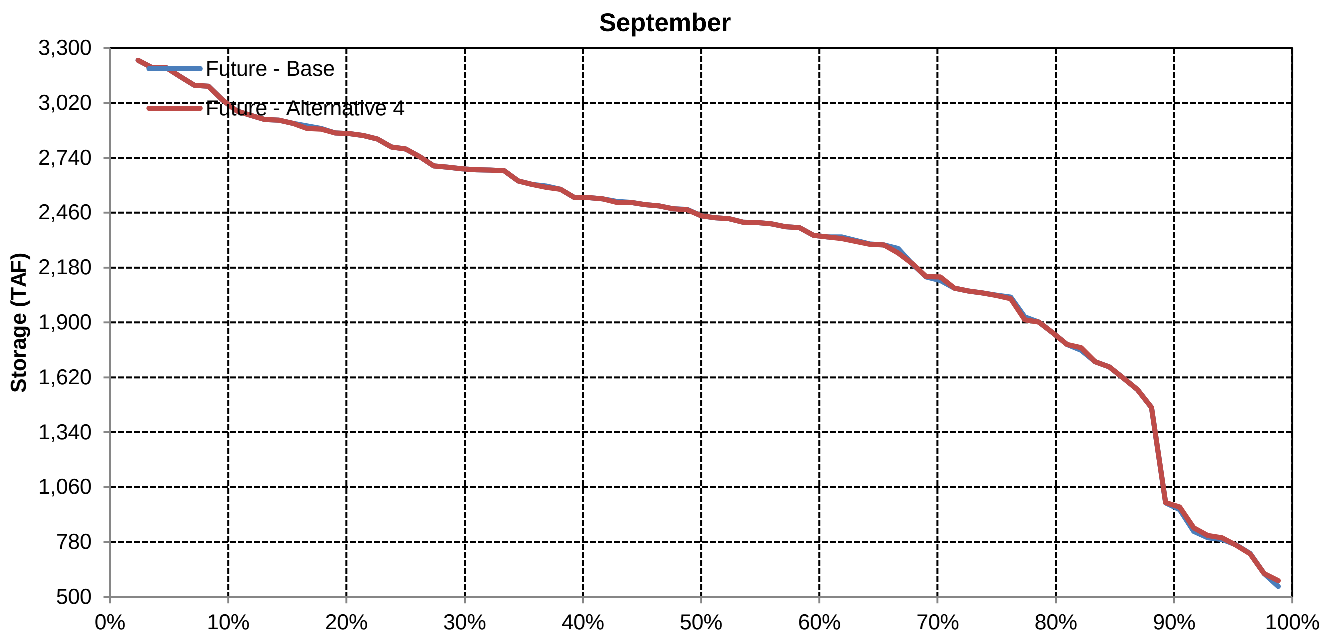
Shasta Reservoir Storage





Shasta Reservoir Storage





Long-Term and Water Year-Type Average of Oroville Reservoir Under Future - Base and Future - Alternative 4

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
						Long-Term						
Full Simulation Period												
Future - Base	1,244	1,285	1,585	1,975	2,295	2,515	2,665	2,627	2,322	1,842	1,548	1,355
Future - Alternative 4	1,245	1,285	1,586	1,978	2,296	2,516	2,667	2,629	2,323	1,844	1,549	1,357
Difference	1	0	1	3	1	1	1	2	2	2	1	2
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
						Water Year-Types						
Wet												
Future - Base	1,339	1,496	2,168	2,719	2,891	2,940	3,223	3,257	2,987	2,389	2,023	1,633
Future - Alternative 4	1,341	1,497	2,169	2,720	2,891	2,940	3,223	3,257	2,987	2,389	2,025	1,635
Difference	2	1	0	2	0	0	0	0	0	0	2	2
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal												
Future - Base	1,447	1,447	1,640	2,269	2,768	2,962	3,196	3,169	2,777	2,174	1,831	1,539
Future - Alternative 4	1,443	1,443	1,642	2,276	2,769	2,962	3,196	3,169	2,777	2,174	1,831	1,539
Difference	-4	-4	2	7	1	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Future - Base	1,249	1,221	1,348	1,711	2,121	2,564	2,712	2,662	2,276	1,745	1,468	1,397
Future - Alternative 4	1,250	1,221	1,348	1,711	2,121	2,564	2,712	2,666	2,278	1,746	1,469	1,398
Difference	0	0	0	0	0	0	0	4	2	2	1	1
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry												
Future - Base	1,100	1,111	1,253	1,469	1,902	2,247	2,284	2,176	1,845	1,457	1,207	1,161
Future - Alternative 4	1,101	1,112	1,253	1,470	1,903	2,247	2,284	2,176	1,843	1,455	1,206	1,161
Difference	1	0	0	0	0	0	0	0	-3	-2	-1	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical												
Future - Base	1,087	1,038	1,079	1,222	1,410	1,580	1,555	1,479	1,306	1,102	916	863
Future - Alternative 4	1,089	1,040	1,084	1,230	1,419	1,589	1,564	1,488	1,321	1,114	921	872
Difference	2	2	4	8	8	8	8	9	15	12	6	9
Percent Difference	0%	0%	0%	1%	1%	1%	1%	1%	1%	1%	1%	1%

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	1,636	1,973	2,788	2,854	2,994	3,059	3,347	3,446	3,357	2,744	2,228	1,836
20%	1,502	1,552	2,259	2,788	2,856	2,991	3,237	3,254	3,034	2,401	2,003	1,666
30%	1,413	1,392	1,723	2,787	2,788	2,938	3,180	3,142	2,680	2,176	1,819	1,572
40%	1,252	1,284	1,473	2,185	2,788	2,833	3,081	3,034	2,528	1,958	1,679	1,439
50%	1,159	1,175	1,411	1,820	2,492	2,788	2,979	2,790	2,386	1,840	1,570	1,325
60%	1,084	1,076	1,258	1,613	2,165	2,539	2,672	2,667	2,222	1,693	1,307	1,222
70%	998	1,001	1,180	1,458	1,946	2,268	2,297	2,185	1,924	1,499	1,201	1,097
80%	985	953	1,002	1,258	1,538	1,950	2,026	1,954	1,706	1,328	1,052	995
90%	829	891	941	1,010	1,262	1,594	1,557	1,411	1,216	1,006	916	879
Long Term												
Full Simulation Period	1,244	1,285	1,585	1,975	2,295	2,515	2,665	2,627	2,322	1,842	1,548	1,355
Water Year Types												
Wet	1,339	1,496	2,168	2,719	2,891	2,940	3,223	3,257	2,987	2,389	2,023	1,633
Above Normal	1,447	1,447	1,640	2,269	2,768	2,962	3,196	3,169	2,777	2,174	1,831	1,539
Below Normal	1,249	1,221	1,348	1,711	2,121	2,564	2,712	2,662	2,276	1,745	1,468	1,397
Dry	1,100	1,111	1,253	1,469	1,902	2,247	2,284	2,176	1,845	1,457	1,207	1,161
Critical	1,087	1,038	1,079	1,222	1,410	1,580	1,555	1,479	1,306	1,102	916	863

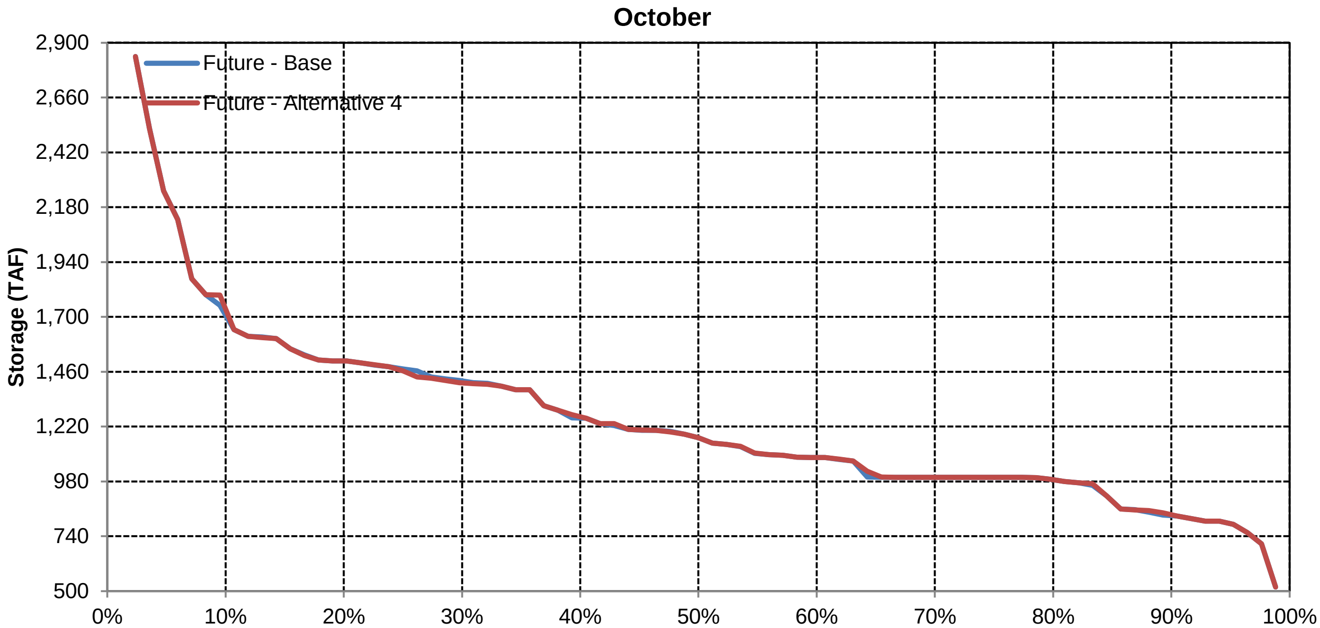
Future - Alternative 4

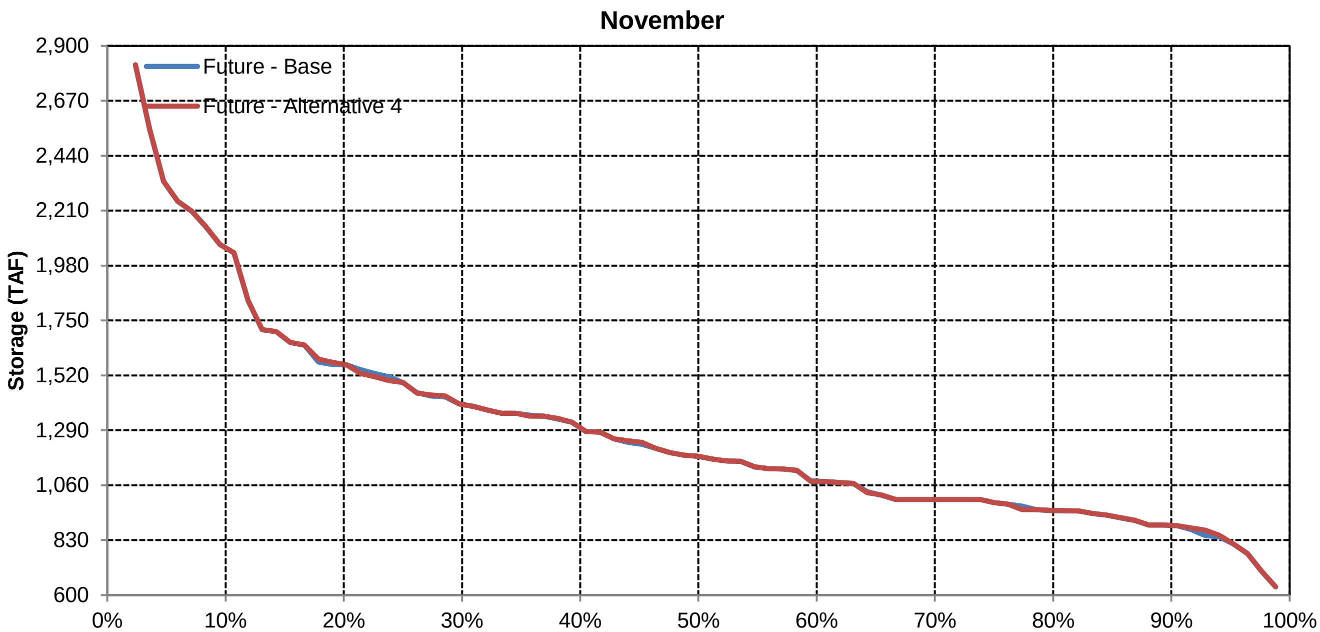
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	1,636	1,973	2,788	2,854	2,994	3,059	3,347	3,446	3,357	2,744	2,228	1,835
20%	1,502	1,542	2,259	2,788	2,856	2,991	3,237	3,254	3,034	2,401	2,003	1,668
30%	1,408	1,391	1,700	2,787	2,788	2,938	3,180	3,142	2,679	2,176	1,819	1,574
40%	1,252	1,285	1,474	2,185	2,788	2,833	3,081	3,034	2,529	1,958	1,679	1,439
50%	1,160	1,176	1,411	1,820	2,494	2,788	2,979	2,790	2,386	1,844	1,570	1,323
60%	1,084	1,076	1,262	1,614	2,165	2,539	2,672	2,667	2,222	1,693	1,312	1,222
70%	998	1,001	1,180	1,458	1,946	2,269	2,295	2,185	1,925	1,499	1,199	1,104
80%	986	954	1,002	1,258	1,560	1,951	2,026	1,954	1,713	1,326	1,030	995
90%	833	891	941	1,011	1,262	1,594	1,558	1,417	1,216	1,006	917	882
Long Term												
Full Simulation Period	1,245	1,285	1,586	1,978	2,296	2,516	2,667	2,629	2,323	1,844	1,549	1,357
Water Year Types												
Wet	1,341	1,497	2,169	2,720	2,891	2,940	3,223	3,257	2,987	2,389	2,025	1,635
Above Normal	1,443	1,443	1,642	2,276	2,769	2,962	3,196	3,169	2,777	2,174	1,831	1,539
Below Normal	1,250	1,221	1,348	1,711	2,121	2,564	2,712	2,666	2,278	1,746	1,469	1,398
Dry	1,101	1,112	1,253	1,470	1,903	2,247	2,284	2,176	1,843	1,455	1,206	1,161
Critical	1,089	1,040	1,084	1,230	1,419	1,589	1,564	1,488	1,321	1,114	921	872

Future - Alternative 4 Minus Future - Base

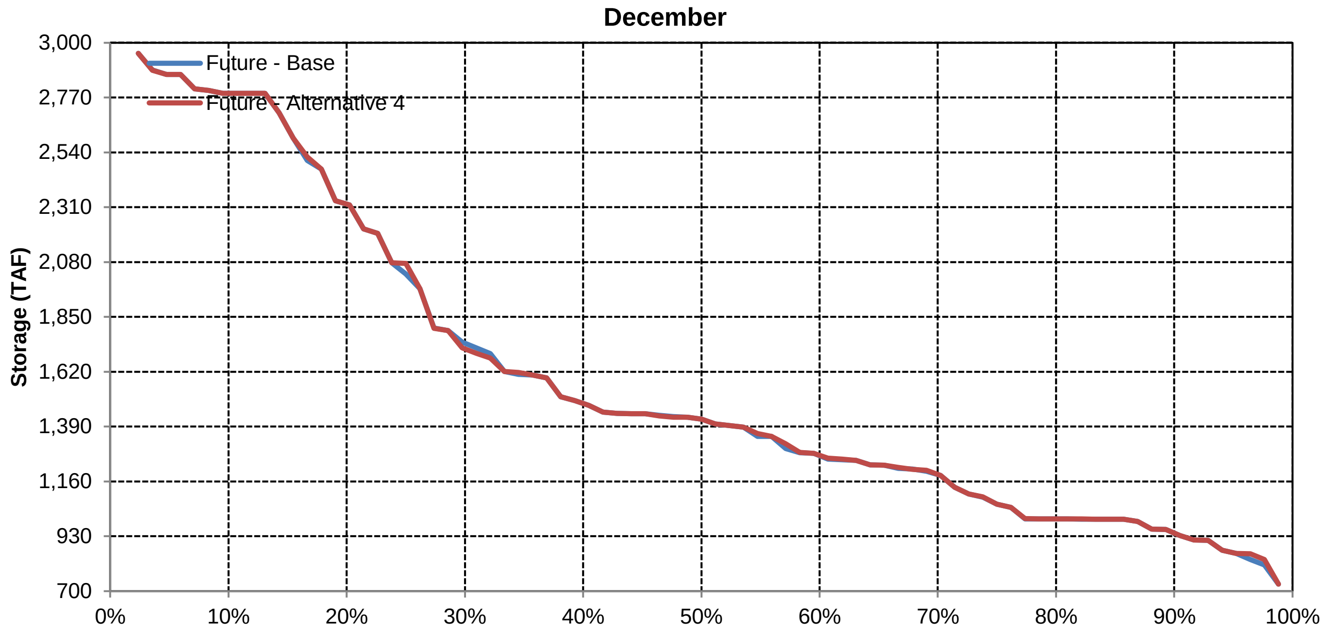
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	-1
20%	0	-10	0	0	0	0	0	0	0	0	0	2
30%	-5	-2	-23	0	0	0	0	0	0	0	0	2
40%	0	0	0	0	0	0	0	0	1	0	0	0
50%	0	1	0	0	2	0	0	0	0	5	0	-1
60%	0	0	4	0	0	0	0	0	0	0	5	0
70%	0	0	0	0	0	1	-2	0	1	0	-2	7
80%	0	1	0	0	22	1	0	0	7	-2	-22	0
90%	3	0	0	1	0	0	2	6	0	0	0	3
Long Term												
Full Simulation Period	1	0	1	3	1	1	1	2	2	2	1	2
Water Year Types												
Wet	2	1	0	2	0	0	0	0	0	0	2	2
Above Normal	-4	-4	2	7	1	0	0	0	0	0	0	0
Below Normal	0	0	0	0	0	0	0	4	2	2	1	1
Dry	1	0	0	0	0	0	0	0	-3	-2	-1	0
Critical	2	2	4	8	8	8	8	9	15	12	6	9

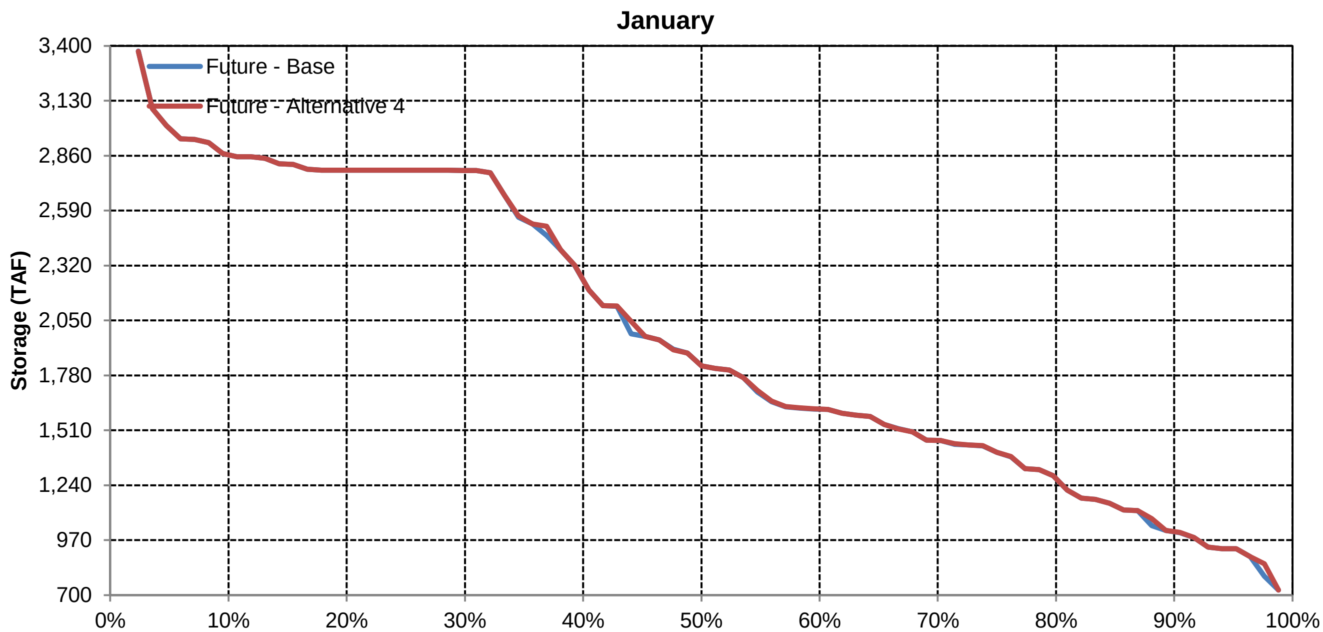
Oroville Reservoir



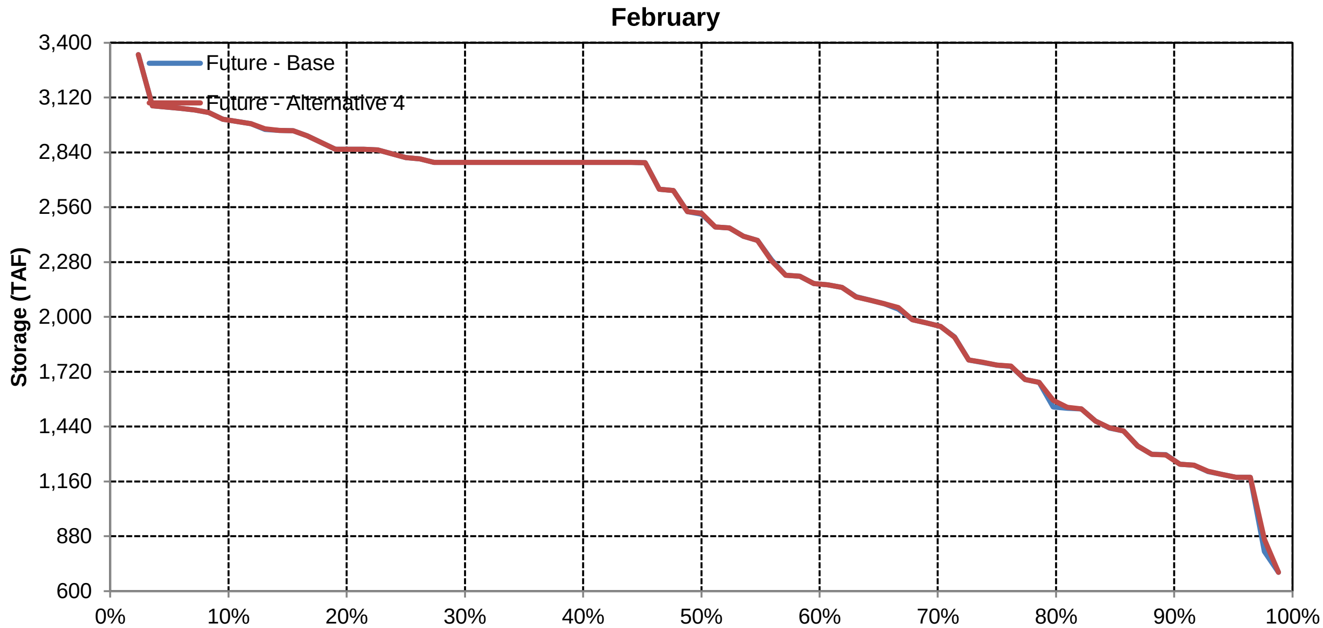


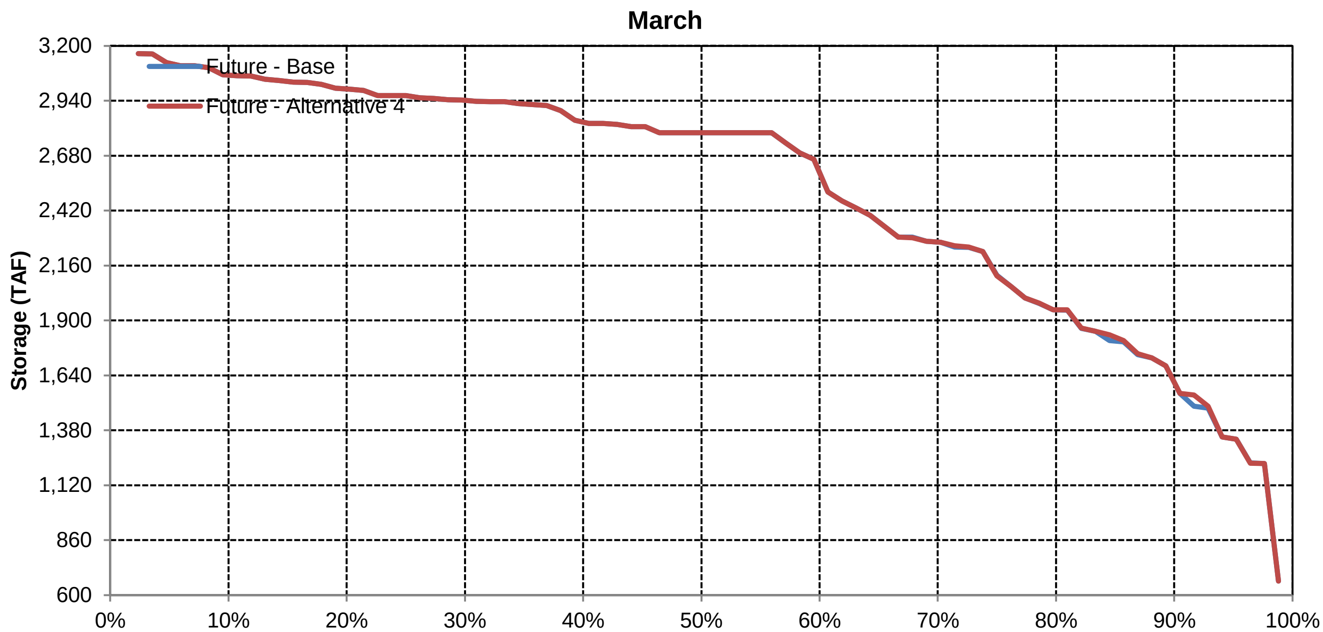
Oroville Reservoir



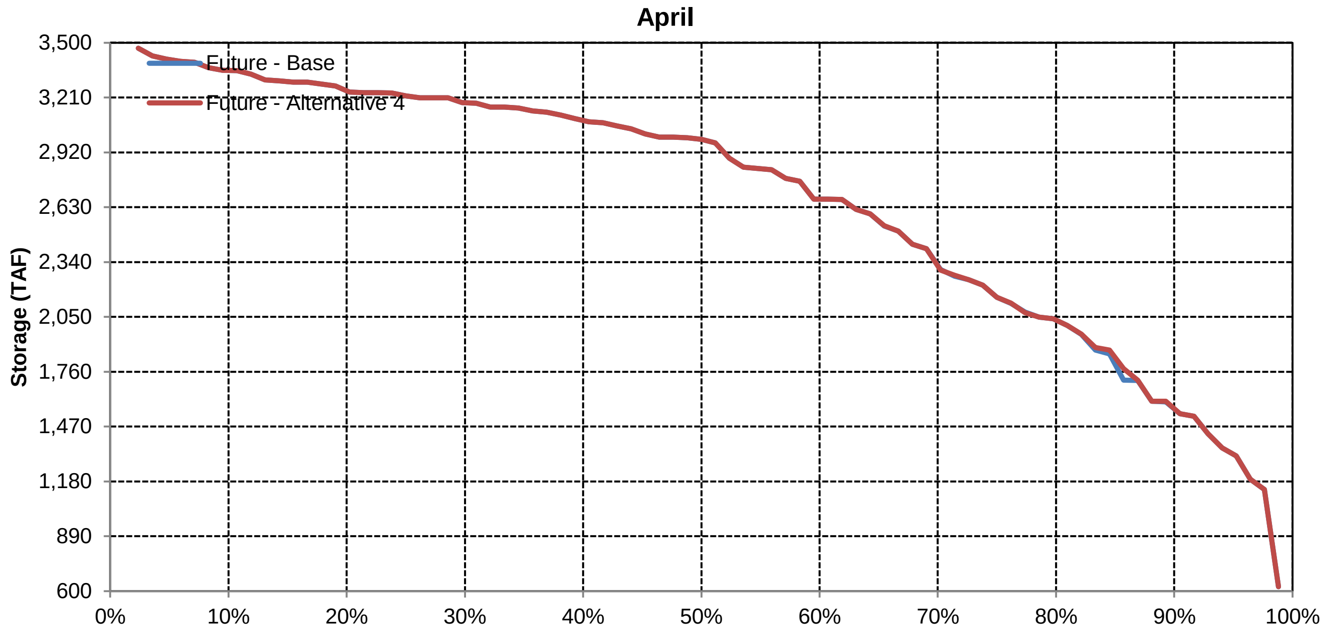


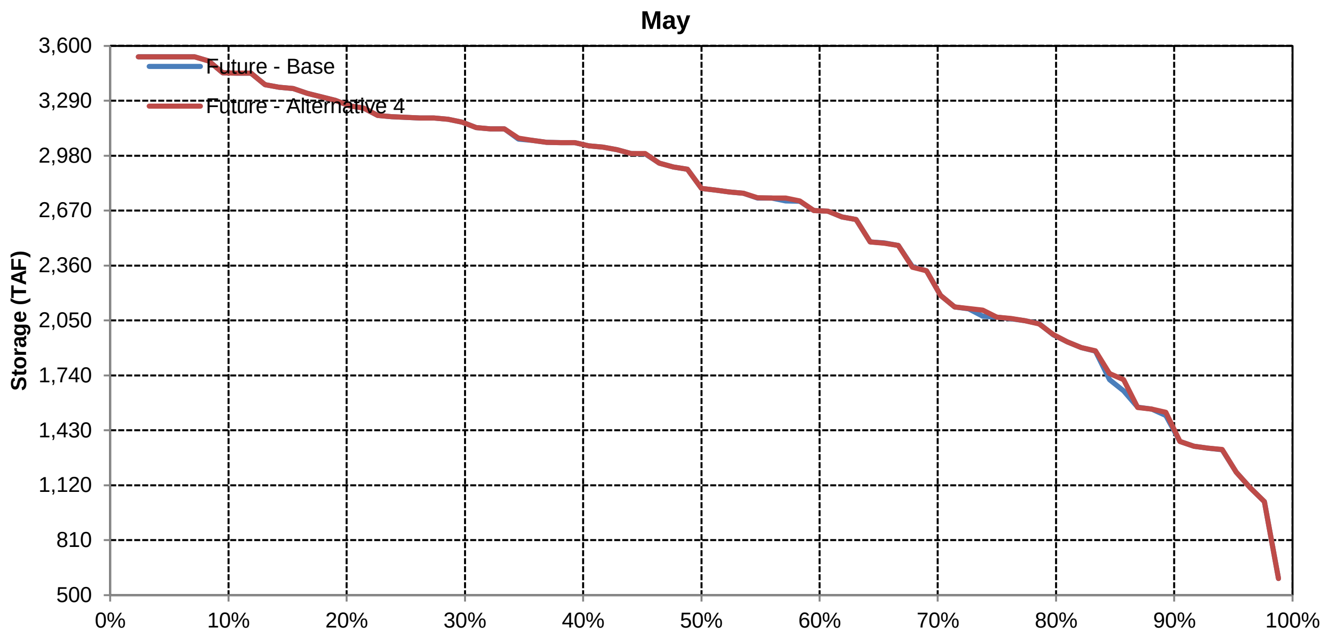
Oroville Reservoir



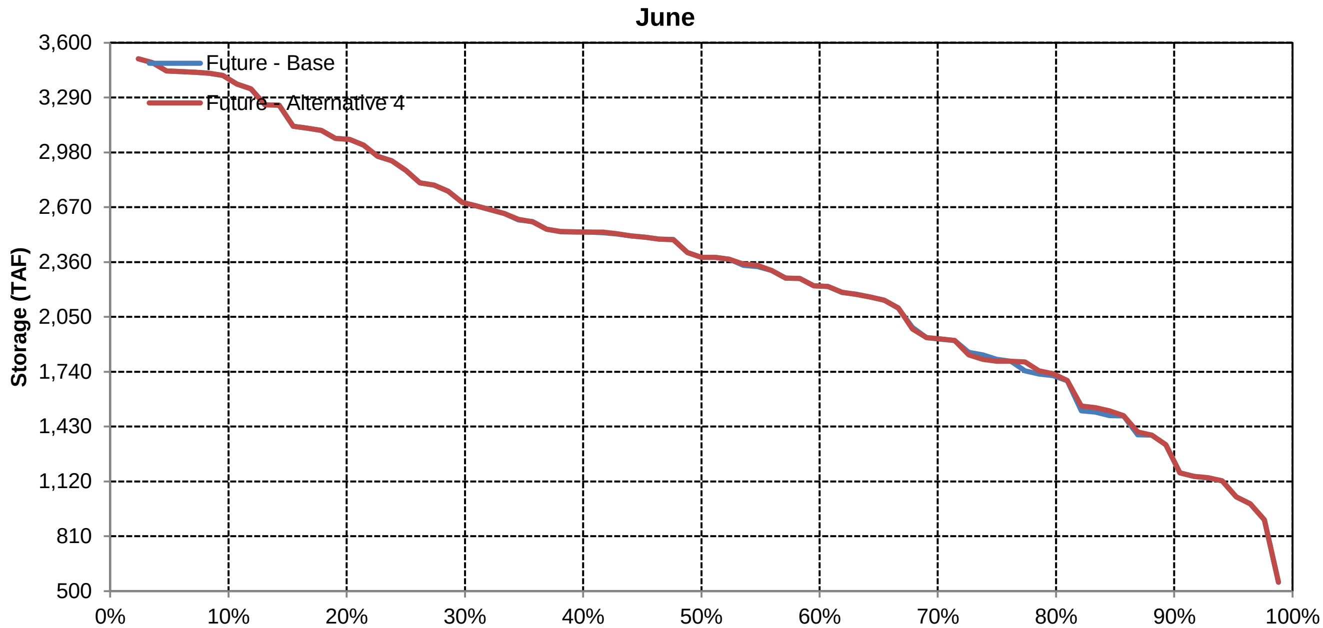


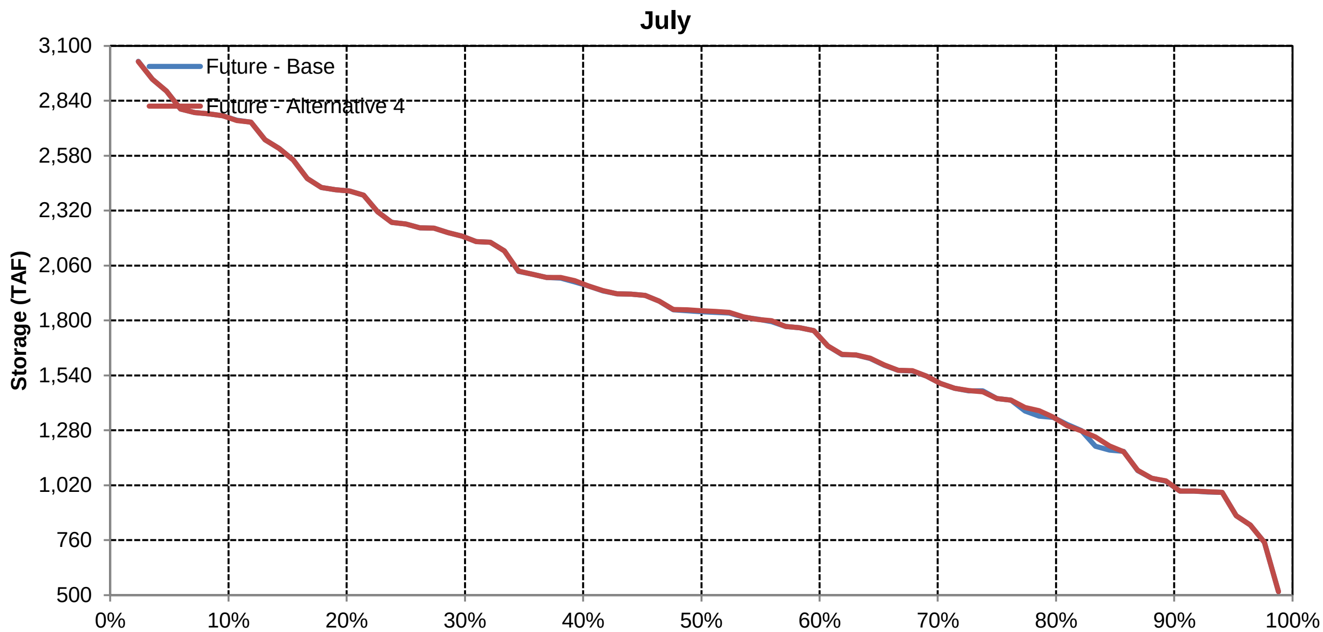
Oroville Reservoir



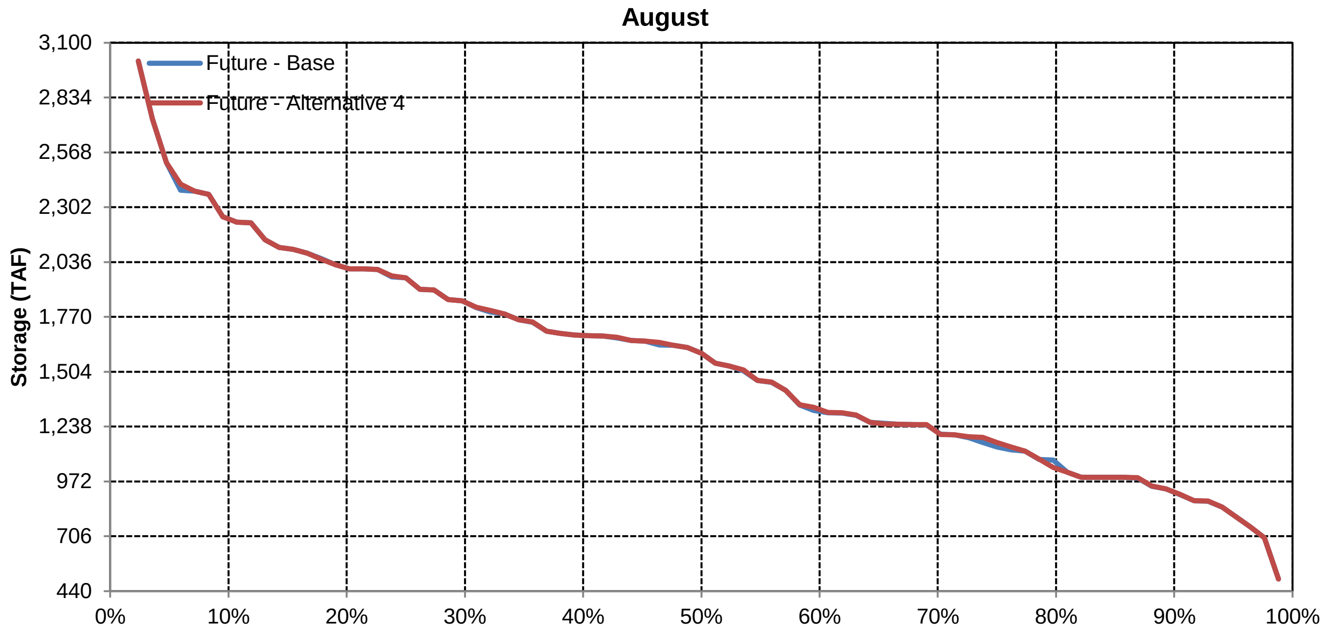


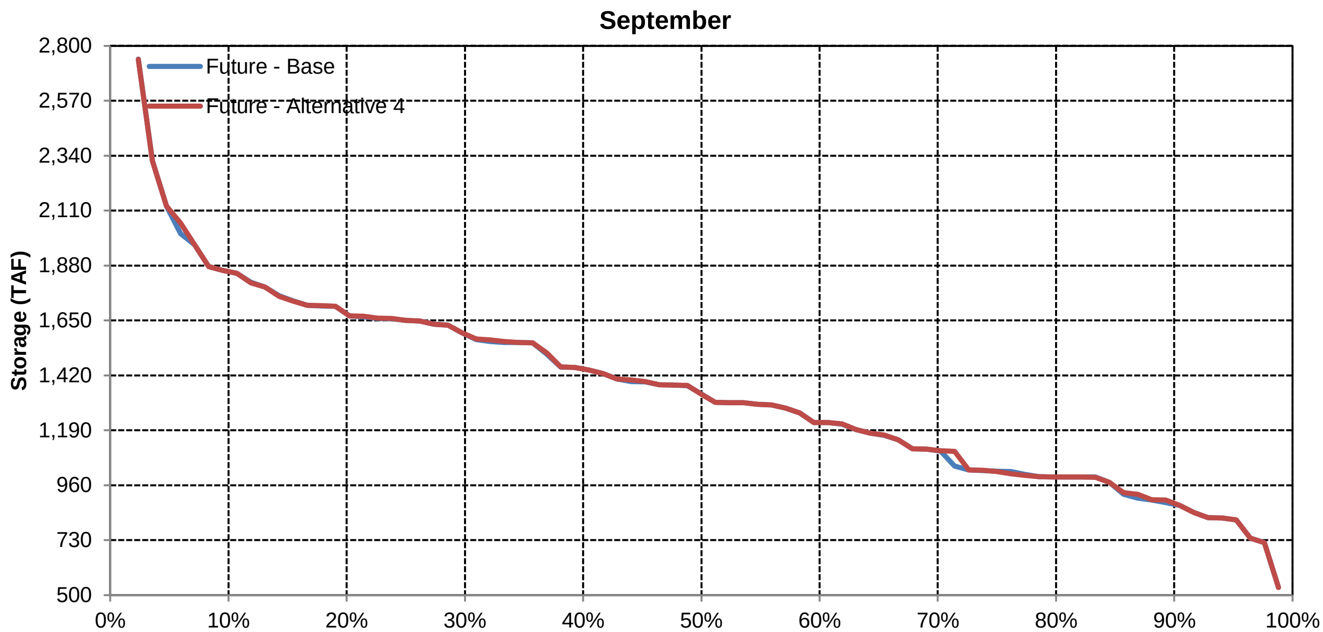
Oroville Reservoir





Oroville Reservoir





Long-Term and Water Year-Type Average of Folsom Reservoir Under Future - Base and Future - Alternative 4

Analysis Period	October	November	December	January	February	March	April	May	June	July	August	September
					Average Storage (TAF)							
Long-Term												
Full Simulation Period												
Future - Base	354	352	404	454	482	592	680	678	580	460	427	390
Future - Alternative 4	354	352	405	455	483	593	681	679	581	461	427	391
Difference	0	0	1	1	1	1	1	1	1	0	0	1
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Water Year-Types												
Wet												
Future - Base	368	385	480	522	509	624	760	806	699	547	509	430
Future - Alternative 4	368	385	480	522	509	624	760	806	699	547	508	430
Difference	0	0	0	0	0	0	0	0	0	-1	-1	-1
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal												
Future - Base	363	358	415	512	550	644	766	766	668	492	471	427
Future - Alternative 4	365	357	415	512	550	644	766	766	668	492	471	427
Difference	2	-1	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Future - Base	375	361	399	471	508	624	727	714	609	493	465	455
Future - Alternative 4	374	361	399	471	508	624	727	714	610	495	466	456
Difference	0	0	0	0	0	0	0	0	1	1	1	1
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry												
Future - Base	336	332	372	411	477	592	646	596	489	395	356	357
Future - Alternative 4	336	333	373	412	477	592	646	596	490	395	357	358
Difference	1	1	1	1	0	0	0	0	1	1	1	1
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical												
Future - Base	321	298	288	306	341	440	436	418	360	317	287	256
Future - Alternative 4	322	299	294	312	347	446	442	422	364	319	286	260
Difference	1	1	6	6	6	6	6	4	4	2	0	4
Percent Difference	0%	0%	2%	2%	2%	1%	1%	1%	1%	1%	0%	2%

Folsom Reservoir

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	487	501	567	567	567	662	792	939	828	636	580	540
20%	445	437	566	567	567	656	792	820	729	587	548	504
30%	395	394	498	564	563	652	792	763	694	549	519	455
40%	365	365	432	556	557	645	791	745	621	495	483	417
50%	349	342	392	507	549	629	766	706	592	443	413	396
60%	321	327	352	454	495	616	701	656	538	418	388	360
70%	304	311	319	372	443	590	635	600	500	383	356	333
80%	269	272	302	305	386	565	554	498	404	332	305	295
90%	223	217	252	260	302	426	437	426	355	311	276	231
Long Term												
Full Simulation Period	354	352	404	454	482	592	680	678	580	460	427	390
Water Year Types												
Wet	368	385	480	522	509	624	760	806	699	547	509	430
Above Normal	363	358	415	512	550	644	766	766	668	492	471	427
Below Normal	375	361	399	471	508	624	727	714	609	493	465	455
Dry	336	332	372	411	477	592	646	596	489	395	356	357
Critical	321	298	288	306	341	440	436	418	360	317	287	256

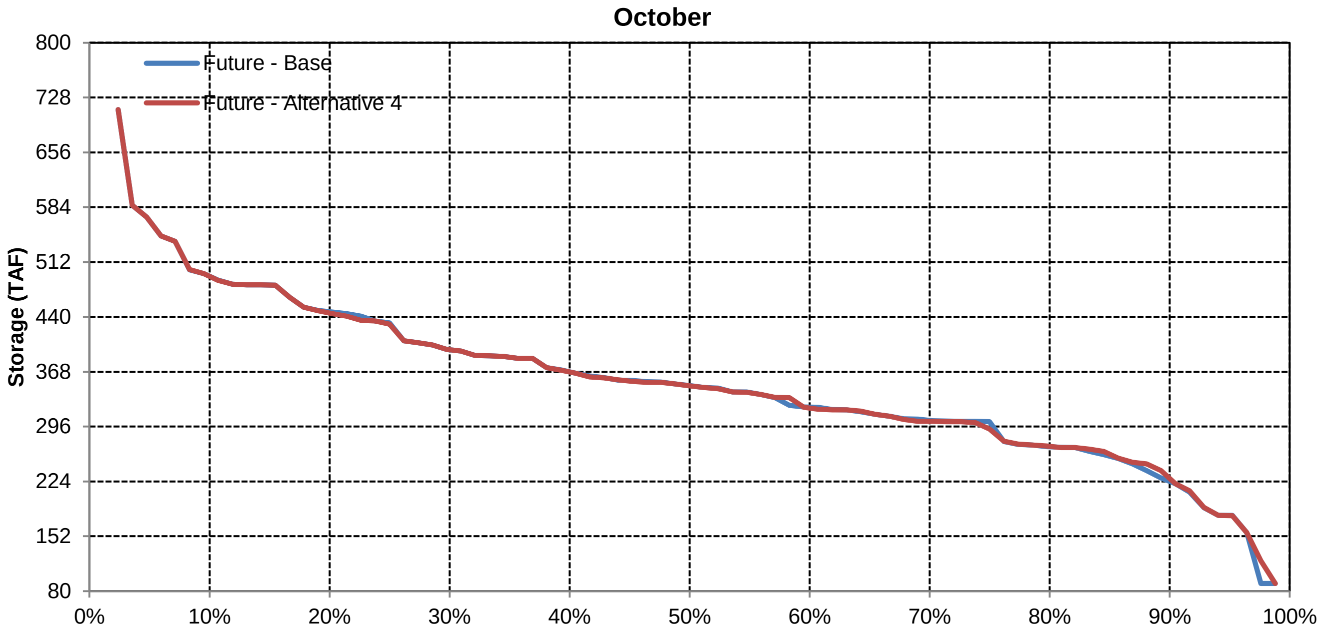
Future - Alternative 4

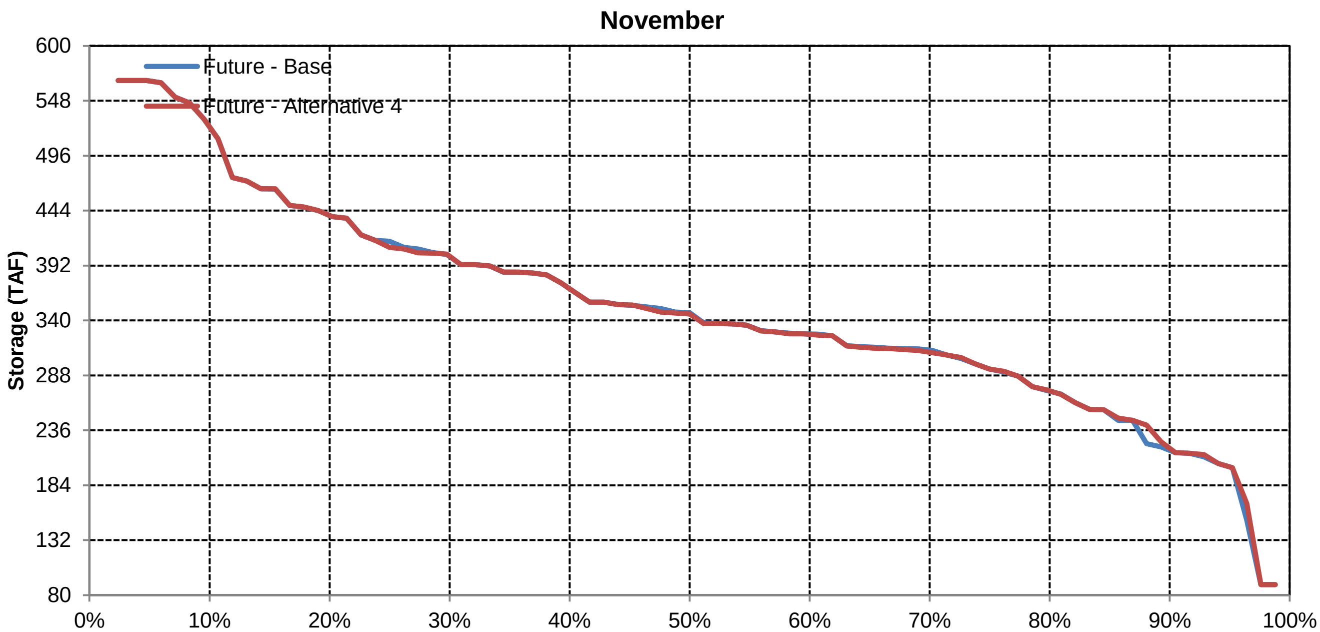
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	487	501	567	567	567	662	792	939	828	636	580	540
20%	442	437	564	567	567	656	792	820	729	587	548	503
30%	395	394	498	564	563	653	792	763	694	549	519	455
40%	365	365	432	556	557	646	791	745	621	495	483	416
50%	348	342	391	507	549	632	766	706	592	444	413	396
60%	319	326	352	454	495	618	701	656	536	418	389	360
70%	303	309	318	372	446	593	635	600	500	379	350	333
80%	270	273	302	305	386	565	554	498	405	331	305	295
90%	226	218	252	262	302	426	447	443	363	311	276	232
Long Term												
Full Simulation Period	354	352	405	455	483	593	681	679	581	461	427	391
Water Year Types												
Wet	368	385	480	522	509	624	760	806	699	547	508	430
Above Normal	365	357	415	512	550	644	766	766	668	492	471	427
Below Normal	374	361	399	471	508	624	727	714	610	495	466	456
Dry	336	333	373	412	477	592	646	596	490	395	357	358
Critical	322	299	294	312	347	446	442	422	364	319	286	260

Future - Alternative 4 Minus Future - Base

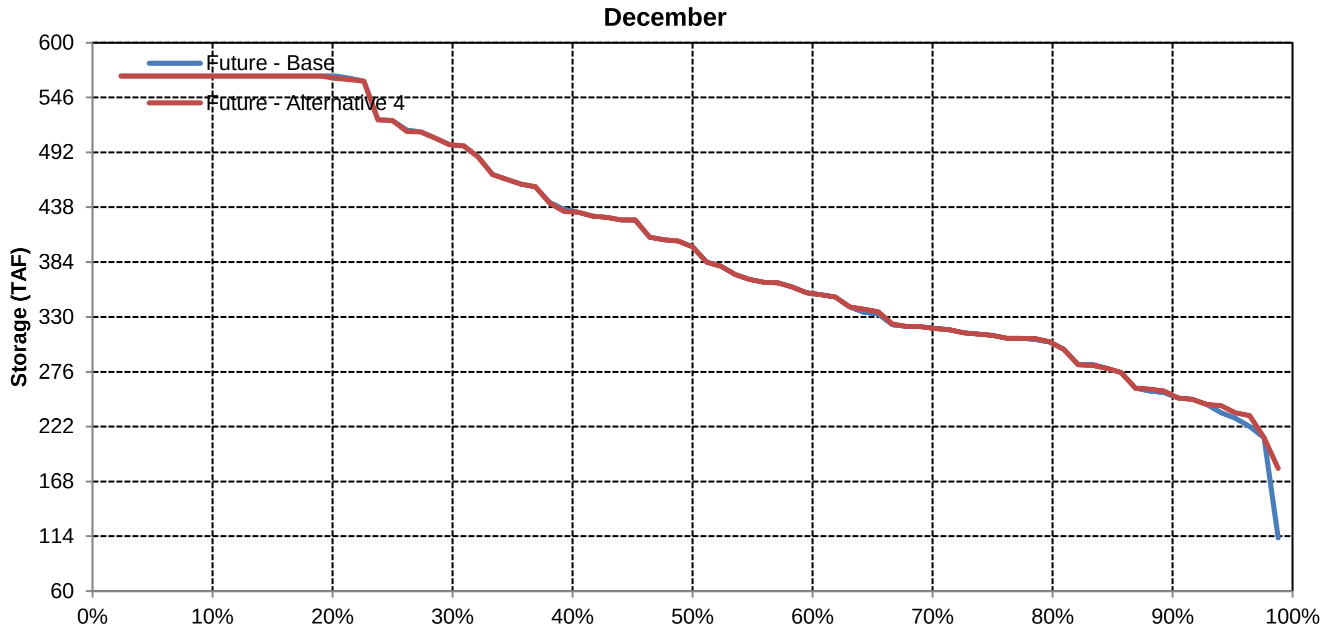
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	-3	0	-2	0	0	0	0	0	0	0	0	-1
30%	0	0	0	0	0	1	0	0	0	0	0	0
40%	0	0	0	0	0	1	0	0	0	0	0	-1
50%	0	-1	0	0	0	3	0	0	0	1	0	0
60%	-2	-1	0	0	0	2	0	0	-2	0	1	0
70%	-1	-2	0	0	3	3	0	0	0	-5	-6	0
80%	0	0	0	0	0	0	0	0	1	-1	0	0
90%	3	1	0	1	0	0	10	17	8	1	0	1
Long Term												
Full Simulation Period	0	0	1	1	1	1	1	1	1	0	0	1
Water Year Types												
Wet	0	0	0	0	0	0	0	0	0	-1	-1	-1
Above Normal	2	-1	0	0	0	0	0	0	0	0	0	0
Below Normal	0	0	0	0	0	0	0	0	1	1	1	1
Dry	1	1	1	1	0	0	0	0	1	1	1	1
Critical	1	1	6	6	6	6	6	4	4	2	0	4

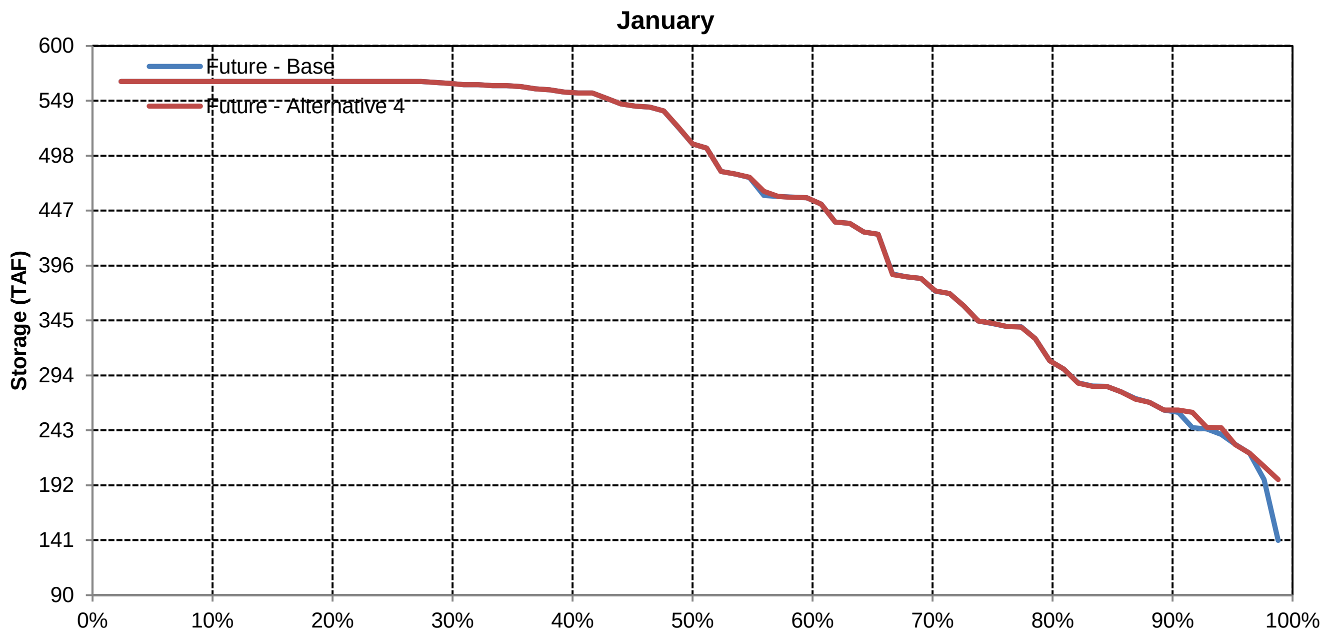
Folsom Reservoir



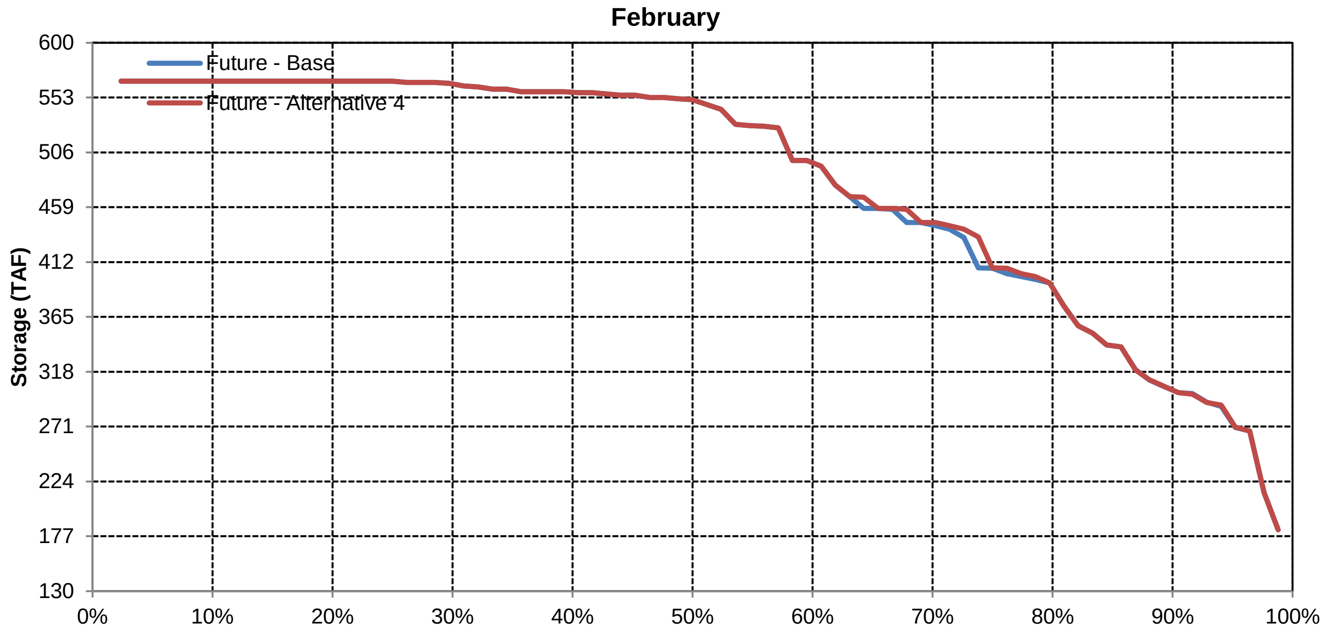


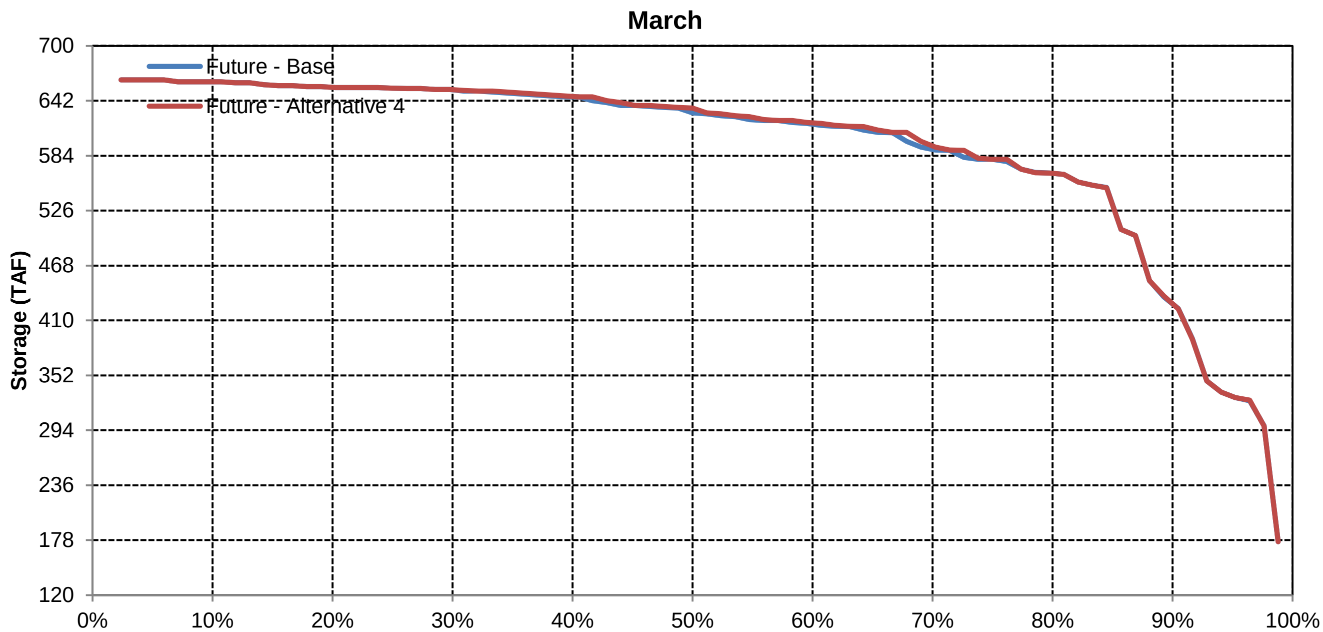
Folsom Reservoir



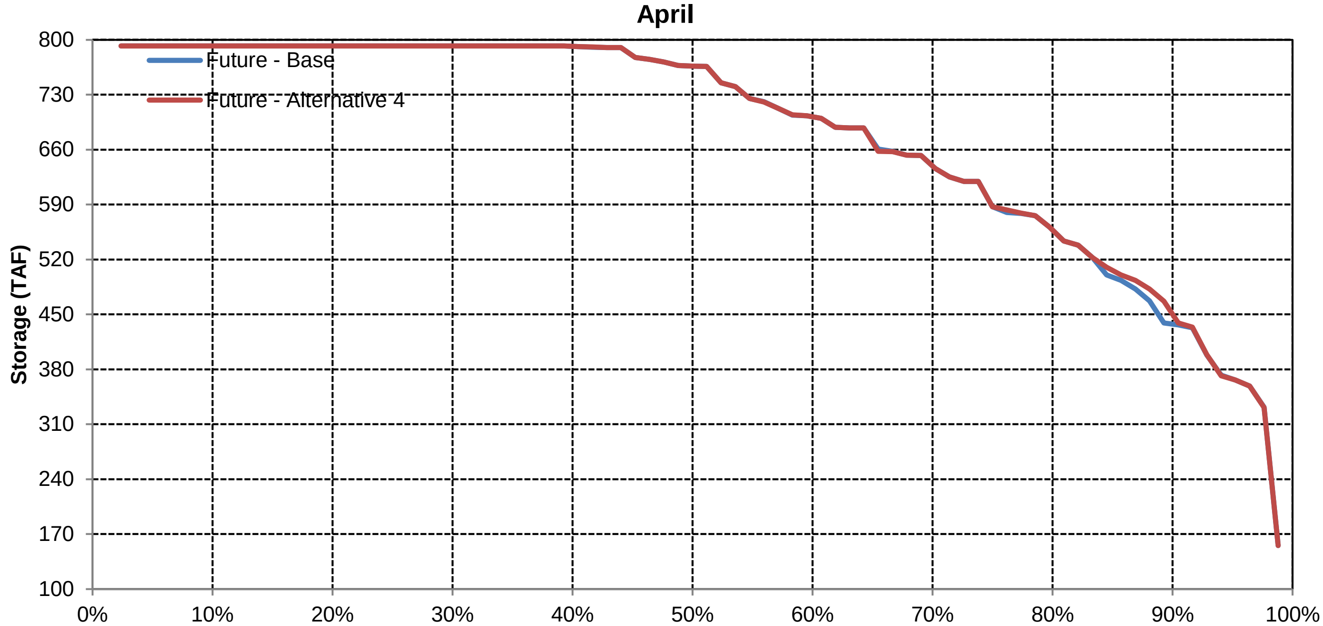


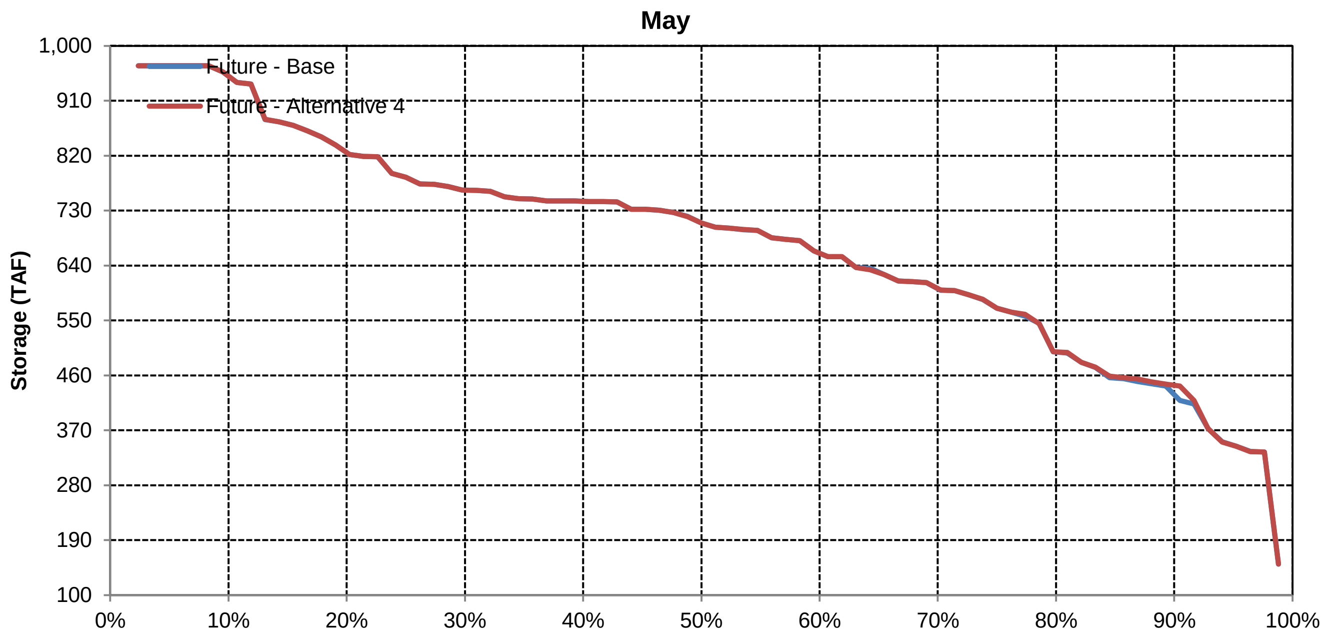
Folsom Reservoir



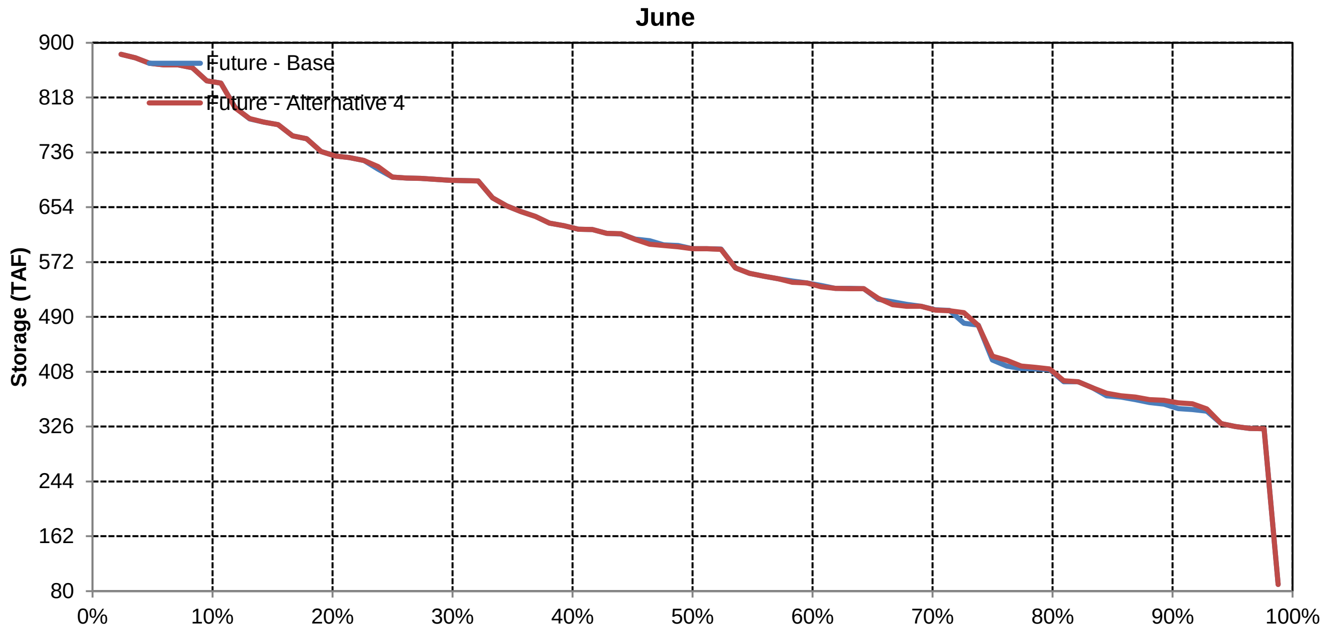


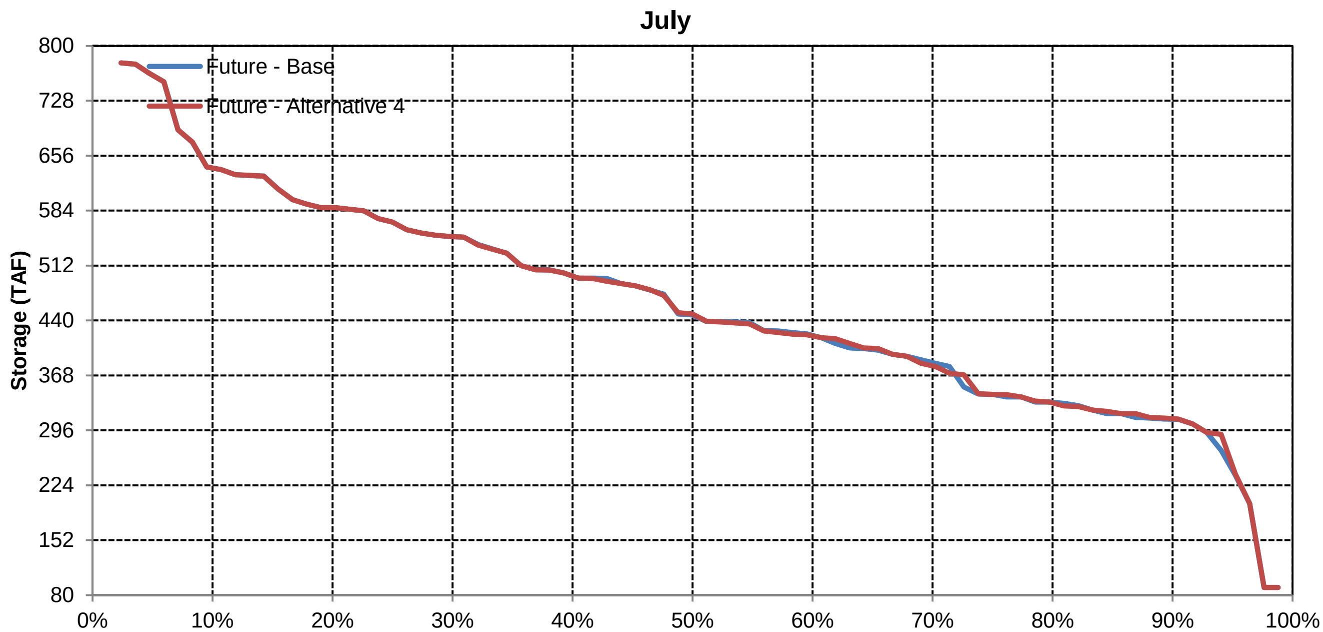
Folsom Reservoir



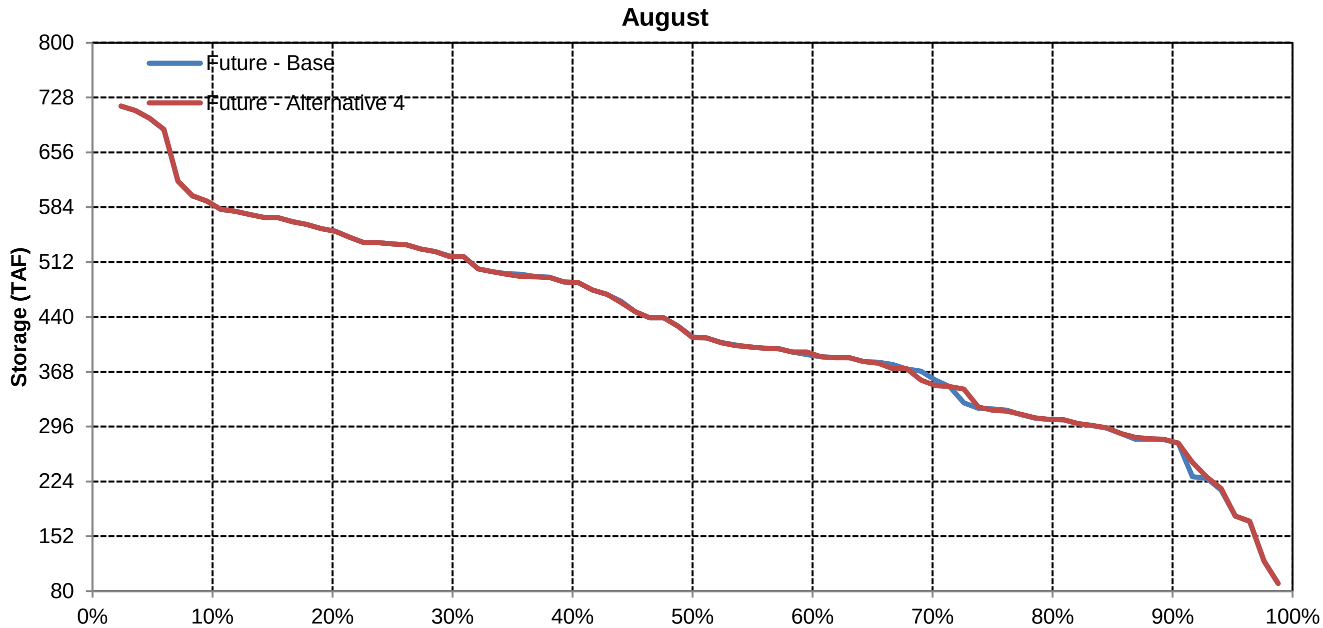


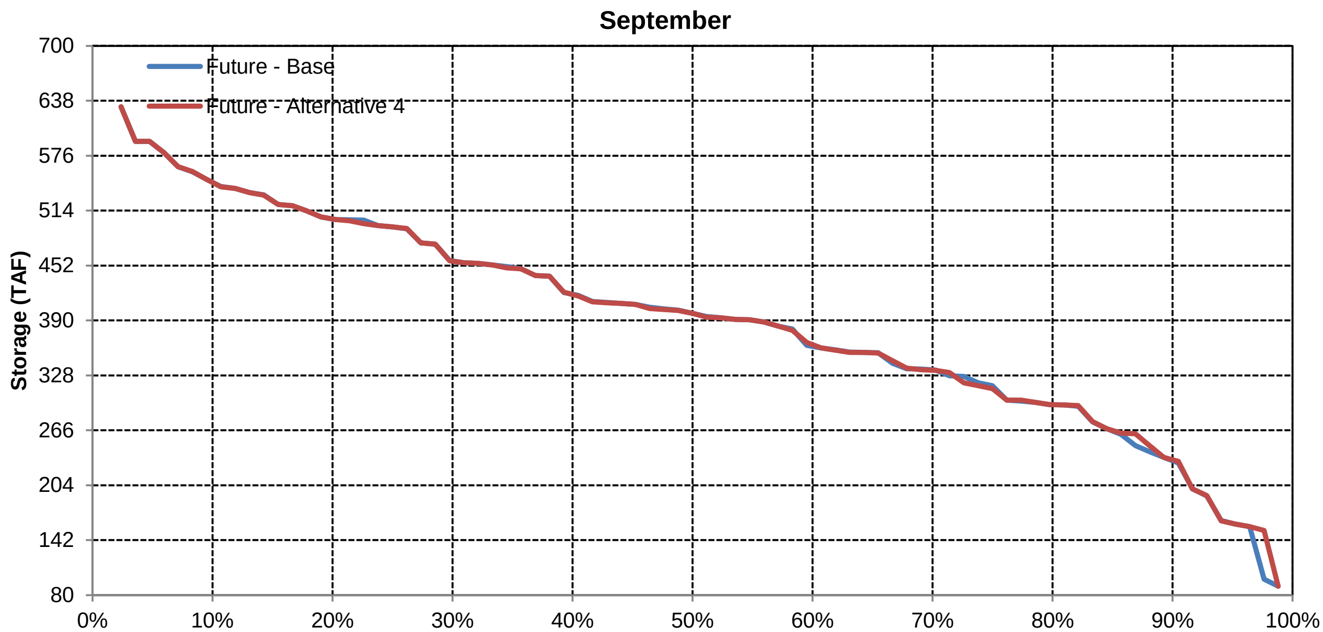
Folsom Reservoir





Folsom Reservoir





Long-Term and Water Year-Type Average of CVP San Luis Reservoir Under Future - Base and Future - Alternative 4

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
						Long-Term						
Full Simulation Period												
Future - Base	218	294	461	615	743	823	788	682	578	413	314	270
Future - Alternative 4	215	291	458	611	740	820	785	679	574	410	311	266
Difference	-2	-3	-3	-3	-3	-3	-3	-3	-4	-3	-3	-3
Percent Difference	-1%	-1%	-1%	-1%	0%	0%	0%	0%	-1%	-1%	-1%	-1%
						Water Year-Types						
Wet												
Future - Base	203	294	487	682	836	918	880	792	678	499	390	304
Future - Alternative 4	201	292	484	680	834	918	879	790	675	497	388	302
Difference	-2	-3	-3	-2	-2	0	-2	-1	-3	-2	-2	-2
Percent Difference	-1%	-1%	-1%	0%	0%	0%	0%	0%	0%	0%	-1%	-1%
Above Normal												
Future - Base	215	289	456	607	754	844	802	668	594	409	303	202
Future - Alternative 4	218	291	456	607	750	844	801	667	594	409	302	202
Difference	3	3	0	0	-5	0	0	0	0	0	0	-1
Percent Difference	1%	1%	0%	0%	-1%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Future - Base	237	280	459	588	713	836	815	706	632	430	313	312
Future - Alternative 4	234	276	456	583	712	835	813	705	631	431	314	312
Difference	-3	-3	-3	-5	-1	-1	-1	-1	0	1	1	0
Percent Difference	-1%	-1%	-1%	-1%	0%	0%	0%	0%	0%	0%	0%	0%
Dry												
Future - Base	211	284	442	576	689	772	742	621	516	359	253	240
Future - Alternative 4	207	280	438	572	689	771	741	620	513	359	253	239
Difference	-4	-4	-3	-4	-1	-1	-1	-1	-2	0	0	0
Percent Difference	-2%	-1%	-1%	-1%	0%	0%	0%	0%	0%	0%	0%	0%
Critical												
Future - Base	242	329	444	571	654	666	621	536	395	302	263	262
Future - Alternative 4	236	321	437	563	641	652	607	521	378	286	245	244
Difference	-6	-8	-7	-8	-13	-14	-14	-15	-17	-16	-18	-18
Percent Difference	-2%	-2%	-2%	-1%	-2%	-2%	-2%	-3%	-4%	-5%	-7%	-7%

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	442	574	764	972	972	972	972	909	861	675	596	517
20%	367	426	607	826	972	972	958	858	767	563	489	434
30%	272	373	528	720	942	972	913	806	702	492	413	347
40%	209	298	476	659	826	967	889	768	647	455	316	289
50%	160	269	425	581	736	883	869	715	609	394	256	223
60%	118	232	369	521	682	833	793	636	539	340	226	161
70%	90	173	327	477	630	718	665	571	458	287	190	132
80%	90	122	284	432	554	658	611	480	404	238	140	91
90%	90	90	246	370	439	573	531	393	274	197	110	90
Long Term												
Full Simulation Period	218	294	461	615	743	823	788	682	578	413	314	270
Water Year Types												
Wet	203	294	487	682	836	918	880	792	678	499	390	304
Above Normal	215	289	456	607	754	844	802	668	594	409	303	202
Below Normal	237	280	459	588	713	836	815	706	632	430	313	312
Dry	211	284	442	576	689	772	742	621	516	359	253	240
Critical	242	329	444	571	654	666	621	536	395	302	263	262

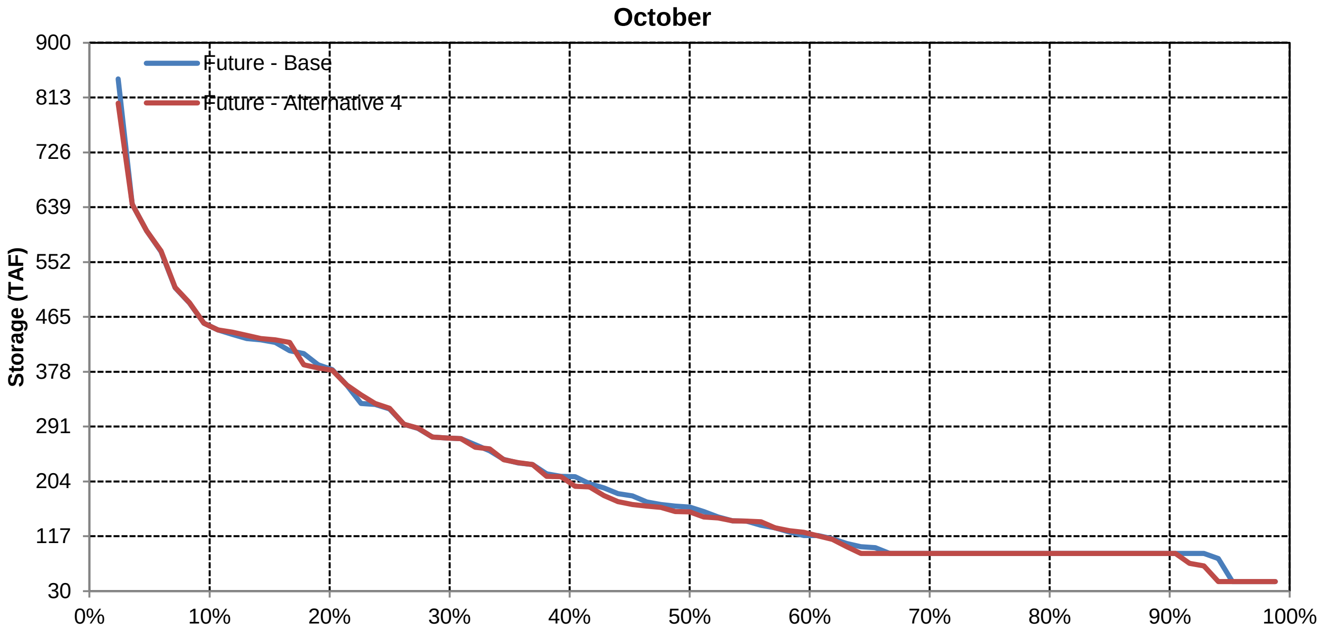
Future - Alternative 4

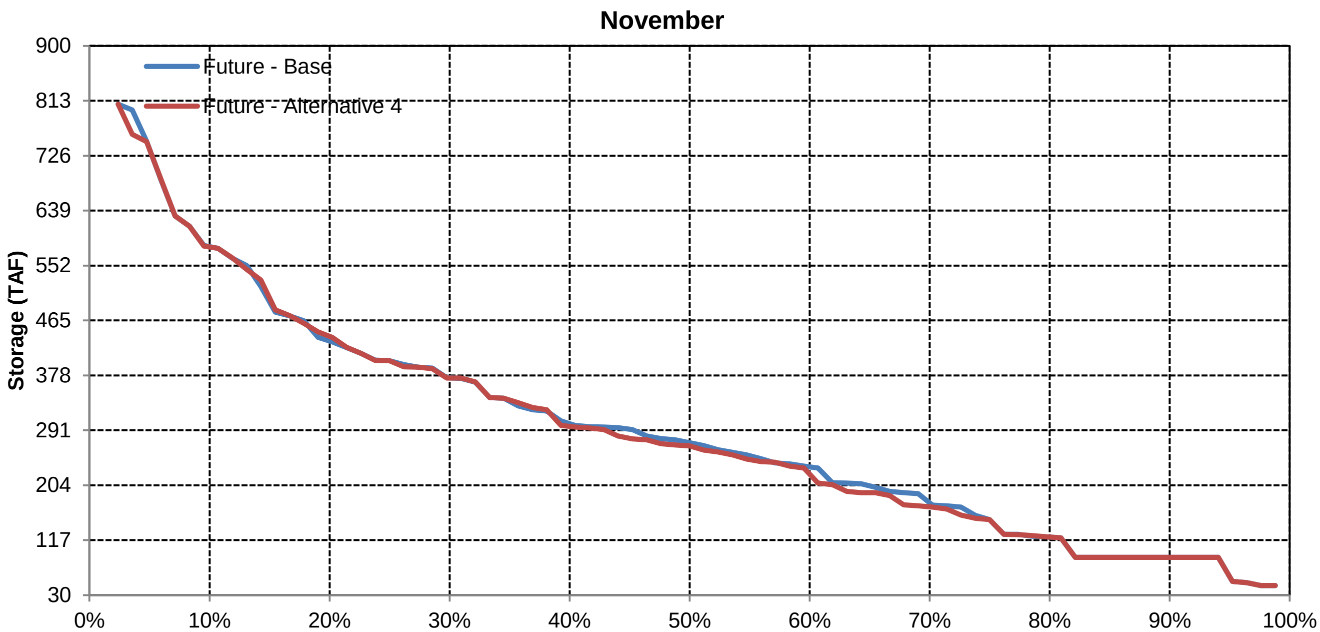
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	443	575	764	972	972	972	972	909	860	675	596	516
20%	367	429	589	827	972	972	958	858	767	563	490	433
30%	272	374	532	720	941	972	913	806	702	492	393	347
40%	196	296	476	649	825	969	888	767	644	454	318	289
50%	152	263	423	581	719	881	866	713	610	394	256	216
60%	119	212	367	518	682	833	797	637	537	340	225	156
70%	90	169	327	477	616	717	661	565	445	280	188	129
80%	90	122	277	430	548	658	605	476	391	229	137	90
90%	90	90	248	363	439	557	515	389	273	196	98	90
Long Term												
Full Simulation Period	215	291	458	611	740	820	785	679	574	410	311	266
Water Year Types												
Wet	201	292	484	680	834	918	879	790	675	497	388	302
Above Normal	218	291	456	607	750	844	801	667	594	409	302	202
Below Normal	234	276	456	583	712	835	813	705	631	431	314	312
Dry	207	280	438	572	689	771	741	620	513	359	253	239
Critical	236	321	437	563	641	652	607	521	378	286	245	244

Future - Alternative 4 Minus Future - Base

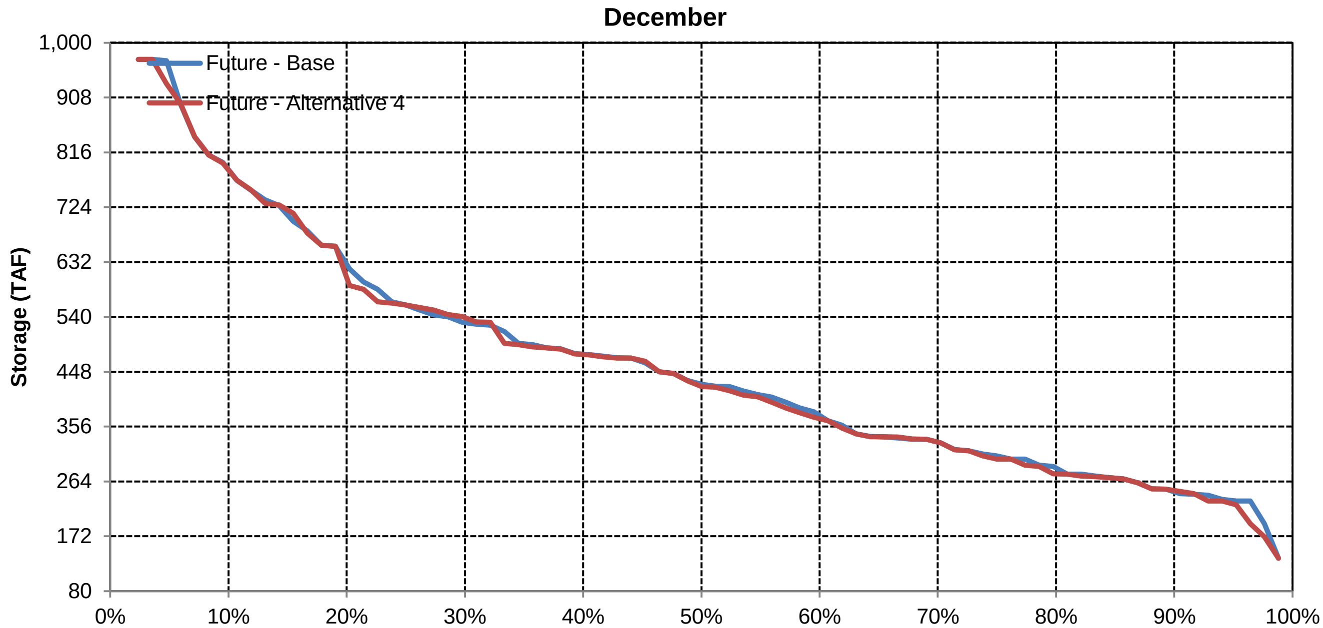
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	1	0	0	0	0	0	0	0	0	0	0	0
20%	0	3	-19	0	0	0	0	0	0	0	0	-2
30%	0	0	4	0	0	0	0	0	0	0	-20	0
40%	-14	-2	-1	-10	0	1	-1	0	-3	-1	2	1
50%	-8	-6	-3	0	-18	-2	-3	-2	2	0	0	-7
60%	1	-20	-2	-2	-1	0	4	1	-2	1	-1	-6
70%	0	-4	0	0	-14	-1	-4	-6	-13	-8	-2	-4
80%	0	0	-7	-3	-7	0	-6	-3	-13	-9	-3	-1
90%	0	0	3	-8	0	-16	-16	-4	-1	0	-11	0
Long Term												
Full Simulation Period	-2	-3	-3	-3	-3	-3	-3	-3	-4	-3	-3	-3
Water Year Types												
Wet	-2	-3	-3	-2	-2	0	-2	-1	-3	-2	-2	-2
Above Normal	3	3	0	0	-5	0	0	0	0	0	0	-1
Below Normal	-3	-3	-3	-5	-1	-1	-1	-1	0	1	1	0
Dry	-4	-4	-3	-4	-1	-1	-1	-1	-2	0	0	0
Critical	-6	-8	-7	-8	-13	-14	-14	-15	-17	-16	-18	-18

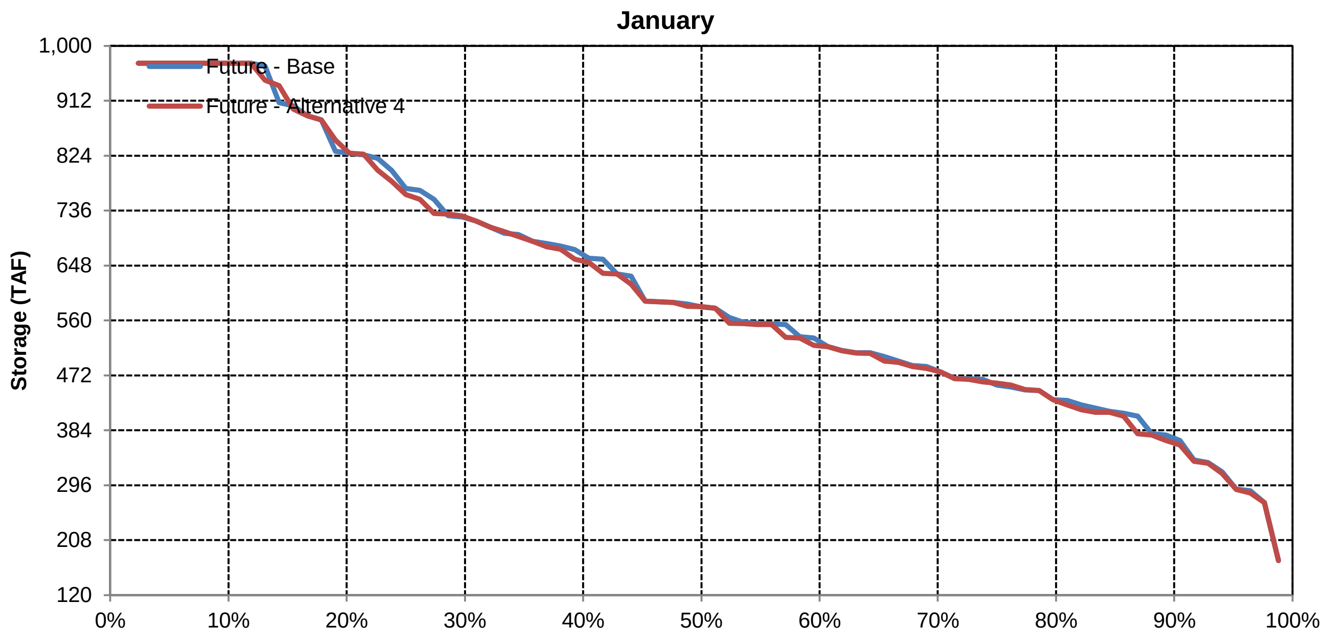
CVP San Luis Reservoir





CVP San Luis Reservoir





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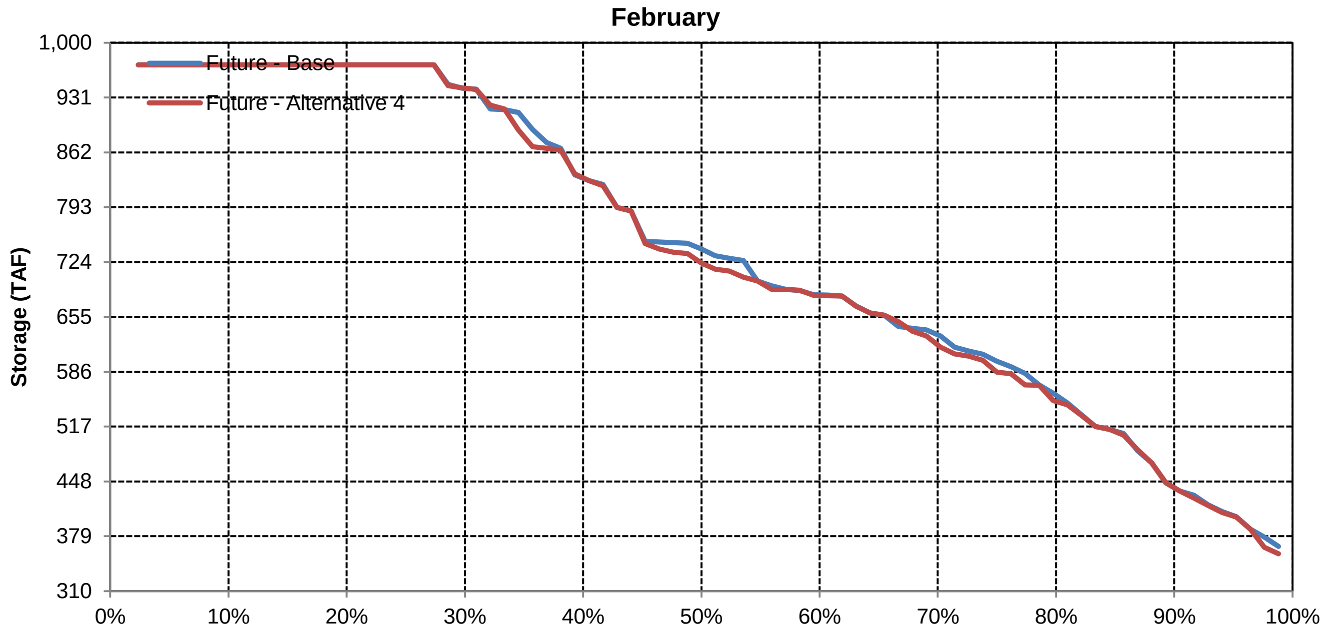
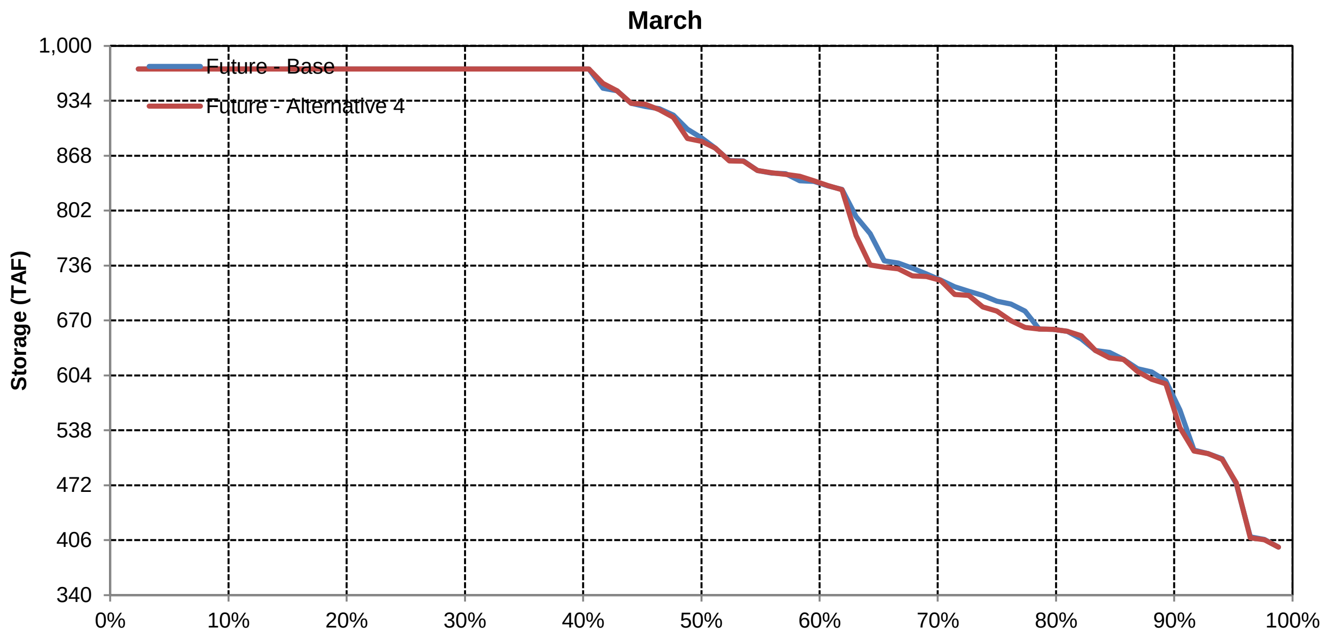
CVP San Luis Reservoir





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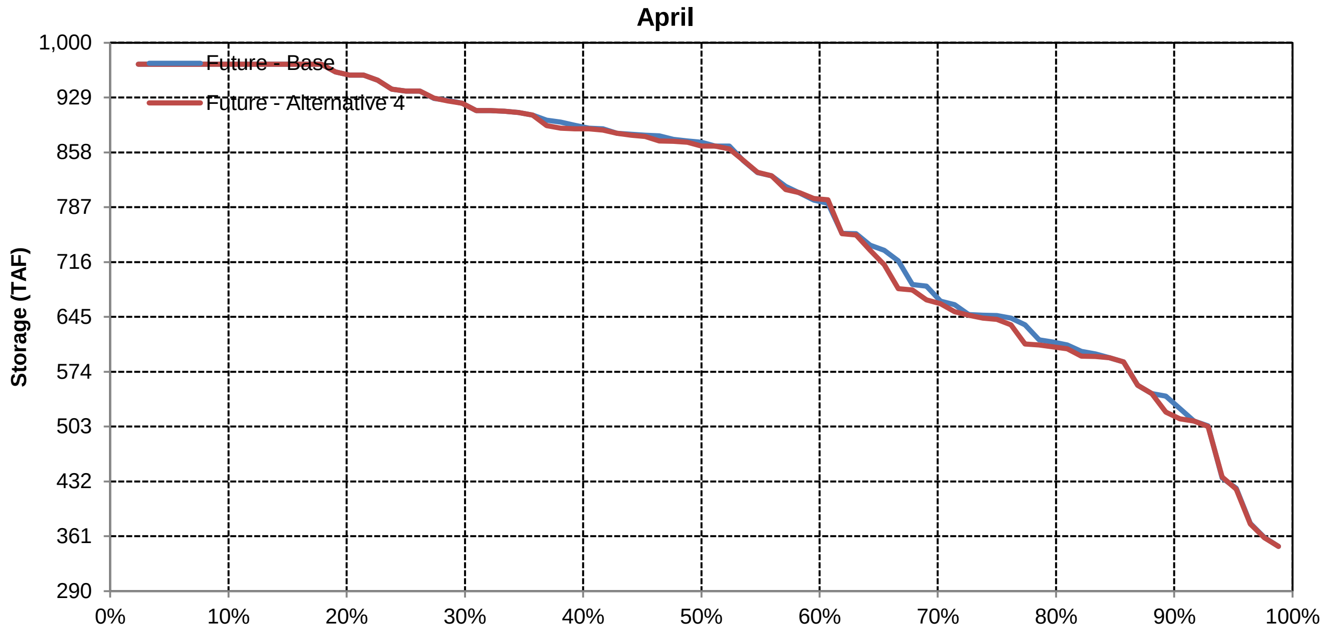

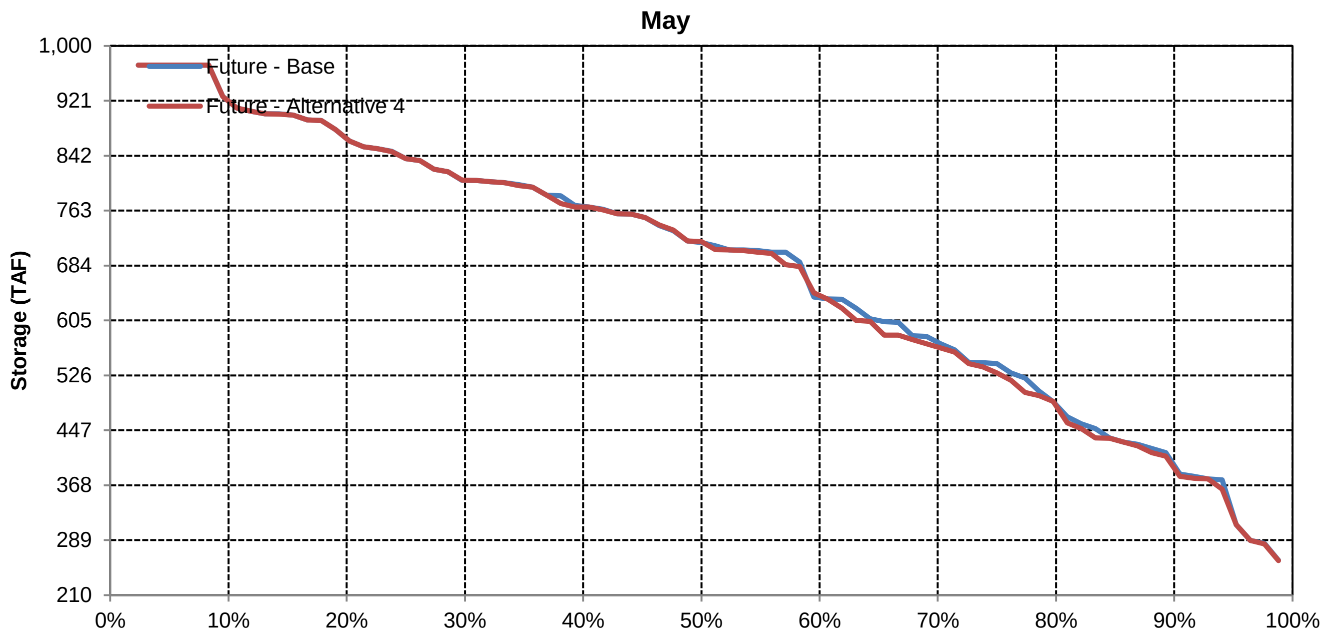

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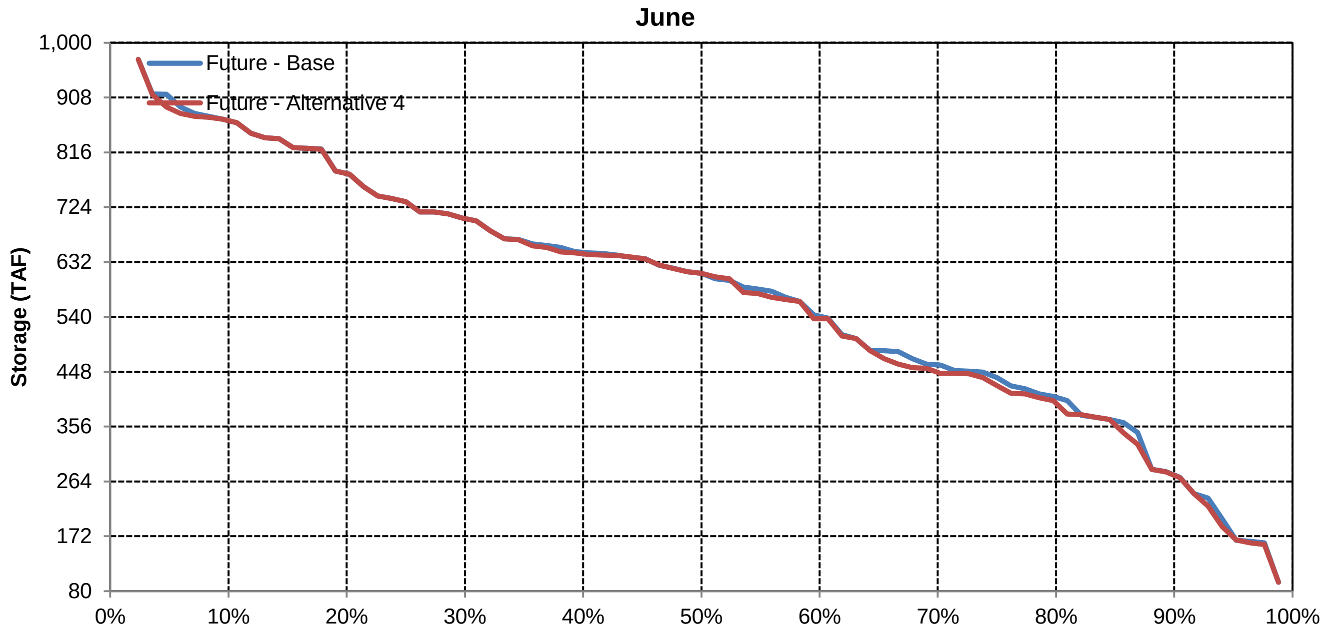
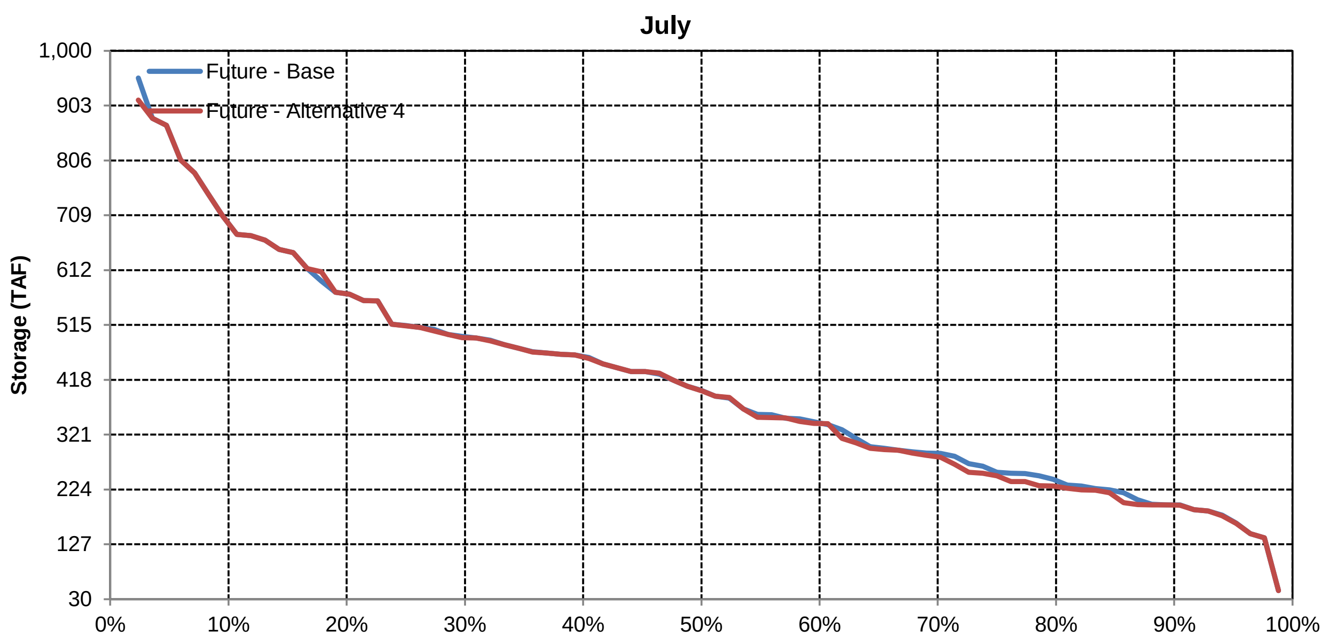
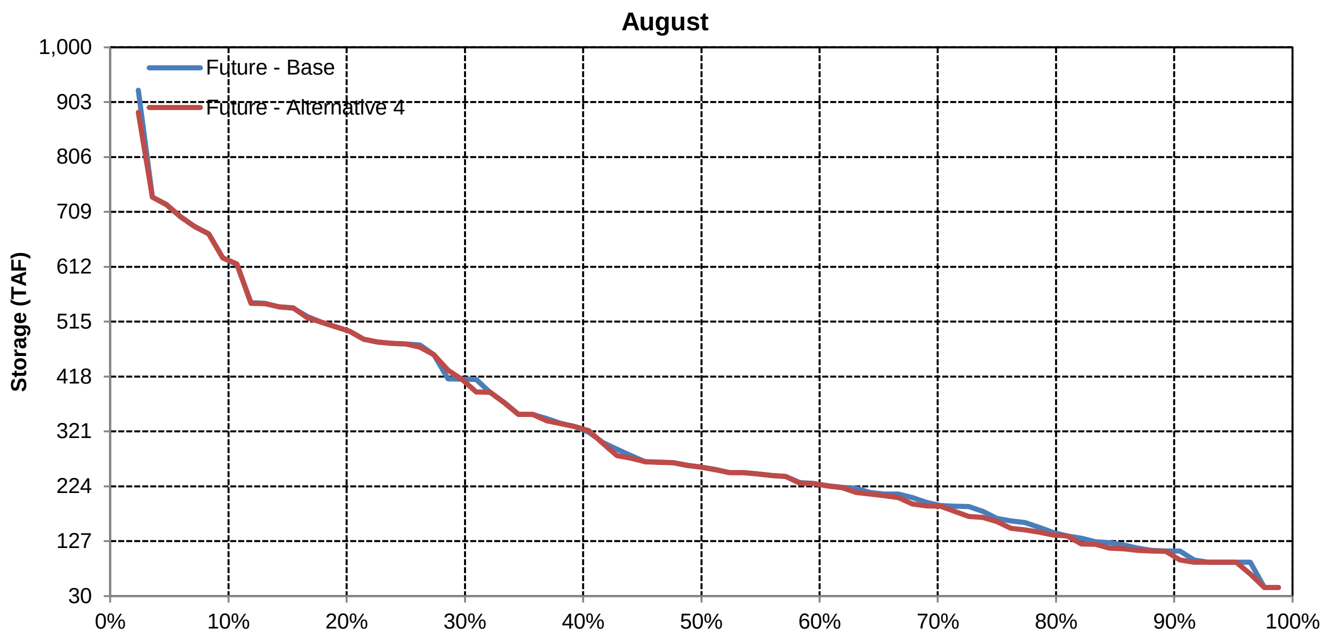
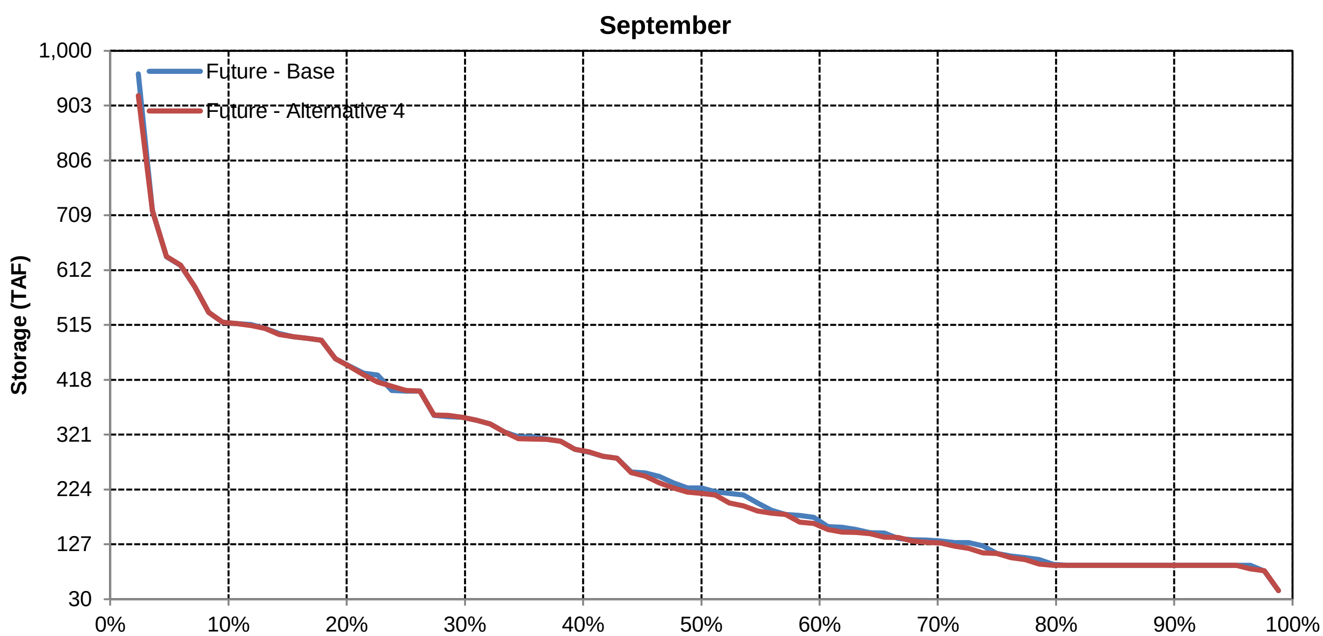




CVP San Luis Reservoir





Long-Term and Water Year-Type Average of SWP San Luis Reservoir Under Future - Base and Future - Alternative 4

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
						Long-Term						
Full Simulation Period												
Future - Base	181	218	351	573	767	885	811	640	506	467	355	257
Future - Alternative 4	180	218	350	571	764	883	809	639	506	467	355	257
Difference	0	0	-1	-3	-2	-2	-2	-2	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
						Water Year-Types						
Wet												
Future - Base	203	282	505	823	1,011	1,058	951	746	542	550	458	320
Future - Alternative 4	202	282	504	819	1,010	1,058	950	746	543	551	458	319
Difference	-1	0	-1	-3	-1	0	-1	-1	1	1	0	-1
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal												
Future - Base	154	177	288	602	890	1,035	904	639	536	533	415	285
Future - Alternative 4	151	173	277	593	887	1,032	902	637	534	531	413	284
Difference	-3	-3	-11	-9	-4	-2	-2	-2	-2	-2	-2	-1
Percent Difference	-2%	-2%	-4%	-2%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Future - Base	158	169	276	398	650	887	815	629	522	492	321	226
Future - Alternative 4	159	169	277	397	647	885	813	624	520	490	320	226
Difference	0	0	1	-1	-3	-2	-2	-5	-2	-2	-1	-1
Percent Difference	0%	0%	0%	0%	0%	0%	0%	-1%	0%	0%	0%	0%
Dry												
Future - Base	169	206	304	453	620	767	724	597	504	425	286	210
Future - Alternative 4	169	206	304	451	615	762	720	595	506	425	287	210
Difference	0	0	0	-2	-5	-5	-4	-2	2	1	1	0
Percent Difference	0%	0%	0%	0%	-1%	-1%	-1%	0%	0%	0%	0%	0%
Critical												
Future - Base	203	190	237	399	497	565	563	496	384	272	225	207
Future - Alternative 4	204	193	239	400	498	565	563	496	381	272	229	210
Difference	1	3	1	1	1	0	0	0	-3	0	3	3
Percent Difference	0%	2%	0%	0%	0%	0%	0%	0%	-1%	0%	1%	2%

SWP San Luis Reservoir

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	315	489	775	1,067	1,067	1,067	1,021	828	699	642	503	311
20%	247	327	590	954	1,067	1,067	959	755	649	601	410	291
30%	211	266	394	761	1,067	1,067	945	701	621	551	383	268
40%	165	235	339	664	984	1,067	921	680	601	539	371	243
50%	145	178	282	538	818	1,067	897	643	567	505	355	237
60%	128	94	223	455	664	944	869	621	492	462	333	225
70%	114	55	183	369	597	745	733	586	381	341	315	210
80%	90	55	116	243	482	636	621	505	332	279	229	196
90%	55	55	59	155	322	485	503	404	248	235	165	156
Long Term												
Full Simulation Period	181	218	351	573	767	885	811	640	506	467	355	257
Water Year Types												
Wet	203	282	505	823	1,011	1,058	951	746	542	550	458	320
Above Normal	154	177	288	602	890	1,035	904	639	536	533	415	285
Below Normal	158	169	276	398	650	887	815	629	522	492	321	226
Dry	169	206	304	453	620	767	724	597	504	425	286	210
Critical	203	190	237	399	497	565	563	496	384	272	225	207

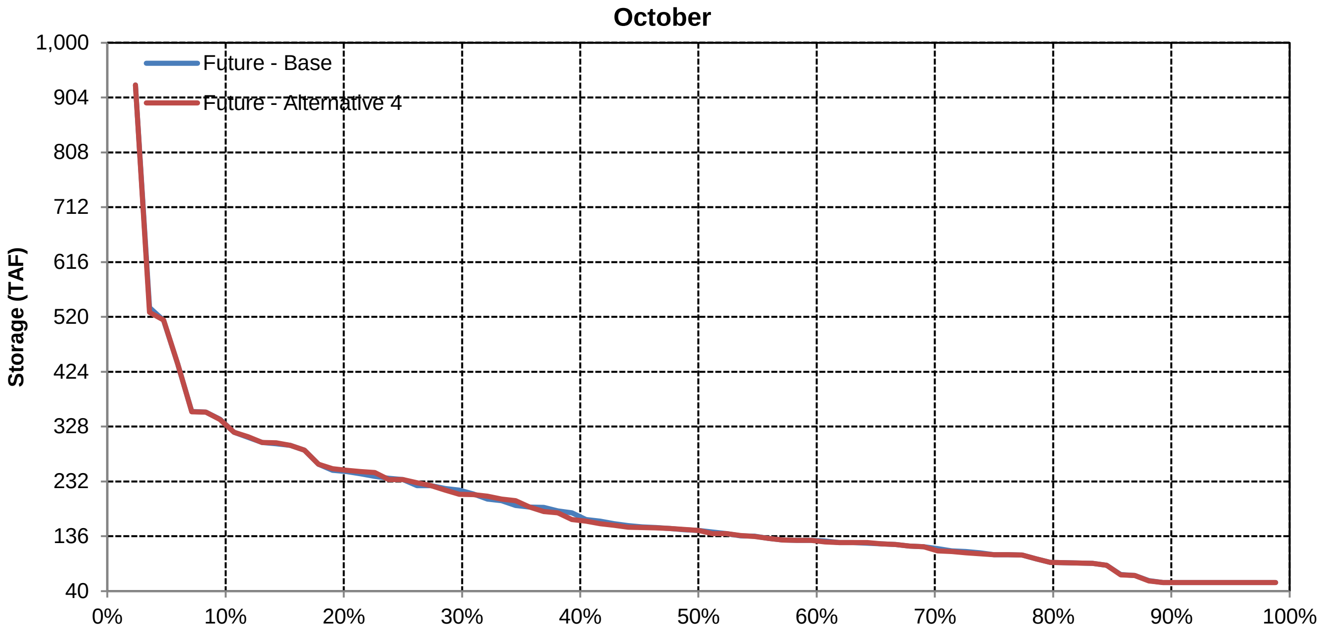
Future - Alternative 4

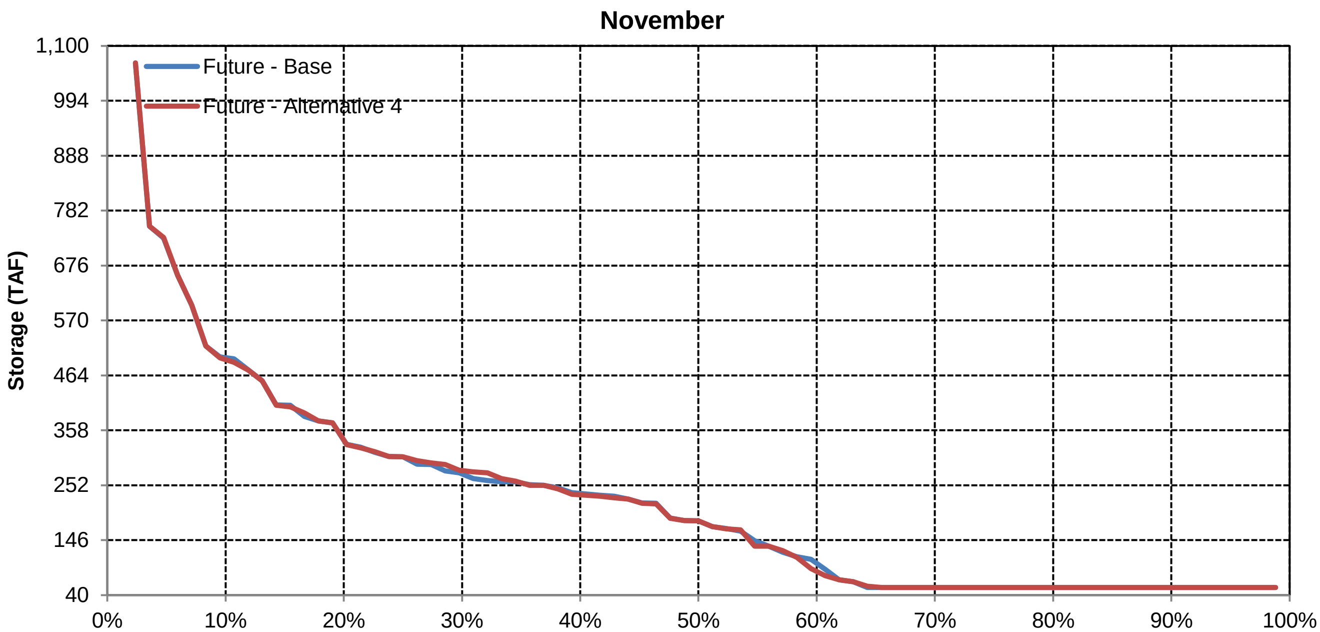
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	316	484	780	1,067	1,067	1,067	1,019	829	699	638	505	311
20%	250	326	588	955	1,067	1,067	957	755	647	602	410	291
30%	209	278	394	751	1,067	1,067	945	700	621	567	383	269
40%	161	232	333	641	985	1,067	914	678	598	539	371	249
50%	143	178	282	527	808	1,067	895	643	567	504	356	237
60%	127	80	222	454	674	945	867	620	499	462	342	225
70%	110	55	173	345	596	743	730	592	381	343	316	210
80%	90	55	116	240	470	642	614	490	326	278	226	196
90%	55	55	59	154	316	485	502	407	248	235	167	153
Long Term												
Full Simulation Period	180	218	350	571	764	883	809	639	506	467	355	257
Water Year Types												
Wet	202	282	504	819	1,010	1,058	950	746	543	551	458	319
Above Normal	151	173	277	593	887	1,032	902	637	534	531	413	284
Below Normal	159	169	277	397	647	885	813	624	520	490	320	226
Dry	169	206	304	451	615	762	720	595	506	425	287	210
Critical	204	193	239	400	498	565	563	496	381	272	229	210

Future - Alternative 4 Minus Future - Base

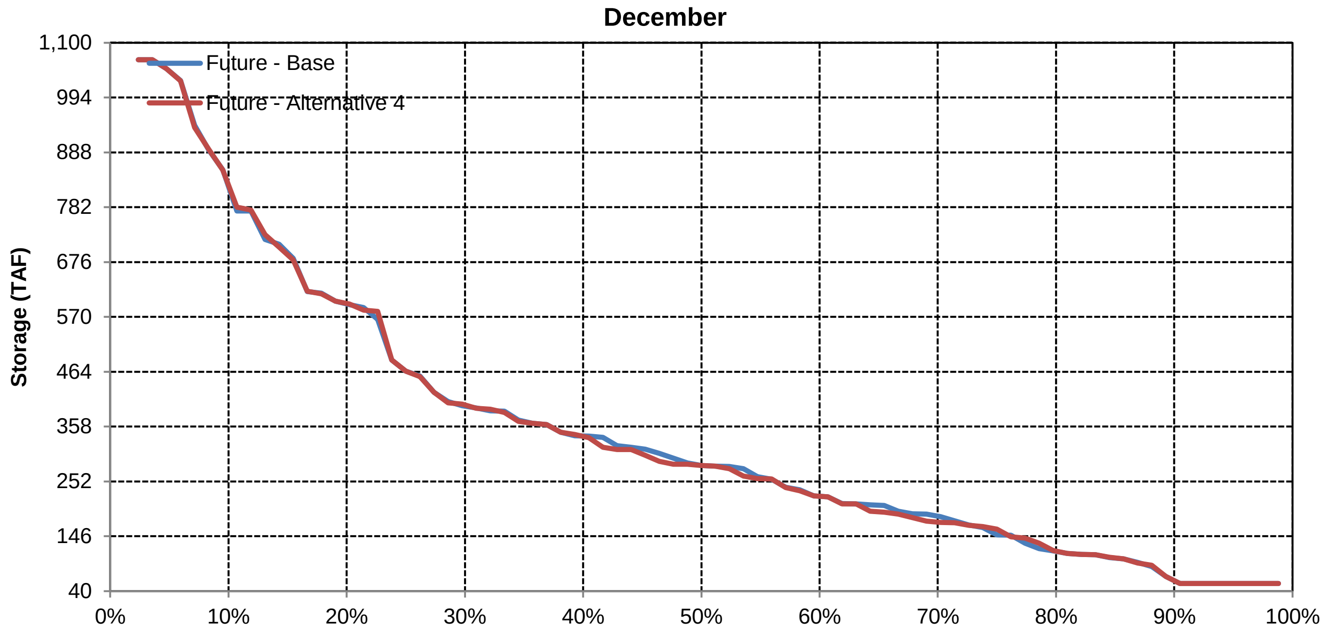
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	0	-5	6	0	0	0	-2	1	0	-4	3	0
20%	3	-1	-3	1	0	0	-2	0	-1	1	1	0
30%	-2	12	0	-10	0	0	0	0	0	16	0	0
40%	-3	-2	-6	-23	1	0	-7	-2	-3	0	0	6
50%	-1	0	0	-11	-10	0	-2	0	-1	-1	1	0
60%	-2	-14	0	-1	10	1	-2	-1	7	0	9	0
70%	-4	0	-10	-23	-1	-2	-3	6	0	1	0	0
80%	0	0	0	-2	-12	6	-7	-16	-5	-1	-3	0
90%	0	0	0	-1	-6	-1	-1	3	0	0	2	-3
Long Term												
Full Simulation Period	0	0	-1	-3	-2	-2	-2	-2	0	0	0	0
Water Year Types												
Wet	-1	0	-1	-3	-1	0	-1	-1	1	1	0	-1
Above Normal	-3	-3	-11	-9	-4	-2	-2	-2	-2	-2	-2	-1
Below Normal	0	0	1	-1	-3	-2	-2	-5	-2	-2	-1	-1
Dry	0	0	0	-2	-5	-5	-4	-2	2	1	1	0
Critical	1	3	1	1	1	0	0	0	-3	0	3	3

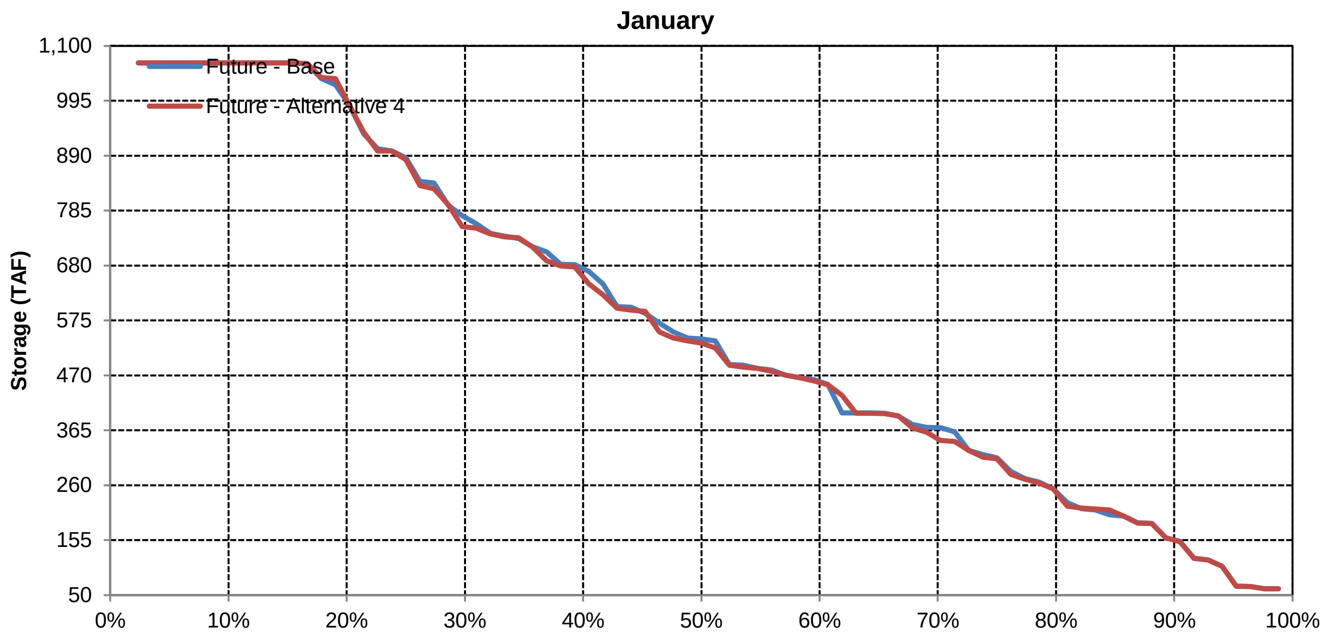
SWP San Luis Reservoir





SWP San Luis Reservoir





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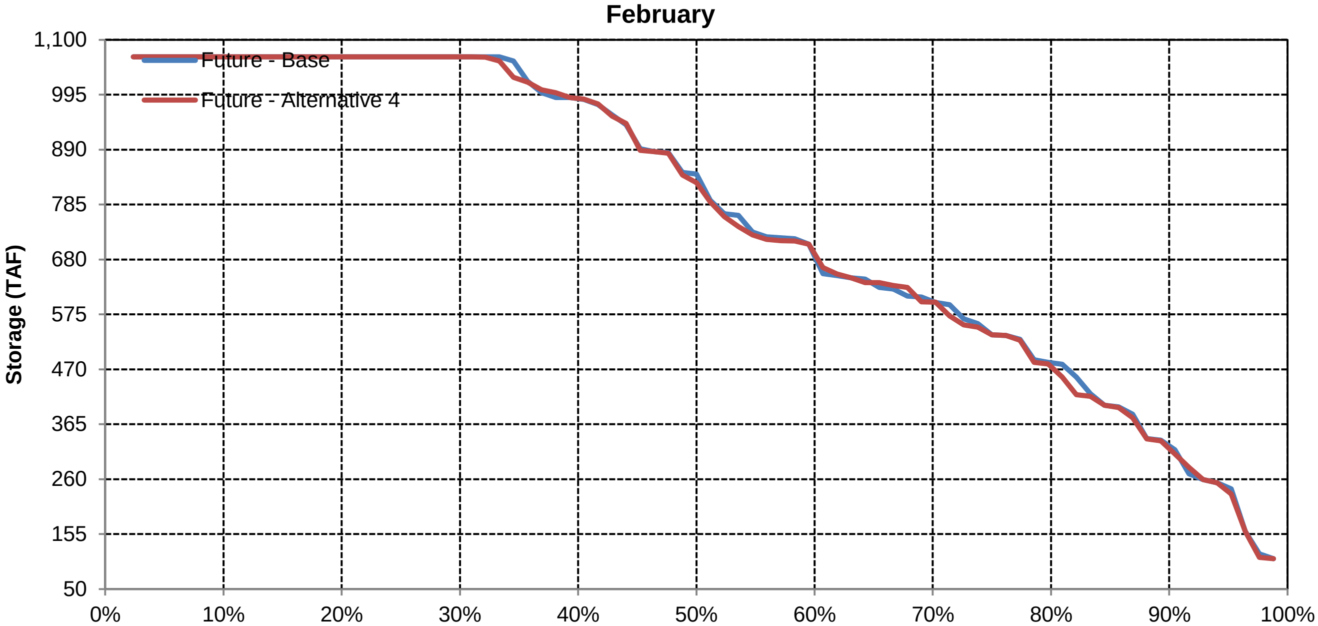

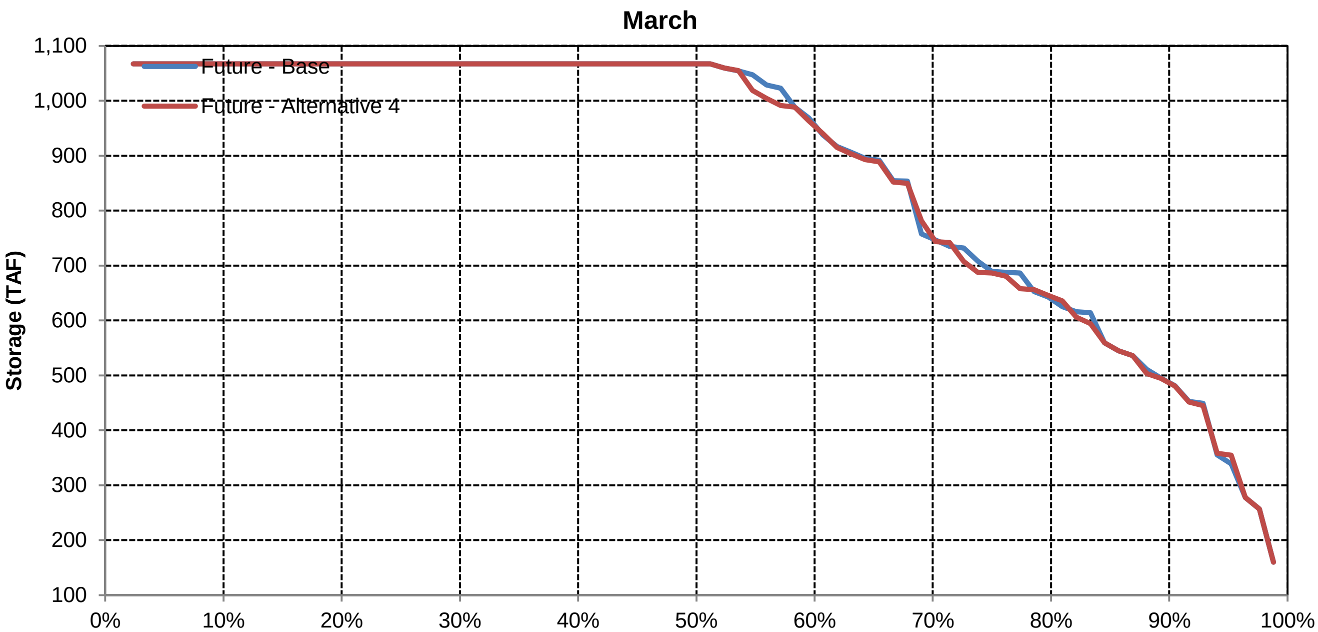

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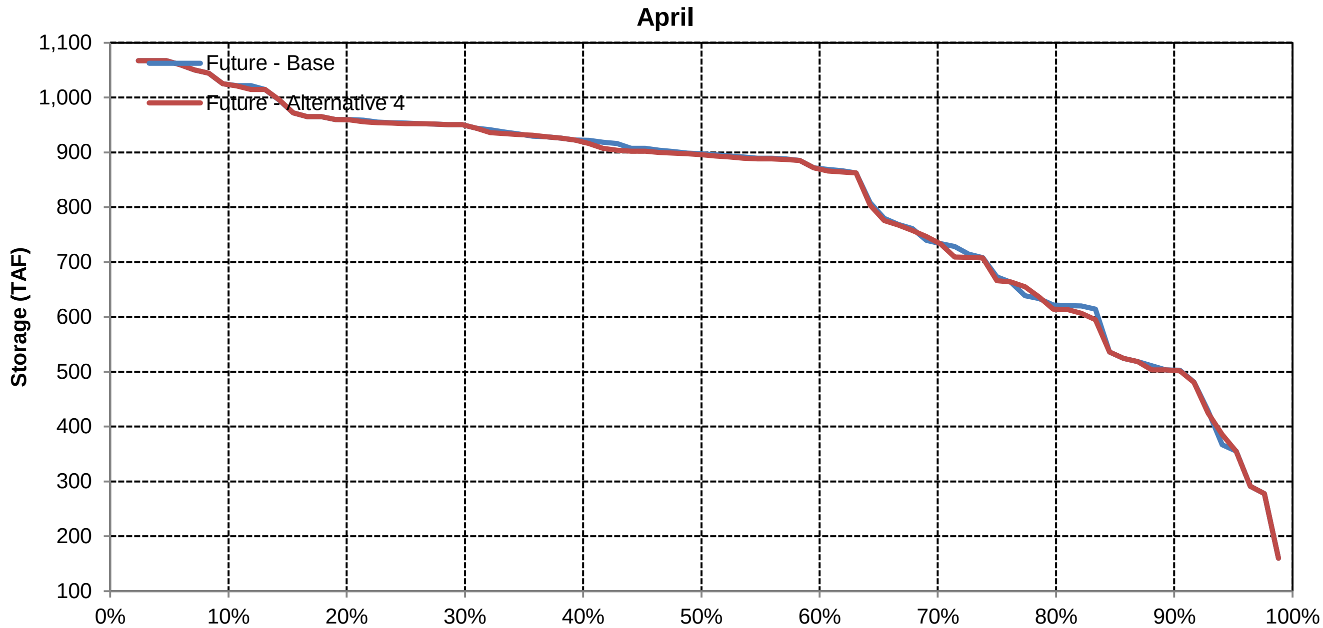

