Appendix D Modeling

Reclamation ROC on LTO
Modeling to Support the January 2019 BA Qualitative Analysis

Without Action, Current Operations, and Proposed Action Scenarios

Introduction

The U.S. Bureau of Reclamation (Reclamation), Re-initiation of Consultation on long-term operations of the Central Valley Project (CVP) and State Water Project (SWP) (ROC on LTO) project team, has developed model simulations to support qualitative analysis of CVP and SWP long-term operations as part of developing a Biologic Assessment (BA), for completion in January 2019.

The results of model simulations are provided for informational purposes. Please do not use any information contained in these products for any purpose other than related to Reclamation ROC on LTO process. If there are any questions regarding the results of these model simulations, please contact the Reclamation ROC on LTO team.

Any use of results of model simulations should observe limitations of the models used as well as the limitations to the modeled scenarios. These results should only be used for comparative purposes. More information regarding limitations of the models used as well as the limitations to the modeled scenarios is included Appendix D Attachment 2-7 Model Limitations.

Modeled Scenarios

The following scenarios were prepared:

- Without Action 011519
- Current Operations 011319
- Proposed Action 011519

The assumptions used for each scenario and each model listed above are documented in the following attachments:

- Appendix D Attachment 2-1 Model Assumptions
- Appendix D Attachment 2-2 CalSim II Model Assumptions Callouts
- Appendix D Attachment 2-3 DSM2 Model Assumptions Callouts
- Appendix D Attachment 2-4 HEC5Q and Reclamation Temperature Model Assumptions Callouts
- Appendix D Attachment 2-5 CalSim II Model Delivery Specifications
- Appendix D Attachment 2-6 Winter Run Chinook Temperature-Dependent Egg Mortality Modeling
- Appendix D Attachment 2-7 Model Limitations

The following is a summary of the scenarios and the models used:

Without Action

The Without Action Scenario (WOA) reflects conditions where the CVP and SWP (Projects) only operate to flood conditions due to public health and safety as required by the guidelines of the US Army Corps of Engineers (USACE). Under this scenario, it is assumed that the projects

do not operate to meet the environmental or contractual obligations. To clarify the conditions represented, February 19, 1986 is selected as the "day that represents the CVP and SWP operations", which happens to be a day with the highest daily observed release at Folsom Reservoir, where the projects passed through all the runoff only constrained by reservoir, gate, and channel capacities. Reclamation and DWR would set the CVP and SWP gates, valves, and switches to release flows in order to preserve the integrity of facilities.

Current Operations

The Current Operations Scenario (COS) represents CVP and SWP operations to comply with the "current" regulatory environment as of (December 27, 2017) under projected Year 2030 conditions. The COS assumptions include existing facilities and ongoing programs that existed as of December 27, 2017- publication date of the Notice of Intent (NOI). The COS assumptions also include facilities and programs that received approvals and permits by December, 2017 because those programs were consistent with existing management direction as of the Notice of Intent. The COS model does not include any potential future habitat restoration areas due to the uncertainty on system effects depending on potential locations of such areas within the Delta.

Proposed Action

The Proposed Action Scenario (PA) represents CVP and SWP operations with modified Shasta temperature, Delta Smelt habitat, and OMR actions to incorporate real-time monitoring and focusing water resources on locations and timing with the most benefits for fish. The PA includes the New Melones Stepped Release plan to obtain a more sustainable operation on the Stanislaus River, as well as the 2017 Flow Management Standard and "planning minimum" for the American River.

The following model simulations were prepared for each scenario:

- CalSim II
- HEC5Q
- Reclamation Temperature Model
- DSM2
- Winter Run Chinook Temperature-Dependent Egg Mortality Models

CalSim II

Reclamation / California Department of Water Resources (DWR) CalSim II planning model was used to simulate the coordinated operation of the CVP and SWP over a range of hydrologic conditions. CalSim II is a generalized reservoir-river basin simulation model that allows for specification and achievement of user-specified allocation targets, or goals (Draper et al. 2004). CalSim II represents the best available planning model for CVP and SWP system operations and has been used in previous system-wide evaluations of CVP and SWP operations (U.S. Bureau of Reclamation 2015).

HEC5Q

Over the past 15 years, various temperature models were developed to simulate temperature conditions on the rivers affected by CVP and SWP operations (SRWQM, San Joaquin River HEC5Q model) (Reclamation 2008). Recently, these models were compiled and updated into a single modeling package called in here as the HEC5Q model. Further updates were performed under the LTO EIS modeling that included improved meteorological data and subsequent validation of the Sacramento and American River models, implementation of the Folsom Temperature Control Devices and low-level outlet, implementation of the Trinity auxiliary outlet, improved temperature targeting for Shasta and Folsom Dams, as well as improved documentation and streamlining of the models as well as improved integration with the CalSim II model (U.S. Bureau of Reclamation 2015).

Reclamation Temperature Model

Reclamation Temperature Model includes reservoir and stream temperature models, which simulate monthly reservoir and stream temperatures used for evaluating the effects of CVP/SWP project operations on mean monthly water temperatures in the basin (Reclamatioin 2008). The model simulates temperatures in seven major reservoirs (Trinity, Whiskeytown, Shasta, Oroville, Folsom, New Melones and Tulloch), four downstream regulating reservoirs (Lewiston, Keswick, Goodwin and Natoma), and five main river systems (Trinity, Sacramento, Feather, American and Stanislaus). The river component of the Reclamation Temperature model calculates temperature changes in the regulating reservoirs, below the main reservoirs. With regulating reservoir release temperature as the initial river temperature, the river model computes temperatures at several locations along the rivers. The calculation points for river temperatures generally coincide with tributary inflow locations. The model is one-dimensional in the longitudinal direction and assumes fully mixed river cross sections. The effect of tributary inflow on river temperature is computed by mass balance calculation. The river temperature calculations are based on regulating reservoir release temperatures, river flows, and climatic data (U.S Bureau of Reclamation 2015).

DSM2

DSM2 is a one-dimensional hydrodynamic and water quality simulation model used to simulate hydrodynamics, water quality, and particle tracking in the Sacramento-San Joaquin Delta (DWR, 2002). DSM2 represents the best available planning model for Delta tidal hydraulic and salinity modeling. It is appropriate for describing the existing conditions in the Delta, as well as performing simulations for the assessment of incremental environmental impacts caused by future facilities and operations (U.S. Bureau of Reclamation 2015).

Winter Run Chinook Temperature-Dependent Egg Mortality Models

Two egg mortality estimation methods were used for evaluating Winter Run Chinook habitat on the Sacramento River downstream of Keswick Dam. Both models start by modeling a redd's lifetime by counting the days required to cross a known cumulative degree-days threshold, and both estimate mortality as a linear, increasing function of temperature past a known temperature

threshold, but each uses a different set of assumptions to implement this conceptual model. The methods are applied to a set of simulated redds and the results are summarized on a seasonal level for comparison of mortality outcomes between HEC5Q model runs. The Martin model was developed for estimating temperature-dependent egg mortality in the field and fit its parameters to Sacramento River Winter run Chinook population data collected between 1996 and 2015 (Martin et al., 2017). The Anderson model uses field data from 2002 through 2015, a critical period just before hatching was found to provide the best fit (Anderson, 2018).

Model Results for Modeled Scenarios

Model Results

The results for each scenario for each model are compiled in tables and charts in the following attachments:

- Appendix D Attachment 3-1 Storage and Elevation Results (CalSim II)
- Appendix D Attachment 3-2 Flow Results (CalSim II)
- Appendix D Attachment 3-3 Diversion Results (CalSim II)
- Appendix D Attachment 3-4 Temperature Results (HEC5Q)
- Appendix D Attachment 3-5 Temperature Results (Reclamation Temperature Model)
- Appendix D Attachment 3-6 Salinity (EC) Results (DSM2-QUAL)
- Appendix D Attachment 3-7 X2 Position Results (DSM2-QUAL)
- Appendix D Attachment 3-8 Winter Run Chinook Temperature Dependent Egg Mortality Results (Martin and Anderson Models)

Each attachment includes a catalog of results included.

As noted in the Introduction any use of results of model simulations should observe limitations of the models used as well as the limitations to the modeled scenarios. These results should only be used for comparative purposes. More information regarding limitations of the models used as well as the limitations to the modeled scenarios is included Appendix D Attachment 2-7 Model Limitations.

Formats provided

The following formats are provided:

- Monthly tables comparing two scenarios (exceedance values, long-term average, and average by water year type)
- Monthly pattern charts (long-term average and average by water year type) including all scenarios
- Monthly exceedance charts (all months) including all scenarios

References

Anderson, James. (2018). Using river temperature to optimize fish incubation metabolism and survival: a case for mechanistic models. 10.1101/257154.

California Department of Water Resources, Modeling Support Branch. Last updated September 2002. Site accessed February 4, 2011. URL = http://modeling.water.ca.gov/.

Draper, A.J., Munévar, A., Arora, S.K., Reyes, E., Parker, N 1 .L., Chung, F.I., and Peterson, L.E. 2004. CalSim: Generalized Model for Reservoir System Analysis. American Society of Civil Engineers, Journal of Water Resources Planning and Management, Vol. 130, No. 6.

Martin, B. T., A. Pike, S. N. John, N. Hamda, J. Roberts, S. T. Lindley, and E. M. Danner. 2017. Phenomenological vs. biophysical models of thermal stress in aquatic eggs. Ecology Letters 20:50–59.

U. S. Bureau of Reclamation, 2015. Coordinated Long Term Operation of the CVP and SWP EIS, Appendix 5A CalSim II and DSM2 Modeling.

Appendix D – Modeling

Attachment 2-1 – Model Assumptions

1 Introduction

The following model simulations were prepared to evaluate the impacts of different project operations at projected Year 2030 climate conditions:

- Without Action 011519
- Current Operations 011319
- Proposed Action 011519

Sections 2 through 4 describe the assumptions used for each model simulation. Section 5 describes the assumptions used for Year 2030 climate conditions. Section 6 lists references cited.

The assumptions for all model simulations are also summarized in table format in the following attachments:

- Appendix D Attachment 2-2 CalSim II Model Assumptions Callouts
- Appendix D Attachment 2-3 DSM2 Model Assumptions Callouts
- Appendix D Attachment 2-4 HEC5Q and Reclamation Temperature Model Assumptions Callouts
- Appendix D Attachment 2-5 CalSim II Model Delivery Specifications

Any use of results of model simulations should observe limitations of the models used as well as the limitations to the modeled scenarios. These results should only be used for comparative purposes. More information regarding limitations of the models used as well as the limitations to the modeled scenarios is included Appendix D Attachment 2-7 Model Limitations.

2 Assumptions for the Without Action Scenario

This section presents the assumptions used in developing the CalSim II, DSM2, HEC5Q, Reclamation Temperature Model and Egg Mortality Model simulations of the Without Action Scenario (WOA) considered for the ROC on LTO ESA Consultation.

The WOA scenario reflects conditions where the CVP and SWP (Projects) only operate to flood conditions due to public health and safety as required by the guidelines of the US Army Corps of Engineers (USACE). Under this scenario, it is assumed that the projects do not operate to meet the environmental or contractual obligations. To clarify the conditions represented, February 19, 1986 is selected as the "day that represents the CVP and SWP operations", which happens to be a day with the highest daily observed release at Folsom Reservoir, where the projects passed through all the runoff only constrained by reservoir, gate, and channel capacities. Reclamation and DWR would set the CVP and SWP gates, valves, and switches to release flows in order to preserve the integrity of facilities.

The WOA includes projected climate change and sea level rise assumptions corresponding to the Year 2030. Change in climate results in the changes in the reservoir and tributary inflows included in CalSim II. The sea level rise changes result in modified flow-salinity relationships in

the Delta. The climate change and sea level rise assumptions at Year 2030 are described in detail in Section 5.

2.1 CalSim II Assumptions for the Without Action Scenario

The following is a description of the assumptions listed in Appendix D Attachment 2-2 CalSim II Model Assumptions Callouts.

Hydrology

Inflows/Supplies

The CalSim II model includes the historical hydrology projected to Year 2030 with climate change and with projected 2020 modifications for operations upstream of the rim reservoirs. The climate change representation is the same as the Bay-Delta Conservation Plan Early Long-term Q5 climate scenario (ICF, 2016).

Level of Development

CalSim II uses a hydrology which is the result of an analysis of agricultural and urban land use and population estimates. The assumptions used for Sacramento Valley land use result from aggregation of historical survey and projected data developed for the California Water Plan Update (Bulletin 160-98). Generally, land use projections are based on Year 2020 estimates (hydrology serial number 2020D09E), however the San Joaquin Valley hydrology reflects draft 2030 land use assumptions developed by Reclamation. Where appropriate Year 2020 projections of demands associated with water rights and CVP and SWP water service contracts have been included. Specifically, projections of full build out are used to describe the American River region demands for water rights and CVP contract supplies, and California Aqueduct and the Delta Mendota Canal SWP/CVP contractor demands are set to full contract amounts.

CVP Settlement Contractor Consumptive Use of Applied Water (CUAW) Demands are modified to match historical annual volumes and monthly distributions, based on historical data from 2000 – 2016. The monthly distributions of annual contract amounts were also modified to match the distributions of CUAW demand.

Demands, Water Rights, CVP/SWP Contracts

CalSim II demand inputs are preprocessed monthly time series for a specified level of development (e.g. 2020) and according to hydrologic conditions. Demands are classified as CVP project, SWP project, local project or non-project. CVP and SWP demands are separated into different classes based on the contract type. A description of various demands and classifications included in CalSim II is provided in the 2008 OCAP BA Appendix D (USBR, 2008a).

The detailed listing of CVP and SWP contract amounts and other water rights assumptions are included in the delivery specification tables in Appendix D Attachment 2-5 CalSim II Model

Delivery Specifications. The demand assumptions are not modified for changes in climate conditions.

While all demands are still simulated in CalSim II, the WOA Scenario assumes that the Projects will not be operated to meet project demands. CVP Settlement and Exchange Contractors and other prior water rights would continue to divert water as long as flows or storage is high enough in the rivers/reservoirs. Any other water district infrastructure / diversions with non-CVP or non-SWP water rights are assumed to operate to the extent possible.

Facilities

CalSim II includes representation of all the existing CVP and SWP storage and conveyance facilities. Assumptions regarding selected key facilities are as follows.

Lake Trinity

Lake Trinity is assumed at current capacity (2,447 taf). Under this scenario, it is assumed that outletworks valves and spillway gates are fully open and able to pass flow based on hydraulic capacity as determined by the reservoir water surface elevation and as potentially limited by downstream channel capacity. . No trans-basin diversions are assumed to Whiskeytown Lake.

Lake Shasta

Lake Shasta is assumed at current capacity (4,552 taf). Under this scenario, it is assumed that outletworks valves and spillway gates are fully open and able to pass flow based on hydraulic capacity as determined by the reservoir water surface elevation and as potentially limited by downstream channel capacity. The Temperature Control Device is not operated under this scenario; all shutters are assumed to be open.

Keswick Dam

Keswick Dam outletworks and spillway gates are assumed to be fully open and able to pass Shasta outflow.

Whiskeytown Dam

Whiskeytown Dam outlets are assumed to be set to 3,000 cfs due to Clear Creek channel capacity; and the Glory Hole spillway is assumed to pass additional flows should the reservoir fill. No diversions are made to Spring Creek Tunnel.

Red Bluff Diversion Dam (RBDD)

RBDD gates are no longer used to back water up in the river to deliver water via gravity; and Red Bluff Pumping Plant with fish screen is now used to deliver CVP project water to Tehama Colusa and Corning Canals. Since the CVP does not operate to meet project demands under this scenario, the Red Bluff Pumping Plant is assumed to be turned off.

Lake Oroville

Lake Oroville has a capacity of 3,538 taf. Under this scenario it is assumed that outletworks and spillway gates are fully open, and able to pass flow based on hydraulic capacity as determined by the reservoir water surface elevation and as potentially limited by downstream channel capacity.

Folsom Lake

Folsom Lake has a capacity of 967 taf. Under this scenario it is assumed that outletworks and spillway gates, including the auxiliary spillway, are fully open and able to pass flow based on hydraulic capacity as determined by the reservoir water surface elevation and as potentially limited by downstream channel capacity. Diversions to senior water rights holders are enabled if storage in Folsom is high enough to reach the M&I intake.

Nimbus Dam

Nimbus Dam outlet works and spillway gates are assumed to be fully open and able to pass Folsom outflow (approximately 240,000 cfs).

Folsom South Canal

Folsom South Canal would not deliver CVP water; however senior water rights holders are assumed to divert water off of the Folsom South Canal as long as Nimbus Dam storage is high enough to divert to the Folsom South Canal.

Flood Control Weirs along the Sacramento River

Flood control weirs along the Sacramento River are assumed to be in place.

Fremont Weir

Fremont Weir is a flood control structure located along the Sacramento River at the head of the Yolo Bypass. To enhance the potential benefits of the Yolo Bypass for various fish species, the Fremont Weir is assumed to be notched to provide increased seasonal floodplain inundation in all of the alternatives simulated for this consultation. For this scenario, it is assumed that an opening in the existing weir and operable gates are constructed at invert elevation 14 feet along with two smaller openings and operable gates at invert elevation 18 feet.

In the WOA scenario, these operable gates in Fremont Weir are assumed closed. Therefore, the rating curve for the existing weir (without notch/gates) is used to model the spills over the Fremont Weir.

Freeport Regional Water Project (FRWP)

FRWP is assumed to be in place; however, CVP diversions through FRWP for delivery to SCWA or EBMUD are assumed to not take place under this scenario.

Clifton Court Forebay

Clifton Court Forebay gates are assumed to be open and not operated.

CVP C.W. Bill Jones Pumping Plant (Tracy PP) Capacity

The Jones Pumping Plant is assumed to be turned off under this scenario.

SWP Banks Pumping Plant Capacity

SWP Banks pumping plant is assumed to be turned off under this scenario.

CCWD Intakes

The Contra Costa Canal originates at Rock Slough, about four miles southeast of Oakley, and terminates after 47.7 miles at Martinez Reservoir. Historically, diversions at the unscreened Rock Slough facility (Contra Costa Canal Pumping Plant No. 1) have ranged from about 50 to 250 cfs. The canal and associated facilities are part of the CVP; but are operated and maintained by the Contra Costa Water District (CCWD). CCWD also operates a diversion on Old River and the Alternative Intake Project (AIP), the new drinking water intake at Victoria Canal, about 2.5 miles east of Contra Costa Water District's (CCWD) intake on the Old River. CCWD can divert water to the Los Vaqueros Reservoir to store good quality water when available and supply to its customers.

Under this scenario, CCWD is assumed to not divert CVP water, but would continue to divert water based on their water rights.

New Melones Reservoir

New Melones Reservoir has a capacity of 2,420 taf. Under this scenario, it is assumed that outletworks and spillway gates are fully open, and able to pass flow based on hydraulic capacity as determined by the reservoir water surface elevation and as potentially limited by downstream channel capacity. .

Millerton Lake

Millerton Lake has a capacity of 520 taf capacity. Under this scenario, spillway gates are assumed to be open and valves are assumed to be set to pass flows up to modeled channel capacity (approximately 15,000 cfs) based on a reservoir elevation at the bottom of the spillway.

Friant-Kern and Madera Canals

Friant-Kern and Madera Canals are assumed to not deliver CVP water.

Regulatory Standards

The regulatory standards that govern the operations of the CVP and SWP facilities are simulated as outlined below.

D-1641 Operations

The SWRCB Water Quality Control Plan (WQCP) and other applicable water rights decisions, as well as other agreements are important factors in determining the operations of both the Central Valley Project (CVP) and the State Water Project (SWP). These would not be in effect under this scenario. Therefore, all D1641 requirements including X2 standards, export/inflow (E/I) ratios, Delta water quality standards, real-time Delta Cross Channel operation, and San Joaquin flow and water quality standards are assumed ineffective under this scenario.

Coordinated Operations Agreement (COA)

The CVP and SWP use a common water supply in the Central Valley of California. Reclamation and DWR have built water conservation and water delivery facilities in the Central Valley in order to deliver water supplies to project contractors. The water rights of the projects are conditioned by the SWRCB to protect the beneficial uses of water within each respective project and jointly for the protection of beneficial uses in the Sacramento Valley and the Sacramento-San Joaquin Delta Estuary. The agencies coordinate and operate the CVP and SWP to meet the joint water right requirements in the Delta.

Since the Projects will not need to coordinate their operations under this scenario; COA is not applicable.

CVPIA (b)(2) Assumptions

The Central Valley Project Improvement Act (CVPIA) 3406(b)(2) water allocation, management and related actions (B2) are assumed to be ineffective under this scenario. However, Refuge Level 1 supplies as defined in the Refuge Water Supply Investigation Program (Reclamation 1989) are assumed to be diverted from flows in the river when available.

Continued CALFED Agreements

The projects would not be operated for CALFED Agreements under this scenario; including the Lower Yuba River Accord transfers.

USFWS Delta Smelt BO Actions

The USFWS Delta Smelt BO was released on December 15, 2008, in response to Reclamation's request for formal consultation with the USFWS on the coordinated operations of the Central Valley Project (CVP) and State Water Project (SWP) in California.

Since there are no project operations considered under this scenario, no representation of USFWS BO RPA is included in the model.

NMFS BO Salmon Actions

The NMFS Salmon BO on long-term operations of the CVP and SWP was released on June 4, 2009.

Since there are no project operations considered under this scenario, no representation of NMFS BO RPA is included in the model.

Water Transfers

No south of Delta pumping is simulated; therefore, no transfers are included in the model.

Specific Regulatory Assumptions

Trinity River Restoration Program

Since the Projects do not operate other than flood control purposes, Trinity River Restoration Program would not take place.

Lower American Flow Management

Since the Projects do not operate other than for flood control purposes, American River Flow Management Standard (ARFMS) is also not included in the model for this scenario.

Delta Outflow (Flow and Salinity)

Since the Projects do not operate other than flood control purposes, there are no Delta Outflow requirements simulated in this scenario.

Exports at the South Delta Intakes

Since the Projects do not operate other than flood control purposes, no south of Delta exports are simulated in the model, including the minimum pumping for health and safety.

Delta Water Quality

Since the Projects do not operate other than flood control purposes, SWRCB D-1641 salinity requirements are not simulated in the model.

The sea level rise change assumed at the Year 2030 results in a modified flow – salinity relationship in the Delta. An artificial neural network (ANN) which is capable of emulating the DSM2 model under the 15-cm sea level rise condition at the Year 2030 is used to simulate the

flow-salinity relationship in the CalSim II simulation, however it does not control the operations of any project facilities under this scenario.

San Joaquin River Restoration Program

Since the Projects do not operate other than for flood control purposes, Friant Dam releases for SJRRP are not simulated under this scenario.

Operations Criteria

Fremont Weir Operations

Fremont Weir is assumed to be in place, however, gates are not operated and are assumed to be closed in this scenario.

Delta Cross Channel Gate Operations

Delta Cross Channel is assumed to be closed in this scenario.

Allocation Decisions

The Projects do not operate to meet demands of CVP and SWP contractors under this scenario. Therefore, no allocation decisions are simulated in the model.

CVP water service contract allocations are set to zero along with CVP Friant allocations (Class1, Class2, 215). CVP Settlement and Exchange contractor allocations are set to 75% and 77% respectively; to allow for off-the-river diversions for senior water rights holders. CVP refuge allocations are effectively set to firm Level 1 demands (Reclamation 1989).

SWP Table A allocations are set to zero. Feather River Settlement Agreement (FRSA) contractors divert off of the river when flows are high enough.

San Luis Operations

San Luis Dam is simulated as an off-stream reservoir in CalSim II. There is no Projects operation to deliver south of the Delta, therefore, San Luis Reservoir is not operated.

2.2 DSM2 Assumptions for the Without Action Scenario

The following is a description of the assumptions listed in Appendix D Attachment 2-3 DSM2 Model Assumptions Callouts.

River Flows

For DSM2 simulation, the river flows at the DSM2 boundaries are based on the monthly flow time series from CalSim II.

Tidal Boundary

The tidal boundary condition at Martinez is based on an adjusted astronomical tide normalized for sea level rise (Ateljevich and Yu, 2007) and is modified to account for the sea level rise using the correlations derived based on three-dimensional (UnTRIM) modeling of the Bay-Delta with sea level rise at Year 2030.

Water Quality

Martinez EC

The Martinez EC boundary condition in the DSM2 planning simulation is estimated using the G-model based on the net Delta outflow simulated in CalSim II and the pure astronomical tide (Ateljevich, 2001), as modified to account for the salinity changes related to the sea level rise using the correlations derived based on the three-dimensional (UnTRIM) modeling of the Bay-Delta with sea level rise at Year 2030.

Vernalis EC

For the DSM2 simulation, the Vernalis EC boundary condition is based on the monthly San Joaquin EC time series estimated in CalSim II.

Morphological Changes

No additional morphological changes were assumed as part of the Without Action Scenario. The DSM2 model and grid developed as part of the 2009 recalibration effort (CH2M HILL, 2009) was used for modeling.

Facilities

Delta Cross Channel

Delta Cross Channel gates are assumed to be closed under this scenario.

South Delta Temporary Barriers

South Delta Temporary Barriers are assumed to be out year-round and Head of Old River Barrier is assumed to be not installed. No barrier or gate operations are assumed under this scenario.

Clifton Court Forebay Gates

Clifton Court Forebay gates are assumed to be open and not operated.

Operations Criteria

South Delta Temporary Barriers

South Delta Temporary Barriers are assumed to be out year-round and Head of Old River Barrier is assumed to be not installed. No barrier or gate operations are assumed under this scenario.

Montezuma Salinity Control Gate

The radial gates in the Montezuma Slough Salinity Control Gate Structure are assumed to be open year-round and not operated.

2.3 HEC5Q and Reclamation Temperature Model Assumptions for the Without Action Scenario

The following is a description of the assumptions listed in Appendix D Attachment 2-4 HEC5Q and Reclamation Temperature Model Assumptions Callouts.

Sacramento-Trinity Rivers

Reservoir Storage Conditions

Trinity Lake, Lewiston Lake, Whiskeytown Lake, Shasta Lake, and Keswick Reservoir are all operated to maintain approximate volume at bottom of conservation pool. Black Butte Lake is operated per CalSim II output.

Shasta Temperature Management

No temperature management.

Trinity Temperature Management

No temperature management.

American River

Reservoir Storage Conditions

Folsom Lake and Lake Natoma are operated to maintain approximate volume at bottom of conservation pool.

Folsom Temperature Management

No temperature management.

Stanislaus River

Reservoir Storage Conditions

New Melones Lake, Lake Tulloch, and Goodwin Reservoir are all operated to maintain approximate volume at bottom of conservation pool.

Feather River

Reservoir Storage Conditions

Lake Oroville and Thermalito Afterbay are operated to maintain approximate volume at bottom of conservation pool.

2.4 Egg Mortality Model Assumptions for the Without Action Scenario

Temperature-dependent egg mortality is estimated with two methods: Martin and Anderson. Both methods calculate redd's lifetime with a degree-days threshold, estimate the temperature-mortality relationship as linear. However, they assume temperature-dependent mortality occurs during different time-windows in the redd's lifespan. The distribution redds is the average location and timing of redds counted in California Department of Fish and Wildlife Winter run aerial survey data from 2007 to 2014. See Appendix D Attachment 2-6 Winter Run Chinook Temperature-Dependent Egg Mortality Modeling for more information.

3 Assumptions for the Current Operations Scenario

This section presents the assumptions used in developing the CalSim II, DSM2, HEC5Q, Reclamation Temperature Model and Egg Mortality Model simulations of the Current Operations Scenario (COS) considered for the ROC on LTO ESA Consultation.

The COS represents CVP and SWP operations to comply with the "current" regulatory environment as of (December 27, 2017) under projected Year 2030 conditions. The COS assumptions include existing facilities and ongoing programs that existed as of December 27, 2017- publication date of the Notice of Intent (NOI). The COS assumptions also include facilities and programs that received approvals and permits by December, 2017 because those programs were consistent with existing management direction as of the Notice of Intent. The COS model does not include any potential future habitat restoration areas due to the uncertainty on system effects depending on potential locations of such areas within the Delta.

The COS includes projected climate change and sea level rise assumptions corresponding to the Year 2030. Change in climate results in the changes in the reservoir and tributary inflows included in CalSim II. The sea level rise changes result in modified flow-salinity relationships in the Delta. The climate change and sea level rise assumptions at Year 2030 are described in detail in Section 5. The CalSim II simulation for the COS does not consider any adaptation measures that would result in managing the CVP and SWP system in a different manner than today to reduce climate impacts. For example, future changes in reservoir flood control reservation to better accommodate a seasonally changing hydrograph may be considered under future programs but are not considered under this consultation.

3.1 CalSim II Assumptions for the Current Operations Scenario

The following is a description of the assumptions listed in Appendix D Attachment 2-2 CalSim II Model Assumptions Callouts.

Hydrology

Inflows/Supplies

Same as the WOA Scenario.

Level of Development

Same as the WOA Scenario.

Demands, Water Rights, CVP/SWP Contracts

Projected 2020 level demands as described in the WOA Scenario. The demands simulated in CalSim II are consistent with all the scenarios presented in this document; and the Projects operate to meet CVP-SWP demands in the COS and all Proposed Action scenarios.

Facilities

All CVP-SWP existing facilities are simulated based on operations criteria under current regulatory environment.

CalSim II includes representation of all the existing CVP and SWP storage and conveyance facilities. Assumptions regarding selected key facilities are included in the callout tables in Appendix D Attachment 2-2 CalSim II Model Assumptions Callouts.

CalSim II also represents the flood control weirs such as the Fremont Weir located along the Sacramento River at the upstream end of the Yolo Bypass (Reclamation, 2017).

The COS also includes the Freeport Regional Water Project, located along the Sacramento River near Freeport and the City of Stockton Delta Water Supply Project (30 mgd capacity).

A brief description of the key export facilities that are located in the Delta and included under the COS run is provided below.

The Delta serves as a natural system of channels to transport river flows and reservoir storage to the CVP and SWP facilities in the south Delta, which export water to the projects' contractors through two pumping plants: CVP's C.W. Jones Pumping Plant and SWP's Harvey O. Banks Pumping Plant. Jones and Banks Pumping Plants supply water to agricultural and urban users throughout parts of the San Joaquin Valley, South Lahontan, Southern California, Central Coast, and South San Francisco Bay Area regions.

The Contra Costa Canal and the North Bay Aqueduct supply water to users in the northeastern San Francisco Bay and Napa Valley areas.

Fremont Weir

Fremont Weir is assumed to be notched, as described in the Without Action section.

CVP C.W. Bill Jones Pumping Plant (Tracy PP) Capacity

The Jones Pumping Plant consists of six pumps including one rated at 800 cfs, two at 850 cfs, and three at 950 cfs. Maximum pumping capacity is assumed to be 4,600 cfs with the 400 cfs Delta Mendota Canal (DMC) –California Aqueduct Intertie that became operational in July 2012.

SWP Banks Pumping Plant Capacity

SWP Banks pumping plant has an installed capacity of about 10,300 cfs. The SWP water rights for diversions specify a maximum of 10,300 cfs, but the U. S. Army Corps' of Engineers (ACOE) permit for SWP Banks Pumping Plant allows a maximum pumping of 6,680 cfs. With additional diversions depending on Vernalis flows the total diversion can go up to 10,300 cfs during December 15 – March 15. Additional capacity of 500 cfs (pumping limit up to 7,180 cfs) is allowed to reduce impact of NMFS BO Action 4.2.1 on the SWP.

CCWD Intakes

The Contra Costa Canal originates at Rock Slough, about four miles southeast of Oakley, and terminates after 47.7 miles at Martinez Reservoir. Historically, diversions at the unscreened Rock Slough facility (Contra Costa Canal Pumping Plant No. 1) have ranged from about 50 to 250 cfs. The canal and associated facilities are part of the CVP; but are operated and maintained by the Contra Costa Water District (CCWD). CCWD also operates a diversion on Old River and the Alternative Intake Project (AIP), the new drinking water intake at Victoria Canal, about 2.5 miles east of Contra Costa Water District's (CCWD) intake on the Old River. CCWD can divert water to the Los Vaqueros Reservoir to store good quality water when available and supply to its customers.

Regulatory Standards

The regulatory standards that govern the operations of the CVP and SWP facilities under the BMAA are briefly described below. Specific assumptions related to key regulatory standards are also outlined below.

D-1641 Operations

The SWRCB Water Quality Control Plan (WQCP) and other applicable water rights decisions, as well as other agreements are important factors in determining the operations of both the Central Valley Project (CVP) and the State Water Project (SWP).

The December 1994 Accord committed the CVP and SWP to a set of Delta habitat protective objectives that were incorporated into the 1995 WQCP and later, were implemented by D-1641. Significant elements in D-1641 include X2 standards, export/inflow (E/I) ratios, Delta water quality standards, real-time Delta Cross Channel operation, and San Joaquin flow standards.

Coordinated Operations Agreement (COA)

The CVP and SWP use a common water supply in the Central Valley of California. Reclamation and DWR have built water conservation and water delivery facilities in the Central Valley in order to deliver water supplies to project contractors. The water rights of the projects are conditioned by the SWRCB to protect the beneficial uses of water within each respective project and jointly for the protection of beneficial uses in the Sacramento Valley and the Sacramento-San Joaquin Delta Estuary. The agencies coordinate and operate the CVP and SWP to meet the joint water right requirements in the Delta.

The Coordinated Operations Agreement (COA), signed in 1986, defines the project facilities and their water supplies, sets forth procedures for coordination of operations, identifies formulas for sharing joint responsibilities for meeting Delta standards as they existed in SWRCB Decision 1485 (D-1485), identifies how unstored flow will be shared, sets up a framework for exchange of water and services between the Projects, and provides for periodic review of the agreement.

Reclamation and DWR re-negotiated COA in 2018 and this ROC on LTO includes the new COA. The amendment stipulates a change in responsibility for making storage withdrawals to meet in-basin use (as noted in Table 1) and a change in export capacity when exports are constrained (Table 2).

Table 1. Sharing of Responsibility for Meeting In-basin Use

	CVP	SWP
W	80%	20%
AN	80%	20%
BN	75%	25%
D	65%	35%
C	60%	40%

Table 2. Sharing of Applicable Export Capacity When Exports Are Constrained

	CVP	SWP
Balanced Water Conditions	65%	35%
Excess Water Conditions	60%	40%

CVPIA (b)(2) Assumptions

The 2008 OCAP BA modeling included a dynamic representation of the Central Valley Project Improvement Act (CVPIA) 3406(b)(2) water allocation, management and related actions (B2). The selection of discretionary actions for use of B2 water in each year was based on a May 2003 Department of the Interior policy decision. The use of B2 water is assumed to continue in conjunction with the USFWS and NMFS BO RPA actions. The CalSim II implementation used for modeling does not dynamically account for the use of (b)(2) water, but rather assumes pre-determined USFWS BO upstream fish objectives for Clear Creek and American River below Nimbus Dam, and a pulse period exports limit. Other (b)(2) actions are assumed to be accommodated by USFWS and NMFS BO RPA actions for the American River, Stanislaus River, and Delta export restrictions.

Continued CALFED Agreements

The Environmental Water Account (EWA) was established in 2000 by the CALFED Record of Decision (ROD). The EWA was initially identified as a 4-year cooperative effort intended to operate from 2001 through 2004 but was extended through 2007 by agreement between the EWA agencies. It is uncertain, however, whether the EWA will be in place in the future and what actions and assets it may include. Because of this uncertainty, the EWA has not been included in the current CalSim II implementation.

One element of the EWA available assets is the Lower Yuba River Accord (LYRA) Component 1 water. In the absence of the EWA and implementation in CalSim II, the LYRA Component 1 water is assumed to be transferred to South of Delta (SOD) State Water Project (SWP) contractors to help mitigate the impact of the NMFS BO and D1641 on SWP exports during April and May. An additional 500 cfs of capacity is permitted at Banks Pumping Plant from July through September to export this transferred water.

USFWS Delta Smelt BO Actions

The USFWS Delta Smelt BO was released on December 15, 2008, in response to Reclamation's request for formal consultation with the USFWS on the coordinated operations of the Central Valley Project (CVP) and State Water Project (SWP) in California. To develop CalSim II modeling assumptions for the RPA documented in this BO, DWR led a series of meetings that involved members of fisheries and project agencies. This group has prepared the assumptions and CalSim II implementations to represent the RPA in the CalSim II model. The following actions of the USFWS BO RPA have been included in the COS CalSim II model simulation:

- Action 1: Adult Delta smelt migration and entrainment (RPA Component 1, Action 1 – First Flush)
- Action 2: Adult Delta smelt migration and entrainment (RPA Component 1, Action 2)
- Action 3: Entrainment protection of larval and juvenile Delta smelt (RPA Component 2)
- Action 4: Estuarine habitat during Fall (RPA Component 3)
- Action 5: Temporary spring head of Old River barrier and the Temporary Barrier Project (RPA Component 2)

A detailed description of the assumptions that have been used to model each action is included in the technical memorandum "Representation of U.S. Fish and Wildlife Service Biological Opinion Reasonable and Prudent Alternative Actions for CalSim II Planning Studies", prepared by an interagency working group under the direction of the lead agencies. This technical memorandum is included in the Appendix 5A of the LTO EIS (Reclamation 2015b).

NMFS BO Salmon Actions

The NMFS Salmon BO on long-term operations of the CVP and SWP was released on June 4, 2009. To develop CalSim II modeling assumptions for the RPA's documented in this BO, DWR led a series of meetings that involved members of fisheries and project agencies. This group has prepared the assumptions and CalSim II implementations to represent the RPA in the CalSim II model for future planning studies. The following NMFS BO RPA's have been included in the COS CalSim II model simulation:

- Action I.1.1: Clear Creek spring attraction flows
- Action I.4: Wilkins Slough operations
- Action II.1: Lower American River flow management
- Action III.1.3: Stanislaus River flows below Goodwin Dam
- Action IV.1.2: Delta Cross Channel gate operations
- Action IV.2.1: San Joaquin River flow requirements at Vernalis and Delta export restrictions
- Action IV.2.3: Old and Middle River flow management

For Action I.2.1, which calls for a percentage of years that meet certain specified end-of-September and end-of-April storage and temperature criteria resulting from the operation of Lake Shasta, no specific CalSim II modeling code is implemented to simulate the performance measures identified.

A detailed description of the assumptions that have been used to model each action is included in the technical memorandum "Representation of National Marine Fisheries Service Biological Opinion Reasonable and Prudent Alternative Actions for CalSim II Planning Studies", prepared by an interagency working group under the direction of the lead agencies. This technical memorandum is included in the in Appendix 5A of the LTO EIS (Reclamation 2015c)

Water Transfers

Lower Yuba River Accord (LYRA)

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

Phase 8 transfers

Phase 8 transfers are not included in the COS simulation.

Short-term or Temporary Water Transfers

Short term or temporary transfers such as Sacramento Valley acquisitions conveyed through Banks PP are not included in the COS simulation.

Specific Regulatory Assumptions

Lower American Flow Management

The American River Flow Management Standard (ARFMS) is included in the COS scenario.

The flow requirements of ARFMS are further described in Reclamation 2006.

Delta Outflow (Flow and Salinity)

SWRCB D-1641:

All Delta outflow requirements per SWRCB D-1641 are included in the COS simulation. Similarly, for the February through June period the X2 standard is included in the COS simulation.

USFWS BO (December, 2008) Action 4:

USFWS BO Action 4 requires additional Delta outflow to manage X2 in the fall months following wet and above normal years to maintain an average X2 for September and October no greater (more eastward) than 74 kilometers following wet years and 81 kilometers following above normal years. In November, the inflow to CVP/SWP reservoirs in the Sacramento Basin should be added to reservoir releases to provide an added increment of Delta inflow and to augment Delta outflow up to the fall X2 target. This action is included in the C.

Combined Old and Middle River Flows

USFWS BO restricts south Delta pumping to preserve certain OMR flows in three of its Actions: Action 1 to protect pre-spawning adult Delta smelt from entrainment during the first flush, Action 2 to protect pre-spawning adults from entrainment and from adverse hydrodynamic conditions, and Action 3 to protect larval Delta smelt from entrainment. CalSim II simulates these actions to a limited extent.

Brief description of USFWS BO Actions 1-3 implementations in CalSim is as follows: Action 1 is onset based on a turbidity trigger that takes place during or after December. This action requires limit on exports so that the average daily OMR flow is no more negative than -2,000 cfs for a total duration of 14 days, with a 5-day running average no more negative than -2,500 cfs (within 25 percent of the monthly criteria). Action 1 ends after 14 days of duration or when Action 3 is triggered based on a temperature criterion. Action 2 starts immediately after Action 1 and requires a range of net daily OMR flows to be no more negative than -1,250 to -5,000 cfs (with a 5-day running average within 25 percent of the monthly criteria). The Action continues

until Action 3 is triggered. Action 3 also requires net daily OMR flow to be no more negative than -1,250 to -5,000 cfs based on a 14 day running average (with a simultaneous 5-day running average within 25 percent). Although the range is similar to Action 2, the Action implementation is different. Action 3 continues until June 30 or when water temperature reaches a certain threshold. A more detailed description is included in the Appendix 5A of the LTO EIS (Reclamation 2015b).

NMFS BO Action 4.2.3 requires OMR flow management to protect emigrating juvenile winter-run, yearling spring-run, and Central Valley steelhead within the lower Sacramento and San Joaquin rivers from entrainment into south Delta channels and at the export facilities in the south Delta. This action requires reducing exports from January 1 through June 15 to limit negative OMR flows to -2,500 to -5,000 cfs. CalSim II assumes OMR flows required in NMFS BO are covered by OMR flow requirements developed for actions 1 through 3 of the USFWS BO as described in the Appendix 5A of the LTO EIS (Reclamation 2015c).

South Delta Export-San Joaquin River Inflow Ratio

NMFS BO Action 4.2.1 requires exports to be capped at a certain fraction of San Joaquin River flow at Vernalis during April and May while maintaining a health and safety pumping of 1,500 cfs.

Exports at the South Delta Intakes

Exports at Jones and Banks Pumping Plant are restricted to their permitted capacities per SWRCB D-1641 requirements. In addition, the south Delta exports are subjected to Vernalis flow-based export limits during April and May as required by Action 4.2.1. Additional 500 cfs pumping is allowed to reduce impact of NMFS BO Action 4.2.1 and D1641 on SWP during the July through September period.

Under D-1641 the combined export of the CVP Tracy Pumping Plant and SWP Banks Pumping Plant is limited to a percentage of Delta inflow. The percentage ranges from 35 to 45 percent during February depending on the January eight river index and is 35 percent during March through June months. For rest of the months 65 percent of the Delta inflow is allowed to be exported.

A minimum health and safety pumping of 1,500 cfs is assumed from January through June.

Delta Water Quality

The COS simulation includes SWRCB D-1641 salinity requirements. However, not all salinity requirements are included as CalSim II is not capable of predicting salinities in the Delta. Instead, empirically based equations and models are used to relate interior salinity conditions with the flow conditions. DWR's Artificial Neural Network (ANN) trained for salinity is used to predict and interpret salinity conditions at the Emmaton, Jersey Point, Rock Slough and Collinsville stations. Emmaton and Jersey Point standards are for protecting water quality conditions for agricultural use in the western Delta and they are in effect from April 1 to August

15. The EC requirement at Emmaton varies from 0.45 mmhos/cm to 2.78 mmhos/cm, depending on the water year type. The EC requirement at Jersey Point varies from 0.45 to 2.20 mmhos/cm, depending on the water year type. The Rock Slough standard is for protecting water quality conditions for M&I use for water exported through the Contra Costa Canal. It is a year-round standard that requires a certain number of days in a year with chloride concentration less than 150 mg/L. The number of days requirement is dependent upon the water year type. The Collinsville standard is applied during October through May months to protect water quality conditions for migrating fish species, and it varies between 12.5 mmhos/cm in May and 19.0 mmhos/cm in October.

The sea level rise change assumed at the Year 2030 results in a modified flow – salinity relationship in the Delta. An ANN, which is capable of emulating DSM2 results under the 15-cm sea level rise condition at the Year 2030 is used to simulate the flow-salinity relationship in CalSim II simulation for the No Action Alternative.

San Joaquin River Restoration Program

Friant Dam releases required by the San Joaquin River Restoration Program are included in the COS and the proposed action. More detailed description of the San Joaquin River Restoration Program is presented in the Appendix 3A "*No Action Alternative: Central Valley Project and State Water Project Operations*" of the LTO EIS (Reclamation 2015a).

Operations Criteria

Fremont Weir Operations

To provide seasonal floodplain inundation in the Yolo Bypass, the 14- and the two 18-foot elevation gates are opened between November 1 and March 15. The gates would open to allow a maximum flow of 6,000 cfs when the water surface elevation in the river reaches 28 feet. The gates are operated to limit maximum spill to 6,000 cfs until the Sacramento River stage reaches the existing Fremont Weir crest elevation. When the river stage is at or above the existing Fremont Weir crest elevation, the notch gates are assumed to be closed. While desired inundation period is on the order of 30 to 45 days, gates are not managed to limit to this range, instead the duration of the event is governed by the Sacramento River flow conditions. The spills at about 21 feet river stage would be around 1,000 cfs.

Delta Cross Channel Gate Operations

SWRCB D-1641 DCC standards provide for closure of the DCC gates for fisheries protection at certain times of the year. From November through January, the DCC may be closed for up to 45 days. From February 1 through May 20, the gates are closed every day. The gates may also be closed for 14 days during the May 21 through June 15 time period. Reclamation determines the timing and duration of the closures after discussion with USFWS, DFG, and NMFS.

NMFS BO Action 4.1.2 requires gates to be operated as described in the BO based on the presence of salmonids and water quality from October 1 through December 14; and gates to be

closed from December 15 to January 31, except for short-term operations to maintain water quality. CalSim II includes the NMFS BO DCC gate operations in addition to the D-1641 gate operations. When the daily flows in the Sacramento River at Wilkins Slough exceed 7,500 cfs (flow assumed to flush salmon into the Delta), DCC is closed for a certain number of days in a month as described in Appendix 5A of the LTO EIS (Reclamation 2015b). During October 1 – December 14, if the flow trigger condition is such that additional days of DCC gates closure is called for, however water quality conditions are a concern and the DCC gates remain open, then Delta exports are limited to 2,000 cfs for each day in question.

Allocation Decisions

CalSim II includes allocation logic for determining deliveries to north-of-Delta and south-of-Delta CVP and SWP contractors. The delivery logic uses runoff forecast information, which incorporates uncertainty in the hydrology, and standardized rule curves (i.e. Water Supply Index versus Demand Index Curve). The rule curves relate forecasted water supplies to deliverable "demand," and then use deliverable "demand" to assign subsequent delivery levels to estimate the water available for delivery and carryover storage. Updates of delivery levels occur monthly from January 1 through May 1 for the SWP and March 1 through May 1 for the CVP as runoff forecasts become more certain. The south-of-Delta SWP delivery is determined based on water supply parameters and operational constraints. The CVP system wide delivery and south-of-Delta delivery are determined similarly upon water supply parameters and operational constraints with specific consideration for export constraints.

San Luis Operations

CalSim II sets targets for San Luis storage each month that are dependent on the current South-of-Delta allocation and upstream reservoir storage. When upstream reservoir storage is high, allocations and San Luis fill targets are increased. During a prolonged drought when upstream storage is low, allocations and fill targets are correspondingly low. For the COS simulation, the San Luis rule curve is managed to minimize situations in which shortages may occur due to lack of storage or exports.

New Melones Operations

In addition to flood control, New Melones is operated for four different purposes: fishery flows, water quality, Bay-Delta flow, and water supply.

Fishery

In the COS Scenario, fishery flows refer to flow requirements of the 2009 NMFS BO Action III.1.3 (NMFS 2009). These flows are patterned to provide fall attraction flows in October and outmigration pulse flows in spring months (April 15 through May 15 in all years) and total up to 98.9 TAF to 589.5 TAF annually depending on the hydrological conditions based on the New Melones water supply forecast (the end-of-February New Melones Storage, plus the March - September forecast of inflow to the reservoir) (Tables 3 through 5).

Table 3. Annual Fishery Flow Allocation in New Melones

New Melones Water Supply Forecast (TAF)	Fishery Flows (TAF)
0 to 1,399.9	185.3
1,400 to 1,999.9	234.1
2,000 to 2,499.9	346.7
2,500 to 2,999.9	483.7
≥3,000	589.5

Table 4. Monthly "Base" Flows for Fisheries Purposes Based on the Annual Fishery Volume

Annual Fishery Flow Volume (TAF)	Monthly Fishery Base Flows (cfs)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr 1–15	May 16–31	Jun	Jul	Aug	Sep
98.9	110	200	200	125	125	125	250	250	0	0	0	0
185.3	577.4	200	200	212.9	214.3	200	200	150	150	150	150	150
234.1	635.5	200	200	219.4	221.4	200	500	284.4	200	200	200	200
346.7	774.2	200	200	225.8	228.6	200	1,471.4	1,031.3	363.3	250	250	250
483.7	796.8	200	200	232.3	235.7	1,521	1,614.3	1,200	940	300	300	300
589.5	841.9	300	300	358.1	364.3	1,648.4	2,442.9	1,725	1,100	429	400	400

Table 5. April 15 through May 15 "Pulse" Flows for Fisheries Purposes Based on the Annual Fishery Volume

Annual Fishery Flow Volume (TAF)	Fishery Pulse Flows (CFS)	
	April 15-30	May 1-15
185.3	687.5	666.7
234.1	1,000.0	1,000.0
346.7	1,625.0	1,466.7
483.7	1,212.5	1,933.3
589.5	925.0	2,206.7

Water Quality

Water quality releases include releases to meet the State Water Resources Control Board (SWRCB) Decision 1641 (D-1641) salinity objectives at Vernalis and the Decision 1422 (D-1422) dissolved oxygen objectives at Ripon. The Vernalis water quality requirement (SWRCB D-1641) is an electrical conductivity (EC) requirement of 700 and 1000 micromhos/cm for the irrigation (Apr-Aug) and non-irrigation (Sep-Mar) seasons, respectively.

Additional releases are made to the Stanislaus River below Goodwin Dam if necessary, to meet the D-1422 dissolved oxygen content objective. Surrogate flows representing releases for DO requirement in CalSim II are presented in Table 6. The surrogate flows are reduced for critical years where New Melones water supply forecast (the end-of-February New Melones Storage, plus the March - September forecast of inflow to the reservoir) is less than 940 TAF. These flows are met through releases from New Melones without any annual volumetric limit.

Table 6. Surrogate flows for D1422 DO requirement at Vernalis (TAF)

	Non-Critical Years	**Critical Years**
January	0.0	0.0
February	0.0	0.0
March	0.0	0.0
April	0.0	0.0
May	0.0	0.0
June	15.2	11.9
July	16.3	12.3
August	17.4	12.3
September	14.8	11.9
October	0.0	0.0
November	0.0	0.0
December	0.0	0.0

Bay-Delta Flows

Bay-Delta flow requirements are defined by D-1641 flow requirements at Vernalis (not including pulse flows during the April 15 - May 16 period). These flows are met through releases from New Melones without any annual volumetric limit. D-1641 requires the flow at Vernalis to be maintained during the February through June period. The flow requirement is based on the required location of "X2" and the San Joaquin Valley water year hydrologic classification (60-20-20 Index) as summarized in Table 7.

Table 7. Bay-Delta Vernalis Flow Objectives (average monthly cfs)

60-20-20 Index	Flow Required if X2 is West of Chipps Island	Flow required if X2 is East of Chipps Island
Wet	3,420	2,130
Above Normal	3,420	2,130
Below Normal	2,280	1,420
Dry	2,280	1,420
Critical	1,140	710

Water Supply

Water supply refers to deliveries from New Melones to water rights holders (Oakdale Irrigation District and South San Joaquin Irrigation District) and CVP eastside contractors (Stockton East Water District and Central San Joaquin Water Control District). Water is provided to Oakdale ID and South San Joaquin ID in accordance with their 1988 Settlement Agreement with Reclamation (up to 600 TAF based on hydrologic conditions), limited by consumptive use. The conservation account of up to 200 TAF storage capacity defined under this agreement is not modeled in CalSim II.

Water Supply-CVP Eastside Contractors

Annual allocations are determined using New Melones water supply forecast (the end-of-February New Melones Storage, plus the March - September forecast of inflow to the reservoir) for Stockton East WD and Central San Joaquin WCD (Table 8) and are distributed throughout a year using monthly patterns.

Table 8. CVP Contractor Allocations

New Melones Water Supply Forecast (TAF)	CVP Contractor Allocation (TAF)
<1,400	0
1,400 to 1,800	49
>1,800	155

3.2 DSM2 Assumptions for Current Operations Scenario

The following is a description of the assumptions listed in Appendix D Attachment 2-3 DSM2 Model Assumptions Callouts.

River Flows

Same as the WOA Scenario.

Tidal Boundary

Same as the WOA Scenario.

Water Quality

Martinez EC

Same as the WOA Scenario.

Vernalis EC

Same as the WOA Scenario.

Morphological Changes

Same as the WOA Scenario.

Facilities

Delta Cross Channel

Delta Cross Channel gate operations are modeled in DSM2. The number of days in a month the DCC gates are open is based on the monthly time series from CalSim II.

South Delta Temporary Barriers

South Delta Temporary Barriers are included in the COS simulation. The three agricultural temporary barriers located on Old River, Middle River and Grant Line Canal are included in the model. The fish barrier located at the Head of Old River is also included in the model.

Clifton Court Forebay Gates

Clifton Court Forebay gates are operated based on the Priority 3 operation, where the gate operations are synchronized with the incoming tide to minimize the impacts to low water levels in nearby channels. The Priority 3 operation is described in the 2008 OCAP BA Appendix F Section 5.2 (USBR, 2008b).

Operations Criteria

South Delta Temporary Barriers

South Delta Temporary Barriers are operated based on San Joaquin flow conditions. Head of Old River Barrier is assumed to be only installed from September 16 to November 30 and is not installed in the spring months, based on the USFWS Delta Smelt BO Action 5. The agricultural barriers on Old and Middle Rivers are assumed to be installed starting from May 16 and the one on Grant Line Canal from June 1. All three agricultural barriers are allowed to operate until November 30. The tidal gates on Old and Middle River agricultural barriers are assumed to be tied open from May 16 to May 31.

Montezuma Salinity Control Gate

The radial gates in the Montezuma Slough Salinity Control Gate Structure are assumed to be tidally operating from October through February each year, to minimize propagation of high salinity conditions into the interior Delta.

3.3 HEC5Q and Reclamation Temperature Model Assumptions for the Current Operations Scenario

The following is a description of the assumptions listed in Appendix D Attachment 2-4 HEC5Q and Reclamation Temperature Model Assumptions Callouts.

Sacramento-Trinity Rivers

Reservoir Storage Conditions

Trinity Lake, Lewiston Lake, Whiskeytown Lake, Shasta Lake, Keswick Reservoir, and Black Butte Lake are all operated per CalSim II output.

Shasta Temperature Management

Similar to 2009 NMFS BiOp Appendix B (See 2015 LTO for details).

Trinity Temperature Management

Releases from lower, auxiliary outlet are allowed when normal outlet releases are too warm.

American River

Reservoir Storage Conditions

Folsom Lake and Lake Natoma are operated per CalSim II output.

Folsom Temperature Management

Similar to 2009 NMFS BiOp Appendix B (See 2015 LTO for details).

Stanislaus River

Reservoir Storage Conditions

New Melones Lake, Lake Tulloch, and Goodwin Reservoir are all operated per CalSim II output.

Feather River

Reservoir Storage Conditions

Lake Oroville and Thermolito Afterbay are operated per CalSim II output.

3.4 Egg Mortality Model Assumptions for the Current Operations Scenario

Same as the WOA scenario.

4 Assumptions for the Proposed Action

This section presents the assumptions used in developing the CalSim II, DSM2, HEC5Q, Reclamation Temperature Model and Egg Mortality Model simulations of the Proposed Action (PA) considered for the ROC on LTO ESA Consultation.

The PA Scenario includes modified Shasta temperature, Delta Smelt habitat, and OMR actions to incorporate real-time monitoring and focusing water resources on locations and timing with the most benefits for fish. The PA includes the New Melones Stepped Release plan to obtain a more sustainable operation on the Stanislaus River, as well as the 2017 Flow Management Standard and "planning minimum" for the American River.

The PA includes projected climate change and sea level rise assumptions corresponding to the Year 2030. Change in climate results in the changes in the reservoir and tributary inflows included in CalSim II. The sea level rise changes result in modified flow-salinity relationships in the Delta. The climate change and sea level rise assumptions at Year 2030 are described in detail in Section 5. The CalSim II simulation for the COS does not consider any adaptation measures that would result in managing the CVP and SWP system in a different manner than today to reduce climate impacts. For example, future changes in reservoir flood control reservation to better accommodate a seasonally changing hydrograph may be considered under future programs but are not considered under this consultation.

4.1 CalSim II Assumptions for the Proposed Action Scenario

The following is a description of the assumptions listed in Appendix D Attachment 2-2 CalSim II Model Assumptions Callouts.

Hydrology

Inflows/Supplies

Same as the WOA Scenario.

Level of Development

Same as the WOA Scenario.

Demands, Water Rights, CVP/SWP Contracts

Same as the COS Scenario.

Facilities

Same as the COS Scenario.

Fremont Weir

Same as the COS Scenario.

CVP C.W. Bill Jones Pumping Plant (Tracy PP) Capacity

Same as the COS Scenario.

SWP Banks Pumping Plant Capacity

Same as the COS Scenario.

CCWD Intakes

Same as the COS Scenario.

Regulatory Standards

The regulatory standards that govern the operations of the CVP and SWP facilities are briefly described below. Specific assumptions related to key regulatory standards are also outlined below.

D-1641 Operations

Same as the COS Scenario.

Coordinated Operations Agreement (COA)

Same as the COS Scenario.

CVPIA (b)(2) Assumptions

The Central Valley Project Improvement Act (CVPIA) 3406(b)(2) water allocation, management and related actions (B2) would not be included in this scenario.

Clear Creek Flows

The regulated condition under the PA is assumed to be similar to the COS, therefore the model implementation has been assumed to be same as the COS Scenario.

However, Reclamation proposes to release Clear Creek flows in accordance with the 1960 Memorandum of Agreement (MOA) with CDFW, and the April 15, 2002 SWRCB permit, which established minimum flows to be released to Clear Creek at Whiskeytown Dam. Reclamation proposes a minimum baseflow in Clear Creek of 150 cfs year-round in all year types except Critical year types. In Critical years, Clear Creek base flows may be reduced below 150 cfs based on available water from Trinity Reservoir. Additional flow may be required for temperature management during the fall.

In addition, Reclamation proposes to create pulse flows for both channel maintenance and spring attraction flows. For spring attraction flows, Reclamation would release 10 Thousand Acre-Feet (measured at the release), with daily release up to the safe release capacity (approximately 900 cfs, depending on reservoir elevation and downstream capacity), in all year-types except for Critical year-types to be shaped by the Clear Creek Implementation Team in coordination with CVO.

Continued CALFED Agreements

Same as the COS Scenario.

USFWS Delta Smelt BO Actions

The USFWS Delta Smelt BO RPA actions are replaced with actions developed for the proposed action as summarized below and described further in this document.

NMFS BO Salmon Actions

The NMFS Salmon BO RPA actions are replaced with actions developed for the proposed action as summarized below and described further in this document.

Water Transfers

Same as the COS Scenario.

Specific Regulatory Assumptions

Lower American Flow Management

Model includes Water Forum's 2017 Lower American Flow Management Standard where the flows range from 500 to 2000 cfs based on time of year and annual hydrology. Planning minimum storage is represented with a 275 taf end-of September storage target in Folsom and will be further refined in the future.

Delta Outflow (Flow and Salinity)

SWRCB D-1641:

Same as the COS Scenario.

Combined Old and Middle River Flows

Reclamation and DWR propose to operate the CVP and SWP in a manner that maximizes exports while minimizing entrainment of fish and protecting critical habitat.

Proposed OMR management is modeled as follows:

Projects operate to an OMR index no more negative than a 14-day moving average of -5,000 cfs between January 1 and June 30 except for the following conditions:

- Integrated Early Winter Pulse Protection: After December 1, and when the 3-day average turbidity is 12 NTU or greater at Old River at Bacon Island (OBI), Prisoner's Point (PPT), and Victoria Canal (VCU), Reclamation and DWR propose to operate to -2,000 cfs of the 14-day average OMR index for 14 days. The same model index of SAC_RI developed for the USFWS RPA Action I representation is used in the model to determine when the turbidity exceeds 12 NTU.
- Turbidity Bridge Avoidance: For January and February in any water year type, if the Turbidity trigger is reached (SAC_RI greater than or equal to 20,000 cfs), Projects operate to 14-day average OMR Index if -2000 cfs for five days. For March through June of Wet and Above Normal years, it is assumed that there will be one event of turbidity bridge avoidance in each month (-2000 cfs for five days).
- WIIN Act Storm-Related OMR Flexibility: It is assumed that there may be storm-related OMR management flexibility in January and February. In wet years, it is assumed that storm events will coincide with turbidity bridge events and no OMR flexibility is modeled. In Above Normal and Below Normal years, it is assumed that there will be one opportunity in January and one opportunity in February to operate to a more negative OMR index than -5000 cfs. This is modeled as 14-day OMR index of -6000 cfs for 7 days in each month. In dry years, it is assumed that one opportunity occurs either in January or February but not both months.

- Species-specific cumulative salvage or loss threshold: Even though salvage or loss cannot be modeled using CalSim, it is assumed that this threshold would be reached by April and May of above normal and below normal years and species-specific offramp would be met by June. The OMR restriction for this condition is defined as and 14-day average OMR index of -3,500 cfs.

South Delta Export-San Joaquin River Inflow Ratio

NMFS BO Action 4.2.1 would not be implemented under this scenario.

Exports at the South Delta Intakes

Same as the COS Scenario.

Delta Water Quality

Same as the COS Scenario.

San Joaquin River Restoration Program

Same as the COS Scenario.

Operations Criteria

Fremont Weir Operations

Same as the COS Scenario.

Delta Cross Channel Gate Operations

Delta Cross Channel (DCC) Gates are assumed to be operated based on the proposed DCC operational changes describe in Table 2 of the Delta Cross Channel Temporary Closure Final Environmental Assessment (Reclamation 2012a). However, model representation of the proposed DCC operations remain the same as the COS Scenario as the proposed changes cannot be captured within the CalSim model.

Allocation Decisions

Same as the COS Scenario.

San Luis Operations

Same as the COS Scenario.

New Melones Operations

In addition to flood control, New Melones is operated for three different purposes: fishery flows, water quality, and water supply.

Fishery

These flows are patterned to provide fall attraction flows in October and outmigration pulse flows in spring months (April 15 through May 15 in all years), and total up to 98.9 TAF to 483.7 TAF annually depending on the hydrological conditions based on the San Joaquin 60-20-20 Index (Tables 9 through 11).

Table 9. Annual Fishery Flow Allocation

60-20-20 Index	Fishery Flows (TAF)
Critical	185.3
Dry	234.1
Below Normal	346.7
Above Normal	346.7
Wet	483.7

Table 10. Monthly "Base" Flows for Fishery Purposes Based on the Annual Fishery Volume

Annual Fishery Flow Volume (TAF)	Monthly Fishery Base Flows (cfs)											
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr. 1-14	May 16-31	June	July	Aug.	Sept.
185.3	577.4	200	200	212.9	214.3	200	200	150	150	150	150	150
234.1	635.5	200	200	219.4	221.4	200	500	284.4	200	200	200	200
346.7	774.2	200	200	225.8	228.6	200	1,471.4	1,031.3	363.3	250	250	250
483.7	796.8	200	200	232.3	235.7	1,521	1,614.3	1,200	940	300	300	300

Table 11. April 15 through May 15 "Pulse" Flows for Fishery Purposes Based on the Annual Fishery Volume

Annual Fishery Flow Volume (TAF)	Fishery Pulse Flows (cfs)	
	April 15-30	May 1-15
185.3	687.5	666.7
234.1	1,000	1,000
346.7	1,625	1,466.7
483.7	1,212.5	1,933.3

Water Quality

Releases are made to the Stanislaus River below Goodwin Dam to meet the D-1422 dissolved oxygen content objective. Surrogate flows representing releases for dissolved oxygen requirement in CalSim II are presented in Table 12. The surrogate flows are reduced for critical years under the San Joaquin 60-20-20 Index. These flows are met through releases from New Melones without any annual volumetric limit.

Table 12. Surrogate flows representing releases for dissolved oxygen requirement in CalSim II

	Non-Critical Years	Critical Years
January	0.0	0.0
February	0.0	0.0
March	0.0	0.0
April	0.0	0.0
May	15.2	11.9
June	16.3	12.3
July	17.4	12.3
August	14.8	11.9
September	0.0	0.0
October	0.0	0.0
November	0.0	0.0
December	0.0	0.0

Water Supply

Water supply refers to deliveries from New Melones to water rights holders (Oakdale Irrigation District [ID] and South San Joaquin ID) and CVP eastside contractors (Stockton East Water District [WD] and Central San Joaquin Water Control District [WCD]).

Water is provided to Oakdale ID and South San Joaquin ID in accordance with their 1988 Settlement Agreement with Reclamation (up to 600 TAF based on hydrologic conditions), limited by consumptive use. The conservation account of up to 200 TAF storage capacity defined under this agreement is not modeled in CalSim II.

Water Supply-CVP Eastside Contractors

Annual allocations are determined using the San Joaquin 60-20-20 Index for Stockton East WD and Central San Joaquin WCD (Table 13) and are distributed throughout 1 year using monthly patterns.

Table 13. Annual allocations for Stockton East WD and Central San Joaquin WCD

60-20-20 Index	CVP Contractor Allocation (TAF)
Critical	0
Dry	49
Below Normal, Above Normal, and Wet	155

4.2 DSM2 Assumptions for the Proposed Action Scenario

The following is a description of the assumptions listed in Appendix D Attachment 2-3 DSM2 Model Assumptions Callouts.

River Flows

Same as the WOA Scenario.

Tidal Boundary

Same as the WOA Scenario.

Water Quality

Martinez EC

Same as the WOA Scenario.

Vernalis EC

Same as the WOA Scenario.

Morphological Changes

Same as the WOA Scenario.

Facilities

Delta Cross Channel

Same as the COS Scenario.

South Delta Temporary Barriers

The three agricultural temporary barriers located on Old River, Middle River and Grant Line Canal are included in the model; however, the fish barrier located at the Head of Old River is not included in the model.

Clifton Court Forebay Gates

Same as the COS Scenario.

Operations Criteria

South Delta Temporary Barriers

South Delta Temporary Barriers are operated based on San Joaquin flow conditions. The agricultural barriers on Old and Middle Rivers are assumed to be installed starting from May 16 and the one on Grant Line Canal from June 1. All three agricultural barriers are allowed to operate until November 30. The tidal gates on Old and Middle River agricultural barriers are assumed to be tied open from May 16 to May 31. Head of Old River Barrier would not be installed.

Montezuma Salinity Control Gate

The radial gates in the Montezuma Slough Salinity Control Gate Structure are assumed to be tidally operating from October through February each year, to minimize propagation of high salinity conditions into the interior Delta.

Gate operations occur in October through February. Gates open when upstream water level is 0.3 ft above downstream water level. Gates close when current is less than -0.1 fps. Gates are open in March through September.

Reclamation proposes to eliminate Fall X2 and instead operate the Suisun Marsh Salinity Control Gates in September and October of Above-Normal and Below-Normal Water year types. Iterative analysis using the DSM2 model would be required to identify associated changes in Delta outflow and reservoir releases required to support changes in Outflow. This analysis has not completed and therefore the effects of this operation have not been incorporated in the CalSim II model (would require an modified implementation of the flow-salinity ANN model).

4.3 HEC5Q and Reclamation Temperature Model Assumptions for the Proposed Action Scenario

The following is a description of the assumptions listed in Appendix D Attachment 2-4 HEC5Q and Reclamation Temperature Model Assumptions Callouts.

Sacramento-Trinity Rivers

Reservoir Storage Conditions

Same as the COS scenario.

Shasta Temperature Management

Proposed Action temperature strategy focuses on maximizing duration of temperature below 53.5^0 F at Sacramento River at Clear Creek (CCR) from May 15th through October 31st. The strategy consists of four temperature tiers, based on Shasta cold water pool or storage volume. As Shasta cold water pool or storage decrease, the 53.5^0 F compliance time window narrows or

focuses on the projected time when the Winter-run eggs have the highest dissolved oxygen requirement. The updated strategy applies a tactical approach. Temperature release targets are adjusted based on information from near-term changes in Shasta storage and meteorological conditions.

Trinity Temperature Management

Same as the COS scenario.

American River

Reservoir Storage Conditions

Same as the COS scenario.

Folsom Temperature Management

Same as the COS scenario.

Stanislaus River

Reservoir Storage Conditions

Same as the COS scenario.

Feather River

Reservoir Storage Conditions

Same as the COS scenario.

4.4 Egg Mortality Model Assumptions for the Proposed Action Scenario

Same as the WOA scenario.

5 Planning Horizon - Year 2030 Climate Condition

The Without Action, the Current Operations Scenario, and the Proposed Action are simulated at Year 2030 conditions. Changes in climate conditions and sea level (15 cm rise) were assumed at Year 2030 and are consistent within all alternatives. Using the BDCP EIR/S approach, the climate scenario was derived based on sampling of the ensemble of GCM projections rather than one single realization or a handful of individual realizations. The Q5 scenario that represents the central tendency of the climate projections was selected.

Simulation of climate change and sea level rise effects in CalSim II modeling of the Alternatives is accomplished by:

- Incorporating the modified CalSim II inputs reflecting climate change for parameters including inflows, water year types, runoff forecasts, and Delta water temperature.
- Incorporating modified ANNs to reflect the flow-salinity response under sea level change.

Simulation of the tidal marsh restoration areas and sea level rise effects in DSM2 modeling of the alternatives is accomplished by:

- Incorporating consistent grid changes identified in corroboration simulation into the DSM2 model for the sea level rise condition.
- Modifying the downstream stage and EC boundary conditions at Martinez in the DSM2 model using the appropriate regression equation for the 15 cm sea level rise. The adjusted astronomical tide specified at Martinez in the alternatives is modified using the correlations shown in Table 14. The Martinez EC boundary condition resulting from the G-model is modified using the correlations specified in the Table 14.

Table 14. Correlation to Transform Baseline Martinez Stage and EC for use in alternatives DSM2 Simulations at Year 2030

Scenario	Martinez Stage (feet NGVD 29)		Martinez EC (µS/cm)	
	Correlation	Lag (min)	Correlation	Lag (min)
Year 2030 (15cm SLR)	Y = 1.0033*X + .47	-1	Y = 0.9954* X + 556.3	0

Notes:

X = Baseline Martinez stage or EC
Y = Alternative Martinez stage or EC

6 References

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Appendix D – Modeling

Attachment 2-2 – CalSim II Model Assumptions Callouts

Introduction

The assumptions for all Reclamation ROC on LTO model simulations are summarized in Appendix D Attachment 2-1 Model Assumptions.

CalSim II Modeling Assumptions Callouts

The following matrix summarizes the assumptions used for the CalSim II models:

- Without Action 011519
- Current Operations 011319
- Proposed Action 011519

	Without Action (WOA)	***Current Operations (COS)***	***Proposed Action (PA)***
GENERAL			
Planning horizon[a]	Year 2030	Same as WOA	Same as WOA
Period of simulation	82 years (1922-2003)	Same as WOA	Same as WOA
HYDROLOGY			
Climate Condition	ELT Q5 projected changes in temperature, and precipitation; Sea level rise increased by 15cm.	Same as WOA	Same as WOA
Inflows/Supplies	Modified inflows based on historical hydrology and projected climate condition.	Same as WOA	Same as WOA
Level of development	Projected 2030 level[c]	Same as WOA	Same as WOA
DEMANDS, WATER RIGHTS, CVP/SWP CONTRACTS			
Sacramento River Region (excluding American River)			
CVP[d]	CVP service demands reflect land-use basis, Settlement Contractor demands represented by historical diversion levels. Deliveries are made as possible without CVP facility operations up to full contract amounts.	Land-use based, full build-out of contract amounts, except for Settlement Contractors represented with historical diversions.	Same as COS
SWP (FRSA)[e]	Demands reflect land-use basis. Deliveries are made as possible without SWP facility operations up to full contract amounts.	Land-use based, limited by contract amounts	Same as COS

	Without Action (WOA)	***Current Operations (COS)***	***Proposed Action (PA)***
Non-project	Land use based, limited by water rights and SWRCB Decisions for Existing Facilities. Deliveries are made as possible given hydrologic conditions.	Land use based, limited by water rights and SWRCB Decisions for Existing Facilities	Same as COS
Antioch Water Works	Pre-1914 water right	Same as WOA	Same as WOA
Federal refuges	Firm Level 1 water supply needs are represented – deliveries are made as possible given hydrologic conditions.	Firm Level 2 water supply needs	Same as COS
Sacramento River Region - American River[g]			
Water rights	Year 2025, full water rights. Deliveries are made as possible given hydrologic conditions and without CVP storage operations.	Year 2025, full water rights	Same as COS
CVP	Year 2025 full contracts; Deliveries are made as possible given hydrologic conditions and without CVP storage/conveyance operations.	Year 2025, full contracts except for Settlement Contractors at historical diversions, including Freeport Regional Water Project	Same as COS
San Joaquin River Region[h]			
Friant Unit	No diversions are made from Friant Dam to satisfy project demands.	Limited by contract amounts, based on current allocation policy	Same as COS
Lower Basin	Land-use based, based on district level operations and constraints	Land-use based, based on district level operations and constraints	Same as COS
Stanislaus River	Land-use based demands met as possible without New Melones operations.	Land-use based, Revised Operations Plan (2008 model assumptions) and NMFS BO (Jun 2009) Actions III.1.2 and III.1.3	Land-use based, Stepped Release Plan (SRP)
San Francisco Bay, Central Coast, Tulare Lake and South Coast Regions (CVP/SWP project facilities)			
CVP[d]	No project deliveries.	Demand based on contract amounts	Same as COS
CCWD[j]	No project deliveries.	195 TAF/yr CVP contract supply and water rights	Same as COS
SWP[e,k]	No project deliveries.	Demand based on Table A amounts	Same as COS
Article 56	No project deliveries.	Based on 2001-08 contractor requests	Same as COS

	Without Action (WOA)	*Current Operations (COS)*	*Proposed Action (PA)*
Article 21	No project deliveries.	MWD demand up to 200 TAF/month from December to March subject to conveyance capacity, KCWA demand up to 180 TAF/month and other contractor demands up to 34 TAF/month in all months, subject to conveyance capacity	Same as COS
North Bay Aqueduct (NBA)	No project deliveries.	77 TAF/yr demand under SWP contracts, up to 43.7 cfs of excess flow under Fairfield, Vacaville and Benecia Settlement Agreement	Same as COS
Federal refuges	Firm Level 2 demands are represented – deliveries are made as possible given hydrologic conditions.	Firm Level 2 water needs	Same as COS
FACILITIES			
Systemwide			
Systemwide	Existing Facilities operated only to maintain facility integrity. CalSim II is a monthly timestep model and therefore results do not reflect reasonable storage or flow release conditions for sub-monthly flood events whenever storage is less than full capacity for the month	Existing facilities	Same as COS
Sacramento River Region			
Shasta Lake	Existing Facilities operated only to maintain facility integrity. CalSim II is a monthly timestep model and results do not reflect reasonable storage or flow release conditions for flood events whenever storage is less than full capacity for the month	Existing, 4,552 TAF capacity	Same as COS
Red Bluff Diversion Dam	Pumping Plant not operated	Diversion dam gates out all year, Pumping Plant operated to deliver CVP water	Same as COS

	Without Action (WOA)	***Current Operations (COS)***	***Proposed Action (PA)***
Fremont Weir	Notched Fremont Weir with gates closed (equivalent to no-notch condition)	Notched Fremont Weir as represented in Yolo Bypass Salmonid Habitat Restoration and Fish Passage EIS/EIR Alternative 1 (preferred alternative)	Same as COS
Colusa Basin	Water rights/settlement diversions only, as water is available, no storage	Existing conveyance and storage facilities	Same as COS
Upper American River[g,l]	Water rights diversions only	PCWA American River Pump Station	Same as COS
Lower Sacramento River	Water rights diversions only	Freeport Regional Water Project[n]	Same as COS
San Joaquin River Region			
Millerton Lake (Friant Dam)	Existing facility, operated only to maintain facility structural integrity	Existing, 520 TAF capacity	Same as COS
Lower San Joaquin River	City of Stockton Delta Water Supply Project, 30-mgd capacity; operation allowed assuming it was non project	City of Stockton Delta Water Supply Project, 30-mgd capacity	Same as COS
SWP Banks Pumping Plant (South Delta)	Pumps shut down	Physical capacity is 10,300 cfs but 6,680 cfs permitted capacity in all months. Pumping can be up to 10,300 cfs during Dec 15 – Mar 15 depending on Vernalis flow conditions; additional capacity of 500 cfs (up to 7,180 cfs) allowed Jul – Sep for reducing impact of NMFS BO (Jun 2009) Action IV.2.1 Phase II on SWP	Physical capacity is 10,300 cfs but 6,680 cfs permitted capacity in all months. Pumping can be up to 10,300 cfs during Dec 15 – Mar 15 depending on Vernalis flow conditions; additional capacity of 500 cfs (up to 7,180 cfs) allowed Jul – Sep for reducing impact of OMR action on SWP exports
CVP C.W. Bill Jones Pumping Plant (Tracy PP)	Pumps shut down	Permit capacity is 4,600 cfs in all months (allowed for by the Delta-Mendota Canal–California Aqueduct Intertie)	Same as COS
Upper Delta-Mendota Canal Capacity	Existing facility, not operated	Existing plus 400 cfs Delta-Mendota Canal–California Aqueduct Intertie	Same as COS
CCWD Intakes	Los Vaqueros Reservoir with existing storage capacity (160 TAF), and existing intakes except for Mallard Slough Intake. Intakes only divert water rights water	Los Vaqueros Reservoir with existing storage capacity (160 TAF), and existing intakes except for Mallard Slough Intake	Same as COS

	Without Action (WOA)	*Current Operations (COS)*	*Proposed Action (PA)*
San Francisco Bay Region			
South Bay Aqueduct (SBA)	Existing facility, not operated	SBA rehabilitation, 430 cfs capacity from junction with California Aqueduct to Alameda County FC&WSD Zone 7 diversion point	Same as COS
South Coast Region			
California Aqueduct East Branch	Existing facility, not operated	Existing capacity	Same as COS
REGULATORY STANDARDS			
North Coast Region			
Trinity River			
Minimum flow below Lewiston Dam	None	Trinity EIS Preferred Alternative (369-815 TAF/yr)	Same as COS
Trinity River Fall Augmentation Flows	None	420 cfs August 1 through September 30 in all but wet years	Same as COS
Trinity Reservoir end-of-September minimum storage	No target	Trinity EIS Preferred Alternative (600 TAF as able)	Same as COS
Sacramento River Region			
Clear Creek			
Minimum flow below Whiskeytown Dam	None	Downstream water rights, 1963 USBR Proposal to USFWS and NPS, predetermined CVPIA 3406(b)(2) flows, and NMFS BO (Jun 2009) Action I.1.1	Same as COS
Upper Sacramento River			
Shasta Lake end-of-September minimum storage	No target	NMFS 2004 Winter-run Biological Opinion, (1900 TAF in non-critically dry years), and NMFS BO (Jun 2009) Action I.2.1 (NMFS BiOp storage objectives not explictly modeled; achieved through project allocation procedures when hydrologically feasible)	1900 TAF in non-critically dry years (not explicitly modeled - achieved through project allocation profiles when hydrologically feasible)
Minimum flow below Keswick Dam	None	SWRCB WR 90-5; NMFS BO (Jun 2009) Action I.2.2 achieved as possible through other modeled actions	Same as COS

	Without Action (WOA)	***Current Operations (COS)***	***Proposed Action (PA)***
Feather River			
Minimum flow below Thermalito Diversion Dam	None	2006 Settlement Agreement (700 / 800 cfs)	Same as COS
Minimum flow below Thermalito Afterbay outlet	None	1983 DWR, DFG Agreement (750-1,700 cfs)	Same as COS
Yuba River			
Minimum flow below Daguerre Point Dam	D-1644 Operations (Lower Yuba River Accord)[r]	Same as WOA	D-1644 Operations (Lower Yuba River Accord)
American River			
Minimum flow below Nimbus Dam	None	American River Flow Management[s] as required by NMFS BO (Jun 2009) Action II.1[v]	American River Flow Management Standard, per 2017 Water Forum Agreement with a planning minimum end of September storage target of 275 TAF
Minimum Flow at H Street Bridge	None	SWRCB D-893	Same as COS
Lower Sacramento River			
Minimum flow near Rio Vista	None	SWRCB D-1641	Same as COS
San Joaquin River Region			
Mokelumne River			
Minimum flow below Camanche Dam	FERC 2916-029, 1996 (Joint Settlement Agreement) (100-325 cfs)	Same as WOA	Same as WOA
Minimum flow below Woodbridge Diversion Dam	FERC 2916-029, 1996 (Joint Settlement Agreement) (25-300 cfs)	Same as WOA	Same as WOA
Stanislaus River			
Minimum flow below Goodwin Dam	None	1987 USBR, DFG agreement, and flows required for NMFS BO (Jun 2009) Action III.1.2 and III.1.3[v]	Flows per New Melones SRP
Minimum dissolved oxygen	None	SWRCB D-1422	Model representation same as COS
Merced River			
Minimum flow below Crocker-Huffman Diversion Dam	Davis-Grunsky (180-220 cfs, Nov-Mar), and Cowell Agreement	Same as WOA	Same as WOA
Minimum flow at Shaffer Bridge	FERC 2179 (25-100 cfs)	Same as WOA	Same as WOA

	Without Action (WOA)	***Current Operations (COS)***	***Proposed Action (PA)***
Tuolumne River			
Minimum flow at Lagrange Bridge	FERC 2299-024, 1995 (Settlement Agreement) (94-301 TAF/yr)	Same as WOA	Same as WOA
San Joaquin River			
San Joaquin River below Friant Dam/ Mendota Pool	None	San Joaquin River Restoration-full flows, not constrained by current river capacity, model implementation does not include any recapture/recirculation	Same as COS
Maximum salinity near Vernalis	No target	SWRCB D-1641	Stanislaus contribution per New Melones SRP
Minimum flow near Vernalis	None	SWRCB D-1641, and NMFS BO (Jun 2009) Action IV.2.1[v]	Stanislaus contribution per New Melones SRP
Sacramento River–San Joaquin Delta Region			
Delta Outflow Index (Flow, NDOI)	None	SWRCB D-1641 and FWS BO (Dec 2008) Action 4	SWRCB D-1641
Delta Cross Channel gate operation	Gates closed	SRWCB D-1641 with additional days closed from Oct 1 – Jan 31 based on NMFS BO (Jun 2009) Action IV.1.2 (closed during flushing flows from Oct 1 – Dec 14 unless adverse water quality conditions would result)	Gate operations per Multi Year Study Program; model representation same as COS
South Delta exports (Jones PP and Banks PP)	Pumps turned off	SWRCB D-1641, Vernalis flow-based export limits Apr 1 – May 31 as required by NMFS BO (Jun, 2009) Action IV.2.1 (additional 500 cfs allowed for Jul – Sep for reducing impact on SWP)	SWRCB D-1641 Vernalis flow-based export limits Apr 1 – May 31, (additional 500 cfs allowed for Jul – Sep for reducing impact on SWP)
Combined Flow in Old and Middle River (OMR)	No target	FWS BO (Dec 2008) Actions 1 through 3 and NMFS BO (Jun 2009) Action IV.2.3	OMR target of -5,000 cfs January through June except for 5 day of -2,000 cfs when turbidity bridge occurs and 7 days of 6,000 cfs when increased pumping due to storm is possible, and -3,500 cfs in April and May of AN and BN years; followed by "first flush" action only if it occurs in December (14 days of -2,000 cfs)

	Without Action (WOA)	*Current Operations (COS)*	*Proposed Action (PA)*
OPERATIONS CRITERIA: RIVER-SPECIFIC			
Sacramento River Region			
Upper Sacramento River: Flow objective for navigation (Wilkins Slough)	None	Flow objective for Wilkins Slough based on month, CVP allocation, and Shasta storage condition to reflect CVP operations for local delivery.	Same as COS
American River: Folsom Dam flood control	Variable 400/600 flood control diagram (without outlet modifications)	Same as WOA	Same as WOA
Feather River: Flow at Mouth of Feather River (above Verona)	None	Maintain DFG/DWR flow target of 2,800 cfs for Apr – Sep dependent on Oroville inflow and FRSA allocation	Same as COS
San Joaquin River Region			
Stanislaus River: Flow below Goodwin Dam[i]	None	1987 USBR, DFG agreement, and flows required for NMFS BO (Jun 2009) Action III.1.2 and III.1.3[v]	Flows per New Melones SRP
San Joaquin River: Salinity at Vernalis	No target	Grasslands Bypass Project (full implementation)	Same as COS
OPERATIONS CRITERIA: SYSTEMWIDE			
CVP water allocation			
Settlement / Exchange	Allocation set to 75% / 77% to account for pre-CVP water rights and ability to divert off the rivers.	100% (75% in Shasta critical years)	Same as COS
Refuges	Level 1 water needs met off the river (Model uses L2 demands, and 75% allocation to enable Level 1 needs and any riparian water rights. However, project water is not delivered to meet the demands)	100% (75% in Shasta critical years)	Same as COS
Agriculture Service	None	100%-0% based on supply, South-of-Delta allocations are additionally limited due to D-1641, FWS BO (Dec 2008) and NMFS BO (Jun 2009) export restrictions	100%-0% based on supply, South-of-Delta allocations are additionally limited due to D-1641 and OMR action
Municipal & Industrial Service	None	100%-50% based on supply, South-of-Delta allocations are additionally limited due to D-1641, FWS BO (Dec 2008) and NMFS BO (Jun 2009) export restrictions[v]	100%-50% based on supply, South-of-Delta allocations are additionally limited due to D-1641 and OMR action

	Without Action (WOA)	*Current Operations (COS)*	*Proposed Action (PA)*
SWP water allocation			
North of Delta (FRSA)	None, water rights diversions off-the river	Contract specific	Same as COS
South of Delta (including North Bay Aqueduct)	None	Based on supply; equal prioritization between Ag and M&I based on Monterey Agreement; allocations are additionally limited due to D-1641 and FWS BO (Dec 2008) and NMFS BO (Jun 2009) export restrictions[v]	Based on supply; equal prioritization between Ag and M&I based on Monterey Agreement; allocations are additionally limited due to D-1641 and OMR action
CVP-SWP coordinated operations			
Sharing of responsibility for in-basin-use	None	Revised Coordinated Operations Agreement	Same as COS
Sharing of surplus flows	None	Revised Coordinated Operations Agreement	Same as COS
Sharing of restricted export capacity for project-specific priority pumping	None	Revised Coordinated Operations Agreement	Same as COS
Water transfers	None	Acquisitions by SWP contractors are wheeled at priority in Banks Pumping Plant over non-SWP users; LYRA included for SWP contractors	Same as COS
Sharing of export capacity for lesser priority and wheeling-related pumping	None	Cross Valley Canal wheeling (max of 128 TAF/yr), CALFED ROD defined Joint Point of Diversion (JPOD)	Same as COS
San Luis Reservoir	Not operated	San Luis Reservoir is allowed to operate to a minimum storage of 100 TAF	Same as COS
CVPIA 3406(b)(2)[u,v]			
Policy Decision	N/A	Per May 2003 Dept. of Interior Decision:	N/A
Allocation	No B2 Allocation	800 TAF, 700 TAF in 40-30-30 dry years, and 600 TAF in 40-30-30 critical years as a function of Ag allocation	No B2 Allocation
Actions	No B2 Action	Pre-determined upstream fish flow objectives below Whiskeytown Dam, non-discretionary NMFS BO (Jun 2009) actions for the American and Stanislaus Rivers, and NMFS BO (Jun 2009) and FWS BO (Dec 2008) actions leading to export restrictions	Pre-determined upstream fish flow objectives below Whiskeytown

	Without Action (WOA)	*Current Operations (COS)*	*Proposed Action (PA)*
Accounting[w]	No B2 Accounting	Releases for non-discretionary FWS BO (Dec 2008) and NMFS BO (Jun 2009) actions may or may not always be deemed (b)(2) actions; in general, it is anticipated, that accounting of these actions using (b)(2) metrics, the sum would exceed the (b)(2) allocation in many years; therefore no additional actions are considered and no accounting logic is included in the model	No B2 Accounting
WATER MANAGEMENT ACTIONS			
Water Transfer Supplies (long term programs)			
Lower Yuba River Accord[w]	None	Yuba River acquisitions for reducing impact of NMFS BO export restrictions on SWP	Yuba River acquisitions for reducing impact of D1641 and OMR Action export restrictions on SWP
Phase 8	None	None	None

Notes:

[a] These assumptions have been developed under the direction of the Bureau of Reclamation (Reclamation) management team for the Re-initiation of Consultation on long-term operations of the Central Valley Project (CVP) and State Water Project (SWP).

[b] Footnote not used

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

[d] Refer to Appendix D Attachment 2-5 CalSim II Model Delivery Specifications for contract specific details

[e] Refer to Appendix D Attachment 2-5 CalSim II Model Delivery Specifications for contract specific details

[f] Footnote not used

[g] Assumptions regarding American River water rights and CVP contracts with the Sacramento River Water Reliability Project are documented in the Delivery Specifications attachments. The Sacramento Area Water Forum agreement, its dry year diversion reductions, Middle Fork Project operations and water is not included. Refer to Appendix D Attachment 2-5 CalSim II Model Delivery Specifications for contract specific details

[h] The CALSIM II representation of the San Joaquin River reflects the difficulties on-going groundwater overdraft problems. The 2030 level of development representation of the San Joaquin River Basin does not make any attempt to offer solutions to groundwater overdraft problems. In addition a dynamic groundwater simulation is not yet developed for the San Joaquin River Valley. Groundwater extraction/ recharge and stream-groundwater interaction are static assumptions and may not accurately reflect a response to simulated actions. These limitations should be considered in the analysis of results.

[i] Footnote not used

[j] The actual amount diverted is operated is conjunction with supplies from the Los Vaqueros project. The existing Los Vaqueros storage capacity is 160 TAF. Associated water rights to fill Los Vaqueros with Delta excess flows are included, but CCWD's water right permit and water right license on Mallard Slough are not included.

[k] It is assumed that SWP Contractors can take delivery of all Table A allocations and Article 21 supplies. Article 56 provisions are assumed and allow for SWP Contractors to manage storage and delivery conditions such that full Table A allocations can be delivered. Detailed analysis of the South Coast and Tulare regions support these assumptions. NBA Article 21 deliveries are dependent on excess conditions only, all other Article 21 deliveries also require that San Luis Reservoir be at capacity and that Banks PP and the California Aqueduct has available capacity to divert from the Delta for direct delivery.

[l] PCWA American River pumping facility upstream of Folsom Lake is included.

[m] Footnote not used

[n] Mokelumne River flows are modified to reflect modified operations associated with EBMUD supplies from the Freeport Regional Water Project.

[o] Current ACOE permit for Banks PP allows for an average diversion rate of 6,680 cfs in all months. Diversion rate can increase up to 1/3 of the rate of San Joaquin River flow at Vernalis during Dec 15th – Mar 15th up to a maximum diversion of 10,300 cfs, if Vernalis flow exceeds 1,000 cfs.

[p] Footnote not used

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

[r] D-1644 and the Lower Yuba River Accord is assumed to be implemented. The Yuba River is not dynamically modeled in CALSIM II. Yuba River hydrology and availability of water acquisitions under the Lower Yuba River Accord are based on modeling performed and the Lower Yuba River Accord EIS/EIR study team.

[s] Footnote not used

[t] Footnote not used

[u] Footnote not used

[v] In cooperation with Reclamation, National Marine Fisheries Service, Fish and Wildlife Service, and Ca Department of Fish and Game, the Ca Department of Water Resources has developed assumptions for implementation of the FWS BO (Dec 15th 2008) and NMFS BO (June 4th 2009) in CALSIM II. The FWS BO and NMFS BO assumptions are documented in the Appendix 5A of the LTO EIS (Reclamation 2015b).

Appendix D – Modeling

Attachment 2-3 – DSM2 Model Assumptions Callouts

Introduction

The assumptions for all Reclamation ROC on LTO model simulations are summarized in Appendix D Attachment 2-1 Model Assumptions.

DSM2 Modeling Assumptions Callouts

The following matrix summarizes the assumptions used for the DSM2 models:

- Without Action 011519
- Current Operations 011319
- Proposed Action 011519

	Without Action (WOA)	**Current Operations (COS)**	**Proposed Action (PA)**
Period of simulation	82 years (1922-2003)[a]	Same as WOA	Same as WOA
Boundary Conditions			
Boundary flows	Delta pumps are turned off (Monthly timeseries from CalSim II output).	Monthly timeseries from CalSim II output (alternatives provide different flows and exports)[c]	Monthly timeseries from CalSim II output (alternatives provide different flows and exports)[c]
Ag flows (DICU)	2020 Level, DWR Bulletin 160-98[d]	Same as WOA	Same as WOA
Martinez stage	15-minute adjusted astronomical tide with 15 cm sea level rise[a]	Same as WOA	Same as WOA
Vernalis EC	Monthly time series from CalSim II output[e]	Same as WOA	Same as WOA
Agricultural Return EC	Municipal Water Quality Investigation Program analysis	Same as WOA	Same as WOA
Martinez EC	Monthly net Delta Outflow from CalSim output & G-model[f]	Same as WOA	Same as WOA
Facilities			
Freeport Regional Water Project	Monthly output from CalSim II	Same as WOA	Same as WOA
Delta Cross Channel	Gates Closed (Monthly time series of number of days open from CalSim II output)	Monthly time series of number of days open from CalSim II output	Monthly time series of number of days open from CalSim II output
Stockton Delta Water Supply Project	Monthly output from CalSim II	Same as WOA	Same as WOA
Franks Tract Program	None	None	None

	Without Action (WOA)	Current Operations (COS)	Proposed Action (PA)
Clifton Court Forebay	Gates Open	Priority 3, gate operations synchronized with incoming tide to minimize impacts to low water levels in nearby channels	Same as COS
Contra Costa Water District Delta Intakes	Rock Slough Pumping Plant, Old River at Highway 4 Intake and Alternate Improvement Project Intake on Victoria Canal	Same as WOA	Same as WOA
Veale Tract Drainage Relocation	The Veale Tract Water Quality Improvement Project, funded by CALFED, relocates the agricultural drainage outlet was relocated from Rock Slough channel to the southern end of Veale Tract, on Indian Slough[g]	Same as WOA	Same as WOA
South Delta barriers	HORB and Agricultural barriers are not installed.	Temporary Barriers Project operated based on San Joaquin River flow time series from CalSim II output; HORB installed[i] Sep 16 – Nov 30; Agricultural barriers on Old and Middle Rivers are assumed to be installed starting from May 16 and on Grant Line Canal from June 1; All three barriers are allowed to be operated until November 30; May 16 to May 31; the tidal gates are assumed to be tied open for the barriers on Old and Middle Rivers[h].	Temporary Barriers Project operated based on San Joaquin River flow time series from CalSim II output; HORB is not installed; Agricultural barriers on Old and Middle Rivers are assumed to be installed starting from May 16 and on Grant Line Canal from June 1; All three barriers are allowed to be operated until November 30; May 16 to May 31; the tidal gates are assumed to be tied open for the barriers on Old and Middle Rivers[h].
Antioch Water Works	Monthly output from CalSim II	Same as WOA	Same as WOA

	Without Action (WOA)	Current Operations (COS)	Proposed Action (PA)
Montezuma Slough Salinity Control Gates	Gates Open	Gate operations occur in October through February. Gates open when upstream water level is 0.3 ft above downstream water level. Gates close when current is less than -0.1 fps. Gates are open in March through September.	Gate operations occur in October through February. Gates open when upstream water level is 0.3 ft above downstream water level. Gates close when current is less than -0.1 fps. Gates are open in March through September.

Notes:

[a] A new adjusted astronomical tide for use in DSM2 planning studies has been developed by DWR's Bay Delta Office Modeling Support Branch Delta Modeling Section in cooperation with the Common Assumptions workgroup. This tide is based on a more extensive observed dataset and covers the entire 82-year period of record. Martinez stage boundary condition is augmented by 15 cm based on equations used for Bay-Delta Conservation Plan to simulate expected sea level rise in 2030.

[b] Footnote not used

[c] Although monthly CalSim output was used as the DSM2-HYDRO input, the Sacramento and San Joaquin rivers were interpolated to daily values in order to smooth the transition from high to low and low to high flows. DSM2 then uses the daily flow values along with a 15-minute adjusted astronomical tide to simulate effect of the spring and neap tides.

[d] The Delta Island Consumptive Use (DICU) model is used to calculate diversions and return flows for all Delta islands based on the level of development assumed. The projected 2020 land-use assumptions are found in Bulletin 160-98.

[e] CalSim II calculates monthly EC for the San Joaquin River, which was then converted to daily EC using the monthly EC and flow for the San Joaquin River. Fixed concentrations of 150, 175, and 125 µmhos/cm were assumed for the Sacramento River, Yolo Bypass, and eastside streams, respectively.

[f] Net Delta outflow based on the CalSim II flows was used with an updated G-model to calculate Martinez EC. Under changed climate conditions Martinez EC is modified to account for the sea level rise at early (15 cm) and late (45 cm) long-term phases (Year 2060).

[g] Information was obtained based on the information from the draft final "Delta Region Drinking Water Quality Management Plan" dated June 2005 prepared under the CALFED Water Quality Program and a presentation by David Briggs at SWRCB public workshop for periodic review. The presentation "Compliance location at Contra Costa Canal at Pumping Plant #1 – Addressing Local Degradation" notes that the Veale Tract drainage relocation project will be operational in June 2005. The DICU drainage currently simulated at node 204 is moved to node 202 in DSM2.

[h] Based on the FWS Delta Smelt BO Action 5 and the project description provided in the page 119.

[i] Based on the FWS Delta Smelt BO Action 5, Head of Old River Barrier (HORB) is assumed to be not installed in April or May; therefore HORB is only installed in the Fall as shown.

Appendix D – Modeling

Attachment 2-4 – HEC5Q and Reclamation Temperature Model Assumptions Callouts

Introduction

The assumptions for all Reclamation ROC on LTO model simulations are summarized in Appendix D Attachment 2-1 Model Assumptions.

HEC5Q and Reclamation Temperature Modeling Assumptions Callouts

The following matrix summarizes the assumptions used for the HEC5Q and Reclamation Temperature Models:

- Without Action 011519
- Current Operations 011319
- Proposed Action 011519

	Without Action (WOA)	**Current Operations (COS)**	**Proposed Action (PA)**
Period of simulation	82 years (1922-2003)	Same as WOA	Same as WOA
Climate	ELT Q5	Same as WOA	Same as WOA
Sacramento-Trinity Rivers (HEC5Q)			
Boundary flows and storages	Monthly timeseries (from CalSim II output).	Same as WOA	Same as WOA
Trinity Lake	Operated to maintain approximate volume at bottom of conservation pool (12,370 AF).	Monthly timeseries (from CalSim II output). Limited to physical specifications of reservoir.	Same as COS
Lewistown Lake	Operated to maintain approximate volume at bottom of conservation pool (1,543 AF).	Monthly timeseries (from CalSim II output). Limited to physical specifications of reservoir.	Same as COS
Whiskeytown Lake	Operated to maintain approximate volume at bottom of conservation pool (10,000 AF).	Monthly timeseries (from CalSim II output). Limited to physical specifications of reservoir.	Same as COS
Shasta Lake	Operated to maintain approximate volume at bottom of conservation pool (115,800 AF).	Monthly timeseries (from CalSim II output). Limited to physical specifications of reservoir.	Same as COS
Keswick Reservoir	Operated to maintain approximate volume at bottom of conservation pool (6,950 AF).	Monthly timeseries (from CalSim II output). Limited to physical specifications of reservoir.	Same as COS

	Without Action (WOA)	Current Operations (COS)	Proposed Action (PA)
Black Butte Lake	Monthly timeseries (from CalSim II output). Limited to physical specifications of reservoir.	Same as WOA.	Same as WOA
Shasta Temperature Management	None	Similar to 2009 NMFS BiOp Appendix B (See 2015 LTO for details).	Updated temperature schedules to match temperature strategy drafted in BA.
Trinity Temperature Management	None	Releases allowed from lower, auxiliary outlet when normal outlet release are too warm.	Same as COS
Feather River (Reclamation Temperature Model)			
Lake Oroville	Operated to maintain approximate volume at bottom of conservation pool (29,600 AF).	Monthly timeseries (from CalSim II output). Limited to physical specifications of reservoir.	Same as COS
Thermalito Afterbay	Operated to maintain approximate volume at bottom of conservation pool (15,100 AF).	Monthly timeseries (from CalSim II output). Limited to physical specifications of reservoir.	Same as COS
American River (HEC5Q)			
Folsom Lake	Operated to maintain approximate volume at bottom of conservation pool (83,000 AF).	Monthly timeseries (from CalSim II output). Limited to physical specifications of reservoir.	
Lake Natoma	Operated to maintain approximate volume at bottom of conservation pool (1,750 AF).	Monthly timeseries (from CalSim II output). Limited to physical specifications of reservoir.	Same as COS
Folsom Temperature Management	None	Similar to 2009 NMFS BiOp Appendix B (See 2015 LTO for details).	Same as COS
Stanislaus River (HEC5Q)			
New Melones Lake	Operated to maintain approximate volume at bottom of conservation pool (80,000 AF).	Monthly timeseries (from CalSim II output). Limited to physical specifications of reservoir.	Same as COS

	Without Action (WOA)	Current Operations (COS)	Proposed Action (PA)
Lake Tulloch	Operated to maintain approximate volume at bottom of conservation pool (11,000 AF).	Monthly timeseries (from CalSim II output). Limited to physical specifications of reservoir.	Same as COS
Goodwin Reservoir	Operated to maintain approximate volume at bottom of conservation pool (880 AF).	Monthly timeseries (from CalSim II output). Limited to physical specifications of reservoir.	Same as COS

Appendix D – Modeling

Attachment 2-5 – CalSim II Model Delivery Specifications

Introduction

The assumptions for all Reclamation ROC on LTO model simulations are summarized in Appendix D Attachment 2-1 Model Assumptions. This compilation of delivery specifications for the CalSim II model provides additional detail in support of Attachment 2-1.

Delivery Specifications

The delivery specifications for the CalSim II model include Central Valley Project (CVP) and State Water Project (SWP) contract amounts and other water rights assumptions used. These specifications are detailed in the following tables:

- Table 1. CVP North-of-the-Delta – Future Conditions
- Table 2. CVP American River – Future Conditions
- Table 3. CVP Delta – Future Conditions
- Table 4. CVP South-of-the-Delta – Future Conditions
- Table 5. SWP North-of-the-Delta – Future Conditions
- Table 6. SWP South-of-the-Delta – Future Conditions

Table 1. CVP North-of-the-Delta - Future Conditions

CVP Contractor	Geographic Location	CVP Water Service Contracts (TAF/yr)		Settlement / Exchange Contractor (TAF/yr)	Water Rights/ Non-CVP (TAF/yr)	Level 2 Refuges[1] (TAF/yr)
		AG	M&I			
Anderson Cottonwood ID	Sacramento River Redding Subbasin			128.0		
Clear Creek CSD		13.8	1.5			
Bella Vista WD		22.1	2.4			
Shasta CSD			1.0			
Sac R. Misc. Users				3.4		
Redding, City of				21.0		
City of Shasta Lake		2.5	0.3			
Mountain Gate CSD			0.4			
Shasta County Water Agency		0.5	0.5			
Redding, City of/Buckeye			6.1			
Total		**38.9**	**12.2**	**152.4**		**0.0**
Corning WD	Corning Canal	23.0				
Proberta WD		3.5				
Thomes Creek WD		6.4				
Total		**32.9**	**0.0**	**0.0**		**0.0**
Kirkwood WD	Tehama-Colusa Canal	2.1				
Glide WD		10.5				
Kanawha WD		45.0				
Orland-Artois WD		53.0				
Colusa, County of		20.0				
Colusa County WD		62.2				
Davis WD		4.0				

Table 1. CVP North-of-the-Delta - Future Conditions

CVP Contractor	Geographic Location	CVP Water Service Contracts (TAF/yr)		Settlement / Exchange Contractor (TAF/yr)	Water Rights/ Non-CVP (TAF/yr)	Level 2 Refuges[1] (TAF/yr)
		AG	M&I			
Dunnigan WD	Tehama-Colusa Canal	19.0				
La Grande WD		5.0				
Westside WD		65.0				
Total		**285.8**	**0.0**	**0.0**		**0.0**
Sac. R. Misc. Users[2]	Sacramento River			1.5		
Glenn Colusa ID	Glenn-Colusa Canal			441.5		
				383.5		
Sacramento NWR						54.5
Delevan NWR						24.6
Colusa NWR						29.3
Colusa Drain M.W.C.	Colusa Basin Drain			7.7		
				62.3		
Total		**0.0**	**0.0**	**895.0**		**108.4**
Princeton-Cordova-Glenn ID	Sacramento River			67.8		
Provident ID				54.7		
Maxwell ID				1.8		
				16.2		
Sycamore Family Trust				31.8		
Roberts Ditch IC				4.4		
Sac R. Misc. Users[2]				4.9		
				9.5		
Total		**0.0**	**0.0**	**191.2**		**0.0**

Table 1. CVP North-of-the-Delta - Future Conditions

CVP Contractor	Geographic Location	CVP Water Service Contracts (TAF/yr)		Settlement / Exchange Contractor (TAF/yr)	Water Rights/ Non-CVP (TAF/yr)	Level 2 Refuges[1] (TAF/yr)
		AG	M&I			
Reclamation District 108	Sacramento River			12.9		
				219.1		
River Garden Farms				29.8		
Meridian Farms WC				35.0		
Pelger Mutual WC				8.9		
Reclamation District 1004				71.4		
Carter MWC				4.7		
Sutter MWC				226.0		
Tisdale Irrigation & Drainage Co.				9.9		
Sac R. Misc. Users[2]				103.4		
				0.9		
Feather River WD export		20.0				
Total		**20.0**	**0.0**	**722.1**		**0.0**
Sutter NWR	Sutter bypass water for Sutter NWR					25.7
Gray Lodge WMA	Feather River					41.3
Butte Sink Duck Clubs						15.6
Total		**0.0**	**0.0**	**0.0**		**82.6**
Sac. R. Misc. Users[2]	Sacramento River			56.8		
City of West Sacramento	DSA 65			23.6		
Davis-Woodland Water Supply Project						
Total		**0.0**	**0.0**	**80.4**		**0.0**

Table 1. CVP North-of-the-Delta - Future Conditions

CVP Contractor	Geographic Location	CVP Water Service Contracts (TAF/yr)		Settlement / Exchange Contractor (TAF/yr)	Water Rights/ Non-CVP (TAF/yr)	Level 2 Refuges[1] (TAF/yr)
		AG	M&I			
Sac R. Misc. Users	Lower Sacramento River			4.8		
Natomas Central MWC				120.2		
Pleasant Grove-Verona MWC				26.3		
City of Sacramento (PCWA)			0.0		0.0	
PCWA (Water Rights)			0.0		0.0	
Total		**0.0**	**0.0**	**151.3**	**0.0**	
Total CVP North-of-Delta		**377.6**	**12.2**	**2193.8**	**0.0**	**191.0**

Notes:
1. Level 4 Refuge water needs are not included.

Table 2. American River – Future Conditions

	Diversion Location	CVP M&I[1] Contracts (maximum[1])	Water Rights (maximum)	Diversion Limit (maximum capacity)
Placer County Water Agency	Auburn Dam Site		65.0	65.0
Total		**0**	**65.0**	**65.0**
Sacramento Suburban Water District[2]	Folsom Reservoir		0	0
City of Folsom - includes P.L. 101-514		7	27	34
Folsom Prison			5	5
San Juan Water District (Placer County)			25	25
San Juan Water District (Sac County) - includes P.L. 101-514		24.2	33	57.2
El Dorado Irrigation District		7.55	17	24.55
City of Roseville		32	30	62.0
Placer County Water Agency		35		35
El Dorado County - P.L.101-514		15		15
Total		**120.75**	**137.0**	**257.75**
So. Cal WC/Arden Cordova WC	Folsom South Canal		5	5
California Parks and Recreation		5		5
SMUD		30	15	45
Canal Losses			1	1
Total		**35**	**21**	**56**
City of Sacramento[3]	Lower American River		230	230
Carmichael Water District			12	12
Total		**0**	**242**	**242**
Total American River Diversions		**155.75**	**465**	**620.75**
Sacramento River Diversions				
City of Sacramento	Lower Sacramento River		81.8	81.8
Sacramento County Water Agency		10		10
Sacramento County Water Agency - P.L. 101-514 / FRWP		35		35
Sacramento County Water Agency - water rights and acquisitions			varies[4], average ~32	varies[4], average ~32
East Bay Municipal Utilities District		133		varies[5], average 14.6

Table 2. American River – Future Conditions

	Diversion Location	CVP M&I[1] Contracts (maximum[1])	Water Rights (maximum)	Diversion Limit (maximum capacity)
Total Sacramento River Diversions		**178**	**113.8**	**173.4**
Total		**333.75**	**578.8**	**794.15**

Notes:

1. When the CVP Contract quantity exceeds the quantity of the Diversion Limit minus the Water Right (if any), the diversion modeled is the quantity allocated to the CVP Contract (based on the CVP contract quantity shown times the CVP M&I allocation percentage) plus the Water Right (if any), but with the sum limited to the quantity of the Diversion Limit
2. Diversion is only allowed if and when Mar-Nov Folsom Unimpaired Inflow (FUI) exceeds 1600 TAF
3. When the Hodge single dry year criteria is triggered, Mar-Nov FUI falls below 400 TAF, diversion on the American River is limited to 50 TAF/yr; based on monthly Hodge flow limits assumed for the American, diversion on the Sacramento River may be increased to 223 TAF due to reductions of diversions on American River
4. SCWA targets 68 TAF of surface water supplies annually. The portion unmet by CVP contract water is assumed to come from two sources:
   (1) Delta "excess" water- averages 17.5 TAF annually, but varies according to availability. SCWA is assumed to divert excess flow when it is available, and when there is available pumping capacity.
   (2) "Other" water- derived from transfers and/or other appropriated water, averaging 14.5 TAF annually but varying according remaining unmet demand.
5. EBMUD CVP diversions are governed by the Amendatory Contract, stipulating:
   (1) 133 TAF maximum diversion in any given year
   (2) 165 TAF maximum diversion amount over any 3 year period
   (3) Diversions allowed only when EBMUD total storage drops below 500 TAF
   (4) 155 cfs maximum diversion rate

Table 3. Delta - Future Conditions

CVP/ SWP Contractor	Geographic Location	Water Right (TAF/yr)	SWP Table A Amount (TAF)		SWP Article 21 Demand (TAF/mon)	CVP Water Service Contracts (TAF/yr)	
			Ag	M&I		AG	M&I
North Delta							
City of Vallejo	City of Vallejo						16.0
CCWD[1]	Contra Costa County						195.0
Napa County FC&WCD	North Bay Aqueduct			29.03	1.0		
Solano County WA	North Bay Aqueduct			47.76	1.0		
Fairfield, Vacaville and Benicia Agreement	North Bay Aqueduct	31.60					
City of Antioch	City of Antioch	18.0					
Total North Delta		**49.6**	**0.0**	**76.79**	**2.0**	**0.0**	**211.0**
South Delta							
Delta Water Supply Project	City of Stockton	32.4					
Total South Delta		**32.4**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Total		**82.0**	**0.0**	**76.79**	**2.0**	**0.0**	**211.0**

Notes:
1. The Los Vaqueros module in CalSim II is used to determine the range of demands that are met by CVP contracts or other water rights

Table 4. CVP South-of-the-Delta - Future Conditions

CVP Contractor	Geographic Location	CVP Water Service Contracts (TAF/yr)		Settlement/ Exchange Contractor (TAF/yr)	Water Rights/ Non-CVP (TAF/yr)	Level 2 Refuges[1] (TAF/yr)	Losses (TAF/yr)
		AG	M&I				
Byron-Bethany ID	Upper DMC	20.6					
Tracy, City of			10.0				
			5.0				
			5.0				
Banta Carbona ID		20.0					
Total		**40.6**	**20.0**	**0.0**	**0.0**	**0.0**	**0.0**
Del Puerto WD	Upper DMC	12.1					
Davis WD		5.4					
Foothill WD		10.8					
Hospital WD		34.1					
Kern Canon WD		7.7					
Mustang WD		14.7					
Orestimba WD		15.9					
Quinto WD		8.6					
Romero WD		5.2					
Salado WD		9.1					
Sunflower WD		16.6					
West Stanislaus WD		50.0					
Patterson WD		16.5			6.0		
Total		**206.7**	**0.0**	**0.0**	**6.0**	**0.0**	**0.0**
Upper DMC Loss	Upper DMC						18.5

Table 4. CVP South-of-the-Delta - Future Conditions

CVP Contractor	Geographic Location	CVP Water Service Contracts (TAF/yr)		Settlement/ Exchange Contractor (TAF/yr)	Water Rights/ Non-CVP (TAF/yr)	Level 2 Refuges[1] (TAF/yr)	Losses (TAF/yr)
		AG	M&I				
Panoche WD	Lower DMC Volta	6.6					
San Luis WD		65.0					
Laguna WD		0.8					
Eagle Field WD		4.6					
Mercy Springs WD		2.8					
Oro Loma WD		4.6					
Total		**84.4**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Central California ID	Lower DMC Volta			140.0			
Grasslands via CCID	Lower DMC Volta					81.8	
Los Banos WMA						11.2	
Kesterson NWR	Lower DMC Volta					10.5	
Freitas - SJBAP						6.3	
Salt Slough - SJBAP						8.6	
China Island - SJBAP						7.0	
Volta WMA						13.0	
Grassland via Volta Wasteway						23.2	
Total		**0.0**	**0.0**	**140.0**	**0.0**	**161.5**	**0.0**
Fresno Slough WD	San Joaquin River at Mendota Pool	4.0			0.9		
James ID		35.3			9.7		
Coelho Family Trust		2.1			1.3		
Tranquillity ID		13.8			20.2		
Tranquillity PUD		0.1			0.1		
Reclamation District 1606		0.2			0.3		
Central California ID				392.4			

Table 4. CVP South-of-the-Delta - Future Conditions

CVP Contractor	Geographic Location	CVP Water Service Contracts (TAF/yr)		Settlement/ Exchange Contractor (TAF/yr)	Water Rights/ Non-CVP (TAF/yr)	Level 2 Refuges[1] (TAF/yr)	Losses (TAF/yr)
		AG	M&I				
Columbia Canal Co.	San Joaquin River at Mendota Pool			59.0			
Firebaugh Canal Co.				85.0			
San Luis Canal Co.				23.6			
M.L. Dudley Company					2.3		
Grasslands WD						29.0	
Mendota WMA						27.6	
Losses							101.5
Total		**55.5**	**0.0**	**560.0**	**34.8**	**56.6**	**101.5**
San Luis Canal Co.				140.0			
Grasslands WD						2.3	
Los Banos WMA						12.4	
San Luis NWR						19.5	
West Bear Creek NWR						7.5	
East Bear Creek NWR						8.9	
Total		**0.0**	**0.0**	**140.0**	**0.0**	**50.6**	**0.0**
San Benito County WD (Ag)	San Felipe Aqueduct	35.6					
Santa Clara Valley WD (Ag)		33.1					
Pajaro Valley WD		6.3					
San Benito County WD (M&I)			8.3				
Santa Clara Valley WD (M&I)			119.4				
Total		**74.9**	**127.7**	**0.0**	**0.0**	**0.0**	**0.0**
San Luis WD	CA reach 3	60.1					
CA, State Parks and Rec		2.3					
Affonso/Los Banos Gravel Co.		0.3					

Table 4. CVP South-of-the-Delta - Future Conditions

CVP Contractor	Geographic Location	CVP Water Service Contracts (TAF/yr)		Settlement/ Exchange Contractor (TAF/yr)	Water Rights/ Non-CVP (TAF/yr)	Level 2 Refuges[1] (TAF/yr)	Losses (TAF/yr)
		AG	M&I				
Total		**62.6**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Panoche WD	CVP Dos Amigos PP/ CA reach 4	87.4					
Pacheco WD		10.1					
Total		**97.5**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Westlands WD (Centinella)	CA reach 4	2.5					
Westlands WD (Broadview WD)		27.0					
Westlands WD (Mercy Springs WD)		4.2					
Westlands WD (Widern WD)		3.0					
Total		**36.7**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Westlands WD: CA Joint Reach 4	CA reach 4	219.0					
Westlands WD: CA Joint Reach 5	CA reach 5	570.0					
Westlands WD: CA Joint Reach 6	CA reach 6	219.0					
Westlands WD: CA Joint Reach 7	CA reach 7	142.0					
Total		**1150.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Avenal, City of	CA reach 7		3.5		3.5		
Coalinga, City of			10.0				
Huron, City of			3.0				
Total		**0.0**	**16.5**	**0.0**	**3.5**	**0.0**	**0.0**
CA Joint Reach 3 - Loss	CVP Dos Amigos PP/CA reach 3						2.5
CA Joint Reach 4 - Loss	CA reach 4						10.1
CA Joint Reach 5 - Loss	CA reach 5						30.1
CA Joint Reach 6 - Loss	CA reach 6						12.5
CA Joint Reach 7 - Loss	CA reach 7						8.5

Table 4. CVP South-of-the-Delta - Future Conditions

CVP Contractor	Geographic Location	CVP Water Service Contracts (TAF/yr)		Settlement/ Exchange Contractor (TAF/yr)	Water Rights/ Non-CVP (TAF/yr)	Level 2 Refuges[1] (TAF/yr)	Losses (TAF/yr)
		AG	M&I				
Total		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**63.7**
Cross Valley Canal - CVP	CA reach 14						
Fresno, County of		3.0					
Hills Valley ID-Amendatory		3.3					
Kern-Tulare WD		40.0					
Lower Tule River ID		31.1					
Pixley ID		31.1					
Rag Gulch WD		13.3					
Tri-Valley WD		1.1					
Tulare, County of		5.3					
Kern NWR						11.0	
Pixley NWR						1.3	
Total		**128.3**	**0.0**	**0.0**	**0.0**	**12.3**	**0.0**
Total CVP South-of-Delta		**1937.1**	**164.2**	**840.0**	**44.3**	**281.0**	**183.7**

Notes:
1. Level 4 Refuge water needs are not included.

Table 5. SWP North-of-the-Delta - Future Conditions

SWP CONTRACTOR	Geographic Location	FRSA Amount (TAF)	Water Right (TAF/yr)	Table A Amount (TAF)		Article 21 Demand (TAF/mon)	Other (TAF/yr)
				Ag	M&I		
Feather River							
Palermo	FRSA		17.6				
County of Butte	Feather River				27.5		
Thermalito	FRSA		8.0				
Western Canal	FRSA	150.0	145.0				
Joint Board	FRSA	550.0	5.0				
City of Yuba City	Feather River				9.6		
Feather WD	FRSA	17.0					
Garden, Oswald, Joint Board	FRSA						
Garden	FRSA	12.9	5.1				
Oswald	FRSA	2.9					
Joint Board	FRSA	50.0					
Plumas, Tudor	FRSA						
Plumas	FRSA	8.0	6.0				
Tudor	FRSA	5.1	0.2				
Total Feather River Area		**795.8**	**186.9**	**0.0**	**37.1**		
Other							
Yuba County Water Agency	Yuba River						Variable
							333.6
Camp Far West ID	Yuba River						12.6
Bear River Exports	American R/DSA70						Variable
							95.2
Feather River Exports to American River (left bank to DSA70)	American R/DSA70		11.0				

Table 6. SWP South-of-the-Delta –Future Conditions

SWP Contractor	Geographic Location	Table A Amount (TAF)		Article 21 Demand (TAF/mon)	Losses (TAF/yr)
		Ag	M&I		
Alameda Co. FC&WCD, Zone 7	SBA reaches 1-4		43.98	1.00	
	SBA reaches 5-6		36.64	None	
	Total		**80.62**	**1.00**	
Alameda County WD	SBA reaches 7-8		42.00	1.00	
Santa Clara Valley WD	SBA reach 9		100.00	4.00	
Oak Flat WD	CA reach 2A	5.70		None	
County of Kings	CA reach 8C	9.31		None	
Dudley Ridge WD	CA reach 8D	45.35		1.00	
Empire West Side ID	CA reach 8C	3.00		1.00	
Kern County Water Agency	CA reaches 3, 9-13B	608.86	134.60	None	
	CA reaches 14A-C	99.20		180.00	
	CA reaches 15A-16A	59.40		None	
	CA reach 31A	80.67		None	
	Total	**848.13**	**134.60**	**180.00**	
Tulare Lake Basin WSD	CA reaches 8C-8D	87.47		15.00	
San Luis Obispo Co. FC&WCD	CA reaches 33A-35		25.00	None	
Santa Barbara Co. FC&WCD	CA reach 35		45.49	None	
Antelope Valley-East Kern WA	CA reaches 19-20B, 22A-B		144.84	1.00	
Castaic Lake WA	CA reach 31A	12.70		1.00	
	CA reach 30		82.50	None	
	Total	**12.70**	**82.50**	**1.00**	
Coachella Valley WD	CA reach 26A		138.35	2.00	
Crestline-Lake Arrowhead WA	CA reach 24		5.80	None	
Desert WA	CA reach 26A		55.75	5.00	
Littlerock Creek ID	CA reach 21		2.30	None	
Mojave WA	CA reaches 19, 22B-23		85.80	None	
Metropolitan WDSC	CA reach 26A		148.67	90.70	
	CA reach 30		756.69	74.80	
	CA reaches 28G-H		102.71	27.60	
	CA reach 28J		903.43	6.90	
	Total		**1911.50**	**200.00**	
Palmdale WD	CA reaches 20A-B		21.30	None	
San Bernardino Valley MWD	CA reach 26A		102.60	None	

Table 6. SWP South-of-the-Delta –Future Conditions

SWP Contractor	Geographic Location	Table A Amount (TAF)		Article 21 Demand (TAF/mon)	Losses (TAF/yr)
		Ag	M&I		
San Gabriel Valley MWD	CA reach 26A		28.80	None	
San Gorgonio Pass WA	CA reach 26A		17.30	None	
Ventura County FCD	CA reach 29H		3.15	None	
	CA reach 30		16.85	None	
	Total		**20.00**		
SWP Losses	CA reaches 1-2				7.70
	SBA reaches 1-9				0.60
	CA reach 3				10.80
	CA reach 4				2.60
	CA reach 5				3.90
	CA reach 6				1.20
	CA reach 7				1.60
	CA reaches 8C-13B				11.90
	Wheeler Ridge PP and CA reaches 14A-C				3.60
	Chrisman PP and CA reaches 15A-18A				1.80
	Pearblossom PP and CA reaches 17-21				5.10
	Mojave PP and CA reaches 22A-23				4.00
	REC and CA reaches 24-28J				1.40
	CA reaches 29A-29F				1.90
	Castaic PWP and CA reach 29H				3.10
	REC and CA reach 30				2.40
	Total				**63.60**
Total		**1011.66**	**3044.55**	**412.00**	**63.60**

Appendix D – Modeling

Attachment 2-6 – Winter Run Chinook Temperature-Dependent Egg Mortality Modeling

Introduction

Operation of Shasta Dam's Temperature Control Device (TCD) are regulated with the goal of minimizing adverse effects on listed species, including Winter run chinook salmon (Oncorhynchus tshawytscha). Salmon lay eggs in nests called redds composed of inundated gravel. The dissolved oxygen content of the water passing through the gravel substrate and sustaining the eggs is positively correlated with temperature; hot, hypoxic conditions result in egg mortality. This analysis attempts to isolate the thermal component of egg mortality from other components such as density-dependent mortality and redd dewatering.

Two egg mortality estimation methods were used in this analysis. Both start by modeling a redd's lifetime by counting the days required to cross a known cumulative degree-days threshold, and both estimate mortality as a linear, increasing function of temperature past a known temperature threshold, but each uses a different set of assumptions to implement this conceptual model. The methods are applied to a set of simulated redds and the results are summarized on a seasonal level for comparison of mortality outcomes between HEC5Q model runs.

Martin Model

Dr. Benjamin Martin and colleagues at the National Oceanic and Atmospheric Administration's Southwest Fisheries Science Center identified a discrepancy between laboratory and field estimates and proposed a mechanism based on differing flow velocities in the laboratory and field environments. They then outlined a model for estimating temperature-dependent egg mortality in the field and fit its parameters to Sacramento River Winter run Chinook population data collected between 1996 and 2015 (Martin et al., 2017).

The first step in what is herein referred to as the Martin Model is to estimate a redd's date of emergence. Individual eggs within the redd hatch as alevins, which remain within the gravel substrate of the redd. These later depart the redd, emerging as fry. The redd's estimated date of emergence is intended to represent the point in the average egg's/alevin’s life span when it leaves the redd.

The Martin Model estimates the date of emergence using a linear relationship between water temperature and maturation: Rate of maturation = 0.00058 * T(F) - 0.018 (Zueg et al., 2012). For each simulated redd, the Zueg equation was applied to daily temperatures starting the day after redd creation until the cumulative sum of daily maturation rates is greater than one. The day on which this occurs is considered the date of emergence for the redd.

Daily survival is then calculated for every day of the redd's lifespan. Below a temperature threshold of 11.9 C, no temperature-dependent mortality is recorded, and the survival is 1. For each degree C above the threshold, 0.024 is subtracted from the daily survival. The product of the natural exponents of daily survivals is the total survival, and one minus survival is the estimated mortality fraction for that simulated redd.

The Martin Model, in summary, uses the Zueg equation to estimate date of emergence then estimates daily mortality for each day of the redd's lifespan using a linear relationship.

Anderson Model

Dr. James Anderson of the University of Washington has proposed a model building on Martin et al.'s findings but differing in two key assumptions. While Martin applies mortality to each day of a redd's lifespan from spawning past hatching to emergence, Anderson uses a short critical period instead. Using field data from 2002 through 2015, a critical period just before hatching was found to provide the best fit (Anderson, 2018). This analysis used a critical period of five days in length, following the implementation of the Anderson Model on the SacPAS website (http://www.cbr.washington.edu/sacramento/fishmodel/).

Instead of using the Zueg equation to estimate date of emergence, the Anderson Model uses a different equation to estimate date of hatching. Like the Zueg equation, daily temperatures are correlated to daily maturation and a cumulative sum of daily maturation is calculated until maturation crosses a known threshold. The date on which this occurs is the hatching date, and in this implementation of the Martin Model the five days before hatching are the days on which mortality is estimated.

The daily equation was calibrated in Alderdice and Velsen, 1978: ln(Daily development rate) = ln(k) + b * (ln(T(C) - c)), where k = 0.08646, b = 1.23473, and c = -2.26721. The day on which the cumulative sum of daily development rate passes 100 is considered the redd hatching date.

Like the Martin model, a linear relationship between mortality and temperature is assumed, with zero mortality below a threshold. The threshold was set identical to the Martin Model at 11.9 C, while the slope is not 0.024 but 0.5. This is unsurprising; calibration to substantially the same dataset will naturally result in a much higher slope, or a much larger mortality impact per degree C above the threshold, for a model which only applies mortality to five days instead of the full lifespan of the redd. The same formulae for adding up daily survivals and finding a total mortality estimate are used as for the Martin Model.

Spatio-Temporal Distribution of Simulated Winter Run Chinook Eggs

The Martin and Anderson Models were applied to HEC5Q Sacramento River temperature results using the same spatio-temporal distribution of redds in each year. The distribution is the averaged location and timing of redds counted in California Department of Fish and Wildlife Winter run aerial survey data from 2007 to 2014. Simulated redds were created and subjected to mortality calculations. All simulated redds' mortalities were combined in a sum, weighted by the spatio-temporal distribution, to estimate the total seasonal mortality fraction.

No assumption is made regarding the total number of redds, as density-dependent mortality is not considered in this calculation; results indicate only the percentage of the total seasonal Winter run Chinook egg population in the upper Sacramento River that is estimated to have succumbed to temperature-dependent mortality. Because a large percentage of modeled redds survived into October and the HEC5Q simulation ends at September of 2003, temperature-dependent egg mortality is only estimated for the 1922-2002 Winter run Chinook populations.

The following tables indicate the river miles and dates for which simulated redds were created as well as the fraction of the total population which each location or time represents. The same temporal distribution was assumed for all locations.

Table X. Spatial distribution of simulated redds

River Reach	River Mile	Average percentages (2007-2014)
Keswick to A.C.I.D. Dam.	298	46.4%
A.C.I.D. Dam to Highway 44 Bridge	296	46.1%
Highway 44 Br. to Airport Rd. Br.	284	6.7%
Airport Rd. Br. to Balls Ferry Br.	275	0.3%
Balls Ferry Br. to Battle Creek.	271	0.2%
Battle Creek to Jellys Ferry Br.	266	0.2%
Jellys Ferry Br. to Bend Bridge	257	0.1%
Bend Bridge to Red Bluff Diversion Dam	242	0.0%

Table X. Temporal distribution of simulated redds

Dates (m/d)	Average percentages (2007-2014)
5/15	5.4%
6/1	5.9%
6/9	7.8%
6/16	13.3%
6/24	16.0%
7/1	15.9%
7/9	14.2%
7/16	10.4%
7/24	6.7%
8/1	3.1%
8/16	1.4%

References

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Appendix D – Modeling

Attachment 2-7 – Model Limitations

Introduction

Models are commonly used to evaluate changes in the management and operations of water resources systems. These models are computer based and use mathematical expressions, methods and input data to represent hydrologic, physical, environmental, operational, and institutional aspects of the water resources systems. As complex as water resources systems are, the representation of the water resources system in input data, calculations and model outputs is understood to be simplified and generalized in comparison to what is observed in the historical records and documents that describe the real-world water resources system. Even so, models are useful tools in assessing historical, current and future projected conditions of the water resources system. These conditions are described by models based on assumptions that are captured in the data and calculations used.

Because the representation of the water resources system in models is understood to be simplified and generalized in comparison to what is observed in the historical records and documents, the use of model results should be subject to a set of agreed upon limitations and subsequent analysis of results is thereby limited. The developers and expert users of the models in question should be consulted in regard to these limitations. The following is a presentation of information that the team of modelers involved in the ROC on LTO consider relevant to the limitations of the models and modeled scenarios. This information should be considered in use of the model results and any subsequent analysis derived from these model results.

General Limitations of Models Used

1. CalSim II

CalSim II is a monthly model developed for planning level analyses. The model is run for an 82-year historical hydrologic period, at a projected level of hydrology and demands; and under an assumed framework of regulations. Therefore the 82-year simulation does not provide information about historical conditions, but it does provide information about variability of conditions that would occur at the assumed level of hydrology and demand with the assumed operations, under the same historical hydrologic sequence. Because it is not a physically based model, CalSim II is not calibrated and cannot be used in a predictive manner. CalSim II is intended to be used in a comparative manner; which is appropriate for ESA analysis.

In CalSim II, operational decisions are made on a monthly basis, based on a set of pre-defined rules that represent the assumed regulations. Modifications by the model user would be required to allow for variation in these rules based on a sequence of hydrologic events such as a prolonged drought, or statistical performance criteria such as meeting a storage target in an assumed percentage of years.

While there are certain components in the model that are downscaled to a daily time step (simulated or approximated hydrology), such as an air-temperature based trigger for a fisheries action, the results of those daily conditions are always averaged to a monthly time step. For example, a certain number of days with and without the action is calculated and the monthly result is calculated using a day-weighted average based on the total number of days in that

month. Operational decisions based on those components are again made on a monthly basis. Any reporting or use of sub-monthly results from CalSim II should include disaggregation methods that are appropriate for the given application, report, or subsequent model.

Appropriate use of model results is important. Despite detailed model inputs and assumptions, the CalSim II results differ from real-time operations under stressed water supply conditions. Such model results occur due to the inability of the model to make unique real-time policy decisions under extreme circumstances, as the actual (human) operators must do. Therefore, results which indicate severely low storage, or inability to meet flow requirements or senior water rights should only be considered an indicator of stressed water supply conditions under that alternative, and should not necessarily be understood to reflect literally what would occur in the future under that alternative. These conditions, in real-time operations, would be avoided by making policy decisions on other requirements in prior months. In actual future operations, as has always been the case in the past, the project operators would work in real time to satisfy legal and contractual obligations given then current conditions and hydrologic constraints.

Reclamation's 2008 BA on the coordinated long-term operations Appendix W (Reclamation 2008b) included a comprehensive sensitivity and uncertainty analysis of CalSim II results relative to the uncertainty in the inputs. This appendix provides a good summary of the key inputs that are critical to the largest changes in several operational outputs. Understanding the findings from this appendix may help in better understanding of the alternatives.

2. HEC 5Q

The model is one-dimensional in the vertical and longitudinal directions for reservoirs and rivers, respectively. HEC 5Q assumes fully mixed river cross sections. The effect of tributary inflow on river temperature is computed by mass balance calculation. When used with inputs derived from CalSim II outputs, changes in results between two scenarios should be considered at a monthly timestep, consistent with the changes in inputs. HEC 5Q computes at a 6-hour timestep to capture the range of daily temperatures. Despite capturing sub-daily changes, a 6-hour timestep may not capture all variations in flow and climate conditions.. Spatial resolution of the model may miss: inflow from small tributaries or culverts, rapid changes in roughness, or variations in river slope.

HEC5Q was used for Sacramento, Trinity, American, and Stanislaus Rivers.

3. Reclamation Temperature Model

Reclamation Temperature model is one-dimensional in the vertical direction for reservoirs. The reservoir is divided into isothermal, horizontal layers of uniform thickness. Energy exchange between the reservoir and the atmosphere is assumed to occur at the reservoir surface (Reclamation 2008a).

The model is one-dimensional in the longitudinal direction and assumes fully mixed river cross sections. The effect of tributary inflow on river temperature is computed by mass balance calculation. The river temperature calculations are based on regulating reservoir release temperatures, river flows, and climatic data. The model uses up to ten computational steps for

each monthly timestep to approximate results for each month. Mean monthly flows and temperature do not capture daily variations in flow and climate conditions.

Reclamation's 2008 OCAP BA on the coordinated long-term operations Appendix H (Reclamation 2008a) included a comprehensive description Reclamation Temperature Model and its limitations.

The Reclamation Temperature Model was used for the Feather River.

4. DSM2

DSM2 is a one-dimensional model with inherent limitations in simulating hydrodynamic and transport processes in a complex estuarine environment such as the Sacramento – San Joaquin Delta. DSM2 assumes that velocity in a channel can be adequately represented by a single average velocity over the channel cross-section, meaning that variations both across the width of the channel and through the water column are negligible. DSM2 does not have the ability to model short-circuiting of flow through a reach, where a majority of the flow in a cross-section is confined to a small portion of the cross-section. DSM2 does not conserve momentum at the channel junctions and does not model the secondary currents in a channel. DSM2 also does not explicitly account for dispersion due to flow accelerating through channel bends. It cannot model the vertical salinity stratification in the channels.

It has inherent limitations in simulating the hydrodynamics related to the open water areas. Since an open water surface area (represented with a reservoir in the model) is constant in DSM2, it impacts the stage in the reservoir and thereby impacts the flow exchange with the adjoining channel. Due to the inability to change the cross-sectional area of the reservoir inlets with changing water surface elevation, the final entrance and exit coefficients were fine tuned to match a median flow range. This causes errors in the flow exchange at breaches (levee openings) during the extreme spring and neap tides. Using an arbitrary bottom elevation value for the reservoirs representing the proposed marsh areas to get around the wetting-drying limitation of DSM2 may increase the dilution of salinity in the reservoirs. Accurate representation of RMA's tidal marsh areas, bottom elevations, location of breaches, breach widths, cross-sections, and boundary conditions in DSM2 is critical to the agreement of corroboration results.

For open water bodies DSM2 assumes uniform and instantaneous mixing over entire open water area. Thus it does not account for the any salinity gradients that may exist within the open water bodies. Significant uncertainty exists in flow and EC input data related to in-Delta agriculture, which leads to uncertainty in the simulated EC values. Caution needs to be exercised when using EC outputs on a sub-monthly scale, and therefore results are only presented at the monthly scale. Water quality results inside the water bodies representing the tidal marsh areas were not validated specifically and because of the bottom elevation assumptions, preferably should not be used for analysis.

Specific Limitations of Scenarios Modeled

1. Without Action

The Without Action scenario (WOA) scenario represents an analysis of the baseline element of the section 7 analysis, where the CVP and SWP operations are ceased. Presenting the absence of the action allows the isolation and thus analysis of the effects of ongoing operations. The WOA is a unique implementation of CalSim, and its interpretation or comparison to other alternatives should be done with full understanding of its limitations. The WOA scenario is a depiction of system status in the absence of CVP/SWP discretionary operations (the action under consultation). This scenario's results will not reflect numerically accurate flows or deliveries at every location due to issues detailed below, but results can be used to qualitatively assess the general system-wide effects of project operations on flow volumes and water supply reliability.

In order to simulate the WOA, major assumptions had to be made. These assumptions, and the rationale behind them; and some of the important limitations that could affect the model results are shared below. Overall, it is important to note that there is large uncertainty within the WOA model and the results, so the results should only be used qualitatively.

The use of WOA model results should be limited to qualitative analysis and comparison of scenarios. The WOA model results are not appropriate for quantitative analysis due to following uncertainties and assumptions:

Areas of uncertainty:

- Senior Water Rights – CalSim was primarily designed to analyze the effects due to changes in Project operations, so non-project operations are generally considered as a lumped higher priority. The lack of explicit distinction among senior water right priorities means the model cannot make specific decisions on individual non-project deliveries.
- Land Use Assumptions – without the delivery certainty that Project storage provides, there could be a shift in land use, which could change the timing and magnitude of diversions from the rivers.
- Groundwater Response – between SGMA and the decrease in surface water reliability, it is unclear how groundwater use might change under WOA.
- Hydraulic Reality – CalSim does not have detailed information on the locations and conditions required for all non-project users to divert. Additionally, CalSim does not have assumptions for how this might change if the Projects are not operated.
- Regulations – it is unclear how regulations would change without the projects backstopping the system.

Assumptions:

- Minimum instream flows – The minimum instream flow assumptions were made to push water through the river. This helps to address some of the uncertainties around Hydrologic Reality (at what level can non-project users divert) and Regulations described above. Using minimum instream flow assumptions may not be the best reflection of reality, as the rivers may go dry due to senior water rights' diversions or regulations may change that could require even more flow to remain in the rivers.
- Cuts to senior water rights holders – While there was an effort to make sure that non-project water users were able to deliver water when it was available, these results are rough, and many non-project users are not specifically accommodated. For example, Folsom M&I users are cut based on storage levels in Folsom, but diversions on the lower American River are not cut based on river flow levels. Also, Settlement and Exchange contractors were assumed to be cut at a fixed level without consulting contractor's individual water rights. CalSim does not currently have the detail for all water users' diversion requirements and existing water rights
- Fixed groundwater/surface water interactions – Groundwater pumping was not limited in the COS; therefore groundwater/surface water interactions were fixed to the operations in the COS to not allow substantial cumulative groundwater conditions from influencing river flows.
- Fixed land use assumptions – Land use assumptions remained the same as the COS. Although the land use would change under the conditions of WOA, it is unknown how these changes would occur.
- Senior water rights – Settlement contractors were cut to 75% in all years, Exchange contractors to 77% in all years as a simplified representation of supplies available to senior water rights holders in the absence of releases from CVP storage.
- Refuge supplies – Refuge supplies were estimated and set to Level 1
- Non-CVP/Non-SWP facilities – All existing non-project structures would continue to operate as they are currently.
- Flood conditions – CalSim II is a monthly model that operates within the channel capacity defined for each stream. The monthly timestep does not accommodate sub-monthly runoff and flood conditions that could occur under this scenario due to large storms. It also does not accommodate the potential of exceeding channel capacities or potential levee breaches.
- Model consistencies – Hydrologic modeling artifacts, especially Depletion Study Area (DSA) accretion/depletion terms, were not adjusted and may not accurately reflect a true WOA condition.
- Flow Salinity Artificial Neural Network (ANN) model – The ANN was not retrained to handle the wider range of Delta flow conditions, so delta salinity and X2 results may not be accurate.
- Flow splits – The regression equations used for weirs and cross channel flows were not re-computed for the new range of simulated flows

2. Proposed Action

The Proposed Action (PA) model results are appropriate for qualitative analysis with the following considerations:

- OMR actions – The OMR actions as described in the PA are intended to be managed based on a number of real-time triggers. Since not all of these triggers can be modeled in CalSim, the modeled OMR is an approximation of proposed real-time operations that are described in the BA.
- Montezuma Slough Salinity Control Gates operations – The salinity gate operation rules to cover hydrologic conditions simulated in the 82-year planning study have not yet been developed and therefore were not explicitly modeled in DSM2. Similarly, changes to the flow-salinity relationship would not have been captured by the existing ANNs. To preserve consistency in modeling, this action is not modeled and is evaluated qualitatively. With implementation of the extended salinity gate operations, it is likely that the upstream reservoirs would release more water to meet Delta salinity requirements than the PA model results indicate.
- 2017 American River Flow Management Standard – The planning minimum of the 2017 FMS is represented by a Folsom carry over target of 275 taf. Reclamation has committed to working with the Water Forum to develop a planning minimum. The model assumption of 275 taf will be revisited and updated in the future based on those discussions.
- Stanislaus dissolved oxygen location – While the PA proposes to move the dissolved oxygen compliance point upstream to OBB, or use a surrogate DO compliance at the existing Ripon gage, there was not enough data to modify the CalSim II assumptions for the Stanislaus DO release. Releases for DO would likely be less than the PA model results.

References

U. S. Bureau of Reclamation, 2008a. Biological Assessment on the Continued Long-term Operations of the Central Valley Project and State Water Project, Appendix H Reclamation Temperature Model and SRWQM Temperature Model, August 2008.

U. S. Bureau of Reclamation, 2008b. Biological Assessment on the Continued Long-term Operations of the Central Valley Project and State Water Project, Appendix W Sensitivity and Uncertainty Analysis, August 2008.

Appendix D – Modeling

Attachment 3-1 – Storage and Elevation Results (CalSim II)

The following results of the CalSim II model are included for reservoir storage conditions:

Title	Model Parameter	Table Numbers	Figure Numbers
Trinity Lake Storage	S1	1-1 to 1-3	1-1 to 1-2
Trinity Lake Elevation	Post-processed	1a-1 to 1a-3	1a-1 to 1a-2
Shasta Lake Storage	S4	3-1 to 3-3	3-1 to 3-2
Shasta Lake Elevation	Post-processed	3a-1 to 3a-3	3a-1 to 3a-2
Lake Oroville Storage	S6	4-1 to 4-3	4-1 to 4-2
Lake Oroville Elevation	Post-processed	4a-1 to 4a-3	4a-1 to 4a-2
Folsom Lake Storage	S8	5-1 to 5-3	5-1 to 5-2
Folsom Lake Elevation	Post-processed	5a-1 to 5a-3	5a-1 to 5a-2
San Luis Reservoir Storage	S11+S12	6-1 to 6-3	6-1 to 6-2
San Luis Reservoir Elevation	Post-processed	6a-1 to 6a-3	6a-1 to 6a-2
CVP San Luis Reservoir Storage	S11	6b-1 to 6b-3	6b-1 to 6b-2
SWP San Luis Reservoir Storage	S12	6c-1 to 6c-3	6c-1 to 6c-2
New Melones Reservoir Storage	S10	7-1 to 7-3	7-1 to 7-2
New Melones Reservoir Elevation	Post-processed	7a-1 to 7a-3	7a-1 to 7a-2
Millerton Lake Storage	S18	8-1 to 8-3	8-1 to 8-2
Millerton Lake Elevation	Post-processed	8a-1 to 8a-3	8a-1 to 8a-2

Report formats

- Monthly tables comparing two scenarios (exceedance values, long-term average, and average by water year type)
- Monthly exceedance charts (May and September) including all scenarios

Table 1-1. Trinity Lake Storage, End of Month Storage

Without Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	12	12	12	41	47	23	13	57	12	12	12	12
20%	12	12	12	12	12	12	12	12	12	12	12	12
30%	12	12	12	12	12	12	12	12	12	12	12	12
40%	12	12	12	12	12	12	12	12	12	12	12	12
50%	12	12	12	12	12	12	12	12	12	12	12	12
60%	12	12	12	12	12	12	12	12	12	12	12	12
70%	12	12	12	12	12	12	12	12	12	12	12	12
80%	12	12	12	12	12	12	12	12	12	12	12	12
90%	12	12	12	12	12	12	12	12	12	12	12	12
Long Term												
Full Simulation Period[a]	12	14	19	29	28	29	22	31	26	16	12	12
Water Year Types[b,c]												
Wet (32%)	12	12	19	59	55	59	42	70	55	23	12	12
Above Normal (16%)	12	24	19	23	22	23	15	17	12	12	12	12
Below Normal (13%)	12	12	12	12	12	12	14	12	12	12	12	12
Dry (24%)	12	12	26	12	14	13	12	12	12	12	12	12
Critical (15%)	12	12	12	12	12	12	12	12	12	12	12	12

Current Operations 011319

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,850	1,839	1,850	1,900	2,000	2,100	2,300	2,354	2,314	2,261	2,130	1,934
20%	1,804	1,749	1,809	1,885	2,000	2,100	2,270	2,282	2,221	2,094	1,964	1,855
30%	1,510	1,551	1,656	1,765	1,950	2,096	2,226	2,163	2,059	1,914	1,759	1,600
40%	1,430	1,445	1,537	1,668	1,775	2,011	2,151	2,080	1,960	1,806	1,619	1,437
50%	1,245	1,275	1,391	1,529	1,684	1,782	1,942	1,881	1,795	1,652	1,479	1,336
60%	1,169	1,185	1,274	1,345	1,529	1,667	1,802	1,724	1,657	1,506	1,337	1,224
70%	1,072	1,078	1,134	1,205	1,285	1,432	1,580	1,597	1,479	1,395	1,229	1,097
80%	901	945	983	1,005	1,122	1,276	1,443	1,383	1,328	1,176	1,024	924
90%	655	666	668	697	828	922	1,018	978	924	854	755	673
Long Term												
Full Simulation Period[a]	1,264	1,271	1,334	1,415	1,543	1,670	1,815	1,792	1,728	1,602	1,455	1,319
Water Year Types[b,c]												
Wet (32%)	1,696	1,681	1,698	1,769	1,937	2,063	2,233	2,257	2,203	2,091	1,958	1,791
Above Normal (16%)	1,477	1,467	1,507	1,511	1,723	1,908	2,094	2,068	1,981	1,852	1,686	1,534
Below Normal (13%)	1,171	1,185	1,262	1,496	1,584	1,687	1,844	1,769	1,677	1,521	1,346	1,203
Dry (24%)	1,029	1,070	1,213	1,208	1,302	1,434	1,571	1,523	1,454	1,304	1,158	1,050
Critical (15%)	579	586	627	817	859	941	990	955	929	842	711	621

Current Operations 011319 minus Without Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,837	1,827	1,838	1,859	1,953	2,077	2,287	2,296	2,301	2,248	2,118	1,922
20%	1,792	1,737	1,796	1,873	1,988	2,088	2,257	2,269	2,209	2,081	1,951	1,843
30%	1,498	1,538	1,643	1,752	1,937	2,083	2,213	2,150	2,047	1,902	1,746	1,588
40%	1,418	1,433	1,525	1,655	1,763	1,999	2,139	2,067	1,947	1,793	1,607	1,424
50%	1,232	1,262	1,379	1,517	1,672	1,770	1,930	1,869	1,783	1,640	1,467	1,324
60%	1,156	1,173	1,261	1,332	1,517	1,655	1,789	1,712	1,644	1,494	1,325	1,212
70%	1,059	1,066	1,121	1,193	1,273	1,420	1,568	1,585	1,467	1,382	1,217	1,085
80%	889	933	971	993	1,110	1,264	1,430	1,371	1,315	1,164	1,011	912
90%	643	653	655	685	816	909	1,005	966	911	842	743	661
Long Term												
Full Simulation Period[a]	1,252	1,257	1,315	1,386	1,515	1,641	1,793	1,761	1,702	1,586	1,443	1,307
Water Year Types[b,c]												
Wet (32%)	1,683	1,669	1,679	1,710	1,882	2,004	2,191	2,187	2,148	2,069	1,945	1,778
Above Normal (16%)	1,465	1,443	1,488	1,488	1,700	1,885	2,079	2,051	1,969	1,839	1,674	1,522
Below Normal (13%)	1,158	1,173	1,249	1,483	1,571	1,675	1,830	1,757	1,665	1,509	1,334	1,190
Dry (24%)	1,016	1,058	1,187	1,196	1,288	1,421	1,558	1,511	1,442	1,292	1,145	1,038
Critical (15%)	567	574	615	805	847	928	978	942	917	830	698	609

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 1-2. Trinity Lake Storage, End of Month Storage

Without Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	12	12	12	41	47	23	13	57	12	12	12	12
20%	12	12	12	12	12	12	12	12	12	12	12	12
30%	12	12	12	12	12	12	12	12	12	12	12	12
40%	12	12	12	12	12	12	12	12	12	12	12	12
50%	12	12	12	12	12	12	12	12	12	12	12	12
60%	12	12	12	12	12	12	12	12	12	12	12	12
70%	12	12	12	12	12	12	12	12	12	12	12	12
80%	12	12	12	12	12	12	12	12	12	12	12	12
90%	12	12	12	12	12	12	12	12	12	12	12	12
Long Term												
Full Simulation Period[a]	12	14	19	29	28	29	22	31	26	16	12	12
Water Year Types[b,c]												
Wet (32%)	12	12	19	59	55	59	42	70	55	23	12	12
Above Normal (16%)	12	24	19	23	22	23	15	17	12	12	12	12
Below Normal (13%)	12	12	12	12	12	12	14	12	12	12	12	12
Dry (24%)	12	12	26	12	14	13	12	12	12	12	12	12
Critical (15%)	12	12	12	12	12	12	12	12	12	12	12	12

Proposed Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,850	1,850	1,850	1,900	2,000	2,100	2,300	2,354	2,314	2,261	2,130	1,975
20%	1,836	1,844	1,850	1,900	2,000	2,100	2,272	2,281	2,233	2,099	1,981	1,902
30%	1,574	1,613	1,713	1,820	1,991	2,100	2,238	2,179	2,083	1,938	1,777	1,622
40%	1,429	1,484	1,617	1,718	1,861	2,045	2,172	2,104	1,971	1,813	1,638	1,457
50%	1,314	1,334	1,461	1,653	1,744	1,869	2,034	1,933	1,840	1,667	1,482	1,356
60%	1,238	1,243	1,323	1,427	1,545	1,740	1,842	1,822	1,735	1,578	1,397	1,283
70%	1,128	1,160	1,236	1,295	1,405	1,543	1,642	1,630	1,613	1,433	1,264	1,137
80%	971	1,007	1,012	1,058	1,166	1,361	1,547	1,476	1,386	1,261	1,111	1,000
90%	683	703	754	780	834	921	1,071	1,047	1,005	906	781	684
Long Term												
Full Simulation Period[a]	1,304	1,322	1,384	1,463	1,587	1,710	1,856	1,833	1,767	1,631	1,479	1,354
Water Year Types[b,c]												
Wet (32%)	1,727	1,742	1,758	1,781	1,950	2,071	2,245	2,269	2,213	2,097	1,960	1,821
Above Normal (16%)	1,508	1,528	1,570	1,554	1,747	1,925	2,111	2,085	1,990	1,851	1,685	1,540
Below Normal (13%)	1,206	1,213	1,288	1,571	1,659	1,746	1,901	1,824	1,720	1,561	1,377	1,245
Dry (24%)	1,090	1,124	1,266	1,276	1,369	1,502	1,639	1,590	1,534	1,375	1,222	1,112
Critical (15%)	615	617	658	885	928	1,008	1,059	1,024	992	871	734	640

Proposed Action 011519 minus Without Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,838	1,838	1,838	1,859	1,953	2,077	2,287	2,297	2,301	2,248	2,118	1,963
20%	1,824	1,832	1,838	1,888	1,988	2,088	2,260	2,269	2,221	2,087	1,969	1,890
30%	1,562	1,600	1,701	1,808	1,979	2,088	2,225	2,166	2,071	1,925	1,764	1,610
40%	1,417	1,471	1,604	1,705	1,849	2,032	2,160	2,092	1,959	1,800	1,626	1,444
50%	1,301	1,322	1,448	1,641	1,732	1,857	2,022	1,920	1,828	1,654	1,470	1,344
60%	1,226	1,230	1,311	1,415	1,533	1,727	1,830	1,810	1,723	1,565	1,384	1,270
70%	1,116	1,148	1,224	1,283	1,393	1,531	1,629	1,618	1,601	1,421	1,252	1,125
80%	959	995	1,000	1,046	1,154	1,349	1,535	1,464	1,374	1,249	1,099	988
90%	670	690	741	768	821	909	1,059	1,035	993	894	769	672
Long Term												
Full Simulation Period[a]	1,292	1,308	1,365	1,434	1,560	1,681	1,834	1,801	1,741	1,615	1,467	1,341
Water Year Types[b,c]												
Wet (32%)	1,714	1,730	1,740	1,722	1,894	2,011	2,203	2,199	2,158	2,075	1,948	1,809
Above Normal (16%)	1,496	1,504	1,551	1,532	1,725	1,902	2,096	2,069	1,978	1,839	1,673	1,527
Below Normal (13%)	1,193	1,201	1,275	1,559	1,646	1,734	1,888	1,812	1,708	1,549	1,364	1,233
Dry (24%)	1,077	1,112	1,240	1,264	1,355	1,490	1,626	1,578	1,522	1,363	1,210	1,099
Critical (15%)	603	605	646	873	916	995	1,047	1,012	979	859	722	628

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 1-3. Trinity Lake Storage, End of Month Storage

Current Operations 011319

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,850	1,839	1,850	1,900	2,000	2,100	2,300	2,354	2,314	2,261	2,130	1,934
20%	1,804	1,749	1,809	1,885	2,000	2,100	2,270	2,282	2,221	2,094	1,964	1,855
30%	1,510	1,551	1,656	1,765	1,950	2,096	2,226	2,163	2,059	1,914	1,759	1,600
40%	1,430	1,445	1,537	1,668	1,775	2,011	2,151	2,080	1,960	1,806	1,619	1,437
50%	1,245	1,275	1,391	1,529	1,684	1,782	1,942	1,881	1,795	1,652	1,479	1,336
60%	1,169	1,185	1,274	1,345	1,529	1,667	1,802	1,724	1,657	1,506	1,337	1,224
70%	1,072	1,078	1,134	1,205	1,285	1,432	1,580	1,597	1,479	1,395	1,229	1,097
80%	901	945	983	1,005	1,122	1,276	1,443	1,383	1,328	1,176	1,024	924
90%	655	666	668	697	828	922	1,018	978	924	854	755	673
Long Term												
Full Simulation Period[a]	1,264	1,271	1,334	1,415	1,543	1,670	1,815	1,792	1,728	1,602	1,455	1,319
Water Year Types[b,c]												
Wet (32%)	1,696	1,681	1,698	1,769	1,937	2,063	2,233	2,257	2,203	2,091	1,958	1,791
Above Normal (16%)	1,477	1,467	1,507	1,511	1,723	1,908	2,094	2,068	1,981	1,852	1,686	1,534
Below Normal (13%)	1,171	1,185	1,262	1,496	1,584	1,687	1,844	1,769	1,677	1,521	1,346	1,203
Dry (24%)	1,029	1,070	1,213	1,208	1,302	1,434	1,571	1,523	1,454	1,304	1,158	1,050
Critical (15%)	579	586	627	817	859	941	990	955	929	842	711	621

Proposed Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,850	1,850	1,850	1,900	2,000	2,100	2,300	2,354	2,314	2,261	2,130	1,975
20%	1,836	1,844	1,850	1,900	2,000	2,100	2,272	2,281	2,233	2,099	1,981	1,902
30%	1,574	1,613	1,713	1,820	1,991	2,100	2,238	2,179	2,083	1,938	1,777	1,622
40%	1,429	1,484	1,617	1,718	1,861	2,045	2,172	2,104	1,971	1,813	1,638	1,457
50%	1,314	1,334	1,461	1,653	1,744	1,869	2,034	1,933	1,840	1,667	1,482	1,356
60%	1,238	1,243	1,323	1,427	1,545	1,740	1,842	1,822	1,735	1,578	1,397	1,283
70%	1,128	1,160	1,236	1,295	1,405	1,543	1,642	1,630	1,613	1,433	1,264	1,137
80%	971	1,007	1,012	1,058	1,166	1,361	1,547	1,476	1,386	1,261	1,111	1,000
90%	683	703	754	780	834	921	1,071	1,047	1,005	906	781	684
Long Term												
Full Simulation Period[a]	1,304	1,322	1,384	1,463	1,587	1,710	1,856	1,833	1,767	1,631	1,479	1,354
Water Year Types[b,c]												
Wet (32%)	1,727	1,742	1,758	1,781	1,950	2,071	2,245	2,269	2,213	2,097	1,960	1,821
Above Normal (16%)	1,508	1,528	1,570	1,554	1,747	1,925	2,111	2,085	1,990	1,851	1,685	1,540
Below Normal (13%)	1,206	1,213	1,288	1,571	1,659	1,746	1,901	1,824	1,720	1,561	1,377	1,245
Dry (24%)	1,090	1,124	1,266	1,276	1,369	1,502	1,639	1,590	1,534	1,375	1,222	1,112
Critical (15%)	615	617	658	885	928	1,008	1,059	1,024	992	871	734	640

Proposed Action 011519 minus Current Operations 011319

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	11	0	0	0	0	0	0	0	0	0	41
20%	32	95	41	15	0	0	3	-1	12	5	18	47
30%	64	62	58	55	41	4	12	16	24	24	18	22
40%	-1	39	79	50	86	34	21	25	12	7	18	20
50%	69	59	70	124	60	87	92	52	45	14	3	20
60%	70	58	49	82	16	72	41	98	79	71	60	59
70%	57	82	103	90	120	111	62	33	134	38	35	40
80%	70	62	29	53	44	85	105	93	58	85	87	76
90%	28	37	86	83	6	0	53	69	81	52	26	11
Long Term												
Full Simulation Period[a]	40	51	50	48	45	40	41	40	39	29	24	34
Water Year Types[b,c]												
Wet (32%)	31	61	60	12	13	8	12	12	10	6	2	31
Above Normal (16%)	31	61	63	44	25	17	17	17	9	0	-1	5
Below Normal (13%)	35	28	26	75	75	59	57	55	43	40	30	43
Dry (24%)	61	54	53	68	68	69	68	67	80	71	65	62
Critical (15%)	36	31	31	68	69	67	69	69	63	29	24	19

a Based on the 82-year simulation period.

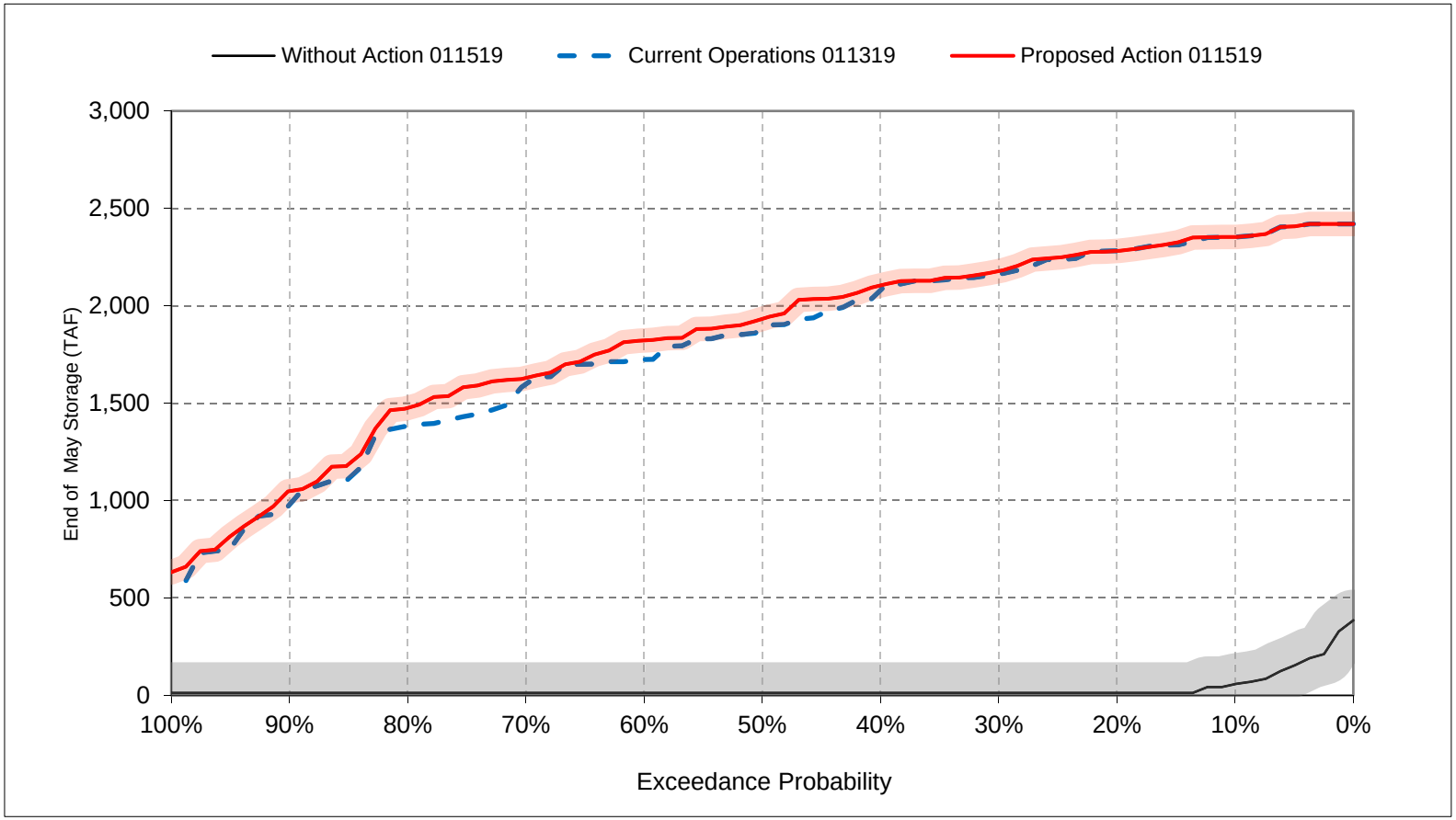
b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

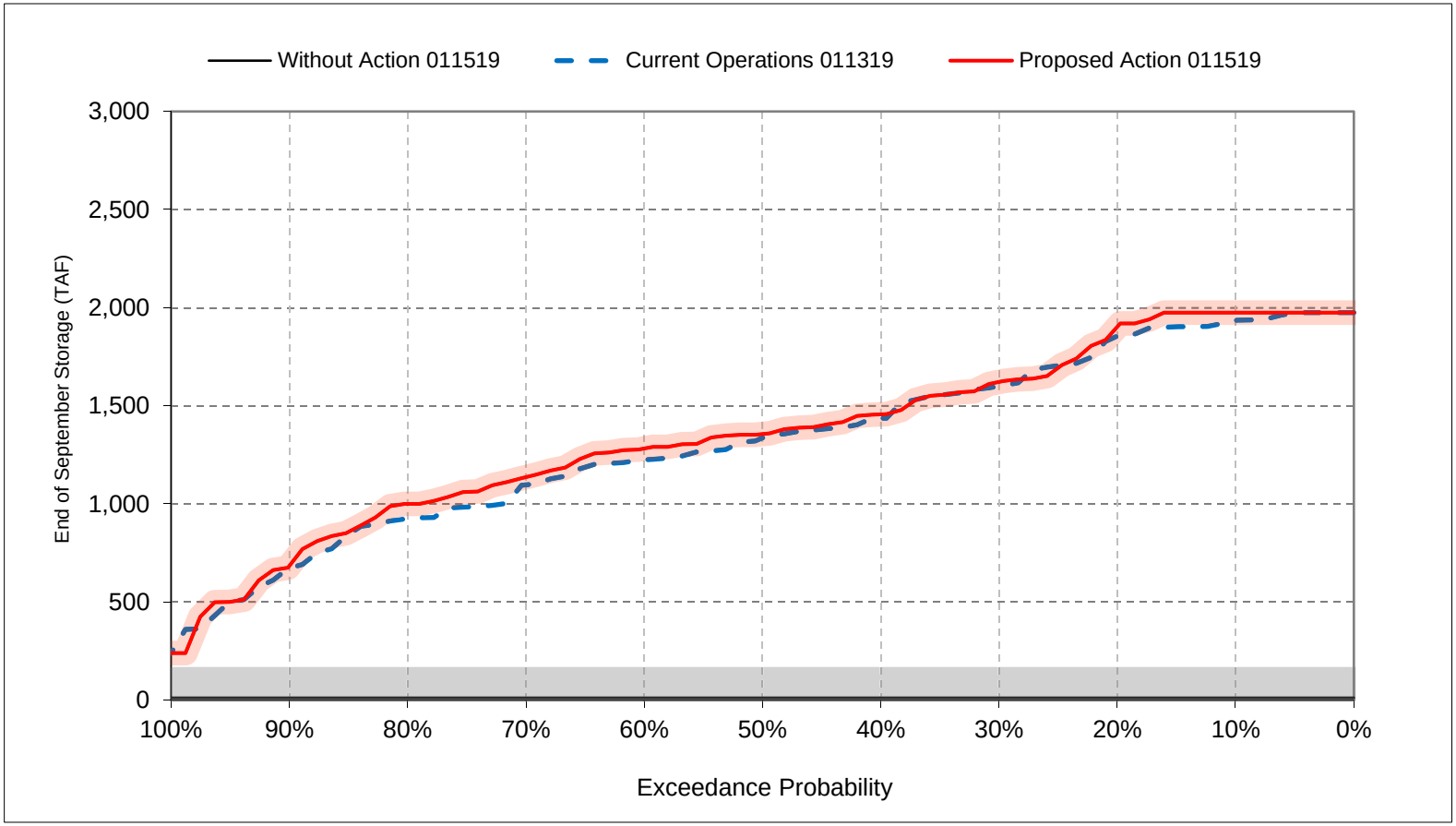
e These are draft results meant for qualitative analysis and are subject to revision.

Figure 1-1. Trinity Lake Storage, End of May Storage



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 1-2. Trinity Lake Storage, End of September Storage



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Table 1a-1. Trinity Lake Elevation, End of Month Elevation

Without Action 011519

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,953	1,953	1,953	1,972	1,976	1,960	1,954	1,983	1,953	1,953	1,953	1,953
20%	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953
30%	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953
40%	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953
50%	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953
60%	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953
70%	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953
80%	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953
90%	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953
Long Term												
Full Simulation Period[a]	1,953	1,954	1,957	1,964	1,963	1,964	1,960	1,965	1,961	1,955	1,953	1,953
Water Year Types[b,c]												
Wet (32%)	1,953	1,953	1,957	1,984	1,979	1,984	1,973	1,989	1,979	1,960	1,953	1,953
Above Normal (16%)	1,953	1,961	1,957	1,960	1,960	1,960	1,955	1,956	1,953	1,953	1,953	1,953
Below Normal (13%)	1,953	1,953	1,953	1,953	1,953	1,953	1,954	1,953	1,953	1,953	1,953	1,953
Dry (24%)	1,953	1,953	1,962	1,953	1,954	1,953	1,953	1,953	1,953	1,953	1,953	1,953
Critical (15%)	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953

Current Operations 011319

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	2,332	2,331	2,332	2,337	2,345	2,350	2,361	2,364	2,362	2,359	2,352	2,339
20%	2,328	2,324	2,329	2,335	2,345	2,350	2,359	2,360	2,357	2,350	2,342	2,333
30%	2,303	2,307	2,316	2,325	2,341	2,350	2,357	2,354	2,348	2,338	2,324	2,311
40%	2,297	2,298	2,306	2,317	2,326	2,345	2,353	2,349	2,342	2,328	2,313	2,297
50%	2,280	2,283	2,293	2,305	2,318	2,326	2,340	2,335	2,328	2,315	2,301	2,289
60%	2,273	2,275	2,283	2,289	2,305	2,317	2,328	2,322	2,316	2,303	2,289	2,278
70%	2,263	2,264	2,269	2,276	2,284	2,297	2,309	2,311	2,301	2,294	2,279	2,266
80%	2,244	2,249	2,253	2,256	2,268	2,284	2,298	2,293	2,288	2,274	2,258	2,246
90%	2,210	2,211	2,212	2,216	2,234	2,246	2,257	2,252	2,246	2,238	2,224	2,212
Long Term												
Full Simulation Period[a]	2,275	2,276	2,282	2,290	2,302	2,313	2,324	2,322	2,317	2,307	2,294	2,281
Water Year Types[b,c]												
Wet (32%)	2,319	2,318	2,319	2,325	2,339	2,348	2,357	2,359	2,355	2,348	2,339	2,327
Above Normal (16%)	2,300	2,299	2,303	2,302	2,321	2,336	2,348	2,347	2,341	2,332	2,318	2,305
Below Normal (13%)	2,270	2,271	2,278	2,300	2,308	2,317	2,329	2,324	2,317	2,303	2,288	2,274
Dry (24%)	2,256	2,261	2,274	2,272	2,282	2,295	2,307	2,303	2,297	2,284	2,270	2,259
Critical (15%)	2,185	2,190	2,198	2,224	2,231	2,243	2,250	2,246	2,244	2,233	2,214	2,197

Current Operations 011319 minus Without Action 011519

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	379	378	379	365	369	390	407	382	409	406	399	386
20%	375	371	376	382	392	397	406	407	404	397	389	380
30%	350	354	363	372	388	397	404	401	395	385	371	358
40%	344	345	353	364	373	392	400	396	388	375	360	344
50%	327	330	340	352	365	373	387	382	374	362	348	336
60%	320	321	330	336	352	364	375	368	363	350	336	325
70%	310	311	316	323	331	344	356	358	348	341	326	313
80%	291	296	300	302	315	330	345	340	335	320	305	293
90%	257	258	258	263	281	293	304	299	293	285	271	259
Long Term												
Full Simulation Period[a]	322	322	325	326	340	349	364	357	356	352	341	328
Water Year Types[b,c]												
Wet (32%)	366	365	362	342	360	364	385	370	377	388	386	374
Above Normal (16%)	347	338	345	342	361	375	393	391	388	379	365	352
Below Normal (13%)	317	318	325	347	355	364	375	370	364	350	335	321
Dry (24%)	303	307	312	319	328	341	354	350	344	331	317	305
Critical (15%)	232	237	245	271	278	290	297	293	290	280	260	244

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 1a-2. Trinity Lake Elevation, End of Month Elevation

Without Action 011519

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,953	1,953	1,953	1,972	1,976	1,960	1,954	1,983	1,953	1,953	1,953	1,953
20%	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953
30%	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953
40%	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953
50%	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953
60%	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953
70%	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953
80%	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953
90%	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953
Long Term												
Full Simulation Period[a]	1,953	1,954	1,957	1,964	1,963	1,964	1,960	1,965	1,961	1,955	1,953	1,953
Water Year Types[b,c]												
Wet (32%)	1,953	1,953	1,957	1,984	1,979	1,984	1,973	1,989	1,979	1,960	1,953	1,953
Above Normal (16%)	1,953	1,961	1,957	1,960	1,960	1,960	1,955	1,956	1,953	1,953	1,953	1,953
Below Normal (13%)	1,953	1,953	1,953	1,953	1,953	1,953	1,954	1,953	1,953	1,953	1,953	1,953
Dry (24%)	1,953	1,953	1,962	1,953	1,954	1,953	1,953	1,953	1,953	1,953	1,953	1,953
Critical (15%)	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953	1,953

Proposed Action 011519

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	2,332	2,332	2,332	2,337	2,345	2,350	2,361	2,364	2,362	2,359	2,352	2,343
20%	2,331	2,332	2,332	2,337	2,345	2,350	2,360	2,360	2,357	2,350	2,343	2,337
30%	2,309	2,312	2,321	2,330	2,344	2,350	2,358	2,355	2,349	2,340	2,326	2,313
40%	2,297	2,301	2,312	2,321	2,333	2,347	2,354	2,351	2,343	2,329	2,314	2,299
50%	2,287	2,289	2,299	2,316	2,323	2,334	2,347	2,339	2,331	2,317	2,301	2,290
60%	2,280	2,280	2,288	2,296	2,306	2,323	2,332	2,330	2,323	2,309	2,294	2,284
70%	2,269	2,272	2,280	2,285	2,295	2,306	2,315	2,314	2,312	2,297	2,282	2,270
80%	2,252	2,256	2,256	2,262	2,273	2,291	2,307	2,301	2,293	2,282	2,267	2,255
90%	2,214	2,217	2,224	2,228	2,235	2,246	2,263	2,260	2,256	2,244	2,228	2,214
Long Term												
Full Simulation Period[a]	2,279	2,281	2,287	2,295	2,307	2,317	2,328	2,326	2,321	2,310	2,296	2,284
Water Year Types[b,c]												
Wet (32%)	2,322	2,323	2,324	2,326	2,340	2,348	2,358	2,360	2,356	2,349	2,339	2,330
Above Normal (16%)	2,303	2,305	2,308	2,305	2,323	2,337	2,349	2,348	2,342	2,332	2,318	2,306
Below Normal (13%)	2,274	2,274	2,281	2,307	2,315	2,322	2,333	2,328	2,320	2,307	2,290	2,278
Dry (24%)	2,263	2,266	2,279	2,278	2,288	2,300	2,313	2,309	2,304	2,290	2,276	2,265
Critical (15%)	2,193	2,197	2,205	2,234	2,240	2,251	2,258	2,254	2,251	2,236	2,216	2,197

Proposed Action 011519 minus Without Action 011519

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	379	379	379	365	369	390	407	382	409	406	399	390
20%	378	379	379	383	392	397	406	407	404	397	390	384
30%	356	359	368	377	391	397	405	401	396	387	373	360
40%	343	348	359	368	380	394	401	397	389	376	361	346
50%	334	335	346	362	370	381	394	386	378	364	348	337
60%	327	327	335	343	353	370	378	377	369	356	341	331
70%	316	319	327	332	341	353	361	360	359	344	329	317
80%	299	303	303	308	319	338	353	347	340	329	314	302
90%	261	263	271	275	282	293	310	307	302	291	275	261
Long Term												
Full Simulation Period[a]	326	327	330	331	344	353	368	361	360	354	343	331
Water Year Types[b,c]												
Wet (32%)	369	370	367	343	361	364	385	371	377	389	386	377
Above Normal (16%)	350	344	351	346	363	377	394	392	388	379	365	353
Below Normal (13%)	321	321	328	353	362	369	380	375	367	354	337	325
Dry (24%)	310	313	317	325	334	347	360	356	351	337	323	312
Critical (15%)	240	243	252	281	287	298	305	301	298	283	263	244

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 1a-3. Trinity Lake Elevation, End of Month Elevation

Current Operations 011319

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	2,332	2,331	2,332	2,337	2,345	2,350	2,361	2,364	2,362	2,359	2,352	2,339
20%	2,328	2,324	2,329	2,335	2,345	2,350	2,359	2,360	2,357	2,350	2,342	2,333
30%	2,303	2,307	2,316	2,325	2,341	2,350	2,357	2,354	2,348	2,338	2,324	2,311
40%	2,297	2,298	2,306	2,317	2,326	2,345	2,353	2,349	2,342	2,328	2,313	2,297
50%	2,280	2,283	2,293	2,305	2,318	2,326	2,340	2,335	2,328	2,315	2,301	2,289
60%	2,273	2,275	2,283	2,289	2,305	2,317	2,328	2,322	2,316	2,303	2,289	2,278
70%	2,263	2,264	2,269	2,276	2,284	2,297	2,309	2,311	2,301	2,294	2,279	2,266
80%	2,244	2,249	2,253	2,256	2,268	2,284	2,298	2,293	2,288	2,274	2,258	2,246
90%	2,210	2,211	2,212	2,216	2,234	2,246	2,257	2,252	2,246	2,238	2,224	2,212
Long Term												
Full Simulation Period[a]	2,275	2,276	2,282	2,290	2,302	2,313	2,324	2,322	2,317	2,307	2,294	2,281
Water Year Types[b,c]												
Wet (32%)	2,319	2,318	2,319	2,325	2,339	2,348	2,357	2,359	2,355	2,348	2,339	2,327
Above Normal (16%)	2,300	2,299	2,303	2,302	2,321	2,336	2,348	2,347	2,341	2,332	2,318	2,305
Below Normal (13%)	2,270	2,271	2,278	2,300	2,308	2,317	2,329	2,324	2,317	2,303	2,288	2,274
Dry (24%)	2,256	2,261	2,274	2,272	2,282	2,295	2,307	2,303	2,297	2,284	2,270	2,259
Critical (15%)	2,185	2,190	2,198	2,224	2,231	2,243	2,250	2,246	2,244	2,233	2,214	2,197

Proposed Action 011519

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	2,332	2,332	2,332	2,337	2,345	2,350	2,361	2,364	2,362	2,359	2,352	2,343
20%	2,331	2,332	2,332	2,337	2,345	2,350	2,360	2,360	2,357	2,350	2,343	2,337
30%	2,309	2,312	2,321	2,330	2,344	2,350	2,358	2,355	2,349	2,340	2,326	2,313
40%	2,297	2,301	2,312	2,321	2,333	2,347	2,354	2,351	2,343	2,329	2,314	2,299
50%	2,287	2,289	2,299	2,316	2,323	2,334	2,347	2,339	2,331	2,317	2,301	2,290
60%	2,280	2,280	2,288	2,296	2,306	2,323	2,332	2,330	2,323	2,309	2,294	2,284
70%	2,269	2,272	2,280	2,285	2,295	2,306	2,315	2,314	2,312	2,297	2,282	2,270
80%	2,252	2,256	2,256	2,262	2,273	2,291	2,307	2,301	2,293	2,282	2,267	2,255
90%	2,214	2,217	2,224	2,228	2,235	2,246	2,263	2,260	2,256	2,244	2,228	2,214
Long Term												
Full Simulation Period[a]	2,279	2,281	2,287	2,295	2,307	2,317	2,328	2,326	2,321	2,310	2,296	2,284
Water Year Types[b,c]												
Wet (32%)	2,322	2,323	2,324	2,326	2,340	2,348	2,358	2,360	2,356	2,349	2,339	2,330
Above Normal (16%)	2,303	2,305	2,308	2,305	2,323	2,337	2,349	2,348	2,342	2,332	2,318	2,306
Below Normal (13%)	2,274	2,274	2,281	2,307	2,315	2,322	2,333	2,328	2,320	2,307	2,290	2,278
Dry (24%)	2,263	2,266	2,279	2,278	2,288	2,300	2,313	2,309	2,304	2,290	2,276	2,265
Critical (15%)	2,193	2,197	2,205	2,234	2,240	2,251	2,258	2,254	2,251	2,236	2,216	2,197

Proposed Action 011519 minus Current Operations 011319

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	1	0	0	0	0	0	0	0	0	0	3
20%	3	8	3	1	0	0	0	**0**	1	0	2	4
30%	5	5	5	5	4	0	1	1	1	2	2	2
40%	**0**	3	7	4	7	2	1	1	1	1	2	2
50%	6	5	6	10	5	7	7	4	4	1	0	2
60%	7	6	4	7	1	6	3	8	7	6	5	6
70%	6	8	10	9	10	9	5	3	11	3	3	4
80%	8	7	3	6	4	7	9	8	5	8	9	9
90%	4	5	12	12	1	**0**	6	8	9	6	4	2
Long Term												
Full Simulation Period[a]	5	5	5	5	4	4	4	4	4	3	2	3
Water Year Types[b,c]												
Wet (32%)	3	5	5	1	1	1	1	1	1	0	0	3
Above Normal (16%)	3	5	6	4	2	1	1	1	1	0	**0**	0
Below Normal (13%)	4	3	2	7	7	5	5	4	4	3	3	4
Dry (24%)	7	6	5	6	6	6	6	6	7	6	6	7
Critical (15%)	8	7	7	10	9	8	8	8	7	3	2	0

a Based on the 82-year simulation period.

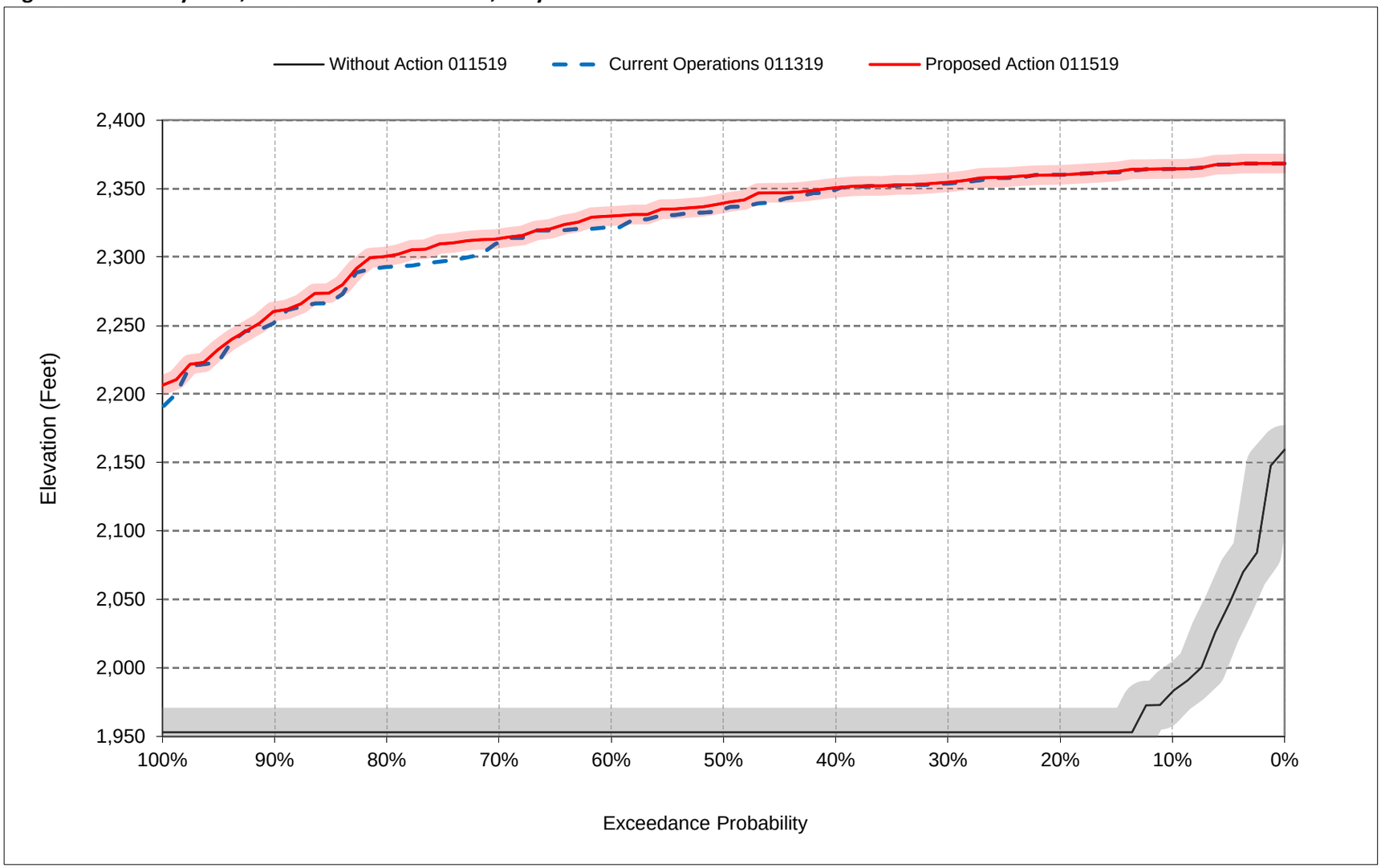
b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

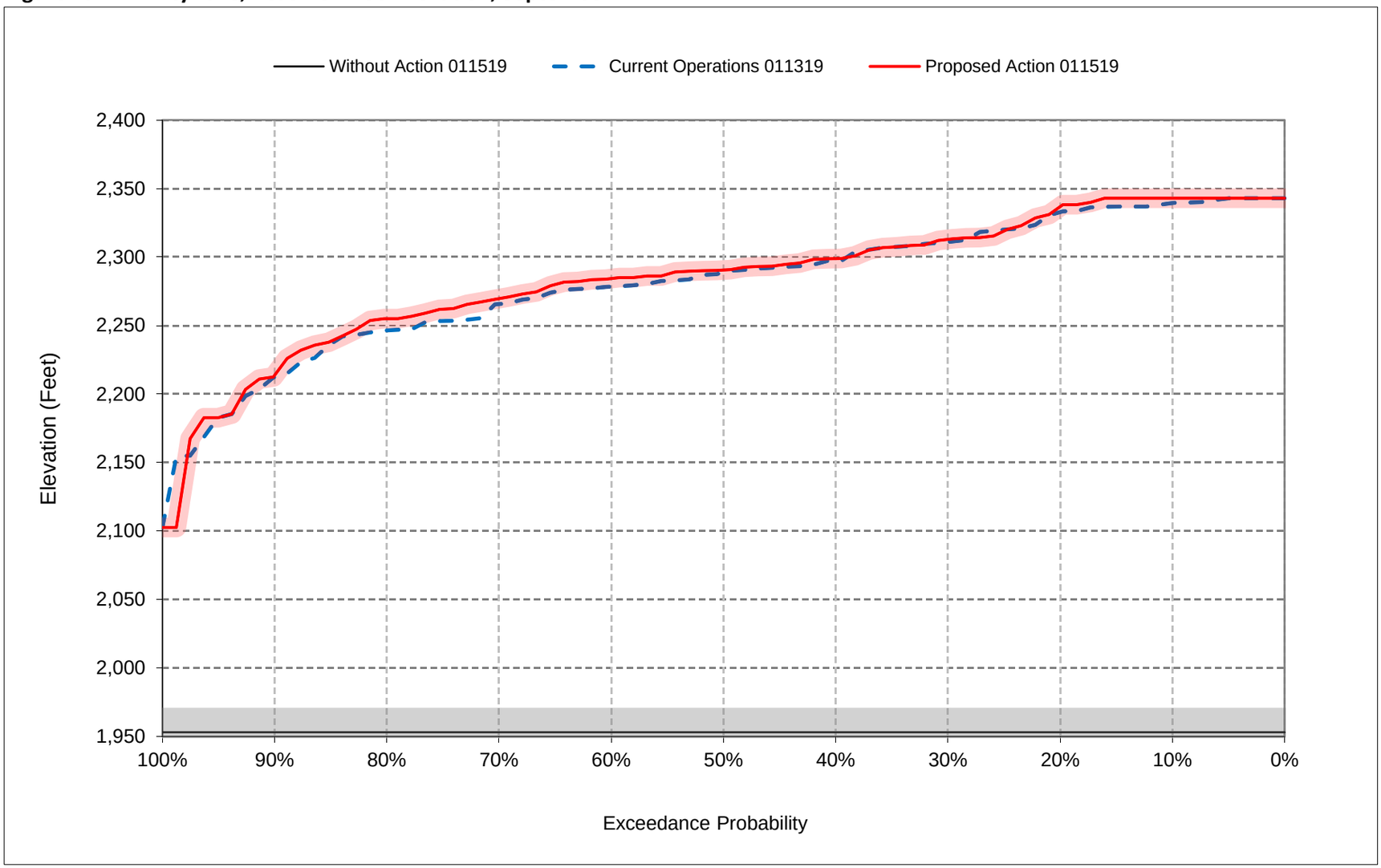
Figure 1a-1. Trinity Lake, Reservoir Pool Elevation, May



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Figure 1a-2. Trinity Lake, Reservoir Pool Elevation, September



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Table 3-1. Shasta Lake Storage, End of Month Storage

Without Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	116	359	990	1,046	1,477	833	674	431	160	116	116	116
20%	116	172	665	652	895	589	573	276	116	116	116	116
30%	116	116	398	472	701	463	416	166	116	116	116	116
40%	116	116	206	386	582	363	306	132	116	116	116	116
50%	116	116	116	228	370	324	233	116	116	116	116	116
60%	116	116	116	122	266	239	195	116	116	116	116	116
70%	116	116	116	116	188	124	136	116	116	116	116	116
80%	116	116	116	116	116	116	116	116	116	116	116	116
90%	116	116	116	116	116	116	116	116	116	116	116	116
Long Term												
Full Simulation Period[a]	124	184	377	443	583	415	347	196	131	115	115	116
Water Year Types[b,c]												
Wet (32%)	116	175	397	747	906	562	542	310	159	116	116	116
Above Normal (16%)	121	247	314	631	748	499	376	197	119	116	116	116
Below Normal (13%)	151	167	350	310	499	244	303	121	124	116	116	116
Dry (24%)	128	205	520	167	352	383	230	133	116	116	116	116
Critical (15%)	116	118	187	158	168	216	129	123	116	109	114	116

Current Operations 011319

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	3,218	3,252	3,335	3,621	3,875	4,229	4,552	4,552	4,500	4,011	3,670	3,199
20%	3,036	2,926	3,309	3,539	3,744	4,127	4,544	4,552	4,402	3,789	3,477	3,106
30%	2,903	2,807	3,266	3,397	3,649	4,046	4,475	4,552	4,288	3,622	3,275	3,005
40%	2,771	2,709	3,027	3,318	3,529	3,980	4,389	4,486	4,101	3,466	3,160	2,923
50%	2,677	2,579	2,793	3,247	3,477	3,875	4,265	4,347	3,909	3,380	3,043	2,809
60%	2,547	2,500	2,656	3,032	3,358	3,724	4,144	4,225	3,800	3,149	2,860	2,660
70%	2,294	2,305	2,426	2,836	3,252	3,513	3,971	3,960	3,450	2,883	2,631	2,476
80%	2,033	2,102	2,233	2,544	2,948	3,348	3,619	3,344	2,986	2,509	2,251	2,198
90%	1,553	1,409	1,720	2,061	2,314	2,593	2,749	2,579	2,276	1,947	1,729	1,673
Long Term												
Full Simulation Period[a]	2,482	2,450	2,669	2,976	3,273	3,630	3,972	3,958	3,668	3,125	2,816	2,579
Water Year Types[b,c]												
Wet (32%)	2,849	2,698	2,932	3,392	3,652	3,892	4,360	4,492	4,342	3,821	3,481	2,989
Above Normal (16%)	2,711	2,597	2,852	3,255	3,529	4,065	4,501	4,489	4,138	3,464	3,120	2,833
Below Normal (13%)	2,690	2,736	2,863	3,170	3,518	3,893	4,213	4,108	3,735	3,129	2,774	2,729
Dry (24%)	2,538	2,640	2,896	2,722	3,135	3,594	3,889	3,811	3,449	2,951	2,680	2,611
Critical (15%)	1,158	1,173	1,345	2,021	2,180	2,413	2,474	2,330	2,002	1,540	1,309	1,225

Current Operations 011319 minus Without Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	3,102	2,893	2,344	2,576	2,398	3,396	3,878	4,121	4,340	3,895	3,555	3,083
20%	2,920	2,754	2,644	2,887	2,848	3,538	3,971	4,276	4,286	3,673	3,362	2,990
30%	2,788	2,691	2,869	2,925	2,948	3,582	4,059	4,386	4,172	3,506	3,159	2,890
40%	2,655	2,593	2,821	2,931	2,947	3,617	4,083	4,354	3,985	3,350	3,044	2,807
50%	2,561	2,463	2,677	3,020	3,107	3,551	4,032	4,231	3,793	3,264	2,928	2,693
60%	2,432	2,384	2,540	2,910	3,092	3,485	3,949	4,109	3,685	3,034	2,744	2,545
70%	2,179	2,189	2,311	2,720	3,064	3,389	3,835	3,844	3,335	2,767	2,515	2,360
80%	1,918	1,986	2,117	2,428	2,832	3,232	3,503	3,228	2,870	2,393	2,135	2,082
90%	1,438	1,293	1,604	1,945	2,198	2,477	2,633	2,463	2,160	1,831	1,613	1,557
Long Term												
Full Simulation Period[a]	2,358	2,266	2,292	2,534	2,690	3,215	3,625	3,761	3,537	3,011	2,700	2,463
Water Year Types[b,c]												
Wet (32%)	2,734	2,523	2,535	2,644	2,746	3,330	3,818	4,182	4,183	3,705	3,365	2,873
Above Normal (16%)	2,589	2,350	2,538	2,623	2,781	3,566	4,125	4,292	4,019	3,348	3,004	2,717
Below Normal (13%)	2,539	2,569	2,513	2,860	3,019	3,648	3,910	3,987	3,611	3,013	2,658	2,613
Dry (24%)	2,410	2,435	2,376	2,555	2,783	3,211	3,659	3,678	3,333	2,835	2,564	2,496
Critical (15%)	1,042	1,055	1,158	1,863	2,012	2,197	2,345	2,207	1,886	1,431	1,195	1,109

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 3-2. Shasta Lake Storage, End of Month Storage

Without Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	116	359	990	1,046	1,477	833	674	431	160	116	116	116
20%	116	172	665	652	895	589	573	276	116	116	116	116
30%	116	116	398	472	701	463	416	166	116	116	116	116
40%	116	116	206	386	582	363	306	132	116	116	116	116
50%	116	116	116	228	370	324	233	116	116	116	116	116
60%	116	116	116	122	266	239	195	116	116	116	116	116
70%	116	116	116	116	188	124	136	116	116	116	116	116
80%	116	116	116	116	116	116	116	116	116	116	116	116
90%	116	116	116	116	116	116	116	116	116	116	116	116
Long Term												
Full Simulation Period[a]	124	184	377	443	583	415	347	196	131	115	115	116
Water Year Types[b,c]												
Wet (32%)	116	175	397	747	906	562	542	310	159	116	116	116
Above Normal (16%)	121	247	314	631	748	499	376	197	119	116	116	116
Below Normal (13%)	151	167	350	310	499	244	303	121	124	116	116	116
Dry (24%)	128	205	520	167	352	383	230	133	116	116	116	116
Critical (15%)	116	118	187	158	168	216	129	123	116	109	114	116

Proposed Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	3,250	3,252	3,359	3,666	3,939	4,262	4,552	4,552	4,500	4,011	3,669	3,400
20%	3,250	3,252	3,337	3,612	3,837	4,182	4,536	4,552	4,402	3,785	3,455	3,400
30%	3,213	3,244	3,314	3,538	3,732	4,080	4,478	4,552	4,253	3,607	3,303	3,304
40%	2,997	3,128	3,280	3,410	3,653	4,012	4,433	4,483	4,058	3,431	3,151	3,058
50%	2,752	2,897	3,226	3,329	3,564	3,966	4,291	4,344	3,879	3,282	2,981	2,914
60%	2,648	2,718	3,098	3,252	3,484	3,855	4,183	4,159	3,661	3,139	2,812	2,804
70%	2,518	2,622	2,789	2,985	3,283	3,638	4,087	3,913	3,484	2,921	2,664	2,589
80%	2,261	2,279	2,411	2,720	3,113	3,418	3,854	3,660	3,177	2,723	2,429	2,377
90%	1,542	1,441	1,798	2,122	2,607	2,690	2,753	2,930	2,552	2,135	1,748	1,676
Long Term												
Full Simulation Period[a]	2,626	2,674	2,833	3,093	3,370	3,706	4,041	3,994	3,667	3,141	2,828	2,730
Water Year Types[b,c]												
Wet (32%)	3,152	3,180	3,280	3,412	3,662	3,899	4,355	4,473	4,318	3,806	3,460	3,280
Above Normal (16%)	2,899	2,940	3,118	3,358	3,567	4,069	4,503	4,461	4,096	3,427	3,084	3,070
Below Normal (13%)	2,637	2,690	2,818	3,404	3,695	4,031	4,328	4,164	3,724	3,109	2,752	2,664
Dry (24%)	2,586	2,689	2,922	2,915	3,330	3,765	4,058	3,928	3,489	3,007	2,730	2,668
Critical (15%)	1,247	1,251	1,423	2,127	2,293	2,501	2,566	2,406	2,039	1,642	1,413	1,331

Proposed Action 011519 minus Without Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	3,134	2,893	2,368	2,621	2,462	3,429	3,878	4,121	4,340	3,895	3,553	3,284
20%	3,134	3,080	2,672	2,960	2,942	3,594	3,964	4,276	4,286	3,669	3,339	3,284
30%	3,097	3,128	2,916	3,066	3,032	3,616	4,063	4,386	4,137	3,491	3,187	3,188
40%	2,881	3,012	3,075	3,024	3,072	3,649	4,127	4,352	3,942	3,315	3,035	2,942
50%	2,636	2,781	3,110	3,101	3,193	3,643	4,058	4,229	3,763	3,167	2,865	2,798
60%	2,532	2,602	2,982	3,130	3,218	3,616	3,988	4,043	3,545	3,023	2,696	2,688
70%	2,402	2,507	2,673	2,870	3,095	3,514	3,951	3,798	3,368	2,806	2,549	2,473
80%	2,145	2,163	2,296	2,605	2,998	3,302	3,738	3,544	3,061	2,607	2,313	2,261
90%	1,426	1,326	1,683	2,007	2,491	2,574	2,637	2,814	2,437	2,020	1,632	1,560
Long Term												
Full Simulation Period[a]	2,501	2,490	2,457	2,651	2,787	3,291	3,693	3,798	3,536	3,026	2,712	2,614
Water Year Types[b,c]												
Wet (32%)	3,036	3,005	2,884	2,665	2,756	3,337	3,813	4,163	4,159	3,690	3,344	3,165
Above Normal (16%)	2,778	2,693	2,804	2,727	2,819	3,570	4,127	4,264	3,977	3,311	2,968	2,954
Below Normal (13%)	2,487	2,523	2,468	3,094	3,195	3,786	4,024	4,043	3,600	2,993	2,636	2,548
Dry (24%)	2,458	2,483	2,402	2,749	2,978	3,381	3,828	3,795	3,373	2,891	2,614	2,552
Critical (15%)	1,131	1,133	1,236	1,969	2,125	2,285	2,437	2,283	1,923	1,533	1,299	1,215

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 3-3. Shasta Lake Storage, End of Month Storage

Current Operations 011319

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	3,218	3,252	3,335	3,621	3,875	4,229	4,552	4,552	4,500	4,011	3,670	3,199
20%	3,036	2,926	3,309	3,539	3,744	4,127	4,544	4,552	4,402	3,789	3,477	3,106
30%	2,903	2,807	3,266	3,397	3,649	4,046	4,475	4,552	4,288	3,622	3,275	3,005
40%	2,771	2,709	3,027	3,318	3,529	3,980	4,389	4,486	4,101	3,466	3,160	2,923
50%	2,677	2,579	2,793	3,247	3,477	3,875	4,265	4,347	3,909	3,380	3,043	2,809
60%	2,547	2,500	2,656	3,032	3,358	3,724	4,144	4,225	3,800	3,149	2,860	2,660
70%	2,294	2,305	2,426	2,836	3,252	3,513	3,971	3,960	3,450	2,883	2,631	2,476
80%	2,033	2,102	2,233	2,544	2,948	3,348	3,619	3,344	2,986	2,509	2,251	2,198
90%	1,553	1,409	1,720	2,061	2,314	2,593	2,749	2,579	2,276	1,947	1,729	1,673
Long Term												
Full Simulation Period[a]	2,482	2,450	2,669	2,976	3,273	3,630	3,972	3,958	3,668	3,125	2,816	2,579
Water Year Types[b,c]												
Wet (32%)	2,849	2,698	2,932	3,392	3,652	3,892	4,360	4,492	4,342	3,821	3,481	2,989
Above Normal (16%)	2,711	2,597	2,852	3,255	3,529	4,065	4,501	4,489	4,138	3,464	3,120	2,833
Below Normal (13%)	2,690	2,736	2,863	3,170	3,518	3,893	4,213	4,108	3,735	3,129	2,774	2,729
Dry (24%)	2,538	2,640	2,896	2,722	3,135	3,594	3,889	3,811	3,449	2,951	2,680	2,611
Critical (15%)	1,158	1,173	1,345	2,021	2,180	2,413	2,474	2,330	2,002	1,540	1,309	1,225

Proposed Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	3,250	3,252	3,359	3,666	3,939	4,262	4,552	4,552	4,500	4,011	3,669	3,400
20%	3,250	3,252	3,337	3,612	3,837	4,182	4,536	4,552	4,402	3,785	3,455	3,400
30%	3,213	3,244	3,314	3,538	3,732	4,080	4,478	4,552	4,253	3,607	3,303	3,304
40%	2,997	3,128	3,280	3,410	3,653	4,012	4,433	4,483	4,058	3,431	3,151	3,058
50%	2,752	2,897	3,226	3,329	3,564	3,966	4,291	4,344	3,879	3,282	2,981	2,914
60%	2,648	2,718	3,098	3,252	3,484	3,855	4,183	4,159	3,661	3,139	2,812	2,804
70%	2,518	2,622	2,789	2,985	3,283	3,638	4,087	3,913	3,484	2,921	2,664	2,589
80%	2,261	2,279	2,411	2,720	3,113	3,418	3,854	3,660	3,177	2,723	2,429	2,377
90%	1,542	1,441	1,798	2,122	2,607	2,690	2,753	2,930	2,552	2,135	1,748	1,676
Long Term												
Full Simulation Period[a]	2,626	2,674	2,833	3,093	3,370	3,706	4,041	3,994	3,667	3,141	2,828	2,730
Water Year Types[b,c]												
Wet (32%)	3,152	3,180	3,280	3,412	3,662	3,899	4,355	4,473	4,318	3,806	3,460	3,280
Above Normal (16%)	2,899	2,940	3,118	3,358	3,567	4,069	4,503	4,461	4,096	3,427	3,084	3,070
Below Normal (13%)	2,637	2,690	2,818	3,404	3,695	4,031	4,328	4,164	3,724	3,109	2,752	2,664
Dry (24%)	2,586	2,689	2,922	2,915	3,330	3,765	4,058	3,928	3,489	3,007	2,730	2,668
Critical (15%)	1,247	1,251	1,423	2,127	2,293	2,501	2,566	2,406	2,039	1,642	1,413	1,331

Proposed Action 011519 minus Current Operations 011319

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	32	0	24	45	64	33	0	0	0	0	**-2**	201
20%	214	326	28	73	93	56	**-8**	0	**0**	**-4**	**-22**	294
30%	309	437	48	141	83	34	3	0	**-35**	**-15**	28	298
40%	226	419	253	93	125	32	44	**-2**	**-43**	**-34**	**-9**	136
50%	75	318	433	82	87	91	25	**-2**	**-30**	**-98**	**-63**	105
60%	100	218	442	220	126	131	39	**-66**	**-140**	**-11**	**-48**	143
70%	223	318	363	149	31	125	116	**-47**	33	39	33	113
80%	228	177	178	177	165	69	236	315	192	214	177	179
90%	**-11**	33	78	62	293	97	4	351	276	188	19	3
Long Term												
Full Simulation Period[a]	143	224	164	117	97	76	69	37	**-1**	15	12	151
Water Year Types[b,c]												
Wet (32%)	302	482	348	21	10	7	**-5**	**-20**	**-24**	**-15**	**-22**	292
Above Normal (16%)	188	343	266	104	38	4	2	**-28**	**-42**	**-37**	**-36**	237
Below Normal (13%)	**-53**	**-46**	**-45**	234	176	138	114	56	**-11**	**-20**	**-22**	**-65**
Dry (24%)	48	48	26	193	195	170	169	117	40	56	50	56
Critical (15%)	88	78	78	107	112	88	92	76	37	102	104	106

a Based on the 82-year simulation period.

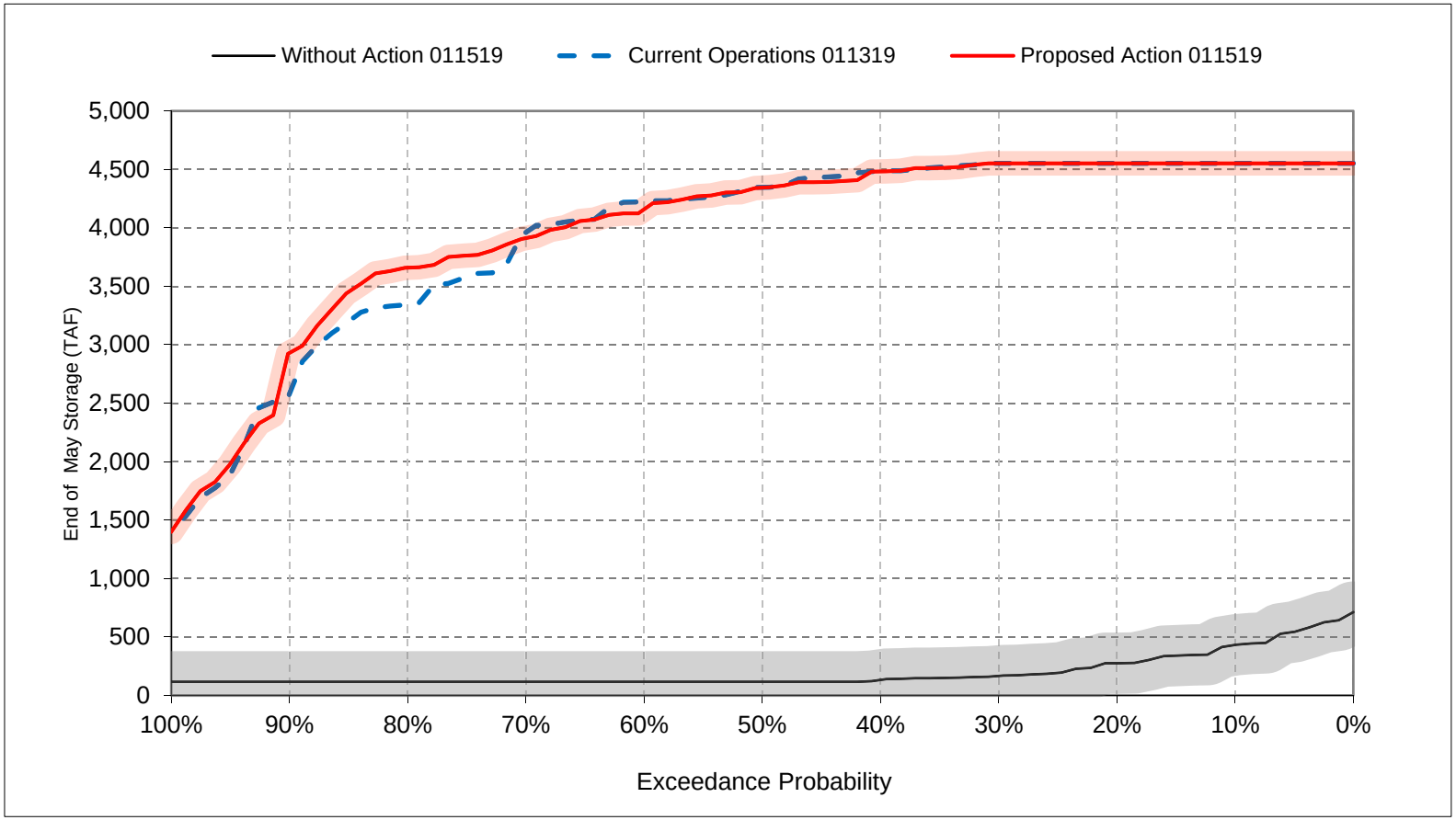
b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

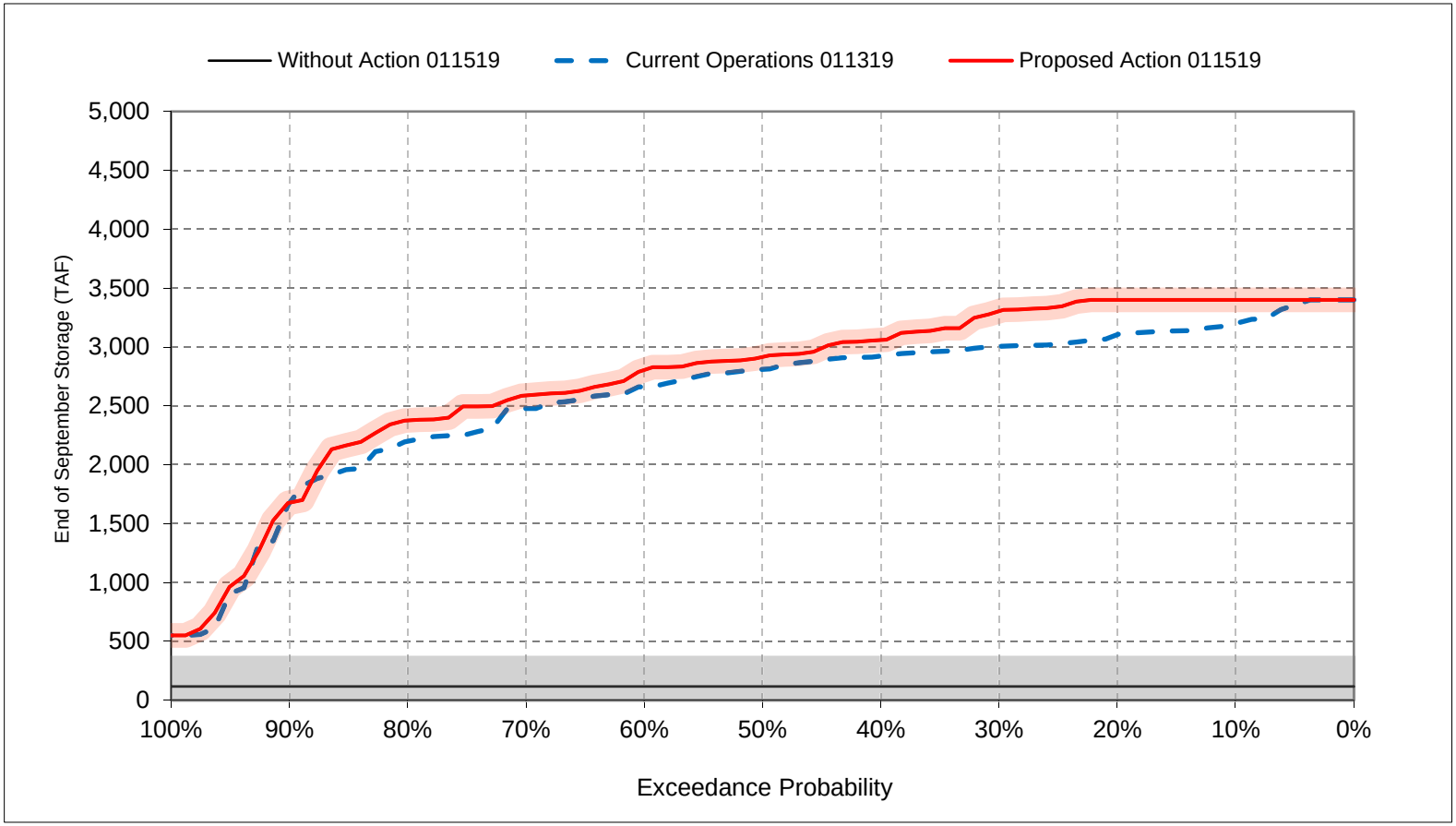
e These are draft results meant for qualitative analysis and are subject to revision.

Figure 3-1. Shasta Lake Storage, End of May Storage



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 3-2. Shasta Lake Storage, End of September Storage



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Table 3a-1. Shasta Lake Elevation, End of Month Elevation

Without Action 011519

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	742	802	882	887	923	865	849	814	752	742	742	742
20%	742	756	848	846	872	840	838	781	742	742	742	742
30%	742	742	808	821	851	819	811	754	742	742	742	742
40%	742	742	764	806	839	802	789	746	742	742	742	742
50%	742	742	742	769	803	793	771	742	742	742	742	742
60%	742	742	742	743	779	772	761	742	742	742	742	742
70%	742	742	742	742	760	744	747	742	742	742	742	742
80%	742	742	742	742	742	742	742	742	742	742	742	742
90%	742	742	742	742	742	742	742	742	742	742	742	742
Long Term												
Full Simulation Period[a]	744	755	785	795	816	796	787	760	745	736	741	742
Water Year Types[b,c]												
Wet (32%)	742	756	787	836	854	813	821	784	752	742	742	742
Above Normal (16%)	743	760	777	829	845	815	797	761	743	742	742	742
Below Normal (13%)	749	754	782	783	810	771	781	743	744	742	742	742
Dry (24%)	745	760	807	754	788	796	766	746	742	742	742	742
Critical (15%)	742	742	758	751	753	765	745	744	742	704	736	742

Current Operations 011319

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,016	1,017	1,021	1,033	1,043	1,055	1,067	1,067	1,065	1,048	1,035	1,015
20%	1,008	1,003	1,019	1,029	1,038	1,052	1,067	1,067	1,062	1,040	1,027	1,011
30%	1,002	998	1,018	1,023	1,034	1,049	1,064	1,067	1,058	1,033	1,018	1,006
40%	996	993	1,007	1,020	1,029	1,047	1,061	1,065	1,051	1,026	1,013	1,003
50%	992	988	997	1,017	1,027	1,043	1,057	1,060	1,044	1,023	1,008	998
60%	986	984	991	1,007	1,022	1,037	1,052	1,055	1,040	1,013	1,000	991
70%	972	973	980	999	1,017	1,028	1,046	1,046	1,026	1,001	990	983
80%	958	962	969	986	1,004	1,021	1,033	1,021	1,005	984	970	967
90%	928	918	940	959	974	988	995	988	971	953	940	937
Long Term												
Full Simulation Period[a]	977	976	987	1,002	1,016	1,031	1,044	1,043	1,031	1,007	993	982
Water Year Types[b,c]												
Wet (32%)	999	992	1,003	1,023	1,034	1,043	1,060	1,065	1,059	1,040	1,027	1,005
Above Normal (16%)	993	987	999	1,017	1,029	1,049	1,065	1,065	1,052	1,026	1,011	998
Below Normal (13%)	991	993	999	1,013	1,028	1,043	1,055	1,051	1,037	1,011	995	993
Dry (24%)	984	989	1,000	991	1,010	1,030	1,042	1,039	1,025	1,003	991	987
Critical (15%)	890	892	907	950	960	976	979	971	952	920	902	895

Current Operations 011319 minus Without Action 011519

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	274	215	139	146	120	190	218	253	313	306	293	273
20%	266	247	172	183	166	212	229	286	320	298	285	269
30%	260	256	209	202	183	229	253	313	316	291	276	264
40%	254	252	243	214	190	244	272	319	309	284	271	261
50%	250	246	255	247	223	249	286	318	302	281	266	256
60%	245	242	249	264	243	265	291	314	298	271	258	250
70%	231	231	238	257	257	285	300	304	284	259	248	241
80%	216	220	227	244	262	279	291	279	264	243	228	225
90%	186	176	198	217	232	247	253	246	230	211	199	195
Long Term												
Full Simulation Period[a]	234	221	202	207	200	235	257	283	286	271	252	240
Water Year Types[b,c]												
Wet (32%)	257	236	216	187	180	230	239	281	308	298	285	264
Above Normal (16%)	249	227	222	188	183	235	268	304	310	284	269	257
Below Normal (13%)	242	239	217	230	219	272	273	308	293	269	253	251
Dry (24%)	239	229	193	237	222	234	276	293	283	262	249	246
Critical (15%)	148	149	149	198	207	210	234	228	210	216	166	153

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 3a-2. Shasta Lake Elevation, End of Month Elevation

Without Action 011519

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	742	802	882	887	923	865	849	814	752	742	742	742
20%	742	756	848	846	872	840	838	781	742	742	742	742
30%	742	742	808	821	851	819	811	754	742	742	742	742
40%	742	742	764	806	839	802	789	746	742	742	742	742
50%	742	742	742	769	803	793	771	742	742	742	742	742
60%	742	742	742	743	779	772	761	742	742	742	742	742
70%	742	742	742	742	760	744	747	742	742	742	742	742
80%	742	742	742	742	742	742	742	742	742	742	742	742
90%	742	742	742	742	742	742	742	742	742	742	742	742
Long Term												
Full Simulation Period[a]	744	755	785	795	816	796	787	760	745	736	741	742
Water Year Types[b,c]												
Wet (32%)	742	756	787	836	854	813	821	784	752	742	742	742
Above Normal (16%)	743	760	777	829	845	815	797	761	743	742	742	742
Below Normal (13%)	749	754	782	783	810	771	781	743	744	742	742	742
Dry (24%)	745	760	807	754	788	796	766	746	742	742	742	742
Critical (15%)	742	742	758	751	753	765	745	744	742	704	736	742

Proposed Action 011519

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,017	1,017	1,022	1,035	1,045	1,057	1,067	1,067	1,065	1,048	1,035	1,023
20%	1,017	1,017	1,021	1,033	1,041	1,054	1,066	1,067	1,062	1,040	1,026	1,023
30%	1,015	1,017	1,020	1,029	1,038	1,050	1,064	1,067	1,056	1,032	1,019	1,019
40%	1,006	1,012	1,018	1,024	1,034	1,048	1,063	1,065	1,049	1,025	1,013	1,009
50%	995	1,002	1,016	1,020	1,031	1,046	1,058	1,060	1,043	1,018	1,005	1,002
60%	991	994	1,010	1,017	1,027	1,042	1,054	1,053	1,035	1,012	998	998
70%	985	990	997	1,005	1,018	1,034	1,050	1,044	1,027	1,003	991	988
80%	971	972	979	994	1,011	1,024	1,042	1,035	1,014	994	980	977
90%	927	920	944	963	989	993	995	1,003	987	963	942	937
Long Term												
Full Simulation Period[a]	984	986	995	1,008	1,020	1,034	1,047	1,045	1,031	1,009	994	989
Water Year Types[b,c]												
Wet (32%)	1,013	1,014	1,018	1,024	1,034	1,043	1,060	1,064	1,059	1,040	1,026	1,018
Above Normal (16%)	1,001	1,003	1,011	1,021	1,030	1,050	1,065	1,064	1,051	1,025	1,010	1,009
Below Normal (13%)	988	991	997	1,024	1,036	1,048	1,059	1,053	1,036	1,010	994	990
Dry (24%)	987	991	1,002	1,000	1,019	1,037	1,049	1,044	1,027	1,006	994	991
Critical (15%)	896	897	912	956	966	980	983	975	953	926	909	902

Proposed Action 011519 minus Without Action 011519

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	275	215	140	148	122	191	218	253	313	306	293	282
20%	275	261	173	186	170	214	228	286	320	298	284	282
30%	273	275	211	209	186	231	253	313	315	291	277	277
40%	264	270	254	218	195	245	274	319	308	283	271	267
50%	253	260	274	251	227	253	287	318	301	277	263	261
60%	249	252	269	274	248	270	292	311	293	270	256	256
70%	243	248	255	264	259	290	304	302	285	261	250	246
80%	229	230	237	252	269	282	300	293	272	252	238	235
90%	186	178	203	221	247	251	254	261	245	222	200	195
Long Term												
Full Simulation Period[a]	241	231	209	212	204	238	259	285	286	272	253	247
Water Year Types[b,c]												
Wet (32%)	271	258	231	188	180	230	239	280	307	298	284	276
Above Normal (16%)	258	243	234	192	185	235	268	303	308	283	268	267
Below Normal (13%)	239	236	215	241	226	277	278	310	292	269	252	248
Dry (24%)	242	231	194	246	230	241	283	298	285	264	252	249
Critical (15%)	154	155	154	204	213	214	238	231	211	223	173	161

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 3a-3. Shasta Lake Elevation, End of Month Elevation

Current Operations 011319

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,016	1,017	1,021	1,033	1,043	1,055	1,067	1,067	1,065	1,048	1,035	1,015
20%	1,008	1,003	1,019	1,029	1,038	1,052	1,067	1,067	1,062	1,040	1,027	1,011
30%	1,002	998	1,018	1,023	1,034	1,049	1,064	1,067	1,058	1,033	1,018	1,006
40%	996	993	1,007	1,020	1,029	1,047	1,061	1,065	1,051	1,026	1,013	1,003
50%	992	988	997	1,017	1,027	1,043	1,057	1,060	1,044	1,023	1,008	998
60%	986	984	991	1,007	1,022	1,037	1,052	1,055	1,040	1,013	1,000	991
70%	972	973	980	999	1,017	1,028	1,046	1,046	1,026	1,001	990	983
80%	958	962	969	986	1,004	1,021	1,033	1,021	1,005	984	970	967
90%	928	918	940	959	974	988	995	988	971	953	940	937
Long Term												
Full Simulation Period[a]	977	976	987	1,002	1,016	1,031	1,044	1,043	1,031	1,007	993	982
Water Year Types[b,c]												
Wet (32%)	999	992	1,003	1,023	1,034	1,043	1,060	1,065	1,059	1,040	1,027	1,005
Above Normal (16%)	993	987	999	1,017	1,029	1,049	1,065	1,065	1,052	1,026	1,011	998
Below Normal (13%)	991	993	999	1,013	1,028	1,043	1,055	1,051	1,037	1,011	995	993
Dry (24%)	984	989	1,000	991	1,010	1,030	1,042	1,039	1,025	1,003	991	987
Critical (15%)	890	892	907	950	960	976	979	971	952	920	902	895

Proposed Action 011519

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,017	1,017	1,022	1,035	1,045	1,057	1,067	1,067	1,065	1,048	1,035	1,023
20%	1,017	1,017	1,021	1,033	1,041	1,054	1,066	1,067	1,062	1,040	1,026	1,023
30%	1,015	1,017	1,020	1,029	1,038	1,050	1,064	1,067	1,056	1,032	1,019	1,019
40%	1,006	1,012	1,018	1,024	1,034	1,048	1,063	1,065	1,049	1,025	1,013	1,009
50%	995	1,002	1,016	1,020	1,031	1,046	1,058	1,060	1,043	1,018	1,005	1,002
60%	991	994	1,010	1,017	1,027	1,042	1,054	1,053	1,035	1,012	998	998
70%	985	990	997	1,005	1,018	1,034	1,050	1,044	1,027	1,003	991	988
80%	971	972	979	994	1,011	1,024	1,042	1,035	1,014	994	980	977
90%	927	920	944	963	989	993	995	1,003	987	963	942	937
Long Term												
Full Simulation Period[a]	984	986	995	1,008	1,020	1,034	1,047	1,045	1,031	1,009	994	989
Water Year Types[b,c]												
Wet (32%)	1,013	1,014	1,018	1,024	1,034	1,043	1,060	1,064	1,059	1,040	1,026	1,018
Above Normal (16%)	1,001	1,003	1,011	1,021	1,030	1,050	1,065	1,064	1,051	1,025	1,010	1,009
Below Normal (13%)	988	991	997	1,024	1,036	1,048	1,059	1,053	1,036	1,010	994	990
Dry (24%)	987	991	1,002	1,000	1,019	1,037	1,049	1,044	1,027	1,006	994	991
Critical (15%)	896	897	912	956	966	980	983	975	953	926	909	902

Proposed Action 011519 minus Current Operations 011319

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1	0	1	2	2	1	0	0	0	0	**0**	9
20%	9	14	1	3	3	2	**0**	0	**0**	**0**	**-1**	13
30%	13	19	2	6	3	1	0	0	**-1**	**-1**	1	13
40%	10	18	11	4	5	1	2	**0**	**-2**	**-1**	**0**	6
50%	3	14	19	4	4	3	1	**0**	**-1**	**-4**	**-3**	5
60%	4	10	19	10	5	5	1	**-2**	**-5**	**0**	**-2**	6
70%	13	17	17	6	1	5	4	**-2**	1	2	1	5
80%	13	10	10	8	7	3	9	14	8	10	10	10
90%	**-1**	2	4	3	15	4	0	15	15	11	1	0
Long Term												
Full Simulation Period[a]	7	11	8	5	4	3	3	2	0	1	1	7
Water Year Types[b,c]												
Wet (32%)	14	22	16	1	0	0	**0**	**-1**	**-1**	**-1**	**-1**	13
Above Normal (16%)	9	16	12	4	1	0	0	**-1**	**-1**	**-2**	**-2**	11
Below Normal (13%)	**-3**	**-2**	**-2**	10	7	5	4	2	**0**	**-1**	**-1**	**-3**
Dry (24%)	3	3	1	9	8	7	7	5	2	3	3	3
Critical (15%)	6	5	5	6	6	4	4	3	1	7	8	8

a Based on the 82-year simulation period.

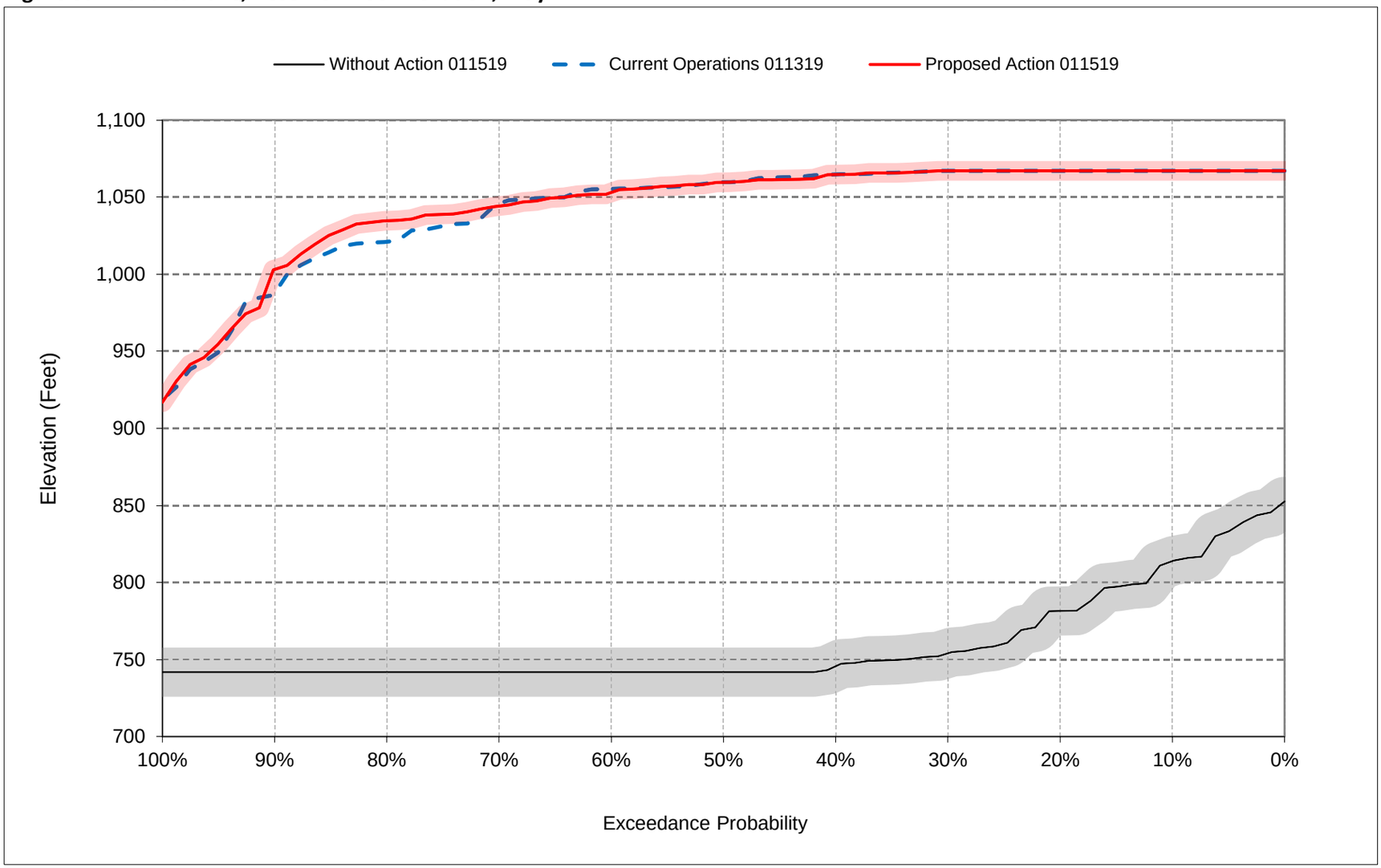
b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

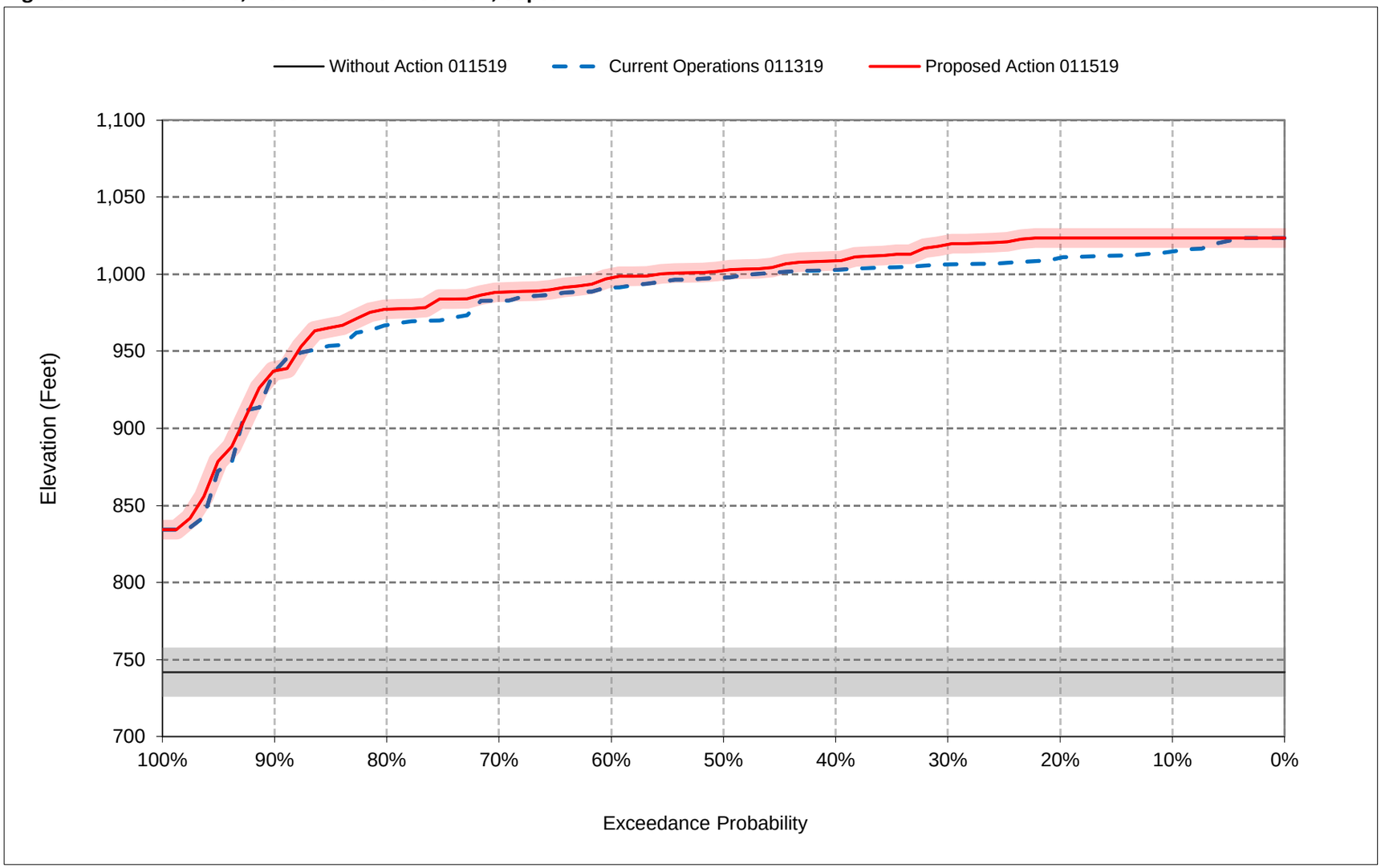
Figure 3a-1. Shasta Lake, Reservoir Pool Elevation, May



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Figure 3a-2. Shasta Lake, Reservoir Pool Elevation, September



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Table 4-1. Lake Oroville Storage, End of Month Storage

Without Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	323	395	968	1,333	1,458	1,281	1,061	1,030	619	576	500	409
20%	288	317	741	977	1,136	927	913	864	606	520	425	331
30%	227	284	439	744	932	835	828	701	605	485	380	264
40%	206	252	364	586	767	707	727	620	575	433	310	230
50%	157	209	295	449	673	659	656	599	526	401	269	178
60%	122	189	264	360	610	604	617	599	505	363	228	157
70%	101	115	221	327	452	562	608	598	460	312	208	141
80%	90	87	138	243	356	485	508	520	389	213	145	127
90%	71	66	87	182	296	373	378	295	189	123	107	91
Long Term												
Full Simulation Period[a]	186	252	466	645	768	760	735	666	493	377	286	218
Water Year Types[b,c]												
Wet (32%)	290	347	563	1,146	1,144	1,040	998	957	625	519	434	352
Above Normal (16%)	178	268	397	757	983	960	777	657	555	440	322	229
Below Normal (13%)	176	183	334	426	677	582	664	597	487	359	241	162
Dry (24%)	123	249	592	298	487	604	636	548	441	299	196	139
Critical (15%)	85	96	240	218	275	359	349	304	230	150	115	101

Current Operations 011319

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	2,151	2,150	2,784	2,788	2,925	3,040	3,352	3,538	3,538	3,060	2,750	2,224
20%	1,834	1,862	2,136	2,764	2,788	2,964	3,302	3,538	3,534	2,975	2,550	2,016
30%	1,704	1,734	1,893	2,405	2,788	2,921	3,273	3,487	3,366	2,843	2,389	1,896
40%	1,548	1,550	1,730	1,961	2,676	2,788	3,209	3,356	3,192	2,614	2,131	1,690
50%	1,487	1,463	1,553	1,807	2,204	2,691	2,908	3,002	2,891	2,290	1,821	1,543
60%	1,370	1,292	1,453	1,557	2,026	2,372	2,662	2,719	2,461	1,836	1,541	1,461
70%	1,237	1,189	1,200	1,473	1,747	2,119	2,263	2,330	2,065	1,540	1,424	1,352
80%	1,137	1,053	1,067	1,242	1,558	1,875	2,015	1,996	1,814	1,533	1,367	1,266
90%	898	906	927	1,084	1,259	1,471	1,578	1,649	1,399	1,137	997	951
Long Term												
Full Simulation Period[a]	1,492	1,474	1,639	1,894	2,193	2,430	2,695	2,788	2,640	2,182	1,889	1,612
Water Year Types[b,c]												
Wet (32%)	2,006	1,967	2,086	2,617	2,858	2,942	3,300	3,487	3,447	3,009	2,676	2,190
Above Normal (16%)	1,658	1,639	1,758	1,995	2,518	2,922	3,265	3,414	3,298	2,718	2,239	1,799
Below Normal (13%)	1,428	1,352	1,467	1,793	2,196	2,468	2,724	2,776	2,612	2,023	1,644	1,494
Dry (24%)	1,228	1,266	1,585	1,380	1,659	2,007	2,252	2,283	2,012	1,563	1,417	1,323
Critical (15%)	697	688	790	1,165	1,287	1,455	1,478	1,448	1,249	986	818	750

Current Operations 011319 minus Without Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,828	1,755	1,816	1,455	1,467	1,760	2,291	2,508	2,919	2,484	2,250	1,815
20%	1,546	1,545	1,395	1,788	1,652	2,037	2,389	2,674	2,928	2,455	2,125	1,686
30%	1,477	1,450	1,454	1,661	1,856	2,086	2,446	2,785	2,761	2,358	2,009	1,632
40%	1,342	1,298	1,365	1,375	1,909	2,081	2,482	2,736	2,616	2,181	1,821	1,460
50%	1,330	1,255	1,257	1,358	1,531	2,032	2,252	2,403	2,365	1,889	1,551	1,365
60%	1,248	1,103	1,189	1,198	1,416	1,768	2,045	2,121	1,956	1,473	1,312	1,303
70%	1,136	1,073	979	1,146	1,295	1,557	1,655	1,731	1,605	1,228	1,216	1,211
80%	1,047	967	928	1,000	1,202	1,390	1,507	1,476	1,425	1,320	1,222	1,140
90%	827	841	840	902	963	1,097	1,201	1,354	1,210	1,013	890	860
Long Term												
Full Simulation Period[a]	1,306	1,223	1,173	1,249	1,424	1,670	1,960	2,122	2,147	1,804	1,604	1,394
Water Year Types[b,c]												
Wet (32%)	1,716	1,620	1,523	1,471	1,714	1,902	2,302	2,530	2,822	2,489	2,242	1,838
Above Normal (16%)	1,480	1,371	1,361	1,239	1,534	1,963	2,487	2,758	2,743	2,278	1,917	1,570
Below Normal (13%)	1,252	1,169	1,133	1,367	1,519	1,886	2,060	2,179	2,125	1,664	1,404	1,332
Dry (24%)	1,105	1,018	994	1,082	1,172	1,404	1,617	1,735	1,571	1,263	1,221	1,184
Critical (15%)	612	591	550	947	1,012	1,096	1,130	1,144	1,018	836	702	648

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 4-2. Lake Oroville Storage, End of Month Storage

Without Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	323	395	968	1,333	1,458	1,281	1,061	1,030	619	576	500	409
20%	288	317	741	977	1,136	927	913	864	606	520	425	331
30%	227	284	439	744	932	835	828	701	605	485	380	264
40%	206	252	364	586	767	707	727	620	575	433	310	230
50%	157	209	295	449	673	659	656	599	526	401	269	178
60%	122	189	264	360	610	604	617	599	505	363	228	157
70%	101	115	221	327	452	562	608	598	460	312	208	141
80%	90	87	138	243	356	485	508	520	389	213	145	127
90%	71	66	87	182	296	373	378	295	189	123	107	91
Long Term Full Simulation Period[a]	186	252	466	645	768	760	735	666	493	377	286	218
Water Year Types[b,c]												
Wet (32%)	290	347	563	1,146	1,144	1,040	998	957	625	519	434	352
Above Normal (16%)	178	268	397	757	983	960	777	657	555	440	322	229
Below Normal (13%)	176	183	334	426	677	582	664	597	487	359	241	162
Dry (24%)	123	249	592	298	487	604	636	548	441	299	196	139
Critical (15%)	85	96	240	218	275	359	349	304	230	150	115	101

Proposed Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	2,687	2,692	2,788	2,807	2,949	3,058	3,352	3,538	3,538	3,060	2,748	2,718
20%	2,206	2,226	2,467	2,788	2,829	2,994	3,302	3,538	3,531	2,959	2,512	2,299
30%	1,954	2,061	2,215	2,530	2,788	2,937	3,273	3,474	3,314	2,761	2,341	2,061
40%	1,660	1,719	1,979	2,406	2,788	2,831	3,209	3,377	3,153	2,530	2,147	1,817
50%	1,525	1,485	1,719	2,092	2,606	2,788	3,128	3,137	2,928	2,292	1,847	1,574
60%	1,376	1,297	1,495	1,594	2,055	2,617	2,805	2,788	2,572	1,951	1,541	1,510
70%	1,226	1,171	1,216	1,497	1,779	2,191	2,329	2,464	2,079	1,540	1,423	1,353
80%	1,142	1,051	1,082	1,244	1,683	1,894	2,190	2,066	1,771	1,529	1,368	1,260
90%	970	951	926	1,126	1,283	1,455	1,593	1,724	1,485	1,251	1,132	1,091
Long Term Full Simulation Period[a]	1,632	1,618	1,761	1,998	2,269	2,489	2,753	2,829	2,642	2,182	1,885	1,741
Water Year Types[b,c]												
Wet (32%)	2,394	2,365	2,413	2,671	2,882	2,942	3,300	3,478	3,420	2,977	2,656	2,534
Above Normal (16%)	1,733	1,722	1,840	2,129	2,611	2,957	3,294	3,428	3,281	2,679	2,203	1,888
Below Normal (13%)	1,456	1,379	1,497	2,105	2,409	2,675	2,927	2,948	2,728	2,102	1,673	1,516
Dry (24%)	1,247	1,283	1,602	1,468	1,749	2,099	2,345	2,353	2,018	1,596	1,442	1,340
Critical (15%)	676	663	769	1,187	1,310	1,481	1,503	1,461	1,226	967	805	739

Proposed Action 011519 minus Without Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	2,364	2,297	1,820	1,473	1,491	1,777	2,291	2,508	2,919	2,484	2,248	2,310
20%	1,917	1,909	1,726	1,811	1,693	2,067	2,389	2,674	2,925	2,439	2,087	1,969
30%	1,727	1,778	1,775	1,786	1,856	2,101	2,446	2,772	2,709	2,276	1,962	1,798
40%	1,453	1,466	1,615	1,820	2,021	2,124	2,482	2,757	2,577	2,096	1,837	1,587
50%	1,368	1,276	1,423	1,643	1,932	2,129	2,472	2,538	2,402	1,891	1,578	1,397
60%	1,254	1,108	1,232	1,235	1,445	2,012	2,187	2,189	2,067	1,588	1,313	1,353
70%	1,125	1,056	994	1,170	1,327	1,629	1,721	1,865	1,619	1,228	1,215	1,211
80%	1,052	964	944	1,002	1,327	1,410	1,682	1,546	1,383	1,316	1,223	1,133
90%	899	886	840	943	987	1,082	1,216	1,429	1,296	1,128	1,025	999
Long Term Full Simulation Period[a]	1,446	1,366	1,295	1,353	1,501	1,730	2,018	2,164	2,149	1,804	1,600	1,523
Water Year Types[b,c]												
Wet (32%)	2,104	2,019	1,850	1,524	1,737	1,902	2,302	2,521	2,795	2,458	2,221	2,182
Above Normal (16%)	1,556	1,454	1,443	1,372	1,628	1,997	2,517	2,771	2,726	2,239	1,882	1,659
Below Normal (13%)	1,280	1,196	1,163	1,679	1,732	2,093	2,263	2,350	2,241	1,743	1,433	1,354
Dry (24%)	1,124	1,035	1,010	1,170	1,263	1,496	1,709	1,805	1,578	1,297	1,246	1,201
Critical (15%)	591	566	529	969	1,035	1,122	1,155	1,157	995	818	689	638

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 4-3. Lake Oroville Storage, End of Month Storage

Current Operations 011319

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	2,151	2,150	2,784	2,788	2,925	3,040	3,352	3,538	3,538	3,060	2,750	2,224
20%	1,834	1,862	2,136	2,764	2,788	2,964	3,302	3,538	3,534	2,975	2,550	2,016
30%	1,704	1,734	1,893	2,405	2,788	2,921	3,273	3,487	3,366	2,843	2,389	1,896
40%	1,548	1,550	1,730	1,961	2,676	2,788	3,209	3,356	3,192	2,614	2,131	1,690
50%	1,487	1,463	1,553	1,807	2,204	2,691	2,908	3,002	2,891	2,290	1,821	1,543
60%	1,370	1,292	1,453	1,557	2,026	2,372	2,662	2,719	2,461	1,836	1,541	1,461
70%	1,237	1,189	1,200	1,473	1,747	2,119	2,263	2,330	2,065	1,540	1,424	1,352
80%	1,137	1,053	1,067	1,242	1,558	1,875	2,015	1,996	1,814	1,533	1,367	1,266
90%	898	906	927	1,084	1,259	1,471	1,578	1,649	1,399	1,137	997	951
Long Term												
Full Simulation Period[a]	1,492	1,474	1,639	1,894	2,193	2,430	2,695	2,788	2,640	2,182	1,889	1,612
Water Year Types[b,c]												
Wet (32%)	2,006	1,967	2,086	2,617	2,858	2,942	3,300	3,487	3,447	3,009	2,676	2,190
Above Normal (16%)	1,658	1,639	1,758	1,995	2,518	2,922	3,265	3,414	3,298	2,718	2,239	1,799
Below Normal (13%)	1,428	1,352	1,467	1,793	2,196	2,468	2,724	2,776	2,612	2,023	1,644	1,494
Dry (24%)	1,228	1,266	1,585	1,380	1,659	2,007	2,252	2,283	2,012	1,563	1,417	1,323
Critical (15%)	697	688	790	1,165	1,287	1,455	1,478	1,448	1,249	986	818	750

Proposed Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	2,687	2,692	2,788	2,807	2,949	3,058	3,352	3,538	3,538	3,060	2,748	2,718
20%	2,206	2,226	2,467	2,788	2,829	2,994	3,302	3,538	3,531	2,959	2,512	2,299
30%	1,954	2,061	2,215	2,530	2,788	2,937	3,273	3,474	3,314	2,761	2,341	2,061
40%	1,660	1,719	1,979	2,406	2,788	2,831	3,209	3,377	3,153	2,530	2,147	1,817
50%	1,525	1,485	1,719	2,092	2,606	2,788	3,128	3,137	2,928	2,292	1,847	1,574
60%	1,376	1,297	1,495	1,594	2,055	2,617	2,805	2,788	2,572	1,951	1,541	1,510
70%	1,226	1,171	1,216	1,497	1,779	2,191	2,329	2,464	2,079	1,540	1,423	1,353
80%	1,142	1,051	1,082	1,244	1,683	1,894	2,190	2,066	1,771	1,529	1,368	1,260
90%	970	951	926	1,126	1,283	1,455	1,593	1,724	1,485	1,251	1,132	1,091
Long Term												
Full Simulation Period[a]	1,632	1,618	1,761	1,998	2,269	2,489	2,753	2,829	2,642	2,182	1,885	1,741
Water Year Types[b,c]												
Wet (32%)	2,394	2,365	2,413	2,671	2,882	2,942	3,300	3,478	3,420	2,977	2,656	2,534
Above Normal (16%)	1,733	1,722	1,840	2,129	2,611	2,957	3,294	3,428	3,281	2,679	2,203	1,888
Below Normal (13%)	1,456	1,379	1,497	2,105	2,409	2,675	2,927	2,948	2,728	2,102	1,673	1,516
Dry (24%)	1,247	1,283	1,602	1,468	1,749	2,099	2,345	2,353	2,018	1,596	1,442	1,340
Critical (15%)	676	663	769	1,187	1,310	1,481	1,503	1,461	1,226	967	805	739

Proposed Action 011519 minus Current Operations 011319

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	536	542	4	19	24	17	**0**	0	0	**0**	**-2**	495
20%	371	364	331	24	41	30	0	0	**-2**	**-16**	**-38**	283
30%	251	328	321	125	0	16	0	**-13**	**-52**	**-82**	**-48**	166
40%	112	169	250	445	111	43	0	21	**-39**	**-85**	16	127
50%	38	22	166	285	401	97	220	135	37	2	27	31
60%	6	5	42	37	29	244	142	69	112	115	0	49
70%	**-12**	**-17**	16	24	32	73	66	134	14	**0**	**-1**	1
80%	5	**-2**	15	2	124	19	175	70	**-43**	**-4**	1	**-7**
90%	72	45	**0**	42	24	**-16**	15	75	86	114	135	139
Long Term												
Full Simulation Period[a]	140	144	122	105	77	60	58	41	3	**0**	**-4**	129
Water Year Types[b,c]												
Wet (32%)	387	398	327	54	24	0	0	**-9**	**-27**	**-32**	**-20**	344
Above Normal (16%)	75	83	83	133	94	34	29	14	**-17**	**-39**	**-35**	90
Below Normal (13%)	28	27	30	312	214	207	203	171	116	80	29	22
Dry (24%)	19	17	16	88	91	92	93	70	7	33	25	17
Critical (15%)	**-21**	**-25**	**-21**	22	23	26	25	14	**-23**	**-18**	**-13**	**-10**

a Based on the 82-year simulation period.

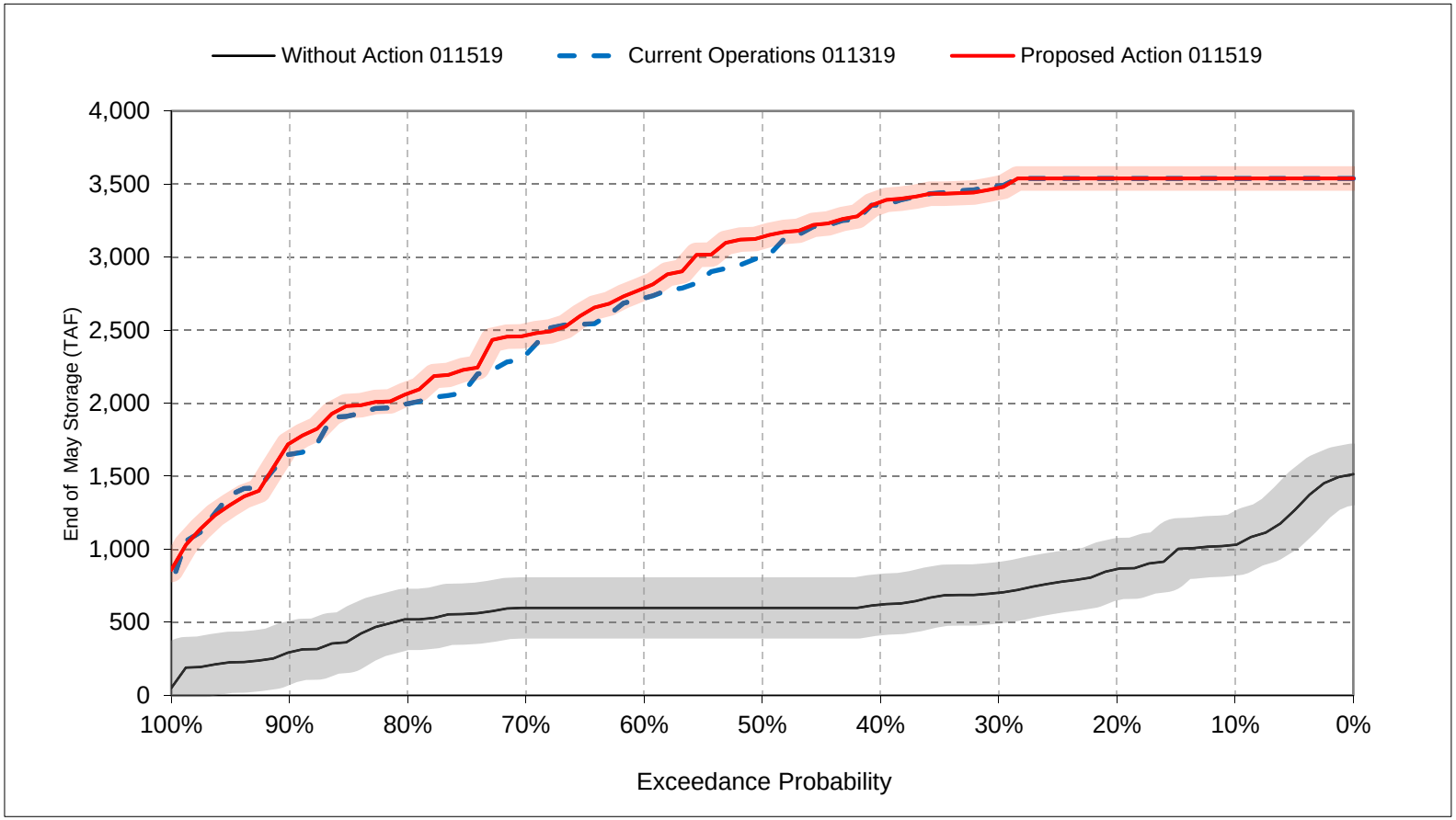
b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

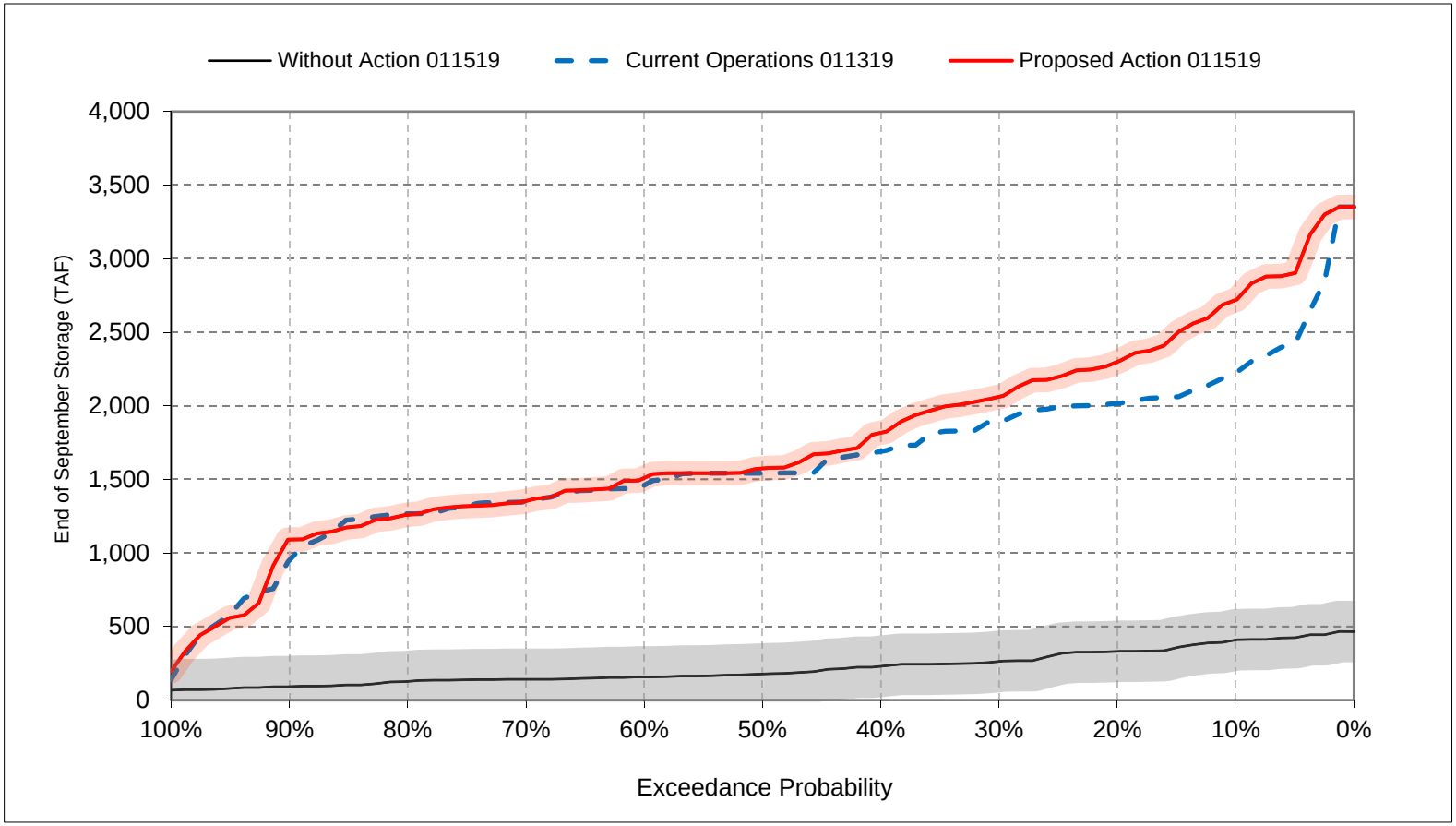
e These are draft results meant for qualitative analysis and are subject to revision.

Figure 4-1. Lake Oroville Storage, End of May Storage



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 4-2. Lake Oroville Storage, End of September Storage



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Table 4a-1. Lake Oroville Elevation, End of Month Elevation

Without Action 011519

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	513	539	661	708	723	701	674	671	596	588	574	544
20%	501	511	619	662	684	653	651	642	594	578	550	516
30%	479	499	555	620	654	637	635	612	594	571	534	492
40%	471	488	528	590	624	613	617	596	588	553	509	480
50%	453	472	503	559	606	604	603	592	579	541	494	461
60%	441	465	492	527	594	593	596	592	575	528	479	453
70%	419	435	477	515	560	585	594	592	563	509	472	448
80%	407	403	447	484	525	571	575	577	537	474	449	442
90%	385	380	403	463	503	531	533	503	465	441	425	408
Long Term												
Full Simulation Period[a]	453	472	528	573	606	611	609	596	561	526	495	471
Water Year Types[b,c]												
Wet (32%)	501	519	562	668	675	661	657	653	597	574	551	524
Above Normal (16%)	458	482	524	614	656	652	626	603	584	554	513	479
Below Normal (13%)	440	442	490	545	599	586	603	590	565	525	484	453
Dry (24%)	425	464	541	502	559	589	594	577	550	500	460	441
Critical (15%)	401	405	471	464	487	520	516	500	473	439	423	415

Current Operations 011319

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	798	798	848	849	858	866	887	900	900	867	846	806
20%	766	769	797	847	849	861	884	900	900	862	832	785
30%	752	756	772	823	849	858	882	896	888	853	822	772
40%	734	734	755	779	841	849	877	888	876	837	796	751
50%	726	724	734	763	804	842	857	863	856	813	764	733
60%	712	703	722	735	786	820	840	844	826	766	733	723
70%	696	690	691	725	757	795	810	816	790	733	719	710
80%	684	674	675	697	735	770	784	782	764	732	712	700
90%	648	650	653	677	699	724	738	746	716	684	665	658
Long Term												
Full Simulation Period[a]	719	717	735	763	793	815	835	841	828	788	760	733
Water Year Types[b,c]												
Wet (32%)	780	777	786	835	854	859	884	896	894	864	840	798
Above Normal (16%)	746	742	755	778	827	858	881	892	884	844	806	762
Below Normal (13%)	718	709	721	759	800	824	843	847	834	784	745	727
Dry (24%)	694	698	730	710	745	782	806	808	783	735	718	706
Critical (15%)	598	600	622	685	701	721	724	719	693	653	622	608

Current Operations 011319 minus Without Action 011519

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	285	259	188	141	135	165	213	229	304	279	272	262
20%	265	257	178	185	165	207	233	258	306	284	282	268
30%	274	256	217	203	194	221	246	285	295	282	288	280
40%	263	246	227	189	217	236	261	291	288	284	288	271
50%	273	251	231	204	197	238	254	271	277	271	270	272
60%	271	238	230	208	191	227	244	252	252	238	254	270
70%	277	255	215	210	197	210	216	224	227	224	247	262
80%	277	270	229	212	210	199	209	205	227	258	263	257
90%	263	270	250	215	195	193	205	243	251	243	240	249
Long Term												
Full Simulation Period[a]	266	244	207	191	188	204	226	246	267	261	265	261
Water Year Types[b,c]												
Wet (32%)	279	258	224	167	179	199	226	244	297	290	289	275
Above Normal (16%)	288	260	231	165	171	206	256	288	299	290	294	282
Below Normal (13%)	278	267	231	214	201	238	240	257	269	259	261	274
Dry (24%)	269	234	189	209	186	194	211	231	232	235	257	265
Critical (15%)	198	195	151	221	214	201	208	219	220	214	199	193

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 4a-2. Lake Oroville Elevation, End of Month Elevation

Without Action 011519

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	513	539	661	708	723	701	674	671	596	588	574	544
20%	501	511	619	662	684	653	651	642	594	578	550	516
30%	479	499	555	620	654	637	635	612	594	571	534	492
40%	471	488	528	590	624	613	617	596	588	553	509	480
50%	453	472	503	559	606	604	603	592	579	541	494	461
60%	441	465	492	527	594	593	596	592	575	528	479	453
70%	419	435	477	515	560	585	594	592	563	509	472	448
80%	407	403	447	484	525	571	575	577	537	474	449	442
90%	385	380	403	463	503	531	533	503	465	441	425	408
Long Term												
Full Simulation Period[a]	453	472	528	573	606	611	609	596	561	526	495	471
Water Year Types[b,c]												
Wet (32%)	501	519	562	668	675	661	657	653	597	574	551	524
Above Normal (16%)	458	482	524	614	656	652	626	603	584	554	513	479
Below Normal (13%)	440	442	490	545	599	586	603	590	565	525	484	453
Dry (24%)	425	464	541	502	559	589	594	577	550	500	460	441
Critical (15%)	401	405	471	464	487	520	516	500	473	439	423	415

Proposed Action 011519

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	842	842	849	850	860	867	887	900	900	867	846	844
20%	804	806	827	849	852	863	884	900	899	860	830	814
30%	778	789	805	831	849	859	882	896	885	847	818	789
40%	748	754	781	823	849	852	877	889	874	831	798	764
50%	731	726	754	792	836	849	872	873	858	813	767	737
60%	713	703	727	740	788	837	850	849	834	778	733	729
70%	695	688	693	728	760	802	815	827	791	733	719	710
80%	684	673	677	697	750	772	802	790	759	732	712	699
90%	661	658	653	682	702	723	739	755	726	698	683	678
Long Term												
Full Simulation Period[a]	731	730	747	773	800	820	840	845	828	788	760	744
Water Year Types[b,c]												
Wet (32%)	816	814	818	839	855	859	884	896	892	862	838	828
Above Normal (16%)	754	751	764	791	834	860	883	892	882	841	803	771
Below Normal (13%)	722	712	725	787	817	838	858	860	844	792	748	730
Dry (24%)	697	700	732	720	754	790	813	814	783	739	721	708
Critical (15%)	589	591	618	686	703	724	727	721	690	650	620	608

Proposed Action 011519 minus Without Action 011519

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	329	303	188	142	137	166	213	229	304	279	272	300
20%	303	295	208	186	168	209	233	258	306	283	280	298
30%	300	290	250	211	194	222	246	284	291	276	284	297
40%	276	266	253	233	225	239	261	293	286	278	289	284
50%	278	254	251	234	230	245	269	280	280	271	273	276
60%	272	238	236	213	194	244	254	256	259	250	254	276
70%	276	253	217	213	200	217	221	234	228	224	247	262
80%	278	270	230	213	225	201	227	212	222	258	263	256
90%	276	278	250	220	198	191	206	251	261	256	258	270
Long Term												
Full Simulation Period[a]	278	257	219	201	194	209	231	249	267	262	265	273
Water Year Types[b,c]												
Wet (32%)	314	295	256	172	180	199	226	243	295	288	287	304
Above Normal (16%)	296	269	240	178	178	209	258	289	298	287	290	292
Below Normal (13%)	282	271	235	241	218	252	254	270	279	267	264	277
Dry (24%)	272	236	191	218	195	202	219	237	233	239	260	267
Critical (15%)	189	186	147	222	216	204	211	221	217	212	197	193

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 4a-3. Lake Oroville Elevation, End of Month Elevation

Current Operations 011319

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	798	798	848	849	858	866	887	900	900	867	846	806
20%	766	769	797	847	849	861	884	900	900	862	832	785
30%	752	756	772	823	849	858	882	896	888	853	822	772
40%	734	734	755	779	841	849	877	888	876	837	796	751
50%	726	724	734	763	804	842	857	863	856	813	764	733
60%	712	703	722	735	786	820	840	844	826	766	733	723
70%	696	690	691	725	757	795	810	816	790	733	719	710
80%	684	674	675	697	735	770	784	782	764	732	712	700
90%	648	650	653	677	699	724	738	746	716	684	665	658
Long Term												
Full Simulation Period[a]	719	717	735	763	793	815	835	841	828	788	760	733
Water Year Types[b,c]												
Wet (32%)	780	777	786	835	854	859	884	896	894	864	840	798
Above Normal (16%)	746	742	755	778	827	858	881	892	884	844	806	762
Below Normal (13%)	718	709	721	759	800	824	843	847	834	784	745	727
Dry (24%)	694	698	730	710	745	782	806	808	783	735	718	706
Critical (15%)	598	600	622	685	701	721	724	719	693	653	622	608

Proposed Action 011519

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	842	842	849	850	860	867	887	900	900	867	846	844
20%	804	806	827	849	852	863	884	900	899	860	830	814
30%	778	789	805	831	849	859	882	896	885	847	818	789
40%	748	754	781	823	849	852	877	889	874	831	798	764
50%	731	726	754	792	836	849	872	873	858	813	767	737
60%	713	703	727	740	788	837	850	849	834	778	733	729
70%	695	688	693	728	760	802	815	827	791	733	719	710
80%	684	673	677	697	750	772	802	790	759	732	712	699
90%	661	658	653	682	702	723	739	755	726	698	683	678
Long Term												
Full Simulation Period[a]	731	730	747	773	800	820	840	845	828	788	760	744
Water Year Types[b,c]												
Wet (32%)	816	814	818	839	855	859	884	896	892	862	838	828
Above Normal (16%)	754	751	764	791	834	860	883	892	882	841	803	771
Below Normal (13%)	722	712	725	787	817	838	858	860	844	792	748	730
Dry (24%)	697	700	732	720	754	790	813	814	783	739	721	708
Critical (15%)	589	591	618	686	703	724	727	721	690	650	620	608

Proposed Action 011519 minus Current Operations 011319

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	44	44	0	1	2	1	**0**	0	0	**0**	**0**	38
20%	38	37	30	2	3	2	0	0	**0**	**-1**	**-3**	29
30%	26	34	33	9	0	1	0	**-1**	**-4**	**-6**	**-4**	17
40%	14	20	26	44	8	3	0	1	**-3**	**-6**	2	13
50%	5	3	20	29	32	7	15	9	3	0	3	4
60%	1	1	5	5	3	17	10	5	8	12	0	6
70%	**-1**	**-2**	2	3	3	7	6	10	1	**0**	**0**	0
80%	1	**0**	2	0	15	2	18	7	**-4**	**0**	0	**-1**
90%	13	8	**0**	5	3	**-2**	2	8	10	14	18	21
Long Term												
Full Simulation Period[a]	12	13	12	10	6	5	5	3	0	1	**0**	12
Water Year Types[b,c]												
Wet (32%)	35	37	31	5	2	0	0	**-1**	**-2**	**-2**	**-2**	30
Above Normal (16%)	8	9	9	13	7	2	2	1	**-1**	**-3**	**-3**	9
Below Normal (13%)	3	4	4	27	17	15	14	13	10	8	3	3
Dry (24%)	3	2	2	9	9	8	8	6	1	4	3	2
Critical (15%)	**-9**	**-9**	**-4**	1	2	3	3	2	**-3**	**-2**	**-2**	**0**

a Based on the 82-year simulation period.

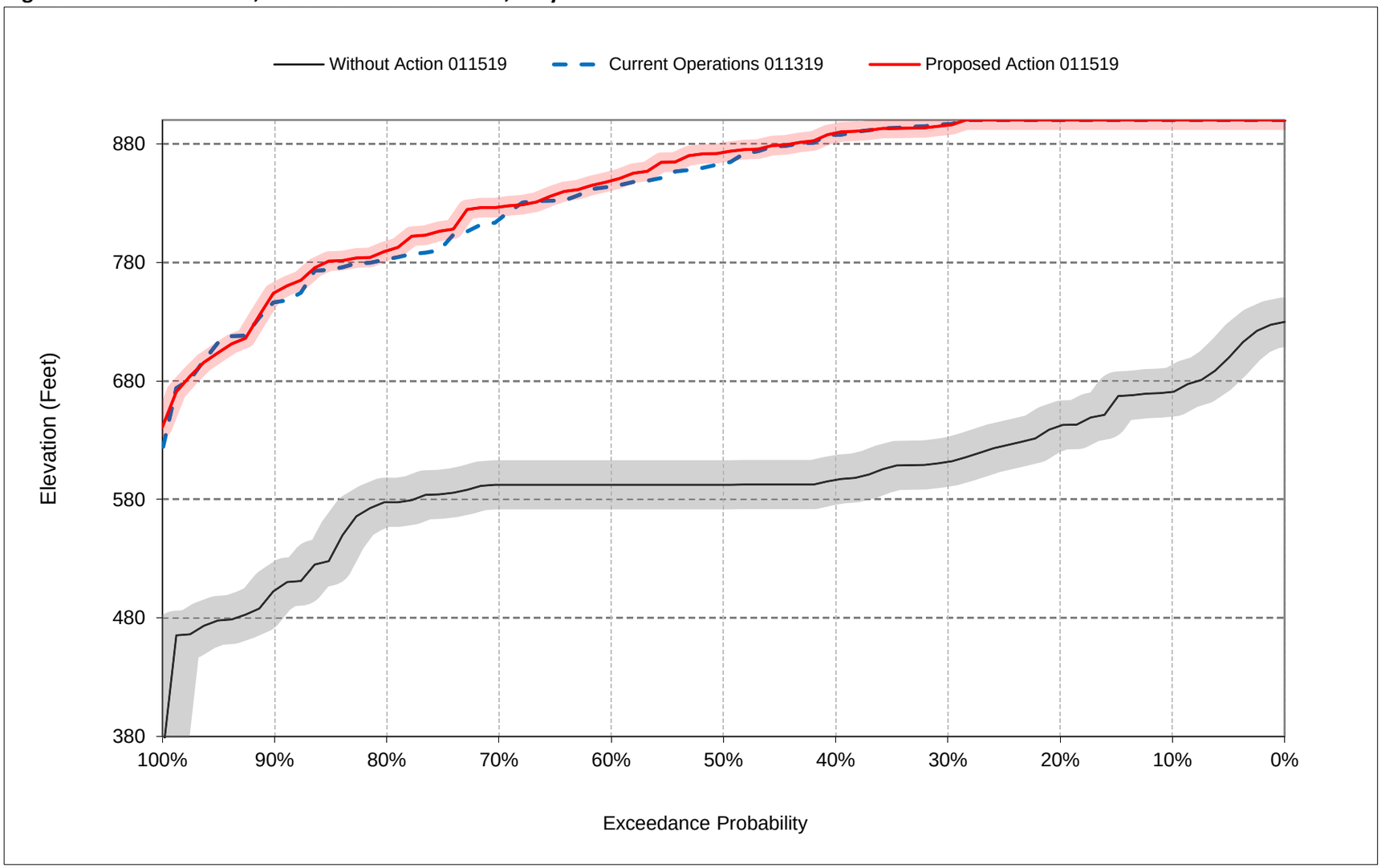
b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

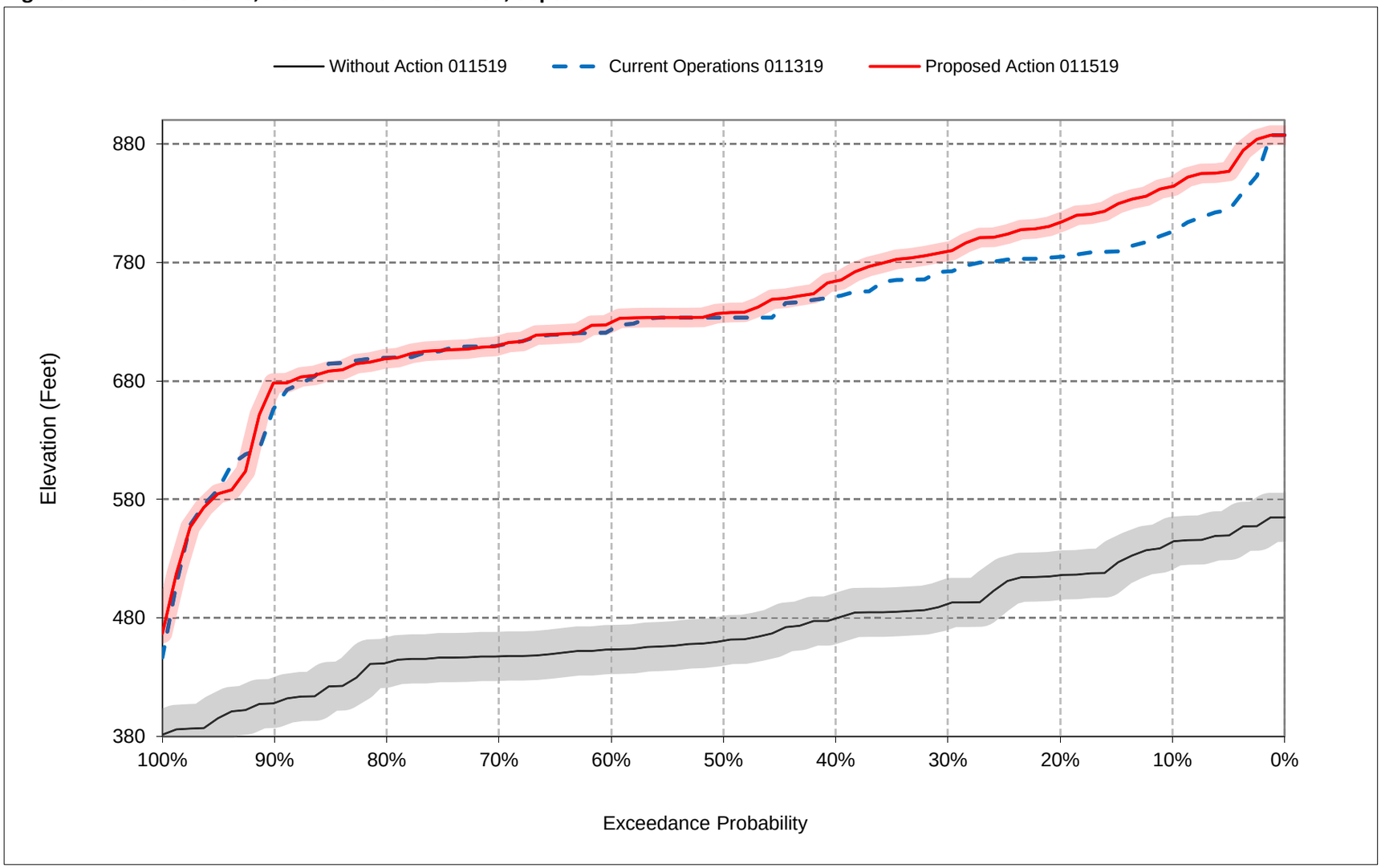
Figure 4a-1. Lake Oroville, Reservoir Pool Elevation, May



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Figure 4a-2. Lake Oroville, Reservoir Pool Elevation, September



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Table 5-1. Folsom Lake Storage, End of Month Storage

Without Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	83	83	83	83	83	83	83	83	83	83	83	83
20%	83	83	83	83	83	83	83	83	83	83	83	83
30%	83	83	83	83	83	83	83	83	83	83	83	83
40%	83	83	83	83	83	83	83	83	83	83	83	83
50%	83	83	83	83	83	83	83	83	83	83	83	83
60%	83	83	83	83	83	83	83	83	83	83	83	83
70%	83	83	83	83	83	83	83	83	83	83	83	83
80%	83	83	83	83	83	83	83	83	83	83	83	83
90%	83	83	83	83	83	83	83	83	83	83	83	83
Long Term												
Full Simulation Period[a]	83	83	83	91	90	83	83	83	83	82	82	82
Water Year Types[b,c]												
Wet (32%)	83	83	83	108	104	83	83	83	83	83	83	83
Above Normal (16%)	83	83	83	83	83	83	83	83	83	83	83	83
Below Normal (13%)	83	83	83	83	83	83	83	83	83	83	83	83
Dry (24%)	83	83	83	83	83	83	83	83	83	83	83	83
Critical (15%)	83	83	83	83	83	83	83	83	79	76	75	79

Current Operations 011319

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	592	542	567	567	567	659	792	967	967	913	792	681
20%	534	489	567	564	566	656	792	967	967	849	755	618
30%	492	457	521	557	558	652	792	967	955	755	683	570
40%	452	425	484	525	553	646	792	967	910	663	574	516
50%	403	413	447	482	530	632	792	960	842	599	532	474
60%	358	392	414	436	491	621	787	852	767	522	460	408
70%	327	347	382	412	457	599	731	751	667	450	399	380
80%	282	304	345	369	408	524	598	613	533	412	350	303
90%	256	240	257	294	368	409	488	481	433	350	305	262
Long Term												
Full Simulation Period[a]	411	396	437	457	486	586	709	816	763	606	531	465
Water Year Types[b,c]												
Wet (32%)	500	439	477	517	515	632	784	950	935	795	698	583
Above Normal (16%)	416	412	455	506	527	640	786	944	873	607	540	475
Below Normal (13%)	420	411	447	484	531	617	754	834	771	549	483	451
Dry (24%)	389	407	433	419	475	568	682	751	665	531	462	429
Critical (15%)	242	250	331	314	358	430	463	477	428	374	318	271

Current Operations 011319 minus Without Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	509	459	484	484	484	576	709	884	884	830	709	598
20%	451	406	484	481	483	573	709	884	884	766	672	535
30%	409	374	438	474	475	569	709	884	872	672	600	487
40%	369	342	401	442	470	563	709	884	827	580	491	433
50%	320	330	364	399	447	549	709	877	759	516	449	391
60%	275	309	331	353	408	538	704	769	684	439	377	325
70%	244	264	299	329	374	516	648	668	584	367	316	297
80%	199	221	262	286	325	441	515	530	450	329	267	220
90%	173	157	174	211	285	326	405	398	350	267	222	179
Long Term												
Full Simulation Period[a]	328	313	354	366	396	503	626	733	680	524	449	382
Water Year Types[b,c]												
Wet (32%)	417	356	394	409	411	549	701	867	852	711	615	500
Above Normal (16%)	333	329	372	423	444	557	703	861	790	524	457	392
Below Normal (13%)	337	328	364	401	448	534	671	750	688	466	400	368
Dry (24%)	306	324	350	336	392	485	599	668	582	448	379	346
Critical (15%)	159	167	248	231	275	347	380	394	349	298	243	192

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 5-2. Folsom Lake Storage, End of Month Storage

Without Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	83	83	83	83	83	83	83	83	83	83	83	83
20%	83	83	83	83	83	83	83	83	83	83	83	83
30%	83	83	83	83	83	83	83	83	83	83	83	83
40%	83	83	83	83	83	83	83	83	83	83	83	83
50%	83	83	83	83	83	83	83	83	83	83	83	83
60%	83	83	83	83	83	83	83	83	83	83	83	83
70%	83	83	83	83	83	83	83	83	83	83	83	83
80%	83	83	83	83	83	83	83	83	83	83	83	83
90%	83	83	83	83	83	83	83	83	83	83	83	83
Long Term												
Full Simulation Period[a]	83	83	83	91	90	83	83	83	83	82	82	82
Water Year Types[b,c]												
Wet (32%)	83	83	83	108	104	83	83	83	83	83	83	83
Above Normal (16%)	83	83	83	83	83	83	83	83	83	83	83	83
Below Normal (13%)	83	83	83	83	83	83	83	83	83	83	83	83
Dry (24%)	83	83	83	83	83	83	83	83	83	83	83	83
Critical (15%)	83	83	83	83	83	83	83	83	79	76	75	79

Proposed Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	697	567	567	567	567	659	792	967	967	915	792	745
20%	635	565	567	567	567	656	792	967	967	851	747	670
30%	573	538	567	566	564	652	792	967	952	773	692	633
40%	495	521	541	558	558	642	792	967	883	669	587	531
50%	417	461	508	543	553	631	792	959	825	597	524	472
60%	390	423	470	502	528	621	788	880	766	551	488	437
70%	369	382	423	453	477	606	729	751	657	515	452	398
80%	341	353	385	417	448	556	653	649	577	435	373	349
90%	250	283	305	348	394	467	534	547	483	371	304	269
Long Term												
Full Simulation Period[a]	459	444	472	488	503	594	716	824	765	623	544	495
Water Year Types[b,c]												
Wet (32%)	612	533	527	523	515	632	786	954	930	809	712	663
Above Normal (16%)	451	449	487	538	539	640	789	948	867	628	558	505
Below Normal (13%)	397	405	447	544	548	623	756	828	754	547	461	415
Dry (24%)	418	445	463	442	498	581	697	769	680	562	489	442
Critical (15%)	261	282	373	383	405	460	484	496	447	382	331	283

Proposed Action 011519 minus Without Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	614	484	484	484	484	576	709	884	884	832	709	662
20%	552	482	484	484	484	573	709	884	884	768	664	587
30%	490	455	484	483	481	569	709	884	869	690	609	550
40%	412	438	458	475	475	559	709	884	800	586	504	448
50%	334	378	425	460	470	548	709	876	742	514	441	389
60%	307	340	387	419	445	538	705	797	683	468	405	354
70%	286	299	340	370	394	523	646	668	574	432	369	315
80%	258	270	302	334	365	473	570	566	494	352	290	266
90%	167	200	222	265	311	384	451	464	400	288	221	186
Long Term												
Full Simulation Period[a]	376	361	389	397	413	511	633	741	682	541	462	413
Water Year Types[b,c]												
Wet (32%)	529	450	444	415	411	549	703	871	847	726	629	580
Above Normal (16%)	368	366	404	455	456	557	706	865	784	545	475	422
Below Normal (13%)	314	322	364	461	465	540	673	745	671	464	378	332
Dry (24%)	335	362	380	359	415	498	614	686	597	479	406	359
Critical (15%)	178	199	290	300	322	377	401	413	368	306	257	204

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 5-3. Folsom Lake Storage, End of Month Storage

Current Operations 011319

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	592	542	567	567	567	659	792	967	967	913	792	681
20%	534	489	567	564	566	656	792	967	967	849	755	618
30%	492	457	521	557	558	652	792	967	955	755	683	570
40%	452	425	484	525	553	646	792	967	910	663	574	516
50%	403	413	447	482	530	632	792	960	842	599	532	474
60%	358	392	414	436	491	621	787	852	767	522	460	408
70%	327	347	382	412	457	599	731	751	667	450	399	380
80%	282	304	345	369	408	524	598	613	533	412	350	303
90%	256	240	257	294	368	409	488	481	433	350	305	262
Long Term												
Full Simulation Period[a]	411	396	437	457	486	586	709	816	763	606	531	465
Water Year Types[b,c]												
Wet (32%)	500	439	477	517	515	632	784	950	935	795	698	583
Above Normal (16%)	416	412	455	506	527	640	786	944	873	607	540	475
Below Normal (13%)	420	411	447	484	531	617	754	834	771	549	483	451
Dry (24%)	389	407	433	419	475	568	682	751	665	531	462	429
Critical (15%)	242	250	331	314	358	430	463	477	428	374	318	271

Proposed Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	697	567	567	567	567	659	792	967	967	915	792	745
20%	635	565	567	567	567	656	792	967	967	851	747	670
30%	573	538	567	566	564	652	792	967	952	773	692	633
40%	495	521	541	558	558	642	792	967	883	669	587	531
50%	417	461	508	543	553	631	792	959	825	597	524	472
60%	390	423	470	502	528	621	788	880	766	551	488	437
70%	369	382	423	453	477	606	729	751	657	515	452	398
80%	341	353	385	417	448	556	653	649	577	435	373	349
90%	250	283	305	348	394	467	534	547	483	371	304	269
Long Term												
Full Simulation Period[a]	459	444	472	488	503	594	716	824	765	623	544	495
Water Year Types[b,c]												
Wet (32%)	612	533	527	523	515	632	786	954	930	809	712	663
Above Normal (16%)	451	449	487	538	539	640	789	948	867	628	558	505
Below Normal (13%)	397	405	447	544	548	623	756	828	754	547	461	415
Dry (24%)	418	445	463	442	498	581	697	769	680	562	489	442
Critical (15%)	261	282	373	383	405	460	484	496	447	382	331	283

Proposed Action 011519 minus Current Operations 011319

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	105	25	0	0	0	0	0	0	0	2	0	64
20%	101	76	0	3	1	0	0	0	0	2	-8	52
30%	81	81	46	9	6	0	0	0	-3	18	9	63
40%	43	96	57	33	5	-4	0	0	-28	6	13	15
50%	14	47	60	62	23	-2	0	0	-17	-2	-7	-2
60%	32	32	56	66	37	0	1	28	-1	29	28	29
70%	42	34	41	41	20	7	-2	-1	-11	65	53	18
80%	59	49	40	48	40	31	55	36	44	22	23	47
90%	-6	43	48	54	26	57	46	65	50	20	-1	7
Long Term												
Full Simulation Period[a]	48	49	35	31	17	8	8	8	2	17	13	30
Water Year Types[b,c]												
Wet (32%)	113	94	50	6	0	0	2	4	-4	15	14	80
Above Normal (16%)	35	37	32	32	13	0	3	4	-6	21	18	30
Below Normal (13%)	-22	-6	0	60	17	6	2	-6	-16	-2	-22	-35
Dry (24%)	29	39	31	23	23	13	15	18	15	31	28	13
Critical (15%)	20	31	43	69	47	30	20	19	19	8	14	12

a Based on the 82-year simulation period.

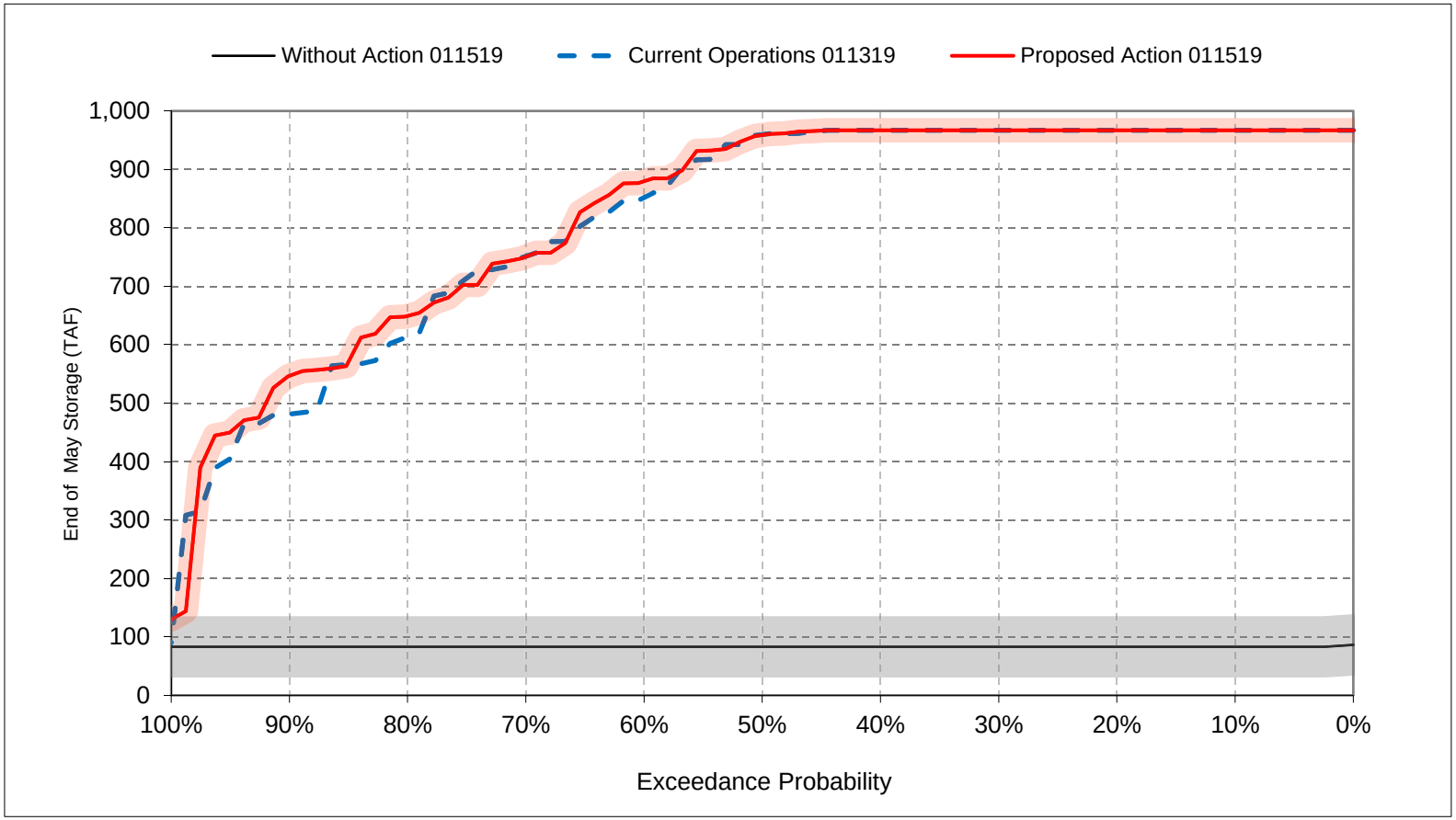
b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

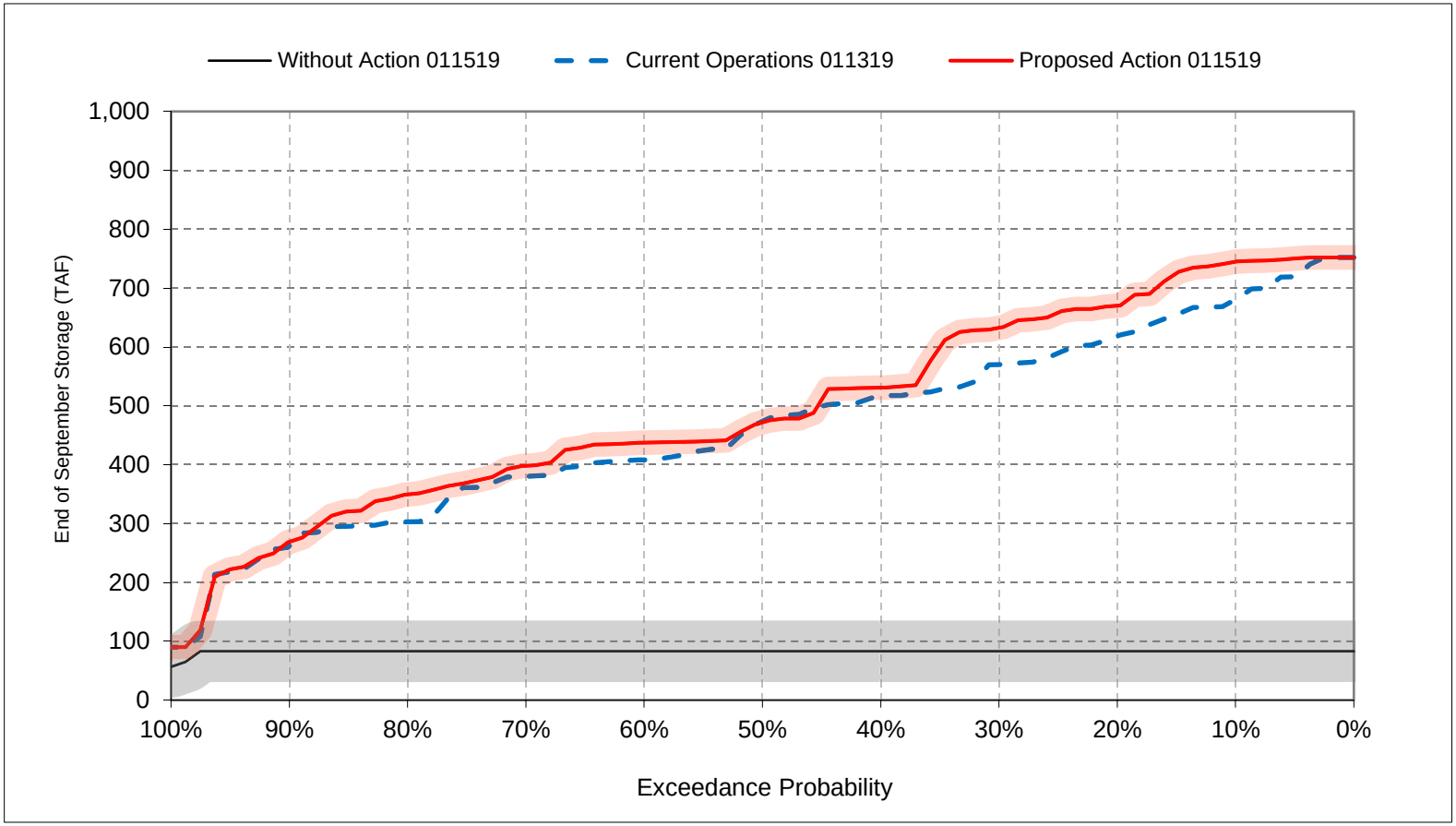
e These are draft results meant for qualitative analysis and are subject to revision.

Figure 5-1. Folsom Lake Storage, End of May Storage



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 5-2. Folsom Lake Storage, End of September Storage



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Table 5a-1. Folsom Lake Elevation, End of Month Elevation

Without Action 011519

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	326	326	326	326	326	326	326	326	326	326	326	326
20%	326	326	326	326	326	326	326	326	326	326	326	326
30%	326	326	326	326	326	326	326	326	326	326	326	326
40%	326	326	326	326	326	326	326	326	326	326	326	326
50%	326	326	326	326	326	326	326	326	326	326	326	326
60%	326	326	326	326	326	326	326	326	326	326	326	326
70%	326	326	326	326	326	326	326	326	326	326	326	326
80%	326	326	326	326	326	326	326	326	326	326	326	326
90%	326	326	326	326	326	326	326	326	326	326	326	326
Long Term												
Full Simulation Period[a]	326	326	326	327	327	326	326	326	325	322	325	325
Water Year Types[b,c]												
Wet (32%)	326	326	326	330	330	326	326	326	326	326	326	326
Above Normal (16%)	326	326	326	326	326	326	326	326	326	326	326	326
Below Normal (13%)	326	326	326	326	326	326	326	326	326	326	326	326
Dry (24%)	326	326	326	326	326	326	326	326	326	326	326	326
Critical (15%)	326	326	326	326	326	326	326	326	322	299	317	324

Current Operations 011319

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	427	421	424	424	424	436	449	466	466	461	449	438
20%	420	415	424	424	424	435	449	466	466	455	445	431
30%	415	411	419	423	423	435	449	466	465	445	438	425
40%	410	407	414	419	423	434	449	466	461	436	425	418
50%	404	405	409	414	420	432	449	465	454	428	420	413
60%	397	403	405	408	415	431	449	455	447	419	411	405
70%	392	396	401	405	411	428	443	445	437	410	403	401
80%	385	389	395	399	405	419	428	430	420	405	396	388
90%	380	377	380	387	399	405	415	414	408	396	389	381
Long Term												
Full Simulation Period[a]	402	401	407	410	414	426	439	450	444	427	418	409
Water Year Types[b,c]												
Wet (32%)	415	408	413	418	418	432	448	464	463	448	439	425
Above Normal (16%)	405	404	410	417	419	433	448	464	457	429	421	413
Below Normal (13%)	404	403	407	414	420	431	445	453	446	421	413	409
Dry (24%)	400	403	406	405	413	424	437	444	435	419	410	406
Critical (15%)	371	373	391	388	394	405	408	409	402	395	385	376

Current Operations 011319 minus Without Action 011519

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	102	95	99	99	99	110	123	140	140	135	123	112
20%	94	89	99	98	98	110	123	140	140	129	120	105
30%	89	85	93	97	97	109	123	140	139	120	113	99
40%	84	81	88	93	97	108	123	140	135	111	99	92
50%	78	79	84	88	94	107	123	140	128	103	94	87
60%	72	77	80	82	89	105	123	129	121	93	85	79
70%	67	70	76	79	85	103	117	119	111	84	78	75
80%	59	63	69	74	79	93	102	104	94	79	70	63
90%	54	51	54	61	73	79	89	88	82	70	63	55
Long Term												
Full Simulation Period[a]	76	75	81	82	87	101	113	124	119	105	93	84
Water Year Types[b,c]												
Wet (32%)	89	82	87	88	88	107	122	139	137	123	113	100
Above Normal (16%)	79	79	84	91	94	108	123	138	131	103	95	87
Below Normal (13%)	78	77	82	88	94	105	119	127	121	95	87	83
Dry (24%)	75	77	81	79	87	99	111	118	109	93	84	80
Critical (15%)	45	48	65	63	68	79	82	83	80	96	68	53

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 5a-2. Folsom Lake Elevation, End of Month Elevation

Without Action 011519

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	326	326	326	326	326	326	326	326	326	326	326	326
20%	326	326	326	326	326	326	326	326	326	326	326	326
30%	326	326	326	326	326	326	326	326	326	326	326	326
40%	326	326	326	326	326	326	326	326	326	326	326	326
50%	326	326	326	326	326	326	326	326	326	326	326	326
60%	326	326	326	326	326	326	326	326	326	326	326	326
70%	326	326	326	326	326	326	326	326	326	326	326	326
80%	326	326	326	326	326	326	326	326	326	326	326	326
90%	326	326	326	326	326	326	326	326	326	326	326	326
Long Term												
Full Simulation Period[a]	326	326	326	327	327	326	326	326	325	322	325	325
Water Year Types[b,c]												
Wet (32%)	326	326	326	330	330	326	326	326	326	326	326	326
Above Normal (16%)	326	326	326	326	326	326	326	326	326	326	326	326
Below Normal (13%)	326	326	326	326	326	326	326	326	326	326	326	326
Dry (24%)	326	326	326	326	326	326	326	326	326	326	326	326
Critical (15%)	326	326	326	326	326	326	326	326	322	299	317	324

Proposed Action 011519

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	440	424	424	424	424	436	449	466	466	461	449	444
20%	433	424	424	424	424	435	449	466	466	455	445	437
30%	425	421	424	424	424	435	449	466	465	447	439	433
40%	415	419	421	423	423	434	449	466	458	437	427	420
50%	406	411	417	421	423	432	449	465	452	428	419	412
60%	402	406	412	416	420	431	449	458	446	422	415	408
70%	399	401	406	410	413	429	443	445	436	418	410	403
80%	395	397	402	406	410	423	435	435	426	408	400	396
90%	379	385	389	396	403	412	420	422	414	399	389	382
Long Term												
Full Simulation Period[a]	408	407	412	414	416	427	440	451	444	428	419	413
Water Year Types[b,c]												
Wet (32%)	430	420	419	419	418	432	448	465	462	450	440	435
Above Normal (16%)	410	409	414	421	421	433	449	464	456	431	423	417
Below Normal (13%)	400	402	408	421	422	431	445	452	445	421	409	403
Dry (24%)	405	409	411	408	415	426	439	446	437	423	414	408
Critical (15%)	374	380	397	399	402	409	411	411	403	394	387	378

Proposed Action 011519 minus Without Action 011519

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	114	99	99	99	99	110	123	140	140	135	123	119
20%	107	98	99	99	99	110	123	140	140	129	119	111
30%	99	95	99	98	98	109	123	140	139	121	114	107
40%	90	93	95	97	97	108	123	140	132	111	101	94
50%	80	85	91	96	97	107	123	139	126	102	93	87
60%	77	81	86	90	94	105	123	132	121	97	89	82
70%	74	76	81	84	87	103	117	119	110	92	84	78
80%	69	71	76	80	84	97	109	109	100	82	74	70
90%	53	59	63	70	77	86	95	96	88	74	63	57
Long Term												
Full Simulation Period[a]	83	82	86	87	89	102	114	125	119	107	95	88
Water Year Types[b,c]												
Wet (32%)	104	94	94	89	88	107	123	139	137	124	115	109
Above Normal (16%)	84	84	88	95	95	108	123	138	131	105	97	91
Below Normal (13%)	74	76	82	96	96	106	120	126	119	95	84	77
Dry (24%)	80	83	85	82	90	100	113	120	111	97	89	83
Critical (15%)	49	54	71	74	76	83	85	85	81	95	69	55

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 5a-3. Folsom Lake Elevation, End of Month Elevation

Current Operations 011319

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	427	421	424	424	424	436	449	466	466	461	449	438
20%	420	415	424	424	424	435	449	466	466	455	445	431
30%	415	411	419	423	423	435	449	466	465	445	438	425
40%	410	407	414	419	423	434	449	466	461	436	425	418
50%	404	405	409	414	420	432	449	465	454	428	420	413
60%	397	403	405	408	415	431	449	455	447	419	411	405
70%	392	396	401	405	411	428	443	445	437	410	403	401
80%	385	389	395	399	405	419	428	430	420	405	396	388
90%	380	377	380	387	399	405	415	414	408	396	389	381
Long Term												
Full Simulation Period[a]	402	401	407	410	414	426	439	450	444	427	418	409
Water Year Types[b,c]												
Wet (32%)	415	408	413	418	418	432	448	464	463	448	439	425
Above Normal (16%)	405	404	410	417	419	433	448	464	457	429	421	413
Below Normal (13%)	404	403	407	414	420	431	445	453	446	421	413	409
Dry (24%)	400	403	406	405	413	424	437	444	435	419	410	406
Critical (15%)	371	373	391	388	394	405	408	409	402	395	385	376

Proposed Action 011519

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	440	424	424	424	424	436	449	466	466	461	449	444
20%	433	424	424	424	424	435	449	466	466	455	445	437
30%	425	421	424	424	424	435	449	466	465	447	439	433
40%	415	419	421	423	423	434	449	466	458	437	427	420
50%	406	411	417	421	423	432	449	465	452	428	419	412
60%	402	406	412	416	420	431	449	458	446	422	415	408
70%	399	401	406	410	413	429	443	445	436	418	410	403
80%	395	397	402	406	410	423	435	435	426	408	400	396
90%	379	385	389	396	403	412	420	422	414	399	389	382
Long Term												
Full Simulation Period[a]	408	407	412	414	416	427	440	451	444	428	419	413
Water Year Types[b,c]												
Wet (32%)	430	420	419	419	418	432	448	465	462	450	440	435
Above Normal (16%)	410	409	414	421	421	433	449	464	456	431	423	417
Below Normal (13%)	400	402	408	421	422	431	445	452	445	421	409	403
Dry (24%)	405	409	411	408	415	426	439	446	437	423	414	408
Critical (15%)	374	380	397	399	402	409	411	411	403	394	387	378

Proposed Action 011519 minus Current Operations 011319

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	12	3	0	0	0	0	0	0	0	0	0	6
20%	13	9	0	0	0	0	0	0	0	0	-1	6
30%	10	10	6	1	1	0	0	0	0	2	1	8
40%	5	12	7	4	1	0	0	0	-3	1	2	2
50%	2	6	8	8	3	0	0	0	-2	0	-1	0
60%	5	4	7	8	5	0	0	3	0	4	4	4
70%	7	6	5	5	2	1	0	0	-1	8	7	2
80%	10	8	6	6	5	4	7	4	5	3	4	8
90%	-1	8	9	9	4	7	6	8	6	3	0	1
Long Term												
Full Simulation Period[a]	7	7	5	4	2	1	1	1	0	2	2	4
Water Year Types[b,c]												
Wet (32%)	14	12	6	1	0	0	0	0	0	2	2	10
Above Normal (16%)	5	5	4	4	2	0	0	0	-1	3	2	4
Below Normal (13%)	-4	-1	0	8	2	1	0	0	-2	0	-3	-6
Dry (24%)	5	6	5	3	3	2	2	2	2	4	4	2
Critical (15%)	4	6	6	11	8	4	3	2	1	-1	2	2

a Based on the 82-year simulation period.

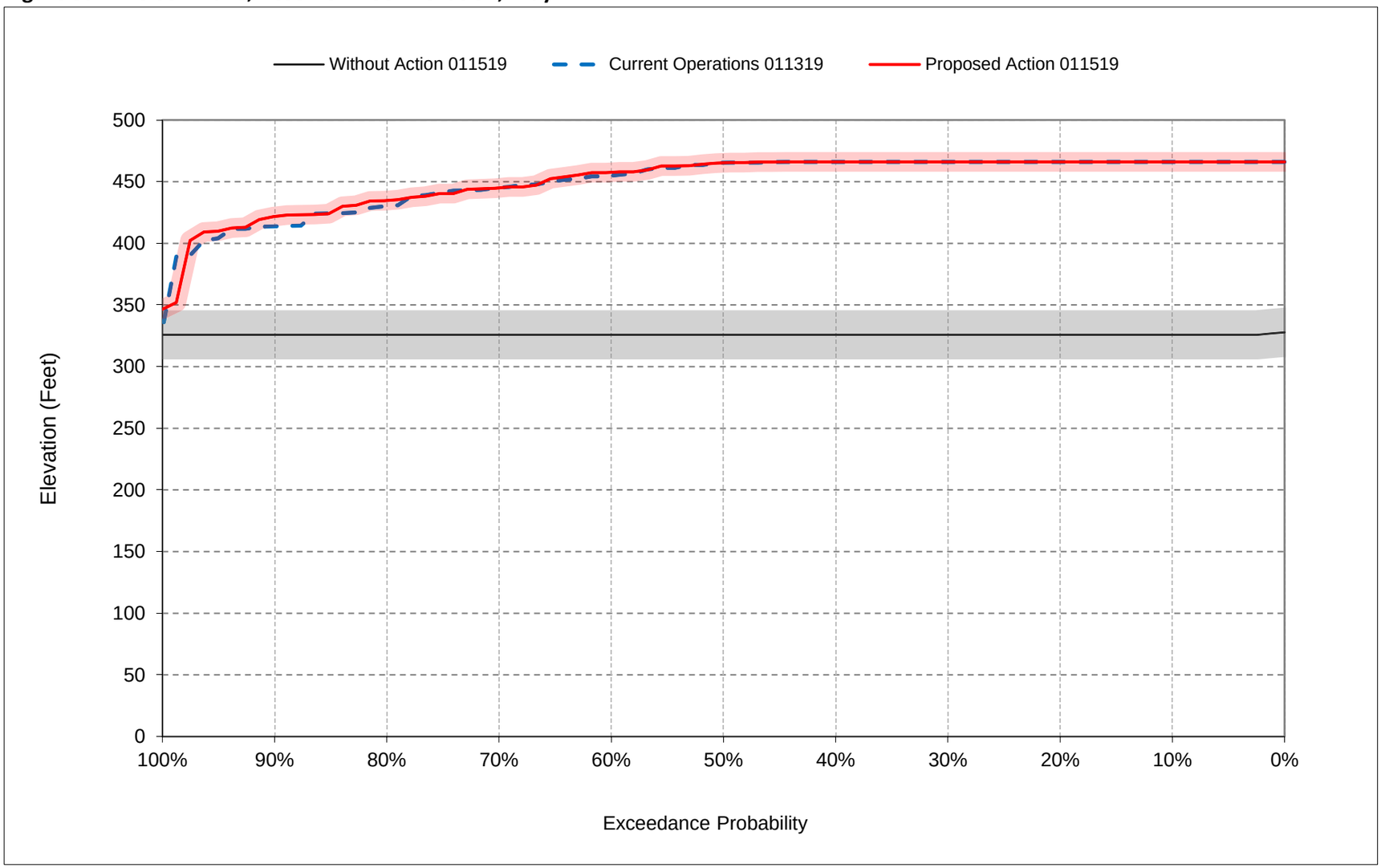
b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

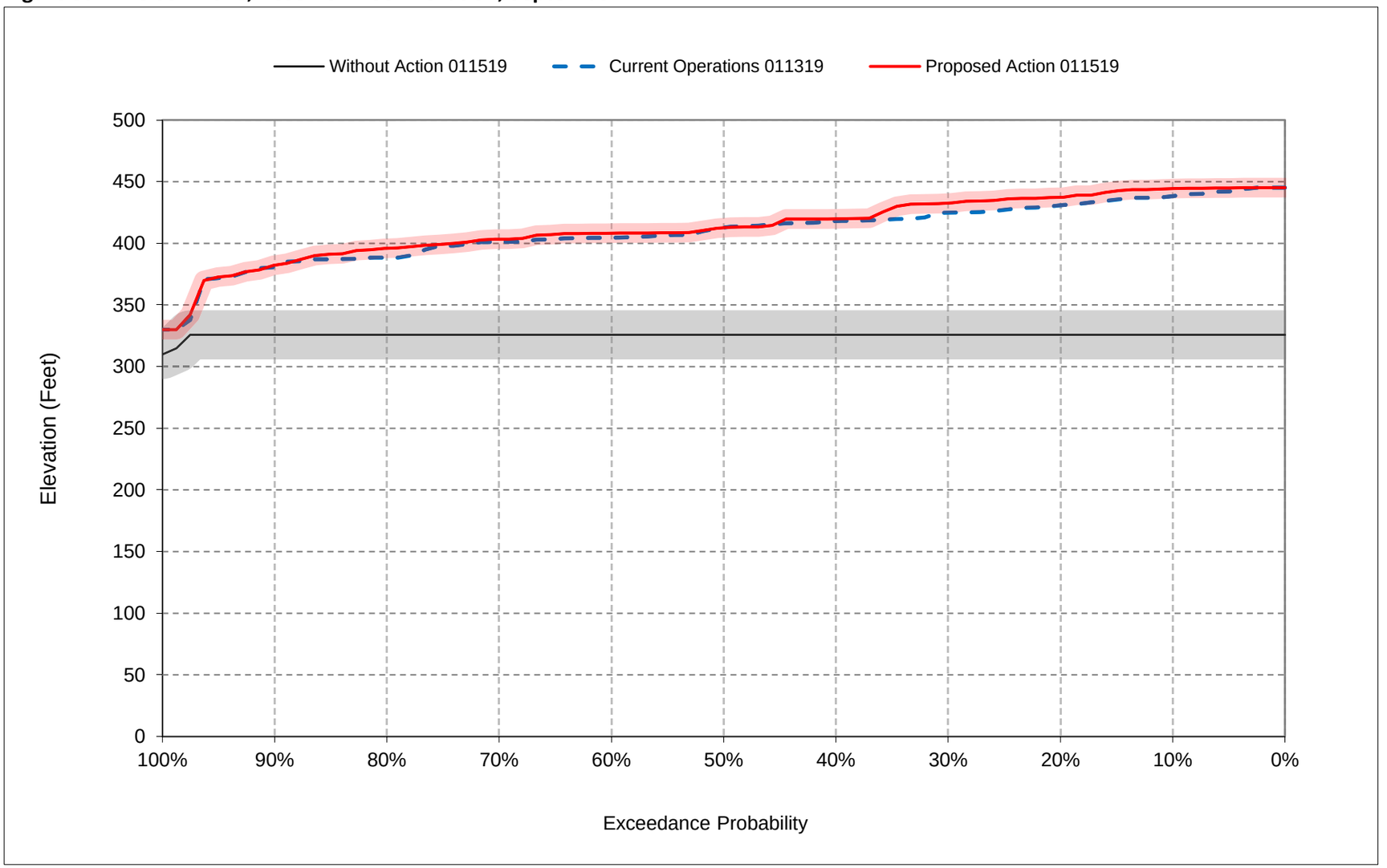
Figure 5a-1. Folsom Lake, Reservoir Pool Elevation, May



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Figure 5a-2. Folsom Lake, Reservoir Pool Elevation, September



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Table 6-1. San Luis Storage (CVP and SWP), End of Month Storage

Without Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types[b,c]												
Wet (32%)	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal (16%)	0	0	0	0	0	0	0	0	0	0	0	0
Below Normal (13%)	0	0	0	0	0	0	0	0	0	0	0	0
Dry (24%)	0	0	0	0	0	0	0	0	0	0	0	0
Critical (15%)	0	0	0	0	0	0	0	0	0	0	0	0

Current Operations 011319

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	687	875	1,128	1,514	1,871	2,039	1,837	1,473	1,217	932	679	699
20%	509	685	1,037	1,321	1,578	1,961	1,751	1,350	956	735	529	572
30%	467	601	925	1,235	1,513	1,776	1,618	1,256	853	627	449	505
40%	427	547	854	1,147	1,445	1,714	1,499	1,157	785	528	366	443
50%	383	500	779	1,033	1,322	1,553	1,416	1,071	717	468	305	380
60%	333	436	708	974	1,225	1,442	1,305	996	621	407	265	339
70%	270	422	635	911	1,066	1,316	1,176	906	577	352	207	232
80%	213	367	556	859	1,011	1,220	1,119	820	474	292	165	178
90%	191	285	454	757	912	1,069	942	749	409	232	127	149
Long Term												
Full Simulation Period[a]	420	545	798	1,092	1,334	1,549	1,409	1,109	764	545	379	423
Water Year Types[b,c]												
Wet (32%)	574	616	890	1,209	1,521	1,813	1,629	1,274	955	711	584	647
Above Normal (16%)	448	568	863	1,101	1,379	1,621	1,412	1,027	642	398	353	465
Below Normal (13%)	380	529	738	979	1,180	1,391	1,238	915	519	409	297	327
Dry (24%)	297	513	762	1,068	1,265	1,460	1,381	1,132	776	573	271	275
Critical (15%)	301	433	646	970	1,133	1,190	1,135	978	690	422	220	227

Current Operations 011319 minus Without Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	687	875	1,128	1,514	1,871	2,039	1,837	1,473	1,217	932	679	699
20%	509	685	1,037	1,321	1,578	1,961	1,751	1,350	956	735	529	572
30%	467	601	925	1,235	1,513	1,776	1,618	1,256	853	627	449	505
40%	427	547	854	1,147	1,445	1,714	1,499	1,157	785	528	366	443
50%	383	500	779	1,033	1,322	1,553	1,416	1,071	717	468	305	380
60%	333	436	708	974	1,225	1,442	1,305	996	621	407	265	339
70%	270	422	635	911	1,066	1,316	1,176	906	577	352	207	232
80%	213	367	556	859	1,011	1,220	1,119	820	474	292	165	178
90%	191	285	454	757	912	1,069	942	749	409	232	127	149
Long Term												
Full Simulation Period[a]	420	545	798	1,092	1,334	1,549	1,409	1,109	764	545	379	423
Water Year Types[b,c]												
Wet (32%)	574	616	890	1,209	1,521	1,813	1,629	1,274	955	711	584	647
Above Normal (16%)	448	568	863	1,101	1,379	1,621	1,412	1,027	642	398	353	465
Below Normal (13%)	380	529	738	979	1,180	1,391	1,238	915	519	409	297	327
Dry (24%)	297	513	762	1,068	1,265	1,460	1,381	1,132	776	573	271	275
Critical (15%)	301	433	646	970	1,133	1,190	1,135	978	690	422	220	227

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 6-2. San Luis Storage (CVP and SWP), End of Month Storage

Without Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types[b,c]												
Wet (32%)	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal (16%)	0	0	0	0	0	0	0	0	0	0	0	0
Below Normal (13%)	0	0	0	0	0	0	0	0	0	0	0	0
Dry (24%)	0	0	0	0	0	0	0	0	0	0	0	0
Critical (15%)	0	0	0	0	0	0	0	0	0	0	0	0

Proposed Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	948	1,206	1,484	1,714	1,992	2,039	2,018	1,885	1,469	1,137	859	854
20%	821	989	1,150	1,346	1,703	2,027	1,966	1,806	1,339	955	695	749
30%	545	740	981	1,274	1,539	1,791	1,889	1,646	1,241	860	583	556
40%	464	591	819	1,142	1,461	1,630	1,638	1,467	1,038	694	440	448
50%	376	524	690	1,008	1,291	1,540	1,499	1,333	952	591	351	344
60%	296	479	620	931	1,183	1,399	1,377	1,139	820	526	275	257
70%	245	412	579	829	1,048	1,300	1,288	1,031	713	453	188	198
80%	232	334	512	768	993	1,177	1,139	938	630	376	159	168
90%	187	266	408	700	941	1,105	1,063	869	517	280	116	140
Long Term												
Full Simulation Period[a]	500	653	831	1,113	1,356	1,551	1,535	1,351	991	675	444	455
Water Year Types[b,c]												
Wet (32%)	766	926	1,111	1,250	1,499	1,706	1,732	1,577	1,201	881	676	707
Above Normal (16%)	415	542	665	1,115	1,344	1,473	1,438	1,195	758	433	312	359
Below Normal (13%)	371	484	605	1,135	1,357	1,540	1,466	1,186	759	543	370	374
Dry (24%)	388	580	809	1,031	1,284	1,549	1,530	1,372	1,062	726	374	353
Critical (15%)	322	456	648	931	1,180	1,311	1,281	1,149	883	526	266	257

Proposed Action 011519 minus Without Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	948	1,206	1,484	1,714	1,992	2,039	2,018	1,885	1,469	1,137	859	854
20%	821	989	1,150	1,346	1,703	2,027	1,966	1,806	1,339	955	695	749
30%	545	740	981	1,274	1,539	1,791	1,889	1,646	1,241	860	583	556
40%	464	591	819	1,142	1,461	1,630	1,638	1,467	1,038	694	440	448
50%	376	524	690	1,008	1,291	1,540	1,499	1,333	952	591	351	344
60%	296	479	620	931	1,183	1,399	1,377	1,139	820	526	275	257
70%	245	412	579	829	1,048	1,300	1,288	1,031	713	453	188	198
80%	232	334	512	768	993	1,177	1,139	938	630	376	159	168
90%	187	266	408	700	941	1,105	1,063	869	517	280	116	140
Long Term												
Full Simulation Period[a]	500	653	831	1,113	1,356	1,551	1,535	1,351	991	675	444	455
Water Year Types[b,c]												
Wet (32%)	766	926	1,111	1,250	1,499	1,706	1,732	1,577	1,201	881	676	707
Above Normal (16%)	415	542	665	1,115	1,344	1,473	1,438	1,195	758	433	312	359
Below Normal (13%)	371	484	605	1,135	1,357	1,540	1,466	1,186	759	543	370	374
Dry (24%)	388	580	809	1,031	1,284	1,549	1,530	1,372	1,062	726	374	353
Critical (15%)	322	456	648	931	1,180	1,311	1,281	1,149	883	526	266	257

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 6-3. San Luis Storage (CVP and SWP), End of Month Storage

Current Operations 011319

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	687	875	1,128	1,514	1,871	2,039	1,837	1,473	1,217	932	679	699
20%	509	685	1,037	1,321	1,578	1,961	1,751	1,350	956	735	529	572
30%	467	601	925	1,235	1,513	1,776	1,618	1,256	853	627	449	505
40%	427	547	854	1,147	1,445	1,714	1,499	1,157	785	528	366	443
50%	383	500	779	1,033	1,322	1,553	1,416	1,071	717	468	305	380
60%	333	436	708	974	1,225	1,442	1,305	996	621	407	265	339
70%	270	422	635	911	1,066	1,316	1,176	906	577	352	207	232
80%	213	367	556	859	1,011	1,220	1,119	820	474	292	165	178
90%	191	285	454	757	912	1,069	942	749	409	232	127	149
Long Term												
Full Simulation Period[a]	420	545	798	1,092	1,334	1,549	1,409	1,109	764	545	379	423
Water Year Types[b,c]												
Wet (32%)	574	616	890	1,209	1,521	1,813	1,629	1,274	955	711	584	647
Above Normal (16%)	448	568	863	1,101	1,379	1,621	1,412	1,027	642	398	353	465
Below Normal (13%)	380	529	738	979	1,180	1,391	1,238	915	519	409	297	327
Dry (24%)	297	513	762	1,068	1,265	1,460	1,381	1,132	776	573	271	275
Critical (15%)	301	433	646	970	1,133	1,190	1,135	978	690	422	220	227

Proposed Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	948	1,206	1,484	1,714	1,992	2,039	2,018	1,885	1,469	1,137	859	854
20%	821	989	1,150	1,346	1,703	2,027	1,966	1,806	1,339	955	695	749
30%	545	740	981	1,274	1,539	1,791	1,889	1,646	1,241	860	583	556
40%	464	591	819	1,142	1,461	1,630	1,638	1,467	1,038	694	440	448
50%	376	524	690	1,008	1,291	1,540	1,499	1,333	952	591	351	344
60%	296	479	620	931	1,183	1,399	1,377	1,139	820	526	275	257
70%	245	412	579	829	1,048	1,300	1,288	1,031	713	453	188	198
80%	232	334	512	768	993	1,177	1,139	938	630	376	159	168
90%	187	266	408	700	941	1,105	1,063	869	517	280	116	140
Long Term												
Full Simulation Period[a]	500	653	831	1,113	1,356	1,551	1,535	1,351	991	675	444	455
Water Year Types[b,c]												
Wet (32%)	766	926	1,111	1,250	1,499	1,706	1,732	1,577	1,201	881	676	707
Above Normal (16%)	415	542	665	1,115	1,344	1,473	1,438	1,195	758	433	312	359
Below Normal (13%)	371	484	605	1,135	1,357	1,540	1,466	1,186	759	543	370	374
Dry (24%)	388	580	809	1,031	1,284	1,549	1,530	1,372	1,062	726	374	353
Critical (15%)	322	456	648	931	1,180	1,311	1,281	1,149	883	526	266	257

Proposed Action 011519 minus Current Operations 011319

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	262	331	357	200	121	0	181	411	252	205	180	155
20%	312	304	113	24	126	66	214	456	383	220	166	178
30%	78	139	55	39	26	15	270	391	387	234	134	52
40%	36	44	**-35**	**-4**	16	**-85**	140	310	253	166	73	5
50%	**-7**	25	**-90**	**-24**	**-31**	**-13**	83	262	235	123	46	**-36**
60%	**-37**	43	**-88**	**-43**	**-43**	**-43**	72	143	199	118	9	**-83**
70%	**-26**	**-9**	**-56**	**-82**	**-18**	**-16**	111	125	136	100	**-19**	**-33**
80%	19	**-32**	**-44**	**-90**	**-18**	**-43**	20	119	156	84	**-7**	**-10**
90%	**-4**	**-18**	**-46**	**-57**	29	36	121	120	109	48	**-12**	**-10**
Long Term												
Full Simulation Period[a]	80	108	32	22	23	2	125	243	227	130	64	32
Water Year Types[b,c]												
Wet (32%)	191	310	221	41	**-22**	**-107**	104	303	246	170	92	60
Above Normal (16%)	**-33**	**-26**	**-198**	14	**-35**	**-148**	26	168	117	35	**-40**	**-106**
Below Normal (13%)	**-9**	**-45**	**-133**	157	177	149	228	271	240	134	72	47
Dry (24%)	91	66	46	**-37**	18	89	148	240	286	153	104	78
Critical (15%)	21	22	2	**-38**	47	120	147	171	193	104	46	30

a Based on the 82-year simulation period.

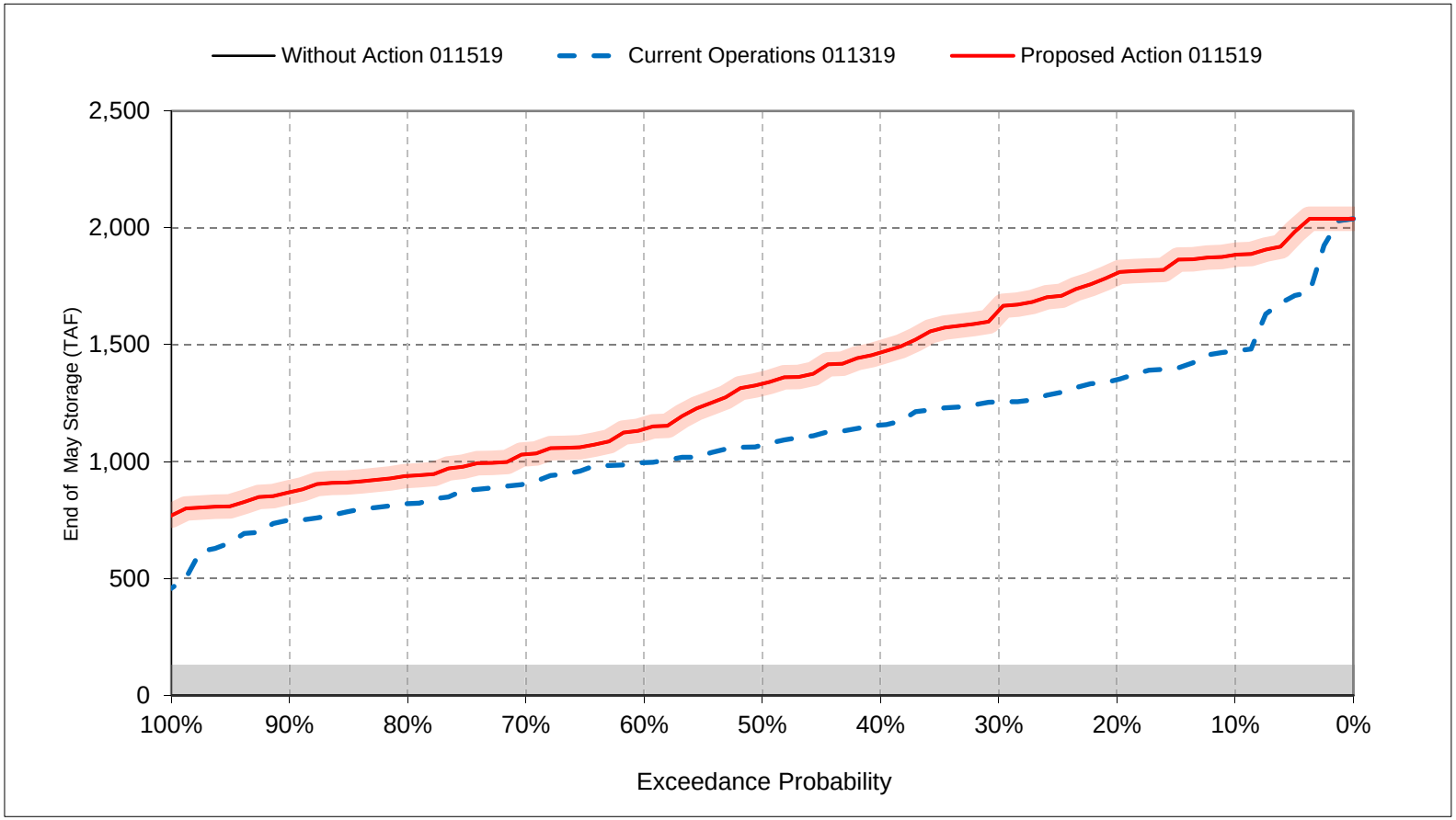
b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

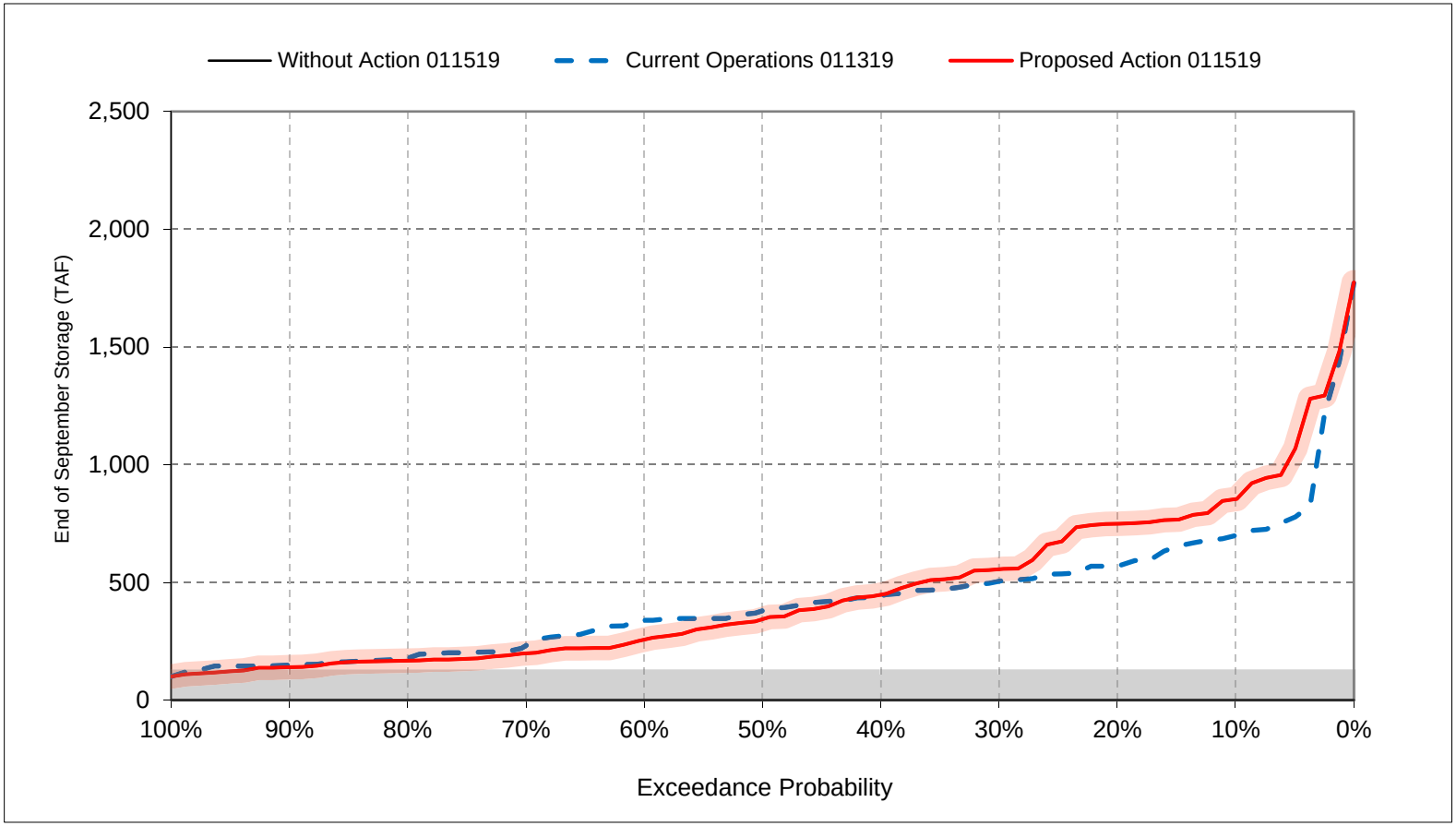
e These are draft results meant for qualitative analysis and are subject to revision.

