# Preliminary Modeling Methods and Results Related to the Water Supply Adjustments under the Regulatory Pathway for the Revised Proposed Plan Amendments

# Table of Contents

## 1.1 Introduction

This document summarizes preliminary modeling methods and results to help to facilitate public review of the State Water Resources Control Board's (State Water Board or Board) July 25, 2025 revised draft updates to the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin River Watershed (Bay-Delta Plan or Plan) focused on the Sacramento River, Delta eastside tributaries (Mokelumne, Cosumnes, and Calaveras Rivers), and Delta (Sacramento/Delta updates to the Bay-Delta Plan). The modeling details are subject to additional refinements as part of the next version of the Staff Report in support of Sacramento/Delta updates to the Bay-Delta Plan, though significant changes are not expected. For more information about the Sacramento/Delta Updates to the Bay-Delta Plan, please see the Board's website.

This document and associated modeling are intended to help to inform the public's review of the changes included in the July 2025 revised draft Bay-Delta Plan from information provided in the 2023 draft Staff Report related to the regulatory pathway in the July 2025 revised draft Plan. Those changes include: changes to the starting point for the regulatory pathway for existing water rights to 55% of unimpaired flow (UF) with watershed-wide water supply adjustments (WSAs) and tributary-specific WSAs that apply to the Mokelumne and Calaveras Rivers and Putah Creek; refinements to reservoir carryover storage provisions under the proposed cold water habitat provisions of the Plan; and changes to constraints on exports from the Delta. The scenario reflecting these changes is referred to as 55% UF with WSAs or 55 w/WSAs scenario.

As described in more detail below, the WSAs were included to reduce the regulatory pathway's water supply and reservoir storage (and associated water temperature) impacts to existing water rights by providing for the starting point for the Sacramento Delta inflow and associated inflow-based Delta outflow requirements to be reduced from 55% UF to 45 and 35% based on drier hydrologic conditions. The draft Staff Report in support of Sacramento/Delta updates to the Bay-Delta Plan included modeling and evaluations of baseline and 35, 45, and 55% UF (in addition to 65 and 75% UF and proposed voluntary agreements (VAs)). The 55% UF with WSAs modeling generally falls within this range. The modeling provided as part of this release will help to inform the public on the general effects of the WSAs in combination with changes to reservoir storage assumptions and changes in constraints on Delta exports.

This document summarizes Sacramento Water Allocation Model (SacWAM) modeling methods and results and water temperature modeling results related to the above changes, as well as other updates summarized below. Specifically, this document summarizes updates to the last public version of SacWAM that was released in 2023 (version 2023.06.12) that are included in the current version (version 2025.08.22) released on August 22, 2025. This document also describes preliminary results for the 55% UF with WSAs, as well as updated results for baseline and 55% UF without WSAs for context. The baseline and 55% UF without WSAs scenarios are largely consistent with the 2023 draft Staff Report with only minor modifications described further below. The 55% UF with WSAs is a new scenario that includes changes from the 55% UF scenario to unimpaired flow requirements, as well as other changes to export operations and reservoir storage consistent with changes to the proposed updates to the Bay-Delta Plan described in the July 2025 revised draft Bay-Delta Plan.

The next version of the Staff Report in support of Sacramento/Delta updates to the Bay-Delta Plan will include the final modeling results and associated documentation of the proposed Sacramento/Delta updates to the Bay-Delta Plan, including results for the VAs and other UF scenarios which are expected to be substantially similar to the modeling results in the draft Staff Report. Because the VAs address the majority of the water use in the watershed, the VA modeling described in the draft Staff Report is largely reflective of the expected effects of implementing the VAs for VA water rights (identified in Appendix B.1 of the July 2025 revised draft Bay-Delta Plan) with the regulatory pathway applying to non-VA water rights. The next version of the Staff Report will include additional documentation related to this issue.

## 1.2 Sacramento Water Allocation Model (SacWAM) General Updates

Since the release of SacWAM version 2023.06.12 to support the Draft Staff Report, minor refinements have been made to SacWAM as part of SacWAM version 2025.08.22 to incorporate input from stakeholders during the public comment process and other refinements. Model changes include extension of the period of simulation through 2021 and changes to modeling assumptions for Central Valley Project (CVP) contractor priorities as well as minor changes to assumptions for operations of Contra Costa Water District (CCWD), Oroville Reservoir, Folsom Reservoir, and Delta depletions. Additionally, a new scenario was developed to represent the WSAs. Each of the sections below presents more detail on each of the model changes.

### 1.2.1 Extension of Period of Simulation

The period of simulation has been extended to include water years 2016-2021 resulting in a full period of simulation of water years 1923-2021 (1922, the “Current Accounts” year in SacWAM is identical across all scenarios, and is thus excluded from analysis). This update allows for the simulation of recent dry periods and simulates more years that are within the recent regulatory environment.

### 1.2.2 Change in Priorities for CVP Contractors

CVP north-of-Delta (NOD) and CVP south-of-Delta (SOD) demand priorities were adjusted to separate delivery priorities between contract types and to more accurately represent the actual way that the U.S. Bureau of Reclamation (Reclamation) allocates water between contract types south-of-Delta.

Previously, Sacramento River Settlement Contract (SRSC) demands were the same priority (45) as NOD refuge demands. The priority for refuge demands were increased to 44 (lower numerical values reflect higher priorities in SacWAM) which results in water being delivered to refuge demands before settlement contract demands when deliveries are shorted by low reservoir storage conditions using the reservoir buffers.

Previously, all SOD CVP demands had a priority of 73 which required a postprocessing exercise to redistribute SOD CVP supplies. Reclamation contracts are written such that SOD refuges and Exchange Contractors receive 100% or Shasta critical year allocations before SOD water service contractors receive water. In this update of SacWAM, the priorities have been updated to reflect the contract priorities negating the need for a postprocessing step. The new SOD CVP demand priorities are shown in Table 1.

**Table 1. Updated CVP South-of-Delta demand priorities**

| CVP South-of-Delta Contract Type | SacWAM Demand Priority |
|---|---|
| CVP SOD Agricultural | 76 |
| CVP SOD Urban | 76 |
| CVP Exchange | 75 |
| CVP SOD Refuge | 74 |

### 1.2.3 Contra Costa Water District Diversions

CCWD diverts water at multiple locations in the Delta under various water rights, contracts, and transfer agreements. Based on comments by CCWD, SacWAM has been updated to more explicitly reflect each of these diversion types separately. SacWAM now contains three transmission links for the Old River (Old River and Victoria Canal) diversion and two transmission links for the Rock Slough diversion. The CVP transmission links are limited based on the CVP allocation. The transfer transmission links are limited based on transfer water supply. Diversion through the water right transmission link is only allowed when the Delta is in excess conditions. The total diversions through all of the transmission links to Old River are limited to no more than 250 cfs and the total diversion through all of the Rock Slough transmission links are limited to 350 cfs. The CCWD WRIMS model was also updated to accommodate the updated transmission links.

### 1.2.4 Delta Depletions

There were two changes made to Delta depletions. First the accretions from and diversions to Byron Bethany Irrigation District (BBID) were added to the depletion arc Delta Depletion 7. Second, the seepage to the Delta islands is now represented as a separate arc from each Delta depletion arc. This reduces the postprocessing required to summarize the water supplied to Delta users.

### 1.2.5 Folsom and Oroville Operations

The expressions for the top of conservation (TOC) for Folsom and Oroville have been updated based on updates made to CalSim 3 which provide a better representation of current operations of these reservoirs. The Folsom TOC was previously calculated dynamically based on available upstream storage capacity. Now the Folsom TOC is a static curve that ranges from 567 thousand acre-feet (TAF) in the winter to 967 TAF in the summer. Based on information provided by the Department of Water Resources (DWR), the Oroville TOC has been refined and now ranges from 2,787 TAF in some winters to 3,538 TAF in the summer. In addition to the TOC for Oroville, the end of September carryover target was updated in the State Water Project (SWP) allocation logic from 1.3 million acre-feet (MAF) to 1.6 MAF to reflect DWR’s updated operational targets.

### 1.2.6 Other Minor Changes

Two additional minor changes were made that have minimal effects on the simulation as a whole, but infrequently have large local effects.

#### 1.2.6.1 Knights Landing Ridge Cut

The Knights Landing Ridge Cut connects the Colusa Basin Drain to the Yolo Bypass. Previously, the operations of the outfall gates led to model instability because the model was inconsistent in portraying whether the water in the Colusa Basin Drain would flow to the Sacramento River or to the Yolo Bypass when the outflow gates were open. A new operational flow requirement was added on the Colusa Basin Drain outflow with a priority of 42. Now when the outfall gates are open, the model will prefer to route water back to the Sacramento River.

#### 1.2.6.2 Limits in diversions from Mill, Deer, and Antelope Creeks

The SacWAM demand site A_05_NA represents Los Molinos Mutal Water Company and other non-district diverters and SRSCs in water budget area 05. This demand site draws water from Mill Creek, Deer Creek, Antelope Creek, the Sacramento River, and groundwater. Previously in SacWAM there were no constraints on the transmission links from each of the surface water sources, so modeled diversions did not necessarily reflect the availability of surface water to the lands irrigated from a particular tributary. Expressions for maximum flow volume and maximum flow percent of demand were added to constrain diversions from each surface water source to better reflect the land use associated with each tributary.

## 1.3 Modeling of 55 Percent of Unimpaired Flow with Water Supply Adjustments (55 w/WSAs)

The starting point for the inflow requirement for existing water rights is reduced below 55% UF by the WSAs. WSAs apply at the watershed-wide scale and, where applicable, at the tributary scale as described below. The following sections outline the rules that were used to model 55% UF with WSAs.

### 1.3.1 Watershed-wide WSAs

The watershed-wide WSAs apply based on the cumulative sum of the prior 12 months of the Sacramento Valley Four River Index (four river index)[1] during October through May. The requirement for May applies for June through September. Under the watershed-wide WSAs, 55% UF is required in the wettest 1/3 of years, 45 percent of unimpaired flow in the middle 1/3 of years, and 35 percent of unimpaired flow in the driest 1/3 of years. Thresholds of the four river index that would trigger the watershed-wide WSAs were calculated as the 0.67 and 0.33 quantiles of historical values of the 12 month four river index from water years 1992 through 2021, rounded to the nearest 0.1 MAF. The years 1992 through 2021 were used to represent current climate and hydrological conditions, based on the contemporary reference period used by the DWR to calculate adjusted historical hydrology for CalSim 3.[2]

[1] The four river index refers to the sum of the unimpaired runoff as published in the DWR Bulletin 120 for the following locations: Sacramento River flow at Bend Bridge, near Red Bluff; Feather River, total inflow to Oroville Reservoir; Yuba River flow at Smartville; American River, total inflow to Folsom Reservoir.

[2] Schwarz, A., Z. Q. R. Chen, A. Perez, and M. He. 2025. Evaluation and Adjustment of Historical Hydroclimate Data: Improving the Representation of Current Hydroclimatic Conditions in Key California Watersheds. Hydrology 12(2):22. https://doi.org/10.3390/hydrology12020022

During October through May, when the 12-month four river index is below 20.2 MAF, the flow requirement is reduced to 45 percent of unimpaired flow watershed-wide and when the 12-month four river index is below 13.2 MAF, the flow requirement is reduced to 35 percent of unimpaired flow watershed-wide. The requirement for May applies for June through September. Water supply adjustments are applied to all UF requirement compliance locations throughout the Sacramento/Delta which are listed in Appendix A1 Table A1-2.

### 1.3.2 Tributary-Specific WSAs

In addition to watershed-wide WSAs described above, additional tributary-specific WSAs apply for specified rainfall dominated and municipal supply dominated tributaries, including the Mokelumne River, Calaveras River, and Putah Creek. The tributary-specific WSAs allow for the requirements to be further reduced, and at times provide for no new inflow requirements under the July 2025 revised draft Bay-Delta Plan (this does not affect other regulatory requirements, including existing Decision 1641 requirements). The tributary-specific WSAs were developed to apply in conjunction with the watershed-wide WSAs to further reduce impacts to municipal water supplies and reservoir carryover storage levels in these three watersheds that are highly impaired and are also either municipal water supply dominated or are flashy rainfall dominated systems that cause significant challenges managing carryover storage, or both. These tributary-specific WSAs are based on local storage conditions as defined in Table 2 which reduce or remove the flow requirements during low storage conditions. If the previous month's storage is below the fraction of TOC listed in Table 2, the applicable flow requirement is the lower of the flow requirement listed or the watershed-wide WSA described above.

**Table 2. Tributary-Specific WSAs**

| Tributary | Reservoir | Fraction of Top of Conservation | Required Percent of Unimpaired Flow |
|---|---|---|---|
| Mokelumne River | Camanche Reservoir | <0.71 | 35% |
| | | <0.38 | 0% |
| Putah Creek | Lake Berryessa | <0.9 | 35% |
| | | <0.57 | 0% |
| Calaveras River | New Hogan Reservoir | <0.75 | 35% |
| | | <0.25 | 0% |

When the UF requirement for an individual tributary is reduced, the reduction in required flow is translated to all UF requirements within the watershed and is translated to downstream flow requirements as well. For example, if the storage is low in Camanche Reservoir in one month, then all UF requirements are reduced on the Mokelumne River the following month. Additionally, the reduction in flow requirement at the Delta outflow location is reduced by the volume reduced at the mouth of the tributary. This ensures that when the required flow is reduced on one tributary, it does not need to be made up from another tributary. Table 3 shows how flow requirement reductions are translated within each watershed and downstream.

**Table 3. Flow requirements modified by each tributary-specific WSA.**

| Tributary | TOC of Reservoir | UF Compliance Location |
|---|---|---|
| Mokelumne River | Camanche Reservoir | SWRCB Pardee Inflow<br>SWRCB Camanche Inflow<br>SWRCB Camanche<br>SWRCB Mokelumne River<br>SWRCB Delta |
| Putah Creek | Lake Berryessa | SWRCB Lake Berryessa<br>SWRCB Putah Creek<br>SWRCB Delta |
| Calaveras River | New Hogan Reservoir | SWRCB New Hogan<br>SWRCB Calaveras River<br>SWRCB Delta |

### 1.3.3 Solano Project Allocation

The maximum allocation for the Solano Project in the 55 scenario described in SacWAM version 2023.06.12 was incorrectly set at 50%. The maximum allocation was updated to 100% to be consistent with the other scenarios.

### 1.3.4 CVP and SWP Allocations

The 55% UF with WSAs scenario includes modification to the CVP and SWP allocation logic to better reflect availability of water supply to each Project with the new flow requirements and carryover storage targets. For the CVP, this is accomplished by reducing the value of the system DeliveryIndex_first variable by up to 200 TAF as a function of the system DemandIndex variable. For the SWP, this is accomplished by defining a lookup table to use the otherwise unused variable DI_Buffer, which is referenced in the expressions for Allocation_init and Allocation_adjustment.

**Table 4. CVP DeliveryIndex_first lookup table for 55 with WSAs scenario. The value of the variable Adjustment is determined by linear interpolation using the modeled value of DemandIndex. DeliveryIndex_first is reduced by Adjustment. All values are in TAF.**

| DemandIndex | Adjustment |
|---|---|
| 0 | 0 |
| 3,990 | 200 |
| 5,442 | 200 |
| 7,162 | 200 |
| 8.717 | 100 |
| 10,434 | 50 |
| 11,395 | 25 |
| 15,099 | 0 |

**Table 5. SWP DI_Buffer lookup table for 55 w/WSAs scenario. The value of the variable DI_Buffer is determined by linear interpolation using the modeled value of DemandIndex. All values are in TAF.**

| DemandIndex | DI_Buffer |
|---|---|
| 0 | 100 |
| 1,000 | 100 |
| 2,000 | 87.5 |
| 4,000 | 50 |
| 6,000 | 12.5 |
| 8,000 | 0 |
| 10,000 | 0 |

### 1.3.5 Export Pool

The baseline scenario makes use of two user defined constraints, CVPBufferExpLimit_P72 and SWPBufferExpLimit_P72, to limit releases for export from Shasta and Oroville Reservoirs, respectively. For these two reservoirs, these constraints take place of the usual WEAP reservoir buffering capabilities used for other reservoirs, including Folsom. The percent of unimpaired flow scenarios modeled for the Draft Staff Report substituted standard buffers on Shasta and Oroville Reservoirs with priorities set to limit release for delivery to SRSC and Feather River Service Area water users. In the revised version of SacWAM, Shasta and Oroville Reservoir buffering key assumptions each contain a new variable named "Export Pool" referenced by CVPBufferExpLimit_P72 and SWPBufferLimit_P72, respectively. This approach maintains the same behavior in the baseline scenario.

The 55 with WSAs scenario uses the usual WEAP reservoir buffering capabilities to limit releases for delivery to SRSC and Feather River Service Area water users as in prior percent of unimpaired flow scenarios in combination with Export Pool limitations on release from each reservoir for export.

### 1.3.6 Export Constraints Based on San Joaquin River Flows (San Joaquin River Inflow to Export Ratio or I:E) Requirement for the CVP

To reflect the current regulatory provisions for the CVP under the 2024 Long Term Operations of the CVP and SWP and associated Biological Opinions and the provisions of the July 2025 revised draft Bay-Delta Plan, in the 55% UF with WSAs scenario the San Joaquin inflow to export ratio (I:E) constraints on CVP exports from April through May (that vary between 4:1 and 1:1) beyond those included in State Water Board Decision 1641 were removed. Consistent with the baseline and alternatives described in the 2023 draft Staff Report this constraint was not removed from the baseline and was also not removed in the 55% UF without WSAs scenario. The I:E requirement is still assumed to apply to the SWP in the 55% UF with WSAs scenario. While the July 2025 revised draft Bay-Delta Plan does not include any additional I:E requirements for either the CVP or the SWP beyond State Water Board Decision 1641, DWR's Incidental Take Permit for the SWP continues to include these requirements and only identifies that the requirements would be removed under the VAs.

### 1.3.7 Feather River Fall Operations

SacWAM includes logic to adhere to the 1983 Memorandum of Understanding (MOU) between DWR and California Department of Fish and Wildlife (DFW). According to the MOU, if fall releases from Oroville in the high-flow channel are above 4,000 cfs and 2,500 cfs in October and November, respectively, high flows need to be maintained all winter. Previously, SacWAM limited releases in October and November to avoid having to make high releases all winter, which at times led to the unimpaired flow requirement not being met or forcing higher releases from other reservoirs.

In this update, if the UF requirement in the 55% UF with WSAs scenario is greater than the thresholds in October and November, the UF requirement is reduced to 4,000 cfs and 2,500 cfs in October and November, respectively.

### 1.3.8 New Bullards Bar Reservoir Buffer Pool

Based on updated temperature data and comments received, the buffer pool in New Bullards Bar Reservoir was lowered to allow the reservoir to be drawn down further throughout the summer. Previously, the buffer pool had an end of September value of 750 TAF in the 55% UF scenario. In the 55% UF with WSAs scenario, the end of September buffer pool is 650 TAF.

### 1.3.9 Camanche Reservoir Operations

Refinements were made to the Camanche Reservoir buffer pool and the variable EBMUD cutback fraction, which allows for greater deliveries through the Mokelumne Aqueduct in drier years.

The Camanche buffer pool was previously a static curve regardless of the inflow hydrology, with an end of September value of 169 TAF. In the 55% UF with WSAs scenario, the buffer pool was increased to 179 TAF except in drier years when it was reduced to 139 TAF, which holds more water in storage in wetter years and allows the reservoir to be drawn down further in drier years.

# 1.4 SacWAM Modeling of Changes in Hydrology and Water Supply

## 1.4.1 Introduction

This section describes the SacWAM (version 2025.08.22) modeled changes in hydrology and water supply under 55% UF with WSAs (55 w/WSAs), as well as updated results for 55% UF without WSAs (55), and baseline. As discussed above, the modeling details are subject to additional refinement, though significant changes are not expected. The potential changes in hydrology and water supply are described for the regions subject to new flow requirements (the Sacramento River watershed, Delta eastside tributaries, and Delta [Sacramento/Delta]), and regions that receive Sacramento/Delta water supplies that may be reduced as a result of the revised proposed Plan amendments (the San Francisco Bay Area [Bay Area], San Joaquin Valley, Central Coast, and Southern California). Model results are presented for changes in streamflows, reservoir levels, and Sacramento/Delta water supply under each scenario.

## 1.4.2 Changes in Hydrology

### 1.4.2.1 Flows

This section presents a summary of findings related to the SacWAM modeling results for streamflows.

#### Sacramento River Region and Delta Eastside Tributaries

Overall, the SacWAM modeling results show distinct hydrologic patterns for unregulated tributaries and regulated tributaries. Findings for each are presented separately below.

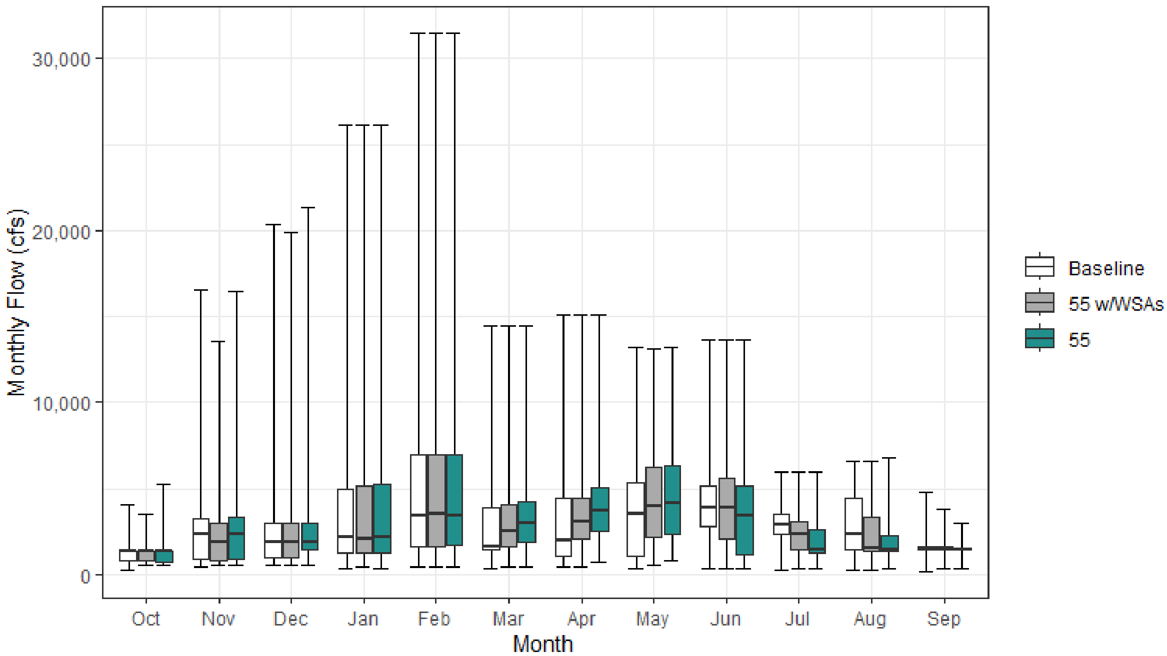
**Regulated Tributary Streamflows**

Regulated tributaries are tributaries that contain a major storage reservoir or other large-scale flow-regulating infrastructure. In the Sacramento River watershed and Delta eastside tributaries regions, the following tributaries to the Sacramento River and the Delta are considered regulated tributaries: American River, Bear River, Cache Creek, Calaveras River, Clear Creek, Feather River, Mokelumne River, Putah Creek, Sacramento River, Stony Creek, and Yuba River.

The following sections describe the SacWAM streamflow results for each of the major regulated tributaries. Monthly streamflows are presented by water year, which runs from October through September. In the following boxplots the x-axis (horizontal axis) represents the month and the y-axis (vertical axis) represents the modeled monthly streamflow in cubic feet per second (cfs). Several boxplots are shown for each month, corresponding to individual modeled scenarios. SacWAM-modeled flow scenarios (scenarios) include baseline (as identified in the 2023 draft Staff Report) (white box), 55 w/WSAs scenario (gray box), and 55 scenario (green box).

***American River***

Modeled mean flows on the lower American River under the 55 w/WSAs scenario generally fall between the baseline and 55 scenarios, showing increases from baseline in January through June, and decreases from baseline in July through December. The largest increase in flow compared to baseline occurs in April, when the average monthly flow increases from 3,086 cfs to 3,710 cfs, and the largest decrease occurs in August, when the average monthly flow decreases from 2,758 cfs to 2,322 cfs. Average total January through June streamflows on the lower American River increase by 94 TAF under the 55 w/WSAs scenario compared to baseline, a smaller change than the 132 TAF increase observed under the 55 scenario.




cfs = cubic feet per second

**Figure 1. Monthly Streamflow for the American River above the Sacramento River under Baseline, 55 w/WSAs, and 55**

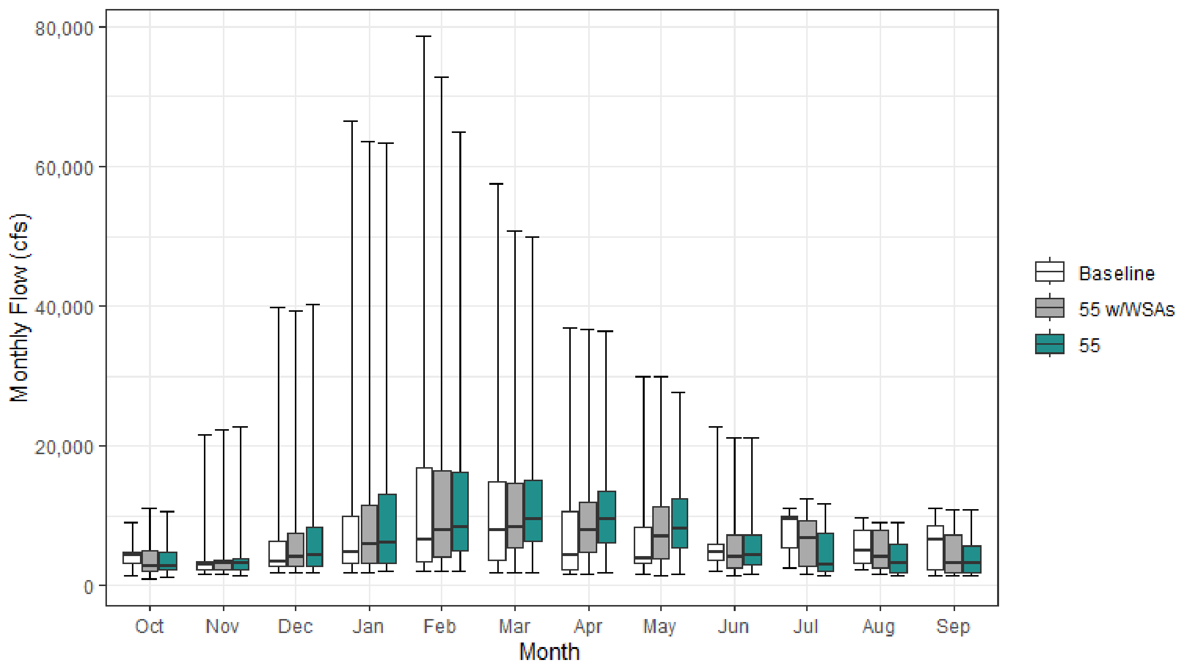
**Table 66. Change in January–June Monthly Average Flow for the American River above the Sacramento River by Water Year Type (TAF/yr)**

| Water Year Type | Baseline | 55 w/WSAs: Change from Baseline | 55: Change from Baseline |
|---|---|---|---|
| C | 415 | 60 | 114 |
| D | 701 | 103 | 159 |
| BN | 1,054 | 140 | 214 |
| AN | 1,620 | 116 | 128 |
| W | 2,572 | 68 | 72 |
| All | 1,401 | 94 | 132 |

### *Feather River*

Modeled mean flows on the lower Feather River under the 55 w/WSAs scenario generally fall between the baseline and 55 scenarios, showing increases from baseline in November through May, and decreases from baseline in June through October. The largest increase in flow compared to baseline occurs in April, when the average monthly flow increases from 7,499 cfs to 9,613 cfs, and the largest decrease occurs in July, when the average monthly flow decreases from 7,821 cfs to 6,237 cfs. Average total January through June streamflows on the lower Feather River increase by

244 TAF under the 55 w/WSAs scenario compared to baseline, a smaller change than the 471 TAF increase observed under the 55 scenario.




cfs = cubic feet per second

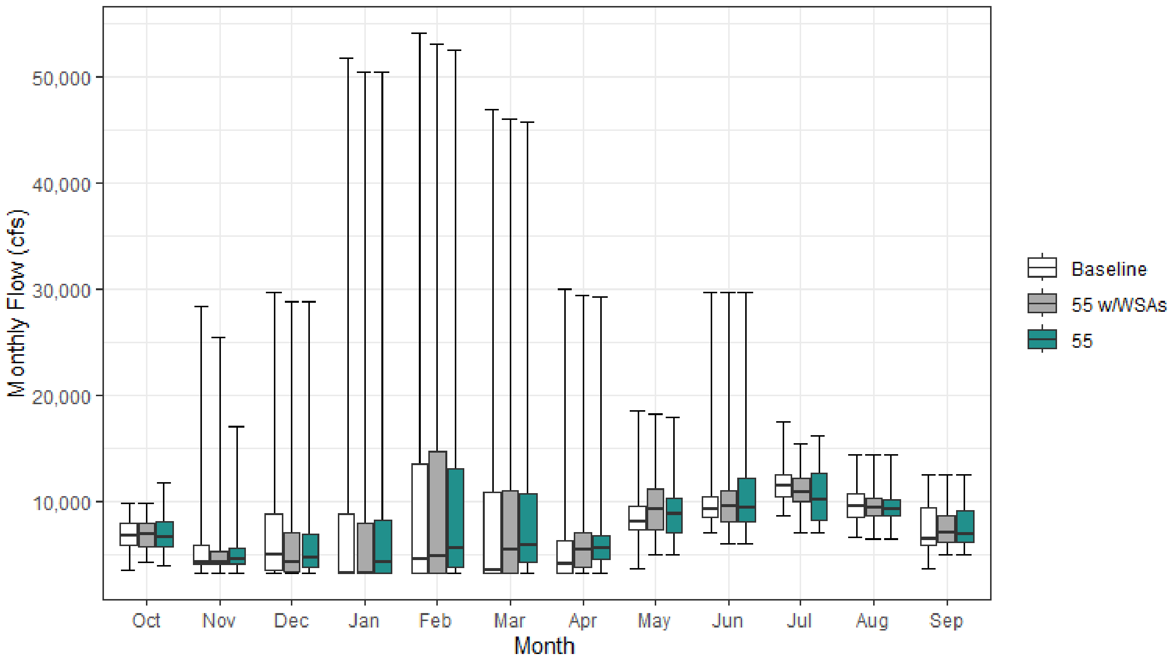
**Figure 2. Monthly Streamflow for the Feather River above the Sacramento River under Baseline, 55 w/WSAs, and 55**

**Table 77. Change in January–June Monthly Average Flow for the Feather River in the High Flow Channel by Water Year Type (TAF/yr)**

| Water Year Type | Baseline | 55 w/WSAs: Change from Baseline | 55: Change from Baseline |
|---|---|---|---|
| C | 987 | 58 | 335 |
| D | 1,383 | 315 | 681 |
| BN | 2,098 | 513 | 861 |
| AN | 3,480 | 356 | 654 |
| W | 6,210 | 74 | 69 |
| All | 3,173 | 244 | 471 |

***Sacramento River***

Modeled mean flows on the Sacramento River below Keswick Reservoir under the 55 w/WSAs scenario generally fall between the baseline and 55 scenarios, showing increases from baseline in March through May, September, and October, and decreases from baseline in June through August and November through February. The largest increase in flow compared to baseline occurs in May, when the average monthly flow increases from 8,583 cfs to 9,269 cfs, and the largest decrease occurs in December, when the average monthly flow decreases from 7,639 cfs to 6,806 cfs. Average total January through June streamflows on the Sacramento River below Keswick Reservoir increase by 57 TAF under the 55 w/WSAs scenario compared to baseline, a smaller change than the 68 TAF increase observed under the 55 scenario.