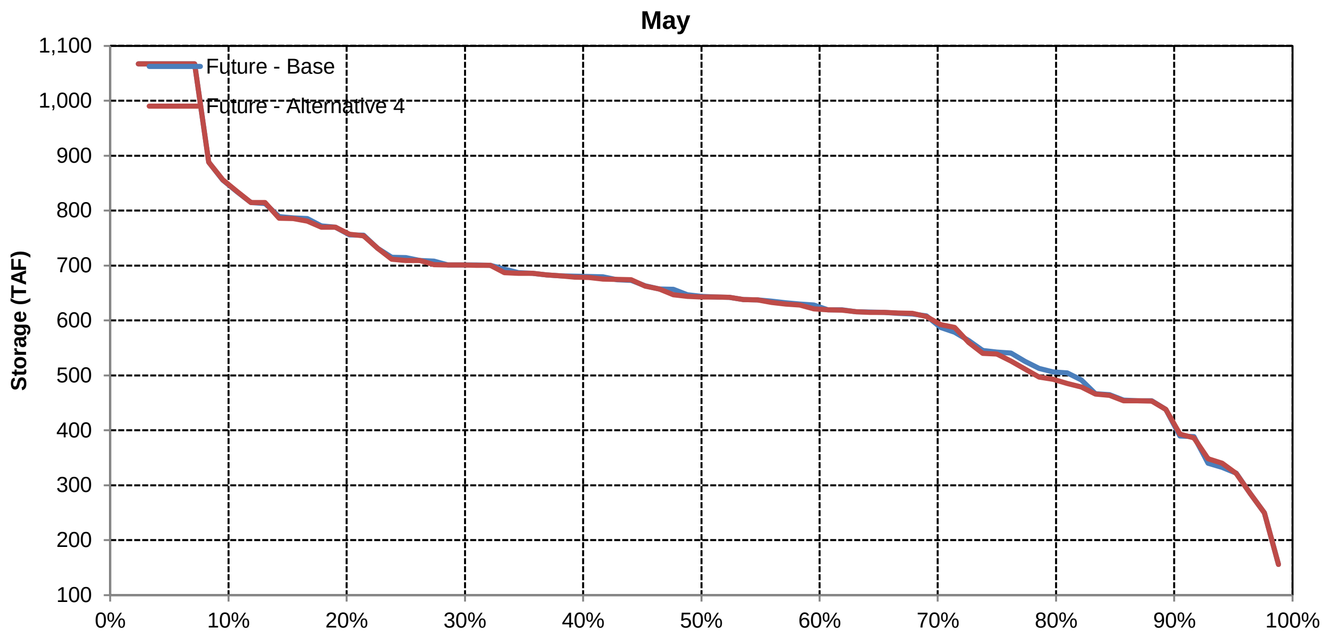

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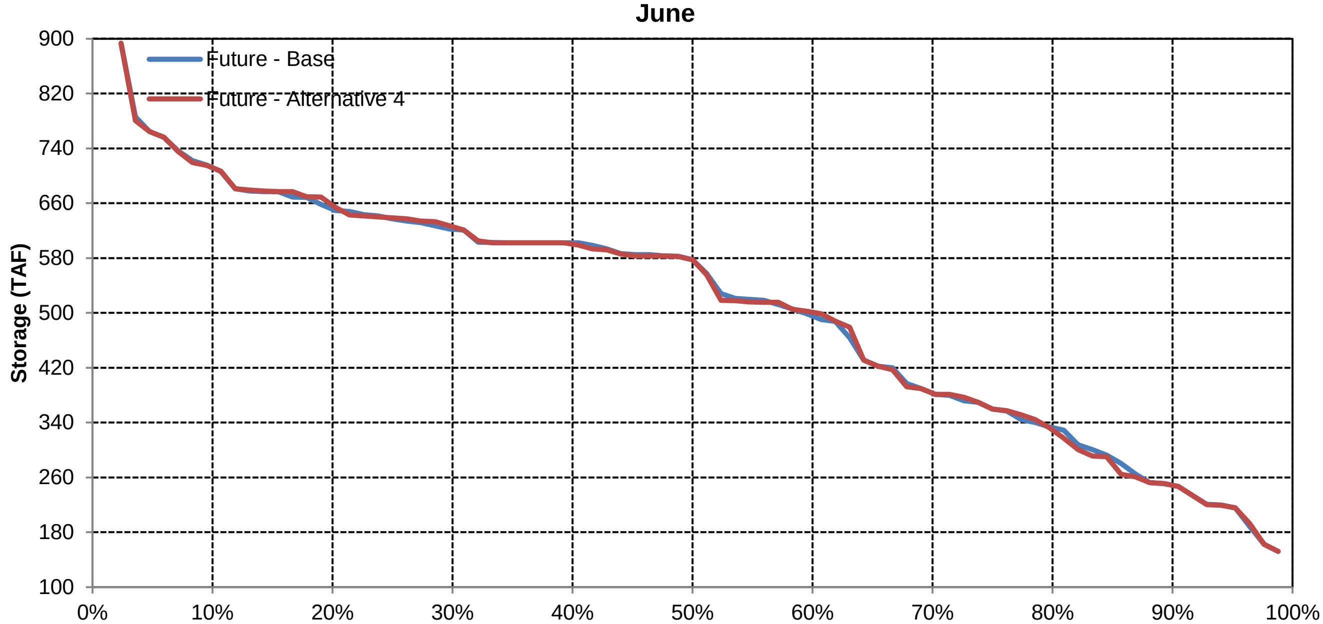
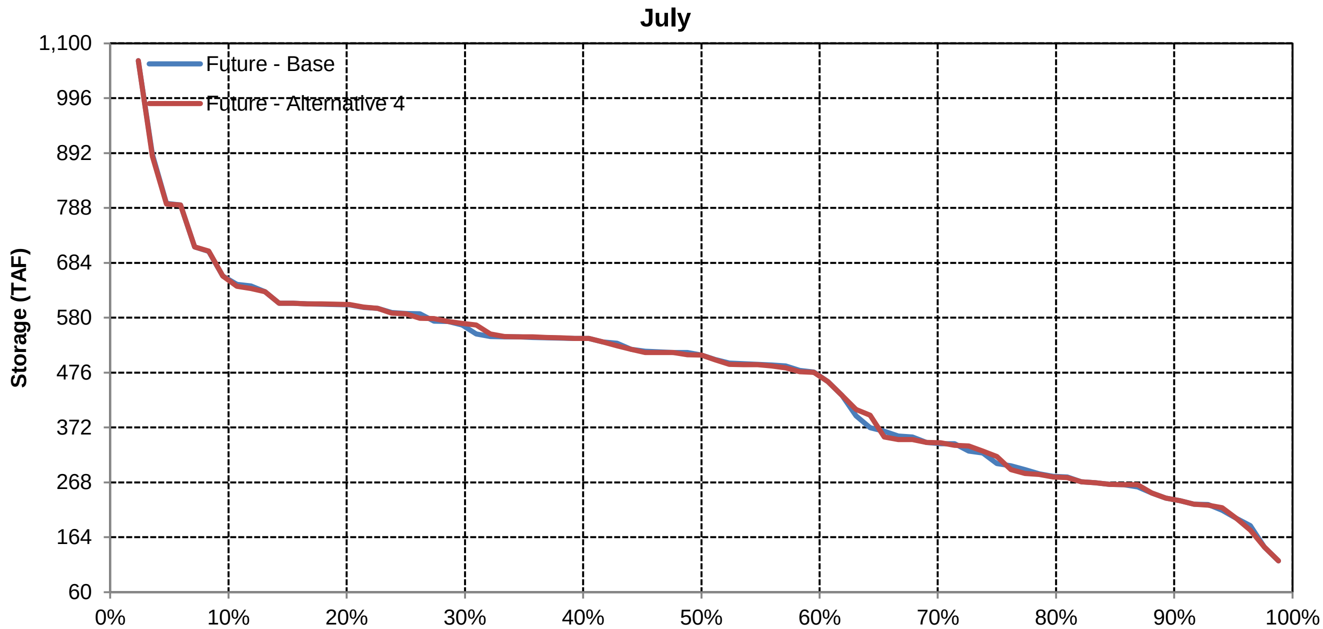
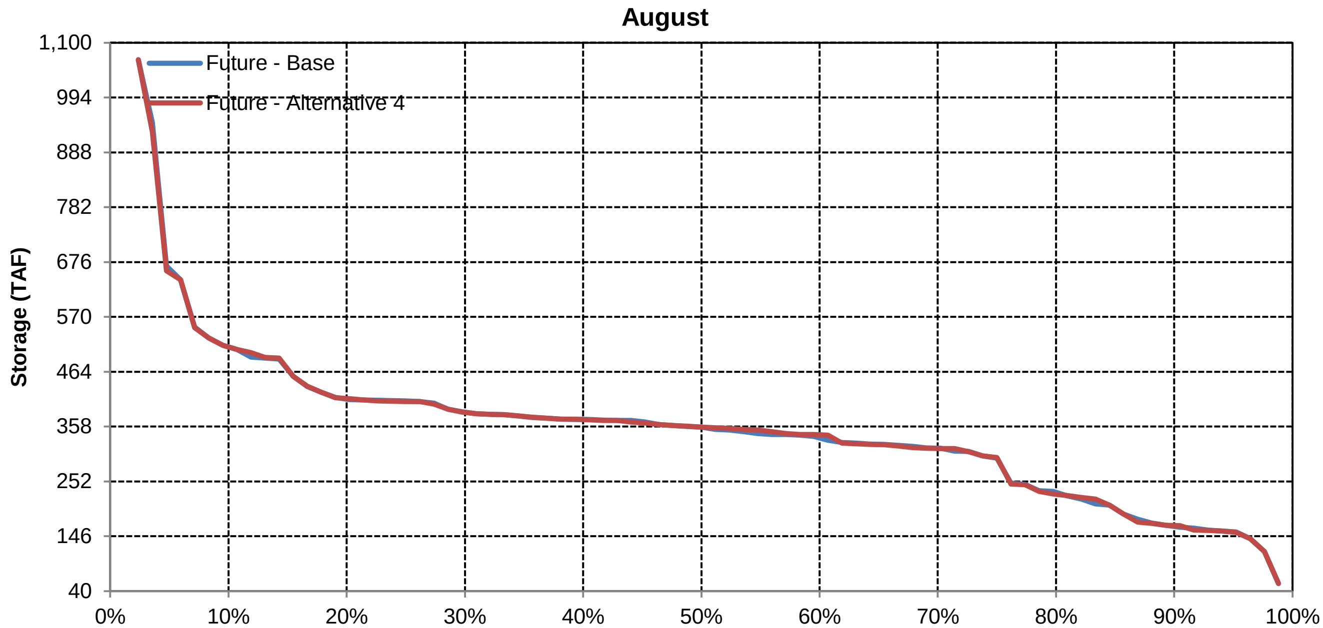
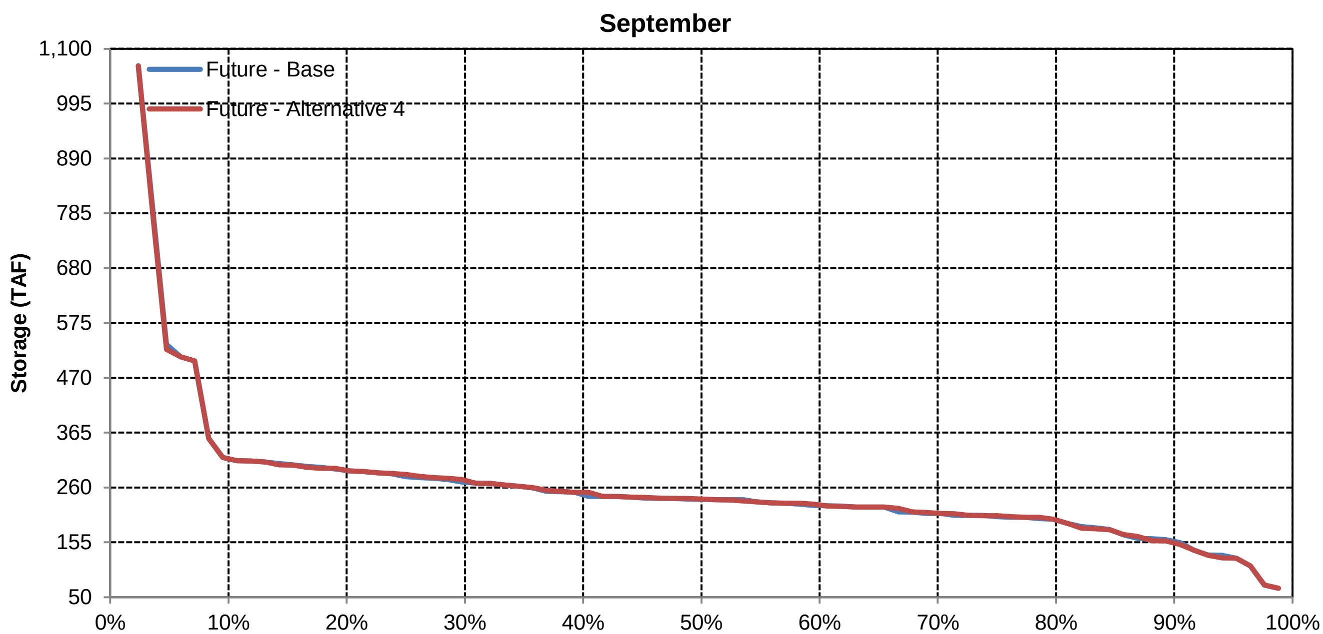




SWP San Luis Reservoir





Long-Term and Water Year-Type Average of Delta Outflow Under Future - Base and Future - Alternative 4

Analysis Period	October	November	December	January	February	March	April	May	June	July	August	September	Total (TAF)
						Average Flow (cfs)							
							Long-Term						
Full Simulation Period													
Future - Base	8,408	10,099	24,888	54,896	70,049	52,500	29,061	14,179	8,605	7,157	4,274	10,294	17,604
Future - Alternative 4	8,448	10,098	24,881	54,918	70,116	52,494	29,067	14,175	8,598	7,157	4,276	10,293	17,611
Difference	39	-1	-8	22	67	-6	6	-4	-7	0	2	0	6
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
							Water Year-Types						
Wet													
Future - Base	9,541	15,088	53,646	115,984	131,904	102,001	53,280	21,075	11,285	9,709	4,000	21,635	32,826
Future - Alternative 4	9,559	15,082	53,673	116,016	131,949	101,996	53,310	21,071	11,286	9,709	4,000	21,635	32,834
Difference	18	-6	26	32	45	-5	29	-4	1	0	0	0	8
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal													
Future - Base	9,036	8,854	16,293	59,685	102,404	57,212	27,004	15,829	8,580	8,899	4,000	13,224	19,718
Future - Alternative 4	9,167	8,854	16,258	59,644	102,601	57,126	27,006	15,829	8,578	8,900	4,000	13,224	19,727
Difference	131	0	-35	-41	197	-86	2	0	-1	1	0	0	9
Percent Difference	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal													
Future - Base	8,461	9,070	13,804	28,415	31,537	29,246	21,994	12,973	7,605	6,655	4,139	3,000	10,623
Future - Alternative 4	8,531	9,080	13,798	28,460	31,524	29,263	21,994	12,959	7,607	6,651	4,140	3,000	10,629
Difference	70	9	-6	45	-13	17	0	-13	2	-3	2	0	7
Percent Difference	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry													
Future - Base	7,611	7,891	10,135	15,901	29,451	24,322	15,139	9,861	7,158	5,000	4,785	3,000	8,395
Future - Alternative 4	7,617	7,888	10,146	15,937	29,506	24,345	15,132	9,859	7,160	5,000	4,785	3,000	8,402
Difference	6	-3	11	36	55	23	-7	-1	2	0	0	0	7
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical													
Future - Base	6,653	5,227	7,054	11,831	15,756	13,084	9,330	6,228	6,318	4,170	4,415	3,092	5,600
Future - Alternative 4	6,677	5,227	6,966	11,842	15,860	13,078	9,319	6,230	6,262	4,171	4,427	3,091	5,600
Difference	24	0	-88	11	104	-6	-11	1	-55	1	12	-1	-1
Percent Difference	0%	0%	-1%	0%	1%	0%	0%	0%	-1%	0%	0%	0%	0%

Delta Outflow

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	10,938	15,863	79,058	151,208	180,010	107,880	70,644	27,159	11,545	10,516	4,885	21,875
20%	10,625	14,764	33,428	92,252	125,923	89,027	38,581	18,353	10,462	9,612	4,709	21,563
30%	10,313	11,693	17,489	56,706	77,981	62,254	28,814	14,204	8,749	9,048	4,349	20,938
40%	7,625	11,004	14,366	33,893	58,622	40,886	20,594	12,808	8,409	8,000	4,217	13,062
50%	7,160	8,104	11,802	26,142	43,165	27,471	17,579	11,253	7,899	6,666	4,000	3,000
60%	6,994	4,500	8,257	19,228	24,986	20,728	15,558	10,174	7,418	6,500	4,000	3,000
70%	6,613	4,500	5,323	14,908	20,687	17,661	13,640	9,584	7,100	5,000	4,000	3,000
80%	6,259	4,500	4,500	13,125	16,723	14,481	11,153	8,460	7,100	5,000	4,000	3,000
90%	5,678	3,500	4,500	8,401	12,239	11,400	10,016	7,100	6,799	4,065	4,000	3,000
Long Term												
Full Simulation Period	8,408	10,099	24,888	54,896	70,049	52,500	29,061	14,179	8,605	7,157	4,274	10,294
Water Year Types												
Wet	9,541	15,088	53,646	115,984	131,904	102,001	53,280	21,075	11,285	9,709	4,000	21,635
Above Normal	9,036	8,854	16,293	59,685	102,404	57,212	27,004	15,829	8,580	8,899	4,000	13,224
Below Normal	8,461	9,070	13,804	28,415	31,537	29,246	21,994	12,973	7,605	6,655	4,139	3,000
Dry	7,611	7,891	10,135	15,901	29,451	24,322	15,139	9,861	7,158	5,000	4,785	3,000
Critical	6,653	5,227	7,054	11,831	15,756	13,084	9,330	6,228	6,318	4,170	4,415	3,092

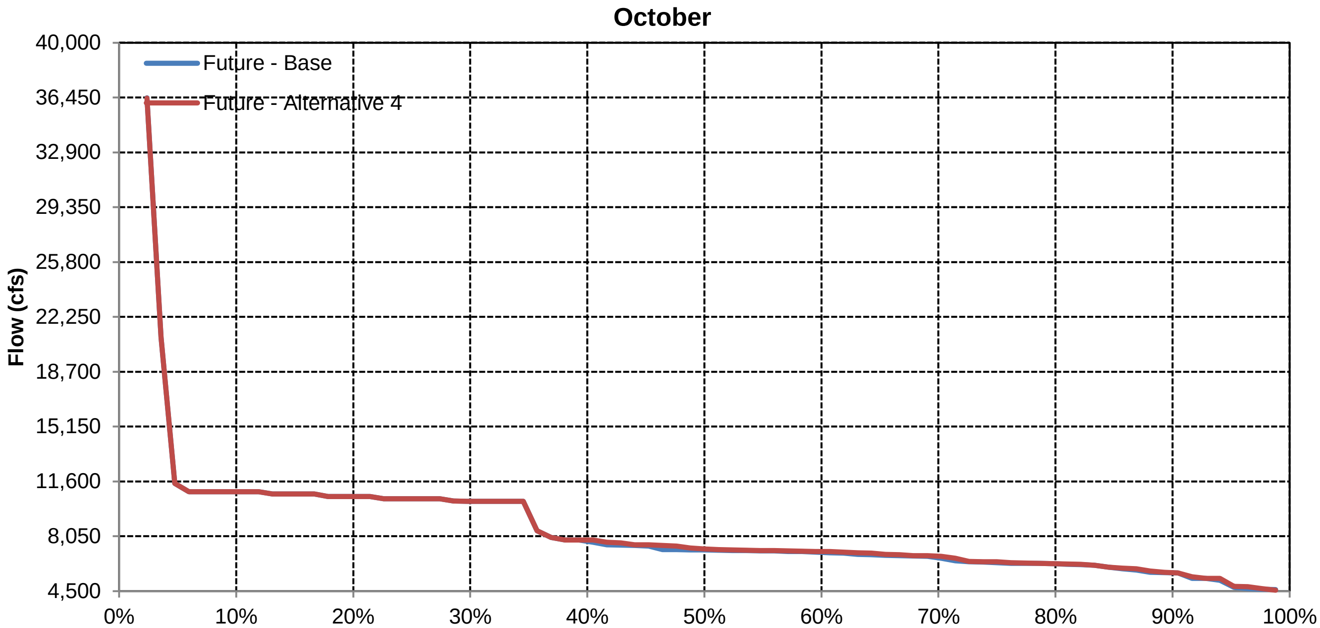
Future - Alternative 4

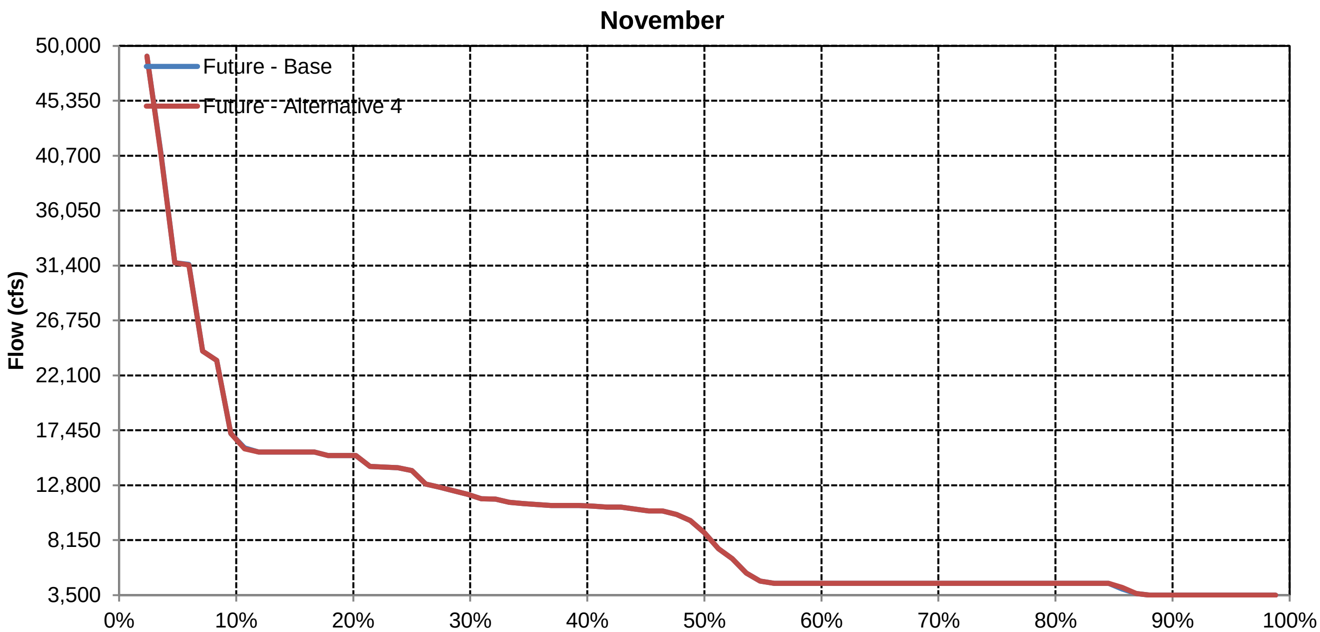
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	10,938	15,804	79,086	151,209	180,068	107,860	70,642	27,158	11,545	10,516	4,889	21,875
20%	10,625	14,764	33,594	91,768	126,760	88,804	38,581	18,350	10,469	9,613	4,708	21,563
30%	10,313	11,693	17,496	57,072	77,981	61,542	28,814	14,204	8,749	9,047	4,357	20,938
40%	7,772	11,004	14,389	33,914	58,622	40,831	20,594	12,808	8,409	8,000	4,214	13,062
50%	7,205	8,101	11,812	26,169	43,224	27,471	17,697	11,253	7,970	6,664	4,008	3,000
60%	7,055	4,500	8,203	19,274	25,095	20,735	15,558	10,169	7,276	6,500	4,000	3,000
70%	6,738	4,500	5,740	14,962	20,737	17,661	13,640	9,571	7,100	5,000	4,000	3,000
80%	6,266	4,500	4,500	13,132	16,777	14,506	11,114	8,469	7,100	5,000	4,000	3,000
90%	5,692	3,500	4,500	8,404	12,280	11,400	10,027	7,100	6,799	4,069	4,000	3,000
Long Term												
Full Simulation Period	8,448	10,098	24,881	54,918	70,116	52,494	29,067	14,175	8,598	7,157	4,276	10,293
Water Year Types												
Wet	9,559	15,082	53,673	116,016	131,949	101,996	53,310	21,071	11,286	9,709	4,000	21,635
Above Normal	9,167	8,854	16,258	59,644	102,601	57,126	27,006	15,829	8,578	8,900	4,000	13,224
Below Normal	8,531	9,080	13,798	28,460	31,524	29,263	21,994	12,959	7,607	6,651	4,140	3,000
Dry	7,617	7,888	10,146	15,937	29,506	24,345	15,132	9,859	7,160	5,000	4,785	3,000
Critical	6,677	5,227	6,966	11,842	15,860	13,078	9,319	6,230	6,262	4,171	4,427	3,091

Future - Alternative 4 Minus Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	-59	29	1	58	-20	-2	-1	0	0	4	0
20%	0	0	166	-484	837	-223	0	-2	7	0	0	0
30%	0	0	7	366	1	-712	0	0	0	0	8	0
40%	147	0	23	21	0	-55	0	0	0	0	-2	0
50%	44	-3	9	27	60	0	118	0	71	-3	8	0
60%	61	0	-53	46	109	6	0	-5	-142	0	0	0
70%	125	0	417	53	51	0	0	-13	0	0	0	0
80%	8	0	0	7	55	25	-39	9	0	0	0	0
90%	14	0	0	3	41	0	10	0	0	3	0	0
Long Term												
Full Simulation Period	39	-1	-8	22	67	-6	6	-4	-7	0	2	0
Water Year Types												
Wet	18	-6	26	32	45	-5	29	-4	1	0	0	0
Above Normal	131	0	-35	-41	197	-86	2	0	-1	1	0	0
Below Normal	70	9	-6	45	-13	17	0	-13	2	-3	2	0
Dry	6	-3	11	36	55	23	-7	-1	2	0	0	0
Critical	24	0	-88	11	104	-6	-11	1	-55	1	12	-1

Delta Outflow





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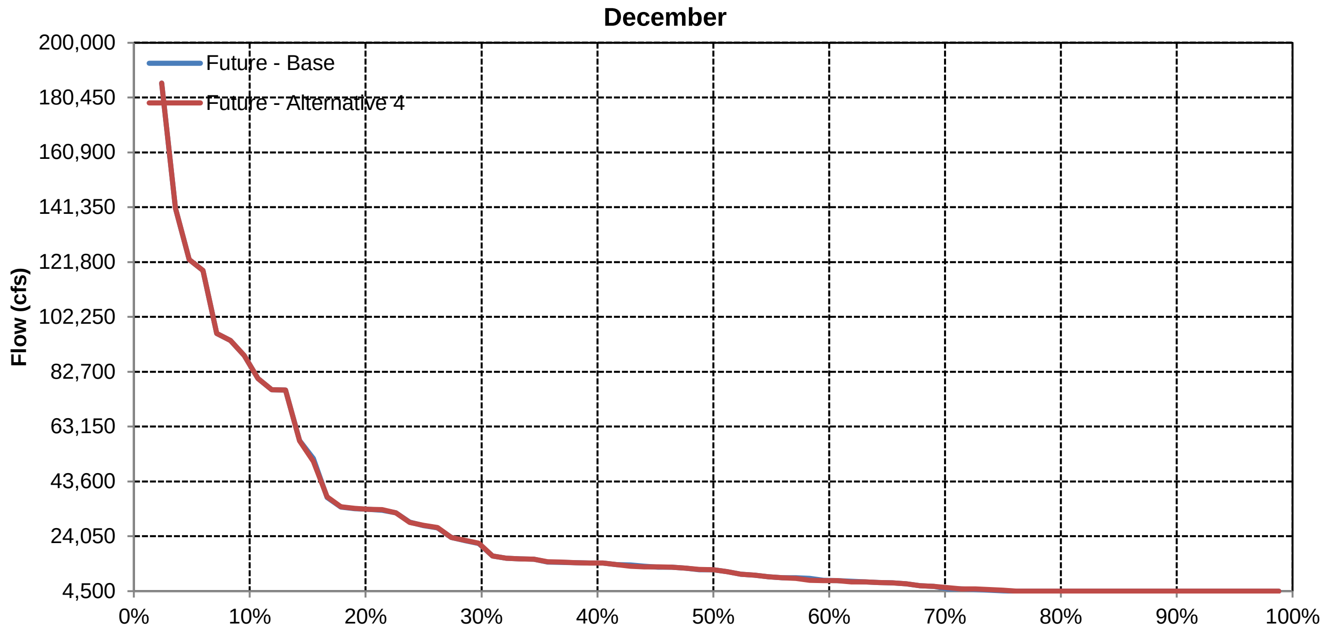

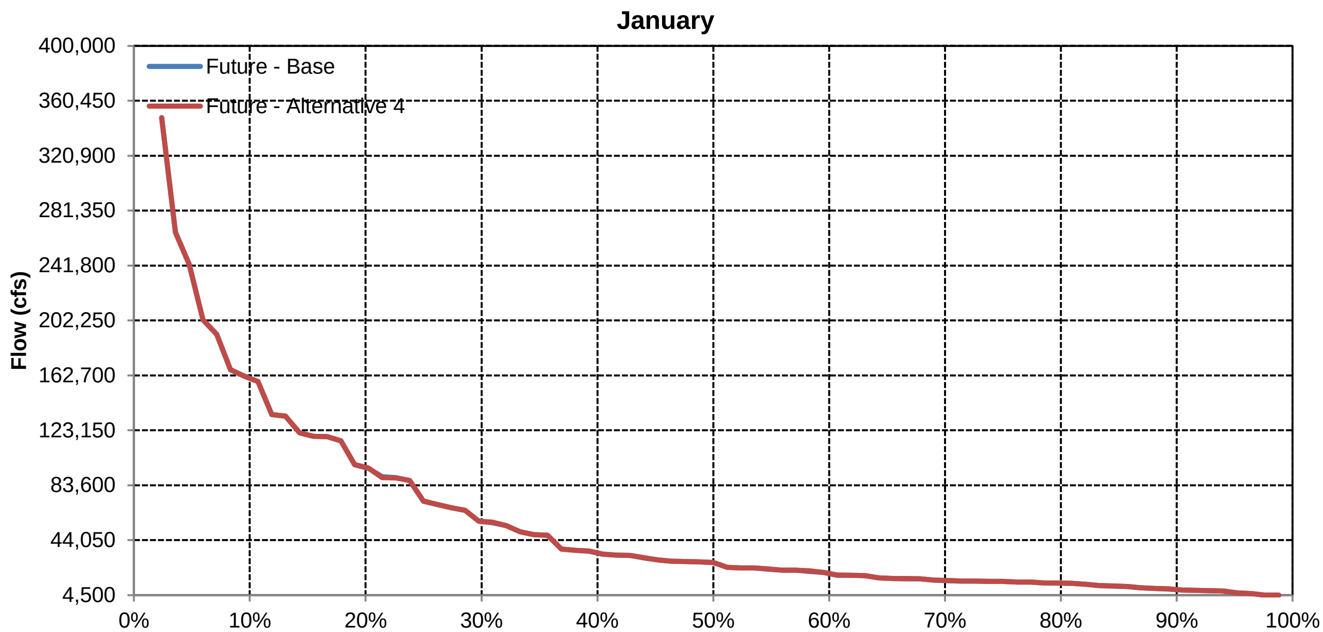

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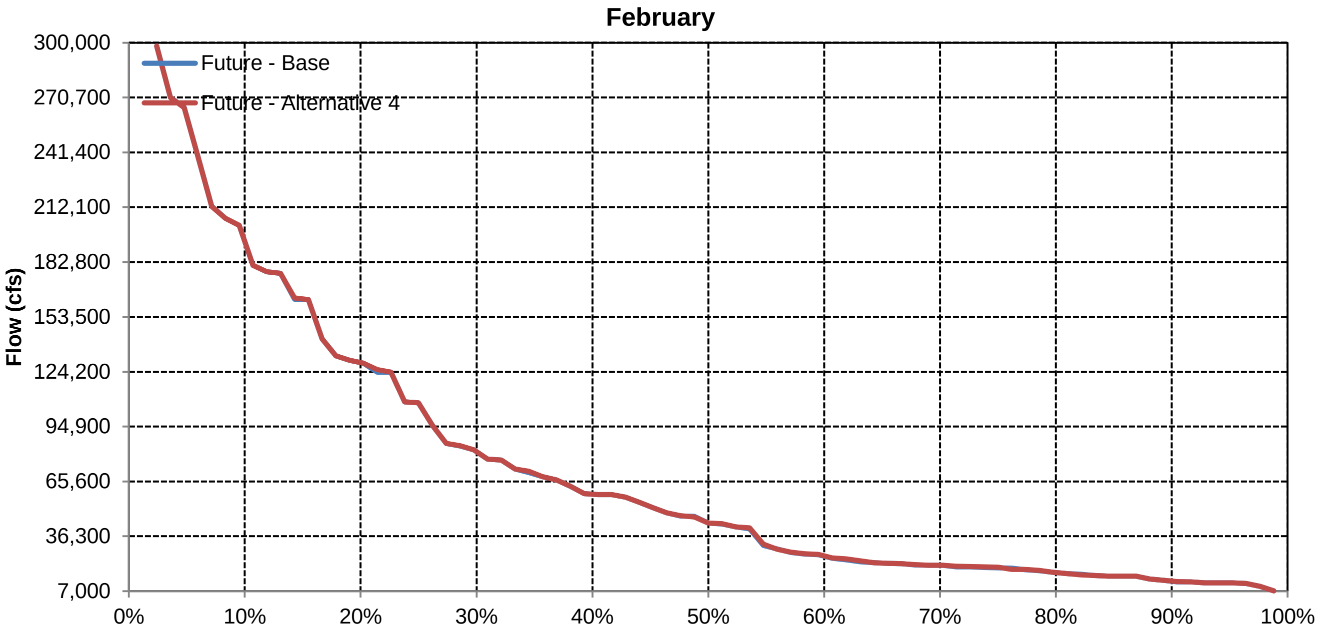

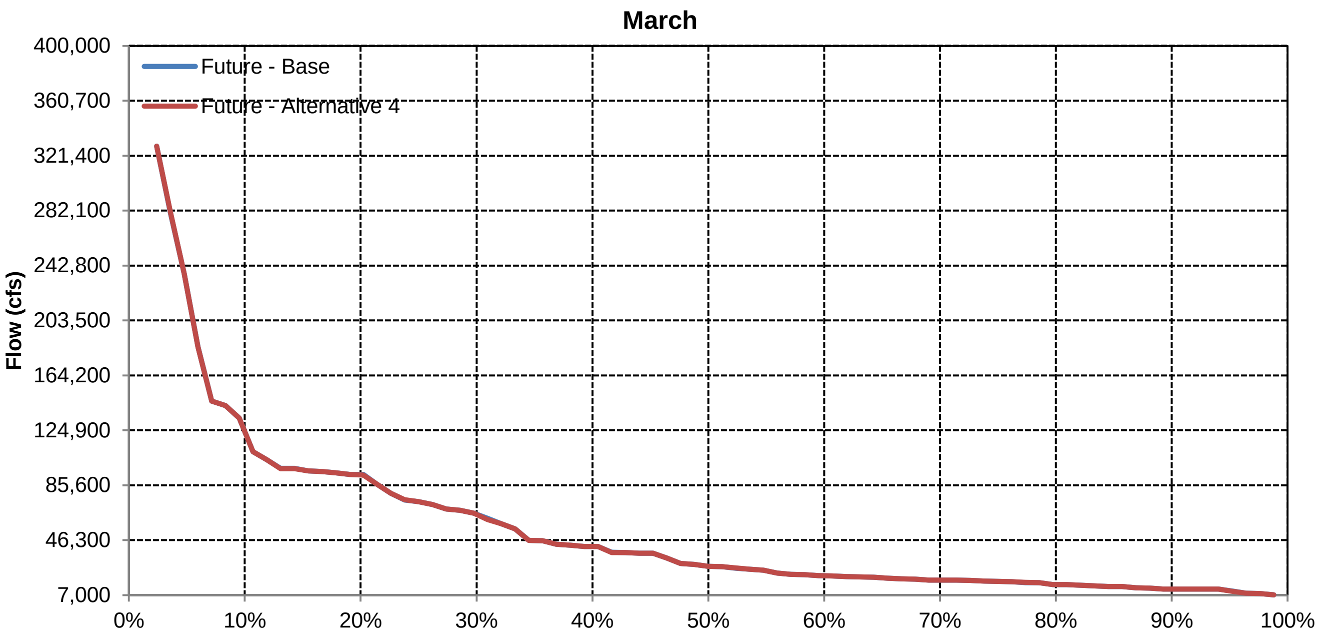

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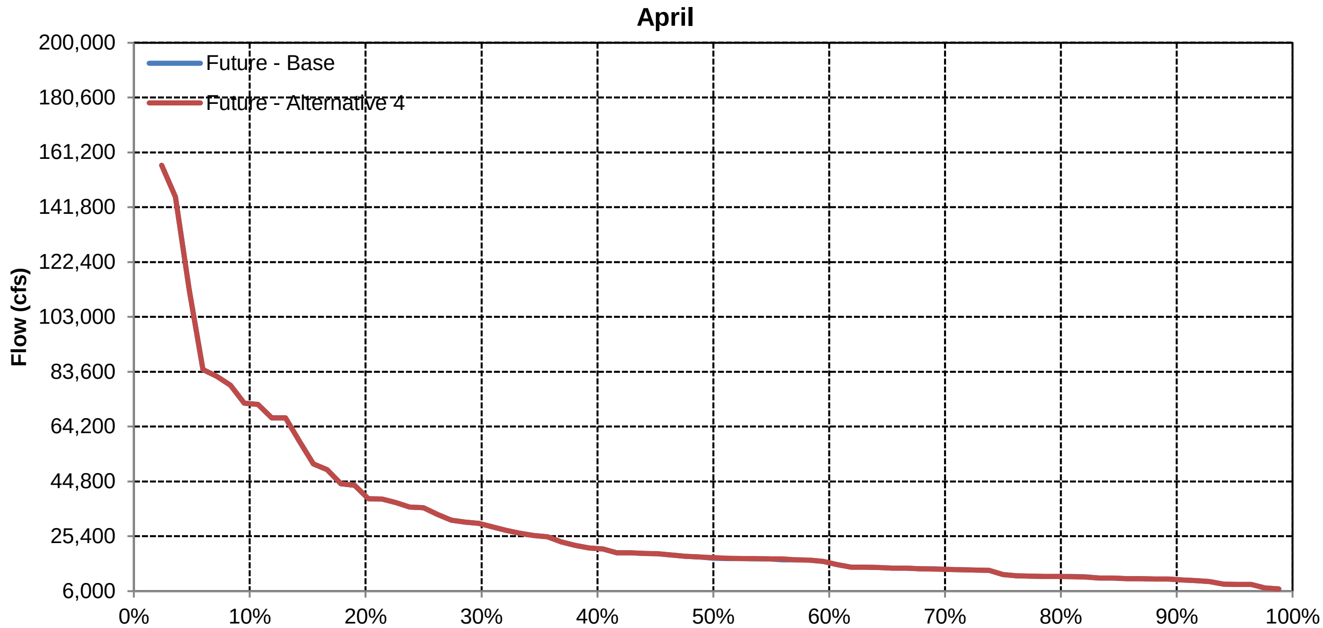

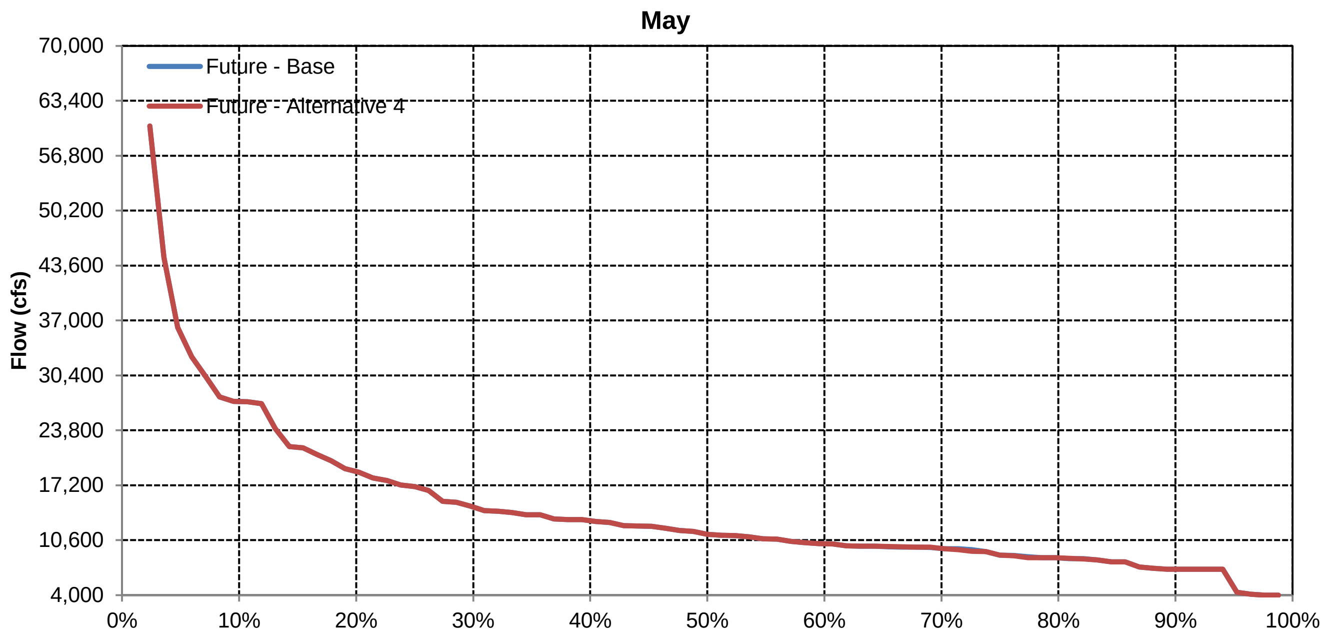

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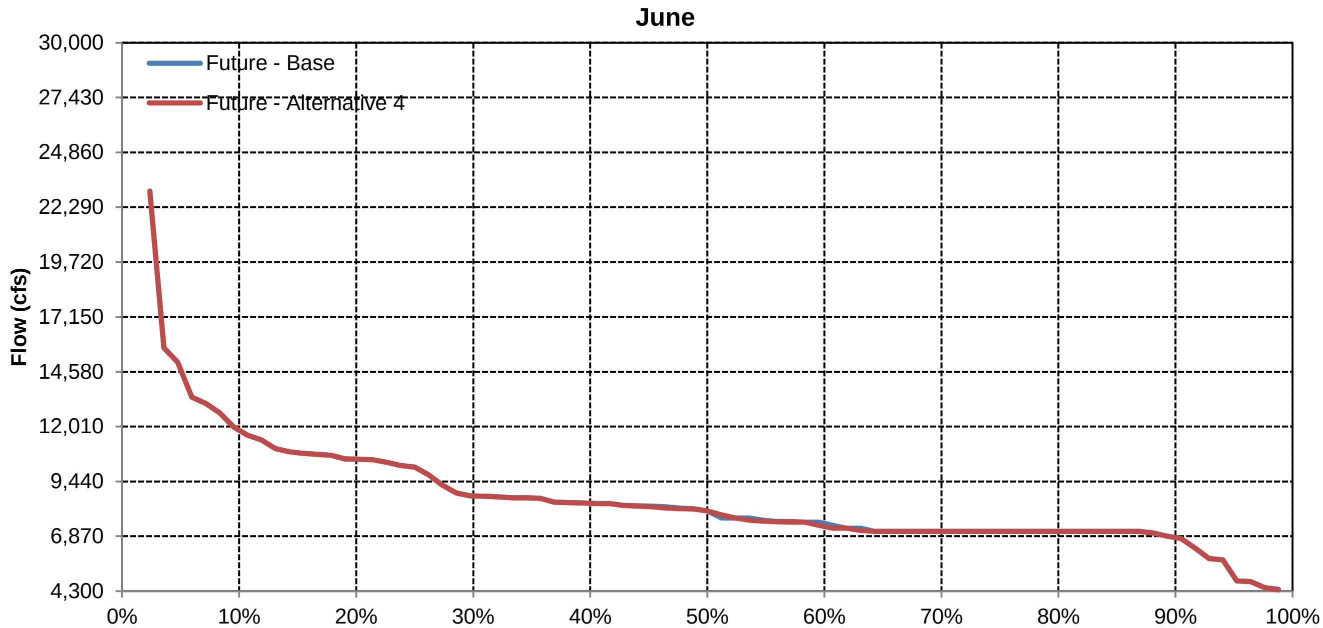
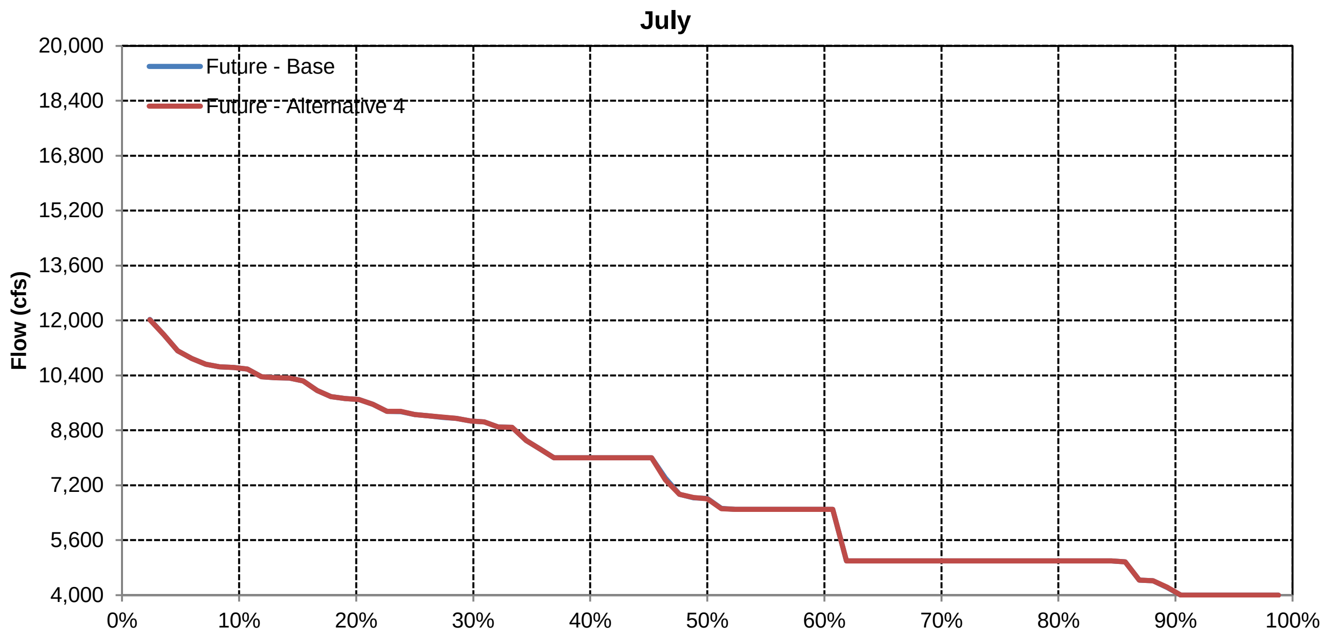
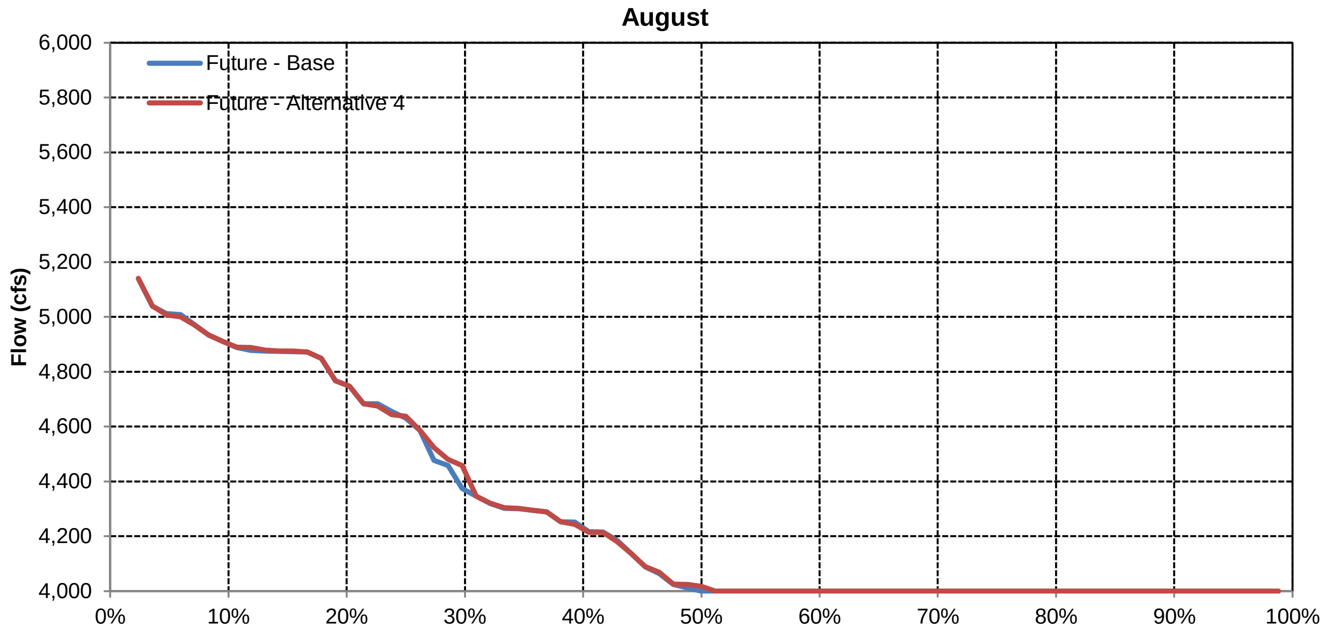




Delta Outflow



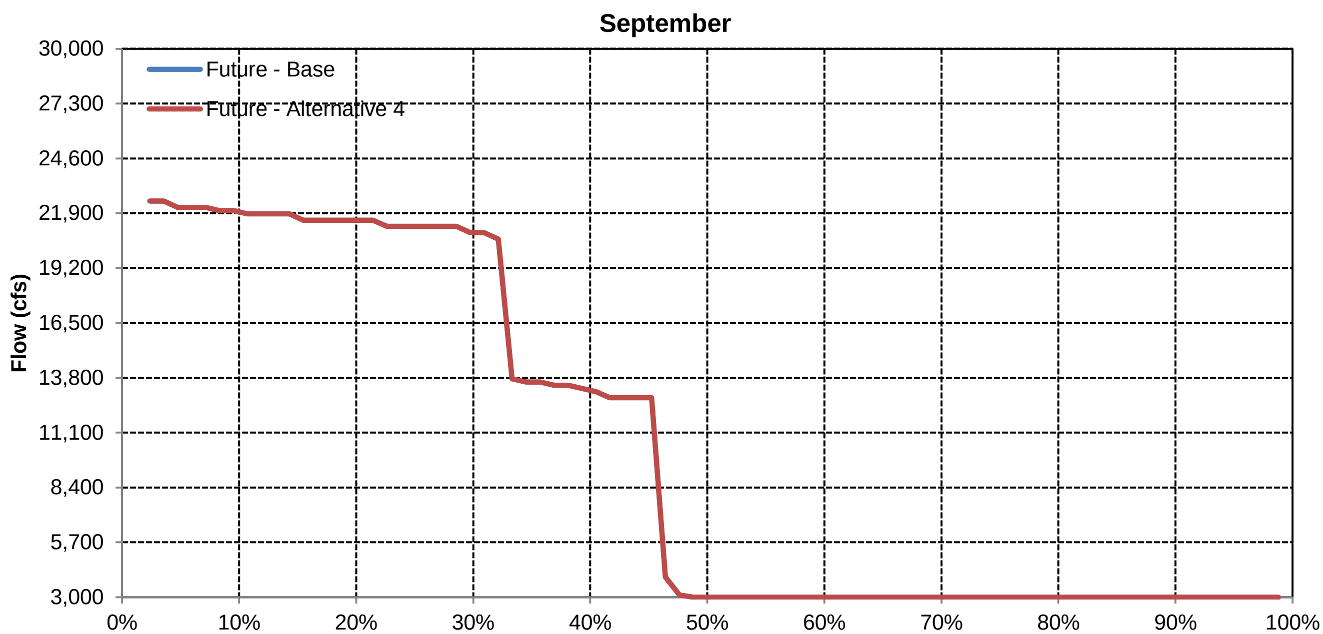


Table 185 No Action Alternative-Alternative 4 (Future)

Winter-run Chinook Salmon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 4 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration	November through July	Mean Monthly Flow (cfs)	Verona		10	Lower 40%		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
			Freeport		10	Lower 40%		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
		Mean Monthly Water Temperature (°F)	Feather River Confluence	64		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
				68		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
			Freeport	64		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
				68		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Juvenile Rearing and Downstream Movement*	July through March	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	61		All Years	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
				65		All Years	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
			Freeport	61		All Years	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
				65		All Years	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0

Table 186 No Action Alternative-Alternative 4 (Future)

Spring-run Chinook Salmon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 4 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration	March through September	Mean Monthly Flow (cfs)	Verona		10	Lower 40%						0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport		10	Lower 40%						0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	64		All Years						0.0	0.0	0.0	0.0	0.0	0.0	0.0
				68		All Years						0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport	64		All Years						0.0	0.0	0.0	0.0	0.0	0.0	0.0
				68		All Years						0.0	0.0	0.0	0.0	0.0	0.0	0.0
Juvenile Rearing (and Downstream Movement)	Year-round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	61		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
				65		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Smolt Emigration	October through May	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
		Mean Monthly Water Temperature (°F)	Feather River Confluence	63		All Years	-0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
			Freeport	63		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				

Table 187 No Action Alternative-Alternative 4 (Future)

Fall-run Chinook Salmon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location Description	Metric Value	Metric %	Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Staging	July through December	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0							0.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0							0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	64		All Years	-1.3	0.0	0.0							0.0	0.0	0.0
				68		All Years	0.0	0.0	0.0							0.0	0.0	0.0
			Freeport	64		All Years	0.0	0.0	0.0							0.0	0.0	0.0
				68		All Years	0.0	0.0	0.0							0.0	0.0	0.0
Juvenile Rearing and Downstream Movement	December through July	Mean Monthly Flow (cfs)	Verona		10	Lower 40%			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
			Freeport		10	Lower 40%			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
		Mean Monthly Water Temperature (°F)	Freeport	61		All Years			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
				65		All Years			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		

Note: the month columns (Oct–Sep) show the net change in probability of exceedance under Alternative 4 (Future) relative to No Action Alternative.

Table 188 No Action Alternative-Alternative 4 (Future)

Late Fall-run Chinook Salmon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location Description	Metric Value	Metric %	Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Staging	October through April	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
		Mean Monthly Water Temperature (°F)	Feather River Confluence	64		All Years	-1.3	0.0	0.0	0.0	0.0	0.0	0.0					
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
			Freeport	64		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
Juvenile Rearing and Downstream Movement	April through December	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Freeport	61		All Years	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
				65		All Years	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0

Net Change in Probability of Exceedance under Alternative 4 (Future) relative to No Action Alternative (columns Oct–Sep)

Table 189 No Action Alternative-Alternative 4 (Future)

Steelhead in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location Description	Metric Value	Metric %	Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
							Net Change in Probability of Exceedance under Alternative 4 (Future) relative to No Action Alternative											
Adult Immigration	August through March	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	64		All Years	-1.3	0.0	0.0	0.0	0.0	0.0					0.0	0.0
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0
			Freeport	64		All Years	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0
Juvenile Rearing and Downstream Movement	Year-Round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	65		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Smolt Emigration	January through June	Mean Monthly Flow (cfs)	Verona		10	Lower 40%				0.0	0.0	0.0	0.0	0.0	0.0			
			Freeport		10	Lower 40%				0.0	0.0	0.0	0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Feather River Confluence	52		All Years				0.0	0.0	0.0	0.0	0.0	0.0			
				55		All Years				0.0	0.0	0.0	0.0	0.0	0.0			
			Freeport	52		All Years				0.0	0.0	0.0	0.0	0.0	0.0			
				55		All Years				0.0	0.0	0.0	0.0	0.0	0.0			

Table 190 No Action Alternative-Alternative 4 (Future)

Green Sturgeon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 4 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Holding	February through July	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%					0.0	0.0	0.0	0.0	0.0	0.0		
		Mean Monthly Water Temperature (°F)	Freeport	61		All Years					0.0	0.0	0.0	0.0	0.0	0.0		
Adult Post-Spawning Holding and Emigration	July through November	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%	0.0	0.0								0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Freeport	61		All Years	0.0	0.0								0.0	0.0	0.0
Juvenile Rearing and Downstream Movement	Year-round	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Freeport	66		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 191 No Action Alternative-Alternative 4 (Future)

White Sturgeon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location Description	Metric Value	Metric %	Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Holding	November through May	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%		0.0	0.0	0.0	0.0	0.0	0.0	0.0				
		Mean Monthly Water Temperature (°F)	Freeport	77		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Spawning and Egg Incubation	February through June	Mean Monthly Flow (cfs)	Verona		10	Lower 40%					0.0	0.0	0.0	0.0	0.0			
			Freeport		10	Lower 40%					0.0	0.0	0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Feather River Confluence	61		All Years					0.0	0.0	0.0	0.0	0.0			
Juvenile Rearing and Downstream Movement	Year-round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	66		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport	66		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Net Change in Probability of Exceedance under Alternative 4 (Future) relative to No Action Alternative (columns Oct–Sep)

Table 192 No Action Alternative-Alternative 4 (Future)

River Lamprey in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 4 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration	September through June	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0
		Mean Monthly Water Temperature (°F)	Freeport	42-60		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0
Ammocoete Rearing and Downstream Movement	Year-round	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Freeport	72		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

[1]Water temperature ranges are evaluated by calculating the net change in the probability of water temperatures occurring within the specified range.

Table 193 No Action Alternative-Alternative 4 (Future)

Pacific Lamprey in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location Description	Metric Value	Metric %	Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration	January through June	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%				0.0	0.0	0.0	0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Freeport	42-60		All Years				0.0	0.0	0.0	0.0	0.0	0.0			
Ammocoete Rearing and Downstream Movement	Year-round	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Freeport	72		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

The month columns (Oct–Sep) are headed "Net Change in Probability of Exceedance under Alternative 4 (Future) relative to No Action Alternative".

[1]Water temperature ranges are evaluated by calculating the net change in the probability of water temperatures occurring within the specified range.

Table 194 No Action Alternative-Alternative 4 (Future)

Hardhead in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location Description	Metric Value	Metric %	Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adults and Other Lifestages	Year-round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	61-77		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.6	0.0	0.0
			Freeport	61-77		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.3	0.0	1.2	0.0
Adult Spawning	April through June	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%							0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Freeport	59-64		All Years							0.0	0.0	0.0			

[1]Water temperature ranges are evaluated by calculating the net change in the probability of water temperatures occurring within the specified range.

Table 195 No Action Alternative-Alternative 4 (Future)

American Shad in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location Description	Metric Value	Metric %	Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Spawning	April through June	Mean Monthly Flow (cfs)	Verona		10	Lower 40%							0.0	0.0	0.0			
			Freeport		10	Lower 40%							0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Feather River Confluence	60-70		All Years							0.1	0.0	0.0			
			Freeport	60-70		All Years							0.0	0.0	0.0			
Juvenile Rearing and Downstream Movement	Year-Round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	63-77		All Years	-0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.6	0.0	0.0
			Freeport	63-77		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.3	0.0	1.2	0.0

Month columns: Net Change in Probability of Exceedance under Alternative 4 (Future) relative to No Action Alternative

[1]Water temperature ranges are evaluated by calculating the net change in the probability of water temperatures occurring within the specified range.

Table 196 No Action Alternative-Alternative 4 (Future)

Striped Bass in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location Description	Metric Value	Metric %	Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Spawning	April through June	Mean Monthly Flow (cfs)	Verona		10	Lower 40%							0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Feather River Confluence	59-68		All Years							0.0	0.0	0.0			
Juvenile Rearing and Downstream Movement	Year-round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	61-71		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0

[1]Water temperature ranges are evaluated by calculating the net change in the probability of water temperatures occurring within the specified range.

Table 201 No Action Alternative-Alternative 4 (Future)

Alternative 4 (Future) vs No Action Alternative
Sacramento River at Verona, Monthly Flow

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
-1.0 < X < 1.0	73.2	79.3	45.1	47.6	36.6	57.3	98.8	89.0	86.6	95.1	93.9	95.1
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	20.7	1.2	1.2	0.0	0.0	0.0	0.0	0.0	6.1	3.7	1.2	3.7
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	4.9	17.1	52.4	50.0	61.0	40.2	1.2	9.8	4.9	1.2	4.9	0.0
Net Change in % Exceedance:	15.9	-15.9	-51.2	-50.0	-61.0	-40.2	-1.2	-9.8	1.2	2.4	-3.7	3.7
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Low Flows (Upper 40% of Distribution)												
-1.0 < X < 1.0	63.6	84.8	78.8	78.8	36.4	75.8	100.0	93.9	87.9	90.9	97.0	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	24.2	3.0	3.0	0.0	0.0	0.0	0.0	0.0	3.0	6.1	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	9.1	12.1	18.2	15.2	57.6	21.2	0.0	6.1	6.1	3.0	3.0	0.0
Net Change in % Exceedance:	15.2	-9.1	-15.2	-15.2	-57.6	-21.2	0.0	-6.1	-3.0	3.0	-3.0	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 202 No Action Alternative-Alternative 4 (Future)

Alternative 4 (Future) vs No Action Alternative
Sacramento River at Freeport, Monthly Flow

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
-1.0 < X < 1.0	78.0	90.2	47.6	50.0	42.7	63.4	100.0	95.1	91.5	95.1	96.3	96.3
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	20.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	4.9	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	1.2	9.8	48.8	50.0	54.9	35.4	0.0	4.9	3.7	0.0	3.7	2.4
Net Change in % Exceedance:	19.5	-9.8	-48.8	-50.0	-54.9	-35.4	0.0	-4.9	-1.2	4.9	-3.7	-2.4
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Low Flows (Upper 40% of Distribution)												
-1.0 < X < 1.0	69.7	100.0	72.7	84.8	51.5	81.8	100.0	93.9	90.9	97.0	100.0	93.9
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	27.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	3.0	0.0	21.2	15.2	45.5	15.2	0.0	6.1	9.1	0.0	0.0	6.1
Net Change in % Exceedance:	24.2	0.0	-21.2	-15.2	-45.5	-15.2	0.0	-6.1	-9.1	3.0	0.0	-6.1
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Alternative 4 (Future) vs No Action Alternative

Sacramento River at Feather River, Monthly Temperature

Exceedance of Water Temperature Index Values and Probability of Occurring within the Water Temperature Index Ranges

No Action Alternative

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	98.2	96.4	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	91.9	87.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	40.2	23.2	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	22.0	5.5	90.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	98.8	8.5	1.2	73.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	95.1	1.7	1.2	30.1	97.3	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	87.8	1.2	1.2	12.0	86.0	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	67.1	1.2	1.2	6.1	74.4	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	42.7	1.2	1.2	3.1	61.0	98.7	98.8	98.8	98.8	98.8	98.8
56	98.8	26.8	1.2	1.2	1.2	39.0	97.6	98.8	98.8	98.8	98.8	98.8
57	98.8	14.0	1.2	1.2	1.2	23.2	96.7	98.8	98.8	98.8	98.8	98.8
58	98.8	5.5	1.2	1.2	1.2	12.8	91.2	98.8	98.8	98.8	98.8	98.8
59	98.8	1.2	1.2	1.2	1.2	7.3	85.7	98.8	98.8	98.8	98.8	98.8
60	98.8	1.2	1.2	1.2	1.2	2.7	81.1	98.8	98.8	98.8	98.8	98.8
61	92.1	1.2	1.2	1.2	1.2	2.0	74.4	98.8	98.8	98.8	98.8	98.8
62	74.4	1.2	1.2	1.2	1.2	1.4	61.0	98.8	98.8	98.8	98.8	98.8
63	52.8	1.2	1.2	1.2	1.2	1.2	50.0	98.6	98.8	98.8	98.8	98.8
64	41.5	1.2	1.2	1.2	1.2	1.2	34.5	98.0	98.8	98.8	98.8	98.8
65	23.2	1.2	1.2	1.2	1.2	1.2	23.2	96.3	98.8	98.8	98.8	98.8
66	15.2	1.2	1.2	1.2	1.2	1.2	10.4	90.7	98.8	98.8	98.8	97.4
68	4.1	1.2	1.2	1.2	1.2	1.2	1.2	65.2	96.5	98.8	98.8	89.6
69	2.1	1.2	1.2	1.2	1.2	1.2	1.2	45.1	95.3	98.8	98.8	78.9
70	1.4	1.2	1.2	1.2	1.2	1.2	1.2	28.7	86.6	98.8	98.8	70.7
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	15.9	72.0	98.8	98.8	57.7
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	10.4	57.3	97.6	95.9	46.3
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.3	23.2	74.4	84.1	18.3
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	2.6	11.0	54.9	69.5	9.8
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	18.3	30.5	3.0
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	90.7	86.6	97.6	97.6	97.6	96.2	87.8	43.9	29.3	89.0
50-64	57.3	97.6	7.3	0.0	72.0	97.6	64.3	0.8	0.0	0.0	0.0	0.0
55-56	0.0	15.9	0.0	0.0	1.9	22.0	1.1	0.0	0.0	0.0	0.0	0.0
59-64	57.3	0.0	0.0	0.0	0.0	6.1	51.2	0.8	0.0	0.0	0.0	0.0
59-68	94.7	0.0	0.0	0.0	0.0	6.1	84.5	33.6	2.3	0.0	0.0	9.2
59-75	97.6	0.0	0.0	0.0	0.0	6.1	84.5	96.2	87.8	43.9	29.3	89.0
60-70	97.4	0.0	0.0	0.0	0.0	1.5	79.9	70.1	12.2	0.0	0.0	28.1
61-71	90.9	0.0	0.0	0.0	0.0	0.8	73.2	82.9	26.8	0.0	0.0	41.1
63-69	50.7	0.0	0.0	0.0	0.0	0.0	48.8	53.5	3.5	0.0	0.0	19.9
63-77	51.6	0.0	0.0	0.0	0.0	0.0	48.8	97.4	97.6	80.5	68.3	95.8
65-82	22.0	0.0	0.0	0.0	0.0	0.0	22.0	95.1	97.6	97.6	97.6	97.6
70-82	0.2	0.0	0.0	0.0	0.0	0.0	0.0	27.5	85.4	97.6	97.6	69.5
42-60	0.0	97.6	97.6	95.8	97.6	96.1	17.7	0.0	0.0	0.0	0.0	0.0
61-77	90.9	0.0	0.0	0.0	0.0	0.8	73.2	97.6	97.6	80.5	68.3	95.8

Alternative 4 (Future)

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	98.2	96.4	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	91.9	87.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	40.2	23.2	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	20.7	5.5	89.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	98.8	8.5	1.2	73.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	95.1	1.7	1.2	30.1	97.3	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	87.8	1.2	1.2	12.0	86.0	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	65.9	1.2	1.2	6.1	74.4	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	42.7	1.2	1.2	3.1	61.0	98.7	98.8	98.8	98.8	98.8	98.8
56	98.8	26.8	1.2	1.2	1.2	39.0	97.6	98.8	98.8	98.8	98.8	98.8
57	98.8	14.0	1.2	1.2	1.2	23.2	96.7	98.8	98.8	98.8	98.8	98.8
58	98.8	5.5	1.2	1.2	1.2	12.8	91.2	98.8	98.8	98.8	98.8	98.8
59	98.8	1.2	1.2	1.2	1.2	7.3	85.7	98.8	98.8	98.8	98.8	98.8
60	98.8	1.2	1.2	1.2	1.2	2.7	81.2	98.8	98.8	98.8	98.8	98.8
61	92.1	1.2	1.2	1.2	1.2	2.0	74.4	98.8	98.8	98.8	98.8	98.8
62	74.4	1.2	1.2	1.2	1.2	1.4	61.0	98.8	98.8	98.8	98.8	98.8
63	52.4	1.2	1.2	1.2	1.2	1.2	50.0	98.6	98.8	98.8	98.8	98.8
64	40.2	1.2	1.2	1.2	1.2	1.2	34.5	98.0	98.8	98.8	98.8	98.8
65	23.2	1.2	1.2	1.2	1.2	1.2	23.2	96.3	98.8	98.8	98.8	98.8
66	15.2	1.2	1.2	1.2	1.2	1.2	10.4	90.7	98.8	98.8	98.8	97.4
68	4.1	1.2	1.2	1.2	1.2	1.2	1.2	65.2	96.5	98.8	98.8	89.6
69	2.0	1.2	1.2	1.2	1.2	1.2	1.2	45.1	95.3	98.8	98.8	78.9
70	1.4	1.2	1.2	1.2	1.2	1.2	1.2	28.7	86.6	98.8	98.8	70.7
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	15.9	70.7	98.8	98.8	57.7
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	10.4	57.3	97.6	95.9	46.3
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.3	22.0	74.4	84.1	18.3
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	2.6	11.0	54.9	69.5	9.1
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	18.9	30.5	3.0
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	90.7	86.6	97.6	97.6	97.6	96.2	87.8	43.9	29.3	89.7
50-64	58.6	97.6	7.3	0.0	72.0	97.6	64.3	0.8	0.0	0.0	0.0	0.0
55-56	0.0	15.9	0.0	0.0	1.9	22.0	1.1	0.0	0.0	0.0	0.0	0.0
59-64	58.6	0.0	0.0	0.0	0.0	6.1	51.2	0.8	0.0	0.0	0.0	0.0
59-68	94.7	0.0	0.0	0.0	0.0	6.1	84.5	33.6	2.3	0.0	0.0	9.2
59-75	97.6	0.0	0.0	0.0	0.0	6.1	84.5	96.2	87.8	43.9	29.3	89.7
60-70	97.4	0.0	0.0	0.0	0.0	1.5	80.0	70.1	12.2	0.0	0.0	28.1
61-71	90.9	0.0	0.0	0.0	0.0	0.8	73.2	82.9	28.1	0.0	0.0	41.1
63-69	50.4	0.0	0.0	0.0	0.0	0.0	48.8	53.5	3.5	0.0	0.0	19.9
63-77	51.2	0.0	0.0	0.0	0.0	0.0	48.8	97.4	97.6	79.9	68.3	95.8
65-82	22.0	0.0	0.0	0.0	0.0	0.0	22.0	95.1	97.6	97.6	97.6	97.6
70-82	0.2	0.0	0.0	0.0	0.0	0.0	0.0	27.5	85.4	97.6	97.6	69.5
42-60	0.0	97.6	97.6	95.8	97.6	96.1	17.6	0.0	0.0	0.0	0.0	0.0
61-77	90.9	0.0	0.0	0.0	0.0	0.8	73.2	97.6	97.6	79.9	68.3	95.8

Alternative 4 (Future) - No Action Alternative

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
43	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
48	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
49	0.0	0.0	-1.3	0.0	-0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
52	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
53	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
54	0.0	-1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
56	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
57	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
58	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
61	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
62	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63	-0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
64	-1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
66	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
68	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
69	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.3	0.0	0.0	0.0
72	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
74	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.2	0.0	0.0	0.0
75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.7
77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0
82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
86	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
88	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
98	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45-75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7
50-64	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55-56	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-64	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-68	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7
60-70	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
61-71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0
63-69	-0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63-77	-0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.6	0.0	0.0
65-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42-60	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.0
61-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.6	0.0	0.0

Alternative 4 (Future) vs No Action Alternative

Sacramento River at Freeport, Monthly Temperature

Exceedance of Water Temperature Index Values and Probability of Occurring within the Water Temperature Index Ranges

No Action Alternative

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	98.3	96.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	90.2	86.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	43.9	26.2	97.6	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	26.2	8.5	92.7	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	98.8	9.8	1.2	78.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	97.8	1.5	1.2	29.3	98.8	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	90.2	1.2	1.2	15.6	90.2	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	70.7	1.2	1.2	7.0	75.6	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	50.0	1.2	1.2	4.6	63.4	98.8	98.8	98.8	98.8	98.8	98.8
56	98.8	31.7	1.2	1.2	2.0	43.9	97.8	98.8	98.8	98.8	98.8	98.8
57	98.8	22.0	1.2	1.2	1.2	27.4	96.6	98.8	98.8	98.8	98.8	98.8
58	98.8	6.1	1.2	1.2	1.2	18.9	92.4	98.8	98.8	98.8	98.8	98.8
59	98.8	2.4	1.2	1.2	1.2	7.3	88.0	98.8	98.8	98.8	98.8	98.8
60	98.8	1.2	1.2	1.2	1.2	4.9	81.7	98.8	98.8	98.8	98.8	98.8
61	98.0	1.2	1.2	1.2	1.2	2.4	74.0	98.8	98.8	98.8	98.8	98.8
62	89.6	1.2	1.2	1.2	1.2	1.9	62.8	98.8	98.8	98.8	98.8	98.8
63	63.4	1.2	1.2	1.2	1.2	1.3	49.4	98.8	98.8	98.8	98.8	98.8
64	52.4	1.2	1.2	1.2	1.2	1.2	32.3	98.4	98.8	98.8	98.8	98.8
65	35.4	1.2	1.2	1.2	1.2	1.2	27.6	97.0	98.8	98.8	98.8	98.8
66	21.3	1.2	1.2	1.2	1.2	1.2	17.1	92.3	98.8	98.8	98.8	98.8
68	4.7	1.2	1.2	1.2	1.2	1.2	1.2	78.7	98.8	98.8	98.8	95.3
69	2.7	1.2	1.2	1.2	1.2	1.2	1.2	54.9	96.6	98.8	98.8	89.8
70	1.6	1.2	1.2	1.2	1.2	1.2	1.2	38.2	95.2	98.8	98.8	78.0
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	21.3	86.9	98.8	98.8	70.1
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	13.0	81.7	98.8	98.8	53.7
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.6	39.6	91.5	88.7	22.0
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.1	20.1	78.7	81.7	9.8
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	39.0	43.9	2.1
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	89.0	84.8	97.6	97.6	97.6	95.7	78.7	20.1	17.1	89.0
50-64	46.4	97.6	8.6	0.0	76.8	97.6	66.5	0.4	0.0	0.0	0.0	0.0
55-56	0.0	18.3	0.0	0.0	2.6	19.5	1.0	0.0	0.0	0.0	0.0	0.0
59-64	46.4	1.2	0.0	0.0	0.0	6.1	55.7	0.4	0.0	0.0	0.0	0.0
59-68	94.1	1.2	0.0	0.0	0.0	6.1	86.8	20.1	0.0	0.0	0.0	3.5
59-75	97.6	1.2	0.0	0.0	0.0	6.1	86.8	95.7	78.7	20.1	17.1	89.0
60-70	97.2	0.0	0.0	0.0	0.0	3.7	80.5	60.6	3.6	0.0	0.0	20.8
61-71	96.8	0.0	0.0	0.0	0.0	1.2	72.8	77.5	11.9	0.0	0.0	28.7
63-69	60.7	0.0	0.0	0.0	0.0	0.1	48.2	43.9	2.2	0.0	0.0	9.0
63-77	62.2	0.0	0.0	0.0	0.0	0.1	48.2	97.6	97.6	59.8	54.9	96.7
65-82	34.2	0.0	0.0	0.0	0.0	0.0	26.4	95.8	97.6	97.6	97.6	97.6
70-82	0.4	0.0	0.0	0.0	0.0	0.0	0.0	37.0	94.0	97.6	97.6	76.8
42-60	0.0	97.6	97.6	95.8	97.6	93.9	17.1	0.0	0.0	0.0	0.0	0.0
61-77	96.8	0.0	0.0	0.0	0.0	1.2	72.8	97.6	97.6	59.8	54.9	96.7

Alternative 4 (Future)

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	98.3	96.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	90.2	86.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	43.9	26.2	97.6	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	25.6	8.5	92.7	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	98.8	9.8	1.2	78.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	97.8	1.5	1.2	29.3	98.8	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	90.7	1.2	1.2	15.9	90.2	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	70.7	1.2	1.2	6.8	75.6	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	50.0	1.2	1.2	4.6	63.4	98.8	98.8	98.8	98.8	98.8	98.8
56	98.8	31.7	1.2	1.2	2.0	43.9	97.8	98.8	98.8	98.8	98.8	98.8
57	98.8	22.0	1.2	1.2	1.2	27.4	96.6	98.8	98.8	98.8	98.8	98.8
58	98.8	6.1	1.2	1.2	1.2	18.9	92.4	98.8	98.8	98.8	98.8	98.8
59	98.8	2.3	1.2	1.2	1.2	7.3	88.0	98.8	98.8	98.8	98.8	98.8
60	98.8	1.2	1.2	1.2	1.2	4.9	81.7	98.8	98.8	98.8	98.8	98.8
61	98.0	1.2	1.2	1.2	1.2	2.4	74.0	98.8	98.8	98.8	98.8	98.8
62	89.6	1.2	1.2	1.2	1.2	1.9	62.8	98.8	98.8	98.8	98.8	98.8
63	63.4	1.2	1.2	1.2	1.2	1.3	49.4	98.8	98.8	98.8	98.8	98.8
64	52.4	1.2	1.2	1.2	1.2	1.2	32.3	98.4	98.8	98.8	98.8	98.8
65	35.4	1.2	1.2	1.2	1.2	1.2	27.6	97.0	98.8	98.8	98.8	98.8
66	21.3	1.2	1.2	1.2	1.2	1.2	17.1	92.3	98.8	98.8	98.8	98.8
68	4.7	1.2	1.2	1.2	1.2	1.2	1.2	78.7	98.8	98.8	98.8	95.3
69	2.7	1.2	1.2	1.2	1.2	1.2	1.2	54.9	96.6	98.8	98.8	89.8
70	1.6	1.2	1.2	1.2	1.2	1.2	1.2	38.2	95.2	98.8	98.8	78.0
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	21.3	86.9	98.8	98.8	70.1
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	13.0	81.7	98.8	98.8	53.7
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.6	40.9	91.5	88.7	22.0
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.1	20.3	78.7	82.3	9.8
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.5	39.0	42.7	2.1
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	89.0	84.8	97.6	97.6	97.6	95.7	78.5	20.1	16.5	89.0
50-64	46.4	97.6	8.6	0.0	76.8	97.6	66.5	0.4	0.0	0.0	0.0	0.0
55-56	0.0	18.3	0.0	0.0	2.6	19.5	1.0	0.0	0.0	0.0	0.0	0.0
59-64	46.4	1.1	0.0	0.0	0.0	6.1	55.7	0.4	0.0	0.0	0.0	0.0
59-68	94.1	1.1	0.0	0.0	0.0	6.1	86.8	20.1	0.0	0.0	0.0	3.5
59-75	97.6	1.1	0.0	0.0	0.0	6.1	86.8	95.7	78.5	20.1	16.5	89.0
60-70	97.2	0.0	0.0	0.0	0.0	3.7	80.5	60.6	3.6	0.0	0.0	20.8
61-71	96.8	0.0	0.0	0.0	0.0	1.2	72.8	77.5	11.9	0.0	0.0	28.7
63-69	60.7	0.0	0.0	0.0	0.0	0.1	48.2	43.9	2.2	0.0	0.0	9.0
63-77	62.2	0.0	0.0	0.0	0.0	0.1	48.2	97.6	97.3	59.8	56.1	96.7
65-82	34.2	0.0	0.0	0.0	0.0	0.0	26.4	95.8	97.6	97.6	97.6	97.6
70-82	0.4	0.0	0.0	0.0	0.0	0.0	0.0	37.0	94.0	97.6	97.6	76.8
42-60	0.0	97.6	97.6	95.8	97.6	93.9	17.1	0.0	0.0	0.0	0.0	0.0
61-77	96.8	0.0	0.0	0.0	0.0	1.2	72.8	97.6	97.3	59.8	56.1	96.7

Alternative 4 (Future) - No Action Alternative

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
43	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
48	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
49	0.0	0.0	-0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
52	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
53	0.0	0.5	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
54	0.0	0.0	0.0	0.0	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
56	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
57	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
58	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
62	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
66	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
68	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
72	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
74	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0
75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.6	0.0
77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	-1.2	0.0
82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
86	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
88	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
98	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45-75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.2	0.0	-0.6	0.0
50-64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55-56	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-64	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-68	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-75	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	-0.2	0.0	-0.6	0.0
60-70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61-71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63-69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.3	0.0	1.2	0.0
65-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42-60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.3	0.0	1.2	0.0

Table 227 No Action Alternative -Alternative 4 (Future)

Delta Smelt in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 4 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult	December through May	Mean Monthly Water Temperature (°F)	Sacramento River at Freeport	59-68		All Years			0.0	0.0	0.0	0.0	0.0	0.0				
		Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years			58.5	54.9	52.4	63.4	0.0	0.0				
	September through November	Mean Monthly X_2 (RKm)	X_2 between 74 km and 81 km	74-81		Wet and Above Normal Water Years	0.0	0.0										0.0
	December through February	Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<-5000 cfs		All Years			-1.2	0.0	0.0							
Egg and Embryo	February through May	Mean Monthly Water Temperature (°F)	Sacramento River at Freeport	59-68		All Years					0.0	0.0	0.0	0.0				
Larval	March through June	Mean Monthly Water Temperature (°F)	Sacramento River at Freeport	59-68		All Years						0.0	0.0	0.0	0.0			
		Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<-1500 cfs		Dry and Critical Water Years						0.0	-6.7	0.0	0.0			
		Mean Monthly Delta Outflow (cfs)	Delta		10	All Years						0.0	0.0	0.0	0.0			
Juvenile	May through July	Mean Monthly Water Temperature (°F)	Sacramento River at Freeport	59-68		All Years								0.0	0.0	0.0		
		Mean Monthly X_2 (RKm)	Changes in X_2 between RKm 65 and 80	0.5 RKm		All Years								0.0	0.0	0.0		

Table 228 No Action Alternative -Alternative 4 (Future)

Longfin Smelt in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 4 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult	December through March	Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<-5000 cfs		All Years			-1.2	0.0	0.0	0.0						
Larvae and Juvenile	April and May	Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<-1500 cfs		Dry and Critical Water Years							-6.7	0.0				
				< 0 cfs		Dry and Critical Water Years							0.0	0.0				
	January through June	Mean Monthly X_2 (RKm)	X_2	< 75 RKm		All Years				0.0	0.0	0.0	1.2	0.0	0.0			
				< 75 RKm		Dry and Critical Water Years				0.0	0.0	0.0	0.0	0.0	0.0			

Table 229 No Action Alternative -Alternative 4 (Future)

Winter-run Chinook Salmon in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location Description	Metric Value	Metric %	Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	November through May	Mean Monthly Flow (cfs)	Rio Vista		10	Lower 40%		0.0	0.0	0.0	0.0	0.0	0.0	0.0				
		Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years		69.5	58.5	54.9	52.4	63.4	0.0	0.0				
		Mean Monthly Delta Outflow (cfs)	Delta		10	All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0				
		Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<2500 cfs		All Years		0.0	0.0	0.0	-1.2	0.0	0.0	0.0				

Net Change in Probability of Exceedance under Alternative 4 (Future) relative to No Action Alternative (Oct–Sep columns)

Table 230 No Action Alternative -Alternative 4 (Future)

Spring-run Chinook Salmon in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location Description	Metric Value	Metric %	Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
							Net Change in Probability of Exceedance under Alternative 4 (Future) relative to No Action Alternative											
Juvenile Rearing and Emigration	November through June	Mean Monthly Flow (cfs)	Rio Vista		10	Lower 40%		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
		Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years		69.5	58.5	54.9	52.4	63.4	0.0	0.0	0.0			
		Mean Monthly Delta Outflow (cfs)	Delta		10	All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
		Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<2500 cfs		All Years		0.0	0.0	0.0	-1.2	0.0	0.0	0.0	0.0			

Table 231 No Action Alternative -Alternative 4 (Future)

Fall- and Late Fall-run Chinook Salmon in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 4 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	November through June	Mean Monthly Flow (cfs)	Rio Vista		10	Lower 40%		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
		Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years		69.5	58.5	54.9	52.4	63.4	0.0	0.0	0.0			
		Mean Monthly Delta Outflow (cfs)	Delta		10	All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
		Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<2500 cfs		All Years		0.0	0.0	0.0	-1.2	0.0	0.0	0.0	0.0			
Adult (San Joaquin River)	December through February	Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<-5000 cfs		All Years			0.0	0.0	-1.2							

Table 232 No Action Alternative -Alternative 4 (Future)

Steelhead in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location Description	Metric Value	Metric %	Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	October through July	Mean Monthly Flow (cfs)	Rio Vista		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
		Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years	0.0	69.5	58.5	54.9	52.4	63.4	0.0	0.0	0.0	0.0		
		Mean Monthly Delta Outflow (cfs)	Delta		10	All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
		Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<2500 cfs		All Years	0.0	0.0	0.0	0.0	-1.2	0.0	0.0	0.0	0.0	0.0		

Net Change in Probability of Exceedance under Alternative 4 (Future) relative to No Action Alternative (Oct–Sep columns)

Table 233 No Action Alternative -Alternative 4 (Future)

Green Sturgeon in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 4 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	Year-round	Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years	0.0	69.5	58.5	54.9	52.4	63.4	0.0	0.0	0.0	0.0	0.0	0.0

Table 234 No Action Alternative -Alternative 4 (Future)

White Sturgeon in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 4 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	April through June	Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years							0.0	0.0	0.0			

Table 235 No Action Alternative -Alternative 4 (Future)

Splittail in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 4 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Spawning and Embryo Incubation	February through May	Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years					52.4	63.4	0.0	0.0				
Juvenile Rearing and Emigration	April through July	Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years							0.0	0.0	0.0	0.0		

Table 236 No Action Alternative -Alternative 4 (Future)

American Shad in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 4 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Egg and Larvae	April through June	Mean Monthly X_2 (RKm)	Changes in X_2	1 RKm		All Years							0.0	0.0	0.0			

Table 237 No Action Alternative -Alternative 4 (Future)

Striped Bass in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 4 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Egg and Larvae	April through June	Mean Monthly X_2 (RKm)	Changes in X_2	1 RKm		All Years							0.0	0.0	0.0			

Alternative 4 (Future) vs No Action Alternative

Sacramento River at Freeport, Monthly Temperature

Exceedance of Water Temperature Index Values and Probability of Occurring within the Water Temperature Index Ranges

No Action Alternative

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	98.3	96.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	90.2	86.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	43.9	26.2	97.6	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	26.2	8.5	92.7	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	98.8	9.8	1.2	78.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	97.8	1.5	1.2	29.3	98.8	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	90.2	1.2	1.2	15.6	90.2	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	70.7	1.2	1.2	7.0	75.6	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	50.0	1.2	1.2	4.6	63.4	98.8	98.8	98.8	98.8	98.8	98.8
56	98.8	31.7	1.2	1.2	2.0	43.9	97.8	98.8	98.8	98.8	98.8	98.8
57	98.8	22.0	1.2	1.2	1.2	27.4	96.6	98.8	98.8	98.8	98.8	98.8
58	98.8	6.1	1.2	1.2	1.2	18.9	92.4	98.8	98.8	98.8	98.8	98.8
59	98.8	2.4	1.2	1.2	1.2	7.3	88.0	98.8	98.8	98.8	98.8	98.8
60	98.8	1.2	1.2	1.2	1.2	4.9	81.7	98.8	98.8	98.8	98.8	98.8
61	98.0	1.2	1.2	1.2	1.2	2.4	74.0	98.8	98.8	98.8	98.8	98.8
62	89.6	1.2	1.2	1.2	1.2	1.9	62.8	98.8	98.8	98.8	98.8	98.8
63	63.4	1.2	1.2	1.2	1.2	1.3	49.4	98.8	98.8	98.8	98.8	98.8
64	52.4	1.2	1.2	1.2	1.2	1.2	32.3	98.4	98.8	98.8	98.8	98.8
65	35.4	1.2	1.2	1.2	1.2	1.2	27.6	97.0	98.8	98.8	98.8	98.8
66	21.3	1.2	1.2	1.2	1.2	1.2	17.1	92.3	98.8	98.8	98.8	98.8
68	4.7	1.2	1.2	1.2	1.2	1.2	1.2	78.7	98.8	98.8	98.8	95.3
69	2.7	1.2	1.2	1.2	1.2	1.2	1.2	54.9	96.6	98.8	98.8	89.8
70	1.6	1.2	1.2	1.2	1.2	1.2	1.2	38.2	95.2	98.8	98.8	78.0
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	21.3	86.9	98.8	98.8	70.1
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	13.0	81.7	98.8	98.8	53.7
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.6	39.6	91.5	88.7	22.0
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.1	20.1	78.7	81.7	9.8
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	39.0	43.9	2.1
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	89.0	84.8	97.6	97.6	97.6	95.7	78.7	20.1	17.1	89.0
50-64	46.4	97.6	8.6	0.0	76.8	97.6	66.5	0.4	0.0	0.0	0.0	0.0
55-56	0.0	18.3	0.0	0.0	2.6	19.5	1.0	0.0	0.0	0.0	0.0	0.0
59-64	46.4	1.2	0.0	0.0	0.0	6.1	55.7	0.4	0.0	0.0	0.0	0.0
59-68	94.1	1.2	0.0	0.0	0.0	6.1	86.8	20.1	0.0	0.0	0.0	3.5
59-75	97.6	1.2	0.0	0.0	0.0	6.1	86.8	95.7	78.7	20.1	17.1	89.0
60-70	97.2	0.0	0.0	0.0	0.0	3.7	80.5	60.6	3.6	0.0	0.0	20.8
61-71	96.8	0.0	0.0	0.0	0.0	1.2	72.8	77.5	11.9	0.0	0.0	28.7
63-69	60.7	0.0	0.0	0.0	0.0	0.1	48.2	43.9	2.2	0.0	0.0	9.0
63-77	62.2	0.0	0.0	0.0	0.0	0.1	48.2	97.6	97.6	59.8	54.9	96.7
65-82	34.2	0.0	0.0	0.0	0.0	0.0	26.4	95.8	97.6	97.6	97.6	97.6
70-82	0.4	0.0	0.0	0.0	0.0	0.0	0.0	37.0	94.0	97.6	97.6	76.8
42-60	0.0	97.6	97.6	95.8	97.6	93.9	17.1	0.0	0.0	0.0	0.0	0.0
61-77	96.8	0.0	0.0	0.0	0.0	1.2	72.8	97.6	97.6	59.8	54.9	96.7

Alternative 4 (Future)

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	98.3	96.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	90.2	86.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	43.9	26.2	97.6	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	25.6	8.5	92.7	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	98.8	9.8	1.2	78.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	97.8	1.5	1.2	29.3	98.8	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	90.7	1.2	1.2	15.9	90.2	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	70.7	1.2	1.2	6.8	75.6	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	50.0	1.2	1.2	4.6	63.4	98.8	98.8	98.8	98.8	98.8	98.8
56	98.8	31.7	1.2	1.2	2.0	43.9	97.8	98.8	98.8	98.8	98.8	98.8
57	98.8	22.0	1.2	1.2	1.2	27.4	96.6	98.8	98.8	98.8	98.8	98.8
58	98.8	6.1	1.2	1.2	1.2	18.9	92.4	98.8	98.8	98.8	98.8	98.8
59	98.8	2.3	1.2	1.2	1.2	7.3	88.0	98.8	98.8	98.8	98.8	98.8
60	98.8	1.2	1.2	1.2	1.2	4.9	81.7	98.8	98.8	98.8	98.8	98.8
61	98.0	1.2	1.2	1.2	1.2	2.4	74.0	98.8	98.8	98.8	98.8	98.8
62	89.6	1.2	1.2	1.2	1.2	1.9	62.8	98.8	98.8	98.8	98.8	98.8
63	63.4	1.2	1.2	1.2	1.2	1.3	49.4	98.8	98.8	98.8	98.8	98.8
64	52.4	1.2	1.2	1.2	1.2	1.2	32.3	98.4	98.8	98.8	98.8	98.8
65	35.4	1.2	1.2	1.2	1.2	1.2	27.6	97.0	98.8	98.8	98.8	98.8
66	21.3	1.2	1.2	1.2	1.2	1.2	17.1	92.3	98.8	98.8	98.8	98.8
68	4.7	1.2	1.2	1.2	1.2	1.2	1.2	78.7	98.8	98.8	98.8	95.3
69	2.7	1.2	1.2	1.2	1.2	1.2	1.2	54.9	96.6	98.8	98.8	89.8
70	1.6	1.2	1.2	1.2	1.2	1.2	1.2	38.2	95.2	98.8	98.8	78.0
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	21.3	86.9	98.8	98.8	70.1
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	13.0	81.7	98.8	98.8	53.7
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.6	40.9	91.5	88.7	22.0
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.1	20.3	78.7	82.3	9.8
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.5	39.0	42.7	2.1
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	89.0	84.8	97.6	97.6	97.6	95.7	78.5	20.1	16.5	89.0
50-64	46.4	97.6	8.6	0.0	76.8	97.6	66.5	0.4	0.0	0.0	0.0	0.0
55-56	0.0	18.3	0.0	0.0	2.6	19.5	1.0	0.0	0.0	0.0	0.0	0.0
59-64	46.4	1.1	0.0	0.0	0.0	6.1	55.7	0.4	0.0	0.0	0.0	0.0
59-68	94.1	1.1	0.0	0.0	0.0	6.1	86.8	20.1	0.0	0.0	0.0	3.5
59-75	97.6	1.1	0.0	0.0	0.0	6.1	86.8	95.7	78.5	20.1	16.5	89.0
60-70	97.2	0.0	0.0	0.0	0.0	3.7	80.5	60.6	3.6	0.0	0.0	20.8
61-71	96.8	0.0	0.0	0.0	0.0	1.2	72.8	77.5	11.9	0.0	0.0	28.7
63-69	60.7	0.0	0.0	0.0	0.0	0.1	48.2	43.9	2.2	0.0	0.0	9.0
63-77	62.2	0.0	0.0	0.0	0.0	0.1	48.2	97.6	97.3	59.8	56.1	96.7
65-82	34.2	0.0	0.0	0.0	0.0	0.0	26.4	95.8	97.6	97.6	97.6	97.6
70-82	0.4	0.0	0.0	0.0	0.0	0.0	0.0	37.0	94.0	97.6	97.6	76.8
42-60	0.0	97.6	97.6	95.8	97.6	93.9	17.1	0.0	0.0	0.0	0.0	0.0
61-77	96.8	0.0	0.0	0.0	0.0	1.2	72.8	97.6	97.3	59.8	56.1	96.7

Alternative 4 (Future) - No Action Alternative

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
43	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
48	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
49	0.0	0.0	-0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
52	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
53	0.0	0.5	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
54	0.0	0.0	0.0	0.0	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
56	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
57	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
58	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
62	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
66	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
68	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
72	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
74	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0
75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.6	0.0
77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	-1.2	0.0
82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
86	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
88	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
98	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45-75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.2	0.0	-0.6	0.0
50-64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55-56	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-64	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-68	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-75	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	-0.2	0.0	-0.6	0.0
60-70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61-71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63-69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.3	0.0	1.2	0.0
65-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42-60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.3	0.0	1.2	0.0

Table 239 No Action Alternative -Alternative 4 (Future)

Alternative 4 (Future) vs No Action Alternative
Sacramento River at Rio Vista, Monthly Flow

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
-1.0 < X < 1.0	75.6	98.8	89.0	85.4	82.9	91.5	89.0	89.0	93.9	92.7	97.6	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	22.0	1.2	3.7	9.8	14.6	2.4	4.9	1.2	1.2	6.1	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	1.2	0.0	7.3	0.0	1.2	2.4	6.1	9.8	3.7	1.2	1.2	0.0
Net Change in % Exceedance:	20.7	1.2	-3.7	9.8	13.4	0.0	-1.2	-8.5	-2.4	4.9	-1.2	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Low Flows (Upper 40% of Distribution)												
-1.0 < X < 1.0	90.9	97.0	81.8	100.0	81.8	90.9	84.8	90.9	100.0	81.8	97.0	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1 (Total %)	6.1	3.0	3.0	0.0	12.1	3.0	12.1	0.0	0.0	15.2	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1 (Total %)	3.0	0.0	15.2	0.0	3.0	0.0	3.0	9.1	0.0	3.0	0.0	0.0
Net Change in % Exceedance:	3.0	3.0	-12.1	0.0	9.1	3.0	9.1	-9.1	0.0	12.1	0.0	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 240 No Action Alternative -Alternative 4 (Future)

Alternative 4 (Future) vs No Action Alternative
Yolo Bypass, Monthly Flow

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
-1.0 < X < 1.0	100.0	30.5	31.7	34.1	29.3	22.0	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	69.5	58.5	54.9	52.4	63.4	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	0.0	69.5	67.1	65.9	70.7	78.0	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	69.5	65.9	65.9	70.7	78.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	69.5	58.5	54.9	52.4	63.4	0.0	0.0	0.0	0.0	0.0	0.0
Low Flows (Upper 40% of Distribution)												
-1.0 < X < 1.0	100.0	75.8	69.7	48.5	30.3	12.1	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	24.2	30.3	51.5	69.7	87.9	0.0	0.0	0.0	0.0	0.0	0.0
X>1 (Total %)	0.0	24.2	30.3	51.5	69.7	87.9	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	24.2	30.3	51.5	69.7	87.9	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	24.2	30.3	51.5	69.7	87.9	0.0	0.0	0.0	0.0	0.0	0.0

Table 241 No Action Alternative -Alternative 4 (Future)

Alternative 4 (Future) vs No Action Alternative
Delta Outflow, Monthly Flow

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
-1.0 < X < 1.0	73.2	98.8	86.6	97.6	87.8	95.1	97.6	96.3	93.9	100.0	97.6	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	22.0	1.2	4.9	2.4	9.8	1.2	2.4	0.0	1.2	0.0	2.4	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	0.0	0.0	8.5	0.0	2.4	2.4	0.0	3.7	4.9	0.0	0.0	0.0
Net Change in % Exceedance:	22.0	1.2	-3.7	2.4	7.3	-1.2	2.4	-3.7	-3.7	0.0	2.4	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Low Flows (Upper 40% of Distribution)												
-1.0 < X < 1.0	54.5	97.0	84.8	100.0	75.8	90.9	100.0	90.9	93.9	100.0	100.0	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1 (Total %)	33.3	3.0	12.1	0.0	18.2	3.0	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1 (Total %)	0.0	0.0	3.0	0.0	6.1	3.0	0.0	9.1	6.1	0.0	0.0	0.0
Net Change in % Exceedance:	33.3	3.0	9.1	0.0	12.1	0.0	0.0	-9.1	-6.1	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Long-Term and Water Year-Type Average of Sacramento River Delta Inflow Under Future - Base and Future - Alternative 5

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Future - Base	8,350	10,798	22,082	31,475	37,498	30,725	19,501	11,009	11,566	13,675	9,771	13,116	13,187
Future - Alternative 5	8,372	10,695	21,739	30,880	36,894	30,403	19,496	11,002	11,561	13,674	9,765	13,112	13,069
Difference	22	-103	-343	-596	-604	-321	-5	-8	-5	0	-7	-4	-118
Percent Difference	0%	-1%	-2%	-2%	-2%	-1%	0%	0%	0%	0%	0%	0%	-1%
							Water Year-Types						
Wet													
Future - Base	8,996	14,634	37,088	51,035	56,945	47,194	30,753	12,279	11,846	17,045	8,777	23,150	19,185
Future - Alternative 5	9,000	14,383	36,363	50,229	56,220	46,849	30,782	12,286	11,847	17,046	8,760	23,139	19,015
Difference	4	-251	-725	-805	-725	-345	30	7	1	1	-17	-11	-170
Percent Difference	0%	-2%	-2%	-2%	-1%	-1%	0%	0%	0%	0%	0%	0%	-1%
Above Normal													
Future - Base	9,290	10,029	19,595	40,534	52,912	37,168	18,221	12,048	12,038	14,830	9,005	15,709	15,067
Future - Alternative 5	9,456	9,948	19,204	39,596	52,210	36,648	18,223	12,048	12,037	14,830	9,000	15,709	14,919
Difference	166	-81	-391	-938	-701	-520	2	0	-1	0	-4	0	-148
Percent Difference	2%	-1%	-2%	-2%	-1%	-1%	0%	0%	0%	0%	0%	0%	-1%
Below Normal													
Future - Base	8,183	9,236	16,398	24,715	25,957	23,572	16,492	11,386	12,357	12,801	10,142	6,570	10,705
Future - Alternative 5	8,181	9,217	16,201	23,971	25,220	23,202	16,438	11,367	12,366	12,784	10,143	6,570	10,576
Difference	-2	-19	-198	-744	-737	-370	-55	-19	9	-17	0	0	-128
Percent Difference	0%	0%	-1%	-3%	-3%	-2%	0%	0%	0%	0%	0%	0%	-1%
Dry													
Future - Base	7,696	9,129	14,297	16,142	24,160	21,042	12,961	10,471	11,580	11,715	11,004	6,583	9,426
Future - Alternative 5	7,696	9,092	14,202	15,859	23,621	20,721	12,940	10,444	11,584	11,699	11,004	6,583	9,347
Difference	0	-36	-95	-283	-539	-321	-21	-27	4	-16	1	0	-79
Percent Difference	0%	0%	-1%	-2%	-2%	-2%	0%	0%	0%	0%	0%	0%	-1%
Critical													
Future - Base	7,362	7,663	10,980	13,674	15,968	13,022	10,454	7,796	9,644	9,526	10,173	6,975	7,426
Future - Alternative 5	7,353	7,660	10,939	13,483	15,749	12,985	10,448	7,796	9,592	9,567	10,167	6,974	7,395
Difference	-9	-3	-41	-191	-218	-36	-6	0	-53	40	-6	-1	-31
Percent Difference	0%	0%	0%	-1%	-1%	0%	0%	0%	-1%	0%	0%	0%	0%

Sacramento River Delta Inflow

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	9,235	17,027	51,654	65,553	69,785	60,402	45,827	14,062	14,775	19,566	11,080	23,931
20%	8,769	12,121	31,691	57,934	63,984	51,170	26,603	12,353	13,371	17,266	10,982	23,302
30%	8,164	10,380	21,194	41,318	55,940	41,821	18,011	11,604	12,742	14,296	10,796	21,171
40%	7,981	9,237	17,702	28,066	43,996	30,782	15,285	11,092	11,853	13,342	10,577	15,579
50%	7,891	8,609	16,336	22,928	32,847	22,574	13,363	10,364	11,233	12,636	10,333	6,896
60%	7,870	7,940	13,685	19,586	22,299	17,435	12,171	9,646	10,701	12,343	9,683	6,650
70%	7,816	7,863	12,583	14,988	18,509	15,725	11,343	9,037	10,289	11,773	8,734	6,595
80%	7,655	7,666	9,913	12,874	16,673	13,489	10,154	8,418	9,791	11,041	8,421	6,535
90%	6,420	6,929	9,262	10,998	14,384	11,578	8,911	7,956	8,712	9,884	7,899	6,418
Long Term												
Full Simulation Period	8,350	10,798	22,082	31,475	37,498	30,725	19,501	11,009	11,566	13,675	9,771	13,116
Water Year Types												
Wet	8,996	14,634	37,088	51,035	56,945	47,194	30,753	12,279	11,846	17,045	8,777	23,150
Above Normal	9,290	10,029	19,595	40,534	52,912	37,168	18,221	12,048	12,038	14,830	9,005	15,709
Below Normal	8,183	9,236	16,398	24,715	25,957	23,572	16,492	11,386	12,357	12,801	10,142	6,570
Dry	7,696	9,129	14,297	16,142	24,160	21,042	12,961	10,471	11,580	11,715	11,004	6,583
Critical	7,362	7,663	10,980	13,674	15,968	13,022	10,454	7,796	9,644	9,526	10,173	6,975

Future - Alternative 5

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	9,257	16,693	50,759	65,452	69,822	59,676	45,827	14,062	14,731	19,564	11,081	23,931
20%	8,823	12,106	30,366	56,643	63,716	51,103	26,619	12,350	13,405	17,266	10,975	23,304
30%	8,221	10,363	20,560	39,016	54,306	40,793	18,008	11,602	12,750	14,302	10,796	21,171
40%	7,981	9,230	17,545	26,714	43,173	29,419	15,158	11,013	11,855	13,339	10,577	15,580
50%	7,891	8,589	16,200	22,327	31,796	22,175	13,360	10,364	11,209	12,614	10,275	6,895
60%	7,856	7,935	13,668	19,167	21,371	17,317	12,171	9,635	10,718	12,342	9,683	6,650
70%	7,814	7,859	12,537	14,906	18,136	15,649	11,338	9,037	10,289	11,776	8,734	6,595
80%	7,655	7,664	9,879	12,835	16,522	13,426	10,281	8,418	9,790	11,228	8,421	6,535
90%	6,454	6,927	9,261	10,984	14,368	11,586	8,911	7,949	8,712	9,848	7,901	6,418
Long Term												
Full Simulation Period	8,372	10,695	21,739	30,880	36,894	30,403	19,496	11,002	11,561	13,674	9,765	13,112
Water Year Types												
Wet	9,000	14,383	36,363	50,229	56,220	46,849	30,782	12,286	11,847	17,046	8,760	23,139
Above Normal	9,456	9,948	19,204	39,596	52,210	36,648	18,223	12,048	12,037	14,830	9,000	15,709
Below Normal	8,181	9,217	16,201	23,971	25,220	23,202	16,438	11,367	12,366	12,784	10,143	6,570
Dry	7,696	9,092	14,202	15,859	23,621	20,721	12,940	10,444	11,584	11,699	11,004	6,583
Critical	7,353	7,660	10,939	13,483	15,749	12,985	10,448	7,796	9,592	9,567	10,167	6,974

Future - Alternative 5 Minus Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	23	-334	-894	-100	37	-726	0	0	-44	-2	0	0
20%	54	-16	-1,326	-1,291	-268	-67	17	-2	33	0	-7	2
30%	58	-17	-634	-2,302	-1,635	-1,028	-3	-2	8	6	1	0
40%	0	-7	-157	-1,352	-824	-1,363	-127	-78	2	-3	0	1
50%	0	-20	-136	-601	-1,051	-399	-3	0	-25	-21	-58	-1
60%	-14	-5	-18	-419	-928	-118	0	-11	17	0	0	0
70%	-2	-5	-46	-82	-373	-76	-5	0	0	3	0	0
80%	0	-2	-34	-39	-151	-63	127	0	0	187	0	0
90%	34	-2	-1	-14	-16	8	0	-7	0	-36	1	0
Long Term												
Full Simulation Period	22	-103	-343	-596	-604	-321	-5	-8	-5	0	-7	-4
Water Year Types												
Wet	4	-251	-725	-805	-725	-345	30	7	1	1	-17	-11
Above Normal	166	-81	-391	-938	-701	-520	2	0	-1	0	-4	0
Below Normal	-2	-19	-198	-744	-737	-370	-55	-19	9	-17	0	0
Dry	0	-36	-95	-283	-539	-321	-21	-27	4	-16	1	0
Critical	-9	-3	-41	-191	-218	-36	-6	0	-53	40	-6	-1

Long-Term and Water Year-Type Average of Total CVP Deliveries North of the Delta Under Future - Base and Future - Alternative 5

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Future - Base	1,473	705	382	224	236	323	5,015	5,427	7,762	7,605	5,752	1,944	2,234
Future - Alternative 5	1,473	705	383	224	235	323	5,015	5,427	7,762	7,605	5,752	1,944	2,234
Difference	0	0	1	0	-1	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
							Water Year-Types						
Wet													
Future - Base	1,422	667	363	222	239	272	4,539	5,521	8,164	8,101	6,181	2,142	2,294
Future - Alternative 5	1,422	667	363	223	240	272	4,539	5,521	8,164	8,101	6,180	2,142	2,294
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal													
Future - Base	1,457	694	376	226	237	239	4,896	5,545	7,962	7,972	5,945	2,186	2,288
Future - Alternative 5	1,454	694	376	226	236	239	4,896	5,545	7,961	7,971	5,944	2,186	2,287
Difference	-2	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal													
Future - Base	1,574	746	411	234	233	328	5,295	5,621	7,827	7,667	5,800	1,881	2,280
Future - Alternative 5	1,574	746	417	234	227	328	5,295	5,621	7,827	7,667	5,800	1,881	2,281
Difference	0	0	7	0	-6	0	0	0	1	1	0	0	0
Percent Difference	0%	0%	2%	0%	-3%	0%	0%	0%	0%	0%	0%	0%	0%
Dry													
Future - Base	1,508	709	382	229	237	331	5,227	5,486	7,679	7,543	5,719	1,793	2,233
Future - Alternative 5	1,508	709	382	229	237	331	5,227	5,486	7,679	7,543	5,719	1,793	2,233
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical													
Future - Base	1,430	744	395	208	229	491	5,500	4,805	6,777	6,232	4,651	1,613	2,004
Future - Alternative 5	1,430	744	395	208	229	491	5,500	4,805	6,777	6,232	4,651	1,613	2,004
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Total CVP Deliveries North of the Delta

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	1,805	942	487	299	267	609	6,547	6,089	8,526	8,483	6,489	2,345
20%	1,755	883	457	252	247	417	5,972	5,927	8,171	8,021	6,143	2,197
30%	1,658	800	416	226	238	324	5,606	5,855	8,035	7,830	5,984	2,126
40%	1,589	744	392	214	238	246	5,384	5,734	7,885	7,765	5,908	2,076
50%	1,479	674	372	213	238	223	5,166	5,604	7,789	7,720	5,830	1,992
60%	1,378	629	349	213	232	214	4,809	5,360	7,687	7,626	5,729	1,927
70%	1,309	601	337	211	230	212	4,680	5,116	7,576	7,431	5,626	1,790
80%	1,217	552	310	198	212	212	4,277	4,968	7,405	7,212	5,449	1,713
90%	1,119	511	297	183	206	199	3,070	4,539	7,117	7,088	5,246	1,500
Long Term												
Full Simulation Period	1,473	705	382	224	236	323	5,015	5,427	7,762	7,605	5,752	1,944
Water Year Types												
Wet	1,422	667	363	222	239	272	4,539	5,521	8,164	8,101	6,181	2,142
Above Normal	1,457	694	376	226	237	239	4,896	5,545	7,962	7,972	5,945	2,186
Below Normal	1,574	746	411	234	233	328	5,295	5,621	7,827	7,667	5,800	1,881
Dry	1,508	709	382	229	237	331	5,227	5,486	7,679	7,543	5,719	1,793
Critical	1,430	744	395	208	229	491	5,500	4,805	6,777	6,232	4,651	1,613

Future - Alternative 5

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	1,805	942	487	299	267	609	6,547	6,089	8,526	8,483	6,490	2,345
20%	1,755	883	457	252	247	416	5,972	5,927	8,170	8,021	6,143	2,197
30%	1,657	800	423	226	238	324	5,606	5,864	8,035	7,830	5,984	2,126
40%	1,589	744	394	214	238	246	5,384	5,734	7,885	7,765	5,909	2,076
50%	1,479	674	376	213	238	223	5,166	5,603	7,789	7,720	5,830	1,993
60%	1,378	629	350	213	231	214	4,809	5,360	7,685	7,633	5,728	1,926
70%	1,309	601	337	211	230	212	4,680	5,116	7,576	7,438	5,626	1,791
80%	1,217	552	310	198	210	212	4,277	4,968	7,402	7,209	5,449	1,713
90%	1,119	511	297	183	203	199	3,070	4,539	7,116	7,088	5,246	1,499
Long Term												
Full Simulation Period	1,473	705	383	224	235	323	5,015	5,427	7,762	7,605	5,752	1,944
Water Year Types												
Wet	1,422	667	363	223	240	272	4,539	5,521	8,164	8,101	6,180	2,142
Above Normal	1,454	694	376	226	236	239	4,896	5,545	7,961	7,971	5,944	2,186
Below Normal	1,574	746	417	234	227	328	5,295	5,621	7,827	7,667	5,800	1,881
Dry	1,508	709	382	229	237	331	5,227	5,486	7,679	7,543	5,719	1,793
Critical	1,430	744	395	208	229	491	5,500	4,805	6,777	6,232	4,651	1,613

Future - Alternative 5 Minus Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	1	0	0	0	0	0	0	0	0	0	1	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	-1	0	8	0	0	0	0	9	0	0	0	0
40%	0	0	2	0	0	0	0	0	0	-1	1	0
50%	0	0	4	0	0	0	0	-1	0	-1	0	0
60%	0	0	1	0	0	0	0	0	-2	7	-1	-1
70%	0	0	0	0	0	0	0	0	0	7	0	1
80%	0	0	0	0	-3	0	0	-1	-3	-2	0	0
90%	0	0	0	0	-3	1	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	1	0	-1	0	0	0	0	0	0	0
Water Year Types												
Wet	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal	-2	0	0	0	0	0	0	0	0	0	0	0
Below Normal	0	0	7	0	-6	0	0	0	1	1	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

Long-Term and Water Year-Type Average of Total CVP Deliveries South of the Delta Under Future - Base and Future - Alternative 5

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Future - Base	2,541	1,483	1,013	1,043	1,435	1,900	2,274	3,350	4,776	5,105	4,521	3,213	1,977
Future - Alternative 5	2,541	1,483	1,013	1,043	1,434	1,900	2,274	3,350	4,776	5,104	4,521	3,213	1,977
Difference	0	0	0	0	0	0	0	0	-1	-1	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
							Water Year-Types						
Wet													
Future - Base	2,628	1,550	1,095	1,170	1,593	2,232	2,721	3,999	5,835	6,367	5,454	3,566	2,313
Future - Alternative 5	2,628	1,550	1,095	1,170	1,593	2,231	2,720	3,998	5,833	6,365	5,453	3,565	2,313
Difference	0	0	0	0	0	-1	0	-1	-1	-1	-1	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal													
Future - Base	2,596	1,530	1,079	1,152	1,565	2,038	2,507	3,669	5,292	5,715	4,982	3,398	2,150
Future - Alternative 5	2,596	1,530	1,079	1,151	1,565	2,038	2,507	3,669	5,291	5,714	4,981	3,398	2,150
Difference	0	0	0	0	-1	0	0	0	-1	-1	-1	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal													
Future - Base	2,569	1,496	1,013	1,030	1,414	1,790	2,113	3,233	4,568	4,845	4,352	3,183	1,913
Future - Alternative 5	2,570	1,496	1,013	1,031	1,416	1,792	2,114	3,232	4,568	4,845	4,351	3,183	1,914
Difference	1	0	1	1	1	2	1	0	-1	-1	-1	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry													
Future - Base	2,498	1,450	976	989	1,372	1,737	2,052	3,009	4,201	4,404	4,029	3,068	1,802
Future - Alternative 5	2,498	1,449	976	989	1,370	1,739	2,052	3,009	4,201	4,404	4,030	3,068	1,802
Difference	0	0	-1	-1	-1	2	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical													
Future - Base	2,345	1,334	839	773	1,100	1,443	1,639	2,349	3,196	3,259	3,082	2,556	1,447
Future - Alternative 5	2,345	1,334	839	773	1,099	1,443	1,639	2,349	3,196	3,259	3,082	2,556	1,447
Difference	0	0	0	0	-1	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Total CVP Deliveries South of the Delta

Future - Base

	Average Monthly Flow (cfs)											
Statistic	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Probability of Exceedance												
10%	2,941	1,798	1,415	1,688	2,240	2,237	2,991	4,427	6,543	7,218	6,075	3,780
20%	2,680	1,582	1,131	1,233	1,686	2,097	2,545	3,727	5,389	5,832	5,065	3,423
30%	2,638	1,550	1,086	1,155	1,563	2,032	2,485	3,587	5,156	5,552	4,863	3,357
40%	2,592	1,514	1,037	1,069	1,461	1,991	2,369	3,431	4,896	5,239	4,638	3,283
50%	2,558	1,488	1,001	1,006	1,392	1,953	2,330	3,318	4,708	5,013	4,475	3,229
60%	2,543	1,477	986	979	1,342	1,867	2,220	3,270	4,627	4,915	4,405	3,206
70%	2,503	1,445	943	909	1,280	1,698	2,023	3,147	4,424	4,671	4,227	3,144
80%	2,317	1,285	758	649	946	1,506	1,789	2,595	3,551	3,699	3,435	2,852
90%	2,252	1,229	666	483	770	1,506	1,565	2,402	3,208	3,212	3,156	2,749
Long Term												
Full Simulation Period	2,541	1,483	1,013	1,043	1,435	1,900	2,274	3,350	4,776	5,105	4,521	3,213
Water Year Types												
Wet	2,628	1,550	1,095	1,170	1,593	2,232	2,721	3,999	5,835	6,367	5,454	3,566
Above Normal	2,596	1,530	1,079	1,152	1,565	2,038	2,507	3,669	5,292	5,715	4,982	3,398
Below Normal	2,569	1,496	1,013	1,030	1,414	1,790	2,113	3,233	4,568	4,845	4,352	3,183
Dry	2,498	1,450	976	989	1,372	1,737	2,052	3,009	4,201	4,404	4,029	3,068
Critical	2,345	1,334	839	773	1,100	1,443	1,639	2,349	3,196	3,259	3,082	2,556

Future - Alternative 5

	Average Monthly Flow (cfs)											
Statistic	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Probability of Exceedance												
10%	2,941	1,798	1,415	1,688	2,240	2,237	2,989	4,427	6,543	7,217	6,075	3,780
20%	2,680	1,582	1,131	1,233	1,686	2,097	2,545	3,727	5,389	5,832	5,065	3,423
30%	2,638	1,550	1,086	1,155	1,563	2,032	2,486	3,587	5,156	5,552	4,863	3,357
40%	2,591	1,514	1,037	1,069	1,461	1,990	2,368	3,431	4,896	5,239	4,638	3,283
50%	2,557	1,488	1,001	1,005	1,396	1,952	2,329	3,316	4,704	5,008	4,471	3,228
60%	2,543	1,477	986	979	1,341	1,867	2,229	3,270	4,627	4,915	4,405	3,206
70%	2,503	1,444	943	909	1,280	1,701	2,023	3,145	4,422	4,669	4,225	3,143
80%	2,316	1,284	758	648	945	1,506	1,789	2,592	3,547	3,692	3,431	2,850
90%	2,252	1,229	666	483	770	1,506	1,565	2,402	3,208	3,212	3,156	2,749
Long Term												
Full Simulation Period	2,541	1,483	1,013	1,043	1,434	1,900	2,274	3,350	4,776	5,104	4,521	3,213
Water Year Types												
Wet	2,628	1,550	1,095	1,170	1,593	2,231	2,720	3,998	5,833	6,365	5,453	3,565
Above Normal	2,596	1,530	1,079	1,151	1,565	2,038	2,507	3,669	5,291	5,714	4,981	3,398
Below Normal	2,570	1,496	1,013	1,031	1,416	1,792	2,114	3,232	4,568	4,845	4,351	3,183
Dry	2,498	1,449	976	989	1,370	1,739	2,052	3,009	4,201	4,404	4,030	3,068
Critical	2,345	1,334	839	773	1,099	1,443	1,639	2,349	3,196	3,259	3,082	2,556

Future - Alternative 5 Minus Future - Base

	Average Monthly Flow (cfs)											
Statistic	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Probability of Exceedance												
10%	0	0	0	0	0	0	-1	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	-1	-1	0	0	0	0	0
50%	-1	-1	-1	-1	3	-1	-1	-2	-4	-5	-3	-1
60%	0	0	0	0	-1	0	9	0	0	0	0	0
70%	0	0	0	-1	-1	3	0	-1	-2	-2	-2	-1
80%	-1	-1	-1	-1	-1	0	0	-3	-5	-6	-4	-1
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	-1	-1	0	0
Water Year Types												
Wet	0	0	0	0	0	-1	0	-1	-1	-1	-1	0
Above Normal	0	0	0	0	-1	0	0	0	-1	-1	-1	0
Below Normal	1	0	1	1	1	2	1	0	-1	-1	-1	0
Dry	0	0	-1	-1	-1	2	0	0	0	0	0	0
Critical	0	0	0	0	-1	0	0	0	0	0	0	0

Long-Term and Water Year-Type Average of Total SWP Deliveries North of the Delta Under Future - Base and Future - Alternative 5

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Future - Base	1,383	1,394	894	328	13	89	2,005	2,578	3,092	3,044	2,413	1,806	1,154
Future - Alternative 5	1,382	1,393	894	326	13	89	2,005	2,578	3,092	3,044	2,413	1,806	1,154
Difference	0	-1	0	-2	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	-1%	0%	0%	0%	0%	0%	0%	0%	0%	0%
							Water Year-Types						
Wet													
Future - Base	1,303	1,401	853	242	19	65	1,869	2,776	3,389	3,342	2,672	2,074	1,213
Future - Alternative 5	1,316	1,417	863	242	19	65	1,869	2,776	3,389	3,342	2,672	2,074	1,215
Difference	13	16	10	0	0	0	0	0	0	0	0	0	2
Percent Difference	1%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal													
Future - Base	1,565	1,622	1,055	408	15	50	2,031	2,790	3,335	3,327	2,627	2,204	1,275
Future - Alternative 5	1,565	1,622	1,055	408	15	50	2,031	2,790	3,335	3,327	2,627	2,204	1,275
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal													
Future - Base	1,651	1,640	1,087	417	9	64	2,125	2,653	3,143	3,043	2,435	1,792	1,216
Future - Alternative 5	1,651	1,639	1,087	417	9	64	2,125	2,653	3,143	3,043	2,435	1,792	1,216
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	-1%	0%	0%	0%	0%	0%	0%	0%	0%
Dry													
Future - Base	1,337	1,248	830	347	9	103	2,053	2,604	3,083	2,985	2,385	1,750	1,136
Future - Alternative 5	1,319	1,224	815	339	9	103	2,053	2,604	3,082	2,985	2,385	1,750	1,132
Difference	-18	-24	-14	-8	0	0	0	0	0	0	0	0	-4
Percent Difference	-1%	-2%	-2%	-2%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical													
Future - Base	1,172	1,146	734	313	9	182	2,067	1,833	2,185	2,240	1,680	967	881
Future - Alternative 5	1,172	1,146	734	313	9	182	2,067	1,833	2,185	2,240	1,680	967	881
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Total SWP Deliveries North of the Delta

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	2,163	2,065	1,372	614	20	198	2,860	3,128	3,657	3,561	2,846	2,296
20%	2,011	1,961	1,290	520	20	128	2,556	3,038	3,510	3,477	2,800	2,233
30%	1,827	1,898	1,219	469	20	45	2,378	2,974	3,442	3,369	2,687	2,175
40%	1,653	1,843	1,157	443	19	45	2,110	2,899	3,373	3,302	2,608	2,118
50%	1,404	1,703	1,024	383	15	45	2,006	2,738	3,312	3,227	2,577	2,049
60%	1,320	1,495	940	266	11	45	1,845	2,648	3,201	3,168	2,531	1,963
70%	1,203	1,193	681	154	4	45	1,739	2,470	3,116	3,106	2,484	1,662
80%	861	570	347	60	3	32	1,397	1,931	2,987	2,952	2,290	1,247
90%	277	53	12	11	2	20	1,141	1,669	1,927	1,929	1,506	987
Long Term												
Full Simulation Period	1,383	1,394	894	328	13	89	2,005	2,578	3,092	3,044	2,413	1,806
Water Year Types												
Wet	1,303	1,401	853	242	19	65	1,869	2,776	3,389	3,342	2,672	2,074
Above Normal	1,565	1,622	1,055	408	15	50	2,031	2,790	3,335	3,327	2,627	2,204
Below Normal	1,651	1,640	1,087	417	9	64	2,125	2,653	3,143	3,043	2,435	1,792
Dry	1,337	1,248	830	347	9	103	2,053	2,604	3,083	2,985	2,385	1,750
Critical	1,172	1,146	734	313	9	182	2,067	1,833	2,185	2,240	1,680	967

Future - Alternative 5

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	2,163	2,065	1,372	611	20	198	2,860	3,128	3,657	3,561	2,846	2,296
20%	1,976	1,951	1,290	513	20	128	2,556	3,038	3,510	3,477	2,800	2,233
30%	1,796	1,893	1,219	464	20	45	2,378	2,974	3,442	3,369	2,686	2,175
40%	1,653	1,825	1,151	443	19	45	2,110	2,899	3,373	3,302	2,608	2,118
50%	1,404	1,672	991	383	15	45	2,006	2,738	3,312	3,227	2,577	2,049
60%	1,320	1,486	931	266	11	45	1,845	2,648	3,200	3,168	2,531	1,963
70%	1,203	1,193	681	154	4	45	1,739	2,470	3,116	3,106	2,484	1,662
80%	860	570	347	60	3	31	1,397	1,931	2,987	2,952	2,290	1,247
90%	311	79	12	11	2	20	1,141	1,669	1,927	1,929	1,506	987
Long Term												
Full Simulation Period	1,382	1,393	894	326	13	89	2,005	2,578	3,092	3,044	2,413	1,806
Water Year Types												
Wet	1,316	1,417	863	242	19	65	1,869	2,776	3,389	3,342	2,672	2,074
Above Normal	1,565	1,622	1,055	408	15	50	2,031	2,790	3,335	3,327	2,627	2,204
Below Normal	1,651	1,639	1,087	417	9	64	2,125	2,653	3,143	3,043	2,435	1,792
Dry	1,319	1,224	815	339	9	103	2,053	2,604	3,082	2,985	2,385	1,750
Critical	1,172	1,146	734	313	9	182	2,067	1,833	2,185	2,240	1,680	967

Future - Alternative 5 Minus Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	0	0	-3	0	0	0	0	0	0	0	0
20%	-35	-11	0	-7	0	0	0	0	0	0	0	0
30%	-30	-4	0	-5	0	0	0	0	0	0	0	0
40%	0	-17	-6	0	0	0	0	0	0	0	0	0
50%	0	-30	-34	0	0	0	0	0	0	0	0	0
60%	0	-9	-8	0	0	0	0	0	0	0	-1	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	34	26	0	0	0	-1	0	0	0	0	0	-1
Long Term												
Full Simulation Period	0	-1	0	-2	0	0	0	0	0	0	0	0
Water Year Types												
Wet	13	16	10	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	-18	-24	-14	-8	0	0	0	0	0	0	0	0
Critical	0	0	0	0	0	0	0	0	0	0	0	0

Long-Term and Water Year-Type Average of Total SWP Deliveries South of the Delta Under Future - Base and Future - Alternative 5

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Future - Base	4,043	2,984	3,596	472	840	1,531	2,542	3,813	5,165	5,535	5,706	4,829	2,489
Future - Alternative 5	4,042	2,980	3,581	469	838	1,522	2,533	3,804	5,157	5,530	5,700	4,824	2,484
Difference	-1	-4	-15	-3	-2	-9	-10	-9	-8	-4	-6	-6	-5
Percent Difference	0%	0%	0%	-1%	0%	-1%	0%	0%	0%	0%	0%	0%	0%
							Water Year-Types						
Wet													
Future - Base	4,344	2,993	4,138	1,107	1,816	2,666	3,835	5,364	6,773	6,814	7,151	6,006	3,210
Future - Alternative 5	4,355	2,994	4,105	1,106	1,813	2,664	3,834	5,363	6,771	6,812	7,149	6,004	3,208
Difference	10	1	-33	-1	-3	-1	-1	-1	-2	-2	-2	-2	-2
Percent Difference	0%	0%	-1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal													
Future - Base	4,230	3,445	3,981	275	949	2,295	3,530	4,967	6,244	6,377	6,711	5,656	2,949
Future - Alternative 5	4,220	3,439	3,973	253	948	2,291	3,527	4,964	6,239	6,371	6,707	5,651	2,945
Difference	-10	-7	-8	-21	-1	-4	-3	-4	-5	-5	-4	-4	-5
Percent Difference	0%	0%	0%	-8%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal													
Future - Base	4,466	3,200	3,761	277	460	940	2,653	3,955	5,476	6,029	6,261	5,329	2,596
Future - Alternative 5	4,461	3,196	3,757	276	459	894	2,636	3,950	5,468	6,020	6,248	5,319	2,589
Difference	-5	-4	-4	0	-1	-47	-17	-4	-8	-9	-13	-11	-7
Percent Difference	0%	0%	0%	0%	0%	-5%	-1%	0%	0%	0%	0%	0%	0%
Dry													
Future - Base	3,825	2,760	3,103	122	199	821	1,523	2,587	4,084	4,826	4,854	4,140	1,994
Future - Alternative 5	3,819	2,752	3,096	122	196	818	1,502	2,560	4,070	4,829	4,854	4,137	1,988
Difference	-6	-9	-7	0	-3	-2	-22	-27	-13	3	1	-2	-5
Percent Difference	0%	0%	0%	0%	-2%	0%	-1%	-1%	0%	0%	0%	0%	0%
Critical													
Future - Base	3,125	2,678	2,710	71	105	198	415	1,284	2,155	2,635	2,470	2,132	1,213
Future - Alternative 5	3,122	2,674	2,703	71	105	197	409	1,278	2,144	2,620	2,453	2,117	1,208
Difference	-3	-4	-8	0	0	-1	-6	-6	-11	-16	-17	-15	-5
Percent Difference	0%	0%	0%	0%	0%	0%	-1%	0%	-1%	-1%	-1%	-1%	0%

Total SWP Deliveries South of the Delta

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	6,024	4,586	5,669	1,962	2,014	2,905	4,303	5,987	7,491	7,386	7,710	6,606
20%	5,428	4,361	5,320	595	1,939	2,706	3,782	5,413	6,881	7,045	7,177	6,208
30%	5,007	4,042	4,484	231	1,754	2,547	3,546	4,855	6,162	6,469	6,763	5,710
40%	4,894	3,793	4,121	172	634	2,500	3,396	4,756	6,020	6,231	6,634	5,517
50%	4,695	3,368	3,879	145	305	1,970	3,227	4,579	5,814	6,154	6,532	5,440
60%	4,383	2,362	3,600	104	193	456	2,566	3,547	5,530	5,944	6,369	5,228
70%	2,920	2,054	2,708	91	137	337	1,514	2,544	4,505	5,640	5,920	4,934
80%	2,451	1,296	1,887	72	112	220	520	2,078	3,482	4,247	3,946	3,332
90%	1,299	897	964	56	55	146	301	1,184	1,956	2,357	2,163	1,854
Long Term												
Full Simulation Period	4,043	2,984	3,596	472	840	1,531	2,542	3,813	5,165	5,535	5,706	4,829
Water Year Types												
Wet	4,344	2,993	4,138	1,107	1,816	2,666	3,835	5,364	6,773	6,814	7,151	6,006
Above Normal	4,230	3,445	3,981	275	949	2,295	3,530	4,967	6,244	6,377	6,711	5,656
Below Normal	4,466	3,200	3,761	277	460	940	2,653	3,955	5,476	6,029	6,261	5,329
Dry	3,825	2,760	3,103	122	199	821	1,523	2,587	4,084	4,826	4,854	4,140
Critical	3,125	2,678	2,710	71	105	198	415	1,284	2,155	2,635	2,470	2,132

Future - Alternative 5

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	6,027	4,586	5,670	1,965	2,014	2,904	4,306	5,988	7,493	7,390	7,707	6,606
20%	5,430	4,362	5,319	595	1,939	2,681	3,783	5,413	6,881	7,037	7,166	6,209
30%	5,007	4,042	4,484	233	1,748	2,584	3,547	4,855	6,161	6,496	6,778	5,705
40%	4,894	3,772	4,112	172	615	2,486	3,347	4,756	6,020	6,233	6,635	5,523
50%	4,683	3,356	3,869	145	308	1,942	3,227	4,570	5,805	6,155	6,532	5,437
60%	4,351	2,366	3,526	107	193	456	2,509	3,437	5,488	5,940	6,348	5,226
70%	2,959	2,042	2,499	91	137	335	1,470	2,534	4,488	5,642	5,901	4,936
80%	2,467	1,299	1,886	72	111	219	525	2,095	3,512	4,279	3,975	3,353
90%	1,299	894	956	56	55	145	297	1,171	1,934	2,330	2,138	1,848
Long Term												
Full Simulation Period	4,042	2,980	3,581	469	838	1,522	2,533	3,804	5,157	5,530	5,700	4,824
Water Year Types												
Wet	4,355	2,994	4,105	1,106	1,813	2,664	3,834	5,363	6,771	6,812	7,149	6,004
Above Normal	4,220	3,439	3,973	253	948	2,291	3,527	4,964	6,239	6,371	6,707	5,651
Below Normal	4,461	3,196	3,757	276	459	894	2,636	3,950	5,468	6,020	6,248	5,319
Dry	3,819	2,752	3,096	122	196	818	1,502	2,560	4,070	4,829	4,854	4,137
Critical	3,122	2,674	2,703	71	105	197	409	1,278	2,144	2,620	2,453	2,117

Future - Alternative 5 Minus Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	3	1	1	3	0	-1	3	1	2	4	-2	0
20%	2	0	-1	-1	0	-25	0	0	1	-9	-11	1
30%	-1	0	0	2	-6	36	1	-1	-1	27	15	-5
40%	0	-21	-10	0	-19	-15	-50	0	0	2	1	6
50%	-12	-12	-10	0	4	-28	0	-9	-8	1	0	-3
60%	-33	4	-75	3	0	0	-57	-110	-42	-4	-21	-2
70%	39	-12	-209	0	0	-2	-44	-9	-17	2	-19	2
80%	16	3	-1	0	0	-1	5	17	30	32	29	21
90%	0	-3	-9	0	0	-1	-3	-13	-22	-27	-24	-6
Long Term												
Full Simulation Period	-1	-4	-15	-3	-2	-9	-10	-9	-8	-4	-6	-6
Water Year Types												
Wet	10	1	-33	-1	-3	-1	-1	-1	-2	-2	-2	-2
Above Normal	-10	-7	-8	-21	-1	-4	-3	-4	-5	-5	-4	-4
Below Normal	-5	-4	-4	0	-1	-47	-17	-4	-8	-9	-13	-11
Dry	-6	-9	-7	0	-3	-2	-22	-27	-13	3	1	-2
Critical	-3	-4	-8	0	0	-1	-6	-6	-11	-16	-17	-15

Long-Term and Water Year-Type Average of Fremont Weir Spill to Yolo Bypass Under Future - Base and Future - Alternative 5

	Average Flow (cfs)												
Analysis Period	October	November	December	January	February	March	April	May	June	July	August	September	Total (TAF)
							Long-Term						
Full Simulation Period													
Future - Base	43	57	2,754	12,157	16,930	8,465	1,050	3	0	0	0	0	2,453
Future - Alternative 5	43	162	3,104	12,792	17,614	8,794	1,050	3	0	0	0	0	2,579
Difference	0	105	350	635	684	329	0	0	0	0	0	0	125
Percent Difference	0%	185%	13%	5%	4%	4%	0%	0%	0%	0%	0%	0%	5%
							Water Year-Types						
Wet													
Future - Base	135	180	7,592	34,147	41,220	23,151	3,236	10	0	0	0	0	6,503
Future - Alternative 5	135	447	8,376	35,015	42,013	23,454	3,236	10	0	0	0	0	6,683
Difference	0	267	784	867	794	303	0	0	0	0	0	0	180
Percent Difference	0%	148%	10%	3%	2%	1%	0%	0%	0%	0%	0%	0%	3%
Above Normal													
Future - Base	0	0	946	9,205	25,241	6,208	14	0	0	0	0	0	2,432
Future - Alternative 5	0	70	1,198	10,133	26,065	6,715	14	0	0	0	0	0	2,586
Difference	0	70	253	928	823	506	0	0	0	0	0	0	154
Percent Difference	0%	0%	27%	10%	3%	8%	0%	0%	0%	0%	0%	0%	6%
Below Normal													
Future - Base	0	0	1,390	583	1,456	737	137	0	0	0	0	0	257
Future - Alternative 5	0	19	1,599	1,381	2,258	1,179	137	0	0	0	0	0	392
Difference	0	19	209	798	802	442	0	0	0	0	0	0	135
Percent Difference	0%	0%	15%	137%	55%	60%	0%	0%	0%	0%	0%	0%	53%
Dry													
Future - Base	0	0	0	11	981	717	0	0	0	0	0	0	99
Future - Alternative 5	0	32	116	331	1,613	1,071	0	0	0	0	0	0	185
Difference	0	32	116	321	632	353	0	0	0	0	0	0	86
Percent Difference	0%	0%	0%	2965%	64%	49%	0%	0%	0%	0%	0%	0%	86%
Critical													
Future - Base	0	0	0	0	26	0	0	0	0	0	0	0	1
Future - Alternative 5	0	3	39	209	304	62	0	0	0	0	0	0	37
Difference	0	3	39	209	278	62	0	0	0	0	0	0	35
Percent Difference	0%	0%	0%	0%	1067%	0%	0%	0%	0%	0%	0%	0%	2340%