Figure 6-1. San Luis Storage (CVP and SWP), End of May Storage



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 6-2. San Luis Storage (CVP and SWP), End of September Storage



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Table 6a-1. San Luis Reservoir (SWP and CVP), End of Month Elevation

Without Action 011519

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types[b,c]												
Wet (32%)	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal (16%)	0	0	0	0	0	0	0	0	0	0	0	0
Below Normal (13%)	0	0	0	0	0	0	0	0	0	0	0	0
Dry (24%)	0	0	0	0	0	0	0	0	0	0	0	0
Critical (15%)	0	0	0	0	0	0	0	0	0	0	0	0

Current Operations 011319

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	422	443	480	506	541	544	536	515	500	450	412	419
20%	396	429	469	500	529	544	529	508	478	422	383	390
30%	386	429	466	495	525	544	525	489	454	403	363	375
40%	381	423	462	491	514	534	521	482	444	399	353	370
50%	379	416	455	488	503	524	510	477	431	391	350	360
60%	375	407	449	482	495	518	505	469	423	387	347	356
70%	372	399	442	472	489	506	492	461	420	377	337	351
80%	370	390	430	460	477	494	483	454	409	365	331	348
90%	361	380	409	449	464	470	464	442	401	349	329	345
Long Term												
Full Simulation Period[a]	385	414	451	481	502	517	506	478	441	396	362	373
Water Year Types[b,c]												
Wet (32%)	398	428	466	492	517	536	525	498	468	414	378	387
Above Normal (16%)	379	412	456	479	504	525	509	473	438	372	347	365
Below Normal (13%)	380	409	442	476	493	511	496	463	418	382	347	364
Dry (24%)	378	407	443	480	496	513	503	476	434	399	360	369
Critical (15%)	382	404	433	469	482	484	474	456	421	389	358	364

Current Operations 011319 minus Without Action 011519

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	422	443	480	506	541	544	536	515	500	450	412	419
20%	396	429	469	500	529	544	529	508	478	422	383	390
30%	386	429	466	495	525	544	525	489	454	403	363	375
40%	381	423	462	491	514	534	521	482	444	399	353	370
50%	379	416	455	488	503	524	510	477	431	391	350	360
60%	375	407	449	482	495	518	505	469	423	387	347	356
70%	372	399	442	472	489	506	492	461	420	377	337	351
80%	370	390	430	460	477	494	483	454	409	365	331	348
90%	361	380	409	449	464	470	464	442	401	349	329	345
Long Term												
Full Simulation Period[a]	385	414	451	481	502	517	506	478	441	396	362	373
Water Year Types[b,c]												
Wet (32%)	398	428	466	492	517	536	525	498	468	414	378	387
Above Normal (16%)	379	412	456	479	504	525	509	473	438	372	347	365
Below Normal (13%)	380	409	442	476	493	511	496	463	418	382	347	364
Dry (24%)	378	407	443	480	496	513	503	476	434	399	360	369
Critical (15%)	382	404	433	469	482	484	474	456	421	389	358	364

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 6a-2. San Luis Reservoir (SWP and CVP), End of Month Elevation

Without Action 011519

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types[b,c]												
Wet (32%)	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal (16%)	0	0	0	0	0	0	0	0	0	0	0	0
Below Normal (13%)	0	0	0	0	0	0	0	0	0	0	0	0
Dry (24%)	0	0	0	0	0	0	0	0	0	0	0	0
Critical (15%)	0	0	0	0	0	0	0	0	0	0	0	0

Proposed Action 011519

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	456	488	526	544	544	544	544	544	525	466	436	440
20%	429	451	485	513	540	544	544	544	507	445	405	411
30%	411	442	469	501	528	544	544	533	488	430	382	391
40%	390	427	460	490	521	542	539	523	474	416	370	380
50%	382	414	451	483	505	529	532	515	463	404	357	376
60%	379	404	439	475	497	519	525	501	453	398	353	360
70%	371	391	431	463	488	509	508	494	446	393	349	355
80%	365	384	425	457	477	502	492	475	442	386	336	348
90%	341	373	404	437	462	485	484	466	434	370	329	339
Long Term												
Full Simulation Period[a]	395	422	453	483	505	522	521	508	471	414	372	382
Water Year Types[b,c]												
Wet (32%)	414	450	483	500	520	535	541	534	497	436	392	402
Above Normal (16%)	389	417	448	470	493	513	520	507	463	385	352	367
Below Normal (13%)	387	406	433	492	511	527	521	501	461	408	366	377
Dry (24%)	388	410	445	476	499	519	513	498	462	412	370	377
Critical (15%)	381	402	428	468	491	502	493	478	447	403	363	367

Proposed Action 011519 minus Without Action 011519

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	456	488	526	544	544	544	544	544	525	466	436	440
20%	429	451	485	513	540	544	544	544	507	445	405	411
30%	411	442	469	501	528	544	544	533	488	430	382	391
40%	390	427	460	490	521	542	539	523	474	416	370	380
50%	382	414	451	483	505	529	532	515	463	404	357	376
60%	379	404	439	475	497	519	525	501	453	398	353	360
70%	371	391	431	463	488	509	508	494	446	393	349	355
80%	365	384	425	457	477	502	492	475	442	386	336	348
90%	341	373	404	437	462	485	484	466	434	370	329	339
Long Term												
Full Simulation Period[a]	395	422	453	483	505	522	521	508	471	414	372	382
Water Year Types[b,c]												
Wet (32%)	414	450	483	500	520	535	541	534	497	436	392	402
Above Normal (16%)	389	417	448	470	493	513	520	507	463	385	352	367
Below Normal (13%)	387	406	433	492	511	527	521	501	461	408	366	377
Dry (24%)	388	410	445	476	499	519	513	498	462	412	370	377
Critical (15%)	381	402	428	468	491	502	493	478	447	403	363	367

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 6a-3. San Luis Reservoir (SWP and CVP), End of Month Elevation

Current Operations 011319

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	422	443	480	506	541	544	536	515	500	450	412	419
20%	396	429	469	500	529	544	529	508	478	422	383	390
30%	386	429	466	495	525	544	525	489	454	403	363	375
40%	381	423	462	491	514	534	521	482	444	399	353	370
50%	379	416	455	488	503	524	510	477	431	391	350	360
60%	375	407	449	482	495	518	505	469	423	387	347	356
70%	372	399	442	472	489	506	492	461	420	377	337	351
80%	370	390	430	460	477	494	483	454	409	365	331	348
90%	361	380	409	449	464	470	464	442	401	349	329	345
Long Term												
Full Simulation Period[a]	385	414	451	481	502	517	506	478	441	396	362	373
Water Year Types[b,c]												
Wet (32%)	398	428	466	492	517	536	525	498	468	414	378	387
Above Normal (16%)	379	412	456	479	504	525	509	473	438	372	347	365
Below Normal (13%)	380	409	442	476	493	511	496	463	418	382	347	364
Dry (24%)	378	407	443	480	496	513	503	476	434	399	360	369
Critical (15%)	382	404	433	469	482	484	474	456	421	389	358	364

Proposed Action 011519

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	456	488	526	544	544	544	544	544	525	466	436	440
20%	429	451	485	513	540	544	544	544	507	445	405	411
30%	411	442	469	501	528	544	544	533	488	430	382	391
40%	390	427	460	490	521	542	539	523	474	416	370	380
50%	382	414	451	483	505	529	532	515	463	404	357	376
60%	379	404	439	475	497	519	525	501	453	398	353	360
70%	371	391	431	463	488	509	508	494	446	393	349	355
80%	365	384	425	457	477	502	492	475	442	386	336	348
90%	341	373	404	437	462	485	484	466	434	370	329	339
Long Term												
Full Simulation Period[a]	395	422	453	483	505	522	521	508	471	414	372	382
Water Year Types[b,c]												
Wet (32%)	414	450	483	500	520	535	541	534	497	436	392	402
Above Normal (16%)	389	417	448	470	493	513	520	507	463	385	352	367
Below Normal (13%)	387	406	433	492	511	527	521	501	461	408	366	377
Dry (24%)	388	410	445	476	499	519	513	498	462	412	370	377
Critical (15%)	381	402	428	468	491	502	493	478	447	403	363	367

Proposed Action 011519 minus Current Operations 011319

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	33	45	46	38	3	0	8	29	25	16	24	22
20%	33	22	16	13	11	0	15	35	29	23	22	21
30%	24	13	2	6	3	0	19	44	35	27	19	16
40%	9	4	-2	-1	6	8	18	41	30	17	16	9
50%	4	-2	-4	-5	1	6	22	38	32	13	8	16
60%	4	-3	-10	-7	3	1	20	32	31	11	6	4
70%	-1	-8	-10	-9	-1	3	16	33	27	17	12	5
80%	-5	-6	-5	-3	1	8	9	21	33	21	4	0
90%	-20	-7	-4	-13	-2	15	20	24	33	22	0	-5
Long Term												
Full Simulation Period[a]	10	8	3	2	4	5	15	30	30	18	11	9
Water Year Types[b,c]												
Wet (32%)	15	21	16	8	3	0	16	36	29	22	14	15
Above Normal (16%)	10	5	-8	-9	-11	-12	11	34	25	14	5	2
Below Normal (13%)	7	-2	-9	16	18	16	25	38	42	26	19	13
Dry (24%)	10	3	2	-4	2	7	11	22	28	12	10	9
Critical (15%)	-1	-2	-5	-1	8	19	19	21	26	13	4	3

a Based on the 82-year simulation period.

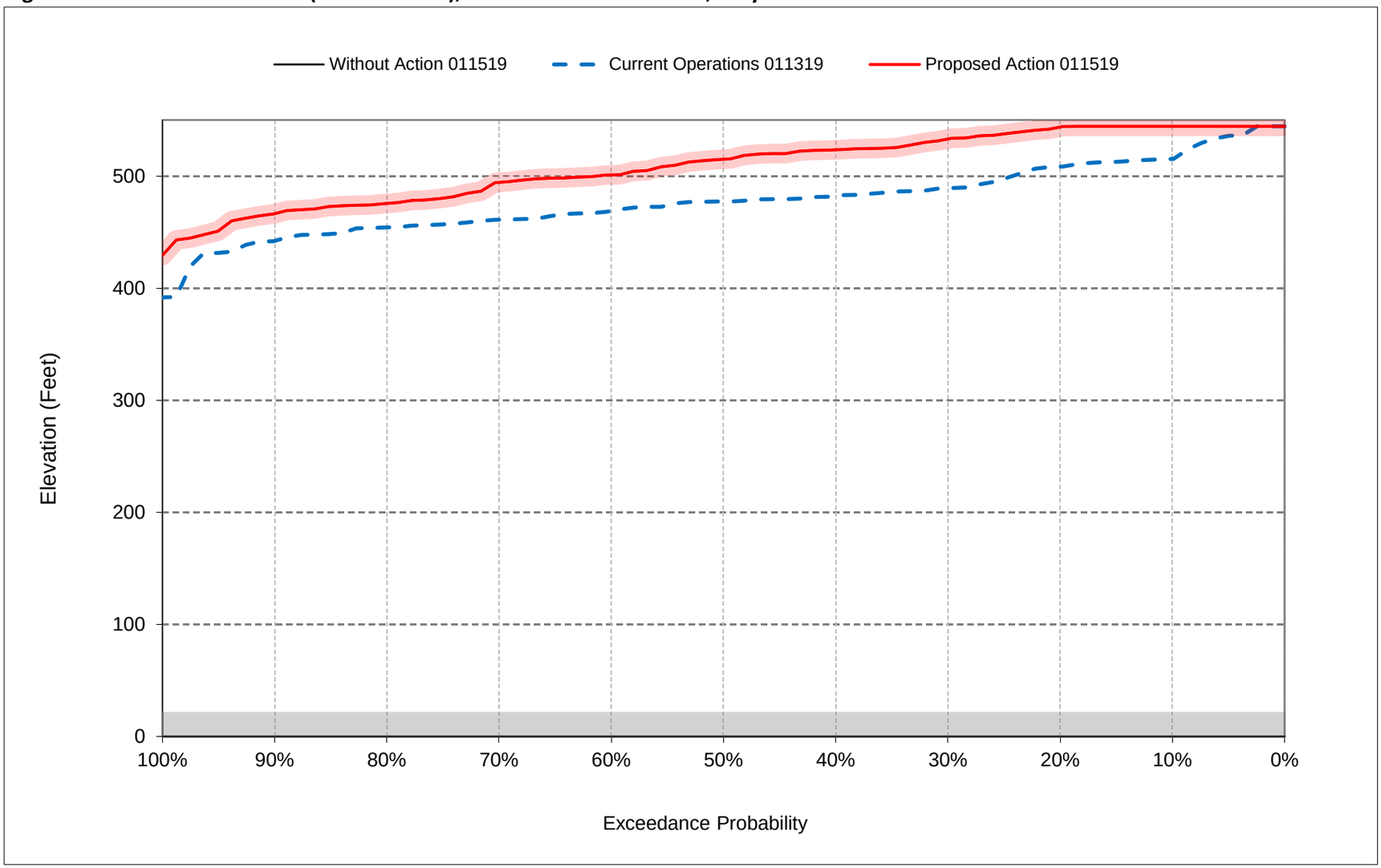
b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

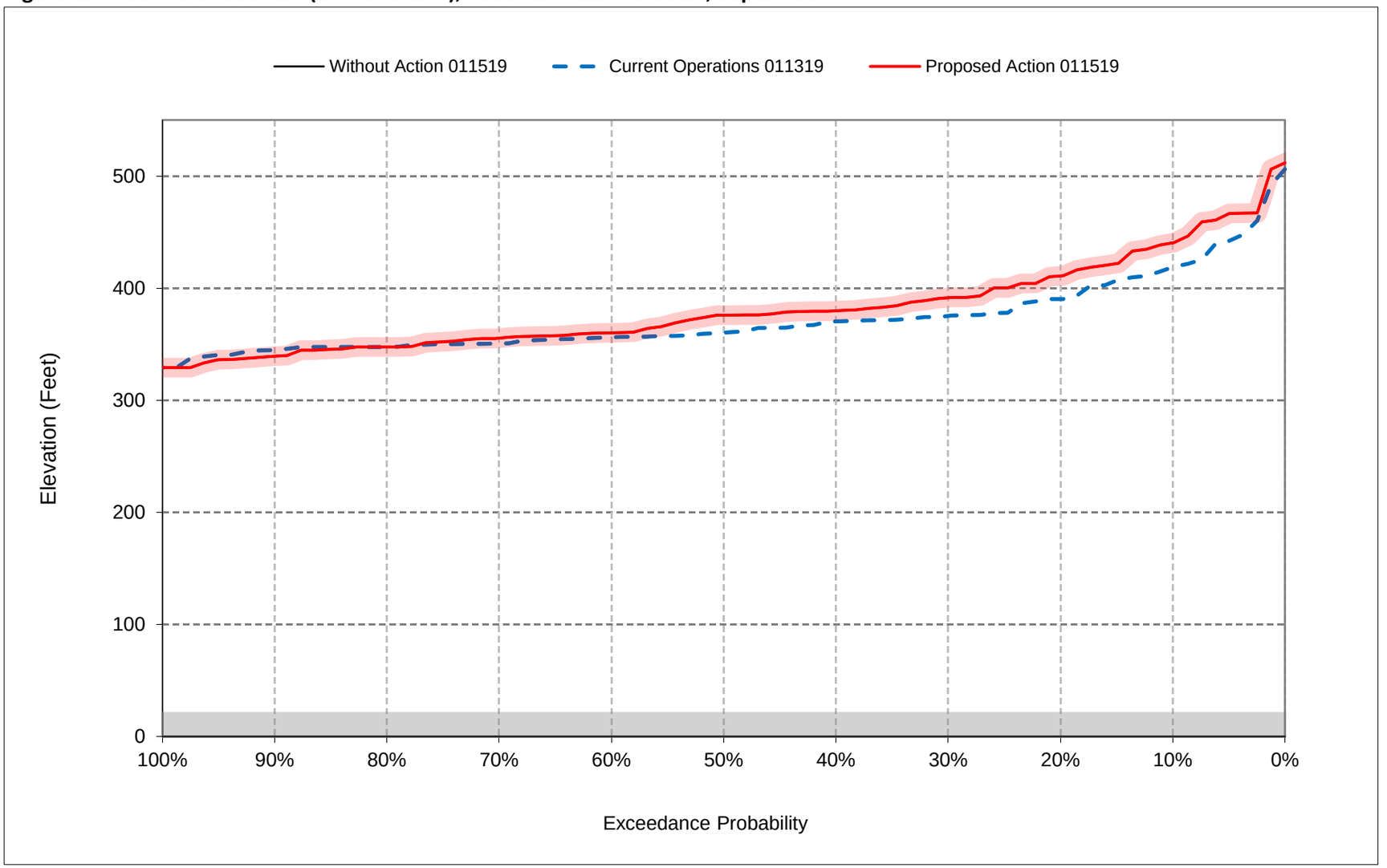
Figure 6a-1. San Luis Reservoir (SWP and CVP), Reservoir Pool Elevation, May



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Figure 6a-2. San Luis Reservoir (SWP and CVP), Reservoir Pool Elevation, September



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Table 6b-1. San Luis CVP Storage, End of Month Storage

Without Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types[b,c]												
Wet (32%)	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal (16%)	0	0	0	0	0	0	0	0	0	0	0	0
Below Normal (13%)	0	0	0	0	0	0	0	0	0	0	0	0
Dry (24%)	0	0	0	0	0	0	0	0	0	0	0	0
Critical (15%)	0	0	0	0	0	0	0	0	0	0	0	0

Current Operations 011319

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	338	432	614	750	951	972	924	801	720	464	296	324
20%	234	367	557	716	878	972	880	763	601	338	190	215
30%	201	367	544	692	857	972	859	659	479	262	128	163
40%	182	340	520	667	797	910	835	624	436	244	104	146
50%	176	314	488	654	736	849	774	598	374	217	95	121
60%	163	276	459	620	688	816	743	556	341	202	90	111
70%	152	245	424	569	658	749	674	516	328	168	64	97
80%	145	215	370	513	596	685	629	482	285	133	50	90
90%	123	181	283	459	531	564	532	427	252	92	45	83
Long Term												
Full Simulation Period[a]	207	314	476	625	733	820	754	609	436	251	140	170
Water Year Types[b,c]												
Wet (32%)	256	373	547	682	816	920	860	711	561	330	198	222
Above Normal (16%)	176	299	492	611	746	860	769	582	414	169	94	138
Below Normal (13%)	182	287	434	596	689	784	702	534	332	193	90	134
Dry (24%)	181	285	442	614	700	791	735	598	398	251	127	154
Critical (15%)	203	277	399	564	634	640	589	502	343	223	134	154

Current Operations 011319 minus Without Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	338	432	614	750	951	972	924	801	720	464	296	324
20%	234	367	557	716	878	972	880	763	601	338	190	215
30%	201	367	544	692	857	972	859	659	479	262	128	163
40%	182	340	520	667	797	910	835	624	436	244	104	146
50%	176	314	488	654	736	849	774	598	374	217	95	121
60%	163	276	459	620	688	816	743	556	341	202	90	111
70%	152	245	424	569	658	749	674	516	328	168	64	97
80%	145	215	370	513	596	685	629	482	285	133	50	90
90%	123	181	283	459	531	564	532	427	252	92	45	83
Long Term												
Full Simulation Period[a]	207	314	476	625	733	820	754	609	436	251	140	170
Water Year Types[b,c]												
Wet (32%)	256	373	547	682	816	920	860	711	561	330	198	222
Above Normal (16%)	176	299	492	611	746	860	769	582	414	169	94	138
Below Normal (13%)	182	287	434	596	689	784	702	534	332	193	90	134
Dry (24%)	181	285	442	614	700	791	735	598	398	251	127	154
Critical (15%)	203	277	399	564	634	640	589	502	343	223	134	154

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 6b-2. San Luis CVP Storage, End of Month Storage

Without Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types[b,c]												
Wet (32%)	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal (16%)	0	0	0	0	0	0	0	0	0	0	0	0
Below Normal (13%)	0	0	0	0	0	0	0	0	0	0	0	0
Dry (24%)	0	0	0	0	0	0	0	0	0	0	0	0
Critical (15%)	0	0	0	0	0	0	0	0	0	0	0	0

Proposed Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	489	653	863	972	972	972	972	972	858	541	399	419
20%	367	466	637	788	944	972	972	968	754	438	268	293
30%	291	425	555	723	874	972	972	904	655	372	187	219
40%	212	356	511	662	831	958	941	848	583	311	144	179
50%	188	305	468	629	742	882	900	799	525	266	114	166
60%	177	266	414	585	703	820	858	723	478	241	104	120
70%	149	216	377	526	652	767	760	686	445	225	92	109
80%	131	193	348	496	599	727	676	589	427	200	61	90
90%	73	157	266	402	522	640	634	544	390	146	45	70
Long Term												
Full Simulation Period[a]	252	356	495	638	753	844	840	770	574	318	176	205
Water Year Types[b,c]												
Wet (32%)	335	481	637	724	834	920	952	911	709	420	251	282
Above Normal (16%)	219	327	458	570	692	794	831	763	530	219	111	148
Below Normal (13%)	210	282	403	682	788	873	838	730	519	284	141	177
Dry (24%)	216	301	452	595	714	828	794	713	527	299	158	181
Critical (15%)	207	277	382	559	676	735	682	606	456	269	149	166

Proposed Action 011519 minus Without Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	489	653	863	972	972	972	972	972	858	541	399	419
20%	367	466	637	788	944	972	972	968	754	438	268	293
30%	291	425	555	723	874	972	972	904	655	372	187	219
40%	212	356	511	662	831	958	941	848	583	311	144	179
50%	188	305	468	629	742	882	900	799	525	266	114	166
60%	177	266	414	585	703	820	858	723	478	241	104	120
70%	149	216	377	526	652	767	760	686	445	225	92	109
80%	131	193	348	496	599	727	676	589	427	200	61	90
90%	73	157	266	402	522	640	634	544	390	146	45	70
Long Term												
Full Simulation Period[a]	252	356	495	638	753	844	840	770	574	318	176	205
Water Year Types[b,c]												
Wet (32%)	335	481	637	724	834	920	952	911	709	420	251	282
Above Normal (16%)	219	327	458	570	692	794	831	763	530	219	111	148
Below Normal (13%)	210	282	403	682	788	873	838	730	519	284	141	177
Dry (24%)	216	301	452	595	714	828	794	713	527	299	158	181
Critical (15%)	207	277	382	559	676	735	682	606	456	269	149	166

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 6b-3. San Luis CVP Storage, End of Month Storage

Current Operations 011319

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	338	432	614	750	951	972	924	801	720	464	296	324
20%	234	367	557	716	878	972	880	763	601	338	190	215
30%	201	367	544	692	857	972	859	659	479	262	128	163
40%	182	340	520	667	797	910	835	624	436	244	104	146
50%	176	314	488	654	736	849	774	598	374	217	95	121
60%	163	276	459	620	688	816	743	556	341	202	90	111
70%	152	245	424	569	658	749	674	516	328	168	64	97
80%	145	215	370	513	596	685	629	482	285	133	50	90
90%	123	181	283	459	531	564	532	427	252	92	45	83
Long Term												
Full Simulation Period[a]	207	314	476	625	733	820	754	609	436	251	140	170
Water Year Types[b,c]												
Wet (32%)	256	373	547	682	816	920	860	711	561	330	198	222
Above Normal (16%)	176	299	492	611	746	860	769	582	414	169	94	138
Below Normal (13%)	182	287	434	596	689	784	702	534	332	193	90	134
Dry (24%)	181	285	442	614	700	791	735	598	398	251	127	154
Critical (15%)	203	277	399	564	634	640	589	502	343	223	134	154

Proposed Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	489	653	863	972	972	972	972	972	858	541	399	419
20%	367	466	637	788	944	972	972	968	754	438	268	293
30%	291	425	555	723	874	972	972	904	655	372	187	219
40%	212	356	511	662	831	958	941	848	583	311	144	179
50%	188	305	468	629	742	882	900	799	525	266	114	166
60%	177	266	414	585	703	820	858	723	478	241	104	120
70%	149	216	377	526	652	767	760	686	445	225	92	109
80%	131	193	348	496	599	727	676	589	427	200	61	90
90%	73	157	266	402	522	640	634	544	390	146	45	70
Long Term												
Full Simulation Period[a]	252	356	495	638	753	844	840	770	574	318	176	205
Water Year Types[b,c]												
Wet (32%)	335	481	637	724	834	920	952	911	709	420	251	282
Above Normal (16%)	219	327	458	570	692	794	831	763	530	219	111	148
Below Normal (13%)	210	282	403	682	788	873	838	730	519	284	141	177
Dry (24%)	216	301	452	595	714	828	794	713	527	299	158	181
Critical (15%)	207	277	382	559	676	735	682	606	456	269	149	166

Proposed Action 011519 minus Current Operations 011319

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	151	221	249	222	21	0	48	171	138	77	103	95
20%	134	100	80	72	66	0	92	205	153	100	78	78
30%	91	58	11	31	17	0	113	245	176	110	59	56
40%	30	17	**-10**	**-5**	35	48	105	224	147	67	40	32
50%	12	**-9**	**-20**	**-24**	7	33	126	201	151	49	19	45
60%	14	**-10**	**-45**	**-35**	15	4	115	166	137	39	14	9
70%	**-3**	**-29**	**-47**	**-44**	**-6**	19	86	170	118	58	28	12
80%	**-14**	**-22**	**-22**	**-17**	3	43	47	107	141	67	11	**0**
90%	**-50**	**-24**	**-17**	**-57**	**-9**	76	103	117	138	54	0	**-13**
Long Term												
Full Simulation Period[a]	45	42	19	13	20	24	85	161	138	67	36	35
Water Year Types[b,c]												
Wet (32%)	80	108	90	42	18	**0**	93	199	147	90	53	60
Above Normal (16%)	42	28	**-35**	**-42**	**-54**	**-65**	62	181	116	50	17	10
Below Normal (13%)	27	**-5**	**-31**	86	99	89	136	196	187	92	51	42
Dry (24%)	36	17	10	**-19**	14	37	59	115	129	47	30	28
Critical (15%)	4	**0**	**-17**	**-5**	42	95	93	104	113	47	15	12

a Based on the 82-year simulation period.

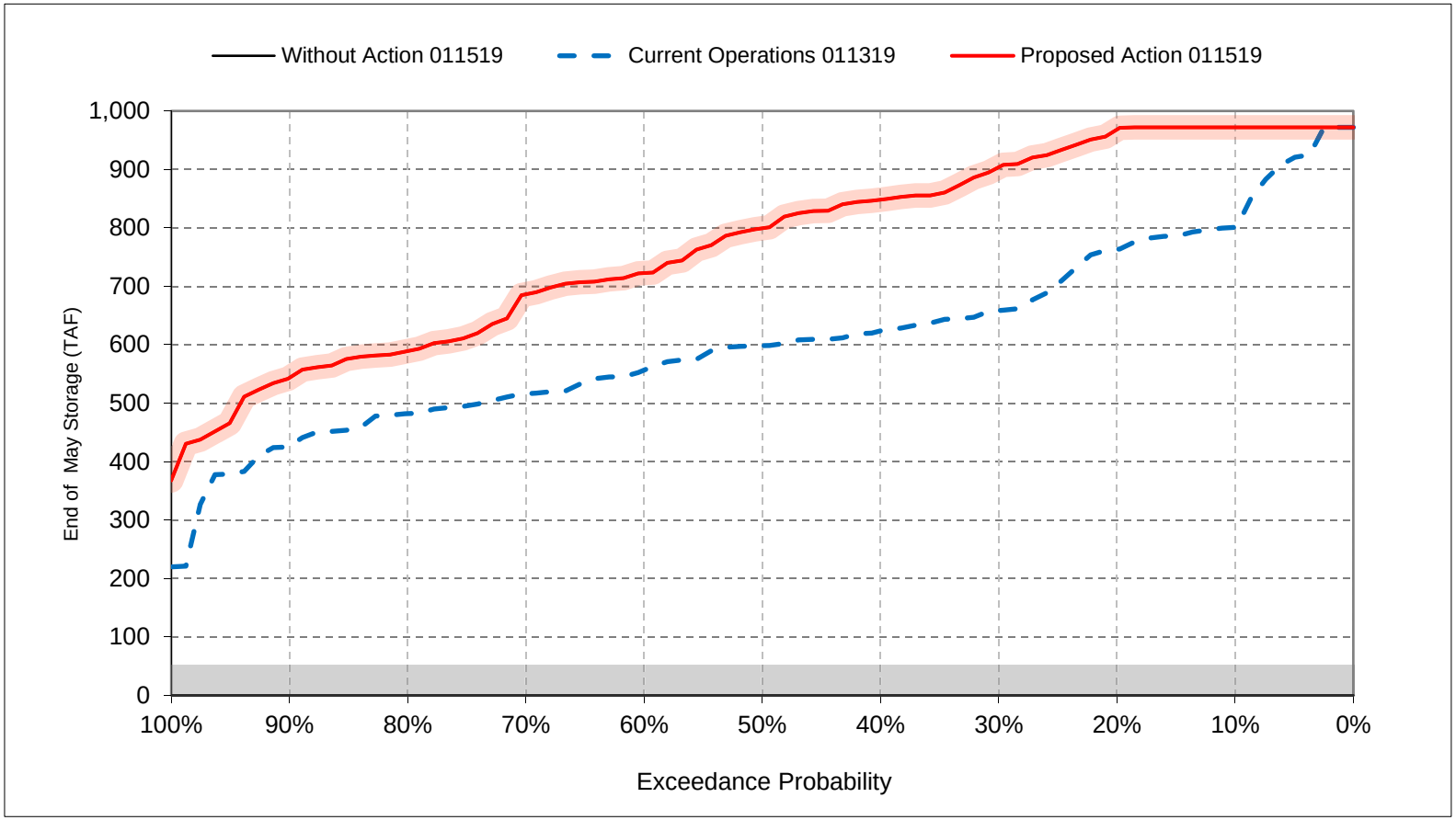
b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

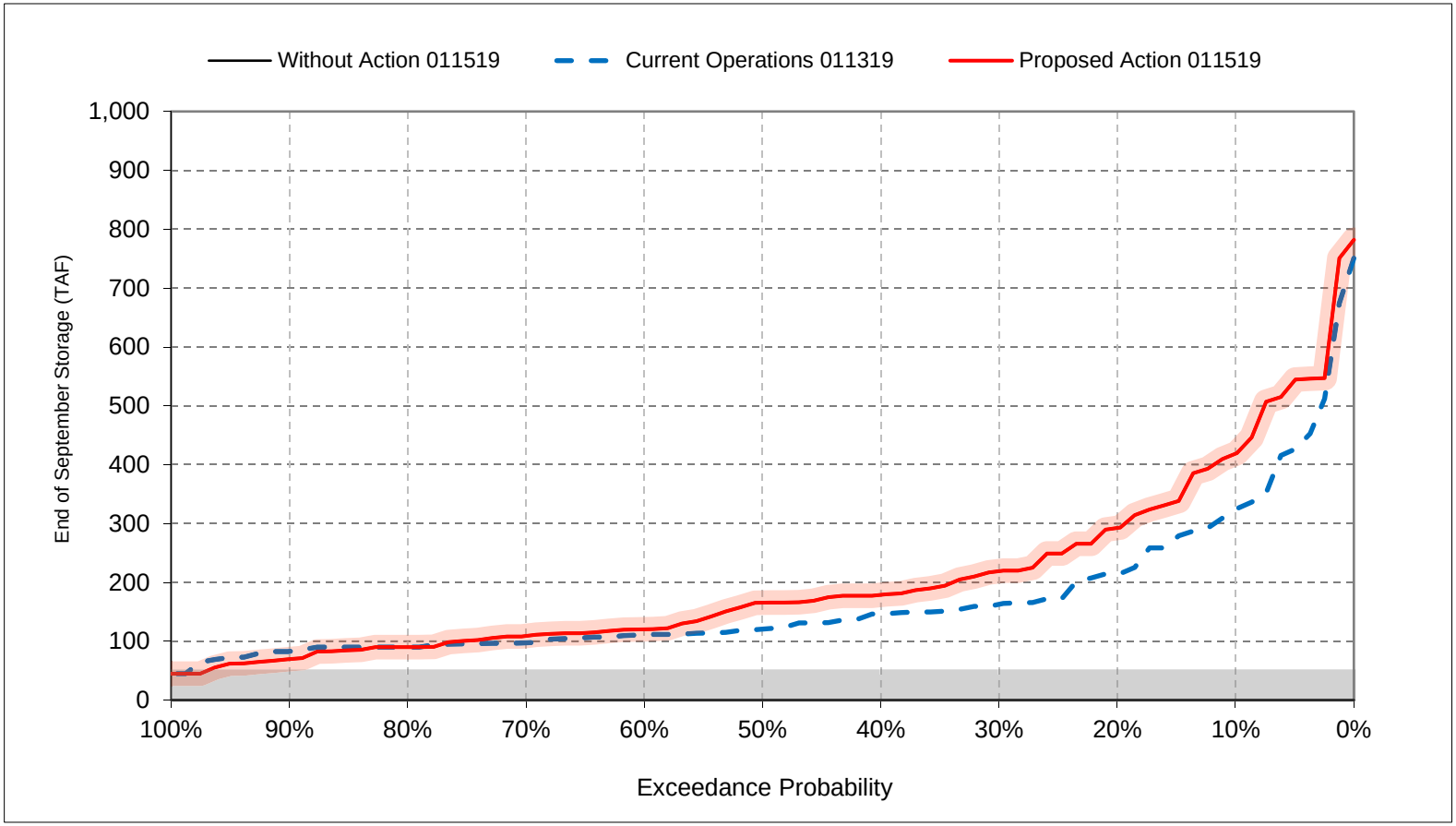
e These are draft results meant for qualitative analysis and are subject to revision.

Figure 6b-1. San Luis CVP Storage, End of May Storage



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 6b-2. San Luis CVP Storage, End of September Storage



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Table 6c-1. San Luis SWP Storage, End of Month Storage

Without Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types[b,c]												
Wet (32%)	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal (16%)	0	0	0	0	0	0	0	0	0	0	0	0
Below Normal (13%)	0	0	0	0	0	0	0	0	0	0	0	0
Dry (24%)	0	0	0	0	0	0	0	0	0	0	0	0
Critical (15%)	0	0	0	0	0	0	0	0	0	0	0	0

Current Operations 011319

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	461	467	648	764	967	1,067	931	734	558	476	429	453
20%	293	352	510	672	786	1,015	896	643	453	418	352	408
30%	268	311	413	579	724	900	797	621	412	366	312	342
40%	227	228	354	496	657	811	730	557	360	306	238	272
50%	186	189	294	425	587	720	666	483	291	249	198	229
60%	128	155	244	354	520	656	589	434	247	219	168	158
70%	70	70	177	289	435	586	494	373	224	187	117	98
80%	55	55	97	232	333	457	429	308	181	137	66	55
90%	55	55	55	200	299	391	348	266	90	100	55	55
Long Term												
Full Simulation Period[a]	213	231	323	466	601	729	655	500	329	293	239	253
Water Year Types[b,c]												
Wet (32%)	319	244	343	527	705	893	769	563	394	381	386	425
Above Normal (16%)	272	269	370	490	633	761	643	446	228	229	259	326
Below Normal (13%)	198	242	305	383	491	606	536	381	187	216	207	193
Dry (24%)	116	229	320	454	566	669	647	534	378	321	144	122
Critical (15%)	98	156	247	406	500	550	546	476	346	199	86	73

Current Operations 011319 minus Without Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	461	467	648	764	967	1,067	931	734	558	476	429	453
20%	293	352	510	672	786	1,015	896	643	453	418	352	408
30%	268	311	413	579	724	900	797	621	412	366	312	342
40%	227	228	354	496	657	811	730	557	360	306	238	272
50%	186	189	294	425	587	720	666	483	291	249	198	229
60%	128	155	244	354	520	656	589	434	247	219	168	158
70%	70	70	177	289	435	586	494	373	224	187	117	98
80%	55	55	97	232	333	457	429	308	181	137	66	55
90%	55	55	55	200	299	391	348	266	90	100	55	55
Long Term												
Full Simulation Period[a]	213	231	323	466	601	729	655	500	329	293	239	253
Water Year Types[b,c]												
Wet (32%)	319	244	343	527	705	893	769	563	394	381	386	425
Above Normal (16%)	272	269	370	490	633	761	643	446	228	229	259	326
Below Normal (13%)	198	242	305	383	491	606	536	381	187	216	207	193
Dry (24%)	116	229	320	454	566	669	647	534	378	321	144	122
Critical (15%)	98	156	247	406	500	550	546	476	346	199	86	73

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 6c-2. San Luis SWP Storage, End of Month Storage

Without Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types[b,c]												
Wet (32%)	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal (16%)	0	0	0	0	0	0	0	0	0	0	0	0
Below Normal (13%)	0	0	0	0	0	0	0	0	0	0	0	0
Dry (24%)	0	0	0	0	0	0	0	0	0	0	0	0
Critical (15%)	0	0	0	0	0	0	0	0	0	0	0	0

Proposed Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	618	636	808	950	1,067	1,067	1,059	944	763	652	560	587
20%	439	483	561	708	879	1,065	1,021	887	626	559	487	429
30%	302	397	486	633	765	934	928	775	553	474	337	317
40%	233	317	348	498	632	788	810	682	491	391	260	249
50%	163	245	238	394	575	674	654	559	401	325	208	174
60%	96	175	171	287	482	618	587	483	340	285	173	91
70%	55	62	80	233	370	516	502	398	255	208	77	55
80%	55	55	55	215	347	428	443	329	161	144	55	55
90%	55	55	55	200	318	355	335	215	55	55	55	55
Long Term												
Full Simulation Period[a]	248	296	336	475	604	707	695	581	418	357	268	250
Water Year Types[b,c]												
Wet (32%)	430	445	474	525	665	787	780	667	493	461	425	425
Above Normal (16%)	196	216	207	545	652	679	608	432	228	214	202	211
Below Normal (13%)	162	201	202	453	569	667	628	456	240	259	229	197
Dry (24%)	172	278	357	436	570	721	735	659	535	427	217	172
Critical (15%)	115	179	266	372	505	576	600	542	427	257	117	91

Proposed Action 011519 minus Without Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	618	636	808	950	1,067	1,067	1,059	944	763	652	560	587
20%	439	483	561	708	879	1,065	1,021	887	626	559	487	429
30%	302	397	486	633	765	934	928	775	553	474	337	317
40%	233	317	348	498	632	788	810	682	491	391	260	249
50%	163	245	238	394	575	674	654	559	401	325	208	174
60%	96	175	171	287	482	618	587	483	340	285	173	91
70%	55	62	80	233	370	516	502	398	255	208	77	55
80%	55	55	55	215	347	428	443	329	161	144	55	55
90%	55	55	55	200	318	355	335	215	55	55	55	55
Long Term												
Full Simulation Period[a]	248	296	336	475	604	707	695	581	418	357	268	250
Water Year Types[b,c]												
Wet (32%)	430	445	474	525	665	787	780	667	493	461	425	425
Above Normal (16%)	196	216	207	545	652	679	608	432	228	214	202	211
Below Normal (13%)	162	201	202	453	569	667	628	456	240	259	229	197
Dry (24%)	172	278	357	436	570	721	735	659	535	427	217	172
Critical (15%)	115	179	266	372	505	576	600	542	427	257	117	91

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 6c-3. San Luis SWP Storage, End of Month Storage

Current Operations 011319

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	461	467	648	764	967	1,067	931	734	558	476	429	453
20%	293	352	510	672	786	1,015	896	643	453	418	352	408
30%	268	311	413	579	724	900	797	621	412	366	312	342
40%	227	228	354	496	657	811	730	557	360	306	238	272
50%	186	189	294	425	587	720	666	483	291	249	198	229
60%	128	155	244	354	520	656	589	434	247	219	168	158
70%	70	70	177	289	435	586	494	373	224	187	117	98
80%	55	55	97	232	333	457	429	308	181	137	66	55
90%	55	55	55	200	299	391	348	266	90	100	55	55
Long Term												
Full Simulation Period[a]	213	231	323	466	601	729	655	500	329	293	239	253
Water Year Types[b,c]												
Wet (32%)	319	244	343	527	705	893	769	563	394	381	386	425
Above Normal (16%)	272	269	370	490	633	761	643	446	228	229	259	326
Below Normal (13%)	198	242	305	383	491	606	536	381	187	216	207	193
Dry (24%)	116	229	320	454	566	669	647	534	378	321	144	122
Critical (15%)	98	156	247	406	500	550	546	476	346	199	86	73

Proposed Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	618	636	808	950	1,067	1,067	1,059	944	763	652	560	587
20%	439	483	561	708	879	1,065	1,021	887	626	559	487	429
30%	302	397	486	633	765	934	928	775	553	474	337	317
40%	233	317	348	498	632	788	810	682	491	391	260	249
50%	163	245	238	394	575	674	654	559	401	325	208	174
60%	96	175	171	287	482	618	587	483	340	285	173	91
70%	55	62	80	233	370	516	502	398	255	208	77	55
80%	55	55	55	215	347	428	443	329	161	144	55	55
90%	55	55	55	200	318	355	335	215	55	55	55	55
Long Term												
Full Simulation Period[a]	248	296	336	475	604	707	695	581	418	357	268	250
Water Year Types[b,c]												
Wet (32%)	430	445	474	525	665	787	780	667	493	461	425	425
Above Normal (16%)	196	216	207	545	652	679	608	432	228	214	202	211
Below Normal (13%)	162	201	202	453	569	667	628	456	240	259	229	197
Dry (24%)	172	278	357	436	570	721	735	659	535	427	217	172
Critical (15%)	115	179	266	372	505	576	600	542	427	257	117	91

Proposed Action 011519 minus Current Operations 011319

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	157	169	160	186	100	0	128	211	205	177	130	134
20%	146	131	51	36	94	50	125	244	173	140	135	21
30%	34	86	73	55	41	34	132	154	142	108	25	**-25**
40%	6	89	**-7**	1	**-25**	**-24**	80	125	131	86	23	**-23**
50%	**-23**	56	**-56**	**-31**	**-12**	**-45**	**-12**	76	110	75	10	**-55**
60%	**-32**	20	**-72**	**-67**	**-37**	**-38**	**-2**	48	94	66	5	**-66**
70%	**-15**	**-9**	**-96**	**-55**	**-64**	**-70**	8	25	32	21	**-39**	**-43**
80%	0	0	**-42**	**-18**	14	**-29**	14	20	**-20**	7	**-11**	0
90%	0	0	**0**	0	19	**-36**	**-13**	**-51**	**-35**	**-45**	0	0
Long Term												
Full Simulation Period[a]	35	65	14	9	3	**-22**	40	81	89	63	29	**-3**
Water Year Types[b,c]												
Wet (32%)	112	201	131	**-2**	**-40**	**-106**	11	104	99	80	39	**0**
Above Normal (16%)	**-75**	**-54**	**-163**	55	19	**-82**	**-35**	**-13**	1	**-15**	**-57**	**-115**
Below Normal (13%)	**-36**	**-40**	**-102**	71	78	61	92	75	53	43	22	5
Dry (24%)	56	50	36	**-18**	5	53	89	125	158	106	73	50
Critical (15%)	17	22	19	**-33**	5	26	54	67	80	58	31	18

a Based on the 82-year simulation period.

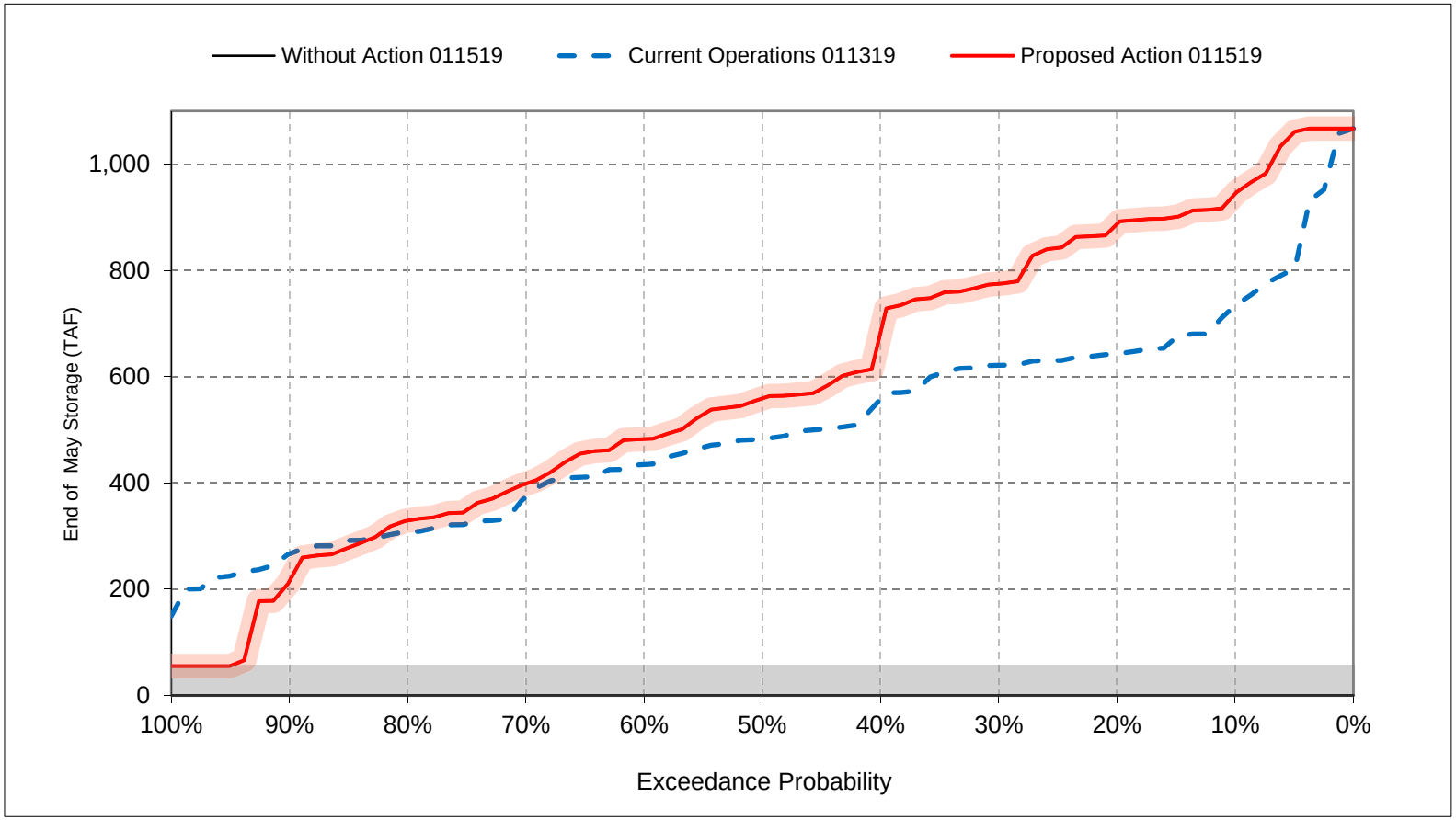
b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

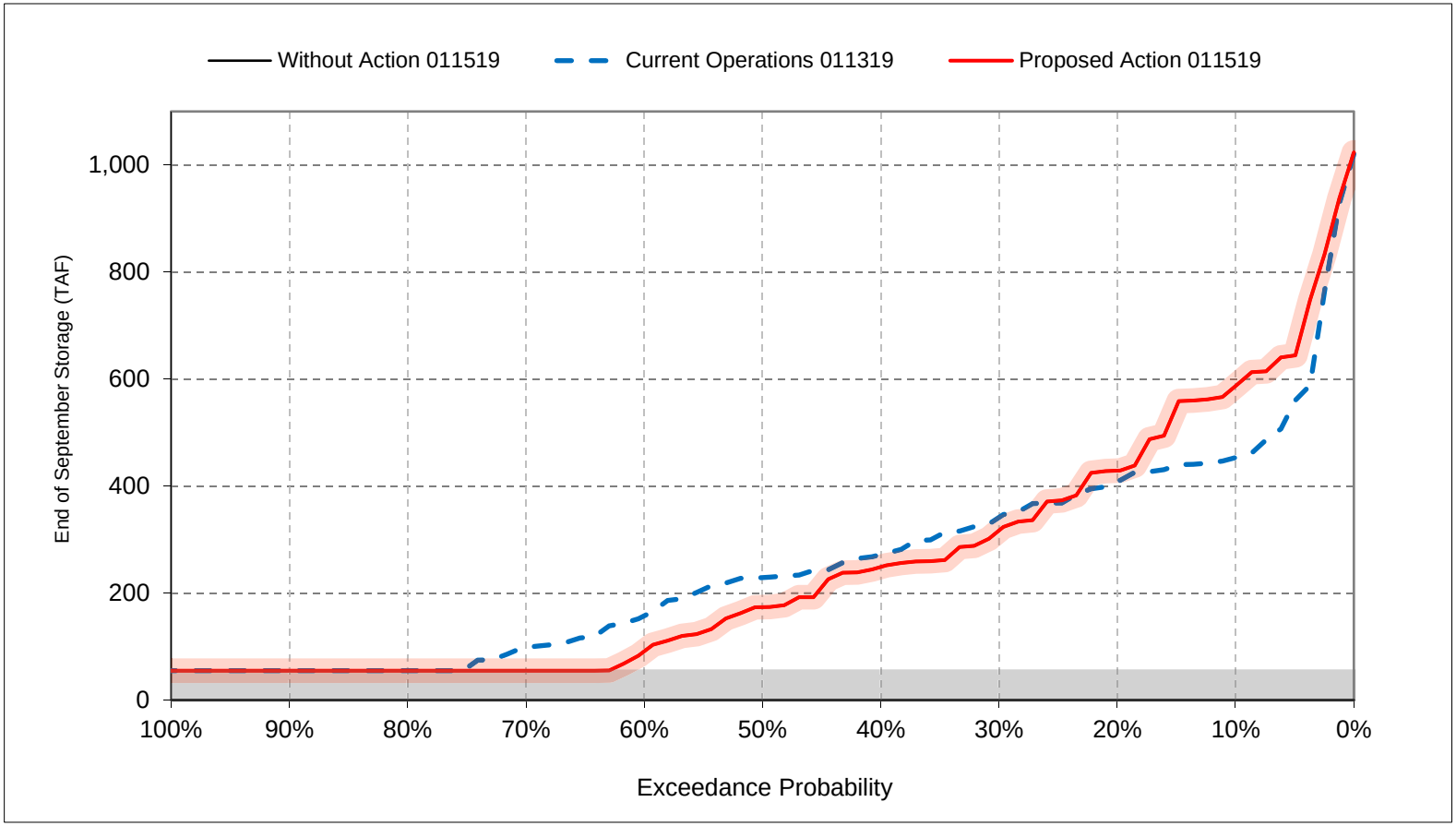
e These are draft results meant for qualitative analysis and are subject to revision.

Figure 6c-1. San Luis SWP Storage, End of May Storage



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 6c-2. San Luis SWP Storage, End of September Storage



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Table 7-1. New Melones Storage, End of Month Storage

Without Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	80	80	90	185	186	211	256	380	441	130	80	80
20%	80	80	80	87	131	161	198	350	341	88	80	80
30%	80	80	80	80	101	124	160	285	279	80	80	80
40%	80	80	80	80	80	93	106	224	212	80	80	80
50%	80	80	80	80	80	80	86	199	137	80	80	80
60%	80	80	80	80	80	80	80	113	80	80	80	80
70%	80	80	80	80	80	80	80	80	80	80	80	80
80%	80	80	80	80	80	80	80	80	80	80	80	80
90%	80	80	80	80	80	80	80	80	80	80	80	80
Long Term												
Full Simulation Period[a]	80	85	98	114	121	128	136	213	207	102	81	80
Water Year Types[b,c]												
Wet (23%)	80	89	115	193	209	214	219	344	354	151	82	80
Above Normal (24%)	80	80	81	99	121	141	164	311	276	93	81	80
Below Normal (10%)	80	80	80	116	86	86	100	174	190	98	80	80
Dry (16%)	80	100	111	80	80	86	88	118	113	85	80	80
Critical (27%)	80	80	98	80	80	80	80	82	80	80	80	80

Current Operations 011319

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,765	1,759	1,823	1,880	1,931	1,980	1,946	2,053	2,075	1,978	1,870	1,806
20%	1,612	1,631	1,647	1,687	1,768	1,799	1,834	1,901	1,877	1,798	1,692	1,633
30%	1,533	1,537	1,555	1,597	1,686	1,729	1,687	1,745	1,786	1,707	1,605	1,557
40%	1,272	1,274	1,432	1,515	1,594	1,618	1,592	1,534	1,539	1,433	1,333	1,274
50%	1,120	1,127	1,154	1,308	1,436	1,535	1,461	1,443	1,392	1,283	1,190	1,156
60%	1,024	1,042	1,079	1,146	1,199	1,273	1,279	1,335	1,277	1,200	1,103	1,054
70%	882	911	986	1,015	1,039	1,057	1,083	1,090	1,087	994	910	868
80%	646	658	683	684	735	808	835	878	871	808	733	692
90%	430	435	440	486	541	569	574	586	630	566	507	473
Long Term												
Full Simulation Period[a]	1,132	1,142	1,180	1,237	1,305	1,348	1,338	1,373	1,381	1,300	1,208	1,159
Water Year Types[b,c]												
Wet (23%)	1,725	1,729	1,754	1,496	1,637	1,703	1,757	1,913	2,035	1,968	1,845	1,771
Above Normal (24%)	1,229	1,239	1,271	1,174	1,267	1,342	1,366	1,470	1,480	1,387	1,290	1,240
Below Normal (10%)	1,201	1,206	1,228	1,464	1,518	1,550	1,495	1,502	1,502	1,408	1,307	1,249
Dry (16%)	931	965	1,040	1,254	1,277	1,315	1,265	1,226	1,175	1,080	996	958
Critical (27%)	614	616	657	978	993	994	935	860	805	734	674	643

Current Operations 011319 minus Without Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,685	1,679	1,733	1,695	1,745	1,769	1,691	1,673	1,634	1,848	1,790	1,726
20%	1,532	1,551	1,567	1,600	1,637	1,638	1,636	1,551	1,536	1,710	1,612	1,553
30%	1,453	1,457	1,475	1,517	1,586	1,605	1,527	1,459	1,507	1,627	1,525	1,477
40%	1,192	1,194	1,352	1,435	1,514	1,525	1,486	1,309	1,327	1,353	1,253	1,194
50%	1,040	1,047	1,074	1,228	1,356	1,455	1,375	1,244	1,254	1,203	1,110	1,076
60%	944	962	999	1,066	1,119	1,193	1,199	1,223	1,197	1,120	1,023	974
70%	802	831	906	935	959	977	1,003	1,010	1,007	914	830	788
80%	566	578	603	604	655	728	755	798	791	728	653	612
90%	350	355	360	406	461	489	494	506	550	486	427	393
Long Term												
Full Simulation Period[a]	1,052	1,057	1,082	1,122	1,185	1,221	1,201	1,160	1,174	1,198	1,128	1,079
Water Year Types[b,c]												
Wet (23%)	1,645	1,639	1,639	1,302	1,427	1,489	1,537	1,569	1,682	1,817	1,763	1,691
Above Normal (24%)	1,149	1,159	1,190	1,075	1,146	1,201	1,201	1,159	1,204	1,294	1,209	1,160
Below Normal (10%)	1,121	1,126	1,148	1,348	1,432	1,464	1,395	1,328	1,312	1,309	1,227	1,169
Dry (16%)	851	865	930	1,174	1,197	1,229	1,177	1,107	1,062	995	916	878
Critical (27%)	534	536	558	898	913	914	855	778	725	654	594	563

a Based on the 82-year simulation period.

b As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 7-2. New Melones Storage, End of Month Storage

Without Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	80	80	90	185	186	211	256	380	441	130	80	80
20%	80	80	80	87	131	161	198	350	341	88	80	80
30%	80	80	80	80	101	124	160	285	279	80	80	80
40%	80	80	80	80	80	93	106	224	212	80	80	80
50%	80	80	80	80	80	80	86	199	137	80	80	80
60%	80	80	80	80	80	80	80	113	80	80	80	80
70%	80	80	80	80	80	80	80	80	80	80	80	80
80%	80	80	80	80	80	80	80	80	80	80	80	80
90%	80	80	80	80	80	80	80	80	80	80	80	80
Long Term												
Full Simulation Period[a]	80	85	98	114	121	128	136	213	207	102	81	80
Water Year Types[b,c]												
Wet (23%)	80	89	115	193	209	214	219	344	354	151	82	80
Above Normal (24%)	80	80	81	99	121	141	164	311	276	93	81	80
Below Normal (10%)	80	80	80	116	86	86	100	174	190	98	80	80
Dry (16%)	80	100	111	80	80	86	88	118	113	85	80	80
Critical (27%)	80	80	98	80	80	80	80	82	80	80	80	80

Proposed Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,884	1,877	1,911	1,965	1,970	2,030	2,010	2,086	2,207	2,117	2,008	1,942
20%	1,745	1,748	1,780	1,860	1,942	1,975	1,918	1,989	2,023	1,919	1,828	1,785
30%	1,619	1,628	1,685	1,781	1,833	1,857	1,818	1,867	1,900	1,817	1,713	1,655
40%	1,504	1,539	1,586	1,652	1,738	1,765	1,752	1,759	1,753	1,653	1,569	1,527
50%	1,411	1,432	1,456	1,522	1,620	1,669	1,628	1,662	1,623	1,560	1,483	1,439
60%	1,317	1,341	1,361	1,408	1,473	1,554	1,531	1,552	1,560	1,485	1,384	1,349
70%	1,131	1,160	1,254	1,299	1,369	1,403	1,379	1,376	1,369	1,277	1,211	1,173
80%	974	974	1,013	1,027	1,055	1,112	1,068	1,174	1,166	1,103	1,045	1,004
90%	594	580	589	597	616	690	672	734	834	765	692	642
Long Term												
Full Simulation Period[a]	1,316	1,326	1,366	1,422	1,483	1,526	1,516	1,558	1,572	1,490	1,398	1,349
Water Year Types[b,c]												
Wet (23%)	1,753	1,758	1,791	1,593	1,703	1,758	1,816	1,973	2,073	1,997	1,874	1,800
Above Normal (24%)	1,339	1,349	1,379	1,304	1,396	1,474	1,475	1,570	1,610	1,515	1,413	1,361
Below Normal (10%)	1,383	1,387	1,407	1,675	1,719	1,758	1,691	1,692	1,695	1,597	1,493	1,433
Dry (16%)	1,234	1,270	1,347	1,495	1,523	1,563	1,528	1,509	1,469	1,380	1,299	1,264
Critical (27%)	938	940	983	1,245	1,262	1,266	1,224	1,168	1,121	1,056	997	968

Proposed Action 011519 minus Without Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,804	1,797	1,821	1,780	1,784	1,819	1,754	1,706	1,766	1,987	1,928	1,862
20%	1,665	1,668	1,700	1,774	1,810	1,814	1,720	1,639	1,682	1,832	1,748	1,705
30%	1,539	1,548	1,605	1,701	1,733	1,733	1,658	1,581	1,622	1,737	1,633	1,575
40%	1,424	1,459	1,506	1,572	1,658	1,672	1,646	1,535	1,541	1,573	1,489	1,447
50%	1,331	1,352	1,376	1,442	1,540	1,589	1,542	1,462	1,486	1,480	1,403	1,359
60%	1,237	1,261	1,281	1,328	1,393	1,474	1,451	1,439	1,480	1,405	1,304	1,269
70%	1,051	1,080	1,174	1,219	1,289	1,323	1,299	1,296	1,289	1,197	1,131	1,093
80%	894	894	933	947	975	1,032	988	1,094	1,086	1,023	965	924
90%	514	500	509	517	536	610	592	654	754	685	612	562
Long Term												
Full Simulation Period[a]	1,236	1,241	1,269	1,307	1,362	1,398	1,380	1,344	1,365	1,388	1,317	1,269
Water Year Types[b,c]												
Wet (23%)	1,673	1,669	1,676	1,399	1,494	1,544	1,596	1,628	1,719	1,846	1,792	1,720
Above Normal (24%)	1,259	1,269	1,298	1,205	1,275	1,333	1,311	1,259	1,334	1,422	1,332	1,281
Below Normal (10%)	1,303	1,307	1,327	1,559	1,633	1,672	1,591	1,518	1,505	1,499	1,413	1,353
Dry (16%)	1,154	1,170	1,236	1,415	1,443	1,476	1,440	1,391	1,356	1,295	1,219	1,184
Critical (27%)	858	860	885	1,165	1,182	1,185	1,144	1,086	1,041	976	917	888

a Based on the 82-year simulation period.

b As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 7-3. New Melones Storage, End of Month Storage

Current Operations 011319

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,765	1,759	1,823	1,880	1,931	1,980	1,946	2,053	2,075	1,978	1,870	1,806
20%	1,612	1,631	1,647	1,687	1,768	1,799	1,834	1,901	1,877	1,798	1,692	1,633
30%	1,533	1,537	1,555	1,597	1,686	1,729	1,687	1,745	1,786	1,707	1,605	1,557
40%	1,272	1,274	1,432	1,515	1,594	1,618	1,592	1,534	1,539	1,433	1,333	1,274
50%	1,120	1,127	1,154	1,308	1,436	1,535	1,461	1,443	1,392	1,283	1,190	1,156
60%	1,024	1,042	1,079	1,146	1,199	1,273	1,279	1,335	1,277	1,200	1,103	1,054
70%	882	911	986	1,015	1,039	1,057	1,083	1,090	1,087	994	910	868
80%	646	658	683	684	735	808	835	878	871	808	733	692
90%	430	435	440	486	541	569	574	586	630	566	507	473
Long Term												
Full Simulation Period[a]	1,132	1,142	1,180	1,237	1,305	1,348	1,338	1,373	1,381	1,300	1,208	1,159
Water Year Types[b,c]												
Wet (23%)	1,725	1,729	1,754	1,496	1,637	1,703	1,757	1,913	2,035	1,968	1,845	1,771
Above Normal (24%)	1,229	1,239	1,271	1,174	1,267	1,342	1,366	1,470	1,480	1,387	1,290	1,240
Below Normal (10%)	1,201	1,206	1,228	1,464	1,518	1,550	1,495	1,502	1,502	1,408	1,307	1,249
Dry (16%)	931	965	1,040	1,254	1,277	1,315	1,265	1,226	1,175	1,080	996	958
Critical (27%)	614	616	657	978	993	994	935	860	805	734	674	643

Proposed Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,884	1,877	1,911	1,965	1,970	2,030	2,010	2,086	2,207	2,117	2,008	1,942
20%	1,745	1,748	1,780	1,860	1,942	1,975	1,918	1,989	2,023	1,919	1,828	1,785
30%	1,619	1,628	1,685	1,781	1,833	1,857	1,818	1,867	1,900	1,817	1,713	1,655
40%	1,504	1,539	1,586	1,652	1,738	1,765	1,752	1,759	1,753	1,653	1,569	1,527
50%	1,411	1,432	1,456	1,522	1,620	1,669	1,628	1,662	1,623	1,560	1,483	1,439
60%	1,317	1,341	1,361	1,408	1,473	1,554	1,531	1,552	1,560	1,485	1,384	1,349
70%	1,131	1,160	1,254	1,299	1,369	1,403	1,379	1,376	1,369	1,277	1,211	1,173
80%	974	974	1,013	1,027	1,055	1,112	1,068	1,174	1,166	1,103	1,045	1,004
90%	594	580	589	597	616	690	672	734	834	765	692	642
Long Term												
Full Simulation Period[a]	1,316	1,326	1,366	1,422	1,483	1,526	1,516	1,558	1,572	1,490	1,398	1,349
Water Year Types[b,c]												
Wet (23%)	1,753	1,758	1,791	1,593	1,703	1,758	1,816	1,973	2,073	1,997	1,874	1,800
Above Normal (24%)	1,339	1,349	1,379	1,304	1,396	1,474	1,475	1,570	1,610	1,515	1,413	1,361
Below Normal (10%)	1,383	1,387	1,407	1,675	1,719	1,758	1,691	1,692	1,695	1,597	1,493	1,433
Dry (16%)	1,234	1,270	1,347	1,495	1,523	1,563	1,528	1,509	1,469	1,380	1,299	1,264
Critical (27%)	938	940	983	1,245	1,262	1,266	1,224	1,168	1,121	1,056	997	968

Proposed Action 011519 minus Current Operations 011319

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	118	118	88	85	39	50	64	33	132	138	138	137
20%	134	117	133	173	173	176	84	88	146	121	136	152
30%	86	91	130	184	147	128	132	122	115	110	108	99
40%	233	264	154	137	143	147	161	226	214	219	236	254
50%	291	305	303	214	183	134	167	218	231	277	293	283
60%	293	299	282	262	274	281	252	216	283	285	281	294
70%	249	249	268	284	330	347	296	285	282	282	301	304
80%	328	316	330	343	320	305	233	296	295	295	312	311
90%	164	146	149	111	76	121	98	147	204	198	185	170
Long Term												
Full Simulation Period[a]	184	184	186	185	178	177	179	184	191	190	190	190
Water Year Types[b,c]												
Wet (23%)	28	29	37	97	67	56	59	60	37	29	29	29
Above Normal (24%)	111	110	108	130	129	132	109	100	129	128	123	121
Below Normal (10%)	181	180	180	211	201	207	196	190	193	189	186	184
Dry (16%)	303	305	307	242	247	248	263	283	294	300	304	306
Critical (27%)	324	324	327	267	269	271	289	308	316	321	323	324

a Based on the 82-year simulation period.

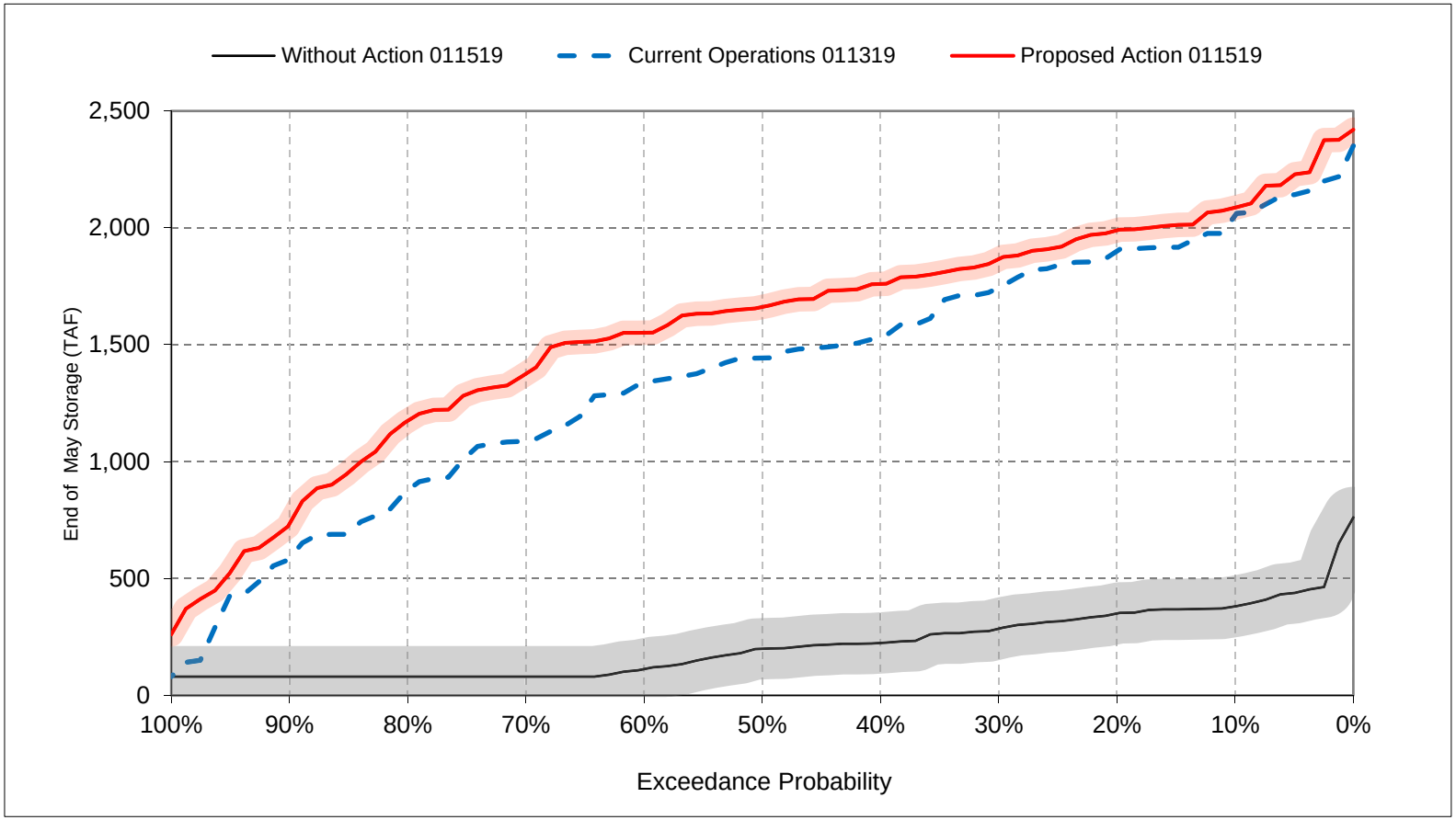
b As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

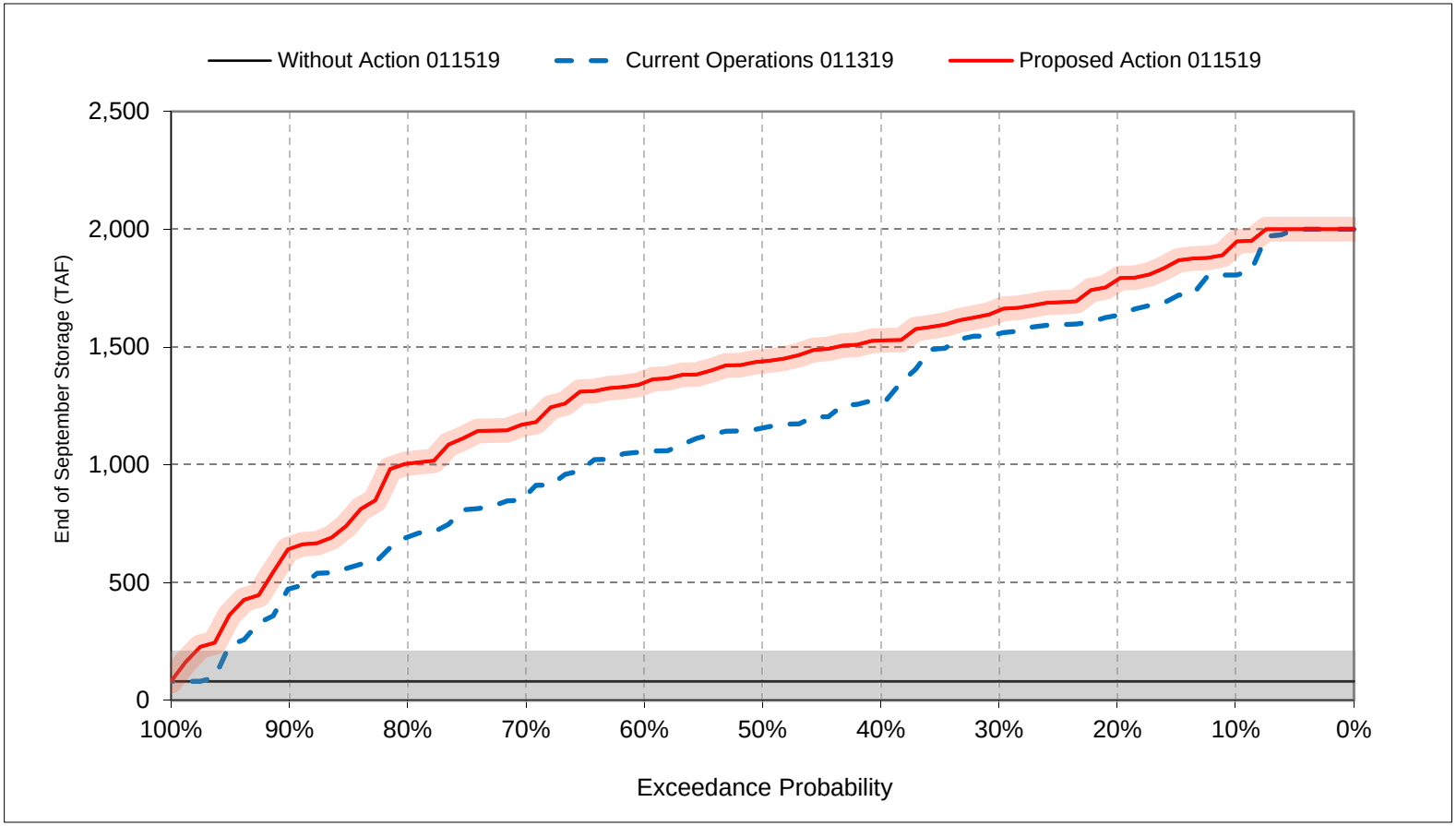
e These are draft results meant for qualitative analysis and are subject to revision.

Figure 7-1. New Melones Storage, End of May Storage



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 7-2. New Melones Storage, End of September Storage



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Table 7a-1. New Melones Reservoir, End of Month Elevation

Without Action 011519

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	715	715	720	768	769	778	793	824	837	743	715	715
20%	715	715	715	718	743	760	773	818	816	719	715	715
30%	715	715	715	715	726	740	760	803	801	715	715	715
40%	715	715	715	715	715	722	729	782	778	715	715	715
50%	715	715	715	715	715	715	718	774	747	715	715	715
60%	715	715	715	715	715	715	715	733	715	715	715	715
70%	715	715	715	715	715	715	715	715	715	715	715	715
80%	715	715	715	715	715	715	715	715	715	715	715	715
90%	715	715	715	715	715	715	715	715	715	715	715	715
Long Term												
Full Simulation Period[a]	715	717	722	728	731	736	740	767	763	724	715	715
Water Year Types[b,c]												
Wet (23%)	715	719	729	757	762	771	773	810	810	743	716	715
Above Normal (24%)	715	715	715	724	737	745	756	807	791	721	715	715
Below Normal (10%)	715	715	715	728	718	718	726	761	768	725	715	715
Dry (16%)	715	723	727	715	715	718	719	734	731	717	715	715
Critical (27%)	715	715	723	715	715	715	715	716	715	715	715	715

Current Operations 011319

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,029	1,028	1,035	1,040	1,046	1,050	1,047	1,057	1,059	1,050	1,039	1,033
20%	1,013	1,015	1,017	1,021	1,029	1,032	1,036	1,043	1,040	1,032	1,021	1,016
30%	1,006	1,006	1,008	1,012	1,021	1,025	1,021	1,027	1,031	1,023	1,013	1,008
40%	975	976	995	1,004	1,012	1,014	1,011	1,006	1,006	995	983	976
50%	956	957	960	980	996	1,006	998	996	991	977	965	960
60%	943	945	950	959	966	976	976	984	976	966	953	947
70%	925	928	938	942	945	947	951	952	951	939	928	923
80%	879	881	886	887	897	912	918	924	923	912	897	888
90%	835	836	837	846	857	863	864	867	876	863	850	843
Long Term												
Full Simulation Period[a]	944	945	950	958	968	974	973	976	976	965	954	947
Water Year Types[b,c]												
Wet (23%)	1,024	1,025	1,027	996	1,012	1,021	1,026	1,042	1,054	1,047	1,036	1,029
Above Normal (24%)	963	965	969	945	959	970	976	991	994	983	971	965
Below Normal (10%)	963	963	966	990	998	1,001	996	998	999	988	976	969
Dry (16%)	924	929	939	967	970	975	969	965	960	947	935	929
Critical (27%)	858	859	867	922	925	927	917	903	893	881	870	864

Current Operations 011319 minus Without Action 011519

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	314	314	314	272	277	273	254	232	222	307	325	318
20%	299	301	302	303	286	272	263	224	224	313	307	301
30%	291	291	293	297	295	286	261	224	230	308	298	293
40%	261	261	280	289	297	292	282	223	228	281	269	261
50%	241	242	245	265	281	291	280	223	244	262	250	246
60%	228	231	236	244	251	261	262	251	261	251	239	232
70%	210	214	223	227	230	233	236	237	237	225	214	208
80%	164	167	172	172	182	197	203	209	209	197	182	174
90%	120	121	122	131	143	148	149	152	161	148	136	129
Long Term												
Full Simulation Period[a]	229	228	228	230	236	238	233	209	213	241	238	233
Water Year Types[b,c]												
Wet (23%)	310	305	299	239	250	250	253	233	244	304	320	314
Above Normal (24%)	249	250	253	221	222	225	220	184	203	262	255	250
Below Normal (10%)	248	249	251	262	279	283	270	237	231	263	261	254
Dry (16%)	209	207	212	252	255	256	250	231	229	230	220	214
Critical (27%)	144	144	145	208	211	212	203	188	178	166	155	149

a Based on the 82-year simulation period.

b As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 7a-2. New Melones Reservoir, End of Month Elevation

Without Action 011519

Statistic	End of Month Elevation (FEET) Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	715	715	720	768	769	778	793	824	837	743	715	715
20%	715	715	715	718	743	760	773	818	816	719	715	715
30%	715	715	715	715	726	740	760	803	801	715	715	715
40%	715	715	715	715	715	722	729	782	778	715	715	715
50%	715	715	715	715	715	715	718	774	747	715	715	715
60%	715	715	715	715	715	715	715	733	715	715	715	715
70%	715	715	715	715	715	715	715	715	715	715	715	715
80%	715	715	715	715	715	715	715	715	715	715	715	715
90%	715	715	715	715	715	715	715	715	715	715	715	715
Long Term												
Full Simulation Period[a]	715	717	722	728	731	736	740	767	763	724	715	715
Water Year Types[b,c]												
Wet (23%)	715	719	729	757	762	771	773	810	810	743	716	715
Above Normal (24%)	715	715	715	724	737	745	756	807	791	721	715	715
Below Normal (10%)	715	715	715	728	718	718	726	761	768	725	715	715
Dry (16%)	715	723	727	715	715	718	719	734	731	717	715	715
Critical (27%)	715	715	723	715	715	715	715	716	715	715	715	715

Proposed Action 011519

Statistic	End of Month Elevation (FEET) Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,041	1,040	1,044	1,049	1,050	1,055	1,053	1,060	1,070	1,062	1,053	1,047
20%	1,027	1,027	1,030	1,038	1,047	1,050	1,044	1,051	1,054	1,044	1,035	1,031
30%	1,014	1,015	1,021	1,031	1,036	1,038	1,034	1,039	1,043	1,034	1,024	1,018
40%	1,003	1,006	1,011	1,017	1,026	1,029	1,028	1,028	1,028	1,018	1,009	1,005
50%	993	995	998	1,004	1,014	1,019	1,015	1,018	1,015	1,008	1,000	996
60%	981	984	987	993	999	1,008	1,005	1,007	1,008	1,001	990	985
70%	957	961	973	979	988	992	989	989	988	976	968	963
80%	937	937	942	943	947	955	949	963	962	953	946	941
90%	868	865	867	869	873	888	884	897	917	903	888	878
Long Term												
Full Simulation Period[a]	970	972	977	984	992	997	996	1,000	1,001	992	981	975
Water Year Types[b,c]												
Wet (23%)	1,027	1,028	1,031	1,007	1,019	1,026	1,032	1,048	1,057	1,050	1,039	1,032
Above Normal (24%)	972	973	977	962	976	986	987	1,001	1,006	995	982	975
Below Normal (10%)	987	988	990	1,018	1,023	1,027	1,020	1,020	1,021	1,011	1,000	993
Dry (16%)	966	971	979	998	1,001	1,005	1,001	999	995	985	975	971
Critical (27%)	916	916	923	964	966	967	961	953	946	936	926	921

Proposed Action 011519 minus Without Action 011519

Statistic	End of Month Elevation (FEET) Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	326	326	323	281	280	277	260	235	233	319	338	332
20%	312	313	316	320	303	290	271	233	238	325	321	316
30%	299	300	306	316	309	299	275	236	242	319	309	303
40%	288	291	296	303	311	307	298	246	250	303	294	290
50%	278	281	283	290	300	305	297	245	268	294	286	281
60%	267	270	272	278	285	293	291	274	294	286	275	271
70%	242	246	258	264	273	278	275	274	273	261	253	248
80%	222	222	227	229	232	240	234	248	247	239	231	226
90%	154	151	152	154	158	173	170	182	202	188	174	163
Long Term												
Full Simulation Period[a]	256	255	255	256	260	261	256	233	238	268	266	260
Water Year Types[b,c]												
Wet (23%)	313	309	303	250	257	256	259	238	248	307	323	317
Above Normal (24%)	258	259	262	238	239	241	231	194	215	274	267	261
Below Normal (10%)	272	273	275	290	305	309	294	259	253	286	285	278
Dry (16%)	252	248	252	283	286	287	282	265	264	267	260	256
Critical (27%)	201	201	200	249	251	252	246	237	231	221	211	206

a Based on the 82-year simulation period.

b As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 7a-3. New Melones Reservoir, End of Month Elevation

Current Operations 011319

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,029	1,028	1,035	1,040	1,046	1,050	1,047	1,057	1,059	1,050	1,039	1,033
20%	1,013	1,015	1,017	1,021	1,029	1,032	1,036	1,043	1,040	1,032	1,021	1,016
30%	1,006	1,006	1,008	1,012	1,021	1,025	1,021	1,027	1,031	1,023	1,013	1,008
40%	975	976	995	1,004	1,012	1,014	1,011	1,006	1,006	995	983	976
50%	956	957	960	980	996	1,006	998	996	991	977	965	960
60%	943	945	950	959	966	976	976	984	976	966	953	947
70%	925	928	938	942	945	947	951	952	951	939	928	923
80%	879	881	886	887	897	912	918	924	923	912	897	888
90%	835	836	837	846	857	863	864	867	876	863	850	843
Long Term												
Full Simulation Period[a]	944	945	950	958	968	974	973	976	976	965	954	947
Water Year Types[b,c]												
Wet (23%)	1,024	1,025	1,027	996	1,012	1,021	1,026	1,042	1,054	1,047	1,036	1,029
Above Normal (24%)	963	965	969	945	959	970	976	991	994	983	971	965
Below Normal (10%)	963	963	966	990	998	1,001	996	998	999	988	976	969
Dry (16%)	924	929	939	967	970	975	969	965	960	947	935	929
Critical (27%)	858	859	867	922	925	927	917	903	893	881	870	864

Proposed Action 011519

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,041	1,040	1,044	1,049	1,050	1,055	1,053	1,060	1,070	1,062	1,053	1,047
20%	1,027	1,027	1,030	1,038	1,047	1,050	1,044	1,051	1,054	1,044	1,035	1,031
30%	1,014	1,015	1,021	1,031	1,036	1,038	1,034	1,039	1,043	1,034	1,024	1,018
40%	1,003	1,006	1,011	1,017	1,026	1,029	1,028	1,028	1,028	1,018	1,009	1,005
50%	993	995	998	1,004	1,014	1,019	1,015	1,018	1,015	1,008	1,000	996
60%	981	984	987	993	999	1,008	1,005	1,007	1,008	1,001	990	985
70%	957	961	973	979	988	992	989	989	988	976	968	963
80%	937	937	942	943	947	955	949	963	962	953	946	941
90%	868	865	867	869	873	888	884	897	917	903	888	878
Long Term												
Full Simulation Period[a]	970	972	977	984	992	997	996	1,000	1,001	992	981	975
Water Year Types[b,c]												
Wet (23%)	1,027	1,028	1,031	1,007	1,019	1,026	1,032	1,048	1,057	1,050	1,039	1,032
Above Normal (24%)	972	973	977	962	976	986	987	1,001	1,006	995	982	975
Below Normal (10%)	987	988	990	1,018	1,023	1,027	1,020	1,020	1,021	1,011	1,000	993
Dry (16%)	966	971	979	998	1,001	1,005	1,001	999	995	985	975	971
Critical (27%)	916	916	923	964	966	967	961	953	946	936	926	921

Proposed Action 011519 minus Current Operations 011319

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	12	12	9	9	4	4	6	3	11	12	13	14
20%	13	12	13	17	17	18	8	9	14	12	14	15
30%	9	9	13	19	15	13	13	12	12	11	11	10
40%	27	30	16	14	14	15	16	23	22	22	26	29
50%	38	39	38	24	18	14	17	22	24	31	36	36
60%	38	39	37	34	34	32	29	24	32	35	37	38
70%	32	32	35	37	43	45	39	37	37	37	39	40
80%	58	55	55	57	50	43	31	39	38	41	49	52
90%	34	30	31	23	15	25	20	30	42	41	38	35
Long Term												
Full Simulation Period[a]	27	27	26	25	24	23	23	24	26	27	27	28
Water Year Types[b,c]												
Wet (23%)	3	3	4	11	7	6	6	6	4	3	3	3
Above Normal (24%)	9	9	9	17	16	16	11	9	12	12	11	11
Below Normal (10%)	24	24	24	28	26	25	24	22	22	22	24	25
Dry (16%)	42	41	40	31	31	30	32	34	35	38	40	42
Critical (27%)	57	57	56	41	41	40	44	49	53	55	56	57

a Based on the 82-year simulation period.

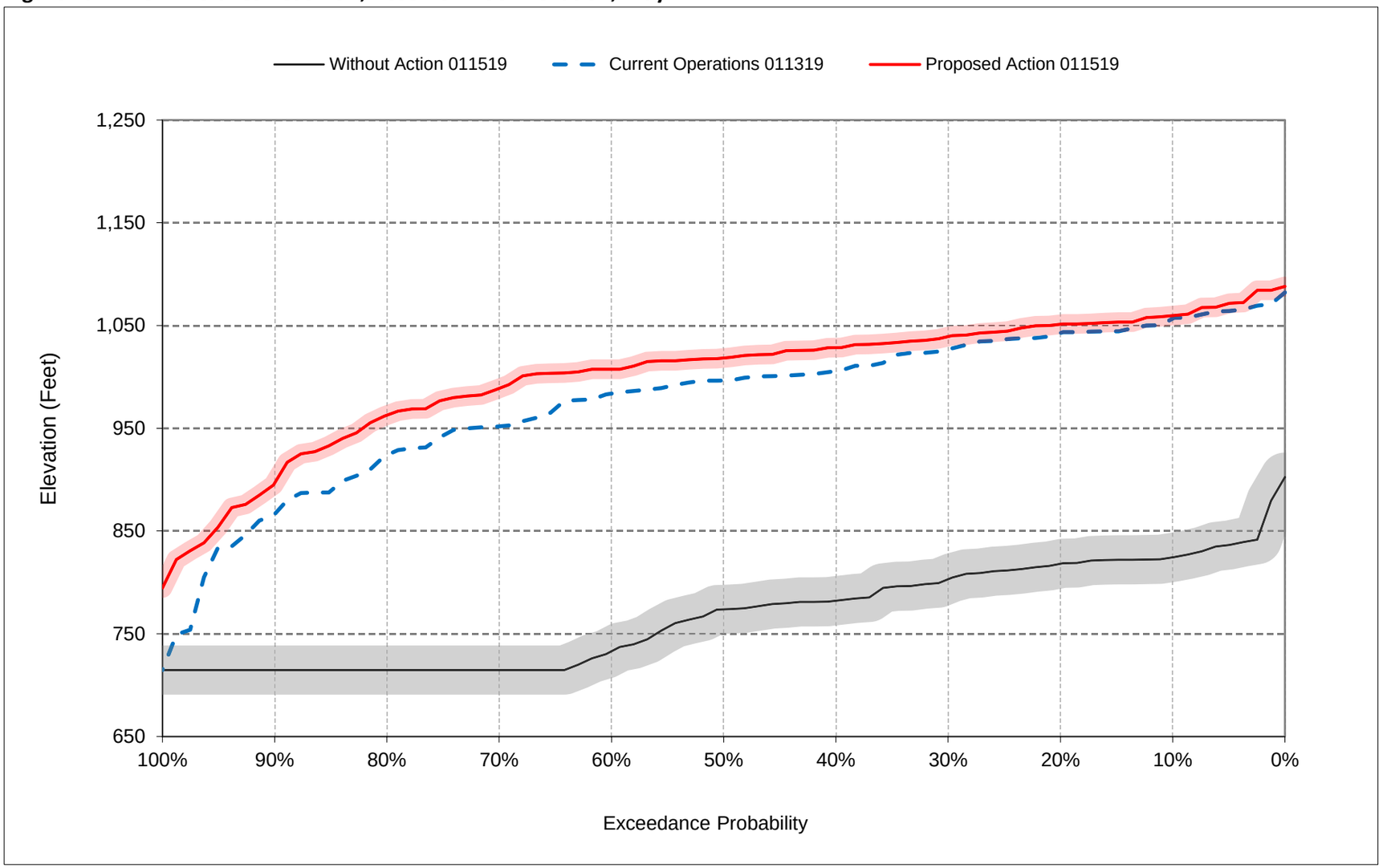
b As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

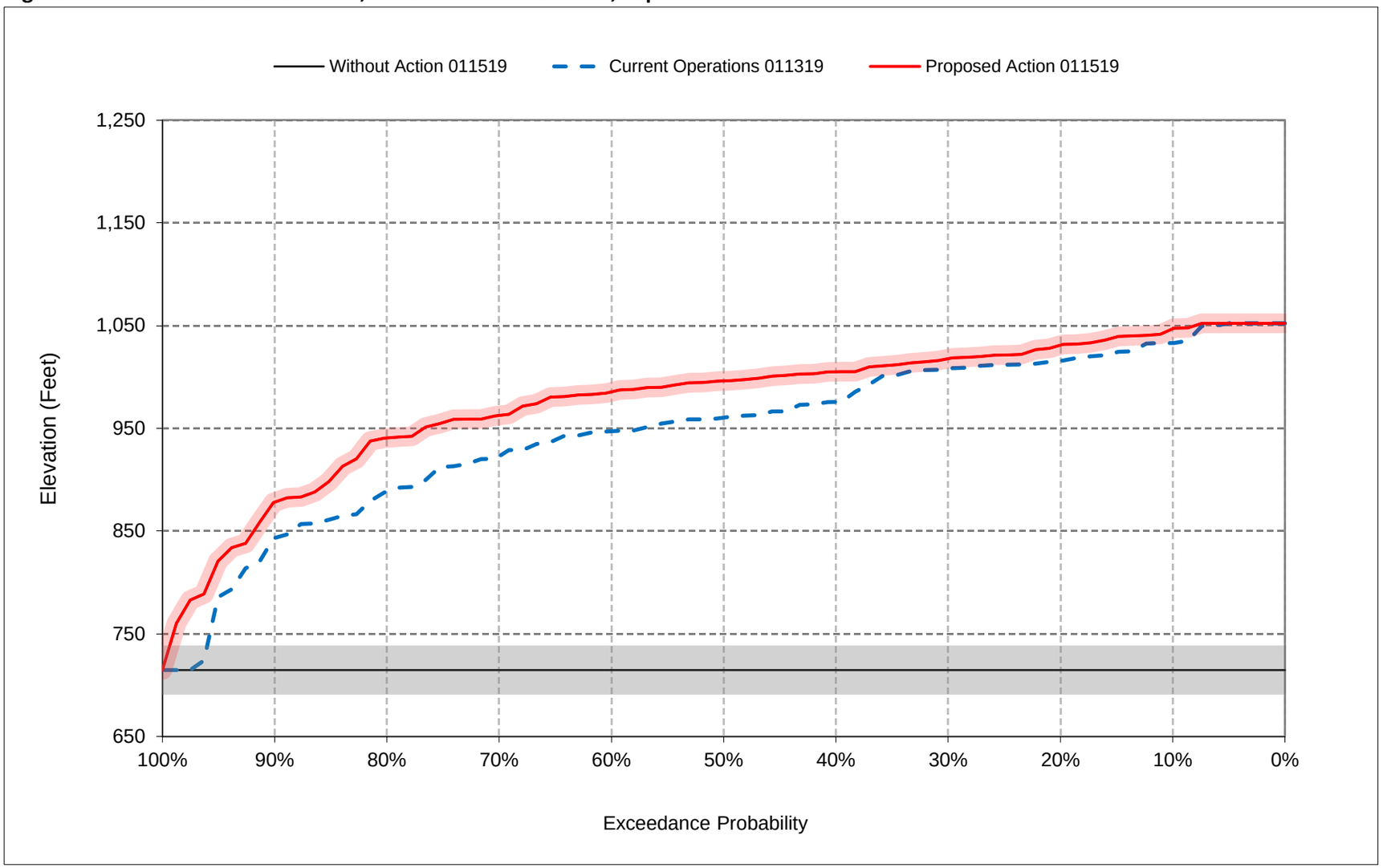
Figure 7a-1. New Melones Reservoir, Reservoir Pool Elevation, May



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Figure 7a-2. New Melones Reservoir, Reservoir Pool Elevation, September



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Table 8-1. Millerton Lake Storage, End of Month Storage

Without Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	120	120	120	120	120	120	154	120	120	120	120	120
20%	120	120	120	120	120	120	140	120	120	120	120	120
30%	120	120	120	120	120	120	128	120	120	120	120	120
40%	120	120	120	120	120	120	120	120	120	120	120	120
50%	120	120	120	120	120	120	120	120	120	120	120	120
60%	120	120	120	120	120	120	120	120	120	120	120	120
70%	120	120	120	120	120	120	120	120	120	120	120	120
80%	120	120	120	120	120	120	120	120	120	120	120	120
90%	120	120	120	120	120	120	120	120	120	120	120	120
Long Term												
Full Simulation Period[a]	120	120	120	120	120	120	128	120	122	120	120	120
Water Year Types[b,c]												
Wet (23%)	120	120	120	120	120	120	133	122	131	120	120	120
Above Normal (24%)	120	120	120	120	120	120	125	120	120	120	120	120
Below Normal (10%)	120	120	120	120	120	120	127	120	120	120	120	120
Dry (16%)	120	120	120	120	120	120	134	120	120	120	120	120
Critical (27%)	120	120	120	120	120	120	124	120	119	120	120	120

Current Operations 011319

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	258	292	374	439	439	479	488	524	524	495	311	258
20%	224	267	318	412	439	479	447	523	521	433	260	213
30%	211	250	293	351	439	472	421	479	503	361	210	194
40%	197	223	270	333	419	436	396	455	477	323	188	183
50%	189	210	252	303	383	396	373	430	418	283	178	179
60%	178	194	232	288	339	368	344	403	394	257	169	175
70%	172	176	213	258	315	326	308	382	364	228	162	172
80%	162	168	197	232	266	274	268	332	313	195	158	168
90%	155	154	172	187	204	205	225	245	246	163	136	159
Long Term												
Full Simulation Period[a]	199	220	261	310	353	372	359	415	411	307	207	195
Water Year Types[b,c]												
Wet (23%)	256	279	311	382	426	448	360	428	509	464	312	256
Above Normal (24%)	202	241	291	340	417	447	404	491	496	355	210	184
Below Normal (10%)	192	209	244	297	354	360	348	401	393	283	185	180
Dry (16%)	177	202	246	302	327	343	386	426	372	231	162	181
Critical (27%)	161	162	202	231	247	260	306	334	278	182	148	168

Current Operations 011319 minus Without Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	138	172	254	319	319	359	334	404	404	375	191	138
20%	104	147	198	292	319	359	306	403	401	313	140	93
30%	91	130	173	231	319	352	294	359	383	241	90	74
40%	77	103	150	213	299	316	276	335	357	203	68	63
50%	69	90	132	183	263	276	253	310	298	163	58	59
60%	58	74	112	168	219	248	224	283	274	137	49	55
70%	52	56	93	138	195	206	188	262	244	108	42	52
80%	42	48	77	112	146	154	148	212	193	75	38	48
90%	35	34	52	67	84	85	105	125	126	43	16	39
Long Term												
Full Simulation Period[a]	79	100	141	190	233	252	231	295	288	187	87	75
Water Year Types[b,c]												
Wet (23%)	136	159	191	262	306	328	227	305	378	344	192	136
Above Normal (24%)	82	121	171	220	297	327	280	371	376	235	90	64
Below Normal (10%)	72	89	124	177	234	240	221	281	273	163	65	60
Dry (16%)	57	82	126	182	207	223	252	306	252	111	42	61
Critical (27%)	41	42	82	111	127	140	182	214	159	62	28	48

a Based on the 82-year simulation period.

b As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 8-2. Millerton Lake Storage, End of Month Storage

Without Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	120	120	120	120	120	120	154	120	120	120	120	120
20%	120	120	120	120	120	120	140	120	120	120	120	120
30%	120	120	120	120	120	120	128	120	120	120	120	120
40%	120	120	120	120	120	120	120	120	120	120	120	120
50%	120	120	120	120	120	120	120	120	120	120	120	120
60%	120	120	120	120	120	120	120	120	120	120	120	120
70%	120	120	120	120	120	120	120	120	120	120	120	120
80%	120	120	120	120	120	120	120	120	120	120	120	120
90%	120	120	120	120	120	120	120	120	120	120	120	120
Long Term												
Full Simulation Period[a]	120	120	120	120	120	120	128	120	122	120	120	120
Water Year Types[b,c]												
Wet (23%)	120	120	120	120	120	120	133	122	131	120	120	120
Above Normal (24%)	120	120	120	120	120	120	125	120	120	120	120	120
Below Normal (10%)	120	120	120	120	120	120	127	120	120	120	120	120
Dry (16%)	120	120	120	120	120	120	134	120	120	120	120	120
Critical (27%)	120	120	120	120	120	120	124	120	119	120	120	120

Proposed Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	258	292	374	439	439	479	488	524	524	495	311	258
20%	224	267	318	412	439	479	447	523	521	433	260	213
30%	211	250	293	351	439	472	421	479	503	361	210	194
40%	197	223	270	333	419	436	396	455	477	323	188	183
50%	189	210	252	303	383	396	373	430	418	283	178	179
60%	178	194	232	288	339	368	344	403	394	257	169	175
70%	172	176	213	258	315	326	308	382	364	228	162	172
80%	162	168	197	232	266	274	268	332	313	195	158	168
90%	155	154	172	187	204	205	225	245	246	163	136	159
Long Term												
Full Simulation Period[a]	199	220	261	310	353	372	359	415	411	307	207	195
Water Year Types[b,c]												
Wet (23%)	256	279	311	382	426	448	360	428	509	464	312	256
Above Normal (24%)	202	241	291	340	417	447	404	491	496	355	210	184
Below Normal (10%)	192	209	244	297	354	360	348	401	393	283	185	180
Dry (16%)	177	202	246	302	327	343	386	426	372	231	162	181
Critical (27%)	161	162	202	231	247	260	306	334	278	182	148	168

Proposed Action 011519 minus Without Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	138	172	254	319	319	359	334	404	404	375	191	138
20%	104	147	198	292	319	359	306	403	401	313	140	93
30%	91	130	173	231	319	352	294	359	383	241	90	74
40%	77	103	150	213	299	316	276	335	357	203	68	63
50%	69	90	132	183	263	276	253	310	298	163	58	59
60%	58	74	112	168	219	248	224	283	274	137	49	55
70%	52	56	93	138	195	206	188	262	244	108	42	52
80%	42	48	77	112	146	154	148	212	193	75	38	48
90%	35	34	52	67	84	85	105	125	126	43	16	39
Long Term												
Full Simulation Period[a]	79	100	141	190	233	252	231	295	288	187	87	75
Water Year Types[b,c]												
Wet (23%)	136	159	191	262	306	328	227	305	378	344	192	136
Above Normal (24%)	82	121	171	220	297	327	280	371	376	235	90	64
Below Normal (10%)	72	89	124	177	234	240	221	281	273	163	65	60
Dry (16%)	57	82	126	182	207	223	252	306	252	111	42	61
Critical (27%)	41	42	82	111	127	140	182	214	159	62	28	48

a Based on the 82-year simulation period.

b As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 8-3. Millerton Lake Storage, End of Month Storage

Current Operations 011319

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	258	292	374	439	439	479	488	524	524	495	311	258
20%	224	267	318	412	439	479	447	523	521	433	260	213
30%	211	250	293	351	439	472	421	479	503	361	210	194
40%	197	223	270	333	419	436	396	455	477	323	188	183
50%	189	210	252	303	383	396	373	430	418	283	178	179
60%	178	194	232	288	339	368	344	403	394	257	169	175
70%	172	176	213	258	315	326	308	382	364	228	162	172
80%	162	168	197	232	266	274	268	332	313	195	158	168
90%	155	154	172	187	204	205	225	245	246	163	136	159
Long Term												
Full Simulation Period[a]	199	220	261	310	353	372	359	415	411	307	207	195
Water Year Types[b,c]												
Wet (23%)	256	279	311	382	426	448	360	428	509	464	312	256
Above Normal (24%)	202	241	291	340	417	447	404	491	496	355	210	184
Below Normal (10%)	192	209	244	297	354	360	348	401	393	283	185	180
Dry (16%)	177	202	246	302	327	343	386	426	372	231	162	181
Critical (27%)	161	162	202	231	247	260	306	334	278	182	148	168

Proposed Action 011519

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	258	292	374	439	439	479	488	524	524	495	311	258
20%	224	267	318	412	439	479	447	523	521	433	260	213
30%	211	250	293	351	439	472	421	479	503	361	210	194
40%	197	223	270	333	419	436	396	455	477	323	188	183
50%	189	210	252	303	383	396	373	430	418	283	178	179
60%	178	194	232	288	339	368	344	403	394	257	169	175
70%	172	176	213	258	315	326	308	382	364	228	162	172
80%	162	168	197	232	266	274	268	332	313	195	158	168
90%	155	154	172	187	204	205	225	245	246	163	136	159
Long Term												
Full Simulation Period[a]	199	220	261	310	353	372	359	415	411	307	207	195
Water Year Types[b,c]												
Wet (23%)	256	279	311	382	426	448	360	428	509	464	312	256
Above Normal (24%)	202	241	291	340	417	447	404	491	496	355	210	184
Below Normal (10%)	192	209	244	297	354	360	348	401	393	283	185	180
Dry (16%)	177	202	246	302	327	343	386	426	372	231	162	181
Critical (27%)	161	162	202	231	247	260	306	334	278	182	148	168

Proposed Action 011519 minus Current Operations 011319

Statistic	End of Month Storage (TAF)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	**0**	0
40%	0	0	0	0	0	0	0	0	0	0	0	**0**
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types[b,c]												
Wet (23%)	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal (24%)	0	0	0	0	0	0	0	0	0	0	**0**	**0**
Below Normal (10%)	0	0	0	0	0	0	0	0	0	0	0	0
Dry (16%)	0	0	0	0	0	0	0	0	0	0	0	0
Critical (27%)	0	0	0	0	0	0	0	0	0	0	0	0

a Based on the 82-year simulation period.

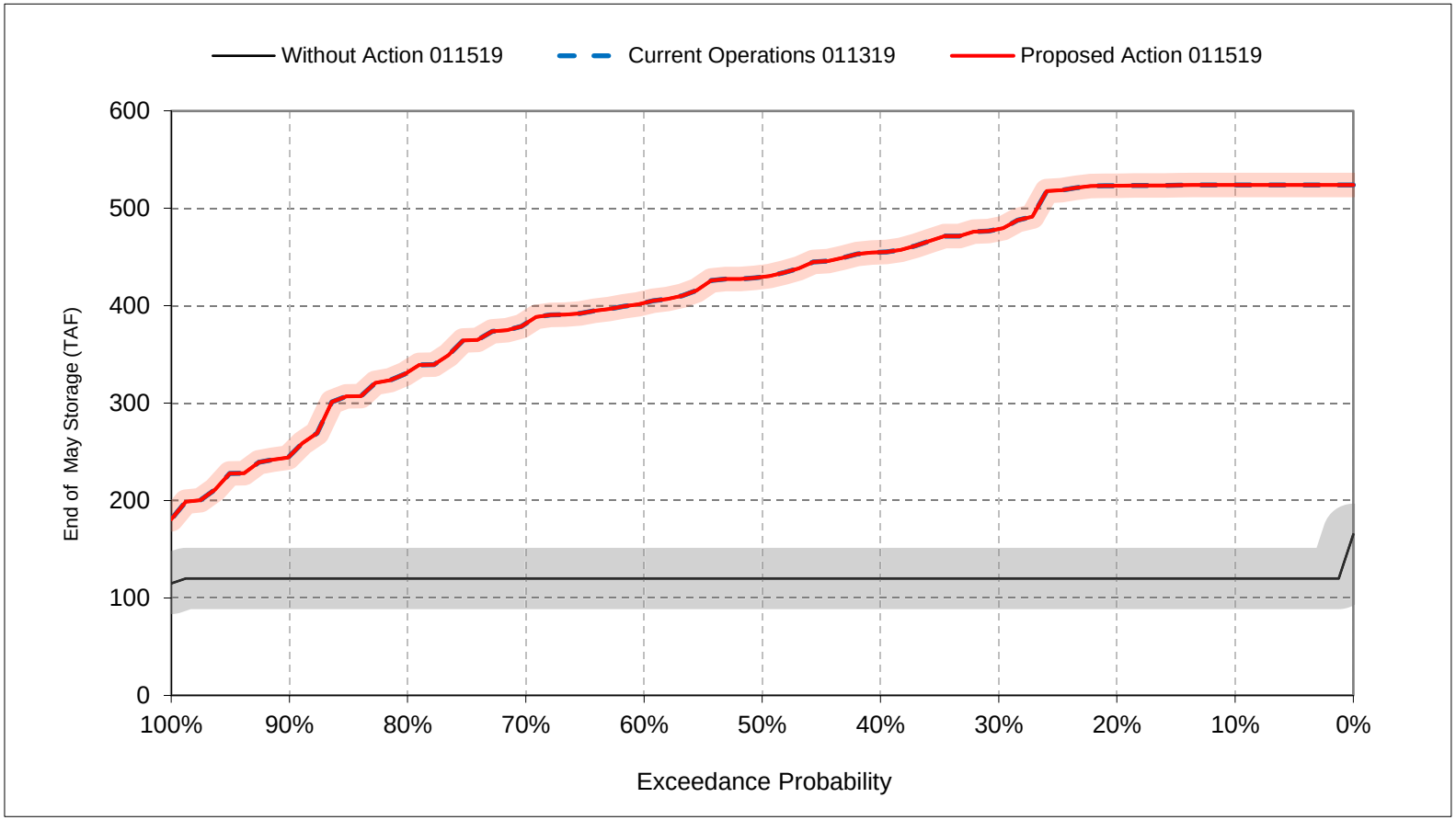
b As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

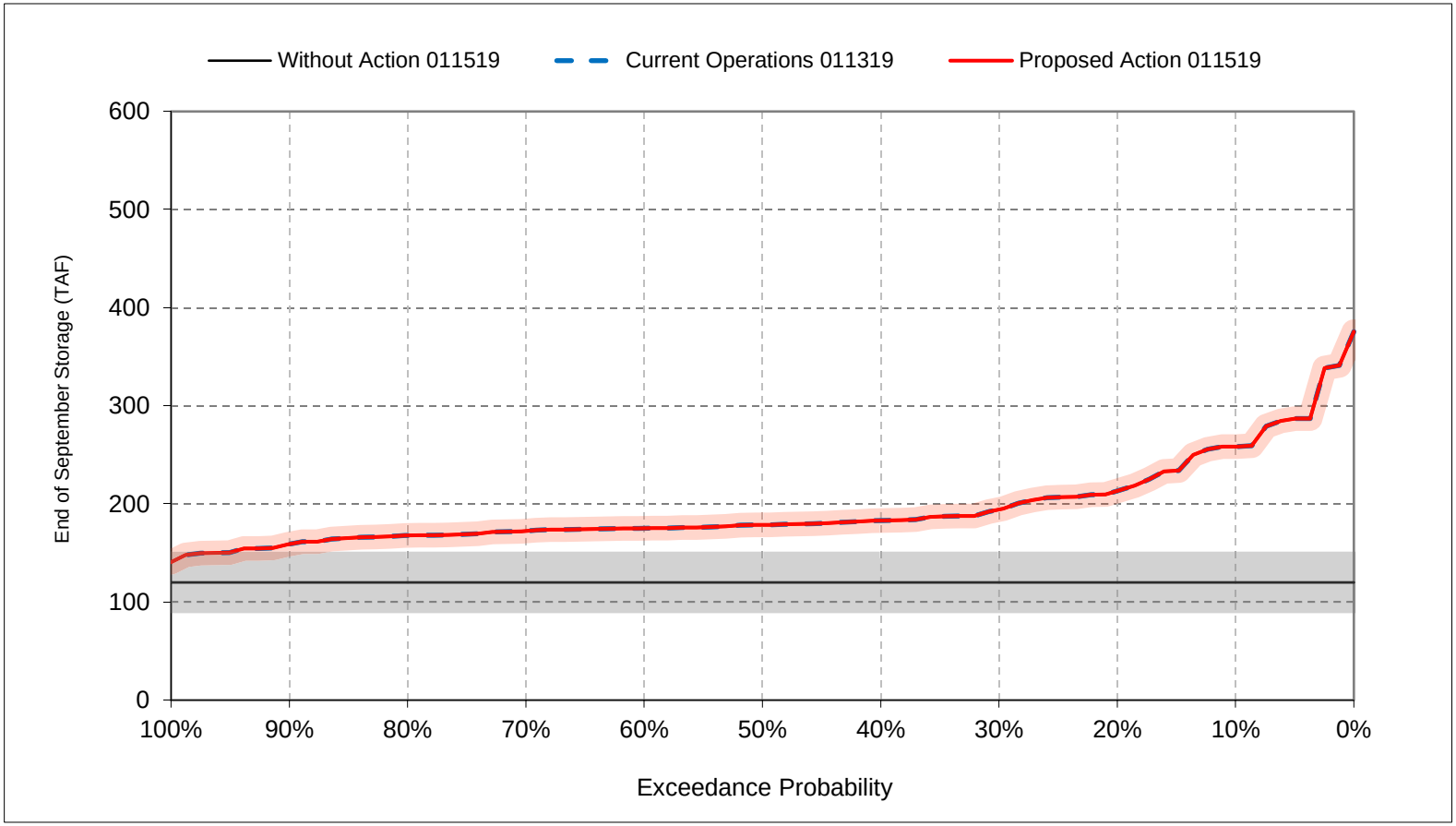
e These are draft results meant for qualitative analysis and are subject to revision.

Figure 8-1. Millerton Storage, End of May Storage



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 8-2. Millerton Storage, End of September Storage



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Table 8a-1. Millerton Lake Elevation, End of Month Elevation

Without Action 011519

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	459	459	459	459	459	459	475	459	459	459	459	459
20%	459	459	459	459	459	459	469	459	459	459	459	459
30%	459	459	459	459	459	459	463	459	459	459	459	459
40%	459	459	459	459	459	459	459	459	459	459	459	459
50%	459	459	459	459	459	459	459	459	459	459	459	459
60%	459	459	459	459	459	459	459	459	459	459	459	459
70%	459	459	459	459	459	459	459	459	459	459	459	459
80%	459	459	459	459	459	459	459	459	459	459	459	459
90%	459	459	459	459	459	459	459	459	459	459	459	459
Long Term												
Full Simulation Period[a]	459	459	459	459	459	459	463	459	460	459	459	459
Water Year Types[b,c]												
Wet (23%)	459	459	459	459	459	459	465	460	463	459	459	459
Above Normal (24%)	459	459	459	459	459	459	461	459	459	459	459	459
Below Normal (10%)	459	459	459	459	459	459	462	459	459	459	459	459
Dry (16%)	459	459	459	459	459	459	466	459	459	459	459	459
Critical (27%)	459	459	459	459	459	459	461	459	459	459	459	459

Current Operations 011319

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	515	524	546	561	561	568	570	577	577	571	530	515
20%	503	517	532	555	561	568	562	577	576	559	515	499
30%	498	512	525	540	561	567	557	568	573	543	498	493
40%	493	502	518	536	556	560	551	564	568	533	490	488
50%	491	498	513	528	549	551	546	559	556	522	486	486
60%	486	492	506	523	537	545	539	553	551	514	482	484
70%	483	485	499	514	531	534	529	548	544	504	479	483
80%	479	481	493	506	517	519	517	536	531	493	477	481
90%	475	475	483	490	496	496	503	510	510	479	467	477
Long Term												
Full Simulation Period[a]	493	500	513	527	538	542	540	553	552	524	494	491
Water Year Types[b,c]												
Wet (23%)	512	520	529	547	558	562	539	556	574	565	528	512
Above Normal (24%)	495	508	523	536	555	562	552	570	572	541	497	487
Below Normal (10%)	492	497	509	524	540	542	539	552	550	521	488	487
Dry (16%)	485	493	508	526	533	535	546	556	545	505	479	487
Critical (27%)	478	479	493	503	508	511	526	533	518	486	472	482

Current Operations 011319 minus Without Action 011519

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	56	65	87	102	102	109	95	118	118	112	71	56
20%	44	58	73	96	102	109	93	118	117	100	56	40
30%	39	53	66	81	102	108	94	109	114	84	39	34
40%	34	43	59	77	97	101	92	105	109	74	31	29
50%	32	39	54	69	90	92	87	100	97	63	27	27
60%	27	33	47	64	78	86	80	94	92	55	23	25
70%	24	26	40	55	72	75	70	89	85	45	20	24
80%	20	22	34	47	58	60	58	77	72	34	18	22
90%	16	16	24	31	37	37	44	51	51	20	8	18
Long Term												
Full Simulation Period[a]	34	41	54	68	79	83	77	94	92	65	35	32
Water Year Types[b,c]												
Wet (23%)	53	61	70	88	99	103	73	96	111	106	69	53
Above Normal (24%)	36	49	64	77	96	103	90	111	113	82	38	28
Below Normal (10%)	33	38	50	65	81	83	76	93	91	62	29	28
Dry (16%)	26	34	49	67	74	76	80	97	86	46	20	28
Critical (27%)	19	20	34	44	49	52	65	74	60	27	13	23

a Based on the 82-year simulation period.

b As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 8a-2. Millerton Lake Elevation, End of Month Elevation

Without Action 011519

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	459	459	459	459	459	459	475	459	459	459	459	459
20%	459	459	459	459	459	459	469	459	459	459	459	459
30%	459	459	459	459	459	459	463	459	459	459	459	459
40%	459	459	459	459	459	459	459	459	459	459	459	459
50%	459	459	459	459	459	459	459	459	459	459	459	459
60%	459	459	459	459	459	459	459	459	459	459	459	459
70%	459	459	459	459	459	459	459	459	459	459	459	459
80%	459	459	459	459	459	459	459	459	459	459	459	459
90%	459	459	459	459	459	459	459	459	459	459	459	459
Long Term												
Full Simulation Period[a]	459	459	459	459	459	459	463	459	460	459	459	459
Water Year Types[b,c]												
Wet (23%)	459	459	459	459	459	459	465	460	463	459	459	459
Above Normal (24%)	459	459	459	459	459	459	461	459	459	459	459	459
Below Normal (10%)	459	459	459	459	459	459	462	459	459	459	459	459
Dry (16%)	459	459	459	459	459	459	466	459	459	459	459	459
Critical (27%)	459	459	459	459	459	459	461	459	459	459	459	459

Proposed Action 011519

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	515	524	546	561	561	568	570	577	577	571	530	515
20%	503	517	532	555	561	568	562	577	576	559	515	499
30%	498	512	525	540	561	567	557	568	573	543	498	493
40%	493	502	518	536	556	560	551	564	568	533	490	488
50%	491	498	513	528	549	551	546	559	556	522	486	486
60%	486	492	506	523	537	545	539	553	551	514	482	484
70%	483	485	499	514	531	534	529	548	544	504	479	483
80%	479	481	493	506	517	519	517	536	531	493	477	481
90%	475	475	483	490	496	496	503	510	510	479	467	477
Long Term												
Full Simulation Period[a]	493	500	513	527	538	542	540	553	552	524	494	491
Water Year Types[b,c]												
Wet (23%)	512	520	529	547	558	562	539	556	574	565	528	512
Above Normal (24%)	495	508	523	536	555	562	552	570	572	541	497	487
Below Normal (10%)	492	497	509	524	540	542	539	552	550	521	488	487
Dry (16%)	485	493	508	526	533	535	546	556	545	505	479	487
Critical (27%)	478	479	493	503	508	511	526	533	518	486	472	482

Proposed Action 011519 minus Without Action 011519

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	56	65	87	102	102	109	95	118	118	112	71	56
20%	44	58	73	96	102	109	93	118	117	100	56	40
30%	39	53	66	81	102	108	94	109	114	84	39	34
40%	34	43	59	77	97	101	92	105	109	74	31	29
50%	32	39	54	69	90	92	87	100	97	63	27	27
60%	27	33	47	64	78	86	80	94	92	55	23	25
70%	24	26	40	55	72	75	70	89	85	45	20	24
80%	20	22	34	47	58	60	58	77	72	34	18	22
90%	16	16	24	31	37	37	44	51	51	20	8	18
Long Term												
Full Simulation Period[a]	34	41	54	68	79	83	77	94	92	65	35	32
Water Year Types[b,c]												
Wet (23%)	53	61	70	88	99	103	73	96	111	106	69	53
Above Normal (24%)	36	49	64	77	96	103	90	111	113	82	38	28
Below Normal (10%)	33	38	50	65	81	83	76	93	91	62	29	28
Dry (16%)	26	34	49	67	74	76	80	97	86	46	20	28
Critical (27%)	19	20	34	44	49	52	65	74	60	27	13	23

a Based on the 82-year simulation period.

b As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 8a-3. Millerton Lake Elevation, End of Month Elevation

Current Operations 011319

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	515	524	546	561	561	568	570	577	577	571	530	515
20%	503	517	532	555	561	568	562	577	576	559	515	499
30%	498	512	525	540	561	567	557	568	573	543	498	493
40%	493	502	518	536	556	560	551	564	568	533	490	488
50%	491	498	513	528	549	551	546	559	556	522	486	486
60%	486	492	506	523	537	545	539	553	551	514	482	484
70%	483	485	499	514	531	534	529	548	544	504	479	483
80%	479	481	493	506	517	519	517	536	531	493	477	481
90%	475	475	483	490	496	496	503	510	510	479	467	477
Long Term												
Full Simulation Period[a]	493	500	513	527	538	542	540	553	552	524	494	491
Water Year Types[b,c]												
Wet (23%)	512	520	529	547	558	562	539	556	574	565	528	512
Above Normal (24%)	495	508	523	536	555	562	552	570	572	541	497	487
Below Normal (10%)	492	497	509	524	540	542	539	552	550	521	488	487
Dry (16%)	485	493	508	526	533	535	546	556	545	505	479	487
Critical (27%)	478	479	493	503	508	511	526	533	518	486	472	482

Proposed Action 011519

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	515	524	546	561	561	568	570	577	577	571	530	515
20%	503	517	532	555	561	568	562	577	576	559	515	499
30%	498	512	525	540	561	567	557	568	573	543	498	493
40%	493	502	518	536	556	560	551	564	568	533	490	488
50%	491	498	513	528	549	551	546	559	556	522	486	486
60%	486	492	506	523	537	545	539	553	551	514	482	484
70%	483	485	499	514	531	534	529	548	544	504	479	483
80%	479	481	493	506	517	519	517	536	531	493	477	481
90%	475	475	483	490	496	496	503	510	510	479	467	477
Long Term												
Full Simulation Period[a]	493	500	513	527	538	542	540	553	552	524	494	491
Water Year Types[b,c]												
Wet (23%)	512	520	529	547	558	562	539	556	574	565	528	512
Above Normal (24%)	495	508	523	536	555	562	552	570	572	541	497	487
Below Normal (10%)	492	497	509	524	540	542	539	552	550	521	488	487
Dry (16%)	485	493	508	526	533	535	546	556	545	505	479	487
Critical (27%)	478	479	493	503	508	511	526	533	518	486	472	482

Proposed Action 011519 minus Current Operations 011319

Statistic	End of Month Elevation (FEET)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types[b,c]												
Wet (23%)	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal (24%)	0	0	0	0	0	0	0	0	0	0	0	0
Below Normal (10%)	0	0	0	0	0	0	0	0	0	0	0	0
Dry (16%)	0	0	0	0	0	0	0	0	0	0	**0**	0
Critical (27%)	0	0	0	0	0	0	0	0	0	0	0	0

a Based on the 82-year simulation period.

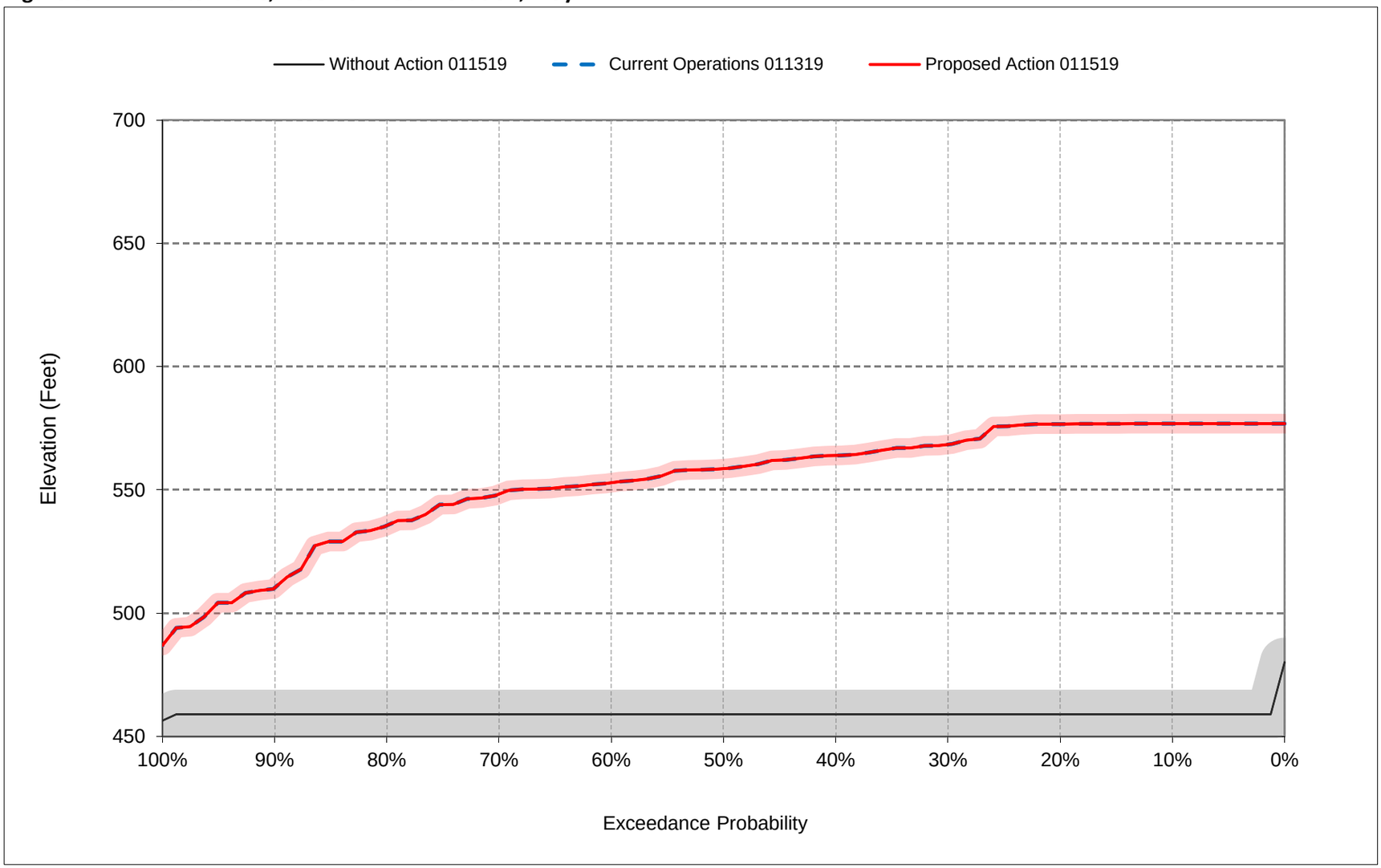
b As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

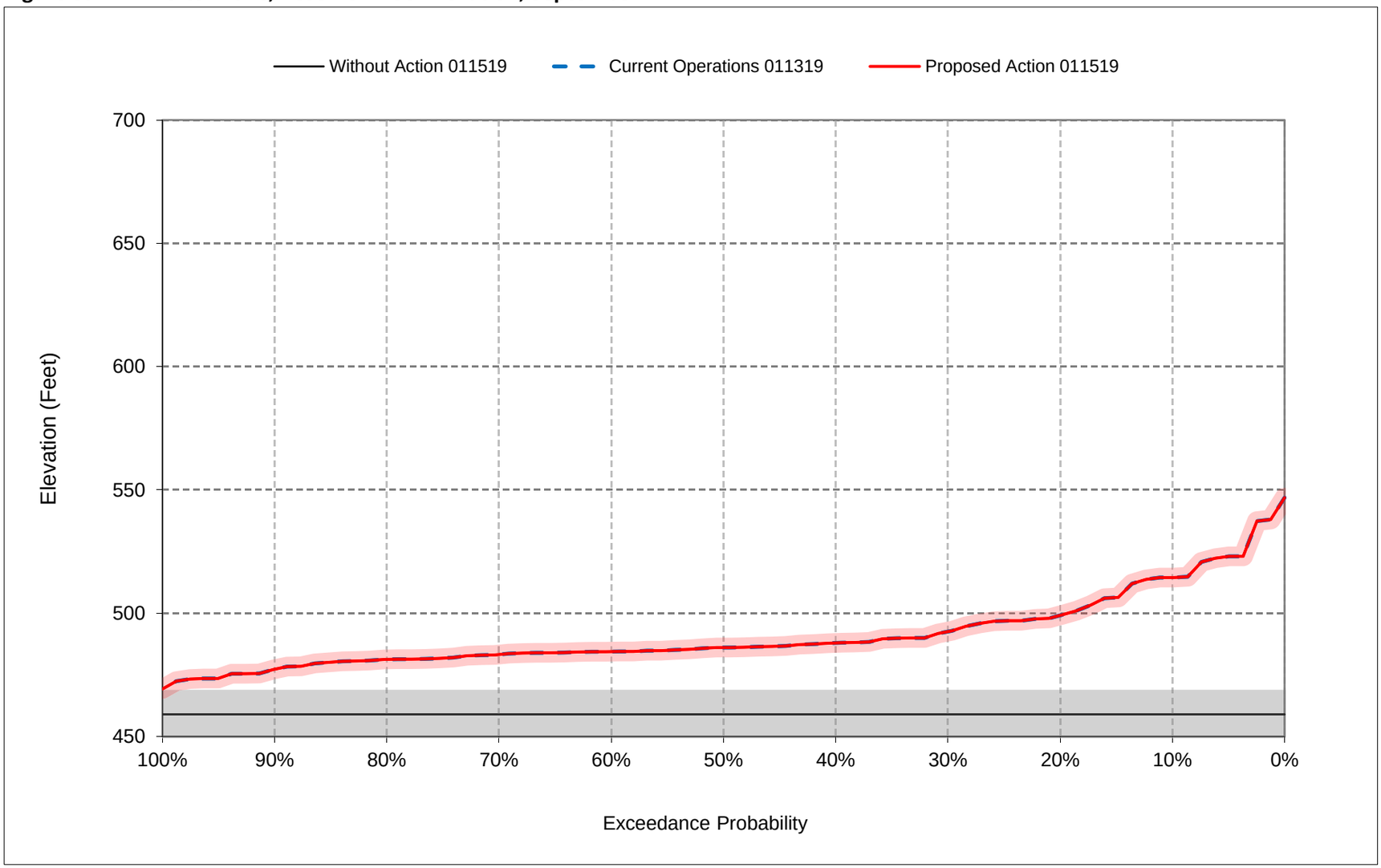
Figure 8a-1. Millerton Lake, Reservoir Pool Elevation, May



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Figure 8a-2. Millerton Lake, Reservoir Pool Elevation, September



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Appendix D – Modeling

Attachment 3-2 – Flow Results (CalSim II)

The following results of the CalSim II model are included for river flow conditions:

Title	Model Parameter	Table Numbers	Figure Numbers
Trinity River Flow below Lewiston	C100	12-1 to 12-3	12-1 to 12-18
Clear Creek below Whiskeytown Dam Flow	C3	14-1 to 14-3	14-1 to 14-18
Sacramento River Flow downstream of Keswick Reservoir	C5	15-1 to 15-3	15-1 to 15-18
Sacramento Flow River at Bend Bridge	C109	16-1 to 16-3	16-1 to 16-18
Sacramento River below Red Bluff Diversion Dam Flow	C112	17-1 to 17-3	17-1 to 17-18
Sacramento River Flow at Hamilton City	C114	18-1 to 18-3	18-1 to 18-18
Sacramento River at Wilkins Slough Flow	C129	19-1 to 19-3	19-1 to 19-18
Feather River Flow downstream of Thermalito	C203	21-1 to 21-3	21-1 to 21-18
Feather River at Sacramento River Confluence Flow	C223	22-1 to 22-3	22-1 to 22-18
Fremont Weir Spills	D160	24-1 to 24-3	24-1 to 24-18
Yolo Bypass Flow	C157	25-1 to 25-3	25-1 to 25-18
American River below Nimbus Dam Flow	C9	27-1 to 27-3	27-1 to 27-18
American River at H Street	C303	28-1 to 28-3	28-1 to 28-18
Sacramento River Flow at Freeport	C169	29-1 to 29-3	29-1 to 29-18
Sacramento River Flow at Rio Vista	C405	32-1 to 32-3	32-1 to 32-18
San Joaquin River Flow at Gravelly Ford	C603	33-1 to 33-3	33-1 to 33-18
San Joaquin River Flow below Sack Dam	C608	34-1 to 34-3	34-1 to 34-18
San Joaquin River Flow below confluence with Merced	C620	35-1 to 35-3	35-1 to 35-18
Stanislaus River Flow below Goodwin	C520	37-1 to 37-3	37-1 to 37-18
Stanislaus River Flow at Mouth	C528	38-1 to 38-3	38-1 to 38-18
San Joaquin River at Vernalis	C639	39-1 to 39-3	39-1 to 39-18
San Joaquin River at Vernalis (60-20-20)	C639	39b-1 to 39b-3	39b-1 to 39b-18
Old and Middle River Flow	C408	40-1 to 40-3	40-1 to 40-18
Delta Outflow	C406	41-1 to 41-3	41-1 to 41-18

Report formats

- Monthly tables comparing two scenarios (exceedance values, long-term average, and average by water year type)
- Monthly pattern charts (long-term average and average by water year type) including all scenarios
- Monthly exceedance charts (all months) including all scenarios

Table 12-1. Trinity River Flow below Lewiston, Monthly Flow

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	756	2,307	4,822	6,000	6,000	6,000	5,999	6,000	4,379	817	325	231
20%	288	1,466	3,468	3,770	5,614	4,296	4,896	5,378	2,877	571	247	204
30%	261	957	2,315	2,817	4,224	3,460	4,257	4,502	2,036	437	199	173
40%	214	729	1,426	2,186	3,258	3,068	3,883	3,959	1,510	374	178	154
50%	192	542	977	1,859	2,848	2,688	3,483	3,253	1,271	305	158	145
60%	166	395	737	1,216	2,237	2,506	3,166	2,801	1,080	286	152	141
70%	148	249	607	815	1,655	2,074	2,558	2,478	1,002	260	144	136
80%	145	188	389	582	1,013	1,485	2,195	2,066	792	219	136	121
90%	139	149	270	442	827	1,316	1,595	1,490	528	184	104	95
Long Term												
Full Simulation Period[a]	387	931	1,821	2,277	3,088	2,990	3,519	3,512	1,867	616	247	162
Water Year Types[b,c]												
Wet (32%)	238	944	1,867	3,708	4,497	3,749	4,328	4,841	3,205	1,289	429	179
Above Normal (16%)	738	1,086	1,677	3,038	4,360	3,836	4,163	4,282	1,935	443	202	202
Below Normal (13%)	491	773	1,620	1,880	2,252	2,256	3,438	2,760	1,174	287	174	155
Dry (24%)	424	1,152	2,449	1,025	2,066	2,592	3,104	2,774	1,089	279	160	144
Critical (15%)	170	513	1,015	805	1,125	1,768	1,833	1,713	823	211	114	116

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	373	300	300	521	1,219	861	600	4,709	4,626	1,102	870	870
20%	373	300	300	300	300	300	540	4,709	2,526	1,102	870	870
30%	373	300	300	300	300	300	540	4,570	2,526	1,102	870	870
40%	373	300	300	300	300	300	540	4,570	2,526	1,102	870	870
50%	373	300	300	300	300	300	493	4,189	2,120	1,102	870	870
60%	373	300	300	300	300	300	493	4,189	2,120	1,102	870	870
70%	373	300	300	300	300	300	460	2,924	783	450	870	870
80%	373	300	300	300	300	300	460	2,924	783	450	870	870
90%	373	300	300	300	300	300	427	1,498	783	450	450	450
Long Term												
Full Simulation Period[a]	368	356	639	700	691	667	588	3,753	2,210	890	793	793
Water Year Types[b,c]												
Wet (32%)	373	300	1,192	1,562	1,279	1,377	735	4,556	3,413	1,136	676	676
Above Normal (16%)	373	678	652	300	528	462	457	4,597	2,948	1,102	773	773
Below Normal (13%)	373	300	300	300	630	300	517	3,585	1,755	924	870	870
Dry (24%)	373	300	300	300	300	300	528	3,250	1,271	678	870	870
Critical (15%)	342	275	300	300	300	300	575	2,092	783	450	870	870

Current Operations 011319 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	**-383**	**-2,007**	**-4,522**	**-5,479**	**-4,781**	**-5,139**	**-5,399**	**-1,291**	247	285	545	639
20%	85	**-1,166**	**-3,168**	**-3,470**	**-5,314**	**-3,996**	**-4,356**	**-669**	**-351**	531	623	667
30%	112	**-657**	**-2,015**	**-2,517**	**-3,924**	**-3,160**	**-3,717**	68	490	665	672	697
40%	159	**-429**	**-1,126**	**-1,886**	**-2,958**	**-2,768**	**-3,343**	611	1,016	728	692	716
50%	181	**-242**	**-677**	**-1,559**	**-2,548**	**-2,388**	**-2,990**	936	849	797	712	725
60%	207	**-95**	**-437**	**-916**	**-1,937**	**-2,206**	**-2,673**	1,388	1,040	816	719	729
70%	225	51	**-307**	**-515**	**-1,355**	**-1,774**	**-2,098**	446	**-219**	190	726	734
80%	228	112	**-89**	**-282**	**-713**	**-1,185**	**-1,735**	858	**-9**	231	734	749
90%	234	151	30	**-142**	**-527**	**-1,016**	**-1,168**	8	255	266	346	355
Long Term												
Full Simulation Period[a]	**-19**	**-575**	**-1,182**	**-1,577**	**-2,397**	**-2,323**	**-2,931**	242	343	274	546	631
Water Year Types[b,c]												
Wet (32%)	135	**-644**	**-674**	**-2,146**	**-3,218**	**-2,372**	**-3,593**	**-285**	207	**-154**	247	497
Above Normal (16%)	**-365**	**-407**	**-1,025**	**-2,738**	**-3,832**	**-3,374**	**-3,706**	314	1,014	659	571	571
Below Normal (13%)	**-118**	**-473**	**-1,320**	**-1,580**	**-1,622**	**-1,956**	**-2,921**	824	581	637	696	715
Dry (24%)	**-51**	**-852**	**-2,149**	**-725**	**-1,766**	**-2,292**	**-2,576**	476	183	399	710	726
Critical (15%)	171	**-238**	**-715**	**-505**	**-825**	**-1,468**	**-1,258**	379	**-40**	239	756	754

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 12-2. Trinity River Flow below Lewiston, Monthly Flow

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	756	2,307	4,822	6,000	6,000	6,000	5,999	6,000	4,379	817	325	231
20%	288	1,466	3,468	3,770	5,614	4,296	4,896	5,378	2,877	571	247	204
30%	261	957	2,315	2,817	4,224	3,460	4,257	4,502	2,036	437	199	173
40%	214	729	1,426	2,186	3,258	3,068	3,883	3,959	1,510	374	178	154
50%	192	542	977	1,859	2,848	2,688	3,483	3,253	1,271	305	158	145
60%	166	395	737	1,216	2,237	2,506	3,166	2,801	1,080	286	152	141
70%	148	249	607	815	1,655	2,074	2,558	2,478	1,002	260	144	136
80%	145	188	389	582	1,013	1,485	2,195	2,066	792	219	136	121
90%	139	149	270	442	827	1,316	1,595	1,490	528	184	104	95
Long Term												
Full Simulation Period[a]	387	931	1,821	2,277	3,088	2,990	3,519	3,512	1,867	616	247	162
Water Year Types[b,c]												
Wet (32%)	238	944	1,867	3,708	4,497	3,749	4,328	4,841	3,205	1,289	429	179
Above Normal (16%)	738	1,086	1,677	3,038	4,360	3,836	4,163	4,282	1,935	443	202	202
Below Normal (13%)	491	773	1,620	1,880	2,252	2,256	3,438	2,760	1,174	287	174	155
Dry (24%)	424	1,152	2,449	1,025	2,066	2,592	3,104	2,774	1,089	279	160	144
Critical (15%)	170	513	1,015	805	1,125	1,768	1,833	1,713	823	211	114	116

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	373	300	300	1,372	2,099	889	600	4,709	4,626	1,102	870	870
20%	373	300	300	300	300	300	540	4,709	2,526	1,102	870	870
30%	373	300	300	300	300	300	540	4,570	2,526	1,102	870	870
40%	373	300	300	300	300	300	540	4,570	2,526	1,102	870	870
50%	373	300	300	300	300	300	493	4,189	2,120	1,102	870	870
60%	373	300	300	300	300	300	493	4,189	2,120	1,102	870	870
70%	373	300	300	300	300	300	460	2,924	783	450	870	870
80%	373	300	300	300	300	300	460	2,924	783	450	870	870
90%	373	300	300	300	300	300	427	1,498	783	450	450	450
Long Term												
Full Simulation Period[a]	364	352	675	719	743	685	588	3,753	2,210	890	793	786
Water Year Types[b,c]												
Wet (32%)	373	300	1,297	1,622	1,291	1,434	735	4,556	3,413	1,136	676	676
Above Normal (16%)	373	625	652	300	833	462	457	4,597	2,948	1,102	773	773
Below Normal (13%)	373	300	300	300	630	303	517	3,585	1,755	924	870	870
Dry (24%)	373	300	314	300	300	300	528	3,250	1,271	678	870	870
Critical (15%)	311	300	300	300	300	300	575	2,092	783	450	870	818

Proposed Action 011519 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	**-383**	**-2,007**	**-4,522**	**-4,628**	**-3,901**	**-5,111**	**-5,399**	**-1,291**	247	285	545	639
20%	85	**-1,166**	**-3,168**	**-3,470**	**-5,314**	**-3,996**	**-4,356**	**-669**	**-351**	531	623	667
30%	112	**-657**	**-2,015**	**-2,517**	**-3,924**	**-3,160**	**-3,717**	68	490	665	672	697
40%	159	**-429**	**-1,126**	**-1,886**	**-2,958**	**-2,768**	**-3,343**	611	1,016	728	692	716
50%	181	**-242**	**-677**	**-1,559**	**-2,548**	**-2,388**	**-2,990**	936	849	797	712	725
60%	207	**-95**	**-437**	**-916**	**-1,937**	**-2,206**	**-2,673**	1,388	1,040	816	719	729
70%	225	51	**-307**	**-515**	**-1,355**	**-1,774**	**-2,098**	446	**-219**	190	726	734
80%	228	112	**-89**	**-282**	**-713**	**-1,185**	**-1,735**	858	**-9**	231	734	749
90%	234	151	30	**-142**	**-527**	**-1,016**	**-1,168**	8	255	266	346	355
Long Term												
Full Simulation Period[a]	**-23**	**-580**	**-1,145**	**-1,558**	**-2,345**	**-2,305**	**-2,931**	242	343	274	546	624
Water Year Types[b,c]												
Wet (32%)	135	**-644**	**-569**	**-2,086**	**-3,206**	**-2,315**	**-3,593**	**-285**	207	**-154**	247	497
Above Normal (16%)	**-365**	**-461**	**-1,025**	**-2,738**	**-3,527**	**-3,374**	**-3,706**	314	1,014	659	571	571
Below Normal (13%)	**-118**	**-473**	**-1,320**	**-1,580**	**-1,622**	**-1,953**	**-2,921**	824	581	637	696	715
Dry (24%)	**-51**	**-852**	**-2,135**	**-725**	**-1,766**	**-2,292**	**-2,576**	476	183	399	710	726
Critical (15%)	140	**-213**	**-715**	**-505**	**-825**	**-1,468**	**-1,258**	379	**-40**	239	756	702

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 12-3. Trinity River Flow below Lewiston, Monthly Flow

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	373	300	300	521	1,219	861	600	4,709	4,626	1,102	870	870
20%	373	300	300	300	300	300	540	4,709	2,526	1,102	870	870
30%	373	300	300	300	300	300	540	4,570	2,526	1,102	870	870
40%	373	300	300	300	300	300	540	4,570	2,526	1,102	870	870
50%	373	300	300	300	300	300	493	4,189	2,120	1,102	870	870
60%	373	300	300	300	300	300	493	4,189	2,120	1,102	870	870
70%	373	300	300	300	300	300	460	2,924	783	450	870	870
80%	373	300	300	300	300	300	460	2,924	783	450	870	870
90%	373	300	300	300	300	300	427	1,498	783	450	450	450
Long Term												
Full Simulation Period[a]	368	356	639	700	691	667	588	3,753	2,210	890	793	793
Water Year Types[b,c]												
Wet (32%)	373	300	1,192	1,562	1,279	1,377	735	4,556	3,413	1,136	676	676
Above Normal (16%)	373	678	652	300	528	462	457	4,597	2,948	1,102	773	773
Below Normal (13%)	373	300	300	300	630	300	517	3,585	1,755	924	870	870
Dry (24%)	373	300	300	300	300	300	528	3,250	1,271	678	870	870
Critical (15%)	342	275	300	300	300	300	575	2,092	783	450	870	870

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	373	300	300	1,372	2,099	889	600	4,709	4,626	1,102	870	870
20%	373	300	300	300	300	300	540	4,709	2,526	1,102	870	870
30%	373	300	300	300	300	300	540	4,570	2,526	1,102	870	870
40%	373	300	300	300	300	300	540	4,570	2,526	1,102	870	870
50%	373	300	300	300	300	300	493	4,189	2,120	1,102	870	870
60%	373	300	300	300	300	300	493	4,189	2,120	1,102	870	870
70%	373	300	300	300	300	300	460	2,924	783	450	870	870
80%	373	300	300	300	300	300	460	2,924	783	450	870	870
90%	373	300	300	300	300	300	427	1,498	783	450	450	450
Long Term												
Full Simulation Period[a]	364	352	675	719	743	685	588	3,753	2,210	890	793	786
Water Year Types[b,c]												
Wet (32%)	373	300	1,297	1,622	1,291	1,434	735	4,556	3,413	1,136	676	676
Above Normal (16%)	373	625	652	300	833	462	457	4,597	2,948	1,102	773	773
Below Normal (13%)	373	300	300	300	630	303	517	3,585	1,755	924	870	870
Dry (24%)	373	300	314	300	300	300	528	3,250	1,271	678	870	870
Critical (15%)	311	300	300	300	300	300	575	2,092	783	450	870	818

Proposed Action 011519 minus Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	0	0	851	880	28	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	**-5**	**-5**	37	19	52	18	0	0	0	0	0	**-8**
Water Year Types[b,c]												
Wet (32%)	0	0	105	60	12	57	0	0	0	0	0	0
Above Normal (16%)	0	**-53**	0	0	305	0	0	0	0	0	0	0
Below Normal (13%)	0	0	0	0	0	3	0	0	0	0	0	0
Dry (24%)	0	0	14	0	0	0	0	0	0	0	0	0
Critical (15%)	**-31**	25	0	0	0	0	0	0	0	0	0	**-52**

a Based on the 82-year simulation period.

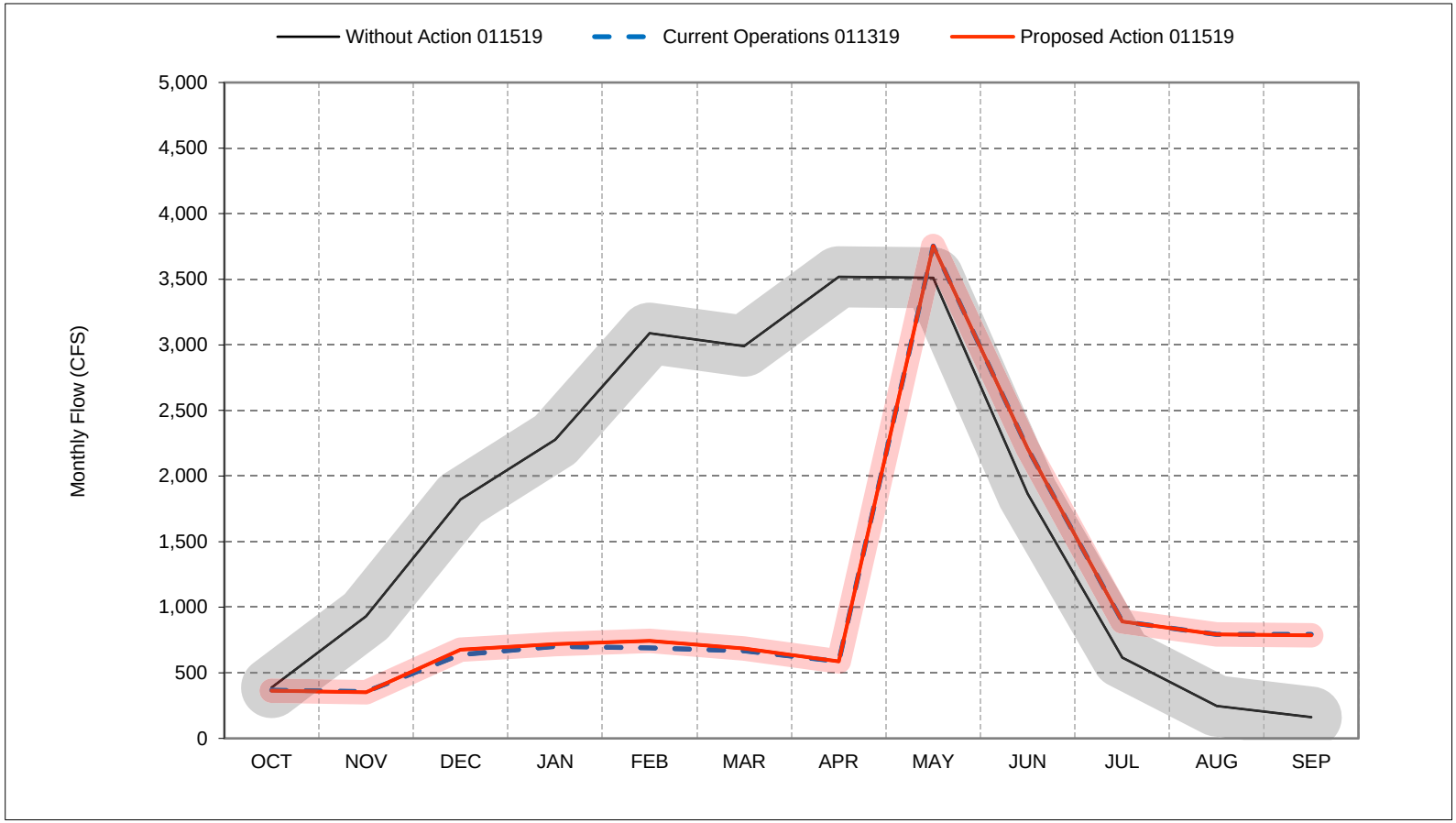
b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

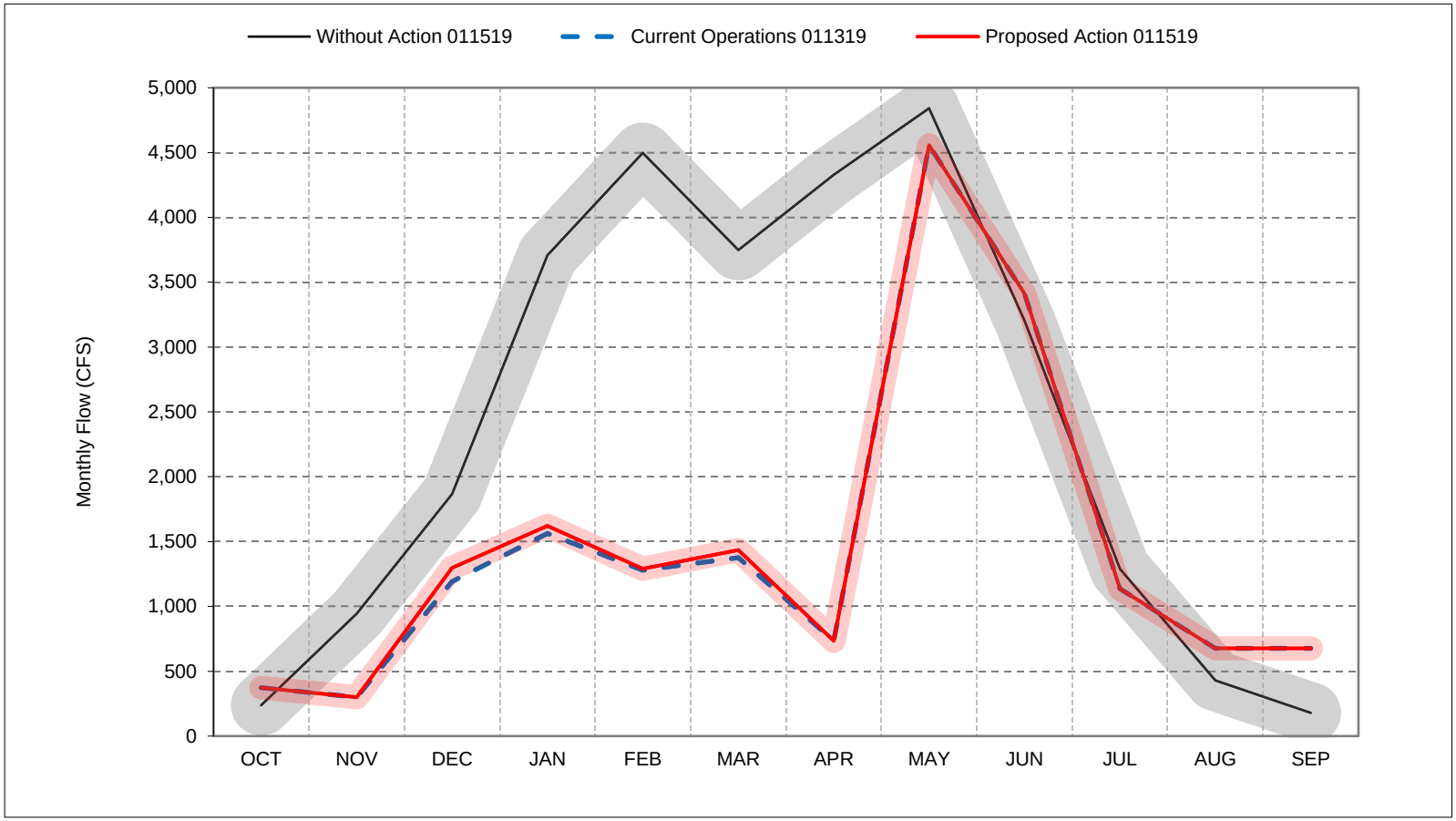
e These are draft results meant for qualitative analysis and are subject to revision.

Figure 12-1. Trinity River Flow below Lewiston, Long-Term Average Flow



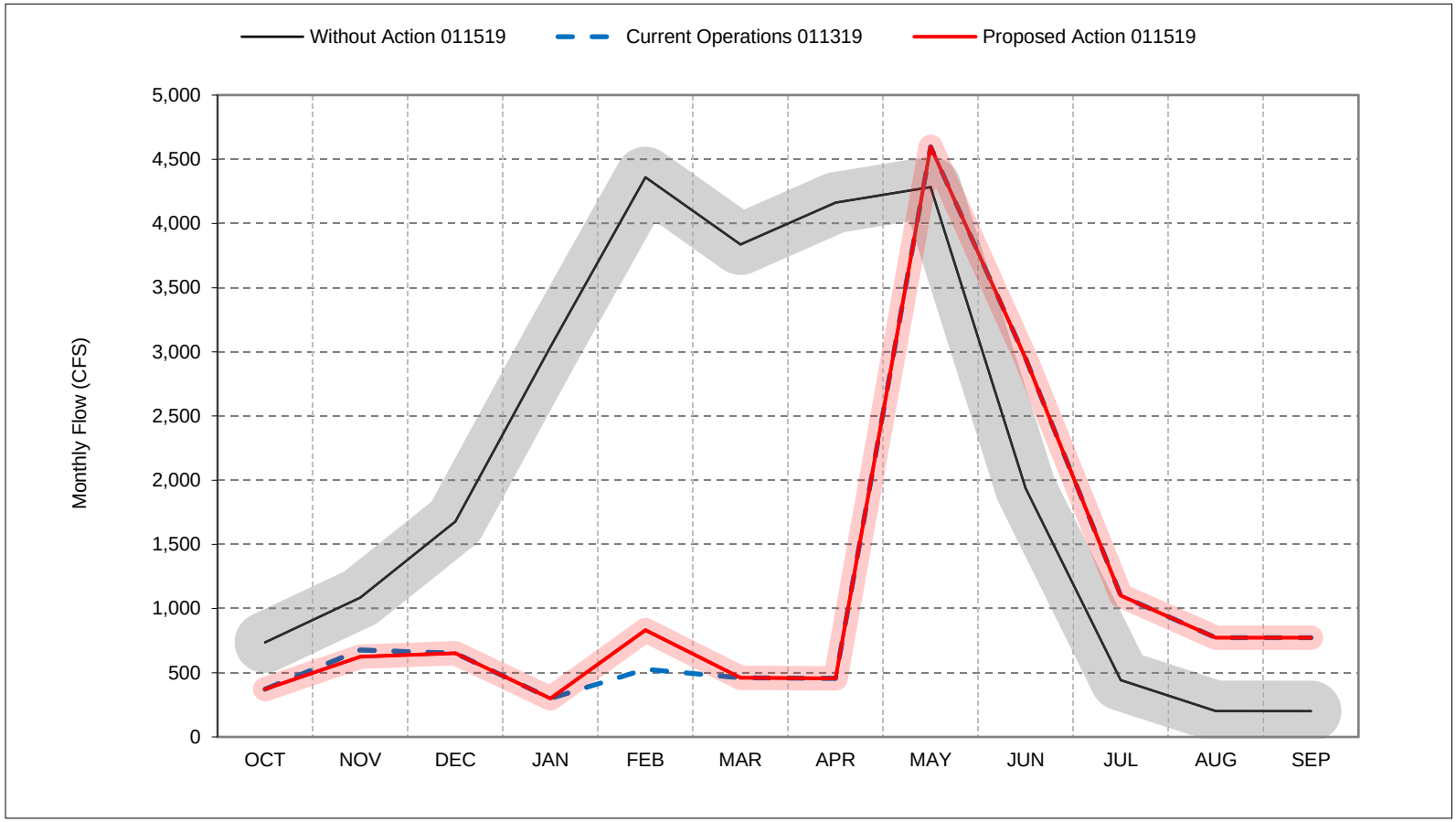
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 12-2. Trinity River Flow below Lewiston, Wet Year Average Flow



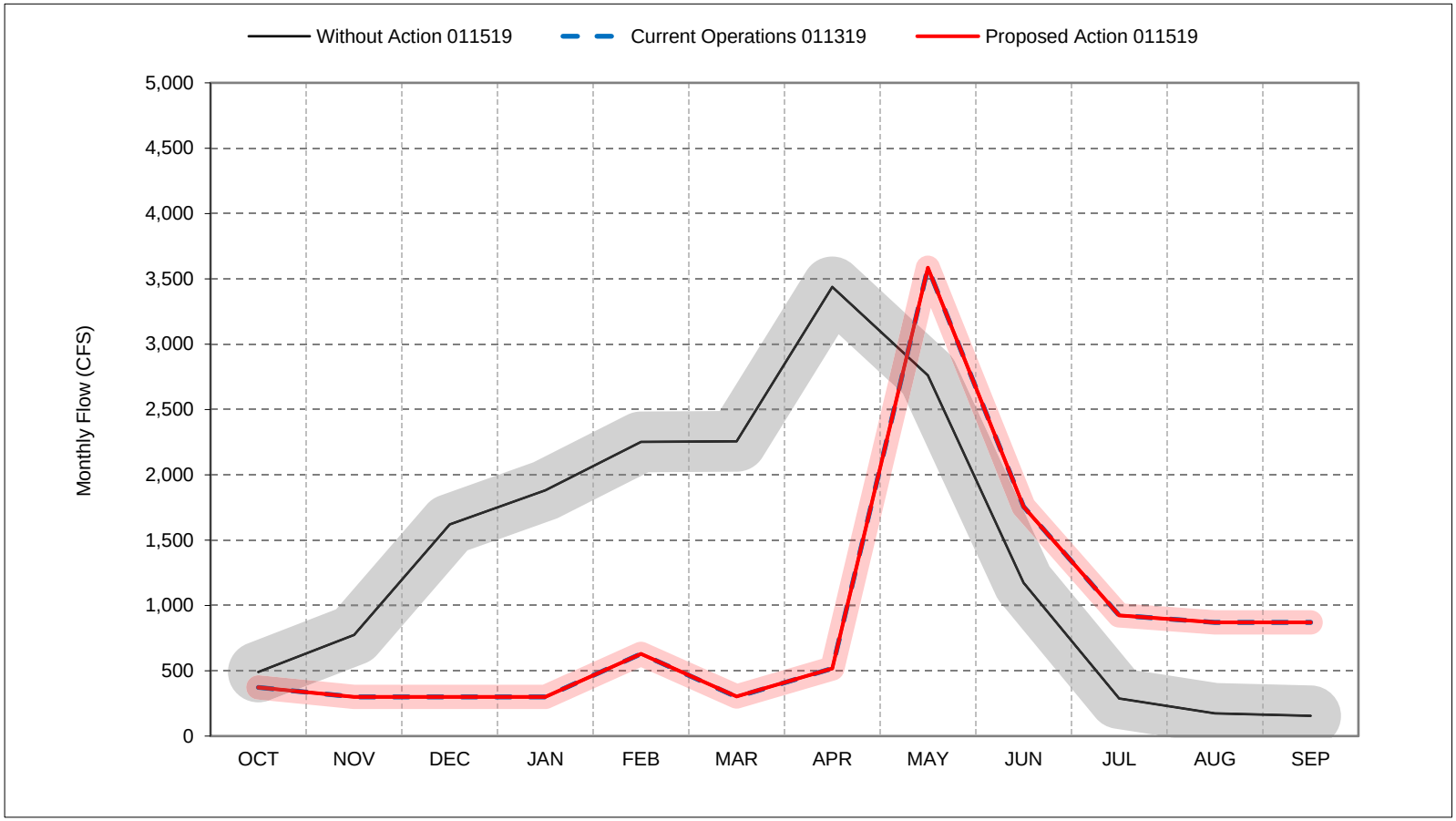
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 12-3. Trinity River Flow below Lewiston, Above Normal Year Average Flow



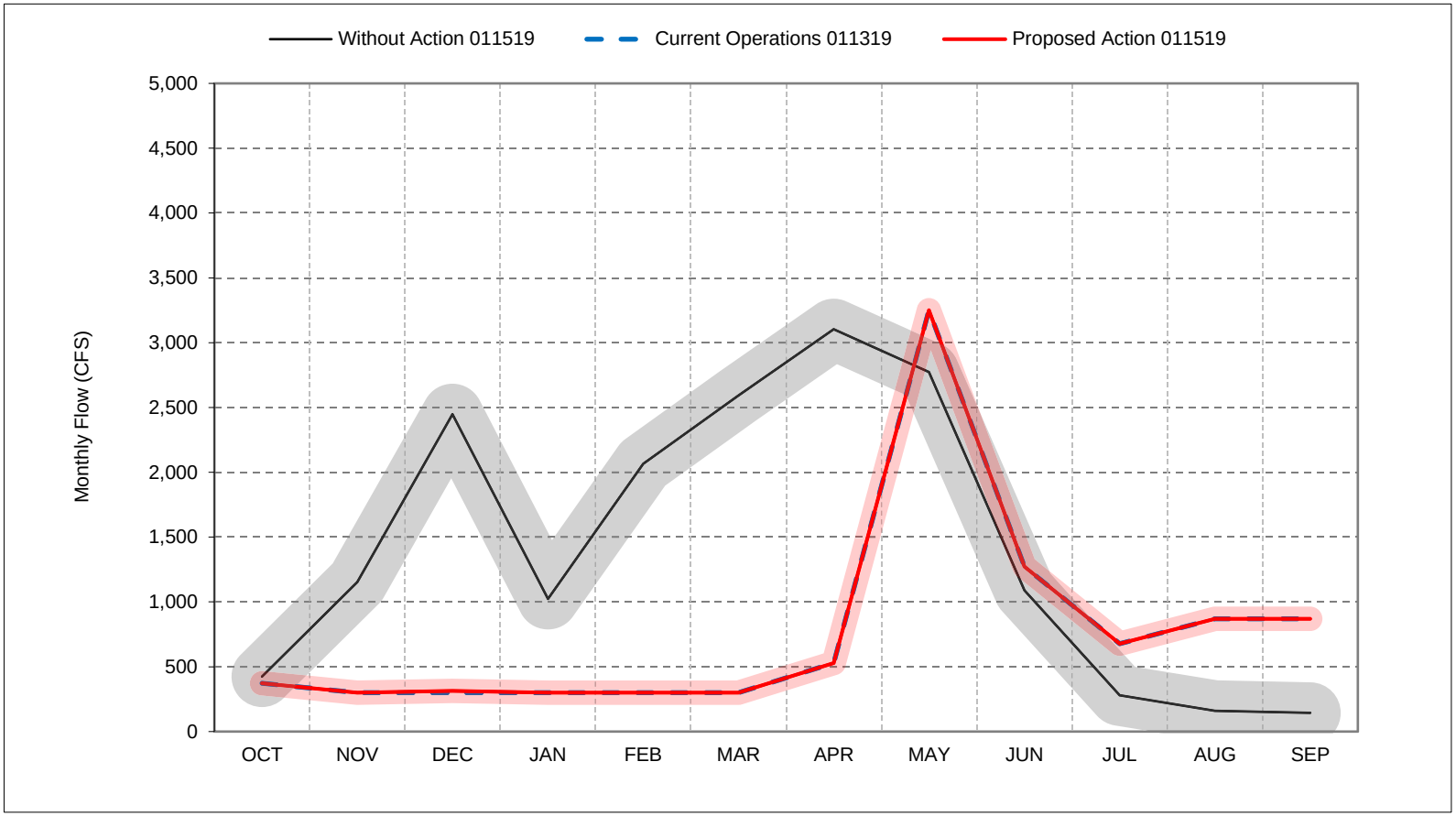
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 12-4. Trinity River Flow below Lewiston, Below Normal Year Average Flow



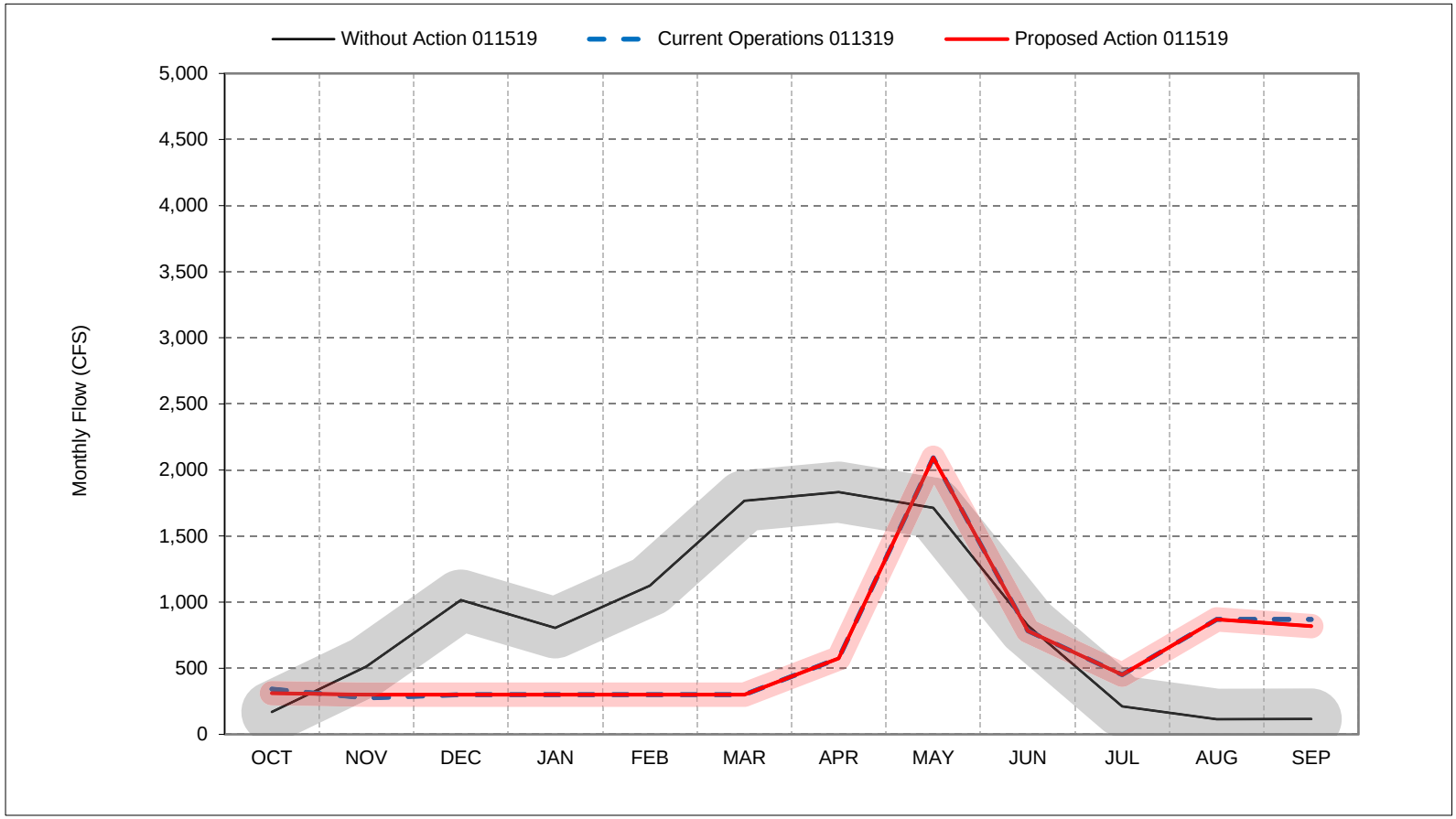
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 12-5. Trinity River Flow below Lewiston, Dry Year Average Flow



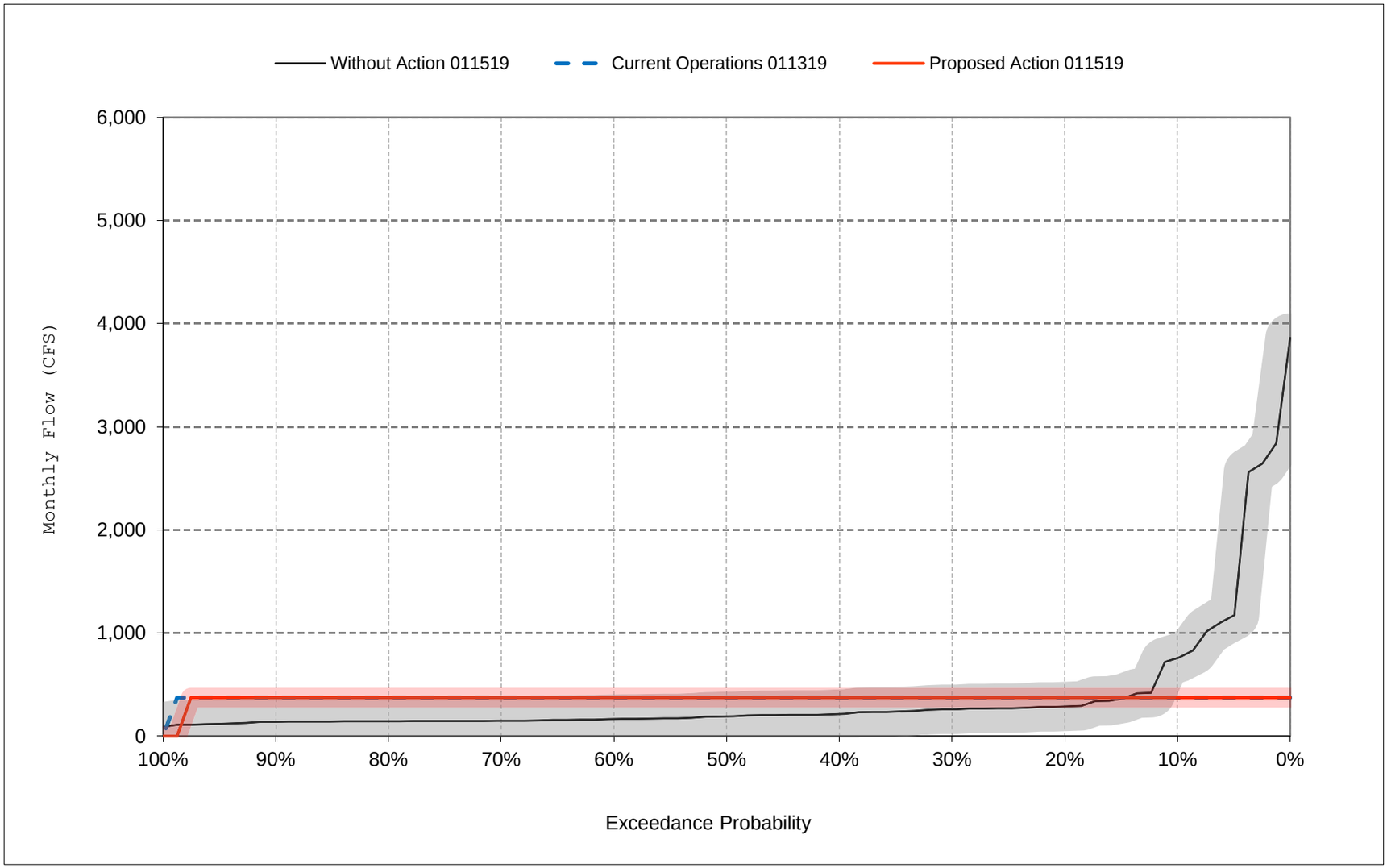
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 12-6. Trinity River Flow below Lewiston, Critical Year Average Flow



*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

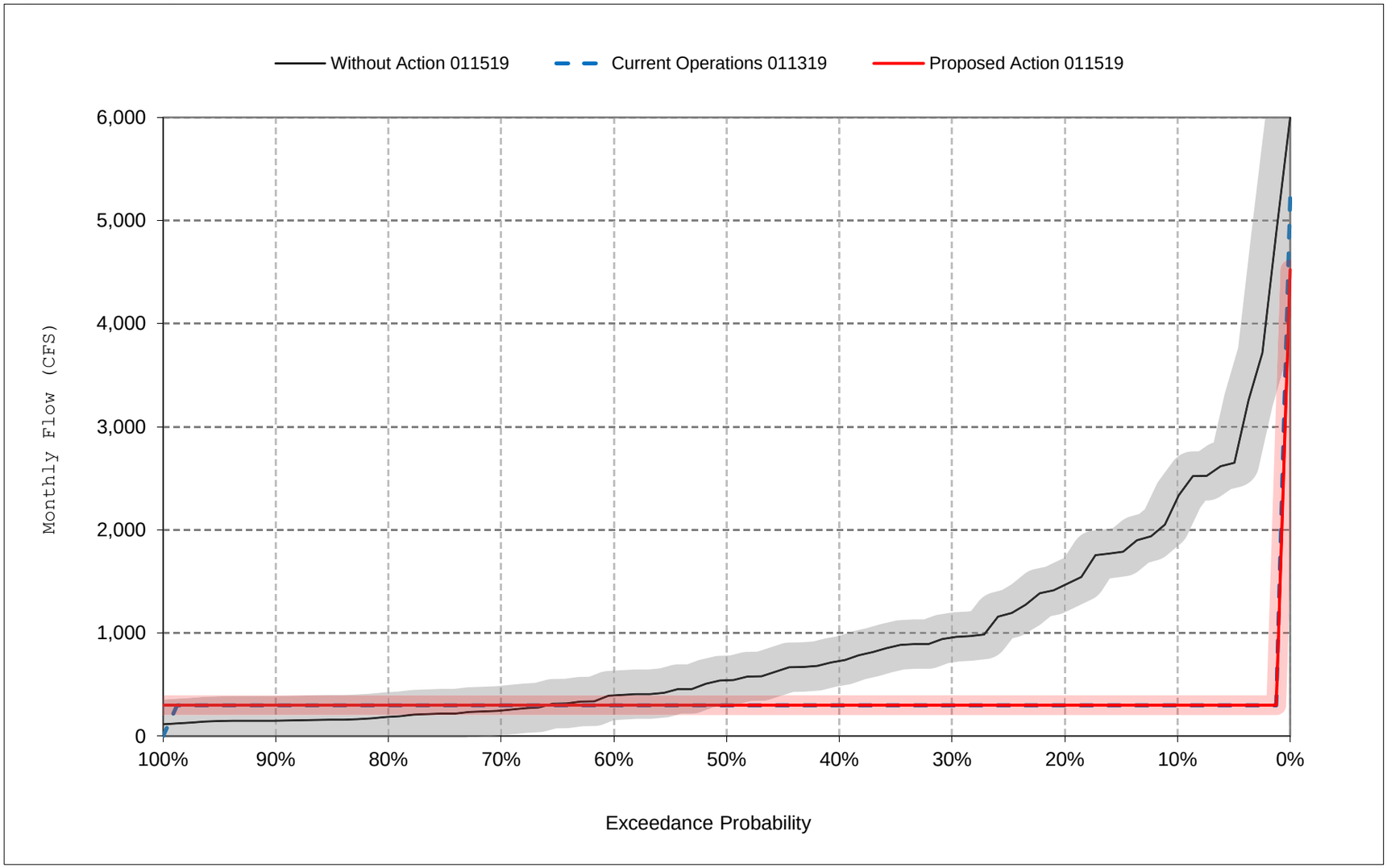
Figure 12-7. Trinity River Flow below Lewiston, October



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

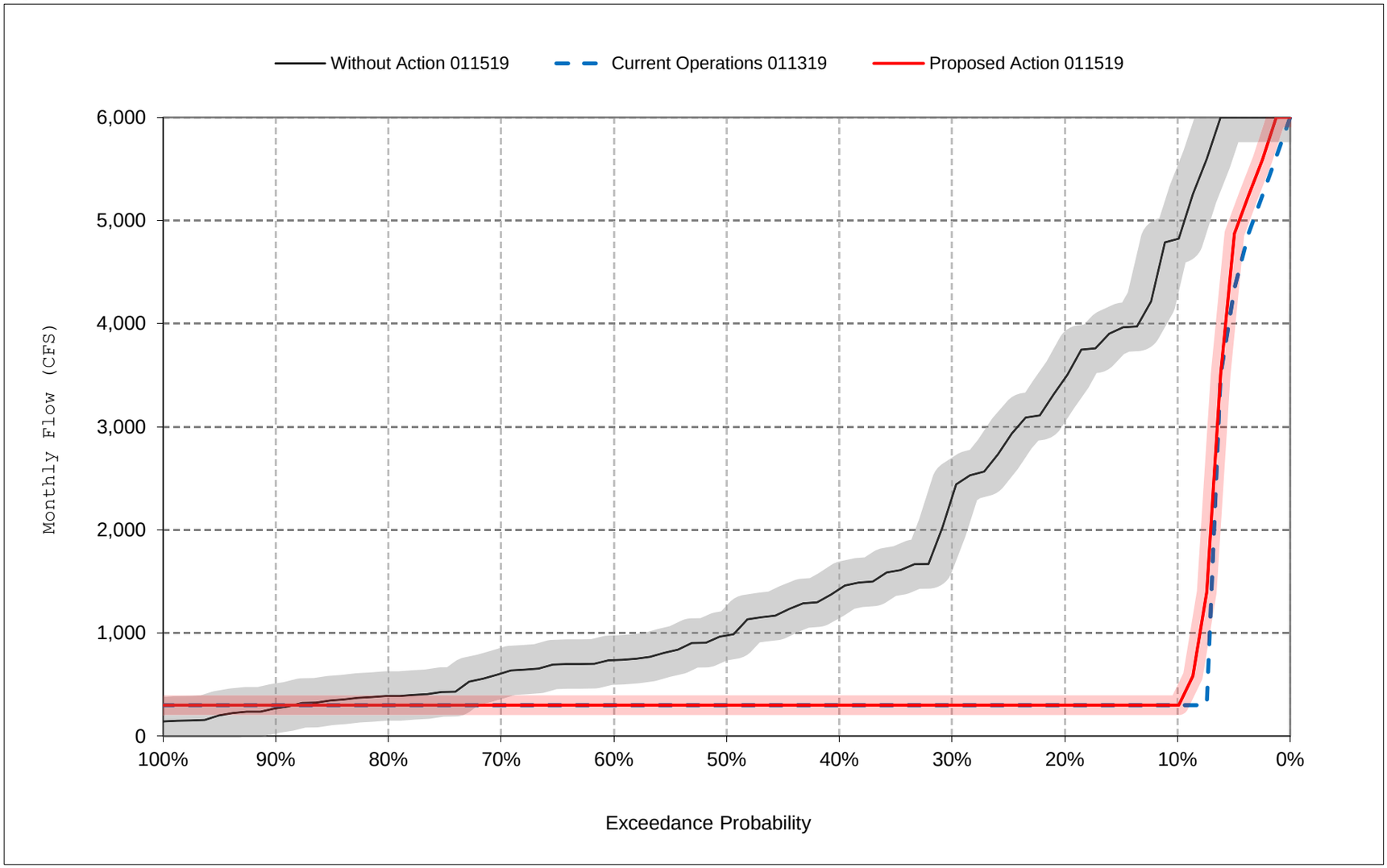
Figure 12-8. Trinity River Flow below Lewiston, November



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

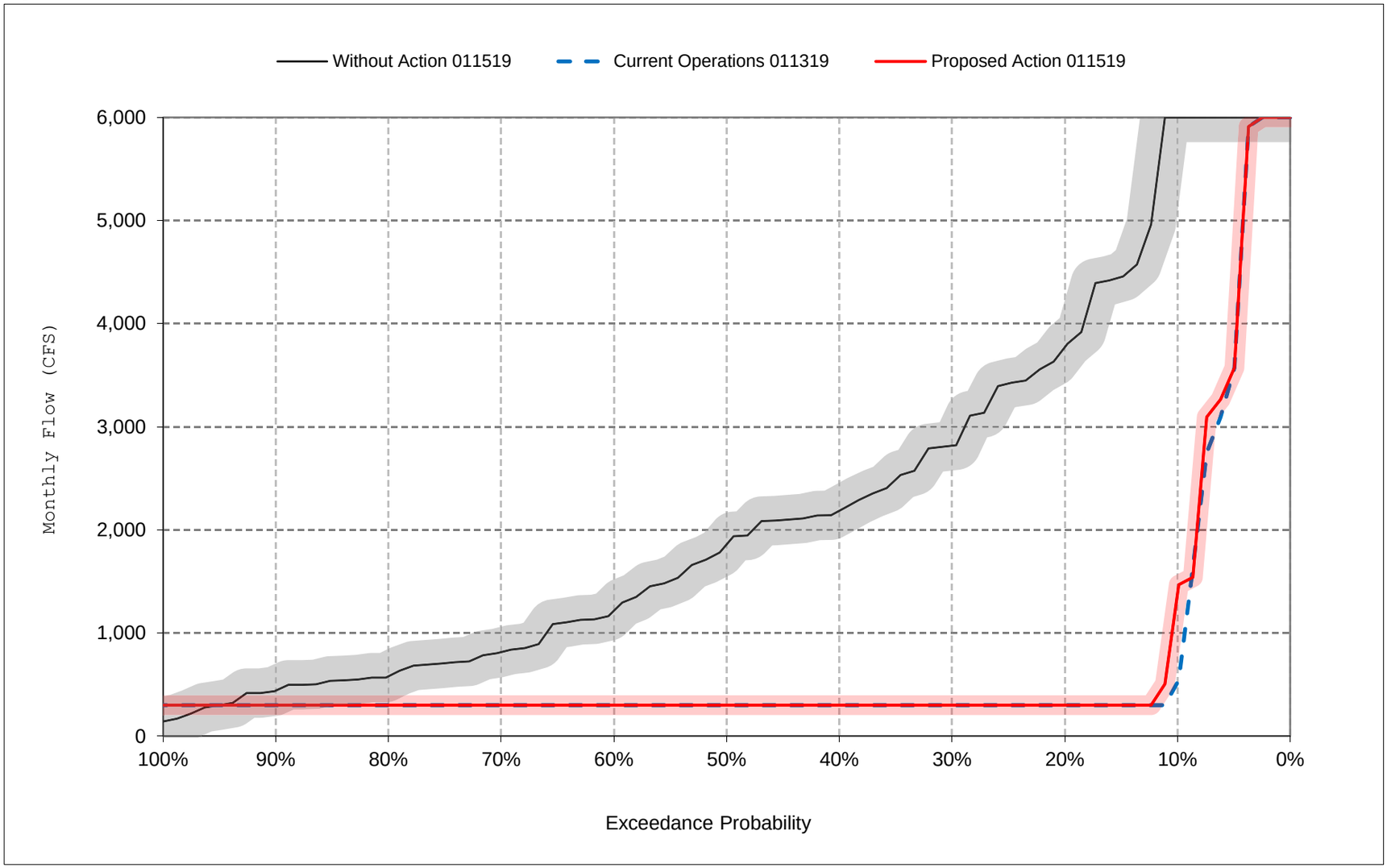
Figure 12-9. Trinity River Flow below Lewiston, December



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

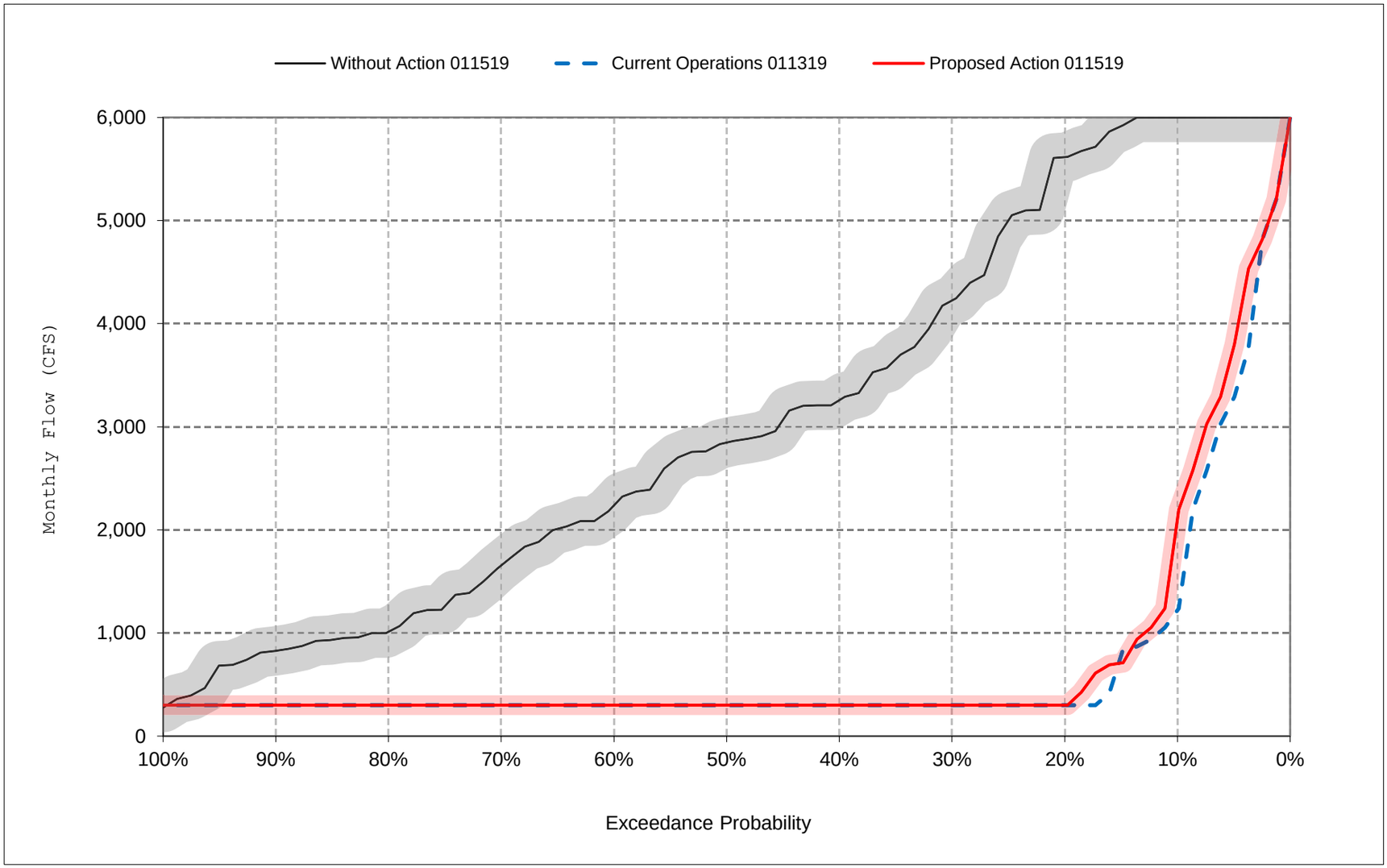
Figure 12-10. Trinity River Flow below Lewiston, January



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

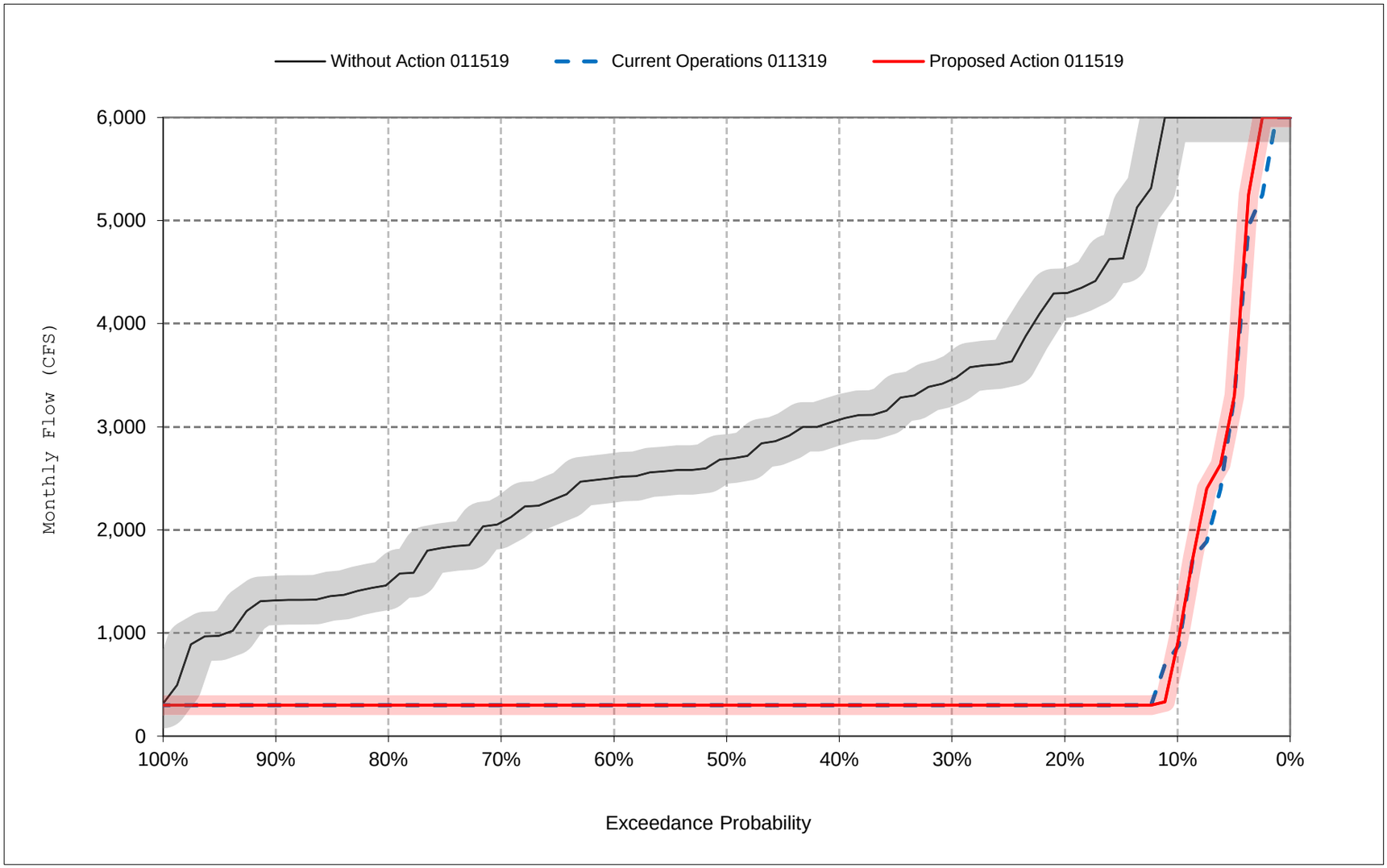
Figure 12-11. Trinity River Flow below Lewiston, February



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

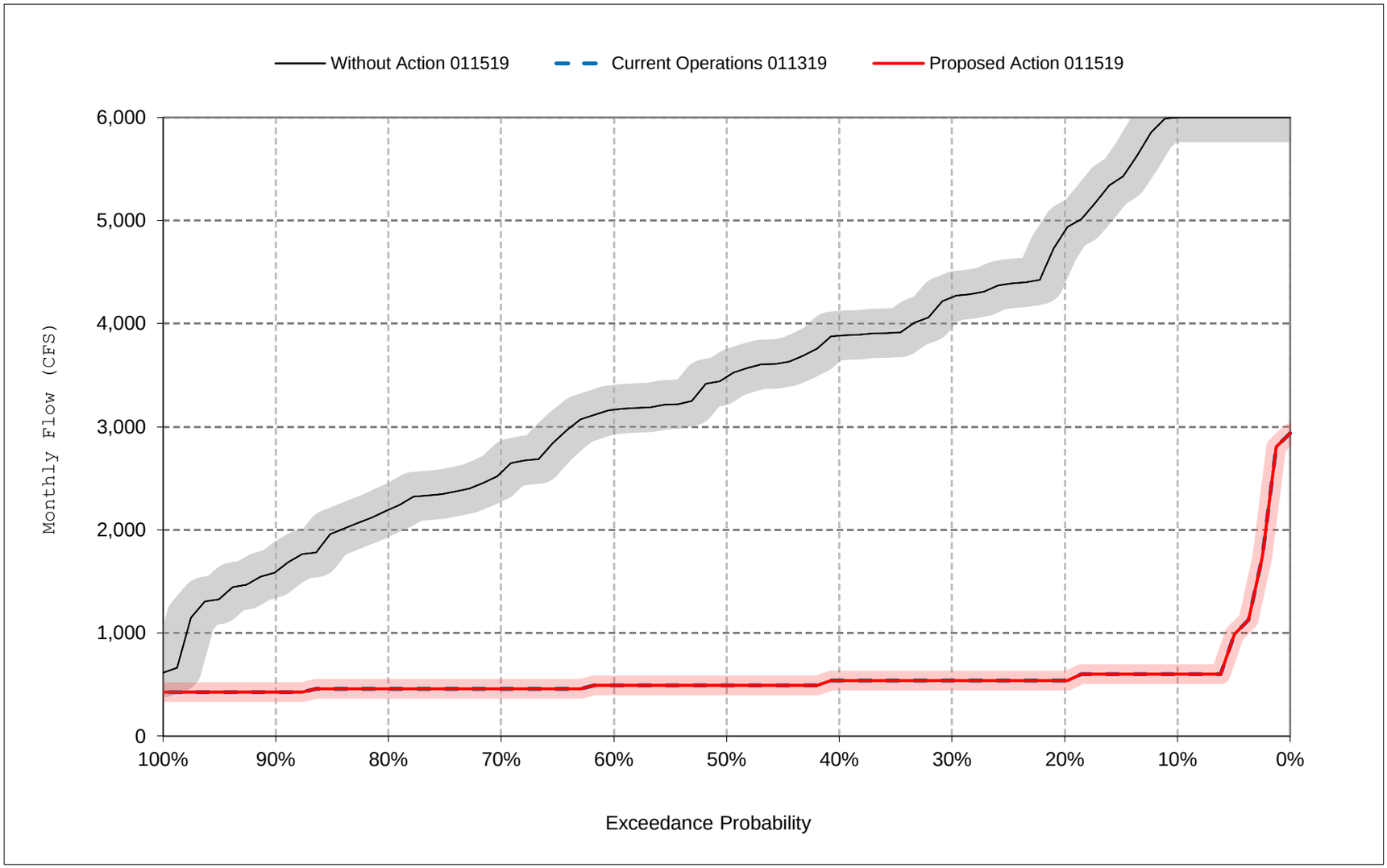
Figure 12-12. Trinity River Flow below Lewiston, March



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

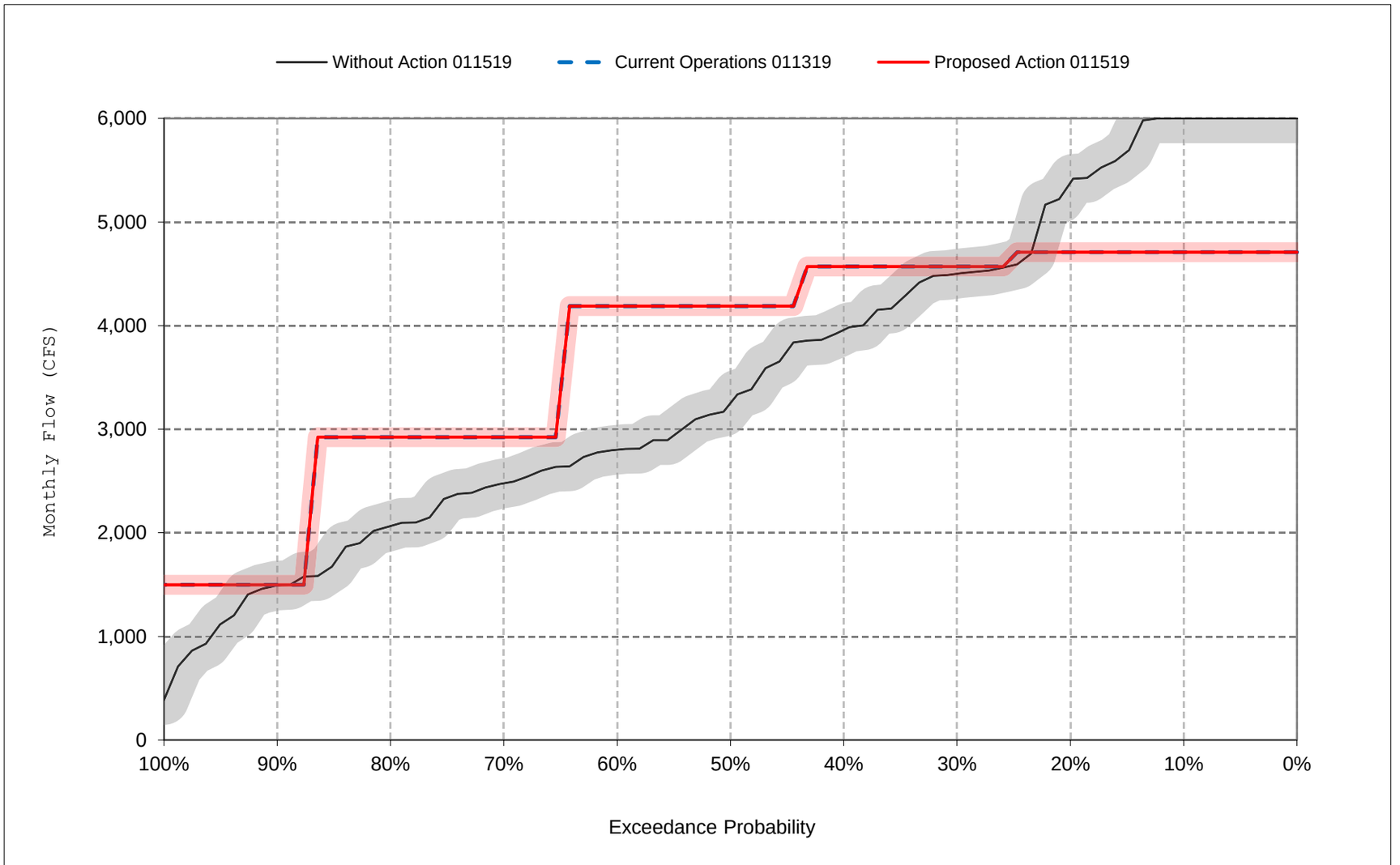
Figure 12-13. Trinity River Flow below Lewiston, April



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

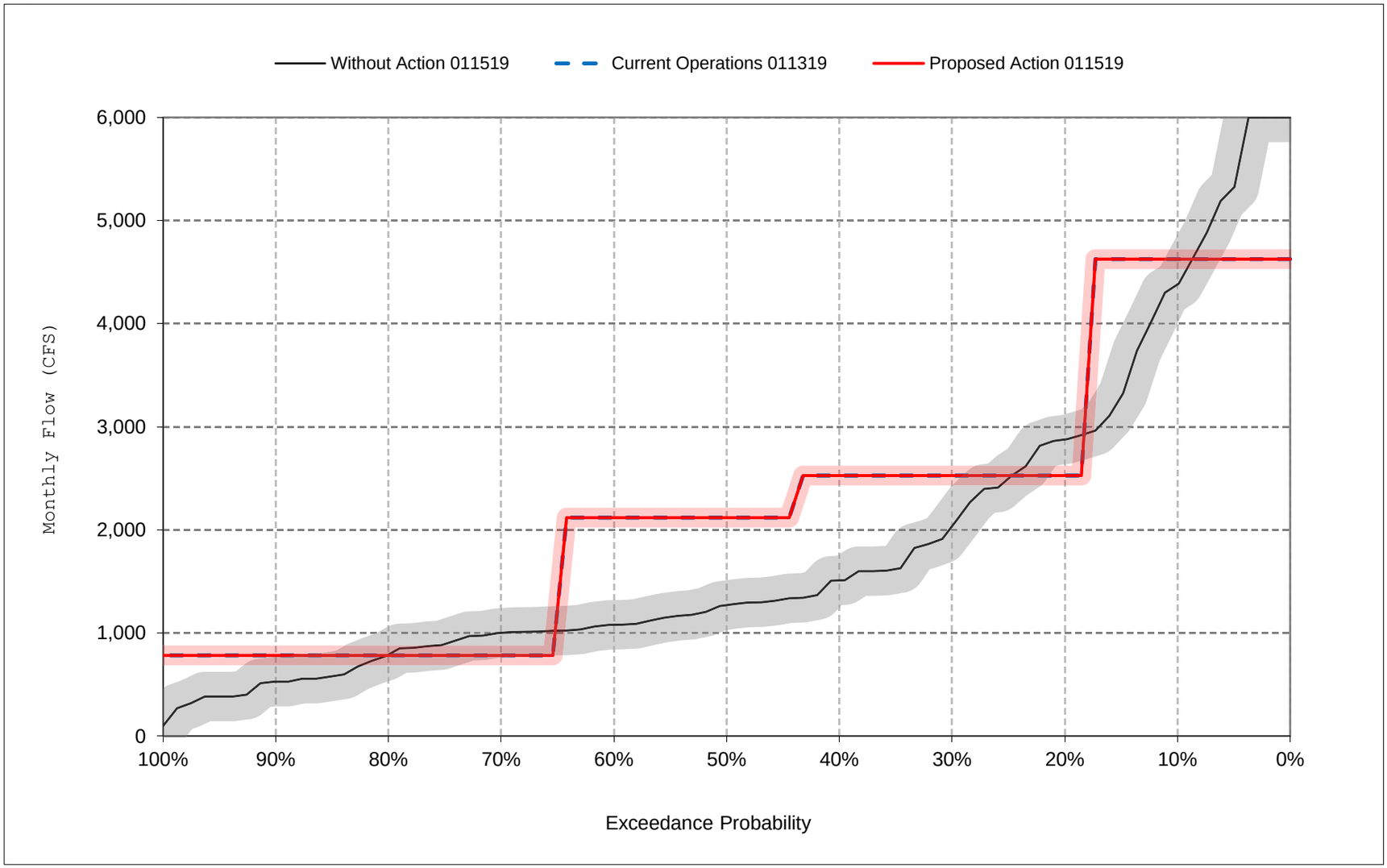
Figure 12-14. Trinity River Flow below Lewiston, May



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

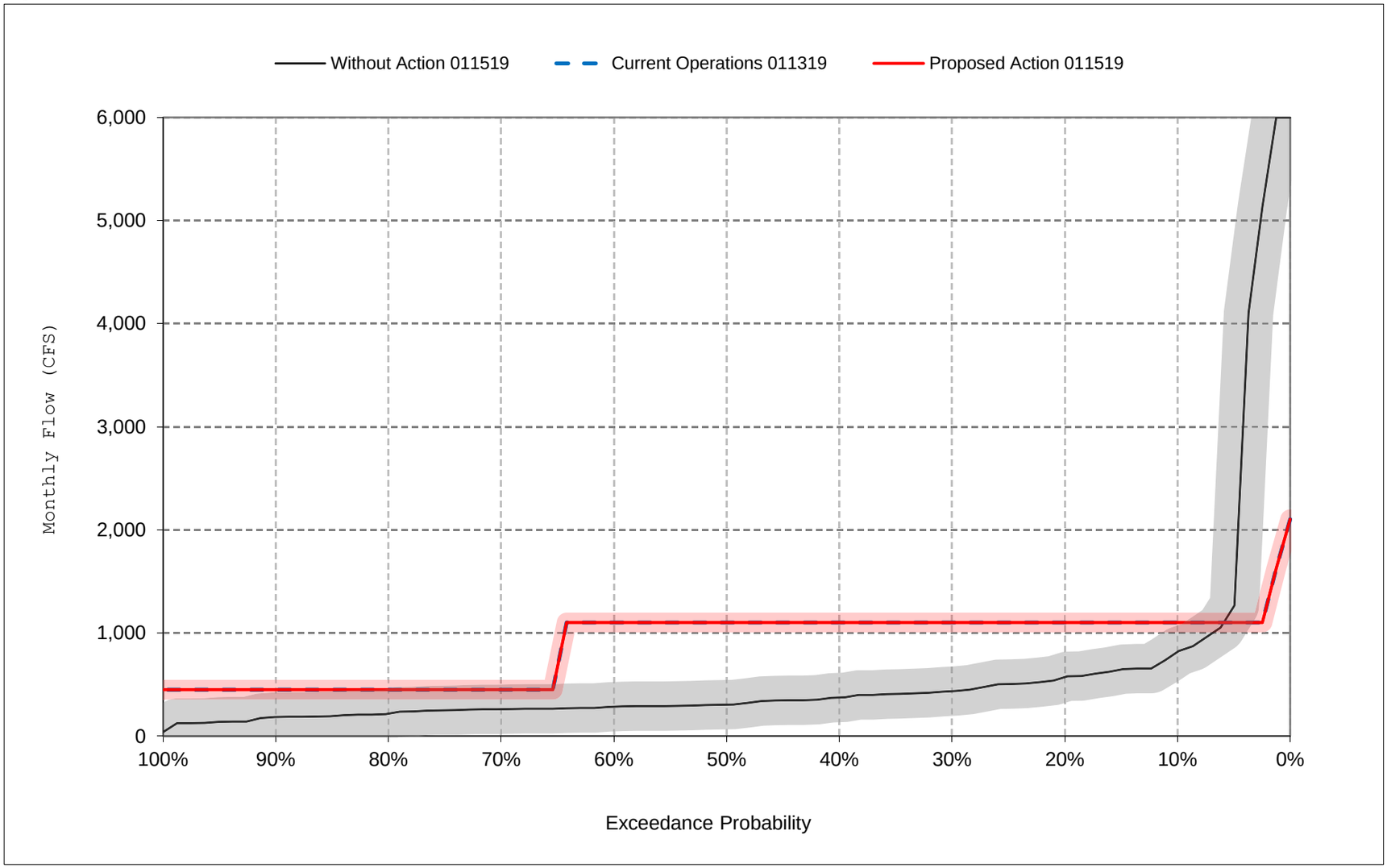
Figure 12-15. Trinity River Flow below Lewiston, June



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

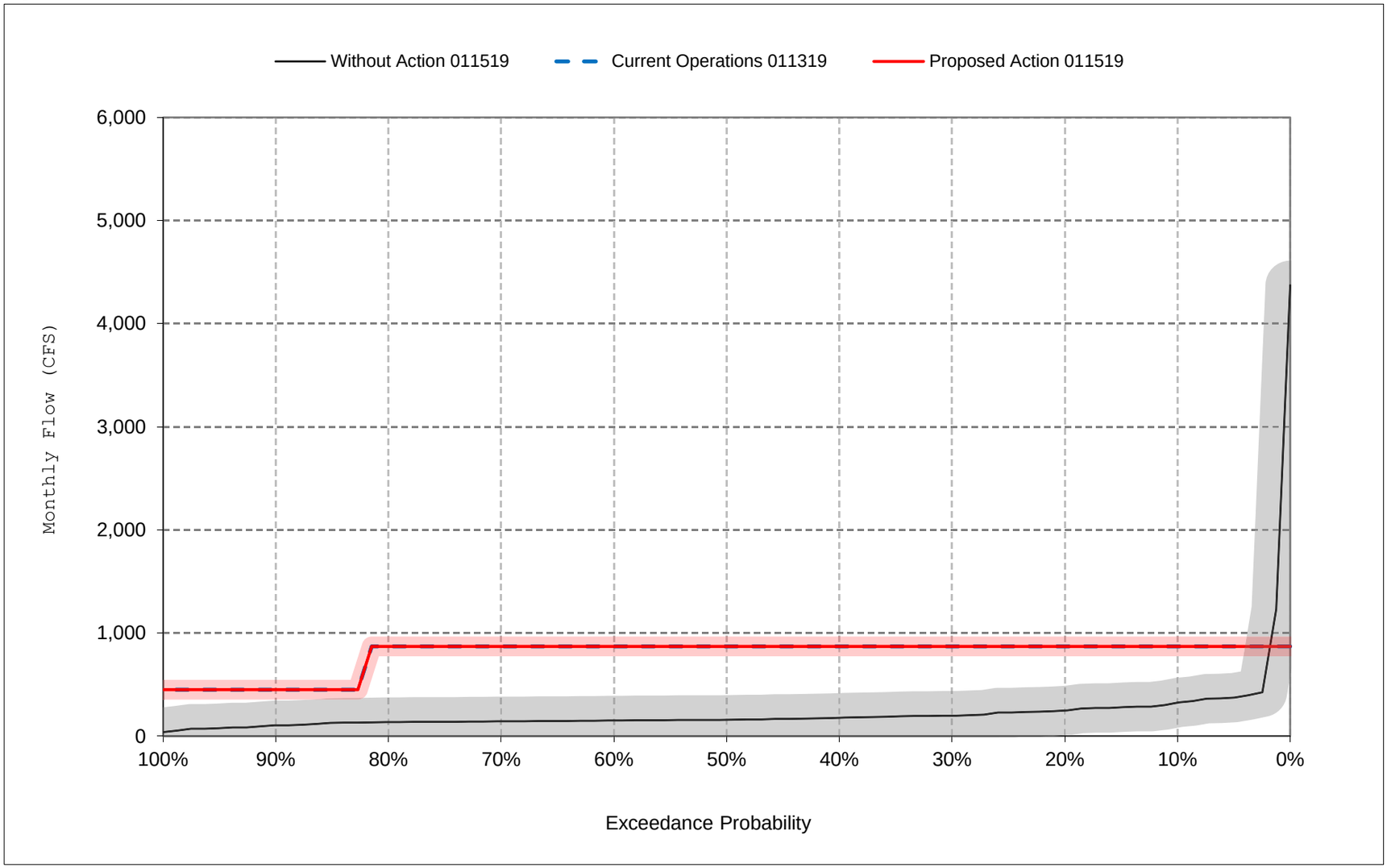
Figure 12-16. Trinity River Flow below Lewiston, July



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

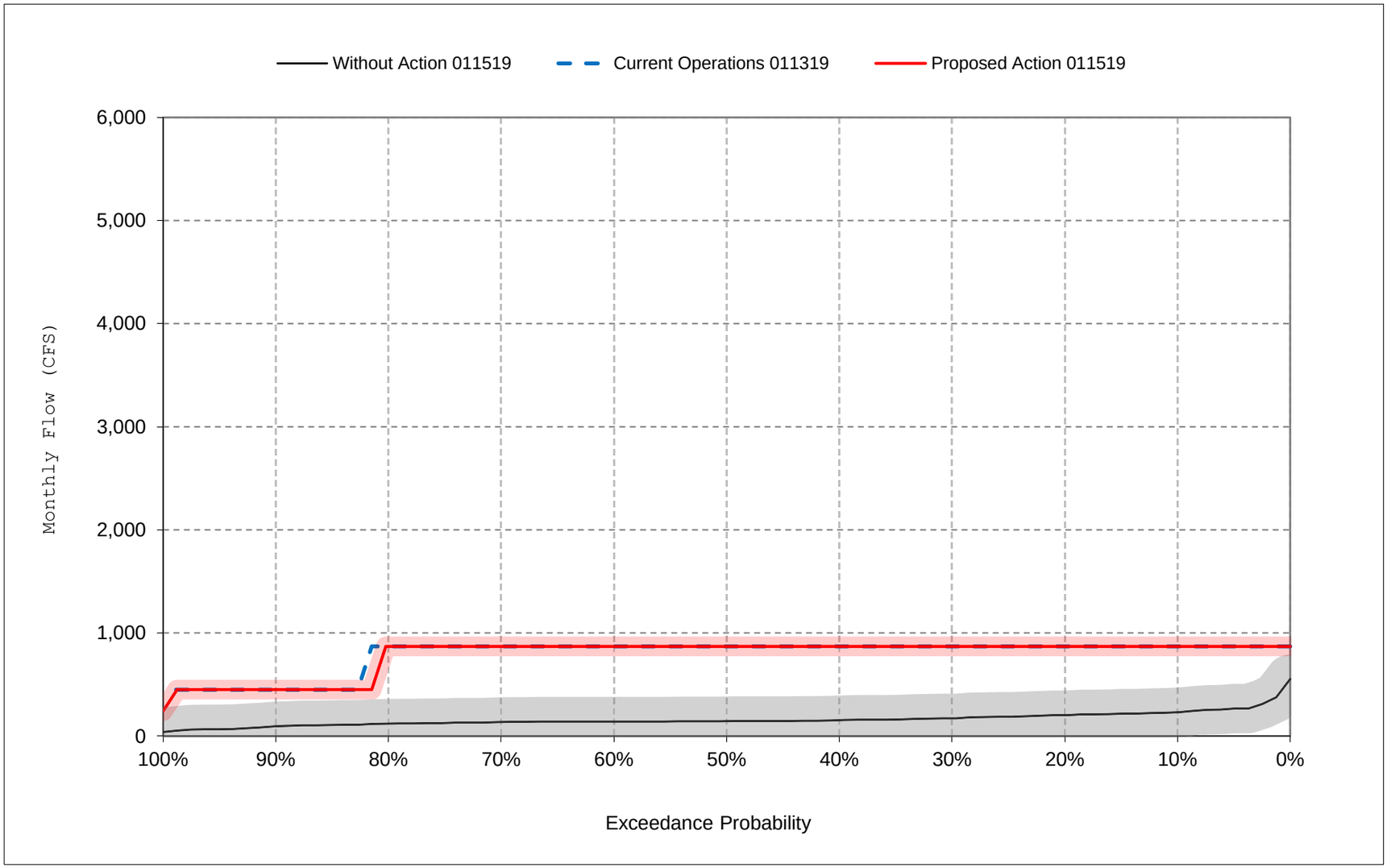
Figure 12-17. Trinity River Flow below Lewiston, August



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Figure 12-18. Trinity River Flow below Lewiston, September



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Table 14-1. Clear Creek below Whiskeytown Dam Flow, Monthly Flow

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	198	571	1,550	1,858	2,635	1,778	1,313	672	341	185	158	144
20%	144	400	950	1,335	1,728	1,390	1,068	541	245	136	101	112
30%	108	250	686	968	1,382	1,063	915	457	215	112	86	78
40%	84	163	449	787	1,128	809	624	372	178	89	64	69
50%	67	125	311	593	888	697	482	299	145	73	47	47
60%	52	104	241	366	558	556	429	228	116	48	46	47
70%	49	75	169	283	393	431	367	197	98	45	45	46
80%	48	61	96	200	318	370	269	147	79	44	45	46
90%	47	51	55	106	197	219	197	96	50	43	44	46
Long Term												
Full Simulation Period[a]	134	251	580	802	1,083	897	725	392	185	96	83	78
Water Year Types[b,c]												
Wet (32%)	92	272	595	1,414	1,546	1,305	1,197	611	287	134	99	99
Above Normal (16%)	328	359	691	1,064	1,728	1,157	791	463	215	91	100	100
Below Normal (13%)	105	207	487	520	781	523	457	220	122	94	75	64
Dry (24%)	114	251	711	327	686	704	507	269	109	68	61	62
Critical (15%)	72	128	292	244	322	395	238	202	114	68	72	45

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	200	200	200	200	200	200	200	277	200	85	85	150
20%	200	200	200	200	200	200	200	277	200	85	85	150
30%	200	200	200	200	200	200	200	277	200	85	85	150
40%	200	200	200	200	200	200	200	277	200	85	85	150
50%	200	200	200	200	200	200	200	277	200	85	85	150
60%	200	200	200	200	200	200	200	277	200	85	85	150
70%	200	200	200	200	200	200	200	277	200	85	85	150
80%	200	200	200	200	200	200	200	277	150	85	85	150
90%	150	150	150	150	150	150	150	237	150	85	85	150
Long Term												
Full Simulation Period[a]	185	186	190	225	207	194	191	265	181	85	85	148
Water Year Types[b,c]												
Wet (32%)	200	200	200	309	249	207	200	277	200	85	85	150
Above Normal (16%)	200	200	200	192	196	196	196	277	200	85	85	150
Below Normal (13%)	195	195	195	195	195	195	195	274	191	85	85	150
Dry (24%)	188	188	188	190	190	190	190	267	183	85	85	150
Critical (15%)	121	128	154	167	167	167	167	214	111	85	85	133

Current Operations 011319 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	2	-371	-1,350	-1,658	-2,435	-1,578	-1,113	-395	-141	-100	-73	6
20%	56	-200	-750	-1,135	-1,528	-1,190	-868	-264	-45	-51	-16	38
30%	92	-50	-486	-768	-1,182	-863	-715	-180	-15	-27	-1	72
40%	116	37	-249	-587	-928	-609	-424	-95	22	-4	21	81
50%	133	75	-111	-393	-688	-497	-282	-22	55	12	38	103
60%	148	96	-41	-166	-358	-356	-229	50	84	37	39	103
70%	151	125	31	-83	-193	-231	-167	80	102	40	40	104
80%	152	139	104	0	-118	-170	-69	131	71	41	40	104
90%	103	99	95	44	-47	-69	-47	141	100	42	41	104
Long Term												
Full Simulation Period[a]	51	-65	-390	-577	-876	-703	-533	-127	-4	-11	2	70
Water Year Types[b,c]												
Wet (32%)	108	-72	-395	-1,105	-1,297	-1,099	-997	-334	-87	-49	-14	51
Above Normal (16%)	-128	-159	-491	-872	-1,532	-961	-595	-185	-15	-6	-15	50
Below Normal (13%)	90	-11	-292	-324	-586	-327	-262	54	69	-9	10	86
Dry (24%)	74	-64	-524	-137	-496	-514	-317	-1	73	17	24	88
Critical (15%)	49	0	-137	-77	-155	-228	-72	11	-3	17	13	89

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 14-2. Clear Creek below Whiskeytown Dam Flow, Monthly Flow

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	198	571	1,550	1,858	2,635	1,778	1,313	672	341	185	158	144
20%	144	400	950	1,335	1,728	1,390	1,068	541	245	136	101	112
30%	108	250	686	968	1,382	1,063	915	457	215	112	86	78
40%	84	163	449	787	1,128	809	624	372	178	89	64	69
50%	67	125	311	593	888	697	482	299	145	73	47	47
60%	52	104	241	366	558	556	429	228	116	48	46	47
70%	49	75	169	283	393	431	367	197	98	45	45	46
80%	48	61	96	200	318	370	269	147	79	44	45	46
90%	47	51	55	106	197	219	197	96	50	43	44	46
Long Term												
Full Simulation Period[a]	134	251	580	802	1,083	897	725	392	185	96	83	78
Water Year Types[b,c]												
Wet (32%)	92	272	595	1,414	1,546	1,305	1,197	611	287	134	99	99
Above Normal (16%)	328	359	691	1,064	1,728	1,157	791	463	215	91	100	100
Below Normal (13%)	105	207	487	520	781	523	457	220	122	94	75	64
Dry (24%)	114	251	711	327	686	704	507	269	109	68	61	62
Critical (15%)	72	128	292	244	322	395	238	202	114	68	72	45

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	200	200	200	200	200	200	200	277	200	85	85	150
20%	200	200	200	200	200	200	200	277	200	85	85	150
30%	200	200	200	200	200	200	200	277	200	85	85	150
40%	200	200	200	200	200	200	200	277	200	85	85	150
50%	200	200	200	200	200	200	200	277	200	85	85	150
60%	200	200	200	200	200	200	200	277	200	85	85	150
70%	200	200	200	200	200	200	200	277	200	85	85	150
80%	200	200	200	200	200	200	200	277	150	85	85	150
90%	150	150	150	150	150	150	150	237	150	85	85	150
Long Term												
Full Simulation Period[a]	187	188	190	225	207	194	191	265	181	85	86	148
Water Year Types[b,c]												
Wet (32%)	200	200	200	309	249	207	200	277	200	85	85	150
Above Normal (16%)	200	200	200	192	196	196	196	277	200	85	85	150
Below Normal (13%)	195	195	195	195	195	195	195	274	191	85	85	150
Dry (24%)	188	188	188	190	190	190	190	267	183	85	85	150
Critical (15%)	133	141	154	167	167	167	167	214	111	85	94	133

Proposed Action 011519 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	2	-371	-1,350	-1,658	-2,435	-1,578	-1,113	-395	-141	-100	-73	6
20%	56	-200	-750	-1,135	-1,528	-1,190	-868	-264	-45	-51	-16	38
30%	92	-50	-486	-768	-1,182	-863	-715	-180	-15	-27	-1	72
40%	116	37	-249	-587	-928	-609	-424	-95	22	-4	21	81
50%	133	75	-111	-393	-688	-497	-282	-22	55	12	38	103
60%	148	96	-41	-166	-358	-356	-229	50	84	37	39	103
70%	151	125	31	-83	-193	-231	-167	80	102	40	40	104
80%	152	139	104	0	-118	-170	-69	131	71	41	40	104
90%	103	99	95	44	-47	-69	-47	141	100	42	41	104
Long Term												
Full Simulation Period[a]	53	-63	-390	-577	-876	-703	-533	-127	-4	-11	4	70
Water Year Types[b,c]												
Wet (32%)	108	-72	-395	-1,105	-1,297	-1,099	-997	-334	-87	-49	-14	51
Above Normal (16%)	-128	-159	-491	-872	-1,532	-961	-595	-185	-15	-6	-15	50
Below Normal (13%)	90	-11	-292	-324	-586	-327	-262	54	69	-9	10	86
Dry (24%)	74	-64	-524	-137	-496	-514	-317	-1	73	17	24	88
Critical (15%)	62	12	-137	-77	-155	-228	-72	11	-3	17	22	89

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 14-3. Clear Creek below Whiskeytown Dam Flow, Monthly Flow

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	200	200	200	200	200	200	200	277	200	85	85	150
20%	200	200	200	200	200	200	200	277	200	85	85	150
30%	200	200	200	200	200	200	200	277	200	85	85	150
40%	200	200	200	200	200	200	200	277	200	85	85	150
50%	200	200	200	200	200	200	200	277	200	85	85	150
60%	200	200	200	200	200	200	200	277	200	85	85	150
70%	200	200	200	200	200	200	200	277	200	85	85	150
80%	200	200	200	200	200	200	200	277	150	85	85	150
90%	150	150	150	150	150	150	150	237	150	85	85	150
Long Term												
Full Simulation Period[a]	185	186	190	225	207	194	191	265	181	85	85	148
Water Year Types[b,c]												
Wet (32%)	200	200	200	309	249	207	200	277	200	85	85	150
Above Normal (16%)	200	200	200	192	196	196	196	277	200	85	85	150
Below Normal (13%)	195	195	195	195	195	195	195	274	191	85	85	150
Dry (24%)	188	188	188	190	190	190	190	267	183	85	85	150
Critical (15%)	121	128	154	167	167	167	167	214	111	85	85	133

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	200	200	200	200	200	200	200	277	200	85	85	150
20%	200	200	200	200	200	200	200	277	200	85	85	150
30%	200	200	200	200	200	200	200	277	200	85	85	150
40%	200	200	200	200	200	200	200	277	200	85	85	150
50%	200	200	200	200	200	200	200	277	200	85	85	150
60%	200	200	200	200	200	200	200	277	200	85	85	150
70%	200	200	200	200	200	200	200	277	200	85	85	150
80%	200	200	200	200	200	200	200	277	150	85	85	150
90%	150	150	150	150	150	150	150	237	150	85	85	150
Long Term												
Full Simulation Period[a]	187	188	190	225	207	194	191	265	181	85	86	148
Water Year Types[b,c]												
Wet (32%)	200	200	200	309	249	207	200	277	200	85	85	150
Above Normal (16%)	200	200	200	192	196	196	196	277	200	85	85	150
Below Normal (13%)	195	195	195	195	195	195	195	274	191	85	85	150
Dry (24%)	188	188	188	190	190	190	190	267	183	85	85	150
Critical (15%)	133	141	154	167	167	167	167	214	111	85	94	133

Proposed Action 011519 minus Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	2	2	**0**	**0**	**0**	**0**	**0**	0	0	0	1	0
Water Year Types[b,c]												
Wet (32%)	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal (16%)	0	0	0	0	0	0	0	0	0	0	0	0
Below Normal (13%)	0	0	0	0	0	0	0	0	0	0	0	0
Dry (24%)	0	0	0	0	**0**	**0**	**0**	0	0	0	0	0
Critical (15%)	13	13	**0**	**0**	**0**	**0**	**0**	0	0	0	9	0

a Based on the 82-year simulation period.

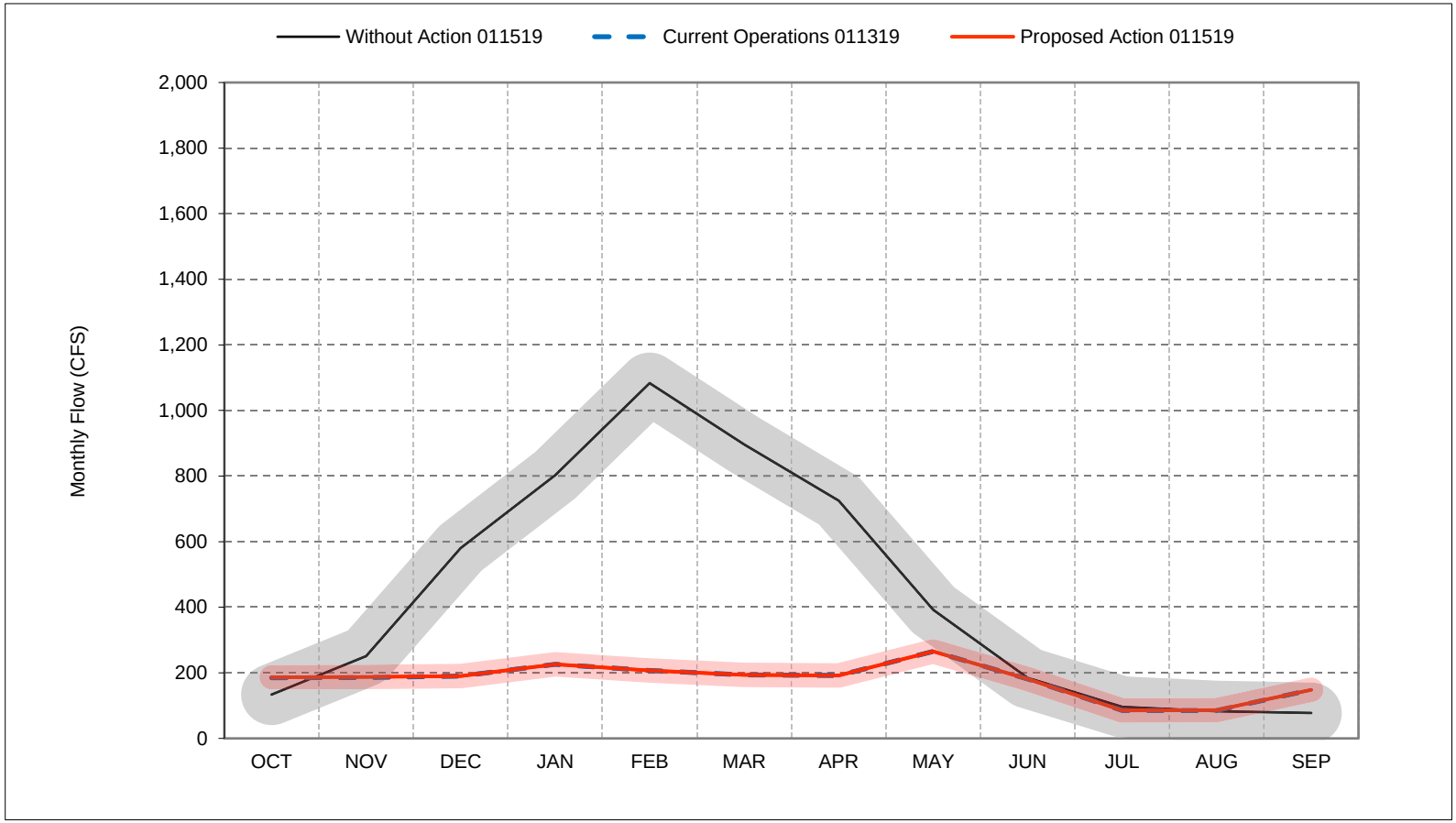
b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

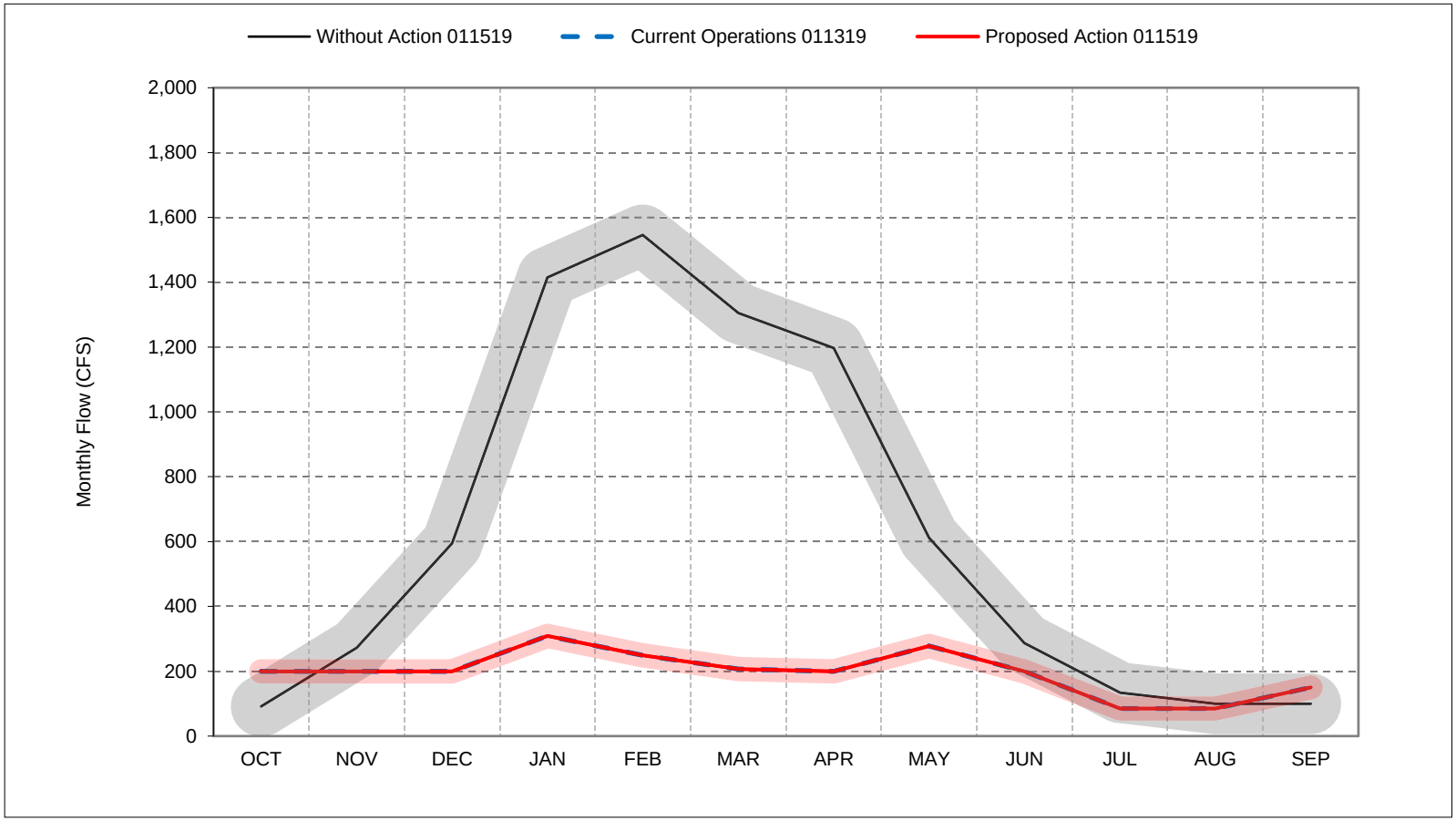
e These are draft results meant for qualitative analysis and are subject to revision.

Figure 14-1. Clear Creek below Whiskeytown Dam Flow, Long-Term Average Flow



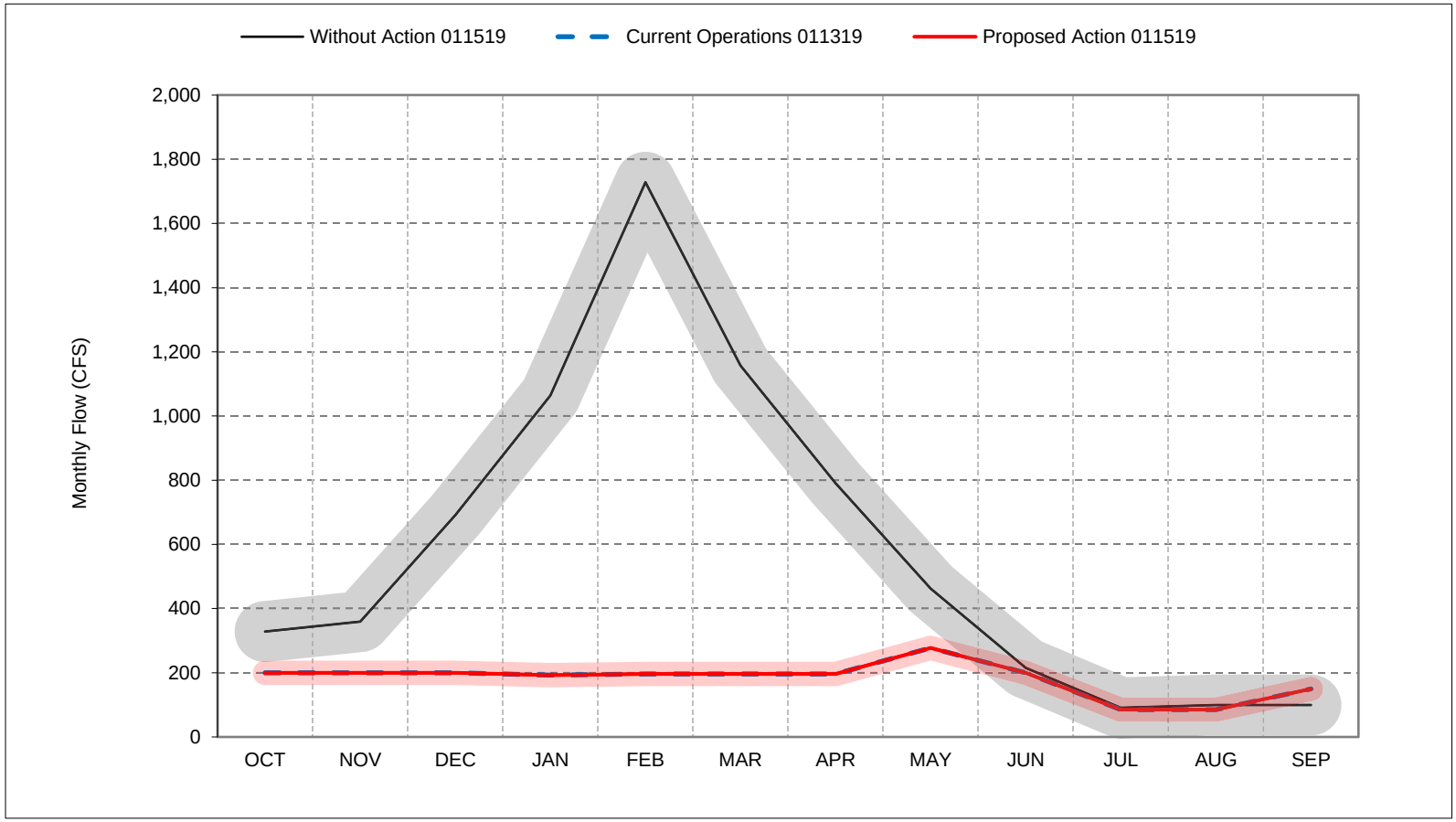
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 14-2. Clear Creek below Whiskeytown Dam Flow, Wet Year Average Flow



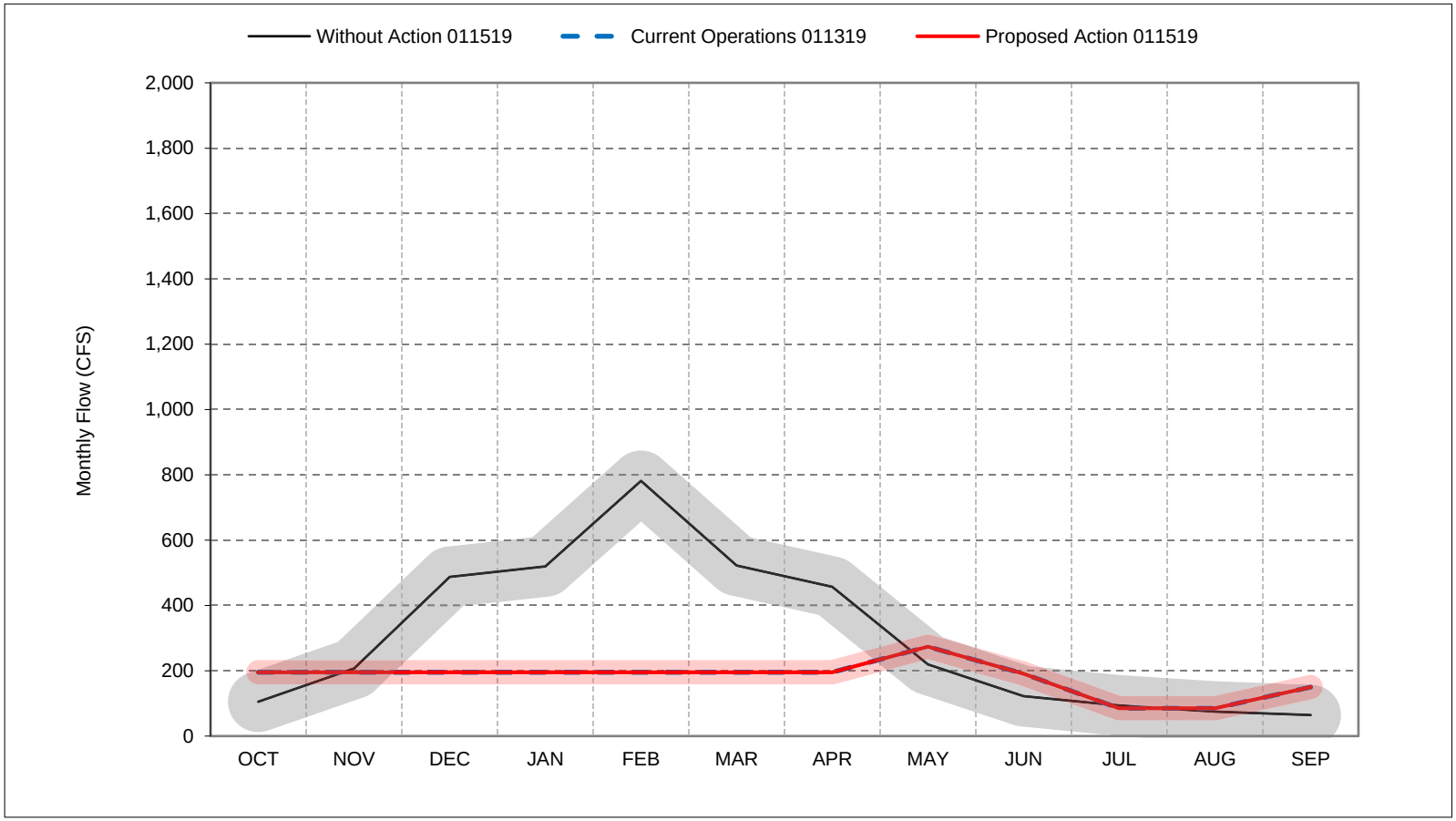
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 14-3. Clear Creek below Whiskeytown Dam Flow, Above Normal Year Average Flow



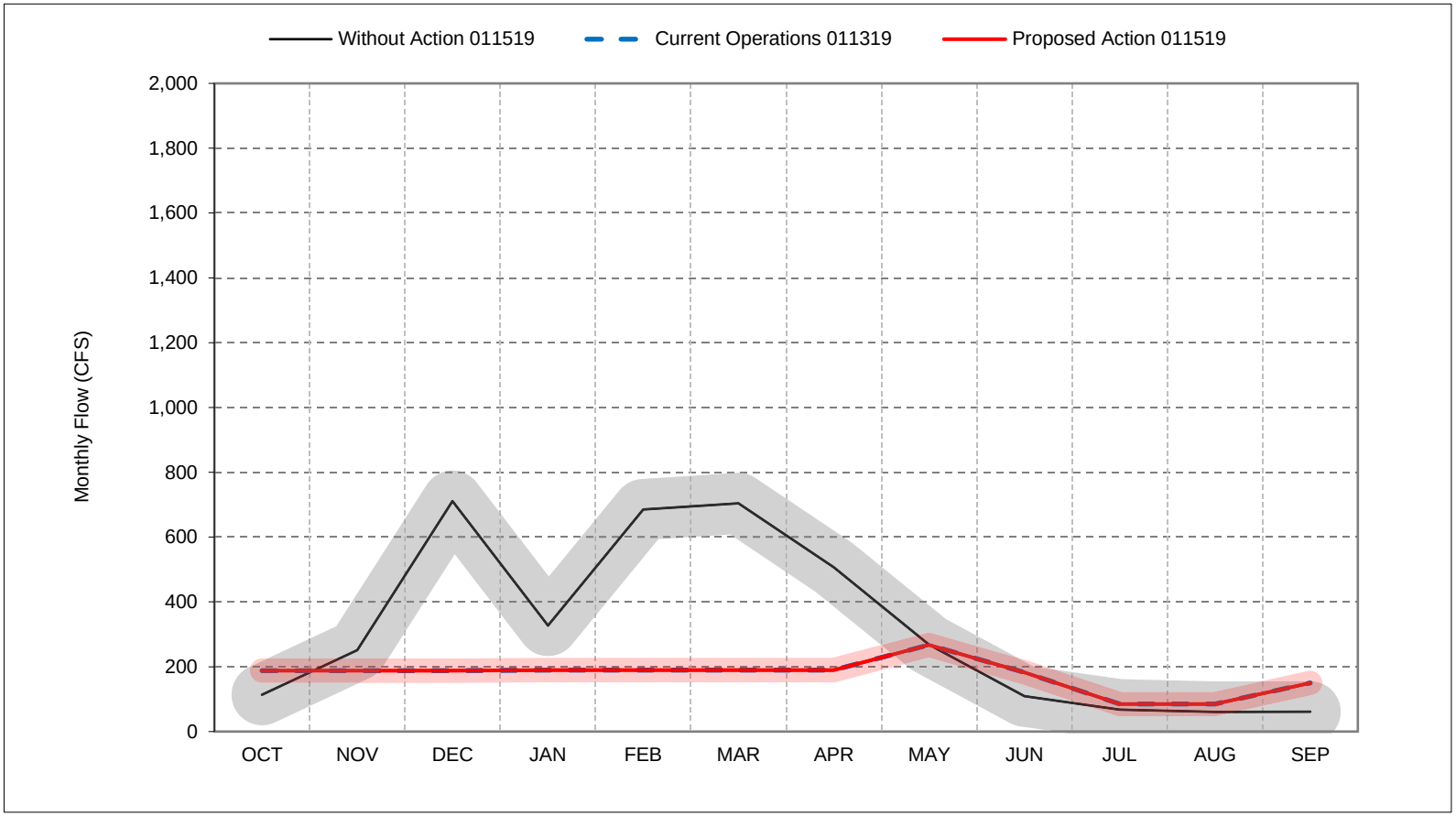
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 14-4. Clear Creek below Whiskeytown Dam Flow, Below Normal Year Average Flow



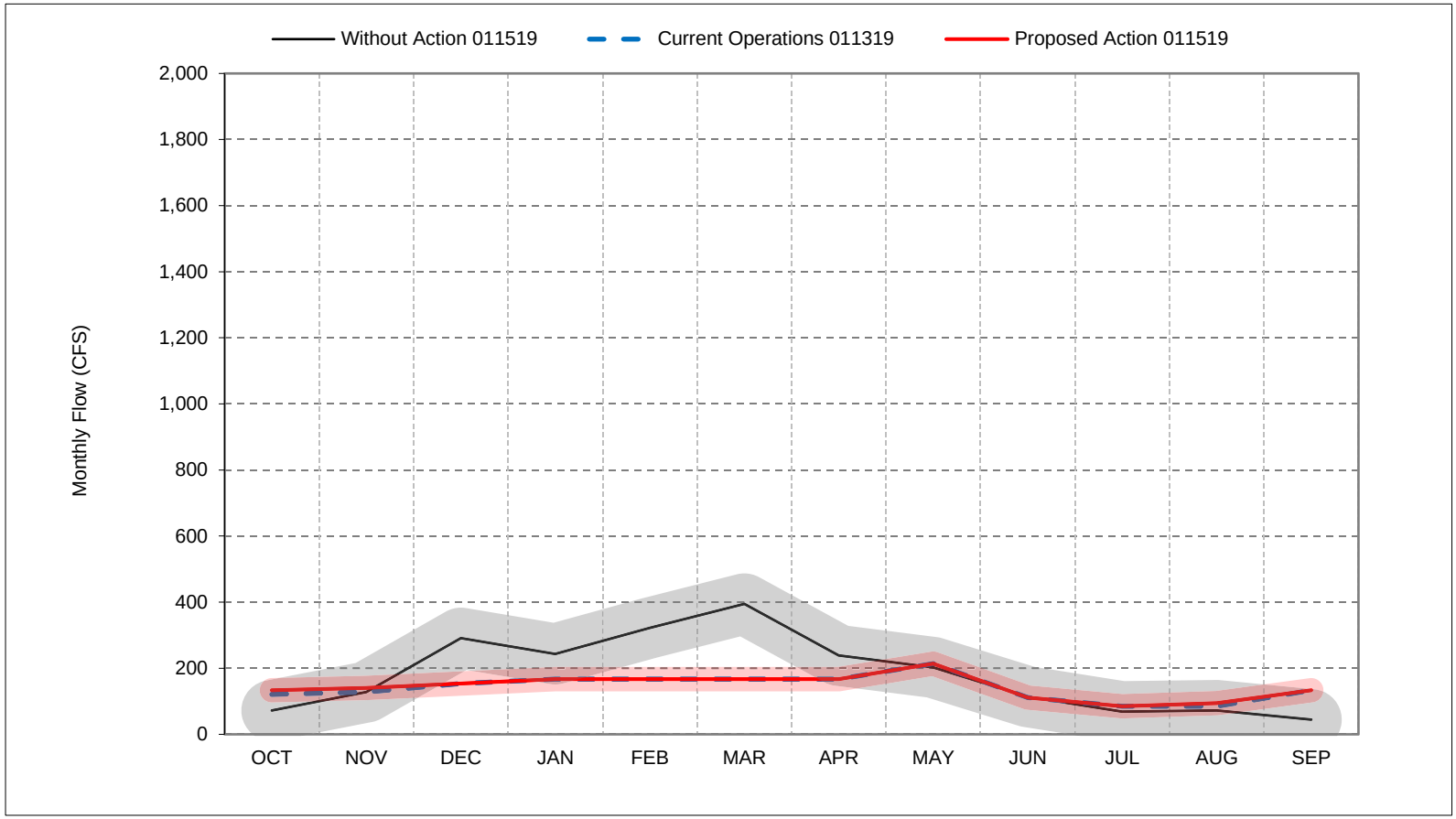
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 14-5. Clear Creek below Whiskeytown Dam Flow, Dry Year Average Flow



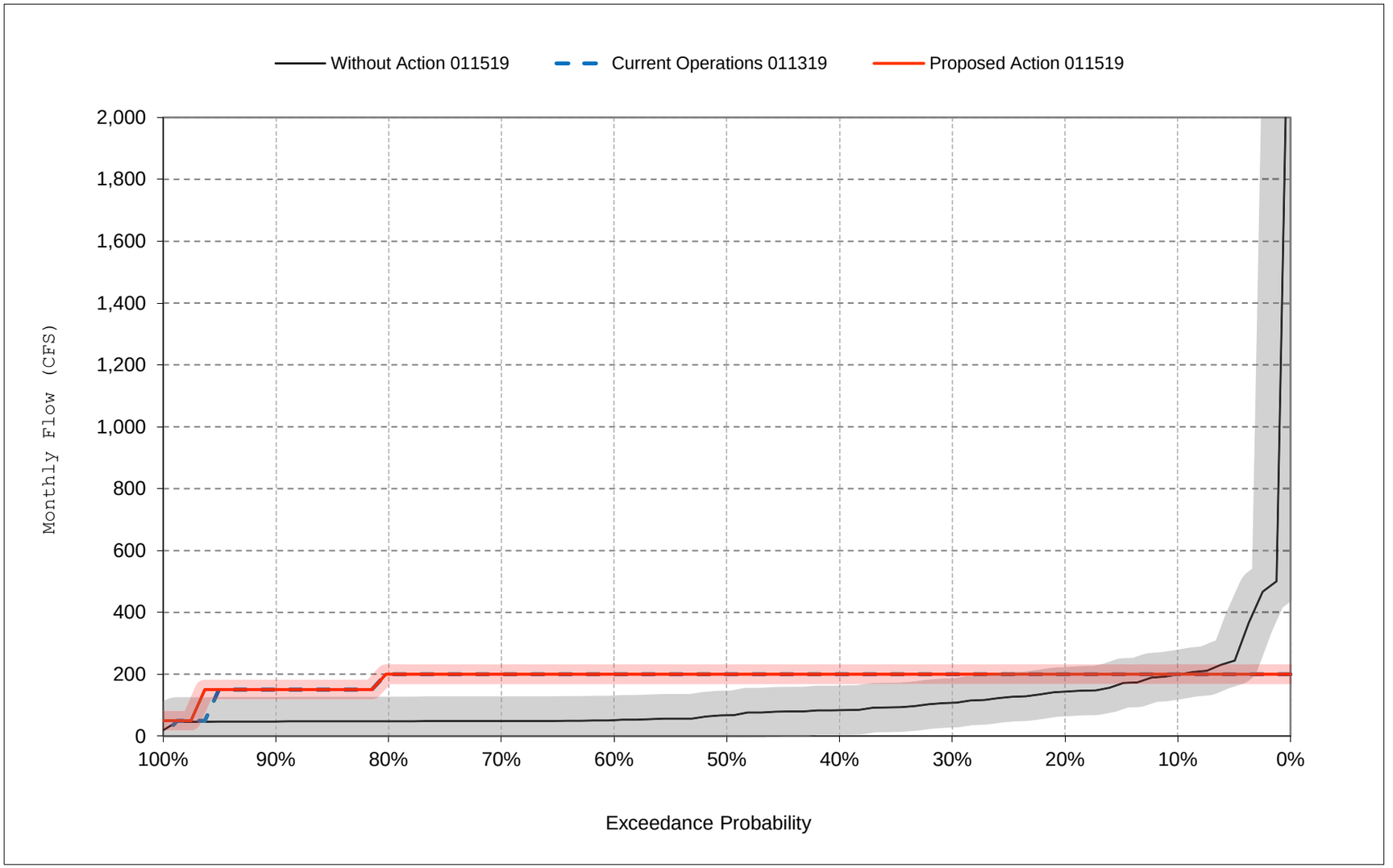
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 14-6. Clear Creek below Whiskeytown Dam Flow, Critical Year Average Flow



*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

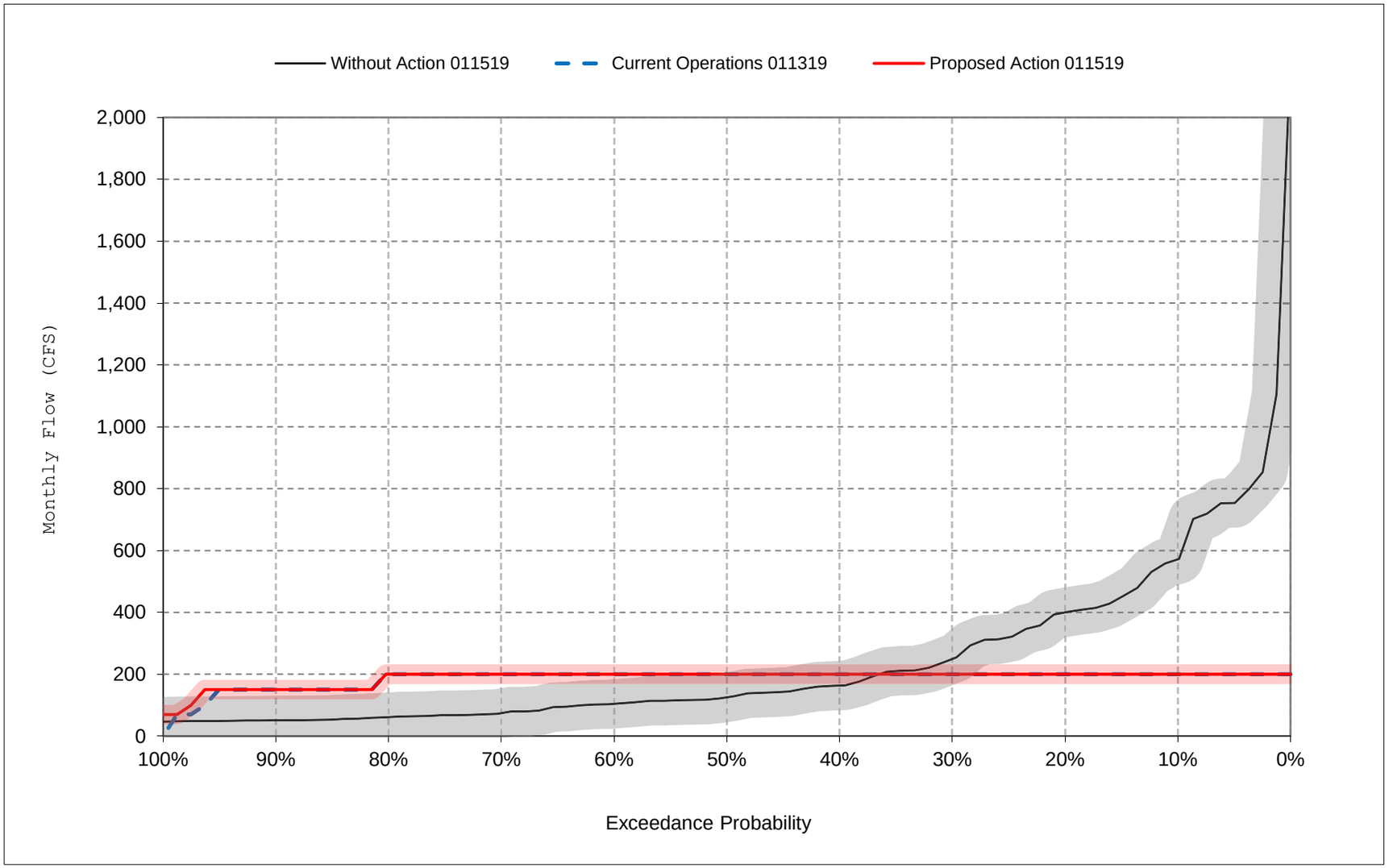
Figure 14-7. Clear Creek below Whiskeytown Dam Flow, October



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

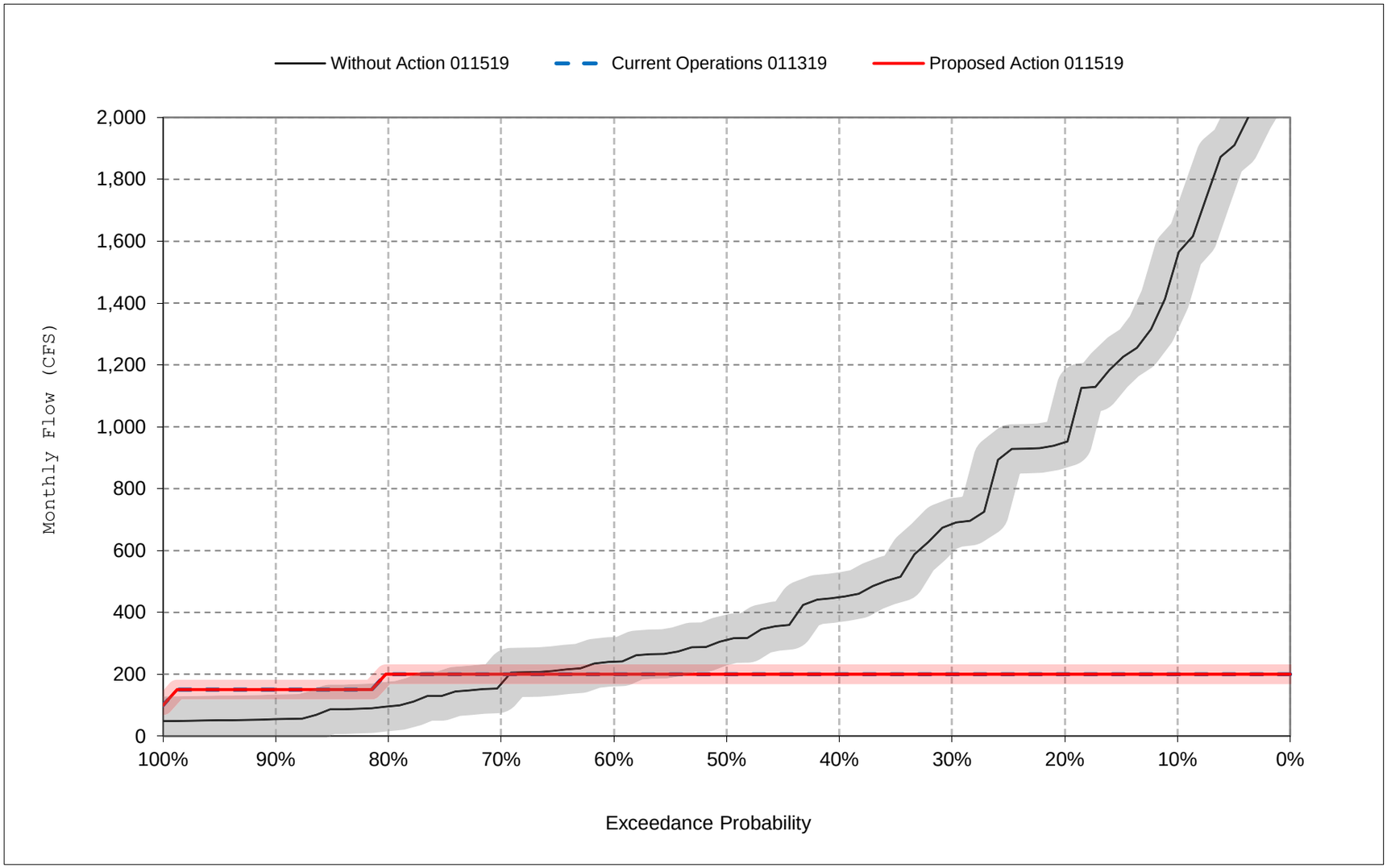
Figure 14-8. Clear Creek below Whiskeytown Dam Flow, November



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

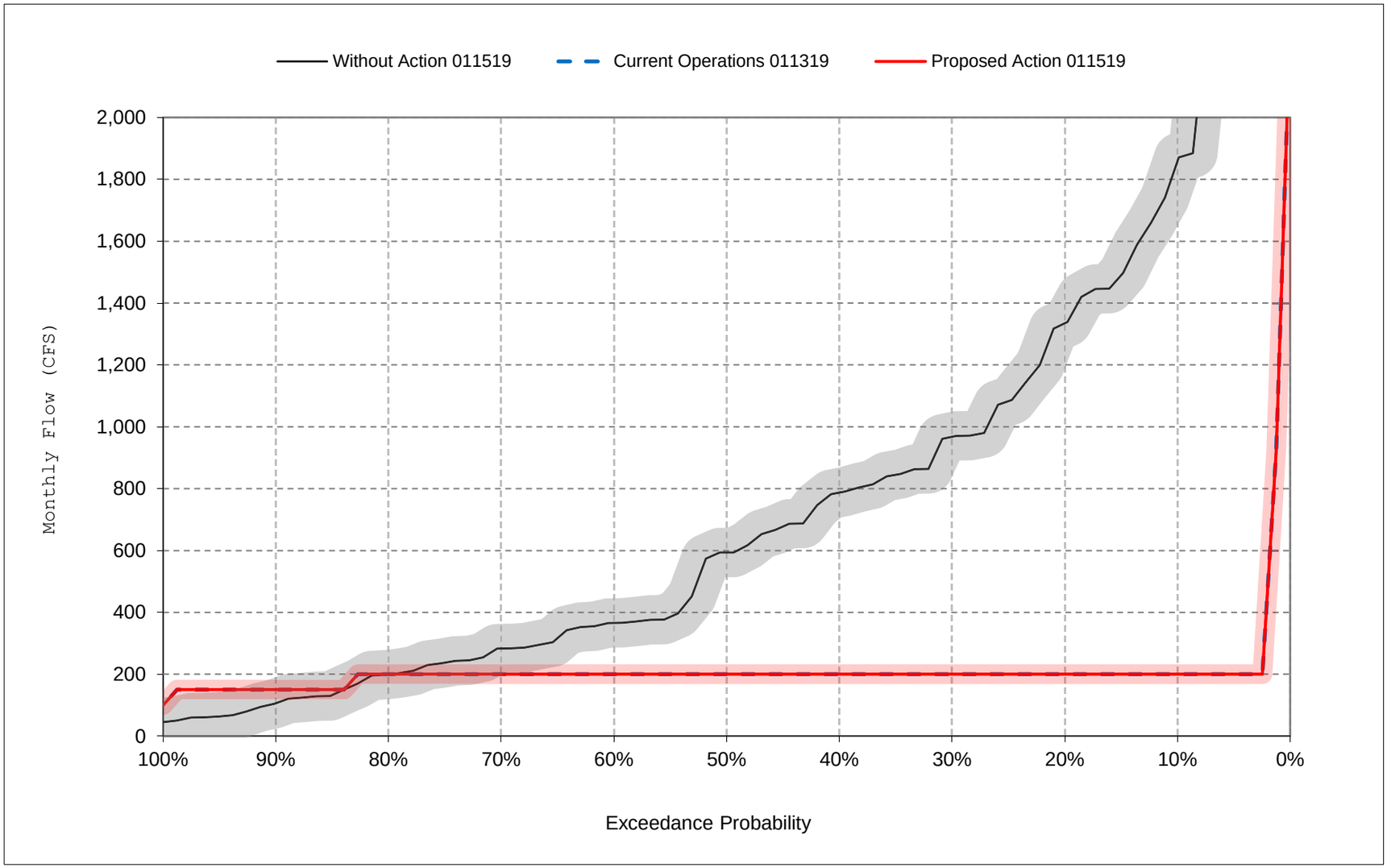
Figure 14-9. Clear Creek below Whiskeytown Dam Flow, December



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

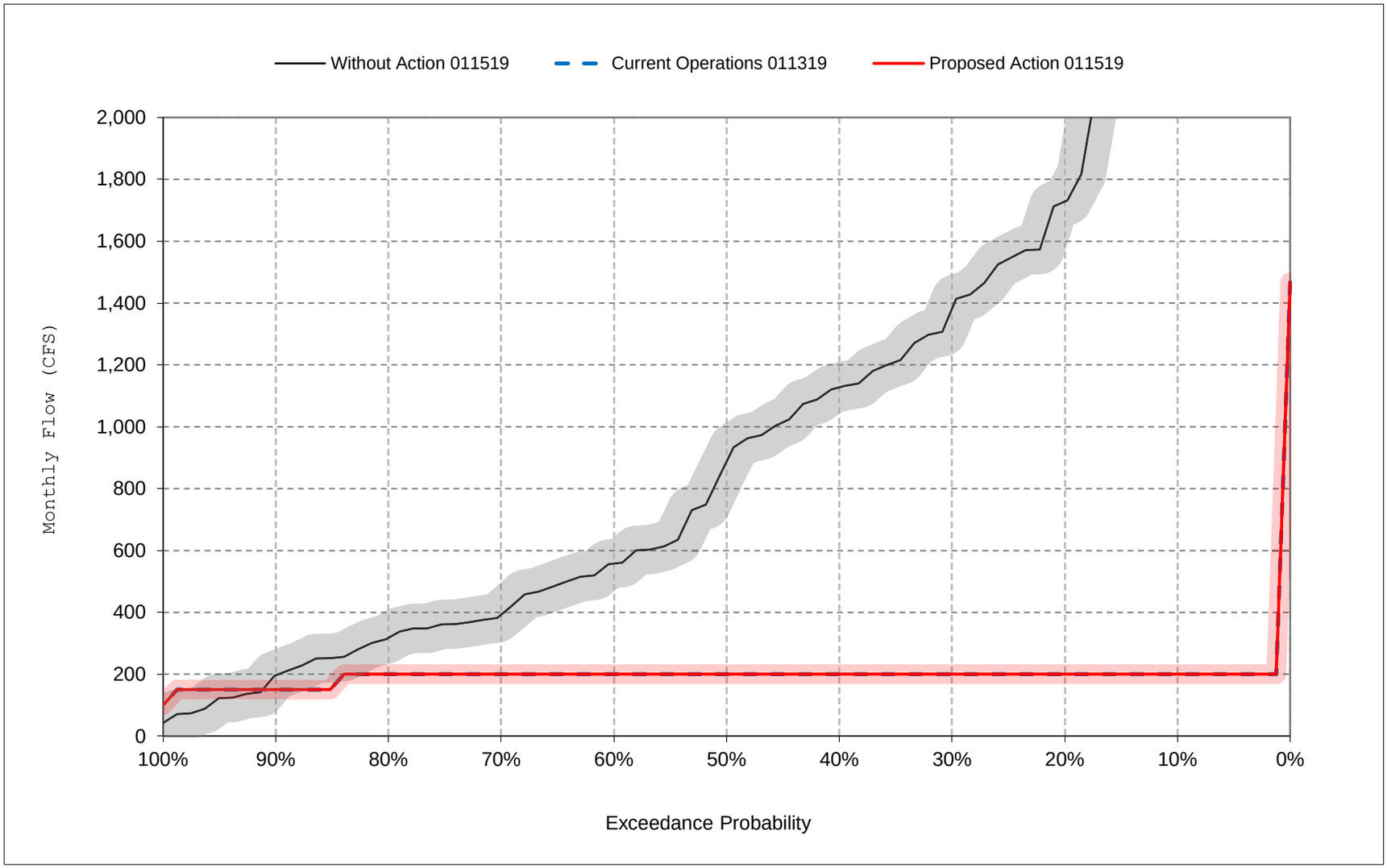
Figure 14-10. Clear Creek below Whiskeytown Dam Flow, January



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

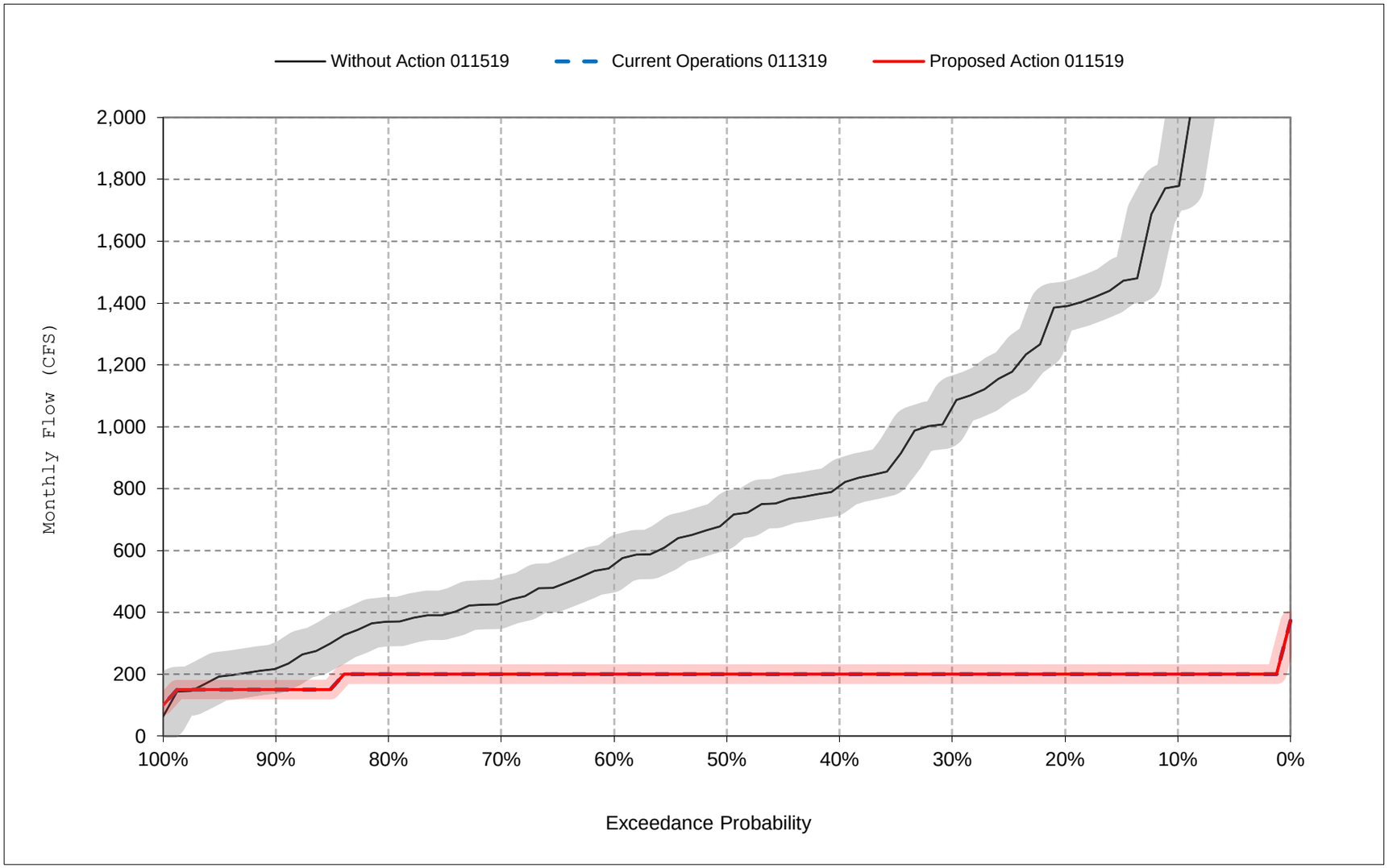
Figure 14-11. Clear Creek below Whiskeytown Dam Flow, February



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

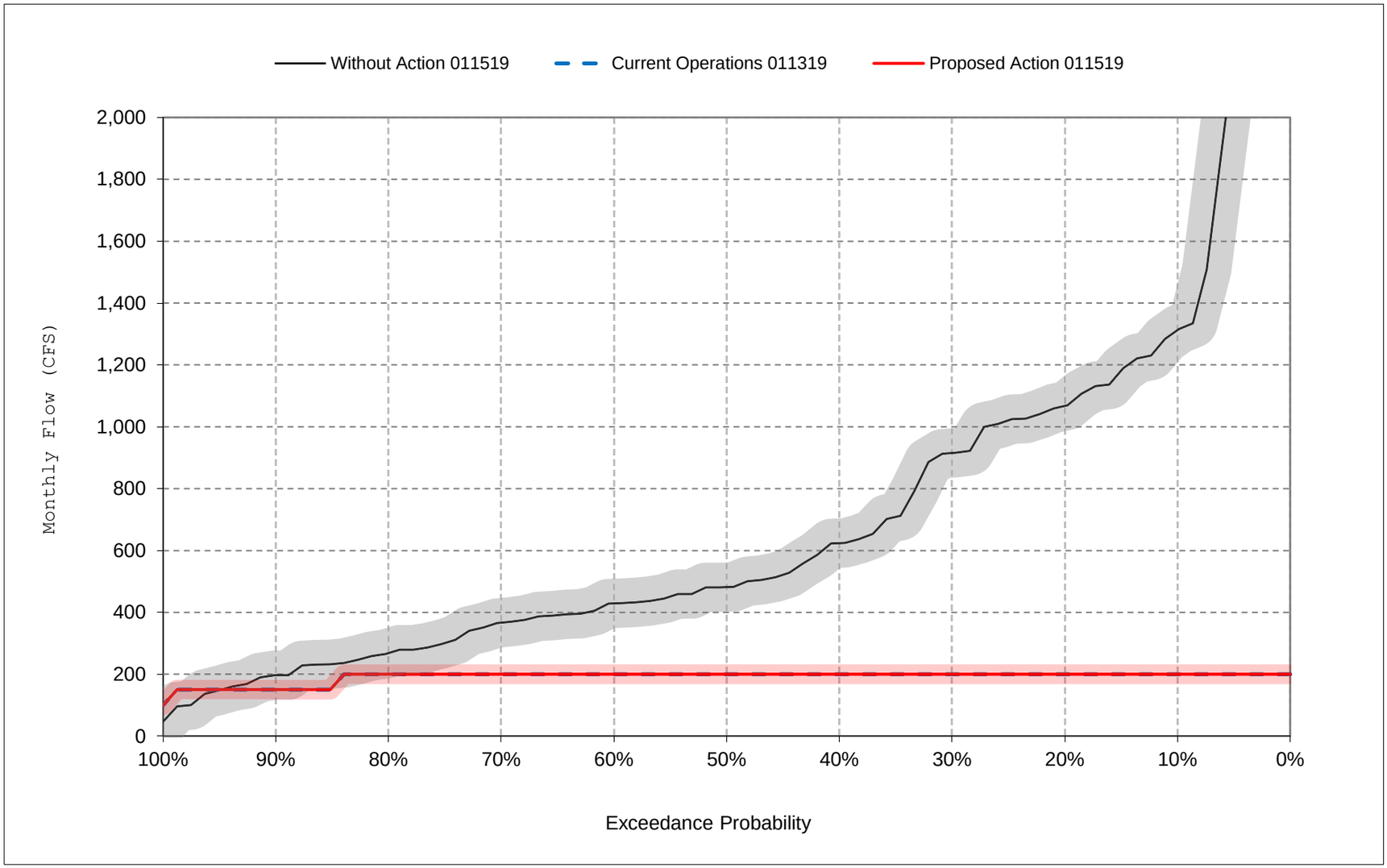
Figure 14-12. Clear Creek below Whiskeytown Dam Flow, March



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

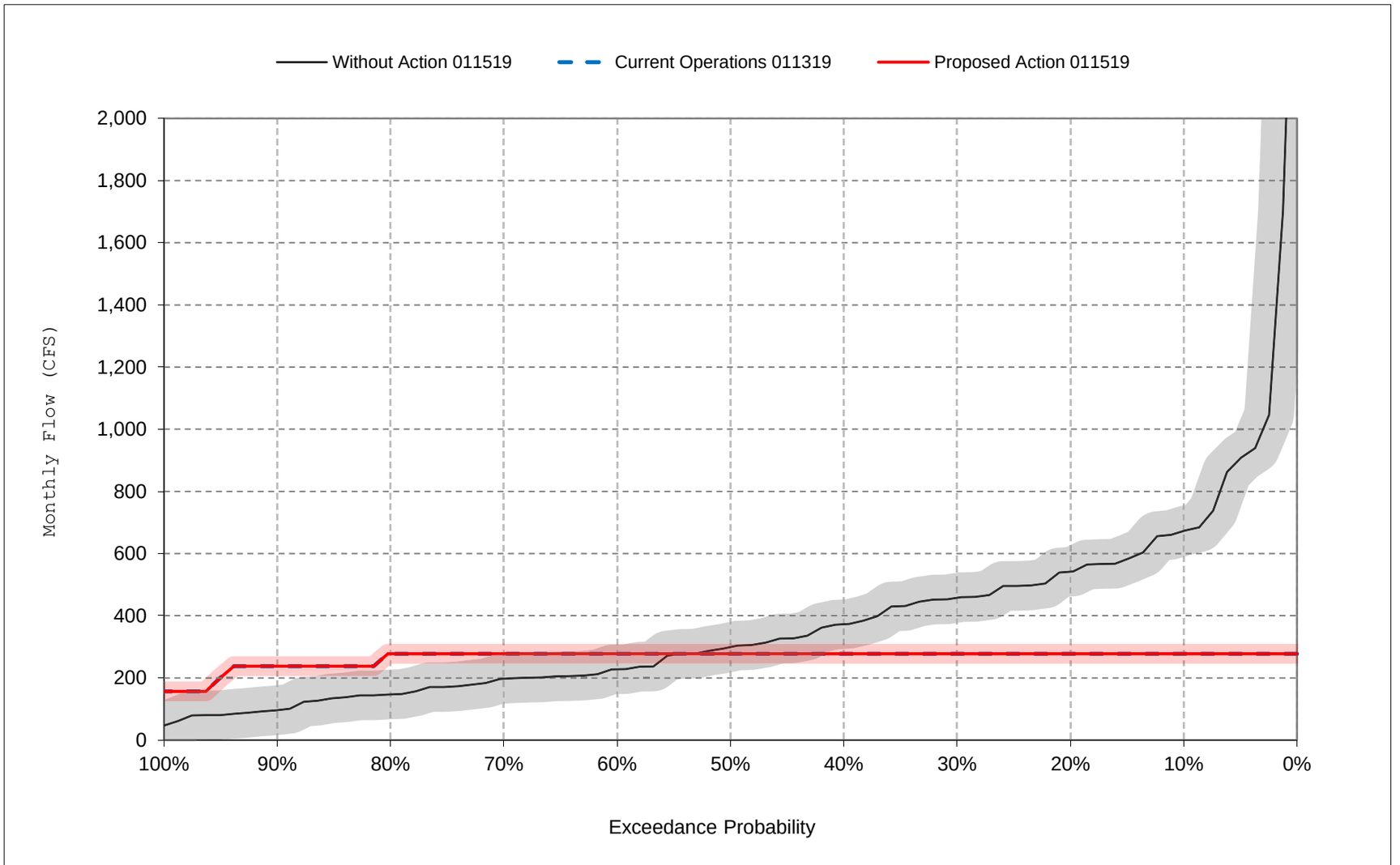
Figure 14-13. Clear Creek below Whiskeytown Dam Flow, April



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

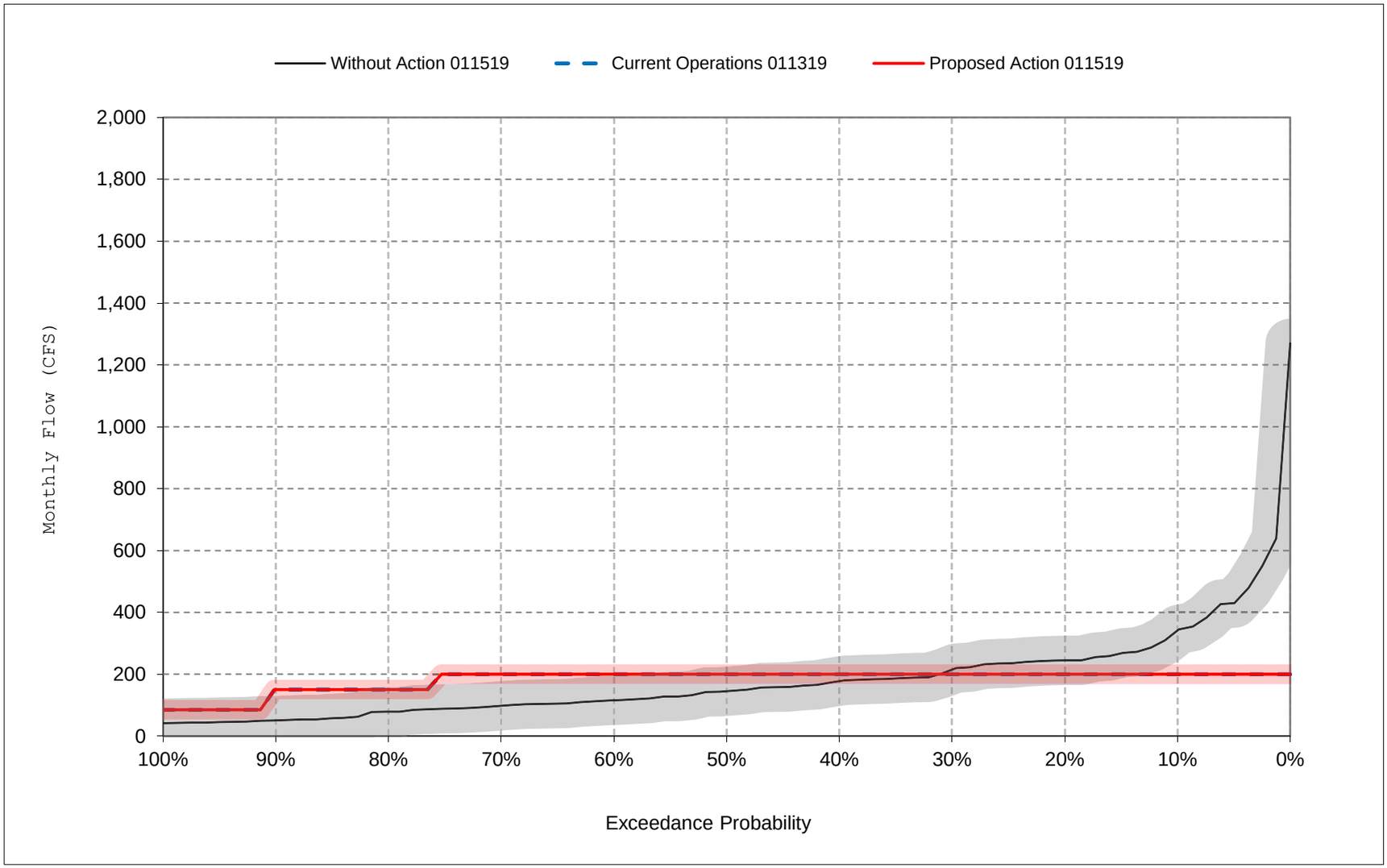
Figure 14-14. Clear Creek below Whiskeytown Dam Flow, May



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

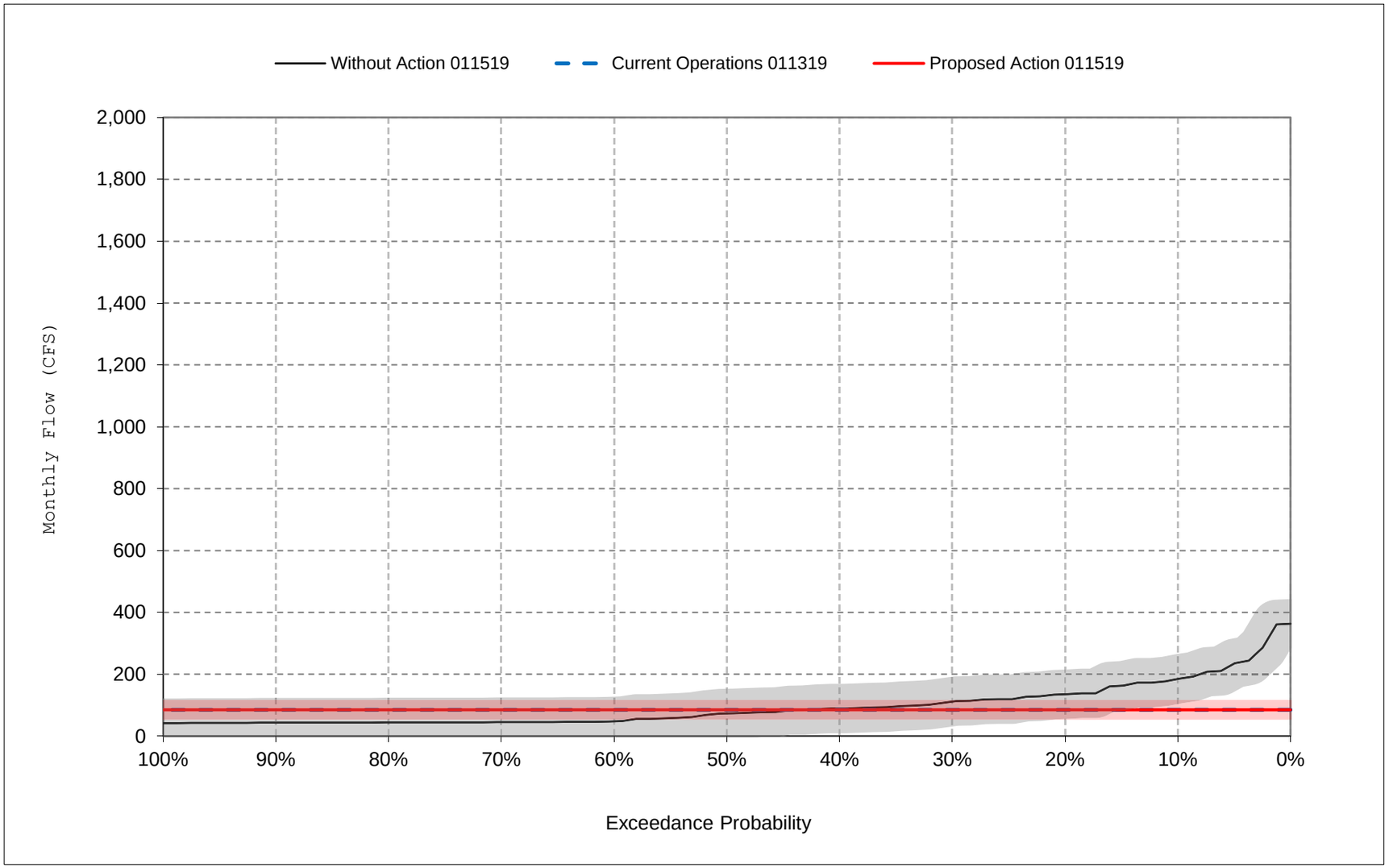
Figure 14-15. Clear Creek below Whiskeytown Dam Flow, June



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

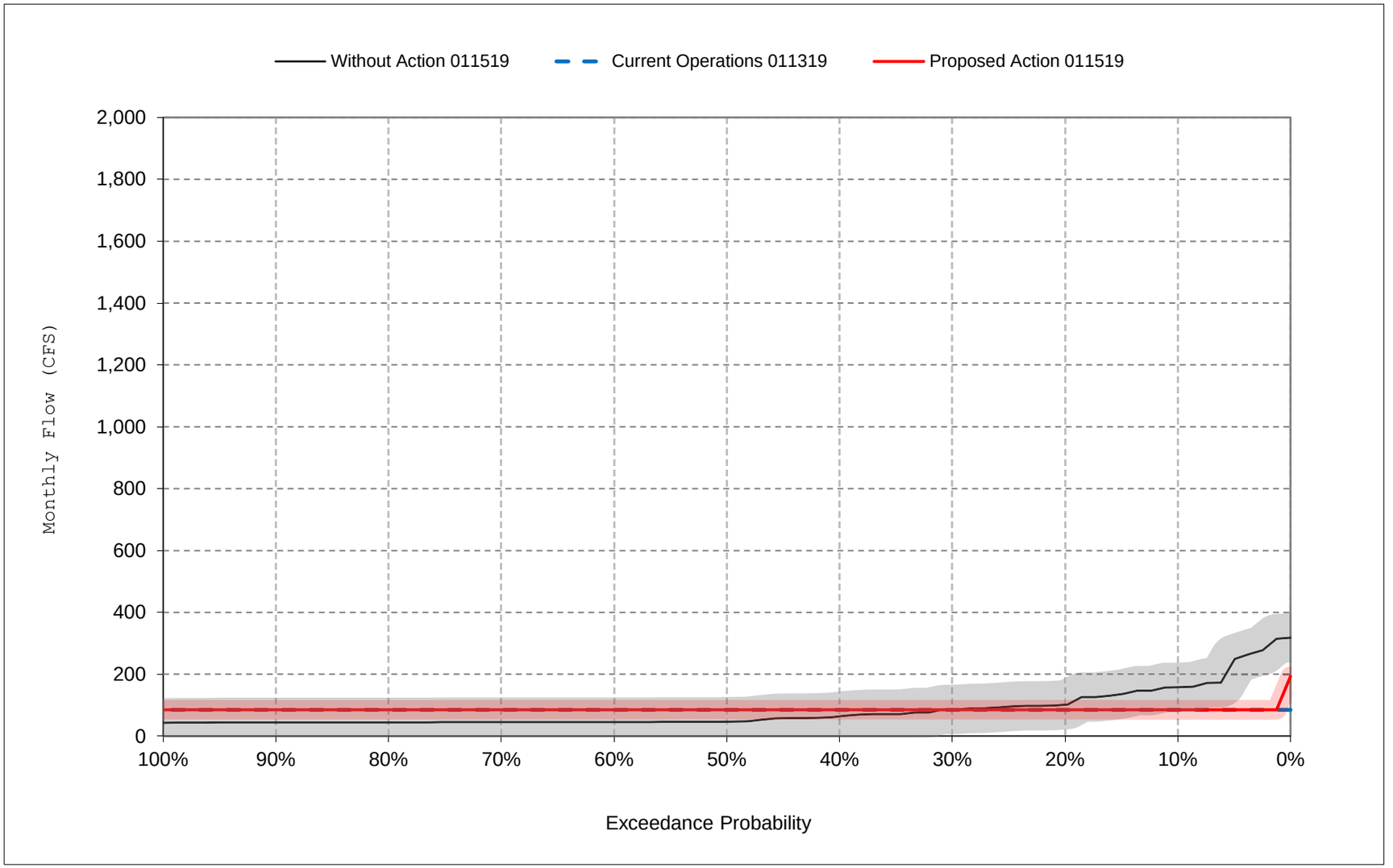
Figure 14-16. Clear Creek below Whiskeytown Dam Flow, July



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

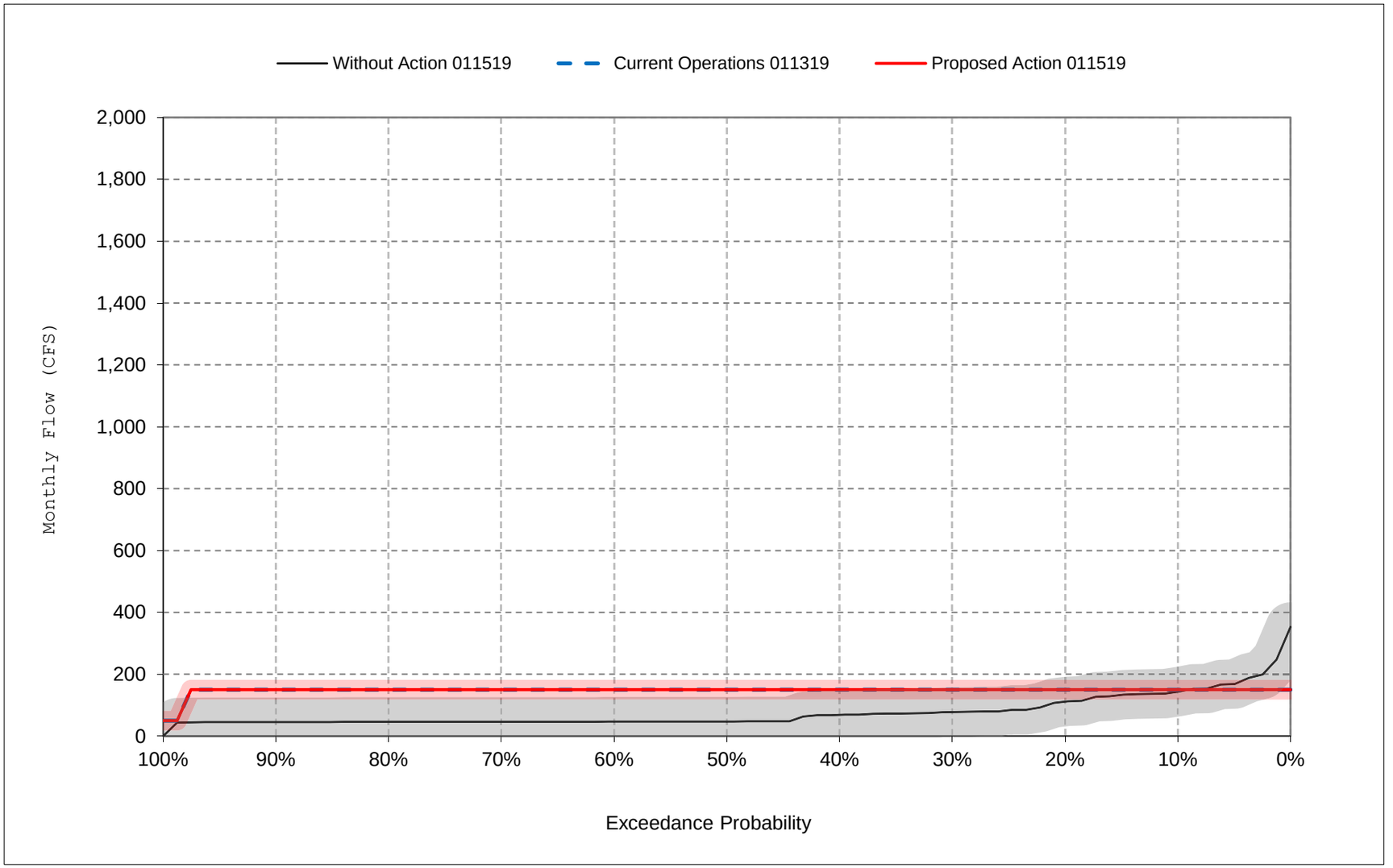
Figure 14-17. Clear Creek below Whiskeytown Dam Flow, August



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Figure 14-18. Clear Creek below Whiskeytown Dam Flow, September



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Table 15-1. Sacramento River Flow downstream of Keswick Reservoir, Monthly Flow

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	5,499	6,192	10,936	29,630	29,870	37,200	21,472	16,947	11,344	4,820	3,918	4,105
20%	4,473	6,192	7,304	16,653	16,122	23,192	13,596	13,025	8,426	4,100	3,657	3,731
30%	4,162	6,166	6,192	11,145	11,939	17,855	11,914	11,382	6,135	3,791	3,502	3,650
40%	3,946	5,480	6,192	8,103	10,863	13,314	10,982	9,733	5,162	3,640	3,399	3,509
50%	3,724	4,763	6,192	6,192	8,604	11,046	10,048	8,119	4,357	3,380	3,198	3,358
60%	3,508	4,293	5,914	6,192	6,192	9,300	8,721	7,210	4,133	3,261	3,072	3,216
70%	3,369	3,901	5,208	6,192	6,192	7,874	6,215	6,192	3,955	3,054	2,946	3,068
80%	3,073	3,680	4,139	5,385	6,192	6,192	6,192	5,174	3,409	2,890	2,770	2,946
90%	2,890	3,128	3,667	4,147	5,974	6,192	6,192	4,567	3,074	2,692	2,602	2,679
Long Term												
Full Simulation Period[a]	3,960	4,964	6,840	11,657	13,041	16,326	12,159	9,972	5,882	3,687	3,227	3,371
Water Year Types[b,c]												
Wet (32%)	4,235	5,207	6,784	20,002	19,992	24,362	15,964	14,362	8,987	4,806	3,729	3,835
Above Normal (16%)	4,491	5,049	8,726	12,328	17,809	20,285	14,225	10,725	5,928	3,566	3,273	3,483
Below Normal (13%)	3,972	5,113	6,308	6,492	9,365	13,867	8,302	9,124	4,271	3,363	3,162	3,351
Dry (24%)	3,816	5,197	7,160	6,913	7,120	10,593	11,296	7,378	4,168	3,050	2,979	3,067
Critical (15%)	3,020	3,822	4,869	5,492	6,051	6,435	6,652	4,744	3,440	2,753	2,563	2,766

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	8,932	11,500	16,771	21,434	30,624	18,502	10,385	10,220	13,073	16,000	11,867	15,678
20%	8,180	10,441	9,449	12,382	23,596	12,316	6,617	9,427	11,319	16,000	10,889	13,382
30%	7,340	8,747	5,320	7,732	11,665	8,447	4,504	8,708	10,520	15,558	10,368	11,580
40%	6,852	7,482	4,377	3,589	4,945	4,329	3,747	8,150	9,841	14,530	9,720	9,405
50%	6,214	6,238	3,500	3,250	3,250	3,250	3,250	7,655	9,049	13,411	9,511	6,403
60%	5,763	5,623	3,250	3,250	3,250	3,250	3,250	7,112	8,763	12,505	9,166	5,594
70%	5,219	4,289	3,250	3,250	3,250	3,250	3,250	6,616	8,324	11,858	8,779	5,315
80%	4,880	3,369	3,250	3,250	3,250	3,250	3,250	5,925	8,091	10,966	8,159	4,812
90%	4,496	3,250	3,250	3,250	3,250	3,250	3,250	5,270	7,653	9,821	7,754	4,235
Long Term												
Full Simulation Period[a]	6,497	7,173	6,976	8,716	11,068	8,473	5,522	7,778	9,787	13,314	9,650	8,687
Water Year Types[b,c]												
Wet (32%)	7,908	9,796	7,444	17,876	19,288	16,127	8,458	8,662	8,940	13,440	10,474	14,063
Above Normal (16%)	7,054	10,124	6,406	7,629	16,401	8,534	5,221	7,925	10,359	15,316	10,494	9,972
Below Normal (13%)	5,842	4,960	7,558	3,285	7,149	3,925	3,803	7,867	10,930	14,421	10,624	5,493
Dry (24%)	5,660	5,111	8,652	3,697	3,564	3,961	3,719	7,014	10,368	12,658	8,608	4,995
Critical (15%)	4,829	3,755	3,251	3,392	3,580	3,509	4,065	6,895	8,984	10,947	7,793	4,729

Current Operations 011319 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	3,433	5,308	5,835	**-8,195**	754	**-18,698**	**-11,088**	**-6,727**	1,729	11,180	7,949	11,573
20%	3,708	4,249	2,144	**-4,271**	7,474	**-10,876**	**-6,979**	**-3,598**	2,893	11,900	7,232	9,651
30%	3,178	2,581	**-873**	**-3,413**	**-274**	**-9,408**	**-7,410**	**-2,674**	4,385	11,767	6,866	7,930
40%	2,905	2,002	**-1,816**	**-4,514**	**-5,918**	**-8,985**	**-7,235**	**-1,584**	4,679	10,891	6,321	5,896
50%	2,489	1,475	**-2,692**	**-2,942**	**-5,354**	**-7,796**	**-6,798**	**-464**	4,692	10,032	6,313	3,045
60%	2,255	1,330	**-2,664**	**-2,942**	**-2,942**	**-6,050**	**-5,471**	**-98**	4,630	9,244	6,094	2,378
70%	1,850	388	**-1,958**	**-2,942**	**-2,942**	**-4,624**	**-2,965**	424	4,369	8,803	5,833	2,248
80%	1,807	**-311**	**-889**	**-2,135**	**-2,942**	**-2,942**	**-2,942**	752	4,682	8,076	5,389	1,866
90%	1,606	122	**-417**	**-897**	**-2,724**	**-2,942**	**-2,942**	703	4,578	7,129	5,152	1,556
Long Term												
Full Simulation Period[a]	2,536	2,209	136	**-2,941**	**-1,973**	**-7,853**	**-6,638**	**-2,193**	3,904	9,627	6,422	5,316
Water Year Types[b,c]												
Wet (32%)	3,674	4,589	660	**-2,126**	**-704**	**-8,234**	**-7,506**	**-5,699**	**-47**	8,635	6,745	10,228
Above Normal (16%)	2,563	5,075	**-2,320**	**-4,699**	**-1,407**	**-11,751**	**-9,004**	**-2,799**	4,430	11,751	7,221	6,489
Below Normal (13%)	1,870	**-152**	1,250	**-3,207**	**-2,216**	**-9,942**	**-4,500**	**-1,257**	6,659	11,058	7,461	2,142
Dry (24%)	1,844	**-86**	1,492	**-3,215**	**-3,556**	**-6,633**	**-7,577**	**-364**	6,200	9,608	5,628	1,928
Critical (15%)	1,808	**-66**	**-1,619**	**-2,101**	**-2,471**	**-2,926**	**-2,586**	2,151	5,544	8,194	5,229	1,963

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 15-2. Sacramento River Flow downstream of Keswick Reservoir, Monthly Flow

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	5,499	6,192	10,936	29,630	29,870	37,200	21,472	16,947	11,344	4,820	3,918	4,105
20%	4,473	6,192	7,304	16,653	16,122	23,192	13,596	13,025	8,426	4,100	3,657	3,731
30%	4,162	6,166	6,192	11,145	11,939	17,855	11,914	11,382	6,135	3,791	3,502	3,650
40%	3,946	5,480	6,192	8,103	10,863	13,314	10,982	9,733	5,162	3,640	3,399	3,509
50%	3,724	4,763	6,192	6,192	8,604	11,046	10,048	8,119	4,357	3,380	3,198	3,358
60%	3,508	4,293	5,914	6,192	6,192	9,300	8,721	7,210	4,133	3,261	3,072	3,216
70%	3,369	3,901	5,208	6,192	6,192	7,874	6,215	6,192	3,955	3,054	2,946	3,068
80%	3,073	3,680	4,139	5,385	6,192	6,192	6,192	5,174	3,409	2,890	2,770	2,946
90%	2,890	3,128	3,667	4,147	5,974	6,192	6,192	4,567	3,074	2,692	2,602	2,679
Long Term												
Full Simulation Period[a]	3,960	4,964	6,840	11,657	13,041	16,326	12,159	9,972	5,882	3,687	3,227	3,371
Water Year Types[b,c]												
Wet (32%)	4,235	5,207	6,784	20,002	19,992	24,362	15,964	14,362	8,987	4,806	3,729	3,835
Above Normal (16%)	4,491	5,049	8,726	12,328	17,809	20,285	14,225	10,725	5,928	3,566	3,273	3,483
Below Normal (13%)	3,972	5,113	6,308	6,492	9,365	13,867	8,302	9,124	4,271	3,363	3,162	3,351
Dry (24%)	3,816	5,197	7,160	6,913	7,120	10,593	11,296	7,378	4,168	3,050	2,979	3,067
Critical (15%)	3,020	3,822	4,869	5,492	6,051	6,435	6,652	4,744	3,440	2,753	2,563	2,766

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	8,870	7,994	19,652	24,806	30,772	19,100	10,691	10,854	14,173	16,000	11,780	9,351
20%	8,392	6,605	12,187	15,008	21,412	12,718	6,804	10,217	12,693	16,000	10,939	7,780
30%	7,829	6,090	6,884	9,696	12,674	9,001	5,386	9,641	11,861	15,431	10,462	6,248
40%	6,819	5,169	4,788	5,609	6,290	6,453	3,747	8,774	10,612	14,184	9,996	5,808
50%	6,101	4,941	4,000	3,250	4,000	3,250	3,250	8,305	10,014	13,290	9,646	5,449
60%	5,821	4,312	3,549	3,250	3,250	3,250	3,250	7,638	9,252	12,406	9,241	5,163
70%	5,220	4,017	3,250	3,250	3,250	3,250	3,250	6,975	8,426	11,636	8,878	4,960
80%	4,855	3,409	3,250	3,250	3,250	3,250	3,250	6,448	8,139	10,936	8,298	4,636
90%	4,310	3,250	3,250	3,250	3,250	3,250	3,250	5,760	7,653	9,809	7,889	4,258
Long Term												
Full Simulation Period[a]	6,461	5,627	7,922	9,498	11,428	8,880	5,618	8,309	10,429	13,220	9,769	6,186
Water Year Types[b,c]												
Wet (32%)	7,715	6,274	9,509	18,983	19,458	16,213	8,572	8,912	9,047	13,352	10,647	8,317
Above Normal (16%)	7,055	7,059	7,624	8,995	17,580	9,220	5,247	8,410	10,738	15,382	10,503	5,266
Below Normal (13%)	5,767	4,961	7,578	4,681	8,163	4,794	4,242	8,845	12,257	14,609	10,807	6,008
Dry (24%)	5,811	5,213	9,023	3,823	3,565	4,344	3,741	7,870	11,441	12,525	8,801	4,931
Critical (15%)	4,823	3,977	3,288	3,368	3,460	3,933	4,012	7,131	9,729	10,481	7,737	4,820

Proposed Action 011519 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	3,371	1,802	8,716	**-4,824**	903	**-18,100**	**-10,781**	**-6,093**	2,829	11,180	7,862	5,246
20%	3,919	413	4,882	**-1,646**	5,291	**-10,474**	**-6,792**	**-2,808**	4,267	11,900	7,282	4,049
30%	3,667	**-76**	692	**-1,449**	736	**-8,853**	**-6,528**	**-1,742**	5,726	11,639	6,960	2,598
40%	2,873	**-311**	**-1,405**	**-2,494**	**-4,573**	**-6,861**	**-7,234**	**-959**	5,450	10,544	6,597	2,299
50%	2,377	178	**-2,192**	**-2,942**	**-4,604**	**-7,796**	**-6,798**	186	5,658	9,910	6,448	2,092
60%	2,313	20	**-2,365**	**-2,942**	**-2,942**	**-6,050**	**-5,471**	428	5,119	9,145	6,169	1,948
70%	1,852	116	**-1,958**	**-2,942**	**-2,942**	**-4,624**	**-2,965**	783	4,471	8,582	5,932	1,892
80%	1,782	**-271**	**-889**	**-2,135**	**-2,942**	**-2,942**	**-2,942**	1,274	4,731	8,046	5,528	1,690
90%	1,420	122	**-417**	**-897**	**-2,724**	**-2,942**	**-2,942**	1,193	4,579	7,117	5,287	1,578
Long Term												
Full Simulation Period[a]	2,501	663	1,082	**-2,159**	**-1,613**	**-7,446**	**-6,541**	**-1,663**	4,547	9,533	6,542	2,815
Water Year Types[b,c]												
Wet (32%)	3,481	1,067	2,725	**-1,019**	**-534**	**-8,149**	**-7,392**	**-5,450**	60	8,546	6,918	4,482
Above Normal (16%)	2,564	2,010	**-1,102**	**-3,333**	**-228**	**-11,065**	**-8,978**	**-2,315**	4,810	11,816	7,230	1,783
Below Normal (13%)	1,795	**-152**	1,270	**-1,811**	**-1,202**	**-9,073**	**-4,061**	**-279**	7,986	11,246	7,644	2,657
Dry (24%)	1,995	16	1,863	**-3,090**	**-3,555**	**-6,250**	**-7,555**	492	7,272	9,475	5,821	1,863
Critical (15%)	1,802	156	**-1,581**	**-2,125**	**-2,591**	**-2,502**	**-2,640**	2,387	6,289	7,728	5,173	2,054

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 15-3. Sacramento River Flow downstream of Keswick Reservoir, Monthly Flow

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	8,932	11,500	16,771	21,434	30,624	18,502	10,385	10,220	13,073	16,000	11,867	15,678
20%	8,180	10,441	9,449	12,382	23,596	12,316	6,617	9,427	11,319	16,000	10,889	13,382
30%	7,340	8,747	5,320	7,732	11,665	8,447	4,504	8,708	10,520	15,558	10,368	11,580
40%	6,852	7,482	4,377	3,589	4,945	4,329	3,747	8,150	9,841	14,530	9,720	9,405
50%	6,214	6,238	3,500	3,250	3,250	3,250	3,250	7,655	9,049	13,411	9,511	6,403
60%	5,763	5,623	3,250	3,250	3,250	3,250	3,250	7,112	8,763	12,505	9,166	5,594
70%	5,219	4,289	3,250	3,250	3,250	3,250	3,250	6,616	8,324	11,858	8,779	5,315
80%	4,880	3,369	3,250	3,250	3,250	3,250	3,250	5,925	8,091	10,966	8,159	4,812
90%	4,496	3,250	3,250	3,250	3,250	3,250	3,250	5,270	7,653	9,821	7,754	4,235
Long Term												
Full Simulation Period[a]	6,497	7,173	6,976	8,716	11,068	8,473	5,522	7,778	9,787	13,314	9,650	8,687
Water Year Types[b,c]												
Wet (32%)	7,908	9,796	7,444	17,876	19,288	16,127	8,458	8,662	8,940	13,440	10,474	14,063
Above Normal (16%)	7,054	10,124	6,406	7,629	16,401	8,534	5,221	7,925	10,359	15,316	10,494	9,972
Below Normal (13%)	5,842	4,960	7,558	3,285	7,149	3,925	3,803	7,867	10,930	14,421	10,624	5,493
Dry (24%)	5,660	5,111	8,652	3,697	3,564	3,961	3,719	7,014	10,368	12,658	8,608	4,995
Critical (15%)	4,829	3,755	3,251	3,392	3,580	3,509	4,065	6,895	8,984	10,947	7,793	4,729

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	8,870	7,994	19,652	24,806	30,772	19,100	10,691	10,854	14,173	16,000	11,780	9,351
20%	8,392	6,605	12,187	15,008	21,412	12,718	6,804	10,217	12,693	16,000	10,939	7,780
30%	7,829	6,090	6,884	9,696	12,674	9,001	5,386	9,641	11,861	15,431	10,462	6,248
40%	6,819	5,169	4,788	5,609	6,290	6,453	3,747	8,774	10,612	14,184	9,996	5,808
50%	6,101	4,941	4,000	3,250	4,000	3,250	3,250	8,305	10,014	13,290	9,646	5,449
60%	5,821	4,312	3,549	3,250	3,250	3,250	3,250	7,638	9,252	12,406	9,241	5,163
70%	5,220	4,017	3,250	3,250	3,250	3,250	3,250	6,975	8,426	11,636	8,878	4,960
80%	4,855	3,409	3,250	3,250	3,250	3,250	3,250	6,448	8,139	10,936	8,298	4,636
90%	4,310	3,250	3,250	3,250	3,250	3,250	3,250	5,760	7,653	9,809	7,889	4,258
Long Term												
Full Simulation Period[a]	6,461	5,627	7,922	9,498	11,428	8,880	5,618	8,309	10,429	13,220	9,769	6,186
Water Year Types[b,c]												
Wet (32%)	7,715	6,274	9,509	18,983	19,458	16,213	8,572	8,912	9,047	13,352	10,647	8,317
Above Normal (16%)	7,055	7,059	7,624	8,995	17,580	9,220	5,247	8,410	10,738	15,382	10,503	5,266
Below Normal (13%)	5,767	4,961	7,578	4,681	8,163	4,794	4,242	8,845	12,257	14,609	10,807	6,008
Dry (24%)	5,811	5,213	9,023	3,823	3,565	4,344	3,741	7,870	11,441	12,525	8,801	4,931
Critical (15%)	4,823	3,977	3,288	3,368	3,460	3,933	4,012	7,131	9,729	10,481	7,737	4,820

Proposed Action 011519 minus Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	**-62**	**-3,506**	2,881	3,372	149	598	307	634	1,100	0	**-87**	**-6,327**
20%	211	**-3,836**	2,738	2,626	**-2,183**	402	187	790	1,374	0	50	**-5,603**
30%	489	**-2,657**	1,564	1,963	1,009	554	882	933	1,340	**-128**	94	**-5,332**
40%	**-33**	**-2,313**	411	2,020	1,345	2,124	0	625	771	**-347**	276	**-3,597**
50%	**-112**	**-1,297**	500	0	750	0	0	649	966	**-122**	135	**-953**
60%	58	**-1,311**	299	0	0	0	0	526	489	**-99**	75	**-430**
70%	1	**-272**	0	0	0	0	0	359	102	**-222**	99	**-355**
80%	**-25**	40	0	0	0	0	0	523	48	**-30**	139	**-176**
90%	**-186**	0	0	0	0	0	0	489	1	**-12**	135	22
Long Term												
Full Simulation Period[a]	**-35**	**-1,545**	946	782	360	408	97	530	643	**-93**	120	**-2,501**
Water Year Types[b,c]												
Wet (32%)	**-193**	**-3,522**	2,065	1,108	170	85	114	249	106	**-89**	173	**-5,746**
Above Normal (16%)	1	**-3,065**	1,218	1,366	1,179	686	26	484	379	66	9	**-4,706**
Below Normal (13%)	**-75**	1	19	1,396	1,014	869	439	977	1,327	188	183	515
Dry (24%)	151	102	370	125	1	383	22	856	1,073	**-133**	193	**-64**
Critical (15%)	**-6**	222	38	**-24**	**-120**	424	**-54**	236	746	**-466**	**-56**	92

a Based on the 82-year simulation period.

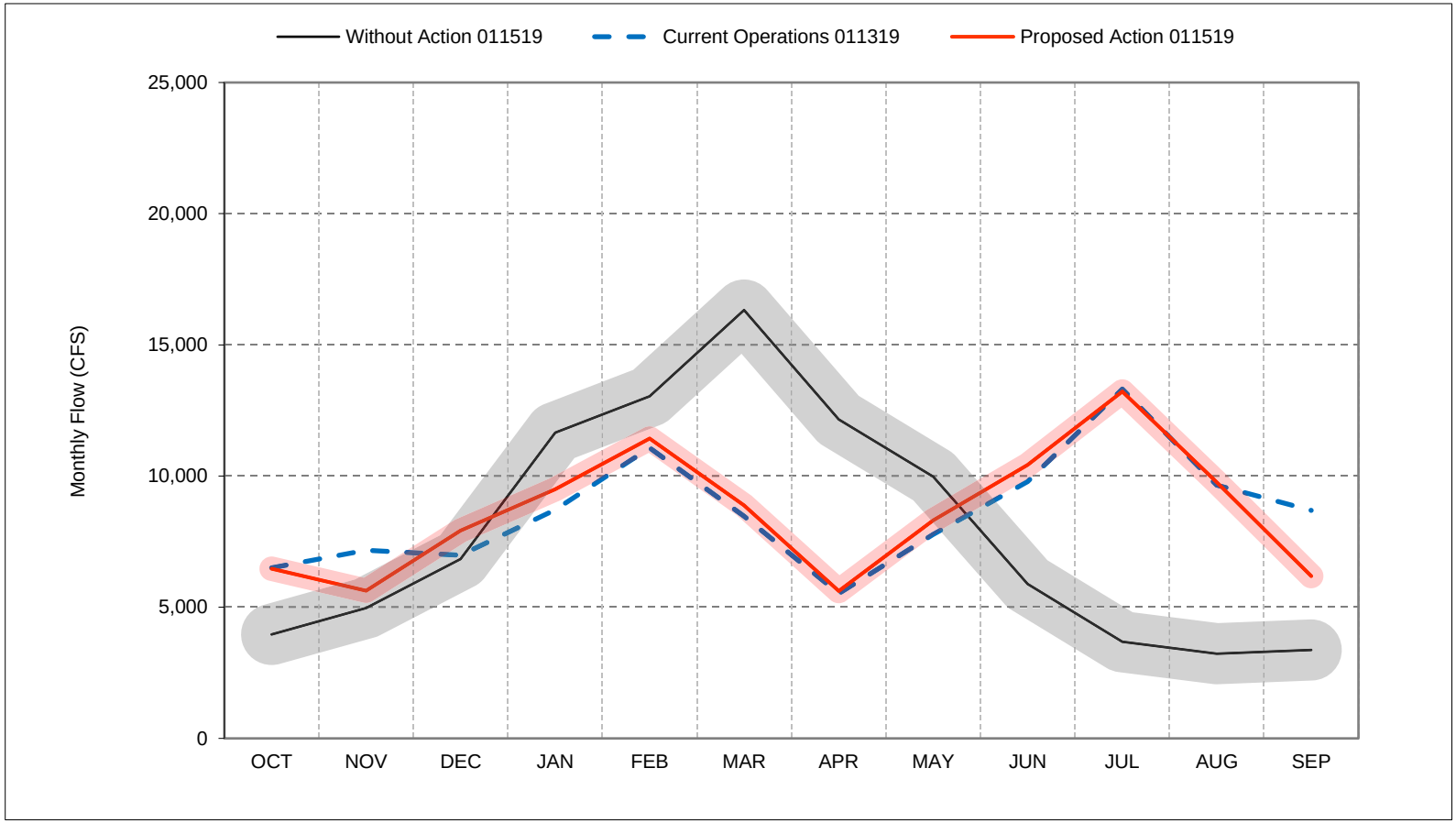
b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

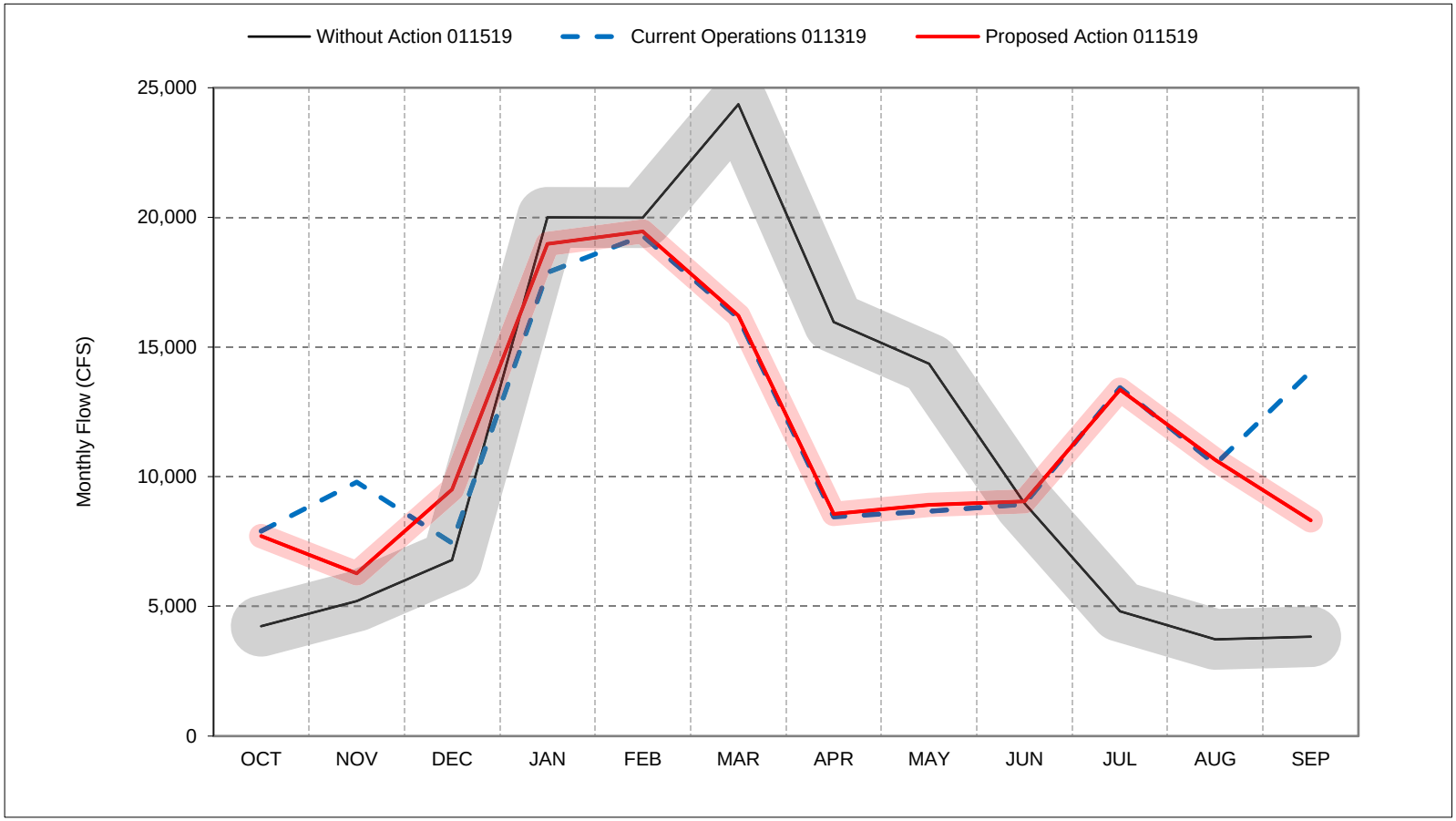
e These are draft results meant for qualitative analysis and are subject to revision.