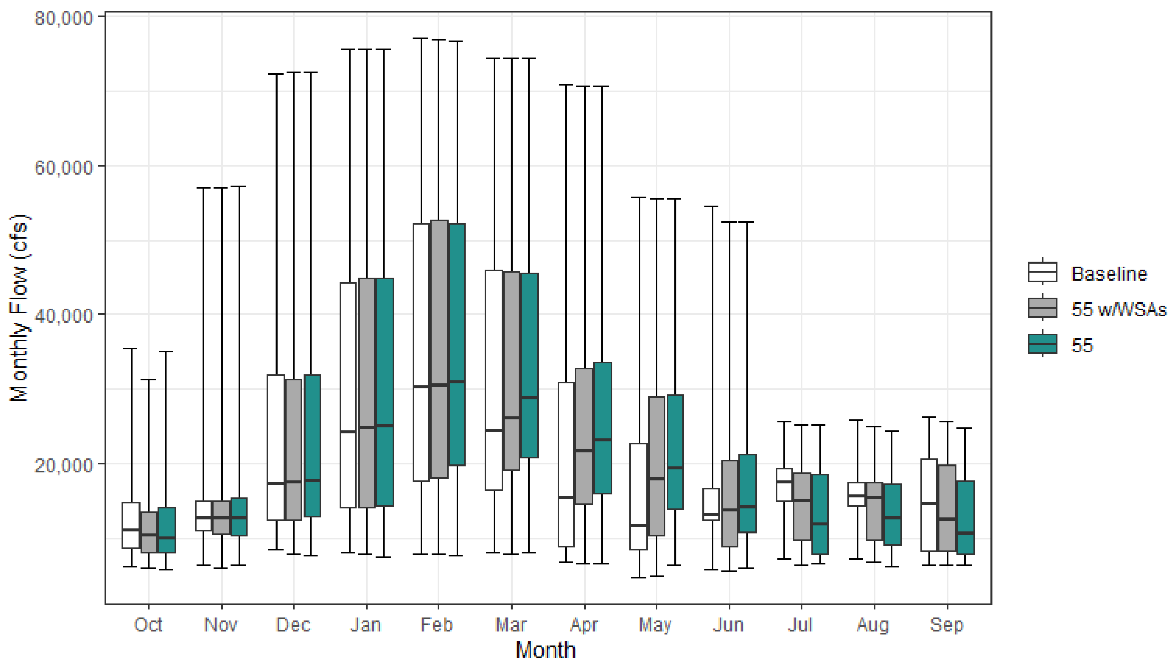

cfs = cubic feet per second

**Figure 3. Monthly Streamflow for the Sacramento River below Keswick Reservoir under Baseline, 55 w/WSAs, and 55**

**Table 88. Change in January–June Monthly Average Flow of the Sacramento River below Keswick by Water Year Type (TAF/yr)**

| Water Year Type | Baseline | 55 w/WSAs: Change from Baseline | 55: Change from Baseline |
|---|---|---|---|
| C | 1,984 | -320 | -159 |
| D | 2,098 | 4 | 140 |
| BN | 2,357 | 246 | 197 |
| AN | 3,400 | 295 | 200 |
| W | 4,869 | 82 | 1 |
| All | 3,127 | 57 | 68 |

Modeled mean flows on the Sacramento River at Freeport under the 55 w/WSAs scenario generally fall between the baseline and 55 scenarios, showing increases from baseline in January through June, and decreases from baseline in July through December. The largest increase in flow compared to baseline occurs in April, when the average monthly flow increases from 22,016 cfs to 25,447 cfs, and the largest decrease occurs in July, when the average monthly flow decreases from 16,664 cfs to 14,495 cfs. Average total January through June streamflows on the Sacramento River at Freeport increase by 534 TAF under the 55 w/WSAs scenario compared to baseline, a smaller change than the 882 TAF increase observed under the 55 scenario.




cfs = cubic feet per second

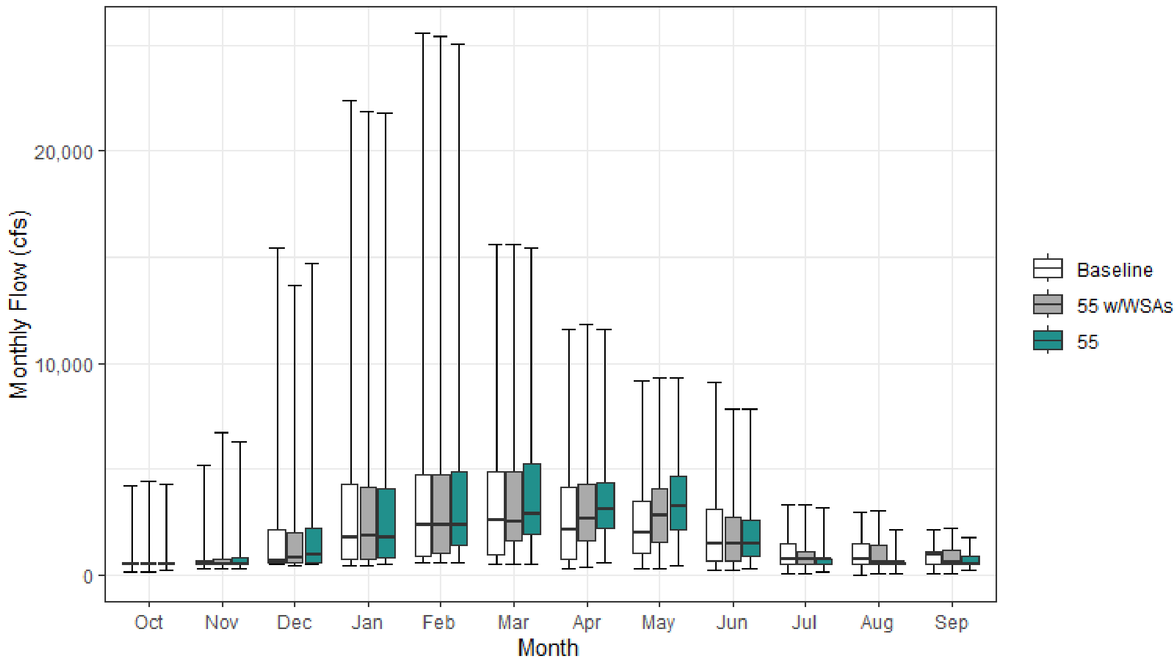
**Figure 4. Monthly Streamflow for the Sacramento River at Freeport under Baseline, 55 w/WSAs, and 55**

**Table 99. Change in January–June Monthly Average Flow for the Sacramento River at Freeport by Water Year Type (TAF/yr)**

| Water Year Type | Baseline | 55 w/WSAs: Change from Baseline | 55: Change from Baseline |
|---|---|---|---|
| C | 4,001 | 66 | 635 |
| D | 5,402 | 500 | 1,157 |
| BN | 7,477 | 850 | 1,322 |
| AN | 11,191 | 821 | 1,029 |
| W | 14,733 | 493 | 473 |
| All | 9,103 | 534 | 882 |

***Yuba River***

Modeled mean flows on the lower Yuba River under the 55 w/WSAs scenario generally fall between the baseline and 55 scenarios, showing increases from baseline in February through May, October, and November, and decreases from baseline in June through September, December, and January. The largest increase in flow compared to baseline occurs in May, when the average monthly flow increases from 2,662 cfs to 3,159 cfs, and the largest decrease occurs in June, when the average monthly flow decreases from 2,108 cfs to 1,985 cfs. Average total January through June streamflows on the lower Yuba River increase by 56 TAF under the 55 w/WSAs scenario compared to baseline, a smaller change than the 140 TAF increase observed under the 55 scenario.




cfs = cubic feet per second

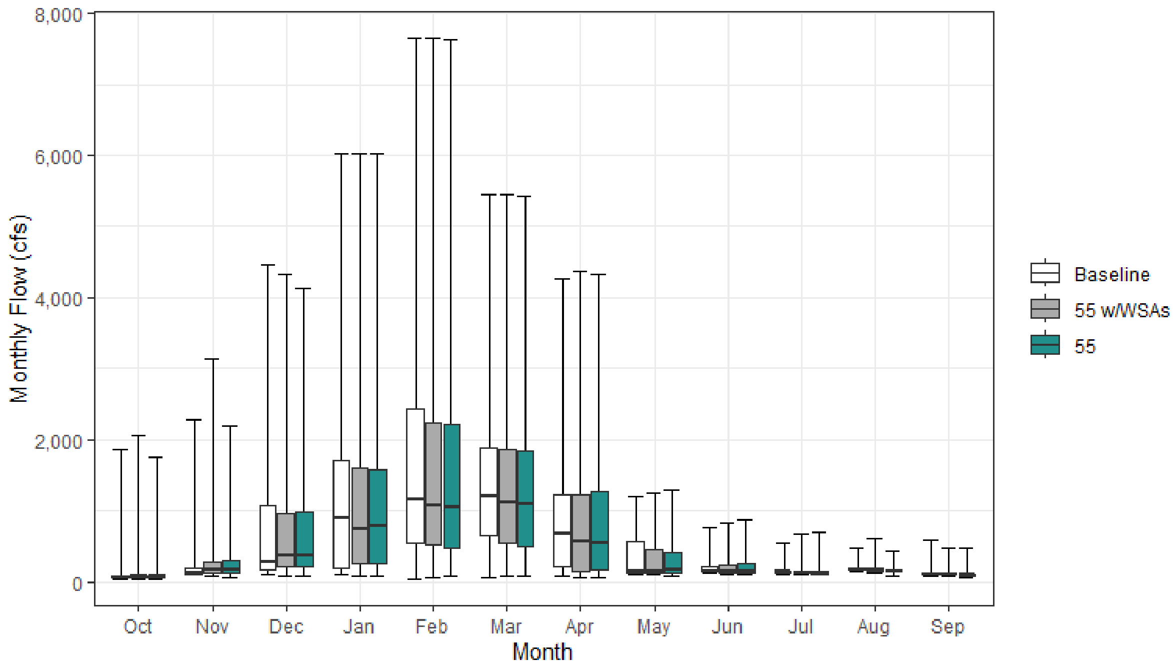
**Figure 5. Monthly Streamflow for the Yuba River above the Feather River under Baseline, 55 w/WSAs, and 55**

**Table 1010. Change in January–June Monthly Average Flow for the Yuba River above the Feather River by Water Year Type (TAF/yr)**

| Water Year Type | Baseline | 55 w/WSAs: Change from Baseline | 55: Change from Baseline |
|---|---|---|---|
| C | 253 | 58 | 170 |
| D | 463 | 84 | 217 |
| BN | 804 | 63 | 171 |
| AN | 1,263 | 56 | 142 |
| W | 2,005 | 29 | 46 |
| All | 1,059 | 56 | 140 |

***Bear River***

Modeled mean flows on the lower Bear River under the 55 w/WSAs scenario generally fall between the baseline and 55 scenarios, showing increases from baseline in June, July, October, and November, and decreases from baseline in January through May, August, September, and December. The largest increase in flow compared to baseline occurs in November, when the average monthly flow increases from 288 cfs to 332 cfs, and the largest decrease occurs in January, when the average monthly flow decreases from 1,341 cfs to 1,299 cfs. Average total January through June streamflows on the lower Bear River decrease by 10 TAF under the 55 w/WSAs scenario compared to baseline, a smaller change than the 17 TAF decrease observed under the 55 scenario.




cfs = cubic feet per second

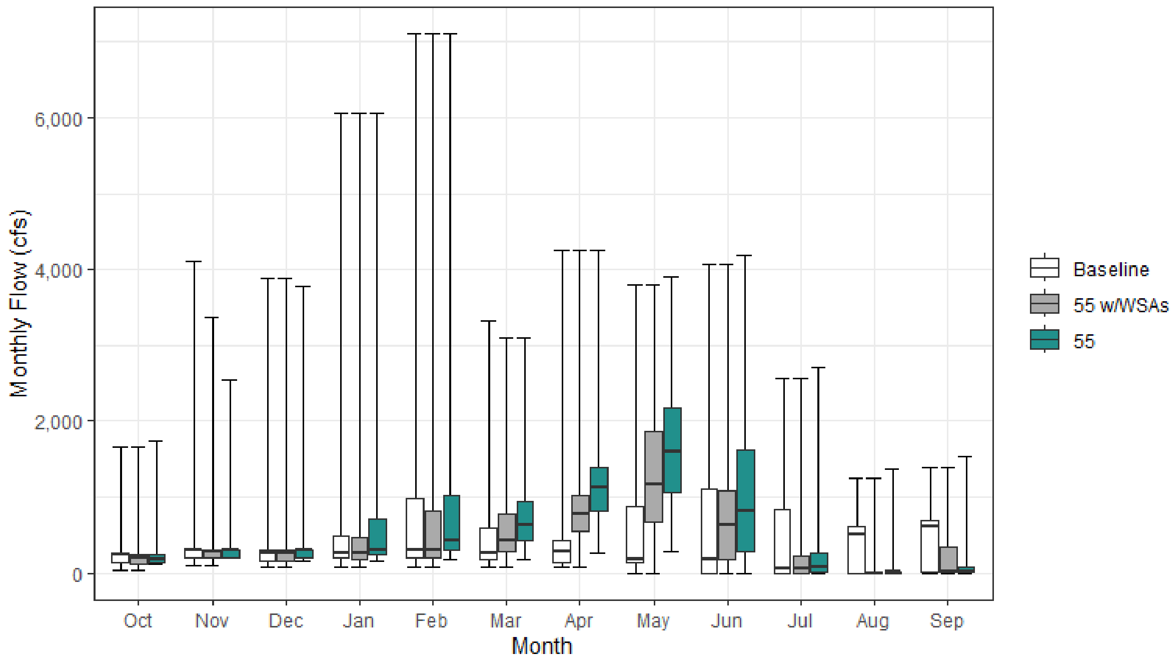
**Figure 6. Monthly Streamflow for the Bear River above the Feather River under Baseline, 55 w/WSAs, and 55**

**Table 1111. Change in January–June Monthly Average Flow for the Bear River above the Feather River by Water Year Type (TAF/yr)**

| Water Year Type | Baseline | 55 w/WSAs: Change from Baseline | 55: Change from Baseline |
|---|---|---|---|
| C | 85 | -2 | -4 |
| D | 168 | -12 | -23 |
| BN | 282 | -15 | -23 |
| AN | 466 | -20 | -31 |
| W | 635 | -7 | -11 |
| All | 354 | -10 | -17 |

***Mokelumne River***

Modeled mean flows on the lower Mokelumne River under the 55 w/WSAs scenario generally fall between the baseline and 55 scenarios, showing increases from baseline in March through June, and decreases from baseline in July through February. The largest increase in flow compared to baseline occurs in May, when the average monthly flow increases from 687 cfs to 1,333 cfs, and the largest decrease occurs in July, when the average monthly flow decreases from 450 cfs to 236 cfs. Average total January through June streamflows on the lower Mokelumne River increase by 74 TAF under the 55 w/WSAs scenario compared to baseline, a smaller change than the 145 TAF increase observed under the 55 scenario.




cfs = cubic feet per second

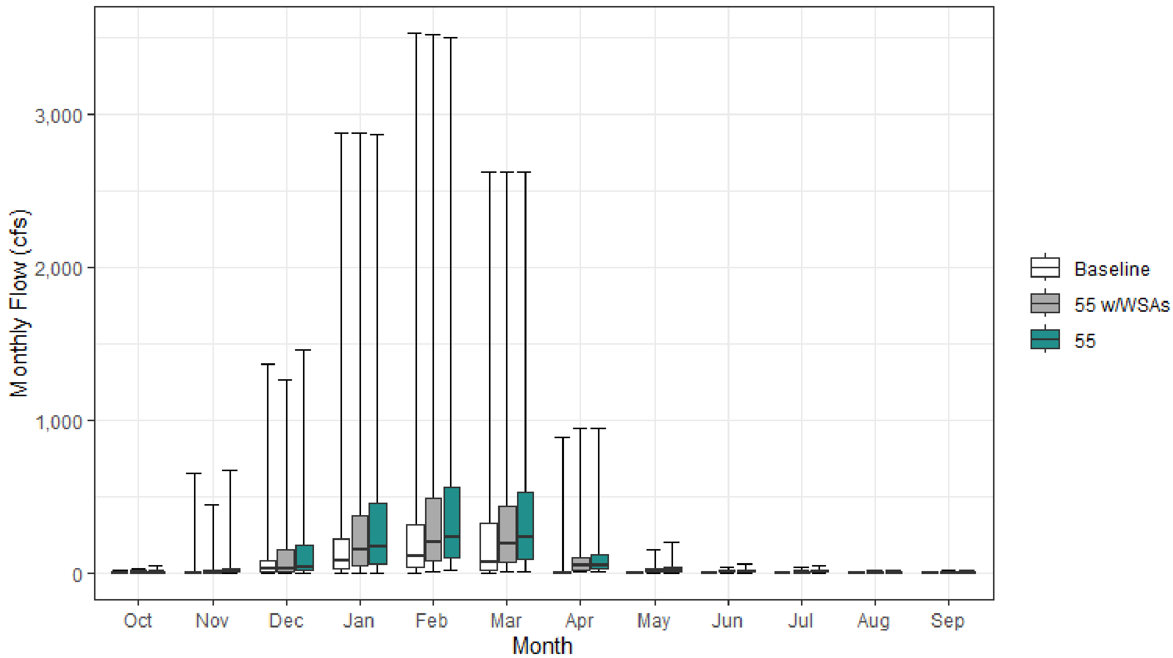
**Figure 7. Monthly Streamflow for the Mokelumne River above the Confluence with the Cosumnes River under Baseline, 55 w/WSAs, and 55**

**Table 1212. Change in January–June Monthly Average Flow for the Mokelumne River above the Confluence with the Cosumnes River by Water Year Type (TAF/yr)**

| Water Year Type | Baseline | 55 w/WSAs: Change from Baseline | 55: Change from Baseline |
|---|---|---|---|
| C | 47 | 44 | 100 |
| D | 64 | 89 | 169 |
| BN | 120 | 101 | 195 |
| AN | 231 | 97 | 192 |
| W | 521 | 53 | 100 |
| All | 230 | 74 | 145 |

***Calaveras River***

Modeled mean flows on the lower Calaveras River under the 55 w/WSAs scenario generally fall between the baseline and 55 scenarios, showing increases from baseline in all months. The largest increase in flow compared to baseline occurs in April when the average monthly flow increases from 31 cfs to 94 cfs. Average total January through June streamflows on the lower Calaveras River increase by 15 TAF under the 55 w/WSAs scenario compared to baseline, a smaller change than the 24 TAF increase observed under the 55 scenario.




cfs = cubic feet per second

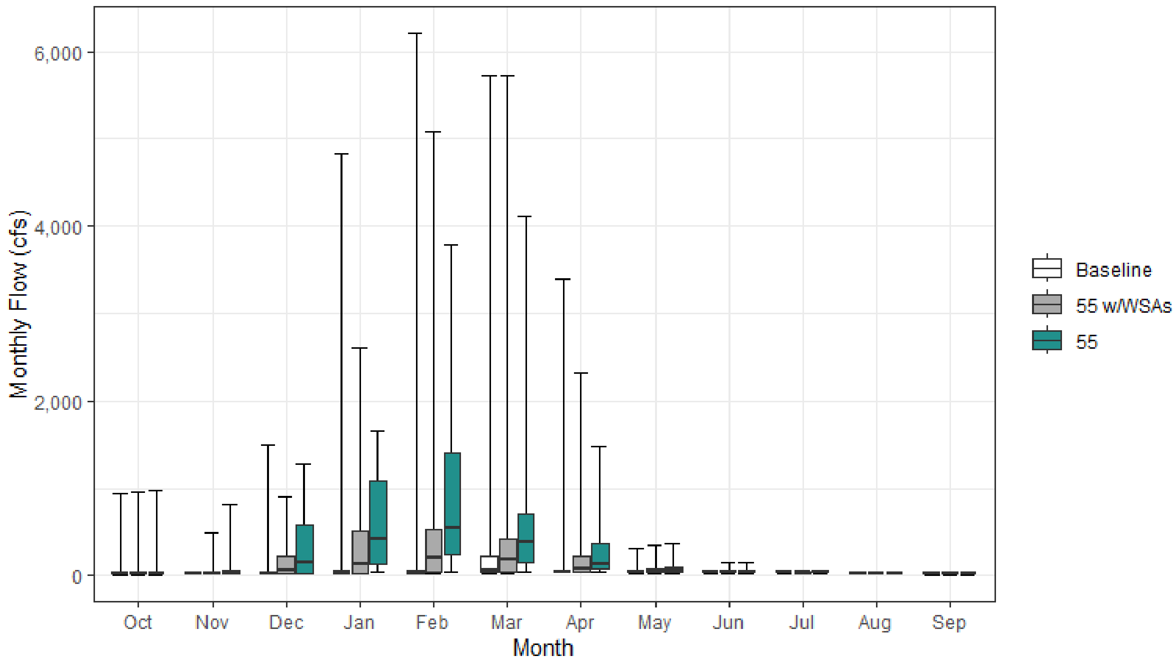
**Figure 8. Monthly Streamflow for the Calaveras River Inflow to the Delta under Baseline, 55 w/WSAs, and 55**

**Table 1313. Change in January–June Monthly Average Flow for the Calaveras River Inflow to the Delta by Water Year Type (TAF/yr)**

| Water Year Type | Baseline | 55 w/WSAs: Change from Baseline | 55: Change from Baseline |
|---|---|---|---|
| C | 7 | 7 | 12 |
| D | 12 | 15 | 23 |
| BN | 33 | 19 | 29 |
| AN | 66 | 20 | 36 |
| W | 142 | 13 | 21 |
| All | 61 | 15 | 24 |

#### *Putah Creek*

Modeled mean flows on lower Putah Creek under the 55 w/WSAs scenario generally fall between the baseline and 55 scenarios, showing increases from baseline in November through February, May, and June, and decreases from baseline in March and April. Modeled mean flows under the 55 w/WSAs scenario show no change from baseline in July through October. The largest increase in flow compared to baseline occurs in December, when the average monthly flow increases from 47 cfs to 157 cfs, and the largest decrease occurs in April, when the average monthly flow decreases from 226 cfs to 193 cfs. Average total January through June streamflows on lower Putah Creek increase by 10 TAF under the 55 w/WSAs scenario compared to baseline, a smaller change than the 64 TAF increase observed under the 55 scenario.




cfs = cubic feet per second

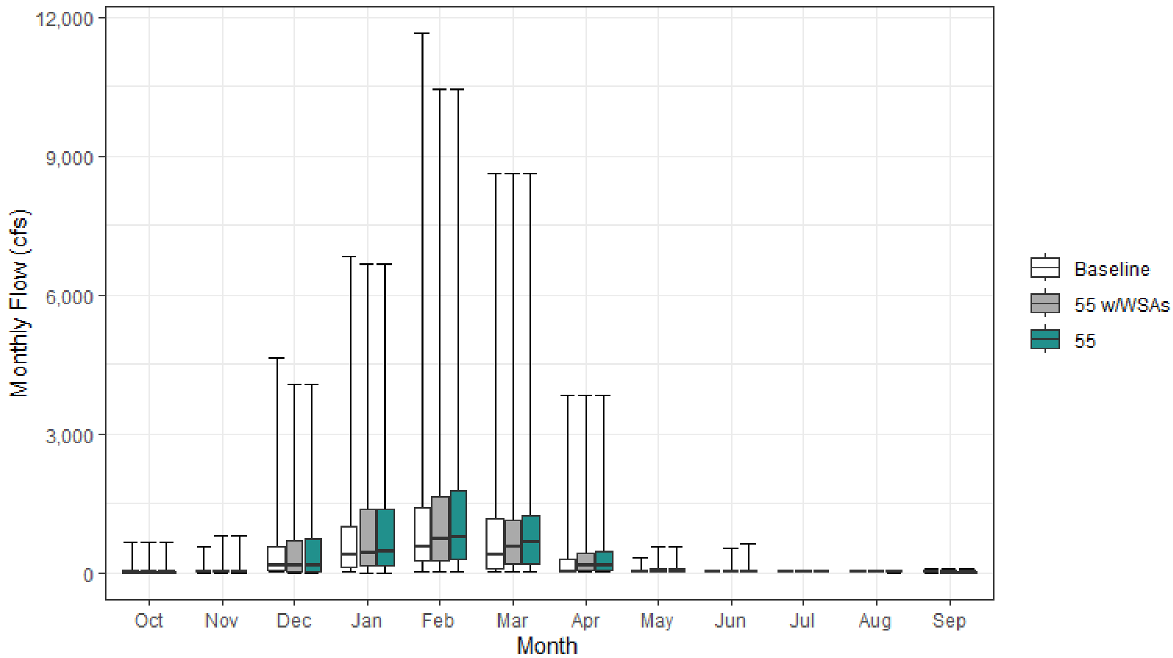
**Figure 9. Monthly Streamflow for Putah Creek above the Yolo Bypass under Baseline, 55 w/WSAs, and 55**