Fremont Weir Spill to Yolo Bypass

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	0	9,636	45,653	68,479	26,076	480	0	0	0	0	0
20%	0	0	417	14,794	32,134	7,332	2	0	0	0	0	0
30%	0	0	0	2,685	10,131	3,487	0	0	0	0	0	0
40%	0	0	0	83	4,103	180	0	0	0	0	0	0
50%	0	0	0	0	501	0	0	0	0	0	0	0
60%	0	0	0	0	3	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	43	57	2,754	12,157	16,930	8,465	1,050	3	0	0	0	0
Water Year Types												
Wet	135	180	7,592	34,147	41,220	23,151	3,236	10	0	0	0	0
Above Normal	0	0	946	9,205	25,241	6,208	14	0	0	0	0	0
Below Normal	0	0	1,390	583	1,456	737	137	0	0	0	0	0
Dry	0	0	0	11	981	717	0	0	0	0	0	0
Critical	0	0	0	0	26	0	0	0	0	0	0	0

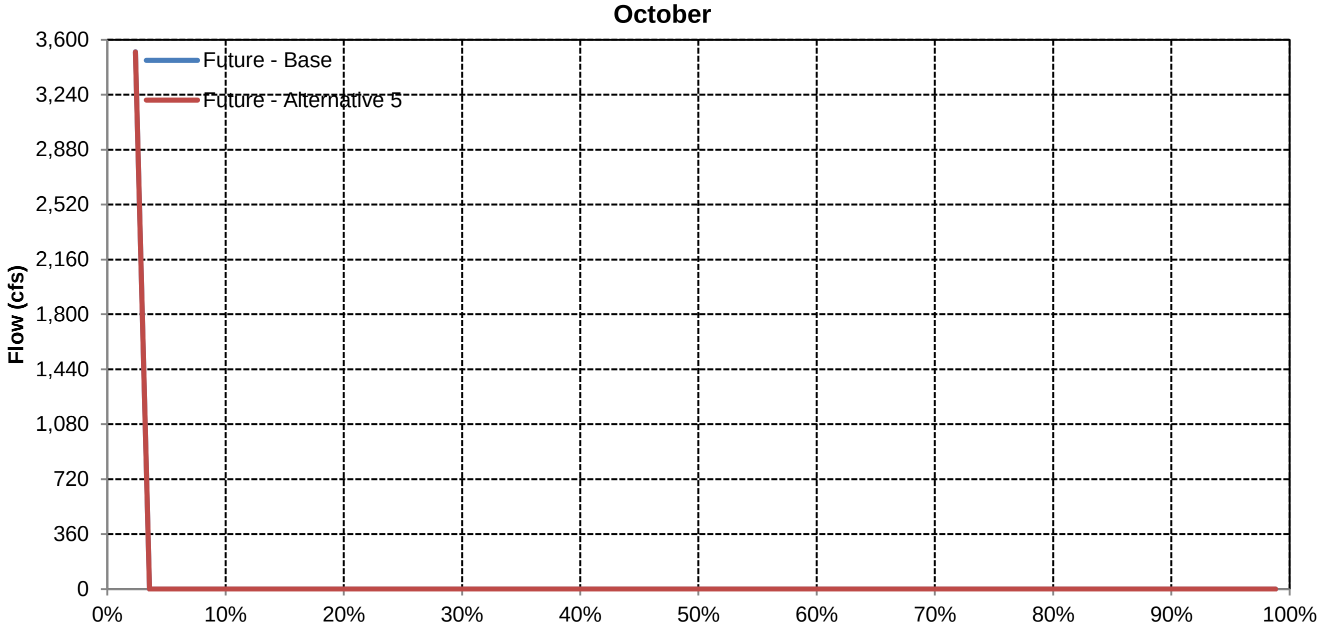
Future - Alternative 5

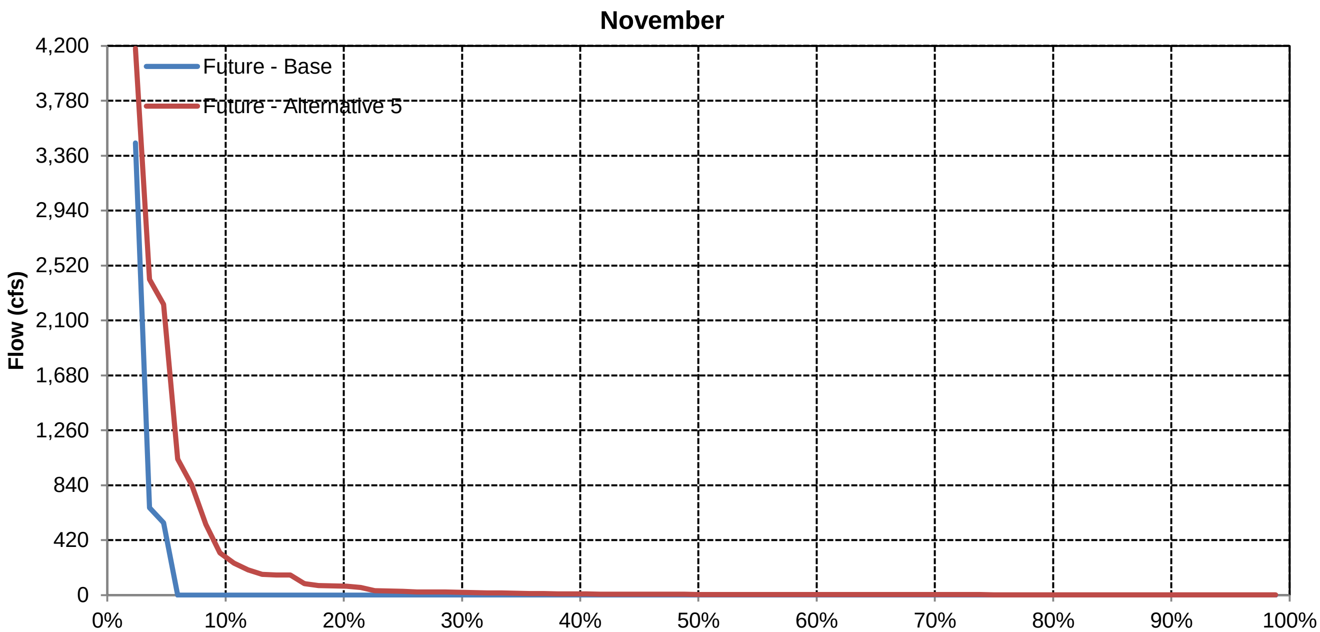
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	229	9,793	45,653	68,636	26,337	480	0	0	0	0	0
20%	0	61	2,077	15,735	32,643	7,645	2	0	0	0	0	0
30%	0	19	450	4,701	11,442	4,002	0	0	0	0	0	0
40%	0	8	249	1,876	5,422	1,514	0	0	0	0	0	0
50%	0	5	124	816	2,273	477	0	0	0	0	0	0
60%	0	4	29	441	1,033	230	0	0	0	0	0	0
70%	0	4	9	96	421	130	0	0	0	0	0	0
80%	0	3	5	24	170	23	0	0	0	0	0	0
90%	0	3	3	9	29	6	0	0	0	0	0	0
Long Term												
Full Simulation Period	43	162	3,104	12,792	17,614	8,794	1,050	3	0	0	0	0
Water Year Types												
Wet	135	447	8,376	35,015	42,013	23,454	3,236	10	0	0	0	0
Above Normal	0	70	1,198	10,133	26,065	6,715	14	0	0	0	0	0
Below Normal	0	19	1,599	1,381	2,258	1,179	137	0	0	0	0	0
Dry	0	32	116	331	1,613	1,071	0	0	0	0	0	0
Critical	0	3	39	209	304	62	0	0	0	0	0	0

Future - Alternative 5 Minus Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	229	157	0	157	261	0	0	0	0	0	0
20%	0	61	1,660	942	508	314	0	0	0	0	0	0
30%	0	19	450	2,016	1,311	514	0	0	0	0	0	0
40%	0	8	249	1,793	1,319	1,334	0	0	0	0	0	0
50%	0	5	124	816	1,772	477	0	0	0	0	0	0
60%	0	4	29	441	1,030	230	0	0	0	0	0	0
70%	0	4	9	96	421	130	0	0	0	0	0	0
80%	0	3	5	24	170	23	0	0	0	0	0	0
90%	0	3	3	9	29	6	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	105	350	635	684	329	0	0	0	0	0	0
Water Year Types												
Wet	0	267	784	867	794	303	0	0	0	0	0	0
Above Normal	0	70	253	928	823	506	0	0	0	0	0	0
Below Normal	0	19	209	798	802	442	0	0	0	0	0	0
Dry	0	32	116	321	632	353	0	0	0	0	0	0
Critical	0	3	39	209	278	62	0	0	0	0	0	0

Fremont Weir Spill to Yolo Bypass





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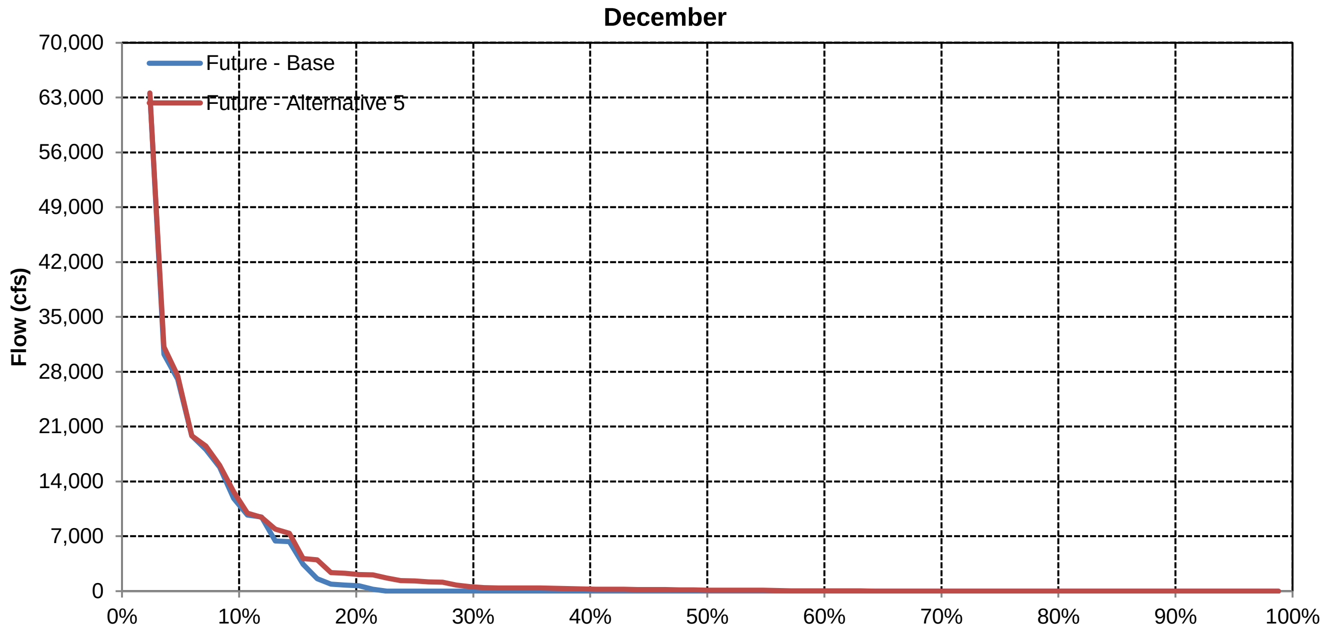

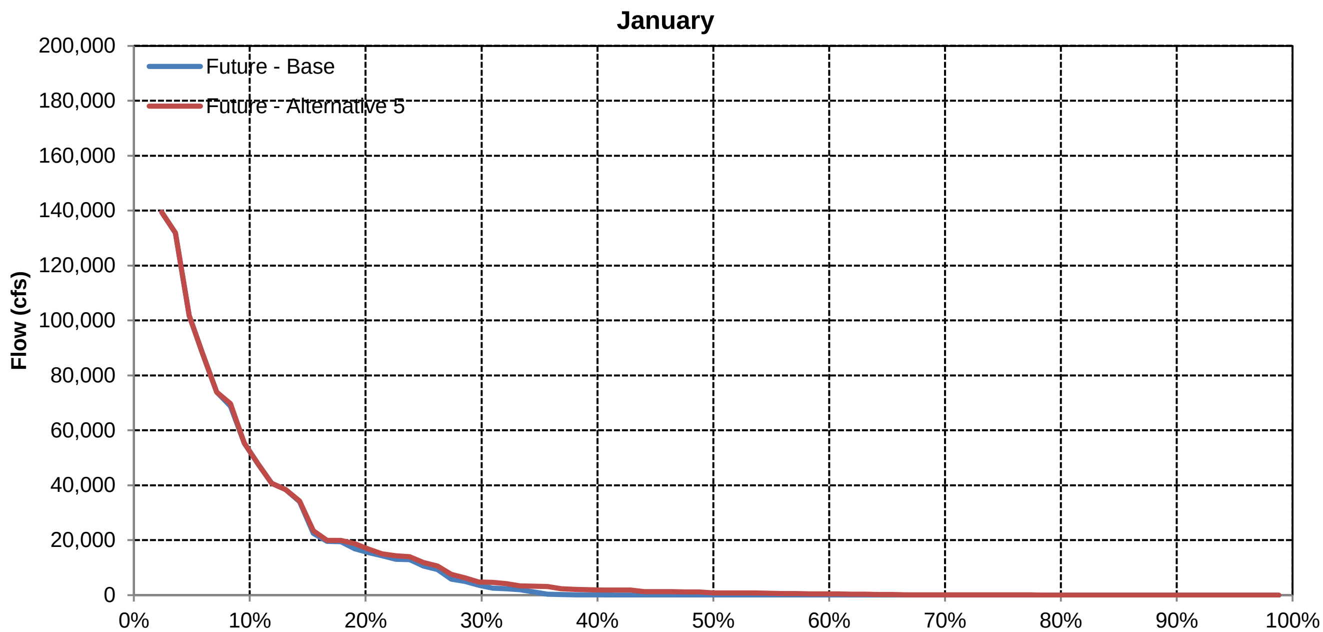

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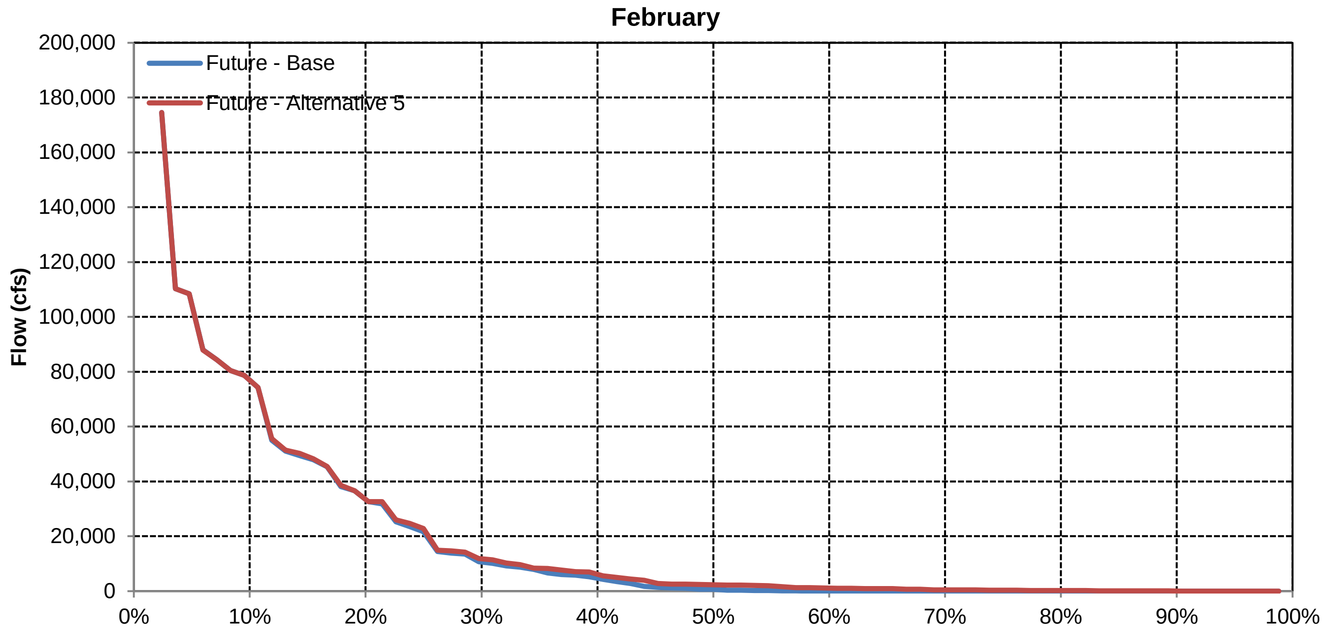

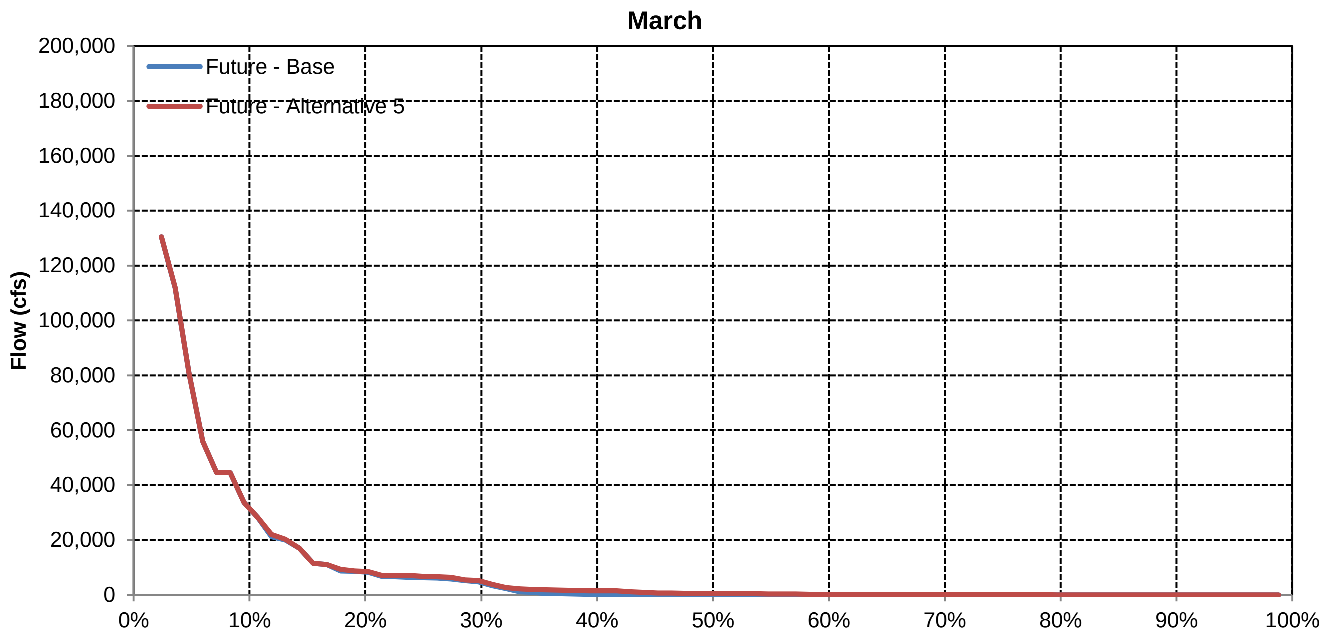

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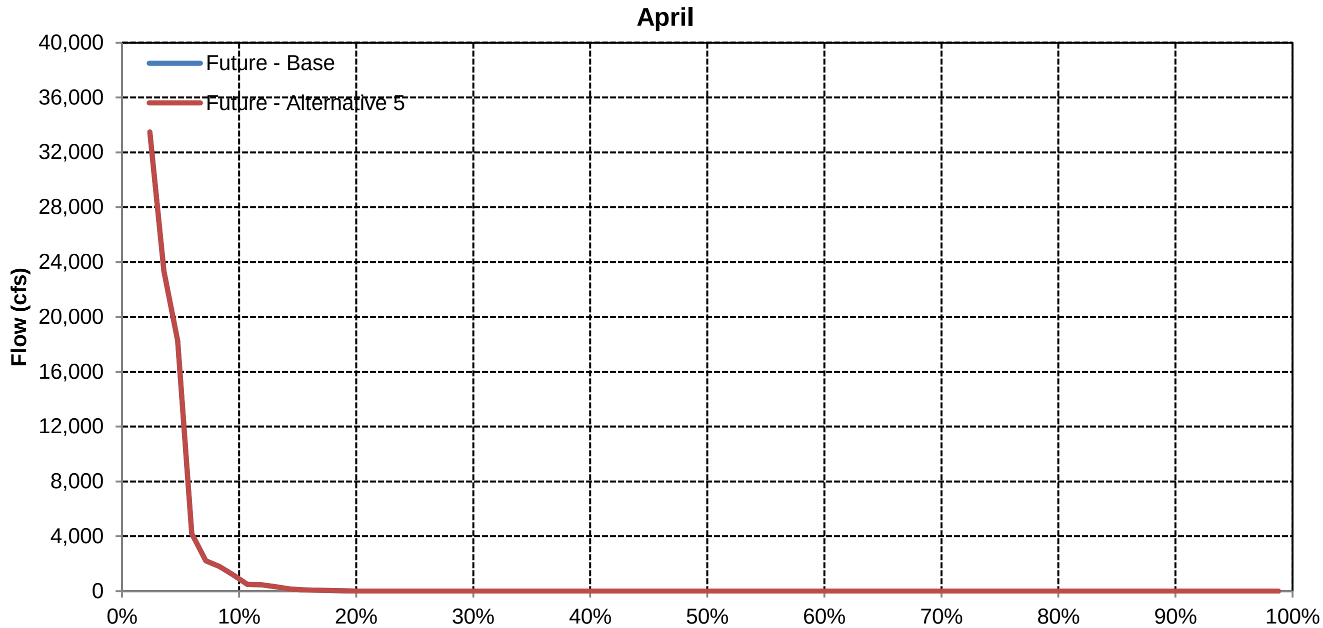

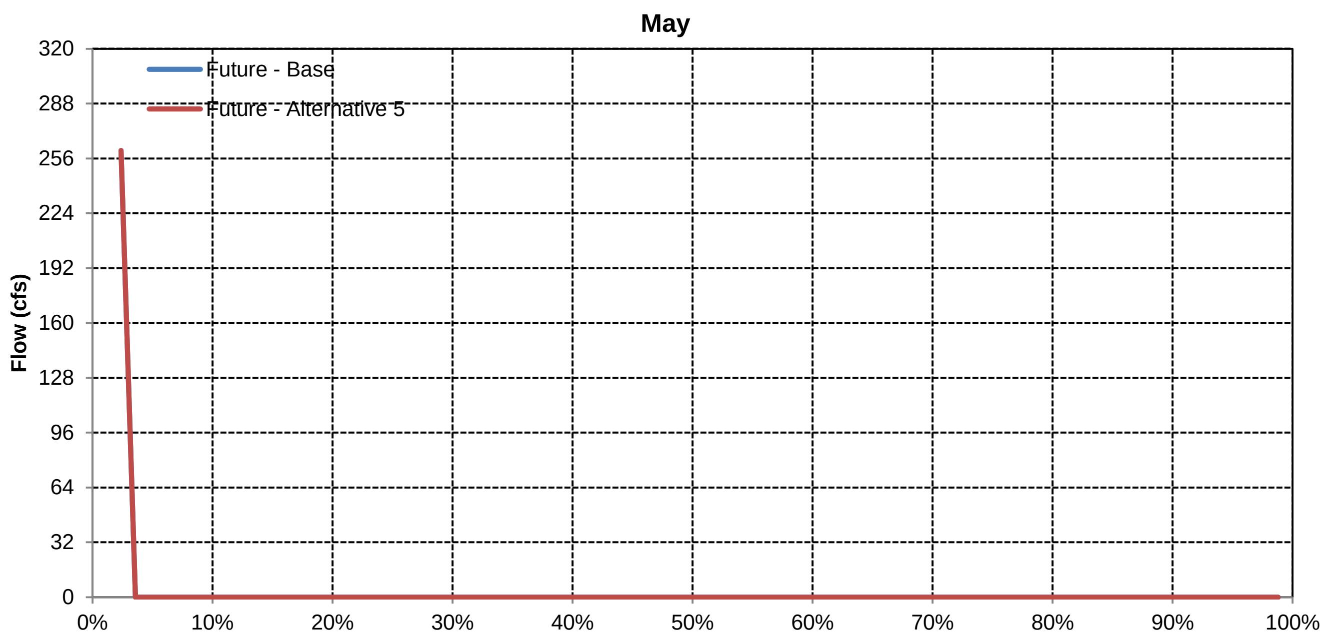

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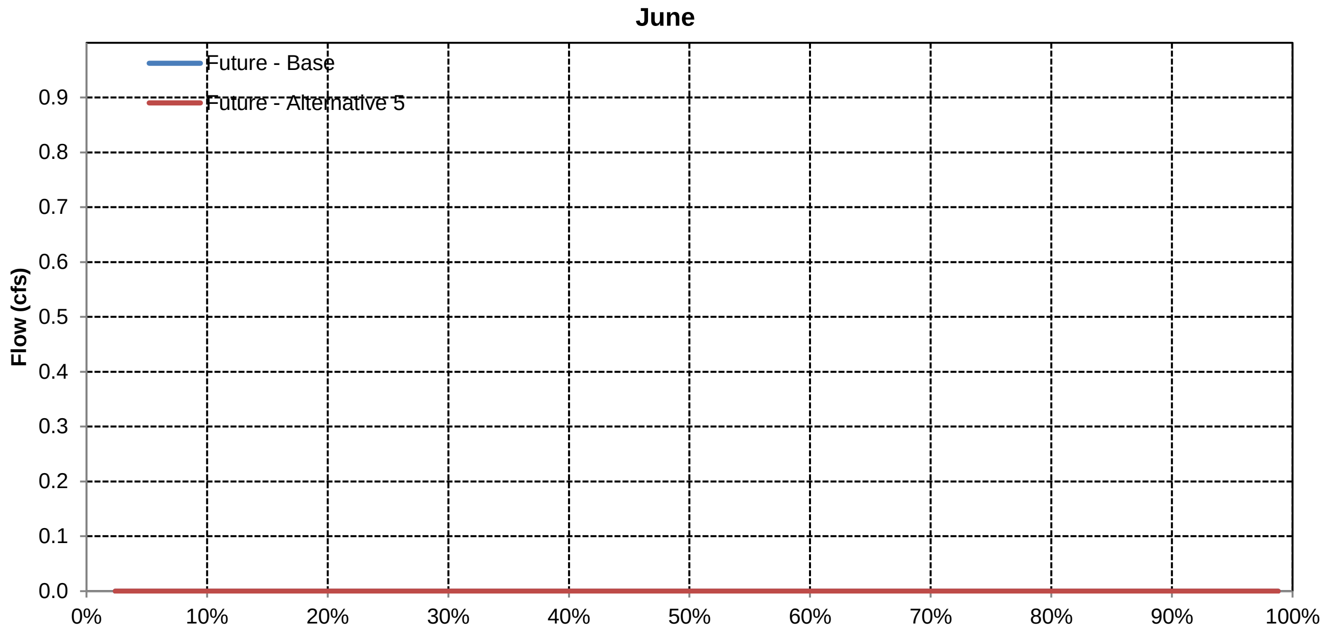

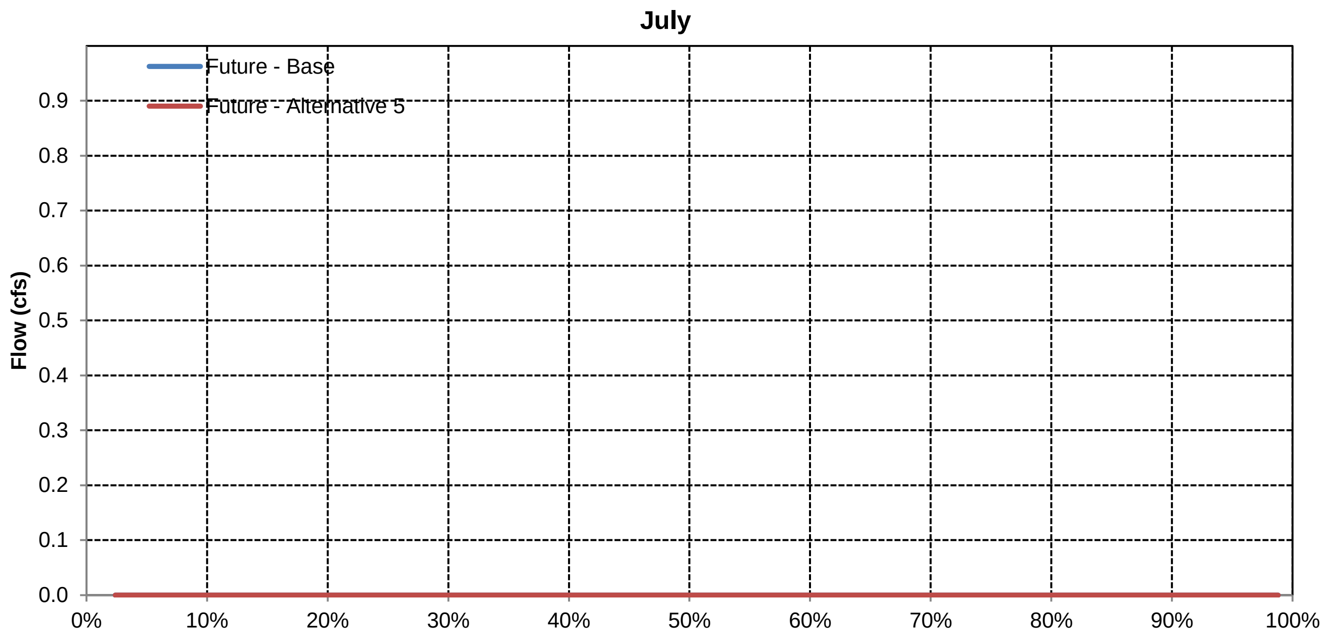

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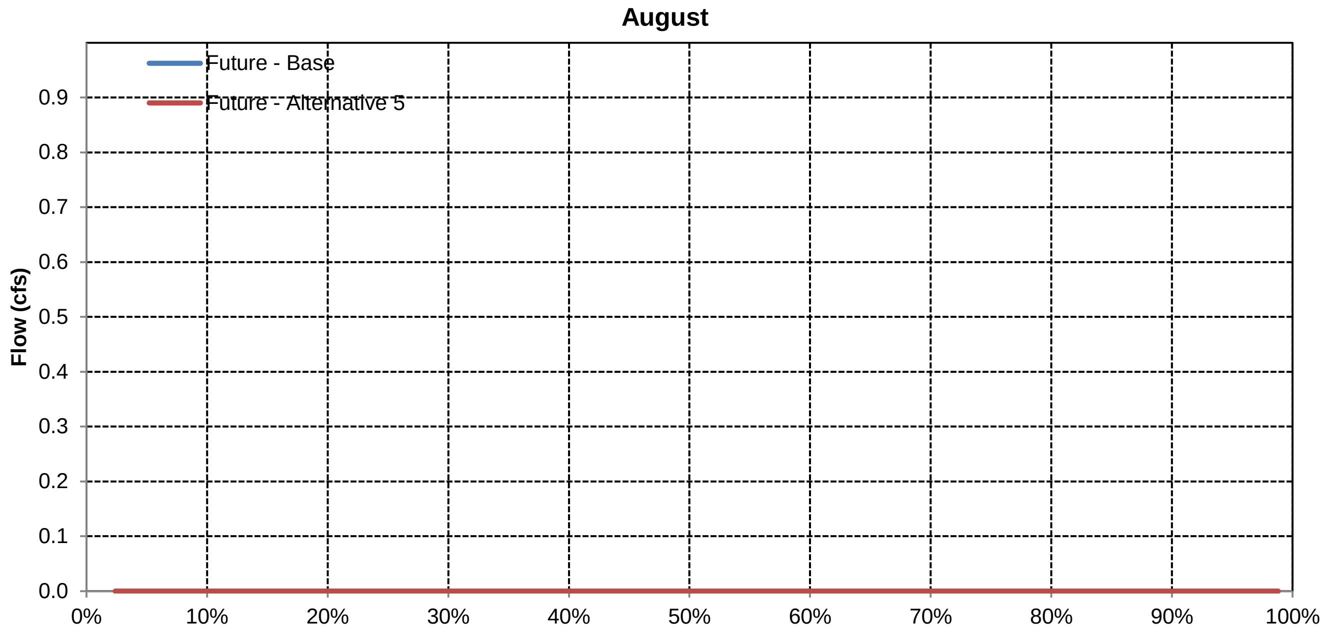
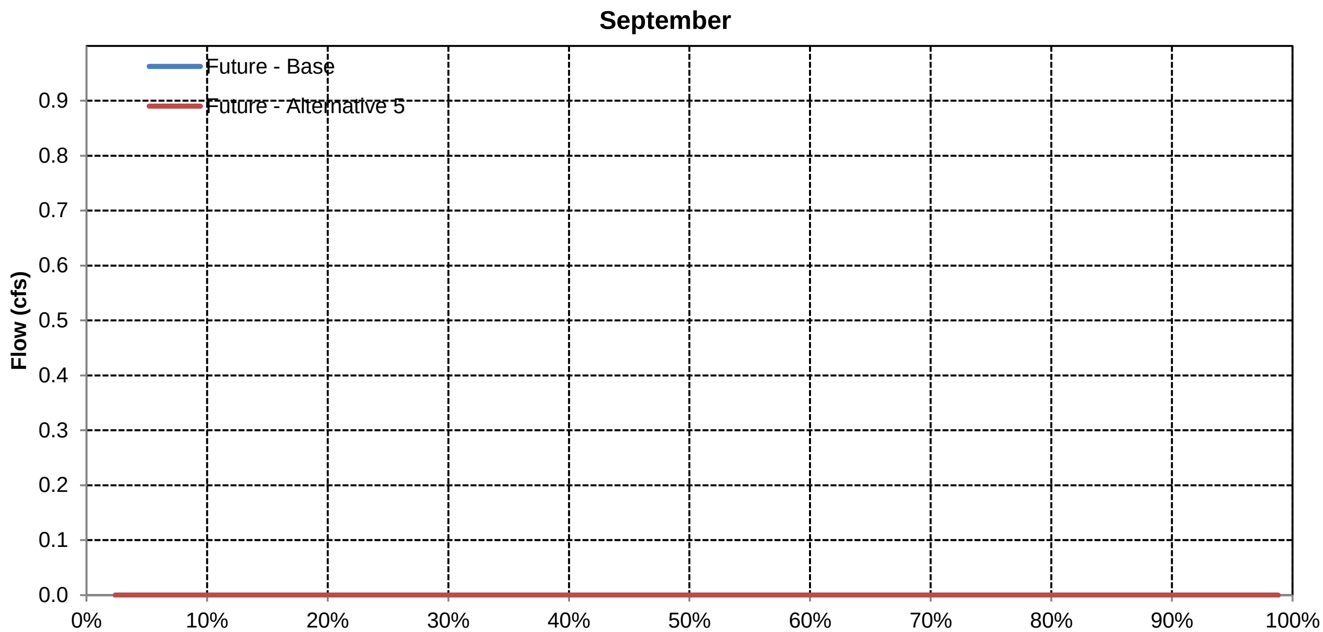




Long-Term and Water Year-Type Average of Sacramento River below Fremont Weir Under Future - Base and Future - Alternative 5

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Future - Base	9,206	10,728	19,728	30,030	35,978	31,028	17,571	10,459	13,675	15,358	11,273	13,824	13,150
Future - Alternative 5	9,239	10,621	19,350	29,388	35,312	30,698	17,569	10,449	13,686	15,357	11,280	13,812	13,025
Difference	33	-107	-378	-642	-667	-330	-2	-11	11	-1	7	-11	-125
Percent Difference	0%	-1%	-2%	-2%	-2%	-1%	0%	0%	0%	0%	0%	0%	-1%
							Water Year-Types						
Wet													
Future - Base	10,316	14,168	33,582	49,490	54,700	46,345	27,848	12,029	14,178	18,965	12,787	23,425	19,081
Future - Alternative 5	10,324	13,902	32,791	48,621	53,954	46,045	27,848	12,025	14,178	18,959	12,761	23,409	18,900
Difference	8	-265	-791	-869	-747	-300	0	-4	0	-6	-26	-16	-181
Percent Difference	0%	-2%	-2%	-2%	-1%	-1%	0%	0%	0%	0%	0%	0%	-1%
Above Normal													
Future - Base	10,180	10,600	18,133	38,066	50,270	39,380	16,639	11,646	16,362	17,891	12,383	16,466	15,480
Future - Alternative 5	10,368	10,520	17,681	37,085	49,533	38,882	16,642	11,646	16,366	17,885	12,379	16,466	15,327
Difference	188	-80	-452	-981	-737	-498	2	0	4	-6	-4	1	-153
Percent Difference	2%	-1%	-2%	-3%	-1%	-1%	0%	0%	0%	0%	0%	0%	-1%
Below Normal													
Future - Base	9,254	9,797	13,924	23,209	25,545	24,426	14,615	10,760	14,962	15,443	10,464	8,153	10,869
Future - Alternative 5	9,281	9,775	13,714	22,414	24,743	23,985	14,615	10,700	15,073	15,437	10,549	8,151	10,744
Difference	28	-22	-210	-795	-803	-441	0	-60	111	-6	85	-2	-126
Percent Difference	0%	0%	-2%	-3%	-3%	-2%	0%	-1%	1%	0%	1%	0%	-1%
Dry													
Future - Base	8,186	9,309	12,579	14,935	22,880	21,608	11,530	9,425	13,173	12,523	10,169	7,654	9,257
Future - Alternative 5	8,185	9,277	12,470	14,614	22,212	21,255	11,522	9,425	13,216	12,503	10,160	7,632	9,169
Difference	-1	-33	-109	-320	-668	-354	-8	0	43	-20	-9	-22	-89
Percent Difference	0%	0%	-1%	-2%	-3%	-2%	0%	0%	0%	0%	0%	0%	-1%
Critical													
Future - Base	7,552	6,764	9,375	13,050	15,447	13,038	9,429	7,372	9,565	9,855	9,692	7,025	7,121
Future - Alternative 5	7,564	6,760	9,333	12,841	15,169	12,955	9,427	7,370	9,446	9,907	9,724	7,021	7,083
Difference	12	-4	-42	-209	-278	-83	-1	-2	-119	52	31	-4	-38
Percent Difference	0%	0%	0%	-2%	-2%	-1%	0%	0%	-1%	1%	0%	0%	-1%

Sacramento River below Fremont Weir

Future - Base

					Average Monthly Flow (cfs)							
Statistic	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Probability of Exceedance												
10%	11,897	16,169	45,741	61,582	63,120	58,501	40,381	14,264	19,317	20,306	15,937	23,746
20%	10,789	13,042	30,986	52,000	59,936	50,976	24,134	12,203	18,036	19,458	13,060	23,231
30%	9,787	11,409	19,616	42,207	50,229	42,750	16,494	11,100	17,030	17,789	11,135	21,443
40%	9,396	10,373	16,258	31,518	42,508	33,844	14,502	10,319	14,771	17,206	10,721	14,835
50%	9,004	9,580	14,683	22,826	32,845	25,125	12,720	9,227	12,760	16,197	10,366	9,351
60%	8,421	8,564	12,034	17,536	23,964	20,148	10,605	8,847	11,697	14,641	10,117	8,213
70%	7,953	7,746	10,580	14,086	19,326	17,034	9,863	8,329	10,907	12,994	9,872	7,627
80%	6,644	6,697	8,469	11,527	15,457	13,796	9,349	7,855	9,488	11,435	9,571	7,237
90%	6,027	5,916	7,135	10,183	12,838	10,799	8,626	7,207	8,168	9,224	9,229	6,510
Long Term												
Full Simulation Period	9,206	10,728	19,728	30,030	35,978	31,028	17,571	10,459	13,675	15,358	11,273	13,824
Water Year Types												
Wet	10,316	14,168	33,582	49,490	54,700	46,345	27,848	12,029	14,178	18,965	12,787	23,425
Above Normal	10,180	10,600	18,133	38,066	50,270	39,380	16,639	11,646	16,362	17,891	12,383	16,466
Below Normal	9,254	9,797	13,924	23,209	25,545	24,426	14,615	10,760	14,962	15,443	10,464	8,153
Dry	8,186	9,309	12,579	14,935	22,880	21,608	11,530	9,425	13,173	12,523	10,169	7,654
Critical	7,552	6,764	9,375	13,050	15,447	13,038	9,429	7,372	9,565	9,855	9,692	7,025

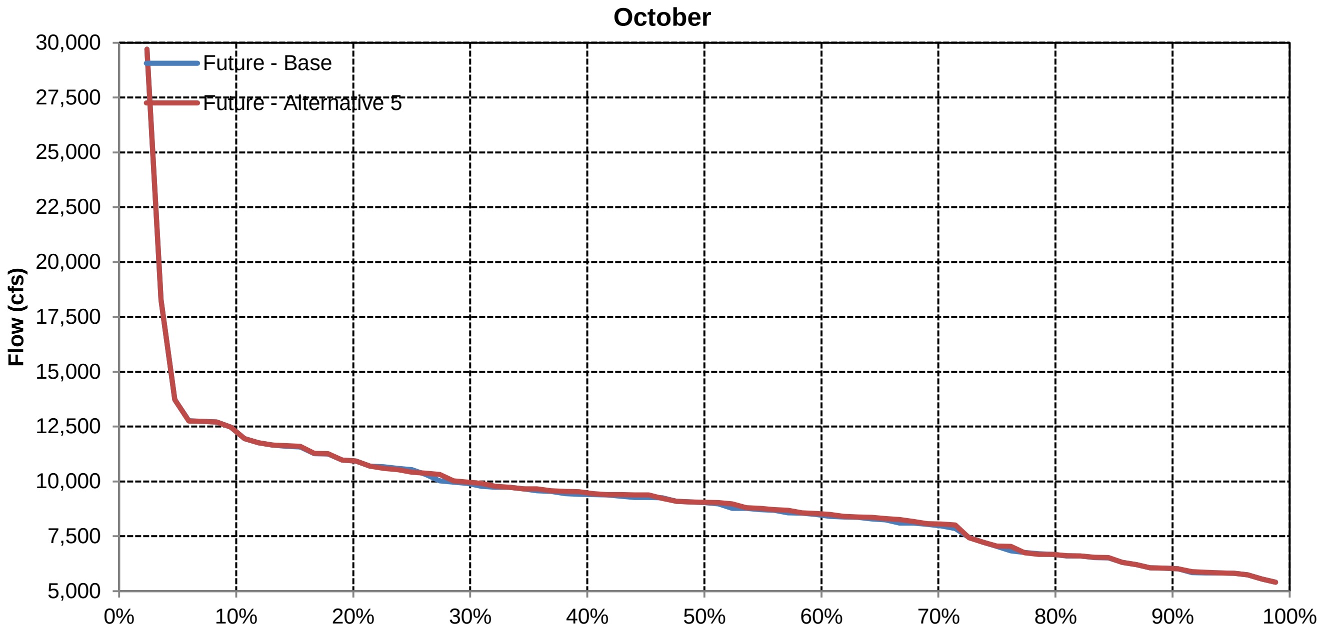
Future - Alternative 5

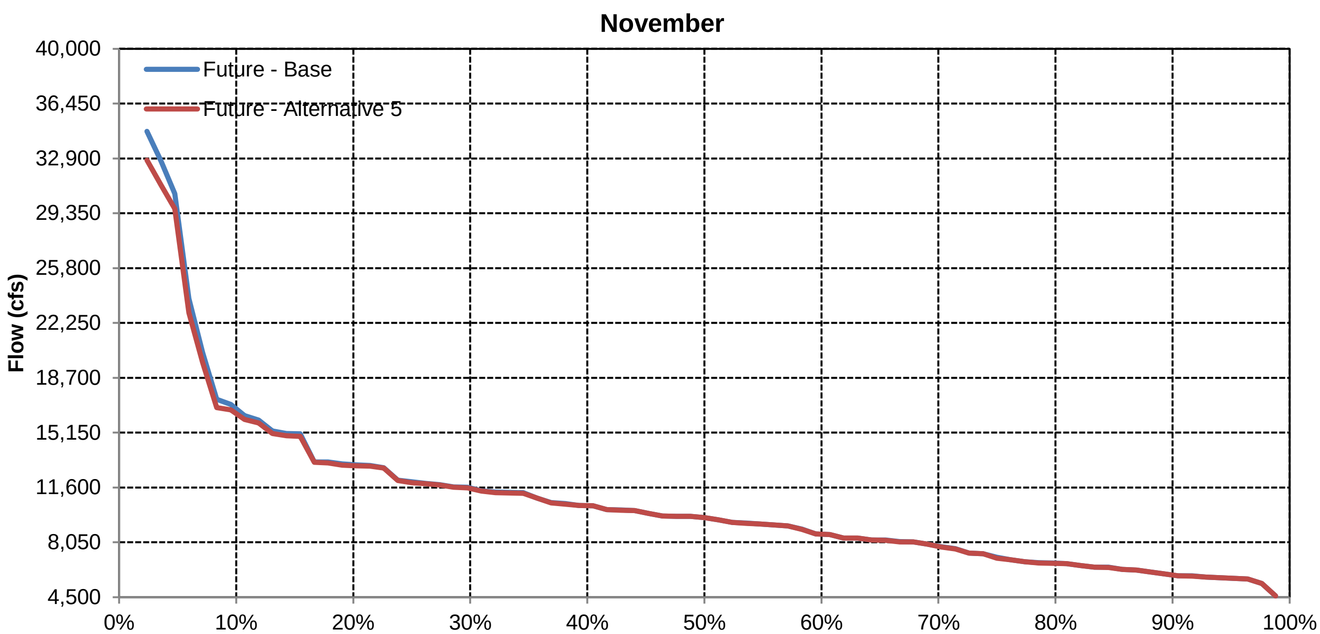
					Average Monthly Flow (cfs)							
Statistic	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Probability of Exceedance												
10%	11,897	15,931	44,359	61,430	63,132	58,501	40,381	14,264	19,318	20,306	16,331	23,749
20%	10,789	12,990	29,741	50,629	59,693	50,906	24,151	12,203	18,232	19,460	13,063	23,235
30%	9,909	11,384	19,180	40,529	48,478	41,845	16,489	10,978	17,029	17,861	11,153	21,444
40%	9,435	10,368	16,038	29,622	41,372	32,381	14,501	10,320	15,002	17,357	10,721	14,834
50%	9,035	9,575	14,474	21,863	30,882	24,826	12,720	9,213	12,755	16,198	10,323	9,340
60%	8,507	8,559	11,991	17,047	23,003	19,922	10,605	8,843	11,599	14,737	10,131	8,131
70%	8,049	7,741	10,697	14,045	18,922	16,829	9,863	8,328	10,907	12,996	9,873	7,627
80%	6,651	6,675	8,389	11,518	15,333	13,727	9,359	7,855	9,488	11,435	9,571	7,239
90%	6,028	5,913	7,133	10,170	12,821	10,795	8,626	7,207	8,168	9,226	9,229	6,508
Long Term												
Full Simulation Period	9,239	10,621	19,350	29,388	35,312	30,698	17,569	10,449	13,686	15,357	11,280	13,812
Water Year Types												
Wet	10,324	13,902	32,791	48,621	53,954	46,045	27,848	12,025	14,178	18,959	12,761	23,409
Above Normal	10,368	10,520	17,681	37,085	49,533	38,882	16,642	11,646	16,366	17,885	12,379	16,466
Below Normal	9,281	9,775	13,714	22,414	24,743	23,985	14,615	10,700	15,073	15,437	10,549	8,151
Dry	8,185	9,277	12,470	14,614	22,212	21,255	11,522	9,425	13,216	12,503	10,160	7,632
Critical	7,564	6,760	9,333	12,841	15,169	12,955	9,427	7,370	9,446	9,907	9,724	7,021

Future - Alternative 5 Minus Future - Base

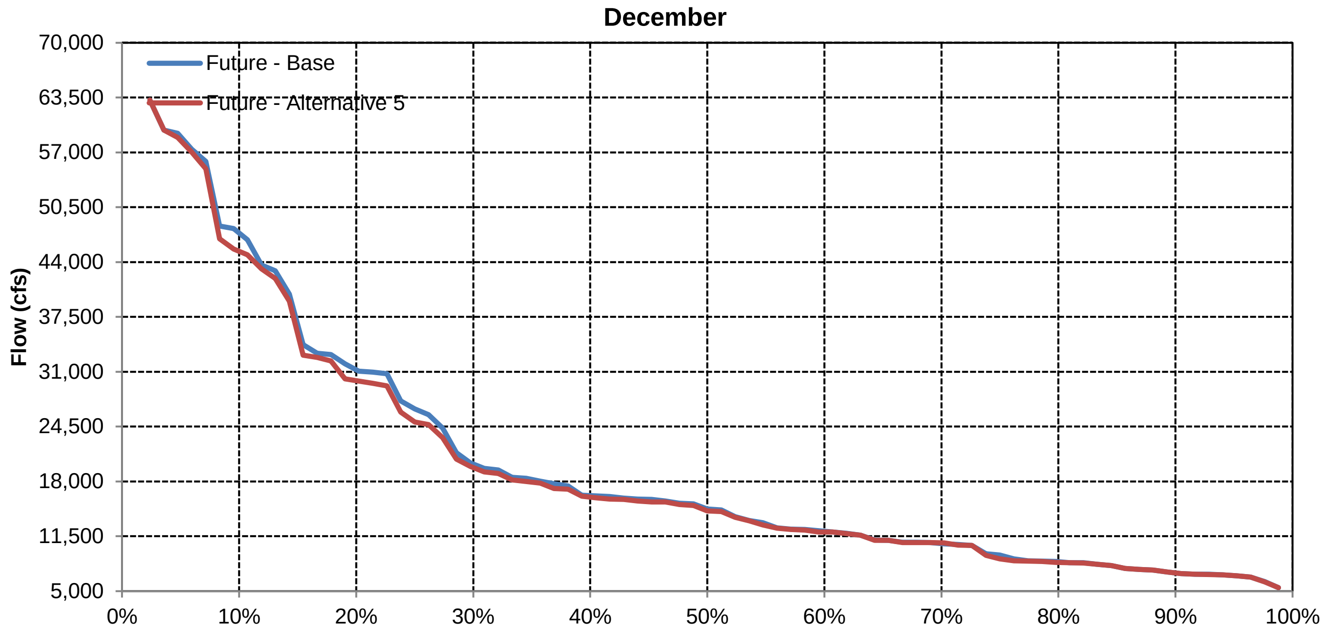
					Average Monthly Flow (cfs)							
Statistic	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Probability of Exceedance												
10%	0	-239	-1,382	-152	12	0	0	0	1	0	394	4
20%	0	-52	-1,245	-1,371	-242	-69	17	0	196	2	3	4
30%	122	-25	-436	-1,678	-1,751	-905	-6	-122	-1	71	18	1
40%	39	-5	-220	-1,897	-1,136	-1,463	-1	1	231	151	0	-1
50%	32	-4	-209	-963	-1,963	-299	0	-14	-5	1	-43	-11
60%	86	-5	-43	-489	-960	-226	0	-4	-98	96	14	-81
70%	96	-5	116	-41	-405	-205	0	0	0	2	1	-1
80%	7	-23	-80	-9	-124	-70	9	0	0	0	0	2
90%	0	-2	-2	-12	-18	-5	0	0	0	1	1	-1
Long Term												
Full Simulation Period	33	-107	-378	-642	-667	-330	-2	-11	11	-1	7	-11
Water Year Types												
Wet	8	-265	-791	-869	-747	-300	0	-4	0	-6	-26	-16
Above Normal	188	-80	-452	-981	-737	-498	2	0	4	-6	-4	1
Below Normal	28	-22	-210	-795	-803	-441	0	-60	111	-6	85	-2
Dry	-1	-33	-109	-320	-668	-354	-8	0	43	-20	-9	-22
Critical	12	-4	-42	-209	-278	-83	-1	-2	-119	52	31	-4

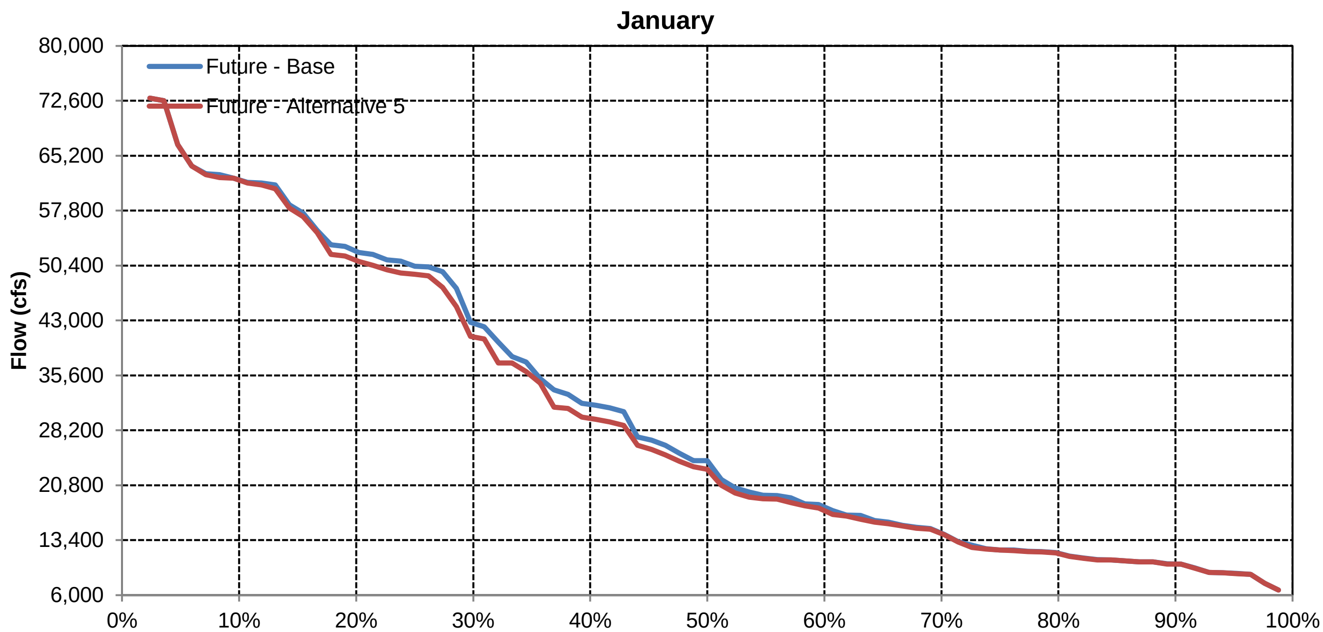
Sacramento River below Fremont Weir



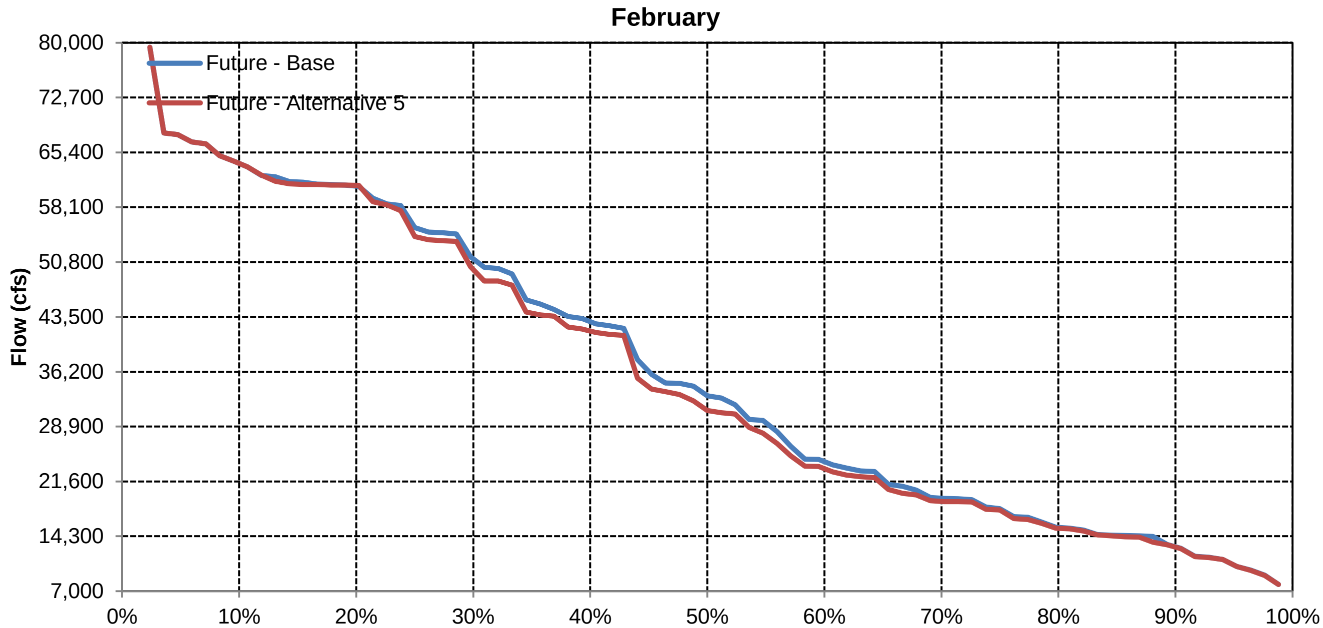


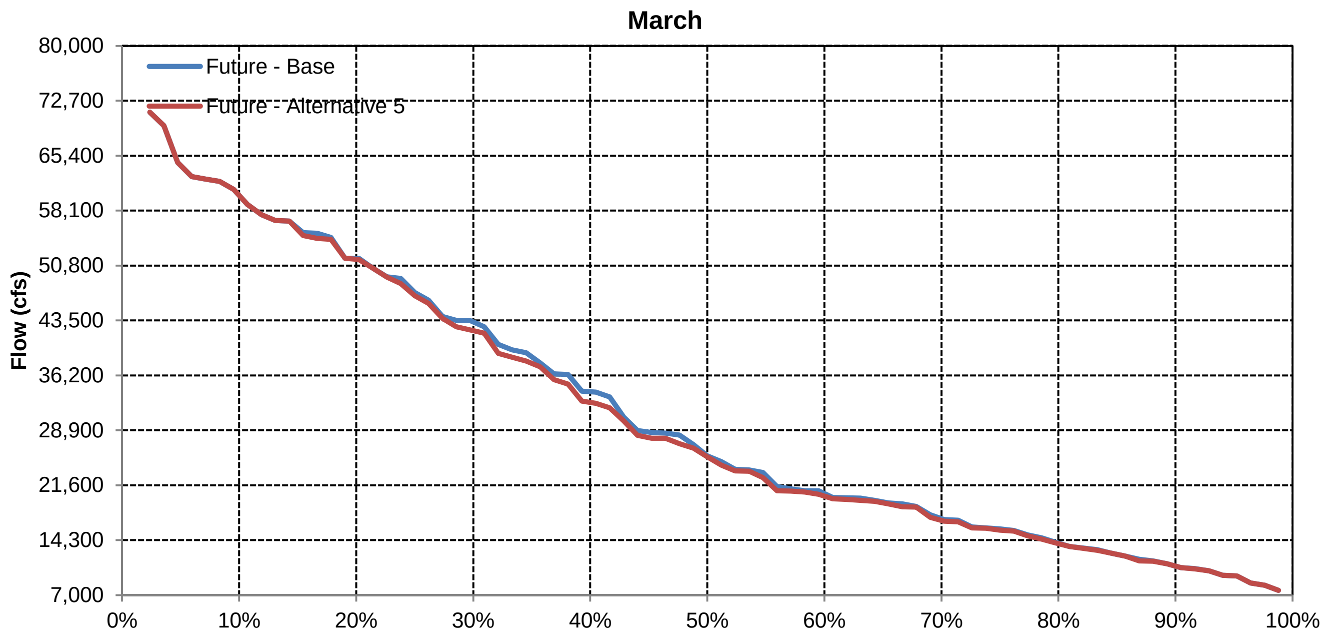
Sacramento River below Fremont Weir



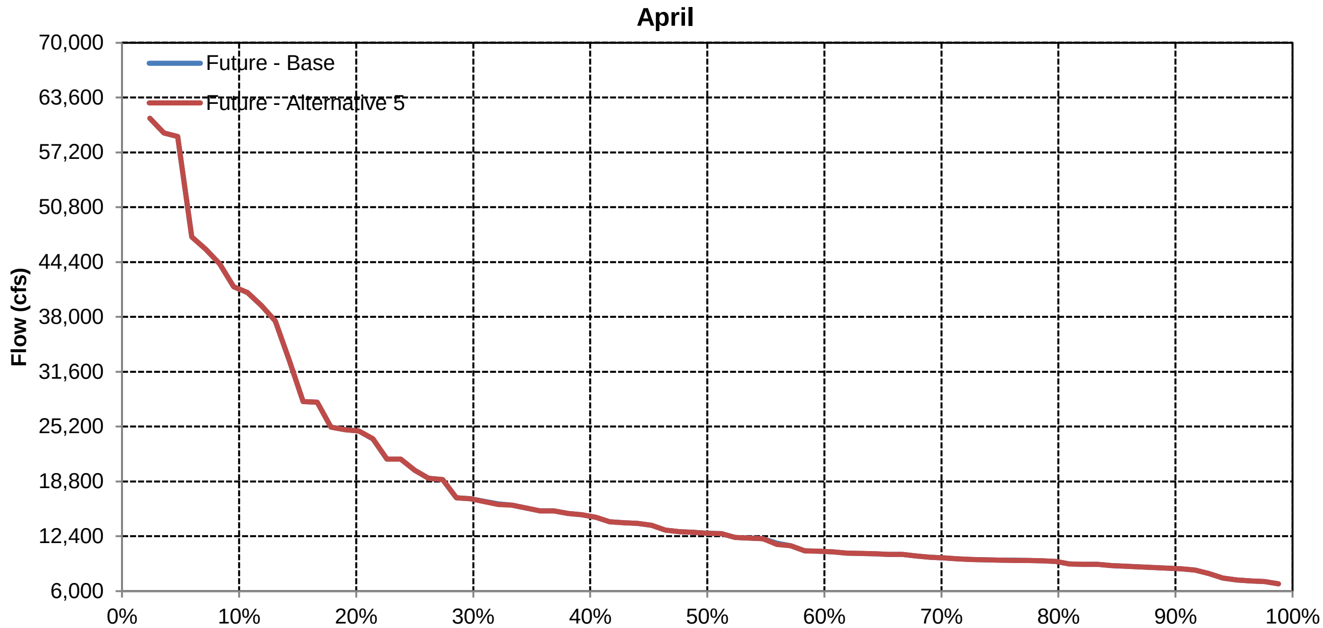


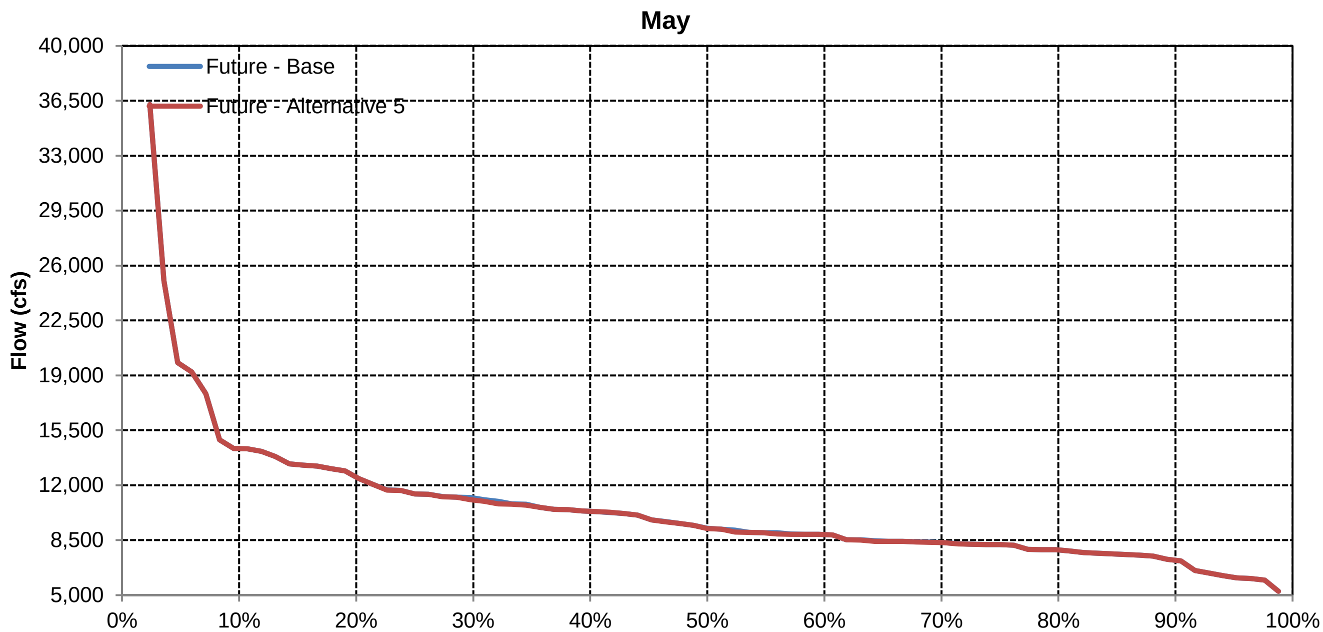
Sacramento River below Fremont Weir



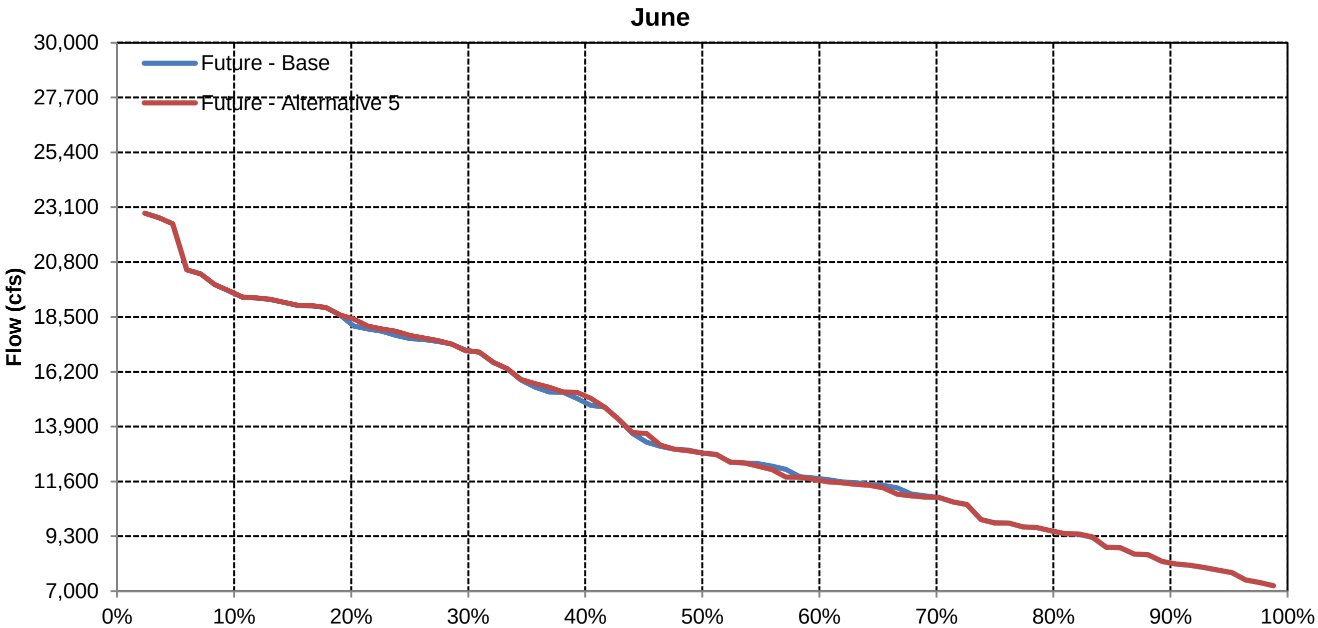


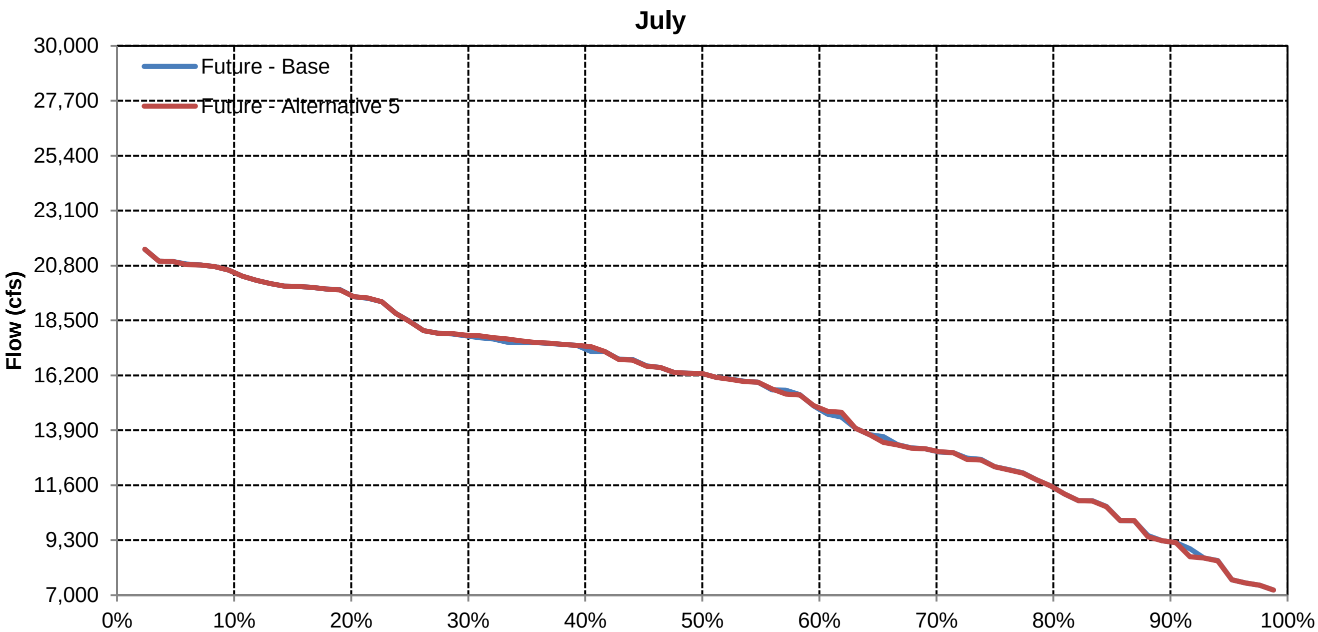
Sacramento River below Fremont Weir



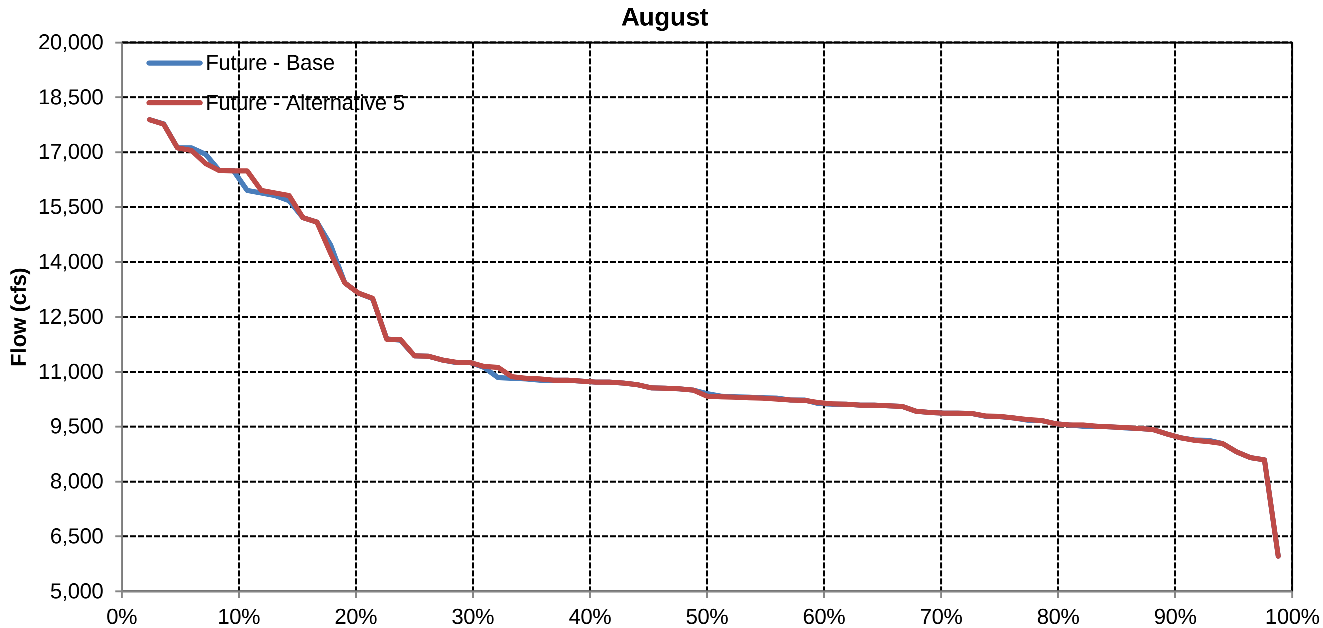


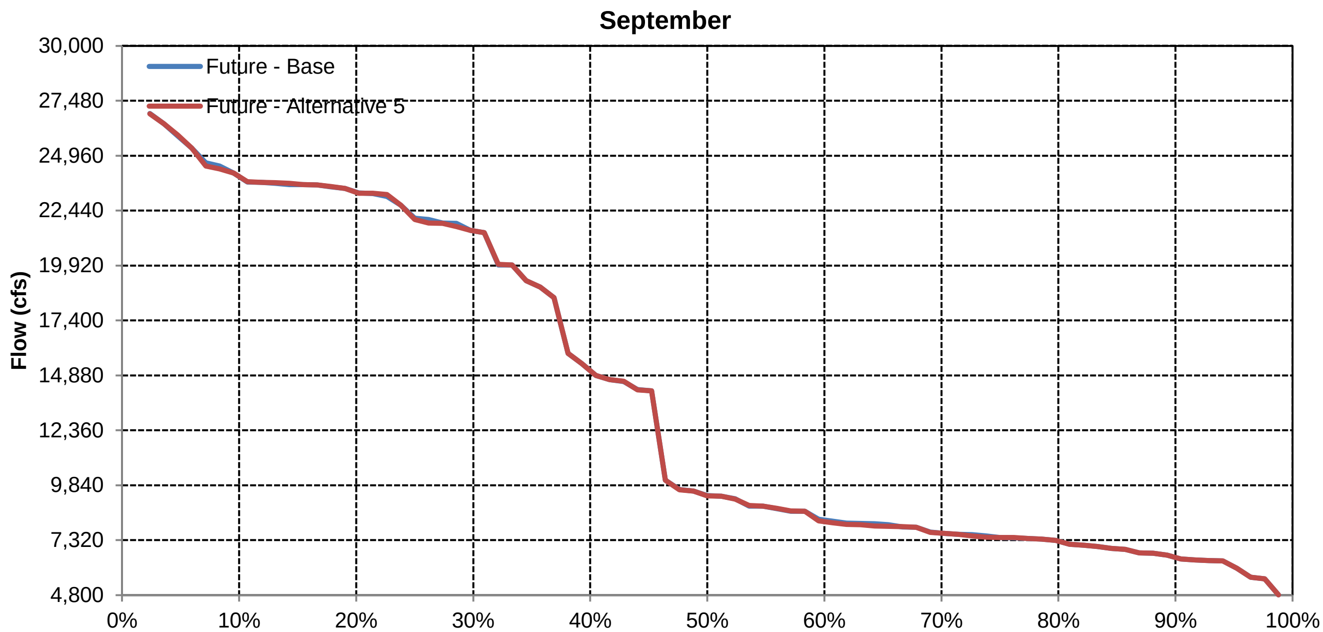
Sacramento River below Fremont Weir





Sacramento River below Fremont Weir





Long-Term and Water Year-Type Average of Trinity Reservoir Under Future - Base and Future - Alternative 5

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
						Long-Term						
Full Simulation Period												
Future - Base	1,111	1,121	1,232	1,403	1,575	1,712	1,826	1,701	1,582	1,421	1,271	1,160
Future - Alternative 5	1,111	1,120	1,232	1,403	1,575	1,711	1,826	1,701	1,582	1,421	1,271	1,160
Difference	-1	-1	0	0	0	0	0	0	-1	-1	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
						Water Year-Types						
Wet												
Future - Base	1,184	1,226	1,437	1,697	1,906	2,037	2,189	2,064	1,903	1,750	1,604	1,455
Future - Alternative 5	1,184	1,225	1,437	1,696	1,906	2,037	2,189	2,064	1,903	1,750	1,604	1,454
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal												
Future - Base	1,184	1,161	1,273	1,559	1,813	1,988	2,142	1,982	1,871	1,704	1,558	1,426
Future - Alternative 5	1,184	1,161	1,273	1,559	1,813	1,988	2,141	1,981	1,870	1,703	1,557	1,426
Difference	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Future - Base	1,148	1,147	1,220	1,391	1,539	1,694	1,829	1,709	1,610	1,441	1,284	1,186
Future - Alternative 5	1,147	1,147	1,220	1,391	1,539	1,695	1,829	1,710	1,611	1,441	1,284	1,186
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry												
Future - Base	1,094	1,097	1,151	1,222	1,376	1,529	1,615	1,477	1,361	1,178	1,006	915
Future - Alternative 5	1,093	1,096	1,150	1,221	1,375	1,528	1,613	1,475	1,359	1,176	1,005	915
Difference	-1	-2	-1	-1	-1	-2	-2	-2	-2	-2	-1	-1
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical												
Future - Base	875	866	898	942	1,012	1,077	1,102	1,022	960	834	714	656
Future - Alternative 5	875	865	897	942	1,012	1,078	1,102	1,023	961	835	714	656
Difference	0	0	-1	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Trinity Reservoir

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	1,479	1,484	1,672	1,900	2,000	2,100	2,298	2,170	1,995	1,863	1,717	1,564
20%	1,385	1,408	1,506	1,818	2,000	2,100	2,233	2,088	1,943	1,791	1,642	1,492
30%	1,303	1,305	1,445	1,638	1,926	2,068	2,167	2,006	1,865	1,697	1,520	1,382
40%	1,248	1,223	1,368	1,593	1,752	1,981	2,113	1,903	1,752	1,562	1,407	1,270
50%	1,152	1,181	1,273	1,421	1,599	1,771	1,933	1,771	1,616	1,443	1,289	1,178
60%	1,079	1,102	1,198	1,304	1,496	1,662	1,745	1,636	1,564	1,378	1,236	1,106
70%	968	957	1,102	1,205	1,371	1,486	1,591	1,531	1,412	1,229	1,083	1,000
80%	775	791	913	1,023	1,256	1,390	1,496	1,376	1,279	1,090	931	846
90%	627	632	678	825	933	1,013	1,056	1,036	957	837	680	625
Long Term												
Full Simulation Period	1,111	1,121	1,232	1,403	1,575	1,712	1,826	1,701	1,582	1,421	1,271	1,160
Water Year Types												
Wet	1,184	1,226	1,437	1,697	1,906	2,037	2,189	2,064	1,903	1,750	1,604	1,455
Above Normal	1,184	1,161	1,273	1,559	1,813	1,988	2,142	1,982	1,871	1,704	1,558	1,426
Below Normal	1,148	1,147	1,220	1,391	1,539	1,694	1,829	1,709	1,610	1,441	1,284	1,186
Dry	1,094	1,097	1,151	1,222	1,376	1,529	1,615	1,477	1,361	1,178	1,006	915
Critical	875	866	898	942	1,012	1,077	1,102	1,022	960	834	714	656

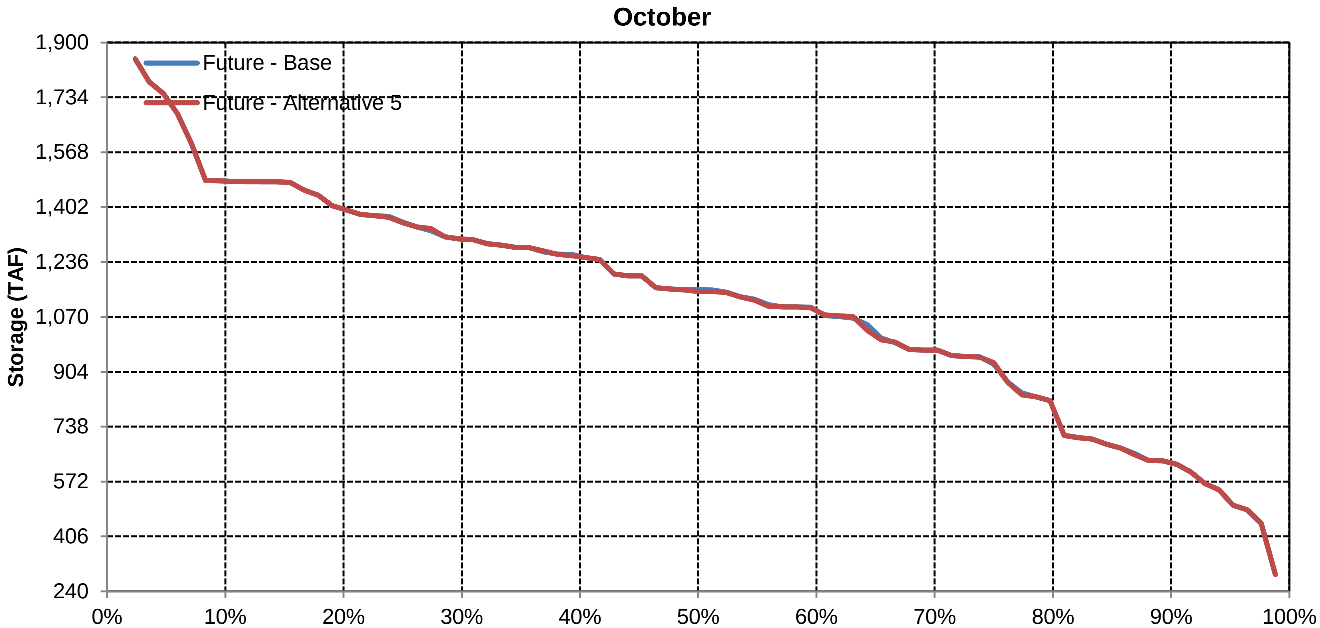
Future - Alternative 5

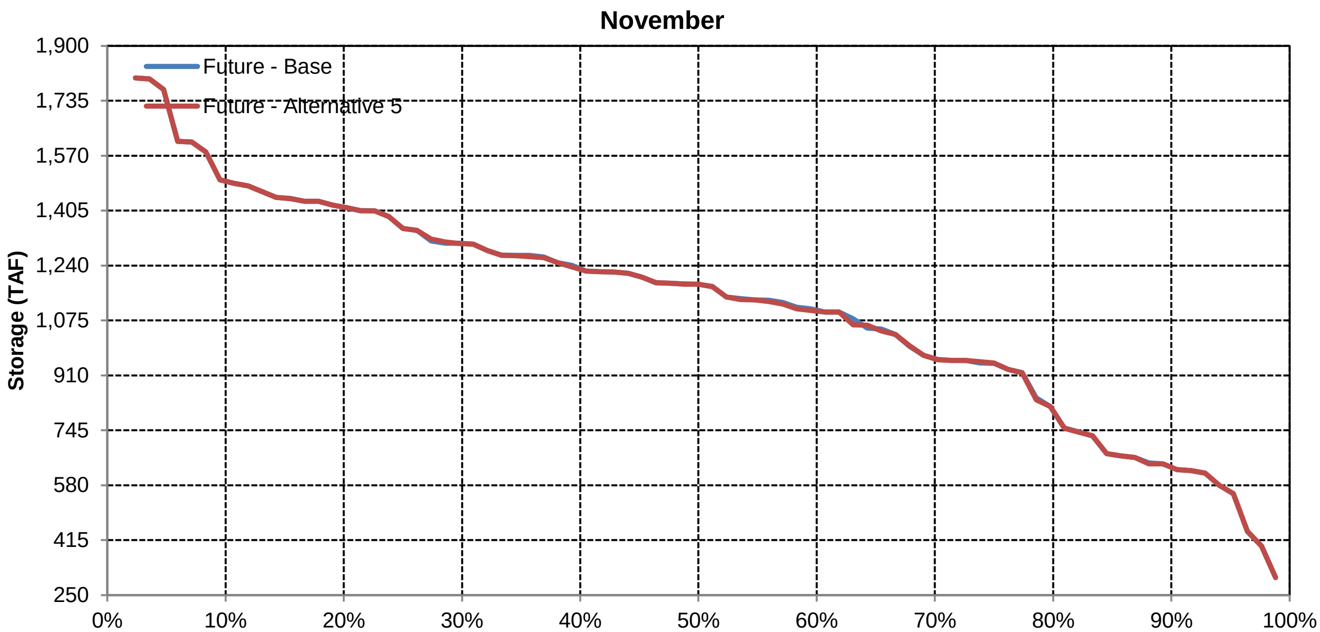
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	1,479	1,484	1,672	1,900	2,000	2,100	2,298	2,170	1,995	1,863	1,717	1,564
20%	1,385	1,408	1,506	1,817	2,000	2,100	2,233	2,088	1,940	1,791	1,642	1,492
30%	1,303	1,305	1,440	1,637	1,926	2,068	2,167	2,006	1,865	1,697	1,520	1,382
40%	1,248	1,223	1,368	1,592	1,752	1,980	2,113	1,903	1,753	1,562	1,407	1,270
50%	1,147	1,180	1,272	1,421	1,596	1,774	1,936	1,770	1,615	1,443	1,288	1,178
60%	1,080	1,101	1,197	1,304	1,494	1,660	1,746	1,639	1,550	1,375	1,233	1,105
70%	968	957	1,100	1,204	1,374	1,491	1,590	1,531	1,412	1,230	1,083	1,000
80%	774	790	910	1,021	1,252	1,390	1,498	1,375	1,278	1,090	929	846
90%	627	632	679	825	933	1,013	1,056	1,036	957	837	680	625
Long Term												
Full Simulation Period	1,111	1,120	1,232	1,403	1,575	1,711	1,826	1,701	1,582	1,421	1,271	1,160
Water Year Types												
Wet	1,184	1,225	1,437	1,696	1,906	2,037	2,189	2,064	1,903	1,750	1,604	1,454
Above Normal	1,184	1,161	1,273	1,559	1,813	1,988	2,141	1,981	1,870	1,703	1,557	1,426
Below Normal	1,147	1,147	1,220	1,391	1,539	1,695	1,829	1,710	1,611	1,441	1,284	1,186
Dry	1,093	1,096	1,150	1,221	1,375	1,528	1,613	1,475	1,359	1,176	1,005	915
Critical	875	865	897	942	1,012	1,078	1,102	1,023	961	835	714	656

Future - Alternative 5 Minus Future - Base

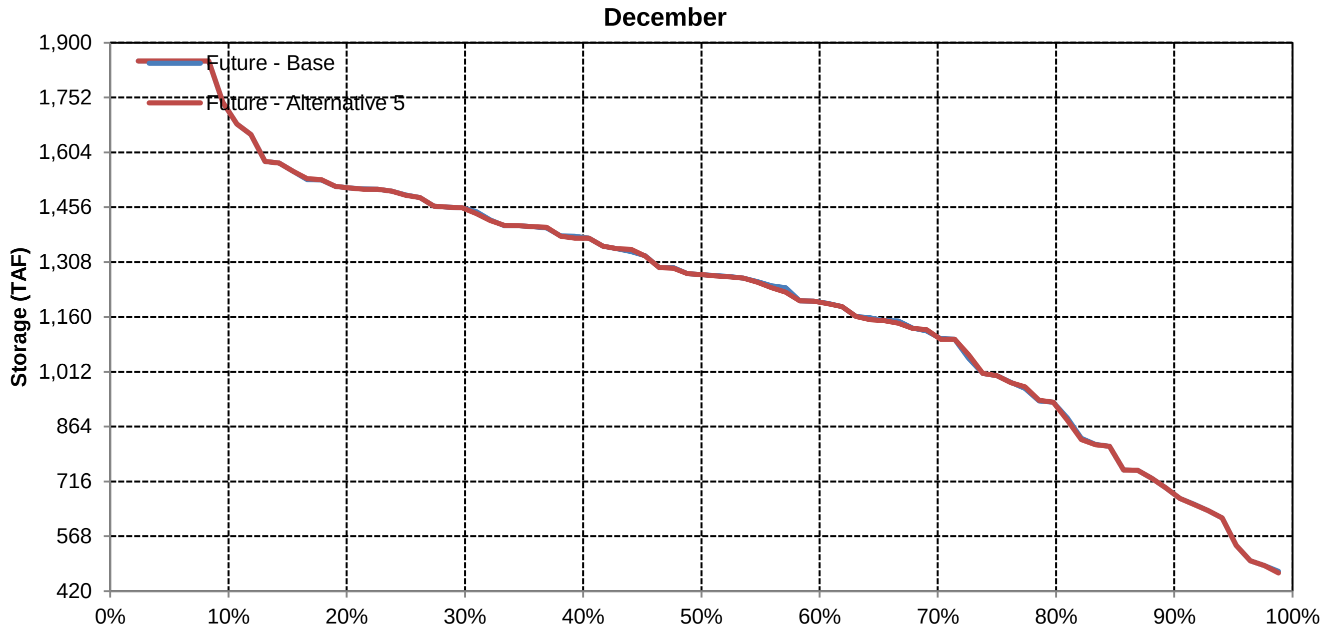
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	-1	0	0	0	0	0	0	-3	0	0	0
30%	0	0	-5	-1	0	0	0	0	-1	0	0	0
40%	0	0	0	-1	0	0	-1	0	1	0	0	0
50%	-5	0	-1	0	-3	3	3	-1	0	0	-1	-1
60%	1	-1	-1	0	-2	-1	1	3	-14	-3	-3	-2
70%	0	0	-2	-1	3	5	-1	0	0	1	0	0
80%	0	0	-2	-2	-3	0	2	0	-1	0	-2	1
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	-1	-1	0	0	0	0	0	0	-1	-1	0	0
Water Year Types												
Wet	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1
Below Normal	0	0	0	0	0	0	0	0	0	0	0	0
Dry	-1	-2	-1	-1	-1	-2	-2	-2	-2	-2	-1	-1
Critical	0	0	-1	0	0	0	0	0	0	0	0	0

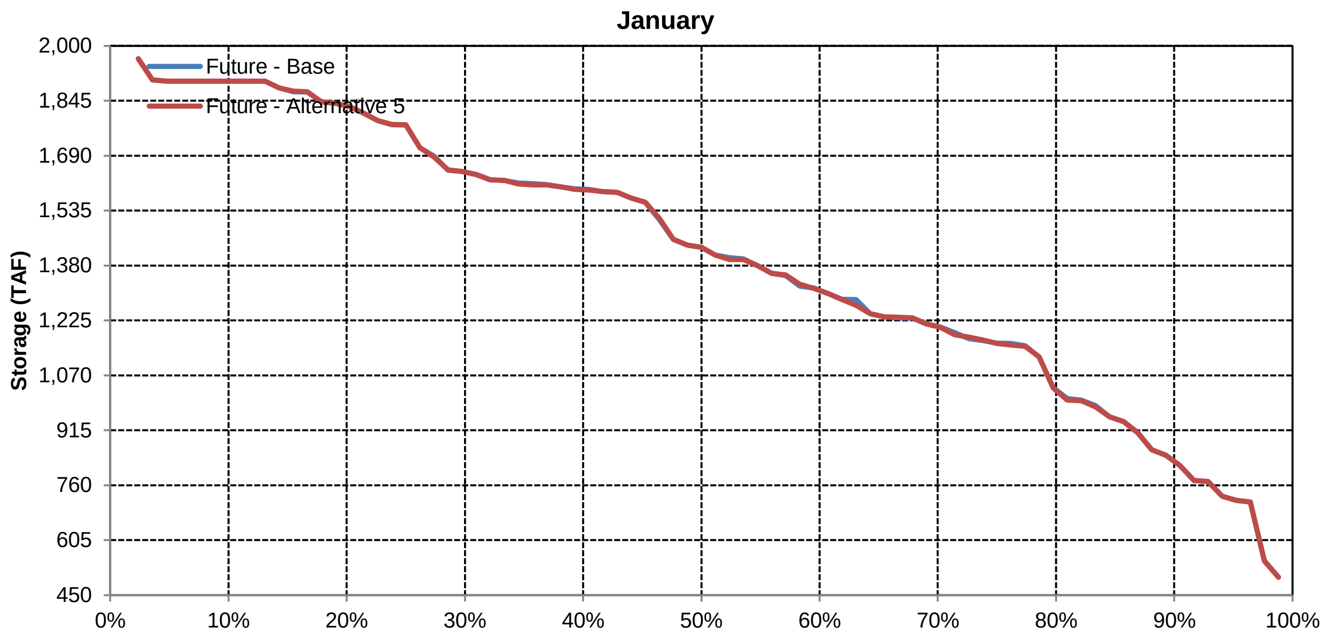
Trinity Reservoir





Trinity Reservoir





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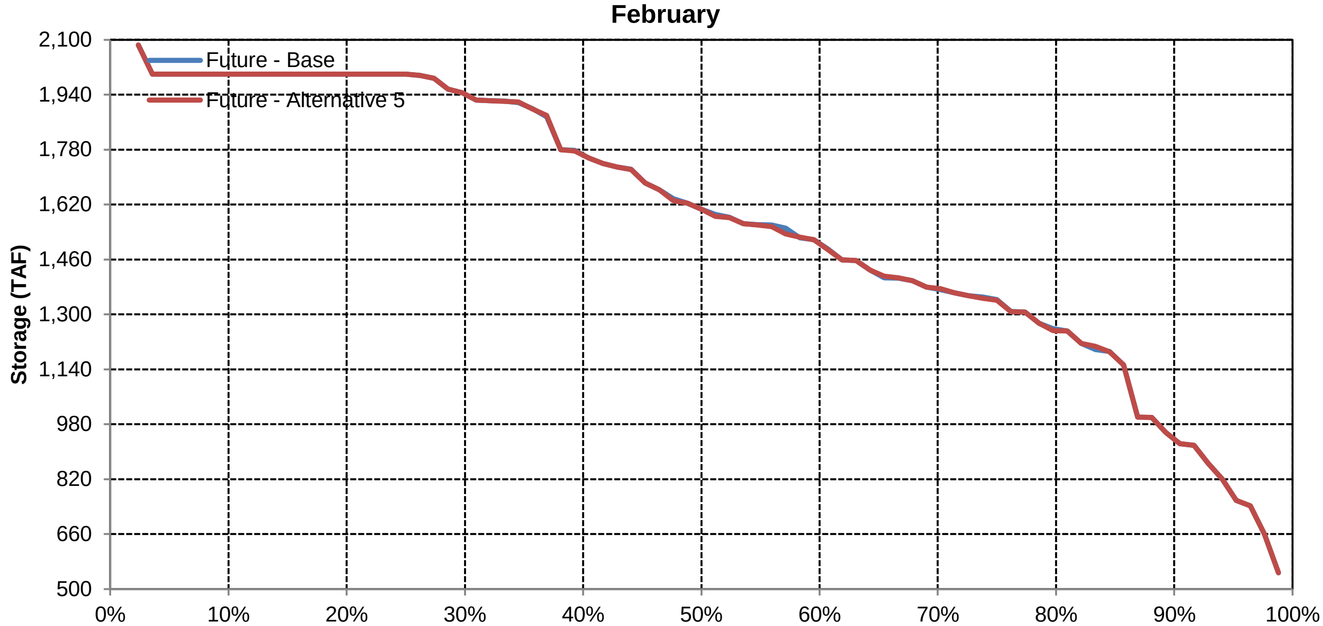

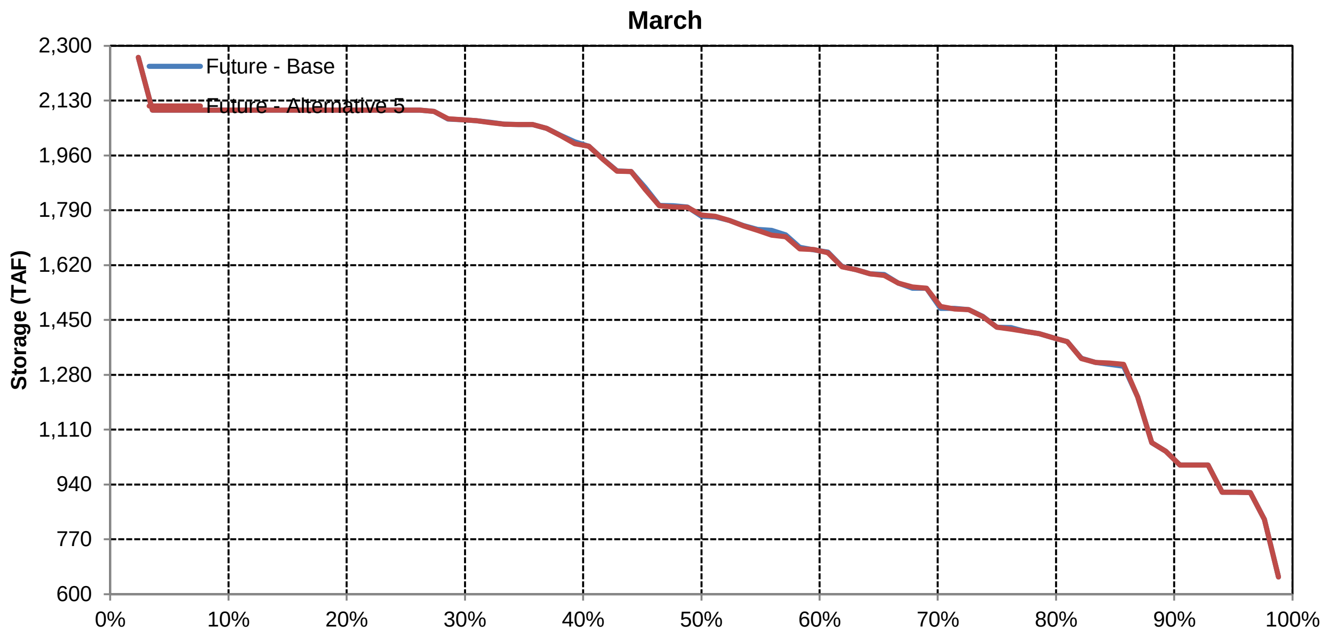

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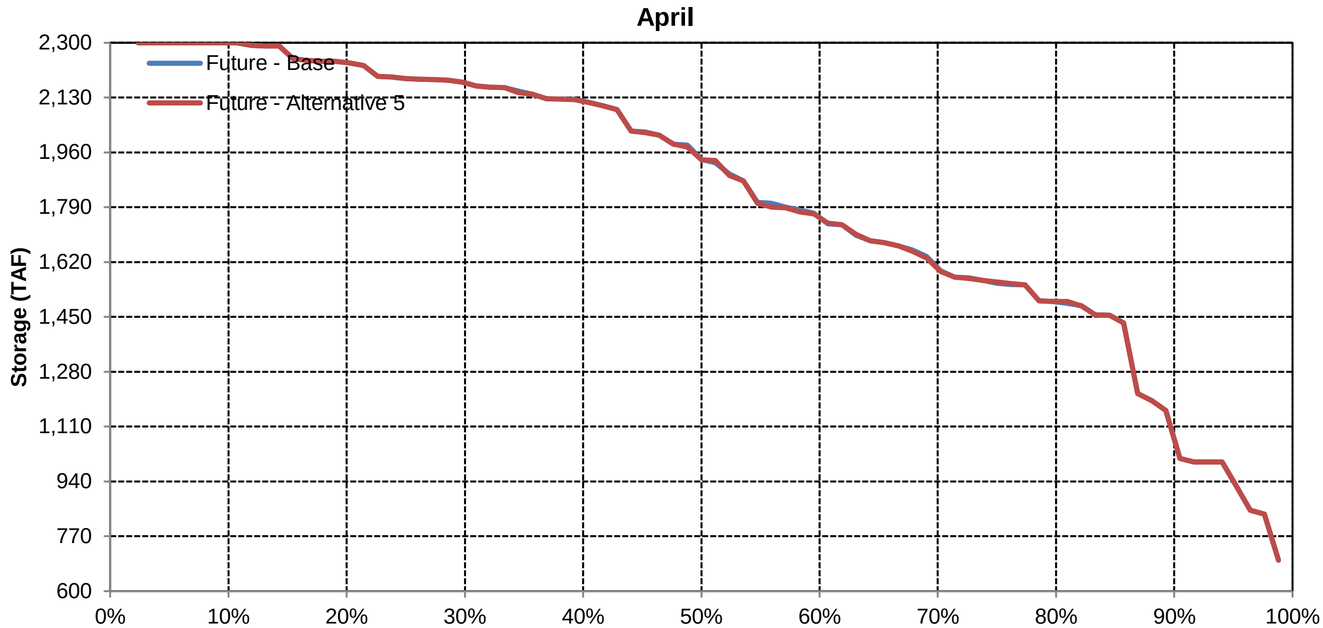

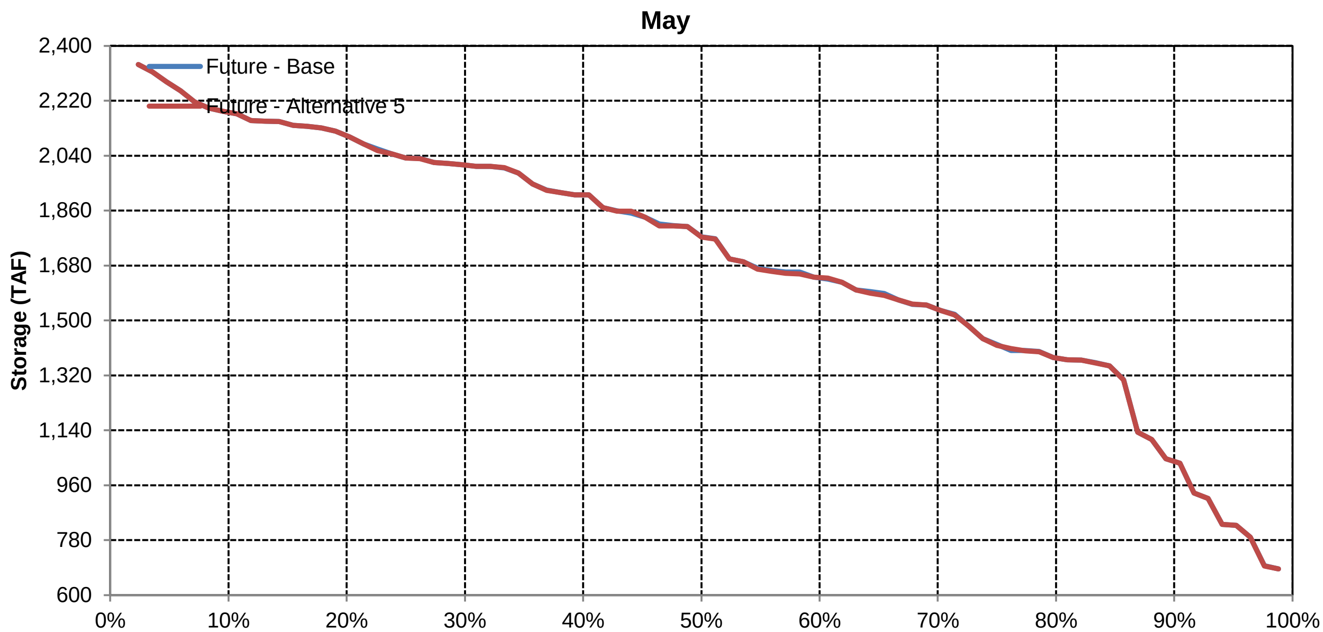

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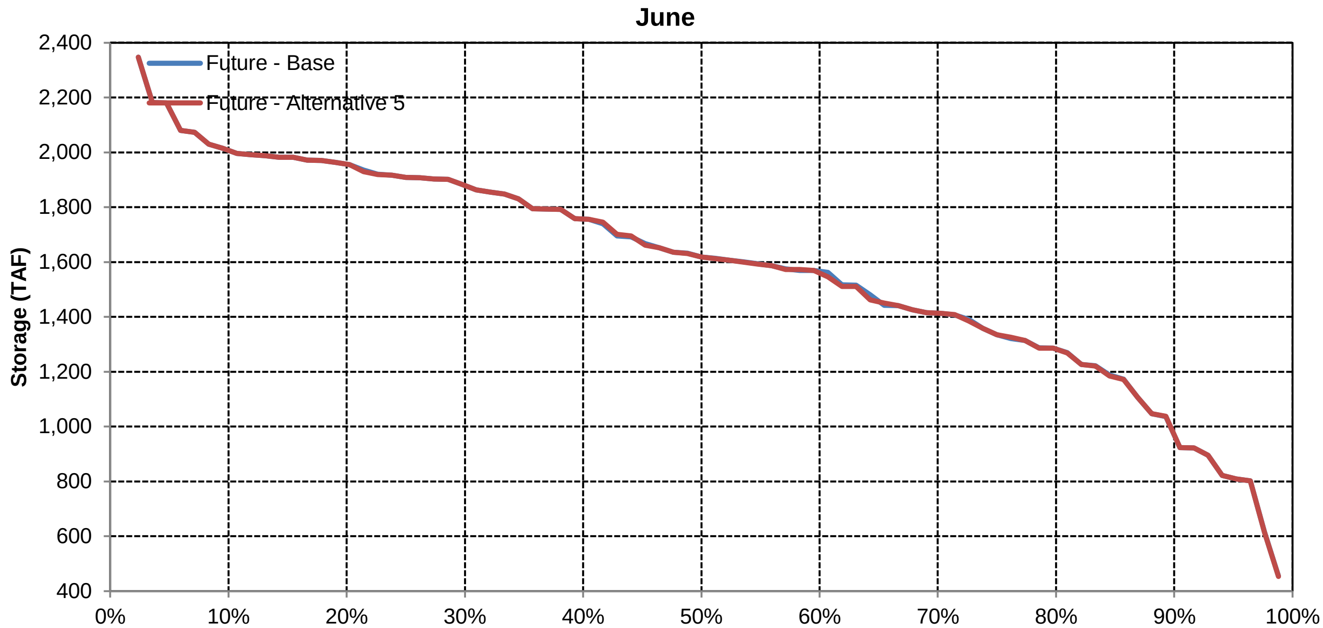
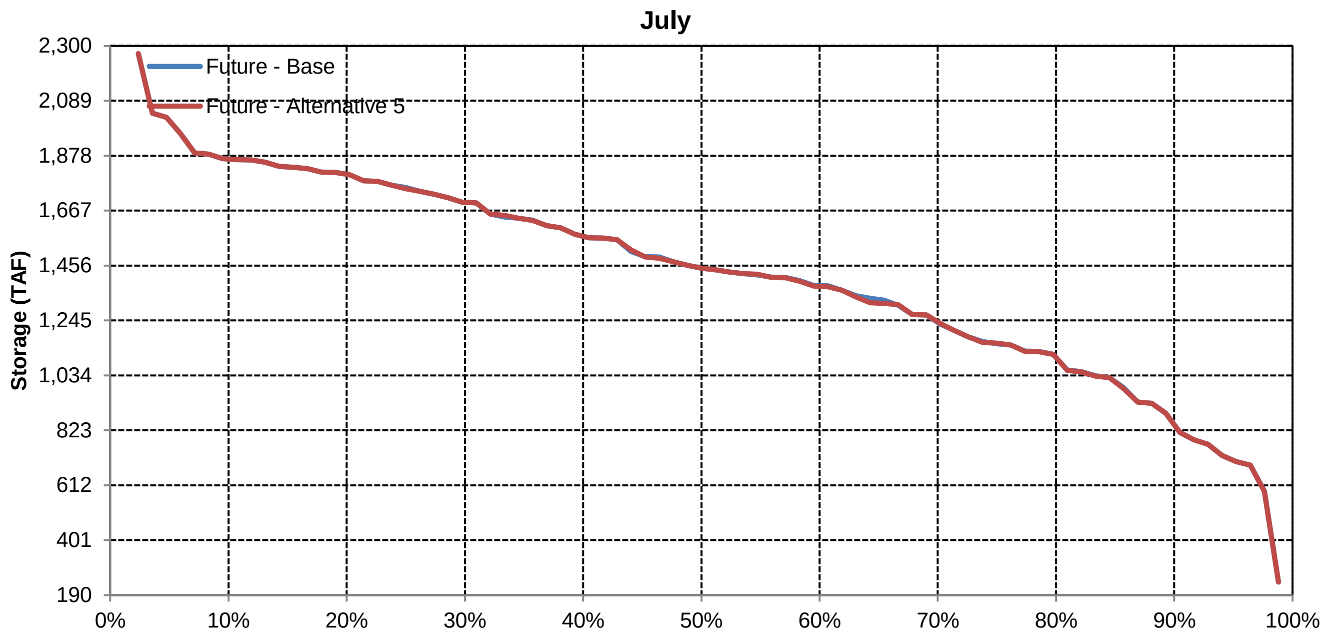
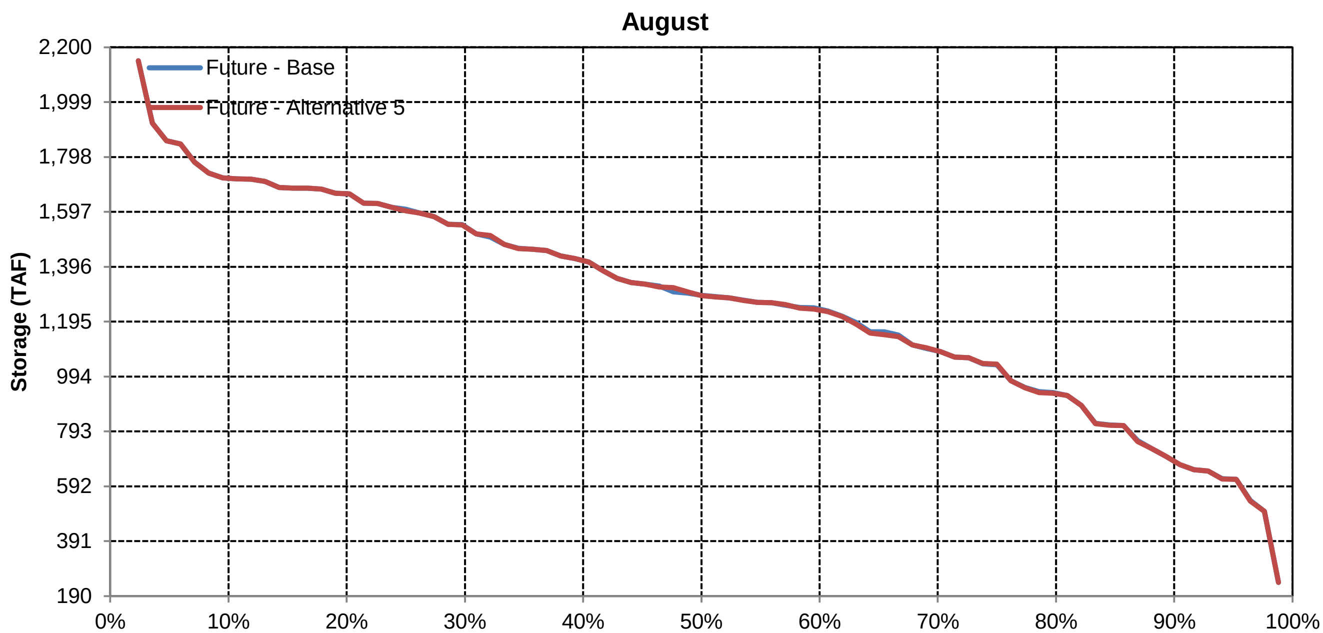
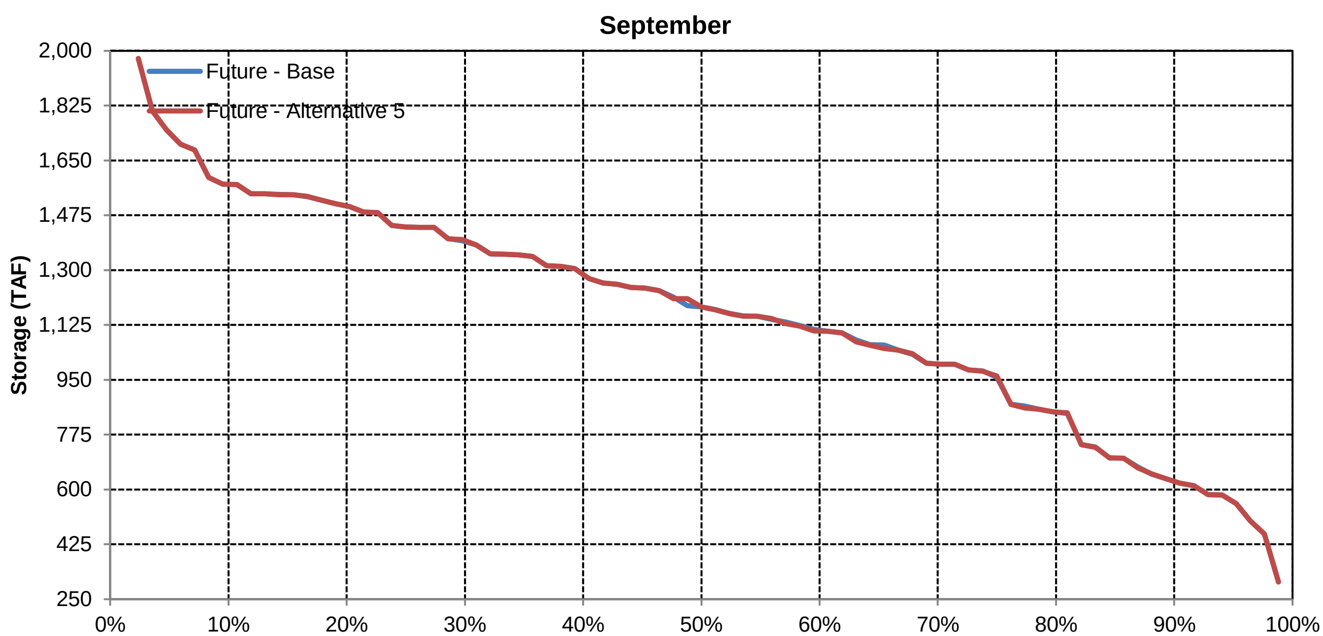




Trinity Reservoir





Long-Term and Water Year-Type Average of Shasta Reservoir Storage Under Future - Base and Future - Alternative 5

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
						Long-Term						
Full Simulation Period												
Future - Base	2,225	2,278	2,586	2,961	3,277	3,633	3,825	3,712	3,230	2,717	2,459	2,291
Future - Alternative 5	2,224	2,277	2,586	2,960	3,276	3,633	3,825	3,712	3,229	2,716	2,459	2,291
Difference	-1	-1	0	0	0	0	0	0	-1	-1	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
						Water Year-Types						
Wet												
Future - Base	2,396	2,480	2,989	3,394	3,578	3,842	4,228	4,235	3,803	3,242	2,994	2,526
Future - Alternative 5	2,395	2,479	2,989	3,394	3,578	3,842	4,228	4,235	3,803	3,241	2,993	2,525
Difference	-1	-1	-1	0	0	0	0	0	0	-1	-1	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal												
Future - Base	2,332	2,398	2,734	3,276	3,538	4,067	4,380	4,287	3,779	3,188	2,931	2,693
Future - Alternative 5	2,325	2,391	2,734	3,276	3,538	4,067	4,380	4,288	3,780	3,188	2,932	2,693
Difference	-6	-6	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Future - Base	2,275	2,333	2,490	3,019	3,412	3,836	4,073	3,949	3,396	2,900	2,674	2,743
Future - Alternative 5	2,279	2,338	2,494	3,022	3,416	3,840	4,076	3,952	3,394	2,898	2,674	2,743
Difference	5	4	4	4	4	4	4	4	-2	-2	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry												
Future - Base	2,104	2,169	2,417	2,659	3,189	3,593	3,618	3,403	2,899	2,449	2,182	2,205
Future - Alternative 5	2,101	2,167	2,414	2,657	3,186	3,591	3,616	3,402	2,899	2,449	2,183	2,206
Difference	-3	-2	-3	-3	-2	-2	-2	-1	0	0	0	1
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical												
Future - Base	1,906	1,851	1,965	2,171	2,385	2,631	2,519	2,310	1,855	1,394	1,094	1,067
Future - Alternative 5	1,904	1,850	1,963	2,170	2,383	2,629	2,517	2,308	1,853	1,392	1,093	1,066
Difference	-1	-1	-1	-1	-2	-2	-2	-2	-1	-1	-1	-1
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Shasta Reservoir Storage

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	3,037	3,187	3,321	3,635	3,916	4,241	4,482	4,552	4,171	3,512	3,194	2,972
20%	2,810	2,927	3,266	3,539	3,777	4,102	4,372	4,324	3,882	3,302	3,029	2,858
30%	2,671	2,735	3,191	3,403	3,662	4,022	4,251	4,224	3,719	3,170	2,942	2,679
40%	2,416	2,533	2,985	3,335	3,537	3,963	4,176	4,142	3,568	3,039	2,823	2,536
50%	2,317	2,324	2,754	3,252	3,445	3,839	4,109	3,953	3,350	2,880	2,669	2,439
60%	2,245	2,200	2,545	2,973	3,289	3,597	4,009	3,839	3,203	2,755	2,499	2,338
70%	2,020	2,057	2,269	2,767	3,252	3,417	3,756	3,608	3,154	2,594	2,360	2,110
80%	1,757	1,817	2,045	2,429	2,913	3,266	3,216	2,997	2,618	2,141	1,806	1,824
90%	884	1,011	1,336	1,917	2,378	2,633	2,534	2,407	1,951	1,420	978	956
Long Term												
Full Simulation Period	2,225	2,278	2,586	2,961	3,277	3,633	3,825	3,712	3,230	2,717	2,459	2,291
Water Year Types												
Wet	2,396	2,480	2,989	3,394	3,578	3,842	4,228	4,235	3,803	3,242	2,994	2,526
Above Normal	2,332	2,398	2,734	3,276	3,538	4,067	4,380	4,287	3,779	3,188	2,931	2,693
Below Normal	2,275	2,333	2,490	3,019	3,412	3,836	4,073	3,949	3,396	2,900	2,674	2,743
Dry	2,104	2,169	2,417	2,659	3,189	3,593	3,618	3,403	2,899	2,449	2,182	2,205
Critical	1,906	1,851	1,965	2,171	2,385	2,631	2,519	2,310	1,855	1,394	1,094	1,067

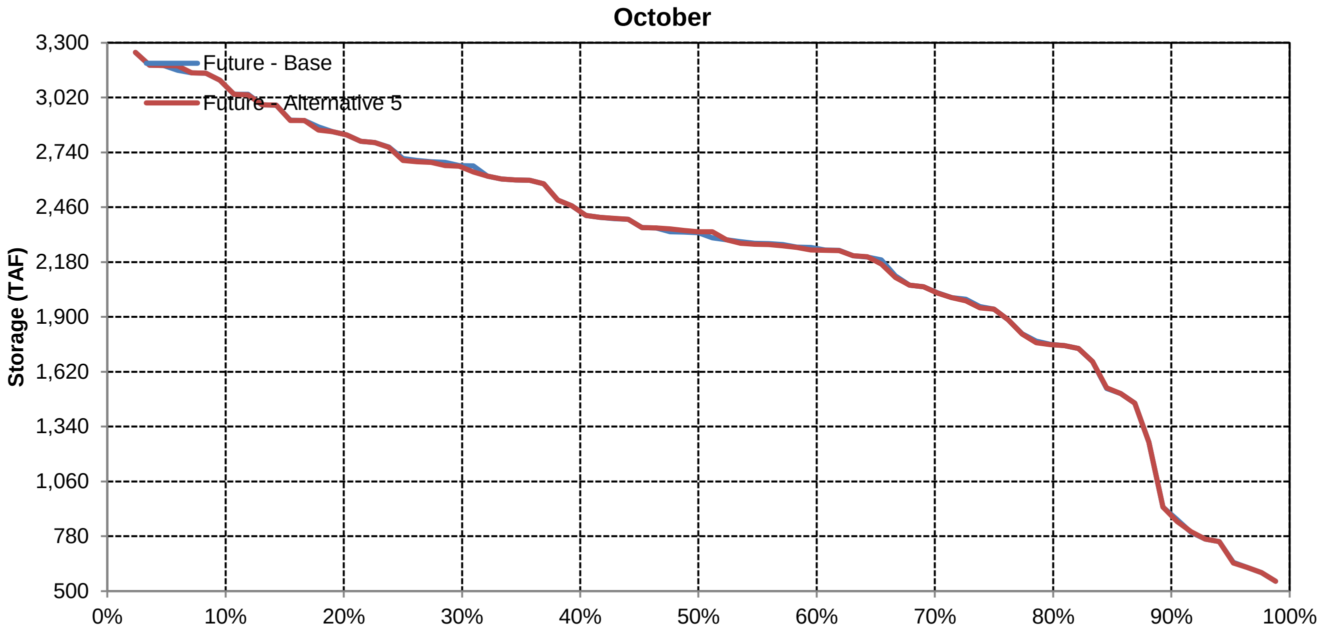
Future - Alternative 5

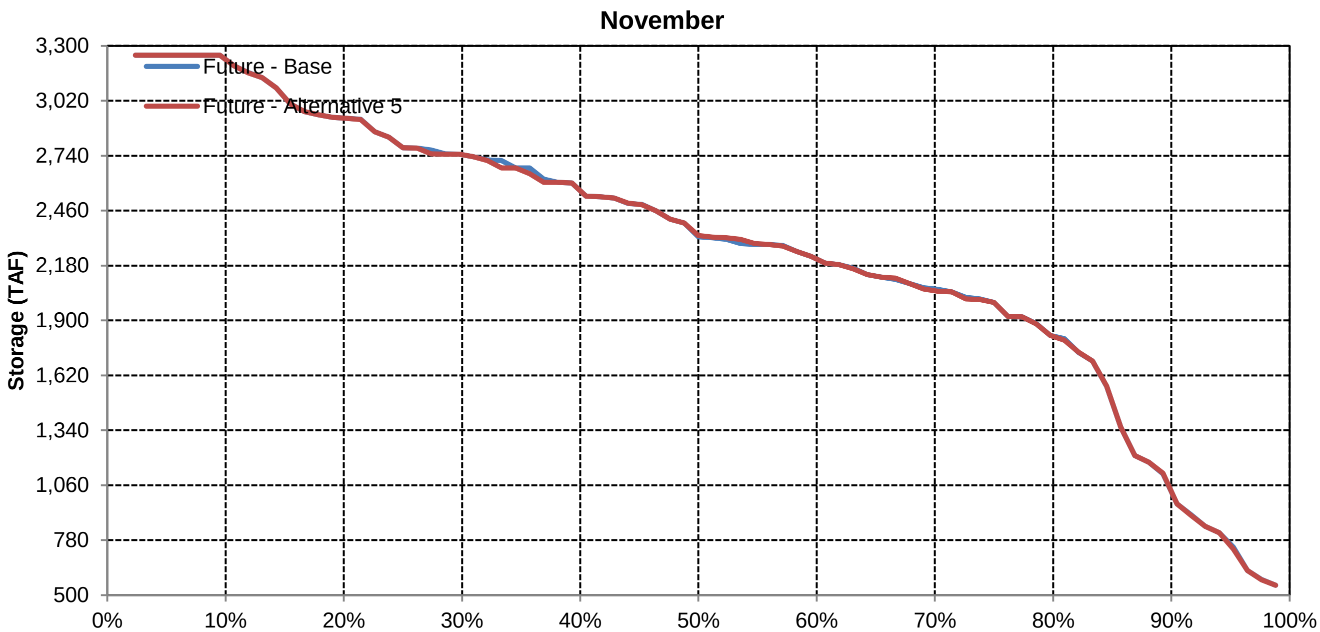
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	3,036	3,187	3,321	3,635	3,916	4,241	4,487	4,552	4,171	3,506	3,194	2,972
20%	2,810	2,927	3,266	3,539	3,777	4,102	4,372	4,324	3,882	3,302	3,029	2,858
30%	2,642	2,736	3,191	3,403	3,662	4,012	4,251	4,224	3,719	3,170	2,942	2,679
40%	2,416	2,533	2,980	3,335	3,537	3,963	4,176	4,143	3,568	3,026	2,823	2,535
50%	2,335	2,329	2,754	3,252	3,446	3,839	4,109	3,953	3,352	2,880	2,669	2,439
60%	2,241	2,200	2,543	2,973	3,289	3,624	4,009	3,836	3,203	2,769	2,503	2,345
70%	2,019	2,049	2,278	2,765	3,252	3,417	3,757	3,635	3,155	2,594	2,355	2,107
80%	1,757	1,814	2,037	2,428	2,916	3,270	3,215	2,992	2,612	2,141	1,806	1,823
90%	878	1,011	1,338	1,919	2,371	2,627	2,534	2,407	1,951	1,420	975	954
Long Term												
Full Simulation Period	2,224	2,277	2,586	2,960	3,276	3,633	3,825	3,712	3,229	2,716	2,459	2,291
Water Year Types												
Wet	2,395	2,479	2,989	3,394	3,578	3,842	4,228	4,235	3,803	3,241	2,993	2,525
Above Normal	2,325	2,391	2,734	3,276	3,538	4,067	4,380	4,288	3,780	3,188	2,932	2,693
Below Normal	2,279	2,338	2,494	3,022	3,416	3,840	4,076	3,952	3,394	2,898	2,674	2,743
Dry	2,101	2,167	2,414	2,657	3,186	3,591	3,616	3,402	2,899	2,449	2,183	2,206
Critical	1,904	1,850	1,963	2,170	2,383	2,629	2,517	2,308	1,853	1,392	1,093	1,066

Future - Alternative 5 Minus Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	-1	0	0	0	0	0	5	0	0	-6	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	-29	0	0	0	0	-11	0	0	0	0	0	0
40%	0	0	-6	0	-1	0	0	1	0	-13	0	-1
50%	18	5	0	0	0	0	0	0	2	0	0	0
60%	-4	0	-1	0	0	27	0	-3	0	14	4	7
70%	-2	-8	9	-2	0	0	1	27	1	0	-5	-3
80%	-1	-3	-8	0	3	4	-1	-5	-6	-1	-1	-1
90%	-6	0	2	1	-7	-6	0	0	0	0	-3	-3
Long Term												
Full Simulation Period	-1	-1	0	0	0	0	0	0	-1	-1	0	0
Water Year Types												
Wet	-1	-1	-1	0	0	0	0	0	0	-1	-1	0
Above Normal	-6	-6	0	0	0	0	0	0	0	0	0	0
Below Normal	5	4	4	4	4	4	4	4	-2	-2	0	0
Dry	-3	-2	-3	-3	-2	-2	-2	-1	0	0	0	1
Critical	-1	-1	-1	-1	-2	-2	-2	-2	-1	-1	-1	-1

Shasta Reservoir Storage





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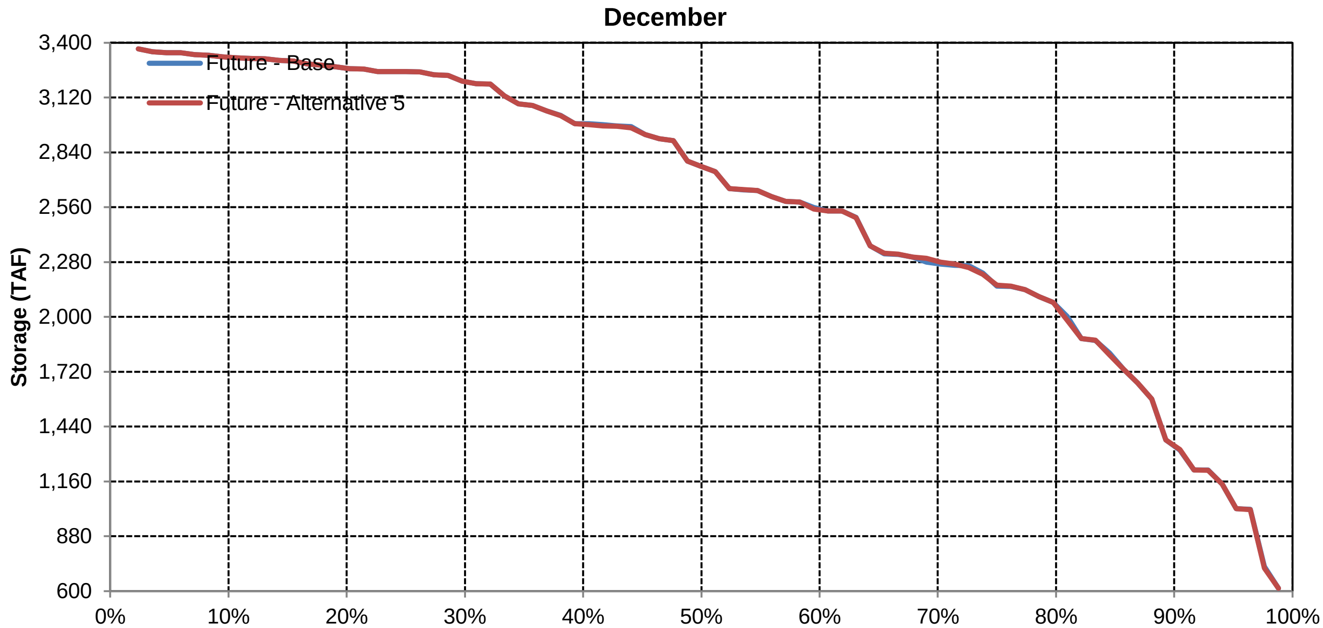

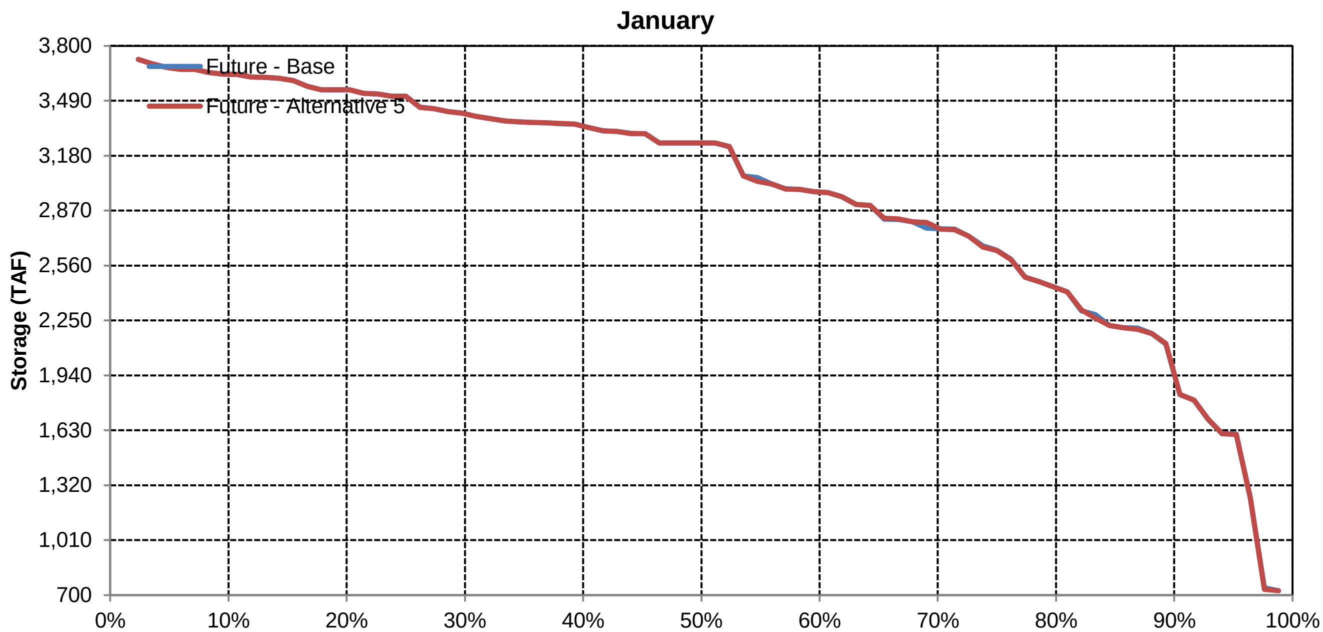

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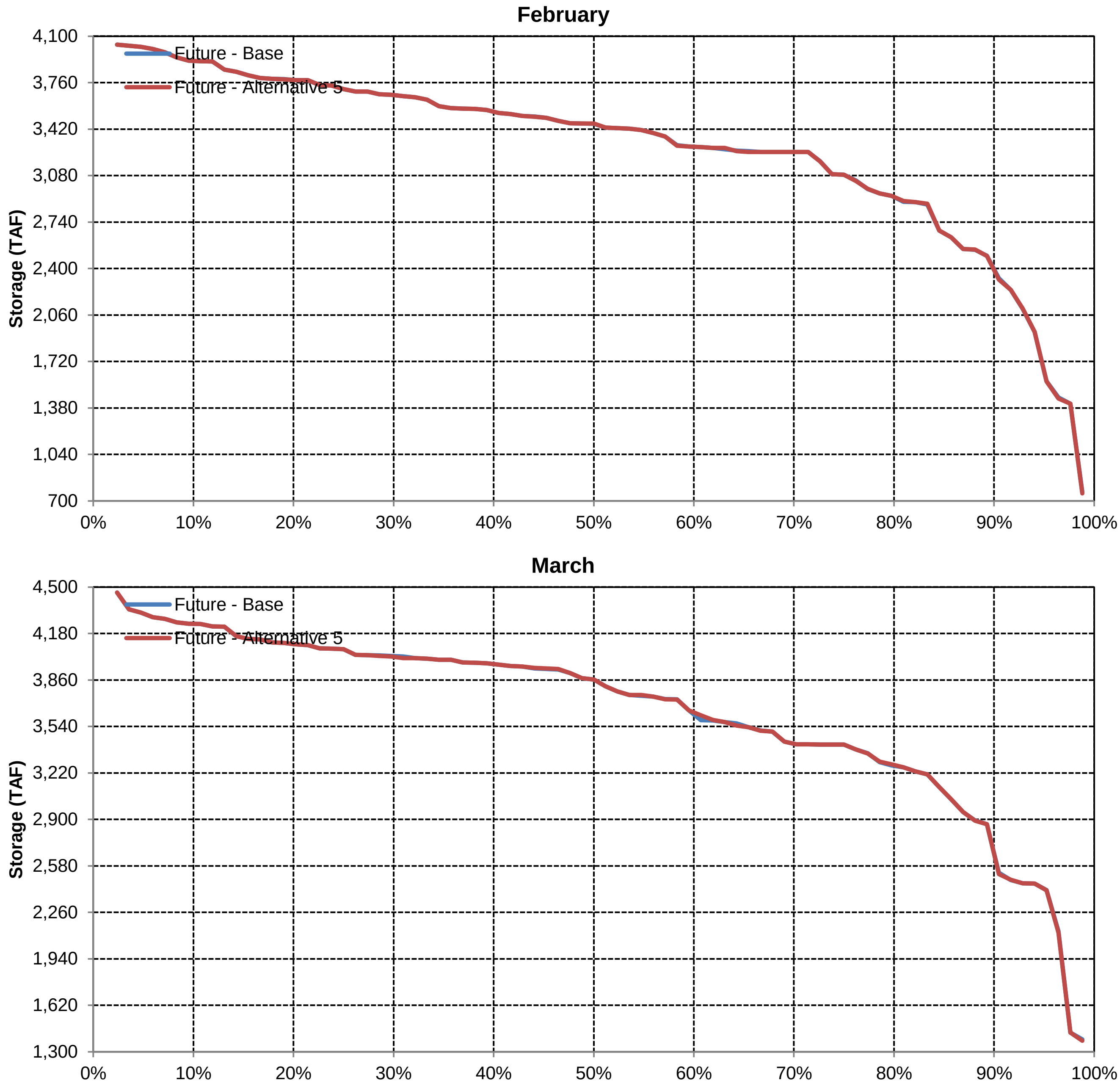
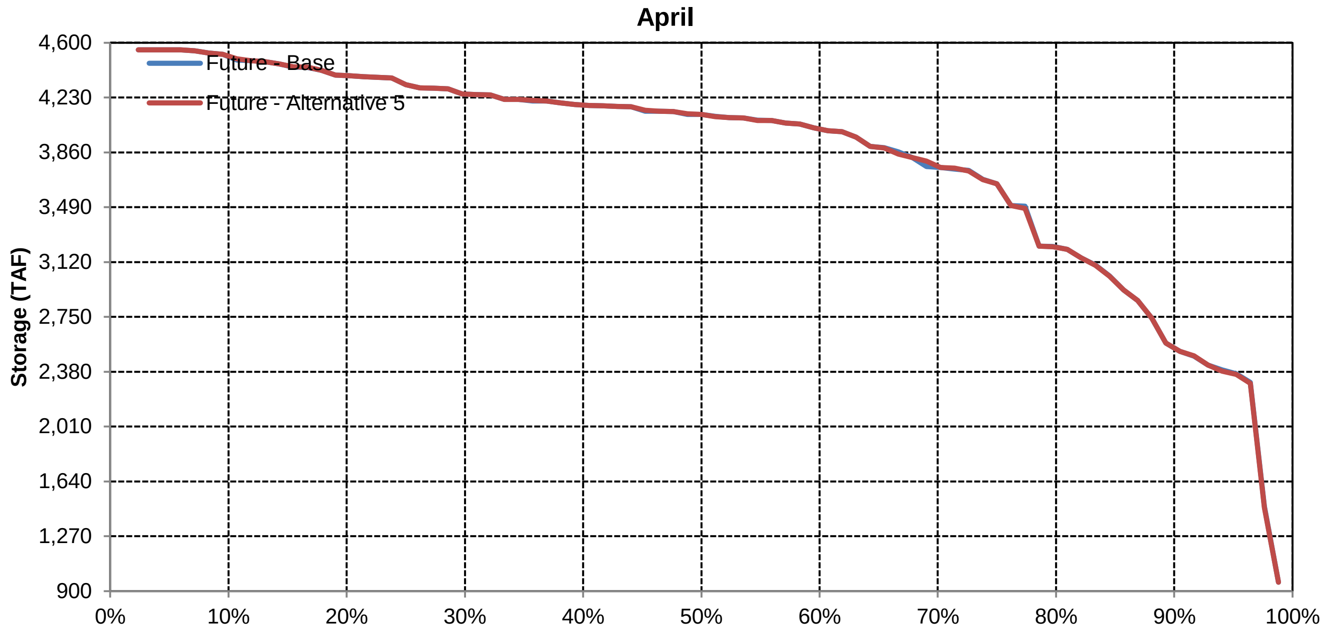
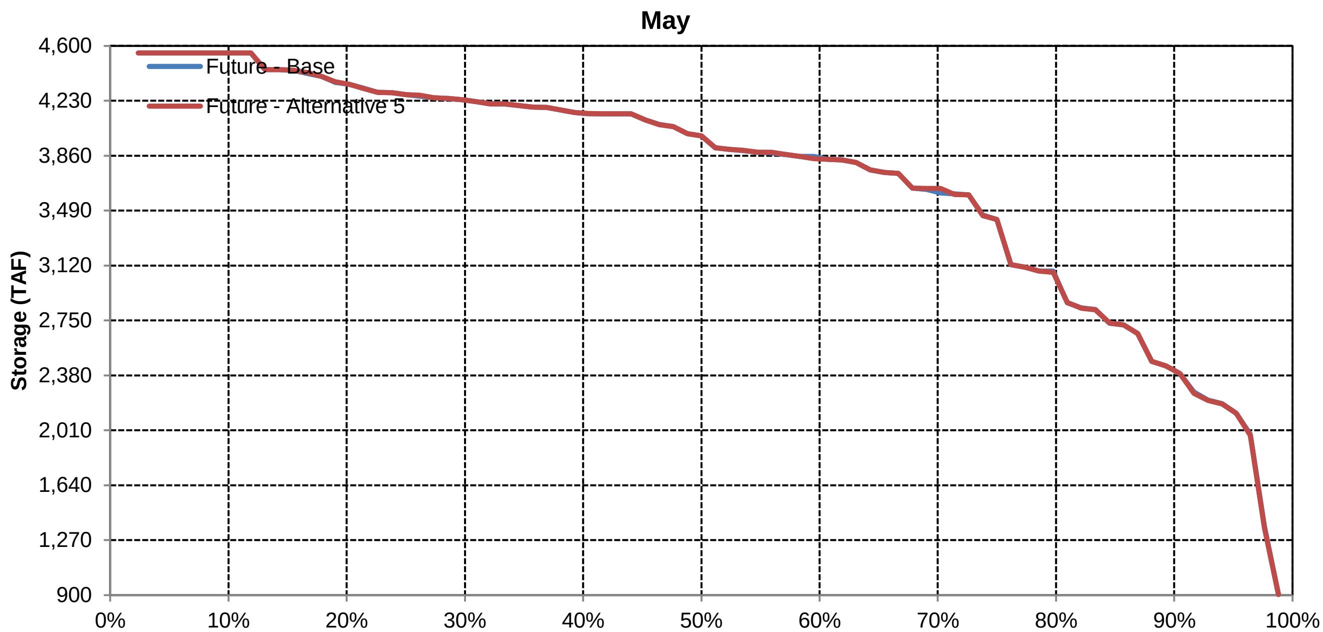