Figure 15-1. Sacramento River Flow downstream of Keswick Reservoir, Long-Term Average Flow



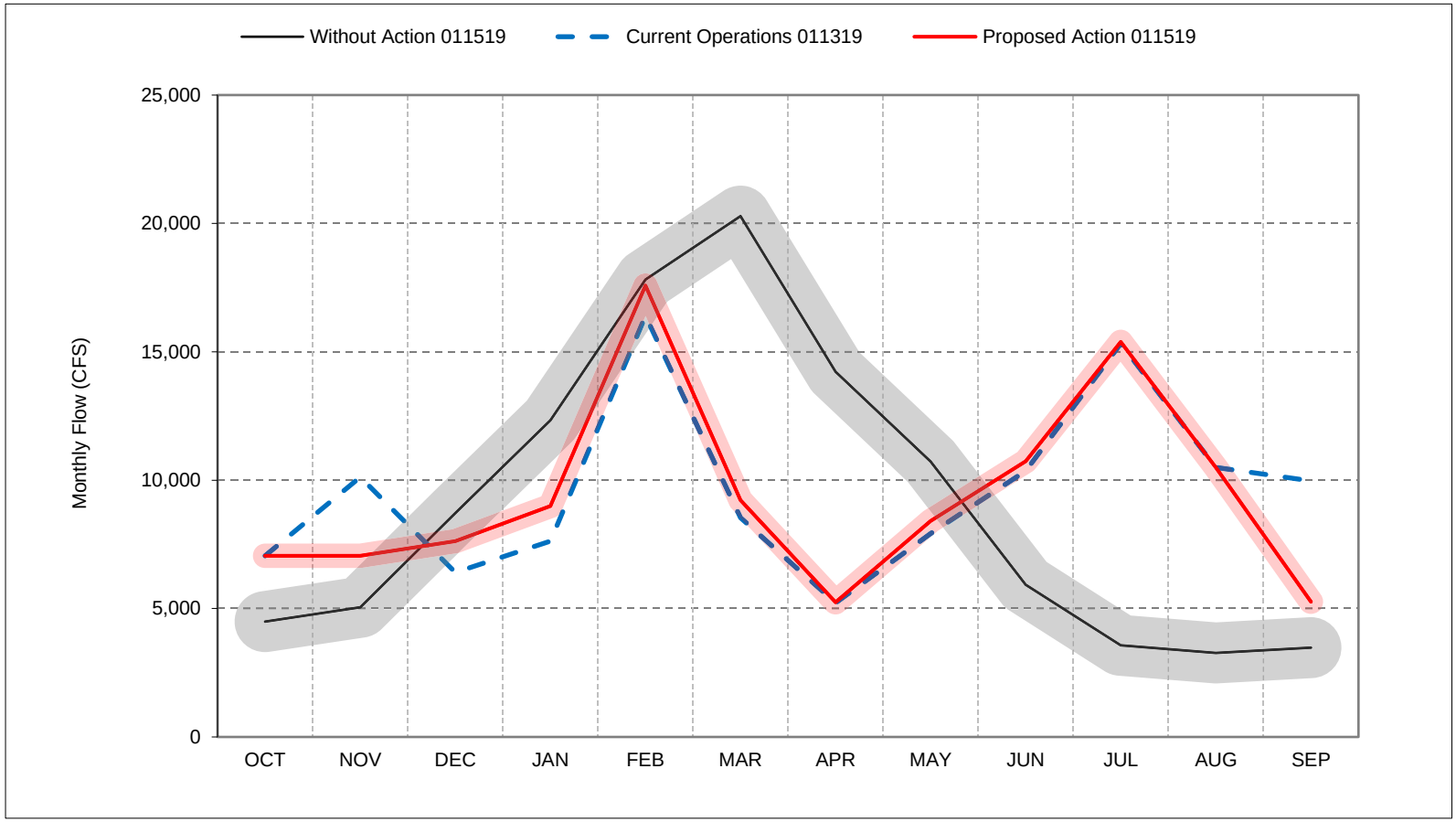
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 15-2. Sacramento River Flow downstream of Keswick Reservoir, Wet Year Average Flow



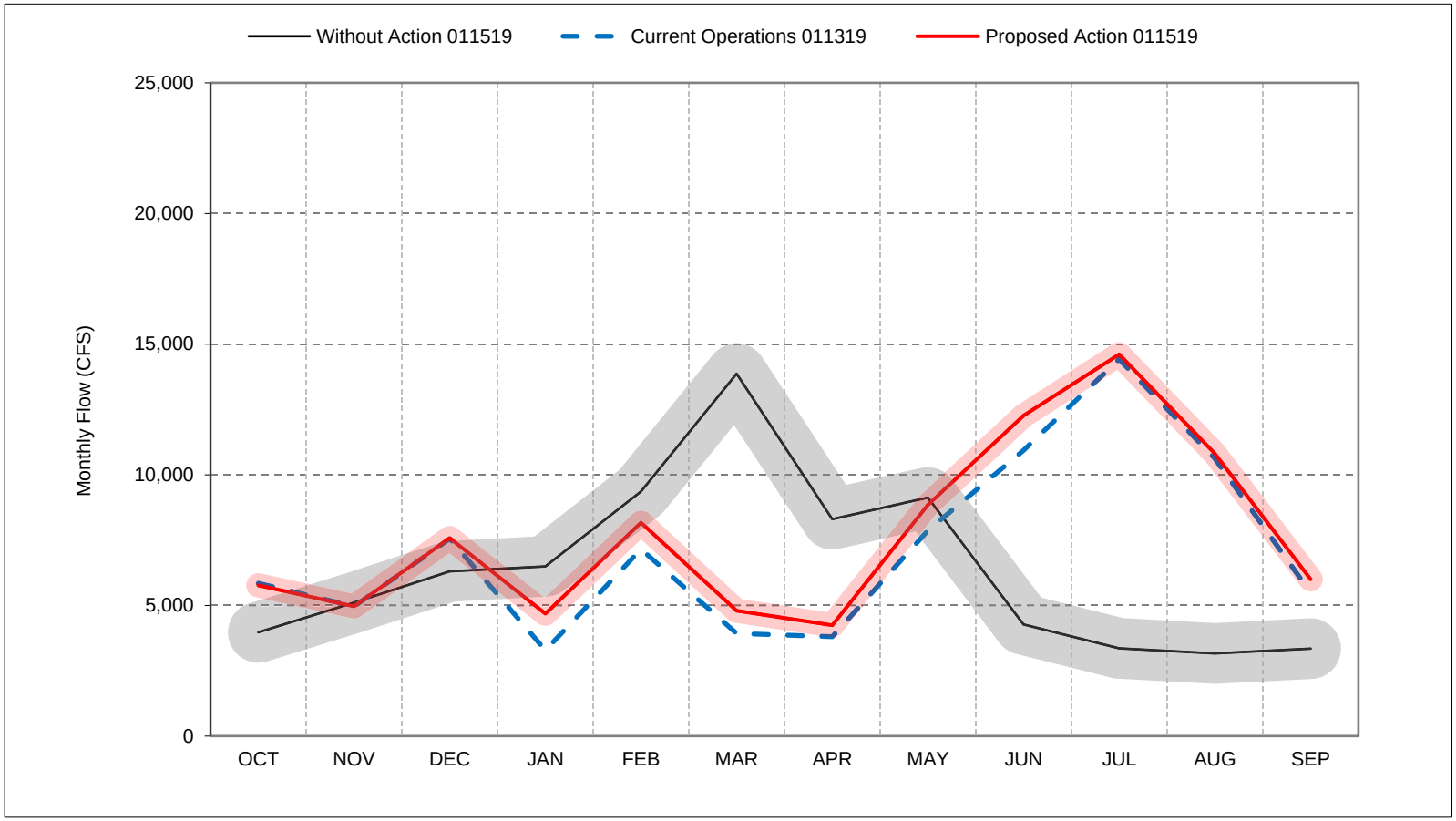
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 15-3. Sacramento River Flow downstream of Keswick Reservoir, Above Normal Year Averag



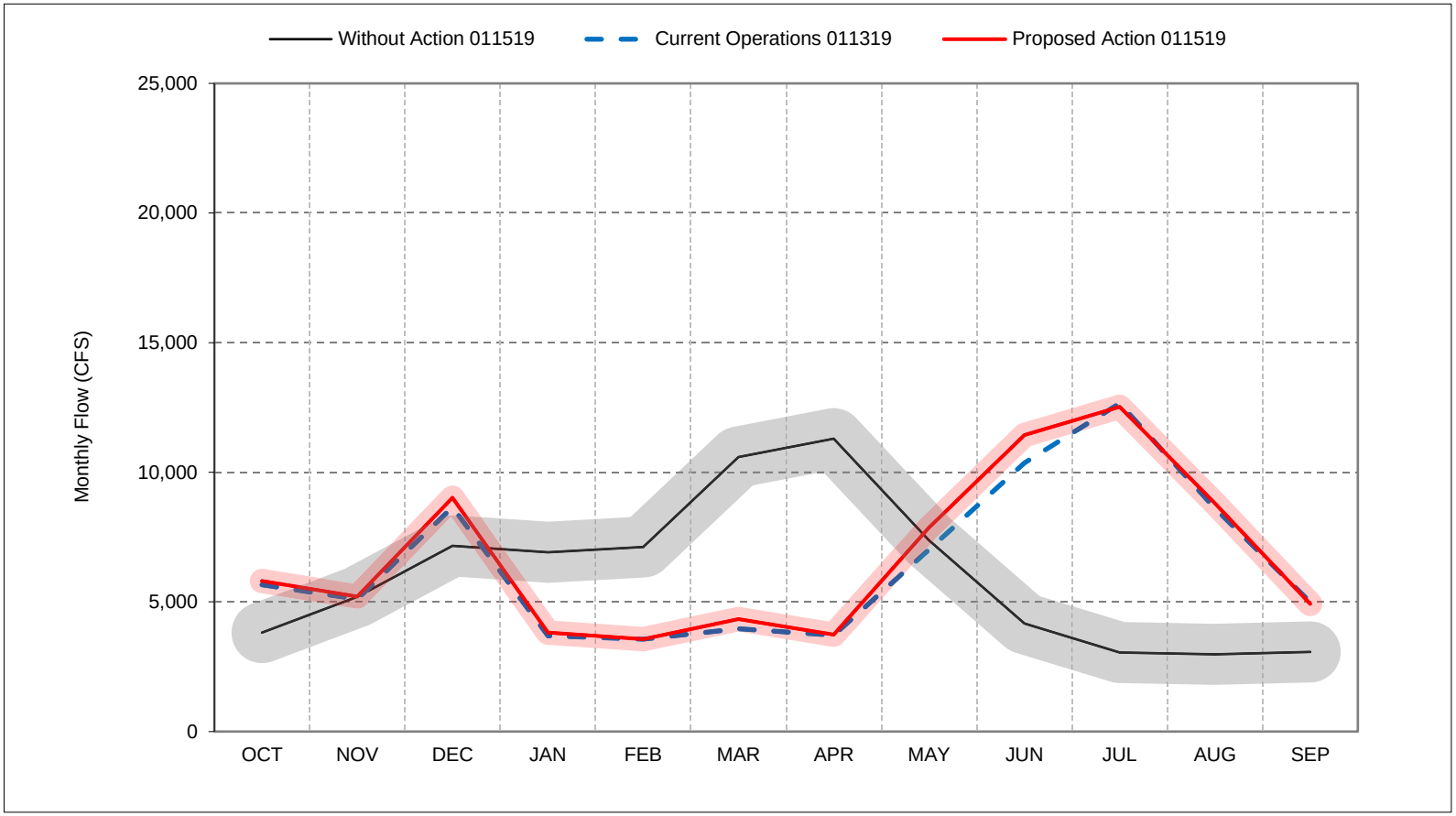
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 15-4. Sacramento River Flow downstream of Keswick Reservoir, Below Normal Year Averag



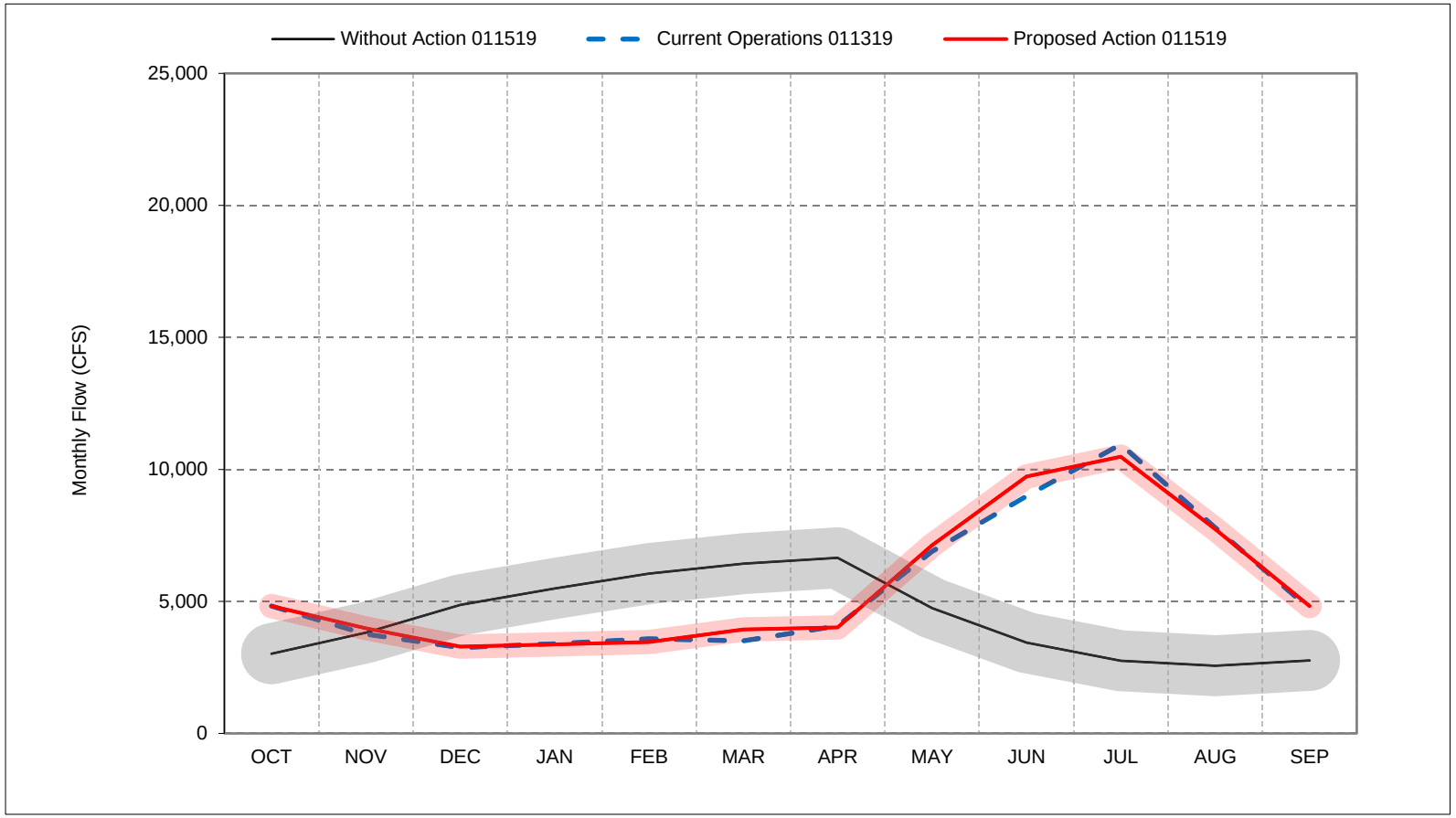
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 15-5. Sacramento River Flow downstream of Keswick Reservoir, Dry Year Average Flow



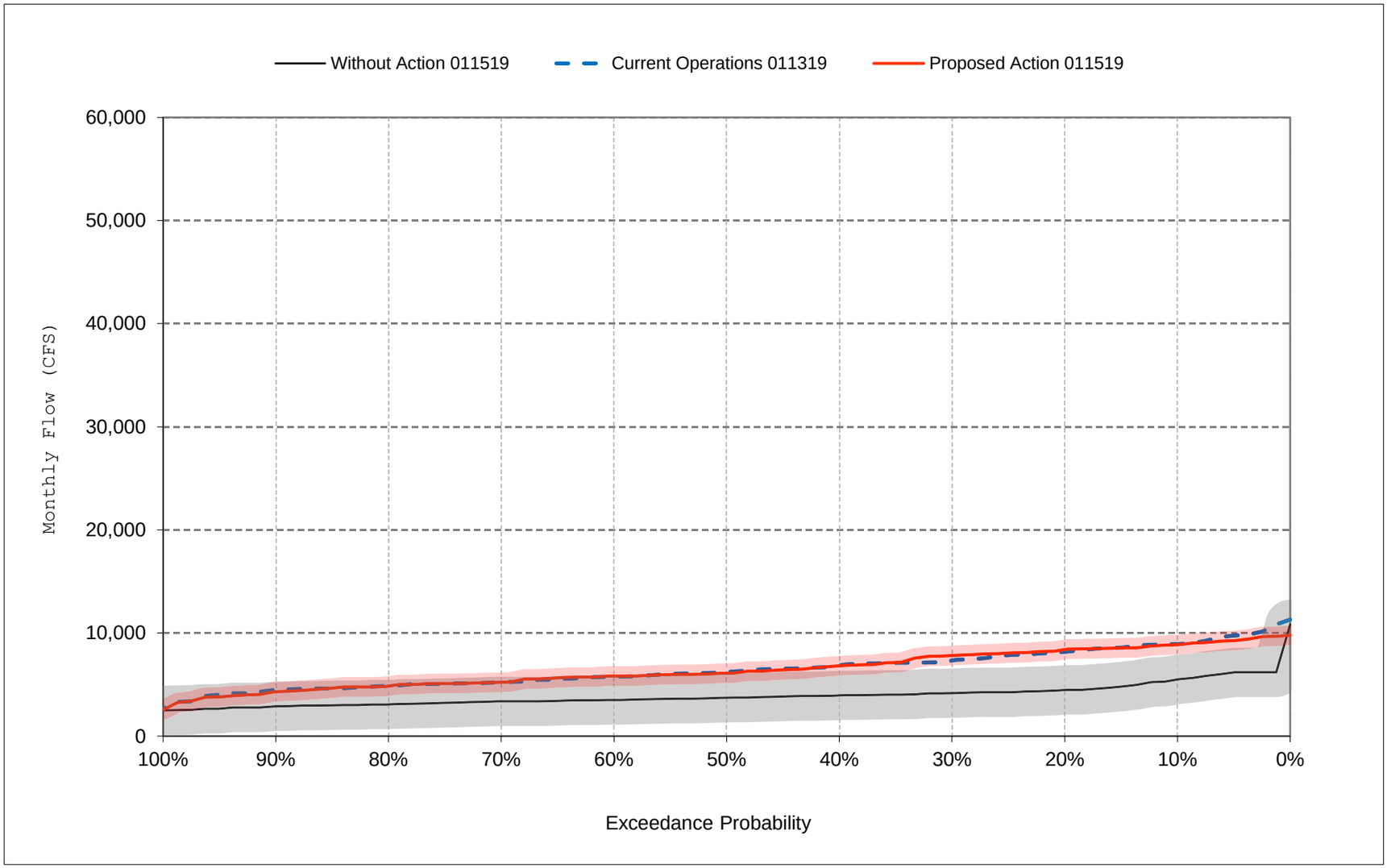
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 15-6. Sacramento River Flow downstream of Keswick Reservoir, Critical Year Average Flow



*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

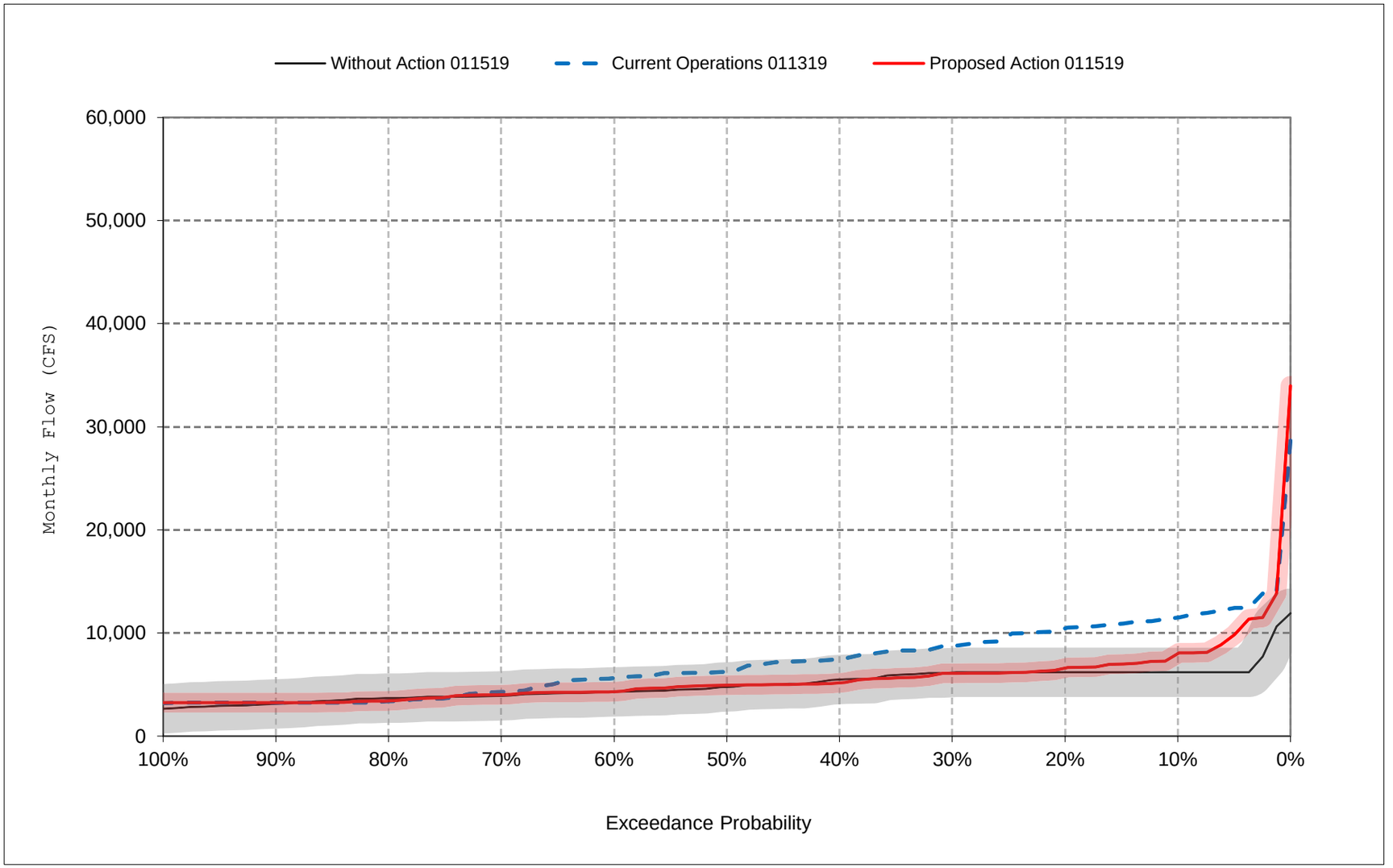
Figure 15-7. Sacramento River Flow downstream of Keswick Reservoir, October



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

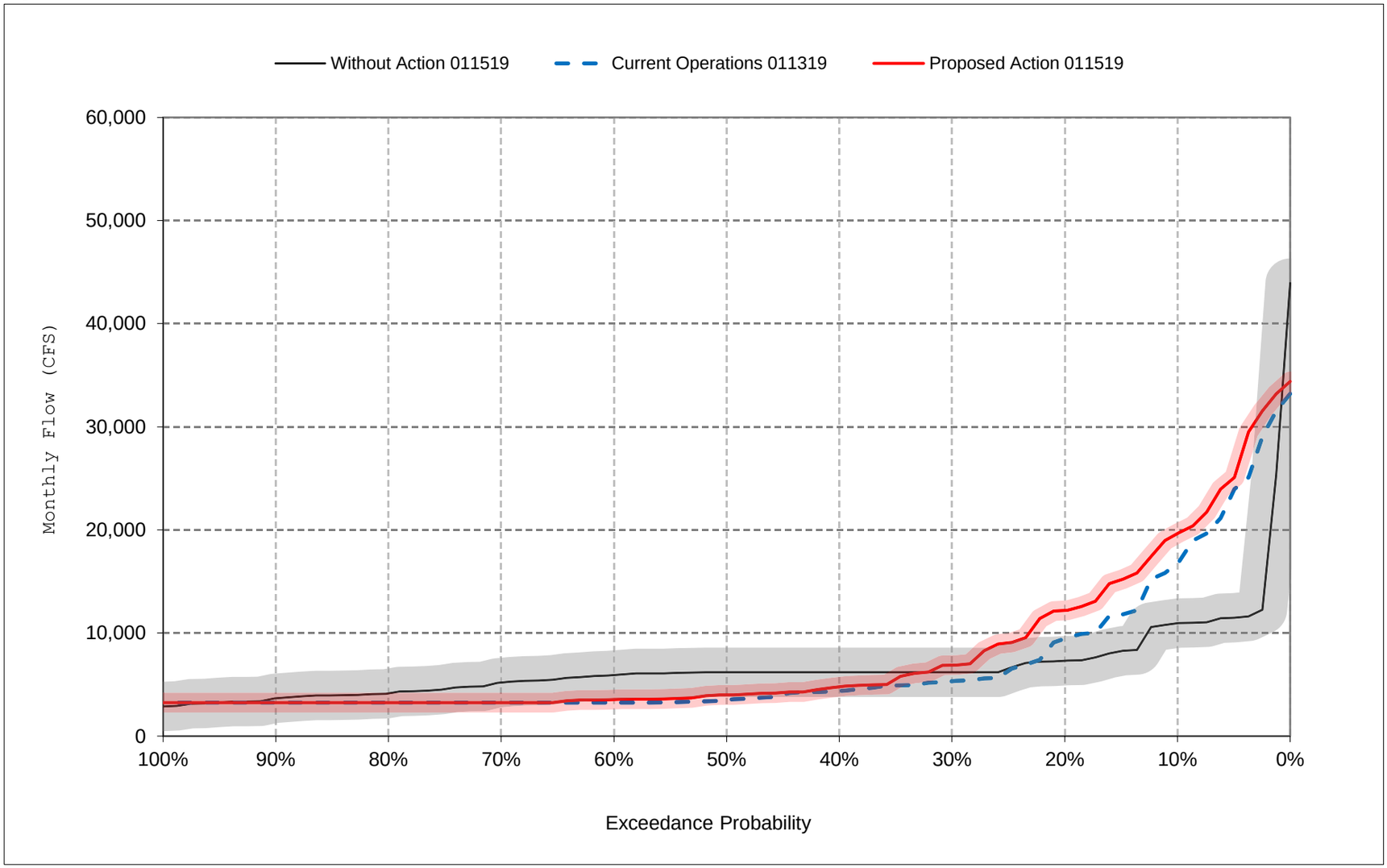
Figure 15-8. Sacramento River Flow downstream of Keswick Reservoir, November



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

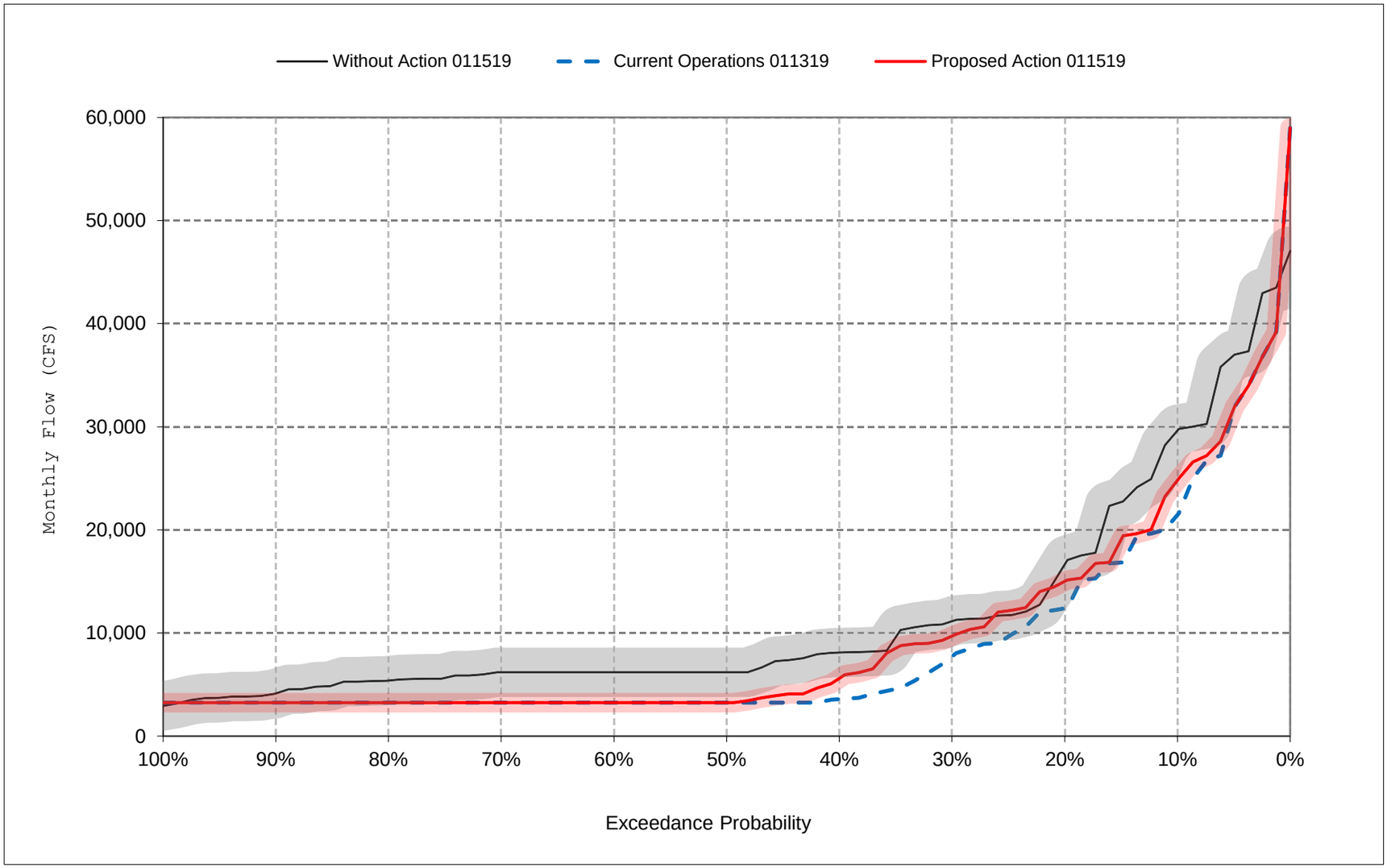
Figure 15-9. Sacramento River Flow downstream of Keswick Reservoir, December



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

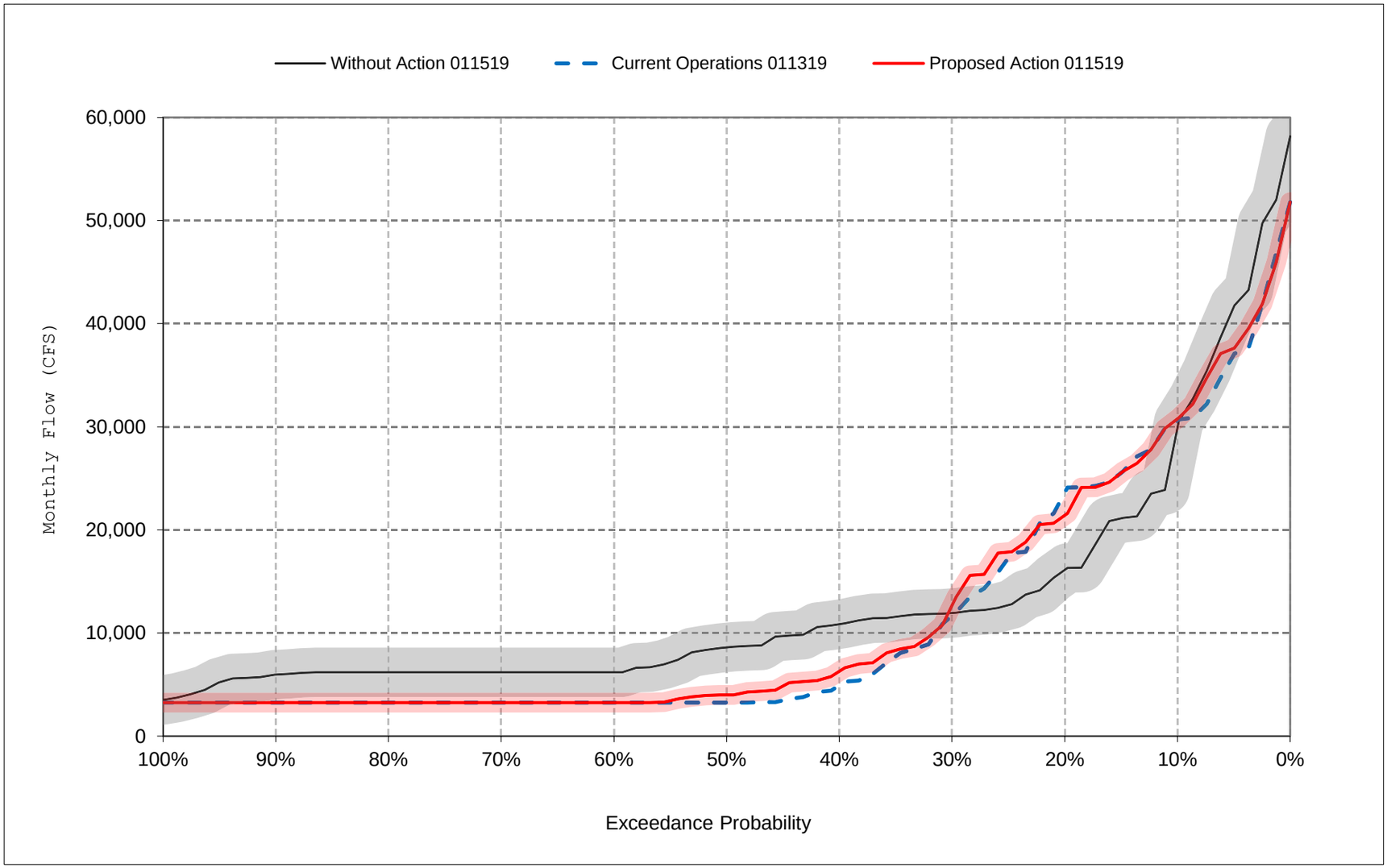
Figure 15-10. Sacramento River Flow downstream of Keswick Reservoir, January



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

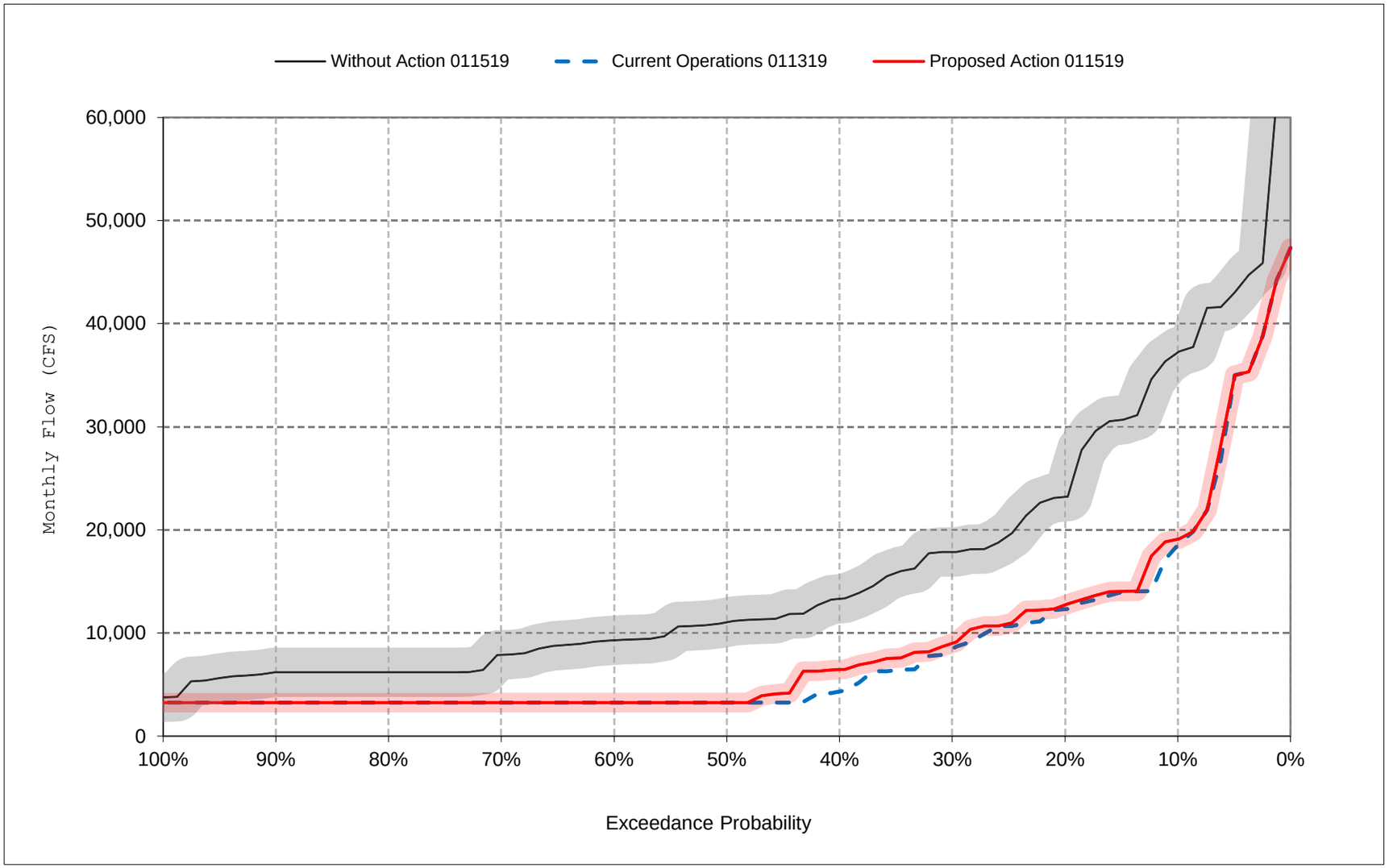
Figure 15-11. Sacramento River Flow downstream of Keswick Reservoir, February



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

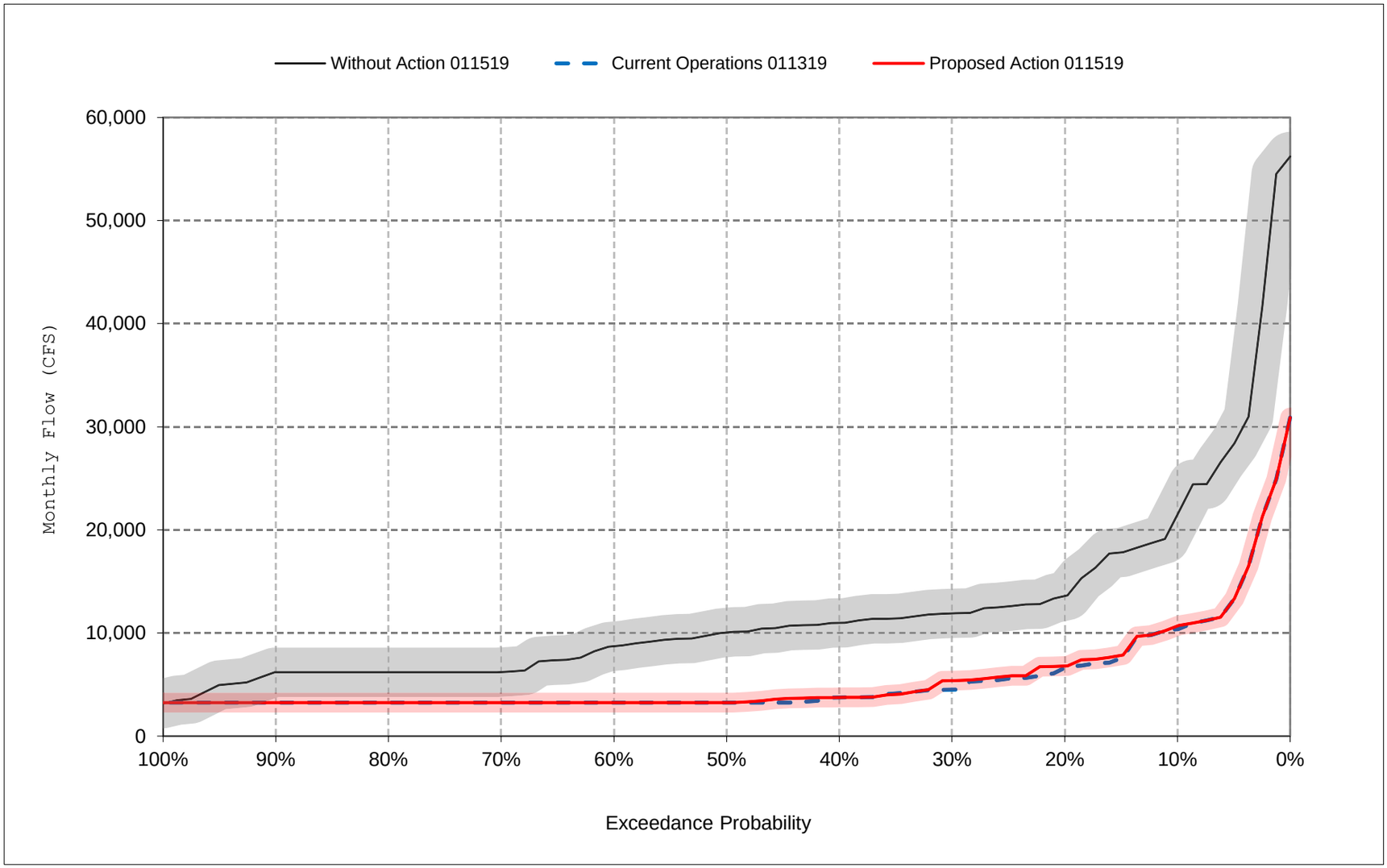
Figure 15-12. Sacramento River Flow downstream of Keswick Reservoir, March



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

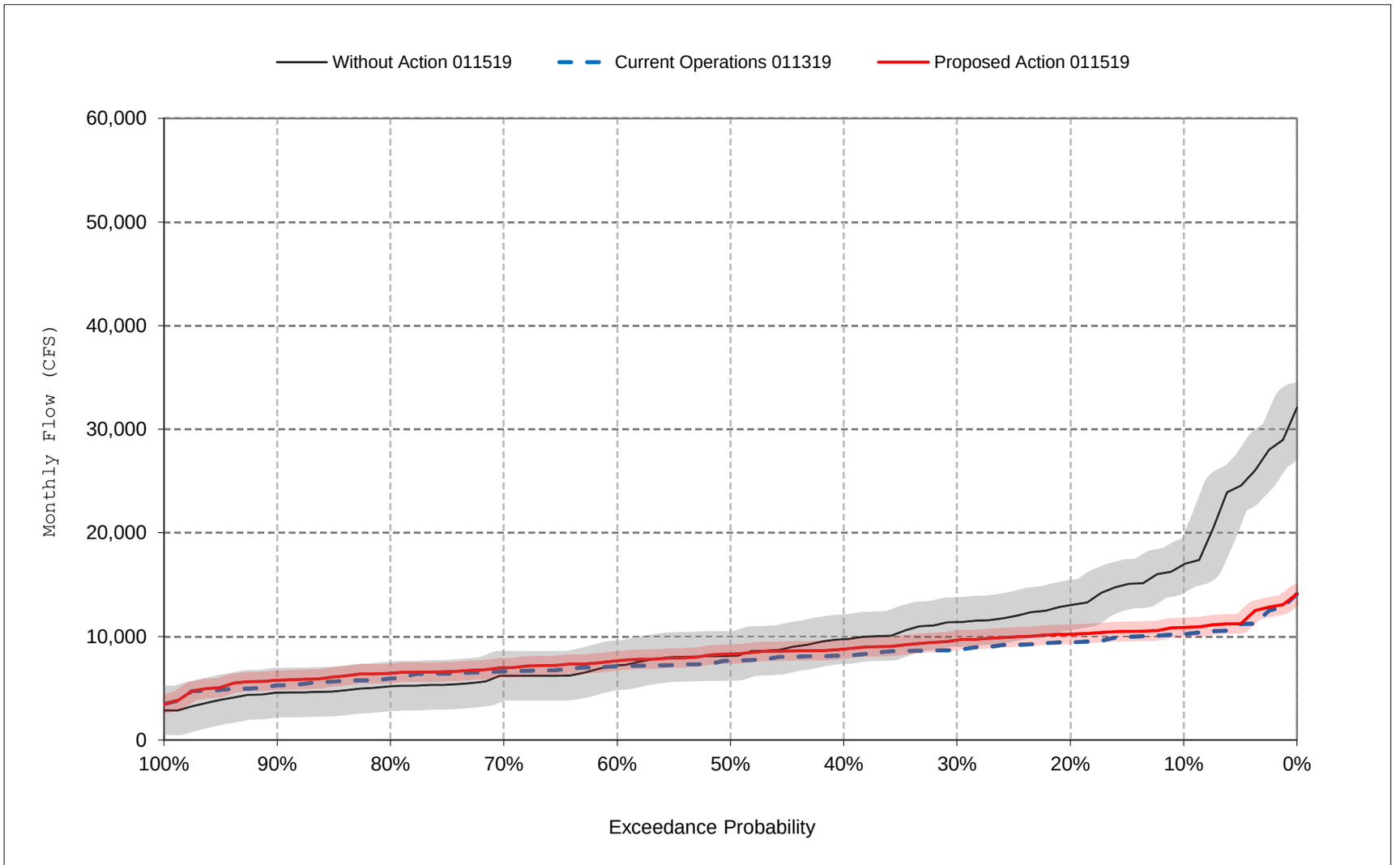
Figure 15-13. Sacramento River Flow downstream of Keswick Reservoir, April



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

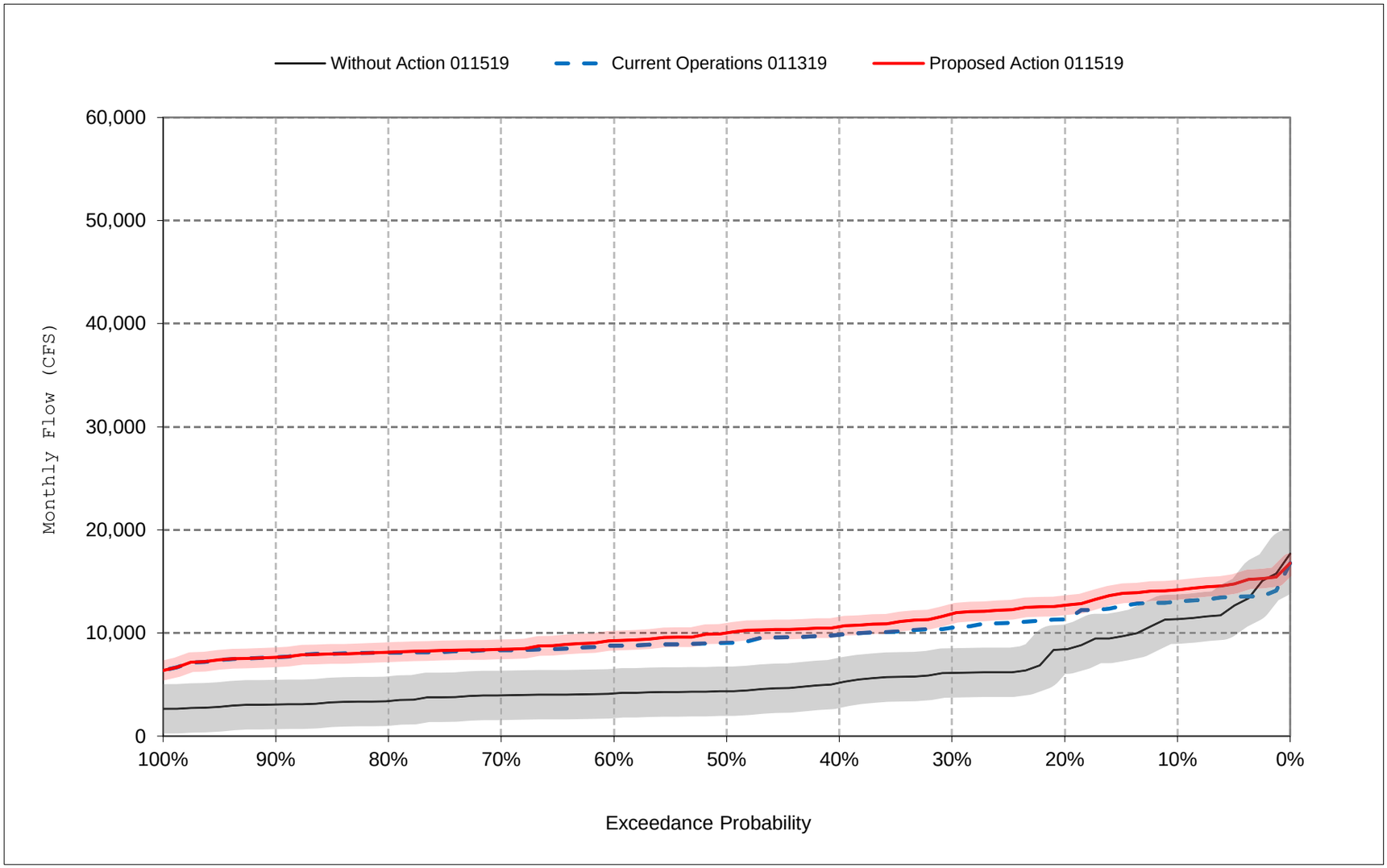
Figure 15-14. Sacramento River Flow downstream of Keswick Reservoir, May



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

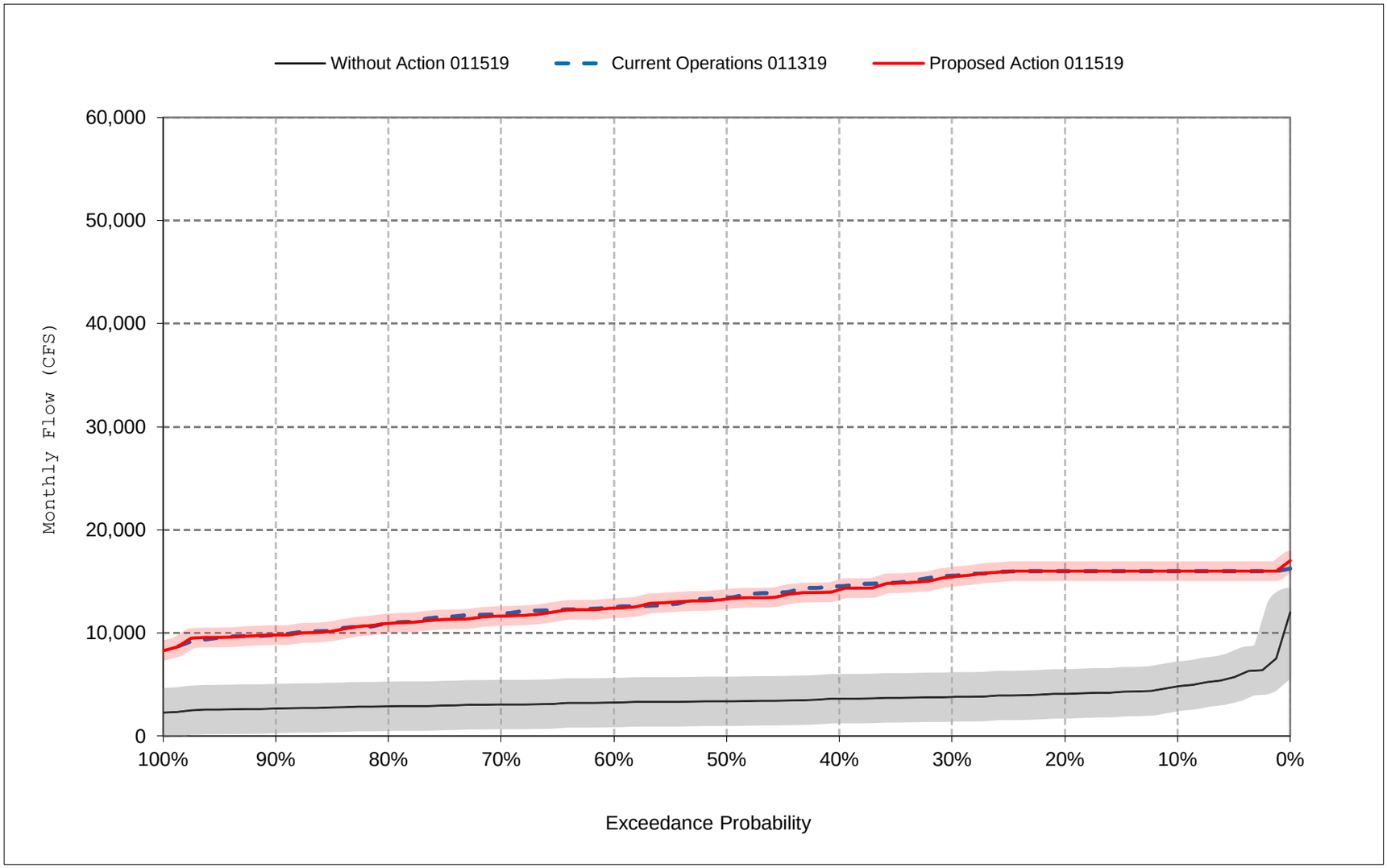
Figure 15-15. Sacramento River Flow downstream of Keswick Reservoir, June



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

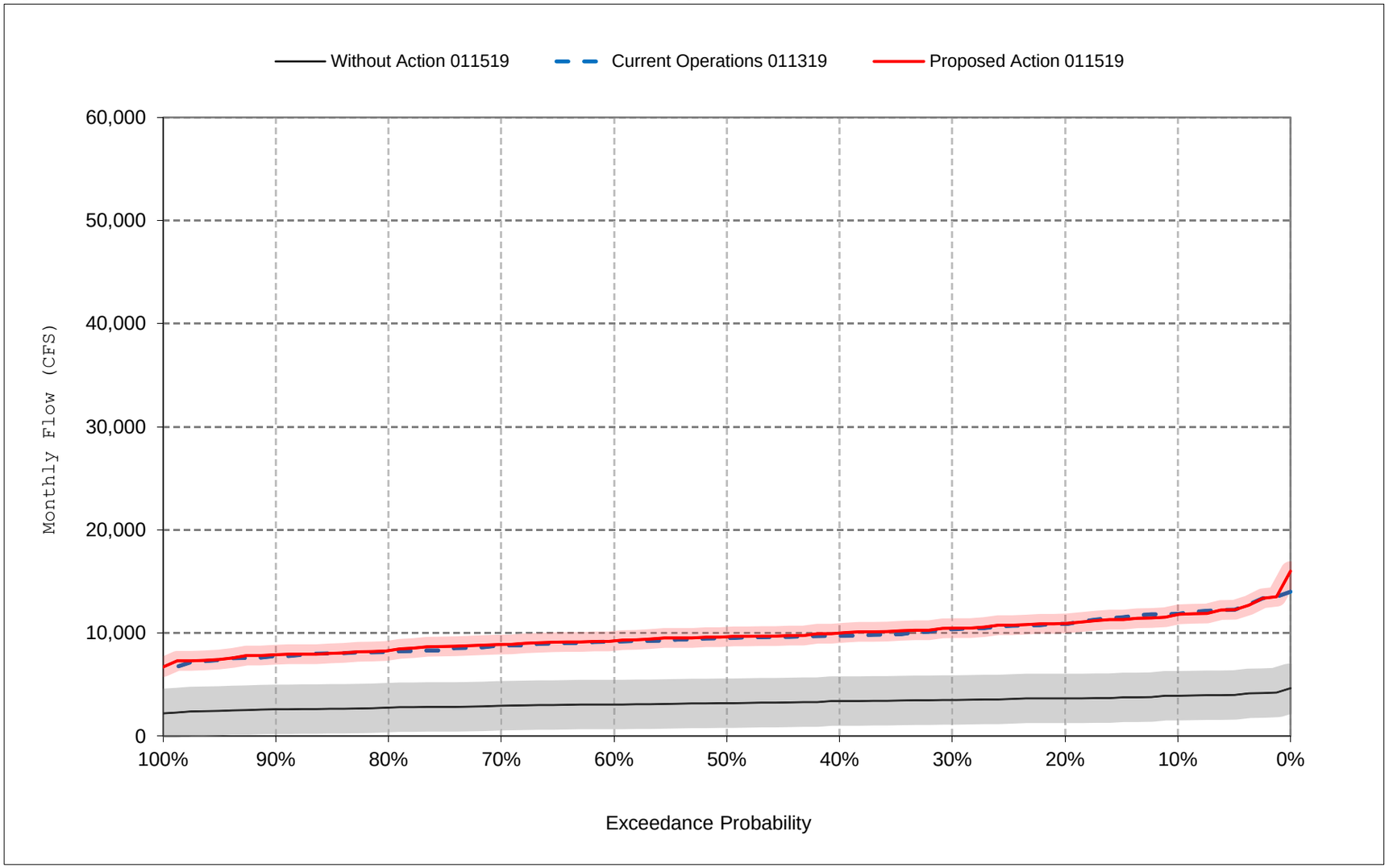
Figure 15-16. Sacramento River Flow downstream of Keswick Reservoir, July



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

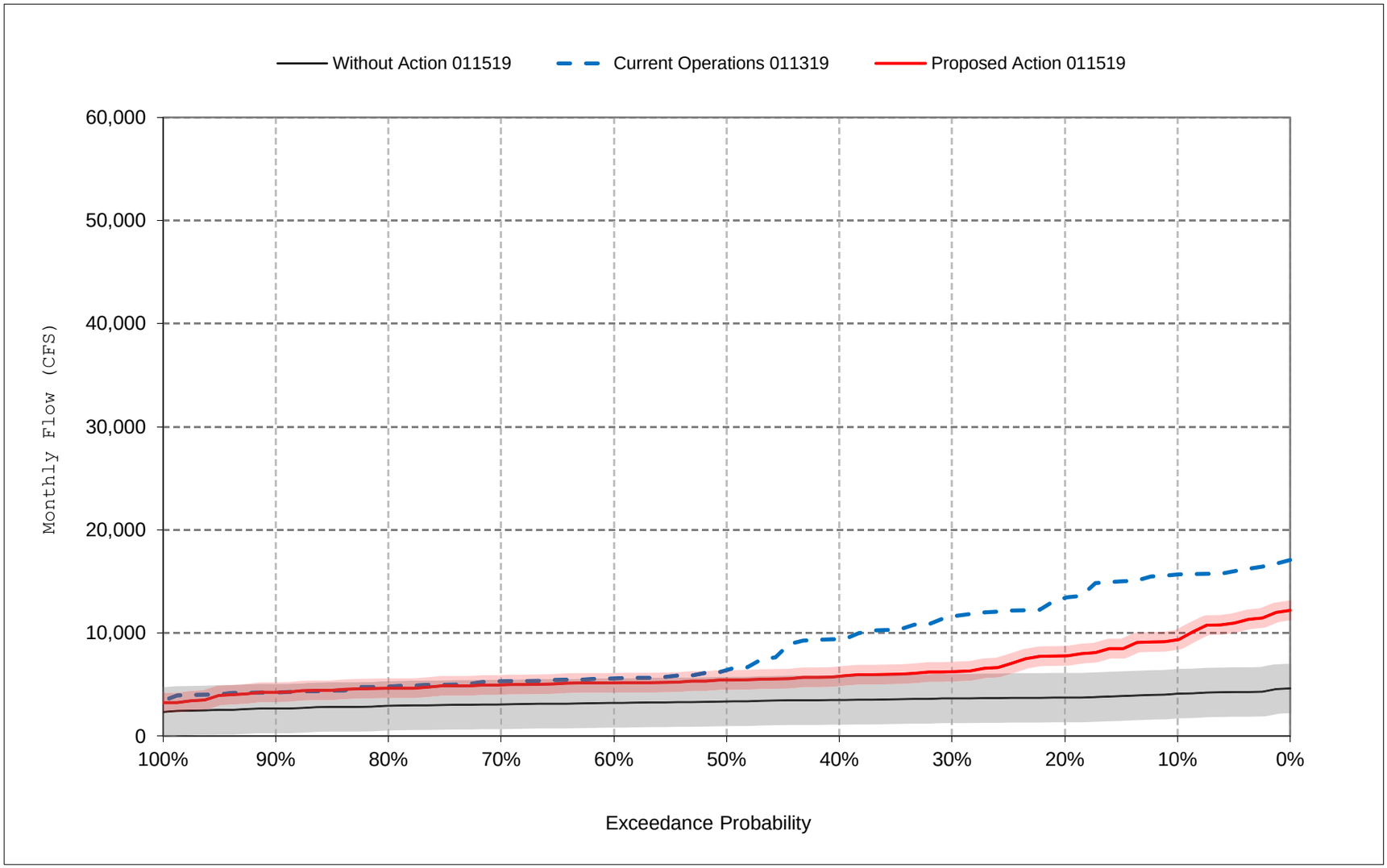
Figure 15-17. Sacramento River Flow downstream of Keswick Reservoir, August



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Figure 15-18. Sacramento River Flow downstream of Keswick Reservoir, September



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Table 16-1. Sacramento Flow River at Bend Bridge, Monthly Flow

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	6,904	10,872	21,470	40,884	44,401	49,187	27,092	20,150	13,134	5,970	4,673	4,940
20%	5,578	9,599	17,092	30,825	33,084	33,182	21,454	15,822	9,801	5,063	4,450	4,451
30%	5,154	8,953	12,981	20,815	24,000	23,514	17,503	14,231	7,328	4,759	4,270	4,263
40%	4,751	7,682	11,312	16,118	18,367	20,560	14,744	12,073	6,248	4,448	4,178	4,140
50%	4,282	6,254	10,158	12,844	15,401	17,919	13,710	10,394	5,458	4,168	3,878	3,781
60%	4,128	5,603	8,422	10,817	14,070	15,626	12,390	9,712	5,196	4,038	3,728	3,650
70%	3,904	4,923	7,011	9,544	12,670	13,393	10,782	7,754	4,921	3,851	3,641	3,482
80%	3,713	4,492	5,668	7,697	10,011	10,583	9,025	6,570	4,480	3,715	3,387	3,176
90%	3,418	3,917	4,500	6,102	8,080	8,188	7,801	5,404	3,884	3,447	3,265	3,036
Long Term												
Full Simulation Period[a]	4,875	7,247	12,041	19,051	21,653	22,991	16,410	12,314	7,213	4,571	3,955	3,895
Water Year Types[b,c]												
Wet (32%)	5,136	7,690	11,950	32,561	32,811	34,228	22,568	17,877	10,886	5,862	4,537	4,474
Above Normal (16%)	5,647	7,575	13,863	21,869	28,939	28,639	19,313	13,419	7,175	4,431	4,016	4,067
Below Normal (13%)	4,998	6,842	10,785	10,934	15,368	17,536	11,238	10,677	5,374	4,157	3,853	3,869
Dry (24%)	4,747	7,865	14,065	10,513	13,427	16,069	14,406	9,026	5,176	3,833	3,678	3,543
Critical (15%)	3,576	5,276	8,042	8,398	9,054	9,064	8,001	6,045	4,375	3,538	3,179	3,068

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	10,188	13,896	26,553	35,636	46,119	29,263	16,420	13,681	13,578	16,305	12,139	16,061
20%	9,084	12,030	16,593	23,614	32,961	19,328	12,773	11,723	12,305	15,990	11,272	13,861
30%	8,301	11,271	10,517	15,779	21,336	14,475	8,661	10,432	11,019	15,716	10,416	12,104
40%	7,817	10,144	7,828	11,444	12,724	10,331	7,211	9,493	10,708	14,723	10,001	10,145
50%	7,018	8,610	6,738	8,651	10,318	8,537	6,295	8,912	10,212	13,608	9,649	6,937
60%	6,439	7,277	6,313	7,028	8,261	7,612	5,896	8,574	9,732	12,748	9,360	5,909
70%	6,077	6,348	5,668	6,316	7,352	6,585	5,504	8,101	9,478	11,944	8,876	5,720
80%	5,759	5,848	5,284	5,793	5,852	5,733	5,240	7,755	9,148	11,171	8,433	5,247
90%	5,254	4,952	4,799	4,918	5,147	5,423	4,899	7,060	8,676	10,393	7,990	4,632
Long Term												
Full Simulation Period[a]	7,419	9,386	11,785	15,532	18,802	14,426	9,158	9,806	10,715	13,540	9,828	9,128
Water Year Types[b,c]												
Wet (32%)	8,864	12,201	12,212	29,328	30,808	24,888	13,988	11,641	10,455	13,909	10,733	14,543
Above Normal (16%)	8,036	12,488	11,050	16,297	25,999	15,923	9,620	10,248	11,192	15,414	10,652	10,421
Below Normal (13%)	6,917	6,667	11,741	7,401	12,565	7,255	6,371	9,297	11,634	14,499	10,741	5,970
Dry (24%)	6,623	7,712	15,032	7,159	9,374	8,913	6,431	8,473	10,962	12,750	8,777	5,420
Critical (15%)	5,408	5,206	6,284	6,219	6,426	5,899	5,290	8,040	9,507	11,146	7,891	5,067

Current Operations 011319 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	3,284	3,024	5,083	**-5,248**	1,718	**-19,924**	**-10,672**	**-6,468**	444	10,335	7,466	11,120
20%	3,506	2,431	**-499**	**-7,211**	**-123**	**-13,855**	**-8,681**	**-4,098**	2,504	10,927	6,822	9,410
30%	3,147	2,318	**-2,464**	**-5,036**	**-2,664**	**-9,040**	**-8,842**	**-3,799**	3,691	10,957	6,146	7,841
40%	3,065	2,462	**-3,484**	**-4,673**	**-5,643**	**-10,229**	**-7,533**	**-2,580**	4,460	10,276	5,822	6,005
50%	2,736	2,357	**-3,419**	**-4,192**	**-5,083**	**-9,382**	**-7,415**	**-1,482**	4,754	9,440	5,771	3,156
60%	2,311	1,673	**-2,109**	**-3,789**	**-5,809**	**-8,014**	**-6,493**	**-1,138**	4,537	8,710	5,632	2,259
70%	2,173	1,425	**-1,343**	**-3,228**	**-5,318**	**-6,808**	**-5,278**	347	4,557	8,093	5,235	2,237
80%	2,046	1,356	**-384**	**-1,904**	**-4,158**	**-4,850**	**-3,785**	1,185	4,668	7,456	5,047	2,071
90%	1,835	1,034	299	**-1,185**	**-2,933**	**-2,765**	**-2,902**	1,655	4,792	6,946	4,726	1,596
Long Term												
Full Simulation Period[a]	2,544	2,138	**-256**	**-3,519**	**-2,850**	**-8,565**	**-7,252**	**-2,508**	3,502	8,968	5,874	5,232
Water Year Types[b,c]												
Wet (32%)	3,728	4,511	262	**-3,233**	**-2,003**	**-9,340**	**-8,580**	**-6,235**	**-431**	8,047	6,196	10,069
Above Normal (16%)	2,389	4,913	**-2,814**	**-5,572**	**-2,941**	**-12,716**	**-9,693**	**-3,171**	4,017	10,983	6,636	6,354
Below Normal (13%)	1,919	**-175**	956	**-3,533**	**-2,804**	**-10,281**	**-4,866**	**-1,380**	6,260	10,342	6,888	2,101
Dry (24%)	1,876	**-152**	967	**-3,354**	**-4,053**	**-7,156**	**-7,975**	**-554**	5,786	8,917	5,099	1,878
Critical (15%)	1,832	**-71**	**-1,758**	**-2,179**	**-2,628**	**-3,165**	**-2,711**	1,995	5,132	7,608	4,712	1,999

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 16-2. Sacramento Flow River at Bend Bridge, Monthly Flow

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	6,904	10,872	21,470	40,884	44,401	49,187	27,092	20,150	13,134	5,970	4,673	4,940
20%	5,578	9,599	17,092	30,825	33,084	33,182	21,454	15,822	9,801	5,063	4,450	4,451
30%	5,154	8,953	12,981	20,815	24,000	23,514	17,503	14,231	7,328	4,759	4,270	4,263
40%	4,751	7,682	11,312	16,118	18,367	20,560	14,744	12,073	6,248	4,448	4,178	4,140
50%	4,282	6,254	10,158	12,844	15,401	17,919	13,710	10,394	5,458	4,168	3,878	3,781
60%	4,128	5,603	8,422	10,817	14,070	15,626	12,390	9,712	5,196	4,038	3,728	3,650
70%	3,904	4,923	7,011	9,544	12,670	13,393	10,782	7,754	4,921	3,851	3,641	3,482
80%	3,713	4,492	5,668	7,697	10,011	10,583	9,025	6,570	4,480	3,715	3,387	3,176
90%	3,418	3,917	4,500	6,102	8,080	8,188	7,801	5,404	3,884	3,447	3,265	3,036
Long Term												
Full Simulation Period[a]	4,875	7,247	12,041	19,051	21,653	22,991	16,410	12,314	7,213	4,571	3,955	3,895
Water Year Types[b,c]												
Wet (32%)	5,136	7,690	11,950	32,561	32,811	34,228	22,568	17,877	10,886	5,862	4,537	4,474
Above Normal (16%)	5,647	7,575	13,863	21,869	28,939	28,639	19,313	13,419	7,175	4,431	4,016	4,067
Below Normal (13%)	4,998	6,842	10,785	10,934	15,368	17,536	11,238	10,677	5,374	4,157	3,853	3,869
Dry (24%)	4,747	7,865	14,065	10,513	13,427	16,069	14,406	9,026	5,176	3,833	3,678	3,543
Critical (15%)	3,576	5,276	8,042	8,398	9,054	9,064	8,001	6,045	4,375	3,538	3,179	3,068

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	10,113	11,120	30,249	39,974	47,109	29,749	16,420	14,020	14,747	16,248	11,749	9,801
20%	9,130	7,882	22,749	25,057	31,480	19,330	12,774	12,184	13,542	15,985	11,023	8,559
30%	8,604	7,183	11,316	17,121	22,239	16,744	8,715	11,082	12,527	15,638	10,550	6,433
40%	7,503	6,970	8,963	13,541	13,520	10,775	7,451	10,519	11,173	14,449	10,149	6,151
50%	6,934	6,571	6,899	8,966	10,596	8,854	6,372	9,928	10,843	13,501	9,763	5,804
60%	6,519	6,156	6,262	7,272	8,428	7,903	5,949	9,027	10,308	12,504	9,487	5,621
70%	6,300	5,823	5,643	6,528	7,385	6,899	5,586	8,559	9,731	11,782	9,095	5,418
80%	5,903	5,565	5,288	5,792	6,138	5,753	5,075	7,966	9,322	11,255	8,510	5,003
90%	5,103	5,254	4,895	4,893	5,269	5,421	4,893	7,500	8,789	10,253	7,995	4,691
Long Term												
Full Simulation Period[a]	7,404	7,839	12,742	16,304	19,156	14,832	9,249	10,332	11,347	13,435	9,944	6,624
Water Year Types[b,c]												
Wet (32%)	8,706	8,671	14,298	30,417	30,972	24,975	14,102	11,890	10,558	13,818	10,905	8,795
Above Normal (16%)	8,074	9,414	12,288	17,657	27,168	16,604	9,643	10,735	11,564	15,475	10,658	5,712
Below Normal (13%)	6,837	6,670	11,764	8,790	13,567	8,117	6,796	10,255	12,936	14,658	10,906	6,477
Dry (24%)	6,774	7,815	15,404	7,277	9,371	9,294	6,445	9,320	12,016	12,599	8,962	5,348
Critical (15%)	5,426	5,441	6,321	6,195	6,307	6,324	5,230	8,274	10,247	10,670	7,843	5,171

Proposed Action 011519 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	3,209	248	8,779	**-910**	2,708	**-19,438**	**-10,671**	**-6,129**	1,613	10,277	7,076	4,861
20%	3,552	**-1,717**	5,657	**-5,768**	**-1,604**	**-13,852**	**-8,679**	**-3,637**	3,741	10,922	6,573	4,108
30%	3,449	**-1,769**	**-1,665**	**-3,694**	**-1,761**	**-6,770**	**-8,788**	**-3,150**	5,200	10,879	6,280	2,170
40%	2,752	**-711**	**-2,349**	**-2,576**	**-4,847**	**-9,785**	**-7,293**	**-1,554**	4,925	10,001	5,970	2,011
50%	2,652	317	**-3,259**	**-3,878**	**-4,805**	**-9,064**	**-7,338**	**-466**	5,385	9,333	5,885	2,023
60%	2,391	553	**-2,160**	**-3,545**	**-5,642**	**-7,723**	**-6,441**	**-686**	5,113	8,466	5,759	1,972
70%	2,396	899	**-1,367**	**-3,016**	**-5,285**	**-6,494**	**-5,196**	805	4,810	7,931	5,454	1,935
80%	2,191	1,072	**-381**	**-1,905**	**-3,873**	**-4,830**	**-3,950**	1,396	4,842	7,540	5,124	1,827
90%	1,685	1,337	395	**-1,210**	**-2,812**	**-2,767**	**-2,909**	2,095	4,905	6,806	4,731	1,654
Long Term												
Full Simulation Period[a]	2,529	592	701	**-2,747**	**-2,497**	**-8,159**	**-7,161**	**-1,983**	4,134	8,864	5,989	2,729
Water Year Types[b,c]												
Wet (32%)	3,570	981	2,347	**-2,145**	**-1,839**	**-9,253**	**-8,466**	**-5,987**	**-328**	7,955	6,367	4,321
Above Normal (16%)	2,427	1,839	**-1,576**	**-4,212**	**-1,771**	**-12,035**	**-9,670**	**-2,685**	4,389	11,043	6,642	1,646
Below Normal (13%)	1,839	**-172**	979	**-2,144**	**-1,801**	**-9,419**	**-4,442**	**-422**	7,562	10,501	7,053	2,608
Dry (24%)	2,027	**-50**	1,339	**-3,236**	**-4,056**	**-6,775**	**-7,961**	294	6,840	8,766	5,284	1,806
Critical (15%)	1,850	165	**-1,720**	**-2,204**	**-2,747**	**-2,741**	**-2,771**	2,229	5,872	7,133	4,665	2,103

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 16-3. Sacramento Flow River at Bend Bridge, Monthly Flow

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	10,188	13,896	26,553	35,636	46,119	29,263	16,420	13,681	13,578	16,305	12,139	16,061
20%	9,084	12,030	16,593	23,614	32,961	19,328	12,773	11,723	12,305	15,990	11,272	13,861
30%	8,301	11,271	10,517	15,779	21,336	14,475	8,661	10,432	11,019	15,716	10,416	12,104
40%	7,817	10,144	7,828	11,444	12,724	10,331	7,211	9,493	10,708	14,723	10,001	10,145
50%	7,018	8,610	6,738	8,651	10,318	8,537	6,295	8,912	10,212	13,608	9,649	6,937
60%	6,439	7,277	6,313	7,028	8,261	7,612	5,896	8,574	9,732	12,748	9,360	5,909
70%	6,077	6,348	5,668	6,316	7,352	6,585	5,504	8,101	9,478	11,944	8,876	5,720
80%	5,759	5,848	5,284	5,793	5,852	5,733	5,240	7,755	9,148	11,171	8,433	5,247
90%	5,254	4,952	4,799	4,918	5,147	5,423	4,899	7,060	8,676	10,393	7,990	4,632
Long Term												
Full Simulation Period[a]	7,419	9,386	11,785	15,532	18,802	14,426	9,158	9,806	10,715	13,540	9,828	9,128
Water Year Types[b,c]												
Wet (32%)	8,864	12,201	12,212	29,328	30,808	24,888	13,988	11,641	10,455	13,909	10,733	14,543
Above Normal (16%)	8,036	12,488	11,050	16,297	25,999	15,923	9,620	10,248	11,192	15,414	10,652	10,421
Below Normal (13%)	6,917	6,667	11,741	7,401	12,565	7,255	6,371	9,297	11,634	14,499	10,741	5,970
Dry (24%)	6,623	7,712	15,032	7,159	9,374	8,913	6,431	8,473	10,962	12,750	8,777	5,420
Critical (15%)	5,408	5,206	6,284	6,219	6,426	5,899	5,290	8,040	9,507	11,146	7,891	5,067

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	10,113	11,120	30,249	39,974	47,109	29,749	16,420	14,020	14,747	16,248	11,749	9,801
20%	9,130	7,882	22,749	25,057	31,480	19,330	12,774	12,184	13,542	15,985	11,023	8,559
30%	8,604	7,183	11,316	17,121	22,239	16,744	8,715	11,082	12,527	15,638	10,550	6,433
40%	7,503	6,970	8,963	13,541	13,520	10,775	7,451	10,519	11,173	14,449	10,149	6,151
50%	6,934	6,571	6,899	8,966	10,596	8,854	6,372	9,928	10,843	13,501	9,763	5,804
60%	6,519	6,156	6,262	7,272	8,428	7,903	5,949	9,027	10,308	12,504	9,487	5,621
70%	6,300	5,823	5,643	6,528	7,385	6,899	5,586	8,559	9,731	11,782	9,095	5,418
80%	5,903	5,565	5,288	5,792	6,138	5,753	5,075	7,966	9,322	11,255	8,510	5,003
90%	5,103	5,254	4,895	4,893	5,269	5,421	4,893	7,500	8,789	10,253	7,995	4,691
Long Term												
Full Simulation Period[a]	7,404	7,839	12,742	16,304	19,156	14,832	9,249	10,332	11,347	13,435	9,944	6,624
Water Year Types[b,c]												
Wet (32%)	8,706	8,671	14,298	30,417	30,972	24,975	14,102	11,890	10,558	13,818	10,905	8,795
Above Normal (16%)	8,074	9,414	12,288	17,657	27,168	16,604	9,643	10,735	11,564	15,475	10,658	5,712
Below Normal (13%)	6,837	6,670	11,764	8,790	13,567	8,117	6,796	10,255	12,936	14,658	10,906	6,477
Dry (24%)	6,774	7,815	15,404	7,277	9,371	9,294	6,445	9,320	12,016	12,599	8,962	5,348
Critical (15%)	5,426	5,441	6,321	6,195	6,307	6,324	5,230	8,274	10,247	10,670	7,843	5,171

Proposed Action 011519 minus Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	**-76**	**-2,775**	3,696	4,339	990	486	1	339	1,169	**-58**	**-390**	**-6,260**
20%	46	**-4,148**	6,156	1,442	**-1,481**	2	1	461	1,238	**-5**	**-249**	**-5,302**
30%	302	**-4,088**	799	1,342	903	2,270	54	649	1,509	**-78**	134	**-5,671**
40%	**-313**	**-3,174**	1,135	2,097	796	444	240	1,026	465	**-274**	148	**-3,994**
50%	**-84**	**-2,040**	160	314	278	318	78	1,016	631	**-107**	114	**-1,133**
60%	80	**-1,121**	**-50**	244	167	291	53	452	576	**-244**	127	**-288**
70%	223	**-526**	**-25**	212	33	314	82	458	253	**-162**	219	**-302**
80%	144	**-284**	3	**-1**	285	20	**-165**	211	174	84	77	**-244**
90%	**-151**	303	96	**-25**	121	**-3**	**-6**	440	112	**-140**	5	58
Long Term												
Full Simulation Period[a]	**-15**	**-1,547**	957	772	354	406	91	525	632	**-105**	116	**-2,504**
Water Year Types[b,c]												
Wet (32%)	**-157**	**-3,530**	2,085	1,089	164	86	114	249	103	**-92**	172	**-5,748**
Above Normal (16%)	39	**-3,074**	1,238	1,360	1,169	681	23	487	372	60	6	**-4,708**
Below Normal (13%)	**-80**	3	23	1,389	1,003	862	424	957	1,302	159	165	506
Dry (24%)	151	103	372	118	**-3**	381	14	847	1,054	**-151**	185	**-72**
Critical (15%)	18	235	37	**-25**	**-120**	425	**-60**	234	740	**-476**	**-48**	104

a Based on the 82-year simulation period.

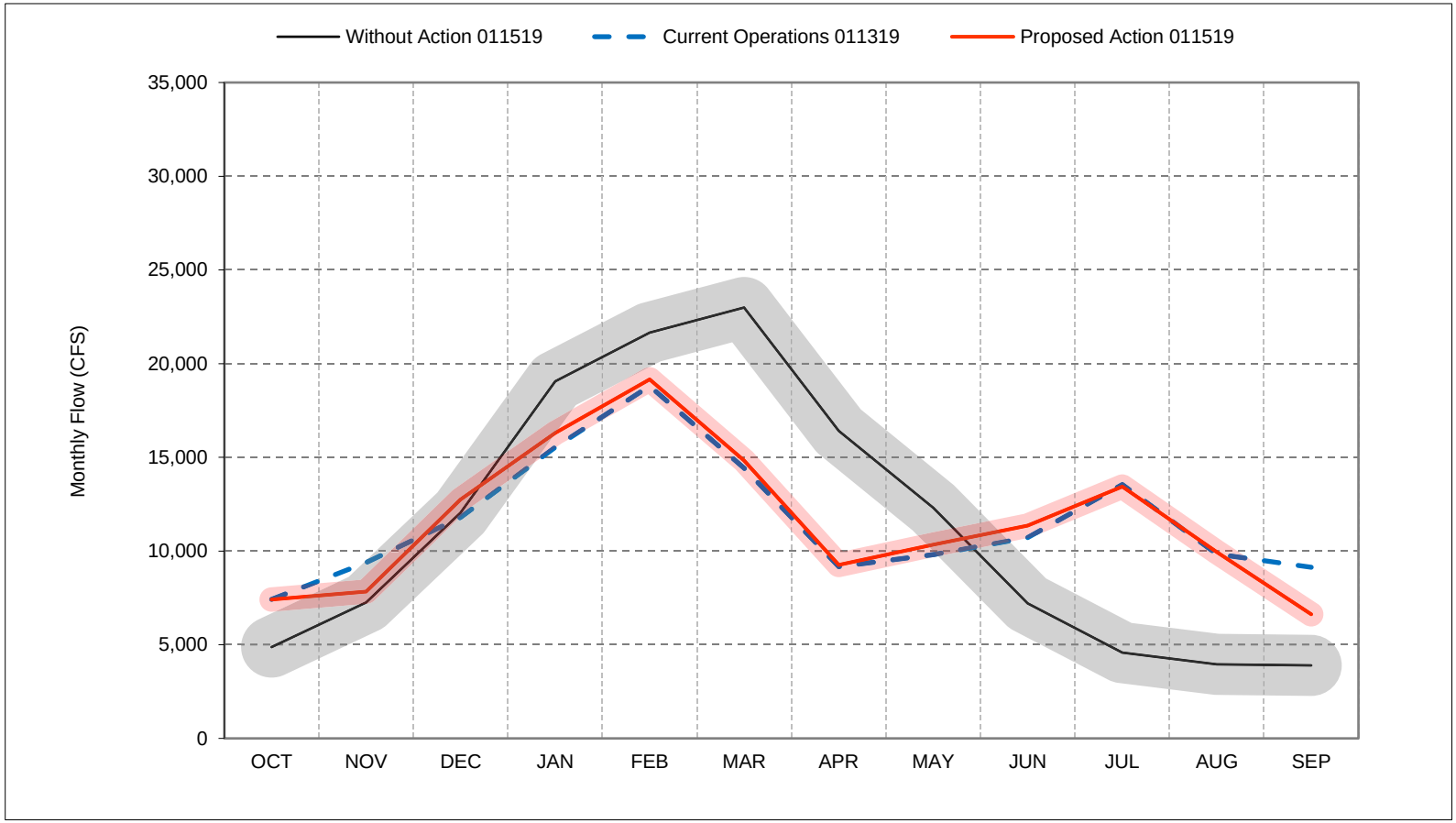
b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

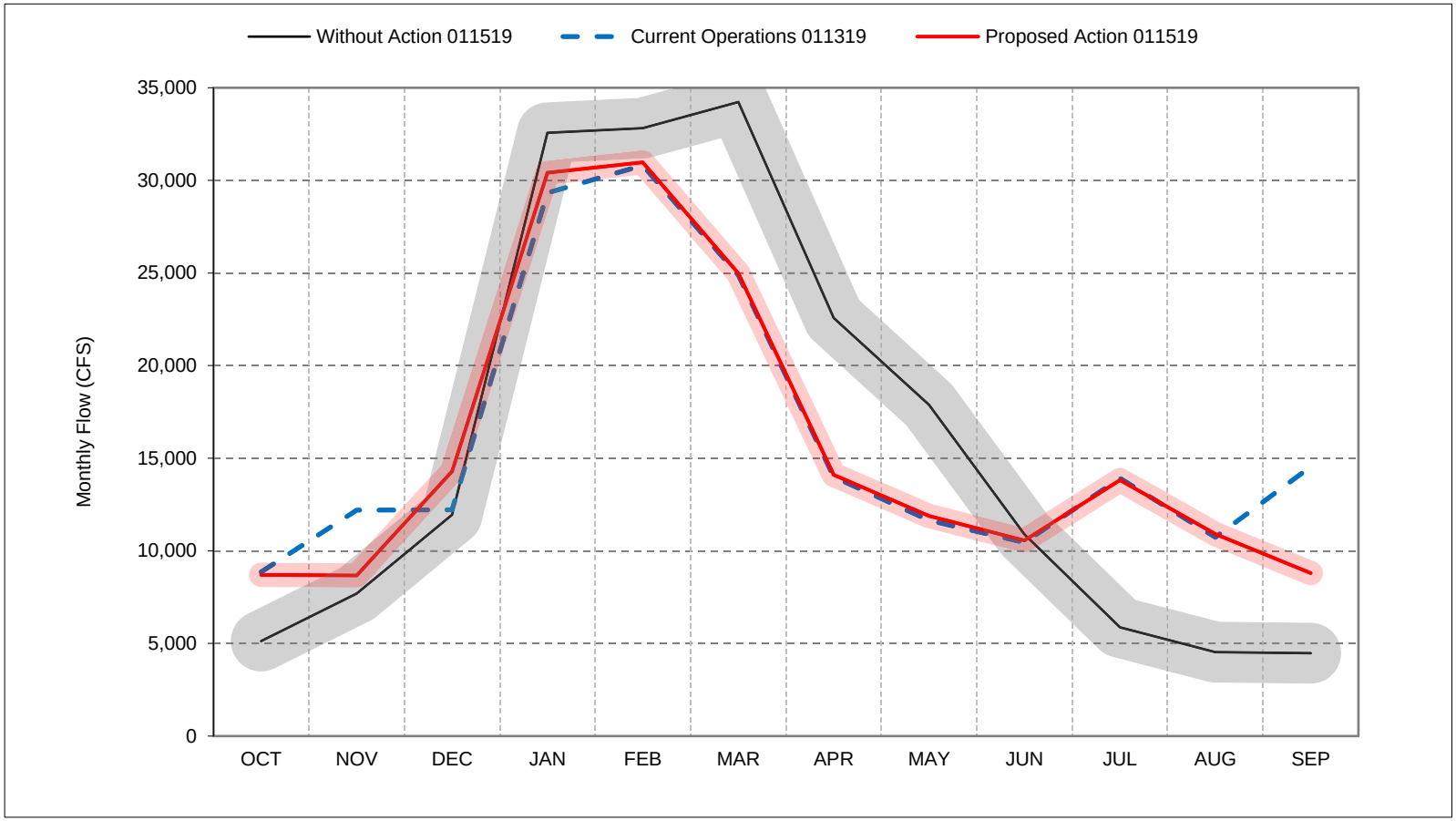
e These are draft results meant for qualitative analysis and are subject to revision.

Figure 16-1. Sacramento Flow River at Bend Bridge, Long-Term Average Flow



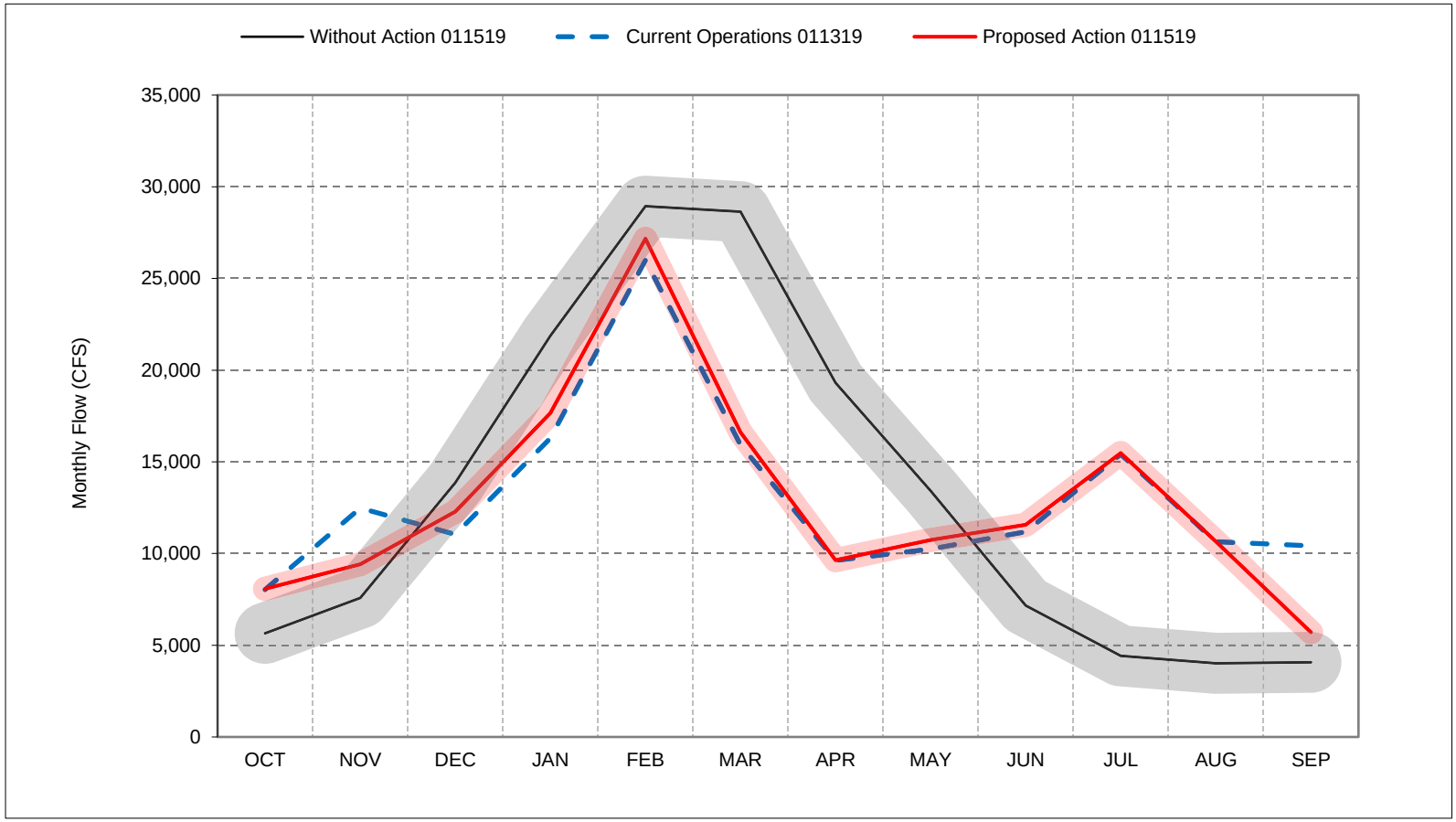
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 16-2. Sacramento Flow River at Bend Bridge, Wet Year Average Flow



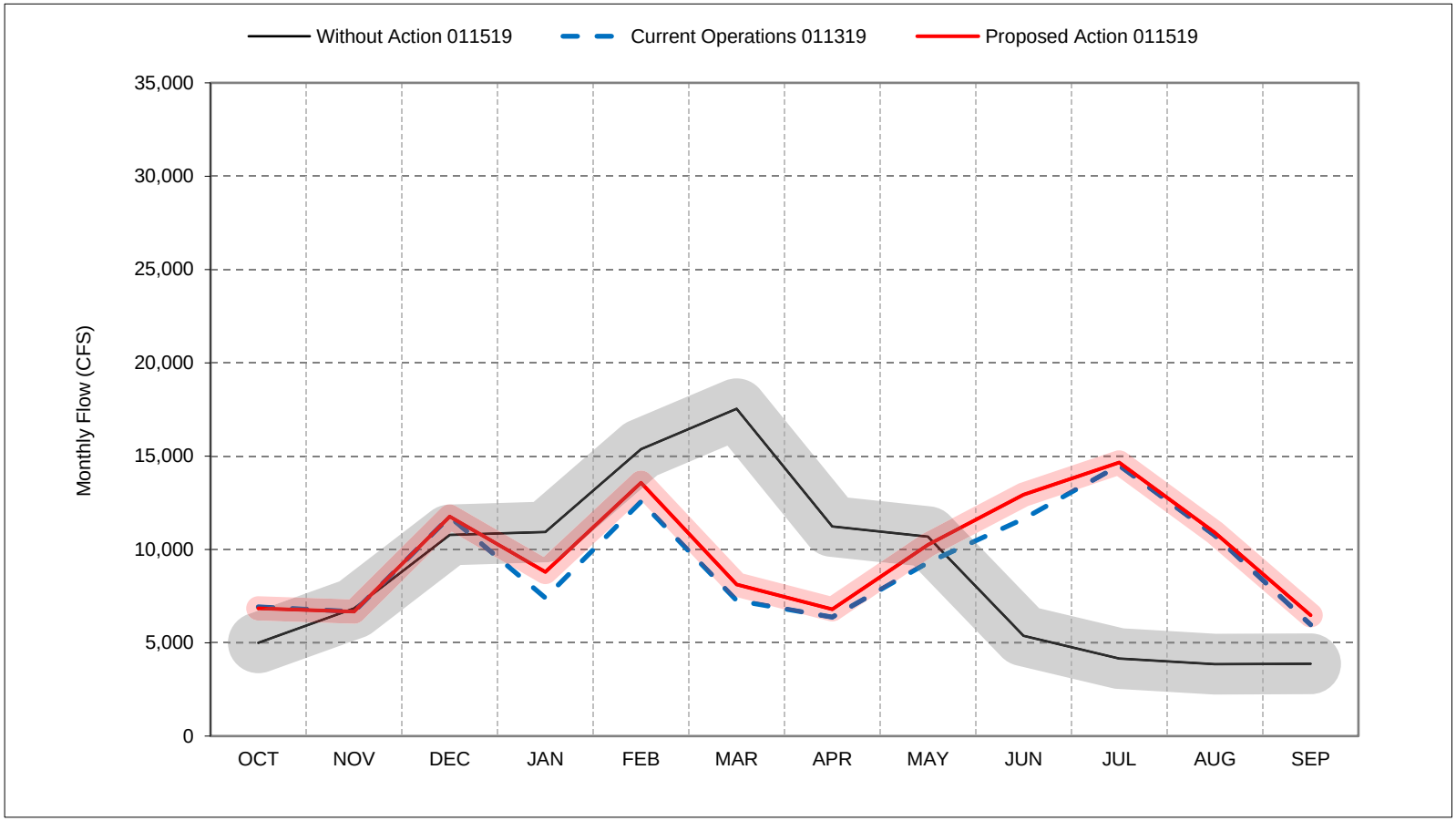
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 16-3. Sacramento Flow River at Bend Bridge, Above Normal Year Average Flow



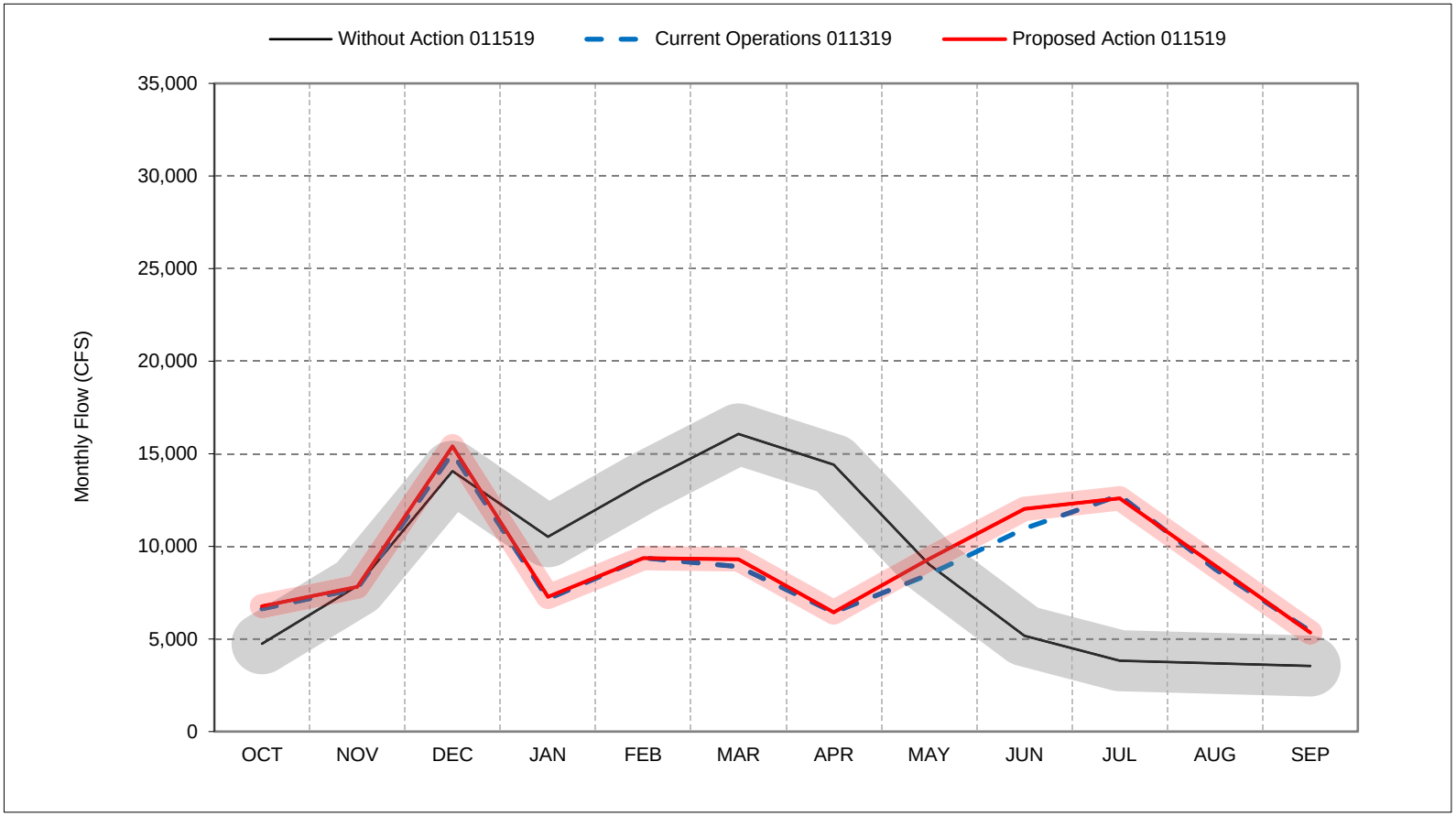
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 16-4. Sacramento Flow River at Bend Bridge, Below Normal Year Average Flow



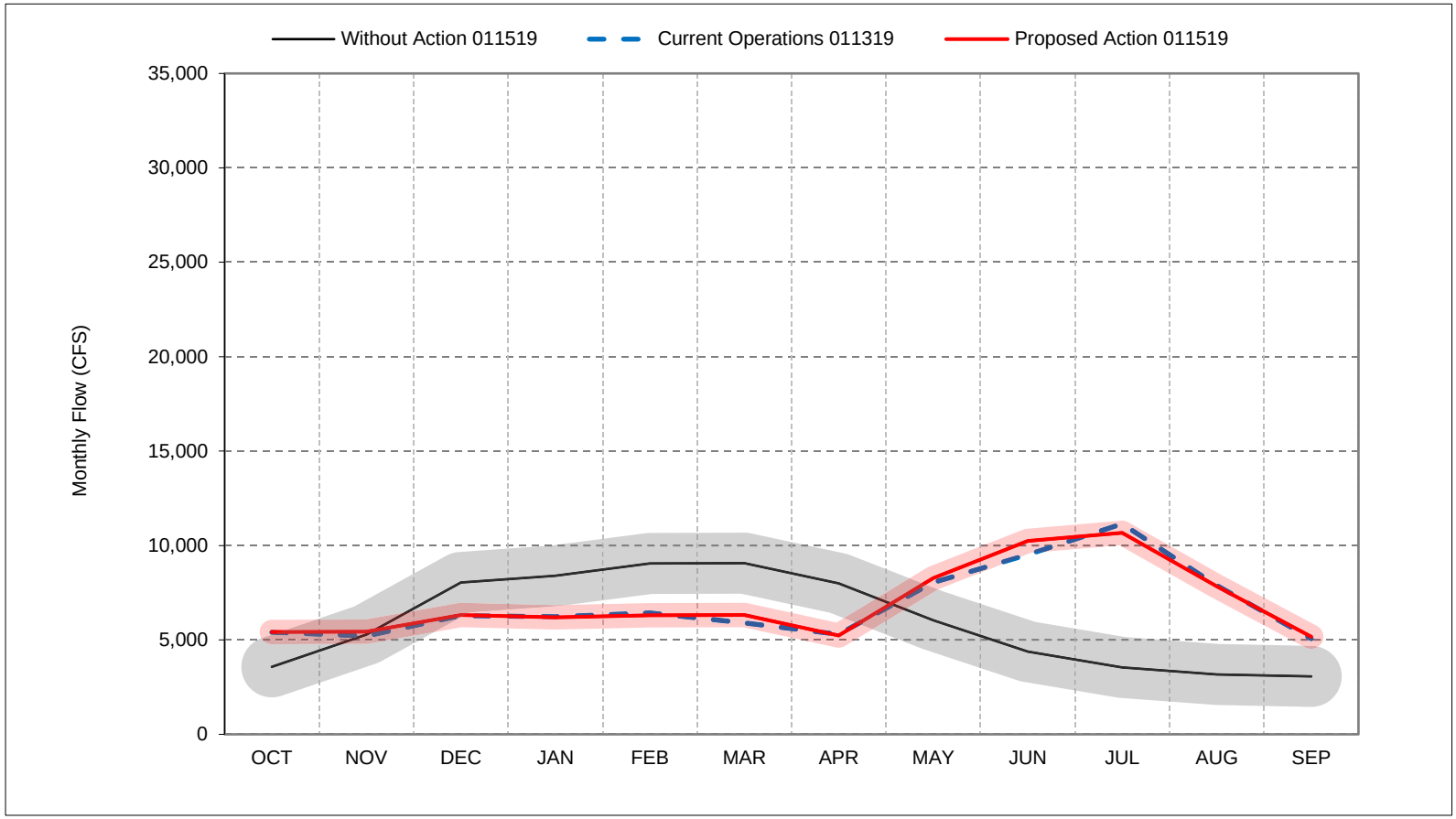
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 16-5. Sacramento Flow River at Bend Bridge, Dry Year Average Flow



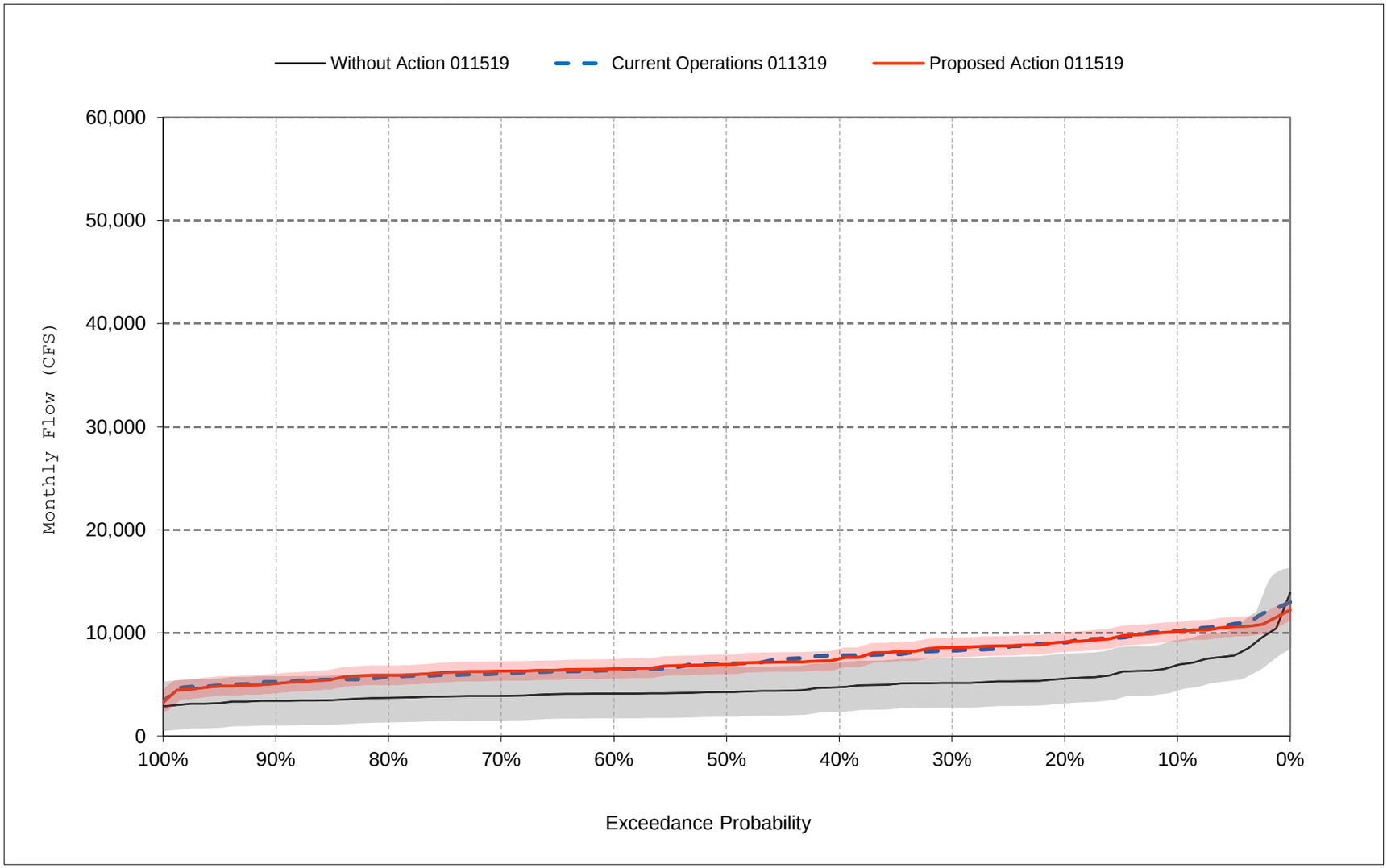
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 16-6. Sacramento Flow River at Bend Bridge, Critical Year Average Flow



*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

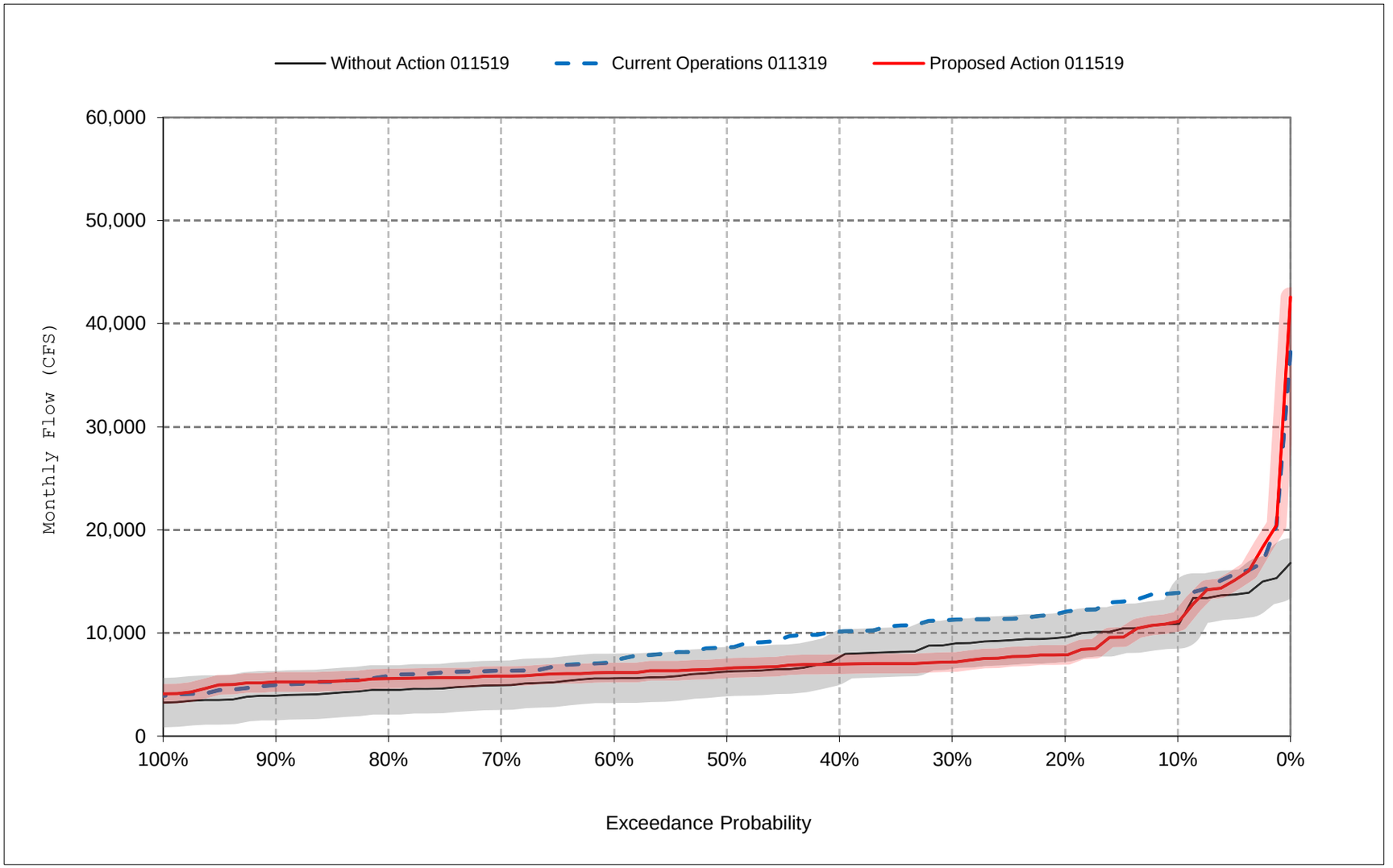
Figure 16-7. Sacramento Flow River at Bend Bridge, October



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

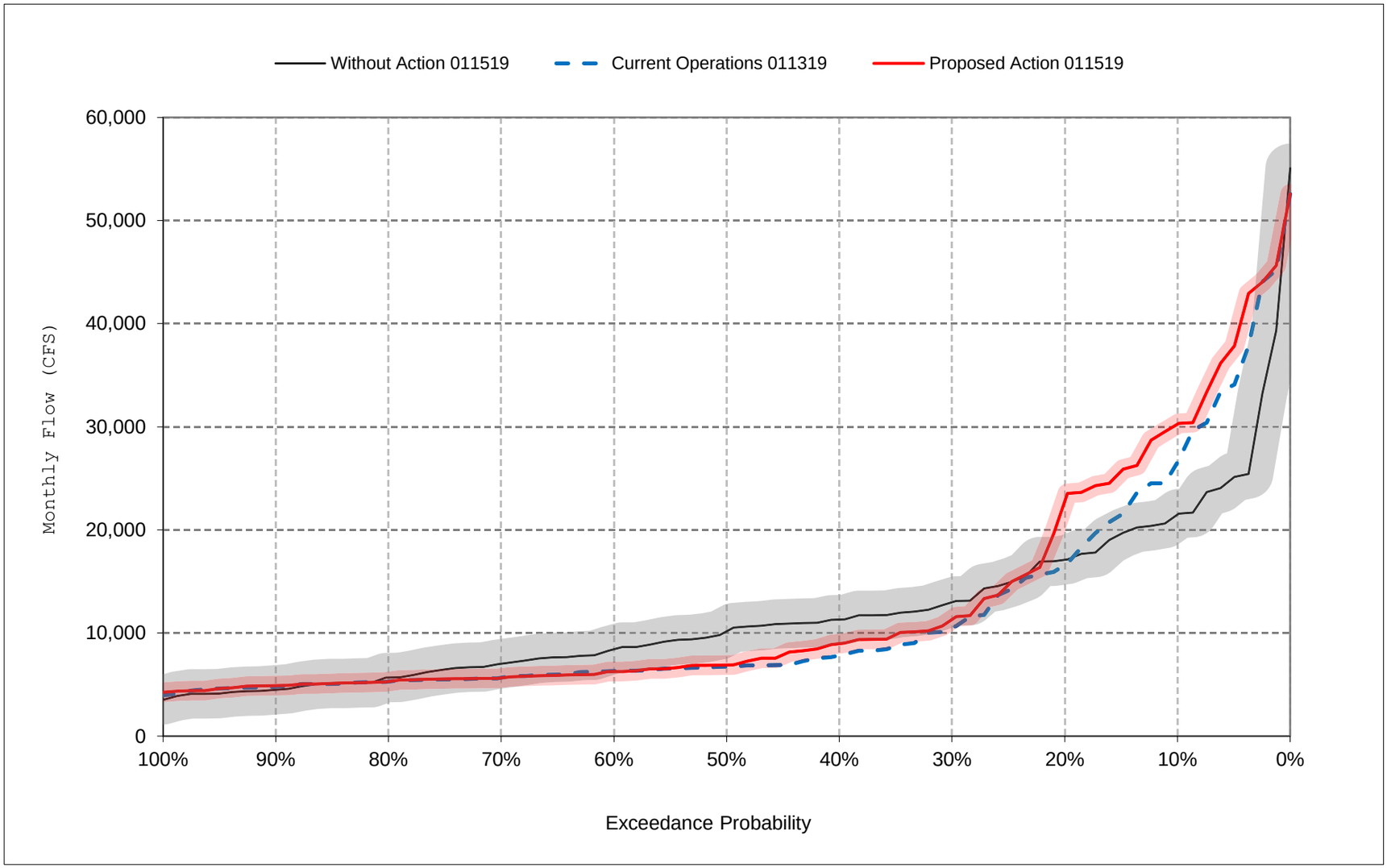
Figure 16-8. Sacramento Flow River at Bend Bridge, November



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

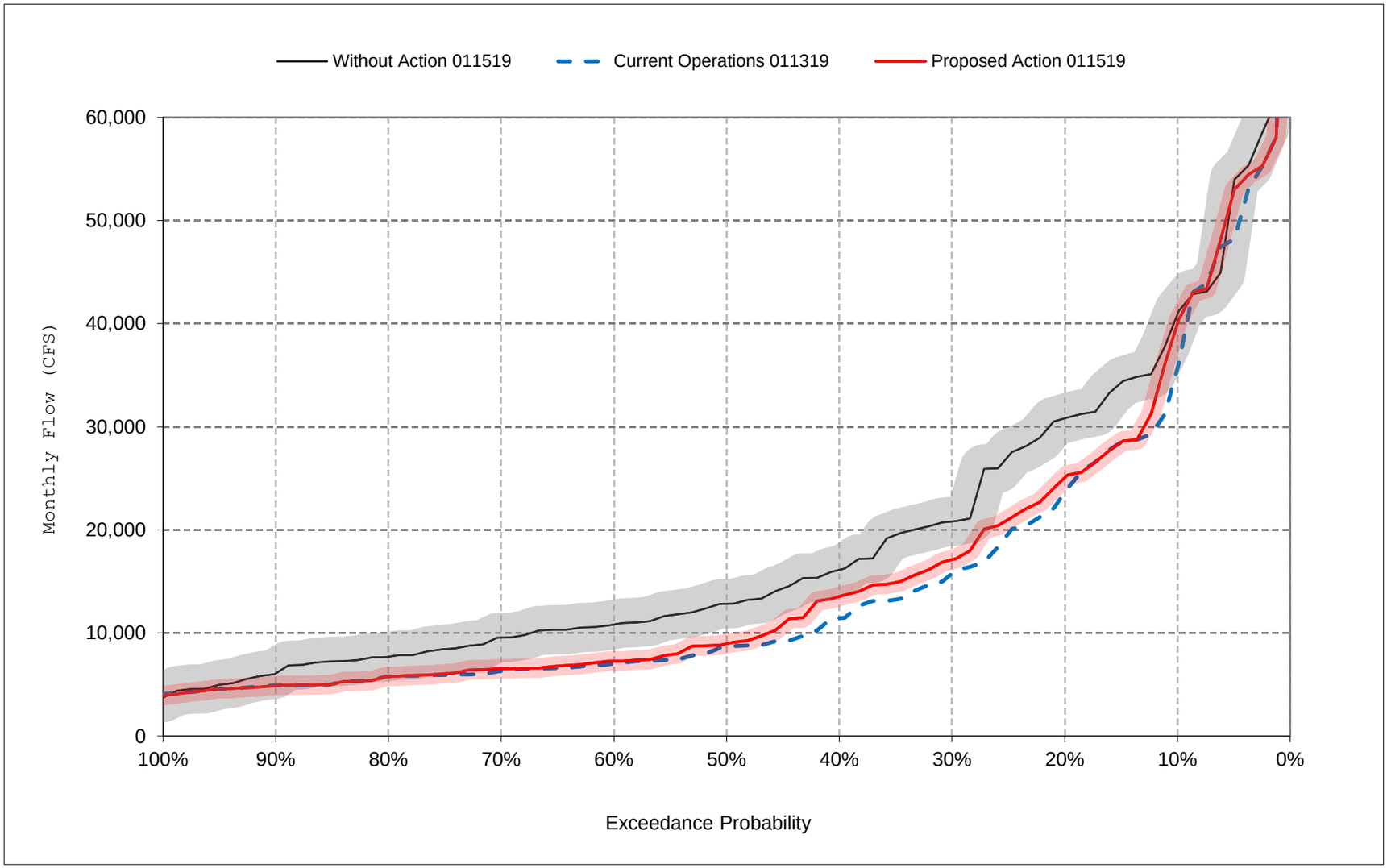
Figure 16-9. Sacramento Flow River at Bend Bridge, December



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

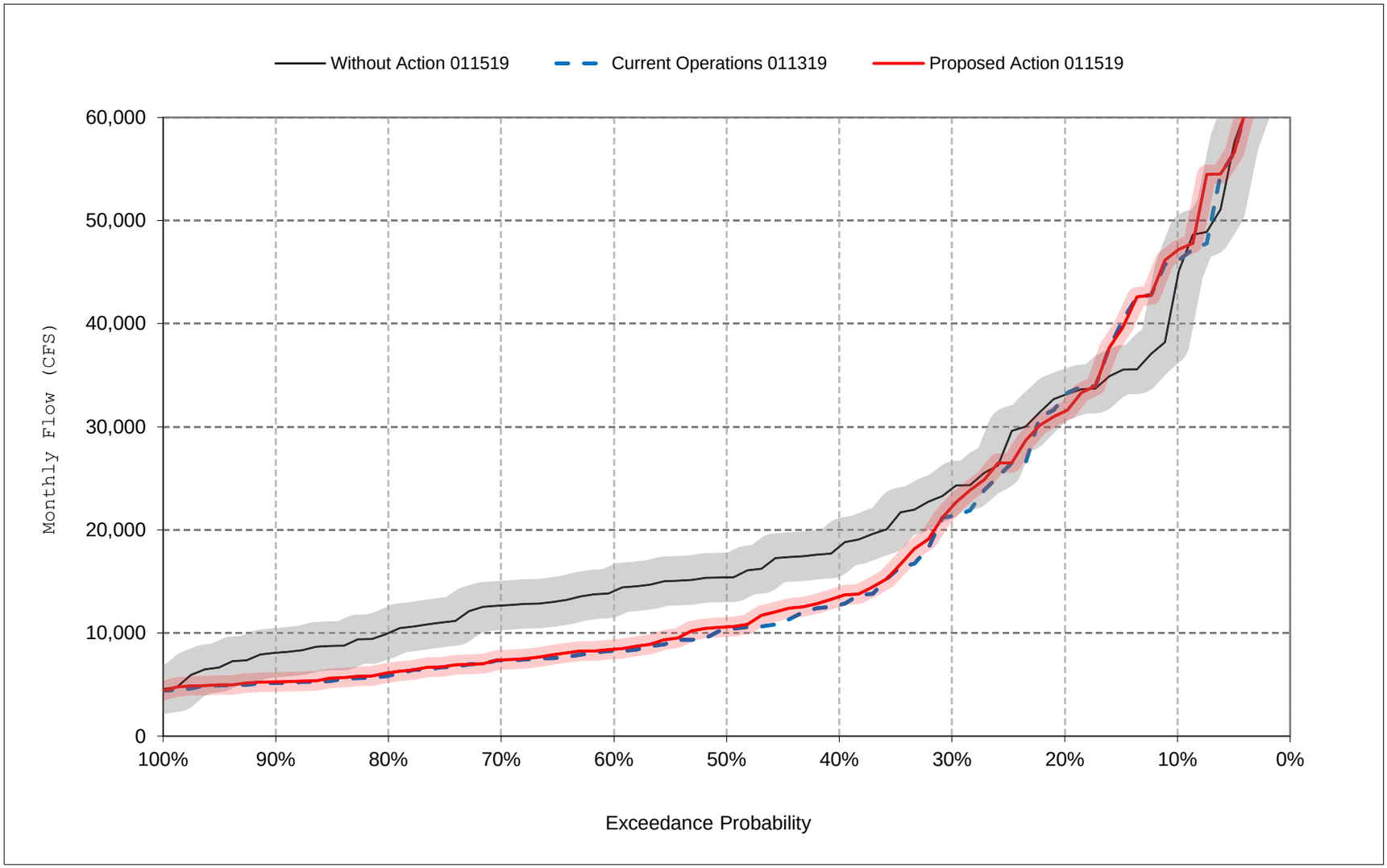
Figure 16-10. Sacramento Flow River at Bend Bridge, January



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

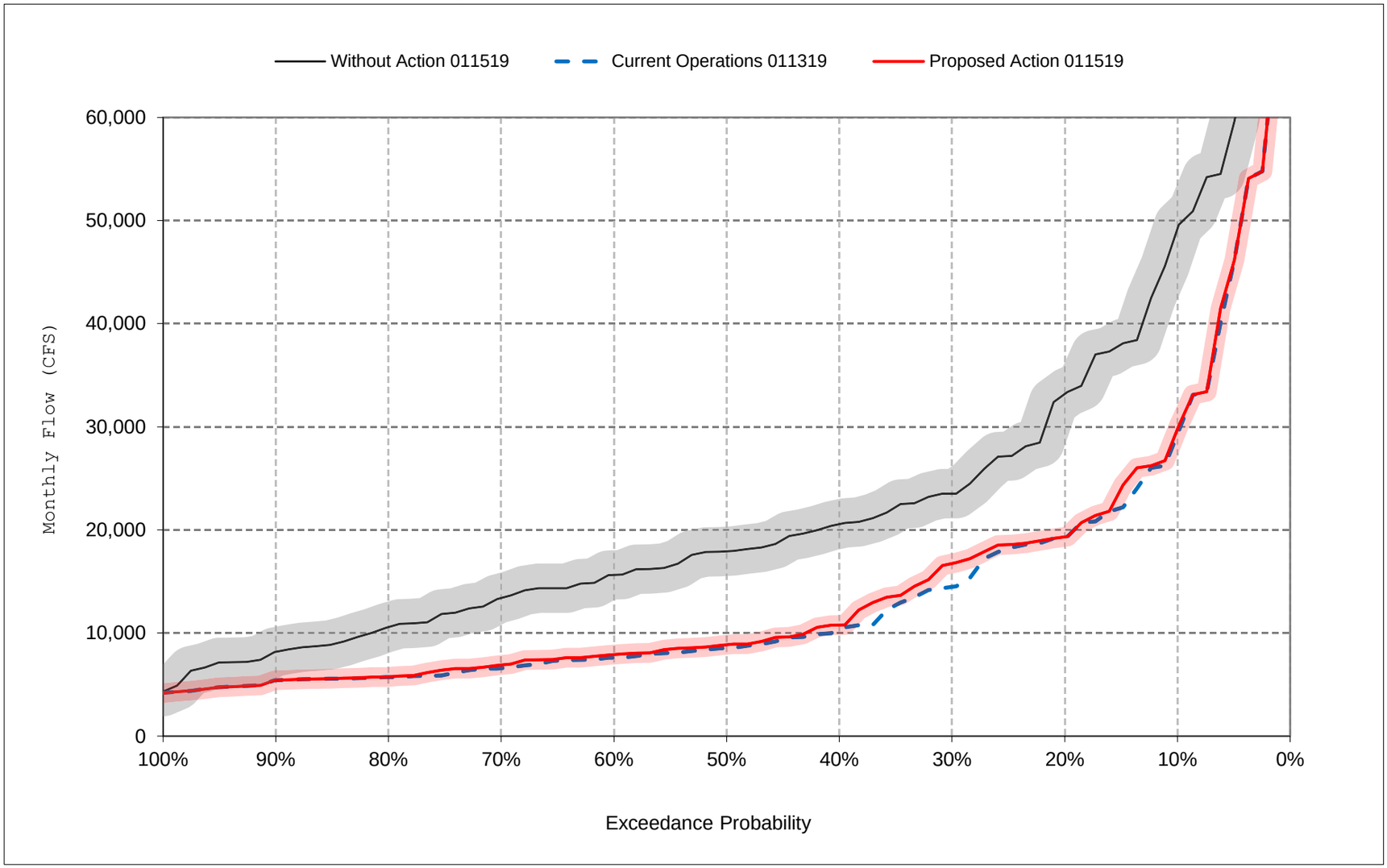
Figure 16-11. Sacramento Flow River at Bend Bridge, February



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

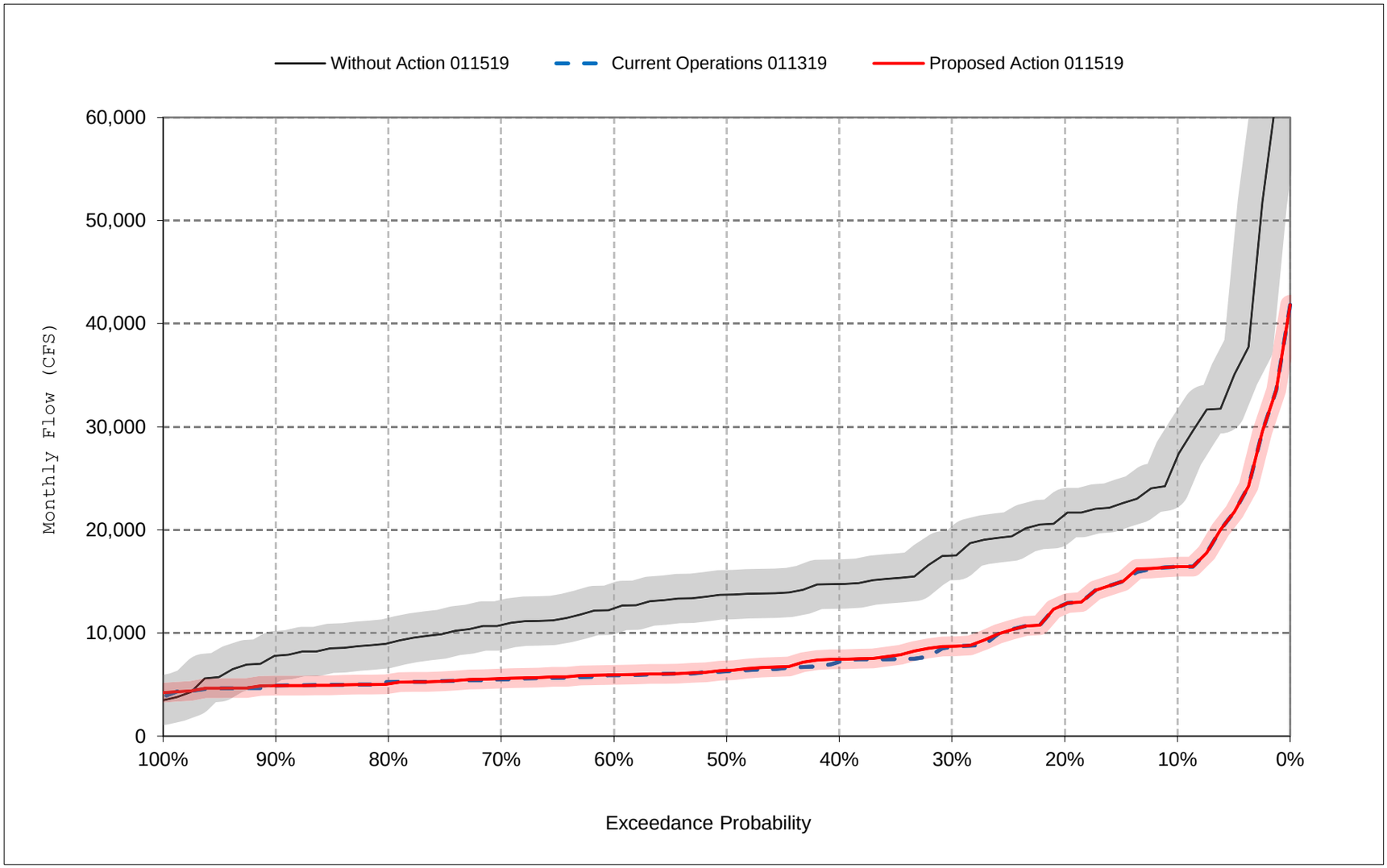
Figure 16-12. Sacramento Flow River at Bend Bridge, March



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

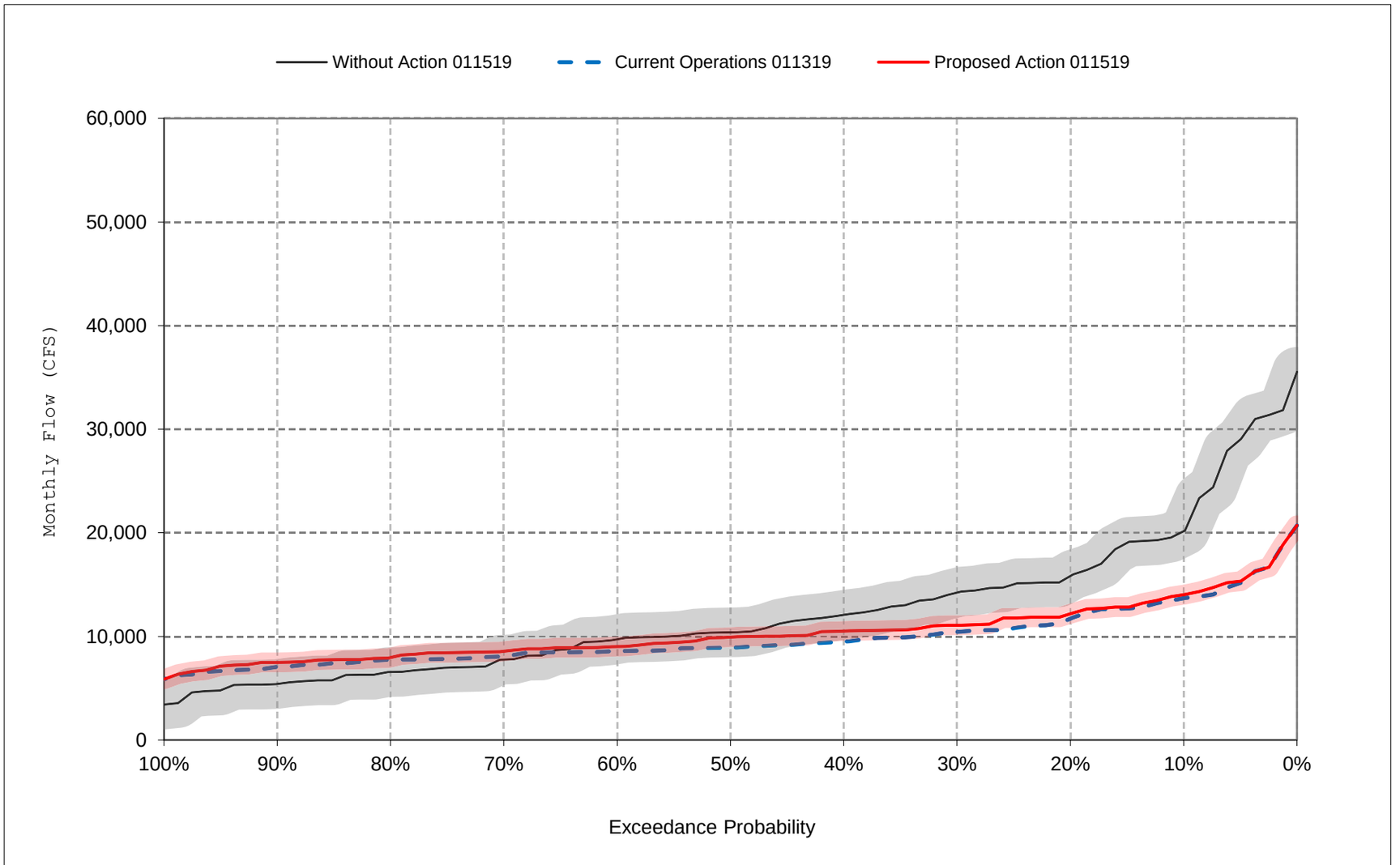
Figure 16-13. Sacramento Flow River at Bend Bridge, April



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

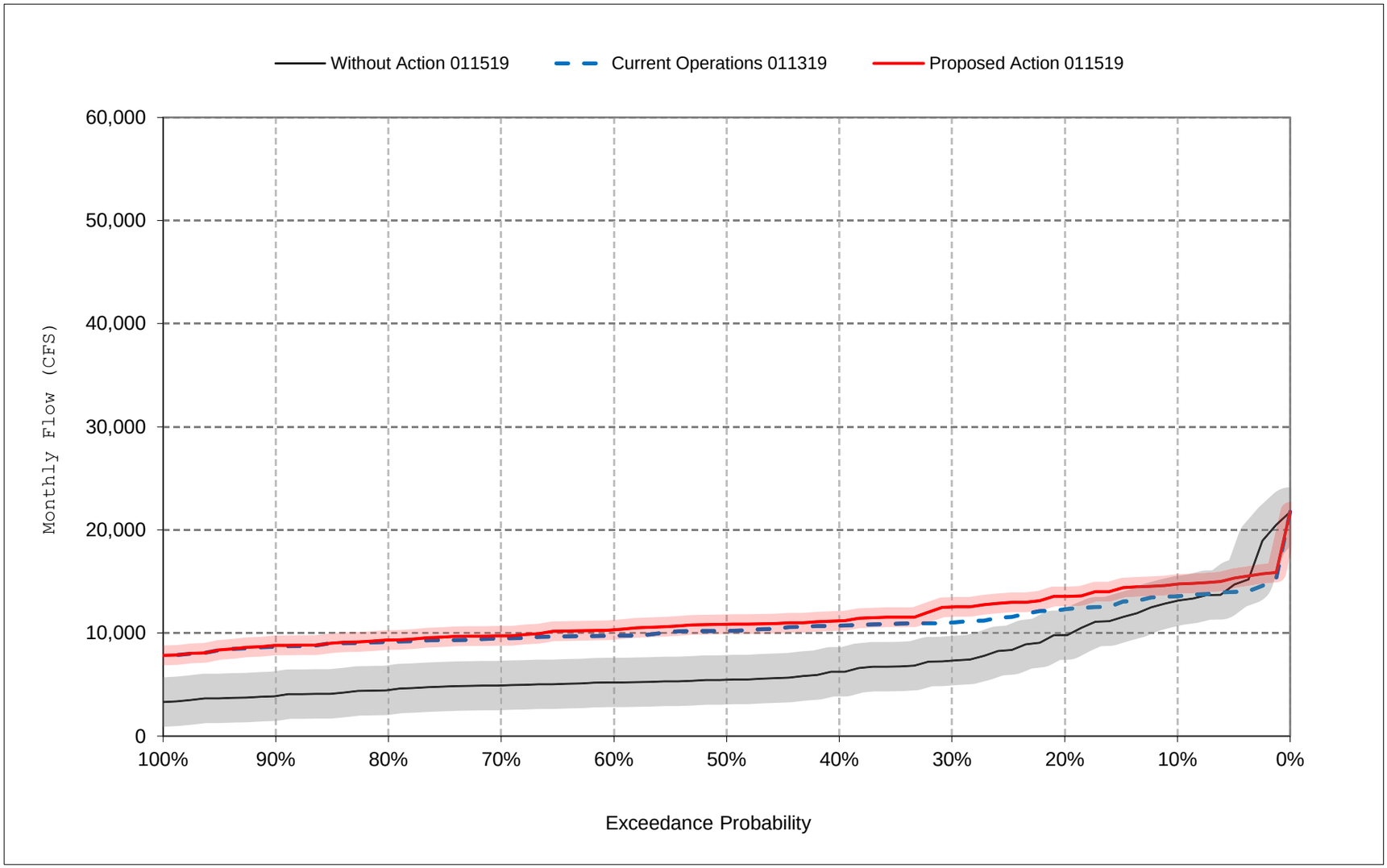
Figure 16-14. Sacramento Flow River at Bend Bridge, May



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

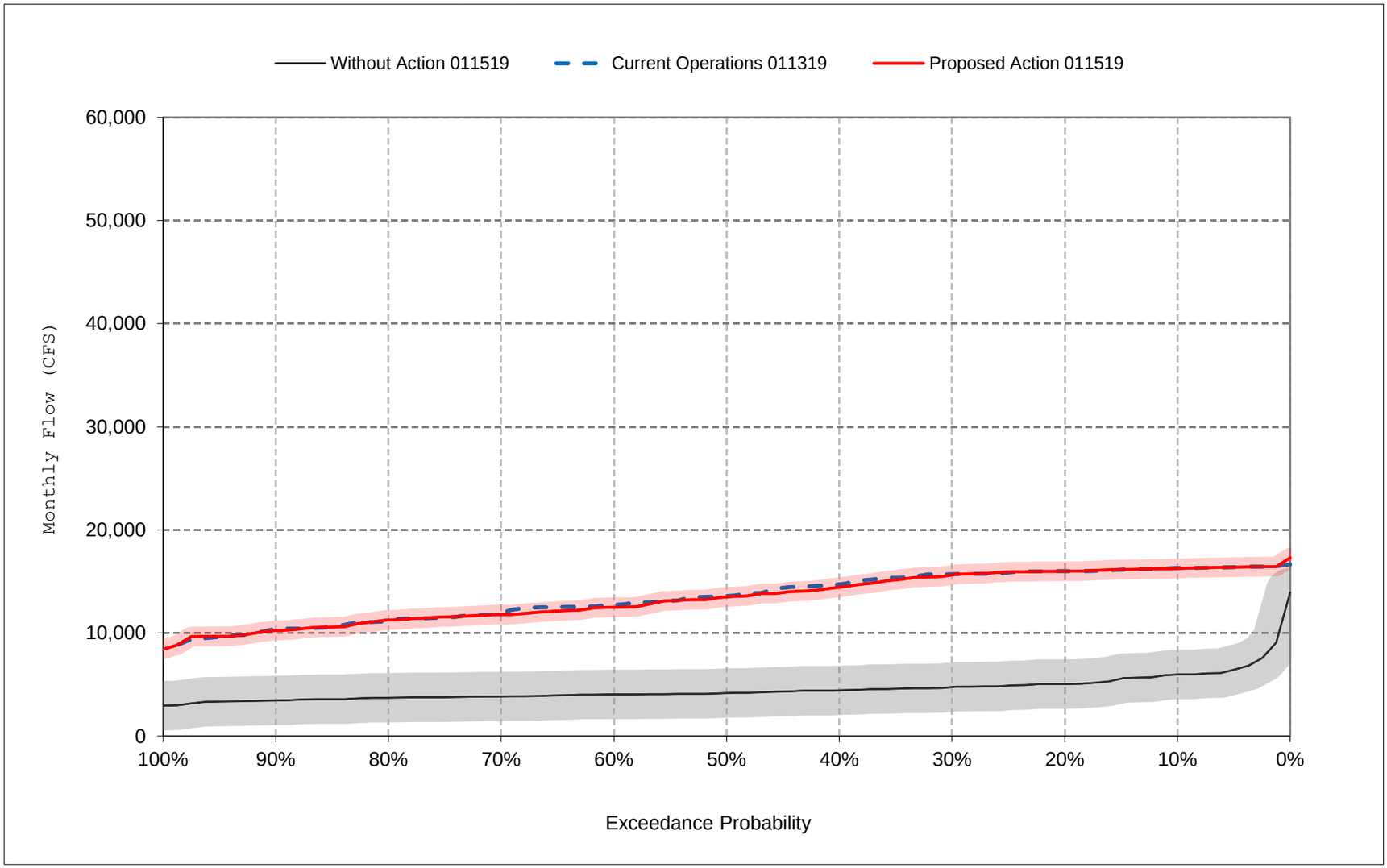
Figure 16-15. Sacramento Flow River at Bend Bridge, June



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

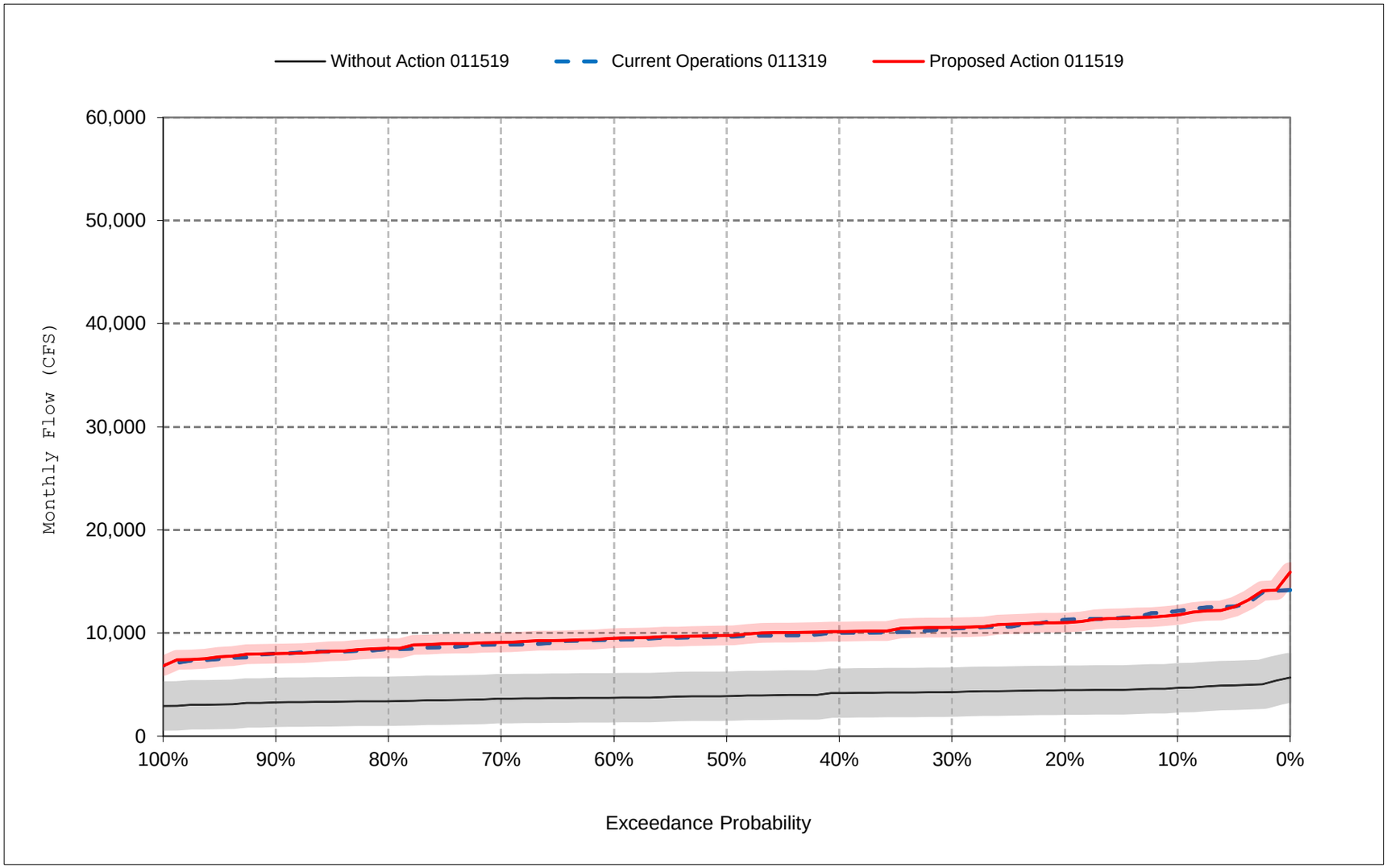
Figure 16-16. Sacramento Flow River at Bend Bridge, July



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

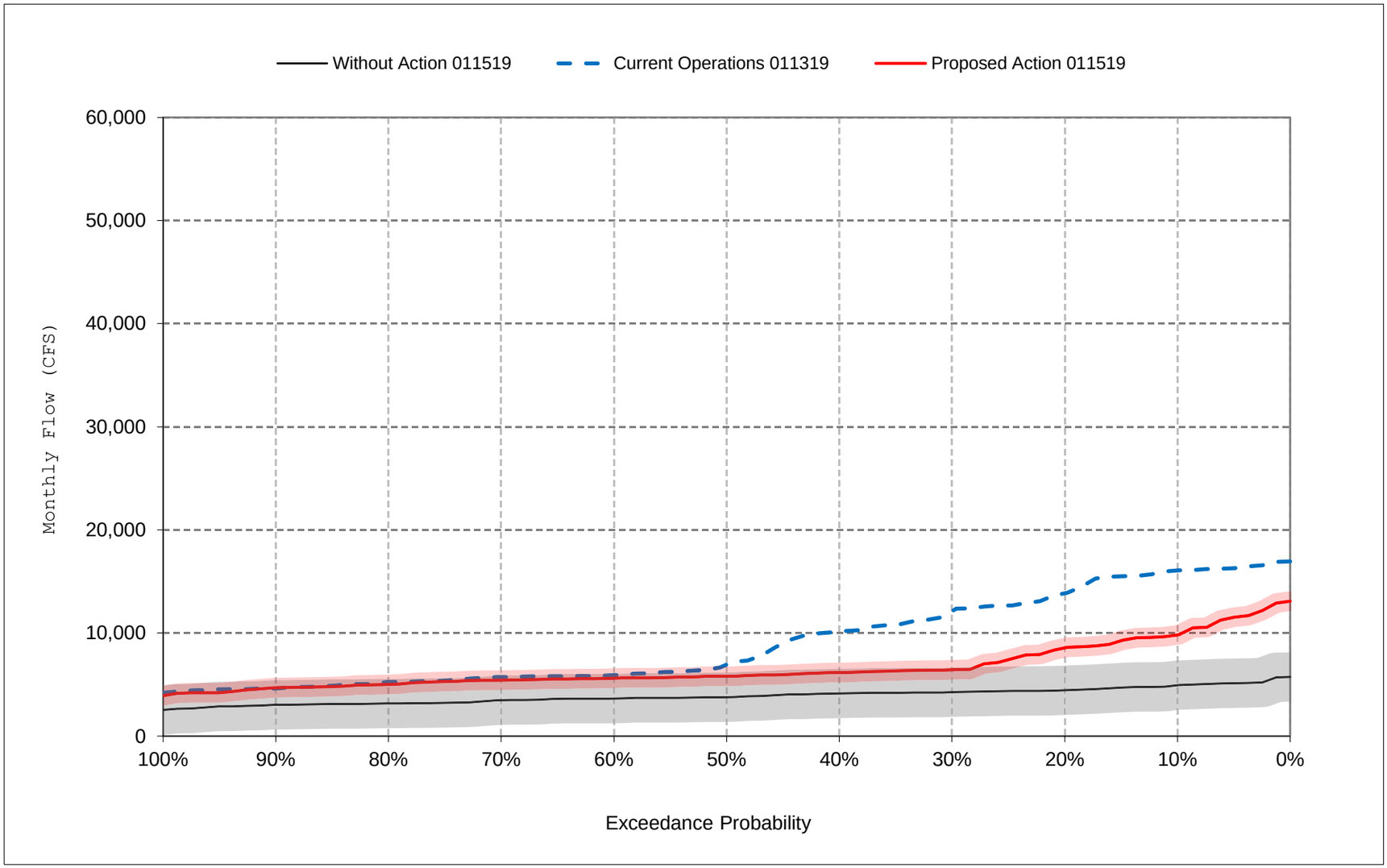
Figure 16-17. Sacramento Flow River at Bend Bridge, August



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Figure 16-18. Sacramento Flow River at Bend Bridge, September



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Table 17-1. Sacramento River below Red Bluff Diversion Dam Flow, Monthly Flow

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	6,918	11,029	22,009	41,544	45,275	49,418	27,371	20,176	13,142	5,972	4,674	4,942
20%	5,590	9,669	17,501	31,710	33,559	33,405	21,595	15,855	9,807	5,066	4,450	4,453
30%	5,165	9,011	13,147	21,506	24,369	23,679	17,641	14,268	7,333	4,760	4,270	4,265
40%	4,761	7,726	11,583	16,463	18,835	20,725	14,800	12,098	6,256	4,449	4,179	4,141
50%	4,292	6,278	10,288	13,202	15,682	18,120	13,823	10,423	5,467	4,169	3,879	3,782
60%	4,137	5,633	8,465	11,045	14,398	15,817	12,451	9,733	5,201	4,038	3,728	3,651
70%	3,911	4,945	7,066	9,625	12,897	13,476	10,880	7,767	4,927	3,852	3,641	3,483
80%	3,717	4,506	5,729	7,755	10,144	10,683	9,099	6,581	4,484	3,715	3,387	3,177
90%	3,427	3,937	4,523	6,176	8,152	8,281	7,836	5,413	3,887	3,448	3,265	3,037
Long Term												
Full Simulation Period[a]	4,886	7,306	12,236	19,411	21,999	23,191	16,530	12,342	7,220	4,573	3,955	3,897
Water Year Types[b,c]												
Wet (32%)	5,146	7,751	12,160	33,215	33,348	34,550	22,778	17,925	10,900	5,864	4,538	4,476
Above Normal (16%)	5,659	7,645	14,048	22,344	29,399	28,882	19,436	13,446	7,182	4,432	4,016	4,069
Below Normal (13%)	5,014	6,887	10,958	11,141	15,661	17,634	11,305	10,693	5,379	4,158	3,853	3,870
Dry (24%)	4,756	7,941	14,312	10,657	13,629	16,211	14,487	9,043	5,180	3,833	3,678	3,544
Critical (15%)	3,582	5,302	8,151	8,497	9,155	9,142	8,041	6,057	4,379	3,538	3,179	3,069

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	10,011	13,916	26,964	36,349	46,951	29,624	16,603	13,148	13,015	15,428	11,307	15,876
20%	8,935	12,026	17,059	24,191	33,406	19,585	13,008	11,101	11,689	14,953	10,296	13,688
30%	8,162	11,326	10,713	16,195	21,743	14,565	8,528	9,878	10,416	14,727	9,580	11,816
40%	7,682	10,236	8,070	11,649	13,058	10,522	7,061	9,105	9,881	13,944	9,184	10,012
50%	6,903	8,639	6,795	8,852	10,563	8,716	5,988	8,579	9,465	12,881	8,934	6,775
60%	6,301	7,375	6,327	7,152	8,447	7,747	5,541	8,064	9,136	12,165	8,564	5,835
70%	5,951	6,380	5,760	6,395	7,537	6,651	5,292	7,736	8,721	11,138	8,375	5,549
80%	5,687	5,854	5,334	5,869	5,964	5,772	5,044	7,317	8,297	10,215	7,926	5,122
90%	5,150	4,954	4,820	4,974	5,202	5,471	4,657	6,623	7,926	9,607	7,749	4,515
Long Term												
Full Simulation Period[a]	7,315	9,438	11,980	15,892	19,147	14,608	9,063	9,371	9,994	12,702	9,166	8,972
Water Year Types[b,c]												
Wet (32%)	8,728	12,255	12,422	29,982	31,345	25,200	14,018	11,059	9,426	12,709	9,781	14,320
Above Normal (16%)	7,927	12,554	11,235	16,772	26,458	16,158	9,459	9,611	10,203	14,275	9,759	10,210
Below Normal (13%)	6,820	6,705	11,915	7,608	12,849	7,303	6,118	8,845	10,980	13,721	10,131	5,837
Dry (24%)	6,538	7,784	15,279	7,303	9,573	9,042	6,326	8,214	10,498	12,221	8,358	5,349
Critical (15%)	5,338	5,218	6,394	6,318	6,527	5,955	5,159	7,866	9,252	10,848	7,654	4,954

Current Operations 011319 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	3,092	2,887	4,954	**-5,195**	1,676	**-19,794**	**-10,768**	**-7,028**	**-127**	9,455	6,633	10,934
20%	3,346	2,358	**-443**	**-7,519**	**-154**	**-13,820**	**-8,587**	**-4,753**	1,881	9,888	5,846	9,235
30%	2,997	2,315	**-2,434**	**-5,311**	**-2,626**	**-9,114**	**-9,113**	**-4,390**	3,083	9,967	5,310	7,551
40%	2,922	2,510	**-3,512**	**-4,814**	**-5,777**	**-10,203**	**-7,739**	**-2,993**	3,624	9,495	5,005	5,871
50%	2,610	2,361	**-3,493**	**-4,350**	**-5,119**	**-9,403**	**-7,834**	**-1,843**	3,998	8,712	5,055	2,992
60%	2,164	1,742	**-2,138**	**-3,894**	**-5,951**	**-8,070**	**-6,909**	**-1,669**	3,935	8,127	4,836	2,184
70%	2,040	1,435	**-1,305**	**-3,230**	**-5,361**	**-6,825**	**-5,589**	**-30**	3,794	7,286	4,734	2,066
80%	1,970	1,348	**-395**	**-1,886**	**-4,180**	**-4,910**	**-4,055**	736	3,813	6,500	4,539	1,945
90%	1,723	1,017	298	**-1,202**	**-2,950**	**-2,811**	**-3,179**	1,210	4,039	6,160	4,484	1,478
Long Term												
Full Simulation Period[a]	2,429	2,131	**-256**	**-3,519**	**-2,853**	**-8,583**	**-7,467**	**-2,971**	2,773	8,129	5,211	5,075
Water Year Types[b,c]												
Wet (32%)	3,582	4,504	262	**-3,233**	**-2,003**	**-9,350**	**-8,759**	**-6,867**	**-1,473**	6,845	5,243	9,844
Above Normal (16%)	2,268	4,909	**-2,814**	**-5,572**	**-2,941**	**-12,724**	**-9,977**	**-3,835**	3,021	9,843	5,743	6,141
Below Normal (13%)	1,806	**-183**	956	**-3,533**	**-2,812**	**-10,330**	**-5,187**	**-1,848**	5,601	9,564	6,278	1,967
Dry (24%)	1,783	**-157**	967	**-3,354**	**-4,057**	**-7,169**	**-8,160**	**-829**	5,319	8,388	4,680	1,805
Critical (15%)	1,756	**-84**	**-1,758**	**-2,179**	**-2,628**	**-3,188**	**-2,882**	1,810	4,873	7,310	4,475	1,886

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 17-2. Sacramento River below Red Bluff Diversion Dam Flow, Monthly Flow

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	6,918	11,029	22,009	41,544	45,275	49,418	27,371	20,176	13,142	5,972	4,674	4,942
20%	5,590	9,669	17,501	31,710	33,559	33,405	21,595	15,855	9,807	5,066	4,450	4,453
30%	5,165	9,011	13,147	21,506	24,369	23,679	17,641	14,268	7,333	4,760	4,270	4,265
40%	4,761	7,726	11,583	16,463	18,835	20,725	14,800	12,098	6,256	4,449	4,179	4,141
50%	4,292	6,278	10,288	13,202	15,682	18,120	13,823	10,423	5,467	4,169	3,879	3,782
60%	4,137	5,633	8,465	11,045	14,398	15,817	12,451	9,733	5,201	4,038	3,728	3,651
70%	3,911	4,945	7,066	9,625	12,897	13,476	10,880	7,767	4,927	3,852	3,641	3,483
80%	3,717	4,506	5,729	7,755	10,144	10,683	9,099	6,581	4,484	3,715	3,387	3,177
90%	3,427	3,937	4,523	6,176	8,152	8,281	7,836	5,413	3,887	3,448	3,265	3,037
Long Term												
Full Simulation Period[a]	4,886	7,306	12,236	19,411	21,999	23,191	16,530	12,342	7,220	4,573	3,955	3,897
Water Year Types[b,c]												
Wet (32%)	5,146	7,751	12,160	33,215	33,348	34,550	22,778	17,925	10,900	5,864	4,538	4,476
Above Normal (16%)	5,659	7,645	14,048	22,344	29,399	28,882	19,436	13,446	7,182	4,432	4,016	4,069
Below Normal (13%)	5,014	6,887	10,958	11,141	15,661	17,634	11,305	10,693	5,379	4,158	3,853	3,870
Dry (24%)	4,756	7,941	14,312	10,657	13,629	16,211	14,487	9,043	5,180	3,833	3,678	3,544
Critical (15%)	3,582	5,302	8,151	8,497	9,155	9,142	8,041	6,057	4,379	3,538	3,179	3,069

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	10,094	11,251	30,654	41,231	47,844	30,095	16,604	13,637	14,019	15,143	11,091	9,587
20%	9,087	7,890	23,214	25,628	32,156	19,588	13,006	11,604	12,690	14,882	10,172	8,323
30%	8,562	7,216	11,557	17,517	22,646	16,748	8,515	10,466	11,652	14,422	9,599	6,220
40%	7,394	7,006	9,146	13,981	13,804	10,972	7,283	9,875	10,578	13,285	9,274	6,038
50%	6,893	6,621	7,024	9,111	10,808	9,079	6,050	9,339	9,897	12,614	8,943	5,660
60%	6,486	6,185	6,320	7,475	8,585	7,922	5,627	8,679	9,437	11,439	8,719	5,415
70%	6,245	5,822	5,730	6,631	7,552	6,947	5,271	8,051	9,027	11,078	8,427	5,277
80%	5,889	5,580	5,343	5,880	6,216	5,854	4,966	7,626	8,430	10,276	8,036	4,951
90%	5,048	5,263	4,928	4,948	5,381	5,465	4,589	7,123	7,905	9,373	7,722	4,491
Long Term												
Full Simulation Period[a]	7,340	7,880	12,937	16,664	19,500	15,011	9,122	9,847	10,550	12,510	9,209	6,451
Water Year Types[b,c]												
Wet (32%)	8,619	8,715	14,507	31,071	31,509	25,285	14,115	11,289	9,497	12,581	9,925	8,559
Above Normal (16%)	8,009	9,467	12,472	18,132	27,628	16,837	9,455	10,081	10,510	14,262	9,707	5,479
Below Normal (13%)	6,768	6,695	11,938	8,997	13,851	8,149	6,478	9,630	12,102	13,667	10,128	6,311
Dry (24%)	6,735	7,875	15,651	7,421	9,569	9,421	6,297	9,004	11,447	11,951	8,448	5,253
Critical (15%)	5,374	5,449	6,431	6,293	6,407	6,376	5,075	8,072	9,956	10,328	7,542	5,058

Proposed Action 011519 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	3,176	222	8,645	**-313**	2,569	**-19,323**	**-10,767**	**-6,539**	877	9,171	6,418	4,645
20%	3,498	**-1,779**	5,713	**-6,081**	**-1,403**	**-13,818**	**-8,589**	**-4,250**	2,883	9,816	5,722	3,870
30%	3,396	**-1,795**	**-1,590**	**-3,990**	**-1,724**	**-6,932**	**-9,126**	**-3,802**	4,318	9,662	5,329	1,955
40%	2,634	**-719**	**-2,436**	**-2,482**	**-5,031**	**-9,753**	**-7,516**	**-2,222**	4,322	8,837	5,095	1,897
50%	2,600	343	**-3,264**	**-4,090**	**-4,874**	**-9,040**	**-7,773**	**-1,084**	4,431	8,445	5,064	1,877
60%	2,349	552	**-2,145**	**-3,570**	**-5,812**	**-7,895**	**-6,824**	**-1,054**	4,236	7,401	4,991	1,764
70%	2,334	876	**-1,336**	**-2,994**	**-5,345**	**-6,529**	**-5,609**	284	4,100	7,226	4,786	1,794
80%	2,172	1,075	**-386**	**-1,876**	**-3,928**	**-4,828**	**-4,133**	1,045	3,946	6,560	4,649	1,774
90%	1,621	1,326	406	**-1,228**	**-2,771**	**-2,817**	**-3,247**	1,710	4,018	5,925	4,457	1,454
Long Term												
Full Simulation Period[a]	2,454	574	701	**-2,747**	**-2,499**	**-8,180**	**-7,408**	**-2,495**	3,330	7,938	5,254	2,554
Water Year Types[b,c]												
Wet (32%)	3,473	964	2,347	**-2,145**	**-1,839**	**-9,265**	**-8,662**	**-6,636**	**-1,403**	6,717	5,387	4,083
Above Normal (16%)	2,349	1,822	**-1,576**	**-4,212**	**-1,771**	**-12,045**	**-9,980**	**-3,365**	3,328	9,830	5,691	1,410
Below Normal (13%)	1,754	**-193**	979	**-2,144**	**-1,810**	**-9,484**	**-4,827**	**-1,063**	6,723	9,509	6,275	2,441
Dry (24%)	1,980	**-66**	1,339	**-3,236**	**-4,060**	**-6,790**	**-8,189**	**-39**	6,268	8,118	4,769	1,710
Critical (15%)	1,791	147	**-1,720**	**-2,204**	**-2,748**	**-2,766**	**-2,966**	2,015	5,577	6,790	4,363	1,989

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 17-3. Sacramento River below Red Bluff Diversion Dam Flow, Monthly Flow

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	10,011	13,916	26,964	36,349	46,951	29,624	16,603	13,148	13,015	15,428	11,307	15,876
20%	8,935	12,026	17,059	24,191	33,406	19,585	13,008	11,101	11,689	14,953	10,296	13,688
30%	8,162	11,326	10,713	16,195	21,743	14,565	8,528	9,878	10,416	14,727	9,580	11,816
40%	7,682	10,236	8,070	11,649	13,058	10,522	7,061	9,105	9,881	13,944	9,184	10,012
50%	6,903	8,639	6,795	8,852	10,563	8,716	5,988	8,579	9,465	12,881	8,934	6,775
60%	6,301	7,375	6,327	7,152	8,447	7,747	5,541	8,064	9,136	12,165	8,564	5,835
70%	5,951	6,380	5,760	6,395	7,537	6,651	5,292	7,736	8,721	11,138	8,375	5,549
80%	5,687	5,854	5,334	5,869	5,964	5,772	5,044	7,317	8,297	10,215	7,926	5,122
90%	5,150	4,954	4,820	4,974	5,202	5,471	4,657	6,623	7,926	9,607	7,749	4,515
Long Term												
Full Simulation Period[a]	7,315	9,438	11,980	15,892	19,147	14,608	9,063	9,371	9,994	12,702	9,166	8,972
Water Year Types[b,c]												
Wet (32%)	8,728	12,255	12,422	29,982	31,345	25,200	14,018	11,059	9,426	12,709	9,781	14,320
Above Normal (16%)	7,927	12,554	11,235	16,772	26,458	16,158	9,459	9,611	10,203	14,275	9,759	10,210
Below Normal (13%)	6,820	6,705	11,915	7,608	12,849	7,303	6,118	8,845	10,980	13,721	10,131	5,837
Dry (24%)	6,538	7,784	15,279	7,303	9,573	9,042	6,326	8,214	10,498	12,221	8,358	5,349
Critical (15%)	5,338	5,218	6,394	6,318	6,527	5,955	5,159	7,866	9,252	10,848	7,654	4,954

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	10,094	11,251	30,654	41,231	47,844	30,095	16,604	13,637	14,019	15,143	11,091	9,587
20%	9,087	7,890	23,214	25,628	32,156	19,588	13,006	11,604	12,690	14,882	10,172	8,323
30%	8,562	7,216	11,557	17,517	22,646	16,748	8,515	10,466	11,652	14,422	9,599	6,220
40%	7,394	7,006	9,146	13,981	13,804	10,972	7,283	9,875	10,578	13,285	9,274	6,038
50%	6,893	6,621	7,024	9,111	10,808	9,079	6,050	9,339	9,897	12,614	8,943	5,660
60%	6,486	6,185	6,320	7,475	8,585	7,922	5,627	8,679	9,437	11,439	8,719	5,415
70%	6,245	5,822	5,730	6,631	7,552	6,947	5,271	8,051	9,027	11,078	8,427	5,277
80%	5,889	5,580	5,343	5,880	6,216	5,854	4,966	7,626	8,430	10,276	8,036	4,951
90%	5,048	5,263	4,928	4,948	5,381	5,465	4,589	7,123	7,905	9,373	7,722	4,491
Long Term												
Full Simulation Period[a]	7,340	7,880	12,937	16,664	19,500	15,011	9,122	9,847	10,550	12,510	9,209	6,451
Water Year Types[b,c]												
Wet (32%)	8,619	8,715	14,507	31,071	31,509	25,285	14,115	11,289	9,497	12,581	9,925	8,559
Above Normal (16%)	8,009	9,467	12,472	18,132	27,628	16,837	9,455	10,081	10,510	14,262	9,707	5,479
Below Normal (13%)	6,768	6,695	11,938	8,997	13,851	8,149	6,478	9,630	12,102	13,667	10,128	6,311
Dry (24%)	6,735	7,875	15,651	7,421	9,569	9,421	6,297	9,004	11,447	11,951	8,448	5,253
Critical (15%)	5,374	5,449	6,431	6,293	6,407	6,376	5,075	8,072	9,956	10,328	7,542	5,058

Proposed Action 011519 minus Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	83	**-2,665**	3,690	4,883	893	471	1	489	1,004	**-284**	**-216**	**-6,288**
20%	152	**-4,136**	6,155	1,438	**-1,249**	2	**-2**	503	1,001	**-71**	**-124**	**-5,364**
30%	399	**-4,110**	845	1,322	903	2,182	**-13**	588	1,236	**-305**	19	**-5,596**
40%	**-288**	**-3,230**	1,076	2,332	746	450	223	770	697	**-659**	90	**-3,974**
50%	**-10**	**-2,018**	229	260	246	363	61	760	433	**-267**	9	**-1,115**
60%	184	**-1,189**	**-7**	323	138	175	85	615	301	**-726**	155	**-420**
70%	294	**-559**	**-31**	236	15	296	**-20**	315	306	**-60**	52	**-272**
80%	202	**-273**	9	10	252	82	**-78**	309	133	61	110	**-170**
90%	**-102**	309	108	**-25**	179	**-6**	**-68**	500	**-21**	**-235**	**-27**	**-25**
Long Term												
Full Simulation Period[a]	25	**-1,557**	957	772	353	402	59	476	556	**-192**	43	**-2,521**
Water Year Types[b,c]												
Wet (32%)	**-109**	**-3,540**	2,085	1,089	164	85	97	231	71	**-128**	144	**-5,761**
Above Normal (16%)	82	**-3,087**	1,238	1,360	1,169	679	**-3**	470	306	**-12**	**-52**	**-4,731**
Below Normal (13%)	**-52**	**-10**	23	1,389	1,002	846	360	785	1,122	**-54**	**-3**	474
Dry (24%)	197	91	372	118	**-4**	379	**-29**	790	949	**-270**	90	**-95**
Critical (15%)	35	231	37	**-25**	**-120**	422	**-84**	205	704	**-520**	**-112**	103

a Based on the 82-year simulation period.

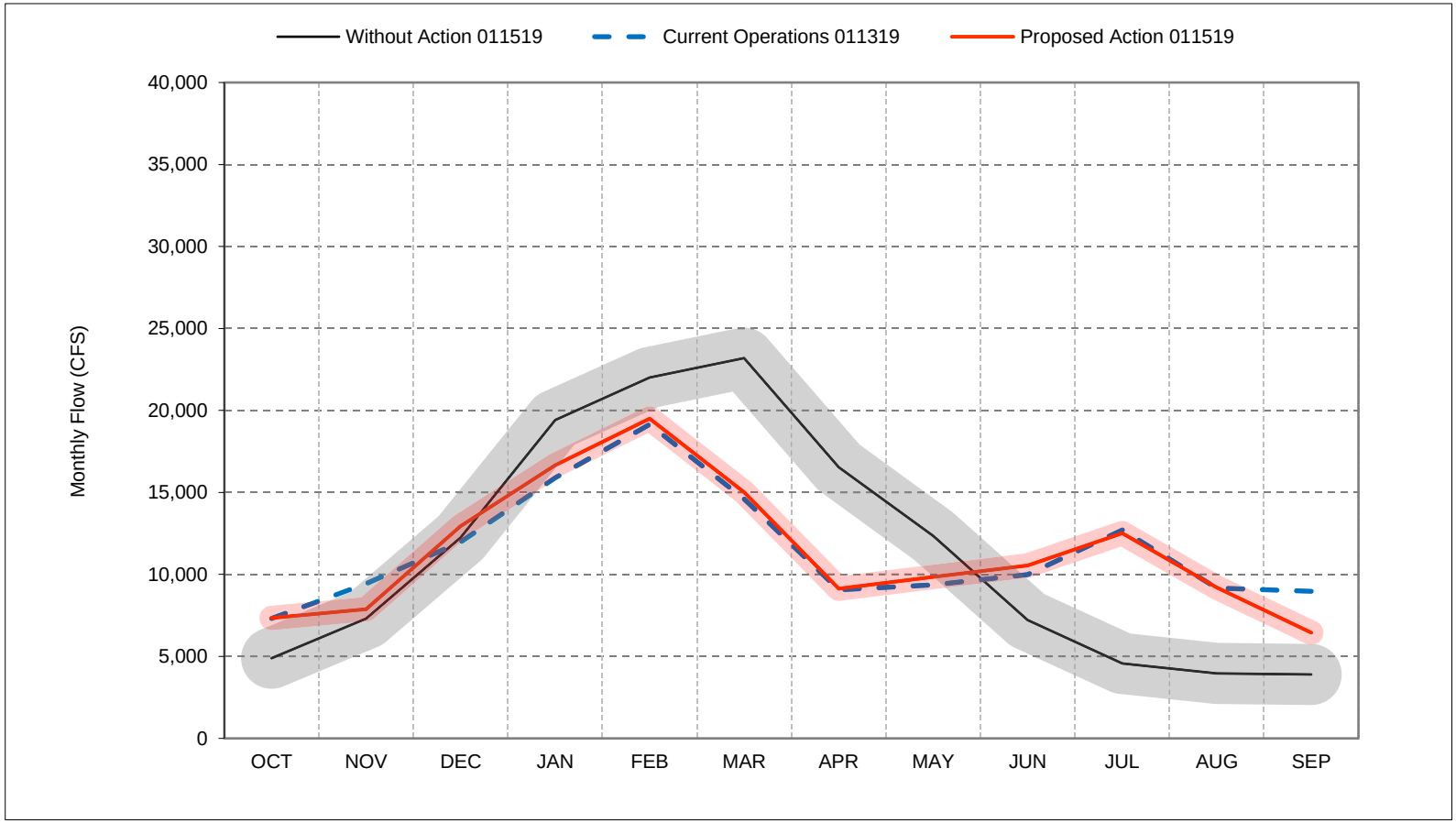
b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

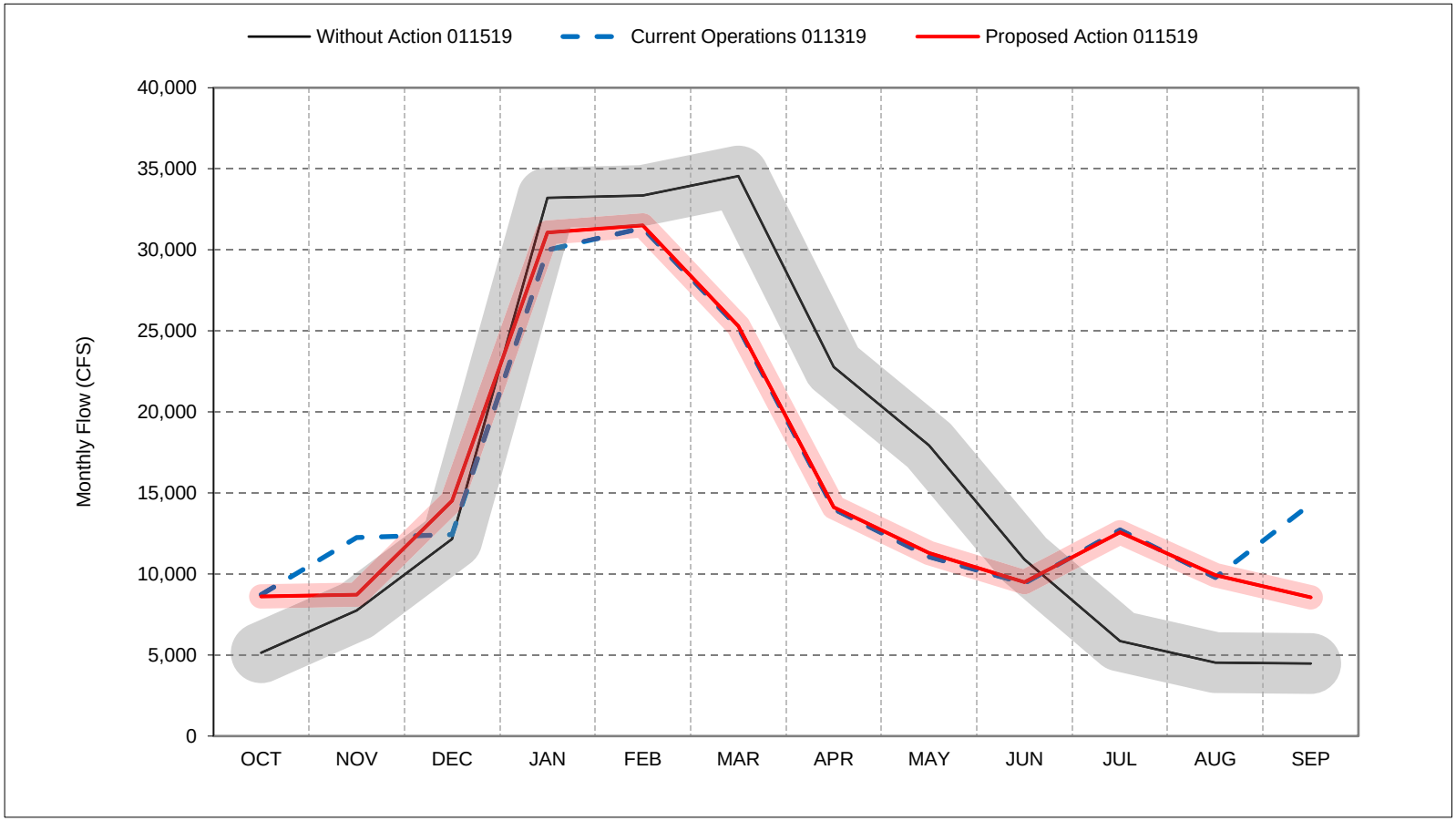
e These are draft results meant for qualitative analysis and are subject to revision.

Figure 17-1. Sacramento River below Red Bluff Diversion Dam Flow, Long-Term Average Flow



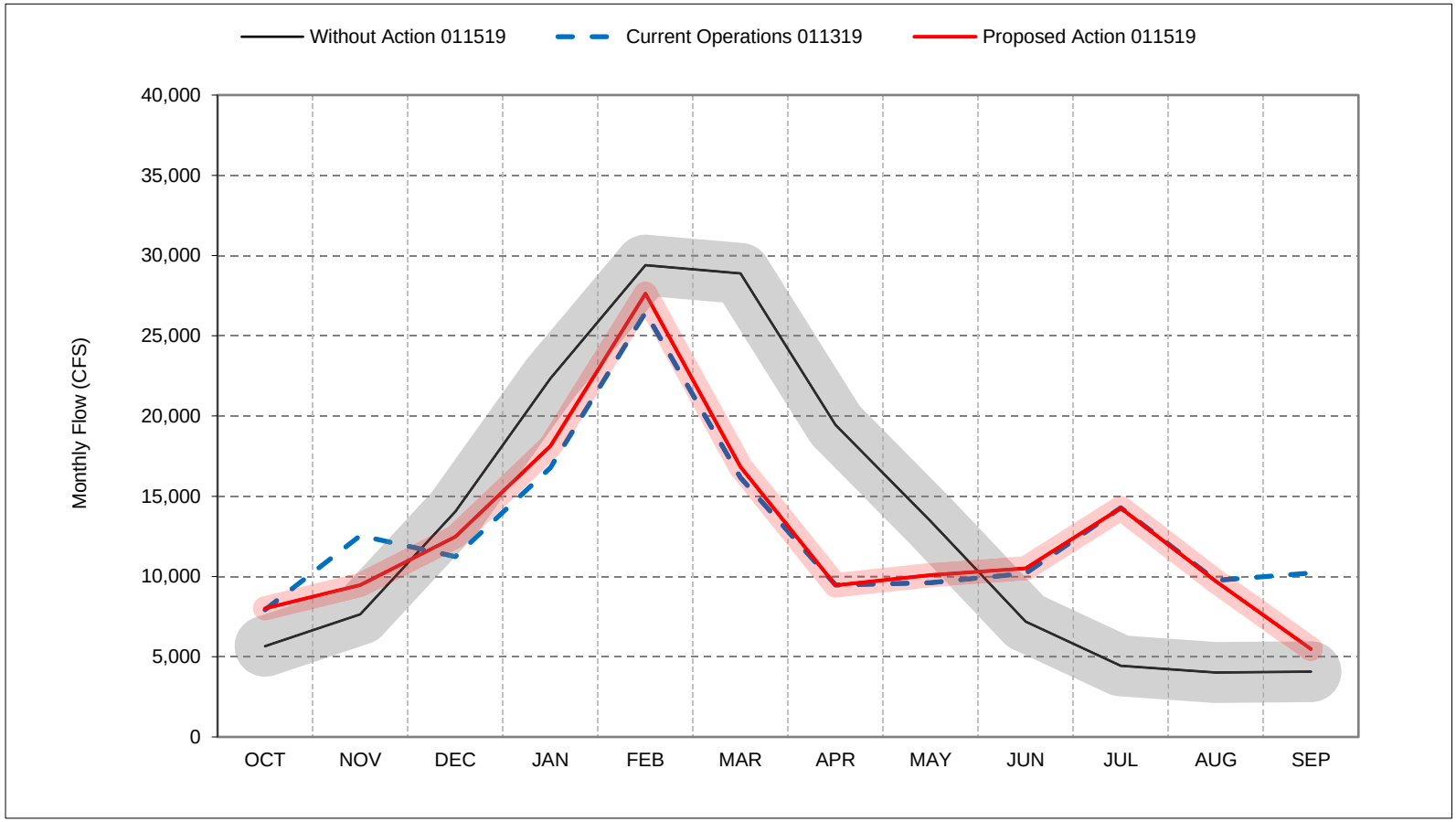
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 17-2. Sacramento River below Red Bluff Diversion Dam Flow, Wet Year Average Flow



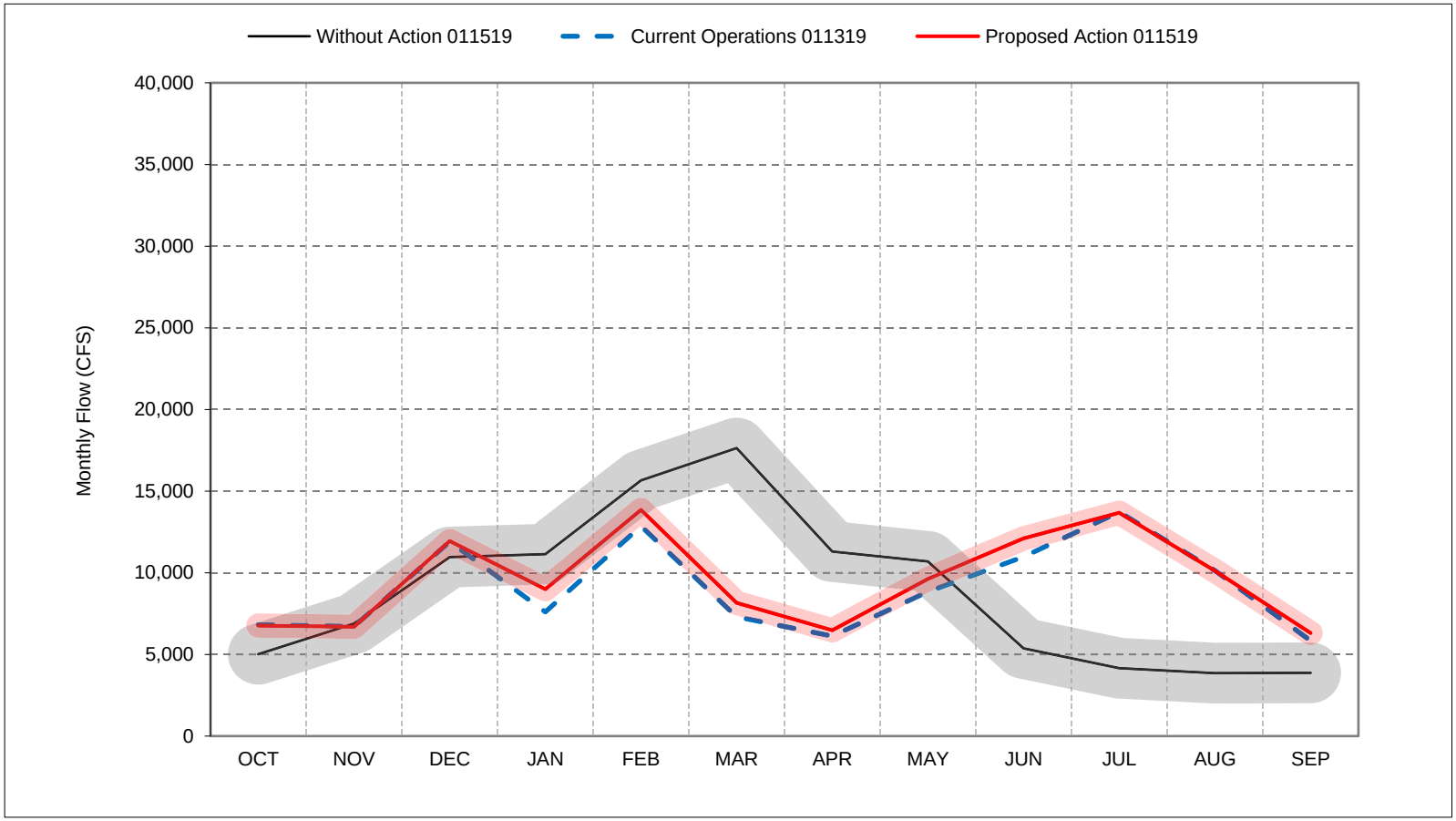
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 17-3. Sacramento River below Red Bluff Diversion Dam Flow, Above Normal Year Average I



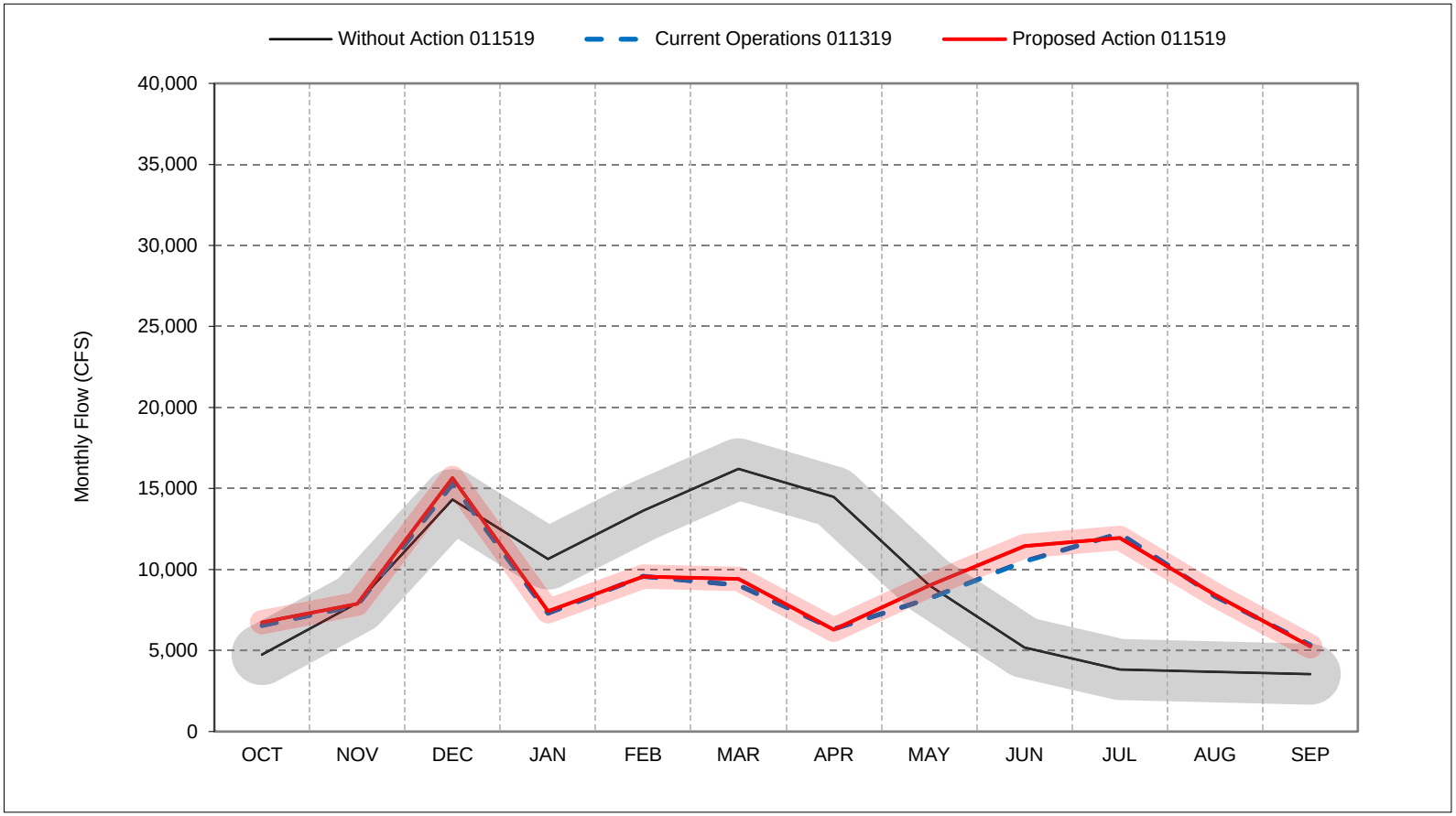
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 17-4. Sacramento River below Red Bluff Diversion Dam Flow, Below Normal Year Average I



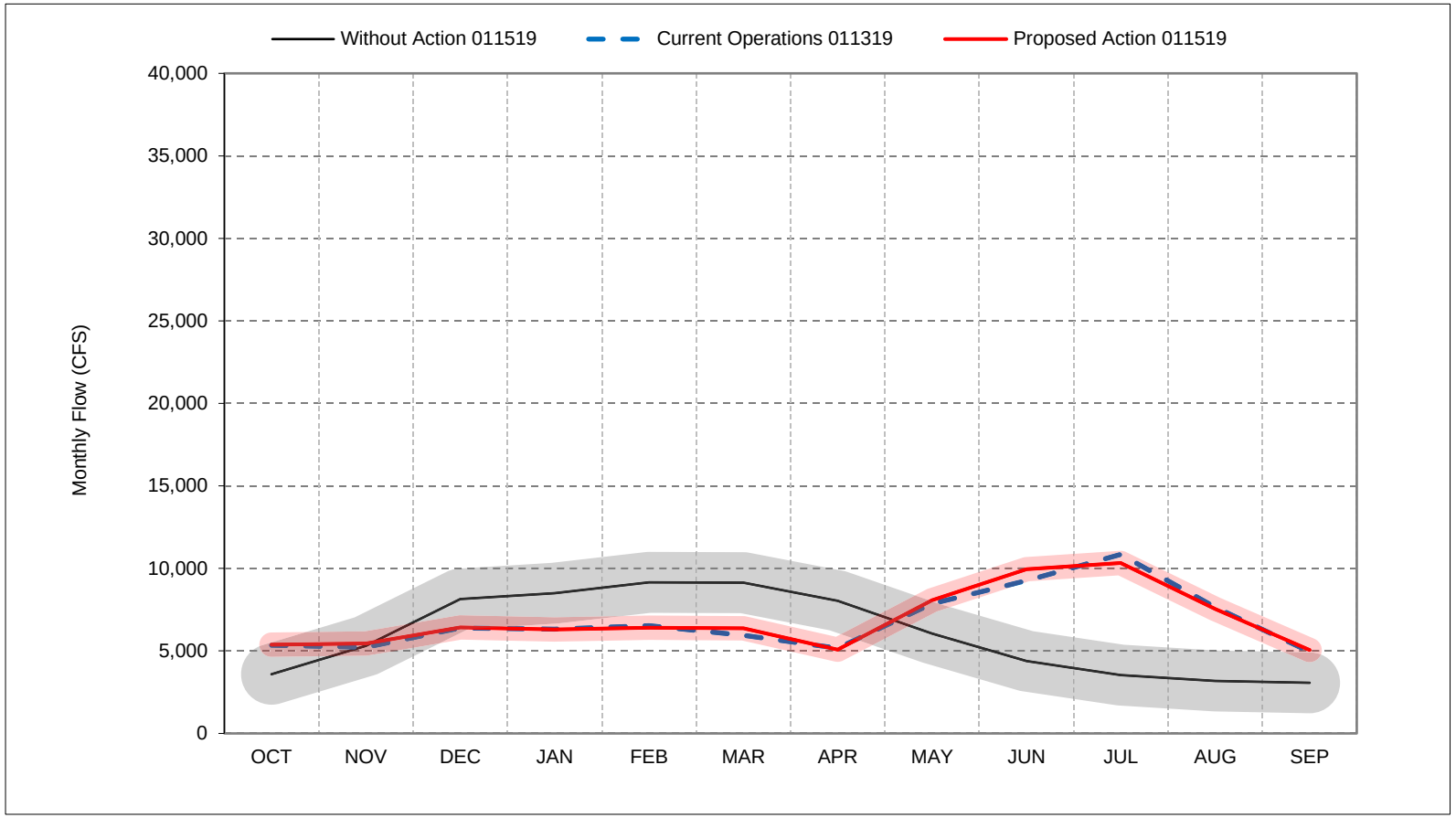
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 17-5. Sacramento River below Red Bluff Diversion Dam Flow, Dry Year Average Flow



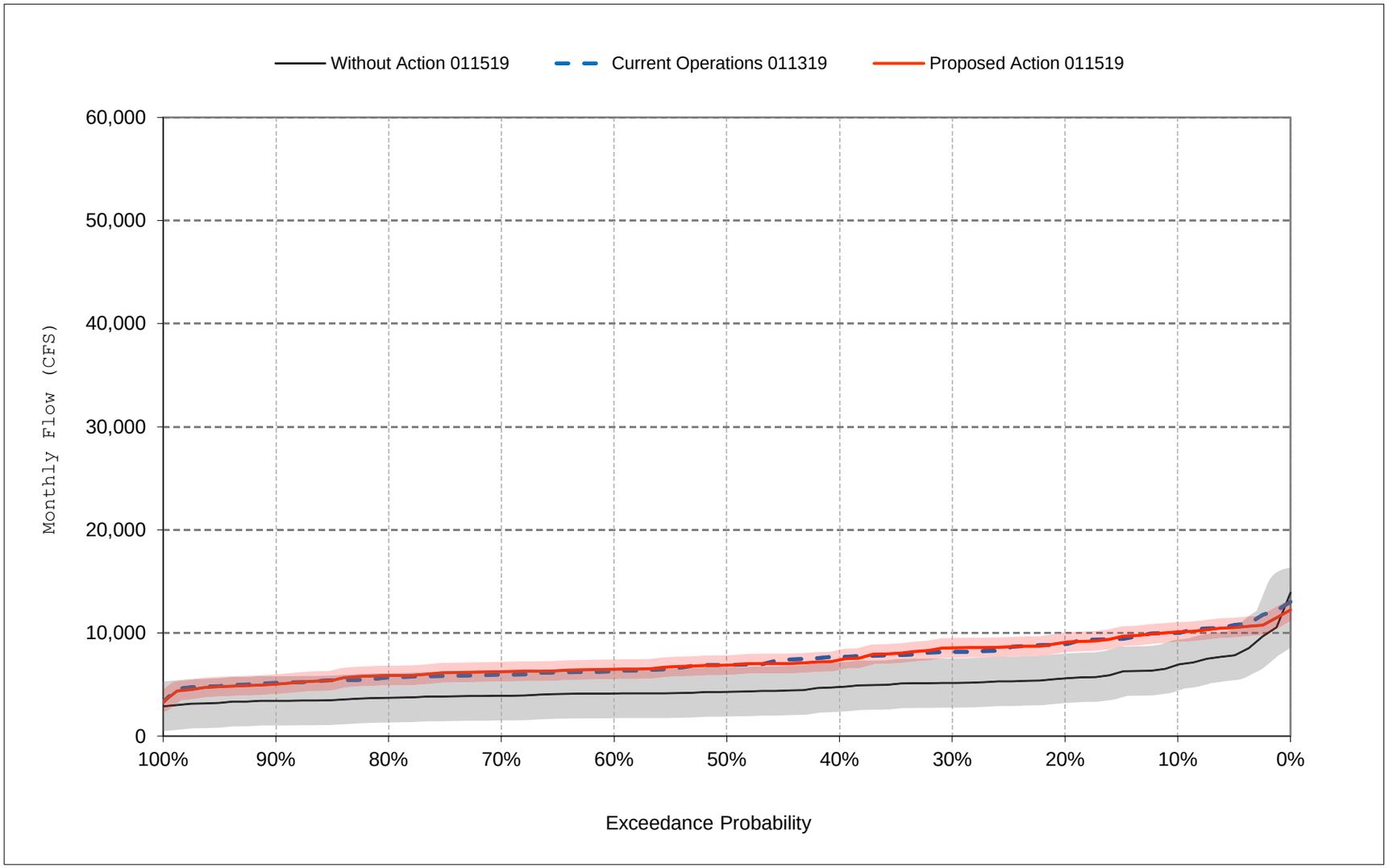
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 17-6. Sacramento River below Red Bluff Diversion Dam Flow, Critical Year Average Flow



*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

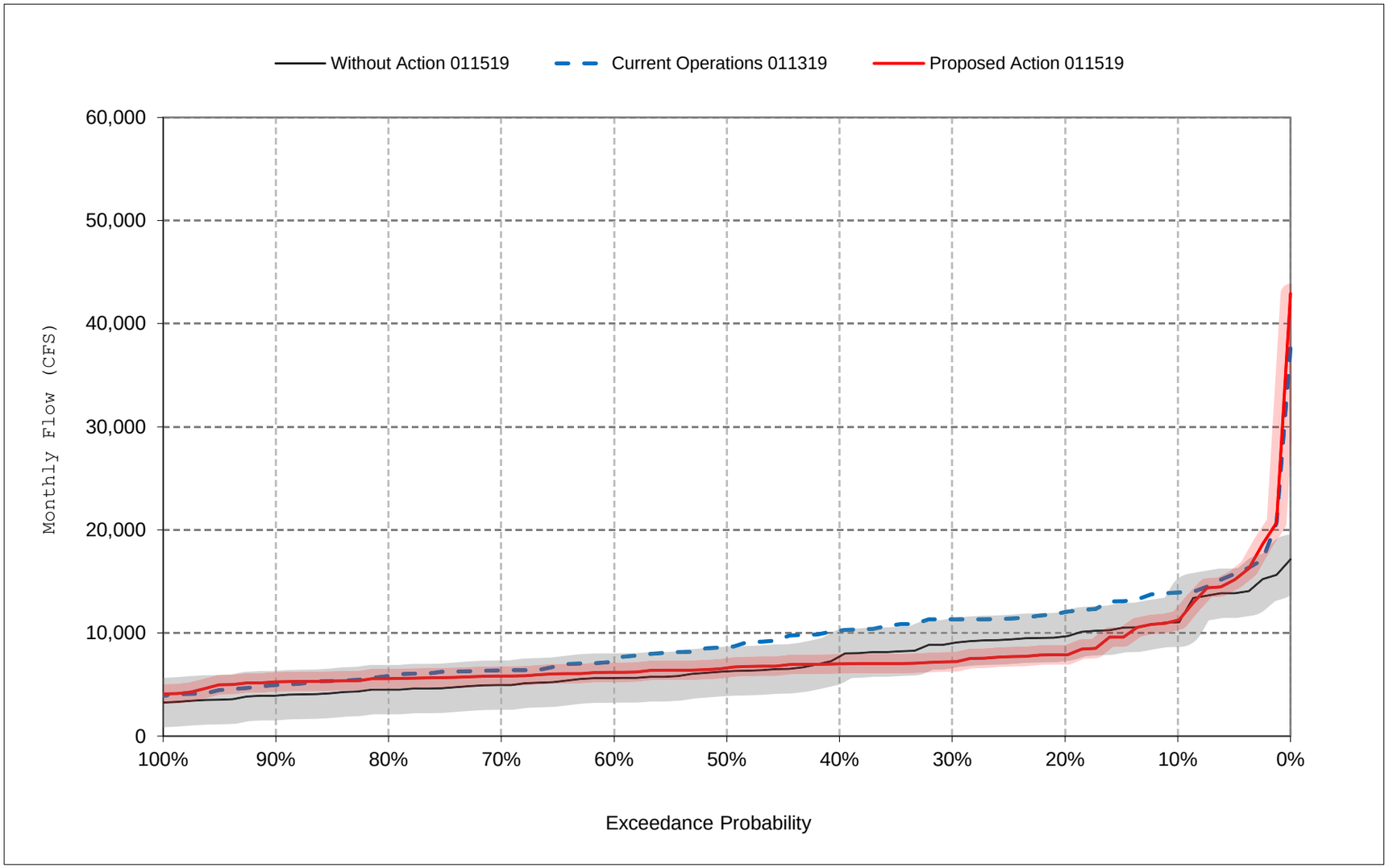
Figure 17-7. Sacramento River below Red Bluff Diversion Dam Flow, October



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

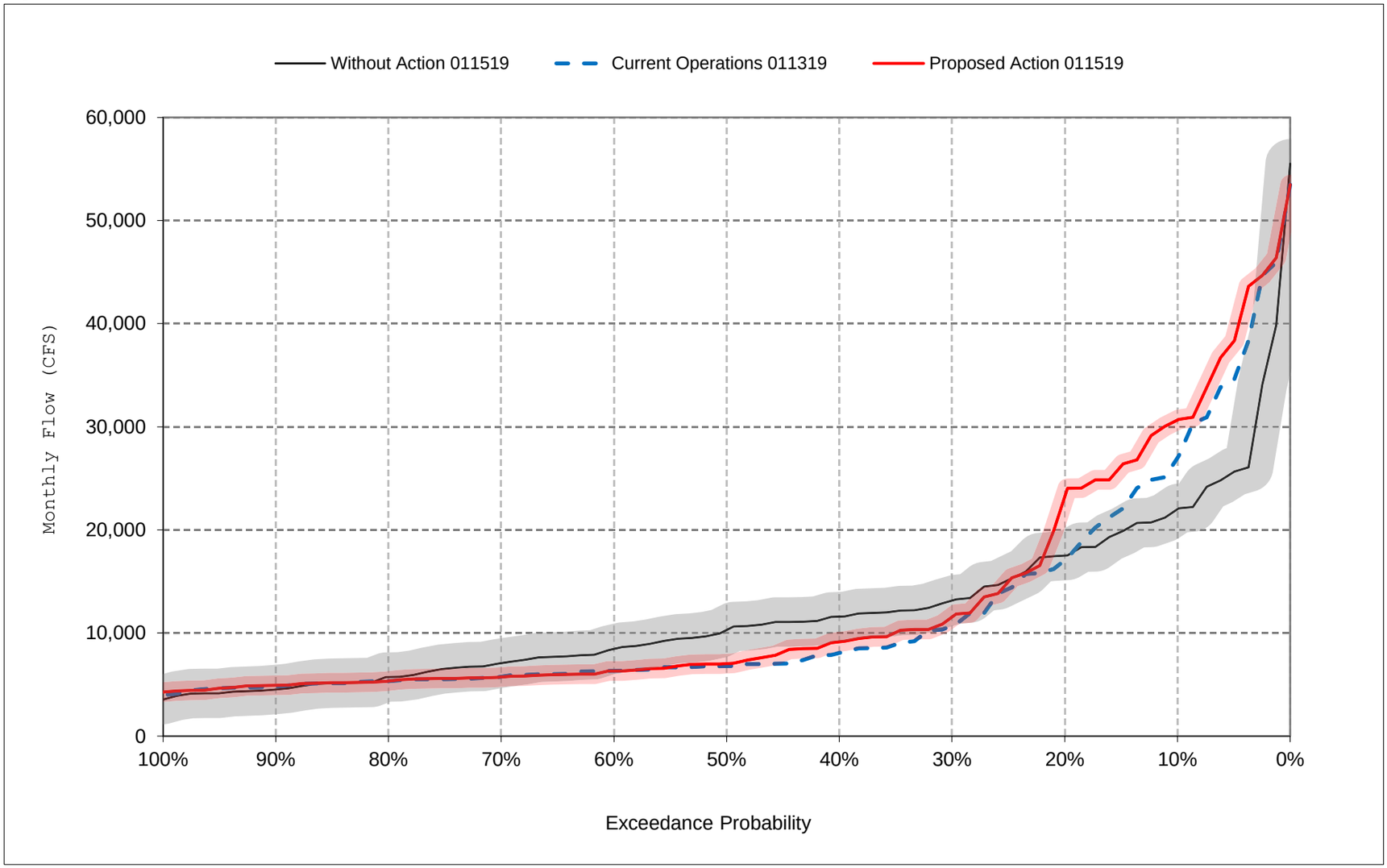
Figure 17-8. Sacramento River below Red Bluff Diversion Dam Flow, November



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

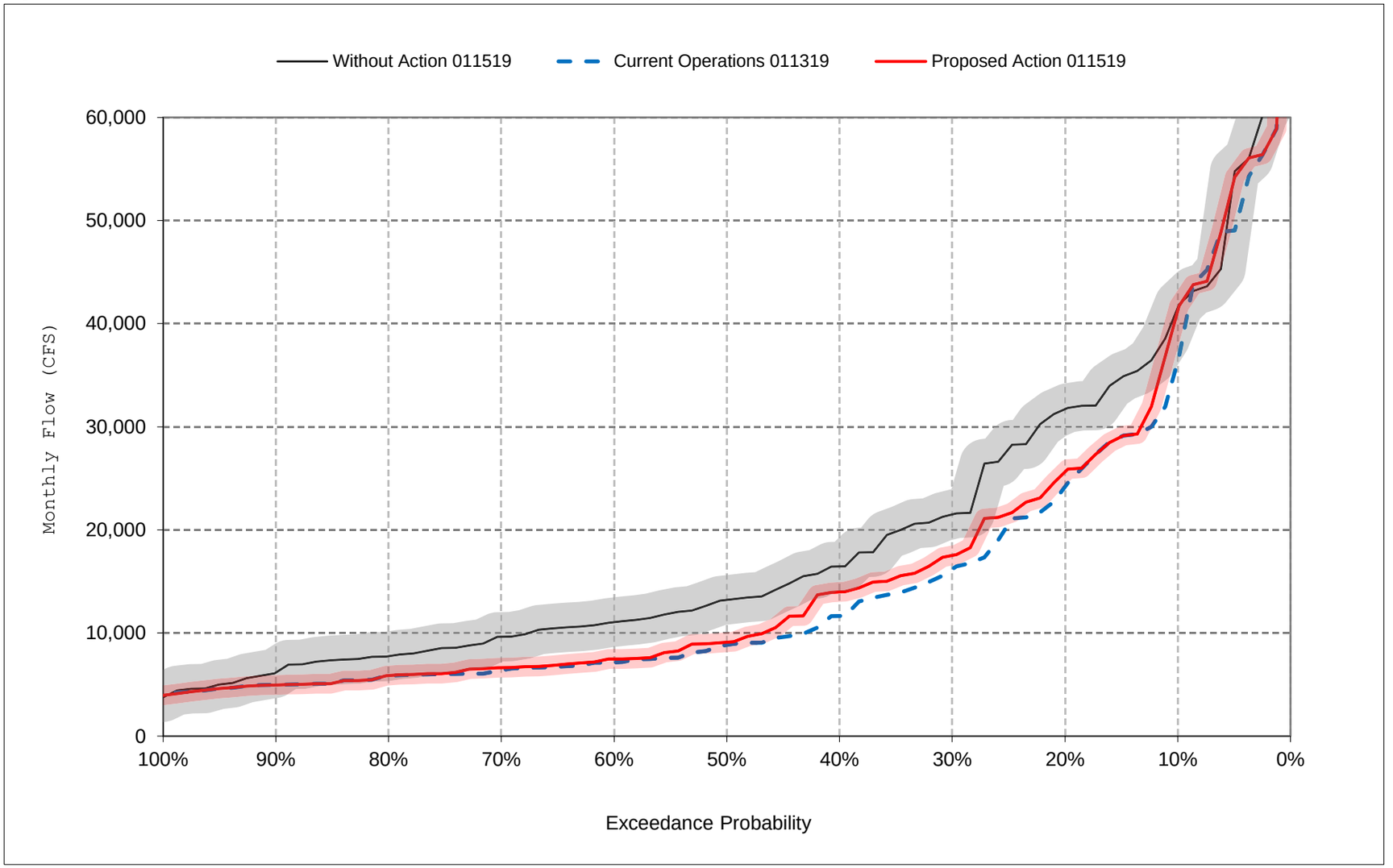
Figure 17-9. Sacramento River below Red Bluff Diversion Dam Flow, December



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

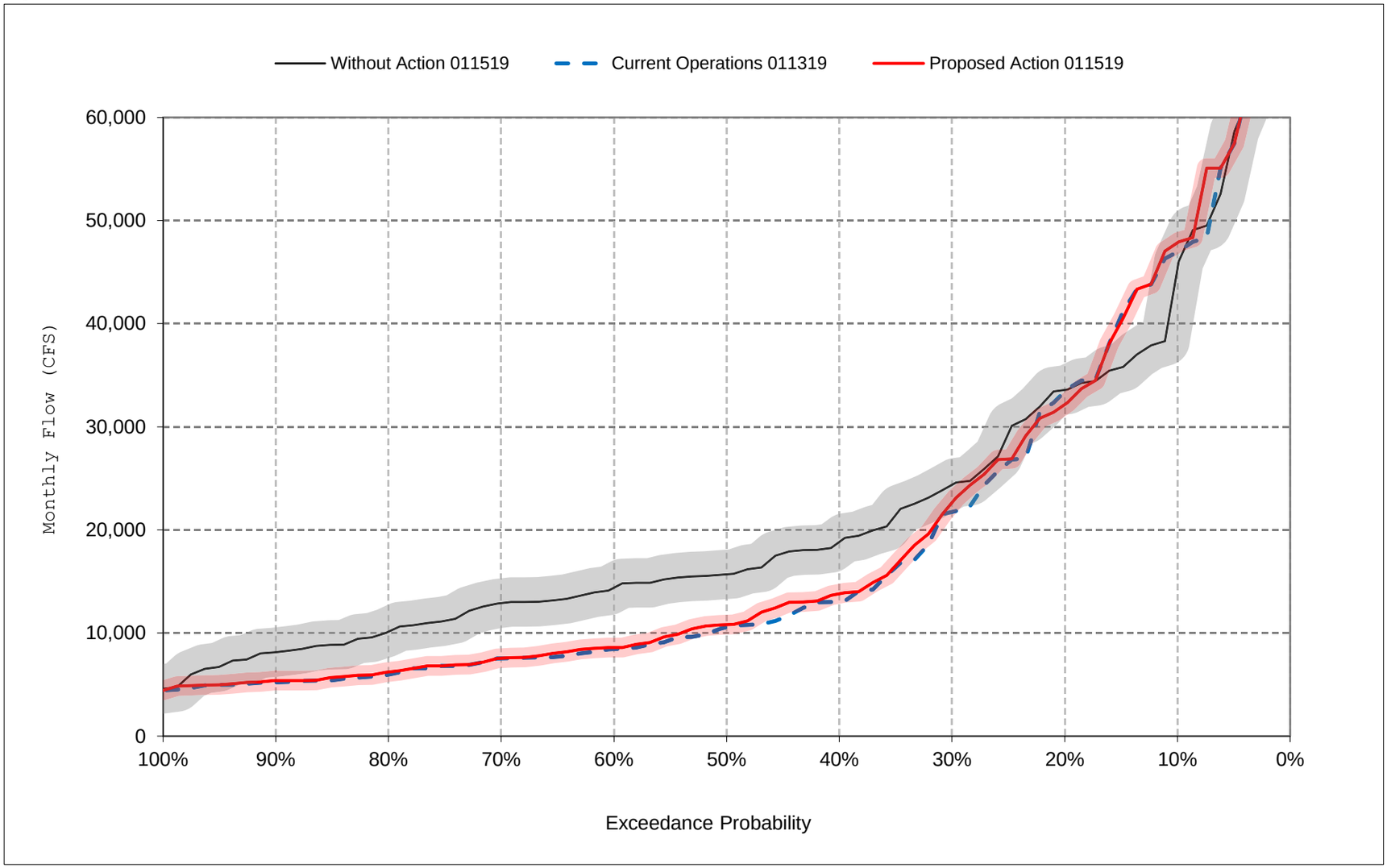
Figure 17-10. Sacramento River below Red Bluff Diversion Dam Flow, January



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

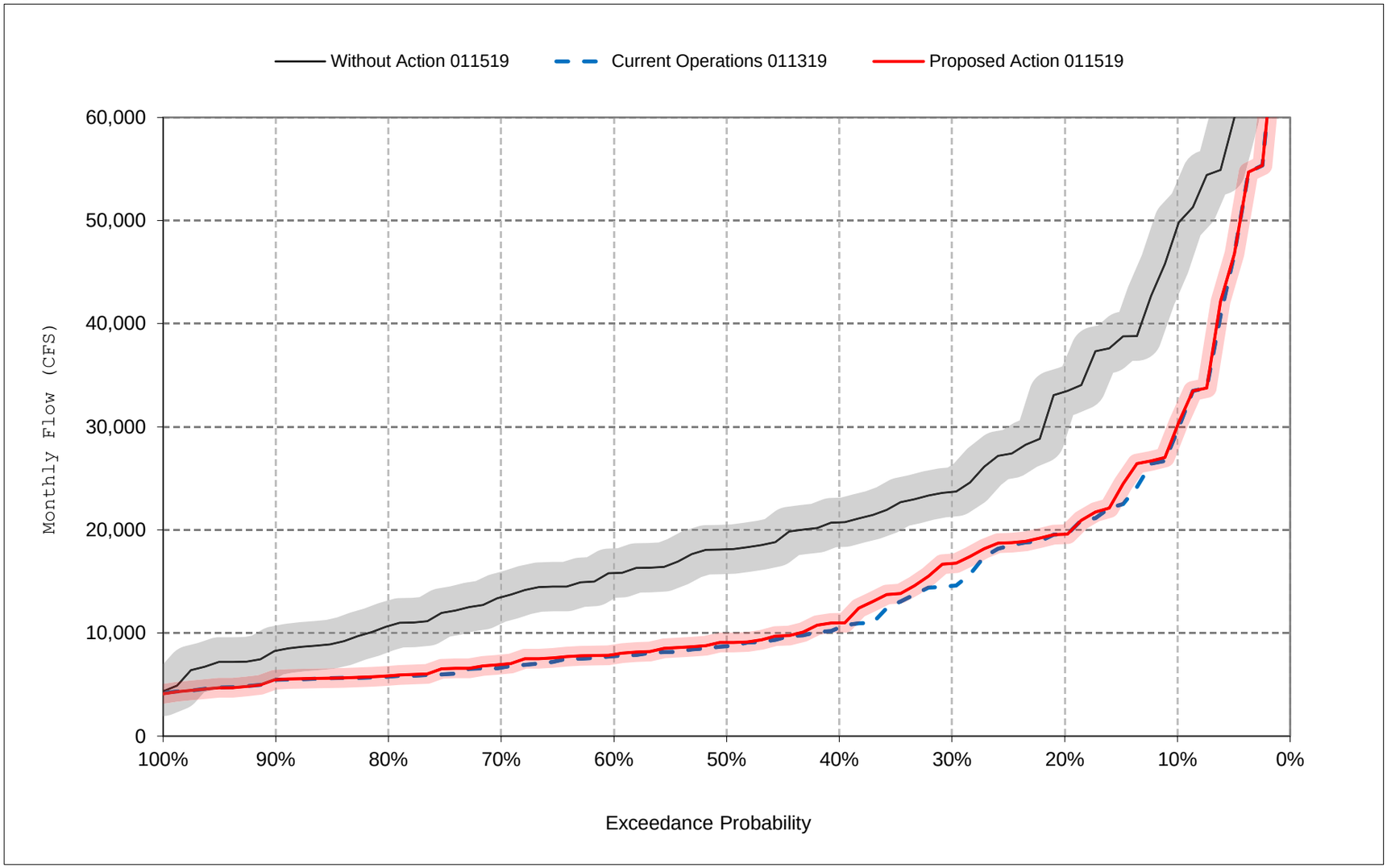
Figure 17-11. Sacramento River below Red Bluff Diversion Dam Flow, February



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

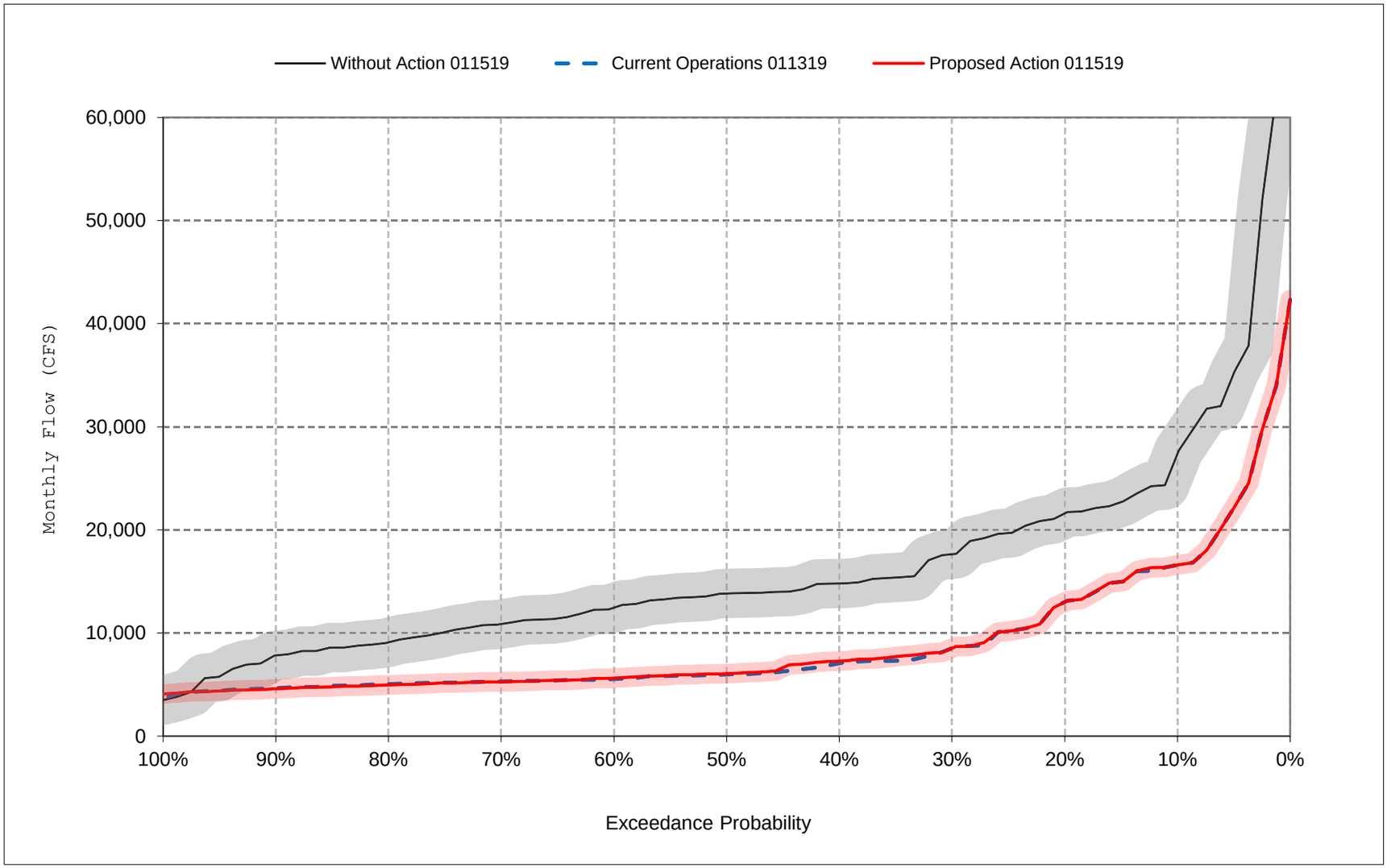
Figure 17-12. Sacramento River below Red Bluff Diversion Dam Flow, March



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

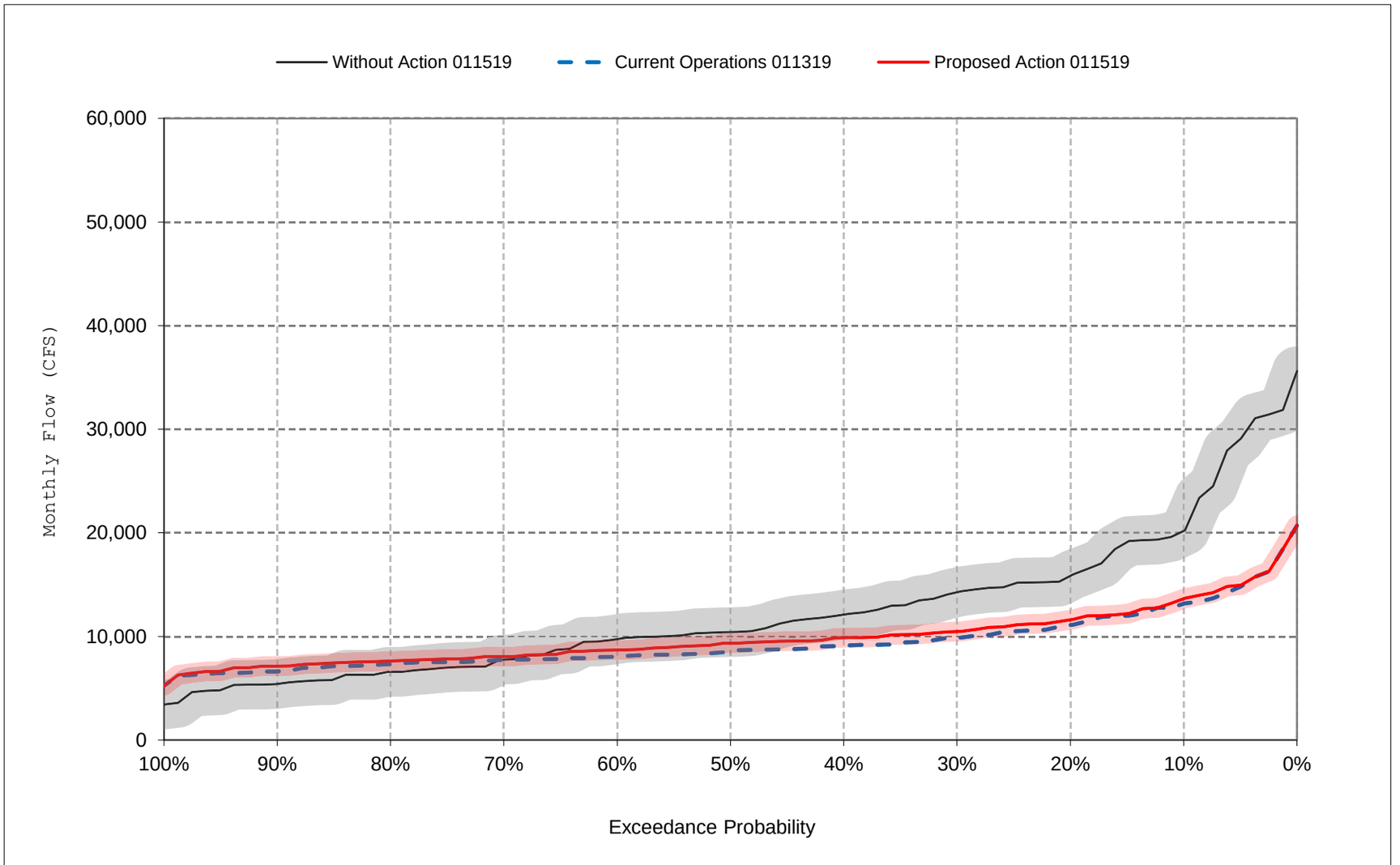
Figure 17-13. Sacramento River below Red Bluff Diversion Dam Flow, April



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

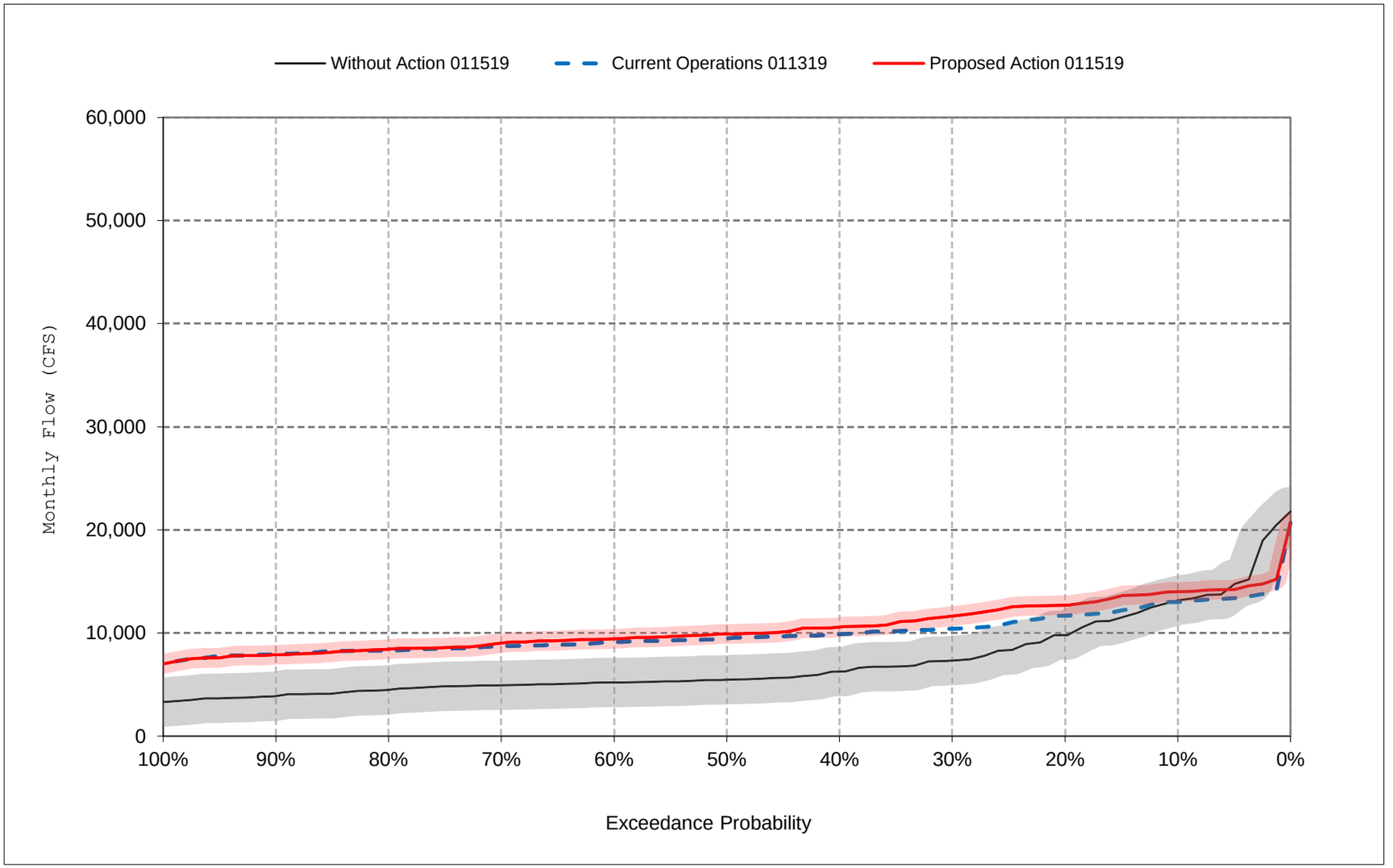
Figure 17-14. Sacramento River below Red Bluff Diversion Dam Flow, May



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

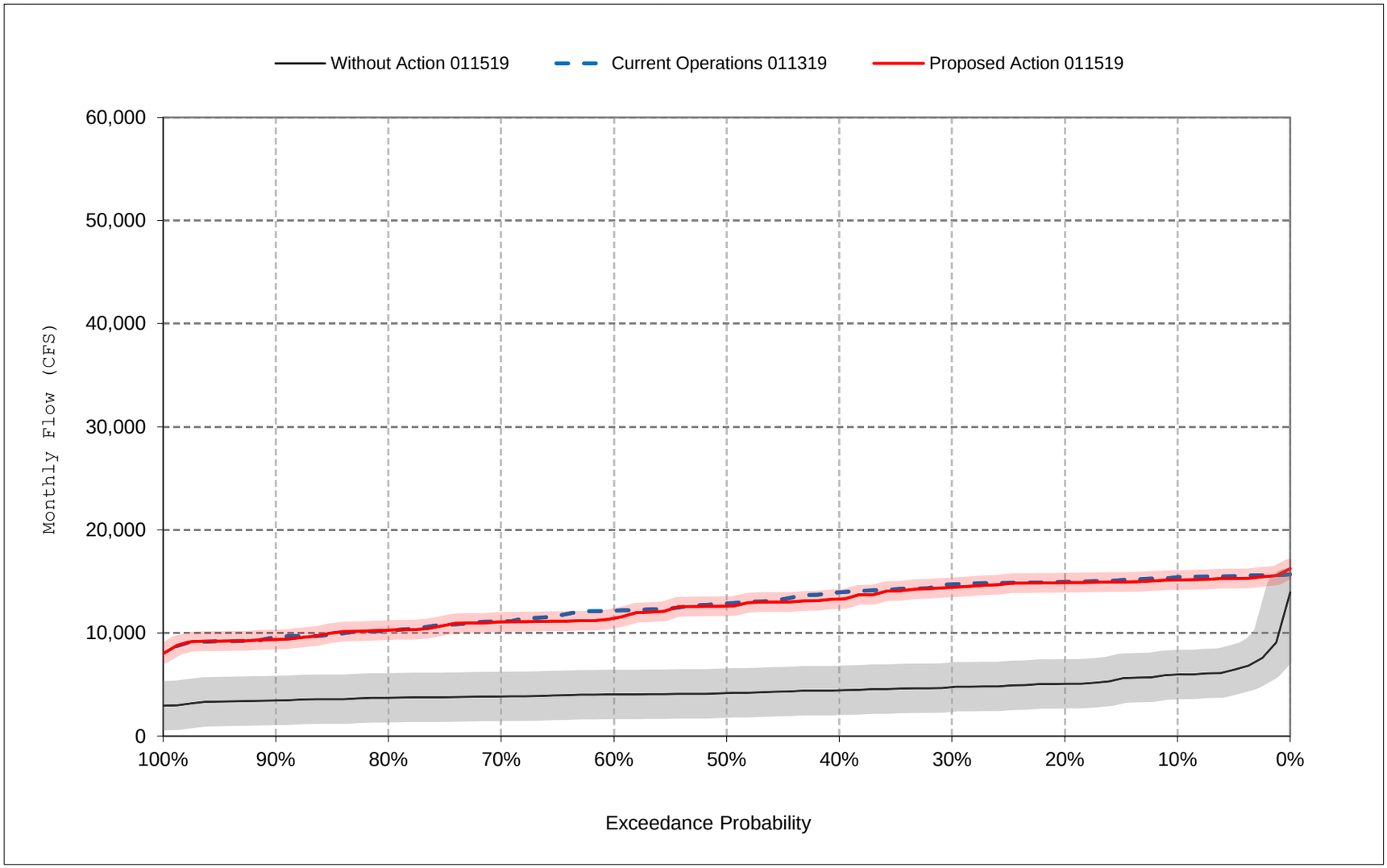
Figure 17-15. Sacramento River below Red Bluff Diversion Dam Flow, June



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

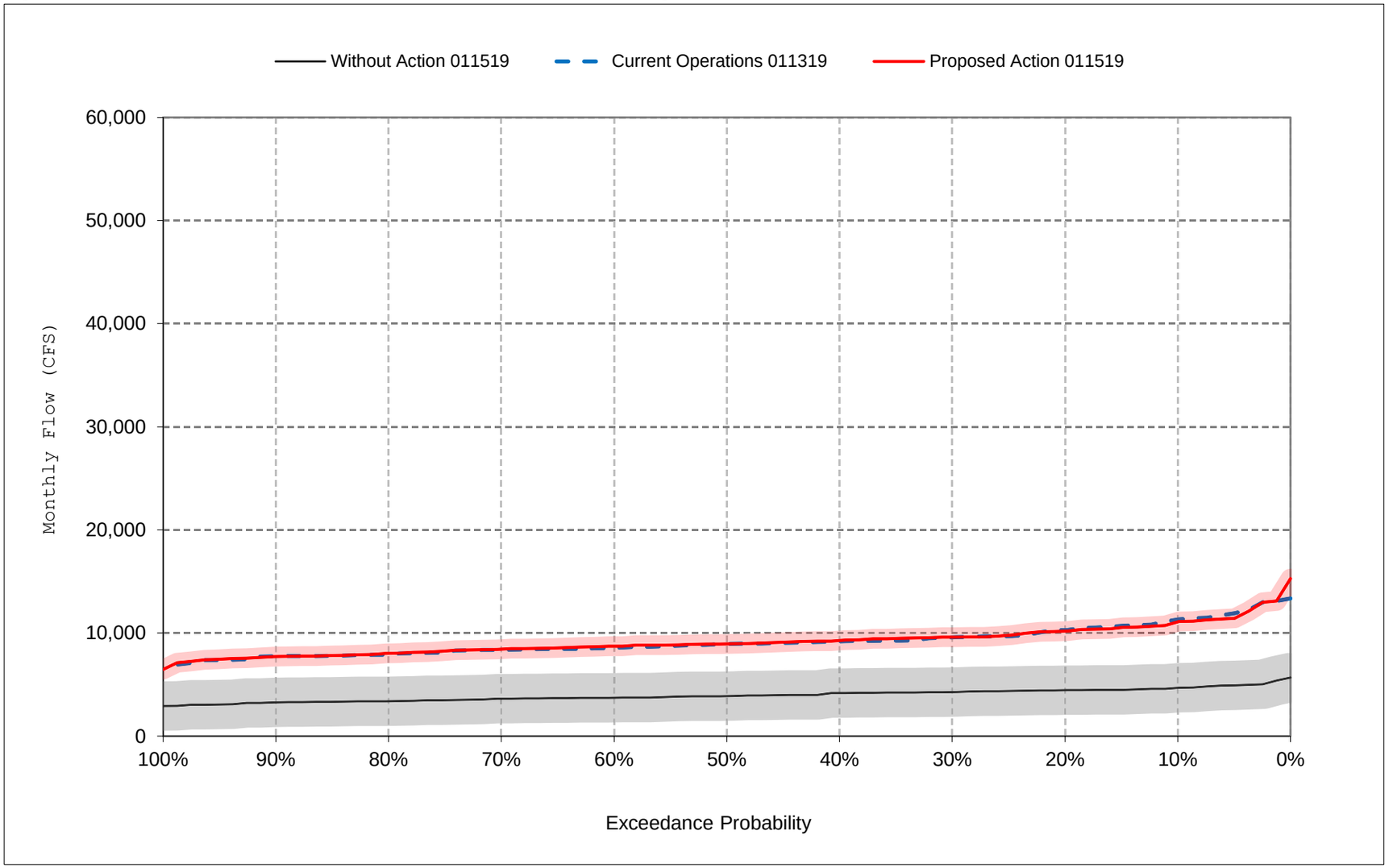
Figure 17-16. Sacramento River below Red Bluff Diversion Dam Flow, July



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

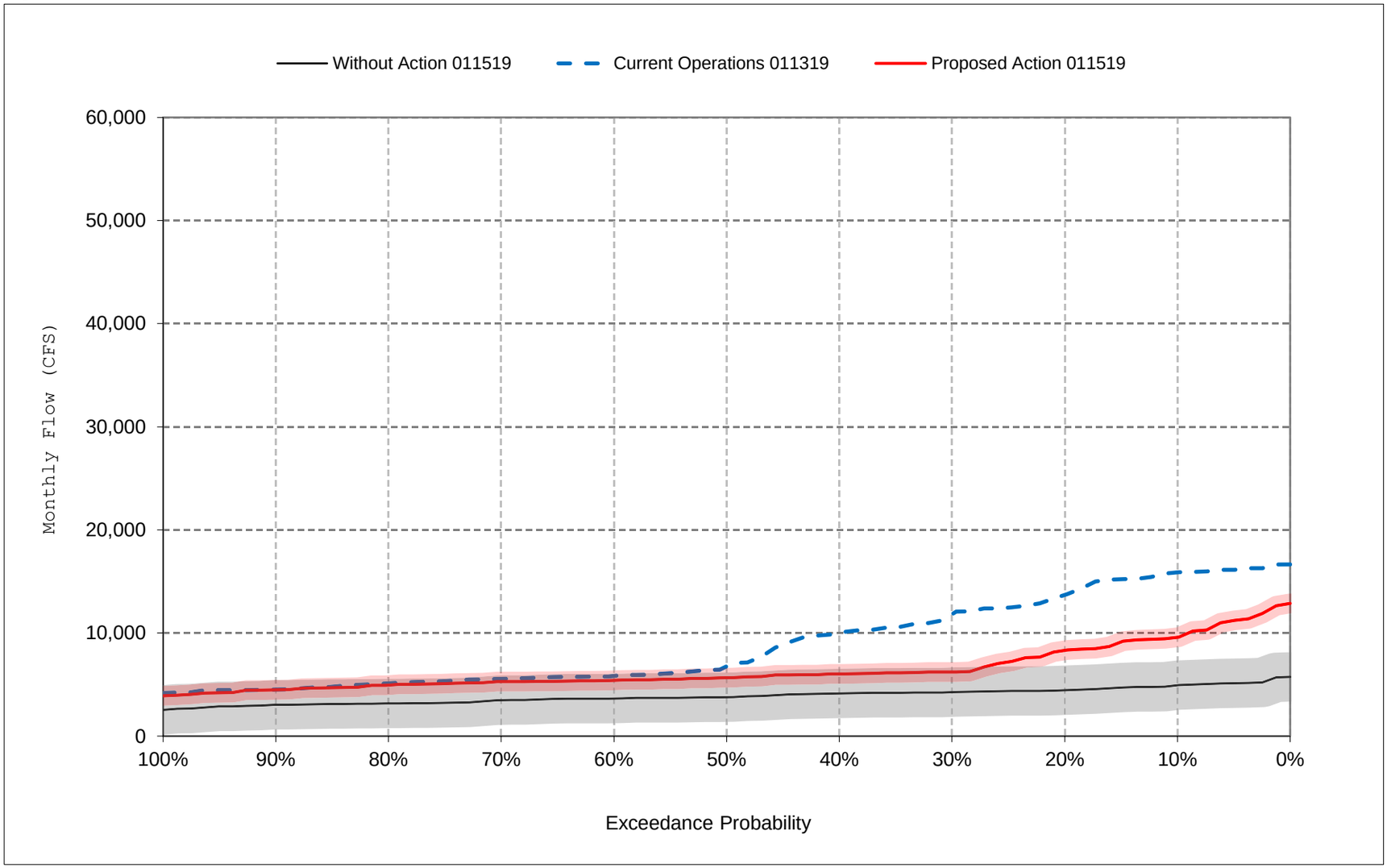
Figure 17-17. Sacramento River below Red Bluff Diversion Dam Flow, August



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Figure 17-18. Sacramento River below Red Bluff Diversion Dam Flow, September



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Table 18-1. Sacramento River Flow at Hamilton City, Monthly Flow

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	6,832	12,380	25,215	44,569	50,339	52,338	29,451	20,697	11,789	4,592	3,772	4,727
20%	5,396	10,482	20,933	36,814	37,324	35,277	23,615	16,110	8,256	4,293	3,578	4,255
30%	4,926	9,547	14,667	24,535	27,100	25,943	20,235	13,717	5,792	4,108	3,448	4,084
40%	4,474	7,955	13,023	19,565	21,784	23,734	16,133	10,858	4,603	3,998	3,329	3,902
50%	3,963	6,531	11,222	14,827	17,803	20,602	14,527	9,712	4,143	3,883	3,268	3,559
60%	3,717	5,816	8,938	12,186	16,155	17,657	13,508	8,345	3,924	3,799	3,205	3,361
70%	3,570	5,039	7,570	10,353	14,193	14,869	12,060	6,117	3,715	3,638	3,045	3,189
80%	3,310	4,579	6,169	8,664	11,133	11,892	9,720	5,025	3,504	3,484	2,900	2,848
90%	2,978	3,922	4,734	6,609	8,819	9,172	8,024	3,892	3,324	3,282	2,641	2,672
Long Term												
Full Simulation Period[a]	4,601	7,759	13,704	21,566	24,447	25,313	17,928	11,630	6,101	4,034	3,230	3,642
Water Year Types[b,c]												
Wet (32%)	4,881	8,271	13,655	37,083	37,152	37,709	25,157	18,128	9,834	4,482	3,359	4,280
Above Normal (16%)	5,398	8,186	15,356	25,067	32,636	31,543	21,076	12,729	5,581	4,046	3,195	3,824
Below Normal (13%)	4,856	7,189	12,201	12,512	17,405	18,877	12,292	9,412	4,329	3,962	3,323	3,632
Dry (24%)	4,449	8,553	16,360	11,533	15,152	17,833	15,426	7,702	4,032	3,758	3,062	3,259
Critical (15%)	3,150	5,385	8,971	9,176	9,993	10,077	8,190	4,941	3,648	3,576	3,182	2,710

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	9,524	14,328	30,407	40,893	51,938	33,411	19,893	13,731	10,553	12,940	9,381	15,452
20%	8,682	11,931	19,454	26,965	36,955	22,491	15,438	11,335	9,481	12,532	8,111	13,186
30%	7,536	11,343	11,974	18,703	23,981	17,461	9,650	8,602	8,701	12,287	7,628	11,325
40%	7,051	10,435	9,406	13,004	15,886	12,296	7,812	7,444	8,000	11,626	7,238	9,593
50%	6,301	8,990	7,689	10,368	11,817	10,482	7,008	7,030	7,384	10,556	6,973	6,281
60%	5,760	7,642	6,671	8,240	9,996	9,142	6,402	6,770	7,112	9,869	6,612	5,266
70%	5,424	6,547	6,236	7,004	8,562	7,906	5,978	6,456	6,847	8,706	6,440	4,991
80%	5,136	5,686	5,536	6,324	7,193	6,759	5,544	5,943	6,634	7,928	6,126	4,585
90%	4,647	4,764	4,972	5,418	5,746	6,105	5,031	5,628	6,183	7,205	5,838	4,026
Long Term												
Full Simulation Period[a]	6,818	9,677	13,293	17,980	21,539	16,715	10,435	8,497	8,101	10,326	7,230	8,472
Water Year Types[b,c]												
Wet (32%)	8,219	12,548	13,755	33,783	35,092	28,342	16,376	11,144	8,207	10,450	7,770	13,867
Above Normal (16%)	7,425	12,867	12,385	19,430	29,641	18,802	11,052	8,831	8,368	11,840	7,780	9,701
Below Normal (13%)	6,440	6,788	13,003	8,908	14,535	8,530	7,083	7,429	8,757	11,240	8,168	5,345
Dry (24%)	5,989	8,176	17,167	8,112	11,042	10,647	7,244	6,779	8,089	9,728	6,468	4,801
Critical (15%)	4,854	5,153	7,089	6,934	7,312	6,875	5,290	6,238	7,000	8,573	5,874	4,436

Current Operations 011319 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	2,692	1,948	5,192	**-3,676**	1,599	**-18,927**	**-9,559**	**-6,966**	**-1,237**	8,347	5,609	10,725
20%	3,286	1,449	**-1,479**	**-9,849**	**-368**	**-12,787**	**-8,176**	**-4,775**	1,225	8,239	4,533	8,930
30%	2,609	1,796	**-2,694**	**-5,833**	**-3,119**	**-8,482**	**-10,586**	**-5,116**	2,909	8,179	4,180	7,241
40%	2,577	2,480	**-3,617**	**-6,562**	**-5,899**	**-11,438**	**-8,321**	**-3,414**	3,397	7,627	3,909	5,691
50%	2,338	2,459	**-3,534**	**-4,459**	**-5,986**	**-10,120**	**-7,519**	**-2,682**	3,242	6,673	3,705	2,723
60%	2,043	1,827	**-2,267**	**-3,946**	**-6,159**	**-8,516**	**-7,106**	**-1,575**	3,188	6,070	3,408	1,905
70%	1,854	1,507	**-1,334**	**-3,349**	**-5,631**	**-6,963**	**-6,081**	340	3,132	5,068	3,395	1,802
80%	1,826	1,107	**-633**	**-2,340**	**-3,940**	**-5,133**	**-4,176**	918	3,129	4,444	3,226	1,737
90%	1,668	842	238	**-1,190**	**-3,073**	**-3,067**	**-2,994**	1,735	2,859	3,923	3,196	1,354
Long Term												
Full Simulation Period[a]	2,217	1,919	**-411**	**-3,586**	**-2,908**	**-8,599**	**-7,493**	**-3,134**	2,000	6,292	4,000	4,830
Water Year Types[b,c]												
Wet (32%)	3,338	4,277	99	**-3,300**	**-2,060**	**-9,366**	**-8,782**	**-6,984**	**-1,628**	5,968	4,411	9,586
Above Normal (16%)	2,027	4,681	**-2,971**	**-5,636**	**-2,995**	**-12,741**	**-10,024**	**-3,898**	2,787	7,794	4,585	5,877
Below Normal (13%)	1,584	**-401**	802	**-3,605**	**-2,870**	**-10,347**	**-5,209**	**-1,983**	4,428	7,278	4,845	1,713
Dry (24%)	1,540	**-377**	807	**-3,420**	**-4,110**	**-7,186**	**-8,183**	**-922**	4,057	5,970	3,407	1,542
Critical (15%)	1,704	**-232**	**-1,882**	**-2,243**	**-2,682**	**-3,202**	**-2,900**	1,297	3,351	4,997	2,692	1,726

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 18-2. Sacramento River Flow at Hamilton City, Monthly Flow

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	6,832	12,380	25,215	44,569	50,339	52,338	29,451	20,697	11,789	4,592	3,772	4,727
20%	5,396	10,482	20,933	36,814	37,324	35,277	23,615	16,110	8,256	4,293	3,578	4,255
30%	4,926	9,547	14,667	24,535	27,100	25,943	20,235	13,717	5,792	4,108	3,448	4,084
40%	4,474	7,955	13,023	19,565	21,784	23,734	16,133	10,858	4,603	3,998	3,329	3,902
50%	3,963	6,531	11,222	14,827	17,803	20,602	14,527	9,712	4,143	3,883	3,268	3,559
60%	3,717	5,816	8,938	12,186	16,155	17,657	13,508	8,345	3,924	3,799	3,205	3,361
70%	3,570	5,039	7,570	10,353	14,193	14,869	12,060	6,117	3,715	3,638	3,045	3,189
80%	3,310	4,579	6,169	8,664	11,133	11,892	9,720	5,025	3,504	3,484	2,900	2,848
90%	2,978	3,922	4,734	6,609	8,819	9,172	8,024	3,892	3,324	3,282	2,641	2,672
Long Term												
Full Simulation Period[a]	4,601	7,759	13,704	21,566	24,447	25,313	17,928	11,630	6,101	4,034	3,230	3,642
Water Year Types[b,c]												
Wet (32%)	4,881	8,271	13,655	37,083	37,152	37,709	25,157	18,128	9,834	4,482	3,359	4,280
Above Normal (16%)	5,398	8,186	15,356	25,067	32,636	31,543	21,076	12,729	5,581	4,046	3,195	3,824
Below Normal (13%)	4,856	7,189	12,201	12,512	17,405	18,877	12,292	9,412	4,329	3,962	3,323	3,632
Dry (24%)	4,449	8,553	16,360	11,533	15,152	17,833	15,426	7,702	4,032	3,758	3,062	3,259
Critical (15%)	3,150	5,385	8,971	9,176	9,993	10,077	8,190	4,941	3,648	3,576	3,182	2,710

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	9,690	11,929	34,073	46,659	52,522	33,860	19,894	13,755	11,595	12,682	9,029	9,118
20%	8,499	8,618	25,165	28,515	35,438	23,142	15,429	11,547	10,555	12,461	8,137	7,829
30%	7,885	7,515	12,874	19,733	24,884	19,894	9,896	9,317	9,549	12,049	7,602	5,743
40%	6,737	7,046	10,296	16,609	16,119	13,184	8,087	8,445	8,713	11,151	7,287	5,440
50%	6,401	6,706	7,868	10,952	12,567	11,204	7,121	7,821	8,223	10,318	7,003	5,142
60%	5,913	6,108	6,631	8,493	10,223	9,304	6,454	7,144	7,493	9,063	6,748	4,913
70%	5,679	5,686	5,988	7,306	8,668	8,150	5,957	6,780	7,101	8,650	6,510	4,741
80%	5,358	5,490	5,535	6,320	7,095	6,996	5,512	6,487	6,850	7,906	6,142	4,414
90%	4,547	5,093	5,052	5,420	5,941	6,507	4,953	5,937	6,184	7,163	5,928	3,958
Long Term												
Full Simulation Period[a]	6,856	8,130	14,251	18,753	21,892	17,117	10,495	8,963	8,653	10,133	7,276	5,954
Water Year Types[b,c]												
Wet (32%)	8,125	9,018	15,840	34,872	35,256	28,427	16,473	11,370	8,272	10,330	7,912	8,102
Above Normal (16%)	7,520	9,793	13,627	20,790	30,810	19,481	11,048	9,298	8,669	11,836	7,728	4,970
Below Normal (13%)	6,396	6,790	13,026	10,296	15,537	9,376	7,443	8,199	9,872	11,151	8,164	5,819
Dry (24%)	6,207	8,278	17,539	8,230	11,039	11,025	7,215	7,555	9,039	9,458	6,558	4,705
Critical (15%)	4,889	5,388	7,126	6,909	7,192	7,297	5,207	6,434	7,699	8,053	5,789	4,568

Proposed Action 011519 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	2,858	**-451**	8,858	2,091	2,183	**-18,478**	**-9,558**	**-6,942**	**-194**	8,090	5,257	4,391
20%	3,103	**-1,864**	4,232	**-8,300**	**-1,885**	**-12,136**	**-8,185**	**-4,563**	2,299	8,168	4,559	3,574
30%	2,959	**-2,033**	**-1,793**	**-4,802**	**-2,216**	**-6,049**	**-10,340**	**-4,400**	3,757	7,941	4,154	1,659
40%	2,263	**-909**	**-2,727**	**-2,957**	**-5,666**	**-10,550**	**-8,046**	**-2,413**	4,110	7,152	3,959	1,538
50%	2,438	175	**-3,354**	**-3,875**	**-5,235**	**-9,398**	**-7,405**	**-1,891**	4,080	6,434	3,735	1,583
60%	2,196	293	**-2,308**	**-3,693**	**-5,932**	**-8,354**	**-7,054**	**-1,202**	3,569	5,264	3,544	1,552
70%	2,109	647	**-1,583**	**-3,047**	**-5,525**	**-6,720**	**-6,102**	663	3,386	5,012	3,465	1,552
80%	2,048	912	**-633**	**-2,344**	**-4,038**	**-4,895**	**-4,208**	1,462	3,346	4,423	3,242	1,565
90%	1,569	1,171	318	**-1,188**	**-2,877**	**-2,666**	**-3,071**	2,045	2,860	3,882	3,286	1,286
Long Term												
Full Simulation Period[a]	2,255	372	547	**-2,814**	**-2,554**	**-8,197**	**-7,433**	**-2,667**	2,552	6,099	4,046	2,312
Water Year Types[b,c]												
Wet (32%)	3,244	747	2,185	**-2,211**	**-1,896**	**-9,281**	**-8,685**	**-6,758**	**-1,562**	5,848	4,553	3,822
Above Normal (16%)	2,123	1,607	**-1,728**	**-4,276**	**-1,826**	**-12,061**	**-10,028**	**-3,432**	3,088	7,790	4,533	1,146
Below Normal (13%)	1,541	**-399**	825	**-2,216**	**-1,868**	**-9,501**	**-4,849**	**-1,213**	5,543	7,189	4,841	2,187
Dry (24%)	1,759	**-275**	1,179	**-3,302**	**-4,114**	**-6,807**	**-8,212**	**-147**	5,007	5,700	3,496	1,446
Critical (15%)	1,740	3	**-1,845**	**-2,267**	**-2,801**	**-2,780**	**-2,983**	1,492	4,050	4,477	2,606	1,858

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 18-3. Sacramento River Flow at Hamilton City, Monthly Flow

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	9,524	14,328	30,407	40,893	51,938	33,411	19,893	13,731	10,553	12,940	9,381	15,452
20%	8,682	11,931	19,454	26,965	36,955	22,491	15,438	11,335	9,481	12,532	8,111	13,186
30%	7,536	11,343	11,974	18,703	23,981	17,461	9,650	8,602	8,701	12,287	7,628	11,325
40%	7,051	10,435	9,406	13,004	15,886	12,296	7,812	7,444	8,000	11,626	7,238	9,593
50%	6,301	8,990	7,689	10,368	11,817	10,482	7,008	7,030	7,384	10,556	6,973	6,281
60%	5,760	7,642	6,671	8,240	9,996	9,142	6,402	6,770	7,112	9,869	6,612	5,266
70%	5,424	6,547	6,236	7,004	8,562	7,906	5,978	6,456	6,847	8,706	6,440	4,991
80%	5,136	5,686	5,536	6,324	7,193	6,759	5,544	5,943	6,634	7,928	6,126	4,585
90%	4,647	4,764	4,972	5,418	5,746	6,105	5,031	5,628	6,183	7,205	5,838	4,026
Long Term												
Full Simulation Period[a]	6,818	9,677	13,293	17,980	21,539	16,715	10,435	8,497	8,101	10,326	7,230	8,472
Water Year Types[b,c]												
Wet (32%)	8,219	12,548	13,755	33,783	35,092	28,342	16,376	11,144	8,207	10,450	7,770	13,867
Above Normal (16%)	7,425	12,867	12,385	19,430	29,641	18,802	11,052	8,831	8,368	11,840	7,780	9,701
Below Normal (13%)	6,440	6,788	13,003	8,908	14,535	8,530	7,083	7,429	8,757	11,240	8,168	5,345
Dry (24%)	5,989	8,176	17,167	8,112	11,042	10,647	7,244	6,779	8,089	9,728	6,468	4,801
Critical (15%)	4,854	5,153	7,089	6,934	7,312	6,875	5,290	6,238	7,000	8,573	5,874	4,436

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	9,690	11,929	34,073	46,659	52,522	33,860	19,894	13,755	11,595	12,682	9,029	9,118
20%	8,499	8,618	25,165	28,515	35,438	23,142	15,429	11,547	10,555	12,461	8,137	7,829
30%	7,885	7,515	12,874	19,733	24,884	19,894	9,896	9,317	9,549	12,049	7,602	5,743
40%	6,737	7,046	10,296	16,609	16,119	13,184	8,087	8,445	8,713	11,151	7,287	5,440
50%	6,401	6,706	7,868	10,952	12,567	11,204	7,121	7,821	8,223	10,318	7,003	5,142
60%	5,913	6,108	6,631	8,493	10,223	9,304	6,454	7,144	7,493	9,063	6,748	4,913
70%	5,679	5,686	5,988	7,306	8,668	8,150	5,957	6,780	7,101	8,650	6,510	4,741
80%	5,358	5,490	5,535	6,320	7,095	6,996	5,512	6,487	6,850	7,906	6,142	4,414
90%	4,547	5,093	5,052	5,420	5,941	6,507	4,953	5,937	6,184	7,163	5,928	3,958
Long Term												
Full Simulation Period[a]	6,856	8,130	14,251	18,753	21,892	17,117	10,495	8,963	8,653	10,133	7,276	5,954
Water Year Types[b,c]												
Wet (32%)	8,125	9,018	15,840	34,872	35,256	28,427	16,473	11,370	8,272	10,330	7,912	8,102
Above Normal (16%)	7,520	9,793	13,627	20,790	30,810	19,481	11,048	9,298	8,669	11,836	7,728	4,970
Below Normal (13%)	6,396	6,790	13,026	10,296	15,537	9,376	7,443	8,199	9,872	11,151	8,164	5,819
Dry (24%)	6,207	8,278	17,539	8,230	11,039	11,025	7,215	7,555	9,039	9,458	6,558	4,705
Critical (15%)	4,889	5,388	7,126	6,909	7,192	7,297	5,207	6,434	7,699	8,053	5,789	4,568

Proposed Action 011519 minus Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	166	**-2,399**	3,666	5,766	584	449	1	24	1,043	**-258**	**-352**	**-6,335**
20%	**-182**	**-3,313**	5,711	1,549	**-1,517**	651	**-9**	212	1,073	**-71**	26	**-5,356**
30%	349	**-3,829**	900	1,030	903	2,433	246	715	848	**-238**	**-27**	**-5,582**
40%	**-315**	**-3,389**	890	3,605	233	888	275	1,001	713	**-475**	49	**-4,153**
50%	100	**-2,284**	180	585	751	722	113	791	838	**-239**	30	**-1,140**
60%	152	**-1,534**	**-41**	253	227	162	52	373	381	**-806**	136	**-353**
70%	255	**-861**	**-249**	302	106	243	**-21**	323	254	**-56**	70	**-250**
80%	222	**-195**	**-1**	**-4**	**-98**	237	**-32**	544	216	**-22**	15	**-171**
90%	**-99**	329	80	2	196	401	**-78**	310	1	**-41**	90	**-68**
Long Term												
Full Simulation Period[a]	38	**-1,547**	957	772	353	402	59	467	552	**-192**	46	**-2,518**
Water Year Types[b,c]												
Wet (32%)	**-94**	**-3,530**	2,085	1,089	164	85	97	226	65	**-120**	142	**-5,764**
Above Normal (16%)	95	**-3,074**	1,243	1,360	1,169	679	**-3**	467	301	**-4**	**-52**	**-4,731**
Below Normal (13%)	**-44**	2	23	1,389	1,002	846	360	770	1,115	**-89**	**-4**	474
Dry (24%)	219	102	372	118	**-4**	379	**-29**	776	950	**-270**	90	**-95**
Critical (15%)	35	235	37	**-25**	**-120**	422	**-83**	196	699	**-520**	**-86**	132

a Based on the 82-year simulation period.

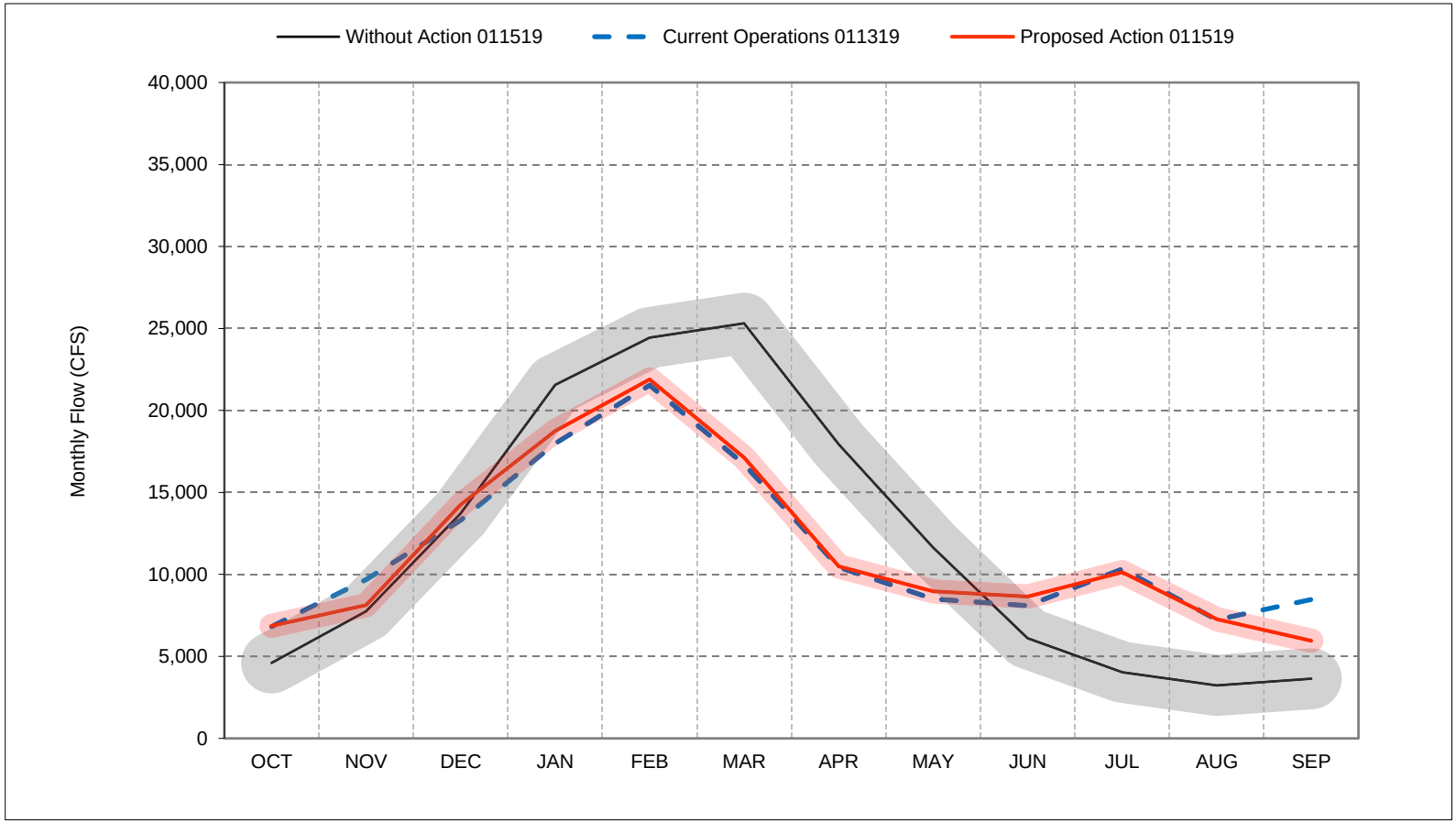
b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

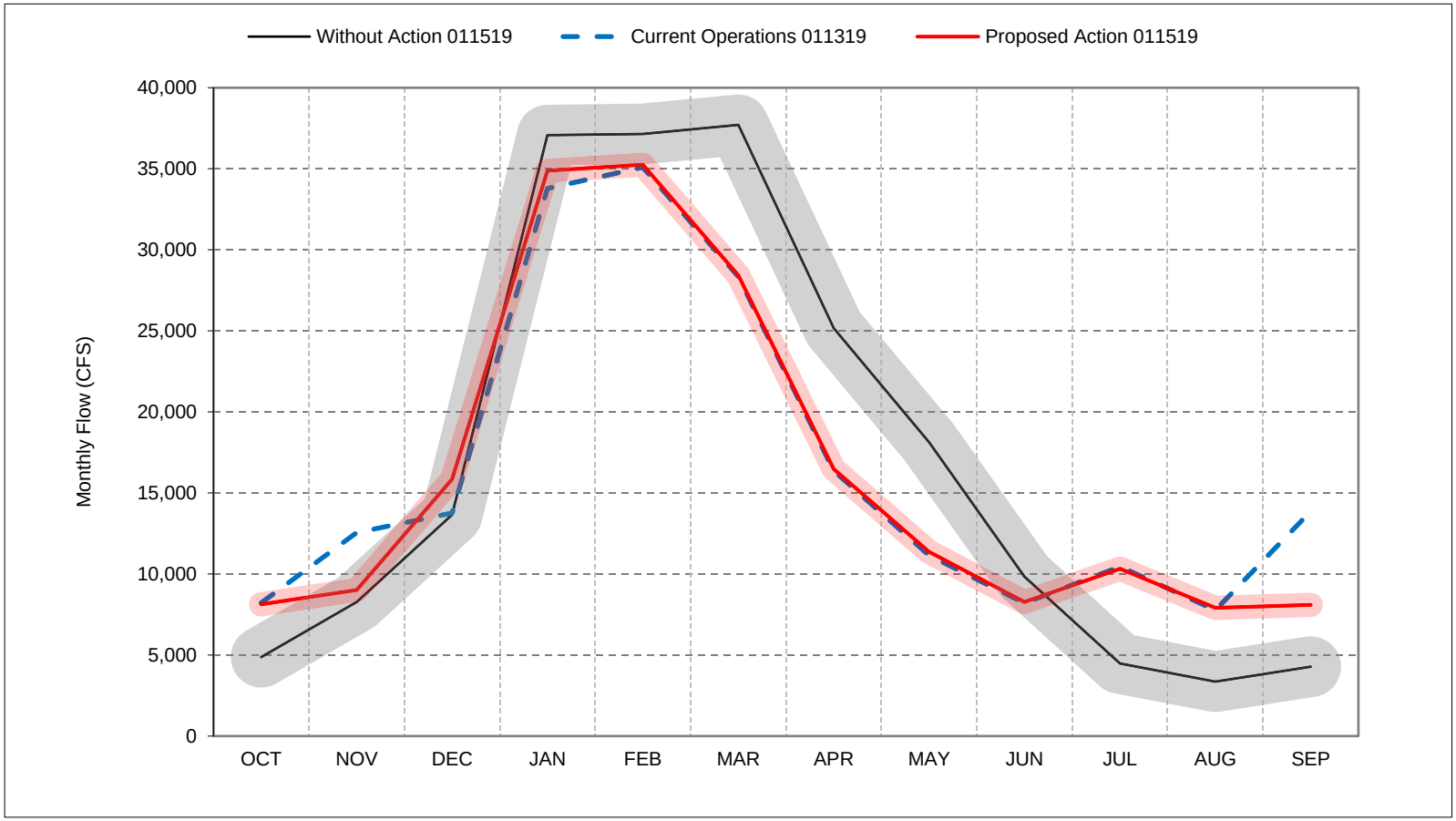
e These are draft results meant for qualitative analysis and are subject to revision.

Figure 18-1. Sacramento River Flow at Hamilton City, Long-Term Average Flow



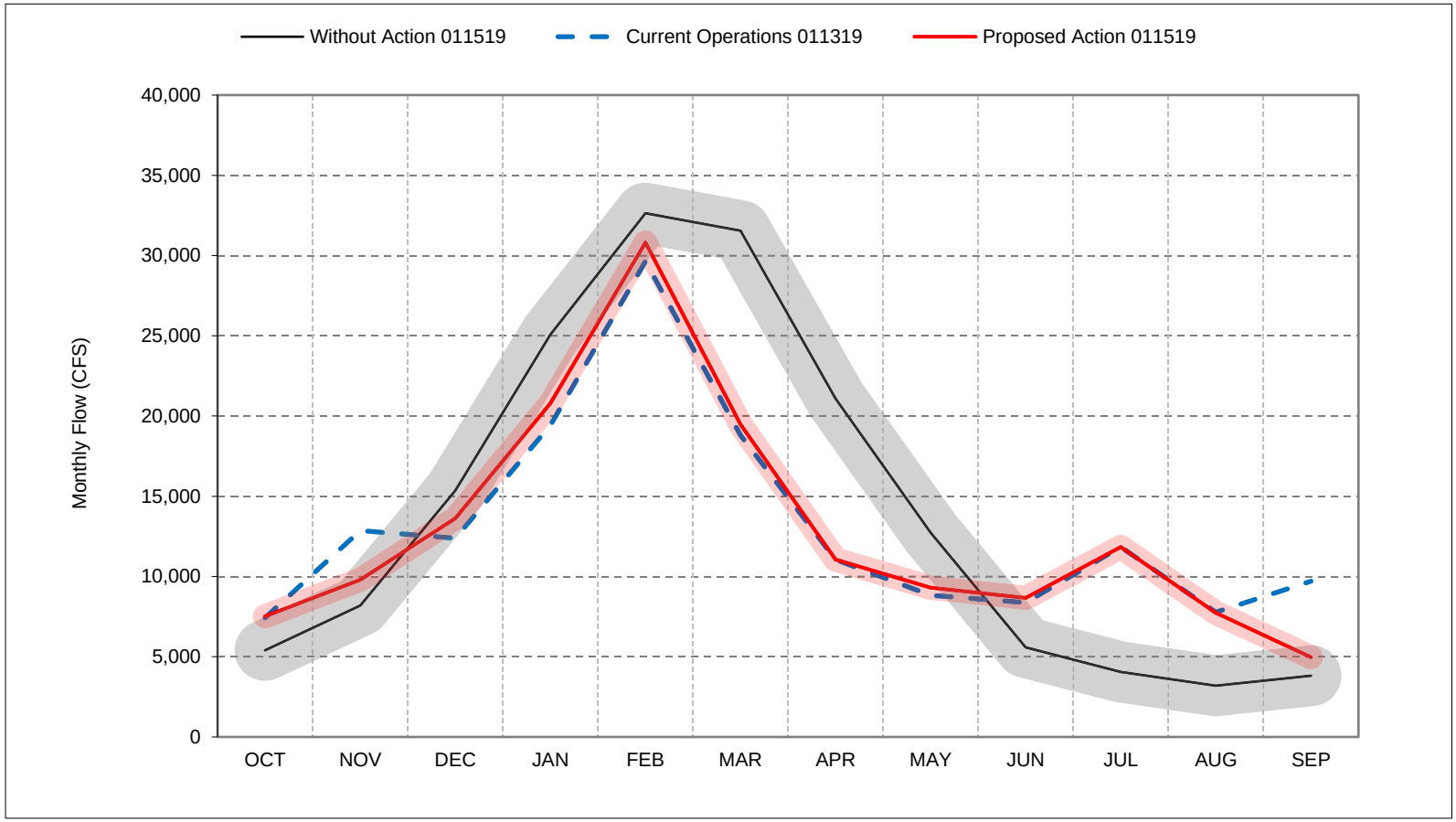
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 18-2. Sacramento River Flow at Hamilton City, Wet Year Average Flow



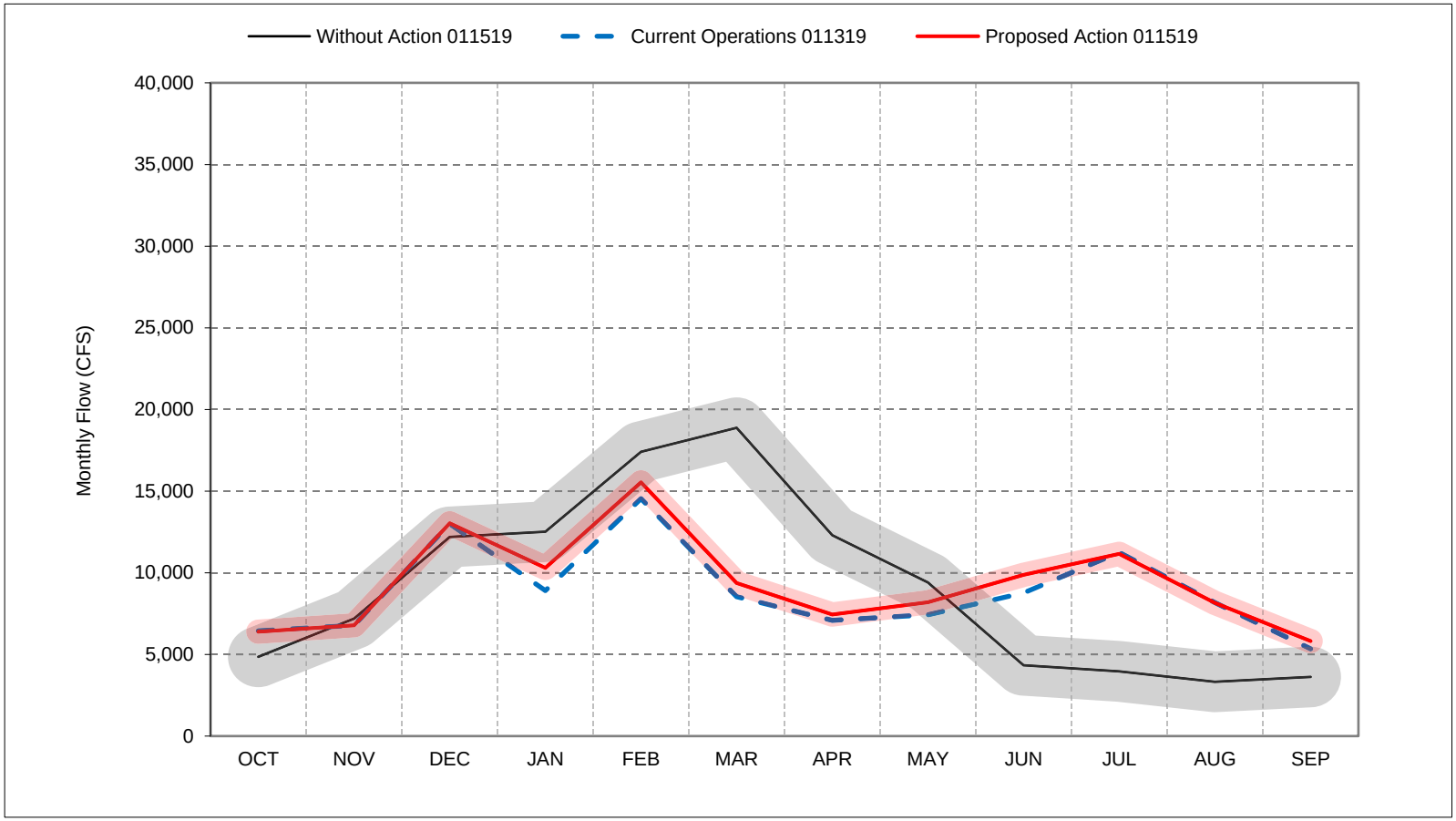
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 18-3. Sacramento River Flow at Hamilton City, Above Normal Year Average Flow



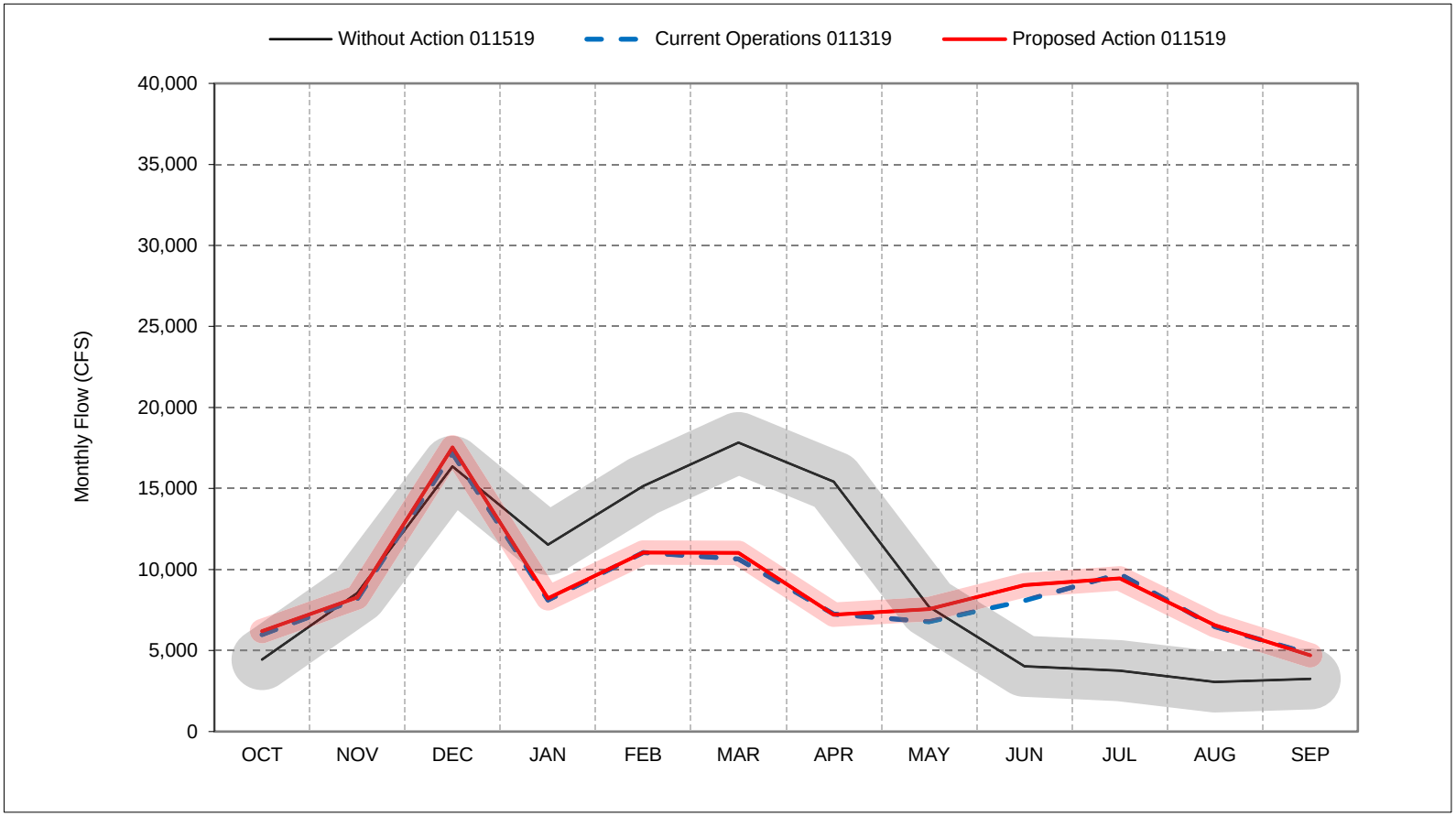
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 18-4. Sacramento River Flow at Hamilton City, Below Normal Year Average Flow



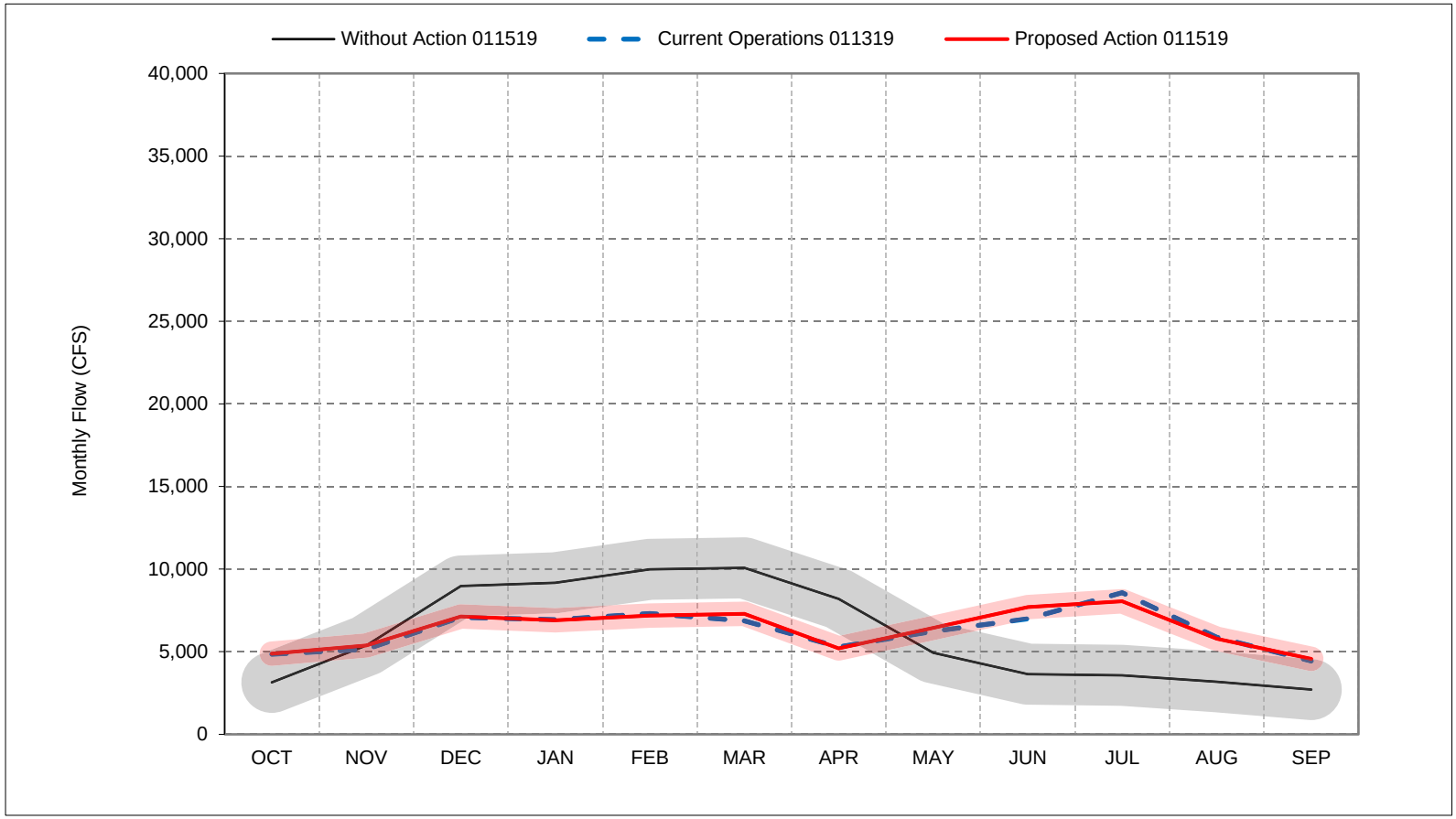
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 18-5. Sacramento River Flow at Hamilton City, Dry Year Average Flow



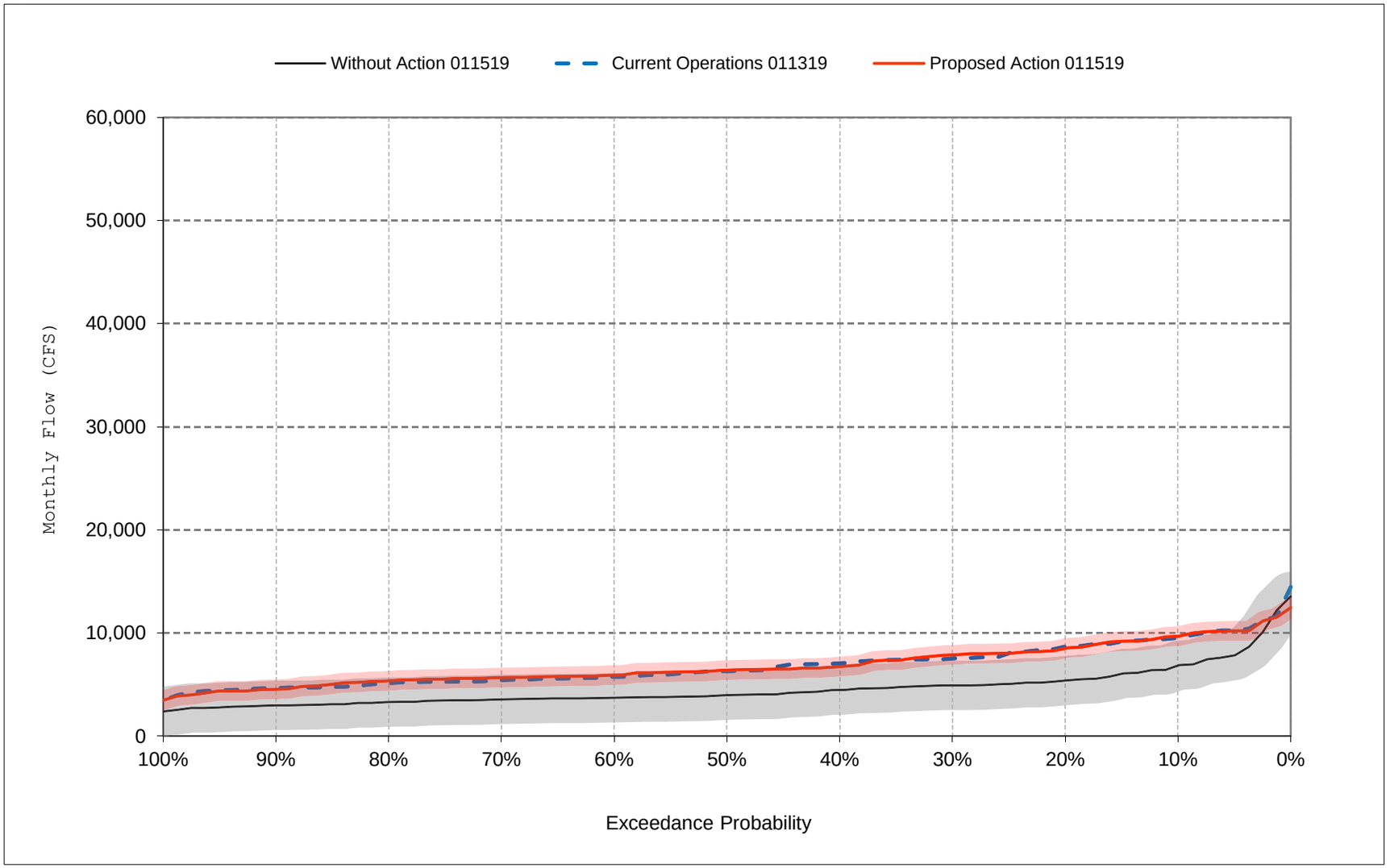
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 18-6. Sacramento River Flow at Hamilton City, Critical Year Average Flow



*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

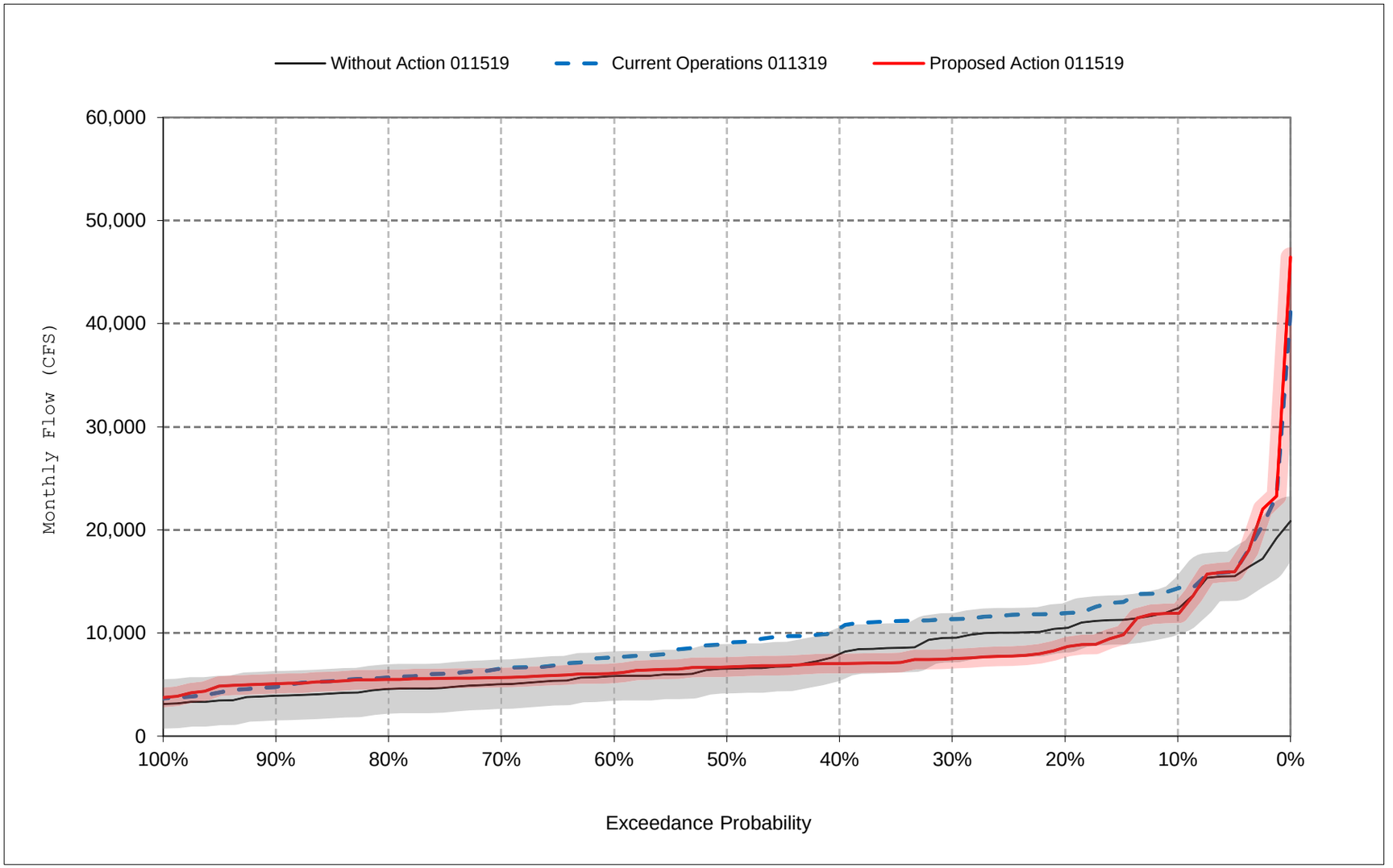
Figure 18-7. Sacramento River Flow at Hamilton City, October



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

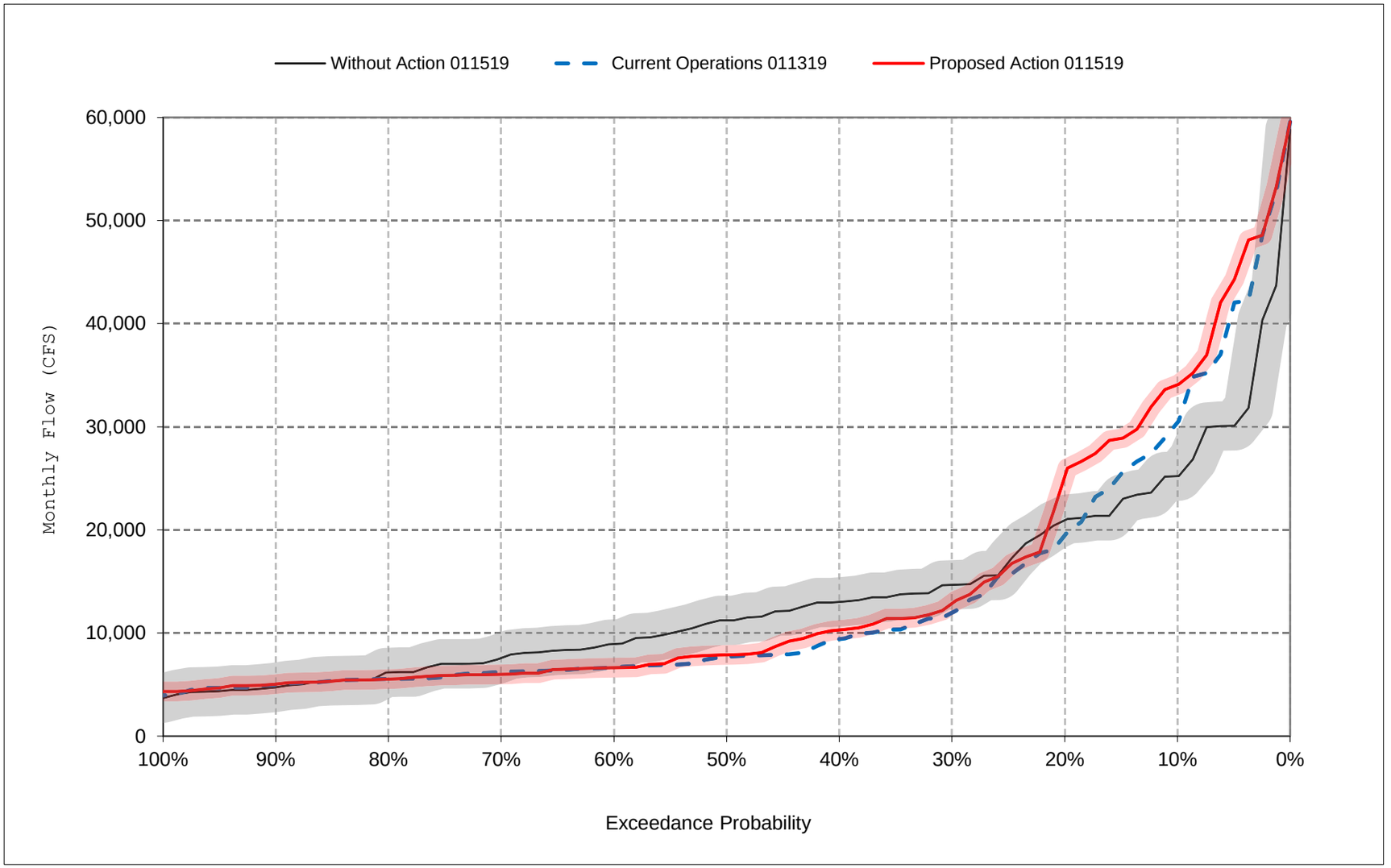
Figure 18-8. Sacramento River Flow at Hamilton City, November



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

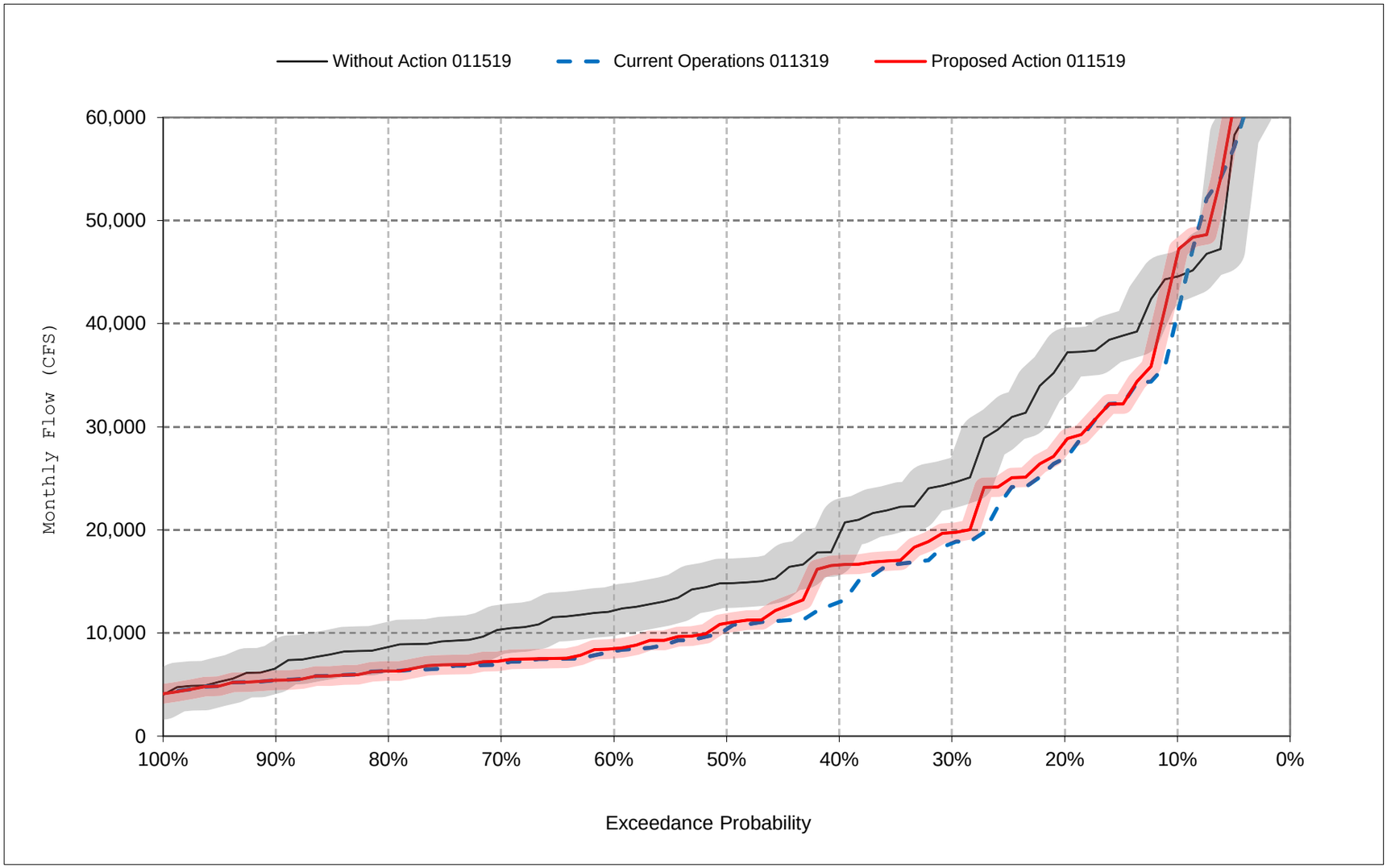
Figure 18-9. Sacramento River Flow at Hamilton City, December



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

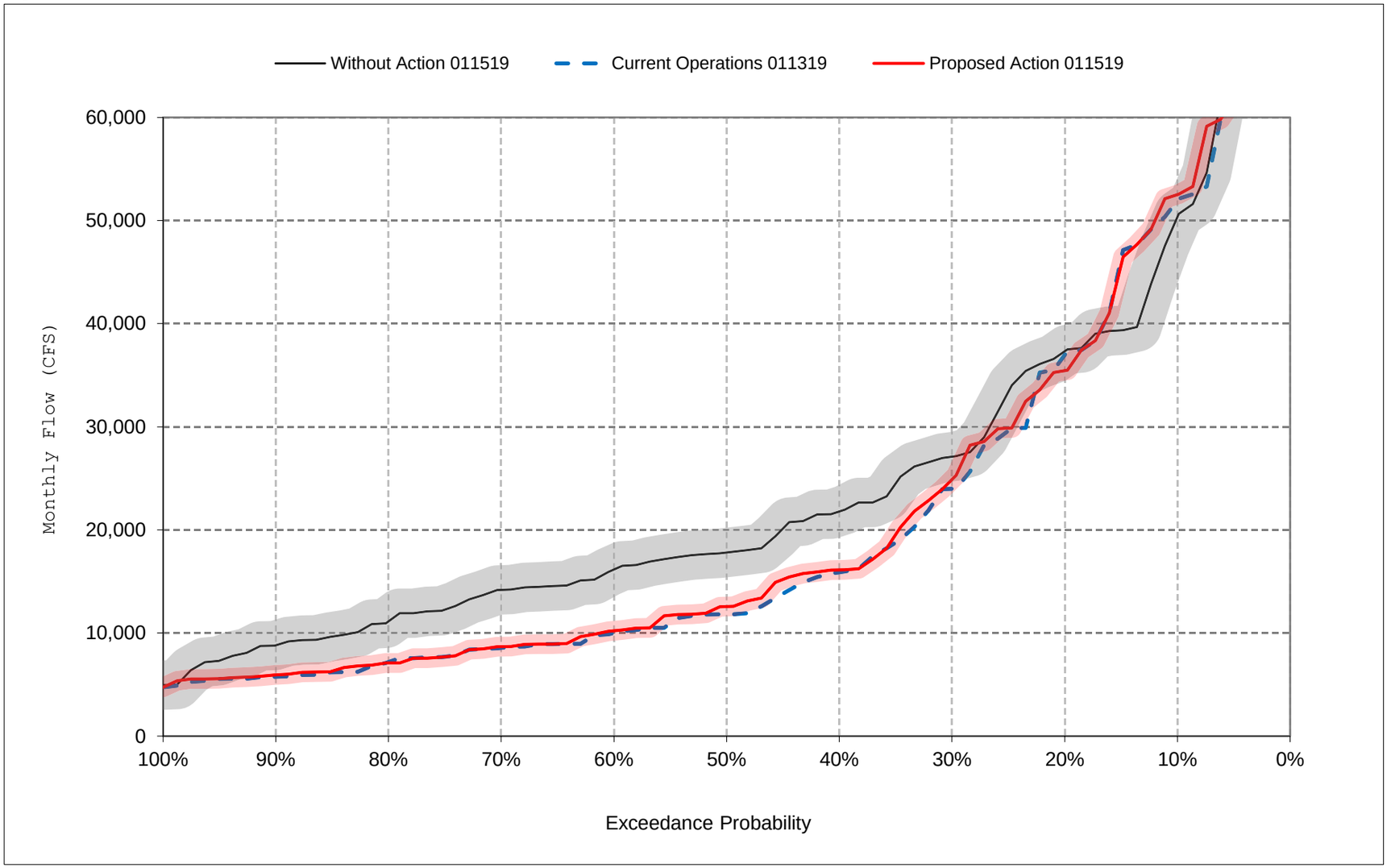
Figure 18-10. Sacramento River Flow at Hamilton City, January



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

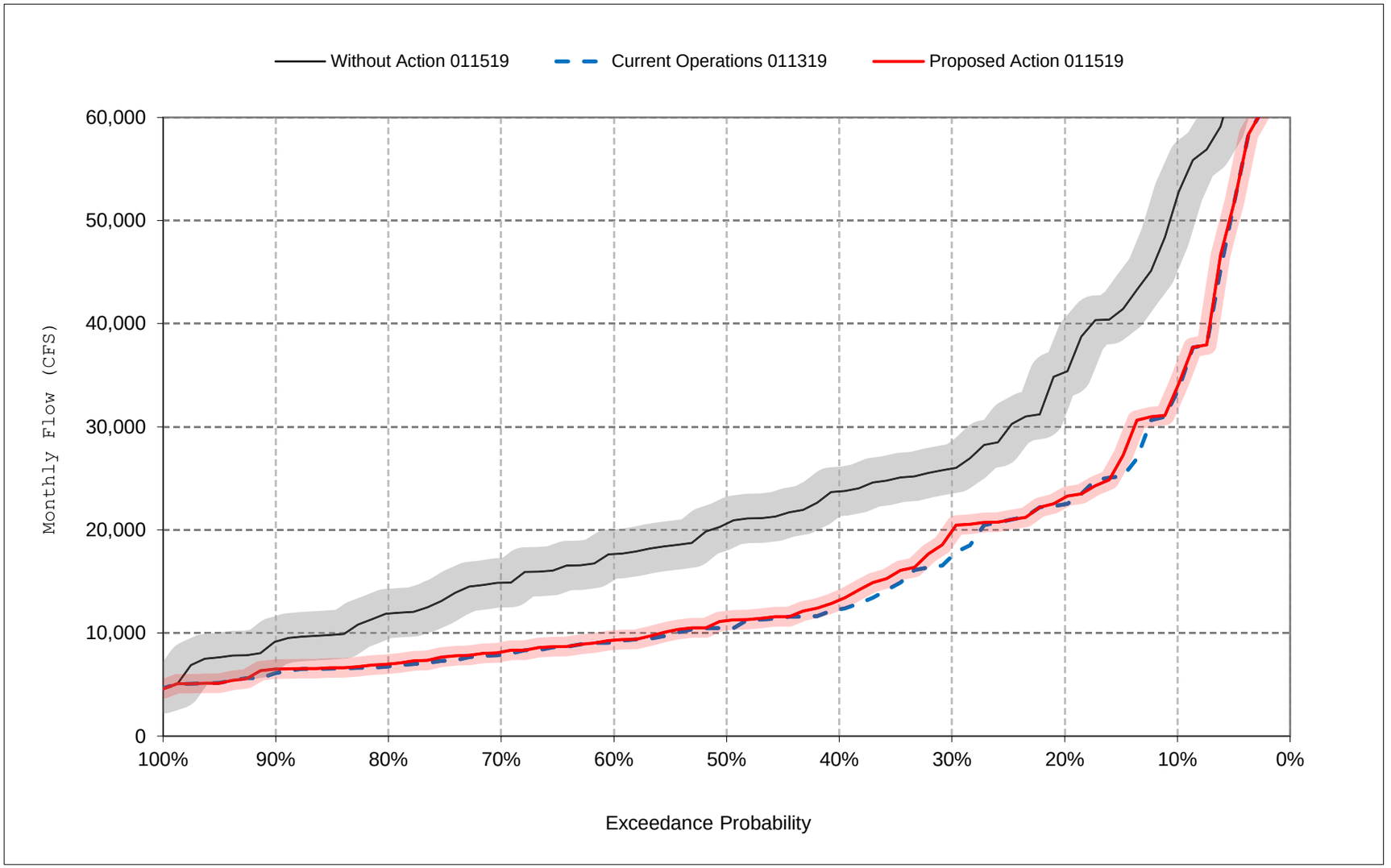
Figure 18-11. Sacramento River Flow at Hamilton City, February



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

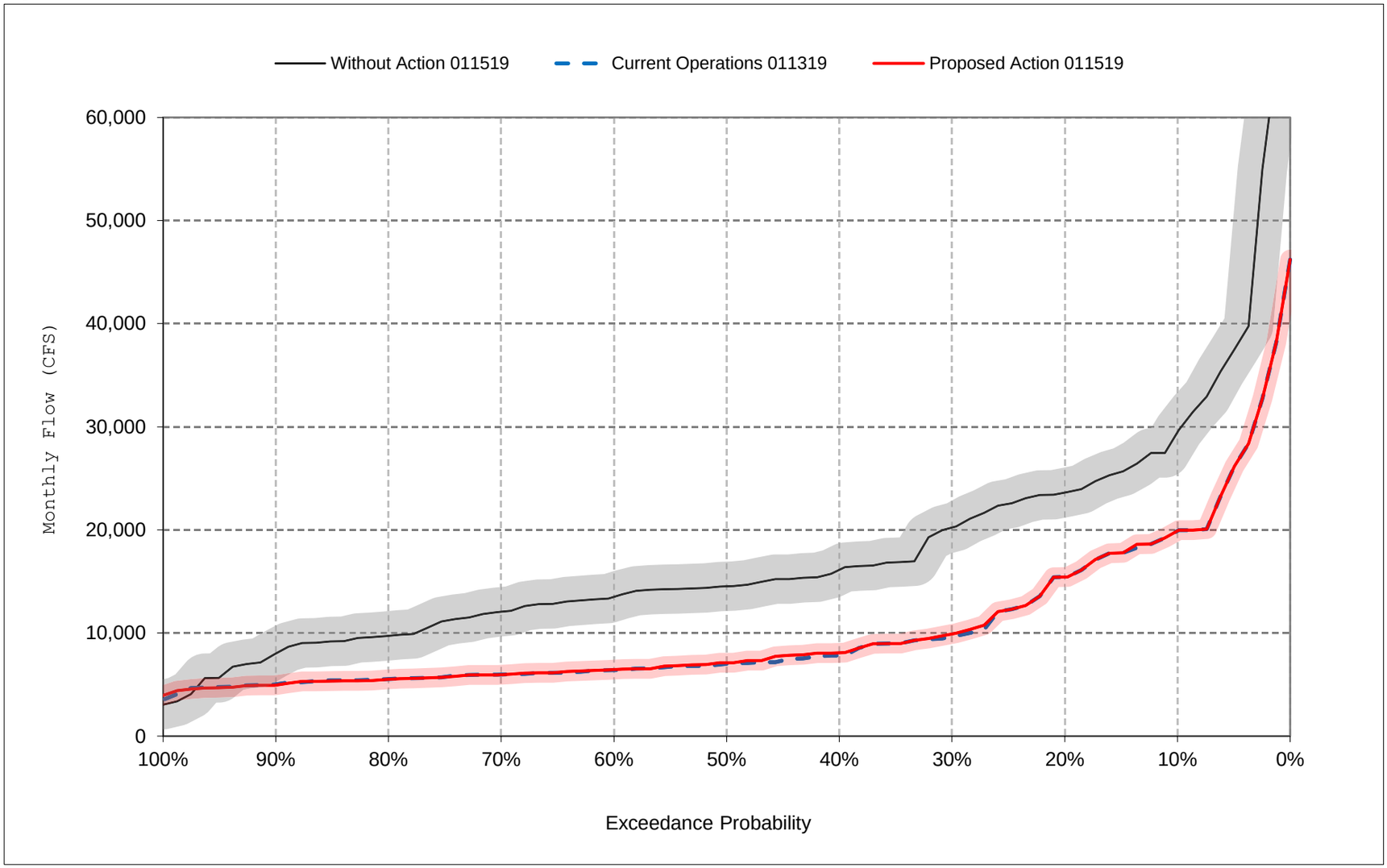
Figure 18-12. Sacramento River Flow at Hamilton City, March



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

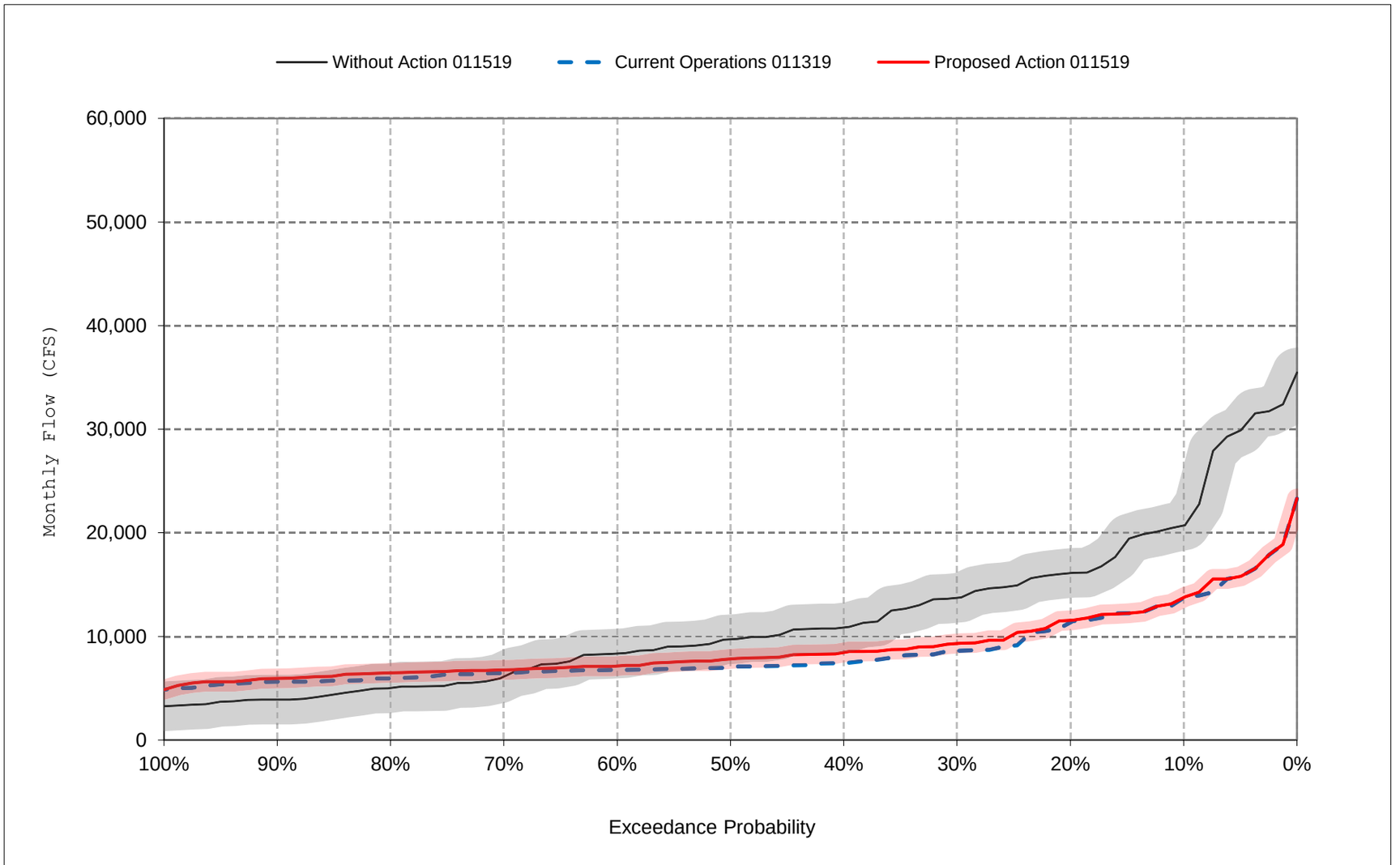
Figure 18-13. Sacramento River Flow at Hamilton City, April



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

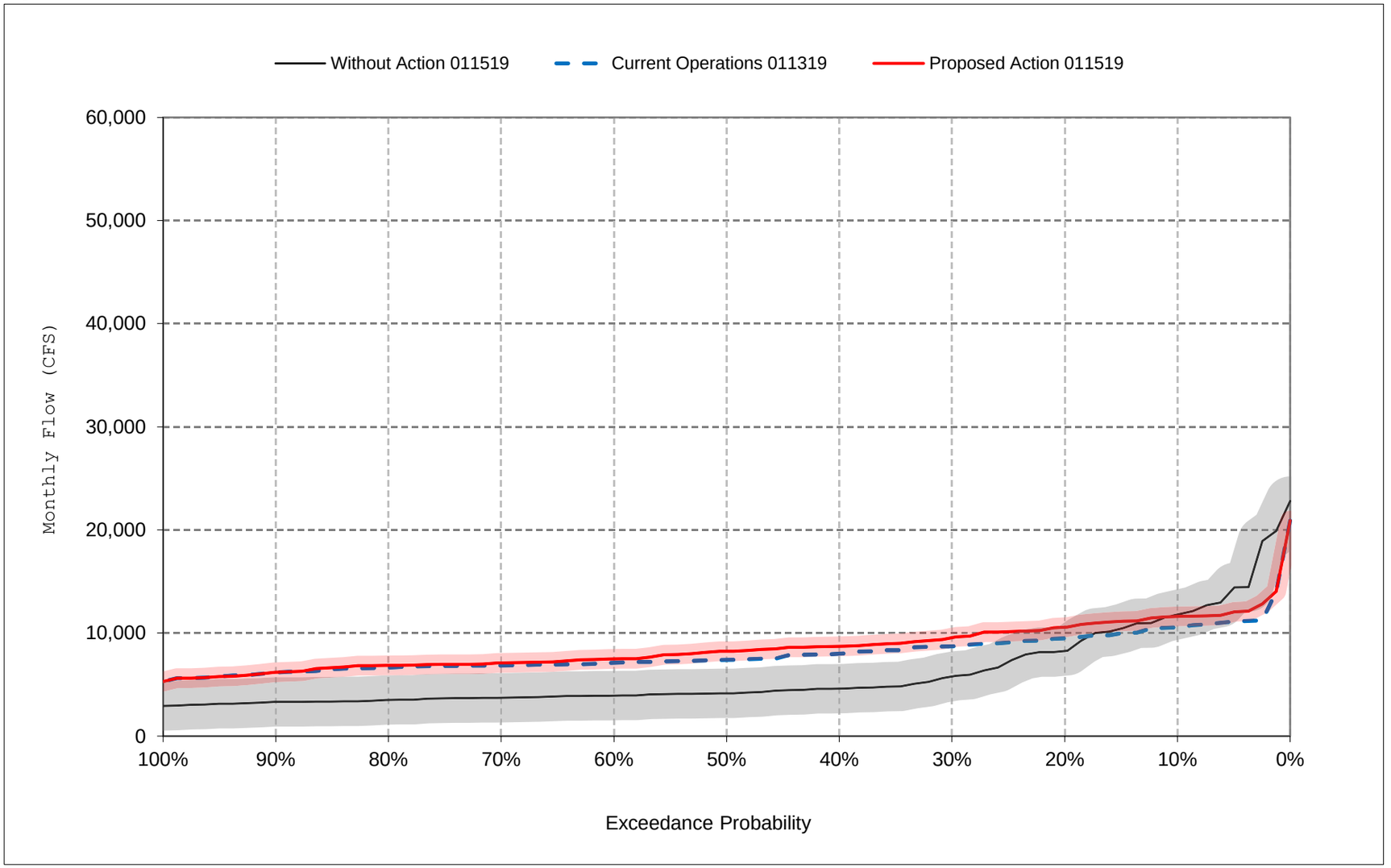
Figure 18-14. Sacramento River Flow at Hamilton City, May



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

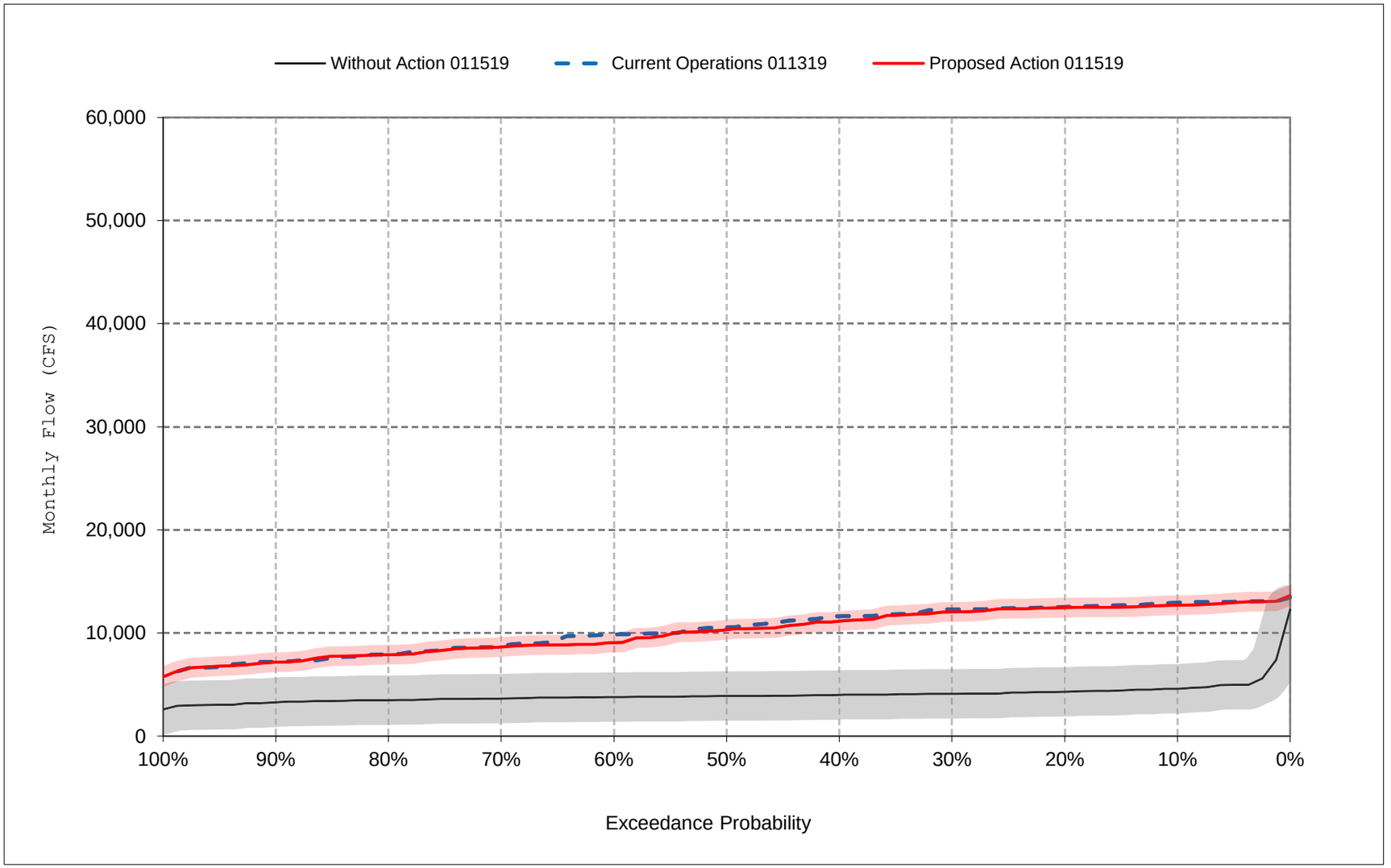
Figure 18-15. Sacramento River Flow at Hamilton City, June



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

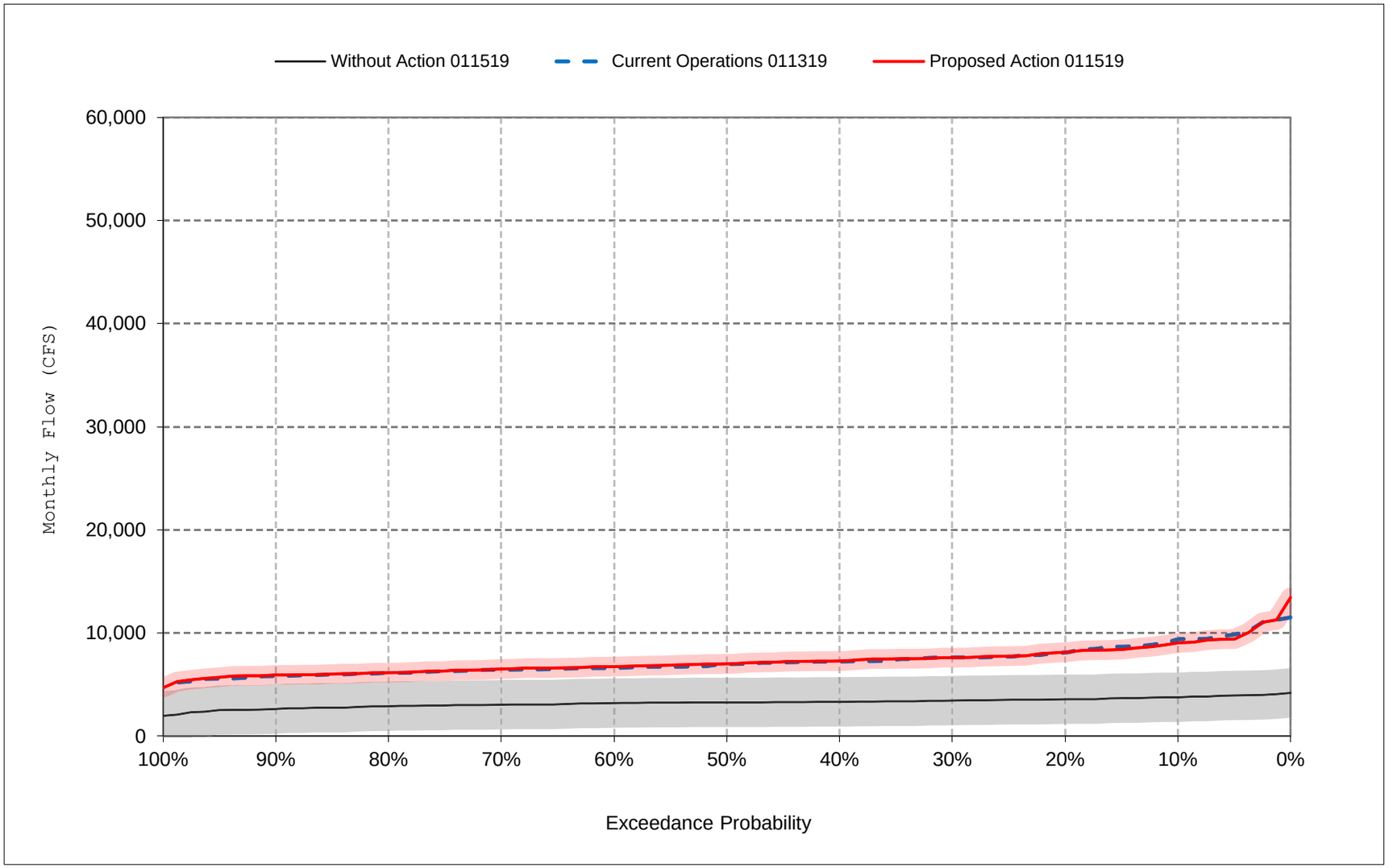
Figure 18-16. Sacramento River Flow at Hamilton City, July



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

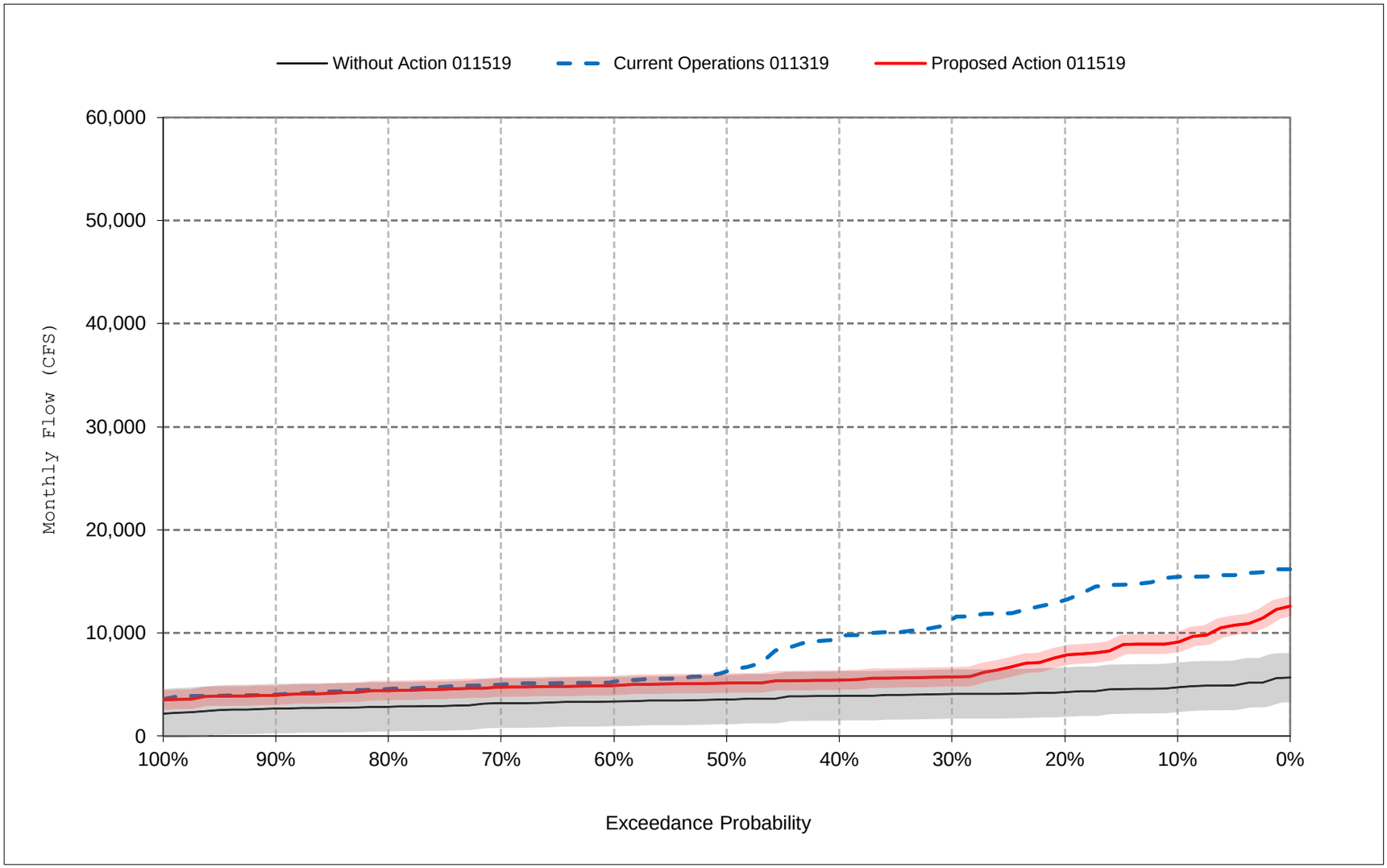
Figure 18-17. Sacramento River Flow at Hamilton City, August



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Figure 18-18. Sacramento River Flow at Hamilton City, September



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Table 19-1. Sacramento River at Wilkins Slough Flow, Monthly Flow

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	6,828	13,792	20,697	22,184	22,545	22,342	20,987	18,498	9,955	3,083	1,697	5,186
20%	5,264	10,976	19,580	21,666	21,812	21,308	20,208	15,342	7,048	2,517	1,000	4,444
30%	4,415	9,190	17,415	20,903	21,102	20,933	18,844	12,119	3,797	1,536	1,000	4,140
40%	3,762	7,542	14,811	18,899	20,312	19,991	17,113	9,012	2,578	1,321	1,000	3,843
50%	3,302	6,347	11,787	15,692	19,266	19,065	15,452	7,931	1,429	1,000	1,000	3,481
60%	3,076	5,443	9,549	13,230	18,119	18,287	14,778	6,225	1,000	1,000	1,000	3,104
70%	2,833	4,532	8,049	11,316	15,361	16,495	12,781	4,421	1,000	1,000	1,000	2,817
80%	2,567	3,843	5,949	9,375	12,747	12,687	10,186	2,442	1,000	1,000	1,000	2,520
90%	2,080	3,173	4,604	7,458	9,408	9,045	8,177	1,034	1,000	1,000	1,000	2,195
Long Term												
Full Simulation Period[a]	4,079	7,621	12,484	15,477	17,484	17,522	15,088	8,835	3,892	1,699	1,209	3,569
Water Year Types[b,c]												
Wet (32%)	4,442	8,208	13,058	20,283	21,191	20,210	18,556	14,278	7,987	1,886	1,078	4,354
Above Normal (16%)	4,896	7,962	12,507	18,451	19,823	20,410	17,541	11,141	3,593	1,579	1,055	3,797
Below Normal (13%)	4,572	6,948	11,841	13,586	16,259	15,931	12,345	6,480	1,937	1,536	1,028	3,441
Dry (24%)	3,825	8,586	13,735	11,818	15,705	17,061	14,618	5,339	1,387	1,203	1,088	3,147
Critical (15%)	2,377	4,985	9,718	9,672	11,004	10,797	8,215	2,533	1,313	2,400	2,026	2,438

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	9,085	13,566	21,070	22,006	22,665	21,630	19,305	12,626	7,804	9,695	6,594	15,000
20%	7,608	12,869	19,597	21,247	21,557	20,323	17,774	9,258	7,069	9,423	5,495	13,681
30%	6,693	10,941	13,753	19,601	20,870	19,029	11,344	6,213	6,008	9,174	5,161	11,042
40%	6,148	10,268	11,687	15,569	19,624	15,809	9,173	5,248	5,478	8,710	4,673	9,367
50%	5,810	9,256	8,468	10,929	15,927	13,550	7,720	4,655	5,002	7,804	4,545	6,275
60%	5,268	7,240	7,263	9,489	12,622	10,302	6,911	4,442	4,834	6,628	4,520	5,260
70%	4,638	5,992	6,017	7,886	10,266	8,916	6,329	3,999	4,707	5,820	4,244	4,623
80%	4,497	5,159	5,612	6,942	7,686	7,980	5,718	3,711	4,165	4,710	3,951	4,372
90%	3,994	4,289	4,854	6,012	6,308	6,211	5,161	3,476	3,495	4,331	3,442	3,965
Long Term												
Full Simulation Period[a]	6,124	9,152	11,234	13,460	15,249	13,881	10,343	6,529	5,684	7,294	4,903	8,377
Water Year Types[b,c]												
Wet (32%)	7,511	12,176	11,622	18,870	19,567	17,810	14,598	9,612	6,426	7,574	5,293	13,916
Above Normal (16%)	6,711	11,184	11,185	16,976	18,484	17,432	12,412	7,174	6,171	8,650	5,448	9,654
Below Normal (13%)	6,046	6,466	11,361	10,381	13,627	9,842	7,454	5,489	5,958	7,948	5,637	5,132
Dry (24%)	5,215	8,027	12,724	9,098	12,422	12,174	8,077	4,381	5,159	6,678	4,291	4,665
Critical (15%)	4,072	4,733	7,847	8,021	8,590	8,066	5,306	3,683	4,176	5,648	3,817	4,154

Current Operations 011319 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	2,258	**-226**	372	**-177**	120	**-712**	**-1,682**	**-5,871**	**-2,151**	6,612	4,897	9,814
20%	2,344	1,893	17	**-419**	**-255**	**-985**	**-2,434**	**-6,083**	21	6,906	4,495	9,237
30%	2,278	1,752	**-3,662**	**-1,302**	**-233**	**-1,904**	**-7,500**	**-5,907**	2,211	7,638	4,161	6,902
40%	2,386	2,726	**-3,124**	**-3,330**	**-688**	**-4,182**	**-7,940**	**-3,764**	2,901	7,389	3,673	5,524
50%	2,508	2,909	**-3,318**	**-4,763**	**-3,339**	**-5,514**	**-7,732**	**-3,276**	3,573	6,804	3,545	2,794
60%	2,192	1,797	**-2,287**	**-3,742**	**-5,497**	**-7,984**	**-7,867**	**-1,783**	3,834	5,628	3,520	2,156
70%	1,805	1,460	**-2,032**	**-3,430**	**-5,095**	**-7,578**	**-6,452**	**-422**	3,707	4,820	3,244	1,806
80%	1,930	1,316	**-337**	**-2,433**	**-5,061**	**-4,708**	**-4,468**	1,270	3,165	3,710	2,951	1,852
90%	1,914	1,116	250	**-1,447**	**-3,100**	**-2,834**	**-3,015**	2,442	2,495	3,331	2,442	1,770
Long Term												
Full Simulation Period[a]	2,046	1,531	**-1,250**	**-2,017**	**-2,234**	**-3,642**	**-4,745**	**-2,306**	1,792	5,595	3,694	4,809
Water Year Types[b,c]												
Wet (32%)	3,069	3,969	**-1,436**	**-1,414**	**-1,624**	**-2,401**	**-3,958**	**-4,666**	**-1,561**	5,688	4,215	9,562
Above Normal (16%)	1,816	3,222	**-1,322**	**-1,475**	**-1,339**	**-2,978**	**-5,129**	**-3,967**	2,578	7,071	4,393	5,857
Below Normal (13%)	1,474	**-482**	**-480**	**-3,205**	**-2,632**	**-6,089**	**-4,891**	**-990**	4,020	6,412	4,609	1,691
Dry (24%)	1,390	**-559**	**-1,011**	**-2,720**	**-3,283**	**-4,887**	**-6,540**	**-957**	3,772	5,475	3,203	1,517
Critical (15%)	1,695	**-252**	**-1,870**	**-1,651**	**-2,414**	**-2,731**	**-2,910**	1,150	2,863	3,248	1,790	1,717

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 19-2. Sacramento River at Wilkins Slough Flow, Monthly Flow

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	6,828	13,792	20,697	22,184	22,545	22,342	20,987	18,498	9,955	3,083	1,697	5,186
20%	5,264	10,976	19,580	21,666	21,812	21,308	20,208	15,342	7,048	2,517	1,000	4,444
30%	4,415	9,190	17,415	20,903	21,102	20,933	18,844	12,119	3,797	1,536	1,000	4,140
40%	3,762	7,542	14,811	18,899	20,312	19,991	17,113	9,012	2,578	1,321	1,000	3,843
50%	3,302	6,347	11,787	15,692	19,266	19,065	15,452	7,931	1,429	1,000	1,000	3,481
60%	3,076	5,443	9,549	13,230	18,119	18,287	14,778	6,225	1,000	1,000	1,000	3,104
70%	2,833	4,532	8,049	11,316	15,361	16,495	12,781	4,421	1,000	1,000	1,000	2,817
80%	2,567	3,843	5,949	9,375	12,747	12,687	10,186	2,442	1,000	1,000	1,000	2,520
90%	2,080	3,173	4,604	7,458	9,408	9,045	8,177	1,034	1,000	1,000	1,000	2,195
Long Term												
Full Simulation Period[a]	4,079	7,621	12,484	15,477	17,484	17,522	15,088	8,835	3,892	1,699	1,209	3,569
Water Year Types[b,c]												
Wet (32%)	4,442	8,208	13,058	20,283	21,191	20,210	18,556	14,278	7,987	1,886	1,078	4,354
Above Normal (16%)	4,896	7,962	12,507	18,451	19,823	20,410	17,541	11,141	3,593	1,579	1,055	3,797
Below Normal (13%)	4,572	6,948	11,841	13,586	16,259	15,931	12,345	6,480	1,937	1,536	1,028	3,441
Dry (24%)	3,825	8,586	13,735	11,818	15,705	17,061	14,618	5,339	1,387	1,203	1,088	3,147
Critical (15%)	2,377	4,985	9,718	9,672	11,004	10,797	8,215	2,533	1,313	2,400	2,026	2,438

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	9,181	12,897	21,341	22,437	22,719	21,616	19,295	12,630	8,569	9,712	6,557	9,602
20%	7,810	8,695	20,686	21,191	21,536	20,380	17,770	9,257	7,906	9,336	5,602	7,566
30%	7,320	7,179	15,241	19,739	20,918	19,077	11,867	7,391	7,191	8,865	5,242	5,748
40%	6,201	6,433	12,099	18,093	19,504	16,467	9,178	6,110	6,270	8,048	4,842	5,327
50%	5,774	6,062	8,866	11,884	16,481	14,327	7,705	5,353	5,687	7,280	4,586	4,892
60%	5,420	5,867	7,486	9,715	13,216	10,957	7,099	4,891	5,055	6,236	4,531	4,678
70%	5,033	5,244	5,950	8,244	10,560	8,896	6,563	4,633	4,775	5,607	4,502	4,521
80%	4,813	4,780	5,542	6,857	7,728	8,001	5,660	4,317	4,630	4,739	4,055	4,277
90%	4,279	4,525	5,156	6,008	6,386	7,406	5,086	3,558	3,683	4,410	3,601	4,012
Long Term												
Full Simulation Period[a]	6,369	7,485	11,587	13,801	15,397	14,114	10,393	6,998	6,215	7,087	4,973	5,861
Water Year Types[b,c]												
Wet (32%)	7,748	8,561	12,436	19,016	19,589	17,809	14,692	9,833	6,480	7,456	5,443	8,143
Above Normal (16%)	7,140	7,623	11,560	18,020	19,043	17,543	12,411	7,649	6,450	8,644	5,406	4,930
Below Normal (13%)	6,084	6,474	11,387	11,282	14,081	10,582	7,801	6,255	7,050	7,831	5,668	5,622
Dry (24%)	5,573	8,060	12,840	9,160	12,462	12,395	8,037	5,163	6,067	6,378	4,418	4,573
Critical (15%)	4,130	4,972	7,869	7,978	8,466	8,492	5,196	3,891	4,864	5,097	3,774	4,286

Proposed Action 011519 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	2,354	**-895**	644	254	175	**-726**	**-1,692**	**-5,868**	**-1,386**	6,629	4,860	4,416
20%	2,546	**-2,281**	1,106	**-475**	**-276**	**-928**	**-2,438**	**-6,085**	858	6,819	4,602	3,122
30%	2,906	**-2,011**	**-2,174**	**-1,165**	**-185**	**-1,856**	**-6,977**	**-4,729**	3,394	7,329	4,242	1,608
40%	2,439	**-1,109**	**-2,712**	**-806**	**-808**	**-3,524**	**-7,935**	**-2,902**	3,693	6,726	3,842	1,484
50%	2,472	**-285**	**-2,921**	**-3,809**	**-2,786**	**-4,737**	**-7,747**	**-2,578**	4,258	6,280	3,586	1,411
60%	2,344	425	**-2,064**	**-3,516**	**-4,903**	**-7,330**	**-7,679**	**-1,333**	4,055	5,236	3,531	1,574
70%	2,200	712	**-2,099**	**-3,072**	**-4,801**	**-7,599**	**-6,218**	212	3,775	4,607	3,502	1,705
80%	2,246	937	**-407**	**-2,518**	**-5,019**	**-4,686**	**-4,526**	1,875	3,630	3,739	3,055	1,757
90%	2,199	1,352	553	**-1,450**	**-3,022**	**-1,639**	**-3,091**	2,525	2,683	3,410	2,601	1,816
Long Term												
Full Simulation Period[a]	2,290	**-136**	**-897**	**-1,675**	**-2,086**	**-3,409**	**-4,695**	**-1,837**	2,322	5,388	3,764	2,292
Water Year Types[b,c]												
Wet (32%)	3,306	353	**-622**	**-1,268**	**-1,602**	**-2,401**	**-3,864**	**-4,445**	**-1,507**	5,570	4,366	3,789
Above Normal (16%)	2,244	**-339**	**-947**	**-431**	**-780**	**-2,867**	**-5,130**	**-3,492**	2,857	7,066	4,351	1,133
Below Normal (13%)	1,512	**-475**	**-454**	**-2,304**	**-2,179**	**-5,349**	**-4,544**	**-225**	5,113	6,295	4,639	2,182
Dry (24%)	1,749	**-526**	**-896**	**-2,658**	**-3,243**	**-4,666**	**-6,580**	**-176**	4,680	5,175	3,330	1,426
Critical (15%)	1,753	**-13**	**-1,849**	**-1,694**	**-2,537**	**-2,304**	**-3,020**	1,358	3,551	2,697	1,748	1,848

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 19-3. Sacramento River at Wilkins Slough Flow, Monthly Flow

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	9,085	13,566	21,070	22,006	22,665	21,630	19,305	12,626	7,804	9,695	6,594	15,000
20%	7,608	12,869	19,597	21,247	21,557	20,323	17,774	9,258	7,069	9,423	5,495	13,681
30%	6,693	10,941	13,753	19,601	20,870	19,029	11,344	6,213	6,008	9,174	5,161	11,042
40%	6,148	10,268	11,687	15,569	19,624	15,809	9,173	5,248	5,478	8,710	4,673	9,367
50%	5,810	9,256	8,468	10,929	15,927	13,550	7,720	4,655	5,002	7,804	4,545	6,275
60%	5,268	7,240	7,263	9,489	12,622	10,302	6,911	4,442	4,834	6,628	4,520	5,260
70%	4,638	5,992	6,017	7,886	10,266	8,916	6,329	3,999	4,707	5,820	4,244	4,623
80%	4,497	5,159	5,612	6,942	7,686	7,980	5,718	3,711	4,165	4,710	3,951	4,372
90%	3,994	4,289	4,854	6,012	6,308	6,211	5,161	3,476	3,495	4,331	3,442	3,965
Long Term												
Full Simulation Period[a]	6,124	9,152	11,234	13,460	15,249	13,881	10,343	6,529	5,684	7,294	4,903	8,377
Water Year Types[b,c]												
Wet (32%)	7,511	12,176	11,622	18,870	19,567	17,810	14,598	9,612	6,426	7,574	5,293	13,916
Above Normal (16%)	6,711	11,184	11,185	16,976	18,484	17,432	12,412	7,174	6,171	8,650	5,448	9,654
Below Normal (13%)	6,046	6,466	11,361	10,381	13,627	9,842	7,454	5,489	5,958	7,948	5,637	5,132
Dry (24%)	5,215	8,027	12,724	9,098	12,422	12,174	8,077	4,381	5,159	6,678	4,291	4,665
Critical (15%)	4,072	4,733	7,847	8,021	8,590	8,066	5,306	3,683	4,176	5,648	3,817	4,154

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	9,181	12,897	21,341	22,437	22,719	21,616	19,295	12,630	8,569	9,712	6,557	9,602
20%	7,810	8,695	20,686	21,191	21,536	20,380	17,770	9,257	7,906	9,336	5,602	7,566
30%	7,320	7,179	15,241	19,739	20,918	19,077	11,867	7,391	7,191	8,865	5,242	5,748
40%	6,201	6,433	12,099	18,093	19,504	16,467	9,178	6,110	6,270	8,048	4,842	5,327
50%	5,774	6,062	8,866	11,884	16,481	14,327	7,705	5,353	5,687	7,280	4,586	4,892
60%	5,420	5,867	7,486	9,715	13,216	10,957	7,099	4,891	5,055	6,236	4,531	4,678
70%	5,033	5,244	5,950	8,244	10,560	8,896	6,563	4,633	4,775	5,607	4,502	4,521
80%	4,813	4,780	5,542	6,857	7,728	8,001	5,660	4,317	4,630	4,739	4,055	4,277
90%	4,279	4,525	5,156	6,008	6,386	7,406	5,086	3,558	3,683	4,410	3,601	4,012
Long Term												
Full Simulation Period[a]	6,369	7,485	11,587	13,801	15,397	14,114	10,393	6,998	6,215	7,087	4,973	5,861
Water Year Types[b,c]												
Wet (32%)	7,748	8,561	12,436	19,016	19,589	17,809	14,692	9,833	6,480	7,456	5,443	8,143
Above Normal (16%)	7,140	7,623	11,560	18,020	19,043	17,543	12,411	7,649	6,450	8,644	5,406	4,930
Below Normal (13%)	6,084	6,474	11,387	11,282	14,081	10,582	7,801	6,255	7,050	7,831	5,668	5,622
Dry (24%)	5,573	8,060	12,840	9,160	12,462	12,395	8,037	5,163	6,067	6,378	4,418	4,573
Critical (15%)	4,130	4,972	7,869	7,978	8,466	8,492	5,196	3,891	4,864	5,097	3,774	4,286

Proposed Action 011519 minus Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	96	**-669**	271	431	54	**-14**	**-10**	3	765	16	**-37**	**-5,398**
20%	202	**-4,174**	1,090	**-56**	**-21**	58	**-5**	**-1**	837	**-87**	107	**-6,115**
30%	628	**-3,763**	1,489	137	48	48	523	1,178	1,183	**-309**	81	**-5,294**
40%	54	**-3,835**	412	2,524	**-120**	658	5	862	792	**-662**	169	**-4,040**
50%	**-36**	**-3,194**	398	954	554	777	**-15**	698	685	**-525**	41	**-1,383**
60%	151	**-1,373**	223	226	594	655	188	449	221	**-392**	12	**-582**
70%	395	**-748**	**-67**	358	294	**-21**	234	634	67	**-214**	257	**-102**
80%	316	**-379**	**-70**	**-85**	42	22	**-58**	605	465	30	104	**-95**
90%	285	236	302	**-3**	78	1,195	**-75**	82	188	79	159	47
Long Term												
Full Simulation Period[a]	244	**-1,667**	352	341	148	233	51	469	530	**-208**	70	**-2,517**
Water Year Types[b,c]												
Wet (32%)	237	**-3,615**	814	146	22	**0**	94	221	54	**-118**	151	**-5,773**
Above Normal (16%)	429	**-3,561**	375	1,044	559	111	**-1**	475	279	**-6**	**-42**	**-4,723**
Below Normal (13%)	38	8	26	901	453	739	348	765	1,092	**-117**	31	491
Dry (24%)	359	33	116	62	40	221	**-40**	782	908	**-300**	127	**-92**
Critical (15%)	58	239	22	**-43**	**-124**	427	**-110**	207	689	**-551**	**-43**	132

a Based on the 82-year simulation period.