**Table 1414. Change in January–June Monthly Average Flow for Putah Creek above the Yolo Bypass by Water Year Type (TAF/yr)**

| Water Year Type | Baseline | 55 w/WSAs: Change from Baseline | 55: Change from Baseline |
|---|---|---|---|
| C | 14 | 6 | 35 |
| D | 15 | 20 | 59 |
| BN | 23 | 20 | 87 |
| AN | 28 | 53 | 145 |
| W | 190 | -19 | 36 |
| All | 71 | 10 | 64 |

***Cache Creek***

Modeled mean flows on lower Cache Creek under the 55 w/WSAs scenario generally fall between the baseline and 55 scenarios, showing increases from baseline in December, January, and March through June, and a decrease from baseline in February. Modeled mean flows under the 55 w/WSAs scenario show little to no change from baseline in July through November. The largest increase in flow compared to baseline occurs in December, when the average monthly flow increases from 381 cfs to 452 cfs, and the largest decrease occurs in February, when the average monthly flow decreases from 1,389 cfs to 1,368. Average total January through June streamflows on lower Cache Creek increase by 10 TAF under the 55 w/WSAs scenario compared to baseline, a smaller change than the 20 TAF increase observed under the 55 scenario.




cfs = cubic feet per second

**Figure 10. Monthly Streamflow for Cache Creek above the Yolo Bypass under Baseline, 55 w/WSAs, and 55**

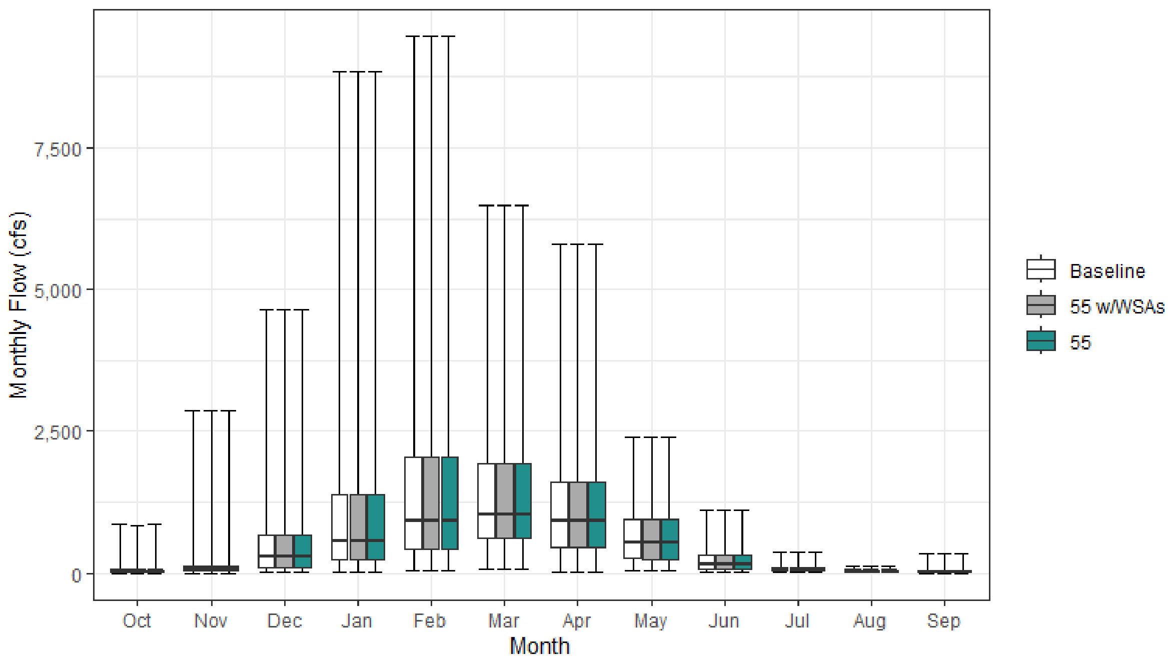
**Table 1515. Change in January–June Monthly Average Flow for Cache Creek above the Yolo Bypass by Water Year Type (TAF/yr)**

| Water Year Type | Baseline | 55 w/WSAs: Change from Baseline | 55: Change from Baseline |
|---|---|---|---|
| C | 40 | 7 | 12 |
| D | 53 | 22 | 33 |
| BN | 101 | 31 | 46 |
| AN | 239 | 20 | 45 |
| W | 510 | -15 | -11 |
| All | 221 | 10 | 20 |

### Unregulated Tributary Streamflows

Unregulated tributaries are tributaries that lack a major storage reservoir or other flow-regulating infrastructure. There are two general categories of unregulated tributaries in the Sacramento River watershed and Delta eastside tributaries: (1) unregulated tributaries that exhibit low surface water demand relative to water availability; and (2) unregulated tributaries that exhibit higher surface water demand relative to water availability.

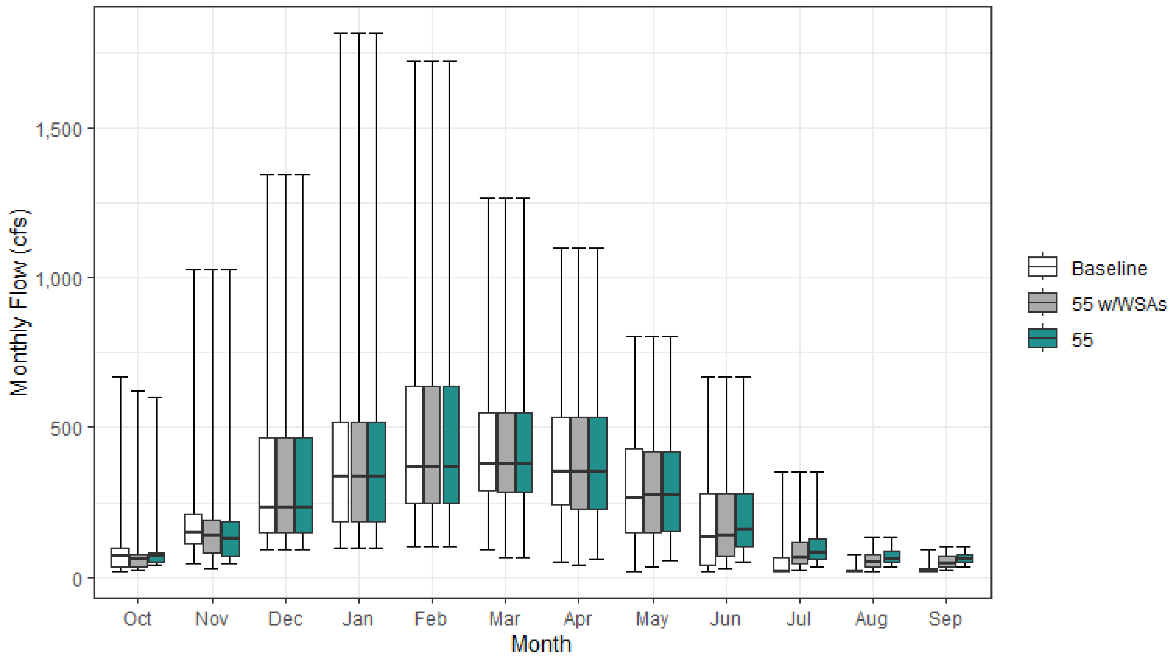
For unregulated tributaries with low surface water demand, streamflows generally remain unchanged between model scenarios. Tributaries that fall under this category include Battle Creek, Big Chico Creek, and the Cosumnes River. Unregulated tributaries with low surface water demand tend to be less hydrologically altered compared with tributaries with higher surface water demand. These tributaries also tend to exhibit higher percentages of unimpaired flow under baseline compared with tributaries with higher surface water demand. As a result, conditions in these tributaries are unlikely to change under the 55 w/WSAs and 55 scenarios. The Cosumnes River shows this representative tributary streamflow pattern for unregulated tributaries with low surface water demand.




Changes represent the typical patterns for unregulated tributaries with low water demand.
cfs = cubic feet per second

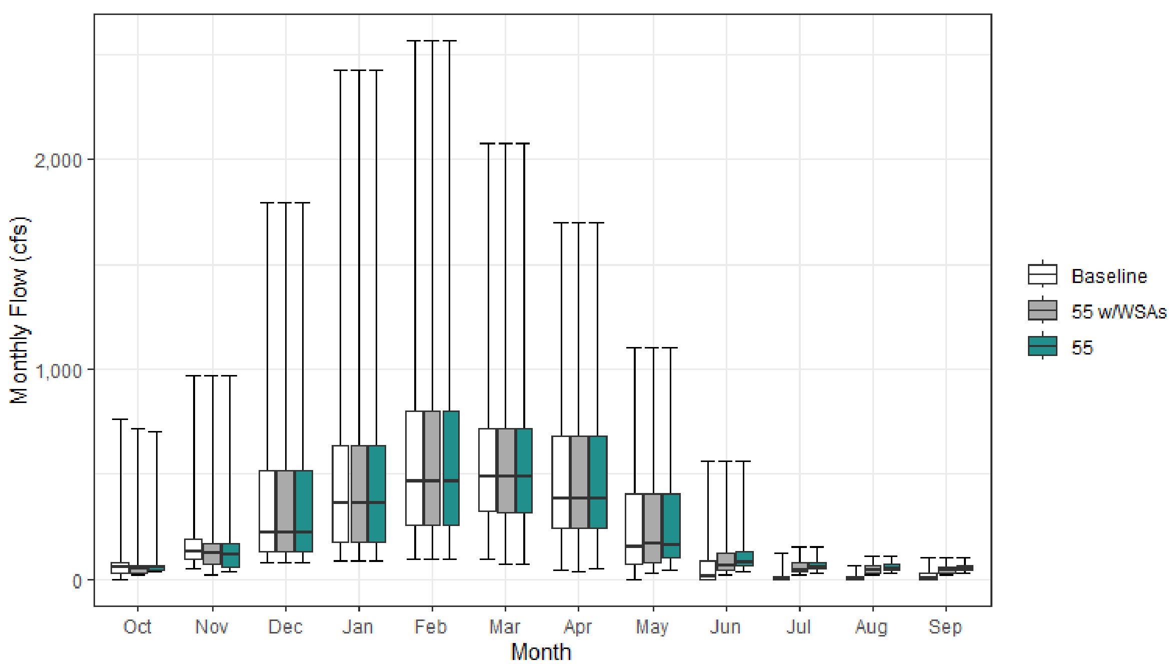
**Figure 11. Monthly Streamflow for the Cosumnes River under Baseline, 55 w/WSAs, and 55**

For unregulated tributaries with higher surface water demand, streamflows vary little between model scenarios during winter months, but generally show increases in streamflows during late spring through early fall (May through September). For these tributaries, surface water demand tends to be low during winter and higher during late spring through early fall due to seasonal consumptive water use (e.g., irrigation use). Surface water availability also tends to be lowest during the irrigation season. Based on the model results, the 55 w/WSAs scenario would likely result in increased streamflows and reduced summer surface water diversions for these tributaries but is unlikely to alter streamflows during winter months compared to baseline. Streamflows under the 55 w/WSAs scenario generally fall between the baseline and 55 scenarios. Mill Creek and Deer Creek show this representative tributary streamflow pattern for unregulated tributaries with higher surface water demand in the figures below. Other unregulated tributaries with higher surface water demand, such as Antelope Creek, show minimal changes from baseline under the 55 w/WSAs and 55 scenarios. Antelope Creek shows this representative tributary streamflow pattern in the figure below.



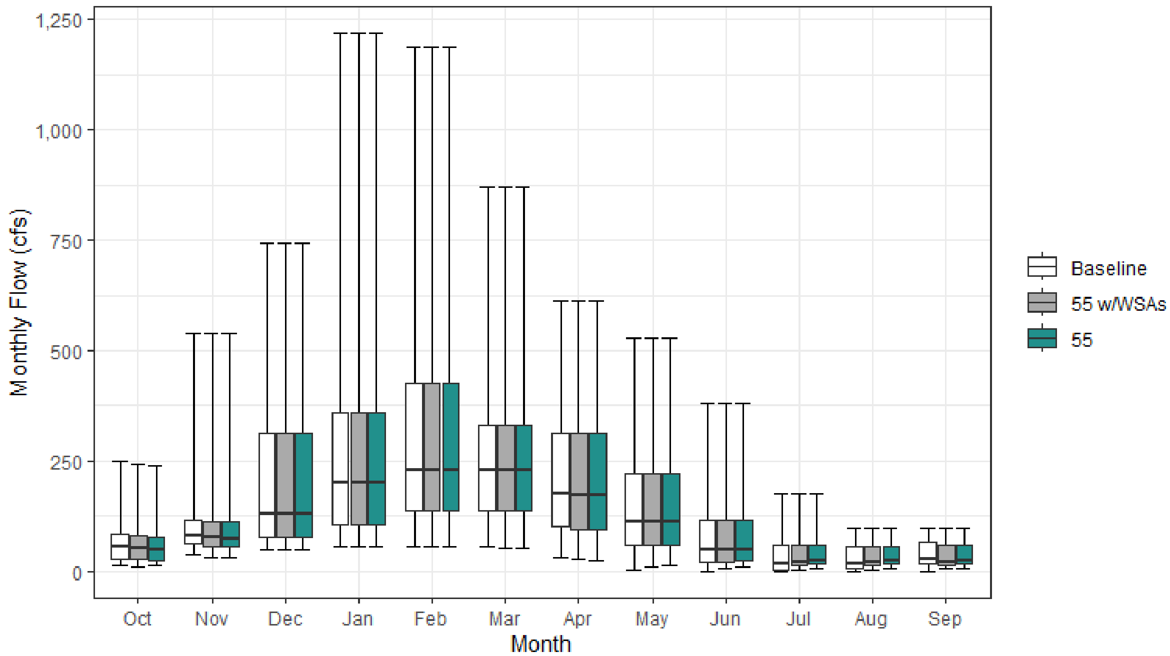

Changes represent the typical patterns for unregulated tributaries with high surface water demand.
Modeled reductions in flow result from limitations in the spatial resolution of agricultural demands in SacWAM.
cfs = cubic feet per second

**Figure 12. Monthly Streamflow for Mill Creek under Baseline, 55 w/WSAs, and 55**




Changes represent the typical patterns for unregulated tributaries with high surface water demand.
Modeled reductions in flow result from limitations in the spatial resolution of agricultural demands in SacWAM.
cfs = cubic feet per second

**Figure 13. Monthly Streamflow for Deer Creek under Baseline, 55 w/WSAs, and 55**

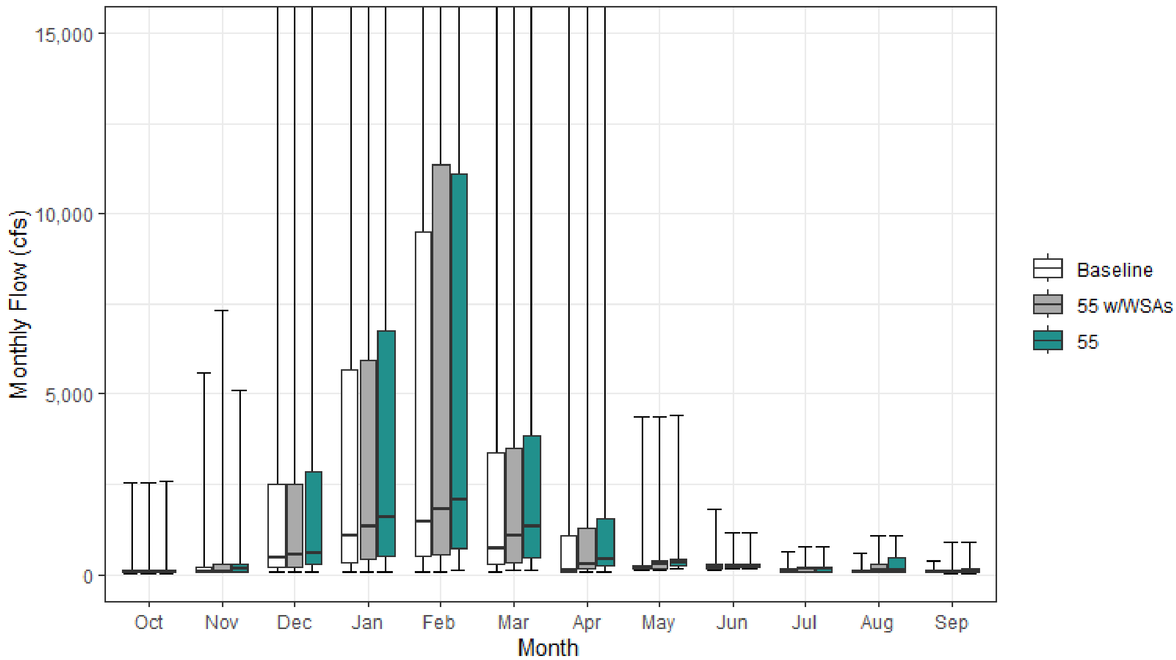



Changes represent the typical patterns for unregulated tributaries with high surface water demand.
Modeled reductions in flow result from limitations in the spatial resolution of agricultural demands in SacWAM.
cfs = cubic feet per second

**Figure 14. Monthly Streamflow for Antelope Creek under Baseline, 55 w/WSAs, and 55**

## Sacramento Valley Flood Bypasses

Increases in streamflow on the mainstem Sacramento River result in very small changes in the frequency and magnitude of spills into the Sutter and Yolo Bypasses. The Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project (Big Notch Project) is expected to increase the frequency and magnitude of spills into the Yolo Bypass from the Sacramento River, but the Big Notch Project is not included in the SacWAM modeling. However, increases in outflows from Cache and Putah Creeks produce substantial increases in flow in the lower half of the Yolo Bypass into the Delta. Increased flows on the lower Yolo Bypass may lead to increases in surface area inundation and floodplain habitat.



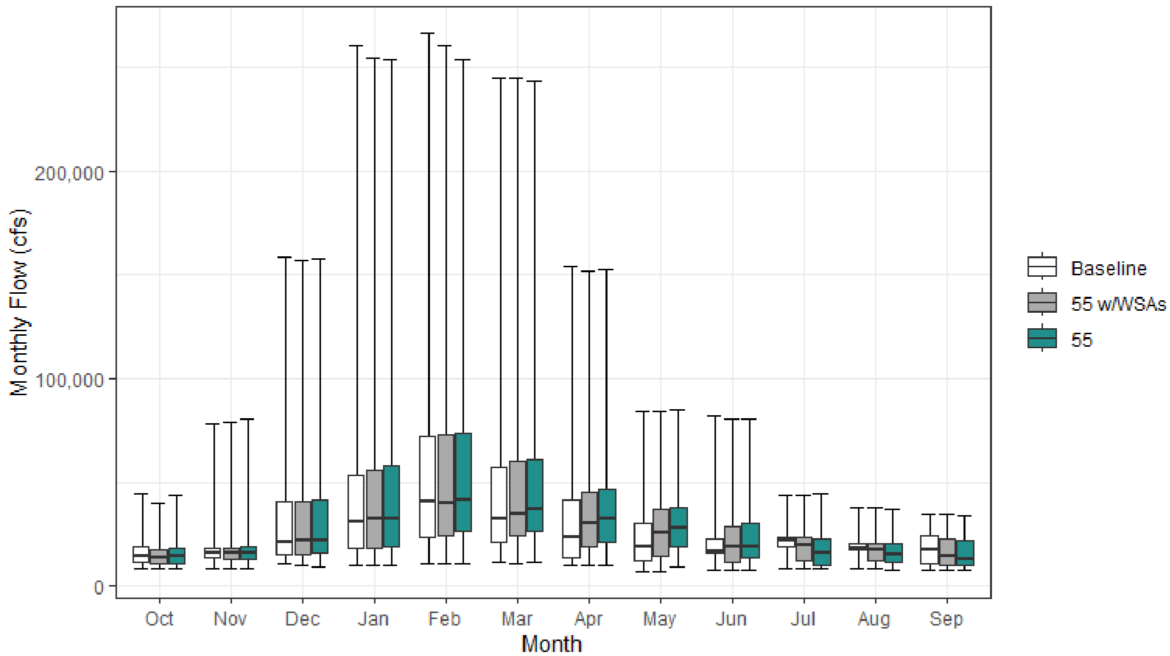

cfs = cubic feet per second

**Figure 15. Monthly Streamflow for Yolo Bypass below Putah Creek Inflow under Baseline, 55 w/WSAs, and 55**

## Delta Inflow, Exports, Interior Delta Flows, and Delta Outflow

### Delta Inflow

Delta inflow is the sum of tributary inflows, as well as local runoff to the Delta. Given the substantial development of storage on the larger regulated tributaries, the changes in Delta inflow under the 55 w/WSAs scenario resemble those seen for a regulated tributary. Monthly average Delta inflow under the 55 w/WSAs scenario generally falls between the baseline and 55 scenarios, showing increases from baseline in January and March through June and decreases from baseline in July through December and in February. Although the timing of Delta inflow is altered, annual average Delta inflow is higher for all water year types except for critical years in the 55 w/WSAs scenario compared to baseline, falling between the baseline and 55 scenarios for all water year types except for critical years.




cfs = cubic feet per second

**Figure 16. Monthly Delta Inflow under Baseline, 55 w/WSAs, and 55**

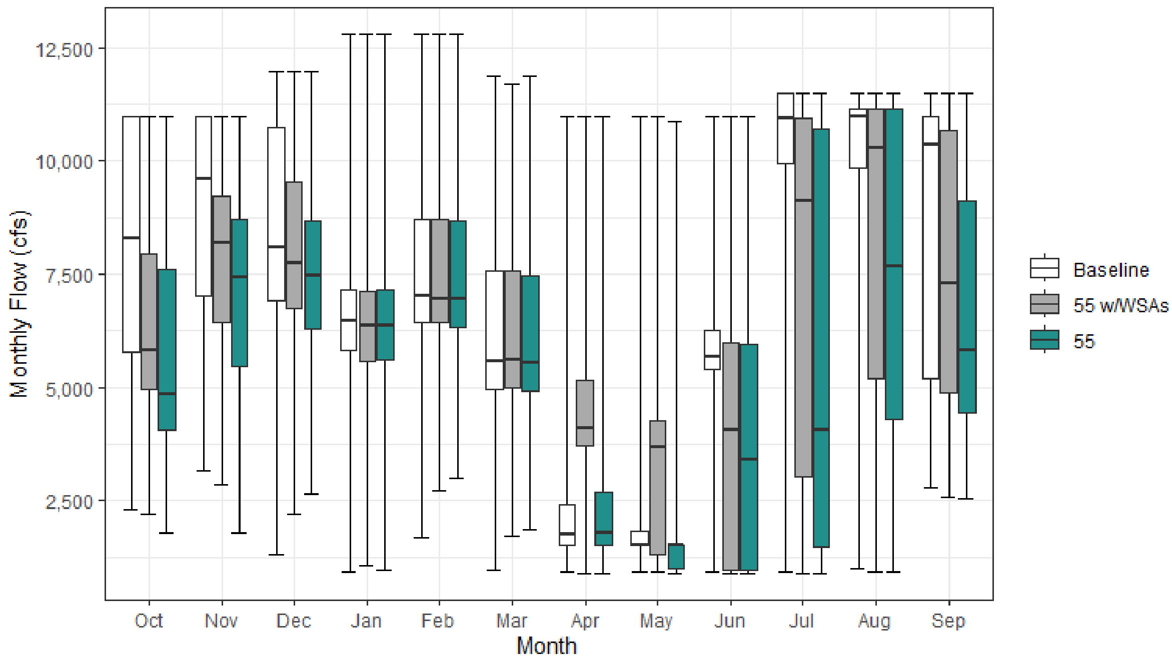
**Table 1616. Change in Total Annual Delta Inflow Average by Water Year Type (TAF/yr)**

| Water Year Type | Baseline | 55 w/WSAs: Change from Baseline | 55: Change from Baseline |
|---|---|---|---|
| C | 9,724 | -189 | 409 |
| D | 13,061 | 33 | 659 |
| BN | 16,922 | 497 | 744 |
| AN | 24,379 | 468 | 643 |
| W | 36,101 | 212 | 313 |
| All | 21,617 | 193 | 528 |

### South of Delta Exports

Under existing conditions, between approximately one third and half of the Sacramento/Delta water supplied is to south of Delta users via south Delta pumping facilities, with higher export rates in wetter years. The figures and tables below present SacWAM modeling results for average south of Delta exports for the baseline, 55 w/WSAs, and 55 scenarios.

Overall, results suggest that annual average south of Delta exports for the 55 w/WSAs scenario fall between the baseline and 55 scenarios in all months except for April and May. Results for the 55 w/WSAs scenario show increases from baseline in April and May (due primarily to the difference in I:E assumptions between baseline and 55 w/WSAs discussed above), decreases from baseline in June through December, and minimal departures from baseline in January through March. During January through June, results show that south of Delta exports under the 55 w/WSAs scenario could increase in all water year types except dry and critical years compared to baseline, as opposed to decreases in all water year types under the 55 scenario. Across all water year types, exports under the 55 w/WSAs scenario could increase during January through June by 56 TAF compared with baseline, in contrast to a decrease of 152 TAF under the 55 scenario. During July through December, south of Delta exports could decrease in all water year types compared to baseline under the 55 w/WSAs scenario, falling between the baseline and 55 scenarios in all water year types. Across all water year types, exports could decrease during July through December by 440 TAF compared with baseline, a smaller reduction than the 741 TAF decrease shown under the 55 scenario. Results suggest that annual average south of Delta exports could decrease under the 55 w/WSAs scenario in all water year types compared to baseline, with an annual average decrease of 384 TAF, a smaller reduction than the 894 TAF decrease shown under the 55 scenario.




cfs = cubic feet per second

**Figure 17. Monthly South of Delta Exports for the Baseline, 55 w/WSAs, and 55 Scenarios**

**Table 1717. Change in January–June Average South of Delta Exports by Water Year Type (TAF/yr) for the 55 w/WSAs and 55 Scenarios Compared to Baseline.**

| Water Year Type | Baseline | 55 w/WSAs: Change from Baseline | 55: Change from Baseline |
|---|---|---|---|
| C | 1,233 | -117 | -137 |
| D | 1,567 | -63 | -267 |
| BN | 1,694 | 166 | -215 |
| AN | 1,918 | 249 | -126 |
| W | 2,757 | 88 | -47 |
| All | 1,940 | 56 | -152 |

**Table 1818. Change in July–December Average South of Delta Exports by Water Year Type (TAF/yr) for the 55 w/WSAs and 55 Scenarios Compared to Baseline**

| Water Year Type | Baseline | 55 w/WSAs: Change from Baseline | 55: Change from Baseline |
|---|---|---|---|
| C | 1,791 | -312 | -475 |
| D | 2,988 | -714 | -1,063 |
| BN | 3,455 | -577 | -1,103 |
| AN | 3,565 | -436 | -921 |
| W | 3,743 | -223 | -345 |
| All | 3,183 | -440 | -741 |

**Table 1919. Annual South of Delta Exports by Water Year Type (TAF/yr) for the 55 w/WSAs and 55 Scenarios Compared to Baseline.**

| Water Year Type | Baseline | 55 w/WSAs: Change from Baseline | 55: Change from Baseline |
|---|---|---|---|
| C | 3,023 | -429 | -613 |
| D | 4,555 | -776 | -1,330 |
| BN | 5,149 | -411 | -1,318 |
| AN | 5,483 | -187 | -1,048 |
| W | 6,499 | -135 | -393 |
| All | 5,123 | -384 | -894 |

### Old and Middle River (OMR) Flows

As discussed above and in the draft Staff Report, modeled interior Delta flows under the baseline and 55 scenarios include restrictions on both SWP and CVP exports as a function of the San Joaquin River flows (I:E) during April and May that limit exports based on a ratio of San Joaquin River flows between 4 to 1 and 1 to 1. Under the 55 w/WSAs scenario this I:E constraint has been removed from the CVP. This change results in decreased (more negative) OMR flows and increased CVP exports in April and May. SacWAM results indicate that OMR reverse flows are less negative than baseline in the 55 w/WSAs scenario in the driest approximately two-thirds of conditions because exports are reduced to meet the higher Delta outflow requirements. In the wettest one-third of conditions SacWAM results indicate more negative OMR flows due to the difference in CVP I:E constraints between baseline and 55 w/WSAs.