S4

Shasta Reservoir Storage





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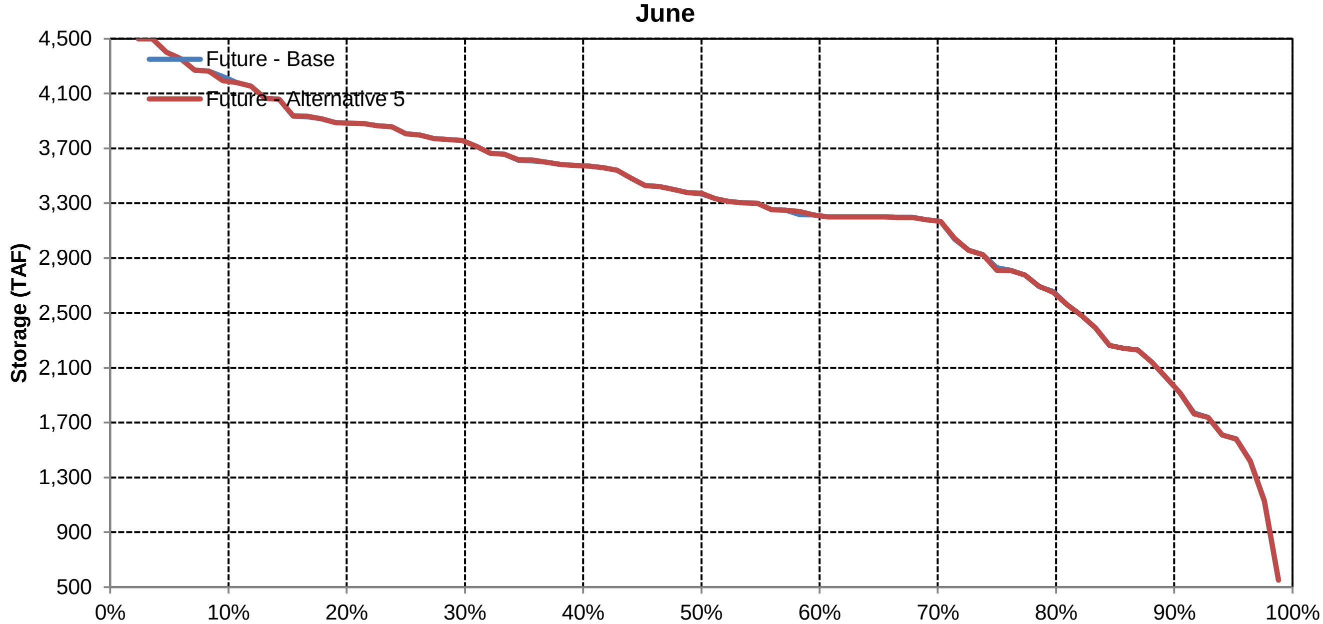

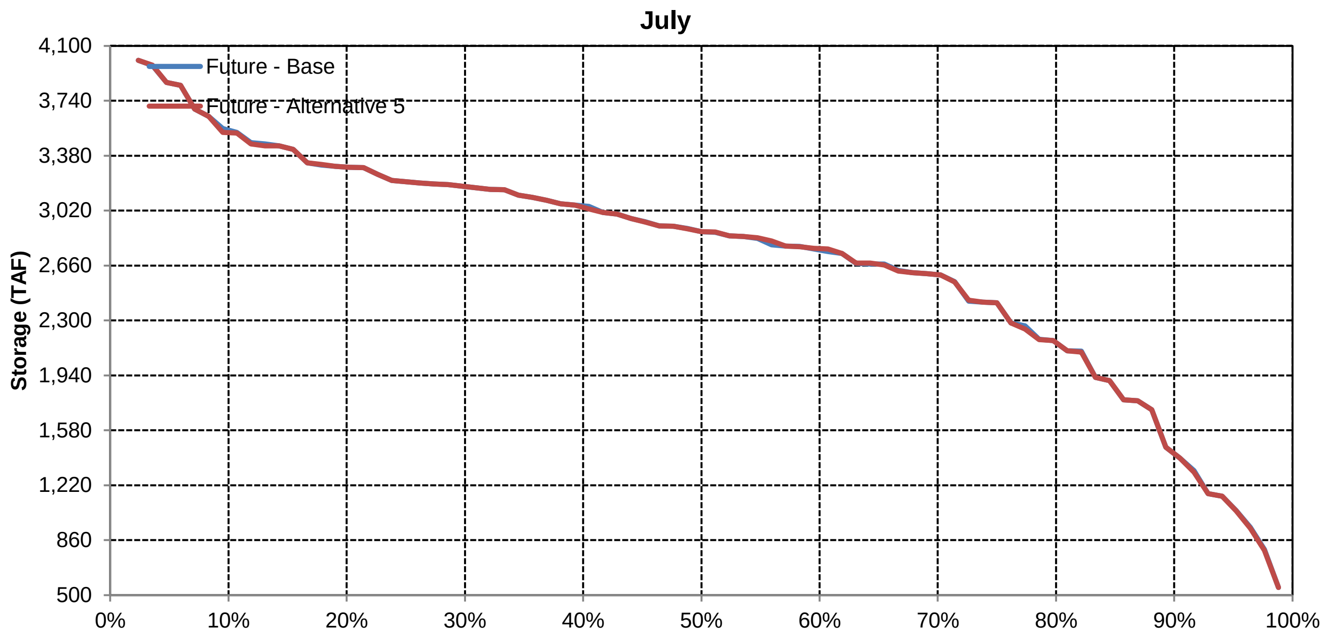

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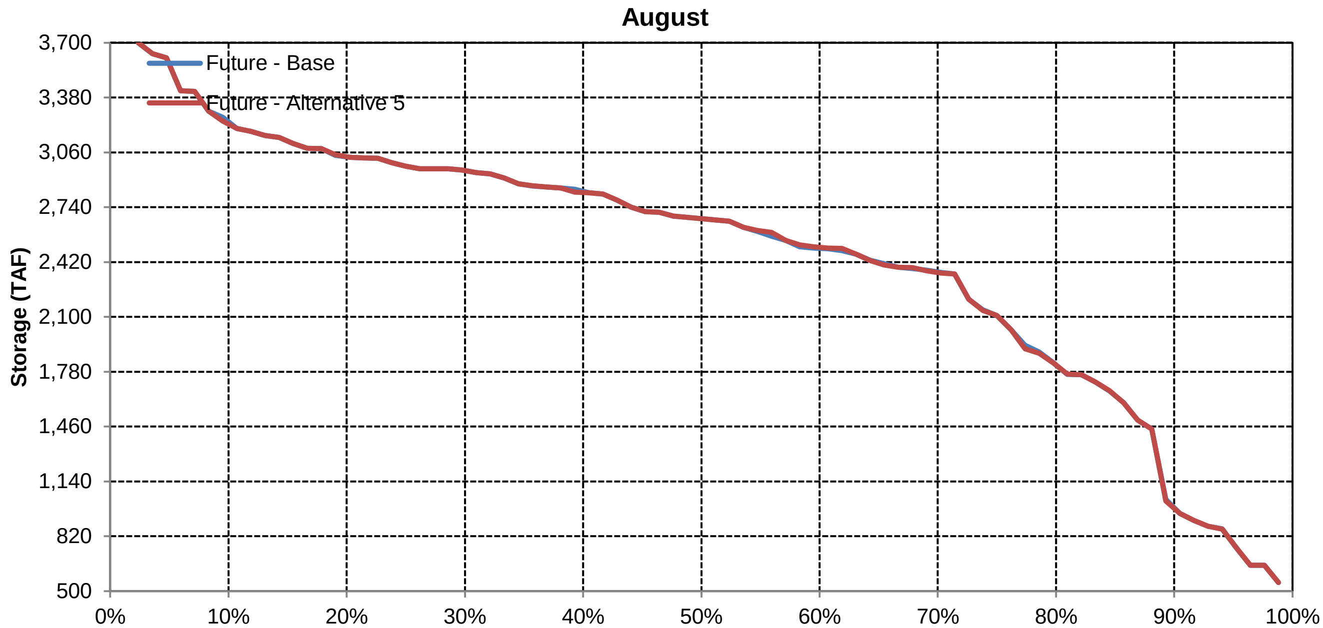
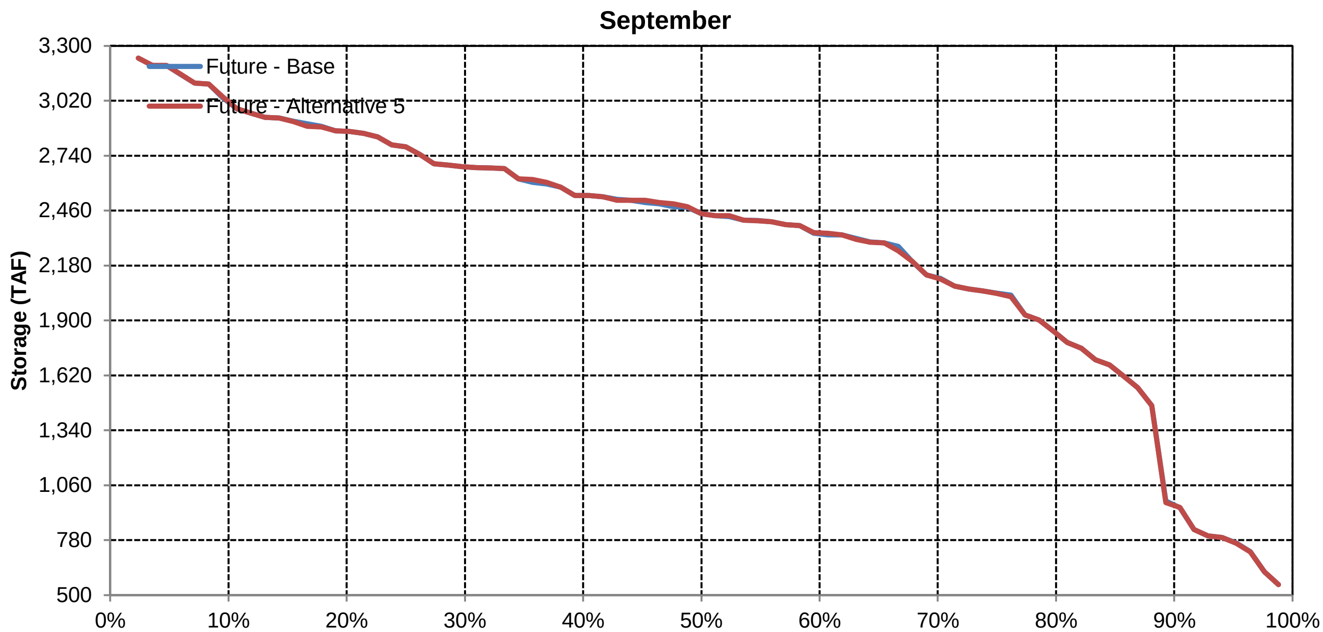




Long-Term and Water Year-Type Average of Oroville Reservoir Under Future - Base and Future - Alternative 5

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
						Long-Term						
Full Simulation Period												
Future - Base	1,244	1,285	1,585	1,975	2,295	2,515	2,665	2,627	2,322	1,842	1,548	1,355
Future - Alternative 5	1,245	1,286	1,586	1,977	2,296	2,516	2,666	2,628	2,323	1,844	1,549	1,356
Difference	1	1	1	2	1	1	1	2	2	2	1	1
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
						Water Year-Types						
Wet												
Future - Base	1,339	1,496	2,168	2,719	2,891	2,940	3,223	3,257	2,987	2,389	2,023	1,633
Future - Alternative 5	1,342	1,498	2,170	2,720	2,891	2,940	3,223	3,257	2,987	2,390	2,026	1,636
Difference	3	2	1	2	0	0	0	0	0	1	3	3
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal												
Future - Base	1,447	1,447	1,640	2,269	2,768	2,962	3,196	3,169	2,777	2,174	1,831	1,539
Future - Alternative 5	1,443	1,443	1,642	2,274	2,769	2,962	3,196	3,169	2,777	2,174	1,831	1,540
Difference	-4	-4	2	5	1	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Future - Base	1,249	1,221	1,348	1,711	2,121	2,564	2,712	2,662	2,276	1,745	1,468	1,397
Future - Alternative 5	1,251	1,221	1,348	1,712	2,123	2,565	2,713	2,667	2,280	1,749	1,465	1,394
Difference	2	0	0	2	2	2	2	5	4	5	-2	-3
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry												
Future - Base	1,100	1,111	1,253	1,469	1,902	2,247	2,284	2,176	1,845	1,457	1,207	1,161
Future - Alternative 5	1,101	1,113	1,253	1,472	1,905	2,249	2,287	2,178	1,845	1,458	1,207	1,162
Difference	1	2	1	3	3	3	3	3	0	1	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical												
Future - Base	1,087	1,038	1,079	1,222	1,410	1,580	1,555	1,479	1,306	1,102	916	863
Future - Alternative 5	1,086	1,038	1,079	1,222	1,411	1,581	1,556	1,479	1,313	1,106	916	866
Difference	0	0	0	0	0	0	0	0	7	4	0	3
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%

Oroville Reservoir

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	1,636	1,973	2,788	2,854	2,994	3,059	3,347	3,446	3,357	2,744	2,228	1,836
20%	1,502	1,552	2,259	2,788	2,856	2,991	3,237	3,254	3,034	2,401	2,003	1,666
30%	1,413	1,392	1,723	2,787	2,788	2,938	3,180	3,142	2,680	2,176	1,819	1,572
40%	1,252	1,284	1,473	2,185	2,788	2,833	3,081	3,034	2,528	1,958	1,679	1,439
50%	1,159	1,175	1,411	1,820	2,492	2,788	2,979	2,790	2,386	1,840	1,570	1,325
60%	1,084	1,076	1,258	1,613	2,165	2,539	2,672	2,667	2,222	1,693	1,307	1,222
70%	998	1,001	1,180	1,458	1,946	2,268	2,297	2,185	1,924	1,499	1,201	1,097
80%	985	953	1,002	1,258	1,538	1,950	2,026	1,954	1,706	1,328	1,052	995
90%	829	891	941	1,010	1,262	1,594	1,557	1,411	1,216	1,006	916	879
Long Term												
Full Simulation Period	1,244	1,285	1,585	1,975	2,295	2,515	2,665	2,627	2,322	1,842	1,548	1,355
Water Year Types												
Wet	1,339	1,496	2,168	2,719	2,891	2,940	3,223	3,257	2,987	2,389	2,023	1,633
Above Normal	1,447	1,447	1,640	2,269	2,768	2,962	3,196	3,169	2,777	2,174	1,831	1,539
Below Normal	1,249	1,221	1,348	1,711	2,121	2,564	2,712	2,662	2,276	1,745	1,468	1,397
Dry	1,100	1,111	1,253	1,469	1,902	2,247	2,284	2,176	1,845	1,457	1,207	1,161
Critical	1,087	1,038	1,079	1,222	1,410	1,580	1,555	1,479	1,306	1,102	916	863

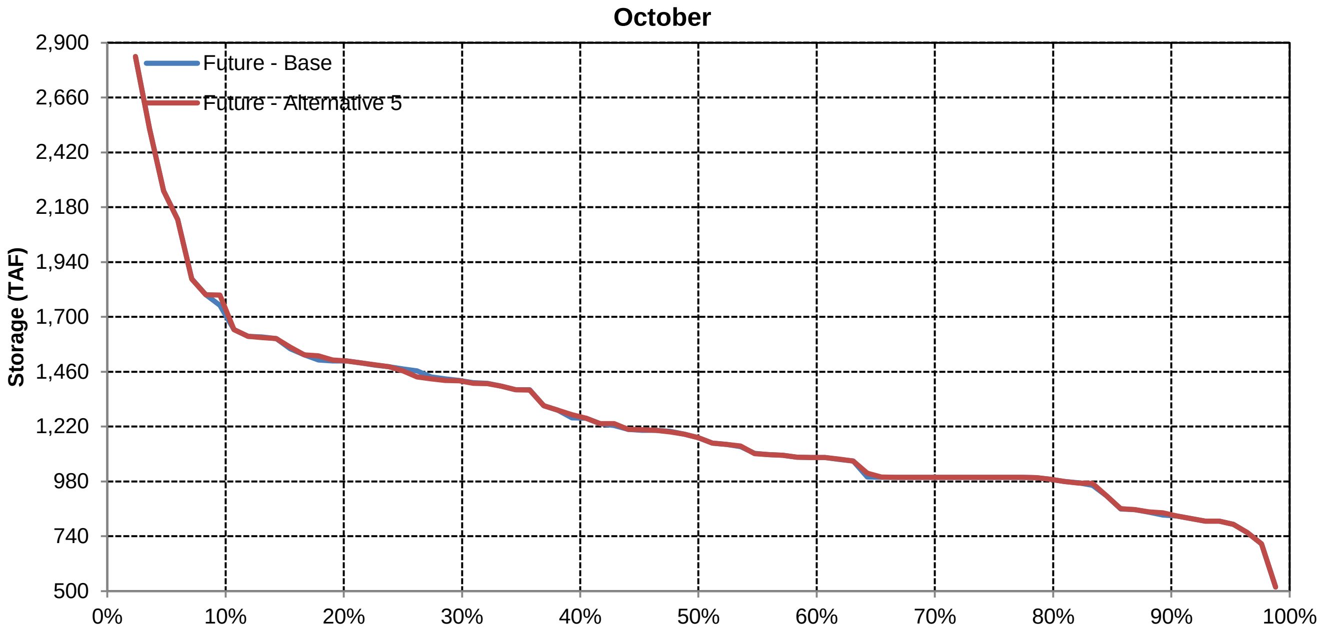
Future - Alternative 5

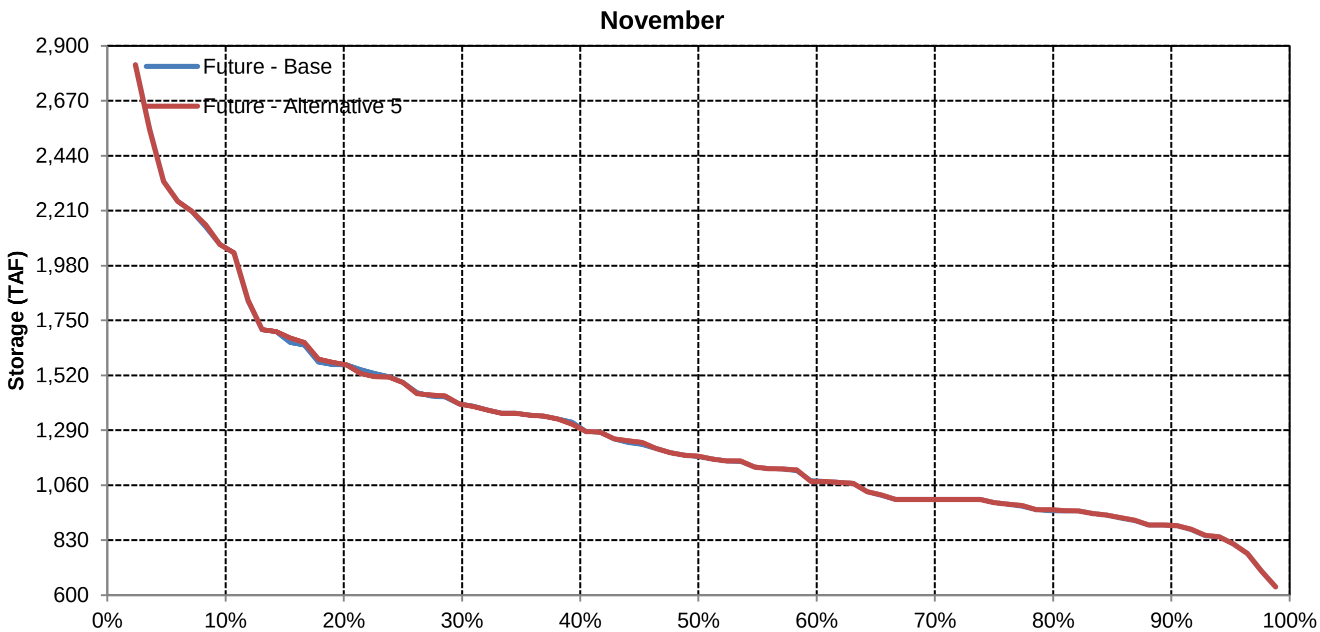
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	1,636	1,973	2,788	2,854	2,994	3,059	3,347	3,446	3,357	2,762	2,228	1,835
20%	1,502	1,542	2,266	2,788	2,856	2,991	3,237	3,254	3,034	2,401	2,003	1,666
30%	1,410	1,391	1,700	2,787	2,788	2,938	3,180	3,142	2,679	2,176	1,819	1,574
40%	1,252	1,285	1,474	2,185	2,788	2,844	3,081	3,044	2,530	1,960	1,679	1,439
50%	1,159	1,176	1,412	1,820	2,494	2,788	2,979	2,790	2,386	1,847	1,570	1,323
60%	1,084	1,076	1,258	1,614	2,165	2,539	2,672	2,667	2,222	1,693	1,312	1,222
70%	998	1,001	1,180	1,458	1,946	2,269	2,298	2,187	1,925	1,515	1,199	1,095
80%	986	956	1,002	1,258	1,538	1,951	2,027	1,954	1,734	1,306	1,030	995
90%	833	891	941	1,024	1,271	1,594	1,557	1,411	1,216	1,007	917	879
Long Term												
Full Simulation Period	1,245	1,286	1,586	1,977	2,296	2,516	2,666	2,628	2,323	1,844	1,549	1,356
Water Year Types												
Wet	1,342	1,498	2,170	2,720	2,891	2,940	3,223	3,257	2,987	2,390	2,026	1,636
Above Normal	1,443	1,443	1,642	2,274	2,769	2,962	3,196	3,169	2,777	2,174	1,831	1,540
Below Normal	1,251	1,221	1,348	1,712	2,123	2,565	2,713	2,667	2,280	1,749	1,465	1,394
Dry	1,101	1,113	1,253	1,472	1,905	2,249	2,287	2,178	1,845	1,458	1,207	1,162
Critical	1,086	1,038	1,079	1,222	1,411	1,581	1,556	1,479	1,313	1,106	916	866

Future - Alternative 5 Minus Future - Base

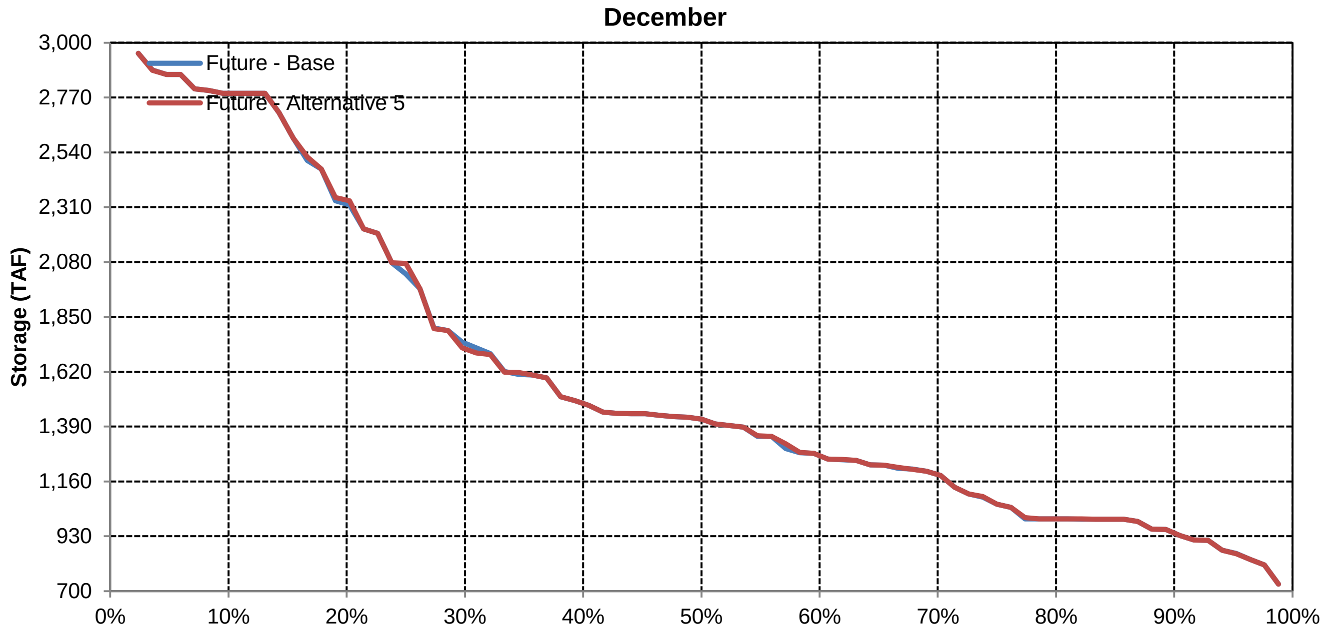
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	17	0	-1
20%	0	-10	7	0	0	0	0	0	0	0	0	0
30%	-3	-2	-23	0	0	0	0	0	0	0	-1	2
40%	0	0	0	0	0	11	0	10	3	2	0	0
50%	0	1	0	0	2	0	0	0	0	8	0	-1
60%	0	-1	0	0	0	0	0	0	0	0	4	0
70%	0	0	0	0	0	1	0	2	2	15	-2	-2
80%	0	2	0	0	0	1	1	0	28	-22	-22	0
90%	3	0	0	14	9	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	1	1	1	2	1	1	1	2	2	2	1	1
Water Year Types												
Wet	3	2	1	2	0	0	0	0	0	1	3	3
Above Normal	-4	-4	2	5	1	0	0	0	0	0	0	0
Below Normal	2	0	0	2	2	2	2	5	4	5	-2	-3
Dry	1	2	1	3	3	3	3	3	0	1	0	0
Critical	0	0	0	0	0	0	0	0	7	4	0	3

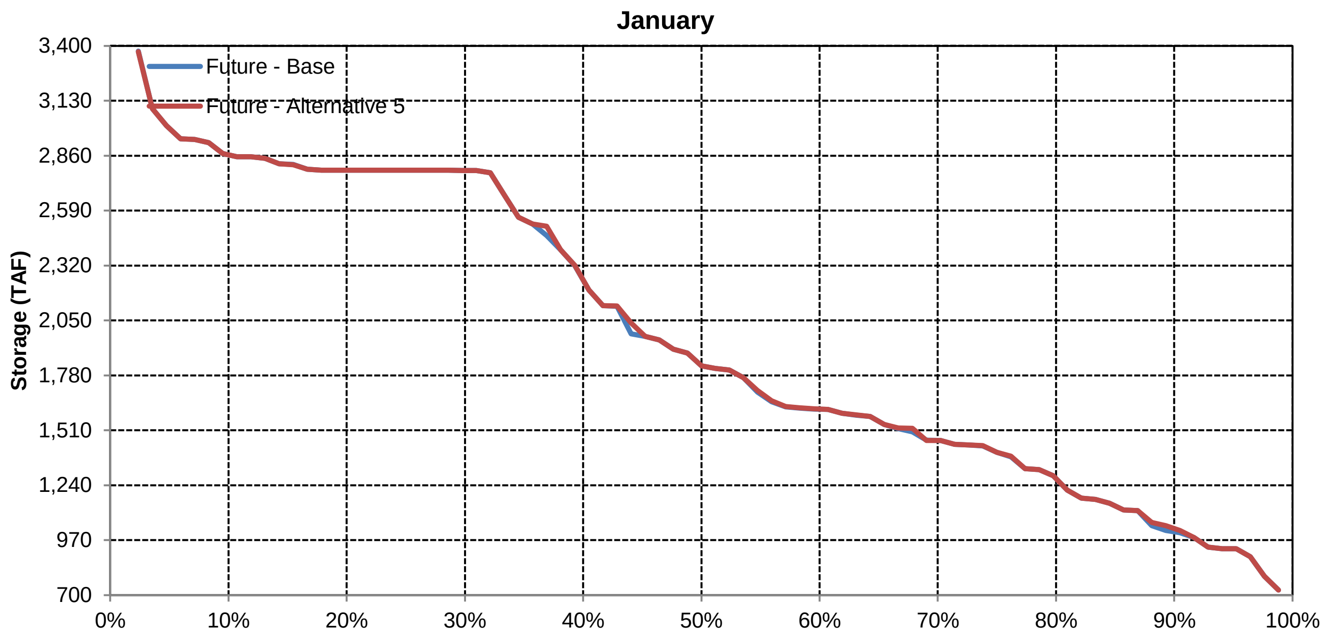
Oroville Reservoir





Oroville Reservoir





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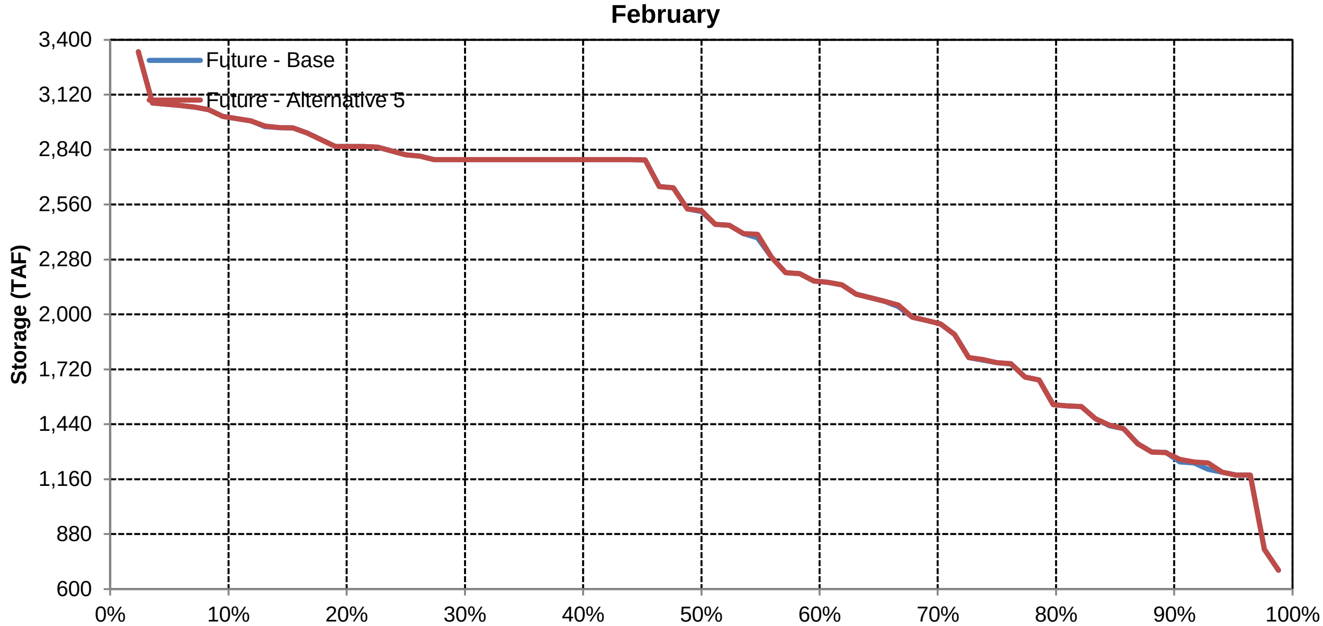
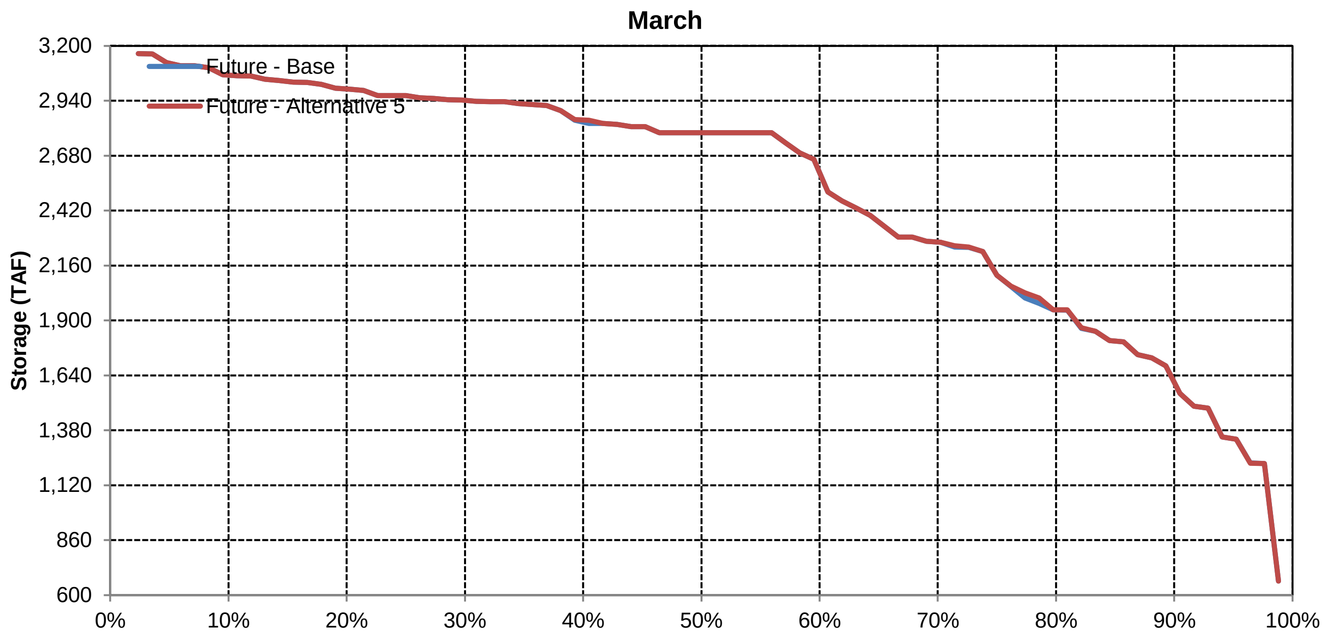
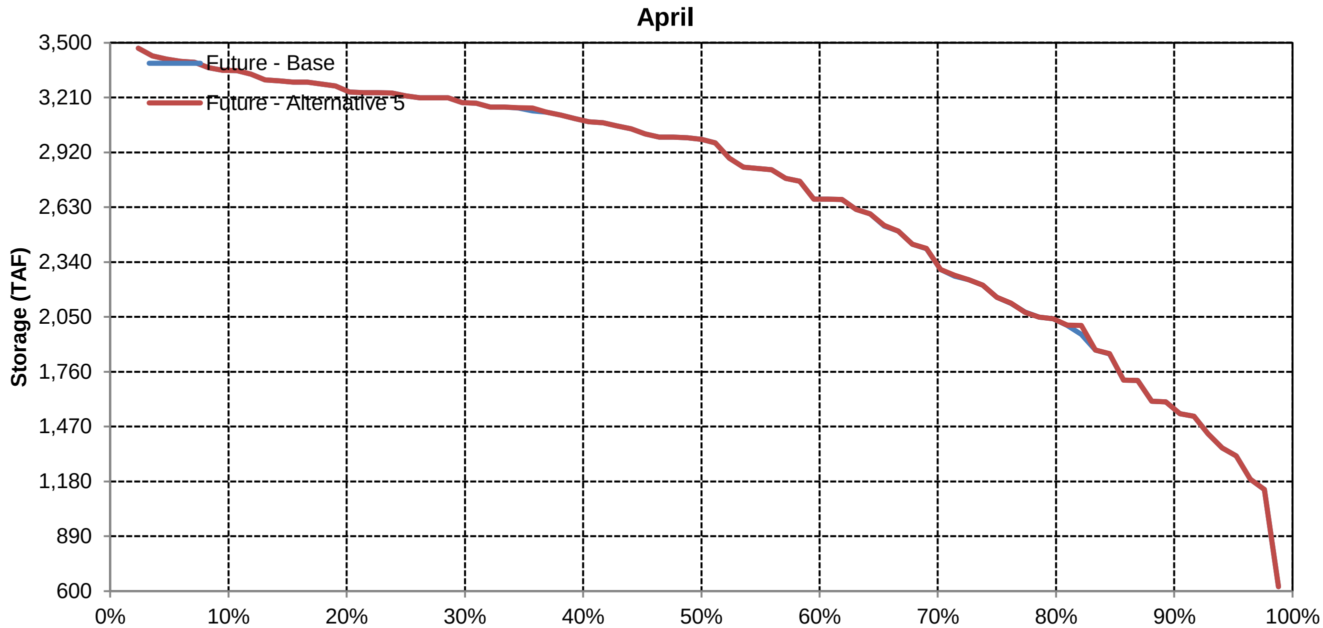
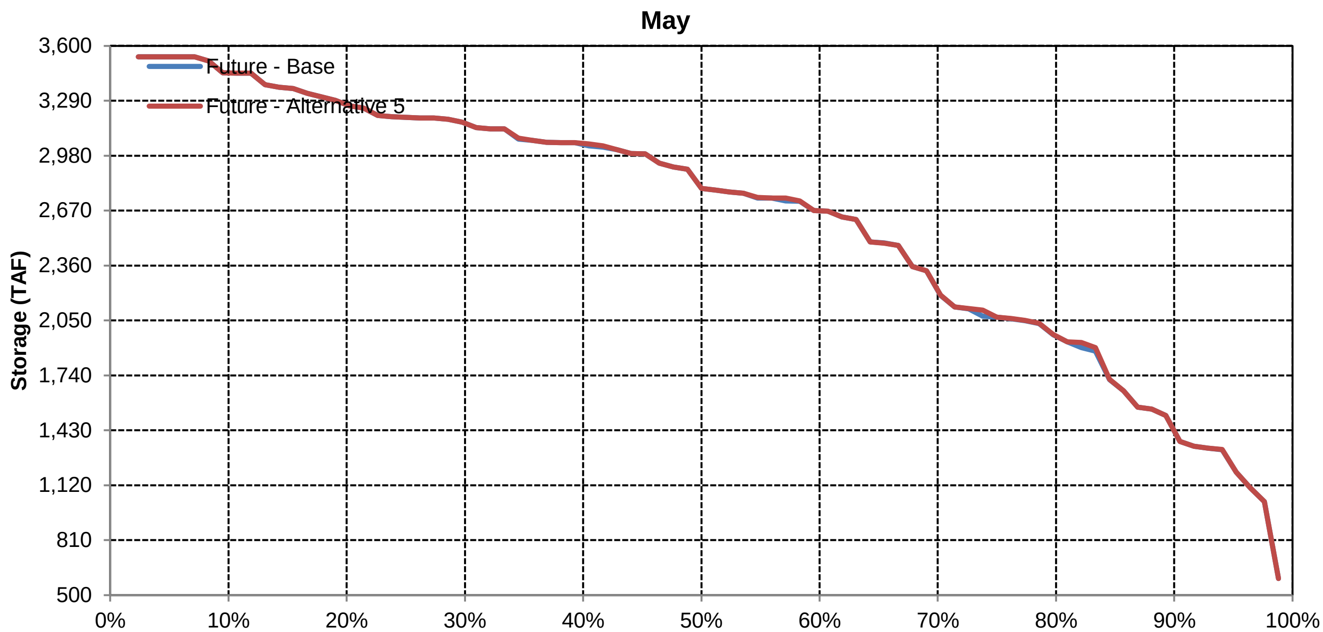




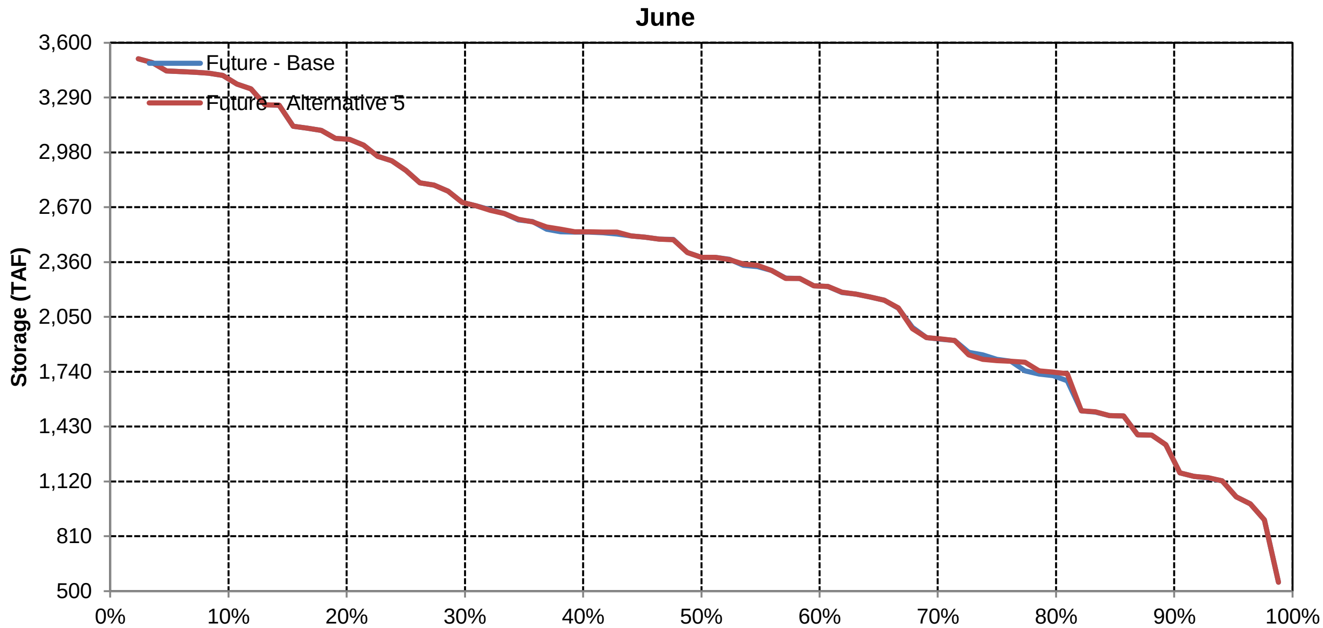
S6

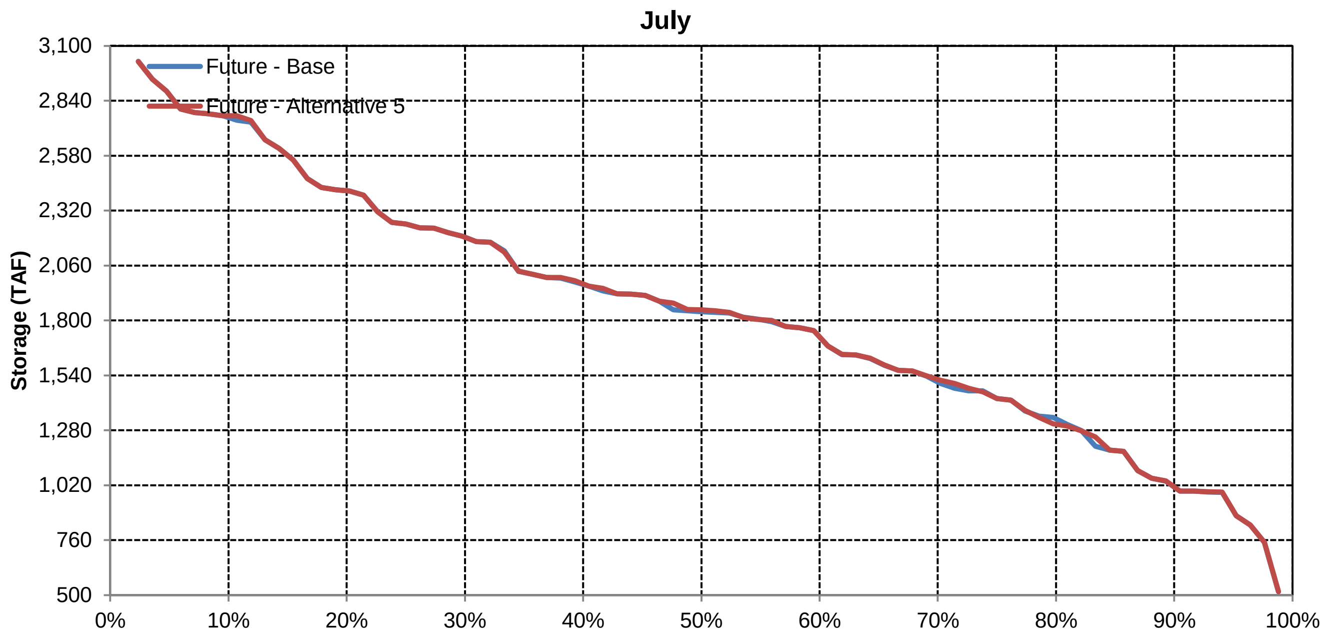
Oroville Reservoir



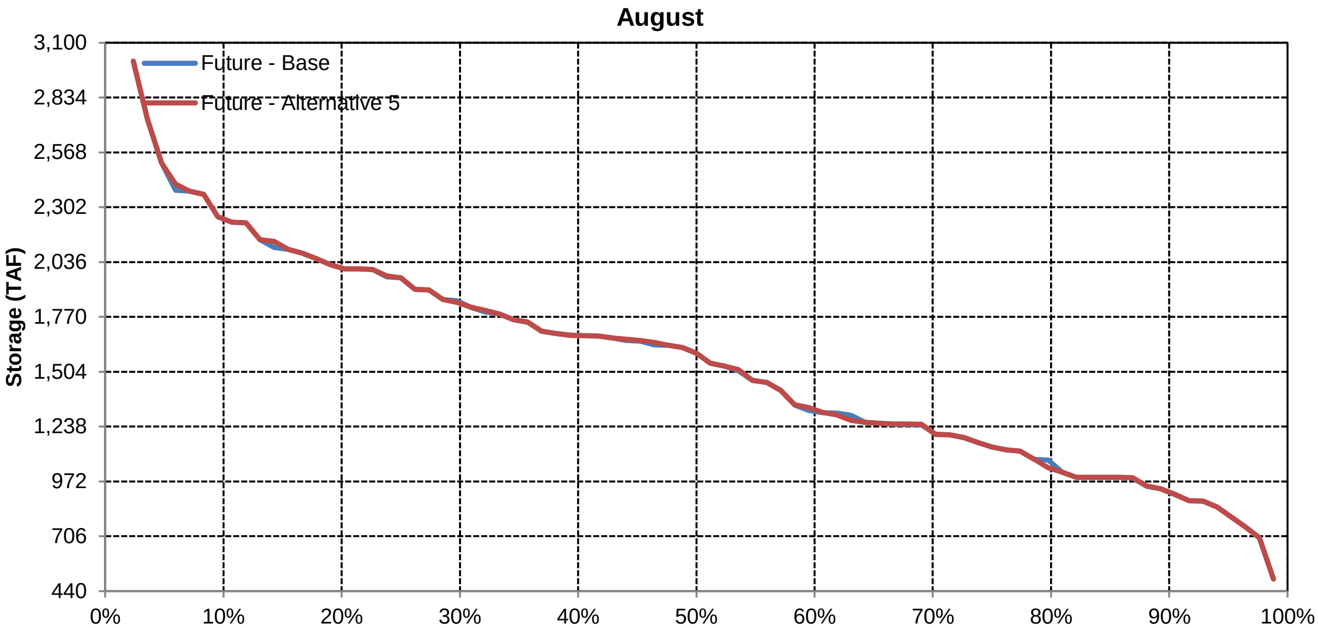


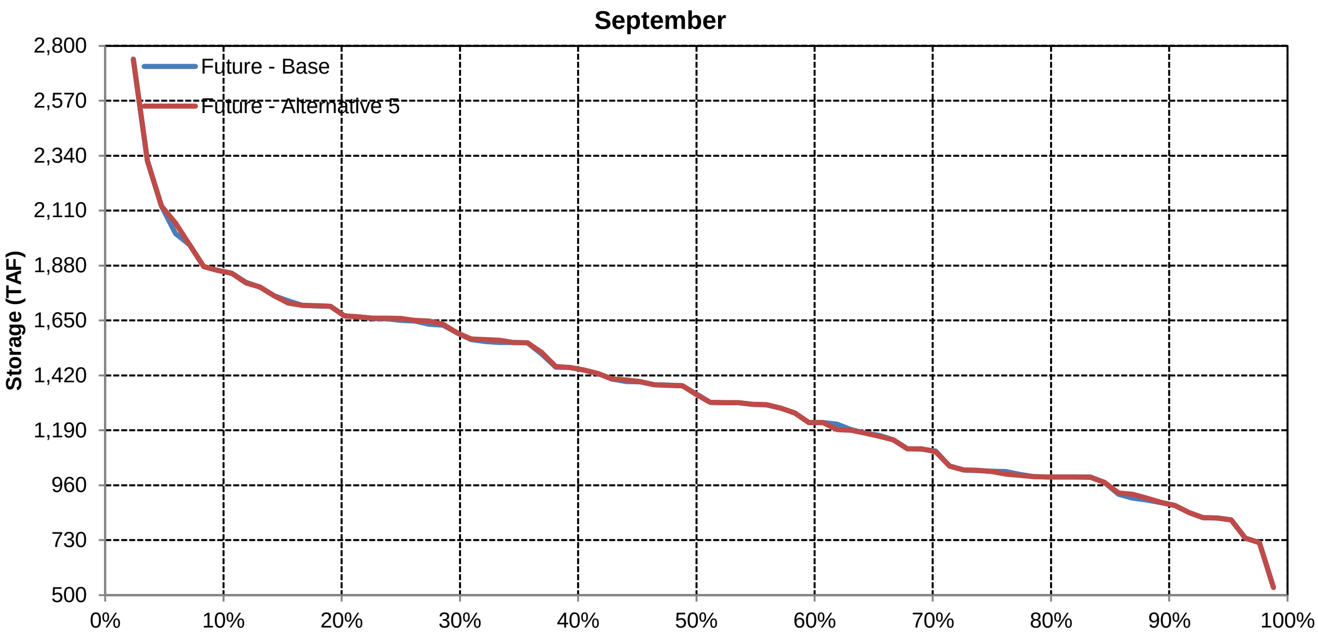
Oroville Reservoir





Oroville Reservoir





Long-Term and Water Year-Type Average of Folsom Reservoir Under Future - Base and Future - Alternative 5

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
Long-Term												
Full Simulation Period												
Future - Base	354	352	404	454	482	592	680	678	580	460	427	390
Future - Alternative 5	354	352	404	454	482	592	680	678	580	461	427	391
Difference	0	0	0	0	0	0	0	0	1	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Water Year-Types												
Wet												
Future - Base	368	385	480	522	509	624	760	806	699	547	509	430
Future - Alternative 5	368	385	480	522	509	624	760	806	699	546	508	430
Difference	1	0	0	0	0	0	0	0	0	-1	-1	-1
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal												
Future - Base	363	358	415	512	550	644	766	766	668	492	471	427
Future - Alternative 5	362	357	415	512	550	644	766	766	668	492	471	427
Difference	-1	-1	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Future - Base	375	361	399	471	508	624	727	714	609	493	465	455
Future - Alternative 5	375	362	400	471	508	624	727	714	610	495	467	457
Difference	1	1	0	0	0	0	0	0	1	2	2	2
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry												
Future - Base	336	332	372	411	477	592	646	596	489	395	356	357
Future - Alternative 5	336	333	373	412	477	592	646	596	491	396	358	359
Difference	1	1	1	1	0	0	0	0	2	1	1	1
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical												
Future - Base	321	298	288	306	341	440	436	418	360	317	287	256
Future - Alternative 5	321	297	288	306	341	439	436	418	360	317	286	255
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	487	501	567	567	567	662	792	939	828	636	580	540
20%	445	437	566	567	567	656	792	820	729	587	548	504
30%	395	394	498	564	563	652	792	763	694	549	519	455
40%	365	365	432	556	557	645	791	745	621	495	483	417
50%	349	342	392	507	549	629	766	706	592	443	413	396
60%	321	327	352	454	495	616	701	656	538	418	388	360
70%	304	311	319	372	443	590	635	600	500	383	356	333
80%	269	272	302	305	386	565	554	498	404	332	305	295
90%	223	217	252	260	302	426	437	426	355	311	276	231
Long Term												
Full Simulation Period	354	352	404	454	482	592	680	678	580	460	427	390
Water Year Types												
Wet	368	385	480	522	509	624	760	806	699	547	509	430
Above Normal	363	358	415	512	550	644	766	766	668	492	471	427
Below Normal	375	361	399	471	508	624	727	714	609	493	465	455
Dry	336	332	372	411	477	592	646	596	489	395	356	357
Critical	321	298	288	306	341	440	436	418	360	317	287	256

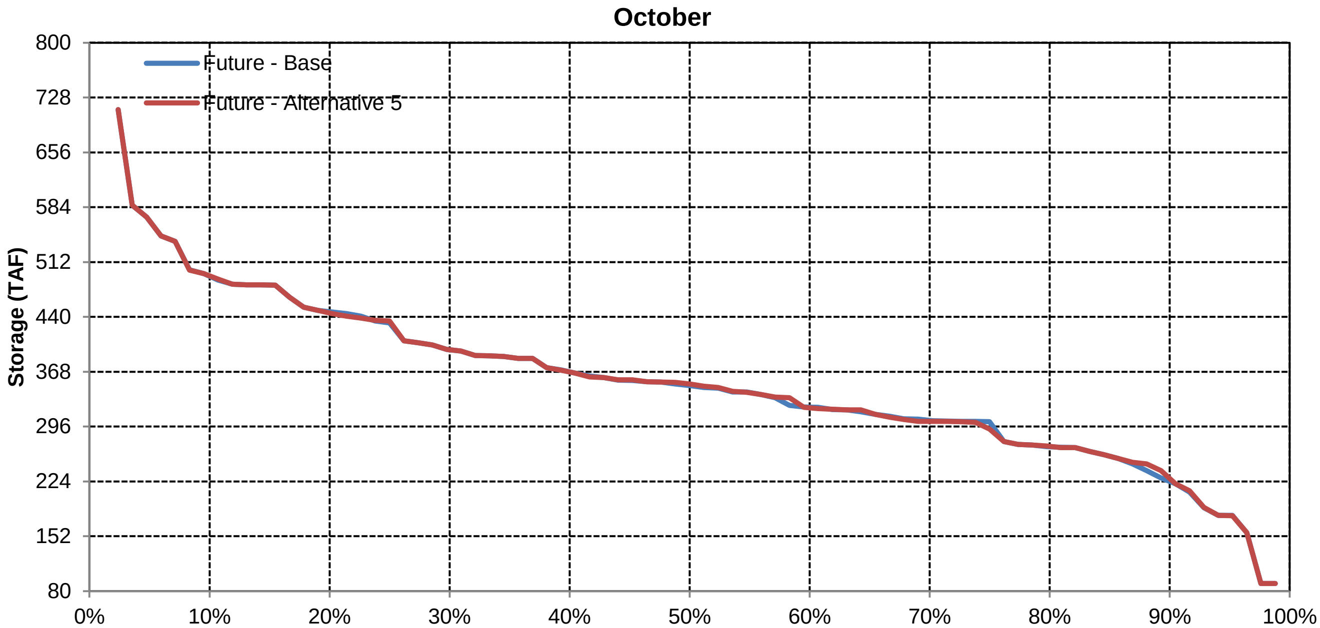
Future - Alternative 5

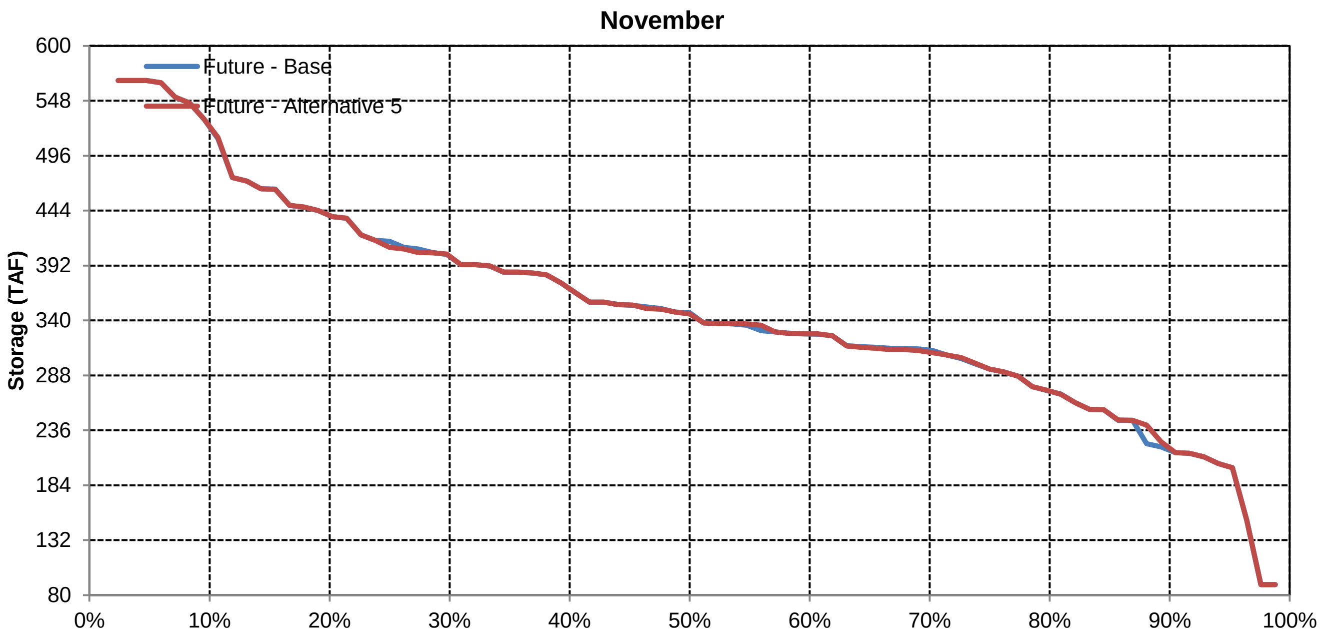
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	488	502	567	567	567	662	792	939	829	636	581	541
20%	442	437	564	567	567	656	792	820	729	587	548	503
30%	395	394	498	564	563	652	792	763	694	549	519	457
40%	365	365	432	556	557	645	791	745	621	495	483	417
50%	351	342	391	507	549	629	766	706	592	448	413	396
60%	320	327	352	454	495	616	701	656	541	419	389	360
70%	303	309	318	372	443	590	635	600	500	379	350	334
80%	270	272	303	305	386	565	554	498	404	331	305	295
90%	226	218	252	262	301	426	439	426	360	311	276	232
Long Term												
Full Simulation Period	354	352	404	454	482	592	680	678	580	461	427	391
Water Year Types												
Wet	368	385	480	522	509	624	760	806	699	546	508	430
Above Normal	362	357	415	512	550	644	766	766	668	492	471	427
Below Normal	375	362	400	471	508	624	727	714	610	495	467	457
Dry	336	333	373	412	477	592	646	596	491	396	358	359
Critical	321	297	288	306	341	439	436	418	360	317	286	255

Future - Alternative 5 Minus Future - Base

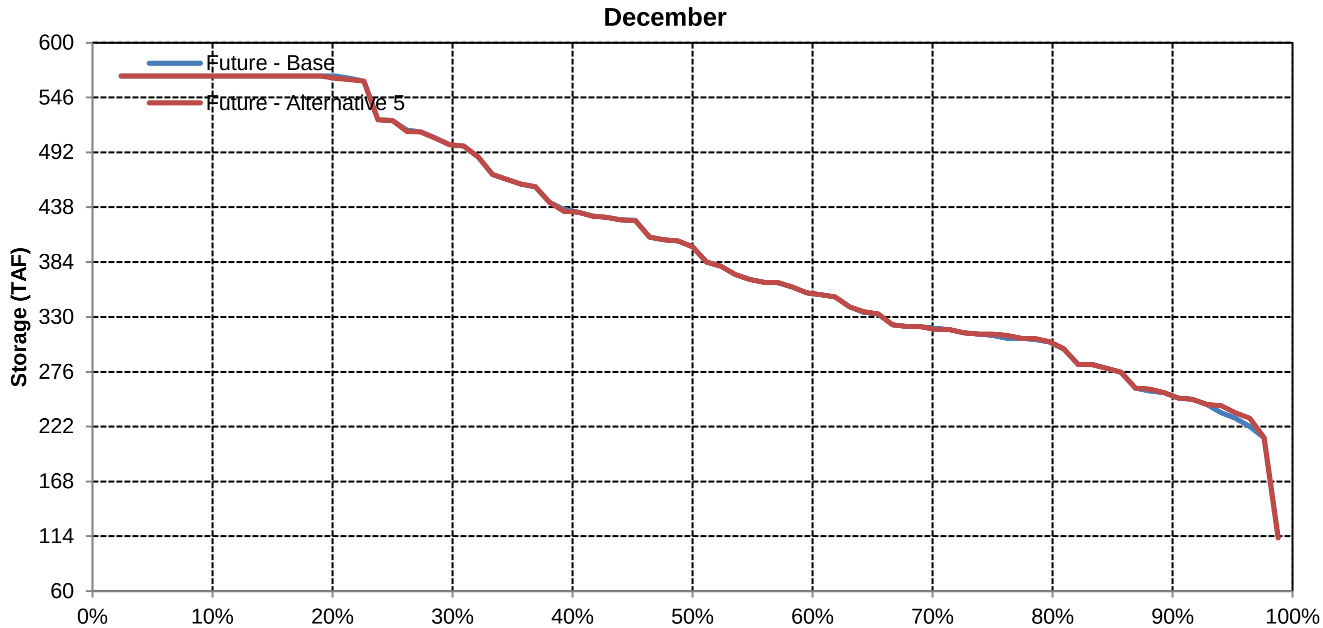
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	1	1	0	0	0	0	0	0	0	0	1	1
20%	-3	0	-2	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	2
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	2	-1	0	0	0	0	0	0	0	6	0	0
60%	-1	0	0	0	0	0	0	0	3	0	1	1
70%	-1	-2	-1	0	0	0	0	0	0	-5	-6	0
80%	0	0	0	0	0	0	0	0	0	-1	0	0
90%	3	1	0	1	0	0	2	0	5	0	0	1
Long Term												
Full Simulation Period	0	0	0	0	0	0	0	0	1	0	0	0
Water Year Types												
Wet	1	0	0	0	0	0	0	0	0	-1	-1	-1
Above Normal	-1	-1	0	0	0	0	0	0	0	0	0	0
Below Normal	1	1	0	0	0	0	0	0	1	2	2	2
Dry	1	1	1	1	0	0	0	0	2	1	1	1
Critical	0	0	0	0	0	0	0	0	0	0	0	0

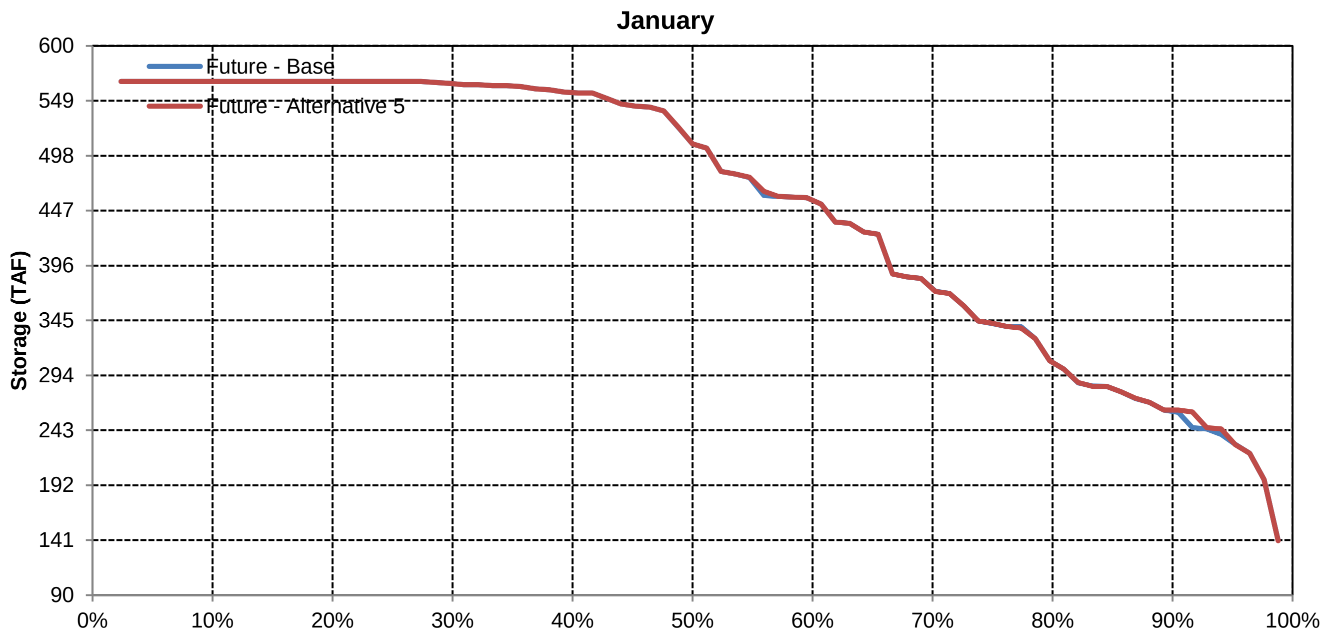
Folsom Reservoir



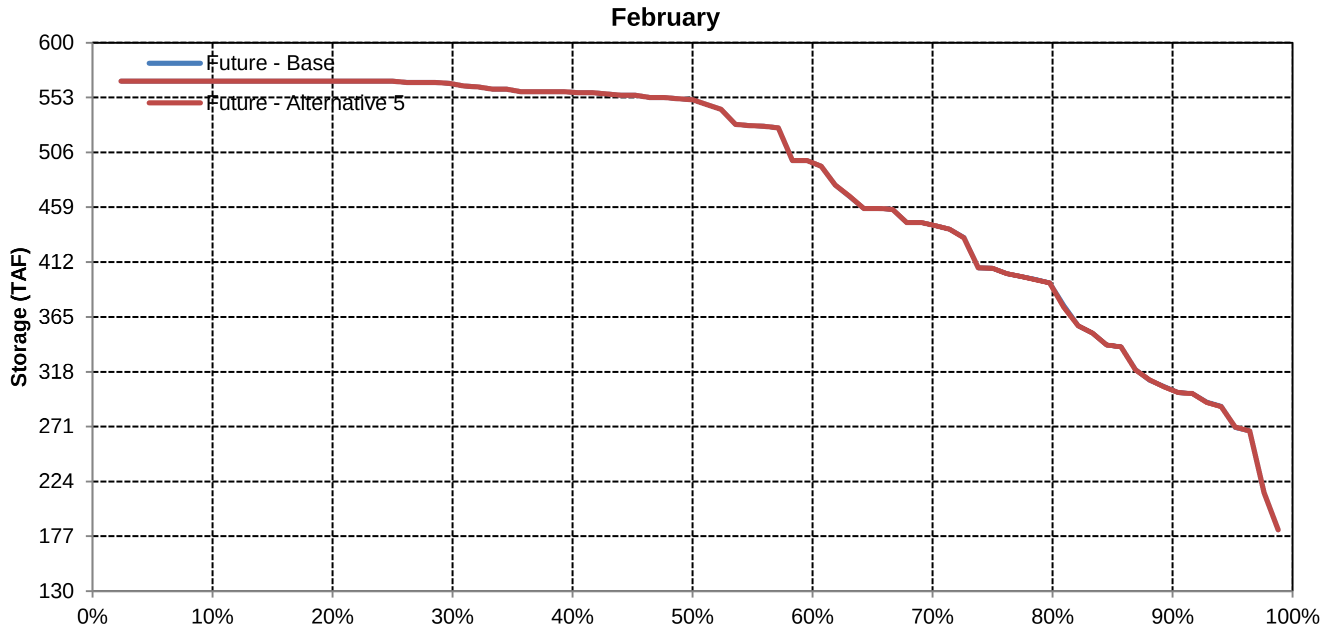


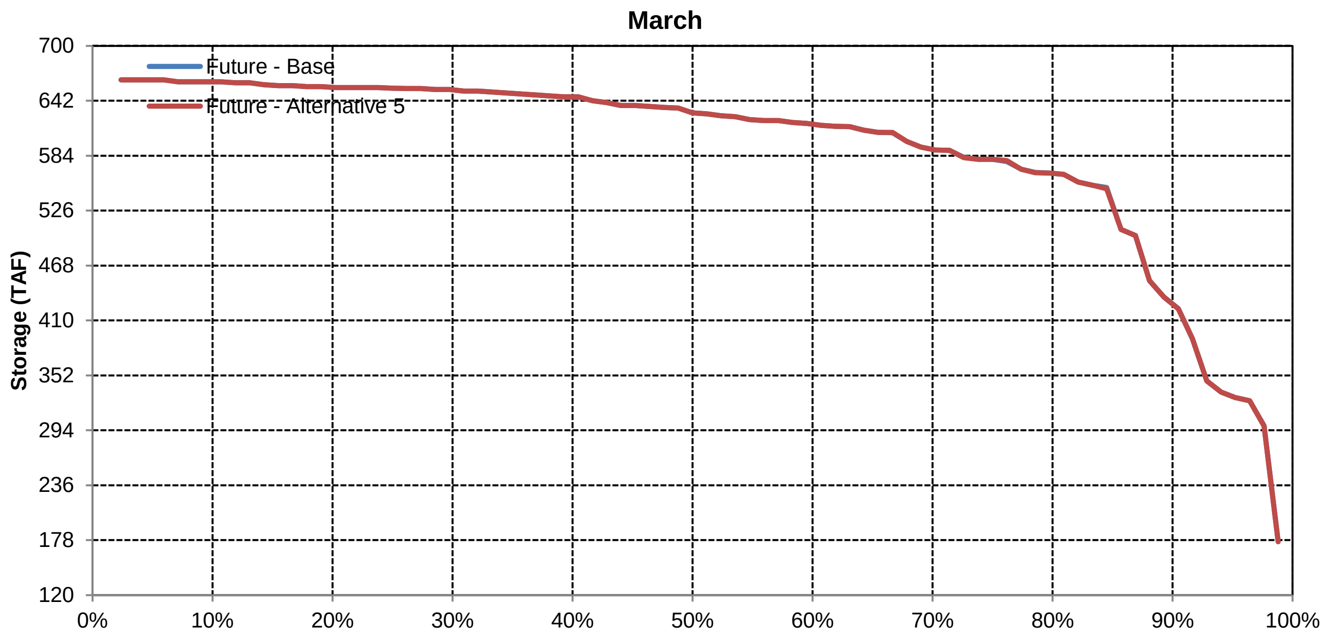
Folsom Reservoir





Folsom Reservoir





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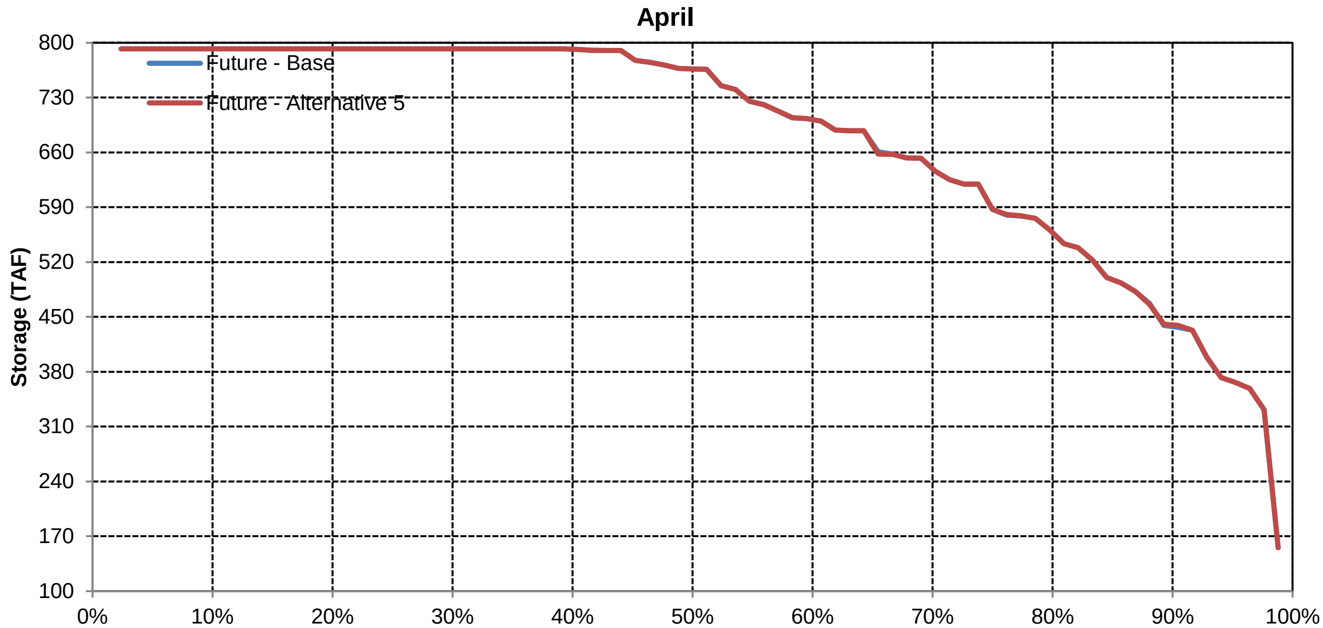
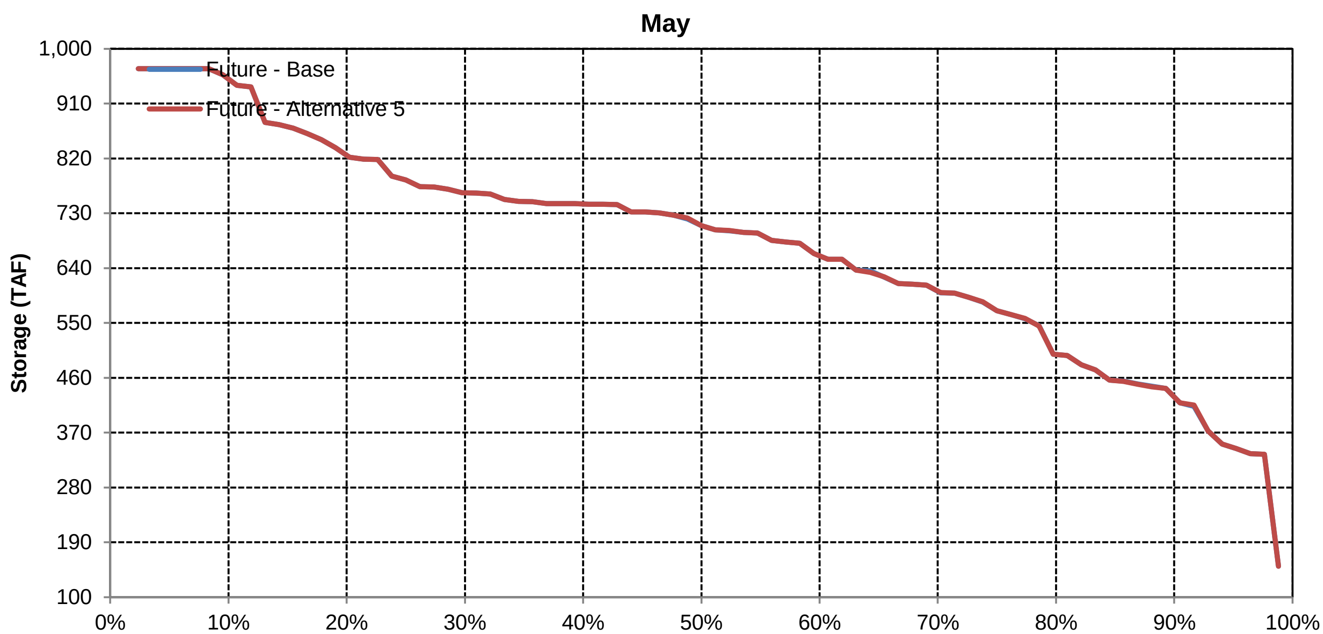
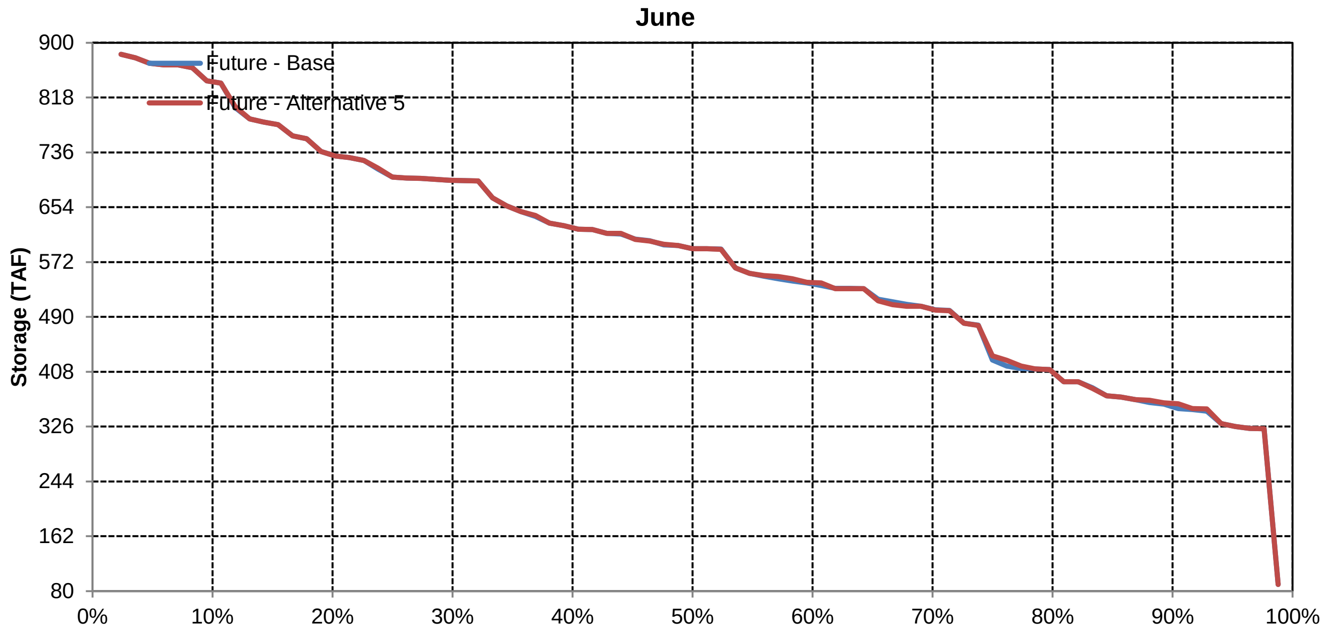
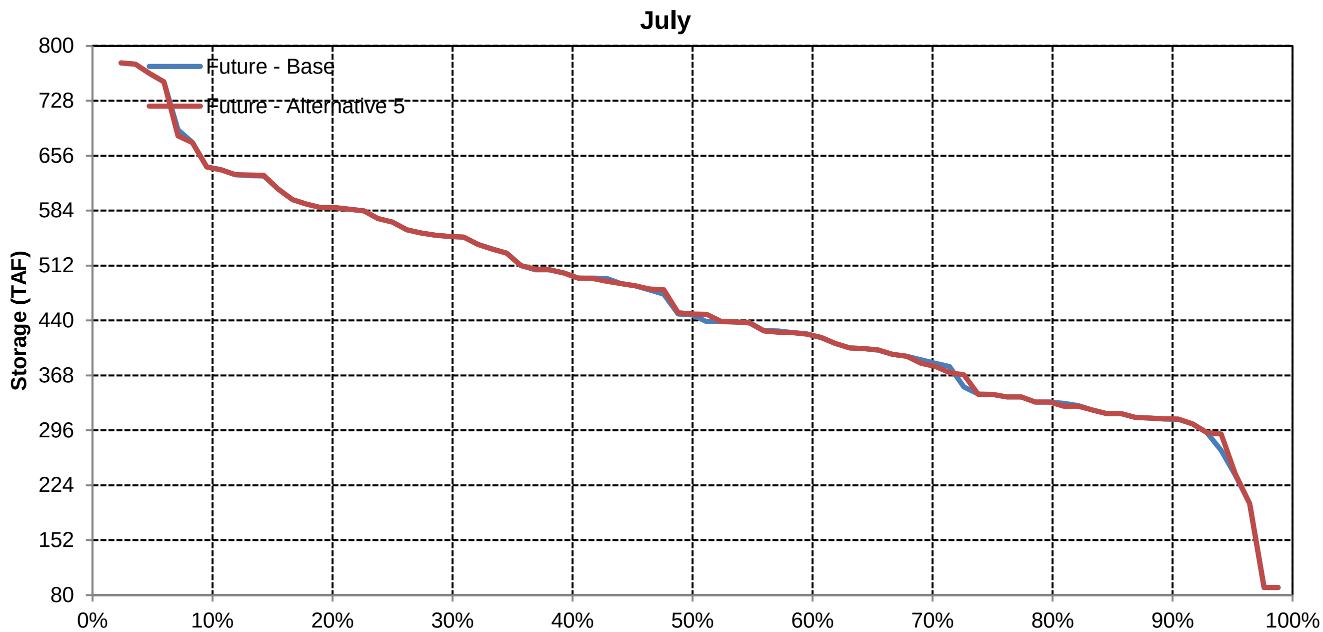


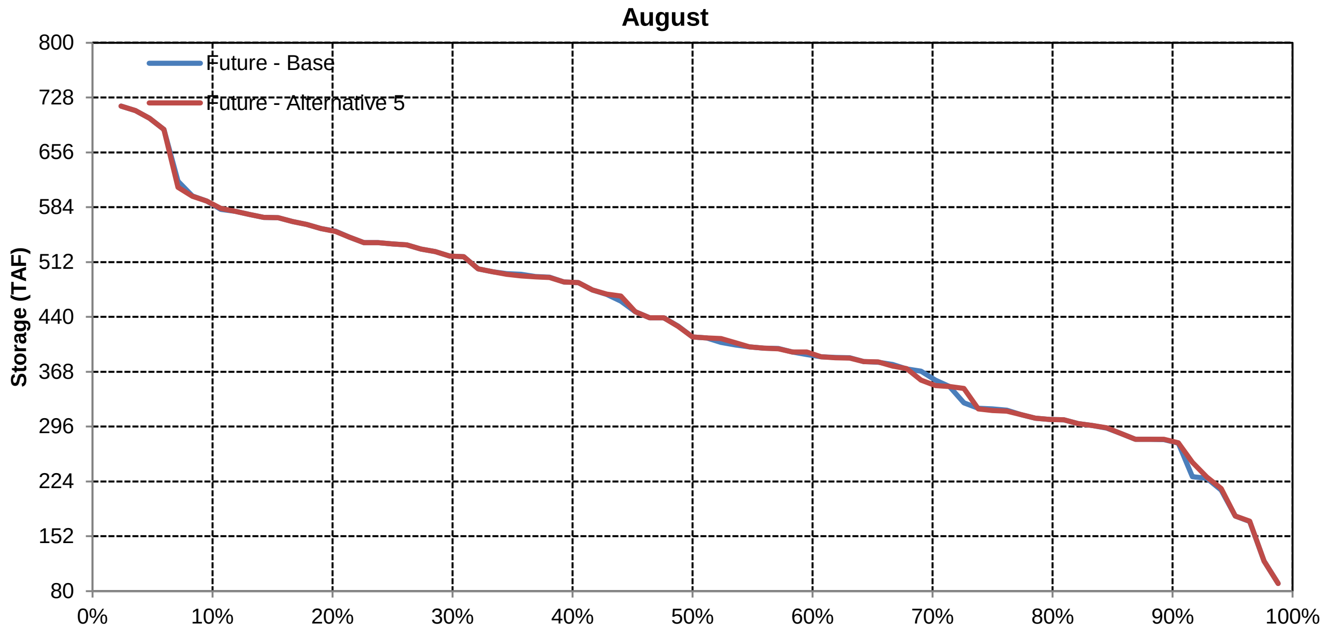


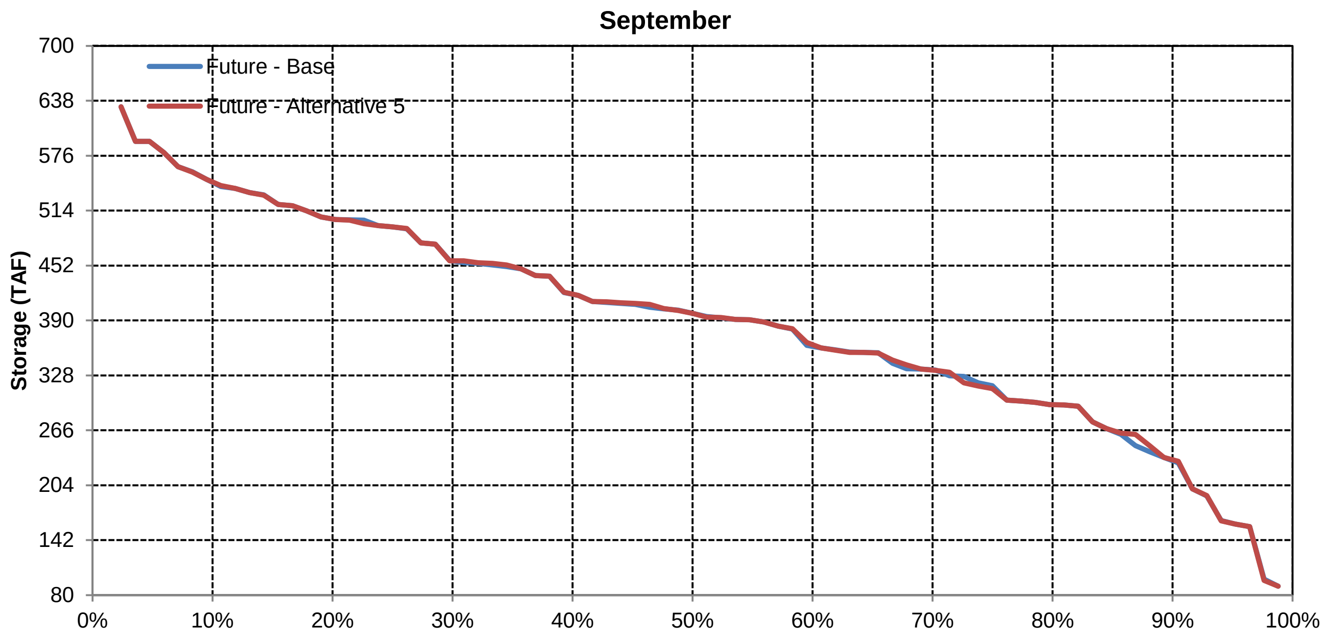
Folsom Reservoir





Folsom Reservoir





Long-Term and Water Year-Type Average of CVP San Luis Reservoir Under Future - Base and Future - Alternative 5

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
						Long-Term						
Full Simulation Period												
Future - Base	218	294	461	615	743	823	788	682	578	413	314	270
Future - Alternative 5	218	295	460	615	743	823	788	683	579	414	314	269
Difference	1	1	-1	0	0	1	0	0	0	1	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
						Water Year-Types						
Wet												
Future - Base	203	294	487	682	836	918	880	792	678	499	390	304
Future - Alternative 5	199	290	482	679	832	918	879	790	674	497	388	301
Difference	-4	-5	-5	-3	-3	0	-2	-1	-4	-2	-2	-3
Percent Difference	-2%	-2%	-1%	0%	0%	0%	0%	0%	-1%	0%	-1%	-1%
Above Normal												
Future - Base	215	289	456	607	754	844	802	668	594	409	303	202
Future - Alternative 5	225	298	459	610	754	844	801	667	594	409	303	202
Difference	10	9	3	3	-1	0	0	0	0	0	0	0
Percent Difference	4%	3%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Future - Base	237	280	459	588	713	836	815	706	632	430	313	312
Future - Alternative 5	234	276	455	582	710	833	813	704	638	436	318	316
Difference	-3	-4	-4	-6	-3	-2	-2	-2	6	7	4	4
Percent Difference	-1%	-1%	-1%	-1%	0%	0%	0%	0%	1%	2%	1%	1%
Dry												
Future - Base	211	284	442	576	689	772	742	621	516	359	253	240
Future - Alternative 5	216	290	446	580	695	776	747	625	518	361	254	240
Difference	5	6	5	4	5	5	5	5	2	2	1	0
Percent Difference	2%	2%	1%	1%	1%	1%	1%	1%	0%	1%	0%	0%
Critical												
Future - Base	242	329	444	571	654	666	621	536	395	302	263	262
Future - Alternative 5	243	330	445	573	655	666	622	537	395	303	263	263
Difference	1	1	1	1	1	0	0	0	0	1	1	1
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

CVP San Luis Reservoir

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	442	574	764	972	972	972	972	909	861	675	596	517
20%	367	426	607	826	972	972	958	858	767	563	489	434
30%	272	373	528	720	942	972	913	806	702	492	413	347
40%	209	298	476	659	826	967	889	768	647	455	316	289
50%	160	269	425	581	736	883	869	715	609	394	256	223
60%	118	232	369	521	682	833	793	636	539	340	226	161
70%	90	173	327	477	630	718	665	571	458	287	190	132
80%	90	122	284	432	554	658	611	480	404	238	140	91
90%	90	90	246	370	439	573	531	393	274	197	110	90
Long Term												
Full Simulation Period	218	294	461	615	743	823	788	682	578	413	314	270
Water Year Types												
Wet	203	294	487	682	836	918	880	792	678	499	390	304
Above Normal	215	289	456	607	754	844	802	668	594	409	303	202
Below Normal	237	280	459	588	713	836	815	706	632	430	313	312
Dry	211	284	442	576	689	772	742	621	516	359	253	240
Critical	242	329	444	571	654	666	621	536	395	302	263	262

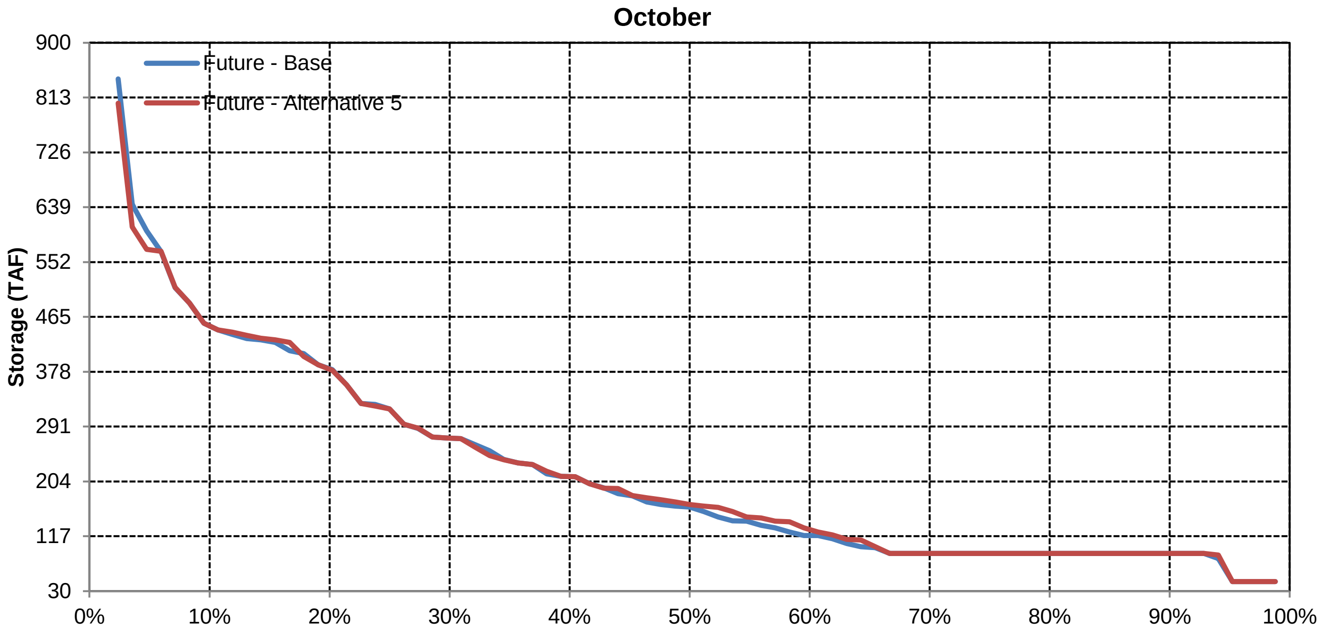
Future - Alternative 5

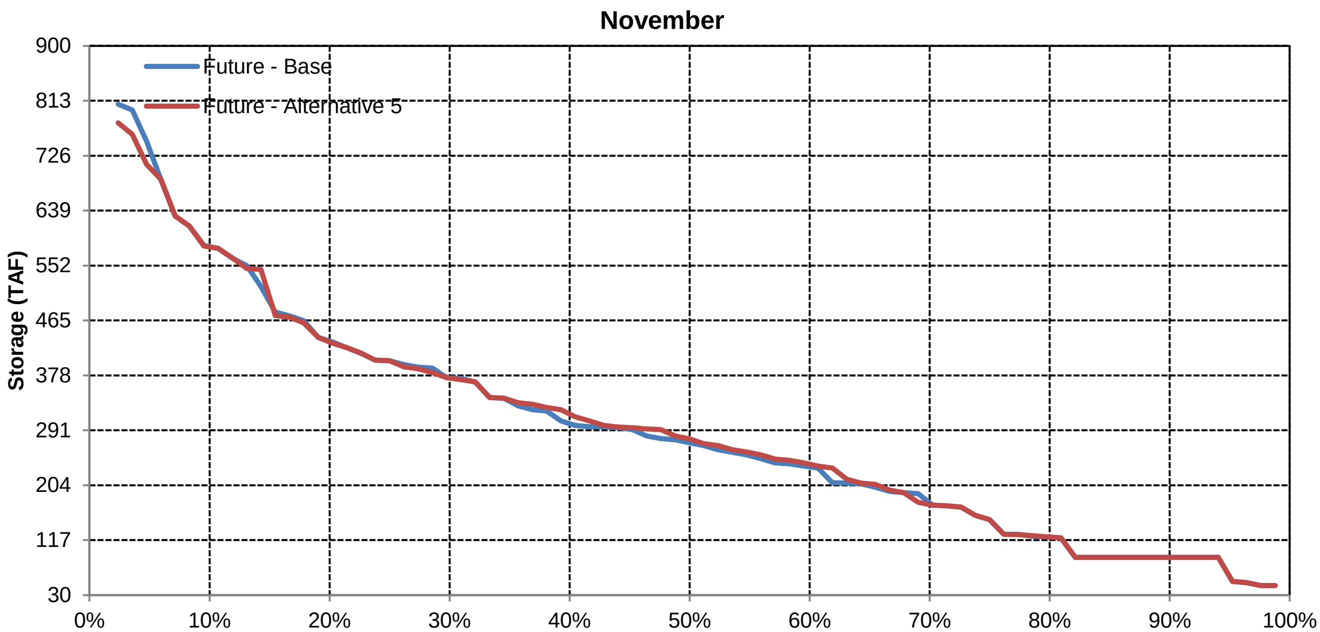
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	443	575	759	972	972	972	972	909	860	675	596	516
20%	366	425	588	827	972	972	958	858	767	563	490	433
30%	272	372	533	720	923	972	913	806	701	492	410	346
40%	209	311	478	657	825	969	887	767	644	454	310	289
50%	166	273	432	581	724	881	866	713	610	394	256	227
60%	125	235	373	520	682	833	797	642	537	340	226	167
70%	90	173	327	477	633	722	678	570	468	288	193	132
80%	90	122	275	436	560	658	609	494	402	250	148	92
90%	90	90	249	370	439	575	526	391	282	197	109	90
Long Term												
Full Simulation Period	218	295	460	615	743	823	788	683	579	414	314	269
Water Year Types												
Wet	199	290	482	679	832	918	879	790	674	497	388	301
Above Normal	225	298	459	610	754	844	801	667	594	409	303	202
Below Normal	234	276	455	582	710	833	813	704	638	436	318	316
Dry	216	290	446	580	695	776	747	625	518	361	254	240
Critical	243	330	445	573	655	666	622	537	395	303	263	263

Future - Alternative 5 Minus Future - Base

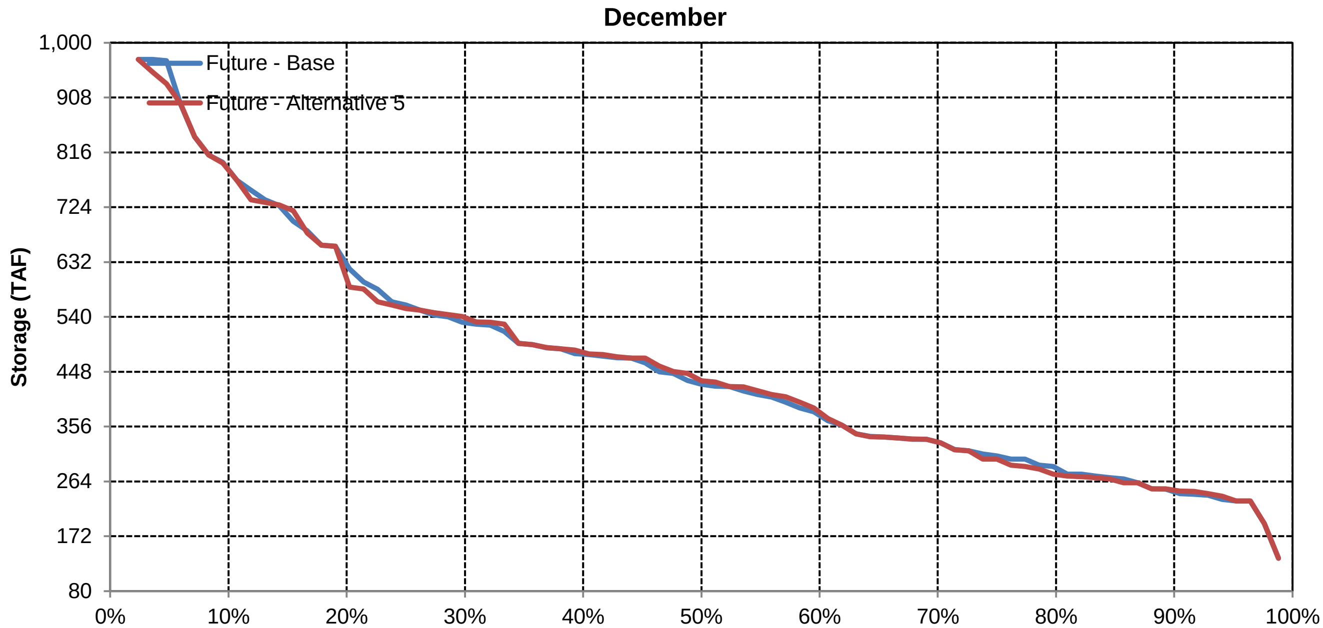
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	1	0	-5	0	0	0	0	0	0	0	0	0
20%	0	-1	-19	1	0	0	0	0	0	0	0	-2
30%	0	-2	4	0	-18	0	0	0	0	0	-3	-2
40%	0	13	1	-2	0	1	-2	0	-3	-1	-6	0
50%	6	5	7	0	-12	-2	-3	-2	2	0	0	4
60%	7	3	5	-1	-1	0	4	6	-2	1	0	5
70%	0	0	0	0	4	5	13	0	10	1	4	0
80%	0	0	-9	3	6	0	-2	14	-1	13	8	1
90%	0	0	3	0	0	3	-5	-3	8	0	0	0
Long Term												
Full Simulation Period	1	1	-1	0	0	1	0	0	0	1	0	0
Water Year Types												
Wet	-4	-5	-5	-3	-3	0	-2	-1	-4	-2	-2	-3
Above Normal	10	9	3	3	-1	0	0	0	0	0	0	0
Below Normal	-3	-4	-4	-6	-3	-2	-2	-2	6	7	4	4
Dry	5	6	5	4	5	5	5	5	2	2	1	0
Critical	1	1	1	1	1	0	0	0	0	1	1	1

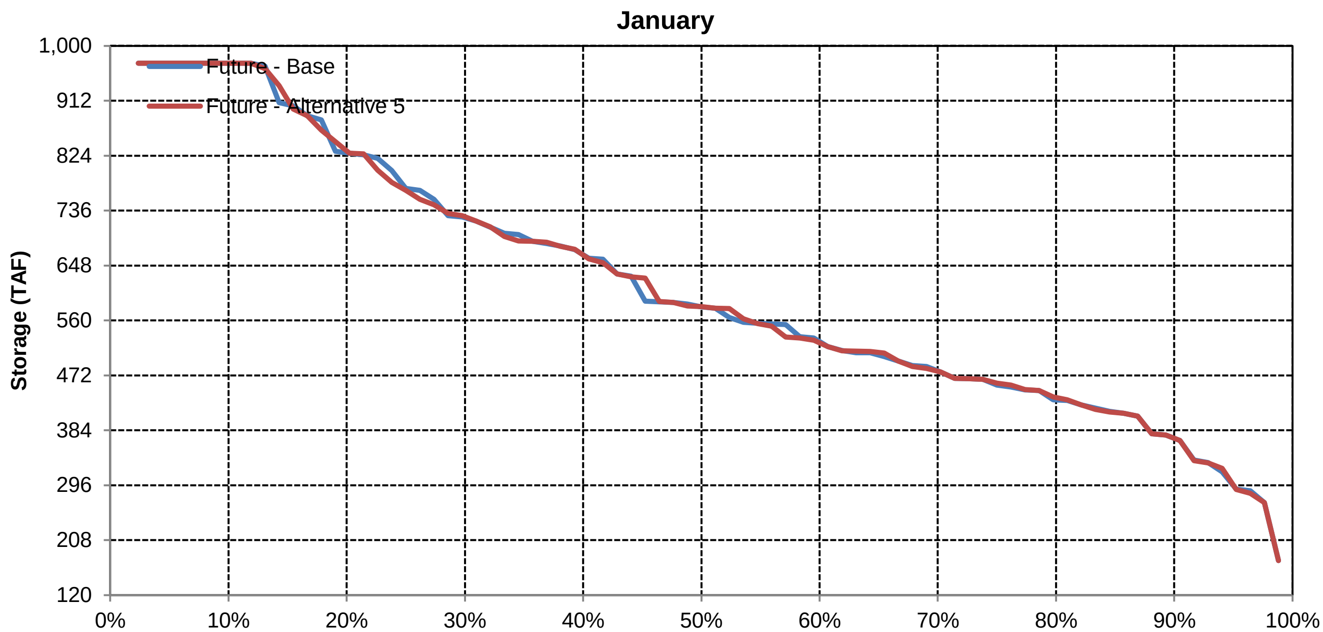
CVP San Luis Reservoir



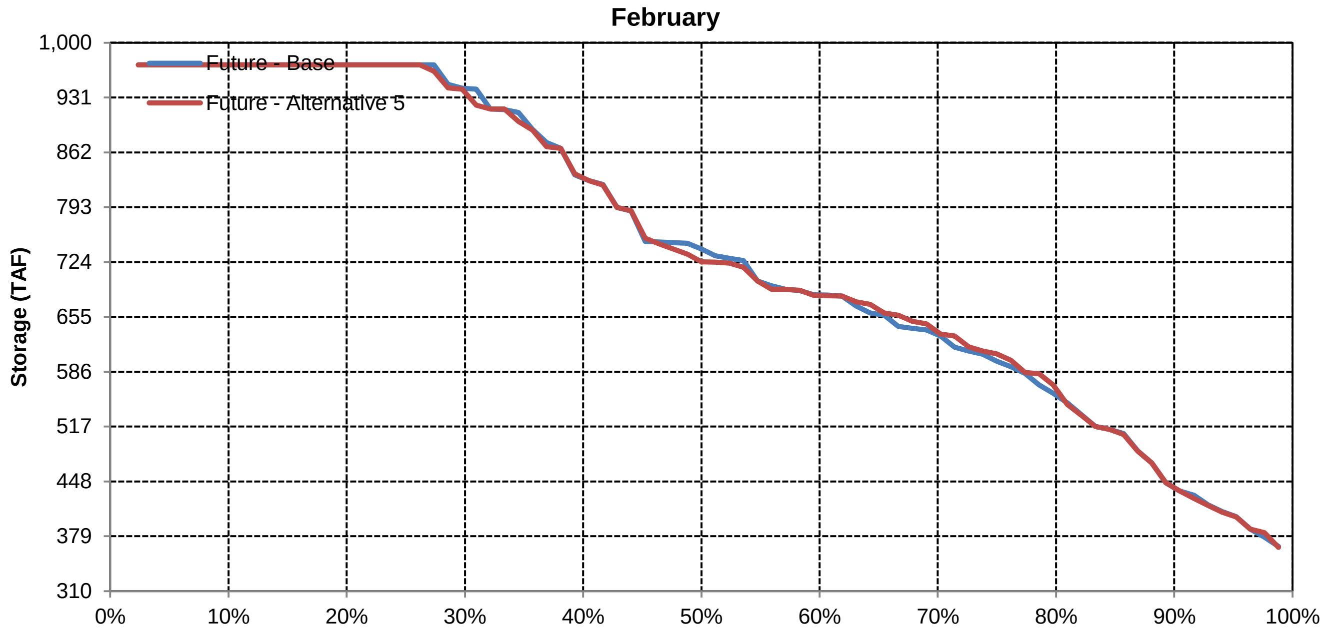


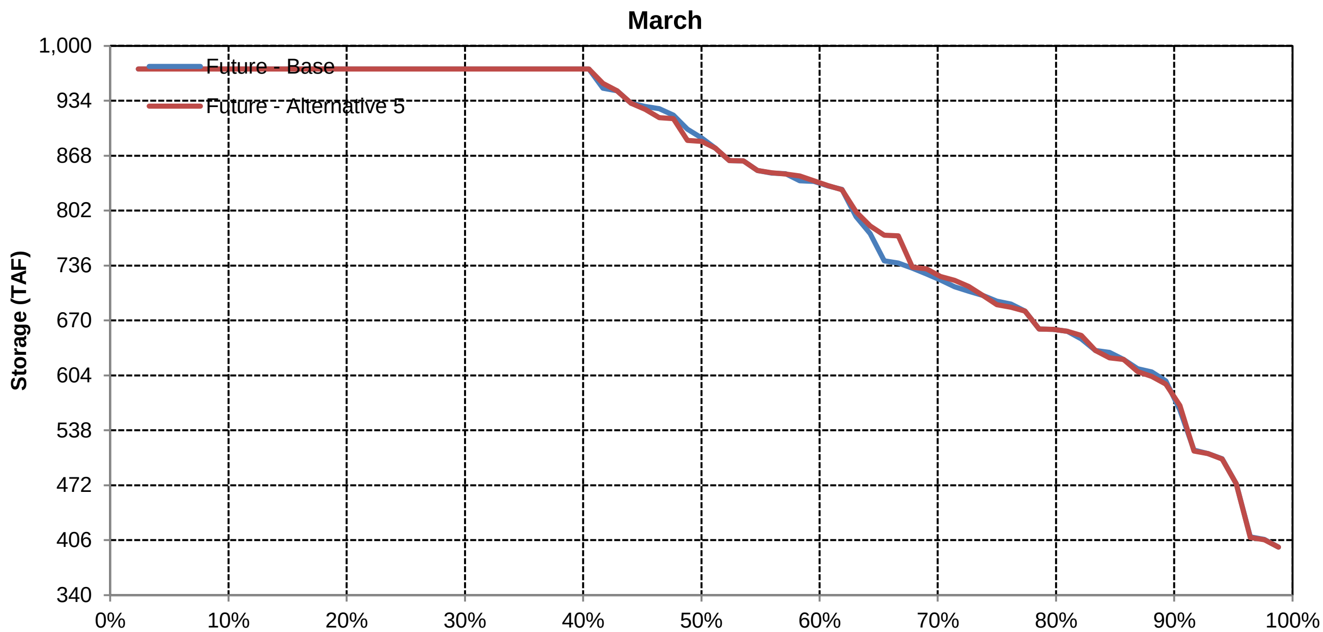
CVP San Luis Reservoir





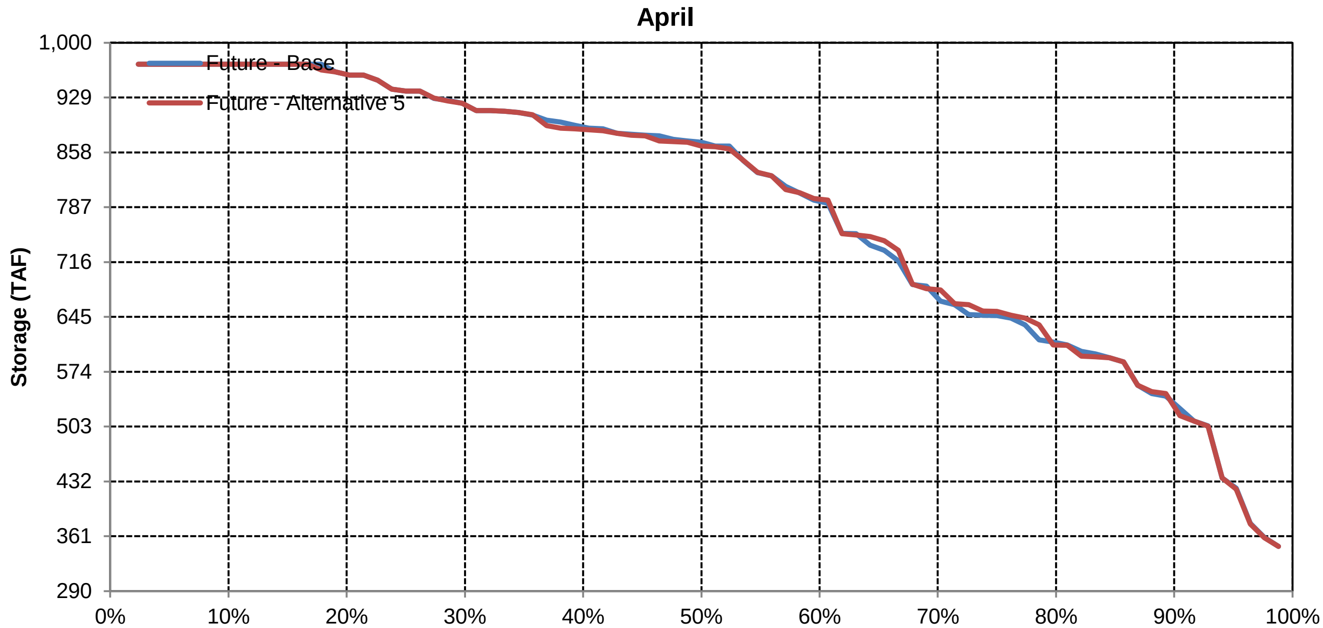
CVP San Luis Reservoir

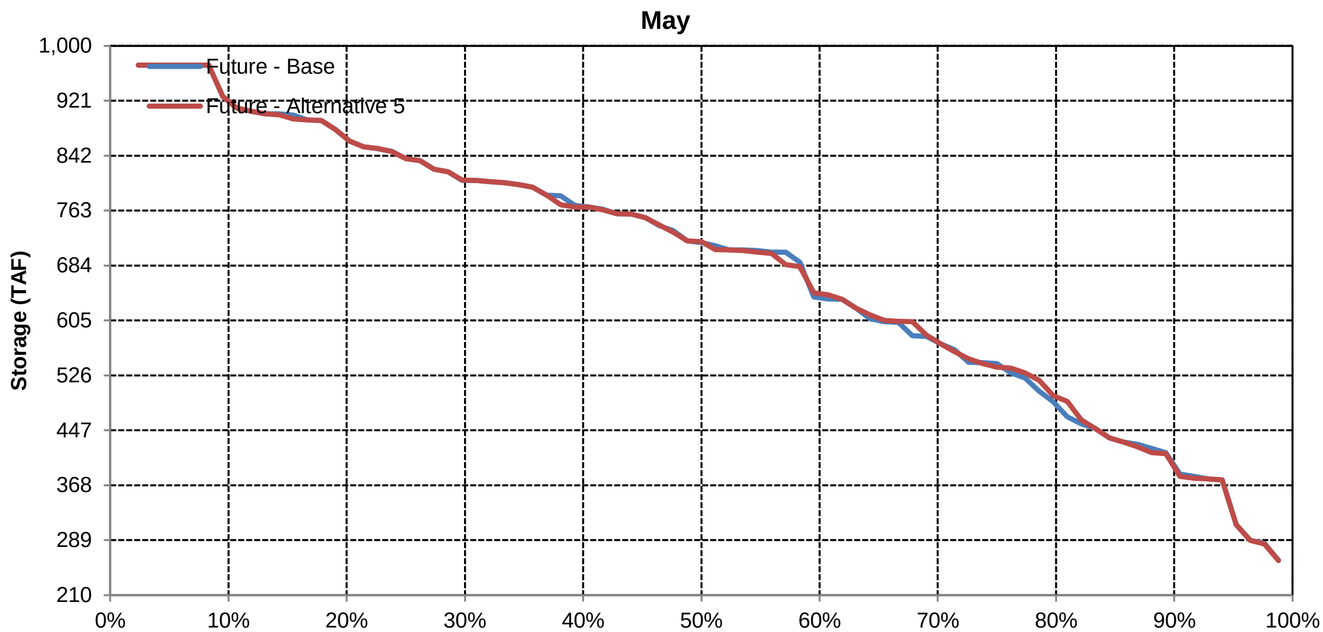




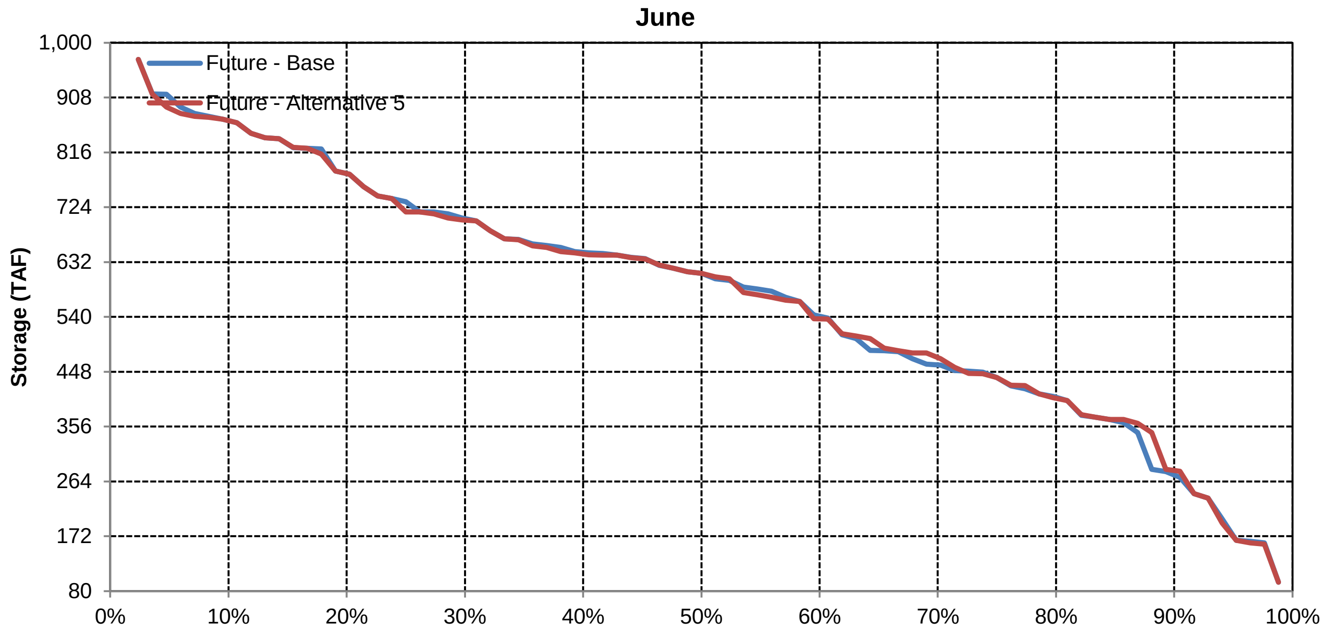
S11

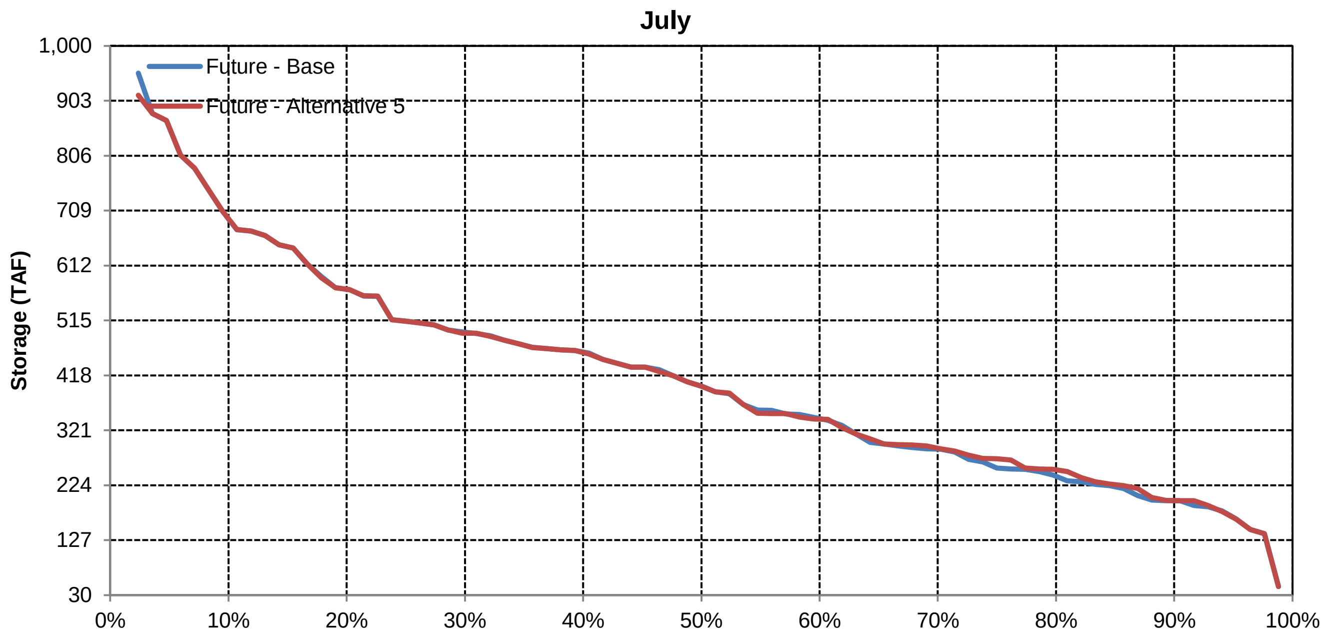
CVP San Luis Reservoir



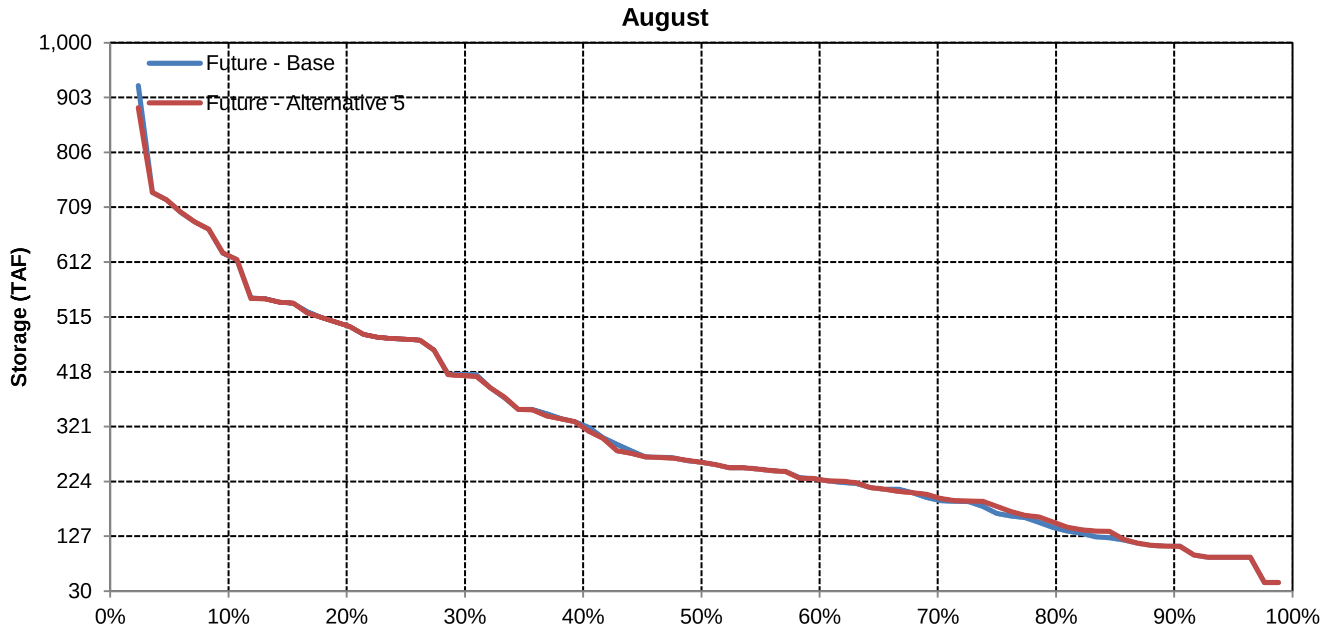


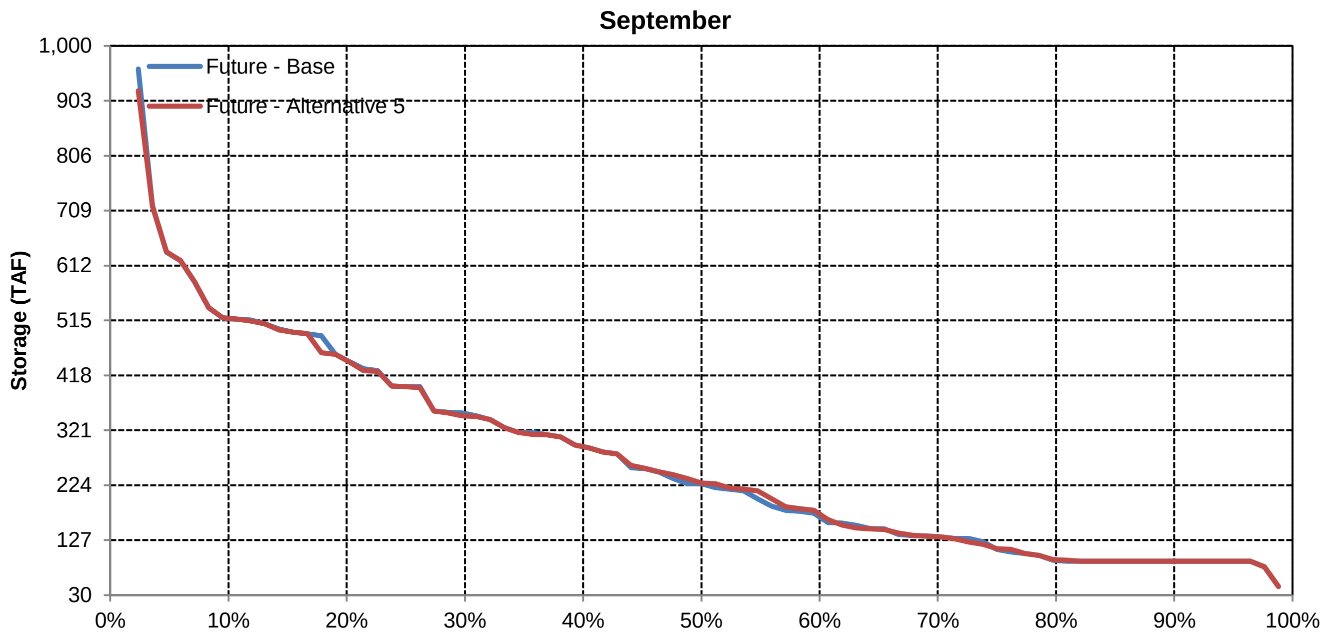
CVP San Luis Reservoir





CVP San Luis Reservoir





Long-Term and Water Year-Type Average of SWP San Luis Reservoir Under Future - Base and Future - Alternative 5

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
						Long-Term						
Full Simulation Period												
Future - Base	181	218	351	573	767	885	811	640	506	467	355	257
Future - Alternative 5	180	217	348	569	762	881	808	637	504	465	354	256
Difference	-1	-1	-3	-4	-5	-4	-3	-3	-2	-2	-1	-1
Percent Difference	-1%	-1%	-1%	-1%	-1%	0%	0%	0%	0%	0%	0%	0%
						Water Year-Types						
Wet												
Future - Base	203	282	505	823	1,011	1,058	951	746	542	550	458	320
Future - Alternative 5	202	282	503	819	1,009	1,058	950	746	545	551	458	319
Difference	0	0	-1	-4	-2	0	-1	-1	2	1	0	-1
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal												
Future - Base	154	177	288	602	890	1,035	904	639	536	533	415	285
Future - Alternative 5	151	174	278	593	886	1,032	902	637	534	532	413	284
Difference	-3	-3	-11	-9	-4	-2	-2	-2	-2	-2	-2	-1
Percent Difference	-2%	-2%	-4%	-1%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Future - Base	158	169	276	398	650	887	815	629	522	492	321	226
Future - Alternative 5	157	167	272	392	642	883	811	622	512	482	319	225
Difference	-1	-2	-4	-6	-8	-4	-4	-7	-10	-10	-2	-1
Percent Difference	-1%	-1%	-1%	-1%	-1%	0%	-1%	-1%	-2%	-2%	-1%	0%
Dry												
Future - Base	169	206	304	453	620	767	724	597	504	425	286	210
Future - Alternative 5	167	204	302	448	613	759	717	593	504	423	285	208
Difference	-2	-2	-2	-4	-7	-8	-6	-5	-1	-2	-1	-1
Percent Difference	-1%	-1%	-1%	-1%	-1%	-1%	-1%	-1%	0%	0%	0%	-1%
Critical												
Future - Base	203	190	237	399	497	565	563	496	384	272	225	207
Future - Alternative 5	204	190	238	399	494	561	559	493	377	270	225	208
Difference	0	1	1	0	-3	-4	-4	-3	-6	-2	0	1
Percent Difference	0%	0%	0%	0%	-1%	-1%	-1%	-1%	-2%	-1%	0%	0%

SWP San Luis Reservoir

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	315	489	775	1,067	1,067	1,067	1,021	828	699	642	503	311
20%	247	327	590	954	1,067	1,067	959	755	649	601	410	291
30%	211	266	394	761	1,067	1,067	945	701	621	551	383	268
40%	165	235	339	664	984	1,067	921	680	601	539	371	243
50%	145	178	282	538	818	1,067	897	643	567	505	355	237
60%	128	94	223	455	664	944	869	621	492	462	333	225
70%	114	55	183	369	597	745	733	586	381	341	315	210
80%	90	55	116	243	482	636	621	505	332	279	229	196
90%	55	55	59	155	322	485	503	404	248	235	165	156
Long Term												
Full Simulation Period	181	218	351	573	767	885	811	640	506	467	355	257
Water Year Types												
Wet	203	282	505	823	1,011	1,058	951	746	542	550	458	320
Above Normal	154	177	288	602	890	1,035	904	639	536	533	415	285
Below Normal	158	169	276	398	650	887	815	629	522	492	321	226
Dry	169	206	304	453	620	767	724	597	504	425	286	210
Critical	203	190	237	399	497	565	563	496	384	272	225	207

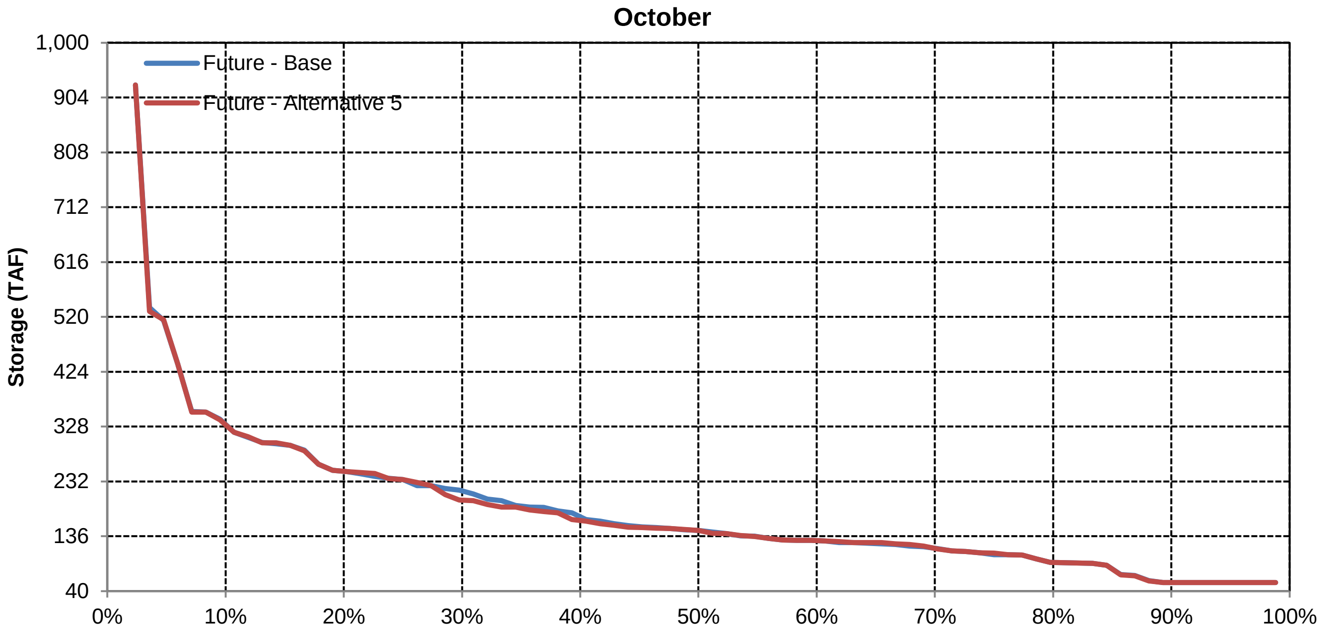
Future - Alternative 5

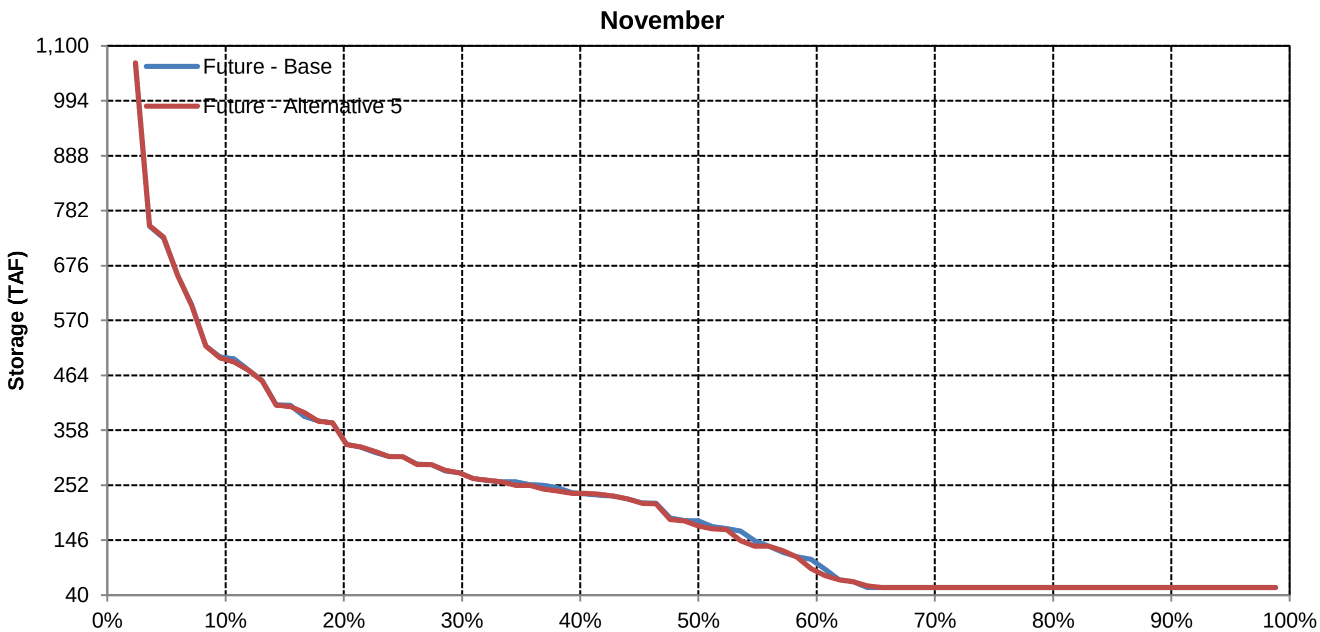
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	316	485	780	1,067	1,067	1,067	1,019	829	699	638	505	311
20%	248	328	587	956	1,067	1,067	957	740	647	601	411	291
30%	198	266	388	743	1,067	1,067	943	700	621	567	383	269
40%	161	236	317	641	985	1,067	914	679	598	539	371	243
50%	144	171	284	523	792	1,067	895	642	547	501	356	236
60%	128	80	212	428	664	946	864	621	485	462	335	225
70%	114	55	170	356	586	742	732	586	381	325	310	207
80%	90	55	117	240	472	625	611	488	324	271	223	188
90%	55	55	59	154	315	486	503	407	248	235	167	153
Long Term												
Full Simulation Period	180	217	348	569	762	881	808	637	504	465	354	256
Water Year Types												
Wet	202	282	503	819	1,009	1,058	950	746	545	551	458	319
Above Normal	151	174	278	593	886	1,032	902	637	534	532	413	284
Below Normal	157	167	272	392	642	883	811	622	512	482	319	225
Dry	167	204	302	448	613	759	717	593	504	423	285	208
Critical	204	190	238	399	494	561	559	493	377	270	225	208

Future - Alternative 5 Minus Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	1	-4	6	0	0	0	-2	0	0	-4	3	0
20%	1	0	-3	2	0	0	-2	-15	-1	-1	1	0
30%	-13	0	-7	-18	0	0	-2	-1	0	16	0	0
40%	-3	1	-22	-23	1	0	-7	-1	-3	0	0	0
50%	-1	-7	2	-14	-26	0	-2	-1	-20	-4	1	-1
60%	0	-14	-11	-27	0	2	-5	0	-7	0	2	0
70%	0	0	-13	-13	-12	-3	-2	-1	0	-16	-5	-3
80%	0	0	2	-3	-10	-11	-10	-17	-7	-8	-7	-8
90%	0	0	0	0	-6	0	0	3	0	0	2	-4
Long Term												
Full Simulation Period	-1	-1	-3	-4	-5	-4	-3	-3	-2	-2	-1	-1
Water Year Types												
Wet	0	0	-1	-4	-2	0	-1	-1	2	1	0	-1
Above Normal	-3	-3	-11	-9	-4	-2	-2	-2	-2	-2	-2	-1
Below Normal	-1	-2	-4	-6	-8	-4	-4	-7	-10	-10	-2	-1
Dry	-2	-2	-2	-4	-7	-8	-6	-5	-1	-2	-1	-1
Critical	0	1	1	0	-3	-4	-4	-3	-6	-2	0	1