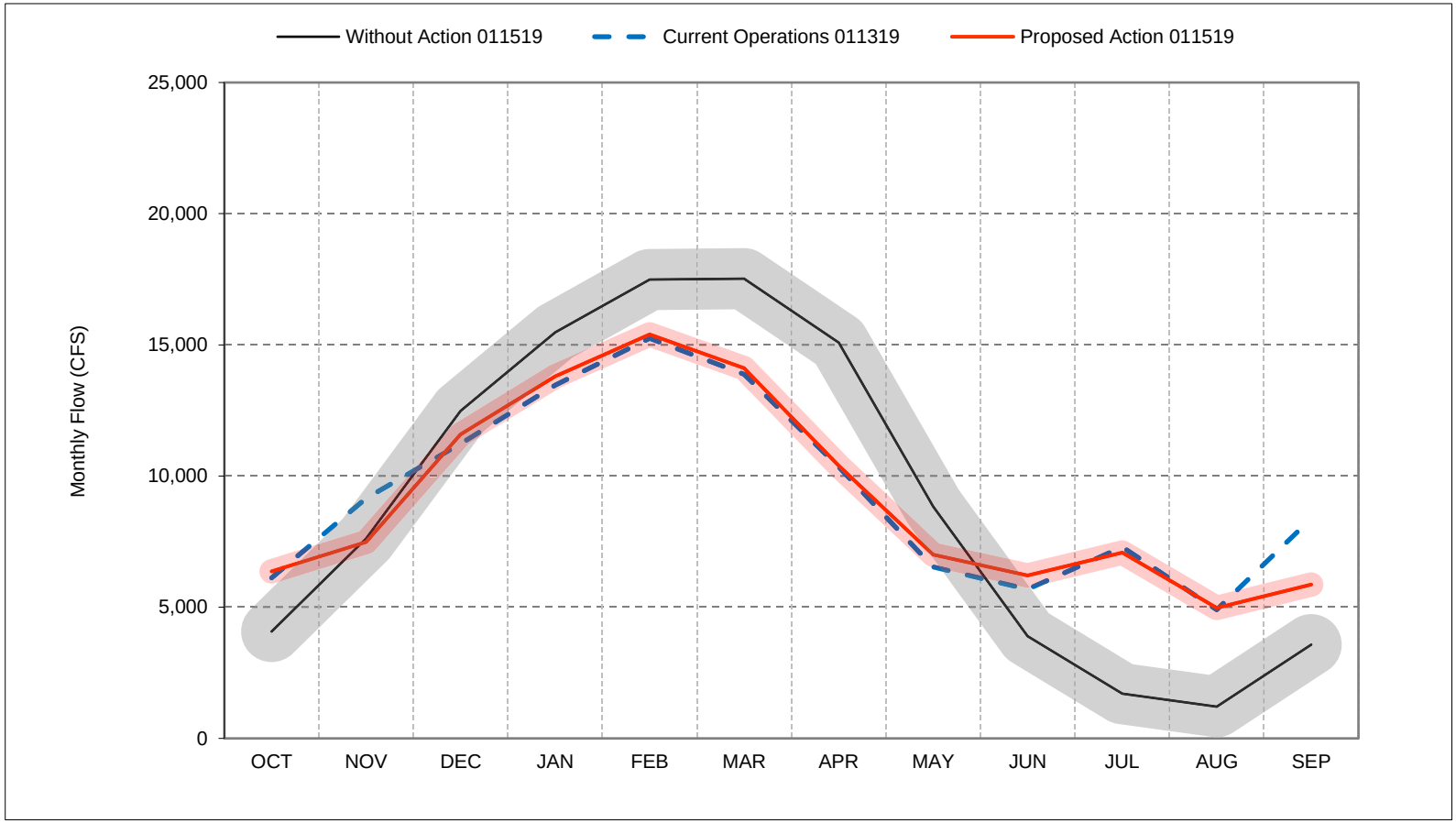
b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

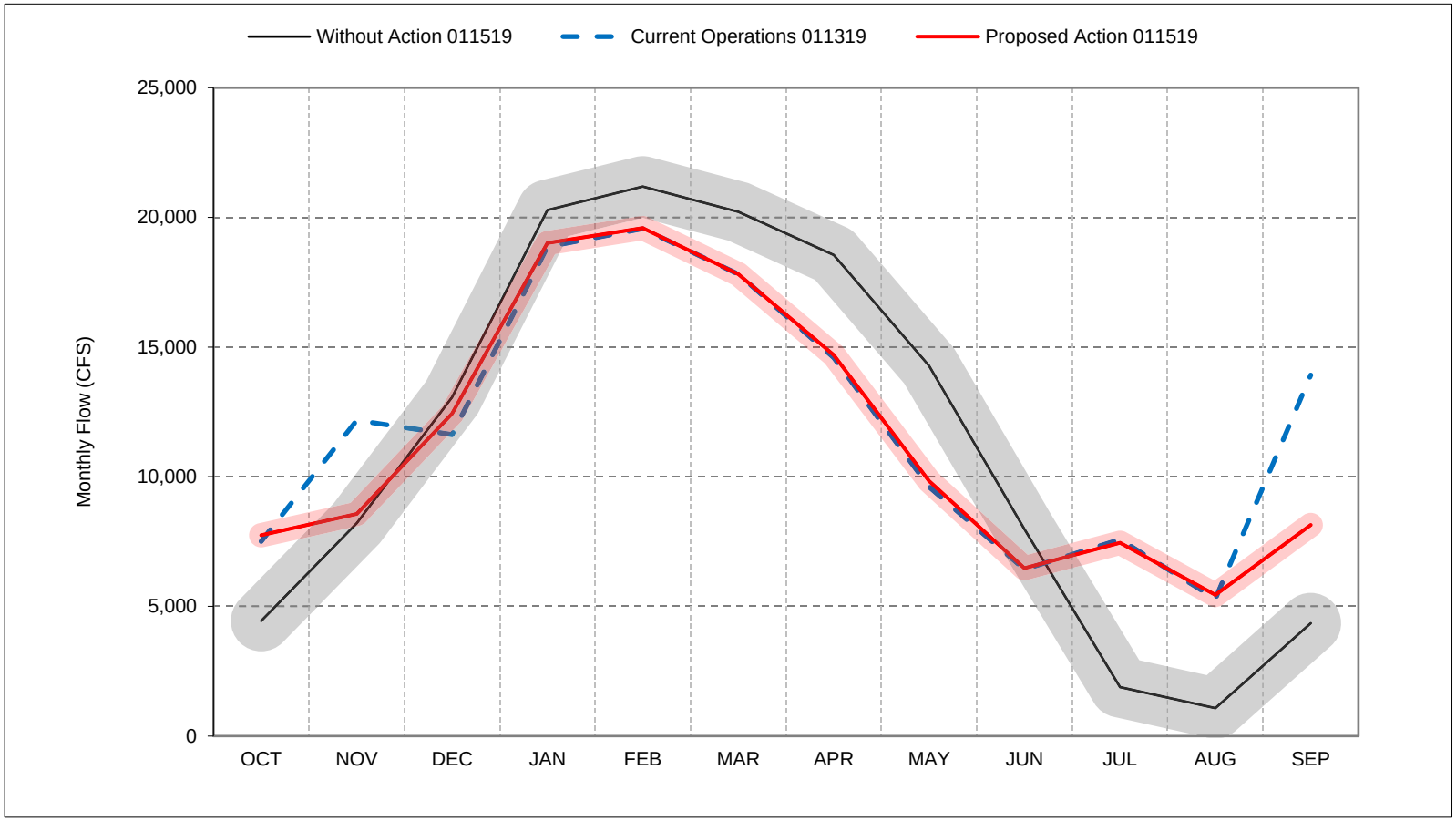
e These are draft results meant for qualitative analysis and are subject to revision.

Figure 19-1. Sacramento River at Wilkins Slough Flow, Long-Term Average Flow



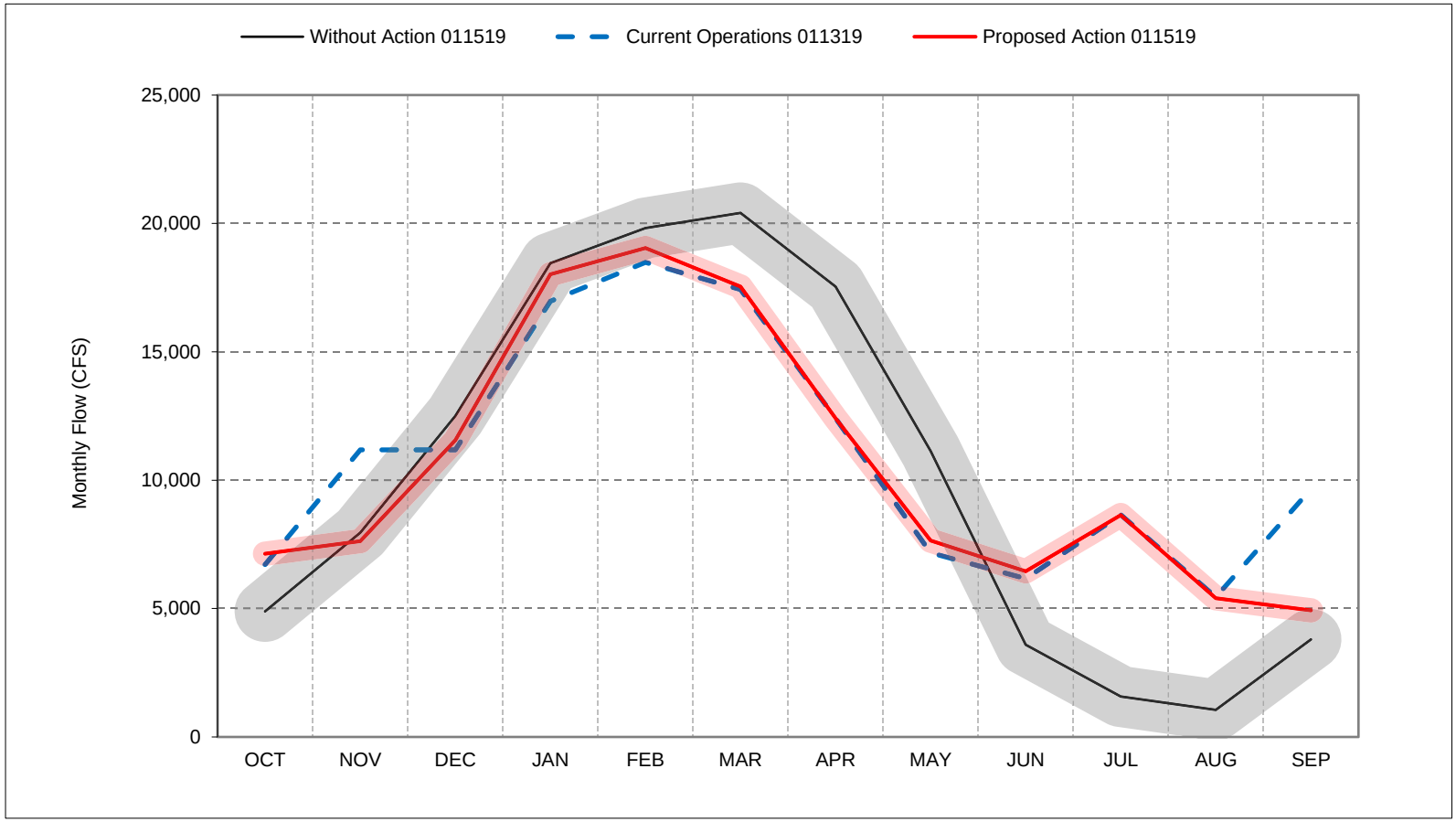
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 19-2. Sacramento River at Wilkins Slough Flow, Wet Year Average Flow



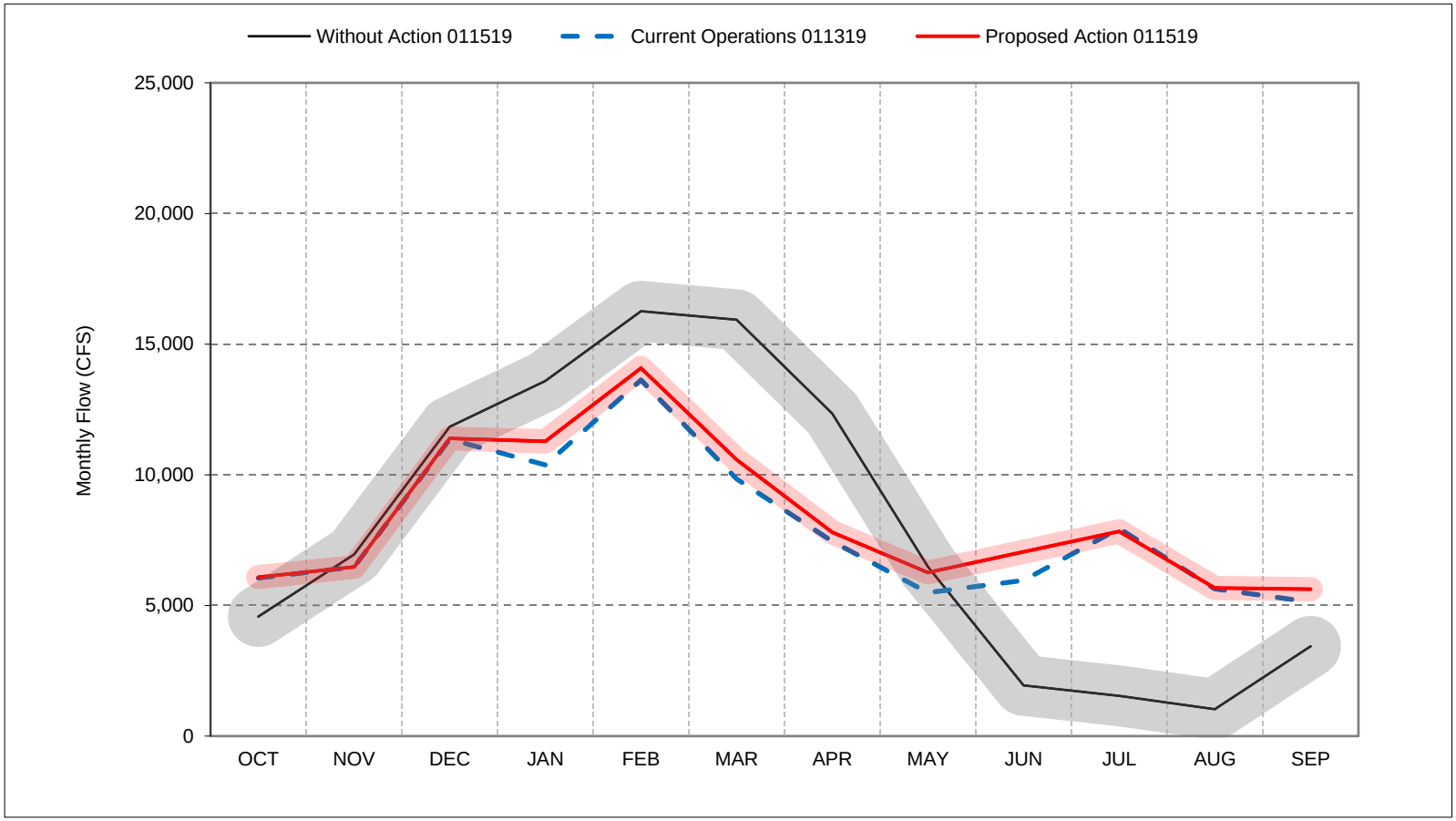
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 19-3. Sacramento River at Wilkins Slough Flow, Above Normal Year Average Flow



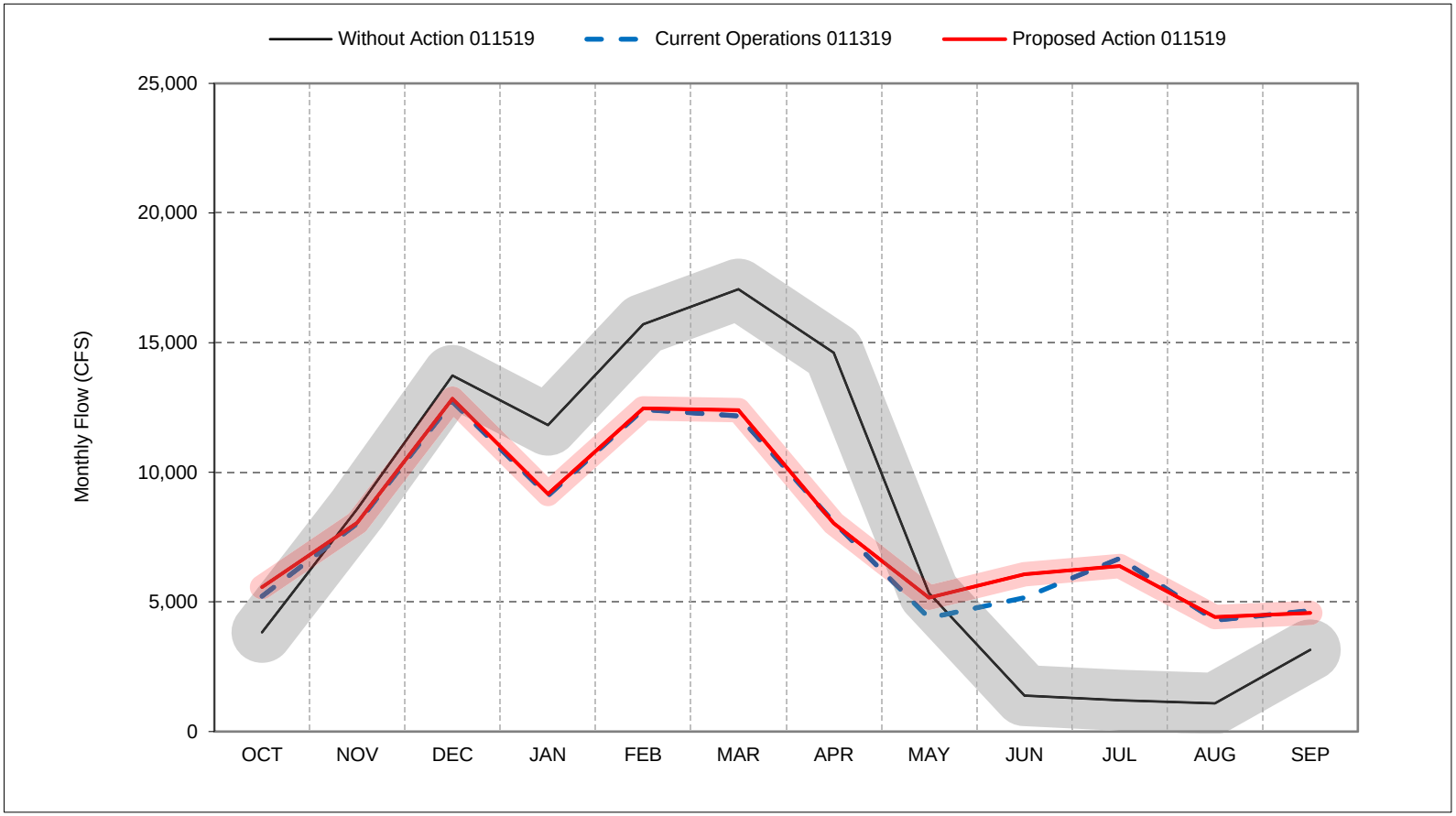
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 19-4. Sacramento River at Wilkins Slough Flow, Below Normal Year Average Flow



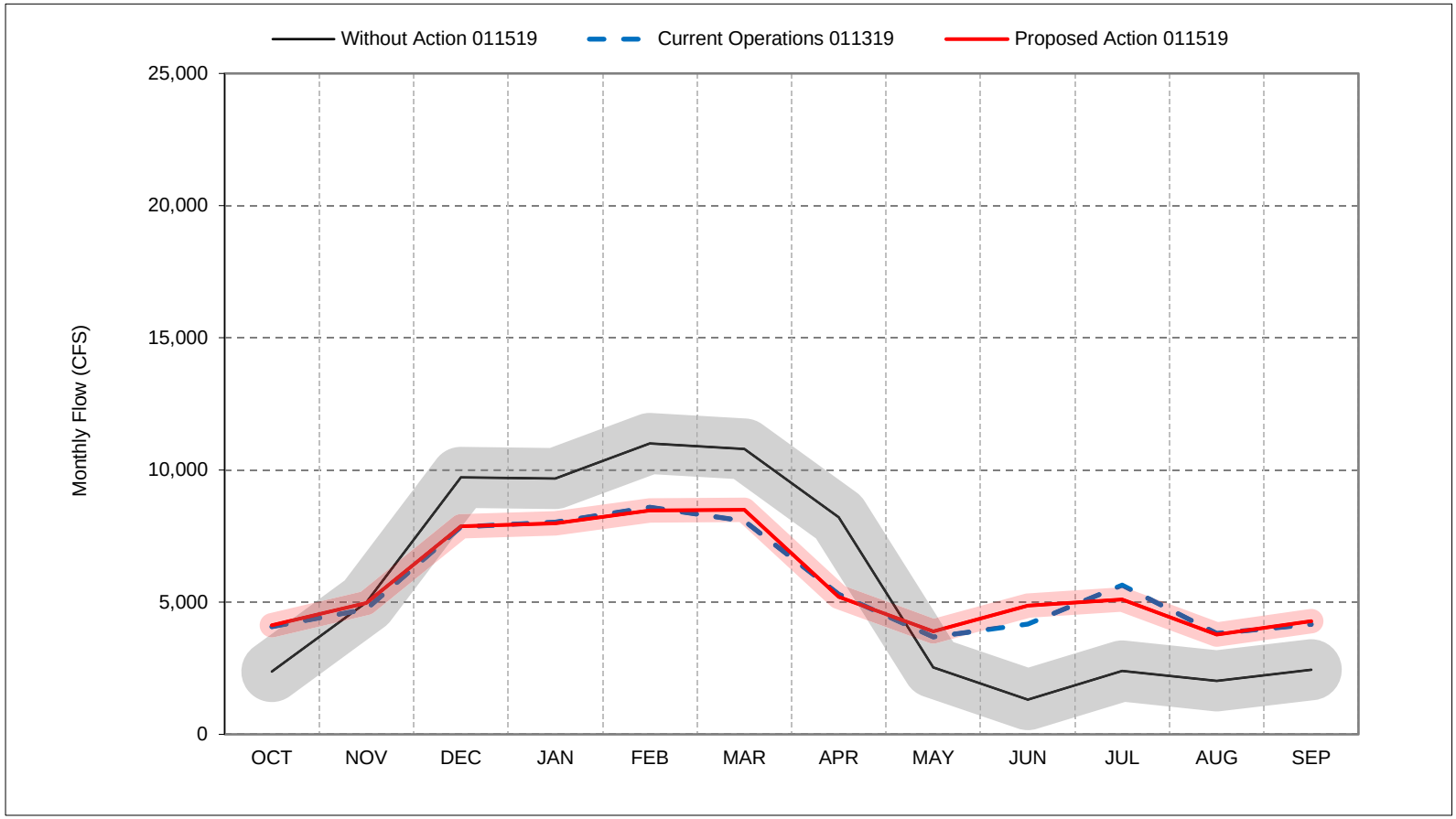
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 19-5. Sacramento River at Wilkins Slough Flow, Dry Year Average Flow



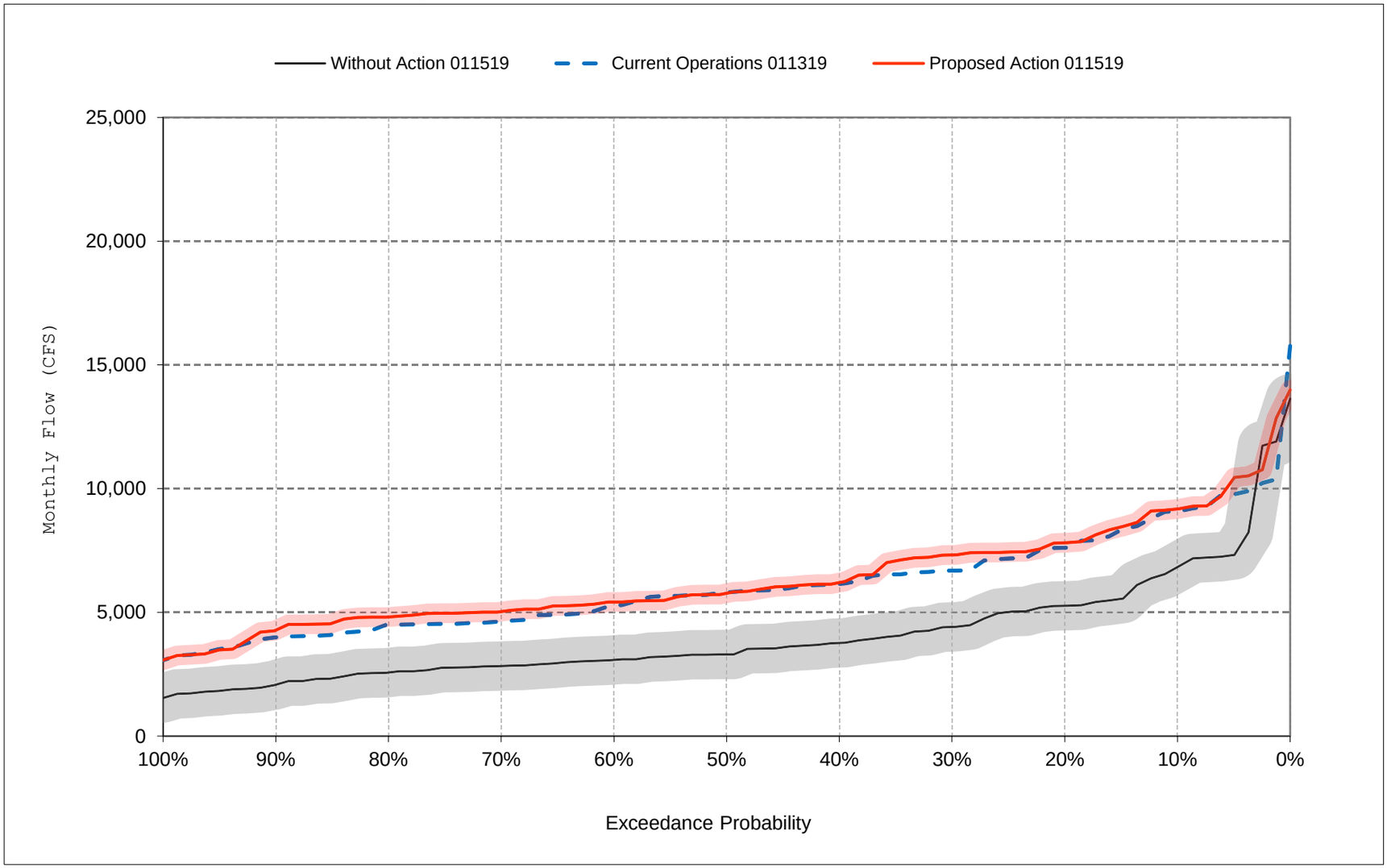
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 19-6. Sacramento River at Wilkins Slough Flow, Critical Year Average Flow



*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

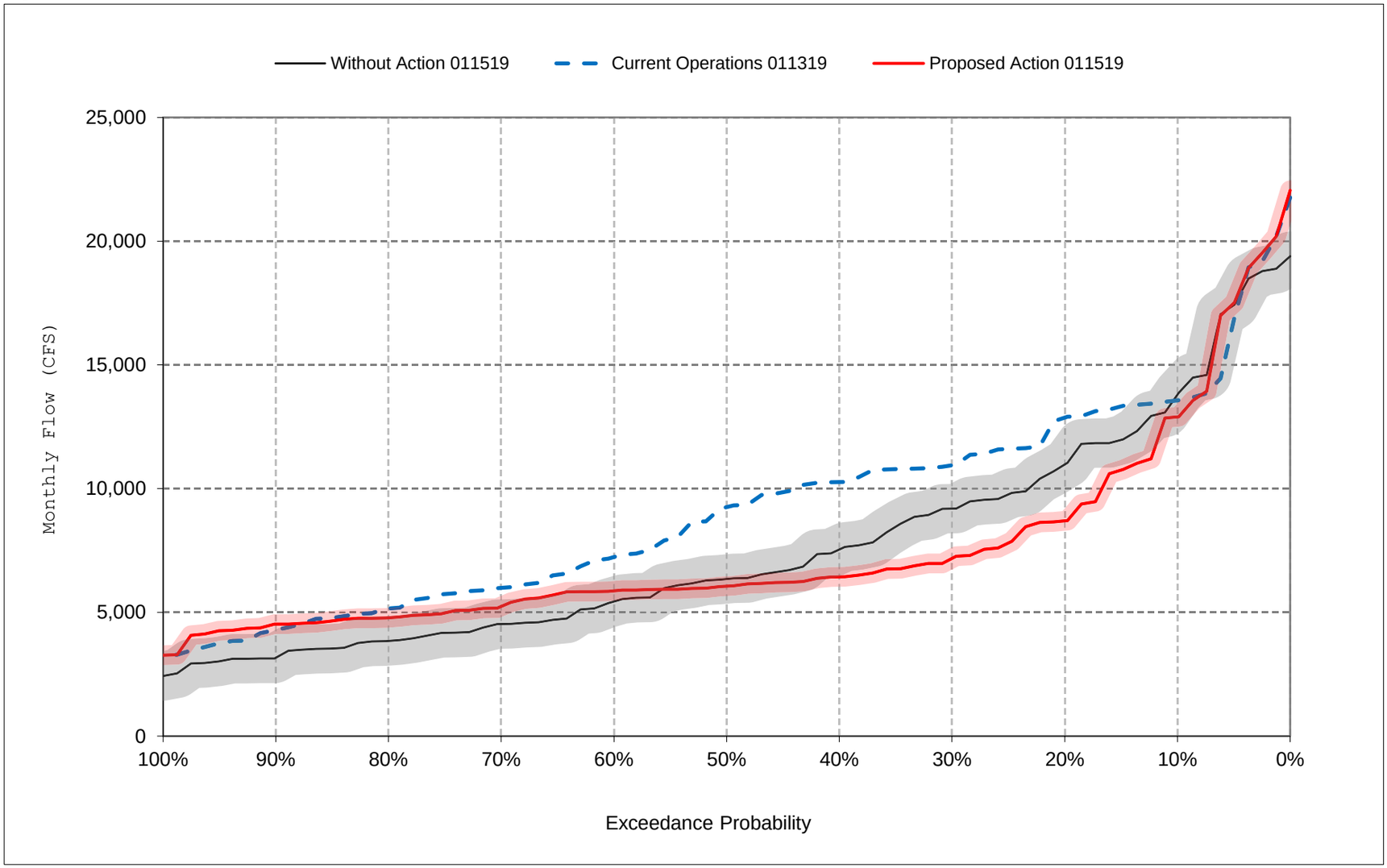
Figure 19-7. Sacramento River at Wilkins Slough Flow, October



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

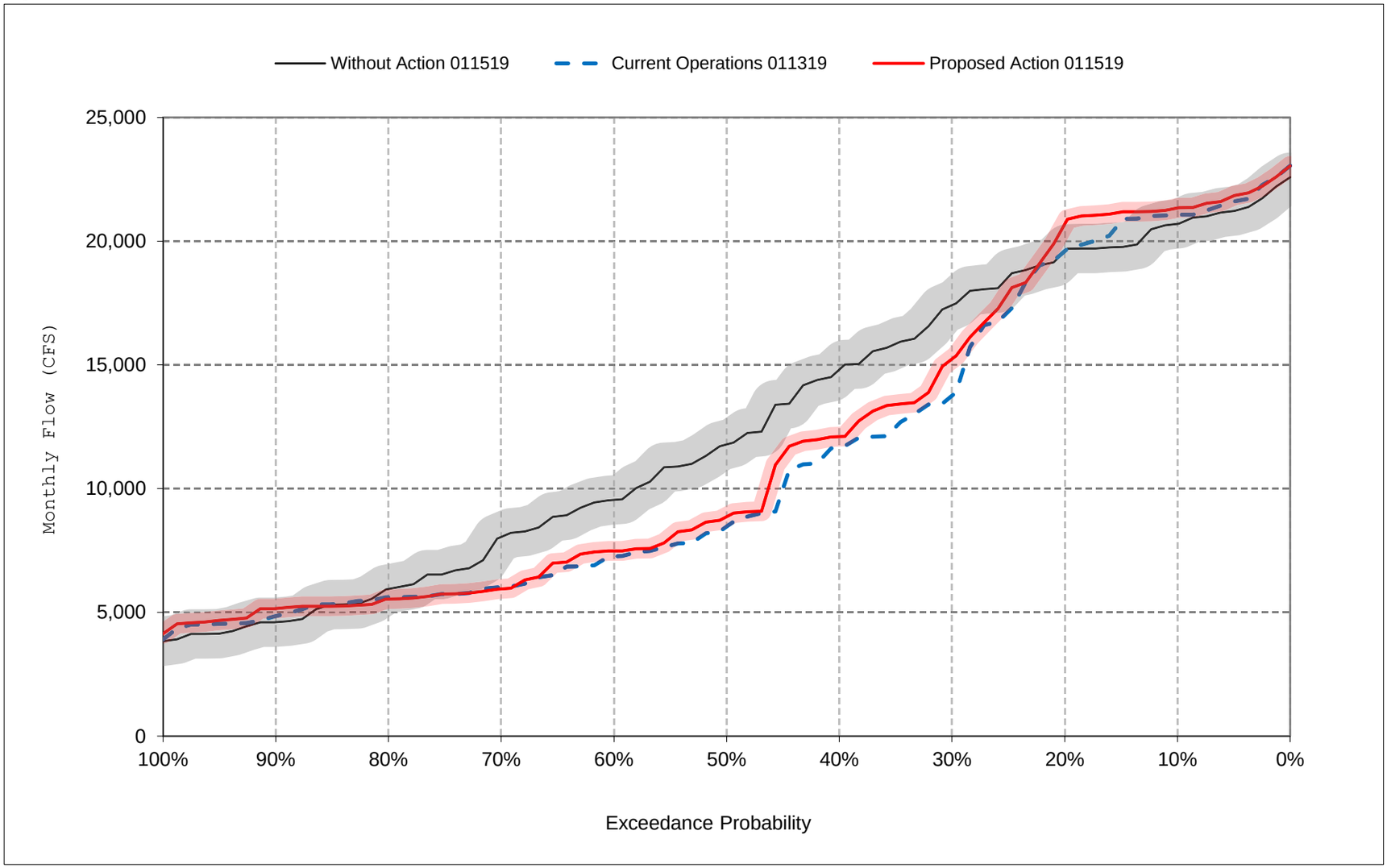
Figure 19-8. Sacramento River at Wilkins Slough Flow, November



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

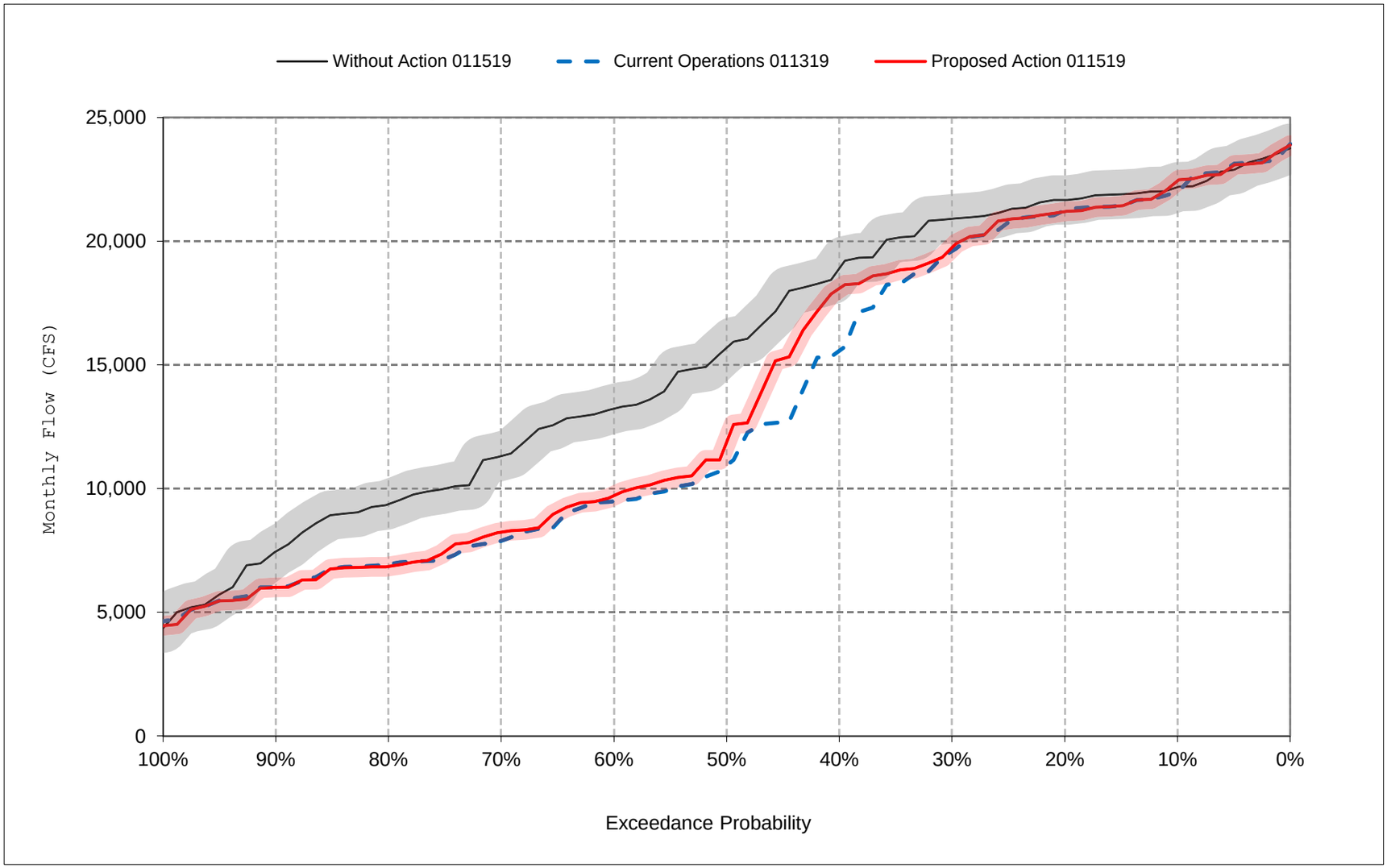
Figure 19-9. Sacramento River at Wilkins Slough Flow, December



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

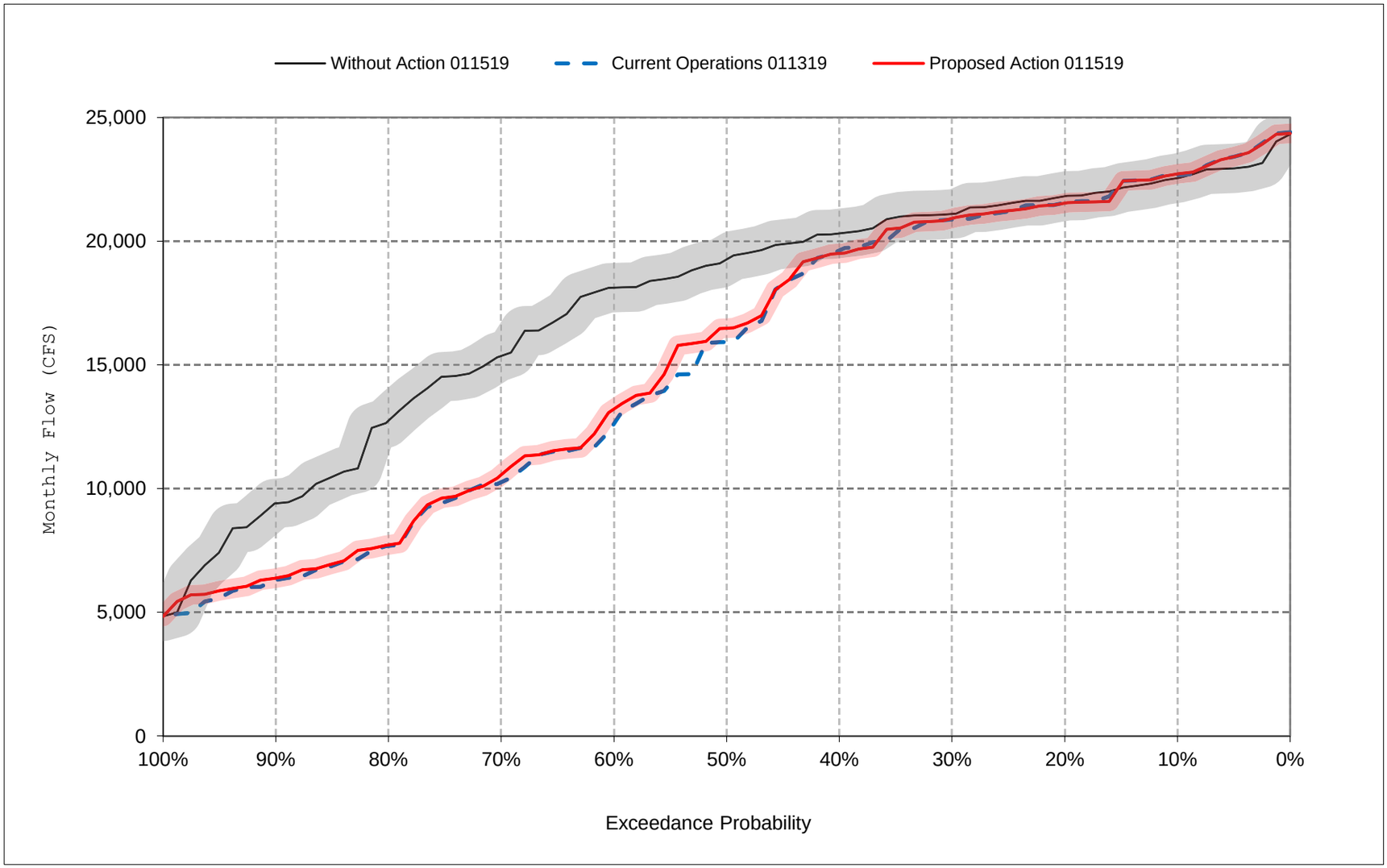
Figure 19-10. Sacramento River at Wilkins Slough Flow, January



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

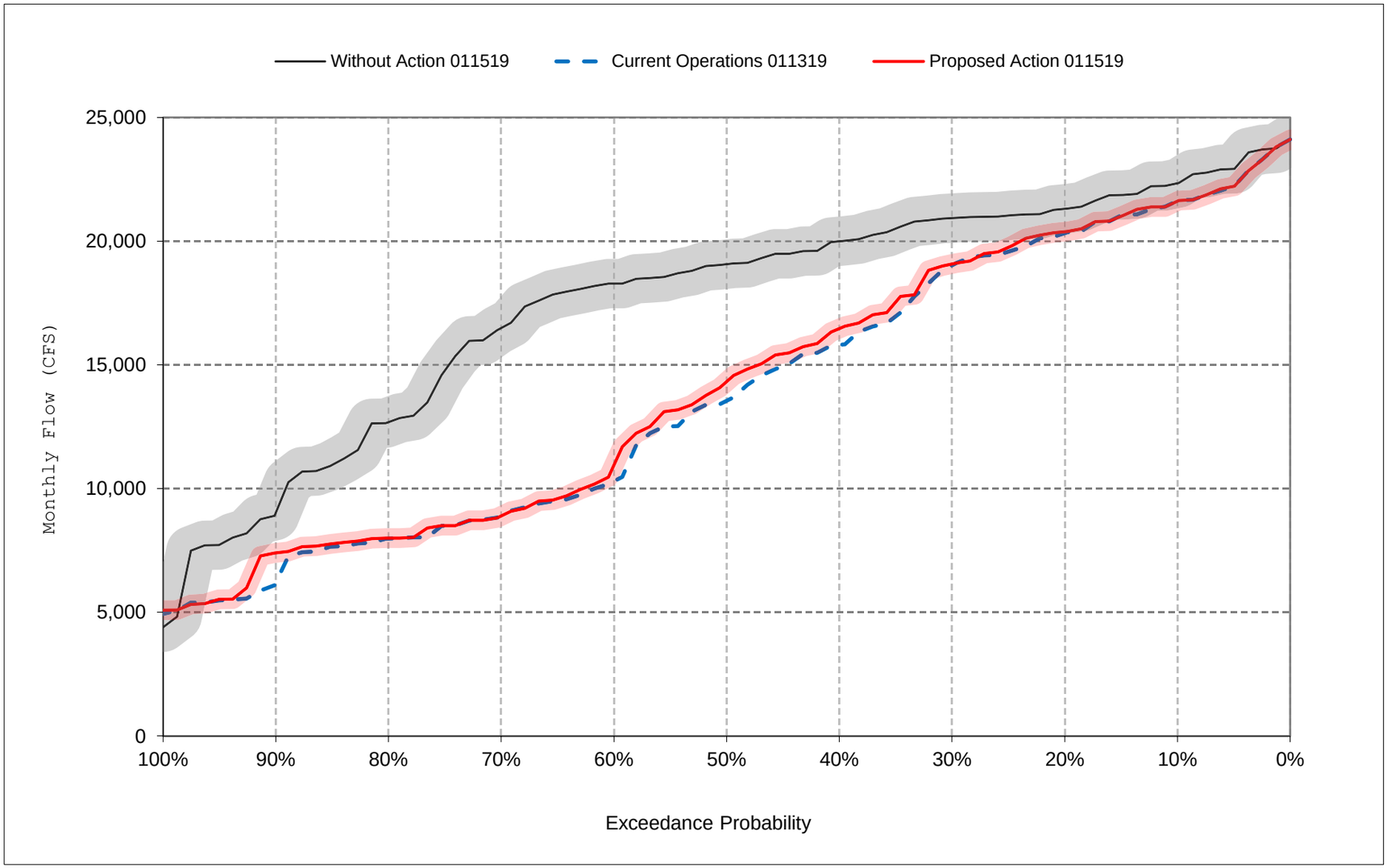
Figure 19-11. Sacramento River at Wilkins Slough Flow, February



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

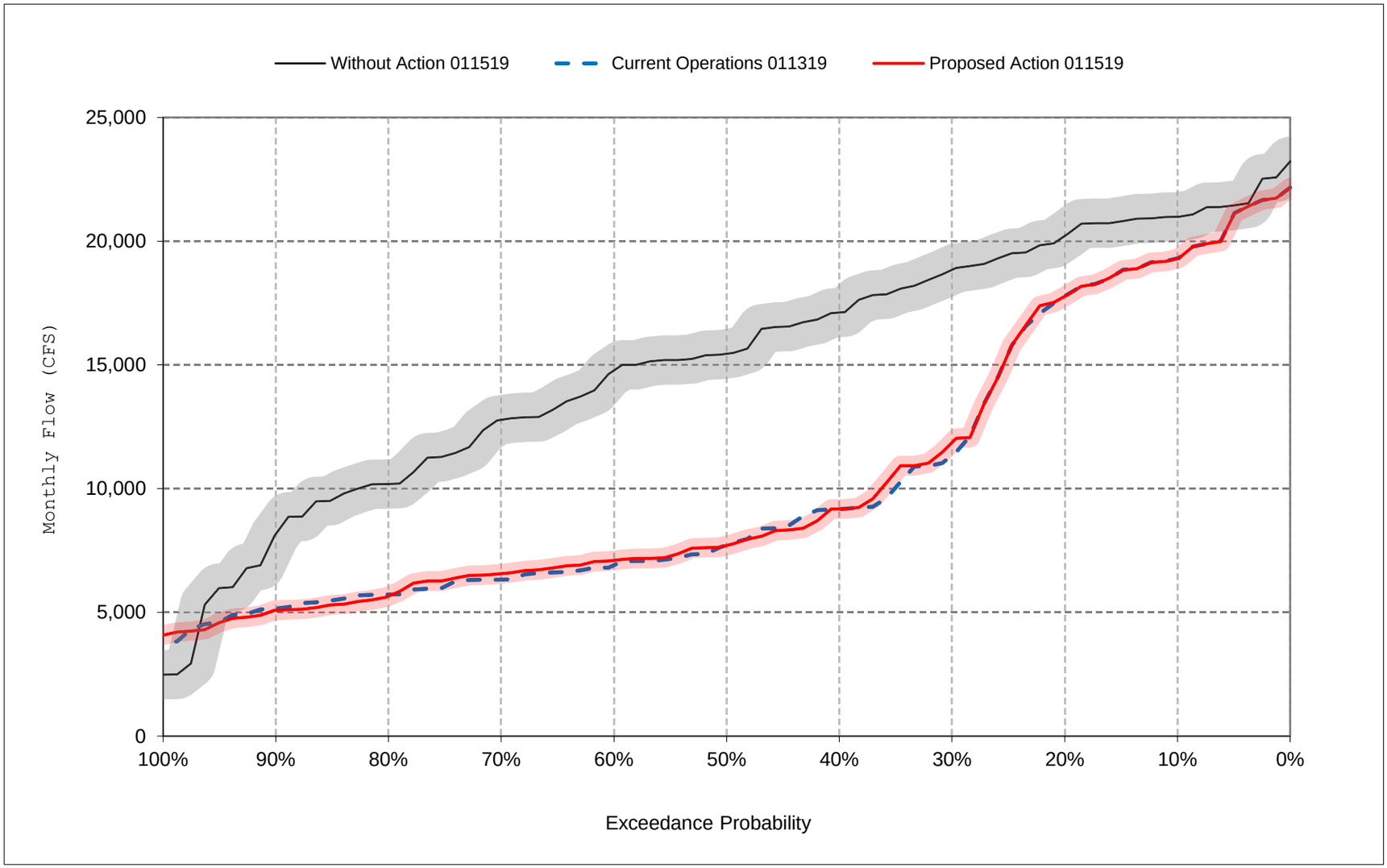
Figure 19-12. Sacramento River at Wilkins Slough Flow, March



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

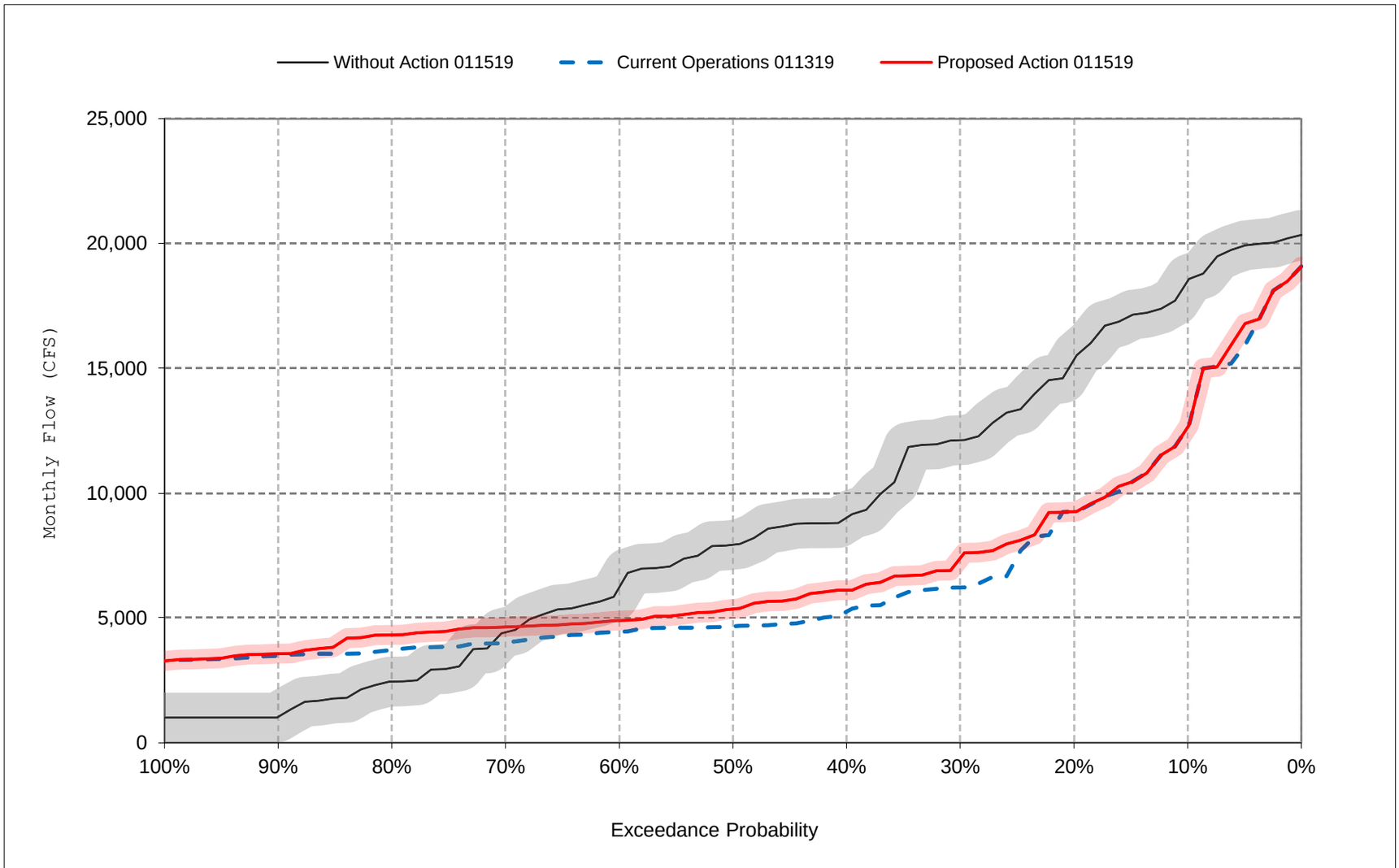
Figure 19-13. Sacramento River at Wilkins Slough Flow, April



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

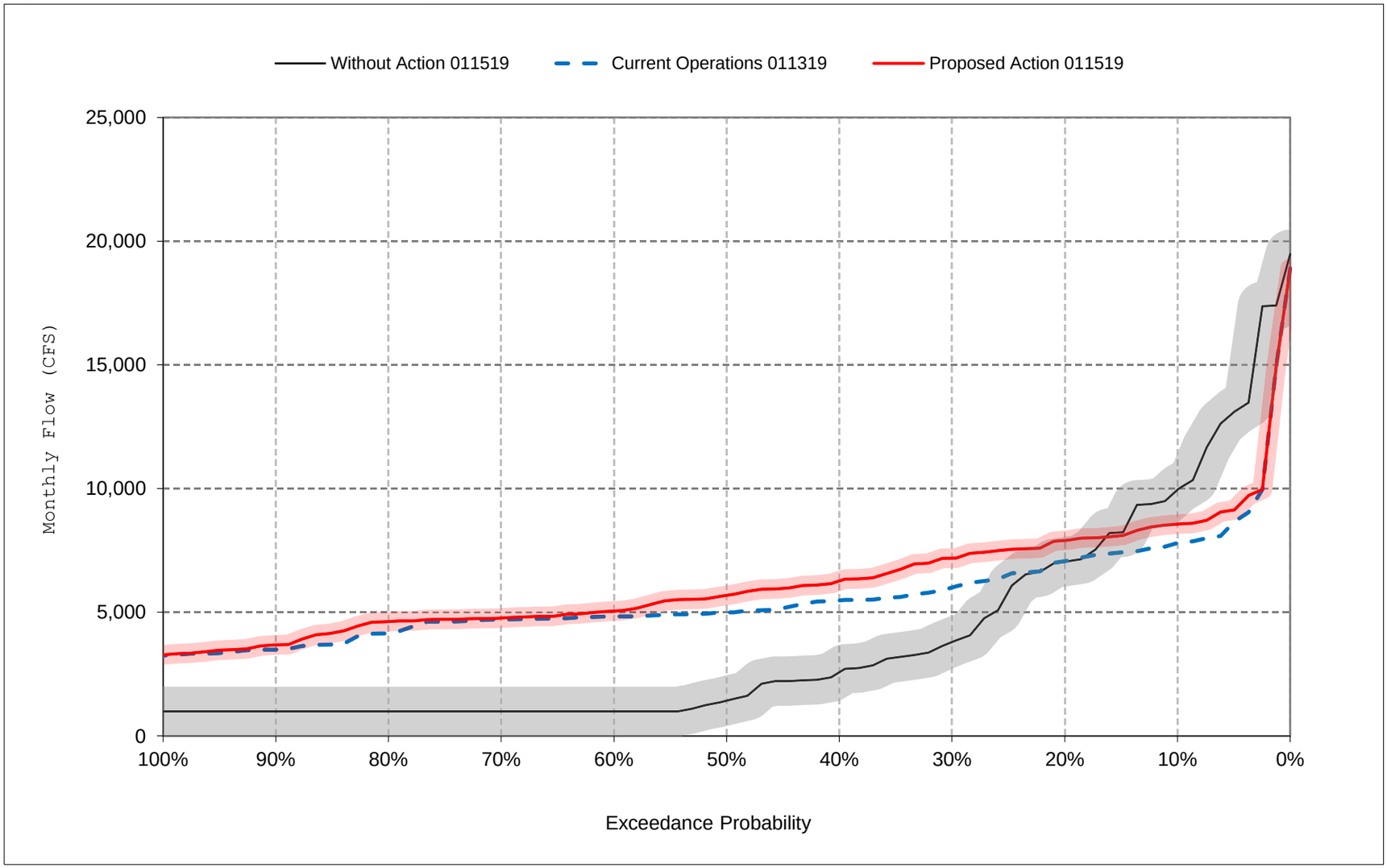
Figure 19-14. Sacramento River at Wilkins Slough Flow, May



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

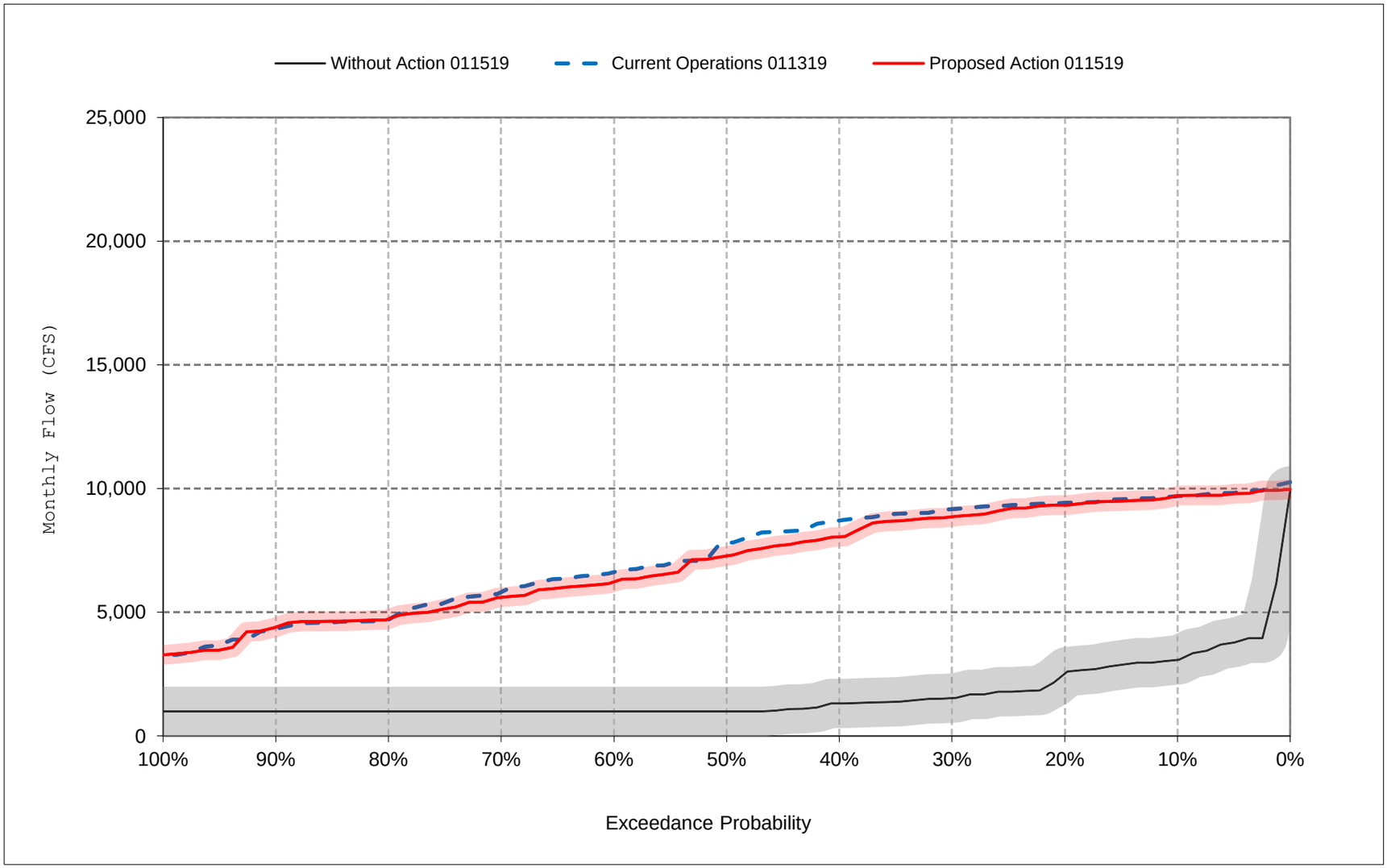
Figure 19-15. Sacramento River at Wilkins Slough Flow, June



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

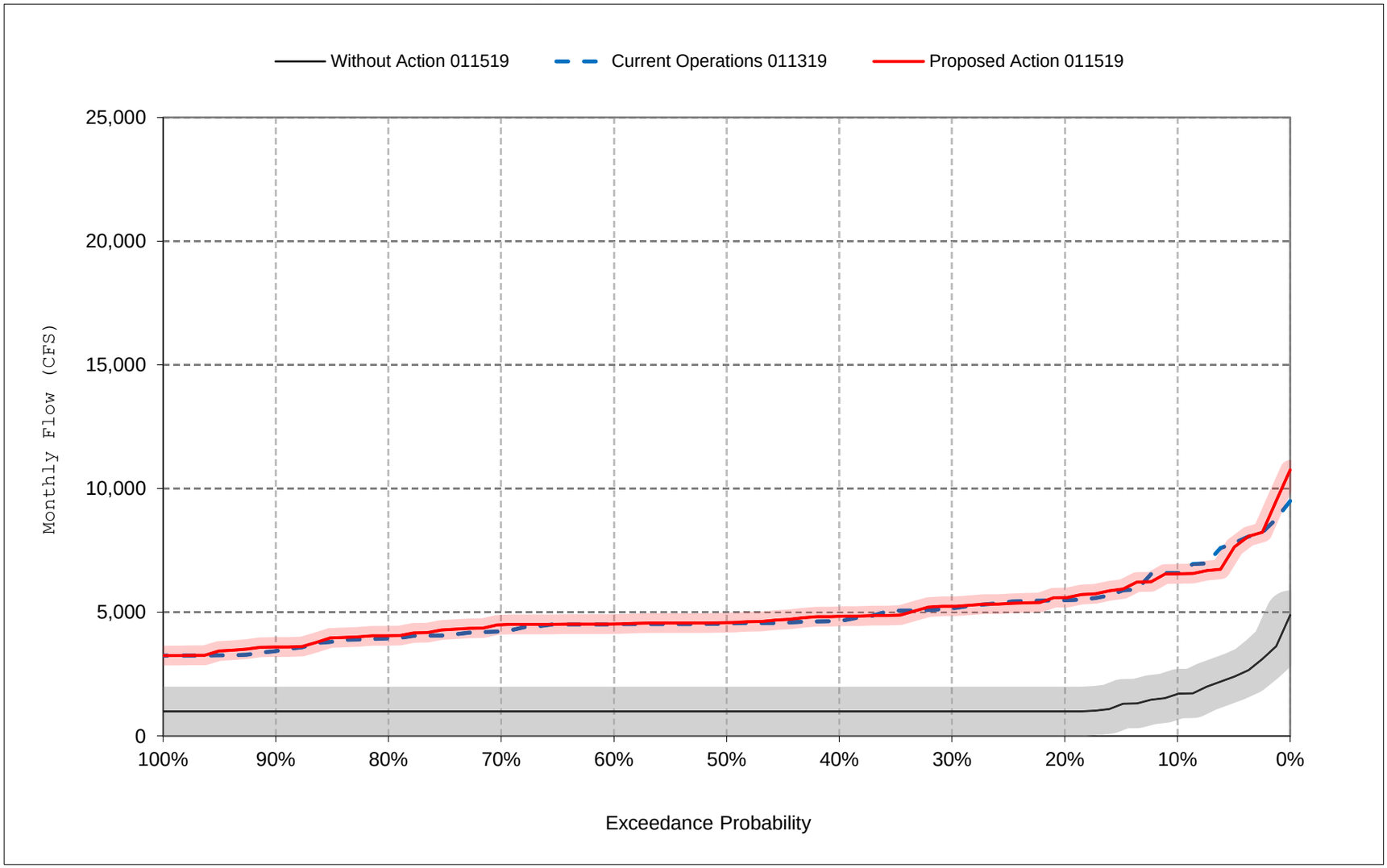
Figure 19-16. Sacramento River at Wilkins Slough Flow, July



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

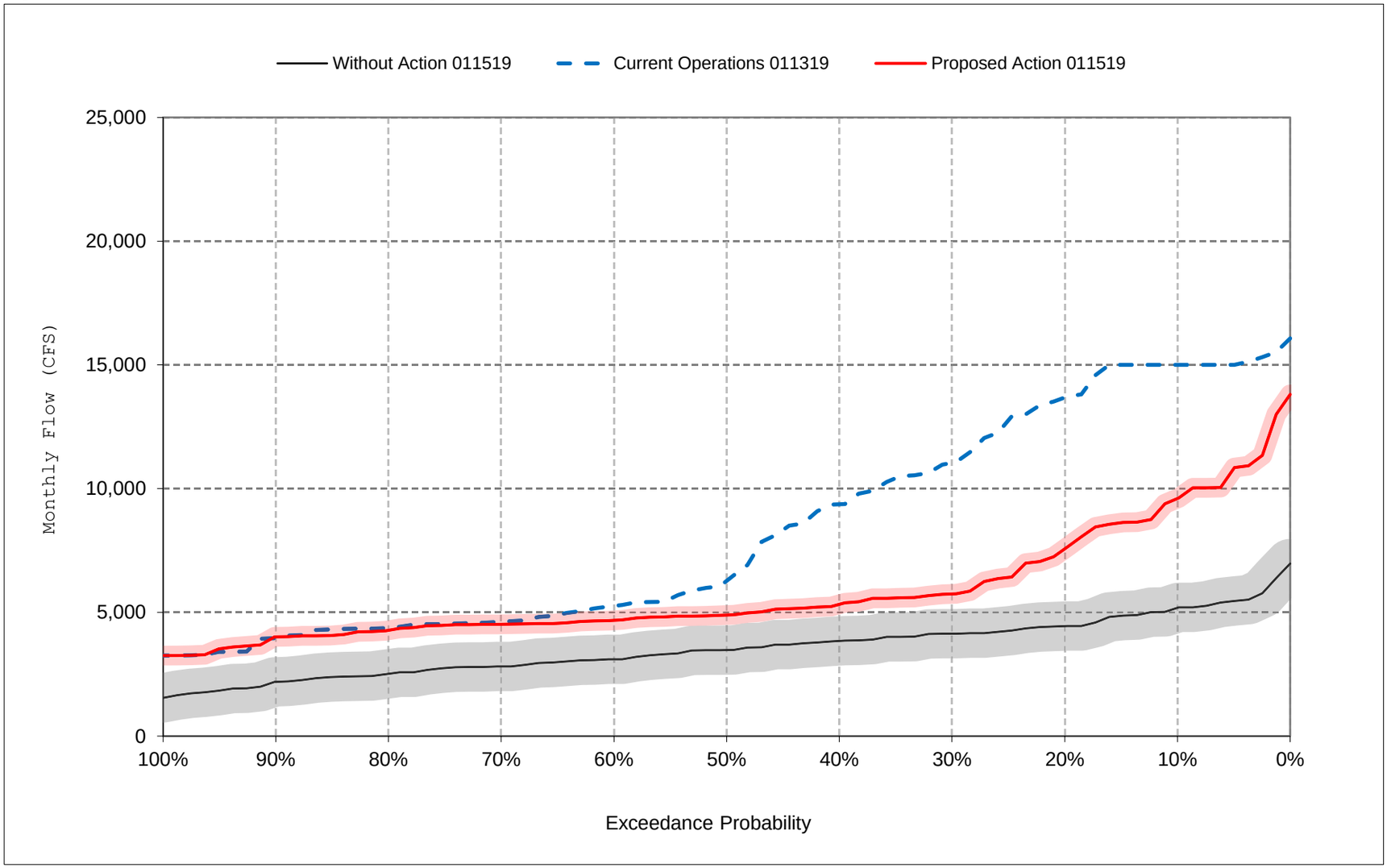
Figure 19-17. Sacramento River at Wilkins Slough Flow, August



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Figure 19-18. Sacramento River at Wilkins Slough Flow, September



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Table 21-1. Feather River Flow downstream of Thermalito, Monthly Flow

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	3,584	3,568	4,233	11,907	19,871	22,381	17,580	12,270	10,530	4,196	2,159	2,402
20%	3,478	3,200	3,420	8,124	12,694	15,889	9,976	9,425	6,345	4,152	2,055	2,269
30%	2,844	2,685	3,213	4,702	8,570	11,752	8,360	6,864	3,125	3,360	2,003	2,154
40%	2,325	2,417	2,797	4,054	6,149	8,892	6,109	5,719	2,343	2,806	1,955	1,817
50%	1,903	1,897	2,491	3,327	4,228	7,374	5,460	4,461	1,757	2,348	1,857	1,464
60%	1,679	1,663	2,261	3,084	4,048	6,652	4,951	3,578	1,489	1,763	1,776	1,251
70%	1,373	1,408	1,695	2,699	3,639	4,230	3,415	2,377	1,400	1,548	1,736	1,099
80%	1,266	1,319	1,375	1,794	2,876	3,819	2,953	1,933	1,283	1,427	1,480	1,012
90%	1,102	1,175	1,174	1,413	2,275	3,015	1,710	1,542	1,183	1,282	1,054	894
Long Term												
Full Simulation Period[a]	2,219	2,215	2,995	6,032	8,707	10,181	8,014	6,230	4,154	2,566	1,752	1,601
Water Year Types[b,c]												
Wet (32%)	3,386	3,250	3,774	11,705	17,024	16,681	13,362	10,775	8,849	2,344	1,913	2,231
Above Normal (16%)	2,240	2,068	3,354	5,702	9,631	13,291	11,011	6,541	2,127	2,877	1,998	1,868
Below Normal (13%)	1,717	1,986	2,194	3,216	4,452	7,957	4,263	3,945	2,599	2,768	1,757	1,342
Dry (24%)	1,578	1,621	3,053	2,860	3,371	5,235	4,796	3,843	1,741	2,840	1,429	1,081
Critical (15%)	1,196	1,334	1,554	1,965	2,478	3,009	1,981	2,120	1,625	2,071	1,675	1,050

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	4,000	2,500	5,018	13,760	17,606	14,415	8,407	8,325	5,575	9,607	7,960	9,472
20%	4,000	2,500	3,321	2,011	11,135	8,902	3,686	5,400	4,238	9,053	7,531	8,992
30%	4,000	2,426	2,087	1,700	4,284	6,734	2,554	3,081	3,871	8,782	7,277	7,869
40%	3,034	1,826	1,700	1,700	1,700	4,737	1,605	2,427	3,235	8,422	6,212	7,419
50%	1,762	1,700	1,700	1,700	1,700	1,700	1,153	1,996	2,947	8,000	4,705	3,893
60%	1,700	1,700	1,700	1,700	1,700	1,700	1,000	1,420	2,667	7,392	2,848	1,736
70%	1,700	1,200	1,700	1,200	1,700	1,700	1,000	1,000	2,450	4,752	2,261	1,203
80%	1,200	1,200	1,200	960	1,200	1,000	1,000	1,000	2,189	3,844	1,900	1,007
90%	900	900	900	900	900	800	758	1,000	1,716	3,226	1,410	1,000
Long Term												
Full Simulation Period[a]	2,473	1,970	2,802	4,459	5,438	6,099	3,050	3,479	3,340	6,888	4,625	4,841
Water Year Types[b,c]												
Wet (32%)	3,811	3,024	4,380	10,636	12,626	13,568	6,591	6,937	3,748	7,115	5,721	8,774
Above Normal (16%)	3,362	2,151	2,430	2,389	4,133	6,286	2,129	2,013	2,140	8,734	7,622	7,550
Below Normal (13%)	1,589	1,564	1,575	1,595	1,589	1,907	1,279	1,880	2,604	8,687	5,874	2,506
Dry (24%)	1,388	1,310	2,388	1,360	1,505	1,299	1,139	1,816	4,103	6,399	1,899	1,305
Critical (15%)	1,234	965	1,600	1,108	1,360	1,554	1,184	1,814	3,162	3,566	2,402	1,420

Current Operations 011319 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	416	**-1,068**	785	1,853	**-2,265**	**-7,966**	**-9,173**	**-3,945**	**-4,956**	5,411	5,801	7,070
20%	522	**-700**	**-99**	**-6,113**	**-1,559**	**-6,987**	**-6,289**	**-4,025**	**-2,107**	4,901	5,476	6,724
30%	1,156	**-259**	**-1,127**	**-3,002**	**-4,286**	**-5,018**	**-5,807**	**-3,783**	746	5,421	5,273	5,714
40%	708	**-591**	**-1,097**	**-2,354**	**-4,449**	**-4,155**	**-4,504**	**-3,293**	892	5,616	4,257	5,602
50%	**-142**	**-197**	**-791**	**-1,627**	**-2,528**	**-5,674**	**-4,307**	**-2,465**	1,190	5,653	2,848	2,429
60%	21	37	**-561**	**-1,384**	**-2,348**	**-4,952**	**-3,951**	**-2,158**	1,179	5,630	1,072	486
70%	327	**-208**	5	**-1,499**	**-1,939**	**-2,530**	**-2,415**	**-1,377**	1,049	3,205	526	104
80%	**-66**	**-119**	**-175**	**-834**	**-1,676**	**-2,819**	**-1,953**	**-933**	907	2,418	421	**-5**
90%	**-202**	**-275**	**-274**	**-513**	**-1,375**	**-2,215**	**-952**	**-542**	533	1,944	356	106
Long Term												
Full Simulation Period[a]	254	**-245**	**-192**	**-1,573**	**-3,269**	**-4,082**	**-4,964**	**-2,751**	**-814**	4,322	2,872	3,240
Water Year Types[b,c]												
Wet (32%)	424	**-226**	607	**-1,069**	**-4,398**	**-3,113**	**-6,771**	**-3,838**	**-5,101**	4,771	3,808	6,543
Above Normal (16%)	1,122	83	**-924**	**-3,312**	**-5,498**	**-7,006**	**-8,882**	**-4,528**	13	5,857	5,624	5,683
Below Normal (13%)	**-128**	**-422**	**-619**	**-1,621**	**-2,863**	**-6,050**	**-2,985**	**-2,065**	5	5,919	4,116	1,163
Dry (24%)	**-190**	**-311**	**-665**	**-1,500**	**-1,865**	**-3,936**	**-3,658**	**-2,027**	2,361	3,558	470	224
Critical (15%)	38	**-368**	46	**-857**	**-1,118**	**-1,455**	**-797**	**-306**	1,537	1,495	727	370

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 21-2. Feather River Flow downstream of Thermalito, Monthly Flow

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	3,584	3,568	4,233	11,907	19,871	22,381	17,580	12,270	10,530	4,196	2,159	2,402
20%	3,478	3,200	3,420	8,124	12,694	15,889	9,976	9,425	6,345	4,152	2,055	2,269
30%	2,844	2,685	3,213	4,702	8,570	11,752	8,360	6,864	3,125	3,360	2,003	2,154
40%	2,325	2,417	2,797	4,054	6,149	8,892	6,109	5,719	2,343	2,806	1,955	1,817
50%	1,903	1,897	2,491	3,327	4,228	7,374	5,460	4,461	1,757	2,348	1,857	1,464
60%	1,679	1,663	2,261	3,084	4,048	6,652	4,951	3,578	1,489	1,763	1,776	1,251
70%	1,373	1,408	1,695	2,699	3,639	4,230	3,415	2,377	1,400	1,548	1,736	1,099
80%	1,266	1,319	1,375	1,794	2,876	3,819	2,953	1,933	1,283	1,427	1,480	1,012
90%	1,102	1,175	1,174	1,413	2,275	3,015	1,710	1,542	1,183	1,282	1,054	894
Long Term												
Full Simulation Period[a]	2,219	2,215	2,995	6,032	8,707	10,181	8,014	6,230	4,154	2,566	1,752	1,601
Water Year Types[b,c]												
Wet (32%)	3,386	3,250	3,774	11,705	17,024	16,681	13,362	10,775	8,849	2,344	1,913	2,231
Above Normal (16%)	2,240	2,068	3,354	5,702	9,631	13,291	11,011	6,541	2,127	2,877	1,998	1,868
Below Normal (13%)	1,717	1,986	2,194	3,216	4,452	7,957	4,263	3,945	2,599	2,768	1,757	1,342
Dry (24%)	1,578	1,621	3,053	2,860	3,371	5,235	4,796	3,843	1,741	2,840	1,429	1,081
Critical (15%)	1,196	1,334	1,554	1,965	2,478	3,009	1,981	2,120	1,625	2,071	1,675	1,050

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	4,000	2,500	5,380	13,768	18,491	14,399	8,408	8,271	6,433	9,812	7,864	5,604
20%	3,963	2,469	3,501	2,739	11,947	10,484	3,603	5,387	5,100	9,307	7,588	4,860
30%	3,350	1,700	2,492	1,700	6,891	7,392	2,577	3,566	4,645	9,002	7,153	3,787
40%	2,035	1,700	1,700	1,700	1,807	5,124	1,633	3,176	4,239	8,702	6,560	2,195
50%	1,748	1,700	1,700	1,700	1,700	2,483	1,187	2,489	3,886	8,075	4,652	1,349
60%	1,700	1,700	1,700	1,700	1,700	1,700	1,000	1,917	3,420	7,255	2,835	1,198
70%	1,700	1,200	1,700	1,200	1,700	1,700	1,000	1,143	2,980	4,356	2,253	1,059
80%	1,200	1,200	1,200	960	1,200	1,000	1,000	1,000	2,559	3,673	1,888	1,000
90%	900	900	900	900	900	800	758	1,000	2,145	3,212	1,578	1,000
Long Term												
Full Simulation Period[a]	2,275	1,888	3,169	4,765	5,948	6,399	3,063	3,745	3,974	6,925	4,671	2,569
Water Year Types[b,c]												
Wet (32%)	3,116	2,832	5,556	11,597	13,163	13,954	6,587	7,086	4,039	7,190	5,539	2,614
Above Normal (16%)	3,404	2,024	2,406	2,389	4,833	7,250	2,205	2,265	2,649	9,083	7,563	5,401
Below Normal (13%)	1,593	1,564	1,564	1,607	3,317	2,064	1,278	2,387	3,520	9,244	6,623	2,470
Dry (24%)	1,402	1,310	2,397	1,360	1,505	1,309	1,126	2,179	5,129	5,966	2,004	1,444
Critical (15%)	1,307	959	1,583	1,108	1,341	1,563	1,221	1,959	3,759	3,483	2,317	1,367

Proposed Action 011519 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	416	**-1,068**	1,147	1,861	**-1,380**	**-7,982**	**-9,172**	**-3,999**	**-4,098**	5,616	5,706	3,202
20%	485	**-731**	81	**-5,385**	**-746**	**-5,405**	**-6,372**	**-4,038**	**-1,245**	5,155	5,533	2,591
30%	506	**-985**	**-722**	**-3,002**	**-1,680**	**-4,361**	**-5,783**	**-3,298**	1,520	5,641	5,150	1,633
40%	**-291**	**-717**	**-1,097**	**-2,354**	**-4,342**	**-3,768**	**-4,476**	**-2,543**	1,896	5,897	4,604	378
50%	**-155**	**-197**	**-791**	**-1,627**	**-2,528**	**-4,892**	**-4,273**	**-1,971**	2,130	5,727	2,795	**-115**
60%	21	37	**-561**	**-1,384**	**-2,348**	**-4,952**	**-3,951**	**-1,661**	1,932	5,492	1,059	**-52**
70%	327	**-208**	5	**-1,499**	**-1,939**	**-2,530**	**-2,415**	**-1,234**	1,580	2,808	518	**-41**
80%	**-66**	**-119**	**-175**	**-834**	**-1,676**	**-2,819**	**-1,953**	**-933**	1,277	2,247	409	**-12**
90%	**-202**	**-275**	**-274**	**-513**	**-1,375**	**-2,215**	**-952**	**-542**	962	1,931	524	106
Long Term												
Full Simulation Period[a]	56	**-327**	175	**-1,267**	**-2,759**	**-3,782**	**-4,951**	**-2,486**	**-180**	4,358	2,919	968
Water Year Types[b,c]												
Wet (32%)	**-270**	**-419**	1,782	**-109**	**-3,861**	**-2,727**	**-6,775**	**-3,688**	**-4,810**	4,846	3,626	384
Above Normal (16%)	1,165	**-44**	**-948**	**-3,313**	**-4,798**	**-6,041**	**-8,806**	**-4,276**	523	6,206	5,565	3,533
Below Normal (13%)	**-124**	**-422**	**-629**	**-1,609**	**-1,135**	**-5,893**	**-2,986**	**-1,558**	920	6,477	4,866	1,127
Dry (24%)	**-176**	**-311**	**-656**	**-1,500**	**-1,865**	**-3,926**	**-3,670**	**-1,664**	3,388	3,125	575	363
Critical (15%)	112	**-375**	29	**-857**	**-1,138**	**-1,446**	**-760**	**-160**	2,134	1,412	642	317

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 21-3. Feather River Flow downstream of Thermalito, Monthly Flow

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	4,000	2,500	5,018	13,760	17,606	14,415	8,407	8,325	5,575	9,607	7,960	9,472
20%	4,000	2,500	3,321	2,011	11,135	8,902	3,686	5,400	4,238	9,053	7,531	8,992
30%	4,000	2,426	2,087	1,700	4,284	6,734	2,554	3,081	3,871	8,782	7,277	7,869
40%	3,034	1,826	1,700	1,700	1,700	4,737	1,605	2,427	3,235	8,422	6,212	7,419
50%	1,762	1,700	1,700	1,700	1,700	1,700	1,153	1,996	2,947	8,000	4,705	3,893
60%	1,700	1,700	1,700	1,700	1,700	1,700	1,000	1,420	2,667	7,392	2,848	1,736
70%	1,700	1,200	1,700	1,200	1,700	1,700	1,000	1,000	2,450	4,752	2,261	1,203
80%	1,200	1,200	1,200	960	1,200	1,000	1,000	1,000	2,189	3,844	1,900	1,007
90%	900	900	900	900	900	800	758	1,000	1,716	3,226	1,410	1,000
Long Term												
Full Simulation Period[a]	2,473	1,970	2,802	4,459	5,438	6,099	3,050	3,479	3,340	6,888	4,625	4,841
Water Year Types[b,c]												
Wet (32%)	3,811	3,024	4,380	10,636	12,626	13,568	6,591	6,937	3,748	7,115	5,721	8,774
Above Normal (16%)	3,362	2,151	2,430	2,389	4,133	6,286	2,129	2,013	2,140	8,734	7,622	7,550
Below Normal (13%)	1,589	1,564	1,575	1,595	1,589	1,907	1,279	1,880	2,604	8,687	5,874	2,506
Dry (24%)	1,388	1,310	2,388	1,360	1,505	1,299	1,139	1,816	4,103	6,399	1,899	1,305
Critical (15%)	1,234	965	1,600	1,108	1,360	1,554	1,184	1,814	3,162	3,566	2,402	1,420

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	4,000	2,500	5,380	13,768	18,491	14,399	8,408	8,271	6,433	9,812	7,864	5,604
20%	3,963	2,469	3,501	2,739	11,947	10,484	3,603	5,387	5,100	9,307	7,588	4,860
30%	3,350	1,700	2,492	1,700	6,891	7,392	2,577	3,566	4,645	9,002	7,153	3,787
40%	2,035	1,700	1,700	1,700	1,807	5,124	1,633	3,176	4,239	8,702	6,560	2,195
50%	1,748	1,700	1,700	1,700	1,700	2,483	1,187	2,489	3,886	8,075	4,652	1,349
60%	1,700	1,700	1,700	1,700	1,700	1,700	1,000	1,917	3,420	7,255	2,835	1,198
70%	1,700	1,200	1,700	1,200	1,700	1,700	1,000	1,143	2,980	4,356	2,253	1,059
80%	1,200	1,200	1,200	960	1,200	1,000	1,000	1,000	2,559	3,673	1,888	1,000
90%	900	900	900	900	900	800	758	1,000	2,145	3,212	1,578	1,000
Long Term												
Full Simulation Period[a]	2,275	1,888	3,169	4,765	5,948	6,399	3,063	3,745	3,974	6,925	4,671	2,569
Water Year Types[b,c]												
Wet (32%)	3,116	2,832	5,556	11,597	13,163	13,954	6,587	7,086	4,039	7,190	5,539	2,614
Above Normal (16%)	3,404	2,024	2,406	2,389	4,833	7,250	2,205	2,265	2,649	9,083	7,563	5,401
Below Normal (13%)	1,593	1,564	1,564	1,607	3,317	2,064	1,278	2,387	3,520	9,244	6,623	2,470
Dry (24%)	1,402	1,310	2,397	1,360	1,505	1,309	1,126	2,179	5,129	5,966	2,004	1,444
Critical (15%)	1,307	959	1,583	1,108	1,341	1,563	1,221	1,959	3,759	3,483	2,317	1,367

Proposed Action 011519 minus Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	0	362	9	885	**-17**	1	**-53**	858	205	**-96**	**-3,868**
20%	**-37**	**-31**	180	728	812	1,582	**-83**	**-13**	862	255	57	**-4,133**
30%	**-650**	**-726**	405	0	2,606	657	24	484	775	220	**-123**	**-4,082**
40%	**-999**	**-126**	0	0	107	387	28	750	1,004	281	347	**-5,224**
50%	**-13**	0	0	0	0	783	34	493	940	74	**-54**	**-2,544**
60%	0	0	0	0	0	0	0	497	753	**-137**	**-13**	**-538**
70%	0	0	0	0	0	0	0	143	531	**-396**	**-8**	**-145**
80%	0	0	0	0	0	0	0	0	370	**-171**	**-12**	**-7**
90%	0	0	0	0	0	0	**0**	0	429	**-13**	168	0
Long Term												
Full Simulation Period[a]	**-199**	**-82**	367	306	510	300	13	265	634	36	47	**-2,272**
Water Year Types[b,c]												
Wet (32%)	**-694**	**-192**	1,176	961	537	386	**-4**	150	291	75	**-182**	**-6,159**
Above Normal (16%)	43	**-127**	**-24**	**-1**	701	965	76	253	510	349	**-59**	**-2,149**
Below Normal (13%)	4	0	**-10**	12	1,729	157	**-1**	507	916	558	749	**-36**
Dry (24%)	14	0	8	0	**0**	10	**-12**	363	1,027	**-433**	105	139
Critical (15%)	74	**-7**	**-17**	0	**-20**	9	37	145	597	**-83**	**-86**	**-53**

a Based on the 82-year simulation period.

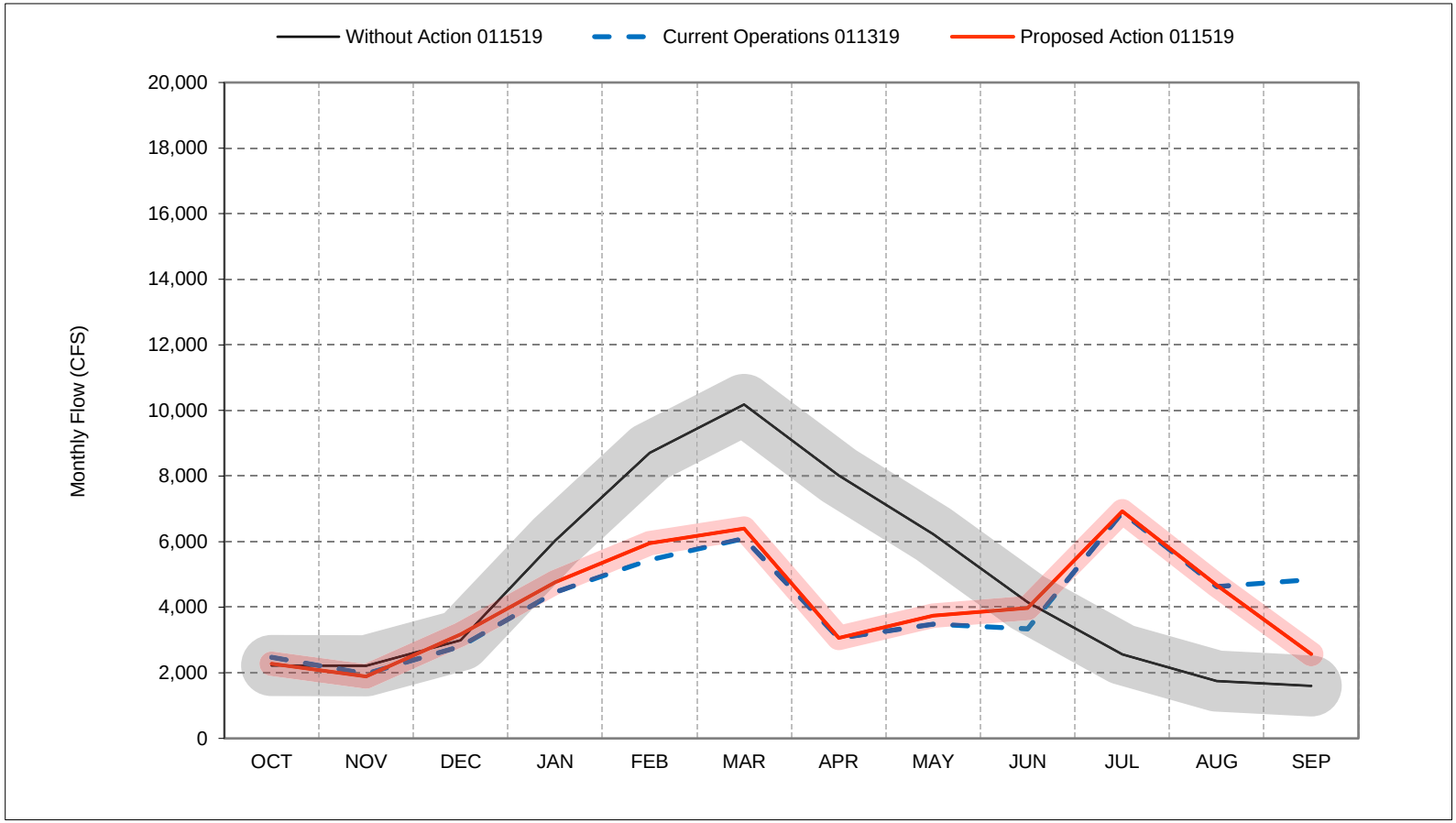
b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

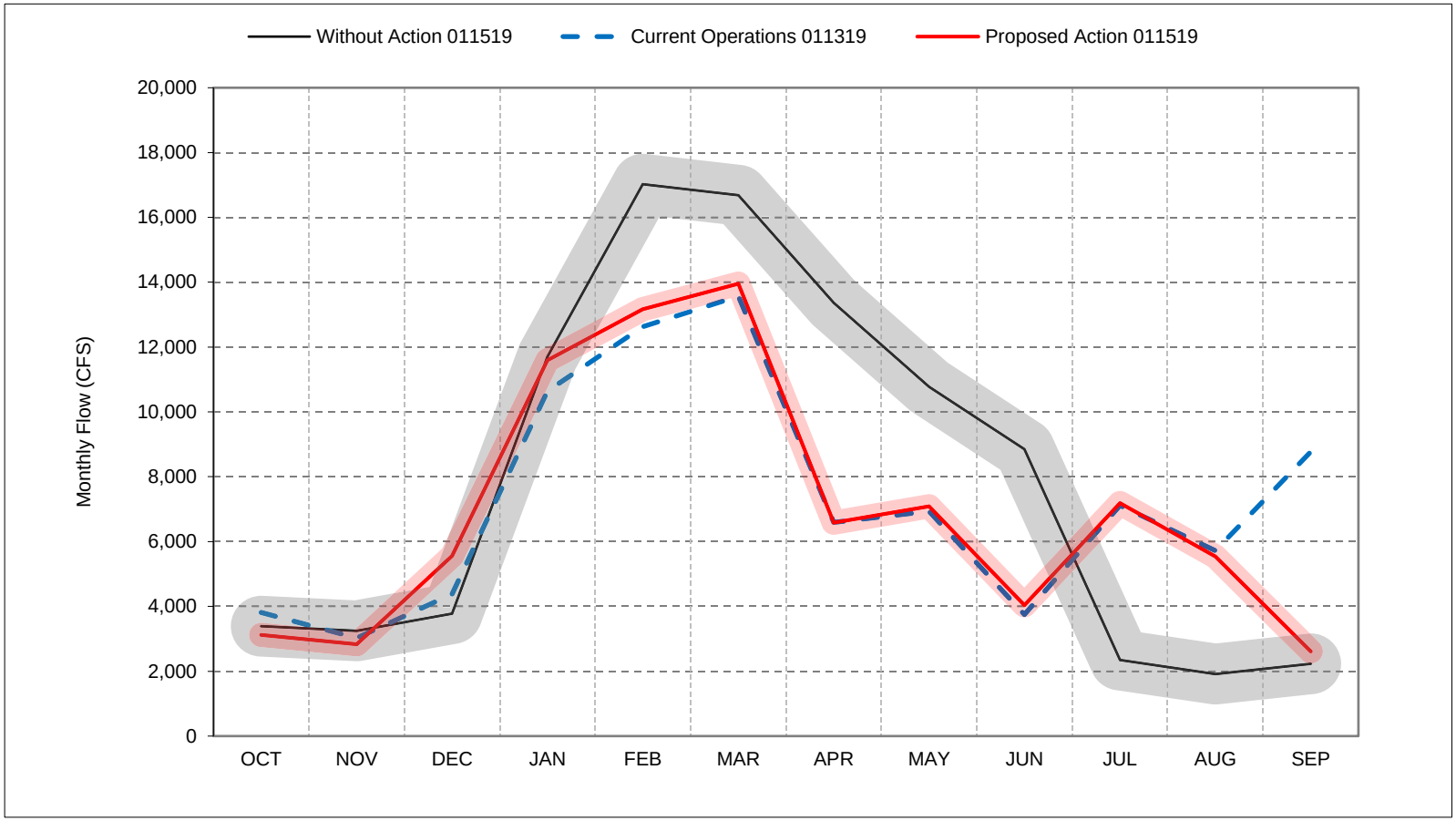
e These are draft results meant for qualitative analysis and are subject to revision.

Figure 21-1. Feather River Flow downstream of Thermalito, Long-Term Average Flow



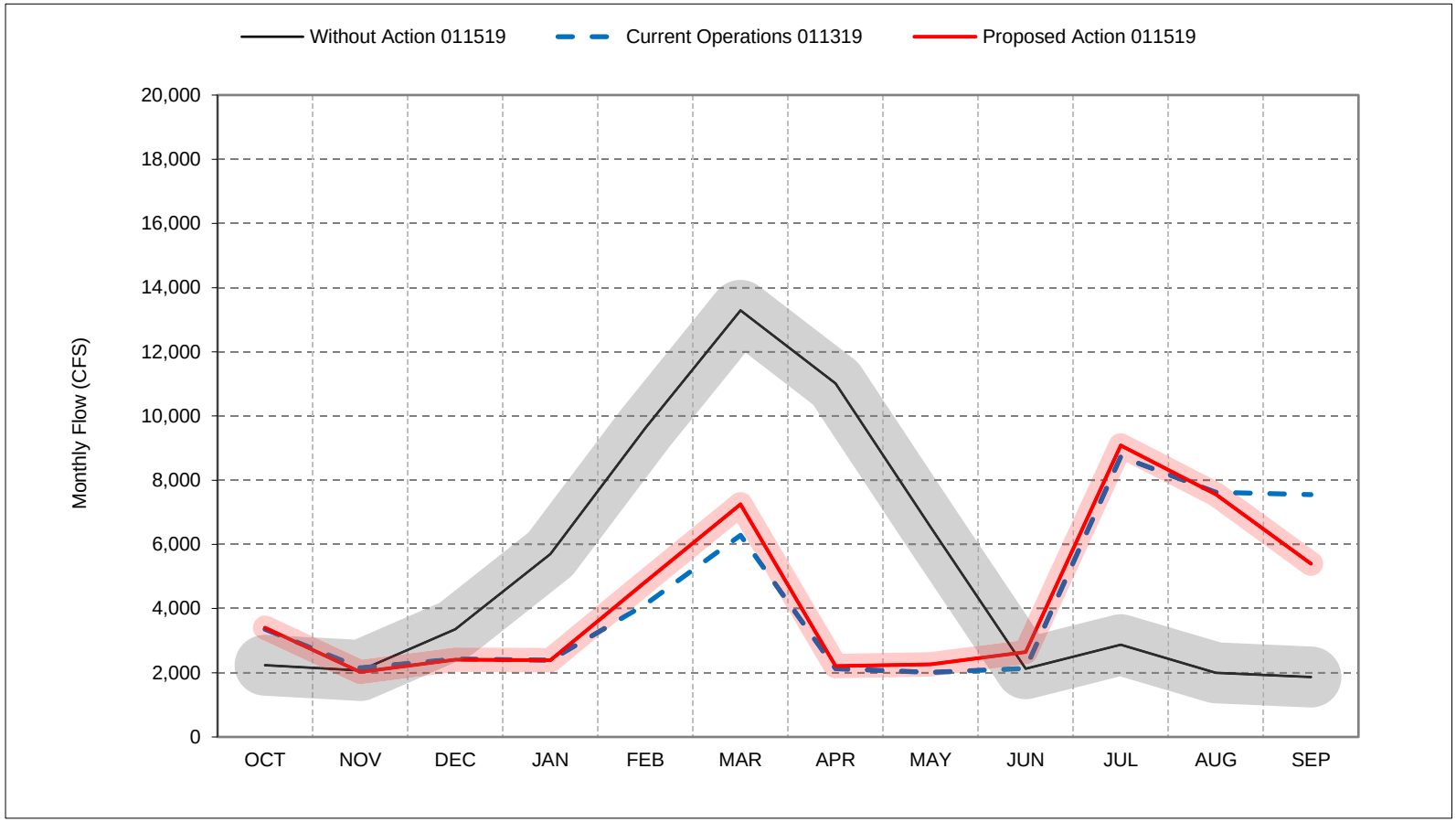
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 21-2. Feather River Flow downstream of Thermalito, Wet Year Average Flow



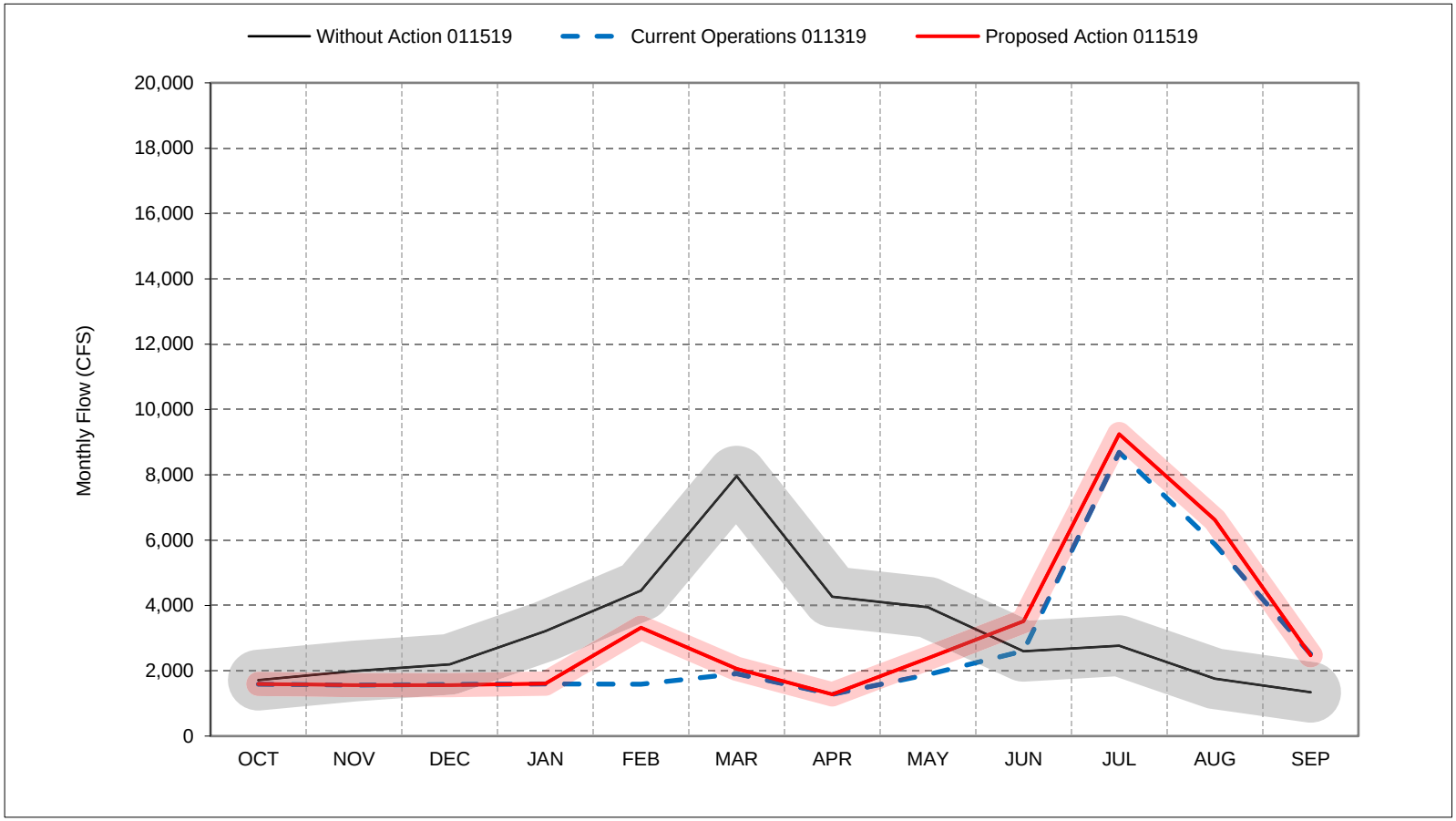
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 21-3. Feather River Flow downstream of Thermalito, Above Normal Year Average Flow



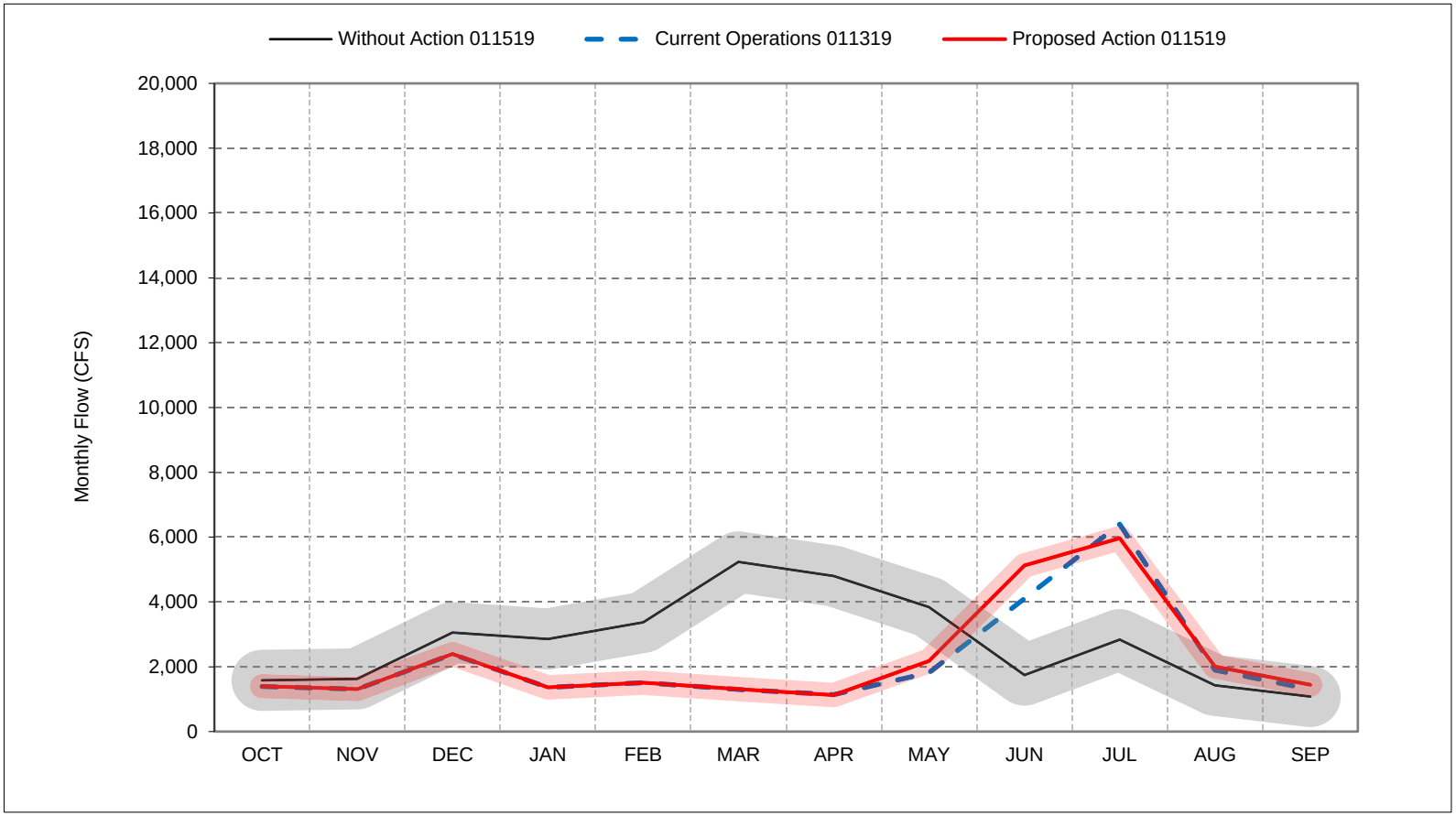
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 21-4. Feather River Flow downstream of Thermalito, Below Normal Year Average Flow



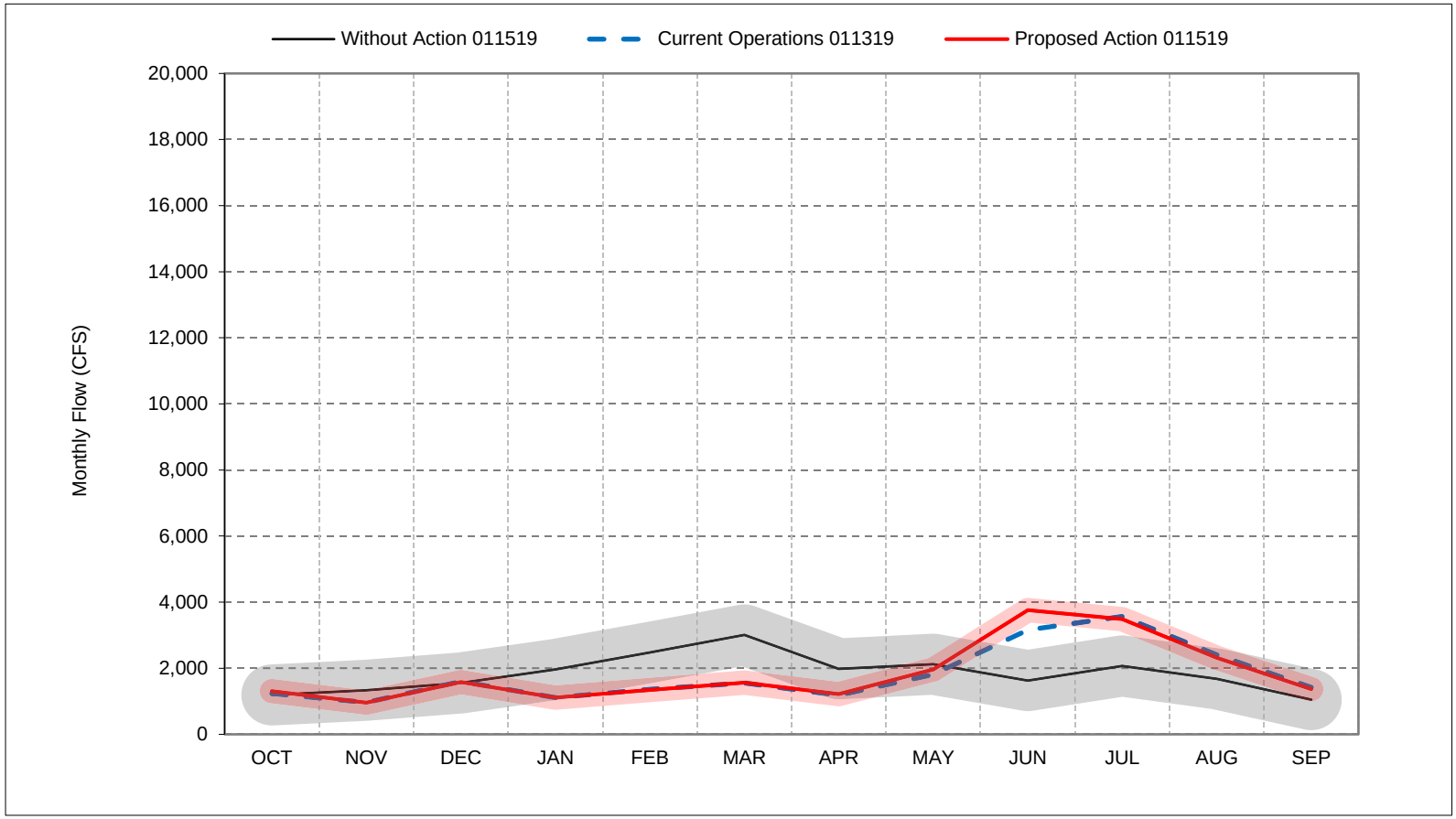
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 21-5. Feather River Flow downstream of Thermalito, Dry Year Average Flow



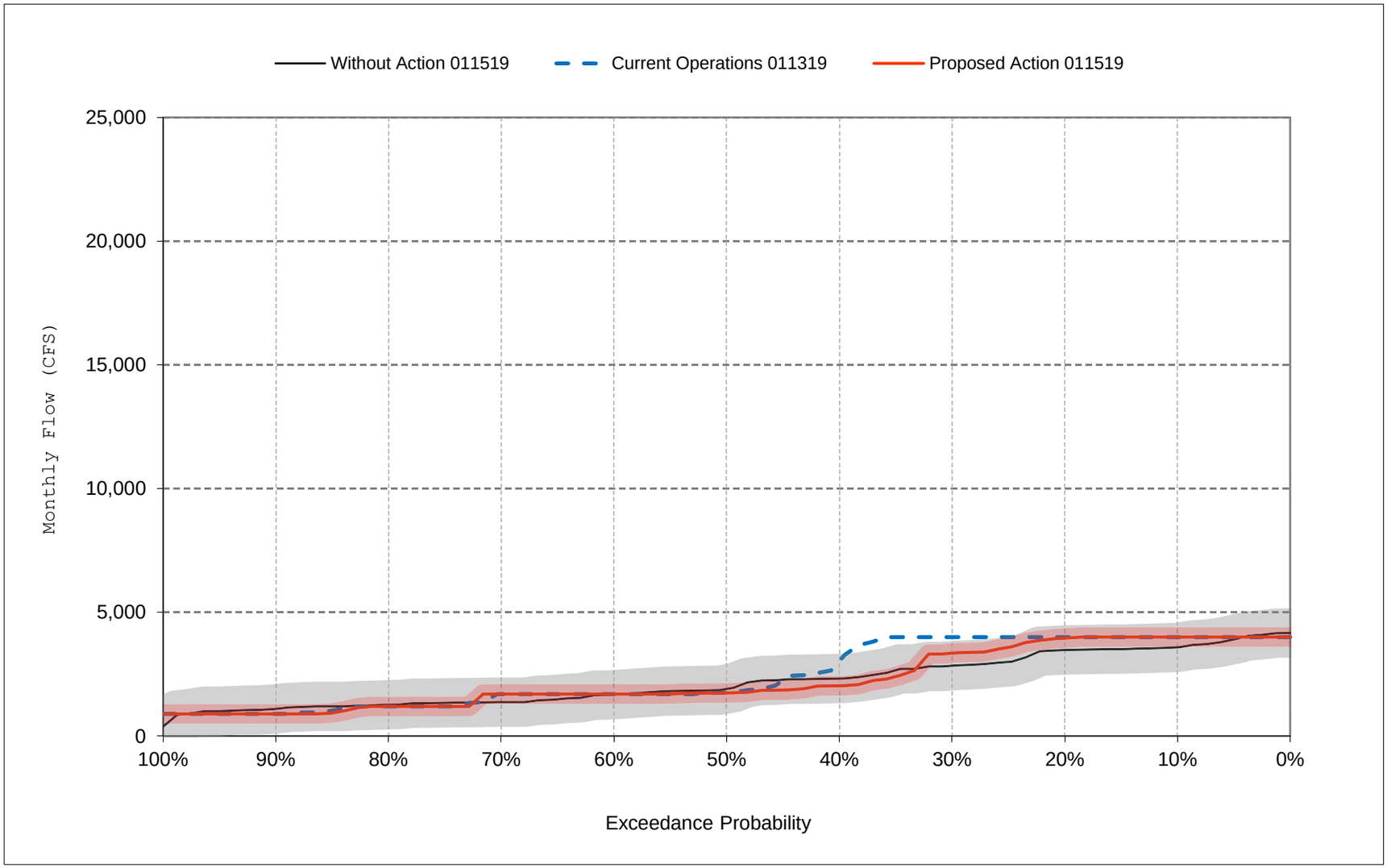
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 21-6. Feather River Flow downstream of Thermalito, Critical Year Average Flow



*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

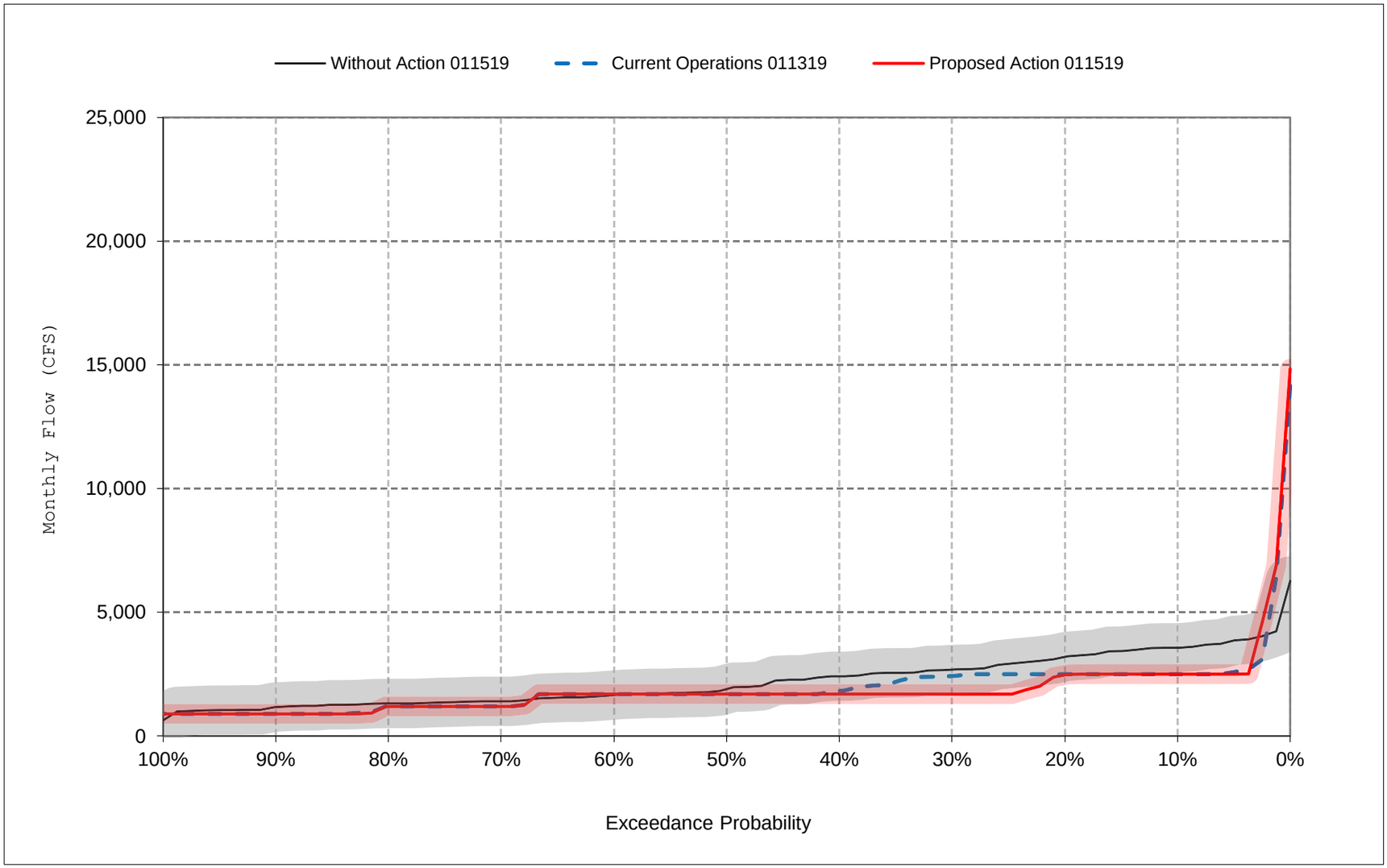
Figure 21-7. Feather River Flow downstream of Thermalito, October



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

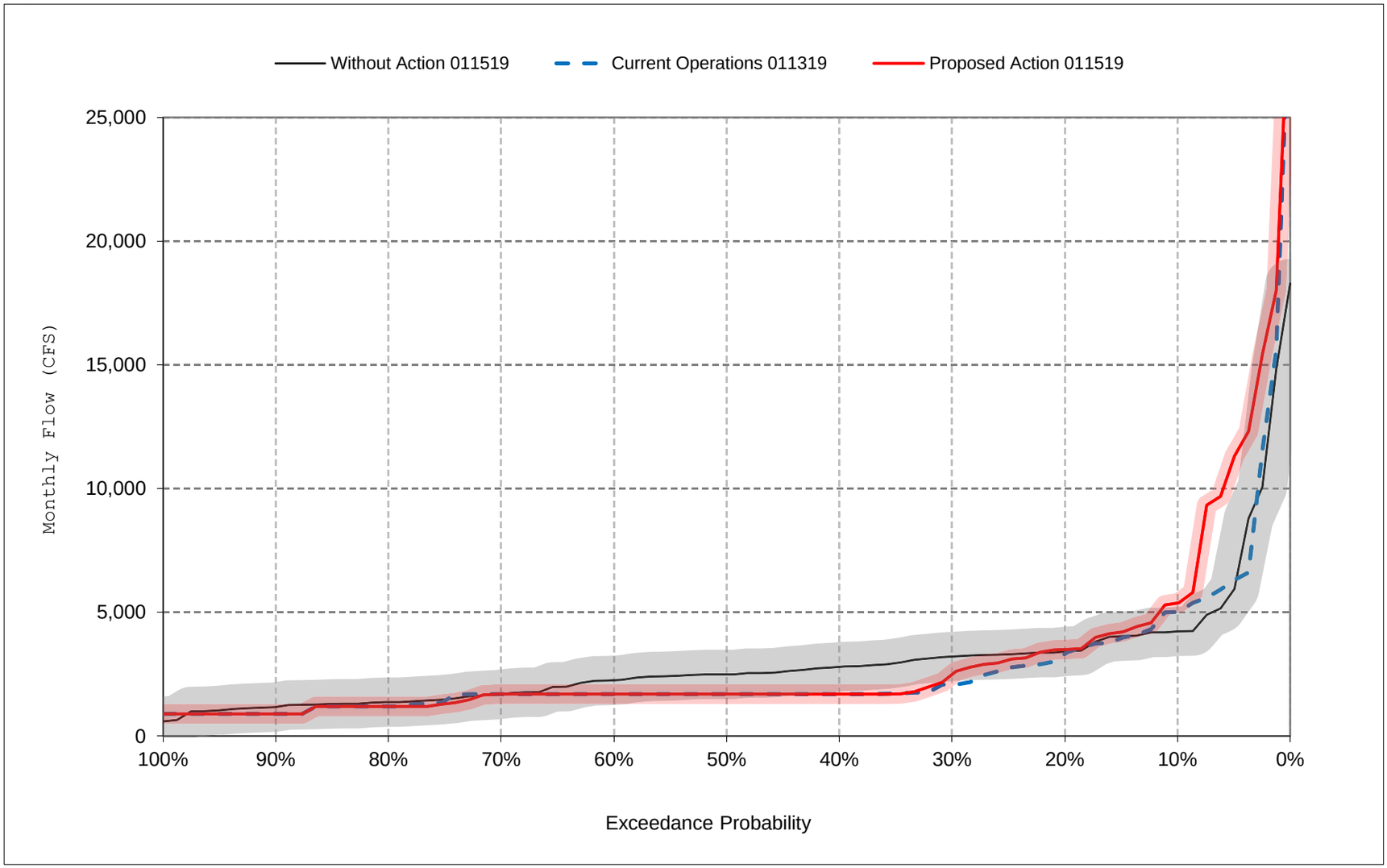
Figure 21-8. Feather River Flow downstream of Thermalito, November



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

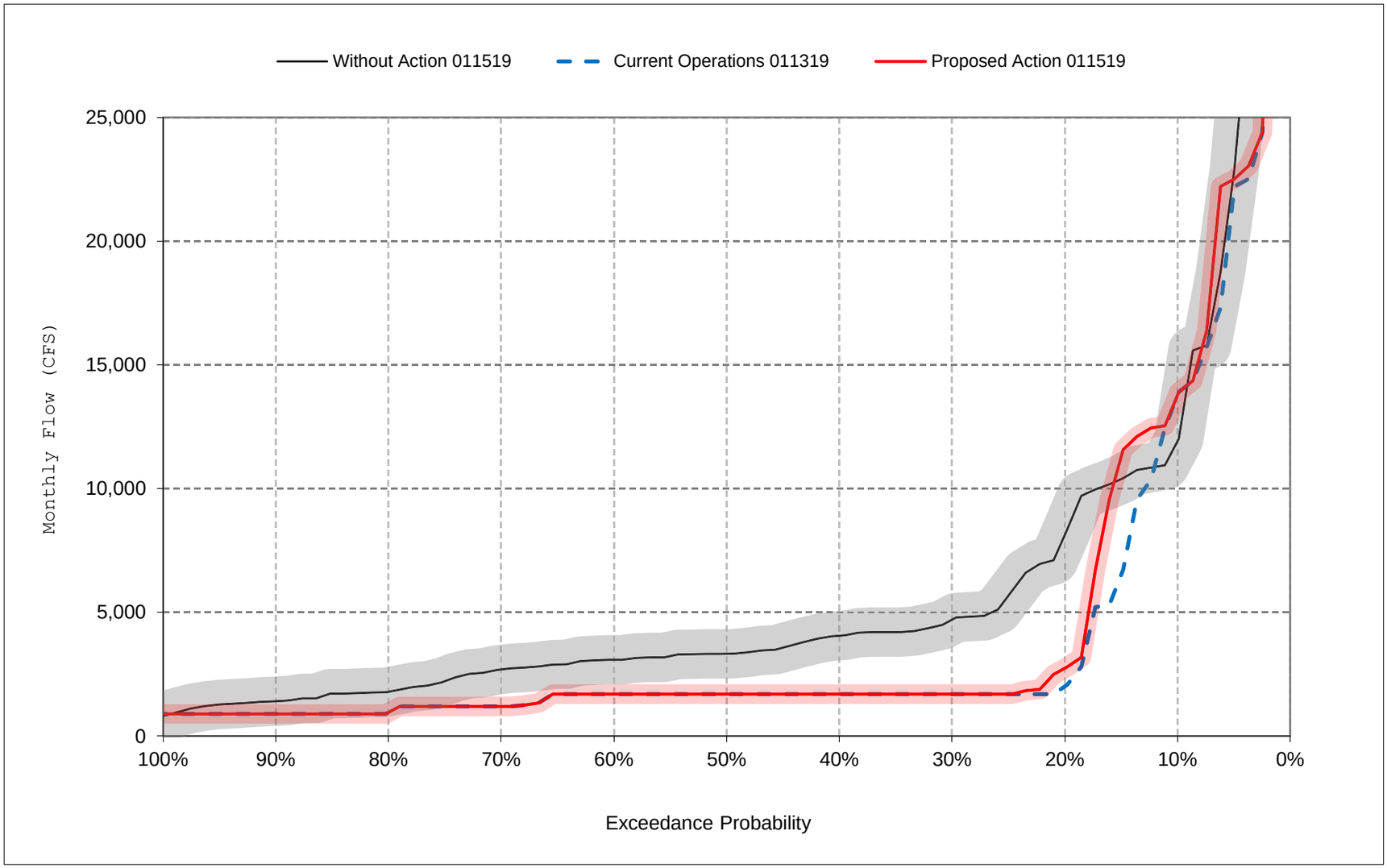
Figure 21-9. Feather River Flow downstream of Thermalito, December



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

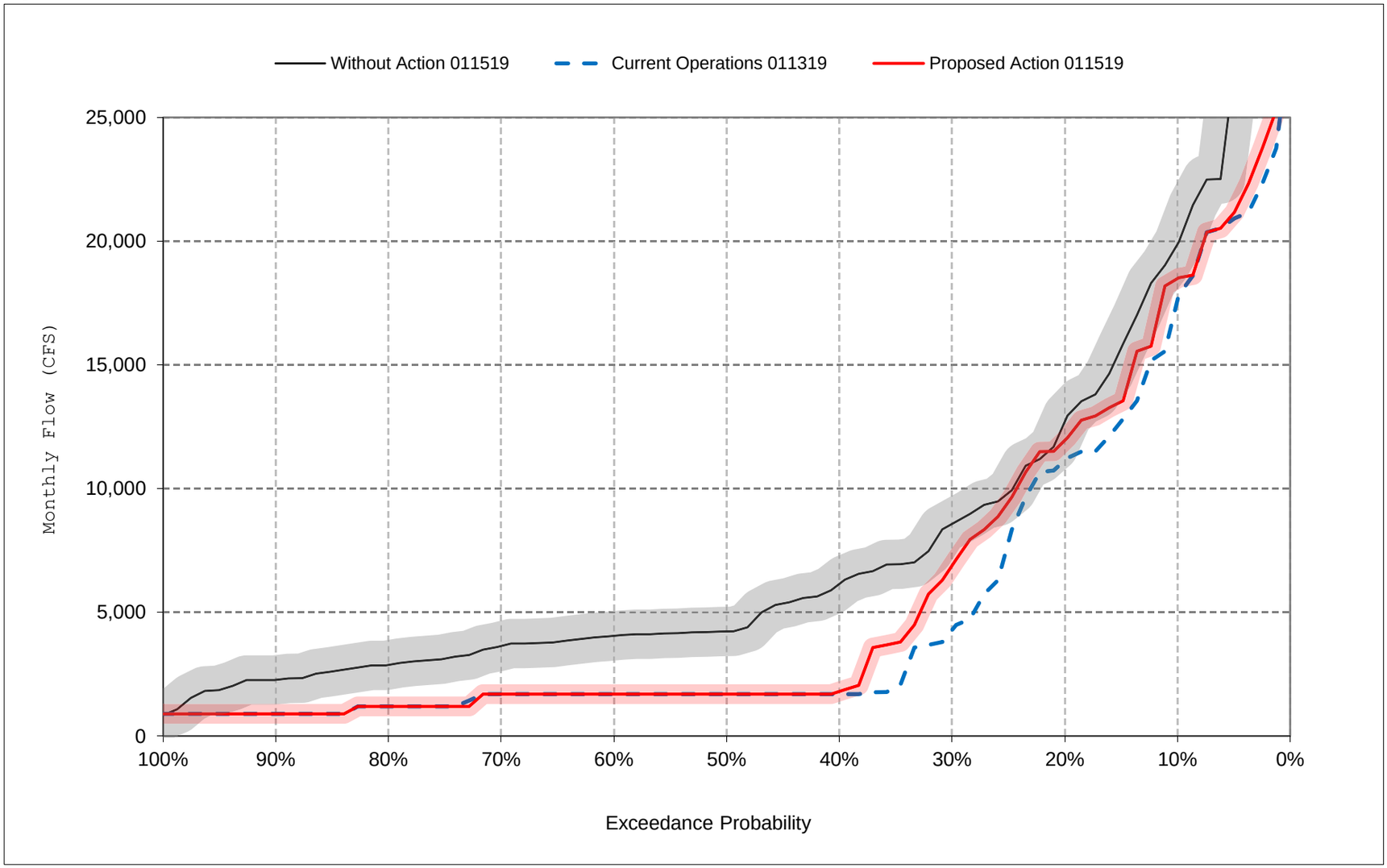
Figure 21-10. Feather River Flow downstream of Thermalito, January



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

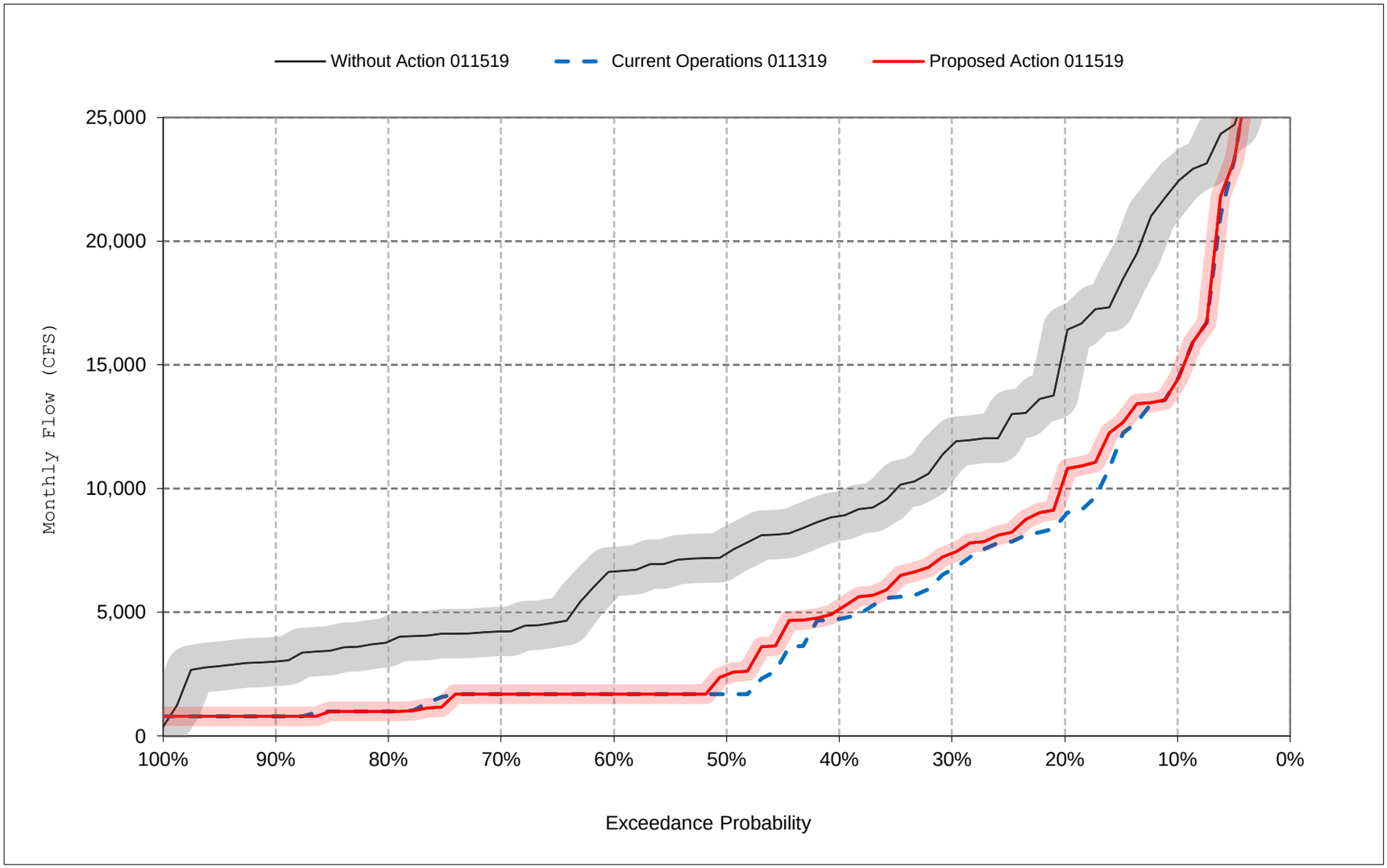
Figure 21-11. Feather River Flow downstream of Thermalito, February



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

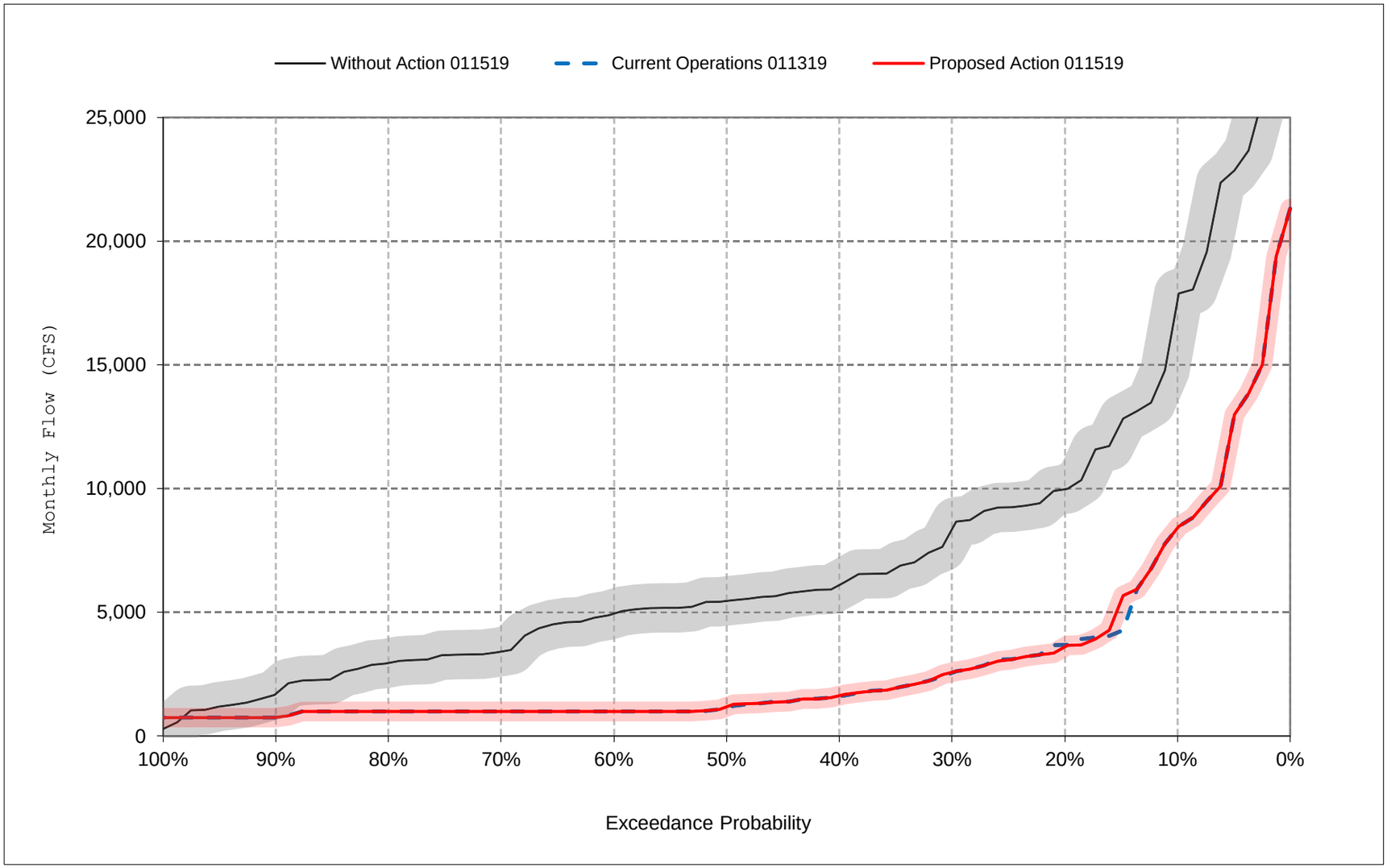
Figure 21-12. Feather River Flow downstream of Thermalito, March



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

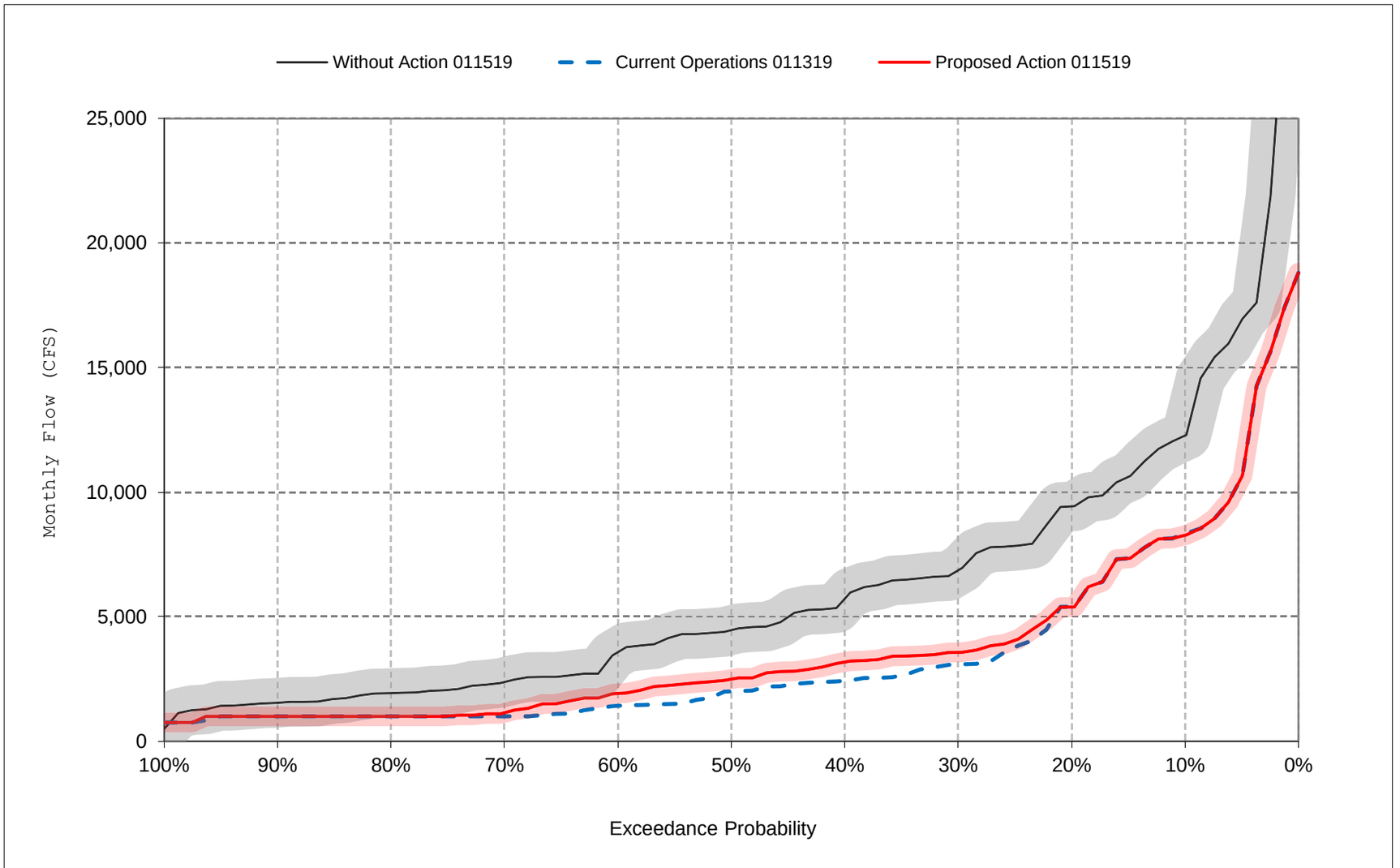
Figure 21-13. Feather River Flow downstream of Thermalito, April



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

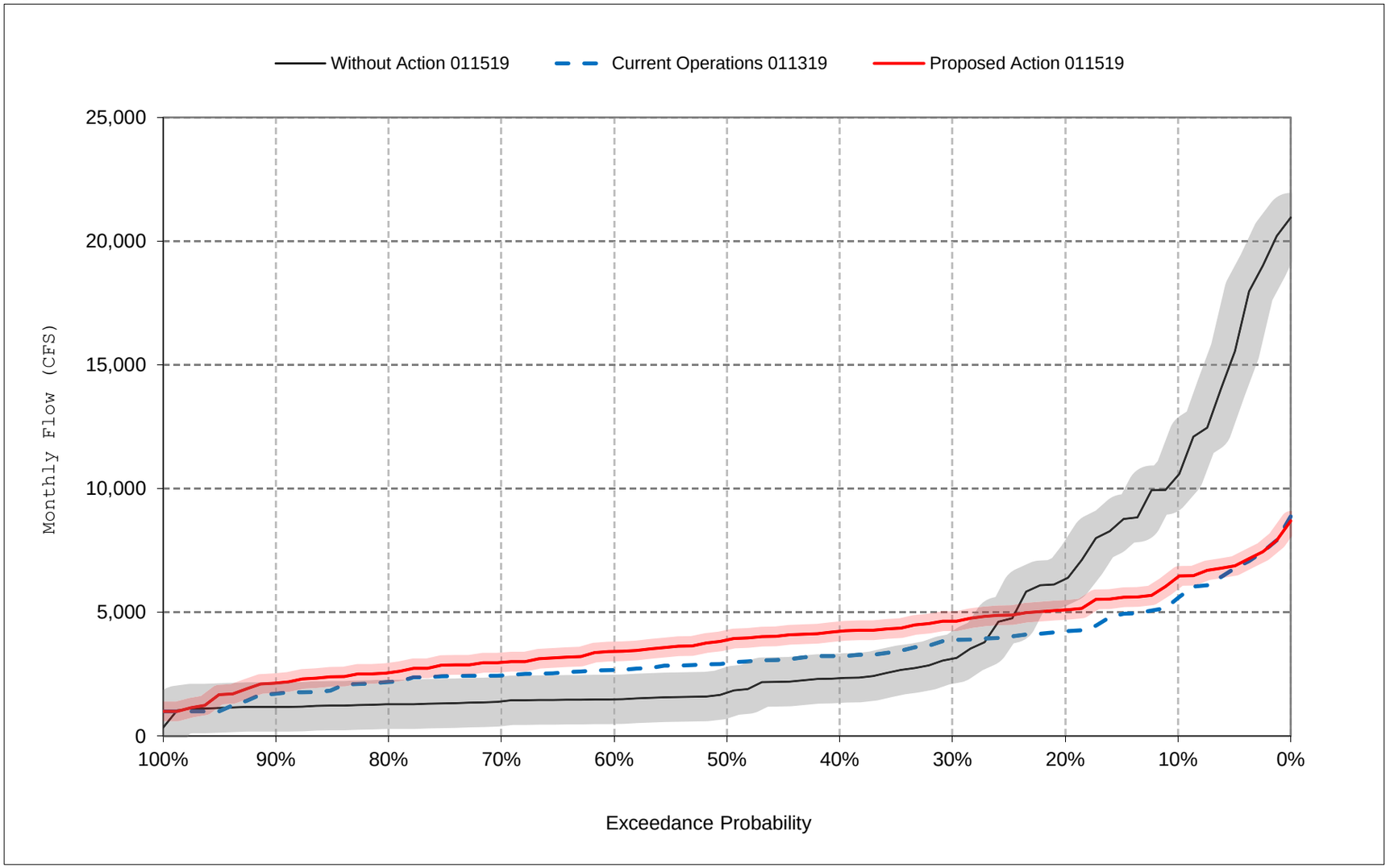
Figure 21-14. Feather River Flow downstream of Thermalito, May



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

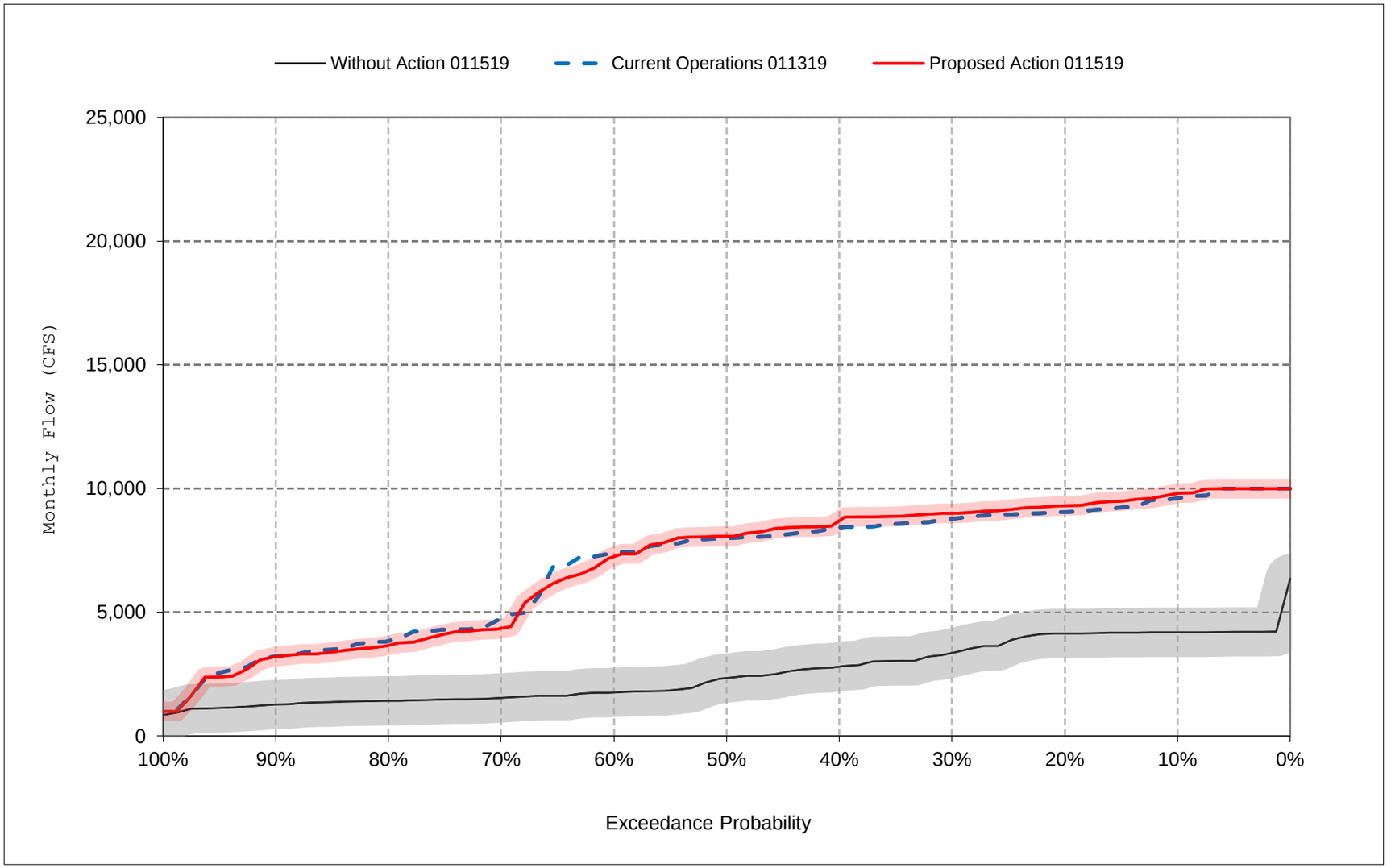
Figure 21-15. Feather River Flow downstream of Thermalito, June



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

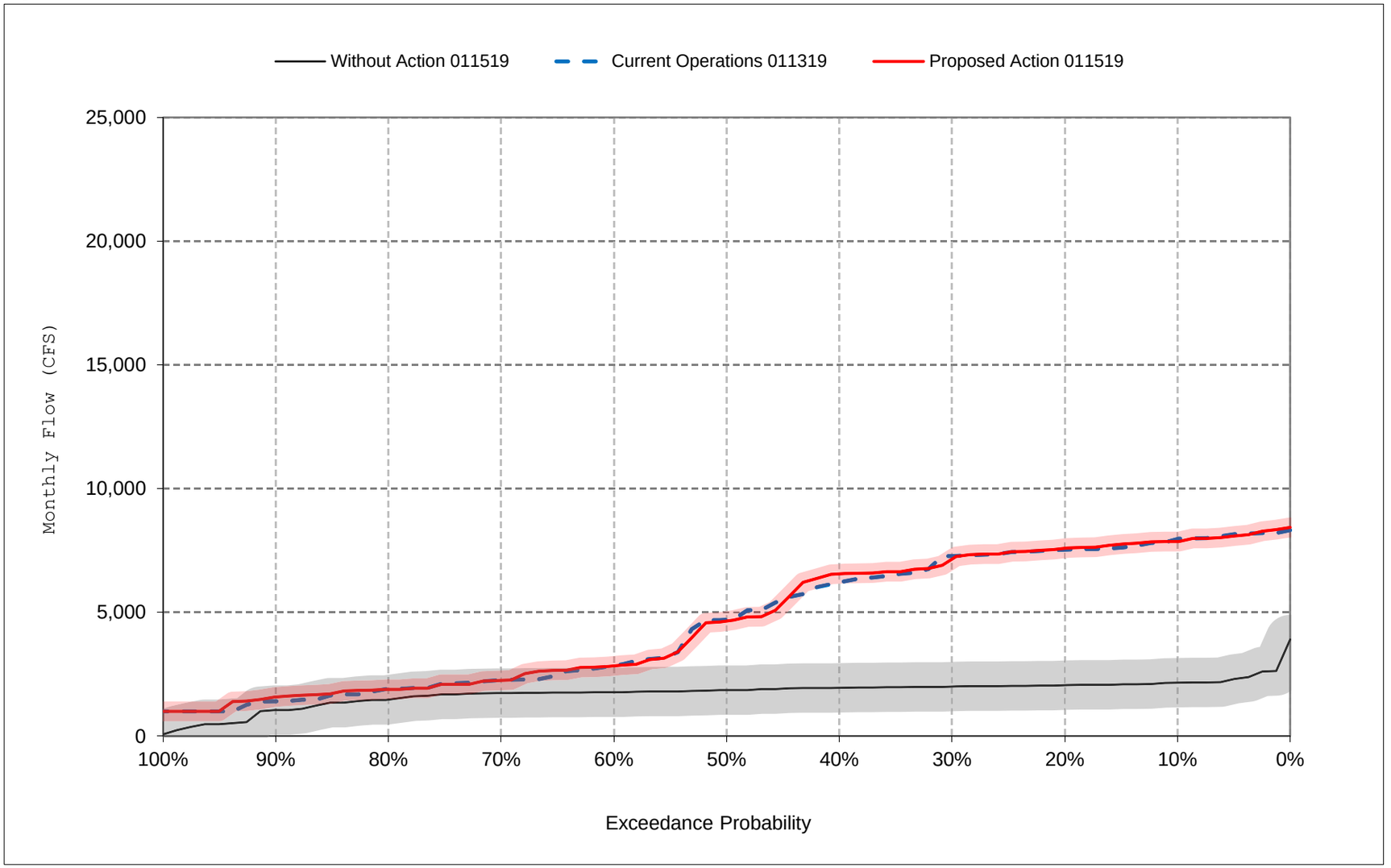
Figure 21-16. Feather River Flow downstream of Thermalito, July



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

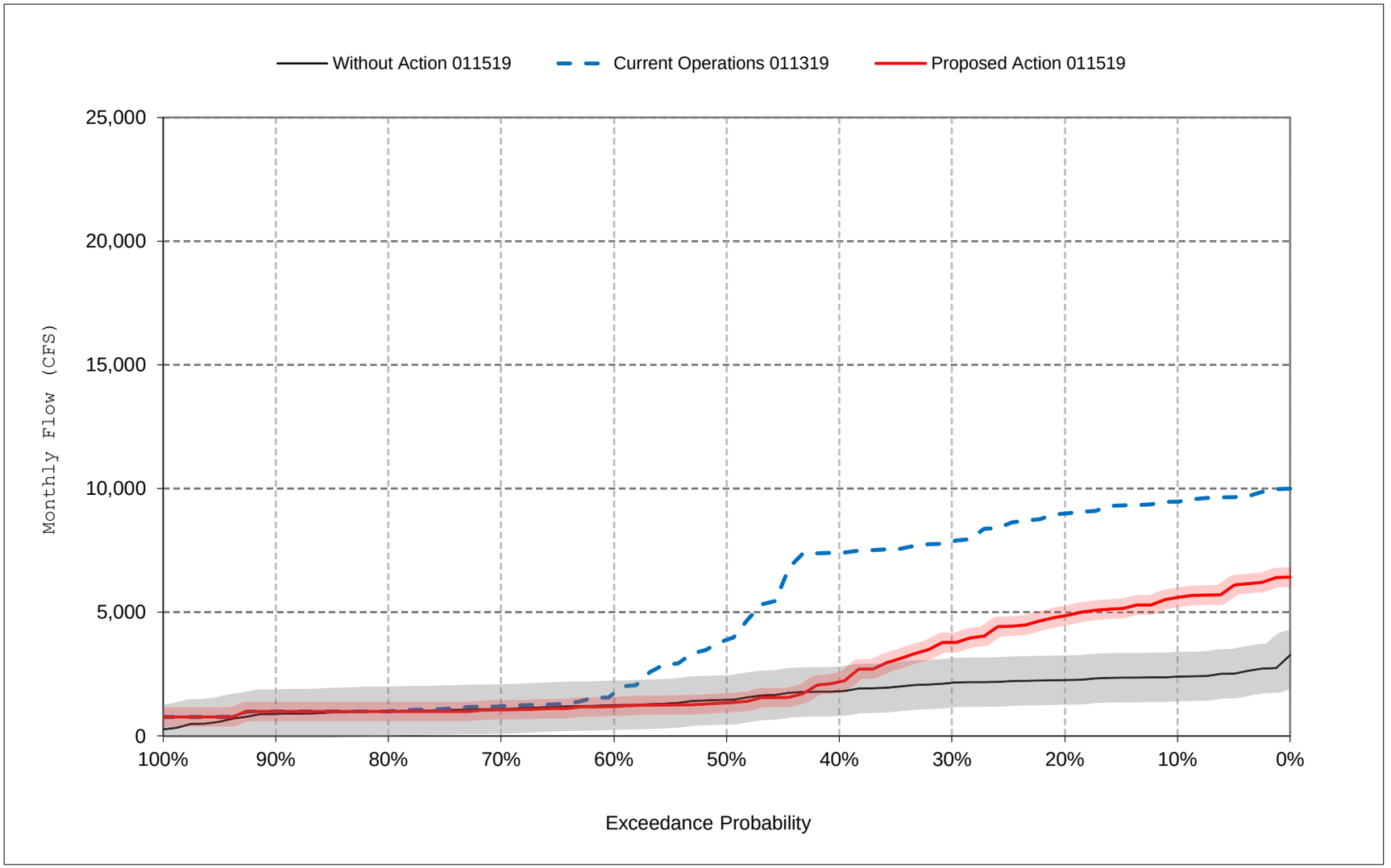
Figure 21-17. Feather River Flow downstream of Thermalito, August



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Figure 21-18. Feather River Flow downstream of Thermalito, September



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Table 22-1. Feather River at Sacramento River Confluence Flow, Monthly Flow

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	4,234	4,845	12,031	28,043	35,486	36,933	26,843	20,106	16,074	4,361	3,378	4,751
20%	3,627	3,875	7,380	20,409	28,135	27,054	19,052	15,182	9,648	3,856	3,007	4,310
30%	3,248	3,581	5,299	14,102	21,185	19,982	15,438	11,610	4,702	3,439	2,535	3,963
40%	2,777	2,981	4,382	10,249	14,950	16,080	11,727	9,738	3,529	3,037	2,317	3,606
50%	2,368	2,584	3,862	7,175	11,809	13,404	10,184	7,549	2,697	2,764	2,218	3,163
60%	2,007	2,233	3,164	6,076	8,499	10,870	7,946	5,613	2,108	2,168	2,067	2,779
70%	1,841	1,899	2,483	5,138	6,461	8,379	6,702	4,102	1,754	1,516	1,780	2,560
80%	1,621	1,615	1,738	4,333	4,837	5,889	4,965	3,373	1,404	1,362	1,528	2,547
90%	1,351	1,380	1,332	3,134	3,507	4,501	3,505	2,400	1,034	795	1,180	2,174
Long Term												
Full Simulation Period[a]	2,709	3,143	5,829	13,311	17,052	17,591	13,665	9,979	6,061	2,682	2,232	3,255
Water Year Types[b,c]												
Wet (32%)	3,755	4,046	7,639	24,828	32,372	28,057	22,778	17,693	13,280	2,860	2,598	4,244
Above Normal (16%)	2,754	3,032	5,091	15,090	19,257	25,677	18,110	10,111	3,405	2,738	2,461	3,682
Below Normal (13%)	3,088	2,919	4,800	6,086	10,047	12,096	7,590	6,445	3,678	2,842	2,010	3,076
Dry (24%)	1,940	3,138	6,798	6,102	7,089	9,717	8,232	6,074	2,183	2,604	1,791	2,704
Critical (15%)	1,333	1,524	2,038	5,068	4,496	4,313	3,727	2,871	1,946	2,222	2,132	1,734

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	4,771	4,662	10,758	23,582	33,696	31,622	20,964	15,603	9,008	9,734	8,603	11,413
20%	4,500	3,132	6,608	16,878	24,867	21,198	11,924	10,225	6,123	9,430	8,347	11,004
30%	3,945	2,893	4,943	10,861	16,465	13,726	8,375	6,606	5,106	8,874	8,015	9,872
40%	3,450	2,648	3,867	8,535	11,070	11,442	6,524	4,917	4,506	8,659	7,235	9,069
50%	2,514	2,404	3,265	5,369	6,814	8,320	5,725	4,423	3,908	8,075	6,139	6,110
60%	2,076	2,184	2,676	4,544	5,322	5,671	4,106	3,879	3,489	7,286	3,146	3,109
70%	1,758	1,793	1,937	3,715	4,240	4,169	3,607	3,551	3,316	5,113	2,534	2,832
80%	1,602	1,445	1,700	2,922	2,615	3,230	3,033	2,937	2,944	3,792	2,342	2,609
90%	1,397	1,212	1,206	2,274	1,736	2,301	2,800	2,800	2,442	2,767	2,153	2,530
Long Term												
Full Simulation Period[a]	2,974	2,923	5,614	11,560	13,513	13,355	8,710	7,260	5,251	6,975	5,380	6,541
Water Year Types[b,c]												
Wet (32%)	4,197	3,846	8,266	23,743	27,715	25,043	16,023	13,872	8,211	7,810	6,891	10,812
Above Normal (16%)	3,893	3,150	4,191	11,529	13,491	18,430	9,251	5,612	3,678	8,640	8,429	9,395
Below Normal (13%)	2,966	2,514	4,204	4,187	6,827	5,807	4,598	4,369	3,545	8,705	6,515	4,337
Dry (24%)	1,746	2,840	6,157	4,376	4,912	5,511	4,583	4,059	4,554	6,192	2,566	3,068
Critical (15%)	1,385	1,187	1,800	3,929	3,226	2,529	2,926	2,702	3,269	3,081	2,453	2,005

Current Operations 011319 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	538	**-183**	**-1,272**	**-4,461**	**-1,790**	**-5,310**	**-5,879**	**-4,503**	**-7,065**	5,373	5,224	6,663
20%	873	**-743**	**-772**	**-3,531**	**-3,268**	**-5,856**	**-7,128**	**-4,957**	**-3,525**	5,574	5,340	6,693
30%	698	**-688**	**-356**	**-3,241**	**-4,720**	**-6,257**	**-7,063**	**-5,004**	404	5,435	5,480	5,908
40%	673	**-334**	**-515**	**-1,714**	**-3,879**	**-4,638**	**-5,203**	**-4,821**	977	5,622	4,918	5,463
50%	146	**-180**	**-597**	**-1,806**	**-4,995**	**-5,084**	**-4,459**	**-3,126**	1,211	5,311	3,921	2,947
60%	69	**-49**	**-488**	**-1,532**	**-3,177**	**-5,200**	**-3,841**	**-1,734**	1,381	5,118	1,079	330
70%	**-82**	**-106**	**-545**	**-1,424**	**-2,220**	**-4,211**	**-3,094**	**-551**	1,562	3,597	754	272
80%	**-20**	**-170**	**-38**	**-1,411**	**-2,222**	**-2,659**	**-1,931**	**-436**	1,540	2,430	814	62
90%	47	**-168**	**-126**	**-860**	**-1,771**	**-2,201**	**-705**	400	1,409	1,972	972	356
Long Term												
Full Simulation Period[a]	265	**-221**	**-215**	**-1,751**	**-3,540**	**-4,235**	**-4,955**	**-2,719**	**-810**	4,293	3,148	3,286
Water Year Types[b,c]												
Wet (32%)	442	**-200**	627	**-1,085**	**-4,657**	**-3,014**	**-6,755**	**-3,820**	**-5,069**	4,950	4,293	6,568
Above Normal (16%)	1,140	119	**-900**	**-3,561**	**-5,767**	**-7,247**	**-8,859**	**-4,500**	273	5,902	5,968	5,713
Below Normal (13%)	**-122**	**-406**	**-595**	**-1,899**	**-3,219**	**-6,289**	**-2,992**	**-2,077**	**-133**	5,862	4,506	1,261
Dry (24%)	**-194**	**-297**	**-641**	**-1,726**	**-2,177**	**-4,206**	**-3,649**	**-2,014**	2,371	3,588	776	365
Critical (15%)	52	**-336**	**-238**	**-1,139**	**-1,270**	**-1,784**	**-801**	**-169**	1,323	859	321	271

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 22-2. Feather River at Sacramento River Confluence Flow, Monthly Flow

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	4,234	4,845	12,031	28,043	35,486	36,933	26,843	20,106	16,074	4,361	3,378	4,751
20%	3,627	3,875	7,380	20,409	28,135	27,054	19,052	15,182	9,648	3,856	3,007	4,310
30%	3,248	3,581	5,299	14,102	21,185	19,982	15,438	11,610	4,702	3,439	2,535	3,963
40%	2,777	2,981	4,382	10,249	14,950	16,080	11,727	9,738	3,529	3,037	2,317	3,606
50%	2,368	2,584	3,862	7,175	11,809	13,404	10,184	7,549	2,697	2,764	2,218	3,163
60%	2,007	2,233	3,164	6,076	8,499	10,870	7,946	5,613	2,108	2,168	2,067	2,779
70%	1,841	1,899	2,483	5,138	6,461	8,379	6,702	4,102	1,754	1,516	1,780	2,560
80%	1,621	1,615	1,738	4,333	4,837	5,889	4,965	3,373	1,404	1,362	1,528	2,547
90%	1,351	1,380	1,332	3,134	3,507	4,501	3,505	2,400	1,034	795	1,180	2,174
Long Term												
Full Simulation Period[a]	2,709	3,143	5,829	13,311	17,052	17,591	13,665	9,979	6,061	2,682	2,232	3,255
Water Year Types[b,c]												
Wet (32%)	3,755	4,046	7,639	24,828	32,372	28,057	22,778	17,693	13,280	2,860	2,598	4,244
Above Normal (16%)	2,754	3,032	5,091	15,090	19,257	25,677	18,110	10,111	3,405	2,738	2,461	3,682
Below Normal (13%)	3,088	2,919	4,800	6,086	10,047	12,096	7,590	6,445	3,678	2,842	2,010	3,076
Dry (24%)	1,940	3,138	6,798	6,102	7,089	9,717	8,232	6,074	2,183	2,604	1,791	2,704
Critical (15%)	1,333	1,524	2,038	5,068	4,496	4,313	3,727	2,871	1,946	2,222	2,132	1,734

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	4,702	4,660	13,489	23,633	33,863	31,638	20,966	15,602	9,547	9,827	8,648	7,353
20%	4,233	2,929	6,229	18,543	24,930	21,189	12,534	10,221	7,059	9,521	8,316	6,918
30%	3,557	2,729	5,012	11,249	17,550	15,218	8,280	6,636	5,641	9,300	7,997	6,088
40%	2,718	2,346	3,903	8,535	12,313	12,863	6,523	5,400	5,126	8,759	7,272	3,842
50%	2,264	2,209	3,313	5,400	7,072	8,371	5,723	4,821	4,813	8,224	5,692	3,101
60%	1,900	1,951	2,476	4,565	5,242	5,673	4,109	4,422	4,563	7,288	3,272	2,830
70%	1,700	1,716	1,910	3,795	4,241	4,164	3,609	3,978	4,112	5,573	2,629	2,684
80%	1,611	1,447	1,696	2,920	2,614	3,228	2,917	3,583	3,679	3,375	2,295	2,585
90%	1,279	1,214	1,207	2,286	1,734	2,298	2,800	2,800	2,955	2,804	2,019	2,360
Long Term												
Full Simulation Period[a]	2,788	2,839	5,981	11,885	14,045	13,671	8,724	7,528	5,888	7,006	5,397	4,249
Water Year Types[b,c]												
Wet (32%)	3,531	3,652	9,438	24,717	28,267	25,442	16,022	14,026	8,510	7,879	6,677	4,656
Above Normal (16%)	3,949	3,013	4,168	11,549	14,203	19,400	9,324	5,868	4,189	8,989	8,371	7,248
Below Normal (13%)	2,975	2,517	4,198	4,225	8,587	5,992	4,599	4,879	4,461	9,270	7,276	4,308
Dry (24%)	1,760	2,841	6,166	4,385	4,942	5,532	4,571	4,424	5,580	5,742	2,585	3,116
Critical (15%)	1,460	1,180	1,784	3,966	3,233	2,565	2,963	2,850	3,868	2,996	2,368	1,952

Proposed Action 011519 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	469	**-185**	1,458	**-4,411**	**-1,623**	**-5,295**	**-5,876**	**-4,503**	**-6,526**	5,467	5,270	2,603
20%	607	**-946**	**-1,151**	**-1,866**	**-3,206**	**-5,865**	**-6,518**	**-4,961**	**-2,589**	5,665	5,309	2,607
30%	309	**-852**	**-288**	**-2,853**	**-3,635**	**-4,765**	**-7,158**	**-4,975**	939	5,861	5,462	2,125
40%	**-59**	**-635**	**-480**	**-1,714**	**-2,637**	**-3,217**	**-5,204**	**-4,338**	1,597	5,722	4,954	236
50%	**-104**	**-375**	**-549**	**-1,774**	**-4,737**	**-5,033**	**-4,461**	**-2,728**	2,116	5,460	3,473	**-62**
60%	**-107**	**-282**	**-689**	**-1,511**	**-3,257**	**-5,197**	**-3,837**	**-1,191**	2,455	5,120	1,205	51
70%	**-141**	**-183**	**-572**	**-1,343**	**-2,220**	**-4,216**	**-3,093**	**-123**	2,358	4,057	849	124
80%	**-10**	**-169**	**-42**	**-1,413**	**-2,223**	**-2,661**	**-2,048**	210	2,275	2,012	768	38
90%	**-72**	**-166**	**-126**	**-848**	**-1,773**	**-2,203**	**-705**	400	1,921	2,009	839	186
Long Term												
Full Simulation Period[a]	78	**-304**	152	**-1,426**	**-3,007**	**-3,919**	**-4,941**	**-2,451**	**-173**	4,323	3,165	994
Water Year Types[b,c]												
Wet (32%)	**-224**	**-394**	1,799	**-111**	**-4,105**	**-2,615**	**-6,756**	**-3,666**	**-4,770**	5,019	4,078	412
Above Normal (16%)	1,195	**-18**	**-923**	**-3,541**	**-5,054**	**-6,277**	**-8,786**	**-4,244**	784	6,251	5,909	3,566
Below Normal (13%)	**-114**	**-402**	**-602**	**-1,861**	**-1,460**	**-6,104**	**-2,991**	**-1,567**	783	6,427	5,267	1,232
Dry (24%)	**-180**	**-297**	**-632**	**-1,717**	**-2,147**	**-4,185**	**-3,662**	**-1,650**	3,397	3,138	794	412
Critical (15%)	127	**-344**	**-254**	**-1,102**	**-1,264**	**-1,748**	**-764**	**-22**	1,922	774	237	218

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 22-3. Feather River at Sacramento River Confluence Flow, Monthly Flow

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	4,771	4,662	10,758	23,582	33,696	31,622	20,964	15,603	9,008	9,734	8,603	11,413
20%	4,500	3,132	6,608	16,878	24,867	21,198	11,924	10,225	6,123	9,430	8,347	11,004
30%	3,945	2,893	4,943	10,861	16,465	13,726	8,375	6,606	5,106	8,874	8,015	9,872
40%	3,450	2,648	3,867	8,535	11,070	11,442	6,524	4,917	4,506	8,659	7,235	9,069
50%	2,514	2,404	3,265	5,369	6,814	8,320	5,725	4,423	3,908	8,075	6,139	6,110
60%	2,076	2,184	2,676	4,544	5,322	5,671	4,106	3,879	3,489	7,286	3,146	3,109
70%	1,758	1,793	1,937	3,715	4,240	4,169	3,607	3,551	3,316	5,113	2,534	2,832
80%	1,602	1,445	1,700	2,922	2,615	3,230	3,033	2,937	2,944	3,792	2,342	2,609
90%	1,397	1,212	1,206	2,274	1,736	2,301	2,800	2,800	2,442	2,767	2,153	2,530
Long Term												
Full Simulation Period[a]	2,974	2,923	5,614	11,560	13,513	13,355	8,710	7,260	5,251	6,975	5,380	6,541
Water Year Types[b,c]												
Wet (32%)	4,197	3,846	8,266	23,743	27,715	25,043	16,023	13,872	8,211	7,810	6,891	10,812
Above Normal (16%)	3,893	3,150	4,191	11,529	13,491	18,430	9,251	5,612	3,678	8,640	8,429	9,395
Below Normal (13%)	2,966	2,514	4,204	4,187	6,827	5,807	4,598	4,369	3,545	8,705	6,515	4,337
Dry (24%)	1,746	2,840	6,157	4,376	4,912	5,511	4,583	4,059	4,554	6,192	2,566	3,068
Critical (15%)	1,385	1,187	1,800	3,929	3,226	2,529	2,926	2,702	3,269	3,081	2,453	2,005

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	4,702	4,660	13,489	23,633	33,863	31,638	20,966	15,602	9,547	9,827	8,648	7,353
20%	4,233	2,929	6,229	18,543	24,930	21,189	12,534	10,221	7,059	9,521	8,316	6,918
30%	3,557	2,729	5,012	11,249	17,550	15,218	8,280	6,636	5,641	9,300	7,997	6,088
40%	2,718	2,346	3,903	8,535	12,313	12,863	6,523	5,400	5,126	8,759	7,272	3,842
50%	2,264	2,209	3,313	5,400	7,072	8,371	5,723	4,821	4,813	8,224	5,692	3,101
60%	1,900	1,951	2,476	4,565	5,242	5,673	4,109	4,422	4,563	7,288	3,272	2,830
70%	1,700	1,716	1,910	3,795	4,241	4,164	3,609	3,978	4,112	5,573	2,629	2,684
80%	1,611	1,447	1,696	2,920	2,614	3,228	2,917	3,583	3,679	3,375	2,295	2,585
90%	1,279	1,214	1,207	2,286	1,734	2,298	2,800	2,800	2,955	2,804	2,019	2,360
Long Term												
Full Simulation Period[a]	2,788	2,839	5,981	11,885	14,045	13,671	8,724	7,528	5,888	7,006	5,397	4,249
Water Year Types[b,c]												
Wet (32%)	3,531	3,652	9,438	24,717	28,267	25,442	16,022	14,026	8,510	7,879	6,677	4,656
Above Normal (16%)	3,949	3,013	4,168	11,549	14,203	19,400	9,324	5,868	4,189	8,989	8,371	7,248
Below Normal (13%)	2,975	2,517	4,198	4,225	8,587	5,992	4,599	4,879	4,461	9,270	7,276	4,308
Dry (24%)	1,760	2,841	6,166	4,385	4,942	5,532	4,571	4,424	5,580	5,742	2,585	3,116
Critical (15%)	1,460	1,180	1,784	3,966	3,233	2,565	2,963	2,850	3,868	2,996	2,368	1,952

Proposed Action 011519 minus Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	**-69**	**-2**	2,731	51	167	15	3	**0**	539	94	45	**-4,060**
20%	**-266**	**-203**	**-379**	1,664	62	**-9**	610	**-4**	936	91	**-31**	**-4,086**
30%	**-389**	**-164**	69	388	1,085	1,492	**-95**	30	535	426	**-18**	**-3,784**
40%	**-732**	**-301**	35	**-1**	1,242	1,421	**-1**	483	620	100	37	**-5,227**
50%	**-249**	**-195**	48	31	258	51	**-2**	398	905	149	**-447**	**-3,009**
60%	**-176**	**-233**	**-201**	20	**-80**	3	4	543	1,074	3	126	**-279**
70%	**-58**	**-77**	**-27**	81	0	**-5**	1	427	796	460	95	**-148**
80%	9	1	**-4**	**-2**	**-1**	**-2**	**-116**	646	735	**-418**	**-46**	**-24**
90%	**-119**	2	0	12	**-2**	**-2**	0	0	512	37	**-134**	**-170**
Long Term												
Full Simulation Period[a]	**-187**	**-84**	367	325	532	316	14	268	636	31	17	**-2,292**
Water Year Types[b,c]												
Wet (32%)	**-666**	**-194**	1,172	974	552	399	**-1**	154	299	68	**-215**	**-6,156**
Above Normal (16%)	56	**-137**	**-23**	20	712	970	74	256	511	348	**-58**	**-2,147**
Below Normal (13%)	8	4	**-7**	38	1,760	185	0	510	916	565	761	**-30**
Dry (24%)	14	1	9	9	29	21	**-12**	365	1,025	**-450**	19	48
Critical (15%)	75	**-8**	**-16**	37	6	37	37	147	599	**-85**	**-84**	**-53**

a Based on the 82-year simulation period.

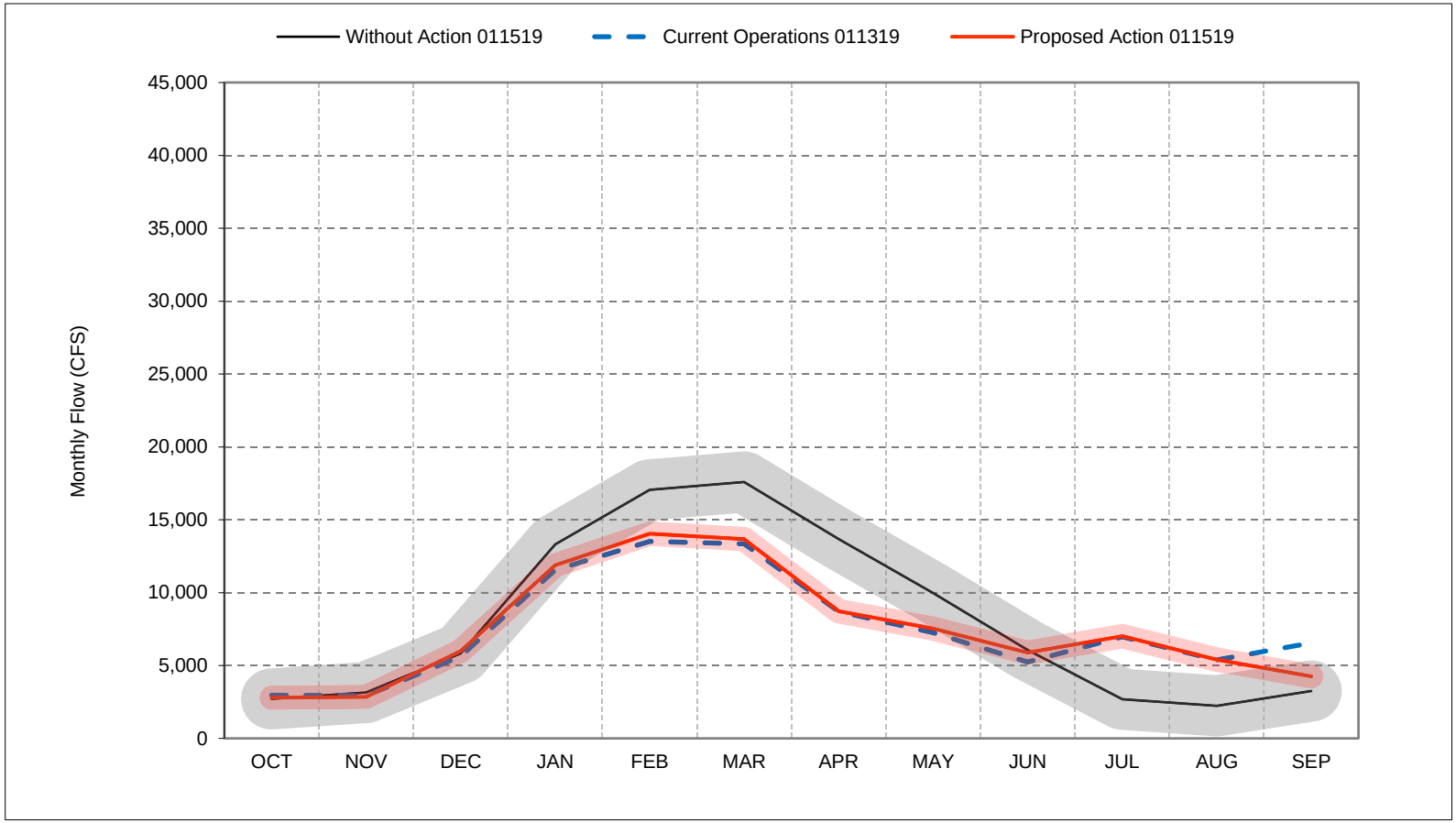
b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

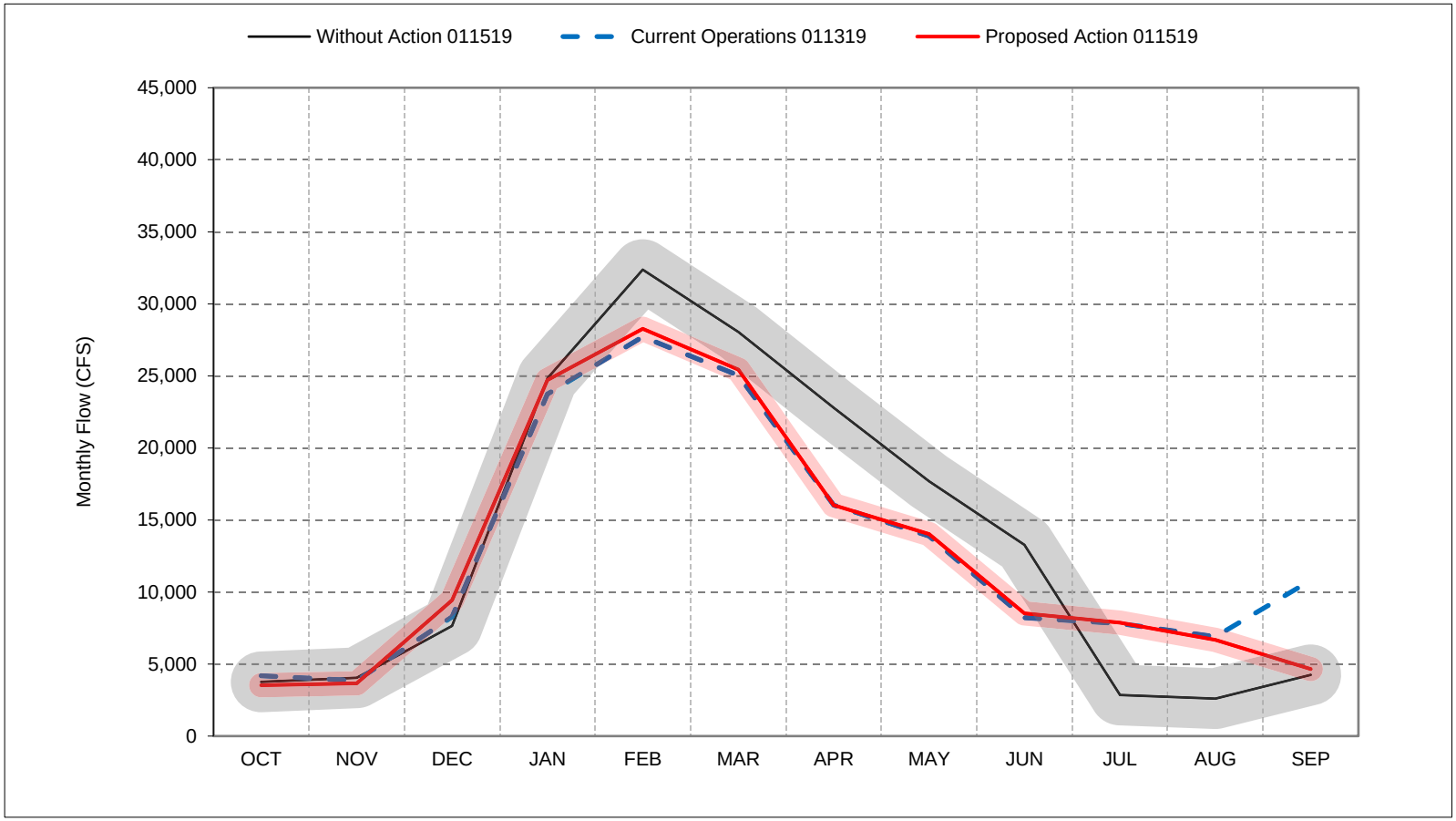
e These are draft results meant for qualitative analysis and are subject to revision.

Figure 22-1. Feather River at Sacramento River Confluence Flow, Long-Term Average Flow



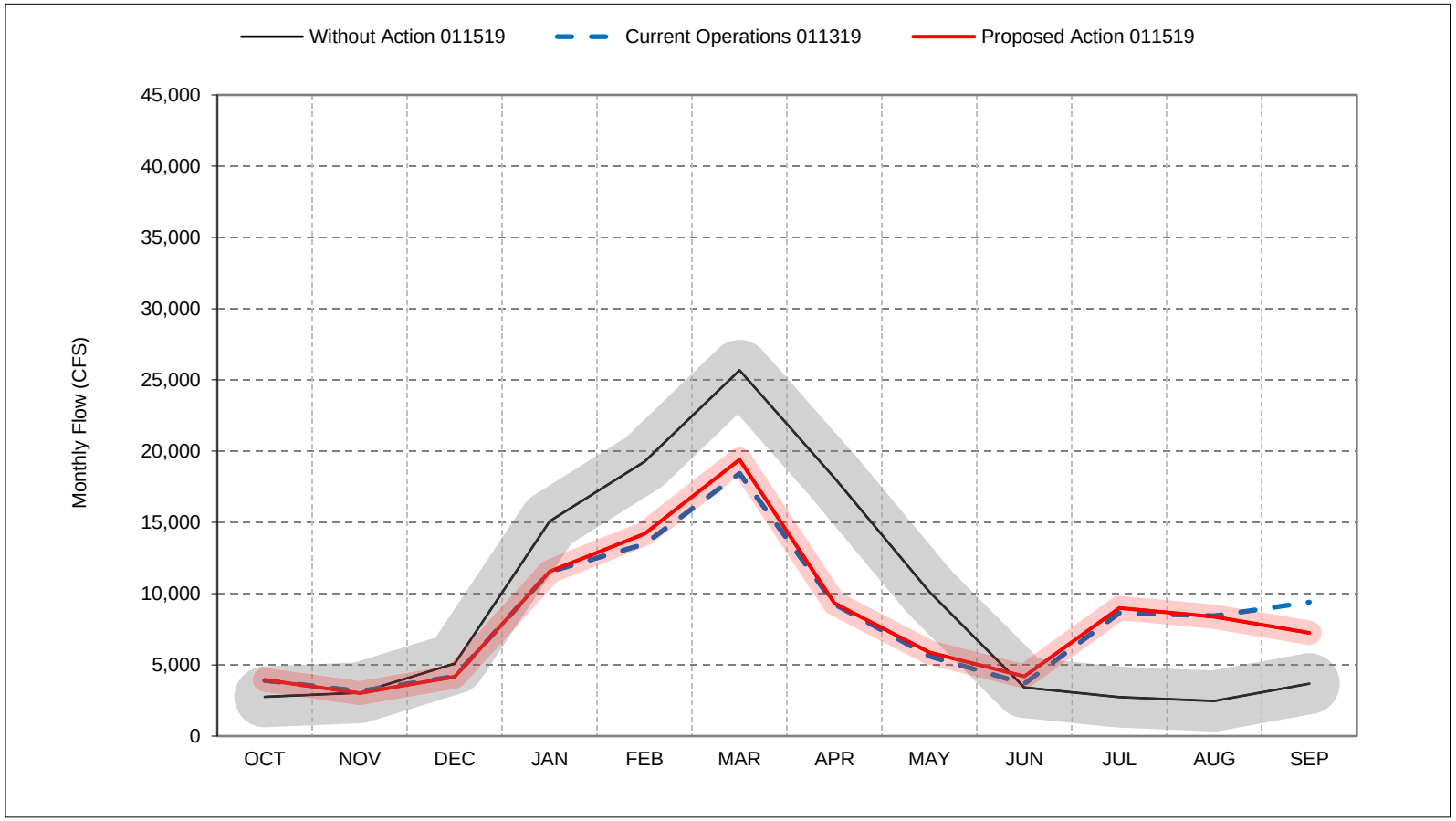
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 22-2. Feather River at Sacramento River Confluence Flow, Wet Year Average Flow



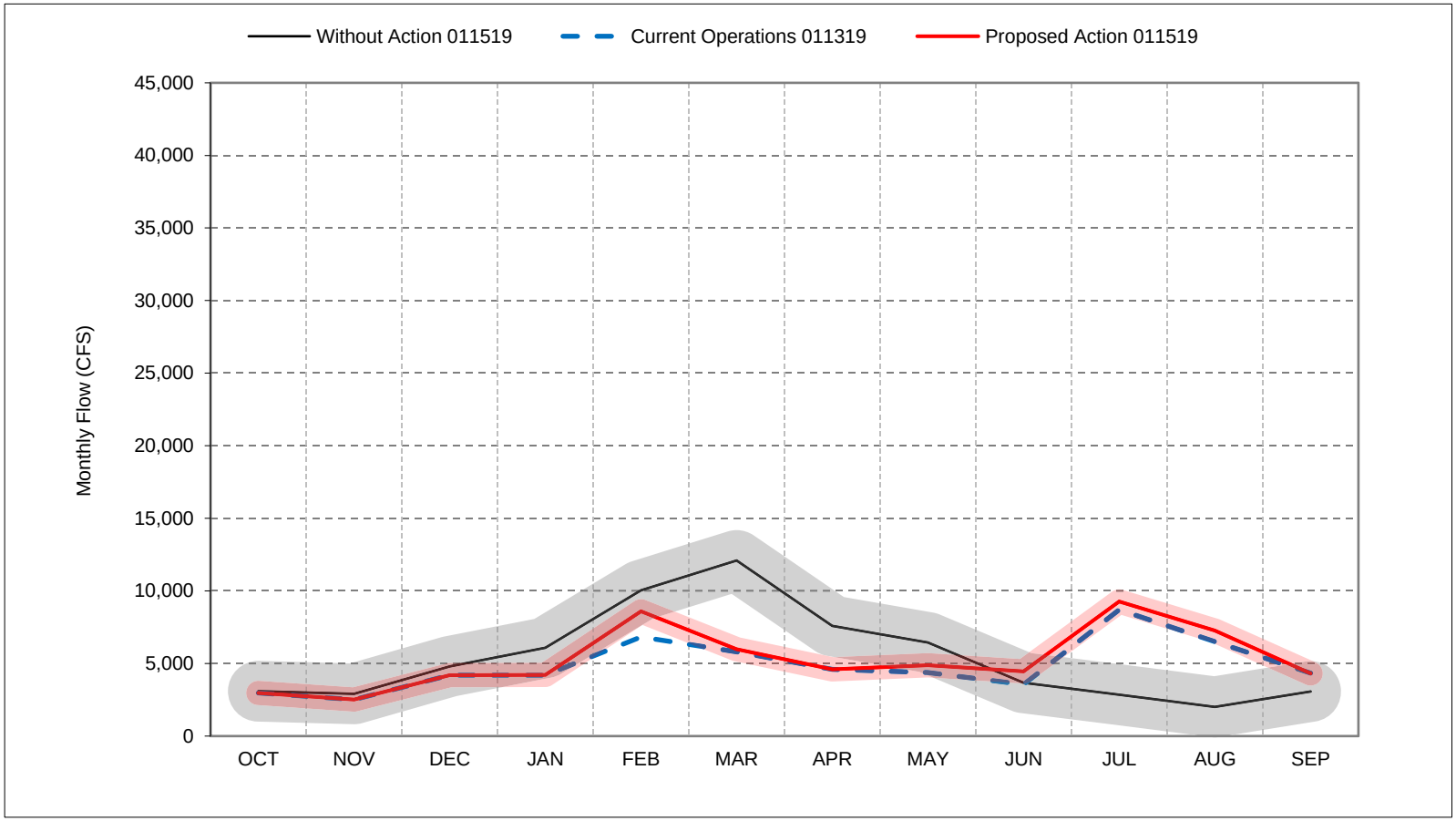
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 22-3. Feather River at Sacramento River Confluence Flow, Above Normal Year Average Flov



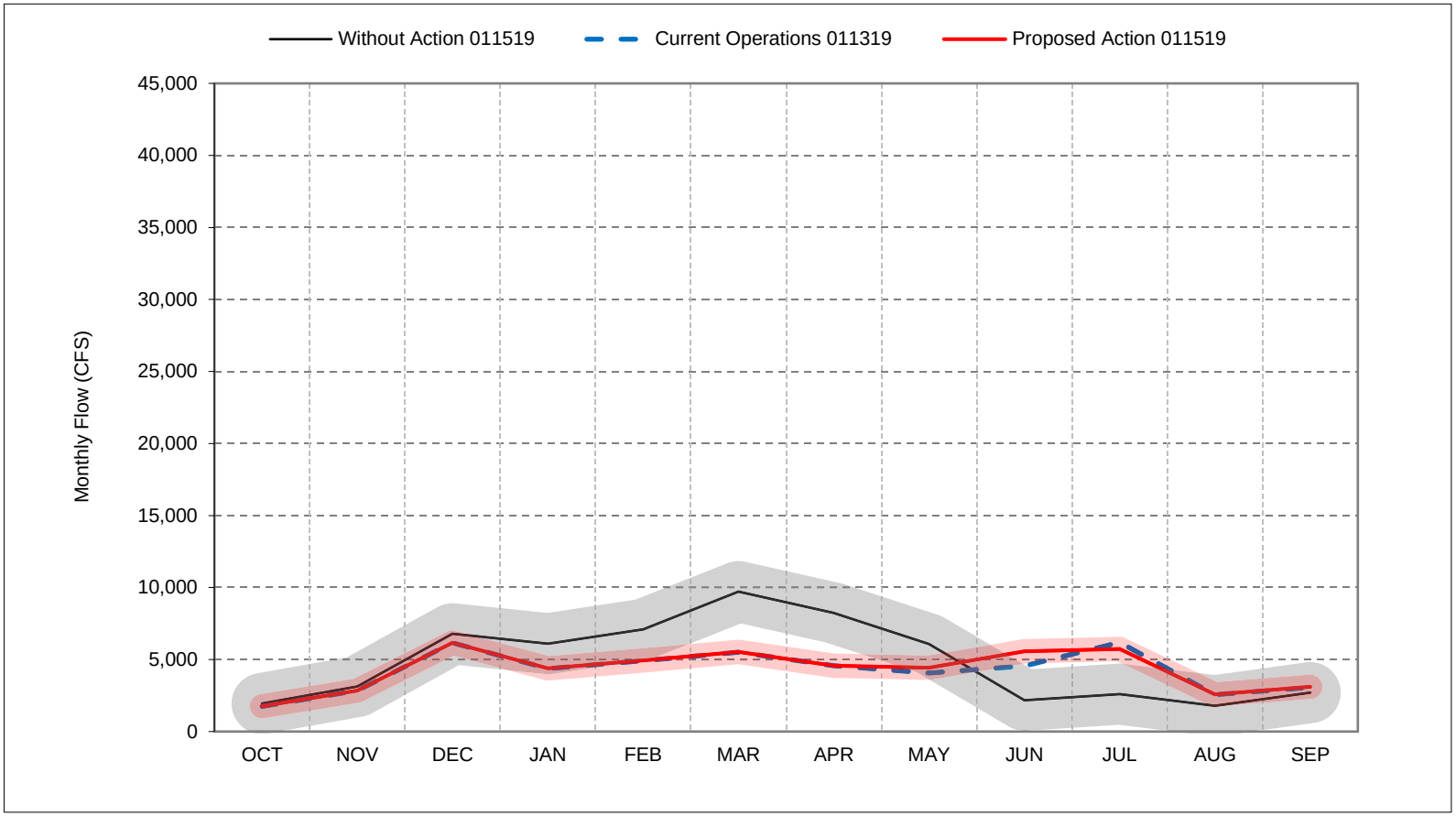
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 22-4. Feather River at Sacramento River Confluence Flow, Below Normal Year Average Flov



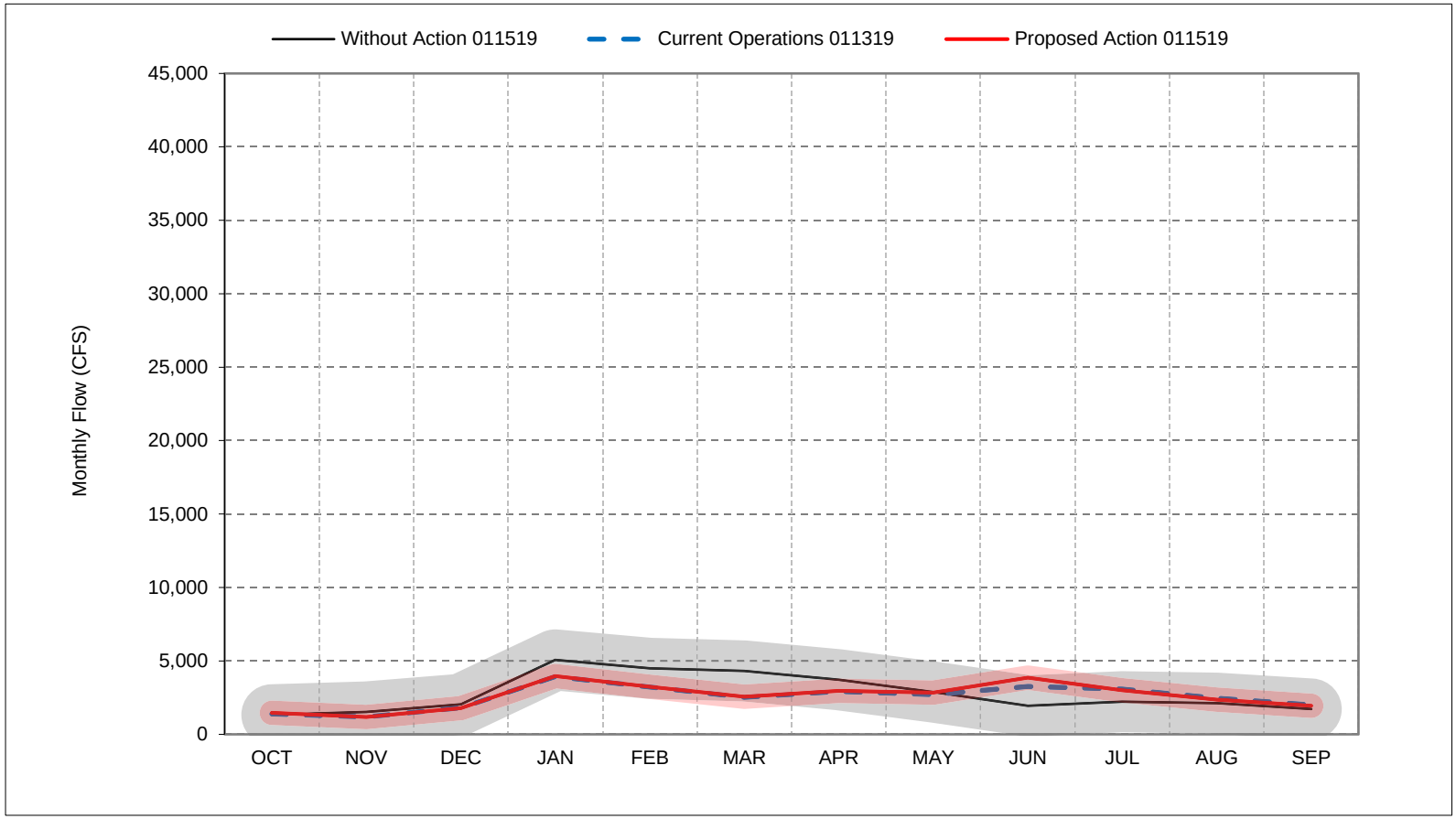
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 22-5. Feather River at Sacramento River Confluence Flow, Dry Year Average Flow



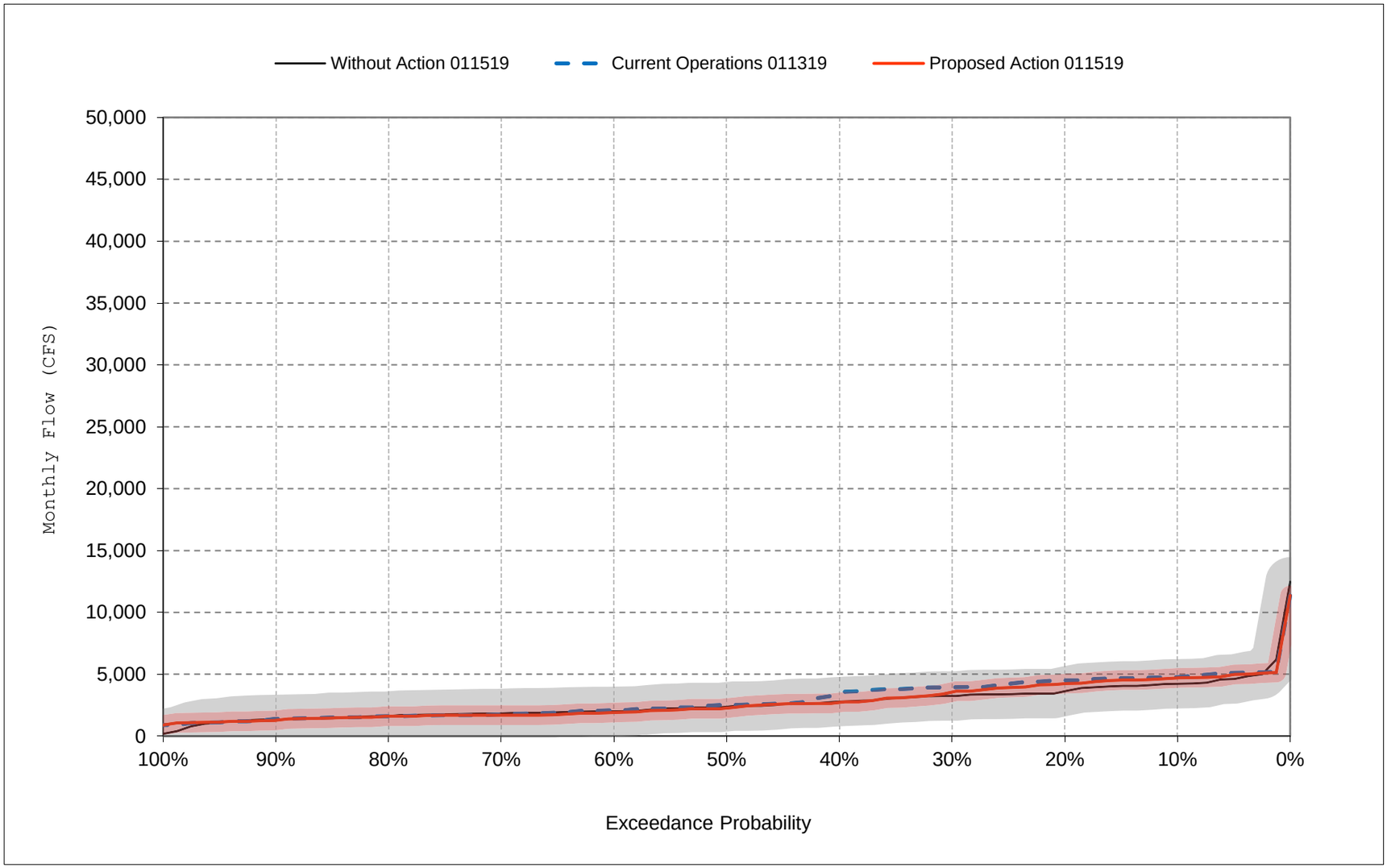
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 22-6. Feather River at Sacramento River Confluence Flow, Critical Year Average Flow



*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

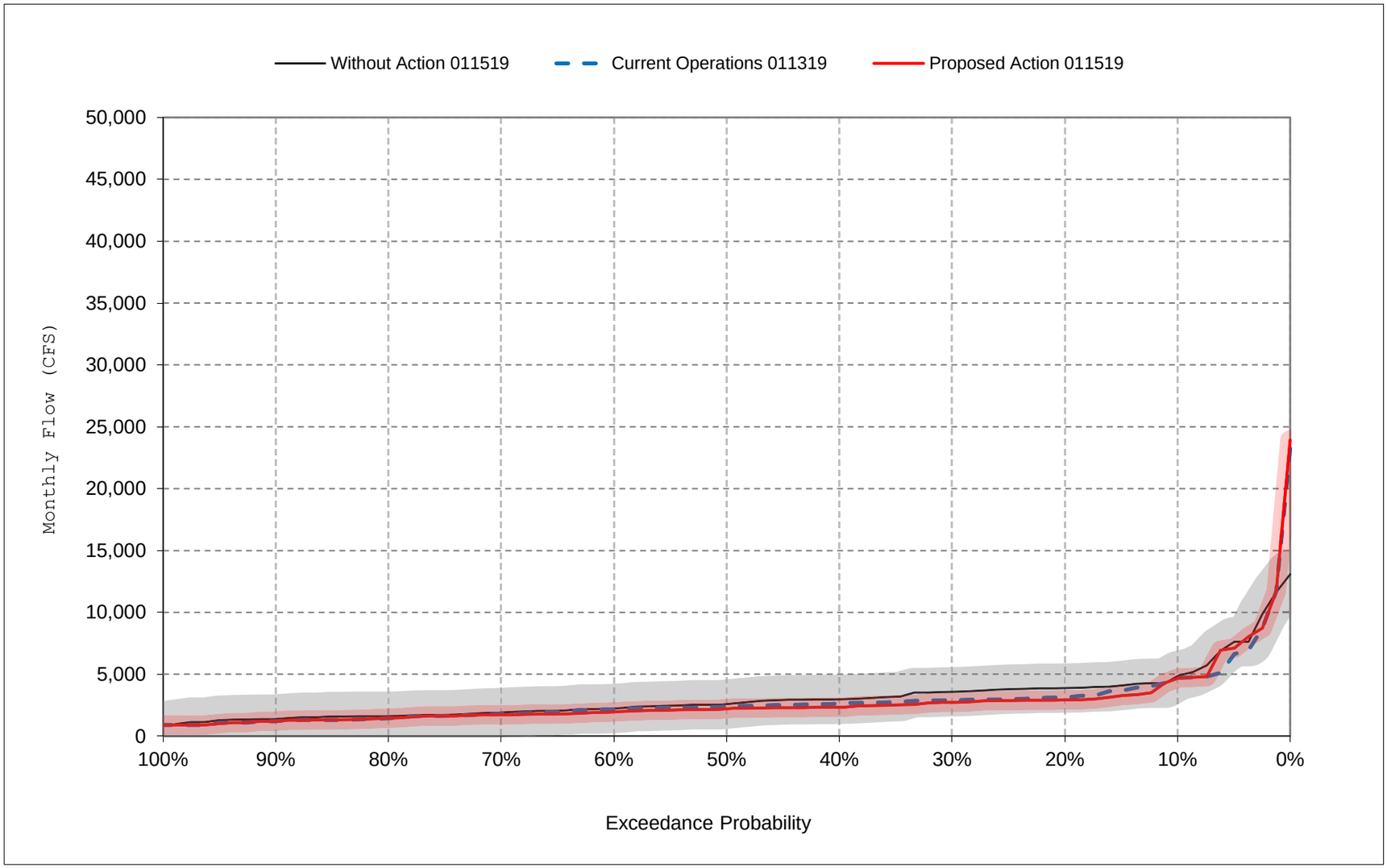
Figure 22-7. Feather River at Sacramento River Confluence Flow, October



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

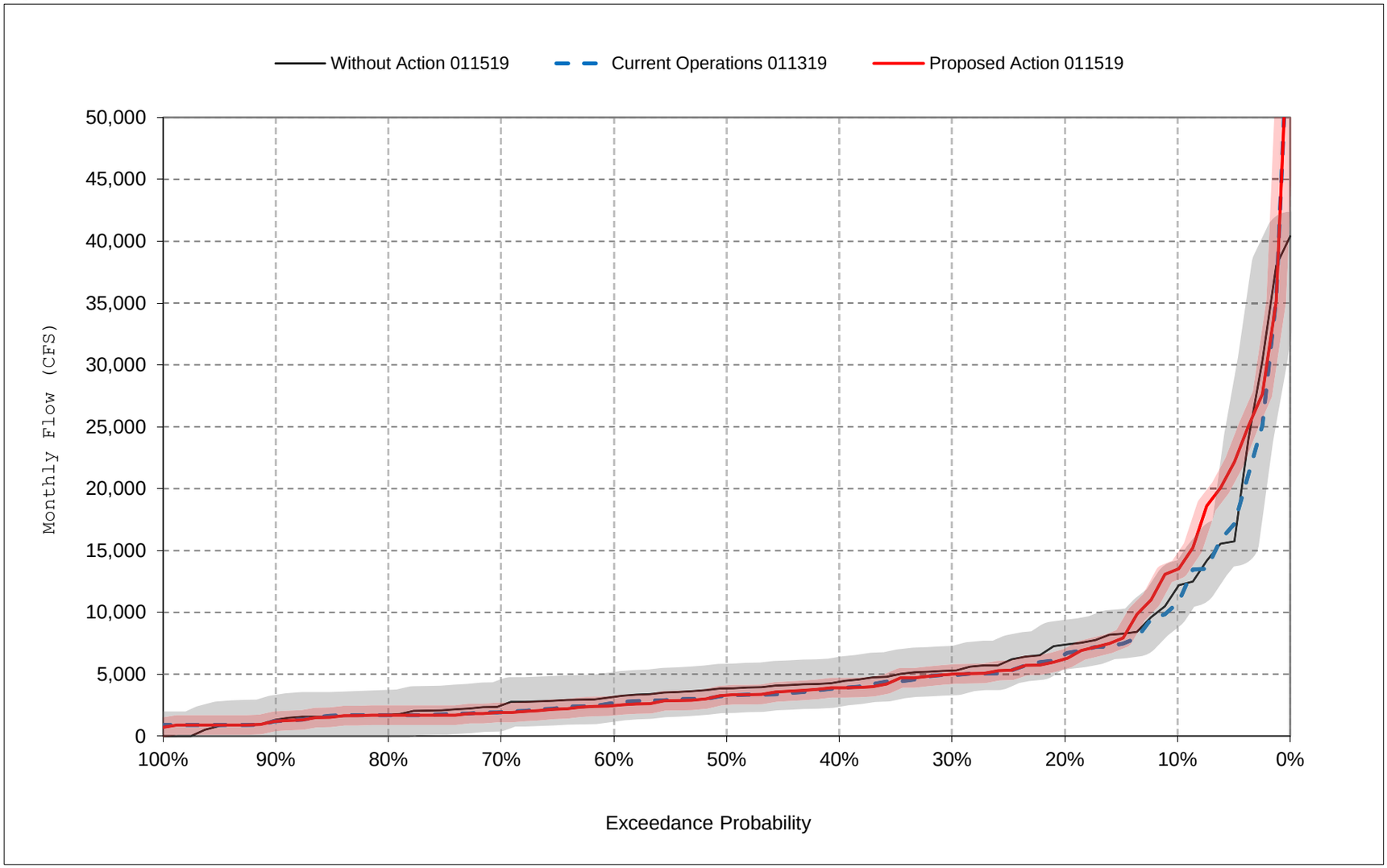
Figure 22-8. Feather River at Sacramento River Confluence Flow, November



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

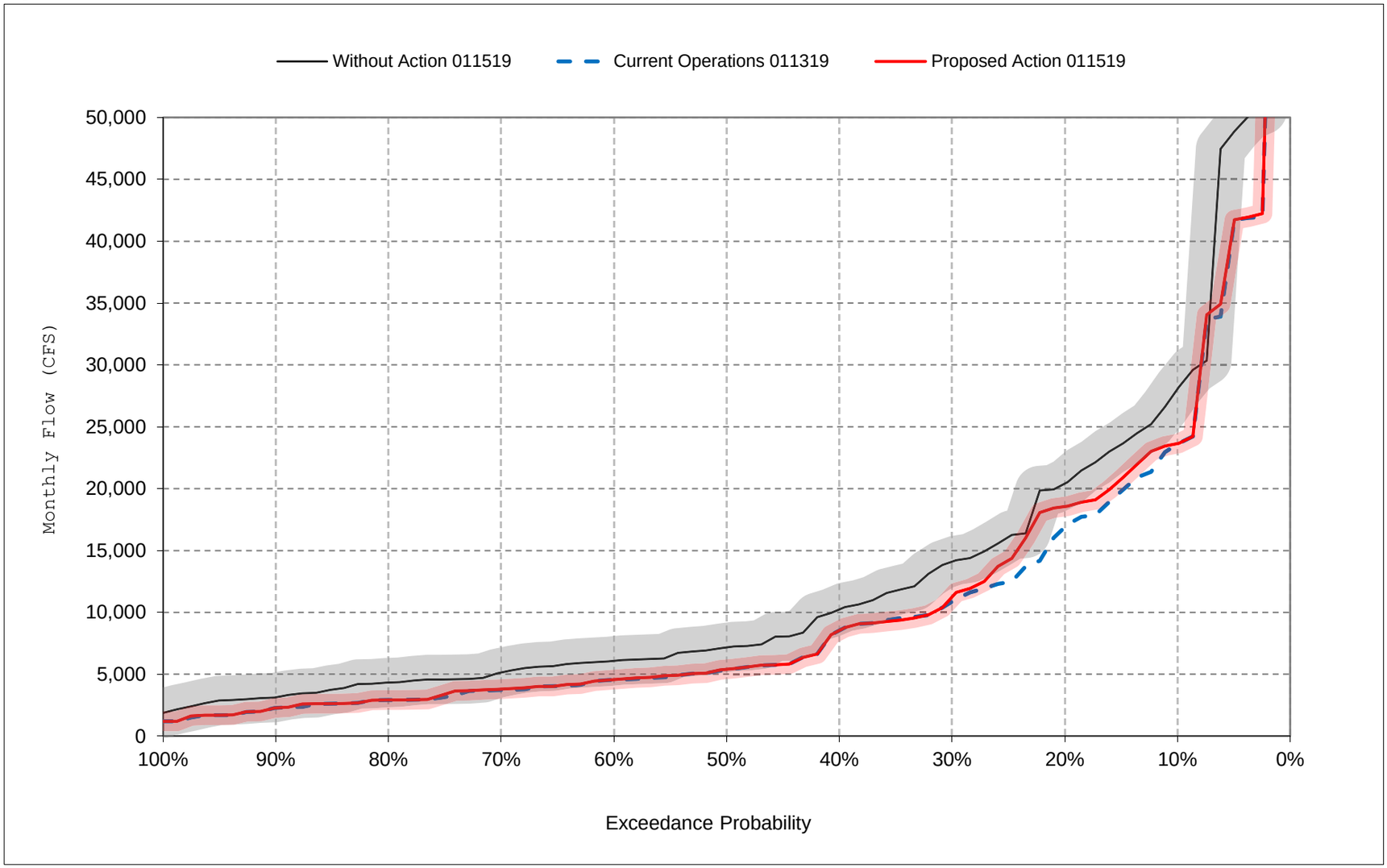
Figure 22-9. Feather River at Sacramento River Confluence Flow, December



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

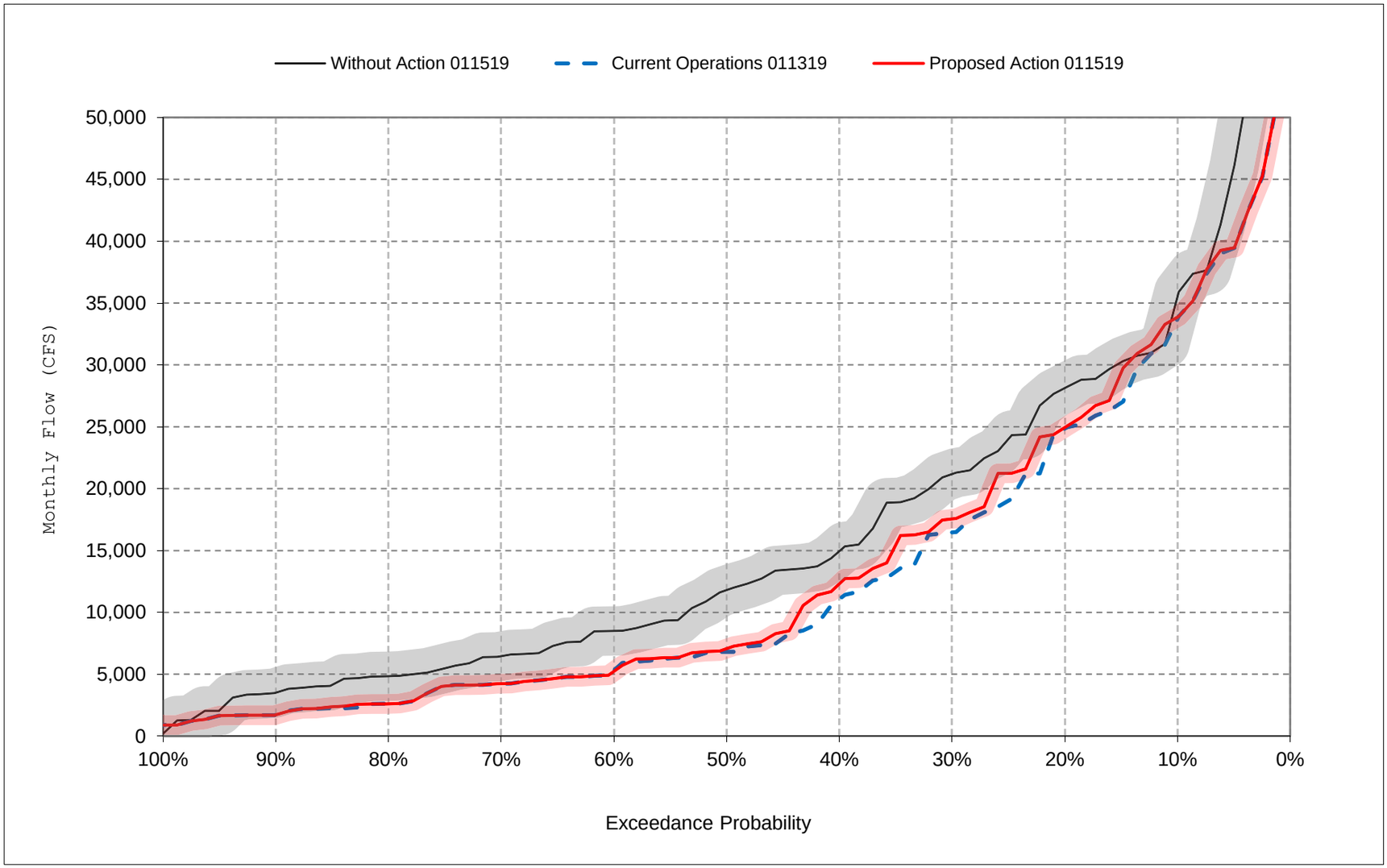
Figure 22-10. Feather River at Sacramento River Confluence Flow, January



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

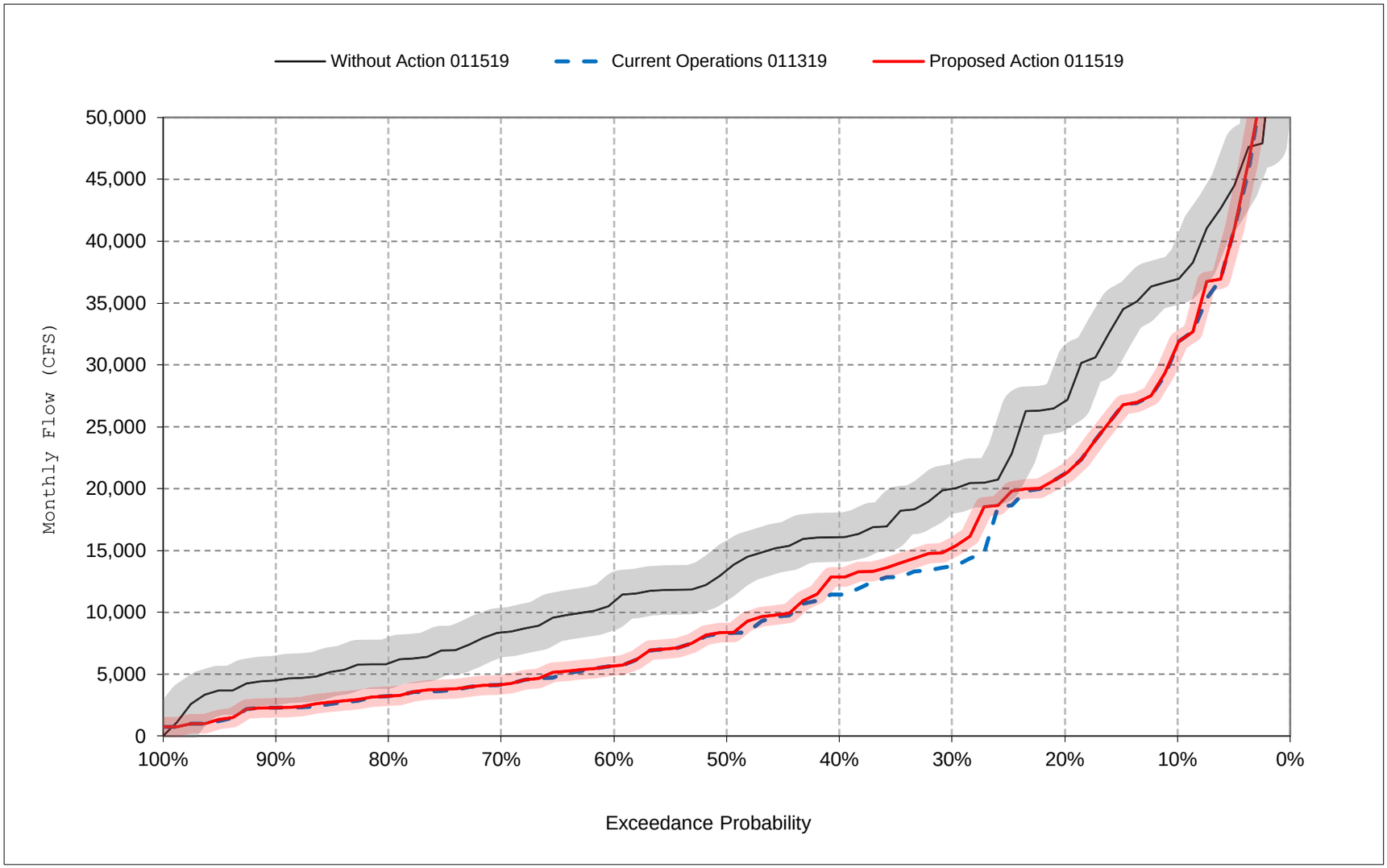
Figure 22-11. Feather River at Sacramento River Confluence Flow, February



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

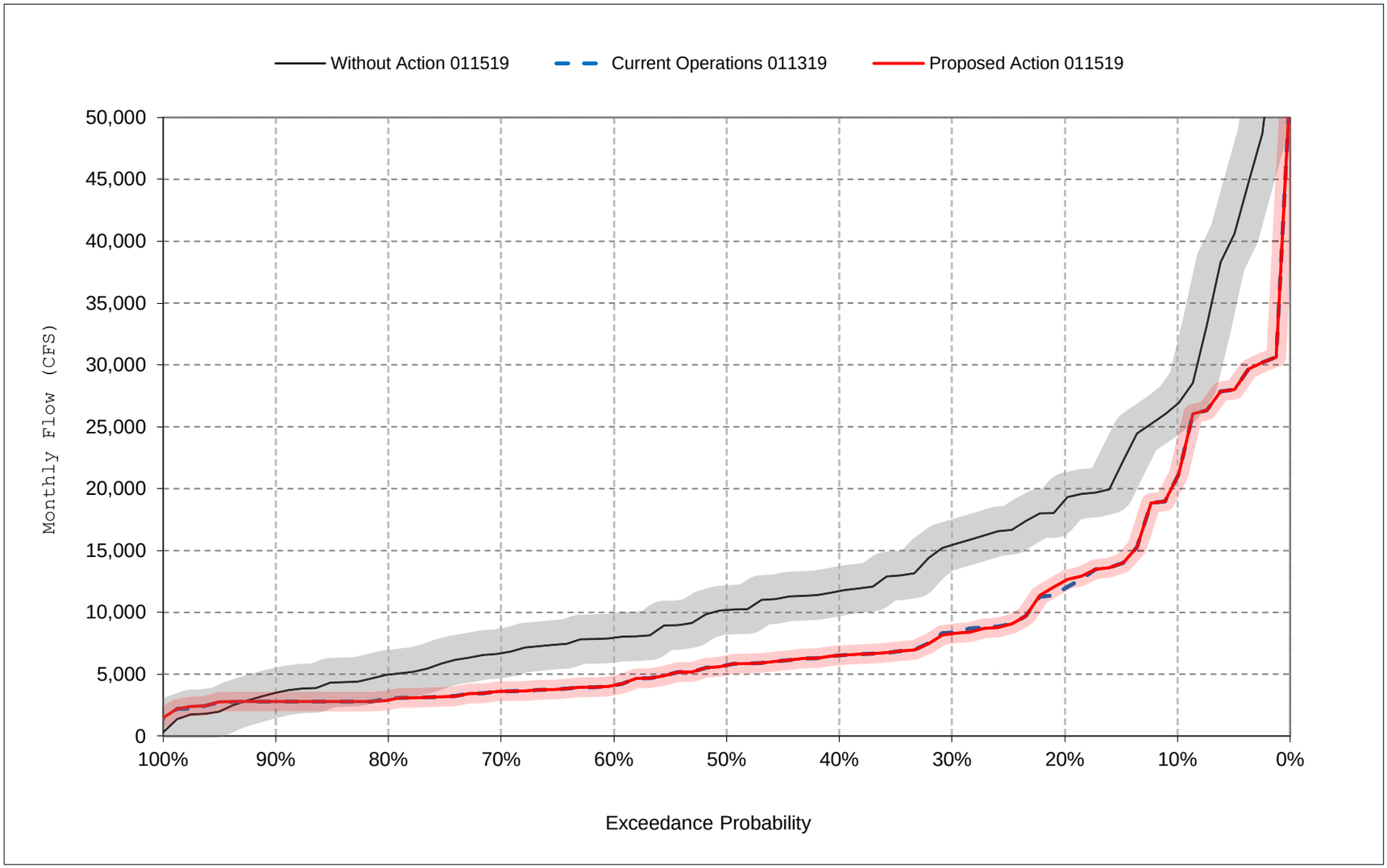
Figure 22-12. Feather River at Sacramento River Confluence Flow, March



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

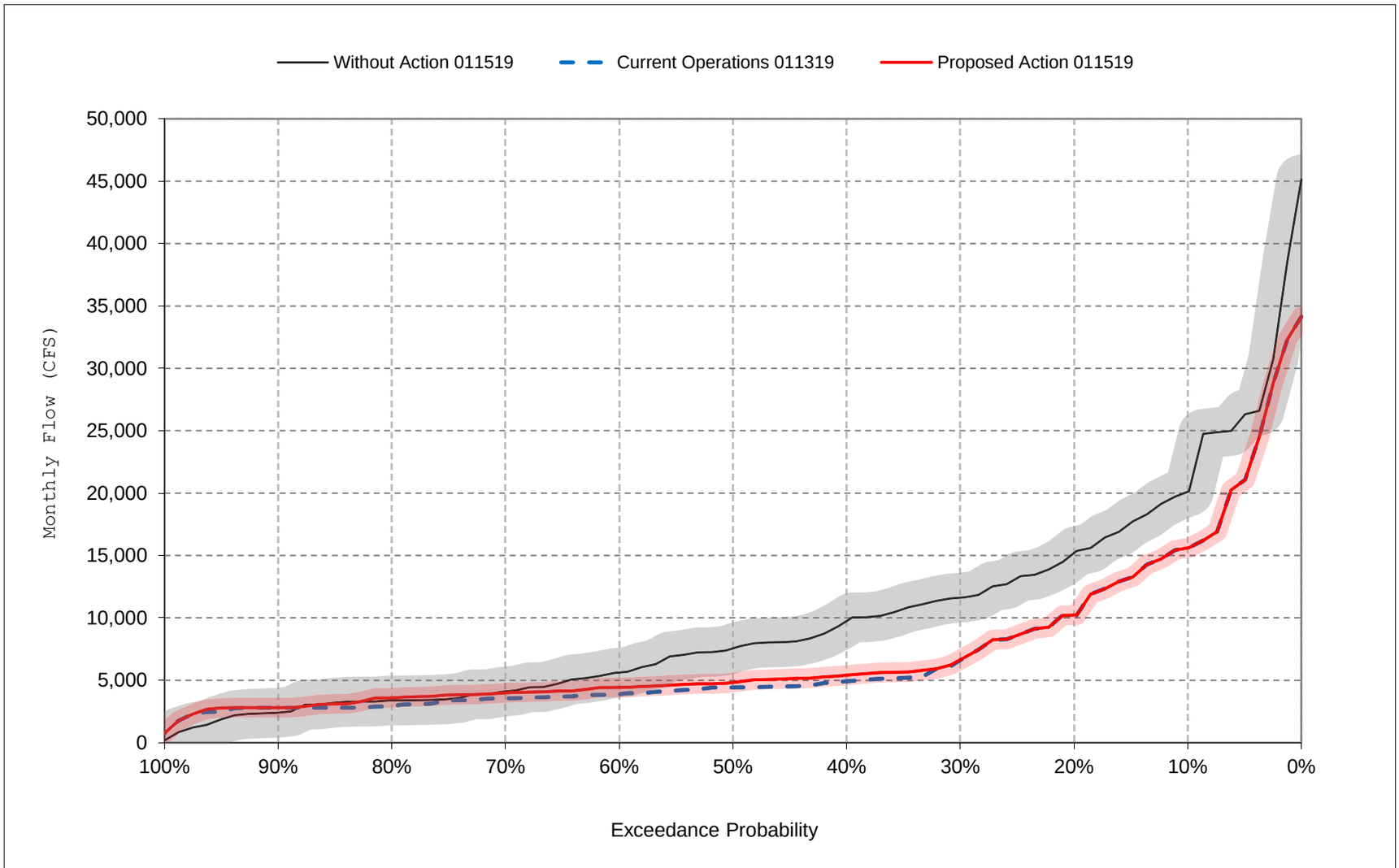
Figure 22-13. Feather River at Sacramento River Confluence Flow, April



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

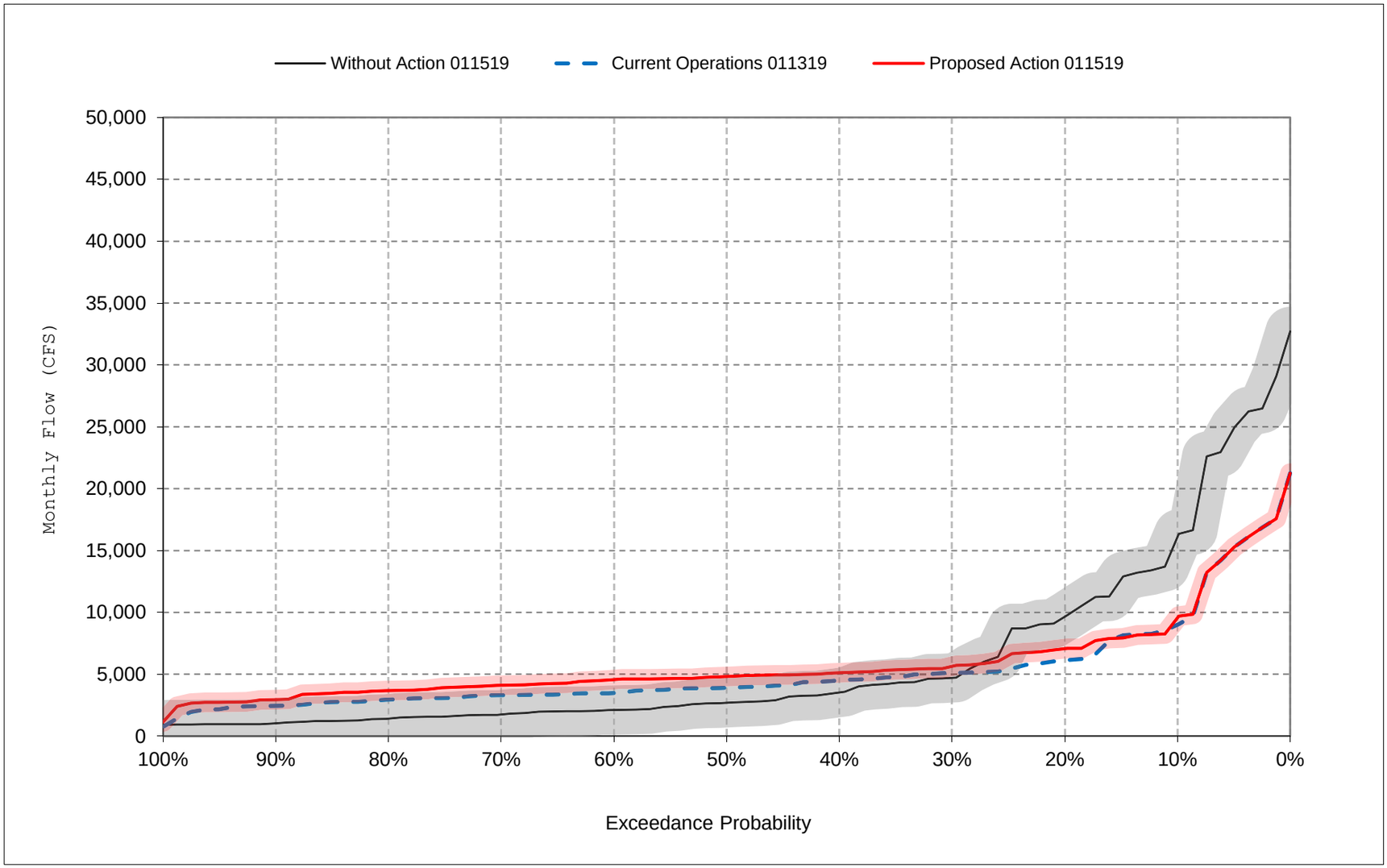
Figure 22-14. Feather River at Sacramento River Confluence Flow, May



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

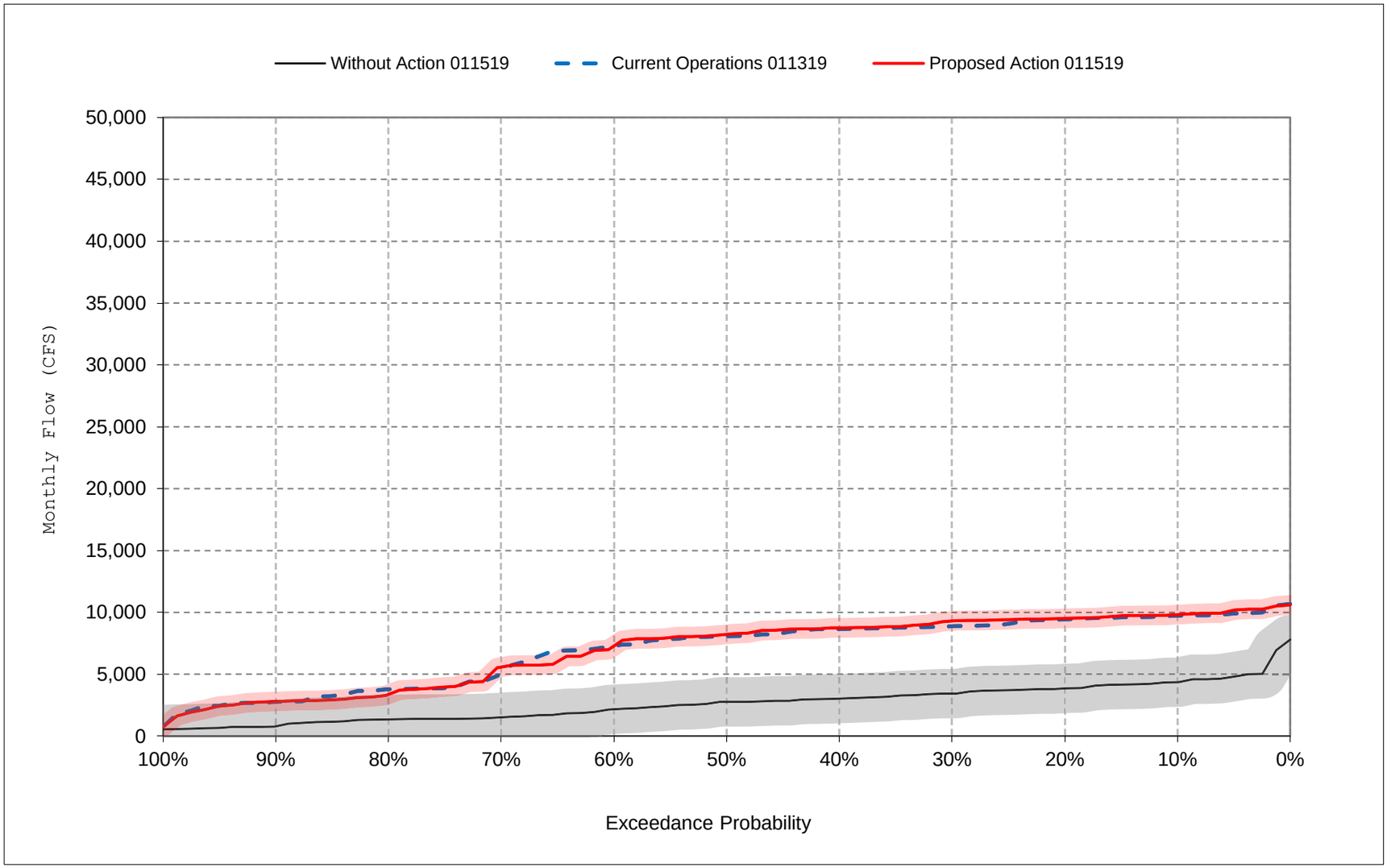
Figure 22-15. Feather River at Sacramento River Confluence Flow, June



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

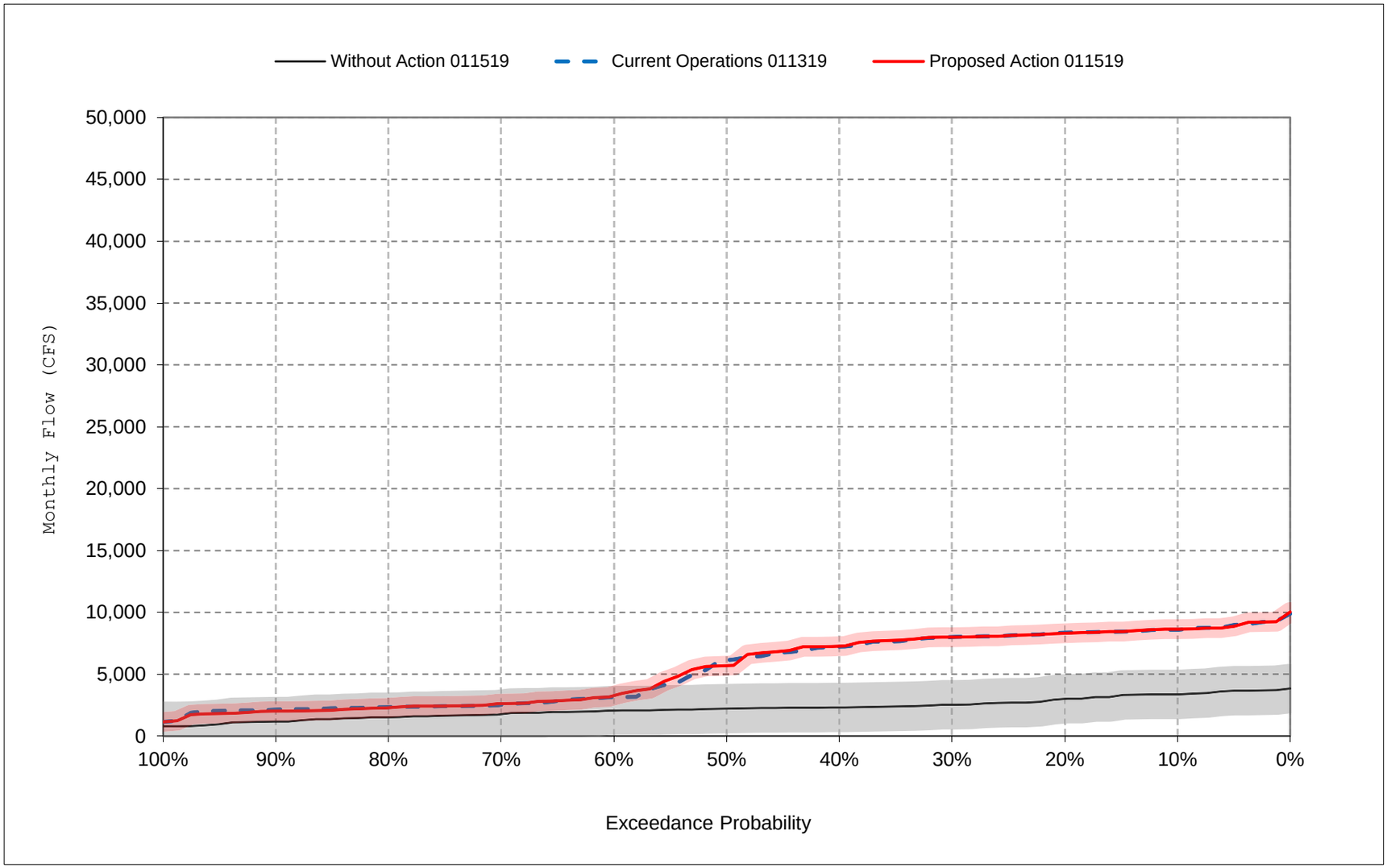
Figure 22-16. Feather River at Sacramento River Confluence Flow, July



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

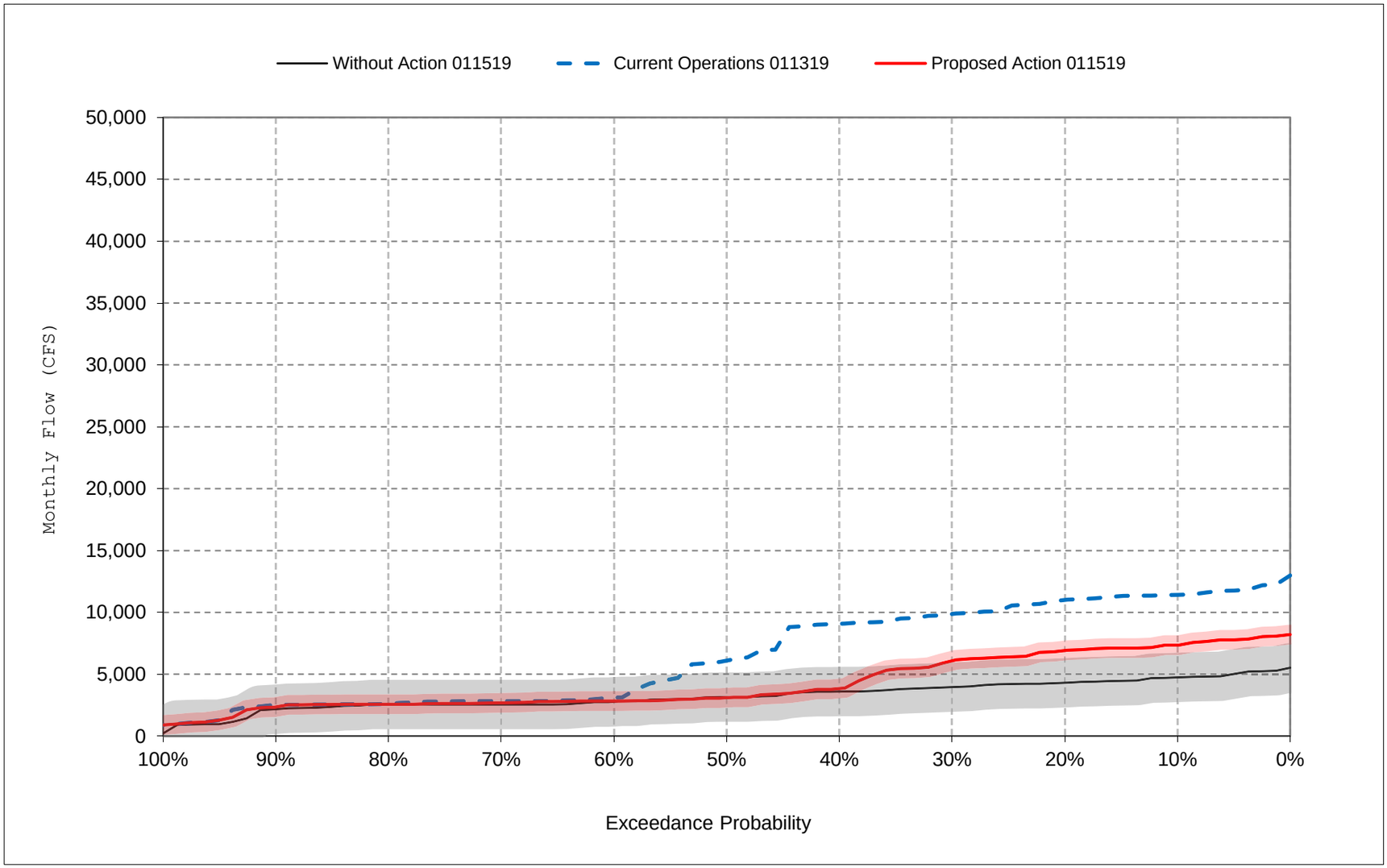
Figure 22-17. Feather River at Sacramento River Confluence Flow, August



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Figure 22-18. Feather River at Sacramento River Confluence Flow, September



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Table 24-1. Fremont Weir Spills, Monthly Spills

Without Action 011519

Statistic	Monthly Spills (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	0	2,076	28,506	41,002	38,017	8,367	131	0	0	0	0
20%	0	0	106	12,505	16,134	12,978	830	0	0	0	0	0
30%	0	0	0	6,152	9,720	5,194	65	0	0	0	0	0
40%	0	0	0	12	2,774	1,657	0	0	0	0	0	0
50%	0	0	0	0	1,021	160	0	0	0	0	0	0
60%	0	0	0	0	0	1	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	26	23	1,665	8,409	11,386	9,534	3,896	524	23	0	0	0
Water Year Types[b,c]												
Wet (32%)	0	7	1,593	22,380	27,257	21,697	9,916	1,490	73	0	0	0
Above Normal (16%)	0	0	2,356	7,308	14,179	14,504	3,811	10	0	0	0	0
Below Normal (13%)	191	0	618	0	1,667	1,847	4	132	0	0	0	0
Dry (24%)	0	84	2,885	631	1,105	440	605	133	0	0	0	0
Critical (15%)	0	0	0	1	21	1	0	0	0	0	0	0

Current Operations 011319

Statistic	Monthly Spills (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	301	7,187	24,201	44,517	14,376	1,904	0	0	0	0	0
20%	0	75	2,202	9,905	14,249	4,769	0	0	0	0	0	0
30%	0	53	505	4,192	6,128	2,111	0	0	0	0	0	0
40%	0	23	138	907	3,893	1,029	0	0	0	0	0	0
50%	0	5	91	485	2,331	296	0	0	0	0	0	0
60%	0	0	20	202	910	144	0	0	0	0	0	0
70%	0	0	8	37	336	82	0	0	0	0	0	0
80%	0	0	0	15	93	15	0	0	0	0	0	0
90%	0	0	0	4	40	1	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	18	375	3,007	8,766	12,004	6,631	1,213	51	7	0	0	0
Water Year Types[b,c]												
Wet (32%)	0	478	4,305	24,513	28,643	17,559	3,706	161	22	0	0	0
Above Normal (16%)	0	807	1,037	5,129	13,268	5,785	184	1	0	0	0	0
Below Normal (13%)	136	23	2,233	354	3,020	241	0	0	0	0	0	0
Dry (24%)	0	377	4,792	455	1,510	443	38	0	0	0	0	0
Critical (15%)	0	2	66	150	308	42	0	0	0	0	0	0

Current Operations 011319 minus Without Action 011519

Statistic	Monthly Spills (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	301	5,110	**-4,305**	3,516	**-23,642**	**-6,464**	**-131**	0	0	0	0
20%	0	75	2,096	**-2,600**	**-1,885**	**-8,209**	**-830**	0	0	0	0	0
30%	0	53	505	**-1,960**	**-3,592**	**-3,083**	**-65**	0	0	0	0	0
40%	0	23	138	895	1,119	**-627**	0	0	0	0	0	0
50%	0	5	91	485	1,310	136	0	0	0	0	0	0
60%	0	0	20	202	910	143	0	0	0	0	0	0
70%	0	0	8	37	336	82	0	0	0	0	0	0
80%	0	0	0	15	93	15	0	0	0	0	0	0
90%	0	0	0	4	40	1	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	**-7**	352	1,342	357	617	**-2,903**	**-2,683**	**-473**	**-16**	0	0	0
Water Year Types[b,c]												
Wet (32%)	0	471	2,712	2,133	1,386	**-4,138**	**-6,210**	**-1,329**	**-51**	0	0	0
Above Normal (16%)	0	806	**-1,319**	**-2,179**	**-911**	**-8,719**	**-3,626**	**-9**	0	0	0	0
Below Normal (13%)	**-55**	23	1,615	354	1,353	**-1,606**	**-4**	**-132**	0	0	0	0
Dry (24%)	0	292	1,906	**-176**	405	2	**-567**	**-133**	0	0	0	0
Critical (15%)	0	2	66	149	287	41	0	0	0	0	0	0

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 24-2. Fremont Weir Spills, Monthly Spills

Without Action 011519

Statistic	Monthly Spills (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	0	2,076	28,506	41,002	38,017	8,367	131	0	0	0	0
20%	0	0	106	12,505	16,134	12,978	830	0	0	0	0	0
30%	0	0	0	6,152	9,720	5,194	65	0	0	0	0	0
40%	0	0	0	12	2,774	1,657	0	0	0	0	0	0
50%	0	0	0	0	1,021	160	0	0	0	0	0	0
60%	0	0	0	0	0	1	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	26	23	1,665	8,409	11,386	9,534	3,896	524	23	0	0	0
Water Year Types[b,c]												
Wet (32%)	0	7	1,593	22,380	27,257	21,697	9,916	1,490	73	0	0	0
Above Normal (16%)	0	0	2,356	7,308	14,179	14,504	3,811	10	0	0	0	0
Below Normal (13%)	191	0	618	0	1,667	1,847	4	132	0	0	0	0
Dry (24%)	0	84	2,885	631	1,105	440	605	133	0	0	0	0
Critical (15%)	0	0	0	1	21	1	0	0	0	0	0	0

Proposed Action 011519

Statistic	Monthly Spills (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	448	9,441	29,156	45,271	15,313	1,896	0	0	0	0	0
20%	0	40	3,176	9,909	13,394	4,463	0	0	0	0	0	0
30%	0	9	602	4,204	8,702	2,600	0	0	0	0	0	0
40%	0	0	161	1,258	4,388	1,030	0	0	0	0	0	0
50%	0	0	91	664	2,140	347	0	0	0	0	0	0
60%	0	0	21	224	1,034	164	0	0	0	0	0	0
70%	0	0	6	51	321	82	0	0	0	0	0	0
80%	0	0	0	19	101	15	0	0	0	0	0	0
90%	0	0	0	4	31	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	18	428	3,531	9,140	12,483	6,809	1,213	51	7	0	0	0
Water Year Types[b,c]												
Wet (32%)	0	496	5,689	25,558	29,184	17,864	3,706	161	22	0	0	0
Above Normal (16%)	0	1,063	1,402	5,263	14,451	6,185	184	1	0	0	0	0
Below Normal (13%)	132	22	2,219	504	3,987	308	0	0	0	0	0	0
Dry (24%)	0	405	4,912	461	1,479	480	38	0	0	0	0	0
Critical (15%)	0	2	64	154	297	42	0	0	0	0	0	0

Proposed Action 011519 minus Without Action 011519

Statistic	Monthly Spills (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	448	7,365	650	4,269	**-22,704**	**-6,471**	**-131**	0	0	0	0
20%	0	40	3,070	**-2,596**	**-2,740**	**-8,515**	**-830**	0	0	0	0	0
30%	0	9	602	**-1,948**	**-1,018**	**-2,594**	**-65**	0	0	0	0	0
40%	0	0	161	1,245	1,614	**-627**	0	0	0	0	0	0
50%	0	0	91	664	1,119	187	0	0	0	0	0	0
60%	0	0	21	224	1,034	163	0	0	0	0	0	0
70%	0	0	6	51	321	82	0	0	0	0	0	0
80%	0	0	0	19	101	15	0	0	0	0	0	0
90%	0	0	0	4	31	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	**-8**	405	1,866	732	1,097	**-2,725**	**-2,683**	**-473**	**-16**	0	0	0
Water Year Types[b,c]												
Wet (32%)	0	490	4,096	3,177	1,927	**-3,833**	**-6,210**	**-1,328**	**-51**	0	0	0
Above Normal (16%)	0	1,062	**-954**	**-2,045**	272	**-8,319**	**-3,627**	**-9**	0	0	0	0
Below Normal (13%)	**-59**	22	1,601	504	2,320	**-1,539**	**-4**	**-132**	0	0	0	0
Dry (24%)	0	320	2,027	**-170**	374	40	**-567**	**-133**	0	0	0	0
Critical (15%)	0	2	64	153	276	42	0	0	0	0	0	0

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 24-3. Fremont Weir Spills, Monthly Spills

Current Operations 011319

Statistic	Monthly Spills (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	301	7,187	24,201	44,517	14,376	1,904	0	0	0	0	0
20%	0	75	2,202	9,905	14,249	4,769	0	0	0	0	0	0
30%	0	53	505	4,192	6,128	2,111	0	0	0	0	0	0
40%	0	23	138	907	3,893	1,029	0	0	0	0	0	0
50%	0	5	91	485	2,331	296	0	0	0	0	0	0
60%	0	0	20	202	910	144	0	0	0	0	0	0
70%	0	0	8	37	336	82	0	0	0	0	0	0
80%	0	0	0	15	93	15	0	0	0	0	0	0
90%	0	0	0	4	40	1	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	18	375	3,007	8,766	12,004	6,631	1,213	51	7	0	0	0
Water Year Types[b,c]												
Wet (32%)	0	478	4,305	24,513	28,643	17,559	3,706	161	22	0	0	0
Above Normal (16%)	0	807	1,037	5,129	13,268	5,785	184	1	0	0	0	0
Below Normal (13%)	136	23	2,233	354	3,020	241	0	0	0	0	0	0
Dry (24%)	0	377	4,792	455	1,510	443	38	0	0	0	0	0
Critical (15%)	0	2	66	150	308	42	0	0	0	0	0	0

Proposed Action 011519

Statistic	Monthly Spills (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	448	9,441	29,156	45,271	15,313	1,896	0	0	0	0	0
20%	0	40	3,176	9,909	13,394	4,463	0	0	0	0	0	0
30%	0	9	602	4,204	8,702	2,600	0	0	0	0	0	0
40%	0	0	161	1,258	4,388	1,030	0	0	0	0	0	0
50%	0	0	91	664	2,140	347	0	0	0	0	0	0
60%	0	0	21	224	1,034	164	0	0	0	0	0	0
70%	0	0	6	51	321	82	0	0	0	0	0	0
80%	0	0	0	19	101	15	0	0	0	0	0	0
90%	0	0	0	4	31	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	18	428	3,531	9,140	12,483	6,809	1,213	51	7	0	0	0
Water Year Types[b,c]												
Wet (32%)	0	496	5,689	25,558	29,184	17,864	3,706	161	22	0	0	0
Above Normal (16%)	0	1,063	1,402	5,263	14,451	6,185	184	1	0	0	0	0
Below Normal (13%)	132	22	2,219	504	3,987	308	0	0	0	0	0	0
Dry (24%)	0	405	4,912	461	1,479	480	38	0	0	0	0	0
Critical (15%)	0	2	64	154	297	42	0	0	0	0	0	0

Proposed Action 011519 minus Current Operations 011319

Statistic	Monthly Spills (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	147	2,255	4,955	754	938	**-8**	0	0	0	0	0
20%	0	**-35**	974	5	**-854**	**-306**	0	0	0	0	0	0
30%	0	**-44**	97	12	2,574	489	0	0	0	0	0	0
40%	0	**-23**	23	351	494	0	0	0	0	0	0	0
50%	0	**-5**	**0**	179	**-192**	51	0	0	0	0	0	0
60%	0	**0**	1	22	124	20	0	0	0	0	0	0
70%	0	0	**-2**	14	**-14**	0	0	0	0	0	0	0
80%	0	0	0	4	8	0	0	0	0	0	0	0
90%	0	0	0	**0**	**-10**	**0**	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	**0**	53	524	374	480	178	**0**	0	0	0	0	0
Water Year Types[b,c]												
Wet (32%)	0	18	1,384	1,044	541	305	0	0	0	0	0	0
Above Normal (16%)	0	256	365	134	1,183	400	**-1**	**0**	0	0	0	0
Below Normal (13%)	**-3**	**-1**	**-14**	150	967	67	0	0	0	0	0	0
Dry (24%)	0	28	121	6	**-31**	37	**0**	0	0	0	0	0
Critical (15%)	0	**0**	**-1**	4	**-11**	0	0	0	0	0	0	0

a Based on the 82-year simulation period.

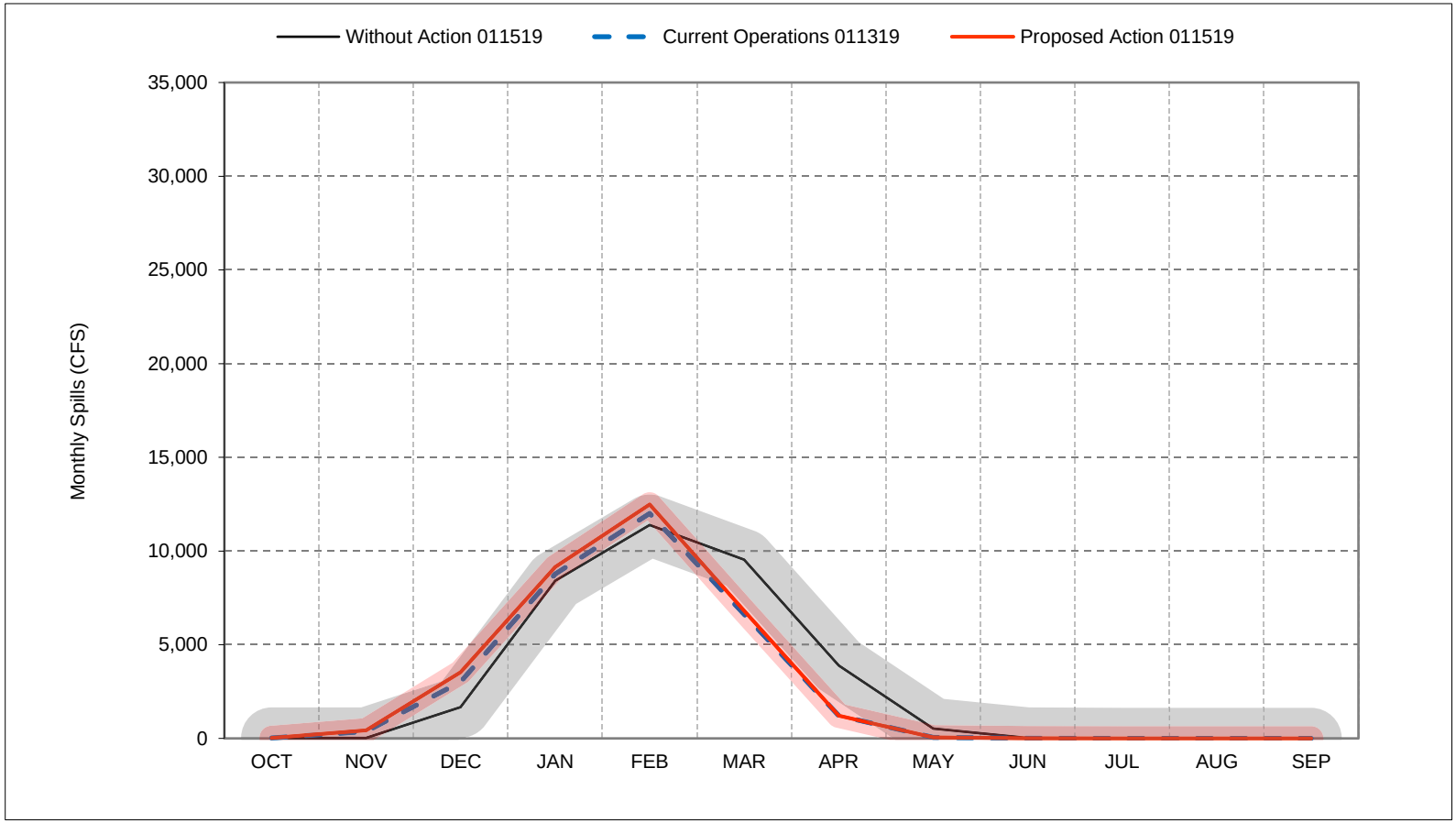
b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

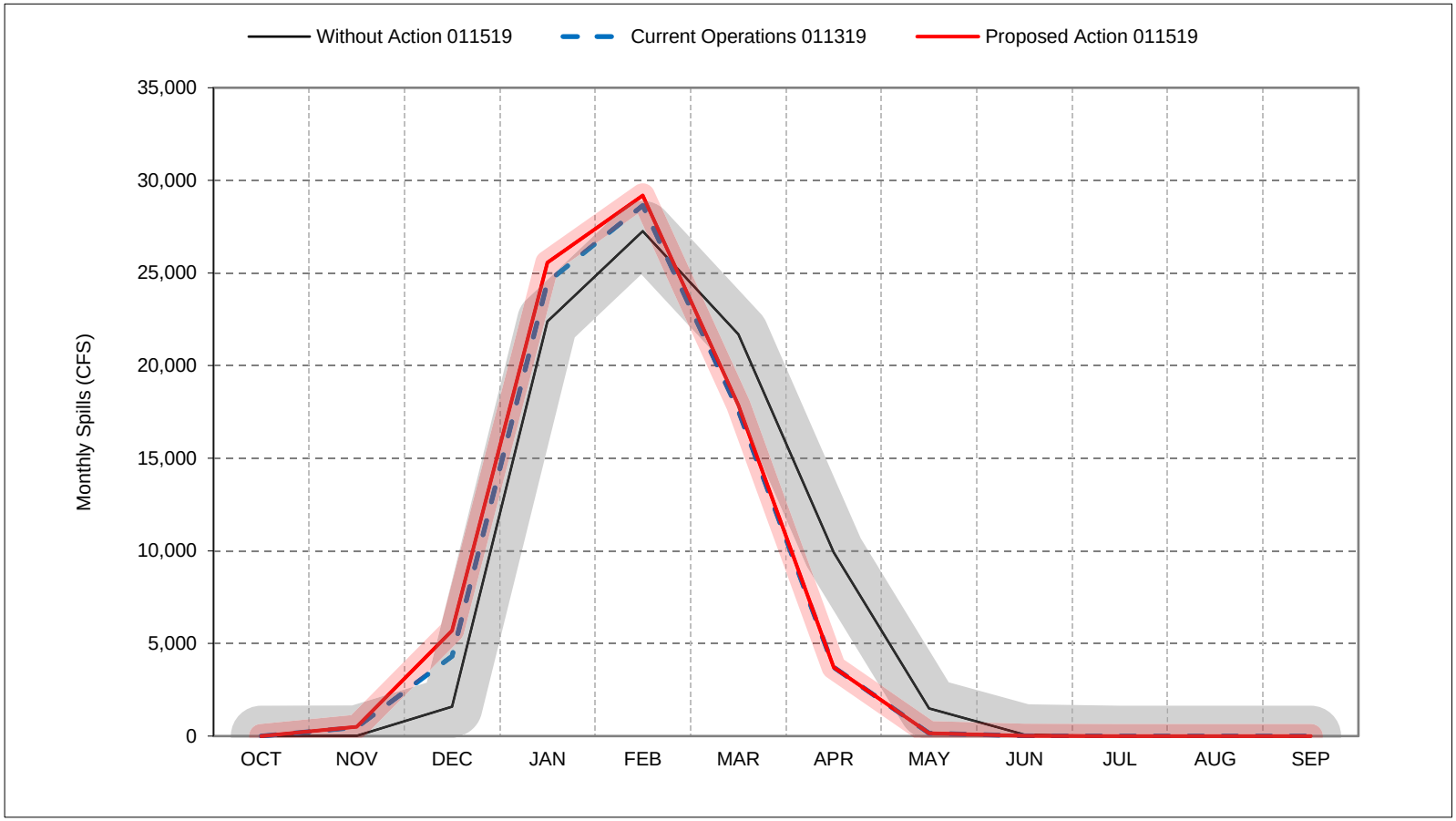
e These are draft results meant for qualitative analysis and are subject to revision.

Figure 24-1. Fremont Weir Spills, Long-Term Average Spills



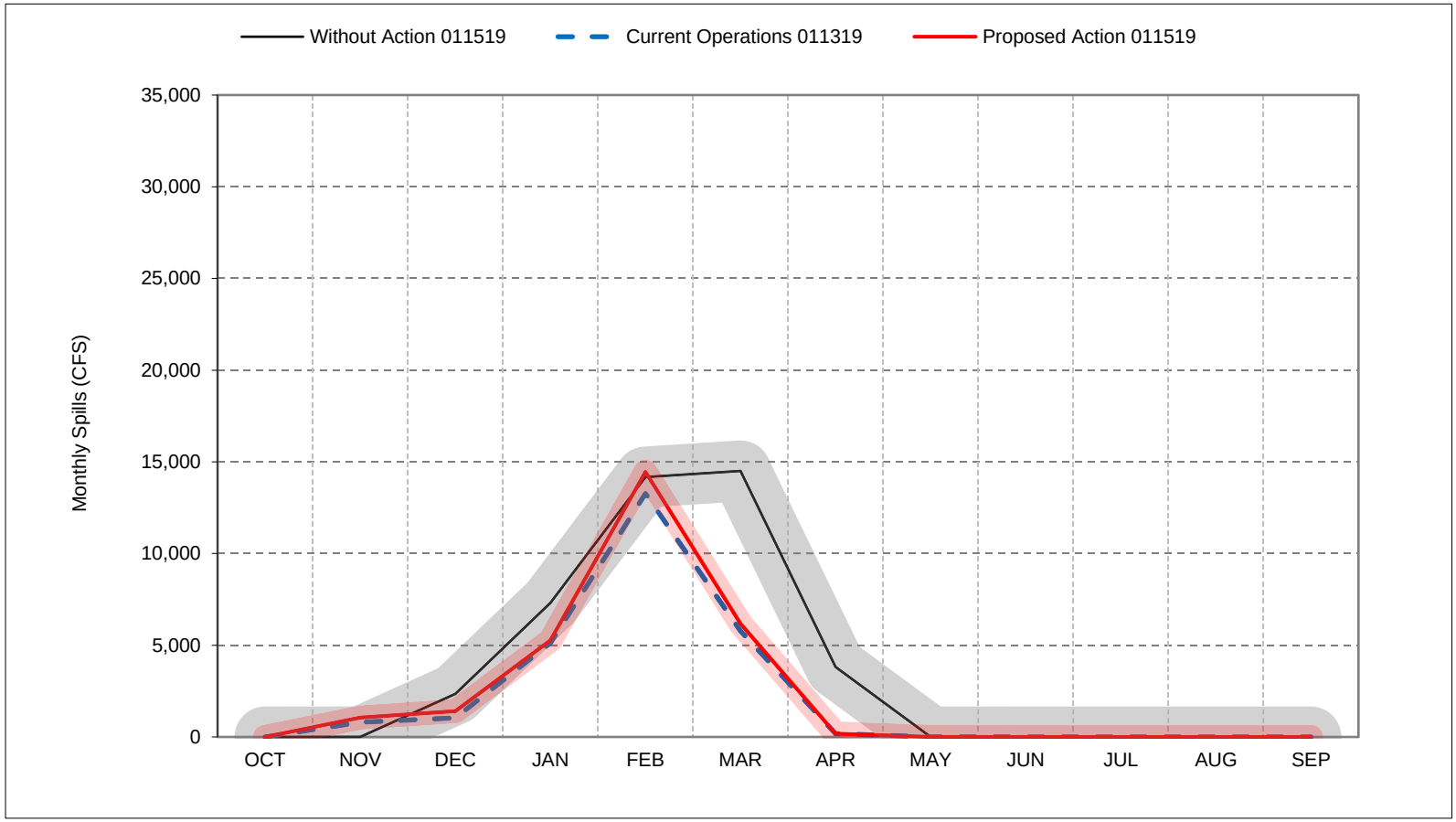
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 24-2. Fremont Weir Spills, Wet Year Average Spills



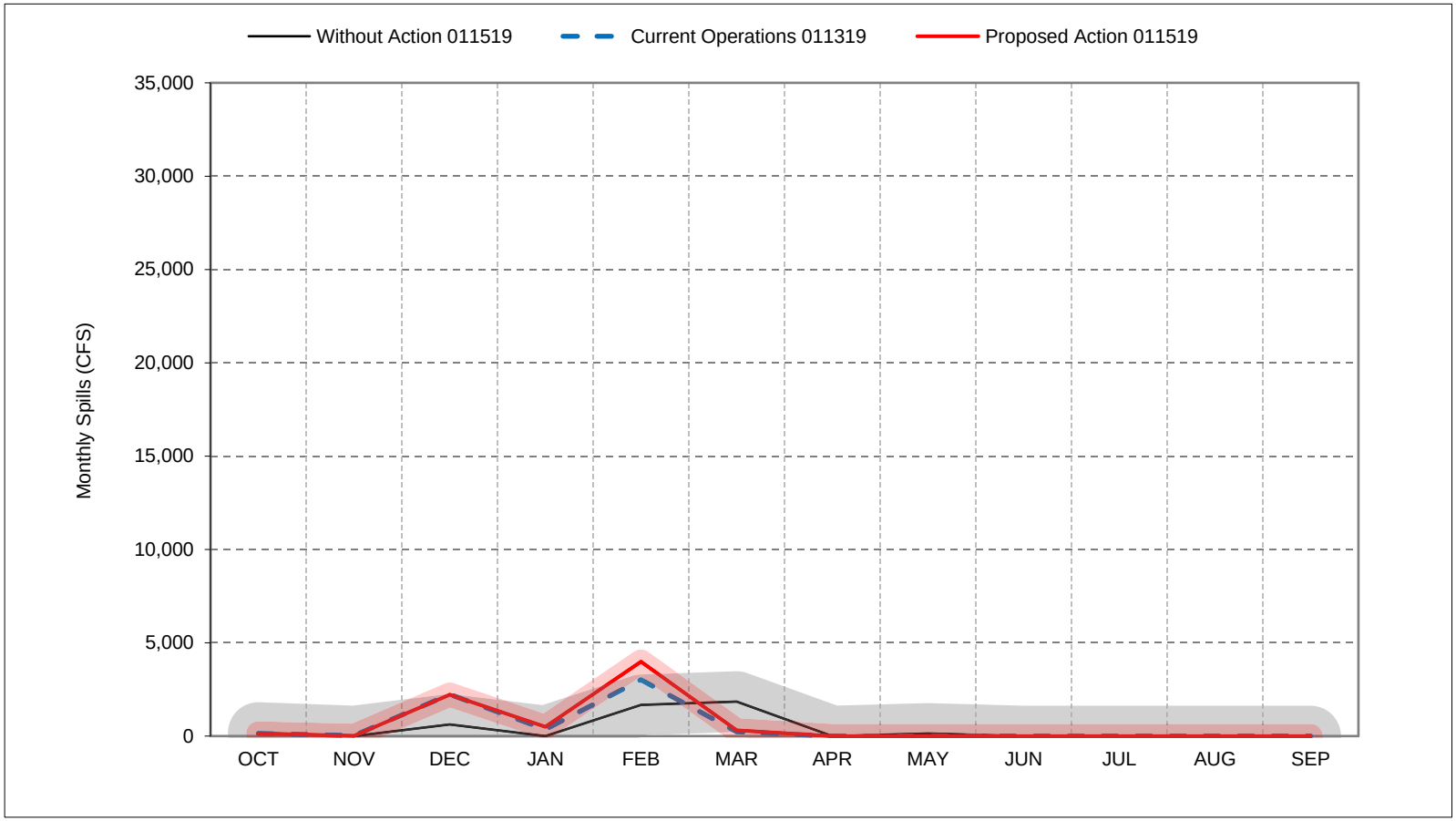
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 24-3. Fremont Weir Spills, Above Normal Year Average Spills



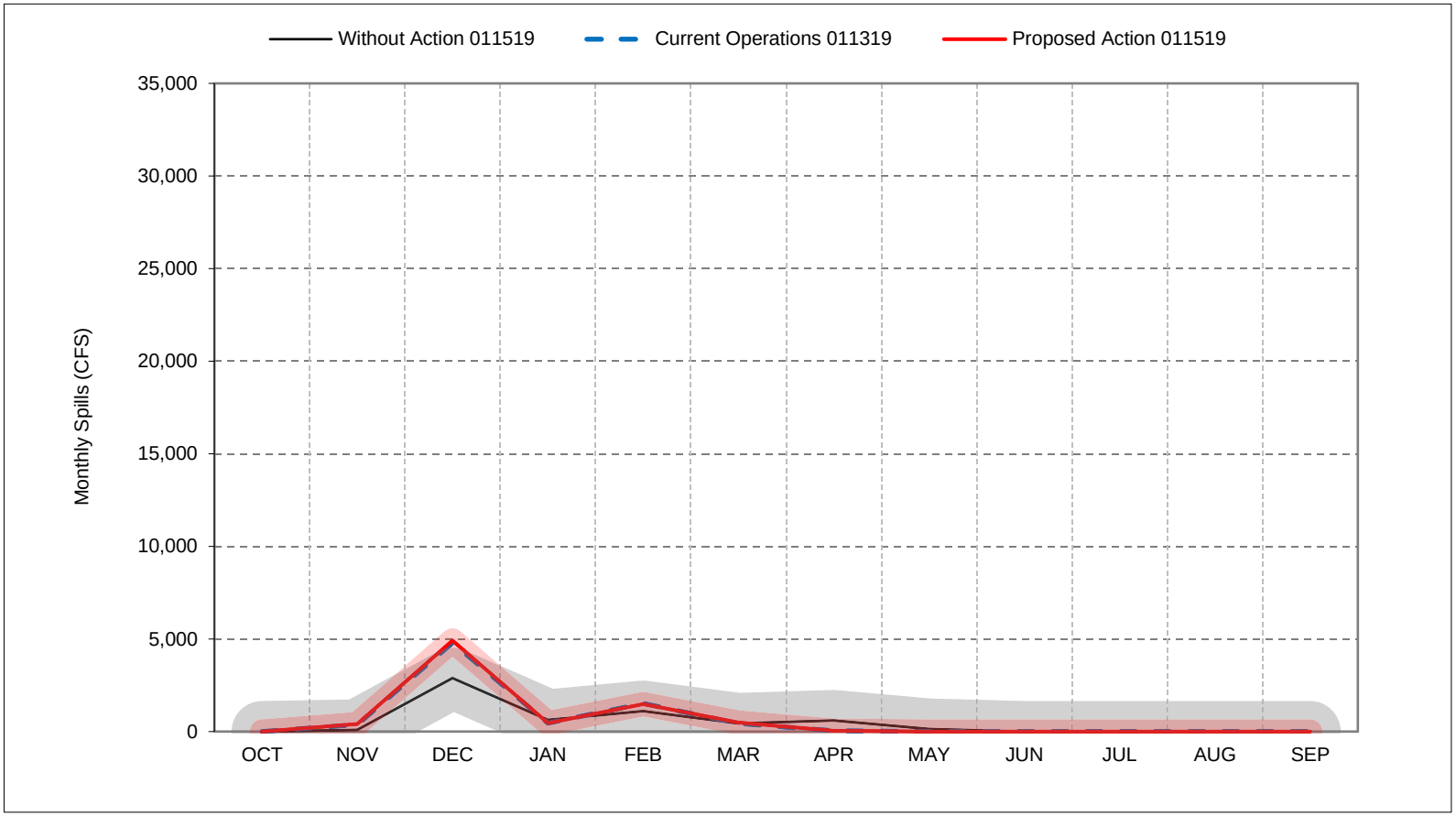
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 24-4. Fremont Weir Spills, Below Normal Year Average Spills



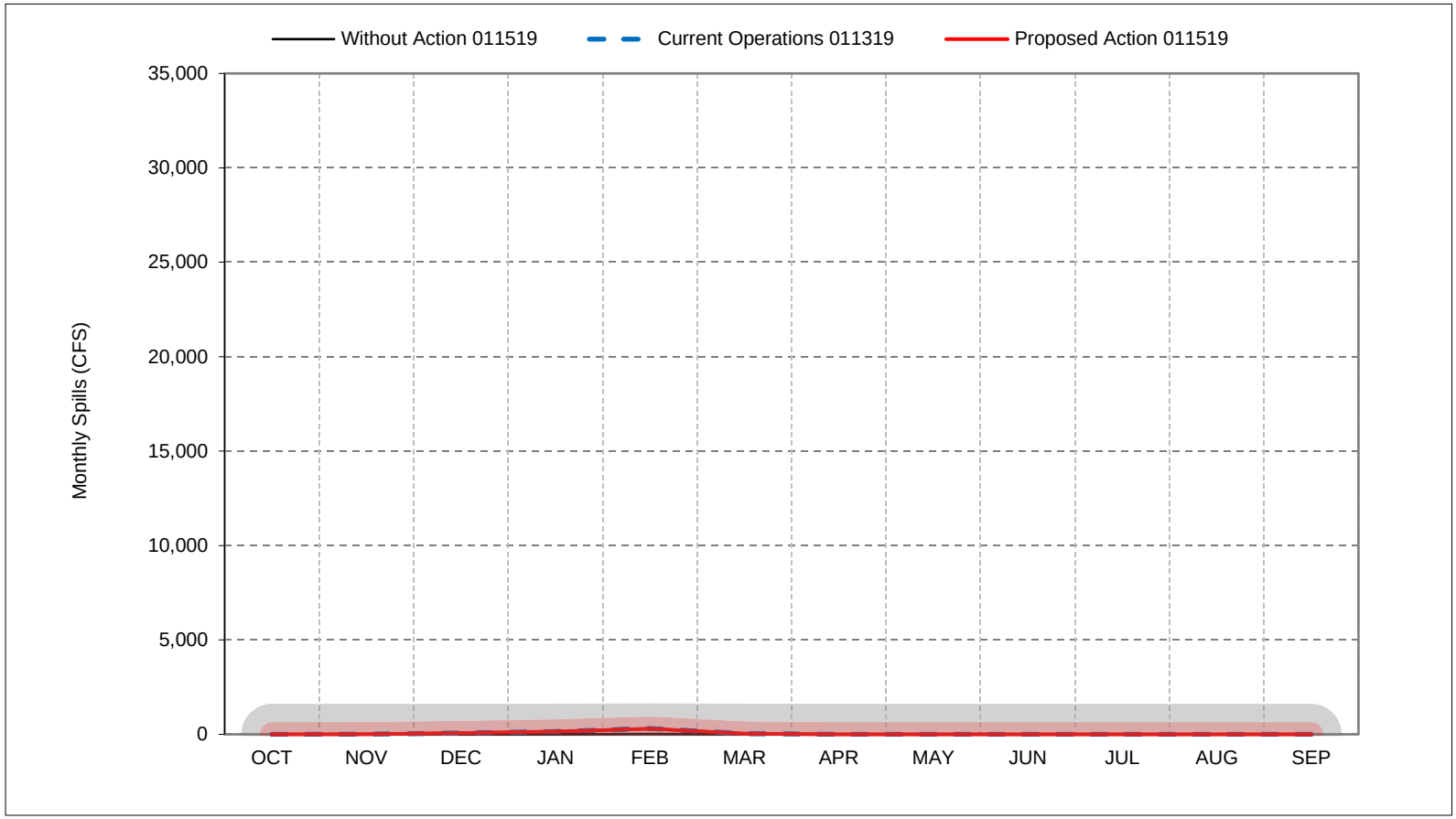
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 24-5. Fremont Weir Spills, Dry Year Average Spills



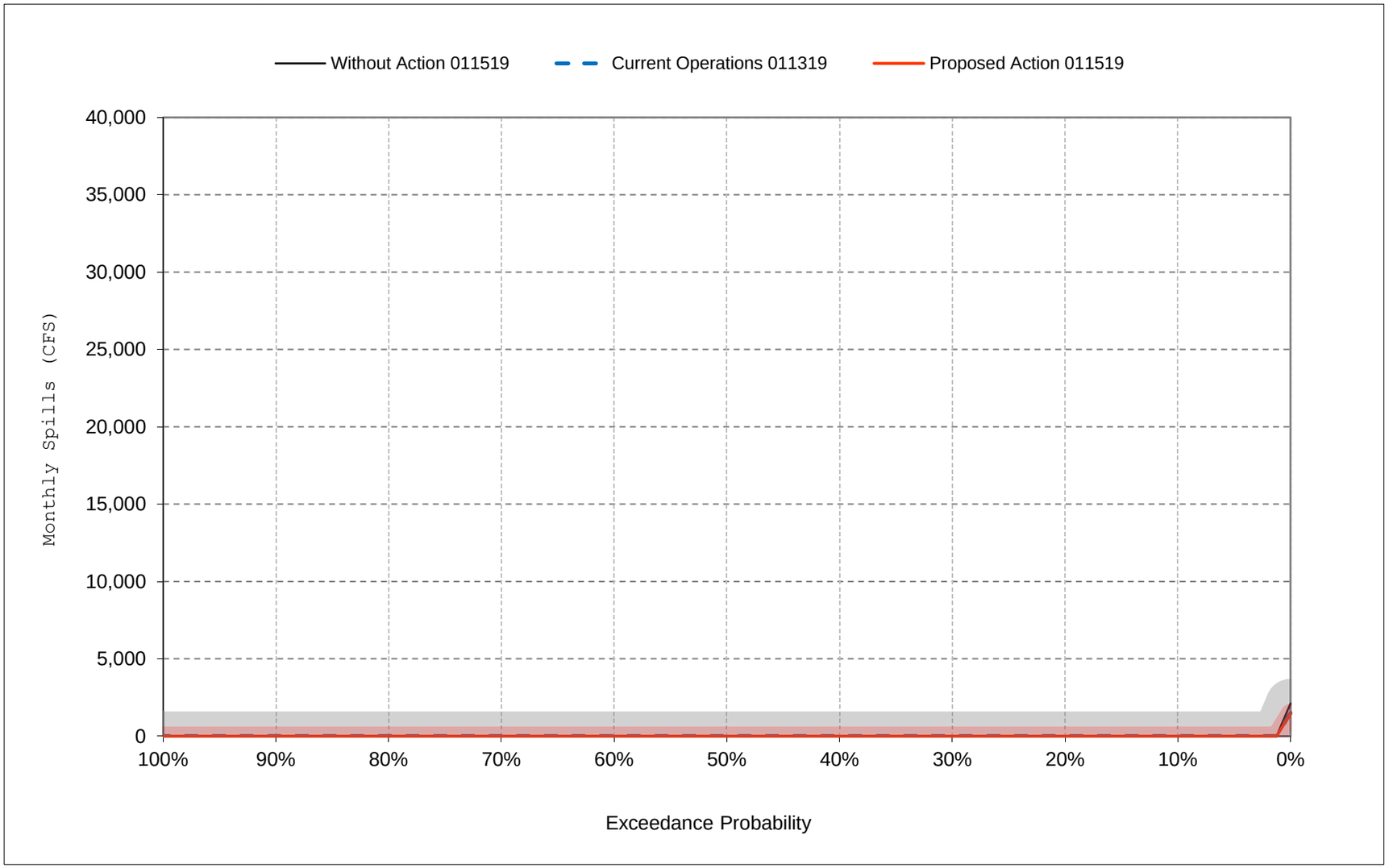
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 24-6. Fremont Weir Spills, Critical Year Average Spills



*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

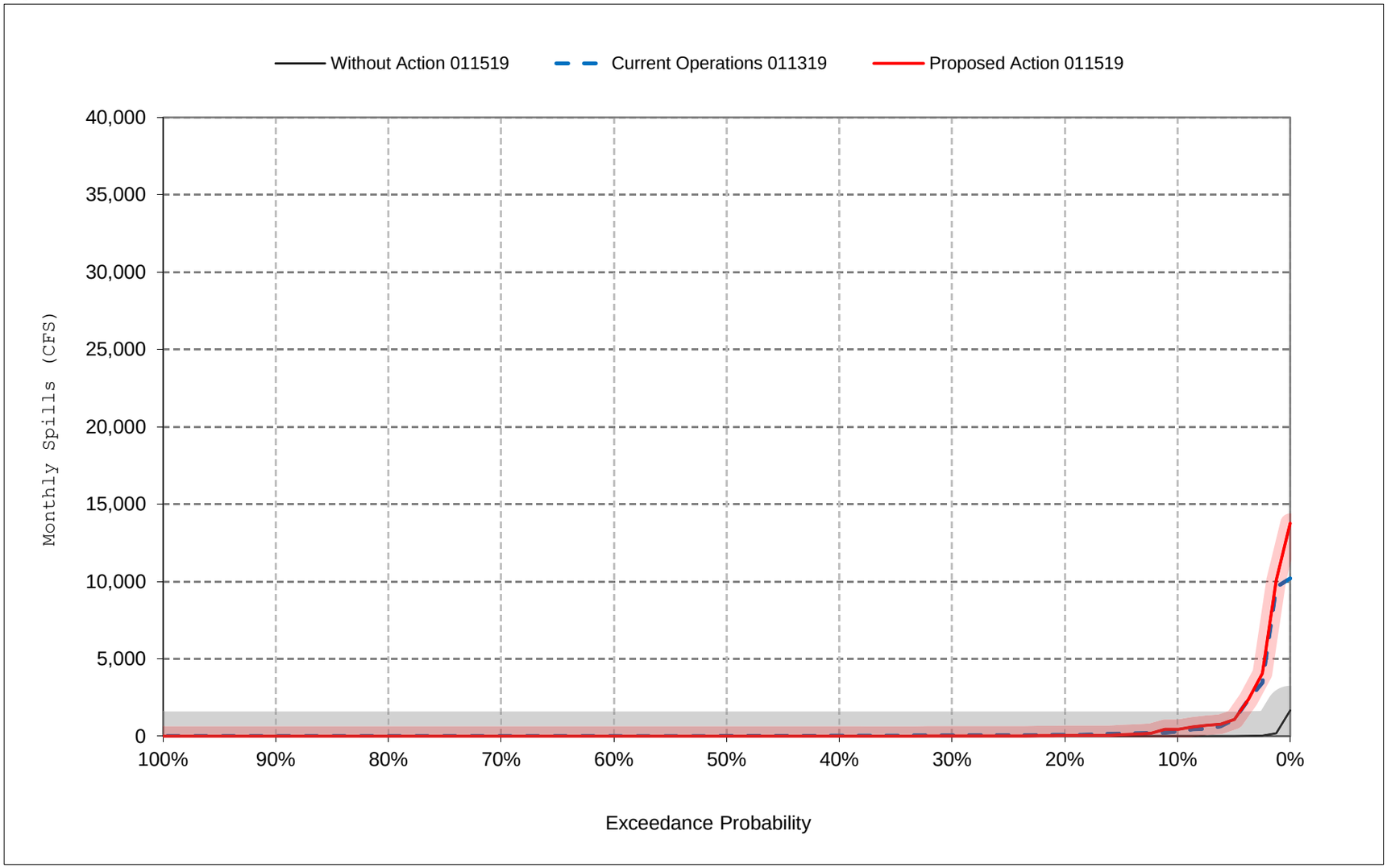
Figure 24-7. Fremont Weir Spills, October



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

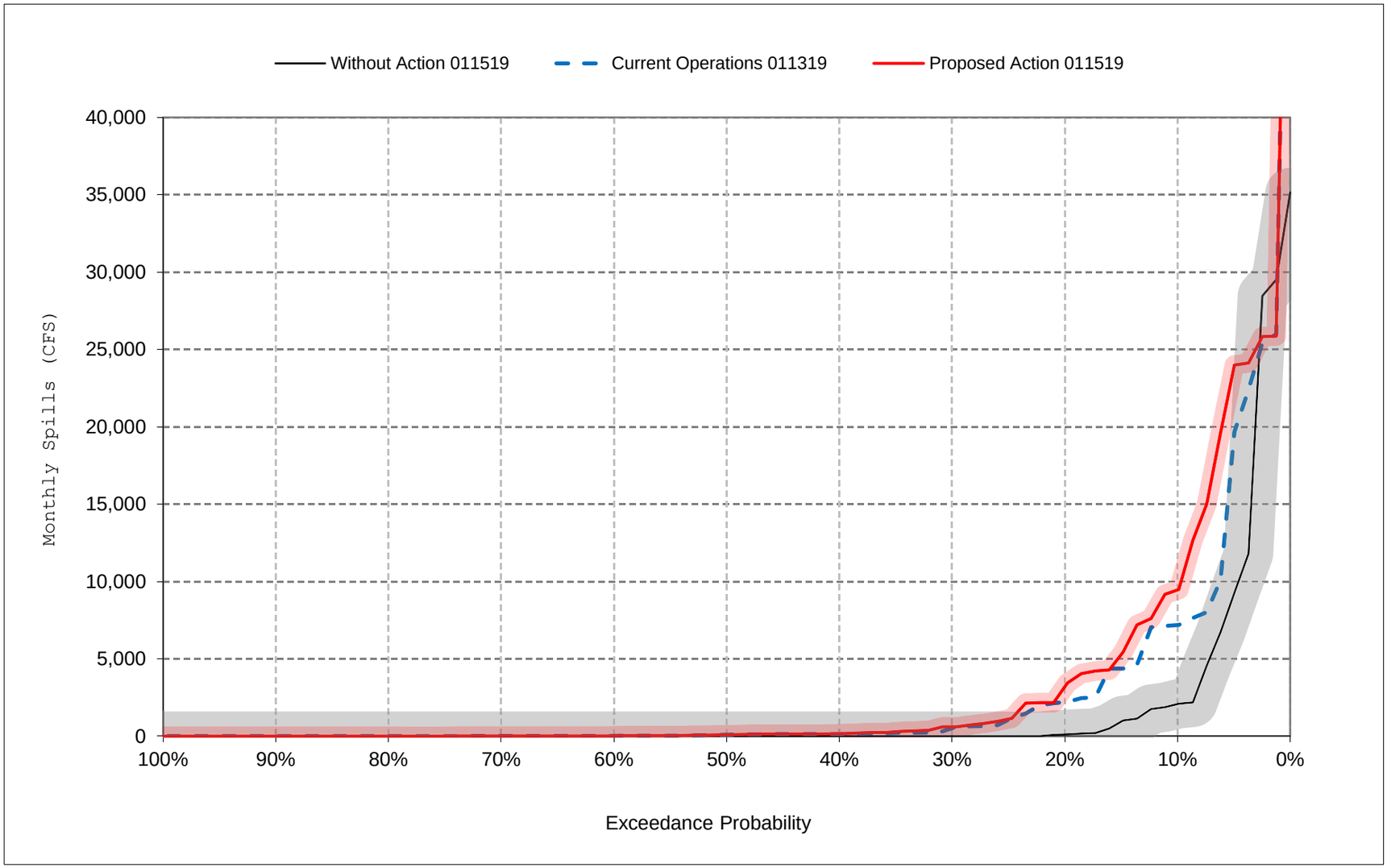
Figure 24-8. Fremont Weir Spills, November



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

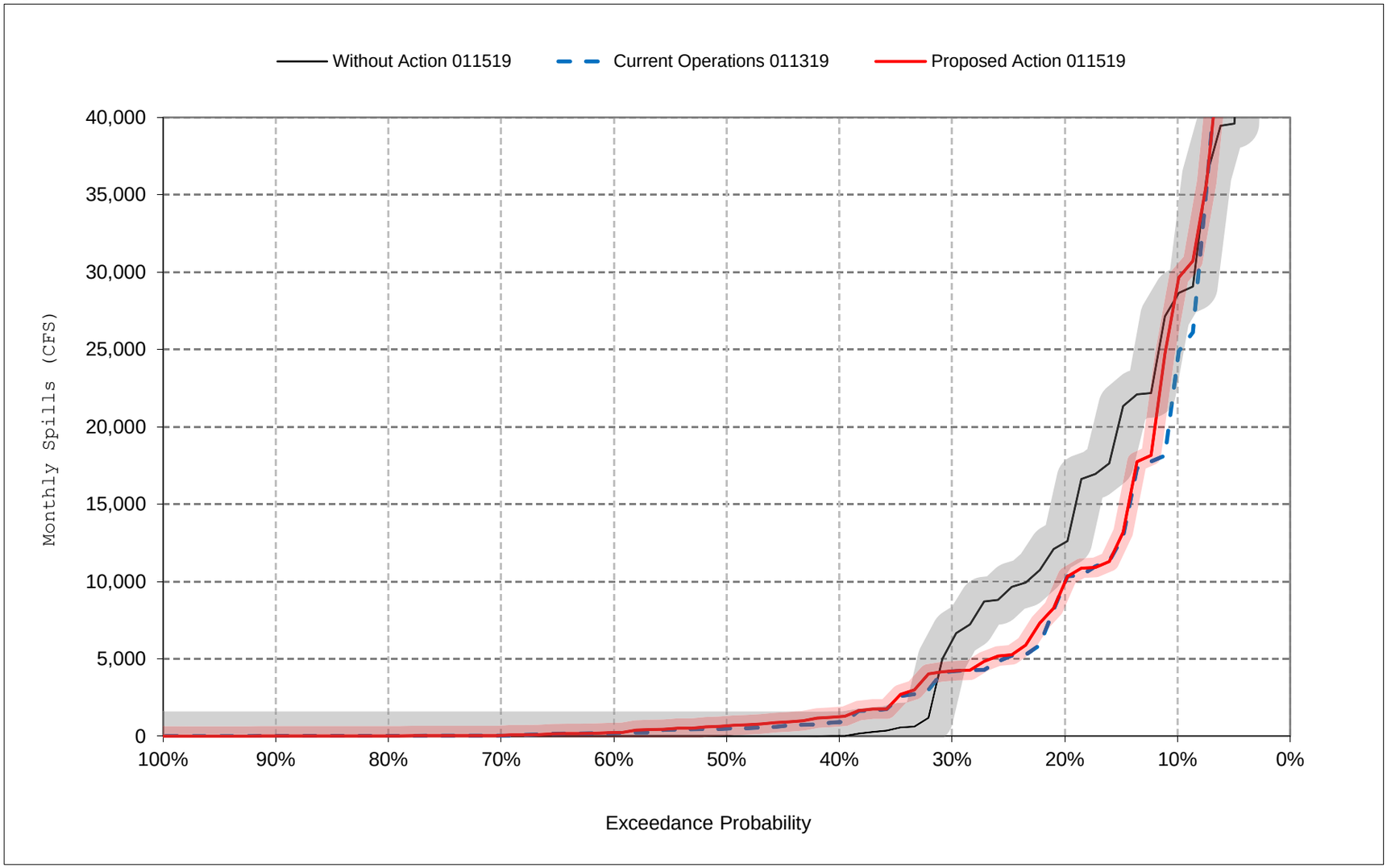
Figure 24-9. Fremont Weir Spills, December



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

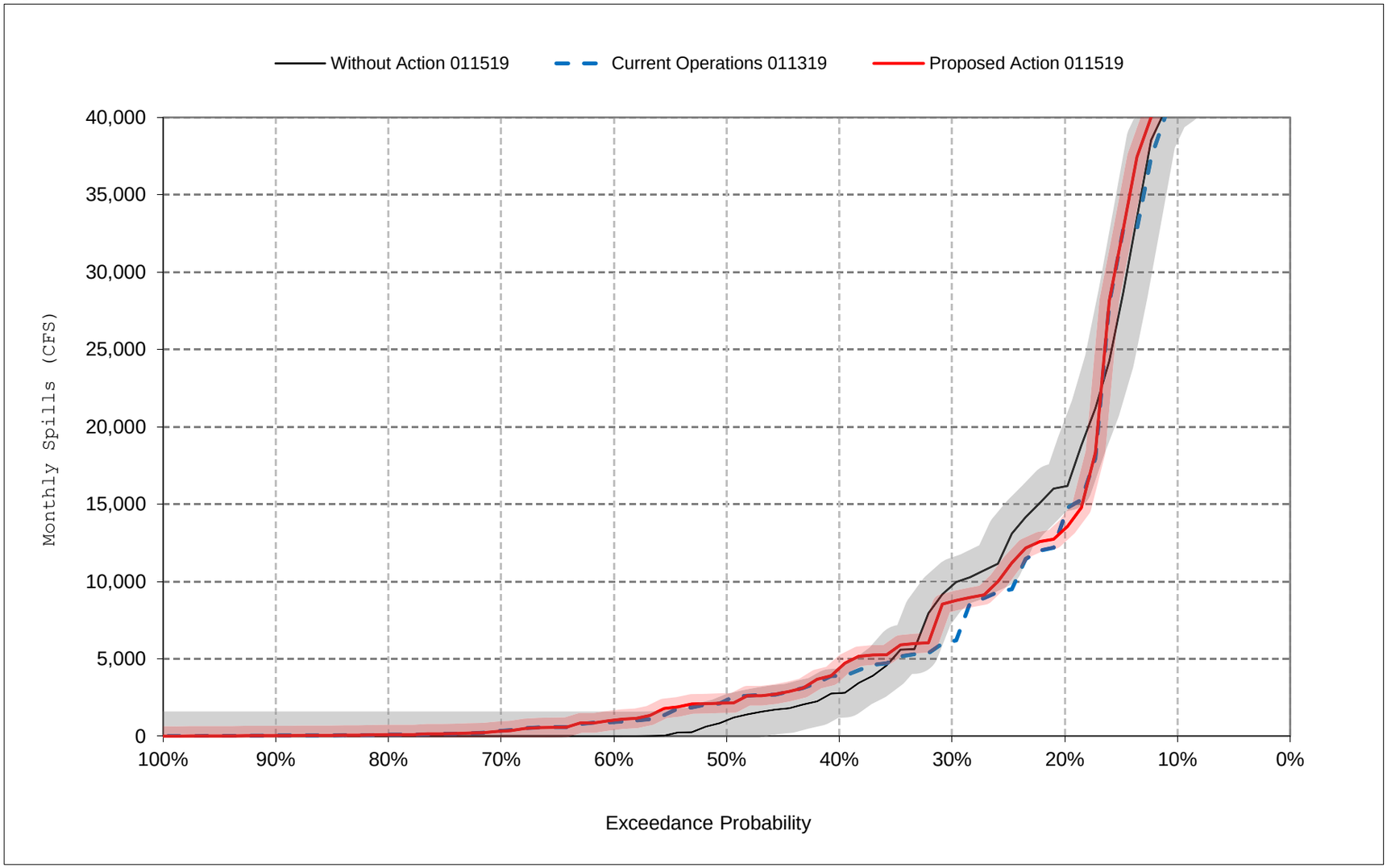
Figure 24-10. Fremont Weir Spills, January



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

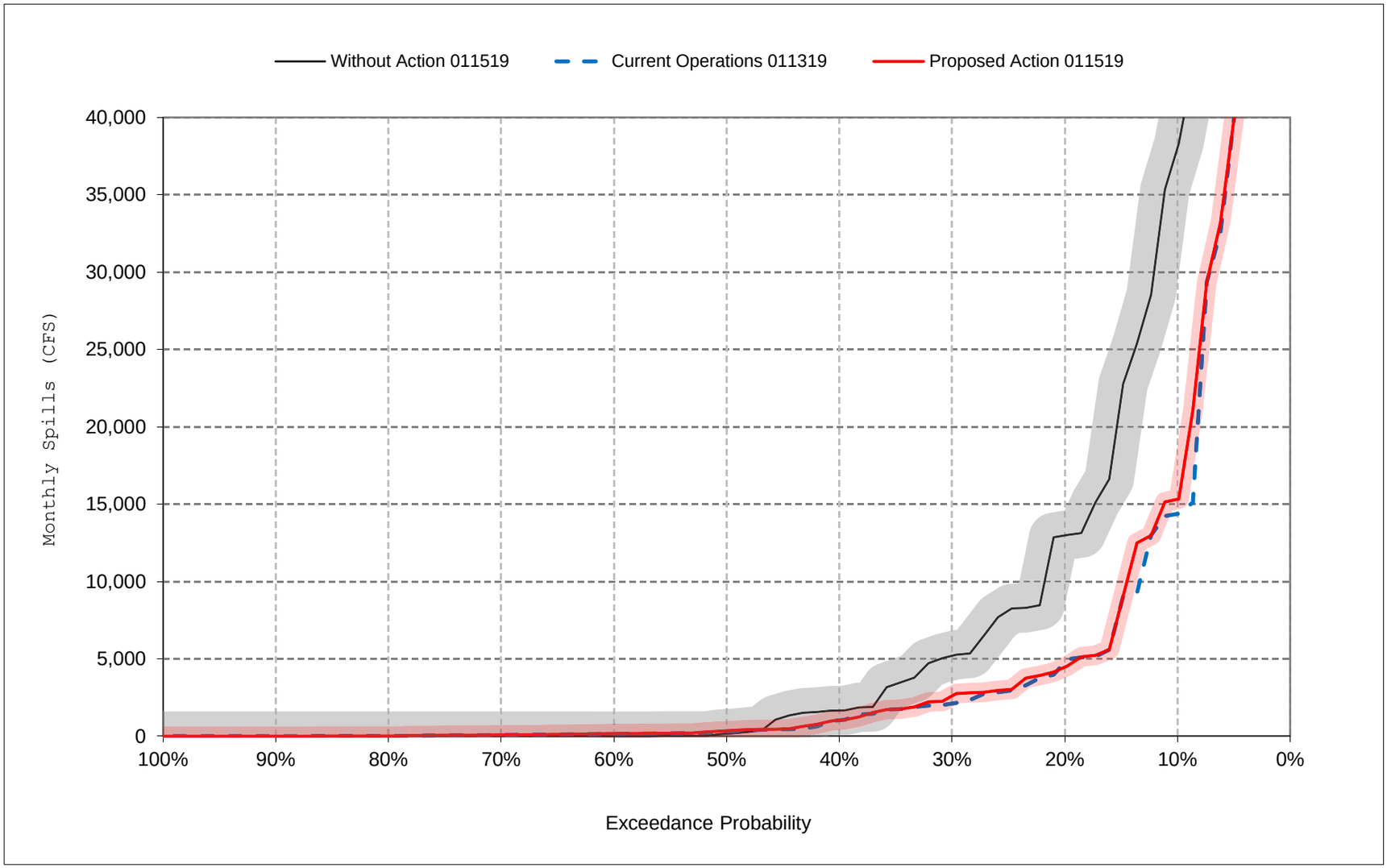
Figure 24-11. Fremont Weir Spills, February



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

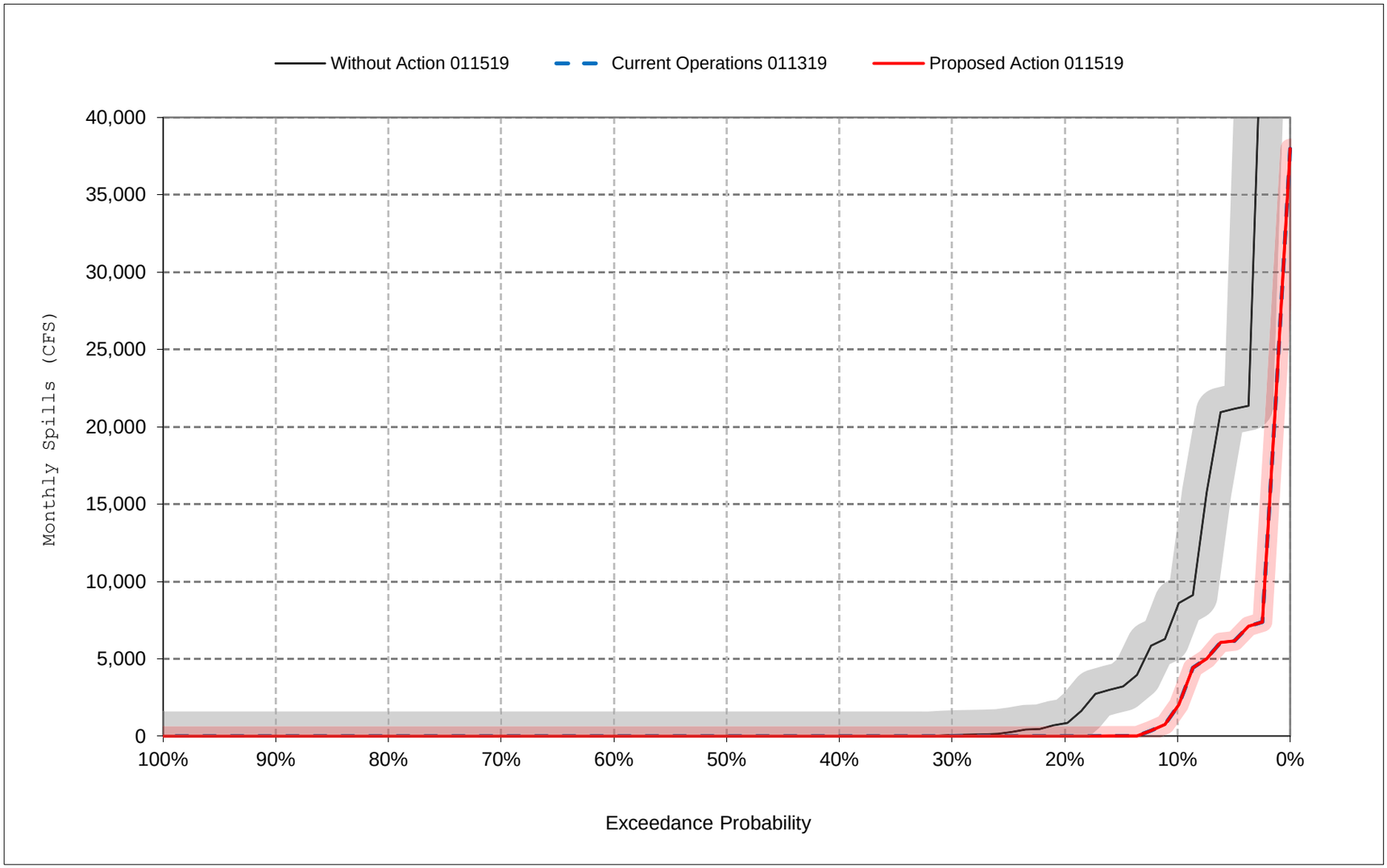
Figure 24-12. Fremont Weir Spills, March



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

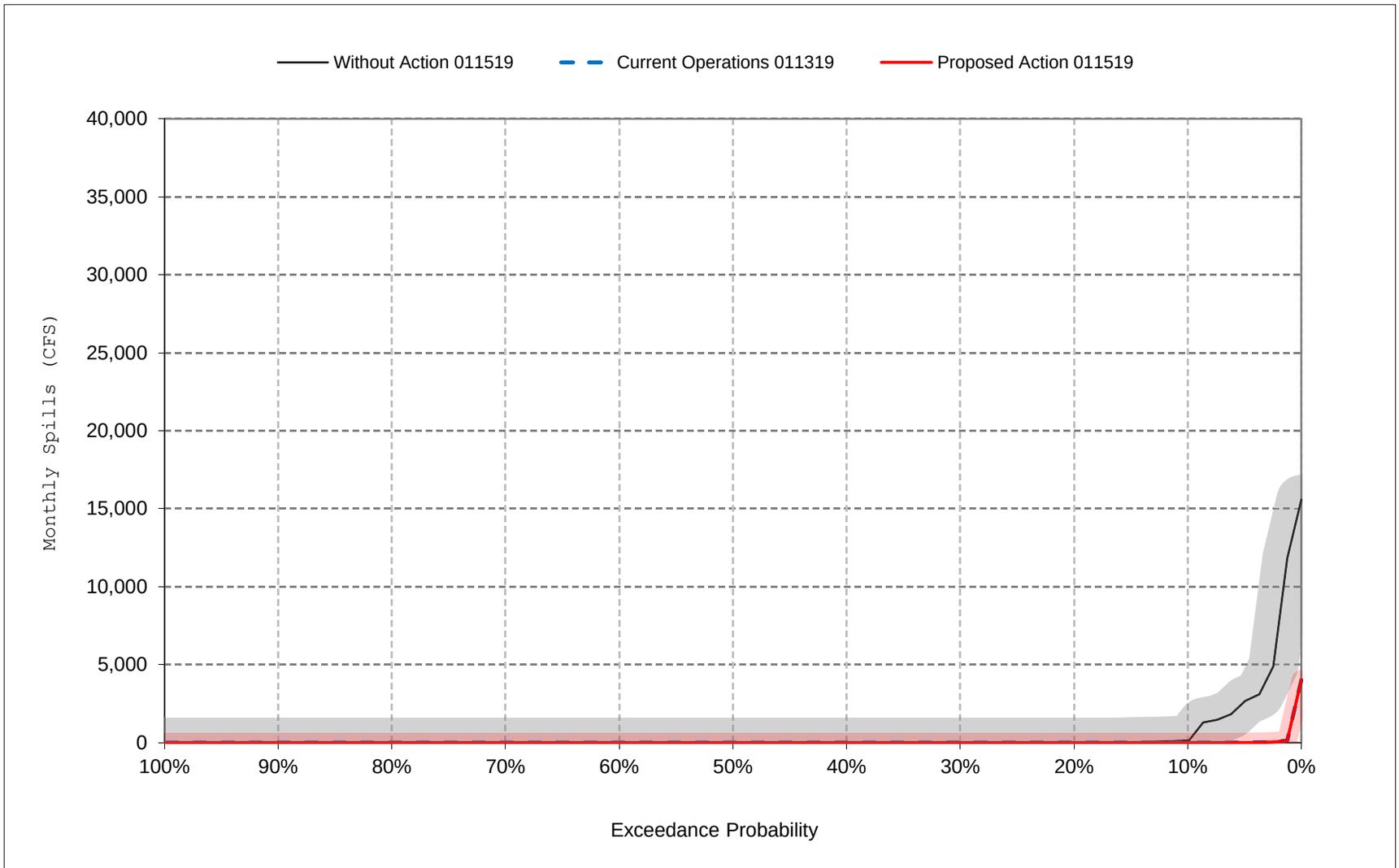
Figure 24-13. Fremont Weir Spills, April



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

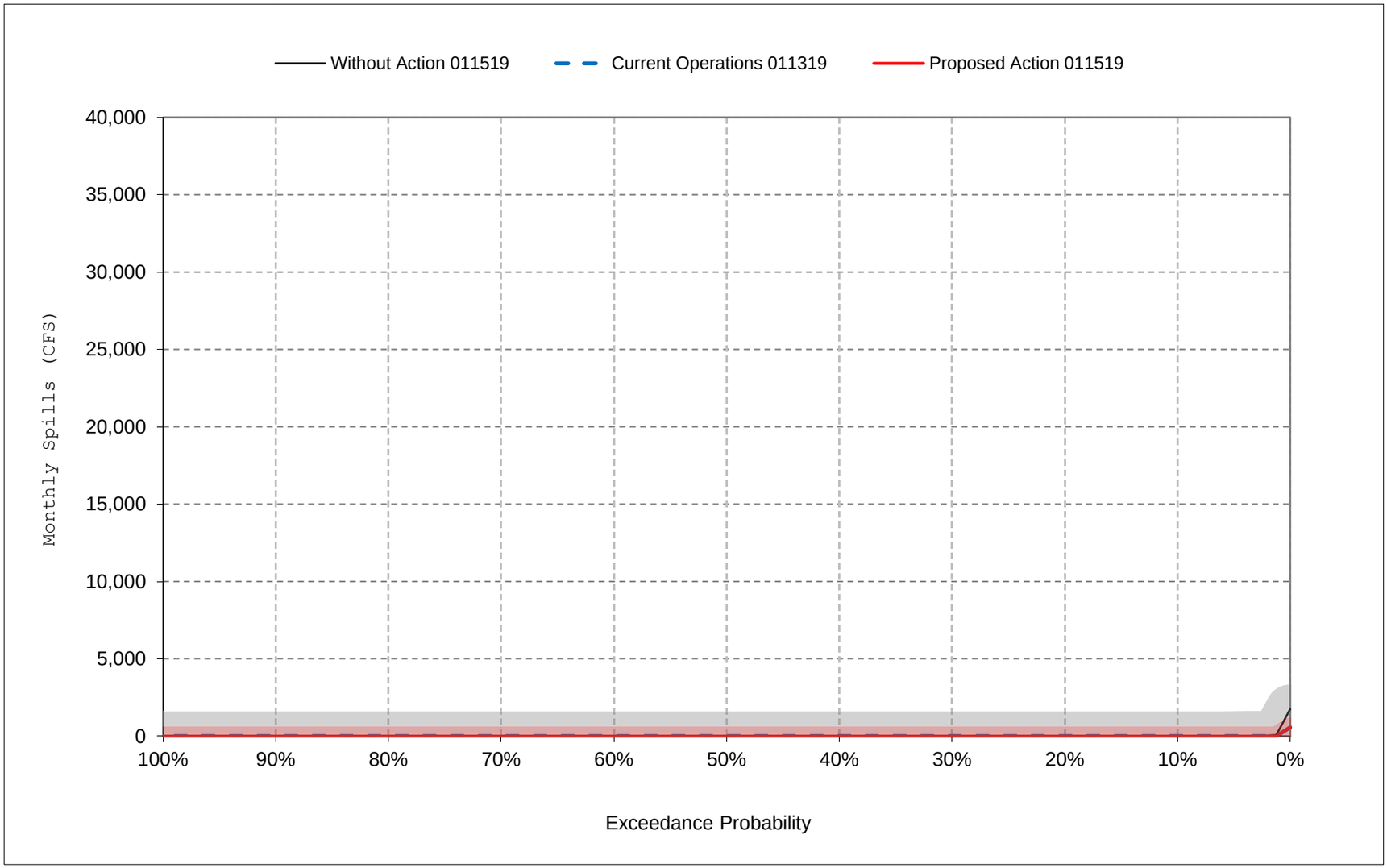
Figure 24-14. Fremont Weir Spills, May



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

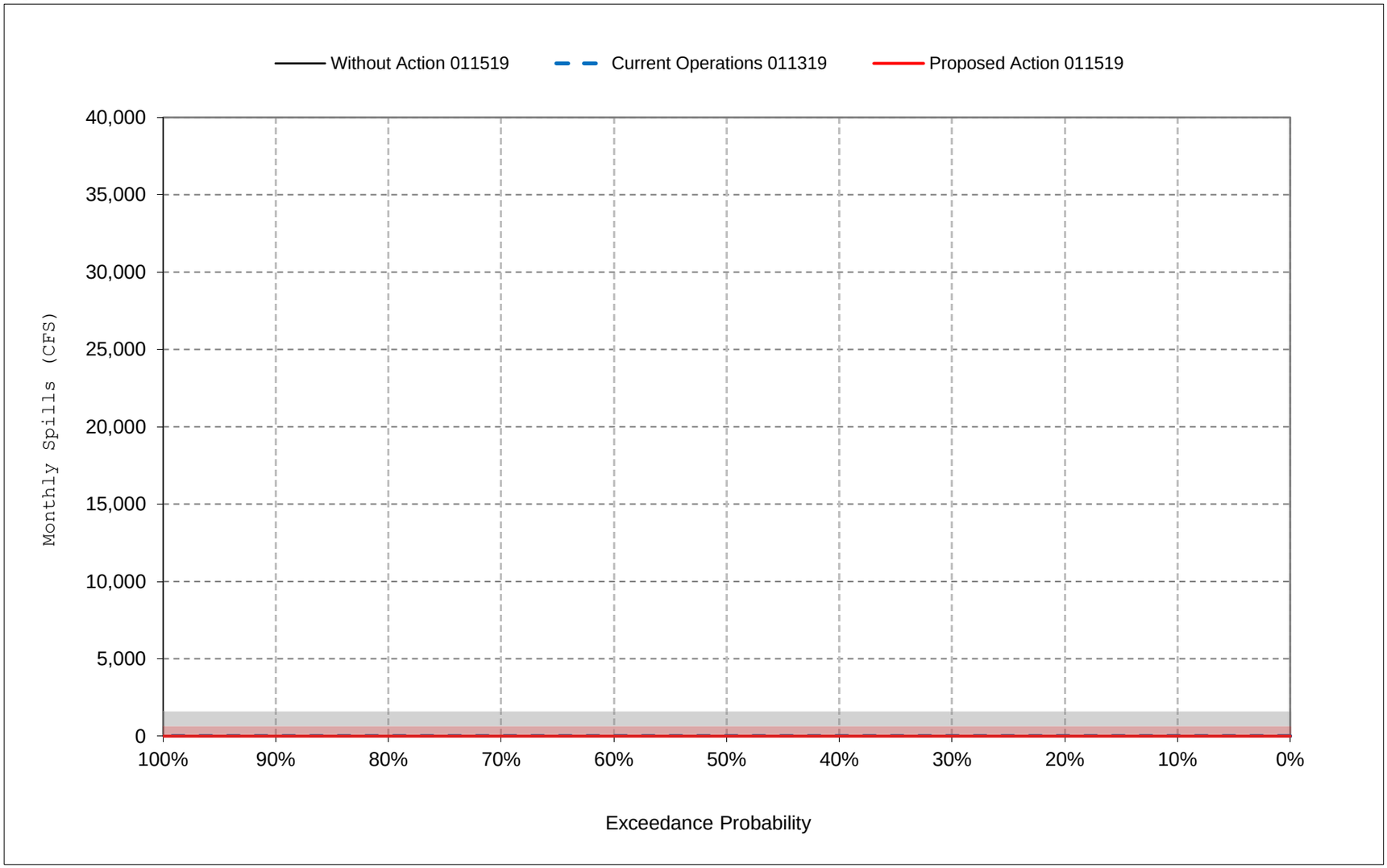
Figure 24-15. Fremont Weir Spills, June



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

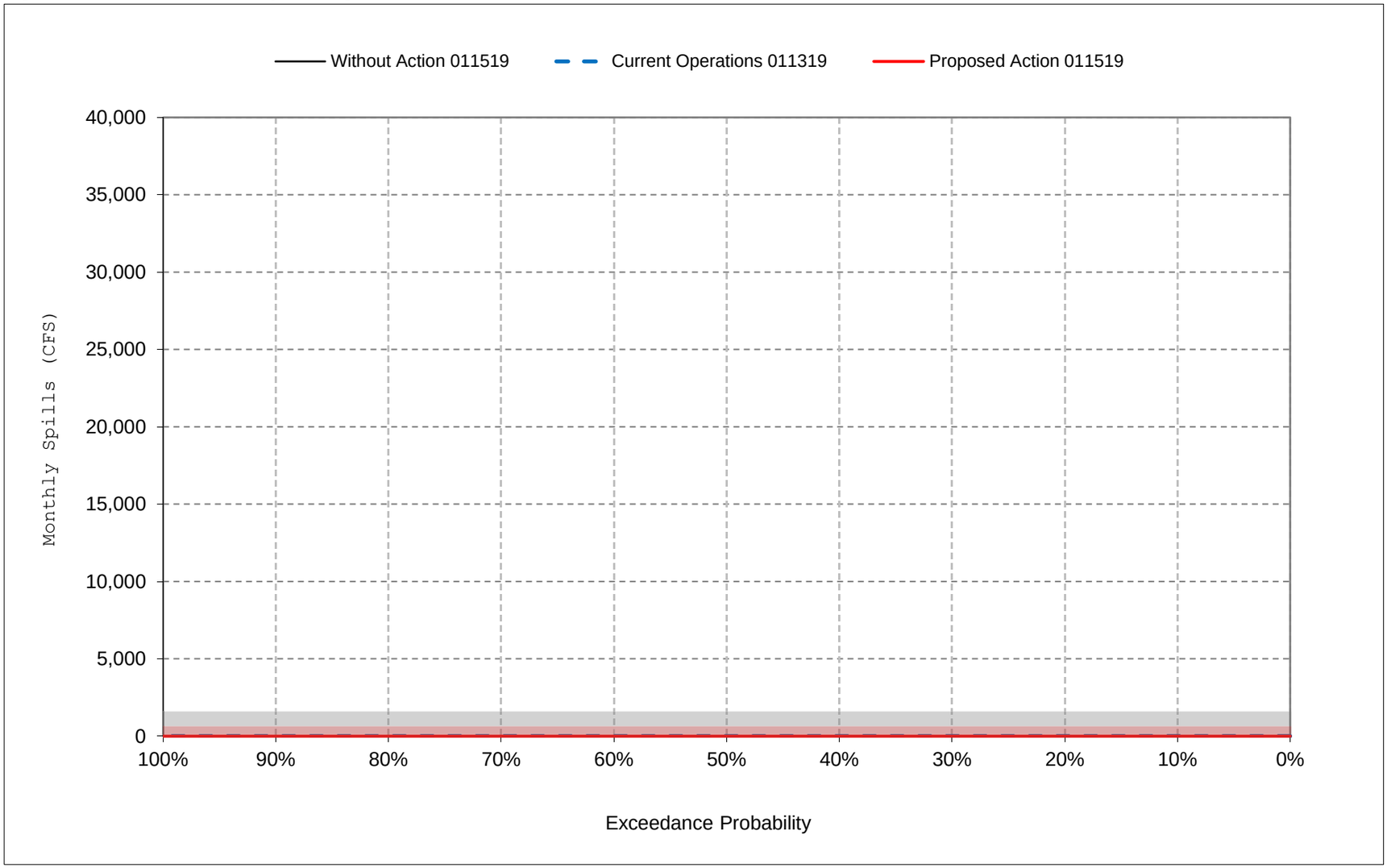
Figure 24-16. Fremont Weir Spills, July



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

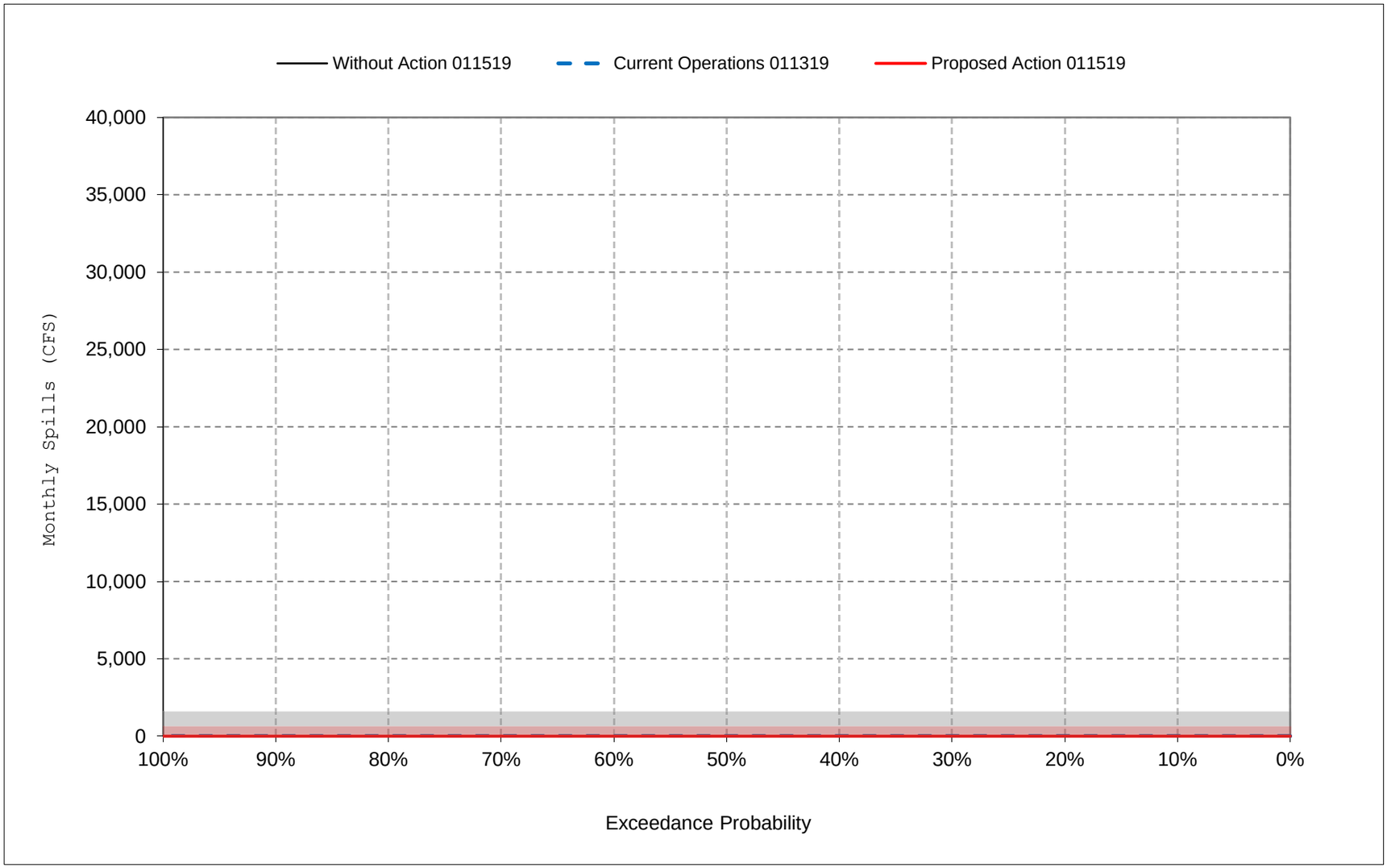
Figure 24-17. Fremont Weir Spills, August



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Figure 24-18. Fremont Weir Spills, September



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Table 25-1. Yolo Bypass Flow, Monthly Flow

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	63	475	6,615	37,367	54,186	51,234	14,110	1,542	163	701	387	130
20%	61	145	2,754	18,000	25,525	17,600	6,330	135	68	515	155	59
30%	57	50	1,195	11,935	13,362	8,173	2,163	77	68	210	55	59
40%	53	10	598	2,083	7,426	3,721	1,070	73	68	48	55	59
50%	45	8	275	959	3,688	2,582	680	70	68	48	55	59
60%	39	5	92	355	1,952	1,023	229	67	67	48	55	59
70%	27	0	36	110	814	490	140	64	66	48	55	57
80%	14	0	0	9	110	114	111	62	65	48	55	55
90%	4	0	0	0	20	45	82	57	63	48	54	52
Long Term												
Full Simulation Period[a]	99	202	3,123	11,206	15,282	12,483	5,699	732	139	228	150	71
Water Year Types[b,c]												
Wet (32%)	86	267	2,862	28,561	34,624	27,839	13,688	1,922	214	97	138	76
Above Normal (16%)	38	111	3,297	10,678	18,828	17,956	5,907	186	66	327	119	64
Below Normal (13%)	381	94	1,770	691	3,787	2,630	235	204	119	419	117	90
Dry (24%)	36	344	5,660	1,319	2,950	1,620	1,483	230	96	220	125	68
Critical (15%)	42	25	510	292	622	417	197	67	146	244	284	58

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	63	809	11,129	34,648	52,391	18,726	7,044	243	68	48	183	247
20%	61	183	4,918	14,959	20,814	8,859	3,162	78	68	48	55	125
30%	58	82	1,543	7,015	11,267	4,861	1,068	73	68	48	55	59
40%	53	58	462	3,161	6,859	2,901	229	70	68	48	55	59
50%	45	33	293	901	4,170	1,135	135	68	67	48	55	59
60%	40	18	138	490	1,552	437	111	65	67	48	55	59
70%	29	9	51	273	580	187	88	63	66	48	55	58
80%	16	5	18	76	184	90	78	59	64	48	55	56
90%	4	0	1	37	68	37	56	53	62	48	54	52
Long Term												
Full Simulation Period[a]	124	552	4,394	11,835	15,819	9,271	2,651	210	88	48	101	115
Water Year Types[b,c]												
Wet (32%)	86	746	5,586	31,695	36,486	23,473	6,899	453	135	48	147	209
Above Normal (16%)	38	927	1,909	8,363	17,697	8,800	1,823	185	66	48	92	65
Below Normal (13%)	556	117	3,567	927	4,807	657	234	69	66	48	130	92
Dry (24%)	40	610	7,304	1,097	2,875	1,223	522	75	67	48	61	70
Critical (15%)	42	29	410	465	671	320	105	67	65	48	55	61

Current Operations 011319 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	333	4,515	**-2,719**	**-1,794**	**-32,508**	**-7,065**	**-1,299**	**-95**	**-653**	**-204**	117
20%	0	38	2,164	**-3,041**	**-4,711**	**-8,741**	**-3,168**	**-57**	0	**-467**	**-100**	66
30%	1	32	348	**-4,920**	**-2,095**	**-3,312**	**-1,094**	**-4**	0	**-162**	0	0
40%	0	49	**-136**	1,077	**-567**	**-820**	**-841**	**-3**	**0**	0	0	0
50%	0	24	19	**-58**	482	**-1,446**	**-545**	**-2**	**0**	0	0	0
60%	1	13	46	136	**-400**	**-585**	**-117**	**-2**	**0**	0	0	1
70%	2	9	15	163	**-234**	**-303**	**-52**	**-2**	**0**	0	0	1
80%	2	5	18	67	74	**-24**	**-33**	**-3**	**0**	0	0	1
90%	0	0	1	37	49	**-8**	**-26**	**-3**	**0**	**0**	0	0
Long Term												
Full Simulation Period[a]	25	350	1,271	629	537	**-3,211**	**-3,048**	**-522**	**-51**	**-180**	**-49**	44
Water Year Types[b,c]												
Wet (32%)	0	479	2,724	3,134	1,862	**-4,366**	**-6,789**	**-1,469**	**-79**	**-49**	9	134
Above Normal (16%)	0	816	**-1,389**	**-2,314**	**-1,131**	**-9,156**	**-4,084**	**-1**	0	**-279**	**-27**	0
Below Normal (13%)	176	23	1,797	236	1,020	**-1,973**	**-1**	**-135**	**-53**	**-371**	13	2
Dry (24%)	4	266	1,644	**-223**	**-75**	**-397**	**-961**	**-154**	**-29**	**-172**	**-64**	2
Critical (15%)	0	4	**-101**	173	49	**-97**	**-92**	0	**-82**	**-196**	**-229**	4

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 25-2. Yolo Bypass Flow, Monthly Flow

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	63	475	6,615	37,367	54,186	51,234	14,110	1,542	163	701	387	130
20%	61	145	2,754	18,000	25,525	17,600	6,330	135	68	515	155	59
30%	57	50	1,195	11,935	13,362	8,173	2,163	77	68	210	55	59
40%	53	10	598	2,083	7,426	3,721	1,070	73	68	48	55	59
50%	45	8	275	959	3,688	2,582	680	70	68	48	55	59
60%	39	5	92	355	1,952	1,023	229	67	67	48	55	59
70%	27	0	36	110	814	490	140	64	66	48	55	57
80%	14	0	0	9	110	114	111	62	65	48	55	55
90%	4	0	0	0	20	45	82	57	63	48	54	52
Long Term												
Full Simulation Period[a]	99	202	3,123	11,206	15,282	12,483	5,699	732	139	228	150	71
Water Year Types[b,c]												
Wet (32%)	86	267	2,862	28,561	34,624	27,839	13,688	1,922	214	97	138	76
Above Normal (16%)	38	111	3,297	10,678	18,828	17,956	5,907	186	66	327	119	64
Below Normal (13%)	381	94	1,770	691	3,787	2,630	235	204	119	419	117	90
Dry (24%)	36	344	5,660	1,319	2,950	1,620	1,483	230	96	220	125	68
Critical (15%)	42	25	510	292	622	417	197	67	146	244	284	58

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	63	857	13,922	37,216	52,602	24,480	7,044	243	68	48	160	127
20%	61	159	5,783	15,734	21,983	8,877	3,162	78	68	48	55	59
30%	58	62	1,649	7,148	11,557	5,312	1,068	73	68	48	55	59
40%	53	36	463	3,255	9,181	2,933	229	70	68	48	55	59
50%	45	10	283	1,469	4,067	1,251	135	68	67	48	55	59
60%	39	8	163	523	2,182	469	111	65	67	48	55	59
70%	29	5	51	284	576	240	88	63	66	48	55	57
80%	15	2	20	93	213	104	78	59	64	48	55	55
90%	4	0	0	19	67	45	56	53	62	48	54	52
Long Term												
Full Simulation Period[a]	88	608	4,980	12,251	16,336	9,480	2,650	211	88	48	101	71
Water Year Types[b,c]												
Wet (32%)	86	794	7,054	32,787	37,029	23,784	6,900	453	135	48	147	73
Above Normal (16%)	38	1,165	2,294	8,573	18,973	9,220	1,822	185	66	48	92	65
Below Normal (13%)	298	116	3,551	1,181	5,973	806	234	69	66	48	130	92
Dry (24%)	37	621	7,558	1,108	2,822	1,321	520	75	67	48	57	70
Critical (15%)	42	29	410	461	664	321	105	67	65	48	55	58

Proposed Action 011519 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	381	7,307	**-152**	**-1,584**	**-26,754**	**-7,065**	**-1,299**	**-95**	**-653**	**-227**	**-3**
20%	0	14	3,029	**-2,266**	**-3,542**	**-8,723**	**-3,168**	**-57**	0	**-467**	**-100**	0
30%	1	12	454	**-4,786**	**-1,805**	**-2,862**	**-1,094**	**-4**	0	**-162**	0	0
40%	0	26	**-136**	1,172	1,756	**-788**	**-841**	**-3**	**0**	0	0	0
50%	0	2	8	510	379	**-1,331**	**-545**	**-2**	**0**	0	0	0
60%	0	4	72	168	229	**-554**	**-117**	**-2**	**0**	0	0	0
70%	2	5	15	174	**-238**	**-250**	**-52**	**-2**	**0**	0	0	0
80%	1	2	20	84	103	**-10**	**-33**	**-3**	**0**	0	0	0
90%	0	0	0	19	48	0	**-26**	**-3**	**0**	**0**	0	0
Long Term												
Full Simulation Period[a]	**-11**	405	1,857	1,045	1,054	**-3,002**	**-3,049**	**-522**	**-51**	**-180**	**-50**	**0**
Water Year Types[b,c]												
Wet (32%)	0	527	4,192	4,226	2,405	**-4,055**	**-6,789**	**-1,468**	**-79**	**-49**	9	**-3**
Above Normal (16%)	0	1,054	**-1,003**	**-2,105**	145	**-8,736**	**-4,085**	**-1**	0	**-279**	**-27**	0
Below Normal (13%)	**-83**	22	1,781	490	2,186	**-1,824**	**-1**	**-135**	**-53**	**-371**	13	2
Dry (24%)	1	277	1,898	**-212**	**-128**	**-299**	**-963**	**-154**	**-29**	**-172**	**-68**	2
Critical (15%)	0	4	**-101**	169	42	**-95**	**-92**	0	**-82**	**-196**	**-229**	0

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 25-3. Yolo Bypass Flow, Monthly Flow

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	63	809	11,129	34,648	52,391	18,726	7,044	243	68	48	183	247
20%	61	183	4,918	14,959	20,814	8,859	3,162	78	68	48	55	125
30%	58	82	1,543	7,015	11,267	4,861	1,068	73	68	48	55	59
40%	53	58	462	3,161	6,859	2,901	229	70	68	48	55	59
50%	45	33	293	901	4,170	1,135	135	68	67	48	55	59
60%	40	18	138	490	1,552	437	111	65	67	48	55	59
70%	29	9	51	273	580	187	88	63	66	48	55	58
80%	16	5	18	76	184	90	78	59	64	48	55	56
90%	4	0	1	37	68	37	56	53	62	48	54	52
Long Term												
Full Simulation Period[a]	124	552	4,394	11,835	15,819	9,271	2,651	210	88	48	101	115
Water Year Types[b,c]												
Wet (32%)	86	746	5,586	31,695	36,486	23,473	6,899	453	135	48	147	209
Above Normal (16%)	38	927	1,909	8,363	17,697	8,800	1,823	185	66	48	92	65
Below Normal (13%)	556	117	3,567	927	4,807	657	234	69	66	48	130	92
Dry (24%)	40	610	7,304	1,097	2,875	1,223	522	75	67	48	61	70
Critical (15%)	42	29	410	465	671	320	105	67	65	48	55	61

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	63	857	13,922	37,216	52,602	24,480	7,044	243	68	48	160	127
20%	61	159	5,783	15,734	21,983	8,877	3,162	78	68	48	55	59
30%	58	62	1,649	7,148	11,557	5,312	1,068	73	68	48	55	59
40%	53	36	463	3,255	9,181	2,933	229	70	68	48	55	59
50%	45	10	283	1,469	4,067	1,251	135	68	67	48	55	59
60%	39	8	163	523	2,182	469	111	65	67	48	55	59
70%	29	5	51	284	576	240	88	63	66	48	55	57
80%	15	2	20	93	213	104	78	59	64	48	55	55
90%	4	0	0	19	67	45	56	53	62	48	54	52
Long Term												
Full Simulation Period[a]	88	608	4,980	12,251	16,336	9,480	2,650	211	88	48	101	71
Water Year Types[b,c]												
Wet (32%)	86	794	7,054	32,787	37,029	23,784	6,900	453	135	48	147	73
Above Normal (16%)	38	1,165	2,294	8,573	18,973	9,220	1,822	185	66	48	92	65
Below Normal (13%)	298	116	3,551	1,181	5,973	806	234	69	66	48	130	92
Dry (24%)	37	621	7,558	1,108	2,822	1,321	520	75	67	48	57	70
Critical (15%)	42	29	410	461	664	321	105	67	65	48	55	58

Proposed Action 011519 minus Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	48	2,792	2,568	210	5,754	0	0	0	0	**-23**	**-120**
20%	0	**-24**	866	775	1,169	18	0	0	0	0	0	**-66**
30%	0	**-20**	106	134	290	451	0	0	0	0	0	0
40%	0	**-22**	1	95	2,323	32	0	0	0	0	0	0
50%	0	**-22**	**-10**	568	**-103**	115	0	0	0	0	0	0
60%	**-1**	**-9**	26	32	629	32	0	0	0	0	0	**-1**
70%	0	**-4**	1	11	**-5**	52	0	0	0	0	0	**-1**
80%	**-1**	**-3**	2	17	29	14	0	0	0	0	0	**-1**
90%	**0**	**0**	**-1**	**-18**	**-1**	8	0	0	0	0	0	**0**
Long Term												
Full Simulation Period[a]	**-35**	56	586	416	517	209	**0**	0	0	0	**-1**	**-44**
Water Year Types[b,c]												
Wet (32%)	0	48	1,467	1,092	543	311	0	0	0	0	0	**-137**
Above Normal (16%)	0	238	385	209	1,275	420	**-1**	**0**	0	0	0	0
Below Normal (13%)	**-258**	**-1**	**-16**	254	1,166	149	0	0	0	0	0	0
Dry (24%)	**-3**	11	254	11	**-53**	98	**-2**	0	0	0	**-4**	0
Critical (15%)	0	**0**	0	**-4**	**-7**	2	0	0	0	0	0	**-4**

a Based on the 82-year simulation period.