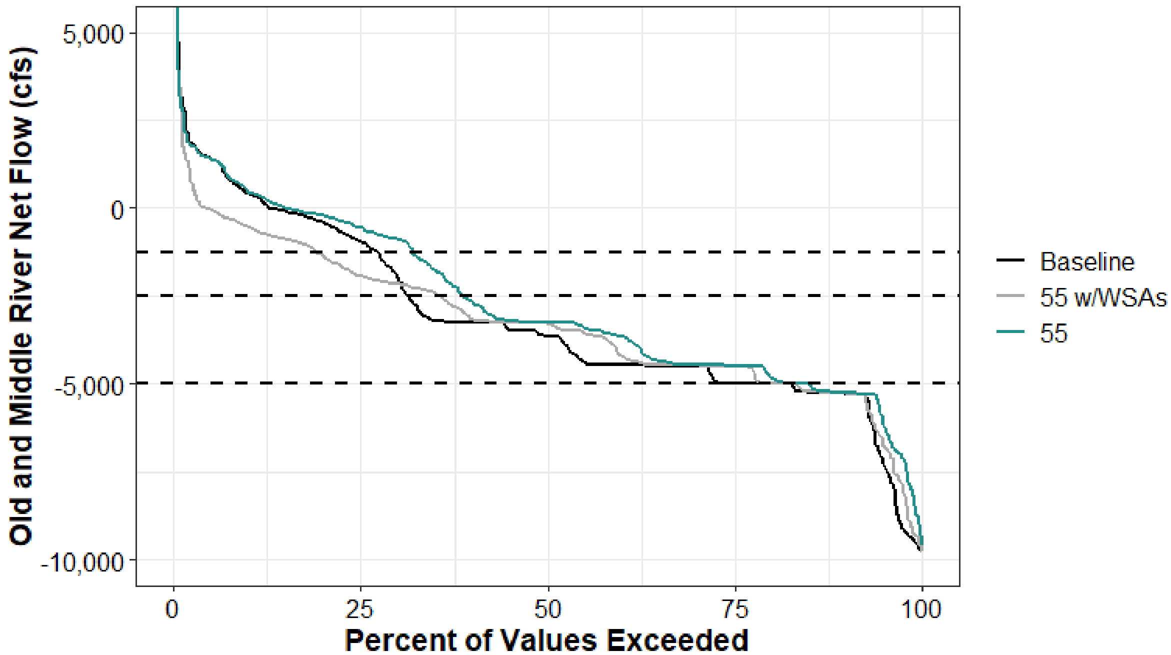
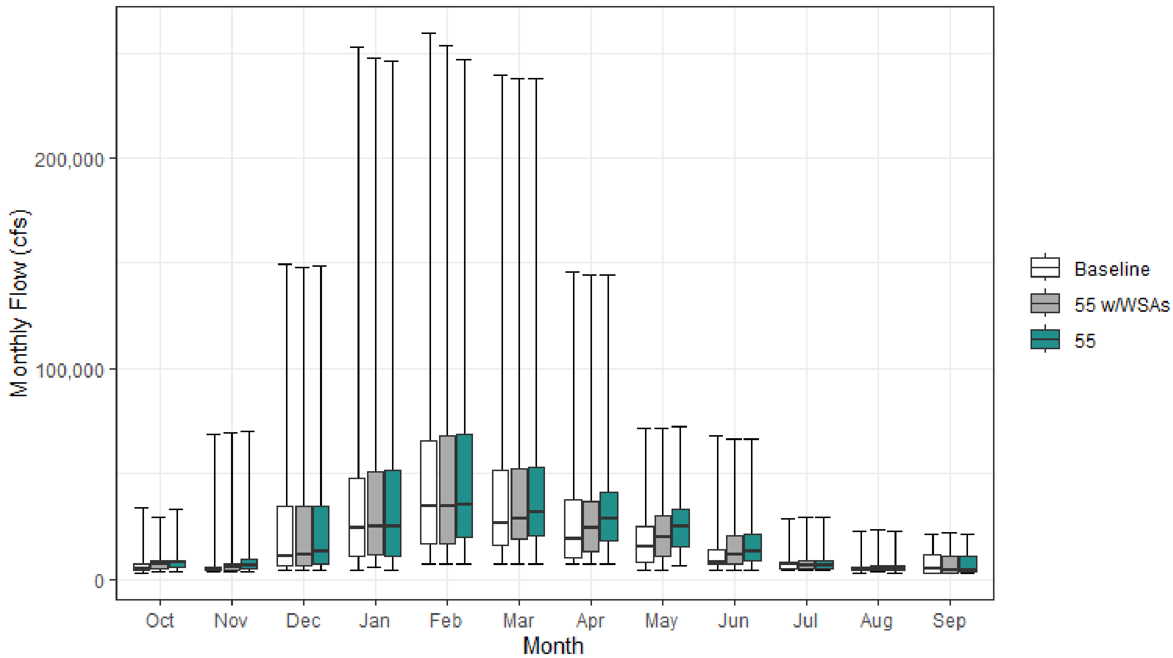



**Figure 18. Monthly Exceedance Frequency Distribution of Old and Middle River Net Flow (cfs) for December–June under the Baseline, 55 w/WSAs, and 55 Scenarios**

### Delta Outflow

Monthly average Delta outflow under the 55 w/WSAs scenario generally falls between the baseline and 55 scenarios, showing an increase under the 55 w/WSAs scenario compared to baseline during January, March through June, October, and November, and decreases during July through September, December, and February. January through June Delta outflow increases in all water year types under the 55 w/WSAs scenario compared to baseline. Average total January through June Delta outflow increases by 554 TAF under the 55 w/WSAs scenario compared to baseline, a smaller change than the 1,249 TAF increase observed under the 55 scenario.




cfs = cubic feet per second

**Figure 19. Monthly Delta Outflow under Baseline, 55 w/WSAs, and 55**

**Table 2020. Change in January–June Monthly Total Delta Outflow Average by Water Year Type (TAF/yr)**

| Water Year Type | Baseline | 55 w/WSAs: Change from Baseline | 55: Change from Baseline |
|---|---|---|---|
| C | 3,555 | 240 | 931 |
| D | 5,025 | 726 | 1,755 |
| BN | 8,064 | 922 | 1,953 |
| AN | 14,056 | 744 | 1,593 |
| W | 22,447 | 287 | 465 |
| All | 11,745 | 554 | 1,249 |

### 1.4.2.2 Reservoir Storage

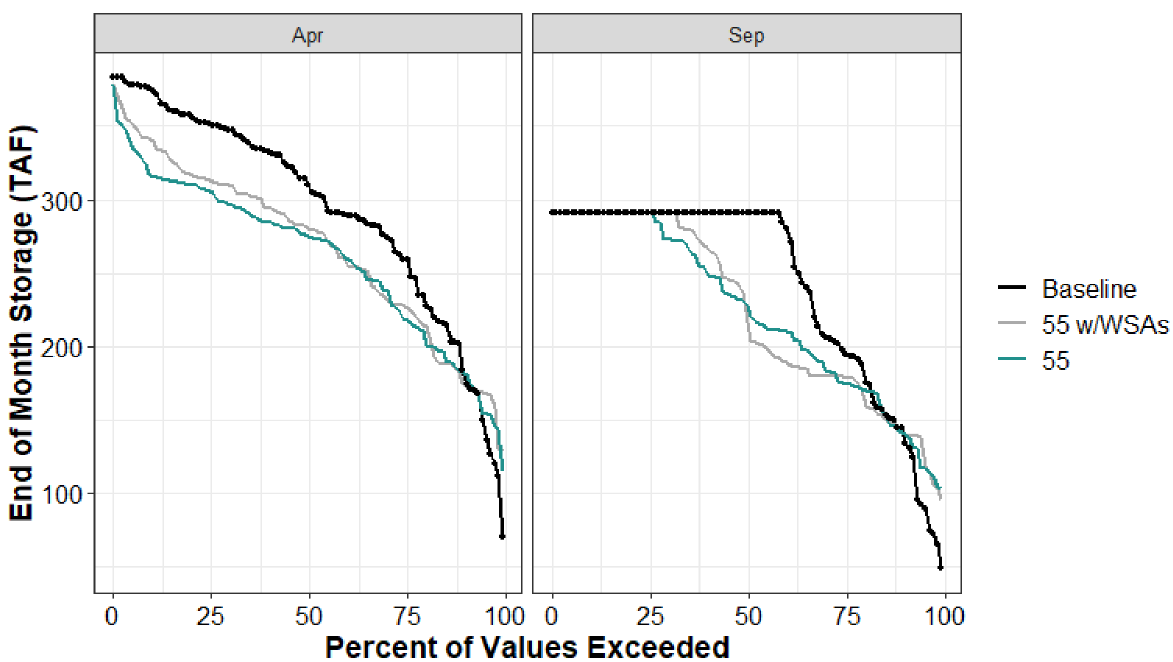
#### Sacramento River Watershed and Delta Eastside Tributaries Rim Reservoirs

In addition to the WSAs, the SacWAM modeling for 55 w/WSAs includes refinements to carryover storage assumptions. Collectively, the WSAs and carryover storage refinements represent a balancing of considerations for instream flows, storage, cold water habitat, and water supply as contemplated by the July 2025 revised draft Bay-Delta Plan. Assumed operations of the rim reservoirs in SacWAM are constrained under the 55 w/WSAs (and other UF scenarios) scenario by: 1) new instream flow requirements that require the bypass of flows resulting in limitations in the ability to store water in the spring: and 2) by cold water pool management assumptions to implement the cold water habitat requirements described in the July 2025 revised draft Bay-Delta Plan that limit how far rim reservoirs can be drawn down in drier years. In general, these assumptions result in lower storage at the end of April entering the irrigation season, and less total water being released in summer months. As described above, the 55 w/ WSAs scenario generally shows lower spring flows and higher summer flows relative to the 55 scenario. Consistent with that pattern, the 55 w/ WSAs scenario generally shows higher end-of-April storage than the 55 scenario, which reflects a greater opportunity to store cold water that can be released in the summer and fall to support both cold water habitat and water supply. For many reservoirs, end-of-September storage conditions are similar to or somewhat lower for the 55 w/ WSAs relative to the 55 scenario. The refined model results better reflect the ranges identified in Table 8 of the July 2025 revised draft Bay-Delta Plan. Due to the flexibility in the cold water habitat requirements in the revised draft Bay-Delta Plan, the actual level of a given reservoir could differ from that modeled.

Model results for the following rim reservoirs are provided below in alphabetical order: Camanche Reservoir (Mokelumne River), Camp Far West Reservoir (Bear River), Folsom Reservoir (American River), Lake Berryessa (Putah Creek), New Bullards Bar Reservoir (Yuba River), New Hogan Reservoir (Calaveras River), Oroville Reservoir (Feather River), Pardee Reservoir (Mokelumne River), Shasta Reservoir (Sacramento River), and Whiskeytown Reservoir (Clear Creek). The tables below show changes in average end-of-April storage for all years and critical years and average end-of-September carryover storage for all years and critical years.

***Camanche Reservoir***

Model results for Camanche Reservoir show that average end-of-April and end-of-September storage decrease from baseline under the 55 w/WSAs scenario in all but the lowest storage (driest) conditions. Overall, results for end-of-April and end-of-September storage in Camanche Reservoir under the 55 w/WSAs scenario are similar to the 55 scenario, with somewhat higher storage in wetter conditions. Because Camanche and Pardee Reservoirs are operated in tandem, these results should be considered along with those for Pardee Reservoir, below.

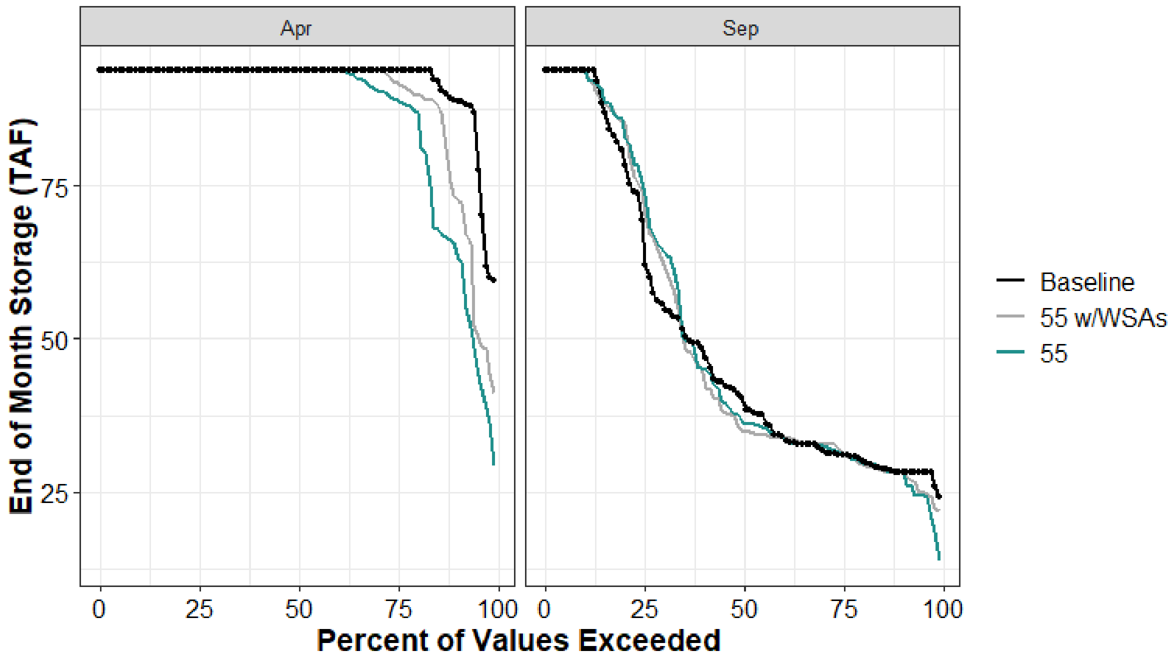



TAF = thousand acre-feet

**Figure 20. Camanche Reservoir End-of-April and End-of-September Carryover Storage under Baseline, 55 w/WSAs, and 55**

#### *Camp Far West Reservoir*

Model results for Camp Far West Reservoir show that average end-of-April storage decreases from baseline under the 55 w/WSAs scenario in drier years and is similar to baseline in other years, while average end-of-September storage is generally similar to baseline under all hydrologic conditions. Camp Far West Reservoir generally shows higher end-of-April storage in drier years under the 55 w/WSAs scenario relative to the 55 scenario. End-of-September storage for the 55 w/ WSAs scenario is similar to the 55 scenario across the full range of hydrology.

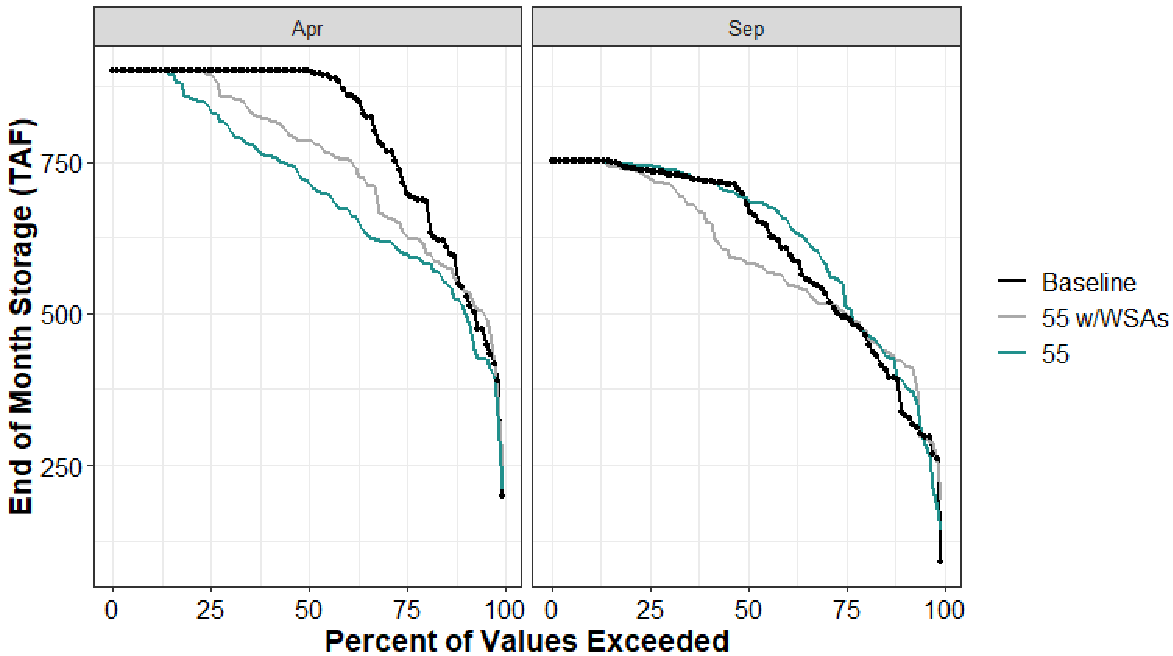



TAF = thousand acre-feet

**Figure 21. Camp Far West Reservoir End-of-April and End-of-September Carryover Storage under Baseline, 55 w/WSAs, and 55**

#### *Folsom Lake*

Model results for Folsom Lake show that average end-of-April storage under the 55 w/WSAs scenario increases from baseline in the driest years and decreases from baseline in all other years. End-of-September storage under the 55 w/WSAs scenario increases from baseline in drier years and decreases from baseline in all other years. Overall, results for end-of-April storage in Folsom Lake under the 55 w/WSAs scenario is higher than that seen under the 55 scenario. Results for end-of-September storage under the 55 w/WSAs scenario are lower than the 55 scenario in all but the driest years.

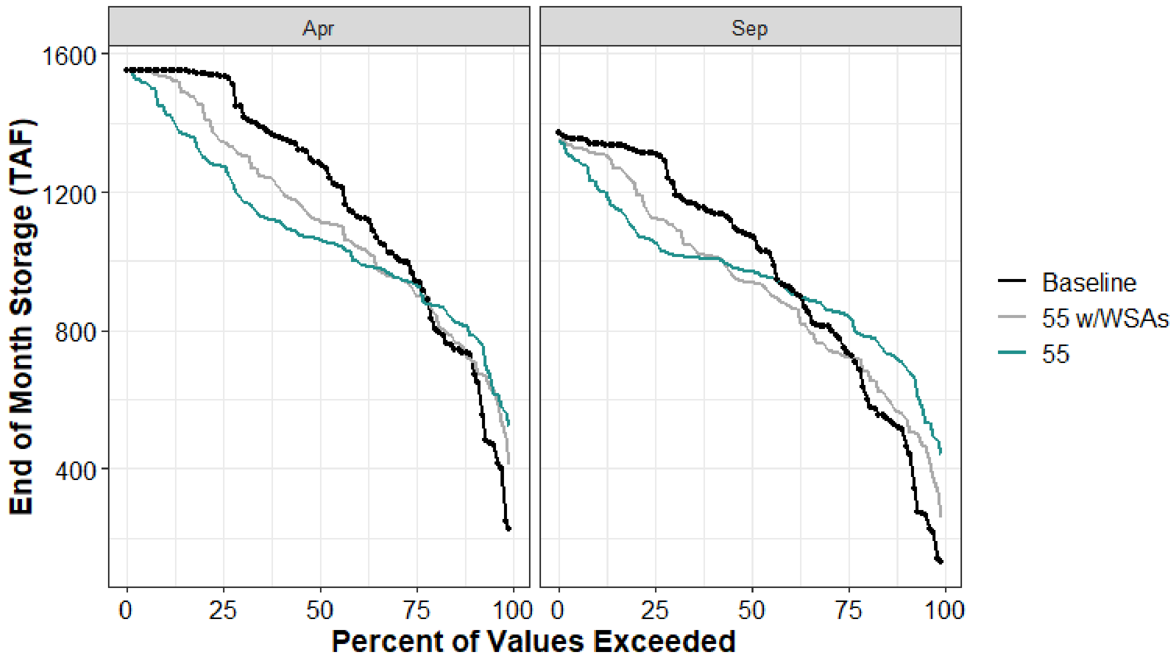



TAF = thousand acre-feet

**Figure 22. Folsom Lake End-of-April and End-of-September Carryover Storage under Baseline, 55 w/WSAs, and 55**

***Lake Berryessa***

Model results for Lake Berryessa show that end-of-April and end-of-September storage decrease from baseline under the 55 w/WSAs scenario in most years, and are similar to or somewhat higher than baseline in drier years. End- of-April storage in Lake Berryessa under the 55 w/WSAs scenario is higher in most years and lower in drier years relative to the 55 scenario. End-of-September storage is generally lower in the 55 w/ WSAs scenario relative to the 55 scenario, except in wetter years. These patterns reflect increased opportunity to store inflow under moderate to wet conditions and reduced constraints on delivery of stored water under drier conditions.

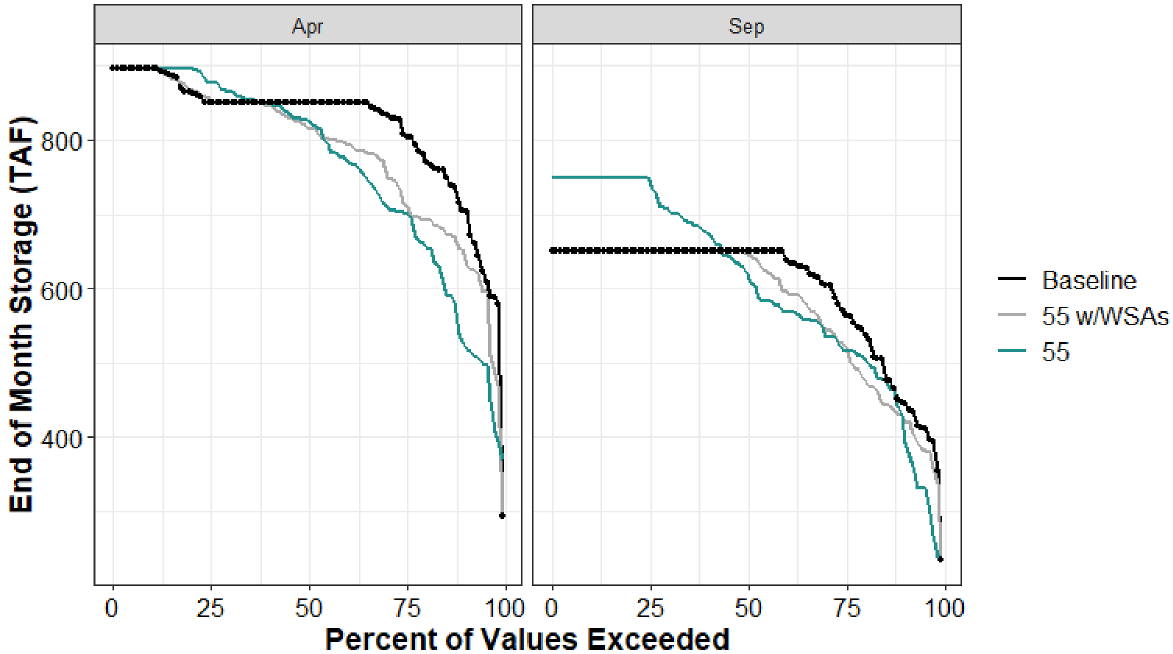



TAF = thousand acre-feet

**Figure 23. Lake Berryessa End-of-April and End-of-September Carryover Storage under Baseline, 55 w/WSAs, and 55**

***New Bullards Bar Reservoir***

Model results for New Bullards Bar Reservoir show that end-of-April and end-of-September storage decrease from baseline under the 55 w/WSAs scenario in all years. Overall, results for end-of-April storage in New Bullards Bar Reservoir under the 55 w/WSAs scenario are higher than those seen under the 55 scenario in all except the wetter years. Results for end-of-September storage under the 55 w/WSAs scenario are similar to the 55 scenario in all except wetter years, when carryover storage levels are significantly higher under the 55 scenario due to the changes to buffer pool assumptions described in Section 1.3, above.

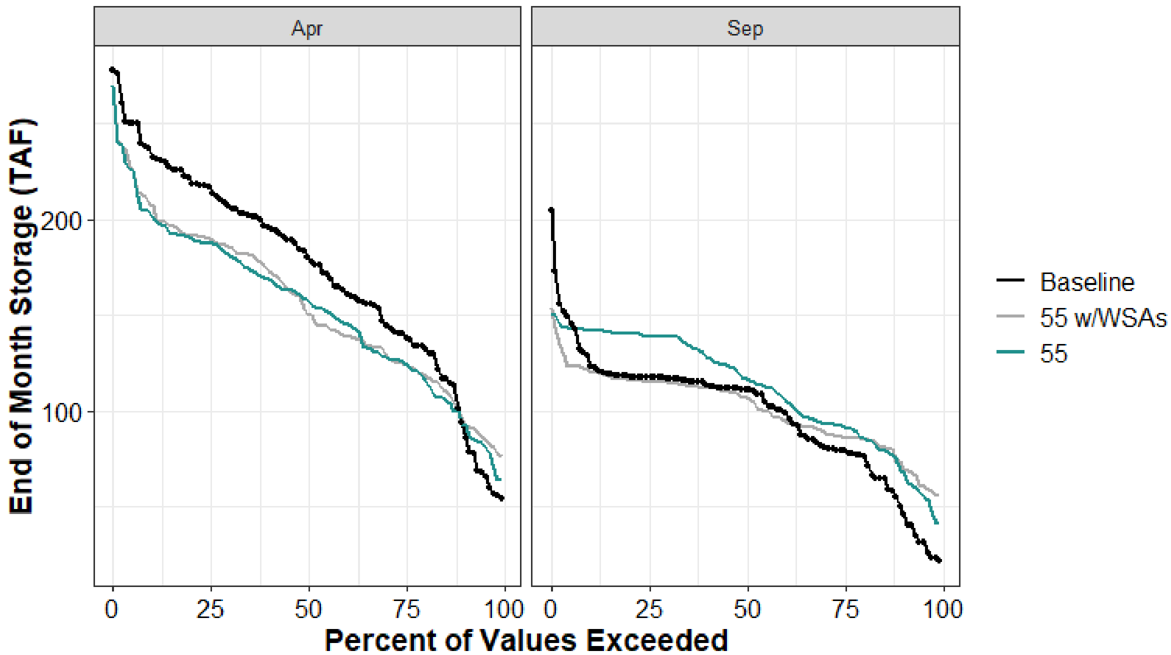



TAF = thousand acre-feet

**Figure 24. New Bullards Bar Reservoir End-of-April and End-of-September Carryover Storage under Baseline, 55 w/WSAs, and 55**

***New Hogan Reservoir***

Model results for New Hogan Reservoir show that end-of-April storage decreases from baseline under the 55 w/WSAs scenario in all but the driest years. End-of-September storage is similar to or lower than baseline under the 55 w/WSAs scenario in all except the driest years. Overall, results for end-of-April storage in New Hogan Reservoir under the 55 w/WSAs scenario are similar to those seen under the 55 scenario. Results for end-of-September storage are lower than those seen under the 55 scenario in all except the driest years due to refinements to carryover assumptions and reduced constraints on deliveries for water supply included in the 55 w/WSAs scenario.