SWP San Luis Reservoir





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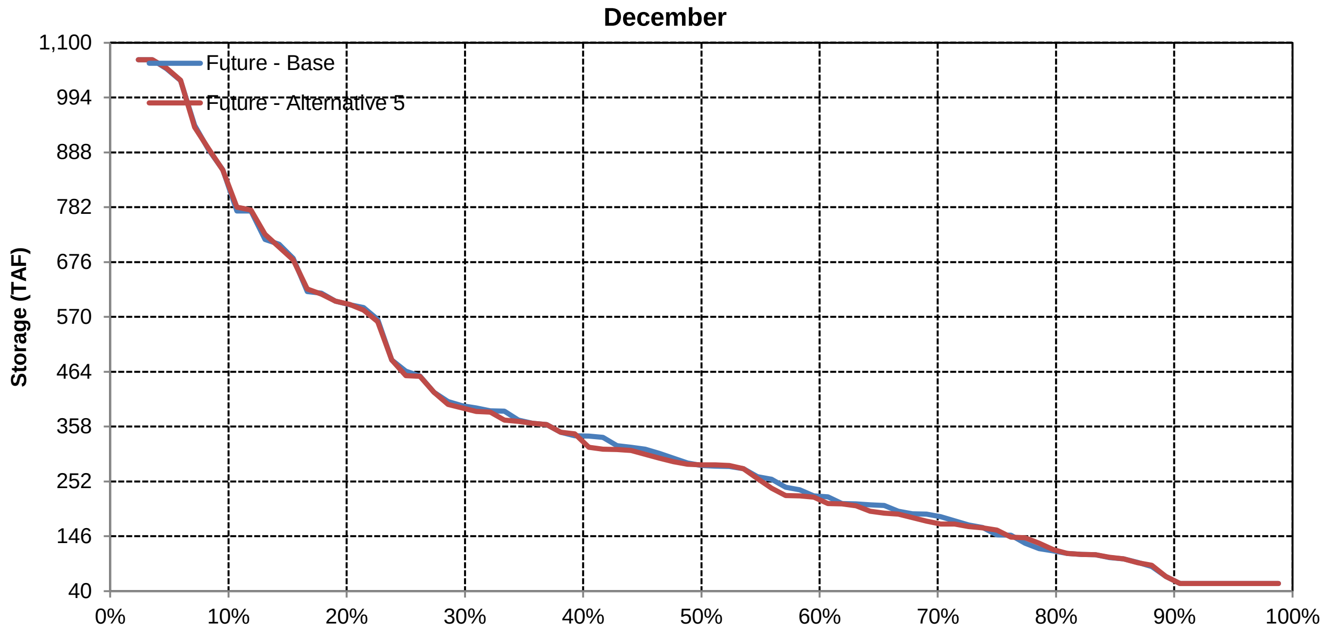

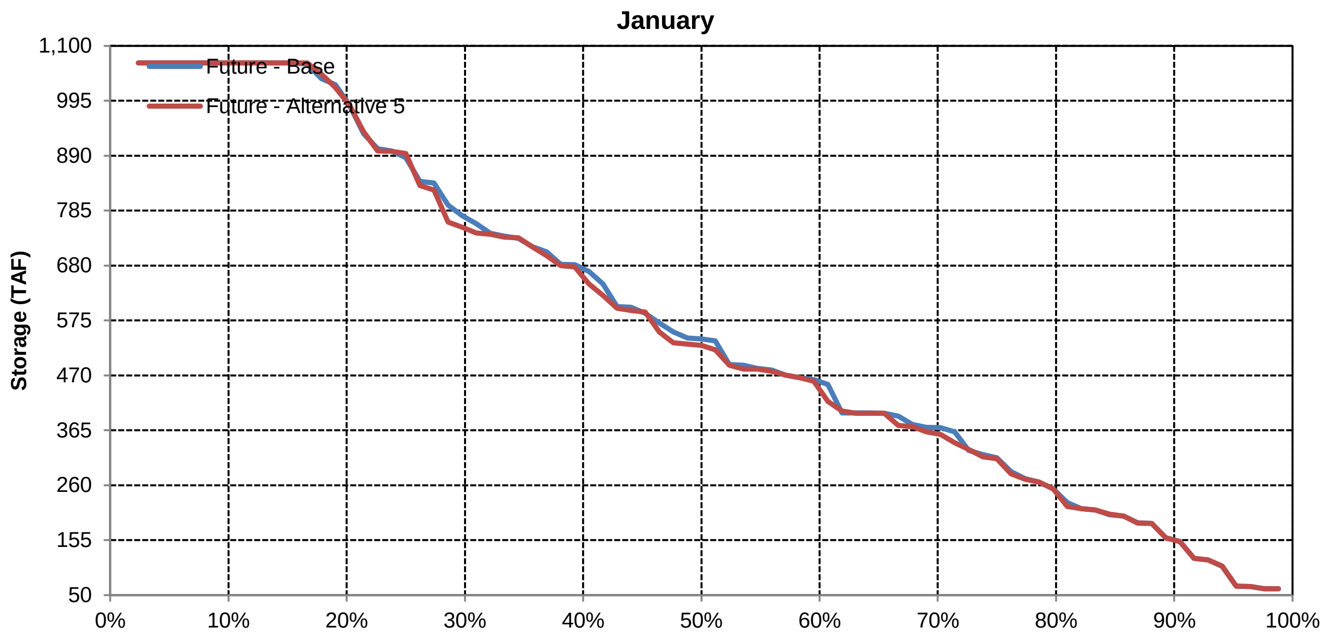

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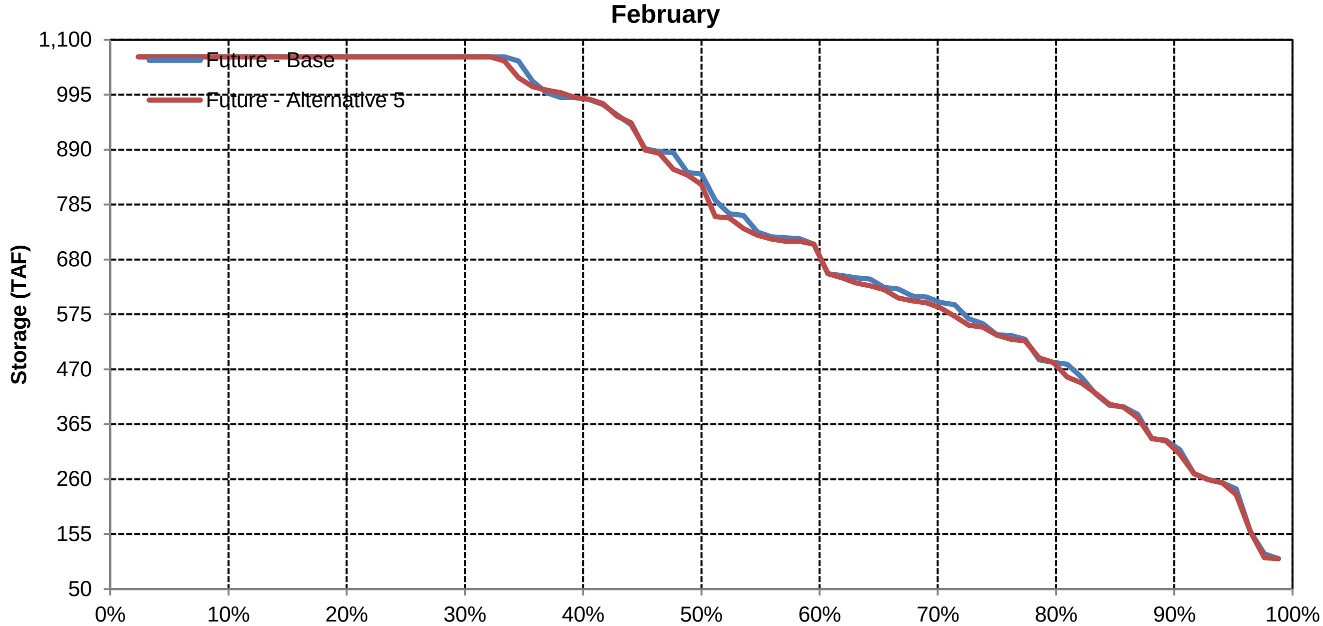

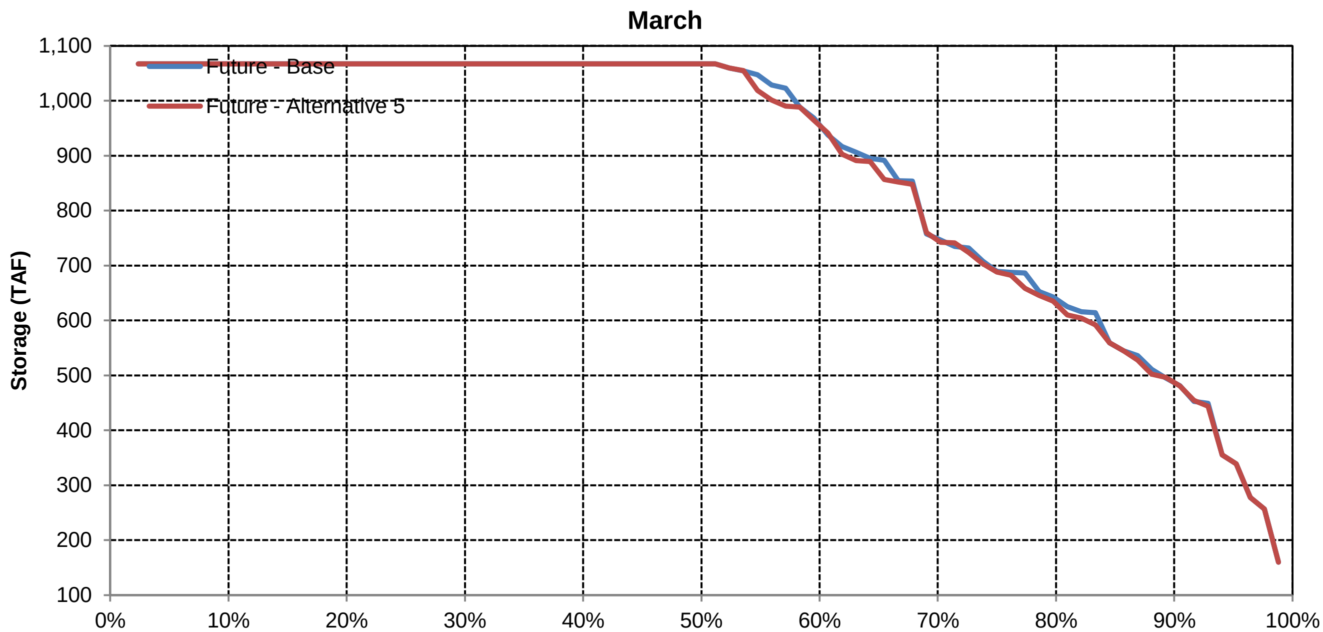

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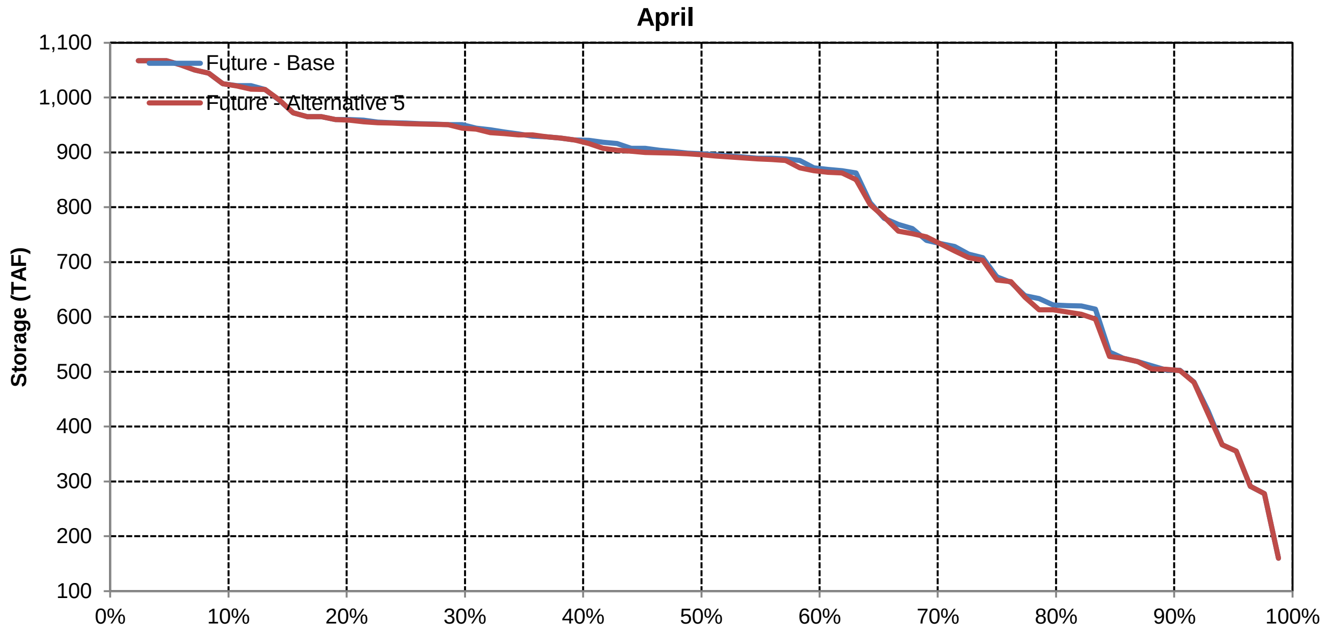

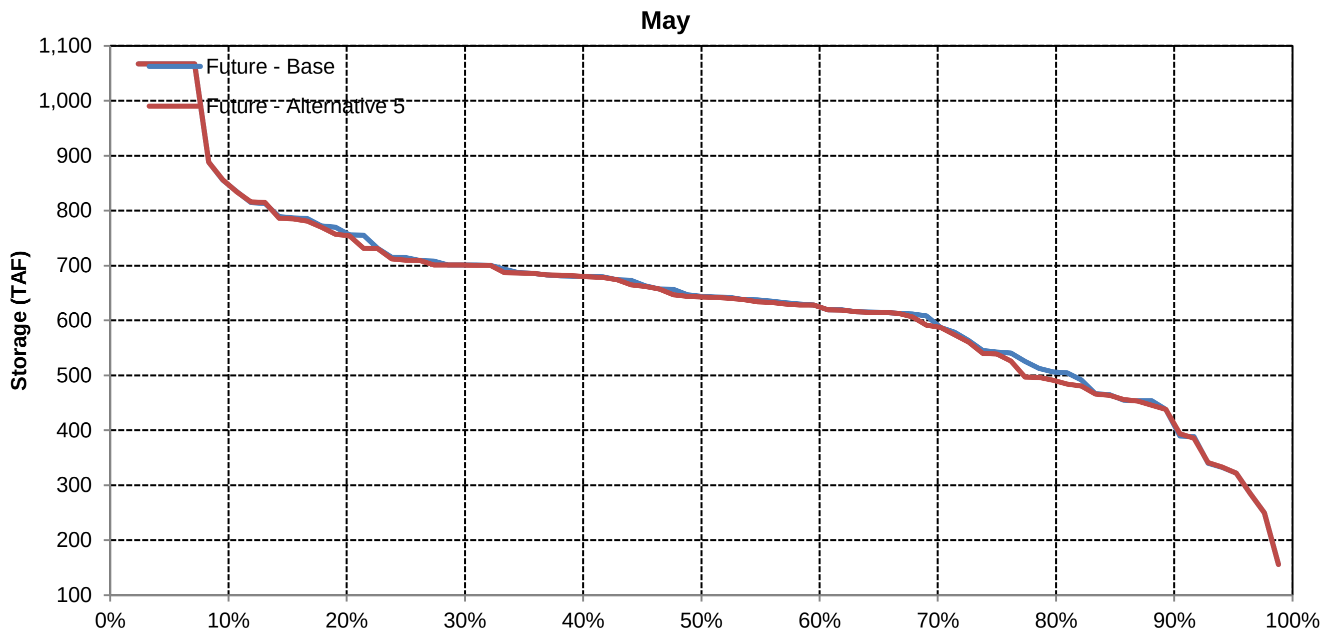

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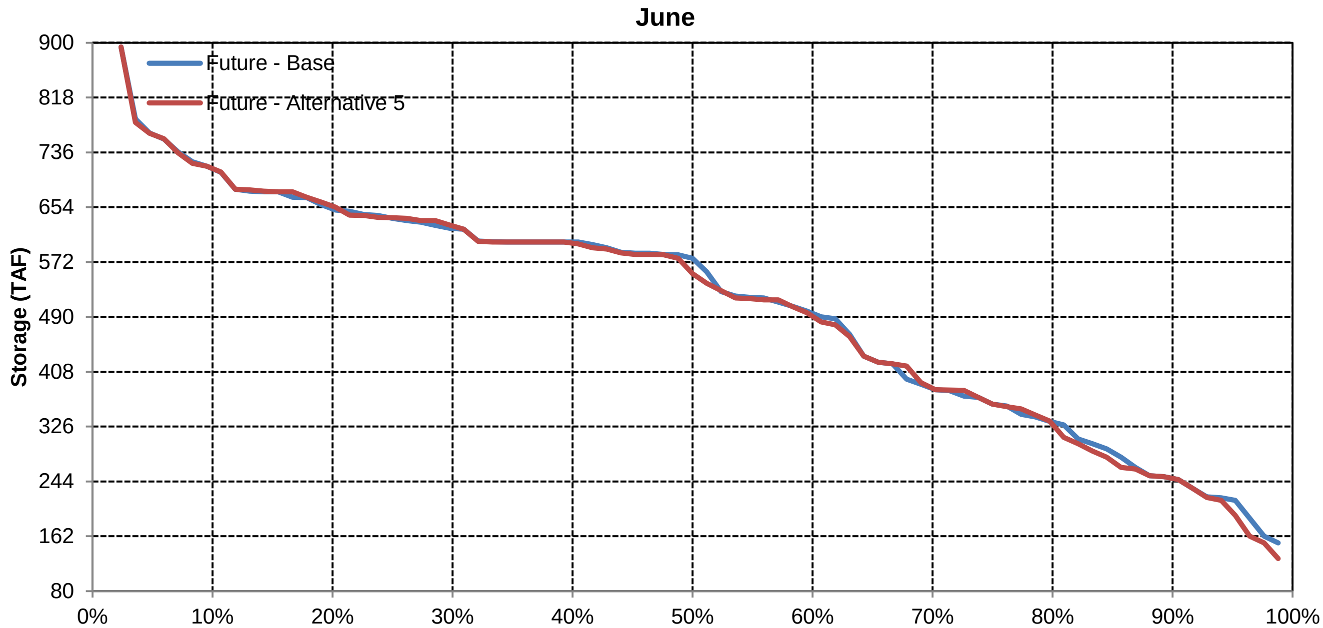

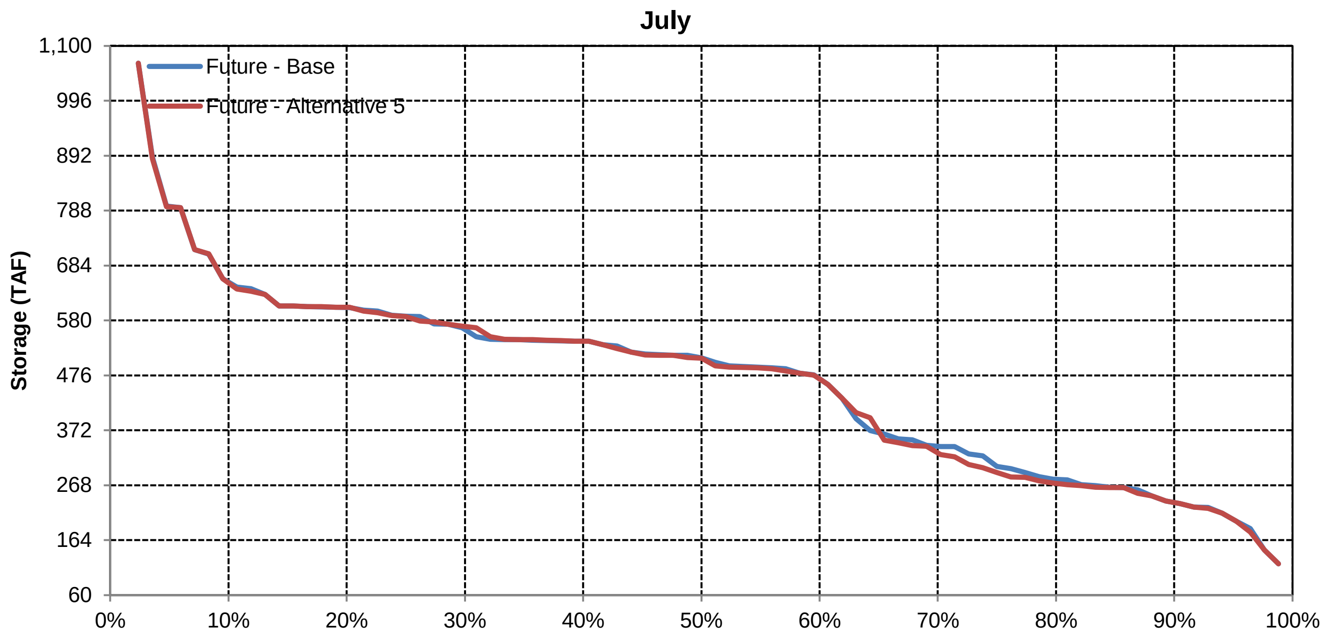

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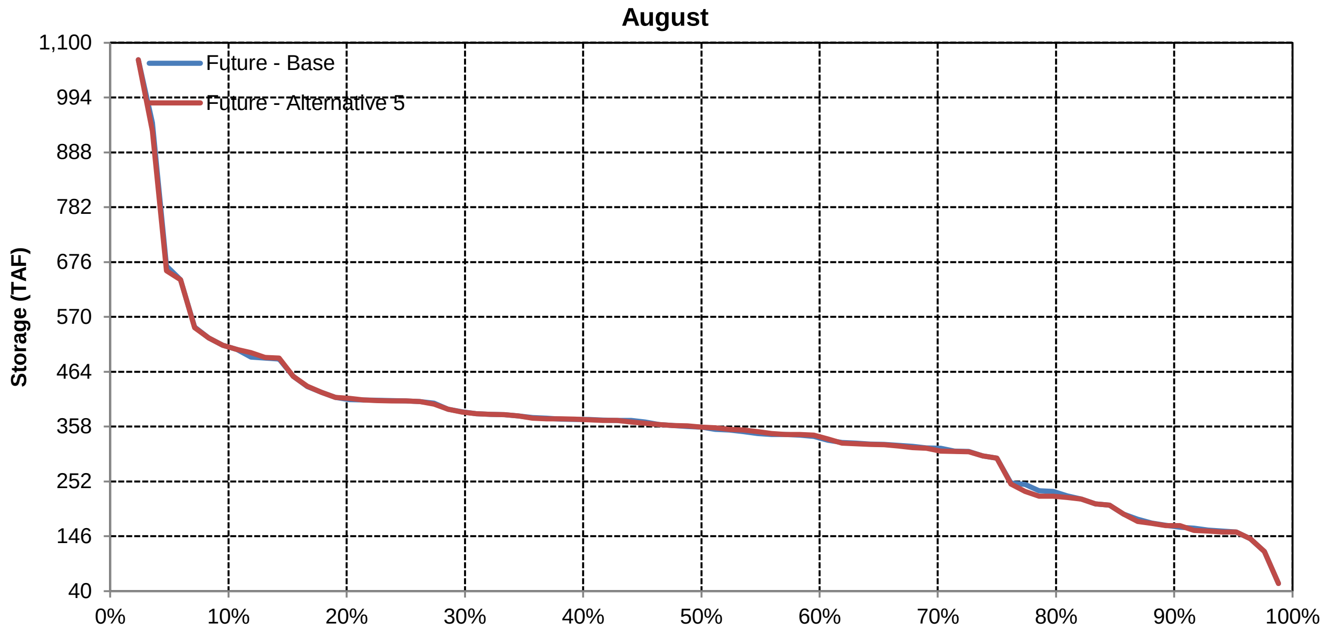
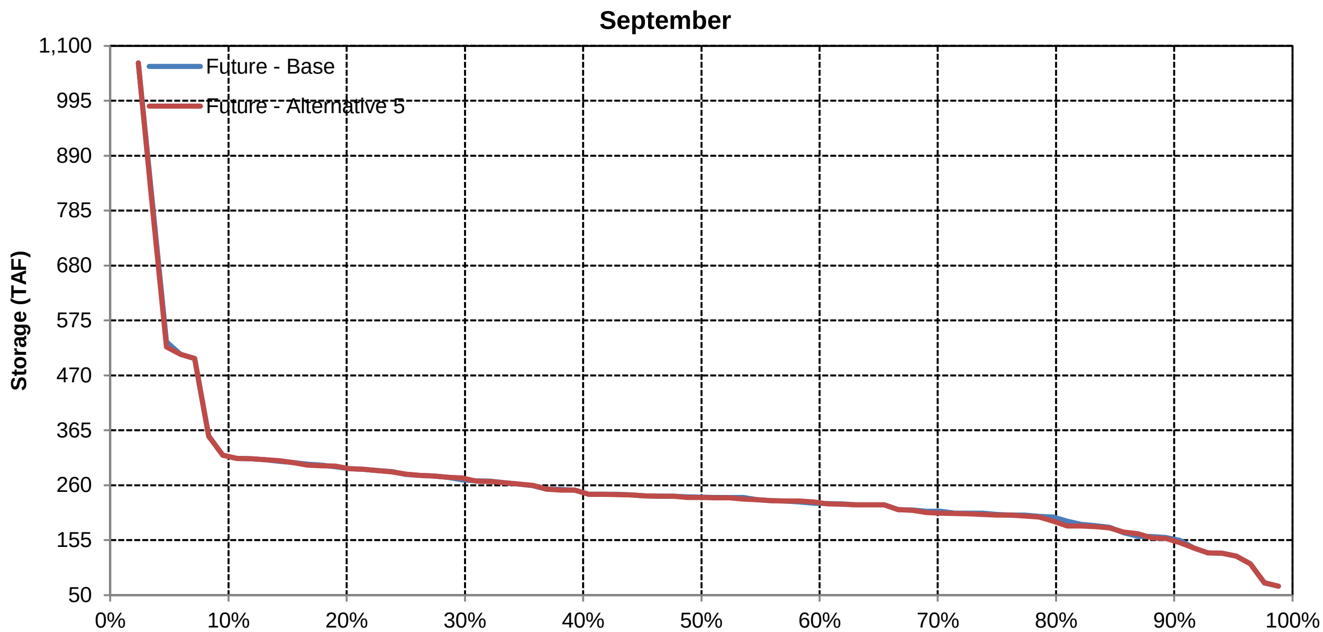




Long-Term and Water Year-Type Average of Delta Outflow Under Future - Base and Future - Alternative 5

Analysis Period	October	November	December	January	February	March	April	May	June	July	August	September	Total (TAF)
						Average Flow (cfs)							
							Long-Term						
Full Simulation Period													
Future - Base	8,408	10,099	24,888	54,896	70,049	52,500	29,061	14,179	8,605	7,157	4,274	10,294	17,604
Future - Alternative 5	8,436	10,107	24,924	54,919	70,109	52,489	29,067	14,175	8,600	7,156	4,276	10,293	17,613
Difference	27	8	36	23	60	-11	6	-3	-6	-1	2	0	8
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
							Water Year-Types						
Wet													
Future - Base	9,541	15,088	53,646	115,984	131,904	102,001	53,280	21,075	11,285	9,709	4,000	21,635	32,826
Future - Alternative 5	9,561	15,102	53,703	116,005	131,955	101,948	53,310	21,071	11,286	9,708	4,000	21,635	32,834
Difference	21	14	57	22	51	-53	29	-4	1	0	0	0	8
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal													
Future - Base	9,036	8,854	16,293	59,685	102,404	57,212	27,004	15,829	8,580	8,899	4,000	13,224	19,718
Future - Alternative 5	9,149	8,853	16,315	59,665	102,565	57,191	27,006	15,829	8,579	8,900	4,000	13,224	19,733
Difference	114	0	22	-20	161	-20	2	0	-1	1	0	0	15
Percent Difference	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal													
Future - Base	8,461	9,070	13,804	28,415	31,537	29,246	21,994	12,973	7,605	6,655	4,139	3,000	10,623
Future - Alternative 5	8,523	9,100	13,850	28,466	31,524	29,267	21,994	12,959	7,614	6,646	4,141	3,000	10,634
Difference	62	30	46	52	-14	22	0	-14	9	-9	2	0	11
Percent Difference	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry													
Future - Base	7,611	7,891	10,135	15,901	29,451	24,322	15,139	9,861	7,158	5,000	4,785	3,000	8,395
Future - Alternative 5	7,580	7,887	10,166	15,938	29,516	24,347	15,132	9,860	7,160	5,000	4,783	3,000	8,402
Difference	-30	-4	31	37	65	25	-7	0	2	0	-2	0	7
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical													
Future - Base	6,653	5,227	7,054	11,831	15,756	13,084	9,330	6,228	6,318	4,170	4,415	3,092	5,600
Future - Alternative 5	6,674	5,227	7,055	11,843	15,816	13,079	9,319	6,228	6,265	4,170	4,427	3,091	5,602
Difference	21	0	1	12	59	-5	-11	0	-53	0	12	-1	2
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	-1%	0%	0%	0%	0%

Delta Outflow

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	10,938	15,863	79,058	151,208	180,010	107,880	70,644	27,159	11,545	10,516	4,885	21,875
20%	10,625	14,764	33,428	92,252	125,923	89,027	38,581	18,353	10,462	9,612	4,709	21,563
30%	10,313	11,693	17,489	56,706	77,981	62,254	28,814	14,204	8,749	9,048	4,349	20,938
40%	7,625	11,004	14,366	33,893	58,622	40,886	20,594	12,808	8,409	8,000	4,217	13,062
50%	7,160	8,104	11,802	26,142	43,165	27,471	17,579	11,253	7,899	6,666	4,000	3,000
60%	6,994	4,500	8,257	19,228	24,986	20,728	15,558	10,174	7,418	6,500	4,000	3,000
70%	6,613	4,500	5,323	14,908	20,687	17,661	13,640	9,584	7,100	5,000	4,000	3,000
80%	6,259	4,500	4,500	13,125	16,723	14,481	11,153	8,460	7,100	5,000	4,000	3,000
90%	5,678	3,500	4,500	8,401	12,239	11,400	10,016	7,100	6,799	4,065	4,000	3,000
Long Term												
Full Simulation Period	8,408	10,099	24,888	54,896	70,049	52,500	29,061	14,179	8,605	7,157	4,274	10,294
Water Year Types												
Wet	9,541	15,088	53,646	115,984	131,904	102,001	53,280	21,075	11,285	9,709	4,000	21,635
Above Normal	9,036	8,854	16,293	59,685	102,404	57,212	27,004	15,829	8,580	8,899	4,000	13,224
Below Normal	8,461	9,070	13,804	28,415	31,537	29,246	21,994	12,973	7,605	6,655	4,139	3,000
Dry	7,611	7,891	10,135	15,901	29,451	24,322	15,139	9,861	7,158	5,000	4,785	3,000
Critical	6,653	5,227	7,054	11,831	15,756	13,084	9,330	6,228	6,318	4,170	4,415	3,092

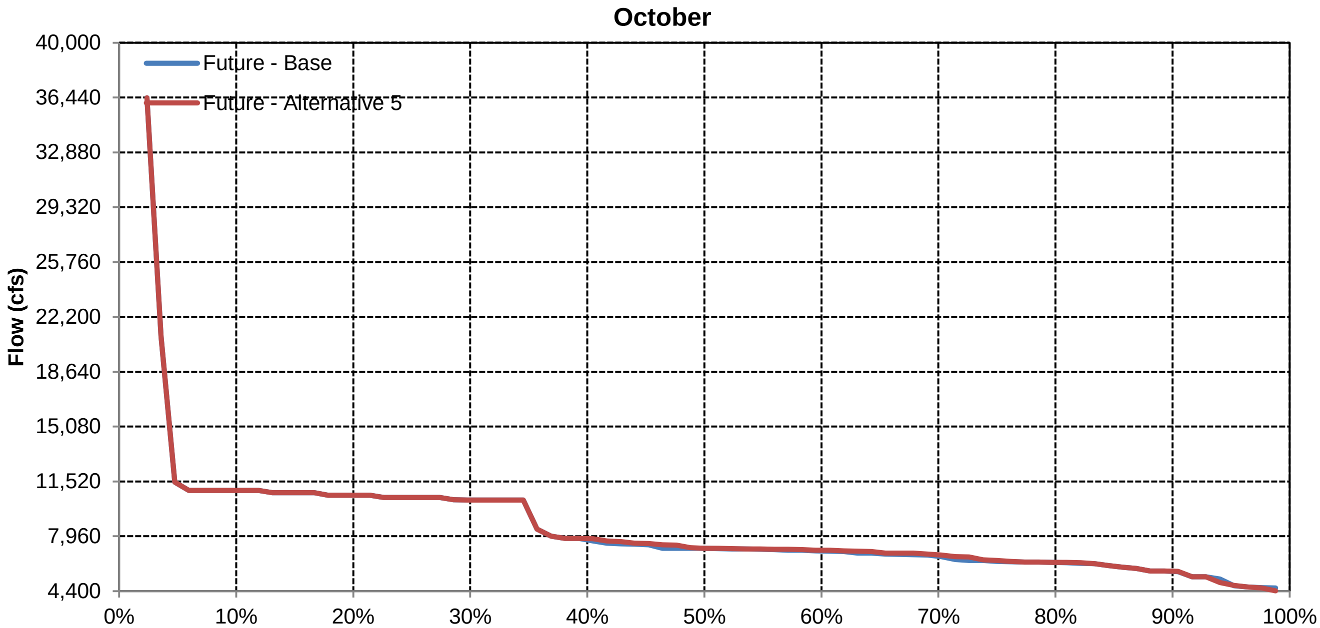
Future - Alternative 5

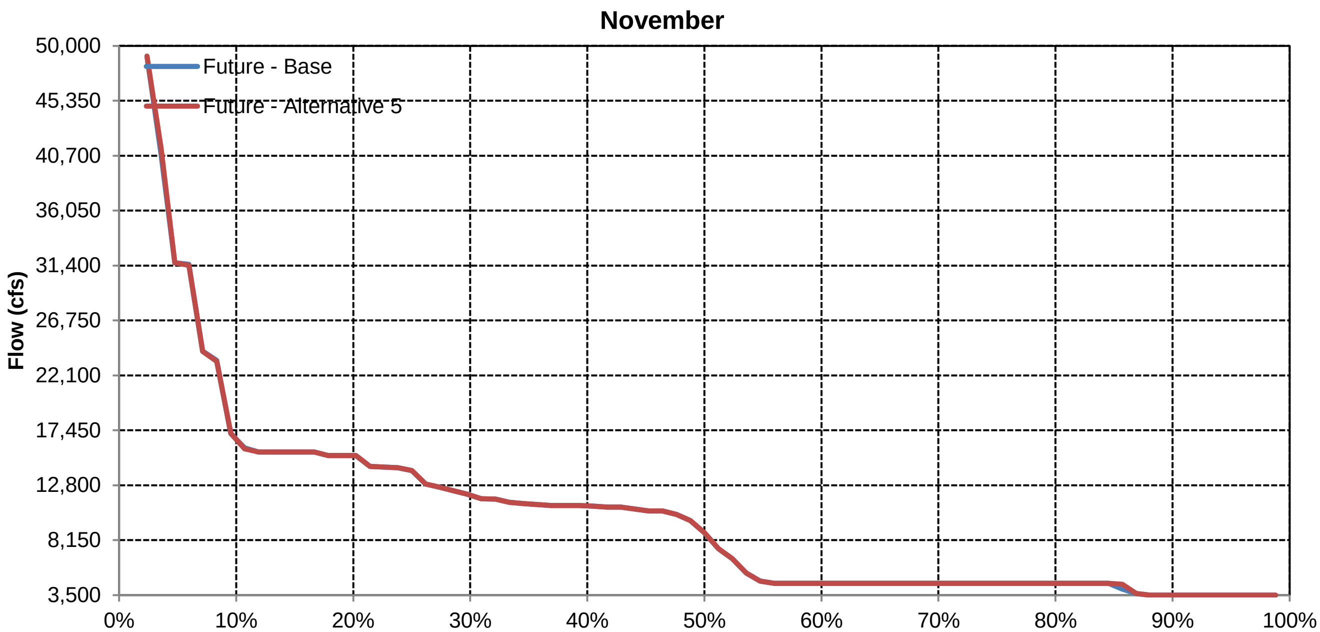
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	10,938	15,801	79,102	151,358	179,864	107,356	70,645	27,158	11,545	10,516	4,885	21,875
20%	10,625	14,764	33,620	91,692	126,733	88,797	38,581	18,353	10,469	9,613	4,709	21,563
30%	10,313	11,693	17,496	57,132	77,979	62,315	28,814	14,204	8,749	9,047	4,356	20,938
40%	7,772	11,004	14,392	33,909	58,628	40,820	20,594	12,808	8,409	8,000	4,220	13,062
50%	7,180	8,100	11,813	26,166	43,232	27,471	17,697	11,253	7,970	6,647	4,005	3,000
60%	7,056	4,500	8,409	19,272	25,107	20,737	15,558	10,169	7,276	6,500	4,000	3,000
70%	6,738	4,500	5,725	14,951	20,739	17,661	13,640	9,571	7,100	5,000	4,000	3,000
80%	6,266	4,500	4,500	13,126	16,777	14,508	11,114	8,468	7,100	5,000	4,000	3,000
90%	5,692	3,500	4,500	8,402	12,283	11,400	10,026	7,100	6,799	4,065	4,000	3,000
Long Term												
Full Simulation Period	8,436	10,107	24,924	54,919	70,109	52,489	29,067	14,175	8,600	7,156	4,276	10,293
Water Year Types												
Wet	9,561	15,102	53,703	116,005	131,955	101,948	53,310	21,071	11,286	9,708	4,000	21,635
Above Normal	9,149	8,853	16,315	59,665	102,565	57,191	27,006	15,829	8,579	8,900	4,000	13,224
Below Normal	8,523	9,100	13,850	28,466	31,524	29,267	21,994	12,959	7,614	6,646	4,141	3,000
Dry	7,580	7,887	10,166	15,938	29,516	24,347	15,132	9,860	7,160	5,000	4,783	3,000
Critical	6,674	5,227	7,055	11,843	15,816	13,079	9,319	6,228	6,265	4,170	4,427	3,091

Future - Alternative 5 Minus Future - Base

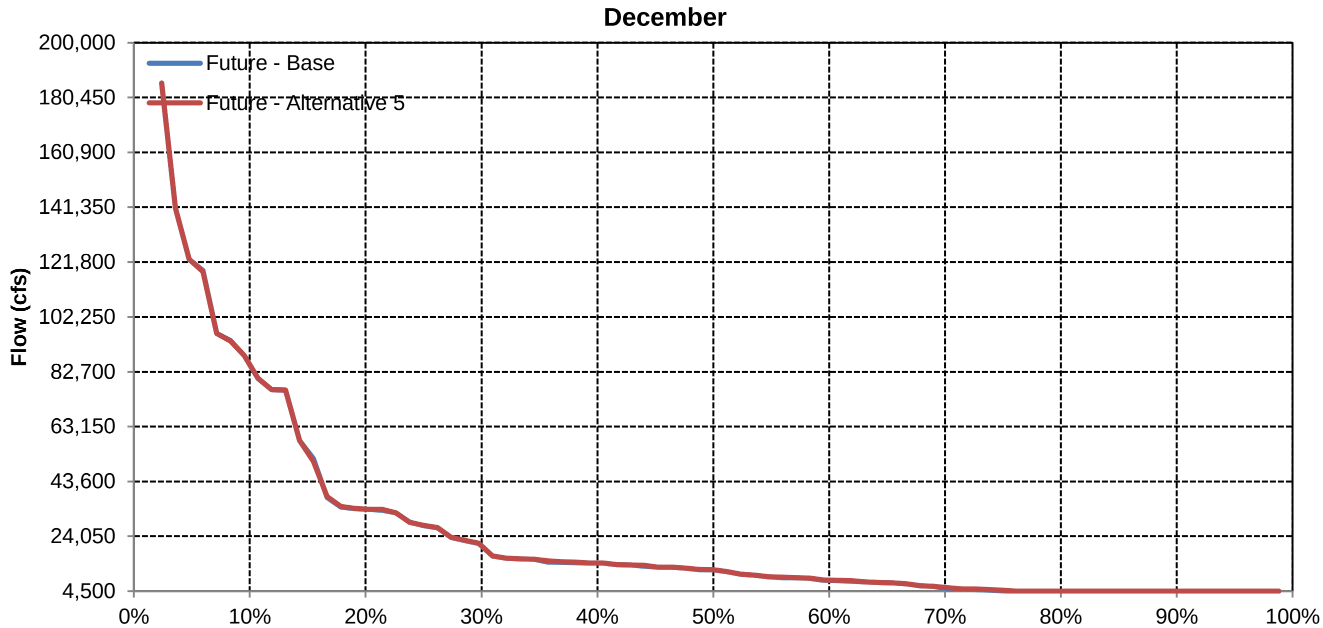
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	-61	44	151	-147	-524	1	-1	0	0	0	0
20%	0	0	192	-561	810	-230	0	0	7	0	0	0
30%	0	0	8	426	-1	61	0	0	0	0	8	0
40%	147	0	27	15	6	-66	0	0	0	0	3	0
50%	19	-4	10	25	68	0	118	0	71	-19	5	0
60%	61	0	152	44	120	8	0	-6	-142	0	0	0
70%	125	0	402	43	53	0	0	-13	0	0	0	0
80%	7	0	0	0	54	27	-39	9	0	0	0	0
90%	13	0	0	1	44	0	9	0	0	0	0	0
Long Term												
Full Simulation Period	27	8	36	23	60	-11	6	-3	-6	-1	2	0
Water Year Types												
Wet	21	14	57	22	51	-53	29	-4	1	0	0	0
Above Normal	114	0	22	-20	161	-20	2	0	-1	1	0	0
Below Normal	62	30	46	52	-14	22	0	-14	9	-9	2	0
Dry	-30	-4	31	37	65	25	-7	0	2	0	-2	0
Critical	21	0	1	12	59	-5	-11	0	-53	0	12	-1

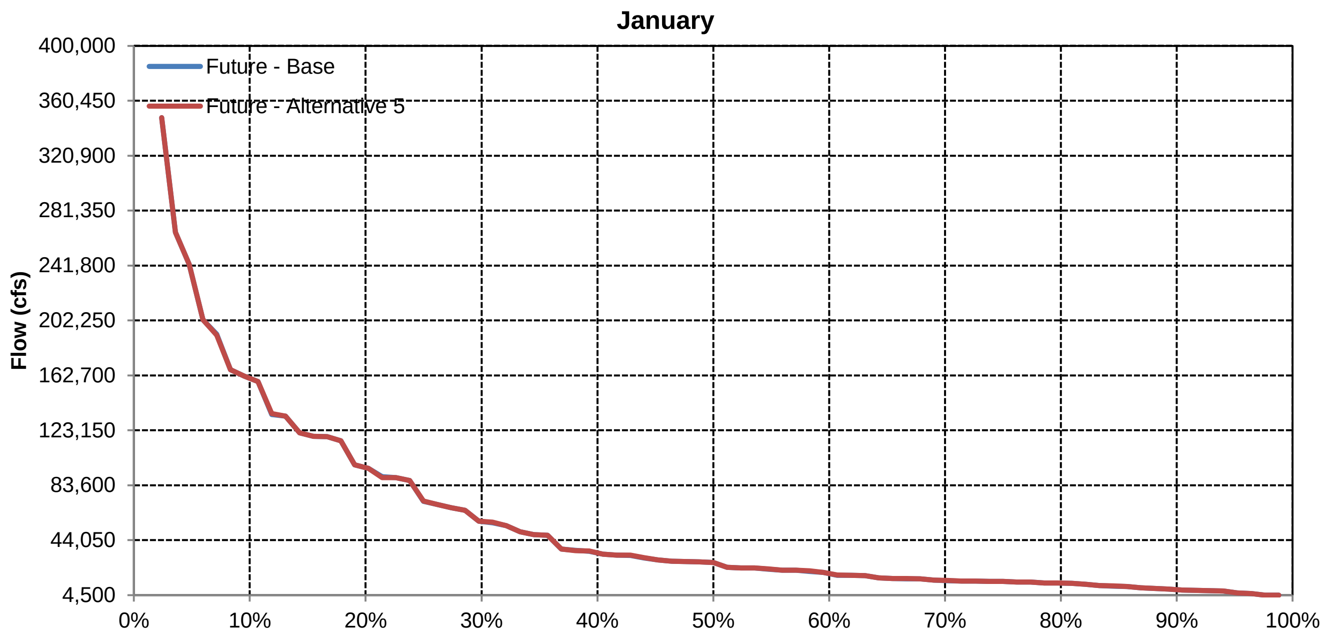
Delta Outflow





Delta Outflow





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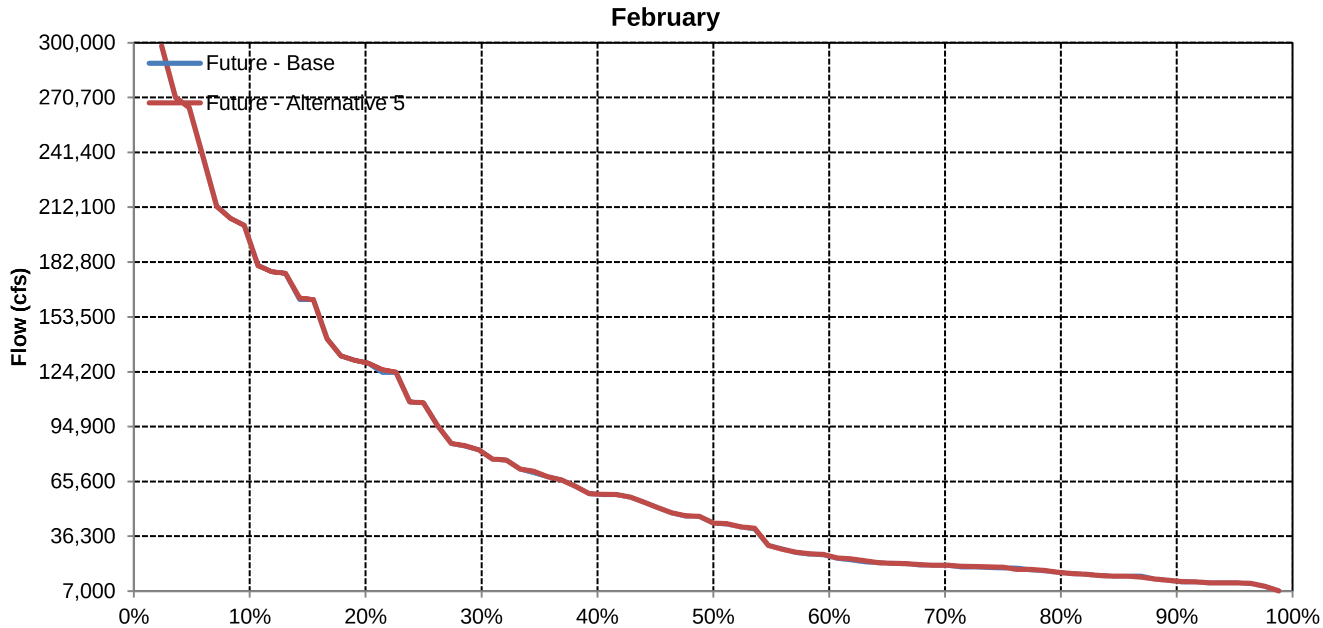
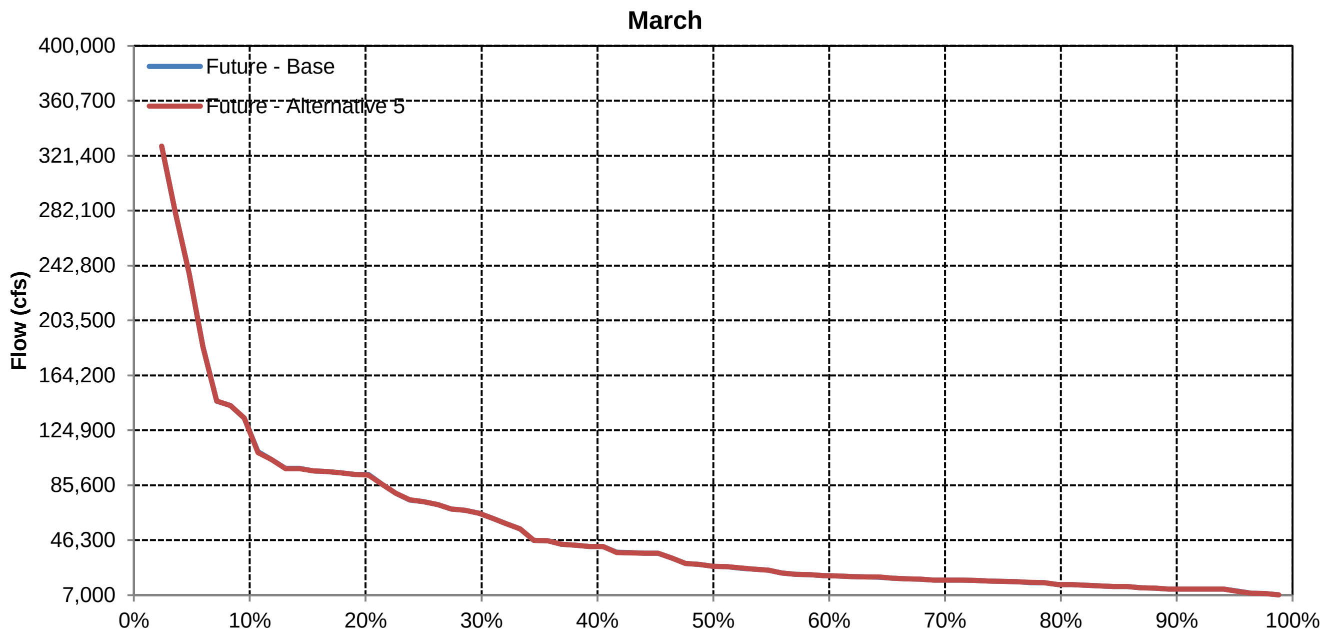
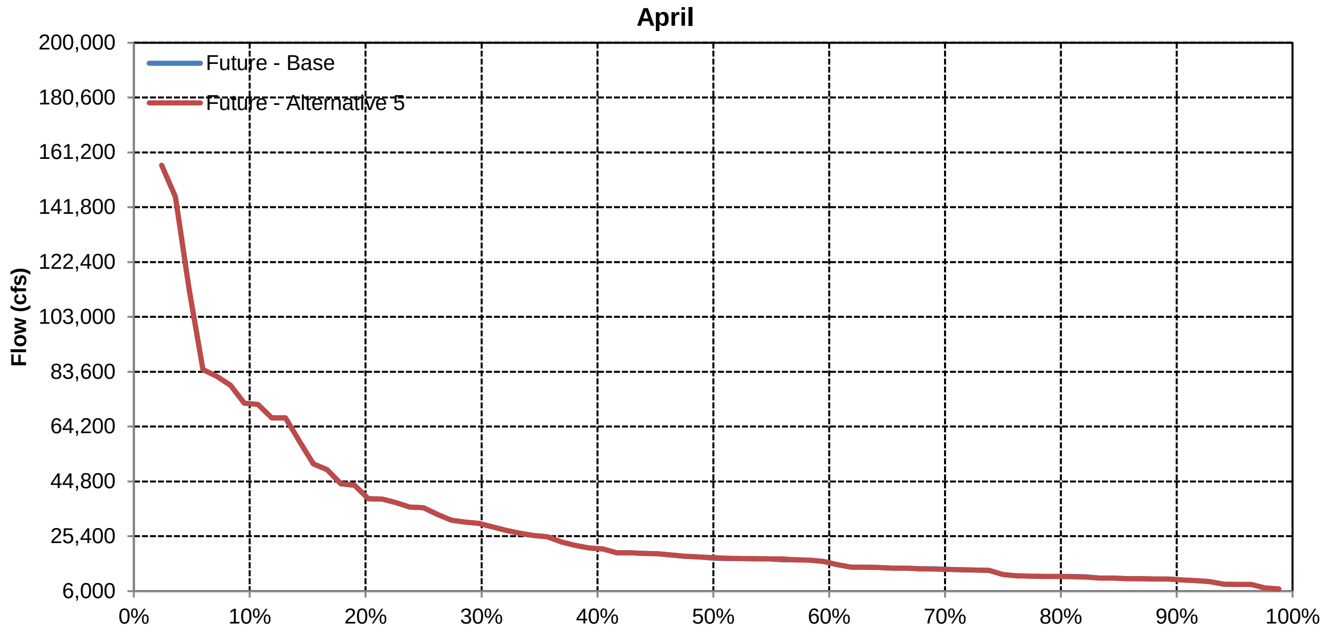
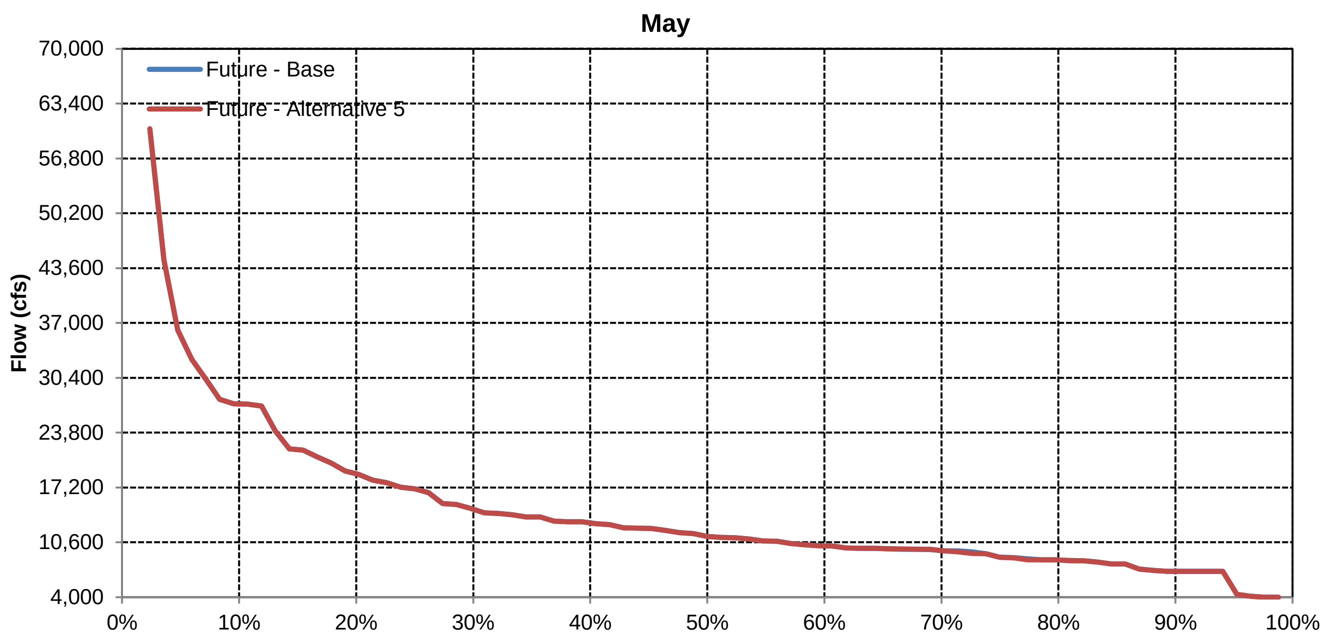


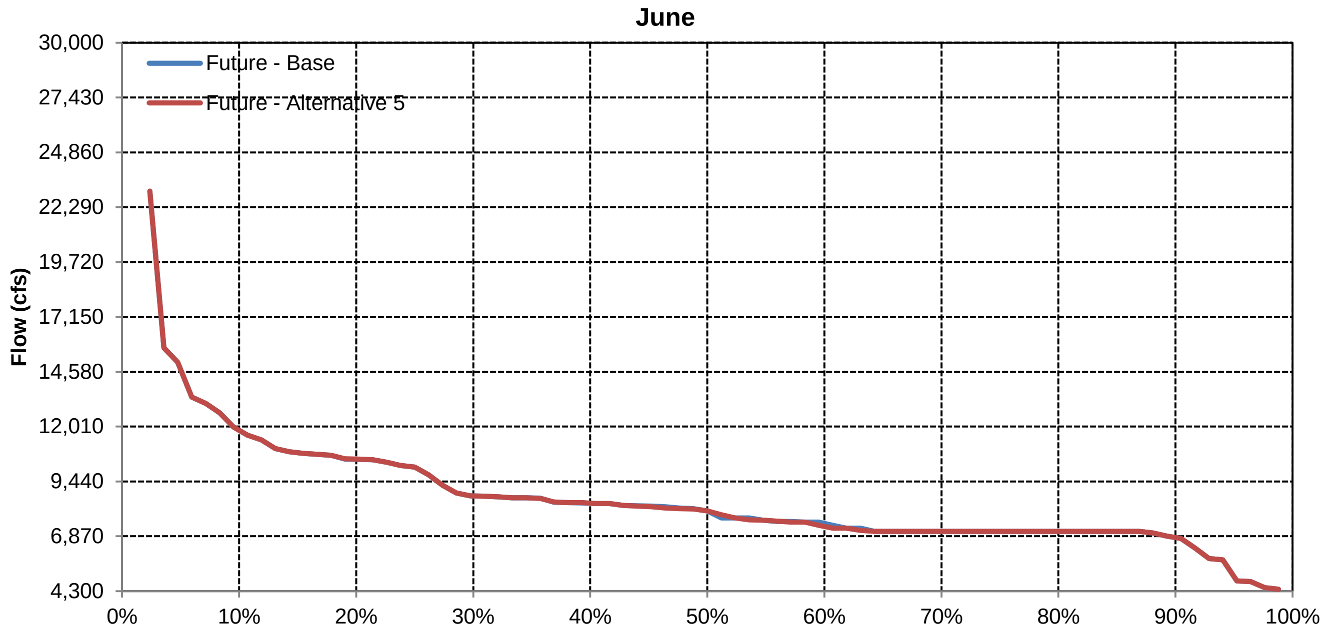


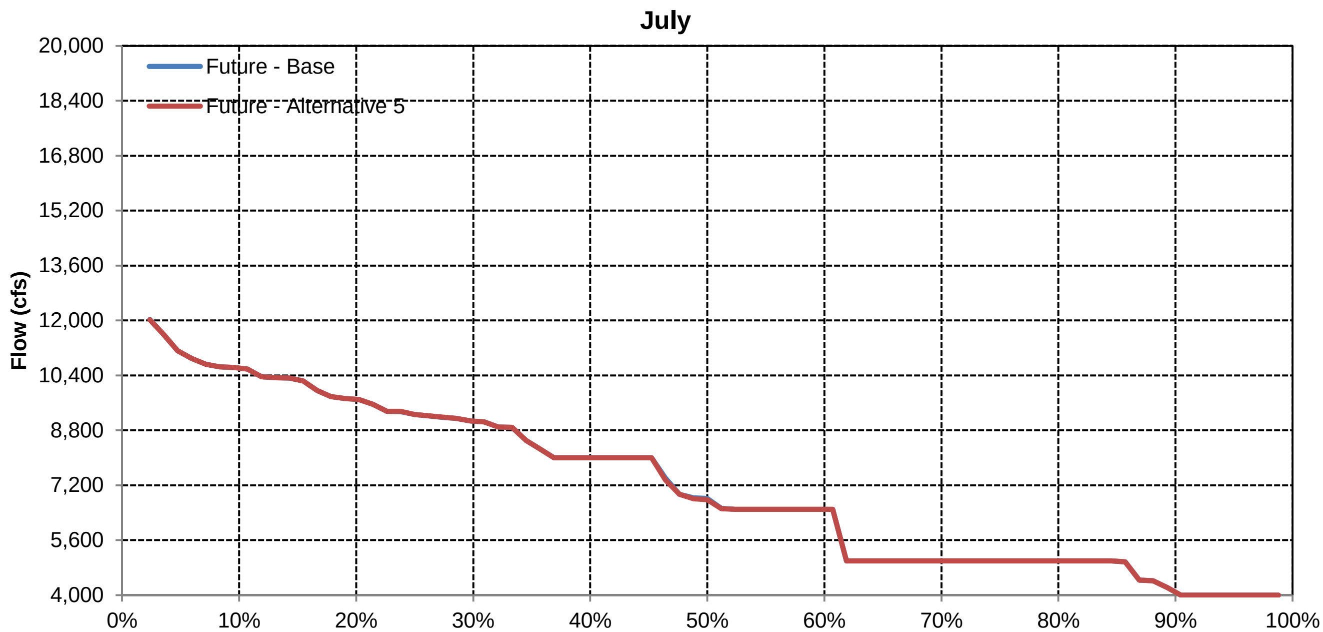
Delta Outflow



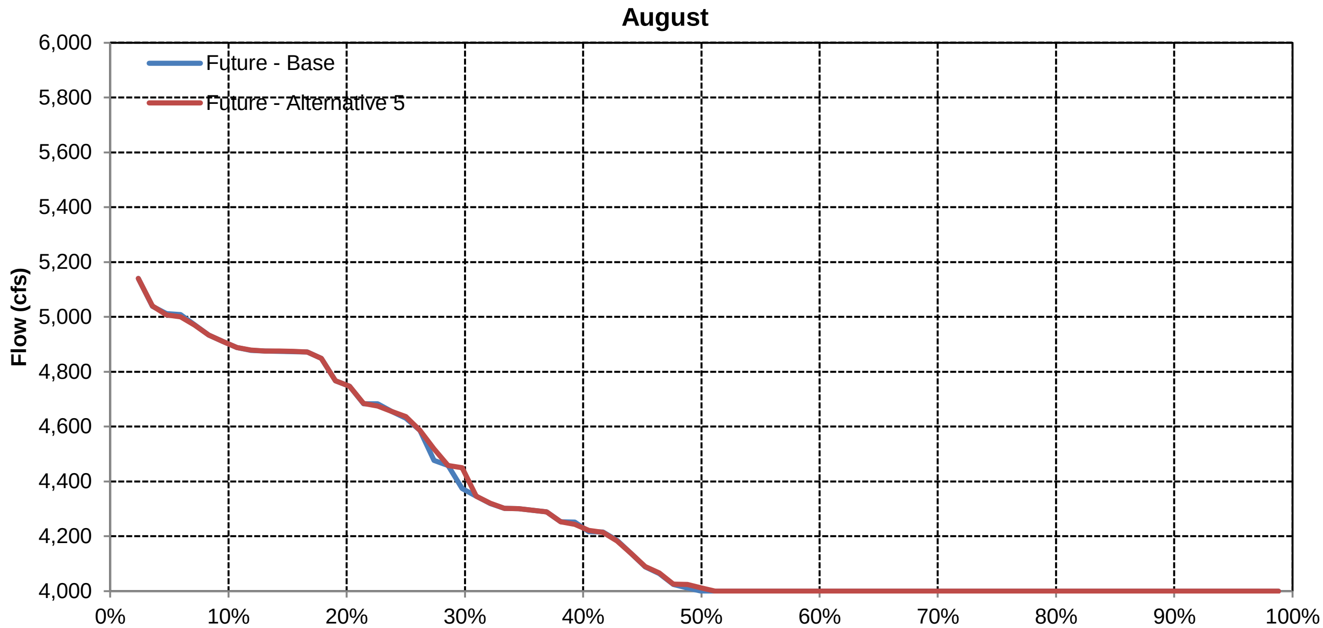


Delta Outflow





Delta Outflow



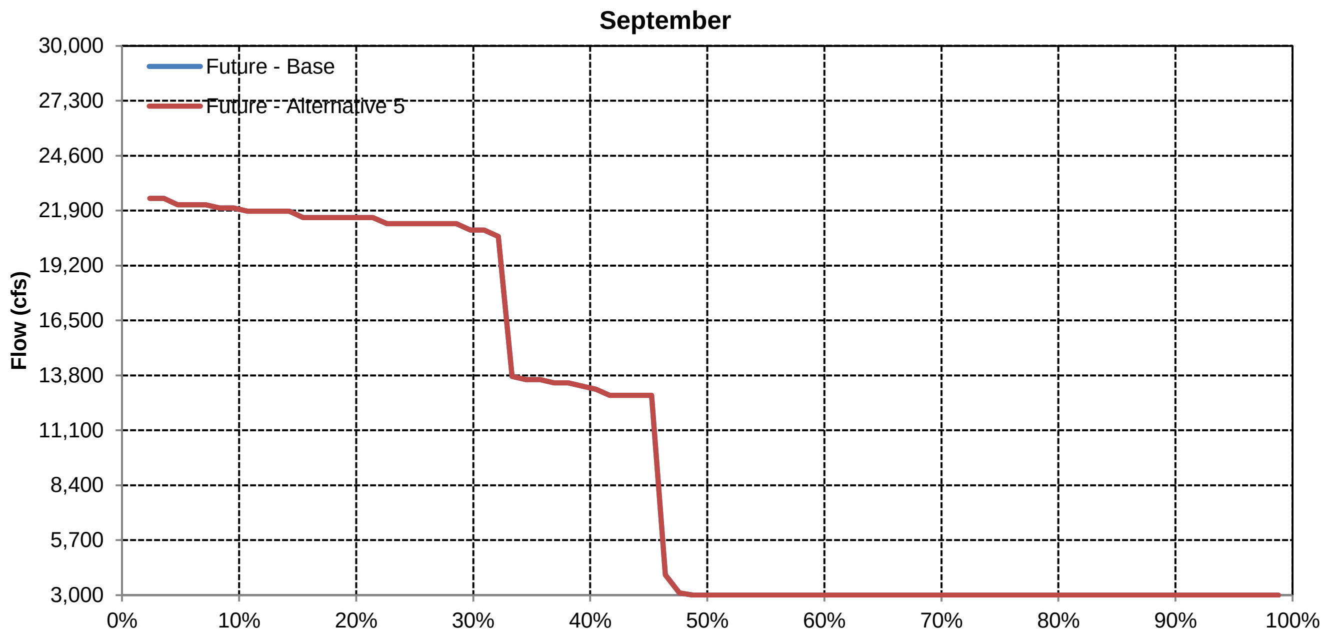


Table 185 No Action Alternative-Alternative 5 (Future)

Winter-run Chinook Salmon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 5 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration	November through July	Mean Monthly Flow (cfs)	Verona		10	Lower 40%		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
			Freeport		10	Lower 40%		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
		Mean Monthly Water Temperature (°F)	Feather River Confluence	64		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
				68		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
			Freeport	64		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
				68		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Juvenile Rearing and Downstream Movement*	July through March	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	61		All Years	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
				65		All Years	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
			Freeport	61		All Years	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
				65		All Years	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0

Table 186 No Action Alternative-Alternative 5 (Future)

Spring-run Chinook Salmon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 5 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration	March through September	Mean Monthly Flow (cfs)	Verona		10	Lower 40%						0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport		10	Lower 40%						0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	64		All Years						0.0	0.0	0.0	0.0	0.0	0.0	0.0
				68		All Years						0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport	64		All Years						0.0	0.0	0.0	0.0	0.0	0.0	0.0
				68		All Years						0.0	0.0	0.0	0.0	0.0	0.0	0.0
Juvenile Rearing (and Downstream Movement)	Year-round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	61		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
				65		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Smolt Emigration	October through May	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
		Mean Monthly Water Temperature (°F)	Feather River Confluence	63		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
			Freeport	63		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				

Table 187 No Action Alternative-Alternative 5 (Future)

Fall-run Chinook Salmon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location Description	Metric Value	Metric %	Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Staging	July through December	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0							0.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0							0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	64		All Years	0.0	0.0	0.0							0.0	0.0	0.0
				68		All Years	0.0	0.0	0.0							0.0	0.0	0.0
			Freeport	64		All Years	0.0	0.0	0.0							0.0	0.0	0.0
				68		All Years	0.0	0.0	0.0							0.0	0.0	0.0
Juvenile Rearing and Downstream Movement	December through July	Mean Monthly Flow (cfs)	Verona		10	Lower 40%			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
			Freeport		10	Lower 40%			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
		Mean Monthly Water Temperature (°F)	Freeport	61		All Years			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
				65		All Years			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		

Note: the table's column header "Net Change in Probability of Exceedance under Alternative 5 (Future) relative to No Action Alternative" spans Oct through Sep.

Table 188 No Action Alternative-Alternative 5 (Future)

Late Fall-run Chinook Salmon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 5 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Staging	October through April	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
		Mean Monthly Water Temperature (°F)	Feather River Confluence	64		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
			Freeport	64		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
Juvenile Rearing and Downstream Movement	April through December	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Freeport	61		All Years	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
				65		All Years	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0

Table 189 No Action Alternative-Alternative 5 (Future)

Steelhead in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 5 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration	August through March	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	64		All Years	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0
			Freeport	64		All Years	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0
Juvenile Rearing and Downstream Movement	Year-Round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	65		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Smolt Emigration	January through June	Mean Monthly Flow (cfs)	Verona		10	Lower 40%				0.0	0.0	0.0	0.0	0.0	0.0			
			Freeport		10	Lower 40%				0.0	0.0	0.0	0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Feather River Confluence	52		All Years				0.0	0.0	0.0	0.0	0.0	0.0			
				55		All Years				0.0	0.0	0.0	0.0	0.0	0.0			
			Freeport	52		All Years				0.0	0.0	0.0	0.0	0.0	0.0			
				55		All Years				0.0	0.0	0.0	0.0	0.0	0.0			

Table 190 No Action Alternative-Alternative 5 (Future)

Green Sturgeon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 5 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Holding	February through July	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%					0.0	0.0	0.0	0.0	0.0	0.0		
		Mean Monthly Water Temperature (°F)	Freeport	61		All Years					0.0	0.0	0.0	0.0	0.0	0.0		
Adult Post-Spawning Holding and Emigration	July through November	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%	0.0	0.0								0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Freeport	61		All Years	0.0	0.0								0.0	0.0	0.0
Juvenile Rearing and Downstream Movement	Year-round	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Freeport	66		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 191 No Action Alternative-Alternative 5 (Future)

White Sturgeon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 5 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Holding	November through May	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%		0.0	0.0	0.0	0.0	0.0	0.0	0.0				
		Mean Monthly Water Temperature (°F)	Freeport	77		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Spawning and Egg Incubation	February through June	Mean Monthly Flow (cfs)	Verona		10	Lower 40%					0.0	0.0	0.0	0.0	0.0			
			Freeport		10	Lower 40%					0.0	0.0	0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Feather River Confluence	61		All Years					0.0	0.0	0.0	0.0	0.0			
Juvenile Rearing and Downstream Movement	Year-round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	66		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport	66		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 192 No Action Alternative-Alternative 5 (Future)

River Lamprey in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 5 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration	September through June	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0
		Mean Monthly Water Temperature (°F)	Freeport	42-60		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0
Ammocoete Rearing and Downstream Movement	Year-round	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Freeport	72		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

[1]Water temperature ranges are evaluated by calculating the net change in the probability of water temperatures occurring within the specified range.

Table 193 No Action Alternative-Alternative 5 (Future)

Pacific Lamprey in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 5 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration	January through June	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%				0.0	0.0	0.0	0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Freeport	42-60		All Years				0.0	0.0	0.0	0.0	0.0	0.0			
Ammocoete Rearing and Downstream Movement	Year-round	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Freeport	72		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

[1]Water temperature ranges are evaluated by calculating the net change in the probability of water temperatures occurring within the specified range.

Table 194 No Action Alternative-Alternative 5 (Future)

Hardhead in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 5 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adults and Other Lifestages	Year-round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	61-77		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.2	0.0	0.0
			Freeport	61-77		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.3	0.0	1.2	0.0
Adult Spawning	April through June	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%							0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Freeport	59-64		All Years							0.0	0.0	0.0			

[1]Water temperature ranges are evaluated by calculating the net change in the probability of water temperatures occurring within the specified range.

Table 195 No Action Alternative-Alternative 5 (Future)

American Shad in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location Description	Metric Value	Metric %	Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Spawning	April through June	Mean Monthly Flow (cfs)	Verona		10	Lower 40%							0.0	0.0	0.0			
			Freeport		10	Lower 40%							0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Feather River Confluence	60-70		All Years							0.1	0.0	0.0			
			Freeport	60-70		All Years							0.0	0.0	0.0			
Juvenile Rearing and Downstream Movement	Year-Round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	63-77		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.2	0.0	0.0
			Freeport	63-77		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.3	0.0	1.2	0.0

Month columns: Net Change in Probability of Exceedance under Alternative 5 (Future) relative to No Action Alternative

[1]Water temperature ranges are evaluated by calculating the net change in the probability of water temperatures occurring within the specified range.

Table 196 No Action Alternative-Alternative 5 (Future)

Striped Bass in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location Description	Metric Value	Metric %	Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
							Net Change in Probability of Exceedance under Alternative 5 (Future) relative to No Action Alternative											
Adult Immigration and Spawning	April through June	Mean Monthly Flow (cfs)	Verona		10	Lower 40%							0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Feather River Confluence	59-68		All Years							0.0	0.0	0.0			
Juvenile Rearing and Downstream Movement	Year-round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	61-71		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0

[1]Water temperature ranges are evaluated by calculating the net change in the probability of water temperatures occurring within the specified range.

Table 201 No Action Alternative-Alternative 5 (Future)

Alternative 5 (Future) vs No Action Alternative
Sacramento River at Verona, Monthly Flow

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
-1.0 < X < 1.0	81.7	84.1	47.6	48.8	37.8	57.3	98.8	93.9	87.8	93.9	95.1	97.6
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	14.6	0.0	1.2	0.0	0.0	0.0	0.0	0.0	6.1	2.4	2.4	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	1.2	12.2	47.6	50.0	59.8	40.2	1.2	4.9	3.7	3.7	2.4	1.2
Net Change in % Exceedance:	13.4	-12.2	-46.3	-50.0	-59.8	-40.2	-1.2	-4.9	2.4	-1.2	0.0	-1.2
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Low Flows (Upper 40% of Distribution)												
-1.0 < X < 1.0	81.8	97.0	84.8	81.8	42.4	72.7	100.0	100.0	97.0	90.9	100.0	93.9
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	15.2	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	0.0	0.0	12.1	15.2	54.5	24.2	0.0	0.0	3.0	6.1	0.0	3.0
Net Change in % Exceedance:	15.2	0.0	-9.1	-15.2	-54.5	-24.2	0.0	0.0	-3.0	-3.0	0.0	-3.0
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 202 No Action Alternative-Alternative 5 (Future)

Alternative 5 (Future) vs No Action Alternative
Sacramento River at Freeport, Monthly Flow

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
-1.0 < X < 1.0	85.4	89.0	57.3	50.0	40.2	61.0	100.0	96.3	89.0	96.3	95.1	93.9
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	12.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.7	2.4	2.4	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	0.0	8.5	42.7	50.0	54.9	36.6	0.0	3.7	4.9	1.2	1.2	3.7
Net Change in % Exceedance:	12.2	-8.5	-42.7	-50.0	-54.9	-36.6	0.0	-3.7	-1.2	1.2	1.2	-3.7
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Low Flows (Upper 40% of Distribution)												
-1.0 < X < 1.0	84.8	100.0	97.0	84.8	45.5	75.8	100.0	97.0	90.9	97.0	100.0	90.9
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	15.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	0.0	0.0	3.0	15.2	45.5	18.2	0.0	3.0	9.1	3.0	0.0	6.1
Net Change in % Exceedance:	15.2	0.0	-3.0	-15.2	-45.5	-18.2	0.0	-3.0	-9.1	-3.0	0.0	-6.1
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Alternative 5 (Future) vs No Action Alternative

Sacramento River at Feather River, Monthly Temperature

Exceedance of Water Temperature Index Values and Probability of Occurring within the Water Temperature Index Ranges

No Action Alternative

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	98.2	96.4	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	91.9	87.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	40.2	23.2	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	22.0	5.5	90.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	98.8	8.5	1.2	73.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	95.1	1.7	1.2	30.1	97.3	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	87.8	1.2	1.2	12.0	86.0	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	67.1	1.2	1.2	6.1	74.4	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	42.7	1.2	1.2	3.1	61.0	98.7	98.8	98.8	98.8	98.8	98.8
56	98.8	26.8	1.2	1.2	1.2	39.0	97.6	98.8	98.8	98.8	98.8	98.8
57	98.8	14.0	1.2	1.2	1.2	23.2	96.7	98.8	98.8	98.8	98.8	98.8
58	98.8	5.5	1.2	1.2	1.2	12.8	91.2	98.8	98.8	98.8	98.8	98.8
59	98.8	1.2	1.2	1.2	1.2	7.3	85.7	98.8	98.8	98.8	98.8	98.8
60	98.8	1.2	1.2	1.2	1.2	2.7	81.1	98.8	98.8	98.8	98.8	98.8
61	92.1	1.2	1.2	1.2	1.2	2.0	74.4	98.8	98.8	98.8	98.8	98.8
62	74.4	1.2	1.2	1.2	1.2	1.4	61.0	98.8	98.8	98.8	98.8	98.8
63	52.8	1.2	1.2	1.2	1.2	1.2	50.0	98.6	98.8	98.8	98.8	98.8
64	41.5	1.2	1.2	1.2	1.2	1.2	34.5	98.0	98.8	98.8	98.8	98.8
65	23.2	1.2	1.2	1.2	1.2	1.2	23.2	96.3	98.8	98.8	98.8	98.8
66	15.2	1.2	1.2	1.2	1.2	1.2	10.4	90.7	98.8	98.8	98.8	97.4
68	4.1	1.2	1.2	1.2	1.2	1.2	1.2	65.2	96.5	98.8	98.8	89.6
69	2.1	1.2	1.2	1.2	1.2	1.2	1.2	45.1	95.3	98.8	98.8	78.9
70	1.4	1.2	1.2	1.2	1.2	1.2	1.2	28.7	86.6	98.8	98.8	70.7
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	15.9	72.0	98.8	98.8	57.7
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	10.4	57.3	97.6	95.9	46.3
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.3	23.2	74.4	84.1	18.3
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	2.6	11.0	54.9	69.5	9.8
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	18.3	30.5	3.0
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	90.7	86.6	97.6	97.6	97.6	96.2	87.8	43.9	29.3	89.0
50-64	57.3	97.6	7.3	0.0	72.0	97.6	64.3	0.8	0.0	0.0	0.0	0.0
55-56	0.0	15.9	0.0	0.0	1.9	22.0	1.1	0.0	0.0	0.0	0.0	0.0
59-64	57.3	0.0	0.0	0.0	0.0	6.1	51.2	0.8	0.0	0.0	0.0	0.0
59-68	94.7	0.0	0.0	0.0	0.0	6.1	84.5	33.6	2.3	0.0	0.0	9.2
59-75	97.6	0.0	0.0	0.0	0.0	6.1	84.5	96.2	87.8	43.9	29.3	89.0
60-70	97.4	0.0	0.0	0.0	0.0	1.5	79.9	70.1	12.2	0.0	0.0	28.1
61-71	90.9	0.0	0.0	0.0	0.0	0.8	73.2	82.9	26.8	0.0	0.0	41.1
63-69	50.7	0.0	0.0	0.0	0.0	0.0	48.8	53.5	3.5	0.0	0.0	19.9
63-77	51.6	0.0	0.0	0.0	0.0	0.0	48.8	97.4	97.6	80.5	68.3	95.8
65-82	22.0	0.0	0.0	0.0	0.0	0.0	22.0	95.1	97.6	97.6	97.6	97.6
70-82	0.2	0.0	0.0	0.0	0.0	0.0	0.0	27.5	85.4	97.6	97.6	69.5
42-60	0.0	97.6	97.6	95.8	97.6	96.1	17.7	0.0	0.0	0.0	0.0	0.0
61-77	90.9	0.0	0.0	0.0	0.0	0.8	73.2	97.6	97.6	80.5	68.3	95.8

Alternative 5 (Future)

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.6	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	98.2	96.4	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	91.9	87.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	40.2	23.2	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	20.7	5.5	90.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	98.8	8.5	1.2	73.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	95.1	1.7	1.2	30.1	97.3	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	87.8	1.2	1.2	12.0	86.0	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	67.1	1.2	1.2	6.1	74.4	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	42.7	1.2	1.2	3.1	61.0	98.7	98.8	98.8	98.8	98.8	98.8
56	98.8	26.8	1.2	1.2	1.2	39.0	97.6	98.8	98.8	98.8	98.8	98.8
57	98.8	14.0	1.2	1.2	1.2	23.2	96.7	98.8	98.8	98.8	98.8	98.8
58	98.8	5.5	1.2	1.2	1.2	12.8	91.2	98.8	98.8	98.8	98.8	98.8
59	98.8	1.2	1.2	1.2	1.2	7.3	85.7	98.8	98.8	98.8	98.8	98.8
60	98.8	1.2	1.2	1.2	1.2	2.7	81.2	98.8	98.8	98.8	98.8	98.8
61	92.1	1.2	1.2	1.2	1.2	2.0	74.4	98.8	98.8	98.8	98.8	98.8
62	74.4	1.2	1.2	1.2	1.2	1.4	61.0	98.8	98.8	98.8	98.8	98.8
63	52.8	1.2	1.2	1.2	1.2	1.2	50.0	98.6	98.8	98.8	98.8	98.8
64	41.5	1.2	1.2	1.2	1.2	1.2	34.5	98.0	98.8	98.8	98.8	98.8
65	23.2	1.2	1.2	1.2	1.2	1.2	23.2	96.3	98.8	98.8	98.8	98.8
66	15.2	1.2	1.2	1.2	1.2	1.2	10.4	90.7	98.8	98.8	98.8	97.4
68	4.1	1.2	1.2	1.2	1.2	1.2	1.2	65.2	96.5	98.8	98.8	89.6
69	2.1	1.2	1.2	1.2	1.2	1.2	1.2	45.1	95.3	98.8	98.8	78.9
70	1.4	1.2	1.2	1.2	1.2	1.2	1.2	28.7	86.6	98.8	98.8	70.7
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	15.9	70.7	98.8	98.8	57.7
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	10.4	56.1	97.6	95.7	46.3
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.3	23.2	74.4	84.1	18.3
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	2.6	11.0	54.9	69.5	9.8
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	19.5	30.5	3.0
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	90.7	86.6	97.6	97.6	97.6	96.2	87.8	43.9	29.3	89.0
50-64	57.3	97.6	7.3	0.0	72.0	97.6	64.3	0.8	0.0	0.0	0.0	0.0
55-56	0.0	15.9	0.0	0.0	1.9	22.0	1.1	0.0	0.0	0.0	0.0	0.0
59-64	57.3	0.0	0.0	0.0	0.0	6.1	51.2	0.8	0.0	0.0	0.0	0.0
59-68	94.7	0.0	0.0	0.0	0.0	6.1	84.5	33.6	2.3	0.0	0.0	9.2
59-75	97.6	0.0	0.0	0.0	0.0	6.1	84.5	96.2	87.8	43.9	29.3	89.0
60-70	97.4	0.0	0.0	0.0	0.0	1.5	80.0	70.1	12.2	0.0	0.0	28.1
61-71	90.9	0.0	0.0	0.0	0.0	0.8	73.2	82.9	28.1	0.0	0.0	41.1
63-69	50.7	0.0	0.0	0.0	0.0	0.0	48.8	53.5	3.5	0.0	0.0	19.9
63-77	51.6	0.0	0.0	0.0	0.0	0.0	48.8	97.4	97.6	79.3	68.3	95.8
65-82	22.0	0.0	0.0	0.0	0.0	0.0	22.0	95.1	97.6	97.6	97.6	97.6
70-82	0.2	0.0	0.0	0.0	0.0	0.0	0.0	27.5	85.4	97.6	97.6	69.5
42-60	0.0	97.6	97.6	95.8	97.6	96.1	17.6	0.0	0.0	0.0	0.0	0.0
61-77	90.9	0.0	0.0	0.0	0.0	0.8	73.2	97.6	97.6	79.3	68.3	95.8

Alternative 5 (Future) - No Action Alternative

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
43	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
48	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
49	0.0	0.0	-1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
52	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
53	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
54	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
56	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
57	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
58	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
61	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
62	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
66	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
68	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.3	0.0	0.0	0.0
72	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.2	0.0	-0.2	0.0
74	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0
82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
86	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
88	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
98	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45-75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50-64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55-56	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-68	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60-70	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
61-71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0
63-69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.2	0.0	0.0
65-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42-60	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.0
61-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.2	0.0	0.0

Alternative 5 (Future) vs No Action Alternative

Sacramento River at Freeport, Monthly Temperature

Exceedance of Water Temperature Index Values and Probability of Occurring within the Water Temperature Index Ranges

No Action Alternative

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	98.3	96.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	90.2	86.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	43.9	26.2	97.6	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	26.2	8.5	92.7	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	98.8	9.8	1.2	78.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	97.8	1.5	1.2	29.3	98.8	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	90.2	1.2	1.2	15.6	90.2	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	70.7	1.2	1.2	7.0	75.6	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	50.0	1.2	1.2	4.6	63.4	98.8	98.8	98.8	98.8	98.8	98.8
56	98.8	31.7	1.2	1.2	2.0	43.9	97.8	98.8	98.8	98.8	98.8	98.8
57	98.8	22.0	1.2	1.2	1.2	27.4	96.6	98.8	98.8	98.8	98.8	98.8
58	98.8	6.1	1.2	1.2	1.2	18.9	92.4	98.8	98.8	98.8	98.8	98.8
59	98.8	2.4	1.2	1.2	1.2	7.3	88.0	98.8	98.8	98.8	98.8	98.8
60	98.8	1.2	1.2	1.2	1.2	4.9	81.7	98.8	98.8	98.8	98.8	98.8
61	98.0	1.2	1.2	1.2	1.2	2.4	74.0	98.8	98.8	98.8	98.8	98.8
62	89.6	1.2	1.2	1.2	1.2	1.9	62.8	98.8	98.8	98.8	98.8	98.8
63	63.4	1.2	1.2	1.2	1.2	1.3	49.4	98.8	98.8	98.8	98.8	98.8
64	52.4	1.2	1.2	1.2	1.2	1.2	32.3	98.4	98.8	98.8	98.8	98.8
65	35.4	1.2	1.2	1.2	1.2	1.2	27.6	97.0	98.8	98.8	98.8	98.8
66	21.3	1.2	1.2	1.2	1.2	1.2	17.1	92.3	98.8	98.8	98.8	98.8
68	4.7	1.2	1.2	1.2	1.2	1.2	1.2	78.7	98.8	98.8	98.8	95.3
69	2.7	1.2	1.2	1.2	1.2	1.2	1.2	54.9	96.6	98.8	98.8	89.8
70	1.6	1.2	1.2	1.2	1.2	1.2	1.2	38.2	95.2	98.8	98.8	78.0
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	21.3	86.9	98.8	98.8	70.1
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	13.0	81.7	98.8	98.8	53.7
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.6	39.6	91.5	88.7	22.0
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.1	20.1	78.7	81.7	9.8
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	39.0	43.9	2.1
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	89.0	84.8	97.6	97.6	97.6	95.7	78.7	20.1	17.1	89.0
50-64	46.4	97.6	8.6	0.0	76.8	97.6	66.5	0.4	0.0	0.0	0.0	0.0
55-56	0.0	18.3	0.0	0.0	2.6	19.5	1.0	0.0	0.0	0.0	0.0	0.0
59-64	46.4	1.2	0.0	0.0	0.0	6.1	55.7	0.4	0.0	0.0	0.0	0.0
59-68	94.1	1.2	0.0	0.0	0.0	6.1	86.8	20.1	0.0	0.0	0.0	3.5
59-75	97.6	1.2	0.0	0.0	0.0	6.1	86.8	95.7	78.7	20.1	17.1	89.0
60-70	97.2	0.0	0.0	0.0	0.0	3.7	80.5	60.6	3.6	0.0	0.0	20.8
61-71	96.8	0.0	0.0	0.0	0.0	1.2	72.8	77.5	11.9	0.0	0.0	28.7
63-69	60.7	0.0	0.0	0.0	0.0	0.1	48.2	43.9	2.2	0.0	0.0	9.0
63-77	62.2	0.0	0.0	0.0	0.0	0.1	48.2	97.6	97.6	59.8	54.9	96.7
65-82	34.2	0.0	0.0	0.0	0.0	0.0	26.4	95.8	97.6	97.6	97.6	97.6
70-82	0.4	0.0	0.0	0.0	0.0	0.0	0.0	37.0	94.0	97.6	97.6	76.8
42-60	0.0	97.6	97.6	95.8	97.6	93.9	17.1	0.0	0.0	0.0	0.0	0.0
61-77	96.8	0.0	0.0	0.0	0.0	1.2	72.8	97.6	97.6	59.8	54.9	96.7

Alternative 5 (Future)

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	98.3	96.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	90.2	86.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	43.9	26.4	97.6	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	25.6	8.5	92.7	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	98.8	9.8	1.2	78.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	97.8	1.5	1.2	29.3	98.8	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	90.7	1.2	1.2	15.9	90.2	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	70.7	1.2	1.2	6.8	75.6	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	50.0	1.2	1.2	4.6	63.4	98.8	98.8	98.8	98.8	98.8	98.8
56	98.8	31.7	1.2	1.2	2.0	43.9	97.8	98.8	98.8	98.8	98.8	98.8
57	98.8	22.0	1.2	1.2	1.2	27.4	96.6	98.8	98.8	98.8	98.8	98.8
58	98.8	6.1	1.2	1.2	1.2	18.9	92.4	98.8	98.8	98.8	98.8	98.8
59	98.8	2.3	1.2	1.2	1.2	7.3	88.0	98.8	98.8	98.8	98.8	98.8
60	98.8	1.2	1.2	1.2	1.2	4.9	81.7	98.8	98.8	98.8	98.8	98.8
61	98.0	1.2	1.2	1.2	1.2	2.4	74.0	98.8	98.8	98.8	98.8	98.8
62	89.6	1.2	1.2	1.2	1.2	1.9	62.8	98.8	98.8	98.8	98.8	98.8
63	63.4	1.2	1.2	1.2	1.2	1.3	49.4	98.8	98.8	98.8	98.8	98.8
64	52.4	1.2	1.2	1.2	1.2	1.2	32.3	98.4	98.8	98.8	98.8	98.8
65	35.4	1.2	1.2	1.2	1.2	1.2	27.6	97.0	98.8	98.8	98.8	98.8
66	21.3	1.2	1.2	1.2	1.2	1.2	17.1	92.3	98.8	98.8	98.8	98.8
68	4.7	1.2	1.2	1.2	1.2	1.2	1.2	78.7	98.8	98.8	98.8	95.3
69	2.7	1.2	1.2	1.2	1.2	1.2	1.2	54.9	96.6	98.8	98.8	89.8
70	1.6	1.2	1.2	1.2	1.2	1.2	1.2	38.2	95.2	98.8	98.8	78.0
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	21.3	86.9	98.8	98.8	70.1
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	13.0	81.7	98.8	98.8	53.7
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.6	39.6	91.5	89.6	22.0
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.1	20.3	78.7	82.3	9.8
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.5	39.0	42.7	2.1
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	89.0	84.8	97.6	97.6	97.6	95.7	78.5	20.1	16.5	89.0
50-64	46.4	97.6	8.6	0.0	76.8	97.6	66.5	0.4	0.0	0.0	0.0	0.0
55-56	0.0	18.3	0.0	0.0	2.6	19.5	1.0	0.0	0.0	0.0	0.0	0.0
59-64	46.4	1.1	0.0	0.0	0.0	6.1	55.7	0.4	0.0	0.0	0.0	0.0
59-68	94.1	1.1	0.0	0.0	0.0	6.1	86.8	20.1	0.0	0.0	0.0	3.5
59-75	97.6	1.1	0.0	0.0	0.0	6.1	86.8	95.7	78.5	20.1	16.5	89.0
60-70	97.2	0.0	0.0	0.0	0.0	3.7	80.5	60.6	3.6	0.0	0.0	20.8
61-71	96.8	0.0	0.0	0.0	0.0	1.2	72.8	77.5	11.9	0.0	0.0	28.7
63-69	60.7	0.0	0.0	0.0	0.0	0.1	48.2	43.9	2.2	0.0	0.0	9.0
63-77	62.2	0.0	0.0	0.0	0.0	0.1	48.2	97.6	97.3	59.8	56.1	96.7
65-82	34.2	0.0	0.0	0.0	0.0	0.0	26.4	95.8	97.6	97.6	97.6	97.6
70-82	0.4	0.0	0.0	0.0	0.0	0.0	0.0	37.0	94.0	97.6	97.6	76.8
42-60	0.0	97.6	97.6	95.8	97.6	93.9	17.1	0.0	0.0	0.0	0.0	0.0
61-77	96.8	0.0	0.0	0.0	0.0	1.2	72.8	97.6	97.3	59.8	56.1	96.7

Alternative 5 (Future) - No Action Alternative

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
43	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
48	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
49	0.0	0.0	-0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
52	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
53	0.0	0.5	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
54	0.0	0.0	0.0	0.0	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
56	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
57	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
58	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
62	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
66	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
68	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
72	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
74	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0
75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.6	0.0
77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	-1.2	0.0
82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
86	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
88	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
98	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45-75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.2	0.0	-0.6	0.0
50-64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55-56	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-64	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-68	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-75	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	-0.2	0.0	-0.6	0.0
60-70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61-71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63-69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.3	0.0	1.2	0.0
65-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42-60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.3	0.0	1.2	0.0

Table 227 No Action Alternative -Alternative 5 (Future)

Delta Smelt in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 5 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult	December through May	Mean Monthly Water Temperature (°F)	Sacramento River at Freeport	59-68		All Years			0.0	0.0	0.0	0.0	0.0	0.0				
		Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years			61.0	54.9	54.9	67.1	0.0	0.0				
	September through November	Mean Monthly X_2 (RKm)	X_2 between 74 km and 81 km	74-81		Wet and Above Normal Water Years	0.0	0.0										0.0
	December through February	Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<-5000 cfs		All Years			-1.2	0.0	0.0							
Egg and Embryo	February through May	Mean Monthly Water Temperature (°F)	Sacramento River at Freeport	59-68		All Years					0.0	0.0	0.0	0.0				
Larval	March through June	Mean Monthly Water Temperature (°F)	Sacramento River at Freeport	59-68		All Years						0.0	0.0	0.0	0.0			
		Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<-1500 cfs		Dry and Critical Water Years						0.0	-3.3	-3.3	0.0			
		Mean Monthly Delta Outflow (cfs)	Delta		10	All Years						0.0	0.0	0.0	0.0			
Juvenile	May through July	Mean Monthly Water Temperature (°F)	Sacramento River at Freeport	59-68		All Years								0.0	0.0	0.0		
		Mean Monthly X_2 (RKm)	Changes in X_2 between RKm 65 and 80	0.5 RKm		All Years								0.0	0.0	0.0		

Table 228 No Action Alternative -Alternative 5 (Future)

Longfin Smelt in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location Description	Metric Value	Metric %	Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult	December through March	Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<-5000 cfs		All Years			-1.2	0.0	0.0	0.0						
Larvae and Juvenile	April and May	Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<-1500 cfs		Dry and Critical Water Years							-3.3	-3.3				
				< 0 cfs		Dry and Critical Water Years							0.0	0.0				
	January through June	Mean Monthly X_2 (RKm)	X_2	< 75 RKm		All Years				0.0	0.0	0.0	1.2	0.0	0.0			
				< 75 RKm		Dry and Critical Water Years				0.0	0.0	0.0	0.0	0.0	0.0			

Net Change in Probability of Exceedance under Alternative 5 (Future) relative to No Action Alternative (columns Oct–Sep)

Table 229 No Action Alternative -Alternative 5 (Future)

Winter-run Chinook Salmon in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 5 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	November through May	Mean Monthly Flow (cfs)	Rio Vista		10	Lower 40%		0.0	0.0	0.0	0.0	0.0	0.0	0.0				
		Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years		67.1	61.0	54.9	54.9	67.1	0.0	0.0				
		Mean Monthly Delta Outflow (cfs)	Delta		10	All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0				
		Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<2500 cfs		All Years		0.0	0.0	0.0	-1.2	0.0	0.0	0.0				

Table 230 No Action Alternative -Alternative 5 (Future)

Spring-run Chinook Salmon in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 5 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	November through June	Mean Monthly Flow (cfs)	Rio Vista		10	Lower 40%		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
		Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years		67.1	61.0	54.9	54.9	67.1	0.0	0.0	0.0			
		Mean Monthly Delta Outflow (cfs)	Delta		10	All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
		Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<2500 cfs		All Years		0.0	0.0	0.0	-1.2	0.0	0.0	0.0	0.0			

Table 231 No Action Alternative -Alternative 5 (Future)

Fall- and Late Fall-run Chinook Salmon in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location Description	Metric Value	Metric %	Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	November through June	Mean Monthly Flow (cfs)	Rio Vista		10	Lower 40%		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
		Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years		67.1	61.0	54.9	54.9	67.1	0.0	0.0	0.0			
		Mean Monthly Delta Outflow (cfs)	Delta		10	All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
		Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<2500 cfs		All Years		0.0	0.0	0.0	-1.2	0.0	0.0	0.0	0.0			
Adult (San Joaquin River)	December through February	Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<-5000 cfs		All Years			0.0	0.0	-1.2							

Net Change in Probability of Exceedance under Alternative 5 (Future) relative to No Action Alternative

Table 232 No Action Alternative -Alternative 5 (Future)

Steelhead in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 5 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	October through July	Mean Monthly Flow (cfs)	Rio Vista		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
		Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years	0.0	67.1	61.0	54.9	54.9	67.1	0.0	0.0	0.0	0.0		
		Mean Monthly Delta Outflow (cfs)	Delta		10	All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
		Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<2500 cfs		All Years	0.0	0.0	0.0	0.0	-1.2	0.0	0.0	0.0	0.0	0.0		

Table 233 No Action Alternative -Alternative 5 (Future)

Green Sturgeon in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 5 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	Year-round	Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years	0.0	67.1	61.0	54.9	54.9	67.1	0.0	0.0	0.0	0.0	0.0	0.0

Table 234 No Action Alternative -Alternative 5 (Future)

White Sturgeon in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 5 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	April through June	Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years							0.0	0.0	0.0			

Table 235 No Action Alternative -Alternative 5 (Future)

Splittail in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 5 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Spawning and Embryo Incubation	February through May	Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years					54.9	67.1	0.0	0.0				
Juvenile Rearing and Emigration	April through July	Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years							0.0	0.0	0.0	0.0		

Table 236 No Action Alternative -Alternative 5 (Future)

American Shad in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 5 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Egg and Larvae	April through June	Mean Monthly X_2 (RKm)	Changes in X_2	1 RKm		All Years							0.0	0.0	0.0			

Table 237 No Action Alternative -Alternative 5 (Future)

Striped Bass in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 5 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Egg and Larvae	April through June	Mean Monthly X_2 (RKm)	Changes in X_2	1 RKm		All Years							0.0	0.0	0.0			

Alternative 5 (Future) vs No Action Alternative

Sacramento River at Freeport, Monthly Temperature

Exceedance of Water Temperature Index Values and Probability of Occurring within the Water Temperature Index Ranges

No Action Alternative

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	98.3	96.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	90.2	86.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	43.9	26.2	97.6	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	26.2	8.5	92.7	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	98.8	9.8	1.2	78.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	97.8	1.5	1.2	29.3	98.8	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	90.2	1.2	1.2	15.6	90.2	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	70.7	1.2	1.2	7.0	75.6	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	50.0	1.2	1.2	4.6	63.4	98.8	98.8	98.8	98.8	98.8	98.8
56	98.8	31.7	1.2	1.2	2.0	43.9	97.8	98.8	98.8	98.8	98.8	98.8
57	98.8	22.0	1.2	1.2	1.2	27.4	96.6	98.8	98.8	98.8	98.8	98.8
58	98.8	6.1	1.2	1.2	1.2	18.9	92.4	98.8	98.8	98.8	98.8	98.8
59	98.8	2.4	1.2	1.2	1.2	7.3	88.0	98.8	98.8	98.8	98.8	98.8
60	98.8	1.2	1.2	1.2	1.2	4.9	81.7	98.8	98.8	98.8	98.8	98.8
61	98.0	1.2	1.2	1.2	1.2	2.4	74.0	98.8	98.8	98.8	98.8	98.8
62	89.6	1.2	1.2	1.2	1.2	1.9	62.8	98.8	98.8	98.8	98.8	98.8
63	63.4	1.2	1.2	1.2	1.2	1.3	49.4	98.8	98.8	98.8	98.8	98.8
64	52.4	1.2	1.2	1.2	1.2	1.2	32.3	98.4	98.8	98.8	98.8	98.8
65	35.4	1.2	1.2	1.2	1.2	1.2	27.6	97.0	98.8	98.8	98.8	98.8
66	21.3	1.2	1.2	1.2	1.2	1.2	17.1	92.3	98.8	98.8	98.8	98.8
68	4.7	1.2	1.2	1.2	1.2	1.2	1.2	78.7	98.8	98.8	98.8	95.3
69	2.7	1.2	1.2	1.2	1.2	1.2	1.2	54.9	96.6	98.8	98.8	89.8
70	1.6	1.2	1.2	1.2	1.2	1.2	1.2	38.2	95.2	98.8	98.8	78.0
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	21.3	86.9	98.8	98.8	70.1
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	13.0	81.7	98.8	98.8	53.7
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.6	39.6	91.5	88.7	22.0
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.1	20.1	78.7	81.7	9.8
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	39.0	43.9	2.1
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	89.0	84.8	97.6	97.6	97.6	95.7	78.7	20.1	17.1	89.0
50-64	46.4	97.6	8.6	0.0	76.8	97.6	66.5	0.4	0.0	0.0	0.0	0.0
55-56	0.0	18.3	0.0	0.0	2.6	19.5	1.0	0.0	0.0	0.0	0.0	0.0
59-64	46.4	1.2	0.0	0.0	0.0	6.1	55.7	0.4	0.0	0.0	0.0	0.0
59-68	94.1	1.2	0.0	0.0	0.0	6.1	86.8	20.1	0.0	0.0	0.0	3.5
59-75	97.6	1.2	0.0	0.0	0.0	6.1	86.8	95.7	78.7	20.1	17.1	89.0
60-70	97.2	0.0	0.0	0.0	0.0	3.7	80.5	60.6	3.6	0.0	0.0	20.8
61-71	96.8	0.0	0.0	0.0	0.0	1.2	72.8	77.5	11.9	0.0	0.0	28.7
63-69	60.7	0.0	0.0	0.0	0.0	0.1	48.2	43.9	2.2	0.0	0.0	9.0
63-77	62.2	0.0	0.0	0.0	0.0	0.1	48.2	97.6	97.6	59.8	54.9	96.7
65-82	34.2	0.0	0.0	0.0	0.0	0.0	26.4	95.8	97.6	97.6	97.6	97.6
70-82	0.4	0.0	0.0	0.0	0.0	0.0	0.0	37.0	94.0	97.6	97.6	76.8
42-60	0.0	97.6	97.6	95.8	97.6	93.9	17.1	0.0	0.0	0.0	0.0	0.0
61-77	96.8	0.0	0.0	0.0	0.0	1.2	72.8	97.6	97.6	59.8	54.9	96.7

Alternative 5 (Future)

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	98.3	96.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	90.2	86.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	43.9	26.4	97.6	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	25.6	8.5	92.7	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	98.8	9.8	1.2	78.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	97.8	1.5	1.2	29.3	98.8	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	90.7	1.2	1.2	15.9	90.2	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	70.7	1.2	1.2	6.8	75.6	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	50.0	1.2	1.2	4.6	63.4	98.8	98.8	98.8	98.8	98.8	98.8
56	98.8	31.7	1.2	1.2	2.0	43.9	97.8	98.8	98.8	98.8	98.8	98.8
57	98.8	22.0	1.2	1.2	1.2	27.4	96.6	98.8	98.8	98.8	98.8	98.8
58	98.8	6.1	1.2	1.2	1.2	18.9	92.4	98.8	98.8	98.8	98.8	98.8
59	98.8	2.3	1.2	1.2	1.2	7.3	88.0	98.8	98.8	98.8	98.8	98.8
60	98.8	1.2	1.2	1.2	1.2	4.9	81.7	98.8	98.8	98.8	98.8	98.8
61	98.0	1.2	1.2	1.2	1.2	2.4	74.0	98.8	98.8	98.8	98.8	98.8
62	89.6	1.2	1.2	1.2	1.2	1.9	62.8	98.8	98.8	98.8	98.8	98.8
63	63.4	1.2	1.2	1.2	1.2	1.3	49.4	98.8	98.8	98.8	98.8	98.8
64	52.4	1.2	1.2	1.2	1.2	1.2	32.3	98.4	98.8	98.8	98.8	98.8
65	35.4	1.2	1.2	1.2	1.2	1.2	27.6	97.0	98.8	98.8	98.8	98.8
66	21.3	1.2	1.2	1.2	1.2	1.2	17.1	92.3	98.8	98.8	98.8	98.8
68	4.7	1.2	1.2	1.2	1.2	1.2	1.2	78.7	98.8	98.8	98.8	95.3
69	2.7	1.2	1.2	1.2	1.2	1.2	1.2	54.9	96.6	98.8	98.8	89.8
70	1.6	1.2	1.2	1.2	1.2	1.2	1.2	38.2	95.2	98.8	98.8	78.0
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	21.3	86.9	98.8	98.8	70.1
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	13.0	81.7	98.8	98.8	53.7
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.6	39.6	91.5	89.6	22.0
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.1	20.3	78.7	82.3	9.8
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.5	39.0	42.7	2.1
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	89.0	84.8	97.6	97.6	97.6	95.7	78.5	20.1	16.5	89.0
50-64	46.4	97.6	8.6	0.0	76.8	97.6	66.5	0.4	0.0	0.0	0.0	0.0
55-56	0.0	18.3	0.0	0.0	2.6	19.5	1.0	0.0	0.0	0.0	0.0	0.0
59-64	46.4	1.1	0.0	0.0	0.0	6.1	55.7	0.4	0.0	0.0	0.0	0.0
59-68	94.1	1.1	0.0	0.0	0.0	6.1	86.8	20.1	0.0	0.0	0.0	3.5
59-75	97.6	1.1	0.0	0.0	0.0	6.1	86.8	95.7	78.5	20.1	16.5	89.0
60-70	97.2	0.0	0.0	0.0	0.0	3.7	80.5	60.6	3.6	0.0	0.0	20.8
61-71	96.8	0.0	0.0	0.0	0.0	1.2	72.8	77.5	11.9	0.0	0.0	28.7
63-69	60.7	0.0	0.0	0.0	0.0	0.1	48.2	43.9	2.2	0.0	0.0	9.0
63-77	62.2	0.0	0.0	0.0	0.0	0.1	48.2	97.6	97.3	59.8	56.1	96.7
65-82	34.2	0.0	0.0	0.0	0.0	0.0	26.4	95.8	97.6	97.6	97.6	97.6
70-82	0.4	0.0	0.0	0.0	0.0	0.0	0.0	37.0	94.0	97.6	97.6	76.8
42-60	0.0	97.6	97.6	95.8	97.6	93.9	17.1	0.0	0.0	0.0	0.0	0.0
61-77	96.8	0.0	0.0	0.0	0.0	1.2	72.8	97.6	97.3	59.8	56.1	96.7

Alternative 5 (Future) - No Action Alternative

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
43	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
48	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
49	0.0	0.0	-0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
52	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
53	0.0	0.5	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
54	0.0	0.0	0.0	0.0	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
56	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
57	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
58	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
62	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
66	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
68	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
72	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
74	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0
75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.6	0.0
77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	-1.2	0.0
82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
86	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
88	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
98	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45-75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.2	0.0	-0.6	0.0
50-64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55-56	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-64	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-68	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-75	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	-0.2	0.0	-0.6	0.0
60-70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61-71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63-69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.3	0.0	1.2	0.0
65-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42-60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.3	0.0	1.2	0.0

Table 239 No Action Alternative -Alternative 5 (Future)

Alternative 5 (Future) vs No Action Alternative
Sacramento River at Rio Vista, Monthly Flow

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
-1.0 < X < 1.0	76.8	97.6	89.0	85.4	80.5	91.5	90.2	90.2	93.9	93.9	97.6	98.8
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	22.0	1.2	4.9	12.2	14.6	6.1	4.9	3.7	1.2	3.7	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	0.0	1.2	2.4	0.0	1.2	1.2	4.9	6.1	3.7	2.4	1.2	1.2
Net Change in % Exceedance:	22.0	0.0	2.4	12.2	13.4	4.9	0.0	-2.4	-2.4	1.2	-1.2	-1.2
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Low Flows (Upper 40% of Distribution)												
-1.0 < X < 1.0	93.9	97.0	90.9	100.0	72.7	90.9	87.9	97.0	100.0	84.8	97.0	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1 (Total %)	6.1	0.0	6.1	0.0	15.2	9.1	12.1	0.0	0.0	9.1	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1 (Total %)	0.0	3.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0	6.1	0.0	0.0
Net Change in % Exceedance:	6.1	-3.0	3.0	0.0	12.1	9.1	12.1	-3.0	0.0	3.0	0.0	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 240 No Action Alternative -Alternative 5 (Future)

Alternative 5 (Future) vs No Action Alternative
Yolo Bypass, Monthly Flow

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
-1.0 < X < 1.0	100.0	30.5	31.7	31.7	29.3	22.0	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	67.1	61.0	54.9	54.9	67.1	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	0.0	69.5	67.1	67.1	69.5	78.0	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	69.5	65.9	67.1	69.5	78.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	67.1	61.0	54.9	54.9	67.1	0.0	0.0	0.0	0.0	0.0	0.0
Low Flows (Upper 40% of Distribution)												
-1.0 < X < 1.0	100.0	75.8	69.7	48.5	30.3	12.1	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	24.2	30.3	51.5	69.7	87.9	0.0	0.0	0.0	0.0	0.0	0.0
X>1 (Total %)	0.0	24.2	30.3	51.5	69.7	87.9	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	24.2	30.3	51.5	69.7	87.9	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	24.2	30.3	51.5	69.7	87.9	0.0	0.0	0.0	0.0	0.0	0.0

Table 241 No Action Alternative -Alternative 5 (Future)

Alternative 5 (Future) vs No Action Alternative
Delta Outflow, Monthly Flow

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
-1.0 < X < 1.0	79.3	97.6	82.9	97.6	89.0	96.3	97.6	96.3	93.9	100.0	98.8	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	14.6	2.4	14.6	2.4	8.5	1.2	2.4	0.0	1.2	0.0	1.2	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	2.4	0.0	1.2	0.0	2.4	1.2	0.0	3.7	4.9	0.0	0.0	0.0
Net Change in % Exceedance:	12.2	2.4	13.4	2.4	6.1	0.0	2.4	-3.7	-3.7	0.0	1.2	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Low Flows (Upper 40% of Distribution)												
-1.0 < X < 1.0	66.7	97.0	81.8	100.0	75.8	90.9	100.0	90.9	93.9	100.0	100.0	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1 (Total %)	18.2	3.0	18.2	0.0	18.2	3.0	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1 (Total %)	6.1	0.0	0.0	0.0	6.1	3.0	0.0	9.1	6.1	0.0	0.0	0.0
Net Change in % Exceedance:	12.1	3.0	18.2	0.0	12.1	0.0	0.0	-9.1	-6.1	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Long-Term and Water Year-Type Average of Sacramento River Delta Inflow Under Future - Base and Future - Alternative 6

Analysis Period	October	November	December	January	February	March	April	May	June	July	August	September	Total (TAF)
	Average Flow (cfs)												
Long-Term													
Full Simulation Period													
Future - Base	8,350	10,798	22,082	31,475	37,498	30,725	19,501	11,009	11,566	13,675	9,771	13,116	13,187
Future - Alternative 6	8,373	10,551	21,201	30,061	35,904	29,942	19,489	10,992	11,570	13,699	9,766	13,111	12,895
Difference	23	-247	-880	-1,414	-1,594	-783	-11	-18	4	25	-5	-5	-292
Percent Difference	0%	-2%	-4%	-4%	-4%	-3%	0%	0%	0%	0%	0%	0%	-2%
Water Year-Types													
Wet													
Future - Base	8,996	14,634	37,088	51,035	56,945	47,194	30,753	12,279	11,846	17,045	8,777	23,150	19,185
Future - Alternative 6	8,997	14,003	35,134	48,869	54,849	46,323	30,763	12,263	11,855	17,107	8,757	23,135	18,725
Difference	2	-631	-1,954	-2,165	-2,096	-871	10	-16	9	63	-20	-15	-460
Percent Difference	0%	-4%	-5%	-4%	-4%	-2%	0%	0%	0%	0%	0%	0%	-2%
Above Normal													
Future - Base	9,290	10,029	19,595	40,534	52,912	37,168	18,221	12,048	12,038	14,830	9,005	15,709	15,067
Future - Alternative 6	9,462	9,911	18,743	38,420	50,902	35,734	18,223	12,047	12,040	14,830	9,004	15,709	14,687
Difference	172	-118	-853	-2,114	-2,010	-1,434	3	-1	2	0	-1	0	-379
Percent Difference	2%	-1%	-4%	-5%	-4%	-4%	0%	0%	0%	0%	0%	0%	-3%
Below Normal													
Future - Base	8,183	9,236	16,398	24,715	25,957	23,572	16,492	11,386	12,357	12,801	10,142	6,570	10,705
Future - Alternative 6	8,179	9,193	16,030	23,129	24,289	22,660	16,438	11,345	12,285	12,788	10,154	6,570	10,422
Difference	-4	-43	-368	-1,586	-1,668	-912	-55	-41	-72	-12	12	0	-283
Percent Difference	0%	0%	-2%	-6%	-6%	-4%	0%	0%	-1%	0%	0%	0%	-3%
Dry													
Future - Base	7,696	9,129	14,297	16,142	24,160	21,042	12,961	10,471	11,580	11,715	11,004	6,583	9,426
Future - Alternative 6	7,694	9,060	14,122	15,568	22,854	20,399	12,938	10,446	11,662	11,708	11,005	6,583	9,265
Difference	-2	-69	-175	-574	-1,306	-643	-23	-24	82	-6	1	0	-161
Percent Difference	0%	-1%	-1%	-4%	-5%	-3%	0%	0%	1%	0%	0%	0%	-2%
Critical													
Future - Base	7,362	7,663	10,980	13,674	15,968	13,022	10,454	7,796	9,644	9,526	10,173	6,975	7,426
Future - Alternative 6	7,362	7,613	10,670	13,316	15,445	12,935	10,449	7,796	9,592	9,584	10,166	6,975	7,347
Difference	0	-51	-310	-358	-523	-87	-5	0	-53	57	-7	-1	-80
Percent Difference	0%	-1%	-3%	-3%	-3%	-1%	0%	0%	-1%	1%	0%	0%	-1%

Sacramento River Delta Inflow

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	9,235	17,027	51,654	65,553	69,785	60,402	45,827	14,062	14,775	19,566	11,080	23,931
20%	8,769	12,121	31,691	57,934	63,984	51,170	26,603	12,353	13,371	17,266	10,982	23,302
30%	8,164	10,380	21,194	41,318	55,940	41,821	18,011	11,604	12,742	14,296	10,796	21,171
40%	7,981	9,237	17,702	28,066	43,996	30,782	15,285	11,092	11,853	13,342	10,577	15,579
50%	7,891	8,609	16,336	22,928	32,847	22,574	13,363	10,364	11,233	12,636	10,333	6,896
60%	7,870	7,940	13,685	19,586	22,299	17,435	12,171	9,646	10,701	12,343	9,683	6,650
70%	7,816	7,863	12,583	14,988	18,509	15,725	11,343	9,037	10,289	11,773	8,734	6,595
80%	7,655	7,666	9,913	12,874	16,673	13,489	10,154	8,418	9,791	11,041	8,421	6,535
90%	6,420	6,929	9,262	10,998	14,384	11,578	8,911	7,956	8,712	9,884	7,899	6,418
Long Term												
Full Simulation Period	8,350	10,798	22,082	31,475	37,498	30,725	19,501	11,009	11,566	13,675	9,771	13,116
Water Year Types												
Wet	8,996	14,634	37,088	51,035	56,945	47,194	30,753	12,279	11,846	17,045	8,777	23,150
Above Normal	9,290	10,029	19,595	40,534	52,912	37,168	18,221	12,048	12,038	14,830	9,005	15,709
Below Normal	8,183	9,236	16,398	24,715	25,957	23,572	16,492	11,386	12,357	12,801	10,142	6,570
Dry	7,696	9,129	14,297	16,142	24,160	21,042	12,961	10,471	11,580	11,715	11,004	6,583
Critical	7,362	7,663	10,980	13,674	15,968	13,022	10,454	7,796	9,644	9,526	10,173	6,975

Future - Alternative 6

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	9,257	16,476	47,388	64,747	69,784	59,277	45,827	14,062	14,732	19,569	11,081	23,922
20%	8,823	12,011	28,338	54,842	62,200	50,442	26,627	12,348	13,418	17,265	10,976	23,306
30%	8,221	10,304	20,189	36,144	50,688	39,232	18,007	11,602	12,750	14,407	10,826	21,171
40%	7,981	9,212	17,364	24,969	40,249	27,853	15,160	11,010	11,856	13,468	10,578	15,580
50%	7,891	8,569	16,074	21,910	29,947	21,671	13,358	10,364	11,230	12,629	10,270	6,895
60%	7,869	7,931	13,646	18,859	20,561	17,188	12,171	9,530	10,729	12,341	9,683	6,650
70%	7,820	7,854	12,590	14,807	17,798	15,600	11,331	9,037	10,289	11,778	8,711	6,595
80%	7,644	7,662	9,856	12,788	16,377	13,327	10,281	8,418	9,790	11,228	8,421	6,535
90%	6,451	6,925	9,164	10,964	14,265	11,553	8,911	7,949	8,712	9,924	7,900	6,418
Long Term												
Full Simulation Period	8,373	10,551	21,201	30,061	35,904	29,942	19,489	10,992	11,570	13,699	9,766	13,111
Water Year Types												
Wet	8,997	14,003	35,134	48,869	54,849	46,323	30,763	12,263	11,855	17,107	8,757	23,135
Above Normal	9,462	9,911	18,743	38,420	50,902	35,734	18,223	12,047	12,040	14,830	9,004	15,709
Below Normal	8,179	9,193	16,030	23,129	24,289	22,660	16,438	11,345	12,285	12,788	10,154	6,570
Dry	7,694	9,060	14,122	15,568	22,854	20,399	12,938	10,446	11,662	11,708	11,005	6,583
Critical	7,362	7,613	10,670	13,316	15,445	12,935	10,449	7,796	9,592	9,584	10,166	6,975

Future - Alternative 6 Minus Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	23	-551	-4,266	-805	-1	-1,125	0	0	-43	3	1	-9
20%	54	-110	-3,354	-3,093	-1,785	-728	24	-4	47	-1	-6	5
30%	58	-77	-1,005	-5,174	-5,252	-2,589	-4	-2	8	111	30	0
40%	0	-25	-338	-3,097	-3,747	-2,929	-125	-82	3	127	0	1
50%	0	-40	-262	-1,018	-2,899	-902	-5	0	-4	-7	-63	-2
60%	-1	-9	-39	-726	-1,738	-246	0	-116	27	-1	0	0
70%	5	-10	6	-182	-711	-125	-12	0	0	5	-24	0
80%	-12	-4	-57	-87	-296	-161	127	0	0	187	0	0
90%	31	-4	-98	-34	-119	-25	0	-7	0	40	1	0
Long Term												
Full Simulation Period	23	-247	-880	-1,414	-1,594	-783	-11	-18	4	25	-5	-5
Water Year Types												
Wet	2	-631	-1,954	-2,165	-2,096	-871	10	-16	9	63	-20	-15
Above Normal	172	-118	-853	-2,114	-2,010	-1,434	3	-1	2	0	-1	0
Below Normal	-4	-43	-368	-1,586	-1,668	-912	-55	-41	-72	-12	12	0
Dry	-2	-69	-175	-574	-1,306	-643	-23	-24	82	-6	1	0
Critical	0	-51	-310	-358	-523	-87	-5	0	-53	57	-7	-1

Long-Term and Water Year-Type Average of Total CVP Deliveries North of the Delta Under Future - Base and Future - Alternative 6

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Future - Base	1,473	705	382	224	236	323	5,015	5,427	7,762	7,605	5,752	1,944	2,234
Future - Alternative 6	1,473	705	383	224	236	323	5,015	5,427	7,762	7,605	5,753	1,944	2,234
Difference	0	1	1	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
							Water Year-Types						
Wet													
Future - Base	1,422	667	363	222	239	272	4,539	5,521	8,164	8,101	6,181	2,142	2,294
Future - Alternative 6	1,423	667	363	223	240	272	4,539	5,521	8,164	8,101	6,180	2,142	2,294
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal													
Future - Base	1,457	694	376	226	237	239	4,896	5,545	7,962	7,972	5,945	2,186	2,288
Future - Alternative 6	1,460	700	376	226	237	239	4,896	5,545	7,962	7,972	5,945	2,186	2,288
Difference	3	6	0	0	0	0	0	0	1	1	1	0	1
Percent Difference	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal													
Future - Base	1,574	746	411	234	233	328	5,295	5,621	7,827	7,667	5,800	1,881	2,280
Future - Alternative 6	1,574	746	417	234	233	328	5,296	5,622	7,828	7,668	5,801	1,882	2,281
Difference	0	0	7	0	0	0	1	1	1	1	1	1	1
Percent Difference	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry													
Future - Base	1,508	709	382	229	237	331	5,227	5,486	7,679	7,543	5,719	1,793	2,233
Future - Alternative 6	1,508	709	382	229	237	331	5,227	5,485	7,678	7,542	5,719	1,792	2,233
Difference	0	0	0	0	0	0	-1	-1	-1	-1	-1	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical													
Future - Base	1,430	744	395	208	229	491	5,500	4,805	6,777	6,232	4,651	1,613	2,004
Future - Alternative 6	1,430	744	395	208	229	492	5,501	4,807	6,779	6,234	4,653	1,614	2,004
Difference	0	0	0	0	0	0	1	1	2	2	2	1	1
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Total CVP Deliveries North of the Delta

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	1,805	942	487	299	267	609	6,547	6,089	8,526	8,483	6,489	2,345
20%	1,755	883	457	252	247	417	5,972	5,927	8,171	8,021	6,143	2,197
30%	1,658	800	416	226	238	324	5,606	5,855	8,035	7,830	5,984	2,126
40%	1,589	744	392	214	238	246	5,384	5,734	7,885	7,765	5,908	2,076
50%	1,479	674	372	213	238	223	5,166	5,604	7,789	7,720	5,830	1,992
60%	1,378	629	349	213	232	214	4,809	5,360	7,687	7,626	5,729	1,927
70%	1,309	601	337	211	230	212	4,680	5,116	7,576	7,431	5,626	1,790
80%	1,217	552	310	198	212	212	4,277	4,968	7,405	7,212	5,449	1,713
90%	1,119	511	297	183	206	199	3,070	4,539	7,117	7,088	5,246	1,500
Long Term												
Full Simulation Period	1,473	705	382	224	236	323	5,015	5,427	7,762	7,605	5,752	1,944
Water Year Types												
Wet	1,422	667	363	222	239	272	4,539	5,521	8,164	8,101	6,181	2,142
Above Normal	1,457	694	376	226	237	239	4,896	5,545	7,962	7,972	5,945	2,186
Below Normal	1,574	746	411	234	233	328	5,295	5,621	7,827	7,667	5,800	1,881
Dry	1,508	709	382	229	237	331	5,227	5,486	7,679	7,543	5,719	1,793
Critical	1,430	744	395	208	229	491	5,500	4,805	6,777	6,232	4,651	1,613

Future - Alternative 6

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	1,805	942	487	299	267	608	6,547	6,089	8,527	8,483	6,488	2,347
20%	1,755	883	457	252	247	416	5,972	5,927	8,170	8,020	6,145	2,197
30%	1,657	800	423	226	238	324	5,606	5,857	8,036	7,830	5,984	2,126
40%	1,591	744	394	214	238	246	5,382	5,734	7,885	7,764	5,907	2,076
50%	1,479	674	376	213	238	223	5,167	5,602	7,789	7,720	5,831	1,993
60%	1,378	629	350	213	232	214	4,809	5,360	7,685	7,627	5,736	1,926
70%	1,309	606	337	211	230	212	4,680	5,116	7,576	7,428	5,626	1,791
80%	1,217	552	310	198	212	212	4,277	4,968	7,400	7,223	5,449	1,716
90%	1,119	511	297	183	206	199	3,070	4,541	7,116	7,088	5,246	1,499
Long Term												
Full Simulation Period	1,473	705	383	224	236	323	5,015	5,427	7,762	7,605	5,753	1,944
Water Year Types												
Wet	1,423	667	363	223	240	272	4,539	5,521	8,164	8,101	6,180	2,142
Above Normal	1,460	700	376	226	237	239	4,896	5,545	7,962	7,972	5,945	2,186
Below Normal	1,574	746	417	234	233	328	5,296	5,622	7,828	7,668	5,801	1,882
Dry	1,508	709	382	229	237	331	5,227	5,485	7,678	7,542	5,719	1,792
Critical	1,430	744	395	208	229	492	5,501	4,807	6,779	6,234	4,653	1,614

Future - Alternative 6 Minus Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	2	0	-1	3
20%	0	0	0	0	0	0	0	0	0	-1	2	0
30%	-1	0	8	0	0	0	0	2	0	-1	0	0
40%	2	0	2	0	0	0	-1	0	0	-1	-2	0
50%	0	0	4	0	0	0	1	-1	0	0	1	1
60%	0	0	1	0	0	0	0	0	-2	1	7	-1
70%	0	5	0	0	0	0	0	0	0	-3	0	1
80%	0	0	0	0	0	0	0	-1	-5	11	0	3
90%	0	0	0	0	0	0	0	2	0	0	0	0
Long Term												
Full Simulation Period	0	1	1	0	0	0	0	0	0	0	0	0
Water Year Types												
Wet	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal	3	6	0	0	0	0	0	0	1	1	1	0
Below Normal	0	0	7	0	0	0	1	1	1	1	1	1
Dry	0	0	0	0	0	0	-1	-1	-1	-1	-1	0
Critical	0	0	0	0	0	0	1	1	2	2	2	1

Long-Term and Water Year-Type Average of Total CVP Deliveries South of the Delta Under Future - Base and Future - Alternative 6

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Future - Base	2,541	1,483	1,013	1,043	1,435	1,900	2,274	3,350	4,776	5,105	4,521	3,213	1,977
Future - Alternative 6	2,541	1,483	1,014	1,044	1,435	1,900	2,274	3,351	4,777	5,106	4,522	3,214	1,977
Difference	0	0	0	0	0	1	0	0	1	1	1	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
							Water Year-Types						
Wet													
Future - Base	2,628	1,550	1,095	1,170	1,593	2,232	2,721	3,999	5,835	6,367	5,454	3,566	2,313
Future - Alternative 6	2,628	1,550	1,095	1,170	1,593	2,231	2,720	3,998	5,834	6,365	5,453	3,565	2,313
Difference	0	0	0	0	0	-1	0	-1	-1	-1	-1	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal													
Future - Base	2,596	1,530	1,079	1,152	1,565	2,038	2,507	3,669	5,292	5,715	4,982	3,398	2,150
Future - Alternative 6	2,598	1,532	1,082	1,156	1,571	2,038	2,508	3,672	5,296	5,720	4,986	3,400	2,153
Difference	3	2	3	4	5	0	1	3	5	6	4	1	2
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal													
Future - Base	2,569	1,496	1,013	1,030	1,414	1,790	2,113	3,233	4,568	4,845	4,352	3,183	1,913
Future - Alternative 6	2,569	1,495	1,013	1,030	1,414	1,792	2,112	3,234	4,570	4,848	4,353	3,184	1,914
Difference	0	0	0	0	-1	1	-1	1	2	2	2	1	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry													
Future - Base	2,498	1,450	976	989	1,372	1,737	2,052	3,009	4,201	4,404	4,029	3,068	1,802
Future - Alternative 6	2,497	1,449	976	988	1,370	1,737	2,051	3,007	4,198	4,400	4,027	3,067	1,801
Difference	-1	-1	-1	-1	-1	0	-1	-2	-3	-4	-3	-1	-1
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical													
Future - Base	2,345	1,334	839	773	1,100	1,443	1,639	2,349	3,196	3,259	3,082	2,556	1,447
Future - Alternative 6	2,345	1,335	839	774	1,100	1,448	1,641	2,352	3,202	3,267	3,087	2,558	1,449
Difference	0	0	0	0	0	6	3	4	6	7	5	2	2
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Total CVP Deliveries South of the Delta

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	2,941	1,798	1,415	1,688	2,240	2,237	2,991	4,427	6,543	7,218	6,075	3,780
20%	2,680	1,582	1,131	1,233	1,686	2,097	2,545	3,727	5,389	5,832	5,065	3,423
30%	2,638	1,550	1,086	1,155	1,563	2,032	2,485	3,587	5,156	5,552	4,863	3,357
40%	2,592	1,514	1,037	1,069	1,461	1,991	2,369	3,431	4,896	5,239	4,638	3,283
50%	2,558	1,488	1,001	1,006	1,392	1,953	2,330	3,318	4,708	5,013	4,475	3,229
60%	2,543	1,477	986	979	1,342	1,867	2,220	3,270	4,627	4,915	4,405	3,206
70%	2,503	1,445	943	909	1,280	1,698	2,023	3,147	4,424	4,671	4,227	3,144
80%	2,317	1,285	758	649	946	1,506	1,789	2,595	3,551	3,699	3,435	2,852
90%	2,252	1,229	666	483	770	1,506	1,565	2,402	3,208	3,212	3,156	2,749
Long Term												
Full Simulation Period	2,541	1,483	1,013	1,043	1,435	1,900	2,274	3,350	4,776	5,105	4,521	3,213
Water Year Types												
Wet	2,628	1,550	1,095	1,170	1,593	2,232	2,721	3,999	5,835	6,367	5,454	3,566
Above Normal	2,596	1,530	1,079	1,152	1,565	2,038	2,507	3,669	5,292	5,715	4,982	3,398
Below Normal	2,569	1,496	1,013	1,030	1,414	1,790	2,113	3,233	4,568	4,845	4,352	3,183
Dry	2,498	1,450	976	989	1,372	1,737	2,052	3,009	4,201	4,404	4,029	3,068
Critical	2,345	1,334	839	773	1,100	1,443	1,639	2,349	3,196	3,259	3,082	2,556

Future - Alternative 6

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	2,941	1,798	1,415	1,688	2,240	2,237	2,989	4,427	6,543	7,217	6,075	3,780
20%	2,683	1,584	1,134	1,239	1,693	2,097	2,545	3,736	5,406	5,852	5,080	3,428
30%	2,638	1,550	1,086	1,155	1,563	2,032	2,486	3,587	5,156	5,552	4,863	3,357
40%	2,592	1,514	1,037	1,069	1,461	1,990	2,368	3,431	4,896	5,239	4,638	3,283
50%	2,557	1,488	1,001	1,005	1,392	1,951	2,328	3,316	4,704	5,008	4,472	3,228
60%	2,543	1,477	986	979	1,340	1,867	2,219	3,270	4,626	4,915	4,404	3,206
70%	2,503	1,445	943	909	1,280	1,698	2,023	3,147	4,424	4,671	4,227	3,144
80%	2,315	1,283	757	657	952	1,506	1,789	2,590	3,542	3,689	3,427	2,849
90%	2,252	1,229	666	483	770	1,506	1,563	2,402	3,208	3,212	3,156	2,749
Long Term												
Full Simulation Period	2,541	1,483	1,014	1,044	1,435	1,900	2,274	3,351	4,777	5,106	4,522	3,214
Water Year Types												
Wet	2,628	1,550	1,095	1,170	1,593	2,231	2,720	3,998	5,834	6,365	5,453	3,565
Above Normal	2,598	1,532	1,082	1,156	1,571	2,038	2,508	3,672	5,296	5,720	4,986	3,400
Below Normal	2,569	1,495	1,013	1,030	1,414	1,792	2,112	3,234	4,570	4,848	4,353	3,184
Dry	2,497	1,449	976	988	1,370	1,737	2,051	3,007	4,198	4,400	4,027	3,067
Critical	2,345	1,335	839	774	1,100	1,448	1,641	2,352	3,202	3,267	3,087	2,558

Future - Alternative 6 Minus Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	0	0	0	0	0	-1	0	0	0	0	0
20%	3	2	3	6	7	0	0	10	17	20	14	5
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	-1	-1	0	0	0	0	0
50%	-1	0	-1	-1	0	-1	-2	-2	-4	-4	-3	-1
60%	0	0	0	0	-2	0	-1	0	-1	-1	-1	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	-2	-2	-2	8	6	0	0	-5	-9	-10	-8	-3
90%	0	0	0	0	0	0	-2	0	0	0	0	0
Long Term												
Full Simulation Period	0	0	0	0	0	1	0	0	1	1	1	0
Water Year Types												
Wet	0	0	0	0	0	-1	0	-1	-1	-1	-1	0
Above Normal	3	2	3	4	5	0	1	3	5	6	4	1
Below Normal	0	0	0	0	-1	1	-1	1	2	2	2	1
Dry	-1	-1	-1	-1	-1	0	-1	-2	-3	-4	-3	-1
Critical	0	0	0	0	0	6	3	4	6	7	5	2

Long-Term and Water Year-Type Average of Total SWP Deliveries North of the Delta Under Future - Base and Future - Alternative 6

Analysis Period	October	November	December	January	February	March	April	May	June	July	August	September	Total (TAF)
	Average Flow (cfs)												
							Long-Term						
Full Simulation Period													
Future - Base	1,383	1,394	894	328	13	89	2,005	2,578	3,092	3,044	2,413	1,806	1,154
Future - Alternative 6	1,383	1,396	894	327	13	89	2,005	2,578	3,092	3,044	2,413	1,806	1,154
Difference	0	3	0	-1	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
							Water Year-Types						
Wet													
Future - Base	1,303	1,401	853	242	19	65	1,869	2,776	3,389	3,342	2,672	2,074	1,213
Future - Alternative 6	1,291	1,389	842	239	19	65	1,869	2,776	3,389	3,342	2,672	2,074	1,210
Difference	-12	-12	-11	-3	0	0	0	0	0	0	0	0	-2
Percent Difference	-1%	-1%	-1%	-1%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal													
Future - Base	1,565	1,622	1,055	408	15	50	2,031	2,790	3,335	3,327	2,627	2,204	1,275
Future - Alternative 6	1,595	1,669	1,080	409	15	50	2,031	2,790	3,335	3,327	2,627	2,204	1,281
Difference	30	46	25	2	0	0	0	0	0	0	0	0	6
Percent Difference	2%	3%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal													
Future - Base	1,651	1,640	1,087	417	9	64	2,125	2,653	3,143	3,043	2,435	1,792	1,216
Future - Alternative 6	1,651	1,639	1,087	417	8	64	2,125	2,653	3,143	3,043	2,435	1,792	1,216
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	-1%	0%	0%	0%	0%	0%	0%	0%	0%
Dry													
Future - Base	1,337	1,248	830	347	9	103	2,053	2,604	3,083	2,985	2,385	1,750	1,136
Future - Alternative 6	1,337	1,248	830	347	9	103	2,053	2,604	3,082	2,985	2,385	1,750	1,136
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical													
Future - Base	1,172	1,146	734	313	9	182	2,067	1,833	2,185	2,240	1,680	967	881
Future - Alternative 6	1,172	1,146	734	313	9	183	2,068	1,833	2,185	2,240	1,680	967	881
Difference	0	0	0	0	0	1	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Total SWP Deliveries North of the Delta

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	2,163	2,065	1,372	614	20	198	2,860	3,128	3,657	3,561	2,846	2,296
20%	2,011	1,961	1,290	520	20	128	2,556	3,038	3,510	3,477	2,800	2,233
30%	1,827	1,898	1,219	469	20	45	2,378	2,974	3,442	3,369	2,687	2,175
40%	1,653	1,843	1,157	443	19	45	2,110	2,899	3,373	3,302	2,608	2,118
50%	1,404	1,703	1,024	383	15	45	2,006	2,738	3,312	3,227	2,577	2,049
60%	1,320	1,495	940	266	11	45	1,845	2,648	3,201	3,168	2,531	1,963
70%	1,203	1,193	681	154	4	45	1,739	2,470	3,116	3,106	2,484	1,662
80%	861	570	347	60	3	32	1,397	1,931	2,987	2,952	2,290	1,247
90%	277	53	12	11	2	20	1,141	1,669	1,927	1,929	1,506	987
Long Term												
Full Simulation Period	1,383	1,394	894	328	13	89	2,005	2,578	3,092	3,044	2,413	1,806
Water Year Types												
Wet	1,303	1,401	853	242	19	65	1,869	2,776	3,389	3,342	2,672	2,074
Above Normal	1,565	1,622	1,055	408	15	50	2,031	2,790	3,335	3,327	2,627	2,204
Below Normal	1,651	1,640	1,087	417	9	64	2,125	2,653	3,143	3,043	2,435	1,792
Dry	1,337	1,248	830	347	9	103	2,053	2,604	3,083	2,985	2,385	1,750
Critical	1,172	1,146	734	313	9	182	2,067	1,833	2,185	2,240	1,680	967

Future - Alternative 6

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	2,163	2,065	1,372	614	20	198	2,860	3,128	3,657	3,561	2,846	2,296
20%	2,011	1,961	1,290	520	20	128	2,556	3,038	3,510	3,477	2,800	2,233
30%	1,796	1,898	1,219	469	20	45	2,378	2,974	3,442	3,369	2,686	2,175
40%	1,606	1,843	1,157	443	19	45	2,110	2,899	3,373	3,302	2,608	2,118
50%	1,404	1,703	1,024	383	15	45	2,006	2,738	3,312	3,227	2,577	2,049
60%	1,320	1,495	940	266	11	45	1,845	2,648	3,201	3,168	2,530	1,963
70%	1,203	1,189	668	153	4	45	1,739	2,470	3,116	3,106	2,484	1,662
80%	861	553	346	55	3	31	1,397	1,931	2,987	2,952	2,290	1,247
90%	340	173	76	13	2	20	1,141	1,669	1,927	1,929	1,506	985
Long Term												
Full Simulation Period	1,383	1,396	894	327	13	89	2,005	2,578	3,092	3,044	2,413	1,806
Water Year Types												
Wet	1,291	1,389	842	239	19	65	1,869	2,776	3,389	3,342	2,672	2,074
Above Normal	1,595	1,669	1,080	409	15	50	2,031	2,790	3,335	3,327	2,627	2,204
Below Normal	1,651	1,639	1,087	417	8	64	2,125	2,653	3,143	3,043	2,435	1,792
Dry	1,337	1,248	830	347	9	103	2,053	2,604	3,082	2,985	2,385	1,750
Critical	1,172	1,146	734	313	9	183	2,068	1,833	2,185	2,240	1,680	967