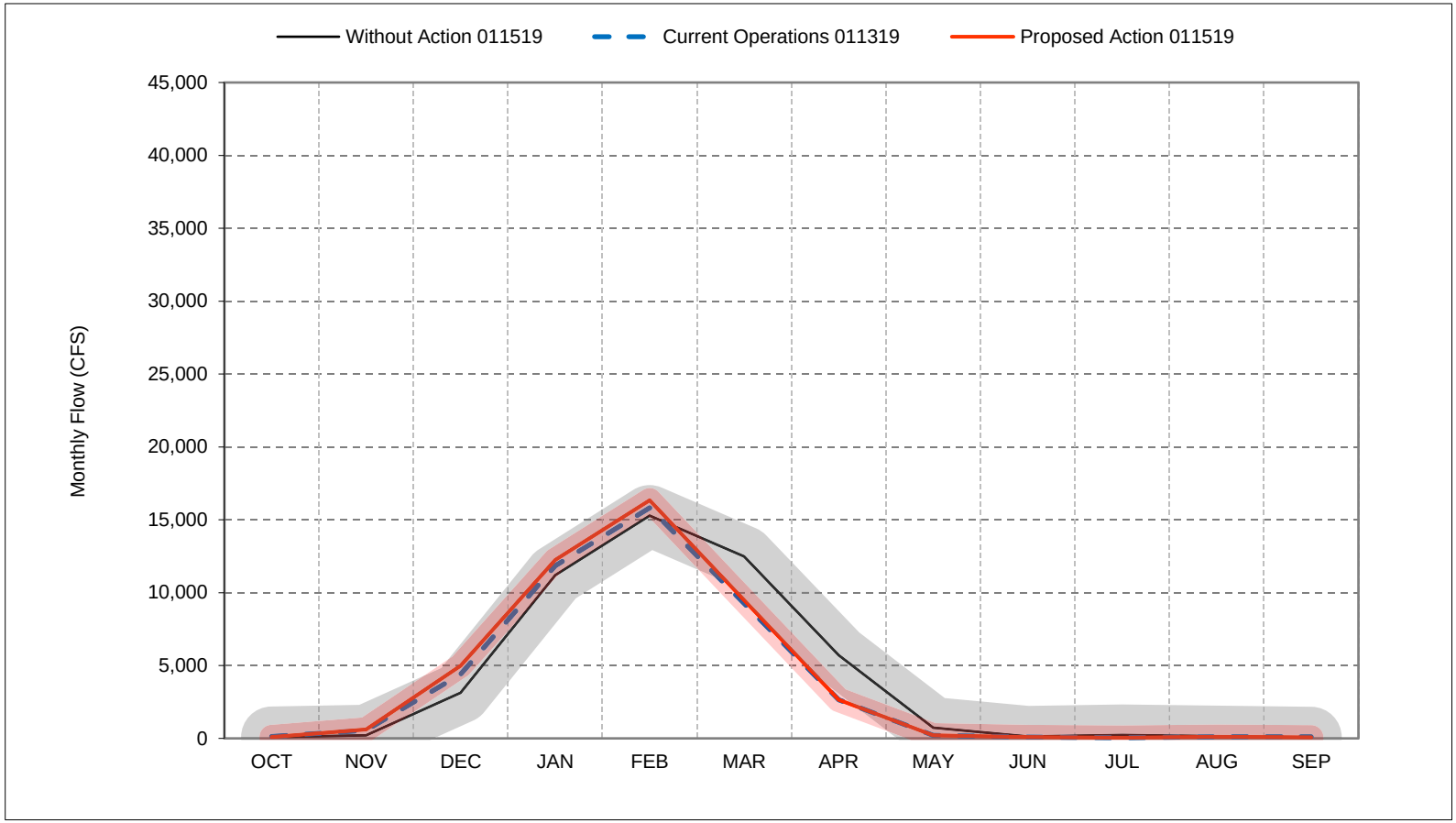
b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

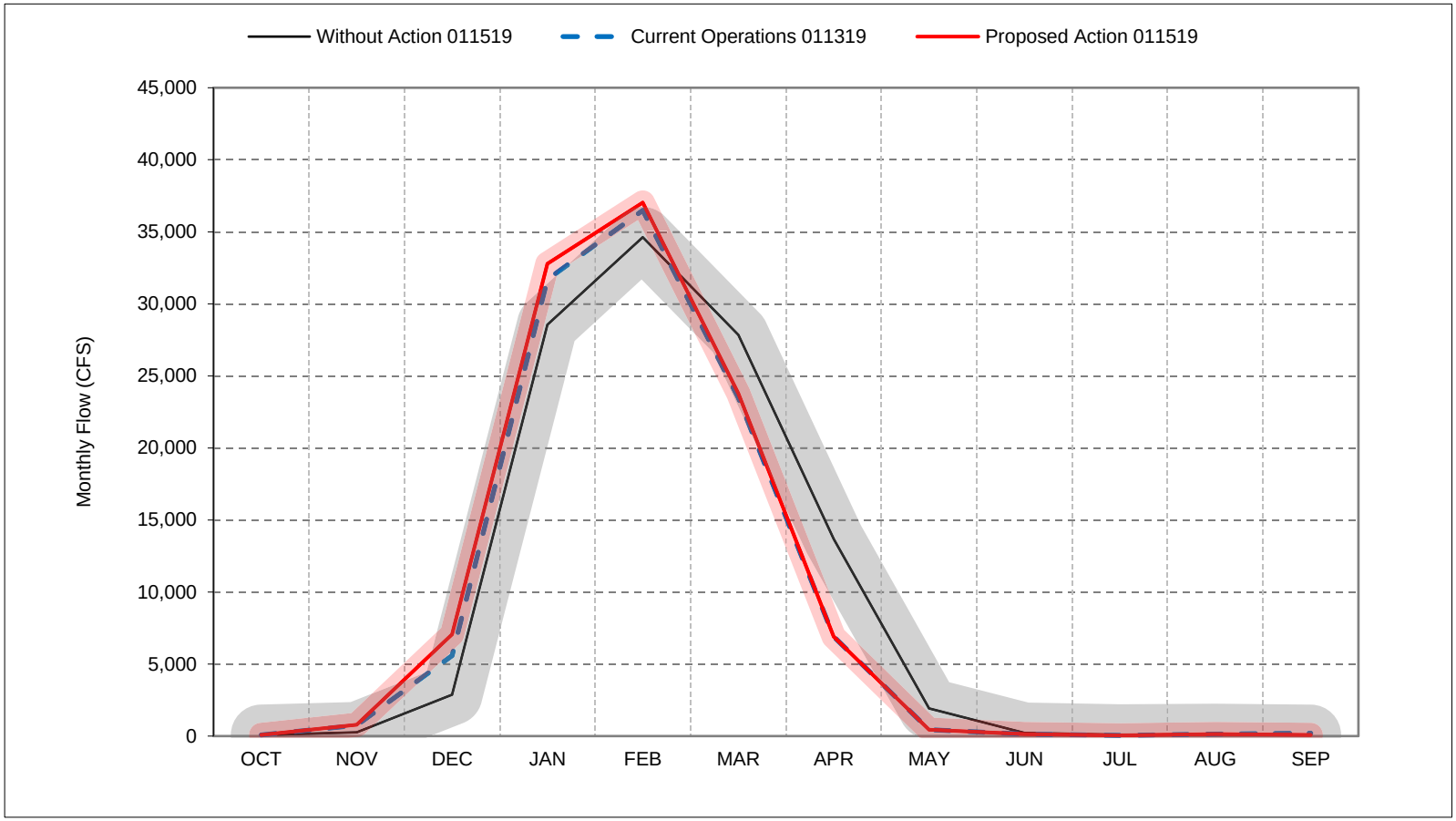
e These are draft results meant for qualitative analysis and are subject to revision.

Figure 25-1. Yolo Bypass Flow, Long-Term Average Flow



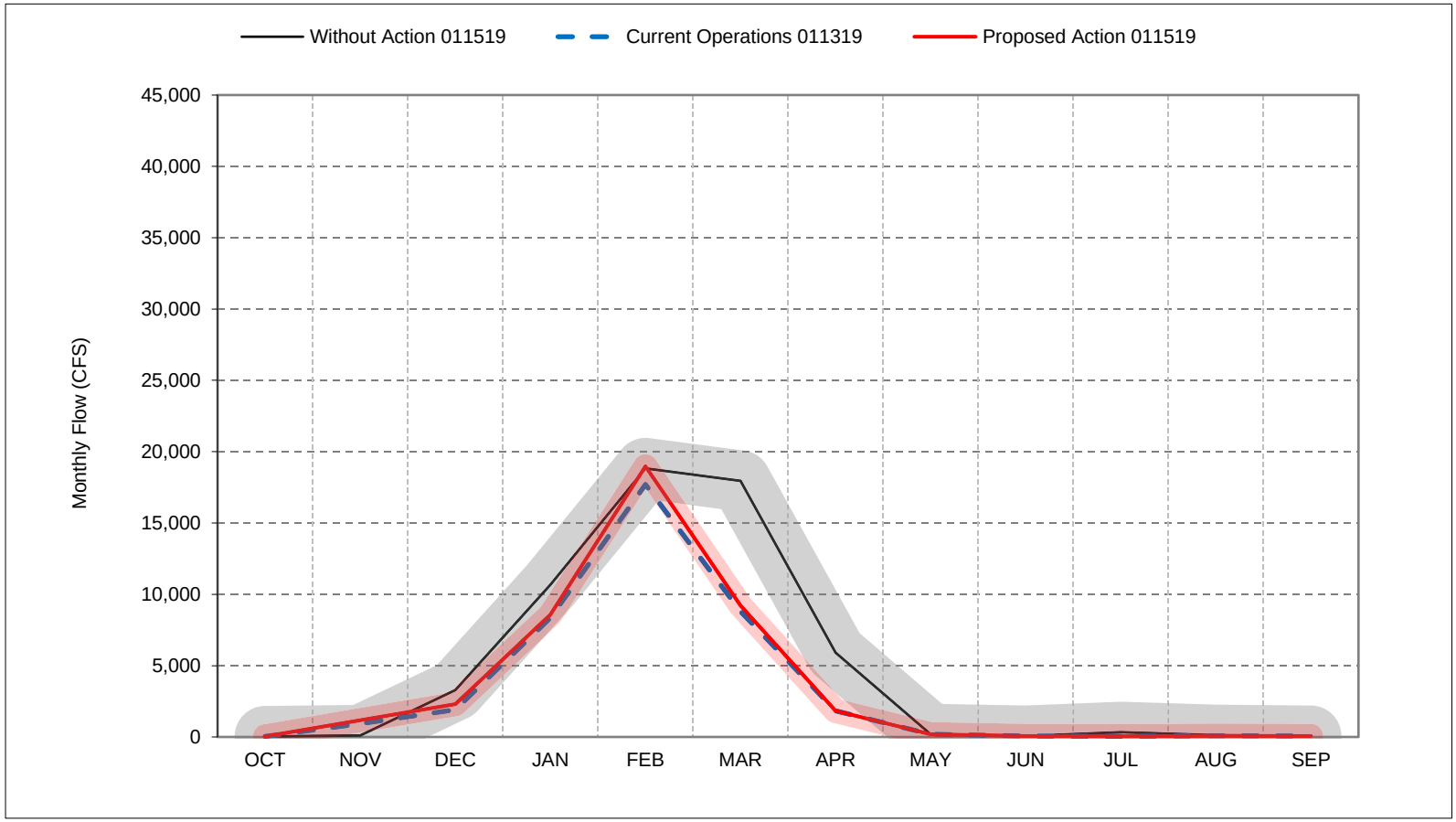
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 25-2. Yolo Bypass Flow, Wet Year Average Flow



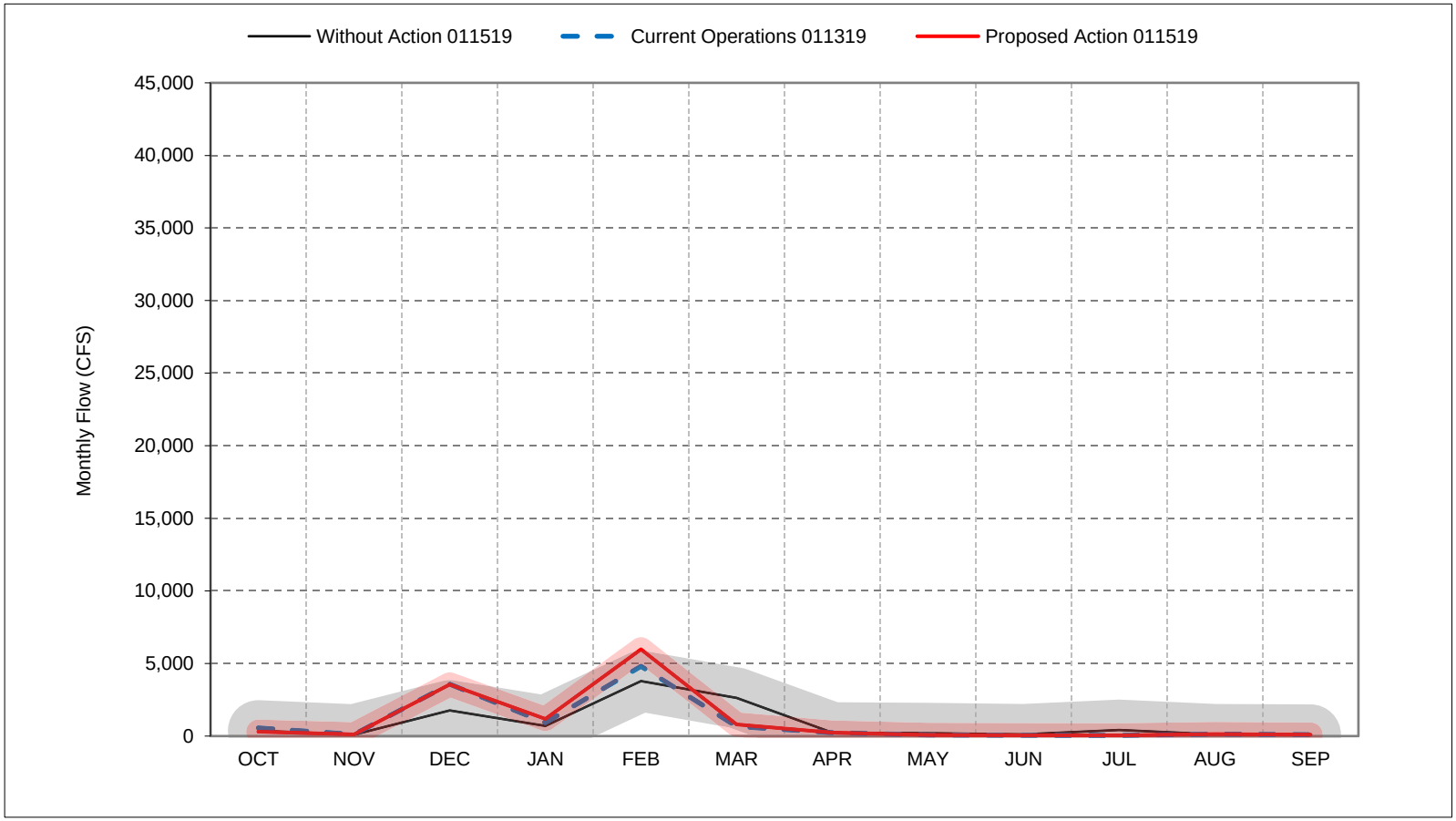
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 25-3. Yolo Bypass Flow, Above Normal Year Average Flow



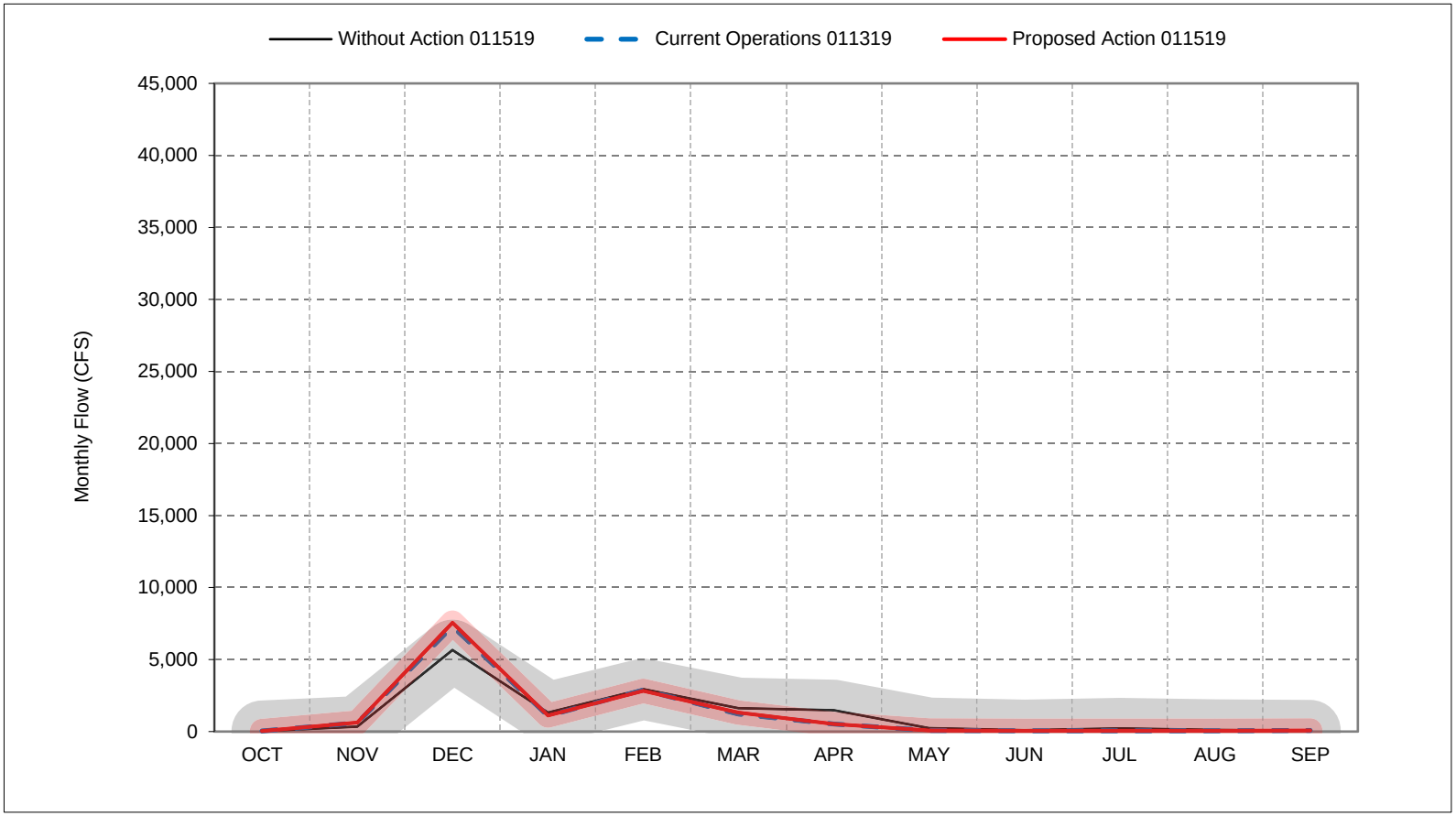
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 25-4. Yolo Bypass Flow, Below Normal Year Average Flow



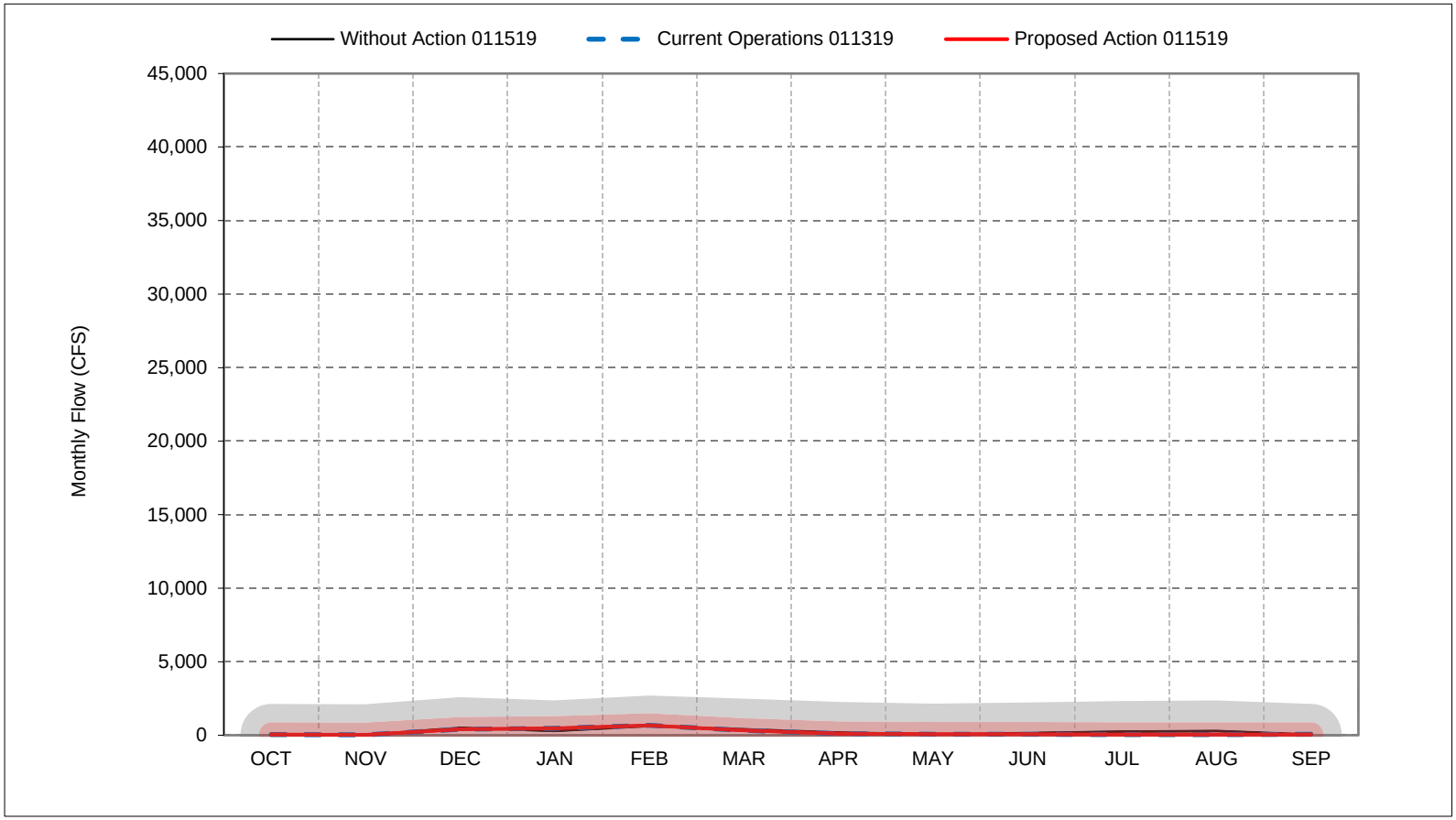
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 25-5. Yolo Bypass Flow, Dry Year Average Flow



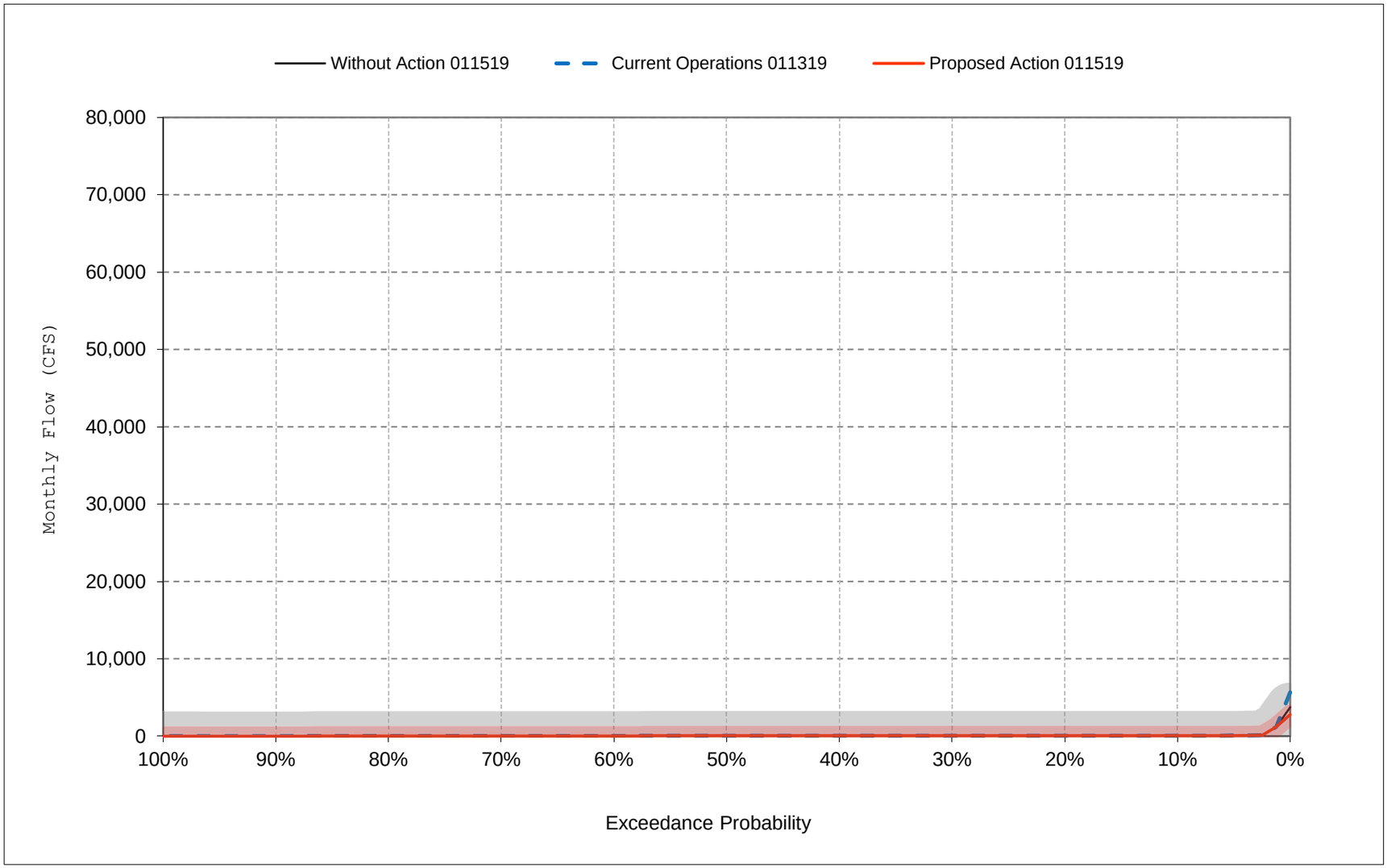
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 25-6. Yolo Bypass Flow, Critical Year Average Flow



*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

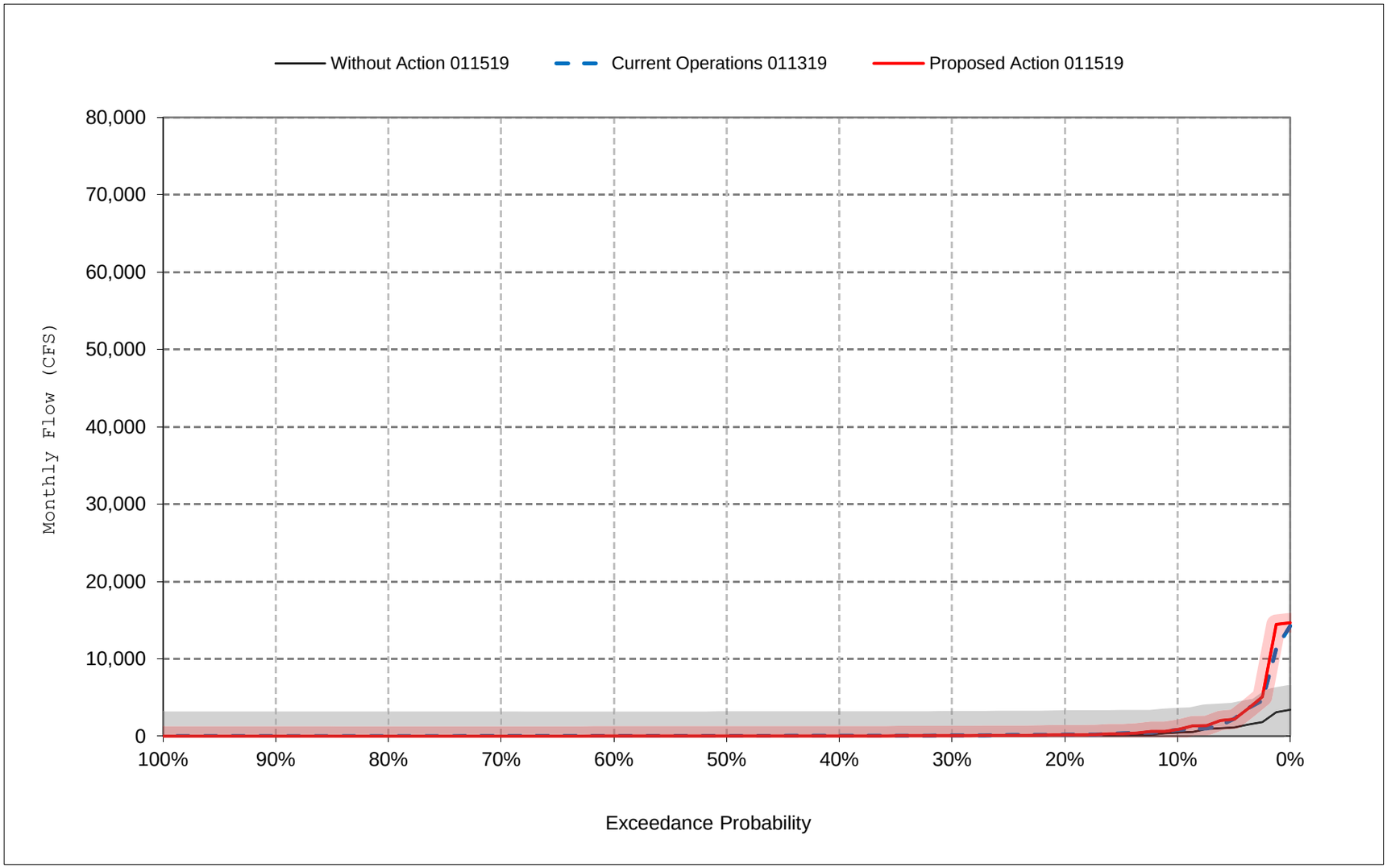
Figure 25-7. Yolo Bypass Flow, October



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

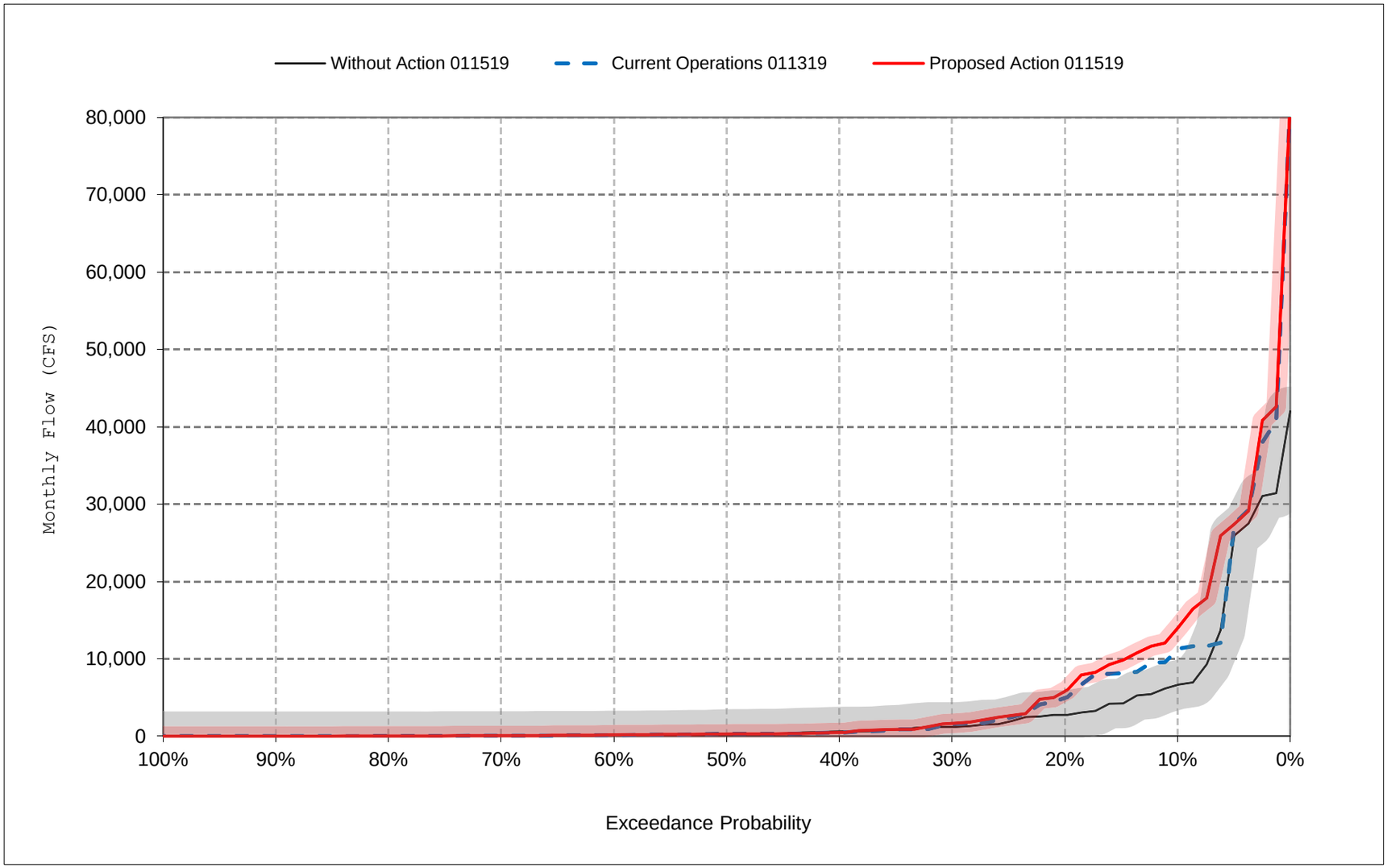
Figure 25-8. Yolo Bypass Flow, November



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

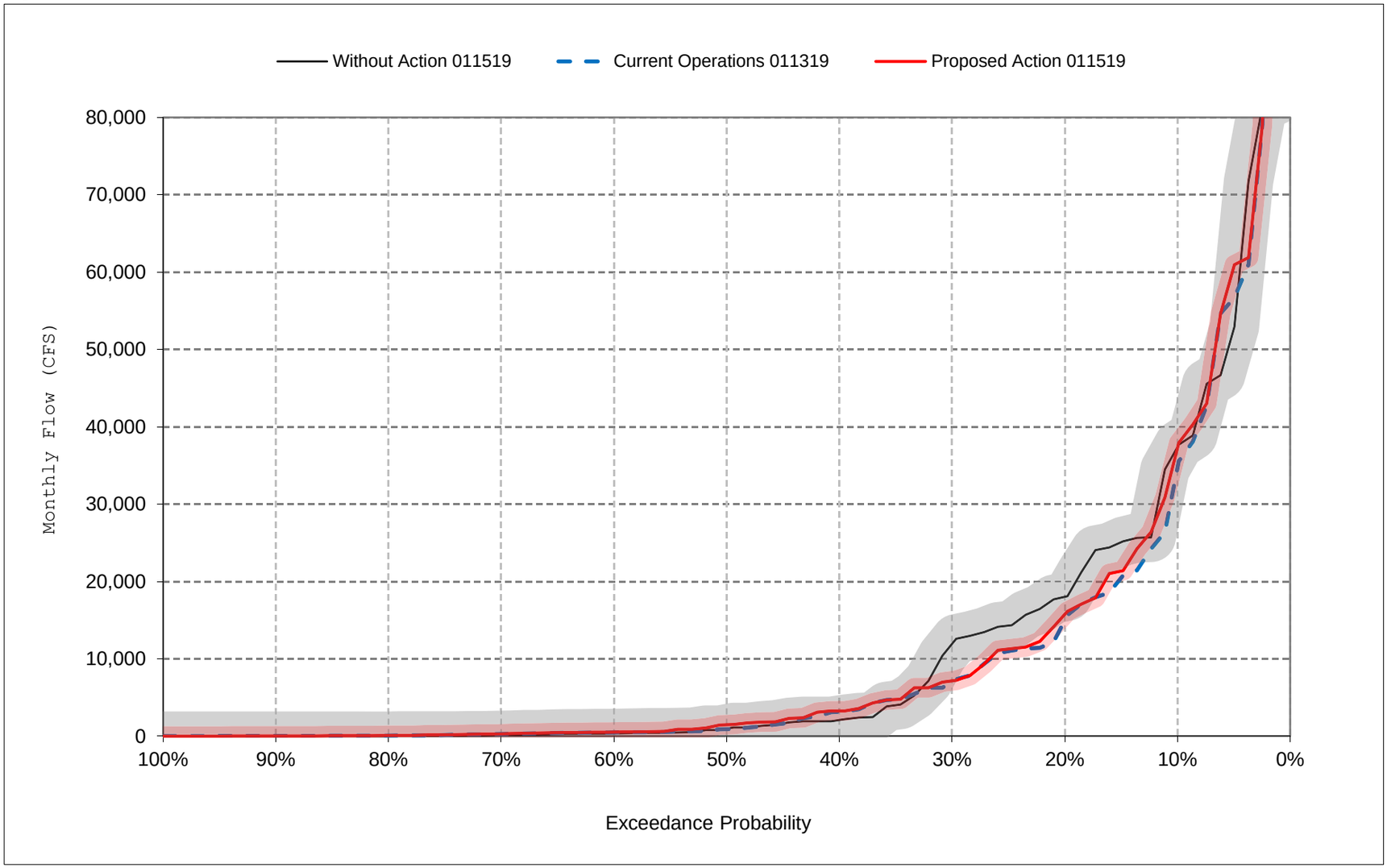
Figure 25-9. Yolo Bypass Flow, December



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

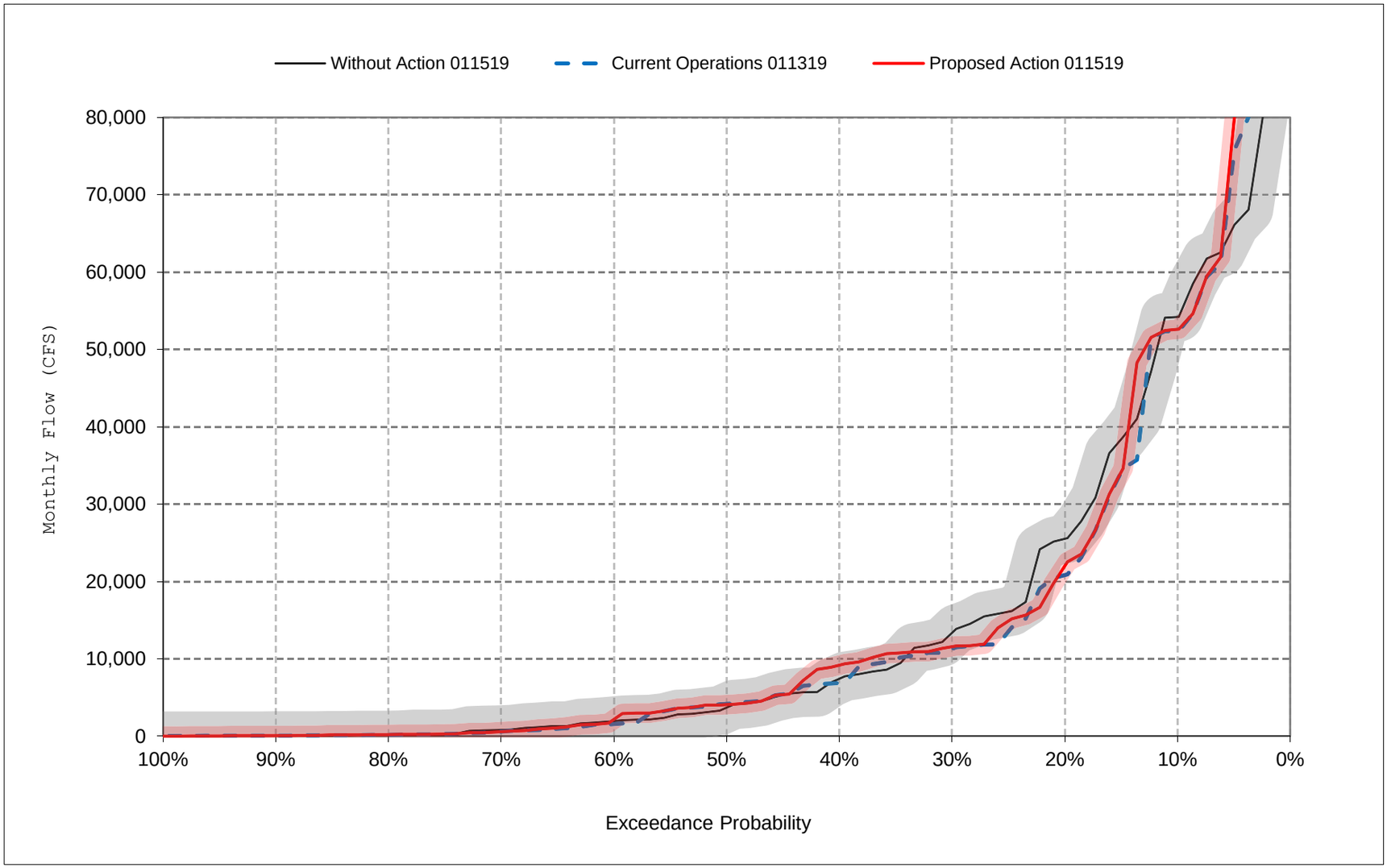
Figure 25-10. Yolo Bypass Flow, January



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

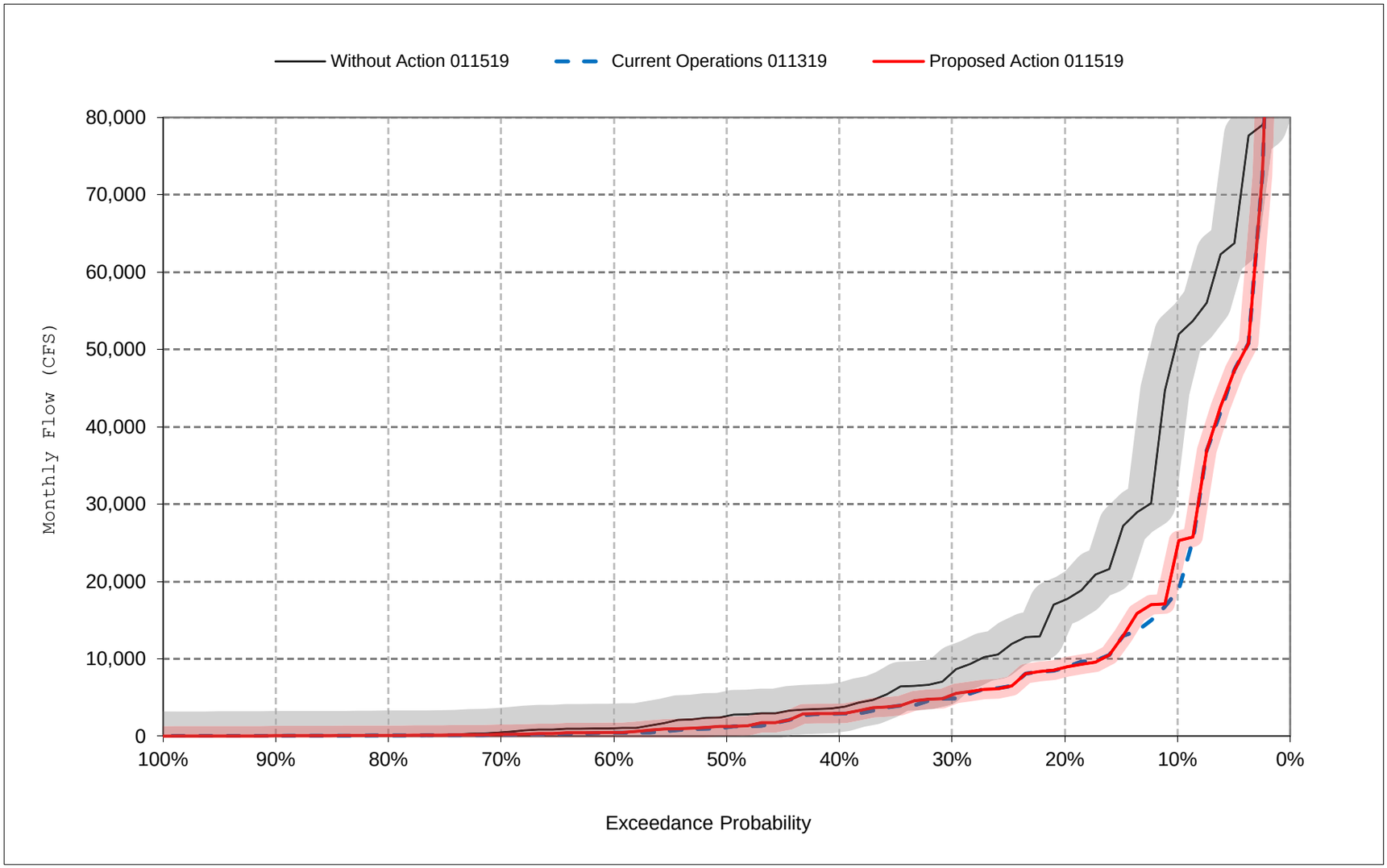
Figure 25-11. Yolo Bypass Flow, February



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

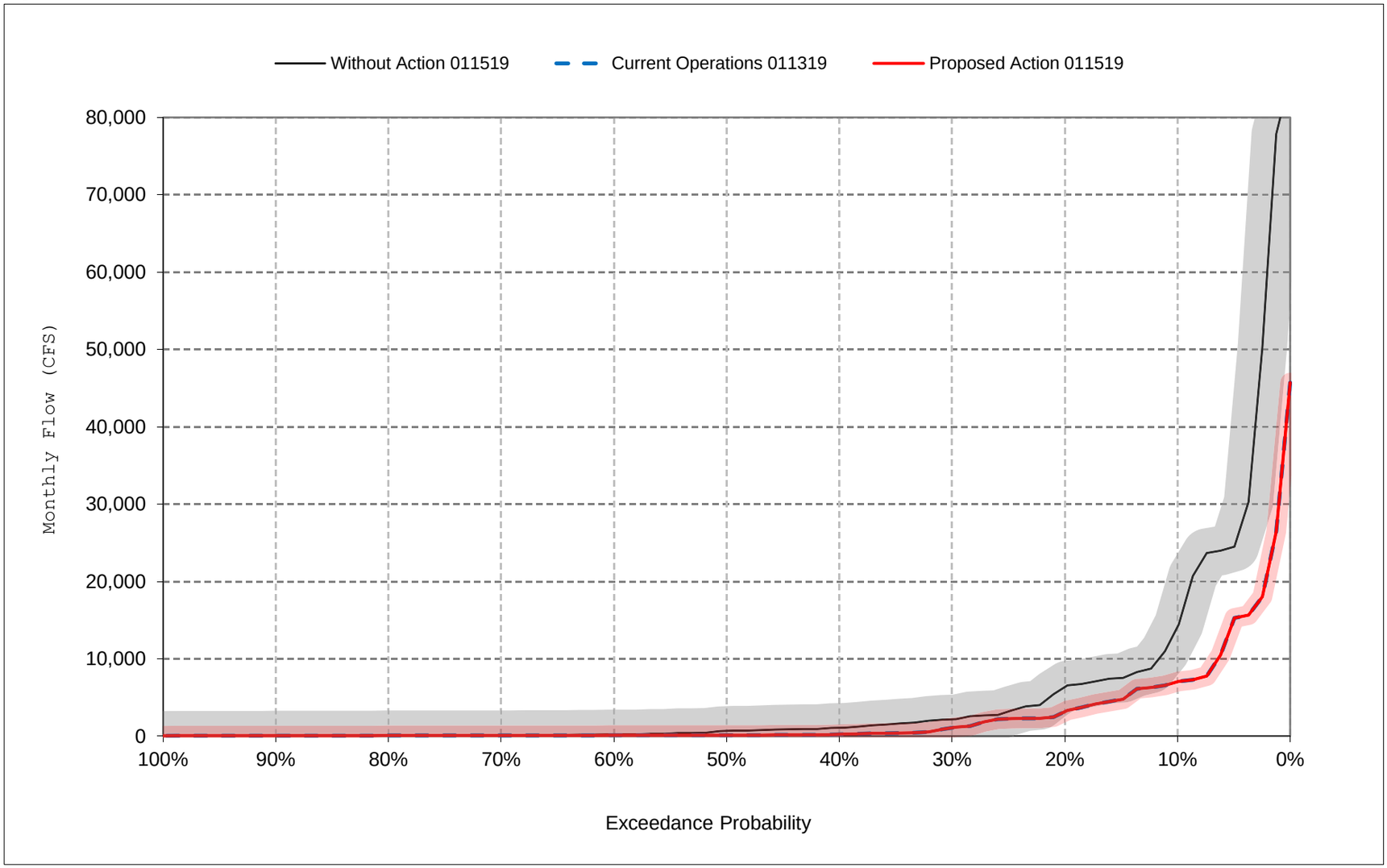
Figure 25-12. Yolo Bypass Flow, March



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

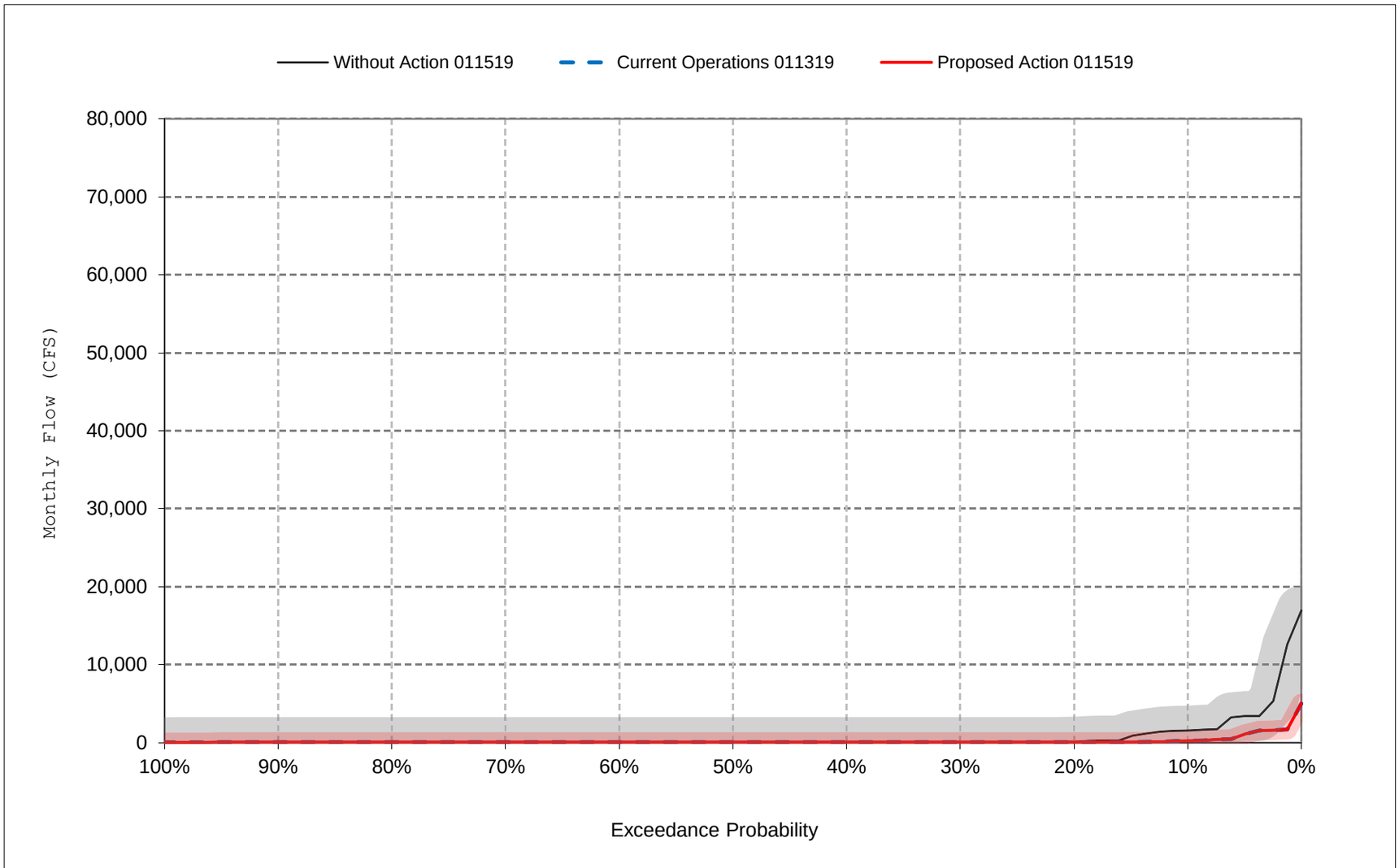
Figure 25-13. Yolo Bypass Flow, April



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

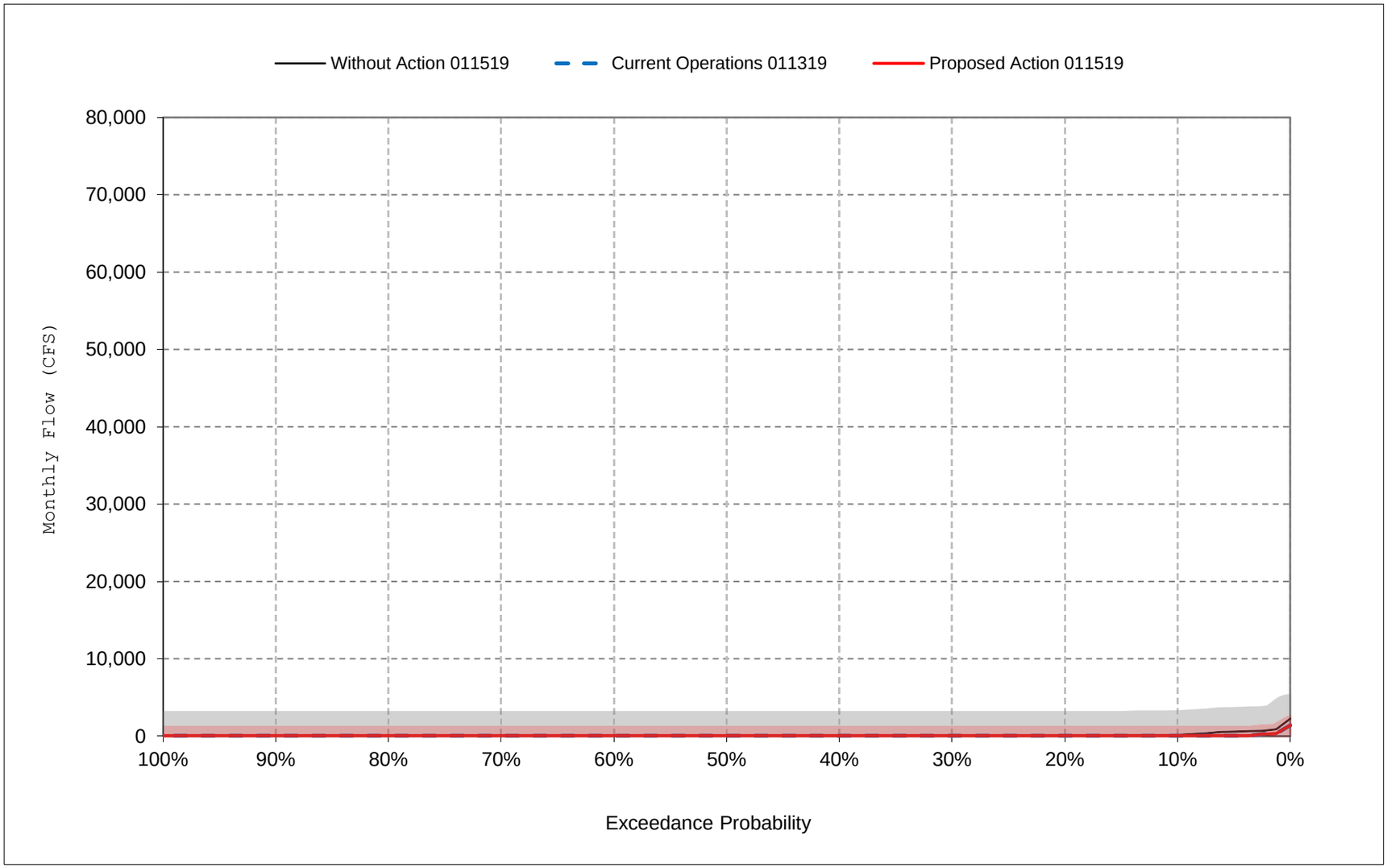
Figure 25-14. Yolo Bypass Flow, May



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

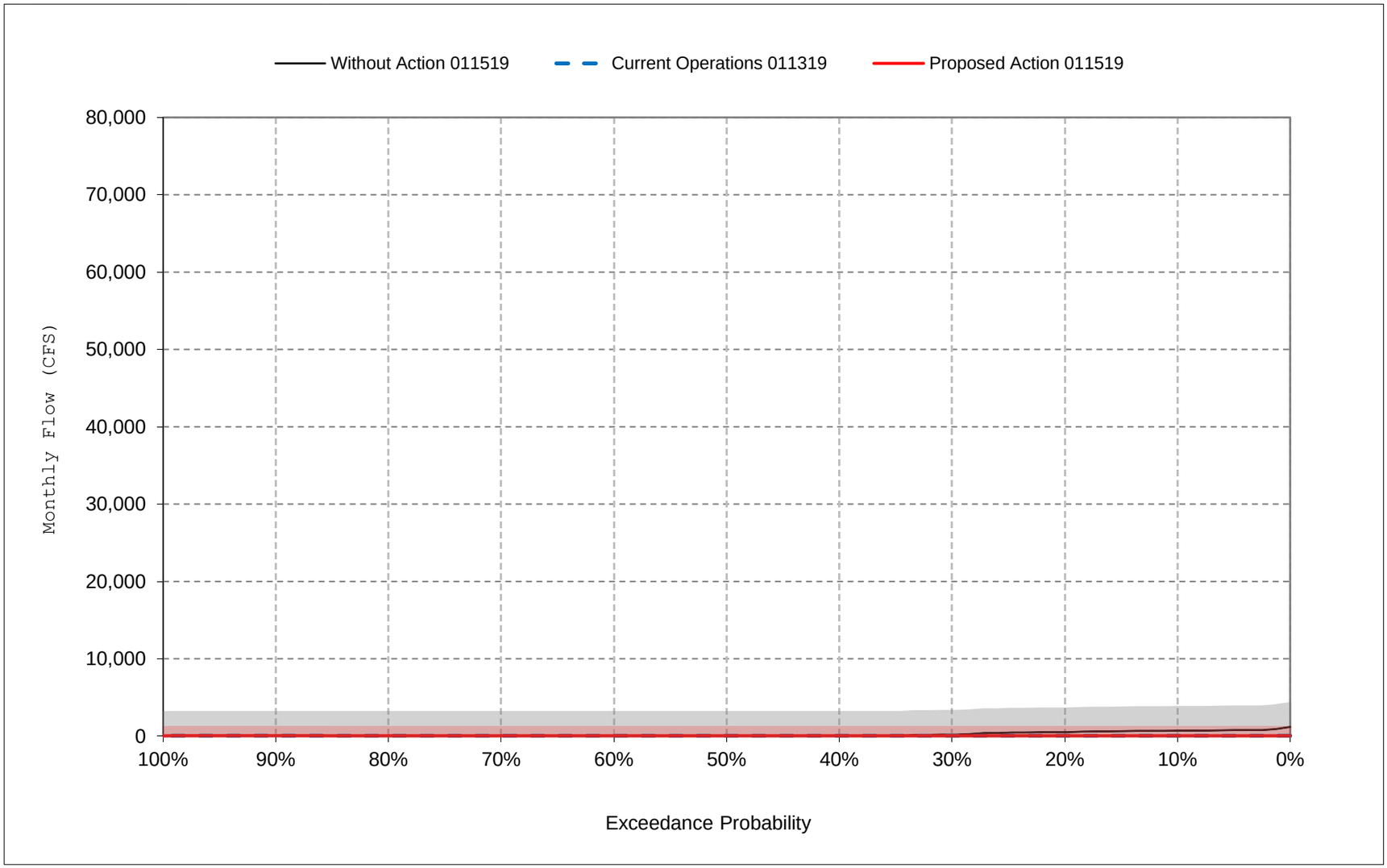
Figure 25-15. Yolo Bypass Flow, June



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

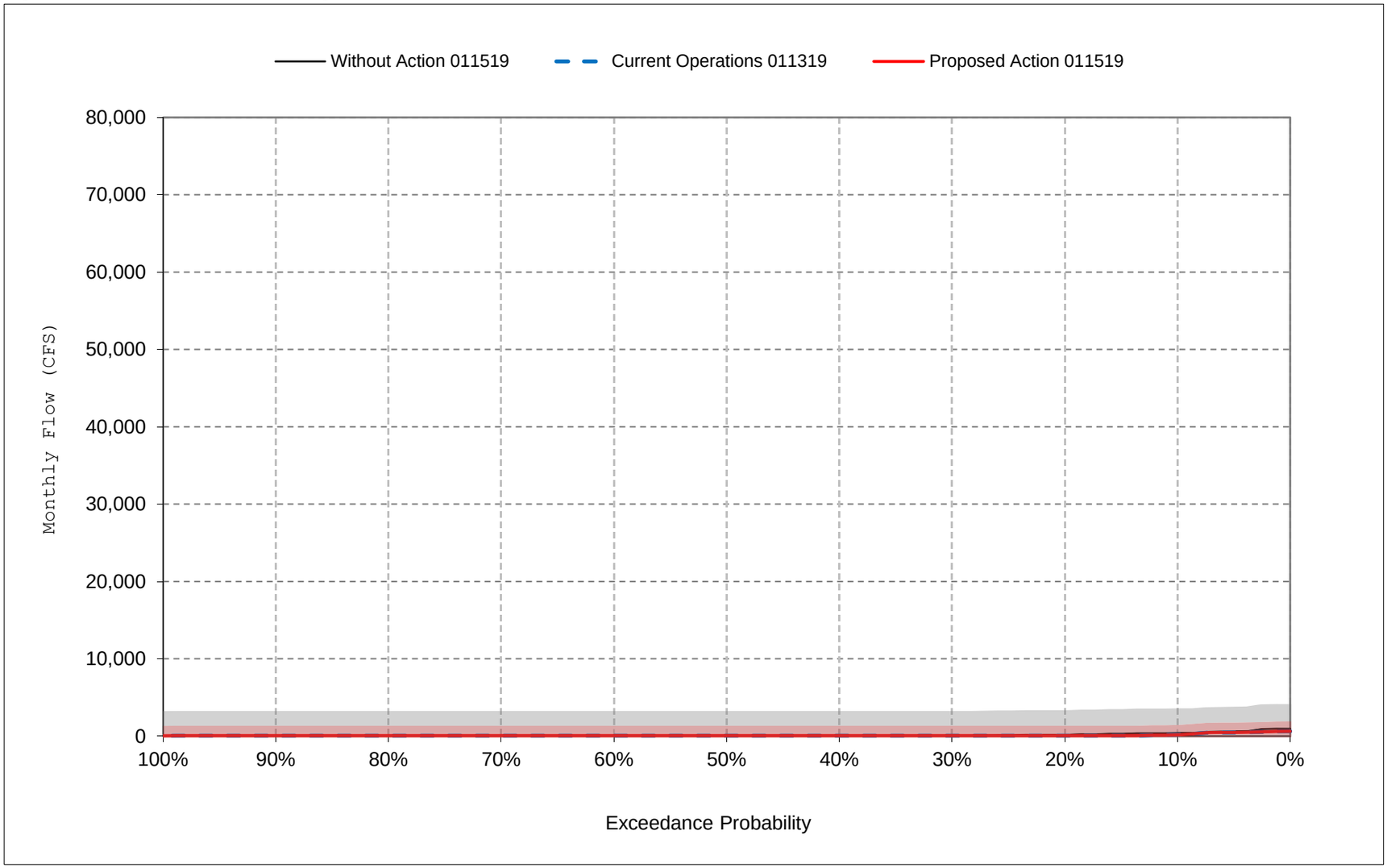
Figure 25-16. Yolo Bypass Flow, July



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

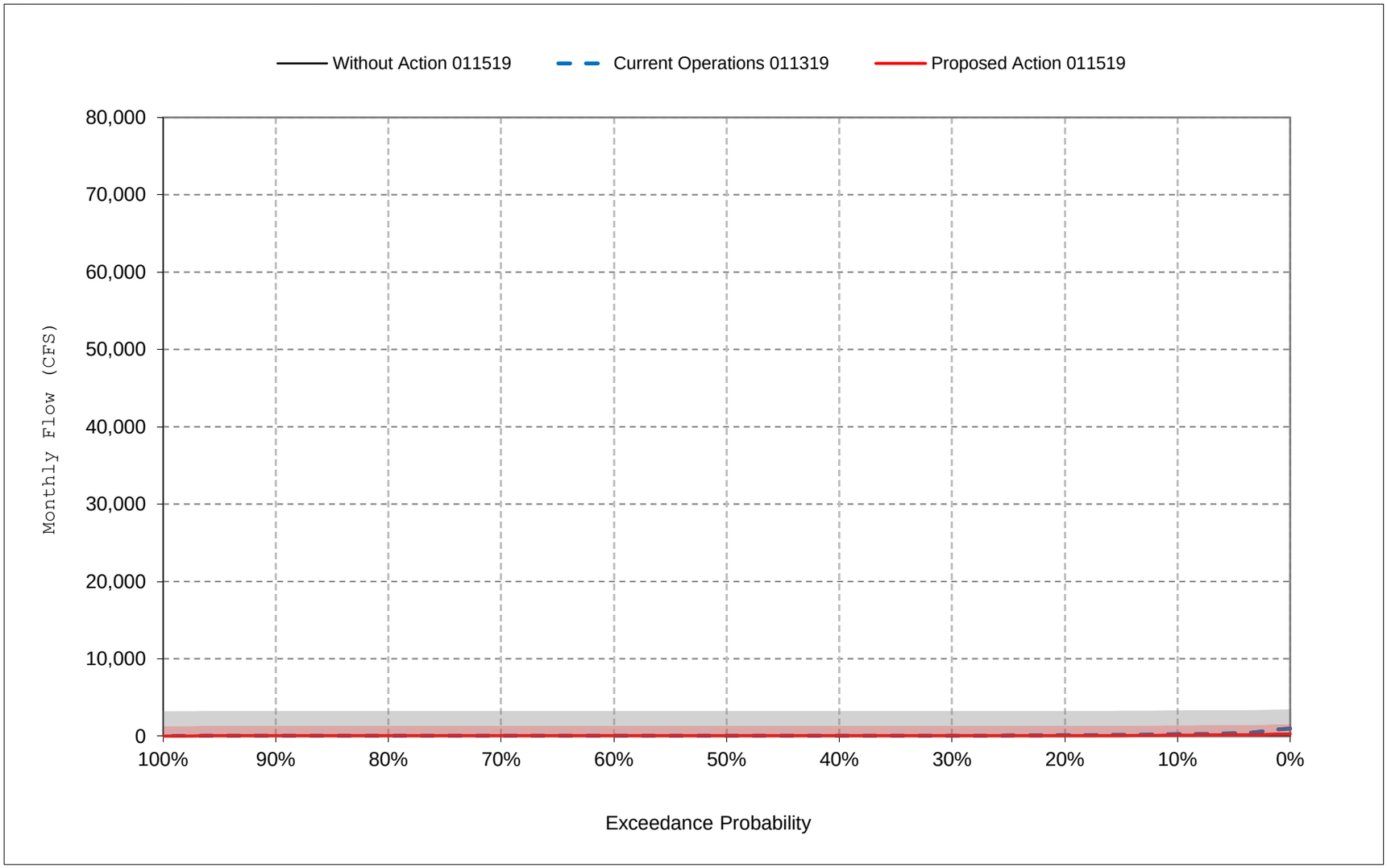
Figure 25-17. Yolo Bypass Flow, August



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Figure 25-18. Yolo Bypass Flow, September



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Table 27-1. American River below Nimbus Dam Flow, Monthly Flow

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,449	3,991	10,305	12,246	14,889	12,690	9,964	10,894	5,440	2,022	1,631	1,604
20%	1,290	2,865	6,119	9,271	11,533	8,564	8,198	7,897	4,246	1,799	1,571	1,539
30%	1,078	2,482	3,849	6,270	8,282	6,995	7,321	6,938	3,048	1,559	1,508	1,406
40%	1,029	2,114	3,234	4,649	6,429	6,034	6,283	6,059	2,277	1,391	1,455	1,381
50%	981	1,912	2,793	2,962	5,188	5,060	5,643	5,376	1,823	1,191	1,391	1,356
60%	943	1,707	2,235	2,406	3,522	4,351	5,033	3,693	1,290	925	1,333	1,320
70%	892	1,563	1,956	1,874	2,630	3,308	3,628	3,081	1,096	797	1,254	1,262
80%	845	1,394	1,730	1,256	1,996	2,898	2,848	1,810	728	511	1,058	1,162
90%	742	1,169	1,461	979	1,562	1,920	2,299	1,281	525	423	619	887
Long Term												
Full Simulation Period[a]	1,122	2,509	4,591	5,475	6,633	6,238	5,921	5,397	2,570	1,254	1,280	1,310
Water Year Types[b,c]												
Wet (32%)	1,339	2,932	5,288	10,367	10,765	9,718	8,555	8,842	4,715	2,007	1,567	1,575
Above Normal (16%)	1,003	2,371	3,782	7,027	8,234	8,027	6,538	5,714	2,112	1,197	1,450	1,418
Below Normal (13%)	1,402	2,122	3,814	2,788	5,921	3,835	5,244	3,866	1,780	969	1,191	1,326
Dry (24%)	1,011	2,930	5,942	2,038	3,430	4,211	4,579	3,607	1,299	775	1,143	1,240
Critical (15%)	706	1,392	2,419	1,383	1,939	2,344	2,401	1,974	1,262	745	781	721

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	2,741	3,756	8,397	12,142	14,637	9,735	6,685	7,387	4,560	5,480	2,916	3,219
20%	1,997	3,254	3,830	7,660	10,885	6,795	5,026	4,409	3,679	4,822	2,438	2,808
30%	1,639	2,599	2,285	5,538	7,067	5,020	4,431	3,523	3,146	3,854	1,953	2,438
40%	1,500	2,149	2,000	3,503	5,724	4,151	3,391	2,648	2,662	3,358	1,750	2,077
50%	1,500	1,925	2,000	1,750	2,905	2,971	2,486	1,899	2,219	2,836	1,750	1,670
60%	1,500	1,683	2,000	1,700	1,771	2,249	2,044	1,750	1,857	2,512	1,750	1,533
70%	1,500	1,559	1,730	1,700	1,445	1,750	1,747	1,632	1,750	1,989	1,634	1,515
80%	1,051	1,128	1,211	1,468	1,268	833	876	1,067	1,162	1,750	1,151	808
90%	800	800	800	950	945	800	800	800	800	886	800	800
Long Term												
Full Simulation Period[a]	1,679	2,500	3,676	5,045	5,836	4,233	3,338	3,035	2,687	3,018	1,812	1,926
Water Year Types[b,c]												
Wet (32%)	2,330	3,667	4,420	10,469	10,458	7,190	5,483	5,489	4,154	3,449	2,372	2,955
Above Normal (16%)	1,634	2,171	2,828	5,591	7,610	5,914	3,524	2,486	2,489	4,679	1,830	1,966
Below Normal (13%)	1,572	1,996	2,991	2,228	4,824	2,152	2,387	1,967	2,065	3,803	1,585	1,389
Dry (24%)	1,344	2,391	5,298	1,549	2,173	2,442	2,162	1,870	2,018	2,226	1,630	1,315
Critical (15%)	971	969	905	1,108	934	896	1,320	1,231	1,406	887	1,089	1,163

Current Operations 011319 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,292	**-235**	**-1,908**	**-105**	**-251**	**-2,955**	**-3,279**	**-3,507**	**-881**	3,458	1,285	1,614
20%	708	389	**-2,289**	**-1,611**	**-649**	**-1,769**	**-3,172**	**-3,488**	**-566**	3,023	867	1,269
30%	561	117	**-1,564**	**-732**	**-1,215**	**-1,975**	**-2,891**	**-3,415**	98	2,295	445	1,032
40%	471	35	**-1,234**	**-1,146**	**-705**	**-1,883**	**-2,892**	**-3,411**	385	1,967	295	697
50%	519	13	**-793**	**-1,212**	**-2,283**	**-2,089**	**-3,157**	**-3,478**	396	1,646	359	314
60%	557	**-24**	**-235**	**-706**	**-1,750**	**-2,102**	**-2,989**	**-1,943**	567	1,587	417	213
70%	608	**-5**	**-227**	**-174**	**-1,185**	**-1,558**	**-1,881**	**-1,449**	654	1,191	380	253
80%	205	**-266**	**-519**	213	**-728**	**-2,065**	**-1,972**	**-742**	434	1,239	92	**-354**
90%	58	**-369**	**-661**	**-30**	**-617**	**-1,120**	**-1,499**	**-481**	275	463	181	**-87**
Long Term												
Full Simulation Period[a]	557	**-9**	**-915**	**-430**	**-797**	**-2,006**	**-2,583**	**-2,362**	117	1,764	532	616
Water Year Types[b,c]												
Wet (32%)	992	735	**-868**	102	**-307**	**-2,528**	**-3,072**	**-3,353**	**-561**	1,442	805	1,380
Above Normal (16%)	631	**-200**	**-954**	**-1,436**	**-623**	**-2,114**	**-3,014**	**-3,227**	377	3,482	380	548
Below Normal (13%)	169	**-126**	**-823**	**-560**	**-1,097**	**-1,682**	**-2,857**	**-1,899**	284	2,834	394	62
Dry (24%)	333	**-539**	**-644**	**-489**	**-1,258**	**-1,770**	**-2,417**	**-1,737**	719	1,451	486	75
Critical (15%)	265	**-423**	**-1,514**	**-275**	**-1,005**	**-1,447**	**-1,081**	**-743**	145	143	309	442

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 27-2. American River below Nimbus Dam Flow, Monthly Flow

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,449	3,991	10,305	12,246	14,889	12,690	9,964	10,894	5,440	2,022	1,631	1,604
20%	1,290	2,865	6,119	9,271	11,533	8,564	8,198	7,897	4,246	1,799	1,571	1,539
30%	1,078	2,482	3,849	6,270	8,282	6,995	7,321	6,938	3,048	1,559	1,508	1,406
40%	1,029	2,114	3,234	4,649	6,429	6,034	6,283	6,059	2,277	1,391	1,455	1,381
50%	981	1,912	2,793	2,962	5,188	5,060	5,643	5,376	1,823	1,191	1,391	1,356
60%	943	1,707	2,235	2,406	3,522	4,351	5,033	3,693	1,290	925	1,333	1,320
70%	892	1,563	1,956	1,874	2,630	3,308	3,628	3,081	1,096	797	1,254	1,262
80%	845	1,394	1,730	1,256	1,996	2,898	2,848	1,810	728	511	1,058	1,162
90%	742	1,169	1,461	979	1,562	1,920	2,299	1,281	525	423	619	887
Long Term												
Full Simulation Period[a]	1,122	2,509	4,591	5,475	6,633	6,238	5,921	5,397	2,570	1,254	1,280	1,310
Water Year Types[b,c]												
Wet (32%)	1,339	2,932	5,288	10,367	10,765	9,718	8,555	8,842	4,715	2,007	1,567	1,575
Above Normal (16%)	1,003	2,371	3,782	7,027	8,234	8,027	6,538	5,714	2,112	1,197	1,450	1,418
Below Normal (13%)	1,402	2,122	3,814	2,788	5,921	3,835	5,244	3,866	1,780	969	1,191	1,326
Dry (24%)	1,011	2,930	5,942	2,038	3,430	4,211	4,579	3,607	1,299	775	1,143	1,240
Critical (15%)	706	1,392	2,419	1,383	1,939	2,344	2,401	1,974	1,262	745	781	721

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,825	4,392	10,055	12,142	14,637	10,410	6,685	7,387	4,560	4,602	2,973	1,916
20%	1,534	3,485	4,672	7,854	10,946	6,796	5,026	4,409	3,679	3,915	2,460	1,750
30%	1,500	2,236	2,606	5,650	7,486	5,020	4,397	3,523	3,255	3,493	2,006	1,750
40%	1,500	2,000	2,195	3,503	5,724	4,144	3,282	2,602	2,873	2,941	1,817	1,750
50%	1,500	2,000	2,000	2,152	3,557	3,000	2,494	1,863	2,519	2,720	1,750	1,750
60%	1,500	1,923	2,000	1,613	2,696	2,234	2,096	1,565	2,094	2,379	1,750	1,750
70%	1,159	1,159	1,813	1,400	1,750	1,750	1,469	1,495	1,673	1,890	1,671	1,669
80%	749	730	802	1,400	1,400	1,442	1,017	1,144	1,212	1,750	1,511	1,545
90%	595	588	626	714	1,388	953	953	953	784	968	877	880
Long Term												
Full Simulation Period[a]	1,376	2,485	3,905	5,106	6,081	4,367	3,340	3,024	2,771	2,771	1,867	1,628
Water Year Types[b,c]												
Wet (32%)	1,789	3,979	5,132	10,620	10,566	7,189	5,453	5,456	4,288	3,131	2,388	1,839
Above Normal (16%)	1,535	2,125	2,921	5,730	7,949	6,117	3,478	2,463	2,657	4,232	1,872	1,763
Below Normal (13%)	1,348	1,693	2,886	2,284	5,585	2,322	2,434	2,070	2,211	3,537	1,903	1,604
Dry (24%)	1,078	2,233	5,424	1,540	2,172	2,600	2,118	1,817	2,044	1,950	1,677	1,537
Critical (15%)	832	787	715	1,013	1,307	1,173	1,480	1,249	1,334	1,073	1,017	1,196

Proposed Action 011519 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	376	401	**-250**	**-105**	**-251**	**-2,281**	**-3,279**	**-3,507**	**-881**	2,580	1,342	312
20%	244	620	**-1,447**	**-1,416**	**-588**	**-1,768**	**-3,172**	**-3,488**	**-566**	2,116	889	211
30%	422	**-246**	**-1,243**	**-620**	**-797**	**-1,975**	**-2,925**	**-3,415**	207	1,934	498	344
40%	471	**-114**	**-1,040**	**-1,146**	**-705**	**-1,890**	**-3,001**	**-3,457**	597	1,550	362	369
50%	519	88	**-793**	**-809**	**-1,631**	**-2,060**	**-3,149**	**-3,513**	696	1,530	359	394
60%	557	216	**-235**	**-793**	**-826**	**-2,117**	**-2,937**	**-2,128**	804	1,454	417	430
70%	267	**-404**	**-143**	**-474**	**-880**	**-1,558**	**-2,159**	**-1,586**	577	1,092	418	407
80%	**-97**	**-664**	**-928**	144	**-596**	**-1,456**	**-1,831**	**-666**	483	1,239	453	382
90%	**-147**	**-581**	**-835**	**-265**	**-174**	**-968**	**-1,347**	**-329**	259	545	258	**-7**
Long Term												
Full Simulation Period[a]	255	**-23**	**-686**	**-369**	**-553**	**-1,872**	**-2,581**	**-2,372**	201	1,517	587	317
Water Year Types[b,c]												
Wet (32%)	450	1,047	**-156**	254	**-199**	**-2,529**	**-3,102**	**-3,386**	**-427**	1,124	821	263
Above Normal (16%)	532	**-246**	**-861**	**-1,298**	**-285**	**-1,910**	**-3,060**	**-3,251**	545	3,035	423	345
Below Normal (13%)	**-54**	**-428**	**-928**	**-504**	**-336**	**-1,513**	**-2,810**	**-1,796**	431	2,568	712	278
Dry (24%)	67	**-698**	**-518**	**-498**	**-1,259**	**-1,611**	**-2,461**	**-1,790**	746	1,175	533	297
Critical (15%)	125	**-605**	**-1,704**	**-370**	**-631**	**-1,171**	**-921**	**-725**	72	329	236	476

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 27-3. American River below Nimbus Dam Flow, Monthly Flow

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	2,741	3,756	8,397	12,142	14,637	9,735	6,685	7,387	4,560	5,480	2,916	3,219
20%	1,997	3,254	3,830	7,660	10,885	6,795	5,026	4,409	3,679	4,822	2,438	2,808
30%	1,639	2,599	2,285	5,538	7,067	5,020	4,431	3,523	3,146	3,854	1,953	2,438
40%	1,500	2,149	2,000	3,503	5,724	4,151	3,391	2,648	2,662	3,358	1,750	2,077
50%	1,500	1,925	2,000	1,750	2,905	2,971	2,486	1,899	2,219	2,836	1,750	1,670
60%	1,500	1,683	2,000	1,700	1,771	2,249	2,044	1,750	1,857	2,512	1,750	1,533
70%	1,500	1,559	1,730	1,700	1,445	1,750	1,747	1,632	1,750	1,989	1,634	1,515
80%	1,051	1,128	1,211	1,468	1,268	833	876	1,067	1,162	1,750	1,151	808
90%	800	800	800	950	945	800	800	800	800	886	800	800
Long Term												
Full Simulation Period[a]	1,679	2,500	3,676	5,045	5,836	4,233	3,338	3,035	2,687	3,018	1,812	1,926
Water Year Types[b,c]												
Wet (32%)	2,330	3,667	4,420	10,469	10,458	7,190	5,483	5,489	4,154	3,449	2,372	2,955
Above Normal (16%)	1,634	2,171	2,828	5,591	7,610	5,914	3,524	2,486	2,489	4,679	1,830	1,966
Below Normal (13%)	1,572	1,996	2,991	2,228	4,824	2,152	2,387	1,967	2,065	3,803	1,585	1,389
Dry (24%)	1,344	2,391	5,298	1,549	2,173	2,442	2,162	1,870	2,018	2,226	1,630	1,315
Critical (15%)	971	969	905	1,108	934	896	1,320	1,231	1,406	887	1,089	1,163

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,825	4,392	10,055	12,142	14,637	10,410	6,685	7,387	4,560	4,602	2,973	1,916
20%	1,534	3,485	4,672	7,854	10,946	6,796	5,026	4,409	3,679	3,915	2,460	1,750
30%	1,500	2,236	2,606	5,650	7,486	5,020	4,397	3,523	3,255	3,493	2,006	1,750
40%	1,500	2,000	2,195	3,503	5,724	4,144	3,282	2,602	2,873	2,941	1,817	1,750
50%	1,500	2,000	2,000	2,152	3,557	3,000	2,494	1,863	2,519	2,720	1,750	1,750
60%	1,500	1,923	2,000	1,613	2,696	2,234	2,096	1,565	2,094	2,379	1,750	1,750
70%	1,159	1,159	1,813	1,400	1,750	1,750	1,469	1,495	1,673	1,890	1,671	1,669
80%	749	730	802	1,400	1,400	1,442	1,017	1,144	1,212	1,750	1,511	1,545
90%	595	588	626	714	1,388	953	953	953	784	968	877	880
Long Term												
Full Simulation Period[a]	1,376	2,485	3,905	5,106	6,081	4,367	3,340	3,024	2,771	2,771	1,867	1,628
Water Year Types[b,c]												
Wet (32%)	1,789	3,979	5,132	10,620	10,566	7,189	5,453	5,456	4,288	3,131	2,388	1,839
Above Normal (16%)	1,535	2,125	2,921	5,730	7,949	6,117	3,478	2,463	2,657	4,232	1,872	1,763
Below Normal (13%)	1,348	1,693	2,886	2,284	5,585	2,322	2,434	2,070	2,211	3,537	1,903	1,604
Dry (24%)	1,078	2,233	5,424	1,540	2,172	2,600	2,118	1,817	2,044	1,950	1,677	1,537
Critical (15%)	832	787	715	1,013	1,307	1,173	1,480	1,249	1,334	1,073	1,017	1,196

Proposed Action 011519 minus Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	**-916**	636	1,658	0	0	675	0	0	0	**-878**	57	**-1,303**
20%	**-463**	231	842	195	61	1	0	0	0	**-907**	22	**-1,058**
30%	**-139**	**-363**	321	111	419	0	**-34**	**0**	109	**-361**	53	**-688**
40%	0	**-149**	195	**0**	**0**	**-7**	**-109**	**-46**	212	**-418**	67	**-327**
50%	0	75	0	402	651	28	8	**-35**	300	**-116**	0	80
60%	0	239	0	**-87**	924	**-15**	52	**-185**	237	**-133**	0	217
70%	**-341**	**-400**	83	**-300**	305	0	**-278**	**-137**	**-77**	**-99**	37	154
80%	**-302**	**-399**	**-409**	**-68**	132	609	141	76	50	0	361	737
90%	**-205**	**-212**	**-174**	**-236**	442	153	153	153	**-16**	82	77	80
Long Term												
Full Simulation Period[a]	**-303**	**-14**	229	62	244	134	2	**-10**	85	**-247**	55	**-298**
Water Year Types[b,c]												
Wet (32%)	**-541**	311	712	152	108	**-1**	**-30**	**-33**	134	**-318**	16	**-1,117**
Above Normal (16%)	**-99**	**-46**	93	139	338	204	**-46**	**-23**	168	**-447**	43	**-204**
Below Normal (13%)	**-224**	**-303**	**-105**	56	762	169	47	103	146	**-266**	318	215
Dry (24%)	**-266**	**-158**	126	**-9**	**-1**	158	**-44**	**-53**	26	**-276**	47	222
Critical (15%)	**-140**	**-182**	**-190**	**-95**	373	276	160	18	**-73**	186	**-72**	33

a Based on the 82-year simulation period.

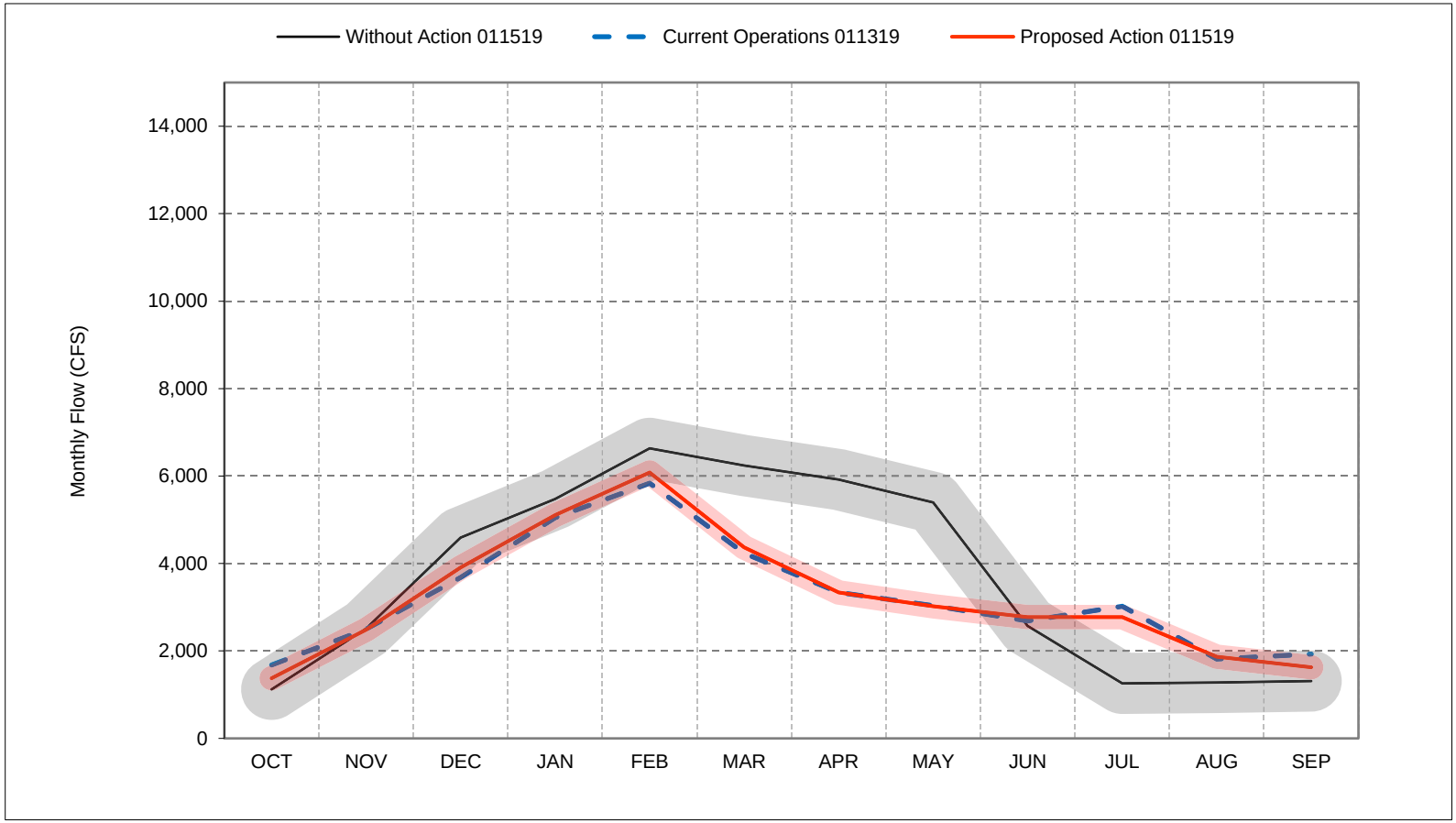
b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

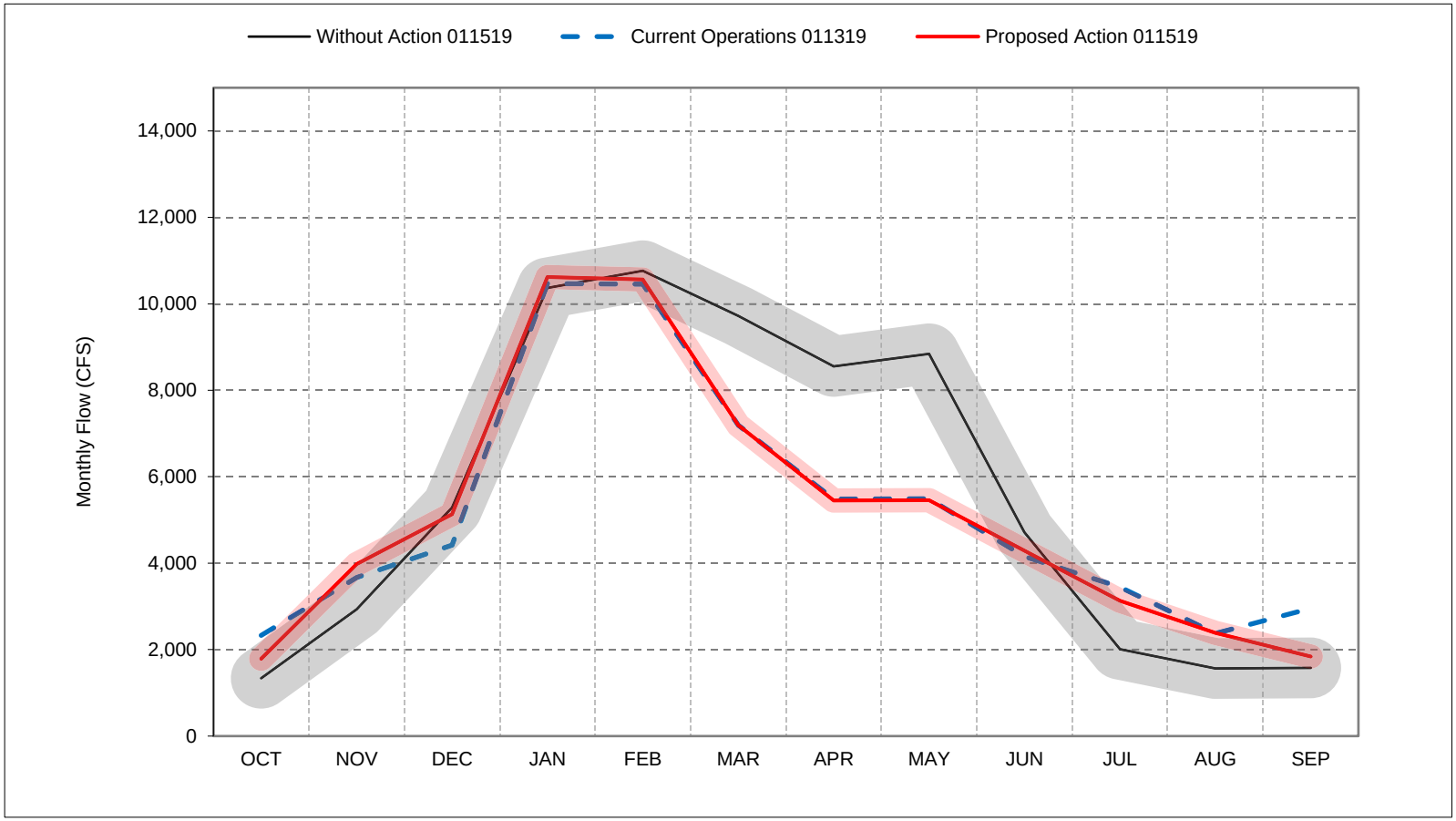
e These are draft results meant for qualitative analysis and are subject to revision.

Figure 27-1. American River below Nimbus Dam Flow, Long-Term Average Flow



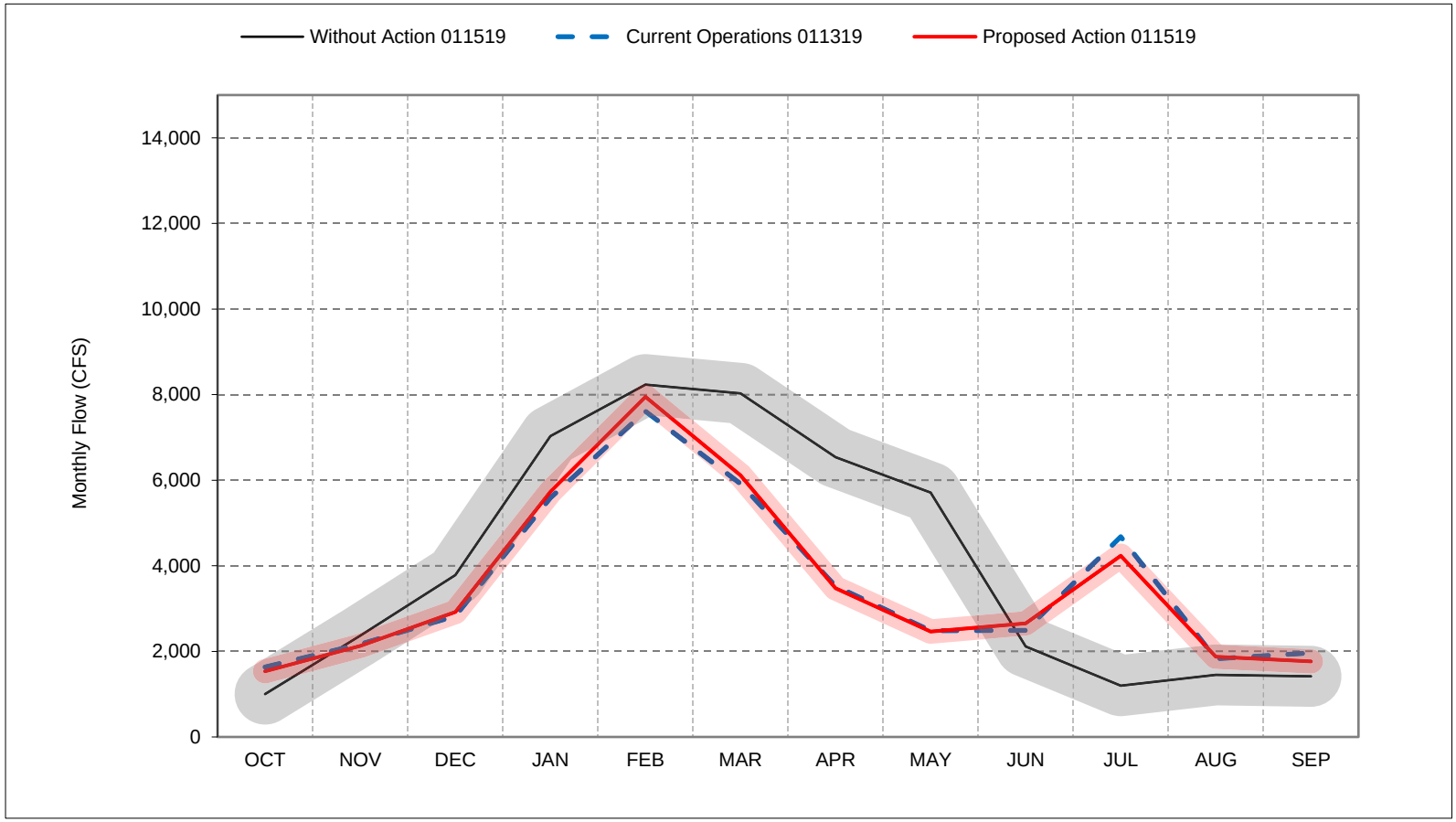
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 27-2. American River below Nimbus Dam Flow, Wet Year Average Flow



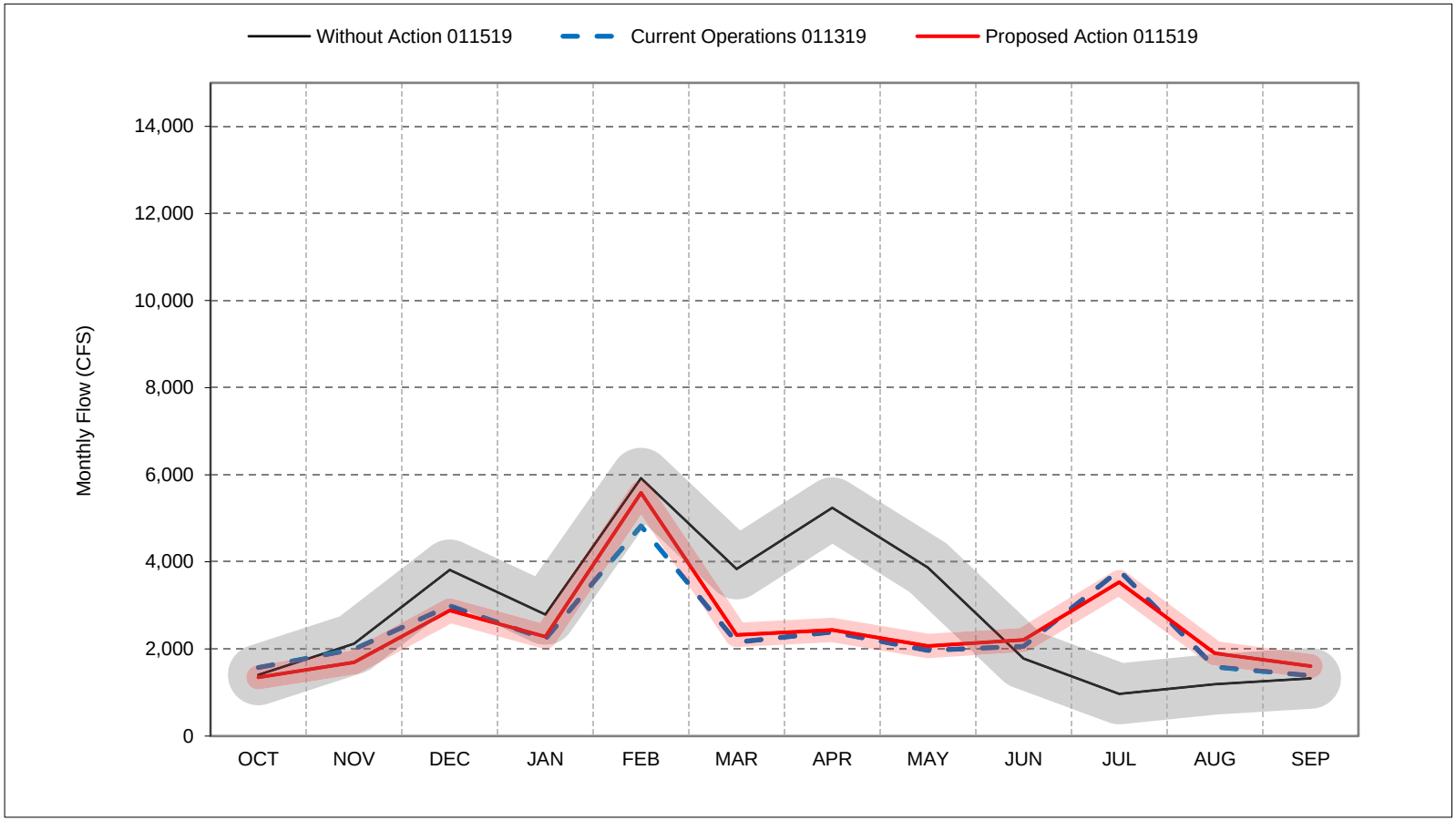
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 27-3. American River below Nimbus Dam Flow, Above Normal Year Average Flow



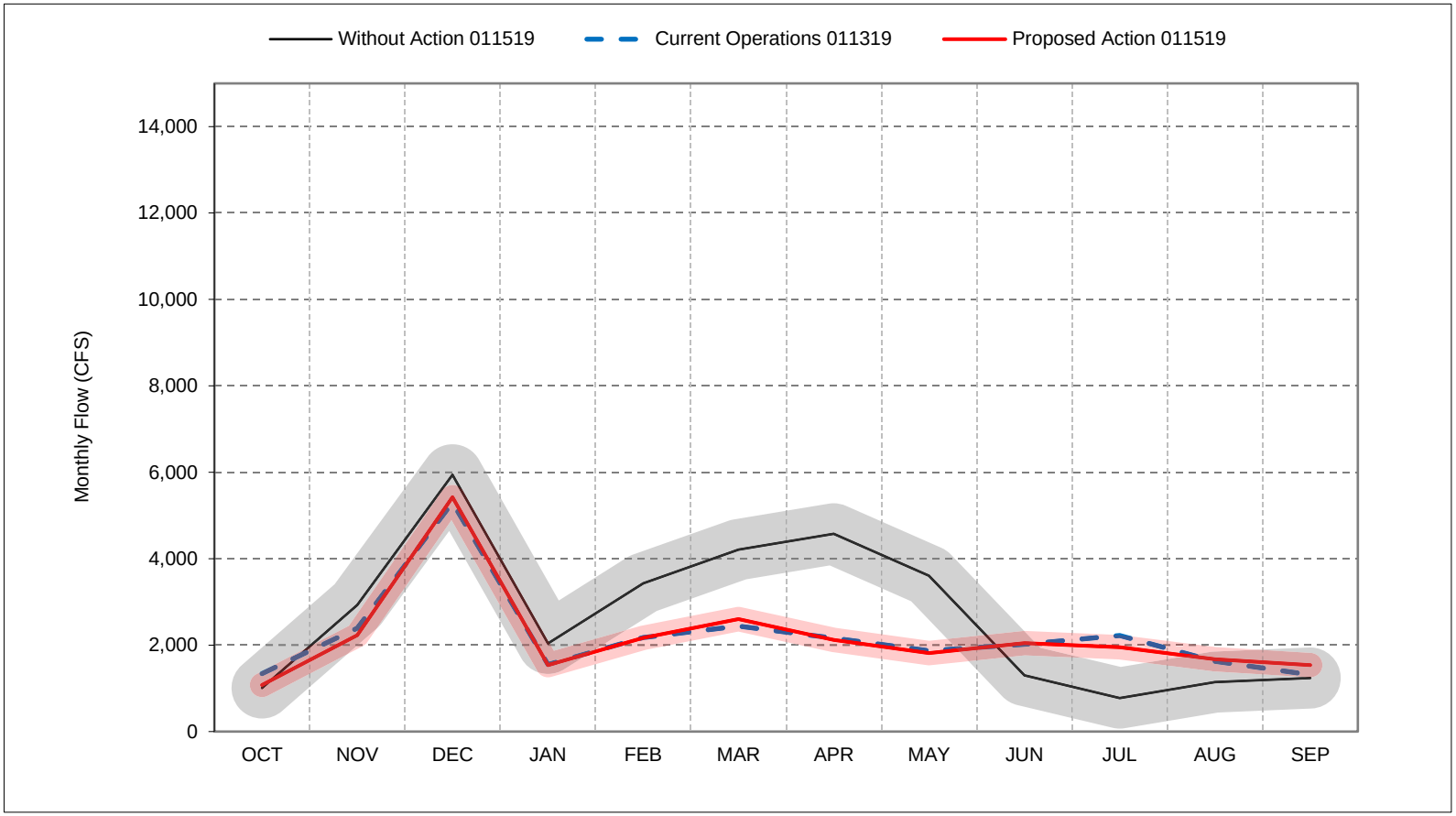
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 27-4. American River below Nimbus Dam Flow, Below Normal Year Average Flow



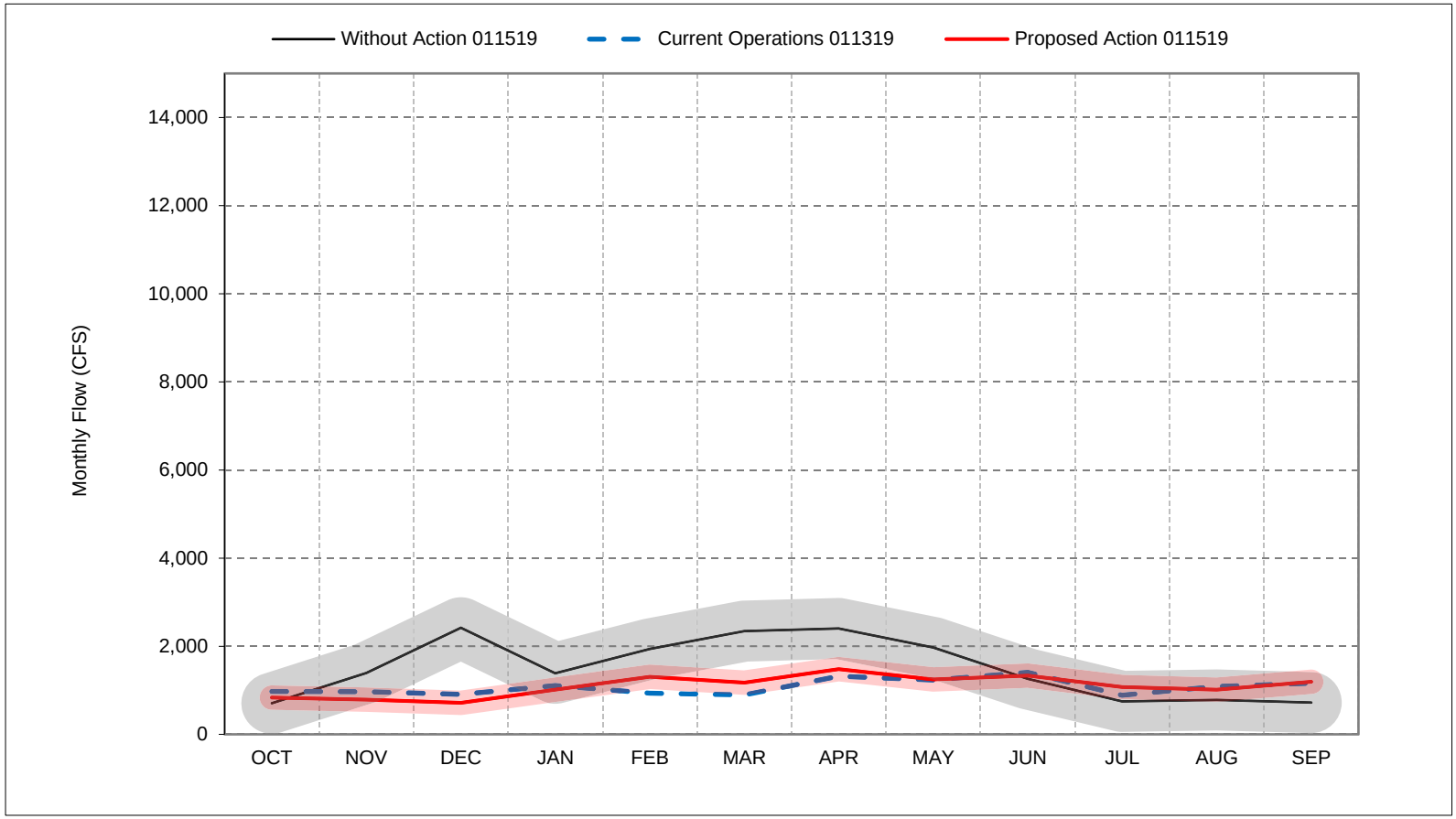
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 27-5. American River below Nimbus Dam Flow, Dry Year Average Flow



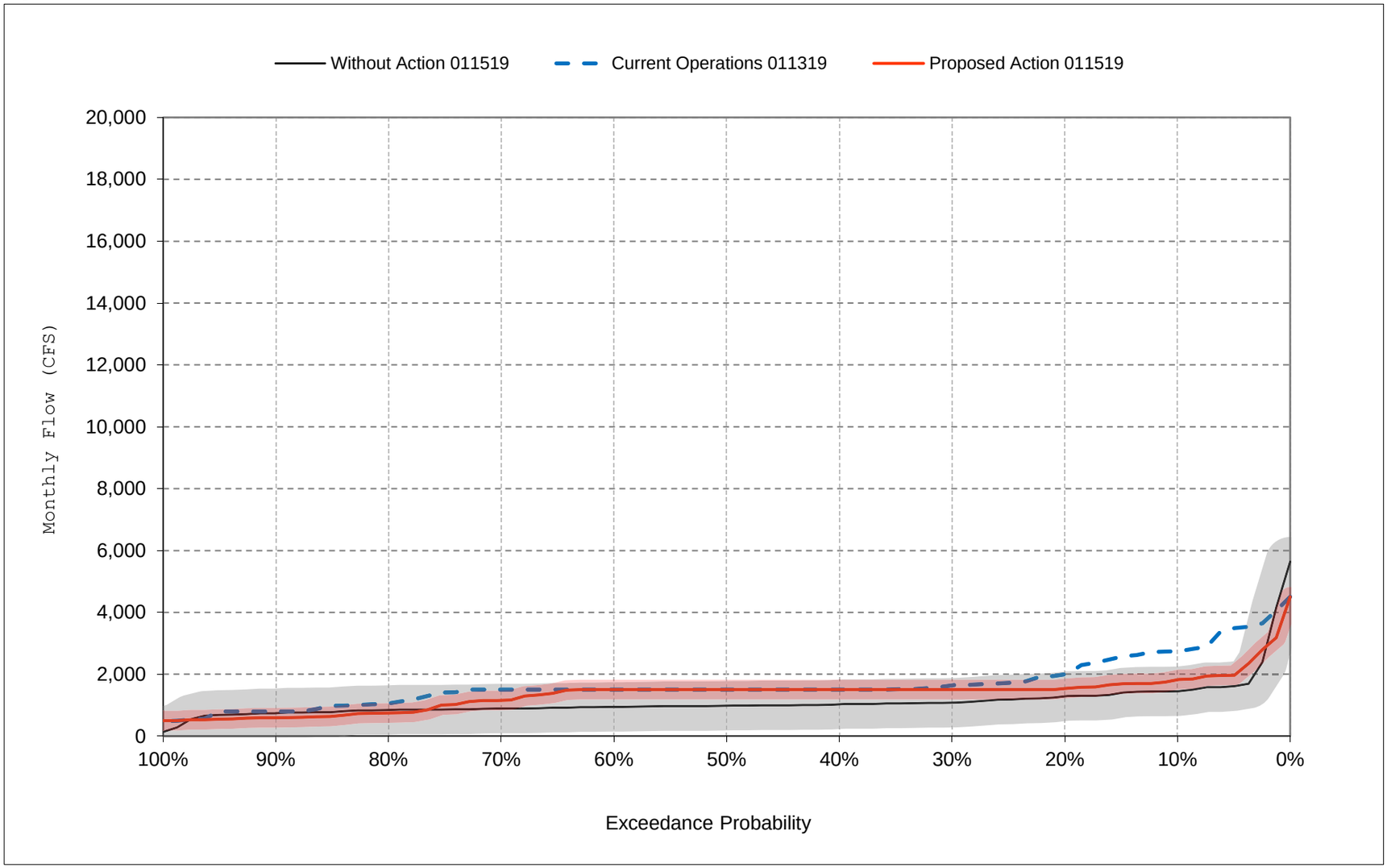
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 27-6. American River below Nimbus Dam Flow, Critical Year Average Flow



*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

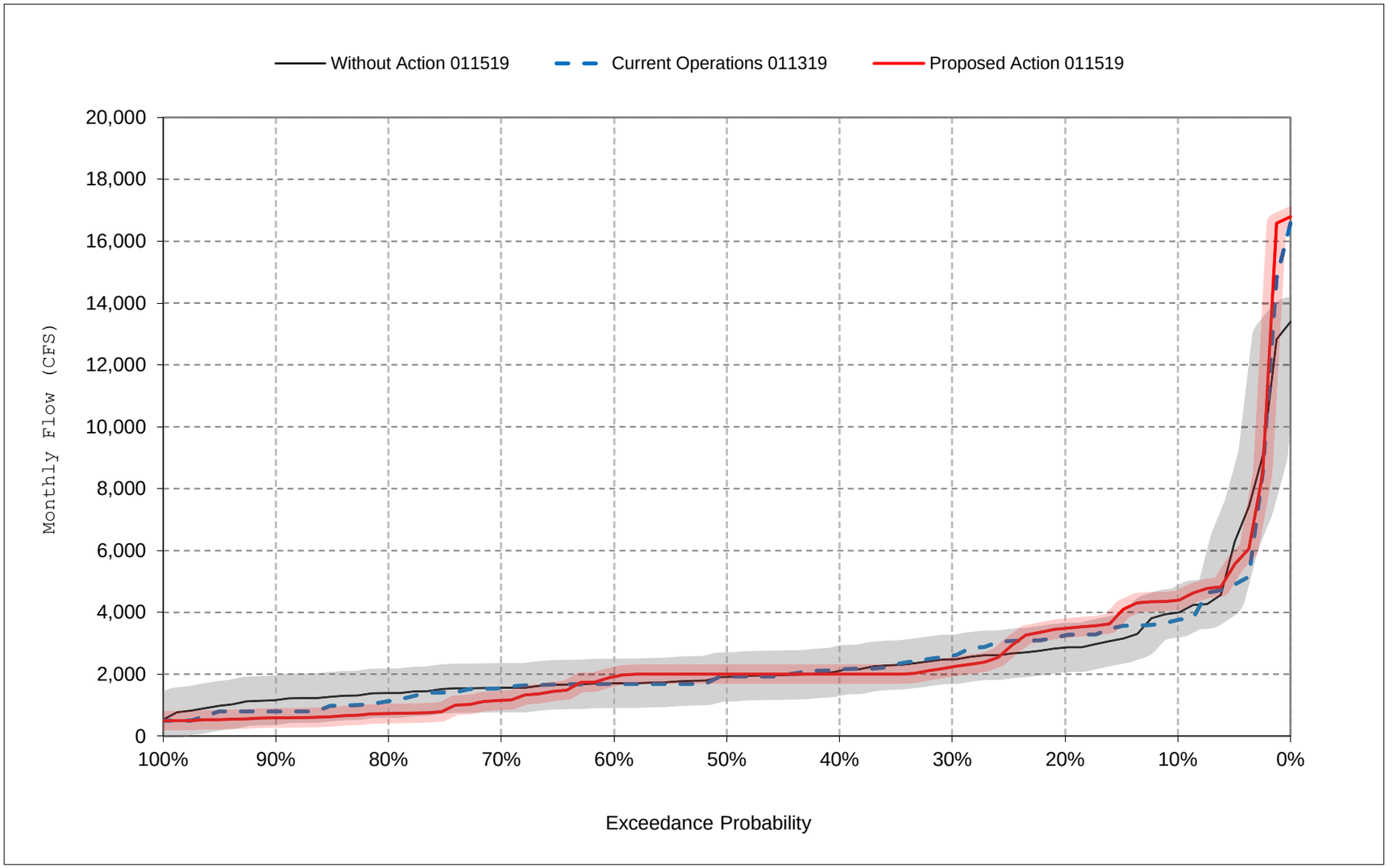
Figure 27-7. American River below Nimbus Dam Flow, October



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

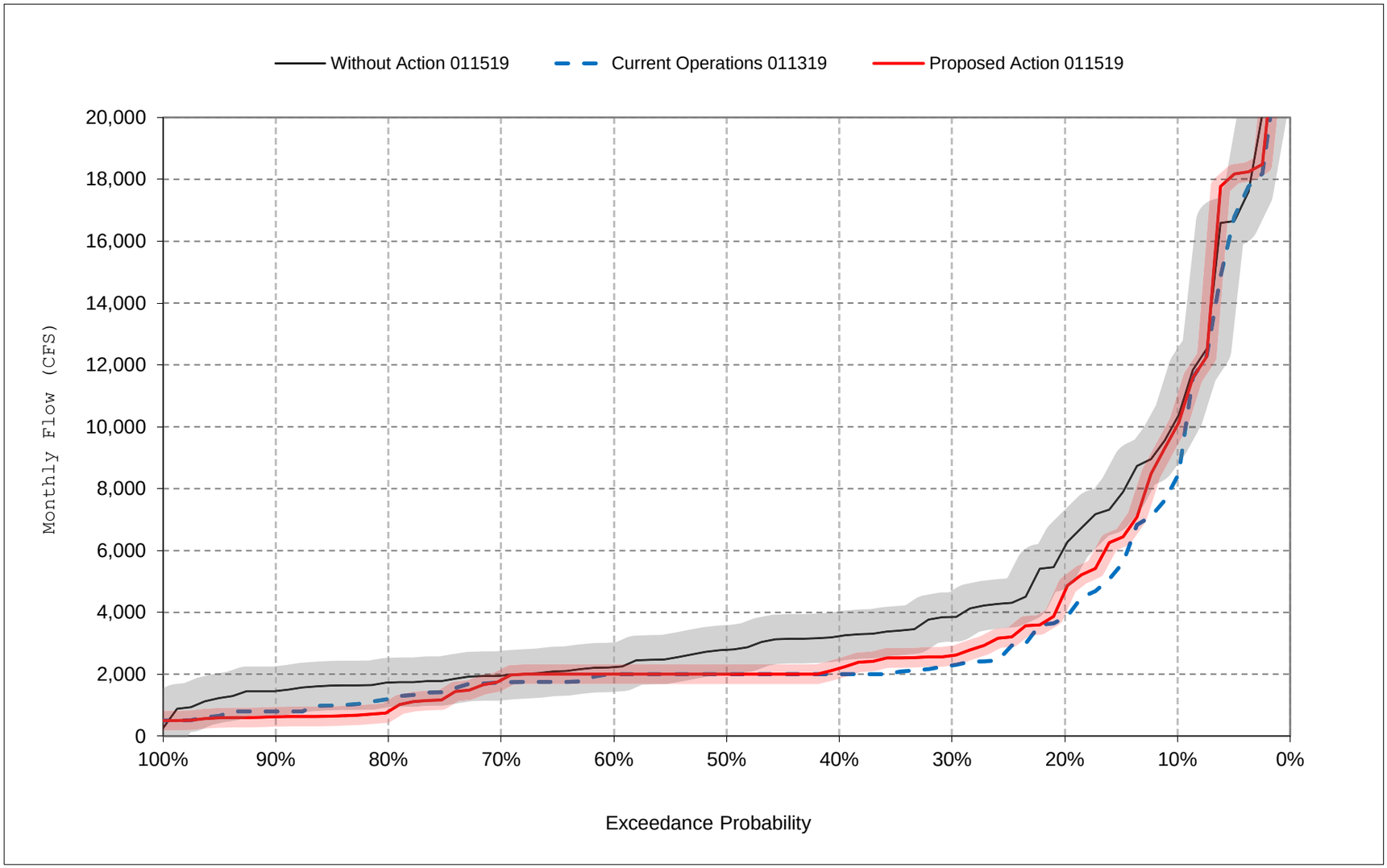
Figure 27-8. American River below Nimbus Dam Flow, November



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

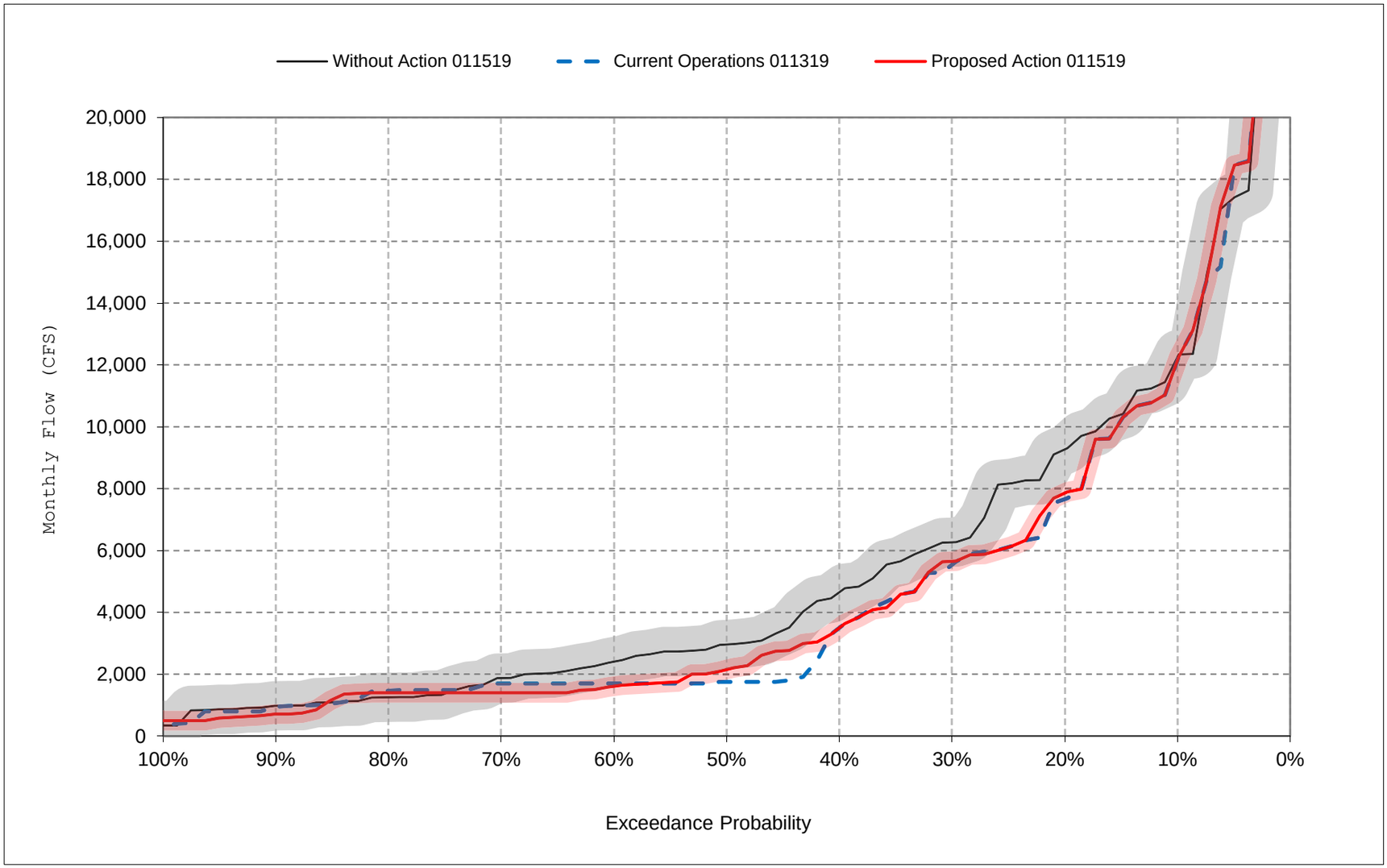
Figure 27-9. American River below Nimbus Dam Flow, December



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

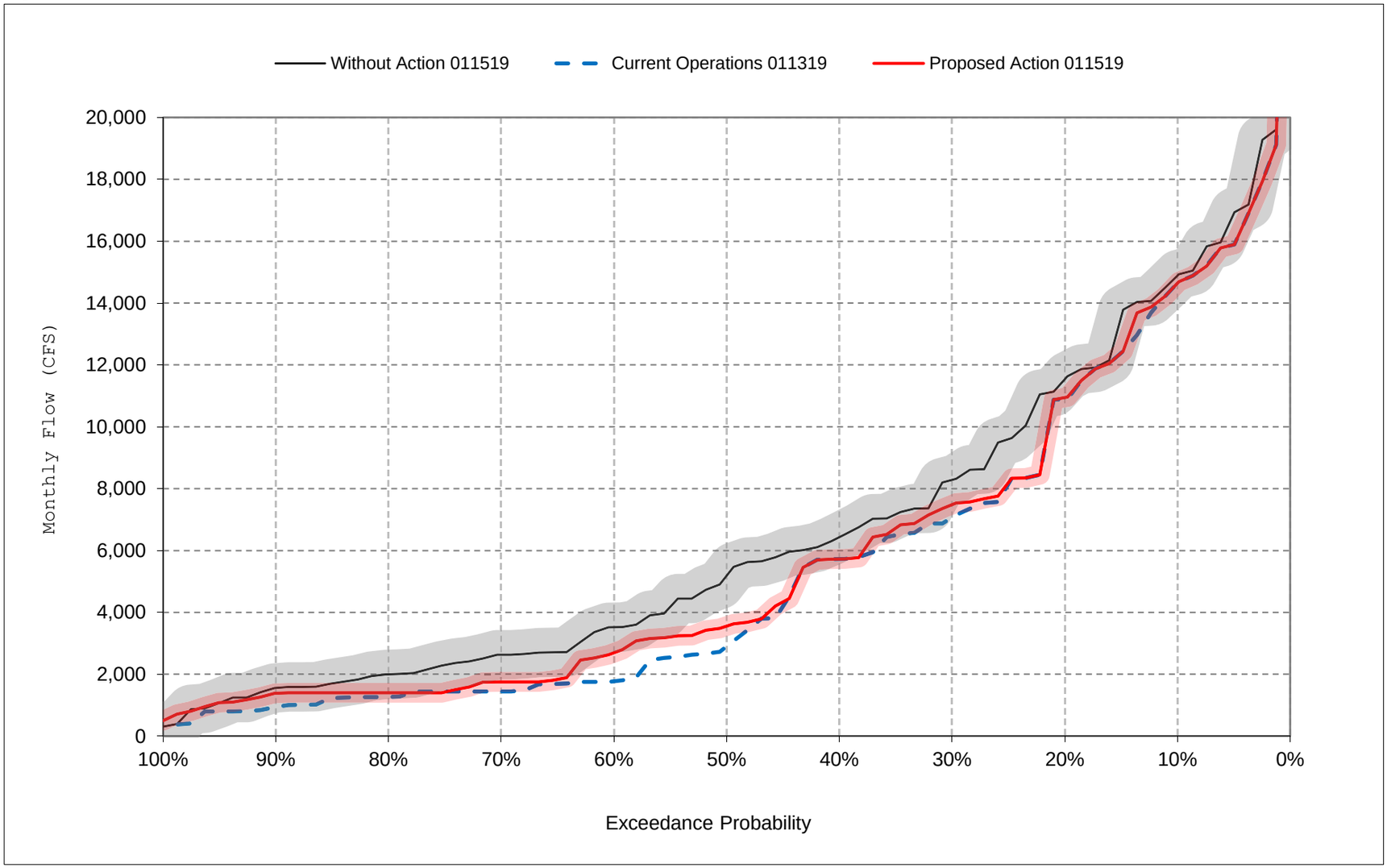
Figure 27-10. American River below Nimbus Dam Flow, January



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

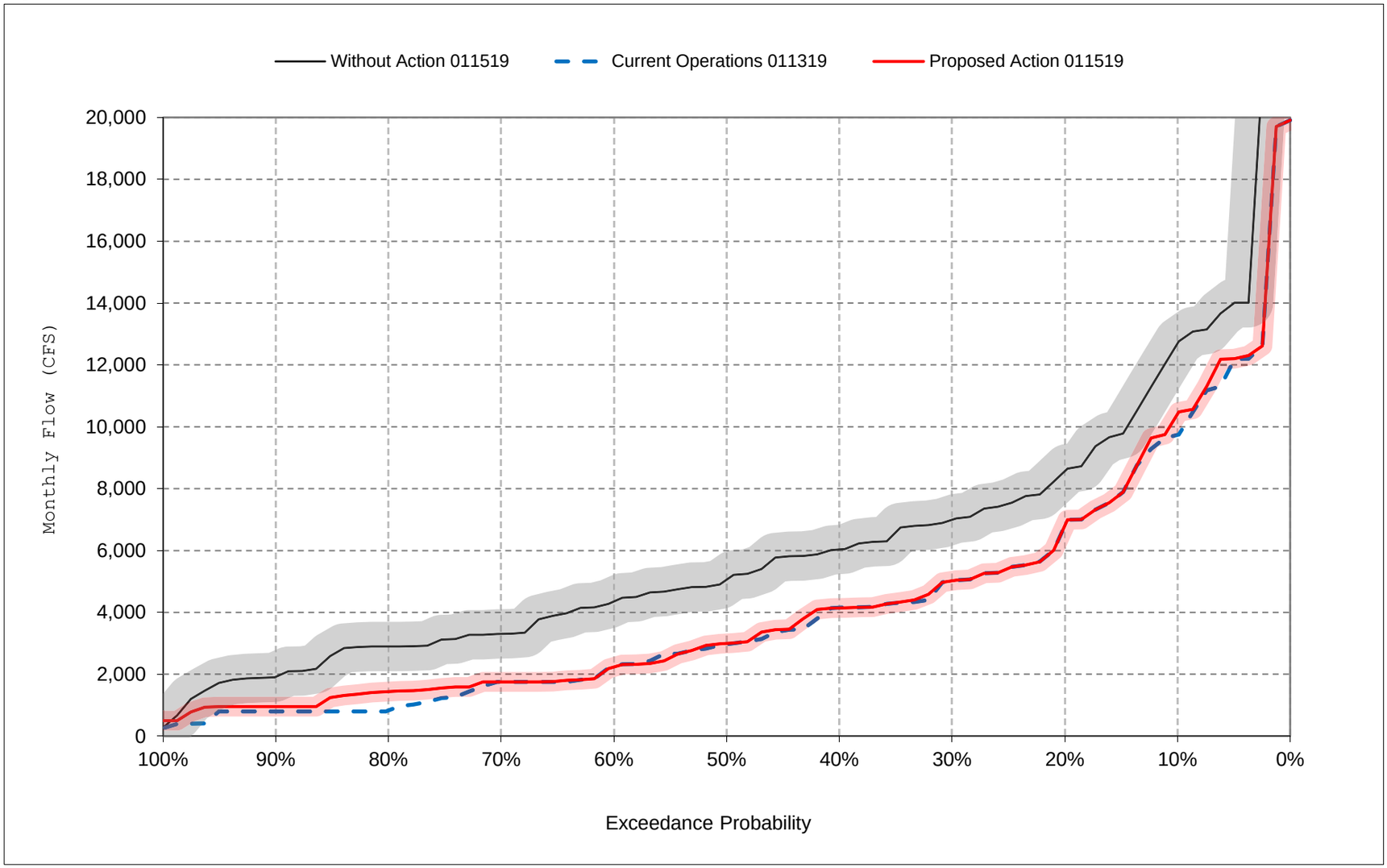
Figure 27-11. American River below Nimbus Dam Flow, February



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

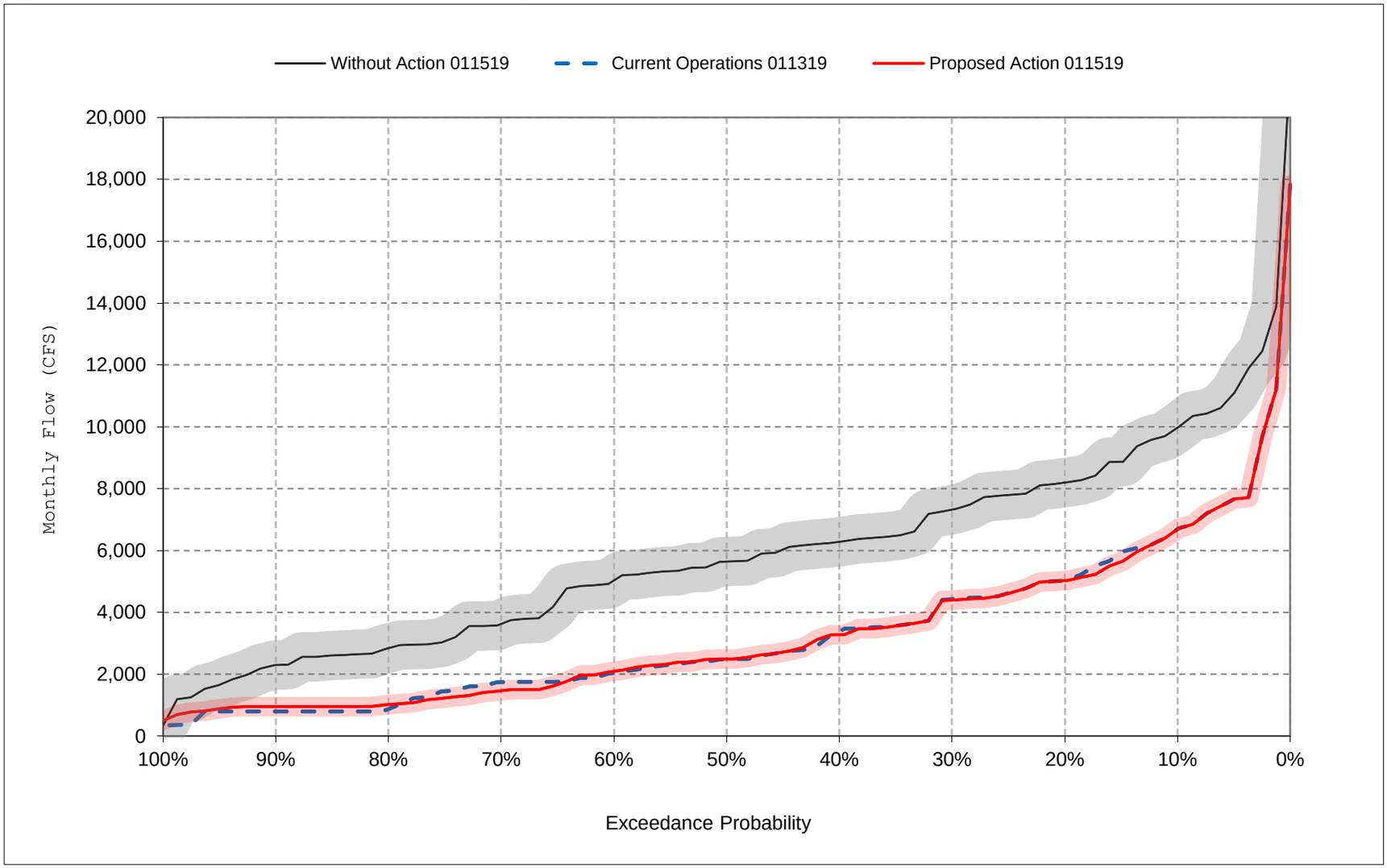
Figure 27-12. American River below Nimbus Dam Flow, March



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

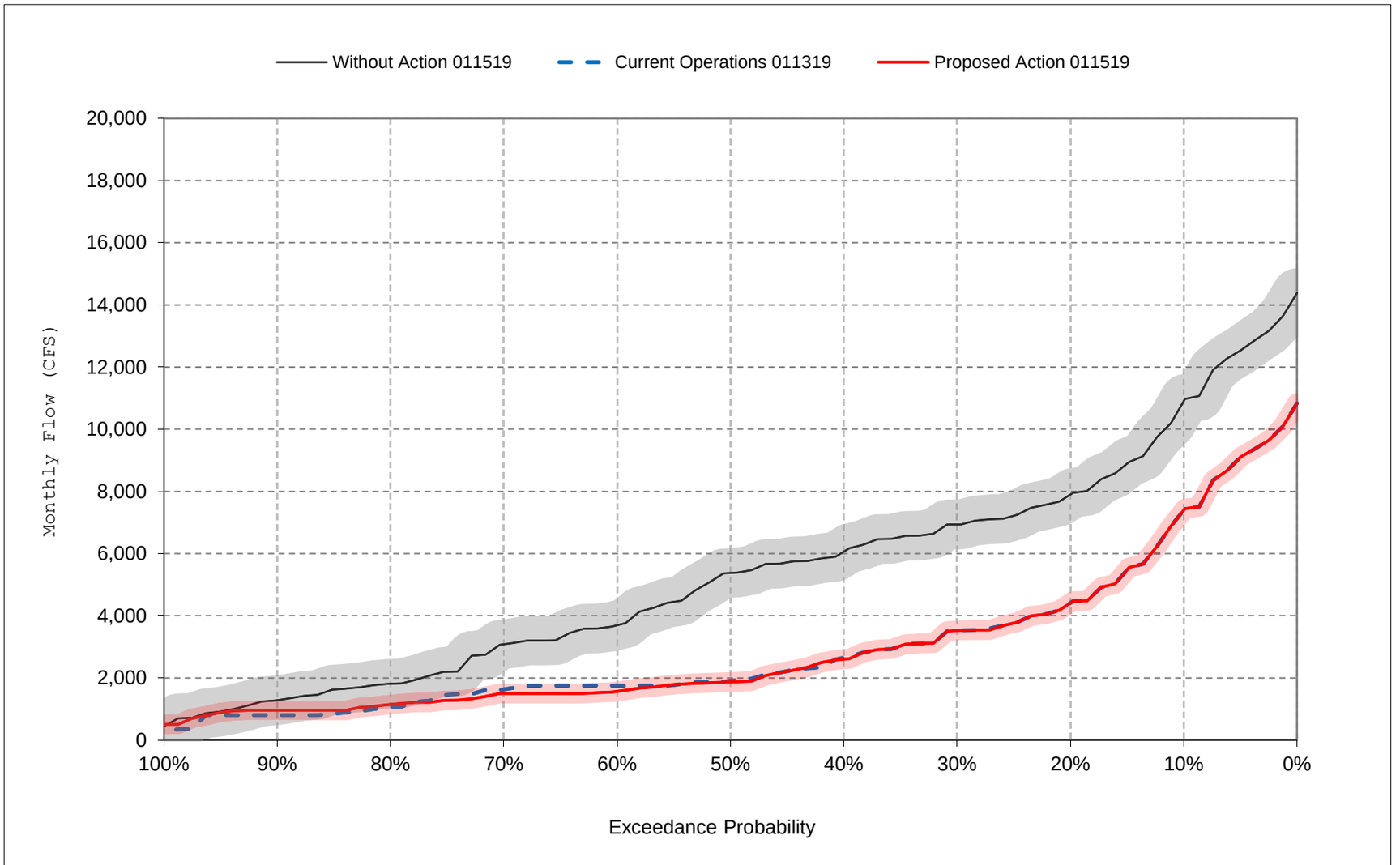
Figure 27-13. American River below Nimbus Dam Flow, April



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

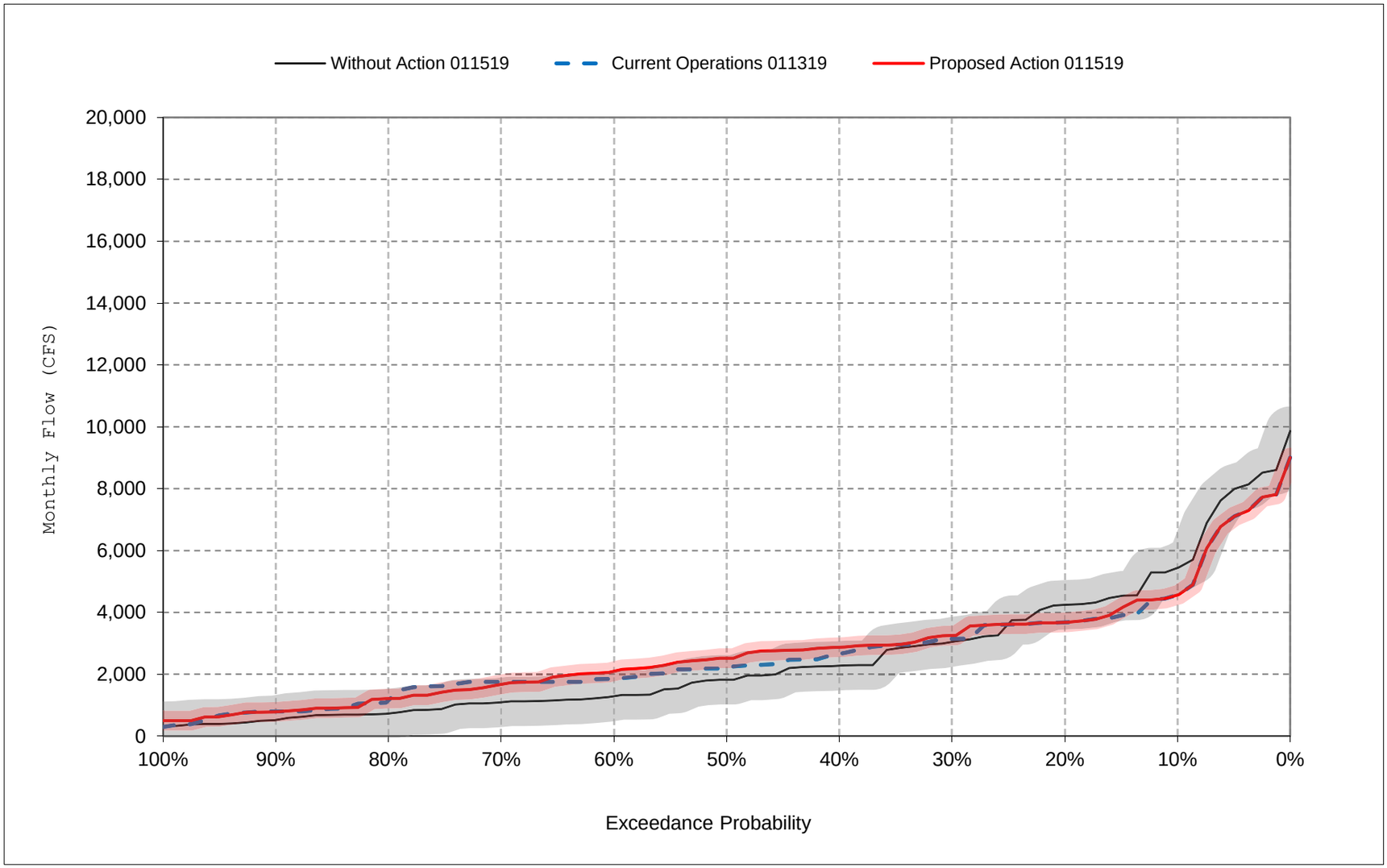
Figure 27-14. American River below Nimbus Dam Flow, May



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

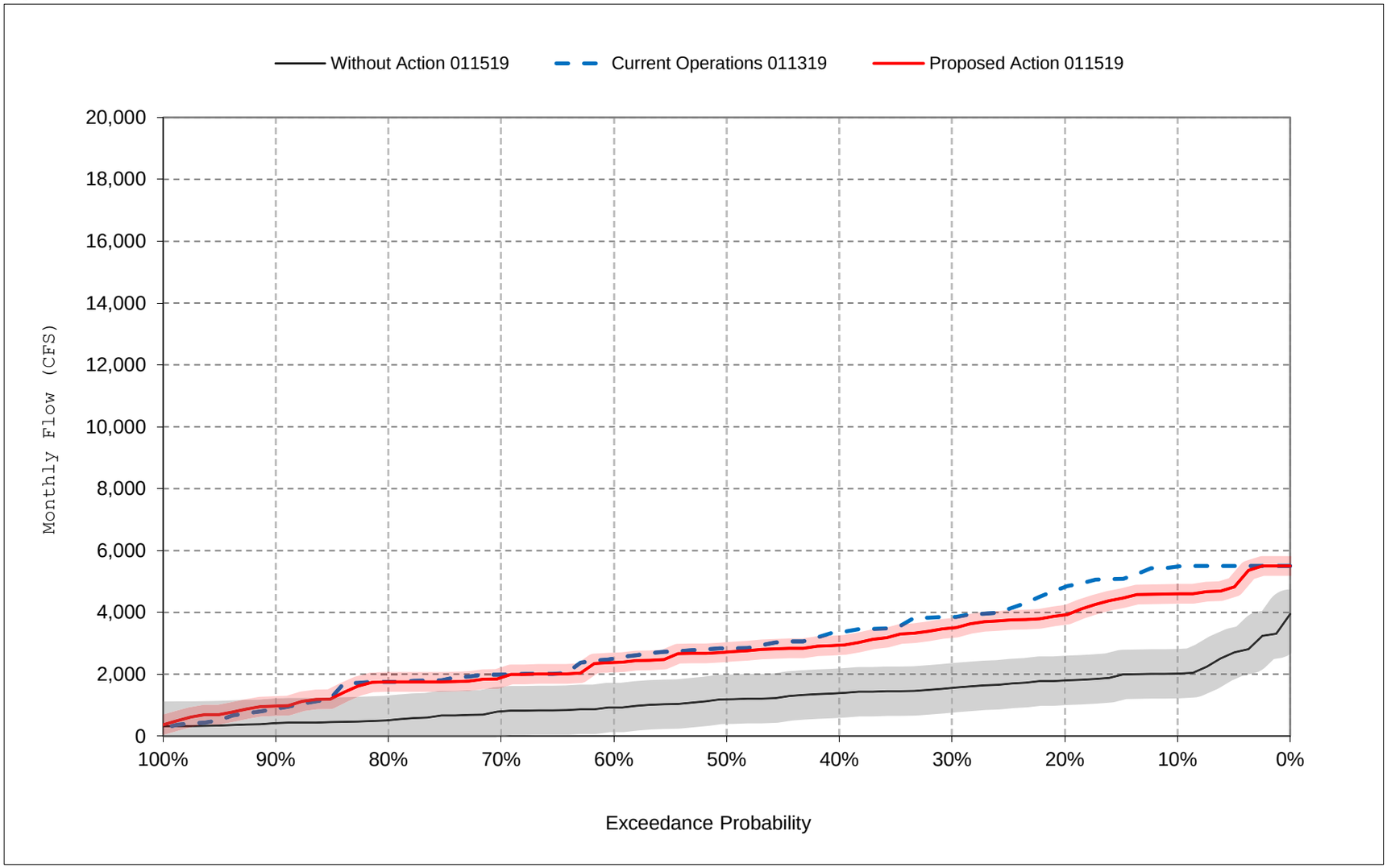
Figure 27-15. American River below Nimbus Dam Flow, June



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

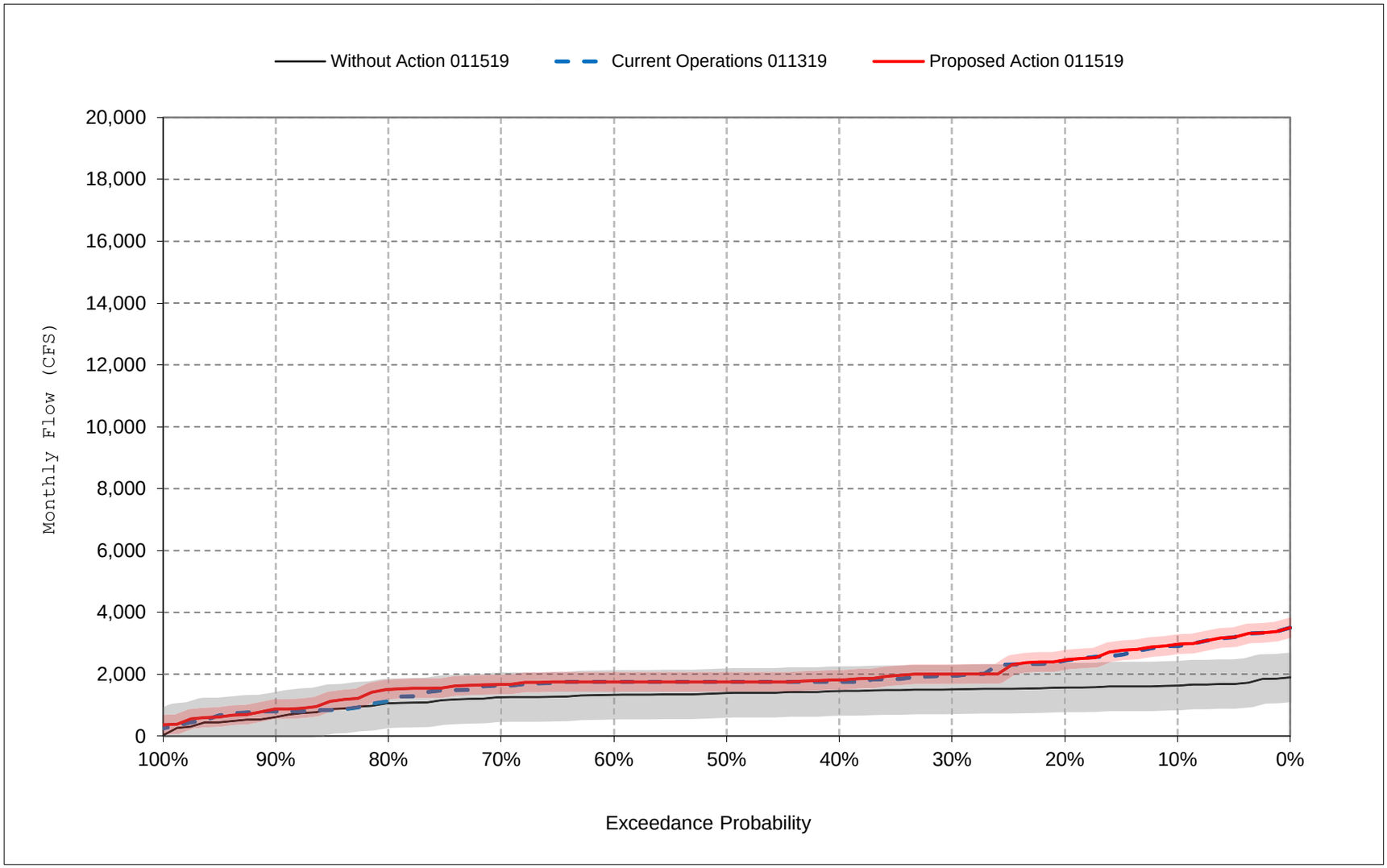
Figure 27-16. American River below Nimbus Dam Flow, July



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

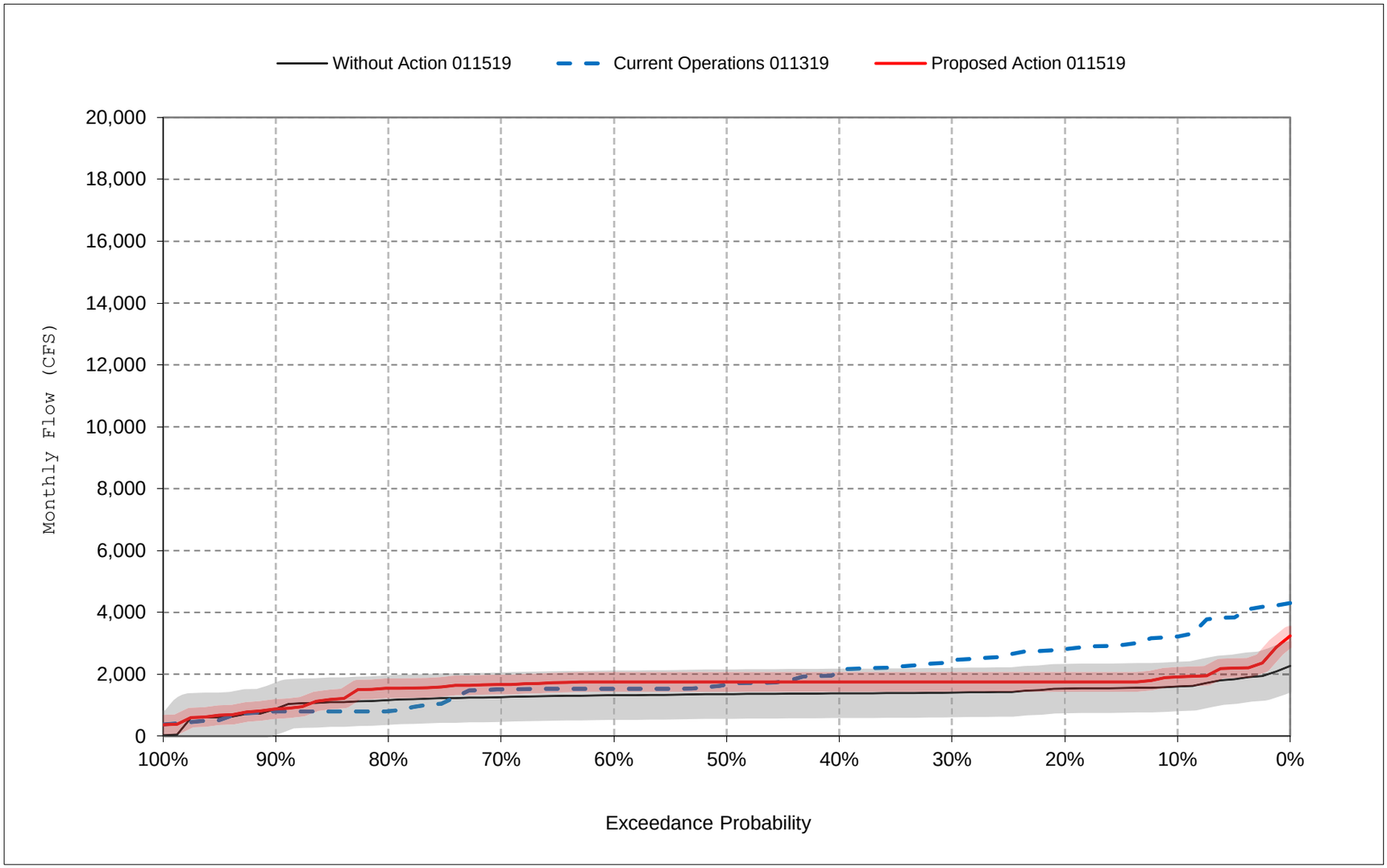
Figure 27-17. American River below Nimbus Dam Flow, August



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Figure 27-18. American River below Nimbus Dam Flow, September



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Table 28-1. American River at H Street, Monthly Flow

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,322	3,824	10,202	12,026	14,718	12,507	9,555	10,325	4,732	1,750	1,387	1,397
20%	1,143	2,672	5,946	9,312	11,254	8,339	7,885	7,312	3,599	1,536	1,303	1,334
30%	944	2,273	3,645	6,085	8,043	6,722	7,001	6,428	2,775	1,305	1,266	1,206
40%	873	1,950	3,051	4,468	6,047	5,787	5,820	5,543	2,021	1,138	1,207	1,179
50%	827	1,784	2,599	2,801	4,988	4,788	5,191	4,844	1,581	943	1,134	1,154
60%	783	1,569	2,022	2,219	3,304	4,220	4,505	3,193	1,088	791	1,064	1,120
70%	716	1,424	1,819	1,699	2,340	3,103	3,154	2,870	858	554	983	1,071
80%	680	1,274	1,560	1,117	1,828	2,750	2,673	1,625	527	345	798	964
90%	580	1,039	1,331	829	1,399	1,774	2,119	1,120	292	184	356	685
Long Term												
Full Simulation Period[a]	964	2,351	4,432	5,306	6,427	6,021	5,549	4,990	2,221	987	1,034	1,111
Water Year Types[b,c]												
Wet (32%)	1,164	2,766	5,105	10,178	10,495	9,456	8,127	8,322	4,216	1,638	1,310	1,355
Above Normal (16%)	844	2,217	3,625	6,873	8,033	7,790	6,068	5,218	1,807	960	1,183	1,218
Below Normal (13%)	1,254	1,949	3,651	2,600	5,737	3,608	4,872	3,526	1,467	740	931	1,136
Dry (24%)	860	2,776	5,786	1,888	3,260	4,039	4,260	3,247	1,033	528	898	1,043
Critical (15%)	571	1,258	2,305	1,225	1,787	2,176	2,173	1,770	1,020	596	596	555

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	2,436	3,529	8,214	11,989	14,510	9,475	6,247	6,818	3,852	4,842	2,337	2,753
20%	1,854	3,050	3,613	7,335	10,688	6,579	4,612	3,824	3,062	4,225	1,875	2,381
30%	1,474	2,341	2,077	5,318	6,812	4,827	3,948	3,000	2,892	3,243	1,693	2,026
40%	1,364	1,996	1,887	3,415	5,506	3,858	3,000	2,437	2,413	2,707	1,503	1,750
50%	1,343	1,763	1,859	1,598	2,664	2,821	2,275	1,697	1,970	2,173	1,486	1,463
60%	1,330	1,547	1,825	1,560	1,612	2,057	1,843	1,547	1,615	1,813	1,476	1,332
70%	1,316	1,476	1,579	1,514	1,323	1,573	1,527	1,439	1,502	1,748	1,393	1,316
80%	919	973	1,082	1,308	1,150	715	717	870	938	1,484	925	648
90%	650	687	707	822	783	622	619	612	565	630	551	599
Long Term												
Full Simulation Period[a]	1,499	2,341	3,538	4,886	5,643	4,033	3,057	2,732	2,328	2,531	1,474	1,637
Water Year Types[b,c]												
Wet (32%)	2,098	3,470	4,257	10,282	10,189	6,940	5,145	5,068	3,669	2,891	1,951	2,548
Above Normal (16%)	1,464	2,015	2,699	5,444	7,426	5,688	3,174	2,204	2,156	4,051	1,515	1,677
Below Normal (13%)	1,410	1,845	2,841	2,064	4,659	1,952	2,136	1,686	1,719	3,224	1,265	1,158
Dry (24%)	1,194	2,257	5,157	1,415	2,023	2,292	1,935	1,633	1,735	1,811	1,320	1,106
Critical (15%)	829	842	828	964	799	749	1,118	1,028	1,159	665	846	943

Current Operations 011319 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,114	**-295**	**-1,988**	**-37**	**-208**	**-3,031**	**-3,308**	**-3,507**	**-881**	3,092	950	1,356
20%	710	378	**-2,333**	**-1,977**	**-566**	**-1,761**	**-3,273**	**-3,488**	**-538**	2,689	572	1,046
30%	530	67	**-1,568**	**-767**	**-1,231**	**-1,895**	**-3,053**	**-3,428**	117	1,938	427	819
40%	491	45	**-1,164**	**-1,053**	**-541**	**-1,930**	**-2,820**	**-3,107**	392	1,569	296	571
50%	516	**-21**	**-740**	**-1,204**	**-2,324**	**-1,967**	**-2,916**	**-3,146**	389	1,230	352	309
60%	547	**-21**	**-197**	**-659**	**-1,693**	**-2,164**	**-2,661**	**-1,646**	527	1,022	412	212
70%	601	52	**-241**	**-184**	**-1,018**	**-1,530**	**-1,627**	**-1,431**	644	1,195	410	245
80%	239	**-300**	**-478**	191	**-678**	**-2,034**	**-1,956**	**-755**	411	1,138	126	**-316**
90%	70	**-352**	**-623**	**-7**	**-616**	**-1,151**	**-1,500**	**-508**	273	446	195	**-86**
Long Term												
Full Simulation Period[a]	535	**-10**	**-894**	**-419**	**-784**	**-1,988**	**-2,493**	**-2,258**	107	1,544	440	526
Water Year Types[b,c]												
Wet (32%)	934	704	**-848**	104	**-307**	**-2,517**	**-2,982**	**-3,253**	**-547**	1,253	641	1,193
Above Normal (16%)	620	**-202**	**-926**	**-1,428**	**-607**	**-2,101**	**-2,893**	**-3,014**	349	3,092	332	460
Below Normal (13%)	156	**-104**	**-810**	**-536**	**-1,079**	**-1,656**	**-2,736**	**-1,840**	252	2,484	333	23
Dry (24%)	333	**-519**	**-629**	**-474**	**-1,237**	**-1,748**	**-2,325**	**-1,613**	701	1,283	422	63
Critical (15%)	258	**-416**	**-1,478**	**-262**	**-988**	**-1,427**	**-1,055**	**-743**	139	69	250	387

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 28-2. American River at H Street, Monthly Flow

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,322	3,824	10,202	12,026	14,718	12,507	9,555	10,325	4,732	1,750	1,387	1,397
20%	1,143	2,672	5,946	9,312	11,254	8,339	7,885	7,312	3,599	1,536	1,303	1,334
30%	944	2,273	3,645	6,085	8,043	6,722	7,001	6,428	2,775	1,305	1,266	1,206
40%	873	1,950	3,051	4,468	6,047	5,787	5,820	5,543	2,021	1,138	1,207	1,179
50%	827	1,784	2,599	2,801	4,988	4,788	5,191	4,844	1,581	943	1,134	1,154
60%	783	1,569	2,022	2,219	3,304	4,220	4,505	3,193	1,088	791	1,064	1,120
70%	716	1,424	1,819	1,699	2,340	3,103	3,154	2,870	858	554	983	1,071
80%	680	1,274	1,560	1,117	1,828	2,750	2,673	1,625	527	345	798	964
90%	580	1,039	1,331	829	1,399	1,774	2,119	1,120	292	184	356	685
Long Term												
Full Simulation Period[a]	964	2,351	4,432	5,306	6,427	6,021	5,549	4,990	2,221	987	1,034	1,111
Water Year Types[b,c]												
Wet (32%)	1,164	2,766	5,105	10,178	10,495	9,456	8,127	8,322	4,216	1,638	1,310	1,355
Above Normal (16%)	844	2,217	3,625	6,873	8,033	7,790	6,068	5,218	1,807	960	1,183	1,218
Below Normal (13%)	1,254	1,949	3,651	2,600	5,737	3,608	4,872	3,526	1,467	740	931	1,136
Dry (24%)	860	2,776	5,786	1,888	3,260	4,039	4,260	3,247	1,033	528	898	1,043
Critical (15%)	571	1,258	2,305	1,225	1,787	2,176	2,173	1,770	1,020	596	596	555

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,660	4,262	9,951	11,969	14,510	10,212	6,247	6,818	3,855	3,964	2,386	1,700
20%	1,414	3,281	4,509	7,617	10,744	6,579	4,613	3,831	3,062	3,270	1,883	1,554
30%	1,358	2,000	2,435	5,445	7,106	4,824	3,947	3,000	2,996	2,863	1,750	1,547
40%	1,343	1,875	1,982	3,412	5,494	3,888	3,000	2,395	2,619	2,321	1,550	1,547
50%	1,329	1,853	1,869	1,986	3,391	2,841	2,309	1,645	2,255	2,084	1,497	1,541
60%	1,324	1,778	1,846	1,443	2,437	2,035	1,897	1,376	1,851	1,750	1,484	1,538
70%	990	1,064	1,681	1,255	1,584	1,583	1,268	1,270	1,437	1,638	1,425	1,469
80%	612	620	655	1,238	1,273	1,333	840	965	971	1,478	1,254	1,345
90%	445	459	500	579	1,221	802	769	756	548	735	625	693
Long Term												
Full Simulation Period[a]	1,218	2,335	3,761	4,943	5,883	4,163	3,060	2,721	2,408	2,285	1,535	1,413
Water Year Types[b,c]												
Wet (32%)	1,620	3,789	4,952	10,425	10,296	6,938	5,115	5,036	3,777	2,572	1,982	1,600
Above Normal (16%)	1,378	1,990	2,793	5,578	7,752	5,885	3,147	2,181	2,323	3,603	1,561	1,562
Below Normal (13%)	1,190	1,552	2,740	2,113	5,408	2,115	2,181	1,789	1,896	2,918	1,556	1,409
Dry (24%)	925	2,106	5,278	1,402	2,021	2,450	1,889	1,581	1,762	1,575	1,385	1,328
Critical (15%)	689	654	641	870	1,168	1,020	1,272	1,043	1,079	842	770	994

Proposed Action 011519 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	339	438	**-251**	**-57**	**-208**	**-2,295**	**-3,308**	**-3,507**	**-877**	2,214	998	304
20%	271	609	**-1,437**	**-1,695**	**-510**	**-1,761**	**-3,272**	**-3,481**	**-538**	1,734	580	220
30%	414	**-273**	**-1,210**	**-640**	**-937**	**-1,898**	**-3,054**	**-3,428**	221	1,558	484	341
40%	470	**-76**	**-1,069**	**-1,056**	**-553**	**-1,900**	**-2,820**	**-3,148**	598	1,183	343	368
50%	502	69	**-729**	**-816**	**-1,597**	**-1,947**	**-2,882**	**-3,199**	673	1,141	363	387
60%	541	209	**-176**	**-776**	**-867**	**-2,185**	**-2,607**	**-1,817**	763	959	420	418
70%	275	**-360**	**-138**	**-444**	**-756**	**-1,520**	**-1,886**	**-1,600**	579	1,084	442	398
80%	**-67**	**-654**	**-905**	122	**-555**	**-1,417**	**-1,833**	**-659**	444	1,133	455	381
90%	**-135**	**-580**	**-831**	**-250**	**-178**	**-971**	**-1,350**	**-365**	257	551	269	8
Long Term												
Full Simulation Period[a]	254	**-16**	**-670**	**-363**	**-545**	**-1,858**	**-2,489**	**-2,269**	187	1,299	501	302
Water Year Types[b,c]												
Wet (32%)	456	1,024	**-153**	247	**-200**	**-2,518**	**-3,012**	**-3,286**	**-439**	934	672	245
Above Normal (16%)	534	**-227**	**-833**	**-1,294**	**-281**	**-1,905**	**-2,921**	**-3,037**	517	2,643	378	344
Below Normal (13%)	**-64**	**-396**	**-912**	**-488**	**-329**	**-1,494**	**-2,691**	**-1,738**	429	2,177	625	274
Dry (24%)	65	**-670**	**-508**	**-487**	**-1,238**	**-1,589**	**-2,371**	**-1,666**	728	1,047	487	284
Critical (15%)	117	**-604**	**-1,665**	**-355**	**-619**	**-1,156**	**-901**	**-728**	59	246	173	439

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 28-3. American River at H Street, Monthly Flow

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	2,436	3,529	8,214	11,989	14,510	9,475	6,247	6,818	3,852	4,842	2,337	2,753
20%	1,854	3,050	3,613	7,335	10,688	6,579	4,612	3,824	3,062	4,225	1,875	2,381
30%	1,474	2,341	2,077	5,318	6,812	4,827	3,948	3,000	2,892	3,243	1,693	2,026
40%	1,364	1,996	1,887	3,415	5,506	3,858	3,000	2,437	2,413	2,707	1,503	1,750
50%	1,343	1,763	1,859	1,598	2,664	2,821	2,275	1,697	1,970	2,173	1,486	1,463
60%	1,330	1,547	1,825	1,560	1,612	2,057	1,843	1,547	1,615	1,813	1,476	1,332
70%	1,316	1,476	1,579	1,514	1,323	1,573	1,527	1,439	1,502	1,748	1,393	1,316
80%	919	973	1,082	1,308	1,150	715	717	870	938	1,484	925	648
90%	650	687	707	822	783	622	619	612	565	630	551	599
Long Term												
Full Simulation Period[a]	1,499	2,341	3,538	4,886	5,643	4,033	3,057	2,732	2,328	2,531	1,474	1,637
Water Year Types[b,c]												
Wet (32%)	2,098	3,470	4,257	10,282	10,189	6,940	5,145	5,068	3,669	2,891	1,951	2,548
Above Normal (16%)	1,464	2,015	2,699	5,444	7,426	5,688	3,174	2,204	2,156	4,051	1,515	1,677
Below Normal (13%)	1,410	1,845	2,841	2,064	4,659	1,952	2,136	1,686	1,719	3,224	1,265	1,158
Dry (24%)	1,194	2,257	5,157	1,415	2,023	2,292	1,935	1,633	1,735	1,811	1,320	1,106
Critical (15%)	829	842	828	964	799	749	1,118	1,028	1,159	665	846	943

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,660	4,262	9,951	11,969	14,510	10,212	6,247	6,818	3,855	3,964	2,386	1,700
20%	1,414	3,281	4,509	7,617	10,744	6,579	4,613	3,831	3,062	3,270	1,883	1,554
30%	1,358	2,000	2,435	5,445	7,106	4,824	3,947	3,000	2,996	2,863	1,750	1,547
40%	1,343	1,875	1,982	3,412	5,494	3,888	3,000	2,395	2,619	2,321	1,550	1,547
50%	1,329	1,853	1,869	1,986	3,391	2,841	2,309	1,645	2,255	2,084	1,497	1,541
60%	1,324	1,778	1,846	1,443	2,437	2,035	1,897	1,376	1,851	1,750	1,484	1,538
70%	990	1,064	1,681	1,255	1,584	1,583	1,268	1,270	1,437	1,638	1,425	1,469
80%	612	620	655	1,238	1,273	1,333	840	965	971	1,478	1,254	1,345
90%	445	459	500	579	1,221	802	769	756	548	735	625	693
Long Term												
Full Simulation Period[a]	1,218	2,335	3,761	4,943	5,883	4,163	3,060	2,721	2,408	2,285	1,535	1,413
Water Year Types[b,c]												
Wet (32%)	1,620	3,789	4,952	10,425	10,296	6,938	5,115	5,036	3,777	2,572	1,982	1,600
Above Normal (16%)	1,378	1,990	2,793	5,578	7,752	5,885	3,147	2,181	2,323	3,603	1,561	1,562
Below Normal (13%)	1,190	1,552	2,740	2,113	5,408	2,115	2,181	1,789	1,896	2,918	1,556	1,409
Dry (24%)	925	2,106	5,278	1,402	2,021	2,450	1,889	1,581	1,762	1,575	1,385	1,328
Critical (15%)	689	654	641	870	1,168	1,020	1,272	1,043	1,079	842	770	994

Proposed Action 011519 minus Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	**-776**	732	1,737	**-20**	**0**	737	**0**	0	3	**-878**	49	**-1,053**
20%	**-440**	231	896	282	56	0	1	7	0	**-955**	8	**-826**
30%	**-116**	**-341**	358	127	294	**-3**	**-1**	0	104	**-380**	57	**-479**
40%	**-22**	**-121**	95	**-3**	**-12**	30	0	**-42**	206	**-386**	47	**-203**
50%	**-14**	90	10	388	727	20	34	**-53**	284	**-89**	11	78
60%	**-5**	231	21	**-117**	826	**-22**	54	**-171**	236	**-63**	8	206
70%	**-326**	**-412**	103	**-260**	262	10	**-259**	**-169**	**-65**	**-110**	32	153
80%	**-307**	**-353**	**-427**	**-69**	123	617	123	96	33	**-5**	329	697
90%	**-205**	**-227**	**-207**	**-243**	438	180	150	144	**-17**	105	74	94
Long Term												
Full Simulation Period[a]	**-281**	**-6**	224	56	240	131	4	**-11**	80	**-245**	61	**-224**
Water Year Types[b,c]												
Wet (32%)	**-478**	320	695	143	107	**-2**	**-30**	**-33**	108	**-319**	31	**-948**
Above Normal (16%)	**-86**	**-25**	94	134	326	197	**-28**	**-23**	168	**-449**	46	**-115**
Below Normal (13%)	**-220**	**-293**	**-102**	49	749	163	45	102	177	**-307**	291	251
Dry (24%)	**-268**	**-151**	121	**-13**	**-1**	158	**-46**	**-53**	27	**-236**	64	221
Critical (15%)	**-140**	**-188**	**-187**	**-93**	369	271	154	15	**-80**	177	**-77**	51

a Based on the 82-year simulation period.

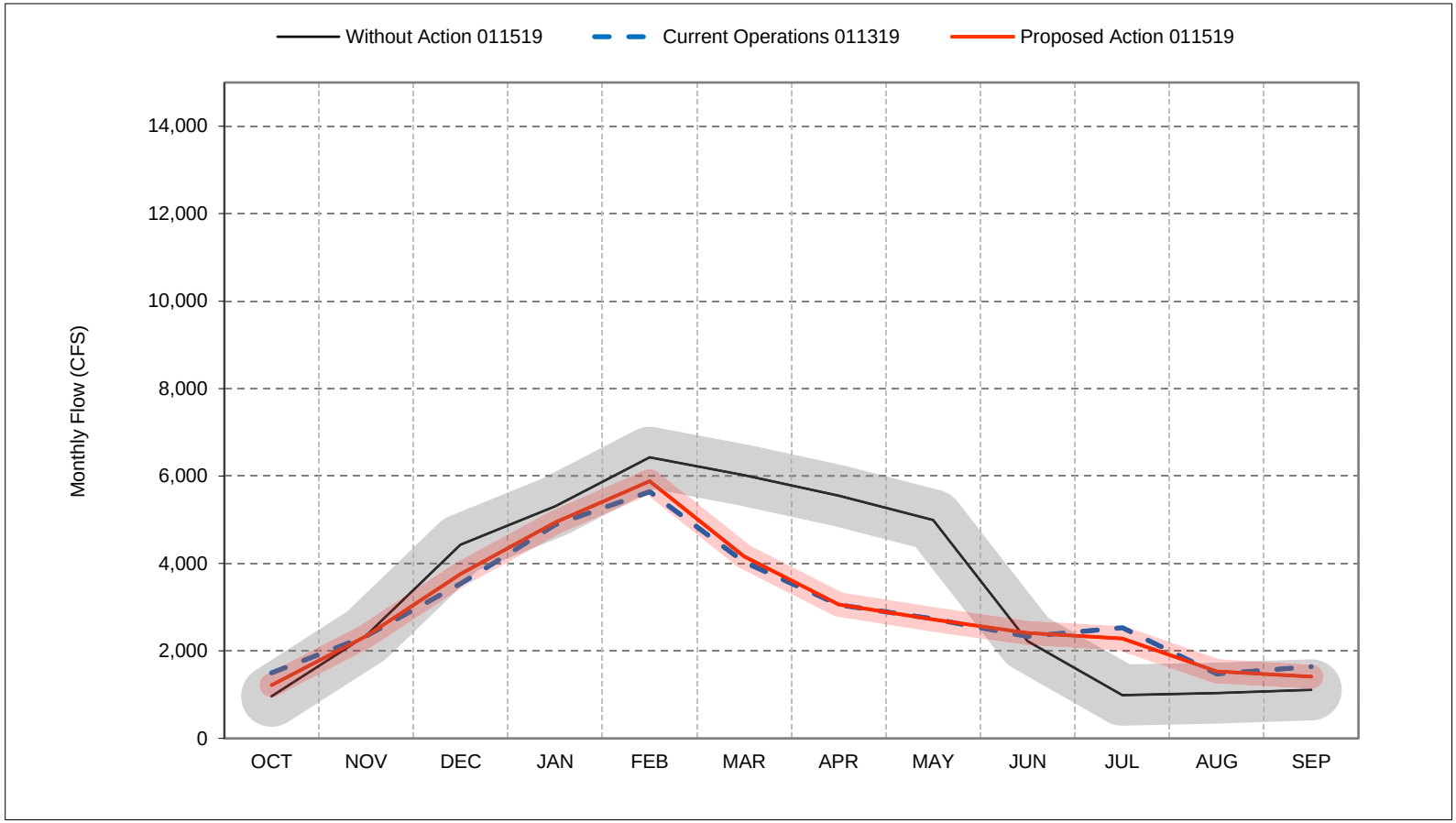
b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

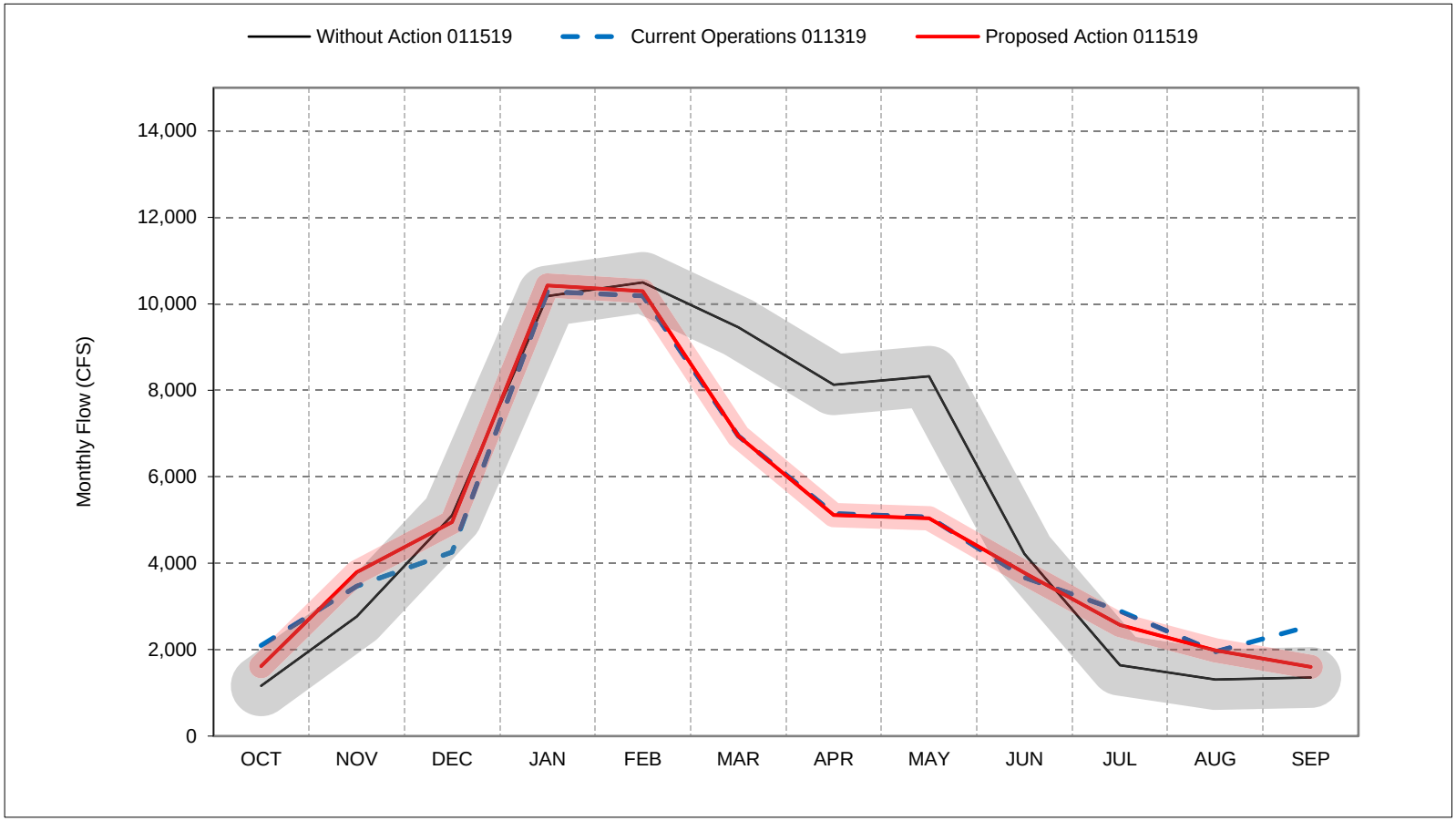
e These are draft results meant for qualitative analysis and are subject to revision.

Figure 28-1. American River at H Street, Long-Term Average Flow



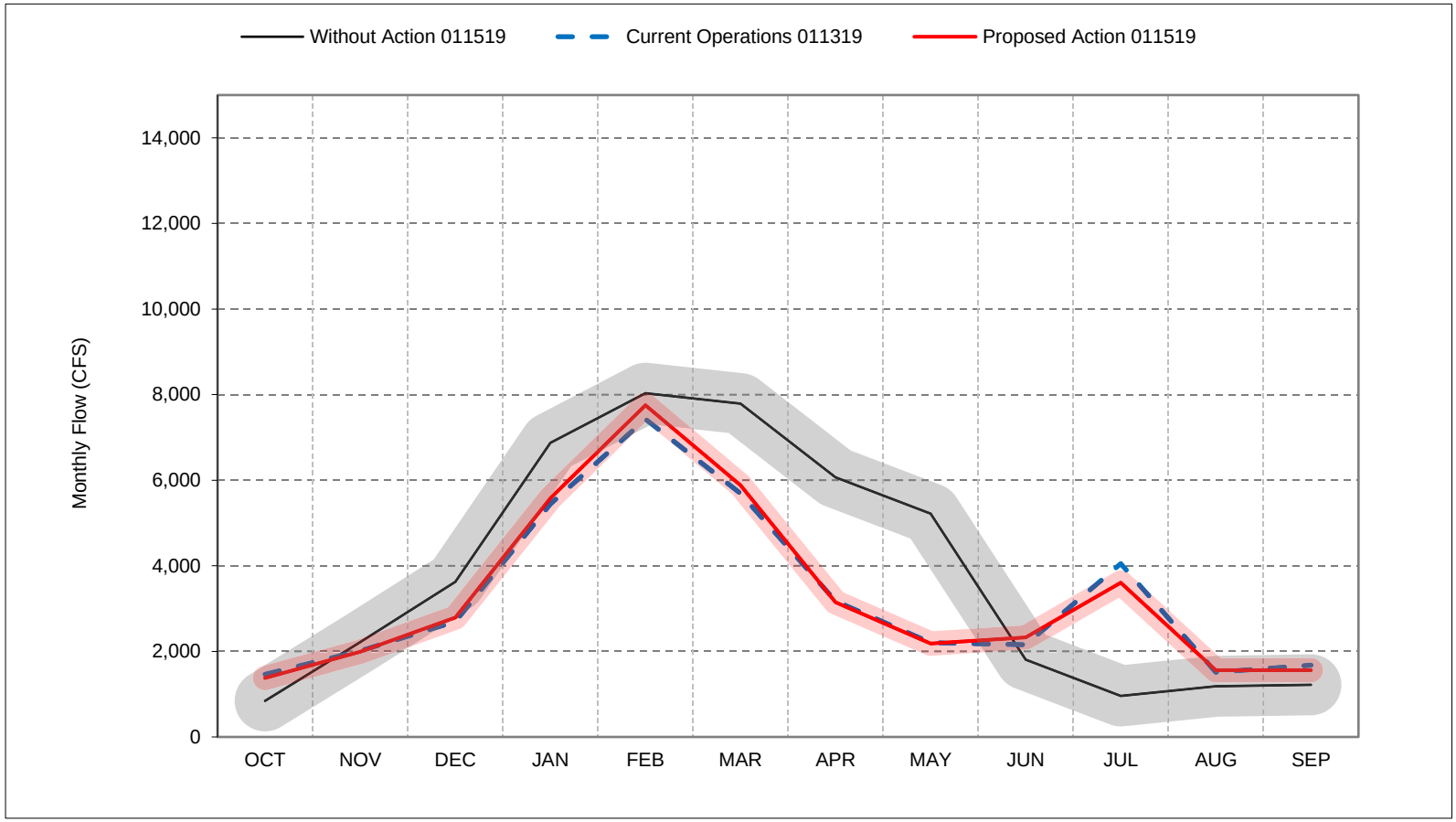
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 28-2. American River at H Street, Wet Year Average Flow



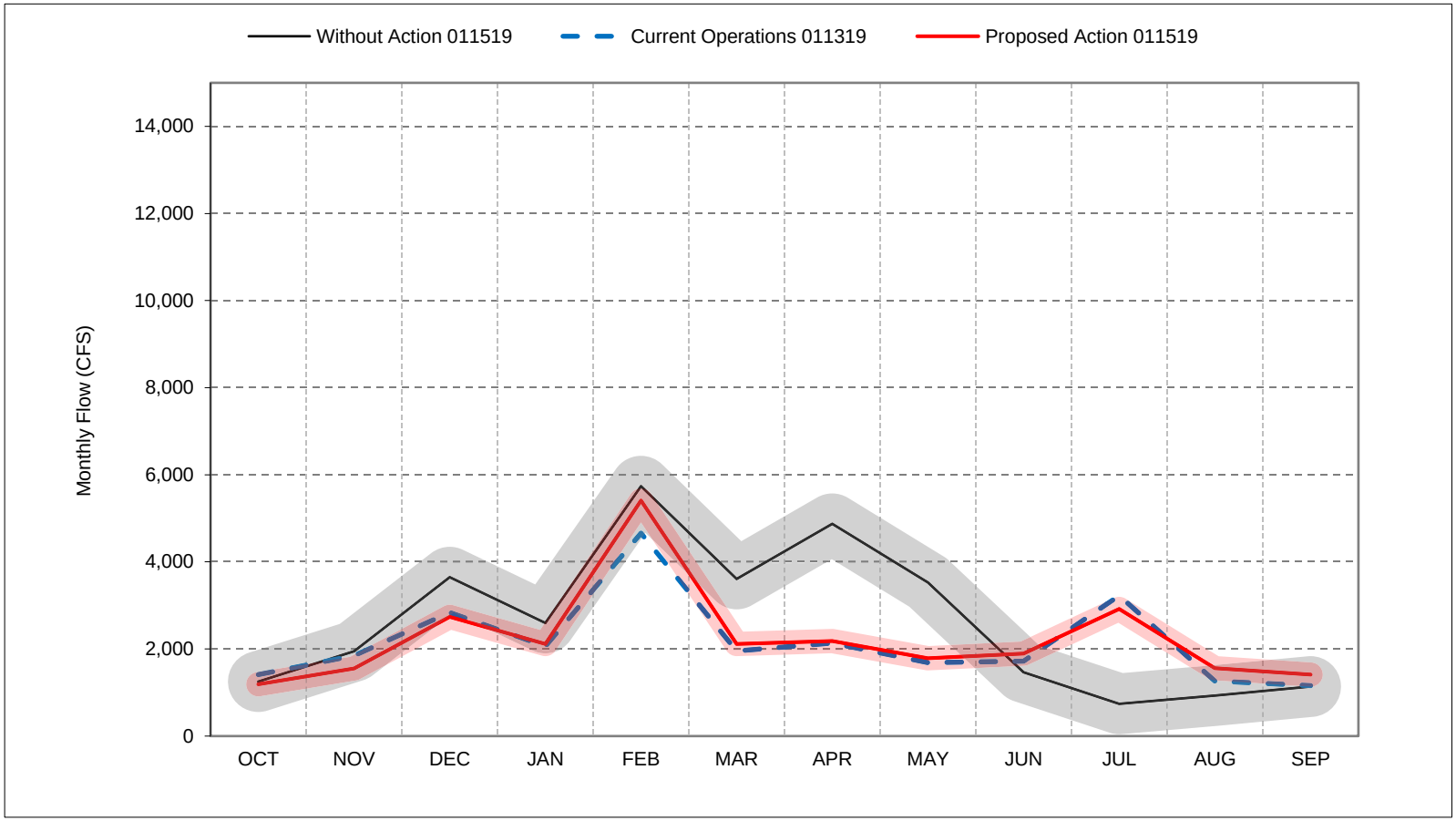
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 28-3. American River at H Street, Above Normal Year Average Flow



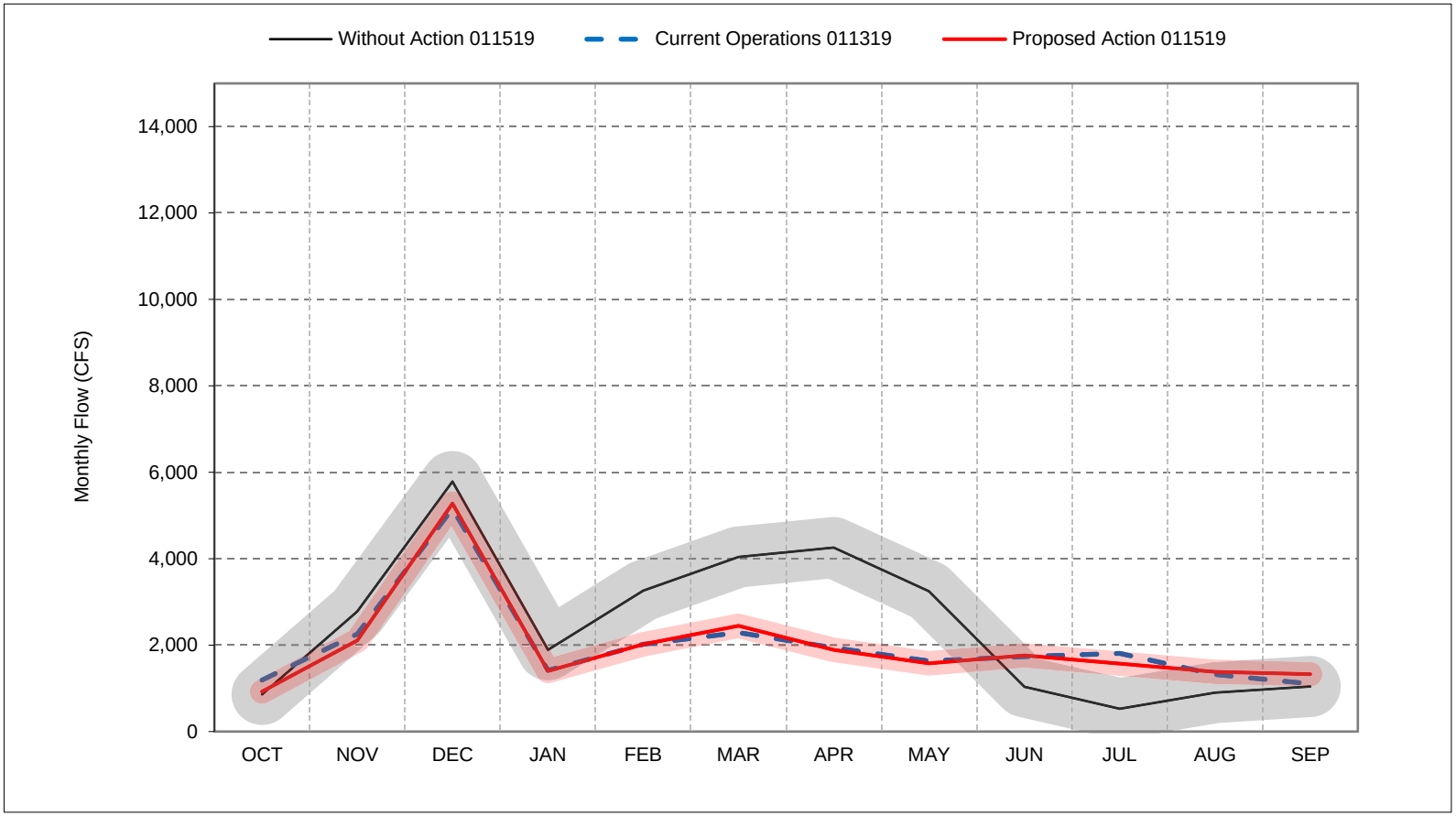
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 28-4. American River at H Street, Below Normal Year Average Flow



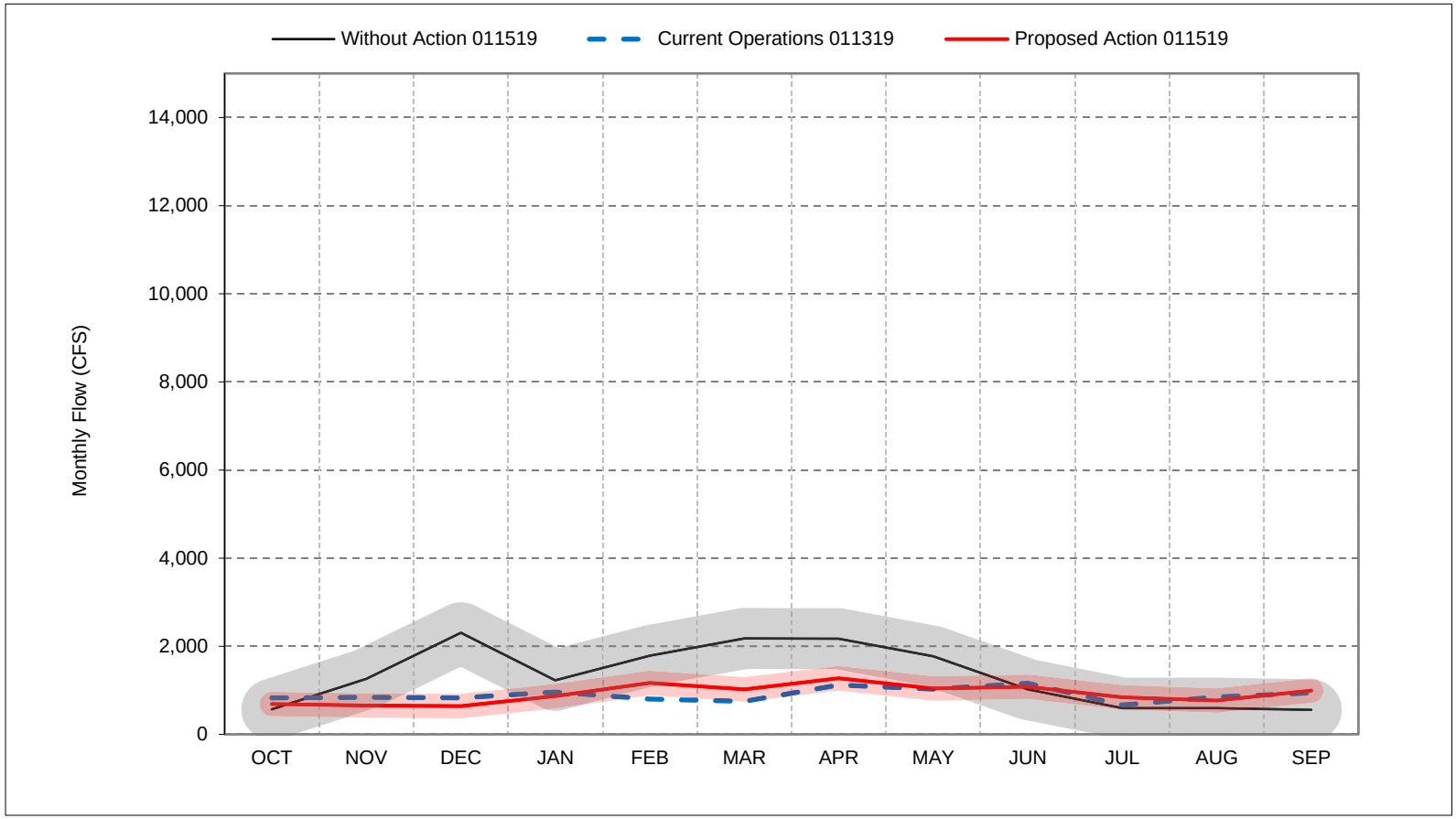
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 28-5. American River at H Street, Dry Year Average Flow



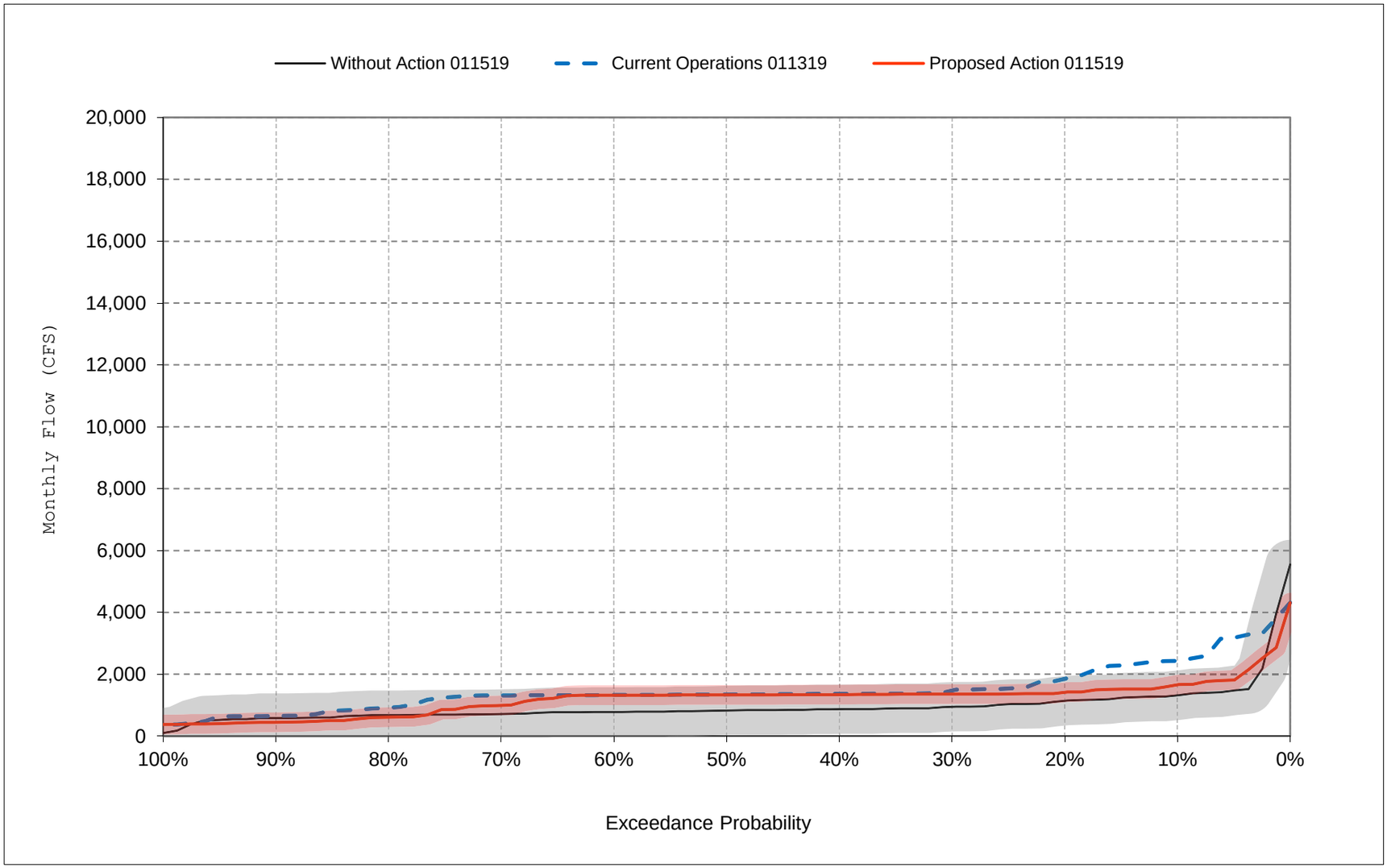
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 28-6. American River at H Street, Critical Year Average Flow



*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

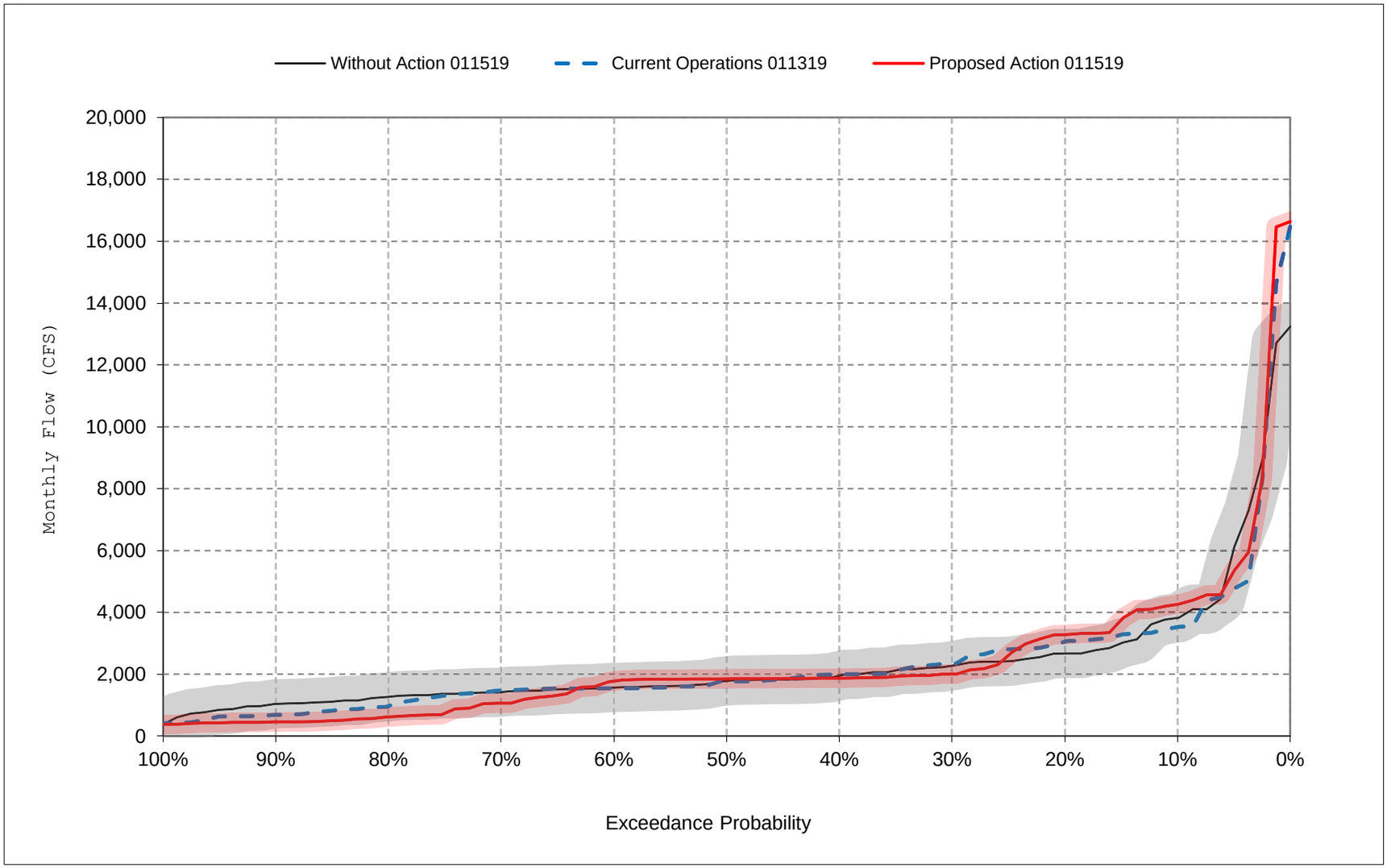
Figure 28-7. American River at H Street, October



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

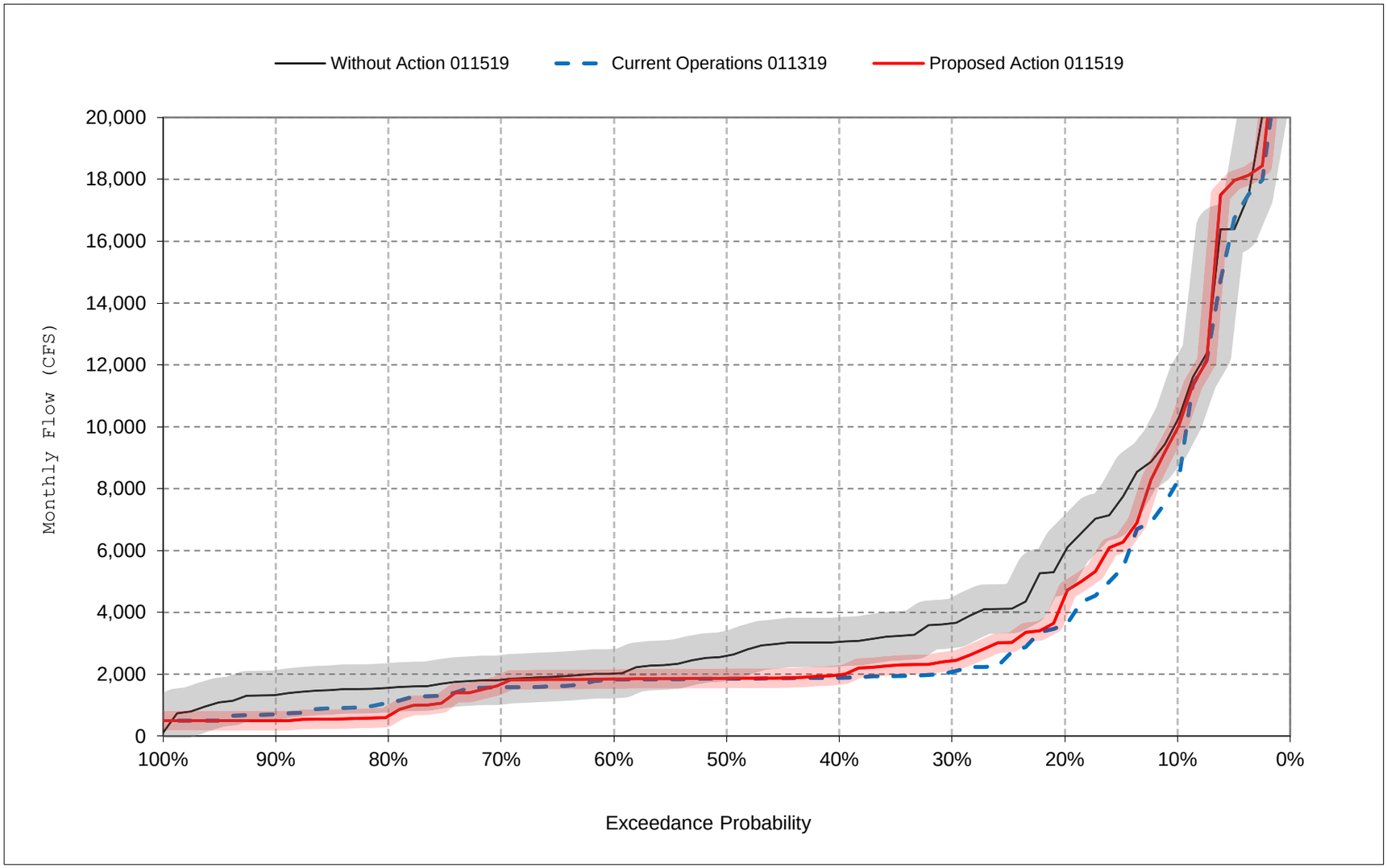
Figure 28-8. American River at H Street, November



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

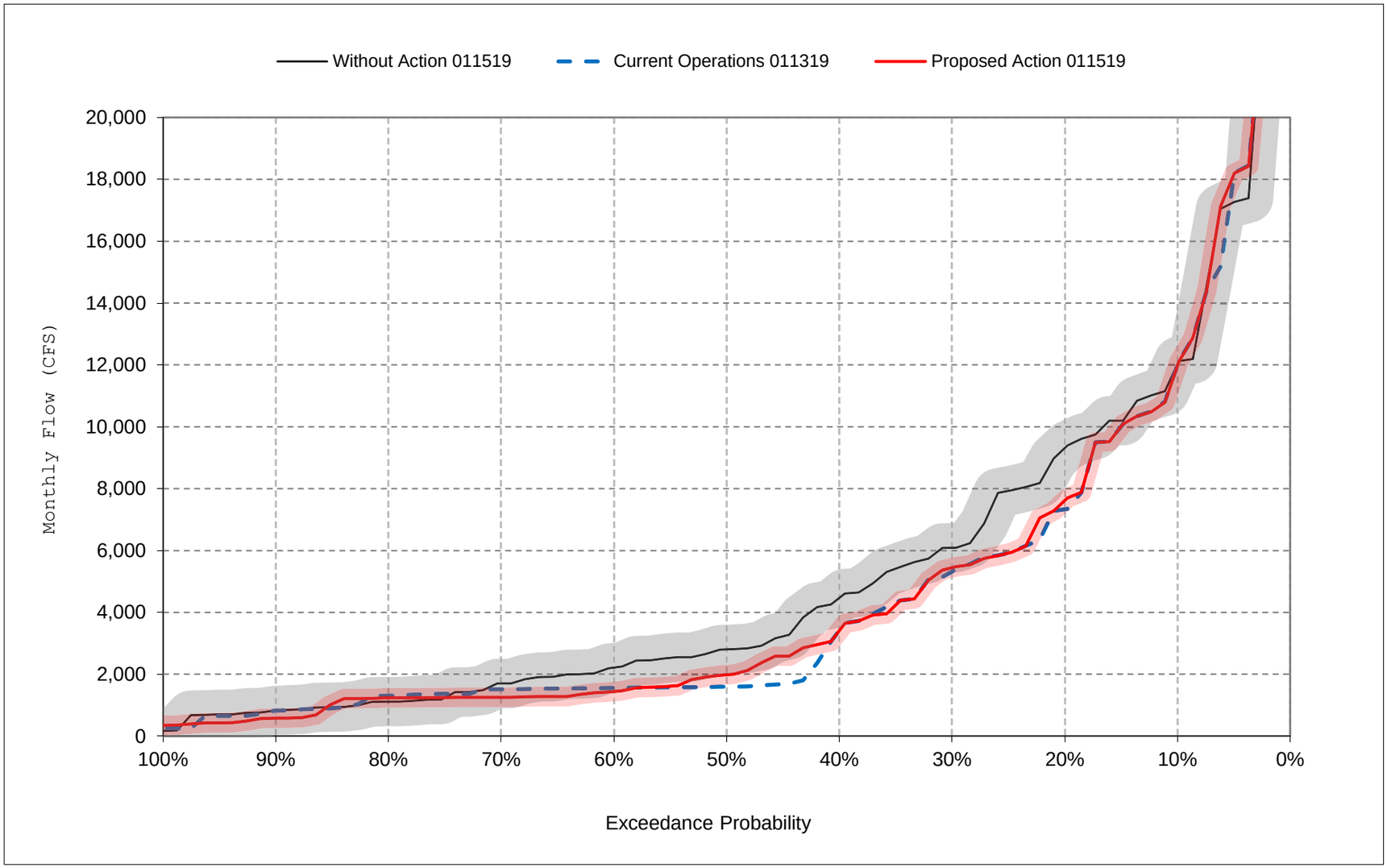
Figure 28-9. American River at H Street, December



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

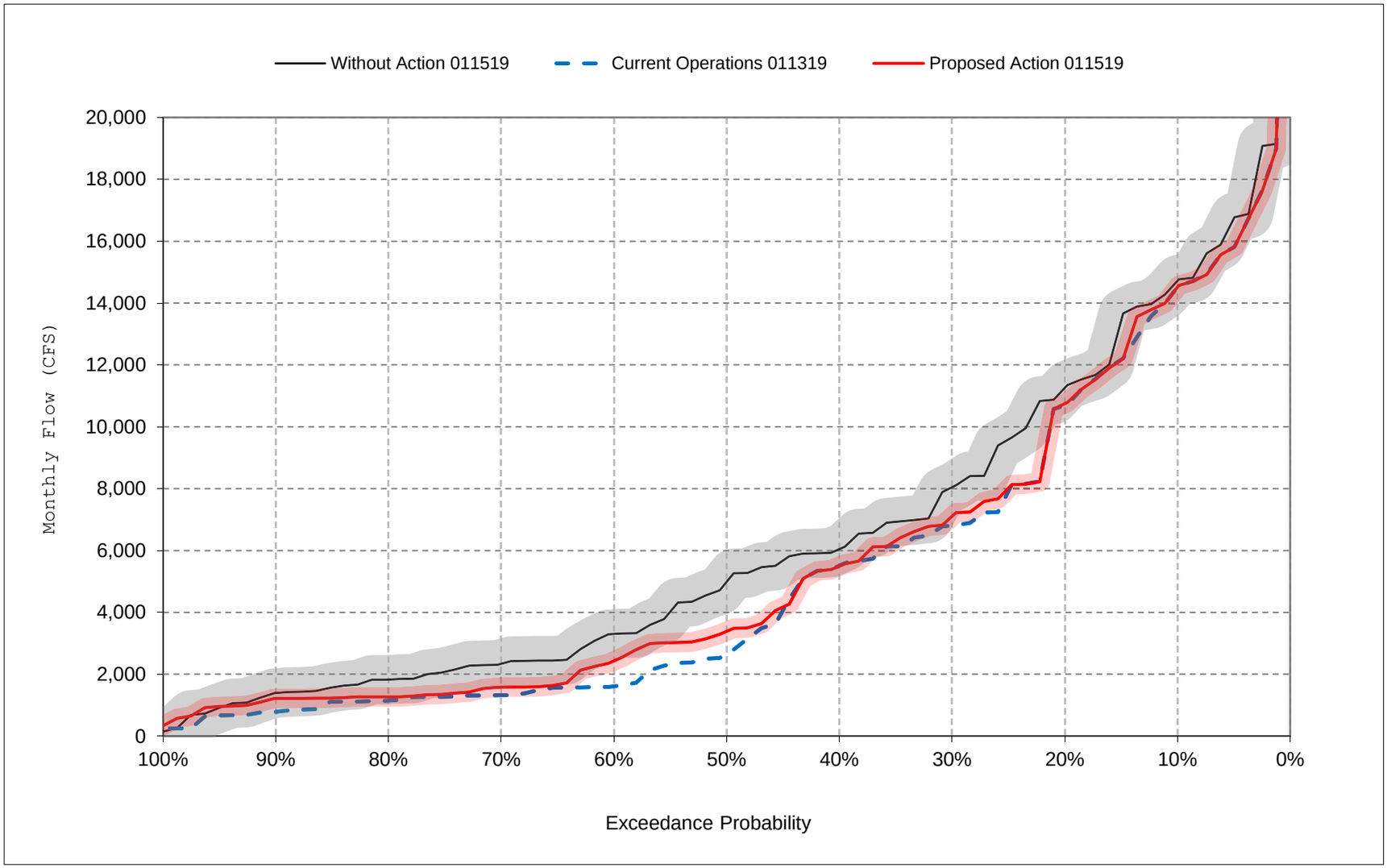
Figure 28-10. American River at H Street, January



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

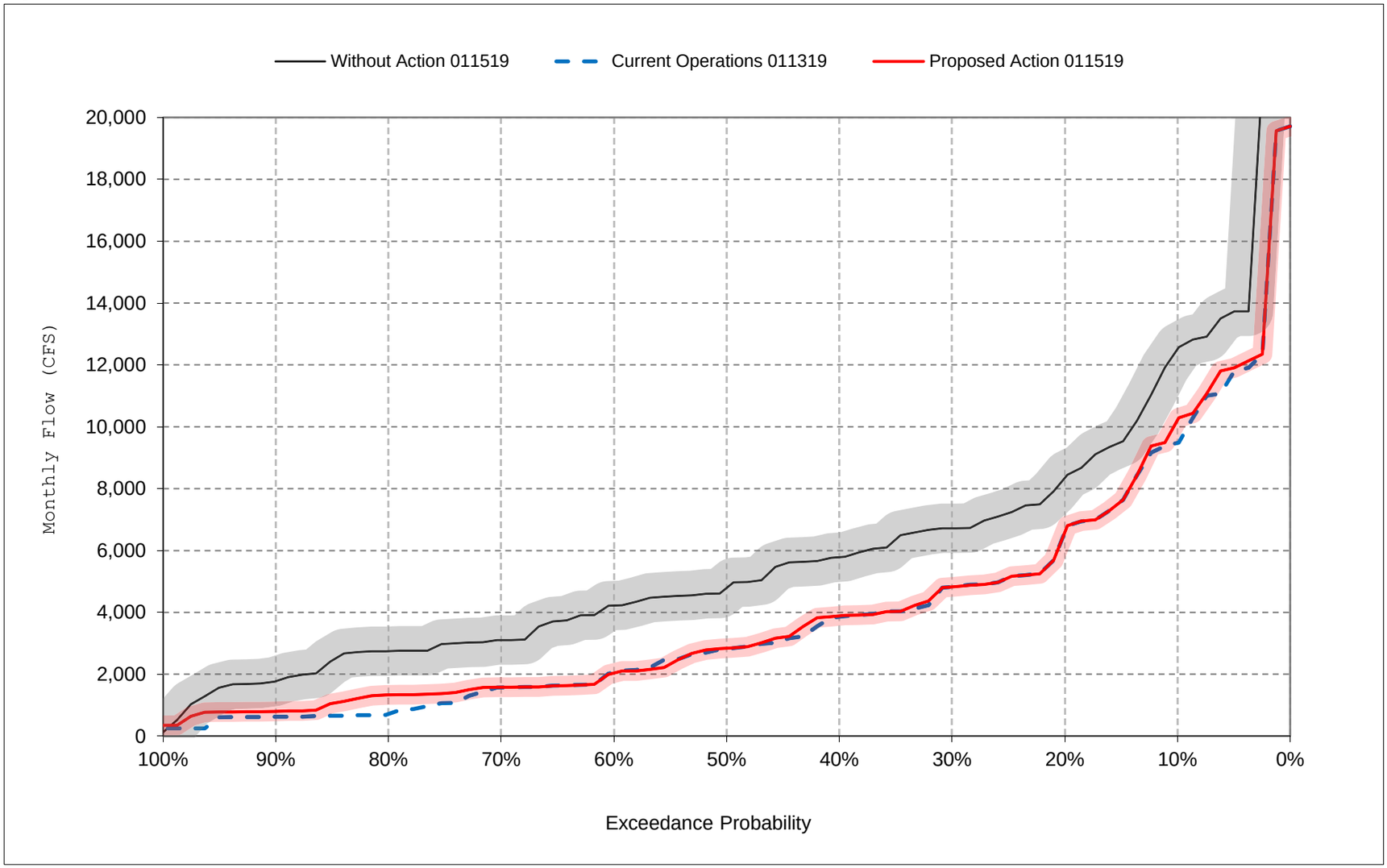
Figure 28-11. American River at H Street, February



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

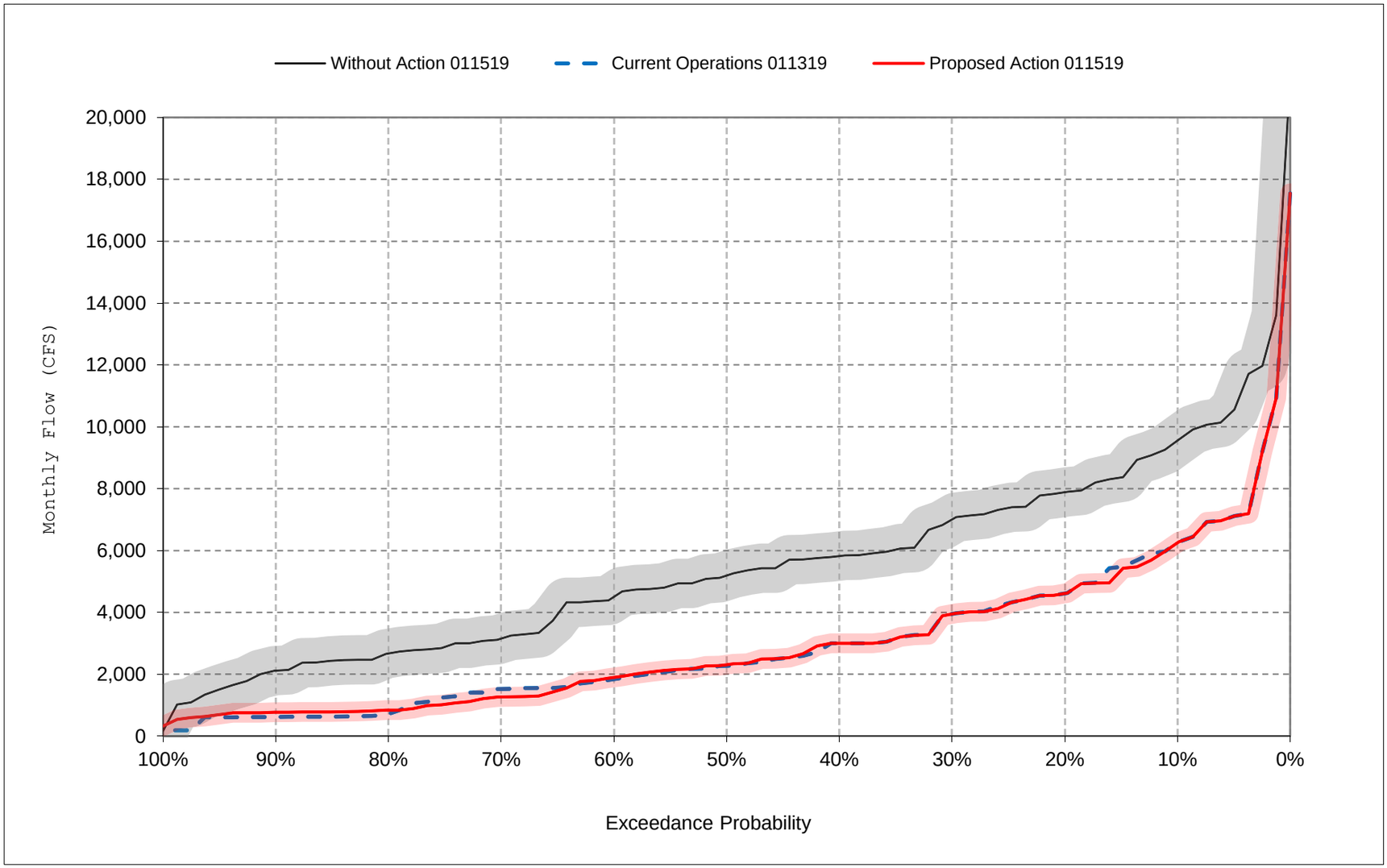
Figure 28-12. American River at H Street, March



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

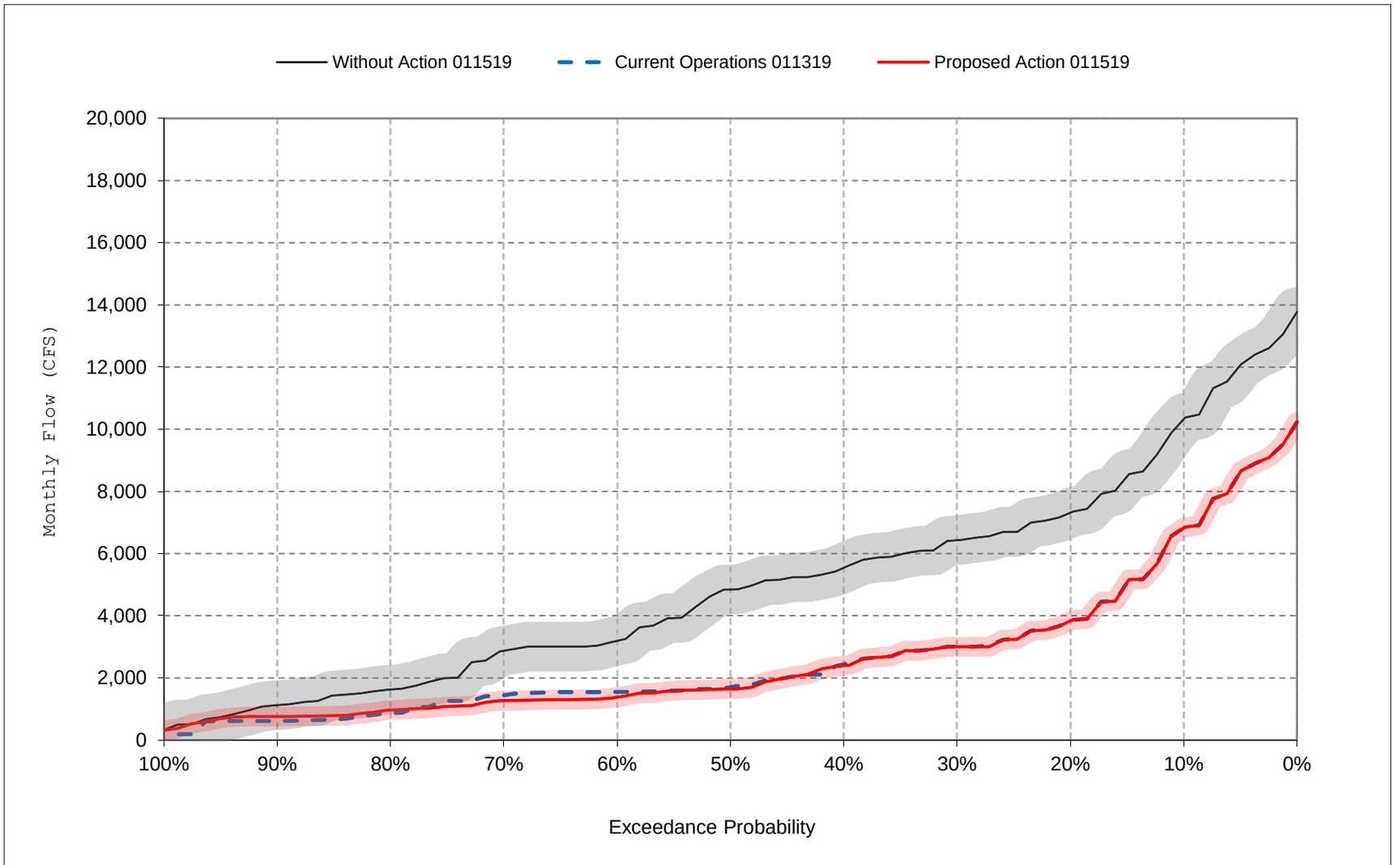
Figure 28-13. American River at H Street, April



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

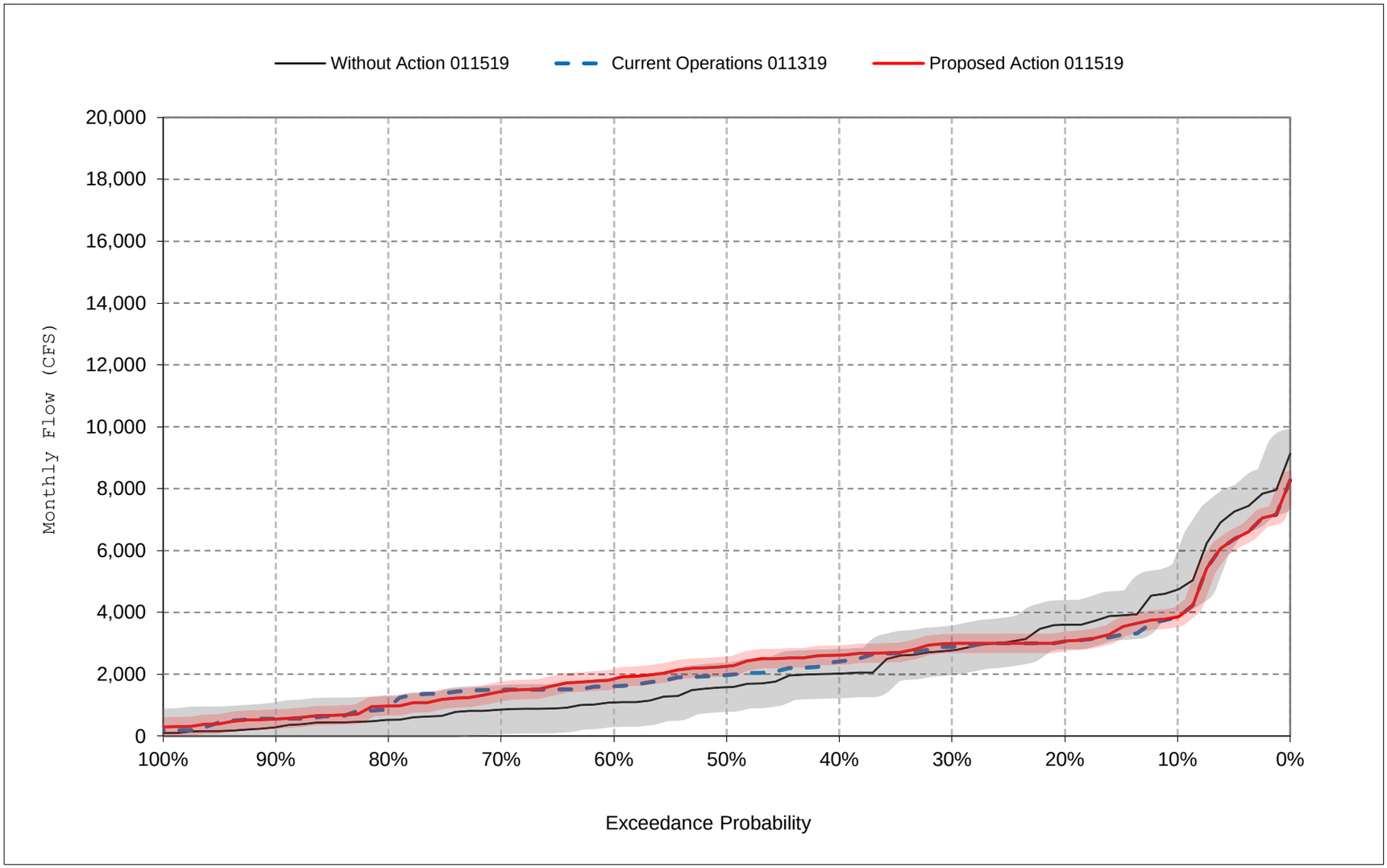
Figure 28-14. American River at H Street, May



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

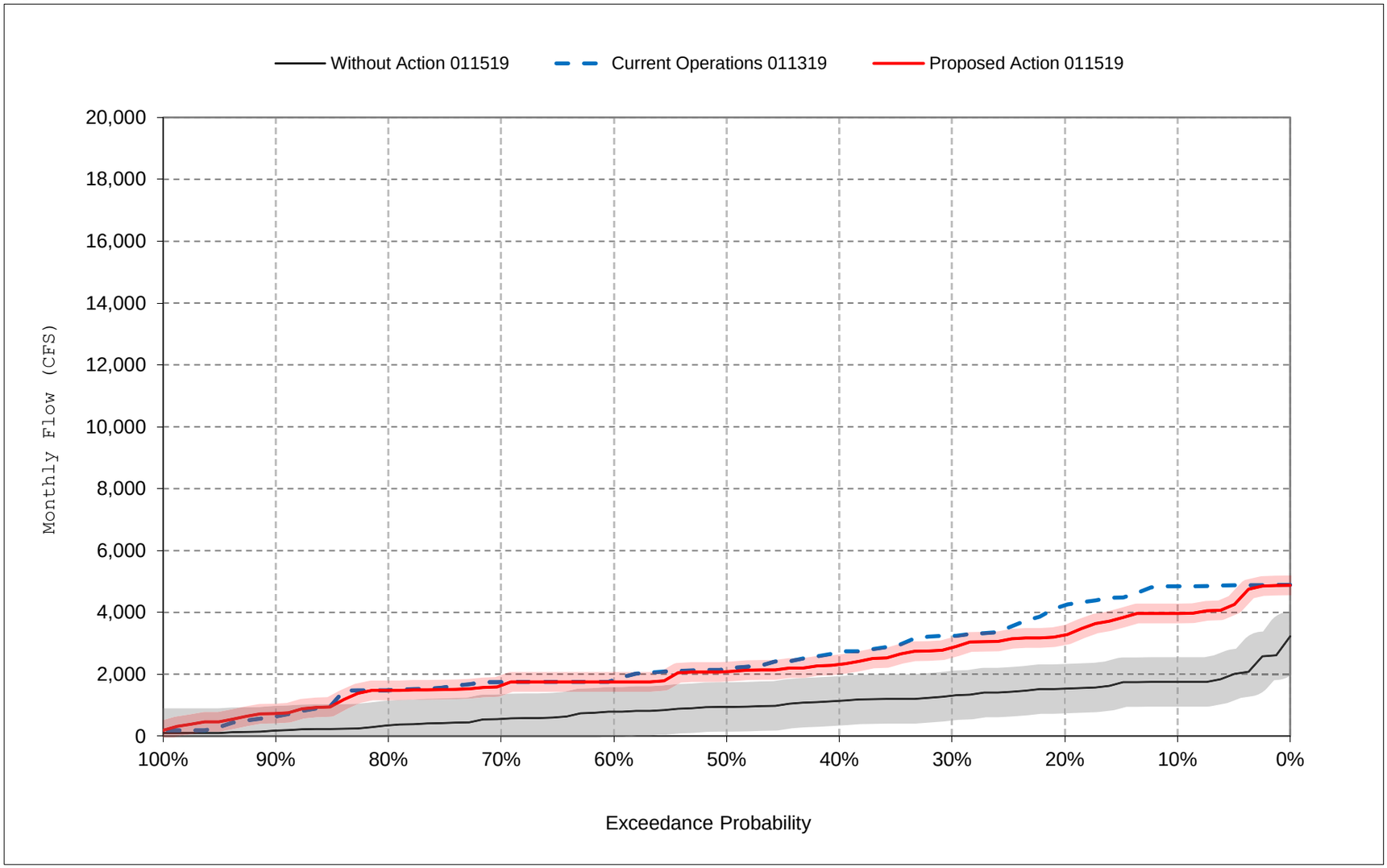
Figure 28-15. American River at H Street, June



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

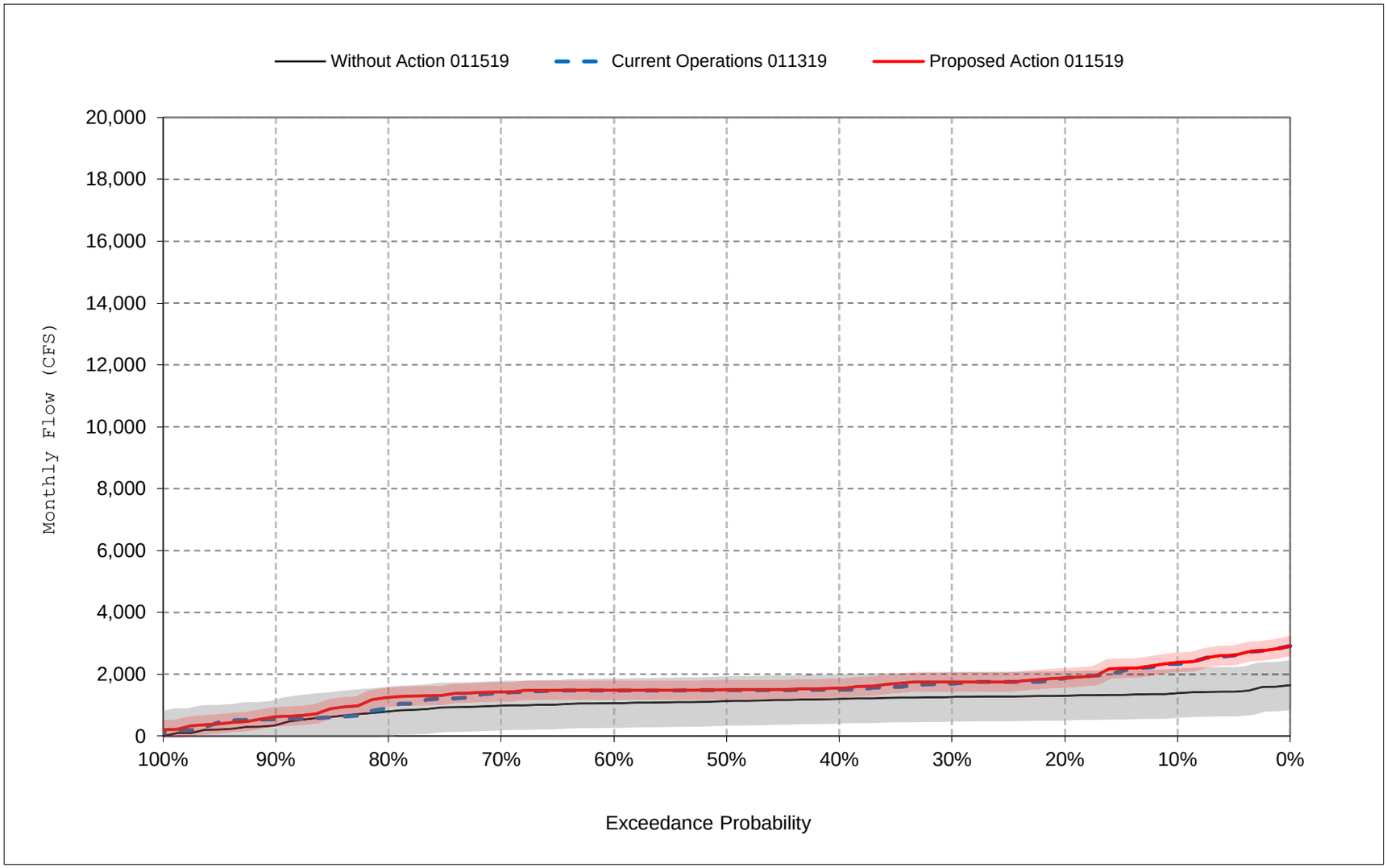
Figure 28-16. American River at H Street, July



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

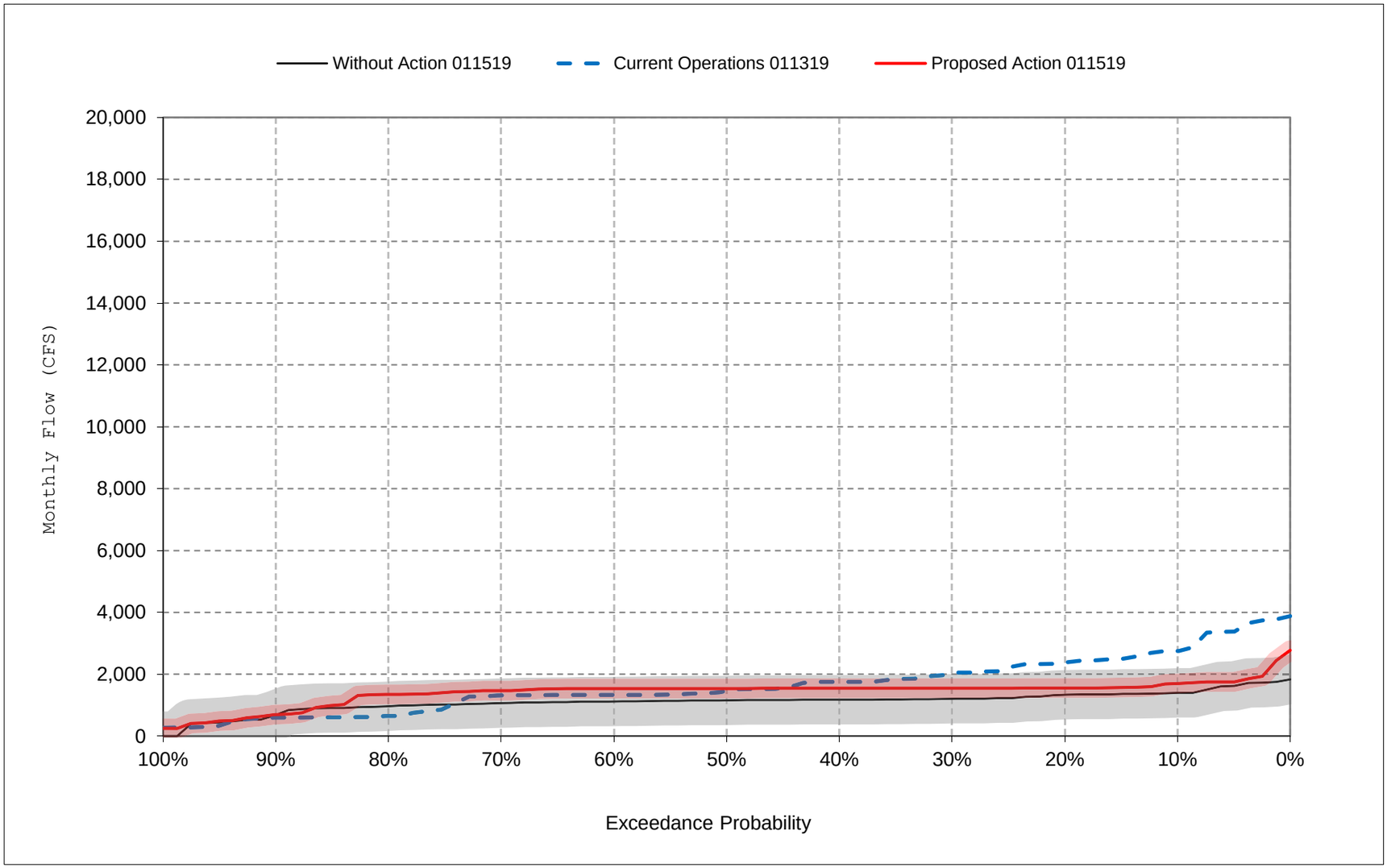
Figure 28-17. American River at H Street, August



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Figure 28-18. American River at H Street, September



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Table 29-1. Sacramento River Flow at Freeport, Monthly Flow

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	12,344	26,547	46,617	68,617	71,314	70,133	64,923	53,418	30,920	11,177	7,757	12,131
20%	10,194	17,715	38,819	61,146	66,342	60,463	55,618	43,247	24,148	10,003	7,151	10,746
30%	9,471	15,720	29,312	48,327	59,931	56,814	44,498	32,410	12,053	8,889	6,564	9,969
40%	8,515	14,033	23,067	37,453	52,531	48,259	36,539	25,374	9,560	8,362	6,271	8,979
50%	7,277	12,248	20,421	28,293	40,646	42,593	33,581	21,422	7,864	7,866	5,992	8,569
60%	6,287	11,265	18,201	25,362	33,810	35,388	28,362	18,464	6,868	7,197	5,534	8,213
70%	5,849	9,124	15,168	20,232	26,384	31,529	25,308	12,794	5,656	5,798	5,326	7,372
80%	5,324	8,093	11,643	16,770	22,310	23,632	21,560	10,153	5,341	5,251	5,198	6,941
90%	4,145	6,449	9,320	14,001	17,716	17,700	15,045	6,904	4,782	4,773	4,975	5,981
Long Term												
Full Simulation Period[a]	8,189	14,505	25,448	37,151	43,785	44,054	36,521	25,954	14,181	7,891	6,205	8,730
Water Year Types[b,c]												
Wet (32%)	9,767	16,438	28,127	57,261	63,914	60,203	51,254	43,053	27,712	8,413	6,538	10,772
Above Normal (16%)	8,875	14,686	25,202	47,319	53,508	55,900	45,135	28,812	10,187	7,889	6,043	9,579
Below Normal (13%)	9,756	13,205	23,384	24,619	36,942	35,166	26,349	19,130	9,613	7,864	5,445	8,568
Dry (24%)	7,027	16,260	28,861	22,620	29,649	35,183	29,976	16,315	6,572	7,262	5,868	7,680
Critical (15%)	4,525	8,388	16,114	18,268	19,471	19,164	15,504	8,131	6,059	7,837	6,919	5,287

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	15,462	21,542	50,195	65,000	69,738	64,827	52,557	38,629	20,654	24,529	16,958	29,451
20%	14,044	19,263	33,944	53,965	62,372	53,989	38,721	28,054	16,178	24,220	16,568	28,488
30%	13,243	18,443	21,814	38,469	50,812	41,513	25,293	16,030	14,030	22,824	16,070	22,484
40%	12,565	17,044	18,066	26,010	43,892	31,089	22,500	13,503	13,452	19,748	15,786	21,731
50%	10,356	15,471	15,521	20,258	33,254	25,635	17,541	12,283	13,093	18,800	15,154	13,854
60%	9,121	13,204	14,767	18,165	25,442	20,351	14,960	11,617	12,619	17,152	13,722	10,719
70%	8,177	10,428	13,379	14,854	20,069	18,975	12,827	10,835	11,599	15,974	9,484	9,942
80%	8,049	9,328	10,586	13,023	16,348	15,258	11,444	10,120	10,846	14,200	8,685	9,222
90%	6,584	7,187	9,357	11,911	14,293	11,409	10,248	8,753	10,213	11,139	8,013	7,852
Long Term												
Full Simulation Period[a]	11,186	15,887	22,809	30,928	38,059	32,551	24,579	18,164	14,924	18,430	13,274	17,499
Water Year Types[b,c]												
Wet (32%)	14,487	20,839	25,490	50,073	56,989	49,902	39,427	30,325	20,392	20,230	16,023	28,227
Above Normal (16%)	12,640	18,546	21,946	39,237	47,178	43,037	27,296	17,159	13,494	22,946	16,776	21,852
Below Normal (13%)	11,241	12,285	21,153	18,490	31,200	18,881	15,326	13,084	12,970	21,656	14,896	11,740
Dry (24%)	8,663	14,783	26,842	17,323	24,217	22,503	16,820	11,656	12,947	16,257	9,702	9,771
Critical (15%)	6,614	7,420	12,728	14,524	16,520	12,876	10,882	8,406	9,709	10,301	7,988	7,702

Current Operations 011319 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	3,117	**-5,005**	3,578	**-3,617**	**-1,576**	**-5,306**	**-12,366**	**-14,788**	**-10,266**	13,352	9,200	17,319
20%	3,850	1,548	**-4,875**	**-7,181**	**-3,970**	**-6,473**	**-16,897**	**-15,193**	**-7,970**	14,217	9,417	17,742
30%	3,771	2,722	**-7,498**	**-9,858**	**-9,119**	**-15,302**	**-19,205**	**-16,380**	1,977	13,935	9,506	12,515
40%	4,050	3,011	**-5,001**	**-11,444**	**-8,639**	**-17,169**	**-14,039**	**-11,872**	3,892	11,386	9,516	12,752
50%	3,079	3,223	**-4,900**	**-8,034**	**-7,392**	**-16,958**	**-16,041**	**-9,140**	5,229	10,934	9,163	5,284
60%	2,833	1,939	**-3,435**	**-7,197**	**-8,368**	**-15,037**	**-13,401**	**-6,847**	5,751	9,955	8,188	2,507
70%	2,328	1,304	**-1,789**	**-5,378**	**-6,315**	**-12,554**	**-12,480**	**-1,959**	5,942	10,177	4,158	2,570
80%	2,726	1,236	**-1,057**	**-3,747**	**-5,962**	**-8,374**	**-10,116**	**-33**	5,504	8,948	3,487	2,281
90%	2,439	738	37	**-2,090**	**-3,424**	**-6,291**	**-4,797**	1,849	5,430	6,367	3,039	1,872
Long Term												
Full Simulation Period[a]	2,997	1,382	**-2,639**	**-6,223**	**-5,726**	**-11,503**	**-11,942**	**-7,790**	743	10,539	7,068	8,769
Water Year Types[b,c]												
Wet (32%)	4,720	4,401	**-2,636**	**-7,188**	**-6,925**	**-10,301**	**-11,827**	**-12,729**	**-7,321**	11,817	9,484	17,455
Above Normal (16%)	3,765	3,860	**-3,256**	**-8,082**	**-6,330**	**-12,863**	**-17,838**	**-11,653**	3,307	15,058	10,733	12,273
Below Normal (13%)	1,485	**-920**	**-2,230**	**-6,129**	**-5,742**	**-16,284**	**-11,023**	**-6,045**	3,357	13,793	9,451	3,172
Dry (24%)	1,636	**-1,477**	**-2,019**	**-5,298**	**-5,432**	**-12,680**	**-13,157**	**-4,658**	6,376	8,995	3,834	2,090
Critical (15%)	2,089	**-968**	**-3,386**	**-3,744**	**-2,951**	**-6,287**	**-4,622**	275	3,651	2,465	1,069	2,415

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 29-2. Sacramento River Flow at Freeport, Monthly Flow

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	12,344	26,547	46,617	68,617	71,314	70,133	64,923	53,418	30,920	11,177	7,757	12,131
20%	10,194	17,715	38,819	61,146	66,342	60,463	55,618	43,247	24,148	10,003	7,151	10,746
30%	9,471	15,720	29,312	48,327	59,931	56,814	44,498	32,410	12,053	8,889	6,564	9,969
40%	8,515	14,033	23,067	37,453	52,531	48,259	36,539	25,374	9,560	8,362	6,271	8,979
50%	7,277	12,248	20,421	28,293	40,646	42,593	33,581	21,422	7,864	7,866	5,992	8,569
60%	6,287	11,265	18,201	25,362	33,810	35,388	28,362	18,464	6,868	7,197	5,534	8,213
70%	5,849	9,124	15,168	20,232	26,384	31,529	25,308	12,794	5,656	5,798	5,326	7,372
80%	5,324	8,093	11,643	16,770	22,310	23,632	21,560	10,153	5,341	5,251	5,198	6,941
90%	4,145	6,449	9,320	14,001	17,716	17,700	15,045	6,904	4,782	4,773	4,975	5,981
Long Term												
Full Simulation Period[a]	8,189	14,505	25,448	37,151	43,785	44,054	36,521	25,954	14,181	7,891	6,205	8,730
Water Year Types[b,c]												
Wet (32%)	9,767	16,438	28,127	57,261	63,914	60,203	51,254	43,053	27,712	8,413	6,538	10,772
Above Normal (16%)	8,875	14,686	25,202	47,319	53,508	55,900	45,135	28,812	10,187	7,889	6,043	9,579
Below Normal (13%)	9,756	13,205	23,384	24,619	36,942	35,166	26,349	19,130	9,613	7,864	5,445	8,568
Dry (24%)	7,027	16,260	28,861	22,620	29,649	35,183	29,976	16,315	6,572	7,262	5,868	7,680
Critical (15%)	4,525	8,388	16,114	18,268	19,471	19,164	15,504	8,131	6,059	7,837	6,919	5,287

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	14,332	24,078	52,760	65,882	70,031	64,878	52,583	38,630	20,650	24,438	16,984	15,507
20%	13,867	14,883	36,616	56,798	62,813	54,088	38,727	28,053	16,842	23,610	16,813	14,883
30%	12,674	13,625	23,713	41,897	52,576	42,854	25,427	17,030	15,485	22,414	16,194	14,471
40%	11,942	12,714	18,423	27,487	46,456	31,354	22,393	14,552	15,130	19,701	15,857	14,254
50%	10,513	11,405	15,591	22,879	33,864	26,172	17,544	13,630	14,771	18,138	15,377	13,809
60%	9,168	10,889	15,135	18,779	25,320	21,156	14,084	12,654	14,170	17,343	14,046	11,248
70%	8,353	10,011	13,160	14,762	21,000	19,022	12,814	12,007	13,642	14,601	9,840	9,903
80%	8,043	8,549	10,627	12,867	17,363	15,741	11,667	11,158	12,511	12,484	8,967	9,147
90%	6,578	7,476	9,473	12,066	14,543	11,855	10,756	9,959	11,510	10,526	7,795	7,837
Long Term												
Full Simulation Period[a]	10,965	14,008	23,811	31,611	38,640	33,182	24,646	18,902	16,177	18,032	13,434	12,456
Water Year Types[b,c]												
Wet (32%)	13,466	17,131	28,084	51,103	57,254	50,062	39,492	30,674	20,886	19,883	15,978	15,383
Above Normal (16%)	13,023	14,792	22,969	40,490	48,085	44,453	27,323	17,873	14,454	22,948	16,722	14,777
Below Normal (13%)	11,334	11,867	21,060	19,669	33,481	19,910	15,723	14,481	15,126	21,888	16,031	12,421
Dry (24%)	8,787	14,566	27,075	17,377	24,294	22,951	16,725	12,769	14,905	15,224	9,912	9,951
Critical (15%)	6,608	7,423	12,546	14,427	16,719	13,619	10,964	8,785	10,921	9,842	7,847	7,804

Proposed Action 011519 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,988	**-2,469**	6,143	**-2,735**	**-1,283**	**-5,254**	**-12,341**	**-14,788**	**-10,270**	13,260	9,227	3,375
20%	3,673	**-2,832**	**-2,203**	**-4,348**	**-3,529**	**-6,375**	**-16,891**	**-15,194**	**-7,306**	13,607	9,662	4,137
30%	3,202	**-2,096**	**-5,599**	**-6,429**	**-7,355**	**-13,960**	**-19,071**	**-15,380**	3,432	13,525	9,630	4,502
40%	3,426	**-1,319**	**-4,645**	**-9,966**	**-6,075**	**-16,905**	**-14,146**	**-10,822**	5,570	11,339	9,586	5,275
50%	3,235	**-843**	**-4,830**	**-5,413**	**-6,782**	**-16,421**	**-16,037**	**-7,792**	6,907	10,271	9,386	5,240
60%	2,881	**-376**	**-3,067**	**-6,584**	**-8,490**	**-14,232**	**-14,277**	**-5,810**	7,302	10,146	8,512	3,036
70%	2,504	887	**-2,008**	**-5,470**	**-5,384**	**-12,507**	**-12,493**	**-787**	7,986	8,803	4,514	2,531
80%	2,720	456	**-1,016**	**-3,903**	**-4,946**	**-7,892**	**-9,893**	1,005	7,170	7,233	3,768	2,206
90%	2,433	1,027	153	**-1,935**	**-3,173**	**-5,844**	**-4,289**	3,055	6,728	5,754	2,821	1,857
Long Term												
Full Simulation Period[a]	2,776	**-497**	**-1,637**	**-5,540**	**-5,145**	**-10,871**	**-11,875**	**-7,052**	1,996	10,141	7,228	3,725
Water Year Types[b,c]												
Wet (32%)	3,699	693	**-43**	**-6,158**	**-6,660**	**-10,141**	**-11,762**	**-12,379**	**-6,827**	11,470	9,439	4,612
Above Normal (16%)	4,148	106	**-2,233**	**-6,830**	**-5,422**	**-11,447**	**-17,812**	**-10,938**	4,267	15,060	10,679	5,198
Below Normal (13%)	1,579	**-1,338**	**-2,323**	**-4,951**	**-3,461**	**-15,256**	**-10,626**	**-4,648**	5,513	14,024	10,586	3,853
Dry (24%)	1,760	**-1,694**	**-1,786**	**-5,243**	**-5,355**	**-12,232**	**-13,251**	**-3,546**	8,334	7,962	4,045	2,271
Critical (15%)	2,082	**-965**	**-3,568**	**-3,841**	**-2,753**	**-5,545**	**-4,540**	654	4,862	2,005	927	2,517

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 29-3. Sacramento River Flow at Freeport, Monthly Flow

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	15,462	21,542	50,195	65,000	69,738	64,827	52,557	38,629	20,654	24,529	16,958	29,451
20%	14,044	19,263	33,944	53,965	62,372	53,989	38,721	28,054	16,178	24,220	16,568	28,488
30%	13,243	18,443	21,814	38,469	50,812	41,513	25,293	16,030	14,030	22,824	16,070	22,484
40%	12,565	17,044	18,066	26,010	43,892	31,089	22,500	13,503	13,452	19,748	15,786	21,731
50%	10,356	15,471	15,521	20,258	33,254	25,635	17,541	12,283	13,093	18,800	15,154	13,854
60%	9,121	13,204	14,767	18,165	25,442	20,351	14,960	11,617	12,619	17,152	13,722	10,719
70%	8,177	10,428	13,379	14,854	20,069	18,975	12,827	10,835	11,599	15,974	9,484	9,942
80%	8,049	9,328	10,586	13,023	16,348	15,258	11,444	10,120	10,846	14,200	8,685	9,222
90%	6,584	7,187	9,357	11,911	14,293	11,409	10,248	8,753	10,213	11,139	8,013	7,852
Long Term												
Full Simulation Period[a]	11,186	15,887	22,809	30,928	38,059	32,551	24,579	18,164	14,924	18,430	13,274	17,499
Water Year Types[b,c]												
Wet (32%)	14,487	20,839	25,490	50,073	56,989	49,902	39,427	30,325	20,392	20,230	16,023	28,227
Above Normal (16%)	12,640	18,546	21,946	39,237	47,178	43,037	27,296	17,159	13,494	22,946	16,776	21,852
Below Normal (13%)	11,241	12,285	21,153	18,490	31,200	18,881	15,326	13,084	12,970	21,656	14,896	11,740
Dry (24%)	8,663	14,783	26,842	17,323	24,217	22,503	16,820	11,656	12,947	16,257	9,702	9,771
Critical (15%)	6,614	7,420	12,728	14,524	16,520	12,876	10,882	8,406	9,709	10,301	7,988	7,702

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	14,332	24,078	52,760	65,882	70,031	64,878	52,583	38,630	20,650	24,438	16,984	15,507
20%	13,867	14,883	36,616	56,798	62,813	54,088	38,727	28,053	16,842	23,610	16,813	14,883
30%	12,674	13,625	23,713	41,897	52,576	42,854	25,427	17,030	15,485	22,414	16,194	14,471
40%	11,942	12,714	18,423	27,487	46,456	31,354	22,393	14,552	15,130	19,701	15,857	14,254
50%	10,513	11,405	15,591	22,879	33,864	26,172	17,544	13,630	14,771	18,138	15,377	13,809
60%	9,168	10,889	15,135	18,779	25,320	21,156	14,084	12,654	14,170	17,343	14,046	11,248
70%	8,353	10,011	13,160	14,762	21,000	19,022	12,814	12,007	13,642	14,601	9,840	9,903
80%	8,043	8,549	10,627	12,867	17,363	15,741	11,667	11,158	12,511	12,484	8,967	9,147
90%	6,578	7,476	9,473	12,066	14,543	11,855	10,756	9,959	11,510	10,526	7,795	7,837
Long Term												
Full Simulation Period[a]	10,965	14,008	23,811	31,611	38,640	33,182	24,646	18,902	16,177	18,032	13,434	12,456
Water Year Types[b,c]												
Wet (32%)	13,466	17,131	28,084	51,103	57,254	50,062	39,492	30,674	20,886	19,883	15,978	15,383
Above Normal (16%)	13,023	14,792	22,969	40,490	48,085	44,453	27,323	17,873	14,454	22,948	16,722	14,777
Below Normal (13%)	11,334	11,867	21,060	19,669	33,481	19,910	15,723	14,481	15,126	21,888	16,031	12,421
Dry (24%)	8,787	14,566	27,075	17,377	24,294	22,951	16,725	12,769	14,905	15,224	9,912	9,951
Critical (15%)	6,608	7,423	12,546	14,427	16,719	13,619	10,964	8,785	10,921	9,842	7,847	7,804

Proposed Action 011519 minus Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	**-1,129**	2,536	2,565	882	293	52	25	0	**-4**	**-91**	26	**-13,944**
20%	**-177**	**-4,380**	2,672	2,833	441	99	6	**-1**	664	**-610**	245	**-13,605**
30%	**-569**	**-4,818**	1,899	3,428	1,764	1,342	135	1,000	1,455	**-411**	124	**-8,013**
40%	**-624**	**-4,330**	357	1,477	2,563	264	**-107**	1,050	1,678	**-47**	70	**-7,477**
50%	156	**-4,066**	70	2,621	610	537	4	1,348	1,678	**-663**	223	**-44**
60%	48	**-2,315**	368	613	**-122**	805	**-876**	1,037	1,550	191	324	529
70%	176	**-417**	**-219**	**-92**	931	47	**-13**	1,172	2,043	**-1,373**	355	**-39**
80%	**-6**	**-779**	41	**-157**	1,015	482	222	1,038	1,665	**-1,715**	282	**-74**
90%	**-6**	288	116	155	250	447	509	1,206	1,298	**-613**	**-218**	**-15**
Long Term												
Full Simulation Period[a]	**-221**	**-1,879**	1,002	682	582	631	67	738	1,253	**-398**	160	**-5,044**
Water Year Types[b,c]												
Wet (32%)	**-1,021**	**-3,708**	2,594	1,031	265	161	65	349	494	**-347**	**-45**	**-12,843**
Above Normal (16%)	383	**-3,754**	1,023	1,253	908	1,416	26	714	960	2	**-54**	**-7,075**
Below Normal (13%)	94	**-418**	**-93**	1,178	2,281	1,028	397	1,397	2,157	232	1,135	681
Dry (24%)	124	**-217**	232	55	78	449	**-94**	1,113	1,958	**-1,034**	211	181
Critical (15%)	**-7**	3	**-182**	**-97**	198	742	82	379	1,211	**-459**	**-142**	102

a Based on the 82-year simulation period.

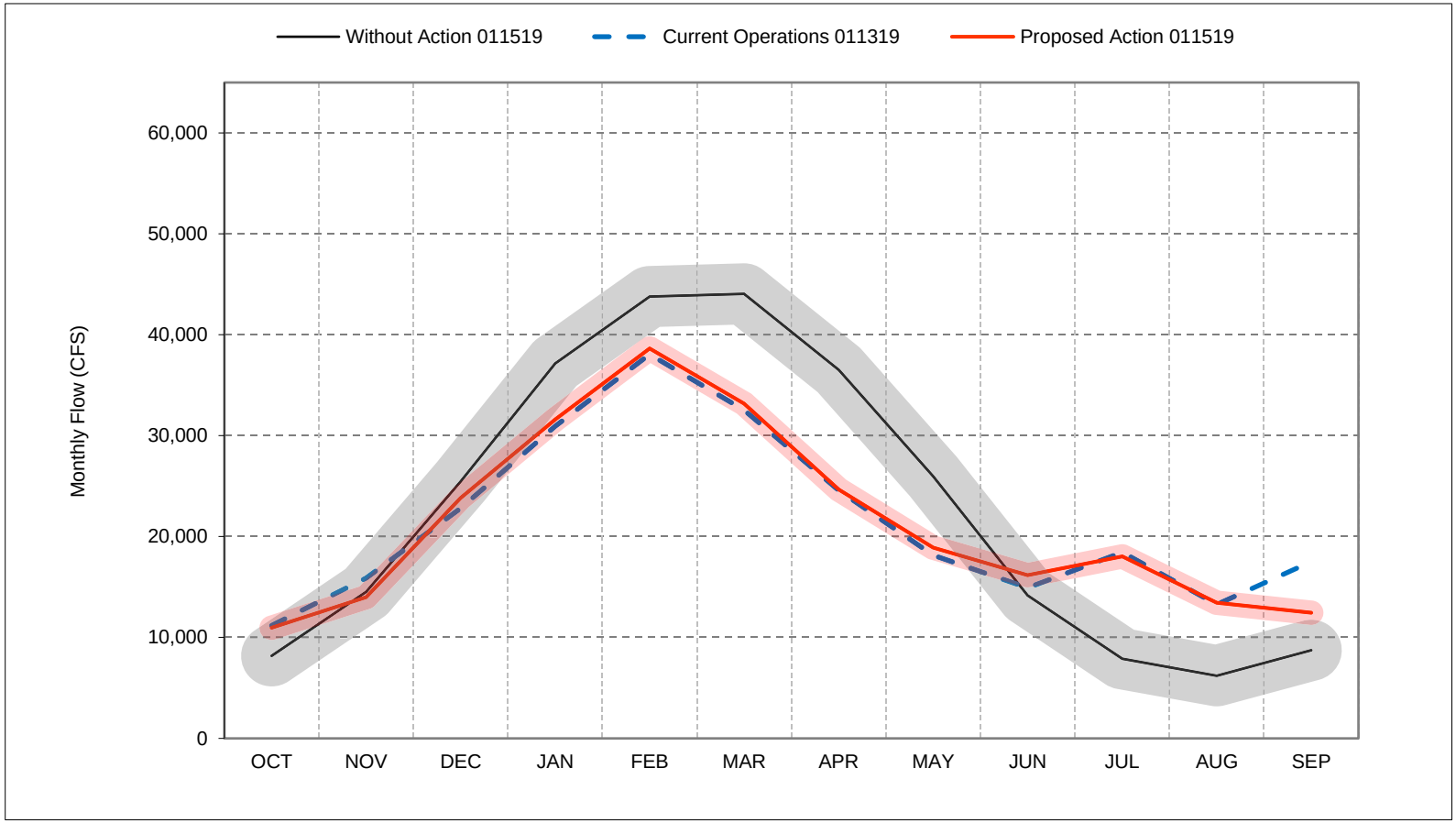
b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

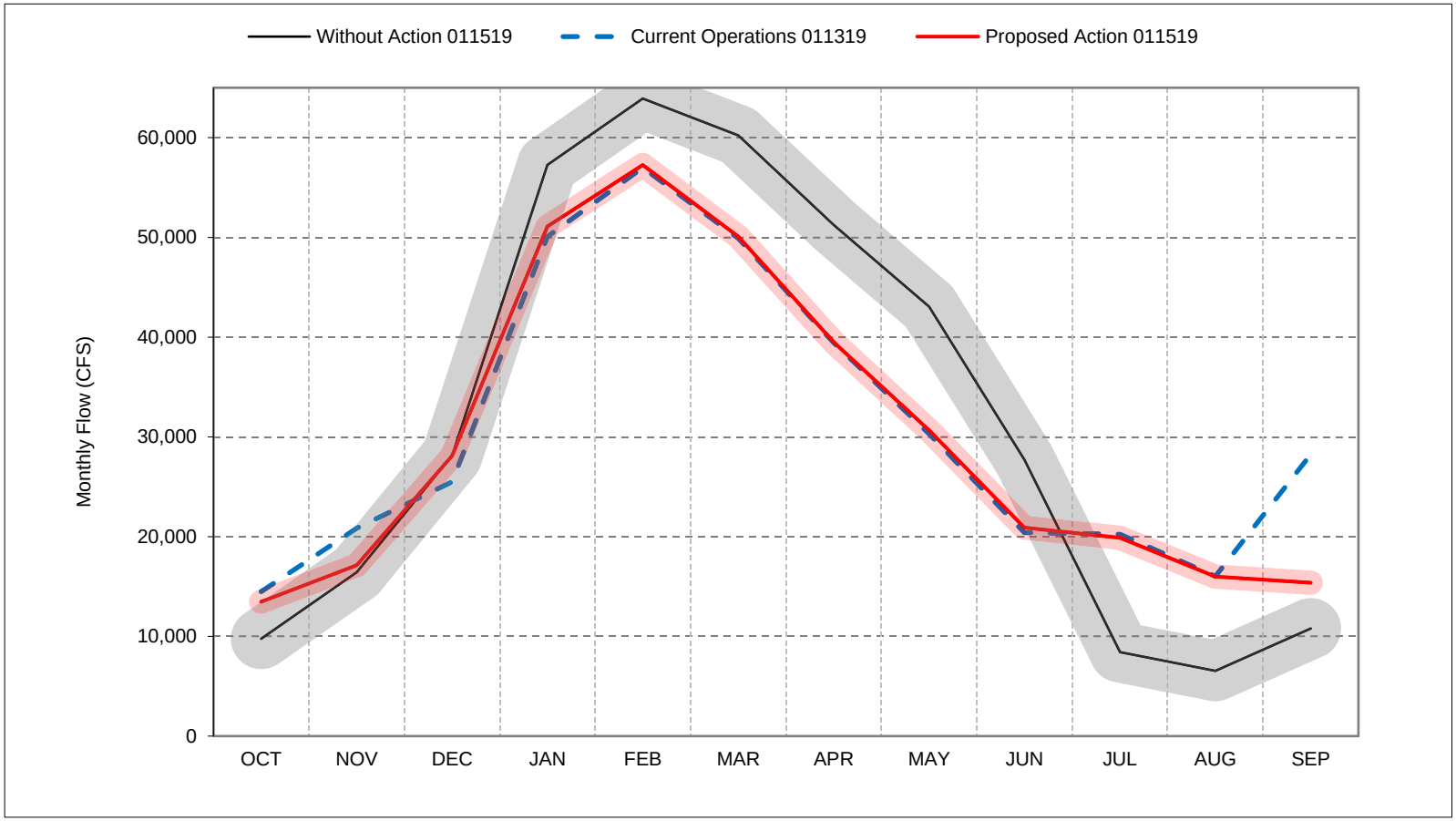
e These are draft results meant for qualitative analysis and are subject to revision.

Figure 29-1. Sacramento River Flow at Freeport, Long-Term Average Flow



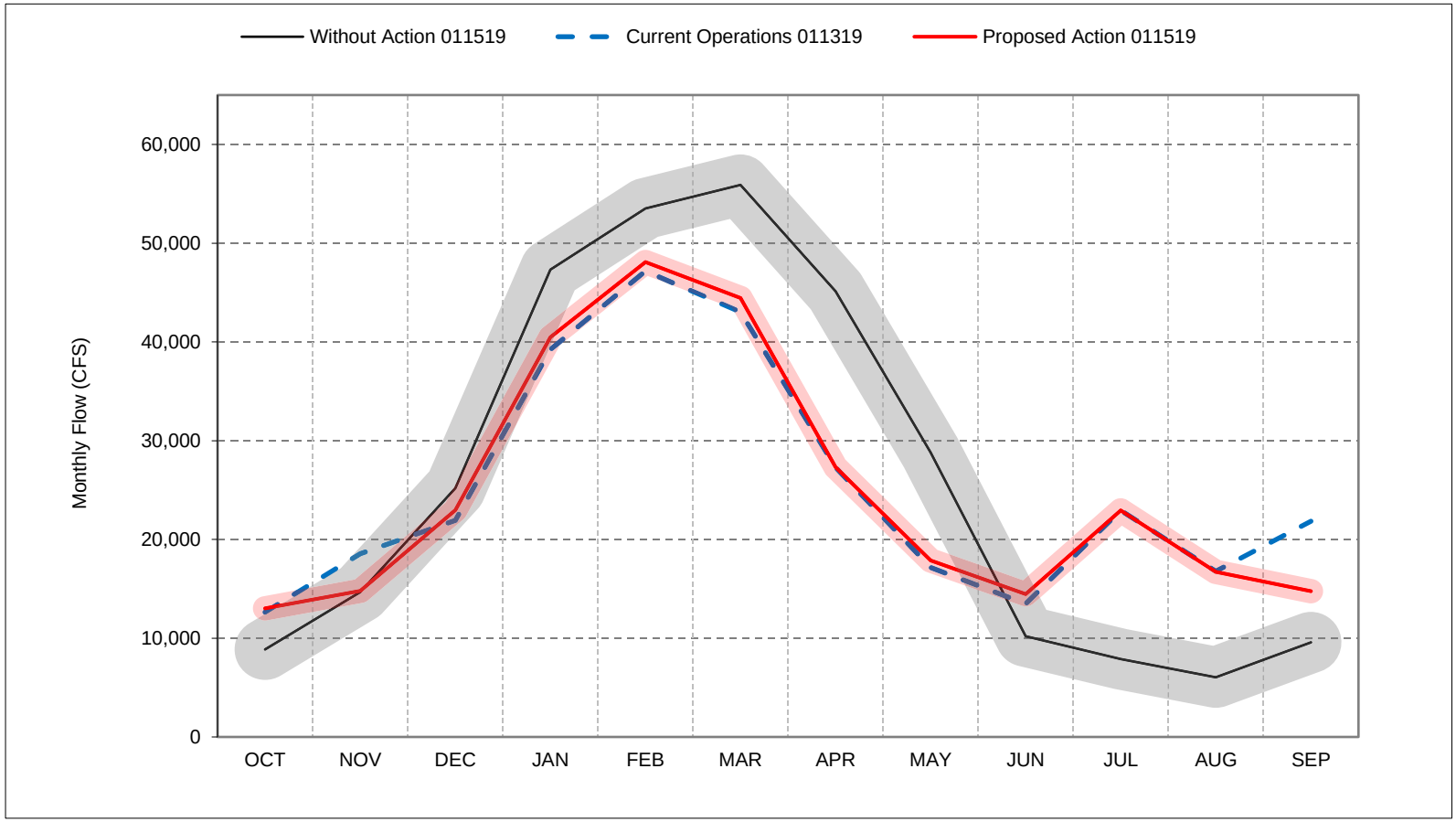
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 29-2. Sacramento River Flow at Freeport, Wet Year Average Flow



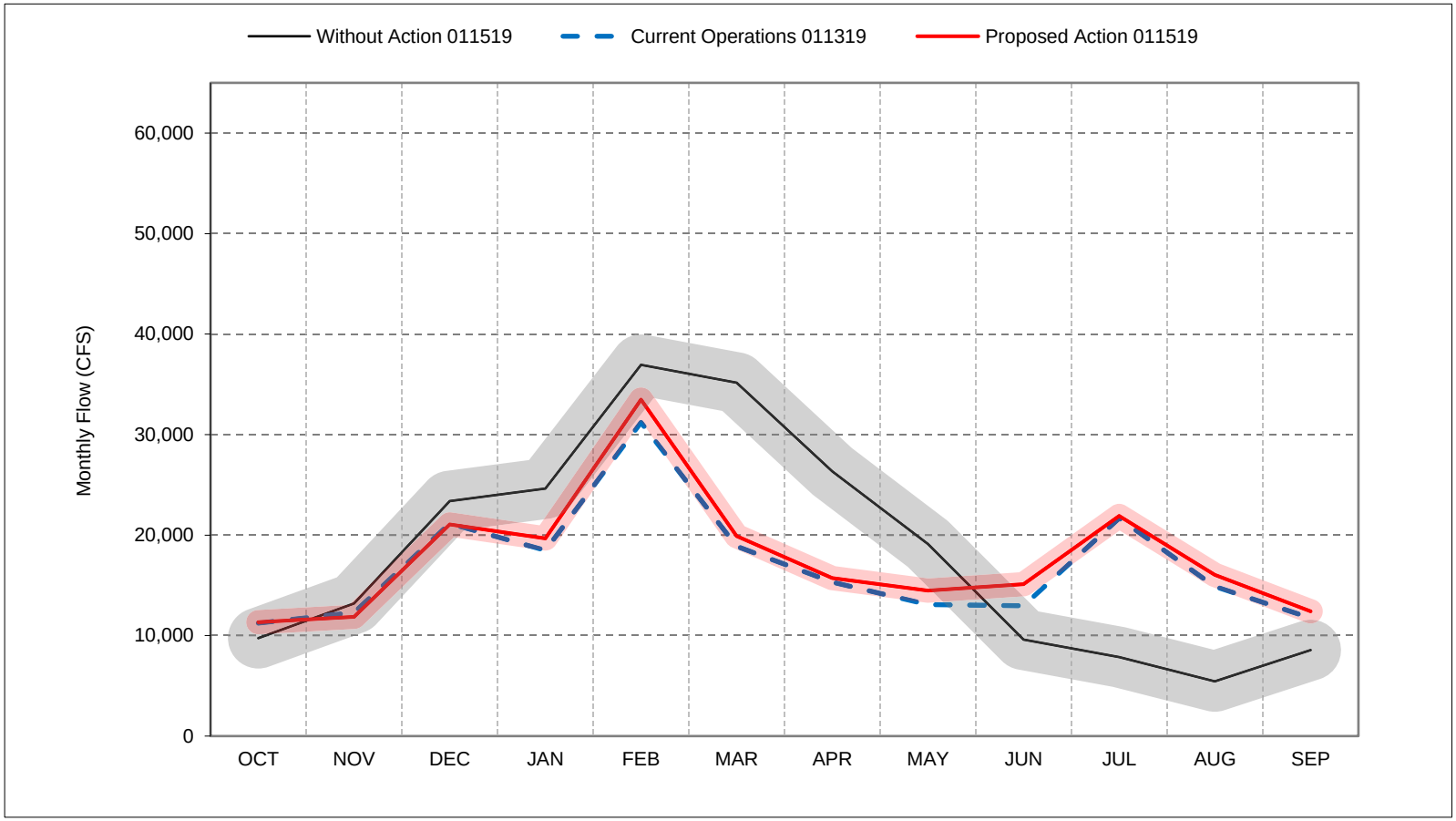
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 29-3. Sacramento River Flow at Freeport, Above Normal Year Average Flow



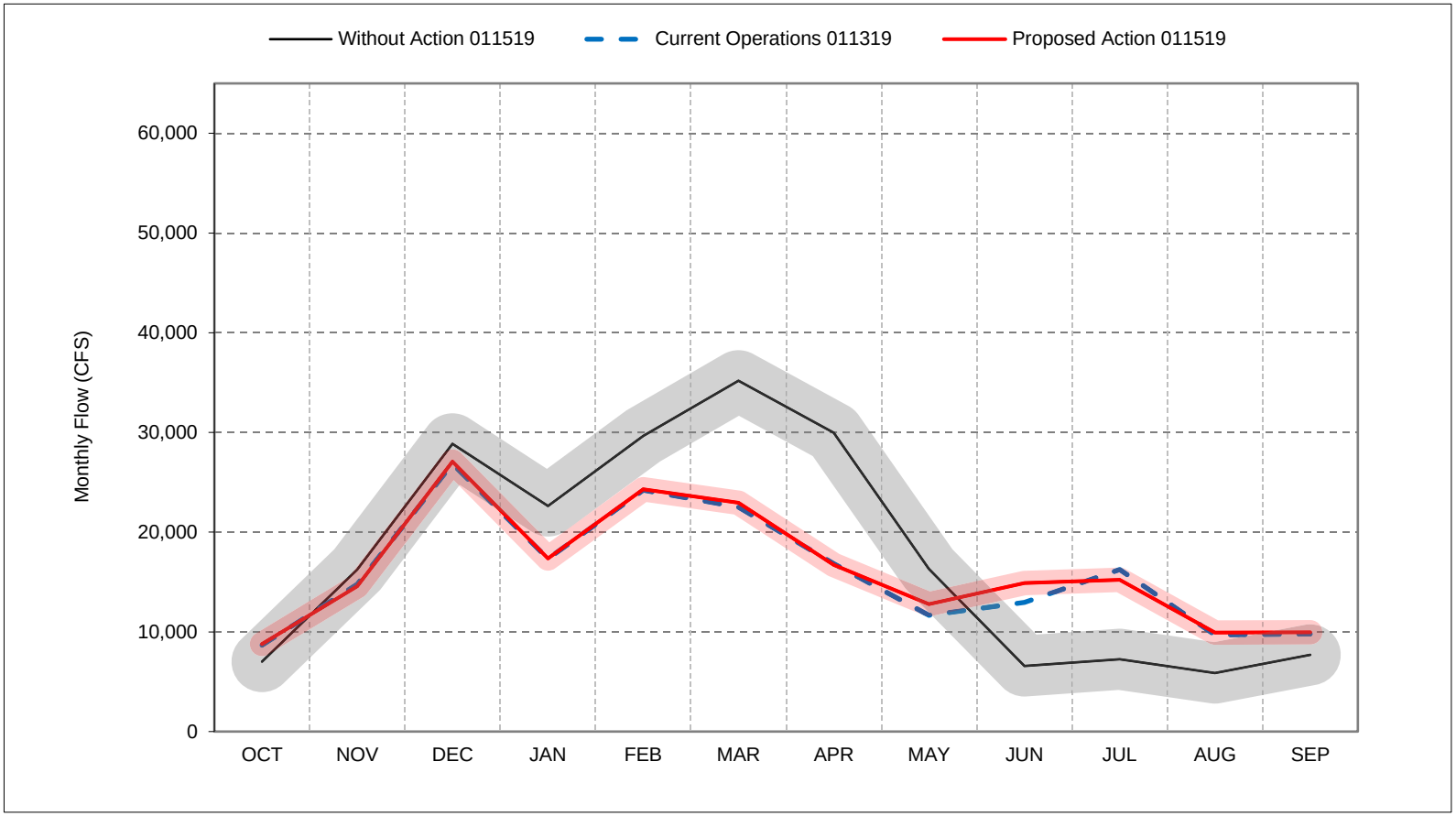
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 29-4. Sacramento River Flow at Freeport, Below Normal Year Average Flow



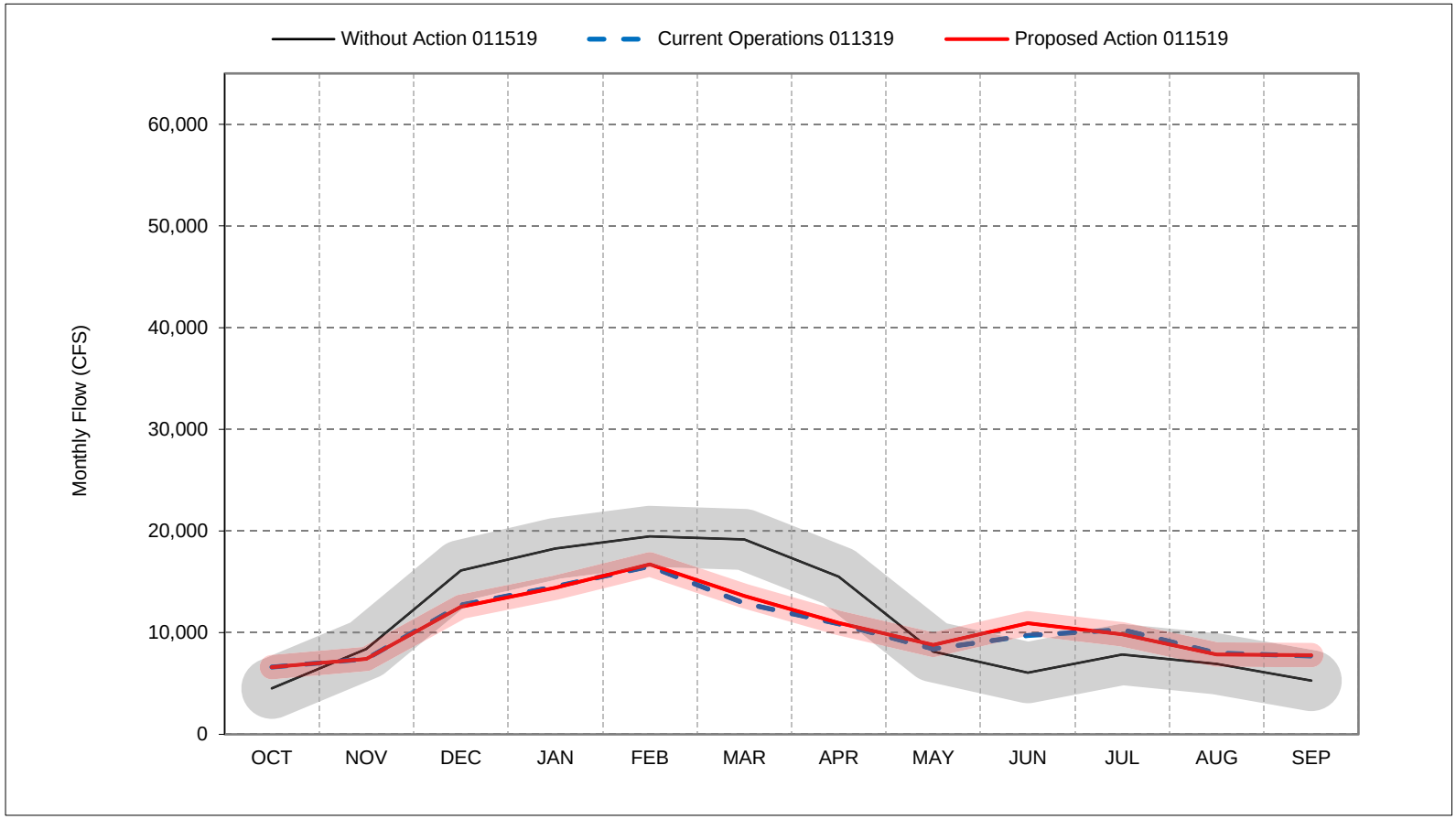
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 29-5. Sacramento River Flow at Freeport, Dry Year Average Flow



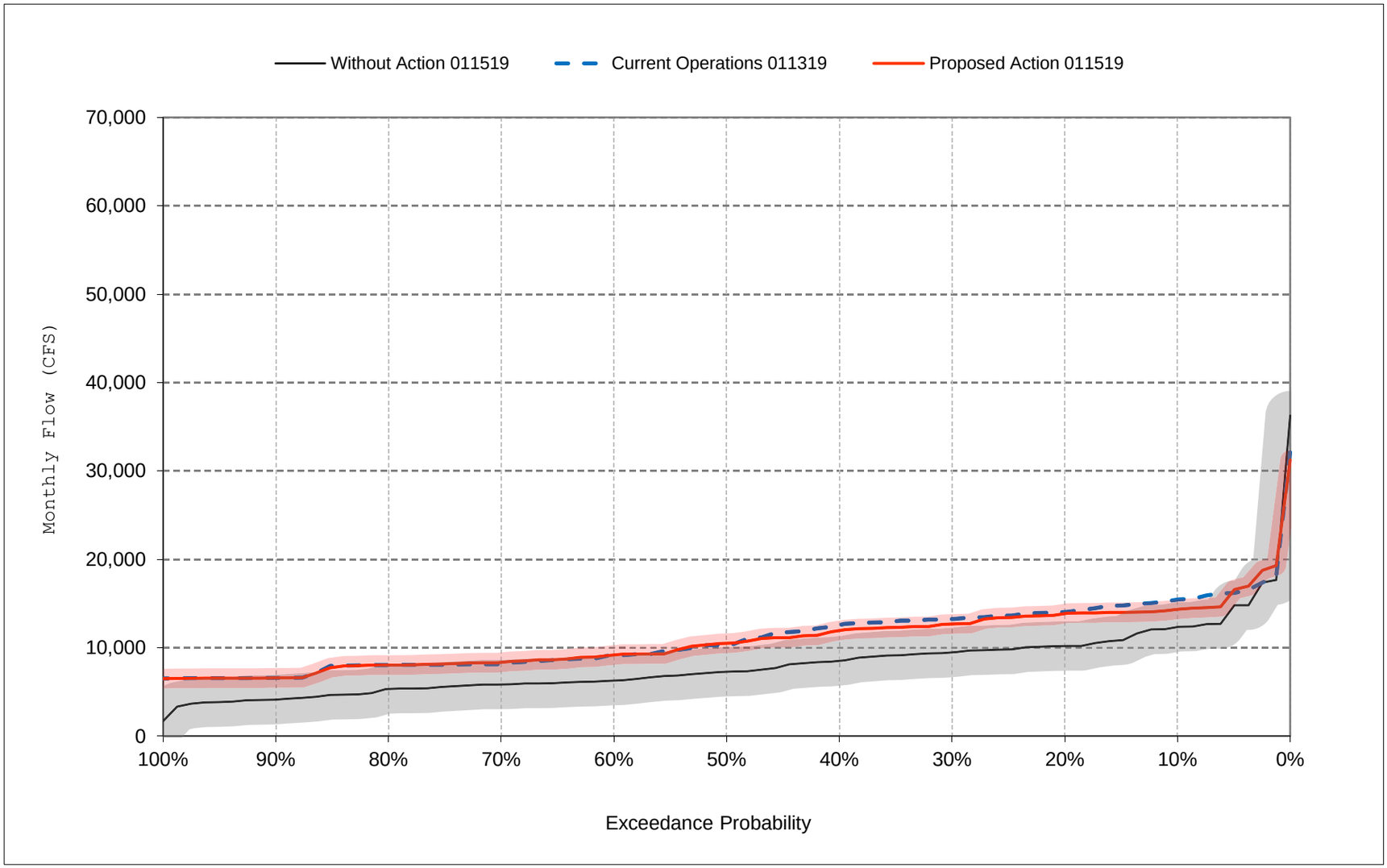
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 29-6. Sacramento River Flow at Freeport, Critical Year Average Flow



*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

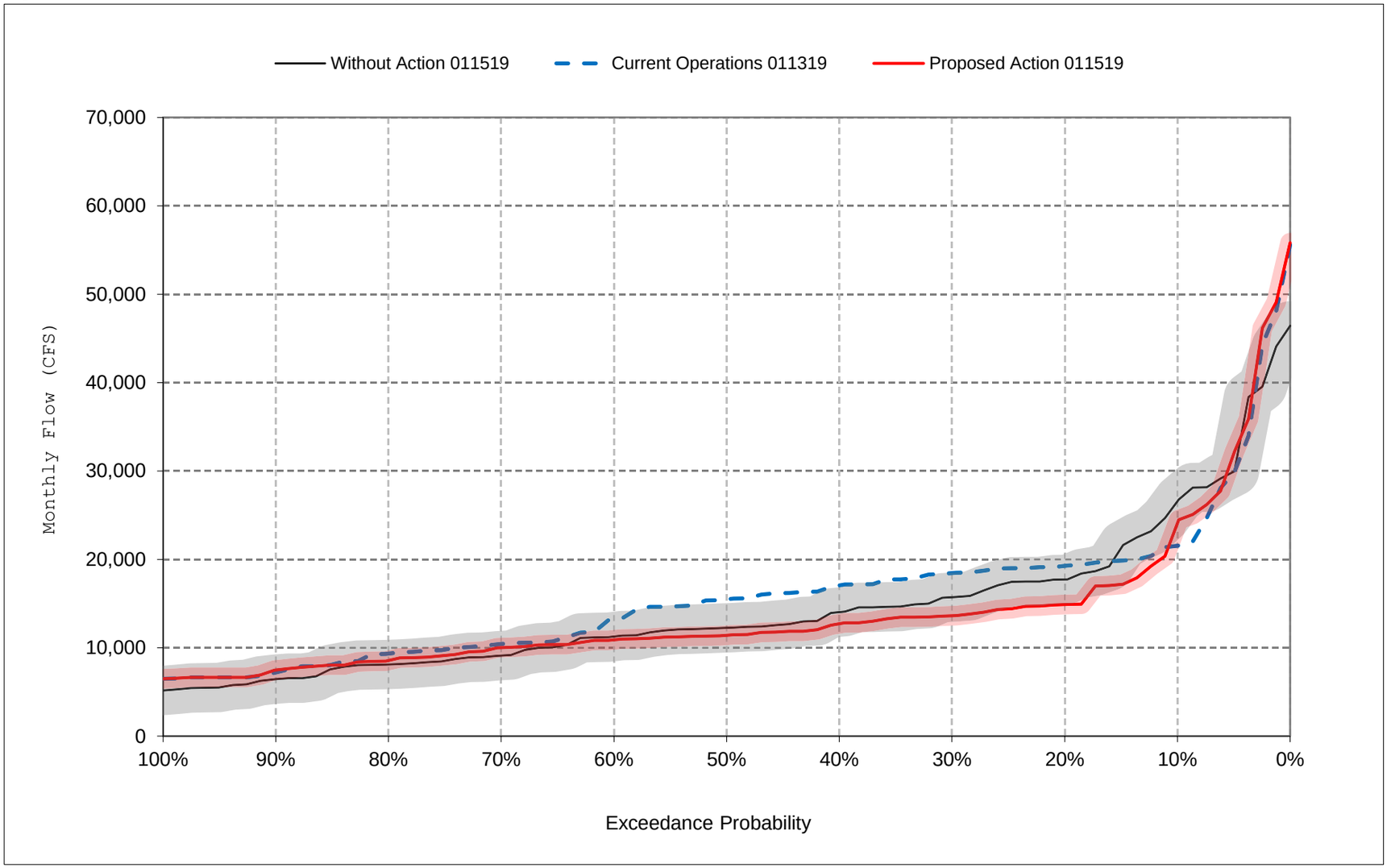
Figure 29-7. Sacramento River Flow at Freeport, October



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

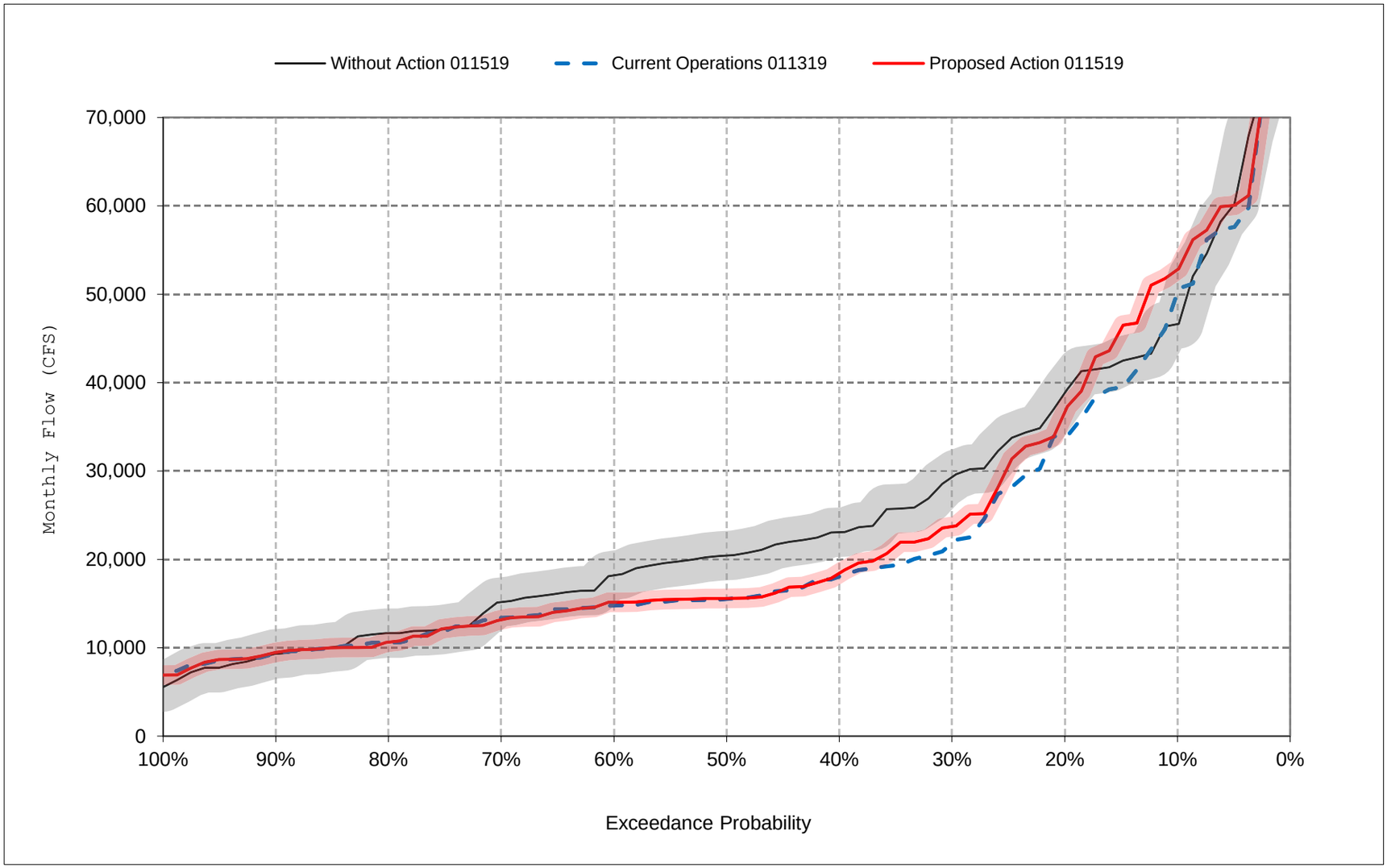
Figure 29-8. Sacramento River Flow at Freeport, November



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

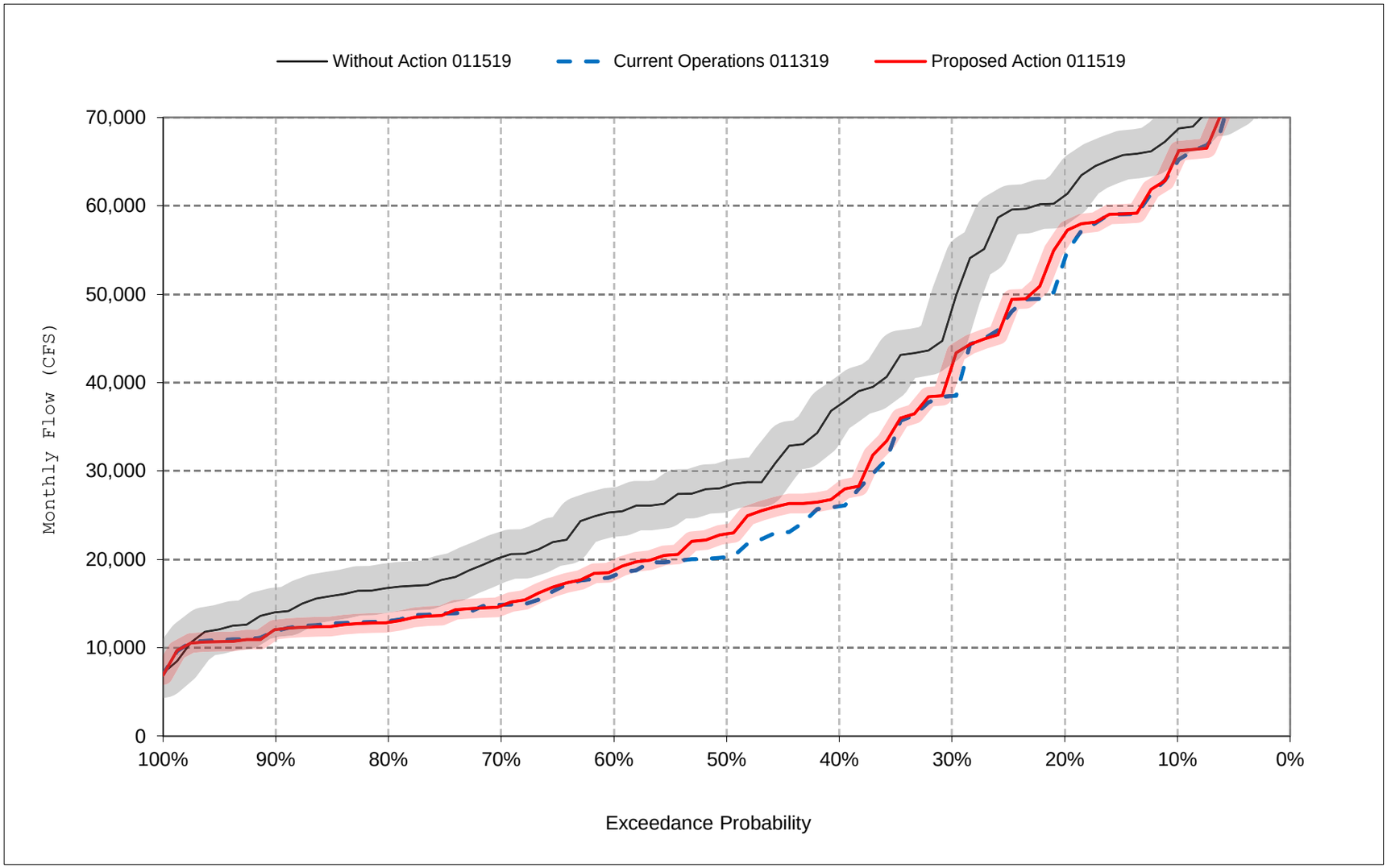
Figure 29-9. Sacramento River Flow at Freeport, December



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

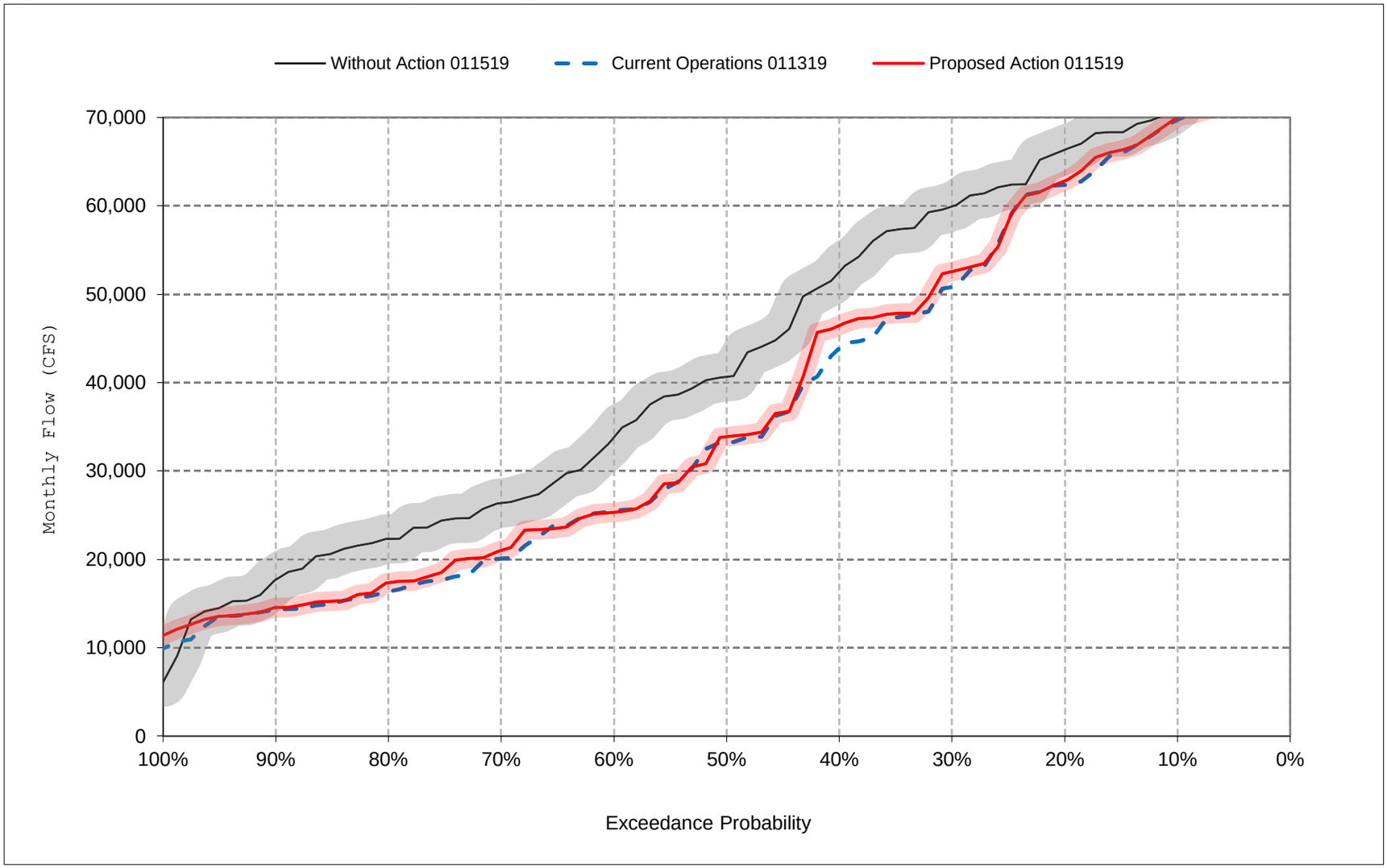
Figure 29-10. Sacramento River Flow at Freeport, January



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

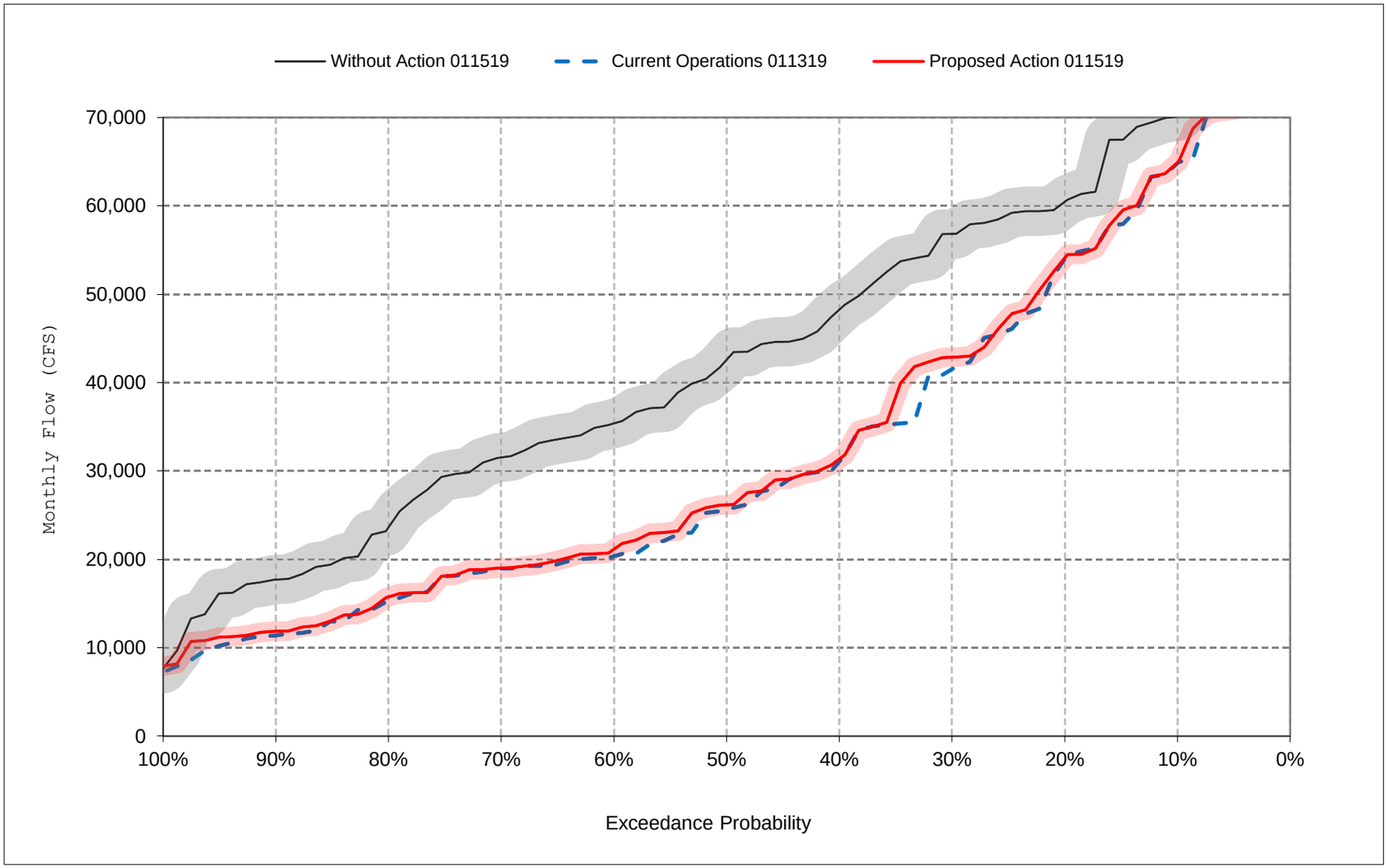
Figure 29-11. Sacramento River Flow at Freeport, February



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

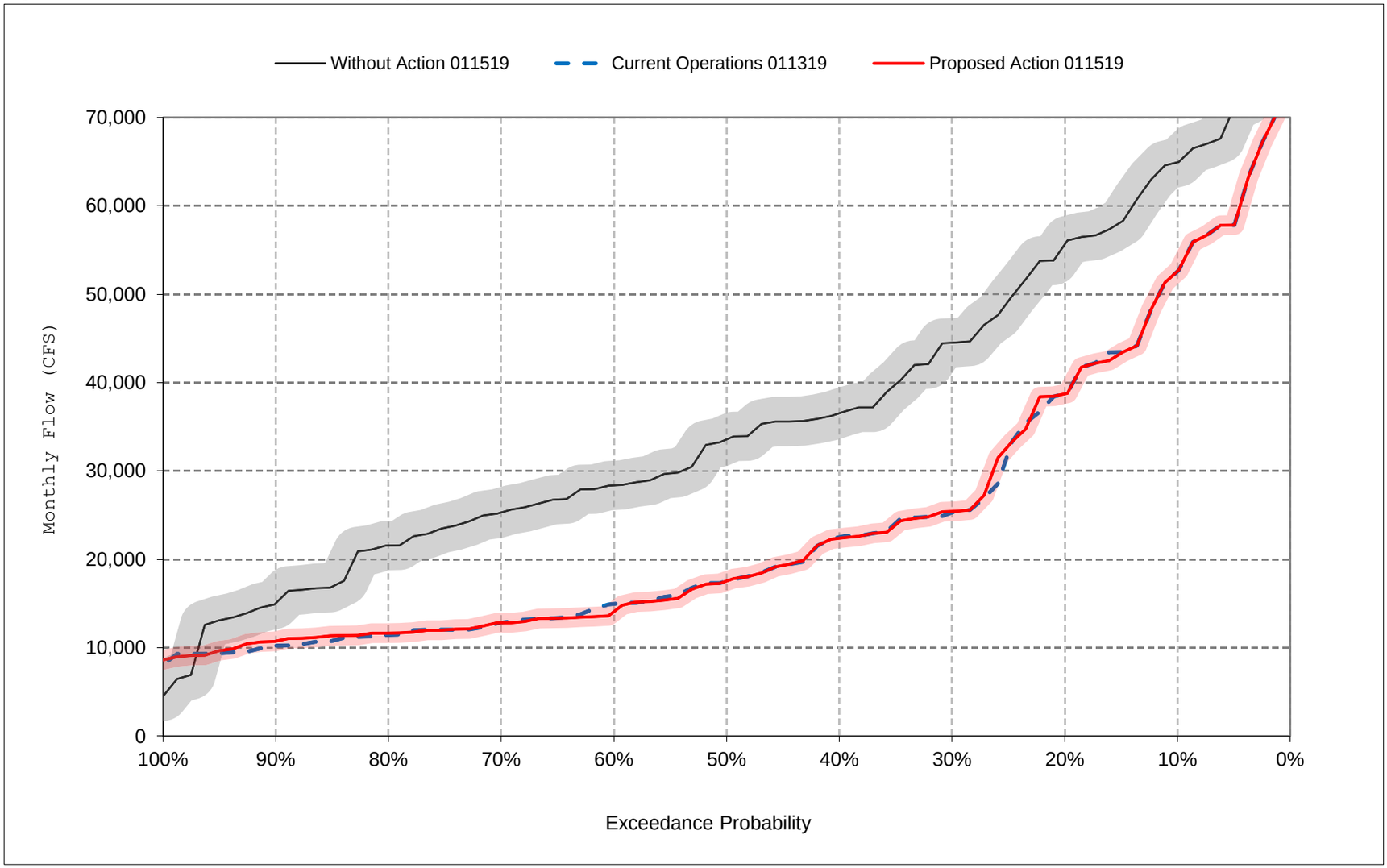
Figure 29-12. Sacramento River Flow at Freeport, March



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

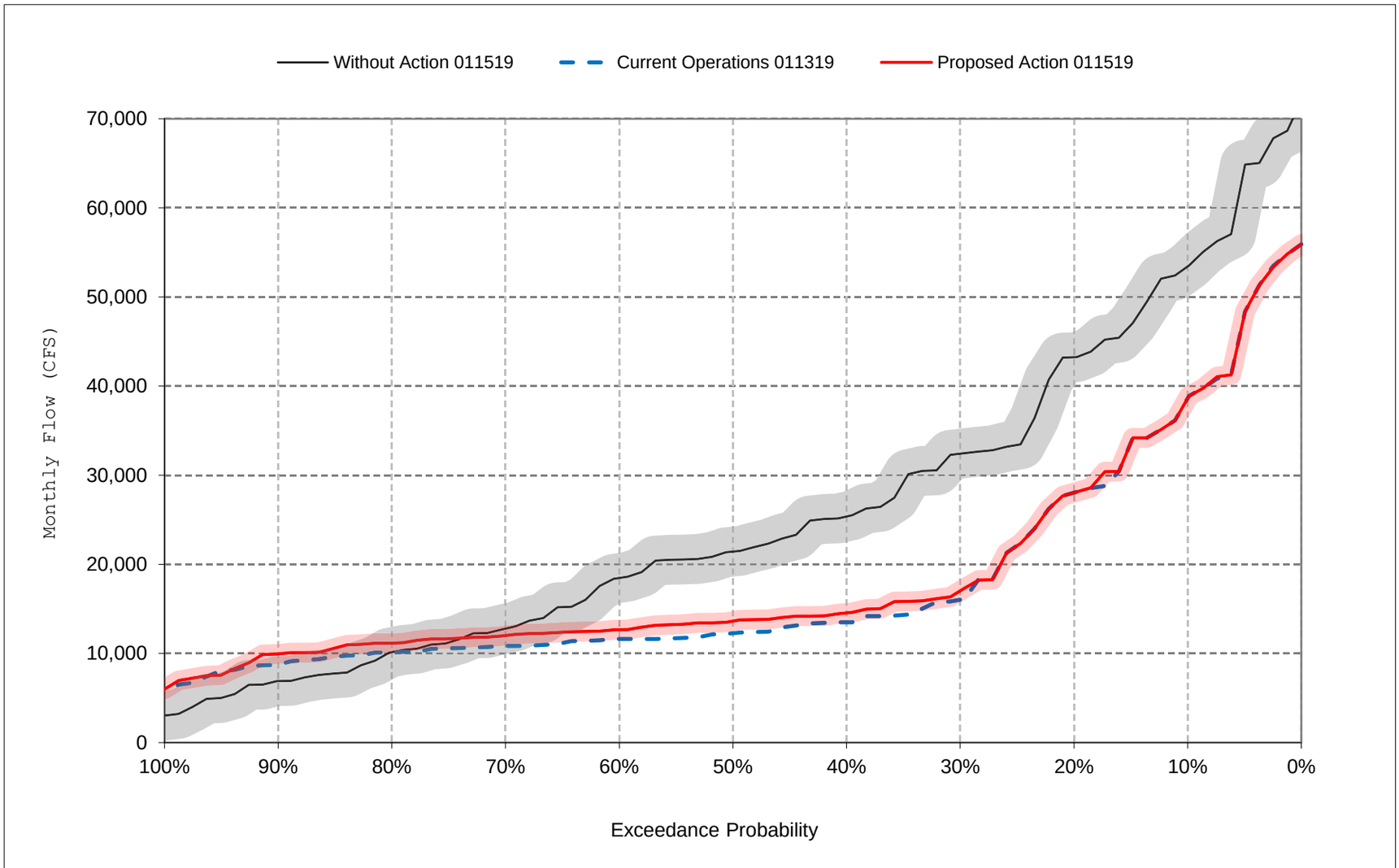
Figure 29-13. Sacramento River Flow at Freeport, April



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

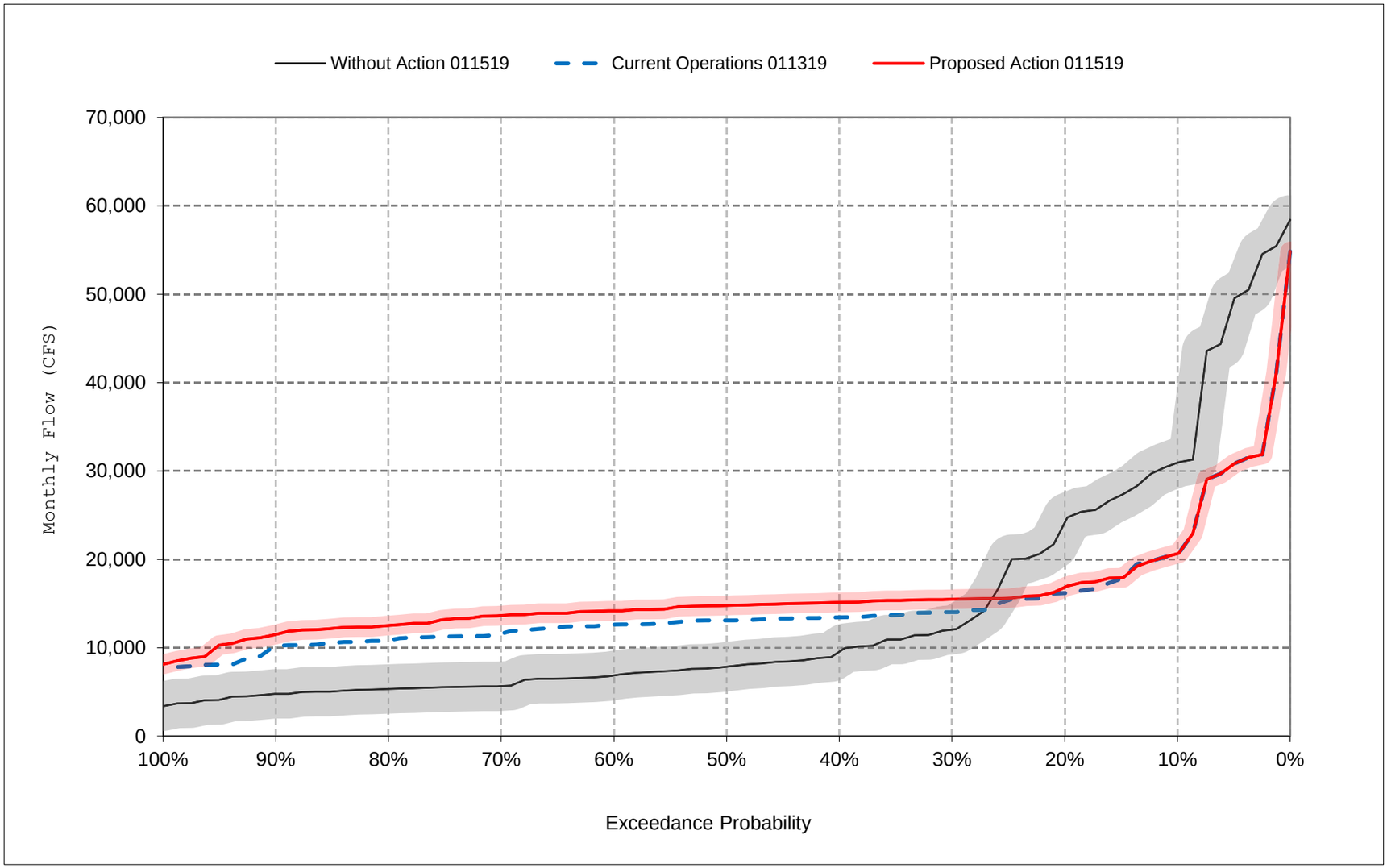
Figure 29-14. Sacramento River Flow at Freeport, May



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

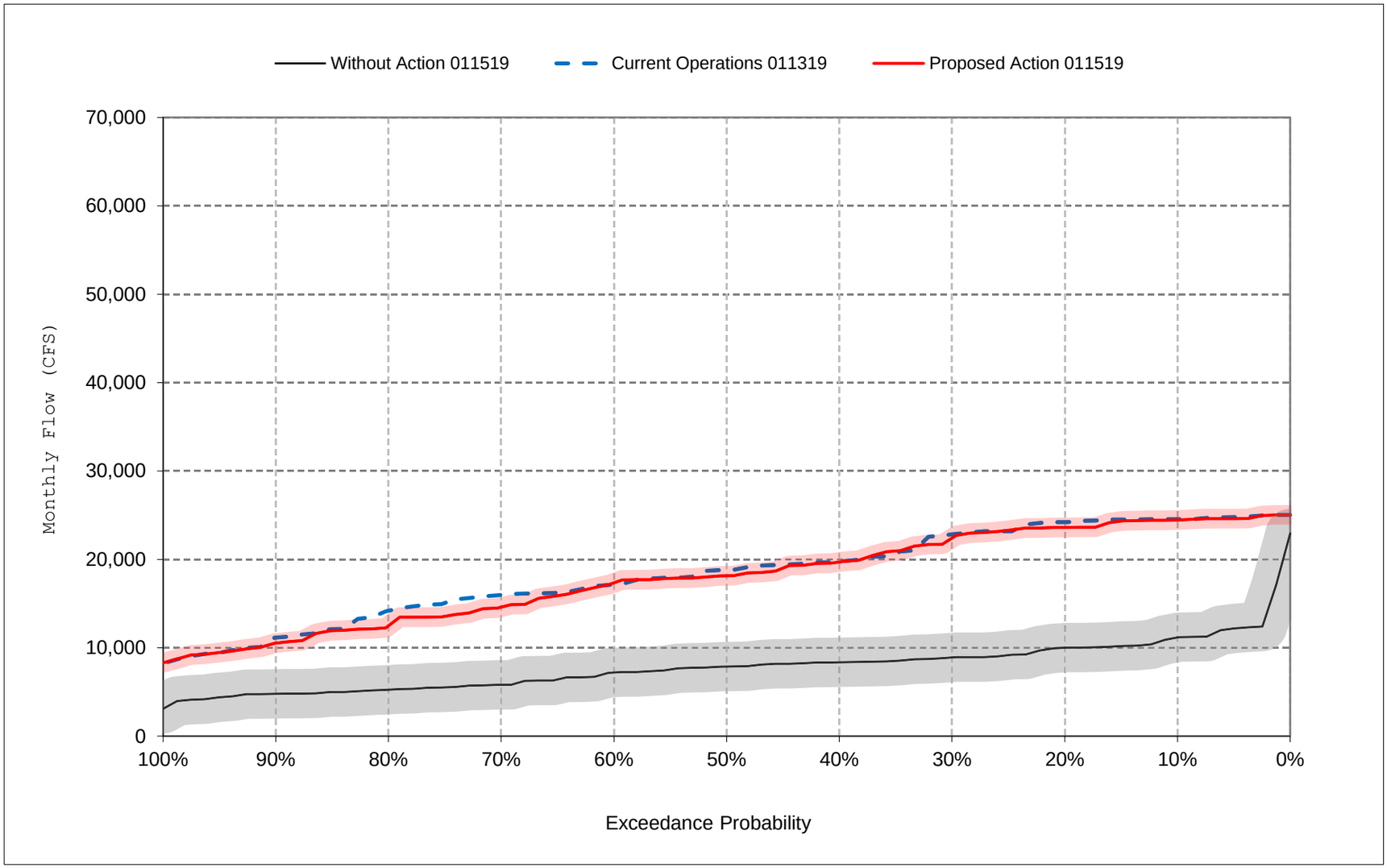
Figure 29-15. Sacramento River Flow at Freeport, June



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

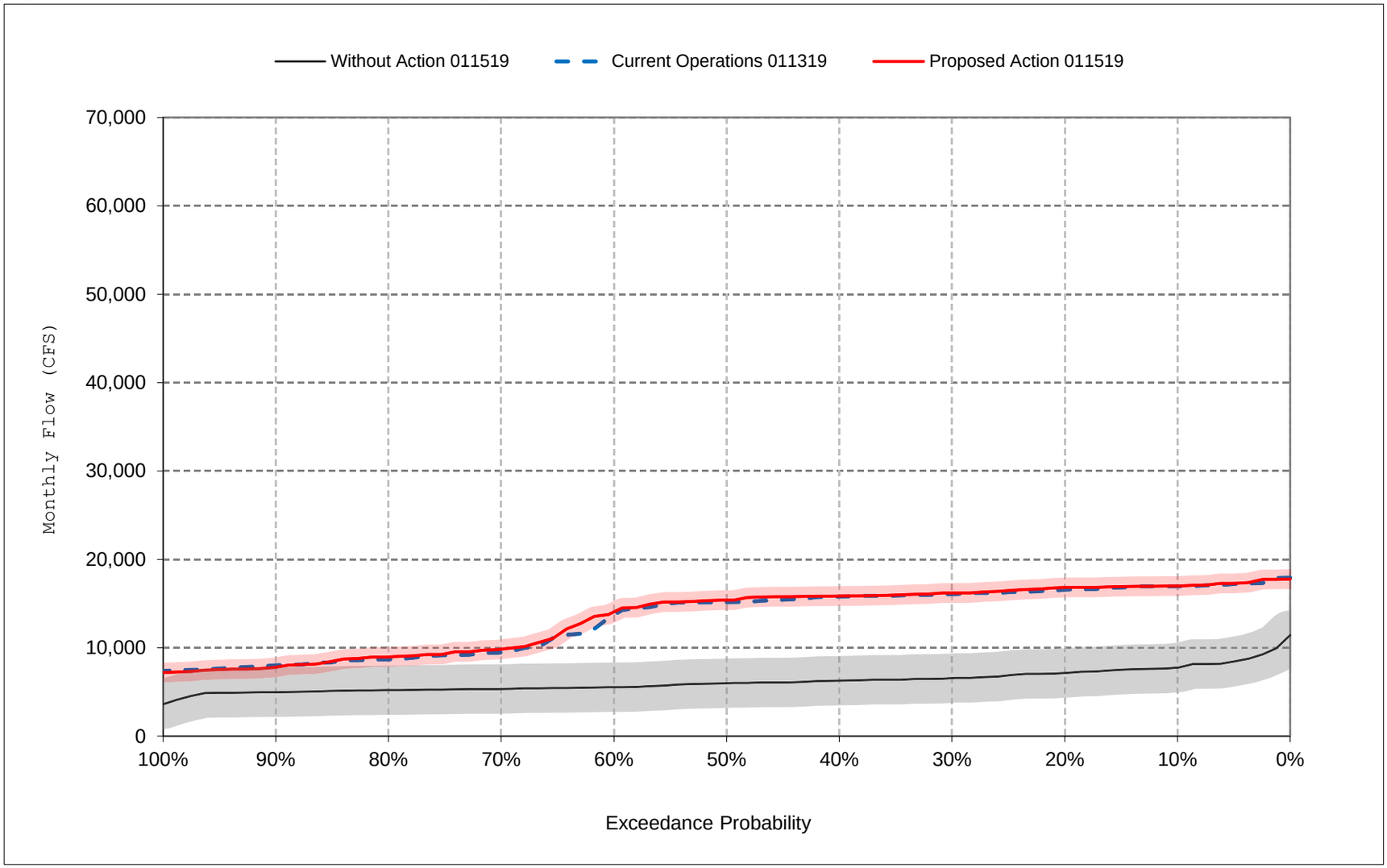
Figure 29-16. Sacramento River Flow at Freeport, July



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

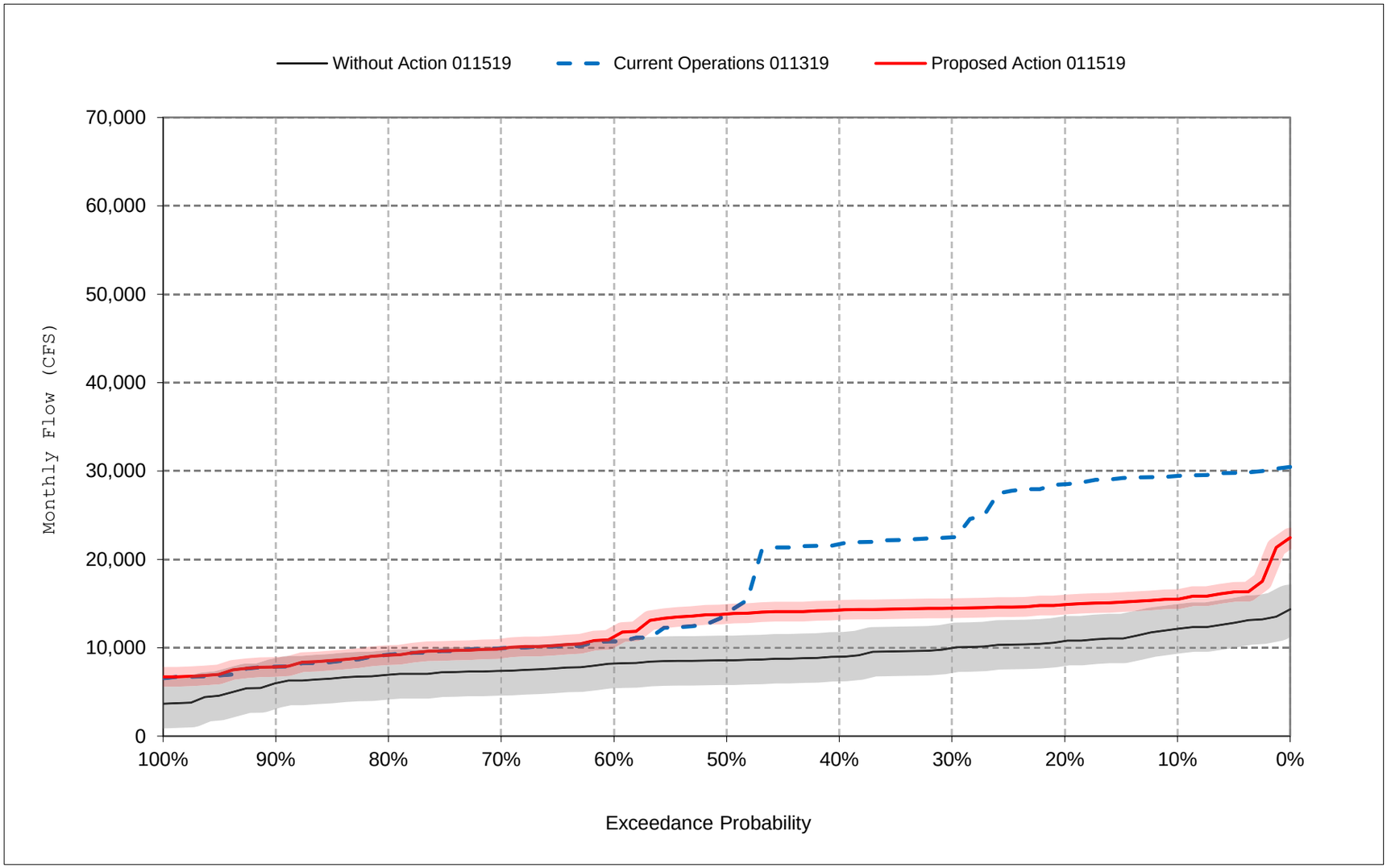
Figure 29-17. Sacramento River Flow at Freeport, August



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Figure 29-18. Sacramento River Flow at Freeport, September



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Table 32-1. Sacramento River Flow at Rio Vista, Monthly Flow

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	9,287	21,651	55,345	97,003	116,876	105,582	67,890	46,429	24,601	7,761	5,294	8,899
20%	7,359	13,975	35,761	69,507	83,369	69,689	49,985	37,312	18,818	6,701	4,519	7,720
30%	6,878	12,390	25,523	54,951	64,775	55,917	39,814	26,537	8,266	5,654	3,915	7,097
40%	5,917	10,786	20,560	35,621	52,447	46,151	31,089	20,438	6,243	5,249	3,575	6,208
50%	4,847	9,266	16,850	24,324	38,199	37,593	28,225	16,808	4,628	4,574	3,381	5,900
60%	3,979	8,416	14,779	21,950	30,164	31,362	23,274	14,325	3,861	4,031	3,065	5,546
70%	3,635	6,566	11,750	16,680	22,510	26,619	20,690	9,499	2,773	2,814	2,858	4,874
80%	3,139	5,621	8,649	13,472	19,144	19,130	17,423	7,217	2,409	2,214	2,721	4,468
90%	2,101	4,146	6,753	10,974	14,332	13,992	11,518	4,127	1,940	1,856	2,511	3,550
Long Term												
Full Simulation Period[a]	5,711	11,429	24,098	42,945	52,632	49,616	35,957	21,508	10,214	4,754	3,635	6,015
Water Year Types[b,c]												
Wet (32%)	7,061	13,199	26,156	78,239	89,664	79,186	56,881	37,596	22,090	5,083	3,912	7,789
Above Normal (16%)	6,238	11,476	24,035	51,485	64,857	65,377	43,653	23,494	6,679	4,860	3,472	6,743
Below Normal (13%)	7,392	10,218	20,914	21,153	35,117	31,881	21,555	14,993	6,204	4,910	2,944	5,925
Dry (24%)	4,643	13,090	29,662	20,149	27,845	31,000	26,037	12,613	3,521	4,186	3,323	5,108
Critical (15%)	2,450	5,883	13,351	15,192	16,521	15,760	12,019	5,297	3,144	4,730	4,365	2,978

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	10,903	18,621	59,795	90,564	115,622	71,578	54,378	32,151	12,575	14,373	9,715	24,126
20%	9,306	15,531	33,264	59,683	75,065	54,949	36,578	22,549	9,094	14,177	9,404	23,512
30%	8,161	14,419	18,523	43,955	55,187	40,265	21,104	12,100	7,689	13,172	9,064	13,705
40%	7,316	12,489	14,842	26,557	44,175	28,903	18,471	9,826	7,217	11,136	8,880	13,181
50%	5,735	11,579	11,994	18,547	31,939	22,096	13,814	8,905	7,070	10,495	8,499	7,859
60%	4,792	8,535	10,708	15,222	22,703	16,751	11,378	8,179	6,674	9,382	7,525	5,753
70%	4,218	6,479	9,550	12,124	16,606	15,413	9,541	7,439	5,981	8,554	4,533	5,220
80%	4,000	5,692	7,002	10,482	13,230	12,084	8,411	6,993	5,455	7,381	4,009	4,655
90%	3,002	4,020	5,869	9,375	11,472	8,470	7,390	5,834	5,003	5,254	3,547	3,742
Long Term												
Full Simulation Period[a]	6,803	12,324	22,567	38,108	48,140	36,365	22,467	14,144	8,825	10,214	7,177	11,805
Water Year Types[b,c]												
Wet (32%)	9,583	17,176	25,983	75,058	85,434	65,804	39,726	24,976	13,818	11,436	9,084	22,317
Above Normal (16%)	7,713	15,026	19,270	42,094	58,153	44,982	23,982	13,276	7,294	13,278	9,560	13,242
Below Normal (13%)	7,280	8,368	20,237	16,001	31,094	15,702	11,888	9,515	6,899	12,387	8,321	6,414
Dry (24%)	4,590	11,315	29,228	15,265	23,021	19,563	13,598	8,341	6,885	8,752	4,700	5,065
Critical (15%)	3,044	4,194	9,768	12,070	13,978	10,189	7,912	5,532	4,668	4,694	3,547	3,651

Current Operations 011319 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,616	-3,029	4,449	-6,439	-1,255	-34,005	-13,511	-14,278	-12,026	6,612	4,421	15,227
20%	1,947	1,557	-2,497	-9,824	-8,304	-14,739	-13,407	-14,763	-9,724	7,476	4,885	15,792
30%	1,283	2,029	-7,000	-10,996	-9,588	-15,652	-18,710	-14,437	-577	7,518	5,149	6,608
40%	1,400	1,703	-5,718	-9,065	-8,272	-17,248	-12,618	-10,612	974	5,888	5,305	6,973
50%	888	2,313	-4,856	-5,777	-6,260	-15,497	-14,411	-7,903	2,442	5,921	5,118	1,959
60%	813	119	-4,071	-6,728	-7,461	-14,611	-11,896	-6,146	2,813	5,351	4,460	208
70%	583	-88	-2,199	-4,556	-5,905	-11,206	-11,149	-2,061	3,209	5,739	1,675	345
80%	861	71	-1,646	-2,990	-5,914	-7,046	-9,012	-225	3,045	5,167	1,289	188
90%	901	-126	-884	-1,599	-2,860	-5,523	-4,128	1,707	3,062	3,398	1,037	193
Long Term												
Full Simulation Period[a]	1,092	895	-1,531	-4,836	-4,492	-13,252	-13,490	-7,364	-1,389	5,460	3,542	5,790
Water Year Types[b,c]												
Wet (32%)	2,521	3,977	-173	-3,180	-4,230	-13,382	-17,155	-12,620	-8,272	6,353	5,172	14,527
Above Normal (16%)	1,476	3,550	-4,765	-9,391	-6,703	-20,396	-19,671	-10,217	615	8,418	6,087	6,499
Below Normal (13%)	-112	-1,849	-677	-5,152	-4,022	-16,179	-9,666	-5,478	694	7,477	5,377	489
Dry (24%)	-53	-1,776	-434	-4,884	-4,824	-11,437	-12,439	-4,272	3,363	4,566	1,377	-43
Critical (15%)	593	-1,689	-3,582	-3,122	-2,543	-5,571	-4,107	235	1,524	-36	-818	673

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 32-2. Sacramento River Flow at Rio Vista, Monthly Flow

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	9,287	21,651	55,345	97,003	116,876	105,582	67,890	46,429	24,601	7,761	5,294	8,899
20%	7,359	13,975	35,761	69,507	83,369	69,689	49,985	37,312	18,818	6,701	4,519	7,720
30%	6,878	12,390	25,523	54,951	64,775	55,917	39,814	26,537	8,266	5,654	3,915	7,097
40%	5,917	10,786	20,560	35,621	52,447	46,151	31,089	20,438	6,243	5,249	3,575	6,208
50%	4,847	9,266	16,850	24,324	38,199	37,593	28,225	16,808	4,628	4,574	3,381	5,900
60%	3,979	8,416	14,779	21,950	30,164	31,362	23,274	14,325	3,861	4,031	3,065	5,546
70%	3,635	6,566	11,750	16,680	22,510	26,619	20,690	9,499	2,773	2,814	2,858	4,874
80%	3,139	5,621	8,649	13,472	19,144	19,130	17,423	7,217	2,409	2,214	2,721	4,468
90%	2,101	4,146	6,753	10,974	14,332	13,992	11,518	4,127	1,940	1,856	2,511	3,550
Long Term												
Full Simulation Period[a]	5,711	11,429	24,098	42,945	52,632	49,616	35,957	21,508	10,214	4,754	3,635	6,015
Water Year Types[b,c]												
Wet (32%)	7,061	13,199	26,156	78,239	89,664	79,186	56,881	37,596	22,090	5,083	3,912	7,789
Above Normal (16%)	6,238	11,476	24,035	51,485	64,857	65,377	43,653	23,494	6,679	4,860	3,472	6,743
Below Normal (13%)	7,392	10,218	20,914	21,153	35,117	31,881	21,555	14,993	6,204	4,910	2,944	5,925
Dry (24%)	4,643	13,090	29,662	20,149	27,845	31,000	26,037	12,613	3,521	4,186	3,323	5,108
Critical (15%)	2,450	5,883	13,351	15,192	16,521	15,760	12,019	5,297	3,144	4,730	4,365	2,978

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	9,384	20,662	62,958	91,677	115,656	77,071	54,377	32,151	12,572	14,334	9,804	8,888
20%	8,619	11,055	38,523	60,974	75,487	54,947	36,575	22,548	9,584	13,694	9,567	8,470
30%	7,739	9,566	20,330	44,843	58,999	40,588	21,437	12,834	8,648	12,851	9,257	8,251
40%	6,684	8,216	15,394	27,131	49,242	29,199	18,422	10,894	8,385	11,033	8,989	8,083
50%	5,773	7,254	11,933	20,320	32,162	22,882	13,788	9,791	8,275	10,047	8,647	7,749
60%	4,820	6,725	10,886	15,734	23,301	18,362	10,714	9,134	7,740	9,463	7,584	6,077
70%	4,374	6,150	9,445	12,270	17,373	15,474	9,528	8,748	7,365	7,604	4,935	5,129
80%	4,097	5,125	7,042	10,453	14,113	12,292	8,636	7,938	6,551	6,151	4,272	4,638
90%	3,000	4,173	6,002	9,384	11,555	8,900	7,830	6,806	5,932	4,751	3,388	3,767
Long Term												
Full Simulation Period[a]	6,557	10,461	24,033	39,117	49,161	37,124	22,527	14,786	9,707	9,943	7,286	6,871
Water Year Types[b,c]												
Wet (32%)	8,830	13,269	29,718	77,045	86,207	66,254	39,782	25,280	14,166	11,200	9,052	8,843
Above Normal (16%)	7,686	11,579	20,554	43,391	60,217	46,632	24,004	13,898	7,967	13,280	9,523	8,422
Below Normal (13%)	7,107	8,033	20,157	17,278	34,240	16,744	12,240	10,726	8,412	12,545	9,091	6,878
Dry (24%)	4,674	11,178	29,684	15,323	23,035	20,050	13,515	9,307	8,260	8,048	4,846	5,186
Critical (15%)	3,040	4,199	9,617	11,982	14,137	10,848	7,991	5,867	5,529	4,381	3,448	3,717

Proposed Action 011519 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	97	**-988**	7,613	**-5,326**	**-1,220**	**-28,511**	**-13,513**	**-14,278**	**-12,029**	6,573	4,510	**-11**
20%	1,259	**-2,919**	2,762	**-8,533**	**-7,882**	**-14,742**	**-13,410**	**-14,764**	**-9,234**	6,993	5,048	750
30%	861	**-2,823**	**-5,193**	**-10,107**	**-5,775**	**-15,329**	**-18,377**	**-13,703**	381	7,197	5,343	1,155
40%	767	**-2,570**	**-5,166**	**-8,490**	**-3,205**	**-16,953**	**-12,667**	**-9,544**	2,142	5,785	5,414	1,875
50%	926	**-2,012**	**-4,917**	**-4,004**	**-6,037**	**-14,711**	**-14,437**	**-7,017**	3,647	5,473	5,267	1,849
60%	840	**-1,691**	**-3,893**	**-6,216**	**-6,863**	**-13,000**	**-12,559**	**-5,192**	3,879	5,433	4,519	531
70%	739	**-417**	**-2,305**	**-4,409**	**-5,137**	**-11,145**	**-11,162**	**-752**	4,592	4,790	2,077	254
80%	958	**-495**	**-1,607**	**-3,019**	**-5,031**	**-6,838**	**-8,786**	720	4,142	3,937	1,552	171
90%	899	27	**-751**	**-1,590**	**-2,777**	**-5,092**	**-3,687**	2,679	3,991	2,895	877	218
Long Term												
Full Simulation Period[a]	846	**-968**	**-65**	**-3,828**	**-3,471**	**-12,492**	**-13,430**	**-6,722**	**-507**	5,189	3,651	855
Water Year Types[b,c]												
Wet (32%)	1,769	69	3,562	**-1,193**	**-3,456**	**-12,932**	**-17,099**	**-12,317**	**-7,924**	6,117	5,140	1,053
Above Normal (16%)	1,449	103	**-3,481**	**-8,094**	**-4,639**	**-18,745**	**-19,649**	**-9,596**	1,288	8,420	6,051	1,679
Below Normal (13%)	**-285**	**-2,184**	**-757**	**-3,875**	**-876**	**-15,137**	**-9,314**	**-4,267**	2,208	7,635	6,148	953
Dry (24%)	31	**-1,912**	22	**-4,826**	**-4,810**	**-10,950**	**-12,522**	**-3,306**	4,739	3,861	1,523	78
Critical (15%)	590	**-1,684**	**-3,733**	**-3,210**	**-2,384**	**-4,912**	**-4,029**	570	2,385	**-349**	**-916**	739

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 32-3. Sacramento River Flow at Rio Vista, Monthly Flow

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	10,903	18,621	59,795	90,564	115,622	71,578	54,378	32,151	12,575	14,373	9,715	24,126
20%	9,306	15,531	33,264	59,683	75,065	54,949	36,578	22,549	9,094	14,177	9,404	23,512
30%	8,161	14,419	18,523	43,955	55,187	40,265	21,104	12,100	7,689	13,172	9,064	13,705
40%	7,316	12,489	14,842	26,557	44,175	28,903	18,471	9,826	7,217	11,136	8,880	13,181
50%	5,735	11,579	11,994	18,547	31,939	22,096	13,814	8,905	7,070	10,495	8,499	7,859
60%	4,792	8,535	10,708	15,222	22,703	16,751	11,378	8,179	6,674	9,382	7,525	5,753
70%	4,218	6,479	9,550	12,124	16,606	15,413	9,541	7,439	5,981	8,554	4,533	5,220
80%	4,000	5,692	7,002	10,482	13,230	12,084	8,411	6,993	5,455	7,381	4,009	4,655
90%	3,002	4,020	5,869	9,375	11,472	8,470	7,390	5,834	5,003	5,254	3,547	3,742
Long Term												
Full Simulation Period[a]	6,803	12,324	22,567	38,108	48,140	36,365	22,467	14,144	8,825	10,214	7,177	11,805
Water Year Types[b,c]												
Wet (32%)	9,583	17,176	25,983	75,058	85,434	65,804	39,726	24,976	13,818	11,436	9,084	22,317
Above Normal (16%)	7,713	15,026	19,270	42,094	58,153	44,982	23,982	13,276	7,294	13,278	9,560	13,242
Below Normal (13%)	7,280	8,368	20,237	16,001	31,094	15,702	11,888	9,515	6,899	12,387	8,321	6,414
Dry (24%)	4,590	11,315	29,228	15,265	23,021	19,563	13,598	8,341	6,885	8,752	4,700	5,065
Critical (15%)	3,044	4,194	9,768	12,070	13,978	10,189	7,912	5,532	4,668	4,694	3,547	3,651

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	9,384	20,662	62,958	91,677	115,656	77,071	54,377	32,151	12,572	14,334	9,804	8,888
20%	8,619	11,055	38,523	60,974	75,487	54,947	36,575	22,548	9,584	13,694	9,567	8,470
30%	7,739	9,566	20,330	44,843	58,999	40,588	21,437	12,834	8,648	12,851	9,257	8,251
40%	6,684	8,216	15,394	27,131	49,242	29,199	18,422	10,894	8,385	11,033	8,989	8,083
50%	5,773	7,254	11,933	20,320	32,162	22,882	13,788	9,791	8,275	10,047	8,647	7,749
60%	4,820	6,725	10,886	15,734	23,301	18,362	10,714	9,134	7,740	9,463	7,584	6,077
70%	4,374	6,150	9,445	12,270	17,373	15,474	9,528	8,748	7,365	7,604	4,935	5,129
80%	4,097	5,125	7,042	10,453	14,113	12,292	8,636	7,938	6,551	6,151	4,272	4,638
90%	3,000	4,173	6,002	9,384	11,555	8,900	7,830	6,806	5,932	4,751	3,388	3,767
Long Term												
Full Simulation Period[a]	6,557	10,461	24,033	39,117	49,161	37,124	22,527	14,786	9,707	9,943	7,286	6,871
Water Year Types[b,c]												
Wet (32%)	8,830	13,269	29,718	77,045	86,207	66,254	39,782	25,280	14,166	11,200	9,052	8,843
Above Normal (16%)	7,686	11,579	20,554	43,391	60,217	46,632	24,004	13,898	7,967	13,280	9,523	8,422
Below Normal (13%)	7,107	8,033	20,157	17,278	34,240	16,744	12,240	10,726	8,412	12,545	9,091	6,878
Dry (24%)	4,674	11,178	29,684	15,323	23,035	20,050	13,515	9,307	8,260	8,048	4,846	5,186
Critical (15%)	3,040	4,199	9,617	11,982	14,137	10,848	7,991	5,867	5,529	4,381	3,448	3,717

Proposed Action 011519 minus Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	**-1,518**	2,041	3,163	1,113	34	5,494	**-1**	0	**-3**	**-39**	88	**-15,238**
20%	**-688**	**-4,476**	5,259	1,291	422	**-2**	**-3**	**-1**	490	**-483**	164	**-15,042**
30%	**-422**	**-4,852**	1,807	888	3,813	323	333	734	959	**-321**	193	**-5,453**
40%	**-632**	**-4,273**	552	574	5,068	296	**-49**	1,068	1,168	**-103**	109	**-5,098**
50%	39	**-4,325**	**-61**	1,773	223	786	**-26**	886	1,205	**-448**	149	**-110**
60%	27	**-1,810**	178	512	598	1,611	**-663**	954	1,066	81	59	324
70%	156	**-329**	**-106**	146	767	61	**-13**	1,309	1,383	**-949**	402	**-91**
80%	97	**-566**	40	**-29**	883	208	225	945	1,097	**-1,230**	263	**-17**
90%	**-2**	153	133	9	83	431	441	973	929	**-503**	**-159**	25
Long Term												
Full Simulation Period[a]	**-246**	**-1,863**	1,466	1,008	1,021	759	60	642	882	**-271**	109	**-4,935**
Water Year Types[b,c]												
Wet (32%)	**-752**	**-3,908**	3,735	1,987	773	450	57	304	348	**-236**	**-32**	**-13,474**
Above Normal (16%)	**-27**	**-3,447**	1,285	1,297	2,064	1,650	22	621	673	1	**-37**	**-4,820**
Below Normal (13%)	**-172**	**-335**	**-80**	1,277	3,146	1,042	352	1,211	1,514	158	771	464
Dry (24%)	83	**-137**	456	58	14	487	**-83**	967	1,376	**-704**	146	121
Critical (15%)	**-3**	5	**-151**	**-89**	159	659	78	336	861	**-313**	**-99**	66

a Based on the 82-year simulation period.