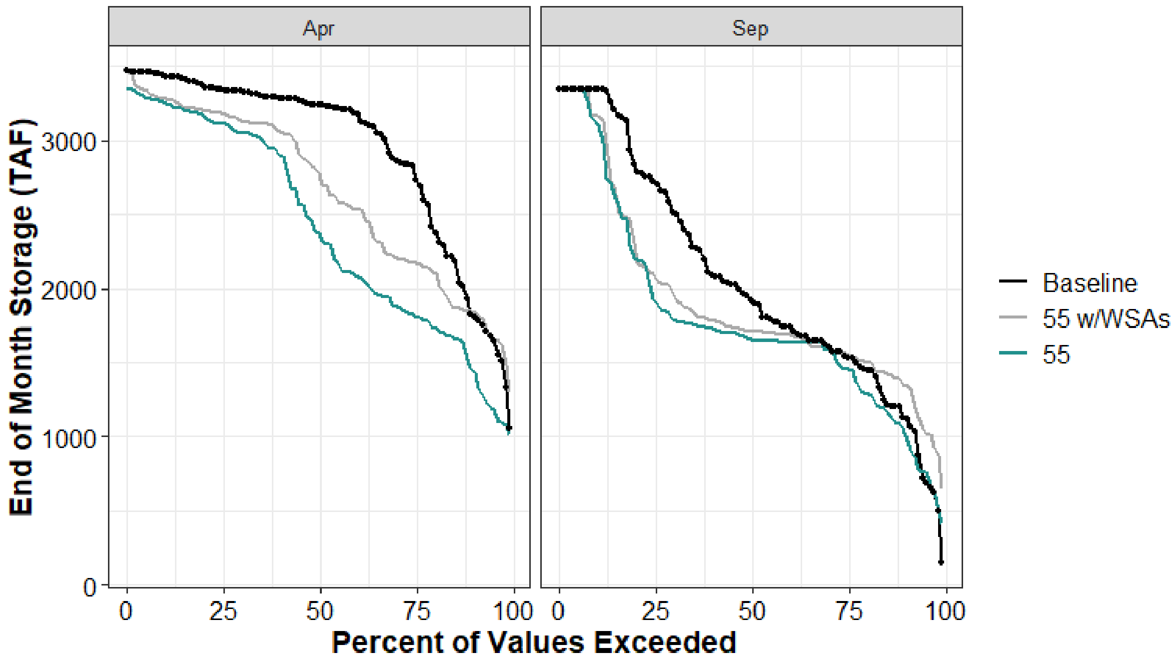



TAF = thousand acre-feet

**Figure 25. New Hogan Reservoir End-of-April and End-of-September Carryover Storage under Baseline, 55 w/WSAs, and 55**

***Oroville Reservoir***

Model results for Oroville Reservoir show that end-of-April storage under the 55 w/WSAs scenario decreases from baseline in all but the driest years, while end-of-September storage under the 55 w/WSAs scenario increases from baseline in drier years and decreases from baseline in all years. Overall, results for end-of-April and storage in Oroville Reservoir under the 55 w/WSAs scenario show greater storage than under the 55 scenario. End-of-September storage for the 55 w/ WSAs scenario is generally similar to the 55 scenario, except in drier years when the 55 w/WSAs scenario shows greater storage than the 55 scenario.

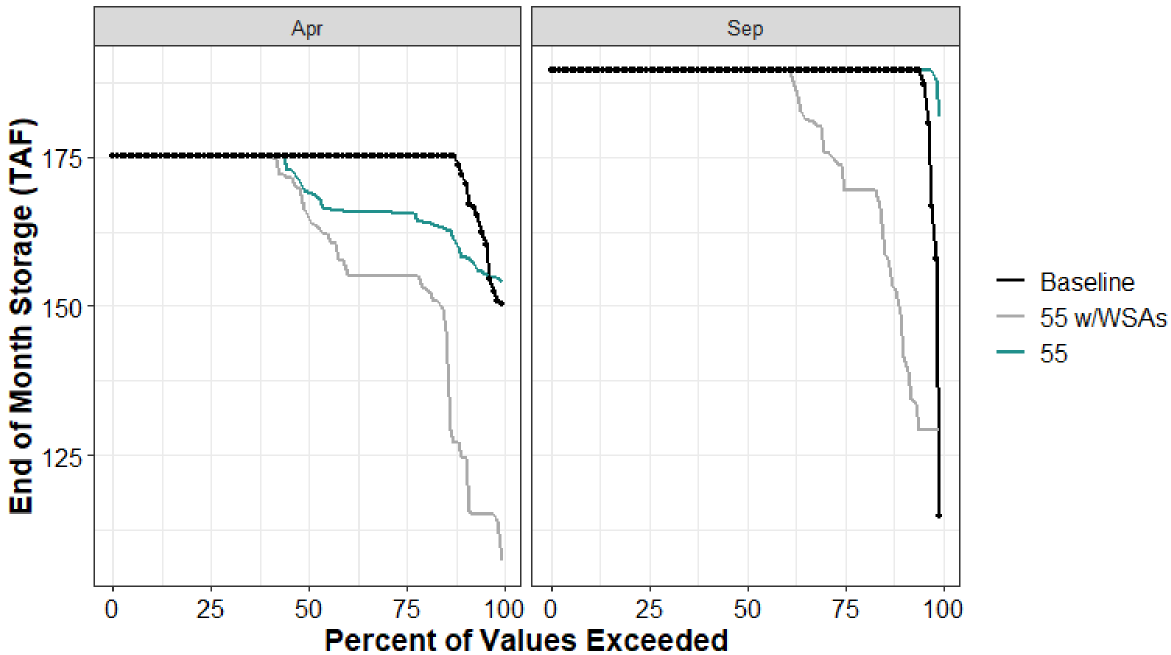



TAF = thousand acre-feet

**Figure 26. Oroville Reservoir End-of-April and End-of-September Carryover Storage under Baseline, 55 w/WSAs, and 55**

***Pardee Reservoir***

Model results for Pardee Reservoir show that end-of-April storage decreases from baseline under the 55 w/WSAs scenario in more than half of years, but with smaller decreases in wetter years. End-of-September storage decreases from baseline under the 55 w/WSAs scenario in drier years and is similar to baseline in all other years. Overall, results for end-of-April and end-of-September storage in Pardee Reservoir under the 55 w/WSAs scenario show lower storage than the 55 scenario. These patterns result largely from reduced constraints on delivery of stored water under the 55 w/ WSAs scenario relative to the 55 scenario. Larger reductions in storage are generally seen during multi-year drought sequences, when the sum of water supply deliveries from Pardee Reservoir and downstream obligations including flow requirements and supplies to in-basin users exceed inflow.

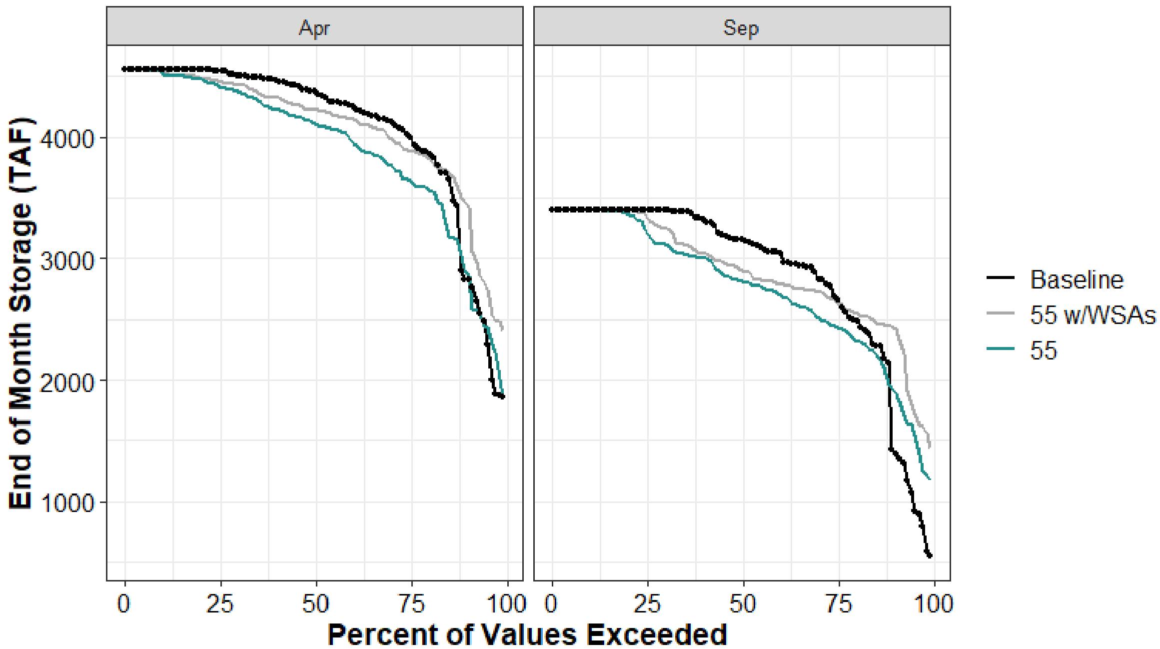



TAF = thousand acre-feet

**Figure 27. Pardee Reservoir End-of-April and End-of-September Carryover Storage under Baseline, 55 w/WSAs, and 55**

***Shasta Reservoir***

Model results for Shasta Reservoir show that end-of-April and end-of-September storage under the 55 w/WSAs scenario increase from baseline in the driest years and decrease from baseline in all other years. Overall, results for end-of-April and end-of-September storage in Shasta Reservoir under the 55 w/WSAs scenario show greater storage than under the 55 scenario, which is also reflective of provisions included in the 2024 Long-Term Operations of the CVP and SWP that include reduced diversion in the driest conditions.

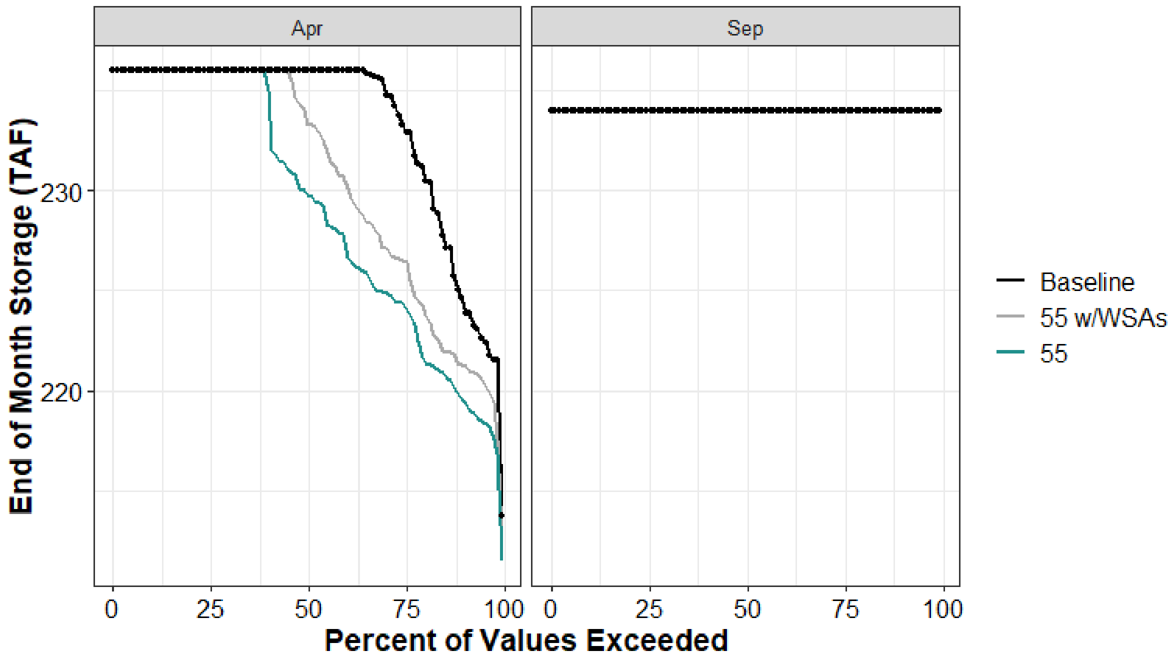



TAF = thousand acre-feet

**Figure 28. Shasta Reservoir End-of-April and End-of-September Carryover Storage under Baseline, 55 w/WSAs, and 55**

***Whiskeytown Reservoir***

Model results for Whiskeytown Reservoir show that end-of-April storage decreases slightly from baseline under the 55 w/WSAs scenario in most years, while end-of-September storage is constant across all scenarios. Overall, results for end-of-April storage in Whiskeytown Reservoir under the 55 w/WSAs scenario are somewhat higher than under the 55 scenario. End-of-September storage results are identical for the 55 w/ WSAs and 55 scenarios.




TAF = thousand acre-feet

**Figure 29. Whiskeytown Reservoir End-of-April and End-of-September Carryover Storage under Baseline, 55 w/WSAs, and 55**

Tables 21 through 24 show changes in average end-of-April and end-of-September storage across all years or critical years to supplement the information discussed above.

**Table 2121. Average End-of-April Storage (thousand acre-feet or TAF) and Percent Differences from Baseline in Rim Reservoirs in the 55 w/WSAs and 55 Scenarios for All Years**

| Reservoir | Baseline TAF | 55 w/WSAs TAF / (%) | 55 TAF / (%) |
|---|---|---|---|
| Camanche Reservoir | 294 | -27 / (-9) | -33 / (-11) |
| Camp Far West | 92 | -3 / (-3) | -6 / (-6) |
| Folsom Lake | 797 | -50 / (-6) | -94 / (-12) |
| Lake Berryessa | 1,178 | -59 / (-5) | -99 / (-8) |
| New Bullards Bar Reservoir | 818 | -34 / (-4) | -51 / (-6) |
| New Hogan Reservoir | 174 | -18 / (-10) | -19 / (-11) |
| Oroville Reservoir | 2,946 | -295 / (-10) | -542 / (-18) |
| Pardee Reservoir | 174 | -14 / (-8) | -5 / (-3) |
| Shasta Lake | 4,084 | -7 / (-0) | -168 / (-4) |
| Whiskeytown Reservoir | 233 | -3 / (-1) | -4 / (-2) |

**Table 2222. Average End-of-April Storage (thousand acre-feet) and Percent Differences from Baseline in Rim Reservoirs in the 55 w/WSAs and 55 Scenarios for Critical Years**

| Reservoir | Baseline TAF | 55 w/WSAs TAF / (%) | 55 TAF / (%) |
|---|---|---|---|
| Camanche Reservoir | 171 | 11 / (7) | 18 / (11) |
| Camp Far West | 85 | -8 / (-10) | -20 / (-23) |
| Folsom Lake | 500 | 23 / (5) | -38 / (-8) |
| Lake Berryessa | 808 | 11 / (1) | 43 / (5) |
| New Bullards Bar Reservoir | 663 | -67 / (-10) | -119 / (-18) |
| New Hogan Reservoir | 94 | 3 / (3) | 3 / (3) |
| Oroville Reservoir | 1,892 | -60 / (-3) | -396 / (-21) |
| Pardee Reservoir | 166 | -42 / (-26) | -6 / (-4) |
| Shasta Lake | 2,880 | 284 / (10) | -111 / (-4) |
| Whiskeytown Reservoir | 228 | -2 / (-1) | -5 / (-2) |

TAF = thousand acre-feet

**Table 2323. Average End-of-September Carryover Storage (thousand acre-feet) and Percent Differences from Baseline in Rim Reservoirs in the 55 w/WSAs and 55 Scenarios for All Years**

| Reservoir | Baseline TAF | 55 w/WSAs TAF / (%) | 55TAF / (%) |
|---|---|---|---|
| Camanche Reservoir | 243 | -19 / (-8) | -19 / (-8) |
| Camp Far West | 50 | -0 / (-0) | 0 / (1) |
| Folsom Lake | 606 | -18 / (-3) | 15 / (3) |
| Lake Berryessa | 969 | -43 / (-4) | -20 / (-2) |
| New Bullards Bar Reservoir | 597 | -19 / (-3) | 5 / (1) |
| New Hogan Reservoir | 99 | 3 / (3) | 14 / (14) |
| Oroville Reservoir | 2,057 | -151 / (-7) | -260 / (-13) |
| Pardee Reservoir | 188 | -9 / (-5) | 1 / (1) |
| Shasta Lake | 2,871 | 11 / (0) | -123 / (-4) |
| Whiskeytown Reservoir | 234 | 0 / (0) | 0 / (0) |

TAF = thousand acre-feet

**Table 2424. Average End-of-September Carryover Storage (thousand acre-feet) and Percent Differences from Baseline in Rim Reservoirs in the 55 w/WSAs and 55 Scenarios for Critical Years**

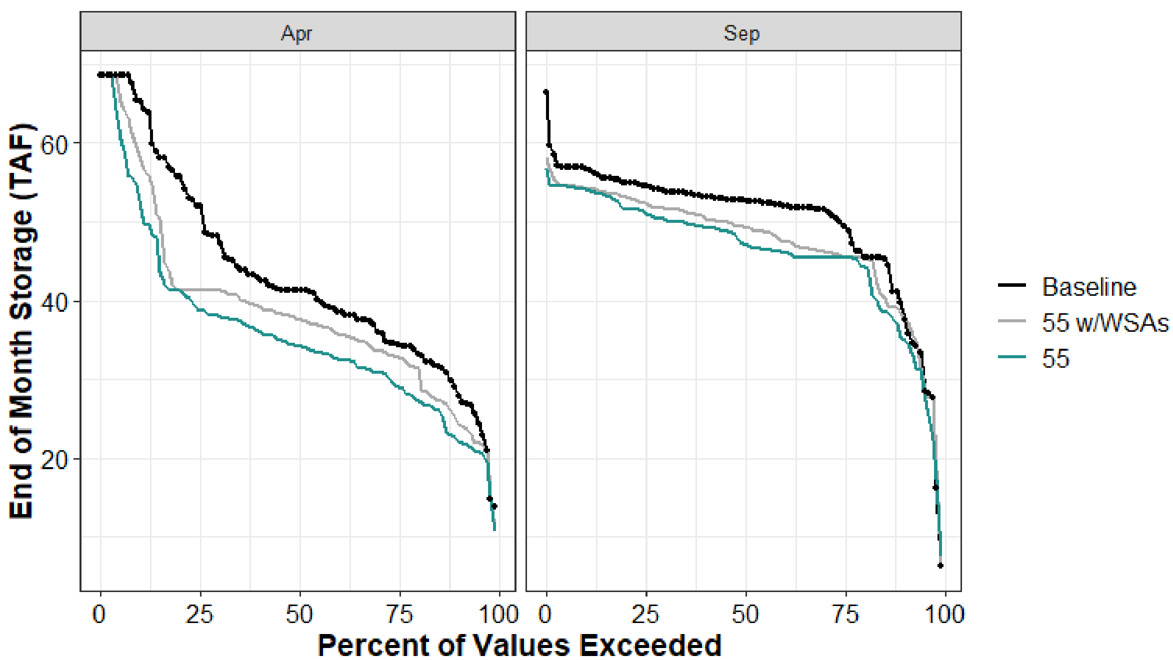
| Reservoir | Baseline TAF | 55 w/WSAs TAF / (%) | 55 TAF / (%) |
|---|---|---|---|
| Camanche Reservoir | 120 | 15 / (12) | 22 / (18) |
| Camp Far West | 35 | 1 / (4) | -1 / (-2) |
| Folsom Lake | 369 | 17 / (5) | -13 / (-3) |
| Lake Berryessa | 610 | 28 / (5) | 151 / (25) |
| New Bullards Bar Reservoir | 463 | -44 / (-9) | -80 / (-17) |
| New Hogan Reservoir | 51 | 20 / (39) | 18 / (36) |
| Oroville Reservoir | 962 | 256 / (27) | -27 / (-3) |
| Pardee Reservoir | 181 | -39 / (-22) | 8 / (5) |
| Shasta Lake | 1,520 | 732 / (48) | 413 / (27) |
| Whiskeytown Reservoir | 234 | 0 / (0) | 0 / (0) |

TAF = thousand acre-feet

## Upper Watershed Reservoirs

Most of the upper watershed reservoirs in the Sacramento River watershed and Delta eastside tributaries regions show no significant change in storage under the 55 w/WSAs scenario, however, similar to the 55 scenario, 12 of the 43 upper watershed reservoirs have potential to see large changes in operation, particularly facilities that include interbasin diversions that move water from one watershed to another.

DWR reservoirs such as Antelope Reservoir, Lake Davis, and Frenchman Reservoir, with a combined maximum storage of about 162 TAF, may be required to bypass inflow or release from storage to meet the new flow requirements, resulting in lower reservoir levels. Increased inflow requirements into Pardee Reservoir could result in lower storages in Salt Springs and Lower Bear River Reservoirs because more water would be required to bypass the reservoirs in spring. Reduced transfers to the Bear River would lower storage levels in Bowman, Lake Fordyce, Jackson Meadows, Rollins, and Lake Spaulding Reservoirs. End-of-September storage for Bowman Reservoir is shown below to illustrate the pattern observed in the modeling of these reservoirs. As shown below, the 55 w/WSAs shows lower end of April and end of September carryover storage than baseline but more than the 55 scenario. Again, the modeling scenarios represent only one possible operation of these systems. The cold water habitat requirements under the regulatory pathway described in the revised proposed Plan amendments include various flexibilities that could reduce the drawdown effects reflected in the modeling scenarios.




Changes in end-of-April and end-of-September carryover storage for Bowman Reservoir represent the typical storage patterns in the upper Yuba River watershed associated with interbasin diversions.
TAF = thousand acre-feet

**Figure 30. Bowman Reservoir End-of-April and End-of-September Carryover Storage under Baseline, 55 w/WSAs, and 55**

## Total Carryover Storage by Tributary Watershed

Because of the inherent flexibility built into the revised proposed Plan amendments for implementation of cold water habitat and flow requirements and given that specific water rights allocations are not necessarily represented with precision in the modeling of flow scenarios, how the flow requirements are met may vary from the specific scenarios modeled. It is informative to examine total watershed storage, as summarized in the tables below. Most watersheds show a decrease in average carryover storage in the 55 w/WSAs scenario relative to baseline. Total watershed carryover storage during critical years increases in most of the watersheds except Cache Creek, Mokelumne River, Stony Creek, and Yuba River watersheds. Generally, results under the 55 w/WSAs scenario are similar to those under the 55 scenario.

**Table 2525. Average End-of-September Watershed Total Storage for Baseline (thousand acre-feet) and Percent Difference from Baseline for the 55 w/WSAs and 55 Scenarios**

| Watershed | Baseline TAF | 55 w/WSAs (%) | 55 (%) |
|---|---|---|---|
| American | 1,104 | -2 | 1 |
| Bear | 114 | 0 | 0 |
| Cache | 987 | -2 | -3 |
| Calaveras | 99 | 3 | 14 |
| Clear | 234 | 0 | 0 |
| Cosumnes [a] | 33 | 0 | 0 |
| Feather | 3,244 | -5 | -8 |
| Mokelumne | 641 | -5 | -5 |
| Putah | 969 | -4 | -2 |
| Sacramento [b] | 2,893 | 0 | -4 |
| Stony | 133 | -18 | -25 |
| Yuba | 866 | -2 | 0 |

[a] The only reservoir represented in SacWAM in the Cosumnes watershed is Sly Park Reservoir, which does not show any change to operations in the 55 w/WSAs scenario.
[b] Sacramento River watershed total storage in this context represents Shasta Lake and Keswick Reservoir storage, excluding storage in all other watersheds listed in the table.

**Table 2626. Average Critical Year End-of-September Watershed Total Storage for Baseline (thousand acre-feet) and Percent Difference from Baseline for the 55 w/WSAs and 55 Scenarios**

| Watershed | Baseline TAF | 55 w/WSAs (%) | 55 (%) |
|---|---|---|---|
| American | 837 | 2 | -3 |
| Bear | 91 | 3 | 0 |
| Cache | 836 | -1 | -1 |
| Calaveras | 51 | 39 | 36 |
| Clear | 234 | 0 | 0 |
| Cosumnes [a] | 30 | 0 | 0 |
| Feather | 1,986 | 13 | -1 |
| Mokelumne | 458 | -7 | -1 |
| Putah | 610 | 5 | 25 |
| Sacramento [b] | 1,542 | 47 | 27 |
| Stony | 75 | -38 | -49 |

| Watershed | Baseline TAF | 55 w/WSAs (%) | 55 (%) |
|---|---|---|---|
| Yuba | 689 | -6 | -12 |

[a] The only reservoir represented in SacWAM in the Cosumnes watershed is Sly Park Reservoir, which does not show any change to operations in the 55 w/WSAs scenario.
[b] Sacramento River watershed total storage in this context represents Shasta Lake and Keswick Reservoir storage, excluding storage in all other watersheds listed in the table.

### 1.4.3 Changes in Surface Water Supply

This section presents a summary of findings related to the SacWAM modeling results for changes in surface water supply by region. Only a portion of the total water supply to each region may be affected by the revised proposed Plan amendments. This portion is termed Sacramento/Delta supply or Sacramento/Delta water. Water supply is summarized by where the water is ultimately supplied, not by where the water may be diverted. For example, water is diverted from the Mokelumne River for use in the Bay Area region; this water is included in the Bay Area water supply discussion, not in the Delta eastside tributaries region discussion. In some regions, the Sacramento/Delta supply makes up only a very small percentage of the total water supply and therefore a minimal effect on the total water supply would be expected to that region.

#### 1.4.3.1 Total Water Supply

Water supply goes to a variety of uses such as agriculture, urban (municipal and industrial), and wildlife refuges. The sources of water supplies range from local surface water supplies, groundwater, and water imported from across the state. The total regional water supply is estimated using historical water delivery data, and the portion of the surface water supply that may be affected by the revised draft Plan is estimated by SacWAM. As described in Section 6.2 of the 2023 Draft Staff Report, *SacWAM Model Assumptions*, SacWAM simulations assumed no change in groundwater pumping for each of the scenarios. Therefore, the Sacramento/Delta supply results presented here include only surface water.

**Table 2727. Annual Average Water Supplied to Each Region in the Study Area (thousand acre-feet per year)**

| | | Sacramento River Watershed | Delta Eastside Tributaries | Delta | San Francisco Bay Area | Central Coast | San Joaquin Valley | Southern California |
|---|---|---|---|---|---|---|---|---|
| Historical Water Deliveries Data | Total | 8,050 | 986 | 1,368 | 1,251 | 1,334 | 18,437 | 9,449 |
| | Agriculture | 6,773 | 824 | 1,185 | 137 | 1,055 | 16,803 | 4,863 |
| | Municipal | 826 | 154 | 136 | 1,089 | 279 | 1,053 | 4,518 |
| | Wetland | 451 | 8 | 48 | 26 | 0 | 581 | 68 |
| Baseline | Sac/Delta | 5,367 | 206 | 1,153 | 696 | 87 | 2,845 | 1,688 |
| | Agriculture | 4,680 | 125 | 1,135 | 27 | 37 | 2,445 | 15 |
| | Municipal | 485 | 81 | 18 | 669 | 49 | 100 | 1,673 |
| | Refuge | 201 | 0 | 0 | 0 | 0 | 300 | 0 |
| 55 w/WSASs | Sac/Delta | 5,132 | 181 | 1,154 | 644 | 82 | 2,767 | 1,409 |
| | Agriculture | 4,471 | 110 | 1,135 | 24 | 39 | 2,382 | 12 |
| | Municipal | 461 | 71 | 18 | 620 | 43 | 87 | 1,396 |
| | Refuge | 200 | 0 | 0 | 0 | 0 | 298 | 0 |
| 55 | Sac/Delta | 4,793 | 161 | 1,147 | 517 | 68 | 2,483 | 1,235 |
| | Agriculture | 4,159 | 95 | 1,130 | 15 | 31 | 2,106 | 11 |
| | Municipal | 434 | 65 | 17 | 502 | 38 | 77 | 1,224 |
| | Refuge | 200 | 0 | 0 | 0 | 0 | 300 | 0 |

The historical water deliveries data values represent an estimate of the total annual supplies to each region, and the values presented for the flow scenarios represent the Sacramento/Delta surface water portion as modeled in SacWAM. When comparing historical water deliveries data estimates to SacWAM results, the reader should keep in mind that they are not meant to be an exact comparison because of differences in methods and time periods. However, these comparisons are presented to give a general idea of the magnitudes of changes relative to the total supply. More information on the differences in the methods can be found in Section 2.8, *Existing Water Supply.*

#### 1.4.3.2 Sacramento/Delta Water in the Study Area

Sacramento/Delta water is defined here as the portion of the surface water supply to regions that originates in or is diverted from waterbodies in the Sacramento River watershed, Delta eastside tributaries, and Delta regions, and may be affected by the provisions in the updates to the Bay-Delta Plan. Generally, the wetter the conditions, the higher the water supply due largely to more water being available in wetter years and less being available in drier years.

In the 55 w/WSAs scenario, average reductions in Sacramento/Delta water supply compared to baseline are greatest in critical (1,220 TAF), dry (1,087 TAF), and below normal (610 TAF) water-year types. Average annual volumetric reductions are larger in wet years (290 TAF) than above normal years (244 TAF), representing an average reduction by water year type of about 2 percent. Average water supply reductions across all water year types are 673 TAF, or about 6 percent. In the 55 scenario, average water supply reductions across all water year types are 1,638 TAF, or about 14 percent.