Future - Alternative 6 Minus Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	-31	0	0	0	0	0	0	0	0	0	0	0
40%	-47	1	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	-1	0
70%	0	-3	-13	-1	0	0	0	0	0	0	0	0
80%	0	-17	-1	-5	0	0	0	0	0	0	0	0
90%	63	120	64	2	0	0	0	0	0	0	0	-2
Long Term												
Full Simulation Period	0	3	0	-1	0	0	0	0	0	0	0	0
Water Year Types												
Wet	-12	-12	-11	-3	0	0	0	0	0	0	0	0
Above Normal	30	46	25	2	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	1	0	0	0	0	0	0

Long-Term and Water Year-Type Average of Total SWP Deliveries South of the Delta Under Future - Base and Future - Alternative 6

Analysis Period	October	November	December	January	February	March	April	May	June	July	August	September	Total (TAF)
						Average Flow (cfs)							
							Long-Term						
Full Simulation Period													
Future - Base	4,043	2,984	3,596	472	840	1,531	2,542	3,813	5,165	5,535	5,706	4,829	2,489
Future - Alternative 6	4,039	2,976	3,576	468	836	1,519	2,529	3,799	5,152	5,526	5,695	4,820	2,482
Difference	-4	-8	-20	-4	-4	-13	-14	-14	-12	-9	-11	-10	-7
Percent Difference	0%	0%	-1%	-1%	0%	-1%	-1%	0%	0%	0%	0%	0%	0%
							Water Year-Types						
Wet													
Future - Base	4,344	2,993	4,138	1,107	1,816	2,666	3,835	5,364	6,773	6,814	7,151	6,006	3,210
Future - Alternative 6	4,355	2,991	4,104	1,105	1,811	2,663	3,833	5,362	6,770	6,812	7,148	6,002	3,207
Difference	11	-3	-34	-2	-5	-3	-2	-2	-3	-3	-4	-3	-3
Percent Difference	0%	0%	-1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal													
Future - Base	4,230	3,445	3,981	275	949	2,295	3,530	4,967	6,244	6,377	6,711	5,656	2,949
Future - Alternative 6	4,219	3,440	3,968	253	948	2,279	3,518	4,951	6,222	6,355	6,695	5,635	2,938
Difference	-11	-5	-14	-22	-1	-16	-12	-17	-22	-22	-17	-20	-11
Percent Difference	0%	0%	0%	-8%	0%	-1%	0%	0%	0%	0%	0%	0%	0%
Below Normal													
Future - Base	4,466	3,200	3,761	277	460	940	2,653	3,955	5,476	6,029	6,261	5,329	2,596
Future - Alternative 6	4,457	3,194	3,756	277	459	883	2,630	3,945	5,462	6,013	6,238	5,310	2,585
Difference	-8	-5	-5	0	-1	-57	-23	-9	-14	-16	-23	-19	-11
Percent Difference	0%	0%	0%	0%	0%	-6%	-1%	0%	0%	0%	0%	0%	0%
Dry													
Future - Base	3,825	2,760	3,103	122	199	821	1,523	2,587	4,084	4,826	4,854	4,140	1,994
Future - Alternative 6	3,810	2,742	3,087	122	191	818	1,495	2,547	4,058	4,819	4,843	4,131	1,983
Difference	-14	-18	-17	0	-8	-3	-29	-39	-26	-7	-11	-9	-11
Percent Difference	0%	-1%	-1%	0%	-4%	0%	-2%	-2%	-1%	0%	0%	0%	-1%
Critical													
Future - Base	3,125	2,678	2,710	71	105	198	415	1,284	2,155	2,635	2,470	2,132	1,213
Future - Alternative 6	3,119	2,671	2,690	71	106	199	410	1,285	2,155	2,633	2,462	2,125	1,210
Difference	-6	-8	-20	0	0	1	-6	2	0	-3	-7	-7	-3
Percent Difference	0%	0%	-1%	0%	0%	1%	-1%	0%	0%	0%	0%	0%	0%

Total SWP Deliveries South of the Delta

Future - Base

	Average Monthly Flow (cfs)											
Statistic	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Probability of Exceedance												
10%	6,024	4,586	5,669	1,962	2,014	2,905	4,303	5,987	7,491	7,386	7,710	6,606
20%	5,428	4,361	5,320	595	1,939	2,706	3,782	5,413	6,881	7,045	7,177	6,208
30%	5,007	4,042	4,484	231	1,754	2,547	3,546	4,855	6,162	6,469	6,763	5,710
40%	4,894	3,793	4,121	172	634	2,500	3,396	4,756	6,020	6,231	6,634	5,517
50%	4,695	3,368	3,879	145	305	1,970	3,227	4,579	5,814	6,154	6,532	5,440
60%	4,383	2,362	3,600	104	193	456	2,566	3,547	5,530	5,944	6,369	5,228
70%	2,920	2,054	2,708	91	137	337	1,514	2,544	4,505	5,640	5,920	4,934
80%	2,451	1,296	1,887	72	112	220	520	2,078	3,482	4,247	3,946	3,332
90%	1,299	897	964	56	55	146	301	1,184	1,956	2,357	2,163	1,854
Long Term												
Full Simulation Period	4,043	2,984	3,596	472	840	1,531	2,542	3,813	5,165	5,535	5,706	4,829
Water Year Types												
Wet	4,344	2,993	4,138	1,107	1,816	2,666	3,835	5,364	6,773	6,814	7,151	6,006
Above Normal	4,230	3,445	3,981	275	949	2,295	3,530	4,967	6,244	6,377	6,711	5,656
Below Normal	4,466	3,200	3,761	277	460	940	2,653	3,955	5,476	6,029	6,261	5,329
Dry	3,825	2,760	3,103	122	199	821	1,523	2,587	4,084	4,826	4,854	4,140
Critical	3,125	2,678	2,710	71	105	198	415	1,284	2,155	2,635	2,470	2,132

Future - Alternative 6

	Average Monthly Flow (cfs)											
Statistic	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Probability of Exceedance												
10%	6,029	4,578	5,671	1,967	2,014	2,904	4,309	5,990	7,494	7,396	7,706	6,606
20%	5,431	4,362	5,319	595	1,939	2,681	3,783	5,413	6,877	7,024	7,151	6,211
30%	4,994	4,042	4,484	233	1,741	2,580	3,551	4,866	6,137	6,496	6,772	5,705
40%	4,894	3,772	4,093	171	587	2,485	3,347	4,756	6,020	6,234	6,626	5,518
50%	4,683	3,346	3,868	144	308	1,834	3,227	4,569	5,782	6,149	6,532	5,428
60%	4,389	2,381	3,527	108	192	456	2,457	3,369	5,484	5,937	6,332	5,225
70%	2,948	2,068	2,501	91	137	337	1,407	2,523	4,467	5,644	5,880	4,938
80%	2,458	1,330	1,898	73	112	231	521	2,079	3,485	4,255	3,956	3,342
90%	1,301	885	948	56	56	144	295	1,159	1,912	2,298	2,112	1,843
Long Term												
Full Simulation Period	4,039	2,976	3,576	468	836	1,519	2,529	3,799	5,152	5,526	5,695	4,820
Water Year Types												
Wet	4,355	2,991	4,104	1,105	1,811	2,663	3,833	5,362	6,770	6,812	7,148	6,002
Above Normal	4,219	3,440	3,968	253	948	2,279	3,518	4,951	6,222	6,355	6,695	5,635
Below Normal	4,457	3,194	3,756	277	459	883	2,630	3,945	5,462	6,013	6,238	5,310
Dry	3,810	2,742	3,087	122	191	818	1,495	2,547	4,058	4,819	4,843	4,131
Critical	3,119	2,671	2,690	71	106	199	410	1,285	2,155	2,633	2,462	2,125

Future - Alternative 6 Minus Future - Base

	Average Monthly Flow (cfs)											
Statistic	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Probability of Exceedance												
10%	5	-8	1	5	0	-1	6	3	3	9	-4	0
20%	3	0	-1	-1	0	-25	1	0	-4	-21	-26	3
30%	-13	0	0	2	-13	33	5	11	-25	27	9	-5
40%	0	-22	-28	0	-47	-15	-49	0	0	2	-8	1
50%	-12	-22	-11	0	4	-137	0	-10	-32	-5	0	-12
60%	6	19	-73	3	-1	0	-109	-178	-46	-6	-36	-4
70%	28	14	-207	0	0	1	-107	-21	-38	5	-40	4
80%	7	34	11	0	0	10	0	0	4	7	10	10
90%	2	-12	-16	0	1	-3	-6	-25	-44	-59	-51	-11
Long Term												
Full Simulation Period	-4	-8	-20	-4	-4	-13	-14	-14	-12	-9	-11	-10
Water Year Types												
Wet	11	-3	-34	-2	-5	-3	-2	-2	-3	-3	-4	-3
Above Normal	-11	-5	-14	-22	-1	-16	-12	-17	-22	-22	-17	-20
Below Normal	-8	-5	-5	0	-1	-57	-23	-9	-14	-16	-23	-19
Dry	-14	-18	-17	0	-8	-3	-29	-39	-26	-7	-11	-9
Critical	-6	-8	-20	0	0	1	-6	2	0	-3	-7	-7

Long-Term and Water Year-Type Average of Fremont Weir Spill to Yolo Bypass Under Future - Base and Future - Alternative 6

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Future - Base	43	57	2,754	12,157	16,930	8,465	1,050	3	0	0	0	0	2,453
Future - Alternative 6	43	302	3,668	13,715	18,661	9,289	1,050	3	0	0	0	0	2,767
Difference	0	245	913	1,558	1,731	824	0	0	0	0	0	0	314
Percent Difference	0%	429%	33%	13%	10%	10%	0%	0%	0%	0%	0%	0%	13%
							Water Year-Types						
Wet													
Future - Base	135	180	7,592	34,147	41,220	23,151	3,236	10	0	0	0	0	6,503
Future - Alternative 6	135	822	9,748	36,526	43,390	24,040	3,235	10	0	0	0	0	6,996
Difference	0	642	2,156	2,379	2,170	889	0	0	0	0	0	0	493
Percent Difference	0%	357%	28%	7%	5%	4%	0%	0%	0%	0%	0%	0%	8%
Above Normal													
Future - Base	0	0	946	9,205	25,241	6,208	14	0	0	0	0	0	2,432
Future - Alternative 6	0	133	1,688	11,510	27,453	7,582	14	0	0	0	0	0	2,836
Difference	0	133	742	2,305	2,211	1,374	0	0	0	0	0	0	404
Percent Difference	0%	0%	79%	25%	9%	22%	0%	0%	0%	0%	0%	0%	17%
Below Normal													
Future - Base	0	0	1,390	583	1,456	737	137	0	0	0	0	0	257
Future - Alternative 6	0	44	1,781	2,321	3,261	1,771	137	0	0	0	0	0	555
Difference	0	44	391	1,738	1,805	1,034	0	0	0	0	0	0	298
Percent Difference	0%	0%	28%	298%	124%	140%	0%	0%	0%	0%	0%	0%	116%
Dry													
Future - Base	0	0	0	11	981	717	0	0	0	0	0	0	99
Future - Alternative 6	0	65	232	650	2,499	1,441	0	0	0	0	0	0	286
Difference	0	65	232	640	1,518	724	0	0	0	0	0	0	187
Percent Difference	0%	0%	0%	5915%	155%	101%	0%	0%	0%	0%	0%	0%	188%
Critical													
Future - Base	0	0	0	0	26	0	0	0	0	0	0	0	1
Future - Alternative 6	0	6	79	429	641	120	0	0	0	0	0	0	75
Difference	0	6	79	429	615	120	0	0	0	0	0	0	74
Percent Difference	0%	0%	0%	0%	2360%	0%	0%	0%	0%	0%	0%	0%	4939%

Fremont Weir Spill to Yolo Bypass

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	0	9,636	45,653	68,479	26,076	480	0	0	0	0	0
20%	0	0	417	14,794	32,134	7,332	2	0	0	0	0	0
30%	0	0	0	2,685	10,131	3,487	0	0	0	0	0	0
40%	0	0	0	83	4,103	180	0	0	0	0	0	0
50%	0	0	0	0	501	0	0	0	0	0	0	0
60%	0	0	0	0	3	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period	43	57	2,754	12,157	16,930	8,465	1,050	3	0	0	0	0
Water Year Types												
Wet	135	180	7,592	34,147	41,220	23,151	3,236	10	0	0	0	0
Above Normal	0	0	946	9,205	25,241	6,208	14	0	0	0	0	0
Below Normal	0	0	1,390	583	1,456	737	137	0	0	0	0	0
Dry	0	0	0	11	981	717	0	0	0	0	0	0
Critical	0	0	0	0	26	0	0	0	0	0	0	0

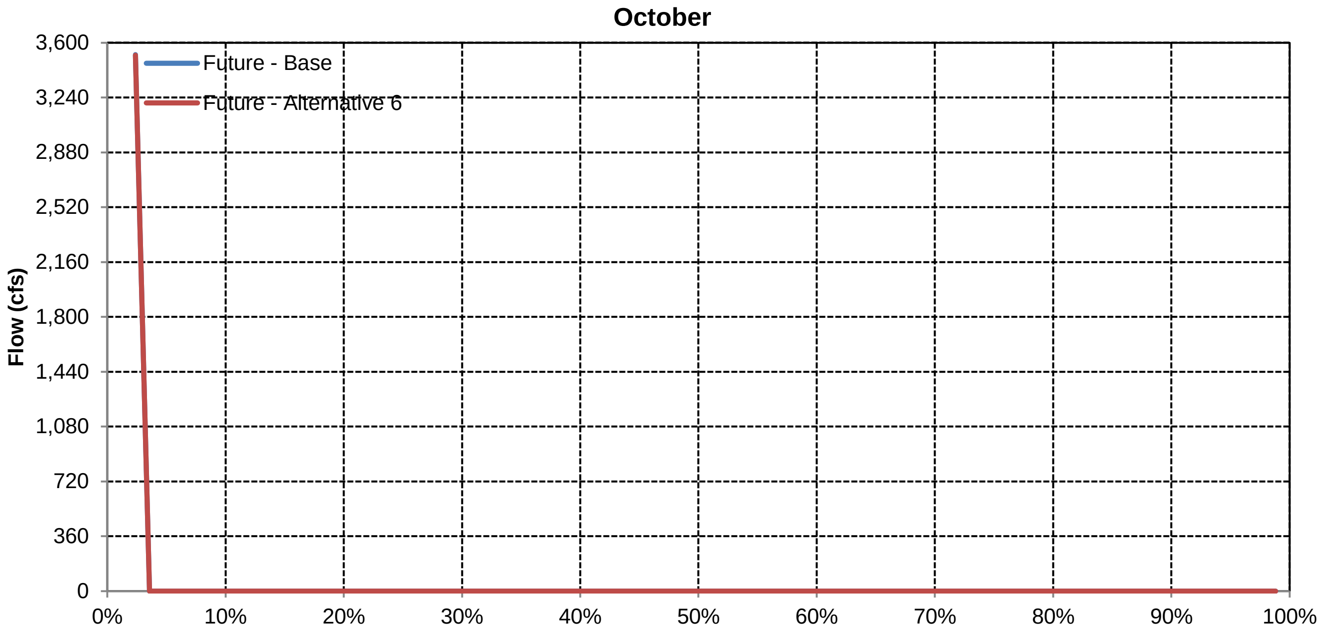
Future - Alternative 6

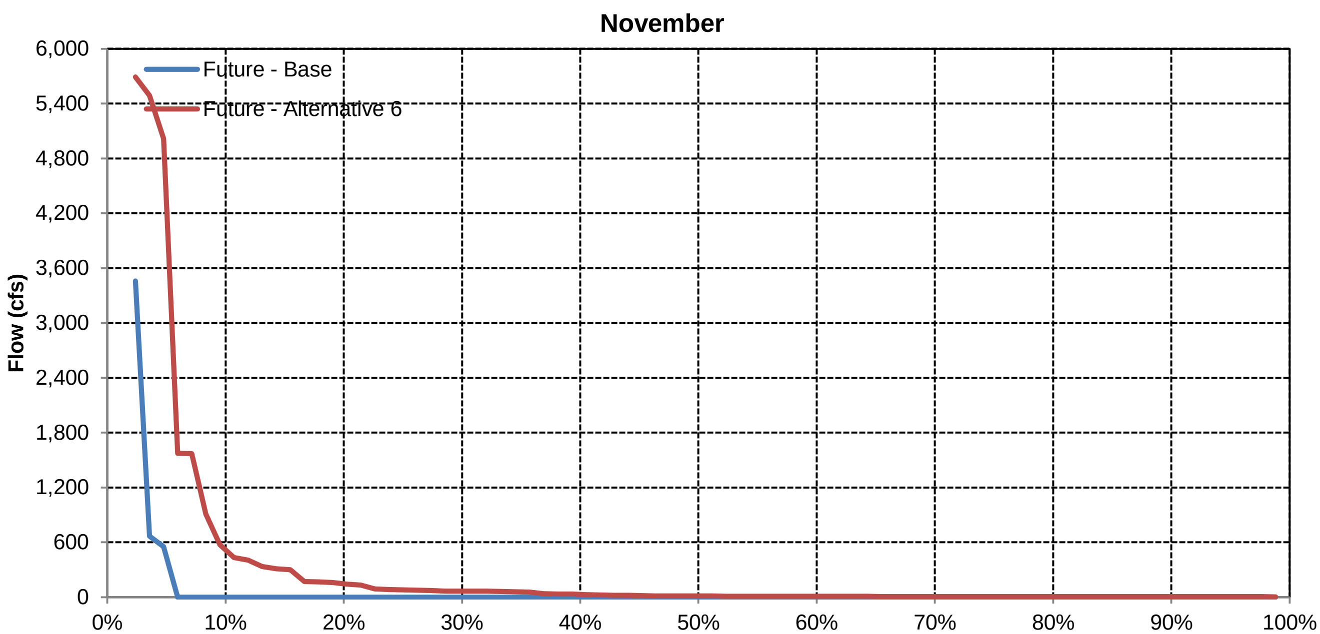
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	426	12,932	46,062	69,134	26,707	480	0	0	0	0	0
20%	0	136	3,584	17,773	32,822	9,089	2	0	0	0	0	0
30%	0	66	835	8,408	14,332	5,678	0	0	0	0	0	0
40%	0	26	512	3,702	8,256	2,633	0	0	0	0	0	0
50%	0	12	310	1,654	4,696	800	0	0	0	0	0	0
60%	0	9	93	798	1,895	401	0	0	0	0	0	0
70%	0	7	26	238	767	268	0	0	0	0	0	0
80%	0	6	11	66	358	84	0	0	0	0	0	0
90%	0	5	7	27	98	17	0	0	0	0	0	0
Long Term												
Full Simulation Period	43	302	3,668	13,715	18,661	9,289	1,050	3	0	0	0	0
Water Year Types												
Wet	135	822	9,748	36,526	43,390	24,040	3,235	10	0	0	0	0
Above Normal	0	133	1,688	11,510	27,453	7,582	14	0	0	0	0	0
Below Normal	0	44	1,781	2,321	3,261	1,771	137	0	0	0	0	0
Dry	0	65	232	650	2,499	1,441	0	0	0	0	0	0
Critical	0	6	79	429	641	120	0	0	0	0	0	0

Future - Alternative 6 Minus Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	426	3,297	409	655	631	0	0	0	0	0	0
20%	0	136	3,167	2,979	688	1,758	0	0	0	0	0	0
30%	0	66	835	5,722	4,201	2,191	0	0	0	0	0	0
40%	0	26	512	3,618	4,152	2,453	0	0	0	0	0	0
50%	0	12	310	1,654	4,195	800	0	0	0	0	0	0
60%	0	9	93	798	1,892	401	0	0	0	0	0	0
70%	0	7	26	238	767	268	0	0	0	0	0	0
80%	0	6	11	66	358	84	0	0	0	0	0	0
90%	0	5	7	27	98	17	0	0	0	0	0	0
Long Term												
Full Simulation Period	0	245	913	1,558	1,731	824	0	0	0	0	0	0
Water Year Types												
Wet	0	642	2,156	2,379	2,170	889	0	0	0	0	0	0
Above Normal	0	133	742	2,305	2,211	1,374	0	0	0	0	0	0
Below Normal	0	44	391	1,738	1,805	1,034	0	0	0	0	0	0
Dry	0	65	232	640	1,518	724	0	0	0	0	0	0
Critical	0	6	79	429	615	120	0	0	0	0	0	0

Fremont Weir Spill to Yolo Bypass





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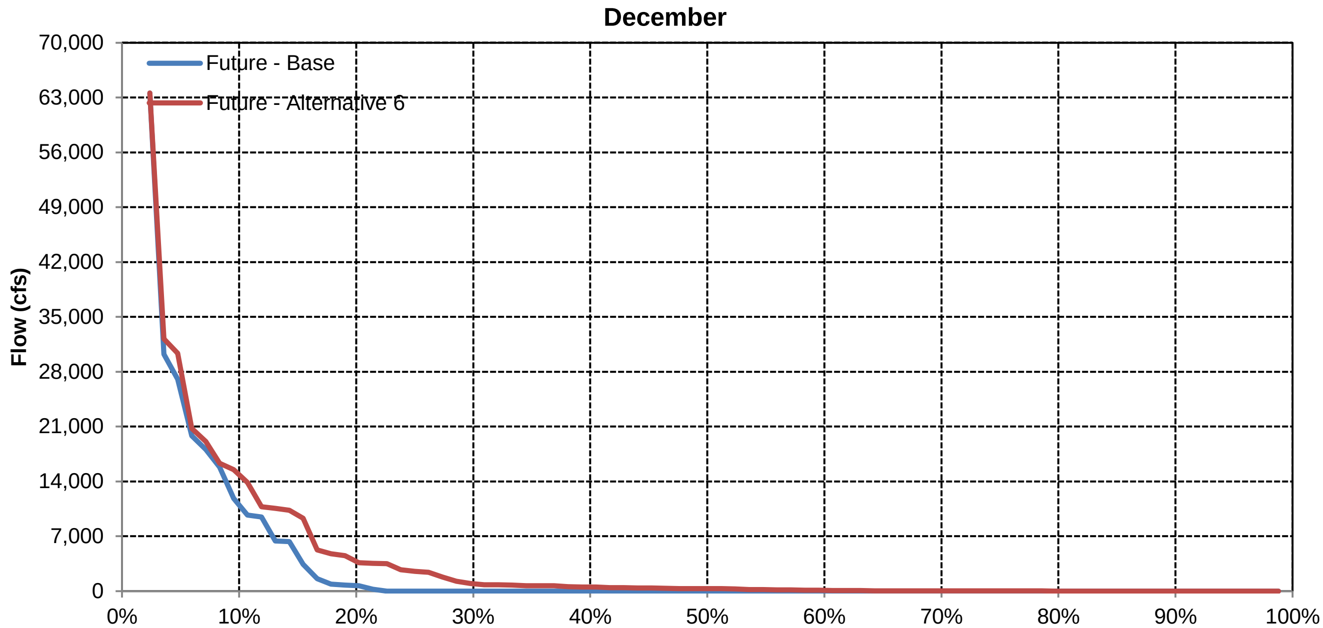

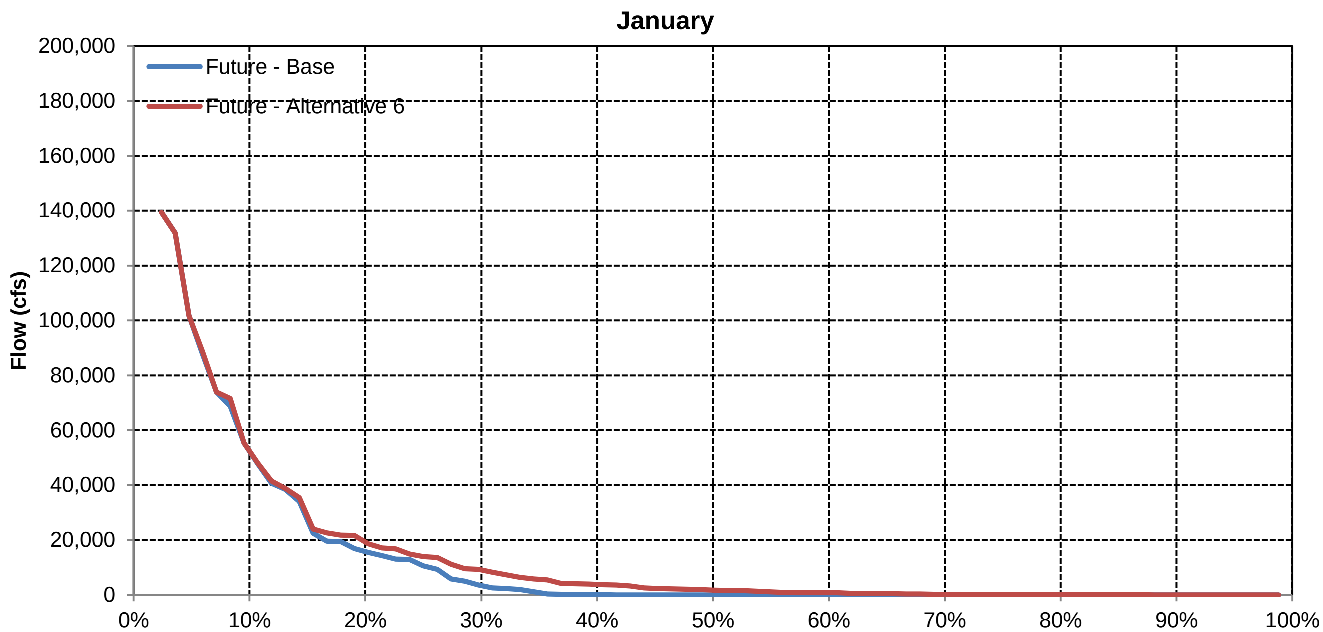

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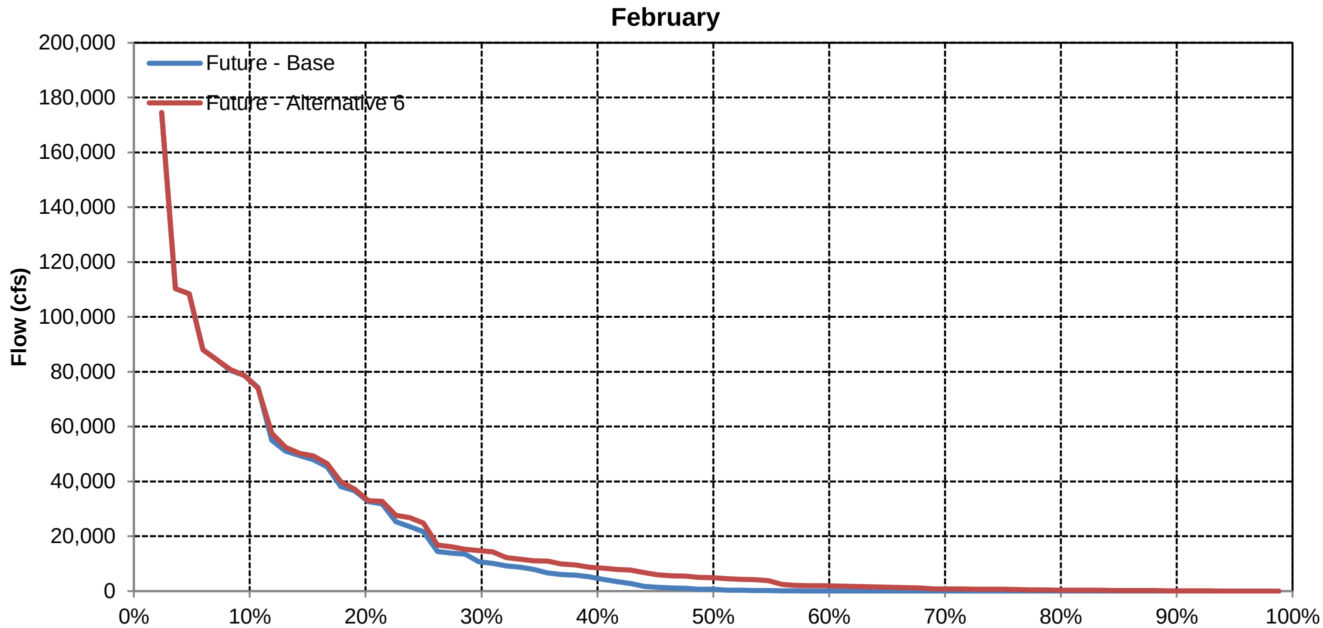

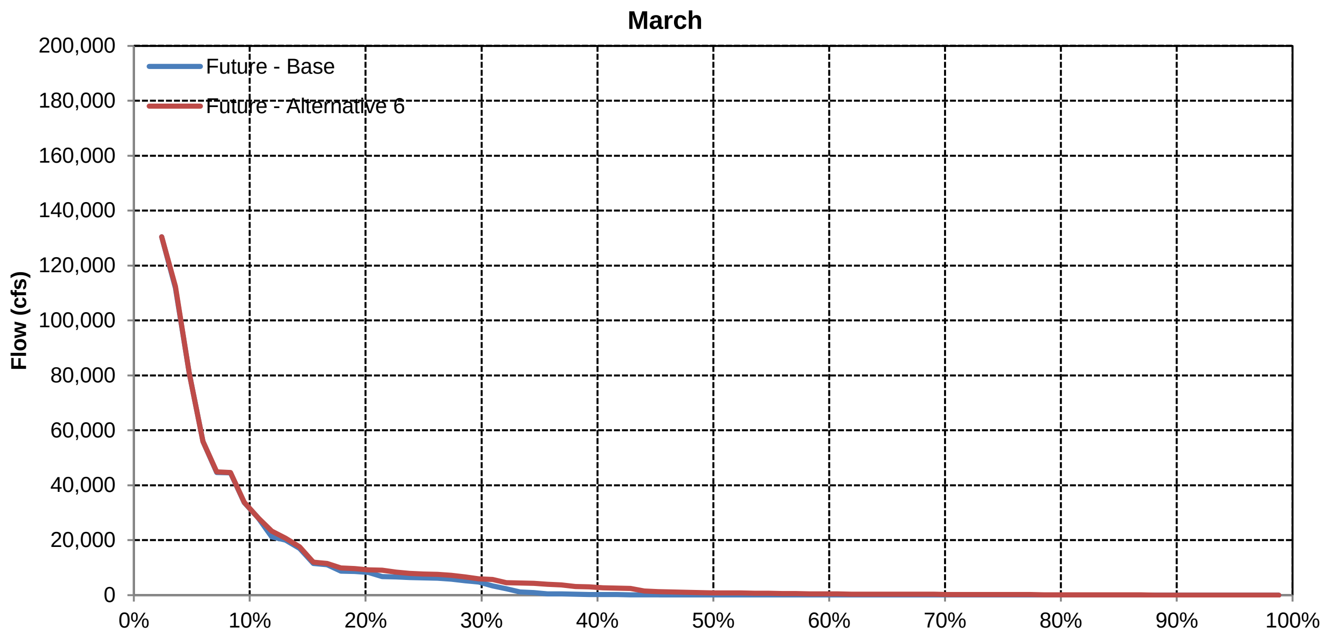

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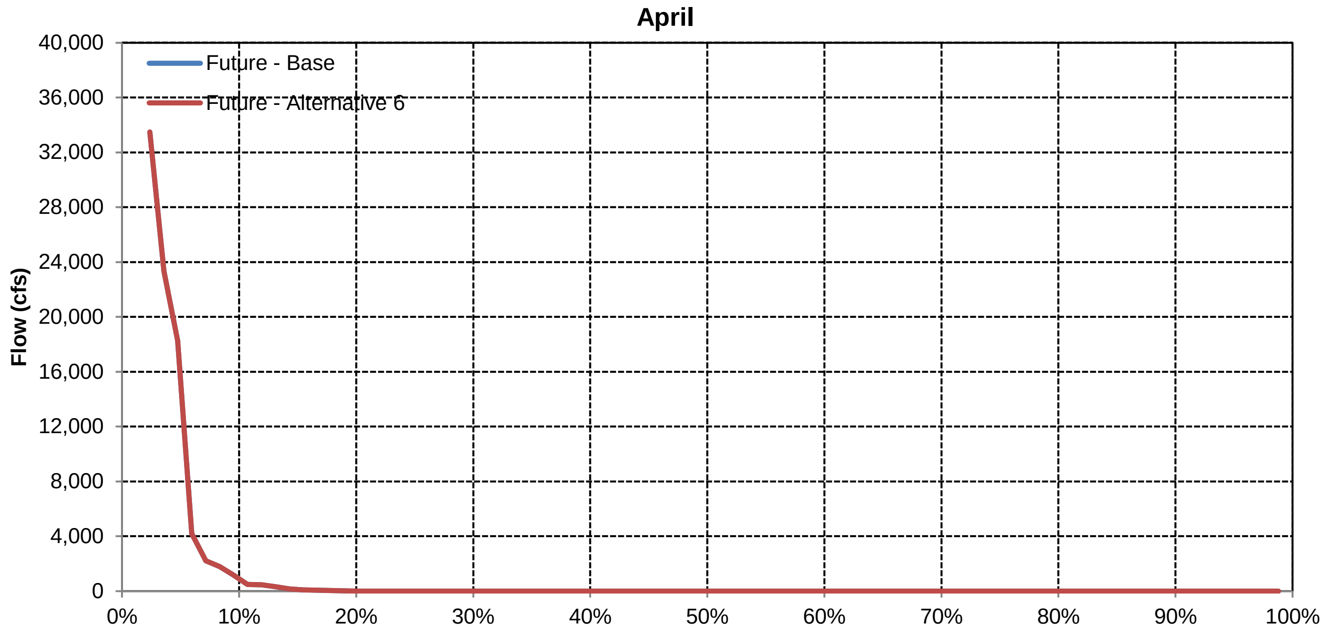

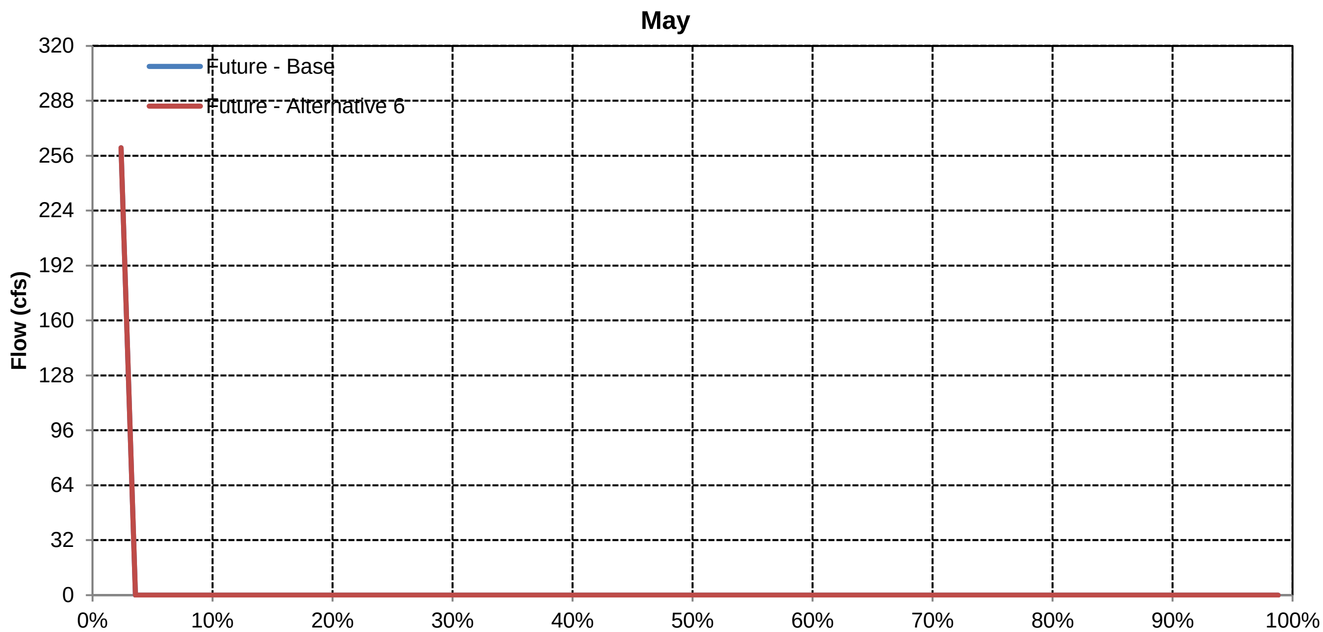

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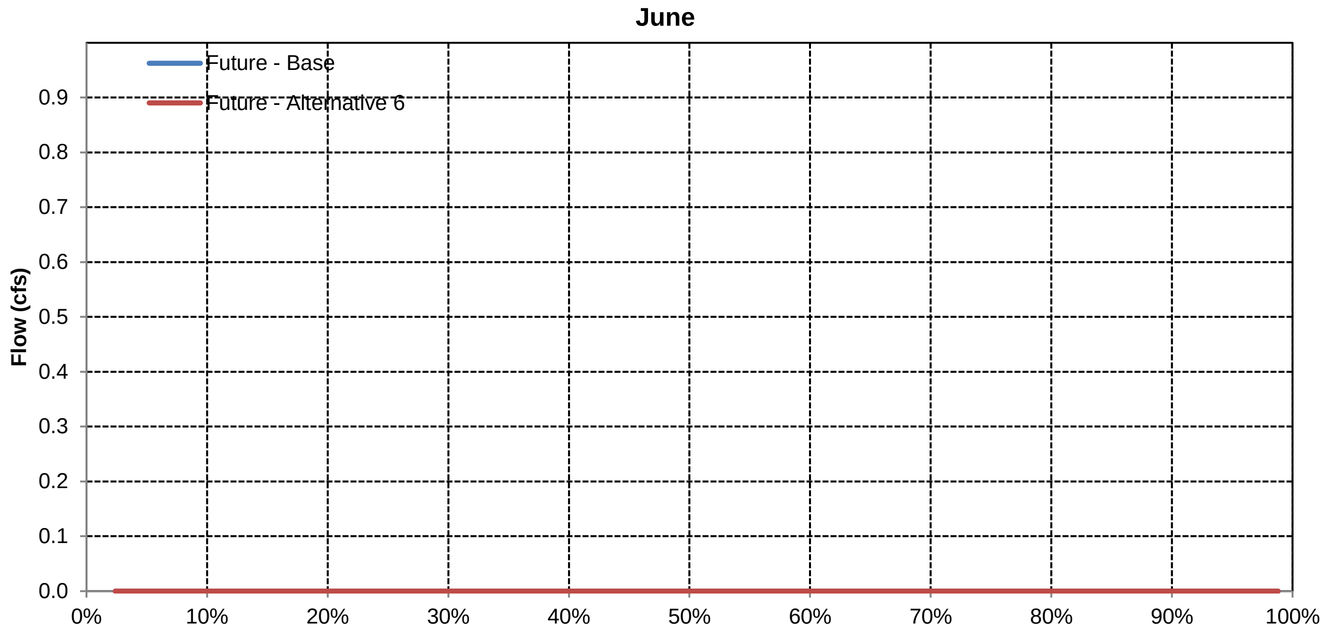

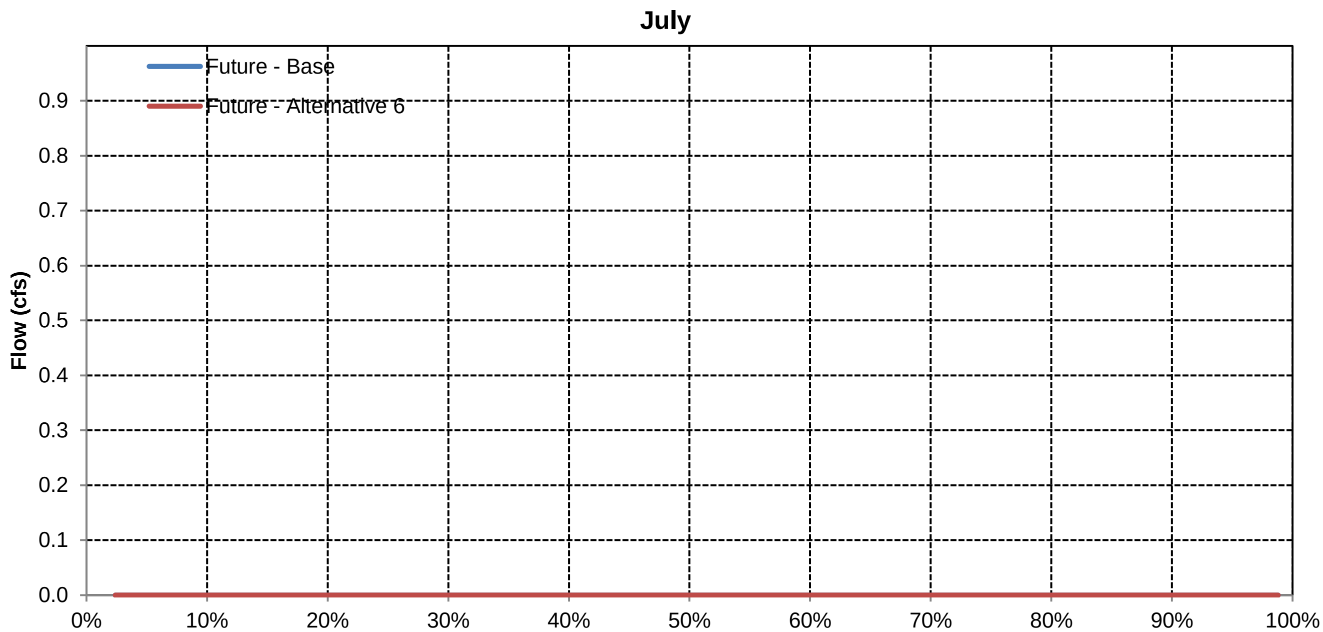

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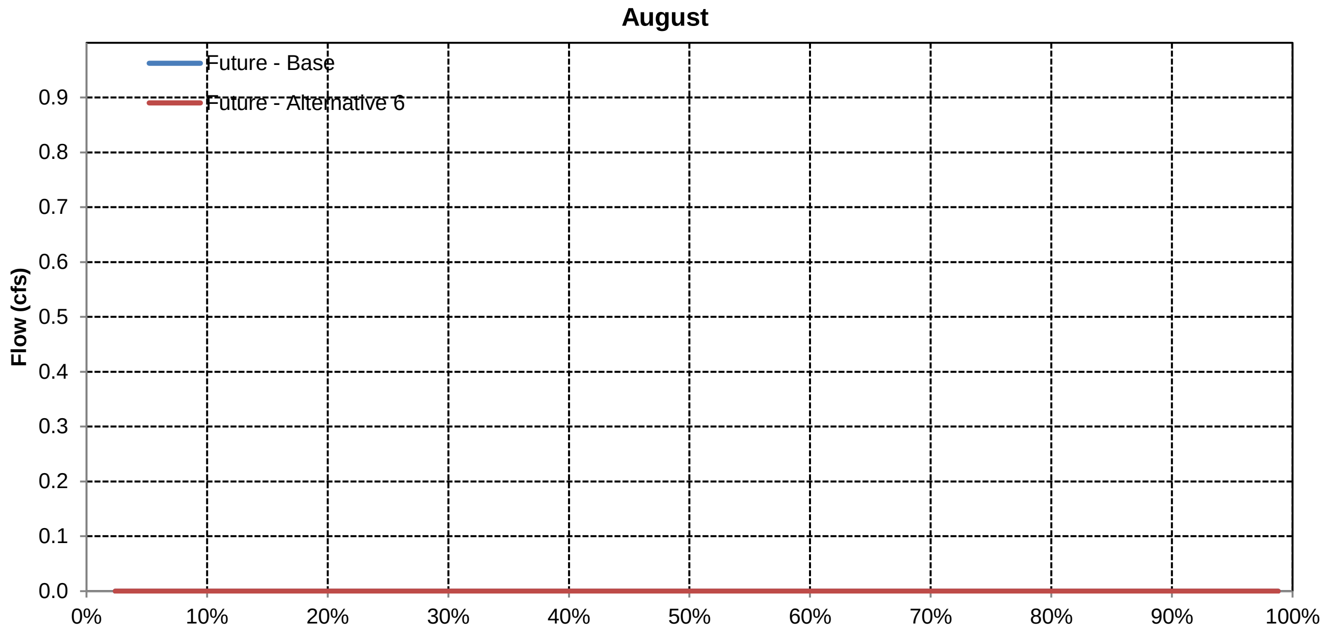
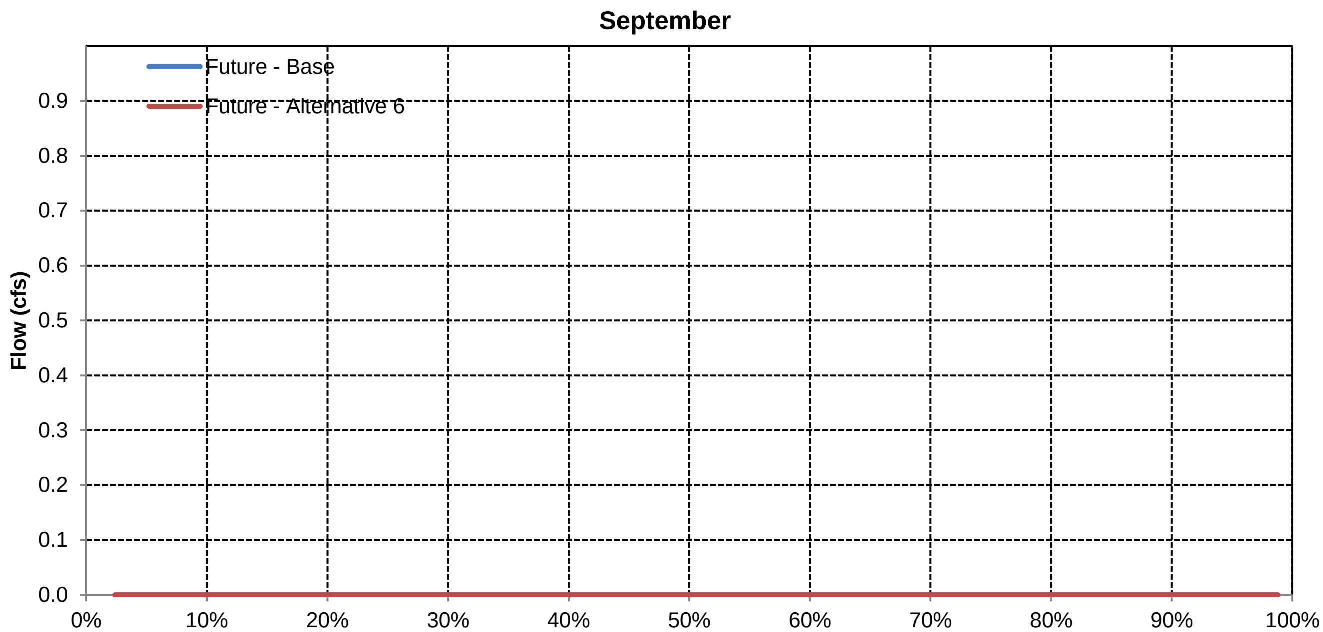




Long-Term and Water Year-Type Average of Sacramento River below Fremont Weir Under Future - Base and Future - Alternative 6

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Future - Base	9,206	10,728	19,728	30,030	35,978	31,028	17,571	10,459	13,675	15,358	11,273	13,824	13,150
Future - Alternative 6	9,233	10,470	18,786	28,495	34,259	30,211	17,563	10,438	13,643	15,362	11,282	13,839	12,835
Difference	27	-258	-942	-1,535	-1,720	-817	-8	-21	-32	4	9	15	-314
Percent Difference	0%	-2%	-5%	-5%	-5%	-3%	0%	0%	0%	0%	0%	0%	-2%
							Water Year-Types						
Wet													
Future - Base	10,316	14,168	33,582	49,490	54,700	46,345	27,848	12,029	14,178	18,965	12,787	23,425	19,081
Future - Alternative 6	10,340	13,511	31,458	47,160	52,525	45,478	27,829	12,006	14,181	18,962	12,731	23,441	18,589
Difference	24	-657	-2,124	-2,331	-2,175	-867	-19	-23	3	-3	-56	15	-492
Percent Difference	0%	-5%	-6%	-5%	-4%	-2%	0%	0%	0%	0%	0%	0%	-3%
Above Normal													
Future - Base	10,180	10,600	18,133	38,066	50,270	39,380	16,639	11,646	16,362	17,891	12,383	16,466	15,480
Future - Alternative 6	10,257	10,413	17,191	35,811	48,166	38,022	16,643	11,646	16,370	17,870	12,390	16,466	15,075
Difference	76	-187	-942	-2,255	-2,104	-1,358	3	0	8	-21	7	0	-404
Percent Difference	1%	-2%	-5%	-6%	-4%	-3%	0%	0%	0%	0%	0%	0%	-3%
Below Normal													
Future - Base	9,254	9,797	13,924	23,209	25,545	24,426	14,615	10,760	14,962	15,443	10,464	8,153	10,869
Future - Alternative 6	9,274	9,752	13,534	21,475	23,740	23,392	14,615	10,697	14,814	15,448	10,596	8,173	10,570
Difference	20	-45	-390	-1,734	-1,805	-1,034	0	-63	-148	5	132	20	-300
Percent Difference	0%	0%	-3%	-7%	-7%	-4%	0%	-1%	-1%	0%	1%	0%	-3%
Dry													
Future - Base	8,186	9,309	12,579	14,935	22,880	21,608	11,530	9,425	13,173	12,523	10,169	7,654	9,257
Future - Alternative 6	8,218	9,243	12,369	14,295	21,359	20,888	11,522	9,421	13,217	12,537	10,176	7,640	9,076
Difference	31	-66	-210	-639	-1,522	-720	-8	-4	44	15	7	-14	-181
Percent Difference	0%	-1%	-2%	-4%	-7%	-3%	0%	0%	0%	0%	0%	0%	-2%
Critical													
Future - Base	7,552	6,764	9,375	13,050	15,447	13,038	9,429	7,372	9,565	9,855	9,692	7,025	7,121
Future - Alternative 6	7,545	6,757	9,177	12,623	14,829	12,900	9,427	7,350	9,421	9,877	9,712	7,097	7,035
Difference	-7	-8	-198	-427	-617	-138	-1	-22	-144	22	20	72	-86
Percent Difference	0%	0%	-2%	-3%	-4%	-1%	0%	0%	-2%	0%	0%	1%	-1%

Sacramento River below Fremont Weir

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	11,897	16,169	45,741	61,582	63,120	58,501	40,381	14,264	19,317	20,306	15,937	23,746
20%	10,789	13,042	30,986	52,000	59,936	50,976	24,134	12,203	18,036	19,458	13,060	23,231
30%	9,787	11,409	19,616	42,207	50,229	42,750	16,494	11,100	17,030	17,789	11,135	21,443
40%	9,396	10,373	16,258	31,518	42,508	33,844	14,502	10,319	14,771	17,206	10,721	14,835
50%	9,004	9,580	14,683	22,826	32,845	25,125	12,720	9,227	12,760	16,197	10,366	9,351
60%	8,421	8,564	12,034	17,536	23,964	20,148	10,605	8,847	11,697	14,641	10,117	8,213
70%	7,953	7,746	10,580	14,086	19,326	17,034	9,863	8,329	10,907	12,994	9,872	7,627
80%	6,644	6,697	8,469	11,527	15,457	13,796	9,349	7,855	9,488	11,435	9,571	7,237
90%	6,027	5,916	7,135	10,183	12,838	10,799	8,626	7,207	8,168	9,224	9,229	6,510
Long Term												
Full Simulation Period	9,206	10,728	19,728	30,030	35,978	31,028	17,571	10,459	13,675	15,358	11,273	13,824
Water Year Types												
Wet	10,316	14,168	33,582	49,490	54,700	46,345	27,848	12,029	14,178	18,965	12,787	23,425
Above Normal	10,180	10,600	18,133	38,066	50,270	39,380	16,639	11,646	16,362	17,891	12,383	16,466
Below Normal	9,254	9,797	13,924	23,209	25,545	24,426	14,615	10,760	14,962	15,443	10,464	8,153
Dry	8,186	9,309	12,579	14,935	22,880	21,608	11,530	9,425	13,173	12,523	10,169	7,654
Critical	7,552	6,764	9,375	13,050	15,447	13,038	9,429	7,372	9,565	9,855	9,692	7,025

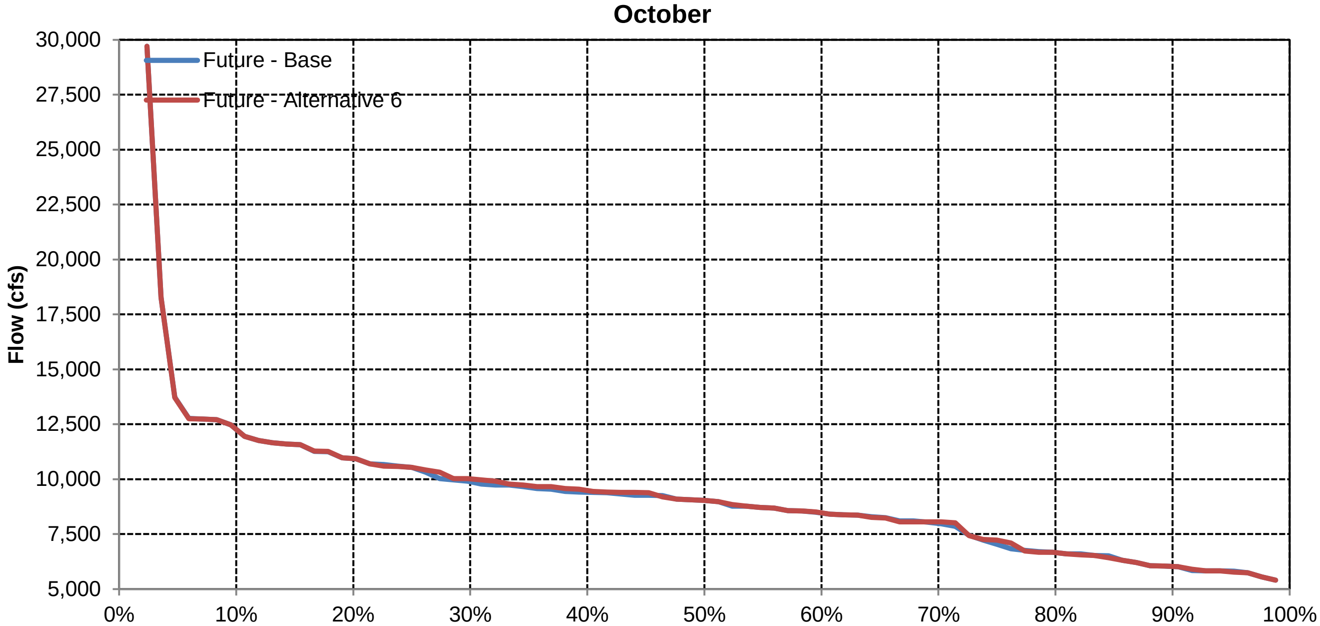
Future - Alternative 6

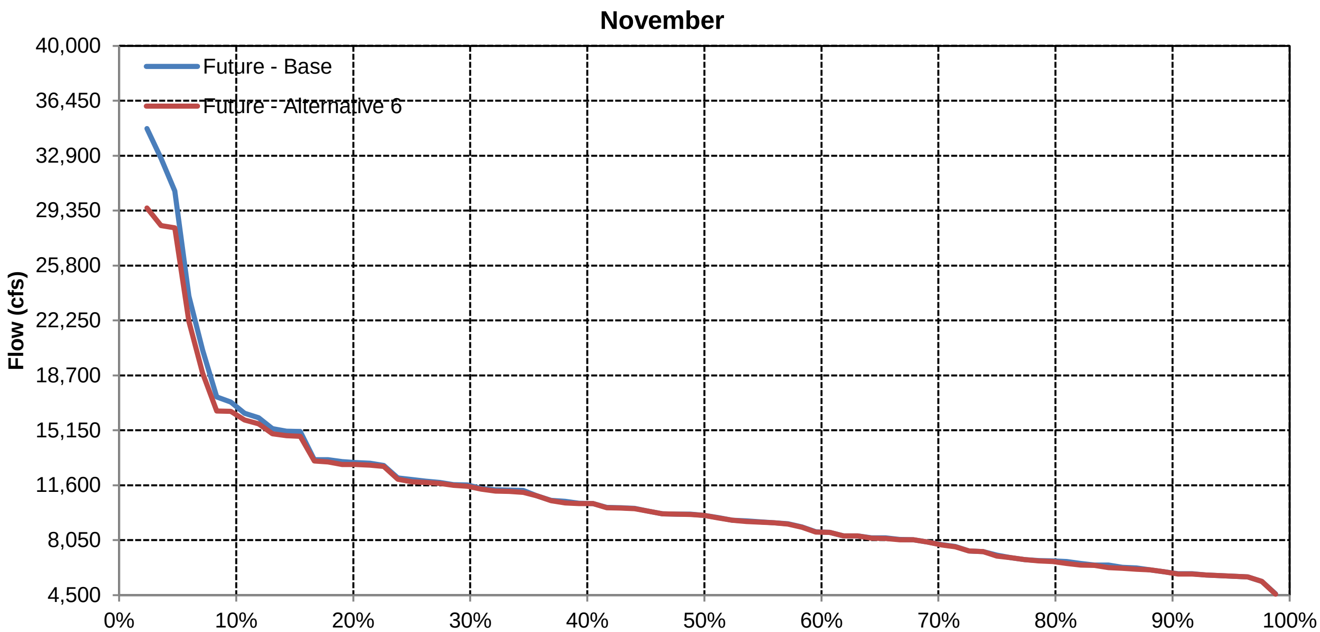
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	11,897	15,734	42,127	60,967	63,130	58,156	40,381	14,264	19,320	20,306	16,331	24,040
20%	10,793	12,916	27,821	48,721	58,348	49,949	24,157	12,202	18,228	19,460	13,064	23,240
30%	9,969	11,363	18,799	37,127	45,363	40,334	16,491	10,975	17,026	17,792	11,211	21,444
40%	9,437	10,363	15,849	27,947	39,921	30,675	14,501	10,320	14,955	17,269	10,713	14,835
50%	9,004	9,571	14,300	20,990	28,782	24,590	12,720	9,101	12,754	16,194	10,324	9,345
60%	8,421	8,556	11,891	16,730	22,085	19,734	10,605	8,843	11,547	14,786	10,115	8,291
70%	8,050	7,737	10,688	13,939	18,575	16,656	9,863	8,329	10,709	12,999	9,868	7,629
80%	6,640	6,617	8,359	11,498	15,160	13,658	9,354	7,777	9,412	11,434	9,571	7,234
90%	6,029	5,911	7,017	10,145	12,771	10,773	8,626	7,207	8,170	9,225	9,230	6,508
Long Term												
Full Simulation Period	9,233	10,470	18,786	28,495	34,259	30,211	17,563	10,438	13,643	15,362	11,282	13,839
Water Year Types												
Wet	10,340	13,511	31,458	47,160	52,525	45,478	27,829	12,006	14,181	18,962	12,731	23,441
Above Normal	10,257	10,413	17,191	35,811	48,166	38,022	16,643	11,646	16,370	17,870	12,390	16,466
Below Normal	9,274	9,752	13,534	21,475	23,740	23,392	14,615	10,697	14,814	15,448	10,596	8,173
Dry	8,218	9,243	12,369	14,295	21,359	20,888	11,522	9,421	13,217	12,537	10,176	7,640
Critical	7,545	6,757	9,177	12,623	14,829	12,900	9,427	7,350	9,421	9,877	9,712	7,097

Future - Alternative 6 Minus Future - Base

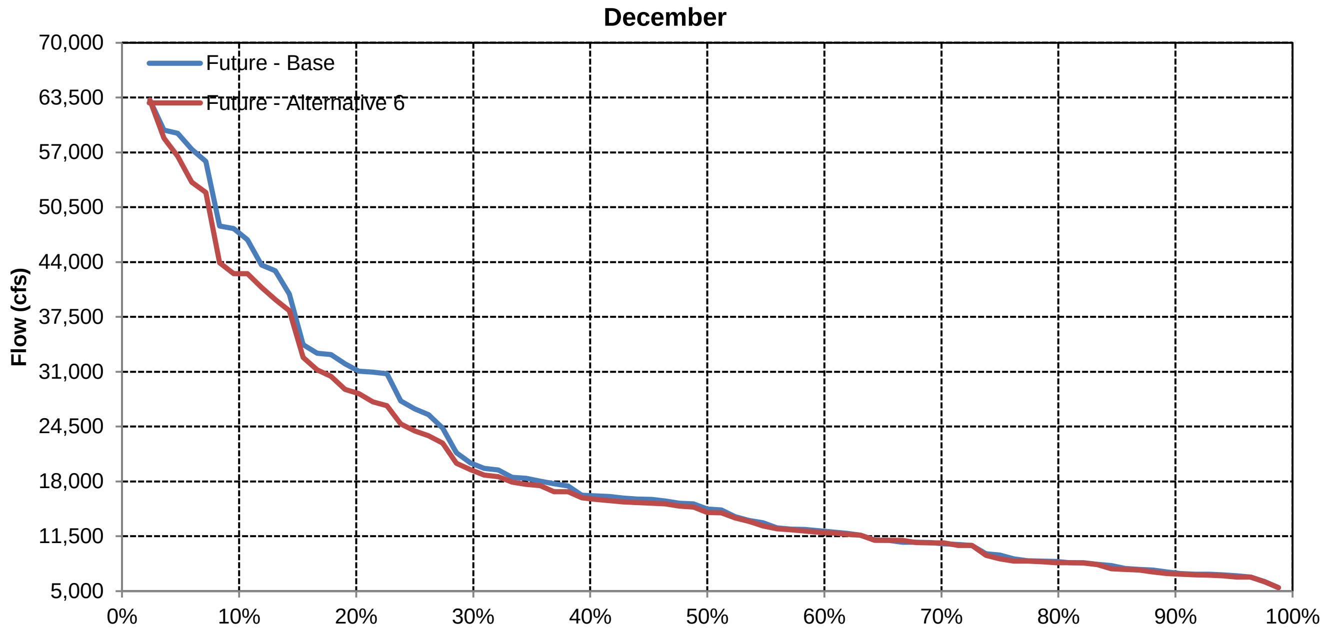
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	-435	-3,614	-615	10	-345	1	0	3	-1	394	294
20%	4	-126	-3,165	-3,278	-1,588	-1,027	23	0	192	2	4	9
30%	182	-46	-817	-5,079	-4,866	-2,416	-4	-125	-3	3	76	1
40%	41	-10	-409	-3,571	-2,587	-3,169	-1	1	184	63	-8	1
50%	0	-9	-384	-1,836	-4,063	-535	0	-126	-6	-3	-42	-6
60%	0	-8	-143	-806	-1,879	-414	0	-4	-150	145	-3	79
70%	98	-9	108	-147	-751	-378	0	0	-198	5	-4	1
80%	-4	-80	-111	-29	-297	-138	5	-78	-76	-1	0	-3
90%	2	-5	-118	-38	-67	-27	0	0	3	1	1	-1
Long Term												
Full Simulation Period	27	-258	-942	-1,535	-1,720	-817	-8	-21	-32	4	9	15
Water Year Types												
Wet	24	-657	-2,124	-2,331	-2,175	-867	-19	-23	3	-3	-56	15
Above Normal	76	-187	-942	-2,255	-2,104	-1,358	3	0	8	-21	7	0
Below Normal	20	-45	-390	-1,734	-1,805	-1,034	0	-63	-148	5	132	20
Dry	31	-66	-210	-639	-1,522	-720	-8	-4	44	15	7	-14
Critical	-7	-8	-198	-427	-617	-138	-1	-22	-144	22	20	72

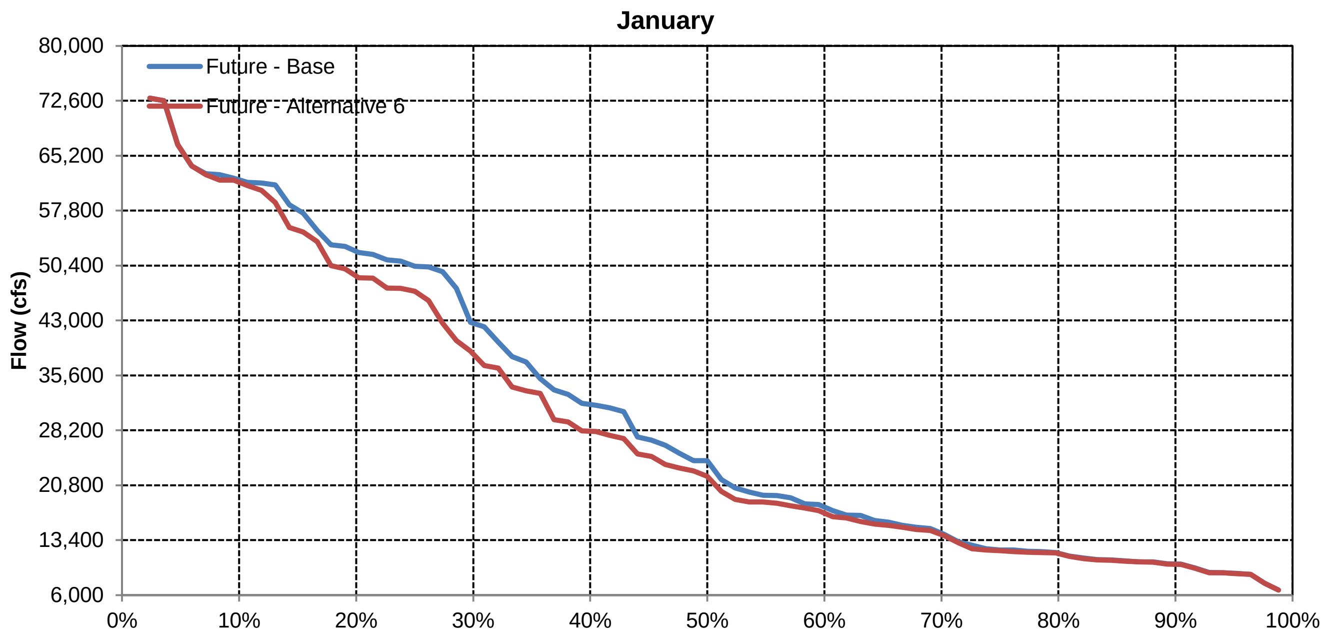
Sacramento River below Fremont Weir



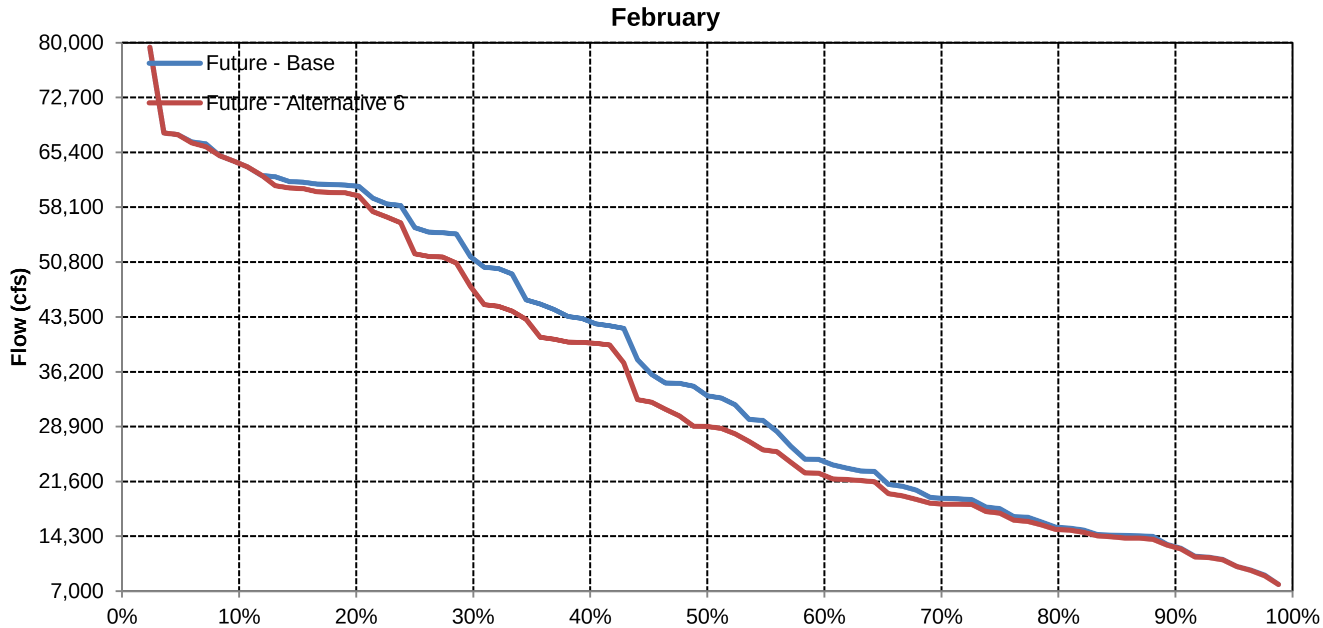


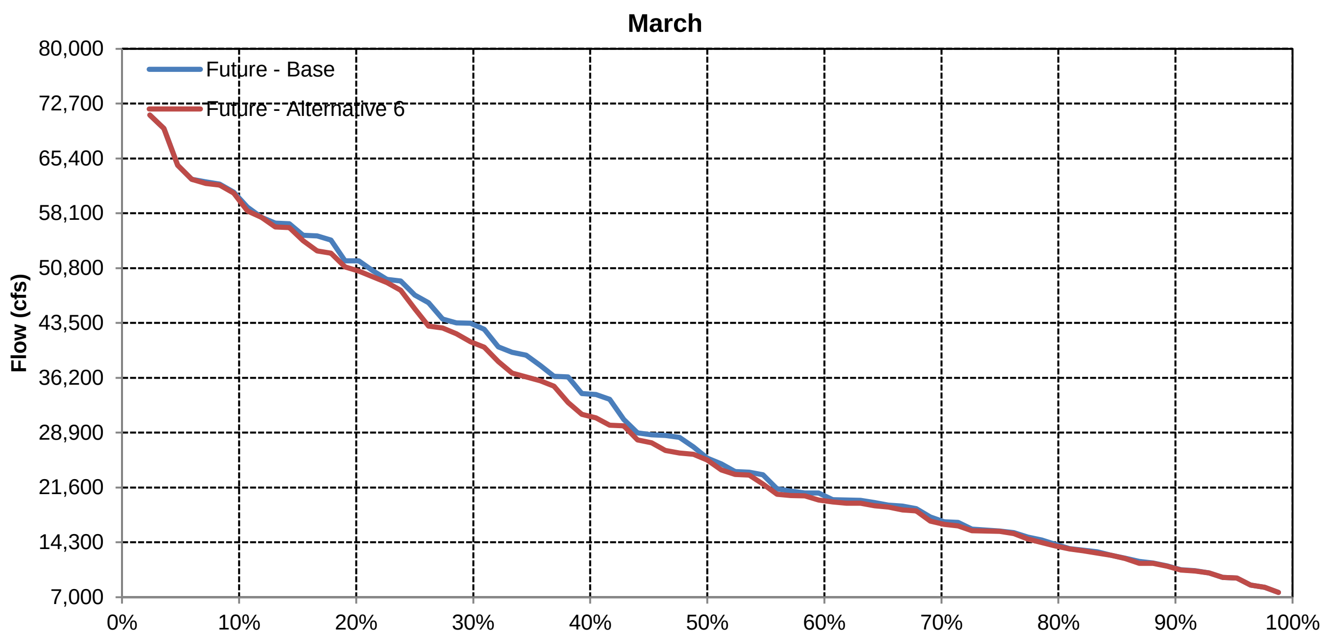
Sacramento River below Fremont Weir



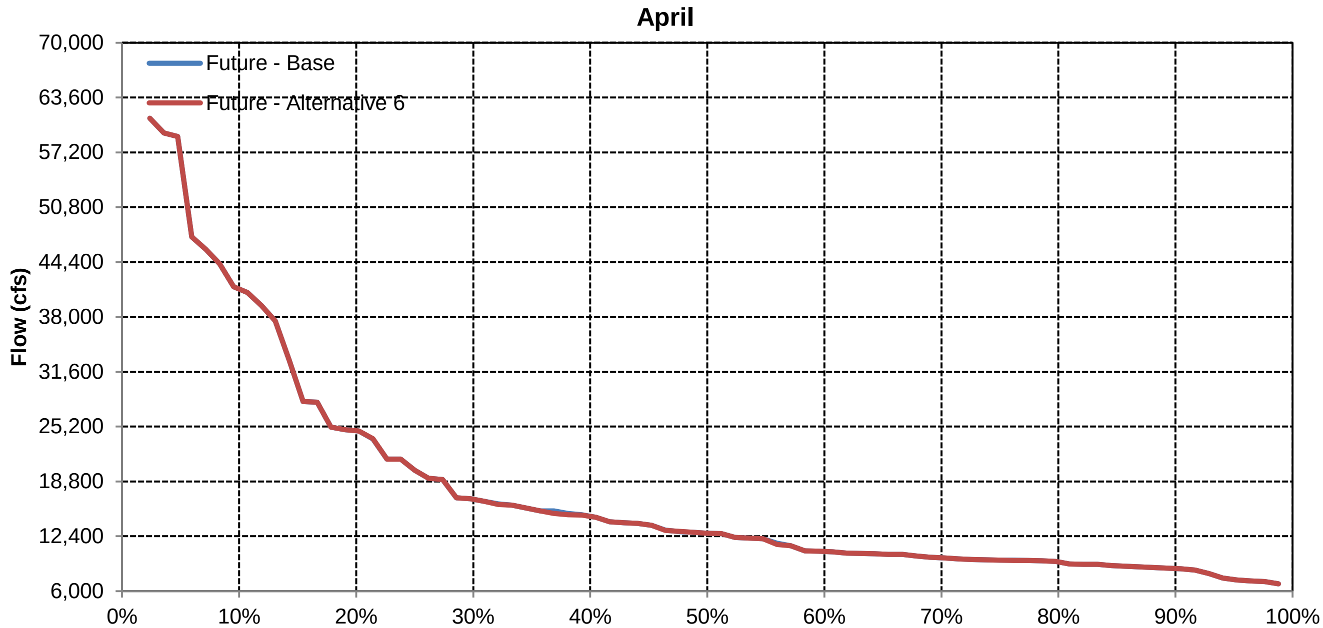


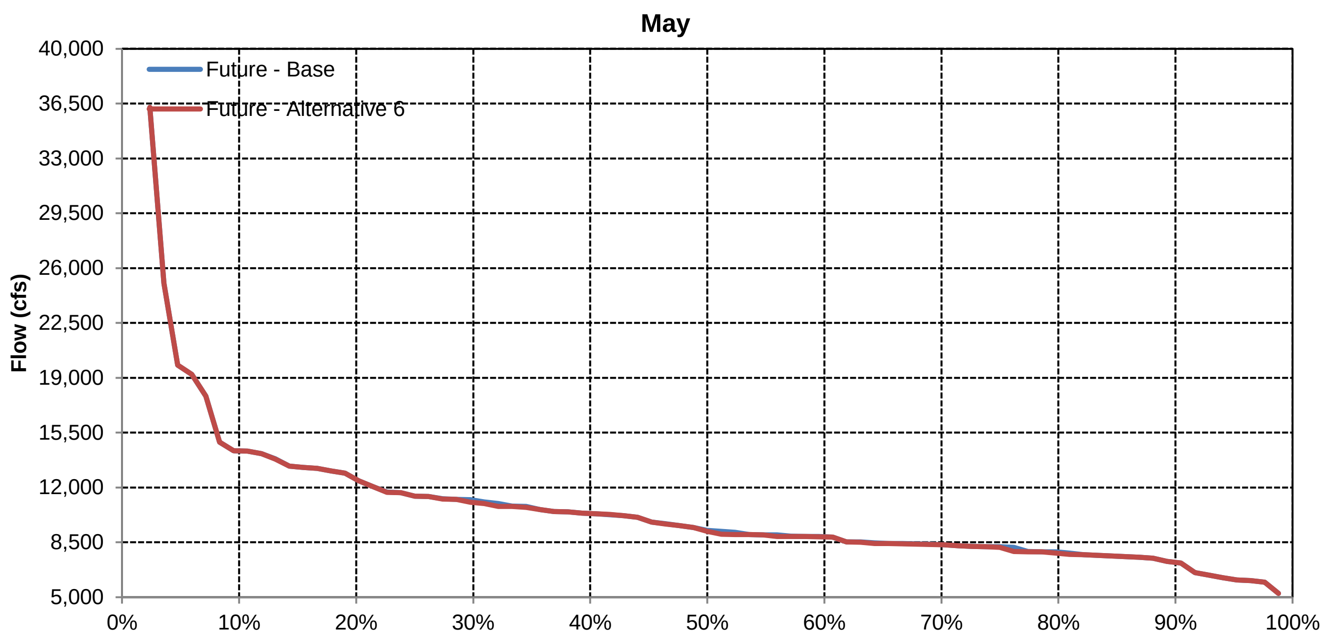
Sacramento River below Fremont Weir



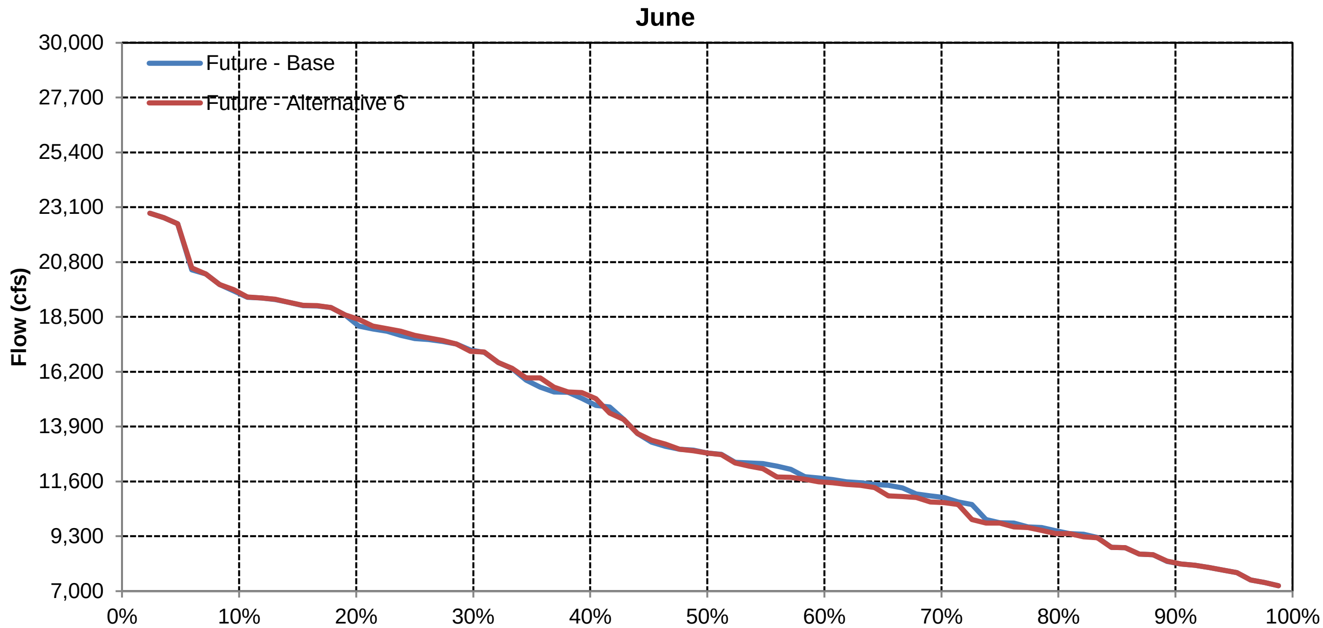


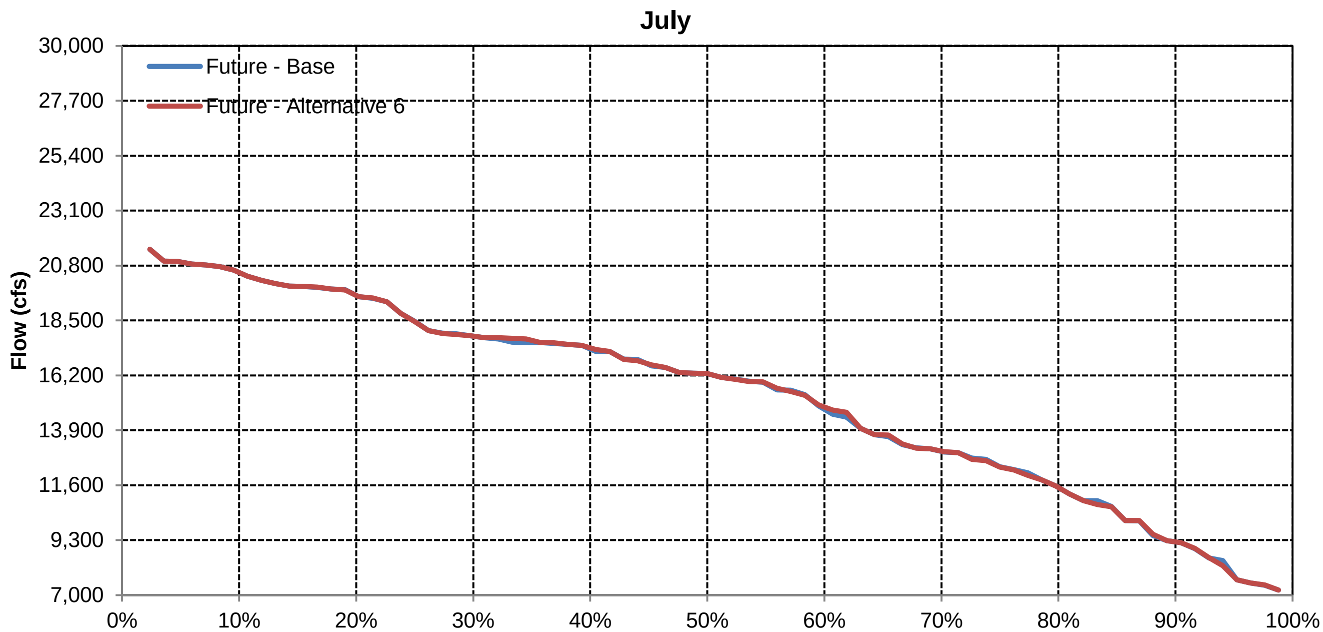
Sacramento River below Fremont Weir



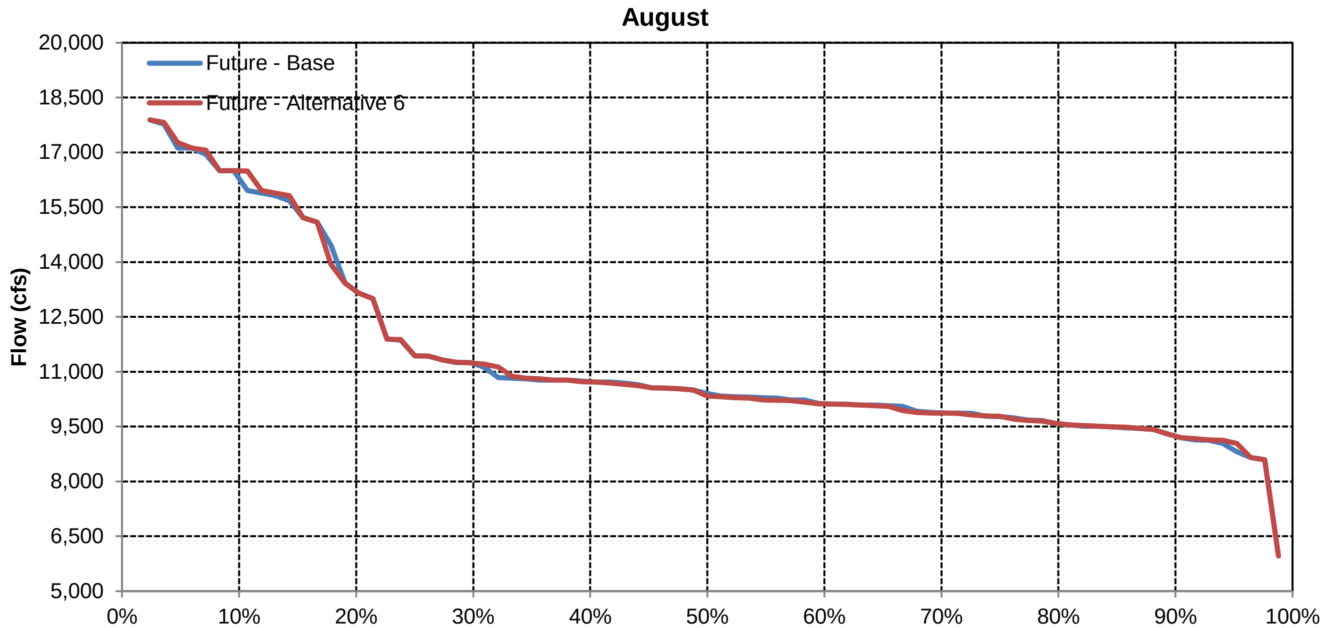


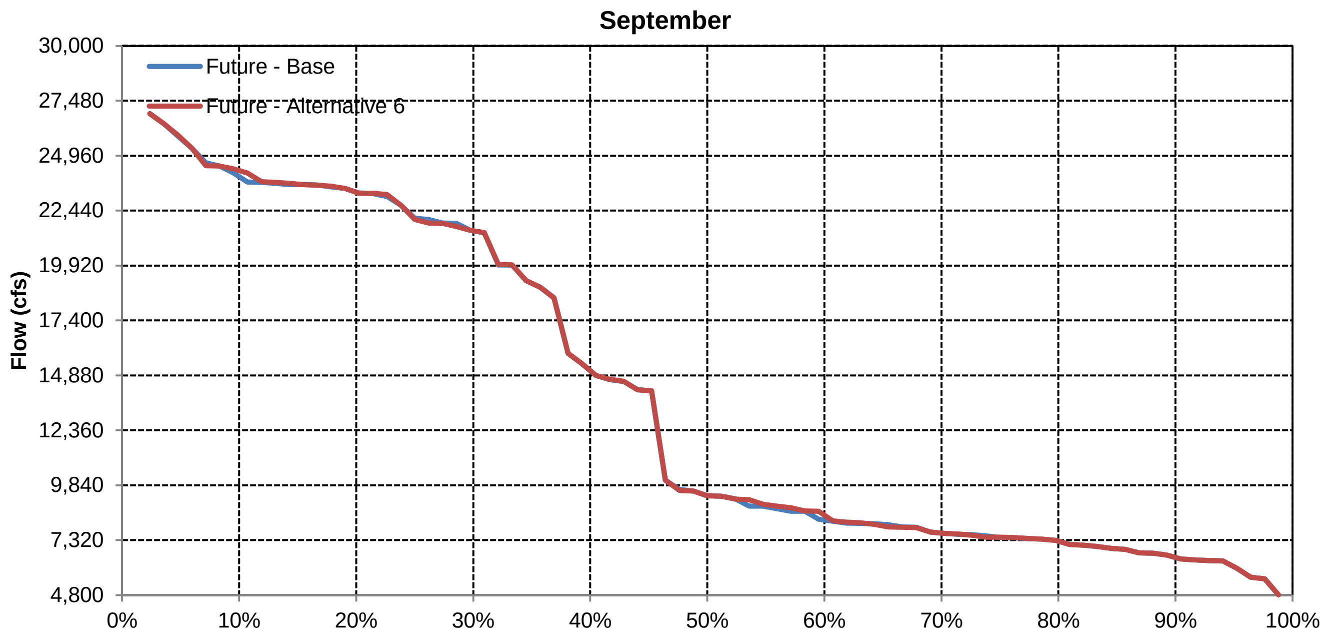
Sacramento River below Fremont Weir





Sacramento River below Fremont Weir





Long-Term and Water Year-Type Average of Trinity Reservoir Under Future - Base and Future - Alternative 6

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
						Long-Term						
Full Simulation Period												
Future - Base	1,111	1,121	1,232	1,403	1,575	1,712	1,826	1,701	1,582	1,421	1,271	1,160
Future - Alternative 6	1,112	1,123	1,234	1,405	1,577	1,713	1,828	1,703	1,583	1,422	1,273	1,161
Difference	1	2	2	2	2	1	1	1	1	1	2	1
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
						Water Year-Types						
Wet												
Future - Base	1,184	1,226	1,437	1,697	1,906	2,037	2,189	2,064	1,903	1,750	1,604	1,455
Future - Alternative 6	1,186	1,227	1,438	1,697	1,907	2,037	2,189	2,064	1,903	1,750	1,604	1,455
Difference	1	1	1	1	1	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal												
Future - Base	1,184	1,161	1,273	1,559	1,813	1,988	2,142	1,982	1,871	1,704	1,558	1,426
Future - Alternative 6	1,185	1,170	1,282	1,568	1,820	1,995	2,148	1,988	1,877	1,711	1,564	1,433
Difference	2	9	9	9	7	7	7	7	7	7	7	7
Percent Difference	0%	1%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Future - Base	1,148	1,147	1,220	1,391	1,539	1,694	1,829	1,709	1,610	1,441	1,284	1,186
Future - Alternative 6	1,147	1,148	1,221	1,392	1,539	1,695	1,830	1,710	1,611	1,442	1,285	1,189
Difference	-1	0	1	1	1	1	1	1	1	1	1	3
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry												
Future - Base	1,094	1,097	1,151	1,222	1,376	1,529	1,615	1,477	1,361	1,178	1,006	915
Future - Alternative 6	1,094	1,097	1,151	1,221	1,375	1,528	1,614	1,476	1,360	1,176	1,004	914
Difference	0	-1	-1	-1	-1	-1	-1	-1	-2	-2	-2	-2
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical												
Future - Base	875	866	898	942	1,012	1,077	1,102	1,022	960	834	714	656
Future - Alternative 6	880	870	901	945	1,015	1,081	1,106	1,027	963	837	720	659
Difference	5	4	3	3	4	4	4	4	3	3	7	3
Percent Difference	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%

Trinity Reservoir

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	1,479	1,484	1,672	1,900	2,000	2,100	2,298	2,170	1,995	1,863	1,717	1,564
20%	1,385	1,408	1,506	1,818	2,000	2,100	2,233	2,088	1,943	1,791	1,642	1,492
30%	1,303	1,305	1,445	1,638	1,926	2,068	2,167	2,006	1,865	1,697	1,520	1,382
40%	1,248	1,223	1,368	1,593	1,752	1,981	2,113	1,903	1,752	1,562	1,407	1,270
50%	1,152	1,181	1,273	1,421	1,599	1,771	1,933	1,771	1,616	1,443	1,289	1,178
60%	1,079	1,102	1,198	1,304	1,496	1,662	1,745	1,636	1,564	1,378	1,236	1,106
70%	968	957	1,102	1,205	1,371	1,486	1,591	1,531	1,412	1,229	1,083	1,000
80%	775	791	913	1,023	1,256	1,390	1,496	1,376	1,279	1,090	931	846
90%	627	632	678	825	933	1,013	1,056	1,036	957	837	680	625
Long Term												
Full Simulation Period	1,111	1,121	1,232	1,403	1,575	1,712	1,826	1,701	1,582	1,421	1,271	1,160
Water Year Types												
Wet	1,184	1,226	1,437	1,697	1,906	2,037	2,189	2,064	1,903	1,750	1,604	1,455
Above Normal	1,184	1,161	1,273	1,559	1,813	1,988	2,142	1,982	1,871	1,704	1,558	1,426
Below Normal	1,148	1,147	1,220	1,391	1,539	1,694	1,829	1,709	1,610	1,441	1,284	1,186
Dry	1,094	1,097	1,151	1,222	1,376	1,529	1,615	1,477	1,361	1,178	1,006	915
Critical	875	866	898	942	1,012	1,077	1,102	1,022	960	834	714	656

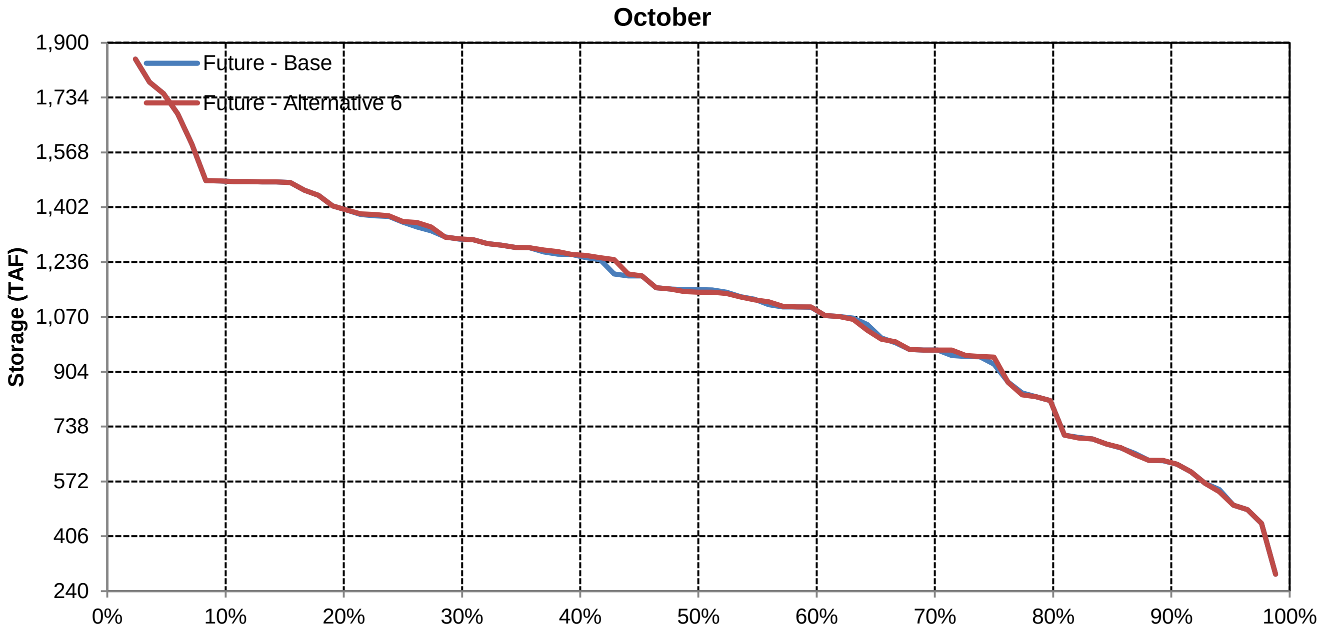
Future - Alternative 6

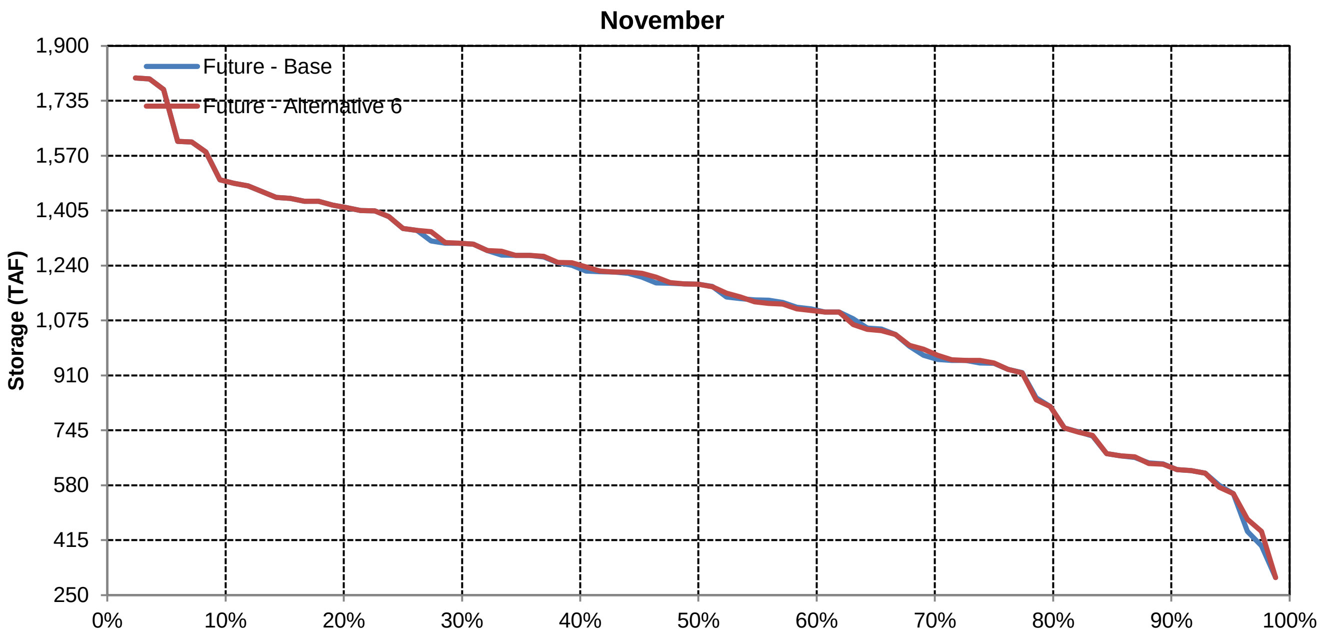
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	1,479	1,484	1,672	1,900	2,000	2,100	2,298	2,170	1,995	1,863	1,717	1,564
20%	1,386	1,408	1,506	1,817	2,000	2,100	2,233	2,088	1,941	1,791	1,642	1,492
30%	1,303	1,305	1,440	1,637	1,926	2,068	2,167	2,006	1,865	1,697	1,520	1,382
40%	1,255	1,233	1,370	1,593	1,752	1,980	2,113	1,903	1,757	1,562	1,416	1,299
50%	1,145	1,180	1,275	1,424	1,597	1,781	1,944	1,771	1,615	1,443	1,284	1,173
60%	1,079	1,101	1,197	1,310	1,510	1,670	1,748	1,638	1,550	1,384	1,242	1,105
70%	970	969	1,100	1,203	1,372	1,539	1,590	1,531	1,412	1,231	1,084	1,000
80%	775	791	910	1,021	1,250	1,393	1,527	1,390	1,279	1,090	929	847
90%	627	632	679	847	934	1,013	1,057	1,037	957	837	677	625
Long Term												
Full Simulation Period	1,112	1,123	1,234	1,405	1,577	1,713	1,828	1,703	1,583	1,422	1,273	1,161
Water Year Types												
Wet	1,186	1,227	1,438	1,697	1,907	2,037	2,189	2,064	1,903	1,750	1,604	1,455
Above Normal	1,185	1,170	1,282	1,568	1,820	1,995	2,148	1,988	1,877	1,711	1,564	1,433
Below Normal	1,147	1,148	1,221	1,392	1,539	1,695	1,830	1,710	1,611	1,442	1,285	1,189
Dry	1,094	1,097	1,151	1,221	1,375	1,528	1,614	1,476	1,360	1,176	1,004	914
Critical	880	870	901	945	1,015	1,081	1,106	1,027	963	837	720	659

Future - Alternative 6 Minus Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	1	0	0	0	0	0	0	0	-3	0	0	0
30%	0	0	-5	0	0	0	1	0	0	0	0	0
40%	6	10	2	0	0	0	0	1	5	0	9	28
50%	-7	-1	2	3	-2	11	11	0	-1	0	-5	-6
60%	0	-1	-1	5	14	8	3	1	-14	6	6	-1
70%	2	12	-2	-1	1	53	0	0	0	2	2	0
80%	0	0	-2	-2	-6	3	31	14	0	0	-2	1
90%	0	0	1	23	0	0	1	1	0	0	-3	0
Long Term												
Full Simulation Period	1	2	2	2	2	1	1	1	1	1	2	1
Water Year Types												
Wet	1	1	1	1	1	0	0	0	0	0	0	0
Above Normal	2	9	9	9	7	7	7	7	7	7	7	7
Below Normal	-1	0	1	1	1	1	1	1	1	1	1	3
Dry	0	-1	-1	-1	-1	-1	-1	-1	-2	-2	-2	-2
Critical	5	4	3	3	4	4	4	4	3	3	7	3

Trinity Reservoir





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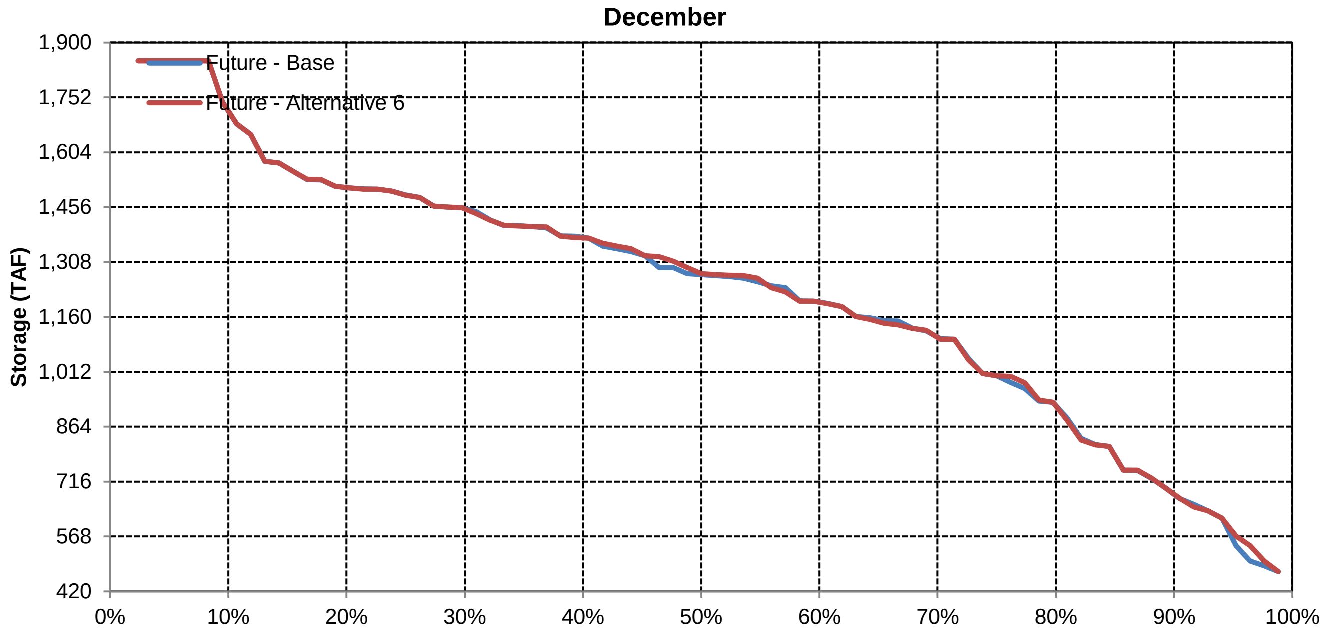

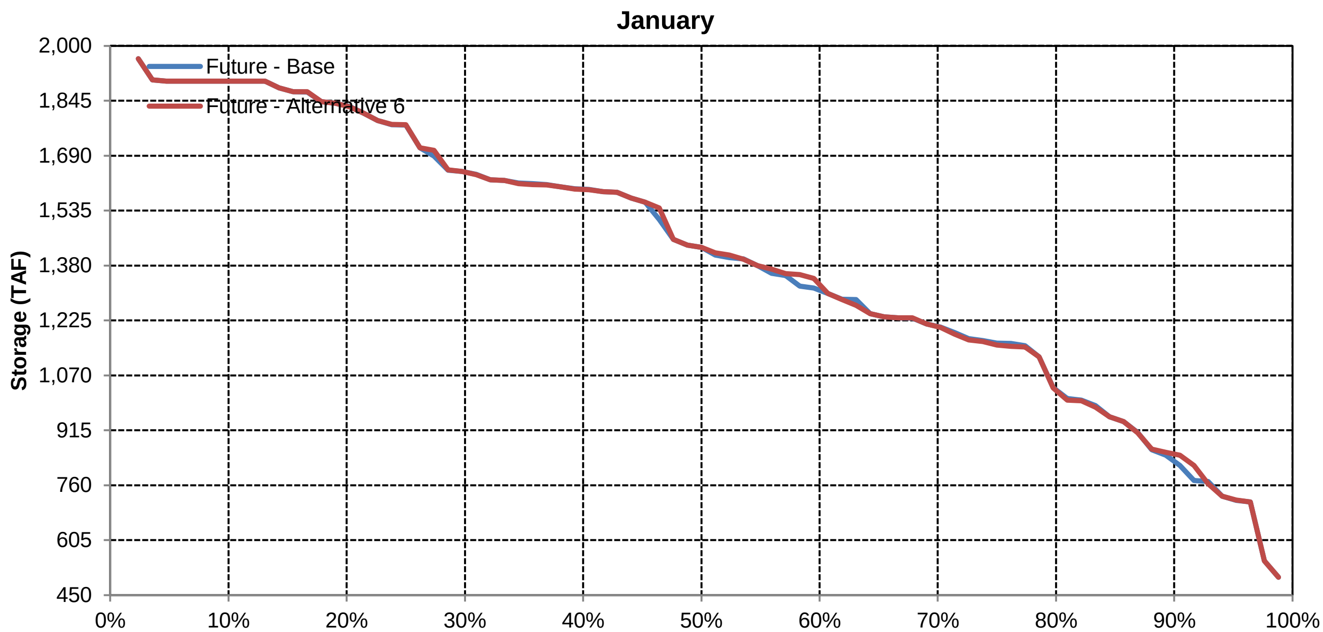

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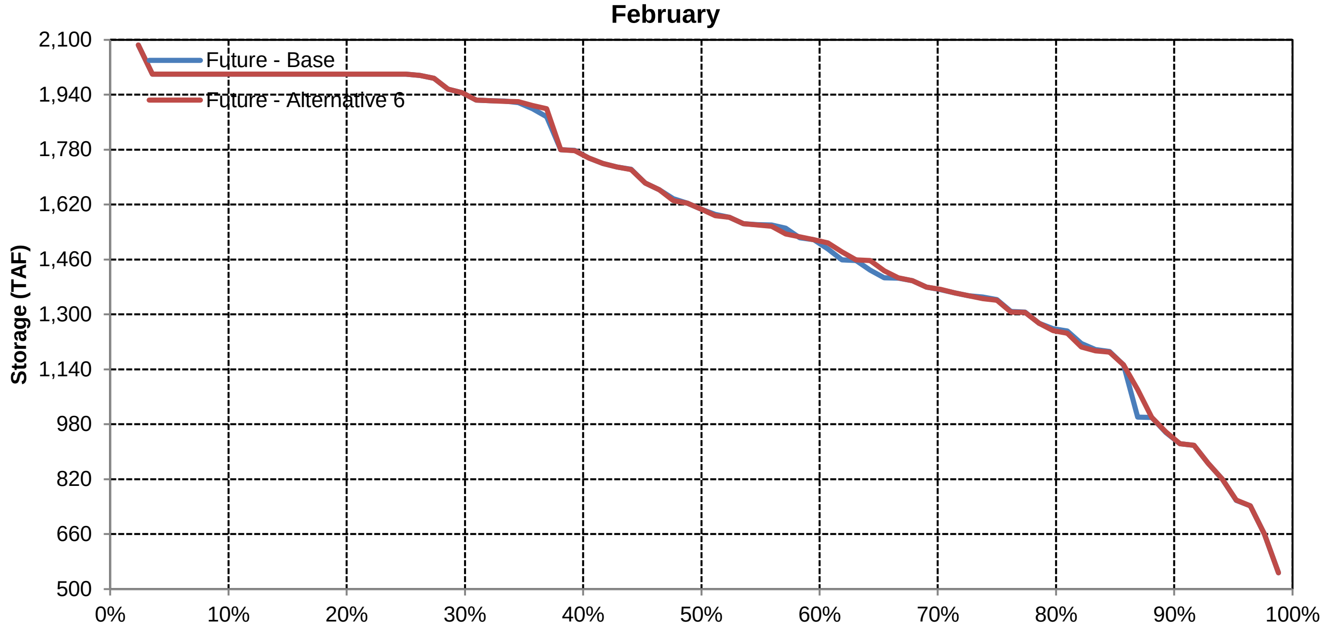

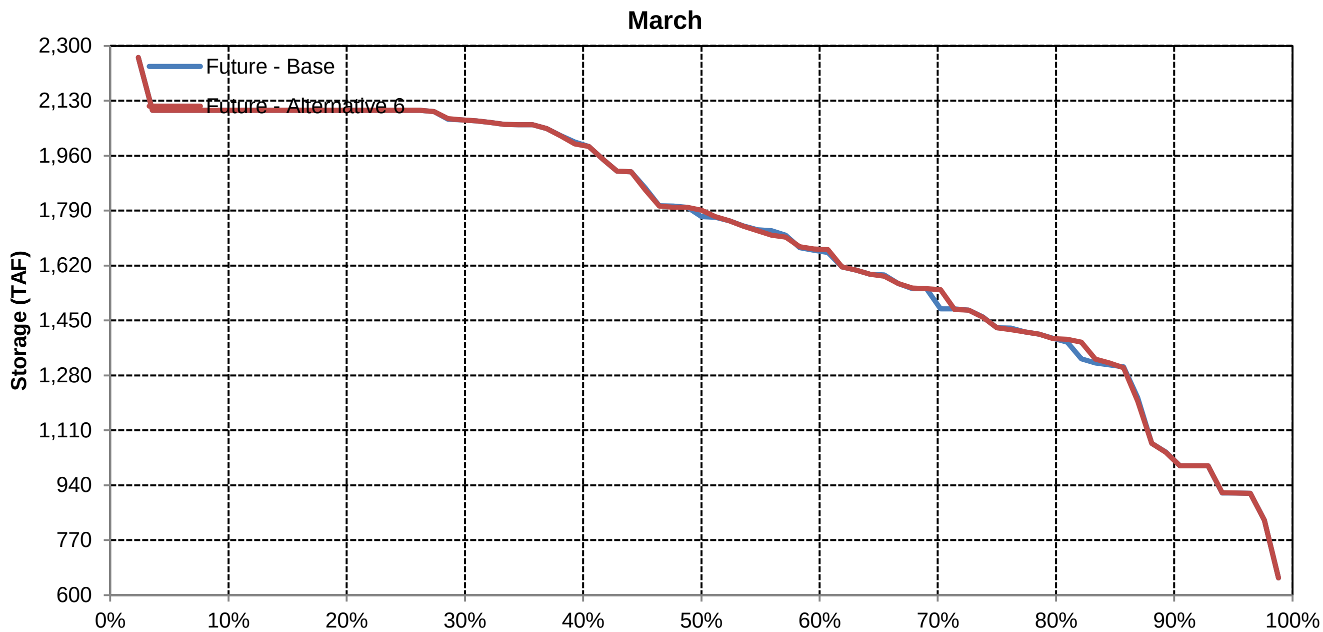

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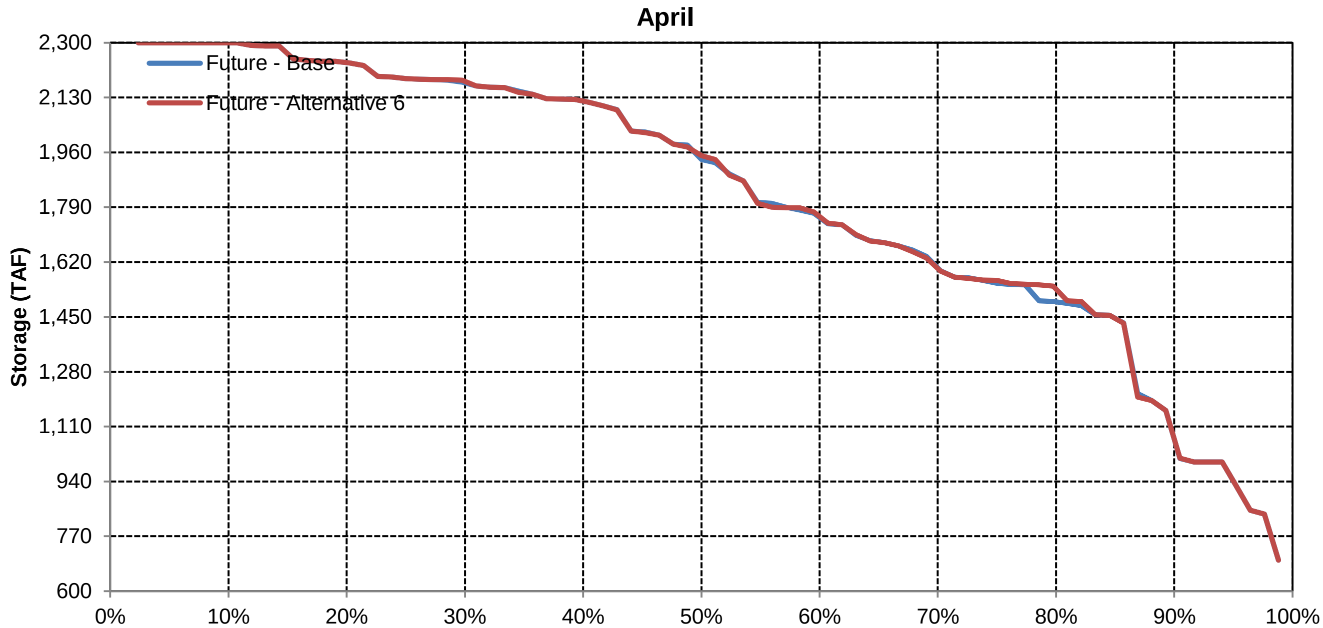

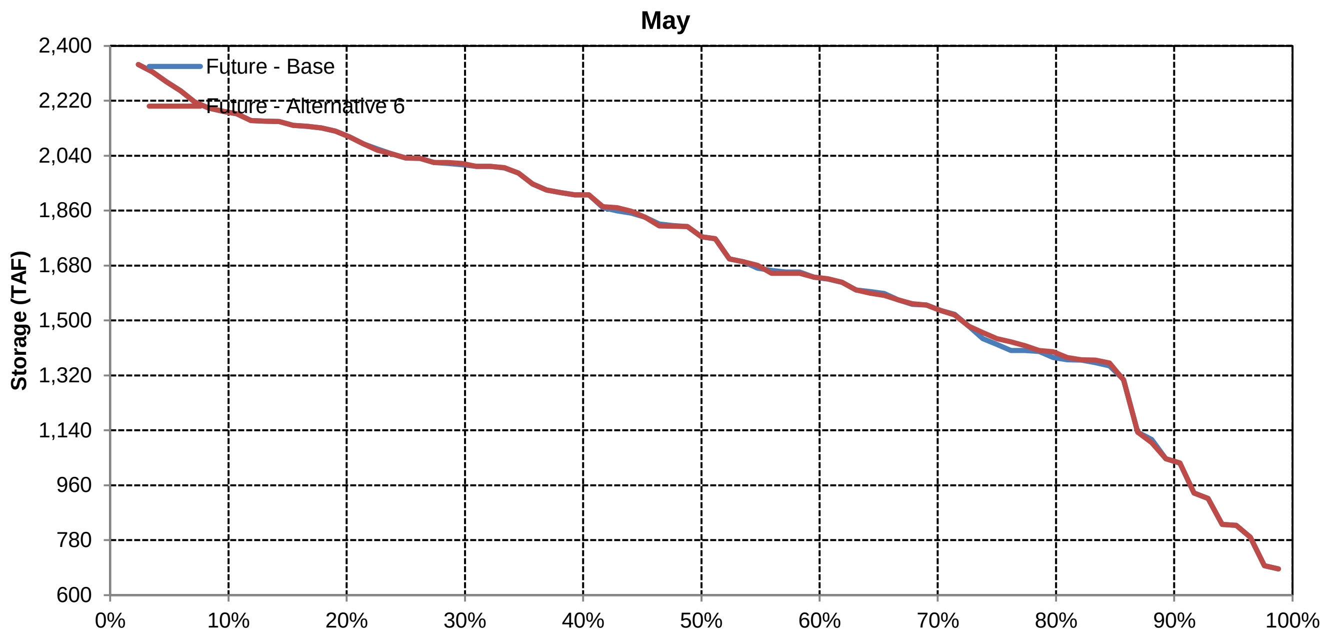

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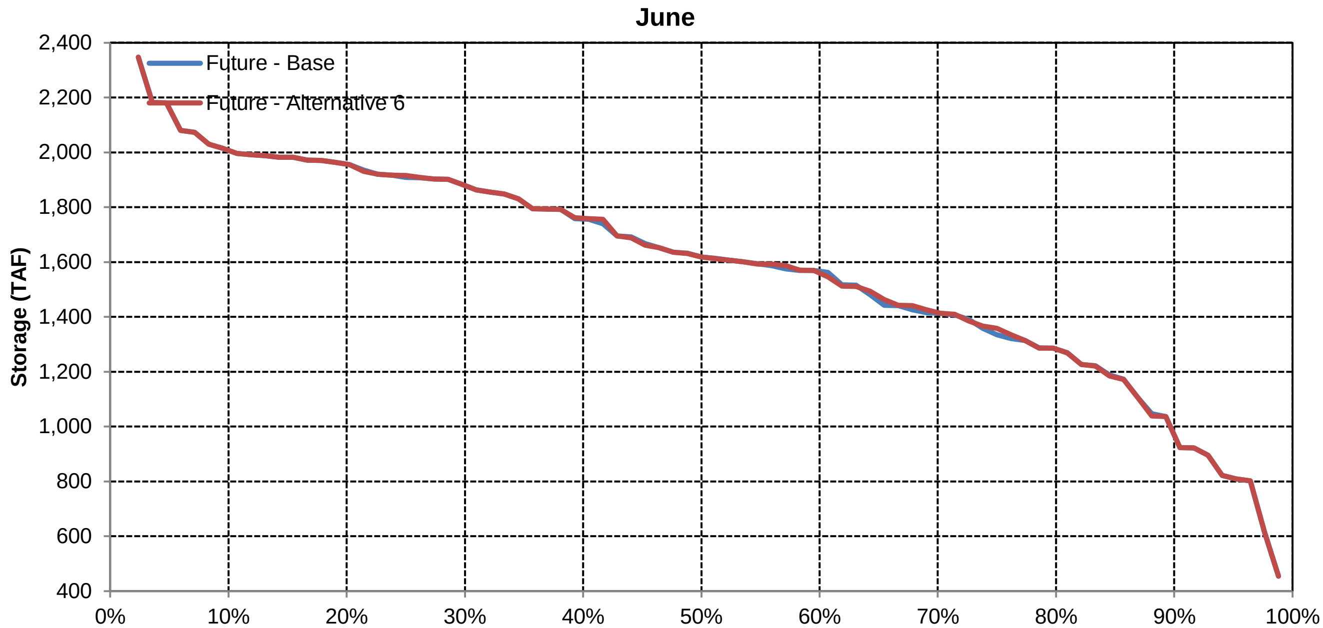

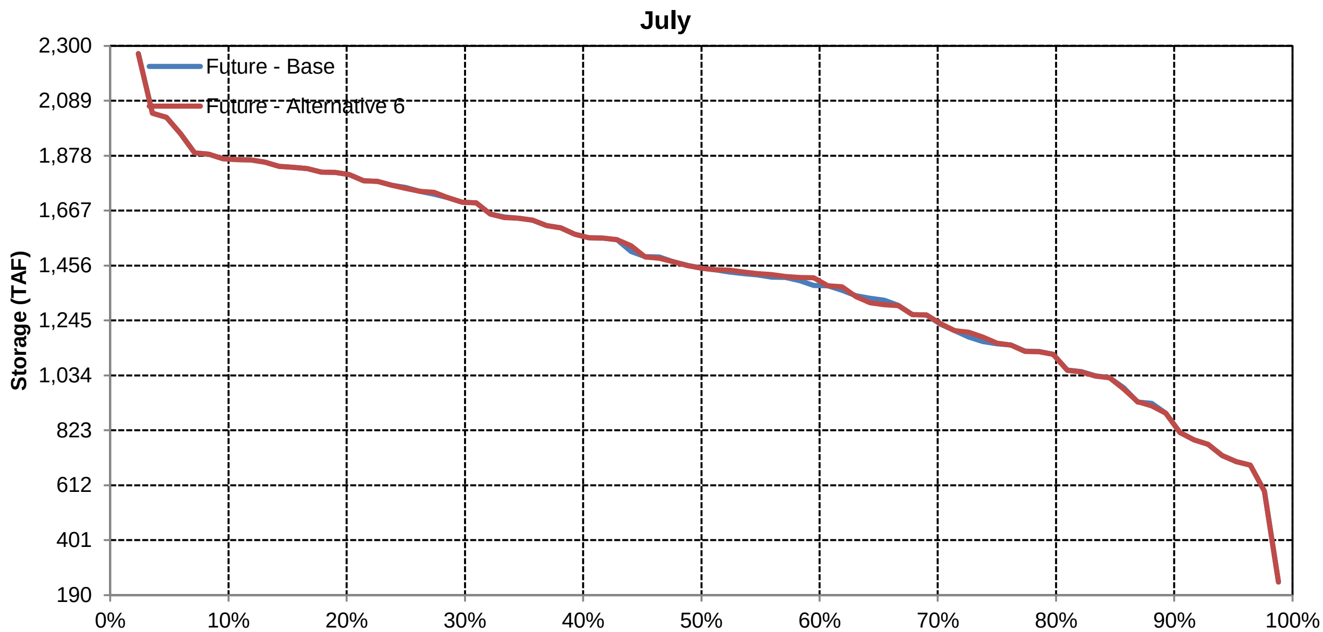

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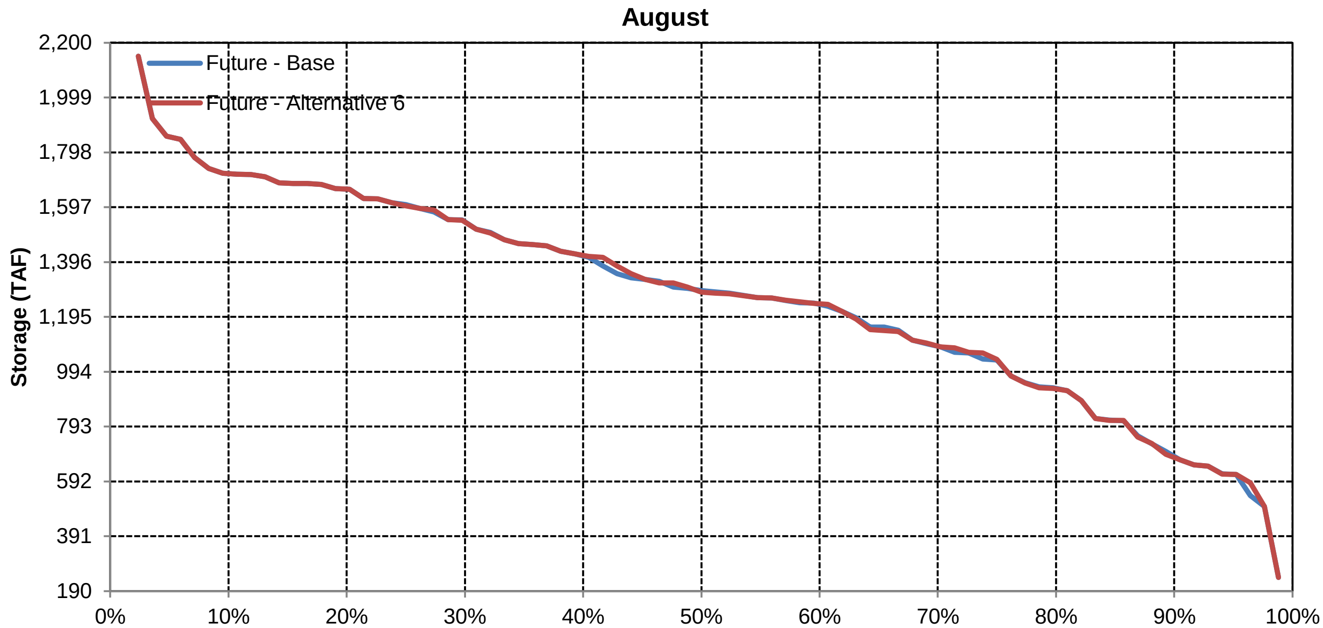
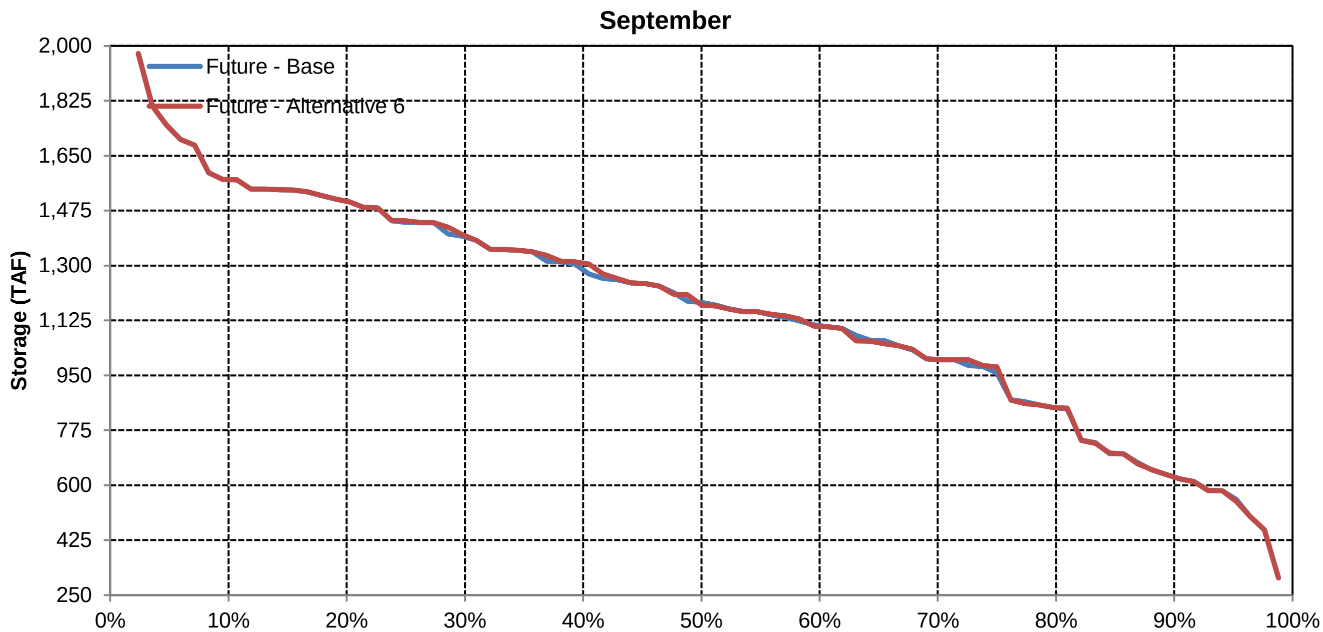




Long-Term and Water Year-Type Average of Shasta Reservoir Storage Under Future - Base and Future - Alternative 6

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
						Long-Term						
Full Simulation Period												
Future - Base	2,225	2,278	2,586	2,961	3,277	3,633	3,825	3,712	3,230	2,717	2,459	2,291
Future - Alternative 6	2,224	2,277	2,587	2,960	3,277	3,633	3,825	3,713	3,231	2,718	2,461	2,291
Difference	-1	-1	0	0	0	0	1	1	2	1	2	1
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
						Water Year-Types						
Wet												
Future - Base	2,396	2,480	2,989	3,394	3,578	3,842	4,228	4,235	3,803	3,242	2,994	2,526
Future - Alternative 6	2,395	2,480	2,990	3,394	3,578	3,842	4,229	4,237	3,805	3,243	2,996	2,527
Difference	-1	0	1	0	0	0	1	2	2	1	2	1
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal												
Future - Base	2,332	2,398	2,734	3,276	3,538	4,067	4,380	4,287	3,779	3,188	2,931	2,693
Future - Alternative 6	2,327	2,392	2,734	3,276	3,538	4,067	4,380	4,288	3,780	3,188	2,932	2,693
Difference	-4	-6	0	0	0	0	0	0	0	0	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Future - Base	2,275	2,333	2,490	3,019	3,412	3,836	4,073	3,949	3,396	2,900	2,674	2,743
Future - Alternative 6	2,278	2,336	2,492	3,020	3,414	3,838	4,074	3,950	3,397	2,900	2,677	2,742
Difference	3	2	2	1	1	1	1	1	1	0	2	-1
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry												
Future - Base	2,104	2,169	2,417	2,659	3,189	3,593	3,618	3,403	2,899	2,449	2,182	2,205
Future - Alternative 6	2,100	2,166	2,414	2,656	3,186	3,590	3,616	3,402	2,899	2,447	2,181	2,203
Difference	-4	-3	-3	-3	-3	-2	-2	-2	-1	-2	-2	-2
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical												
Future - Base	1,906	1,851	1,965	2,171	2,385	2,631	2,519	2,310	1,855	1,394	1,094	1,067
Future - Alternative 6	1,905	1,852	1,968	2,175	2,389	2,635	2,523	2,315	1,862	1,403	1,101	1,074
Difference	0	1	3	3	3	4	4	5	7	9	7	7
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%	1%

Shasta Reservoir Storage

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	3,037	3,187	3,321	3,635	3,916	4,241	4,482	4,552	4,171	3,512	3,194	2,972
20%	2,810	2,927	3,266	3,539	3,777	4,102	4,372	4,324	3,882	3,302	3,029	2,858
30%	2,671	2,735	3,191	3,403	3,662	4,022	4,251	4,224	3,719	3,170	2,942	2,679
40%	2,416	2,533	2,985	3,335	3,537	3,963	4,176	4,142	3,568	3,039	2,823	2,536
50%	2,317	2,324	2,754	3,252	3,445	3,839	4,109	3,953	3,350	2,880	2,669	2,439
60%	2,245	2,200	2,545	2,973	3,289	3,597	4,009	3,839	3,203	2,755	2,499	2,338
70%	2,020	2,057	2,269	2,767	3,252	3,417	3,756	3,608	3,154	2,594	2,360	2,110
80%	1,757	1,817	2,045	2,429	2,913	3,266	3,216	2,997	2,618	2,141	1,806	1,824
90%	884	1,011	1,336	1,917	2,378	2,633	2,534	2,407	1,951	1,420	978	956
Long Term												
Full Simulation Period	2,225	2,278	2,586	2,961	3,277	3,633	3,825	3,712	3,230	2,717	2,459	2,291
Water Year Types												
Wet	2,396	2,480	2,989	3,394	3,578	3,842	4,228	4,235	3,803	3,242	2,994	2,526
Above Normal	2,332	2,398	2,734	3,276	3,538	4,067	4,380	4,287	3,779	3,188	2,931	2,693
Below Normal	2,275	2,333	2,490	3,019	3,412	3,836	4,073	3,949	3,396	2,900	2,674	2,743
Dry	2,104	2,169	2,417	2,659	3,189	3,593	3,618	3,403	2,899	2,449	2,182	2,205
Critical	1,906	1,851	1,965	2,171	2,385	2,631	2,519	2,310	1,855	1,394	1,094	1,067

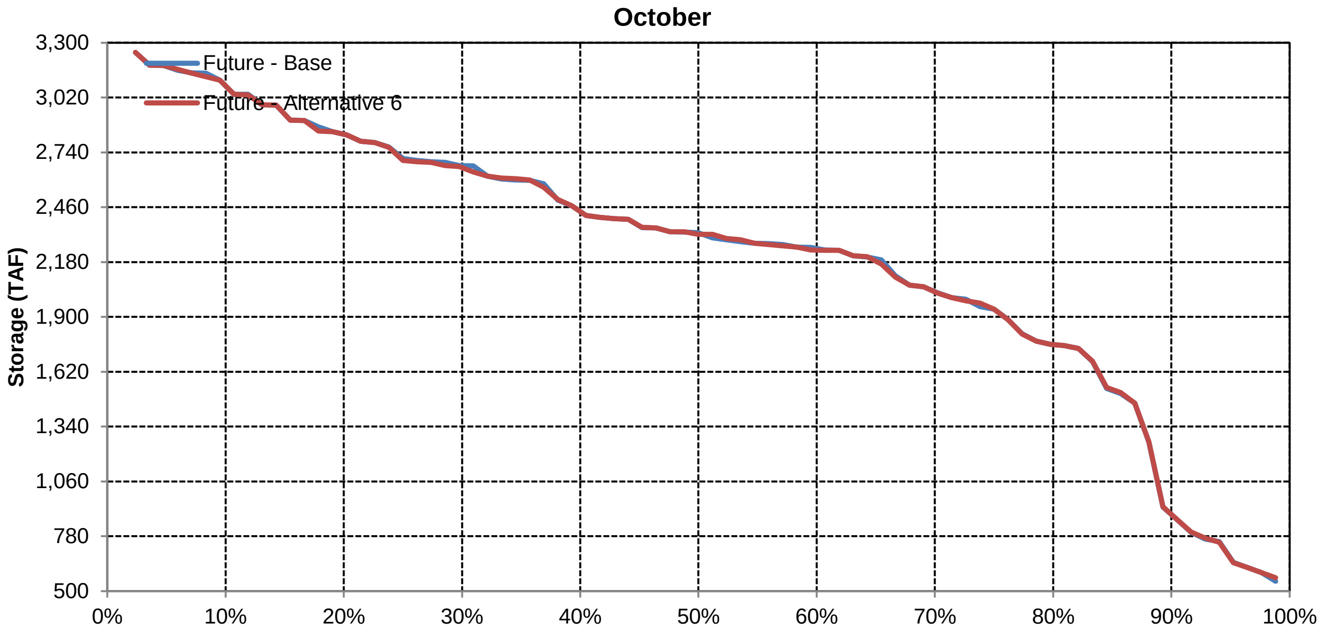
Future - Alternative 6

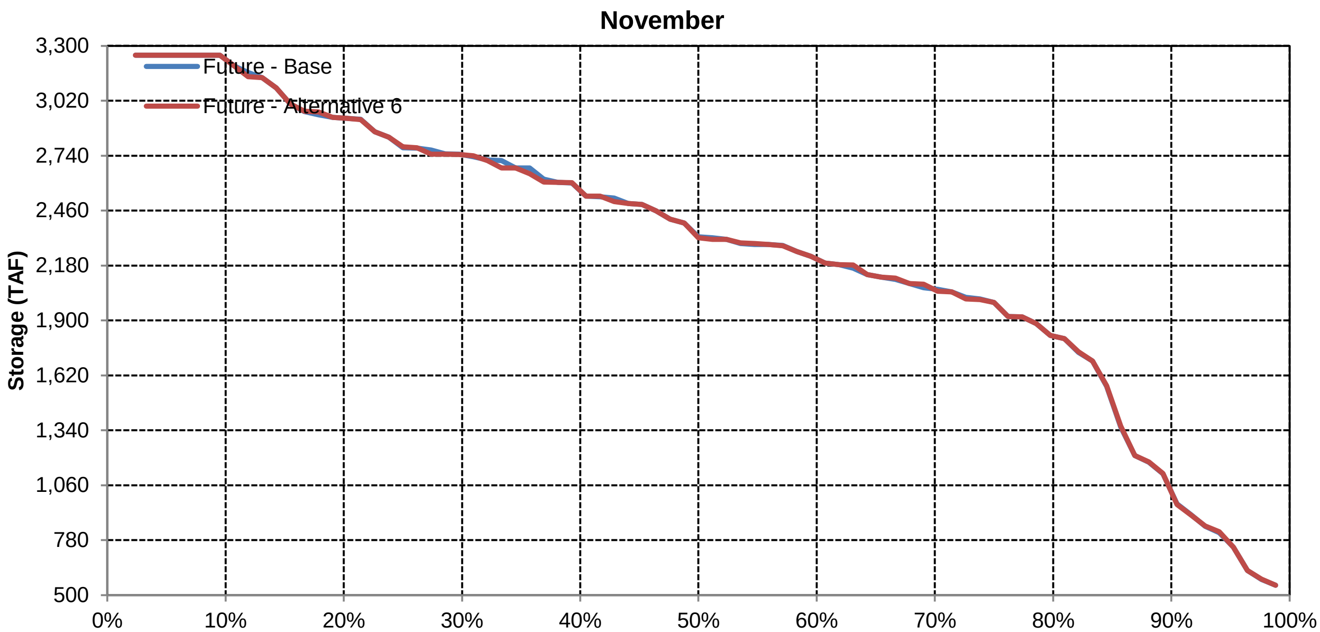
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	3,036	3,181	3,321	3,634	3,916	4,241	4,487	4,552	4,171	3,509	3,224	2,973
20%	2,810	2,927	3,266	3,539	3,777	4,102	4,370	4,320	3,882	3,303	3,036	2,858
30%	2,642	2,740	3,204	3,403	3,662	4,012	4,251	4,224	3,720	3,171	2,942	2,679
40%	2,416	2,534	2,981	3,335	3,529	3,965	4,176	4,143	3,568	3,021	2,820	2,544
50%	2,321	2,317	2,754	3,252	3,445	3,839	4,110	3,953	3,352	2,881	2,669	2,439
60%	2,240	2,200	2,546	2,973	3,283	3,601	4,009	3,836	3,203	2,755	2,502	2,338
70%	2,019	2,049	2,270	2,764	3,252	3,417	3,771	3,614	3,158	2,596	2,356	2,126
80%	1,757	1,817	2,037	2,429	2,913	3,258	3,216	2,992	2,613	2,141	1,806	1,823
90%	885	1,009	1,338	1,921	2,378	2,627	2,530	2,410	1,953	1,423	979	957
Long Term												
Full Simulation Period	2,224	2,277	2,587	2,960	3,277	3,633	3,825	3,713	3,231	2,718	2,461	2,291
Water Year Types												
Wet	2,395	2,480	2,990	3,394	3,578	3,842	4,229	4,237	3,805	3,243	2,996	2,527
Above Normal	2,327	2,392	2,734	3,276	3,538	4,067	4,380	4,288	3,780	3,188	2,932	2,693
Below Normal	2,278	2,336	2,492	3,020	3,414	3,838	4,074	3,950	3,397	2,900	2,677	2,742
Dry	2,100	2,166	2,414	2,656	3,186	3,590	3,616	3,402	2,899	2,447	2,181	2,203
Critical	1,905	1,852	1,968	2,175	2,389	2,635	2,523	2,315	1,862	1,403	1,101	1,074