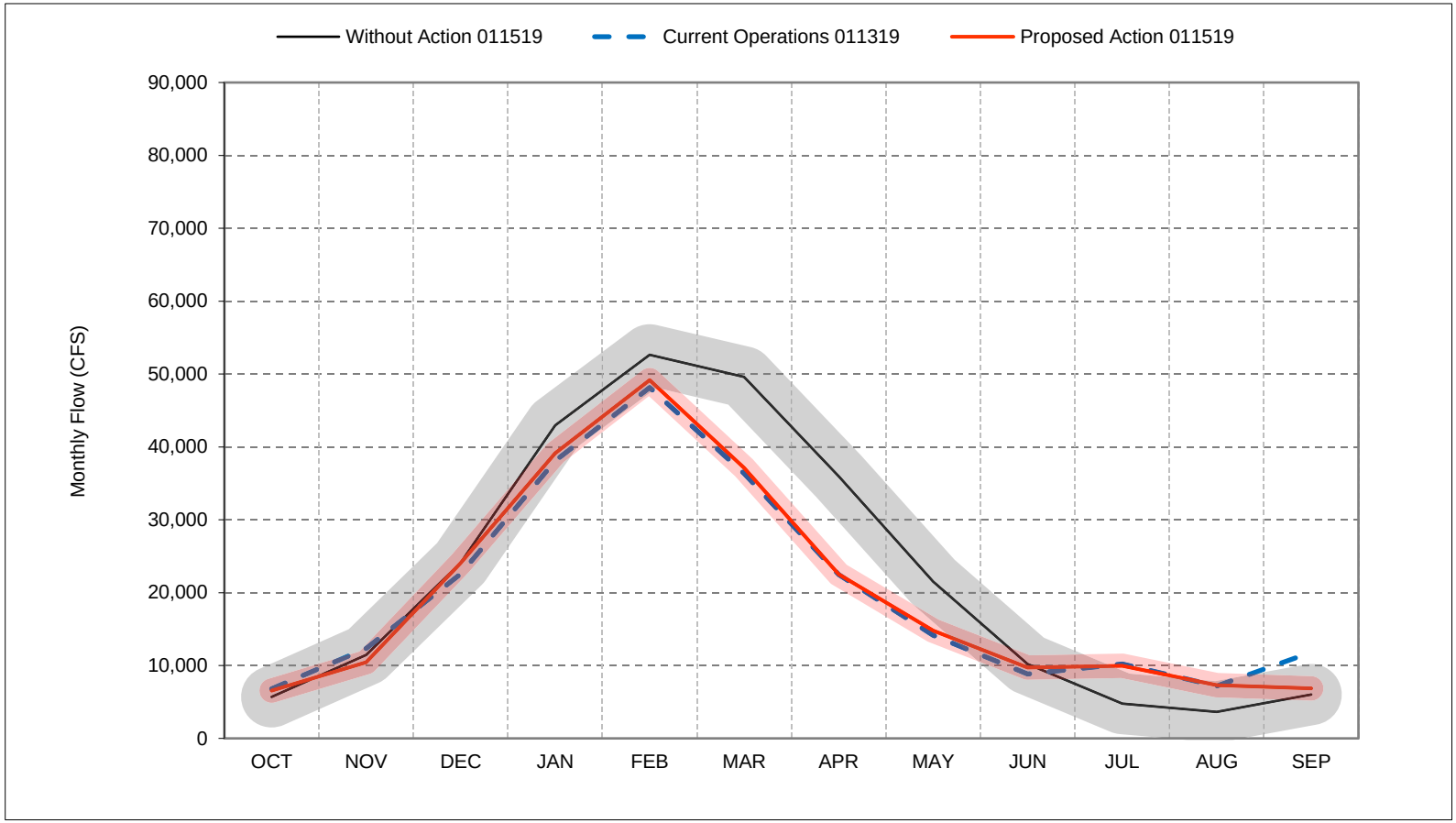
b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

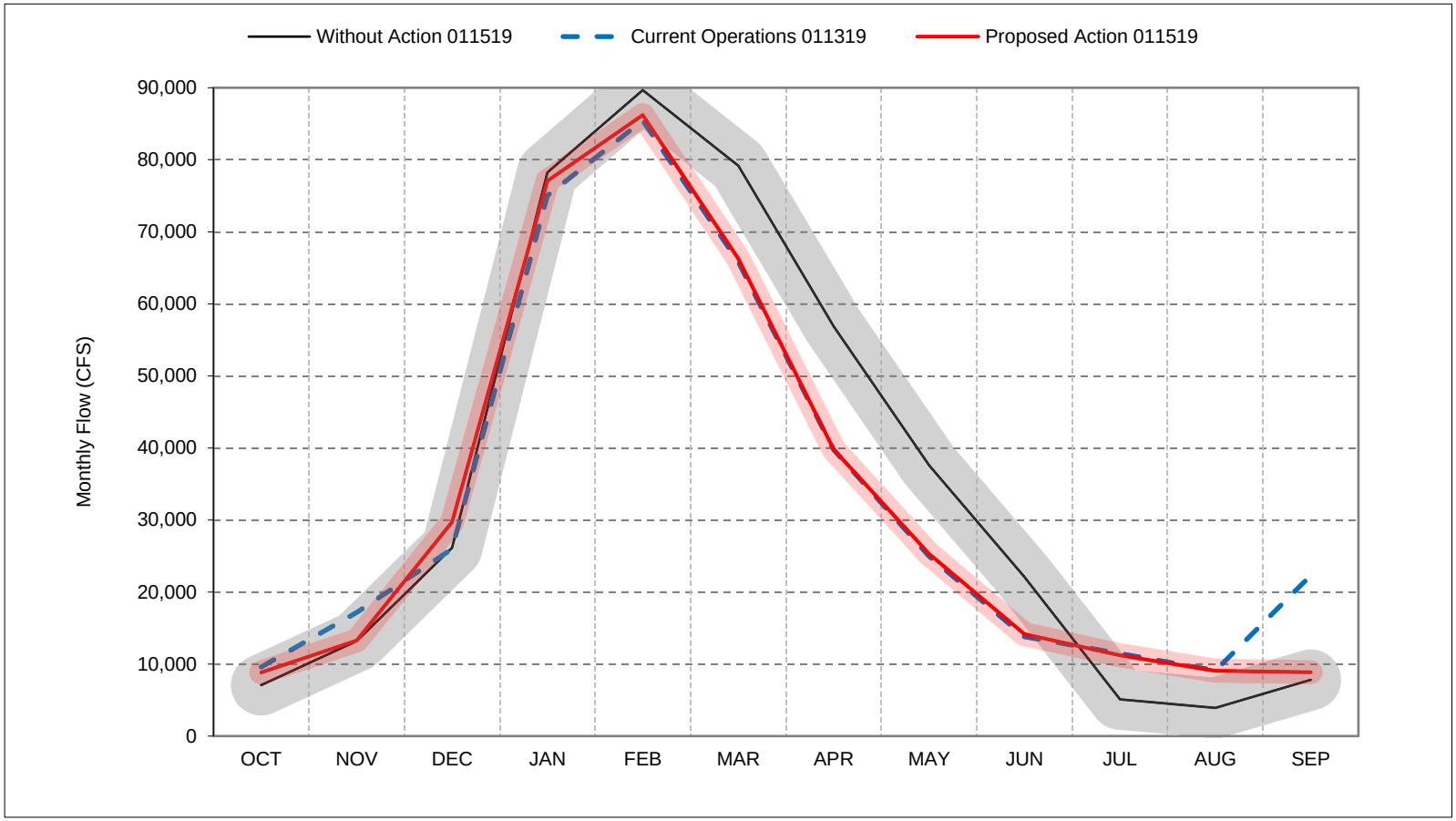
e These are draft results meant for qualitative analysis and are subject to revision.

Figure 32-1. Sacramento River Flow at Rio Vista, Long-Term Average Flow



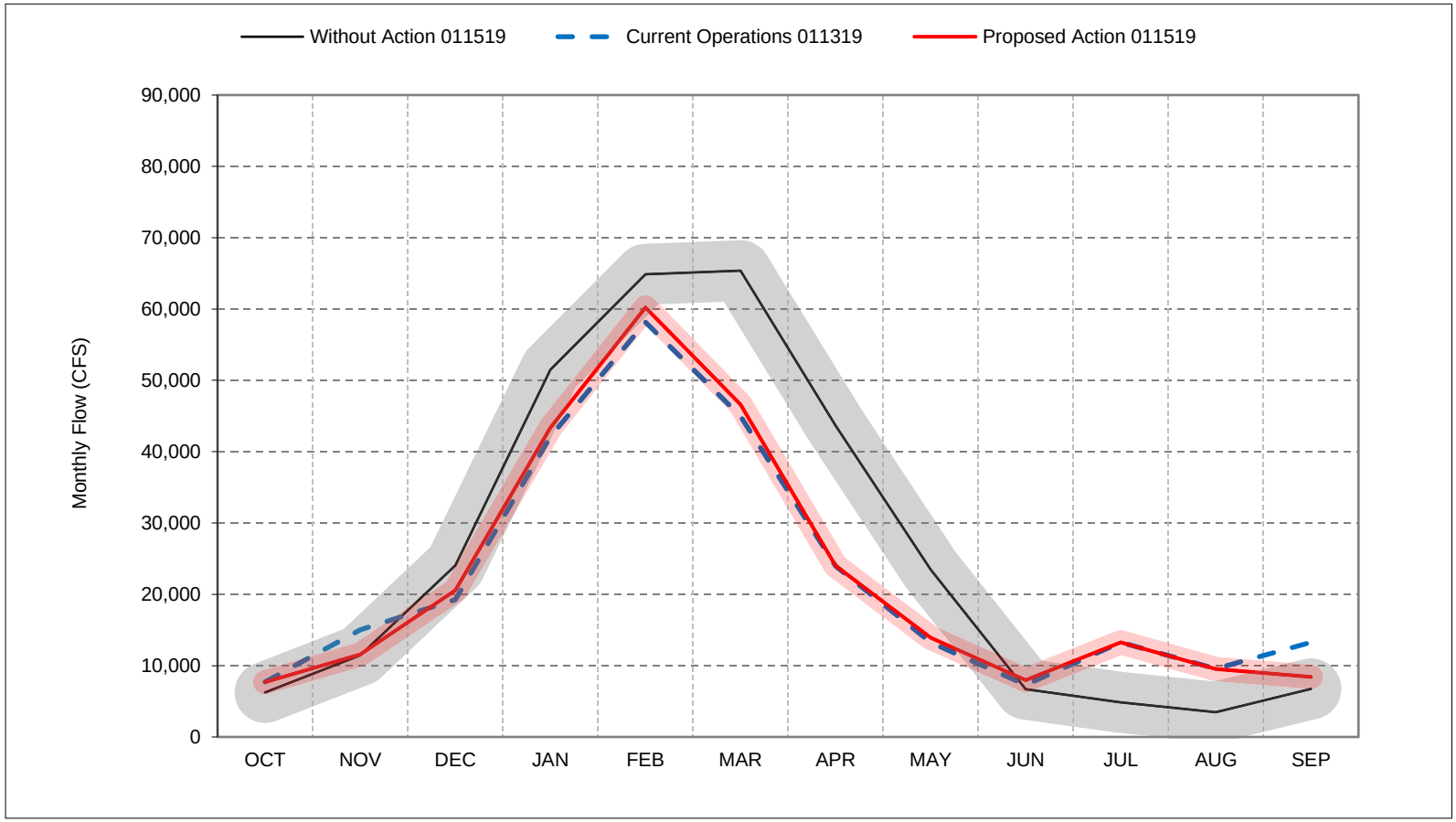
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 32-2. Sacramento River Flow at Rio Vista, Wet Year Average Flow



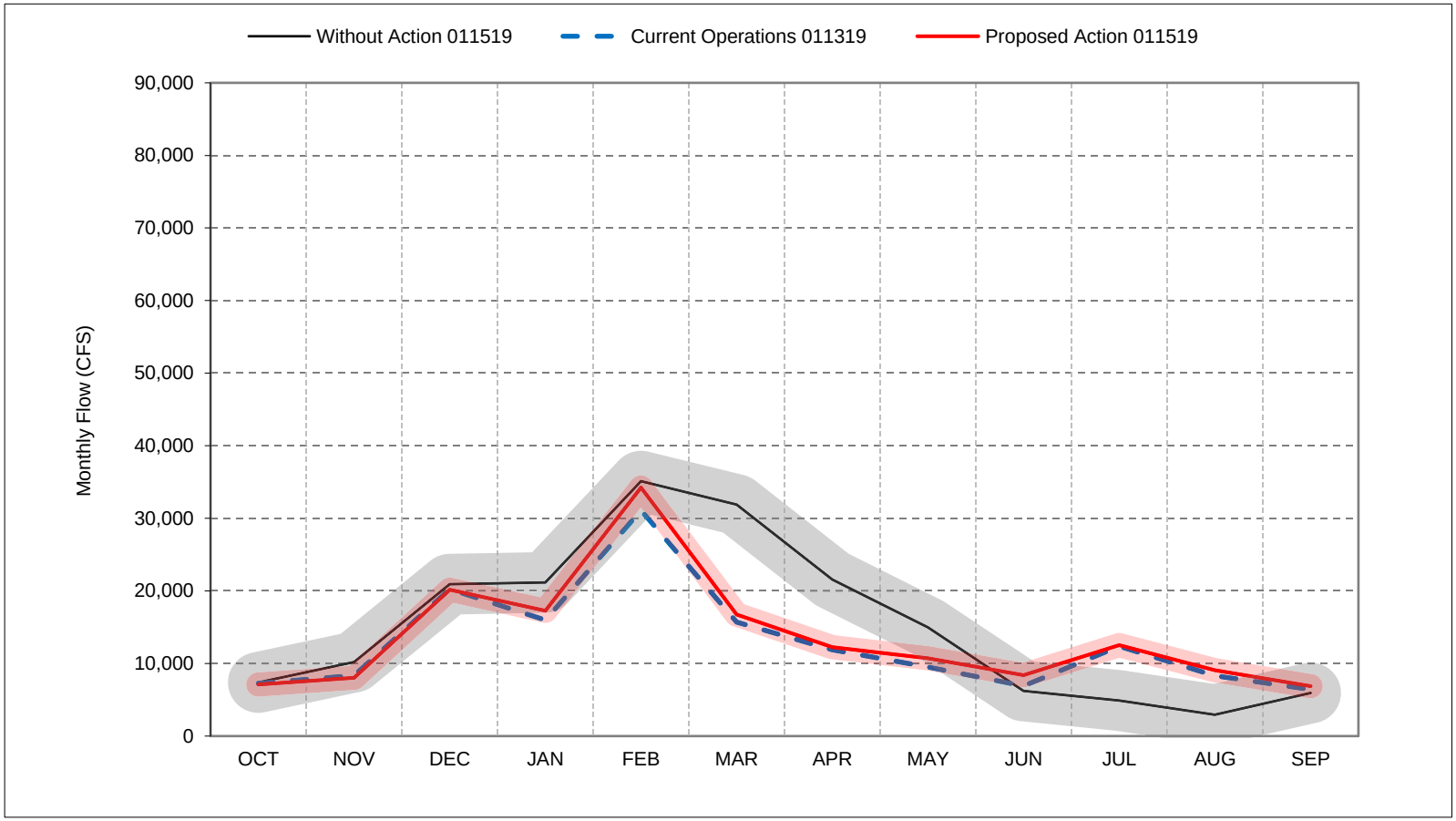
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 32-3. Sacramento River Flow at Rio Vista, Above Normal Year Average Flow



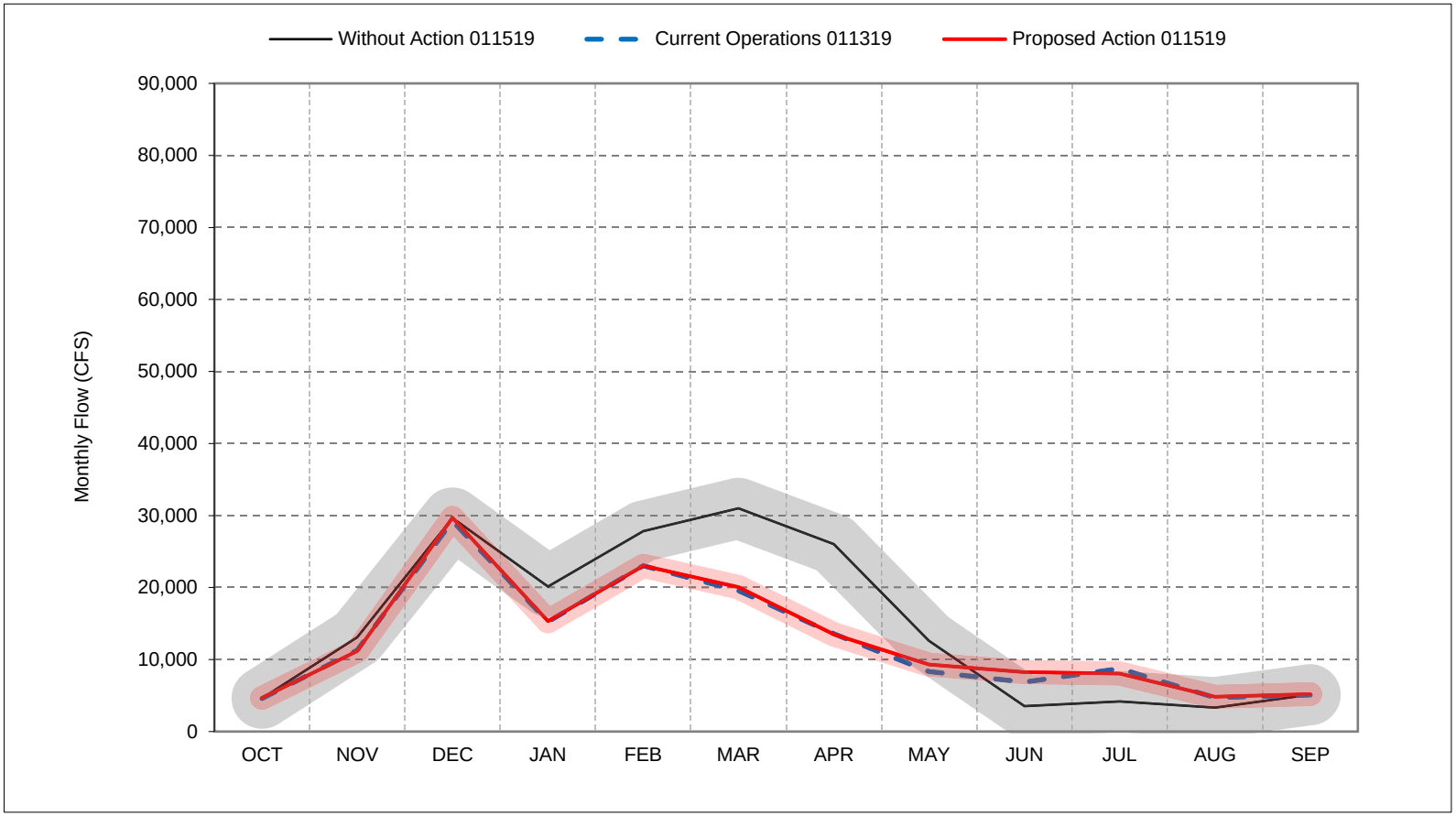
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 32-4. Sacramento River Flow at Rio Vista, Below Normal Year Average Flow



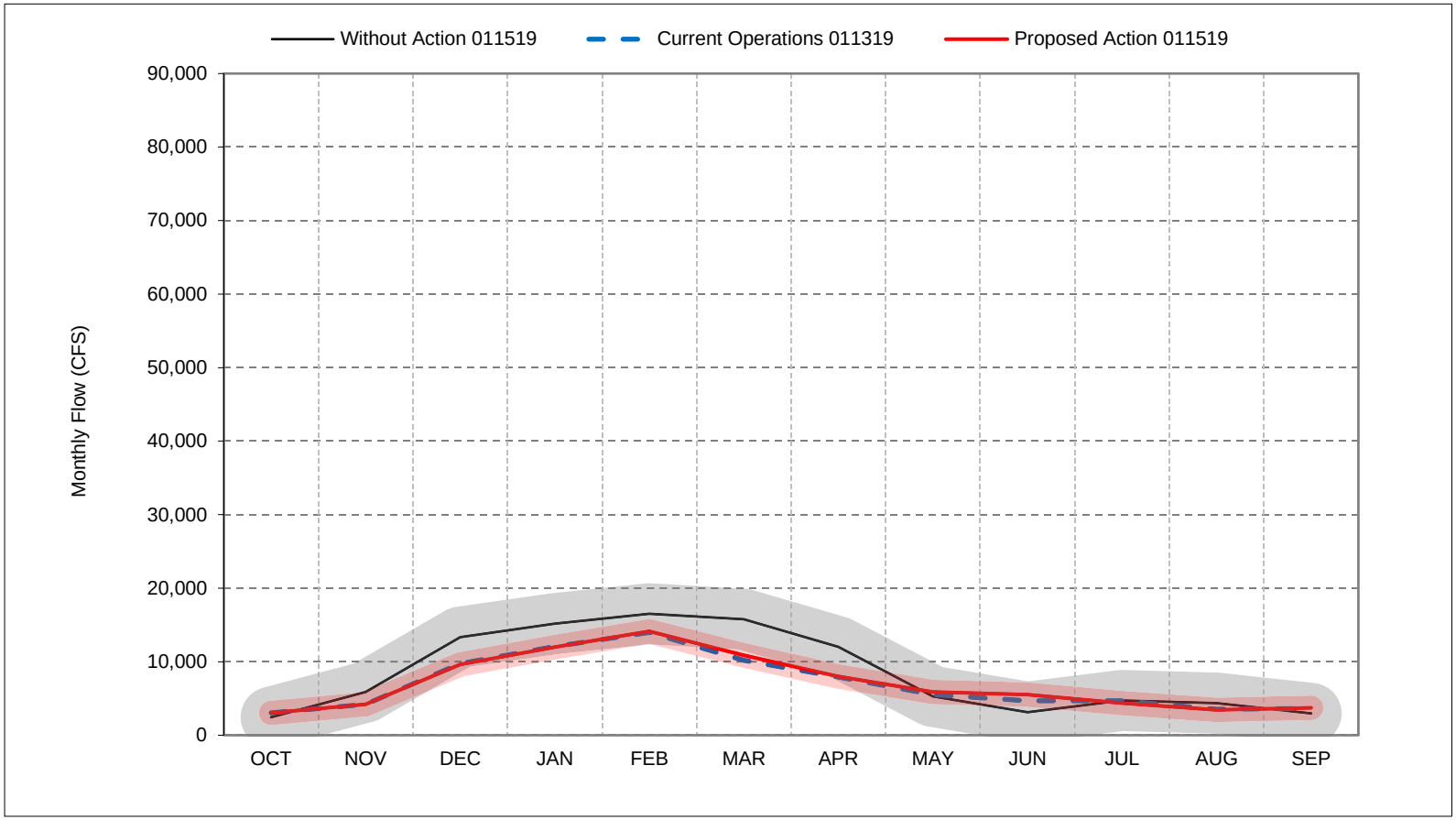
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 32-5. Sacramento River Flow at Rio Vista, Dry Year Average Flow



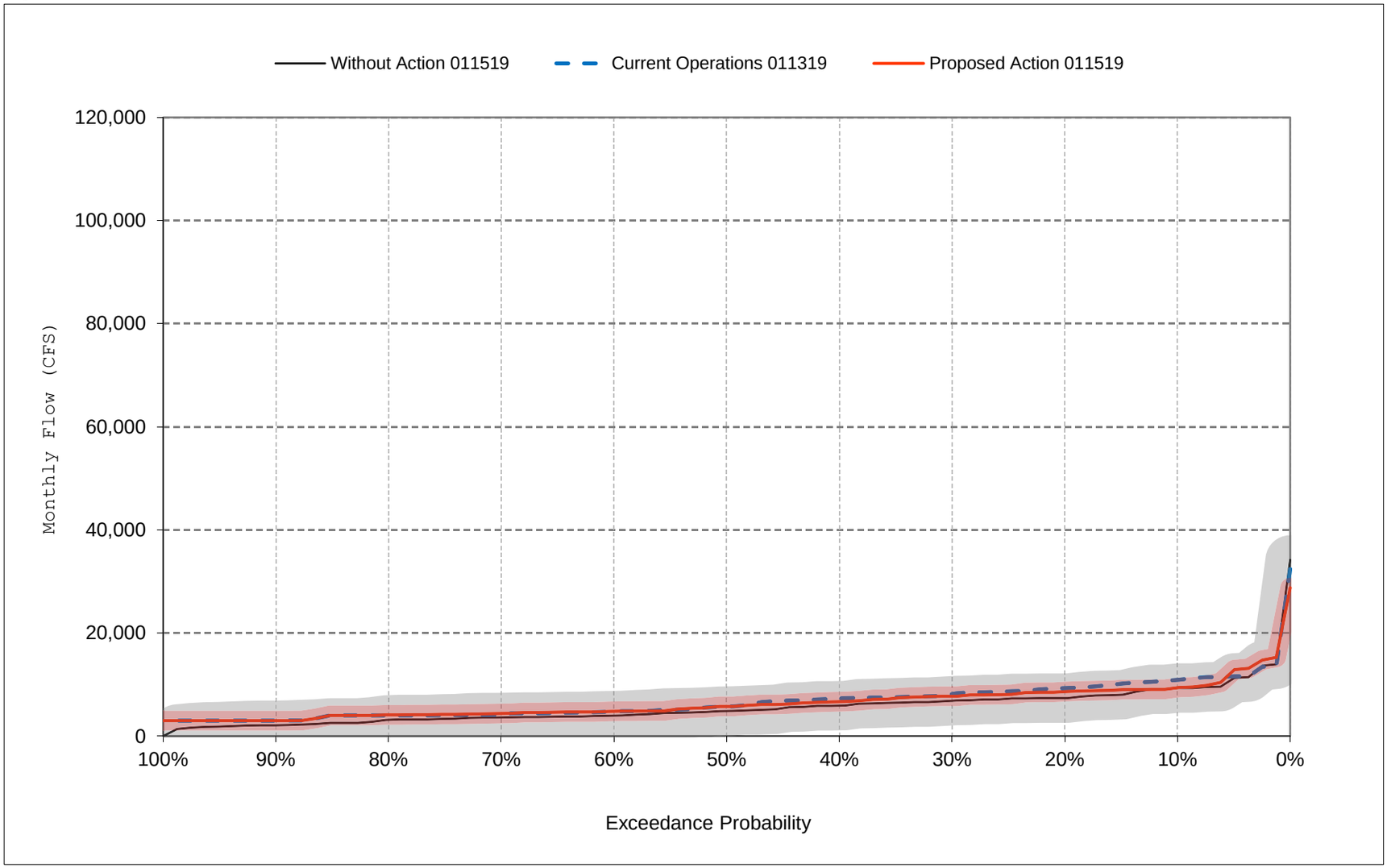
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 32-6. Sacramento River Flow at Rio Vista, Critical Year Average Flow



*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

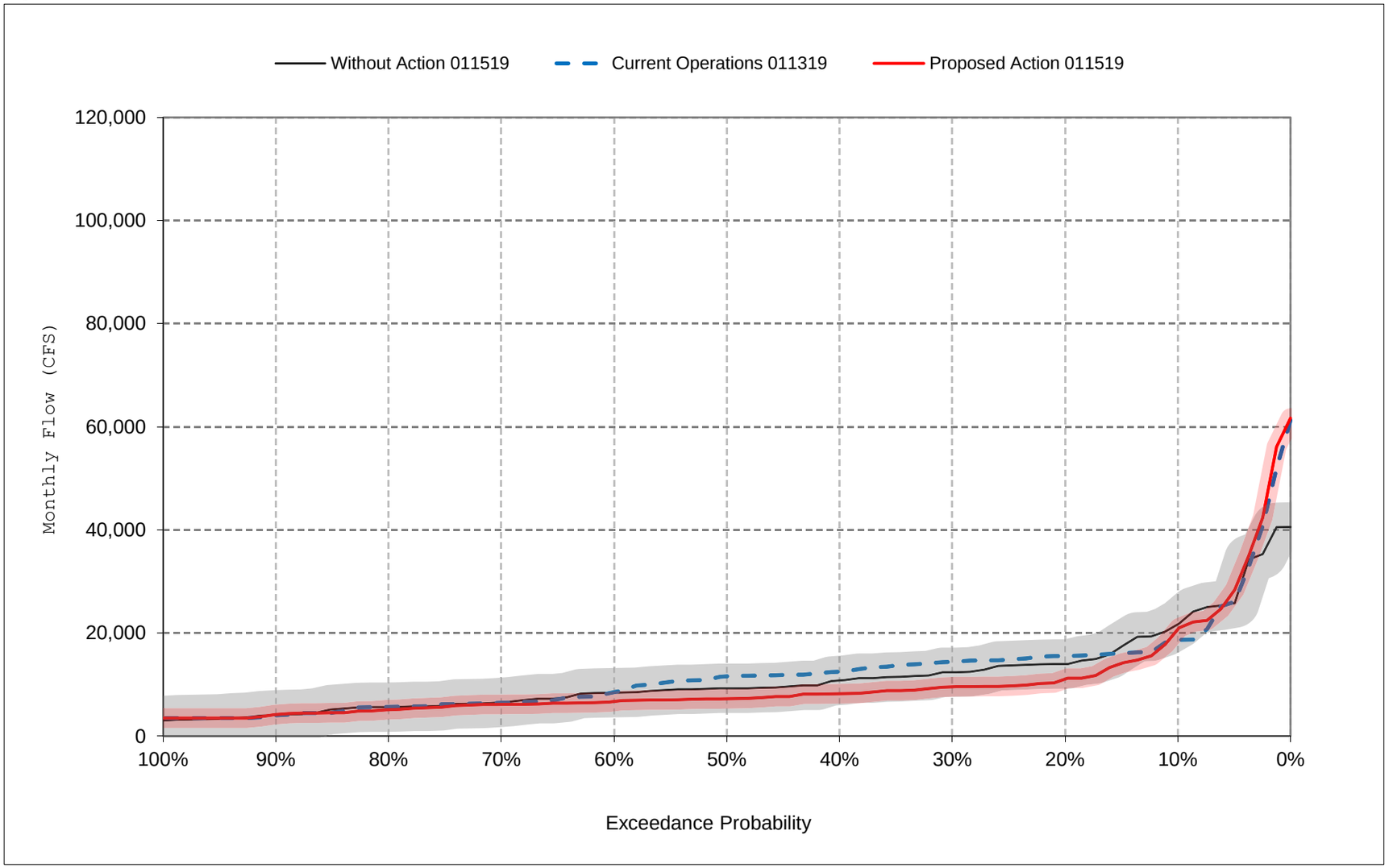
Figure 32-7. Sacramento River Flow at Rio Vista, October



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

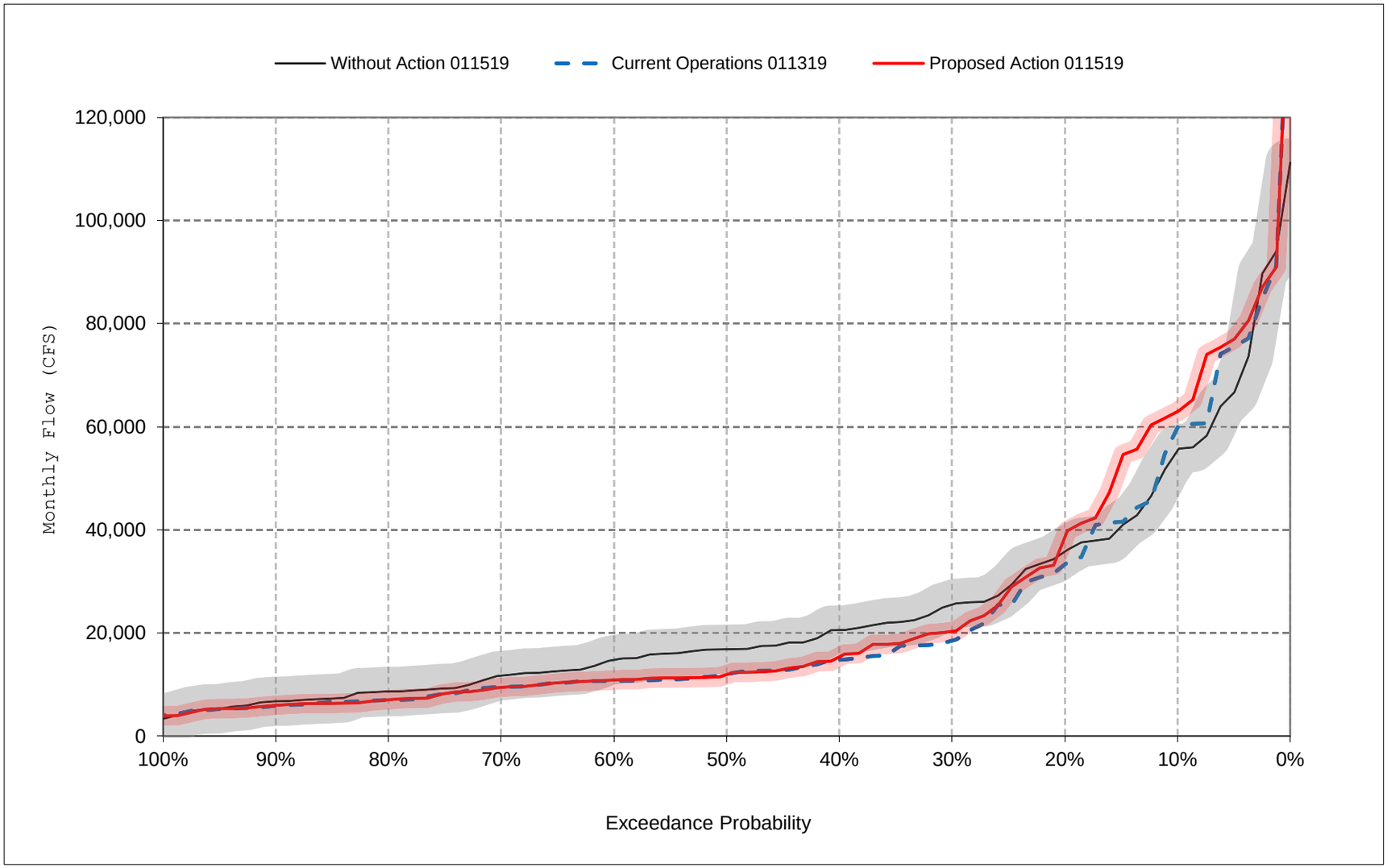
Figure 32-8. Sacramento River Flow at Rio Vista, November



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

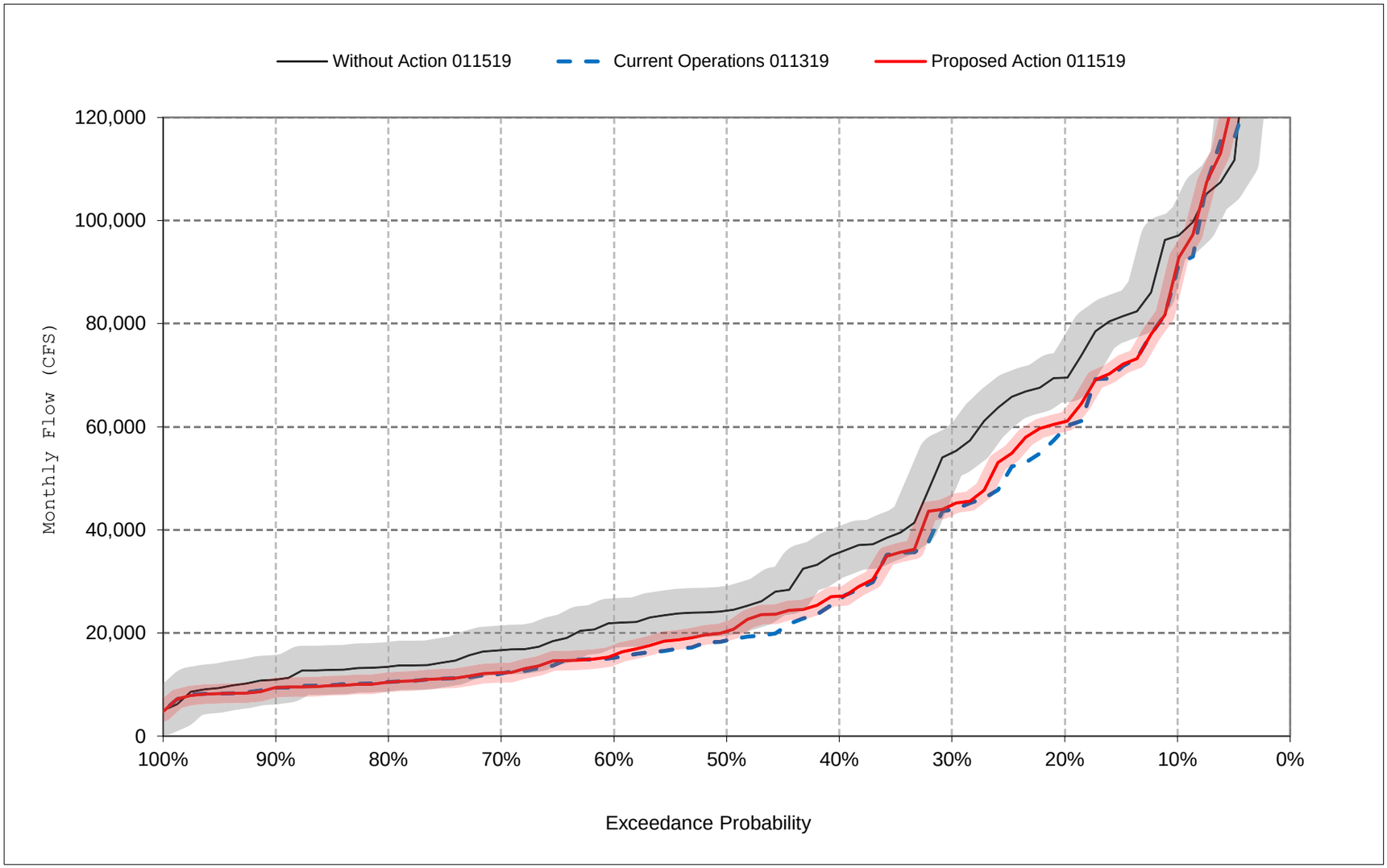
Figure 32-9. Sacramento River Flow at Rio Vista, December



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

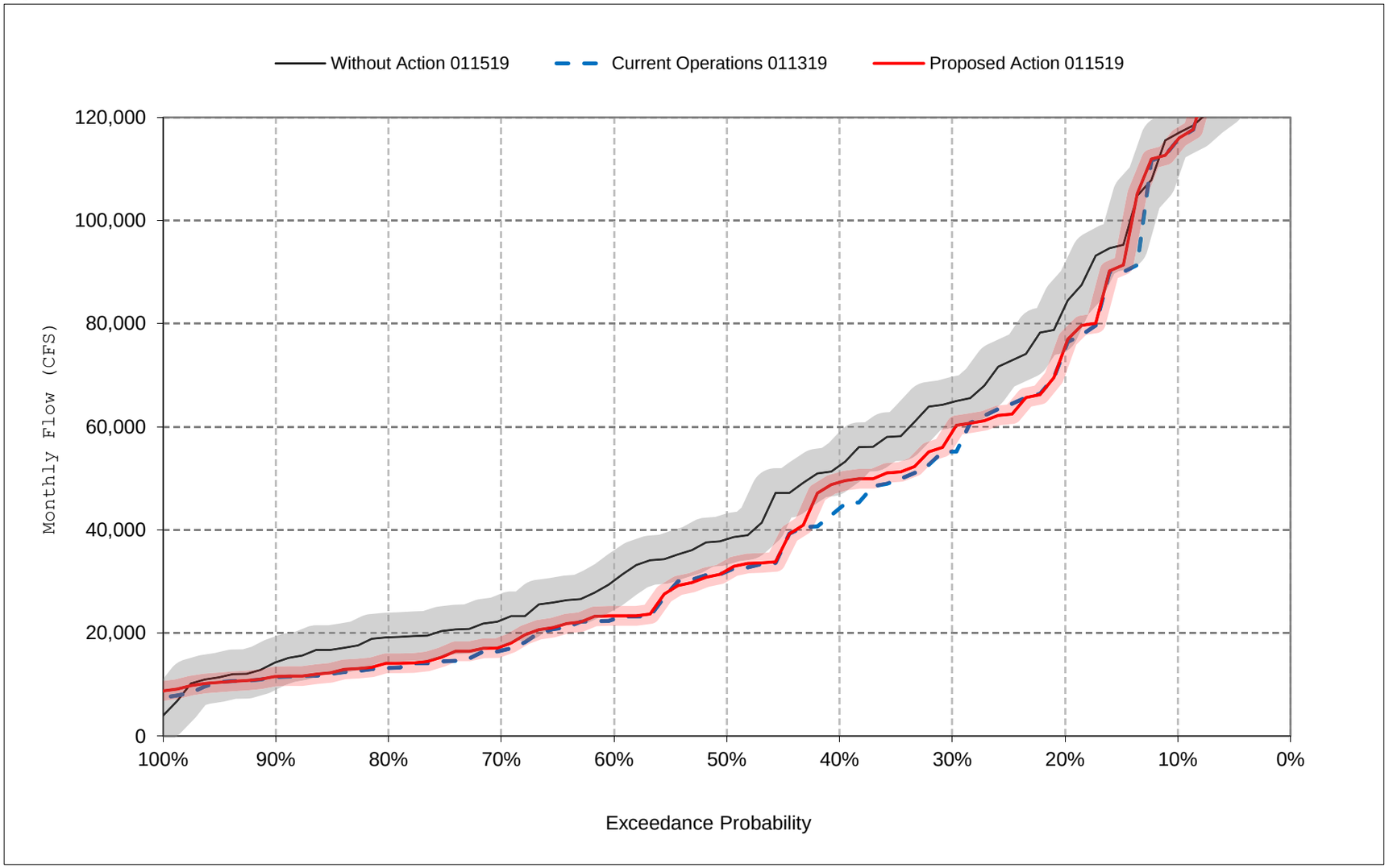
Figure 32-10. Sacramento River Flow at Rio Vista, January



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

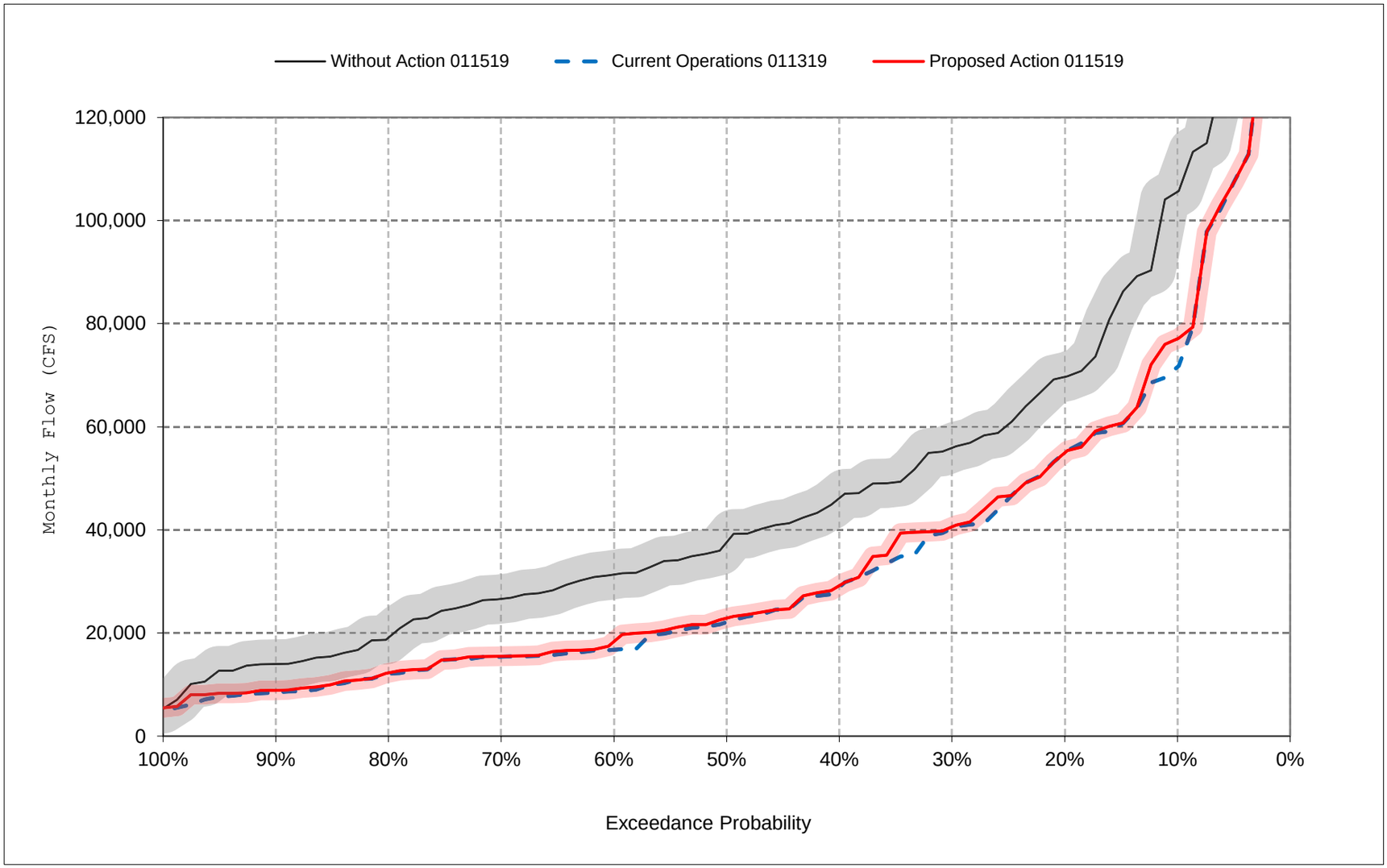
Figure 32-11. Sacramento River Flow at Rio Vista, February



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

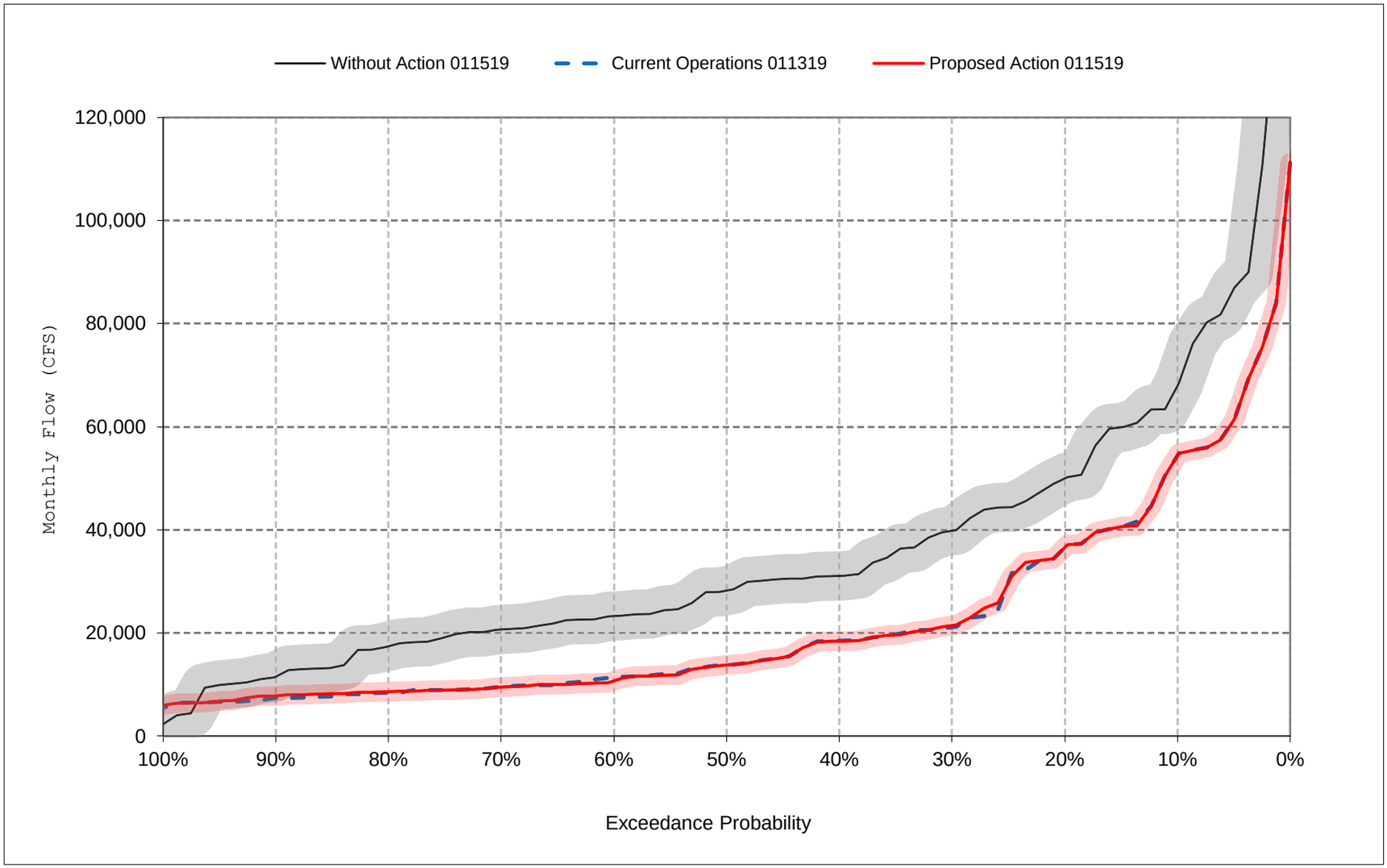
Figure 32-12. Sacramento River Flow at Rio Vista, March



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

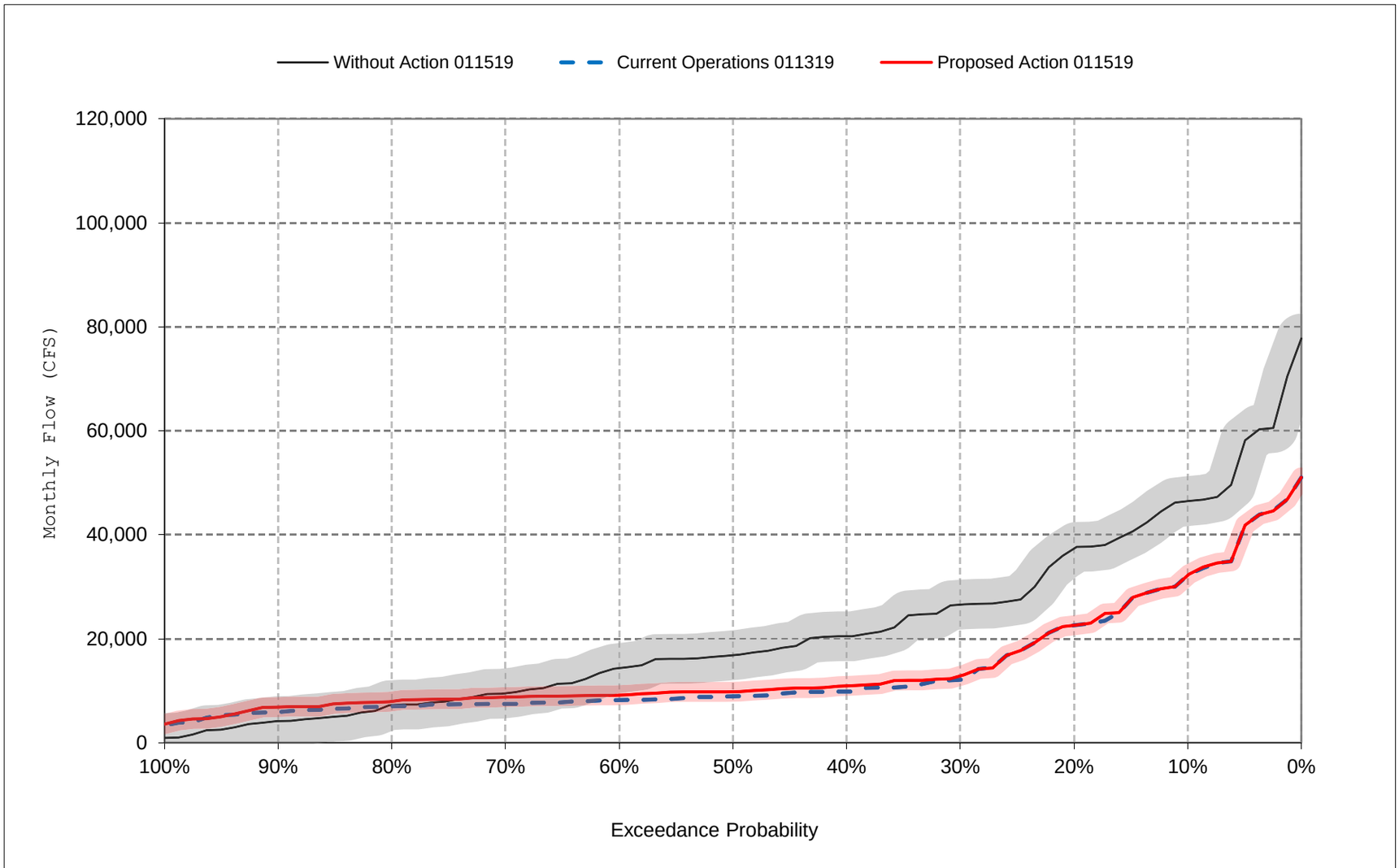
Figure 32-13. Sacramento River Flow at Rio Vista, April



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

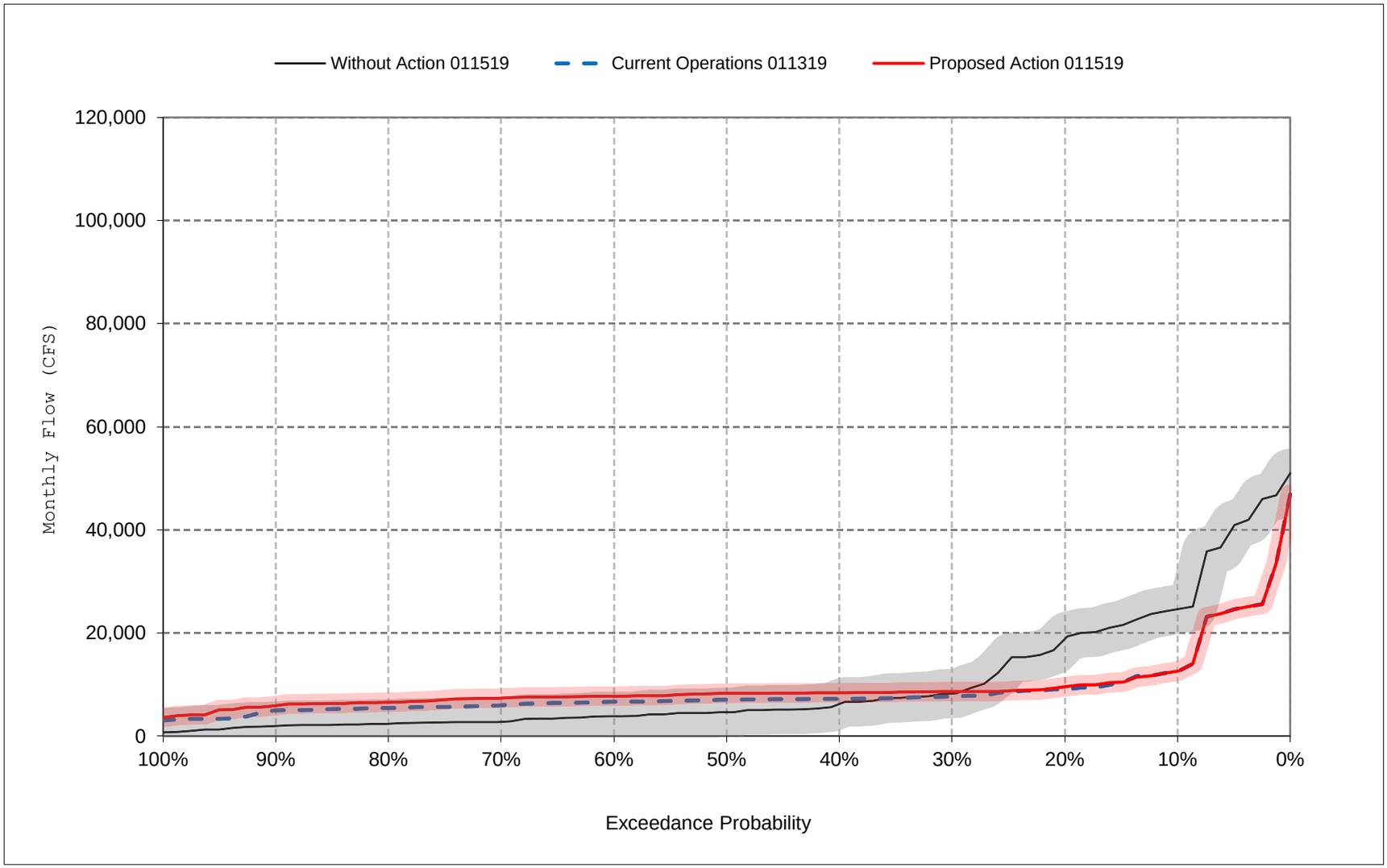
Figure 32-14. Sacramento River Flow at Rio Vista, May



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

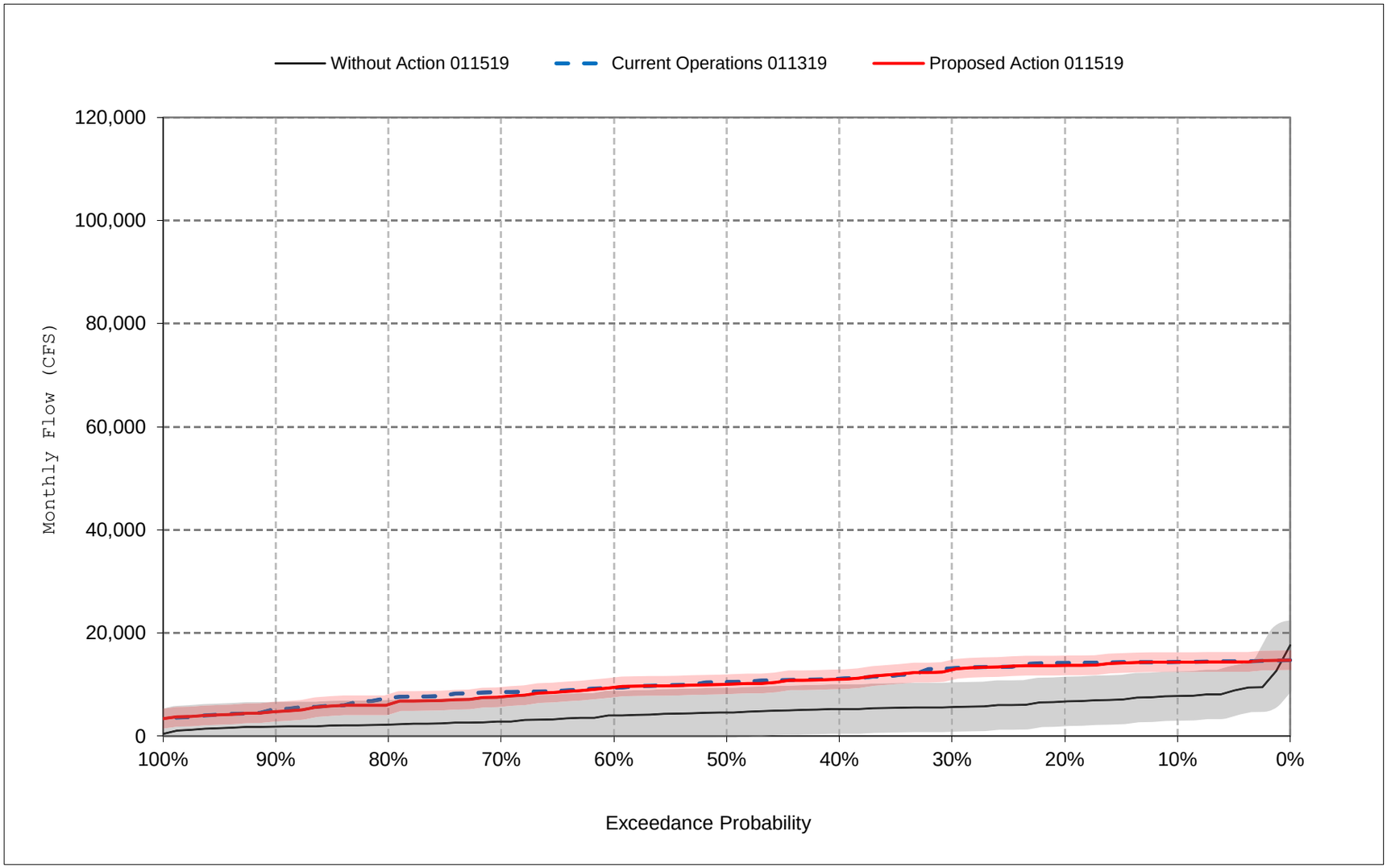
Figure 32-15. Sacramento River Flow at Rio Vista, June



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

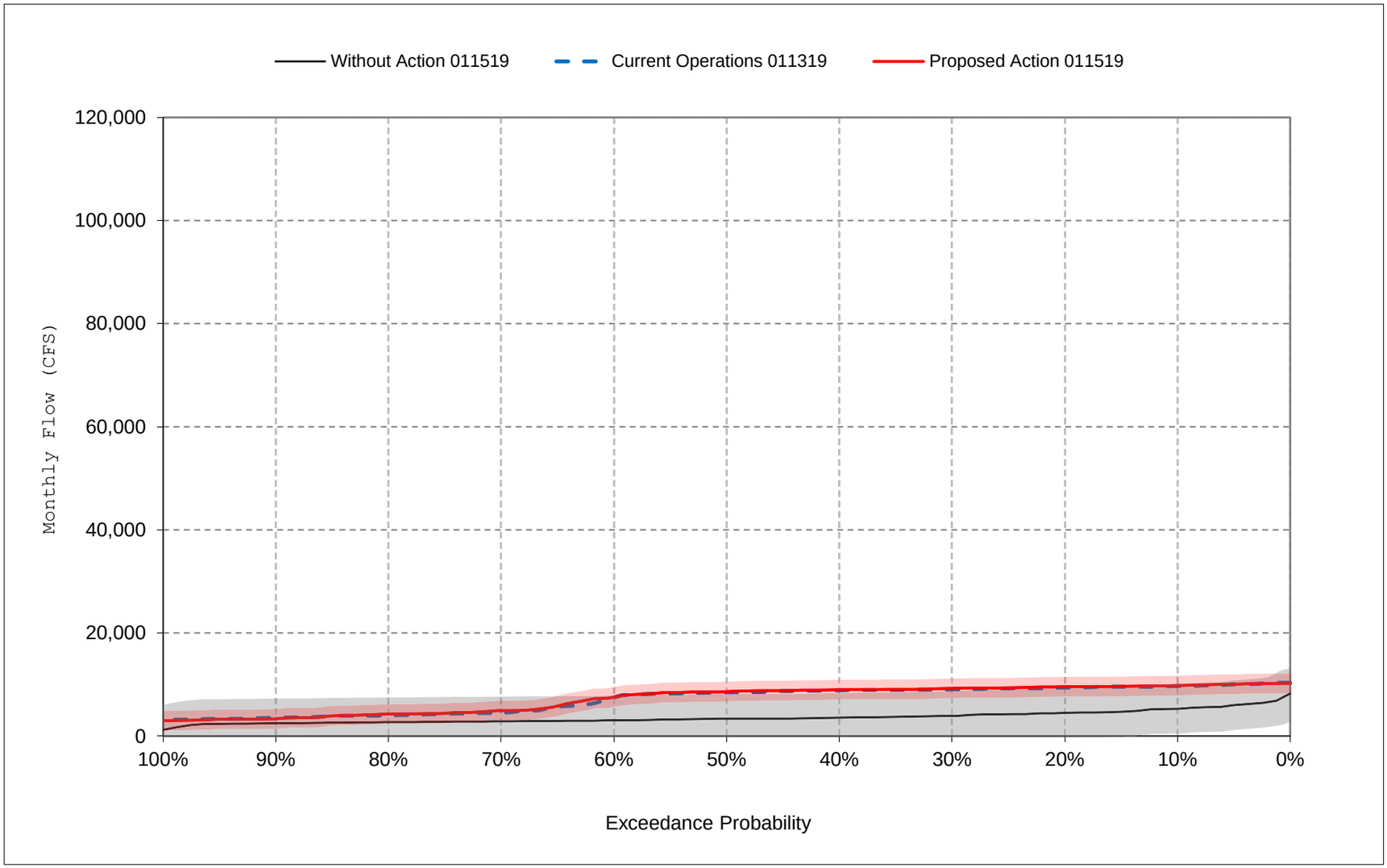
Figure 32-16. Sacramento River Flow at Rio Vista, July



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

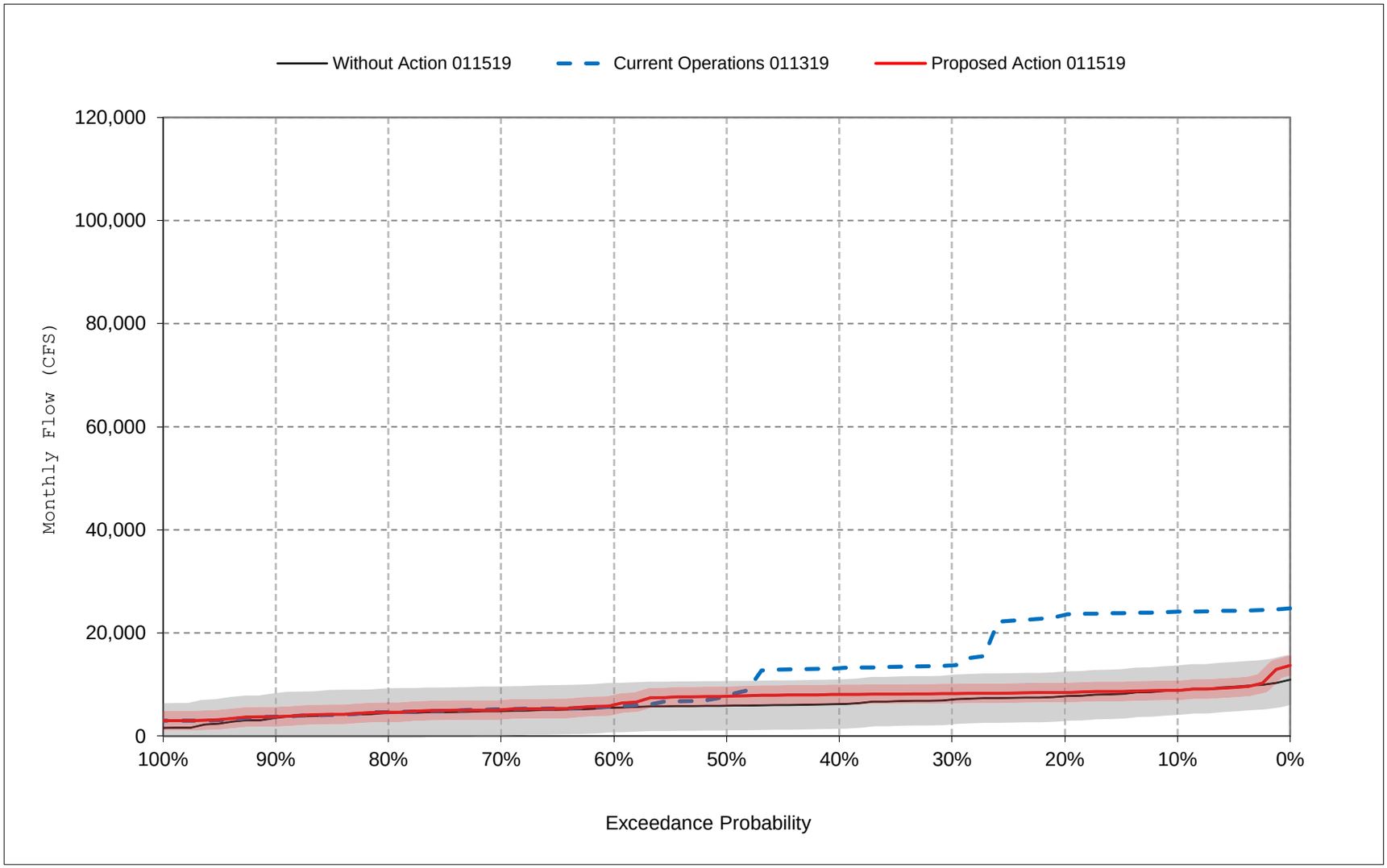
Figure 32-17. Sacramento River Flow at Rio Vista, August



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Figure 32-18. Sacramento River Flow at Rio Vista, September



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Table 33-1. San Joaquin River Flow at Gravelly Ford, Monthly Flow

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	895	1,558	2,309	3,274	4,752	4,204	4,397	8,411	9,265	4,554	1,411	1,407
20%	841	1,072	1,389	2,363	3,582	3,081	4,167	6,512	6,751	2,934	1,004	1,120
30%	762	831	1,059	1,553	2,609	2,562	3,928	4,939	4,636	1,459	899	1,048
40%	724	741	916	1,323	2,203	2,184	3,466	4,064	3,329	938	797	1,015
50%	640	682	794	966	1,579	1,864	2,719	3,227	2,599	666	686	985
60%	551	591	658	859	1,326	1,553	2,283	2,723	2,161	448	582	934
70%	399	492	528	750	1,153	1,377	2,016	1,967	1,208	247	476	869
80%	278	389	446	536	1,000	1,041	1,762	1,279	610	161	435	803
90%	192	217	364	411	630	872	1,306	699	291	76	366	689
Long Term												
Full Simulation Period[a]	611	805	1,124	1,592	2,213	2,220	3,007	3,959	3,802	1,655	811	1,034
Water Year Types[b,c]												
Wet (23%)	915	1,046	1,303	3,238	4,042	3,956	4,815	7,918	9,091	4,842	1,383	1,170
Above Normal (24%)	802	1,079	1,141	1,748	2,825	2,493	3,595	4,864	4,276	1,331	625	964
Below Normal (10%)	605	679	836	1,247	1,811	1,369	2,501	2,609	2,542	986	712	957
Dry (16%)	421	863	1,403	898	1,201	1,466	2,308	2,195	1,441	311	702	1,213
Critical (27%)	272	349	906	562	819	1,226	1,508	1,250	655	234	587	902

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	191	344	230	728	2,696	2,726	4,098	3,406	2,892	121	121	140
20%	191	344	230	258	807	1,072	3,100	1,774	1,646	121	121	140
30%	191	344	230	251	355	925	3,100	497	320	121	121	140
40%	191	344	230	251	253	886	2,821	160	160	121	121	140
50%	191	344	230	251	253	886	1,858	160	160	121	121	140
60%	191	344	230	251	249	886	1,393	160	160	121	121	140
70%	191	344	230	251	249	886	1,131	160	160	121	121	140
80%	191	344	230	251	249	886	668	160	160	121	121	140
90%	191	344	230	251	249	886	238	160	160	121	121	140
Long Term												
Full Simulation Period[a]	179	337	371	586	781	1,320	2,280	1,071	912	301	113	134
Water Year Types[b,c]												
Wet (23%)	191	409	610	1,602	2,227	2,567	4,661	3,580	3,182	930	121	140
Above Normal (24%)	191	344	234	322	563	1,123	2,867	688	414	121	121	140
Below Normal (10%)	191	344	230	330	250	886	1,922	160	160	121	121	140
Dry (16%)	191	344	539	251	250	886	1,150	160	160	121	121	140
Critical (27%)	147	261	255	240	239	835	486	122	122	94	94	117

Current Operations 011319 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	**-704**	**-1,214**	**-2,079**	**-2,546**	**-2,056**	**-1,478**	**-299**	**-5,005**	**-6,374**	**-4,434**	**-1,291**	**-1,267**
20%	**-650**	**-727**	**-1,159**	**-2,105**	**-2,775**	**-2,009**	**-1,068**	**-4,738**	**-5,105**	**-2,814**	**-883**	**-980**
30%	**-571**	**-487**	**-830**	**-1,302**	**-2,255**	**-1,637**	**-828**	**-4,442**	**-4,317**	**-1,338**	**-778**	**-908**
40%	**-534**	**-396**	**-687**	**-1,072**	**-1,950**	**-1,298**	**-645**	**-3,904**	**-3,169**	**-817**	**-676**	**-875**
50%	**-449**	**-337**	**-564**	**-715**	**-1,326**	**-978**	**-861**	**-3,068**	**-2,439**	**-545**	**-565**	**-845**
60%	**-360**	**-247**	**-429**	**-608**	**-1,077**	**-667**	**-890**	**-2,563**	**-2,001**	**-327**	**-461**	**-794**
70%	**-208**	**-148**	**-298**	**-499**	**-904**	**-492**	**-885**	**-1,807**	**-1,048**	**-126**	**-355**	**-729**
80%	**-88**	**-45**	**-217**	**-285**	**-751**	**-156**	**-1,094**	**-1,119**	**-450**	**-40**	**-314**	**-663**
90%	**-1**	127	**-134**	**-161**	**-381**	14	**-1,068**	**-539**	**-131**	45	**-246**	**-549**
Long Term												
Full Simulation Period[a]	**-432**	**-468**	**-753**	**-1,005**	**-1,431**	**-900**	**-728**	**-2,888**	**-2,889**	**-1,354**	**-698**	**-900**
Water Year Types[b,c]												
Wet (23%)	**-724**	**-637**	**-693**	**-1,636**	**-1,815**	**-1,389**	**-154**	**-4,338**	**-5,909**	**-3,911**	**-1,263**	**-1,030**
Above Normal (24%)	**-612**	**-735**	**-907**	**-1,426**	**-2,262**	**-1,370**	**-727**	**-4,175**	**-3,862**	**-1,210**	**-504**	**-824**
Below Normal (10%)	**-414**	**-334**	**-606**	**-917**	**-1,561**	**-483**	**-580**	**-2,449**	**-2,382**	**-866**	**-592**	**-817**
Dry (16%)	**-230**	**-519**	**-864**	**-647**	**-951**	**-580**	**-1,158**	**-2,035**	**-1,280**	**-191**	**-581**	**-1,073**
Critical (27%)	**-124**	**-88**	**-651**	**-322**	**-580**	**-391**	**-1,022**	**-1,128**	**-532**	**-140**	**-493**	**-784**

a Based on the 82-year simulation period.

b As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 33-2. San Joaquin River Flow at Gravelly Ford, Monthly Flow

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	895	1,558	2,309	3,274	4,752	4,204	4,397	8,411	9,265	4,554	1,411	1,407
20%	841	1,072	1,389	2,363	3,582	3,081	4,167	6,512	6,751	2,934	1,004	1,120
30%	762	831	1,059	1,553	2,609	2,562	3,928	4,939	4,636	1,459	899	1,048
40%	724	741	916	1,323	2,203	2,184	3,466	4,064	3,329	938	797	1,015
50%	640	682	794	966	1,579	1,864	2,719	3,227	2,599	666	686	985
60%	551	591	658	859	1,326	1,553	2,283	2,723	2,161	448	582	934
70%	399	492	528	750	1,153	1,377	2,016	1,967	1,208	247	476	869
80%	278	389	446	536	1,000	1,041	1,762	1,279	610	161	435	803
90%	192	217	364	411	630	872	1,306	699	291	76	366	689
Long Term												
Full Simulation Period[a]	611	805	1,124	1,592	2,213	2,220	3,007	3,959	3,802	1,655	811	1,034
Water Year Types[b,c]												
Wet (23%)	915	1,046	1,303	3,238	4,042	3,956	4,815	7,918	9,091	4,842	1,383	1,170
Above Normal (24%)	802	1,079	1,141	1,748	2,825	2,493	3,595	4,864	4,276	1,331	625	964
Below Normal (10%)	605	679	836	1,247	1,811	1,369	2,501	2,609	2,542	986	712	957
Dry (16%)	421	863	1,403	898	1,201	1,466	2,308	2,195	1,441	311	702	1,213
Critical (27%)	272	349	906	562	819	1,226	1,508	1,250	655	234	587	902

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	191	344	230	728	2,696	2,726	4,098	3,406	2,892	121	121	140
20%	191	344	230	258	807	1,072	3,100	1,774	1,646	121	121	140
30%	191	344	230	251	355	925	3,100	497	320	121	121	140
40%	191	344	230	251	253	886	2,821	160	160	121	121	140
50%	191	344	230	251	253	886	1,858	160	160	121	121	140
60%	191	344	230	251	249	886	1,393	160	160	121	121	140
70%	191	344	230	251	249	886	1,131	160	160	121	121	140
80%	191	344	230	251	249	886	668	160	160	121	121	140
90%	191	344	230	251	249	886	238	160	160	121	121	140
Long Term												
Full Simulation Period[a]	179	337	371	586	781	1,320	2,280	1,071	912	301	113	134
Water Year Types[b,c]												
Wet (23%)	191	409	610	1,602	2,227	2,567	4,661	3,580	3,182	930	121	140
Above Normal (24%)	191	344	234	322	563	1,123	2,867	688	414	121	121	140
Below Normal (10%)	191	344	230	330	250	886	1,922	160	160	121	121	140
Dry (16%)	191	344	539	251	250	886	1,150	160	160	121	121	140
Critical (27%)	147	261	255	240	239	835	486	122	122	94	94	117

Proposed Action 011519 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	**-704**	**-1,214**	**-2,079**	**-2,546**	**-2,056**	**-1,478**	**-299**	**-5,005**	**-6,374**	**-4,434**	**-1,291**	**-1,267**
20%	**-650**	**-727**	**-1,159**	**-2,105**	**-2,775**	**-2,009**	**-1,068**	**-4,738**	**-5,105**	**-2,814**	**-883**	**-980**
30%	**-571**	**-487**	**-830**	**-1,302**	**-2,255**	**-1,637**	**-828**	**-4,442**	**-4,317**	**-1,338**	**-778**	**-908**
40%	**-534**	**-396**	**-687**	**-1,072**	**-1,950**	**-1,298**	**-645**	**-3,904**	**-3,169**	**-817**	**-676**	**-875**
50%	**-449**	**-337**	**-564**	**-715**	**-1,326**	**-978**	**-861**	**-3,068**	**-2,439**	**-545**	**-565**	**-845**
60%	**-360**	**-247**	**-429**	**-608**	**-1,077**	**-667**	**-890**	**-2,563**	**-2,001**	**-327**	**-461**	**-794**
70%	**-208**	**-148**	**-298**	**-499**	**-904**	**-492**	**-885**	**-1,807**	**-1,048**	**-126**	**-355**	**-729**
80%	**-88**	**-45**	**-217**	**-285**	**-751**	**-156**	**-1,094**	**-1,119**	**-450**	**-40**	**-314**	**-663**
90%	**-1**	127	**-134**	**-161**	**-381**	14	**-1,068**	**-539**	**-131**	45	**-246**	**-549**
Long Term												
Full Simulation Period[a]	**-432**	**-468**	**-753**	**-1,005**	**-1,431**	**-900**	**-728**	**-2,888**	**-2,889**	**-1,354**	**-698**	**-900**
Water Year Types[b,c]												
Wet (23%)	**-724**	**-637**	**-693**	**-1,636**	**-1,815**	**-1,389**	**-154**	**-4,338**	**-5,909**	**-3,911**	**-1,263**	**-1,030**
Above Normal (24%)	**-612**	**-735**	**-907**	**-1,426**	**-2,262**	**-1,370**	**-727**	**-4,175**	**-3,862**	**-1,210**	**-504**	**-824**
Below Normal (10%)	**-414**	**-334**	**-606**	**-917**	**-1,561**	**-483**	**-580**	**-2,449**	**-2,382**	**-866**	**-592**	**-817**
Dry (16%)	**-230**	**-519**	**-864**	**-647**	**-951**	**-580**	**-1,158**	**-2,035**	**-1,280**	**-191**	**-581**	**-1,073**
Critical (27%)	**-124**	**-88**	**-651**	**-322**	**-580**	**-391**	**-1,022**	**-1,128**	**-532**	**-140**	**-493**	**-784**

a Based on the 82-year simulation period.

b As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 33-3. San Joaquin River Flow at Gravelly Ford, Monthly Flow

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	191	344	230	728	2,696	2,726	4,098	3,406	2,892	121	121	140
20%	191	344	230	258	807	1,072	3,100	1,774	1,646	121	121	140
30%	191	344	230	251	355	925	3,100	497	320	121	121	140
40%	191	344	230	251	253	886	2,821	160	160	121	121	140
50%	191	344	230	251	253	886	1,858	160	160	121	121	140
60%	191	344	230	251	249	886	1,393	160	160	121	121	140
70%	191	344	230	251	249	886	1,131	160	160	121	121	140
80%	191	344	230	251	249	886	668	160	160	121	121	140
90%	191	344	230	251	249	886	238	160	160	121	121	140
Long Term												
Full Simulation Period[a]	179	337	371	586	781	1,320	2,280	1,071	912	301	113	134
Water Year Types[b,c]												
Wet (23%)	191	409	610	1,602	2,227	2,567	4,661	3,580	3,182	930	121	140
Above Normal (24%)	191	344	234	322	563	1,123	2,867	688	414	121	121	140
Below Normal (10%)	191	344	230	330	250	886	1,922	160	160	121	121	140
Dry (16%)	191	344	539	251	250	886	1,150	160	160	121	121	140
Critical (27%)	147	261	255	240	239	835	486	122	122	94	94	117

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	191	344	230	728	2,696	2,726	4,098	3,406	2,892	121	121	140
20%	191	344	230	258	807	1,072	3,100	1,774	1,646	121	121	140
30%	191	344	230	251	355	925	3,100	497	320	121	121	140
40%	191	344	230	251	253	886	2,821	160	160	121	121	140
50%	191	344	230	251	253	886	1,858	160	160	121	121	140
60%	191	344	230	251	249	886	1,393	160	160	121	121	140
70%	191	344	230	251	249	886	1,131	160	160	121	121	140
80%	191	344	230	251	249	886	668	160	160	121	121	140
90%	191	344	230	251	249	886	238	160	160	121	121	140
Long Term												
Full Simulation Period[a]	179	337	371	586	781	1,320	2,280	1,071	912	301	113	134
Water Year Types[b,c]												
Wet (23%)	191	409	610	1,602	2,227	2,567	4,661	3,580	3,182	930	121	140
Above Normal (24%)	191	344	234	322	563	1,123	2,867	688	414	121	121	140
Below Normal (10%)	191	344	230	330	250	886	1,922	160	160	121	121	140
Dry (16%)	191	344	539	251	250	886	1,150	160	160	121	121	140
Critical (27%)	147	261	255	240	239	835	486	122	122	94	94	117

Proposed Action 011519 minus Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	0	0	**0**	0	0	0	0	0	0	0	0	0
Water Year Types[b,c]												
Wet (23%)	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal (24%)	0	0	0	0	0	0	0	0	0	0	0	0
Below Normal (10%)	0	0	0	0	0	0	0	0	0	0	0	0
Dry (16%)	0	0	0	0	0	0	0	0	0	0	0	0
Critical (27%)	0	0	**0**	0	0	0	0	0	0	0	0	0

a Based on the 82-year simulation period.

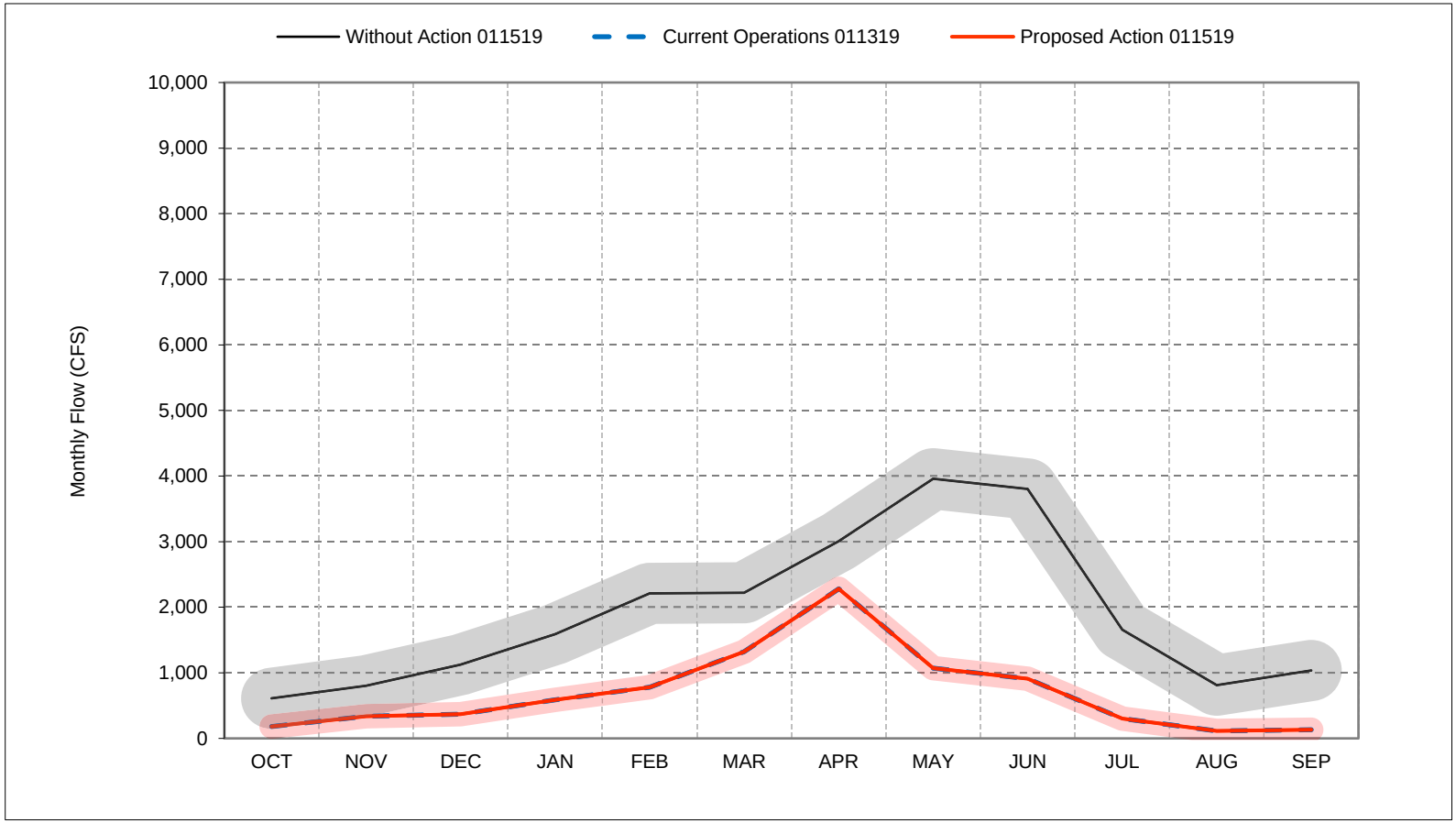
b As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

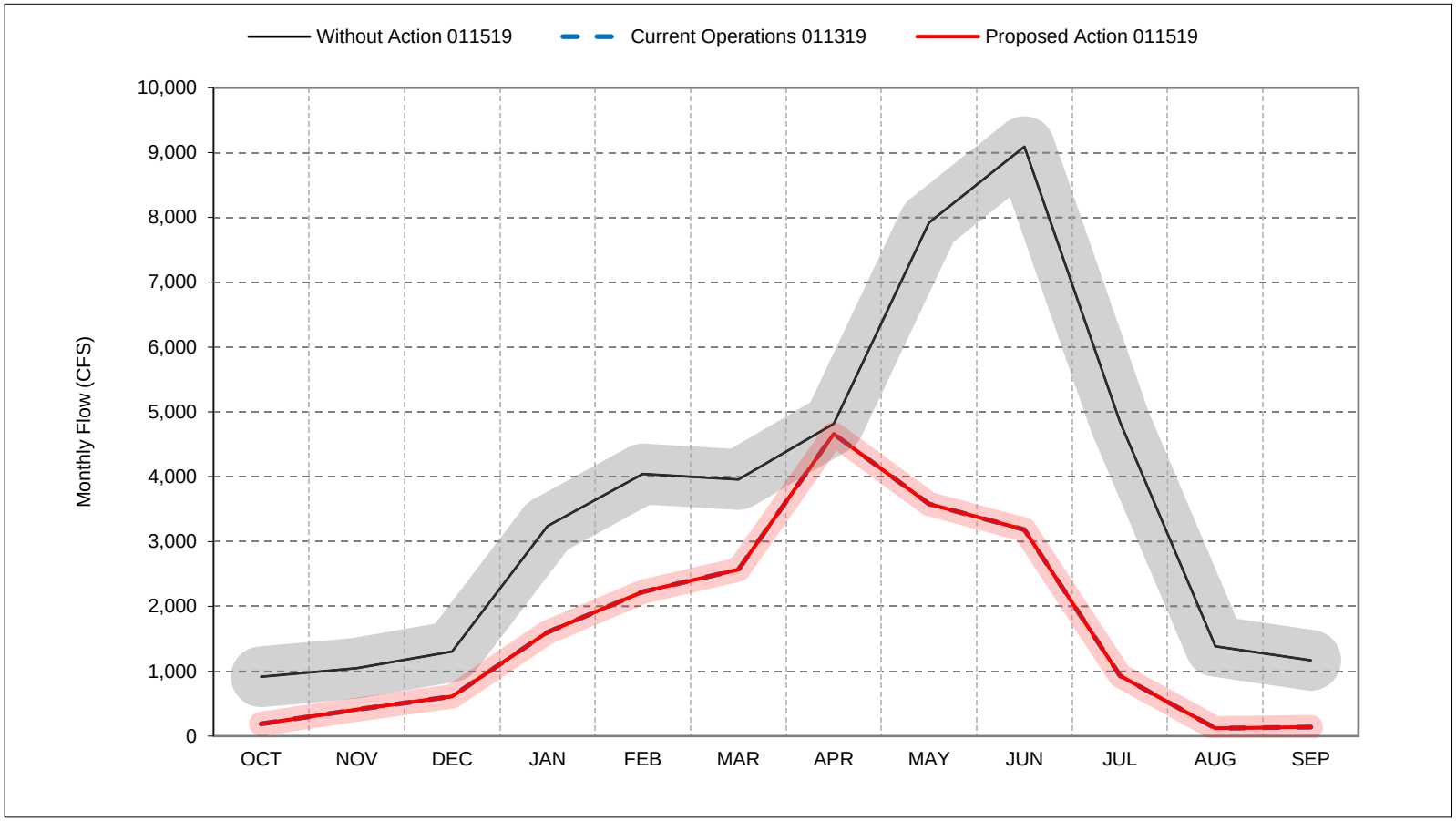
e These are draft results meant for qualitative analysis and are subject to revision.

Figure 33-1. San Joaquin River Flow at Gravelly Ford, Long-Term Average Flow



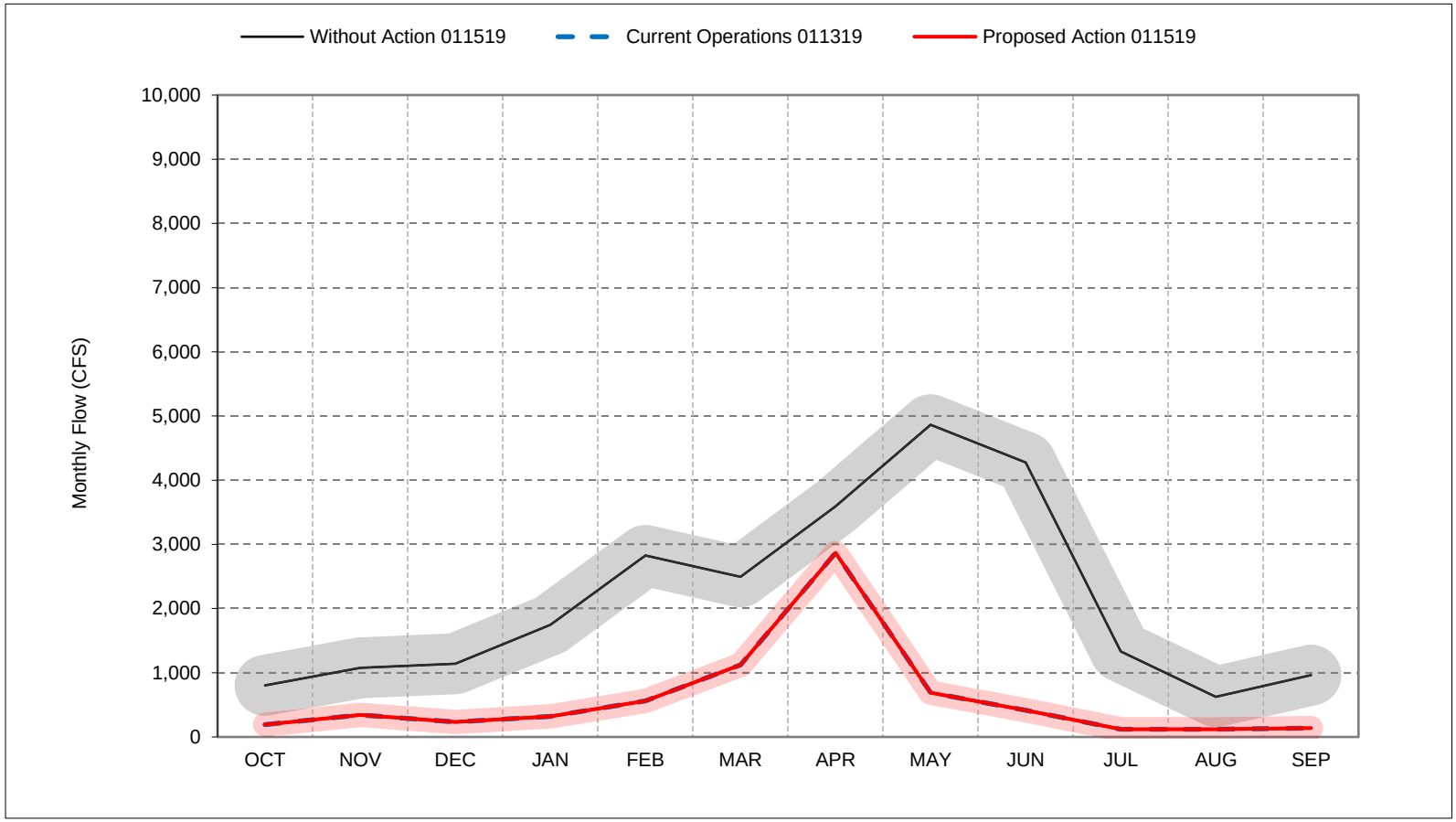
*As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 33-2. San Joaquin River Flow at Gravelly Ford, Wet Year Average Flow



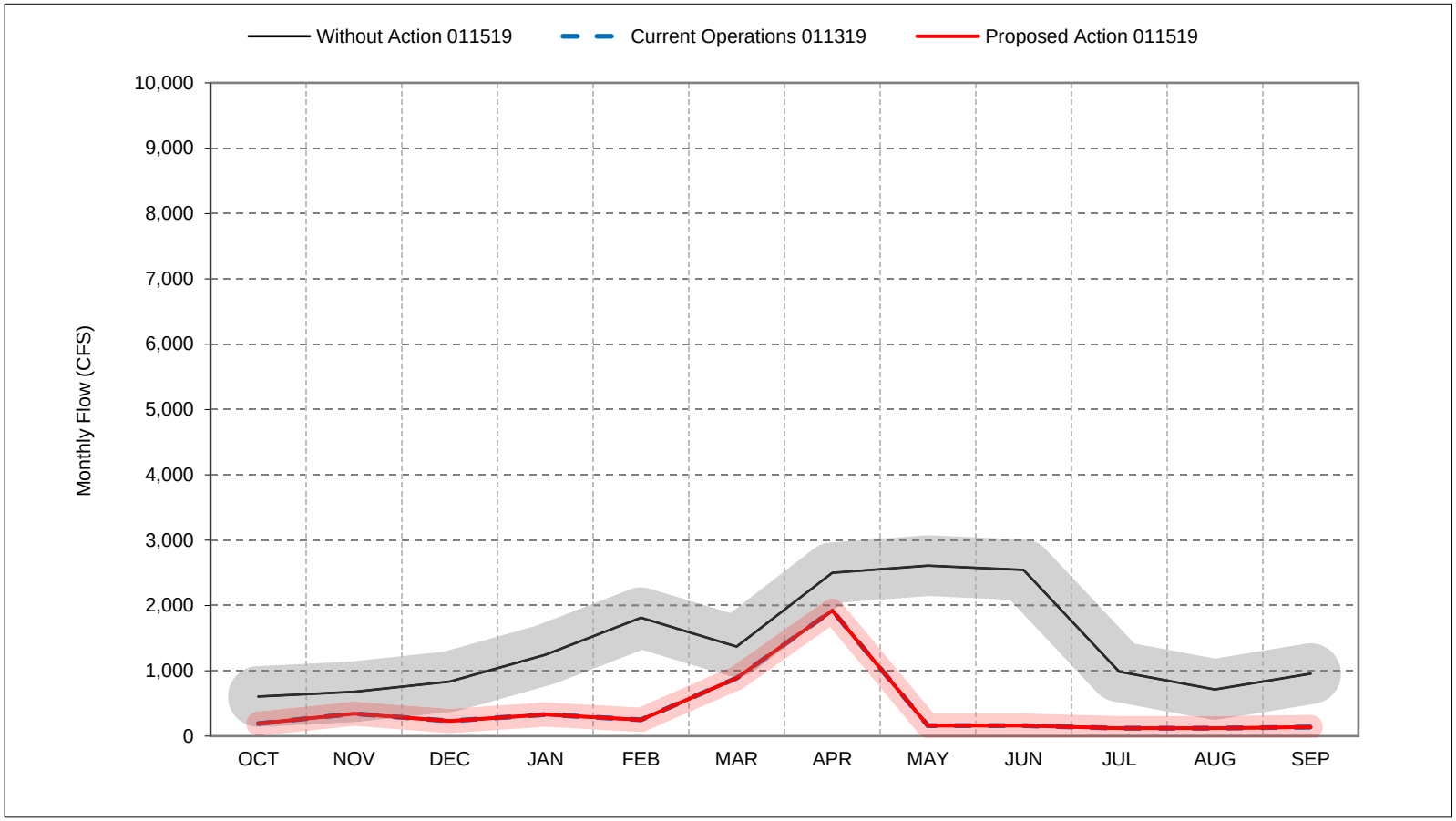
*As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 33-3. San Joaquin River Flow at Gravelly Ford, Above Normal Year Average Flow



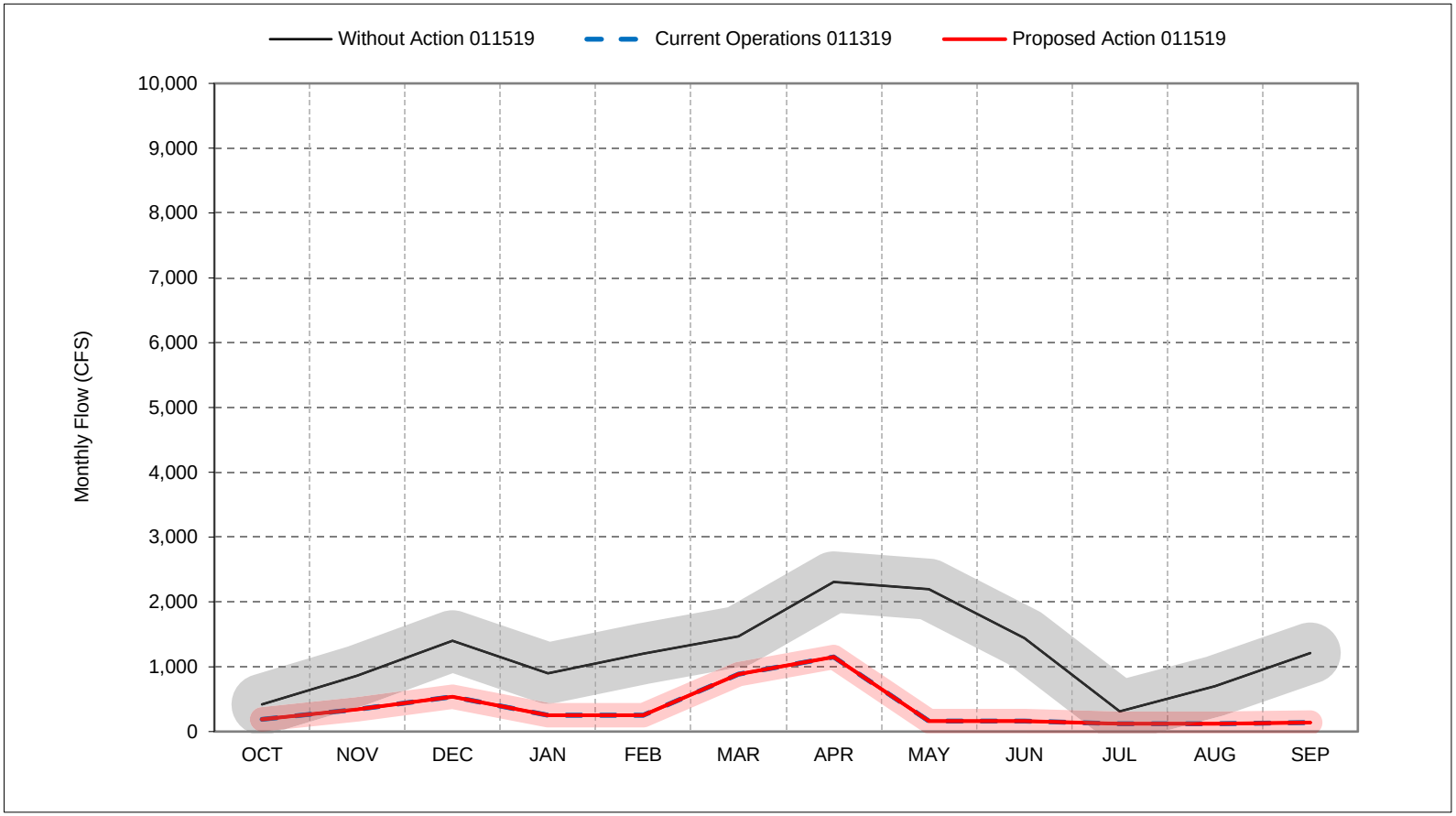
*As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 33-4. San Joaquin River Flow at Gravelly Ford, Below Normal Year Average Flow



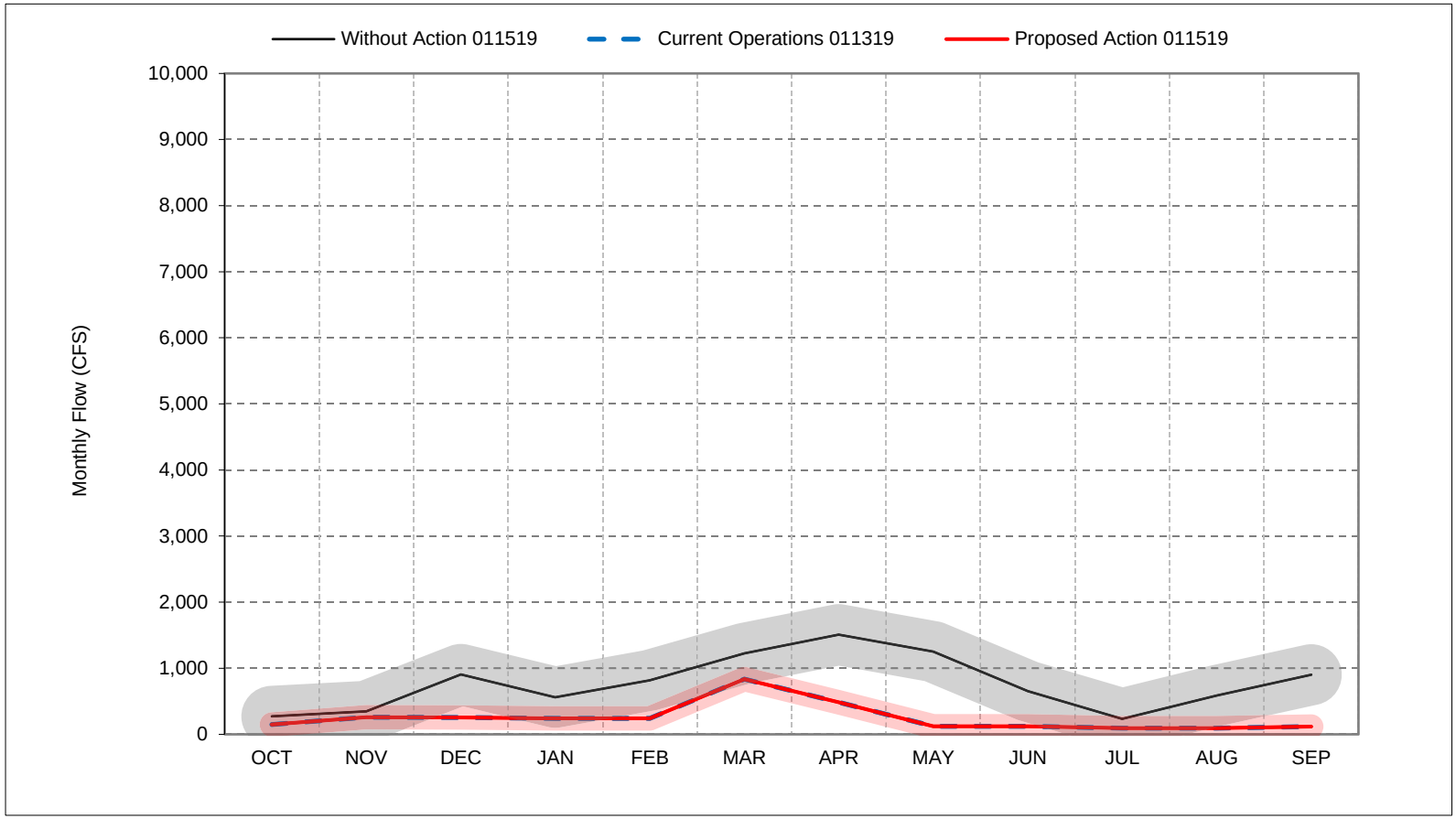
*As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 33-5. San Joaquin River Flow at Gravelly Ford, Dry Year Average Flow



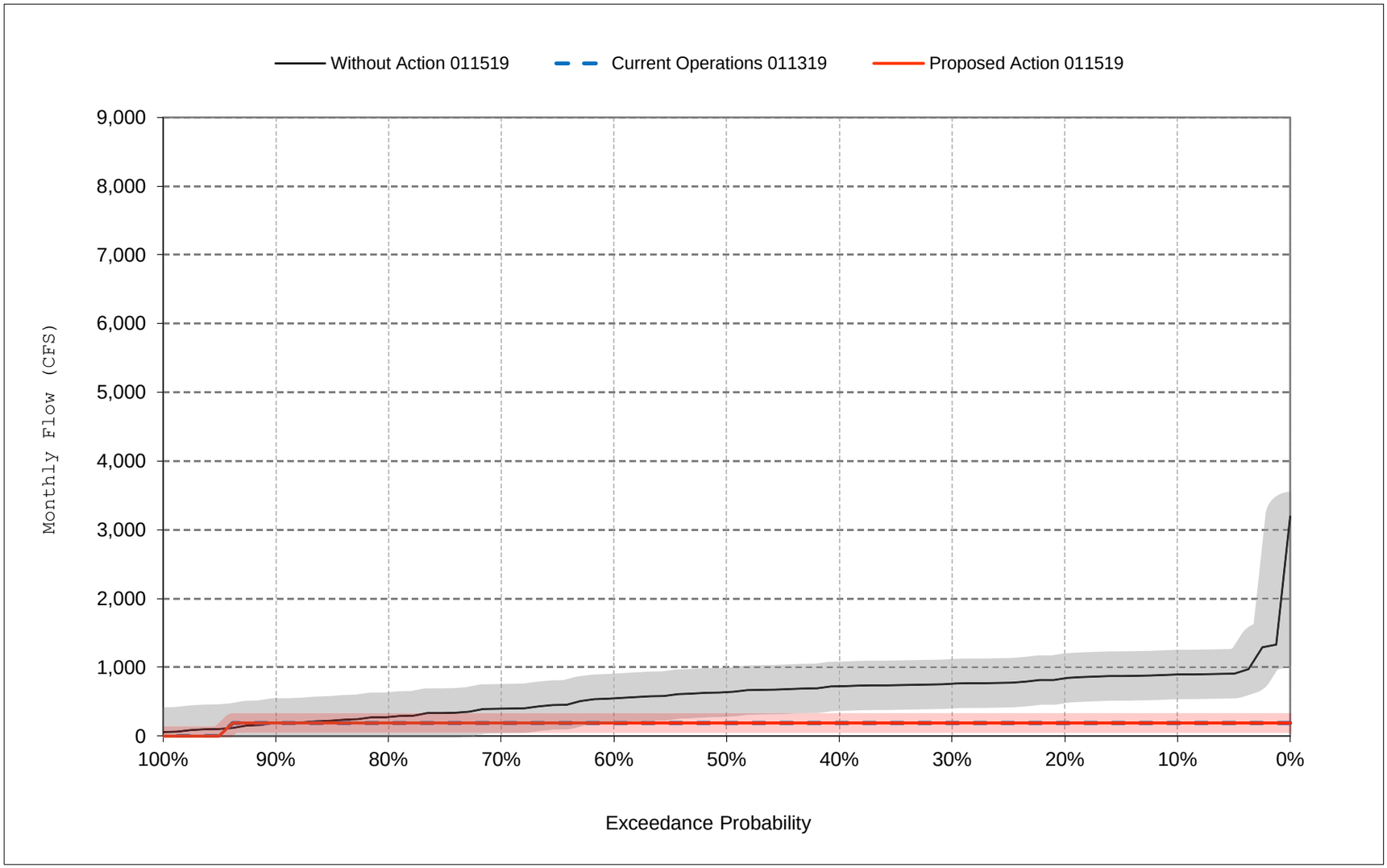
*As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 33-6. San Joaquin River Flow at Gravelly Ford, Critical Year Average Flow



*As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

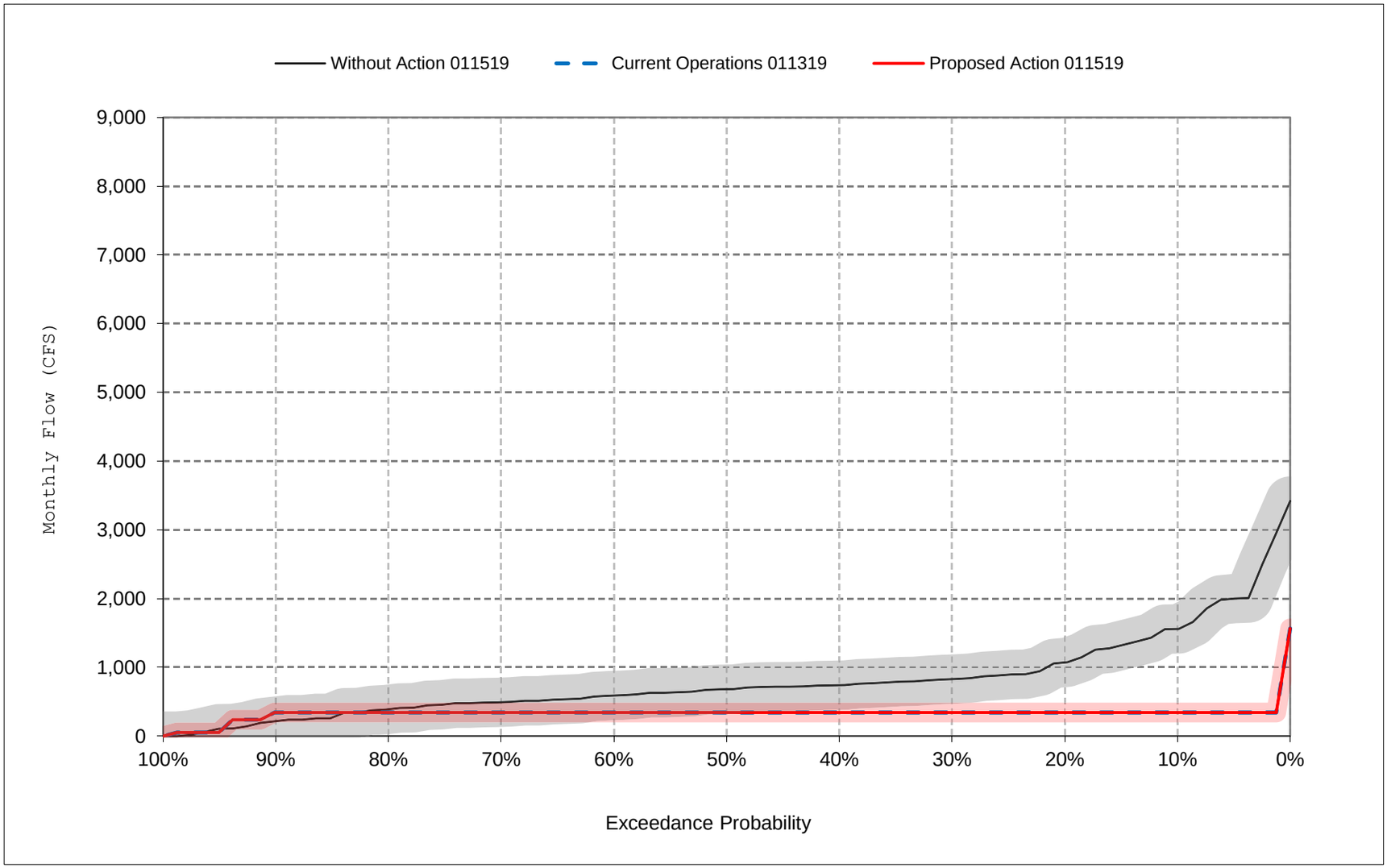
Figure 33-7. San Joaquin River Flow at Gravelly Ford, October



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

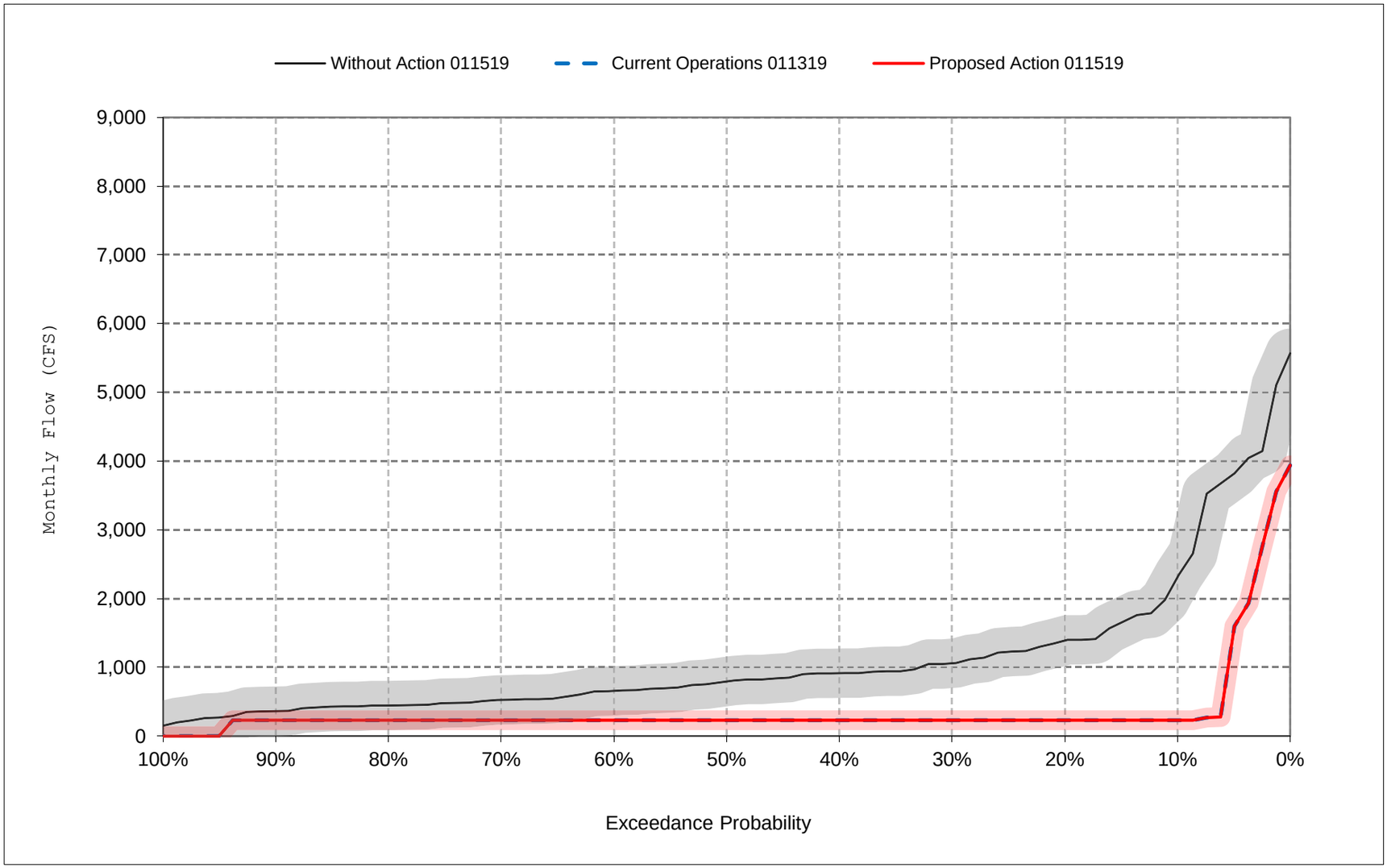
Figure 33-8. San Joaquin River Flow at Gravelly Ford, November



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

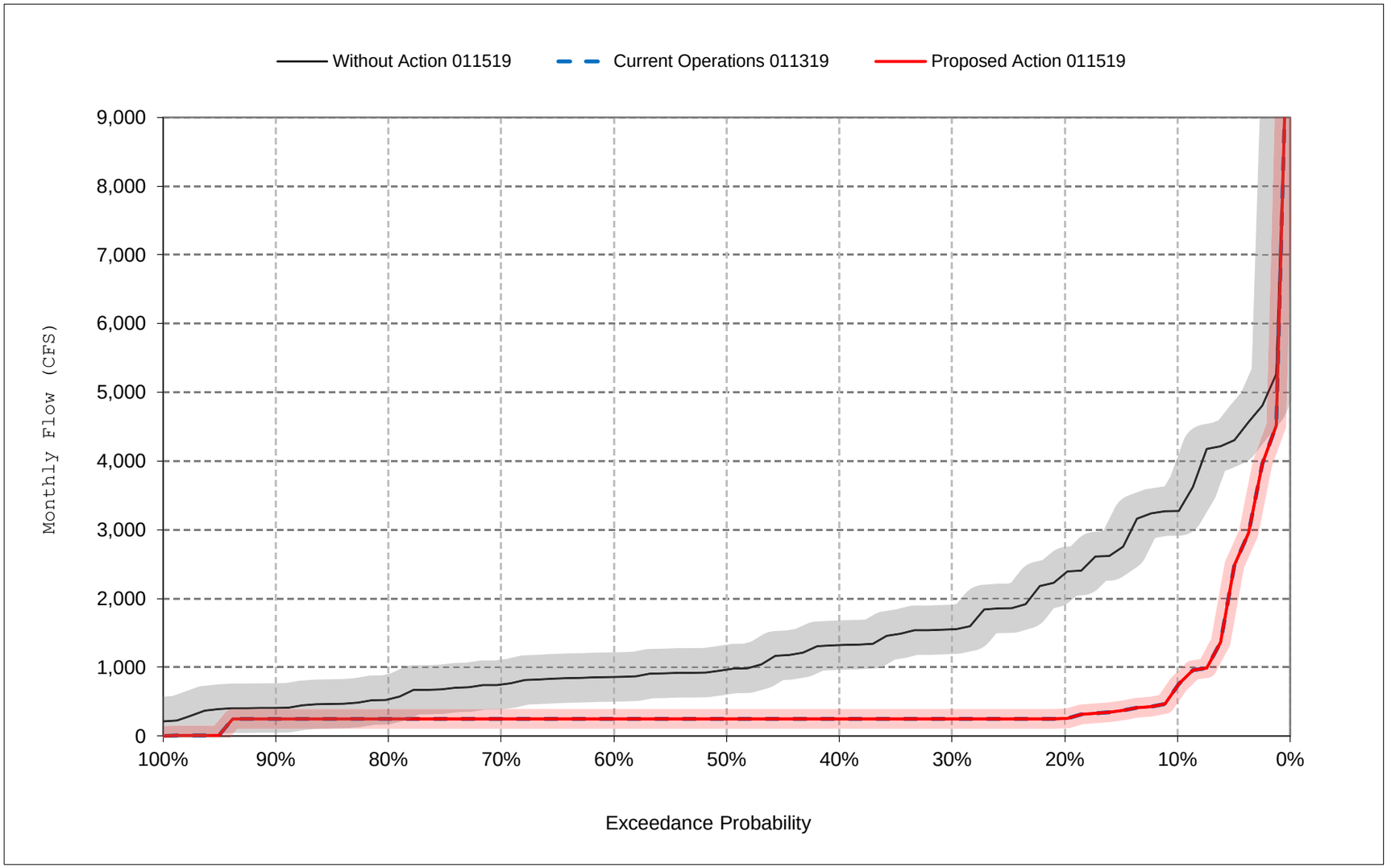
Figure 33-9. San Joaquin River Flow at Gravelly Ford, December



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

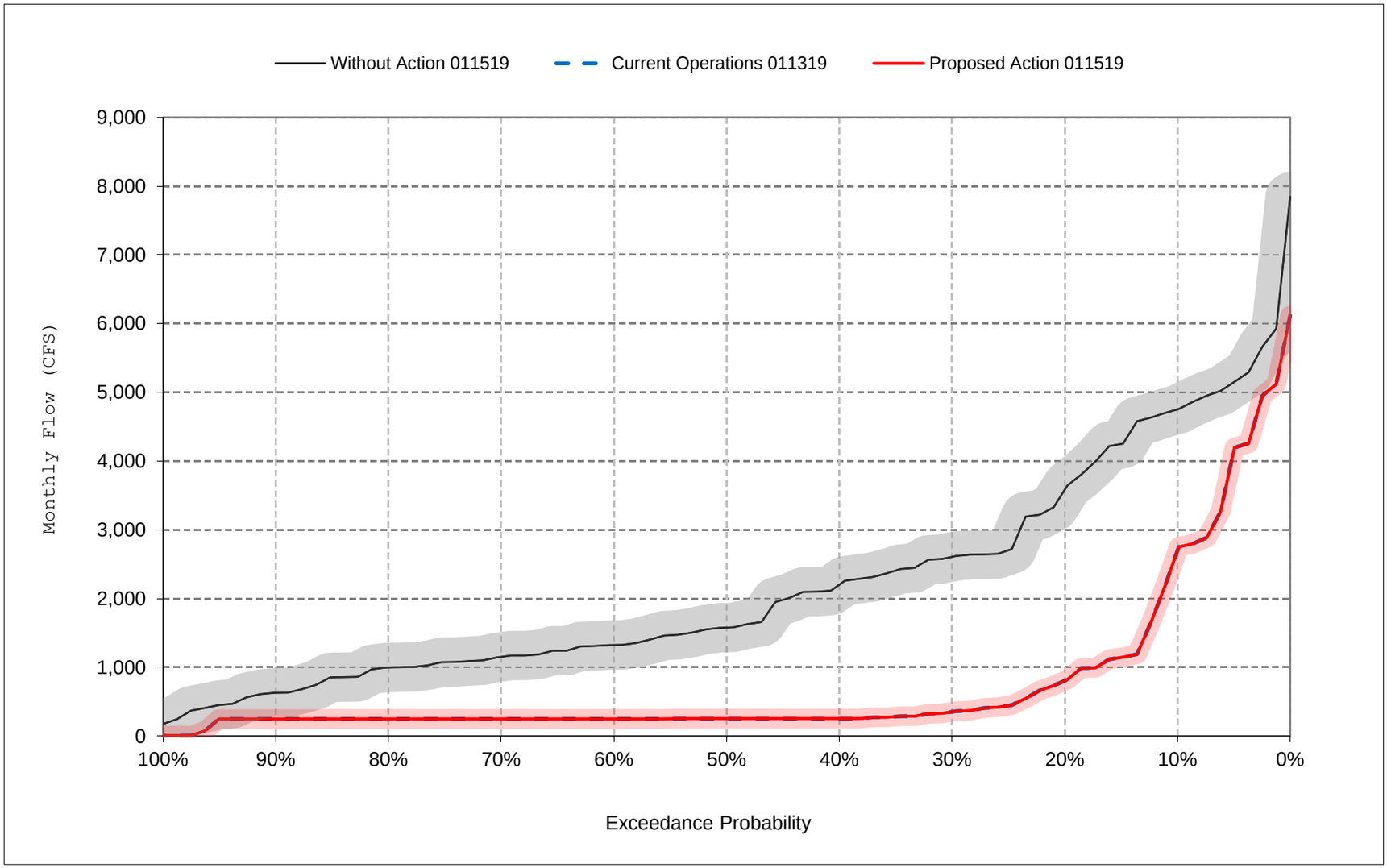
Figure 33-10. San Joaquin River Flow at Gravelly Ford, January



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

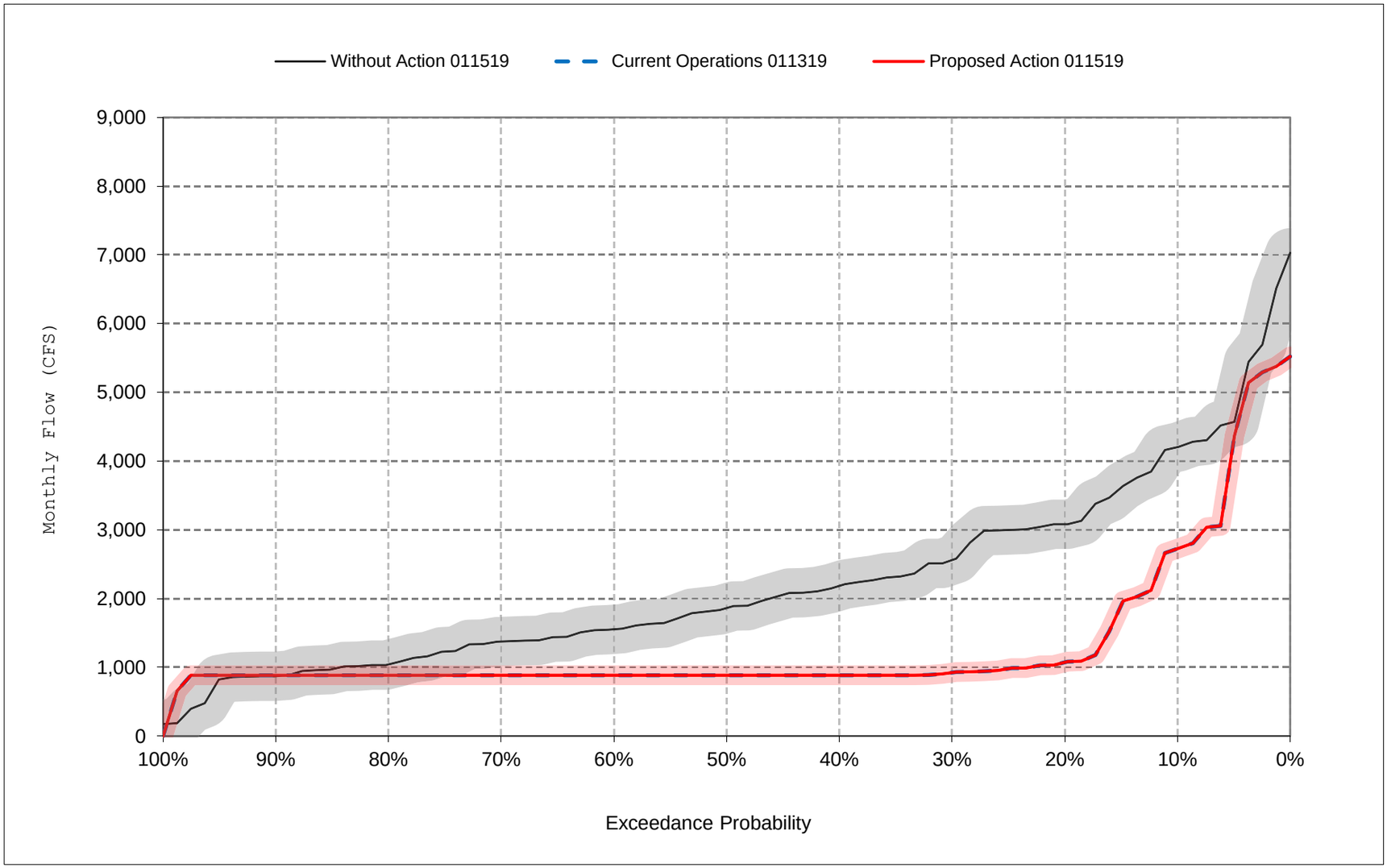
Figure 33-11. San Joaquin River Flow at Gravelly Ford, February



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

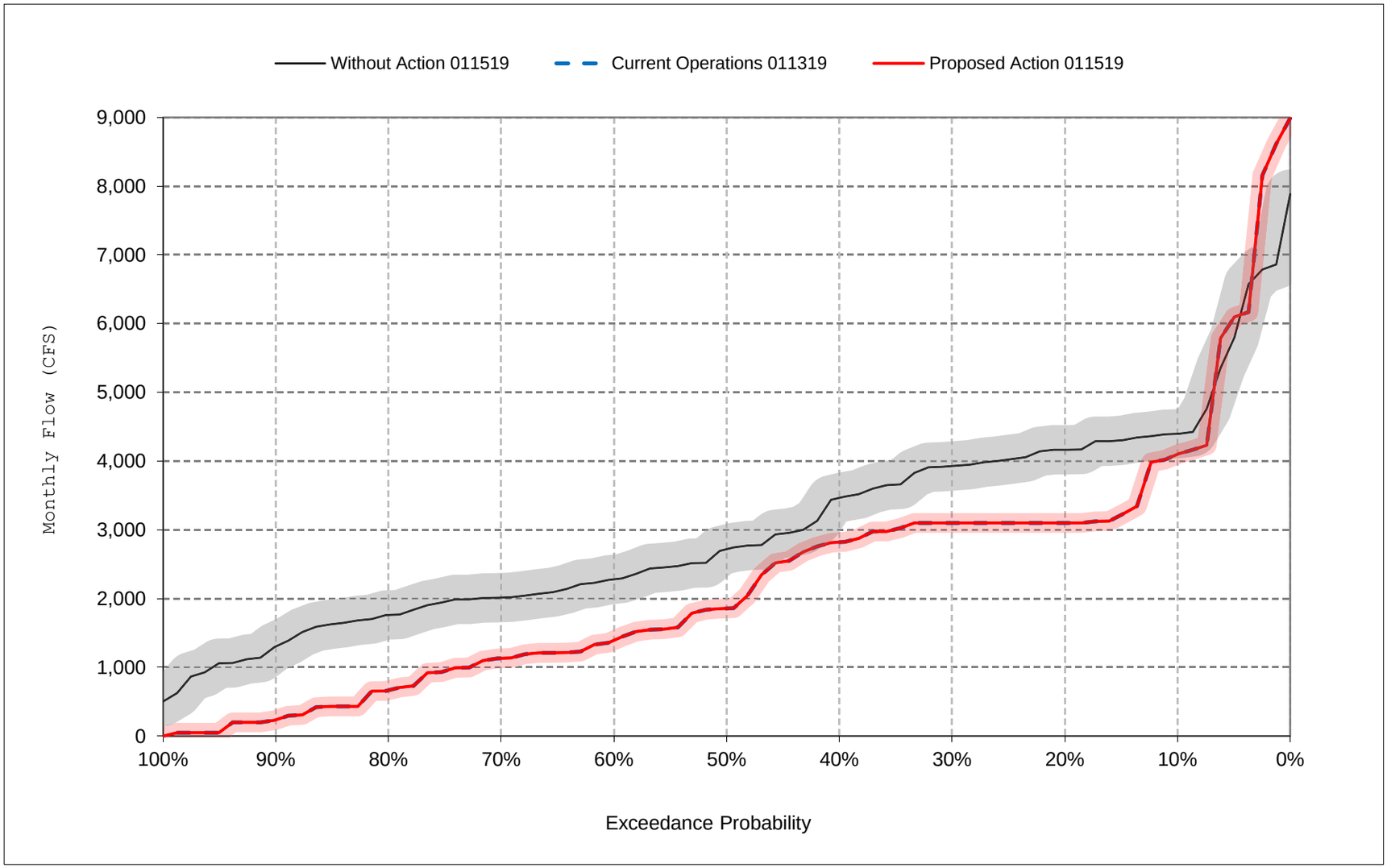
Figure 33-12. San Joaquin River Flow at Gravelly Ford, March



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

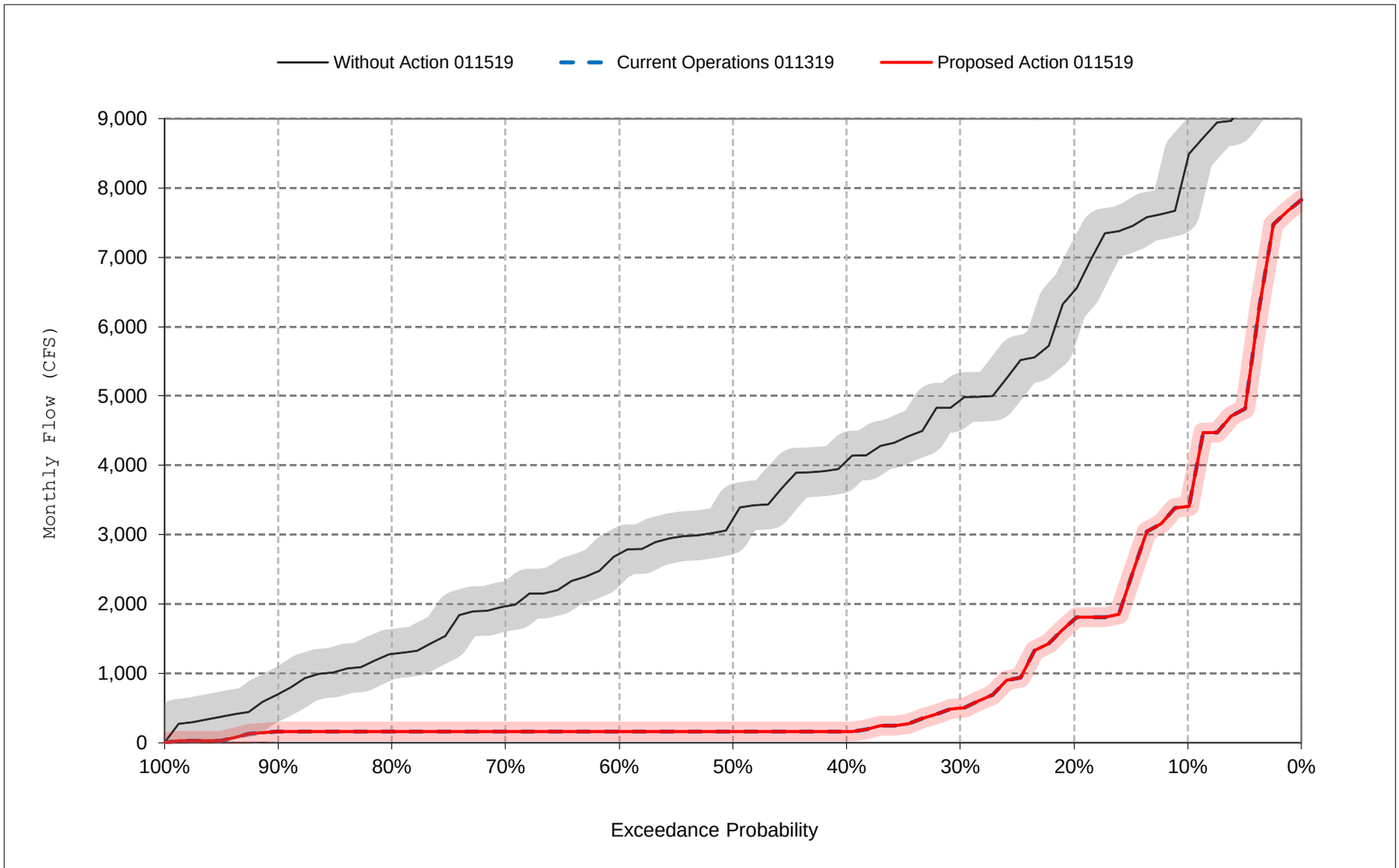
Figure 33-13. San Joaquin River Flow at Gravelly Ford, April



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

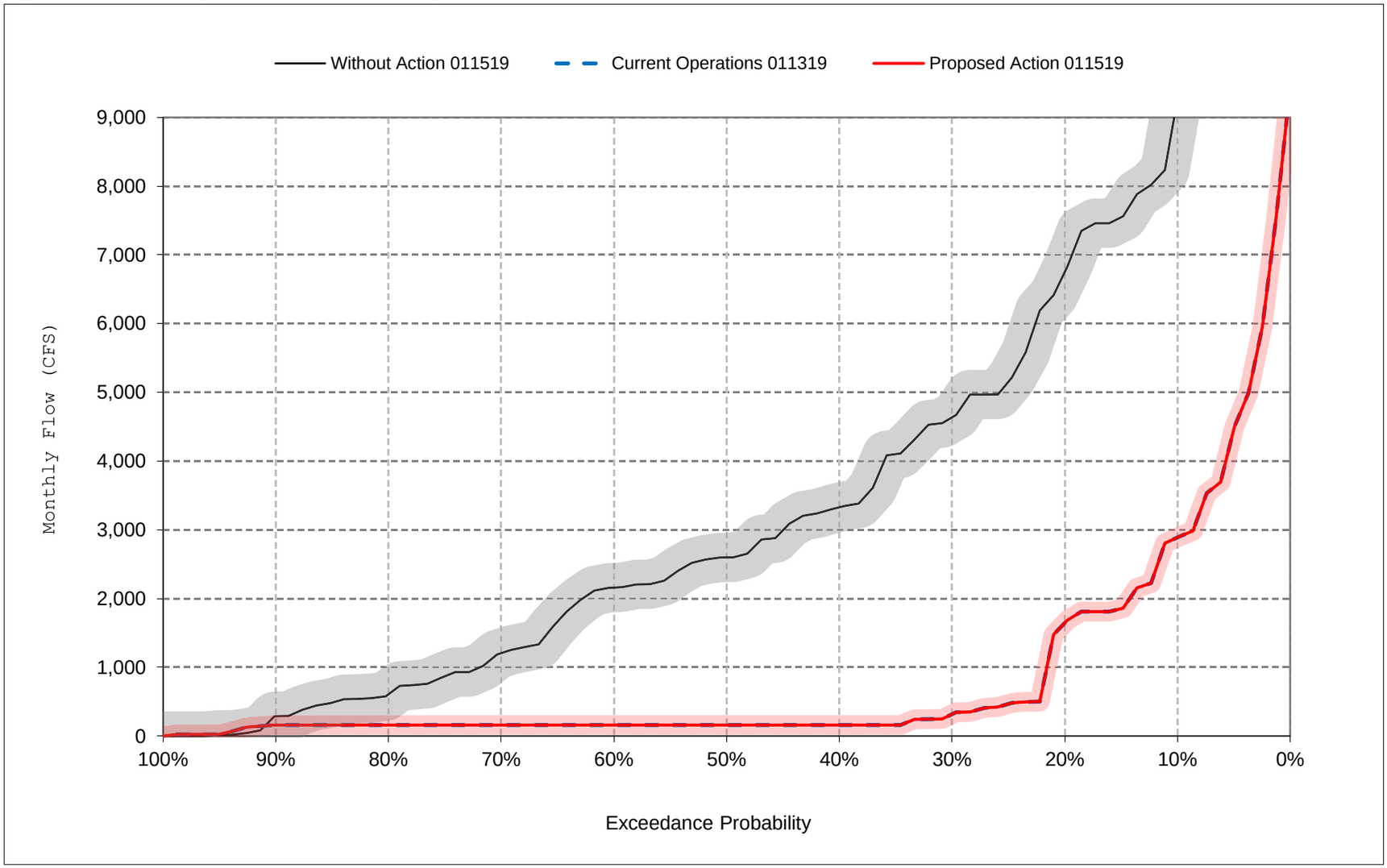
Figure 33-14. San Joaquin River Flow at Gravelly Ford, May



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

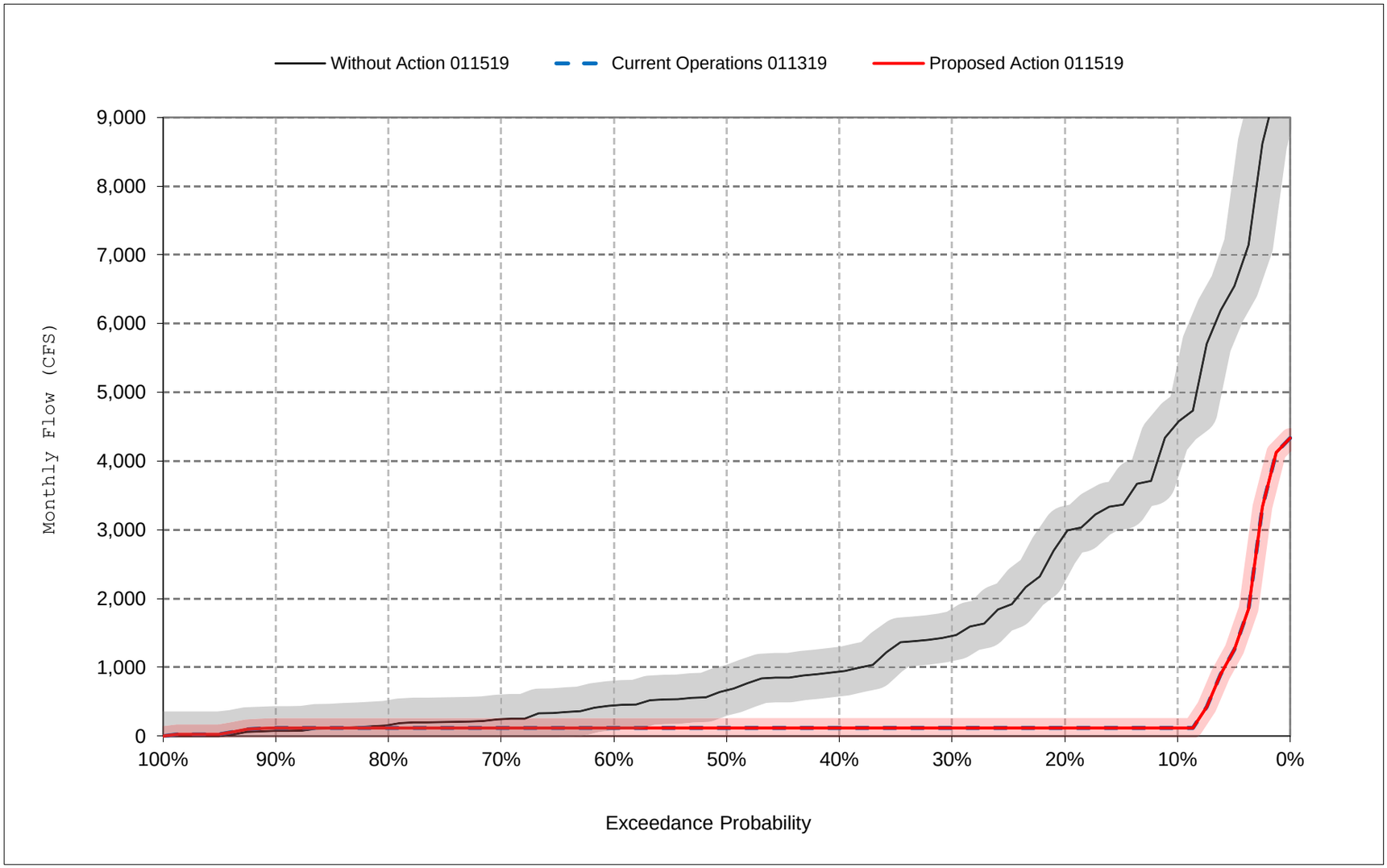
Figure 33-15. San Joaquin River Flow at Gravelly Ford, June



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

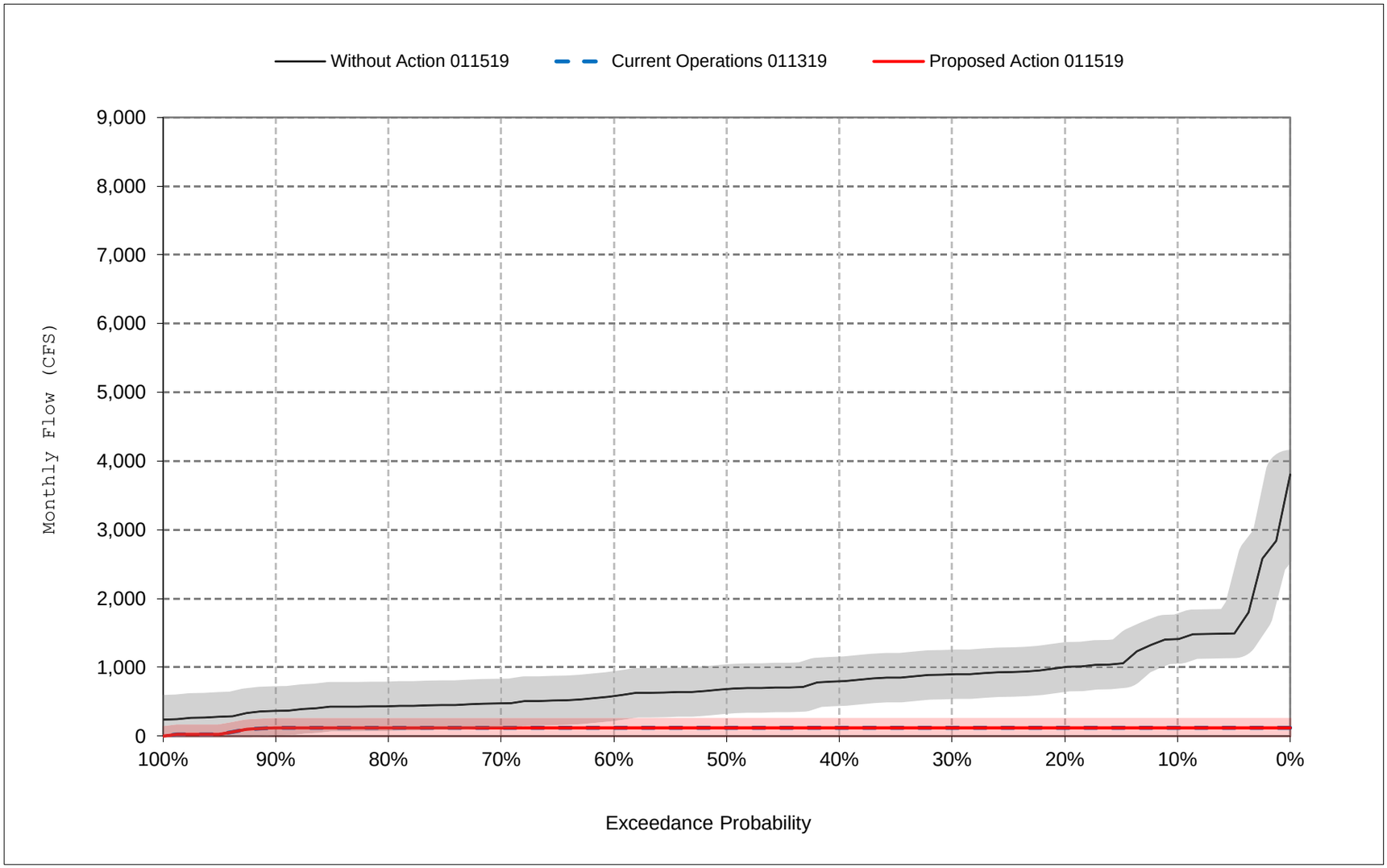
Figure 33-16. San Joaquin River Flow at Gravelly Ford, July



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

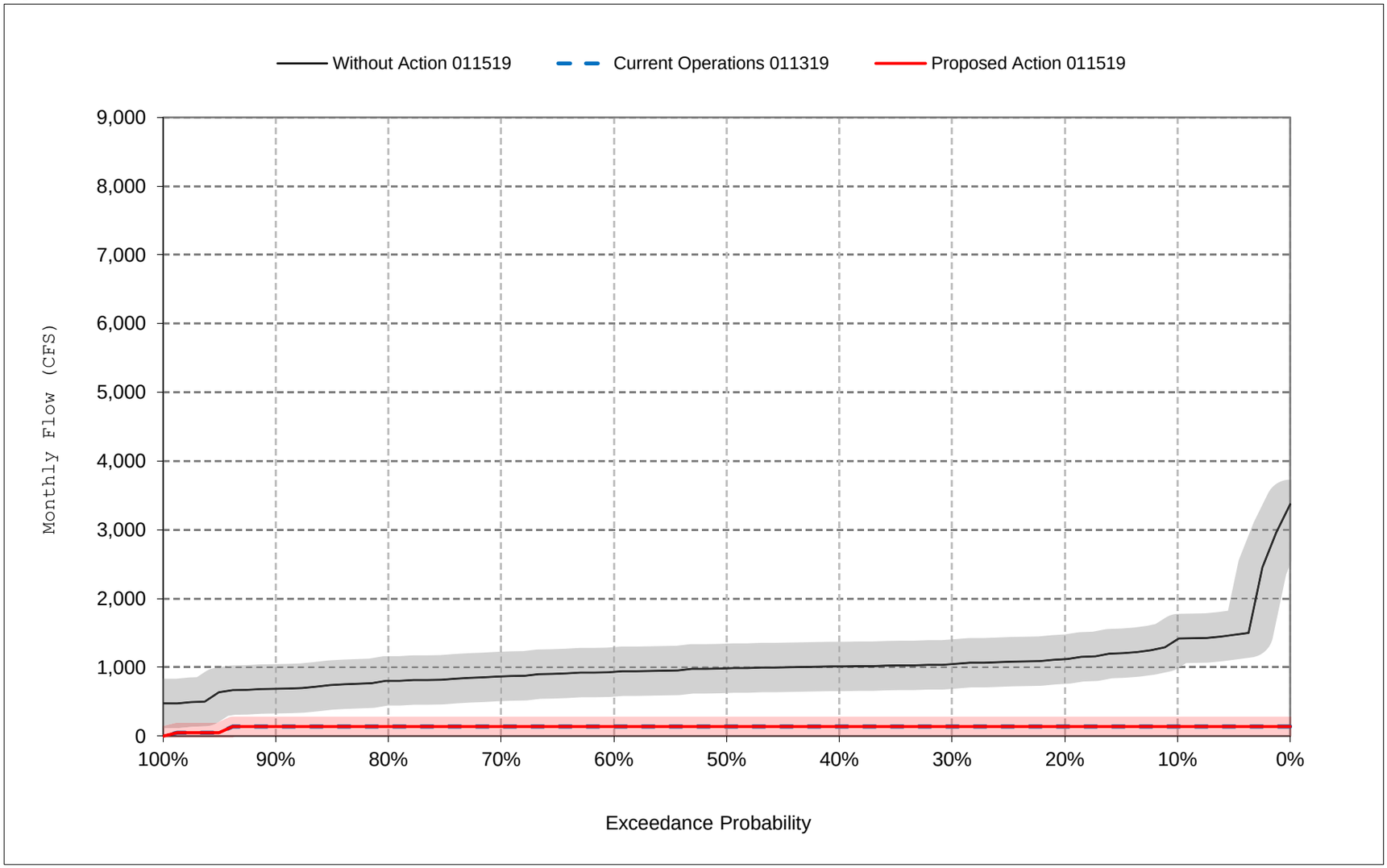
Figure 33-17. San Joaquin River Flow at Gravelly Ford, August



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Figure 33-18. San Joaquin River Flow at Gravelly Ford, September



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Table 34-1. San Joaquin River Flow below Sack Dam, Monthly Flow

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	86	1,058	1,375	1,921	1,686	1,944	4,396	4,680	2,872	20	20	64
20%	86	596	1,076	1,377	1,163	1,322	3,179	1,782	1,475	20	20	38
30%	86	376	801	1,250	1,146	1,322	2,850	420	138	20	20	38
40%	86	295	629	1,000	1,146	1,154	2,775	251	57	20	20	38
50%	86	241	510	673	1,005	881	1,761	251	57	20	20	38
60%	86	232	382	559	775	747	1,370	251	57	20	20	38
70%	86	232	258	451	605	747	1,048	251	57	20	20	38
80%	86	232	180	251	464	747	783	57	57	20	20	38
90%	63	107	123	143	145	747	537	57	44	1	20	38
Long Term												
Full Simulation Period[a]	109	457	702	1,023	1,058	1,269	2,303	1,143	926	182	26	57
Water Year Types[b,c]												
Wet (23%)	194	733	1,028	2,089	2,090	2,497	4,703	3,969	3,645	730	55	113
Above Normal (24%)	105	595	752	1,186	1,177	1,177	2,839	595	235	20	20	38
Below Normal (10%)	86	315	551	785	912	747	1,801	215	57	20	20	38
Dry (16%)	84	426	649	593	630	811	1,201	191	57	18	20	60
Critical (27%)	61	155	457	296	363	753	579	101	37	12	13	32

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	86	232	123	1,034	1,172	1,492	3,803	3,955	1,706	20	20	38
20%	86	232	123	143	377	747	2,850	1,432	457	20	20	38
30%	86	232	123	143	145	747	2,850	137	138	20	20	38
40%	86	232	123	143	145	747	2,585	57	57	20	20	38
50%	86	232	123	143	142	747	1,670	57	57	20	20	38
60%	86	232	123	143	142	747	1,228	57	57	20	20	38
70%	86	232	123	143	142	747	980	57	57	20	20	38
80%	86	232	123	143	142	747	539	57	57	20	20	38
90%	86	232	123	143	142	747	131	57	57	20	20	38
Long Term												
Full Simulation Period[a]	86	263	274	456	493	1,041	2,074	806	584	67	18	36
Water Year Types[b,c]												
Wet (23%)	110	442	610	1,262	1,519	1,987	4,330	3,074	2,204	231	20	38
Above Normal (24%)	86	232	167	302	293	826	2,631	280	199	20	20	38
Below Normal (10%)	86	232	123	310	107	747	1,731	57	57	20	20	38
Dry (16%)	86	232	260	143	142	747	998	57	57	20	20	38
Critical (27%)	67	165	147	137	136	703	380	39	40	13	13	29

Current Operations 011319 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	**-826**	**-1,251**	**-888**	**-514**	**-452**	**-593**	**-725**	**-1,166**	0	0	**-26**
20%	0	**-364**	**-953**	**-1,233**	**-786**	**-575**	**-330**	**-350**	**-1,018**	0	0	0
30%	0	**-144**	**-678**	**-1,107**	**-1,001**	**-575**	0	**-283**	0	0	0	0
40%	0	**-63**	**-505**	**-857**	**-1,001**	**-408**	**-190**	**-194**	0	0	0	0
50%	0	**-9**	**-387**	**-530**	**-863**	**-135**	**-91**	**-194**	0	0	0	0
60%	0	0	**-259**	**-416**	**-633**	0	**-142**	**-194**	0	0	0	0
70%	0	0	**-135**	**-308**	**-463**	0	**-69**	**-194**	0	0	0	0
80%	0	0	**-57**	**-107**	**-323**	0	**-244**	0	0	0	0	0
90%	23	125	**0**	0	**-3**	0	**-406**	0	13	19	0	0
Long Term												
Full Simulation Period[a]	**-22**	**-194**	**-429**	**-568**	**-564**	**-228**	**-230**	**-337**	**-342**	**-115**	**-8**	**-22**
Water Year Types[b,c]												
Wet (23%)	**-83**	**-291**	**-419**	**-827**	**-571**	**-511**	**-373**	**-894**	**-1,441**	**-499**	**-35**	**-75**
Above Normal (24%)	**-19**	**-363**	**-585**	**-884**	**-883**	**-352**	**-208**	**-316**	**-36**	0	0	0
Below Normal (10%)	0	**-83**	**-428**	**-475**	**-805**	0	**-71**	**-158**	0	0	0	0
Dry (16%)	2	**-194**	**-389**	**-449**	**-487**	**-64**	**-203**	**-134**	0	2	0	**-23**
Critical (27%)	5	11	**-310**	**-160**	**-227**	**-51**	**-199**	**-62**	3	1	0	**-3**

a Based on the 82-year simulation period.

b As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 34-2. San Joaquin River Flow below Sack Dam, Monthly Flow

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	86	1,058	1,375	1,921	1,686	1,944	4,396	4,680	2,872	20	20	64
20%	86	596	1,076	1,377	1,163	1,322	3,179	1,782	1,475	20	20	38
30%	86	376	801	1,250	1,146	1,322	2,850	420	138	20	20	38
40%	86	295	629	1,000	1,146	1,154	2,775	251	57	20	20	38
50%	86	241	510	673	1,005	881	1,761	251	57	20	20	38
60%	86	232	382	559	775	747	1,370	251	57	20	20	38
70%	86	232	258	451	605	747	1,048	251	57	20	20	38
80%	86	232	180	251	464	747	783	57	57	20	20	38
90%	63	107	123	143	145	747	537	57	44	1	20	38
Long Term												
Full Simulation Period[a]	109	457	702	1,023	1,058	1,269	2,303	1,143	926	182	26	57
Water Year Types[b,c]												
Wet (23%)	194	733	1,028	2,089	2,090	2,497	4,703	3,969	3,645	730	55	113
Above Normal (24%)	105	595	752	1,186	1,177	1,177	2,839	595	235	20	20	38
Below Normal (10%)	86	315	551	785	912	747	1,801	215	57	20	20	38
Dry (16%)	84	426	649	593	630	811	1,201	191	57	18	20	60
Critical (27%)	61	155	457	296	363	753	579	101	37	12	13	32

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	86	232	123	1,033	1,160	1,488	3,802	3,955	1,706	20	20	38
20%	86	232	123	143	381	747	2,850	1,429	457	20	20	38
30%	86	232	123	143	145	747	2,850	137	138	20	20	38
40%	86	232	123	143	145	747	2,585	57	57	20	20	38
50%	86	232	123	143	142	747	1,670	57	57	20	20	38
60%	86	232	123	143	142	747	1,228	57	57	20	20	38
70%	86	232	123	143	142	747	980	57	57	20	20	38
80%	86	232	123	143	142	747	539	57	57	20	20	38
90%	86	232	123	143	142	747	131	57	57	20	20	38
Long Term												
Full Simulation Period[a]	86	263	274	455	491	1,040	2,073	805	584	67	18	36
Water Year Types[b,c]												
Wet (23%)	110	442	610	1,260	1,511	1,982	4,327	3,072	2,203	230	20	38
Above Normal (24%)	86	232	167	301	292	825	2,631	279	199	20	20	38
Below Normal (10%)	86	232	123	310	107	747	1,731	57	57	20	20	38
Dry (16%)	86	232	260	143	142	747	998	57	57	20	20	38
Critical (27%)	67	165	147	137	136	703	380	39	40	13	13	29

Proposed Action 011519 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	**-826**	**-1,251**	**-888**	**-526**	**-455**	**-594**	**-725**	**-1,166**	0	0	**-26**
20%	0	**-364**	**-953**	**-1,233**	**-782**	**-575**	**-330**	**-353**	**-1,018**	0	0	0
30%	0	**-144**	**-678**	**-1,107**	**-1,001**	**-575**	0	**-283**	0	0	0	0
40%	0	**-63**	**-505**	**-857**	**-1,001**	**-408**	**-190**	**-194**	0	0	0	0
50%	0	**-9**	**-387**	**-530**	**-863**	**-135**	**-91**	**-194**	0	0	0	0
60%	0	0	**-259**	**-416**	**-633**	0	**-142**	**-194**	0	0	0	0
70%	0	0	**-135**	**-308**	**-463**	0	**-69**	**-194**	0	0	0	0
80%	0	0	**-57**	**-107**	**-323**	0	**-244**	0	0	0	0	0
90%	23	125	**0**	0	**-3**	0	**-406**	0	13	19	0	0
Long Term												
Full Simulation Period[a]	**-22**	**-194**	**-429**	**-568**	**-567**	**-229**	**-230**	**-338**	**-342**	**-115**	**-8**	**-22**
Water Year Types[b,c]												
Wet (23%)	**-83**	**-291**	**-419**	**-828**	**-579**	**-515**	**-376**	**-896**	**-1,442**	**-499**	**-35**	**-75**
Above Normal (24%)	**-19**	**-363**	**-585**	**-885**	**-885**	**-352**	**-208**	**-316**	**-36**	0	0	0
Below Normal (10%)	0	**-83**	**-428**	**-475**	**-805**	0	**-71**	**-158**	0	0	0	0
Dry (16%)	2	**-194**	**-389**	**-449**	**-487**	**-64**	**-203**	**-134**	0	2	0	**-23**
Critical (27%)	5	11	**-310**	**-160**	**-227**	**-51**	**-199**	**-62**	3	1	0	**-3**

a Based on the 82-year simulation period.

b As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 34-3. San Joaquin River Flow below Sack Dam, Monthly Flow

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	86	232	123	1,034	1,172	1,492	3,803	3,955	1,706	20	20	38
20%	86	232	123	143	377	747	2,850	1,432	457	20	20	38
30%	86	232	123	143	145	747	2,850	137	138	20	20	38
40%	86	232	123	143	145	747	2,585	57	57	20	20	38
50%	86	232	123	143	142	747	1,670	57	57	20	20	38
60%	86	232	123	143	142	747	1,228	57	57	20	20	38
70%	86	232	123	143	142	747	980	57	57	20	20	38
80%	86	232	123	143	142	747	539	57	57	20	20	38
90%	86	232	123	143	142	747	131	57	57	20	20	38
Long Term												
Full Simulation Period[a]	86	263	274	456	493	1,041	2,074	806	584	67	18	36
Water Year Types[b,c]												
Wet (23%)	110	442	610	1,262	1,519	1,987	4,330	3,074	2,204	231	20	38
Above Normal (24%)	86	232	167	302	293	826	2,631	280	199	20	20	38
Below Normal (10%)	86	232	123	310	107	747	1,731	57	57	20	20	38
Dry (16%)	86	232	260	143	142	747	998	57	57	20	20	38
Critical (27%)	67	165	147	137	136	703	380	39	40	13	13	29

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	86	232	123	1,033	1,160	1,488	3,802	3,955	1,706	20	20	38
20%	86	232	123	143	381	747	2,850	1,429	457	20	20	38
30%	86	232	123	143	145	747	2,850	137	138	20	20	38
40%	86	232	123	143	145	747	2,585	57	57	20	20	38
50%	86	232	123	143	142	747	1,670	57	57	20	20	38
60%	86	232	123	143	142	747	1,228	57	57	20	20	38
70%	86	232	123	143	142	747	980	57	57	20	20	38
80%	86	232	123	143	142	747	539	57	57	20	20	38
90%	86	232	123	143	142	747	131	57	57	20	20	38
Long Term												
Full Simulation Period[a]	86	263	274	455	491	1,040	2,073	805	584	67	18	36
Water Year Types[b,c]												
Wet (23%)	110	442	610	1,260	1,511	1,982	4,327	3,072	2,203	230	20	38
Above Normal (24%)	86	232	167	301	292	825	2,631	279	199	20	20	38
Below Normal (10%)	86	232	123	310	107	747	1,731	57	57	20	20	38
Dry (16%)	86	232	260	143	142	747	998	57	57	20	20	38
Critical (27%)	67	165	147	137	136	703	380	39	40	13	13	29

Proposed Action 011519 minus Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	0	0	**0**	**-12**	**-3**	**-1**	**0**	0	0	0	0
20%	0	0	0	0	4	0	0	**-3**	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	0	0	**0**	**0**	**-2**	**-1**	**-1**	**-1**	**0**	**0**	0	0
Water Year Types[b,c]												
Wet (23%)	0	0	**0**	**-1**	**-7**	**-4**	**-3**	**-2**	**-1**	**0**	0	0
Above Normal (24%)	0	0	**0**	**0**	**-1**	**-1**	**0**	**-1**	0	0	0	0
Below Normal (10%)	0	0	0	0	0	0	0	0	0	0	0	0
Dry (16%)	0	0	0	0	0	0	0	0	0	0	0	0
Critical (27%)	0	0	**0**	0	0	0	0	0	0	0	0	0

a Based on the 82-year simulation period.

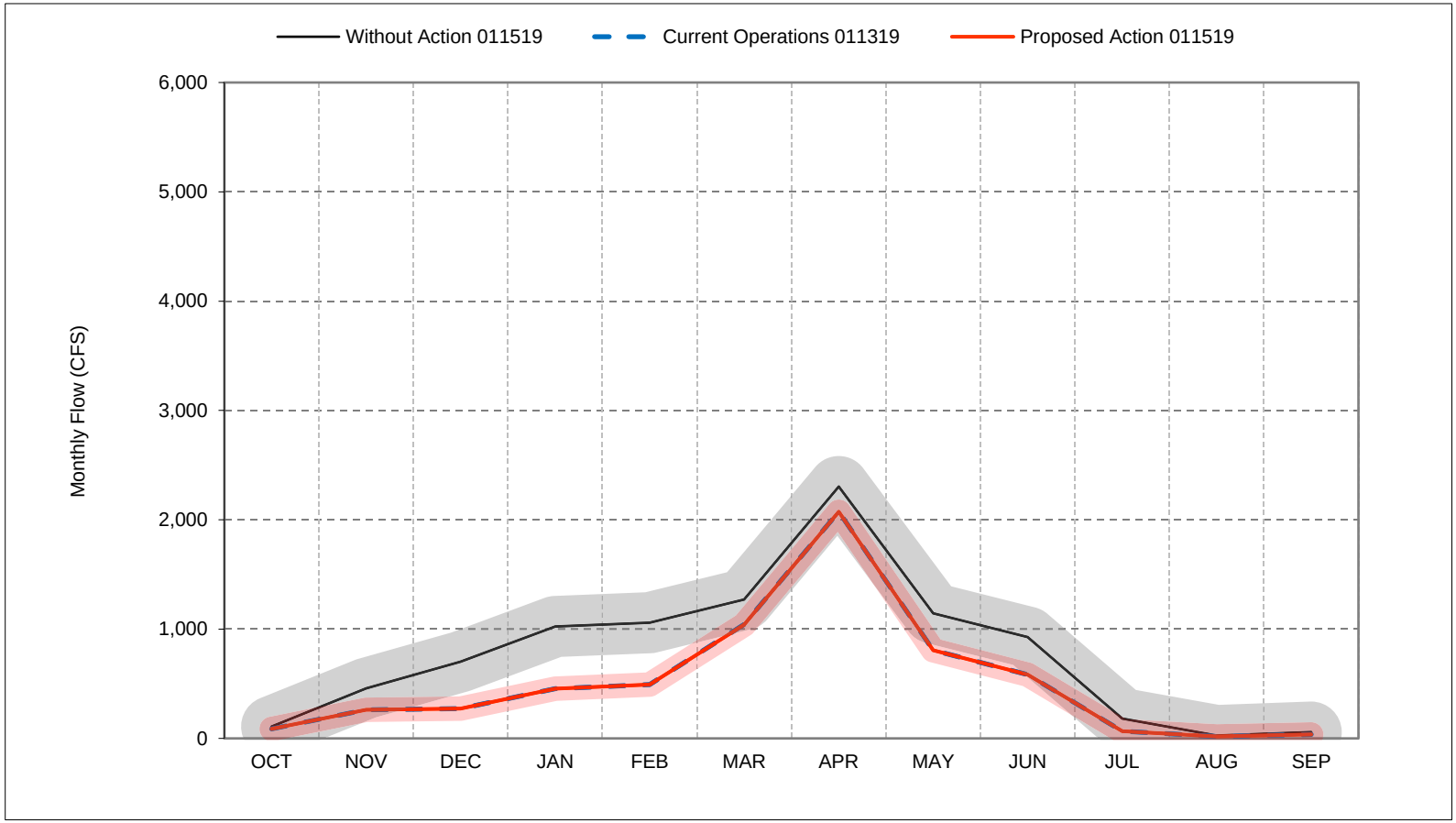
b As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

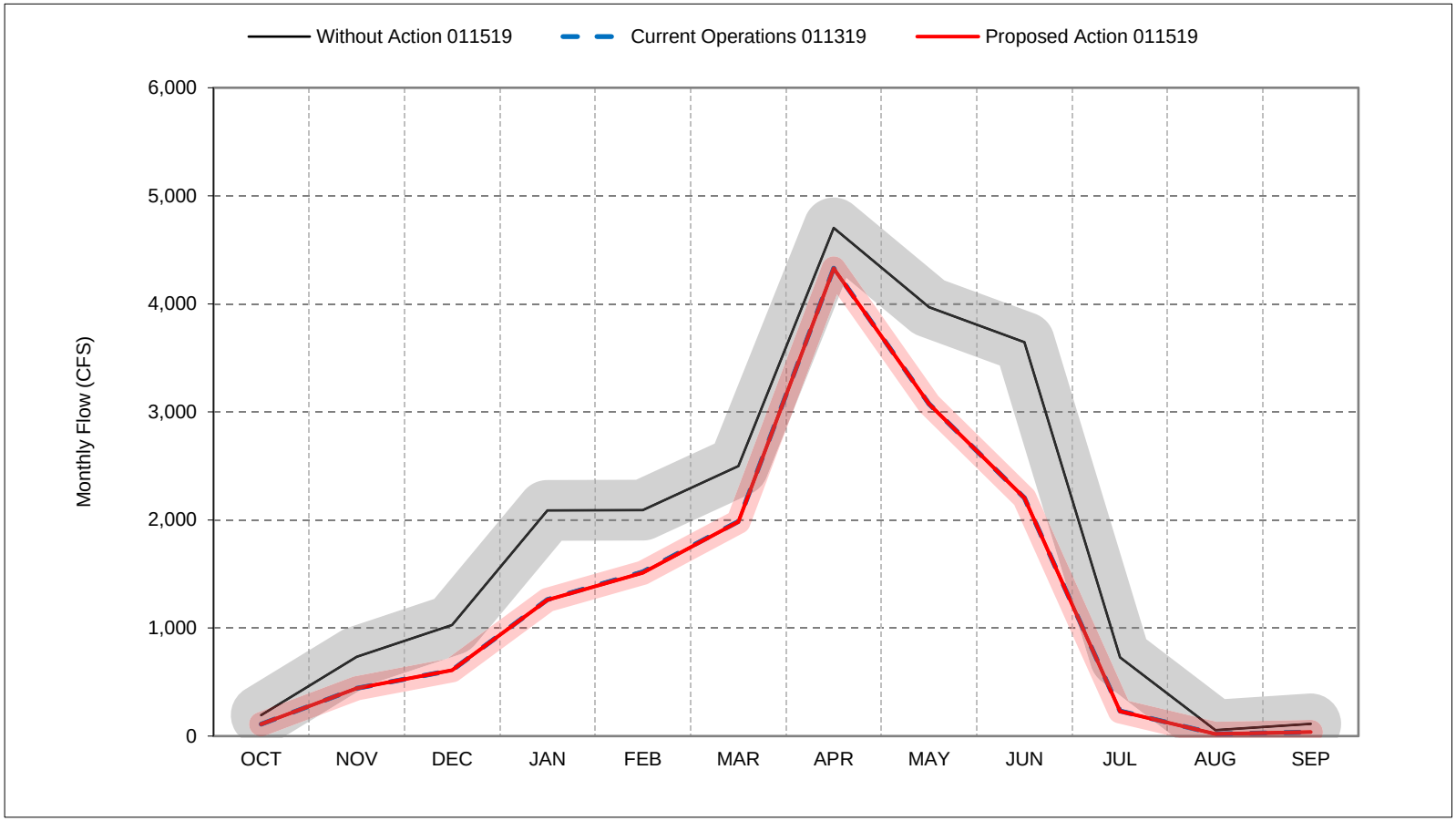
e These are draft results meant for qualitative analysis and are subject to revision.

Figure 34-1. San Joaquin River Flow below Sack Dam, Long-Term Average Flow



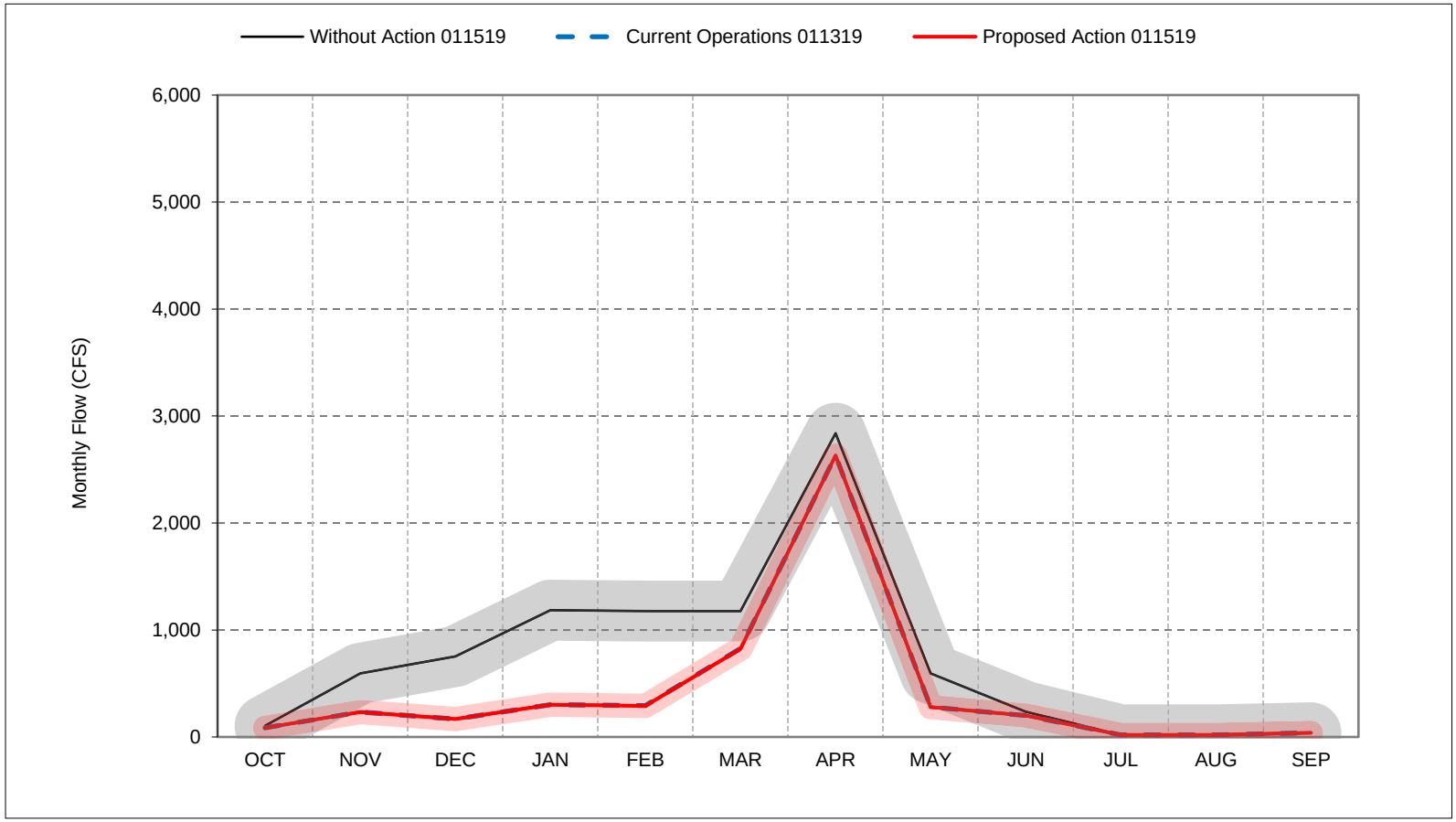
*As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 34-2. San Joaquin River Flow below Sack Dam, Wet Year Average Flow



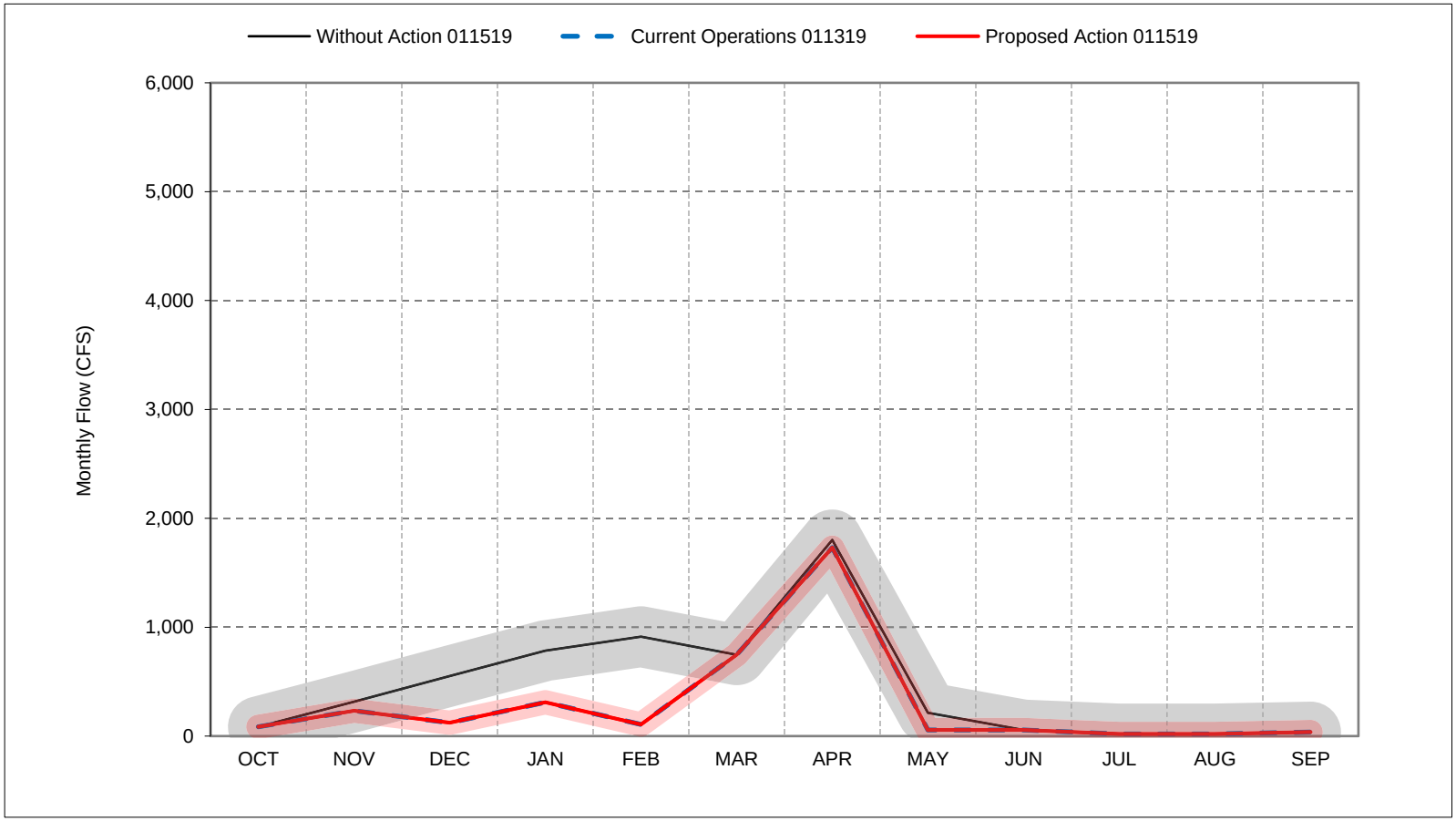
*As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 34-3. San Joaquin River Flow below Sack Dam, Above Normal Year Average Flow



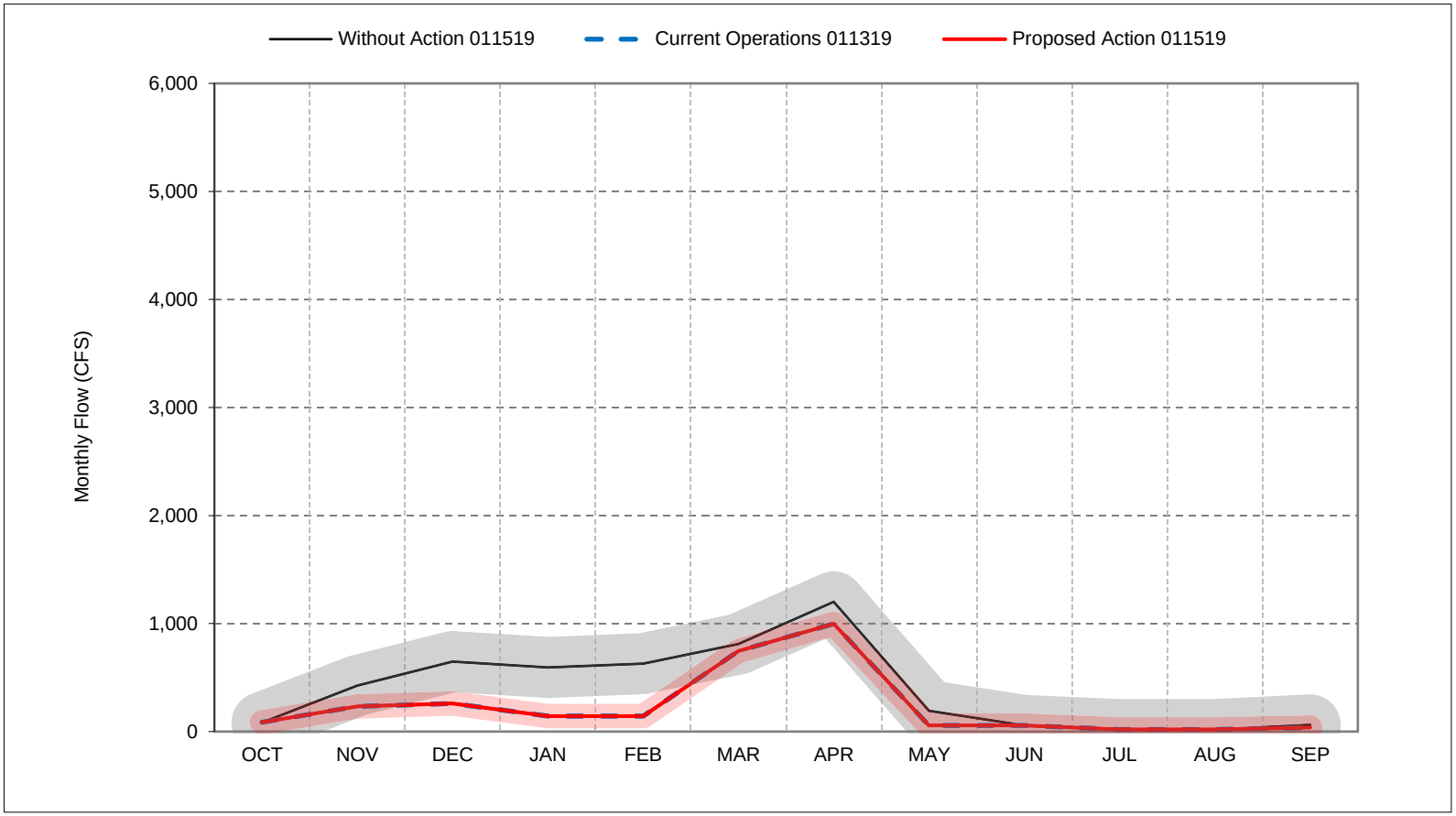
*As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 34-4. San Joaquin River Flow below Sack Dam, Below Normal Year Average Flow



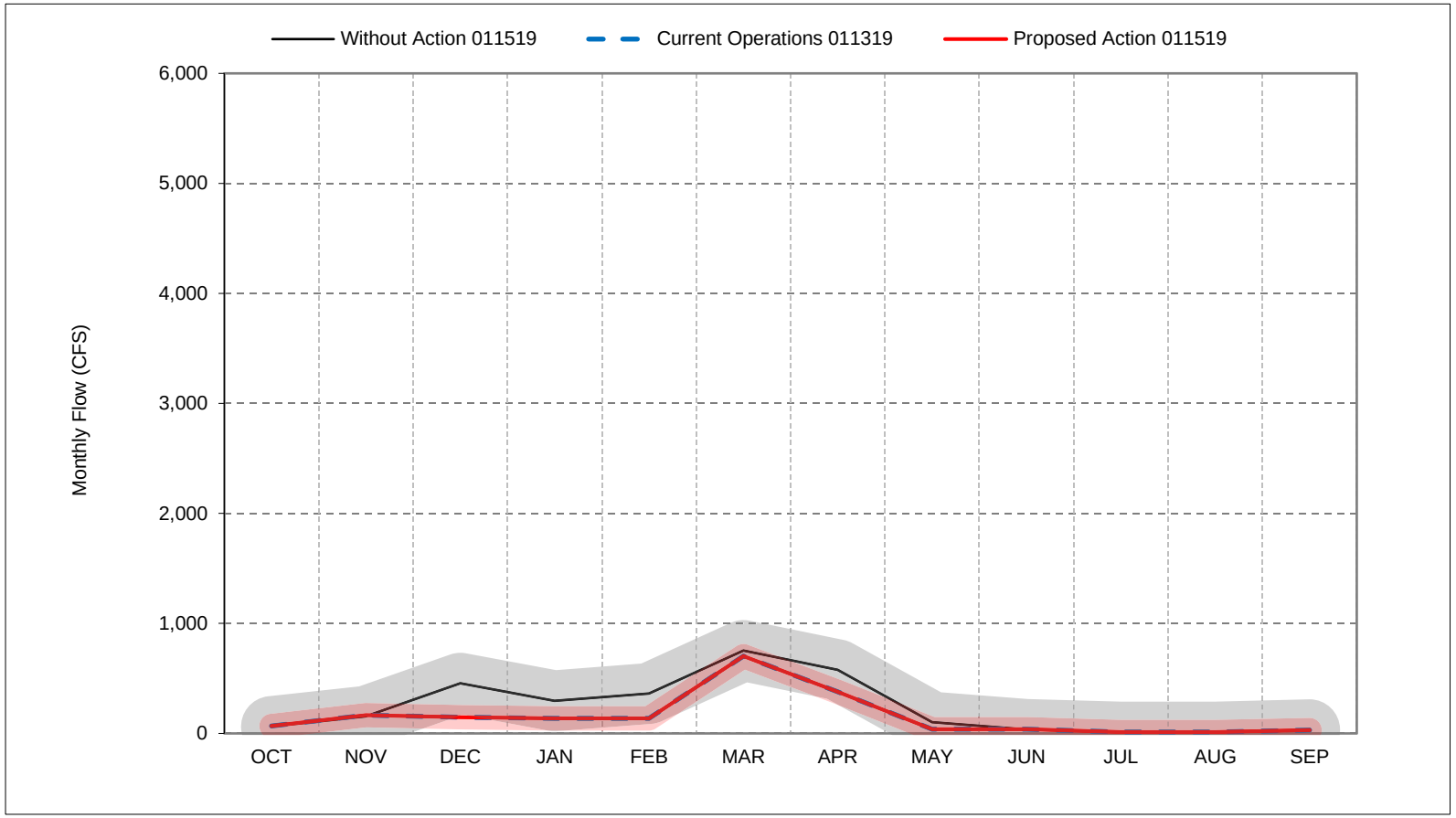
*As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 34-5. San Joaquin River Flow below Sack Dam, Dry Year Average Flow



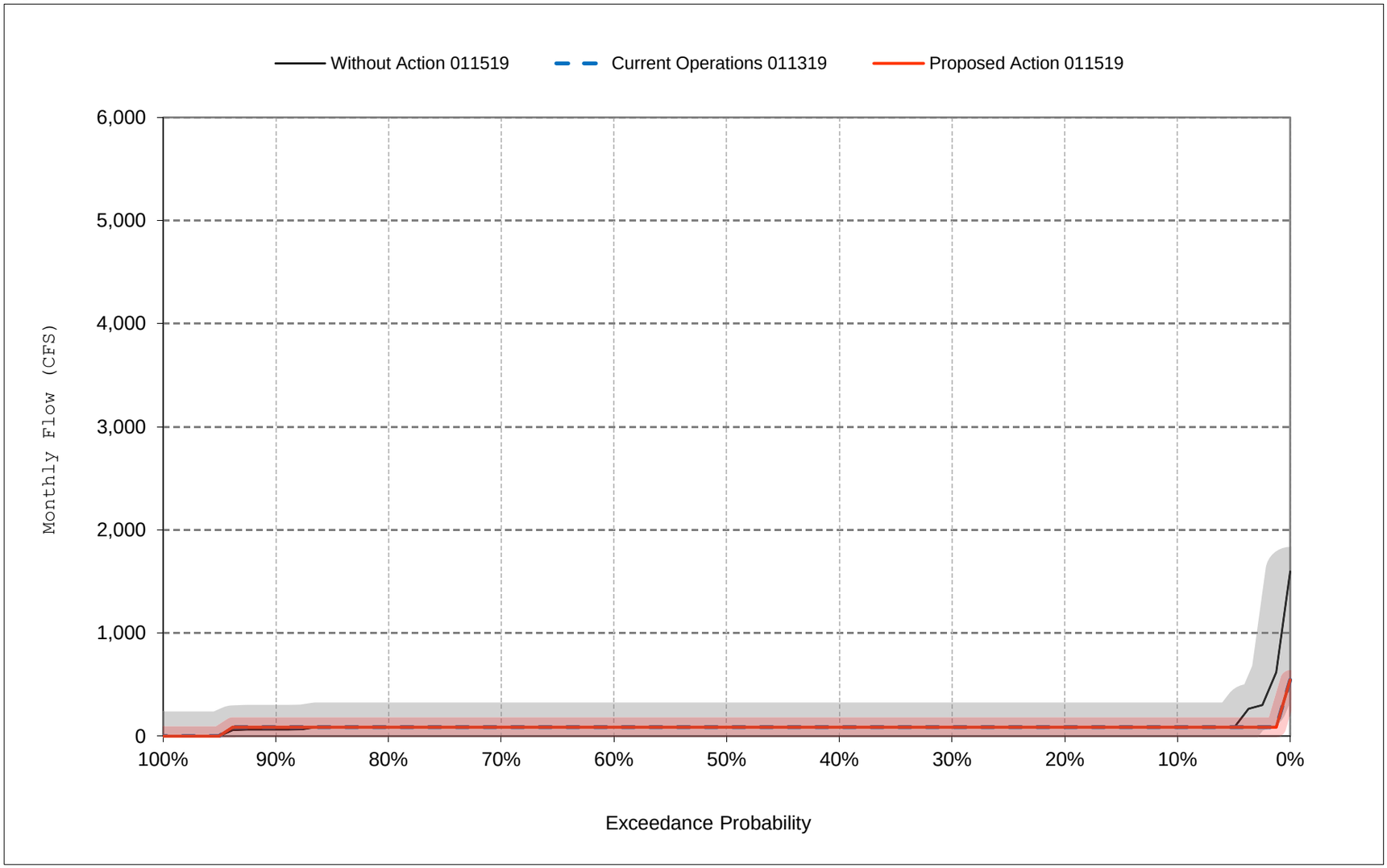
*As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 34-6. San Joaquin River Flow below Sack Dam, Critical Year Average Flow



*As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

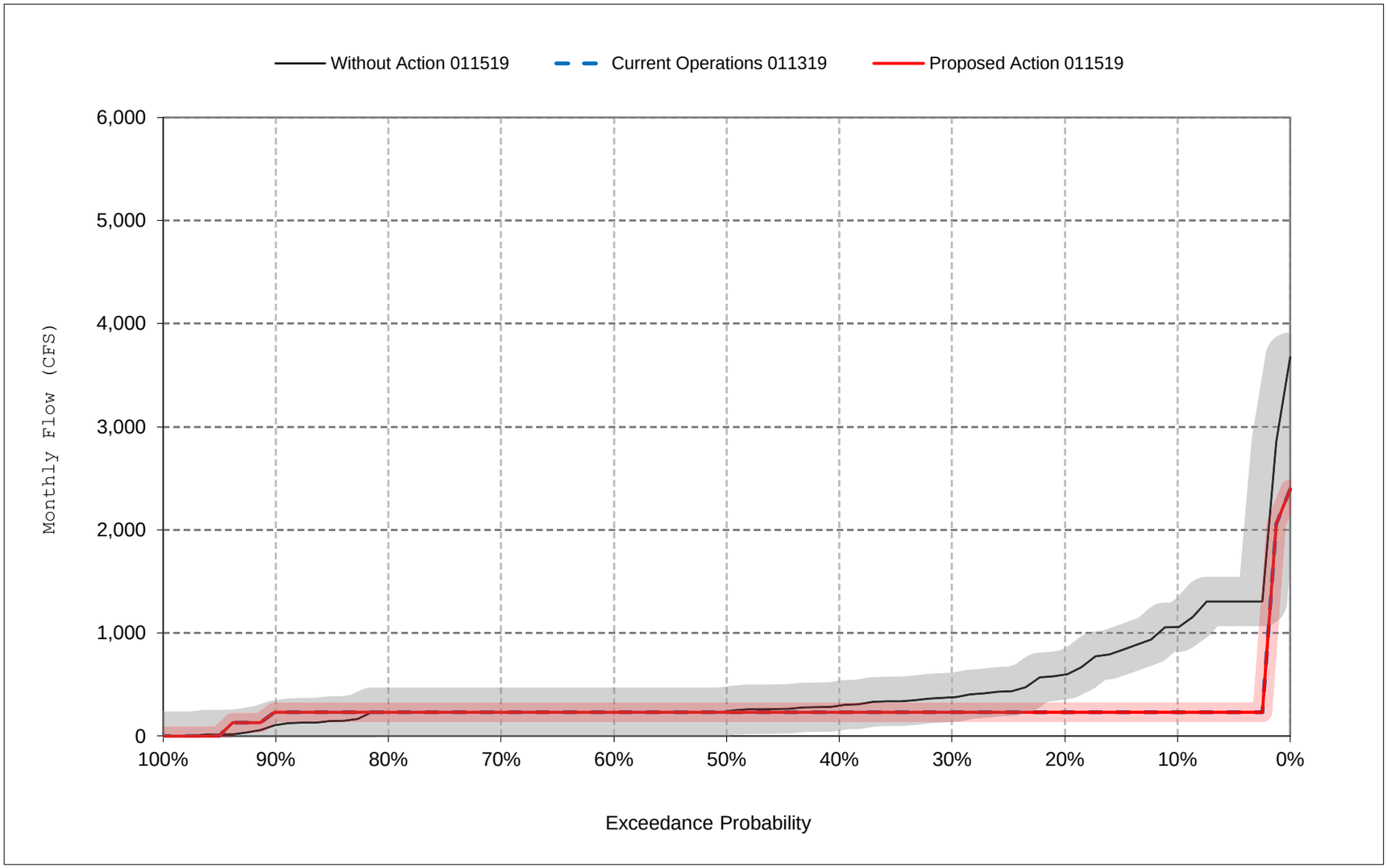
Figure 34-7. San Joaquin River Flow below Sack Dam, October



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

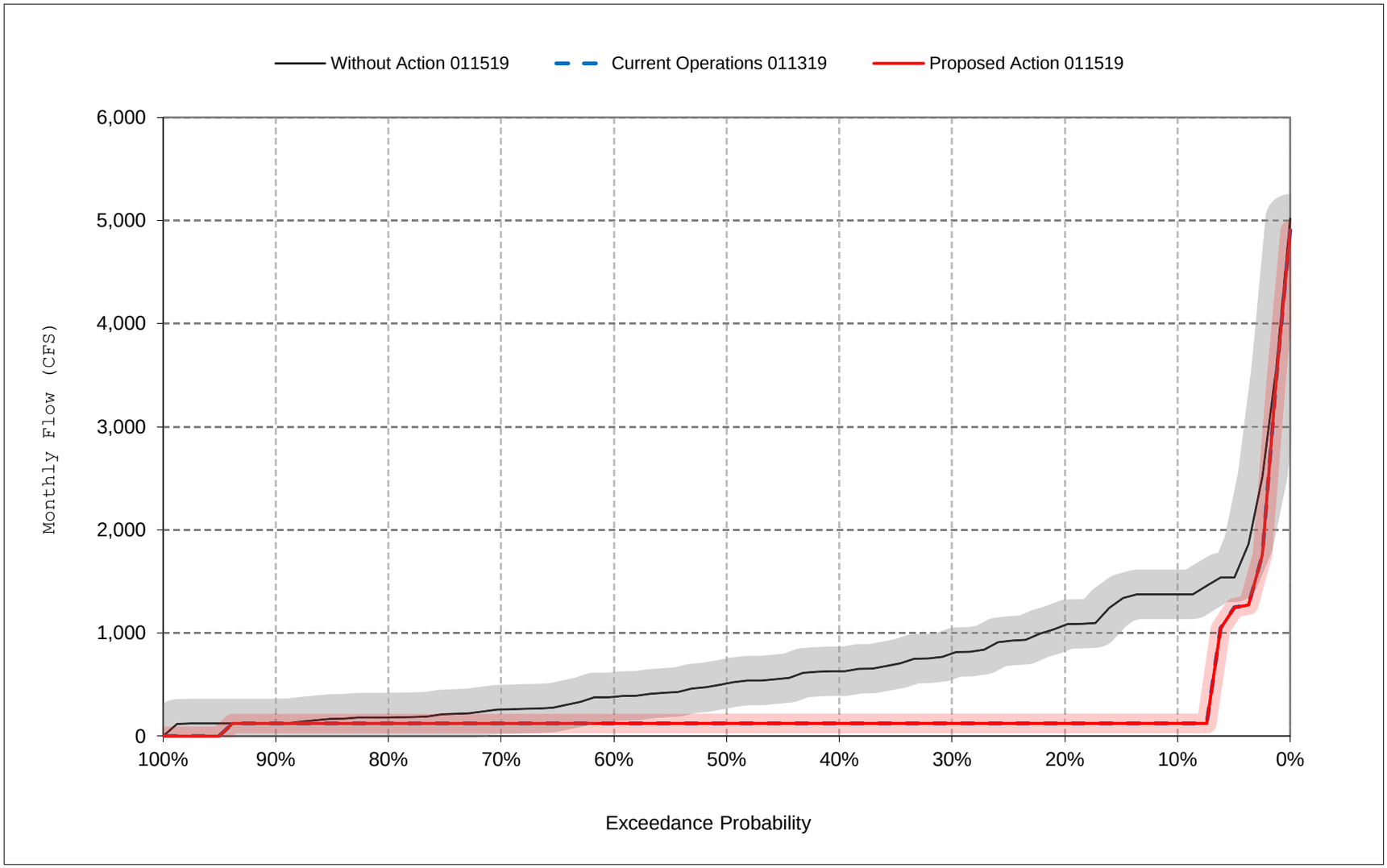
Figure 34-8. San Joaquin River Flow below Sack Dam, November



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

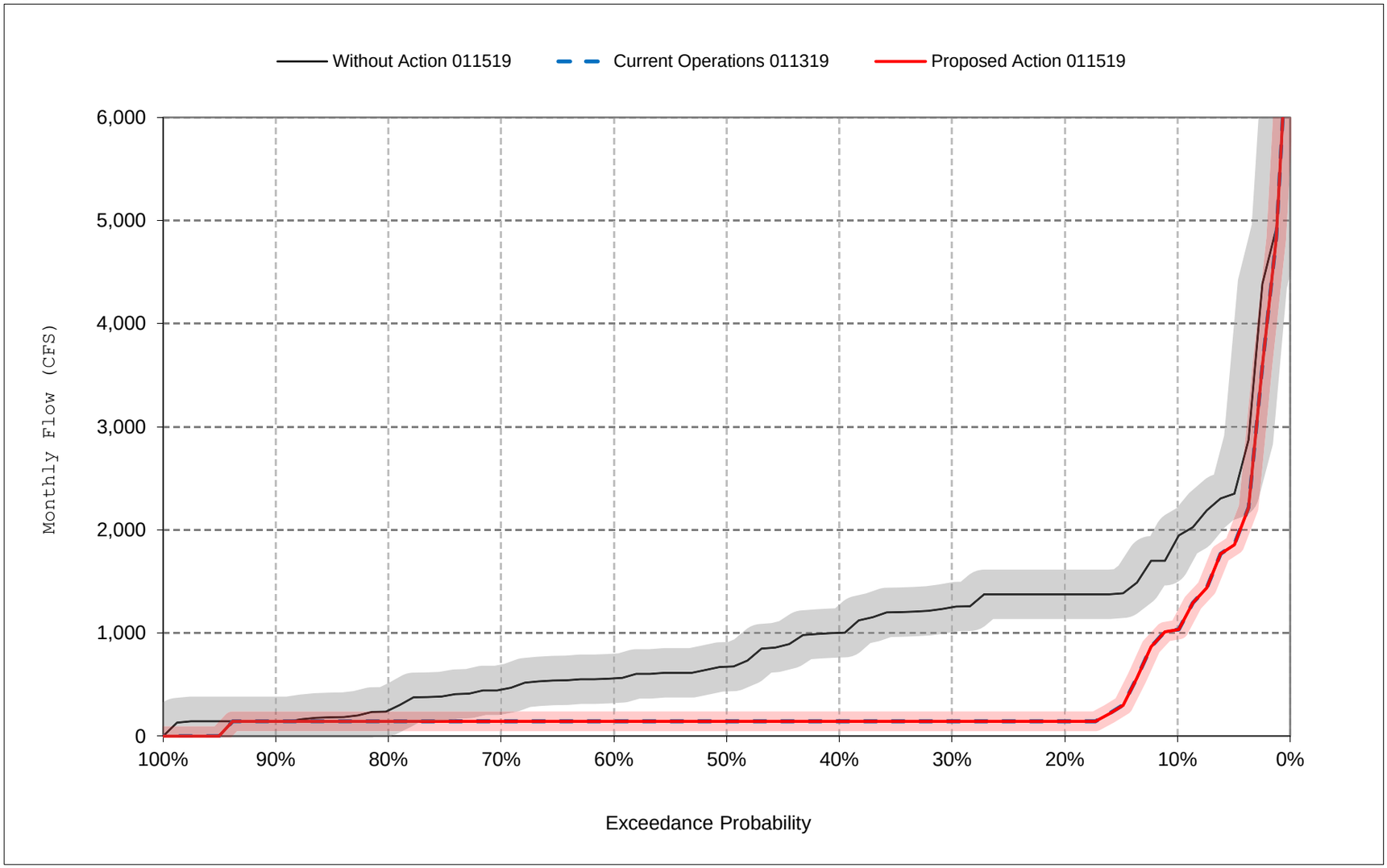
Figure 34-9. San Joaquin River Flow below Sack Dam, December



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

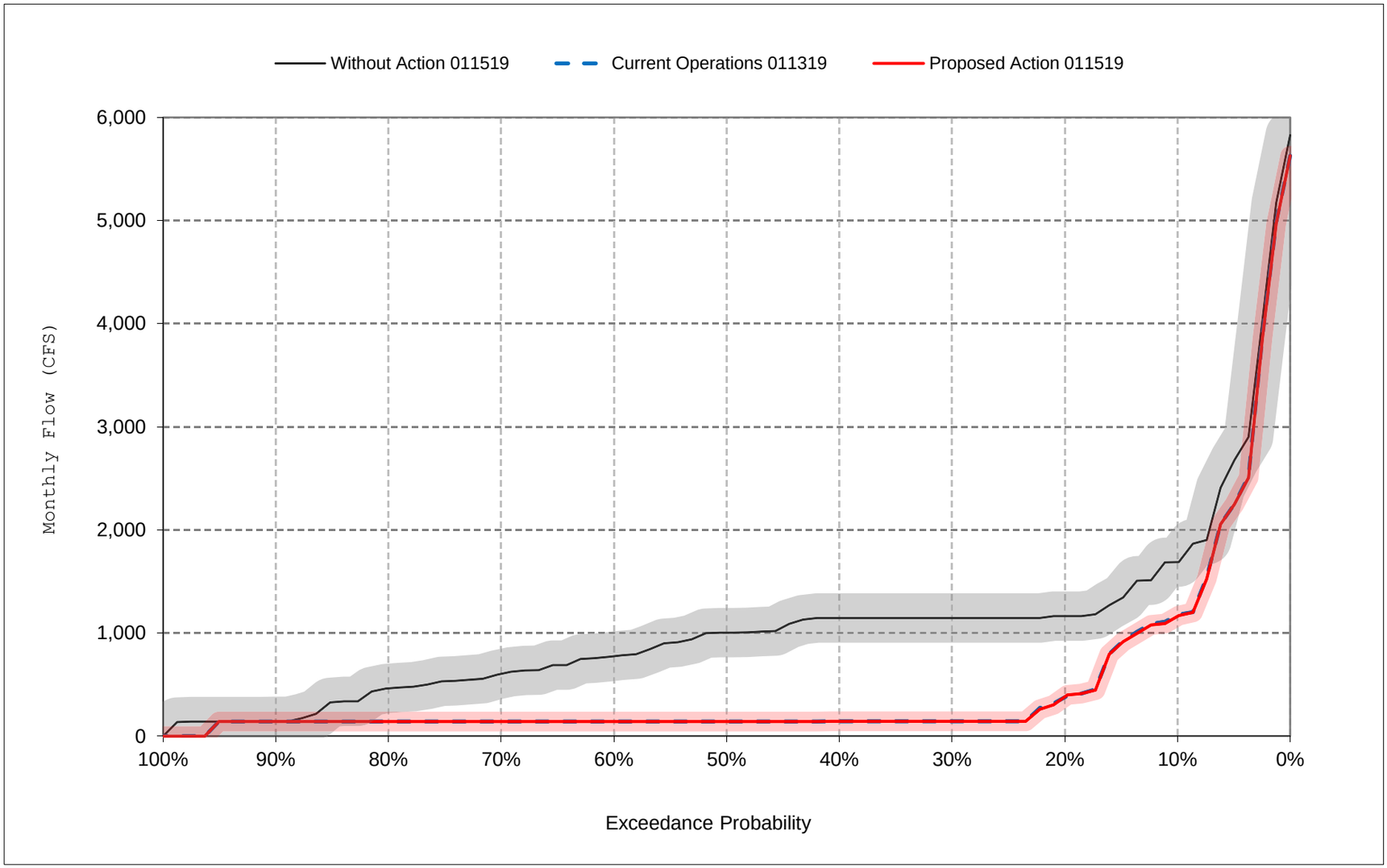
Figure 34-10. San Joaquin River Flow below Sack Dam, January



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

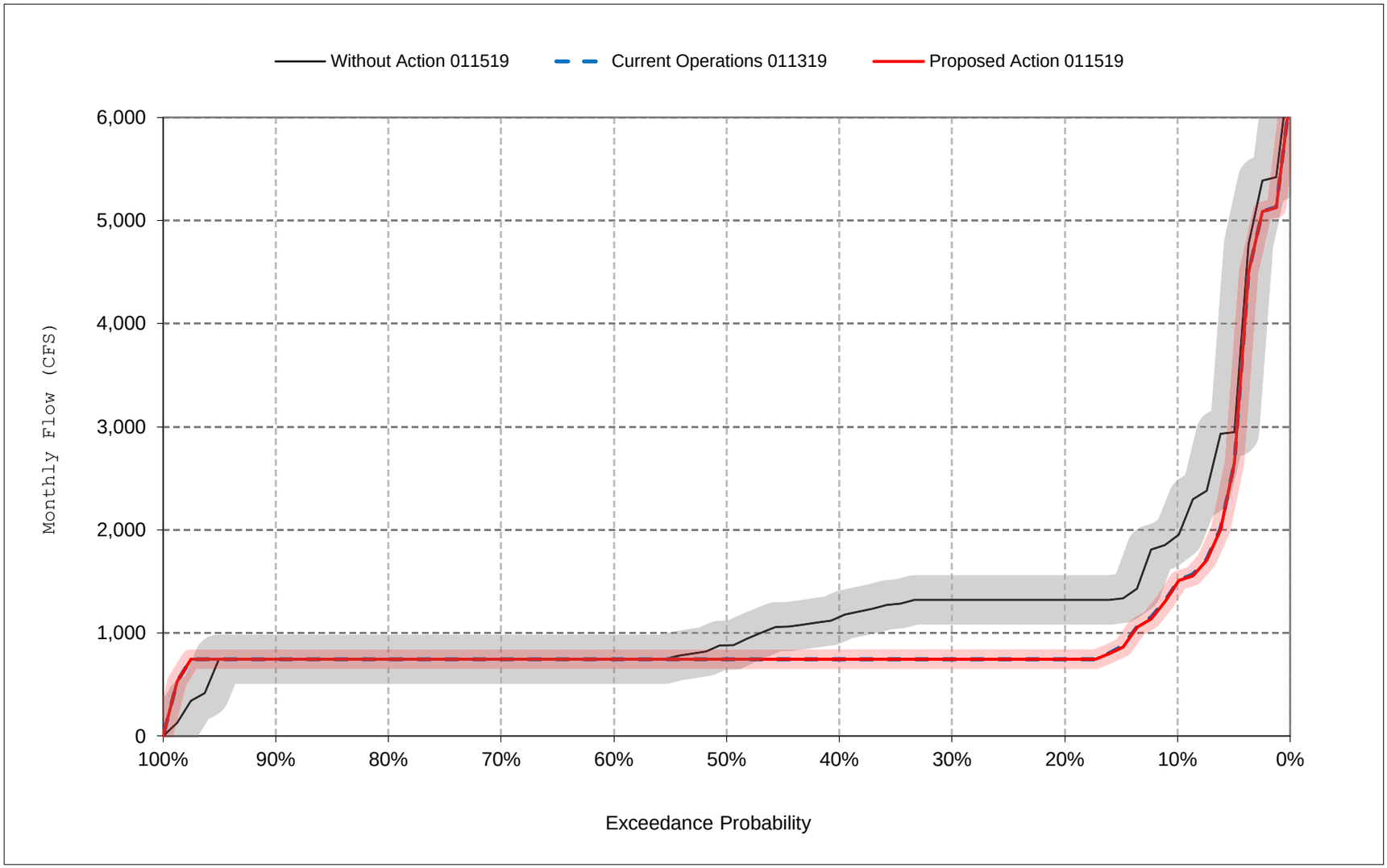
Figure 34-11. San Joaquin River Flow below Sack Dam, February



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

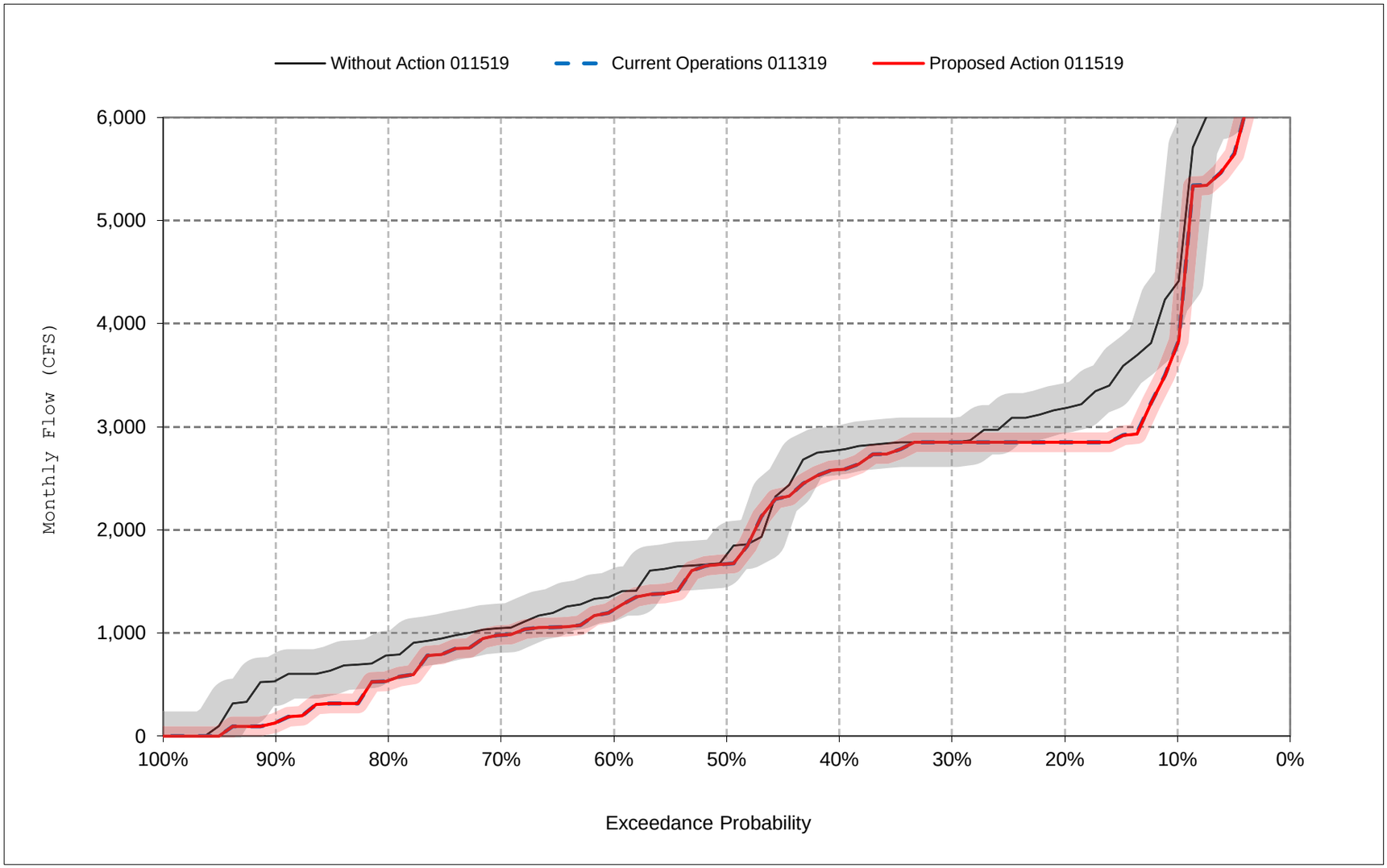
Figure 34-12. San Joaquin River Flow below Sack Dam, March



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

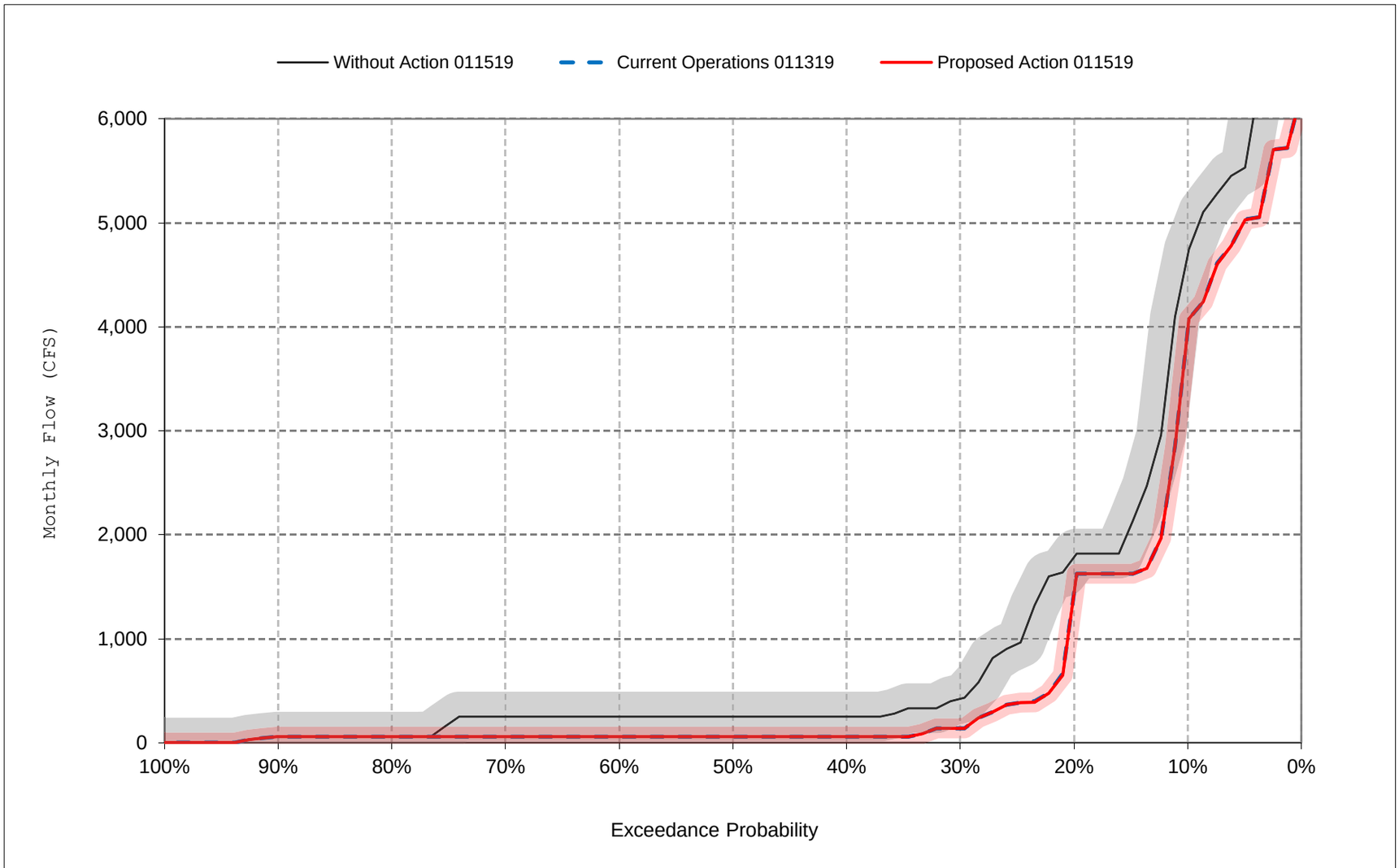
Figure 34-13. San Joaquin River Flow below Sack Dam, April



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

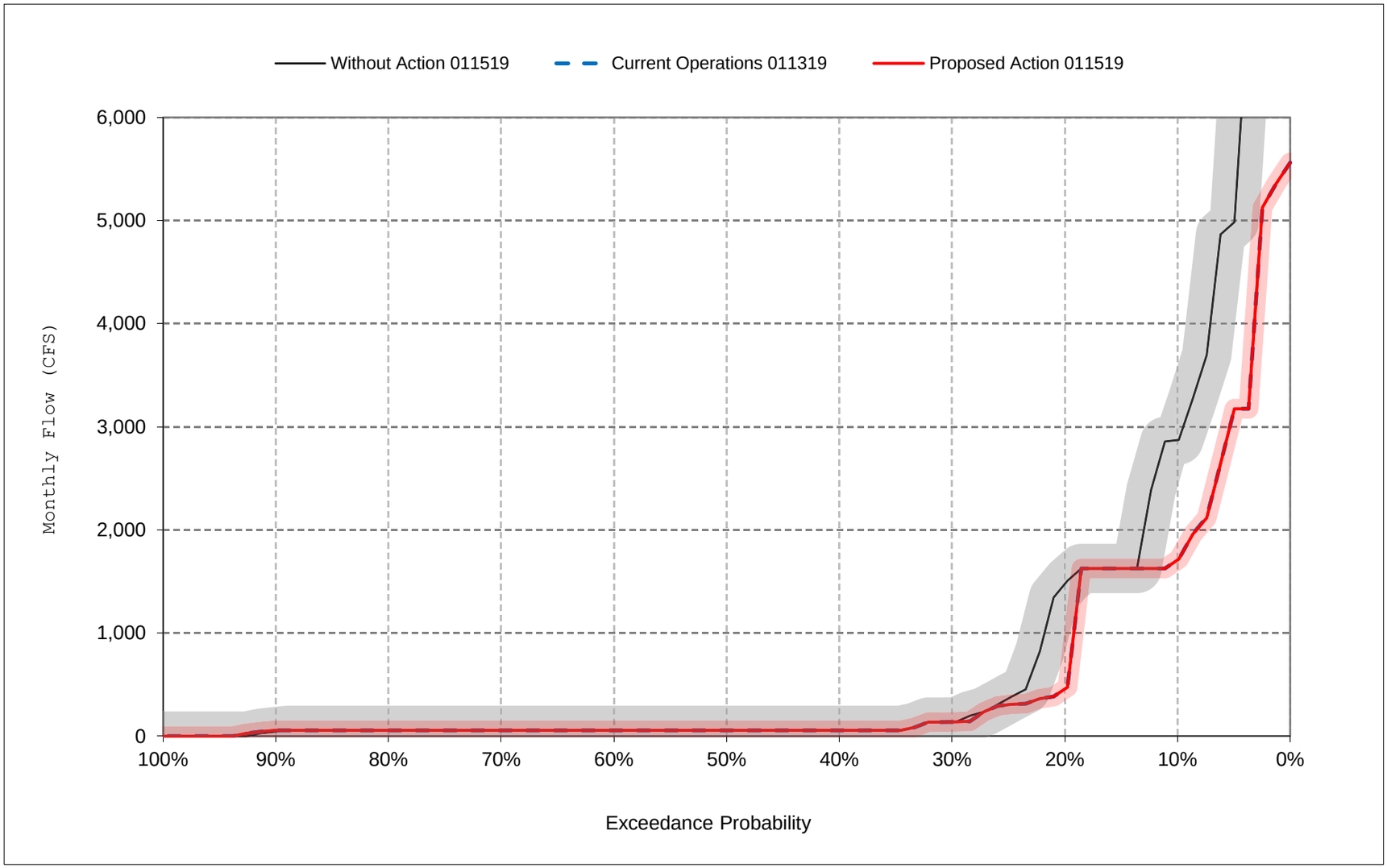
Figure 34-14. San Joaquin River Flow below Sack Dam, May



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

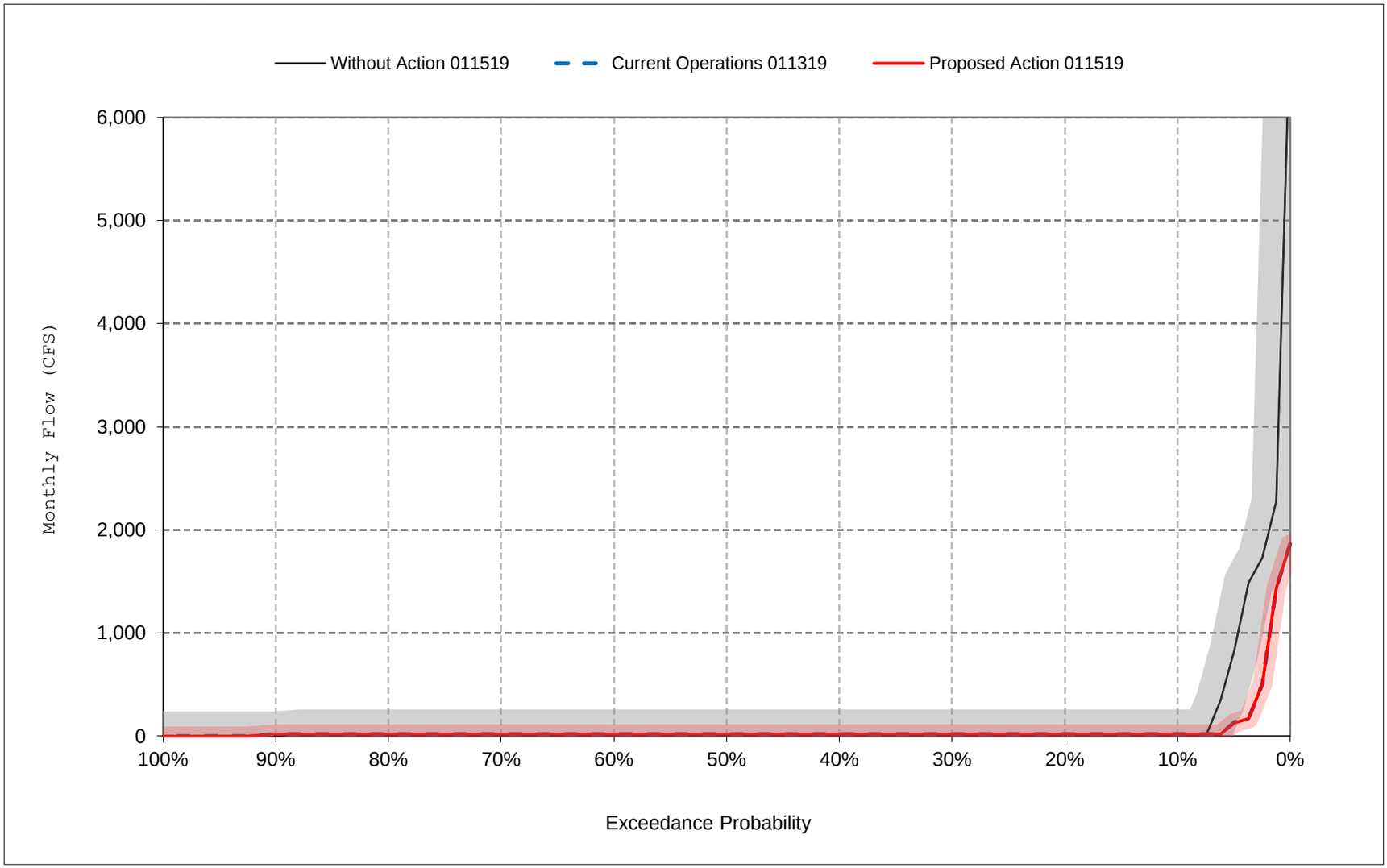
Figure 34-15. San Joaquin River Flow below Sack Dam, June



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

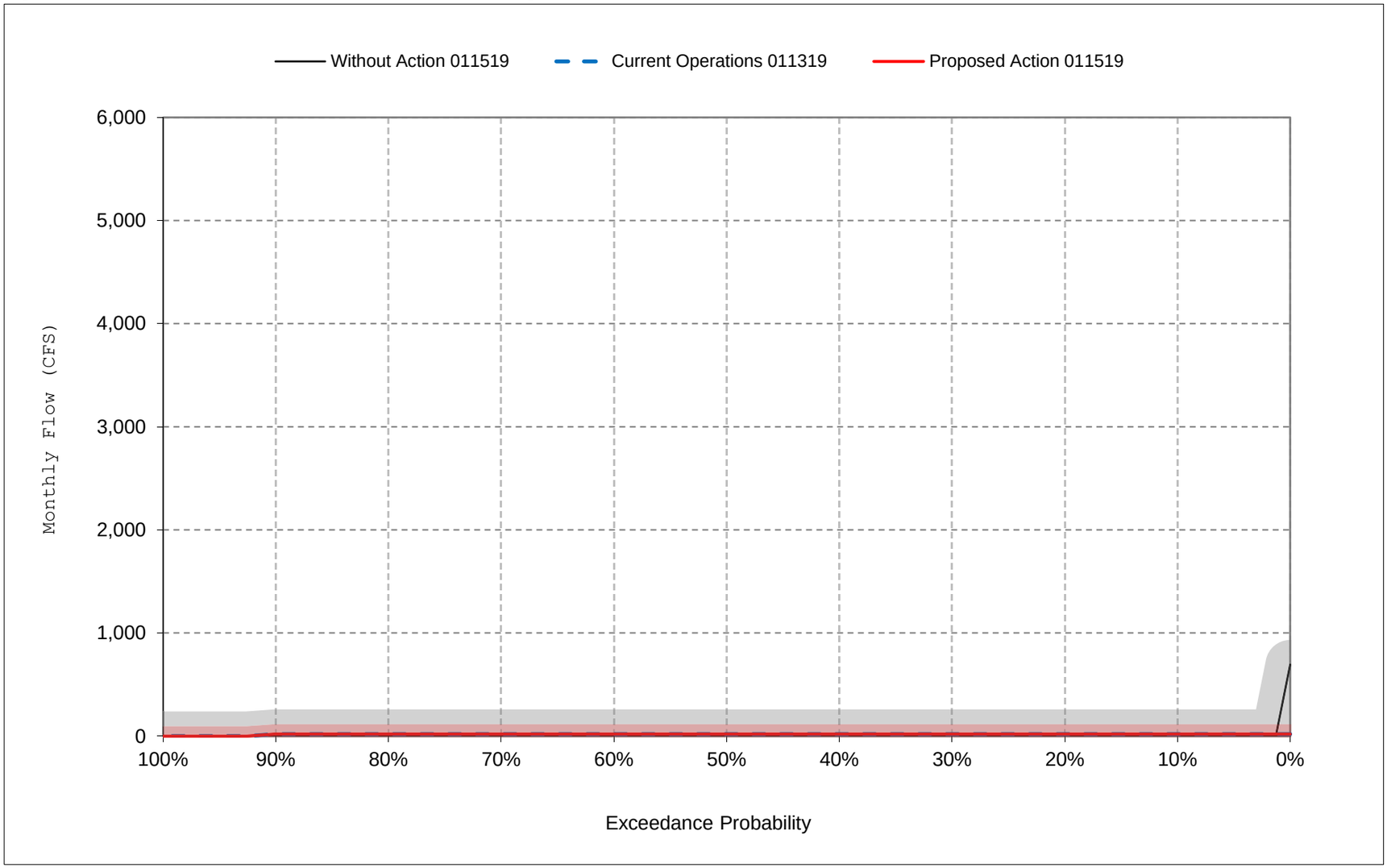
Figure 34-16. San Joaquin River Flow below Sack Dam, July



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

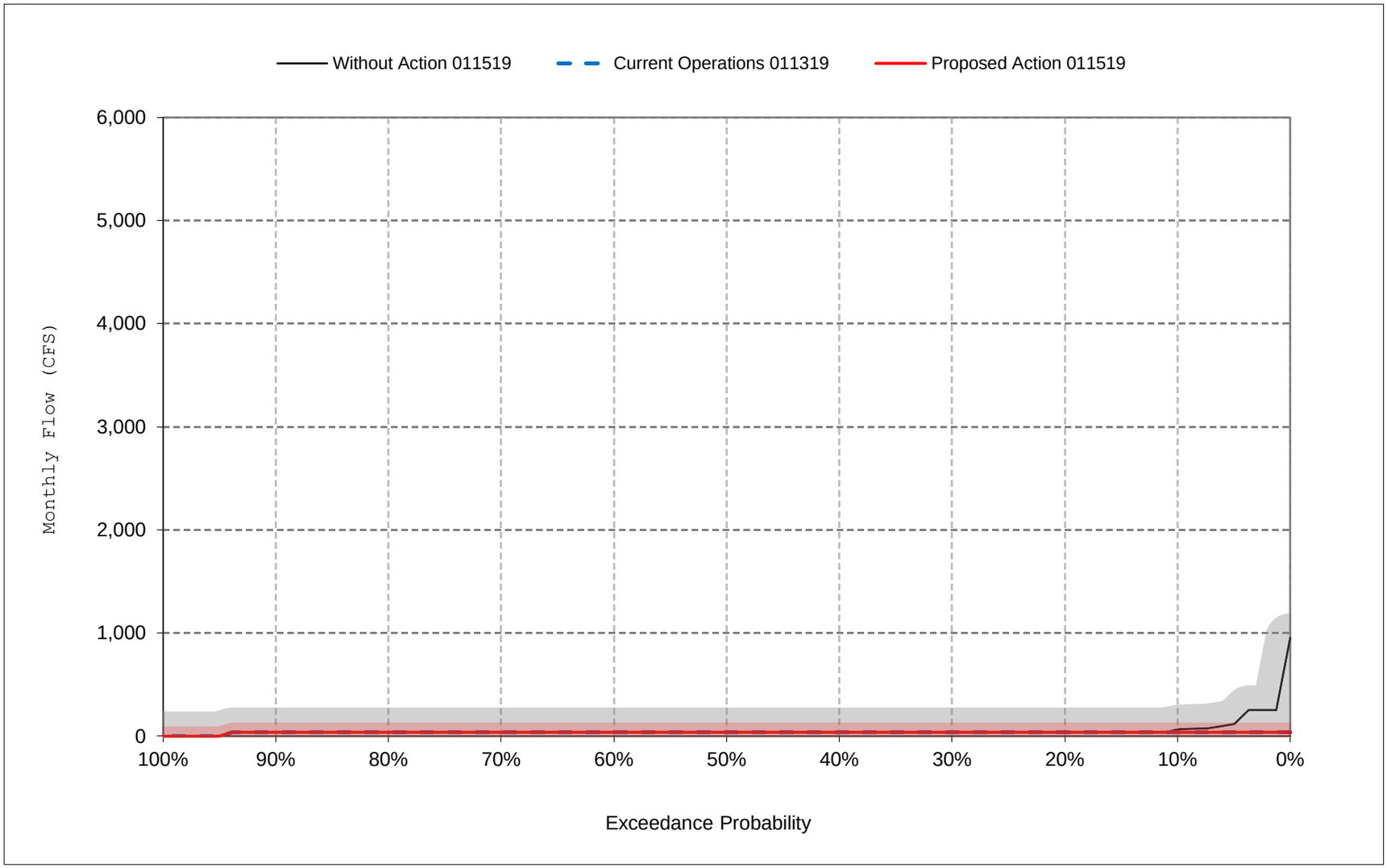
Figure 34-17. San Joaquin River Flow below Sack Dam, August



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Figure 34-18. San Joaquin River Flow below Sack Dam, September



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Table 35-1. San Joaquin River Flow below confluence with Merced , Monthly Flow

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	865	1,933	4,597	6,534	11,241	7,644	8,893	11,710	10,657	4,158	911	723
20%	696	1,223	2,036	4,439	6,110	4,701	4,664	7,172	6,647	1,769	802	616
30%	589	1,043	1,441	2,577	4,599	3,492	3,691	5,077	3,138	162	202	511
40%	558	939	1,168	1,896	3,545	2,140	3,388	2,685	1,664	106	84	217
50%	488	871	1,037	1,340	2,189	1,753	2,478	1,936	962	42	47	174
60%	451	802	888	1,208	1,697	1,510	1,910	1,224	514	14	28	148
70%	409	779	740	1,000	1,443	1,289	1,442	592	175	0	0	133
80%	385	729	652	777	1,135	1,197	1,029	291	72	0	0	121
90%	325	590	589	638	723	1,022	656	113	0	0	0	91
Long Term												
Full Simulation Period[a]	613	1,195	1,962	3,088	4,290	3,502	3,474	4,096	3,421	1,275	340	385
Water Year Types[b,c]												
Wet (23%)	999	1,786	3,045	7,315	9,659	8,631	7,880	11,397	11,031	5,017	1,049	888
Above Normal (24%)	694	1,326	1,906	3,218	5,350	3,372	3,858	4,383	2,796	426	351	391
Below Normal (10%)	467	898	1,133	1,947	2,616	1,549	2,293	1,417	981	64	56	142
Dry (16%)	432	1,166	2,043	1,270	1,428	1,418	1,688	942	399	15	26	261
Critical (27%)	355	681	1,336	806	988	1,132	805	369	91	0	8	105

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	961	1,382	3,009	4,426	9,524	6,041	7,446	8,097	4,050	1,658	1,016	1,095
20%	792	1,288	1,482	2,766	4,303	3,738	4,295	2,720	2,395	825	906	994
30%	691	1,174	1,020	1,845	3,057	2,816	3,740	1,705	670	269	306	891
40%	660	1,114	970	1,219	2,315	2,088	3,330	786	495	216	208	605
50%	587	1,087	935	1,002	1,583	1,813	2,337	577	425	161	152	555
60%	559	1,064	902	926	1,421	1,608	1,761	459	371	148	134	535
70%	504	1,034	890	852	1,222	1,478	1,262	398	297	106	118	521
80%	486	1,004	870	819	1,116	1,378	858	321	220	34	74	496
90%	438	895	810	748	1,018	1,273	326	229	131	0	10	444
Long Term												
Full Simulation Period[a]	675	1,231	1,665	2,463	3,542	3,231	3,315	2,314	1,701	656	379	700
Water Year Types[b,c]												
Wet (23%)	949	1,697	2,787	6,113	8,349	7,546	7,760	7,496	5,902	2,282	936	1,096
Above Normal (24%)	774	1,233	1,481	2,160	3,818	2,934	3,713	1,572	799	329	453	781
Below Normal (10%)	568	1,090	995	1,445	1,865	1,766	2,281	563	473	177	157	532
Dry (16%)	529	1,121	1,638	1,000	1,270	1,565	1,414	416	307	120	129	522
Critical (27%)	463	939	1,130	819	1,092	1,293	615	270	164	40	61	451

Current Operations 011319 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	96	**-551**	**-1,588**	**-2,108**	**-1,717**	**-1,603**	**-1,447**	**-3,613**	**-6,607**	**-2,500**	105	372
20%	96	65	**-553**	**-1,673**	**-1,807**	**-963**	**-369**	**-4,453**	**-4,252**	**-943**	104	378
30%	102	131	**-421**	**-732**	**-1,542**	**-676**	49	**-3,372**	**-2,468**	107	104	380
40%	102	174	**-198**	**-677**	**-1,230**	**-52**	**-59**	**-1,899**	**-1,169**	110	124	388
50%	99	217	**-102**	**-338**	**-605**	60	**-140**	**-1,358**	**-537**	119	105	381
60%	108	262	14	**-282**	**-276**	98	**-149**	**-765**	**-143**	133	106	387
70%	95	255	149	**-148**	**-221**	189	**-180**	**-194**	122	106	118	388
80%	101	275	218	43	**-19**	181	**-172**	30	148	34	74	374
90%	112	305	221	110	295	251	**-329**	116	131	0	10	352
Long Term												
Full Simulation Period[a]	62	37	**-297**	**-625**	**-748**	**-271**	**-159**	**-1,783**	**-1,720**	**-619**	39	316
Water Year Types[b,c]												
Wet (23%)	**-50**	**-88**	**-258**	**-1,202**	**-1,310**	**-1,085**	**-120**	**-3,901**	**-5,129**	**-2,735**	**-114**	208
Above Normal (24%)	80	**-93**	**-425**	**-1,059**	**-1,532**	**-439**	**-145**	**-2,811**	**-1,997**	**-97**	103	390
Below Normal (10%)	100	192	**-138**	**-502**	**-751**	217	**-12**	**-854**	**-507**	114	101	390
Dry (16%)	97	**-45**	**-406**	**-270**	**-159**	147	**-274**	**-525**	**-91**	105	103	261
Critical (27%)	108	258	**-206**	13	103	161	**-190**	**-99**	73	40	53	346

a Based on the 82-year simulation period.

b As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 35-2. San Joaquin River Flow below confluence with Merced , Monthly Flow

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	865	1,933	4,597	6,534	11,241	7,644	8,893	11,710	10,657	4,158	911	723
20%	696	1,223	2,036	4,439	6,110	4,701	4,664	7,172	6,647	1,769	802	616
30%	589	1,043	1,441	2,577	4,599	3,492	3,691	5,077	3,138	162	202	511
40%	558	939	1,168	1,896	3,545	2,140	3,388	2,685	1,664	106	84	217
50%	488	871	1,037	1,340	2,189	1,753	2,478	1,936	962	42	47	174
60%	451	802	888	1,208	1,697	1,510	1,910	1,224	514	14	28	148
70%	409	779	740	1,000	1,443	1,289	1,442	592	175	0	0	133
80%	385	729	652	777	1,135	1,197	1,029	291	72	0	0	121
90%	325	590	589	638	723	1,022	656	113	0	0	0	91
Long Term												
Full Simulation Period[a]	613	1,195	1,962	3,088	4,290	3,502	3,474	4,096	3,421	1,275	340	385
Water Year Types[b,c]												
Wet (23%)	999	1,786	3,045	7,315	9,659	8,631	7,880	11,397	11,031	5,017	1,049	888
Above Normal (24%)	694	1,326	1,906	3,218	5,350	3,372	3,858	4,383	2,796	426	351	391
Below Normal (10%)	467	898	1,133	1,947	2,616	1,549	2,293	1,417	981	64	56	142
Dry (16%)	432	1,166	2,043	1,270	1,428	1,418	1,688	942	399	15	26	261
Critical (27%)	355	681	1,336	806	988	1,132	805	369	91	0	8	105

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	961	1,382	3,009	4,424	9,511	6,040	7,443	8,097	4,050	1,659	1,016	1,095
20%	792	1,288	1,482	2,766	4,303	3,738	4,295	2,721	2,395	827	907	994
30%	691	1,174	1,020	1,844	3,057	2,816	3,740	1,702	671	271	307	892
40%	660	1,114	970	1,219	2,318	2,088	3,330	787	496	217	209	605
50%	588	1,087	935	1,002	1,584	1,813	2,338	578	426	162	153	555
60%	560	1,064	902	926	1,421	1,608	1,762	460	372	148	135	536
70%	504	1,034	890	852	1,222	1,478	1,262	399	297	107	119	522
80%	486	1,004	870	819	1,116	1,378	858	321	220	35	74	496
90%	438	895	810	748	1,018	1,273	326	229	131	0	10	444
Long Term												
Full Simulation Period[a]	675	1,231	1,665	2,462	3,540	3,230	3,315	2,314	1,702	657	380	700
Water Year Types[b,c]												
Wet (23%)	949	1,697	2,786	6,112	8,342	7,541	7,758	7,495	5,902	2,282	936	1,096
Above Normal (24%)	774	1,233	1,481	2,159	3,816	2,933	3,713	1,572	800	330	454	781
Below Normal (10%)	568	1,090	995	1,445	1,865	1,766	2,282	564	475	179	158	533
Dry (16%)	529	1,121	1,638	1,000	1,270	1,565	1,415	417	308	121	130	523
Critical (27%)	463	939	1,130	819	1,092	1,293	615	270	164	40	61	451

Proposed Action 011519 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	96	**-551**	**-1,588**	**-2,110**	**-1,730**	**-1,604**	**-1,450**	**-3,613**	**-6,607**	**-2,499**	105	372
20%	96	65	**-553**	**-1,673**	**-1,807**	**-963**	**-369**	**-4,452**	**-4,252**	**-942**	105	378
30%	103	131	**-421**	**-733**	**-1,542**	**-676**	49	**-3,375**	**-2,467**	109	105	381
40%	102	174	**-198**	**-677**	**-1,227**	**-52**	**-58**	**-1,898**	**-1,168**	111	125	388
50%	99	217	**-102**	**-338**	**-605**	60	**-140**	**-1,358**	**-536**	120	106	381
60%	108	262	14	**-282**	**-276**	99	**-149**	**-765**	**-142**	134	107	387
70%	95	255	149	**-148**	**-221**	189	**-180**	**-193**	122	107	119	389
80%	101	275	218	43	**-19**	181	**-171**	30	148	35	74	374
90%	112	305	221	110	295	251	**-329**	116	131	0	10	353
Long Term												
Full Simulation Period[a]	62	37	**-297**	**-625**	**-750**	**-272**	**-159**	**-1,783**	**-1,719**	**-618**	40	316
Water Year Types[b,c]												
Wet (23%)	**-50**	**-88**	**-259**	**-1,204**	**-1,317**	**-1,090**	**-122**	**-3,902**	**-5,129**	**-2,735**	**-113**	208
Above Normal (24%)	80	**-93**	**-425**	**-1,059**	**-1,533**	**-439**	**-144**	**-2,811**	**-1,996**	**-96**	103	390
Below Normal (10%)	101	192	**-138**	**-502**	**-751**	217	**-12**	**-853**	**-506**	115	102	390
Dry (16%)	97	**-45**	**-405**	**-270**	**-158**	147	**-274**	**-525**	**-91**	106	104	261
Critical (27%)	108	258	**-206**	13	103	161	**-190**	**-98**	74	40	53	346

a Based on the 82-year simulation period.

b As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 35-3. San Joaquin River Flow below confluence with Merced , Monthly Flow

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	961	1,382	3,009	4,426	9,524	6,041	7,446	8,097	4,050	1,658	1,016	1,095
20%	792	1,288	1,482	2,766	4,303	3,738	4,295	2,720	2,395	825	906	994
30%	691	1,174	1,020	1,845	3,057	2,816	3,740	1,705	670	269	306	891
40%	660	1,114	970	1,219	2,315	2,088	3,330	786	495	216	208	605
50%	587	1,087	935	1,002	1,583	1,813	2,337	577	425	161	152	555
60%	559	1,064	902	926	1,421	1,608	1,761	459	371	148	134	535
70%	504	1,034	890	852	1,222	1,478	1,262	398	297	106	118	521
80%	486	1,004	870	819	1,116	1,378	858	321	220	34	74	496
90%	438	895	810	748	1,018	1,273	326	229	131	0	10	444
Long Term												
Full Simulation Period[a]	675	1,231	1,665	2,463	3,542	3,231	3,315	2,314	1,701	656	379	700
Water Year Types[b,c]												
Wet (23%)	949	1,697	2,787	6,113	8,349	7,546	7,760	7,496	5,902	2,282	936	1,096
Above Normal (24%)	774	1,233	1,481	2,160	3,818	2,934	3,713	1,572	799	329	453	781
Below Normal (10%)	568	1,090	995	1,445	1,865	1,766	2,281	563	473	177	157	532
Dry (16%)	529	1,121	1,638	1,000	1,270	1,565	1,414	416	307	120	129	522
Critical (27%)	463	939	1,130	819	1,092	1,293	615	270	164	40	61	451

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	961	1,382	3,009	4,424	9,511	6,040	7,443	8,097	4,050	1,659	1,016	1,095
20%	792	1,288	1,482	2,766	4,303	3,738	4,295	2,721	2,395	827	907	994
30%	691	1,174	1,020	1,844	3,057	2,816	3,740	1,702	671	271	307	892
40%	660	1,114	970	1,219	2,318	2,088	3,330	787	496	217	209	605
50%	588	1,087	935	1,002	1,584	1,813	2,338	578	426	162	153	555
60%	560	1,064	902	926	1,421	1,608	1,762	460	372	148	135	536
70%	504	1,034	890	852	1,222	1,478	1,262	399	297	107	119	522
80%	486	1,004	870	819	1,116	1,378	858	321	220	35	74	496
90%	438	895	810	748	1,018	1,273	326	229	131	0	10	444
Long Term												
Full Simulation Period[a]	675	1,231	1,665	2,462	3,540	3,230	3,315	2,314	1,702	657	380	700
Water Year Types[b,c]												
Wet (23%)	949	1,697	2,786	6,112	8,342	7,541	7,758	7,495	5,902	2,282	936	1,096
Above Normal (24%)	774	1,233	1,481	2,159	3,816	2,933	3,713	1,572	800	330	454	781
Below Normal (10%)	568	1,090	995	1,445	1,865	1,766	2,282	564	475	179	158	533
Dry (16%)	529	1,121	1,638	1,000	1,270	1,565	1,415	417	308	121	130	523
Critical (27%)	463	939	1,130	819	1,092	1,293	615	270	164	40	61	451

Proposed Action 011519 minus Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	0	0	-2	-14	-1	-2	0	0	1	0	0
20%	0	0	0	0	0	0	0	1	0	2	1	0
30%	0	0	0	0	0	0	0	-3	1	2	1	1
40%	0	0	0	0	3	0	0	1	1	1	1	0
50%	0	0	0	0	0	0	0	0	1	1	1	0
60%	0	0	0	0	0	0	0	1	1	1	1	0
70%	0	0	0	0	0	0	0	1	0	2	2	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	0	0	0	0	-2	-1	0	0	1	1	1	0
Water Year Types[b,c]												
Wet (23%)	0	0	0	-1	-7	-4	-2	-1	0	0	0	0
Above Normal (24%)	0	0	0	0	-1	0	0	0	1	1	1	0
Below Normal (10%)	0	0	0	0	0	0	0	1	1	2	1	1
Dry (16%)	0	0	0	0	0	0	0	1	1	1	1	0
Critical (27%)	0	0	0	0	0	0	0	0	0	0	0	0

a Based on the 82-year simulation period.

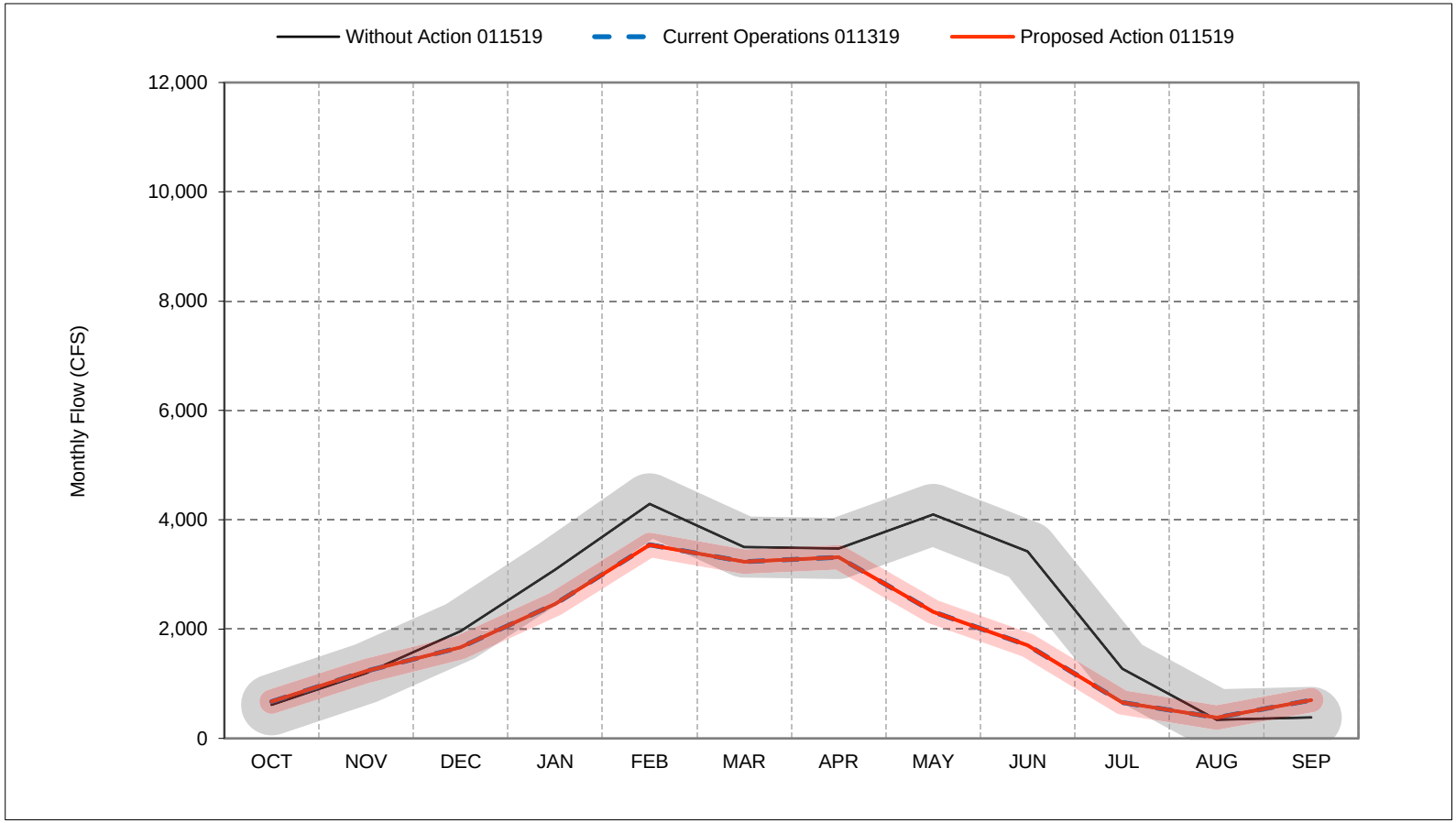
b As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

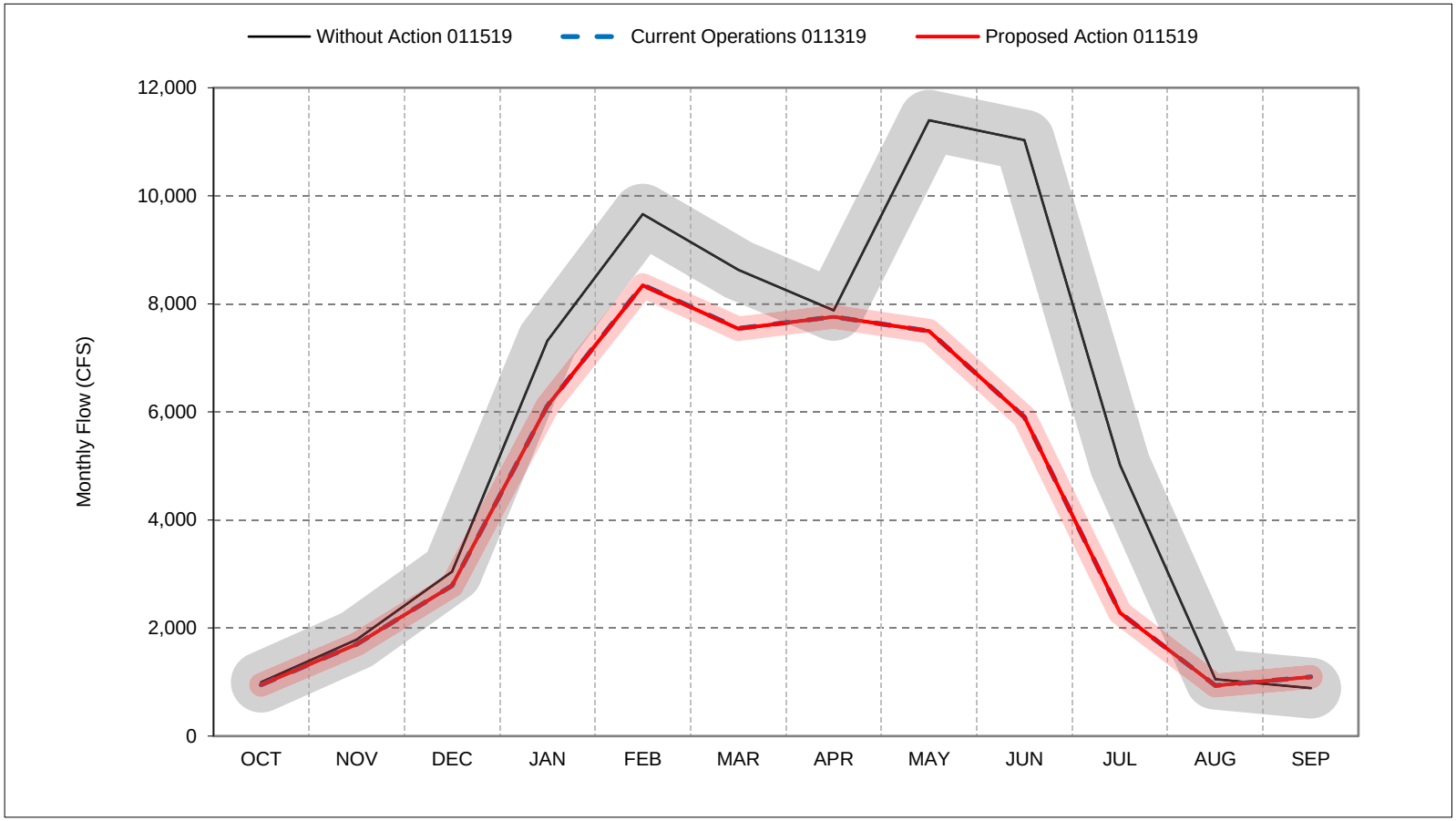
e These are draft results meant for qualitative analysis and are subject to revision.

Figure 35-1. San Joaquin River Flow below confluence with Merced , Long-Term Average Flow



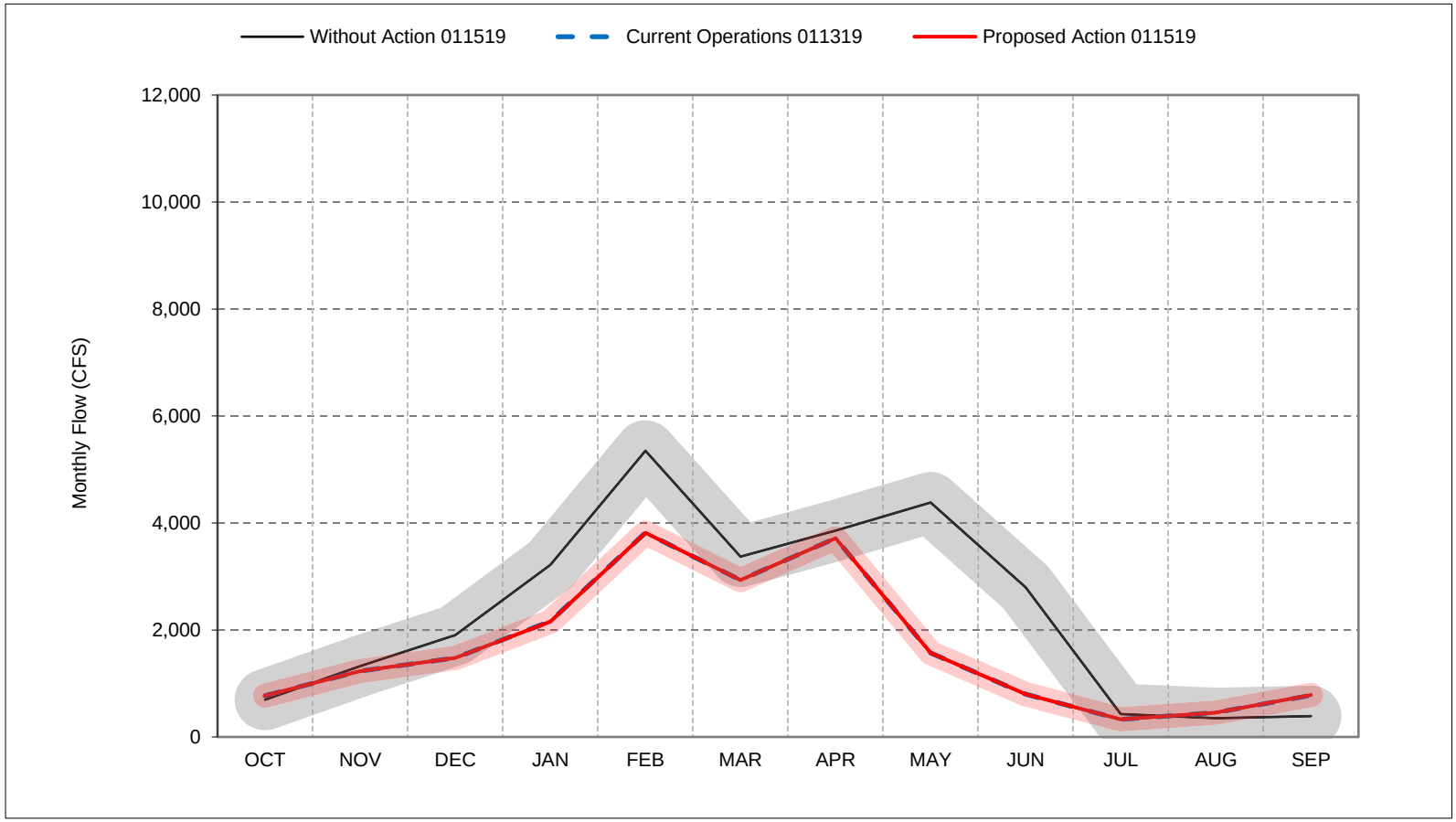
*As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 35-2. San Joaquin River Flow below confluence with Merced , Wet Year Average Flow



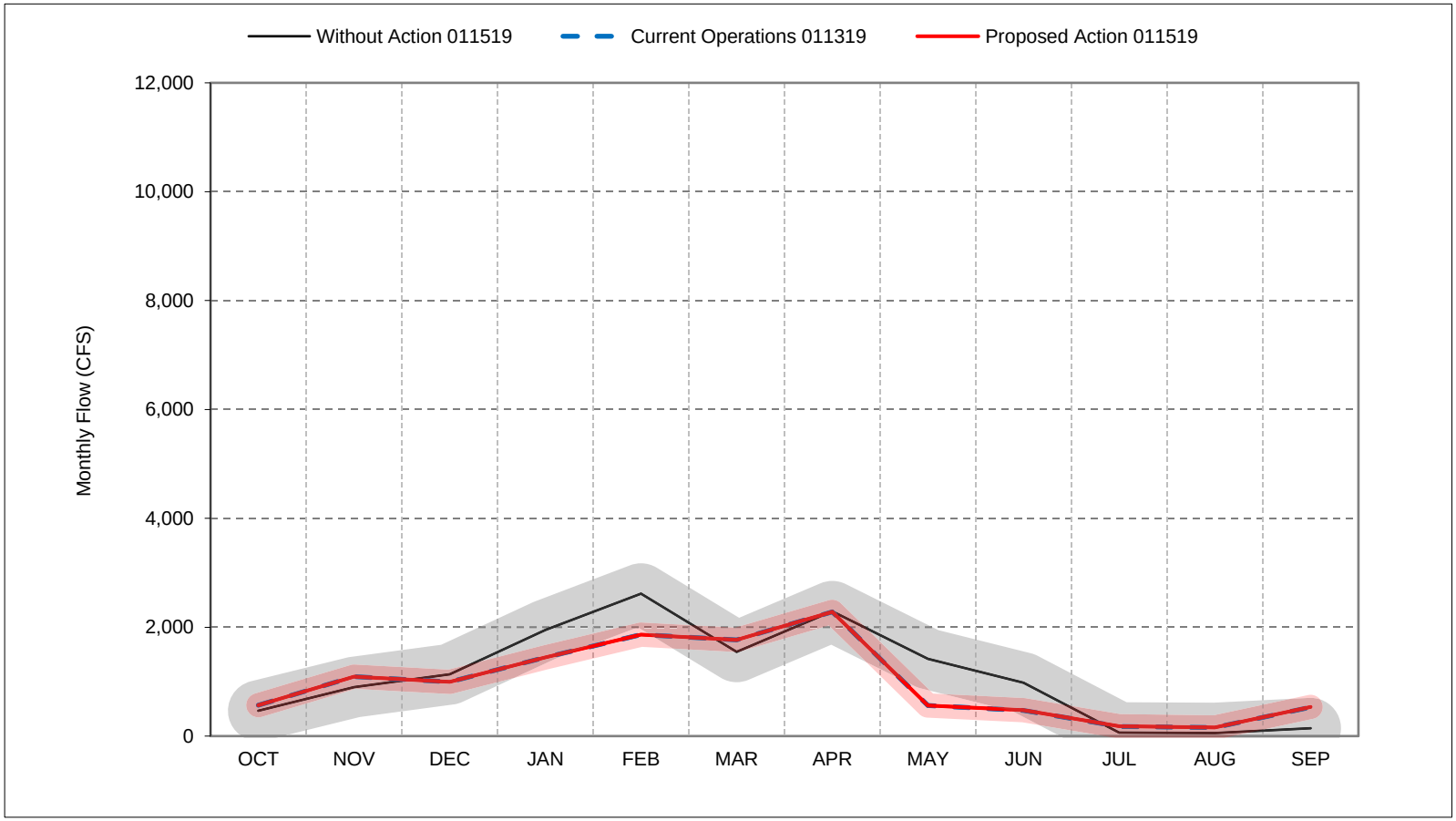
*As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 35-3. San Joaquin River Flow below confluence with Merced , Above Normal Year Average



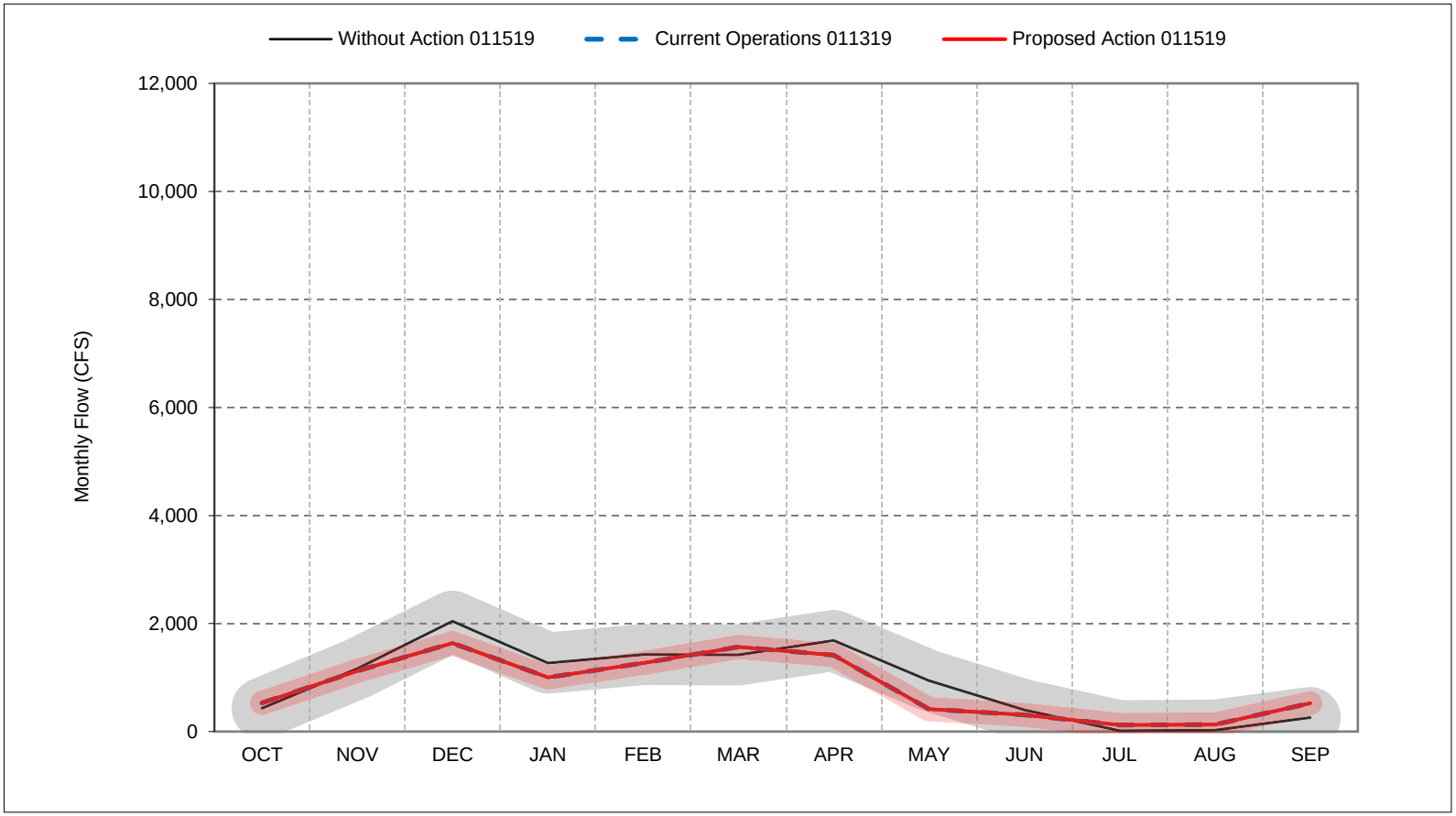
*As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 35-4. San Joaquin River Flow below confluence with Merced , Below Normal Year Average



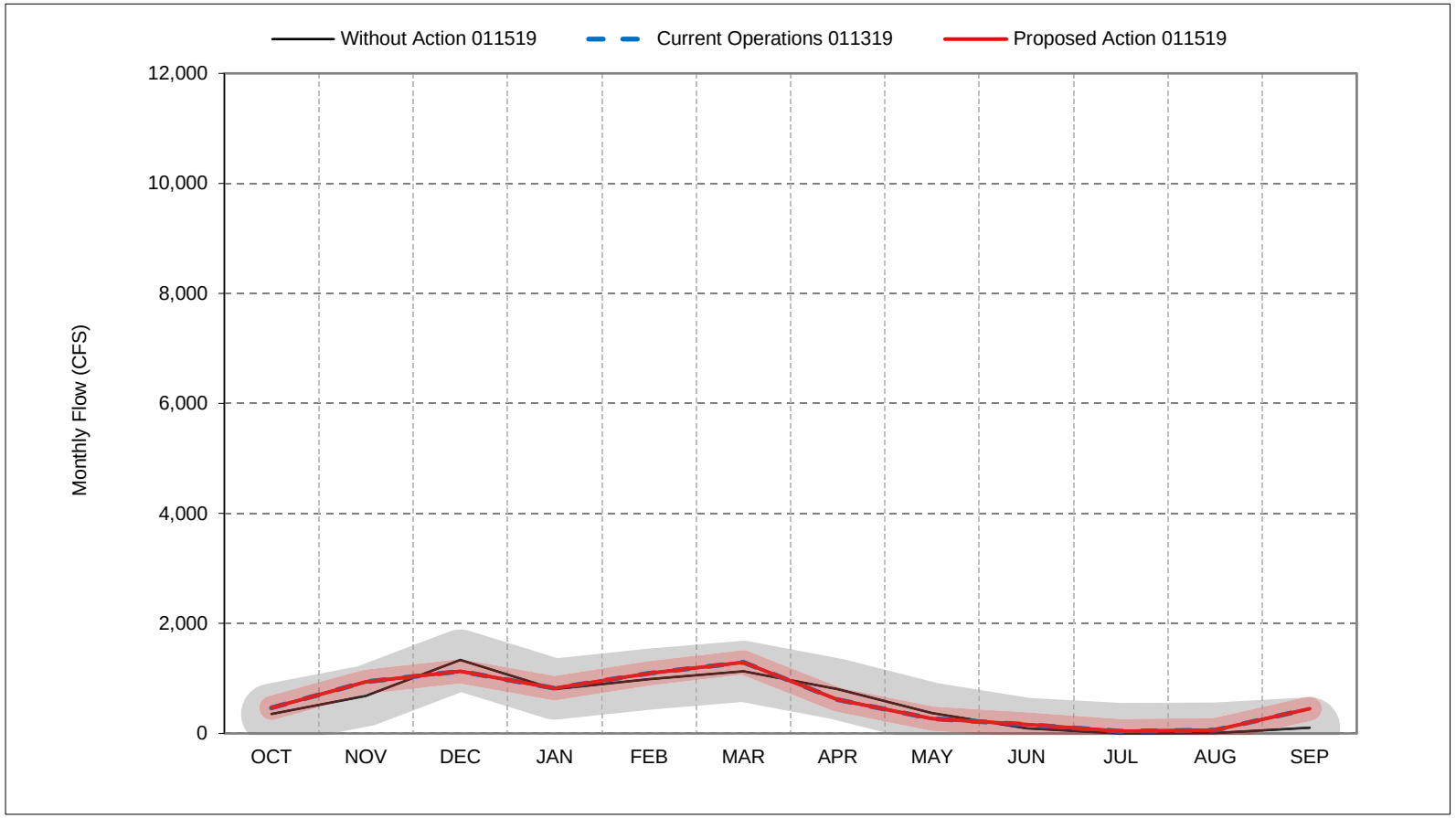
*As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 35-5. San Joaquin River Flow below confluence with Merced , Dry Year Average Flow



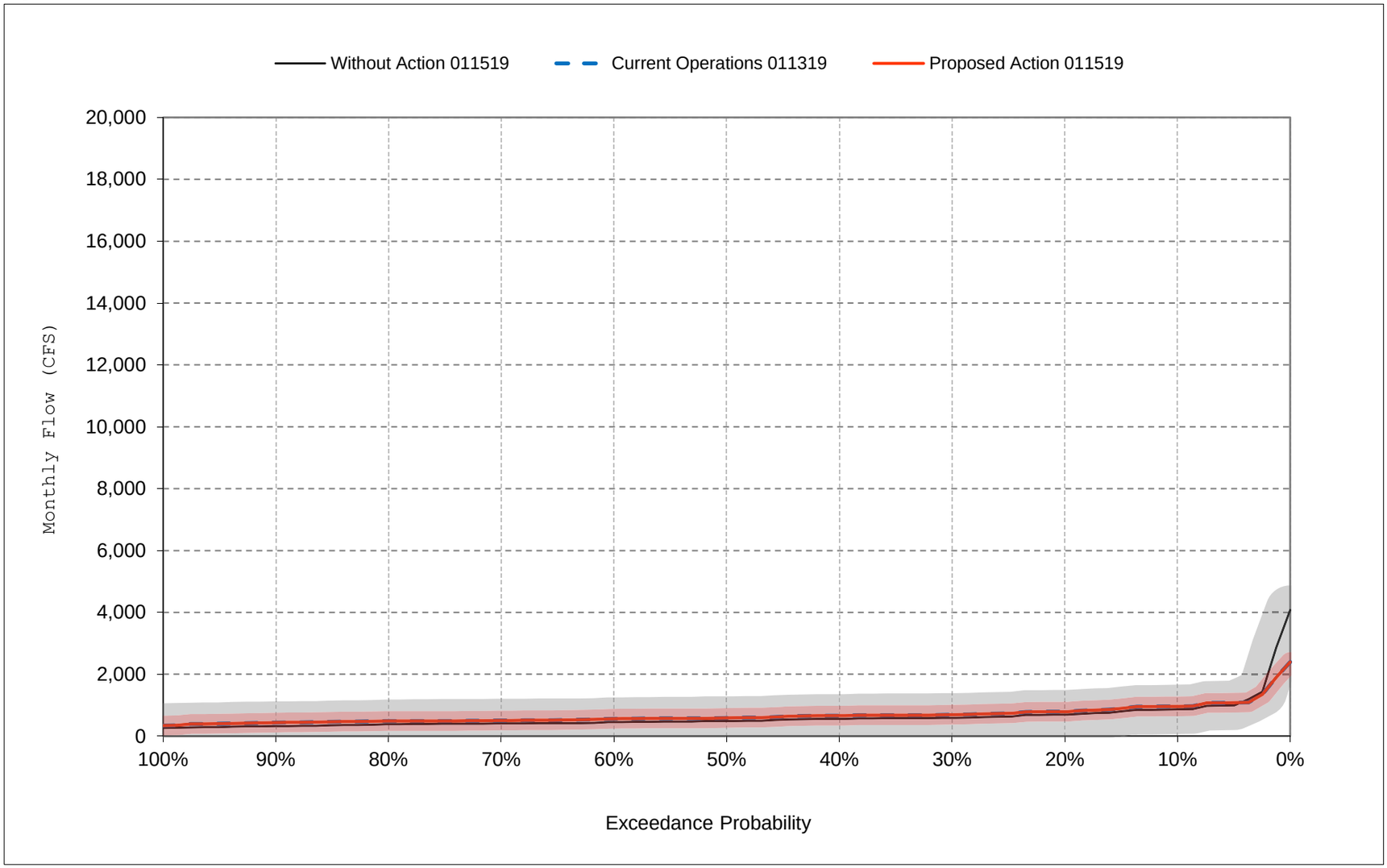
*As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 35-6. San Joaquin River Flow below confluence with Merced , Critical Year Average Flow



*As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

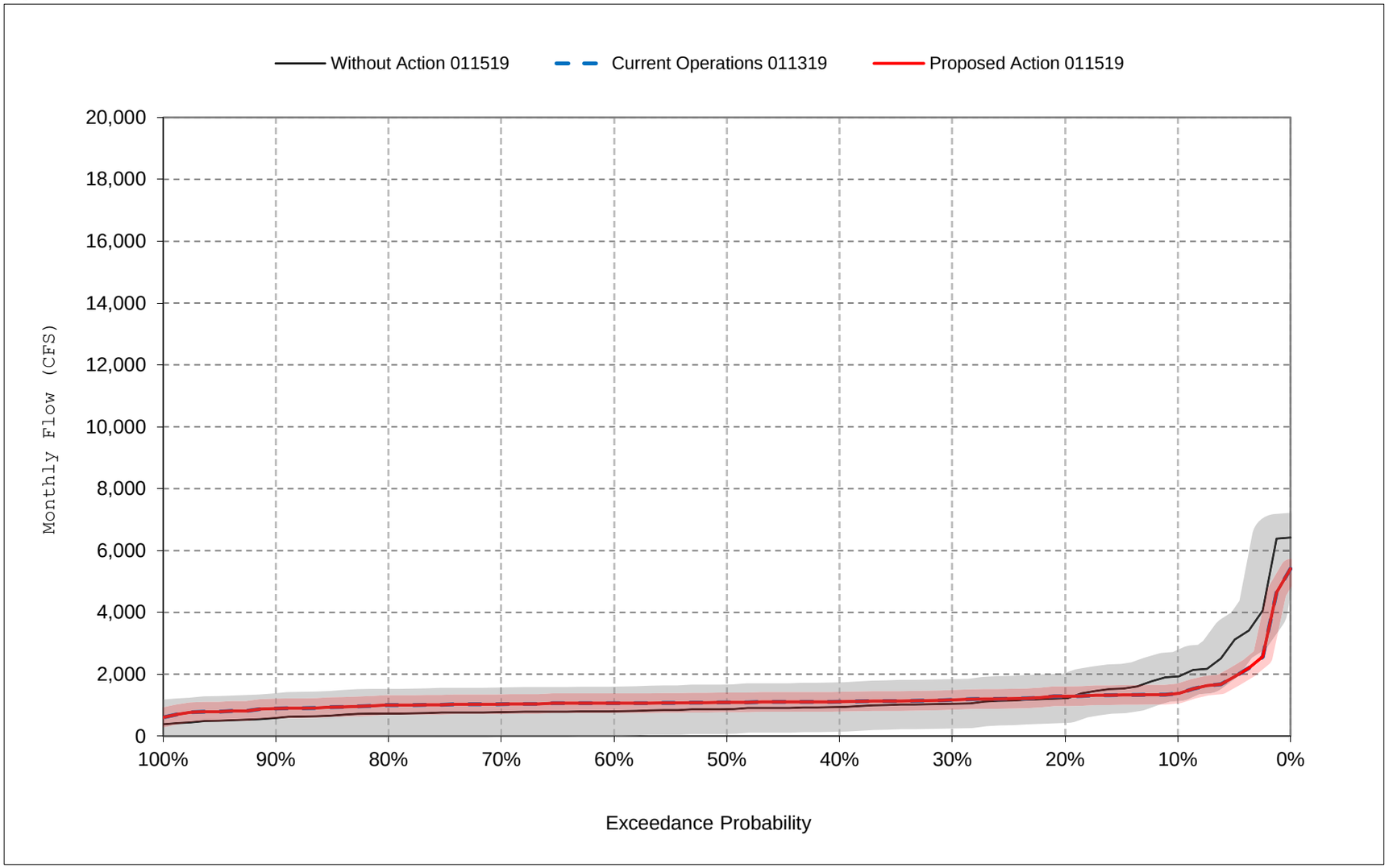
Figure 35-7. San Joaquin River Flow below confluence with Merced , October



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

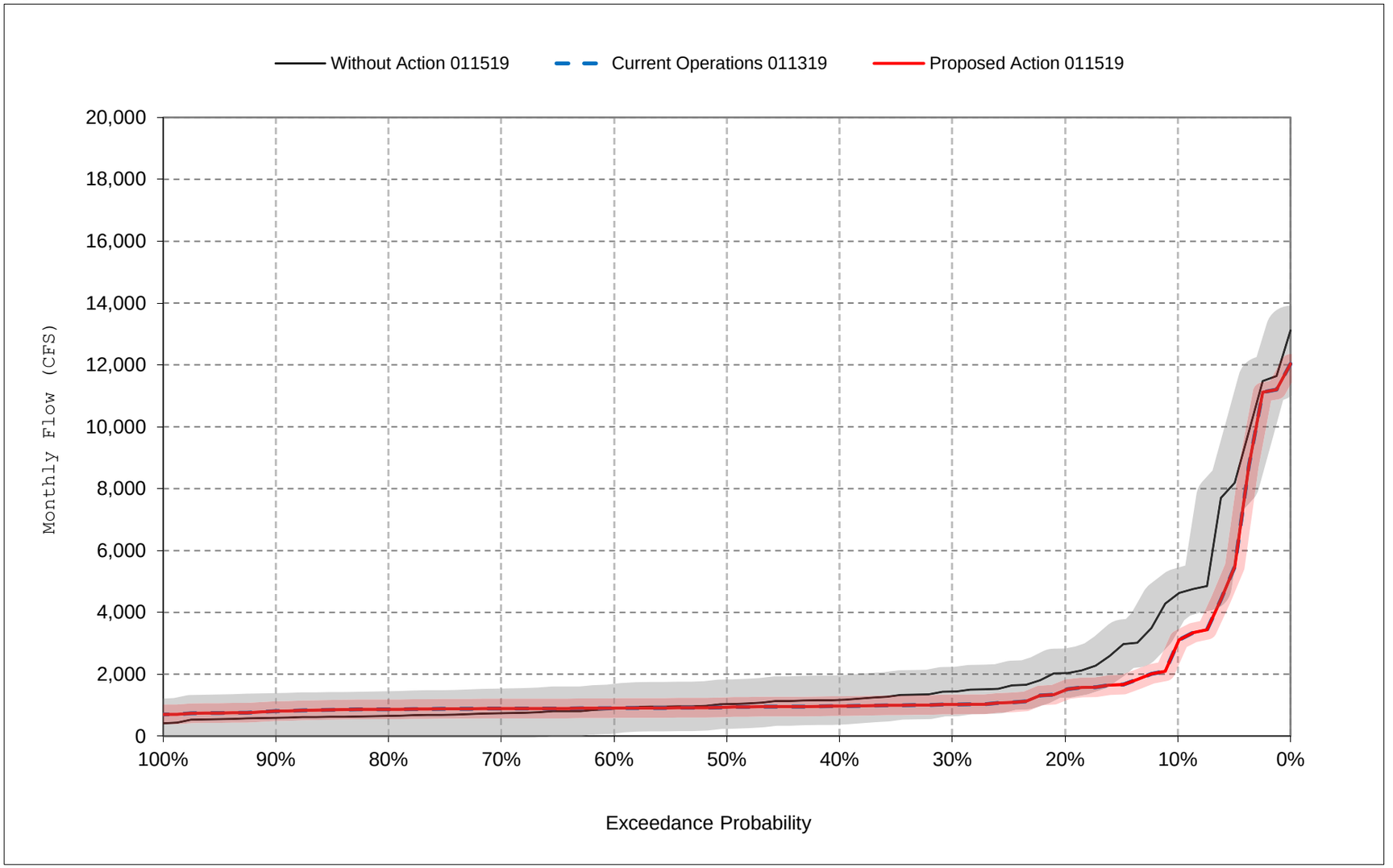
Figure 35-8. San Joaquin River Flow below confluence with Merced , November



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

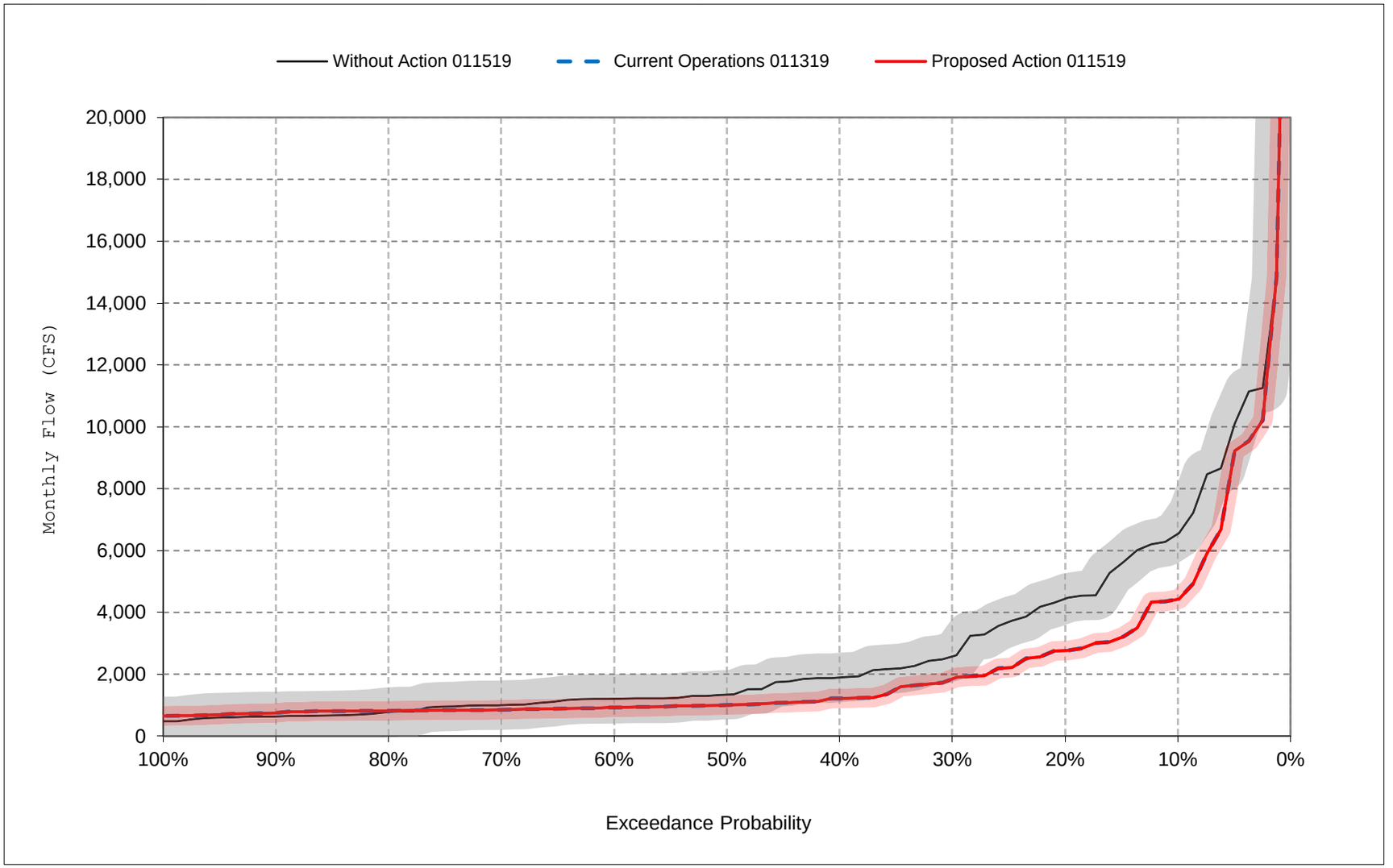
Figure 35-9. San Joaquin River Flow below confluence with Merced , December



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

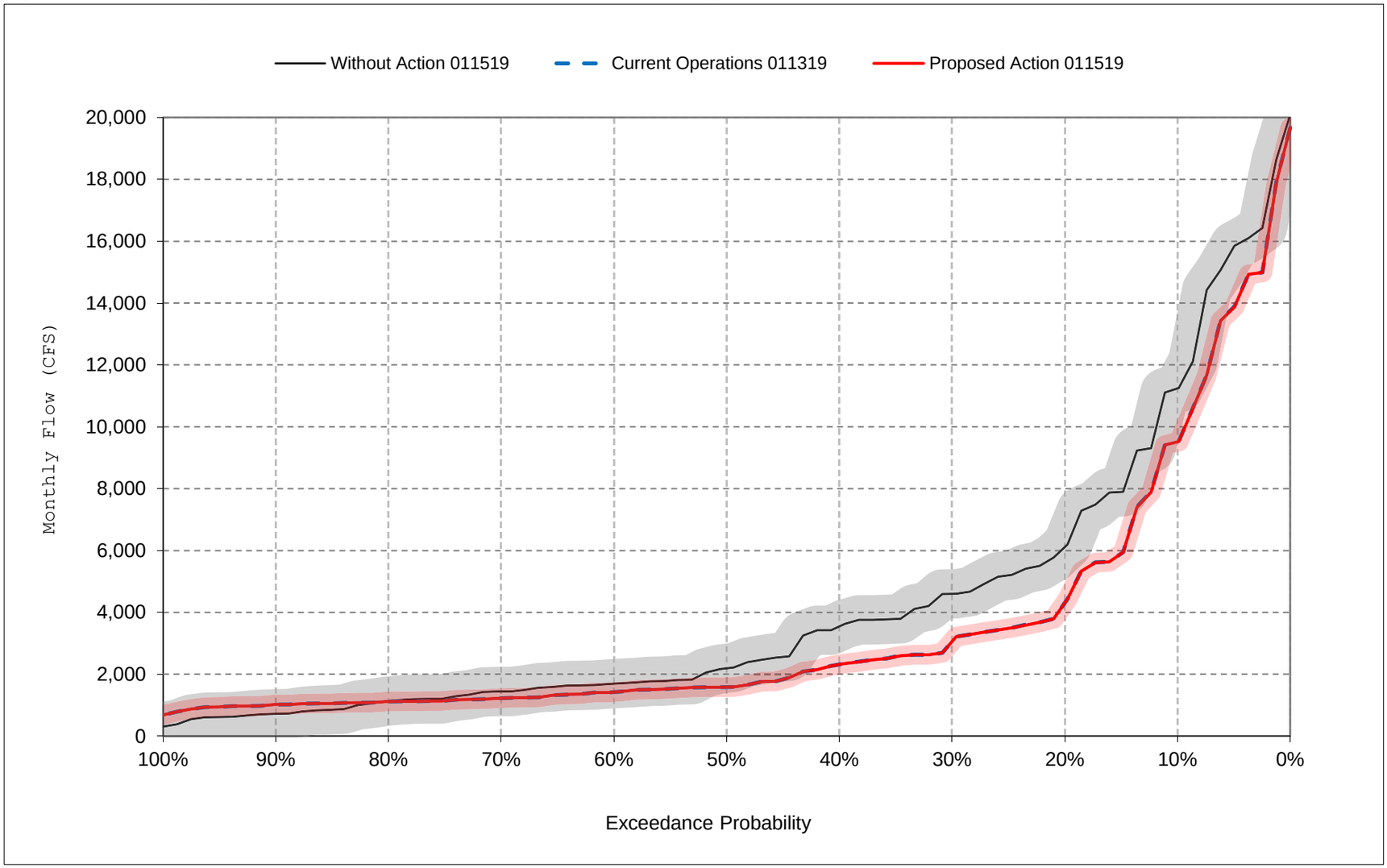
Figure 35-10. San Joaquin River Flow below confluence with Merced , January



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

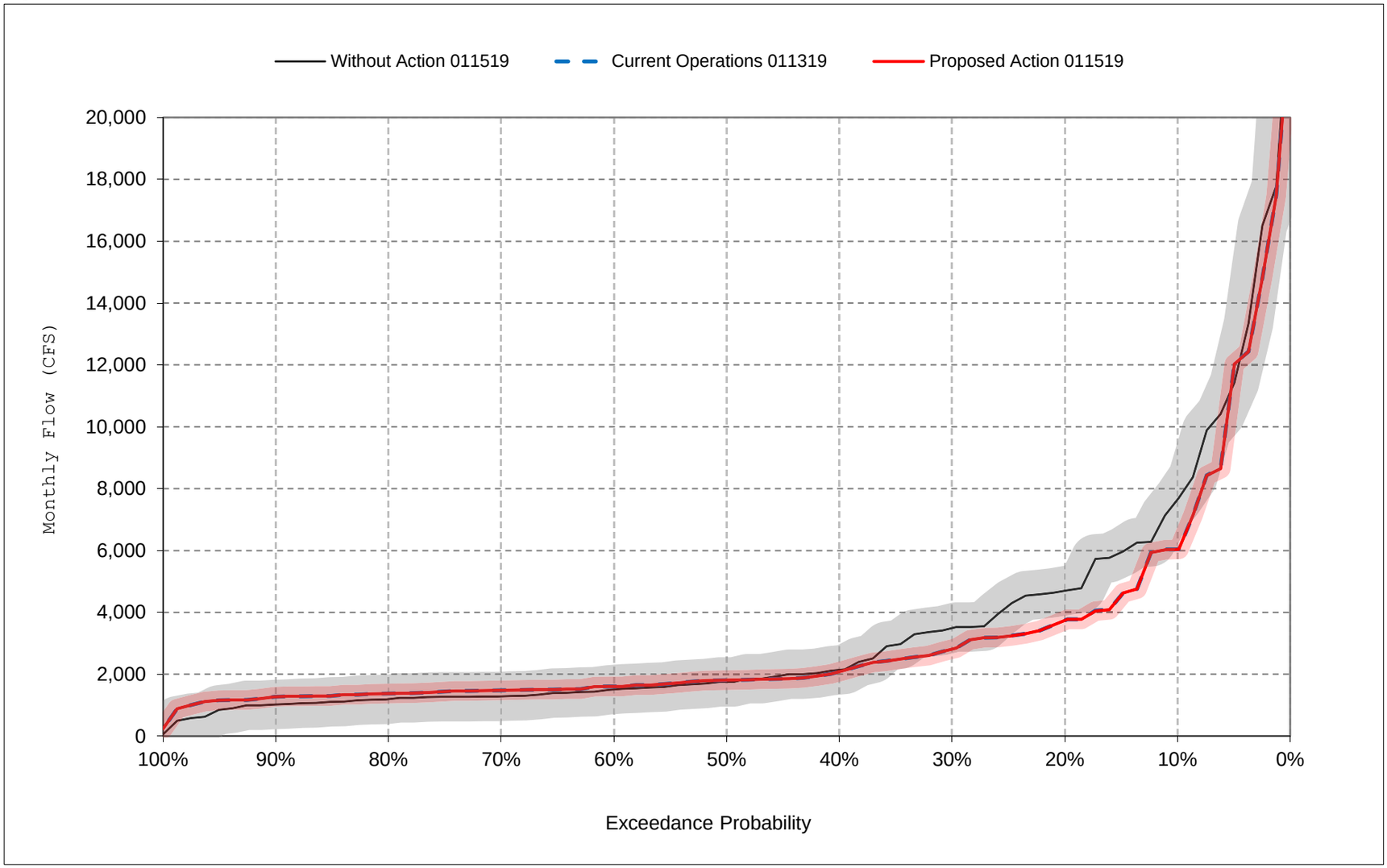
Figure 35-11. San Joaquin River Flow below confluence with Merced , February



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

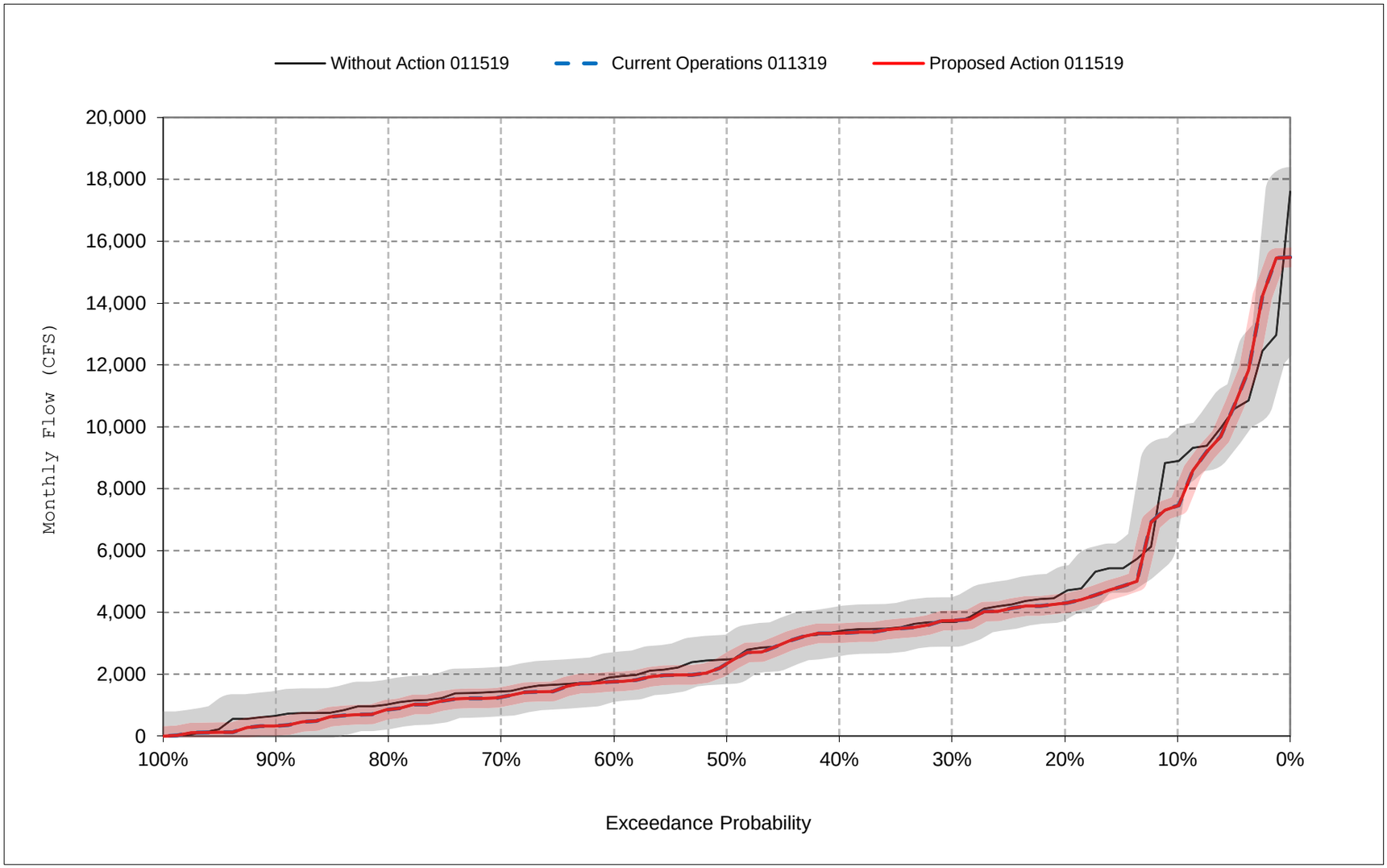
Figure 35-12. San Joaquin River Flow below confluence with Merced , March



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

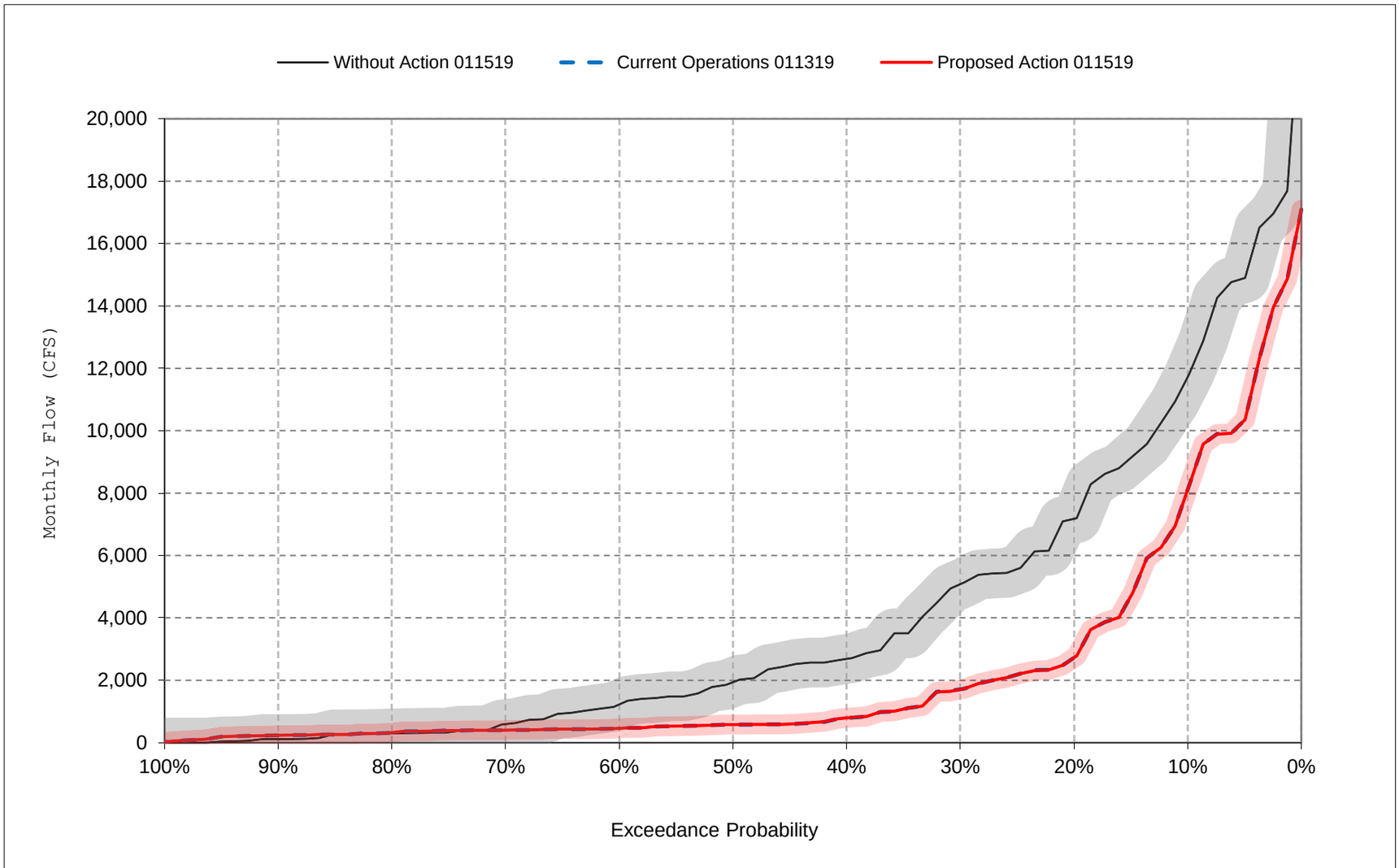
Figure 35-13. San Joaquin River Flow below confluence with Merced , April



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

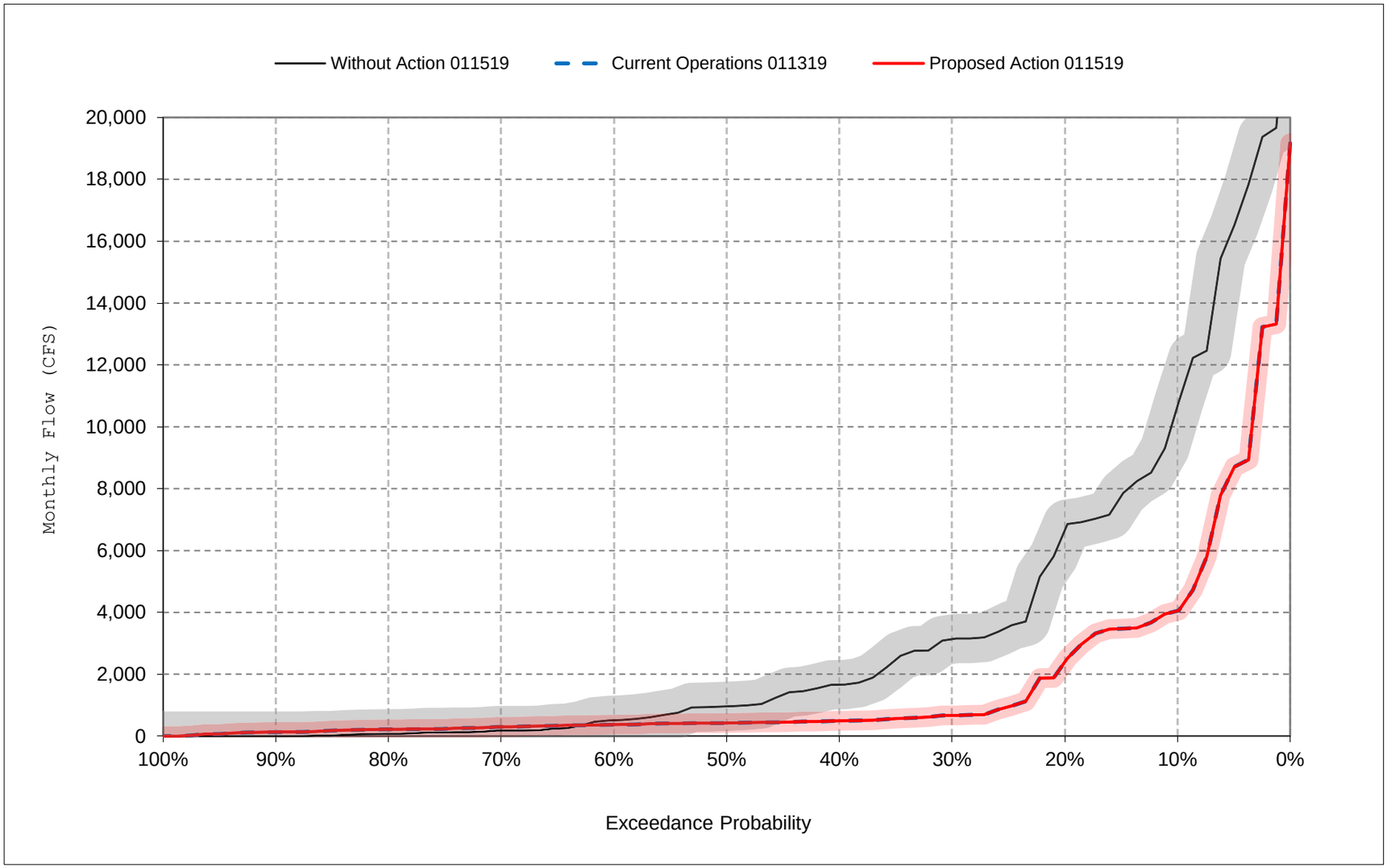
Figure 35-14. San Joaquin River Flow below confluence with Merced , May



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

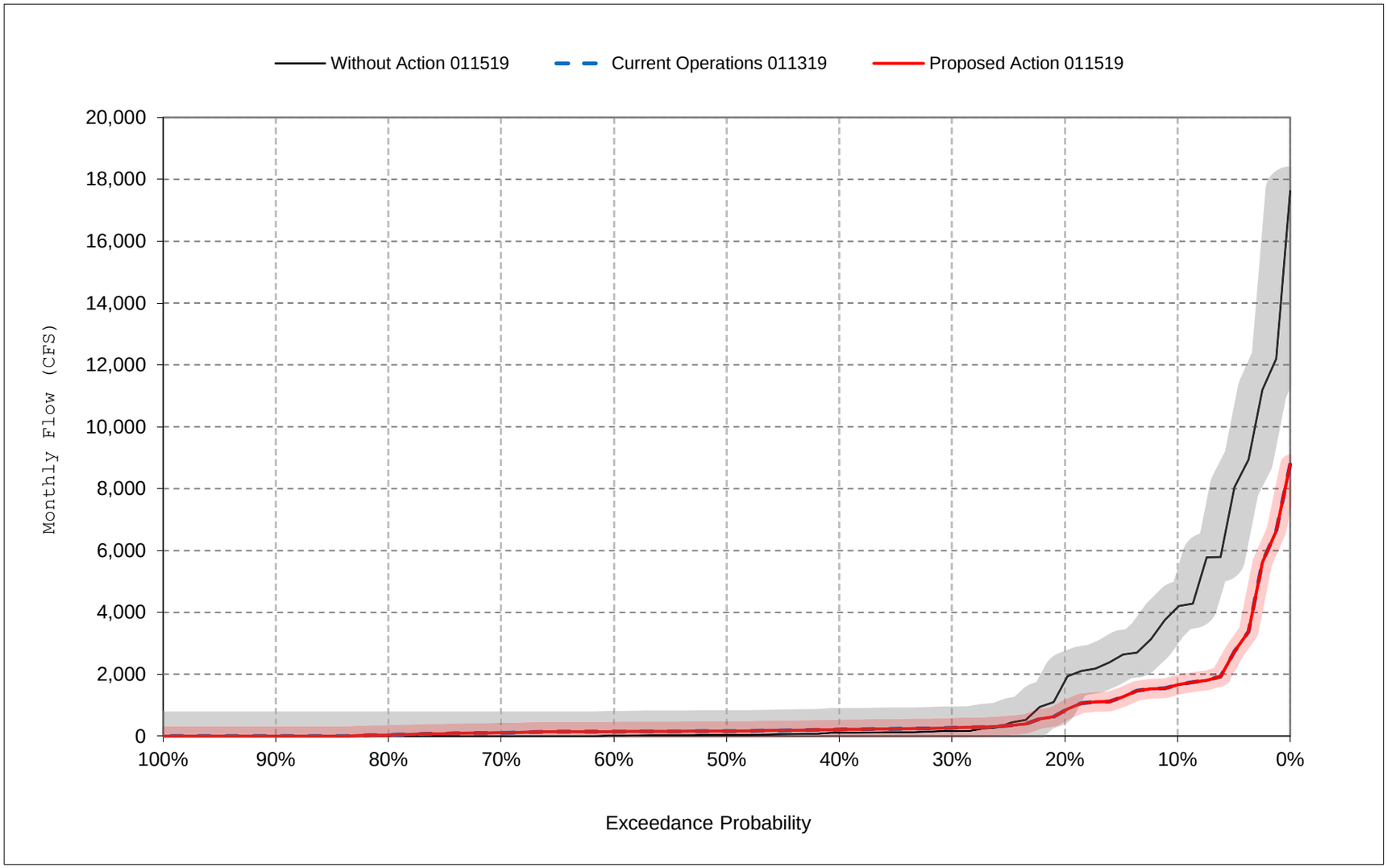
Figure 35-15. San Joaquin River Flow below confluence with Merced , June



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

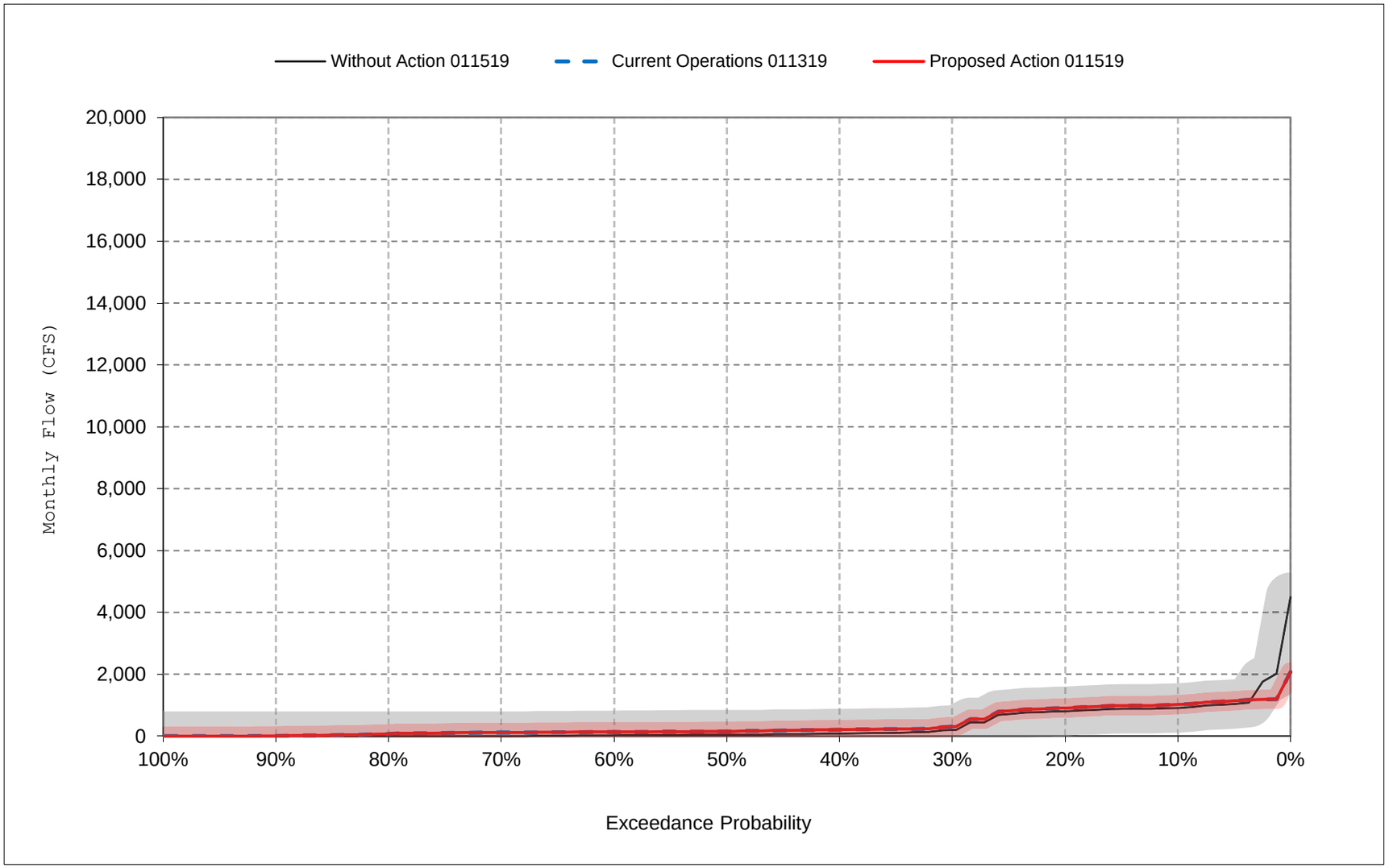
Figure 35-16. San Joaquin River Flow below confluence with Merced , July



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

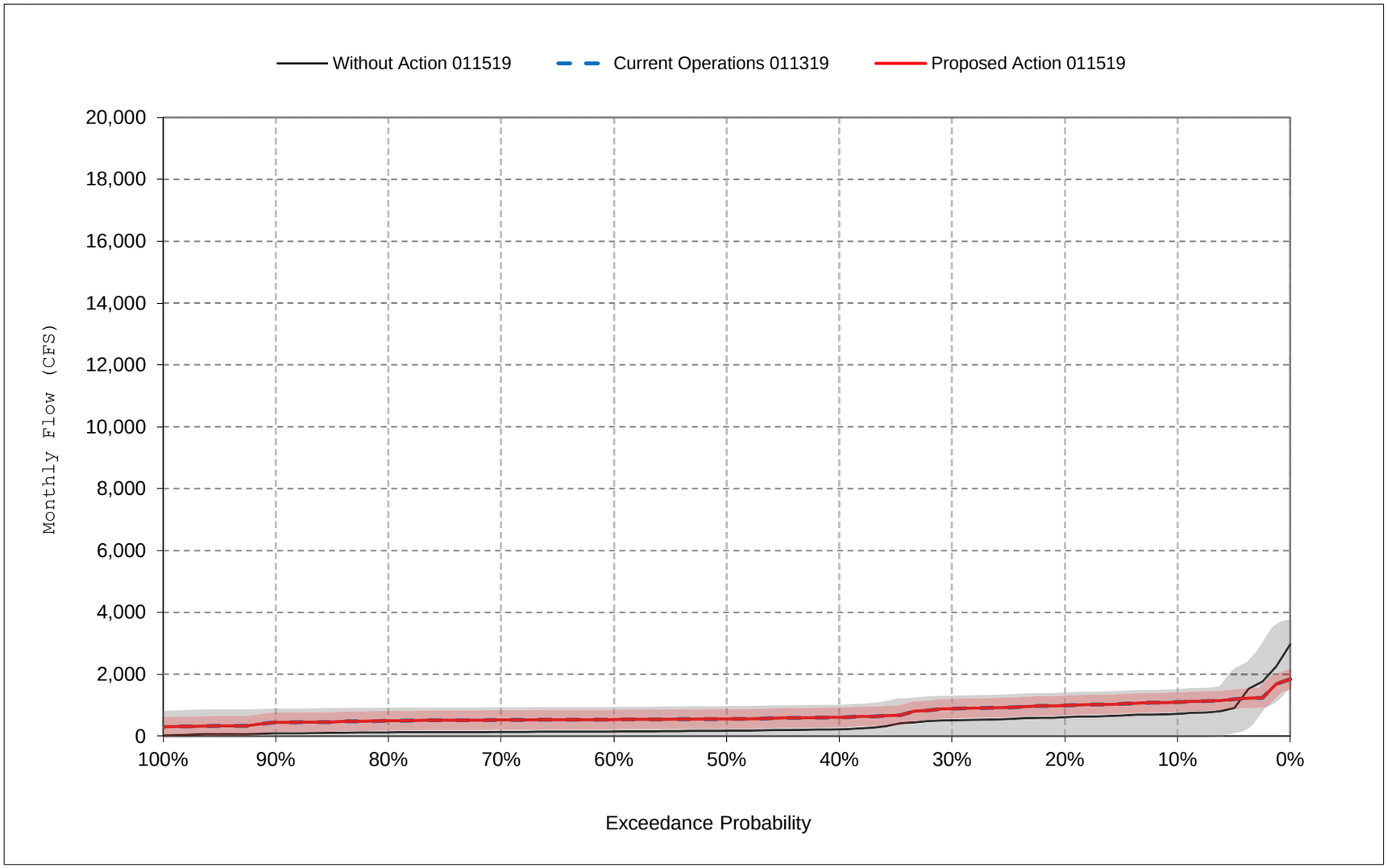
Figure 35-17. San Joaquin River Flow below confluence with Merced , August



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Figure 35-18. San Joaquin River Flow below confluence with Merced , September



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Table 37-1. Stanislaus River Flow below Goodwin, Monthly Flow

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	492	853	1,348	1,561	2,641	2,380	1,885	1,447	5,948	6,817	82	0
20%	345	586	1,202	1,355	1,731	2,101	1,342	1,107	1,342	3,960	0	0
30%	230	517	786	1,345	1,362	1,345	891	828	251	1,777	0	0
40%	170	436	676	1,209	1,342	1,190	674	467	82	211	0	0
50%	97	350	562	832	1,330	1,023	532	283	66	27	0	0
60%	3	283	500	629	1,022	871	372	74	63	0	0	0
70%	0	218	441	512	740	689	237	26	4	0	0	0
80%	0	143	383	368	557	548	49	0	0	0	0	0
90%	0	37	308	301	392	121	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	177	421	822	1,152	1,743	1,477	1,069	955	1,303	1,753	275	33
Water Year Types[b,c]												
Wet (23%)	248	520	970	2,125	3,520	3,122	2,568	2,600	3,380	3,746	985	88
Above Normal (24%)	248	483	739	1,523	1,881	1,728	1,345	939	1,776	2,929	191	0
Below Normal (10%)	83	401	643	759	1,921	1,057	532	519	508	1,142	0	0
Dry (16%)	134	465	1,270	681	795	775	306	370	167	367	0	51
Critical (27%)	106	259	594	396	577	395	169	53	39	3	1	16

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	837	290	306	358	897	1,648	1,633	1,929	1,100	429	392	390
20%	797	200	218	232	405	1,521	1,553	1,555	1,089	318	300	300
30%	774	200	200	232	282	440	1,553	1,294	940	300	283	250
40%	774	200	200	226	236	200	1,400	1,242	853	300	283	250
50%	774	200	200	226	236	200	1,400	1,242	363	275	283	250
60%	636	200	200	219	229	200	812	918	363	265	283	249
70%	636	200	200	219	229	200	767	705	294	265	283	249
80%	578	200	200	214	221	200	767	631	262	265	283	249
90%	577	200	200	213	215	200	504	547	255	265	283	249
Long Term												
Full Simulation Period[a]	723	278	367	519	593	754	1,159	1,124	680	395	362	351
Water Year Types[b,c]												
Wet (23%)	859	532	863	999	1,193	2,014	1,536	1,691	1,140	716	639	692
Above Normal (24%)	728	205	212	664	676	645	1,224	1,146	959	353	292	267
Below Normal (10%)	752	200	202	282	346	365	1,454	1,201	475	269	285	256
Dry (16%)	677	200	200	234	313	200	1,030	930	375	276	277	245
Critical (27%)	614	200	236	227	255	234	742	700	282	272	264	231

Current Operations 011319 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	345	**-563**	**-1,042**	**-1,203**	**-1,744**	**-732**	**-252**	482	**-4,848**	**-6,388**	310	390
20%	451	**-386**	**-984**	**-1,123**	**-1,326**	**-580**	212	447	**-253**	**-3,642**	300	300
30%	544	**-317**	**-586**	**-1,113**	**-1,080**	**-906**	663	466	689	**-1,477**	283	250
40%	604	**-236**	**-476**	**-984**	**-1,107**	**-990**	726	775	771	89	283	250
50%	677	**-150**	**-362**	**-606**	**-1,095**	**-823**	868	959	298	248	283	250
60%	633	**-83**	**-300**	**-409**	**-794**	**-671**	440	844	300	265	283	249
70%	636	**-18**	**-241**	**-293**	**-511**	**-489**	530	679	289	265	283	249
80%	578	57	**-183**	**-154**	**-335**	**-348**	718	631	262	265	283	249
90%	577	163	**-108**	**-88**	**-177**	79	504	547	255	265	283	249
Long Term												
Full Simulation Period[a]	546	**-143**	**-455**	**-633**	**-1,150**	**-723**	90	169	**-623**	**-1,358**	87	319
Water Year Types[b,c]												
Wet (23%)	611	12	**-107**	**-1,126**	**-2,327**	**-1,107**	**-1,032**	**-908**	**-2,240**	**-3,030**	**-346**	605
Above Normal (24%)	481	**-278**	**-527**	**-859**	**-1,205**	**-1,083**	**-121**	206	**-817**	**-2,576**	101	267
Below Normal (10%)	669	**-201**	**-440**	**-477**	**-1,575**	**-692**	923	683	**-33**	**-873**	285	256
Dry (16%)	543	**-265**	**-1,070**	**-447**	**-482**	**-575**	723	560	208	**-90**	277	194
Critical (27%)	508	**-59**	**-357**	**-169**	**-321**	**-161**	573	647	244	269	263	215

a Based on the 82-year simulation period.

b As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

f New Melones forecasts are used as the basis of water operations.