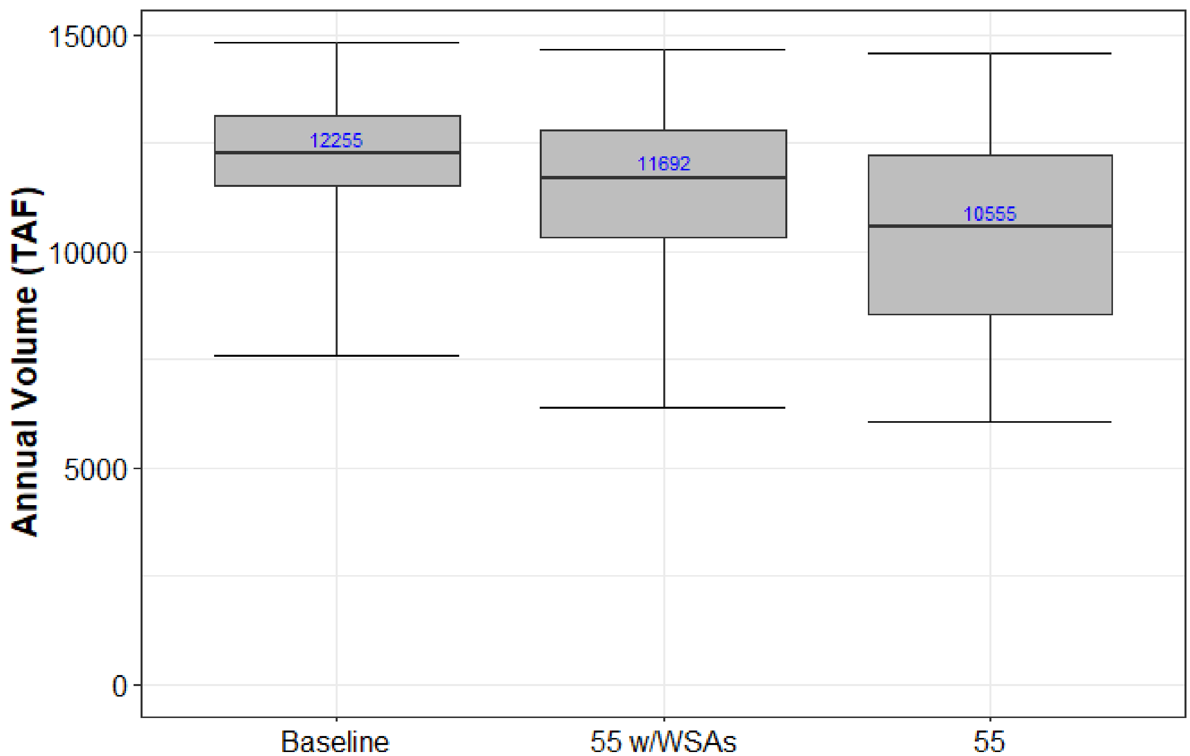



**Figure 31. Annual Sacramento/Delta Supply**

**Table 2828. Annual Water Year Type Average Annual Sacramento/Delta Supply for Baseline and Change from Baseline (thousand acre-feet)**

| Water Year Type | Baseline | 55 w/WSAs | 55 |
|---|---|---|---|
| C | 9,441 | -1,220 | -2,236 |
| D | 11,594 | -1,087 | -2,473 |
| BN | 12,189 | -610 | -1,923 |
| AN | 12,411 | -244 | -1,323 |
| W | 13,514 | -290 | -652 |
| All | 12,041 | -673 | -1,638 |

Water year types are based on the historical Sacramento Valley 40-30-30 Hydrologic Classification.

### 1.4.3.3 Sacramento/Delta Supply to the Sacramento River Watershed, Delta, and Delta Eastside Tributaries Regions (Sacramento/Delta watershed)

#### Sacramento/Delta Supply to the Sacramento River Watershed

Sacramento/Delta water supply in the Sacramento River watershed includes surface water delivered to consumptive uses in the upper watersheds and surface water delivered to agriculture, refuge, and urban uses throughout the Sacramento Valley.

The tables below include a summary of SacWAM results for total supply to the Sacramento River Watershed region. The 55 w/WSAs scenario, on average, shows a reduction in total annual surface supply of 234 TAF, or about 4 percent, across water year types. Reductions are slightly higher in wet years than above normal years (106 TAF, or about 2 percent, versus 67 TAF, or about 1 percent). Modeled reductions in critical, dry, and below normal years are estimated at 778 TAF, 207 TAF, and 116 TAF, or about a 16 percent, 4 percent, and 2 percent annual reduction over their water-year-type averages, respectively.

Agricultural uses receive by far the most water in the Sacramento River watershed, receiving about 87 percent of the total Sacramento/Delta supply consistently across scenarios. In the 55 w/WSAs scenario, the reduction in water supply for agriculture is 210 TAF, or about 4 percent, across all years. Following the pattern already observed, reductions are slightly higher in wet years (96 TAF or about 2 percent vs. above normal years (55 TAF or about 1 percent). Reductions for critical, dry, and below normal years are 713 TAF, 174 TAF, and 103 TAF or about 17 percent, 4 percent, and 2 percent per year on average, respectively.

Municipal and industrial uses on average receive 485 TAF, or about 9 percent, of total Sacramento/Delta supply in the Sacramento River watershed. Under the 55 w/WSAs scenario, reductions for this use type range from 64 TAF in critical years to 8 TAF in wet years with an average reduction across all year-types of 24 TAF, or about 5 percent, per year.

Sacramento/Delta water supplies to refuges in the Sacramento River watershed are relatively small and are unchanged compared to baseline under the 55 w/WSAs scenario in critical and below normal years, decrease by 1 TAF in dry years, and decrease by 2 TAF in above normal and wet years.

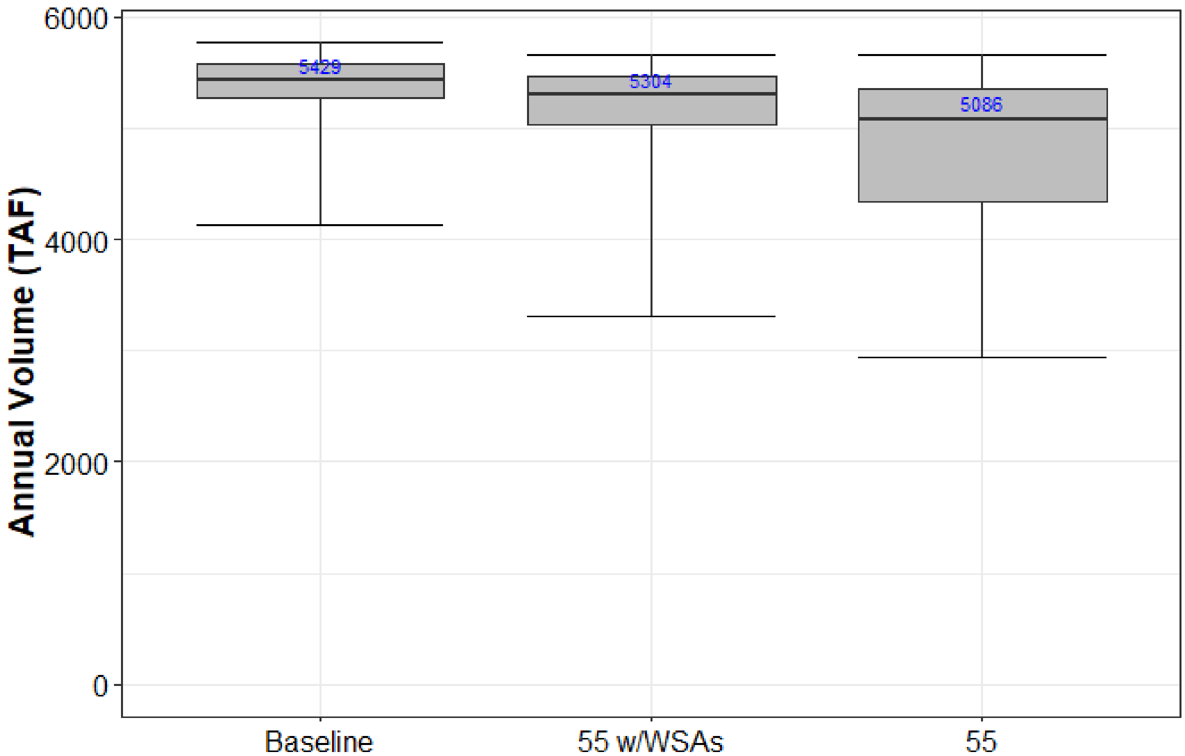



**Figure 32. Annual Total Sacramento/Delta Supply to the Sacramento River Watershed**

**Table 2929. Annual Total Sacramento/Delta Supply to the Sacramento River Watershed Water Year Type Average: Change from Baseline (thousand acre-feet per year)**

| Water Year Type | Baseline | 55 w/WSAs | 55 |
|---|---|---|---|
| C | 4,913 | -778 | -1,368 |
| D | 5,370 | -207 | -854 |
| BN | 5,474 | -116 | -497 |
| AN | 5,469 | -67 | -212 |
| W | 5,497 | -106 | -139 |
| All | 5,367 | -234 | -574 |

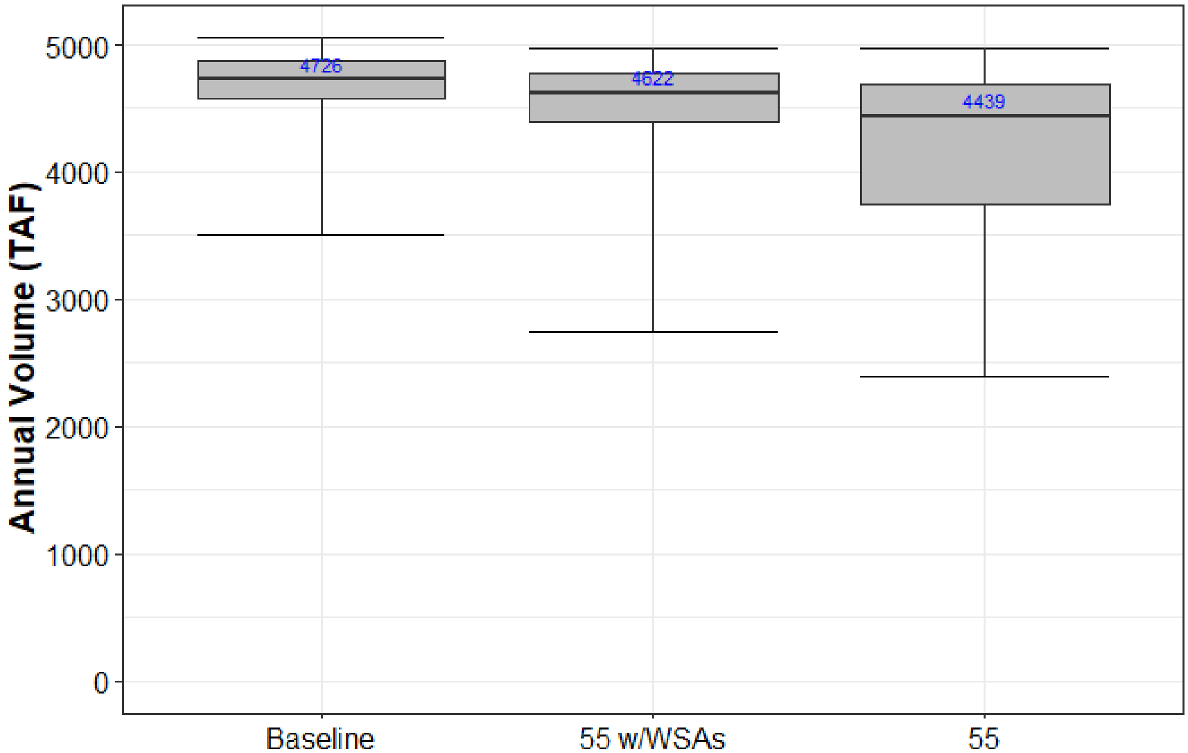



**Figure 33. Annual Sacramento/Delta Supply to Agriculture in the Sacramento River Watershed**

**Table 3030. Annual Sacramento/Delta Supply to Agriculture in the Sacramento River Watershed Water Year Type Average: Change from Baseline (thousand acre-feet per year)**

| Water Year Type | Baseline | 55 w/WSAs | 55 |
|---|---|---|---|
| C | 4,255 | -713 | -1,277 |
| D | 4,690 | -174 | -773 |
| BN | 4,784 | -103 | -442 |
| AN | 4,776 | -55 | -178 |
| W | 4,796 | -96 | -121 |
| All | 4,680 | -210 | -521 |

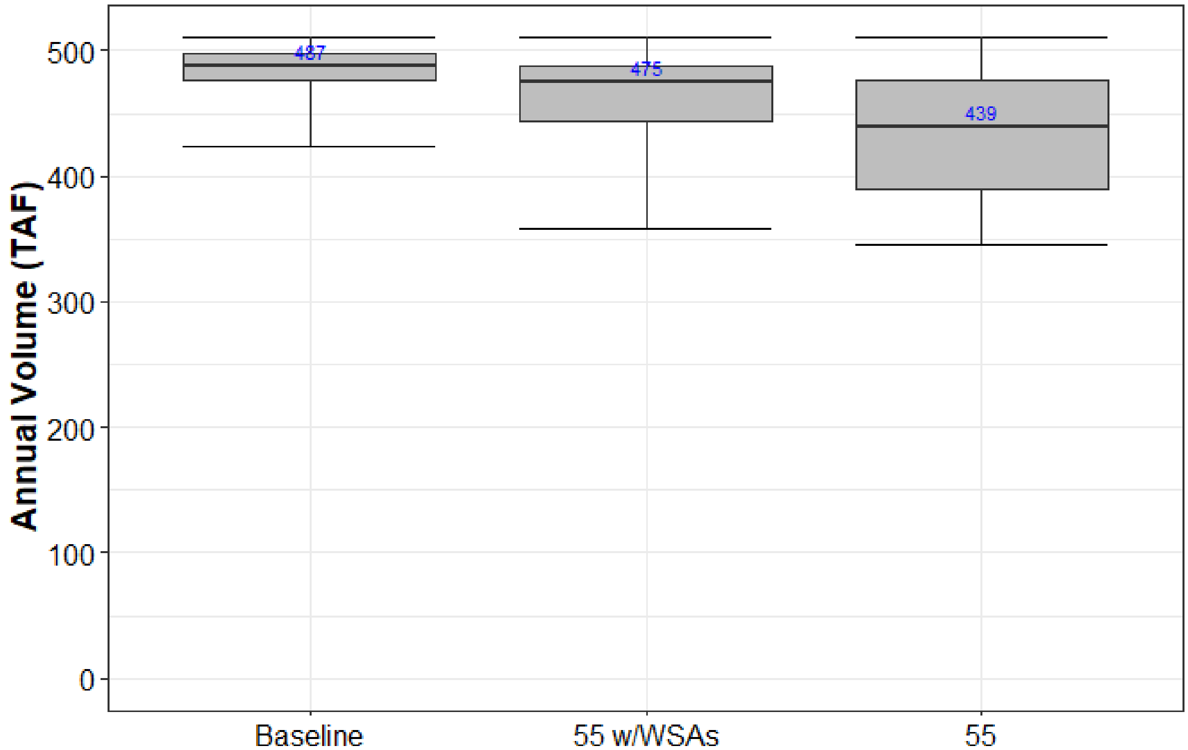



**Figure 34. Annual Sacramento/Delta Supply to Municipal and Industrial Use in the Sacramento River Watershed**

**Table 3131. Annual Sacramento/Delta Supply to Municipal and Industrial Use in the Sacramento River Watershed Water Year Type Average: Change from Baseline (thousand acre-feet per year)**

| Water Year Type | Baseline | 55 w/WSAs | 55 |
|---|---|---|---|
| C | 458 | -64 | -88 |
| D | 477 | -32 | -79 |
| BN | 487 | -13 | -55 |
| AN | 493 | -11 | -31 |
| W | 500 | -8 | -16 |
| All | 485 | -24 | -51 |

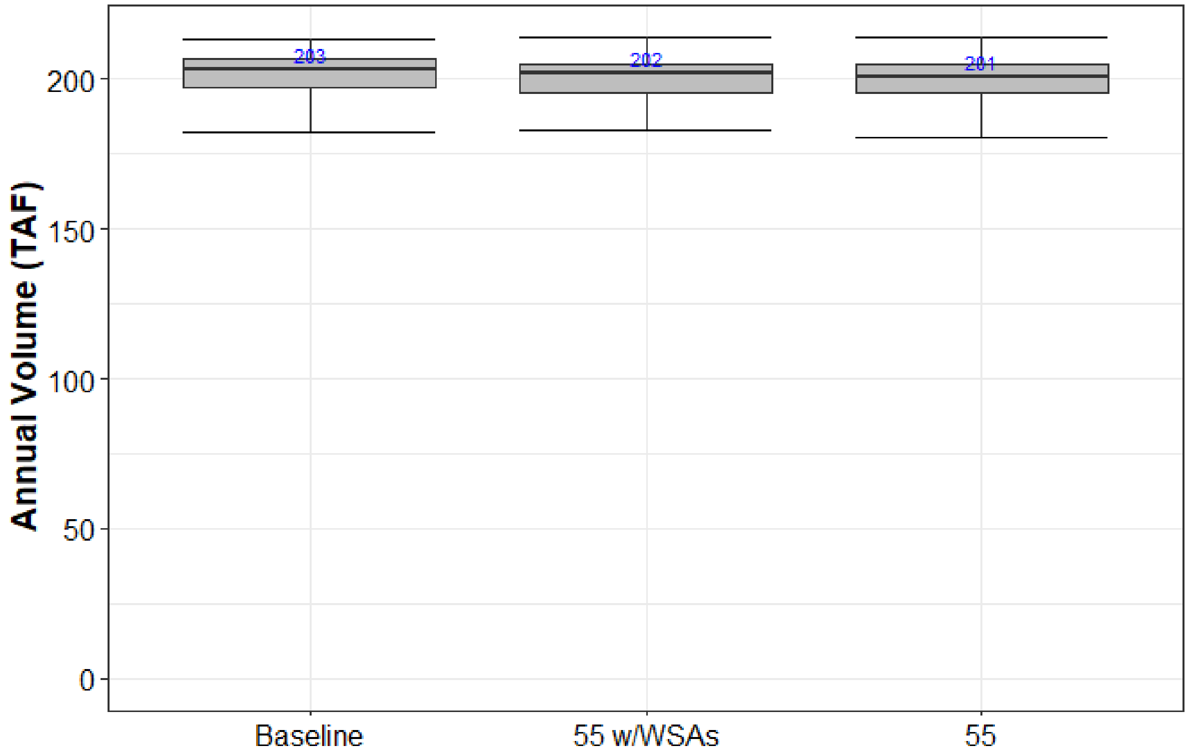



**Figure 35. Annual Sacramento/Delta Supply to Wildlife Refuges in the Sacramento River Watershed**

**Table 3232. Annual Sacramento/Delta Supply to Wildlife Refuges in the Sacramento River Watershed Water Year Type Average: Change from Baseline (thousand acre-feet per year)**

| Water Year Type | Baseline | 55 w/WSAs | 55 |
|---|---|---|---|
| C | 200 | 0 | -3 |
| D | 203 | -1 | -2 |
| BN | 203 | 0 | 0 |
| AN | 200 | -2 | -2 |
| W | 201 | -2 | -2 |
| All | 201 | -1 | -2 |

## Sacramento/Delta Supply to the Delta Eastside Tributaries

Modeled Sacramento/Delta supplies to all uses in the Delta Eastside Tributaries region average 206 TAF annually with a median annual value of 213 TAF under baseline conditions. Reductions from baseline under the 55 w/WSAs scenario average 25 TAF or 12 percent over all water year types. Average annual reductions from baseline generally increase across drier water year types ranging from an estimated reduction of 17 TAF (about 7 percent) in wet years to 35 TAF (22 percent) in critical years. In the 55 scenario, the reductions in supply range from an average of 35 TAF/yr in wet years to 55 TAF/yr in critical years. The 55 w/WSAs scenario results show smaller reductions in Sacramento/Delta surface water supply compared to baseline than the 55 scenario for all water year types.

Table 34 presents baseline Sacramento/Delta supply to agriculture in the Delta Eastside Tributaries region and change from baseline for the 55 w/WSAs and 55 the scenarios. Table 35 presents identical information for municipal and industrial use. On average, under the 55 w/WSA scenario, agricultural use of surface water supply would decrease by 15 TAF or 12 percent and municipal and industrial use by 10 TAF or about 12 percent.

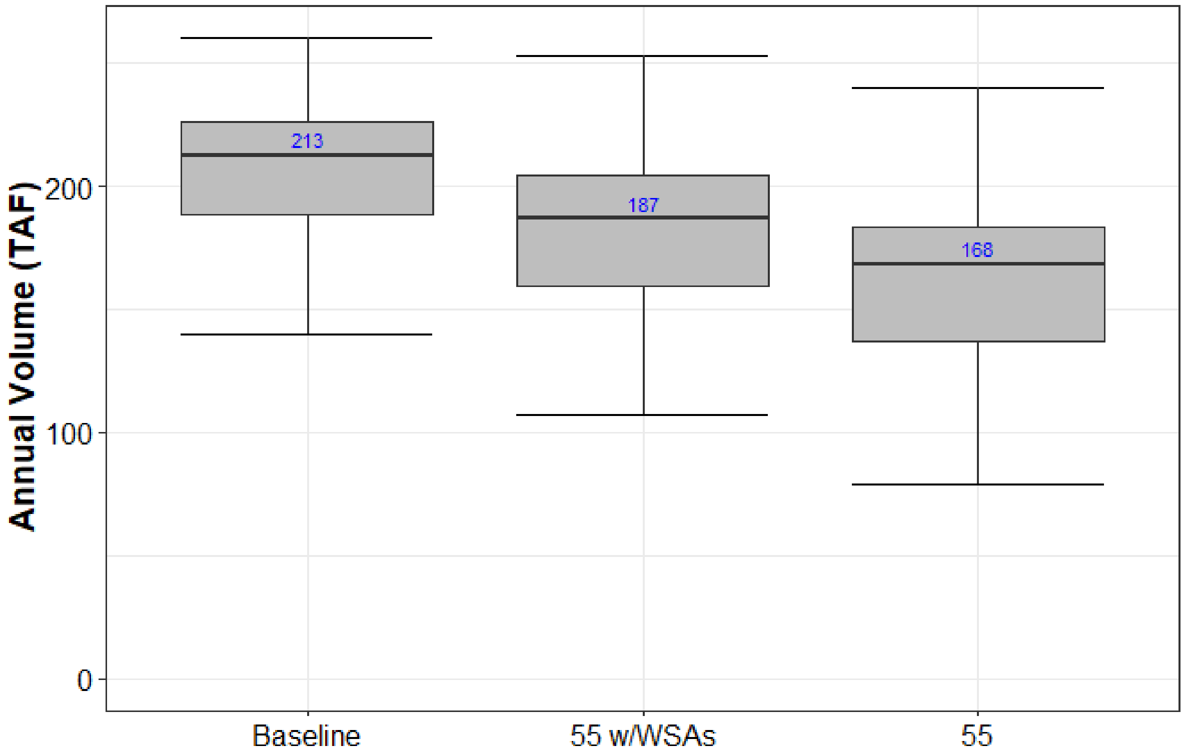



**Figure 36. Annual Sacramento/Delta Supply to the Delta Eastside Tributaries Region**

**Table 3333. Annual Sacramento/Delta Supply to the Delta Eastside Tributaries Region Water Year Type Average: Change from Baseline (thousand acre-feet)**

| Water Year Type | Baseline | 55 w/WSAs | 55 |
|---|---|---|---|
| C | 158 | -35 | -55 |
| D | 193 | -27 | -46 |
| BN | 211 | -28 | -50 |
| AN | 219 | -24 | -46 |
| W | 232 | -17 | -35 |
| All | 206 | -25 | -45 |

**Table 3434. Annual Sacramento/Delta Supply to Agriculture in the Delta Eastside Tributaries Region Water Year Type Average: Change from Baseline (thousand acre-feet per year)**

| Water Year Type | Baseline | 55 w/WSAs | 55 |
|---|---|---|---|
| C | 78 | -9 | -25 |
| D | 110 | -11 | -24 |
| BN | 130 | -22 | -33 |
| AN | 140 | -21 | -38 |
| W | 153 | -15 | -31 |
| All | 125 | -15 | -30 |

**Table 3535. Annual Sacramento/Delta Supply to Municipal and Industrial Use in the Delta Eastside Tributaries Region Water Year Type Average: Change from Baseline (thousand acre-feet per year)**

| Water Year Type | Baseline | 55 w/WSAs | 55 |
|---|---|---|---|
| C | 80 | -26 | -30 |
| D | 83 | -16 | -22 |
| BN | 81 | -6 | -16 |
| AN | 79 | -3 | -8 |
| W | 79 | -2 | -4 |
| All | 81 | -10 | -15 |

## Sacramento/Delta Supply to the Delta

The Sacramento/Delta water delivered to the Delta region does not significantly change in the 55 w/WSAs or 55 scenarios compared to baseline. As explained in Chapter 5 of the 2023 Draft Staff Report, *Proposed Changes to the Bay-Delta Plan for the Sacramento/Delta*, reduced Delta diversions may occur as a result of the revised proposed Plan amendments, but significant reductions are not modeled explicitly in SacWAM. In the baseline scenario, Sacramento/Delta water supply is higher in critical years (1,197 TAF/yr) than in wet years (1,108 TAF/yr). The 55 w/WSAs scenario shows less than a 1 percent change from baseline. The results for the 55 scenario also show a 1 percent or less reduction in Sacramento/Delta supply when compared with the total supply.

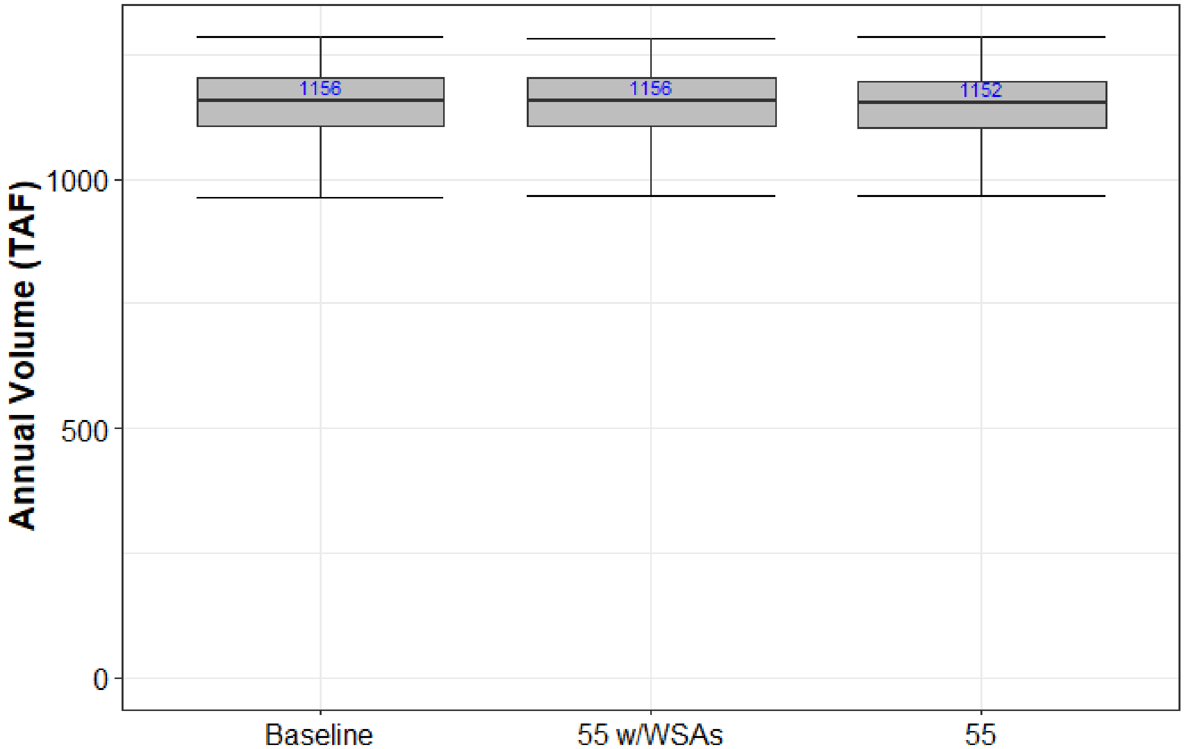



**Figure 37. Annual Sacramento/Delta Supply to the Delta Region**

**Table 3636. Annual Sacramento/Delta Supply to the Delta Region Water Year Type Average: Change from Baseline (thousand acre-feet per year)**

| Water Year Type | Baseline | 55 w/WSAs | 55 |
|---|---|---|---|
| C | 1,197 | -6 | -9 |
| D | 1,184 | 0 | -13 |
| BN | 1,170 | 4 | -9 |
| AN | 1,125 | 5 | -3 |
| W | 1,108 | 2 | 0 |
| All | 1,153 | 1 | -6 |

Table presents baseline Sacramento/Delta supply to Delta region agriculture and change from baseline for the 55 w/WSAs and 55 the scenarios. Table presents identical information for municipal and industrial use. Supply to delta agriculture and municipal and industrial uses would remain unchanged on average in the 55 w/WSAs scenario. In the 55 scenario agricultural supplies decrease by 5 TAF/yr and supplies for municipal and industrial use decrease by 1 TAF.