Future - Alternative 6 Minus Future - Base

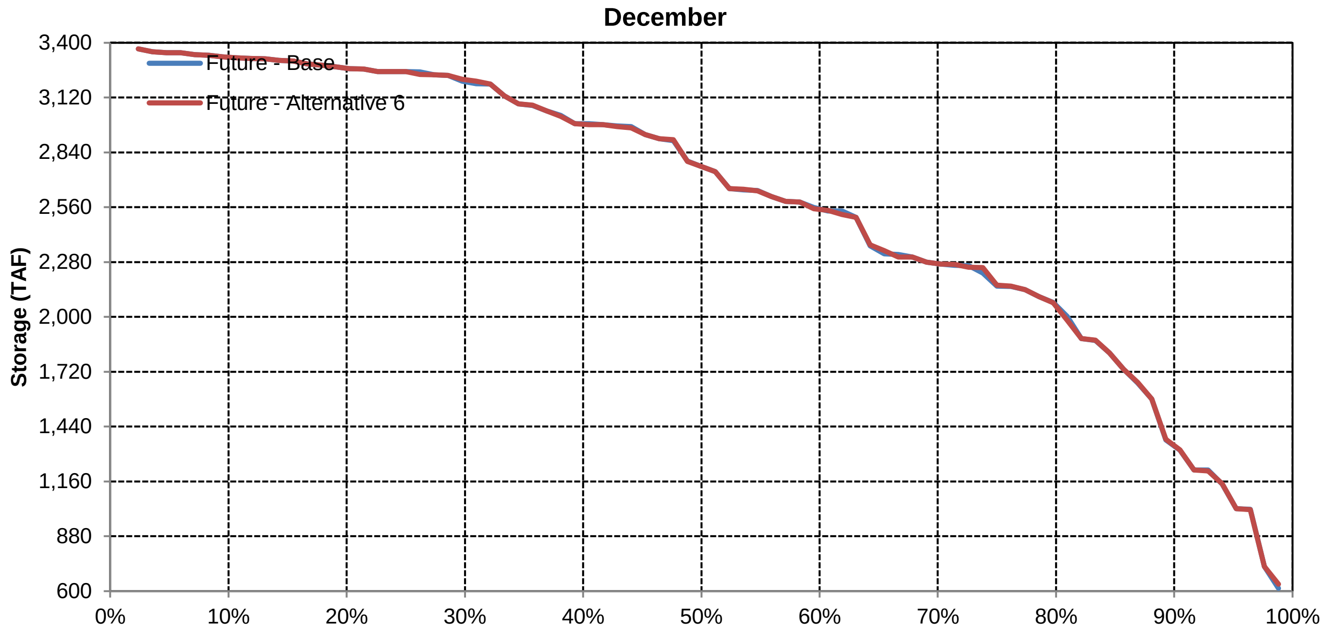
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	-1	-6	0	0	0	0	5	0	0	-3	30	1
20%	0	-1	0	0	0	0	-3	-4	0	0	7	0
30%	-29	4	13	0	0	-11	0	0	0	0	0	0
40%	0	1	-4	0	-8	2	0	0	0	-18	-2	9
50%	4	-6	0	0	0	0	0	0	2	0	0	0
60%	-4	0	2	0	-6	4	0	-2	0	0	3	0
70%	-2	-8	1	-3	0	0	14	6	4	1	-3	17
80%	0	0	-8	0	-1	-8	-1	-5	-5	-1	0	-1
90%	0	-2	3	4	-1	-5	-4	2	2	3	1	1
Long Term												
Full Simulation Period	-1	-1	0	0	0	0	1	1	2	1	2	1
Water Year Types												
Wet	-1	0	1	0	0	0	1	2	2	1	2	1
Above Normal	-4	-6	0	0	0	0	0	0	0	0	0	0
Below Normal	3	2	2	1	1	1	1	1	1	0	2	-1
Dry	-4	-3	-3	-3	-3	-2	-2	-2	-1	-2	-2	-2
Critical	0	1	3	3	3	4	4	5	7	9	7	7

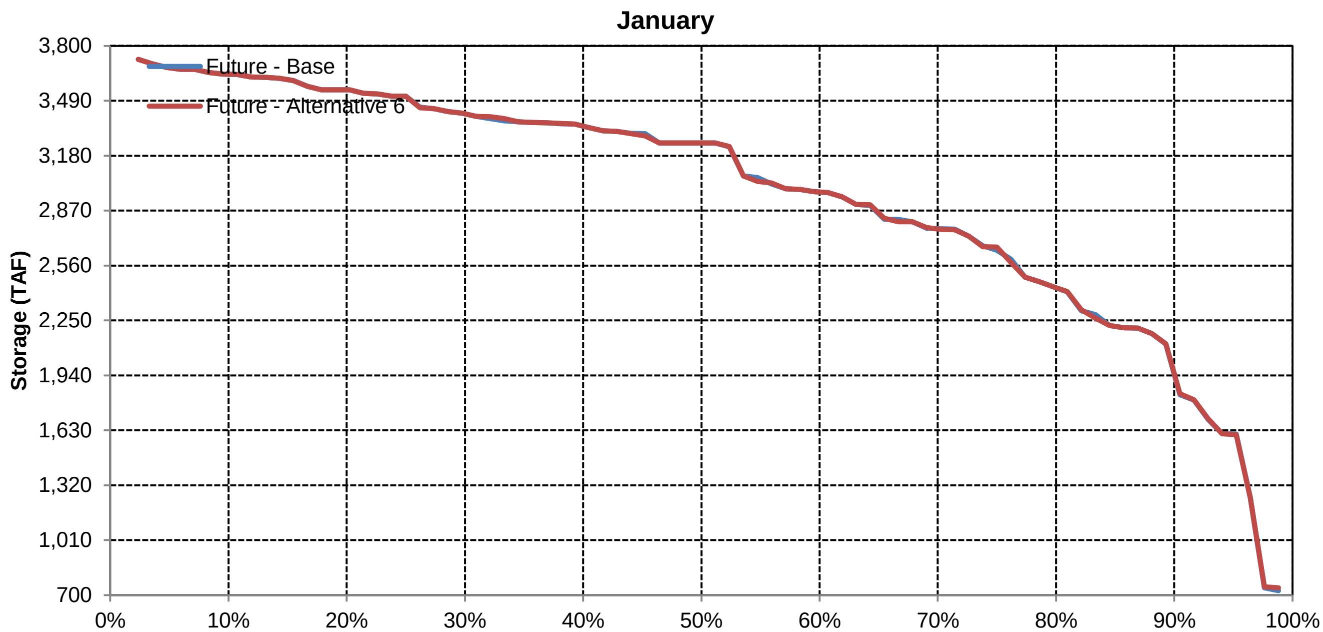
Shasta Reservoir Storage





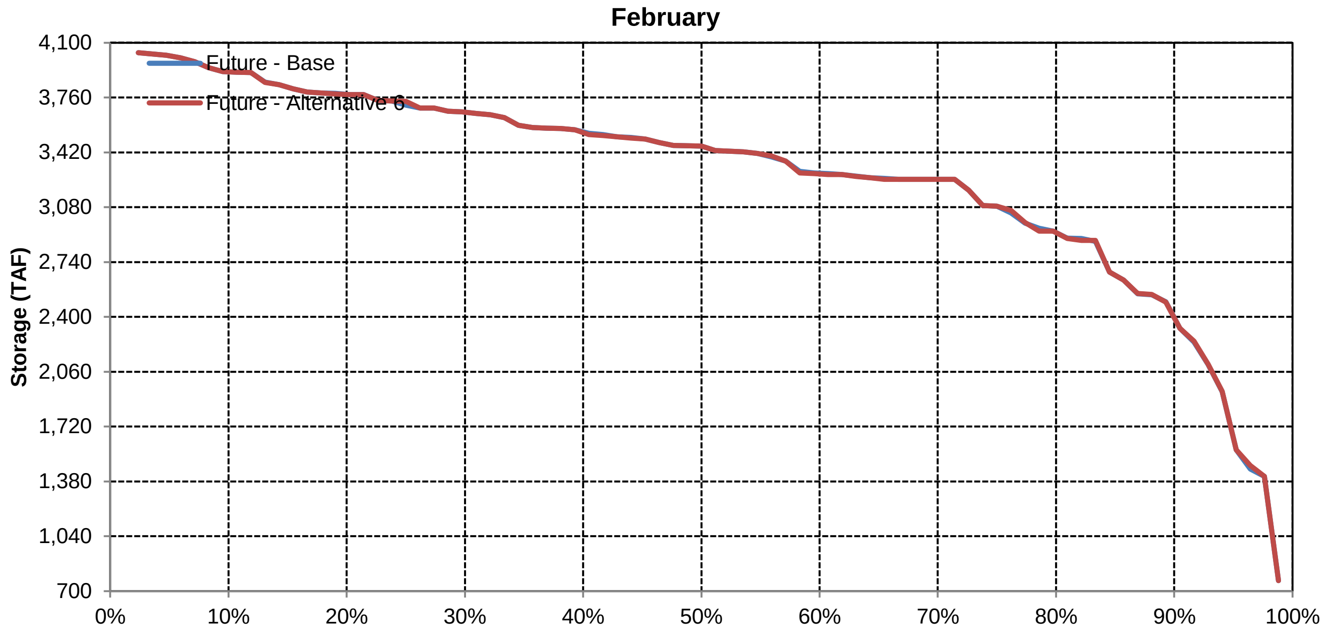
Shasta Reservoir Storage

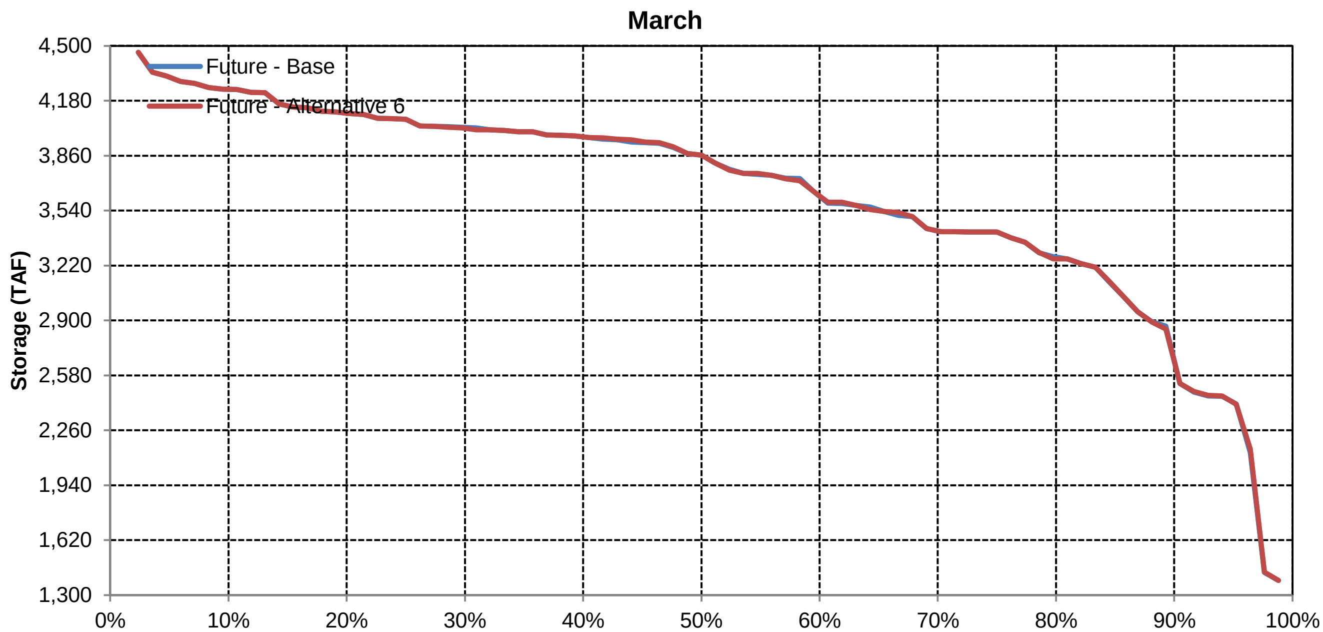




S4

Shasta Reservoir Storage





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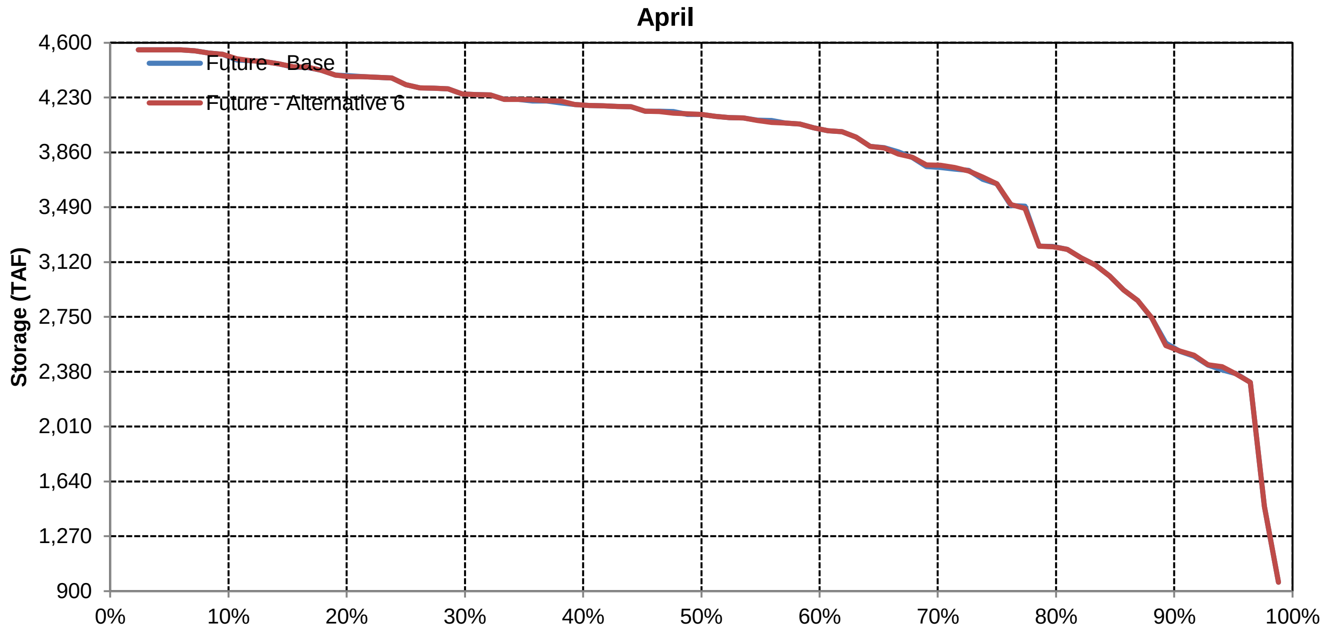

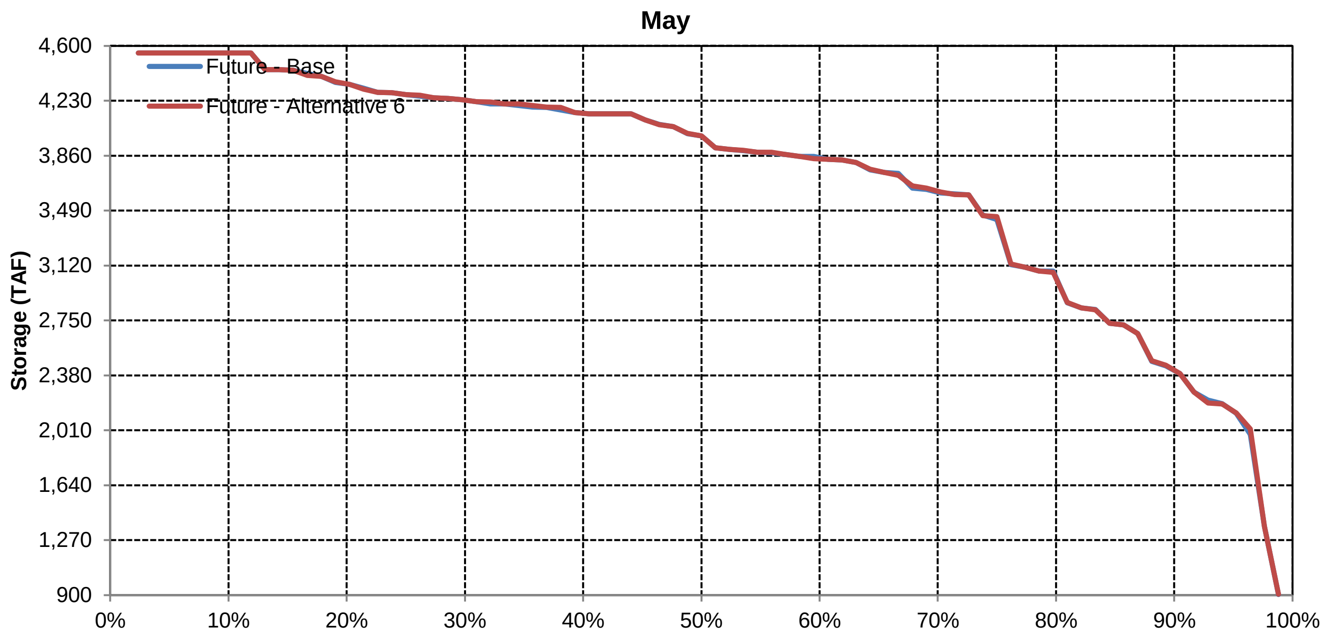

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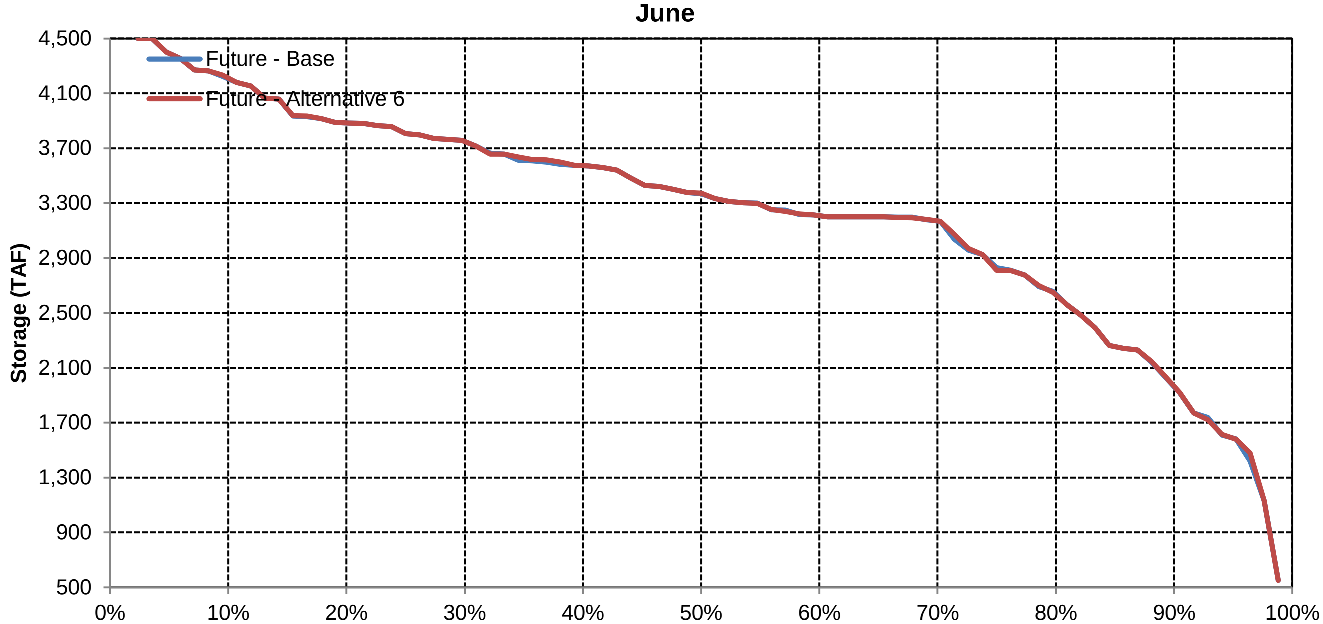
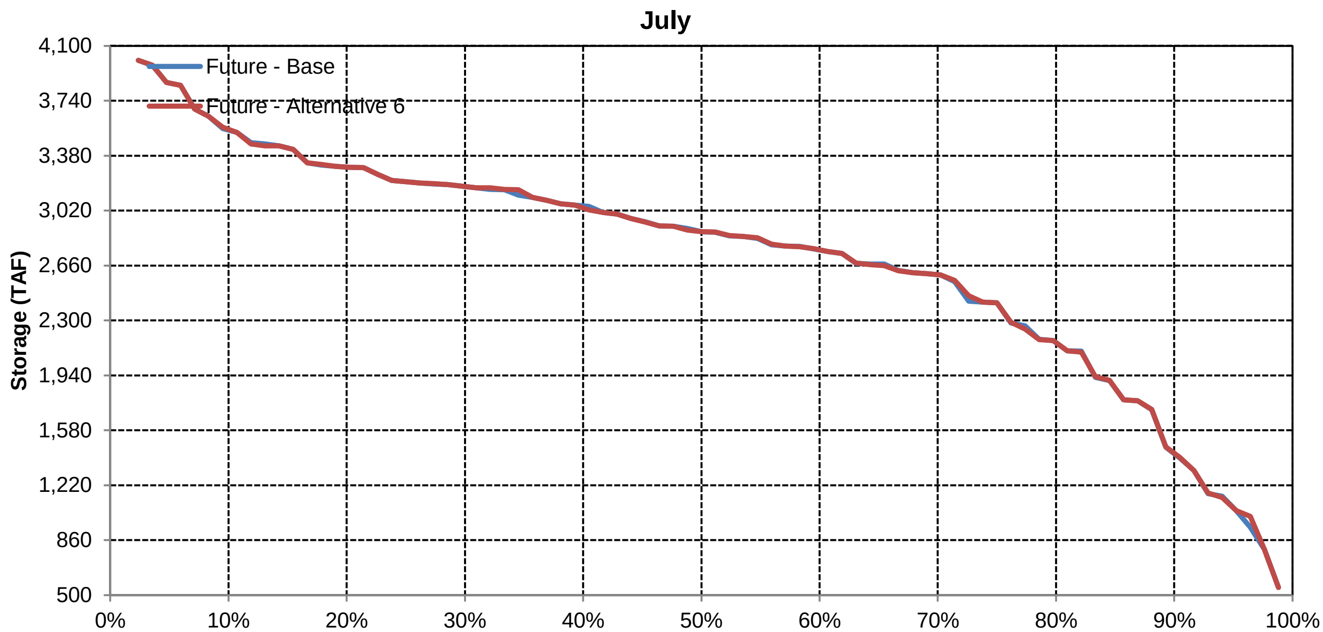
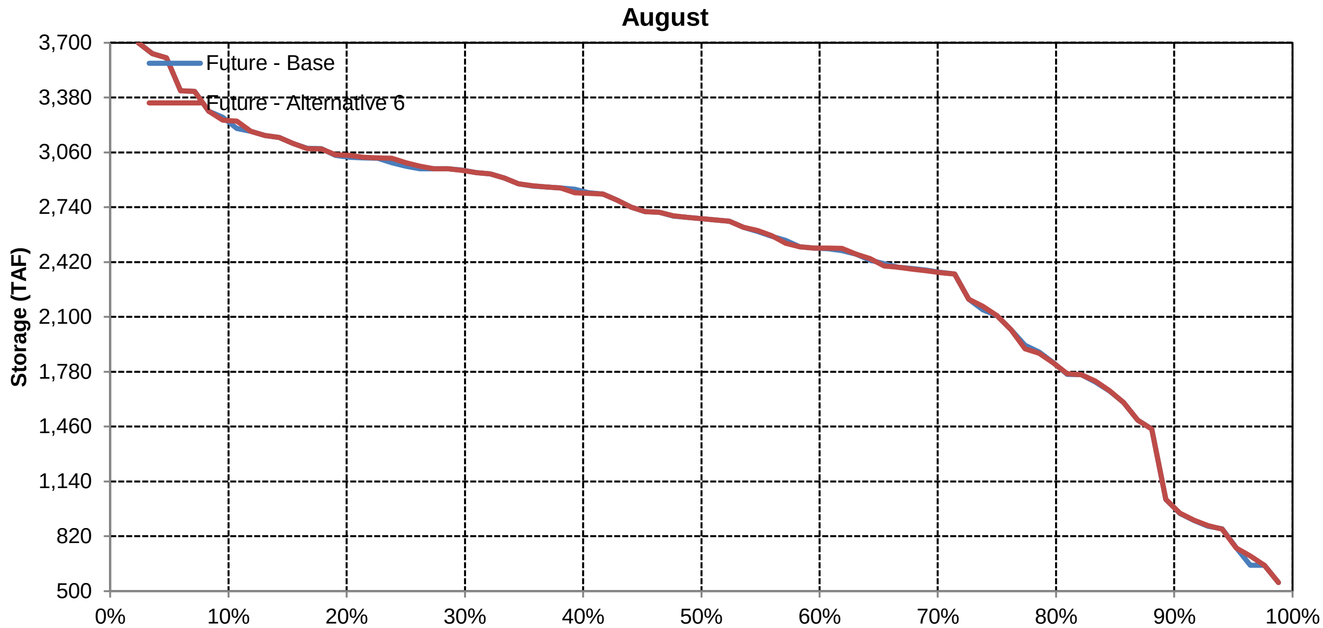
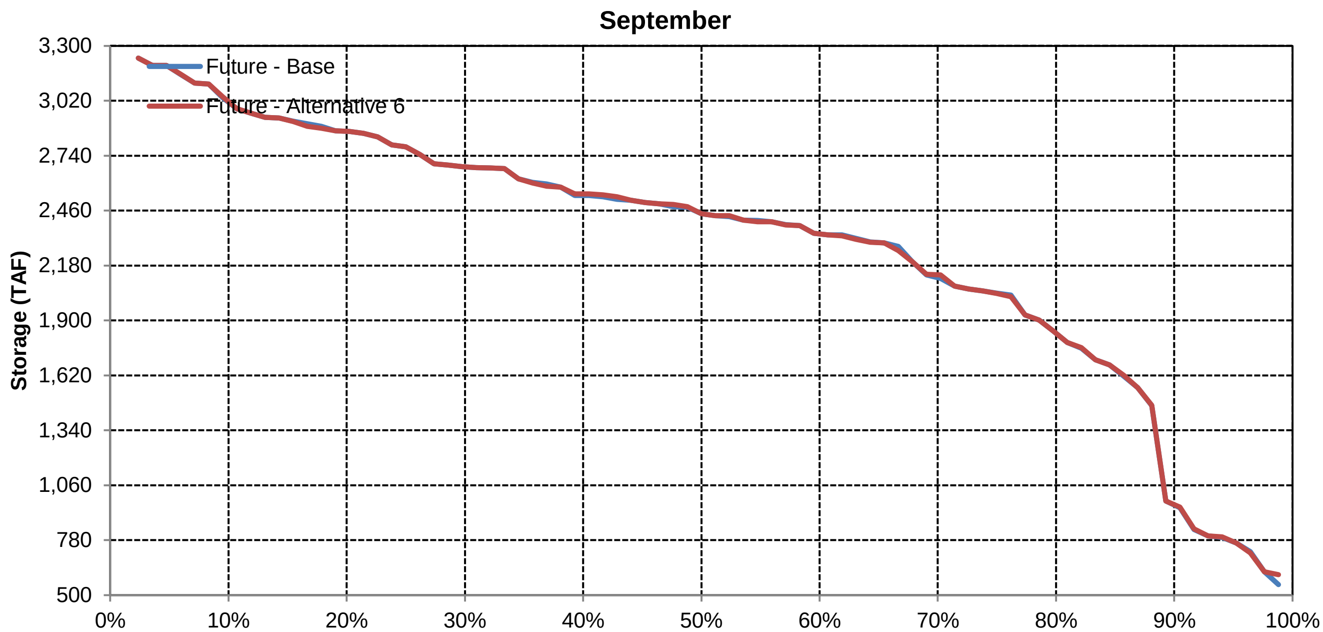




Shasta Reservoir Storage





Long-Term and Water Year-Type Average of Oroville Reservoir Under Future - Base and Future - Alternative 6

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
						Long-Term						
Full Simulation Period												
Future - Base	1,244	1,285	1,585	1,975	2,295	2,515	2,665	2,627	2,322	1,842	1,548	1,355
Future - Alternative 6	1,247	1,288	1,587	1,978	2,297	2,517	2,667	2,629	2,326	1,846	1,550	1,358
Difference	3	3	2	3	2	2	2	2	4	4	2	3
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
						Water Year-Types						
Wet												
Future - Base	1,339	1,496	2,168	2,719	2,891	2,940	3,223	3,257	2,987	2,389	2,023	1,633
Future - Alternative 6	1,342	1,501	2,171	2,720	2,891	2,940	3,223	3,257	2,987	2,390	2,026	1,636
Difference	4	5	3	1	0	0	0	0	0	1	3	3
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal												
Future - Base	1,447	1,447	1,640	2,269	2,768	2,962	3,196	3,169	2,777	2,174	1,831	1,539
Future - Alternative 6	1,452	1,449	1,647	2,273	2,769	2,962	3,196	3,169	2,777	2,174	1,831	1,540
Difference	5	2	7	4	1	0	0	0	0	1	0	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Future - Base	1,249	1,221	1,348	1,711	2,121	2,564	2,712	2,662	2,276	1,745	1,468	1,397
Future - Alternative 6	1,252	1,222	1,349	1,713	2,124	2,566	2,714	2,668	2,292	1,761	1,473	1,402
Difference	2	1	1	2	2	2	2	6	16	16	6	5
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%	0%	0%
Dry												
Future - Base	1,100	1,111	1,253	1,469	1,902	2,247	2,284	2,176	1,845	1,457	1,207	1,161
Future - Alternative 6	1,102	1,114	1,253	1,472	1,905	2,248	2,286	2,177	1,844	1,456	1,206	1,162
Difference	2	3	1	2	2	2	2	2	-1	-1	-1	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical												
Future - Base	1,087	1,038	1,079	1,222	1,410	1,580	1,555	1,479	1,306	1,102	916	863
Future - Alternative 6	1,086	1,037	1,081	1,227	1,416	1,586	1,561	1,484	1,319	1,111	916	869
Difference	0	0	2	5	5	5	5	6	13	9	0	6
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%	0%	1%

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	1,636	1,973	2,788	2,854	2,994	3,059	3,347	3,446	3,357	2,744	2,228	1,836
20%	1,502	1,552	2,259	2,788	2,856	2,991	3,237	3,254	3,034	2,401	2,003	1,666
30%	1,413	1,392	1,723	2,787	2,788	2,938	3,180	3,142	2,680	2,176	1,819	1,572
40%	1,252	1,284	1,473	2,185	2,788	2,833	3,081	3,034	2,528	1,958	1,679	1,439
50%	1,159	1,175	1,411	1,820	2,492	2,788	2,979	2,790	2,386	1,840	1,570	1,325
60%	1,084	1,076	1,258	1,613	2,165	2,539	2,672	2,667	2,222	1,693	1,307	1,222
70%	998	1,001	1,180	1,458	1,946	2,268	2,297	2,185	1,924	1,499	1,201	1,097
80%	985	953	1,002	1,258	1,538	1,950	2,026	1,954	1,706	1,328	1,052	995
90%	829	891	941	1,010	1,262	1,594	1,557	1,411	1,216	1,006	916	879
Long Term												
Full Simulation Period	1,244	1,285	1,585	1,975	2,295	2,515	2,665	2,627	2,322	1,842	1,548	1,355
Water Year Types												
Wet	1,339	1,496	2,168	2,719	2,891	2,940	3,223	3,257	2,987	2,389	2,023	1,633
Above Normal	1,447	1,447	1,640	2,269	2,768	2,962	3,196	3,169	2,777	2,174	1,831	1,539
Below Normal	1,249	1,221	1,348	1,711	2,121	2,564	2,712	2,662	2,276	1,745	1,468	1,397
Dry	1,100	1,111	1,253	1,469	1,902	2,247	2,284	2,176	1,845	1,457	1,207	1,161
Critical	1,087	1,038	1,079	1,222	1,410	1,580	1,555	1,479	1,306	1,102	916	863

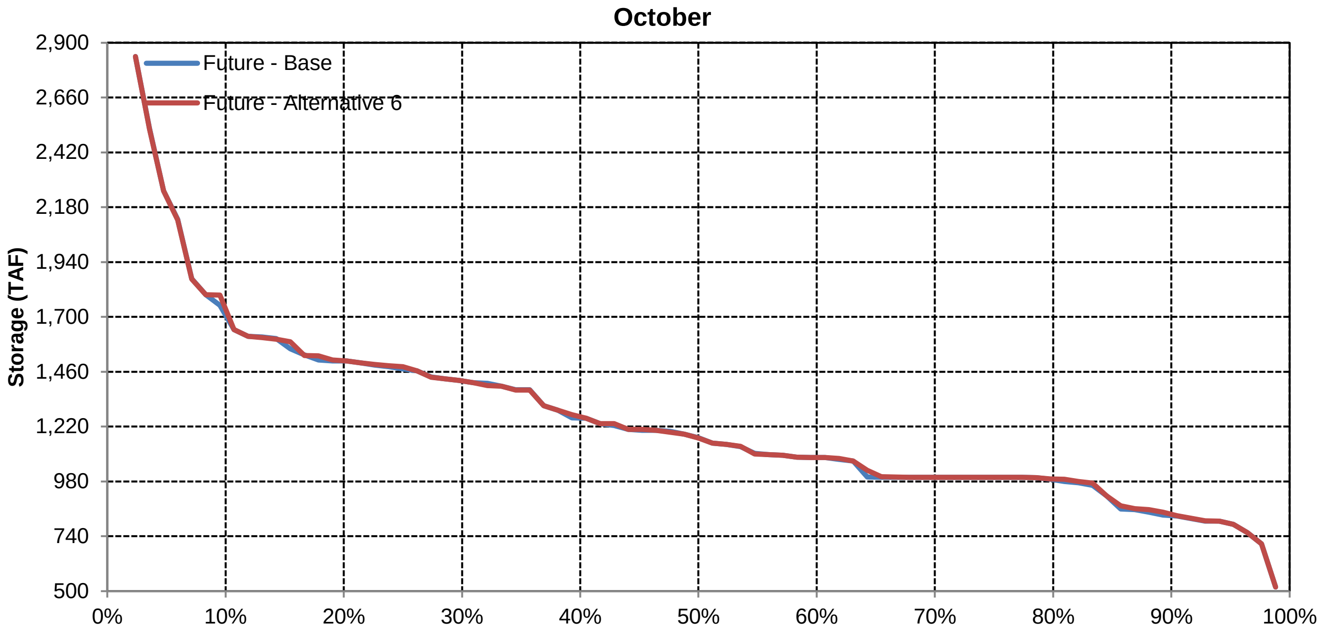
Future - Alternative 6

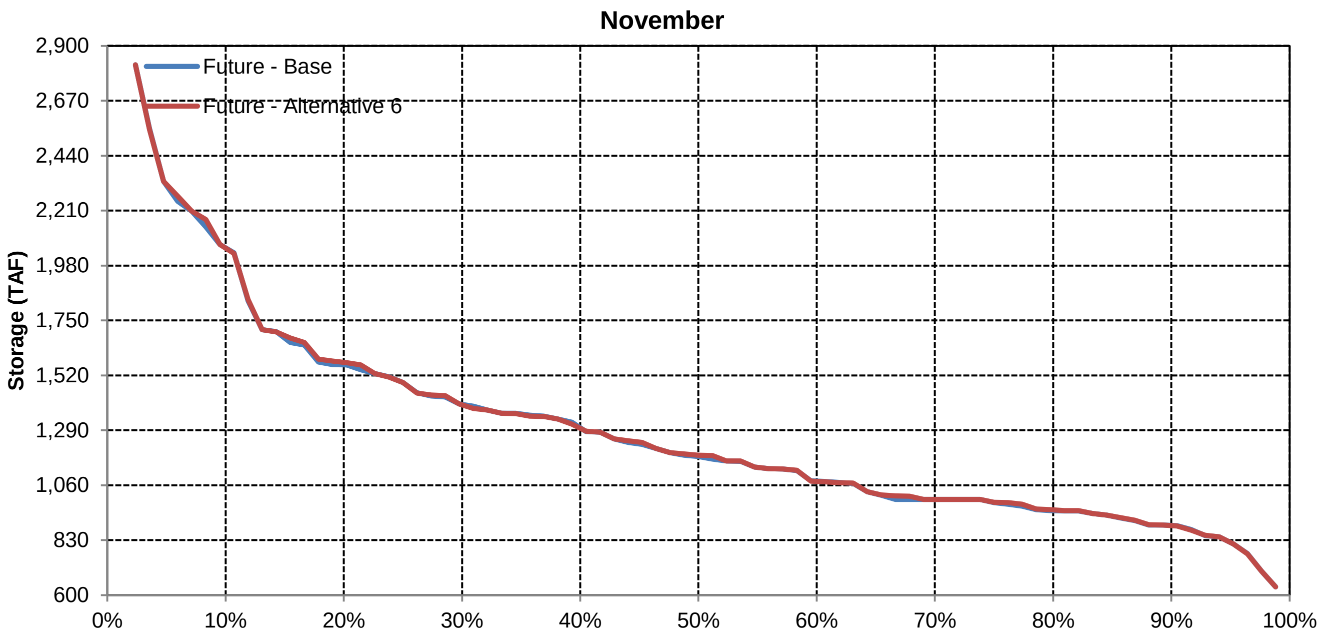
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	1,636	1,973	2,788	2,854	2,994	3,059	3,347	3,446	3,357	2,762	2,227	1,834
20%	1,502	1,568	2,266	2,788	2,856	2,991	3,237	3,254	3,034	2,401	2,004	1,667
30%	1,413	1,384	1,758	2,787	2,788	2,938	3,180	3,142	2,688	2,176	1,819	1,593
40%	1,252	1,285	1,474	2,185	2,788	2,844	3,081	3,049	2,530	1,985	1,679	1,439
50%	1,159	1,185	1,412	1,819	2,496	2,788	2,979	2,790	2,386	1,845	1,570	1,322
60%	1,084	1,075	1,258	1,614	2,165	2,539	2,672	2,667	2,222	1,693	1,341	1,228
70%	998	1,001	1,181	1,458	1,946	2,269	2,297	2,185	1,927	1,503	1,199	1,093
80%	990	956	1,003	1,259	1,577	1,947	2,024	1,950	1,727	1,320	1,025	996
90%	834	891	941	1,025	1,262	1,594	1,557	1,412	1,217	1,007	917	885
Long Term												
Full Simulation Period	1,247	1,288	1,587	1,978	2,297	2,517	2,667	2,629	2,326	1,846	1,550	1,358
Water Year Types												
Wet	1,342	1,501	2,171	2,720	2,891	2,940	3,223	3,257	2,987	2,390	2,026	1,636
Above Normal	1,452	1,449	1,647	2,273	2,769	2,962	3,196	3,169	2,777	2,174	1,831	1,540
Below Normal	1,252	1,222	1,349	1,713	2,124	2,566	2,714	2,668	2,292	1,761	1,473	1,402
Dry	1,102	1,114	1,253	1,472	1,905	2,248	2,286	2,177	1,844	1,456	1,206	1,162
Critical	1,086	1,037	1,081	1,227	1,416	1,586	1,561	1,484	1,319	1,111	916	869

Future - Alternative 6 Minus Future - Base

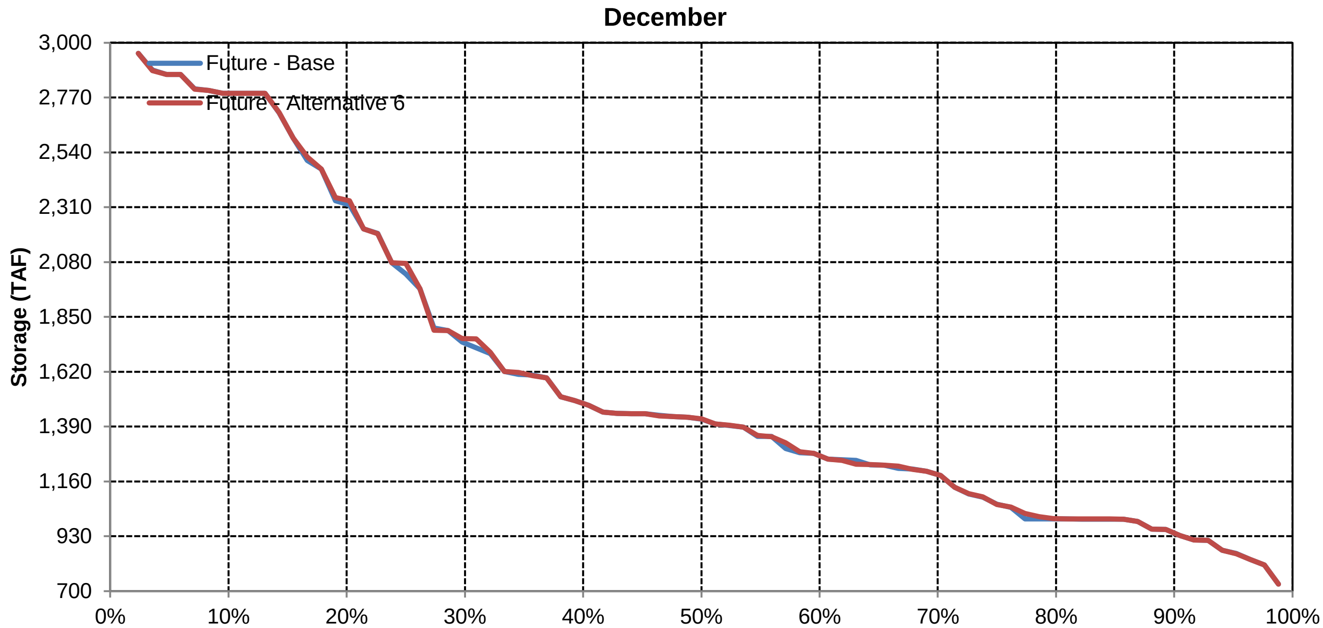
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	17	-1	-2
20%	0	16	7	0	0	0	0	0	0	0	1	0
30%	-1	-9	35	0	0	0	0	0	9	0	0	20
40%	0	1	0	0	0	11	0	15	3	27	0	0
50%	0	10	1	-1	4	0	0	0	0	5	0	-2
60%	0	-1	0	1	0	0	0	0	0	0	34	6
70%	0	0	1	0	0	1	0	0	3	4	-2	-4
80%	5	3	1	0	39	-3	-2	-3	21	-8	-27	1
90%	5	0	0	15	0	0	1	1	1	1	1	6
Long Term												
Full Simulation Period	3	3	2	3	2	2	2	2	4	4	2	3
Water Year Types												
Wet	4	5	3	1	0	0	0	0	0	1	3	3
Above Normal	5	2	7	4	1	0	0	0	0	1	0	0
Below Normal	2	1	1	2	2	2	2	6	16	16	6	5
Dry	2	3	1	2	2	2	2	2	-1	-1	-1	0
Critical	0	0	2	5	5	5	5	6	13	9	0	6

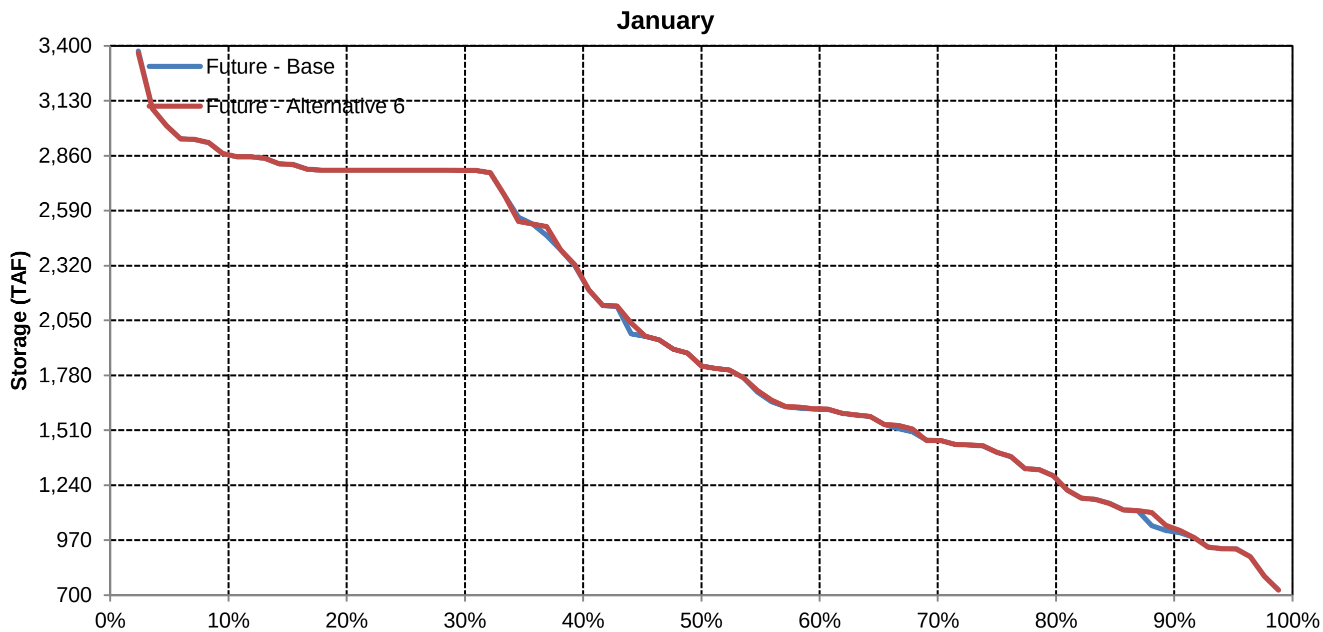
Oroville Reservoir



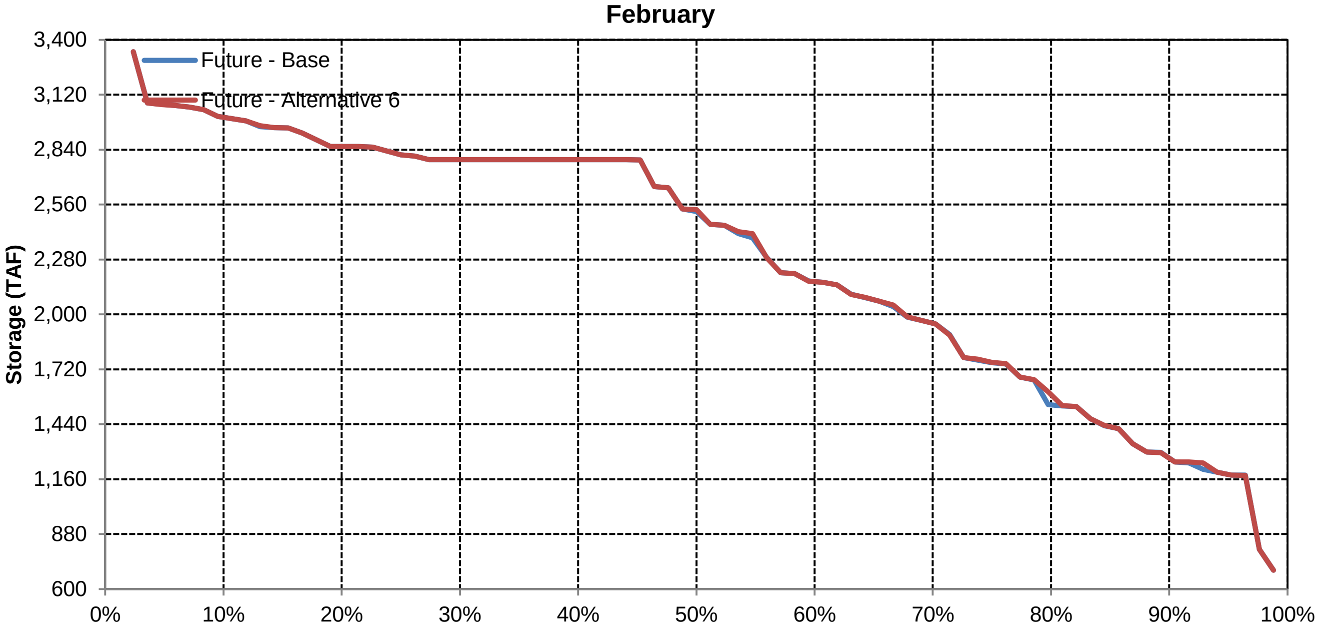


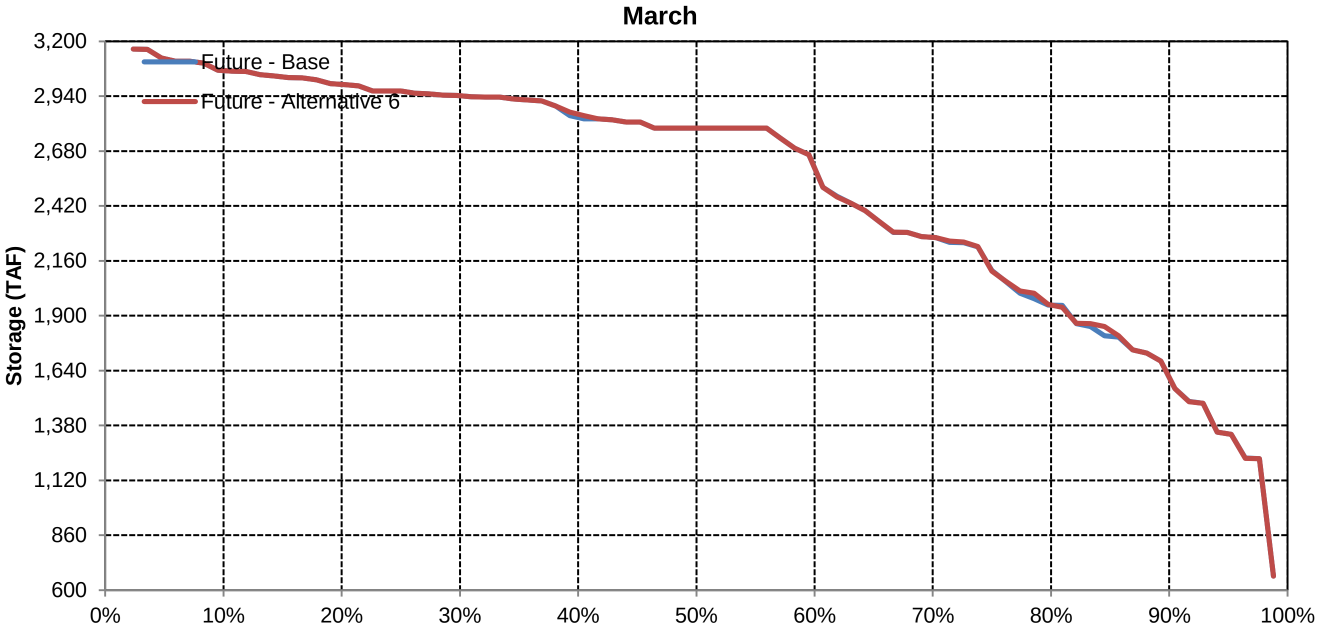
Oroville Reservoir



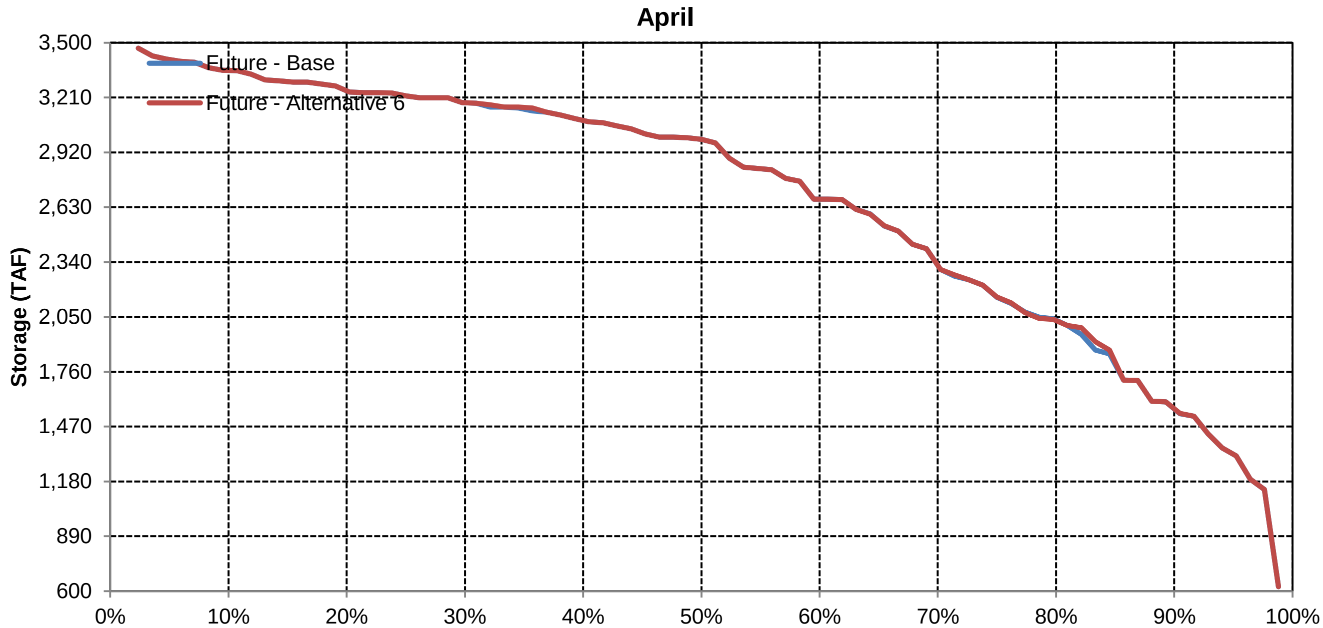


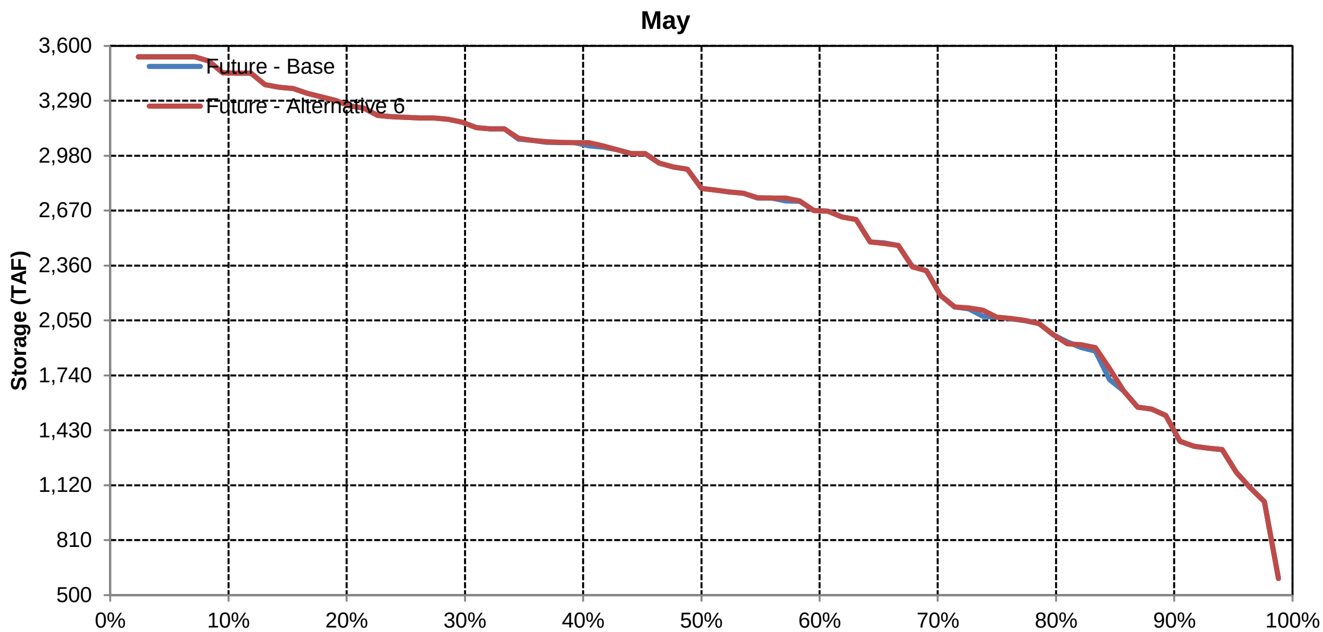
Oroville Reservoir



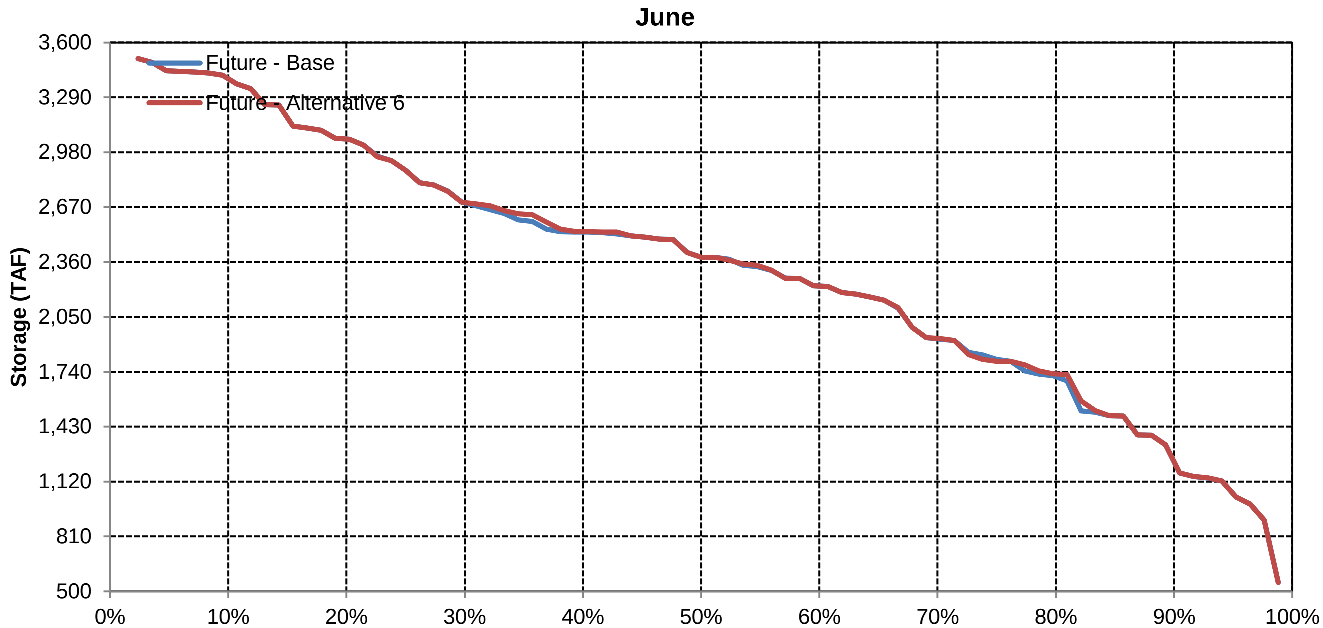


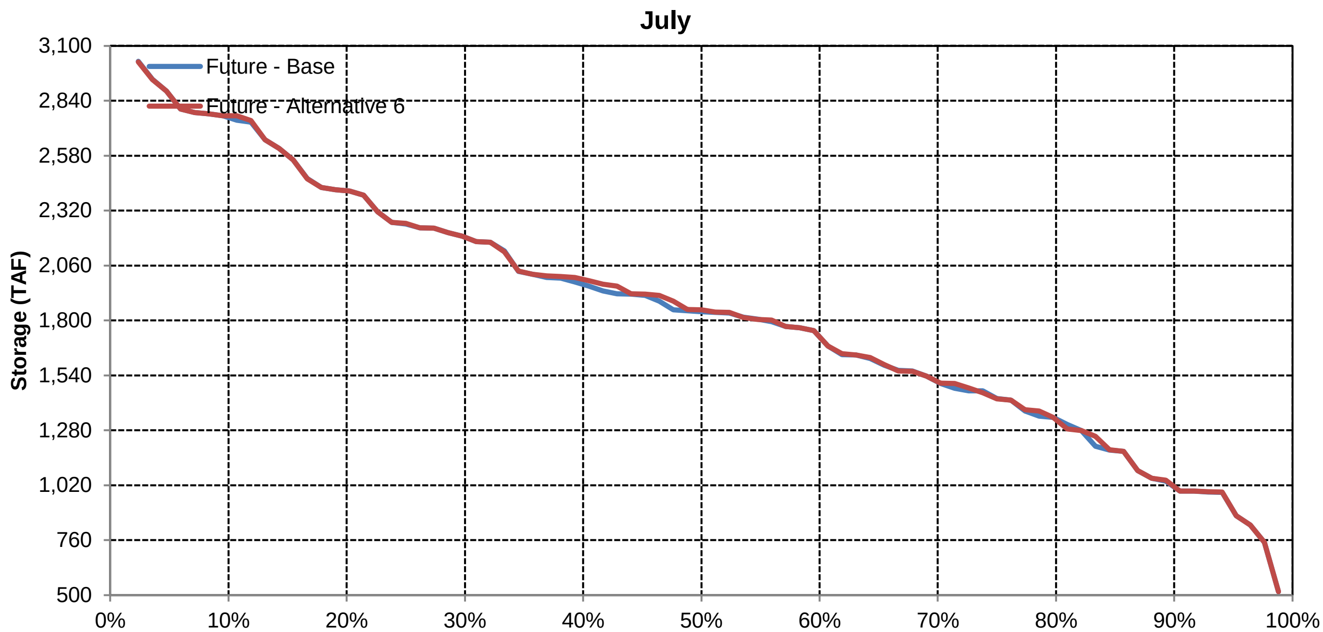
Oroville Reservoir



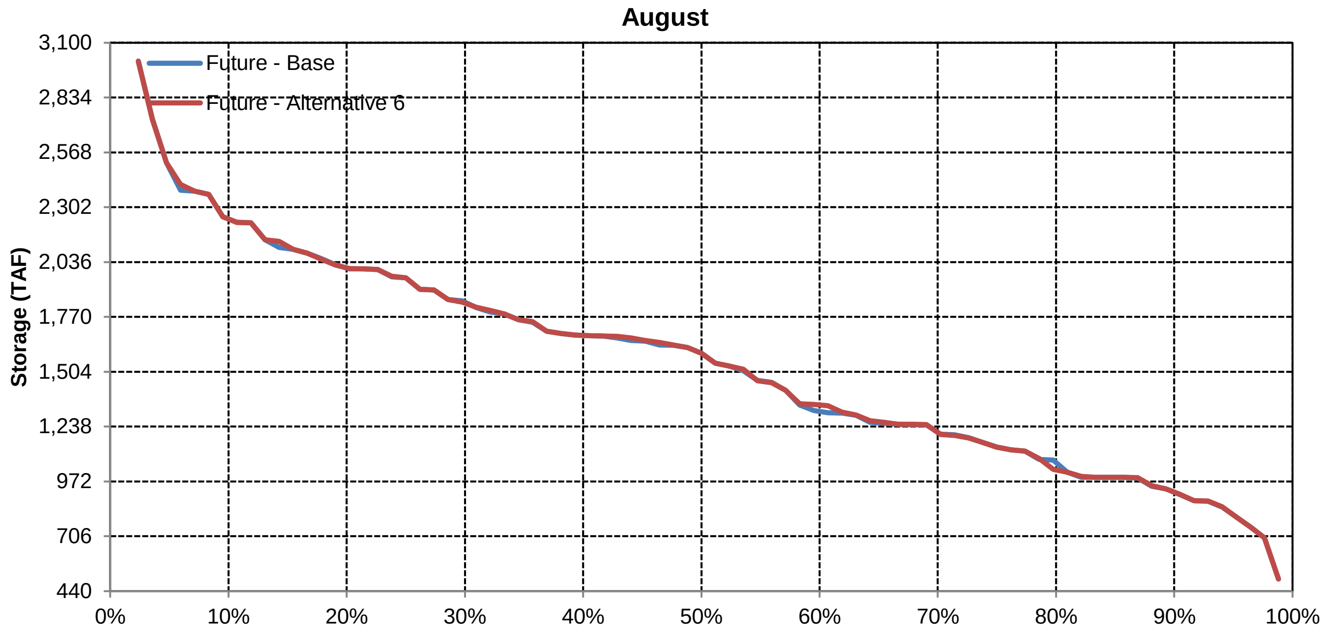


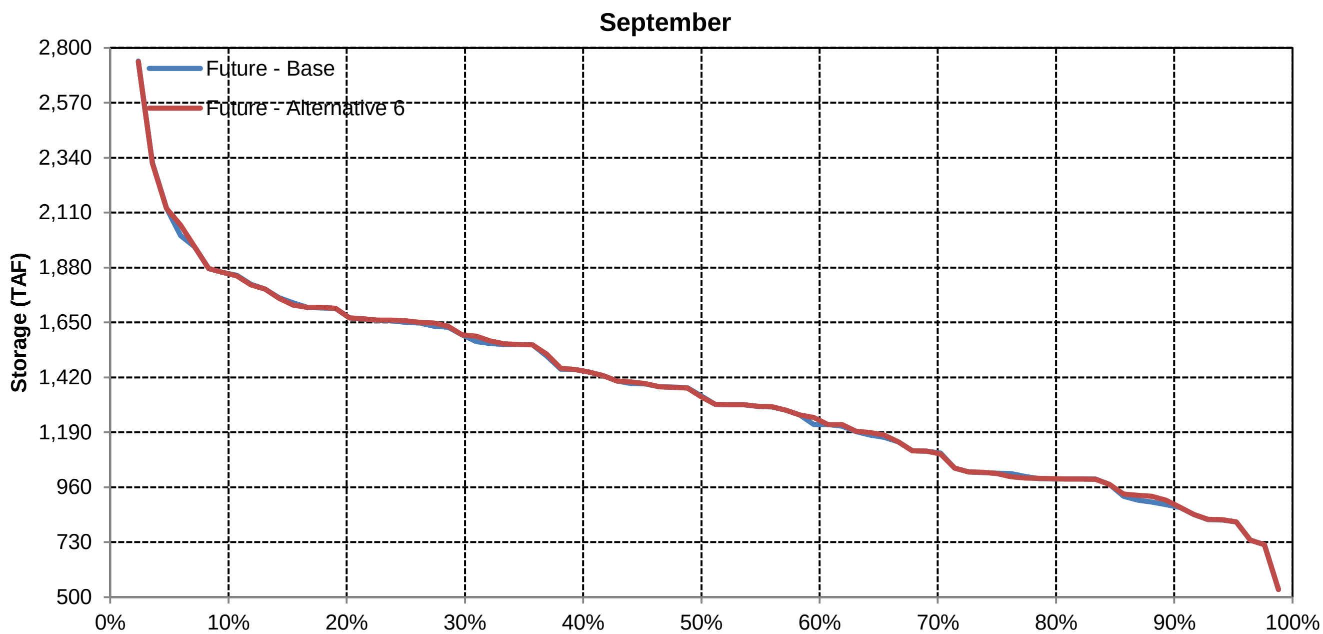
Oroville Reservoir





Oroville Reservoir





S6

Long-Term and Water Year-Type Average of Folsom Reservoir Under Future - Base and Future - Alternative 6

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
						Long-Term						
Full Simulation Period												
Future - Base	354	352	404	454	482	592	680	678	580	460	427	390
Future - Alternative 6	355	352	406	455	483	593	682	679	581	461	428	392
Difference	1	0	2	2	1	1	1	1	1	0	1	1
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
						Water Year-Types						
Wet												
Future - Base	368	385	480	522	509	624	760	806	699	547	509	430
Future - Alternative 6	368	385	480	522	509	624	760	806	699	546	508	430
Difference	0	0	0	0	0	0	0	0	-1	-1	-1	0
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal												
Future - Base	363	358	415	512	550	644	766	766	668	492	471	427
Future - Alternative 6	365	357	415	512	550	644	766	766	668	492	471	426
Difference	2	-1	0	0	0	0	0	0	0	0	0	0
Percent Difference	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Future - Base	375	361	399	471	508	624	727	714	609	493	465	455
Future - Alternative 6	375	362	400	471	508	624	727	714	610	495	467	457
Difference	1	1	1	0	0	0	0	0	1	1	2	2
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%
Dry												
Future - Base	336	332	372	411	477	592	646	596	489	395	356	357
Future - Alternative 6	337	333	373	412	478	592	646	596	491	396	359	360
Difference	1	1	2	2	1	0	0	0	1	1	2	2
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%
Critical												
Future - Base	321	298	288	306	341	440	436	418	360	317	287	256
Future - Alternative 6	323	299	298	314	349	447	444	424	364	318	286	260
Difference	1	2	10	8	7	8	8	6	4	1	0	4
Percent Difference	0%	1%	3%	3%	2%	2%	2%	1%	1%	0%	0%	2%

Folsom Reservoir

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	487	501	567	567	567	662	792	939	828	636	580	540
20%	445	437	566	567	567	656	792	820	729	587	548	504
30%	395	394	498	564	563	652	792	763	694	549	519	455
40%	365	365	432	556	557	645	791	745	621	495	483	417
50%	349	342	392	507	549	629	766	706	592	443	413	396
60%	321	327	352	454	495	616	701	656	538	418	388	360
70%	304	311	319	372	443	590	635	600	500	383	356	333
80%	269	272	302	305	386	565	554	498	404	332	305	295
90%	223	217	252	260	302	426	437	426	355	311	276	231
Long Term												
Full Simulation Period	354	352	404	454	482	592	680	678	580	460	427	390
Water Year Types												
Wet	368	385	480	522	509	624	760	806	699	547	509	430
Above Normal	363	358	415	512	550	644	766	766	668	492	471	427
Below Normal	375	361	399	471	508	624	727	714	609	493	465	455
Dry	336	332	372	411	477	592	646	596	489	395	356	357
Critical	321	298	288	306	341	440	436	418	360	317	287	256

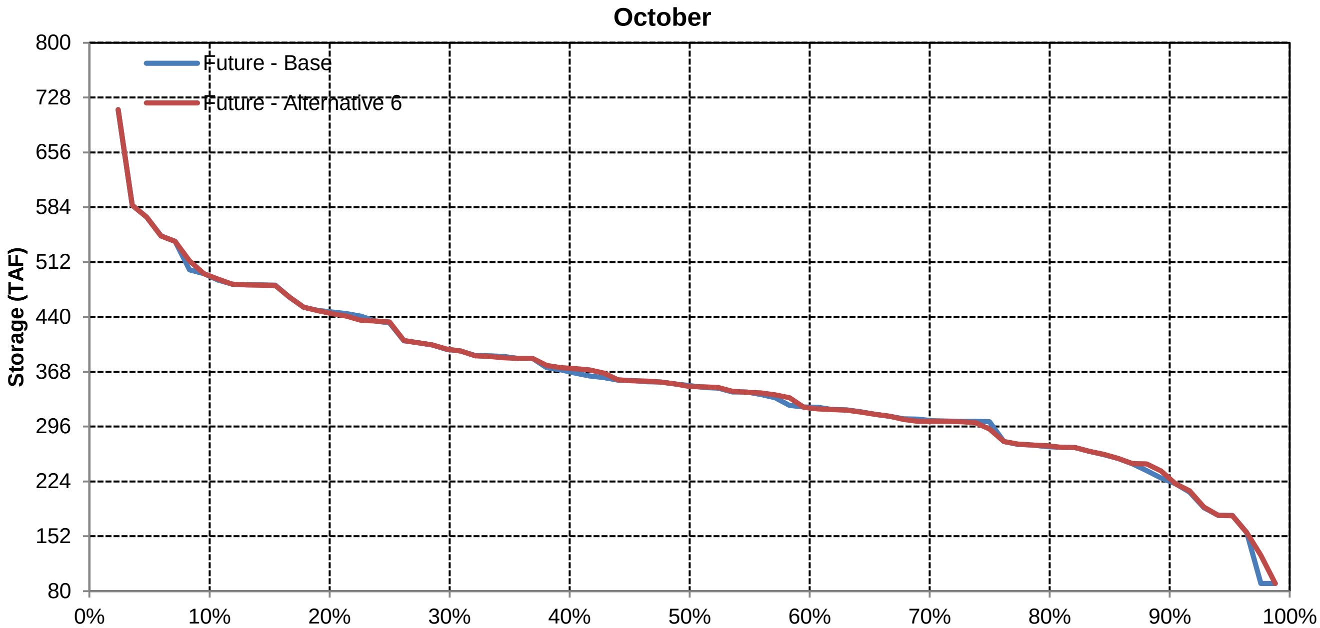
Future - Alternative 6

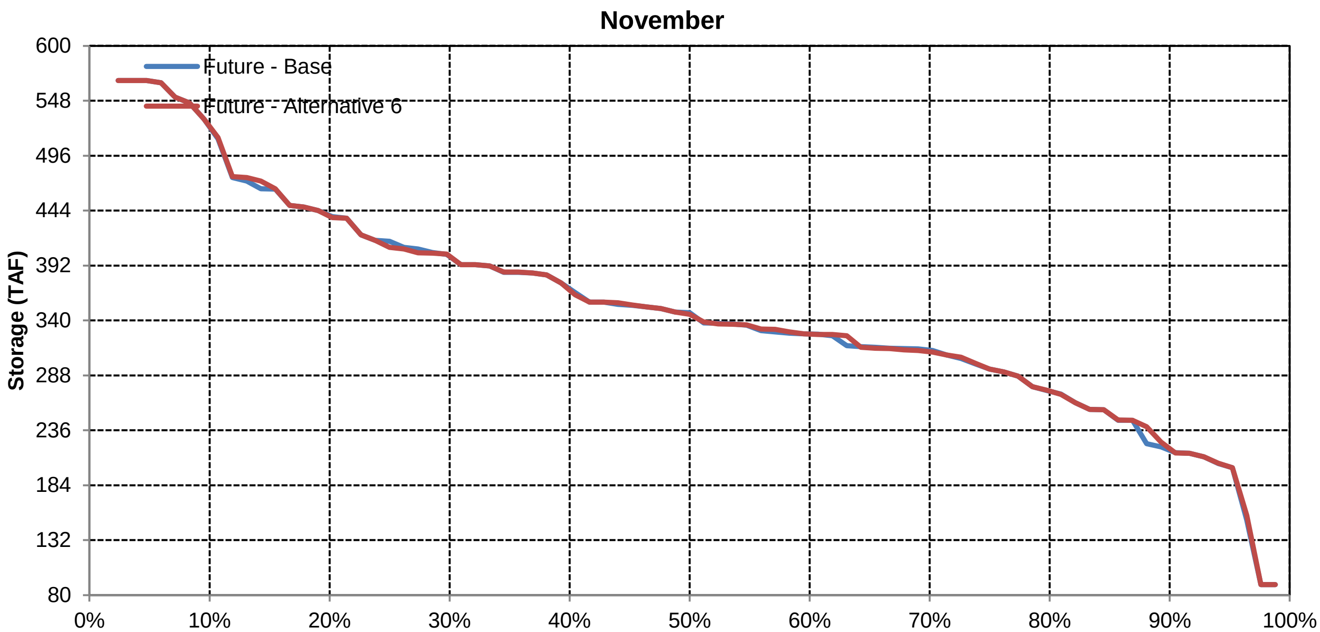
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	488	502	567	567	567	662	792	939	829	636	581	541
20%	442	437	564	567	567	656	792	820	729	587	548	503
30%	395	394	498	564	563	654	792	763	694	548	519	455
40%	372	363	434	556	557	646	791	745	621	495	483	421
50%	348	342	391	507	549	632	766	706	592	444	419	396
60%	320	327	352	454	495	618	700	656	537	417	388	360
70%	303	310	318	383	446	593	635	600	502	381	355	334
80%	270	272	303	305	386	565	554	498	404	331	306	295
90%	226	218	251	262	305	426	447	443	362	311	276	232
Long Term												
Full Simulation Period	355	352	406	455	483	593	682	679	581	461	428	392
Water Year Types												
Wet	368	385	480	522	509	624	760	806	699	546	508	430
Above Normal	365	357	415	512	550	644	766	766	668	492	471	426
Below Normal	375	362	400	471	508	624	727	714	610	495	467	457
Dry	337	333	373	412	478	592	646	596	491	396	359	360
Critical	323	299	298	314	349	447	444	424	364	318	286	260

Future - Alternative 6 Minus Future - Base

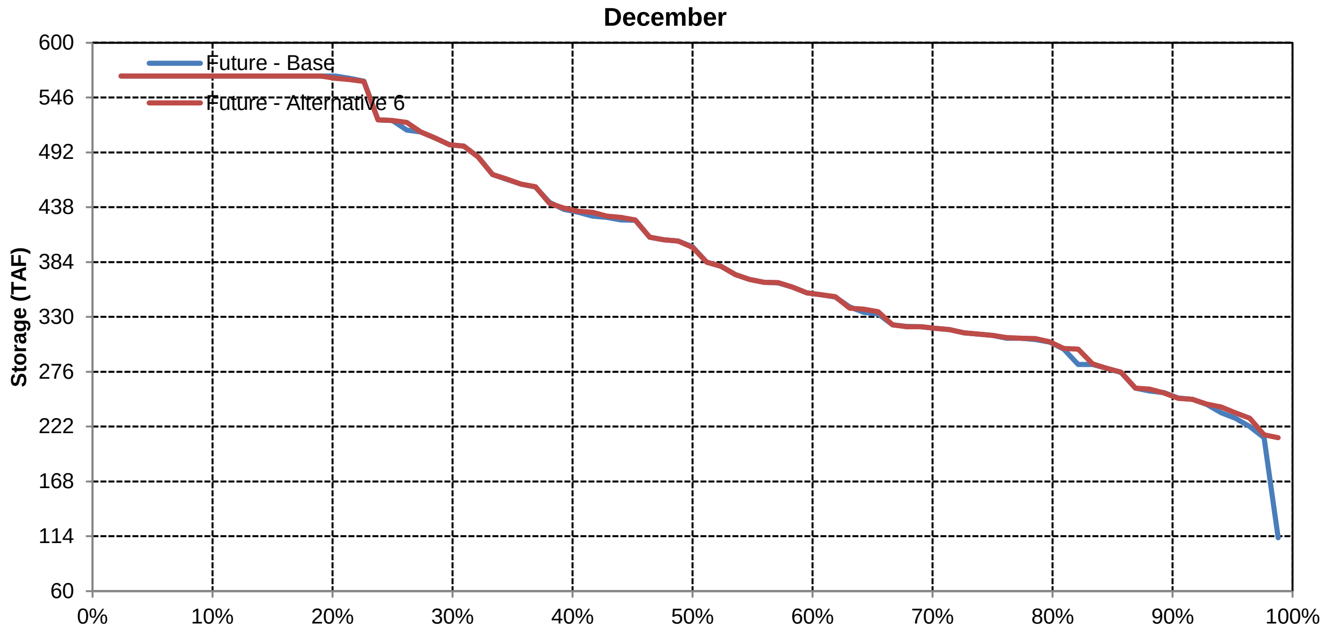
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	End-of-Month Storage (TAF)											
Probability of Exceedance												
10%	1	1	0	0	0	0	0	0	0	0	1	1
20%	-3	0	-2	0	0	0	0	0	0	0	0	-1
30%	0	0	0	0	0	2	0	0	0	-1	0	0
40%	7	-2	1	0	0	1	0	0	0	-1	-1	4
50%	0	0	0	0	0	3	0	0	0	1	5	0
60%	-2	0	0	0	0	2	0	0	0	-1	0	1
70%	-1	-1	0	11	3	3	0	0	1	-3	-2	0
80%	1	0	0	0	0	0	0	0	0	-1	1	0
90%	3	1	0	1	4	0	10	17	8	1	0	1
Long Term												
Full Simulation Period	1	0	2	2	1	1	1	1	1	0	1	1
Water Year Types												
Wet	0	0	0	0	0	0	0	0	-1	-1	-1	0
Above Normal	2	-1	0	0	0	0	0	0	0	0	0	0
Below Normal	1	1	1	0	0	0	0	0	1	1	2	2
Dry	1	1	2	2	1	0	0	0	1	1	2	2
Critical	1	2	10	8	7	8	8	6	4	1	0	4

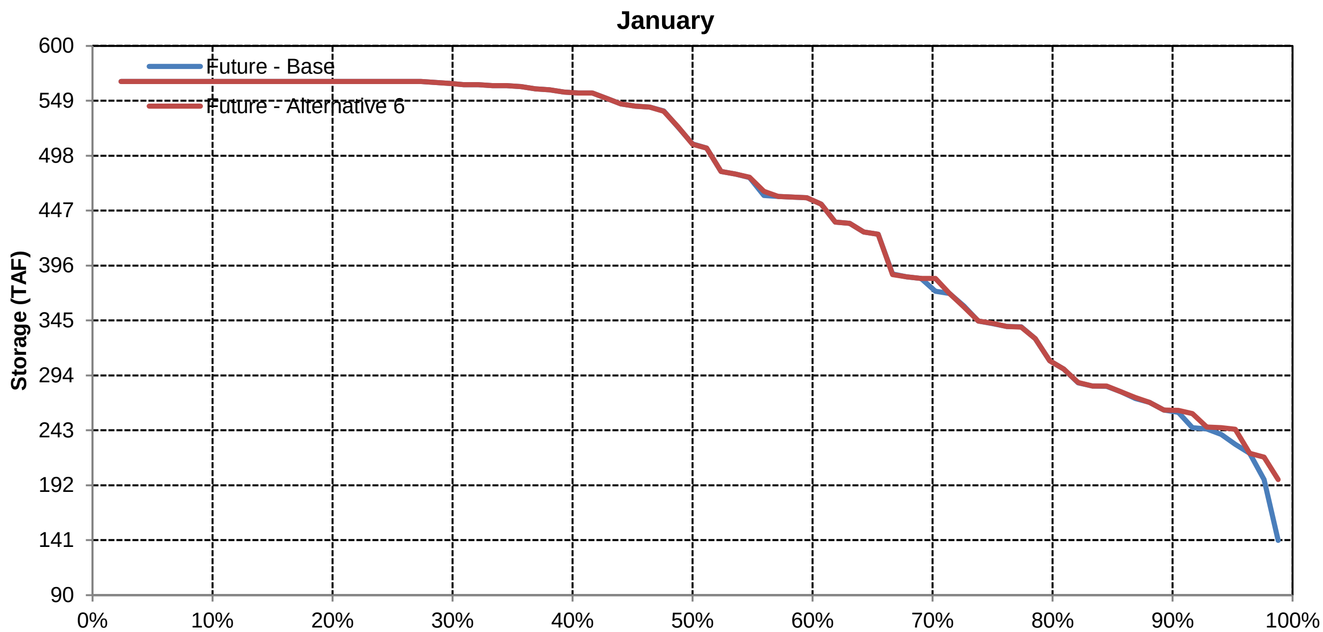
Folsom Reservoir



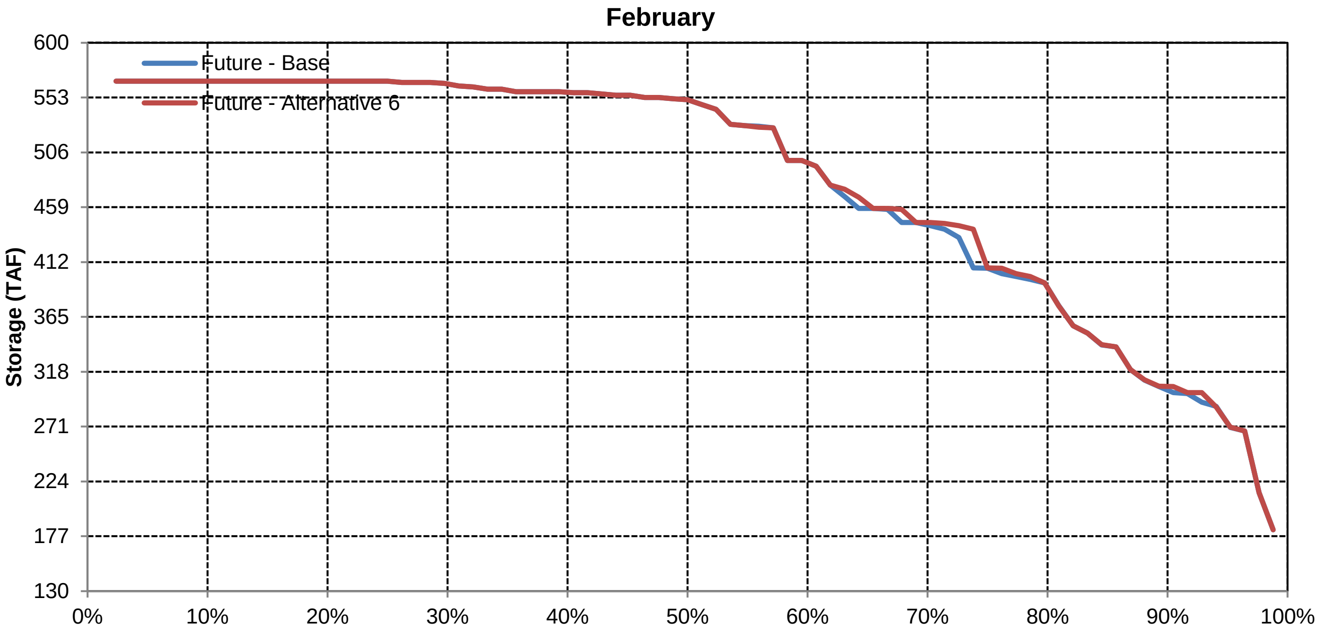


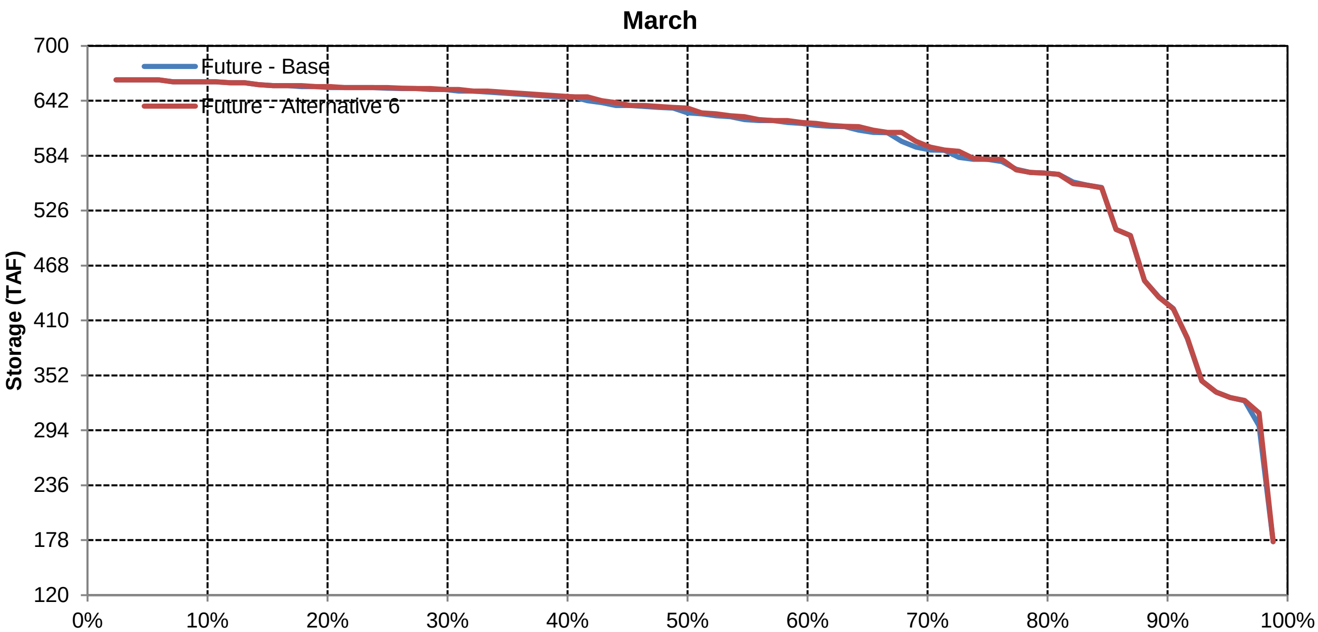
Folsom Reservoir



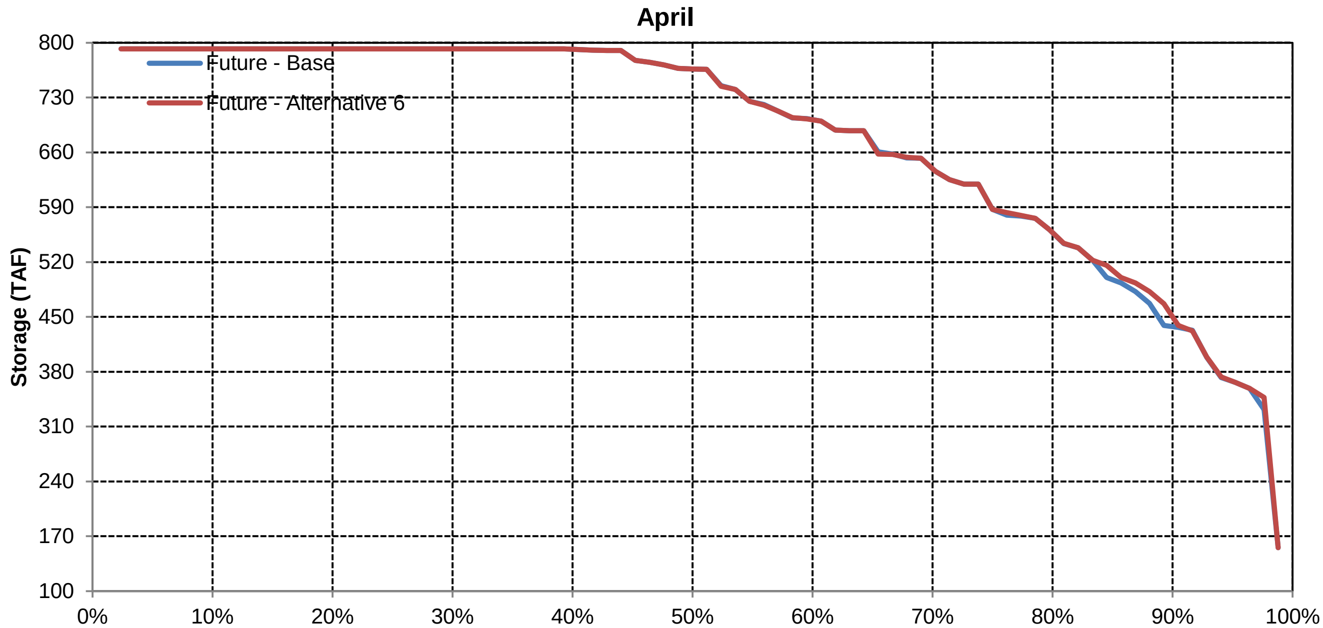


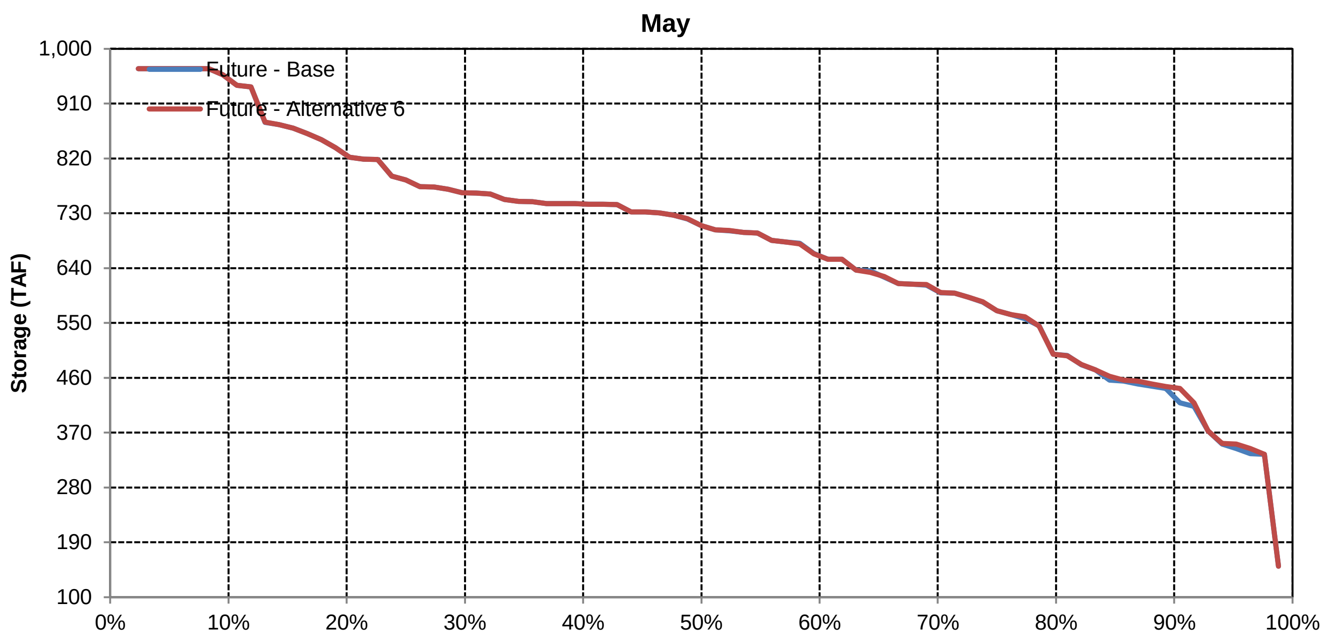
Folsom Reservoir



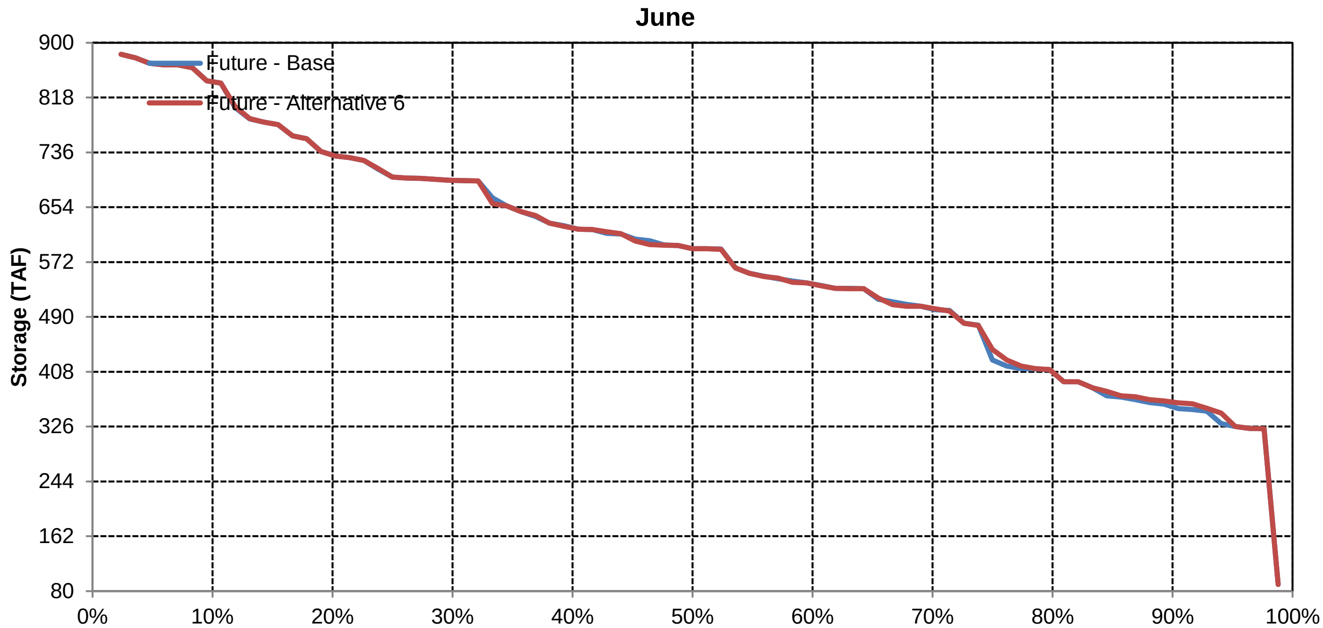


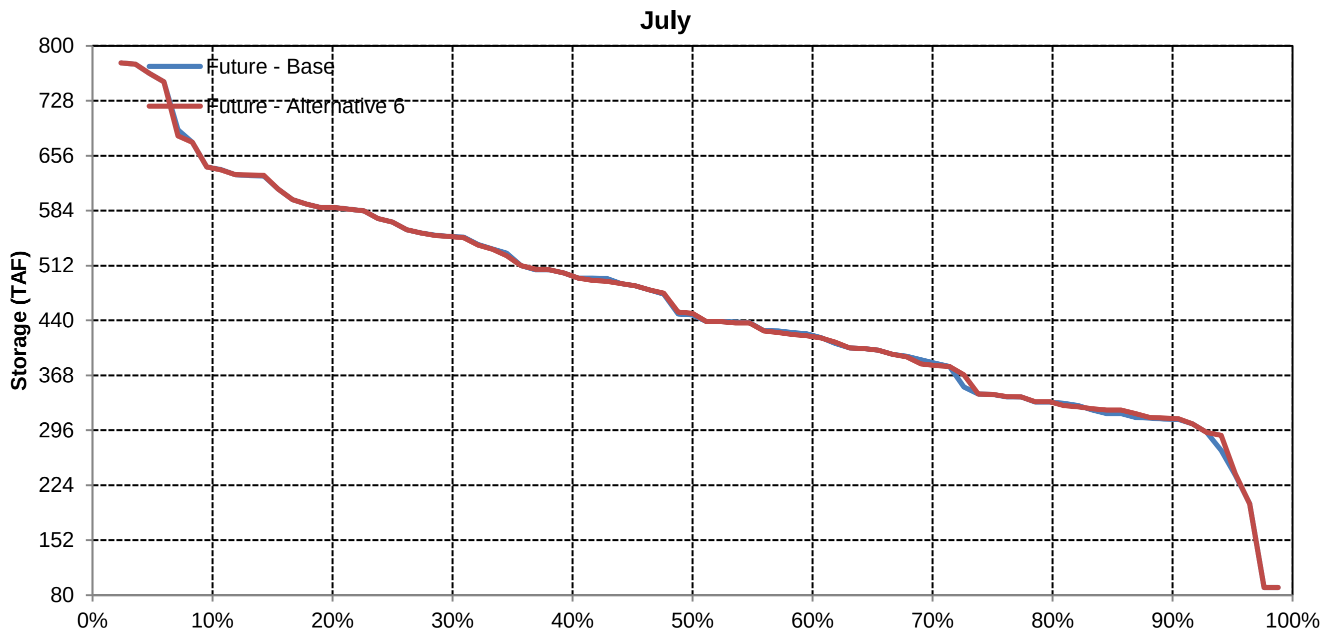
Folsom Reservoir



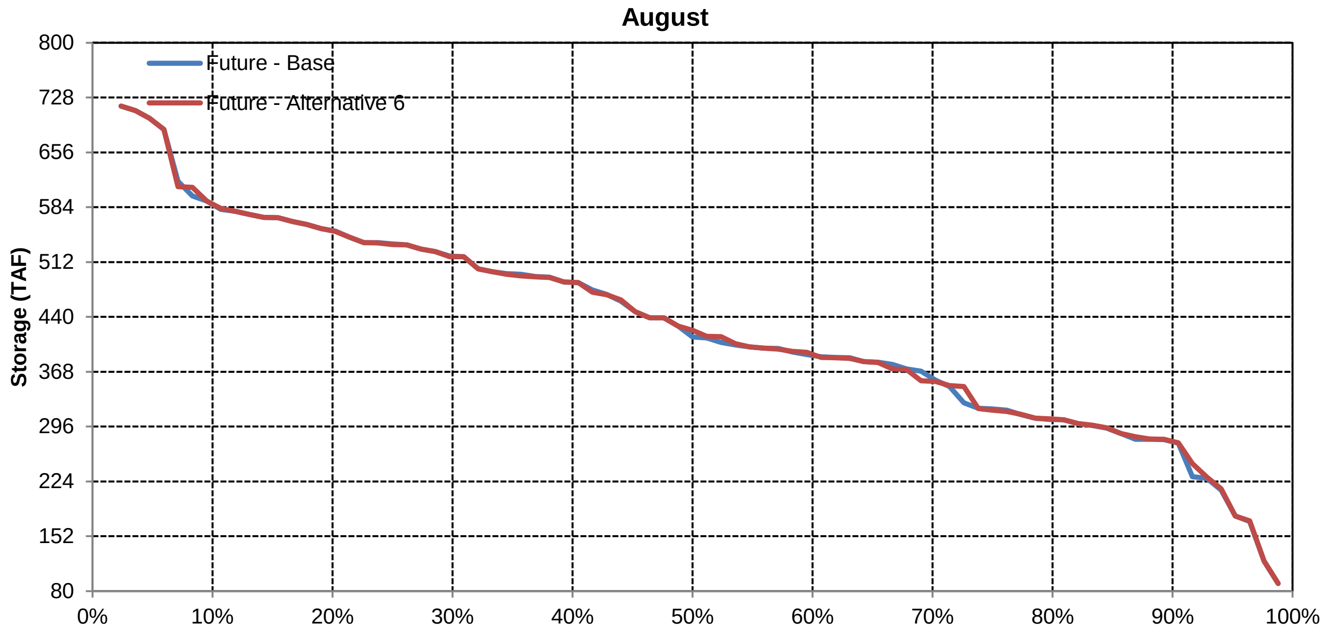


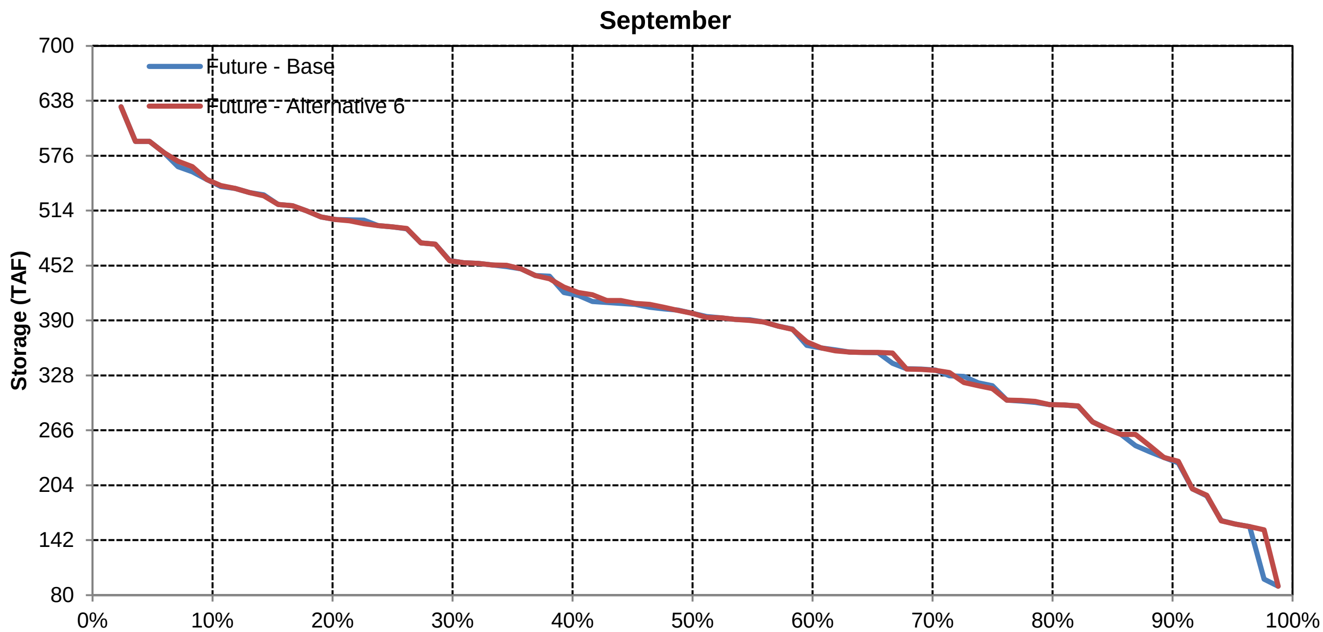
Folsom Reservoir





Folsom Reservoir





S8

Long-Term and Water Year-Type Average of CVP San Luis Reservoir Under Future - Base and Future - Alternative 6

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
						Long-Term						
Full Simulation Period												
Future - Base	218	294	461	615	743	823	788	682	578	413	314	270
Future - Alternative 6	216	291	457	611	740	821	786	680	576	412	311	267
Difference	-2	-2	-4	-4	-3	-2	-2	-2	-2	-1	-3	-3
Percent Difference	-1%	-1%	-1%	-1%	0%	0%	0%	0%	0%	0%	-1%	-1%
						Water Year-Types						
Wet												
Future - Base	203	294	487	682	836	918	880	792	678	499	390	304
Future - Alternative 6	199	290	482	678	832	918	878	790	674	497	386	301
Difference	-4	-4	-5	-3	-4	0	-2	-2	-4	-2	-4	-3
Percent Difference	-2%	-1%	-1%	0%	0%	0%	0%	0%	-1%	0%	-1%	-1%
Above Normal												
Future - Base	215	289	456	607	754	844	802	668	594	409	303	202
Future - Alternative 6	213	285	446	596	748	844	802	667	594	409	302	202
Difference	-2	-3	-10	-11	-6	0	0	0	-1	0	-1	-1
Percent Difference	-1%	-1%	-2%	-2%	-1%	0%	0%	0%	0%	0%	0%	0%
Below Normal												
Future - Base	237	280	459	588	713	836	815	706	632	430	313	312
Future - Alternative 6	237	279	457	583	709	832	811	702	632	430	310	309
Difference	0	-1	-2	-5	-4	-4	-3	-4	0	0	-4	-3
Percent Difference	0%	0%	0%	-1%	-1%	0%	0%	-1%	0%	0%	-1%	-1%
Dry												
Future - Base	211	284	442	576	689	772	742	621	516	359	253	240
Future - Alternative 6	208	281	440	573	689	771	741	620	514	358	252	238
Difference	-3	-3	-2	-3	0	-1	-1	-1	-2	-1	-2	-1
Percent Difference	-1%	-1%	0%	0%	0%	0%	0%	0%	0%	0%	-1%	0%
Critical												
Future - Base	242	329	444	571	654	666	621	536	395	302	263	262
Future - Alternative 6	245	330	444	569	651	662	617	533	391	299	258	257
Difference	3	1	0	-2	-3	-4	-4	-3	-4	-3	-5	-5
Percent Difference	1%	0%	0%	0%	0%	-1%	-1%	-1%	-1%	-1%	-2%	-2%

CVP San Luis Reservoir

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	442	574	764	972	972	972	972	909	861	675	596	517
20%	367	426	607	826	972	972	958	858	767	563	489	434
30%	272	373	528	720	942	972	913	806	702	492	413	347
40%	209	298	476	659	826	967	889	768	647	455	316	289
50%	160	269	425	581	736	883	869	715	609	394	256	223
60%	118	232	369	521	682	833	793	636	539	340	226	161
70%	90	173	327	477	630	718	665	571	458	287	190	132
80%	90	122	284	432	554	658	611	480	404	238	140	91
90%	90	90	246	370	439	573	531	393	274	197	110	90
Long Term												
Full Simulation Period	218	294	461	615	743	823	788	682	578	413	314	270
Water Year Types												
Wet	203	294	487	682	836	918	880	792	678	499	390	304
Above Normal	215	289	456	607	754	844	802	668	594	409	303	202
Below Normal	237	280	459	588	713	836	815	706	632	430	313	312
Dry	211	284	442	576	689	772	742	621	516	359	253	240
Critical	242	329	444	571	654	666	621	536	395	302	263	262

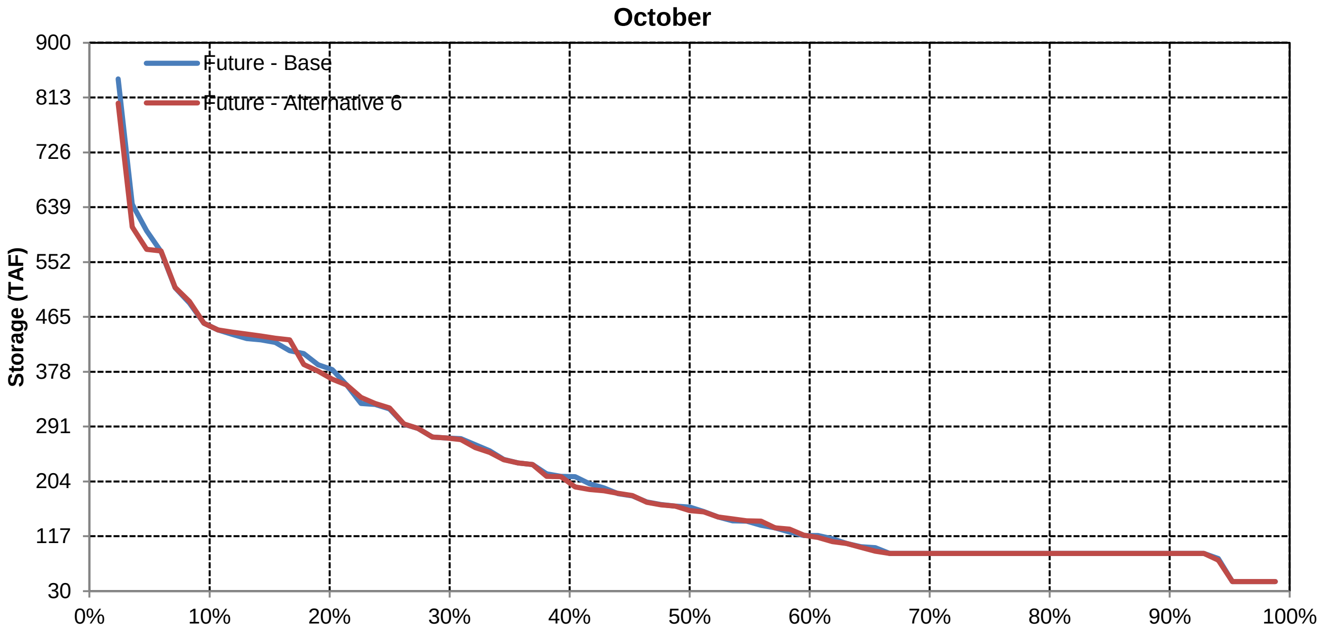
Future - Alternative 6

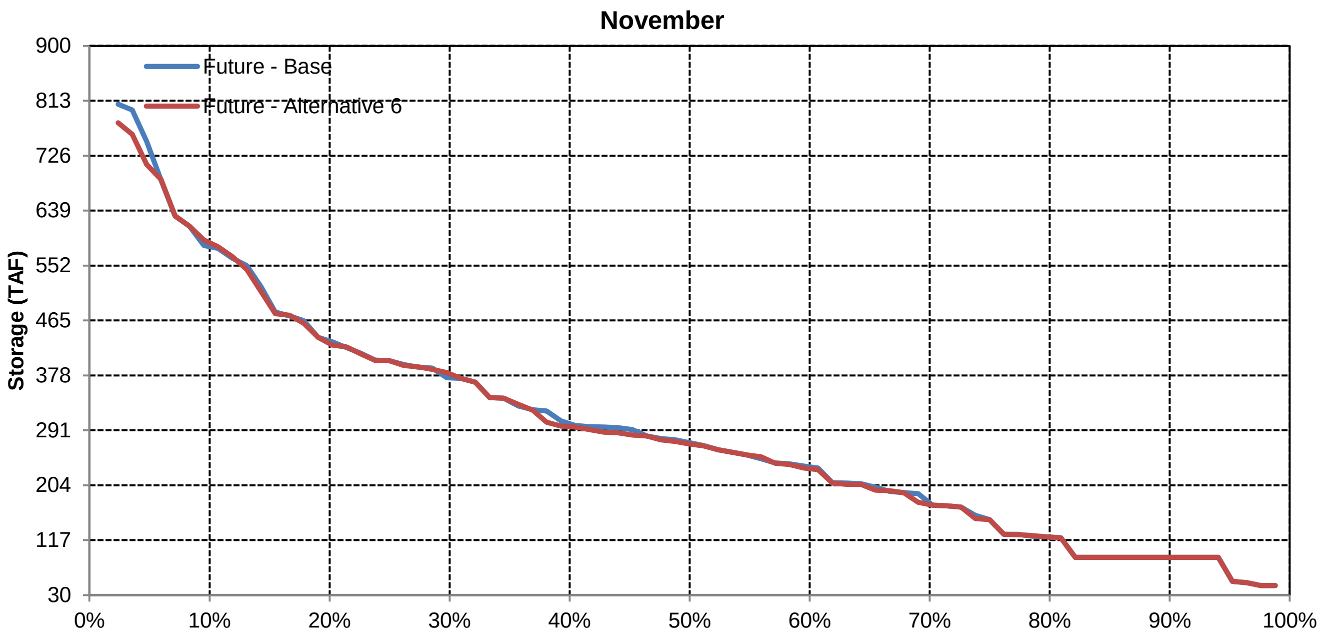
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	443	577	774	972	972	972	972	909	860	675	596	518
20%	361	424	587	818	972	972	958	858	767	563	493	432
30%	271	374	531	724	928	972	913	806	701	491	392	346
40%	195	296	472	646	825	969	886	760	646	452	314	289
50%	157	268	423	579	720	876	865	718	613	392	256	221
60%	116	229	370	512	681	833	798	644	529	340	226	157
70%	90	173	327	477	629	716	661	565	446	279	189	127
80%	90	122	275	434	555	655	608	482	403	238	135	92
90%	90	90	251	370	439	569	520	394	282	197	106	90
Long Term												
Full Simulation Period	216	291	457	611	740	821	786	680	576	412	311	267
Water Year Types												
Wet	199	290	482	678	832	918	878	790	674	497	386	301
Above Normal	213	285	446	596	748	844	802	667	594	409	302	202
Below Normal	237	279	457	583	709	832	811	702	632	430	310	309
Dry	208	281	440	573	689	771	741	620	514	358	252	238
Critical	245	330	444	569	651	662	617	533	391	299	258	257

Future - Alternative 6 Minus Future - Base

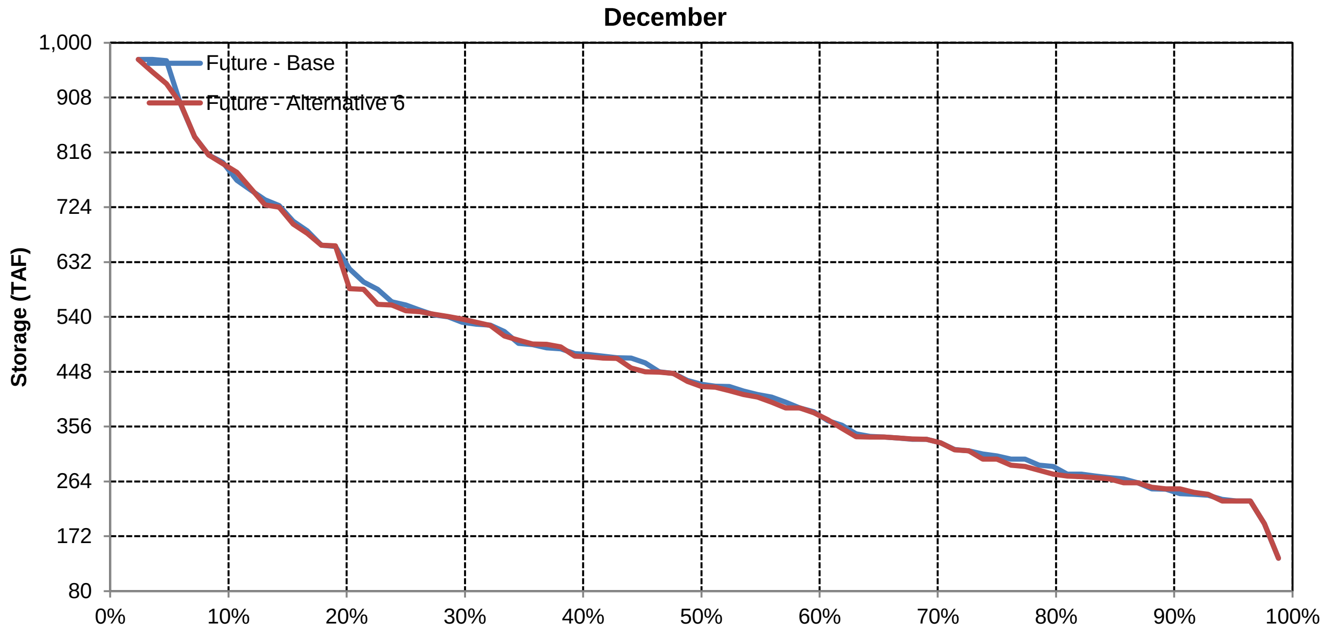
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	1	3	10	0	0	0	0	0	0	0	0	1
20%	-6	-2	-20	-9	0	0	0	0	0	0	3	-3
30%	-1	1	3	4	-14	0	0	0	0	-2	-21	-1
40%	-15	-3	-4	-14	-1	2	-3	-7	-1	-3	-2	0
50%	-3	-1	-3	-1	-16	-7	-3	3	4	-2	0	-2
60%	-2	-2	1	-8	-1	0	5	8	-10	0	0	-4
70%	0	0	0	0	0	-2	-4	-6	-12	-9	-1	-5
80%	0	0	-9	2	1	-4	-3	2	-1	0	-5	1
90%	0	0	6	0	0	-4	-11	0	8	0	-4	0
Long Term												
Full Simulation Period	-2	-2	-4	-4	-3	-2	-2	-2	-2	-1	-3	-3
Water Year Types												
Wet	-4	-4	-5	-3	-4	0	-2	-2	-4	-2	-4	-3
Above Normal	-2	-3	-10	-11	-6	0	0	0	-1	0	-1	-1
Below Normal	0	-1	-2	-5	-4	-4	-3	-4	0	0	-4	-3
Dry	-3	-3	-2	-3	0	-1	-1	-1	-2	-1	-2	-1
Critical	3	1	0	-2	-3	-4	-4	-3	-4	-3	-5	-5

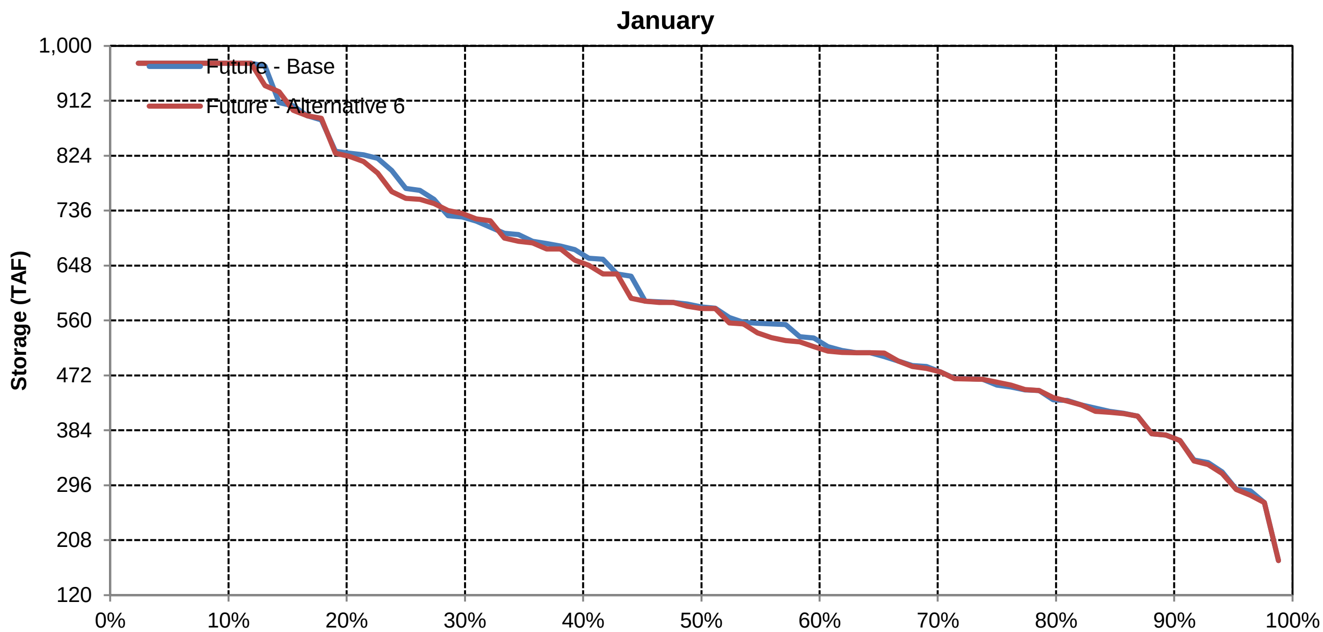
CVP San Luis Reservoir



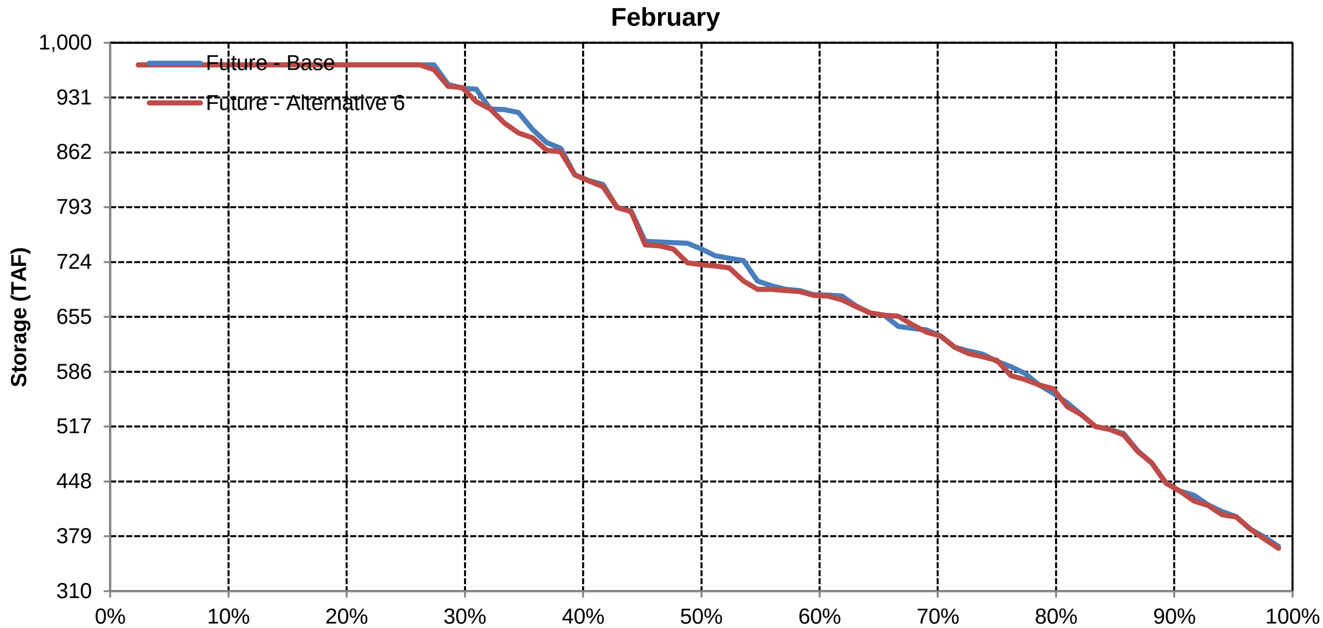


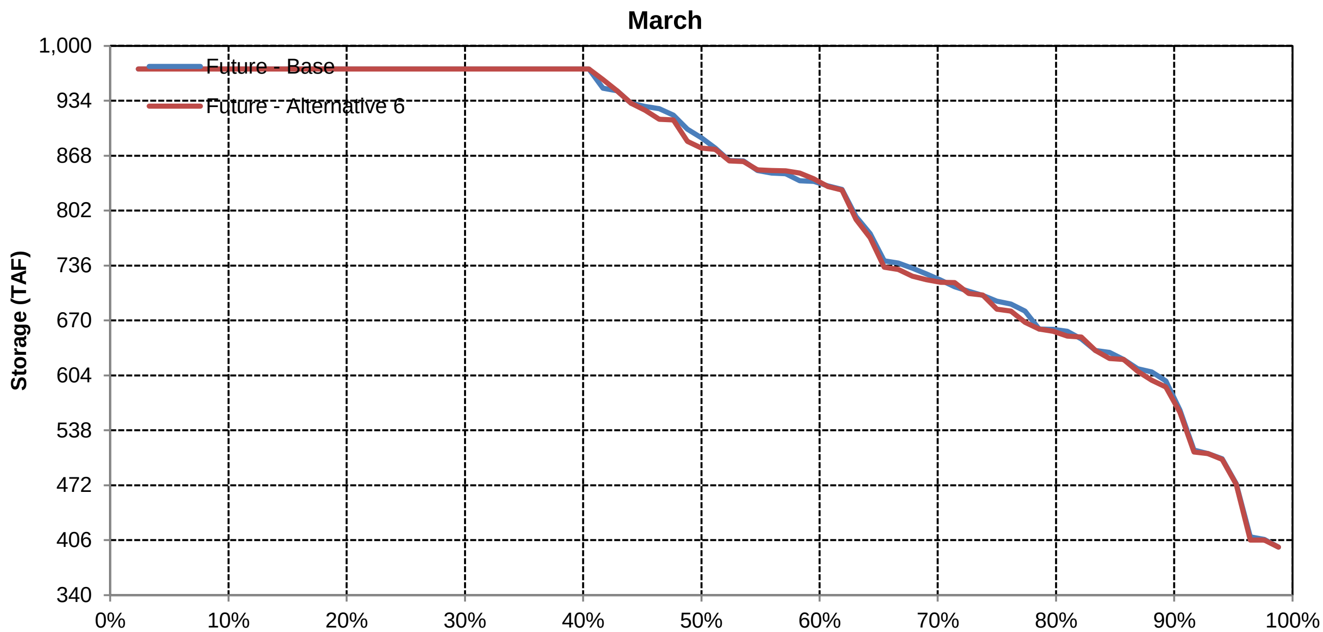
CVP San Luis Reservoir



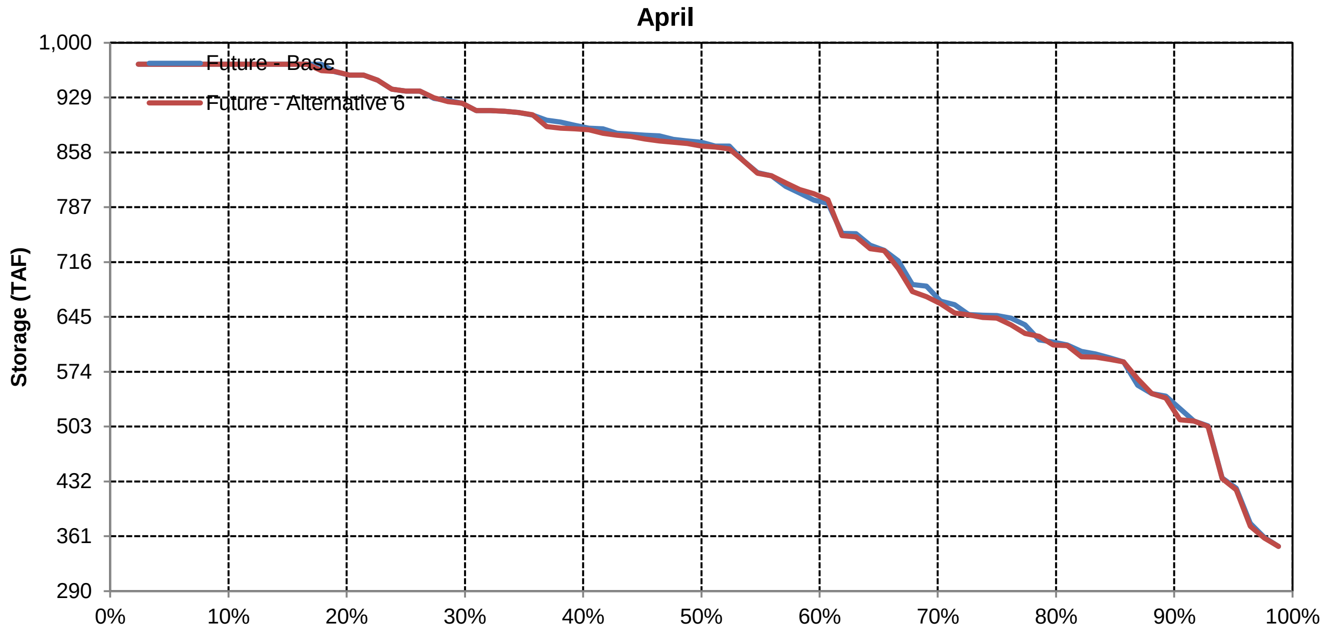


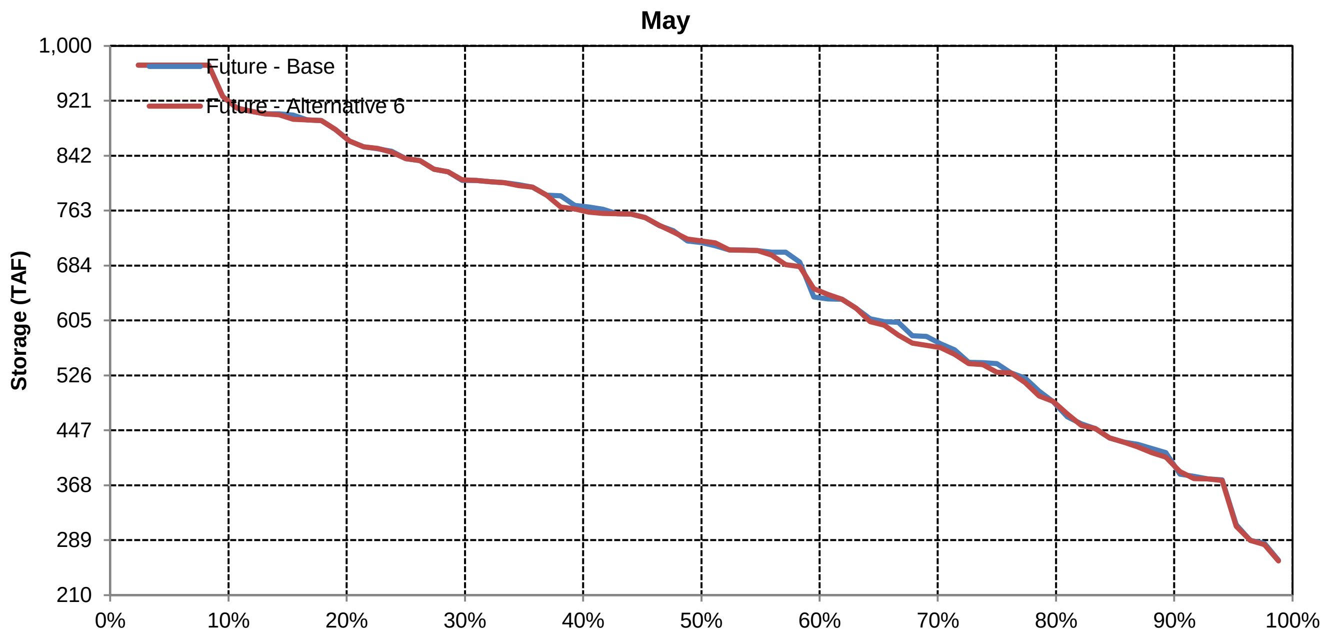
CVP San Luis Reservoir



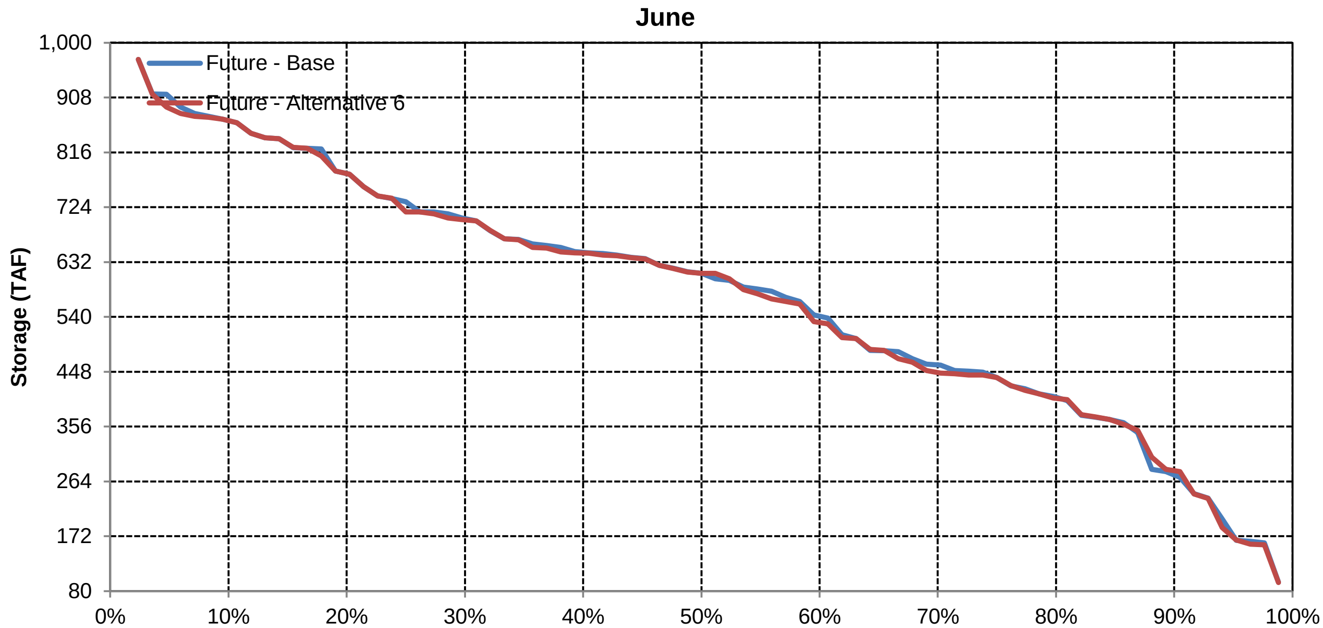


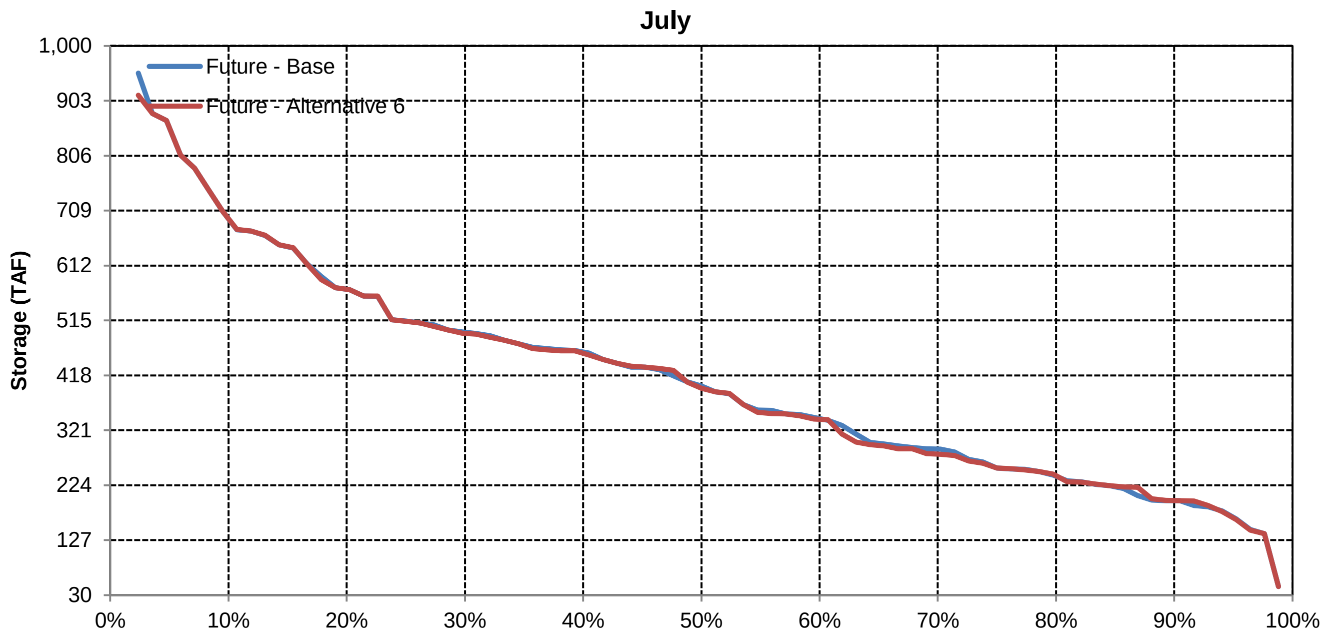
CVP San Luis Reservoir



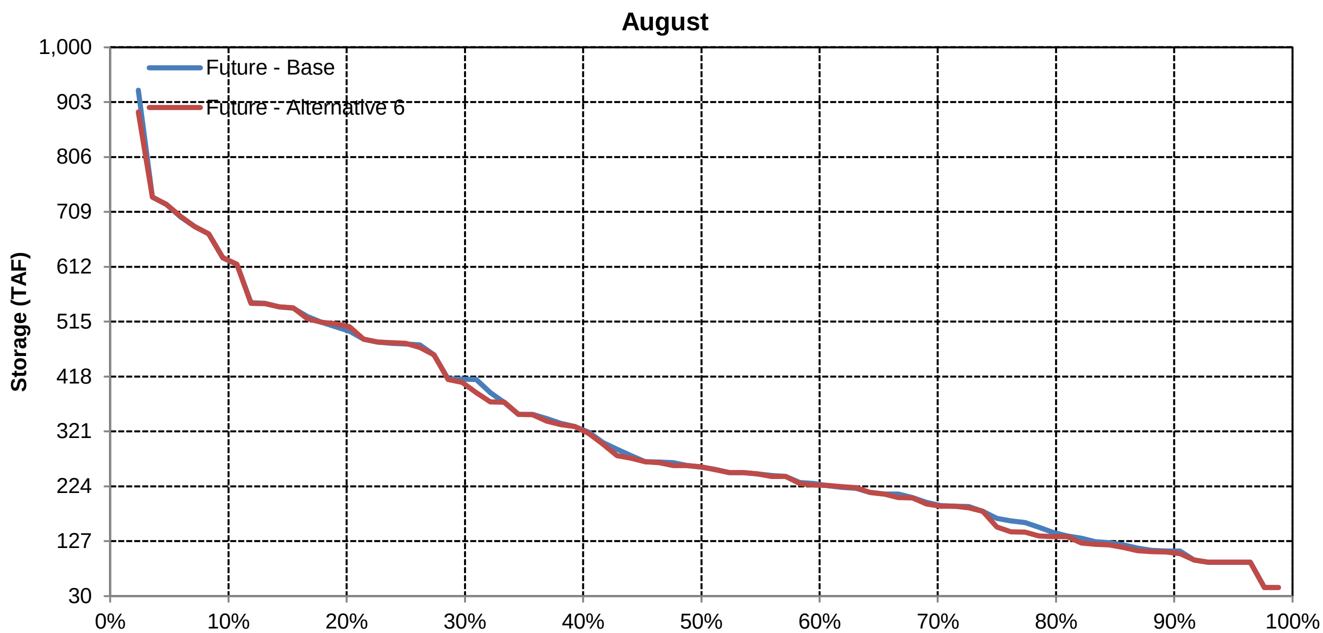


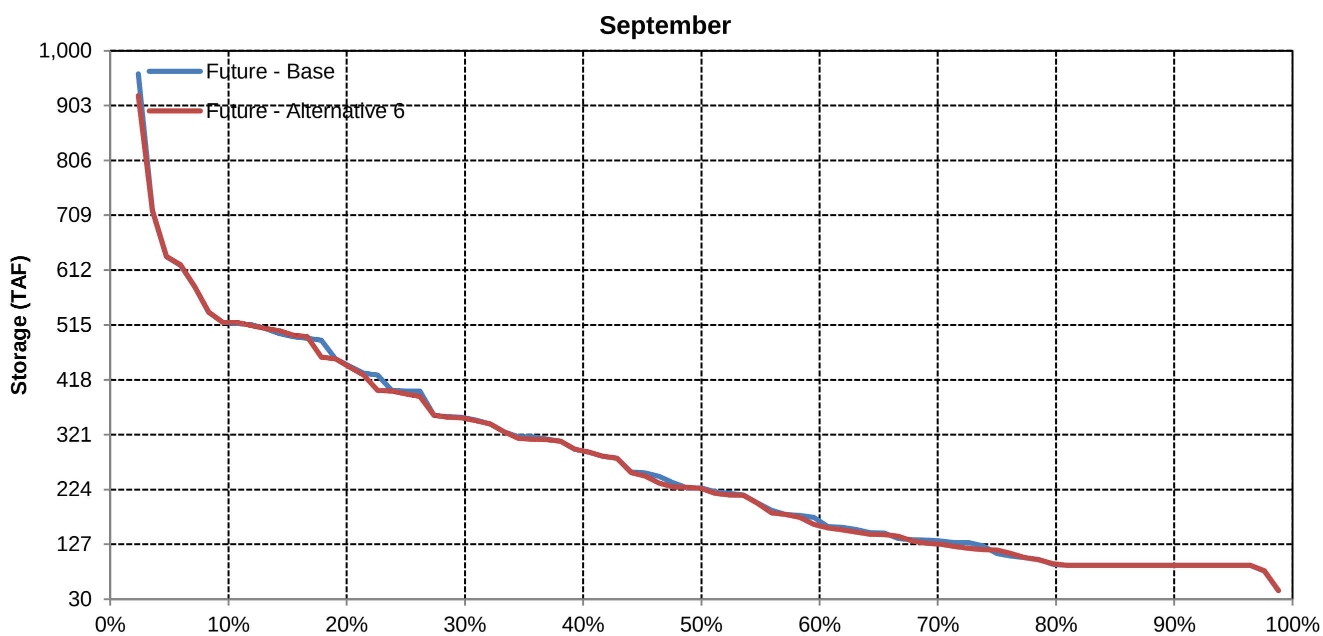
CVP San Luis Reservoir





CVP San Luis Reservoir





S11

Long-Term and Water Year-Type Average of SWP San Luis Reservoir Under Future - Base and Future - Alternative 6