Table 37-2. Stanislaus River Flow below Goodwin, Monthly Flow

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	492	853	1,348	1,561	2,641	2,380	1,885	1,447	5,948	6,817	82	0
20%	345	586	1,202	1,355	1,731	2,101	1,342	1,107	1,342	3,960	0	0
30%	230	517	786	1,345	1,362	1,345	891	828	251	1,777	0	0
40%	170	436	676	1,209	1,342	1,190	674	467	82	211	0	0
50%	97	350	562	832	1,330	1,023	532	283	66	27	0	0
60%	3	283	500	629	1,022	871	372	74	63	0	0	0
70%	0	218	441	512	740	689	237	26	4	0	0	0
80%	0	143	383	368	557	548	49	0	0	0	0	0
90%	0	37	308	301	392	121	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	177	421	822	1,152	1,743	1,477	1,069	955	1,303	1,753	275	33
Water Year Types[b,c]												
Wet (23%)	248	520	970	2,125	3,520	3,122	2,568	2,600	3,380	3,746	985	88
Above Normal (24%)	248	483	739	1,523	1,881	1,728	1,345	939	1,776	2,929	191	0
Below Normal (10%)	83	401	643	759	1,921	1,057	532	519	508	1,142	0	0
Dry (16%)	134	465	1,270	681	795	775	306	370	167	367	0	51
Critical (27%)	106	259	594	396	577	395	169	53	39	3	1	16

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	797	200	306	552	2,259	1,528	1,572	1,555	940	300	300	300
20%	797	200	200	232	294	1,521	1,553	1,555	940	300	300	300
30%	774	200	200	230	236	675	1,553	1,242	363	265	283	250
40%	774	200	200	226	229	200	1,400	1,242	363	265	283	250
50%	774	200	200	226	229	200	1,400	1,242	363	265	283	250
60%	636	200	200	226	229	200	972	819	255	265	283	249
70%	636	200	200	219	221	200	767	631	255	265	283	249
80%	577	200	200	213	214	200	466	400	200	200	200	200
90%	577	200	200	213	214	200	460	400	200	200	200	200
Long Term												
Full Simulation Period[a]	718	272	341	549	722	762	1,147	1,036	566	378	338	339
Water Year Types[b,c]												
Wet (23%)	854	508	735	1,003	1,750	2,189	1,475	1,665	1,499	834	625	691
Above Normal (24%)	774	202	223	694	695	577	1,571	1,255	363	265	283	258
Below Normal (10%)	774	200	202	546	528	247	1,610	1,242	363	265	283	250
Dry (16%)	626	200	209	224	228	200	825	655	256	255	270	241
Critical (27%)	578	200	236	220	222	218	501	445	200	200	200	198

Proposed Action 011519 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	305	**-653**	**-1,042**	**-1,009**	**-382**	**-852**	**-314**	107	**-5,008**	**-6,517**	218	300
20%	451	**-386**	**-1,002**	**-1,123**	**-1,437**	**-580**	212	447	**-402**	**-3,660**	300	300
30%	544	**-317**	**-586**	**-1,115**	**-1,127**	**-670**	663	414	113	**-1,512**	283	250
40%	604	**-236**	**-476**	**-984**	**-1,114**	**-990**	726	775	281	54	283	250
50%	677	**-150**	**-362**	**-606**	**-1,102**	**-823**	868	959	298	238	283	250
60%	633	**-83**	**-300**	**-403**	**-794**	**-671**	599	745	192	265	283	249
70%	636	**-18**	**-241**	**-293**	**-518**	**-489**	530	605	251	265	283	249
80%	577	57	**-183**	**-155**	**-342**	**-348**	417	400	200	200	200	200
90%	577	163	**-108**	**-88**	**-178**	79	460	400	200	200	200	200
Long Term												
Full Simulation Period[a]	541	**-149**	**-481**	**-603**	**-1,021**	**-714**	79	81	**-737**	**-1,375**	63	306
Water Year Types[b,c]												
Wet (23%)	607	**-12**	**-235**	**-1,122**	**-1,771**	**-932**	**-1,092**	**-934**	**-1,881**	**-2,912**	**-360**	603
Above Normal (24%)	527	**-282**	**-516**	**-829**	**-1,186**	**-1,151**	226	316	**-1,413**	**-2,664**	92	258
Below Normal (10%)	691	**-201**	**-440**	**-214**	**-1,392**	**-810**	1,079	723	**-144**	**-877**	283	250
Dry (16%)	492	**-265**	**-1,061**	**-456**	**-567**	**-575**	518	286	88	**-112**	270	190
Critical (27%)	472	**-59**	**-357**	**-176**	**-355**	**-176**	332	392	161	197	199	182

a Based on the 82-year simulation period.

b As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

f New Melones forecasts are used as the basis of water operations.

Table 37-3. Stanislaus River Flow below Goodwin, Monthly Flow

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	837	290	306	358	897	1,648	1,633	1,929	1,100	429	392	390
20%	797	200	218	232	405	1,521	1,553	1,555	1,089	318	300	300
30%	774	200	200	232	282	440	1,553	1,294	940	300	283	250
40%	774	200	200	226	236	200	1,400	1,242	853	300	283	250
50%	774	200	200	226	236	200	1,400	1,242	363	275	283	250
60%	636	200	200	219	229	200	812	918	363	265	283	249
70%	636	200	200	219	229	200	767	705	294	265	283	249
80%	578	200	200	214	221	200	767	631	262	265	283	249
90%	577	200	200	213	215	200	504	547	255	265	283	249
Long Term												
Full Simulation Period[a]	723	278	367	519	593	754	1,159	1,124	680	395	362	351
Water Year Types[b,c]												
Wet (23%)	859	532	863	999	1,193	2,014	1,536	1,691	1,140	716	639	692
Above Normal (24%)	728	205	212	664	676	645	1,224	1,146	959	353	292	267
Below Normal (10%)	752	200	202	282	346	365	1,454	1,201	475	269	285	256
Dry (16%)	677	200	200	234	313	200	1,030	930	375	276	277	245
Critical (27%)	614	200	236	227	255	234	742	700	282	272	264	231

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	797	200	306	552	2,259	1,528	1,572	1,555	940	300	300	300
20%	797	200	200	232	294	1,521	1,553	1,555	940	300	300	300
30%	774	200	200	230	236	675	1,553	1,242	363	265	283	250
40%	774	200	200	226	229	200	1,400	1,242	363	265	283	250
50%	774	200	200	226	229	200	1,400	1,242	363	265	283	250
60%	636	200	200	226	229	200	972	819	255	265	283	249
70%	636	200	200	219	221	200	767	631	255	265	283	249
80%	577	200	200	213	214	200	466	400	200	200	200	200
90%	577	200	200	213	214	200	460	400	200	200	200	200
Long Term												
Full Simulation Period[a]	718	272	341	549	722	762	1,147	1,036	566	378	338	339
Water Year Types[b,c]												
Wet (23%)	854	508	735	1,003	1,750	2,189	1,475	1,665	1,499	834	625	691
Above Normal (24%)	774	202	223	694	695	577	1,571	1,255	363	265	283	258
Below Normal (10%)	774	200	202	546	528	247	1,610	1,242	363	265	283	250
Dry (16%)	626	200	209	224	228	200	825	655	256	255	270	241
Critical (27%)	578	200	236	220	222	218	501	445	200	200	200	198

Proposed Action 011519 minus Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	**-41**	**-90**	0	194	1,362	**-121**	**-62**	**-375**	**-160**	**-129**	**-92**	**-90**
20%	0	0	**-18**	0	**-111**	0	0	0	**-149**	**-18**	0	0
30%	0	0	0	**-2**	**-46**	236	0	**-52**	**-577**	**-35**	**0**	0
40%	0	0	0	0	**-7**	0	0	0	**-490**	**-35**	0	0
50%	0	0	0	0	**-7**	0	0	0	0	**-10**	0	0
60%	0	0	0	6	0	0	160	**-99**	**-108**	0	0	0
70%	0	0	0	0	**-7**	0	0	**-75**	**-38**	0	0	0
80%	**-1**	0	0	**-1**	**-7**	0	**-300**	**-231**	**-62**	**-65**	**-83**	**-49**
90%	0	0	0	0	**-1**	0	**-44**	**-147**	**-55**	**-65**	**-83**	**-49**
Long Term												
Full Simulation Period[a]	**-4**	**-6**	**-26**	31	129	8	**-11**	**-87**	**-114**	**-17**	**-24**	**-13**
Water Year Types[b,c]												
Wet (23%)	**-5**	**-24**	**-128**	4	557	175	**-61**	**-26**	359	118	**-14**	**-1**
Above Normal (24%)	46	**-3**	11	31	20	**-68**	347	109	**-596**	**-88**	**-9**	**-9**
Below Normal (10%)	22	0	0	264	183	**-118**	156	41	**-111**	**-4**	**-2**	**-6**
Dry (16%)	**-51**	0	9	**-10**	**-86**	0	**-205**	**-274**	**-119**	**-21**	**-6**	**-4**
Critical (27%)	**-36**	0	0	**-7**	**-33**	**-15**	**-241**	**-255**	**-82**	**-72**	**-64**	**-33**

a Based on the 82-year simulation period.

b As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

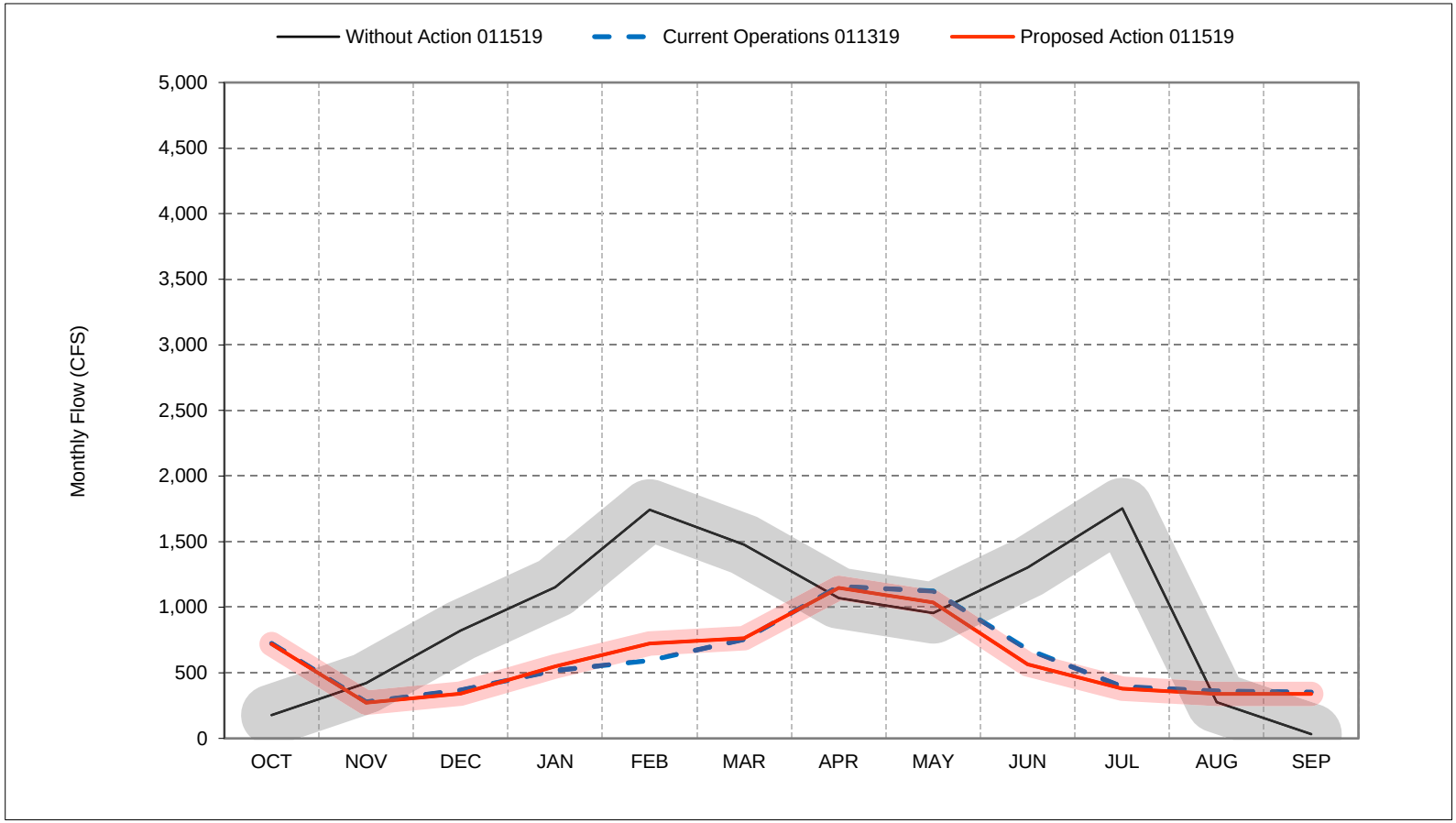
c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

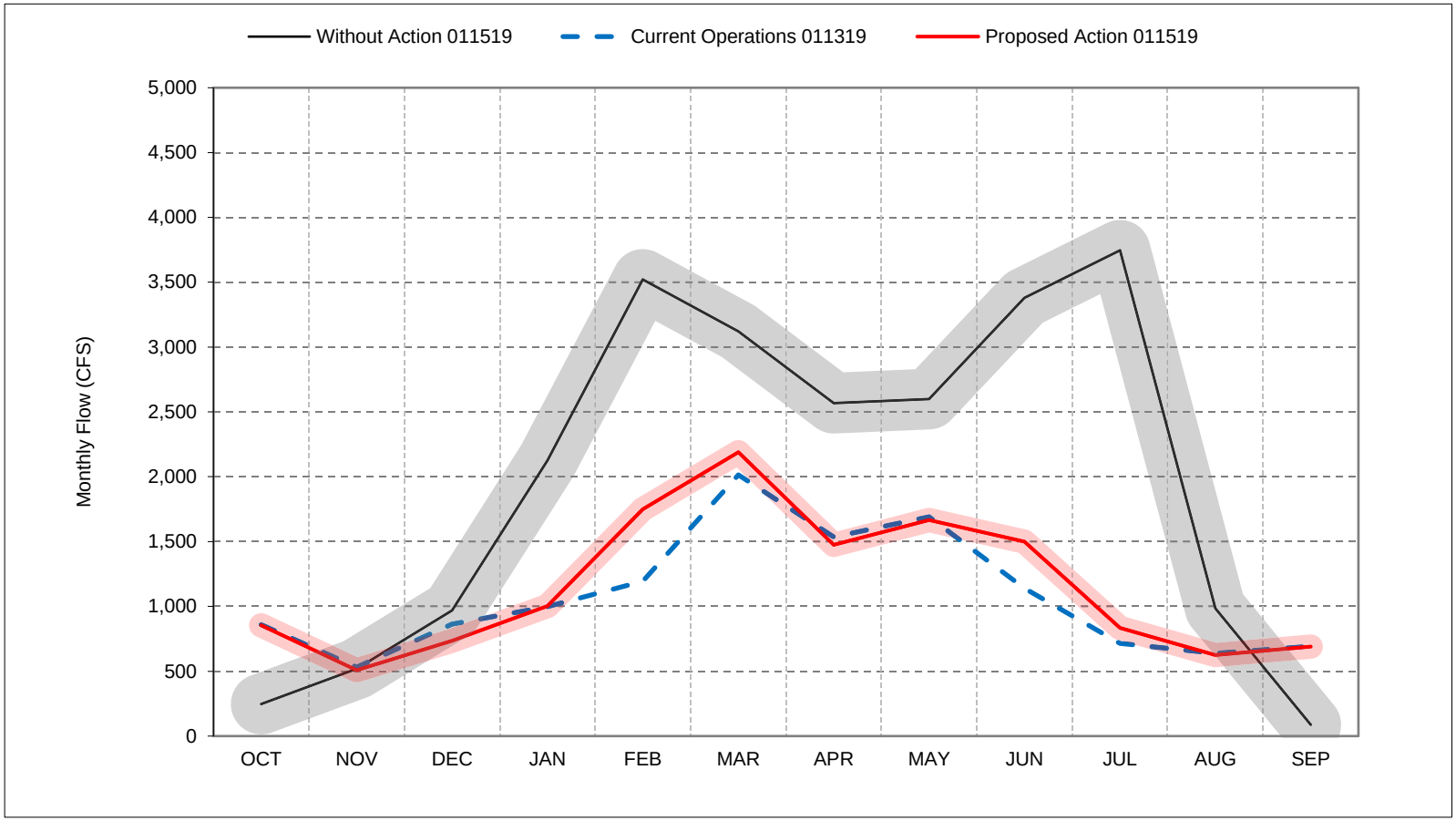
f New Melones forecasts are used as the basis of water operations.

Figure 37-1. Stanislaus River Flow below Goodwin, Long-Term Average Flow



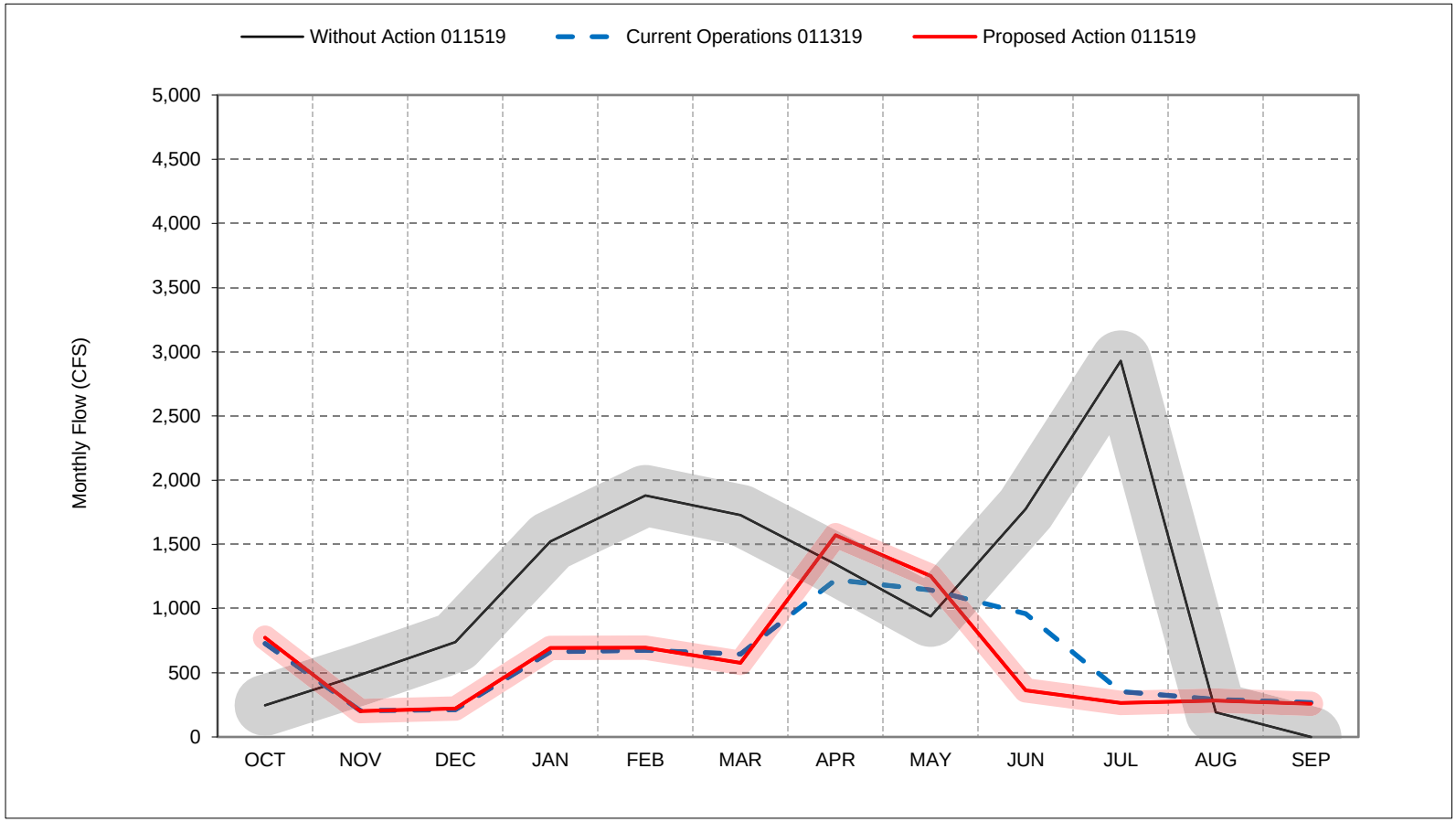
*As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.
*New Melones forecasts are used as the basis of water operations.

Figure 37-2. Stanislaus River Flow below Goodwin, Wet Year Average Flow



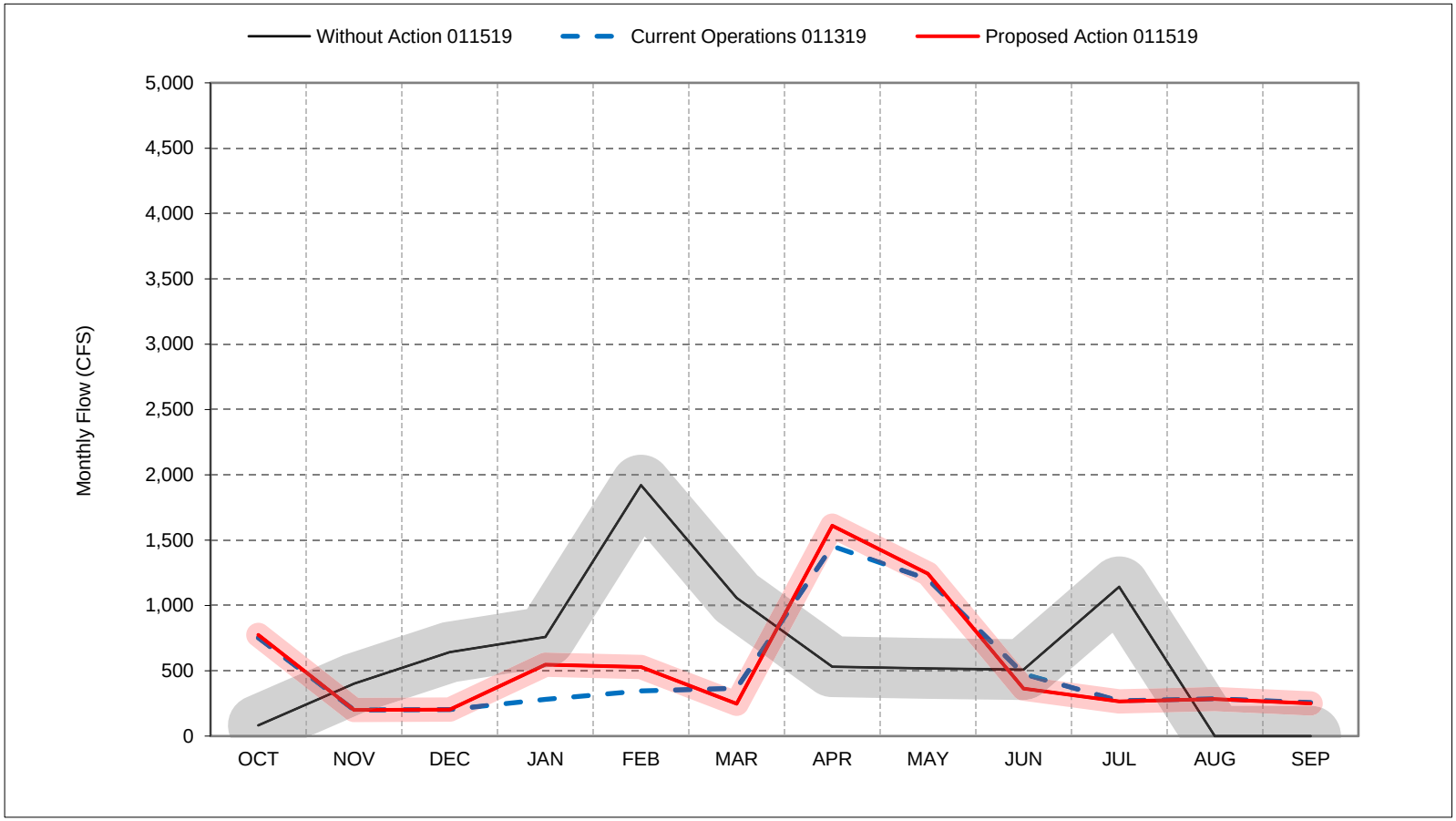
*As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.
*New Melones forecasts are used as the basis of water operations.

Figure 37-3. Stanislaus River Flow below Goodwin, Above Normal Year Average Flow



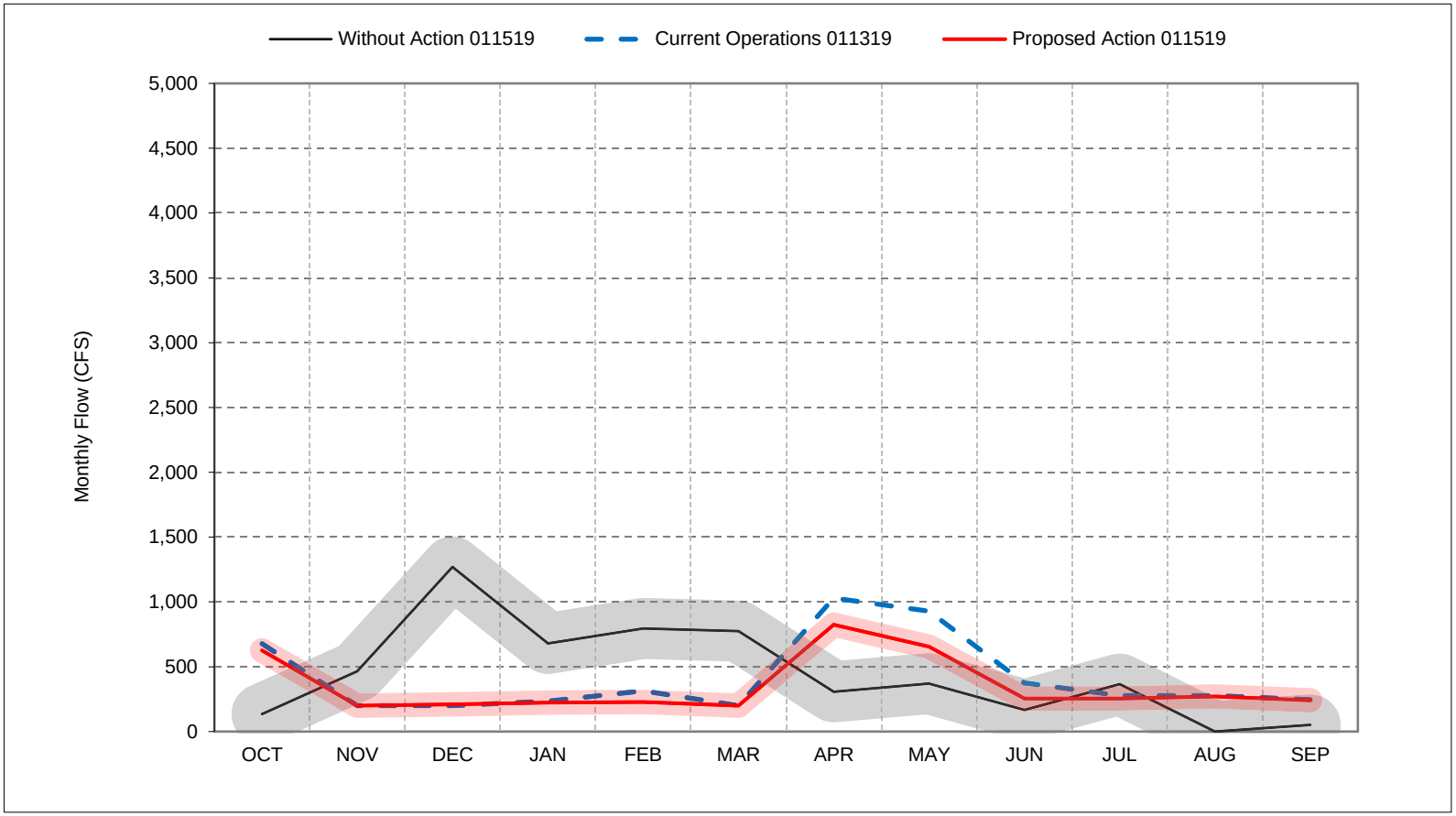
*As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.
*New Melones forecasts are used as the basis of water operations.

Figure 37-4. Stanislaus River Flow below Goodwin, Below Normal Year Average Flow



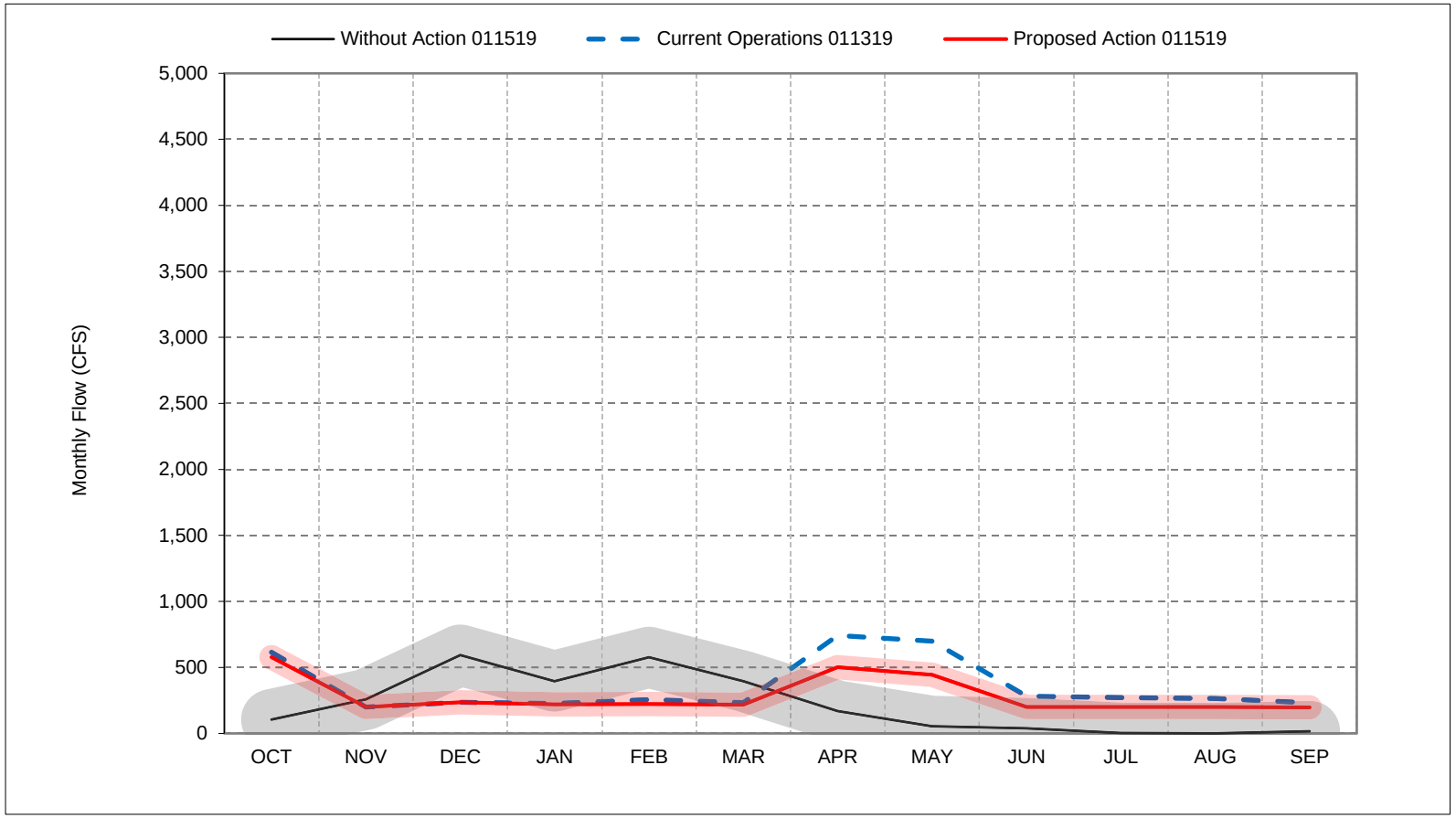
*As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.
*New Melones forecasts are used as the basis of water operations.

Figure 37-5. Stanislaus River Flow below Goodwin, Dry Year Average Flow



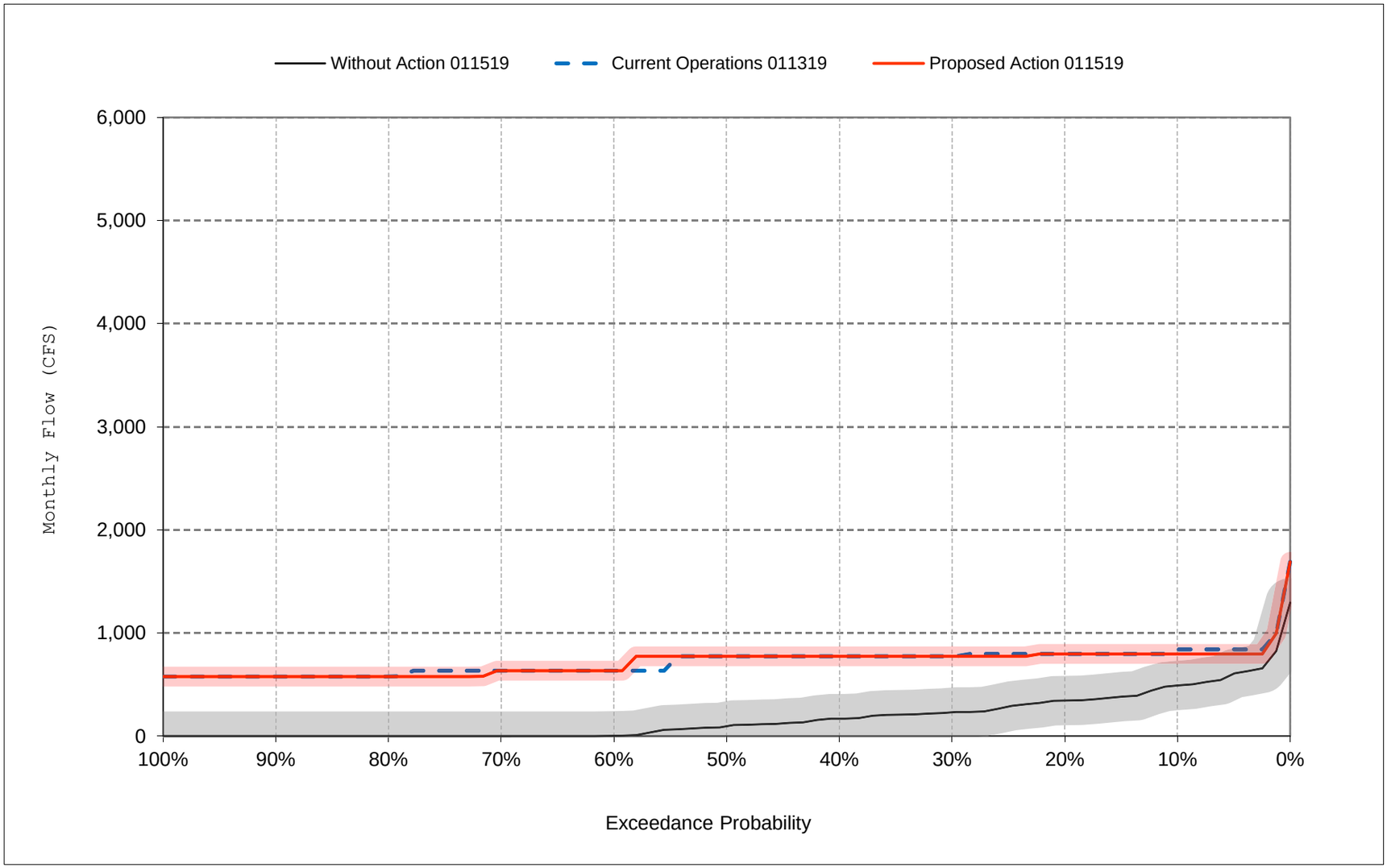
*As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.
*New Melones forecasts are used as the basis of water operations.

Figure 37-6. Stanislaus River Flow below Goodwin, Critical Year Average Flow



*As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.
*New Melones forecasts are used as the basis of water operations.

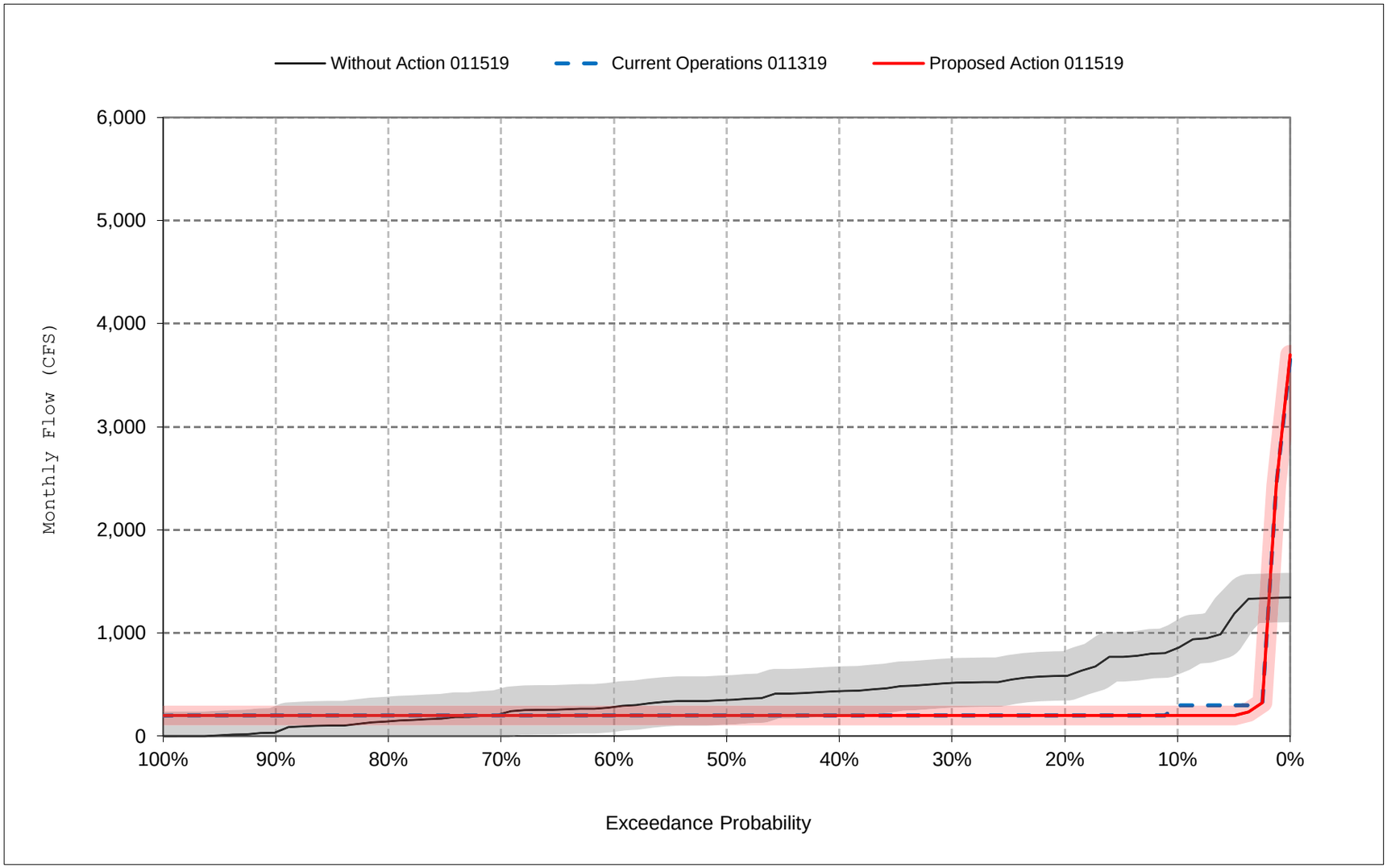
Figure 37-7. Stanislaus River Flow below Goodwin, October



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

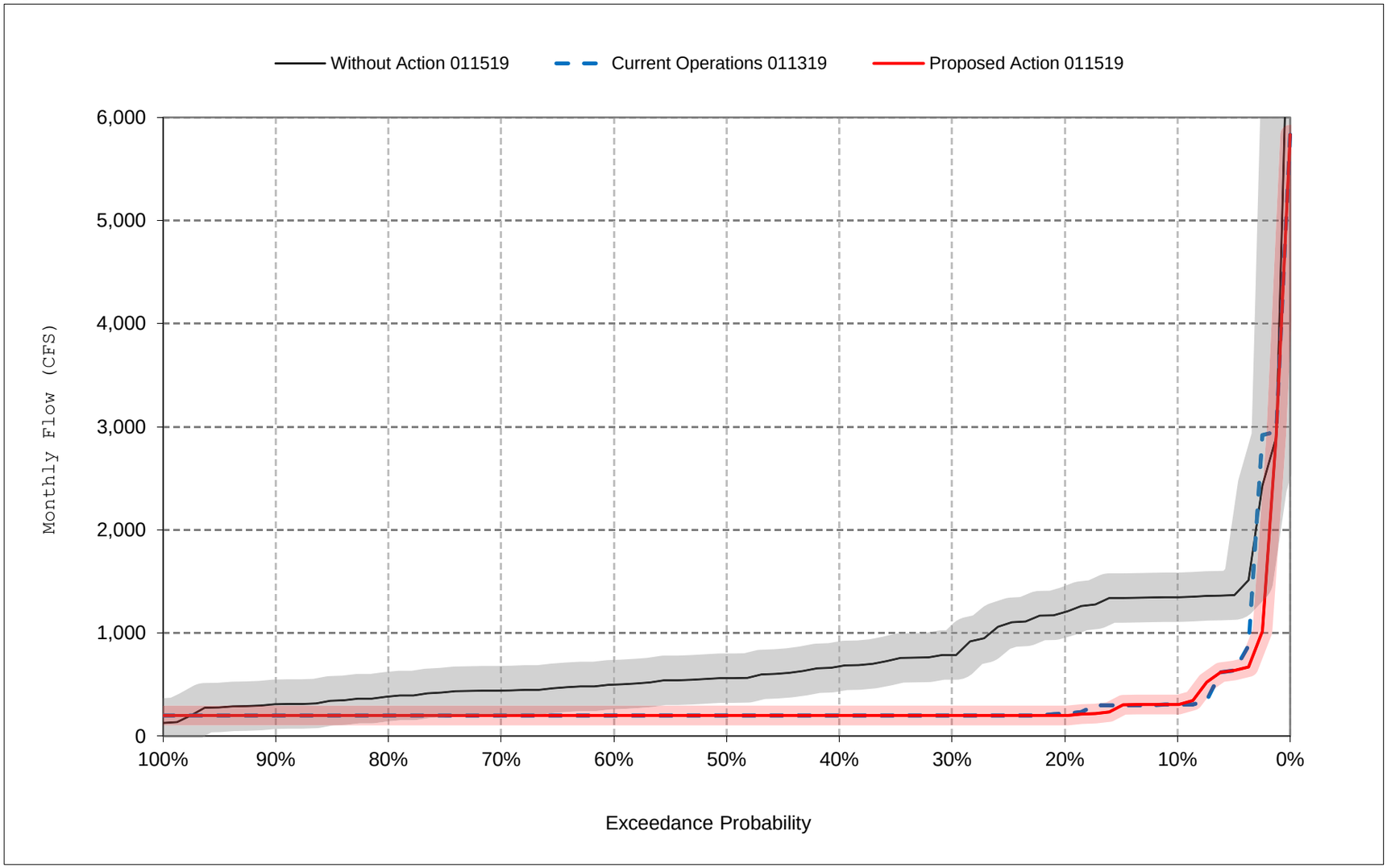
Figure 37-8. Stanislaus River Flow below Goodwin, November



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

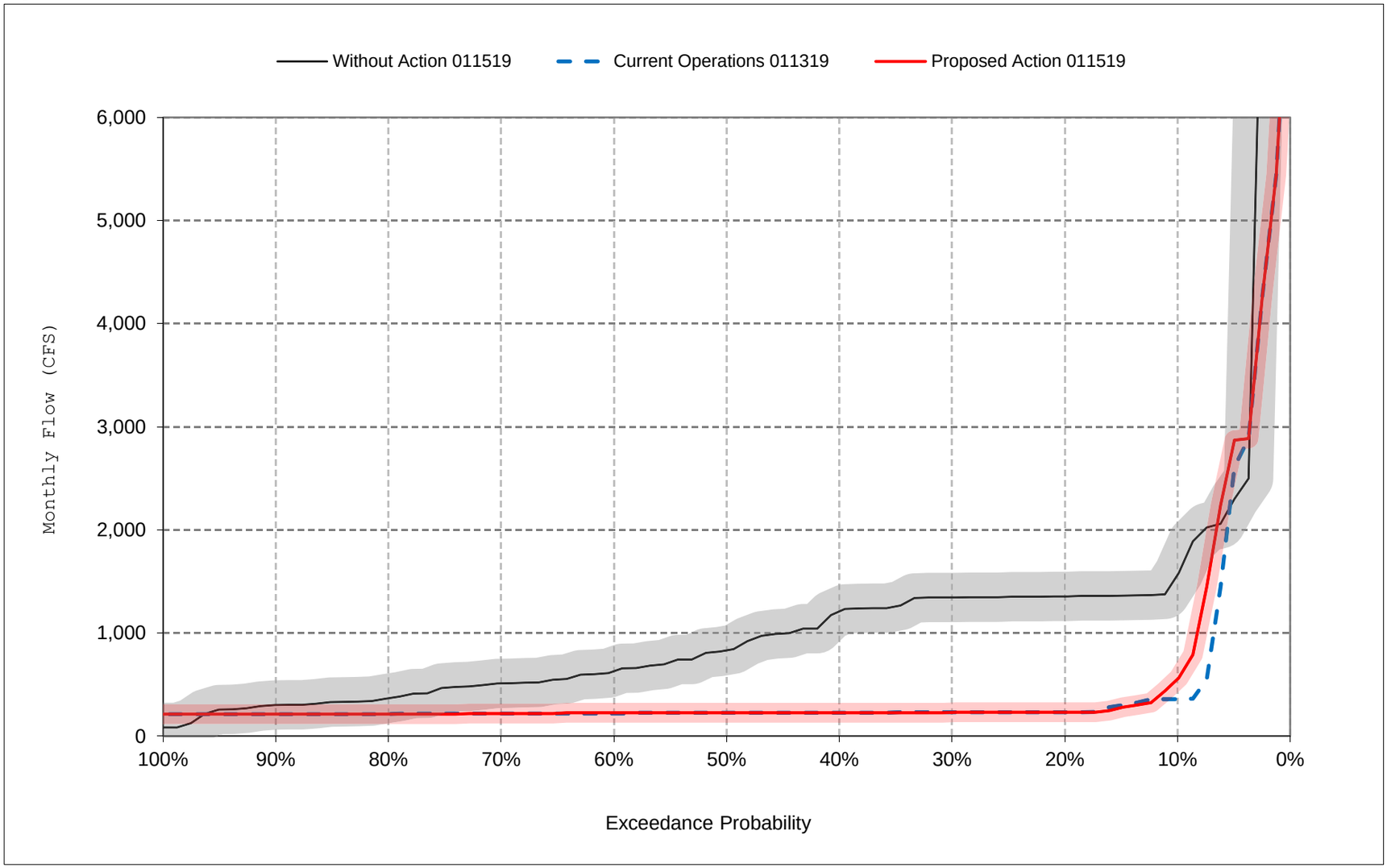
Figure 37-9. Stanislaus River Flow below Goodwin, December



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

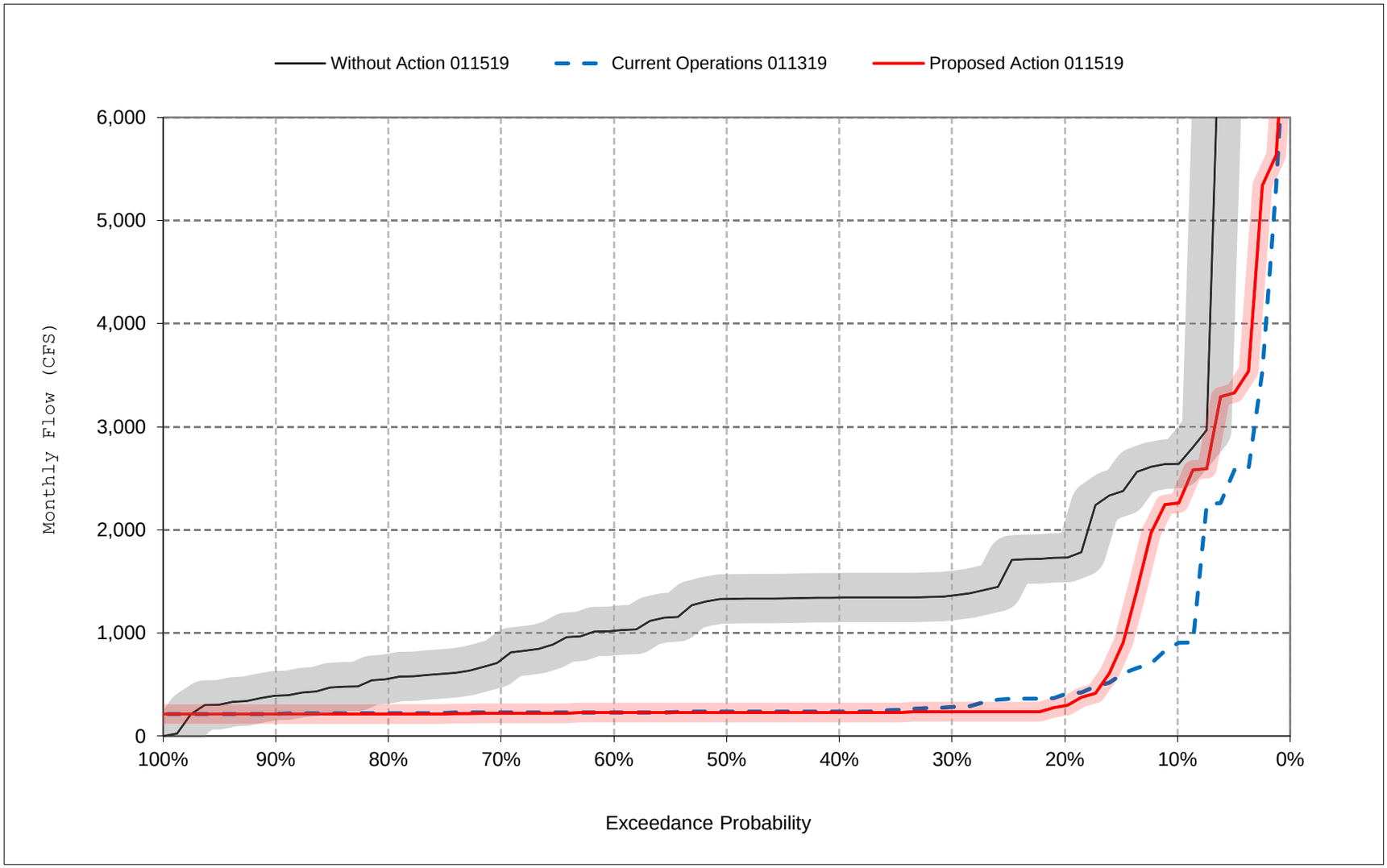
Figure 37-10. Stanislaus River Flow below Goodwin, January



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

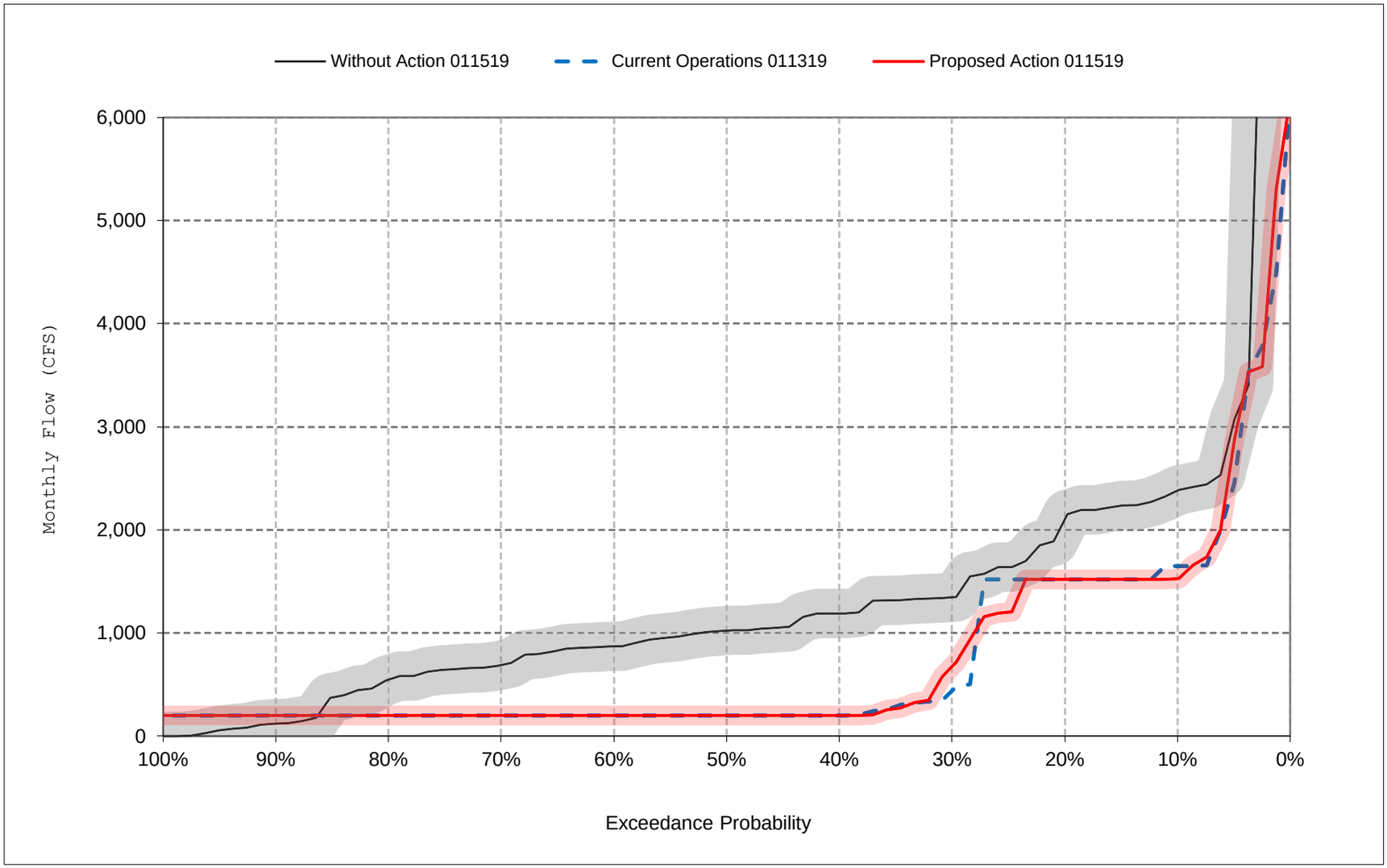
Figure 37-11. Stanislaus River Flow below Goodwin, February



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

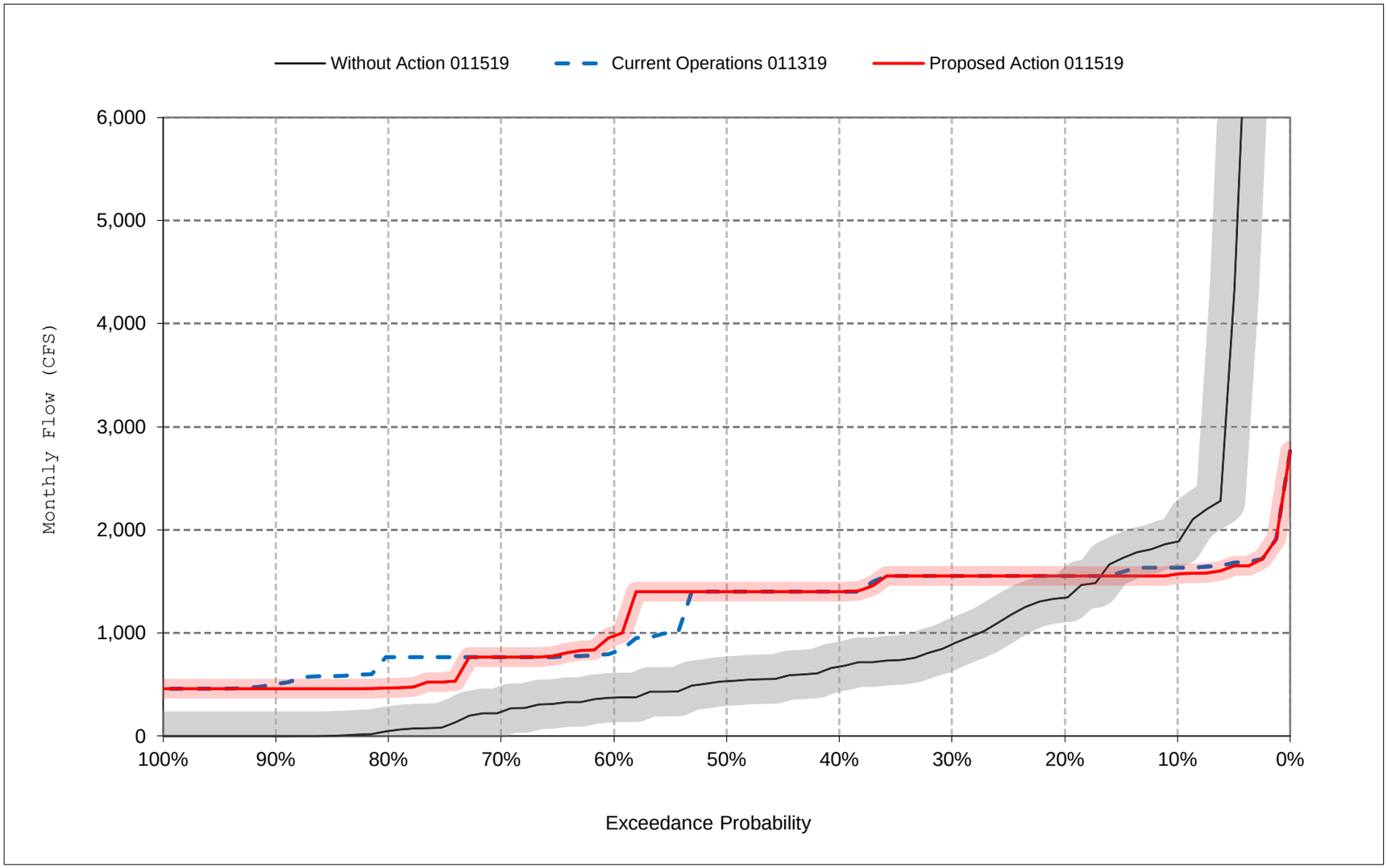
Figure 37-12. Stanislaus River Flow below Goodwin, March



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

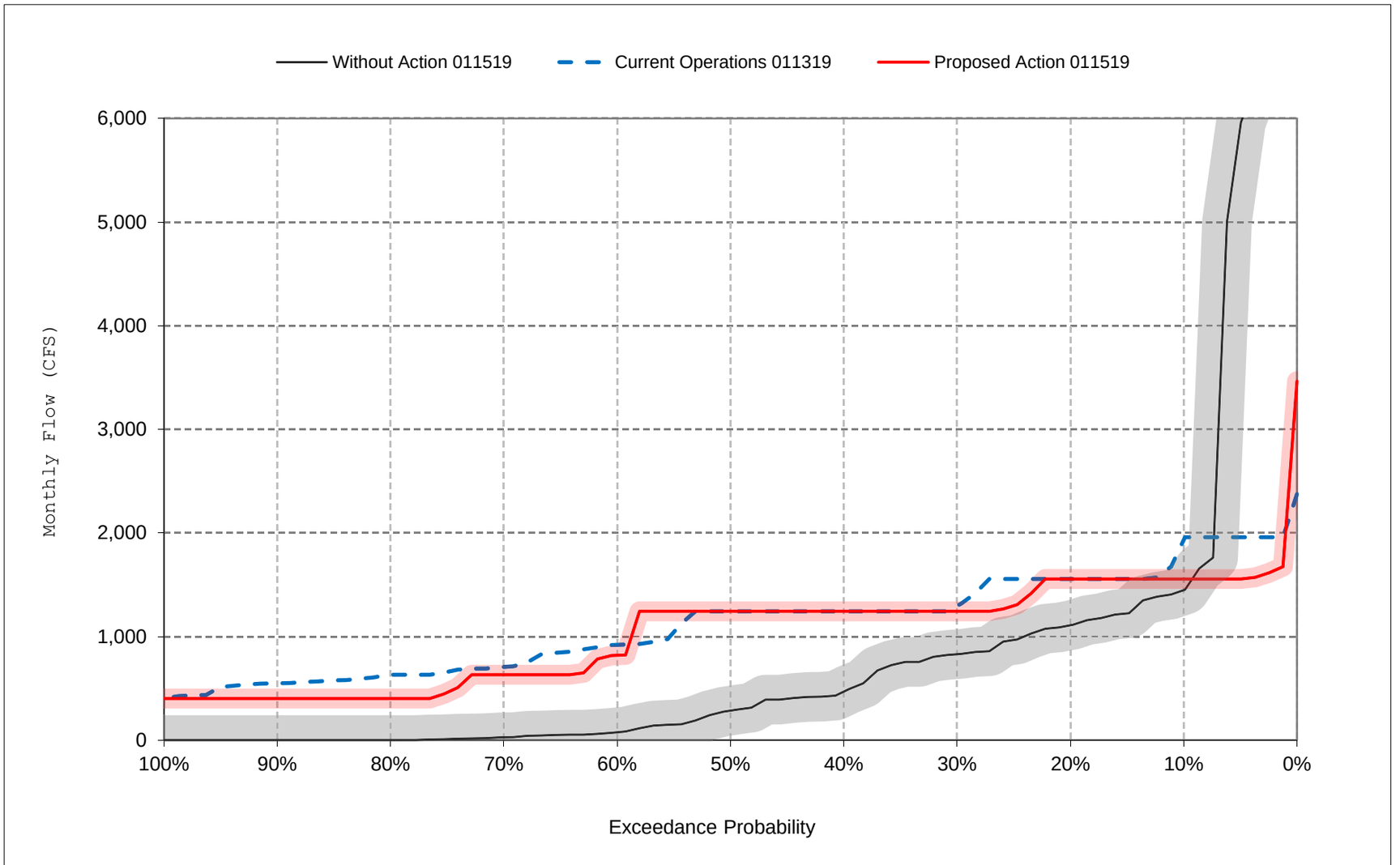
Figure 37-13. Stanislaus River Flow below Goodwin, April



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

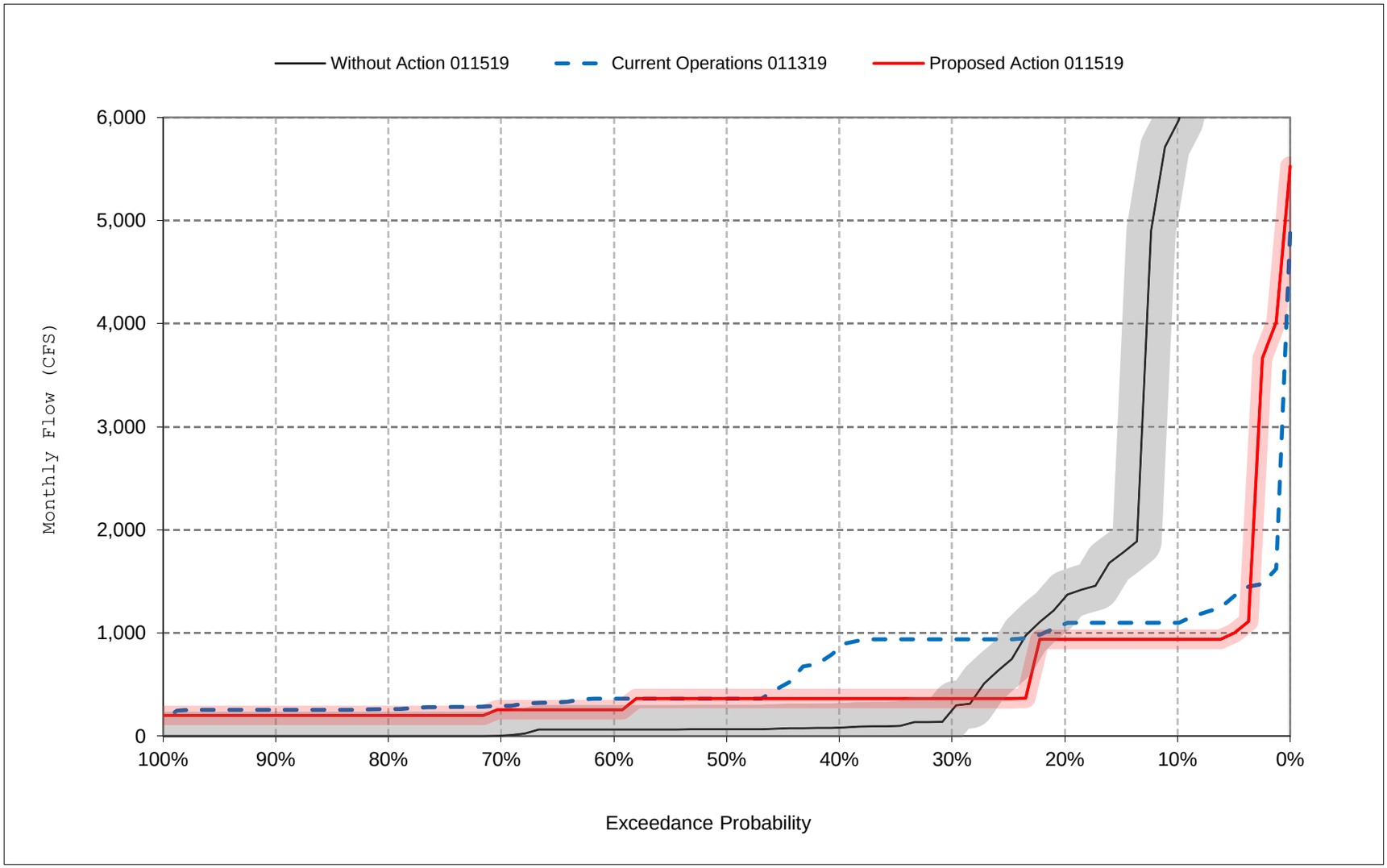
Figure 37-14. Stanislaus River Flow below Goodwin, May



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

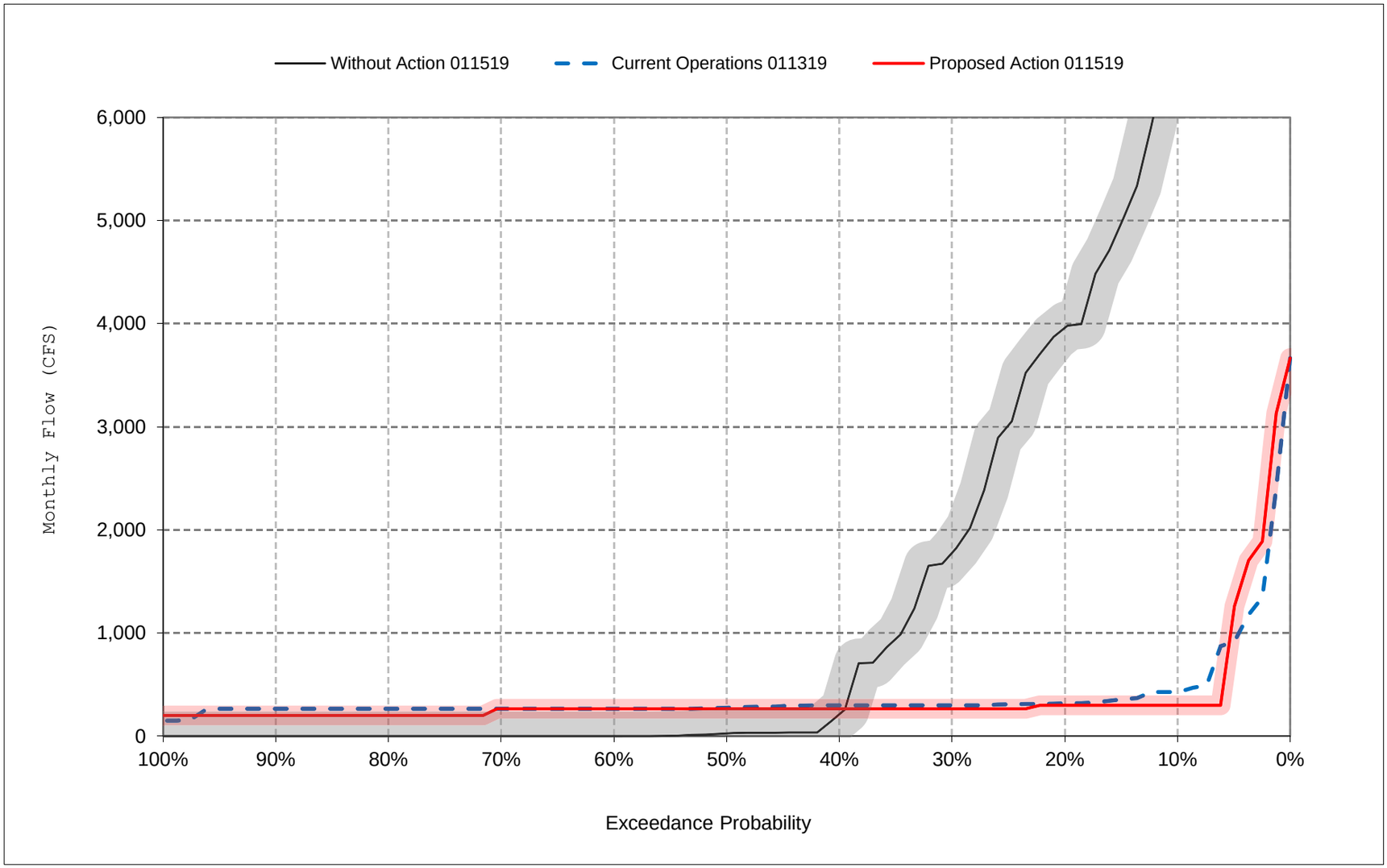
Figure 37-15. Stanislaus River Flow below Goodwin, June



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

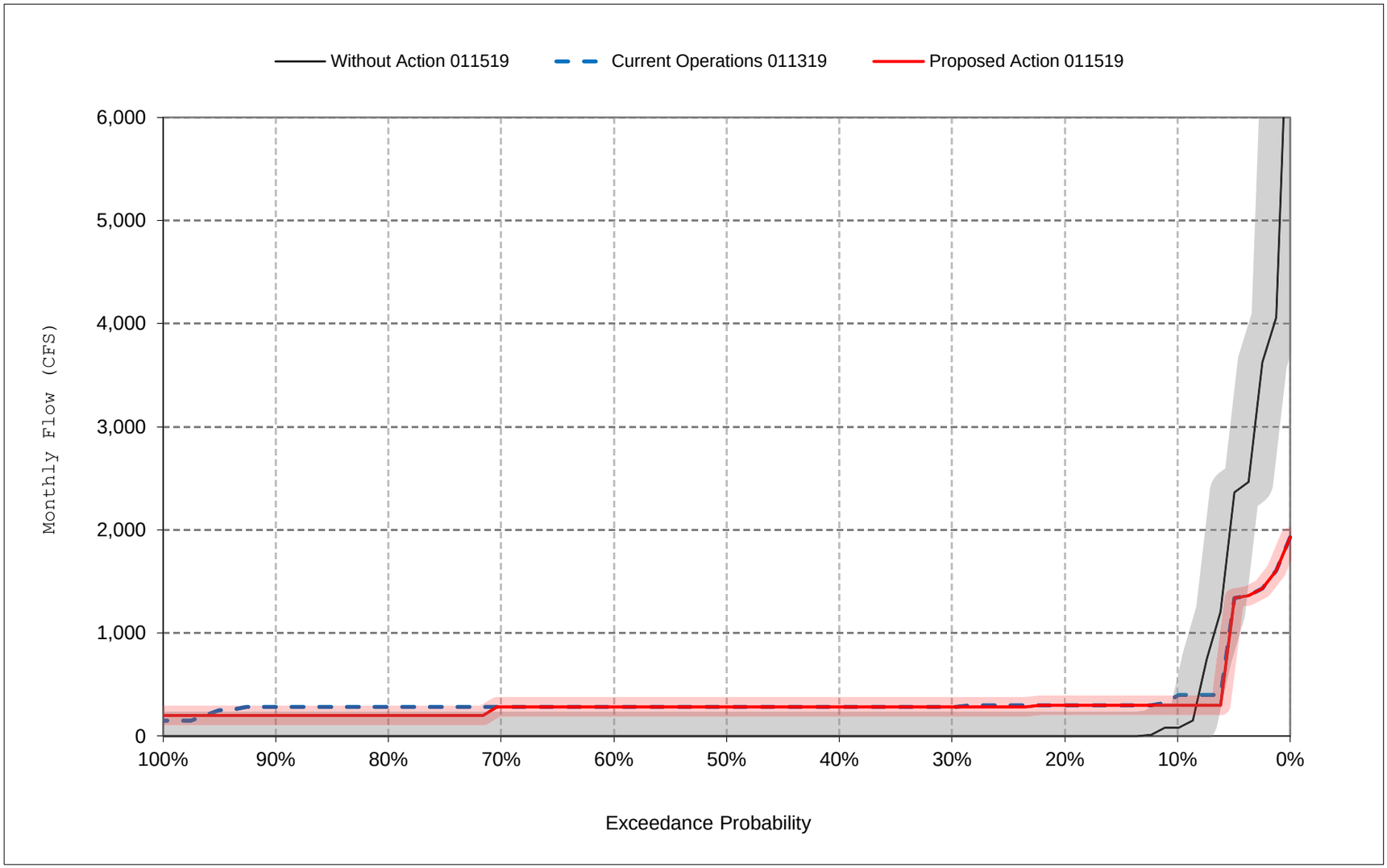
Figure 37-16. Stanislaus River Flow below Goodwin, July



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

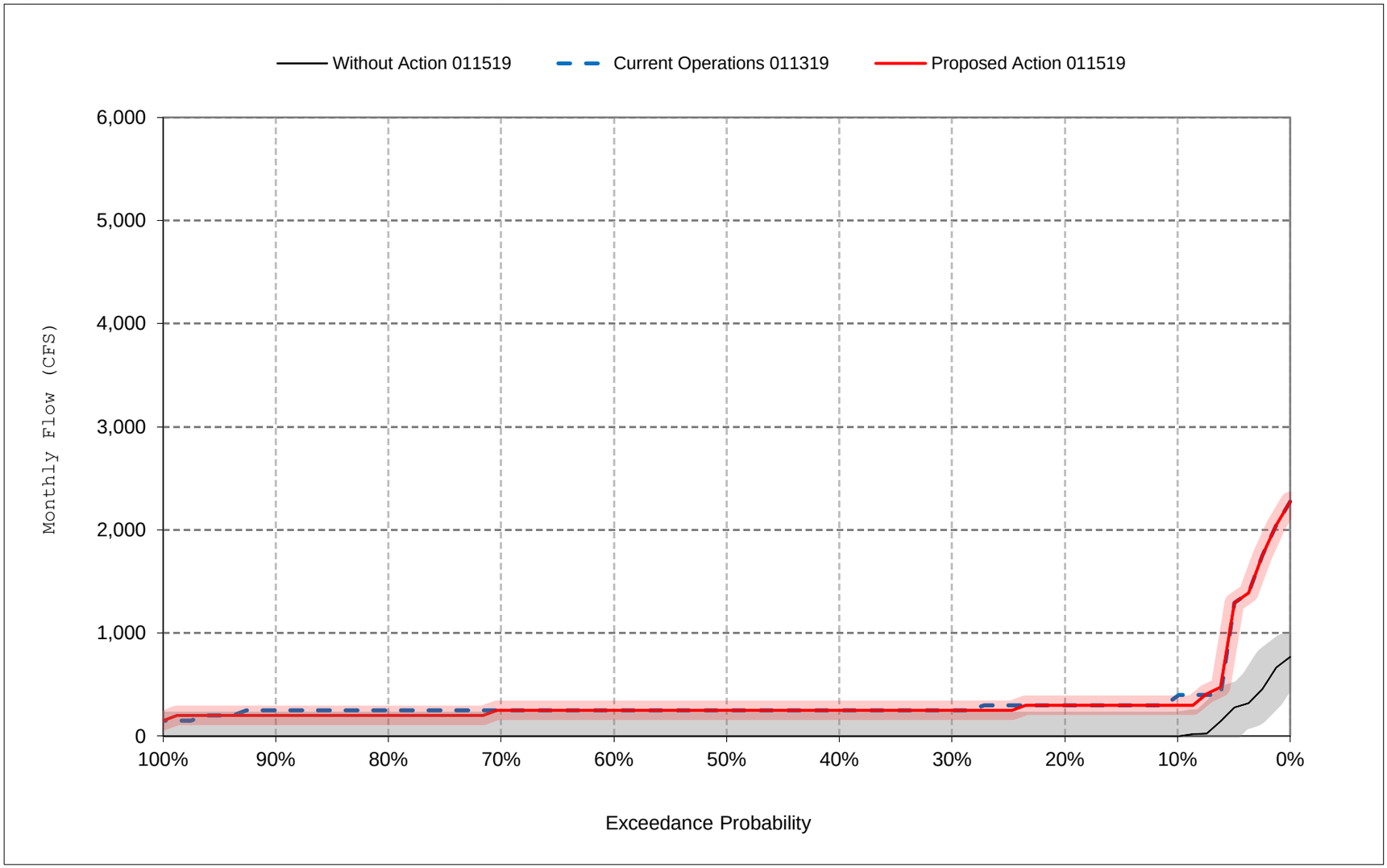
Figure 37-17. Stanislaus River Flow below Goodwin, August



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Figure 37-18. Stanislaus River Flow below Goodwin, September



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Table 38-1. Stanislaus River Flow at Mouth, Monthly Flow

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	694	983	1,412	1,897	2,869	2,621	2,173	1,707	6,408	6,942	334	352
20%	551	793	1,245	1,467	1,919	2,200	1,608	1,278	1,604	4,173	197	237
30%	420	622	909	1,396	1,532	1,636	1,234	929	627	2,095	170	201
40%	348	544	789	1,191	1,415	1,430	888	636	449	442	162	191
50%	283	466	663	1,003	1,361	1,228	573	301	266	218	157	186
60%	255	388	589	760	1,160	1,004	392	153	194	127	133	171
70%	194	339	528	610	807	855	243	90	114	105	113	139
80%	178	270	450	464	630	619	81	55	78	71	91	107
90%	115	165	369	376	432	127	36	27	43	24	64	69
Long Term												
Full Simulation Period[a]	357	541	905	1,264	1,867	1,625	1,189	1,039	1,506	1,905	419	214
Water Year Types[b,c]												
Wet (23%)	509	689	1,100	2,241	3,732	3,364	2,810	2,736	3,696	4,007	1,177	342
Above Normal (24%)	438	594	815	1,636	1,992	1,884	1,531	1,038	2,071	3,110	366	213
Below Normal (10%)	281	515	731	908	2,092	1,231	633	695	701	1,322	155	173
Dry (16%)	289	574	1,381	795	887	920	341	442	323	467	121	204
Critical (27%)	214	353	624	487	641	447	182	52	92	55	84	127

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,122	463	442	576	1,083	1,969	1,886	1,989	1,535	752	587	646
20%	1,029	384	368	427	643	1,708	1,769	1,647	1,330	606	488	507
30%	982	348	319	368	469	521	1,696	1,536	1,221	502	462	473
40%	958	337	304	347	399	433	1,610	1,362	1,053	443	445	443
50%	879	319	290	337	368	367	1,485	1,289	634	415	445	439
60%	826	292	281	326	331	336	936	869	510	384	416	428
70%	772	267	262	312	279	314	806	755	406	374	395	389
80%	755	260	241	295	253	241	693	647	361	343	371	360
90%	676	248	224	273	230	207	579	577	317	311	331	318
Long Term												
Full Simulation Period[a]	903	398	449	630	717	902	1,279	1,207	883	547	505	533
Water Year Types[b,c]												
Wet (23%)	1,120	701	994	1,115	1,404	2,256	1,779	1,828	1,456	977	831	946
Above Normal (24%)	918	316	288	777	786	801	1,410	1,244	1,254	534	467	480
Below Normal (10%)	950	315	291	430	517	539	1,556	1,378	668	449	440	429
Dry (16%)	832	309	311	349	405	345	1,064	1,002	531	377	397	399
Critical (27%)	722	294	266	317	319	286	755	696	336	323	347	342

Current Operations 011319 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	428	**-520**	**-970**	**-1,321**	**-1,786**	**-651**	**-287**	282	**-4,873**	**-6,189**	253	293
20%	478	**-409**	**-877**	**-1,041**	**-1,276**	**-492**	161	369	**-274**	**-3,567**	291	271
30%	563	**-274**	**-590**	**-1,027**	**-1,063**	**-1,114**	462	607	594	**-1,593**	292	272
40%	610	**-207**	**-485**	**-844**	**-1,016**	**-996**	721	726	605	1	283	253
50%	595	**-147**	**-373**	**-666**	**-993**	**-861**	912	987	368	197	287	253
60%	572	**-97**	**-308**	**-434**	**-829**	**-668**	545	716	316	256	283	257
70%	578	**-72**	**-266**	**-298**	**-528**	**-541**	563	664	292	269	281	249
80%	576	**-10**	**-209**	**-169**	**-377**	**-378**	613	592	283	272	279	253
90%	561	83	**-146**	**-103**	**-203**	81	543	550	274	286	267	248
Long Term												
Full Simulation Period[a]	546	**-143**	**-455**	**-633**	**-1,150**	**-723**	90	168	**-623**	**-1,358**	87	319
Water Year Types[b,c]												
Wet (23%)	611	12	**-107**	**-1,126**	**-2,327**	**-1,107**	**-1,032**	**-908**	**-2,240**	**-3,030**	**-346**	605
Above Normal (24%)	481	**-278**	**-527**	**-859**	**-1,205**	**-1,083**	**-121**	206	**-817**	**-2,576**	101	267
Below Normal (10%)	669	**-201**	**-440**	**-477**	**-1,575**	**-692**	923	683	**-33**	**-873**	285	256
Dry (16%)	543	**-265**	**-1,070**	**-447**	**-482**	**-575**	723	560	208	**-90**	277	194
Critical (27%)	508	**-59**	**-357**	**-169**	**-321**	**-161**	573	645	244	269	263	215

a Based on the 82-year simulation period.

b As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

f New Melones forecasts are used as the basis of water operations.

Table 38-2. Stanislaus River Flow at Mouth, Monthly Flow

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	694	983	1,412	1,897	2,869	2,621	2,173	1,707	6,408	6,942	334	352
20%	551	793	1,245	1,467	1,919	2,200	1,608	1,278	1,604	4,173	197	237
30%	420	622	909	1,396	1,532	1,636	1,234	929	627	2,095	170	201
40%	348	544	789	1,191	1,415	1,430	888	636	449	442	162	191
50%	283	466	663	1,003	1,361	1,228	573	301	266	218	157	186
60%	255	388	589	760	1,160	1,004	392	153	194	127	133	171
70%	194	339	528	610	807	855	243	90	114	105	113	139
80%	178	270	450	464	630	619	81	55	78	71	91	107
90%	115	165	369	376	432	127	36	27	43	24	64	69
Long Term												
Full Simulation Period[a]	357	541	905	1,264	1,867	1,625	1,189	1,039	1,506	1,905	419	214
Water Year Types[b,c]												
Wet (23%)	509	689	1,100	2,241	3,732	3,364	2,810	2,736	3,696	4,007	1,177	342
Above Normal (24%)	438	594	815	1,636	1,992	1,884	1,531	1,038	2,071	3,110	366	213
Below Normal (10%)	281	515	731	908	2,092	1,231	633	695	701	1,322	155	173
Dry (16%)	289	574	1,381	795	887	920	341	442	323	467	121	204
Critical (27%)	214	353	624	487	641	447	182	52	92	55	84	127

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,094	401	403	765	2,628	1,947	1,886	1,726	1,352	633	569	673
20%	1,036	376	338	425	541	1,638	1,817	1,610	1,061	536	482	493
30%	975	347	314	364	449	1,054	1,705	1,443	800	479	458	462
40%	966	335	304	350	388	415	1,553	1,335	615	427	445	441
50%	901	318	288	336	340	362	1,525	1,294	531	398	435	437
60%	821	292	280	325	293	334	976	841	408	376	402	400
70%	766	267	262	308	257	312	767	631	341	309	360	382
80%	751	260	239	294	237	241	545	459	287	282	318	337
90%	659	248	223	273	227	207	460	419	243	231	274	282
Long Term												
Full Simulation Period[a]	898	392	424	661	846	911	1,268	1,120	769	530	482	520
Water Year Types[b,c]												
Wet (23%)	1,115	677	866	1,120	1,961	2,431	1,718	1,802	1,816	1,095	817	945
Above Normal (24%)	964	313	299	808	806	733	1,758	1,353	658	446	457	471
Below Normal (10%)	972	315	291	694	700	421	1,712	1,419	557	445	438	423
Dry (16%)	780	309	320	339	320	345	859	727	412	355	391	395
Critical (27%)	686	294	266	310	286	271	514	441	254	252	284	309

Proposed Action 011519 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	400	**-582**	**-1,009**	**-1,132**	**-241**	**-673**	**-287**	18	**-5,056**	**-6,309**	235	321
20%	486	**-417**	**-906**	**-1,042**	**-1,378**	**-562**	210	332	**-543**	**-3,637**	285	256
30%	556	**-275**	**-594**	**-1,032**	**-1,082**	**-582**	470	513	173	**-1,616**	288	261
40%	617	**-209**	**-485**	**-841**	**-1,027**	**-1,014**	665	700	166	**-15**	283	250
50%	618	**-148**	**-375**	**-667**	**-1,021**	**-865**	952	992	265	180	277	251
60%	567	**-97**	**-308**	**-435**	**-868**	**-670**	585	688	213	249	269	230
70%	572	**-72**	**-266**	**-302**	**-550**	**-543**	523	540	226	204	247	243
80%	572	**-10**	**-211**	**-170**	**-393**	**-378**	464	404	210	211	227	230
90%	544	83	**-147**	**-103**	**-205**	81	424	392	200	207	210	212
Long Term												
Full Simulation Period[a]	541	**-149**	**-481**	**-603**	**-1,021**	**-714**	79	81	**-737**	**-1,375**	63	306
Water Year Types[b,c]												
Wet (23%)	607	**-12**	**-235**	**-1,122**	**-1,771**	**-932**	**-1,092**	**-934**	**-1,881**	**-2,912**	**-360**	603
Above Normal (24%)	527	**-282**	**-516**	**-829**	**-1,186**	**-1,151**	226	316	**-1,413**	**-2,664**	92	258
Below Normal (10%)	691	**-201**	**-440**	**-214**	**-1,392**	**-810**	1,079	723	**-144**	**-877**	283	250
Dry (16%)	492	**-265**	**-1,061**	**-456**	**-567**	**-575**	518	286	88	**-112**	270	190
Critical (27%)	472	**-59**	**-357**	**-176**	**-355**	**-176**	332	390	161	197	199	182

a Based on the 82-year simulation period.

b As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

f New Melones forecasts are used as the basis of water operations.

Table 38-3. Stanislaus River Flow at Mouth, Monthly Flow

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,122	463	442	576	1,083	1,969	1,886	1,989	1,535	752	587	646
20%	1,029	384	368	427	643	1,708	1,769	1,647	1,330	606	488	507
30%	982	348	319	368	469	521	1,696	1,536	1,221	502	462	473
40%	958	337	304	347	399	433	1,610	1,362	1,053	443	445	443
50%	879	319	290	337	368	367	1,485	1,289	634	415	445	439
60%	826	292	281	326	331	336	936	869	510	384	416	428
70%	772	267	262	312	279	314	806	755	406	374	395	389
80%	755	260	241	295	253	241	693	647	361	343	371	360
90%	676	248	224	273	230	207	579	577	317	311	331	318
Long Term												
Full Simulation Period[a]	903	398	449	630	717	902	1,279	1,207	883	547	505	533
Water Year Types[b,c]												
Wet (23%)	1,120	701	994	1,115	1,404	2,256	1,779	1,828	1,456	977	831	946
Above Normal (24%)	918	316	288	777	786	801	1,410	1,244	1,254	534	467	480
Below Normal (10%)	950	315	291	430	517	539	1,556	1,378	668	449	440	429
Dry (16%)	832	309	311	349	405	345	1,064	1,002	531	377	397	399
Critical (27%)	722	294	266	317	319	286	755	696	336	323	347	342

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,094	401	403	765	2,628	1,947	1,886	1,726	1,352	633	569	673
20%	1,036	376	338	425	541	1,638	1,817	1,610	1,061	536	482	493
30%	975	347	314	364	449	1,054	1,705	1,443	800	479	458	462
40%	966	335	304	350	388	415	1,553	1,335	615	427	445	441
50%	901	318	288	336	340	362	1,525	1,294	531	398	435	437
60%	821	292	280	325	293	334	976	841	408	376	402	400
70%	766	267	262	308	257	312	767	631	341	309	360	382
80%	751	260	239	294	237	241	545	459	287	282	318	337
90%	659	248	223	273	227	207	460	419	243	231	274	282
Long Term												
Full Simulation Period[a]	898	392	424	661	846	911	1,268	1,120	769	530	482	520
Water Year Types[b,c]												
Wet (23%)	1,115	677	866	1,120	1,961	2,431	1,718	1,802	1,816	1,095	817	945
Above Normal (24%)	964	313	299	808	806	733	1,758	1,353	658	446	457	471
Below Normal (10%)	972	315	291	694	700	421	1,712	1,419	557	445	438	423
Dry (16%)	780	309	320	339	320	345	859	727	412	355	391	395
Critical (27%)	686	294	266	310	286	271	514	441	254	252	284	309

Proposed Action 011519 minus Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	-29	-62	-40	188	1,545	-22	0	-264	-183	-119	-18	28
20%	7	-8	-29	-2	-102	-70	48	-37	-269	-70	-7	-14
30%	-7	-1	-4	-4	-20	532	8	-94	-421	-23	-4	-11
40%	7	-2	-1	2	-11	-18	-56	-27	-438	-16	0	-3
50%	23	-1	-1	-1	-28	-5	41	5	-103	-17	-10	-2
60%	-5	0	0	0	-38	-2	40	-28	-103	-7	-14	-27
70%	-6	0	0	-4	-22	-2	-39	-124	-66	-65	-34	-7
80%	-4	0	-2	-1	-16	0	-149	-188	-73	-61	-52	-24
90%	-17	0	-1	0	-2	0	-118	-158	-74	-80	-56	-36
Long Term												
Full Simulation Period[a]	-4	-6	-26	31	129	8	-11	-87	-114	-17	-24	-13
Water Year Types[b,c]												
Wet (23%)	-5	-24	-128	4	557	175	-61	-26	359	118	-14	-1
Above Normal (24%)	46	-3	11	31	20	-68	347	109	-596	-88	-9	-9
Below Normal (10%)	22	0	0	264	183	-118	156	41	-111	-4	-2	-6
Dry (16%)	-51	0	9	-10	-86	0	-205	-274	-119	-21	-6	-4
Critical (27%)	-36	0	0	-7	-33	-15	-241	-255	-82	-72	-64	-33

a Based on the 82-year simulation period.

b As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

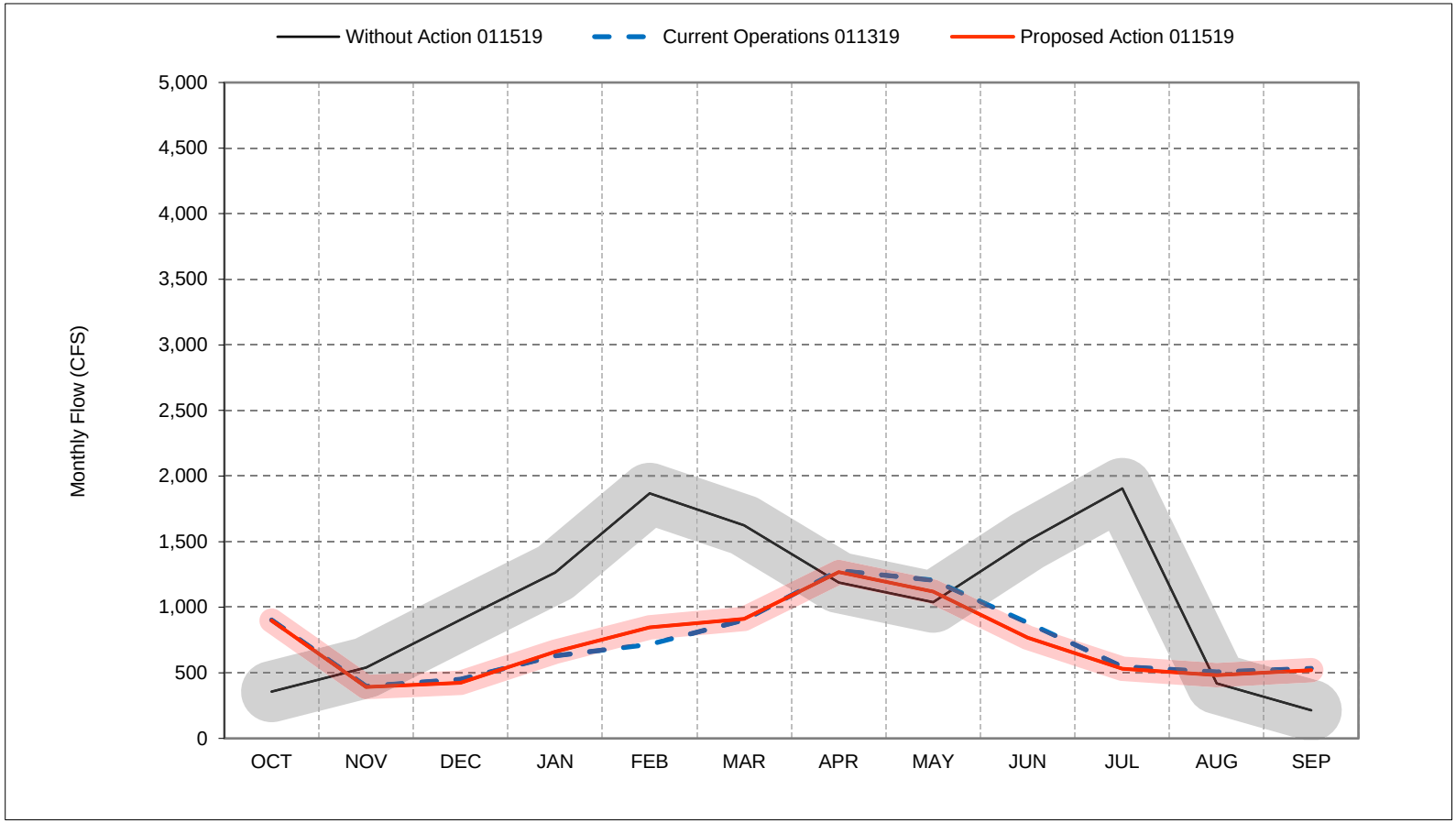
c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

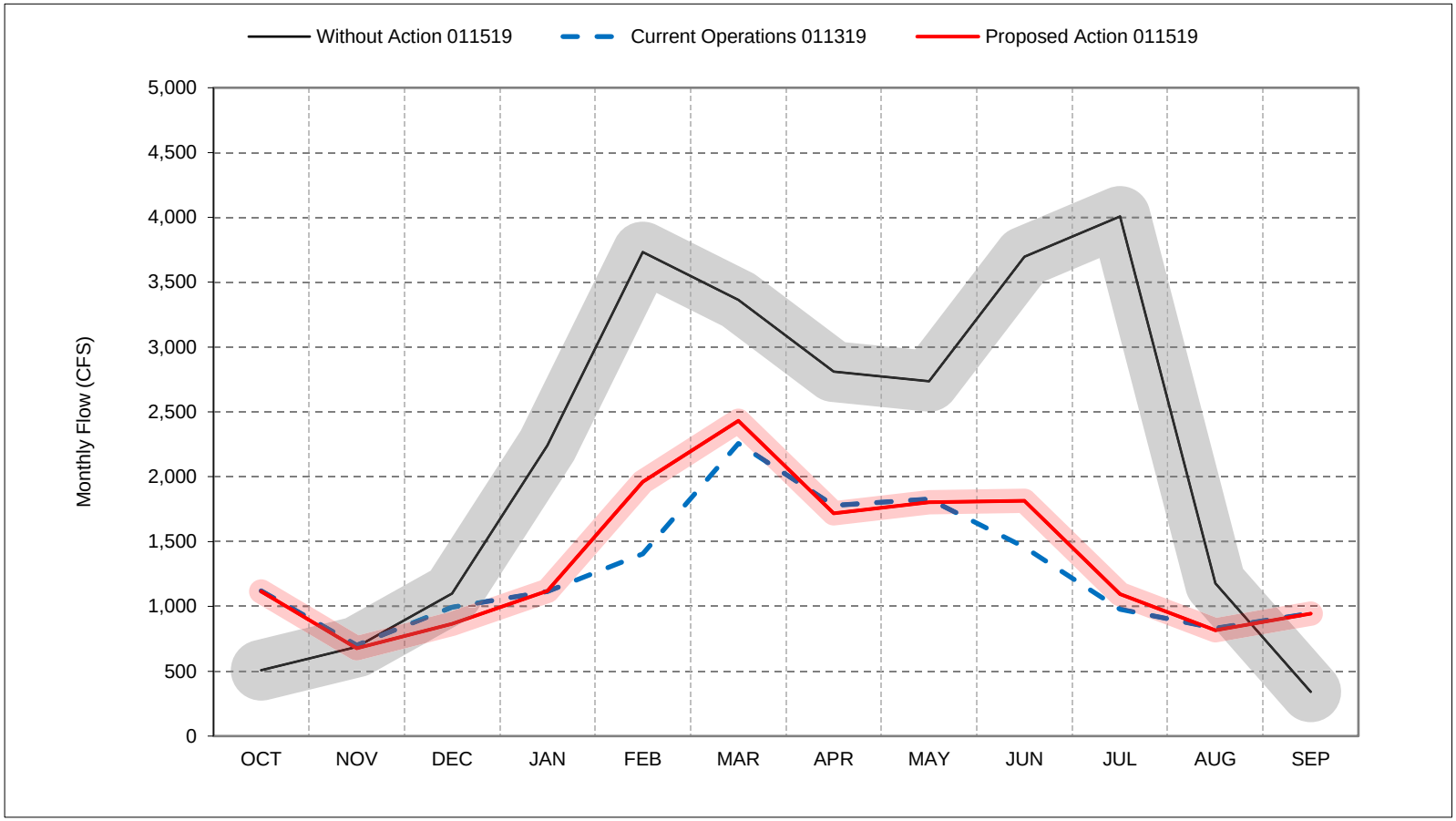
f New Melones forecasts are used as the basis of water operations.

Figure 38-1. Stanislaus River Flow at Mouth, Long-Term Average Flow



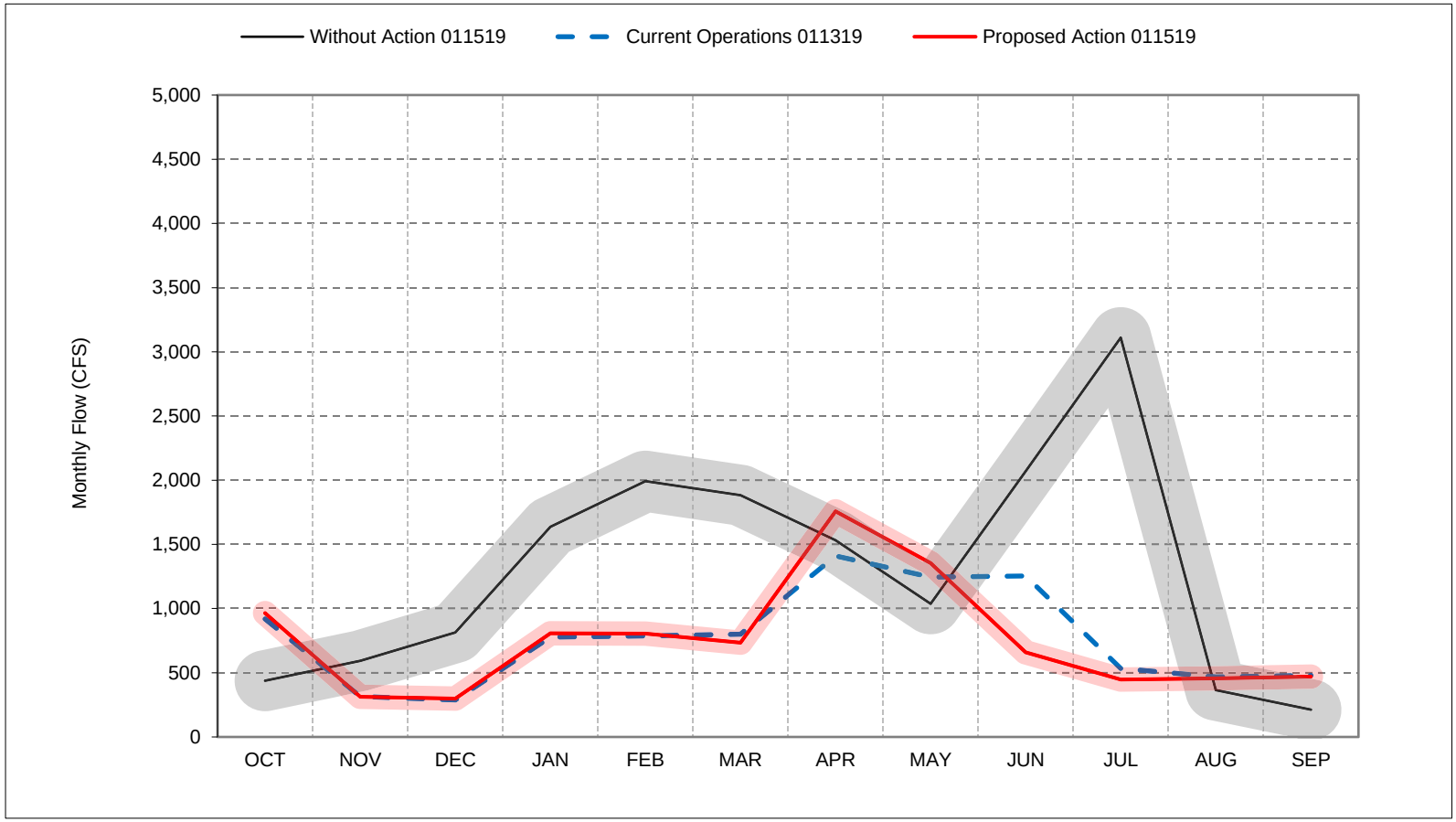
*As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.
*New Melones forecasts are used as the basis of water operations.

Figure 38-2. Stanislaus River Flow at Mouth, Wet Year Average Flow



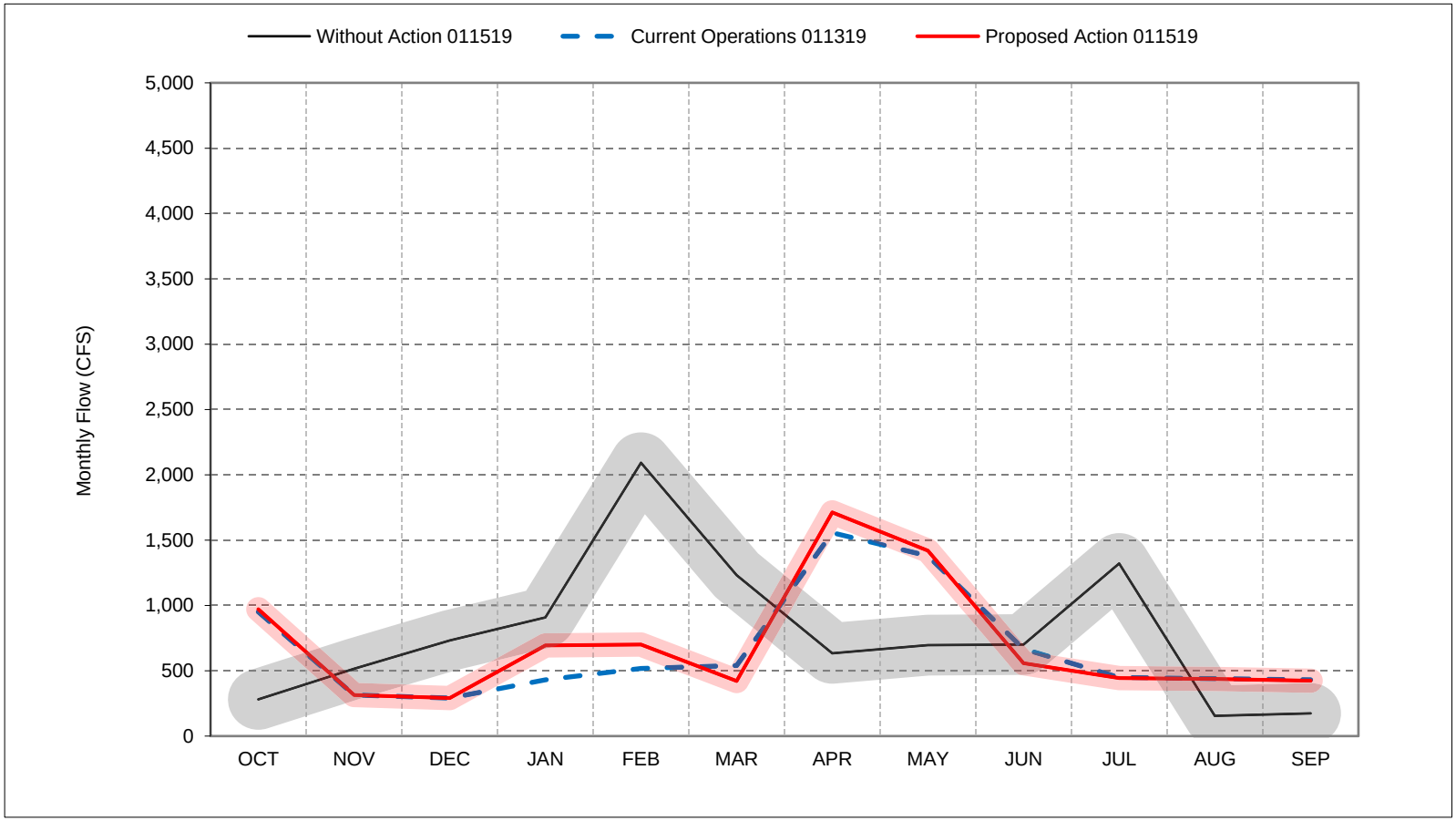
*As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.
*New Melones forecasts are used as the basis of water operations.

Figure 38-3. Stanislaus River Flow at Mouth, Above Normal Year Average Flow



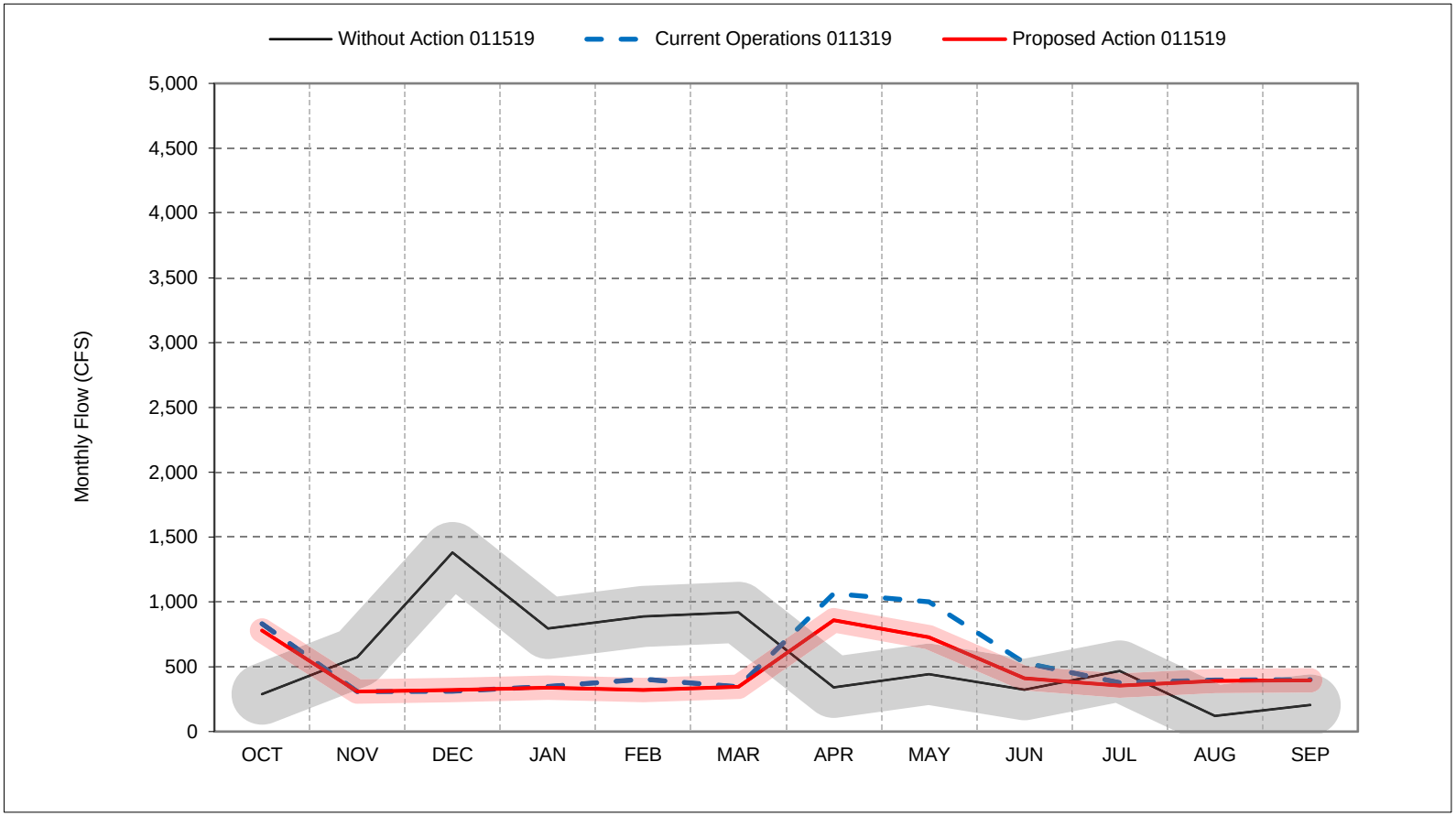
*As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.
*New Melones forecasts are used as the basis of water operations.

Figure 38-4. Stanislaus River Flow at Mouth, Below Normal Year Average Flow



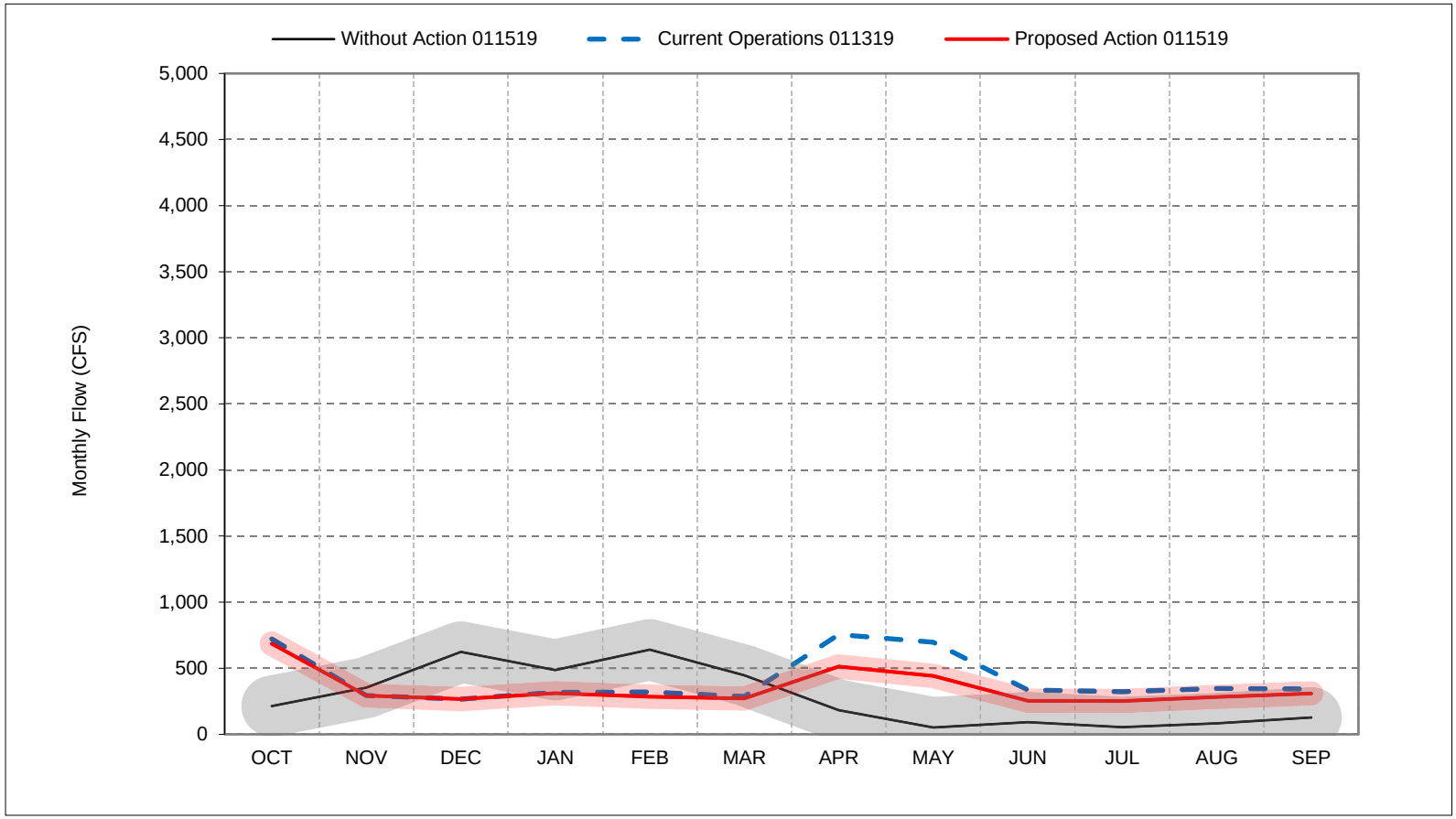
*As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.
*New Melones forecasts are used as the basis of water operations.

Figure 38-5. Stanislaus River Flow at Mouth, Dry Year Average Flow



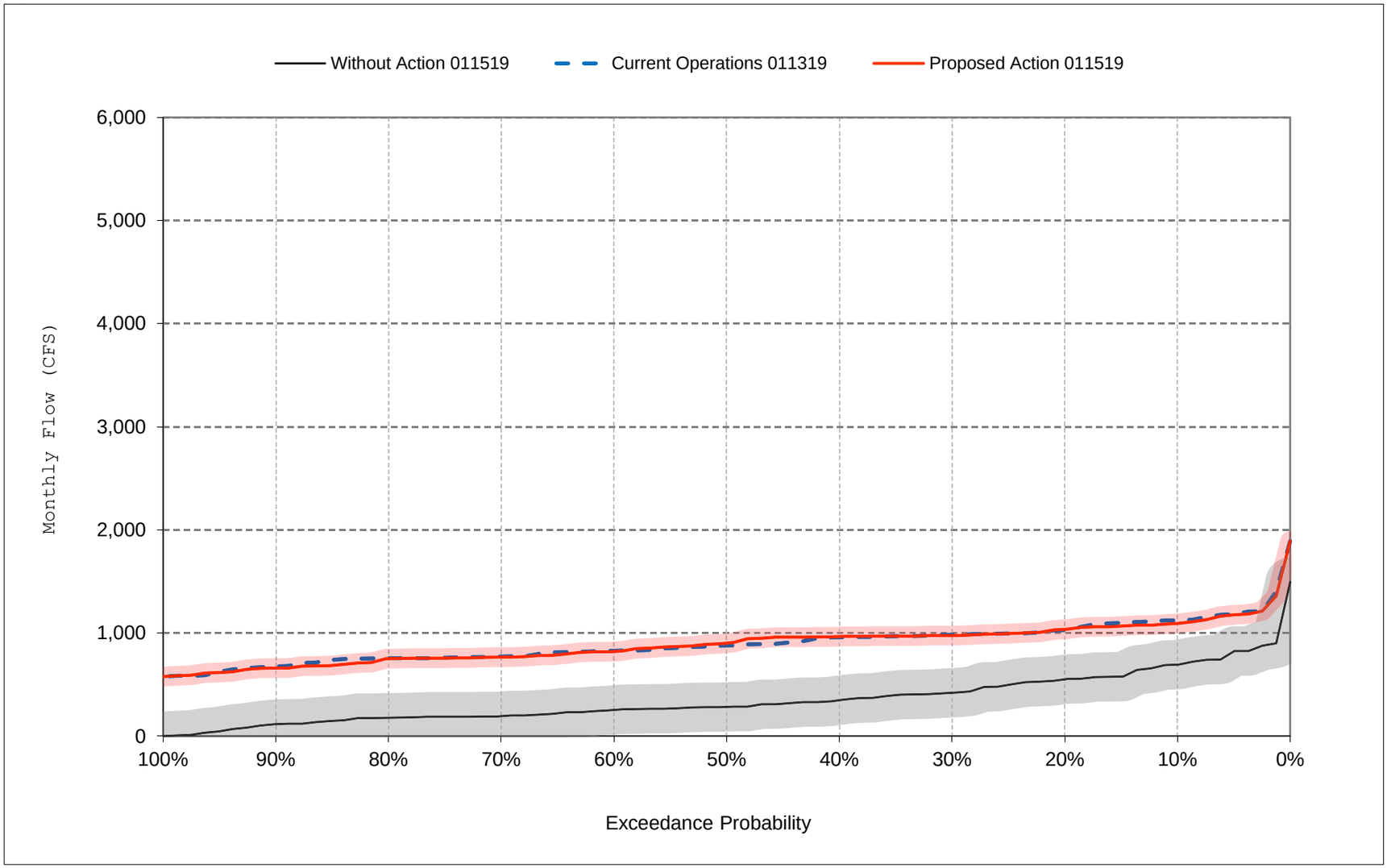
*As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.
*New Melones forecasts are used as the basis of water operations.

Figure 38-6. Stanislaus River Flow at Mouth, Critical Year Average Flow



*As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.
*New Melones forecasts are used as the basis of water operations.

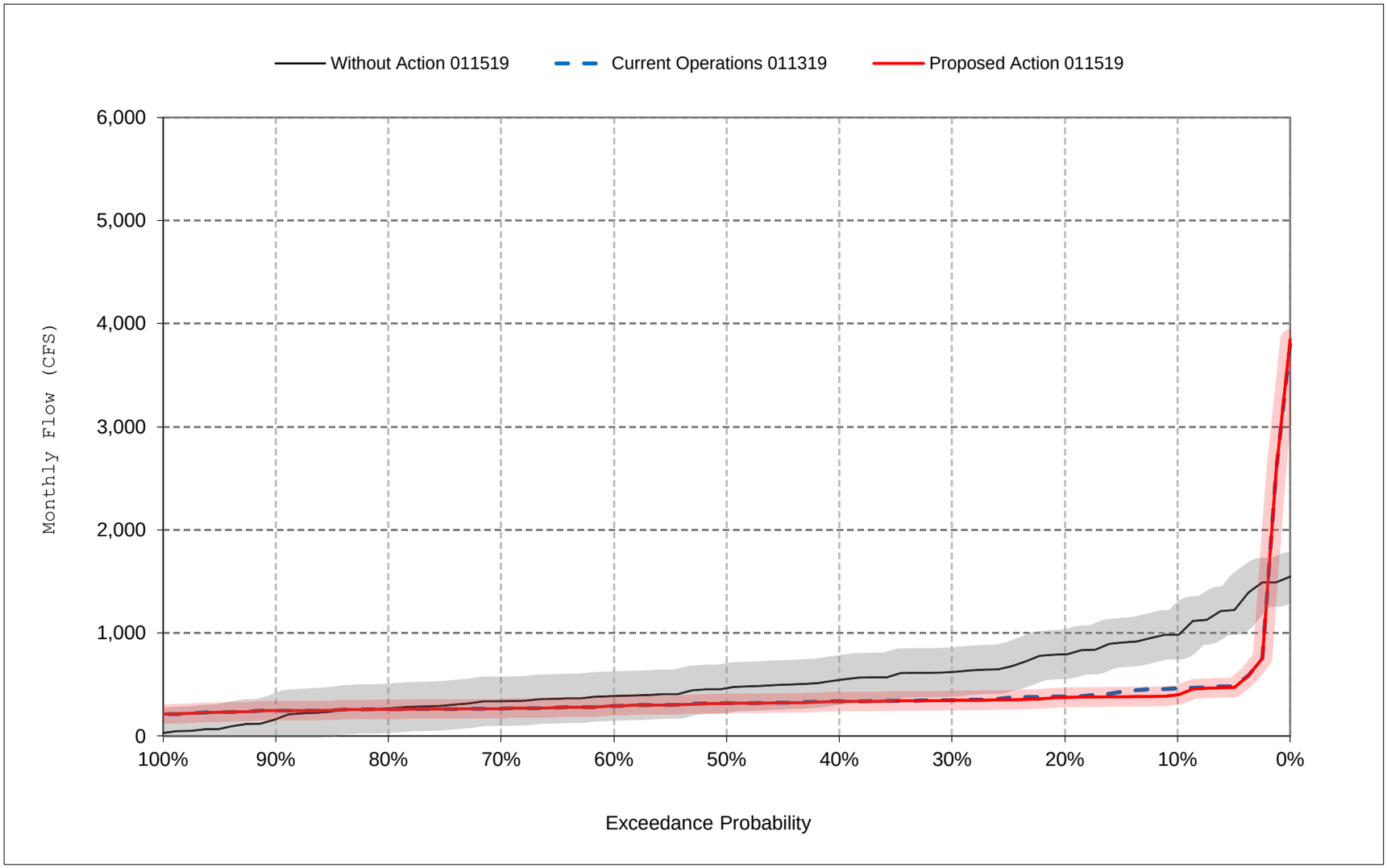
Figure 38-7. Stanislaus River Flow at Mouth, October



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

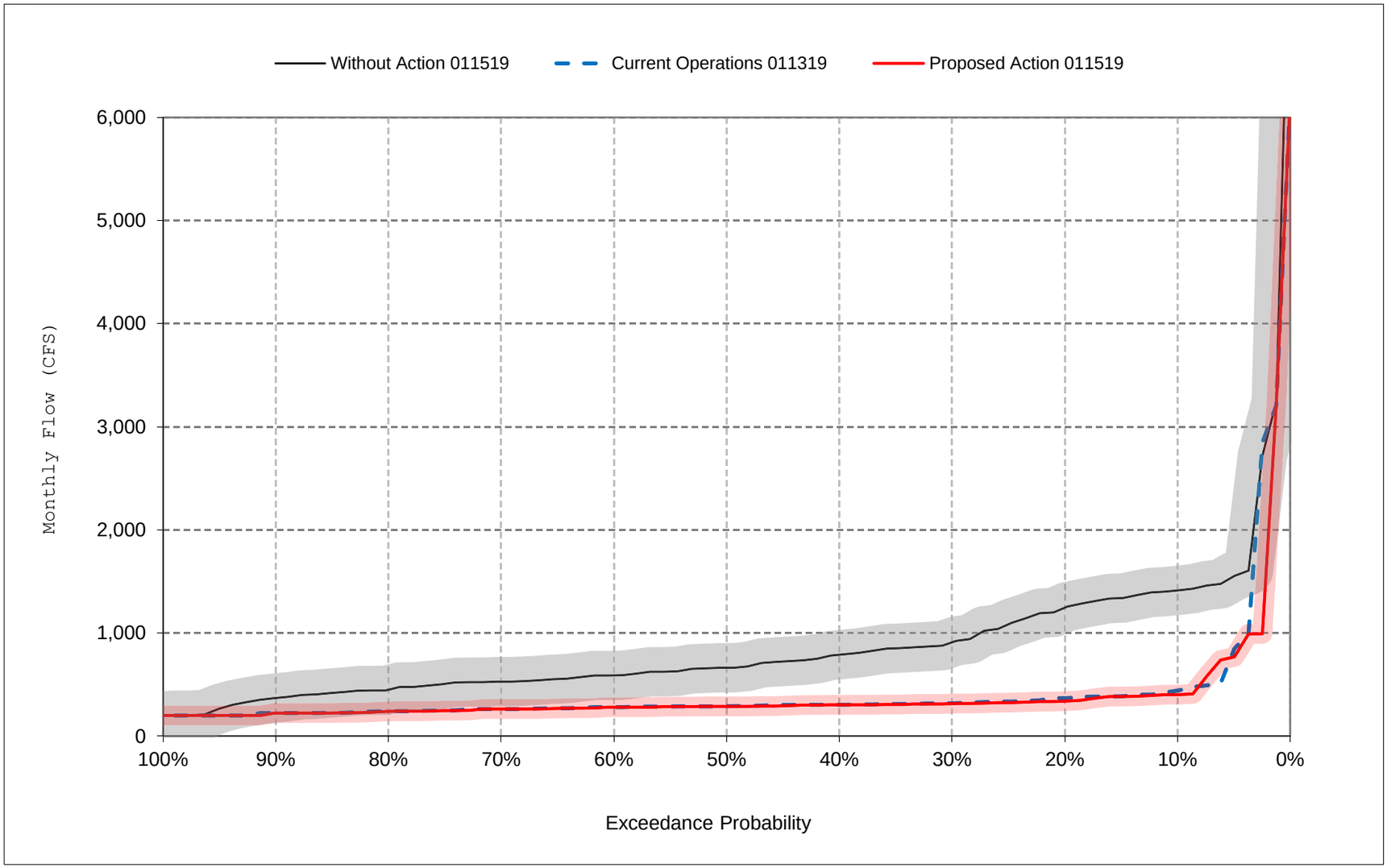
Figure 38-8. Stanislaus River Flow at Mouth, November



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

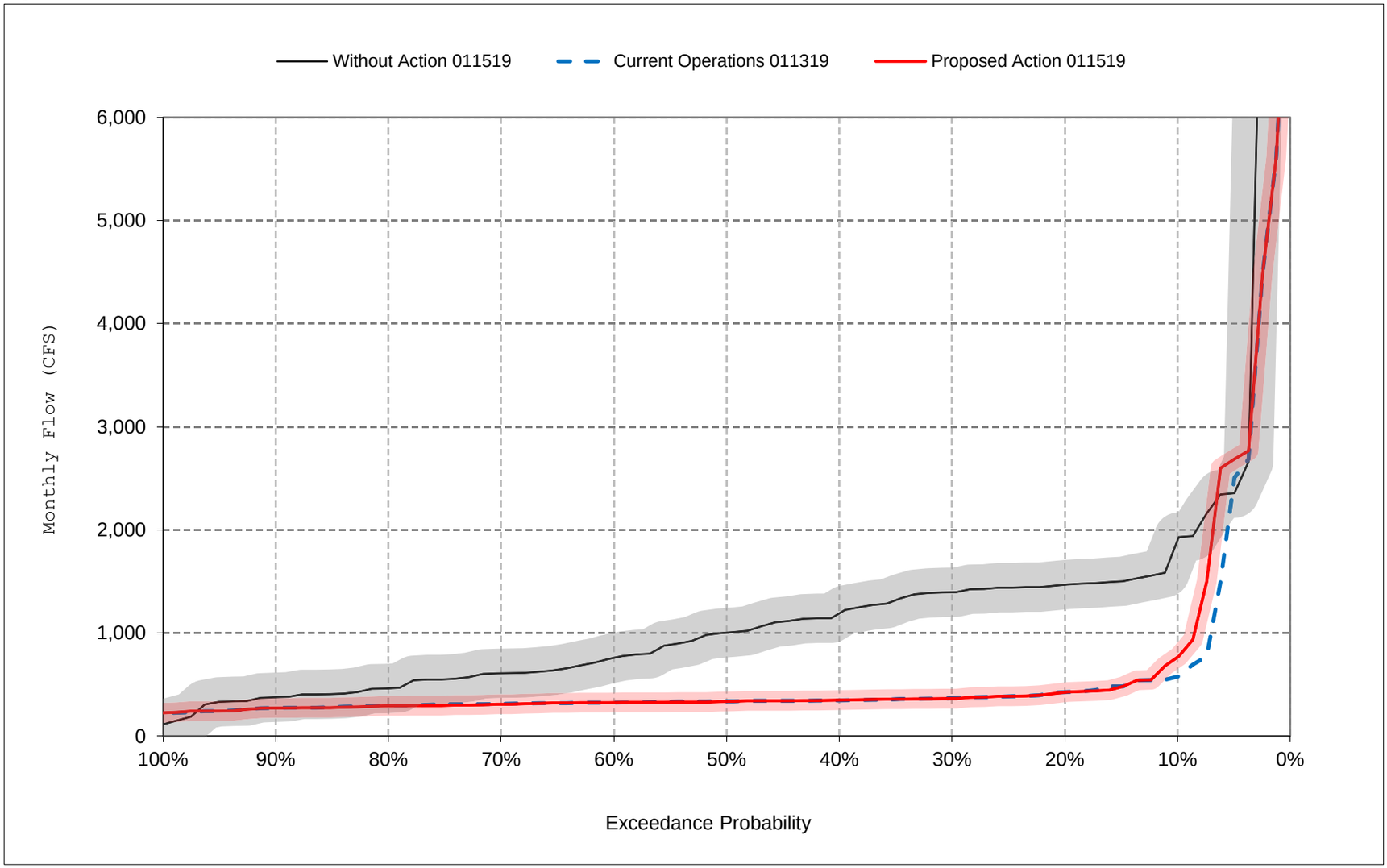
Figure 38-9. Stanislaus River Flow at Mouth, December



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

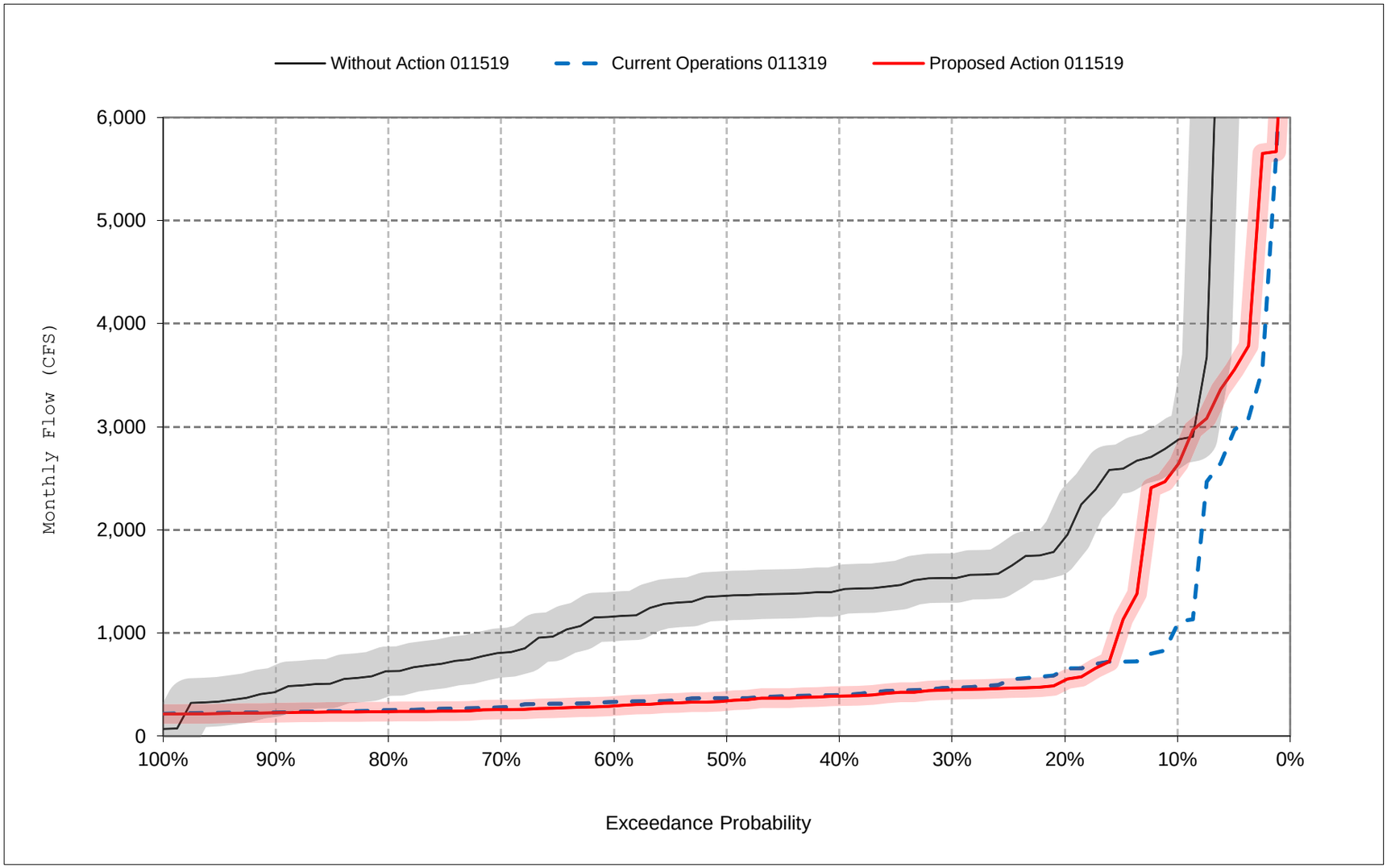
Figure 38-10. Stanislaus River Flow at Mouth, January



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

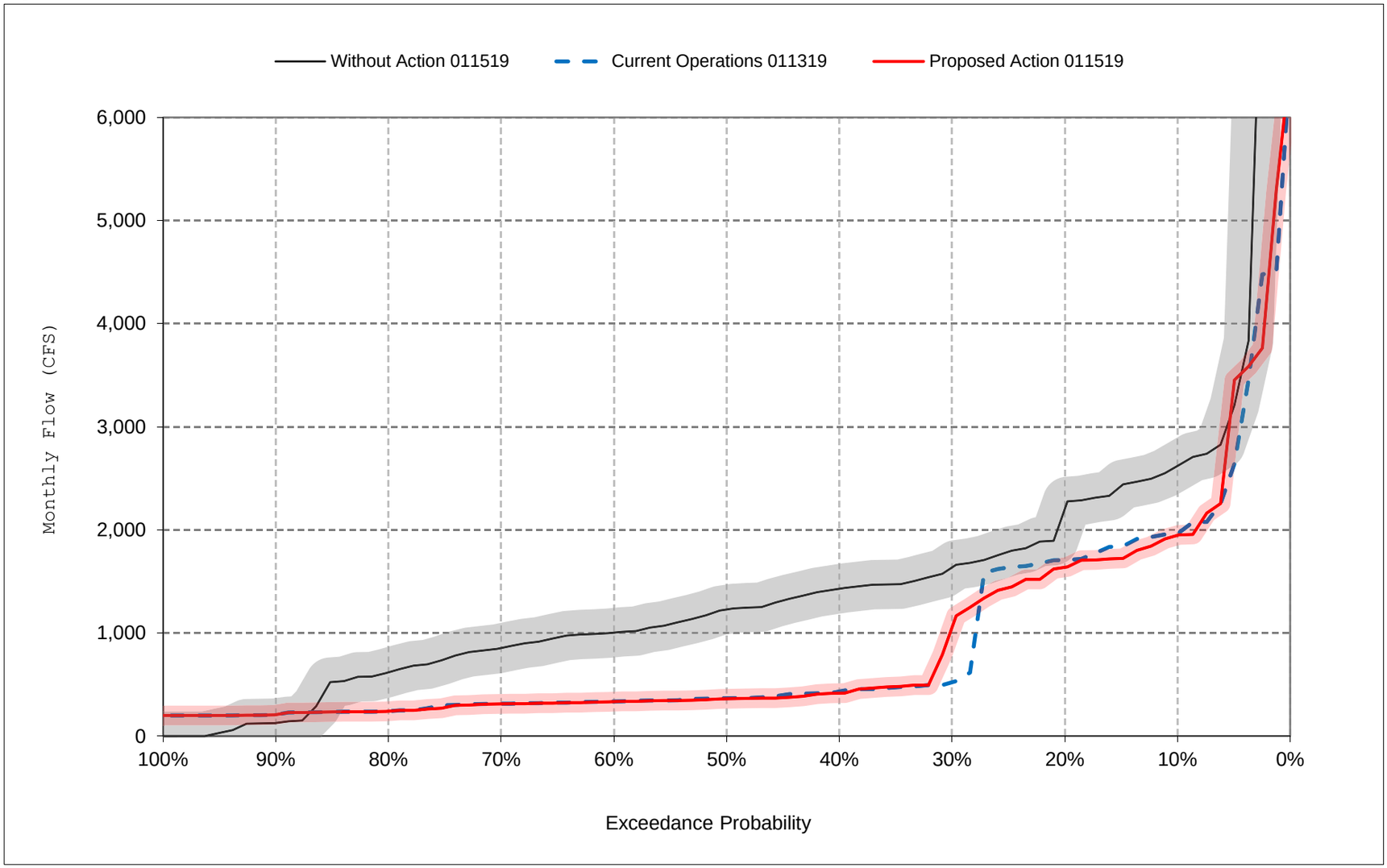
Figure 38-11. Stanislaus River Flow at Mouth, February



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

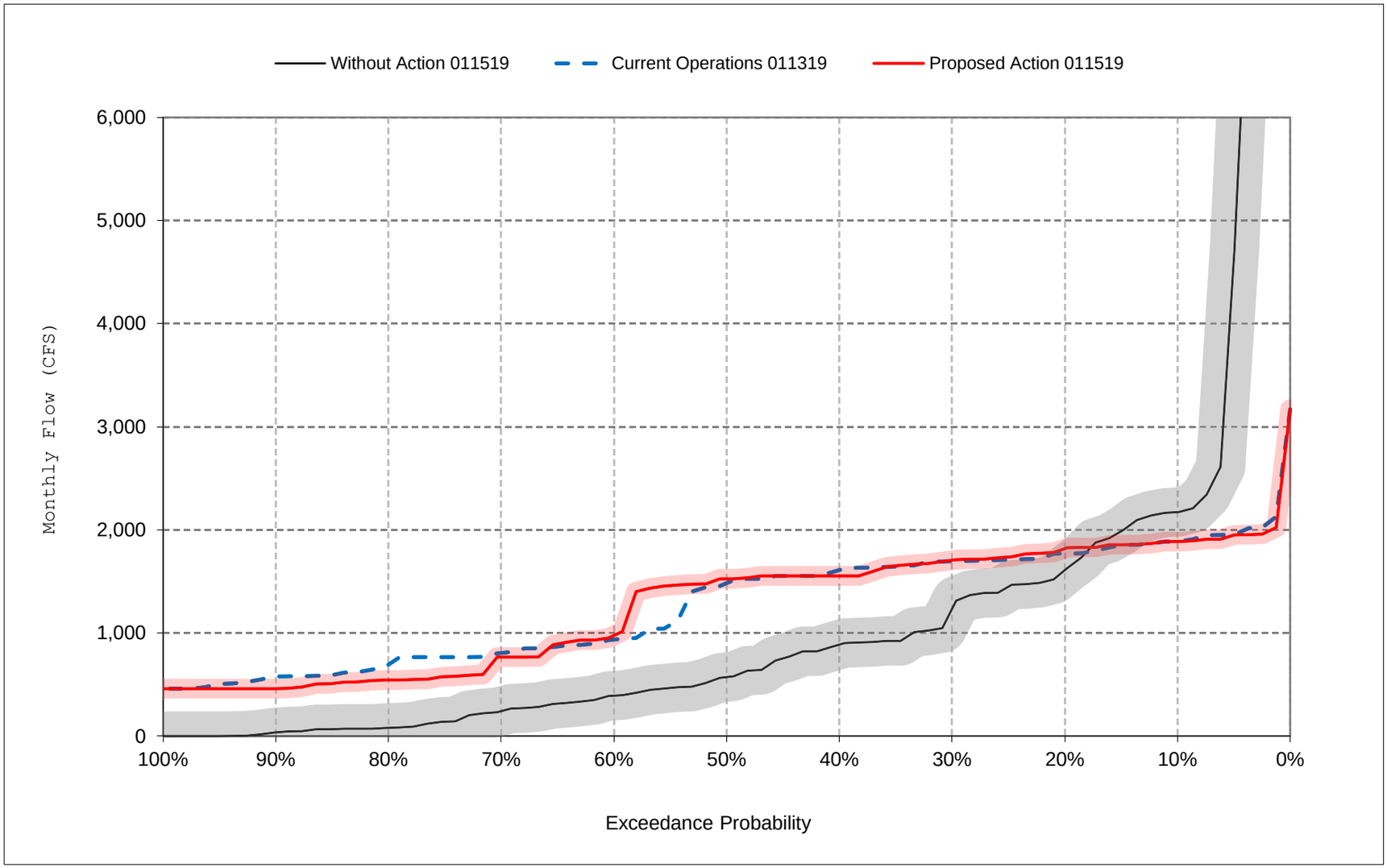
Figure 38-12. Stanislaus River Flow at Mouth, March



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

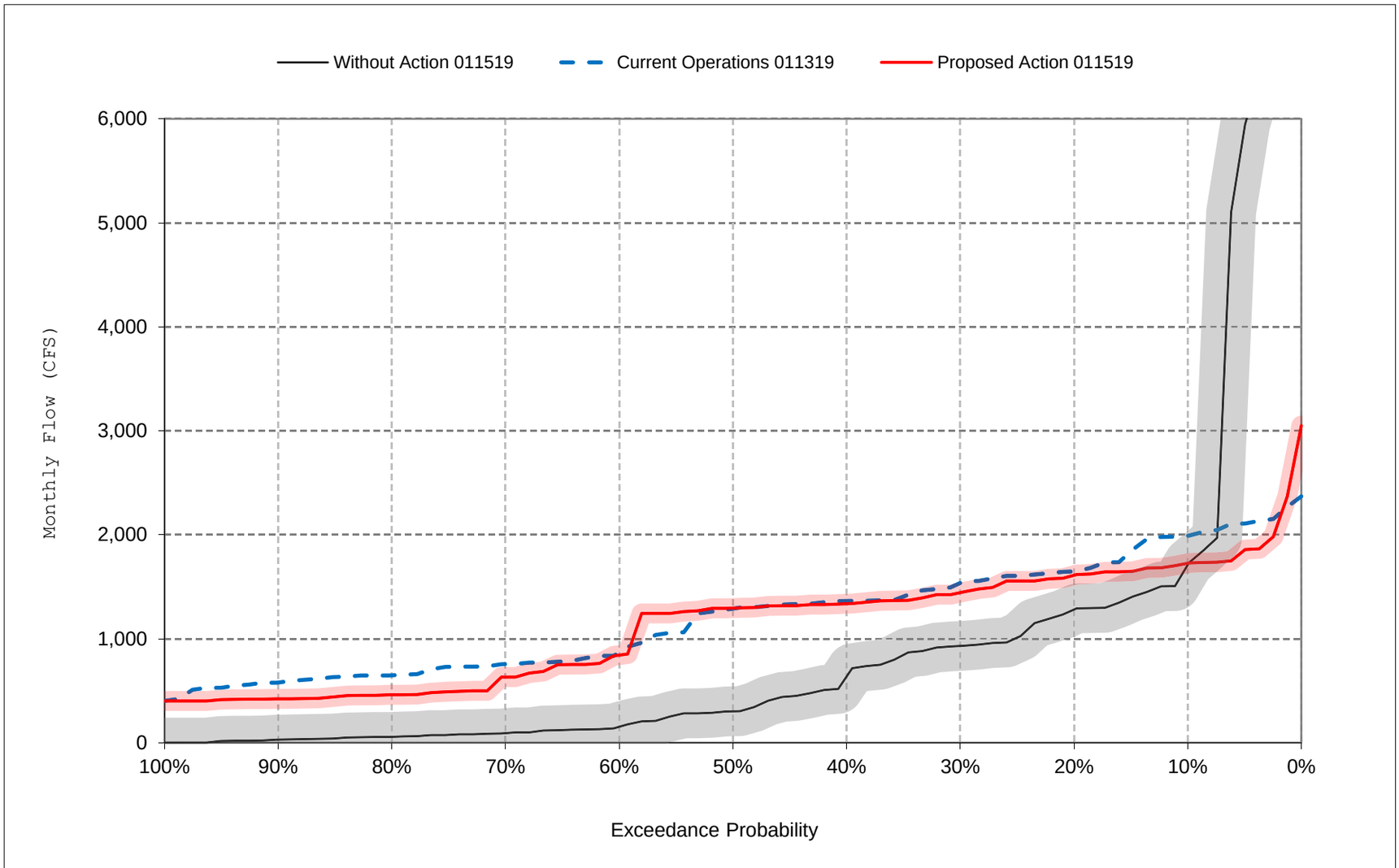
Figure 38-13. Stanislaus River Flow at Mouth, April



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

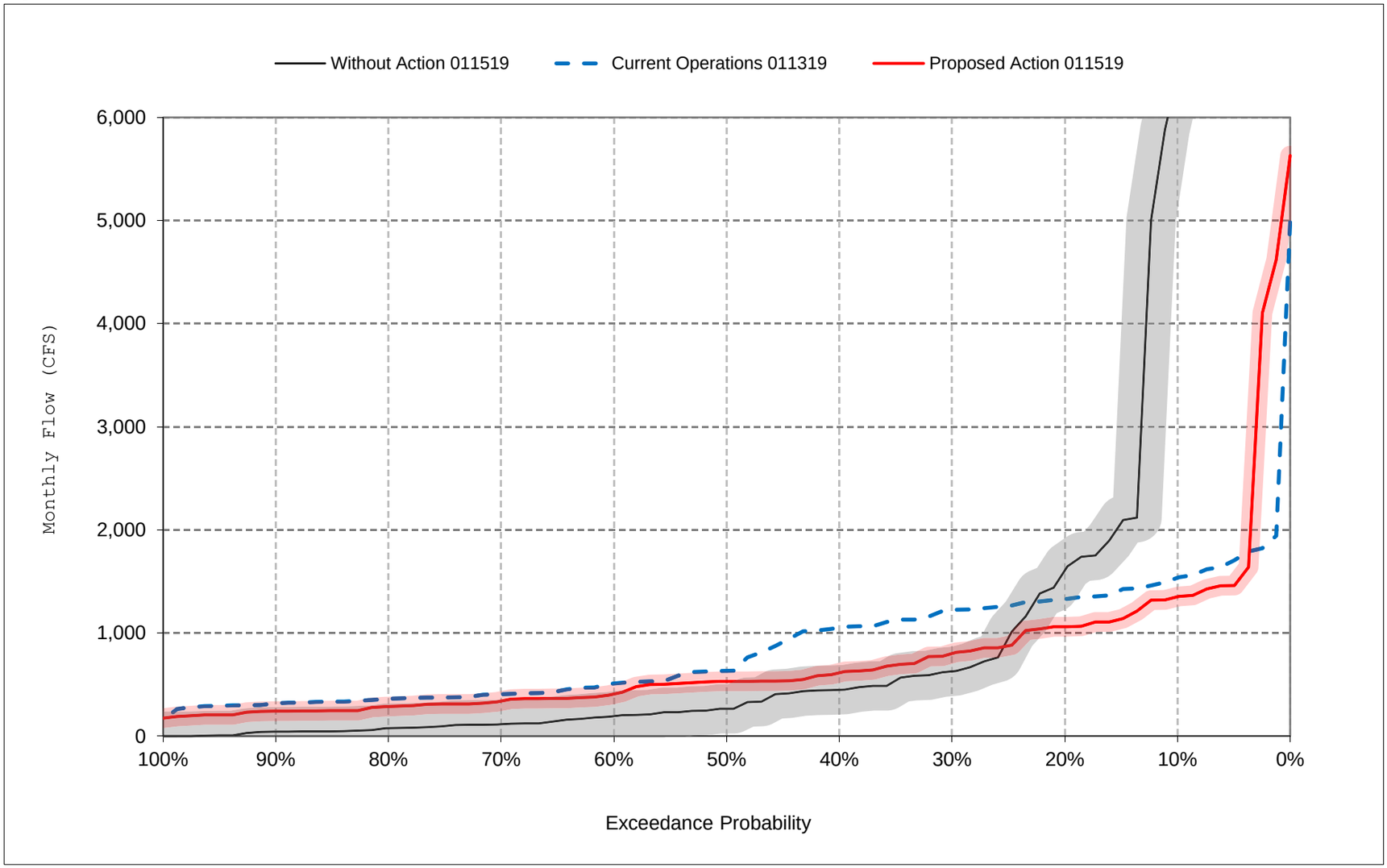
Figure 38-14. Stanislaus River Flow at Mouth, May



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

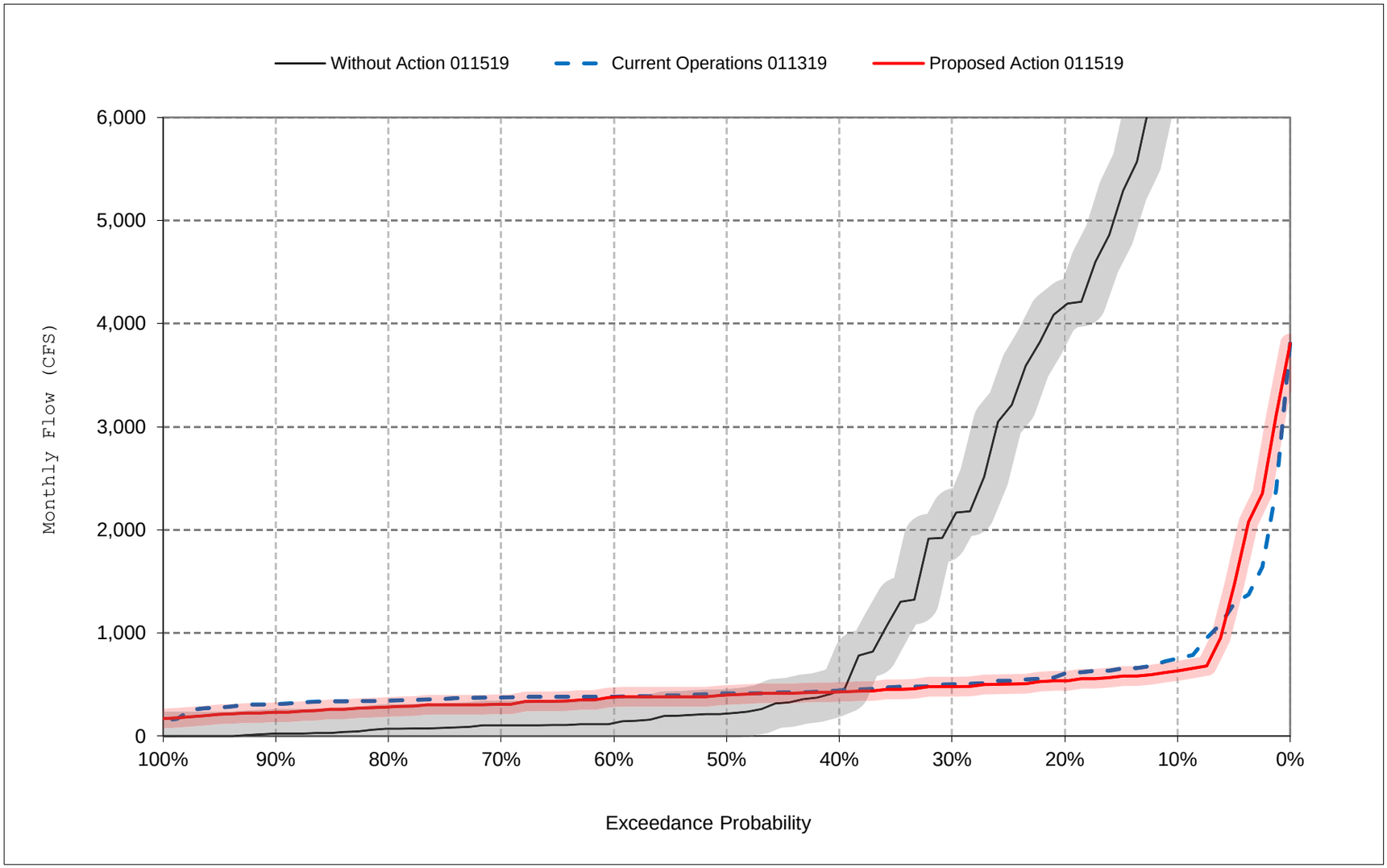
Figure 38-15. Stanislaus River Flow at Mouth, June



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

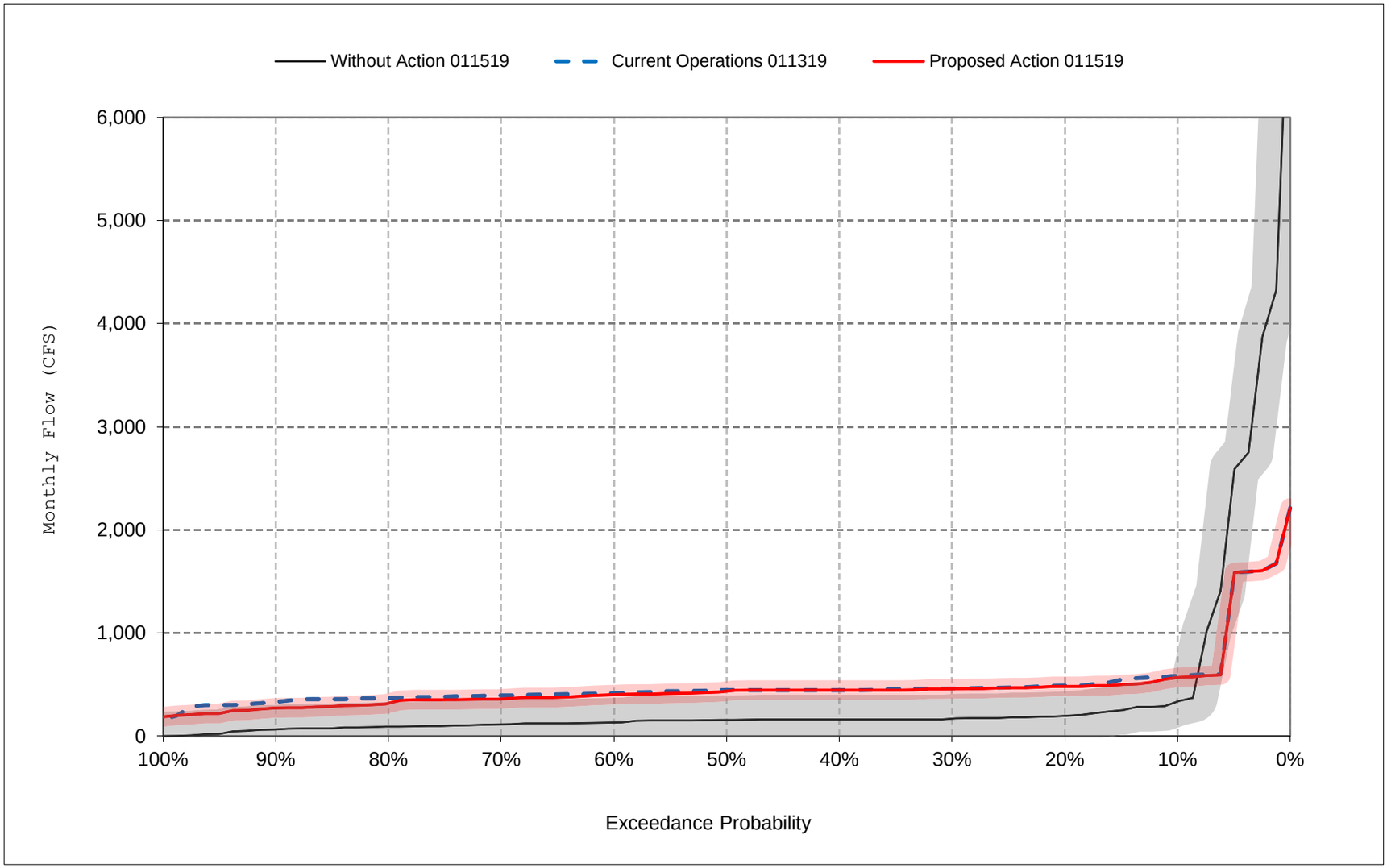
Figure 38-16. Stanislaus River Flow at Mouth, July



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

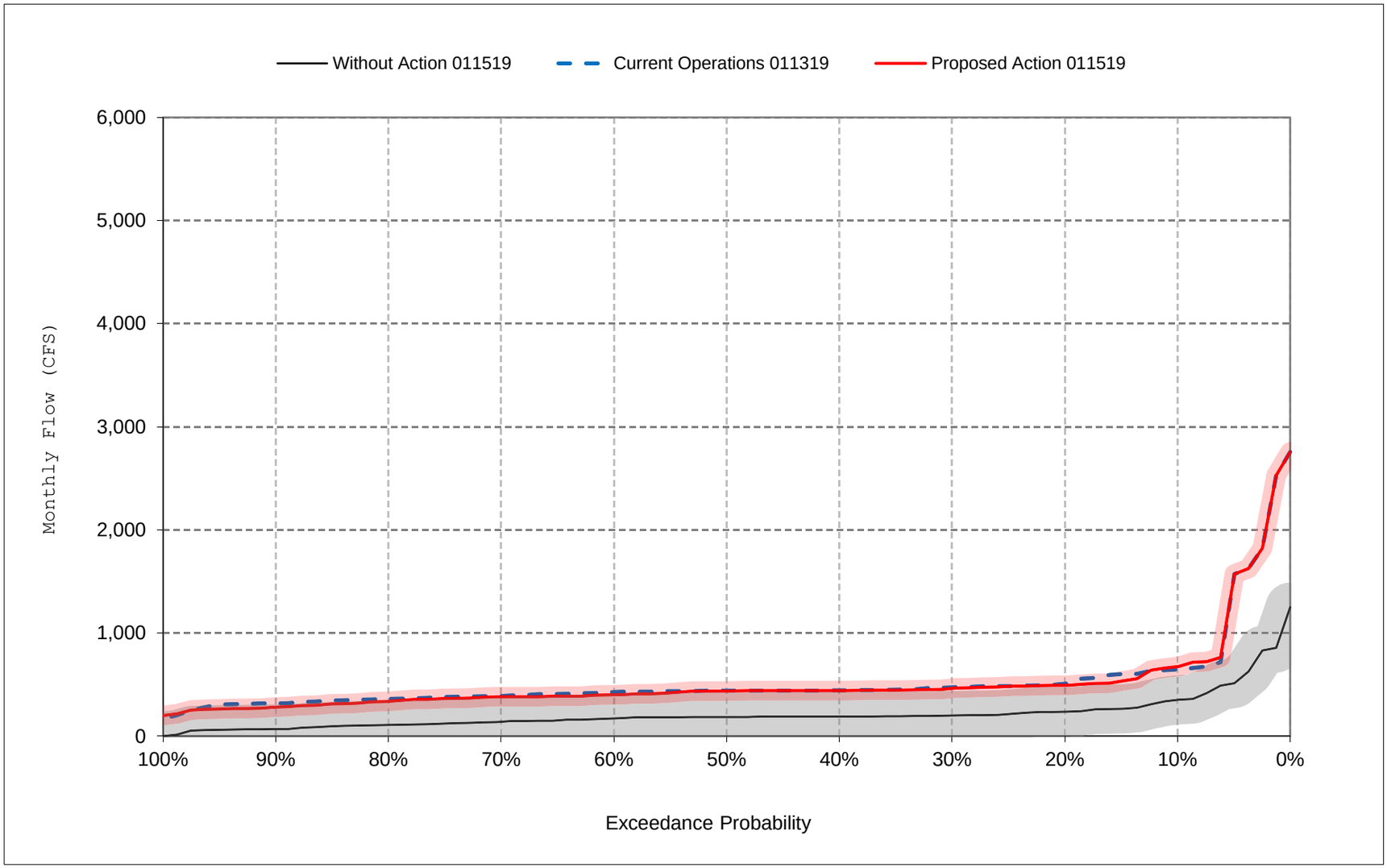
Figure 38-17. Stanislaus River Flow at Mouth, August



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Figure 38-18. Stanislaus River Flow at Mouth, September



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Table 39-1. San Joaquin River at Vernalis, Monthly Flow

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	3,010	3,892	7,130	14,538	19,233	19,462	19,028	19,218	19,342	12,476	2,615	2,159
20%	2,531	3,162	4,159	8,111	13,417	12,206	11,128	12,129	12,255	7,112	2,249	1,994
30%	2,254	2,691	3,406	5,983	8,687	9,782	8,660	8,463	5,150	5,198	1,613	1,854
40%	2,085	2,395	2,925	4,043	7,442	6,502	7,208	6,384	3,730	3,010	1,286	1,528
50%	1,945	2,136	2,585	3,371	4,647	4,881	5,930	4,391	2,790	1,599	1,120	1,359
60%	1,741	2,056	2,343	3,050	3,650	4,206	4,453	3,508	1,888	1,047	1,027	1,218
70%	1,564	1,904	2,107	2,591	3,042	3,436	3,192	2,402	1,068	838	955	1,130
80%	1,413	1,820	1,896	1,989	2,475	2,731	2,284	1,517	901	728	856	1,052
90%	1,201	1,484	1,606	1,677	1,747	1,899	1,540	1,042	771	579	748	927
Long Term												
Full Simulation Period[a]	2,075	2,720	4,145	6,336	8,562	8,283	7,648	7,680	6,556	4,601	1,730	1,604
Water Year Types[b,c]												
Wet (32%)	2,860	3,812	5,571	12,269	15,611	15,699	14,121	14,882	14,142	9,563	3,161	2,252
Above Normal (16%)	2,116	2,701	3,447	6,419	9,246	8,041	7,731	7,559	7,331	3,662	1,382	1,661
Below Normal (13%)	1,935	2,151	3,261	3,482	6,100	5,052	5,107	4,532	2,252	2,655	1,204	1,561
Dry (24%)	1,625	2,372	4,443	2,781	3,935	4,196	4,064	3,803	1,775	1,810	986	1,156
Critical (15%)	1,206	1,478	2,122	1,933	2,517	2,251	1,834	1,553	1,194	1,302	730	922

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	3,499	2,953	4,804	11,236	14,693	15,582	14,771	14,178	9,432	5,890	2,796	3,060
20%	3,162	2,777	2,857	4,812	10,133	10,196	10,640	8,319	4,695	2,634	2,595	2,655
30%	2,980	2,527	2,401	3,611	6,119	8,499	8,616	5,538	3,364	1,990	1,909	2,491
40%	2,796	2,395	2,216	2,629	4,232	5,570	7,564	4,615	2,947	1,741	1,672	2,125
50%	2,602	2,219	2,101	2,402	3,420	3,847	6,019	3,929	2,244	1,493	1,492	1,932
60%	2,401	2,169	2,046	2,293	2,684	3,459	4,835	3,064	1,864	1,370	1,408	1,837
70%	2,247	2,059	1,979	2,114	2,305	2,906	3,778	2,705	1,449	1,163	1,310	1,741
80%	1,995	1,951	1,829	1,883	2,151	2,371	2,792	2,167	1,298	1,099	1,207	1,613
90%	1,849	1,763	1,669	1,699	1,947	2,205	1,888	1,680	1,091	891	1,068	1,477
Long Term												
Full Simulation Period[a]	2,672	2,613	3,393	5,079	6,664	7,282	7,522	6,066	4,211	2,630	1,850	2,225
Water Year Types[b,c]												
Wet (32%)	3,440	3,630	5,116	10,106	12,569	14,033	13,210	11,444	8,798	5,275	2,791	3,062
Above Normal (16%)	2,750	2,461	2,591	4,383	6,149	6,703	7,697	5,516	3,484	2,020	1,768	2,215
Below Normal (13%)	2,558	2,191	2,461	2,701	4,599	4,249	5,598	3,700	2,030	1,494	1,579	1,998
Dry (24%)	2,201	2,118	3,166	2,295	3,124	3,599	4,307	3,261	1,733	1,228	1,348	1,764
Critical (15%)	1,815	1,786	1,764	1,757	2,224	2,199	2,132	1,854	1,192	941	989	1,396

Current Operations 011319 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	489	-939	-2,326	-3,302	-4,540	-3,880	-4,257	-5,039	-9,910	-6,586	181	901
20%	632	-385	-1,302	-3,299	-3,283	-2,009	-488	-3,810	-7,560	-4,478	347	662
30%	726	-164	-1,006	-2,373	-2,568	-1,283	-44	-2,925	-1,786	-3,208	296	637
40%	711	0	-709	-1,414	-3,210	-932	356	-1,768	-783	-1,269	386	597
50%	657	83	-484	-969	-1,227	-1,034	89	-462	-546	-105	372	573
60%	661	113	-297	-757	-966	-746	381	-444	-23	324	381	619
70%	683	155	-129	-477	-737	-530	585	303	381	325	355	611
80%	582	131	-67	-106	-324	-360	508	650	397	371	351	561
90%	648	279	63	22	200	305	348	639	320	312	320	550
Long Term												
Full Simulation Period[a]	598	-107	-751	-1,257	-1,898	-1,001	-125	-1,614	-2,345	-1,971	120	621
Water Year Types[b,c]												
Wet (32%)	580	-182	-455	-2,162	-3,042	-1,665	-911	-3,439	-5,344	-4,288	-370	810
Above Normal (16%)	634	-240	-856	-2,037	-3,096	-1,338	-34	-2,044	-3,847	-1,642	386	554
Below Normal (13%)	623	40	-800	-781	-1,501	-803	492	-832	-222	-1,161	374	437
Dry (24%)	576	-254	-1,277	-486	-811	-597	243	-542	-42	-582	362	608
Critical (15%)	609	308	-358	-176	-294	-52	298	302	-2	-361	259	474

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 39-2. San Joaquin River at Vernalis, Monthly Flow

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	3,010	3,892	7,130	14,538	19,233	19,462	19,028	19,218	19,342	12,476	2,615	2,159
20%	2,531	3,162	4,159	8,111	13,417	12,206	11,128	12,129	12,255	7,112	2,249	1,994
30%	2,254	2,691	3,406	5,983	8,687	9,782	8,660	8,463	5,150	5,198	1,613	1,854
40%	2,085	2,395	2,925	4,043	7,442	6,502	7,208	6,384	3,730	3,010	1,286	1,528
50%	1,945	2,136	2,585	3,371	4,647	4,881	5,930	4,391	2,790	1,599	1,120	1,359
60%	1,741	2,056	2,343	3,050	3,650	4,206	4,453	3,508	1,888	1,047	1,027	1,218
70%	1,564	1,904	2,107	2,591	3,042	3,436	3,192	2,402	1,068	838	955	1,130
80%	1,413	1,820	1,896	1,989	2,475	2,731	2,284	1,517	901	728	856	1,052
90%	1,201	1,484	1,606	1,677	1,747	1,899	1,540	1,042	771	579	748	927
Long Term												
Full Simulation Period[a]	2,075	2,720	4,145	6,336	8,562	8,283	7,648	7,680	6,556	4,601	1,730	1,604
Water Year Types[b,c]												
Wet (32%)	2,860	3,812	5,571	12,269	15,611	15,699	14,121	14,882	14,142	9,563	3,161	2,252
Above Normal (16%)	2,116	2,701	3,447	6,419	9,246	8,041	7,731	7,559	7,331	3,662	1,382	1,661
Below Normal (13%)	1,935	2,151	3,261	3,482	6,100	5,052	5,107	4,532	2,252	2,655	1,204	1,561
Dry (24%)	1,625	2,372	4,443	2,781	3,935	4,196	4,064	3,803	1,775	1,810	986	1,156
Critical (15%)	1,206	1,478	2,122	1,933	2,517	2,251	1,834	1,553	1,194	1,302	730	922

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	3,500	2,975	4,804	12,398	17,192	15,482	15,015	15,004	9,433	5,780	2,744	3,060
20%	3,148	2,778	2,904	4,838	10,122	10,324	10,641	8,327	4,781	2,503	2,602	2,635
30%	2,996	2,483	2,321	3,613	6,806	8,470	8,960	5,767	2,704	1,957	1,894	2,486
40%	2,835	2,395	2,204	2,681	4,232	5,306	7,921	4,655	2,370	1,730	1,679	2,128
50%	2,628	2,219	2,101	2,371	3,071	3,847	6,437	4,131	2,069	1,507	1,497	1,933
60%	2,402	2,170	2,046	2,290	2,614	3,440	4,786	2,910	1,757	1,362	1,407	1,830
70%	2,137	2,060	1,979	2,084	2,305	2,906	3,212	2,305	1,351	1,153	1,319	1,743
80%	1,978	1,951	1,829	1,883	2,128	2,372	2,500	1,866	1,217	994	1,136	1,575
90%	1,807	1,763	1,669	1,699	1,891	2,205	1,765	1,473	978	874	1,029	1,452
Long Term												
Full Simulation Period[a]	2,669	2,607	3,368	5,109	6,792	7,290	7,513	5,982	4,102	2,619	1,831	2,214
Water Year Types[b,c]												
Wet (32%)	3,431	3,610	5,031	10,141	13,006	14,069	13,188	11,332	8,823	5,341	2,778	3,056
Above Normal (16%)	2,786	2,462	2,591	4,535	6,244	6,808	7,962	5,684	3,217	1,943	1,773	2,218
Below Normal (13%)	2,520	2,191	2,462	2,691	4,545	4,130	5,401	3,453	1,880	1,489	1,577	1,993
Dry (24%)	2,189	2,118	3,172	2,282	3,075	3,599	4,232	3,129	1,589	1,179	1,301	1,737
Critical (15%)	1,827	1,786	1,764	1,757	2,177	2,171	2,132	1,785	1,053	890	958	1,385

Proposed Action 011519 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	490	**-917**	**-2,326**	**-2,140**	**-2,041**	**-3,980**	**-4,012**	**-4,214**	**-9,909**	**-6,696**	129	901
20%	618	**-385**	**-1,255**	**-3,273**	**-3,295**	**-1,881**	**-487**	**-3,803**	**-7,474**	**-4,609**	353	641
30%	742	**-208**	**-1,085**	**-2,370**	**-1,881**	**-1,311**	300	**-2,697**	**-2,446**	**-3,240**	281	632
40%	750	0	**-720**	**-1,362**	**-3,210**	**-1,196**	712	**-1,729**	**-1,360**	**-1,280**	393	600
50%	684	84	**-484**	**-999**	**-1,575**	**-1,034**	507	**-260**	**-721**	**-92**	377	574
60%	661	113	**-297**	**-760**	**-1,036**	**-766**	333	**-598**	**-131**	315	380	611
70%	572	155	**-128**	**-507**	**-737**	**-530**	19	**-96**	284	316	364	613
80%	565	131	**-67**	**-106**	**-347**	**-360**	216	349	316	266	280	523
90%	606	280	63	22	144	305	224	431	207	295	281	525
Long Term												
Full Simulation Period[a]	594	**-113**	**-777**	**-1,227**	**-1,770**	**-993**	**-135**	**-1,698**	**-2,454**	**-1,982**	101	610
Water Year Types[b,c]												
Wet (32%)	571	**-202**	**-540**	**-2,127**	**-2,606**	**-1,630**	**-934**	**-3,550**	**-5,319**	**-4,222**	**-383**	803
Above Normal (16%)	670	**-240**	**-856**	**-1,884**	**-3,002**	**-1,233**	232	**-1,875**	**-4,114**	**-1,719**	391	557
Below Normal (13%)	585	40	**-799**	**-792**	**-1,555**	**-922**	295	**-1,078**	**-372**	**-1,166**	373	432
Dry (24%)	563	**-254**	**-1,272**	**-499**	**-860**	**-597**	169	**-674**	**-186**	**-631**	315	580
Critical (15%)	621	309	**-358**	**-176**	**-340**	**-80**	298	232	**-141**	**-412**	227	464

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 39-3. San Joaquin River at Vernalis, Monthly Flow

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	3,499	2,953	4,804	11,236	14,693	15,582	14,771	14,178	9,432	5,890	2,796	3,060
20%	3,162	2,777	2,857	4,812	10,133	10,196	10,640	8,319	4,695	2,634	2,595	2,655
30%	2,980	2,527	2,401	3,611	6,119	8,499	8,616	5,538	3,364	1,990	1,909	2,491
40%	2,796	2,395	2,216	2,629	4,232	5,570	7,564	4,615	2,947	1,741	1,672	2,125
50%	2,602	2,219	2,101	2,402	3,420	3,847	6,019	3,929	2,244	1,493	1,492	1,932
60%	2,401	2,169	2,046	2,293	2,684	3,459	4,835	3,064	1,864	1,370	1,408	1,837
70%	2,247	2,059	1,979	2,114	2,305	2,906	3,778	2,705	1,449	1,163	1,310	1,741
80%	1,995	1,951	1,829	1,883	2,151	2,371	2,792	2,167	1,298	1,099	1,207	1,613
90%	1,849	1,763	1,669	1,699	1,947	2,205	1,888	1,680	1,091	891	1,068	1,477
Long Term												
Full Simulation Period[a]	2,672	2,613	3,393	5,079	6,664	7,282	7,522	6,066	4,211	2,630	1,850	2,225
Water Year Types[b,c]												
Wet (32%)	3,440	3,630	5,116	10,106	12,569	14,033	13,210	11,444	8,798	5,275	2,791	3,062
Above Normal (16%)	2,750	2,461	2,591	4,383	6,149	6,703	7,697	5,516	3,484	2,020	1,768	2,215
Below Normal (13%)	2,558	2,191	2,461	2,701	4,599	4,249	5,598	3,700	2,030	1,494	1,579	1,998
Dry (24%)	2,201	2,118	3,166	2,295	3,124	3,599	4,307	3,261	1,733	1,228	1,348	1,764
Critical (15%)	1,815	1,786	1,764	1,757	2,224	2,199	2,132	1,854	1,192	941	989	1,396

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	3,500	2,975	4,804	12,398	17,192	15,482	15,015	15,004	9,433	5,780	2,744	3,060
20%	3,148	2,778	2,904	4,838	10,122	10,324	10,641	8,327	4,781	2,503	2,602	2,635
30%	2,996	2,483	2,321	3,613	6,806	8,470	8,960	5,767	2,704	1,957	1,894	2,486
40%	2,835	2,395	2,204	2,681	4,232	5,306	7,921	4,655	2,370	1,730	1,679	2,128
50%	2,628	2,219	2,101	2,371	3,071	3,847	6,437	4,131	2,069	1,507	1,497	1,933
60%	2,402	2,170	2,046	2,290	2,614	3,440	4,786	2,910	1,757	1,362	1,407	1,830
70%	2,137	2,060	1,979	2,084	2,305	2,906	3,212	2,305	1,351	1,153	1,319	1,743
80%	1,978	1,951	1,829	1,883	2,128	2,372	2,500	1,866	1,217	994	1,136	1,575
90%	1,807	1,763	1,669	1,699	1,891	2,205	1,765	1,473	978	874	1,029	1,452
Long Term												
Full Simulation Period[a]	2,669	2,607	3,368	5,109	6,792	7,290	7,513	5,982	4,102	2,619	1,831	2,214
Water Year Types[b,c]												
Wet (32%)	3,431	3,610	5,031	10,141	13,006	14,069	13,188	11,332	8,823	5,341	2,778	3,056
Above Normal (16%)	2,786	2,462	2,591	4,535	6,244	6,808	7,962	5,684	3,217	1,943	1,773	2,218
Below Normal (13%)	2,520	2,191	2,462	2,691	4,545	4,130	5,401	3,453	1,880	1,489	1,577	1,993
Dry (24%)	2,189	2,118	3,172	2,282	3,075	3,599	4,232	3,129	1,589	1,179	1,301	1,737
Critical (15%)	1,827	1,786	1,764	1,757	2,177	2,171	2,132	1,785	1,053	890	958	1,385

Proposed Action 011519 minus Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1	22	0	1,162	2,499	**-100**	245	826	1	**-111**	**-52**	0
20%	**-14**	0	47	26	**-11**	128	1	7	87	**-131**	7	**-20**
30%	16	**-45**	**-79**	3	687	**-29**	344	229	**-660**	**-33**	**-15**	**-5**
40%	39	0	**-11**	52	0	**-264**	357	39	**-577**	**-11**	7	3
50%	26	0	0	**-30**	**-349**	0	419	202	**-175**	14	5	1
60%	1	0	0	**-3**	**-70**	**-19**	**-48**	**-154**	**-107**	**-9**	**-1**	**-8**
70%	**-111**	1	0	**-30**	0	0	**-566**	**-400**	**-98**	**-10**	9	2
80%	**-17**	1	0	**-1**	**-23**	0	**-292**	**-301**	**-81**	**-105**	**-71**	**-38**
90%	**-42**	0	0	0	**-56**	**0**	**-123**	**-208**	**-113**	**-17**	**-39**	**-25**
Long Term												
Full Simulation Period[a]	**-4**	**-6**	**-26**	31	127	8	**-10**	**-84**	**-110**	**-11**	**-20**	**-11**
Water Year Types[b,c]												
Wet (32%)	**-9**	**-20**	**-85**	35	437	35	**-23**	**-112**	25	66	**-13**	**-6**
Above Normal (16%)	36	0	0	152	94	105	265	168	**-267**	**-76**	5	3
Below Normal (13%)	**-38**	0	0	**-11**	**-53**	**-119**	**-197**	**-247**	**-150**	**-5**	**-1**	**-6**
Dry (24%)	**-13**	0	5	**-13**	**-49**	0	**-74**	**-132**	**-144**	**-49**	**-47**	**-28**
Critical (15%)	12	0	0	0	**-46**	**-28**	**0**	**-70**	**-139**	**-50**	**-32**	**-11**

a Based on the 82-year simulation period.

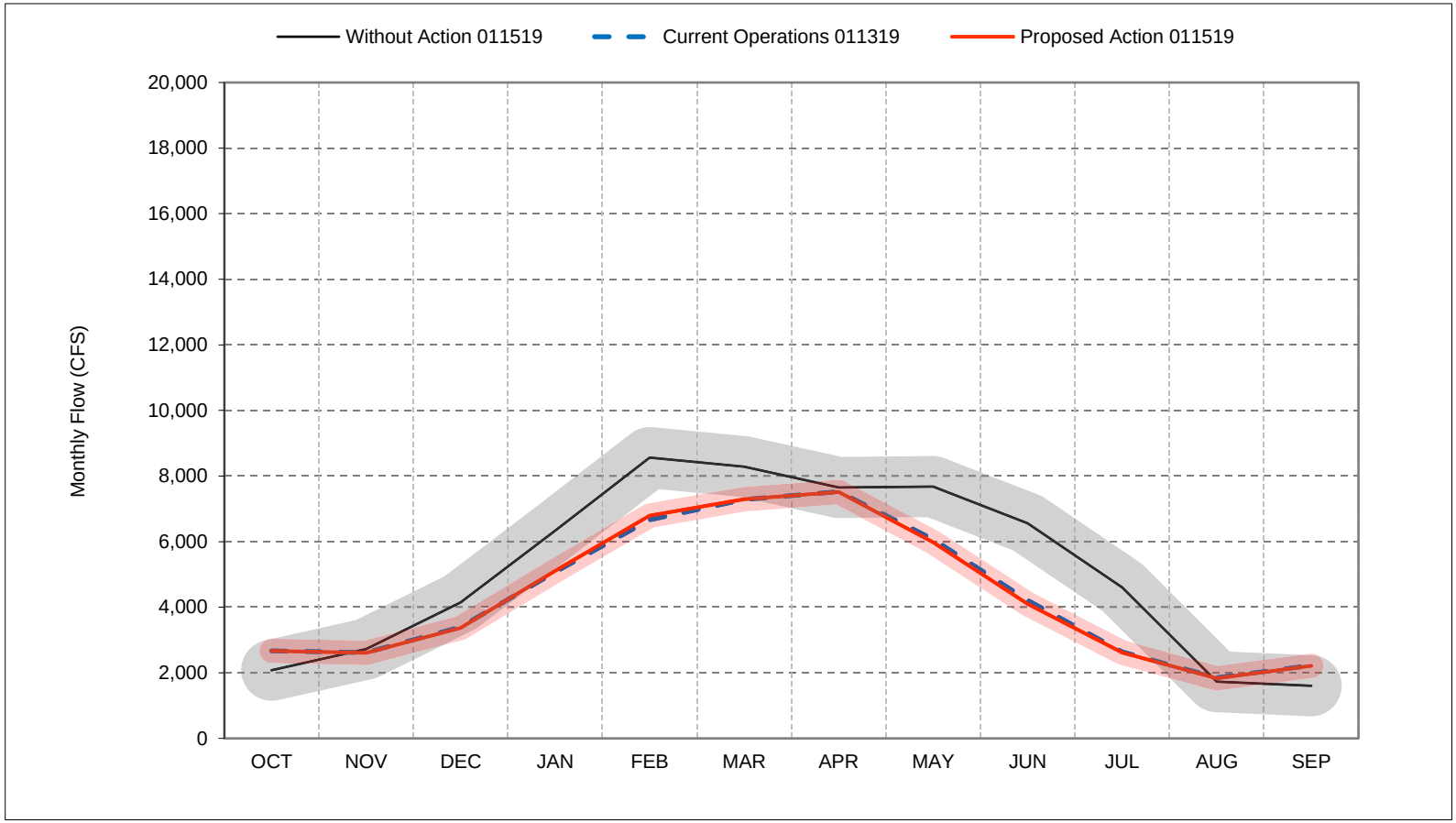
b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

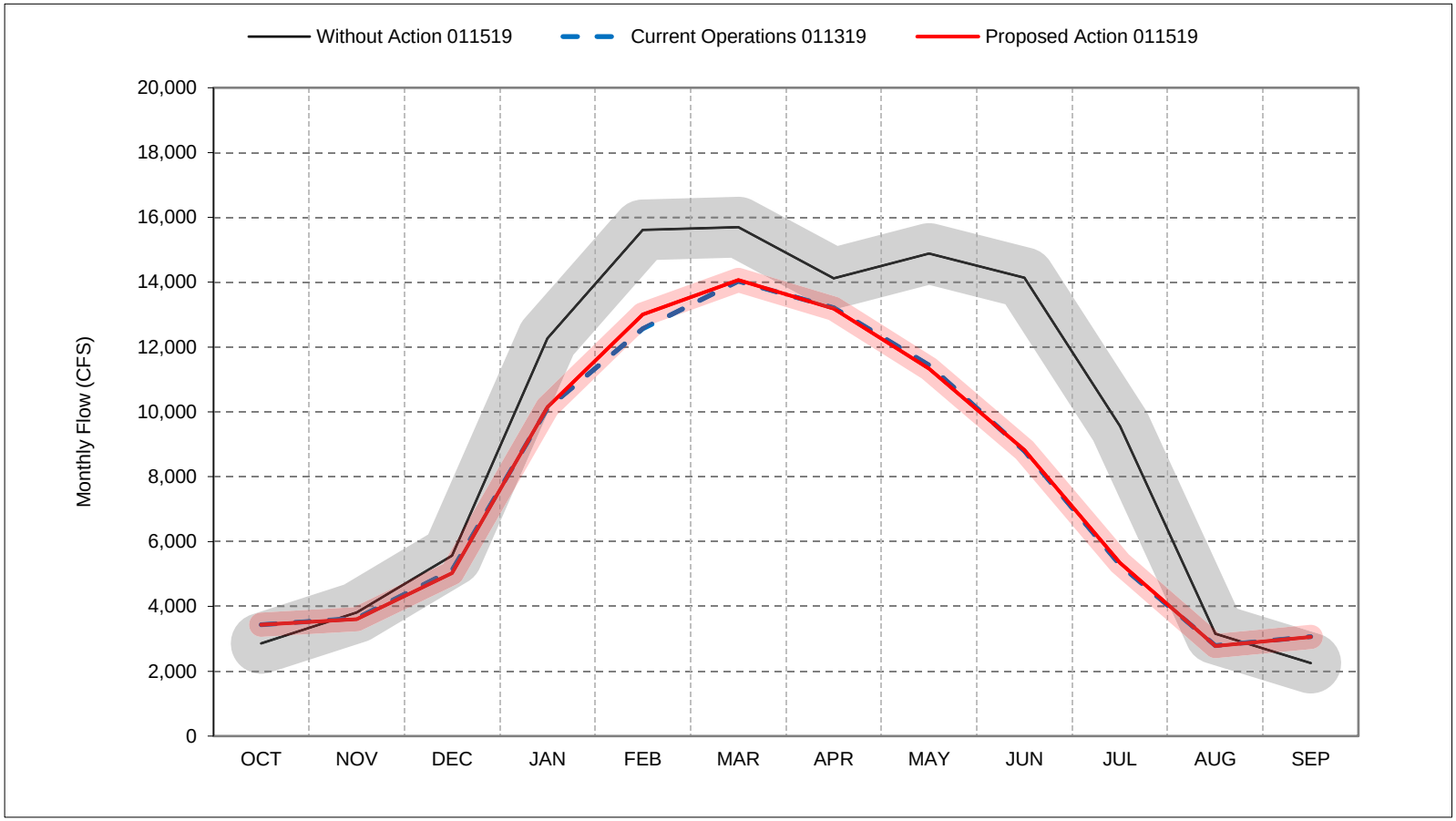
e These are draft results meant for qualitative analysis and are subject to revision.

Figure 39-1. San Joaquin River at Vernalis, Long-Term Average Flow



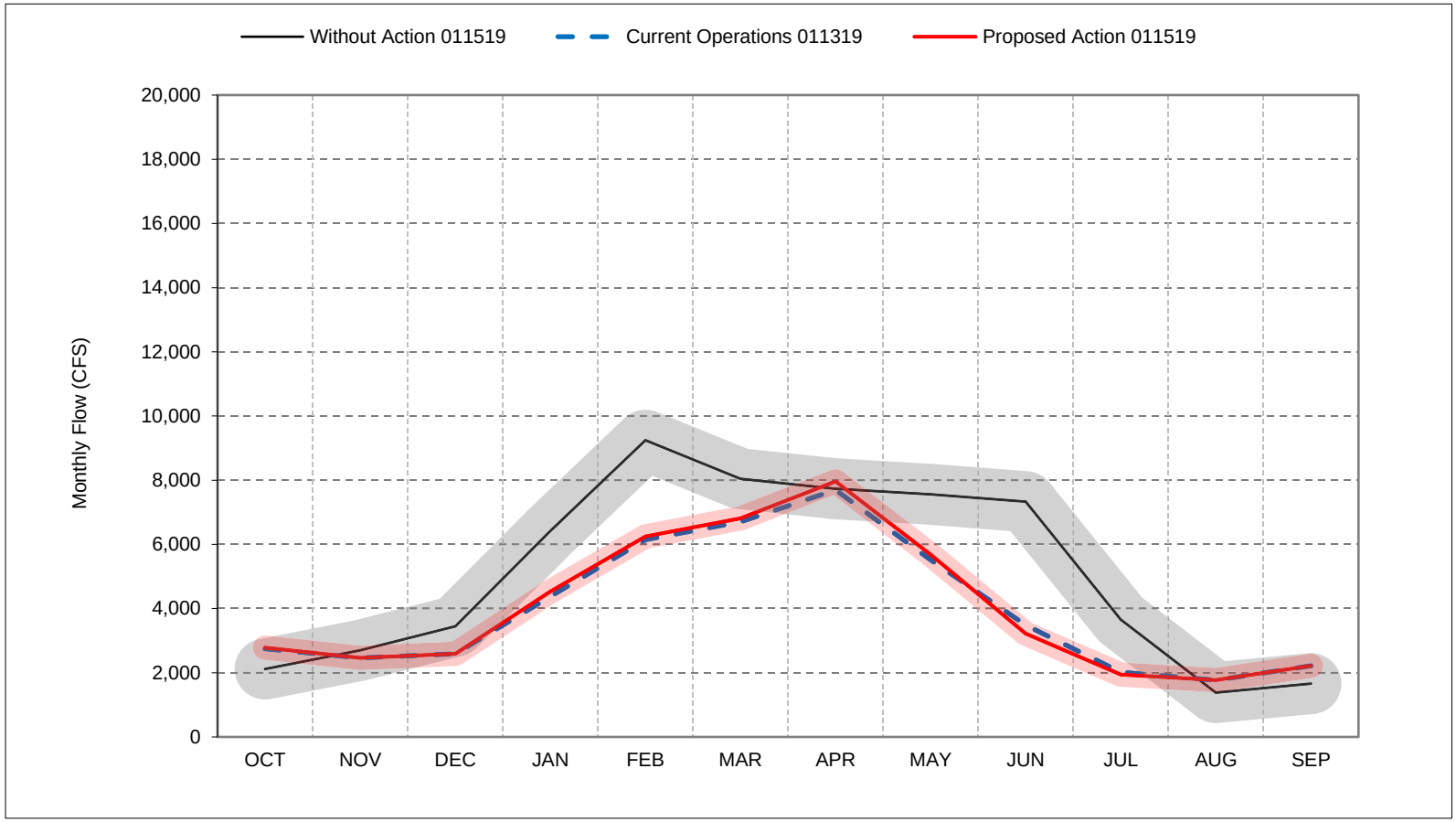
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 39-2. San Joaquin River at Vernalis, Wet Year Average Flow



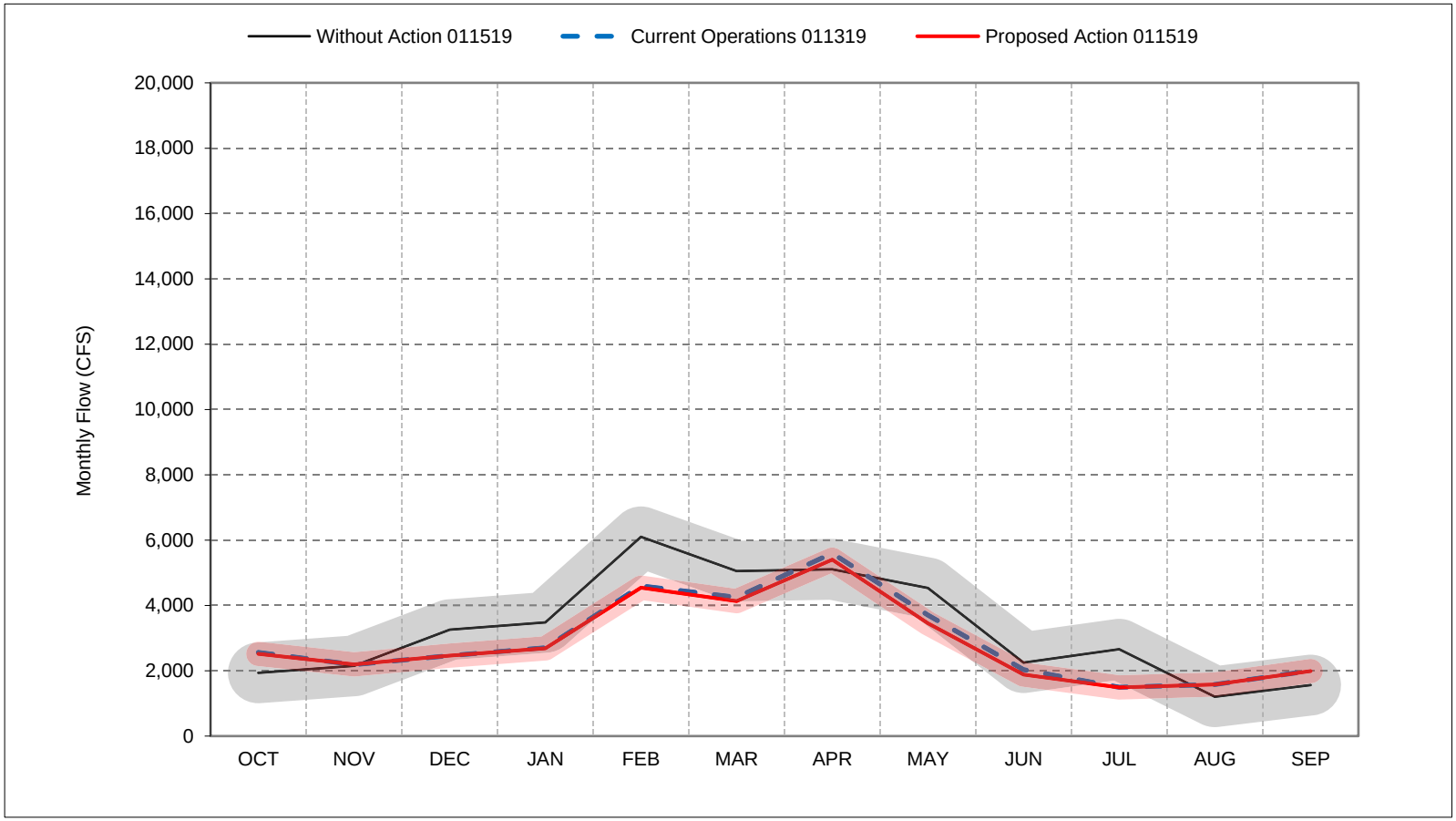
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 39-3. San Joaquin River at Vernalis, Above Normal Year Average Flow



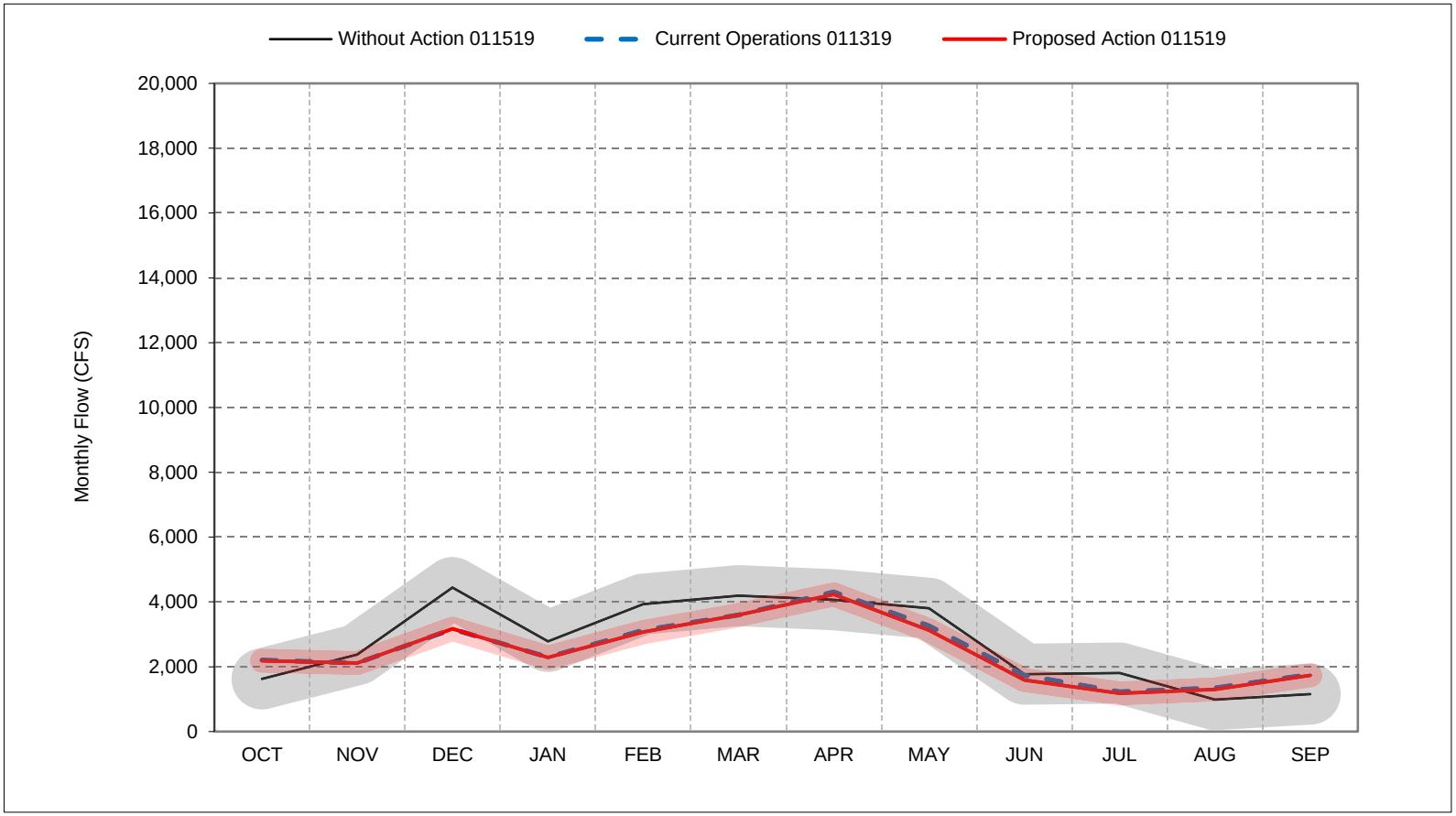
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 39-4. San Joaquin River at Vernalis, Below Normal Year Average Flow



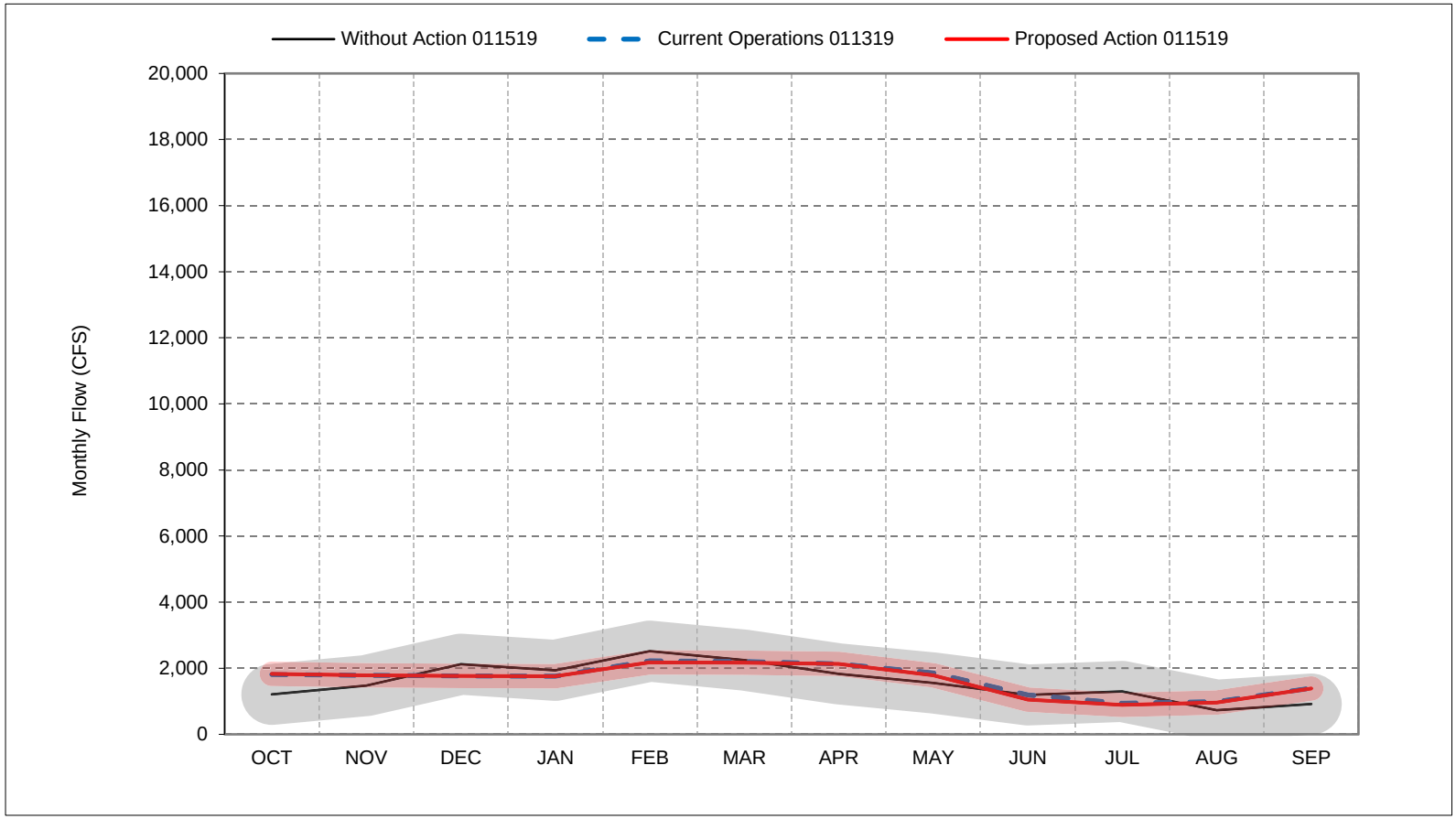
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 39-5. San Joaquin River at Vernalis, Dry Year Average Flow



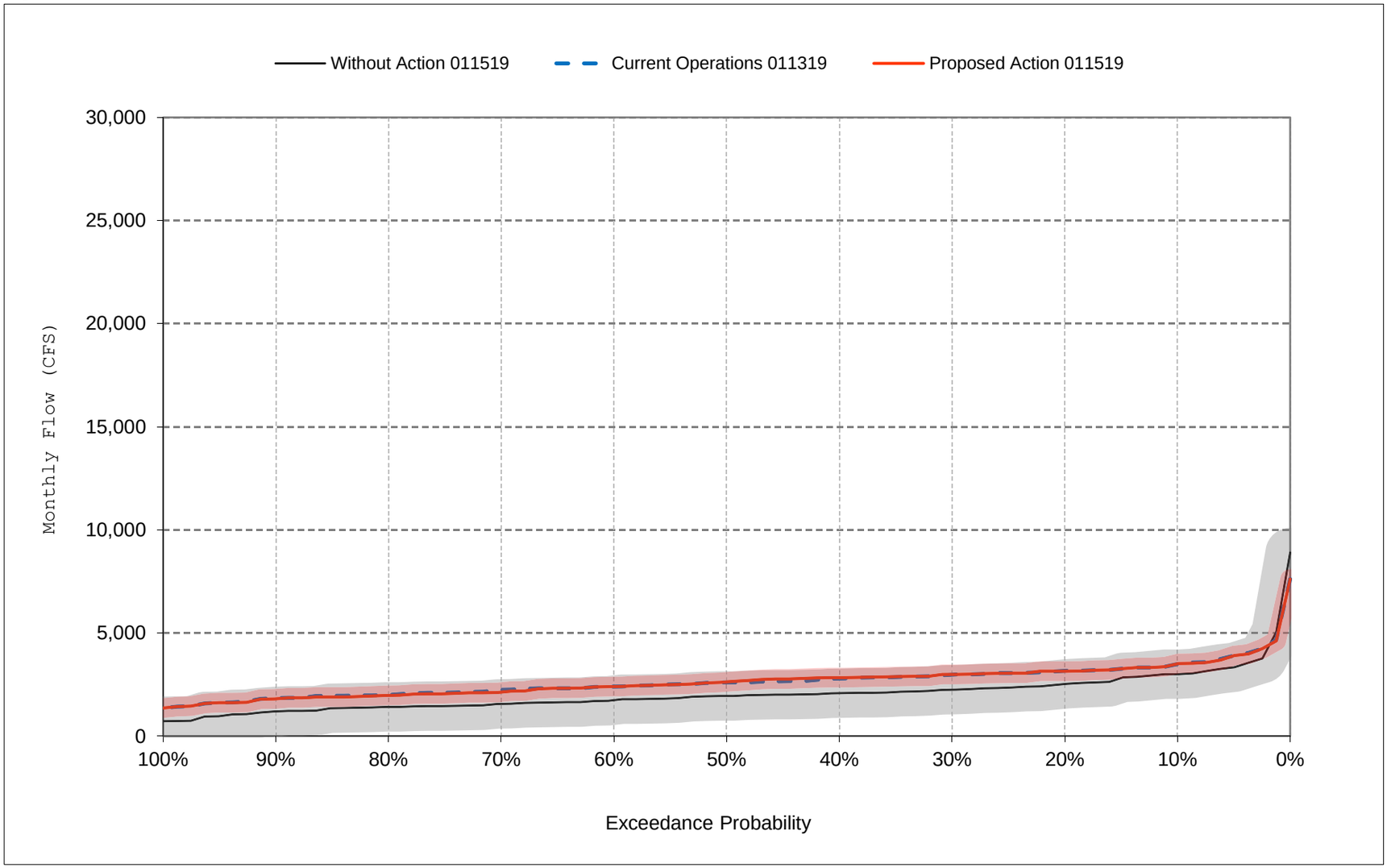
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 39-6. San Joaquin River at Vernalis, Critical Year Average Flow



*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

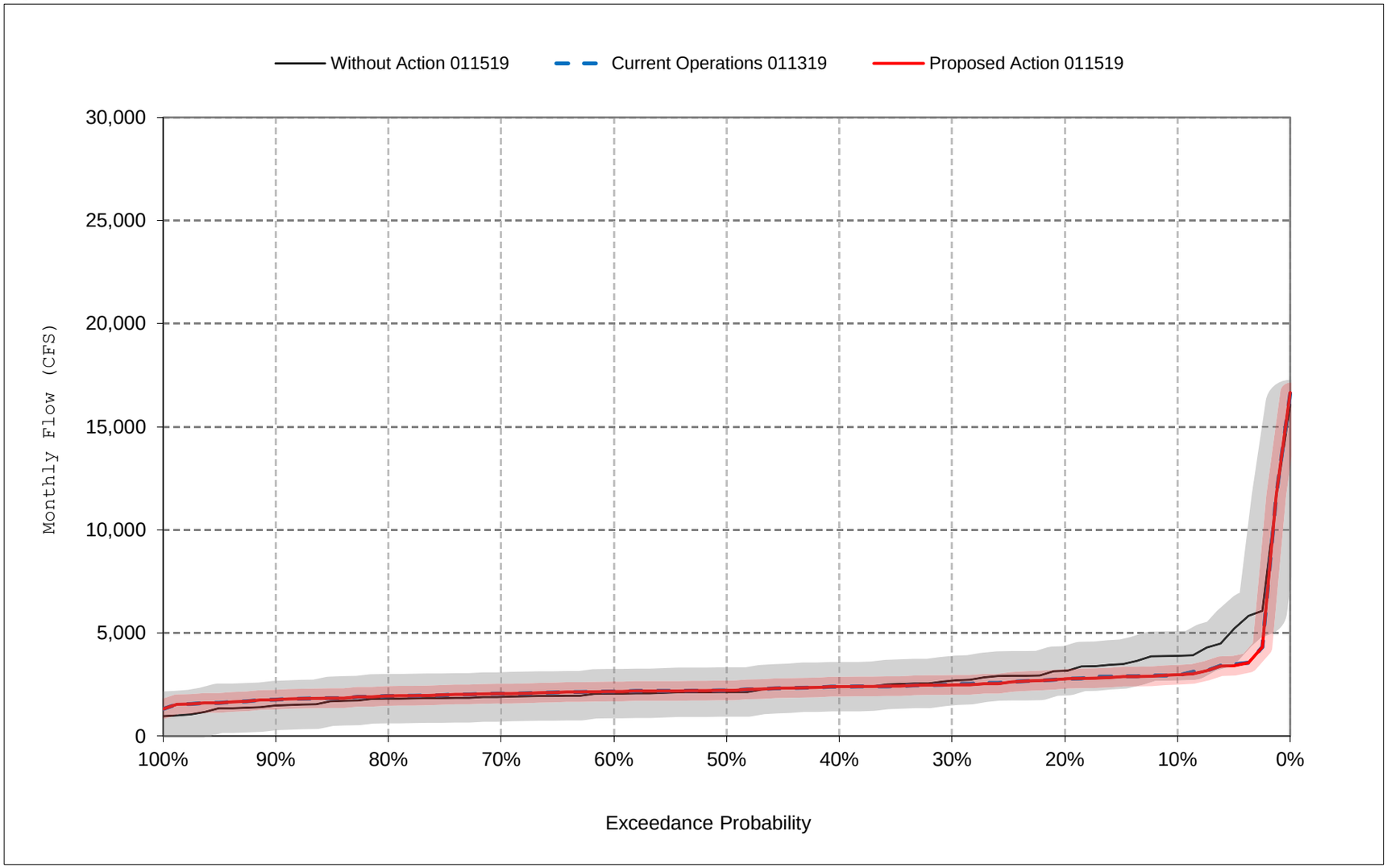
Figure 39-7. San Joaquin River at Vernalis, October



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

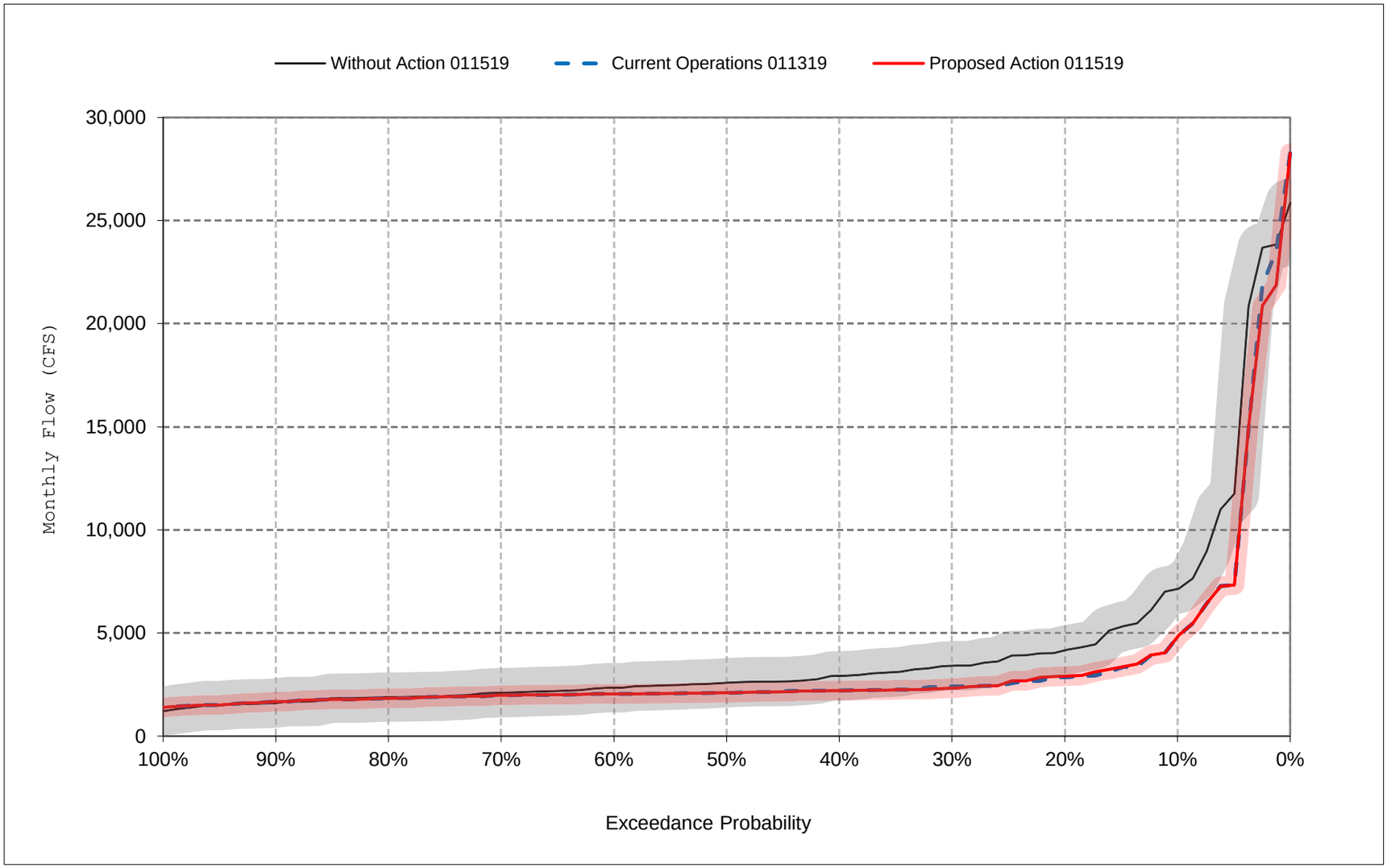
Figure 39-8. San Joaquin River at Vernalis, November



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

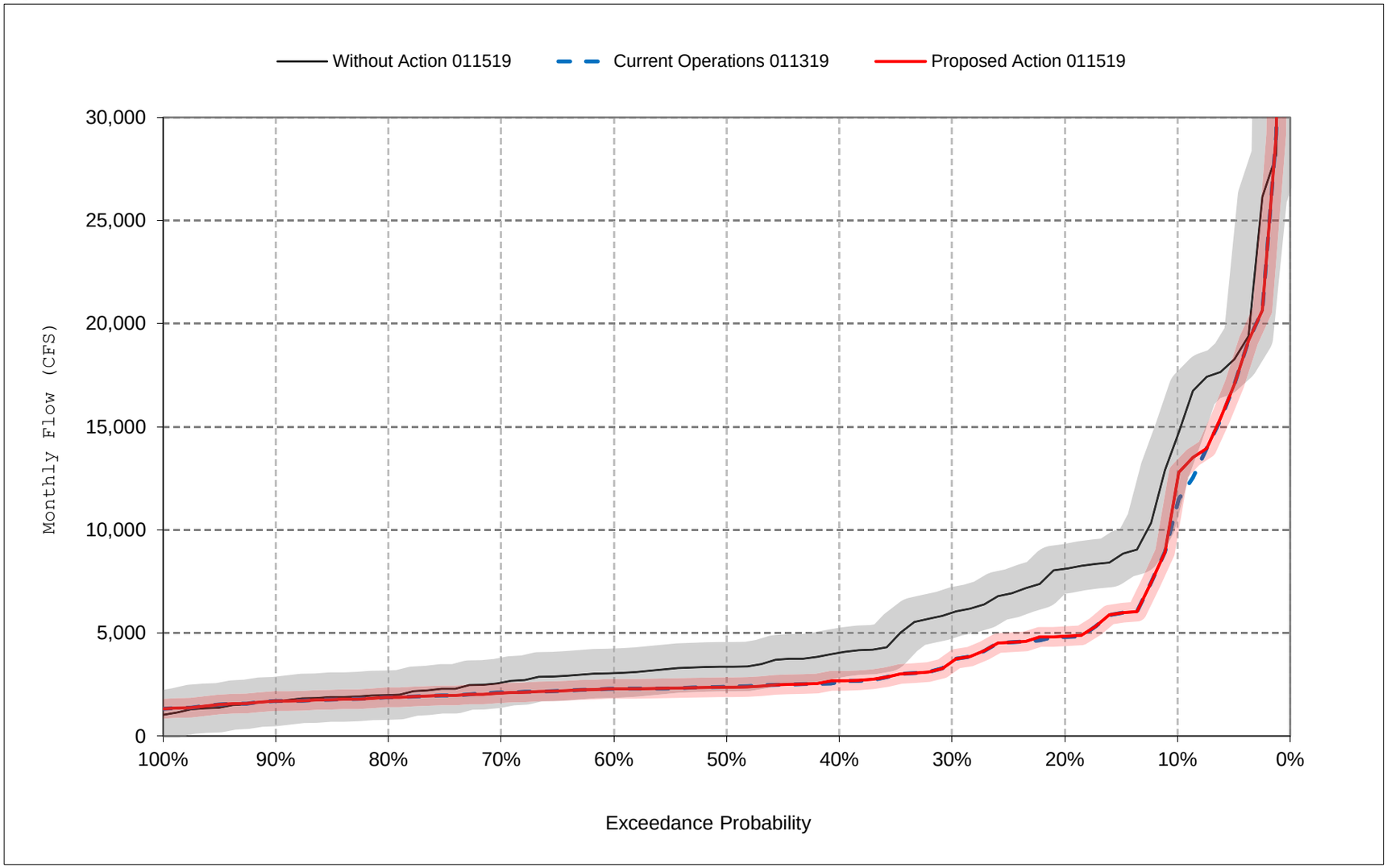
Figure 39-9. San Joaquin River at Vernalis, December



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

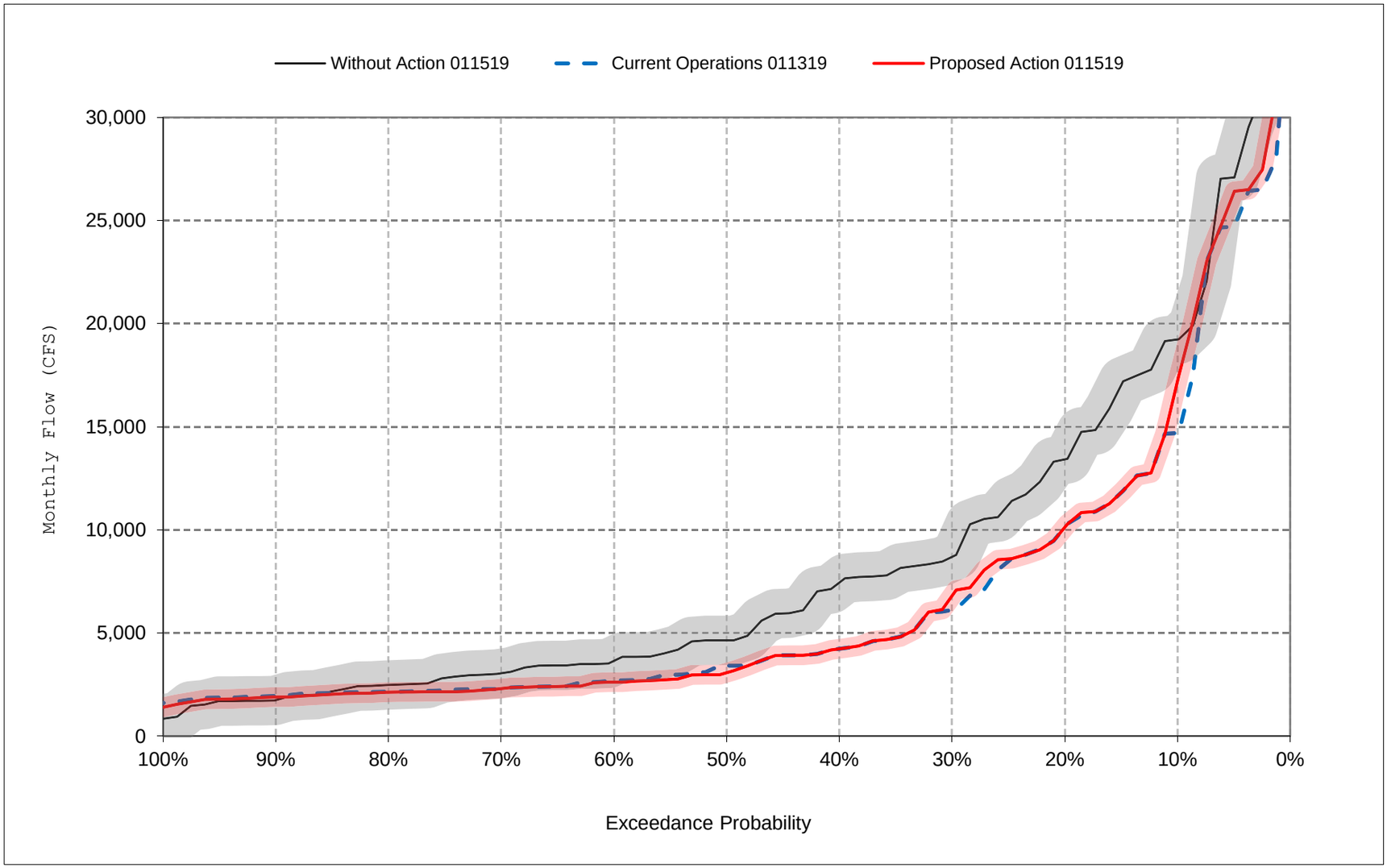
Figure 39-10. San Joaquin River at Vernalis, January



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

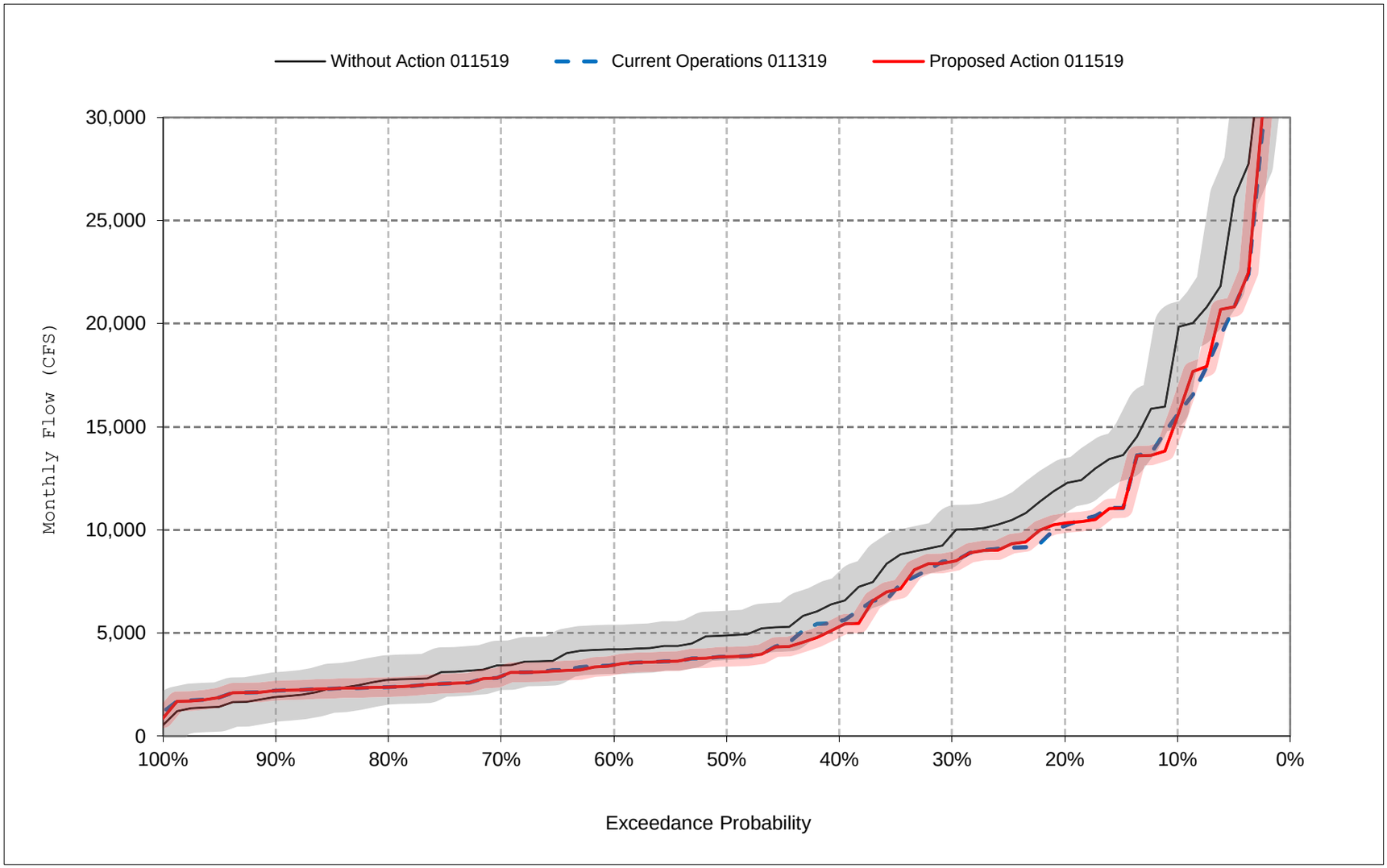
Figure 39-11. San Joaquin River at Vernalis, February



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

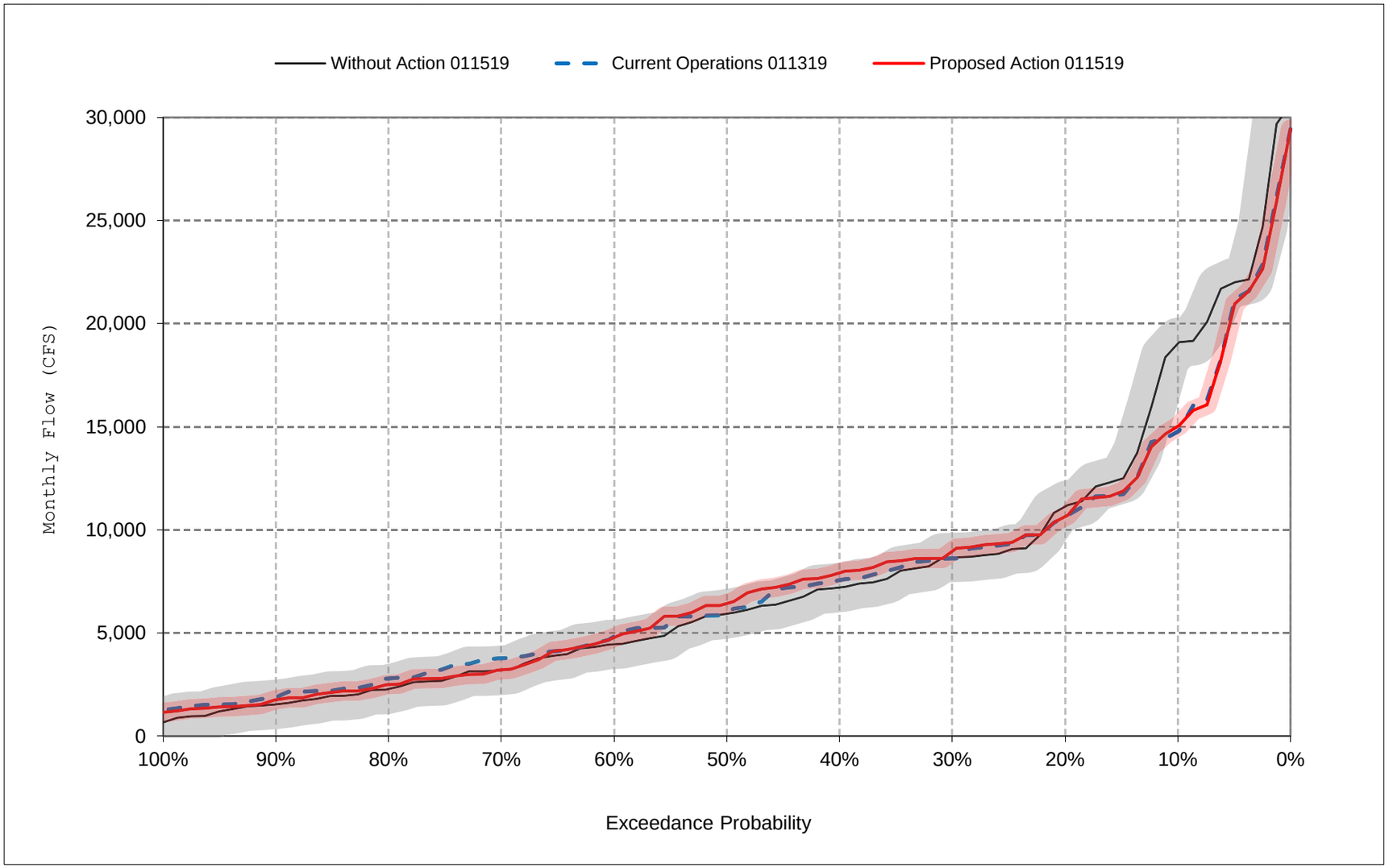
Figure 39-12. San Joaquin River at Vernalis, March



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

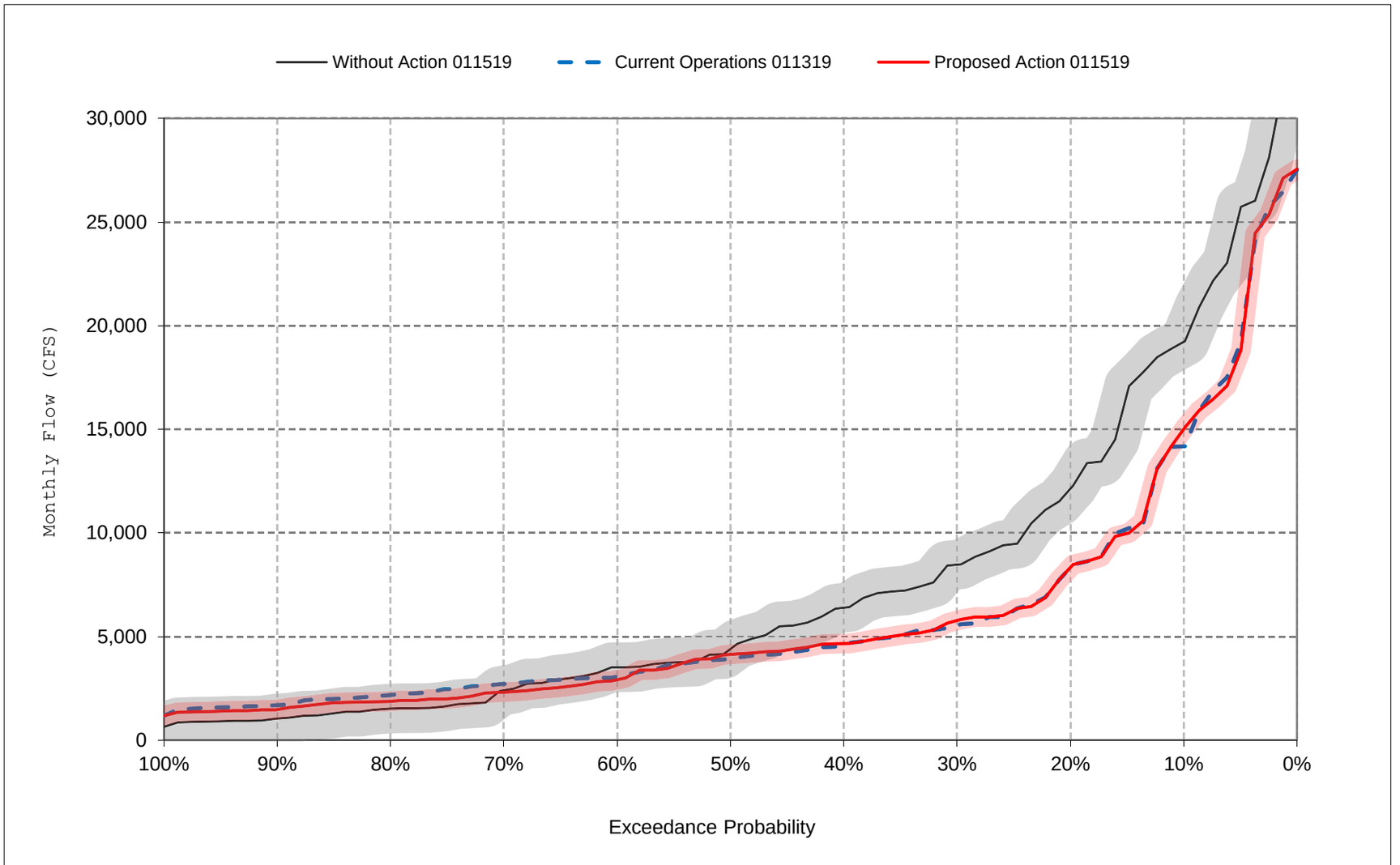
Figure 39-13. San Joaquin River at Vernalis, April



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

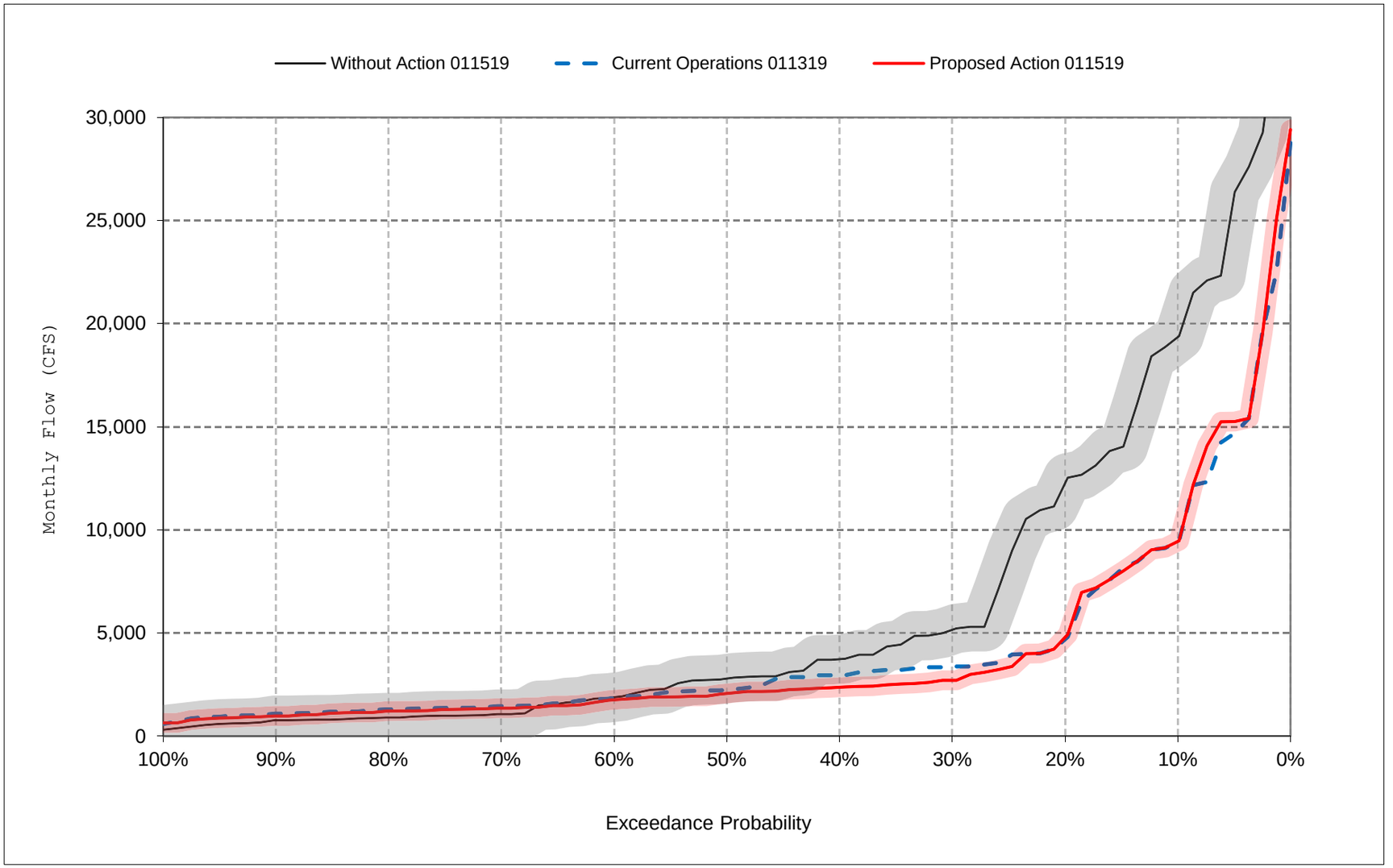
Figure 39-14. San Joaquin River at Vernalis, May



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

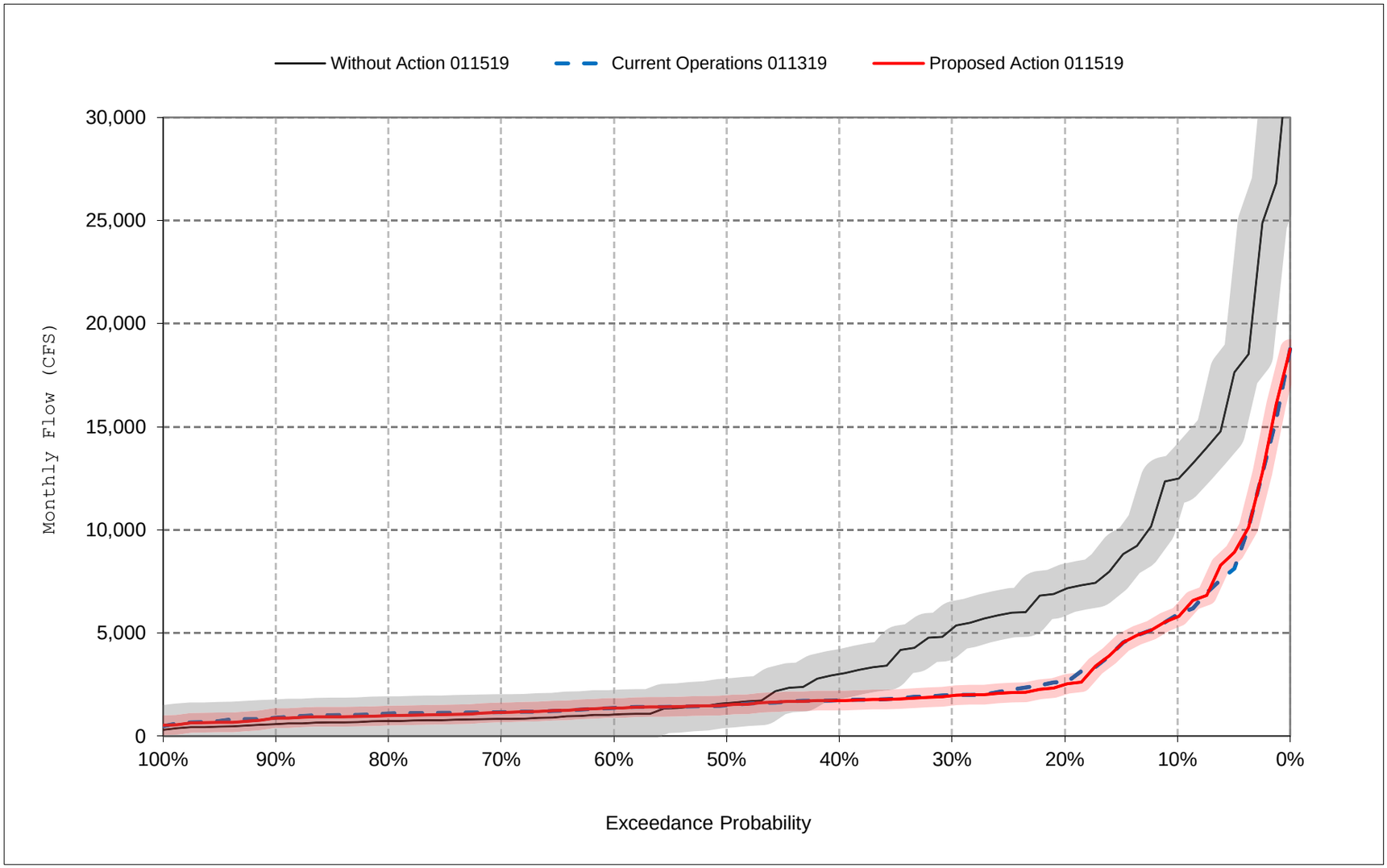
Figure 39-15. San Joaquin River at Vernalis, June



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

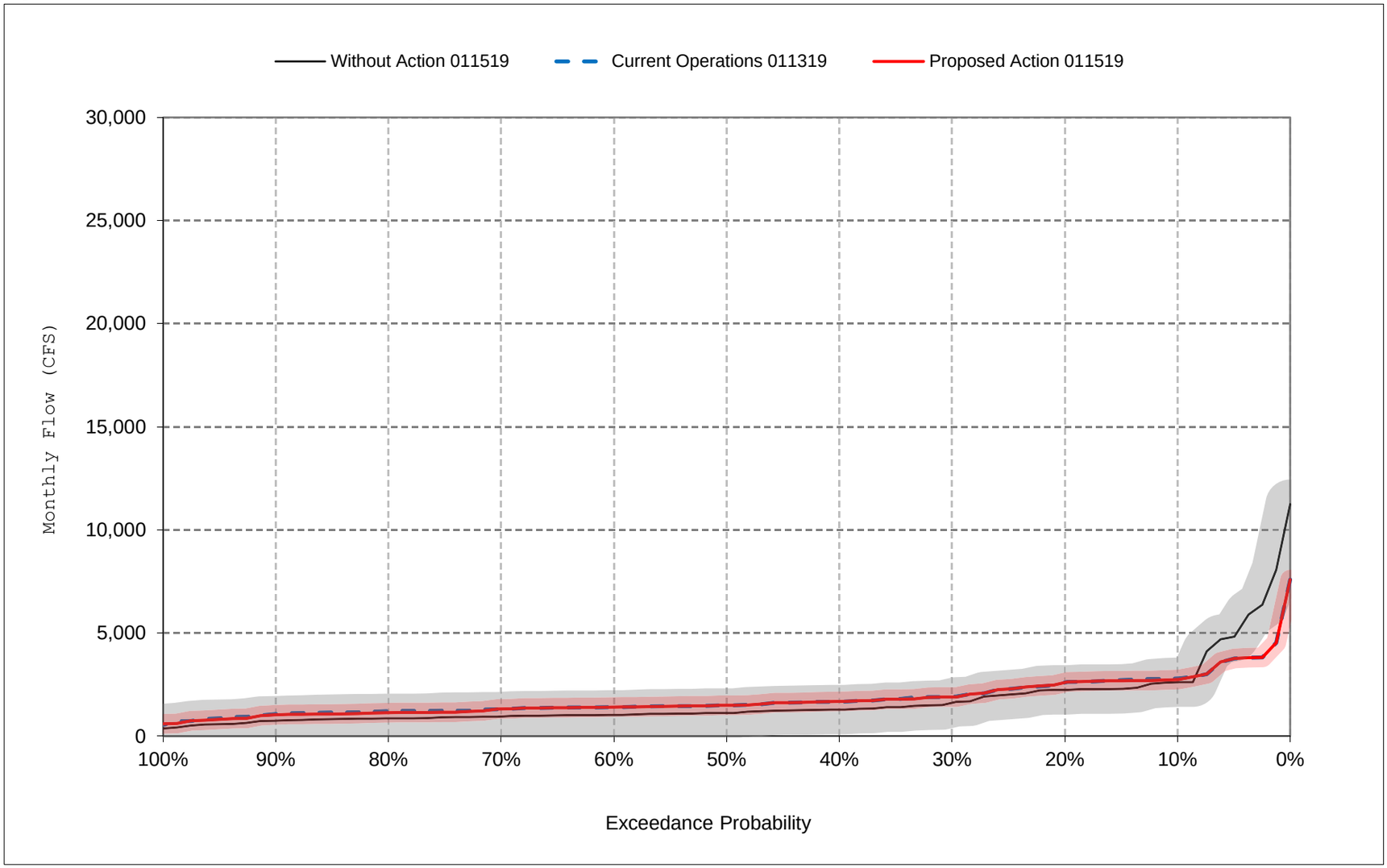
Figure 39-16. San Joaquin River at Vernalis, July



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

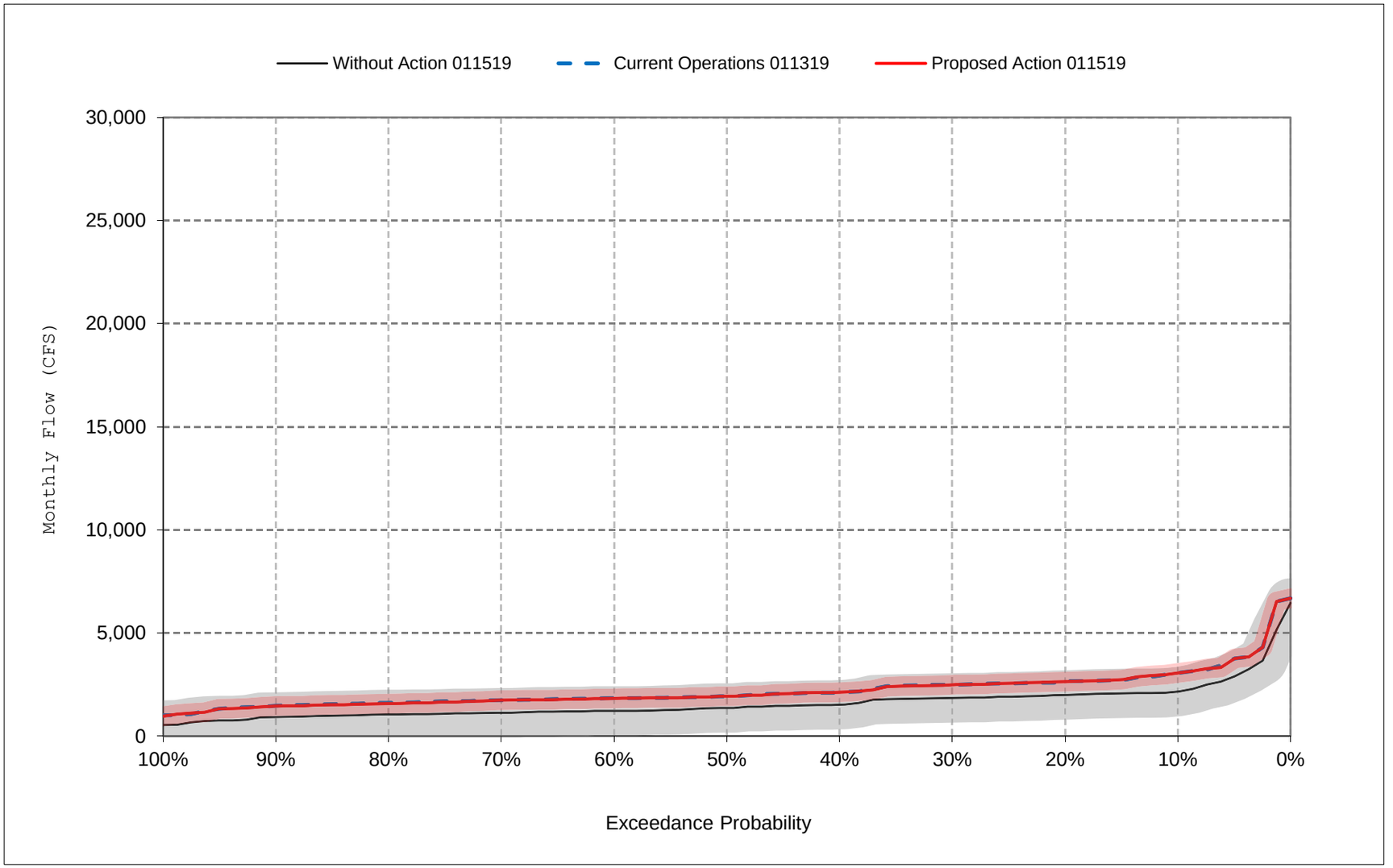
Figure 39-17. San Joaquin River at Vernalis, August



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Figure 39-18. San Joaquin River at Vernalis, September



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Table 39b-1. San Joaquin River at Vernalis (60-20-20), Monthly Flow

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	3,010	3,892	7,130	14,538	19,233	19,462	19,028	19,218	19,342	12,476	2,615	2,159
20%	2,531	3,162	4,159	8,111	13,417	12,206	11,128	12,129	12,255	7,112	2,249	1,994
30%	2,254	2,691	3,406	5,983	8,687	9,782	8,660	8,463	5,150	5,198	1,613	1,854
40%	2,085	2,395	2,925	4,043	7,442	6,502	7,208	6,384	3,730	3,010	1,286	1,528
50%	1,945	2,136	2,585	3,371	4,647	4,881	5,930	4,391	2,790	1,599	1,120	1,359
60%	1,741	2,056	2,343	3,050	3,650	4,206	4,453	3,508	1,888	1,047	1,027	1,218
70%	1,564	1,904	2,107	2,591	3,042	3,436	3,192	2,402	1,068	838	955	1,130
80%	1,413	1,820	1,896	1,989	2,475	2,731	2,284	1,517	901	728	856	1,052
90%	1,201	1,484	1,606	1,677	1,747	1,899	1,540	1,042	771	579	748	927
Long Term												
Full Simulation Period[a]	2,075	2,720	4,145	6,336	8,562	8,283	7,648	7,680	6,556	4,601	1,730	1,604
Water Year Types[b,c]												
Wet (23%)	3,055	4,101	6,498	13,790	19,429	19,073	16,565	19,502	18,753	12,438	3,591	2,610
Above Normal (24%)	2,394	2,954	3,904	6,815	9,639	9,059	8,807	7,896	6,092	4,662	1,780	1,701
Below Normal (10%)	1,758	2,144	2,645	4,498	5,976	4,634	5,473	4,307	2,616	2,222	1,069	1,206
Dry (16%)	1,658	2,465	4,598	3,118	3,189	3,678	3,784	2,772	1,582	1,249	988	1,333
Critical (27%)	1,266	1,653	2,640	2,033	2,314	2,307	1,965	1,399	816	624	757	950

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	3,499	2,953	4,804	11,236	14,693	15,582	14,771	14,178	9,432	5,890	2,796	3,060
20%	3,162	2,777	2,857	4,812	10,133	10,196	10,640	8,319	4,695	2,634	2,595	2,655
30%	2,980	2,527	2,401	3,611	6,119	8,499	8,616	5,538	3,364	1,990	1,909	2,491
40%	2,796	2,395	2,216	2,629	4,232	5,570	7,564	4,615	2,947	1,741	1,672	2,125
50%	2,602	2,219	2,101	2,402	3,420	3,847	6,019	3,929	2,244	1,493	1,492	1,932
60%	2,401	2,169	2,046	2,293	2,684	3,459	4,835	3,064	1,864	1,370	1,408	1,837
70%	2,247	2,059	1,979	2,114	2,305	2,906	3,778	2,705	1,449	1,163	1,310	1,741
80%	1,995	1,951	1,829	1,883	2,151	2,371	2,792	2,167	1,298	1,099	1,207	1,613
90%	1,849	1,763	1,669	1,699	1,947	2,205	1,888	1,680	1,091	891	1,068	1,477
Long Term												
Full Simulation Period[a]	2,672	2,613	3,393	5,079	6,664	7,282	7,522	6,066	4,211	2,630	1,850	2,225
Water Year Types[b,c]												
Wet (23%)	3,611	4,025	6,134	11,463	15,794	16,880	15,399	14,703	11,398	6,693	3,136	3,417
Above Normal (24%)	2,947	2,582	2,953	4,898	6,903	7,536	8,537	5,295	3,282	1,996	1,979	2,347
Below Normal (10%)	2,518	2,133	2,067	3,520	3,651	4,149	6,338	4,142	2,077	1,466	1,448	1,838
Dry (16%)	2,289	2,153	3,123	2,402	2,549	3,241	3,998	2,808	1,685	1,260	1,351	1,778
Critical (27%)	1,864	1,849	2,077	1,878	2,091	2,288	2,310	1,932	1,119	932	1,064	1,489

Current Operations 011319 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	489	-939	-2,326	-3,302	-4,540	-3,880	-4,257	-5,039	-9,910	-6,586	181	901
20%	632	-385	-1,302	-3,299	-3,283	-2,009	-488	-3,810	-7,560	-4,478	347	662
30%	726	-164	-1,006	-2,373	-2,568	-1,283	-44	-2,925	-1,786	-3,208	296	637
40%	711	0	-709	-1,414	-3,210	-932	356	-1,768	-783	-1,269	386	597
50%	657	83	-484	-969	-1,227	-1,034	89	-462	-546	-105	372	573
60%	661	113	-297	-757	-966	-746	381	-444	-23	324	381	619
70%	683	155	-129	-477	-737	-530	585	303	381	325	355	611
80%	582	131	-67	-106	-324	-360	508	650	397	371	351	561
90%	648	279	63	22	200	305	348	639	320	312	320	550
Long Term												
Full Simulation Period[a]	598	-107	-751	-1,257	-1,898	-1,001	-125	-1,614	-2,345	-1,971	120	621
Water Year Types[b,c]												
Wet (23%)	556	-76	-364	-2,327	-3,635	-2,193	-1,166	-4,799	-7,356	-5,745	-455	806
Above Normal (24%)	553	-373	-951	-1,917	-2,736	-1,523	-270	-2,601	-2,811	-2,666	199	646
Below Normal (10%)	760	-11	-578	-978	-2,325	-484	865	-165	-539	-756	380	633
Dry (16%)	631	-312	-1,475	-716	-640	-437	214	36	103	12	362	444
Critical (27%)	598	195	-563	-156	-223	-18	345	533	303	308	308	538

a Based on the 82-year simulation period.

b As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 39b-2. San Joaquin River at Vernalis (60-20-20), Monthly Flow

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	3,010	3,892	7,130	14,538	19,233	19,462	19,028	19,218	19,342	12,476	2,615	2,159
20%	2,531	3,162	4,159	8,111	13,417	12,206	11,128	12,129	12,255	7,112	2,249	1,994
30%	2,254	2,691	3,406	5,983	8,687	9,782	8,660	8,463	5,150	5,198	1,613	1,854
40%	2,085	2,395	2,925	4,043	7,442	6,502	7,208	6,384	3,730	3,010	1,286	1,528
50%	1,945	2,136	2,585	3,371	4,647	4,881	5,930	4,391	2,790	1,599	1,120	1,359
60%	1,741	2,056	2,343	3,050	3,650	4,206	4,453	3,508	1,888	1,047	1,027	1,218
70%	1,564	1,904	2,107	2,591	3,042	3,436	3,192	2,402	1,068	838	955	1,130
80%	1,413	1,820	1,896	1,989	2,475	2,731	2,284	1,517	901	728	856	1,052
90%	1,201	1,484	1,606	1,677	1,747	1,899	1,540	1,042	771	579	748	927
Long Term												
Full Simulation Period[a]	2,075	2,720	4,145	6,336	8,562	8,283	7,648	7,680	6,556	4,601	1,730	1,604
Water Year Types[b,c]												
Wet (23%)	3,055	4,101	6,498	13,790	19,429	19,073	16,565	19,502	18,753	12,438	3,591	2,610
Above Normal (24%)	2,394	2,954	3,904	6,815	9,639	9,059	8,807	7,896	6,092	4,662	1,780	1,701
Below Normal (10%)	1,758	2,144	2,645	4,498	5,976	4,634	5,473	4,307	2,616	2,222	1,069	1,206
Dry (16%)	1,658	2,465	4,598	3,118	3,189	3,678	3,784	2,772	1,582	1,249	988	1,333
Critical (27%)	1,266	1,653	2,640	2,033	2,314	2,307	1,965	1,399	816	624	757	950

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	3,500	2,975	4,804	12,398	17,192	15,482	15,015	15,004	9,433	5,780	2,744	3,060
20%	3,148	2,778	2,904	4,838	10,122	10,324	10,641	8,327	4,781	2,503	2,602	2,635
30%	2,996	2,483	2,321	3,613	6,806	8,470	8,960	5,767	2,704	1,957	1,894	2,486
40%	2,835	2,395	2,204	2,681	4,232	5,306	7,921	4,655	2,370	1,730	1,679	2,128
50%	2,628	2,219	2,101	2,371	3,071	3,847	6,437	4,131	2,069	1,507	1,497	1,933
60%	2,402	2,170	2,046	2,290	2,614	3,440	4,786	2,910	1,757	1,362	1,407	1,830
70%	2,137	2,060	1,979	2,084	2,305	2,906	3,212	2,305	1,351	1,153	1,319	1,743
80%	1,978	1,951	1,829	1,883	2,128	2,372	2,500	1,866	1,217	994	1,136	1,575
90%	1,807	1,763	1,669	1,699	1,891	2,205	1,765	1,473	978	874	1,029	1,452
Long Term												
Full Simulation Period[a]	2,669	2,607	3,368	5,109	6,792	7,290	7,513	5,982	4,102	2,619	1,831	2,214
Water Year Types[b,c]												
Wet (23%)	3,607	4,001	6,006	11,466	16,343	17,052	15,339	14,678	11,759	6,815	3,125	3,417
Above Normal (24%)	2,994	2,579	2,964	4,928	6,922	7,468	8,887	5,409	2,691	1,915	1,976	2,340
Below Normal (10%)	2,542	2,133	2,067	3,784	3,834	4,032	6,497	4,189	1,974	1,473	1,454	1,836
Dry (16%)	2,239	2,153	3,132	2,393	2,464	3,241	3,795	2,537	1,570	1,245	1,349	1,776
Critical (27%)	1,829	1,849	2,077	1,871	2,058	2,274	2,071	1,680	1,040	864	1,003	1,457

Proposed Action 011519 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	490	**-917**	**-2,326**	**-2,140**	**-2,041**	**-3,980**	**-4,012**	**-4,214**	**-9,909**	**-6,696**	129	901
20%	618	**-385**	**-1,255**	**-3,273**	**-3,295**	**-1,881**	**-487**	**-3,803**	**-7,474**	**-4,609**	353	641
30%	742	**-208**	**-1,085**	**-2,370**	**-1,881**	**-1,311**	300	**-2,697**	**-2,446**	**-3,240**	281	632
40%	750	0	**-720**	**-1,362**	**-3,210**	**-1,196**	712	**-1,729**	**-1,360**	**-1,280**	393	600
50%	684	84	**-484**	**-999**	**-1,575**	**-1,034**	507	**-260**	**-721**	**-92**	377	574
60%	661	113	**-297**	**-760**	**-1,036**	**-766**	333	**-598**	**-131**	315	380	611
70%	572	155	**-128**	**-507**	**-737**	**-530**	19	**-96**	284	316	364	613
80%	565	131	**-67**	**-106**	**-347**	**-360**	216	349	316	266	280	523
90%	606	280	63	22	144	305	224	431	207	295	281	525
Long Term												
Full Simulation Period[a]	594	**-113**	**-777**	**-1,227**	**-1,770**	**-993**	**-135**	**-1,698**	**-2,454**	**-1,982**	101	610
Water Year Types[b,c]												
Wet (23%)	552	**-100**	**-492**	**-2,324**	**-3,086**	**-2,021**	**-1,227**	**-4,825**	**-6,994**	**-5,623**	**-466**	807
Above Normal (24%)	600	**-375**	**-940**	**-1,886**	**-2,717**	**-1,591**	79	**-2,487**	**-3,401**	**-2,747**	196	639
Below Normal (10%)	783	**-11**	**-577**	**-714**	**-2,142**	**-602**	1,024	**-118**	**-642**	**-749**	386	630
Dry (16%)	581	**-311**	**-1,466**	**-725**	**-725**	**-437**	11	**-235**	**-11**	**-3**	361	443
Critical (27%)	563	196	**-563**	**-162**	**-256**	**-33**	105	280	224	240	246	506

a Based on the 82-year simulation period.

b As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 39b-3. San Joaquin River at Vernalis (60-20-20), Monthly Flow

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	3,499	2,953	4,804	11,236	14,693	15,582	14,771	14,178	9,432	5,890	2,796	3,060
20%	3,162	2,777	2,857	4,812	10,133	10,196	10,640	8,319	4,695	2,634	2,595	2,655
30%	2,980	2,527	2,401	3,611	6,119	8,499	8,616	5,538	3,364	1,990	1,909	2,491
40%	2,796	2,395	2,216	2,629	4,232	5,570	7,564	4,615	2,947	1,741	1,672	2,125
50%	2,602	2,219	2,101	2,402	3,420	3,847	6,019	3,929	2,244	1,493	1,492	1,932
60%	2,401	2,169	2,046	2,293	2,684	3,459	4,835	3,064	1,864	1,370	1,408	1,837
70%	2,247	2,059	1,979	2,114	2,305	2,906	3,778	2,705	1,449	1,163	1,310	1,741
80%	1,995	1,951	1,829	1,883	2,151	2,371	2,792	2,167	1,298	1,099	1,207	1,613
90%	1,849	1,763	1,669	1,699	1,947	2,205	1,888	1,680	1,091	891	1,068	1,477
Long Term												
Full Simulation Period[a]	2,672	2,613	3,393	5,079	6,664	7,282	7,522	6,066	4,211	2,630	1,850	2,225
Water Year Types[b,c]												
Wet (23%)	3,611	4,025	6,134	11,463	15,794	16,880	15,399	14,703	11,398	6,693	3,136	3,417
Above Normal (24%)	2,947	2,582	2,953	4,898	6,903	7,536	8,537	5,295	3,282	1,996	1,979	2,347
Below Normal (10%)	2,518	2,133	2,067	3,520	3,651	4,149	6,338	4,142	2,077	1,466	1,448	1,838
Dry (16%)	2,289	2,153	3,123	2,402	2,549	3,241	3,998	2,808	1,685	1,260	1,351	1,778
Critical (27%)	1,864	1,849	2,077	1,878	2,091	2,288	2,310	1,932	1,119	932	1,064	1,489

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	3,500	2,975	4,804	12,398	17,192	15,482	15,015	15,004	9,433	5,780	2,744	3,060
20%	3,148	2,778	2,904	4,838	10,122	10,324	10,641	8,327	4,781	2,503	2,602	2,635
30%	2,996	2,483	2,321	3,613	6,806	8,470	8,960	5,767	2,704	1,957	1,894	2,486
40%	2,835	2,395	2,204	2,681	4,232	5,306	7,921	4,655	2,370	1,730	1,679	2,128
50%	2,628	2,219	2,101	2,371	3,071	3,847	6,437	4,131	2,069	1,507	1,497	1,933
60%	2,402	2,170	2,046	2,290	2,614	3,440	4,786	2,910	1,757	1,362	1,407	1,830
70%	2,137	2,060	1,979	2,084	2,305	2,906	3,212	2,305	1,351	1,153	1,319	1,743
80%	1,978	1,951	1,829	1,883	2,128	2,372	2,500	1,866	1,217	994	1,136	1,575
90%	1,807	1,763	1,669	1,699	1,891	2,205	1,765	1,473	978	874	1,029	1,452
Long Term												
Full Simulation Period[a]	2,669	2,607	3,368	5,109	6,792	7,290	7,513	5,982	4,102	2,619	1,831	2,214
Water Year Types[b,c]												
Wet (23%)	3,607	4,001	6,006	11,466	16,343	17,052	15,339	14,678	11,759	6,815	3,125	3,417
Above Normal (24%)	2,994	2,579	2,964	4,928	6,922	7,468	8,887	5,409	2,691	1,915	1,976	2,340
Below Normal (10%)	2,542	2,133	2,067	3,784	3,834	4,032	6,497	4,189	1,974	1,473	1,454	1,836
Dry (16%)	2,239	2,153	3,132	2,393	2,464	3,241	3,795	2,537	1,570	1,245	1,349	1,776
Critical (27%)	1,829	1,849	2,077	1,871	2,058	2,274	2,071	1,680	1,040	864	1,003	1,457

Proposed Action 011519 minus Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1	22	0	1,162	2,499	**-100**	245	826	1	**-111**	**-52**	0
20%	**-14**	0	47	26	**-11**	128	1	7	87	**-131**	7	**-20**
30%	16	**-45**	**-79**	3	687	**-29**	344	229	**-660**	**-33**	**-15**	**-5**
40%	39	0	**-11**	52	0	**-264**	357	39	**-577**	**-11**	7	3
50%	26	0	0	**-30**	**-349**	0	419	202	**-175**	14	5	1
60%	1	0	0	**-3**	**-70**	**-19**	**-48**	**-154**	**-107**	**-9**	**-1**	**-8**
70%	**-111**	1	0	**-30**	0	0	**-566**	**-400**	**-98**	**-10**	9	2
80%	**-17**	1	0	**-1**	**-23**	0	**-292**	**-301**	**-81**	**-105**	**-71**	**-38**
90%	**-42**	0	0	0	**-56**	**0**	**-123**	**-208**	**-113**	**-17**	**-39**	**-25**
Long Term												
Full Simulation Period[a]	**-4**	**-6**	**-26**	31	127	8	**-10**	**-84**	**-110**	**-11**	**-20**	**-11**
Water Year Types[b,c]												
Wet (23%)	**-4**	**-24**	**-128**	3	550	171	**-61**	**-25**	362	122	**-11**	0
Above Normal (24%)	47	**-3**	11	31	19	**-68**	349	114	**-591**	**-80**	**-4**	**-6**
Below Normal (10%)	23	0	0	264	183	**-117**	159	47	**-103**	7	6	**-2**
Dry (16%)	**-50**	0	9	**-9**	**-85**	1	**-203**	**-271**	**-114**	**-15**	**-1**	**-2**
Critical (27%)	**-36**	0	0	**-7**	**-33**	**-15**	**-239**	**-253**	**-80**	**-68**	**-61**	**-32**

a Based on the 82-year simulation period.

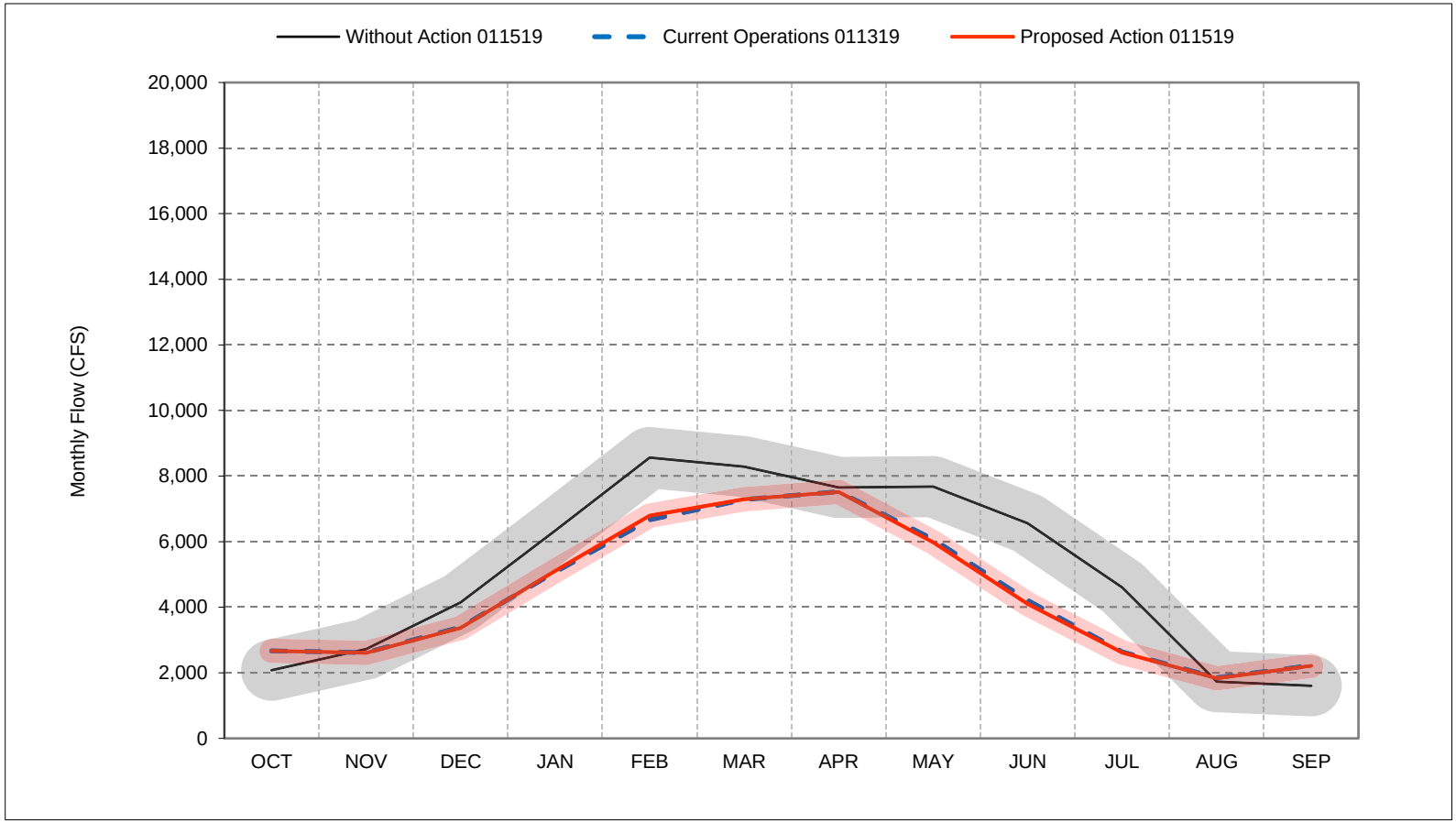
b As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

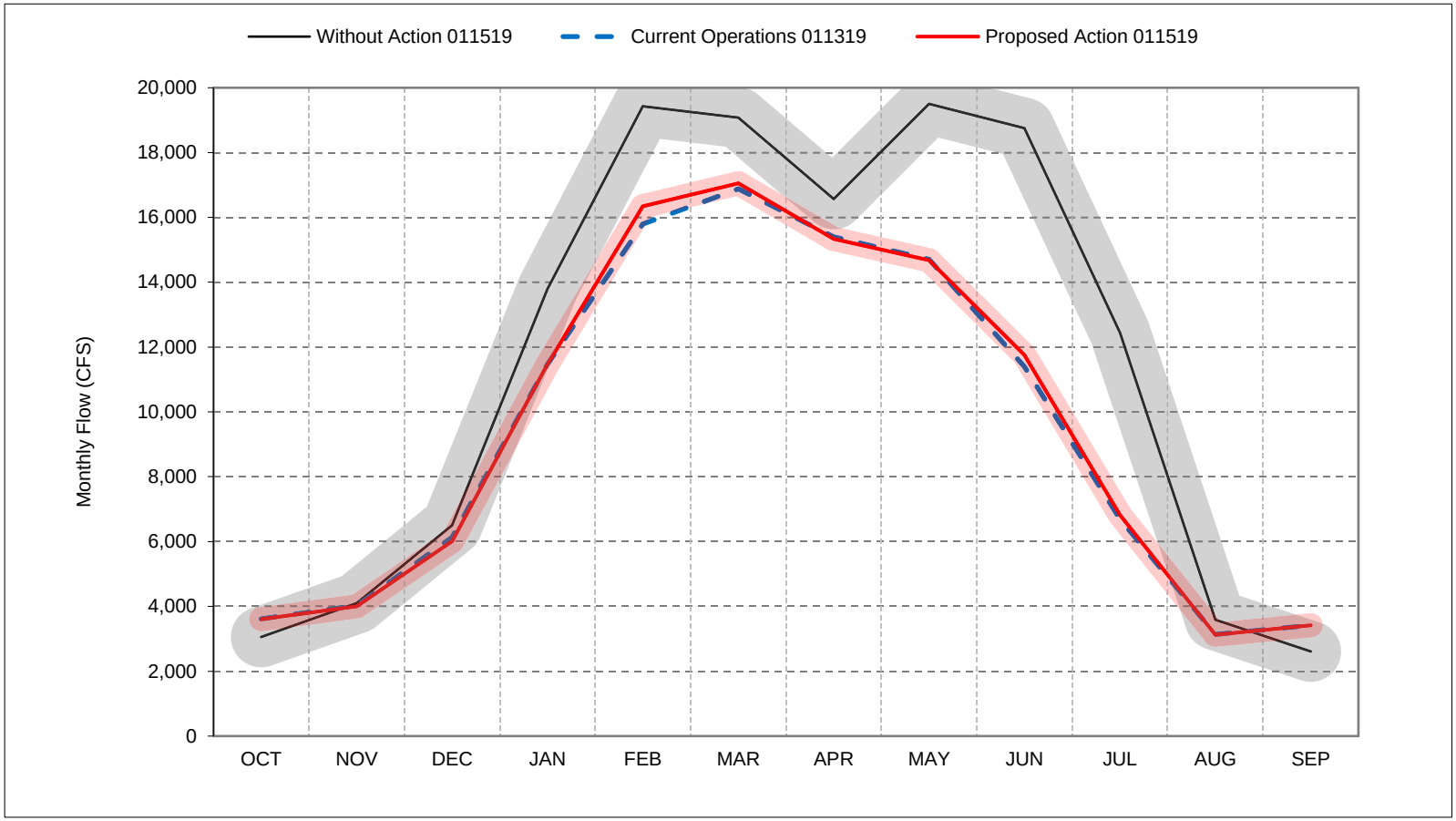
e These are draft results meant for qualitative analysis and are subject to revision.

Figure 39b-1. San Joaquin River at Vernalis (60-20-20), Long-Term Average Flow



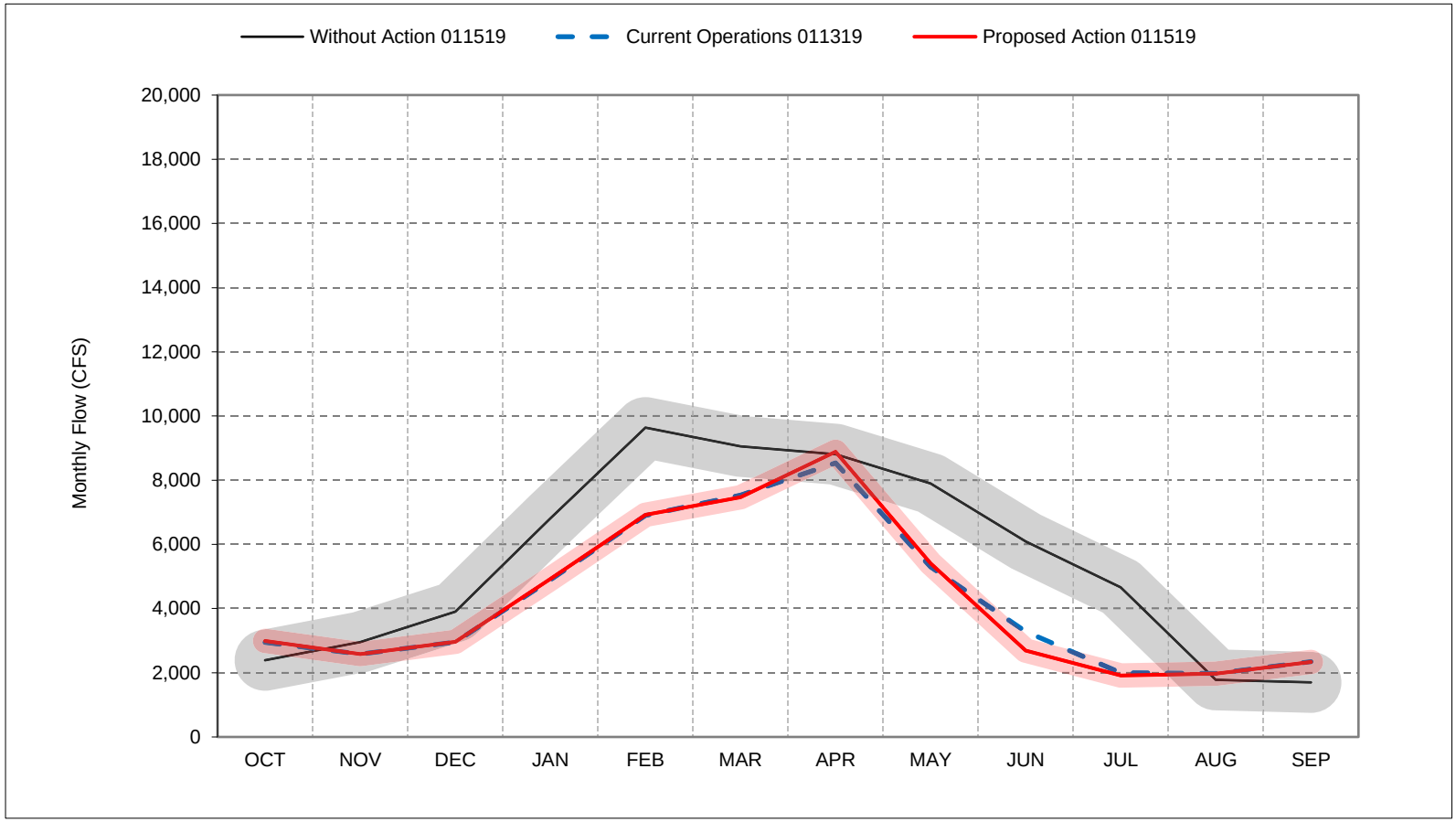
*As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 39b-2. San Joaquin River at Vernalis (60-20-20), Wet Year Average Flow



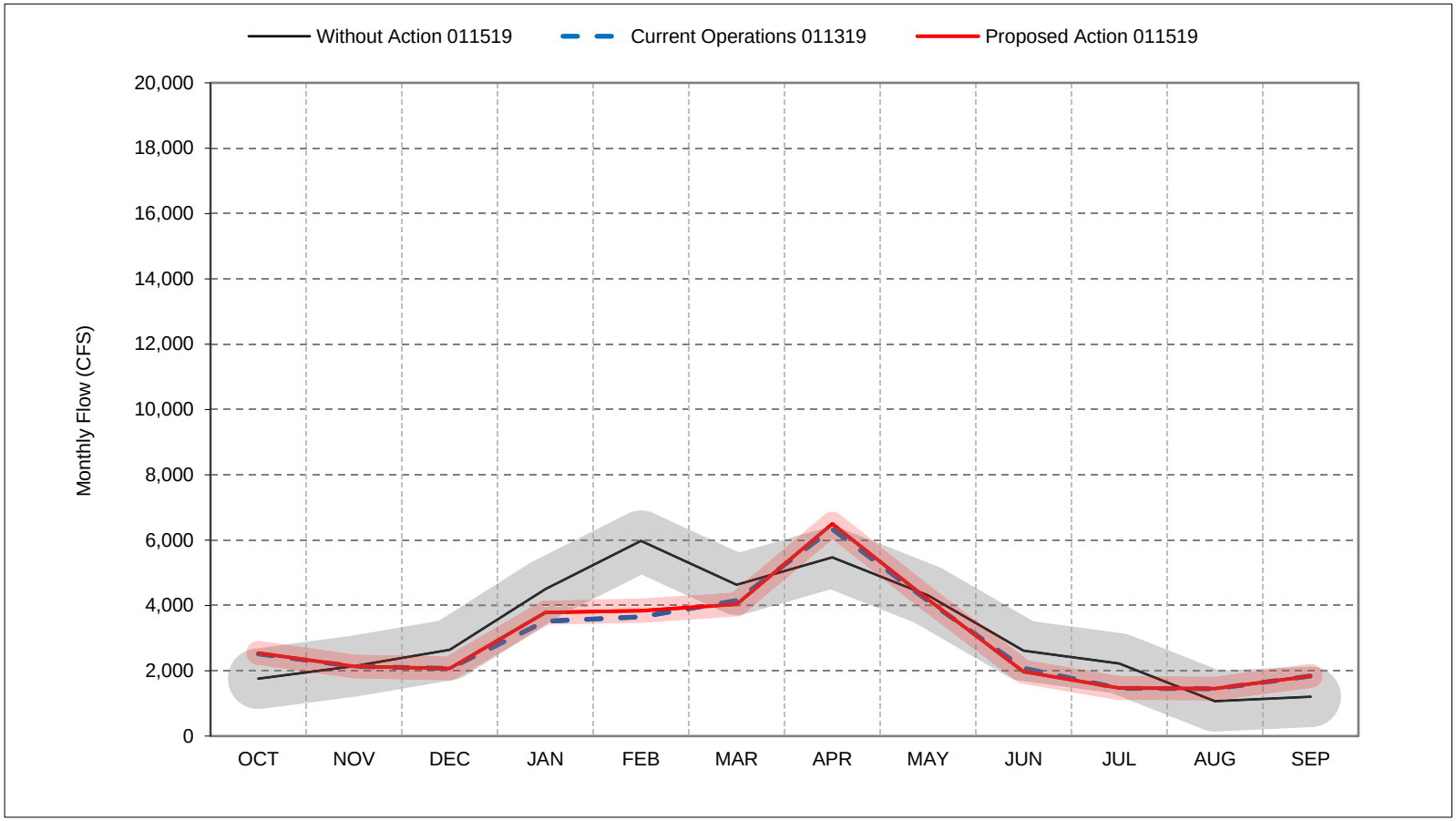
*As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 39b-3. San Joaquin River at Vernalis (60-20-20), Above Normal Year Average Flow



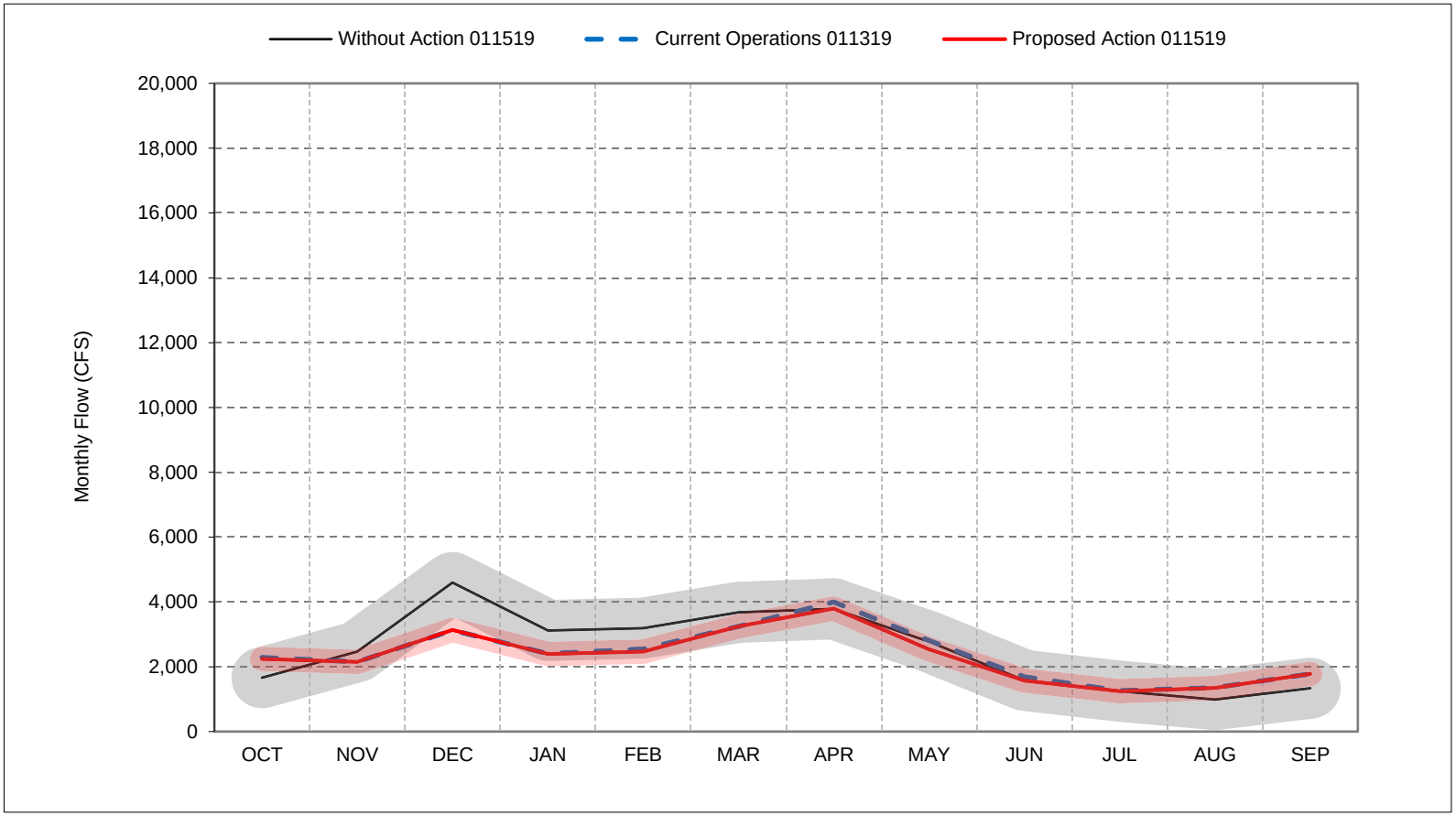
*As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 39b-4. San Joaquin River at Vernalis (60-20-20), Below Normal Year Average Flow



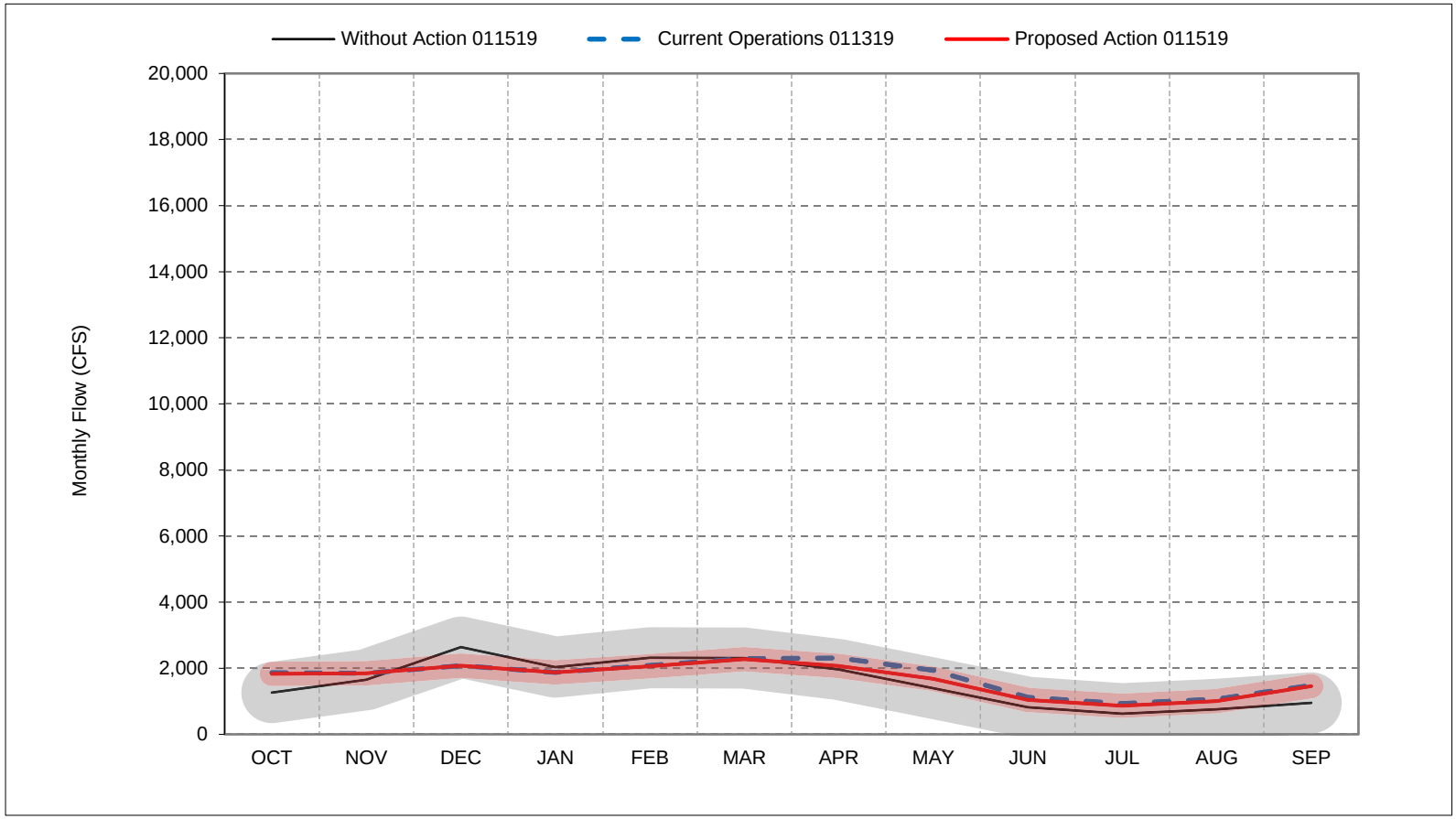
*As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 39b-5. San Joaquin River at Vernalis (60-20-20), Dry Year Average Flow



*As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 39b-6. San Joaquin River at Vernalis (60-20-20), Critical Year Average Flow



*As defined by the San Joaquin Valley 60-20-20 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Table 40-1. Old and Middle River Flow, Monthly Flow (combined flows)

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	469	706	3,379	7,038	10,458	10,106	9,549	9,336	7,081	4,191	421	457
20%	300	524	2,091	4,063	6,880	5,752	4,871	5,155	4,051	1,926	253	363
30%	257	461	1,545	3,183	4,666	4,349	3,672	3,474	1,053	1,141	8	308
40%	221	371	1,366	2,099	3,621	3,094	3,035	2,549	564	240	-92	238
50%	179	315	1,171	1,797	2,330	2,123	2,287	1,544	123	-359	-181	147
60%	138	274	1,029	1,554	1,827	1,921	1,814	1,206	-262	-559	-220	99
70%	79	246	938	1,317	1,555	1,511	1,241	549	-519	-627	-285	67
80%	36	213	823	1,069	1,189	1,114	797	210	-654	-721	-334	41
90%	-43	130	670	941	837	758	402	9	-775	-814	-372	-36
Long Term												
Full Simulation Period[a]	213	428	2,027	3,454	4,547	4,153	3,483	3,424	1,702	917	54	238
Water Year Types[b,c]												
Wet (32%)	399	676	2,831	6,870	8,521	8,313	7,003	7,433	4,896	3,006	652	466
Above Normal (16%)	229	421	1,603	3,341	4,940	3,854	3,285	3,111	1,982	531	-90	252
Below Normal (13%)	189	302	1,485	1,765	2,972	2,292	2,010	1,575	-109	93	-152	245
Dry (24%)	107	356	2,192	1,477	1,981	1,916	1,638	1,289	-314	-246	-251	87
Critical (15%)	-11	136	967	1,019	1,232	901	496	327	-500	-497	-389	-26

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	-3,899	-4,158	-3,846	-2,823	-1,197	-1,150	3,171	2,828	-1,150	-3,145	-2,644	-4,097
20%	-4,145	-4,633	-4,581	-2,823	-1,905	-1,582	2,206	1,315	-1,882	-6,033	-3,489	-5,563
30%	-4,567	-5,444	-5,379	-3,355	-2,768	-3,140	1,603	614	-3,500	-6,887	-4,143	-6,221
40%	-4,884	-5,890	-5,871	-4,348	-3,500	-3,500	1,268	242	-3,500	-7,781	-7,881	-7,025
50%	-5,162	-6,288	-5,871	-4,710	-4,145	-4,017	612	-34	-3,500	-8,770	-9,726	-8,539
60%	-5,506	-6,592	-5,871	-4,993	-5,000	-4,885	-223	-490	-4,317	-9,176	-10,281	-9,573
70%	-5,969	-7,139	-7,069	-5,000	-5,000	-5,000	-599	-766	-5,000	-9,674	-10,684	-9,932
80%	-6,627	-8,064	-9,343	-5,000	-5,000	-5,000	-1,024	-1,055	-5,000	-10,180	-10,772	-10,027
90%	-7,018	-9,851	-9,681	-5,000	-5,000	-5,000	-1,389	-1,422	-5,000	-11,025	-10,967	-10,211
Long Term												
Full Simulation Period[a]	-5,404	-6,485	-6,168	-3,632	-3,102	-2,938	910	309	-3,542	-7,887	-7,667	-7,776
Water Year Types[b,c]												
Wet (32%)	-5,759	-6,524	-6,777	-2,059	-2,135	-1,800	3,139	2,058	-4,304	-8,723	-10,544	-9,575
Above Normal (16%)	-5,990	-7,820	-7,734	-3,716	-3,859	-4,141	1,193	434	-4,479	-8,805	-10,805	-10,094
Below Normal (13%)	-6,354	-6,704	-6,038	-4,380	-3,662	-4,055	181	-305	-3,407	-10,088	-8,919	-7,920
Dry (24%)	-4,923	-6,843	-5,283	-4,640	-3,644	-3,640	-744	-936	-3,260	-7,836	-4,189	-6,133
Critical (15%)	-3,933	-4,157	-4,748	-4,579	-2,962	-1,903	-802	-980	-1,472	-3,145	-2,680	-3,975

Current Operations 011319 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	**-4,368**	**-4,864**	**-7,225**	**-9,861**	**-11,655**	**-11,256**	**-6,378**	**-6,507**	**-8,231**	**-7,336**	**-3,065**	**-4,553**
20%	**-4,445**	**-5,157**	**-6,672**	**-6,886**	**-8,785**	**-7,334**	**-2,665**	**-3,840**	**-5,934**	**-7,959**	**-3,742**	**-5,926**
30%	**-4,824**	**-5,905**	**-6,924**	**-6,537**	**-7,435**	**-7,489**	**-2,070**	**-2,861**	**-4,553**	**-8,028**	**-4,151**	**-6,529**
40%	**-5,106**	**-6,261**	**-7,237**	**-6,447**	**-7,121**	**-6,594**	**-1,766**	**-2,307**	**-4,064**	**-8,021**	**-7,788**	**-7,263**
50%	**-5,341**	**-6,603**	**-7,042**	**-6,507**	**-6,476**	**-6,139**	**-1,675**	**-1,578**	**-3,623**	**-8,411**	**-9,545**	**-8,687**
60%	**-5,643**	**-6,866**	**-6,900**	**-6,547**	**-6,827**	**-6,807**	**-2,037**	**-1,697**	**-4,055**	**-8,617**	**-10,062**	**-9,672**
70%	**-6,048**	**-7,384**	**-8,006**	**-6,317**	**-6,555**	**-6,511**	**-1,840**	**-1,315**	**-4,481**	**-9,047**	**-10,400**	**-9,999**
80%	**-6,663**	**-8,277**	**-10,166**	**-6,069**	**-6,189**	**-6,114**	**-1,821**	**-1,266**	**-4,346**	**-9,460**	**-10,438**	**-10,068**
90%	**-6,975**	**-9,981**	**-10,351**	**-5,941**	**-5,837**	**-5,758**	**-1,791**	**-1,430**	**-4,225**	**-10,211**	**-10,595**	**-10,175**
Long Term												
Full Simulation Period[a]	**-5,617**	**-6,913**	**-8,196**	**-7,086**	**-7,649**	**-7,091**	**-2,573**	**-3,115**	**-5,245**	**-8,804**	**-7,721**	**-8,014**
Water Year Types[b,c]												
Wet (32%)	**-6,158**	**-7,200**	**-9,608**	**-8,930**	**-10,656**	**-10,113**	**-3,864**	**-5,375**	**-9,200**	**-11,729**	**-11,197**	**-10,041**
Above Normal (16%)	**-6,219**	**-8,241**	**-9,337**	**-7,057**	**-8,799**	**-7,995**	**-2,092**	**-2,677**	**-6,461**	**-9,336**	**-10,715**	**-10,345**
Below Normal (13%)	**-6,542**	**-7,006**	**-7,523**	**-6,145**	**-6,633**	**-6,347**	**-1,829**	**-1,880**	**-3,298**	**-10,181**	**-8,767**	**-8,165**
Dry (24%)	**-5,030**	**-7,199**	**-7,476**	**-6,117**	**-5,625**	**-5,556**	**-2,382**	**-2,226**	**-2,946**	**-7,590**	**-3,937**	**-6,220**
Critical (15%)	**-3,922**	**-4,293**	**-5,716**	**-5,598**	**-4,194**	**-2,804**	**-1,298**	**-1,307**	**-973**	**-2,648**	**-2,290**	**-3,949**

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 40-2. Old and Middle River Flow, Monthly Flow (combined flows)

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	469	706	3,379	7,038	10,458	10,106	9,549	9,336	7,081	4,191	421	457
20%	300	524	2,091	4,063	6,880	5,752	4,871	5,155	4,051	1,926	253	363
30%	257	461	1,545	3,183	4,666	4,349	3,672	3,474	1,053	1,141	8	308
40%	221	371	1,366	2,099	3,621	3,094	3,035	2,549	564	240	-92	238
50%	179	315	1,171	1,797	2,330	2,123	2,287	1,544	123	-359	-181	147
60%	138	274	1,029	1,554	1,827	1,921	1,814	1,206	-262	-559	-220	99
70%	79	246	938	1,317	1,555	1,511	1,241	549	-519	-627	-285	67
80%	36	213	823	1,069	1,189	1,114	797	210	-654	-721	-334	41
90%	-43	130	670	941	837	758	402	9	-775	-814	-372	-36
Long Term												
Full Simulation Period[a]	213	428	2,027	3,454	4,547	4,153	3,483	3,424	1,702	917	54	238
Water Year Types[b,c]												
Wet (32%)	399	676	2,831	6,870	8,521	8,313	7,003	7,433	4,896	3,006	652	466
Above Normal (16%)	229	421	1,603	3,341	4,940	3,854	3,285	3,111	1,982	531	-90	252
Below Normal (13%)	189	302	1,485	1,765	2,972	2,292	2,010	1,575	-109	93	-152	245
Dry (24%)	107	356	2,192	1,477	1,981	1,916	1,638	1,289	-314	-246	-251	87
Critical (15%)	-11	136	967	1,019	1,232	901	496	327	-500	-497	-389	-26

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	-3,176	-3,431	-3,956	-2,948	-2,524	-982	-772	-1,369	-2,397	-2,974	-2,553	-3,856
20%	-3,662	-3,954	-4,508	-4,516	-4,302	-3,396	-1,358	-1,686	-3,919	-4,570	-3,637	-5,098
30%	-4,003	-4,629	-5,135	-4,516	-4,464	-4,069	-1,736	-2,314	-4,500	-6,173	-4,625	-5,950
40%	-4,364	-5,367	-5,290	-4,516	-4,464	-4,516	-2,056	-2,821	-4,500	-7,730	-7,998	-7,192
50%	-5,360	-6,363	-5,290	-4,516	-4,464	-4,516	-2,196	-2,978	-4,500	-8,533	-9,939	-8,985
60%	-6,762	-7,112	-5,290	-5,000	-4,483	-4,516	-2,459	-3,211	-4,500	-9,114	-10,362	-9,393
70%	-7,981	-8,121	-6,412	-5,226	-4,892	-4,924	-2,830	-3,258	-5,000	-9,685	-10,660	-9,537
80%	-8,694	-8,875	-6,827	-5,226	-5,193	-5,000	-3,134	-3,619	-5,000	-10,362	-10,737	-9,645
90%	-9,108	-9,271	-9,744	-5,226	-5,250	-5,000	-3,490	-4,026	-5,000	-10,957	-11,081	-9,750
Long Term												
Full Simulation Period[a]	-5,831	-6,293	-5,701	-3,980	-3,700	-3,296	-1,797	-2,458	-4,201	-7,654	-7,816	-7,561
Water Year Types[b,c]												
Wet (32%)	-7,235	-7,620	-6,463	-2,354	-1,838	-1,308	-915	-1,849	-4,079	-8,689	-10,466	-9,337
Above Normal (16%)	-7,485	-7,177	-6,284	-4,445	-3,955	-3,885	-2,671	-3,116	-4,451	-9,267	-10,749	-9,707
Below Normal (13%)	-5,598	-5,968	-5,472	-5,032	-4,663	-4,610	-2,422	-3,107	-5,000	-10,315	-9,935	-7,991
Dry (24%)	-4,585	-5,809	-5,128	-4,780	-4,914	-4,764	-2,227	-2,899	-4,747	-6,769	-4,459	-5,889
Critical (15%)	-3,291	-3,564	-4,581	-4,699	-4,548	-3,315	-1,470	-1,735	-2,551	-2,703	-2,551	-3,781

Proposed Action 011519 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	**-3,645**	**-4,136**	**-7,334**	**-9,985**	**-12,982**	**-11,088**	**-10,322**	**-10,704**	**-9,477**	**-7,165**	**-2,974**	**-4,312**
20%	**-3,962**	**-4,478**	**-6,600**	**-8,579**	**-11,182**	**-9,147**	**-6,230**	**-6,840**	**-7,970**	**-6,495**	**-3,890**	**-5,461**
30%	**-4,260**	**-5,090**	**-6,680**	**-7,699**	**-9,131**	**-8,418**	**-5,408**	**-5,788**	**-5,553**	**-7,314**	**-4,633**	**-6,258**
40%	**-4,585**	**-5,739**	**-6,656**	**-6,615**	**-8,085**	**-7,610**	**-5,091**	**-5,369**	**-5,064**	**-7,971**	**-7,906**	**-7,430**
50%	**-5,539**	**-6,677**	**-6,461**	**-6,313**	**-6,795**	**-6,639**	**-4,483**	**-4,522**	**-4,623**	**-8,174**	**-9,758**	**-9,132**
60%	**-6,900**	**-7,386**	**-6,320**	**-6,554**	**-6,310**	**-6,437**	**-4,273**	**-4,418**	**-4,238**	**-8,555**	**-10,143**	**-9,492**
70%	**-8,060**	**-8,367**	**-7,349**	**-6,543**	**-6,447**	**-6,435**	**-4,071**	**-3,807**	**-4,481**	**-9,058**	**-10,376**	**-9,604**
80%	**-8,730**	**-9,088**	**-7,649**	**-6,295**	**-6,382**	**-6,114**	**-3,931**	**-3,830**	**-4,346**	**-9,642**	**-10,403**	**-9,686**
90%	**-9,065**	**-9,401**	**-10,414**	**-6,167**	**-6,087**	**-5,758**	**-3,892**	**-4,035**	**-4,225**	**-10,143**	**-10,709**	**-9,714**
Long Term												
Full Simulation Period[a]	**-6,044**	**-6,721**	**-7,728**	**-7,434**	**-8,247**	**-7,450**	**-5,279**	**-5,882**	**-5,903**	**-8,571**	**-7,870**	**-7,799**
Water Year Types[b,c]												
Wet (32%)	**-7,634**	**-8,296**	**-9,294**	**-9,225**	**-10,359**	**-9,621**	**-7,917**	**-9,282**	**-8,974**	**-11,695**	**-11,119**	**-9,803**
Above Normal (16%)	**-7,714**	**-7,598**	**-7,887**	**-7,786**	**-8,895**	**-7,740**	**-5,956**	**-6,227**	**-6,432**	**-9,798**	**-10,659**	**-9,958**
Below Normal (13%)	**-5,787**	**-6,270**	**-6,957**	**-6,797**	**-7,634**	**-6,902**	**-4,432**	**-4,682**	**-4,891**	**-10,408**	**-9,783**	**-8,236**
Dry (24%)	**-4,692**	**-6,165**	**-7,320**	**-6,256**	**-6,895**	**-6,680**	**-3,864**	**-4,189**	**-4,433**	**-6,523**	**-4,207**	**-5,976**
Critical (15%)	**-3,281**	**-3,700**	**-5,548**	**-5,718**	**-5,781**	**-4,216**	**-1,967**	**-2,062**	**-2,051**	**-2,205**	**-2,162**	**-3,754**

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 40-3. Old and Middle River Flow, Monthly Flow

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	-3,899	-4,158	-3,846	-2,823	-1,197	-1,150	3,171	2,828	-1,150	-3,145	-2,644	-4,097
20%	-4,145	-4,633	-4,581	-2,823	-1,905	-1,582	2,206	1,315	-1,882	-6,033	-3,489	-5,563
30%	-4,567	-5,444	-5,379	-3,355	-2,768	-3,140	1,603	614	-3,500	-6,887	-4,143	-6,221
40%	-4,884	-5,890	-5,871	-4,348	-3,500	-3,500	1,268	242	-3,500	-7,781	-7,881	-7,025
50%	-5,162	-6,288	-5,871	-4,710	-4,145	-4,017	612	-34	-3,500	-8,770	-9,726	-8,539
60%	-5,506	-6,592	-5,871	-4,993	-5,000	-4,885	-223	-490	-4,317	-9,176	-10,281	-9,573
70%	-5,969	-7,139	-7,069	-5,000	-5,000	-5,000	-599	-766	-5,000	-9,674	-10,684	-9,932
80%	-6,627	-8,064	-9,343	-5,000	-5,000	-5,000	-1,024	-1,055	-5,000	-10,180	-10,772	-10,027
90%	-7,018	-9,851	-9,681	-5,000	-5,000	-5,000	-1,389	-1,422	-5,000	-11,025	-10,967	-10,211
Long Term												
Full Simulation Period[a]	-5,404	-6,485	-6,168	-3,632	-3,102	-2,938	910	309	-3,542	-7,887	-7,667	-7,776
Water Year Types[b,c]												
Wet (32%)	-5,759	-6,524	-6,777	-2,059	-2,135	-1,800	3,139	2,058	-4,304	-8,723	-10,544	-9,575
Above Normal (16%)	-5,990	-7,820	-7,734	-3,716	-3,859	-4,141	1,193	434	-4,479	-8,805	-10,805	-10,094
Below Normal (13%)	-6,354	-6,704	-6,038	-4,380	-3,662	-4,055	181	-305	-3,407	-10,088	-8,919	-7,920
Dry (24%)	-4,923	-6,843	-5,283	-4,640	-3,644	-3,640	-744	-936	-3,260	-7,836	-4,189	-6,133
Critical (15%)	-3,933	-4,157	-4,748	-4,579	-2,962	-1,903	-802	-980	-1,472	-3,145	-2,680	-3,975

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	-3,176	-3,431	-3,956	-2,948	-2,524	-982	-772	-1,369	-2,397	-2,974	-2,553	-3,856
20%	-3,662	-3,954	-4,508	-4,516	-4,302	-3,396	-1,358	-1,686	-3,919	-4,570	-3,637	-5,098
30%	-4,003	-4,629	-5,135	-4,516	-4,464	-4,069	-1,736	-2,314	-4,500	-6,173	-4,625	-5,950
40%	-4,364	-5,367	-5,290	-4,516	-4,464	-4,516	-2,056	-2,821	-4,500	-7,730	-7,998	-7,192
50%	-5,360	-6,363	-5,290	-4,516	-4,464	-4,516	-2,196	-2,978	-4,500	-8,533	-9,939	-8,985
60%	-6,762	-7,112	-5,290	-5,000	-4,483	-4,516	-2,459	-3,211	-4,500	-9,114	-10,362	-9,393
70%	-7,981	-8,121	-6,412	-5,226	-4,892	-4,924	-2,830	-3,258	-5,000	-9,685	-10,660	-9,537
80%	-8,694	-8,875	-6,827	-5,226	-5,193	-5,000	-3,134	-3,619	-5,000	-10,362	-10,737	-9,645
90%	-9,108	-9,271	-9,744	-5,226	-5,250	-5,000	-3,490	-4,026	-5,000	-10,957	-11,081	-9,750
Long Term												
Full Simulation Period[a]	-5,831	-6,293	-5,701	-3,980	-3,700	-3,296	-1,797	-2,458	-4,201	-7,654	-7,816	-7,561
Water Year Types[b,c]												
Wet (32%)	-7,235	-7,620	-6,463	-2,354	-1,838	-1,308	-915	-1,849	-4,079	-8,689	-10,466	-9,337
Above Normal (16%)	-7,485	-7,177	-6,284	-4,445	-3,955	-3,885	-2,671	-3,116	-4,451	-9,267	-10,749	-9,707
Below Normal (13%)	-5,598	-5,968	-5,472	-5,032	-4,663	-4,610	-2,422	-3,107	-5,000	-10,315	-9,935	-7,991
Dry (24%)	-4,585	-5,809	-5,128	-4,780	-4,914	-4,764	-2,227	-2,899	-4,747	-6,769	-4,459	-5,889
Critical (15%)	-3,291	-3,564	-4,581	-4,699	-4,548	-3,315	-1,470	-1,735	-2,551	-2,703	-2,551	-3,781

Proposed Action 011519 minus Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	723	727	**-110**	**-125**	**-1,327**	168	**-3,943**	**-4,197**	**-1,246**	171	91	241
20%	483	678	72	**-1,694**	**-2,397**	**-1,813**	**-3,565**	**-3,001**	**-2,036**	1,463	**-148**	466
30%	564	815	244	**-1,161**	**-1,696**	**-929**	**-3,338**	**-2,928**	**-1,000**	713	**-483**	271
40%	521	522	581	**-168**	**-964**	**-1,016**	**-3,325**	**-3,063**	**-1,000**	50	**-117**	**-166**
50%	**-198**	**-75**	581	194	**-319**	**-499**	**-2,808**	**-2,944**	**-1,000**	236	**-213**	**-445**
60%	**-1,257**	**-520**	581	**-7**	517	369	**-2,236**	**-2,721**	**-183**	62	**-81**	180
70%	**-2,012**	**-982**	657	**-226**	108	76	**-2,230**	**-2,492**	0	**-12**	24	394
80%	**-2,067**	**-811**	2,516	**-226**	**-193**	0	**-2,110**	**-2,564**	0	**-182**	35	383
90%	**-2,090**	580	**-63**	**-226**	**-250**	0	**-2,102**	**-2,605**	0	68	**-114**	461
Long Term												
Full Simulation Period[a]	**-427**	192	468	**-348**	**-598**	**-359**	**-2,706**	**-2,767**	**-658**	232	**-150**	215
Water Year Types[b,c]												
Wet (32%)	**-1,476**	**-1,096**	314	**-295**	297	493	**-4,053**	**-3,907**	225	34	78	238
Above Normal (16%)	**-1,495**	643	1,450	**-729**	**-96**	256	**-3,865**	**-3,550**	28	**-463**	56	387
Below Normal (13%)	756	736	566	**-652**	**-1,001**	**-555**	**-2,603**	**-2,802**	**-1,593**	**-226**	**-1,016**	**-71**
Dry (24%)	338	1,034	155	**-139**	**-1,271**	**-1,124**	**-1,482**	**-1,963**	**-1,487**	1,067	**-270**	244
Critical (15%)	641	593	167	**-120**	**-1,587**	**-1,412**	**-668**	**-755**	**-1,079**	443	129	195

a Based on the 82-year simulation period.