**Table 3737. Annual Sacramento/Delta Supply to Agriculture in the Delta Region Water Year Type Average: Change from Baseline (thousand acre-feet per year)**

| Water Year Type | Baseline | 55 w/WSAs | 55 |
|---|---|---|---|
| C | 1,188 | -4 | -7 |
| D | 1,169 | 0 | -10 |
| BN | 1,153 | 2 | -8 |
| AN | 1,104 | 4 | -3 |
| W | 1,083 | 1 | -1 |
| All | 1,135 | 0 | -5 |

**Table 3838. Annual Sacramento/Delta Supply to Municipal and Industrial Use in the Delta Region Water Year Type Average: Change from Baseline (thousand acre-feet per year)**

| Water Year Type | Baseline | 55 w/WSAs | 55 |
|---|---|---|---|
| C | 9 | -2 | -2 |
| D | 15 | 0 | -3 |
| BN | 18 | 2 | -2 |
| AN | 21 | 1 | 0 |
| W | 25 | 1 | 0 |
| All | 18 | 0 | -1 |

#### 1.4.3.4 Sacramento/Delta Supply to the San Joaquin Valley

Modeled Sacramento/Delta supplies to all uses in the San Joaquin Valley region average 2,845 TAF annually with a median annual value of 2,867 TAF under baseline conditions. Reductions from baseline under the 55 w/WSAs scenario average 77 TAF/yr (3 percent) over all water year types. Average annual reductions from baseline do not follow an intuitive trend owing to various SWP and CVP operations and contracts. See Chapter 6 of the 2023 Draft Staff Report, *Changes to Hydrology and Water Supply,* for additional discussion. Total surface water supply increases over baseline in wet and above normal years (30 TAF/yr and 78 TAF/yr) (due in large part to the difference between I:E assumptions between baseline and 55 w/WSAs)and decreases by 35 TAF/yr (1 percent), 226 TAF/yr (9 percent), and 241 TAF/yr (14 percent) on average in below normal, dry, and critical years, respectively. The 55 w/WSAs scenario results show much smaller reductions (and increases) in Sacramento/Delta surface water supply compared to baseline than the 55 scenario for all water year types.

Modeled Sacramento/Delta supplies to agricultural uses in the San Joaquin Valley region average 2,445 TAF annually with a median annual value of 2,456 TAF under baseline conditions. Agriculture is the dominant use type in this region and drives the pattern described above. Agricultural supply increases over baseline in wet and above normal years (35 TAF/yr and 88 TAF/yr) (due in large part to the difference between I:E assumptions between baseline and 55 w/WSAs) and decreases by 18 TAF/yr, 198 TAF/yr, and 229 TAF/yr on average in below normal, dry, and critical years respectively. The 55 w/WSAs scenario results show much smaller reductions (and increases) in Sacramento/Delta agricultural surface water supply compared to baseline than the 55 scenario for all water year types.

Table 41 presents baseline Sacramento/Delta supply to municipal and industrial uses in the San Joaquin Valley region and change from baseline for the 55 w/WSAs and 55 the scenarios. Table 42 presents identical information for refuge use. Under the 55 w/WSAs scenario, annual average municipal and industrial surface water supply would decrease by 13 TAF, or 13 percent, and refuge use would remain unchanged from a baseline average of 300 TAF/yr.

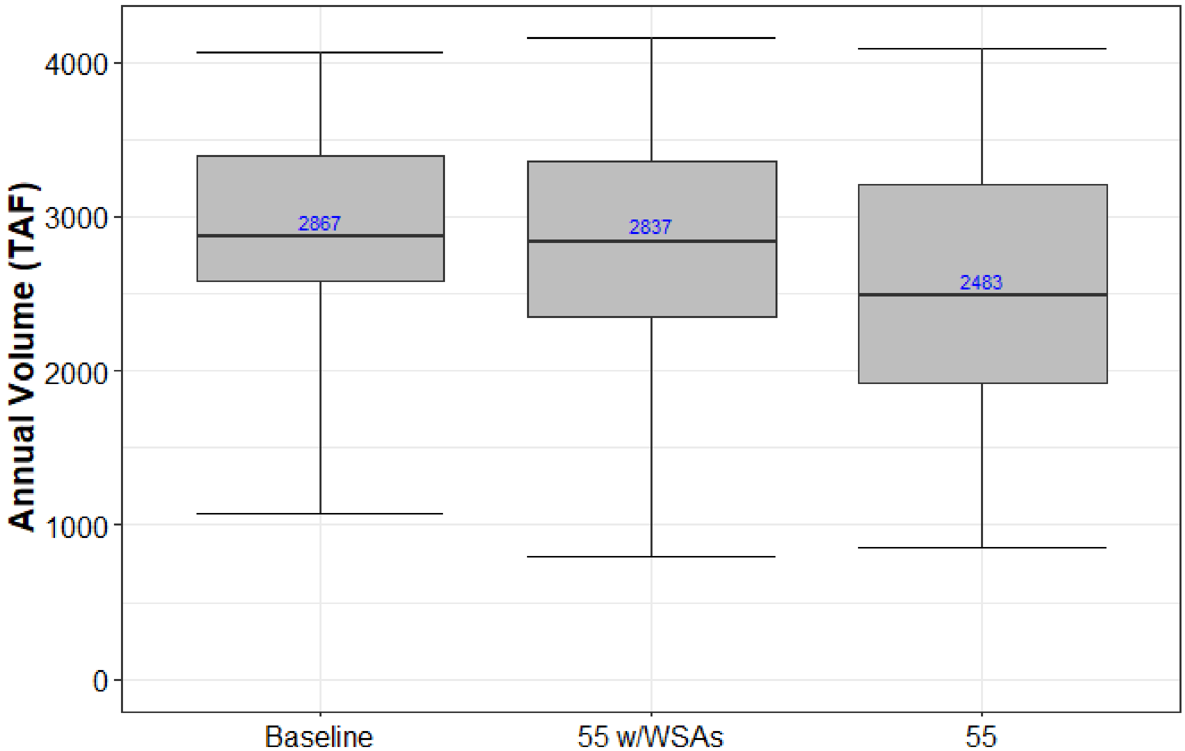



**Figure 38. Annual Sacramento/Delta Supply to the San Joaquin Valley Region**

**Table 3939. Annual Sacramento/Delta Supply to the San Joaquin Valley Region Water Year Type Average: Change from Baseline (thousand acre-feet)**

| Water Year Type | Baseline | 55 w/WSAs | 55 |
|---|---|---|---|
| C | 1,762 | -241 | -397 |
| D | 2,640 | -226 | -636 |
| BN | 2,821 | -35 | -482 |
| AN | 2,960 | 78 | -302 |
| W | 3,541 | 30 | -90 |
| All | 2,845 | -77 | -362 |

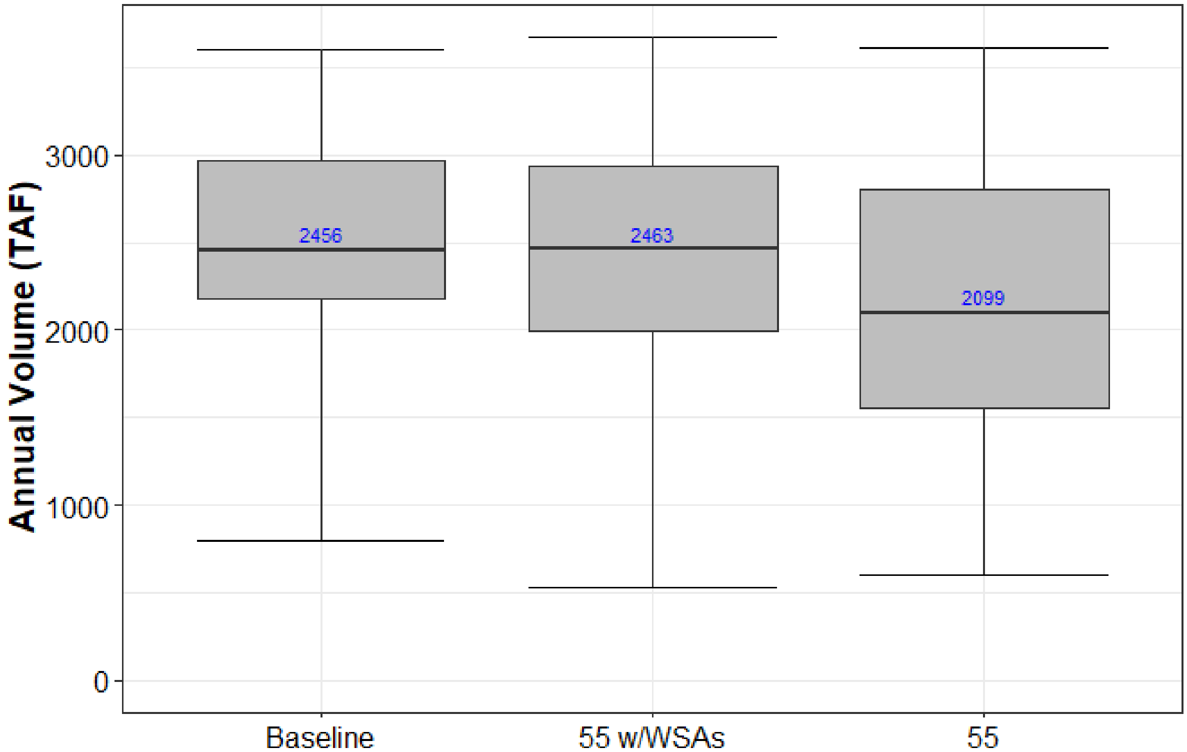



**Figure 39. Sacramento/Delta Supply to Agriculture in the San Joaquin Valley Region**

**Table 4040. Sacramento/Delta Supply to Agriculture in the San Joaquin Valley Region Water Year Type Average: Change from Baseline (thousand acre-feet)**

| Water Year Type | Baseline | 55 w/WSAs | 55 |
|---|---|---|---|
| C | 1,443 | -229 | -386 |
| D | 2,249 | -198 | -597 |
| BN | 2,414 | -18 | -449 |
| AN | 2,550 | 88 | -274 |
| W | 3,101 | 35 | -81 |
| All | 2,445 | -63 | -339 |

**Table 4141. Sacramento/Delta Supply to Urban Use in the San Joaquin Valley Region Water Year Type Average Change from Baseline (thousand acre-feet)**

| Water Year Type | Baseline | 55 w/WSAs | 55 |
|---|---|---|---|
| C | 48 | -5 | -10 |
| D | 89 | -28 | -40 |
| BN | 102 | -17 | -34 |
| AN | 108 | -11 | -28 |
| W | 132 | -4 | -9 |
| All | 100 | -13 | -23 |

**Table 4242. Sacramento/Delta Supply to Wildlife Refuges in the San Joaquin Valley Region Water Year Type Average: Change from Baseline (thousand acre-feet)**

| Water Year Type | Baseline | 55 w/WSAs | 55 |
|---|---|---|---|
| C | 271 | -7 | 0 |
| D | 303 | 0 | 1 |
| BN | 305 | 0 | 0 |
| AN | 302 | 0 | 0 |
| W | 308 | 0 | 0 |
| All | 300 | -1 | 0 |

## 1.4.3.5 Sacramento/Delta Supply to the San Francisco Bay Area, Central Coast, and Southern California

### Sacramento/Delta Supply to the San Francisco Bay Area

Modeled Sacramento/Delta supplies to all uses in the San Francisco Bay Area region average 696 TAF annually with a median annual value of 710 TAF under baseline conditions. Reductions from baseline under the 55 w/WSAs scenario average 53 TAF or 8 percent over all water year types. Average annual reductions from baseline generally increase across drier water year types ranging from an estimated reduction of 20 TAF (about 3 percent) in wet years to 95 TAF (14 percent) in dry years, but 69 TAF or 11 percent in critical years. The 55 scenario shows the same pattern with reductions in supply ranging from 101 TAF/yr in wet years (13 percent) to 240 TAF/yr in dry years (35 percent) and 207 in critical years (also 35 percent). The 55 w/WSAs scenario results show smaller reductions in Sacramento/Delta surface water supply compared to baseline than the 55 scenario for all water year types.

Table 44 presents baseline Sacramento/Delta supply to agriculture in the San Francisco Bay Area region and change from baseline for the 55 w/WSAs and 55 the scenarios. Table 45 presents identical information for municipal and industrial use. On average, under the 55 w/WSAs scenario, agricultural use of surface water supply would decrease by 3 TAF or 12 percent and municipal and industrial use by 167 TAF or about 25 percent.

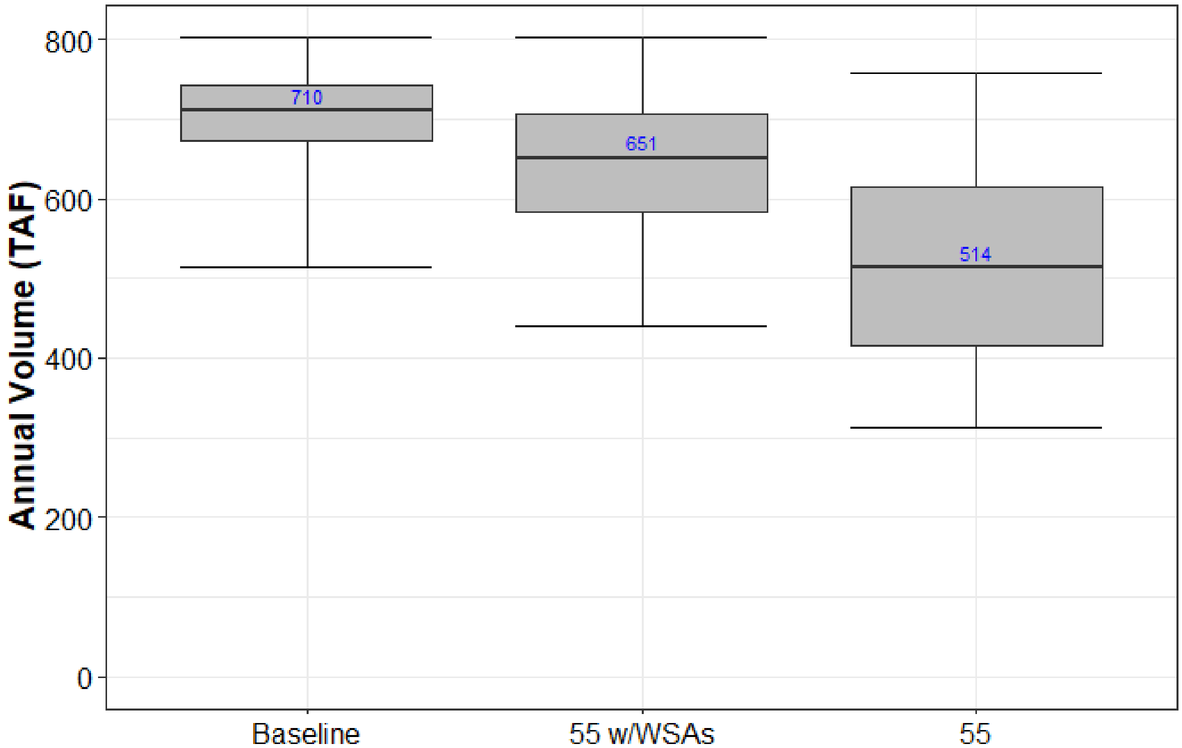



**Figure 40. Annual Sacramento/Delta Supply to the San Francisco Bay Area Region**

**Table 4343. Annual Sacramento/Delta Supply to the San Francisco Bay Area Region Water Year Type Average: Change from Baseline (thousand acre-feet)**

| Water Year Type | Baseline | 55 w/WSAs | 55 |
|---|---|---|---|
| C | 597 | -69 | -207 |
| D | 679 | -95 | -240 |
| BN | 705 | -57 | -217 |
| AN | 707 | -29 | -168 |
| W | 752 | -20 | -101 |
| All | 696 | -53 | -179 |

**Table 4444. Annual Sacramento/Delta Supply to Agriculture in the San Francisco Bay Area Region Water Year Type Average: Change from Baseline (thousand acre-feet per year)**

| Water Year Type | Baseline | 55 w/WSAs | 55 |
|---|---|---|---|
| C | 23 | -3 | -15 |
| D | 27 | -3 | -16 |
| BN | 28 | -5 | -15 |
| AN | 28 | -4 | -13 |
| W | 29 | -2 | -5 |
| All | 27 | -3 | -12 |

**Table 4545. Annual Sacramento/Delta Supply to Municipal and Industrial Use in the San Francisco Bay Area Region Water Year Type Average: Change from Baseline (thousand acre-feet per year)**

| Water Year Type | Baseline | 55 w/WSAs | 55 |
|---|---|---|---|
| C | 574 | -65 | -192 |
| D | 652 | -91 | -224 |
| BN | 677 | -52 | -201 |
| AN | 679 | -26 | -155 |
| W | 723 | -18 | -96 |
| All | 669 | -49 | -167 |

## Sacramento/Delta Supply to the Central Coast

Modeled Sacramento/Delta supplies to all uses in the Central Coast region average 87 TAF annually with a median annual value of 89 TAF under baseline conditions. Reductions from baseline under the 55 w/WSAs scenario average 5 TAF or 6 percent over all water year types. Average annual reductions from baseline generally increase across drier water year types except critical years, ranging from no change to baseline in wet years to 15 TAF (19 percent) in dry years, and 6 TAF (14 percent) in critical years. In the 55 scenario, the reductions in supply range from an average of 7 TAF/yr in wet years to 32 TAF/yr in dry years, and 13 TAF/yr in critical years (31 percent). The 55 w/WSAs scenario results show smaller reductions in Sacramento/Delta surface water supply compared to baseline than the 55 scenario for all water year types.

Table 47 presents baseline Sacramento/Delta supply to agriculture in the Central Coast region and change from baseline for the 55 w/WSAs and 55 the scenarios. Table 48 presents identical information for municipal and industrial use. On average, under the 55 w/WSAs scenario, agricultural use of surface water supply would decrease by 1 TAF or 4 percent and municipal and industrial use by 7 TAF or about 14 percent.

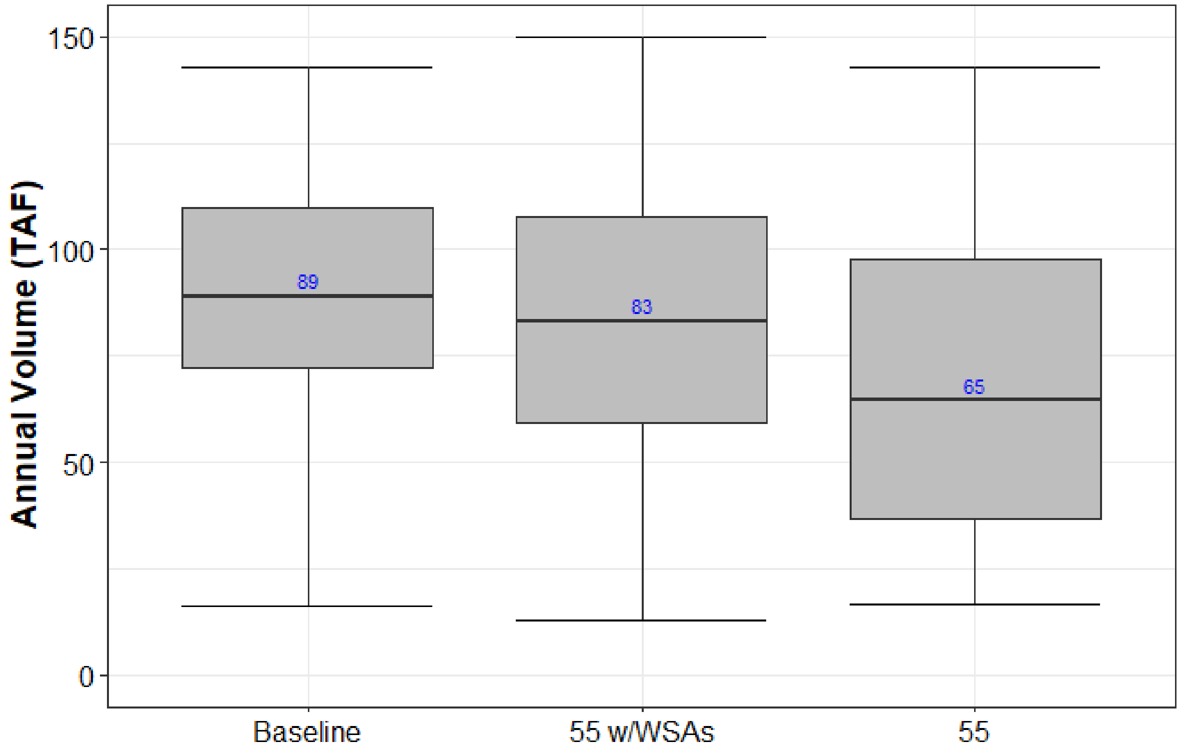



**Figure 41. Annual Sacramento/Delta Supply to the Central Coast Region**

**Table 4646. Annual Sacramento/Delta Supply to the Central Coast Region Water Year Type Average: Change from Baseline (thousand acre-feet)**

| Water Year Type | Baseline | 55 w/WSAs | 55 |
|---|---|---|---|
| C | 42 | -6 | -13 |
| D | 76 | -15 | -32 |
| BN | 86 | -6 | -26 |
| AN | 91 | -1 | -19 |
| W | 118 | 0 | -7 |
| All | 87 | -5 | -18 |

**Table 4747. Annual Sacramento/Delta Supply to Agriculture in the Central Coast Region Water Year Type Average: Change from Baseline (thousand acre-feet per year)**

| Water Year Type | Baseline | 55 w/WSAs | 55 |
|---|---|---|---|
| C | 19 | -4 | -8 |
| D | 33 | 0 | -12 |
| BN | 35 | 3 | -9 |
| AN | 37 | 5 | -5 |
| W | 52 | 3 | -2 |
| All | 37 | 1 | -7 |

**Table 4848. Annual Sacramento/Delta Supply to Municipal and Industrial Use in the Central Coast Region Water Year Type Average: Change from Baseline (thousand acre-feet per year)**

| Water Year Type | Baseline | 55 w/WSAs | 55 |
|---|---|---|---|
| C | 23 | -2 | -5 |
| D | 44 | -15 | -20 |
| BN | 50 | -9 | -17 |
| AN | 54 | -6 | -14 |
| W | 66 | -2 | -5 |
| All | 49 | -7 | -12 |

## Sacramento/Delta Supply to Southern California

Modeled Sacramento/Delta supplies to all uses in the Southern California region average 1,688 TAF annually with a median annual value of 1,786 TAF under baseline conditions. Reductions from baseline under the 55 w/WSAs scenario average 279 TAF, or 1 percent, over all water year types. Average annual reductions from baseline generally increase across drier water year types except for critical years. Reductions range from 179 TAF (8 percent) to 516 TAF (36 percent) but fall to 86 TAF/yr (11 percent) in critical years. In the 55 scenario, the reductions in supply range from an average of 281 TAF/yr in wet years to 653 TAF/yr in dry years, then fall to 187 TAF/yr in critical years. The 55 w/WSAs scenario results show smaller reductions in Sacramento/Delta surface water supply compared to baseline than the 55 scenario for all water year types.

Table 50 presents baseline Sacramento/Delta supply to agriculture in the Southern California region and change from baseline for the 55 w/WSAs and 55 the scenarios. Table 51 presents identical information for municipal and industrial use. On average, under the 55 w/WSAs scenario, agricultural use of Sacramento/Delta water supply would decrease by 2 TAF or 16 percent and municipal and industrial use by 277 TAF or about 17 percent.

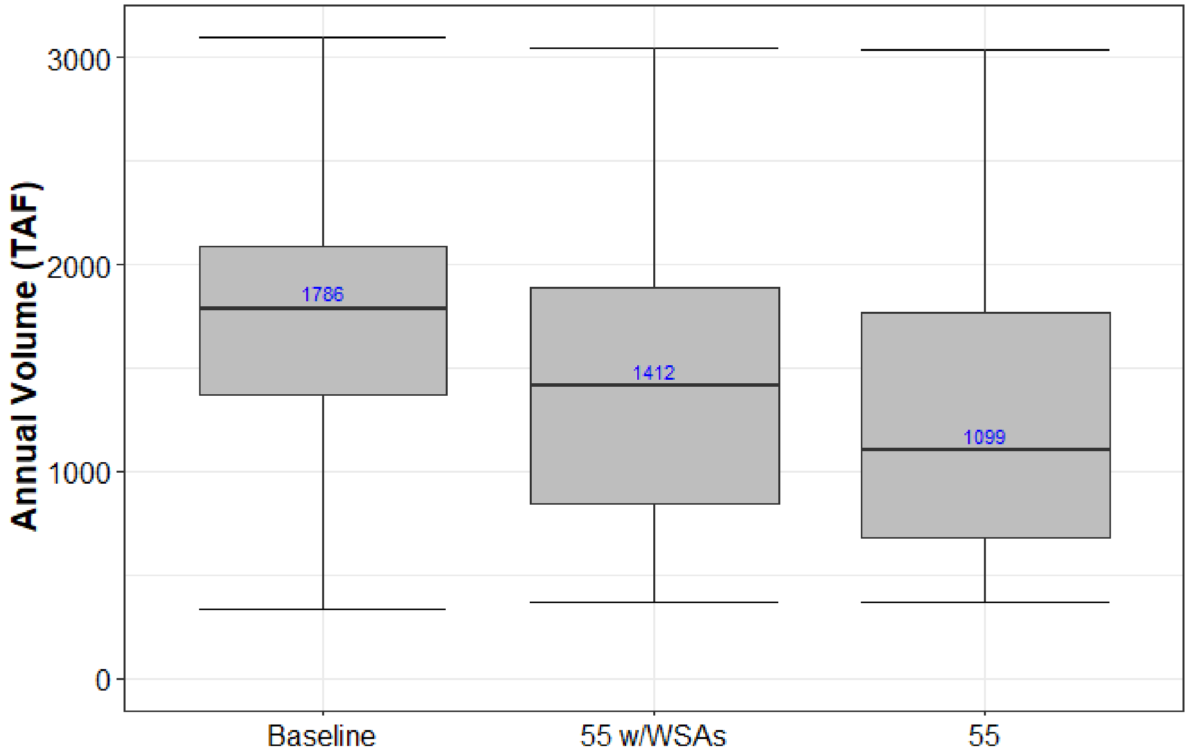



**Figure 42. Sacramento/Delta Supply to the Southern California Region**

**Table 4949. Sacramento/Delta Supply to the Southern California Region Water Year Type Average: Change from Baseline (thousand acre-feet)**

| Water Year Type | Baseline | 55 w/WSAs | 55 |
|---|---|---|---|
| C | 773 | -86 | -187 |
| D | 1,452 | -516 | -653 |
| BN | 1,722 | -373 | -643 |
| AN | 1,840 | -206 | -574 |
| W | 2,266 | -179 | -281 |
| All | 1,688 | -279 | -453 |

**Table 5050. Annual Sacramento/Delta Supply to Agriculture in the Southern California Region Water Year Type Average: Change from Baseline (thousand acre-feet per year)**

| Water Year Type | Baseline | 55 w/WSAs | 55 |
|---|---|---|---|
| C | 7 | -1 | -2 |
| D | 13 | -4 | -6 |
| BN | 15 | -3 | -6 |
| AN | 16 | -2 | -5 |
| W | 20 | -1 | -2 |
| All | 15 | -2 | -4 |

**Table 5151. Annual Sacramento/Delta Supply to Municipal and Industrial Use in the Southern California Region Water Year Type Average: Change from Baseline (thousand acre-feet/year)**

| Water Year Type | Baseline | 55 w/WSAs | 55 |
|---|---|---|---|
| C | 766 | -86 | -186 |
| D | 1,439 | -512 | -647 |
| BN | 1,707 | -369 | -637 |
| AN | 1,824 | -204 | -569 |
| W | 2,247 | -178 | -278 |
| All | 1,673 | -277 | -449 |

## 1.5 Temperature Modeling Results for Baseline and Flow Scenarios

The draft Staff Report included temperature modeling results for the Sacramento, Feather, and American Rivers using the Central Valley HEC 5Q Model. Since the draft Staff Report, a temperature model for the Yuba River was also developed for the State Water Board by Resource Management Associates that will be documented in the next version of the Staff Report. Preliminary results for all four rivers are presented here to assist the public with their review of the revised draft updates to the Bay-Delta Plan, including results for 55 w/WSAs, baseline, and 55 scenarios. As with the SacWAM modeling, the modeling details are subject to additional refinement, though significant changes are not expected.