	Average Storage (TAF)											
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**
Long-Term												
Full Simulation Period												
Future - Base	181	218	351	573	767	885	811	640	506	467	355	257
Future - Alternative 6	180	217	348	568	760	880	806	636	502	464	353	256
Difference	-1	-1	-3	-6	-6	-5	-5	-4	-4	-4	-2	-1
Percent Difference	-1%	0%	-1%	-1%	-1%	-1%	-1%	-1%	-1%	-1%	0%	-1%
Water Year-Types												
Wet												
Future - Base	203	282	505	823	1,011	1,058	951	746	542	550	458	320
Future - Alternative 6	202	282	501	816	1,007	1,058	950	745	544	551	457	319
Difference	0	0	-4	-7	-3	0	-1	-1	2	1	-1	-1
Percent Difference	0%	0%	-1%	-1%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal												
Future - Base	154	177	288	602	890	1,035	904	639	536	533	415	285
Future - Alternative 6	150	175	278	589	881	1,027	897	633	531	529	411	283
Difference	-4	-2	-11	-13	-10	-8	-7	-6	-5	-5	-3	-2
Percent Difference	-2%	-1%	-4%	-2%	-1%	-1%	-1%	-1%	-1%	-1%	-1%	-1%
Below Normal												
Future - Base	158	169	276	398	650	887	815	629	522	492	321	226
Future - Alternative 6	159	169	273	390	637	881	808	620	504	475	316	222
Difference	0	0	-3	-8	-12	-7	-7	-9	-18	-17	-5	-4
Percent Difference	0%	0%	-1%	-2%	-2%	-1%	-1%	-1%	-3%	-3%	-2%	-2%
Dry												
Future - Base	169	206	304	453	620	767	724	597	504	425	286	210
Future - Alternative 6	167	205	302	448	612	757	716	592	503	423	286	209
Difference	-2	-1	-2	-5	-8	-10	-8	-5	-1	-1	0	-1
Percent Difference	-1%	-1%	-1%	-1%	-1%	-1%	-1%	-1%	0%	0%	0%	0%
Critical												
Future - Base	203	190	237	399	497	565	563	496	384	272	225	207
Future - Alternative 6	204	189	241	403	496	563	561	494	377	270	226	208
Difference	1	0	4	3	-1	-2	-2	-2	-6	-3	1	1
Percent Difference	0%	0%	2%	1%	0%	0%	0%	0%	-2%	-1%	0%	0%

SWP San Luis Reservoir

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	315	489	775	1,067	1,067	1,067	1,021	828	699	642	503	311
20%	247	327	590	954	1,067	1,067	959	755	649	601	410	291
30%	211	266	394	761	1,067	1,067	945	701	621	551	383	268
40%	165	235	339	664	984	1,067	921	680	601	539	371	243
50%	145	178	282	538	818	1,067	897	643	567	505	355	237
60%	128	94	223	455	664	944	869	621	492	462	333	225
70%	114	55	183	369	597	745	733	586	381	341	315	210
80%	90	55	116	243	482	636	621	505	332	279	229	196
90%	55	55	59	155	322	485	503	404	248	235	165	156
Long Term												
Full Simulation Period	181	218	351	573	767	885	811	640	506	467	355	257
Water Year Types												
Wet	203	282	505	823	1,011	1,058	951	746	542	550	458	320
Above Normal	154	177	288	602	890	1,035	904	639	536	533	415	285
Below Normal	158	169	276	398	650	887	815	629	522	492	321	226
Dry	169	206	304	453	620	767	724	597	504	425	286	210
Critical	203	190	237	399	497	565	563	496	384	272	225	207

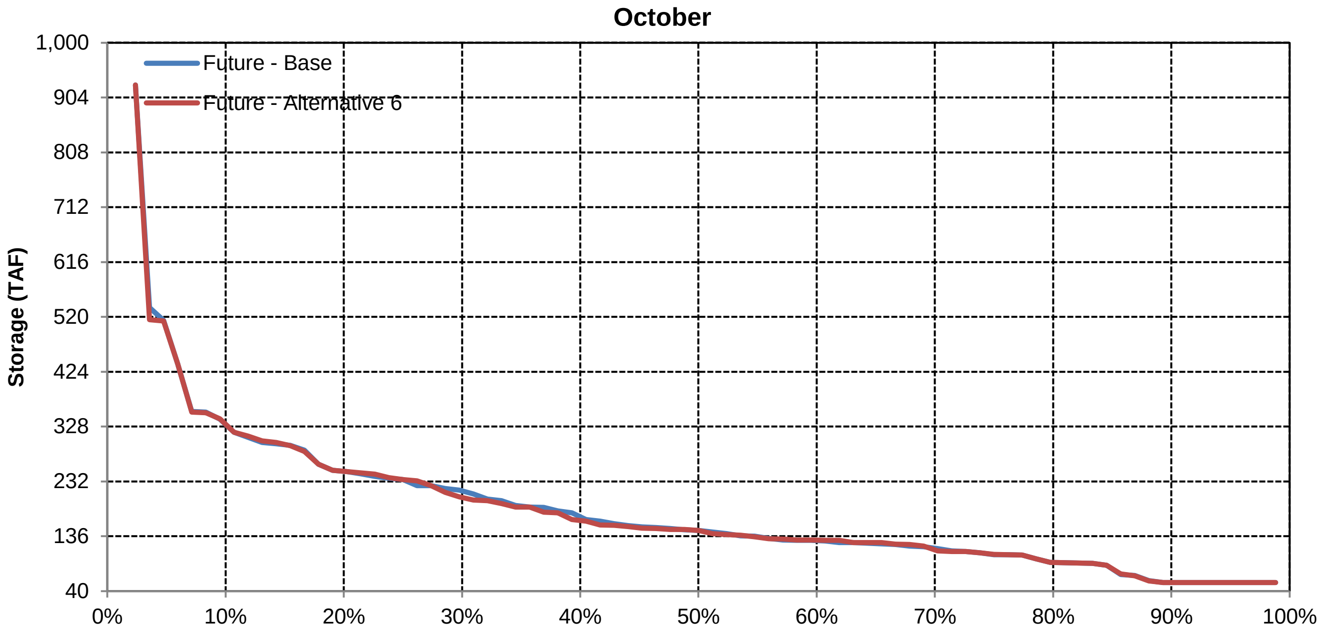
Future - Alternative 6

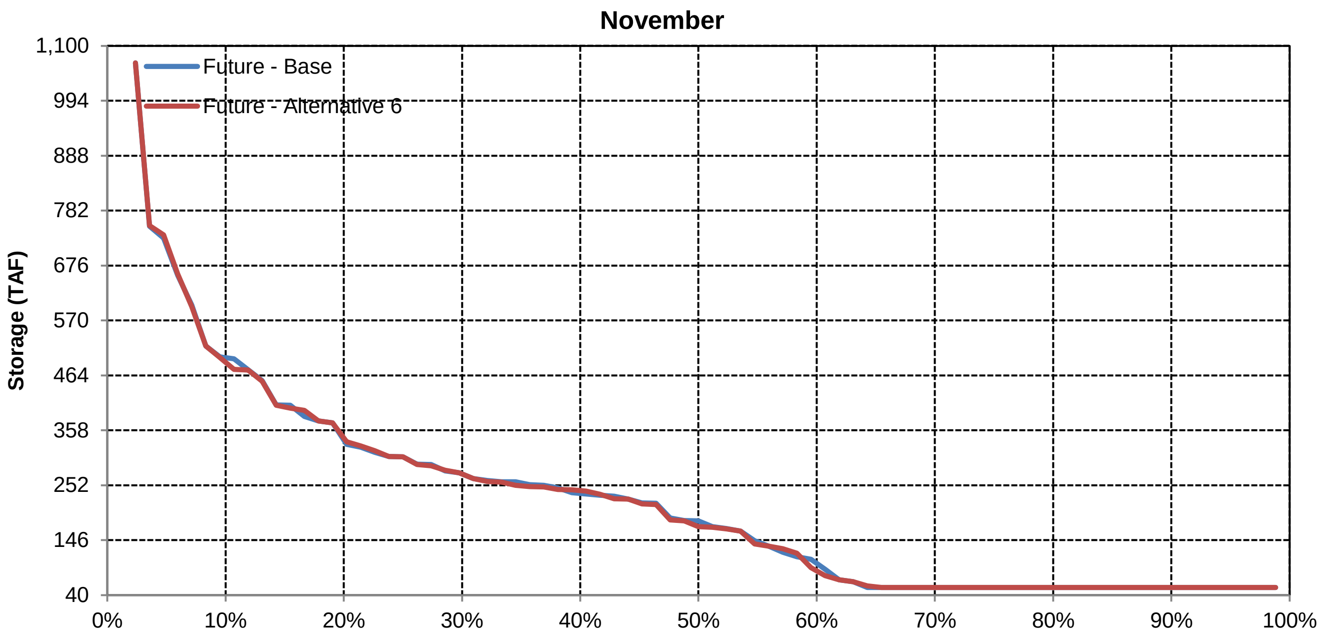
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	316	475	783	1,067	1,067	1,067	1,018	828	701	635	505	311
20%	248	331	586	955	1,067	1,067	957	744	645	601	411	291
30%	200	266	386	741	1,067	1,067	941	700	615	556	383	269
40%	161	240	323	639	983	1,067	914	678	598	539	371	243
50%	143	172	283	509	770	1,067	892	643	552	497	352	236
60%	129	81	222	440	659	942	862	619	490	462	337	224
70%	110	55	168	358	585	746	739	581	381	324	311	207
80%	90	55	121	240	472	624	604	477	325	270	218	192
90%	55	55	59	154	310	482	495	406	248	229	166	151
Long Term												
Full Simulation Period	180	217	348	568	760	880	806	636	502	464	353	256
Water Year Types												
Wet	202	282	501	816	1,007	1,058	950	745	544	551	457	319
Above Normal	150	175	278	589	881	1,027	897	633	531	529	411	283
Below Normal	159	169	273	390	637	881	808	620	504	475	316	222
Dry	167	205	302	448	612	757	716	592	503	423	286	209
Critical	204	189	241	403	496	563	561	494	377	270	226	208

Future - Alternative 6 Minus Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					End-of-Month Storage (TAF)							
Probability of Exceedance												
10%	1	-14	8	0	0	0	-3	0	2	-7	3	0
20%	1	4	-4	1	0	0	-2	-12	-4	-1	1	0
30%	-11	0	-9	-21	0	0	-4	-1	-6	5	0	0
40%	-3	5	-16	-25	0	0	-7	-2	-4	0	0	0
50%	-1	-6	1	-29	-48	0	-4	0	-16	-8	-3	-1
60%	1	-13	0	-15	-5	-2	-8	-2	-2	0	4	-1
70%	-4	0	-15	-11	-12	1	6	-5	0	-18	-5	-3
80%	0	0	5	-3	-10	-12	-17	-29	-6	-9	-11	-4
90%	0	0	0	-1	-12	-3	-8	1	0	-6	1	-6
Long Term												
Full Simulation Period	-1	-1	-3	-6	-6	-5	-5	-4	-4	-4	-2	-1
Water Year Types												
Wet	0	0	-4	-7	-3	0	-1	-1	2	1	-1	-1
Above Normal	-4	-2	-11	-13	-10	-8	-7	-6	-5	-5	-3	-2
Below Normal	0	0	-3	-8	-12	-7	-7	-9	-18	-17	-5	-4
Dry	-2	-1	-2	-5	-8	-10	-8	-5	-1	-1	0	-1
Critical	1	0	4	3	-1	-2	-2	-2	-6	-3	1	1

SWP San Luis Reservoir





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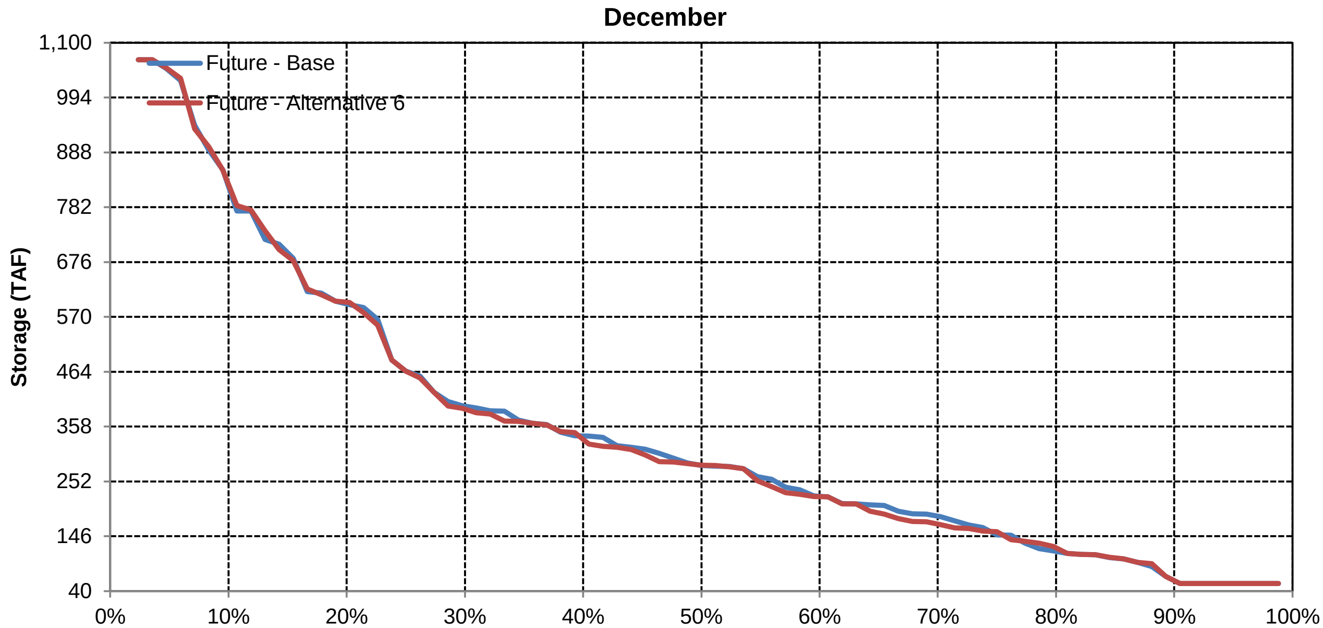

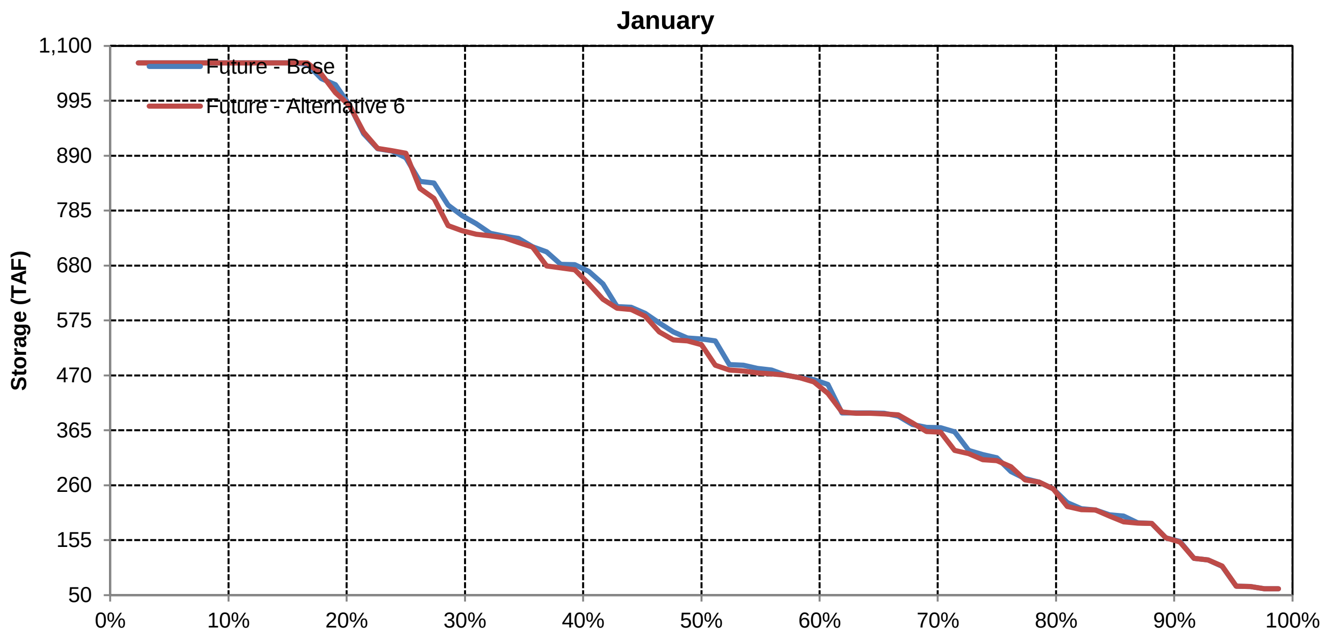

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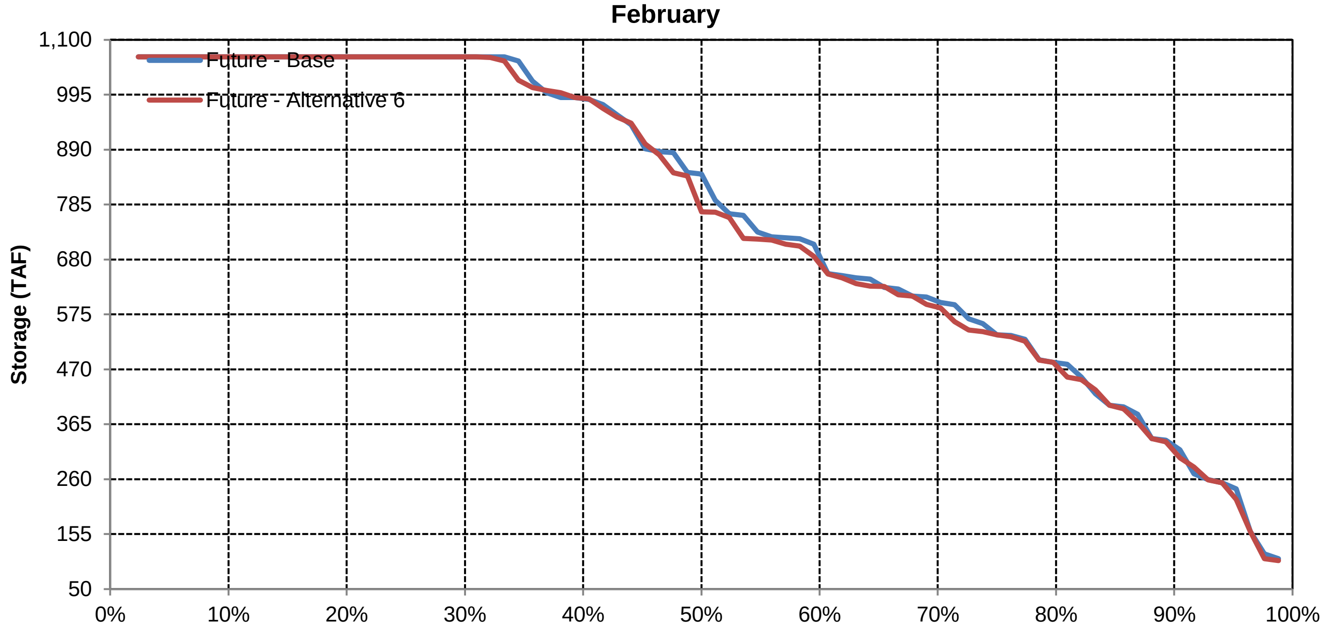

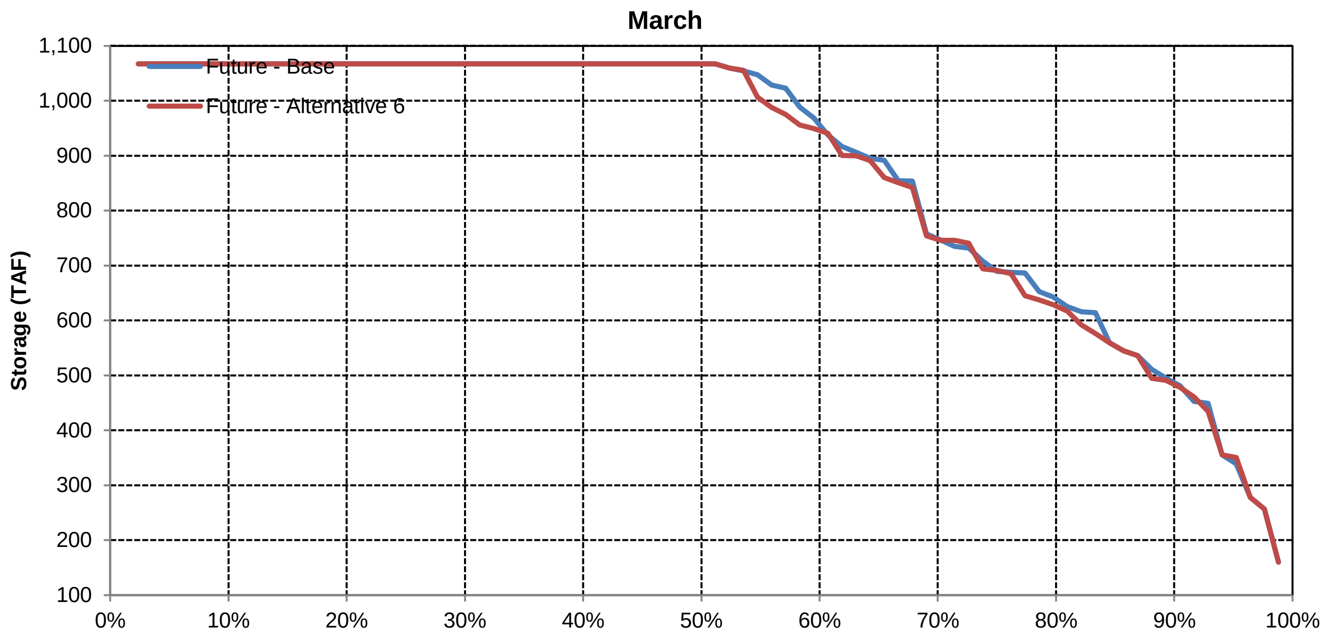

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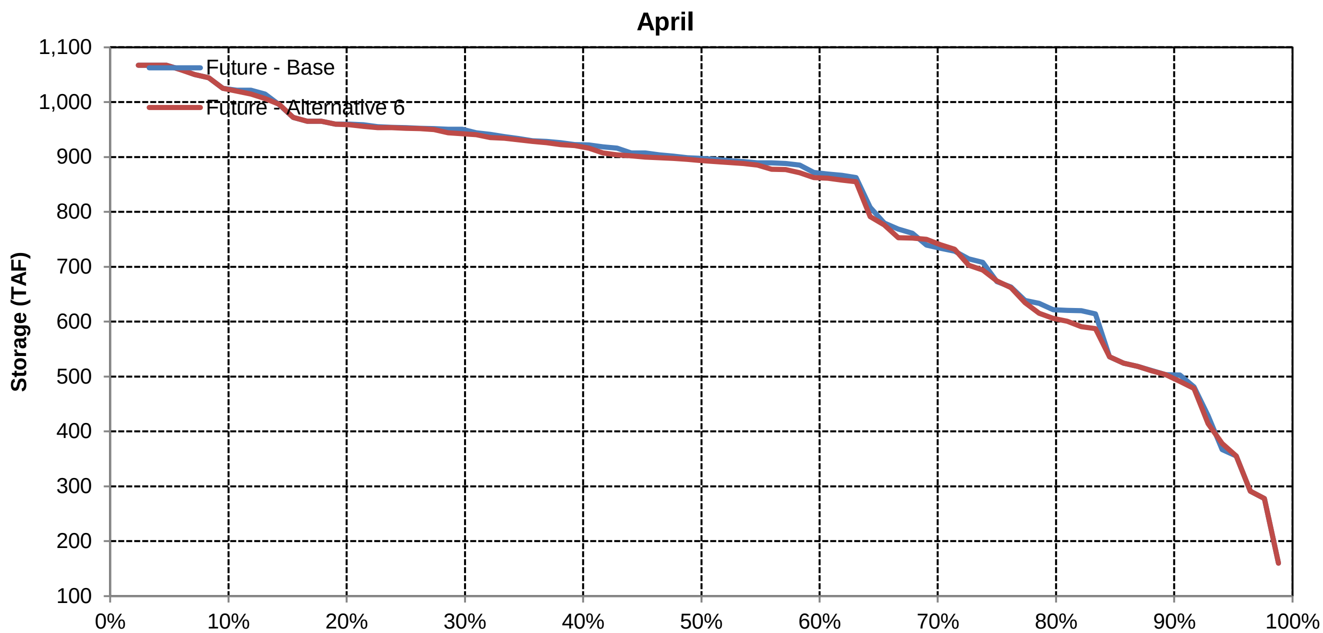

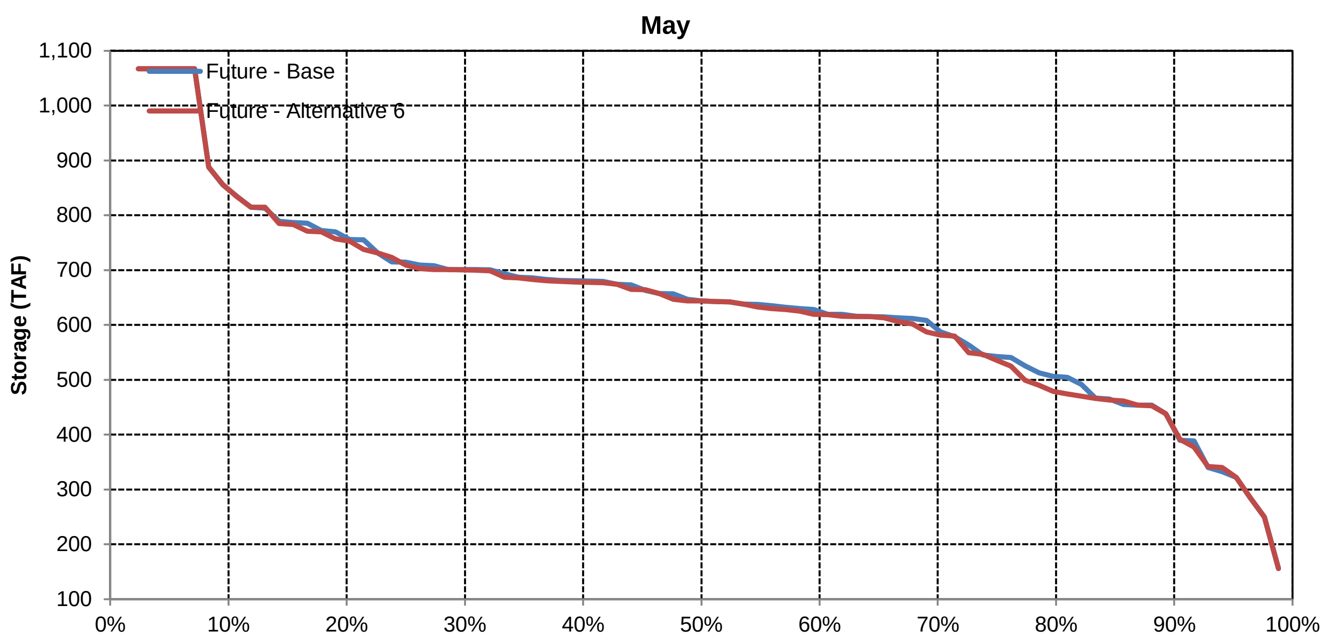

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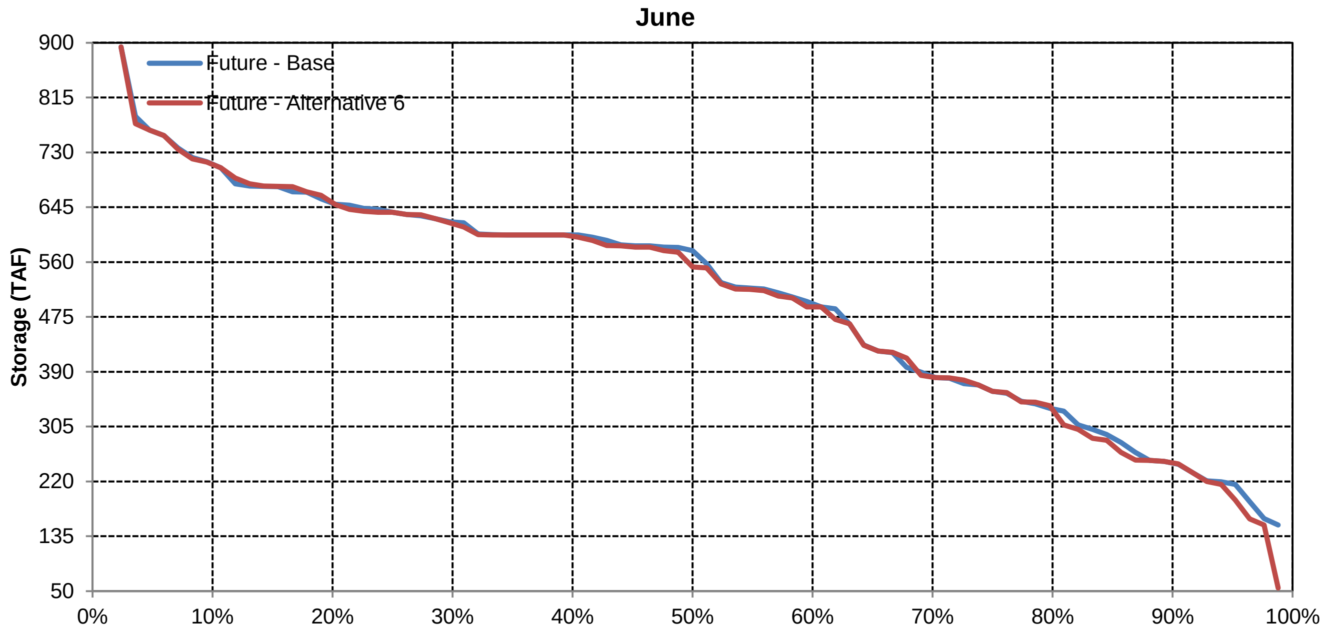

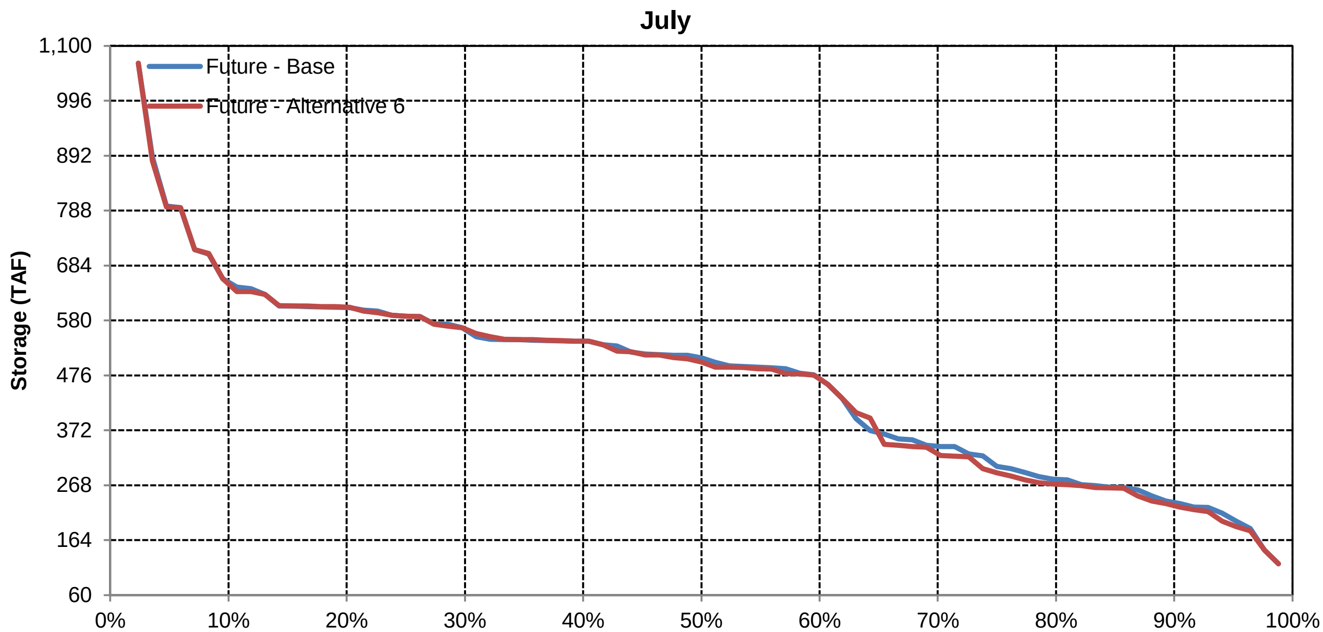

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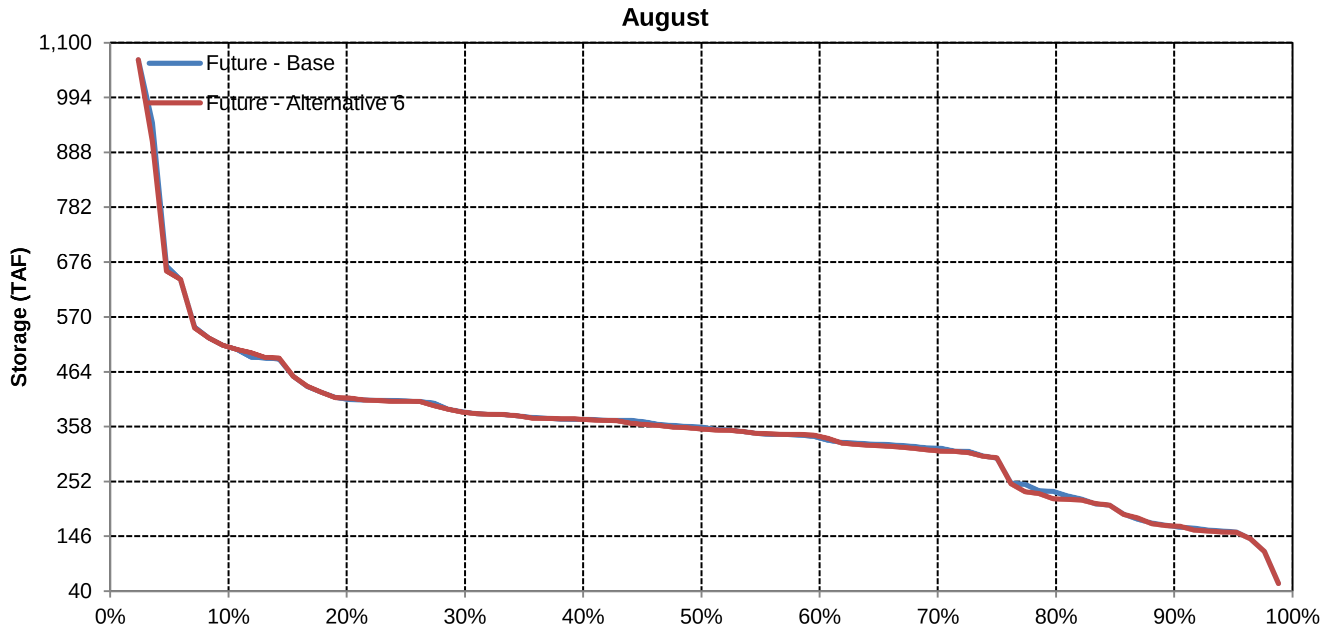
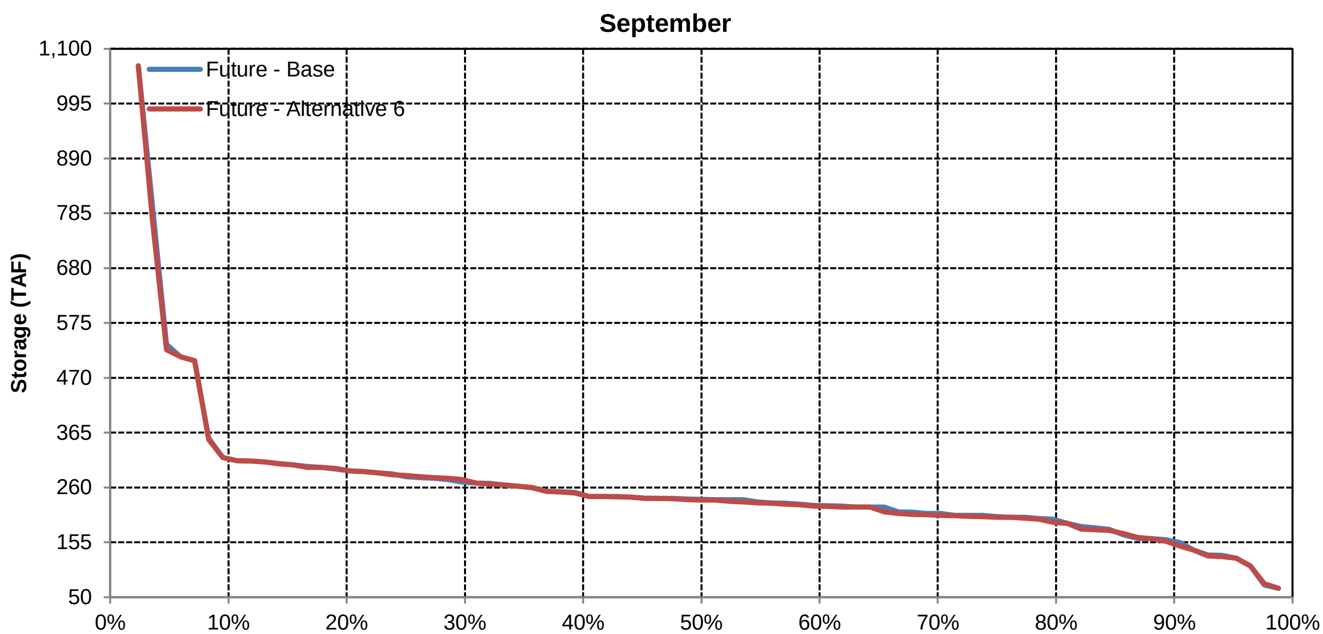




Long-Term and Water Year-Type Average of Delta Outflow Under Future - Base and Future - Alternative 6

	Average Flow (cfs)												
Analysis Period	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**Total (TAF)**
							Long-Term						
Full Simulation Period													
Future - Base	8,408	10,099	24,888	54,896	70,049	52,500	29,061	14,179	8,605	7,157	4,274	10,294	17,604
Future - Alternative 6	8,427	10,108	24,915	55,003	70,106	52,498	29,061	14,168	8,590	7,155	4,279	10,293	17,616
Difference	18	9	26	106	57	-2	0	-11	-15	-2	5	0	11
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
							Water Year-Types						
Wet													
Future - Base	9,541	15,088	53,646	115,984	131,904	102,001	53,280	21,075	11,285	9,709	4,000	21,635	32,826
Future - Alternative 6	9,573	15,087	53,784	116,099	131,901	101,964	53,290	21,051	11,295	9,706	4,000	21,635	32,840
Difference	33	-2	137	116	-3	-36	10	-24	9	-3	0	0	15
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal													
Future - Base	9,036	8,854	16,293	59,685	102,404	57,212	27,004	15,829	8,580	8,899	4,000	13,224	19,718
Future - Alternative 6	9,153	8,854	16,343	59,846	102,482	57,120	27,007	15,828	8,581	8,898	4,000	13,224	19,737
Difference	117	1	50	161	78	-91	3	0	2	-1	0	0	19
Percent Difference	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal													
Future - Base	8,461	9,070	13,804	28,415	31,537	29,246	21,994	12,973	7,605	6,655	4,139	3,000	10,623
Future - Alternative 6	8,451	9,100	13,864	28,547	31,606	29,283	21,994	12,957	7,532	6,649	4,157	3,000	10,637
Difference	-10	30	59	133	69	38	0	-16	-73	-6	18	0	15
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	-1%	0%	0%	0%	0%
Dry													
Future - Base	7,611	7,891	10,135	15,901	29,451	24,322	15,139	9,861	7,158	5,000	4,785	3,000	8,395
Future - Alternative 6	7,616	7,888	10,165	15,965	29,545	24,387	15,130	9,857	7,161	5,000	4,786	3,000	8,410
Difference	5	-4	30	64	94	65	-9	-4	3	0	1	0	15
Percent Difference	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical													
Future - Base	6,653	5,227	7,054	11,831	15,756	13,084	9,330	6,228	6,318	4,170	4,415	3,092	5,600
Future - Alternative 6	6,601	5,263	6,776	11,910	15,848	13,087	9,319	6,228	6,265	4,170	4,428	3,091	5,589
Difference	-52	37	-278	79	92	3	-11	0	-53	0	13	-1	-11
Percent Difference	-1%	1%	-4%	1%	1%	0%	0%	0%	-1%	0%	0%	0%	0%

Delta Outflow

Future - Base

Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	10,938	15,863	79,058	151,208	180,010	107,880	70,644	27,159	11,545	10,516	4,885	21,875
20%	10,625	14,764	33,428	92,252	125,923	89,027	38,581	18,353	10,462	9,612	4,709	21,563
30%	10,313	11,693	17,489	56,706	77,981	62,254	28,814	14,204	8,749	9,048	4,349	20,938
40%	7,625	11,004	14,366	33,893	58,622	40,886	20,594	12,808	8,409	8,000	4,217	13,062
50%	7,160	8,104	11,802	26,142	43,165	27,471	17,579	11,253	7,899	6,666	4,000	3,000
60%	6,994	4,500	8,257	19,228	24,986	20,728	15,558	10,174	7,418	6,500	4,000	3,000
70%	6,613	4,500	5,323	14,908	20,687	17,661	13,640	9,584	7,100	5,000	4,000	3,000
80%	6,259	4,500	4,500	13,125	16,723	14,481	11,153	8,460	7,100	5,000	4,000	3,000
90%	5,678	3,500	4,500	8,401	12,239	11,400	10,016	7,100	6,799	4,065	4,000	3,000
Long Term												
Full Simulation Period	8,408	10,099	24,888	54,896	70,049	52,500	29,061	14,179	8,605	7,157	4,274	10,294
Water Year Types												
Wet	9,541	15,088	53,646	115,984	131,904	102,001	53,280	21,075	11,285	9,709	4,000	21,635
Above Normal	9,036	8,854	16,293	59,685	102,404	57,212	27,004	15,829	8,580	8,899	4,000	13,224
Below Normal	8,461	9,070	13,804	28,415	31,537	29,246	21,994	12,973	7,605	6,655	4,139	3,000
Dry	7,611	7,891	10,135	15,901	29,451	24,322	15,139	9,861	7,158	5,000	4,785	3,000
Critical	6,653	5,227	7,054	11,831	15,756	13,084	9,330	6,228	6,318	4,170	4,415	3,092

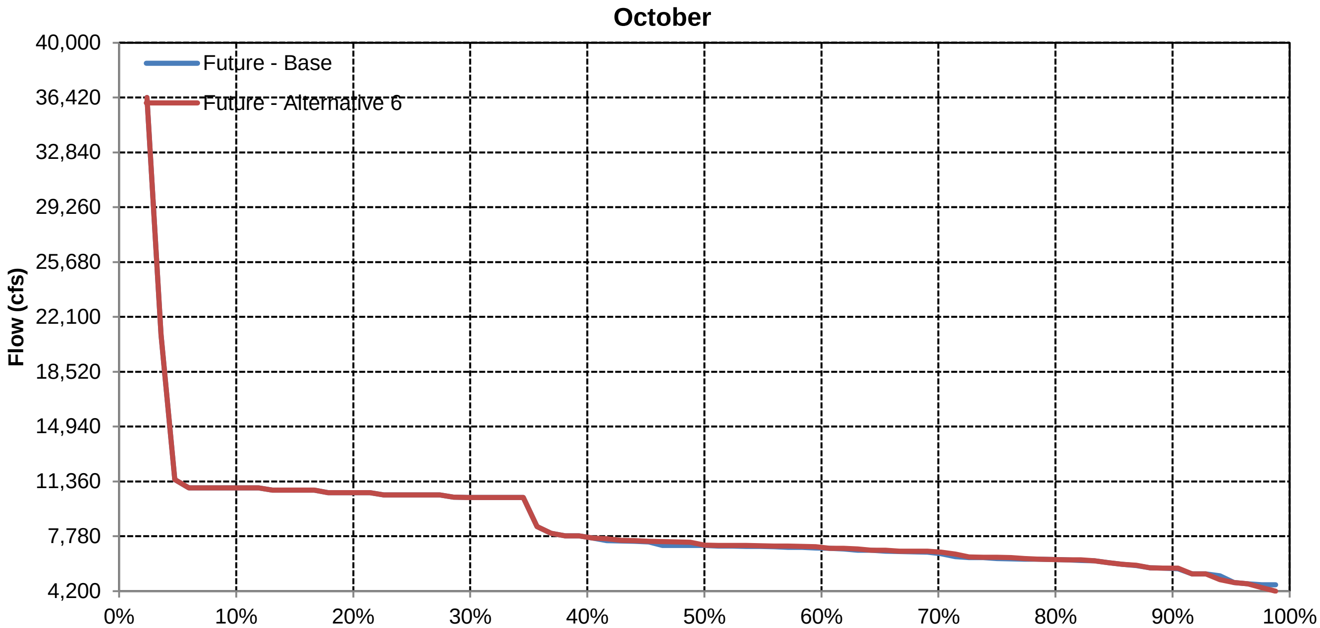
Future - Alternative 6

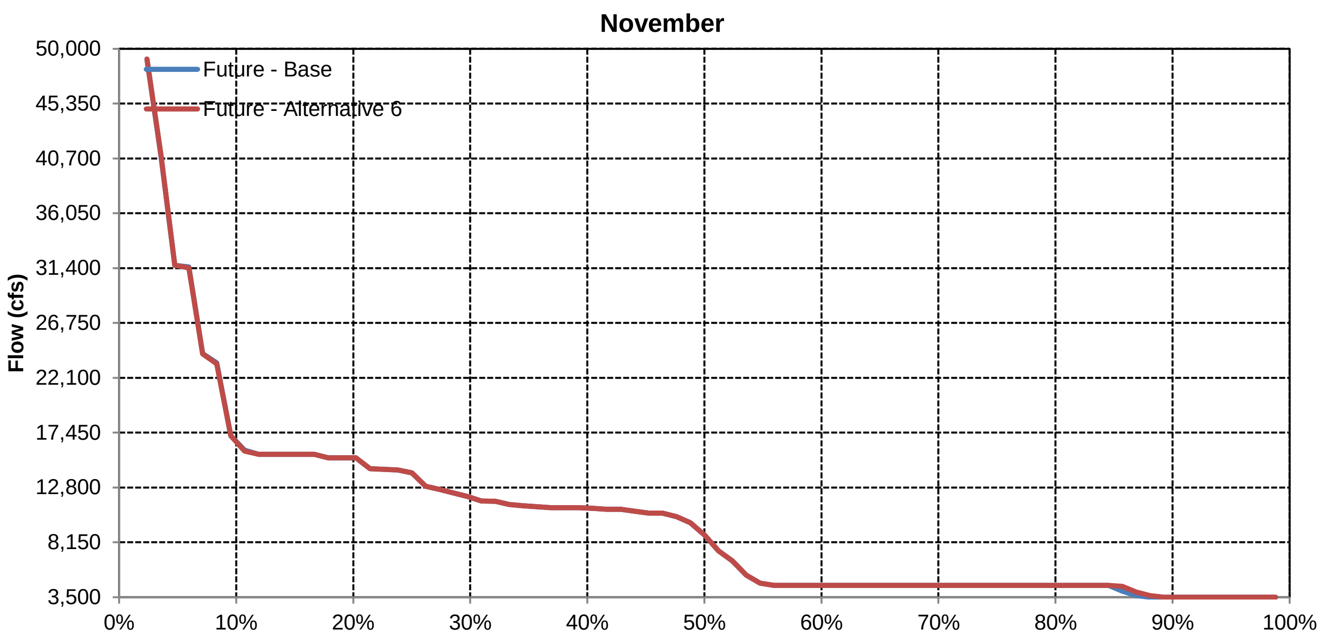
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	10,938	15,802	79,160	151,360	179,871	107,333	70,645	27,156	11,545	10,516	4,887	21,875
20%	10,625	14,764	33,719	92,469	125,927	88,765	38,581	18,350	10,470	9,598	4,708	21,563
30%	10,313	11,693	17,518	57,438	77,980	61,511	28,814	14,204	8,750	9,047	4,435	20,938
40%	7,647	11,004	14,413	33,939	58,847	40,819	20,594	12,808	8,408	8,000	4,237	13,062
50%	7,192	8,101	11,827	26,193	43,298	27,471	17,697	11,253	7,971	6,664	4,005	3,000
60%	7,013	4,500	8,269	19,324	25,212	20,751	15,558	9,951	7,245	6,500	4,000	3,000
70%	6,737	4,500	5,650	15,024	20,772	17,808	13,640	9,567	7,100	5,000	4,000	3,000
80%	6,259	4,500	4,500	13,127	16,836	14,540	11,111	8,460	7,100	5,000	4,000	3,000
90%	5,701	3,500	4,500	8,407	12,324	11,400	10,027	7,100	6,724	4,065	4,000	3,000
Long Term												
Full Simulation Period	8,427	10,108	24,915	55,003	70,106	52,498	29,061	14,168	8,590	7,155	4,279	10,293
Water Year Types												
Wet	9,573	15,087	53,784	116,099	131,901	101,964	53,290	21,051	11,295	9,706	4,000	21,635
Above Normal	9,153	8,854	16,343	59,846	102,482	57,120	27,007	15,828	8,581	8,898	4,000	13,224
Below Normal	8,451	9,100	13,864	28,547	31,606	29,283	21,994	12,957	7,532	6,649	4,157	3,000
Dry	7,616	7,888	10,165	15,965	29,545	24,387	15,130	9,857	7,161	5,000	4,786	3,000
Critical	6,601	5,263	6,776	11,910	15,848	13,087	9,319	6,228	6,265	4,170	4,428	3,091

Future - Alternative 6 Minus Future - Base

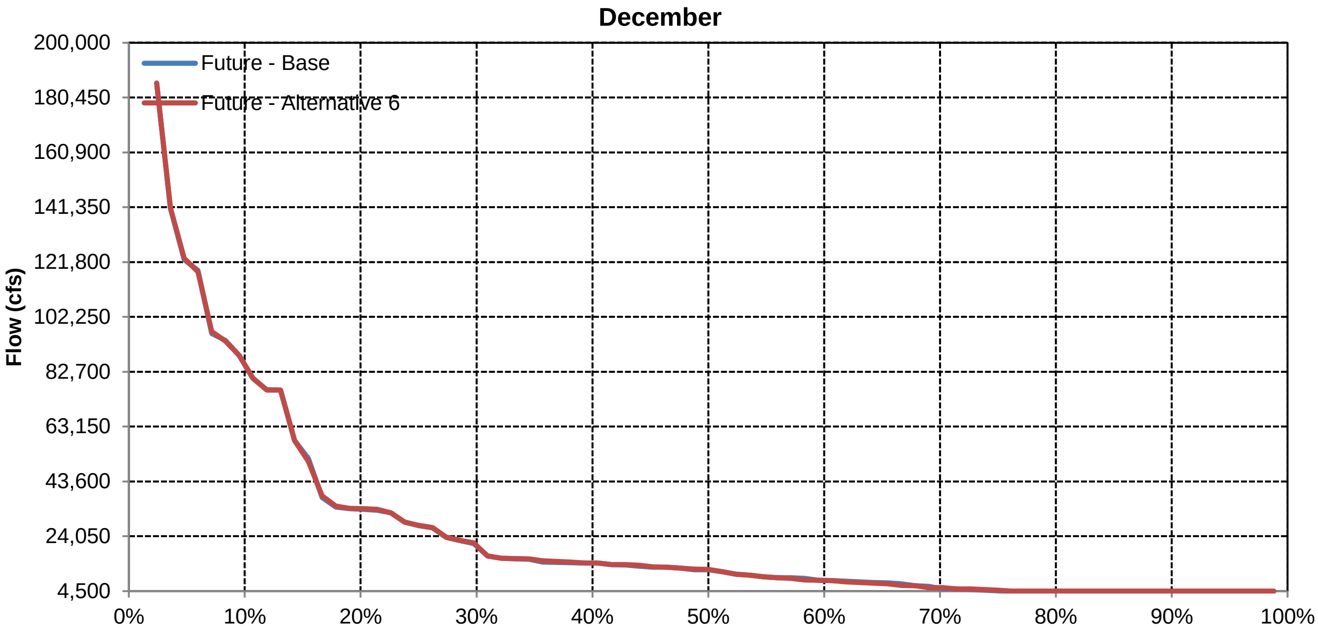
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					Average Monthly Flow (cfs)							
Probability of Exceedance												
10%	0	-60	102	153	-139	-547	1	-4	0	0	2	0
20%	0	0	291	217	4	-262	0	-3	8	-14	0	0
30%	0	0	30	732	0	-742	0	0	1	0	86	0
40%	22	0	47	45	225	-67	0	0	0	0	21	0
50%	32	-2	24	51	133	1	118	0	72	-2	5	0
60%	18	0	12	96	226	23	0	-223	-174	0	0	0
70%	124	0	327	115	86	146	0	-17	0	0	0	0
80%	0	0	0	2	113	59	-42	0	0	0	0	0
90%	23	0	0	7	85	0	11	0	-76	0	0	0
Long Term												
Full Simulation Period	18	9	26	106	57	-2	0	-11	-15	-2	5	0
Water Year Types												
Wet	33	-2	137	116	-3	-36	10	-24	9	-3	0	0
Above Normal	117	1	50	161	78	-91	3	0	2	-1	0	0
Below Normal	-10	30	59	133	69	38	0	-16	-73	-6	18	0
Dry	5	-4	30	64	94	65	-9	-4	3	0	1	0
Critical	-52	37	-278	79	92	3	-11	0	-53	0	13	-1

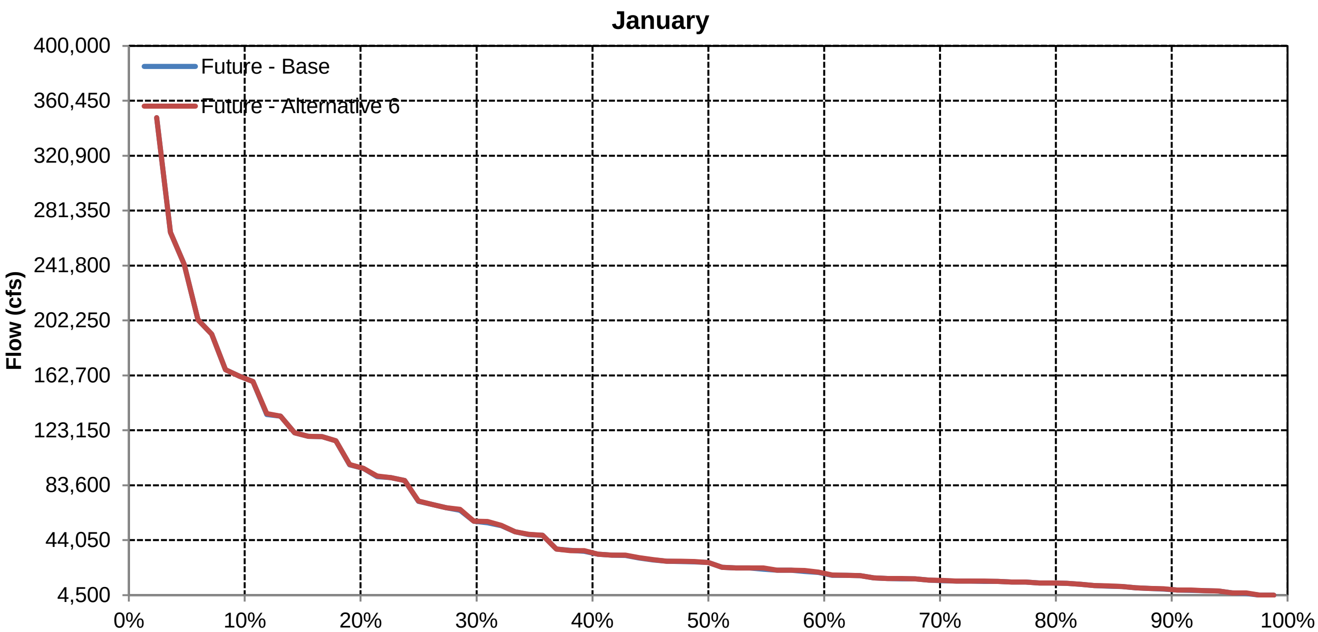
Delta Outflow



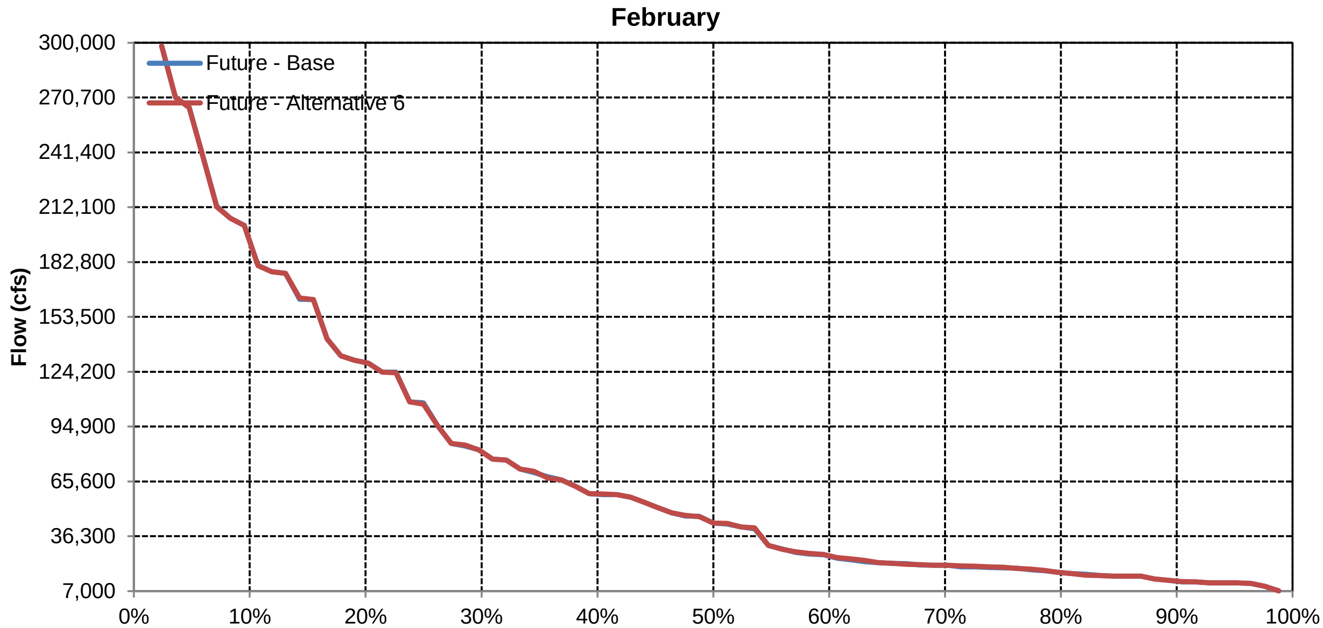


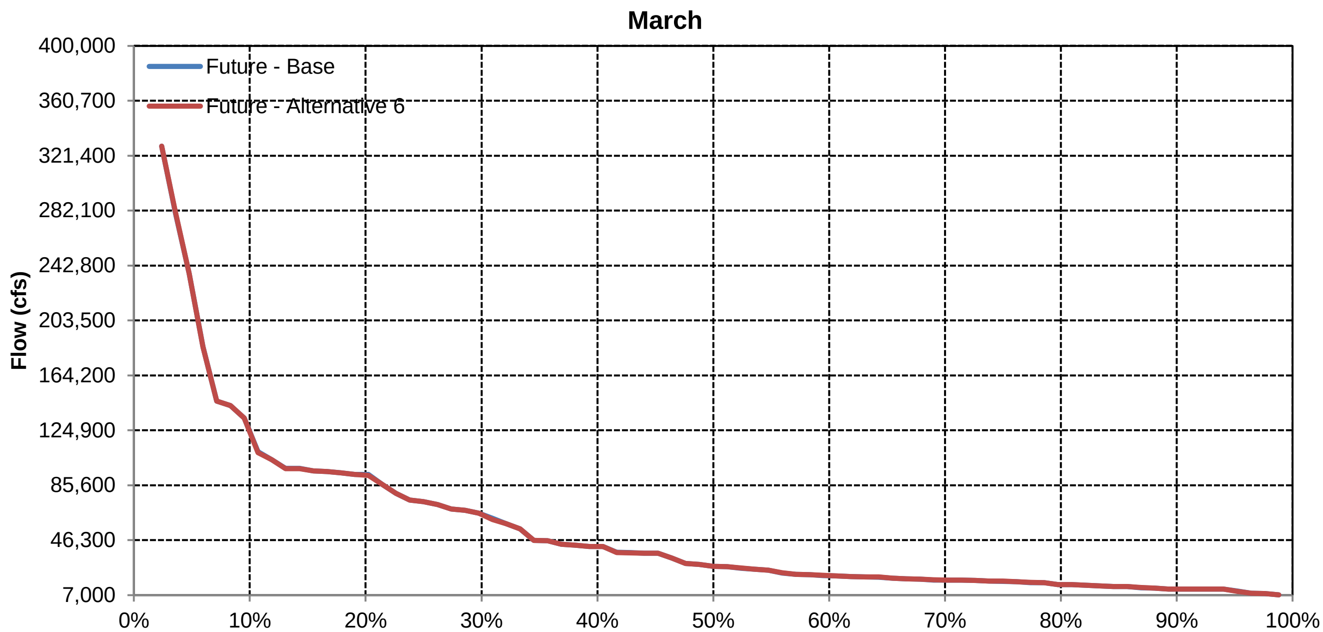
Delta Outflow



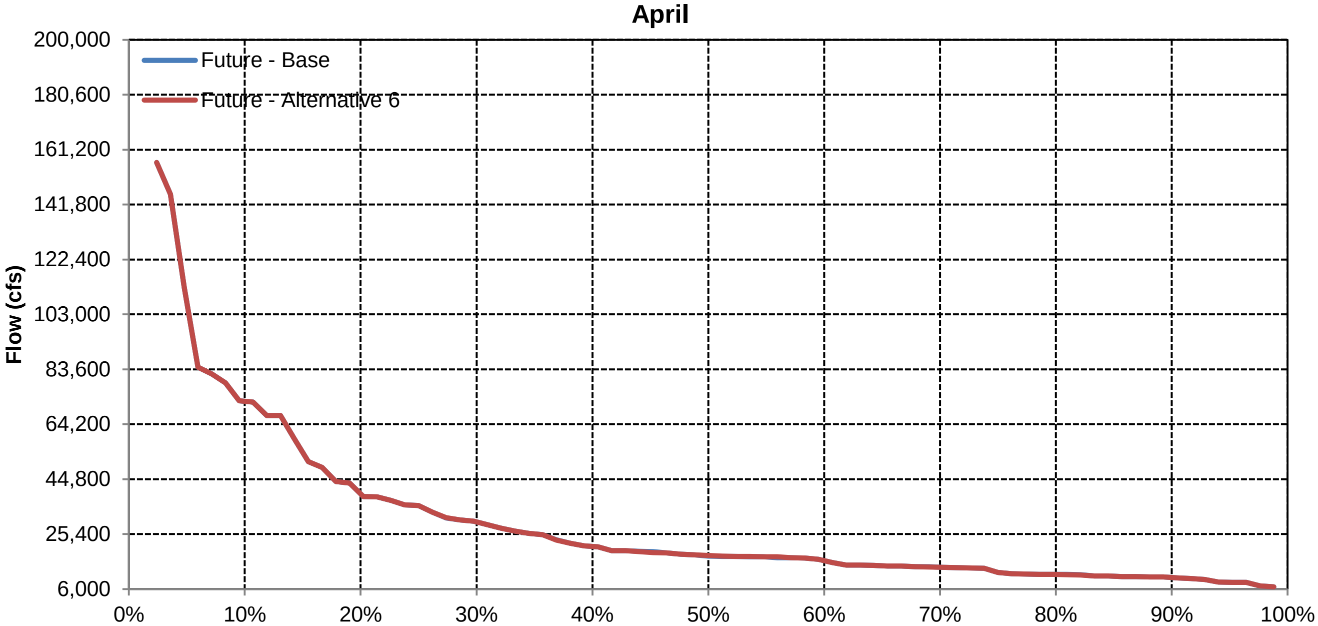


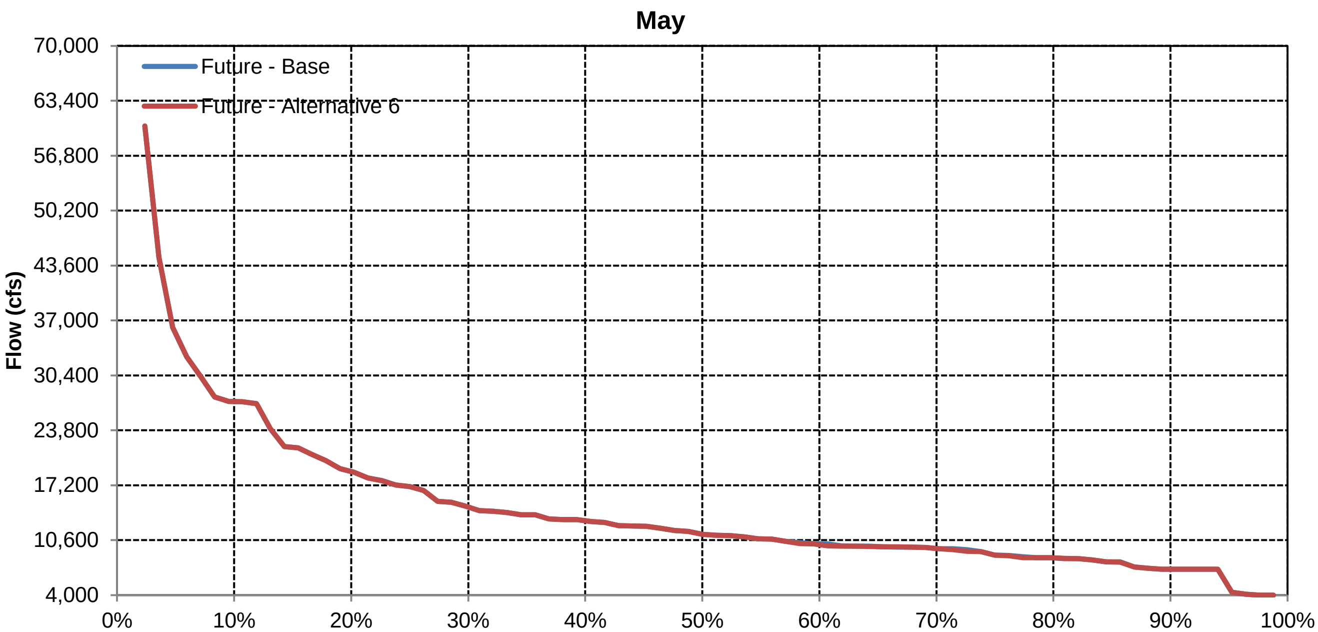
Delta Outflow





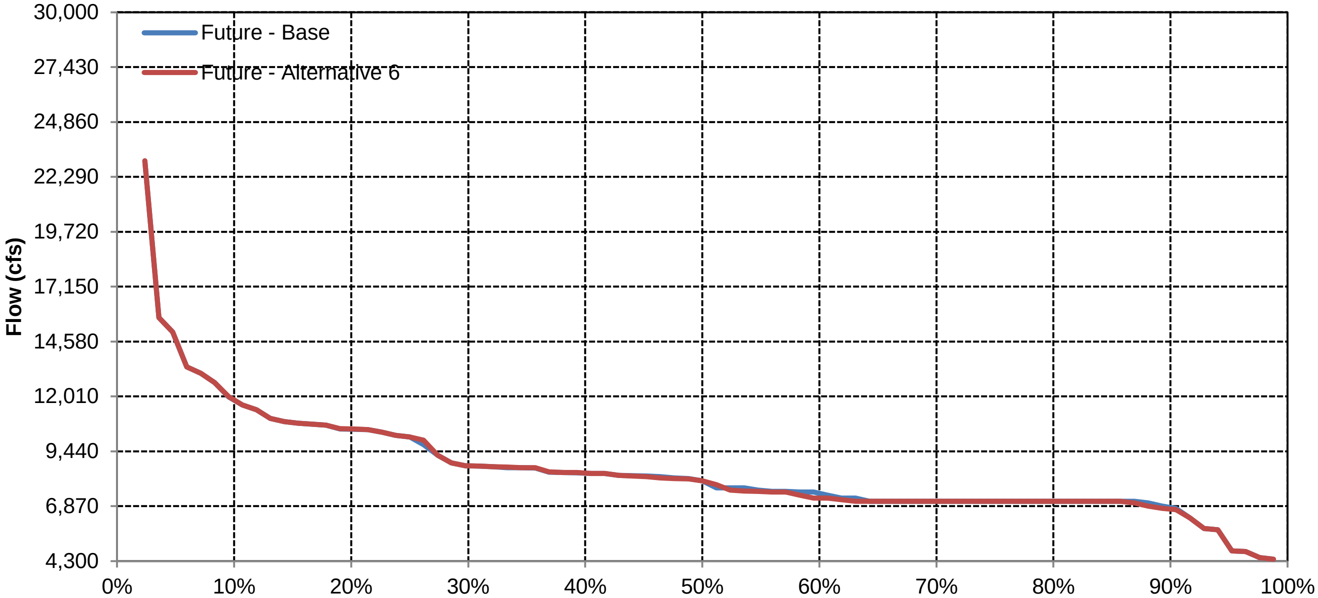
Delta Outflow



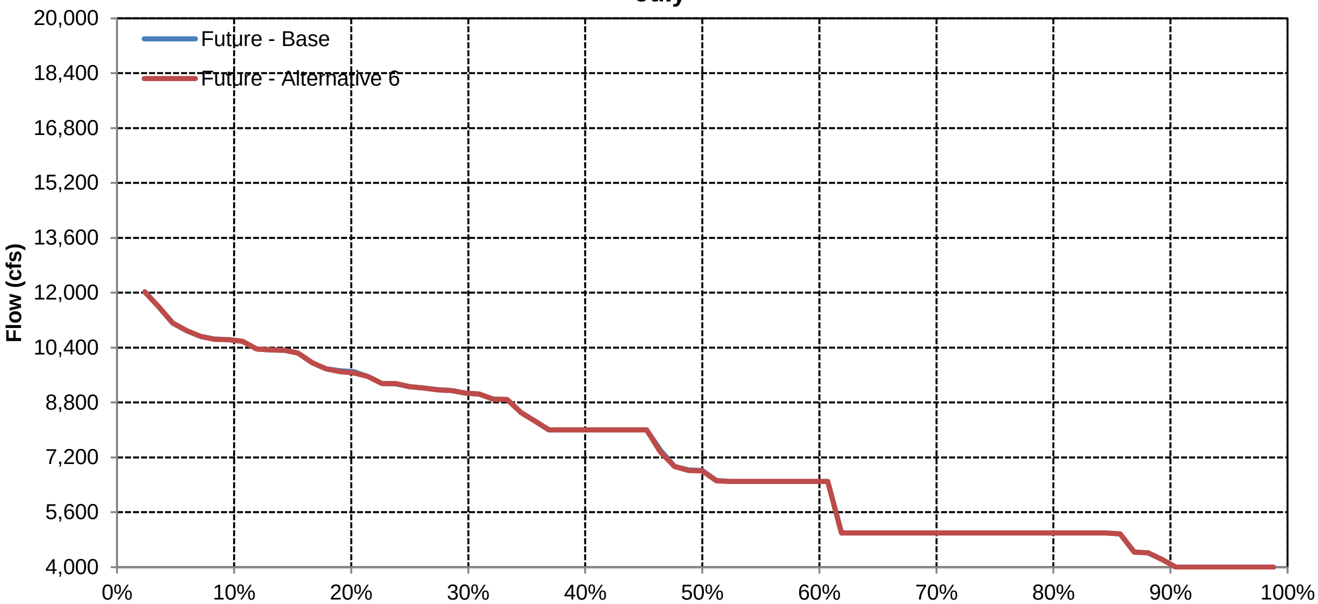


Delta Outflow

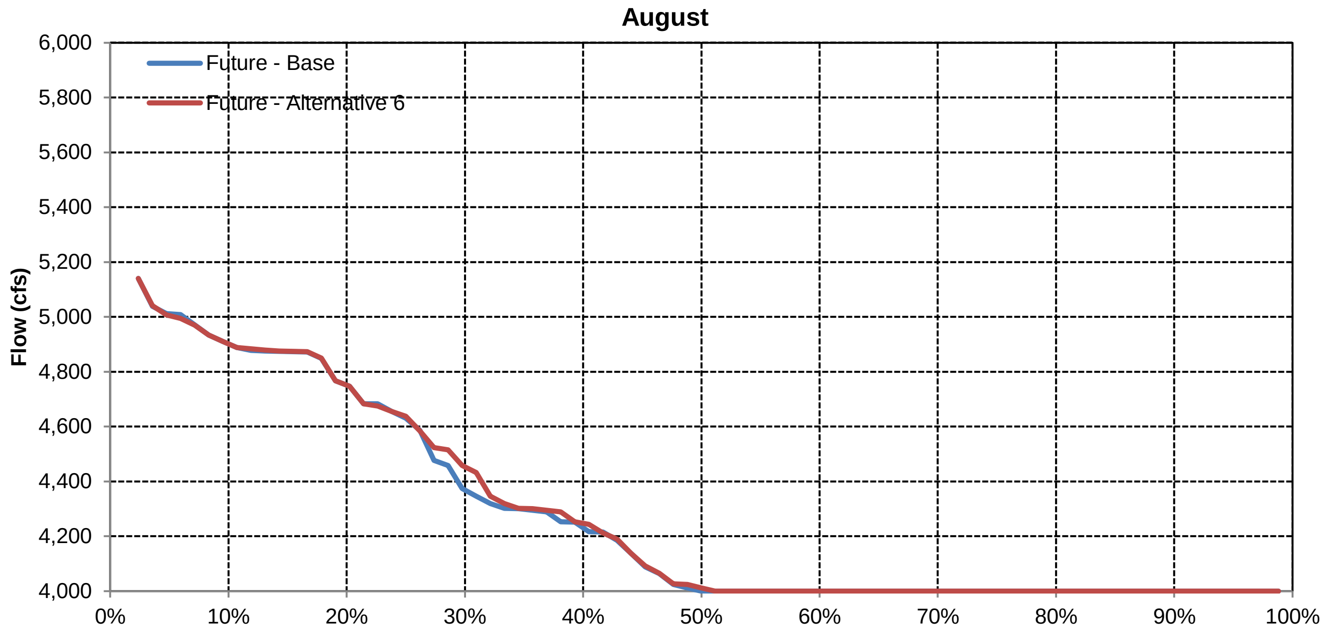
June



July



Delta Outflow



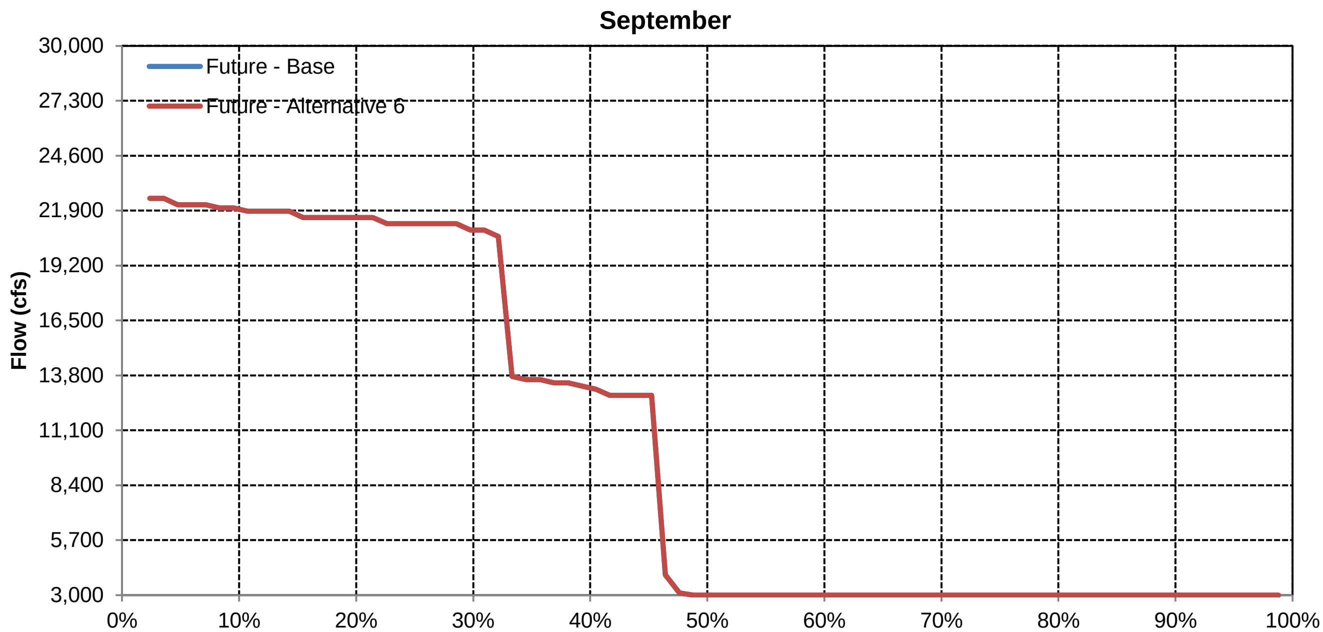


Table 185 No Action Alternative-Alternative 6 (Future)

Winter-run Chinook Salmon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 6 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration	November through July	Mean Monthly Flow (cfs)	Verona		10	Lower 40%		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
			Freeport		10	Lower 40%		0.0	-3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
		Mean Monthly Water Temperature (°F)	Feather River Confluence	64		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
				68		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
			Freeport	64		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
				68		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Juvenile Rearing and Downstream Movement*	July through March	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	-3.0	0.0	0.0	0.0				0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	61		All Years	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
				65		All Years	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
			Freeport	61		All Years	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
				65		All Years	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0

Table 186 No Action Alternative-Alternative 6 (Future)

Spring-run Chinook Salmon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location Description	Metric Value	Metric %	Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration	March through September	Mean Monthly Flow (cfs)	Verona		10	Lower 40%						0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport		10	Lower 40%						0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	64		All Years						0.0	0.0	0.0	0.0	0.0	0.0	0.0
				68		All Years						0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport	64		All Years						0.0	0.0	0.0	0.0	0.0	0.0	0.0
				68		All Years						0.0	0.0	0.0	0.0	0.0	0.0	0.0
Juvenile Rearing (and Downstream Movement)	Year-round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	61		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
				65		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Smolt Emigration	October through May	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
			Freeport		10	Lower 40%	0.0	0.0	-3.0	0.0	0.0	0.0	0.0	0.0				
		Mean Monthly Water Temperature (°F)	Feather River Confluence	63		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
			Freeport	63		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				

Net Change in Probability of Exceedance under Alternative 6 (Future) relative to No Action Alternative (columns Oct–Sep)

Table 187 No Action Alternative-Alternative 6 (Future)

Fall-run Chinook Salmon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location Description	Metric Value	Metric %	Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Staging	July through December	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0							0.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	-3.0							0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	64		All Years	0.0	0.0	0.0							0.0	0.0	0.0
				68		All Years	0.0	0.0	0.0							0.0	0.0	0.0
			Freeport	64		All Years	0.0	0.0	0.0							0.0	0.0	0.0
				68		All Years	0.0	0.0	0.0							0.0	0.0	0.0
Juvenile Rearing and Downstream Movement	December through July	Mean Monthly Flow (cfs)	Verona		10	Lower 40%			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
			Freeport		10	Lower 40%			-3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
		Mean Monthly Water Temperature (°F)	Freeport	61		All Years			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
				65		All Years			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		

Net Change in Probability of Exceedance under Alternative 6 (Future) relative to No Action Alternative (Oct–Sep columns)

Table 188 No Action Alternative-Alternative 6 (Future)

Late Fall-run Chinook Salmon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location Description	Metric Value	Metric %	Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Staging	October through April	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
			Freeport		10	Lower 40%	0.0	0.0	-3.0	0.0	0.0	0.0	0.0					
		Mean Monthly Water Temperature (°F)	Feather River Confluence	64		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
			Freeport	64		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
Juvenile Rearing and Downstream Movement	April through December	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	-3.0				0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Freeport	61		All Years	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
				65		All Years	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0

Net Change in Probability of Exceedance under Alternative 6 (Future) relative to No Action Alternative

Table 189 No Action Alternative-Alternative 6 (Future)

Steelhead in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location Description	Metric Value	Metric %	Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
							Net Change in Probability of Exceedance under Alternative 6 (Future) relative to No Action Alternative											
Adult Immigration	August through March	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	-3.0	0.0	0.0	0.0					0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	64		All Years	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0
			Freeport	64		All Years	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0
Juvenile Rearing and Downstream Movement	Year-Round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	65		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
				68		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Smolt Emigration	January through June	Mean Monthly Flow (cfs)	Verona		10	Lower 40%				0.0	0.0	0.0	0.0	0.0	0.0			
			Freeport		10	Lower 40%				0.0	0.0	0.0	0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Feather River Confluence	52		All Years				0.0	0.0	0.0	0.0	0.0	0.0			
				55		All Years				0.0	0.0	0.0	0.0	0.0	0.0			
			Freeport	52		All Years				0.0	0.0	0.0	0.0	0.0	0.0			
				55		All Years				0.0	0.0	0.0	0.0	0.0	0.0			

Table 190 No Action Alternative-Alternative 6 (Future)

Green Sturgeon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 6 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Holding	February through July	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%					0.0	0.0	0.0	0.0	0.0	0.0		
		Mean Monthly Water Temperature (°F)	Freeport	61		All Years					0.0	0.0	0.0	0.0	0.0	0.0		
Adult Post-Spawning Holding and Emigration	July through November	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%	0.0	0.0								0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Freeport	61		All Years	0.0	0.0								0.0	0.0	0.0
Juvenile Rearing and Downstream Movement	Year-round	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%	0.0	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Freeport	66		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 191 No Action Alternative-Alternative 6 (Future)

White Sturgeon in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 6 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Holding	November through May	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%		0.0	-3.0	0.0	0.0	0.0	0.0	0.0				
		Mean Monthly Water Temperature (°F)	Freeport	77		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Spawning and Egg Incubation	February through June	Mean Monthly Flow (cfs)	Verona		10	Lower 40%					0.0	0.0	0.0	0.0	0.0			
			Freeport		10	Lower 40%					0.0	0.0	0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Feather River Confluence	61		All Years					0.0	0.0	0.0	0.0	0.0			
Juvenile Rearing and Downstream Movement	Year-round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	66		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport	66		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 192 No Action Alternative-Alternative 6 (Future)

River Lamprey in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 6 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration	September through June	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%	0.0	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0
		Mean Monthly Water Temperature (°F)	Freeport	42-60		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0
Ammocoete Rearing and Downstream Movement	Year-round	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%	0.0	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Freeport	72		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

[1]Water temperature ranges are evaluated by calculating the net change in the probability of water temperatures occurring within the specified range.

Table 193 No Action Alternative-Alternative 6 (Future)

Pacific Lamprey in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 6 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration	January through June	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%				0.0	0.0	0.0	0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Freeport	42-60		All Years				0.0	0.0	0.0	0.0	0.0	0.0			
Ammocoete Rearing and Downstream Movement	Year-round	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%	0.0	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Freeport	72		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

[1]Water temperature ranges are evaluated by calculating the net change in the probability of water temperatures occurring within the specified range.

Table 194 No Action Alternative-Alternative 6 (Future)

Hardhead in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location Description	Metric Value	Metric %	Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adults and Other Lifestages	Year-round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	61-77		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.6	0.0	0.0
			Freeport	61-77		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.3	0.0	1.2	0.0
Adult Spawning	April through June	Mean Monthly Flow (cfs)	Freeport		10	Lower 40%							0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Freeport	59-64		All Years							0.0	0.0	0.0			

[1]Water temperature ranges are evaluated by calculating the net change in the probability of water temperatures occurring within the specified range.

Table 195 No Action Alternative-Alternative 6 (Future)

American Shad in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 6 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Spawning	April through June	Mean Monthly Flow (cfs)	Verona		10	Lower 40%							0.0	0.0	0.0			
			Freeport		10	Lower 40%							0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Feather River Confluence	60-70		All Years							0.1	0.0	0.0			
			Freeport	60-70		All Years							0.0	0.0	0.0			
Juvenile Rearing and Downstream Movement	Year-Round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Freeport		10	Lower 40%	0.0	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	63-77		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.6	0.0	0.0
			Freeport	63-77		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.3	0.0	1.2	0.0

[1]Water temperature ranges are evaluated by calculating the net change in the probability of water temperatures occurring within the specified range.

Table 196 No Action Alternative-Alternative 6 (Future)

Striped Bass in the Sacramento River

Lifestage	Evaluation Period	Indicator of Potential Impact	Location Description	Metric Value	Metric %	Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult Immigration and Spawning	April through June	Mean Monthly Flow (cfs)	Verona		10	Lower 40%							0.0	0.0	0.0			
		Mean Monthly Water Temperature (°F)	Feather River Confluence	59-68		All Years							0.0	0.0	0.0			
Juvenile Rearing and Downstream Movement	Year-round	Mean Monthly Flow (cfs)	Verona		10	Lower 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Mean Monthly Water Temperature (°F)	Feather River Confluence	61-71		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.4

[1]Water temperature ranges are evaluated by calculating the net change in the probability of water temperatures occurring within the specified range.

Table 201 No Action Alternative-Alternative 6 (Future)

Alternative 6 (Future) vs No Action Alternative
Sacramento River at Verona, Monthly Flow

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
-1.0 < X < 1.0	82.9	73.2	20.7	31.7	20.7	35.4	96.3	90.2	68.3	95.1	92.7	91.5
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	15.9	0.0	2.4	0.0	0.0	0.0	0.0	0.0	6.1	2.4	3.7	6.1
X<=-10.0	0.0	2.4	3.7	13.4	14.6	1.2	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	1.2	24.4	70.7	65.9	79.3	64.6	2.4	8.5	23.2	2.4	2.4	1.2
Net Change in % Exceedance:	14.6	-24.4	-68.3	-65.9	-79.3	-64.6	-2.4	-8.5	-17.1	0.0	1.2	4.9
Net Change in 10% Exceedance	0.0	-2.4	-3.7	-13.4	-14.6	-1.2	0.0	0.0	0.0	0.0	0.0	0.0
Low Flows (Upper 40% of Distribution)												
-1.0 < X < 1.0	84.8	84.8	42.4	57.6	24.2	51.5	100.0	93.9	57.6	87.9	90.9	97.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	12.1	0.0	6.1	0.0	0.0	0.0	0.0	0.0	0.0	6.1	3.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	3.0	15.2	42.4	36.4	75.8	48.5	0.0	6.1	39.4	6.1	3.0	3.0
Net Change in % Exceedance:	9.1	-15.2	-36.4	-36.4	-75.8	-48.5	0.0	-6.1	-39.4	0.0	0.0	-3.0
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 202 No Action Alternative-Alternative 6 (Future)

Alternative 6 (Future) vs No Action Alternative
Sacramento River at Freeport, Monthly Flow

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
-1.0 < X < 1.0	89.0	80.5	26.8	34.1	24.4	36.6	98.8	92.7	79.3	96.3	91.5	92.7
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	11.0	0.0	2.4	2.4	0.0	0.0	0.0	0.0	3.7	3.7	3.7	2.4
X<=-10.0	0.0	1.2	2.4	7.3	7.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	0.0	17.1	69.5	62.2	74.4	58.5	1.2	4.9	14.6	0.0	3.7	3.7
Net Change in % Exceedance:	11.0	-17.1	-67.1	-59.8	-74.4	-58.5	-1.2	-4.9	-11.0	3.7	0.0	-1.2
Net Change in 10% Exceedance	0.0	-1.2	-2.4	-7.3	-7.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Low Flows (Upper 40% of Distribution)												
-1.0 < X < 1.0	93.9	97.0	54.5	60.6	27.3	57.6	100.0	87.9	84.8	97.0	97.0	93.9
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	6.1	0.0	6.1	6.1	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0
X<=-10.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	0.0	3.0	36.4	30.3	72.7	36.4	0.0	6.1	15.2	0.0	3.0	6.1
Net Change in % Exceedance:	6.1	-3.0	-30.3	-24.2	-72.7	-36.4	0.0	-6.1	-15.2	3.0	-3.0	-6.1
Net Change in 10% Exceedance	0.0	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Alternative 6 (Future) vs No Action Alternative

Sacramento River at Feather River, Monthly Temperature

Exceedance of Water Temperature Index Values and Probability of Occurring within the Water Temperature Index Ranges

No Action Alternative

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	98.2	96.4	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	91.9	87.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	40.2	23.2	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	22.0	5.5	90.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	98.8	8.5	1.2	73.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	95.1	1.7	1.2	30.1	97.3	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	87.8	1.2	1.2	12.0	86.0	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	67.1	1.2	1.2	6.1	74.4	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	42.7	1.2	1.2	3.1	61.0	98.7	98.8	98.8	98.8	98.8	98.8
56	98.8	26.8	1.2	1.2	1.2	39.0	97.6	98.8	98.8	98.8	98.8	98.8
57	98.8	14.0	1.2	1.2	1.2	23.2	96.7	98.8	98.8	98.8	98.8	98.8
58	98.8	5.5	1.2	1.2	1.2	12.8	91.2	98.8	98.8	98.8	98.8	98.8
59	98.8	1.2	1.2	1.2	1.2	7.3	85.7	98.8	98.8	98.8	98.8	98.8
60	98.8	1.2	1.2	1.2	1.2	2.7	81.1	98.8	98.8	98.8	98.8	98.8
61	92.1	1.2	1.2	1.2	1.2	2.0	74.4	98.8	98.8	98.8	98.8	98.8
62	74.4	1.2	1.2	1.2	1.2	1.4	61.0	98.8	98.8	98.8	98.8	98.8
63	52.8	1.2	1.2	1.2	1.2	1.2	50.0	98.6	98.8	98.8	98.8	98.8
64	41.5	1.2	1.2	1.2	1.2	1.2	34.5	98.0	98.8	98.8	98.8	98.8
65	23.2	1.2	1.2	1.2	1.2	1.2	23.2	96.3	98.8	98.8	98.8	98.8
66	15.2	1.2	1.2	1.2	1.2	1.2	10.4	90.7	98.8	98.8	98.8	97.4
68	4.1	1.2	1.2	1.2	1.2	1.2	1.2	65.2	96.5	98.8	98.8	89.6
69	2.1	1.2	1.2	1.2	1.2	1.2	1.2	45.1	95.3	98.8	98.8	78.9
70	1.4	1.2	1.2	1.2	1.2	1.2	1.2	28.7	86.6	98.8	98.8	70.7
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	15.9	72.0	98.8	98.8	57.7
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	10.4	57.3	97.6	95.9	46.3
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.3	23.2	74.4	84.1	18.3
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	2.6	11.0	54.9	69.5	9.8
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	18.3	30.5	3.0
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	90.7	86.6	97.6	97.6	97.6	96.2	87.8	43.9	29.3	89.0
50-64	57.3	97.6	7.3	0.0	72.0	97.6	64.3	0.8	0.0	0.0	0.0	0.0
55-56	0.0	15.9	0.0	0.0	1.9	22.0	1.1	0.0	0.0	0.0	0.0	0.0
59-64	57.3	0.0	0.0	0.0	0.0	6.1	51.2	0.8	0.0	0.0	0.0	0.0
59-68	94.7	0.0	0.0	0.0	0.0	6.1	84.5	33.6	2.3	0.0	0.0	9.2
59-75	97.6	0.0	0.0	0.0	0.0	6.1	84.5	96.2	87.8	43.9	29.3	89.0
60-70	97.4	0.0	0.0	0.0	0.0	1.5	79.9	70.1	12.2	0.0	0.0	28.1
61-71	90.9	0.0	0.0	0.0	0.0	0.8	73.2	82.9	26.8	0.0	0.0	41.1
63-69	50.7	0.0	0.0	0.0	0.0	0.0	48.8	53.5	3.5	0.0	0.0	19.9
63-77	51.6	0.0	0.0	0.0	0.0	0.0	48.8	97.4	97.6	80.5	68.3	95.8
65-82	22.0	0.0	0.0	0.0	0.0	0.0	22.0	95.1	97.6	97.6	97.6	97.6
70-82	0.2	0.0	0.0	0.0	0.0	0.0	0.0	27.5	85.4	97.6	97.6	69.5
42-60	0.0	97.6	97.6	95.8	97.6	96.1	17.7	0.0	0.0	0.0	0.0	0.0
61-77	90.9	0.0	0.0	0.0	0.0	0.8	73.2	97.6	97.6	80.5	68.3	95.8

Alternative 6 (Future)

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.6	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	98.2	96.4	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	92.1	87.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	40.2	23.2	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	20.7	5.5	90.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	98.8	8.5	1.2	73.2	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	95.1	1.7	1.2	30.1	97.3	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	87.8	1.2	1.2	12.0	86.0	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	67.1	1.2	1.2	6.1	74.4	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	42.7	1.2	1.2	3.1	61.0	98.7	98.8	98.8	98.8	98.8	98.8
56	98.8	26.8	1.2	1.2	1.2	39.0	97.6	98.8	98.8	98.8	98.8	98.8
57	98.8	14.0	1.2	1.2	1.2	23.2	96.7	98.8	98.8	98.8	98.8	98.8
58	98.8	5.5	1.2	1.2	1.2	12.8	91.2	98.8	98.8	98.8	98.8	98.8
59	98.8	1.2	1.2	1.2	1.2	7.3	85.7	98.8	98.8	98.8	98.8	98.8
60	98.8	1.2	1.2	1.2	1.2	2.7	81.2	98.8	98.8	98.8	98.8	98.8
61	92.1	1.2	1.2	1.2	1.2	2.0	74.4	98.8	98.8	98.8	98.8	98.8
62	73.2	1.2	1.2	1.2	1.2	1.4	61.0	98.8	98.8	98.8	98.8	98.8
63	52.8	1.2	1.2	1.2	1.2	1.2	50.0	98.6	98.8	98.8	98.8	98.8
64	41.5	1.2	1.2	1.2	1.2	1.2	34.5	98.0	98.8	98.8	98.8	98.8
65	23.2	1.2	1.2	1.2	1.2	1.2	23.2	96.3	98.8	98.8	98.8	98.8
66	15.2	1.2	1.2	1.2	1.2	1.2	10.4	90.7	98.8	98.8	98.8	97.4
68	4.1	1.2	1.2	1.2	1.2	1.2	1.2	65.2	96.5	98.8	98.8	89.6
69	2.1	1.2	1.2	1.2	1.2	1.2	1.2	45.1	95.3	98.8	98.8	78.5
70	1.4	1.2	1.2	1.2	1.2	1.2	1.2	28.7	86.6	98.8	98.8	70.7
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	15.9	70.7	98.8	98.8	57.3
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	10.4	57.3	97.0	95.1	45.1
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.3	22.0	74.4	82.9	18.3
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	2.6	11.0	54.9	69.5	9.1
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	18.9	30.5	3.0
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	90.9	86.6	97.6	97.6	97.6	96.2	87.8	43.9	29.3	89.7
50-64	57.3	97.6	7.3	0.0	72.0	97.6	64.3	0.8	0.0	0.0	0.0	0.0
55-56	0.0	15.9	0.0	0.0	1.9	22.0	1.1	0.0	0.0	0.0	0.0	0.0
59-64	57.3	0.0	0.0	0.0	0.0	6.1	51.2	0.8	0.0	0.0	0.0	0.0
59-68	94.7	0.0	0.0	0.0	0.0	6.1	84.5	33.6	2.3	0.0	0.0	9.2
59-75	97.6	0.0	0.0	0.0	0.0	6.1	84.5	96.2	87.8	43.9	29.3	89.7
60-70	97.4	0.0	0.0	0.0	0.0	1.5	80.0	70.1	12.2	0.0	0.0	28.1
61-71	90.9	0.0	0.0	0.0	0.0	0.8	73.2	82.9	28.1	0.0	0.0	41.5
63-69	50.7	0.0	0.0	0.0	0.0	0.0	48.8	53.5	3.5	0.0	0.0	20.3
63-77	51.6	0.0	0.0	0.0	0.0	0.0	48.8	97.4	97.6	79.9	68.3	95.8
65-82	22.0	0.0	0.0	0.0	0.0	0.0	22.0	95.1	97.6	97.6	97.6	97.6
70-82	0.2	0.0	0.0	0.0	0.0	0.0	0.0	27.5	85.4	97.6	97.6	69.5
42-60	0.0	97.6	97.6	95.8	97.6	96.1	17.6	0.0	0.0	0.0	0.0	0.0
61-77	90.9	0.0	0.0	0.0	0.0	0.8	73.2	97.6	97.6	79.9	68.3	95.8

Alternative 6 (Future) - No Action Alternative

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
43	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
48	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
49	0.0	0.0	-1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
52	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
53	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
54	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
56	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
57	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
58	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
61	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
62	-1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
66	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
68	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.4
70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.3	0.0	0.0	-0.4
72	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.6	-0.8	-1.2
74	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.2	0.0	-1.2	0.0
75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.7
77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0
82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
86	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
88	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
98	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45-75	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7
50-64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55-56	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-68	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7
60-70	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
61-71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.4
63-69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
63-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.6	0.0	0.0
65-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42-60	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.0
61-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.6	0.0	0.0

Table 210 No Action Alternative-Alternative 6 (Future)

Alternative 6 (Future) vs No Action Alternative

Sacramento River at Freeport, Monthly Temperature

Exceedance of Water Temperature Index Values and Probability of Occurring within the Water Temperature Index Ranges

No Action Alternative

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	98.3	96.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	90.2	86.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	43.9	26.2	97.6	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	26.2	8.5	92.7	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	98.8	9.8	1.2	78.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	97.8	1.5	1.2	29.3	98.8	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	90.2	1.2	1.2	15.6	90.2	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	70.7	1.2	1.2	7.0	75.6	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	50.0	1.2	1.2	4.6	63.4	98.8	98.8	98.8	98.8	98.8	98.8
56	98.8	31.7	1.2	1.2	2.0	43.9	97.8	98.8	98.8	98.8	98.8	98.8
57	98.8	22.0	1.2	1.2	1.2	27.4	96.6	98.8	98.8	98.8	98.8	98.8
58	98.8	6.1	1.2	1.2	1.2	18.9	92.4	98.8	98.8	98.8	98.8	98.8
59	98.8	2.4	1.2	1.2	1.2	7.3	88.0	98.8	98.8	98.8	98.8	98.8
60	98.8	1.2	1.2	1.2	1.2	4.9	81.7	98.8	98.8	98.8	98.8	98.8
61	98.0	1.2	1.2	1.2	1.2	2.4	74.0	98.8	98.8	98.8	98.8	98.8
62	89.6	1.2	1.2	1.2	1.2	1.9	62.8	98.8	98.8	98.8	98.8	98.8
63	63.4	1.2	1.2	1.2	1.2	1.3	49.4	98.8	98.8	98.8	98.8	98.8
64	52.4	1.2	1.2	1.2	1.2	1.2	32.3	98.4	98.8	98.8	98.8	98.8
65	35.4	1.2	1.2	1.2	1.2	1.2	27.6	97.0	98.8	98.8	98.8	98.8
66	21.3	1.2	1.2	1.2	1.2	1.2	17.1	92.3	98.8	98.8	98.8	98.8
68	4.7	1.2	1.2	1.2	1.2	1.2	1.2	78.7	98.8	98.8	98.8	95.3
69	2.7	1.2	1.2	1.2	1.2	1.2	1.2	54.9	96.6	98.8	98.8	89.8
70	1.6	1.2	1.2	1.2	1.2	1.2	1.2	38.2	95.2	98.8	98.8	78.0
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	21.3	86.9	98.8	98.8	70.1
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	13.0	81.7	98.8	98.8	53.7
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.6	39.6	91.5	88.7	22.0
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.1	20.1	78.7	81.7	9.8
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	39.0	43.9	2.1
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	89.0	84.8	97.6	97.6	97.6	95.7	78.7	20.1	17.1	89.0
50-64	46.4	97.6	8.6	0.0	76.8	97.6	66.5	0.4	0.0	0.0	0.0	0.0
55-56	0.0	18.3	0.0	0.0	2.6	19.5	1.0	0.0	0.0	0.0	0.0	0.0
59-64	46.4	1.2	0.0	0.0	0.0	6.1	55.7	0.4	0.0	0.0	0.0	0.0
59-68	94.1	1.2	0.0	0.0	0.0	6.1	86.8	20.1	0.0	0.0	0.0	3.5
59-75	97.6	1.2	0.0	0.0	0.0	6.1	86.8	95.7	78.7	20.1	17.1	89.0
60-70	97.2	0.0	0.0	0.0	0.0	3.7	80.5	60.6	3.6	0.0	0.0	20.8
61-71	96.8	0.0	0.0	0.0	0.0	1.2	72.8	77.5	11.9	0.0	0.0	28.7
63-69	60.7	0.0	0.0	0.0	0.0	0.1	48.2	43.9	2.2	0.0	0.0	9.0
63-77	62.2	0.0	0.0	0.0	0.0	0.1	48.2	97.6	97.6	59.8	54.9	96.7
65-82	34.2	0.0	0.0	0.0	0.0	0.0	26.4	95.8	97.6	97.6	97.6	97.6
70-82	0.4	0.0	0.0	0.0	0.0	0.0	0.0	37.0	94.0	97.6	97.6	76.8
42-60	0.0	97.6	97.6	95.8	97.6	93.9	17.1	0.0	0.0	0.0	0.0	0.0
61-77	96.8	0.0	0.0	0.0	0.0	1.2	72.8	97.6	97.6	59.8	54.9	96.7

Alternative 6 (Future)

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	98.3	96.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	90.2	86.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	43.9	26.4	97.6	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	25.6	8.5	93.9	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	98.8	9.8	1.2	78.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	97.8	1.5	1.2	29.3	98.8	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	90.7	1.2	1.2	15.9	90.2	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	70.7	1.2	1.2	6.8	75.6	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	50.0	1.2	1.2	4.6	63.4	98.8	98.8	98.8	98.8	98.8	98.8
56	98.8	31.7	1.2	1.2	2.0	43.9	97.8	98.8	98.8	98.8	98.8	98.8
57	98.8	22.0	1.2	1.2	1.2	27.4	96.6	98.8	98.8	98.8	98.8	98.8
58	98.8	6.1	1.2	1.2	1.2	18.9	92.4	98.8	98.8	98.8	98.8	98.8
59	98.8	2.3	1.2	1.2	1.2	7.3	88.0	98.8	98.8	98.8	98.8	98.8
60	98.8	1.2	1.2	1.2	1.2	4.9	81.7	98.8	98.8	98.8	98.8	98.8
61	98.0	1.2	1.2	1.2	1.2	2.4	74.0	98.8	98.8	98.8	98.8	98.8
62	89.6	1.2	1.2	1.2	1.2	1.9	63.4	98.8	98.8	98.8	98.8	98.8
63	63.4	1.2	1.2	1.2	1.2	1.3	49.4	98.8	98.8	98.8	98.8	98.8
64	52.4	1.2	1.2	1.2	1.2	1.2	32.3	98.4	98.8	98.8	98.8	98.8
65	35.4	1.2	1.2	1.2	1.2	1.2	27.6	97.0	98.8	98.8	98.8	98.8
66	21.3	1.2	1.2	1.2	1.2	1.2	17.1	92.3	98.8	98.8	98.8	98.8
68	4.7	1.2	1.2	1.2	1.2	1.2	1.2	78.7	98.8	98.8	98.8	95.3
69	2.7	1.2	1.2	1.2	1.2	1.2	1.2	54.9	96.6	98.8	98.8	89.8
70	1.6	1.2	1.2	1.2	1.2	1.2	1.2	38.2	95.2	98.8	98.8	78.0
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	21.3	86.9	98.8	98.8	70.1
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	13.0	81.7	98.8	98.8	53.7
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.6	40.9	91.5	89.0	22.0
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.1	20.1	78.7	82.3	9.8
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.5	39.0	42.7	2.1
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	89.0	84.8	97.6	97.6	97.6	95.7	78.7	20.1	16.5	89.0
50-64	46.4	97.6	8.6	0.0	76.8	97.6	66.5	0.4	0.0	0.0	0.0	0.0
55-56	0.0	18.3	0.0	0.0	2.6	19.5	1.0	0.0	0.0	0.0	0.0	0.0
59-64	46.4	1.1	0.0	0.0	0.0	6.1	55.7	0.4	0.0	0.0	0.0	0.0
59-68	94.1	1.1	0.0	0.0	0.0	6.1	86.8	20.1	0.0	0.0	0.0	3.5
59-75	97.6	1.1	0.0	0.0	0.0	6.1	86.8	95.7	78.7	20.1	16.5	89.0
60-70	97.2	0.0	0.0	0.0	0.0	3.7	80.5	60.6	3.6	0.0	0.0	20.8
61-71	96.8	0.0	0.0	0.0	0.0	1.2	72.8	77.5	11.9	0.0	0.0	28.7
63-69	60.7	0.0	0.0	0.0	0.0	0.1	48.2	43.9	2.2	0.0	0.0	9.0
63-77	62.2	0.0	0.0	0.0	0.0	0.1	48.2	97.6	97.3	59.8	56.1	96.7
65-82	34.2	0.0	0.0	0.0	0.0	0.0	26.4	95.8	97.6	97.6	97.6	97.6
70-82	0.4	0.0	0.0	0.0	0.0	0.0	0.0	37.0	94.0	97.6	97.6	76.8
42-60	0.0	97.6	97.6	95.8	97.6	93.9	17.1	0.0	0.0	0.0	0.0	0.0
61-77	96.8	0.0	0.0	0.0	0.0	1.2	72.8	97.6	97.3	59.8	56.1	96.7

Alternative 6 (Future) - No Action Alternative

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
43	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
48	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
49	0.0	0.0	-0.6	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
52	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
53	0.0	0.5	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
54	0.0	0.0	0.0	0.0	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
56	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
57	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
58	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
62	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0
63	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
66	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
68	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
72	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
74	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.3	0.0
75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0
77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	-1.2	0.0
82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
86	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
88	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
98	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45-75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.6	0.0
50-64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55-56	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-64	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-68	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-75	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.6	0.0
60-70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61-71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63-69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.3	0.0	1.2	0.0
65-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42-60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.3	0.0	1.2	0.0

Table 227 No Action Alternative -Alternative 6 (Future)

Delta Smelt in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location Description	Metric Value	Metric %	Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult	December through May	Mean Monthly Water Temperature (°F)	Sacramento River at Freeport	59-68		All Years			0.0	0.0	0.0	0.0	0.0	0.0				
		Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years			64.6	64.6	65.9	76.8	0.0	0.0				
	September through November	Mean Monthly X_2 (RKm)	X_2 between 74 km and 81 km	74-81		Wet and Above Normal Water Years	0.0	0.0										0.0
	December through February	Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<-5000 cfs		All Years			0.0	0.0	0.0							
Egg and Embryo	February through May	Mean Monthly Water Temperature (°F)	Sacramento River at Freeport	59-68		All Years					0.0	0.0	0.0	0.0				
Larval	March through June	Mean Monthly Water Temperature (°F)	Sacramento River at Freeport	59-68		All Years						0.0	0.0	0.0	0.0			
		Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<-1500 cfs		Dry and Critical Water Years						0.0	-3.3	-3.3	3.3			
		Mean Monthly Delta Outflow (cfs)	Delta		10	All Years						0.0	0.0	0.0	0.0			
Juvenile	May through July	Mean Monthly Water Temperature (°F)	Sacramento River at Freeport	59-68		All Years								0.0	0.0	0.0		
		Mean Monthly X_2 (RKm)	Changes in X_2 between RKm 65 and 80	0.5 RKm		All Years								0.0	1.2	1.2		

Net Change in Probability of Exceedance under Alternative 6 (Future) relative to No Action Alternative (columns Oct–Sep)

Table 228 No Action Alternative -Alternative 6 (Future)

Longfin Smelt in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location Description	Metric Value	Metric %	Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Adult	December through March	Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<-5000 cfs		All Years			0.0	0.0	0.0	0.0						
Larvae and Juvenile	April and May	Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<-1500 cfs		Dry and Critical Water Years							-3.3	-3.3				
				< 0 cfs		Dry and Critical Water Years							0.0	0.0				
	January through June	Mean Monthly X_2 (RKm)	X_2	< 75 RKm		All Years				0.0	0.0	0.0	1.2	0.0	-1.2			
				< 75 RKm		Dry and Critical Water Years				0.0	0.0	0.0	0.0	0.0	0.0			

Net Change in Probability of Exceedance under Alternative 6 (Future) relative to No Action Alternative (columns Oct–Sep)

Table 229 No Action Alternative -Alternative 6 (Future)

Winter-run Chinook Salmon in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 6 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	November through May	Mean Monthly Flow (cfs)	Rio Vista		10	Lower 40%		0.0	-6.1	0.0	0.0	0.0	0.0	0.0				
		Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years		69.5	64.6	64.6	65.9	76.8	0.0	0.0				
		Mean Monthly Delta Outflow (cfs)	Delta		10	All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0				
		Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<2500 cfs		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0				

Table 230 No Action Alternative -Alternative 6 (Future)

Spring-run Chinook Salmon in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 6 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	November through June	Mean Monthly Flow (cfs)	Rio Vista		10	Lower 40%		0.0	-6.1	0.0	0.0	0.0	0.0	0.0	0.0			
		Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years		69.5	64.6	64.6	65.9	76.8	0.0	0.0	0.0			
		Mean Monthly Delta Outflow (cfs)	Delta		10	All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
		Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<2500 cfs		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			

Table 231 No Action Alternative -Alternative 6 (Future)

Fall- and Late Fall-run Chinook Salmon in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location Description	Metric Value	Metric %	Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	November through June	Mean Monthly Flow (cfs)	Rio Vista		10	Lower 40%		0.0	-6.1	0.0	0.0	0.0	0.0	0.0	0.0			
		Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years		69.5	64.6	64.6	65.9	76.8	0.0	0.0	0.0			
		Mean Monthly Delta Outflow (cfs)	Delta		10	All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
		Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<2500 cfs		All Years		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Adult (San Joaquin River)	December through February	Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<-5000 cfs		All Years			0.0	0.0	0.0							

Net Change in Probability of Exceedance under Alternative 6 (Future) relative to No Action Alternative (Oct–Sep columns)

Table 232 No Action Alternative -Alternative 6 (Future)

Steelhead in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 6 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	October through July	Mean Monthly Flow (cfs)	Rio Vista		10	Lower 40%	0.0	0.0	-6.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
		Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years	0.0	69.5	64.6	64.6	65.9	76.8	0.0	0.0	0.0	0.0		
		Mean Monthly Delta Outflow (cfs)	Delta		10	All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
		Mean Monthly OMR Flow (cfs)	Old and Middle Rivers	<2500 cfs		All Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		

Table 233 No Action Alternative -Alternative 6 (Future)

Green Sturgeon in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 6 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	Year-round	Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years	0.0	69.5	64.6	64.6	65.9	76.8	0.0	0.0	0.0	0.0	0.0	0.0

Table 234 No Action Alternative -Alternative 6 (Future)

White Sturgeon in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 6 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Juvenile Rearing and Emigration	April through June	Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years							0.0	0.0	0.0			

Table 235 No Action Alternative -Alternative 6 (Future)

Splittail in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 6 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Spawning and Embryo Incubation	February through May	Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years					65.9	76.8	0.0	0.0				
Juvenile Rearing and Emigration	April through July	Mean Monthly Flow (cfs)	Yolo Bypass		10	All Years							0.0	0.0	0.0	0.0		

Table 236 No Action Alternative -Alternative 6 (Future)

American Shad in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 6 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Egg and Larvae	April through June	Mean Monthly X_2 (RKm)	Changes in X_2	1 RKm		All Years							0.0	0.0	0.0			

Table 237 No Action Alternative -Alternative 6 (Future)

Striped Bass in the Delta

Lifestage	Evaluation Period	Indicator of Potential Impact	Location	Metric		Range	Net Change in Probability of Exceedance under Alternative 6 (Future) relative to No Action Alternative											
			Description	Value	%		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Egg and Larvae	April through June	Mean Monthly X_2 (RKm)	Changes in X_2	1 RKm		All Years							0.0	0.0	0.0			

Alternative 6 (Future) vs No Action Alternative

Sacramento River at Freeport, Monthly Temperature

Exceedance of Water Temperature Index Values and Probability of Occurring within the Water Temperature Index Ranges

No Action Alternative

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	98.3	96.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	90.2	86.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	43.9	26.2	97.6	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	26.2	8.5	92.7	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	98.8	9.8	1.2	78.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	97.8	1.5	1.2	29.3	98.8	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	90.2	1.2	1.2	15.6	90.2	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	70.7	1.2	1.2	7.0	75.6	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	50.0	1.2	1.2	4.6	63.4	98.8	98.8	98.8	98.8	98.8	98.8
56	98.8	31.7	1.2	1.2	2.0	43.9	97.8	98.8	98.8	98.8	98.8	98.8
57	98.8	22.0	1.2	1.2	1.2	27.4	96.6	98.8	98.8	98.8	98.8	98.8
58	98.8	6.1	1.2	1.2	1.2	18.9	92.4	98.8	98.8	98.8	98.8	98.8
59	98.8	2.4	1.2	1.2	1.2	7.3	88.0	98.8	98.8	98.8	98.8	98.8
60	98.8	1.2	1.2	1.2	1.2	4.9	81.7	98.8	98.8	98.8	98.8	98.8
61	98.0	1.2	1.2	1.2	1.2	2.4	74.0	98.8	98.8	98.8	98.8	98.8
62	89.6	1.2	1.2	1.2	1.2	1.9	62.8	98.8	98.8	98.8	98.8	98.8
63	63.4	1.2	1.2	1.2	1.2	1.3	49.4	98.8	98.8	98.8	98.8	98.8
64	52.4	1.2	1.2	1.2	1.2	1.2	32.3	98.4	98.8	98.8	98.8	98.8
65	35.4	1.2	1.2	1.2	1.2	1.2	27.6	97.0	98.8	98.8	98.8	98.8
66	21.3	1.2	1.2	1.2	1.2	1.2	17.1	92.3	98.8	98.8	98.8	98.8
68	4.7	1.2	1.2	1.2	1.2	1.2	1.2	78.7	98.8	98.8	98.8	95.3
69	2.7	1.2	1.2	1.2	1.2	1.2	1.2	54.9	96.6	98.8	98.8	89.8
70	1.6	1.2	1.2	1.2	1.2	1.2	1.2	38.2	95.2	98.8	98.8	78.0
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	21.3	86.9	98.8	98.8	70.1
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	13.0	81.7	98.8	98.8	53.7
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.6	39.6	91.5	88.7	22.0
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.1	20.1	78.7	81.7	9.8
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	39.0	43.9	2.1
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	89.0	84.8	97.6	97.6	97.6	95.7	78.7	20.1	17.1	89.0
50-64	46.4	97.6	8.6	0.0	76.8	97.6	66.5	0.4	0.0	0.0	0.0	0.0
55-56	0.0	18.3	0.0	0.0	2.6	19.5	1.0	0.0	0.0	0.0	0.0	0.0
59-64	46.4	1.2	0.0	0.0	0.0	6.1	55.7	0.4	0.0	0.0	0.0	0.0
59-68	94.1	1.2	0.0	0.0	0.0	6.1	86.8	20.1	0.0	0.0	0.0	3.5
59-75	97.6	1.2	0.0	0.0	0.0	6.1	86.8	95.7	78.7	20.1	17.1	89.0
60-70	97.2	0.0	0.0	0.0	0.0	3.7	80.5	60.6	3.6	0.0	0.0	20.8
61-71	96.8	0.0	0.0	0.0	0.0	1.2	72.8	77.5	11.9	0.0	0.0	28.7
63-69	60.7	0.0	0.0	0.0	0.0	0.1	48.2	43.9	2.2	0.0	0.0	9.0
63-77	62.2	0.0	0.0	0.0	0.0	0.1	48.2	97.6	97.6	59.8	54.9	96.7
65-82	34.2	0.0	0.0	0.0	0.0	0.0	26.4	95.8	97.6	97.6	97.6	97.6
70-82	0.4	0.0	0.0	0.0	0.0	0.0	0.0	37.0	94.0	97.6	97.6	76.8
42-60	0.0	97.6	97.6	95.8	97.6	93.9	17.1	0.0	0.0	0.0	0.0	0.0
61-77	96.8	0.0	0.0	0.0	0.0	1.2	72.8	97.6	97.6	59.8	54.9	96.7

Alternative 6 (Future)

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
41	98.8	98.8	98.8	97.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
42	98.8	98.8	98.8	97.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
43	98.8	98.8	98.3	96.5	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
45	98.8	98.8	90.2	86.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
48	98.8	98.8	43.9	26.4	97.6	98.8	98.8	98.8	98.8	98.8	98.8	98.8
49	98.8	98.8	25.6	8.5	93.9	98.8	98.8	98.8	98.8	98.8	98.8	98.8
50	98.8	98.8	9.8	1.2	78.0	98.8	98.8	98.8	98.8	98.8	98.8	98.8
52	98.8	97.8	1.5	1.2	29.3	98.8	98.8	98.8	98.8	98.8	98.8	98.8
53	98.8	90.7	1.2	1.2	15.9	90.2	98.8	98.8	98.8	98.8	98.8	98.8
54	98.8	70.7	1.2	1.2	6.8	75.6	98.8	98.8	98.8	98.8	98.8	98.8
55	98.8	50.0	1.2	1.2	4.6	63.4	98.8	98.8	98.8	98.8	98.8	98.8
56	98.8	31.7	1.2	1.2	2.0	43.9	97.8	98.8	98.8	98.8	98.8	98.8
57	98.8	22.0	1.2	1.2	1.2	27.4	96.6	98.8	98.8	98.8	98.8	98.8
58	98.8	6.1	1.2	1.2	1.2	18.9	92.4	98.8	98.8	98.8	98.8	98.8
59	98.8	2.3	1.2	1.2	1.2	7.3	88.0	98.8	98.8	98.8	98.8	98.8
60	98.8	1.2	1.2	1.2	1.2	4.9	81.7	98.8	98.8	98.8	98.8	98.8
61	98.0	1.2	1.2	1.2	1.2	2.4	74.0	98.8	98.8	98.8	98.8	98.8
62	89.6	1.2	1.2	1.2	1.2	1.9	63.4	98.8	98.8	98.8	98.8	98.8
63	63.4	1.2	1.2	1.2	1.2	1.3	49.4	98.8	98.8	98.8	98.8	98.8
64	52.4	1.2	1.2	1.2	1.2	1.2	32.3	98.4	98.8	98.8	98.8	98.8
65	35.4	1.2	1.2	1.2	1.2	1.2	27.6	97.0	98.8	98.8	98.8	98.8
66	21.3	1.2	1.2	1.2	1.2	1.2	17.1	92.3	98.8	98.8	98.8	98.8
68	4.7	1.2	1.2	1.2	1.2	1.2	1.2	78.7	98.8	98.8	98.8	95.3
69	2.7	1.2	1.2	1.2	1.2	1.2	1.2	54.9	96.6	98.8	98.8	89.8
70	1.6	1.2	1.2	1.2	1.2	1.2	1.2	38.2	95.2	98.8	98.8	78.0
71	1.2	1.2	1.2	1.2	1.2	1.2	1.2	21.3	86.9	98.8	98.8	70.1
72	1.2	1.2	1.2	1.2	1.2	1.2	1.2	13.0	81.7	98.8	98.8	53.7
74	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.6	40.9	91.5	89.0	22.0
75	1.2	1.2	1.2	1.2	1.2	1.2	1.2	3.1	20.1	78.7	82.3	9.8
77	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.5	39.0	42.7	2.1
82	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
86	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
88	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
98	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45-75	97.6	97.6	89.0	84.8	97.6	97.6	97.6	95.7	78.7	20.1	16.5	89.0
50-64	46.4	97.6	8.6	0.0	76.8	97.6	66.5	0.4	0.0	0.0	0.0	0.0
55-56	0.0	18.3	0.0	0.0	2.6	19.5	1.0	0.0	0.0	0.0	0.0	0.0
59-64	46.4	1.1	0.0	0.0	0.0	6.1	55.7	0.4	0.0	0.0	0.0	0.0
59-68	94.1	1.1	0.0	0.0	0.0	6.1	86.8	20.1	0.0	0.0	0.0	3.5
59-75	97.6	1.1	0.0	0.0	0.0	6.1	86.8	95.7	78.7	20.1	16.5	89.0
60-70	97.2	0.0	0.0	0.0	0.0	3.7	80.5	60.6	3.6	0.0	0.0	20.8
61-71	96.8	0.0	0.0	0.0	0.0	1.2	72.8	77.5	11.9	0.0	0.0	28.7
63-69	60.7	0.0	0.0	0.0	0.0	0.1	48.2	43.9	2.2	0.0	0.0	9.0
63-77	62.2	0.0	0.0	0.0	0.0	0.1	48.2	97.6	97.3	59.8	56.1	96.7
65-82	34.2	0.0	0.0	0.0	0.0	0.0	26.4	95.8	97.6	97.6	97.6	97.6
70-82	0.4	0.0	0.0	0.0	0.0	0.0	0.0	37.0	94.0	97.6	97.6	76.8
42-60	0.0	97.6	97.6	95.8	97.6	93.9	17.1	0.0	0.0	0.0	0.0	0.0
61-77	96.8	0.0	0.0	0.0	0.0	1.2	72.8	97.6	97.3	59.8	56.1	96.7

Alternative 6 (Future) - No Action Alternative

Index Value or Range	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
43	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
48	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
49	0.0	0.0	-0.6	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
52	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
53	0.0	0.5	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
54	0.0	0.0	0.0	0.0	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
56	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
57	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
58	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
62	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0
63	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
66	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
68	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
72	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
74	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.3	0.0
75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0
77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	-1.2	0.0
82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
86	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
88	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
98	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45-75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.6	0.0
50-64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55-56	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-64	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-68	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59-75	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.6	0.0
60-70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61-71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63-69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.3	0.0	1.2	0.0
65-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70-82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42-60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
61-77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.3	0.0	1.2	0.0

Table 239 No Action Alternative -Alternative 6 (Future)

Alternative 6 (Future) vs No Action Alternative
Sacramento River at Rio Vista, Monthly Flow

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
-1.0 < X < 1.0	75.6	95.1	63.4	56.1	57.3	72.0	87.8	85.4	90.2	89.0	95.1	98.8
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	20.7	2.4	23.2	41.5	39.0	23.2	4.9	2.4	6.1	11.0	1.2	0.0
X<=-10.0	0.0	0.0	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	2.4	1.2	11.0	0.0	0.0	2.4	7.3	11.0	3.7	0.0	2.4	1.2
Net Change in % Exceedance:	18.3	1.2	12.2	41.5	39.0	20.7	-2.4	-8.5	2.4	11.0	-1.2	-1.2
Net Change in 10% Exceedance	0.0	0.0	-2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Low Flows (Upper 40% of Distribution)												
-1.0 < X < 1.0	90.9	97.0	69.7	81.8	54.5	75.8	87.9	93.9	97.0	87.9	90.9	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1 (Total %)	3.0	0.0	6.1	15.2	39.4	24.2	12.1	0.0	3.0	12.1	3.0	0.0
X<=-10.0	0.0	0.0	6.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1 (Total %)	6.1	3.0	24.2	0.0	0.0	0.0	0.0	6.1	0.0	0.0	3.0	0.0
Net Change in % Exceedance:	-3.0	-3.0	-18.2	15.2	39.4	24.2	12.1	-6.1	3.0	12.1	0.0	0.0
Net Change in 10% Exceedance	0.0	0.0	-6.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 240 No Action Alternative -Alternative 6 (Future)

Alternative 6 (Future) vs No Action Alternative
Yolo Bypass, Monthly Flow

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
-1.0 < X < 1.0	100.0	30.5	29.3	29.3	23.2	14.6	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	69.5	64.6	64.6	65.9	76.8	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	0.0	69.5	70.7	70.7	76.8	85.4	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	69.5	70.7	70.7	76.8	85.4	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	69.5	64.6	64.6	65.9	76.8	0.0	0.0	0.0	0.0	0.0	0.0
Low Flows (Upper 40% of Distribution)												
-1.0 < X < 1.0	100.0	75.8	69.7	48.5	30.3	12.1	100.0	100.0	100.0	100.0	100.0	100.0
X>=10.0	0.0	24.2	30.3	51.5	69.7	87.9	0.0	0.0	0.0	0.0	0.0	0.0
X>1 (Total %)	0.0	24.2	30.3	51.5	69.7	87.9	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1 (Total %)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in % Exceedance:	0.0	24.2	30.3	51.5	69.7	87.9	0.0	0.0	0.0	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	24.2	30.3	51.5	69.7	87.9	0.0	0.0	0.0	0.0	0.0	0.0

Table 241 No Action Alternative -Alternative 6 (Future)

Alternative 6 (Future) vs No Action Alternative
Delta Outflow, Monthly Flow

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
-1.0 < X < 1.0	81.7	96.3	75.6	86.6	82.9	93.9	96.3	93.9	85.4	100.0	95.1	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1.0 (Total %)	13.4	3.7	13.4	11.0	13.4	3.7	2.4	0.0	2.4	0.0	3.7	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1.0 (Total %)	3.7	0.0	11.0	0.0	2.4	2.4	1.2	6.1	11.0	0.0	0.0	0.0
Net Change in % Exceedance:	9.8	3.7	2.4	11.0	11.0	1.2	1.2	-6.1	-8.5	0.0	3.7	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Low Flows (Upper 40% of Distribution)												
-1.0 < X < 1.0	75.8	90.9	69.7	90.9	66.7	87.9	100.0	87.9	81.8	100.0	100.0	100.0
X>=10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X>1 (Total %)	15.2	9.1	12.1	6.1	24.2	9.1	0.0	0.0	0.0	0.0	0.0	0.0
X<=-10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X<-1 (Total %)	9.1	0.0	18.2	0.0	6.1	3.0	0.0	12.1	15.2	0.0	0.0	0.0
Net Change in % Exceedance:	6.1	9.1	-6.1	6.1	18.2	6.1	0.0	-12.1	-15.2	0.0	0.0	0.0
Net Change in 10% Exceedance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Appendix G7. Reclamation Temperature Model

This appendix provides a description of the Reclamation Temperature model used to inform the fisheries effects analysis for the Yolo Bypass Salmonid Habitat Restoration and Fish Passage project.

G7.1 Introduction

The United States Department of the Interior, Bureau of Reclamation (Reclamation) Temperature Model was developed to assist in the planning and operational compliance of temperature objectives. The Reclamation Temperature model simulates monthly mean vertical temperature profiles and release temperatures for Trinity, Whiskeytown, Shasta, Folsom, New Melones, and Tulloch Reservoirs. The objective is to find temperature variability in these the reservoirs and streams, given CVP/SWP operations, and compare between existing and assumed future scenarios.

G7.2 Key Processes

The following processes are simulated in the temperature model:

- Long-term operational scenarios (i.e., using CalSim-II results)
- Reservoir storage given flood control, hydropower, and reservoir release requirements
- Mean monthly downstream temperatures (using monthly meteorology data)
- Accommodate selective withdrawals (Shasta and Folsom reservoir)

G7.3 Model and Application

The Reclamation Temperature Model was created and developed exclusively for CVP and SWP systems in the Central Valley. The reservoir temperature model simulates monthly mean vertical temperature profiles and release temperatures. The temperature models consist of two basic model elements: a reservoir component, and a downstream river component.

G7.3.1 Reclamation Reservoir Model Description

The reservoir component of the Reclamation Temperature model simulates one-dimensional, vertical distribution of reservoir water temperature using monthly input data on initial storage and temperature conditions, inflow, outflow, evaporation, precipitation, radiation, and average air temperature. The reservoir is divided into horizontal layers of uniform thickness. Each layer is assumed to be isothermal (i.e., the same temperature throughout its volume).

The energy exchange between the reservoir and the atmosphere is assumed to affect only the top layers of water except for energy transferred by diffusion. The energy exchange is assumed to affect water temperature linearly from a maximum effect at the surface to a minimum at the depth of energy penetration. Solar radiation, evaporation, and a combination of conduction and long-wave radiation are expressed as functions of the difference between air and water temperatures. These energy exchanges are computed before the stability and diffusion computations are made. The model used five calibration coefficients in calculating the various energy exchange functions. The Reclamation reservoir temperature model simulates monthly mean vertical temperature profiles and release temperatures for Trinity, Whiskeytown, Shasta, Folsom, New Melones and Tulloch Reservoirs based on hydrologic and climatic input data. The temperature control devices (TCD) at Shasta and Folsom Dams can selectively withdraw water from different reservoir levels to provide downstream temperature control. The TCD's are generally operated to conserve cold water for the summer and fall months when river temperatures become critical for fisheries. The model simulates the TCD operations by making upper level releases in the winter and spring, mid-level releases in the late spring and summer, and low level releases in the late summer and fall. To accomplish this function, the Shasta and Folsom temperature models operate to meet mean monthly tail-water temperature targets that function as a surrogate for downstream temperature compliance.

Temperature changes in the downstream regulating reservoirs: Lewiston, Keswick, Natomas, and Goodwin are computed from equilibrium temperature decay equations in the reservoir models, which are similar to the river model equations. The river temperature models output temperatures at 3 locations on the Trinity River from Lewiston Dam to the North Fork, 12 locations on the Sacramento River from Keswick Dam to Freeport, 9 locations on the American River from Nimbus Dam to the mouth, and 8 locations on the Stanislaus River from Goodwin Dam to the mouth (Table G7-1).

G7.3.2 Reclamation River Model Description

The river component of the Reclamation Temperature model calculates temperature changes in the regulating reservoirs, below the main reservoirs. With regulating reservoir release temperature as the initial river temperature, the river model computes temperatures at several locations along the rivers. The calculation points for river temperatures generally coincide with tributary inflow locations. The model is one-dimensional in the longitudinal direction and assumes fully mixed river cross sections. The effect of tributary inflow on river temperature is computed by mass balance calculation. The river temperature calculations are based on regulating reservoir release temperatures, river flows, and climatic data. Monthly mean historical air temperatures for the 82-year period and other long-term average climatic data for Trinity, Shasta, Whiskeytown, Redding, Red Bluff, Colusa, Marysville, Folsom, Sacramento, New Melones, and Stockton were obtained from National Weather Service records and used to represent climatic conditions for the four river systems.

Table G7-1. Reclamation Temperature Model Nodes

River or Creek System	Location
Trinity River	Trinity Dam
	Lewiston Dam
	Douglas City
	North Fork
Clear Creek	Whiskeytown Dam
	Above Igo
	Below Igo
	Mouth
American River	Folsom Dam
	Nimbus Dam
	Sunrise Bridge
	Cordova Park
	Arden Rapids
	Watt Avenue Bridge
	American River Filtration Plant
	H Street
	16^{th} street
	Mouth
Sacramento River	Shasta Dam
	Keswick Lake above Spring Creek Tunnel
	Spring Creek Tunnel
	Keswick Dam
	Balls Ferry
	Jellys Ferry
	Bend Bridge
	Red Bluff
	Vina
	Butte City
	Wilkins Slough
	Colusa Basin Drain
	Feather River
	American River
	Freeport

River or Creek System	Location
Stanislaus River	New Melones Dam
	Tulloch Dam
	Goodwin Dam
	Knights Ferry
	Orange Blossom
	Oakdale
	Riverbank
	McHenry Bridge
	Ripon
	Mouth

G7.4 Model Documentation

The temperature models for the Sacramento and American Rivers are documented in a 1990 Reclamation report (Rowell 1990, as cited in Reclamation 2008). The Trinity River temperature model is documented in a 1979 Reclamation report (Rowell 1979, as cited in Reclamation 2008). The Stanislaus River temperature model is documented in a 1993 Reclamation report (Rowell 1997, as cited in Reclamation 2008). The models are also described in Appendix IX of the 1997 Reclamation Draft CVPIA-PEIS (Reclamation 1997, as cited in Reclamation 2008).

G7.5 Model Mathematics

The Reclamation Temperature model mechanics are described in Rowell, (1979, 1990, and 1997 as cited in Reclamation 2008).

G7.6 Quality Assurance and Data Quality Assessment

No formal process documented the quality assurance and data quality of the Reclamation Temperature Model. This model was developed at a time where specific documentation requirements were less stringent. A peer review of the Reclamation Temperature model has not been performed.

G7.7 Assumptions

The available cold water (in the reservoirs) is utilized efficiently depending on the month in the monthly model and storage levels in any given year in the mean daily model. These targets are developed for facilities that can modify releases for temperature control. The Reclamation Temperature Model Shasta and Folsom reservoir temperature targets are listed in Table G7-2.

Table G7-2. Reclamation Temperature Model Tailwater Targets (° F)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Shasta	80	80	56	48	46	45	47	47	40	40	40	80
Folsom	80	80	80	63	63	63	63	63	63	55	40	80

G7.8 Model Testing

G7.8.1 Calibration and Validation

A discussion of the Reclamation Temperature reservoir and river model verification is presented in (Rowell 1990, as cited in Reclamation 2008) and Rowell, 1993 and 1997, as cited in Reclamation 2008). The predicted temperatures were generally within 1-2° F of measured temperature.

G7.8.2 Sensitivity and Uncertainty of Model Inputs

Sensitivity and uncertainty analyses were not conducted for the Reclamation Temperature or the SRWQM applications

G7.9 Model Results

For each CALSIM II run completed, the results were post-processed using the Reclamation Temperature model to estimate monthly average temperature at desired locations. CALSIM II Scenarios run through the temperature model included Existing Conditions; Alternatives 1, 4, 5, and 6 using 2030 CALSIM II Hydrology; Alternatives 1, 4, 5 and 6 using 2070 CALSIM II hydrology; and the No Action Alternative using 2070 CALSIM hydrology.

Monthly average temperatures for each alternative were output at the Feather River confluence and Freeport for use in the fisheries summary tables

G7.10 Limitations

The main limitation of CALSIM II and the Reclamation temperature model is the time-step. Mean monthly flows and temperatures do not define daily variations that could occur in the rivers due to dynamic flow and climatic conditions. However, monthly results are still useful for general comparison of alternatives. The temperature models are also unable to accurately simulate certain aspects of the actual operations strategies used when attempting to meet temperature objectives, especially on the upper Sacramento River. In the monthly model, to account for the short-term variability and the operational flexibility of the system to respond to changing conditions, cooler water than that indicated by the model is released in order to avoid exceeding the required downstream temperature target.

There is also uncertainty regarding performance characteristics of the Shasta TCD. Due to the hydraulic characteristics of the TCD, including leakage, overflow, and performance of the side intakes, the model releases are cooler than can be achieved in real-time operations; therefore, a more conservative approach is taken in real-time operations that is not fully represented by the model.

G7.11 References

Reclamation. 2008. Central Valley Project and State Water Project Operations Criteria and Plan (OCAP) Biological Assessment, Appendix H Reclamation Temperature Model and SRWQM Temperature Model. U.S. Bureau of Reclamation, Sacramento, CA August 2008.