Simulated temperatures are presented in tables showing the 10th, 50th, and 90th percentiles of baseline temperatures and changes from baseline. Maximum values are not shown because they represent only a single month out of the entire simulation period. The red (the darker the red shading the larger the increase) and blue (the darker the blue shading the larger the decrease) incremental shading provided in these tables is only for indicating the degree of change in temperatures from baseline. Shading does not indicate any impact conclusions. The next version of the Staff Report will include evaluations of expected impacts based on the final temperature modeling results. Temperature results are presented in upstream to downstream order.

The presented model runs do not exercise all of the tools available in real-time operation. For example, refinements to power bypass and reservoir release temperature targets on the Sacramento, Feather, and American Rivers could improve temperature conditions without changing the water balance. Results including these refinements may be included in the next version of the Staff Report. The results generally show reductions in temperatures between the 55 w/WSAs and 55 scenarios during drier conditions.

## 1.5.1 Sacramento River Temperature Model Results

**Table 5252. Comparison of Modeled Baseline and Flow Scenario Monthly Temperature Distributions in the Sacramento River below Keswick**

| Percentile | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Baseline (°F)** | | | | | | | | | | | | |
| 10 | 49.9 | 49.7 | 51.1 | 47.6 | 45.8 | 47.2 | 50.1 | 50.5 | 50.0 | 50.3 | 50.7 | 50.3 |
| 50 | 52.1 | 52.4 | 53.0 | 49.5 | 48.1 | 49.0 | 52.2 | 51.6 | 50.5 | 51.0 | 51.9 | 52.4 |
| 90 | 56.8 | 56.5 | 54.5 | 51.4 | 49.7 | 50.8 | 54.2 | 54.9 | 55.1 | 54.3 | 54.0 | 56.2 |
| **55 Minus Baseline (°F)** | | | | | | | | | | | | |
| 10 | 0.5 | 0.1 | 0.7 | 0.3 | 0.1 | 0.0 | -0.5 | 0.1 | -0.2 | 0.0 | 0.1 | -0.1 |
| 50 | 0.1 | 0.5 | 0.0 | 0.3 | -0.1 | -0.4 | -0.5 | 0.7 | 0.8 | 0.4 | -0.2 | -0.3 |
| 90 | -1.8 | -0.5 | 0.2 | 0.1 | 0.0 | -0.4 | -0.1 | 0.0 | 0.2 | 1.0 | -0.5 | -2.1 |
| **55 w/WSA Minus Baseline (°F)** | | | | | | | | | | | | |
| 10 | 0.4 | 0.3 | 0.6 | 0.5 | 0.3 | 0.0 | 0.0 | 0.1 | -0.1 | -0.1 | 0.1 | 0.0 |
| 50 | 0.0 | 0.1 | 0.0 | 0.2 | 0.1 | 0.1 | -0.4 | 0.6 | 0.6 | 0.0 | -0.1 | -0.4 |
| 90 | -2.4 | -1.4 | 0.0 | 0.1 | 0.0 | -0.1 | -0.2 | 0.1 | -0.8 | 0.6 | -0.5 | -2.4 |

°F = degrees Fahrenheit
Shading is provided only to attract attention to the larger deviations from baseline. Shading does not indicate any impact conclusions.

**Table 5353. Comparison of Modeled Baseline and Flow Scenario Monthly Temperature Distributions in the Sacramento River at Balls Ferry**

| Percentile | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Baseline (°F)** | | | | | | | | | | | | |
| 10 | 51.5 | 49.8 | 48.6 | 46.2 | 46.0 | 47.9 | 51.5 | 52.9 | 52.5 | 52.6 | 53.2 | 52.5 |
| 50 | 53.3 | 51.7 | 50.4 | 47.5 | 47.6 | 49.7 | 54.2 | 54.4 | 54.2 | 53.9 | 54.1 | 54.7 |
| 90 | 57.5 | 55.0 | 52.3 | 49.4 | 49.2 | 51.6 | 56.0 | 57.0 | 57.3 | 56.4 | 56.6 | 58.5 |
| **55 Minus Baseline (°F)** | | | | | | | | | | | | |
| 10 | 0.4 | 0.3 | 0.0 | 0.1 | 0.0 | 0.0 | -0.3 | 0.1 | 0.1 | 0.4 | 0.0 | 0.2 |
| 50 | 0.1 | 0.5 | 0.0 | 0.2 | -0.2 | -0.4 | -0.8 | 0.6 | 0.2 | 0.5 | 0.4 | -0.4 |
| 90 | -1.7 | 0.2 | -0.1 | 0.0 | 0.0 | -0.5 | -0.6 | 0.0 | 0.5 | 1.7 | -0.6 | -2.3 |
| **55 w/WSA Minus Baseline (°F)** | | | | | | | | | | | | |
| 10 | 0.0 | 0.4 | -0.1 | 0.2 | 0.1 | 0.0 | -0.1 | -0.1 | 0.2 | 0.0 | -0.1 | 0.2 |
| 50 | 0.0 | 0.0 | -0.1 | 0.0 | -0.2 | -0.1 | -0.5 | 0.7 | 0.2 | 0.1 | 0.3 | -0.4 |
| 90 | -2.2 | -0.7 | -0.4 | 0.0 | 0.1 | -0.2 | -0.8 | 0.0 | -0.5 | 0.7 | -0.6 | -2.3 |

°F = degrees Fahrenheit
Shading is provided only to attract attention to the larger deviations from baseline. Shading does not indicate any impact conclusions.

**Table 5454. Comparison of Modeled Baseline and Flow Scenario Monthly Temperature Distributions in the Sacramento River at Wilkins Slough**

| Percentile | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Baseline (°F)** | | | | | | | | | | | | |
| 10 | 57.1 | 51.0 | 46.7 | 45.4 | 46.9 | 50.0 | 55.1 | 60.7 | 65.0 | 66.8 | 66.1 | 62.4 |
| 50 | 59.2 | 52.7 | 48.1 | 46.6 | 48.4 | 53.1 | 59.9 | 65.2 | 67.9 | 69.8 | 69.2 | 66.4 |
| 90 | 61.7 | 55.4 | 49.9 | 48.5 | 51.1 | 56.1 | 63.7 | 67.6 | 70.7 | 72.2 | 71.3 | 69.2 |
| **55 Minus Baseline (°F)** | | | | | | | | | | | | |
| 10 | 0.2 | 0.3 | 0.0 | 0.1 | 0.0 | 0.0 | -0.1 | 0.6 | -0.6 | -0.3 | 0.8 | 0.4 |
| 50 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | -0.5 | -0.5 | -0.6 | -0.4 | 0.5 | -0.1 | -0.7 |
| 90 | -0.2 | 0.0 | -0.4 | -0.2 | -0.2 | -0.5 | -1.0 | 0.1 | 0.8 | 2.2 | 0.3 | -0.8 |
| **55 w/WSA Minus Baseline (°F)** | | | | | | | | | | | | |
| 10 | 0.3 | 0.1 | -0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | -0.1 | 0.3 | 0.7 | 0.6 |
| 50 | -0.2 | -0.1 | 0.0 | 0.1 | 0.0 | -0.3 | -0.3 | -0.8 | 0.2 | 0.2 | -0.2 | -0.7 |
| 90 | -0.3 | -0.5 | -0.7 | -0.2 | -0.1 | -0.3 | -0.9 | 0.2 | 0.8 | 1.7 | -0.1 | -1.0 |

°F = degrees Fahrenheit
Shading is provided only to attract attention to the larger deviations from baseline. Shading does not indicate any impact conclusions.

## 1.5.2 Feather River Temperature Model Results

**Table 5555. Comparison of Modeled Baseline and Flow Scenario Monthly Temperature Distributions in the Feather River below Oroville Dam**

| Percentile | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Baseline (°F)** | | | | | | | | | | | | |
| 10 | 50.6 | 51.7 | 50.5 | 46.3 | 45.2 | 47.3 | 49.9 | 51.0 | 55.1 | 56.9 | 56.2 | 50.2 |
| 50 | 51.0 | 52.1 | 52.5 | 49.0 | 48.1 | 50.5 | 50.2 | 51.4 | 55.6 | 57.7 | 56.9 | 50.7 |
| 90 | 53.9 | 54.2 | 53.1 | 53.1 | 51.4 | 53.4 | 50.6 | 51.9 | 56.0 | 58.5 | 58.2 | 52.0 |
| **55 Minus Baseline (°F)** | | | | | | | | | | | | |
| 10 | 0.1 | 0.0 | -0.2 | -0.6 | -0.2 | -0.1 | -0.1 | 0.1 | 0.1 | 0.0 | 0.0 | -0.1 |
| 50 | 0.3 | 0.2 | 0.1 | 0.1 | -0.3 | -1.0 | 0.0 | 0.1 | 0.1 | -0.3 | 0.1 | 0.2 |
| 90 | 4.6 | 1.8 | 0.0 | -0.4 | -0.6 | -0.8 | 0.1 | 0.3 | 0.1 | 0.0 | 0.3 | 7.5 |
| **55 w/WSA Minus Baseline (°F)** | | | | | | | | | | | | |
| 10 | 0.2 | 0.0 | 0.4 | -0.5 | -0.1 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | 0.2 | 0.1 |
| 50 | 0.2 | 0.1 | 0.1 | 0.0 | -0.2 | -0.8 | -0.1 | 0.0 | 0.0 | -0.3 | 0.2 | 0.1 |
| 90 | 2.2 | 0.7 | 0.0 | -0.2 | -0.6 | -0.7 | 0.0 | 0.1 | -0.1 | -0.1 | -0.2 | 0.7 |

°F = degrees Fahrenheit
Shading is provided only to attract attention to the larger deviations from baseline. Shading does not indicate any impact conclusions.

**Table 5656. Comparison of Modeled Baseline and Flow Scenario Monthly Temperature Distributions in the Feather River Low Flow Channel at Robinson Riffle**

| Percentile | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Baseline (°F)** | | | | | | | | | | | | |
| 10 | 52.2 | 50.8 | 48.2 | 45.3 | 45.4 | 48.4 | 52.1 | 55.2 | 59.4 | 61.6 | 60.7 | 54.9 |
| 50 | 52.5 | 51.3 | 49.7 | 47.5 | 48.2 | 51.2 | 54.3 | 55.8 | 60.0 | 62.1 | 61.5 | 55.4 |
| 90 | 55.3 | 53.0 | 50.7 | 50.2 | 50.6 | 54.0 | 55.3 | 56.4 | 60.4 | 62.8 | 62.2 | 57.3 |
| **55 Minus Baseline (°F)** | | | | | | | | | | | | |
| 10 | 0.2 | 0.1 | 0.0 | -0.5 | -0.1 | -0.1 | -0.1 | -0.2 | 0.0 | 0.1 | 0.1 | 0.2 |
| 50 | 0.4 | 0.2 | 0.0 | -0.1 | -0.8 | -0.9 | -1.1 | -0.2 | 0.0 | 0.1 | 0.1 | 0.8 |
| 90 | 3.4 | 1.3 | 0.0 | -0.1 | -0.3 | -1.0 | -1.2 | -0.2 | 0.2 | 0.2 | 0.1 | 4.4 |
| **55 w/WSA Minus Baseline (°F)** | | | | | | | | | | | | |
| 10 | 0.1 | 0.0 | 0.0 | -0.2 | -0.1 | 0.0 | -0.1 | -0.2 | 0.0 | 0.1 | 0.1 | 0.2 |
| 50 | 0.3 | 0.1 | 0.2 | 0.0 | -0.4 | -0.6 | -1.0 | -0.2 | 0.0 | 0.0 | 0.1 | 0.5 |
| 90 | 1.1 | 0.3 | 0.0 | 0.0 | -0.1 | -0.7 | -1.0 | -0.2 | 0.2 | -0.1 | -0.1 | 0.6 |

°F = degrees Fahrenheit
Shading is provided only to attract attention to the larger deviations from baseline. Shading does not indicate any impact conclusions.

**Table 5757. Comparison of Modeled Baseline and flow scenario Monthly Temperature Distributions for the Feather River at Gridley**

| Percentile | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Baseline (°F)** | | | | | | | | | | | | |
| 10 | 55.4 | 52.1 | 48.7 | 45.8 | 46.8 | 49.8 | 54.3 | 56.8 | 62.4 | 64.0 | 64.0 | 57.5 |
| 50 | 56.5 | 53.1 | 49.9 | 48.2 | 50.1 | 53.9 | 59.1 | 61.4 | 65.6 | 64.9 | 65.9 | 60.4 |
| 90 | 59.8 | 54.2 | 51.7 | 50.5 | 52.0 | 57.5 | 62.3 | 63.1 | 66.7 | 68.3 | 68.9 | 64.0 |
| **55 Minus Baseline (°F)** | | | | | | | | | | | | |
| 10 | 0.5 | 0.5 | 0.8 | 0.5 | 0.1 | 0.1 | -0.3 | -0.1 | 0.0 | 0.5 | 1.0 | 1.5 |
| 50 | 1.1 | 0.4 | 0.6 | 0.4 | 0.2 | -0.1 | -1.9 | -1.7 | 0.2 | 3.0 | 1.2 | 2.1 |
| 90 | 2.7 | 1.5 | 0.2 | 0.4 | 1.0 | 0.3 | -0.5 | 0.0 | 0.9 | 1.9 | 0.0 | 2.7 |
| **55 w/WSA Minus Baseline (°F)** | | | | | | | | | | | | |
| 10 | 0.4 | 0.3 | 0.7 | 0.6 | 0.0 | 0.1 | -0.3 | 0.1 | 0.0 | 0.1 | 0.4 | 0.4 |
| 50 | 0.5 | 0.3 | 0.6 | 0.5 | 0.2 | 0.7 | -0.8 | -1.5 | -0.1 | 2.4 | 1.4 | 1.6 |
| 90 | 0.9 | 0.6 | 0.1 | 0.0 | 1.2 | 0.7 | 0.2 | -0.4 | 0.7 | 1.3 | 0.2 | 0.8 |

°F = degrees Fahrenheit
Shading is provided only to attract attention to the larger deviations from baseline. Shading does not indicate any impact conclusions.

## 1.5.3 American River Temperature Model Results

**Table 5858. Comparison of Modeled Baseline and Flow Scenario Monthly Temperature Distributions for the American River below Folsom Dam**

| Percentile | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Baseline (°F)** | | | | | | | | | | | | |
| 10 | 58.7 | 56.4 | 50.7 | 46.0 | 46.1 | 47.7 | 48.9 | 50.9 | 52.7 | 53.6 | 58.0 | 61.4 |
| 50 | 63.1 | 58.1 | 54.9 | 49.6 | 48.3 | 48.9 | 49.8 | 51.9 | 54.3 | 57.3 | 60.4 | 63.4 |
| 90 | 66.5 | 59.1 | 56.0 | 52.4 | 49.9 | 50.7 | 53.0 | 55.4 | 58.3 | 61.9 | 63.2 | 66.8 |
| **55 Minus Baseline (°F)** | | | | | | | | | | | | |
| 10 | 0.0 | 0.5 | 0.1 | -0.1 | 0.0 | 0.3 | 0.2 | 0.4 | 0.8 | 0.2 | 0.2 | -0.2 |
| 50 | 0.0 | 0.3 | 0.0 | 0.2 | -0.1 | 0.4 | 1.0 | 1.5 | 1.3 | 0.3 | 0.5 | -0.1 |
| 90 | -0.5 | 0.2 | 0.0 | 0.2 | 0.8 | 0.3 | 0.3 | 1.1 | 0.9 | 0.8 | 0.5 | -0.2 |
| **55 w/WSA Minus Baseline (°F)** | | | | | | | | | | | | |
| 10 | 0.1 | 0.1 | 0.5 | 0.0 | 0.0 | 0.1 | 0.1 | 0.2 | 0.3 | 0.0 | 0.0 | 0.0 |
| 50 | 0.1 | 0.0 | -0.7 | 0.0 | 0.1 | 0.2 | 0.6 | 1.1 | 1.2 | 1.2 | 1.3 | 0.2 |
| 90 | -0.6 | 0.1 | 0.0 | -0.1 | 0.4 | 0.0 | 0.3 | 0.6 | 0.7 | 0.6 | 0.4 | -0.5 |

°F = degrees Fahrenheit
Shading is provided only to attract attention to the larger deviations from baseline. Shading does not indicate any impact conclusions.

**Table 5959. Comparison of Modeled Baseline and Flow Scenario Monthly Temperature Distributions for the American River at Hazel Avenue**

| Percentile | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Baseline (°F)** | | | | | | | | | | | | |
| 10 | 59.1 | 56.6 | 50.6 | 46.0 | 46.2 | 48.4 | 49.8 | 52.0 | 53.9 | 55.8 | 59.0 | 62.5 |
| 50 | 63.0 | 57.8 | 54.0 | 49.3 | 48.5 | 49.7 | 51.5 | 53.8 | 55.8 | 58.8 | 62.4 | 64.1 |
| 90 | 66.1 | 59.0 | 55.2 | 52.0 | 50.3 | 52.1 | 55.3 | 59.0 | 62.1 | 64.9 | 65.6 | 67.5 |
| **55 Minus Baseline (°F)** | | | | | | | | | | | | |
| 10 | 0.0 | 0.1 | 0.0 | -0.1 | 0.0 | 0.0 | 0.0 | 0.4 | 0.7 | 0.1 | 0.2 | -0.1 |
| 50 | 0.2 | 0.3 | 0.1 | 0.1 | -0.1 | 0.2 | 0.2 | 0.4 | 1.4 | 1.7 | 0.4 | 0.2 |
| 90 | -0.3 | 0.3 | 0.0 | 0.1 | 0.5 | -0.1 | -0.3 | -0.5 | 1.2 | 0.9 | 0.8 | 0.3 |
| **55 w/WSA Minus Baseline (°F)** | | | | | | | | | | | | |
| 10 | 0.0 | -0.2 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.5 | 0.2 | 0.0 | 0.0 |
| 50 | 0.1 | 0.0 | -0.4 | 0.1 | 0.1 | 0.0 | 0.0 | 0.2 | 1.0 | 1.5 | 1.2 | 0.5 |
| 90 | -0.3 | 0.2 | -0.1 | -0.1 | 0.4 | -0.2 | -0.3 | -0.2 | 0.4 | 0.4 | 0.7 | 0.2 |

°F = degrees Fahrenheit
Shading is provided only to attract attention to the larger deviations from baseline. Shading does not indicate any impact conclusions.

**Table 6060. Comparison of Modeled Baseline and Flow Scenario Monthly Temperature Distributions in the American River at Watt Avenue**

| Percentile | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Baseline (°F)** | | | | | | | | | | | | |
| 10 | 60.4 | 56.9 | 50.6 | 46.3 | 47.0 | 49.9 | 51.7 | 55.0 | 57.4 | 60.6 | 61.9 | 65.3 |
| 50 | 64.2 | 58.0 | 53.5 | 49.6 | 49.7 | 52.1 | 55.8 | 56.9 | 59.6 | 63.3 | 66.7 | 67.0 |
| 90 | 67.3 | 59.2 | 54.8 | 52.1 | 52.3 | 55.8 | 60.6 | 66.0 | 69.5 | 70.8 | 70.4 | 70.3 |
| **55 Minus Baseline (°F)** | | | | | | | | | | | | |
| 10 | 0.2 | 0.2 | 0.2 | -0.1 | 0.0 | 0.0 | 0.1 | 0.1 | 0.2 | 0.1 | 0.2 | 0.2 |
| 50 | 0.1 | 0.2 | 0.0 | -0.1 | 0.0 | -0.3 | -1.5 | 0.5 | 1.6 | 3.7 | 0.9 | 0.3 |
| 90 | 0.1 | 0.1 | -0.1 | 0.4 | -0.2 | -0.9 | -1.9 | -2.6 | 1.4 | 1.2 | 1.3 | 0.7 |
| **55 w/WSA Minus Baseline (°F)** | | | | | | | | | | | | |
| 10 | 0.0 | -0.1 | 0.2 | -0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.4 | 0.0 | -0.1 |
| 50 | 0.0 | 0.1 | -0.3 | -0.1 | 0.1 | -0.2 | -1.4 | 0.3 | 1.0 | 1.9 | 1.3 | 0.7 |
| 90 | 0.2 | 0.1 | -0.2 | -0.1 | -0.3 | -0.5 | -1.2 | -1.2 | 0.9 | 0.5 | 1.3 | 0.4 |

°F = degrees Fahrenheit
Shading is provided only to attract attention to the larger deviations from baseline. Shading does not indicate any impact conclusions.

## 1.5.4 Yuba River Temperature Model Results

**Table 6161. Comparison of Modeled Baseline and Flow Scenario Monthly Temperature Distributions in the Yuba River at Smartsville**

| Percentile | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Baseline (°F)** | | | | | | | | | | | | |
| 10 | 52.5 | 50.2 | 44.0 | 41.7 | 42.7 | 44.0 | 46.4 | 47.8 | 50.3 | 50.7 | 51.6 | 52.6 |
| 50 | 53.8 | 51.4 | 46.2 | 43.4 | 44.1 | 46.3 | 48.3 | 49.3 | 51.3 | 52.6 | 53.2 | 54.2 |
| 90 | 55.3 | 52.5 | 48.6 | 45.5 | 46.2 | 48.4 | 50.8 | 52.0 | 53.7 | 54.9 | 55.3 | 56.1 |
| **55 Minus Baseline (°F)** | | | | | | | | | | | | |
| 10 | 0.4 | -0.5 | -0.8 | -0.3 | 0.0 | 0.4 | 0.3 | 0.5 | 1.0 | 2.0 | 1.1 | 0.6 |
| 50 | 0.5 | -0.2 | -0.4 | -0.3 | -0.3 | -0.5 | -0.2 | 0.3 | 1.6 | 2.1 | 1.4 | 1.0 |
| 90 | 0.6 | 0.1 | -0.4 | -0.3 | -0.7 | -1.1 | -1.3 | 0.4 | 1.6 | 2.1 | 1.5 | 0.8 |
| **55 w/WSA Minus Baseline (°F)** | | | | | | | | | | | | |
| 10 | 0.4 | -0.2 | -0.6 | -0.3 | 0.0 | 0.1 | 0.3 | 0.6 | 0.8 | 1.0 | 0.4 | 0.1 |
| 50 | 0.3 | -0.1 | -0.2 | -0.1 | 0.0 | -0.1 | 0.1 | 0.4 | 1.0 | 0.7 | 0.6 | 0.5 |
| 90 | 0.2 | 0.3 | 0.3 | 0.0 | -0.3 | -0.5 | -0.4 | 0.3 | 0.8 | 0.8 | 0.3 | 0.5 |

°F = degrees Fahrenheit
Shading is provided only to attract attention to the larger deviations from baseline. Shading does not indicate any impact conclusions.

**Table 6262. Comparison of Modeled Baseline and Flow Scenario Monthly Temperature Distributions in the Yuba River Below Daguerre Dam**

| Percentile | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Baseline (°F)** | | | | | | | | | | | | |
| 10 | 54.5 | 51.2 | 44.4 | 42.1 | 43.6 | 45.5 | 48.2 | 49.8 | 52.8 | 54.5 | 55.4 | 55.8 |
| 50 | 55.9 | 52.4 | 46.8 | 44.1 | 45.4 | 47.7 | 50.9 | 51.9 | 54.5 | 57.0 | 56.8 | 57.7 |
| 90 | 57.3 | 53.5 | 49.0 | 46.3 | 48.0 | 51.2 | 54.5 | 55.7 | 58.4 | 59.7 | 60.1 | 60.3 |
| **55 Minus Baseline (°F)** | | | | | | | | | | | | |
| 10 | 0.3 | -0.4 | -0.7 | -0.2 | 0.0 | 0.1 | 0.1 | 0.1 | 0.8 | 2.8 | 1.2 | 0.5 |
| 50 | 0.4 | -0.3 | -0.5 | -0.4 | -0.4 | -0.5 | -0.9 | -0.2 | 1.5 | 2.1 | 2.2 | 1.4 |
| 90 | 0.6 | 0.1 | -0.5 | -0.5 | -0.9 | -1.6 | -2.5 | 0.3 | 2.1 | 3.0 | 1.5 | 0.7 |
| **55 w/WSA Minus Baseline (°F)** | | | | | | | | | | | | |
| 10 | 0.3 | -0.4 | -0.5 | -0.2 | -0.1 | 0.0 | 0.1 | 0.3 | 0.8 | 1.1 | 0.4 | 0.0 |
| 50 | 0.2 | -0.1 | -0.3 | -0.2 | -0.2 | 0.2 | -0.5 | -0.1 | 1.2 | 0.9 | 0.9 | 0.7 |
| 90 | 0.2 | 0.2 | 0.2 | -0.2 | -0.3 | -0.8 | -1.2 | 0.2 | 1.0 | 0.8 | 0.4 | 0.3 |

°F = degrees Fahrenheit
Shading is provided only to attract attention to the larger deviations from baseline. Shading does not indicate any impact conclusions.

**Table 6363. Comparison of Modeled Baseline and Flow Scenario Monthly Temperature Distributions in the Yuba River at Marysville**

| Percentile | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Baseline (°F)** | | | | | | | | | | | | |
| 10 | 56.0 | 51.6 | 44.6 | 42.3 | 44.0 | 46.1 | 49.2 | 51.1 | 54.5 | 56.9 | 57.7 | 57.6 |
| 50 | 57.3 | 52.9 | 47.1 | 44.3 | 45.9 | 48.5 | 52.0 | 53.5 | 56.9 | 60.0 | 59.7 | 59.6 |
| 90 | 58.7 | 54.1 | 49.1 | 46.6 | 48.9 | 52.5 | 56.5 | 58.2 | 62.2 | 63.8 | 63.6 | 62.7 |
| **55 Minus Baseline (°F)** | | | | | | | | | | | | |
| 10 | 0.2 | -0.4 | -0.6 | -0.2 | -0.1 | 0.1 | 0.1 | 0.0 | 0.8 | 3.5 | 1.7 | 0.6 |
| 50 | 0.4 | -0.3 | -0.5 | -0.4 | -0.3 | -0.4 | -1.0 | -0.4 | 1.3 | 2.2 | 2.4 | 1.9 |
| 90 | 0.6 | 0.1 | -0.3 | -0.5 | -1.0 | -1.7 | -2.9 | 0.0 | 1.9 | 2.2 | 1.3 | 0.8 |
| **55 w/WSA Minus Baseline (°F)** | | | | | | | | | | | | |
| 10 | 0.2 | -0.2 | -0.5 | -0.2 | 0.0 | 0.0 | 0.2 | 0.1 | 0.8 | 1.2 | 0.3 | 0.0 |
| 50 | 0.2 | -0.1 | -0.4 | -0.2 | -0.2 | 0.3 | -0.4 | -0.1 | 1.0 | 1.1 | 0.9 | 0.8 |
| 90 | 0.3 | 0.0 | 0.2 | -0.2 | -0.5 | -0.9 | -1.6 | 0.2 | 1.2 | 0.7 | 0.5 | 0.1 |

°F = degrees Fahrenheit
Shading is provided only to attract attention to the larger deviations from baseline. Shading does not indicate any impact conclusions.