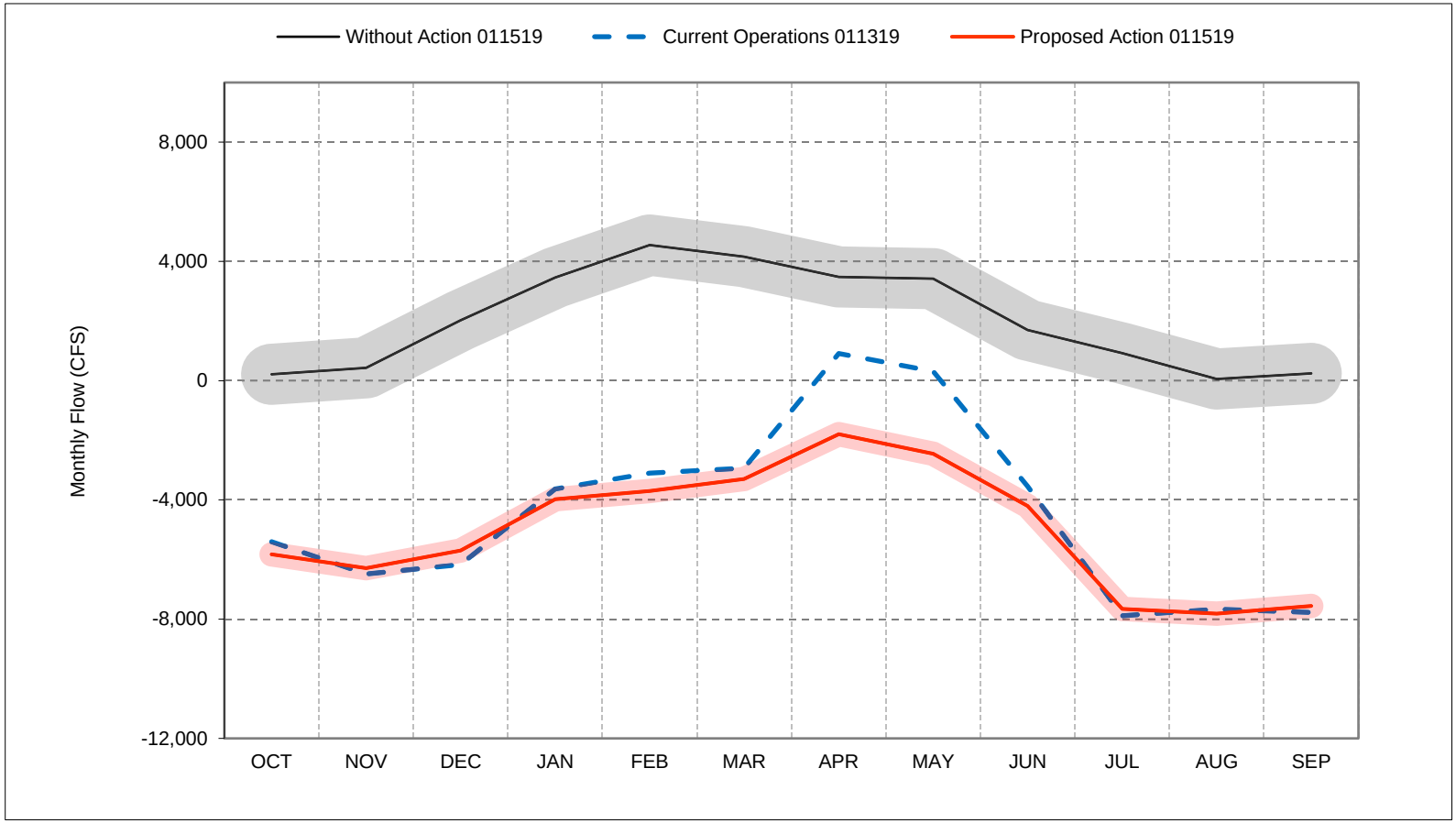
b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

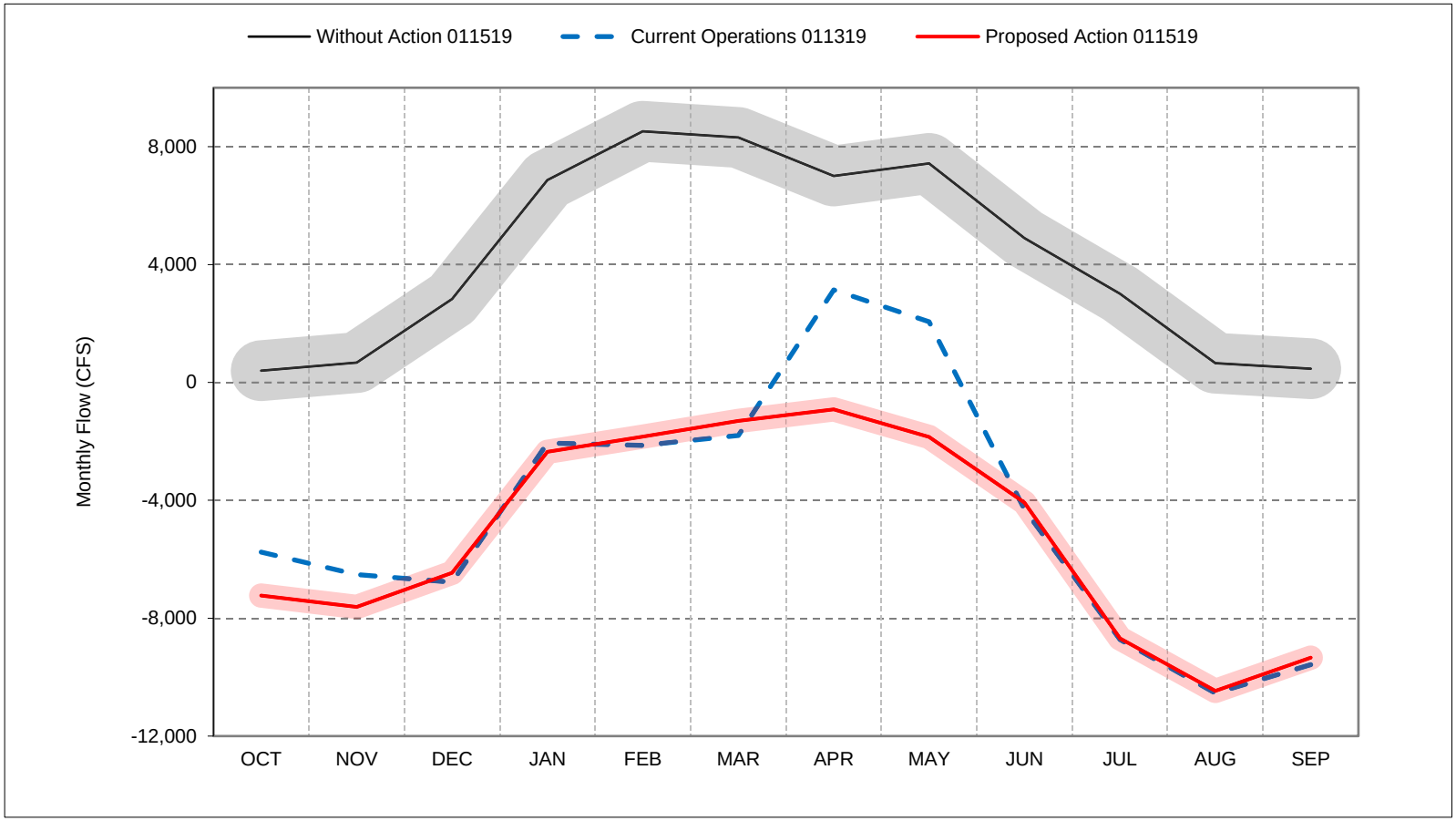
e These are draft results meant for qualitative analysis and are subject to revision.

Figure 40-1. Old and Middle River Flow, Long-Term Average Flow



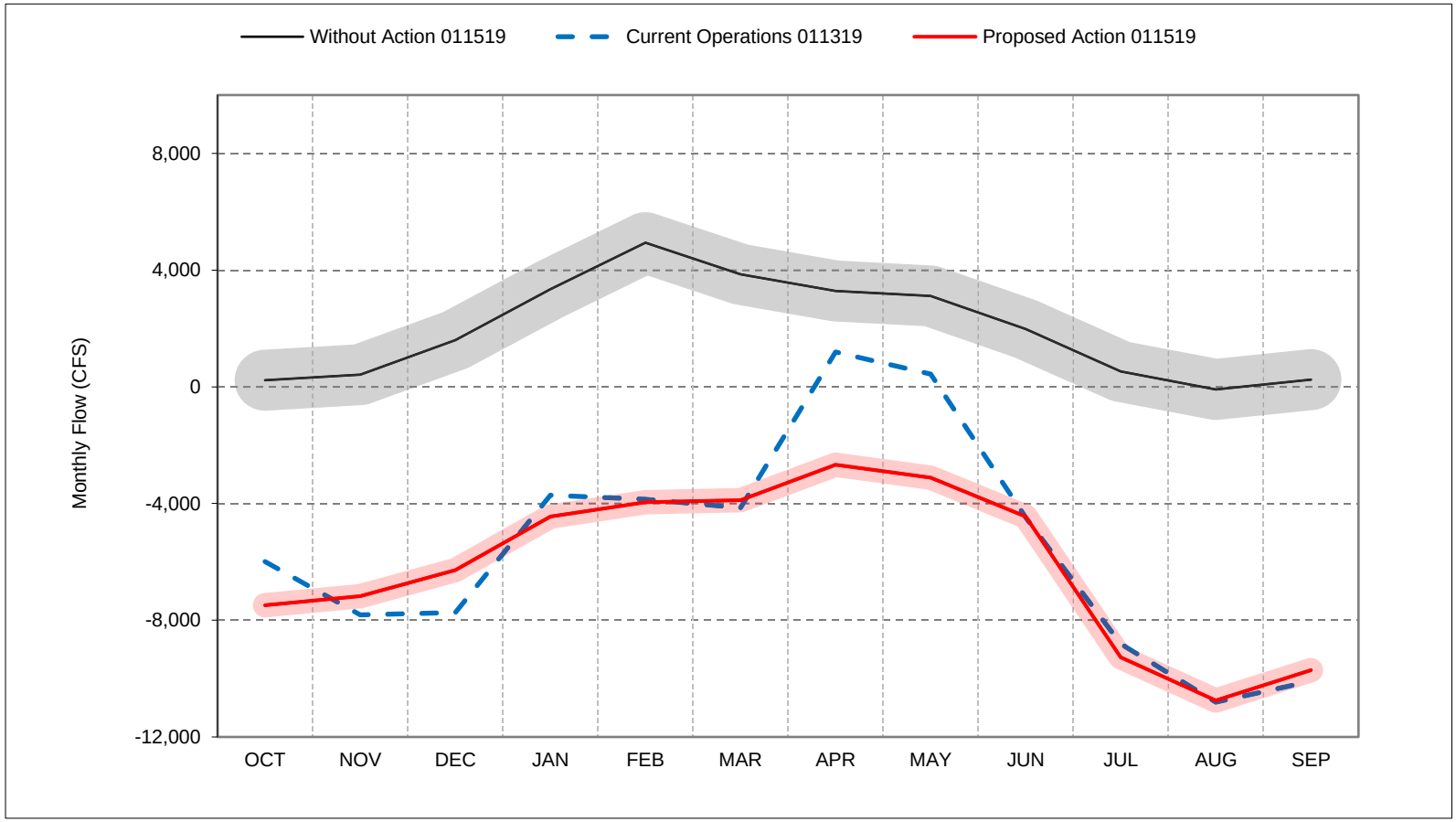
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 40-2. Old and Middle River Flow, Wet Year Average Flow



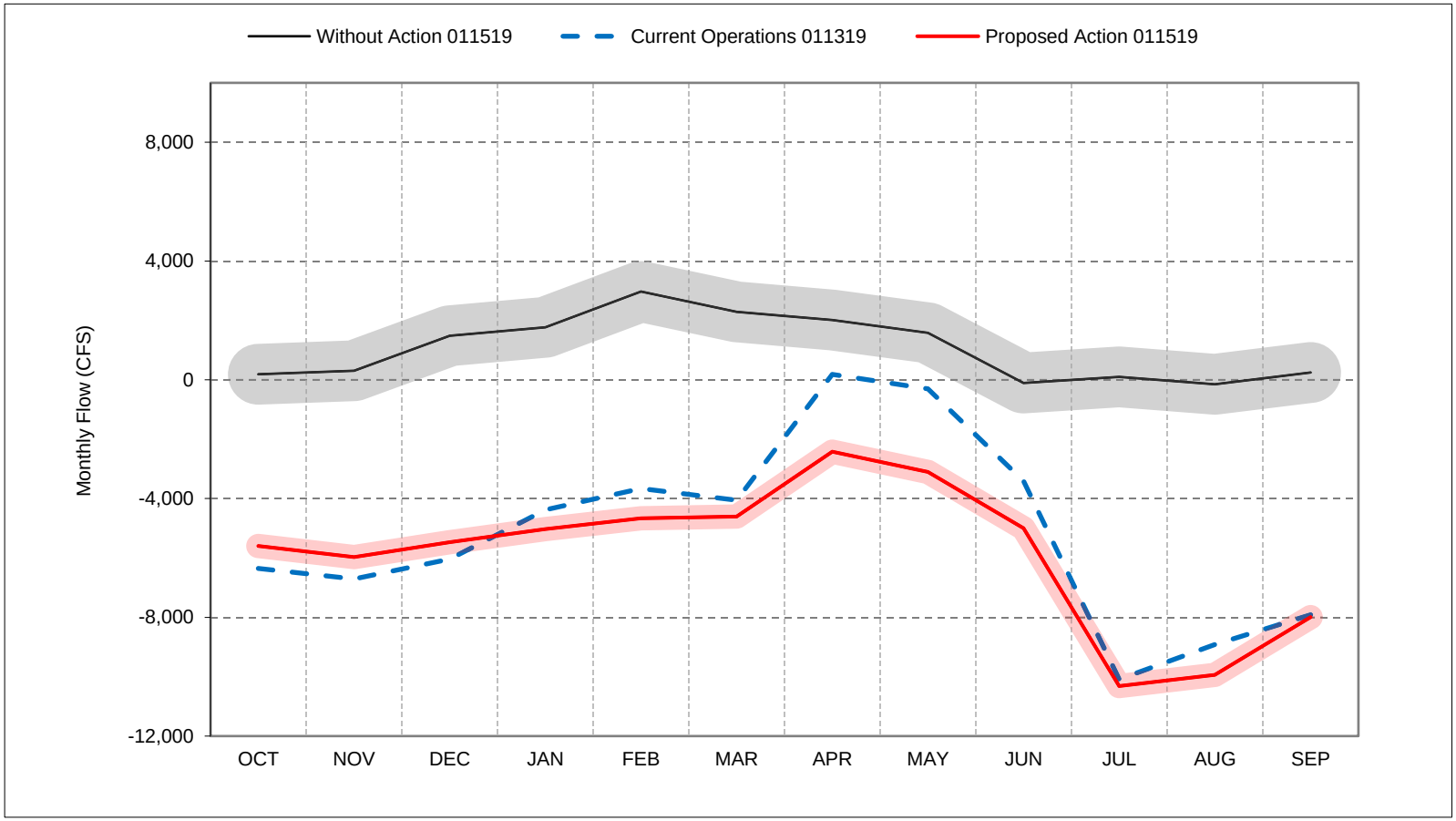
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 40-3. Old and Middle River Flow, Above Normal Year Average Flow



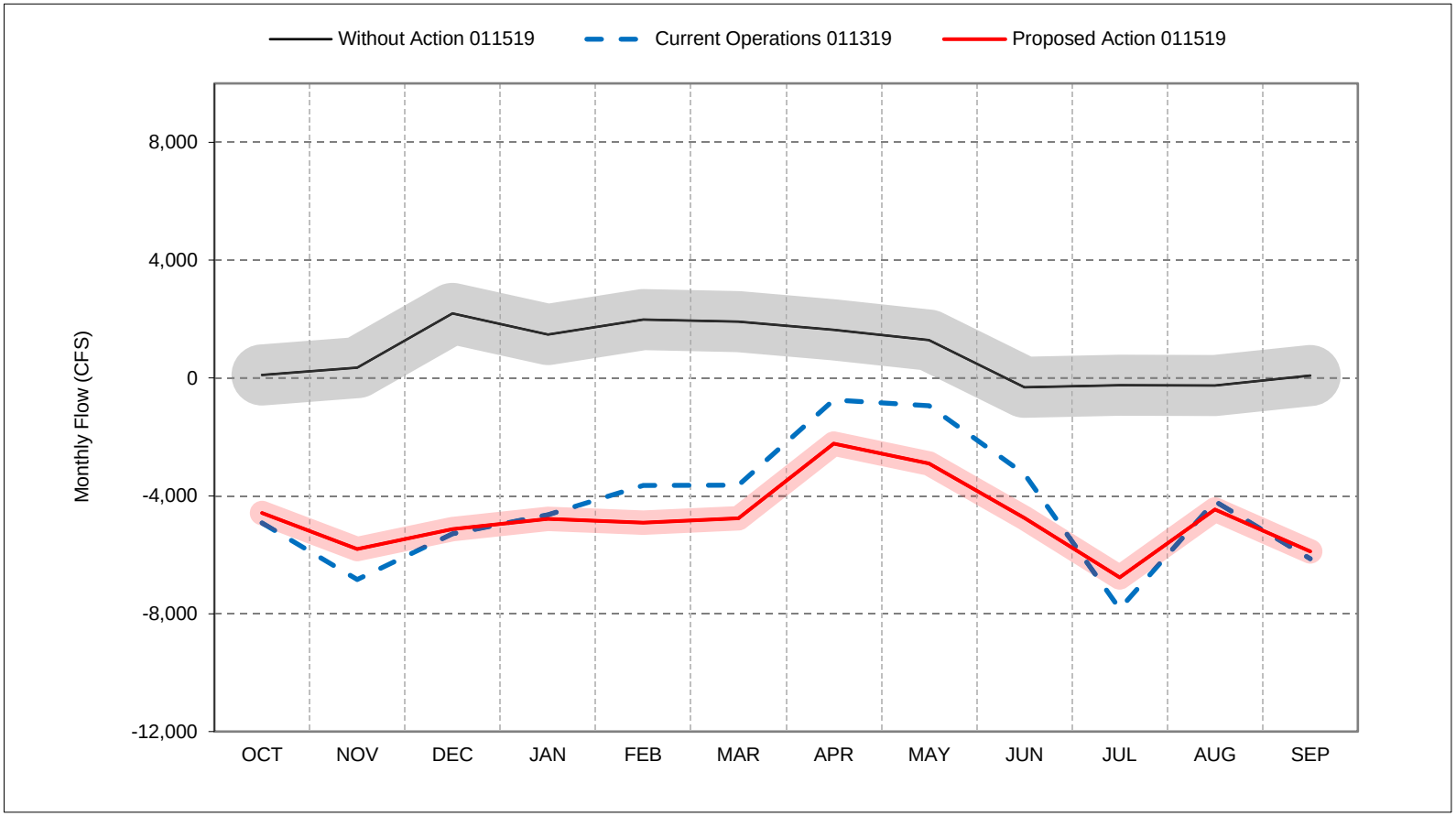
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 40-4. Old and Middle River Flow, Below Normal Year Average Flow



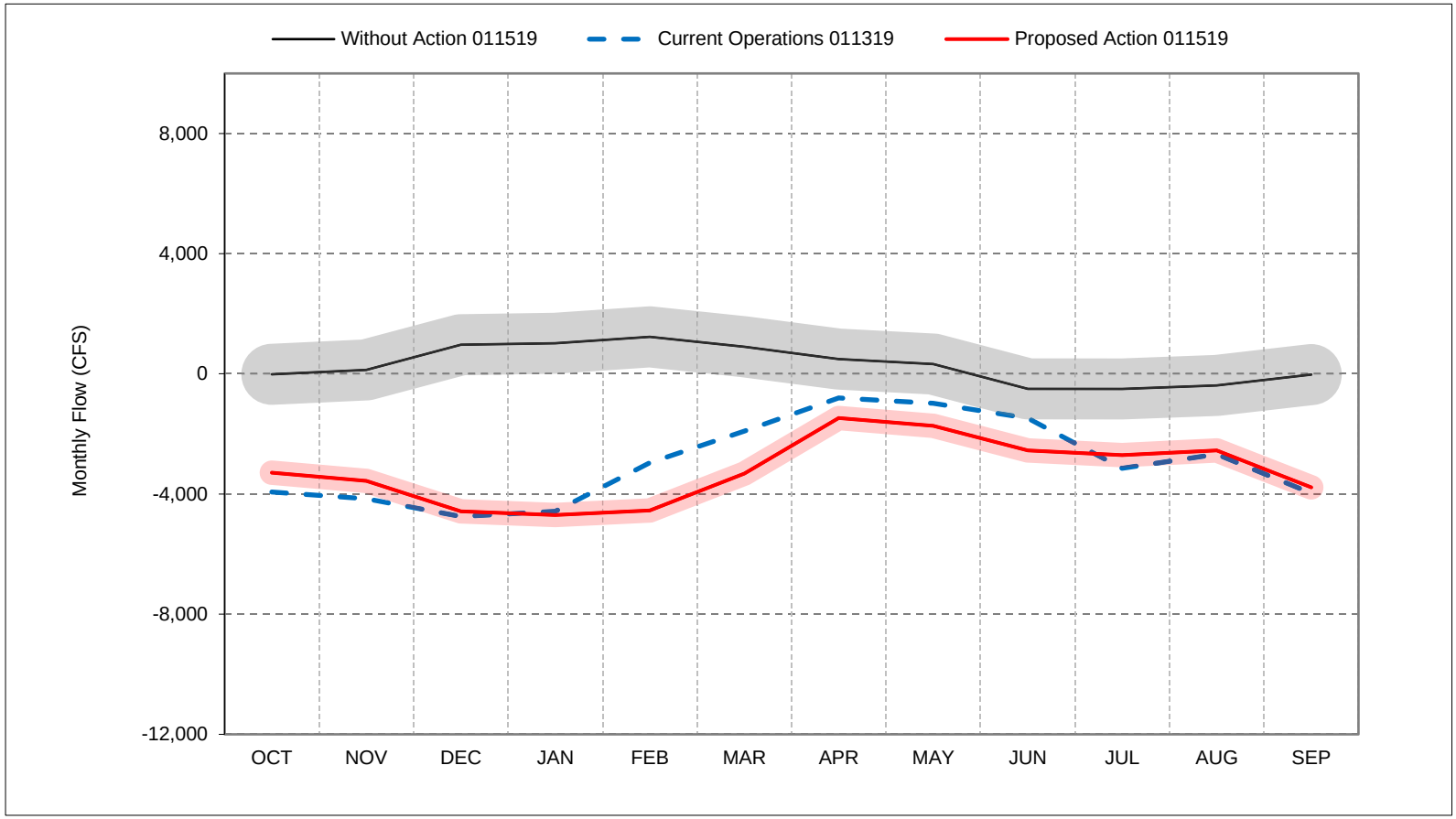
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 40-5. Old and Middle River Flow, Dry Year Average Flow



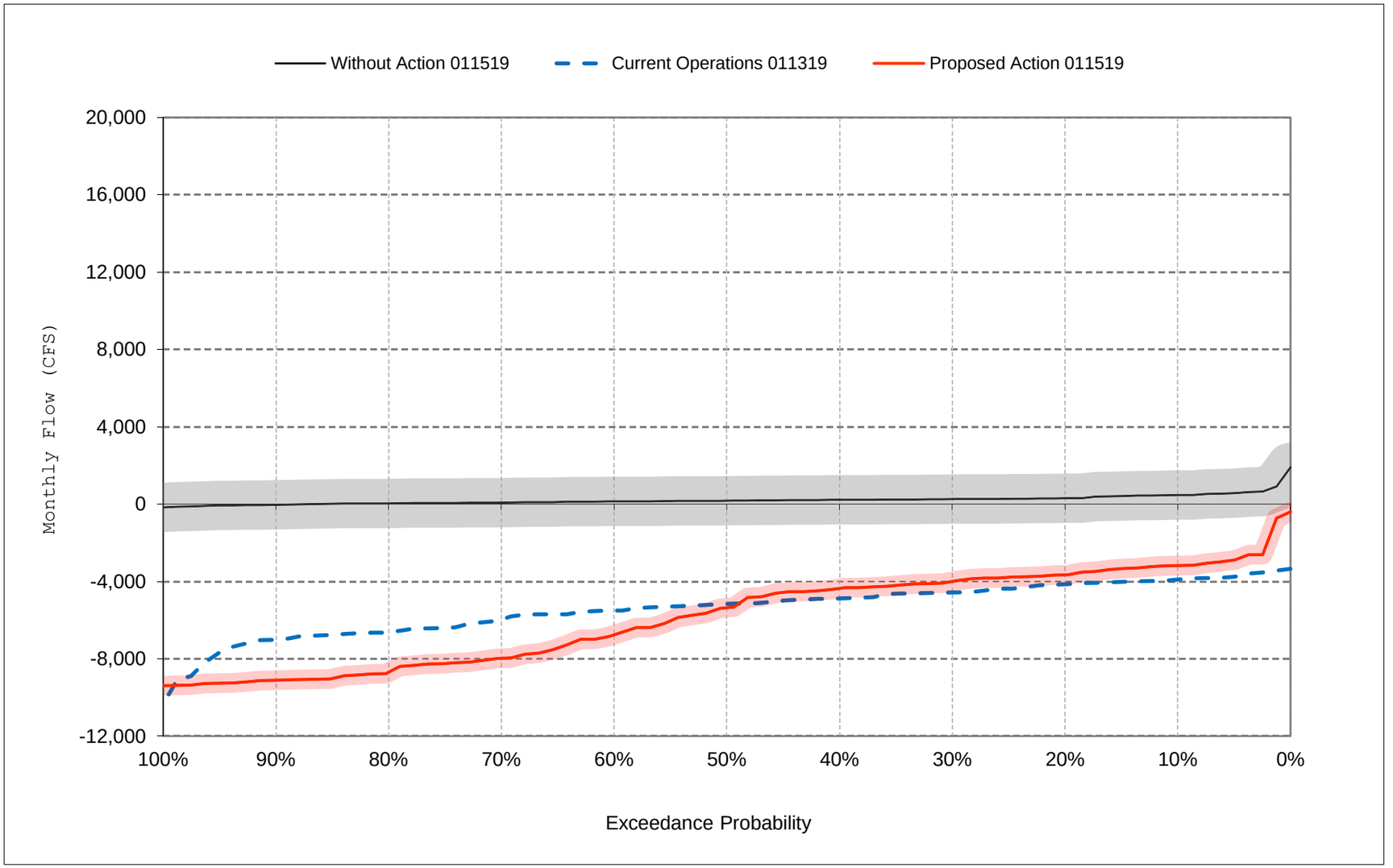
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 40-6. Old and Middle River Flow, Critical Year Average Flow



*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

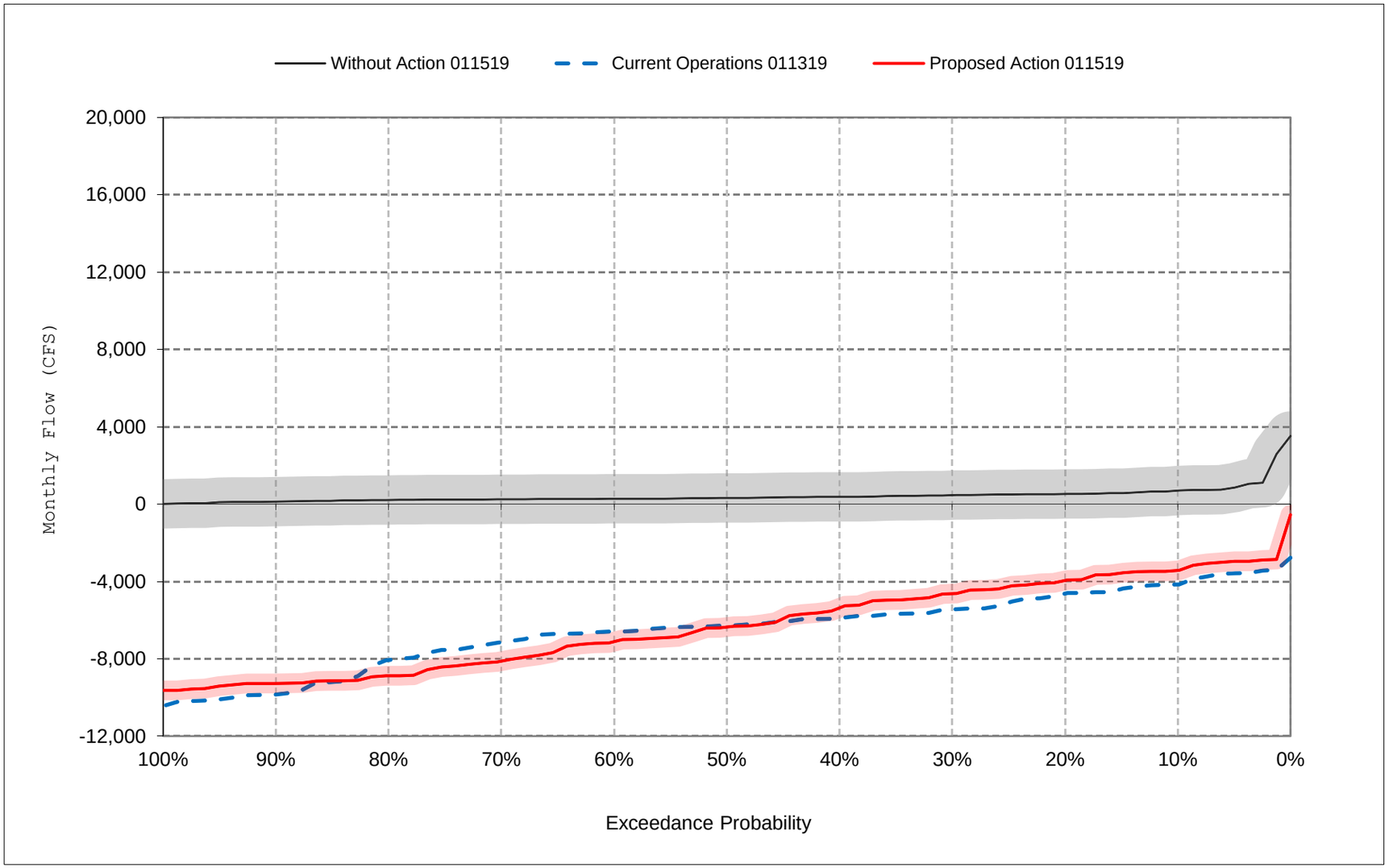
Figure 40-7. Old and Middle River Flow, October



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

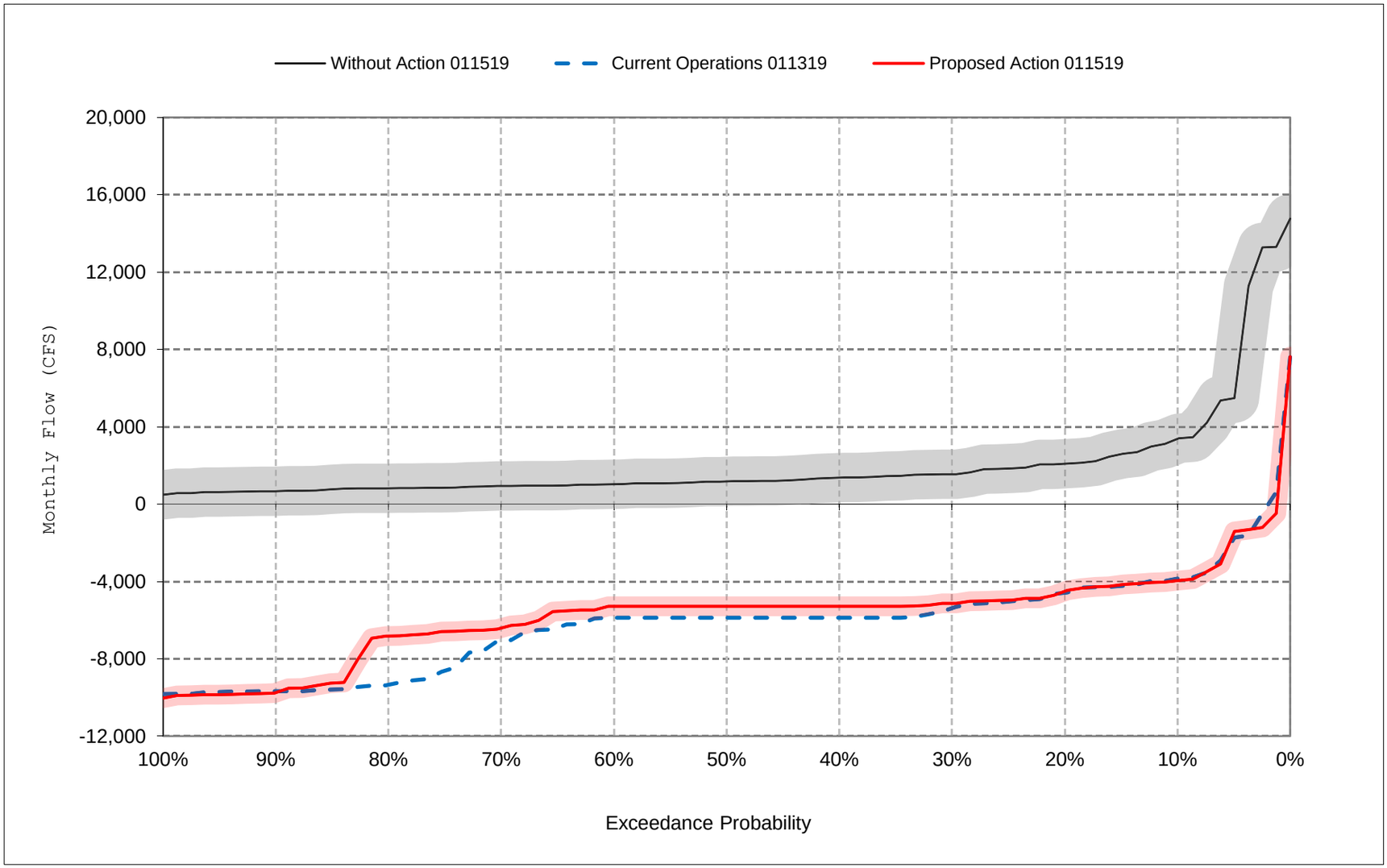
Figure 40-8. Old and Middle River Flow, November



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

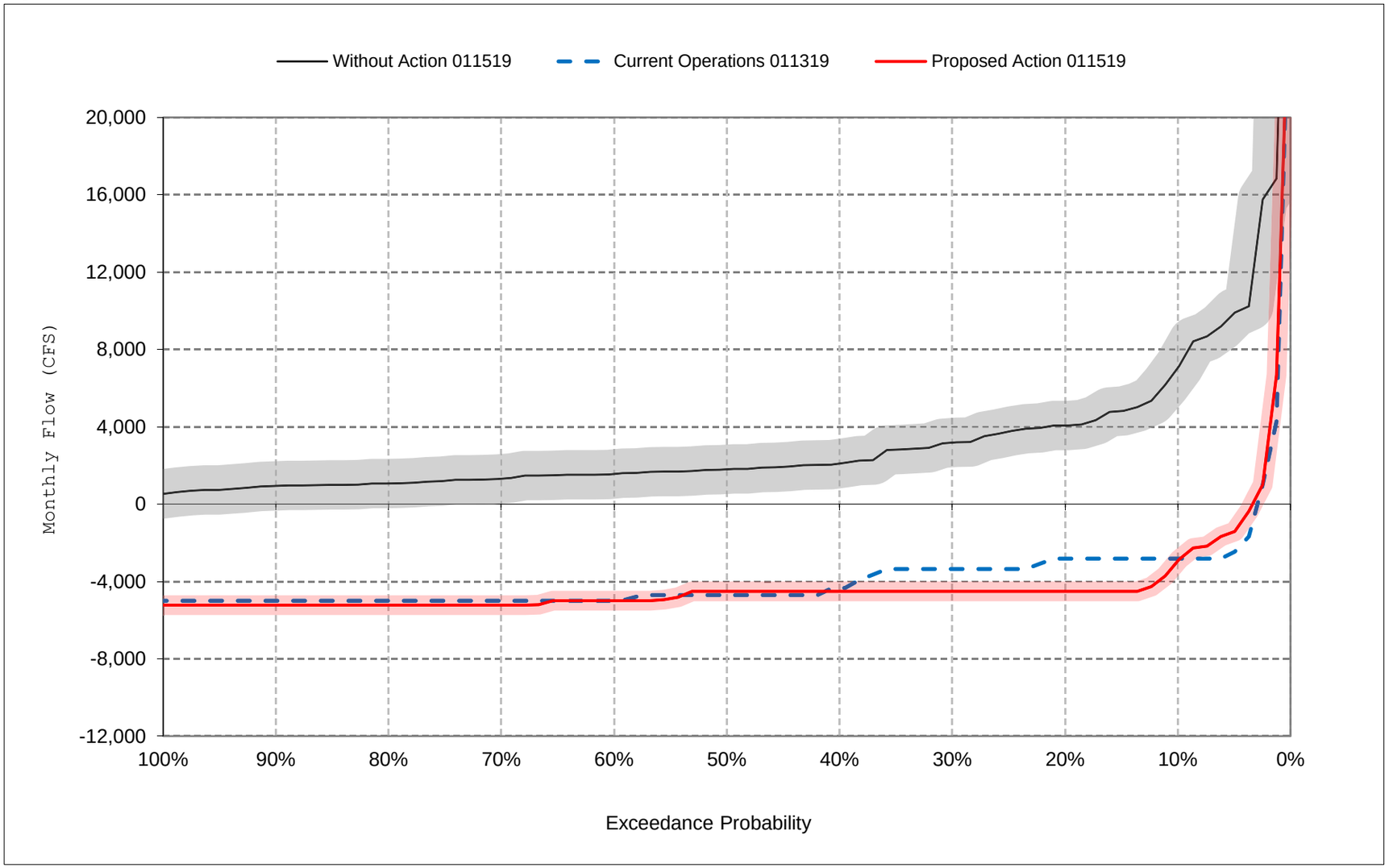
Figure 40-9. Old and Middle River Flow, December



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

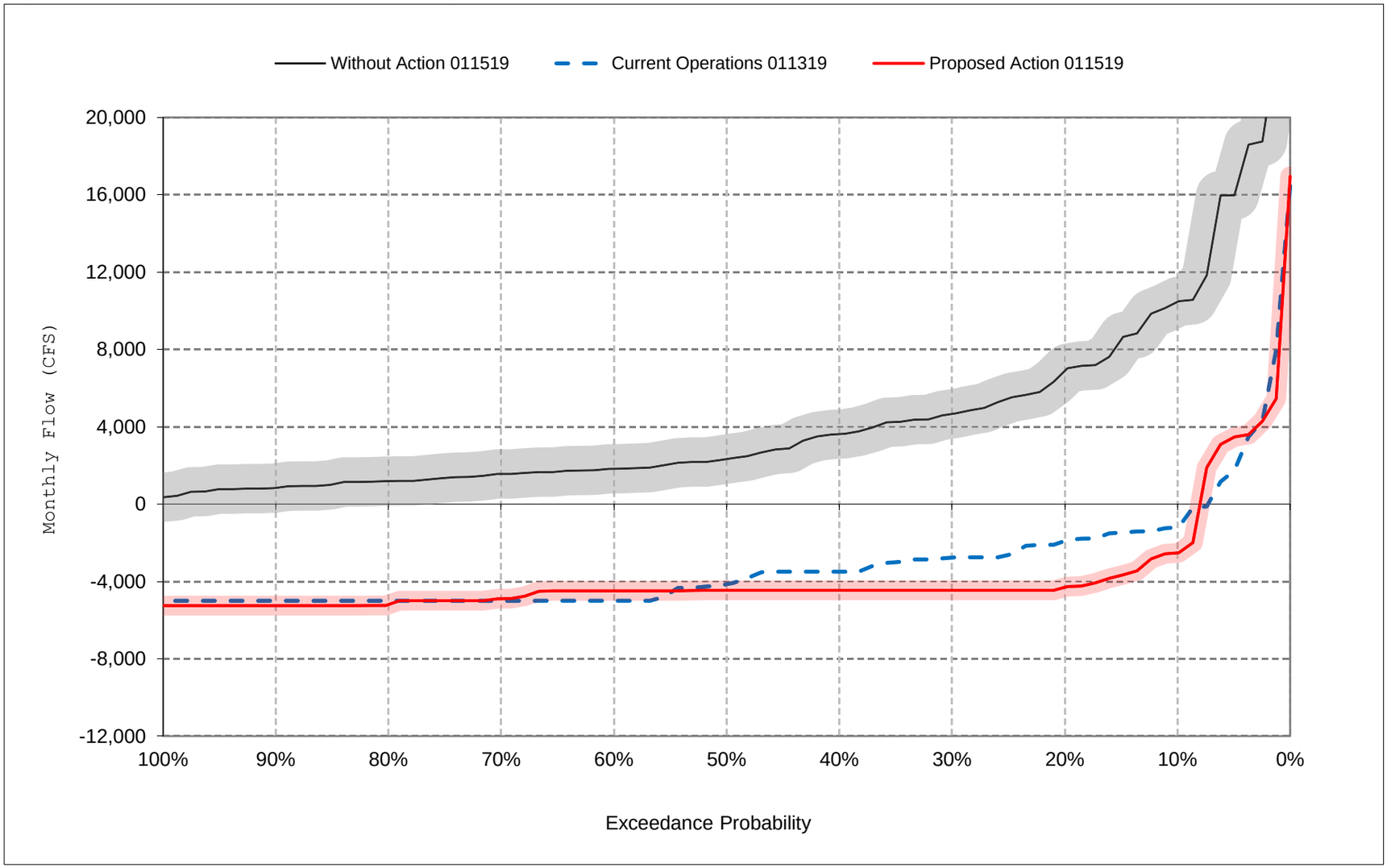
Figure 40-10. Old and Middle River Flow, January



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

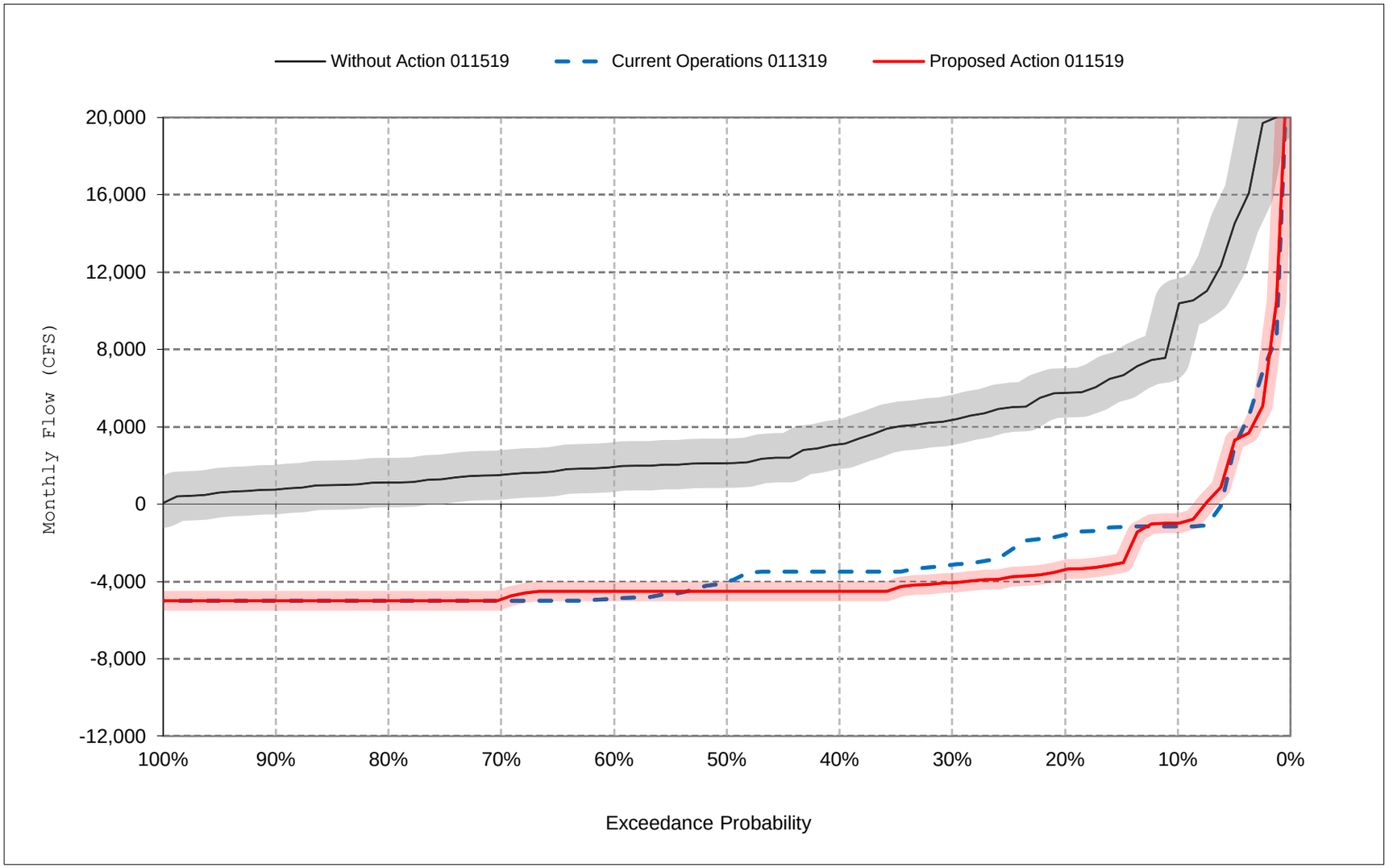
Figure 40-11. Old and Middle River Flow, February



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

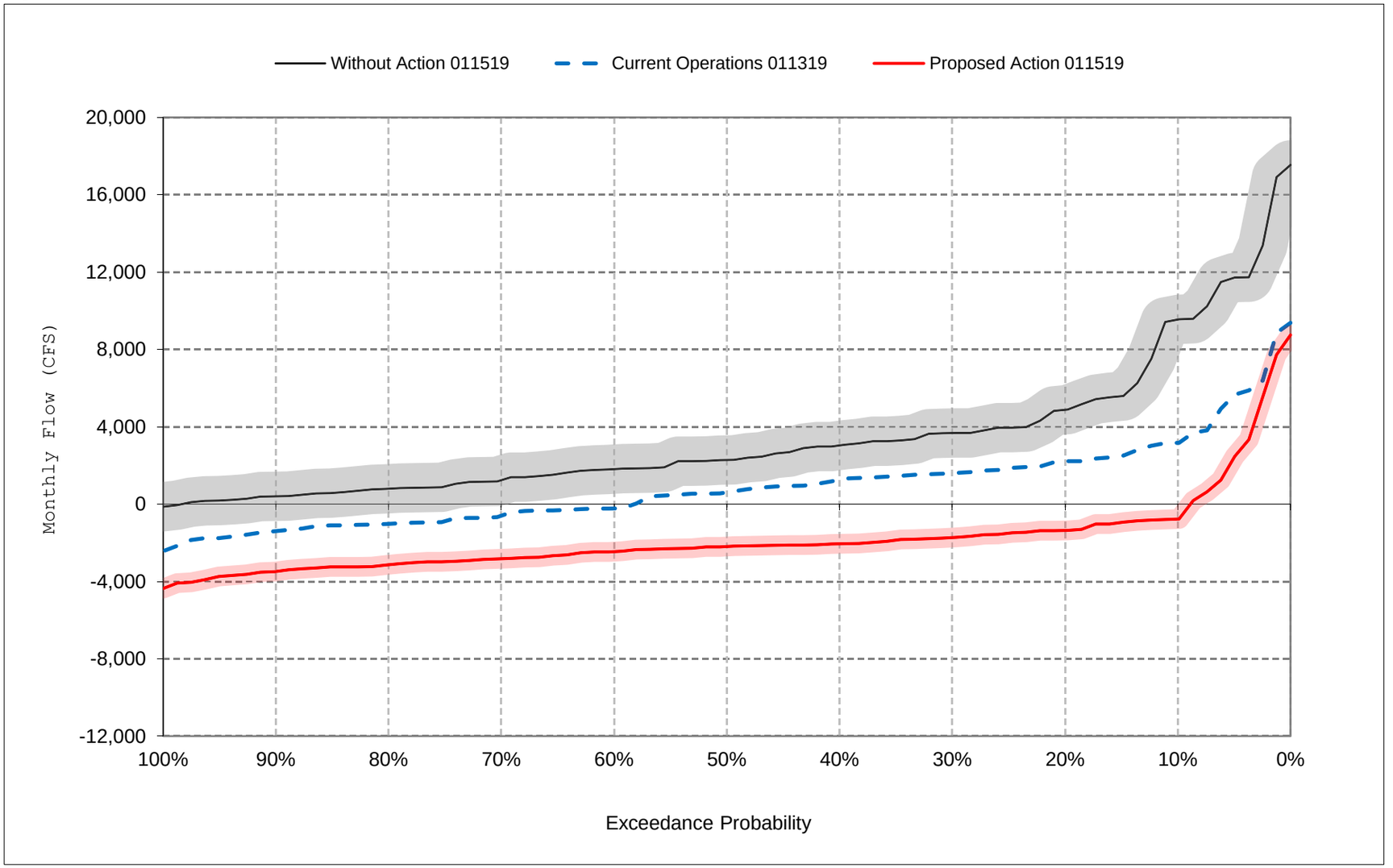
Figure 40-12. Old and Middle River Flow, March



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

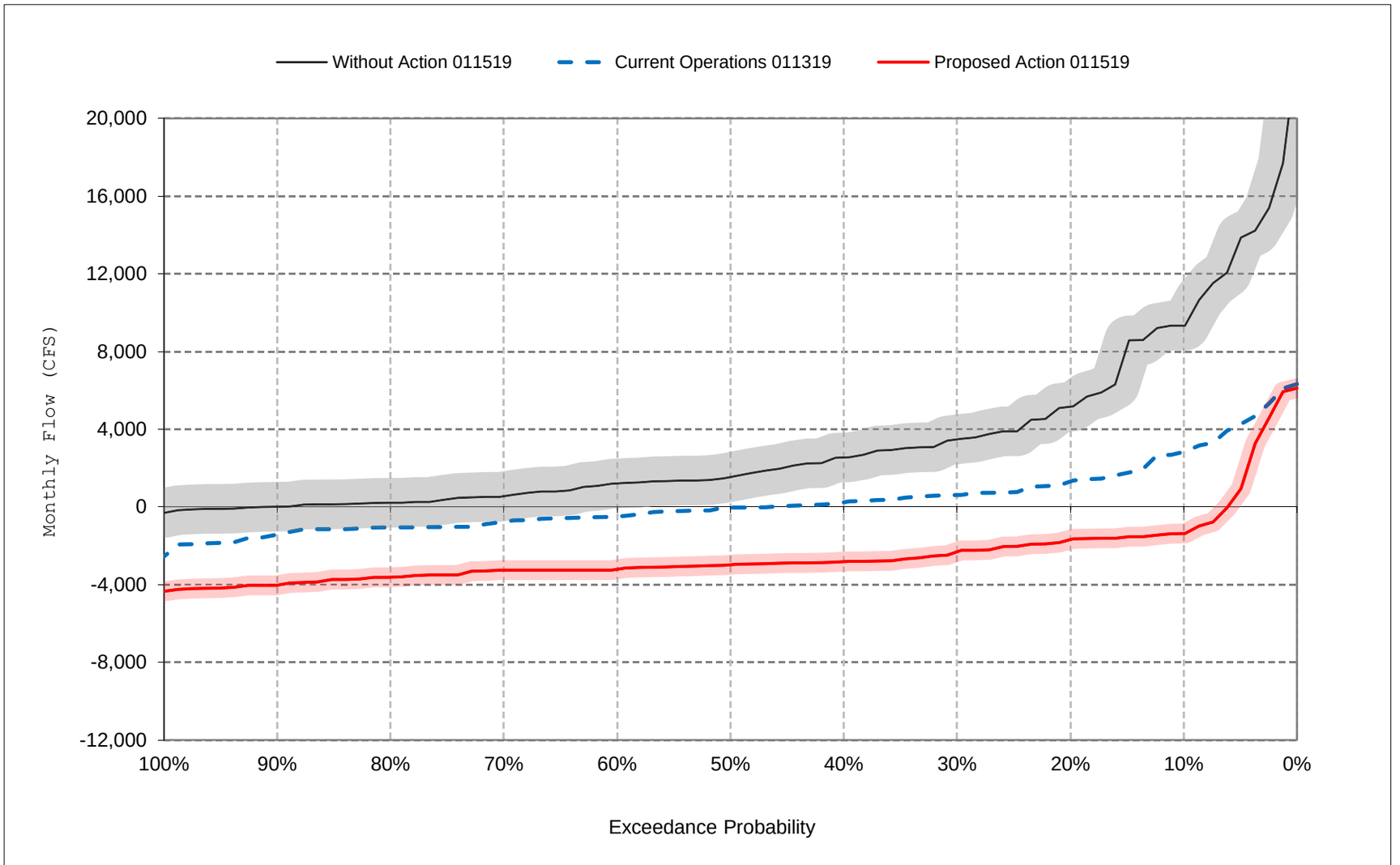
Figure 40-13. Old and Middle River Flow, April



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

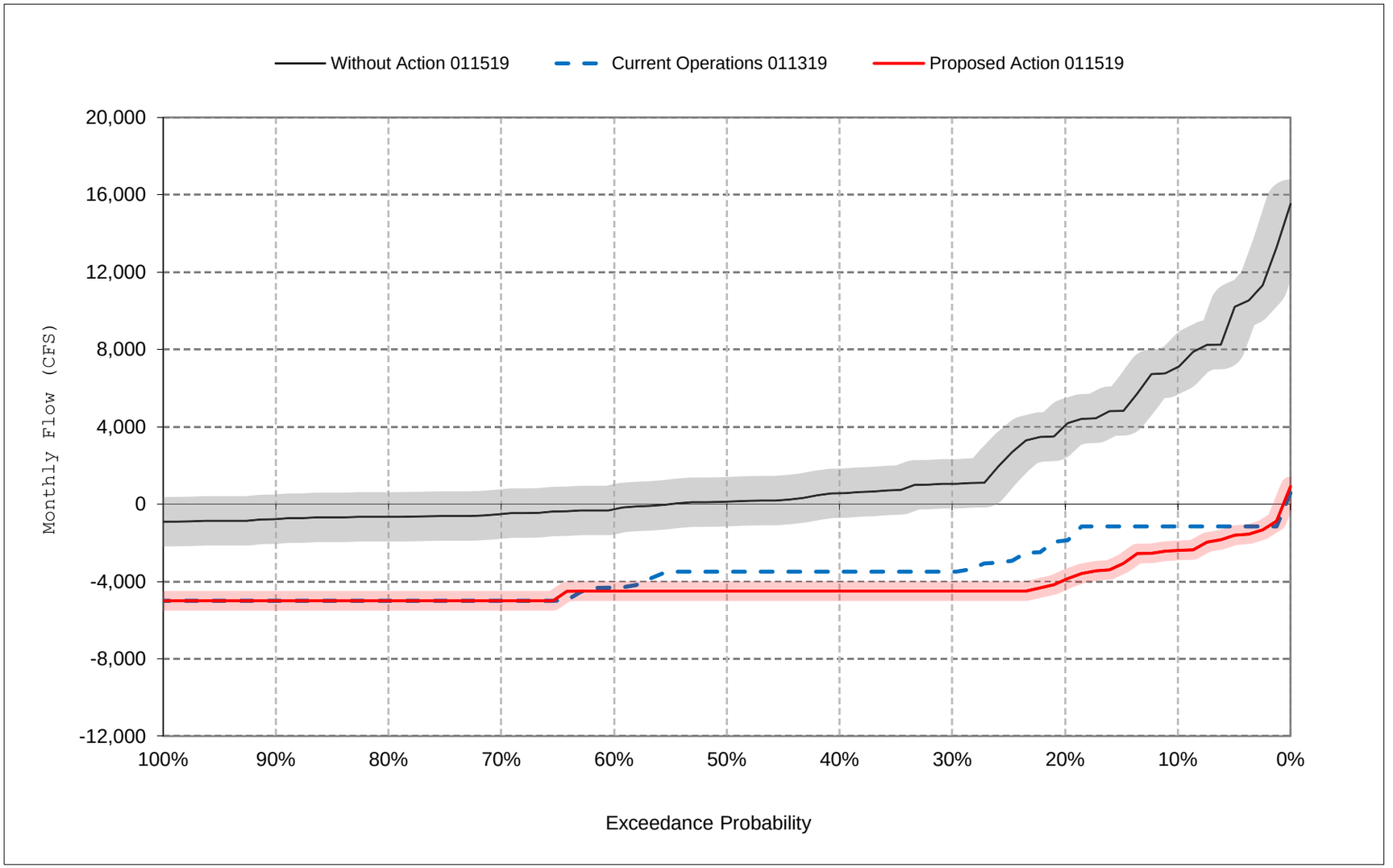
Figure 40-14. Old and Middle River Flow, May



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

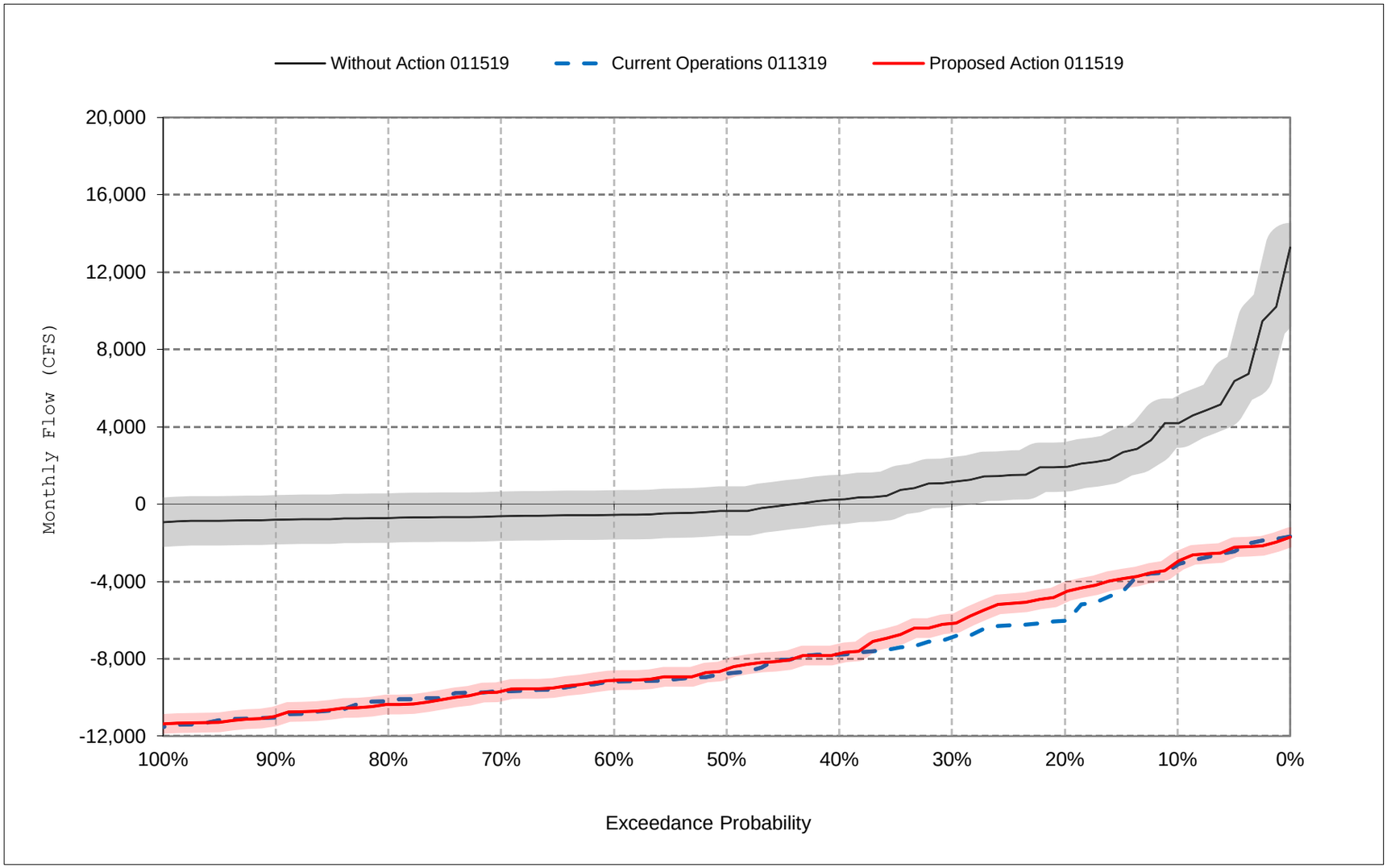
Figure 40-15. Old and Middle River Flow, June



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

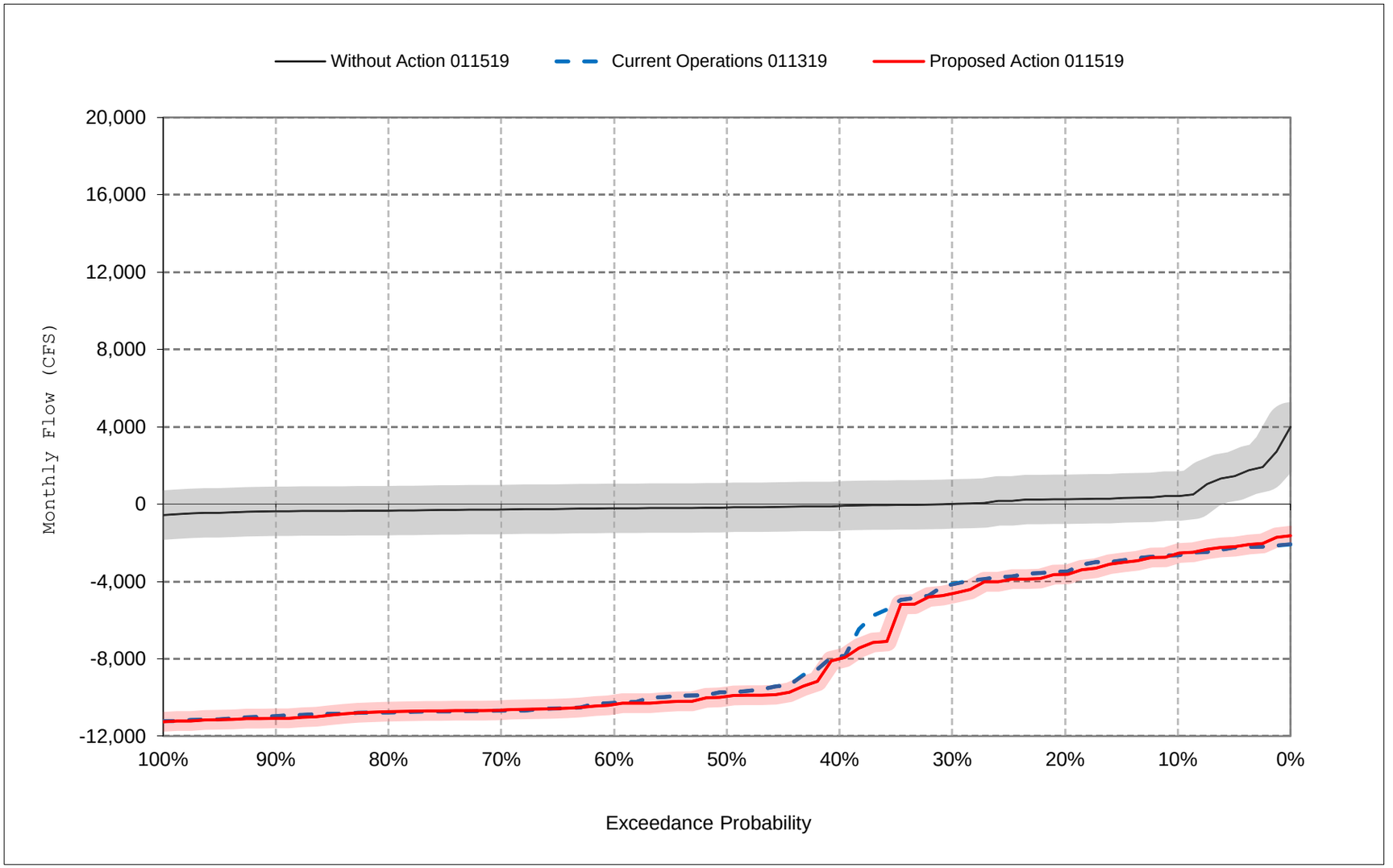
Figure 40-16. Old and Middle River Flow, July



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

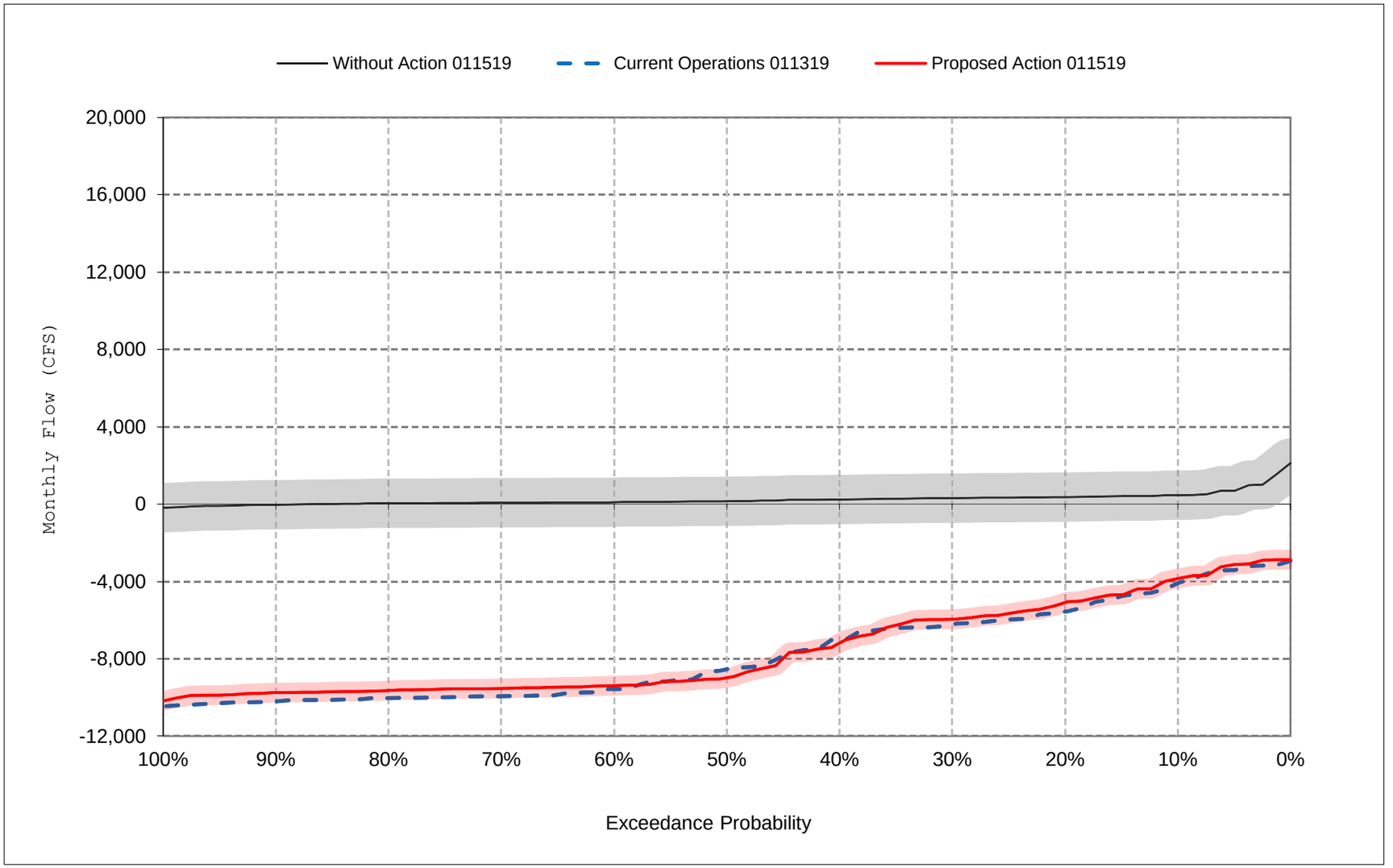
Figure 40-17. Old and Middle River Flow, August



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Figure 40-18. Old and Middle River Flow, September



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Table 41-1. Delta Outflow, Monthly Outflow

Without Action 011519

Statistic	Monthly Outflow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	13,912	28,778	78,391	128,005	143,963	136,693	97,161	73,536	47,229	15,132	7,987	12,874
20%	12,308	21,173	48,866	98,781	111,574	92,375	70,398	50,669	26,601	9,844	6,639	11,580
30%	10,691	18,533	33,711	74,974	88,100	75,517	57,703	39,467	16,058	8,291	5,981	10,068
40%	9,682	16,086	27,236	47,191	72,728	61,185	45,943	33,604	12,141	7,037	5,279	9,287
50%	8,382	14,252	23,373	34,724	56,025	54,490	40,796	27,507	7,072	6,379	4,925	8,710
60%	7,690	13,047	21,274	30,926	39,246	41,914	31,593	20,026	4,710	5,575	4,360	7,993
70%	6,309	11,141	16,443	24,052	32,128	36,068	29,842	14,932	4,272	5,068	4,098	7,066
80%	5,708	9,385	13,125	19,175	27,837	26,568	22,344	9,919	3,054	4,404	3,695	6,369
90%	4,405	7,133	10,796	17,903	20,734	19,715	16,994	6,286	2,488	3,801	3,462	4,795
Long Term												
Full Simulation Period[a]	9,365	17,351	33,865	58,247	71,371	66,750	49,987	33,515	17,542	8,637	5,474	8,984
Water Year Types[b,c]												
Wet (32%)	11,718	20,895	38,113	105,140	120,594	107,956	80,773	60,659	39,686	14,351	7,475	11,954
Above Normal (16%)	10,071	17,245	32,652	68,668	86,220	84,115	58,791	35,519	14,108	7,764	4,922	9,839
Below Normal (13%)	11,195	15,096	28,948	30,113	49,827	43,276	31,018	22,129	8,233	6,663	4,068	8,775
Dry (24%)	7,664	18,926	40,797	28,132	38,257	41,882	35,048	18,619	4,493	5,007	4,243	7,338
Critical (15%)	4,661	9,229	18,931	21,341	23,576	21,621	16,032	7,798	3,566	5,061	5,079	4,562

Current Operations 011319

Statistic	Monthly Outflow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	10,145	15,772	68,184	104,336	138,819	88,087	72,968	46,571	21,259	12,473	4,225	19,516
20%	9,688	14,688	34,582	70,505	88,193	67,845	51,982	30,398	10,131	11,453	4,012	19,313
30%	9,375	13,956	16,201	51,309	68,795	47,758	32,889	19,349	8,976	9,370	4,000	15,362
40%	6,969	12,159	12,260	29,208	51,379	35,067	26,974	16,153	7,676	8,000	4,000	10,938
50%	5,374	9,844	10,005	20,041	36,843	26,853	22,260	13,850	7,243	8,000	4,000	3,712
60%	4,000	6,311	5,880	16,488	25,051	19,793	16,421	11,720	7,100	6,500	4,000	3,000
70%	4,000	4,500	4,950	12,714	18,539	16,589	13,863	9,663	6,937	5,000	3,961	3,000
80%	4,000	4,500	4,511	9,226	15,146	12,431	11,165	8,183	6,044	5,000	3,726	3,000
90%	3,000	3,500	4,500	7,964	11,043	10,764	9,540	7,038	5,391	4,000	3,500	3,000
Long Term												
Full Simulation Period[a]	6,653	11,625	23,116	44,275	56,959	43,806	32,053	20,967	10,940	8,052	4,054	9,423
Water Year Types[b,c]												
Wet (32%)	9,943	17,965	27,333	90,345	102,661	81,638	57,700	39,294	19,071	10,682	4,469	19,040
Above Normal (16%)	7,332	12,903	17,298	49,558	67,693	52,646	34,414	19,816	7,961	11,126	4,035	11,118
Below Normal (13%)	6,260	6,705	19,835	17,008	37,036	17,592	18,032	13,213	7,486	8,099	4,082	3,307
Dry (24%)	4,343	9,898	31,709	15,608	26,159	22,368	18,215	10,819	7,276	5,038	3,832	3,037
Critical (15%)	3,000	3,894	8,967	11,509	15,905	12,017	9,843	6,527	5,825	4,000	3,517	3,000

Current Operations 011319 minus Without Action 011519

Statistic	Monthly Outflow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	**-3,768**	**-13,006**	**-10,207**	**-23,669**	**-5,144**	**-48,606**	**-24,193**	**-26,964**	**-25,970**	**-2,659**	**-3,762**	6,642
20%	**-2,620**	**-6,486**	**-14,284**	**-28,276**	**-23,381**	**-24,530**	**-18,416**	**-20,271**	**-16,470**	1,609	**-2,627**	7,732
30%	**-1,316**	**-4,577**	**-17,510**	**-23,665**	**-19,305**	**-27,759**	**-24,814**	**-20,119**	**-7,081**	1,079	**-1,981**	5,295
40%	**-2,714**	**-3,928**	**-14,976**	**-17,983**	**-21,349**	**-26,118**	**-18,969**	**-17,452**	**-4,465**	963	**-1,279**	1,651
50%	**-3,008**	**-4,408**	**-13,368**	**-14,684**	**-19,182**	**-27,638**	**-18,537**	**-13,656**	171	1,621	**-925**	**-4,998**
60%	**-3,690**	**-6,736**	**-15,394**	**-14,438**	**-14,194**	**-22,121**	**-15,172**	**-8,306**	2,390	925	**-360**	**-4,993**
70%	**-2,309**	**-6,641**	**-11,493**	**-11,338**	**-13,590**	**-19,479**	**-15,979**	**-5,269**	2,665	**-68**	**-136**	**-4,066**
80%	**-1,708**	**-4,885**	**-8,614**	**-9,950**	**-12,691**	**-14,137**	**-11,179**	**-1,736**	2,991	596	31	**-3,369**
90%	**-1,405**	**-3,633**	**-6,296**	**-9,939**	**-9,691**	**-8,951**	**-7,454**	752	2,903	199	38	**-1,795**
Long Term												
Full Simulation Period[a]	**-2,712**	**-5,726**	**-10,749**	**-13,972**	**-14,413**	**-22,944**	**-17,934**	**-12,548**	**-6,602**	**-585**	**-1,421**	438
Water Year Types[b,c]												
Wet (32%)	**-1,775**	**-2,930**	**-10,780**	**-14,795**	**-17,932**	**-26,317**	**-23,073**	**-21,366**	**-20,615**	**-3,669**	**-3,006**	7,086
Above Normal (16%)	**-2,739**	**-4,342**	**-15,354**	**-19,110**	**-18,528**	**-31,469**	**-24,377**	**-15,703**	**-6,148**	3,361	**-887**	1,279
Below Normal (13%)	**-4,935**	**-8,392**	**-9,112**	**-13,104**	**-12,792**	**-25,684**	**-12,986**	**-8,916**	**-747**	1,435	14	**-5,468**
Dry (24%)	**-3,321**	**-9,029**	**-9,088**	**-12,524**	**-12,098**	**-19,514**	**-16,833**	**-7,800**	2,782	31	**-411**	**-4,301**
Critical (15%)	**-1,661**	**-5,336**	**-9,964**	**-9,832**	**-7,671**	**-9,604**	**-6,189**	**-1,271**	2,259	**-1,061**	**-1,562**	**-1,562**

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 41-2. Delta Outflow, Monthly Outflow

Without Action 011519

Statistic	Monthly Outflow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	13,912	28,778	78,391	128,005	143,963	136,693	97,161	73,536	47,229	15,132	7,987	12,874
20%	12,308	21,173	48,866	98,781	111,574	92,375	70,398	50,669	26,601	9,844	6,639	11,580
30%	10,691	18,533	33,711	74,974	88,100	75,517	57,703	39,467	16,058	8,291	5,981	10,068
40%	9,682	16,086	27,236	47,191	72,728	61,185	45,943	33,604	12,141	7,037	5,279	9,287
50%	8,382	14,252	23,373	34,724	56,025	54,490	40,796	27,507	7,072	6,379	4,925	8,710
60%	7,690	13,047	21,274	30,926	39,246	41,914	31,593	20,026	4,710	5,575	4,360	7,993
70%	6,309	11,141	16,443	24,052	32,128	36,068	29,842	14,932	4,272	5,068	4,098	7,066
80%	5,708	9,385	13,125	19,175	27,837	26,568	22,344	9,919	3,054	4,404	3,695	6,369
90%	4,405	7,133	10,796	17,903	20,734	19,715	16,994	6,286	2,488	3,801	3,462	4,795
Long Term												
Full Simulation Period[a]	9,365	17,351	33,865	58,247	71,371	66,750	49,987	33,515	17,542	8,637	5,474	8,984
Water Year Types[b,c]												
Wet (32%)	11,718	20,895	38,113	105,140	120,594	107,956	80,773	60,659	39,686	14,351	7,475	11,954
Above Normal (16%)	10,071	17,245	32,652	68,668	86,220	84,115	58,791	35,519	14,108	7,764	4,922	9,839
Below Normal (13%)	11,195	15,096	28,948	30,113	49,827	43,276	31,018	22,129	8,233	6,663	4,068	8,775
Dry (24%)	7,664	18,926	40,797	28,132	38,257	41,882	35,048	18,619	4,493	5,007	4,243	7,338
Critical (15%)	4,661	9,229	18,931	21,341	23,576	21,621	16,032	7,798	3,566	5,061	5,079	4,562

Proposed Action 011519

Statistic	Monthly Outflow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	7,824	17,900	71,116	106,223	140,258	92,678	67,790	41,291	21,795	11,775	4,316	5,458
20%	4,692	8,678	37,251	73,144	89,151	68,282	47,454	27,083	10,857	10,922	4,000	4,164
30%	4,152	6,120	20,706	51,064	68,288	46,609	29,065	15,948	9,617	9,435	4,000	4,075
40%	4,000	4,892	13,246	29,261	55,133	33,861	22,998	12,150	8,417	8,000	4,000	3,996
50%	4,000	4,644	10,760	21,453	37,061	26,295	17,899	11,152	7,760	8,000	4,000	3,855
60%	4,000	4,500	6,976	16,196	24,552	20,895	13,567	10,233	7,338	6,500	4,000	3,000
70%	4,000	4,500	5,509	12,915	17,723	15,688	11,381	8,944	7,100	5,000	3,789	3,000
80%	4,000	4,500	4,918	9,107	13,995	12,199	9,673	7,921	7,100	5,000	3,514	3,000
90%	3,000	3,500	4,500	7,818	10,541	9,271	8,953	6,804	5,717	4,000	3,500	3,000
Long Term												
Full Simulation Period[a]	5,079	9,103	25,249	44,985	57,425	44,256	29,104	18,600	11,420	7,904	4,010	4,123
Water Year Types[b,c]												
Wet (32%)	6,358	12,022	31,810	92,116	103,918	82,647	53,254	35,255	19,822	10,416	4,471	5,743
Above Normal (16%)	5,350	9,275	20,373	50,231	69,739	54,821	30,246	16,659	8,801	10,620	4,025	4,049
Below Normal (13%)	5,949	6,237	20,351	17,747	39,393	18,100	15,435	11,403	7,829	8,125	4,137	3,474
Dry (24%)	4,007	9,928	32,352	15,515	24,766	21,687	16,439	9,699	7,540	5,094	3,651	3,094
Critical (15%)	3,000	3,845	8,967	11,268	14,309	11,218	9,181	6,051	5,809	4,000	3,477	3,000

Proposed Action 011519 minus Without Action 011519

Statistic	Monthly Outflow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	**-6,088**	**-10,878**	**-7,275**	**-21,782**	**-3,705**	**-44,015**	**-29,371**	**-32,245**	**-25,434**	**-3,357**	**-3,671**	**-7,416**
20%	**-7,616**	**-12,495**	**-11,615**	**-25,638**	**-22,423**	**-24,093**	**-22,944**	**-23,586**	**-15,744**	1,077	**-2,639**	**-7,416**
30%	**-6,540**	**-12,413**	**-13,005**	**-23,910**	**-19,811**	**-28,908**	**-28,638**	**-23,519**	**-6,441**	1,144	**-1,981**	**-5,993**
40%	**-5,682**	**-11,195**	**-13,990**	**-17,930**	**-17,596**	**-27,324**	**-22,945**	**-21,454**	**-3,724**	963	**-1,279**	**-5,291**
50%	**-4,382**	**-9,607**	**-12,613**	**-13,271**	**-18,964**	**-28,196**	**-22,897**	**-16,355**	688	1,621	**-925**	**-4,856**
60%	**-3,690**	**-8,547**	**-14,298**	**-14,730**	**-14,694**	**-21,019**	**-18,026**	**-9,793**	2,627	925	**-360**	**-4,993**
70%	**-2,309**	**-6,641**	**-10,934**	**-11,137**	**-14,405**	**-20,381**	**-18,461**	**-5,988**	2,828	**-68**	**-309**	**-4,066**
80%	**-1,708**	**-4,885**	**-8,208**	**-10,068**	**-13,842**	**-14,369**	**-12,671**	**-1,998**	4,046	596	**-181**	**-3,369**
90%	**-1,405**	**-3,633**	**-6,296**	**-10,085**	**-10,193**	**-10,443**	**-8,041**	518	3,229	199	38	**-1,795**
Long Term												
Full Simulation Period[a]	**-4,287**	**-8,248**	**-8,616**	**-13,263**	**-13,947**	**-22,494**	**-20,883**	**-14,915**	**-6,123**	**-733**	**-1,465**	**-4,862**
Water Year Types[b,c]												
Wet (32%)	**-5,360**	**-8,873**	**-6,303**	**-13,024**	**-16,676**	**-25,309**	**-27,520**	**-25,405**	**-19,864**	**-3,935**	**-3,005**	**-6,211**
Above Normal (16%)	**-4,721**	**-7,970**	**-12,279**	**-18,437**	**-16,482**	**-29,294**	**-28,545**	**-18,860**	**-5,307**	2,856	**-897**	**-5,790**
Below Normal (13%)	**-5,246**	**-8,859**	**-8,597**	**-12,366**	**-10,435**	**-25,175**	**-15,583**	**-10,726**	**-404**	1,462	69	**-5,301**
Dry (24%)	**-3,657**	**-8,999**	**-8,445**	**-12,617**	**-13,491**	**-20,194**	**-18,610**	**-8,920**	3,046	86	**-592**	**-4,244**
Critical (15%)	**-1,661**	**-5,384**	**-9,964**	**-10,073**	**-9,267**	**-10,403**	**-6,852**	**-1,747**	2,243	**-1,061**	**-1,602**	**-1,562**

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 41-3. Delta Outflow, Monthly Outflow

Current Operations 011319

Statistic	Monthly Outflow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	10,145	15,772	68,184	104,336	138,819	88,087	72,968	46,571	21,259	12,473	4,225	19,516
20%	9,688	14,688	34,582	70,505	88,193	67,845	51,982	30,398	10,131	11,453	4,012	19,313
30%	9,375	13,956	16,201	51,309	68,795	47,758	32,889	19,349	8,976	9,370	4,000	15,362
40%	6,969	12,159	12,260	29,208	51,379	35,067	26,974	16,153	7,676	8,000	4,000	10,938
50%	5,374	9,844	10,005	20,041	36,843	26,853	22,260	13,850	7,243	8,000	4,000	3,712
60%	4,000	6,311	5,880	16,488	25,051	19,793	16,421	11,720	7,100	6,500	4,000	3,000
70%	4,000	4,500	4,950	12,714	18,539	16,589	13,863	9,663	6,937	5,000	3,961	3,000
80%	4,000	4,500	4,511	9,226	15,146	12,431	11,165	8,183	6,044	5,000	3,726	3,000
90%	3,000	3,500	4,500	7,964	11,043	10,764	9,540	7,038	5,391	4,000	3,500	3,000
Long Term												
Full Simulation Period[a]	6,653	11,625	23,116	44,275	56,959	43,806	32,053	20,967	10,940	8,052	4,054	9,423
Water Year Types[b,c]												
Wet (32%)	9,943	17,965	27,333	90,345	102,661	81,638	57,700	39,294	19,071	10,682	4,469	19,040
Above Normal (16%)	7,332	12,903	17,298	49,558	67,693	52,646	34,414	19,816	7,961	11,126	4,035	11,118
Below Normal (13%)	6,260	6,705	19,835	17,008	37,036	17,592	18,032	13,213	7,486	8,099	4,082	3,307
Dry (24%)	4,343	9,898	31,709	15,608	26,159	22,368	18,215	10,819	7,276	5,038	3,832	3,037
Critical (15%)	3,000	3,894	8,967	11,509	15,905	12,017	9,843	6,527	5,825	4,000	3,517	3,000

Proposed Action 011519

Statistic	Monthly Outflow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	7,824	17,900	71,116	106,223	140,258	92,678	67,790	41,291	21,795	11,775	4,316	5,458
20%	4,692	8,678	37,251	73,144	89,151	68,282	47,454	27,083	10,857	10,922	4,000	4,164
30%	4,152	6,120	20,706	51,064	68,288	46,609	29,065	15,948	9,617	9,435	4,000	4,075
40%	4,000	4,892	13,246	29,261	55,133	33,861	22,998	12,150	8,417	8,000	4,000	3,996
50%	4,000	4,644	10,760	21,453	37,061	26,295	17,899	11,152	7,760	8,000	4,000	3,855
60%	4,000	4,500	6,976	16,196	24,552	20,895	13,567	10,233	7,338	6,500	4,000	3,000
70%	4,000	4,500	5,509	12,915	17,723	15,688	11,381	8,944	7,100	5,000	3,789	3,000
80%	4,000	4,500	4,918	9,107	13,995	12,199	9,673	7,921	7,100	5,000	3,514	3,000
90%	3,000	3,500	4,500	7,818	10,541	9,271	8,953	6,804	5,717	4,000	3,500	3,000
Long Term												
Full Simulation Period[a]	5,079	9,103	25,249	44,985	57,425	44,256	29,104	18,600	11,420	7,904	4,010	4,123
Water Year Types[b,c]												
Wet (32%)	6,358	12,022	31,810	92,116	103,918	82,647	53,254	35,255	19,822	10,416	4,471	5,743
Above Normal (16%)	5,350	9,275	20,373	50,231	69,739	54,821	30,246	16,659	8,801	10,620	4,025	4,049
Below Normal (13%)	5,949	6,237	20,351	17,747	39,393	18,100	15,435	11,403	7,829	8,125	4,137	3,474
Dry (24%)	4,007	9,928	32,352	15,515	24,766	21,687	16,439	9,699	7,540	5,094	3,651	3,094
Critical (15%)	3,000	3,845	8,967	11,268	14,309	11,218	9,181	6,051	5,809	4,000	3,477	3,000

Proposed Action 011519 minus Current Operations 011319

Statistic	Monthly Outflow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	**-2,320**	2,128	2,932	1,887	1,439	4,592	**-5,178**	**-5,280**	536	**-698**	91	**-14,058**
20%	**-4,996**	**-6,009**	2,669	2,638	957	437	**-4,528**	**-3,315**	727	**-532**	**-12**	**-15,148**
30%	**-5,223**	**-7,836**	4,505	**-245**	**-506**	**-1,149**	**-3,824**	**-3,400**	641	66	0	**-11,288**
40%	**-2,969**	**-7,267**	986	53	3,753	**-1,206**	**-3,976**	**-4,003**	741	0	0	**-6,941**
50%	**-1,374**	**-5,199**	755	1,412	217	**-558**	**-4,361**	**-2,698**	516	0	0	142
60%	0	**-1,811**	1,097	**-293**	**-499**	1,102	**-2,854**	**-1,487**	238	0	0	0
70%	0	0	560	201	**-815**	**-902**	**-2,482**	**-719**	163	0	**-173**	0
80%	0	0	406	**-119**	**-1,150**	**-232**	**-1,492**	**-263**	1,056	0	**-211**	0
90%	0	0	0	**-146**	**-502**	**-1,493**	**-587**	**-234**	326	0	0	0
Long Term												
Full Simulation Period[a]	**-1,574**	**-2,522**	2,133	709	466	450	**-2,949**	**-2,367**	479	**-147**	**-44**	**-5,300**
Water Year Types[b,c]												
Wet (32%)	**-3,584**	**-5,943**	4,477	1,771	1,256	1,009	**-4,446**	**-4,039**	751	**-266**	1	**-13,297**
Above Normal (16%)	**-1,982**	**-3,628**	3,075	673	2,046	2,175	**-4,167**	**-3,157**	840	**-506**	**-10**	**-7,069**
Below Normal (13%)	**-312**	**-467**	516	739	2,357	508	**-2,597**	**-1,810**	343	26	55	167
Dry (24%)	**-335**	30	644	**-93**	**-1,392**	**-680**	**-1,777**	**-1,120**	264	56	**-181**	57
Critical (15%)	0	**-48**	0	**-241**	**-1,596**	**-799**	**-663**	**-476**	**-16**	0	**-40**	0

a Based on the 82-year simulation period.

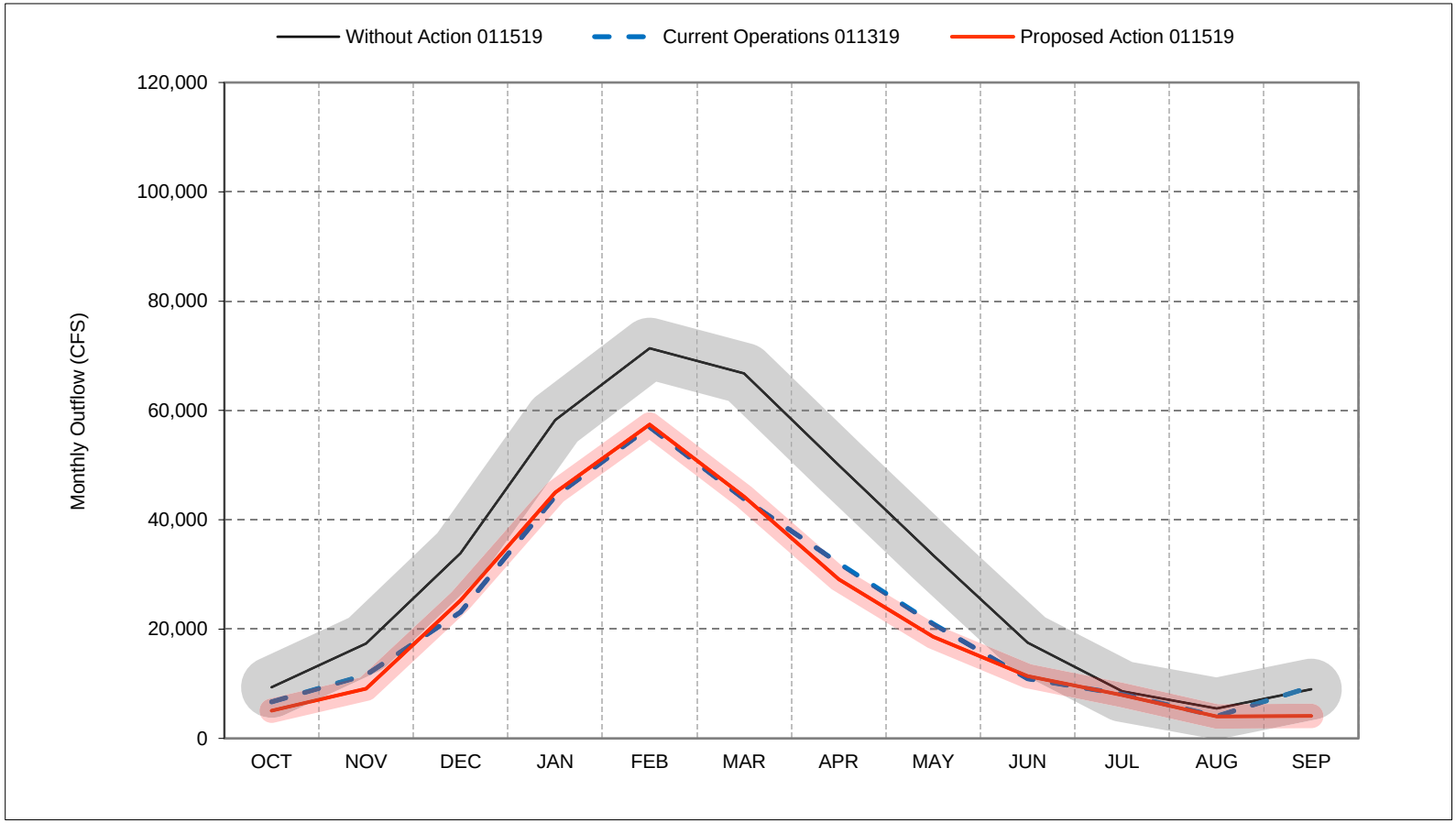
b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

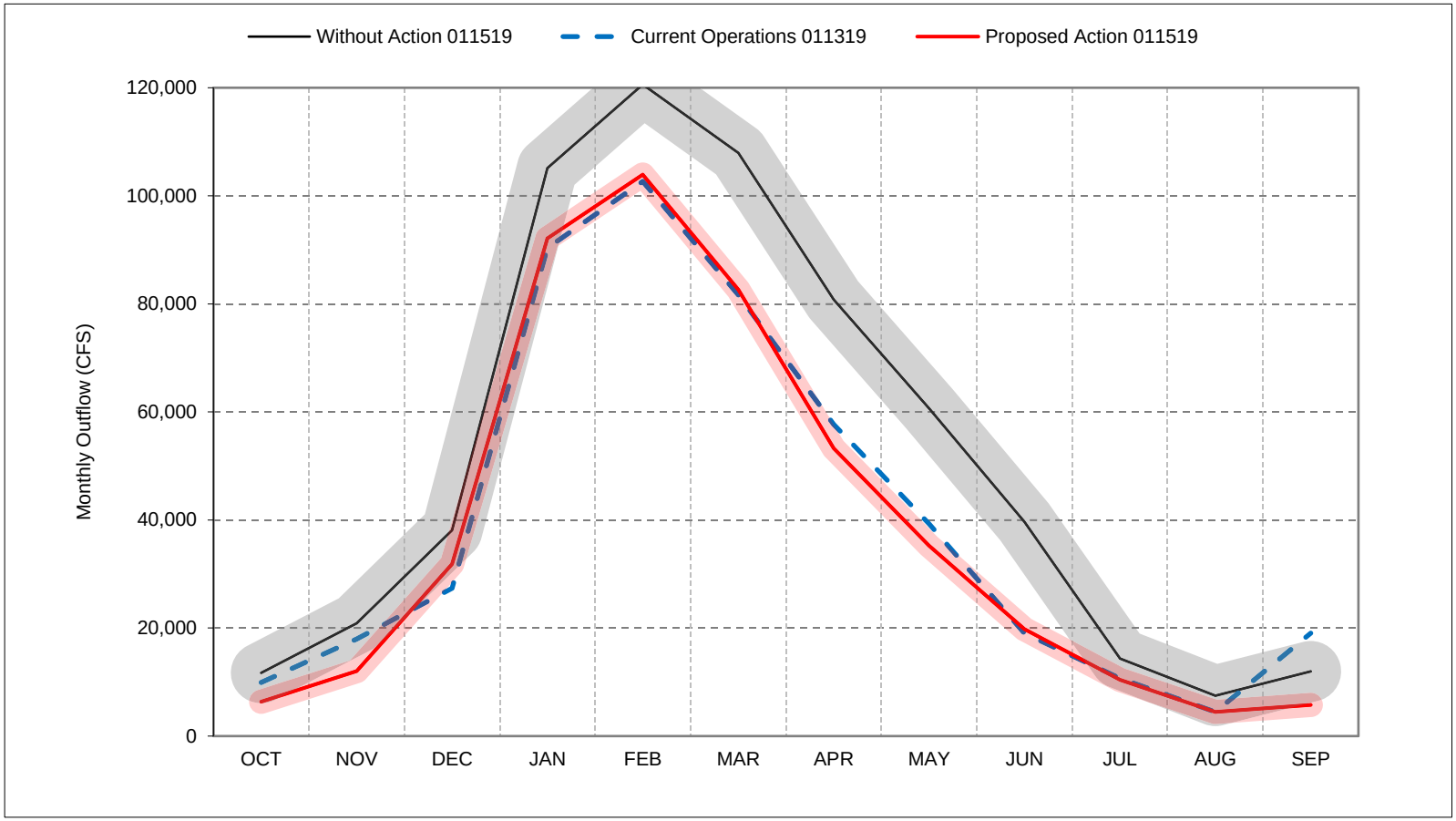
e These are draft results meant for qualitative analysis and are subject to revision.

Figure 41-1. Delta Outflow, Long-Term Average Outflow



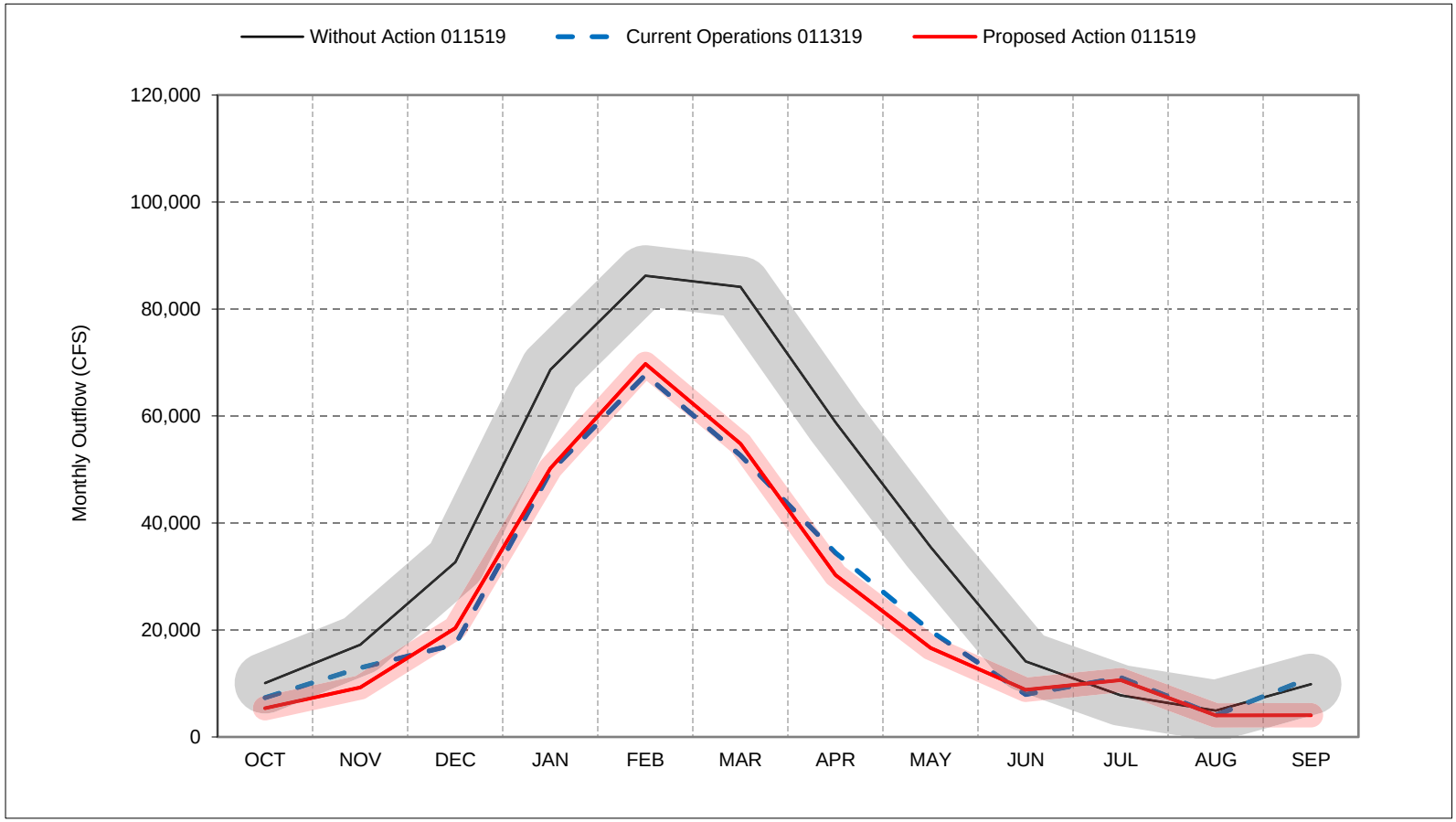
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 41-2. Delta Outflow, Wet Year Average Outflow



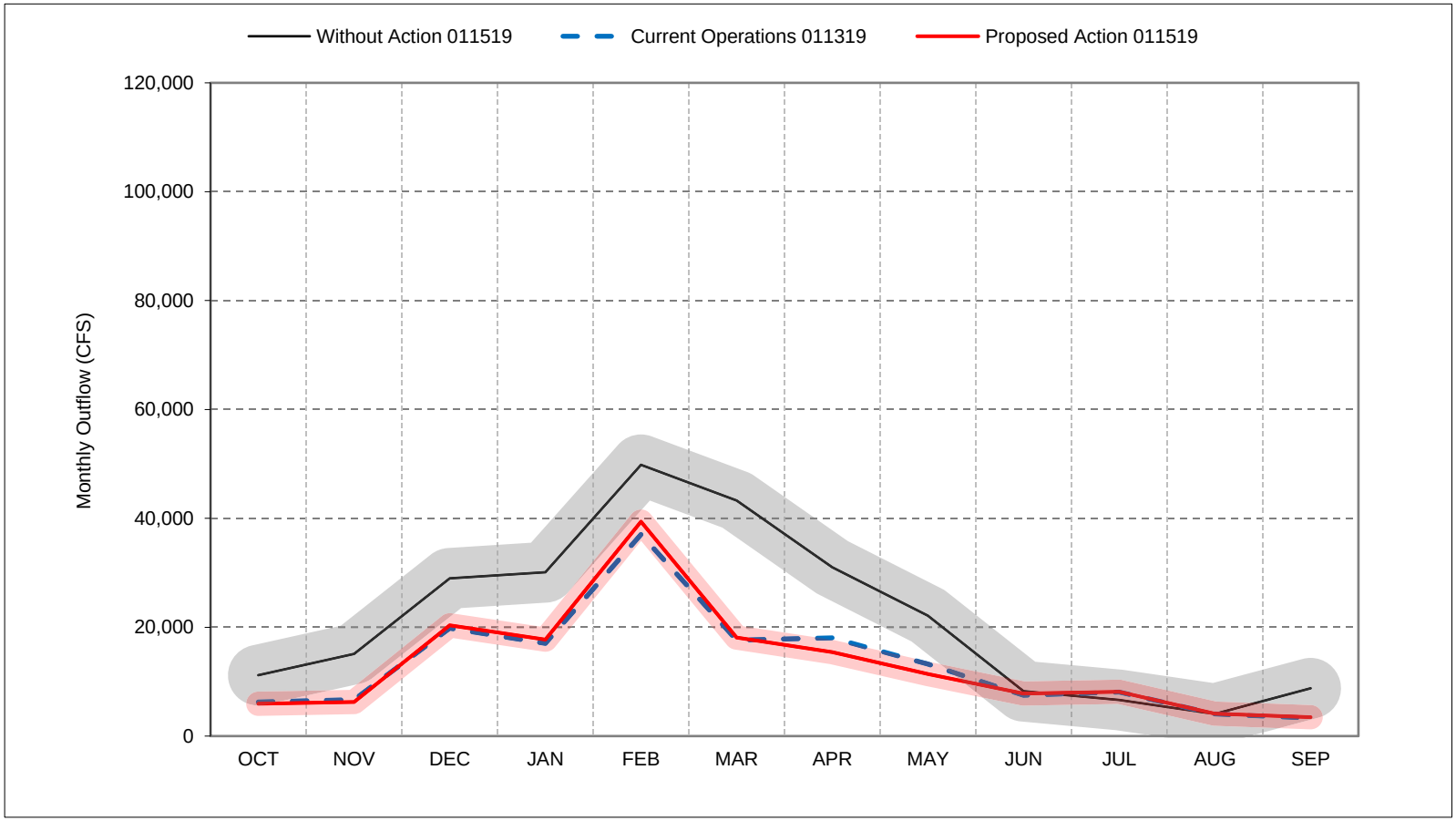
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 41-3. Delta Outflow, Above Normal Year Average Outflow



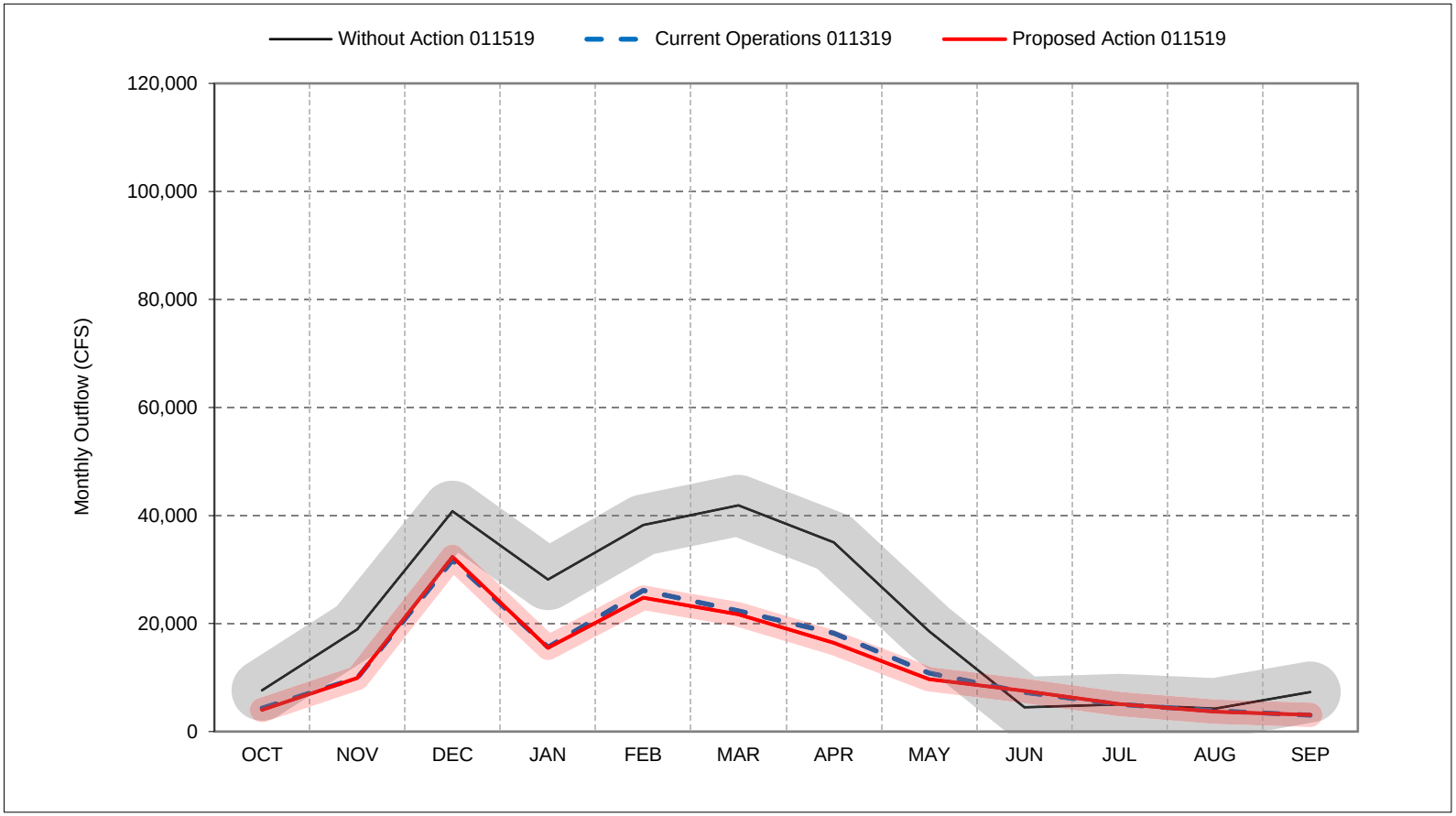
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 41-4. Delta Outflow, Below Normal Year Average Outflow



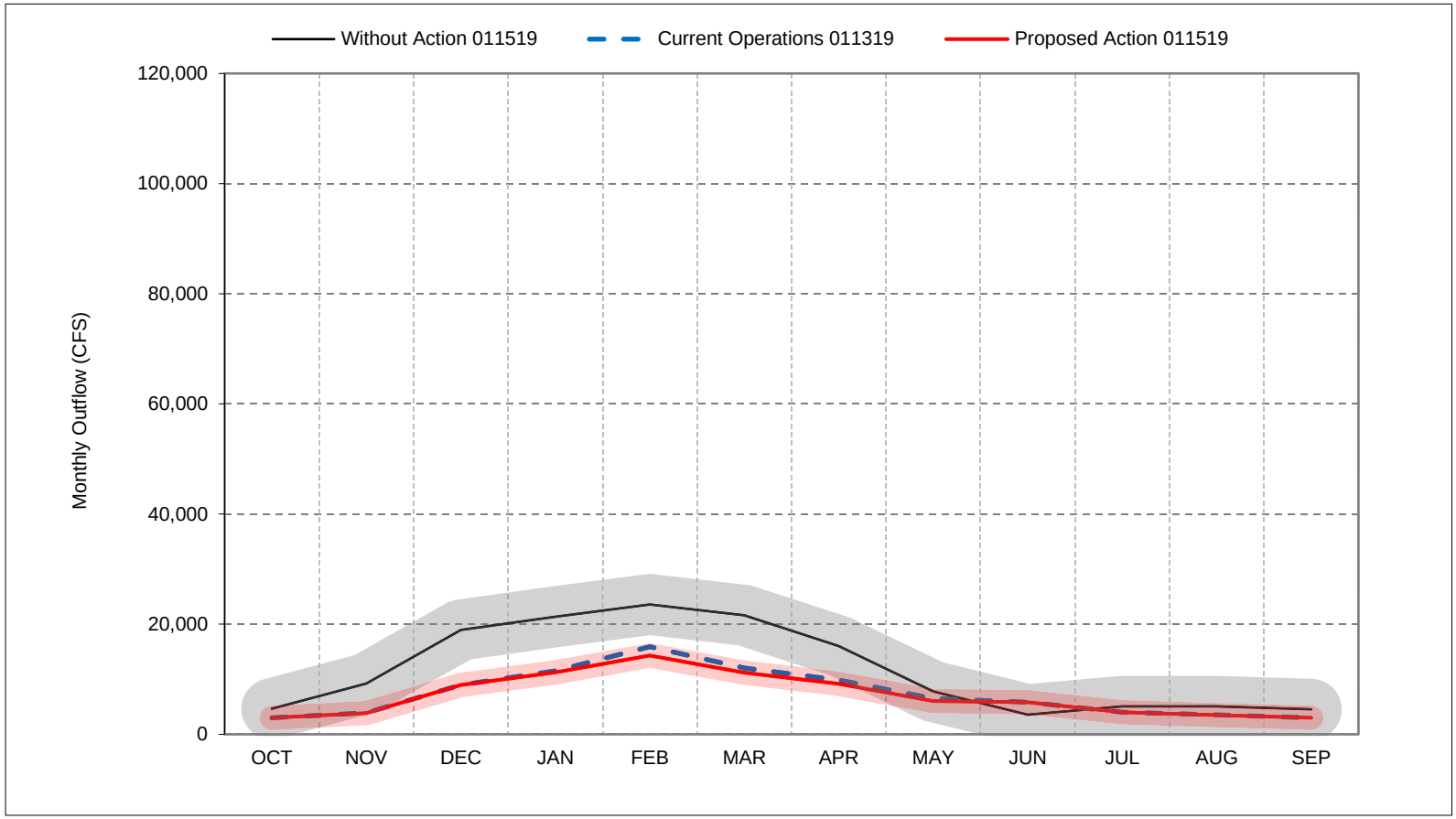
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 41-5. Delta Outflow, Dry Year Average Outflow



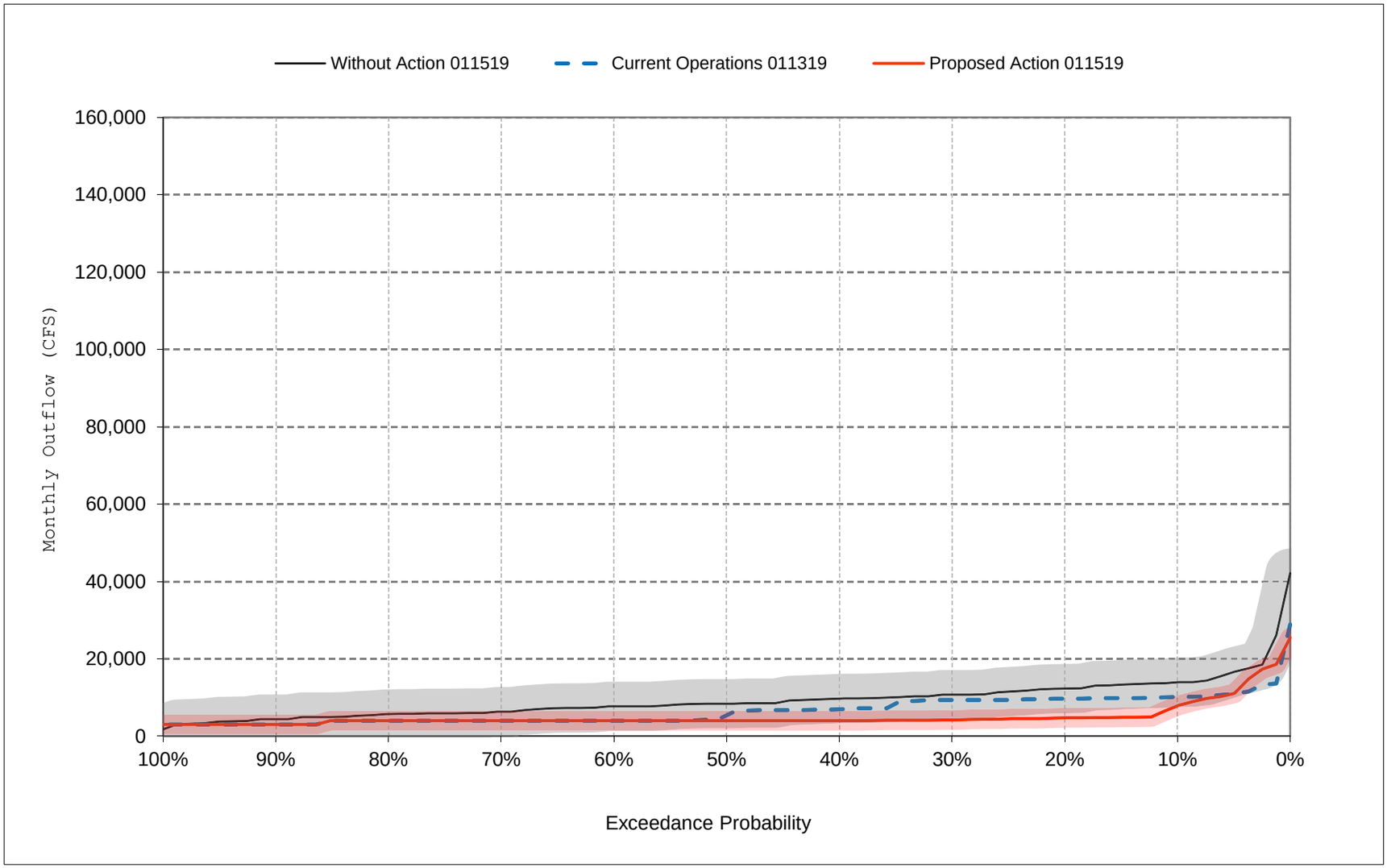
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 41-6. Delta Outflow, Critical Year Average Outflow



*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

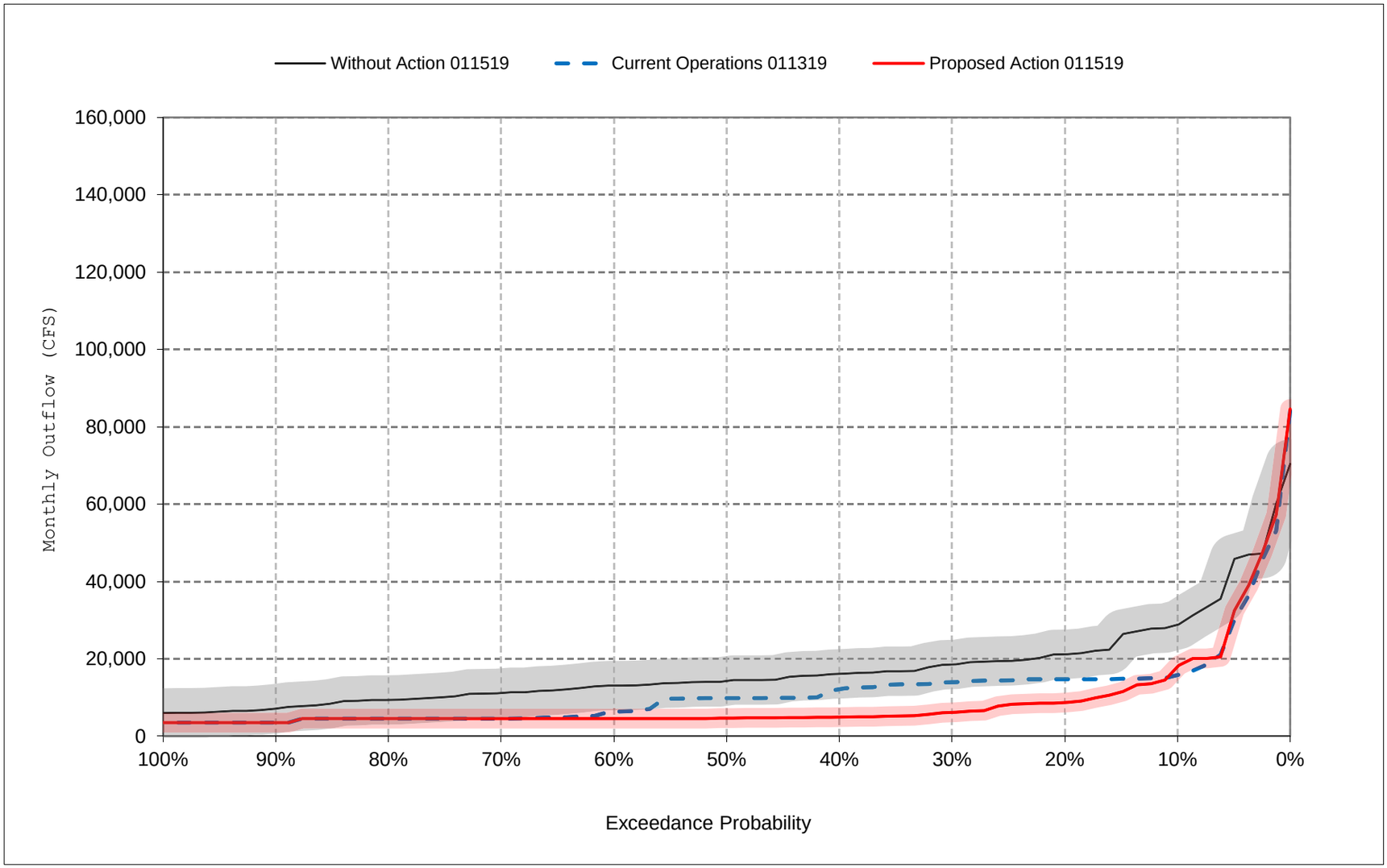
Figure 41-7. Delta Outflow, October



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

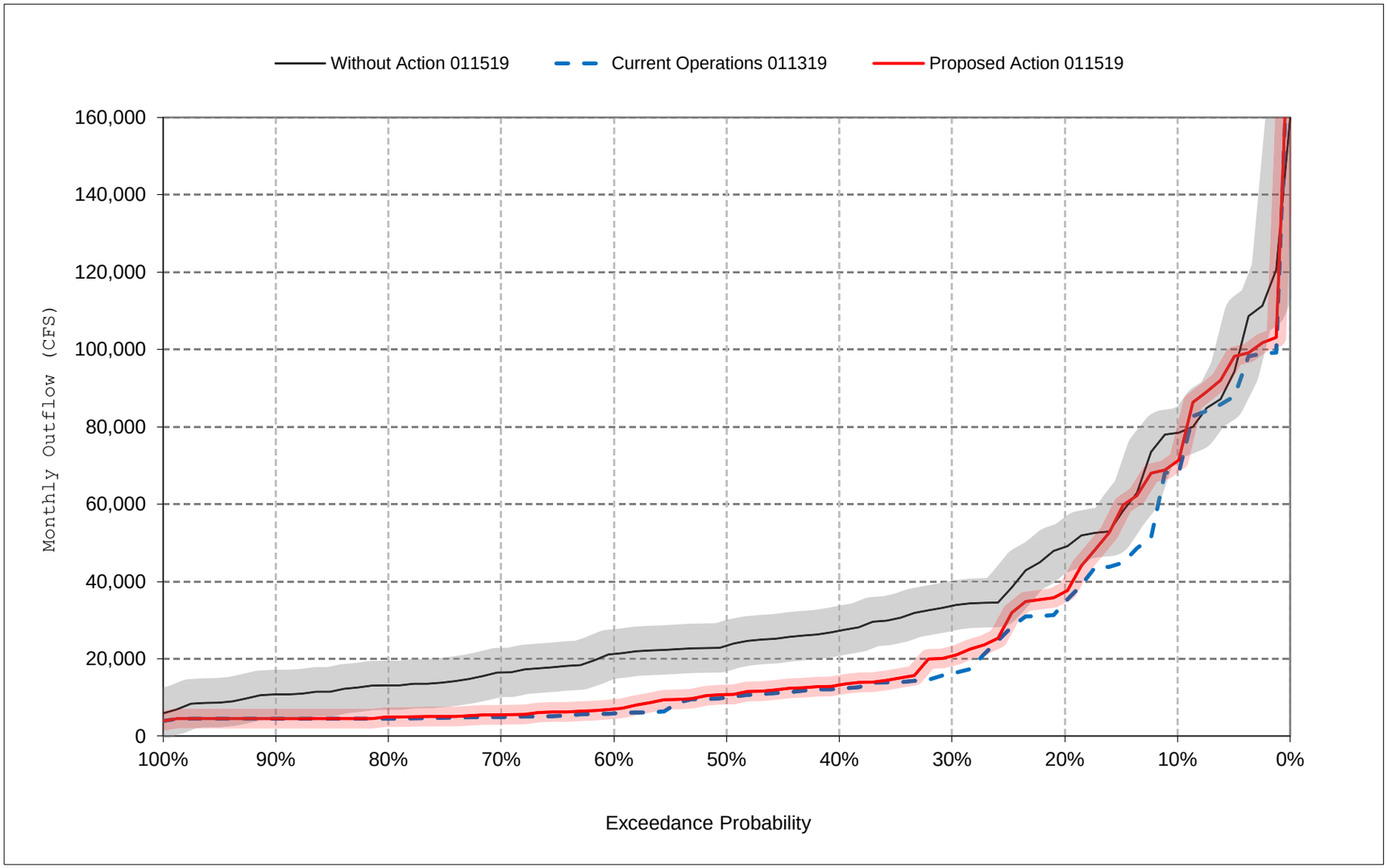
Figure 41-8. Delta Outflow, November



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

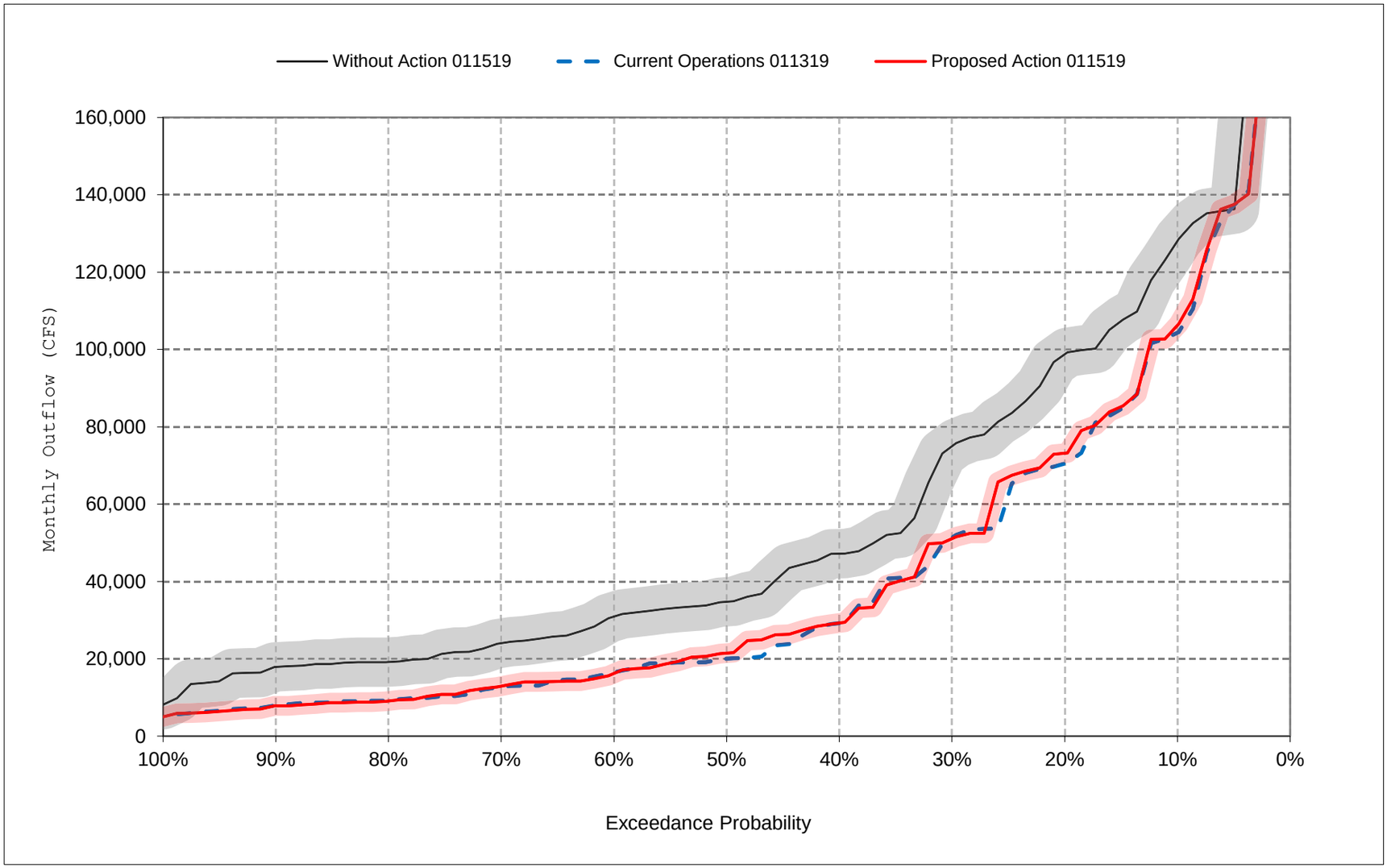
Figure 41-9. Delta Outflow, December



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

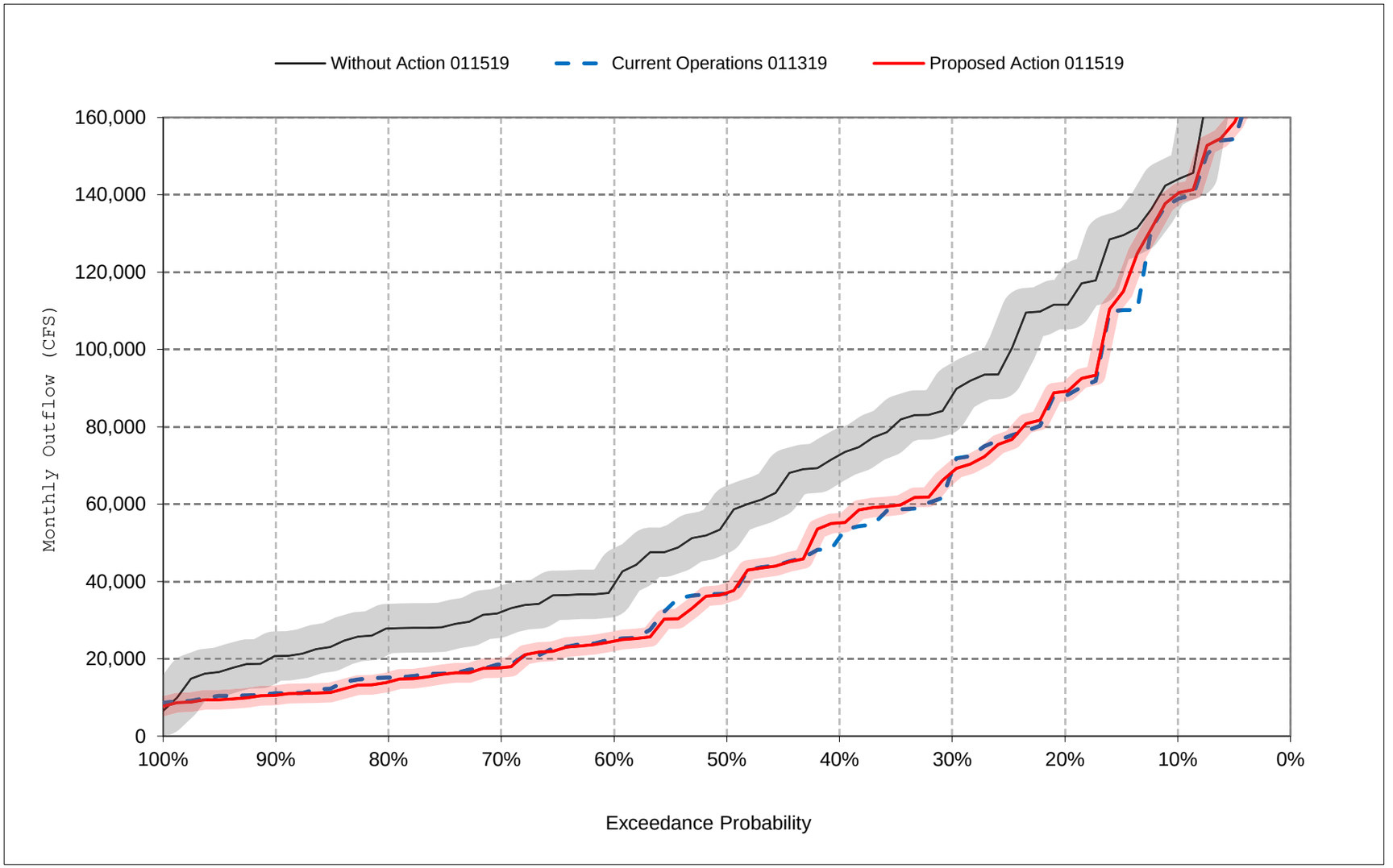
Figure 41-10. Delta Outflow, January



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

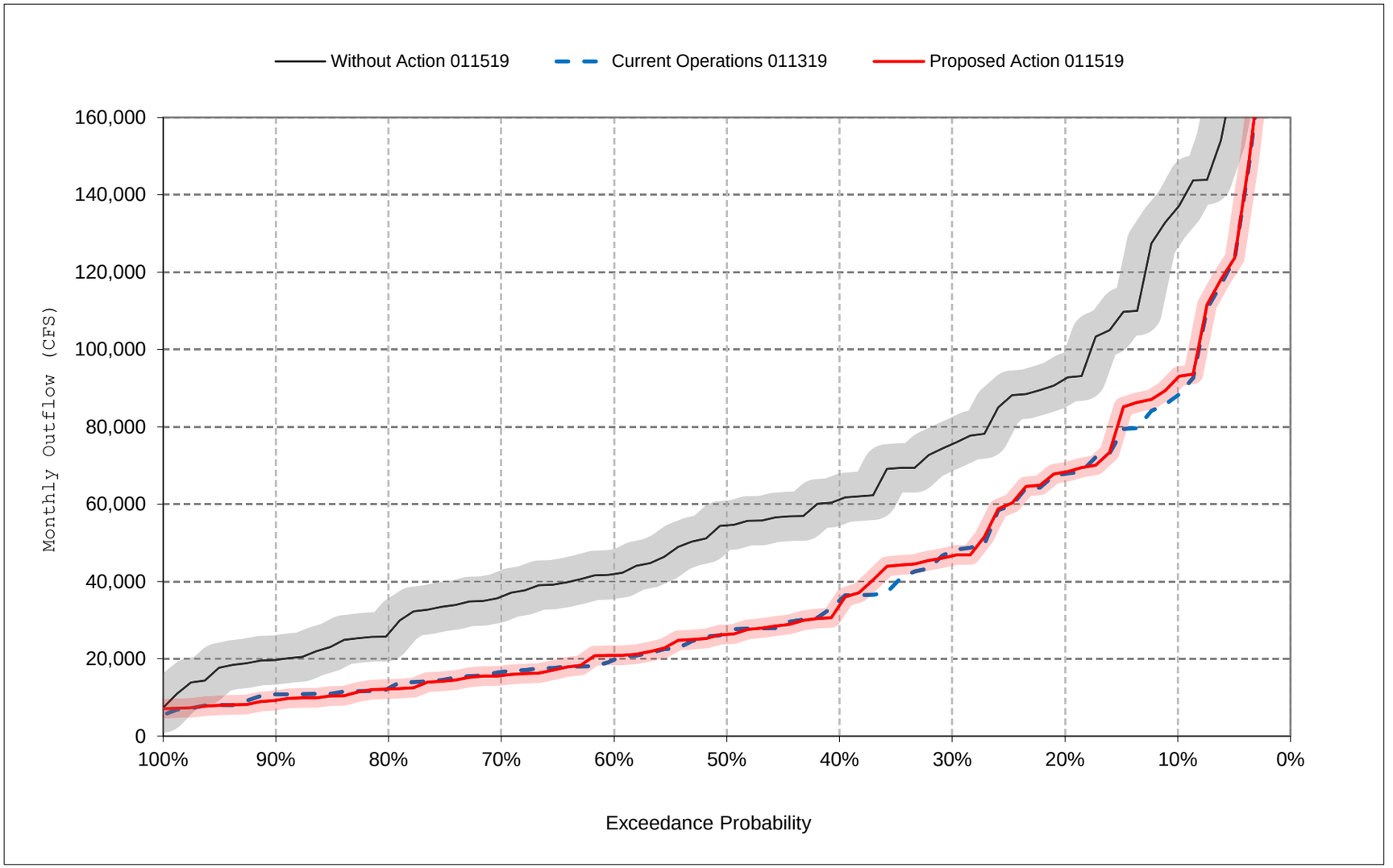
Figure 41-11. Delta Outflow, February



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

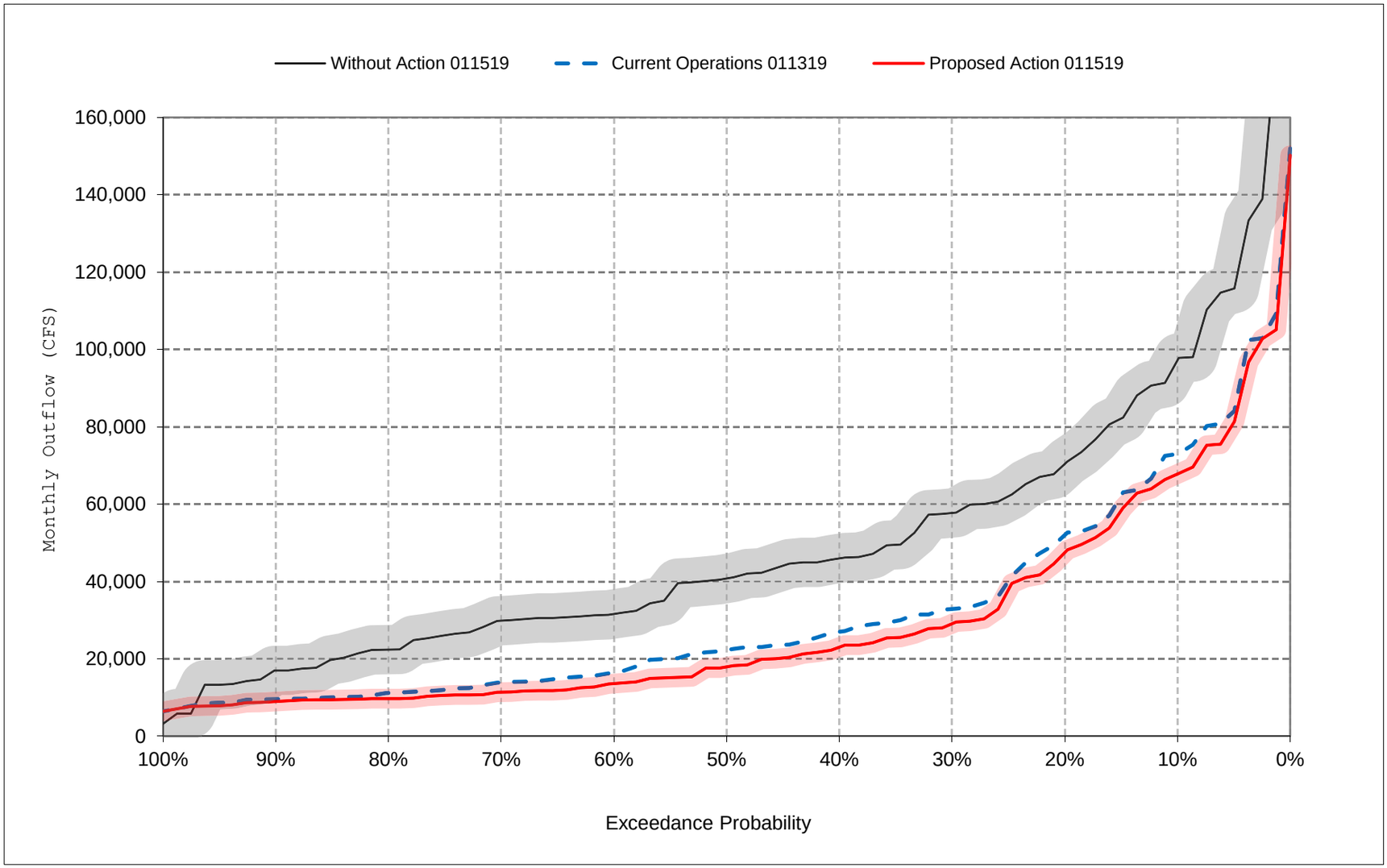
Figure 41-12. Delta Outflow, March



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

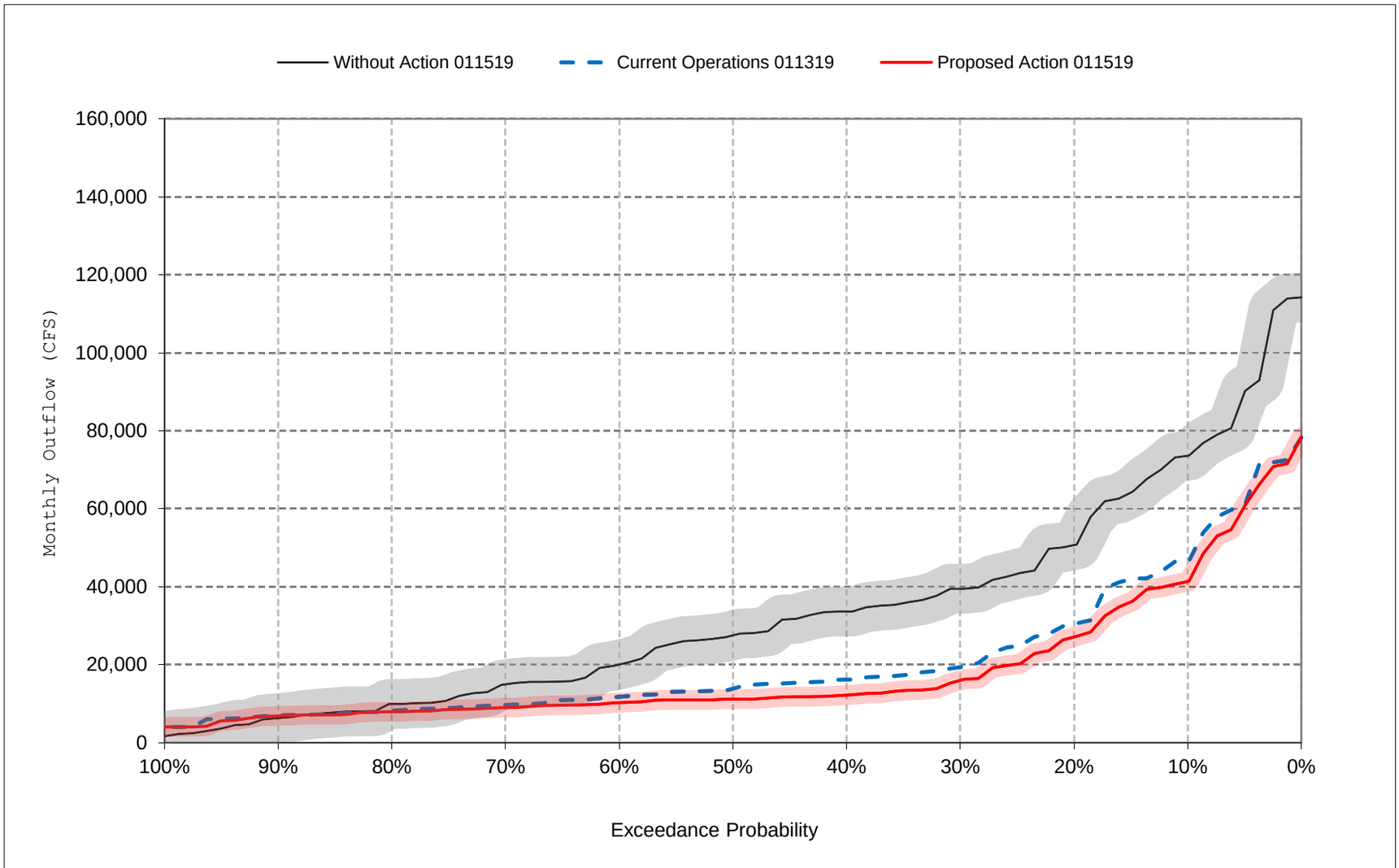
Figure 41-13. Delta Outflow, April



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

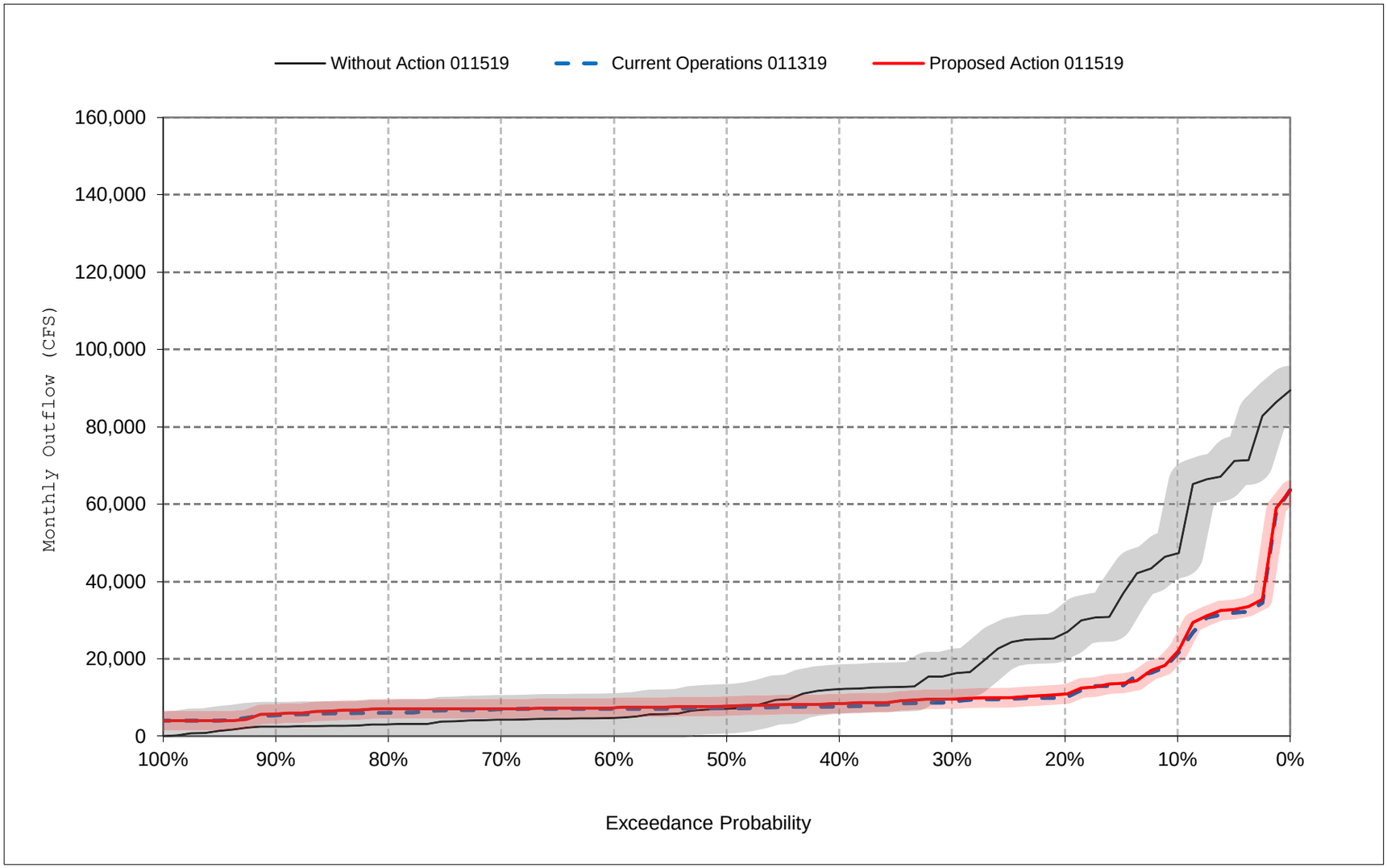
Figure 41-14. Delta Outflow, May



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

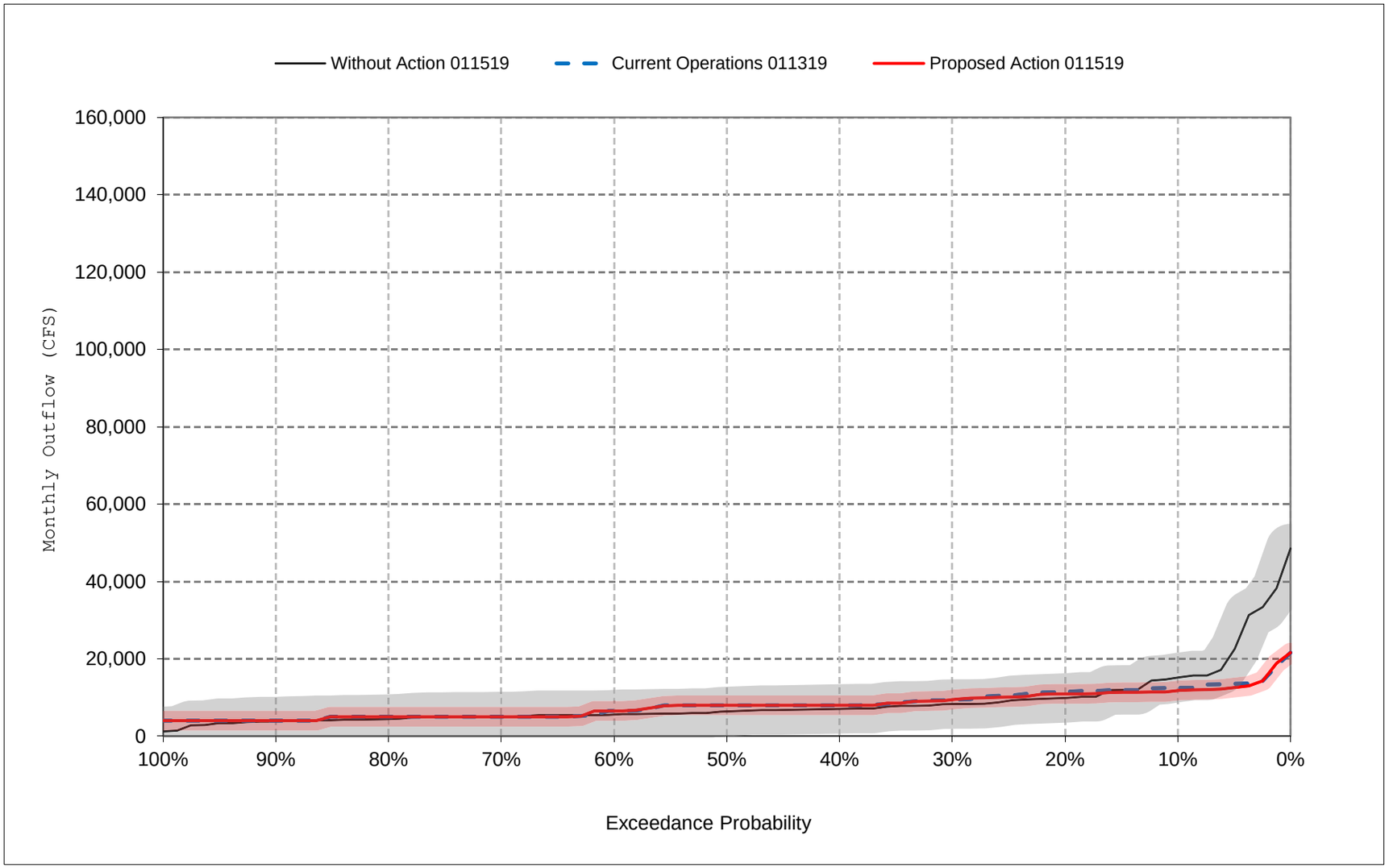
Figure 41-15. Delta Outflow, June



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

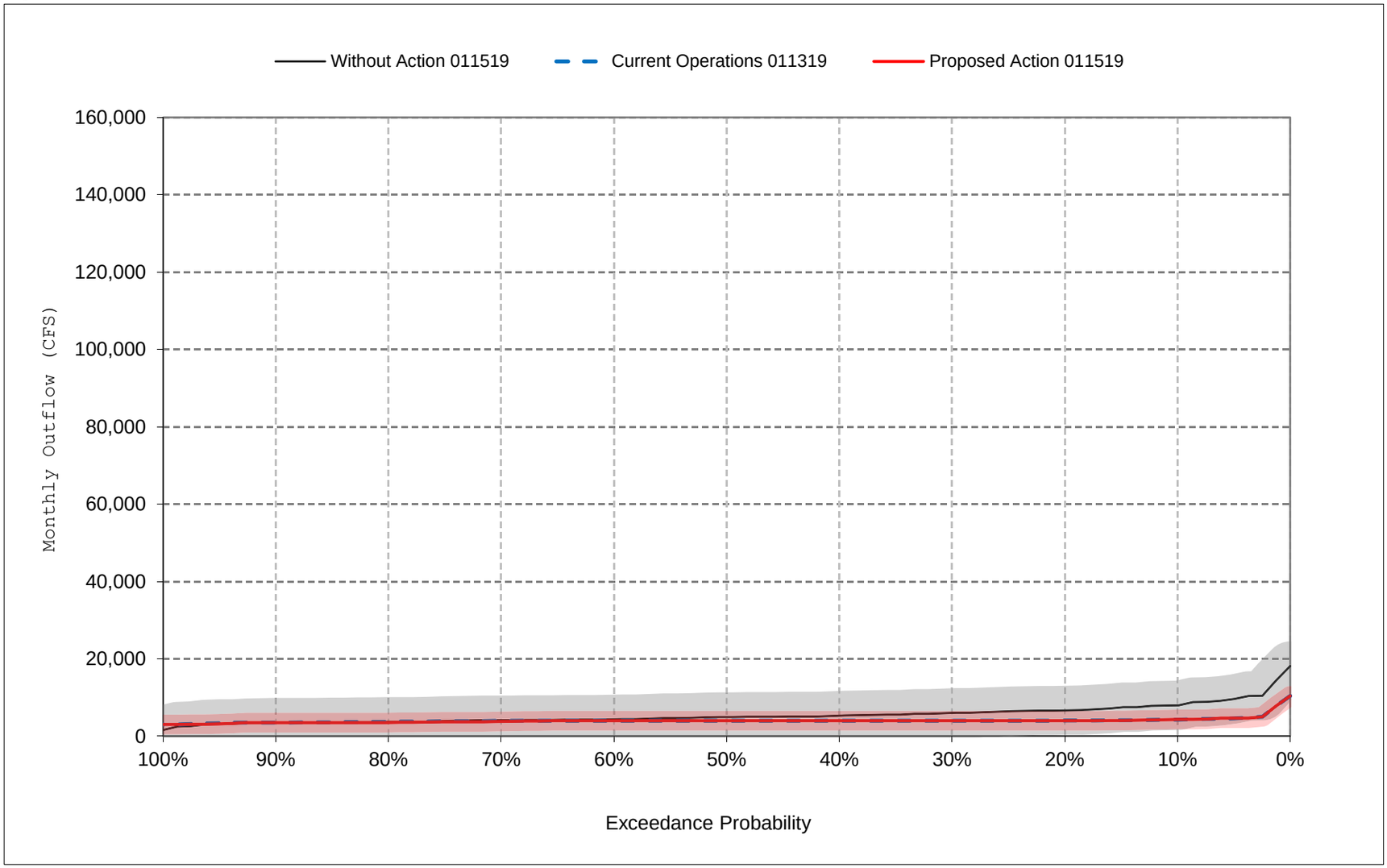
Figure 41-16. Delta Outflow, July



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

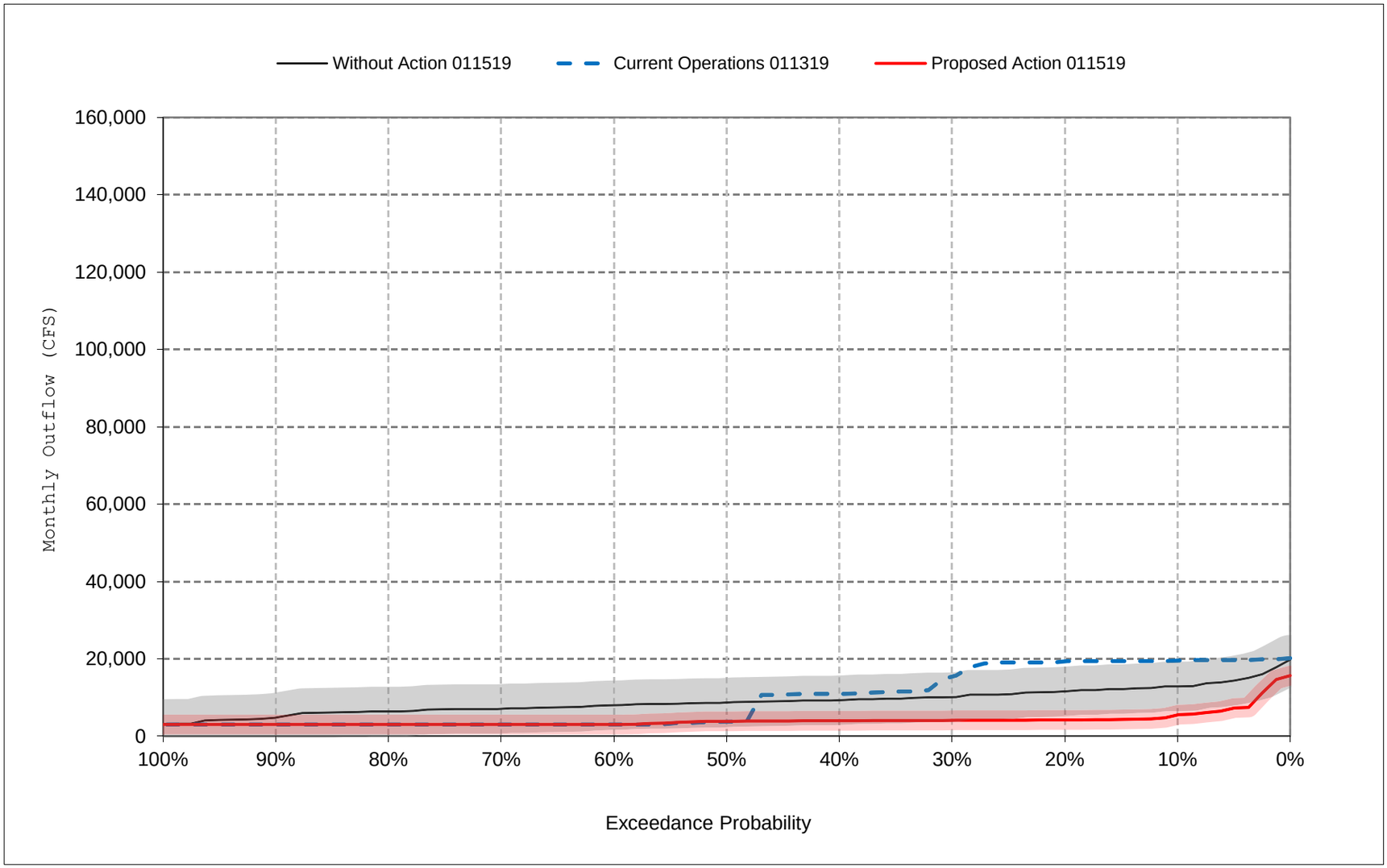
Figure 41-17. Delta Outflow, August



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Figure 41-18. Delta Outflow, September



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Appendix D – Modeling

Attachment 3-3 – Diversion Results (CalSim II)

The following results of the CalSim II model are included for diversions at key project locations:

Title	Model Parameter	Table Numbers	Figure Numbers
Trinity Import - Clear Creek Tunnel	D100	46-1 to 46-3	46-1 to 46-18
Red Bluff Diversion - Tehama Colusa Canal	D112	47-1 to 47-3	47-1 to 47-18
Hamilton City Diversion - Glenn Colusa Canal	D114	48-1 to 48-3	48-1 to 48-18
Folsom South Canal Diversion	D9	49-1 to 49-3	49-1 to 49-18
Friant-Kern Canal Diversion	D18A	50-1 to 50-3	50-1 to 50-18
Madera Canal Diversion	D18B	51-1 to 51-3	51-1 to 51-18
DCC Flow	C401B_DXC	52-1 to 52-3	52-1 to 52-18
Total Delta Exports	TOTAL_EXP	53-1 to 53-3	53-1 to 53-18
Jones PP Exports	D418	54-1 to 54-3	54-1 to 54-18
CVP Banks PP Exports	D419_CVP	55-1 to 55-3	55-1 to 55-18
SWP Banks PP Exports	D419_SWP	56-1 to 56-3	56-1 to 56-18
DMC - CA Intertie Flow	C700A	57-1 to 57-3	57-1 to 57-18

Report formats

- Monthly tables comparing two scenarios (exceedance values, long-term average, and average by water year type)
- Monthly pattern charts (long-term average and average by water year type) including all scenarios
- Monthly exceedance charts (all months) including all scenarios

Table 46-1. Trinity Import - Clear Creek Tunnel, Monthly Diversion

Without Action 011519

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term Full Simulation Period[a]	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types[b,c]												
Wet (32%)	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal (16%)	0	0	0	0	0	0	0	0	0	0	0	0
Below Normal (13%)	0	0	0	0	0	0	0	0	0	0	0	0
Dry (24%)	0	0	0	0	0	0	0	0	0	0	0	0
Critical (15%)	0	0	0	0	0	0	0	0	0	0	0	0

Current Operations 011319

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,785	1,339	375	1,673	200	659	503	250	1,250	2,988	2,434	2,724
20%	1,372	500	250	639	100	242	401	197	766	2,000	2,000	2,336
30%	1,250	468	200	200	100	194	323	93	625	1,714	2,000	2,000
40%	750	450	141	116	50	107	251	0	262	1,500	1,773	1,798
50%	700	209	75	100	19	100	200	0	200	1,500	1,500	1,375
60%	625	75	50	50	0	54	160	0	156	1,352	1,500	1,300
70%	307	50	0	0	0	0	100	0	40	1,125	1,500	1,250
80%	200	0	0	0	0	0	0	0	0	775	1,125	750
90%	12	0	0	0	0	0	0	0	0	73	950	550
Long Term Full Simulation Period[a]	858	478	229	417	88	238	305	161	493	1,447	1,649	1,553
Water Year Types[b,c]												
Wet (32%)	1,361	866	497	516	118	354	369	205	284	1,252	1,583	2,190
Above Normal (16%)	1,177	764	291	136	48	331	358	0	206	1,266	1,955	1,876
Below Normal (13%)	594	223	66	348	46	239	219	256	816	1,734	2,010	1,611
Dry (24%)	360	146	40	481	106	95	194	182	842	1,891	1,552	1,002
Critical (15%)	491	113	46	465	76	120	374	119	379	1,062	1,292	693

Current Operations 011319 minus Without Action 011519

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,785	1,339	375	1,673	200	659	503	250	1,250	2,988	2,434	2,724
20%	1,372	500	250	639	100	242	401	197	766	2,000	2,000	2,336
30%	1,250	468	200	200	100	194	323	93	625	1,714	2,000	2,000
40%	750	450	141	116	50	107	251	0	262	1,500	1,773	1,798
50%	700	209	75	100	19	100	200	0	200	1,500	1,500	1,375
60%	625	75	50	50	0	54	160	0	156	1,352	1,500	1,300
70%	307	50	0	0	0	0	100	0	40	1,125	1,500	1,250
80%	200	0	0	0	0	0	0	0	0	775	1,125	750
90%	12	0	0	0	0	0	0	0	0	73	950	550
Long Term Full Simulation Period[a]	858	478	229	417	88	238	305	161	493	1,447	1,649	1,553
Water Year Types[b,c]												
Wet (32%)	1,361	866	497	516	118	354	369	205	284	1,252	1,583	2,190
Above Normal (16%)	1,177	764	291	136	48	331	358	0	206	1,266	1,955	1,876
Below Normal (13%)	594	223	66	348	46	239	219	256	816	1,734	2,010	1,611
Dry (24%)	360	146	40	481	106	95	194	182	842	1,891	1,552	1,002
Critical (15%)	491	113	46	465	76	120	374	119	379	1,062	1,292	693

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 46-2. Trinity Import - Clear Creek Tunnel, Monthly Diversion

Without Action 011519

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term Full Simulation Period[a]	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types[b,c]												
Wet (32%)	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal (16%)	0	0	0	0	0	0	0	0	0	0	0	0
Below Normal (13%)	0	0	0	0	0	0	0	0	0	0	0	0
Dry (24%)	0	0	0	0	0	0	0	0	0	0	0	0
Critical (15%)	0	0	0	0	0	0	0	0	0	0	0	0

Proposed Action 011519

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,838	532	424	2,109	130	874	456	250	1,374	3,300	2,500	2,202
20%	1,412	450	224	578	100	446	406	200	750	2,443	2,000	2,000
30%	823	450	161	118	100	200	355	99	700	2,000	2,000	1,827
40%	700	352	102	100	65	119	282	0	378	1,500	1,980	1,457
50%	700	91	75	100	0	100	208	0	250	1,500	1,720	1,300
60%	407	75	50	50	0	75	149	0	182	1,475	1,500	1,250
70%	200	0	0	0	0	0	91	0	40	1,125	1,500	1,200
80%	151	0	0	0	0	0	0	0	0	1,086	1,151	750
90%	0	0	0	0	0	0	0	0	0	73	950	550
Long Term Full Simulation Period[a]	778	298	201	437	89	299	283	170	513	1,609	1,727	1,386
Water Year Types[b,c]												
Wet (32%)	1,352	370	396	522	99	381	292	213	312	1,315	1,642	1,715
Above Normal (16%)	790	308	258	280	74	459	355	0	346	1,415	1,968	1,765
Below Normal (13%)	721	332	105	443	57	489	251	288	1,016	1,778	2,167	1,398
Dry (24%)	374	256	54	390	120	71	207	196	625	2,028	1,648	1,048
Critical (15%)	244	171	52	497	58	150	341	107	485	1,602	1,381	819

Proposed Action 011519 minus Without Action 011519

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,838	532	424	2,109	130	874	456	250	1,374	3,300	2,500	2,202
20%	1,412	450	224	578	100	446	406	200	750	2,443	2,000	2,000
30%	823	450	161	118	100	200	355	99	700	2,000	2,000	1,827
40%	700	352	102	100	65	119	282	0	378	1,500	1,980	1,457
50%	700	91	75	100	0	100	208	0	250	1,500	1,720	1,300
60%	407	75	50	50	0	75	149	0	182	1,475	1,500	1,250
70%	200	0	0	0	0	0	91	0	40	1,125	1,500	1,200
80%	151	0	0	0	0	0	0	0	0	1,086	1,151	750
90%	0	0	0	0	0	0	0	0	0	73	950	550
Long Term Full Simulation Period[a]	778	298	201	437	89	299	283	170	513	1,609	1,727	1,386
Water Year Types[b,c]												
Wet (32%)	1,352	370	396	522	99	381	292	213	312	1,315	1,642	1,715
Above Normal (16%)	790	308	258	280	74	459	355	0	346	1,415	1,968	1,765
Below Normal (13%)	721	332	105	443	57	489	251	288	1,016	1,778	2,167	1,398
Dry (24%)	374	256	54	390	120	71	207	196	625	2,028	1,648	1,048
Critical (15%)	244	171	52	497	58	150	341	107	485	1,602	1,381	819

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 46-3. Trinity Import - Clear Creek Tunnel, Monthly Diversion

Current Operations 011319

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,785	1,339	375	1,673	200	659	503	250	1,250	2,988	2,434	2,724
20%	1,372	500	250	639	100	242	401	197	766	2,000	2,000	2,336
30%	1,250	468	200	200	100	194	323	93	625	1,714	2,000	2,000
40%	750	450	141	116	50	107	251	0	262	1,500	1,773	1,798
50%	700	209	75	100	19	100	200	0	200	1,500	1,500	1,375
60%	625	75	50	50	0	54	160	0	156	1,352	1,500	1,300
70%	307	50	0	0	0	0	100	0	40	1,125	1,500	1,250
80%	200	0	0	0	0	0	0	0	0	775	1,125	750
90%	12	0	0	0	0	0	0	0	0	73	950	550
Long Term												
Full Simulation Period[a]	858	478	229	417	88	238	305	161	493	1,447	1,649	1,553
Water Year Types[b,c]												
Wet (32%)	1,361	866	497	516	118	354	369	205	284	1,252	1,583	2,190
Above Normal (16%)	1,177	764	291	136	48	331	358	0	206	1,266	1,955	1,876
Below Normal (13%)	594	223	66	348	46	239	219	256	816	1,734	2,010	1,611
Dry (24%)	360	146	40	481	106	95	194	182	842	1,891	1,552	1,002
Critical (15%)	491	113	46	465	76	120	374	119	379	1,062	1,292	693

Proposed Action 011519

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,838	532	424	2,109	130	874	456	250	1,374	3,300	2,500	2,202
20%	1,412	450	224	578	100	446	406	200	750	2,443	2,000	2,000
30%	823	450	161	118	100	200	355	99	700	2,000	2,000	1,827
40%	700	352	102	100	65	119	282	0	378	1,500	1,980	1,457
50%	700	91	75	100	0	100	208	0	250	1,500	1,720	1,300
60%	407	75	50	50	0	75	149	0	182	1,475	1,500	1,250
70%	200	0	0	0	0	0	91	0	40	1,125	1,500	1,200
80%	151	0	0	0	0	0	0	0	0	1,086	1,151	750
90%	0	0	0	0	0	0	0	0	0	73	950	550
Long Term												
Full Simulation Period[a]	778	298	201	437	89	299	283	170	513	1,609	1,727	1,386
Water Year Types[b,c]												
Wet (32%)	1,352	370	396	522	99	381	292	213	312	1,315	1,642	1,715
Above Normal (16%)	790	308	258	280	74	459	355	0	346	1,415	1,968	1,765
Below Normal (13%)	721	332	105	443	57	489	251	288	1,016	1,778	2,167	1,398
Dry (24%)	374	256	54	390	120	71	207	196	625	2,028	1,648	1,048
Critical (15%)	244	171	52	497	58	150	341	107	485	1,602	1,381	819

Proposed Action 011519 minus Current Operations 011319

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	53	**-807**	50	436	**-70**	216	**-47**	0	124	312	66	**-522**
20%	41	**-50**	**-26**	**-61**	0	204	5	3	**-16**	443	0	**-336**
30%	**-427**	**-17**	**-39**	**-82**	0	6	32	5	75	286	0	**-173**
40%	**-50**	**-98**	**-39**	**-16**	15	12	30	0	116	0	207	**-341**
50%	0	**-118**	0	0	**-19**	0	8	0	50	0	220	**-75**
60%	**-218**	0	0	0	0	21	**-11**	0	26	123	0	**-50**
70%	**-107**	**-50**	0	0	0	0	**-9**	0	0	0	0	**-50**
80%	**-49**	0	0	0	0	0	0	0	0	311	26	0
90%	**-12**	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	**-80**	**-180**	**-28**	20	1	61	**-23**	9	20	162	78	**-167**
Water Year Types[b,c]												
Wet (32%)	**-9**	**-497**	**-102**	5	**-19**	27	**-78**	9	28	63	59	**-475**
Above Normal (16%)	**-387**	**-456**	**-33**	144	26	128	**-3**	0	140	149	14	**-111**
Below Normal (13%)	126	110	39	95	10	251	32	32	200	44	157	**-213**
Dry (24%)	14	109	14	**-91**	15	**-24**	13	14	**-217**	136	95	46
Critical (15%)	**-247**	58	6	32	**-18**	30	**-34**	**-11**	106	540	88	125

a Based on the 82-year simulation period.

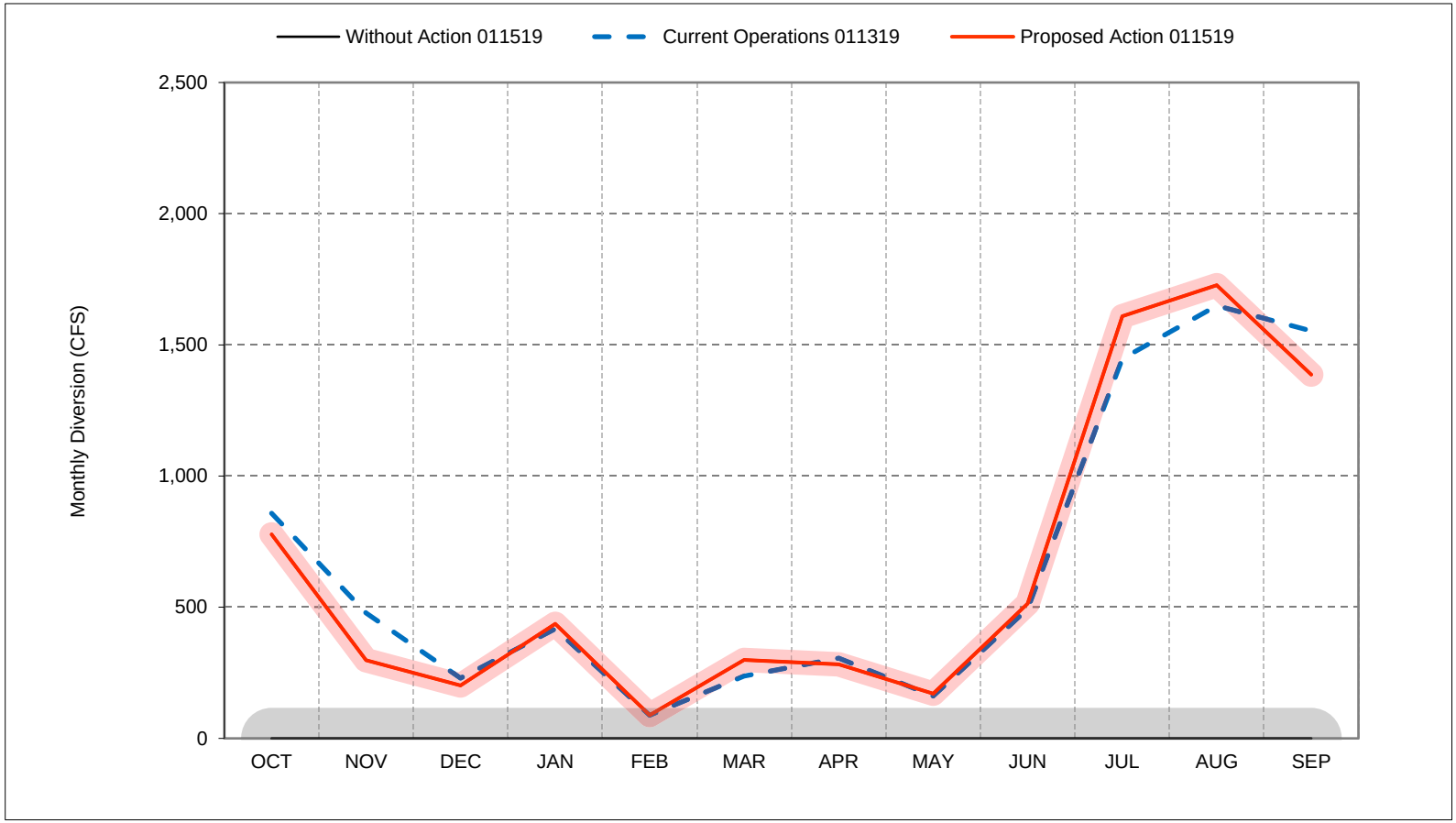
b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

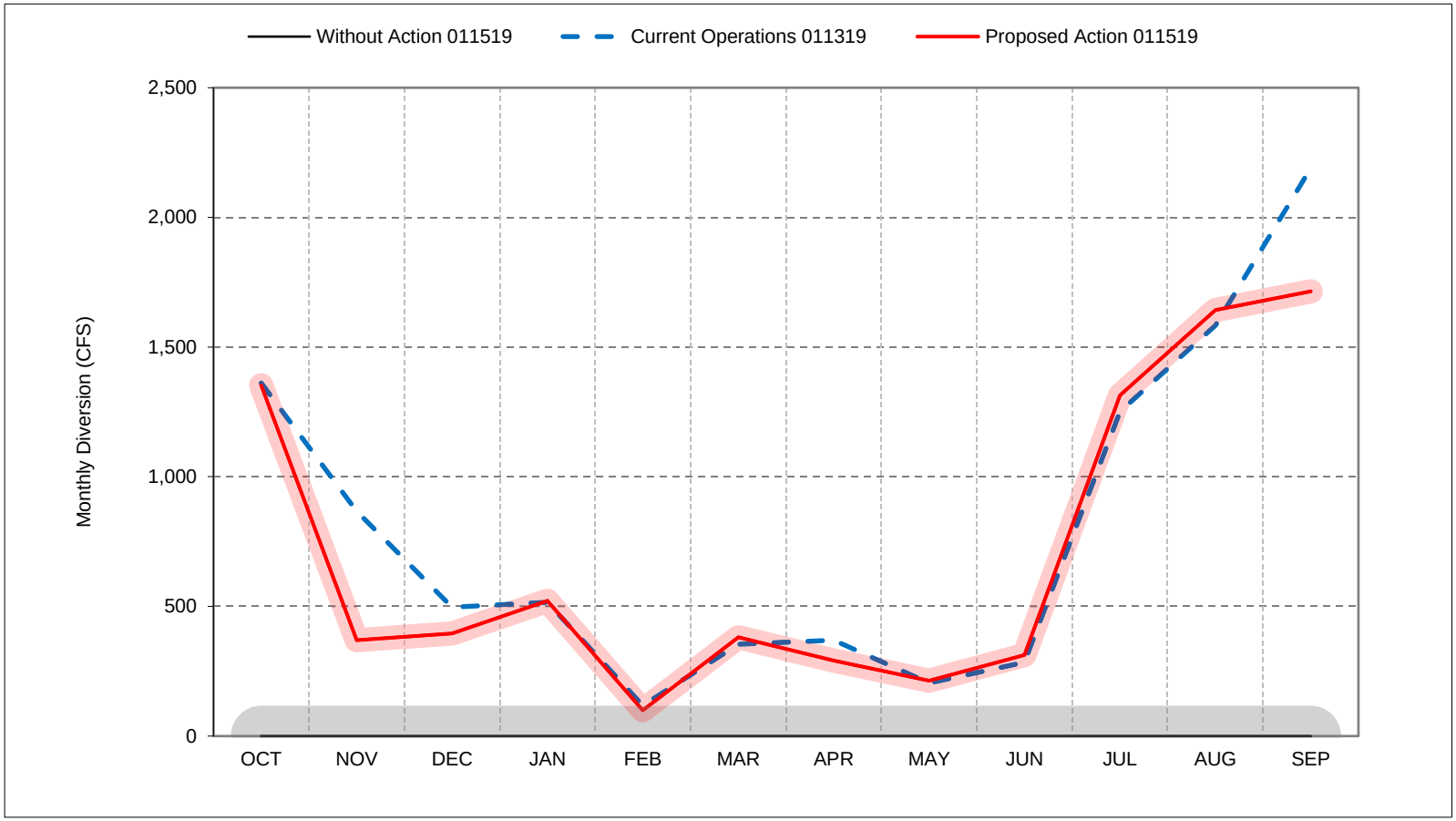
e These are draft results meant for qualitative analysis and are subject to revision.

Figure 46-1. Trinity Import - Clear Creek Tunnel, Long-Term Average Diversion



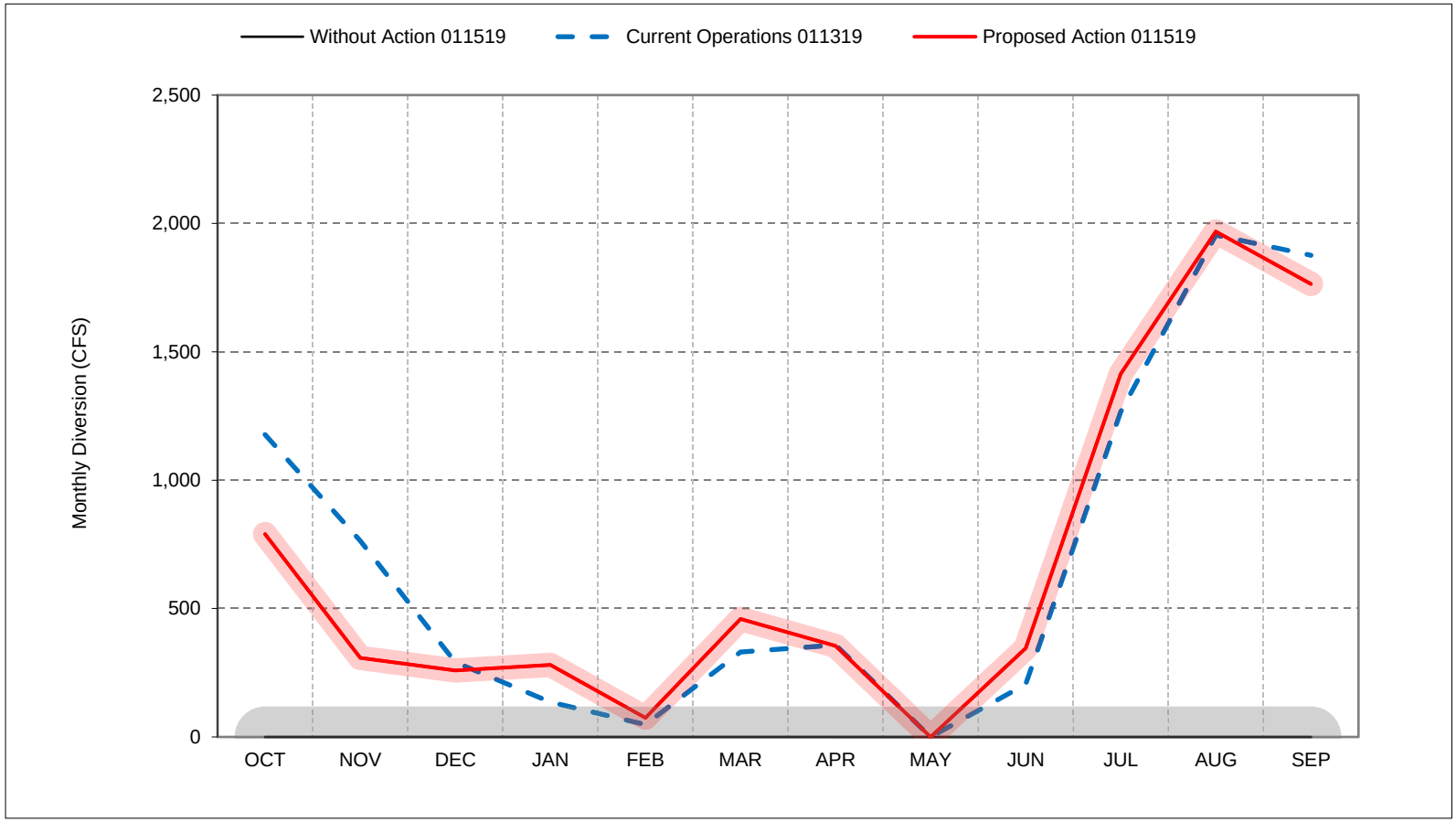
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 46-2. Trinity Import - Clear Creek Tunnel, Wet Year Average Diversion



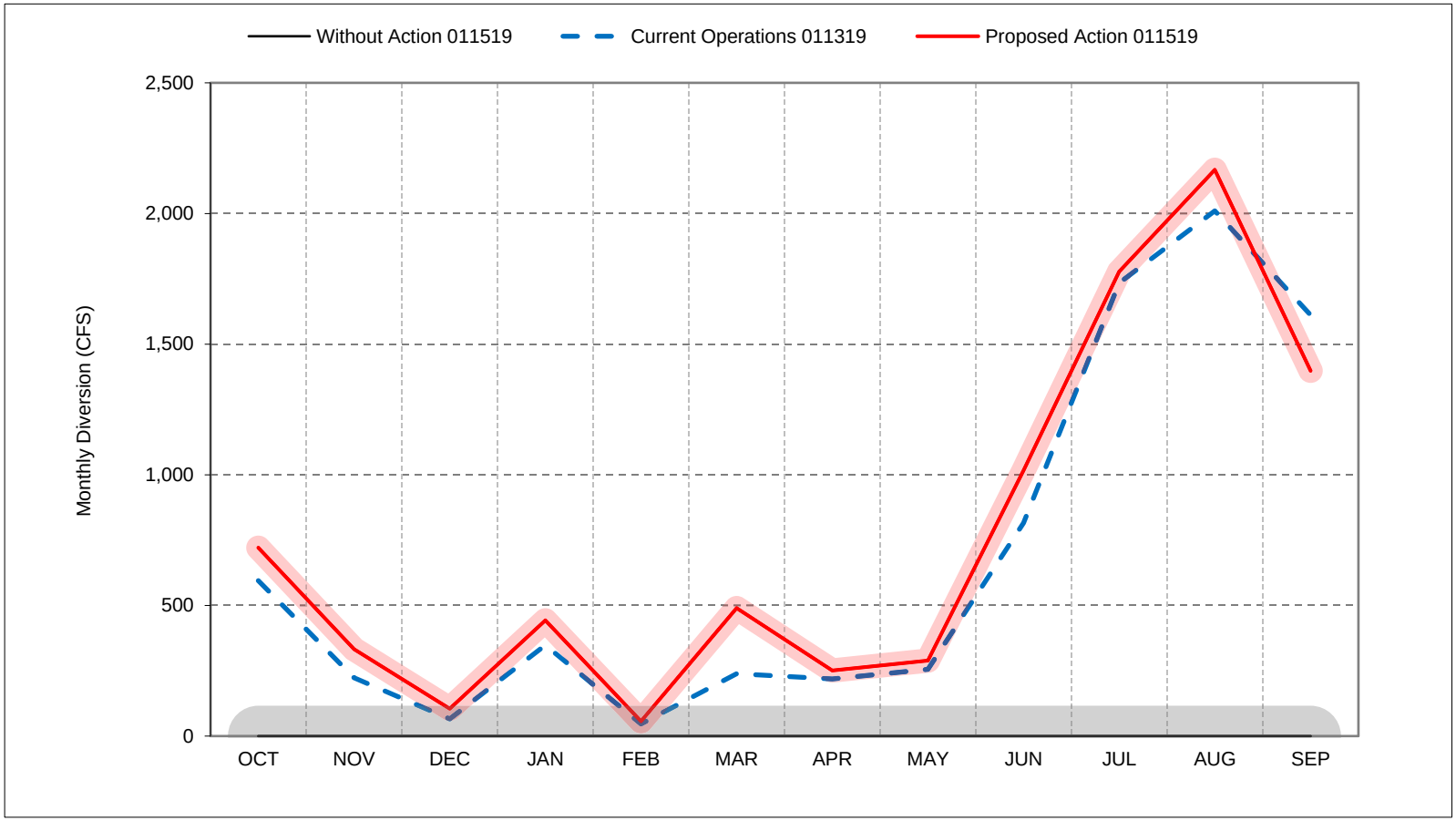
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 46-3. Trinity Import - Clear Creek Tunnel, Above Normal Year Average Diversion



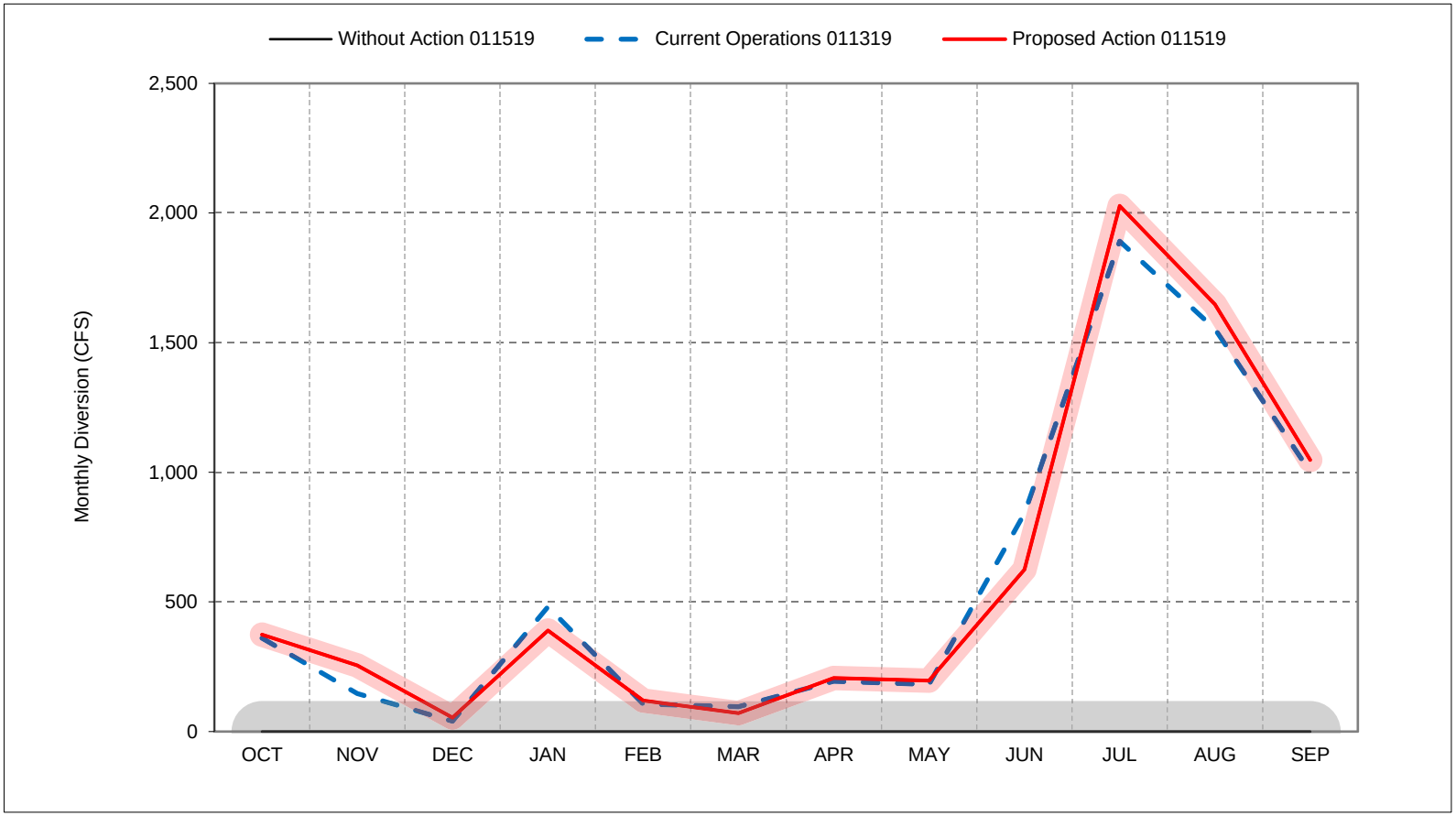
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 46-4. Trinity Import - Clear Creek Tunnel, Below Normal Year Average Diversion



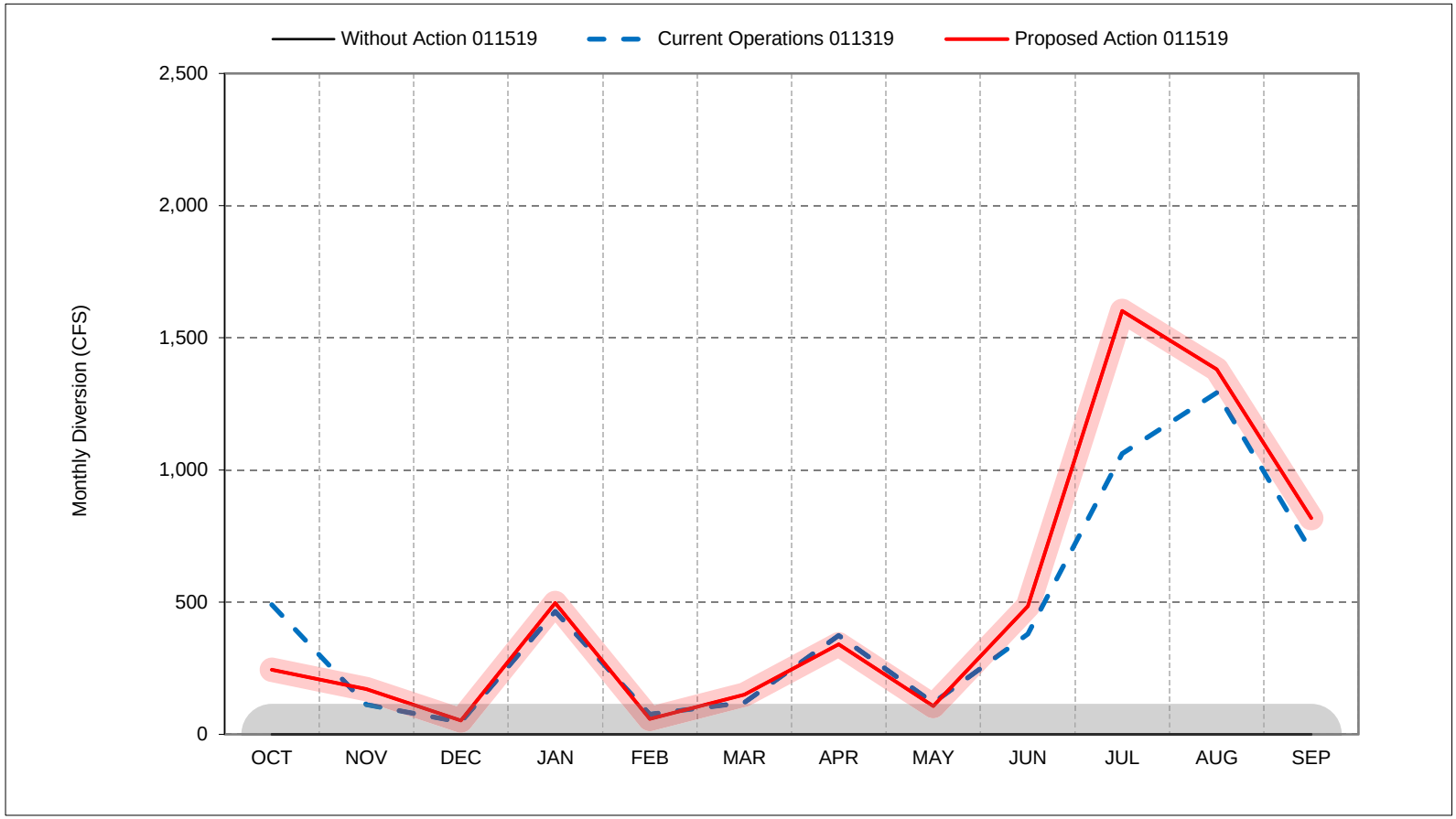
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 46-5. Trinity Import - Clear Creek Tunnel, Dry Year Average Diversion



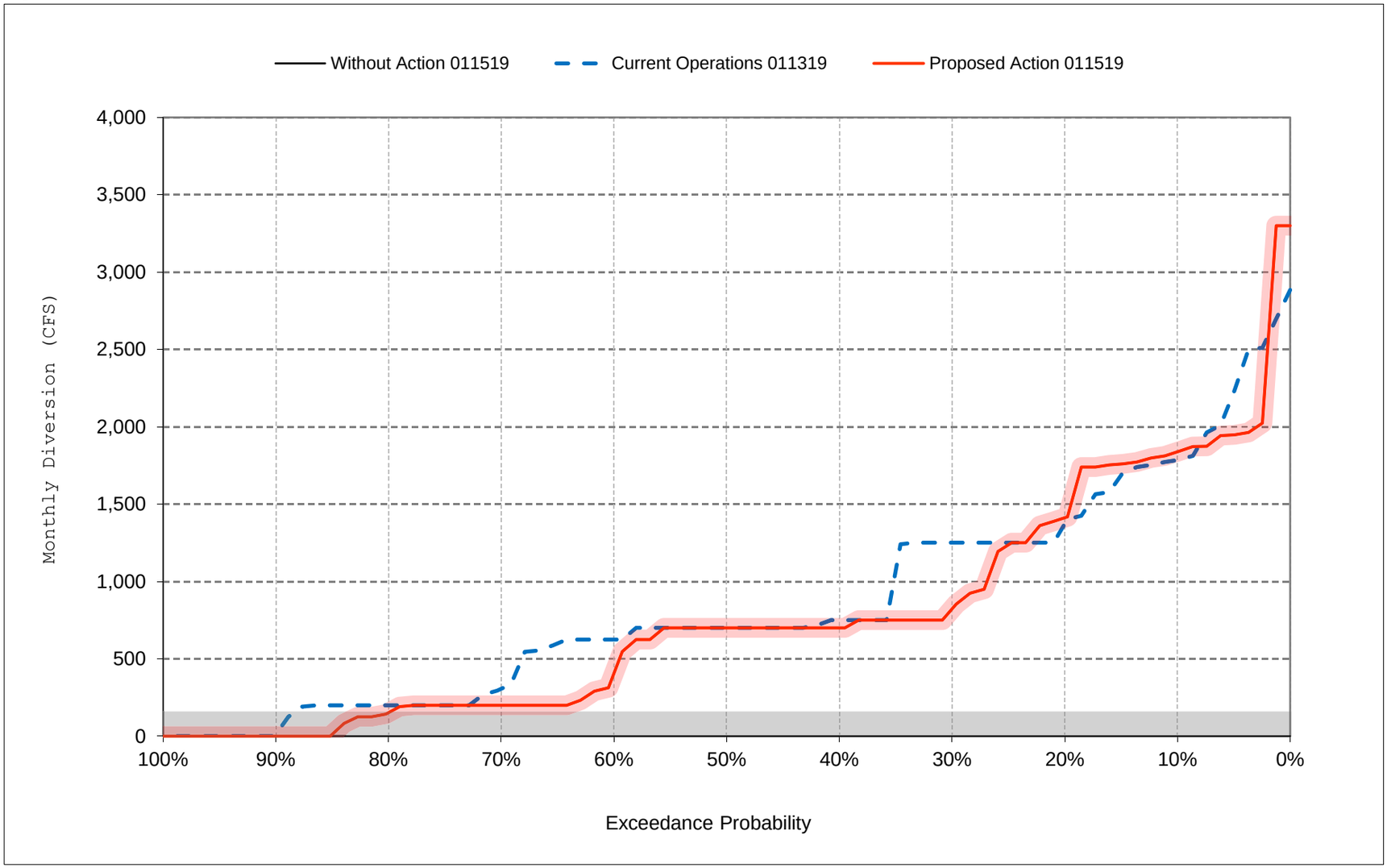
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 46-6. Trinity Import - Clear Creek Tunnel, Critical Year Average Diversion



*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

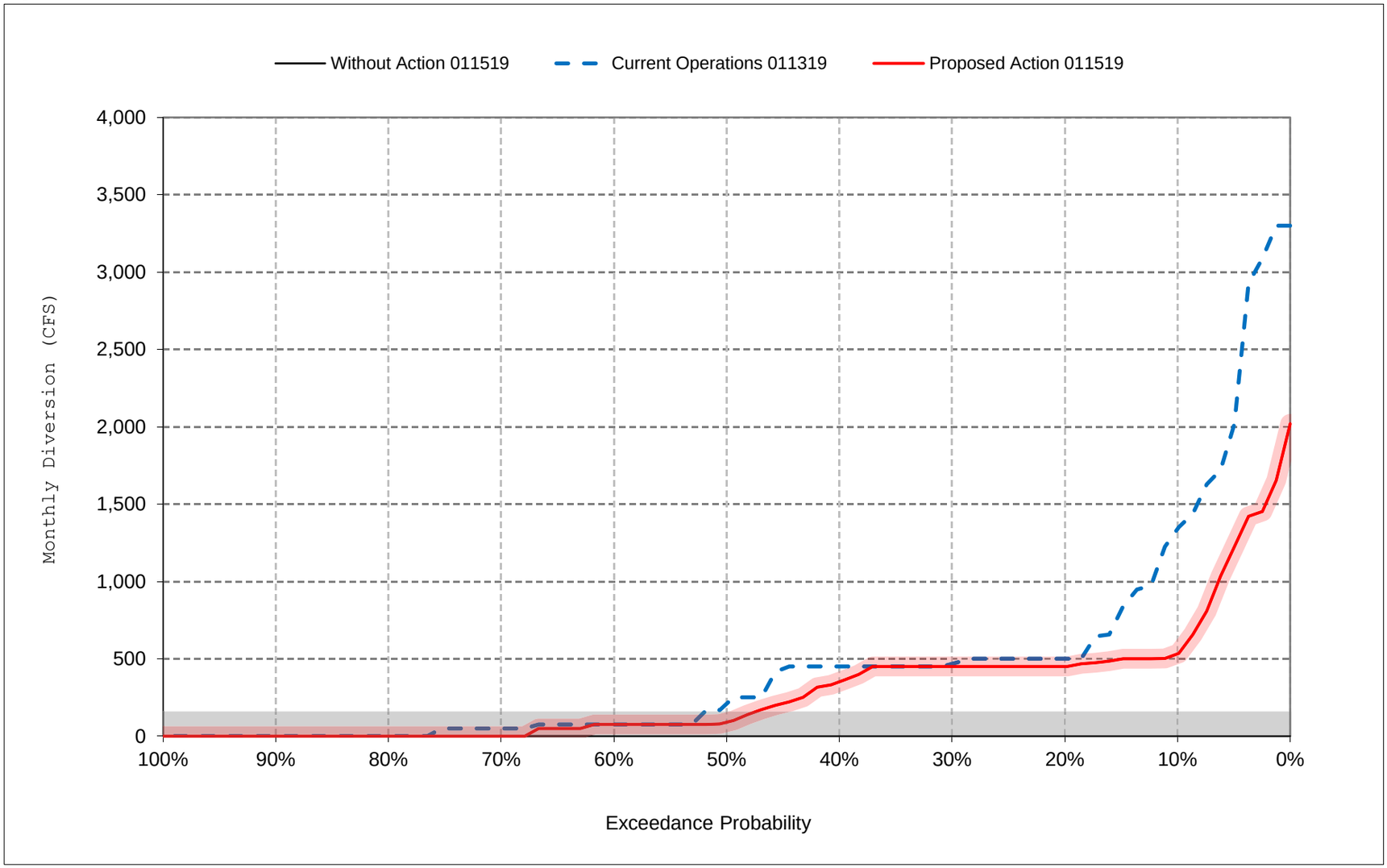
Figure 46-7. Trinity Import - Clear Creek Tunnel, October



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

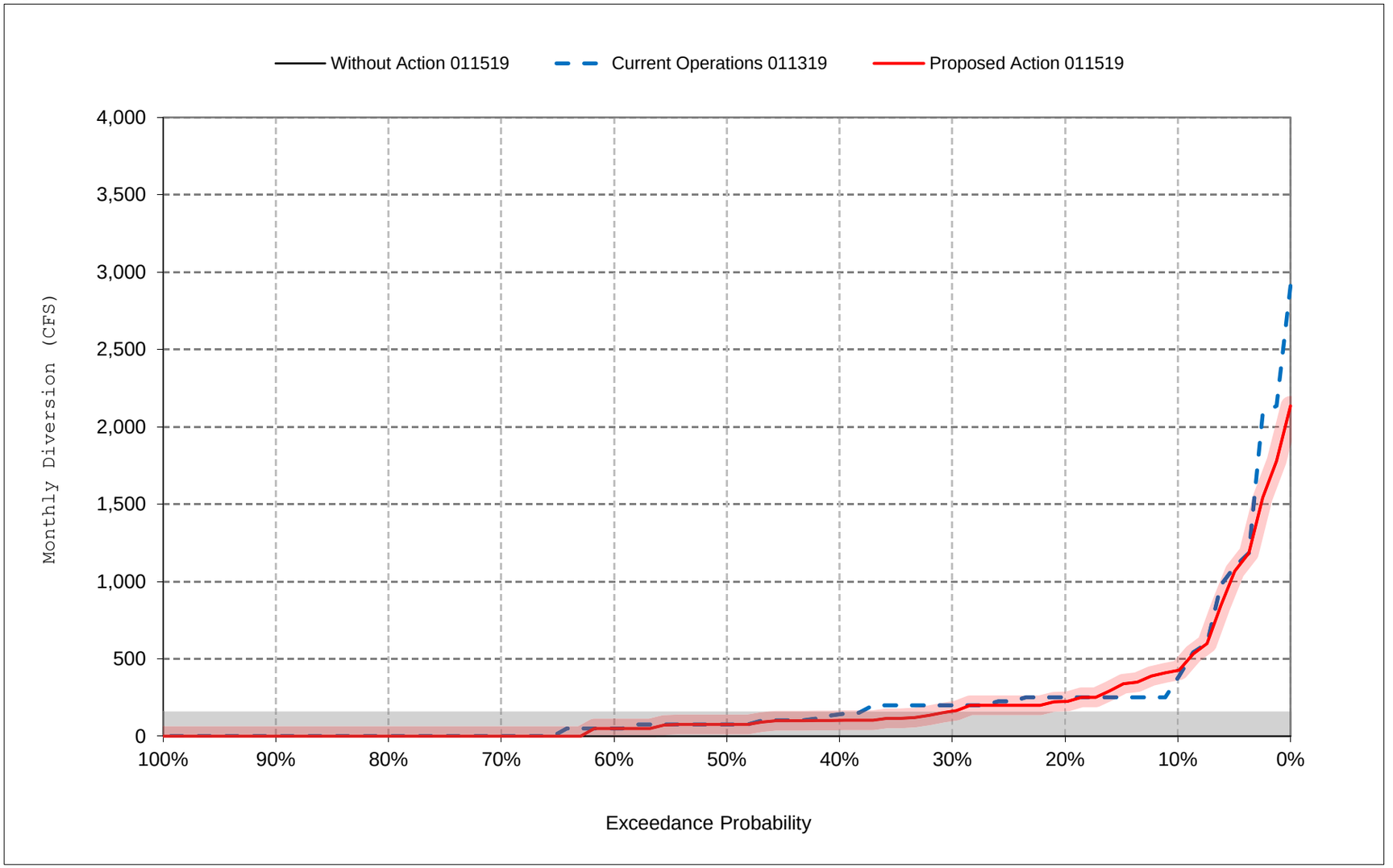
Figure 46-8. Trinity Import - Clear Creek Tunnel, November



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

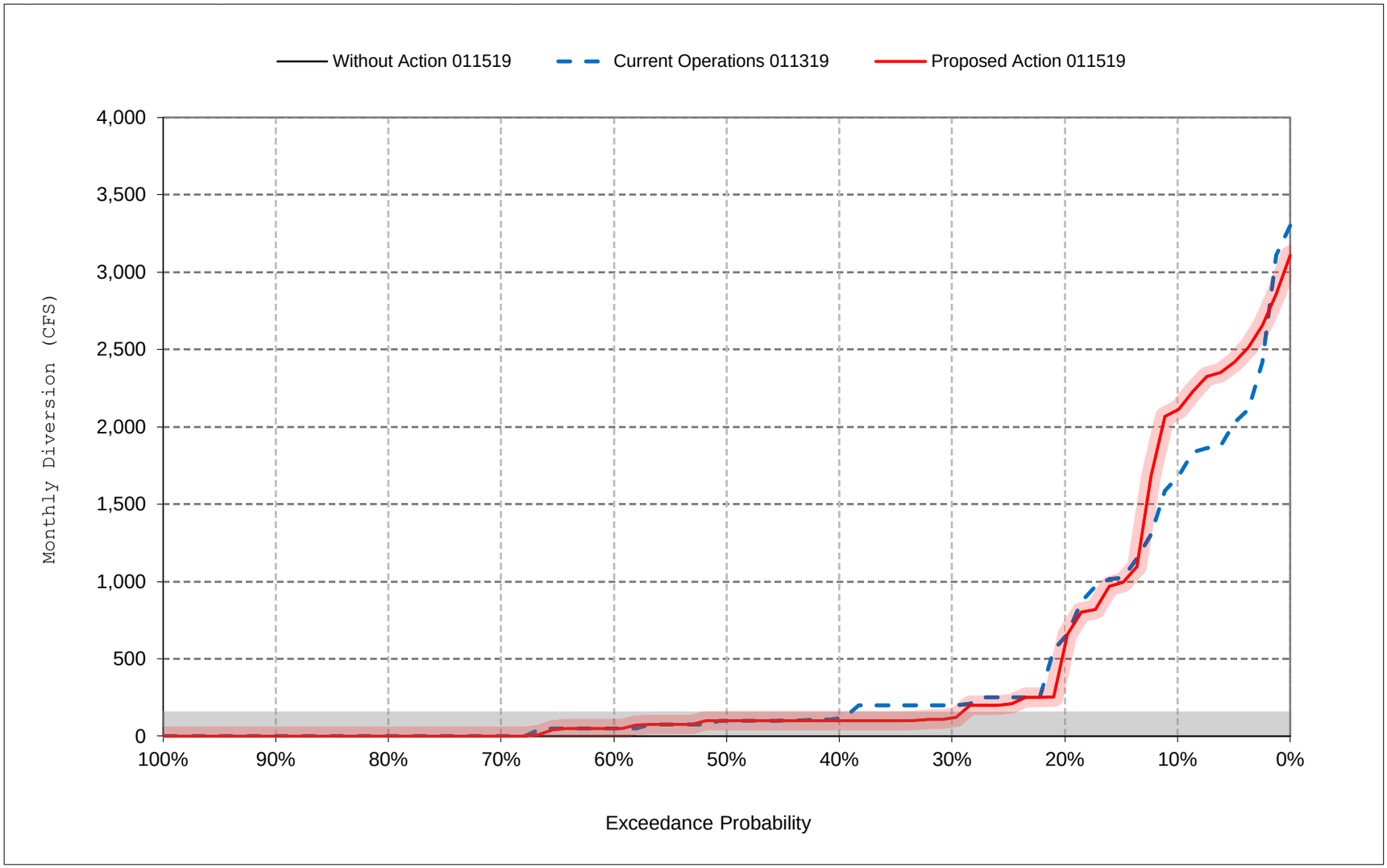
Figure 46-9. Trinity Import - Clear Creek Tunnel, December



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

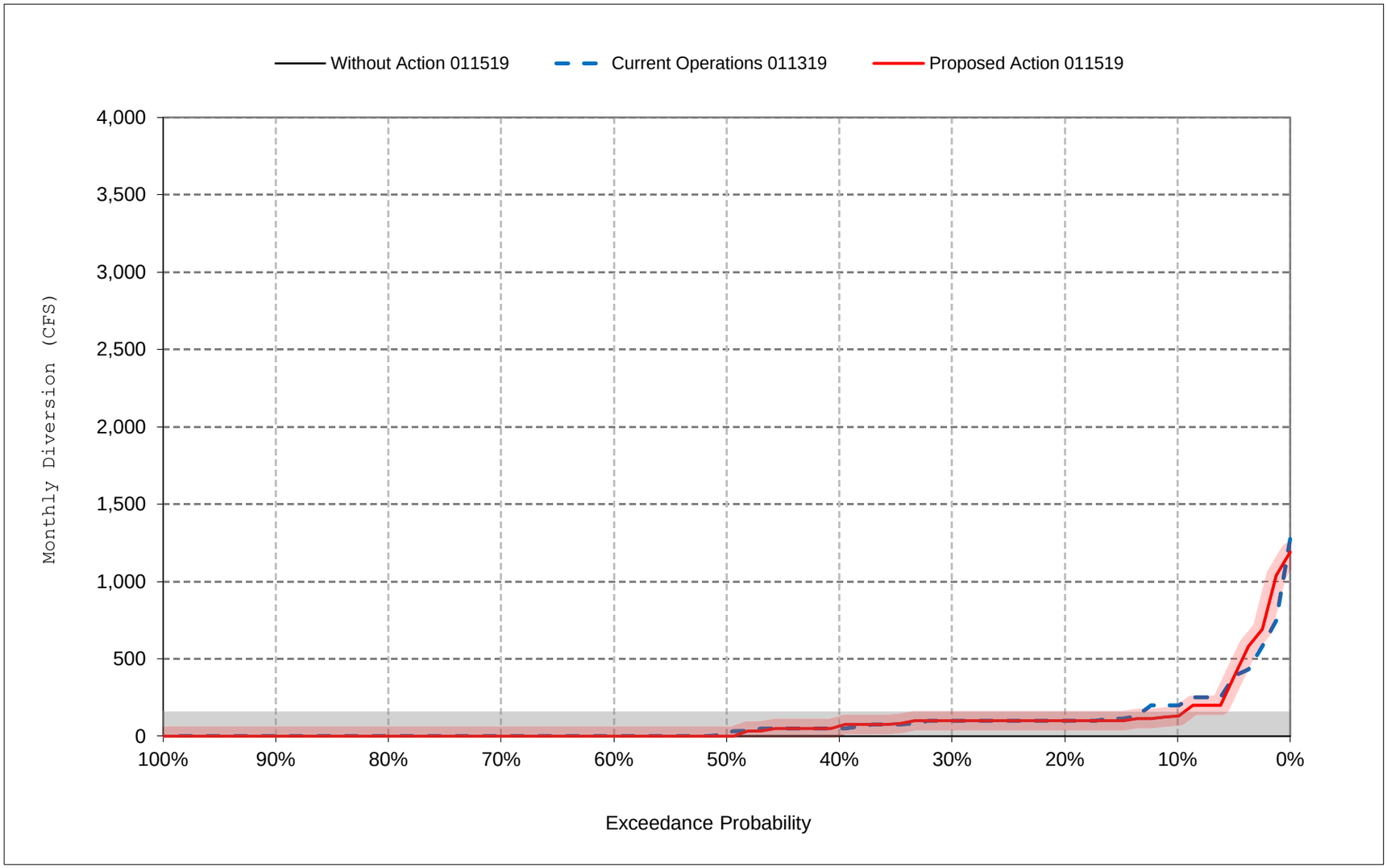
Figure 46-10. Trinity Import - Clear Creek Tunnel, January



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

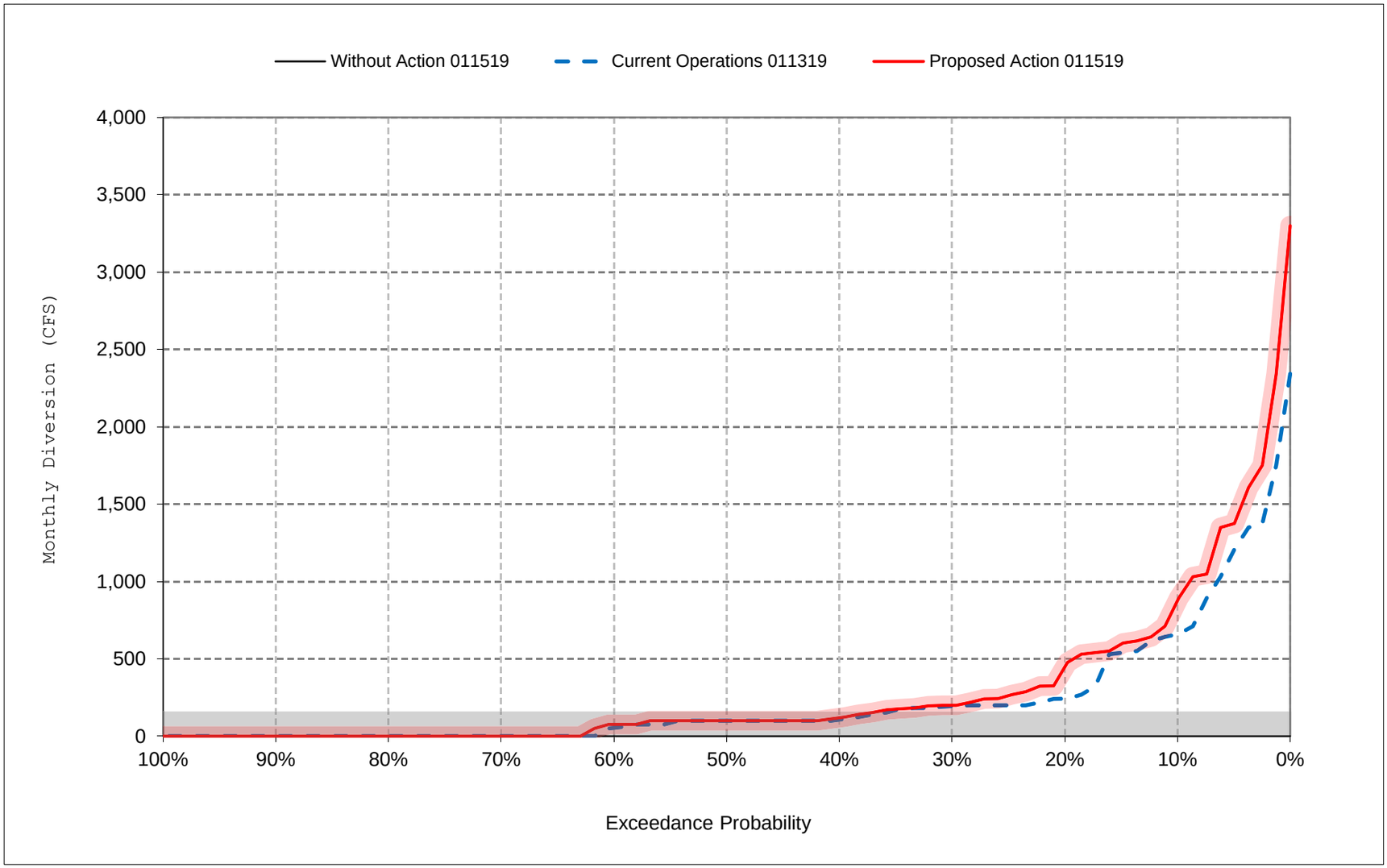
Figure 46-11. Trinity Import - Clear Creek Tunnel, February



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

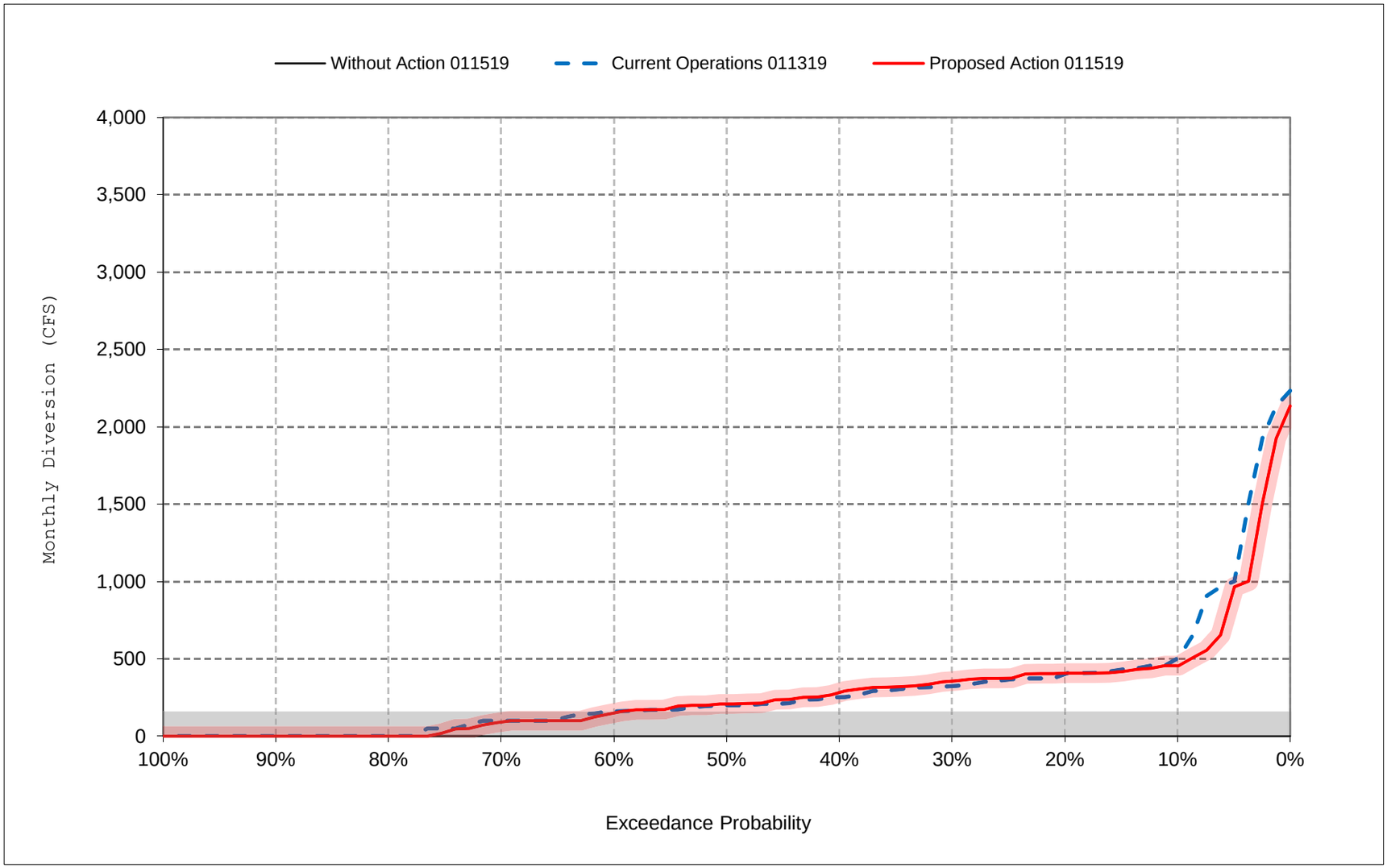
Figure 46-12. Trinity Import - Clear Creek Tunnel, March



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

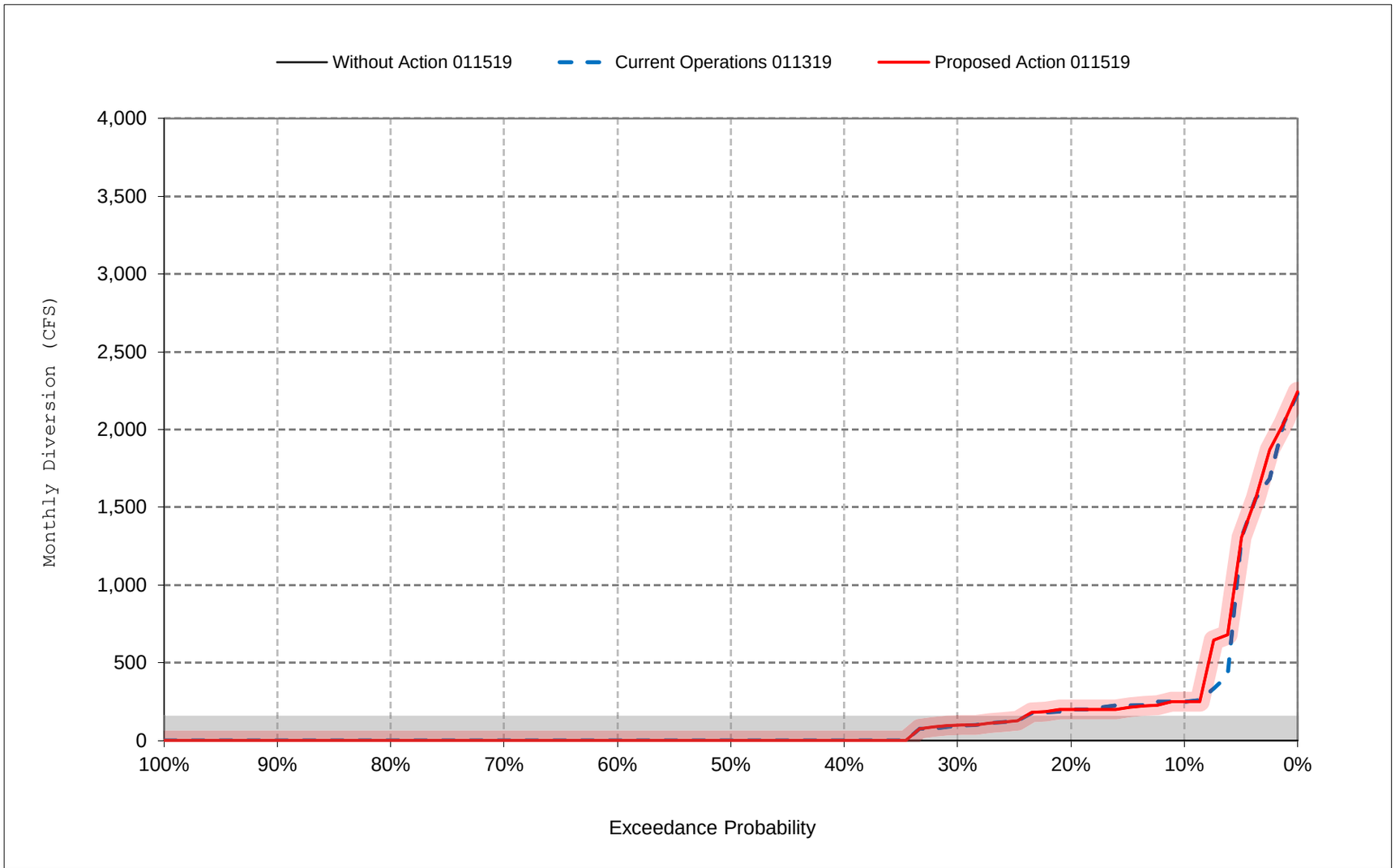
Figure 46-13. Trinity Import - Clear Creek Tunnel, April



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

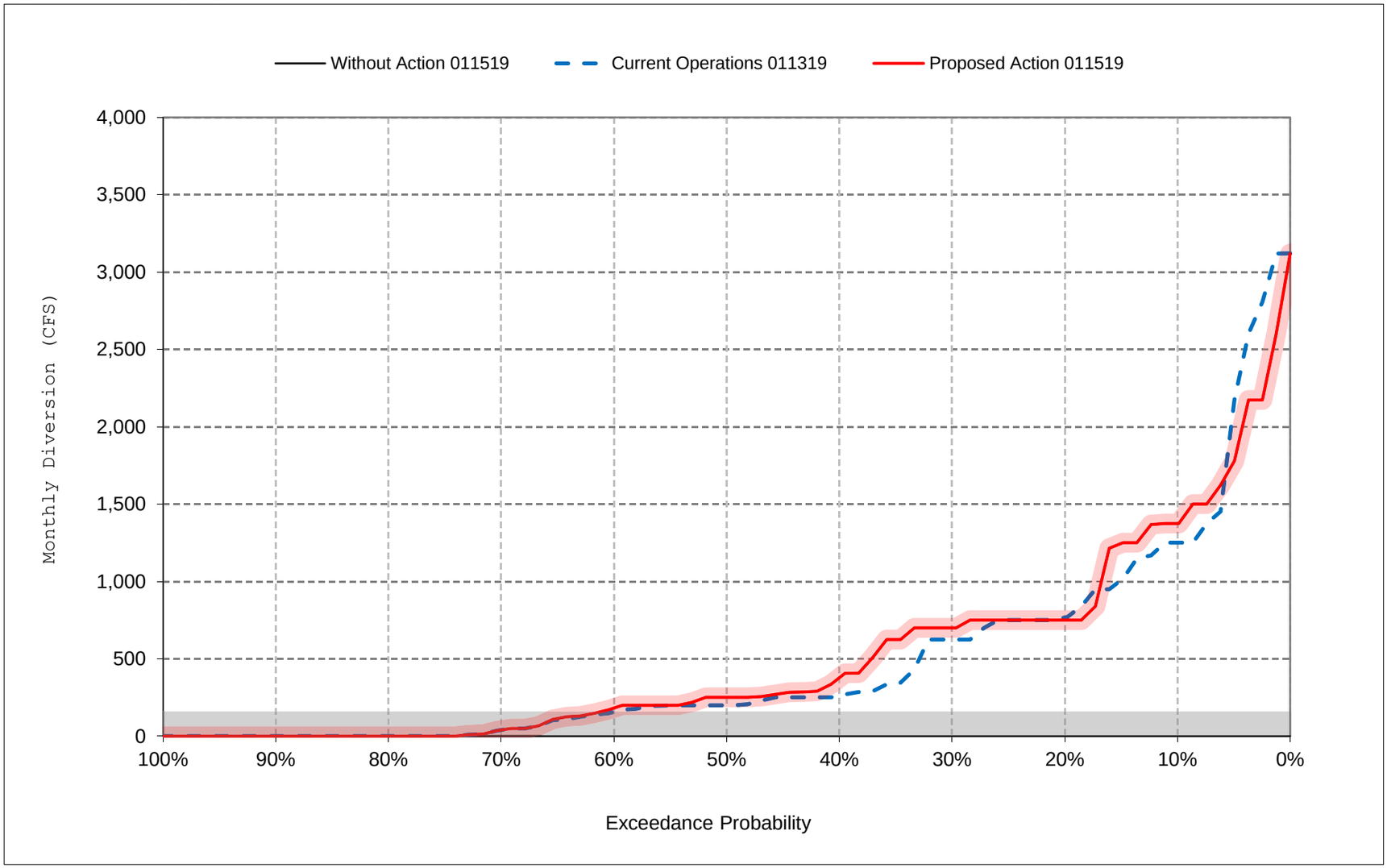
Figure 46-14. Trinity Import - Clear Creek Tunnel, May



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

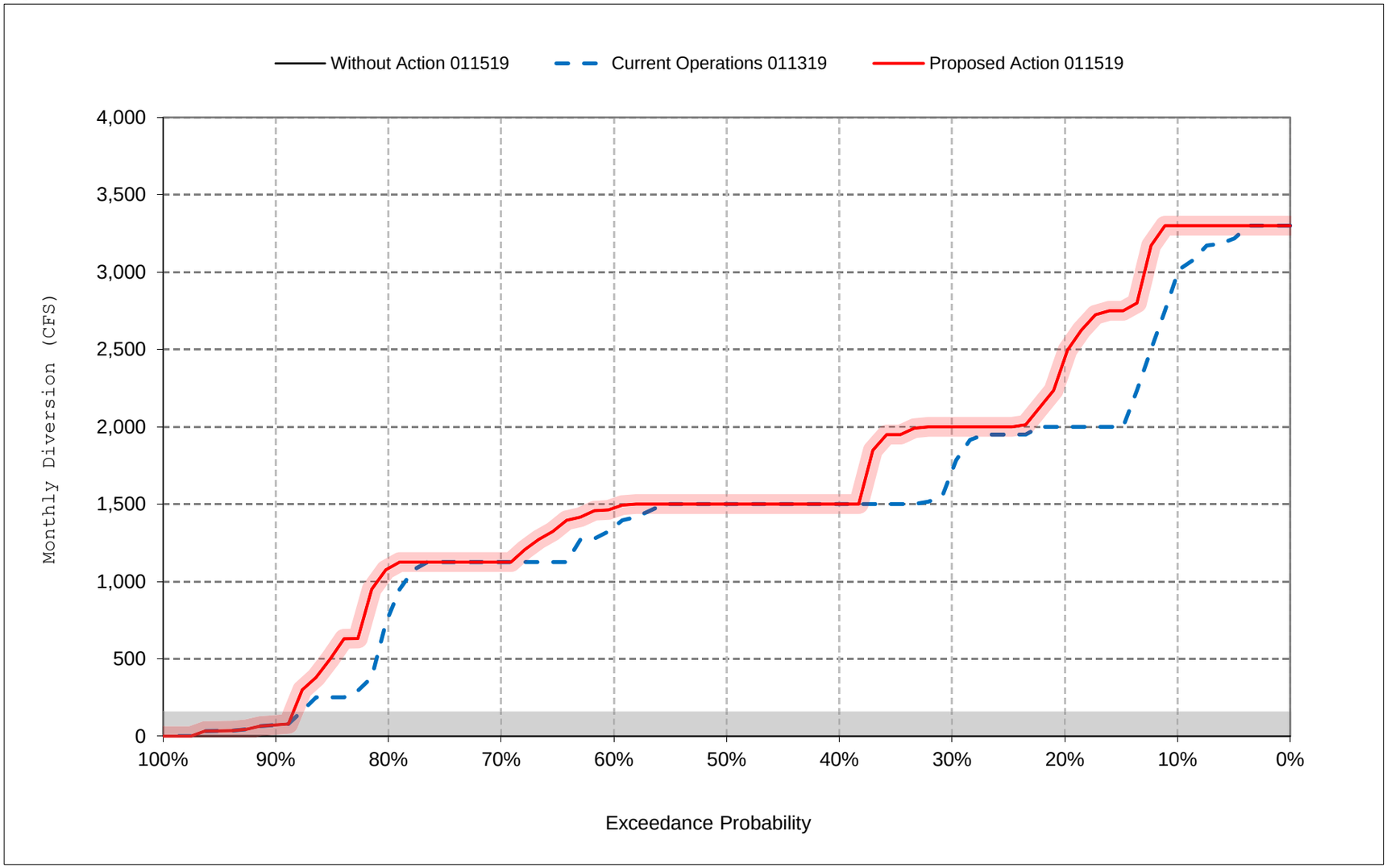
Figure 46-15. Trinity Import - Clear Creek Tunnel, June



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

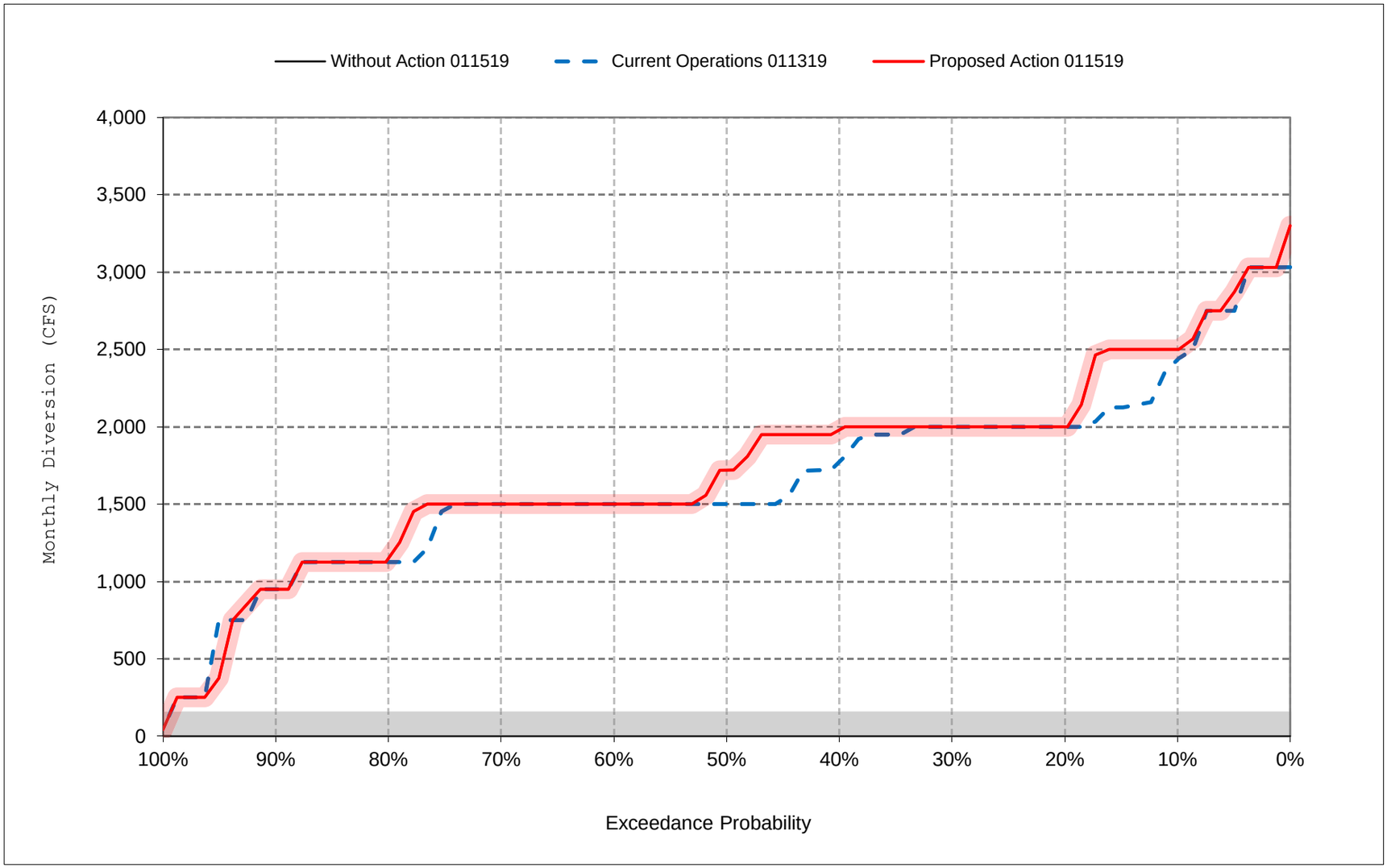
Figure 46-16. Trinity Import - Clear Creek Tunnel, July



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

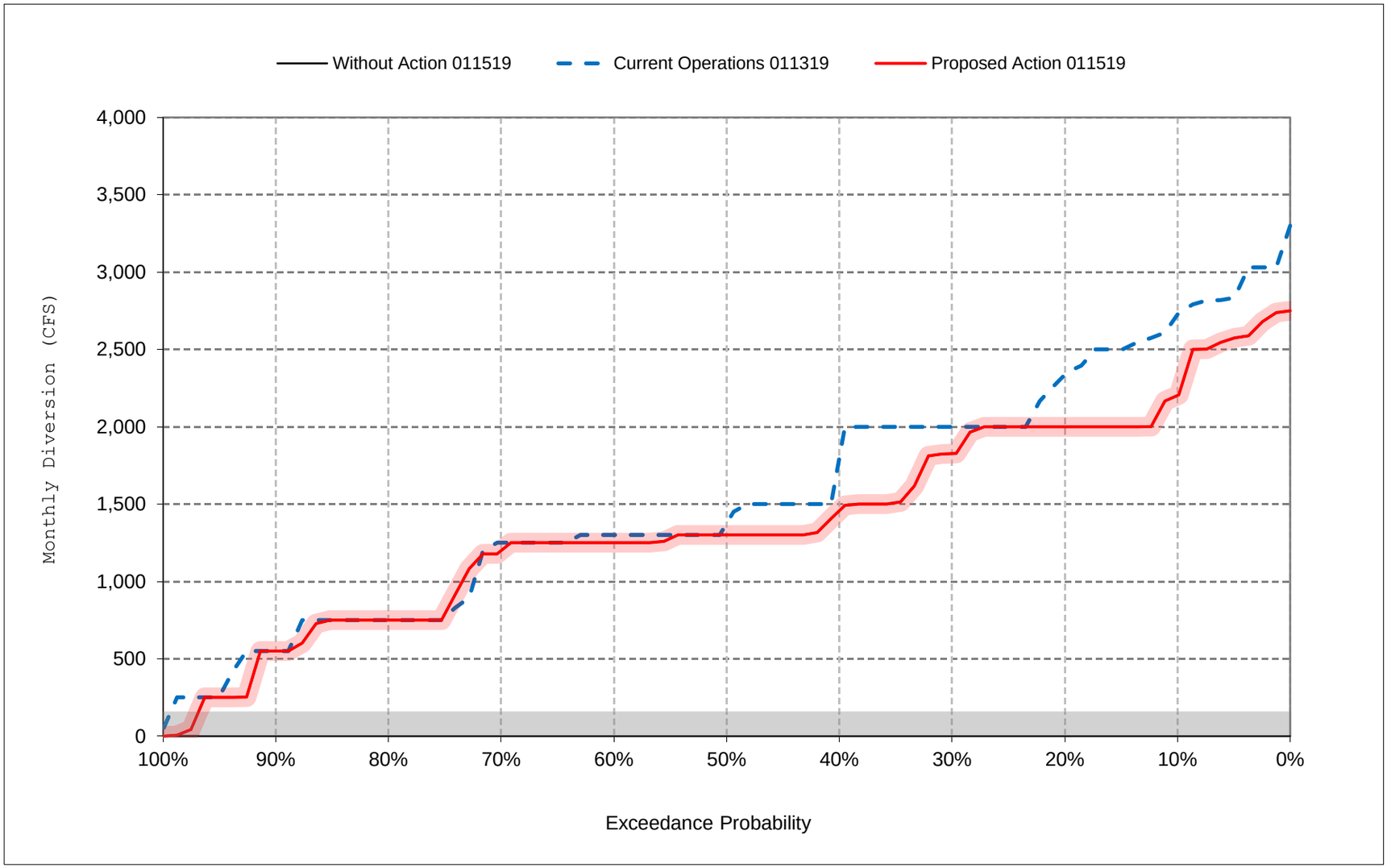
Figure 46-17. Trinity Import - Clear Creek Tunnel, August



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Figure 46-18. Trinity Import - Clear Creek Tunnel, September



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Table 47-1. Red Bluff Diversion - Tehama Colusa Canal, Monthly Diversion

Without Action 011519

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term Full Simulation Period[a]	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types[b,c]												
Wet (32%)	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal (16%)	0	0	0	0	0	0	0	0	0	0	0	0
Below Normal (13%)	0	0	0	0	0	0	0	0	0	0	0	0
Dry (24%)	0	0	0	0	0	0	0	0	0	0	0	0
Critical (15%)	0	0	0	0	0	0	0	0	0	0	0	0

Current Operations 011319

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	186	19	0	0	0	46	454	778	1,189	1,375	1,092	299
20%	169	17	0	0	0	30	342	722	1,096	1,282	1,024	272
30%	141	15	0	0	0	17	277	639	1,004	1,155	900	212
40%	117	3	0	0	0	3	224	532	861	958	756	164
50%	105	0	0	0	0	0	202	476	768	879	663	141
60%	83	0	0	0	0	0	163	370	656	725	579	114
70%	76	0	0	0	0	0	95	302	518	605	478	94
80%	66	0	0	0	0	0	41	221	356	423	334	73
90%	56	0	0	0	0	0	22	129	222	245	195	24
Long Term Full Simulation Period[a]	115	7	0	0	2	18	215	463	729	839	663	157
Water Year Types[b,c]												
Wet (32%)	146	7	0	0	0	10	179	631	1,042	1,202	953	225
Above Normal (16%)	121	4	0	0	0	8	284	664	996	1,140	893	213
Below Normal (13%)	114	8	0	0	8	50	321	468	658	778	611	134
Dry (24%)	93	4	0	0	4	13	185	276	467	529	420	73
Critical (15%)	76	14	0	0	1	22	171	185	259	299	238	113

Current Operations 011319 minus Without Action 011519

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	186	19	0	0	0	46	454	778	1,189	1,375	1,092	299
20%	169	17	0	0	0	30	342	722	1,096	1,282	1,024	272
30%	141	15	0	0	0	17	277	639	1,004	1,155	900	212
40%	117	3	0	0	0	3	224	532	861	958	756	164
50%	105	0	0	0	0	0	202	476	768	879	663	141
60%	83	0	0	0	0	0	163	370	656	725	579	114
70%	76	0	0	0	0	0	95	302	518	605	478	94
80%	66	0	0	0	0	0	41	221	356	423	334	73
90%	56	0	0	0	0	0	22	129	222	245	195	24
Long Term Full Simulation Period[a]	115	7	0	0	2	18	215	463	729	839	663	157
Water Year Types[b,c]												
Wet (32%)	146	7	0	0	0	10	179	631	1,042	1,202	953	225
Above Normal (16%)	121	4	0	0	0	8	284	664	996	1,140	893	213
Below Normal (13%)	114	8	0	0	8	50	321	468	658	778	611	134
Dry (24%)	93	4	0	0	4	13	185	276	467	529	420	73
Critical (15%)	76	14	0	0	1	22	171	185	259	299	238	113

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 47-2. Red Bluff Diversion - Tehama Colusa Canal, Monthly Diversion

Without Action 011519

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term Full Simulation Period[a]	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types[b,c]												
Wet (32%)	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal (16%)	0	0	0	0	0	0	0	0	0	0	0	0
Below Normal (13%)	0	0	0	0	0	0	0	0	0	0	0	0
Dry (24%)	0	0	0	0	0	0	0	0	0	0	0	0
Critical (15%)	0	0	0	0	0	0	0	0	0	0	0	0

Proposed Action 011519

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	153	23	0	0	0	55	470	831	1,189	1,377	1,094	299
20%	132	19	0	0	0	35	412	764	1,106	1,283	1,027	272
30%	103	17	0	0	0	21	345	725	1,059	1,252	991	247
40%	86	17	0	0	0	3	286	643	1,012	1,138	891	214
50%	66	17	0	0	0	1	204	529	929	1,065	825	197
60%	49	17	0	0	0	0	182	456	832	911	717	165
70%	35	17	0	0	0	0	105	330	545	645	526	108
80%	22	17	0	0	0	0	45	248	426	500	419	65
90%	5	17	0	0	0	0	24	133	302	343	278	19
Long Term Full Simulation Period[a]	75	17	0	0	2	21	247	512	804	926	736	175
Water Year Types[b,c]												
Wet (32%)	97	17	0	0	0	12	196	649	1,075	1,238	980	237
Above Normal (16%)	78	17	0	0	0	9	310	680	1,061	1,213	951	236
Below Normal (13%)	85	21	0	0	9	65	385	641	839	992	778	166
Dry (24%)	48	16	0	0	4	15	228	333	573	648	514	96
Critical (15%)	59	18	0	0	1	25	195	214	295	343	302	114

Proposed Action 011519 minus Without Action 011519

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	153	23	0	0	0	55	470	831	1,189	1,377	1,094	299
20%	132	19	0	0	0	35	412	764	1,106	1,283	1,027	272
30%	103	17	0	0	0	21	345	725	1,059	1,252	991	247
40%	86	17	0	0	0	3	286	643	1,012	1,138	891	214
50%	66	17	0	0	0	1	204	529	929	1,065	825	197
60%	49	17	0	0	0	0	182	456	832	911	717	165
70%	35	17	0	0	0	0	105	330	545	645	526	108
80%	22	17	0	0	0	0	45	248	426	500	419	65
90%	5	17	0	0	0	0	24	133	302	343	278	19
Long Term Full Simulation Period[a]	75	17	0	0	2	21	247	512	804	926	736	175
Water Year Types[b,c]												
Wet (32%)	97	17	0	0	0	12	196	649	1,075	1,238	980	237
Above Normal (16%)	78	17	0	0	0	9	310	680	1,061	1,213	951	236
Below Normal (13%)	85	21	0	0	9	65	385	641	839	992	778	166
Dry (24%)	48	16	0	0	4	15	228	333	573	648	514	96
Critical (15%)	59	18	0	0	1	25	195	214	295	343	302	114

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 47-3. Red Bluff Diversion - Tehama Colusa Canal, Monthly Diversion

Current Operations 011319

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	186	19	0	0	0	46	454	778	1,189	1,375	1,092	299
20%	169	17	0	0	0	30	342	722	1,096	1,282	1,024	272
30%	141	15	0	0	0	17	277	639	1,004	1,155	900	212
40%	117	3	0	0	0	3	224	532	861	958	756	164
50%	105	0	0	0	0	0	202	476	768	879	663	141
60%	83	0	0	0	0	0	163	370	656	725	579	114
70%	76	0	0	0	0	0	95	302	518	605	478	94
80%	66	0	0	0	0	0	41	221	356	423	334	73
90%	56	0	0	0	0	0	22	129	222	245	195	24
Long Term												
Full Simulation Period[a]	115	7	0	0	2	18	215	463	729	839	663	157
Water Year Types[b,c]												
Wet (32%)	146	7	0	0	0	10	179	631	1,042	1,202	953	225
Above Normal (16%)	121	4	0	0	0	8	284	664	996	1,140	893	213
Below Normal (13%)	114	8	0	0	8	50	321	468	658	778	611	134
Dry (24%)	93	4	0	0	4	13	185	276	467	529	420	73
Critical (15%)	76	14	0	0	1	22	171	185	259	299	238	113

Proposed Action 011519

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	153	23	0	0	0	55	470	831	1,189	1,377	1,094	299
20%	132	19	0	0	0	35	412	764	1,106	1,283	1,027	272
30%	103	17	0	0	0	21	345	725	1,059	1,252	991	247
40%	86	17	0	0	0	3	286	643	1,012	1,138	891	214
50%	66	17	0	0	0	1	204	529	929	1,065	825	197
60%	49	17	0	0	0	0	182	456	832	911	717	165
70%	35	17	0	0	0	0	105	330	545	645	526	108
80%	22	17	0	0	0	0	45	248	426	500	419	65
90%	5	17	0	0	0	0	24	133	302	343	278	19
Long Term												
Full Simulation Period[a]	75	17	0	0	2	21	247	512	804	926	736	175
Water Year Types[b,c]												
Wet (32%)	97	17	0	0	0	12	196	649	1,075	1,238	980	237
Above Normal (16%)	78	17	0	0	0	9	310	680	1,061	1,213	951	236
Below Normal (13%)	85	21	0	0	9	65	385	641	839	992	778	166
Dry (24%)	48	16	0	0	4	15	228	333	573	648	514	96
Critical (15%)	59	18	0	0	1	25	195	214	295	343	302	114

Proposed Action 011519 minus Current Operations 011319

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	**-34**	4	0	0	0	9	16	53	0	2	3	0
20%	**-37**	2	0	0	0	5	70	43	10	1	4	0
30%	**-38**	2	0	0	0	4	68	86	55	97	91	35
40%	**-30**	14	0	0	0	0	62	112	151	181	135	51
50%	**-38**	17	0	0	0	0	2	53	161	186	163	55
60%	**-33**	17	0	0	0	0	19	86	176	186	138	51
70%	**-41**	17	0	0	0	0	10	28	27	40	49	14
80%	**-44**	17	0	0	0	0	4	27	70	77	85	**-7**
90%	**-51**	17	0	0	0	0	2	3	80	98	83	**-4**
Long Term												
Full Simulation Period[a]	**-40**	10	0	0	0	4	32	50	76	87	73	18
Water Year Types[b,c]												
Wet (32%)	**-48**	10	0	0	0	1	17	18	32	36	27	13
Above Normal (16%)	**-43**	14	0	0	0	1	26	17	66	73	58	22
Below Normal (13%)	**-28**	13	0	0	0	16	64	172	180	214	168	32
Dry (24%)	**-46**	11	0	0	0	2	43	57	105	119	95	23
Critical (15%)	**-17**	4	0	0	0	3	24	29	36	44	64	1

a Based on the 82-year simulation period.

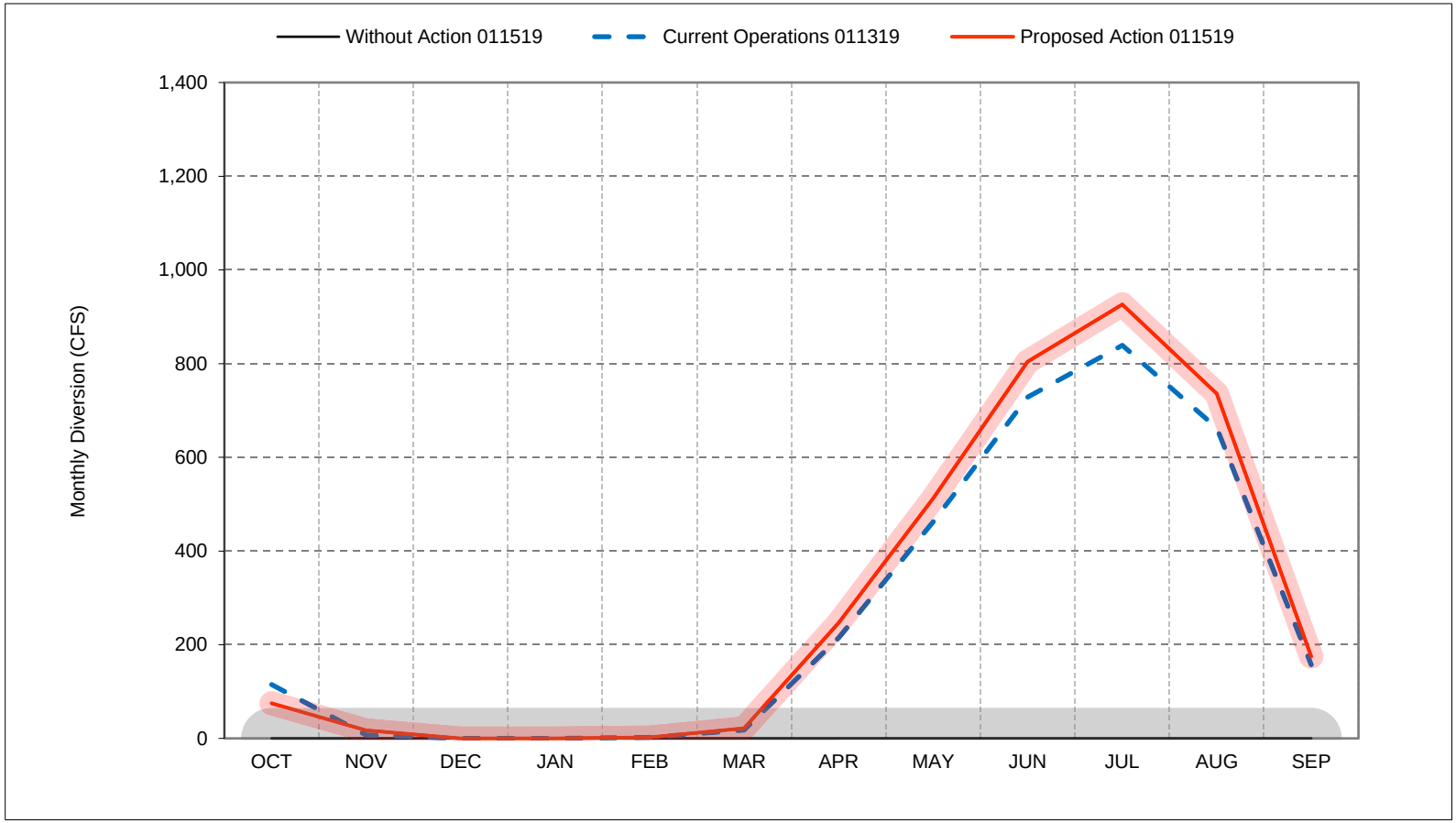
b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

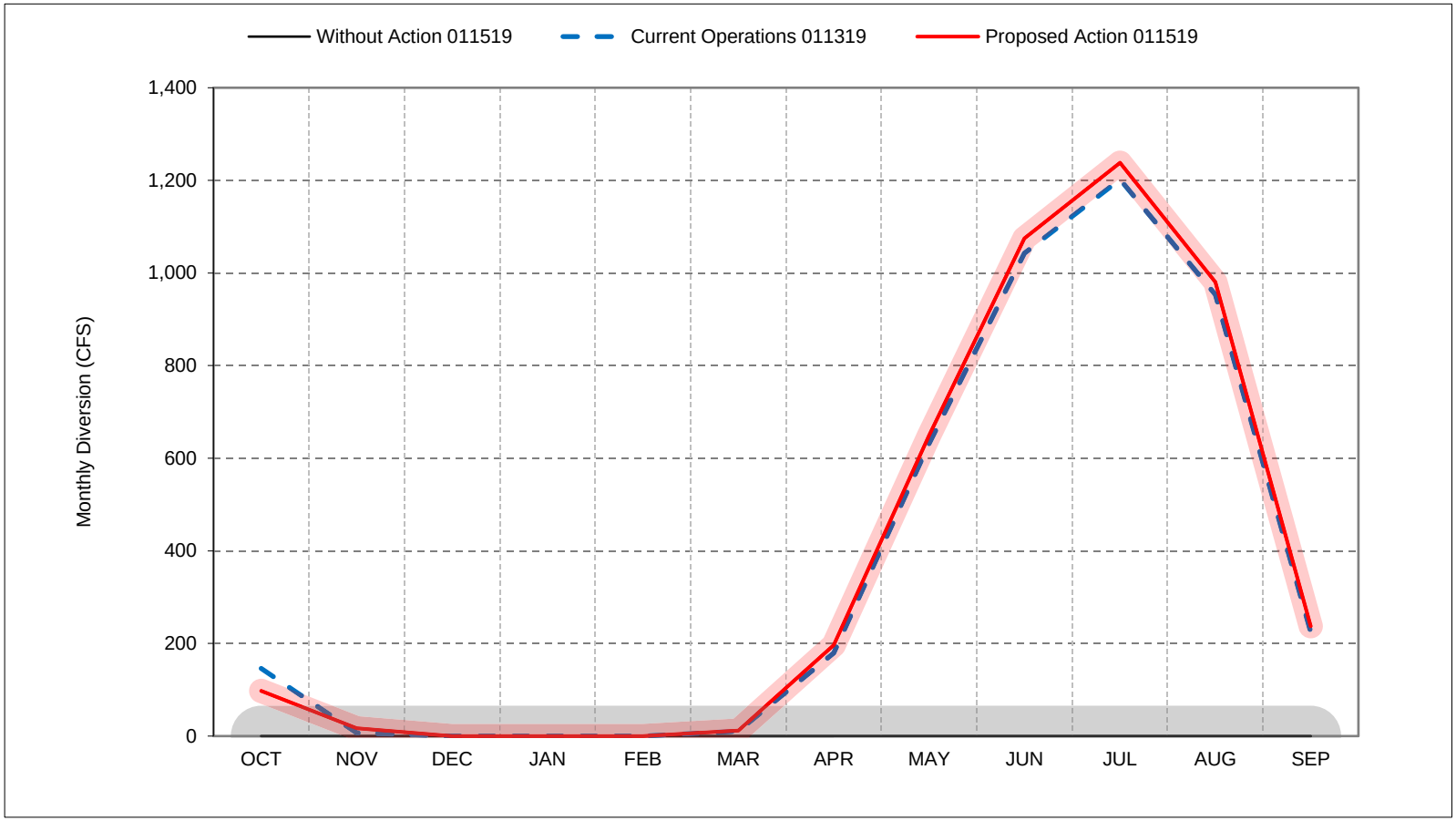
e These are draft results meant for qualitative analysis and are subject to revision.

Figure 47-1. Red Bluff Diversion - Tehama Colusa Canal, Long-Term Average Diversion



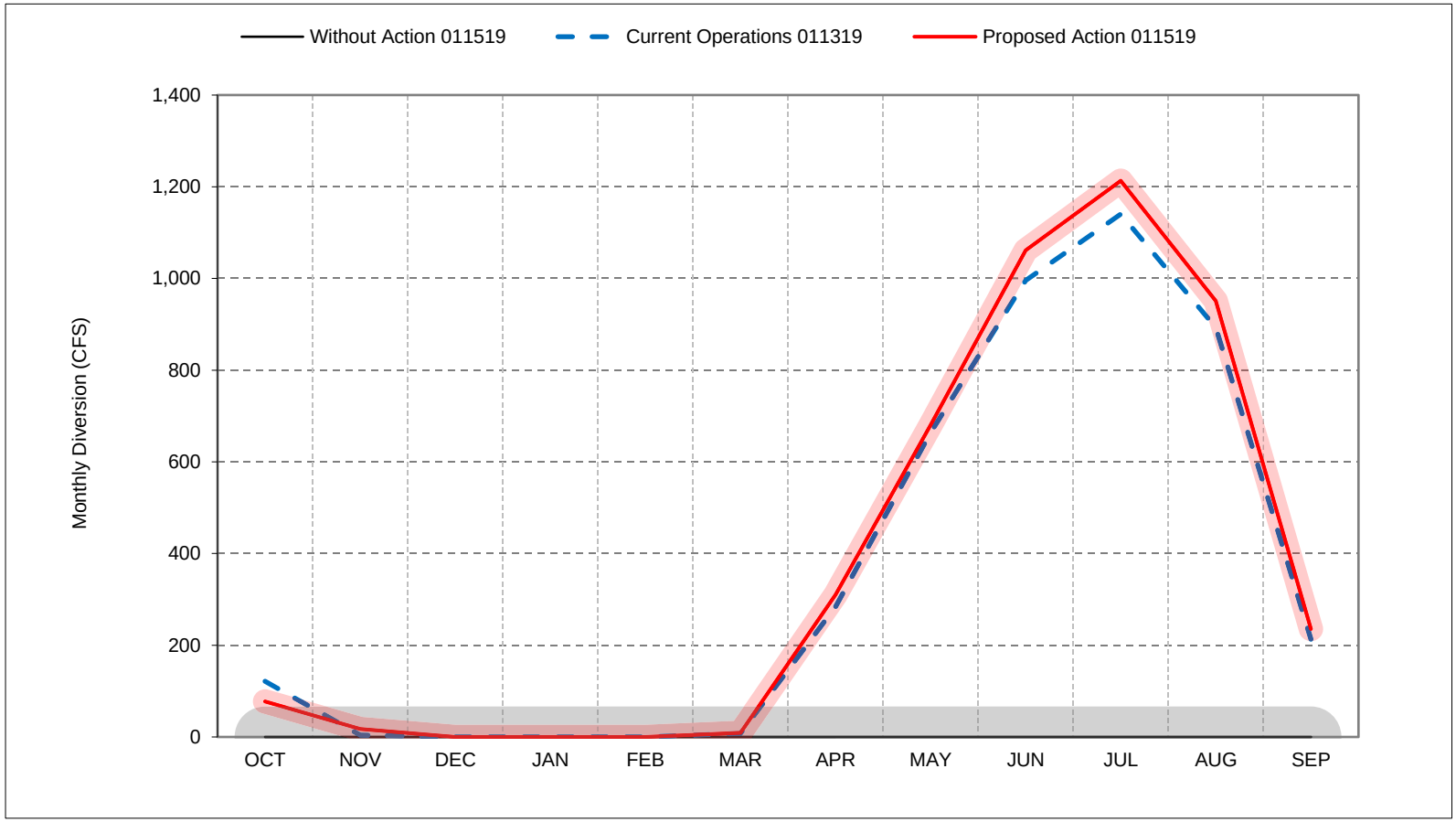
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 47-2. Red Bluff Diversion - Tehama Colusa Canal, Wet Year Average Diversion



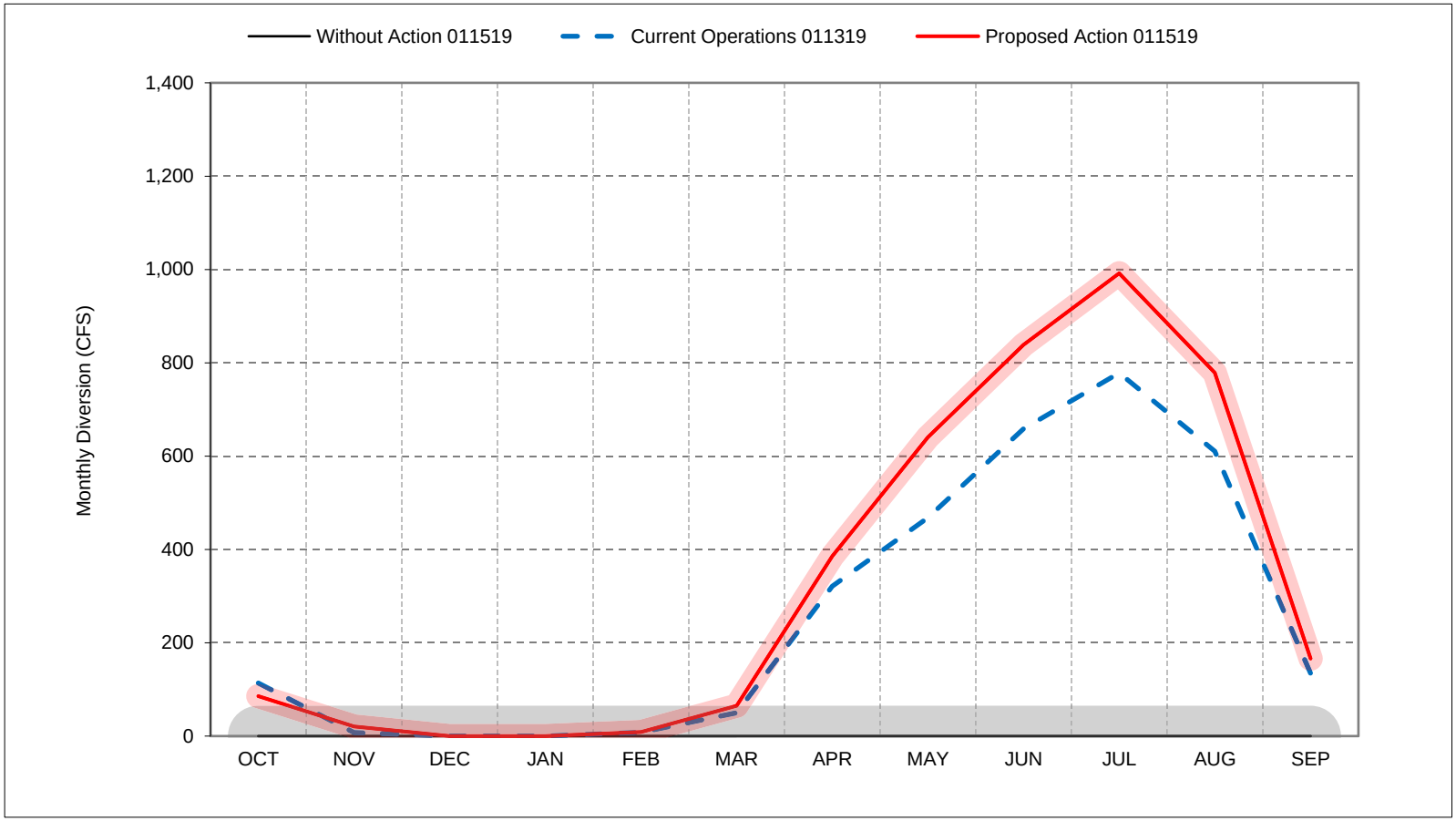
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 47-3. Red Bluff Diversion - Tehama Colusa Canal, Above Normal Year Average Diversion



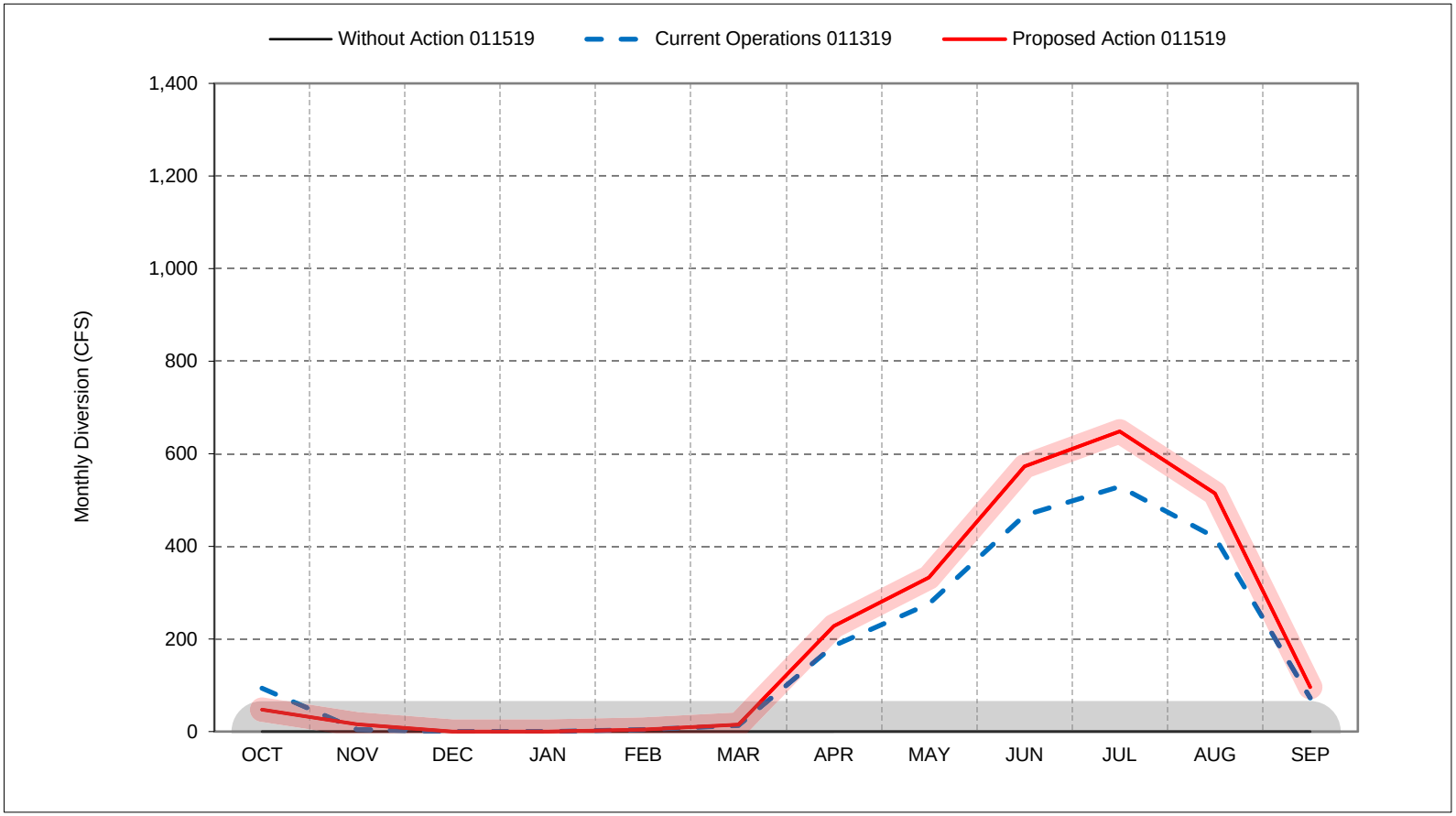
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 47-4. Red Bluff Diversion - Tehama Colusa Canal, Below Normal Year Average Diversion



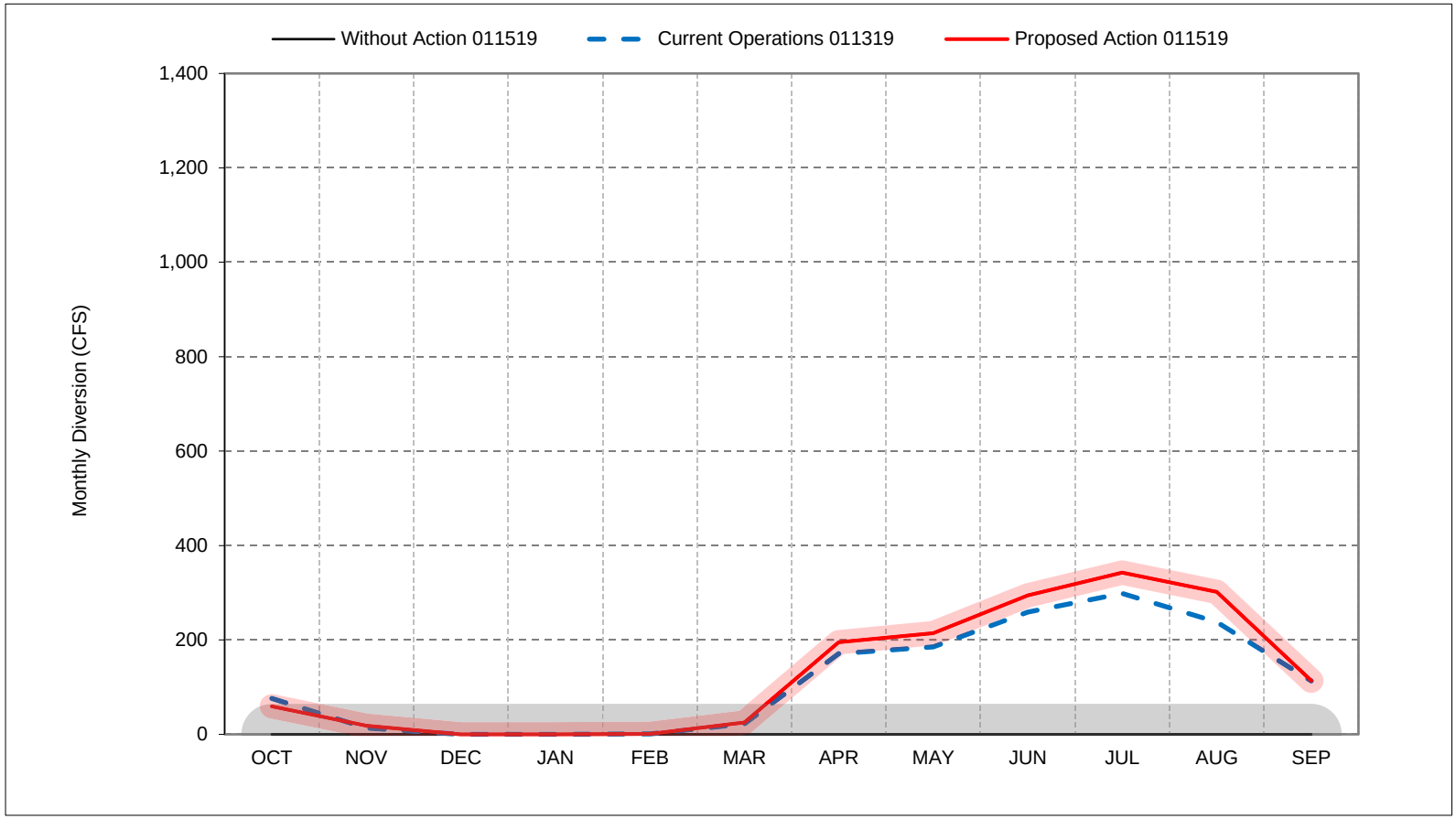
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 47-5. Red Bluff Diversion - Tehama Colusa Canal, Dry Year Average Diversion



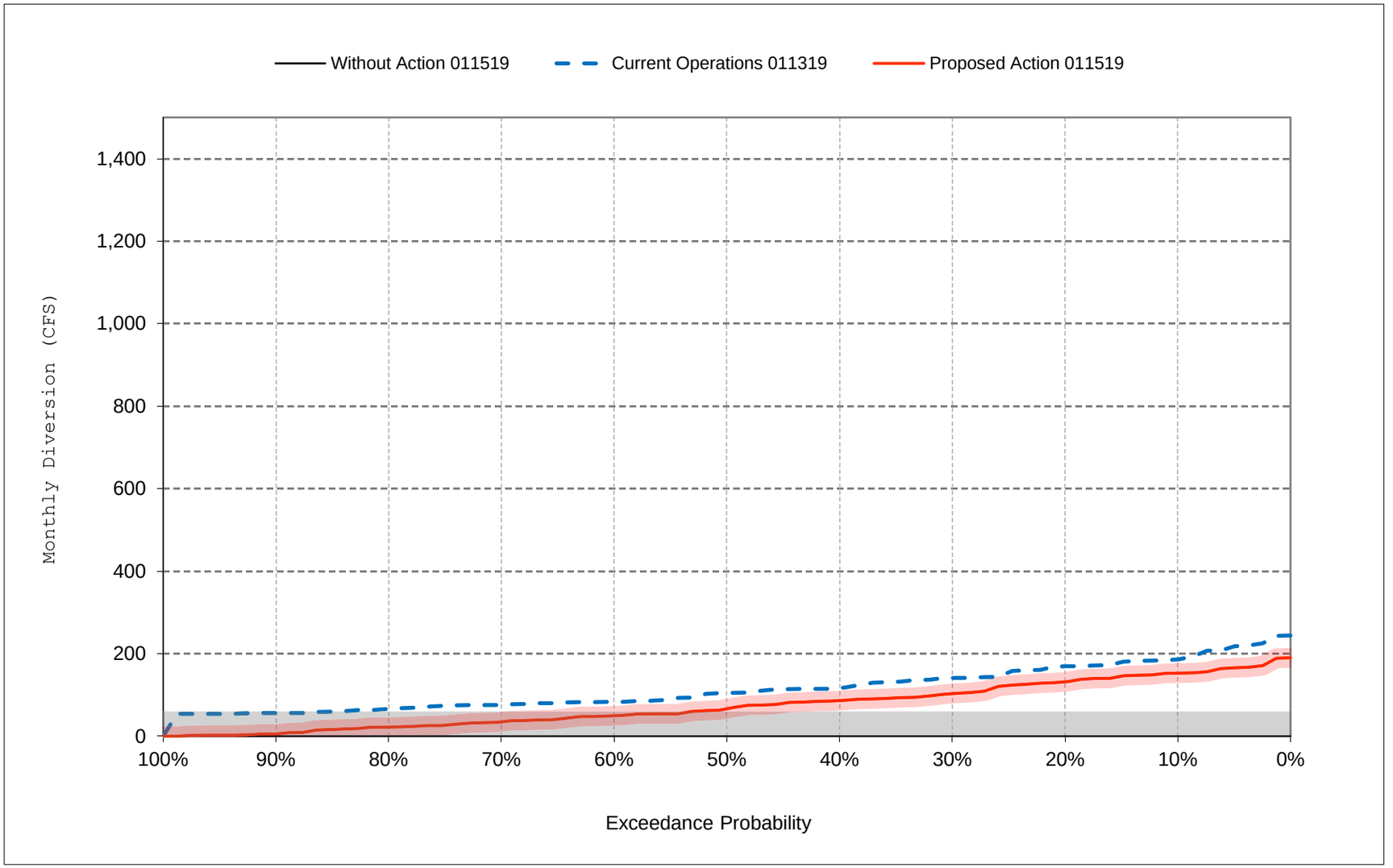
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 47-6. Red Bluff Diversion - Tehama Colusa Canal, Critical Year Average Diversion



*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

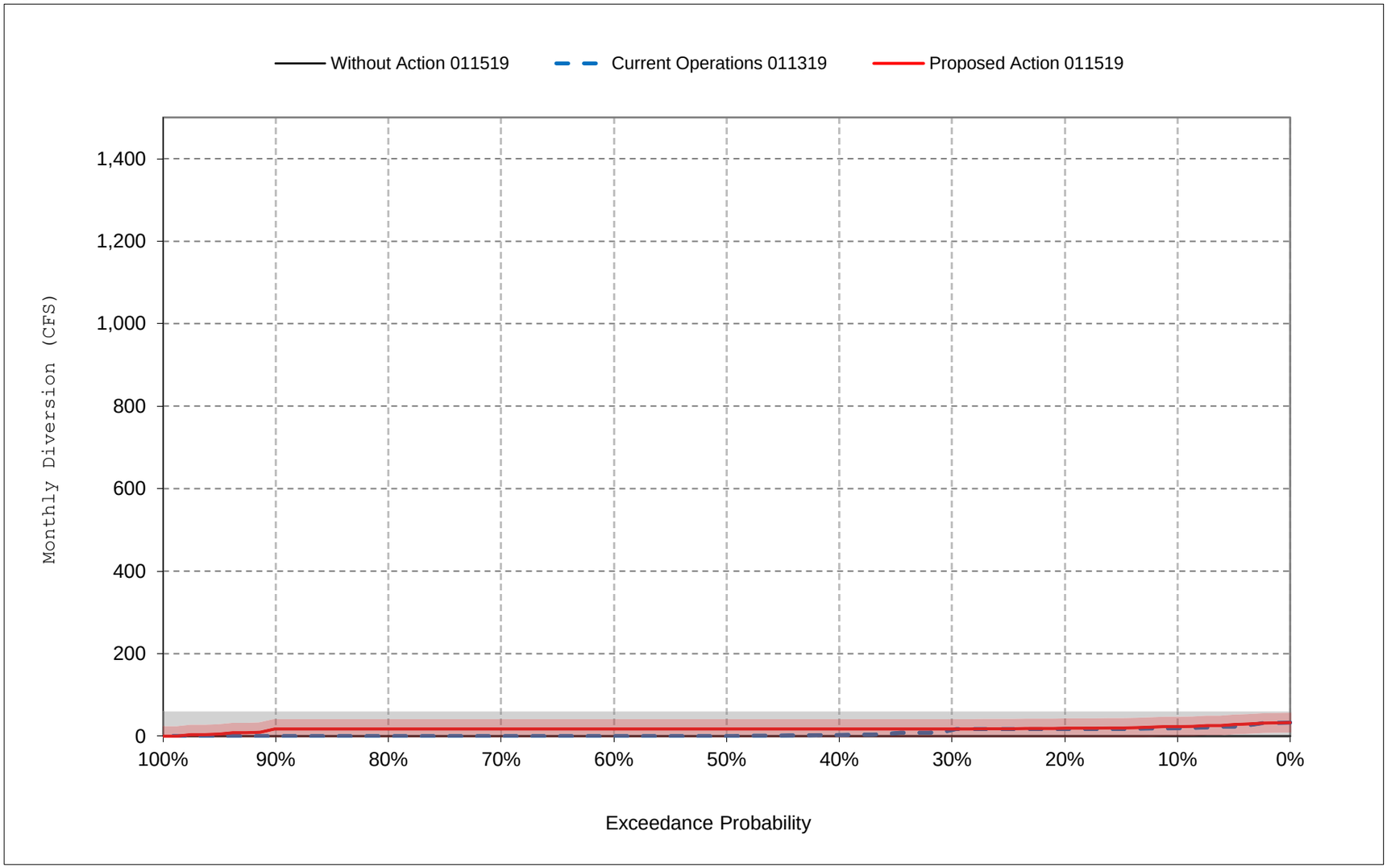
Figure 47-7. Red Bluff Diversion - Tehama Colusa Canal, October



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

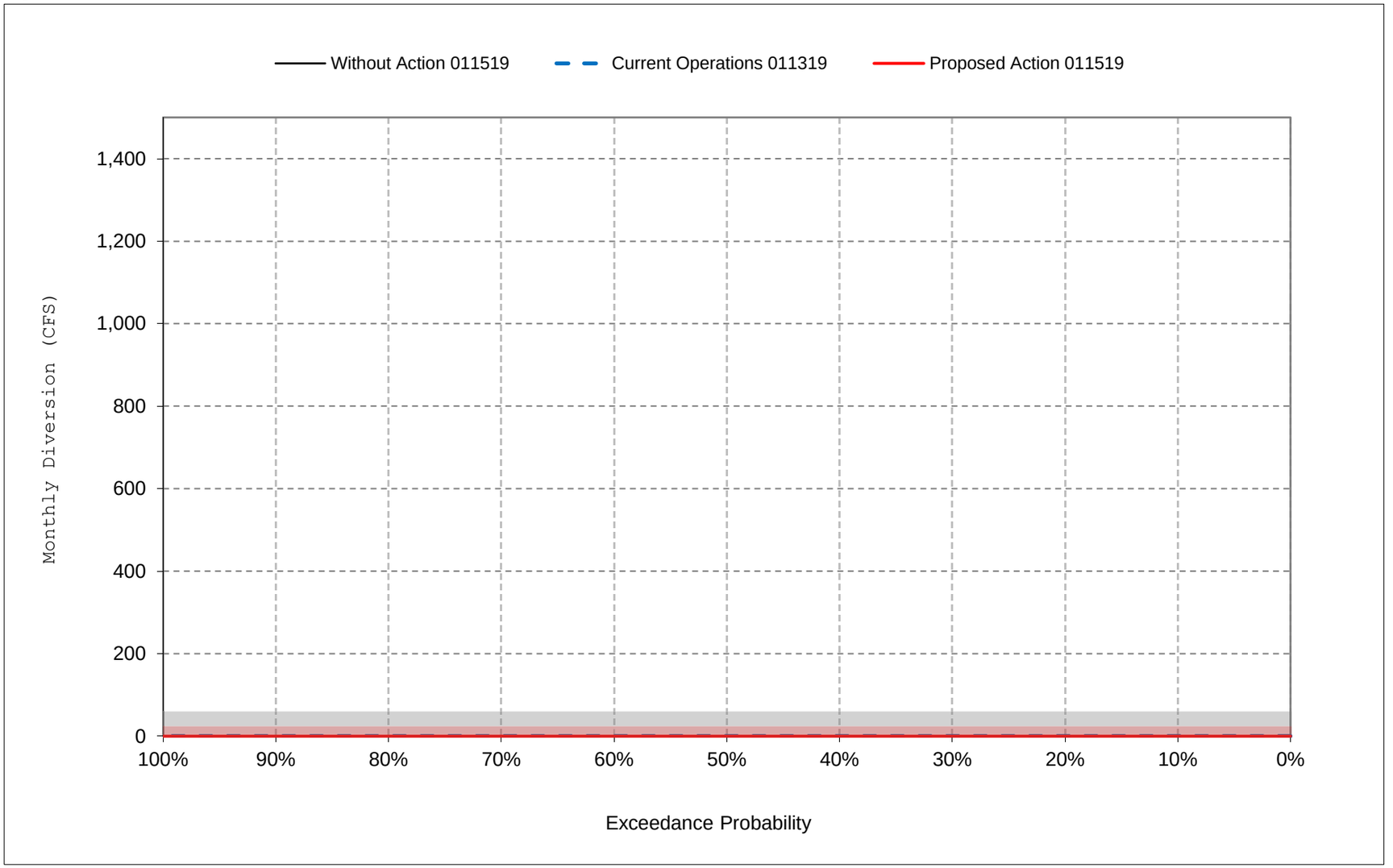
Figure 47-8. Red Bluff Diversion - Tehama Colusa Canal, November



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

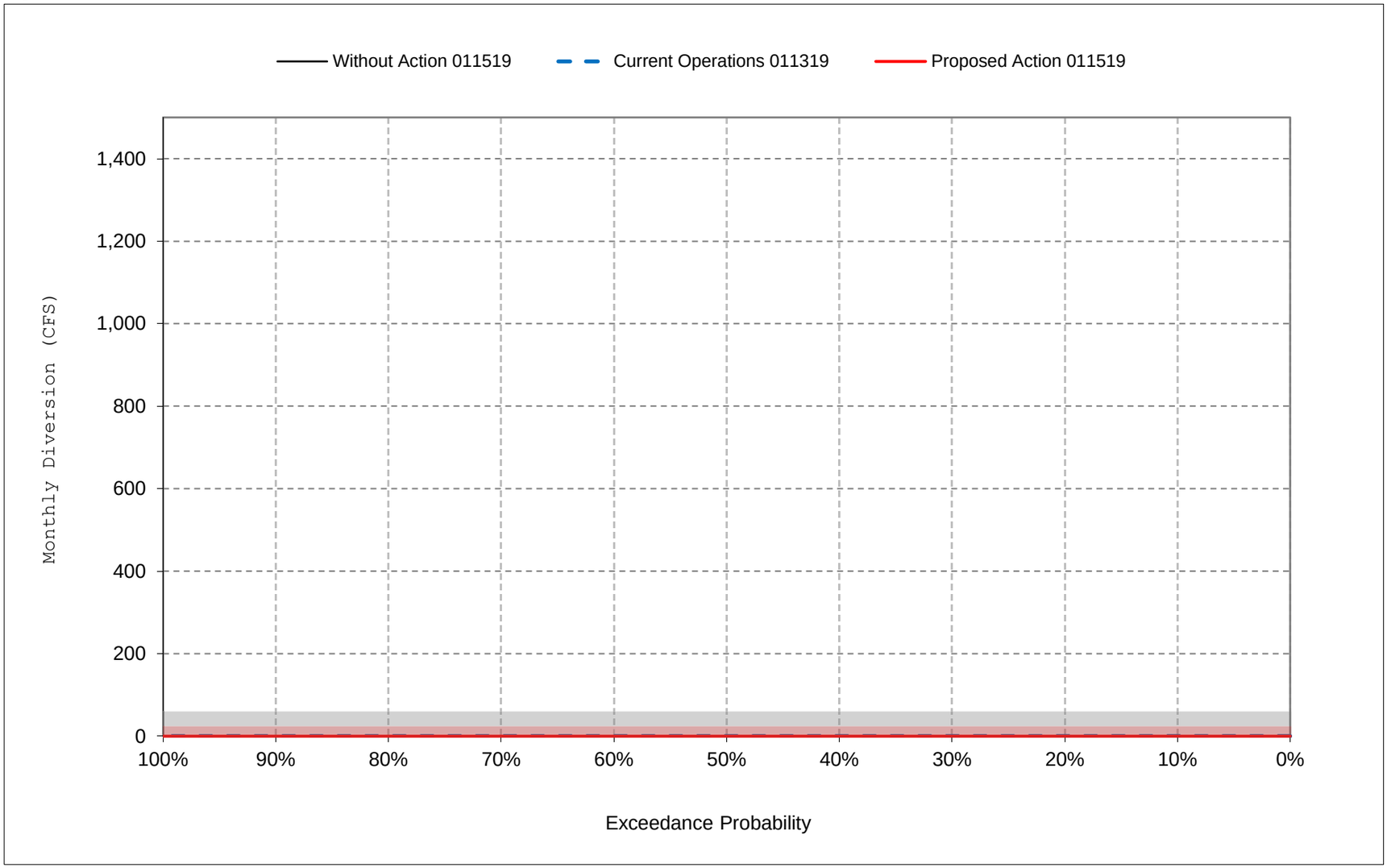
Figure 47-9. Red Bluff Diversion - Tehama Colusa Canal, December



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

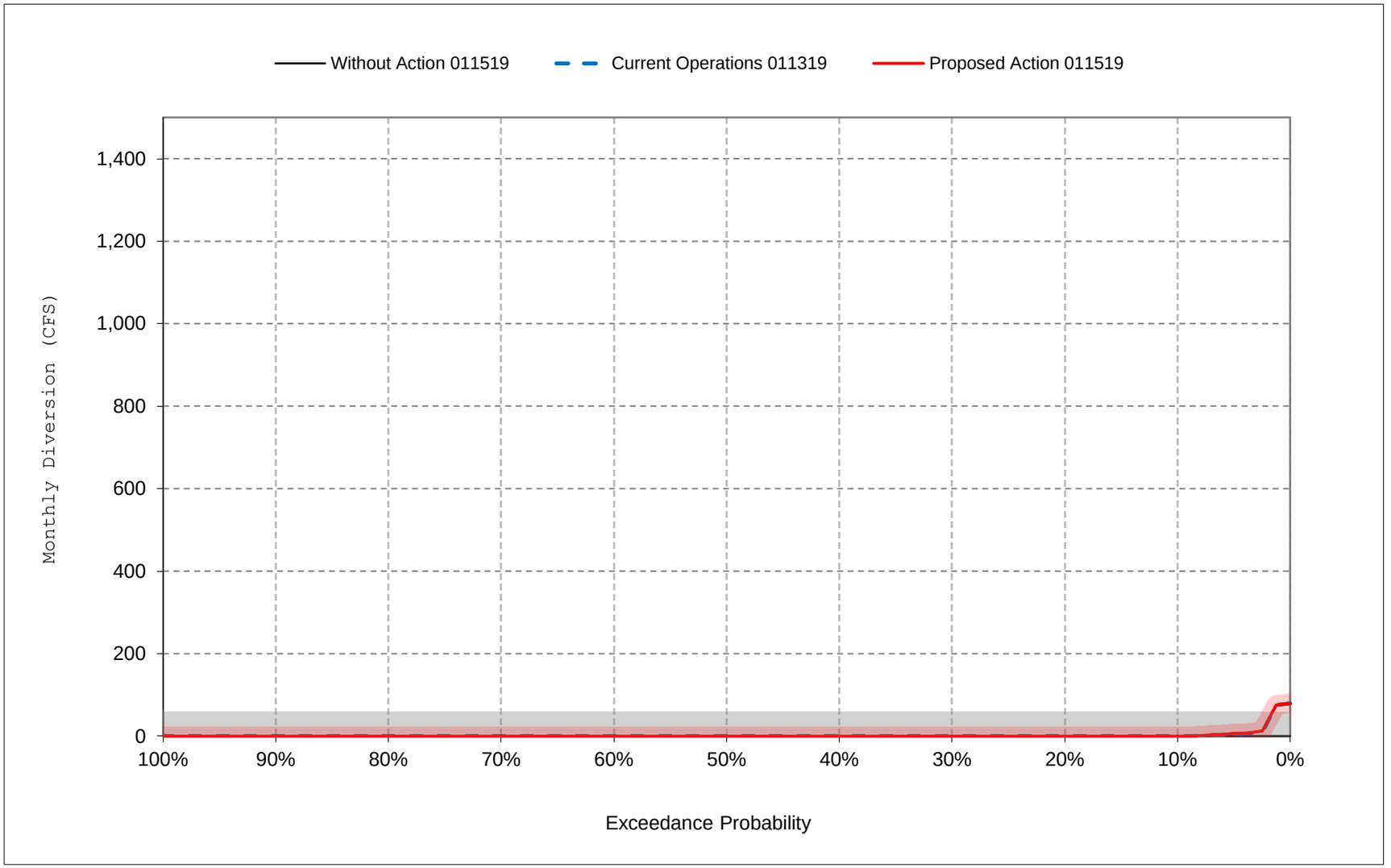
Figure 47-10. Red Bluff Diversion - Tehama Colusa Canal, January



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

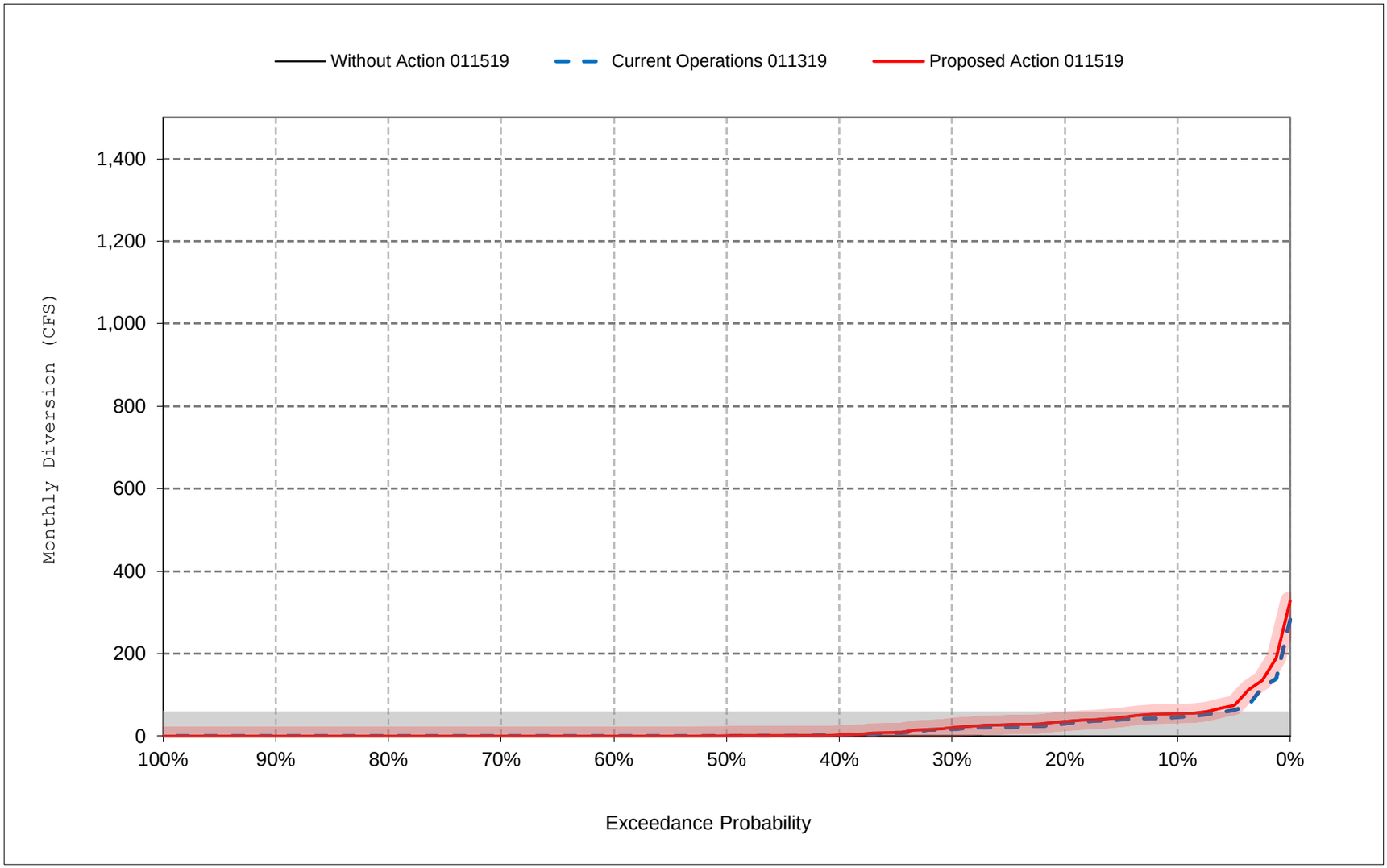
Figure 47-11. Red Bluff Diversion - Tehama Colusa Canal, February



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

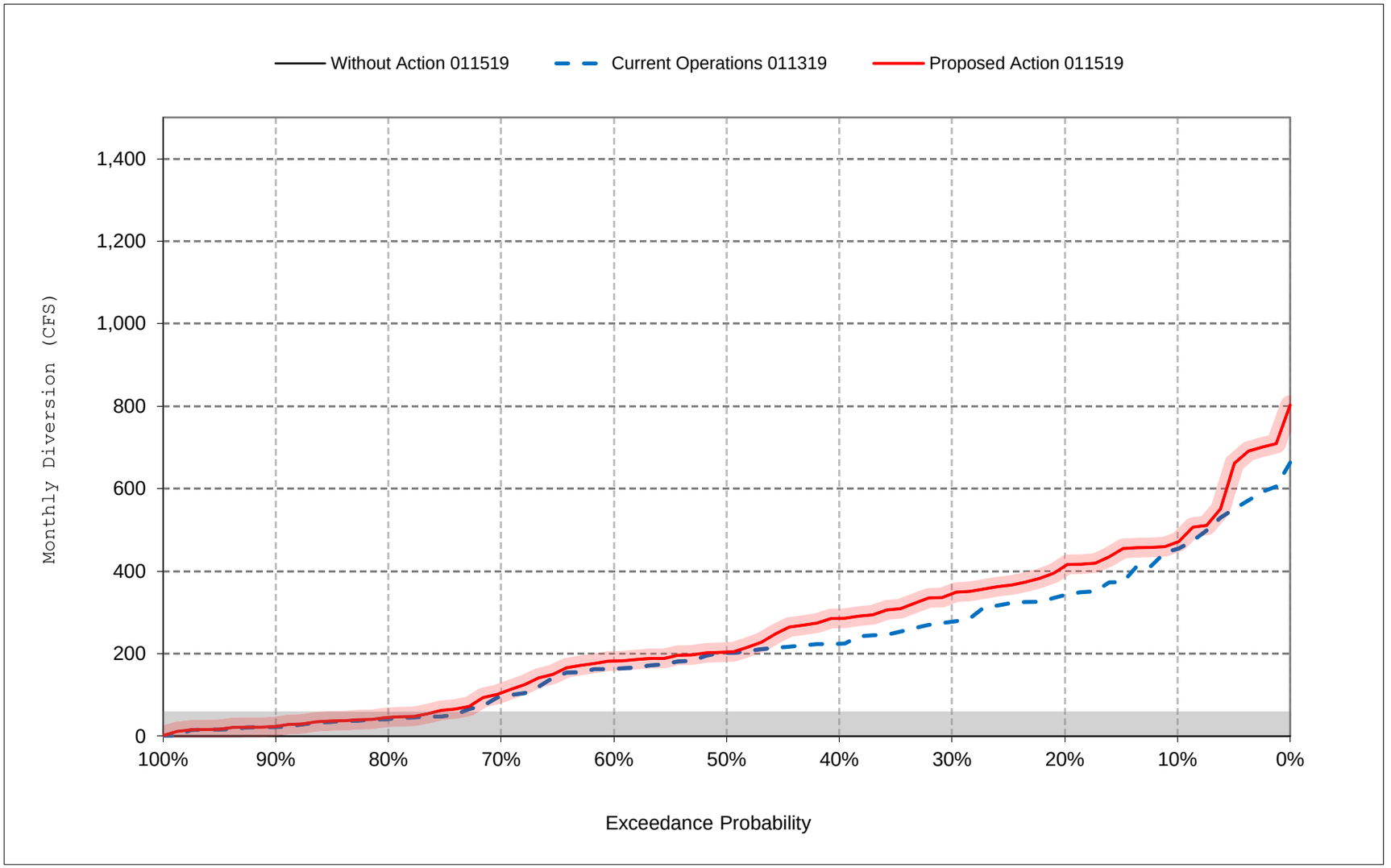
Figure 47-12. Red Bluff Diversion - Tehama Colusa Canal, March



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

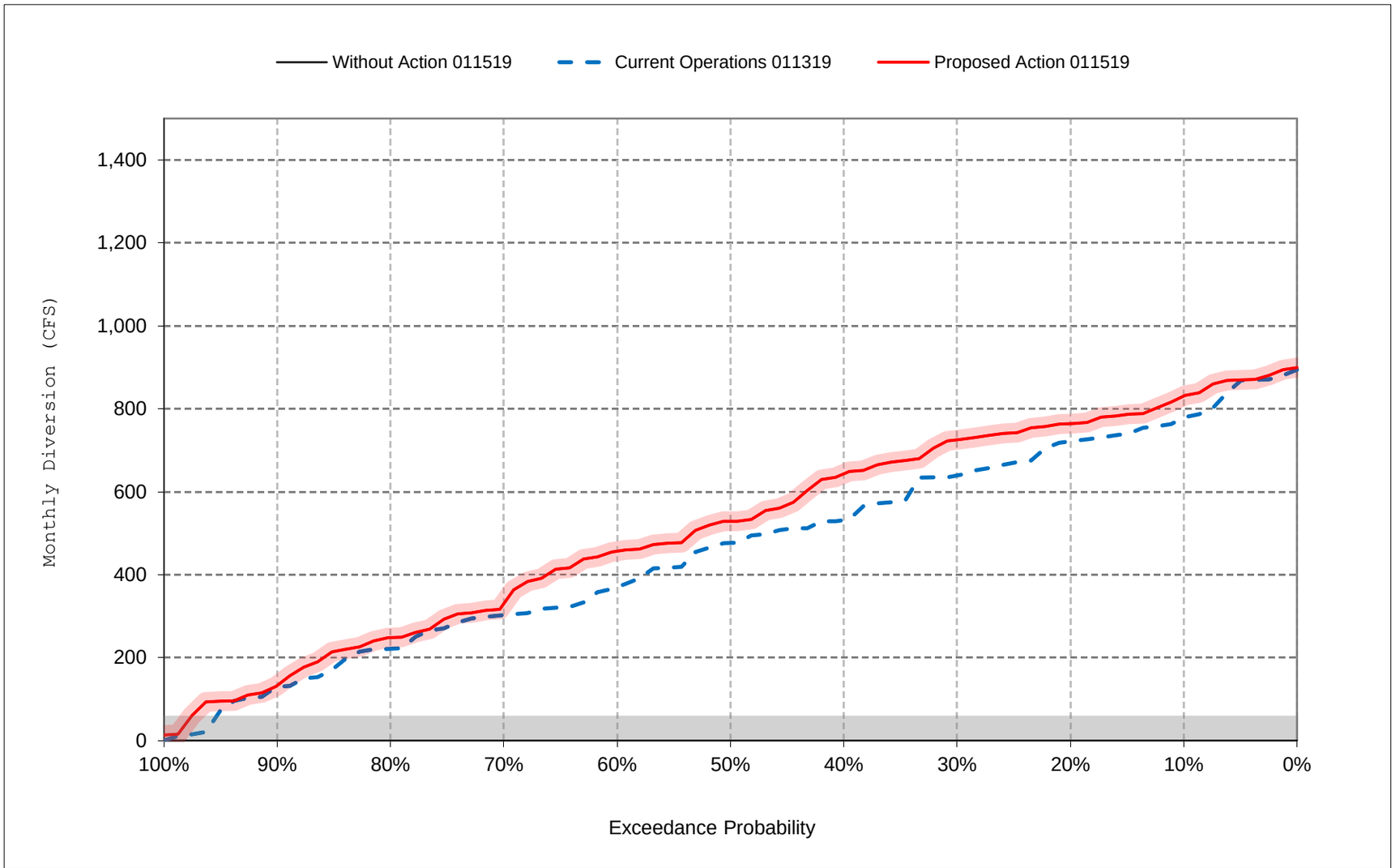
Figure 47-13. Red Bluff Diversion - Tehama Colusa Canal, April



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

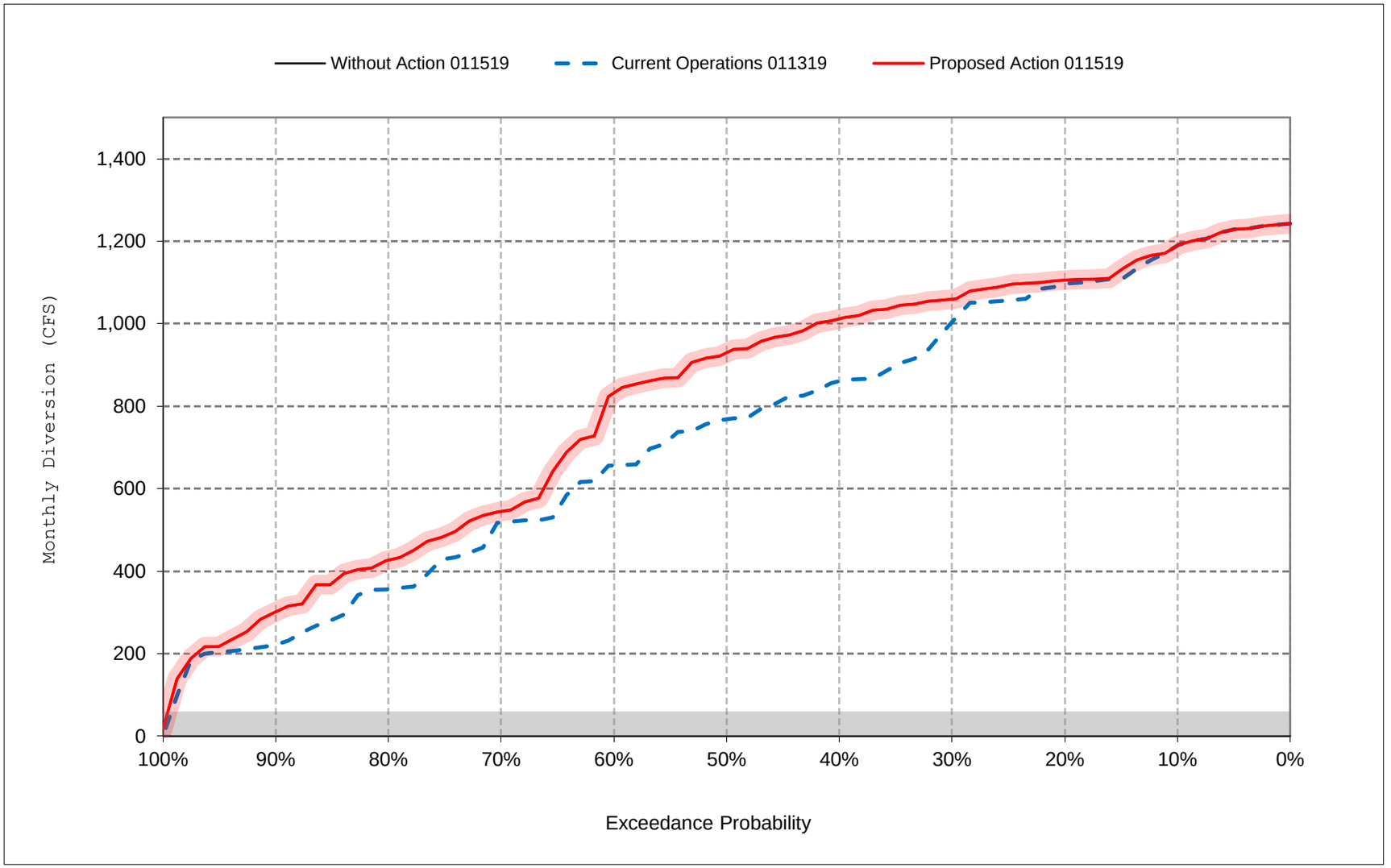
Figure 47-14. Red Bluff Diversion - Tehama Colusa Canal, May



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

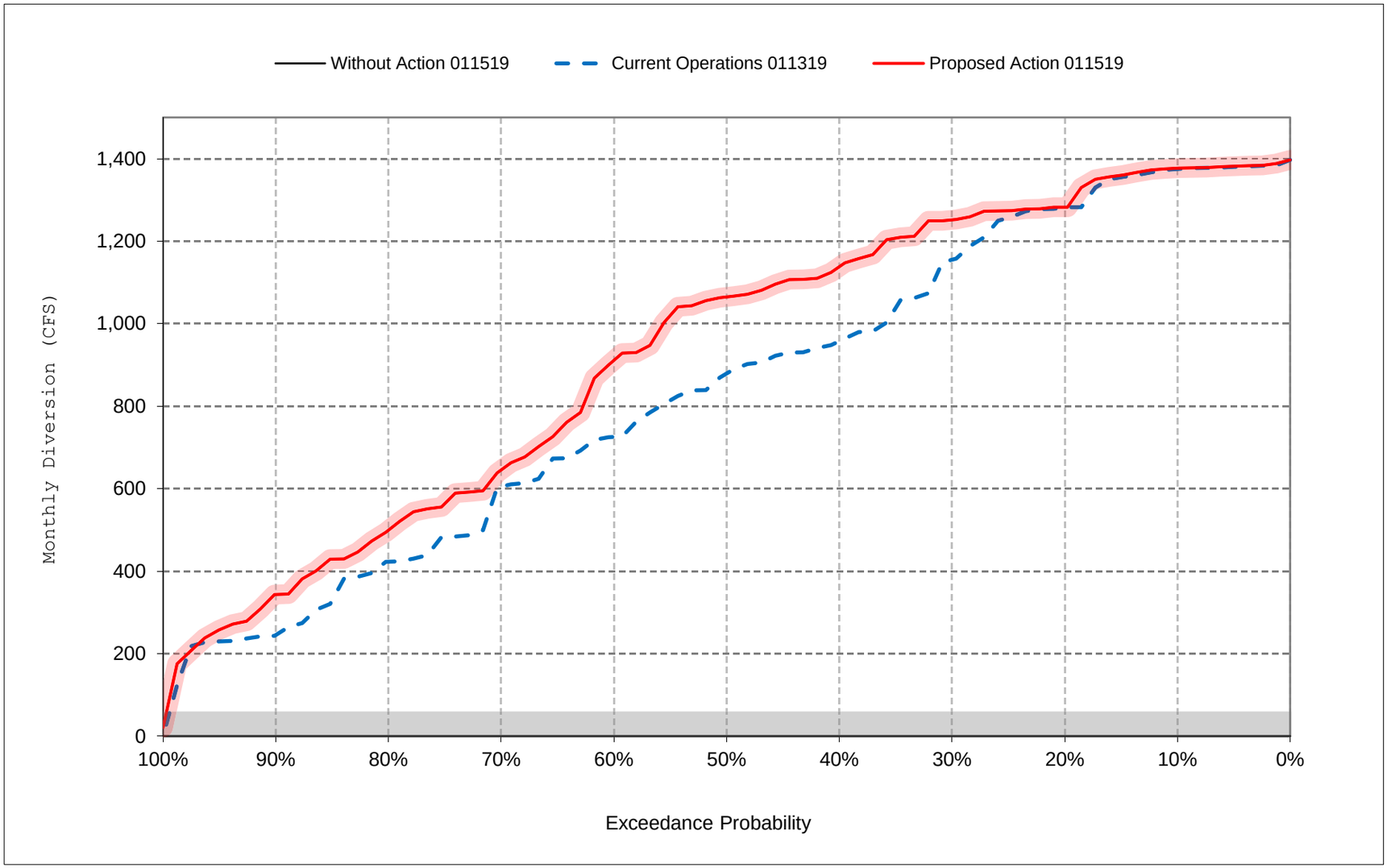
Figure 47-15. Red Bluff Diversion - Tehama Colusa Canal, June



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

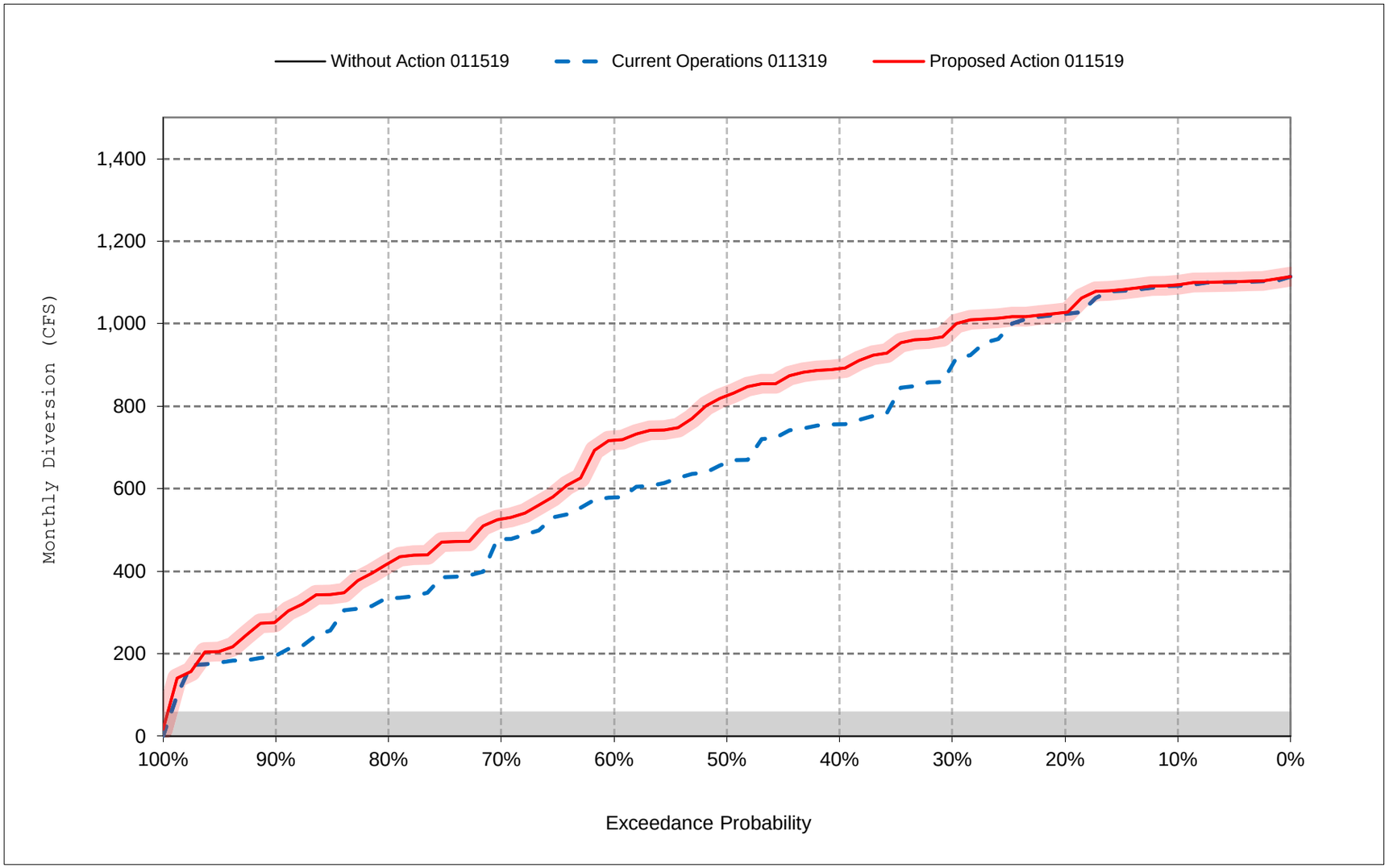
Figure 47-16. Red Bluff Diversion - Tehama Colusa Canal, July



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

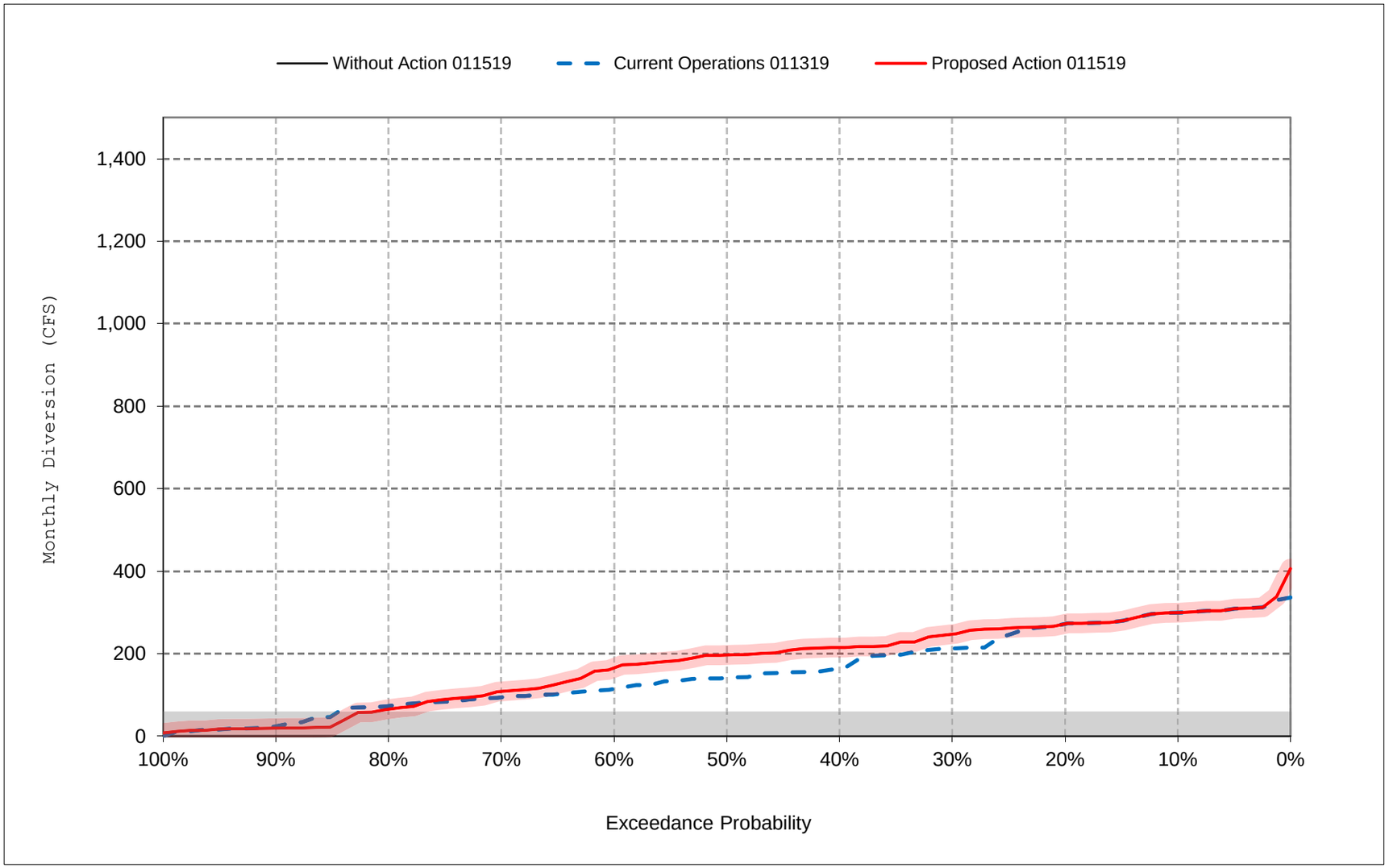
Figure 47-17. Red Bluff Diversion - Tehama Colusa Canal, August



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Figure 47-18. Red Bluff Diversion - Tehama Colusa Canal, September



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Table 48-1. Hamilton City Diversion - Glenn Colusa Canal, Monthly Diversion

Without Action 011519

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	598	318	113	48	11	69	530	2,264	2,307	2,336	1,793	374
20%	593	304	97	26	11	47	505	2,225	2,262	2,119	1,586	369
30%	589	289	81	9	11	32	471	2,208	2,220	723	1,261	367
40%	583	268	65	9	11	17	445	2,172	2,175	270	1,069	365
50%	575	240	52	9	11	4	429	2,131	2,137	64	687	363
60%	564	221	34	9	11	4	405	2,018	2,014	0	383	357
70%	551	195	24	9	11	4	389	1,955	1,439	0	128	350
80%	537	163	13	9	11	4	370	1,807	947	0	0	336
90%	517	136	13	9	11	4	274	1,617	1	0	0	317
Long Term												
Full Simulation Period[a]	565	235	56	18	12	27	418	1,974	1,659	674	787	350
Water Year Types[b,c]												
Wet (32%)	567	233	65	14	11	15	380	2,001	2,107	1,688	1,309	356
Above Normal (16%)	556	233	50	12	11	12	385	2,034	2,125	488	865	351
Below Normal (13%)	559	248	58	26	16	46	450	2,035	1,387	249	561	328
Dry (24%)	564	214	58	19	13	27	425	2,107	1,384	114	637	342
Critical (15%)	578	267	41	20	13	51	494	1,573	892	0	31	370

Current Operations 011319

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	851	564	292	127	68	84	552	2,331	2,705	2,617	2,241	633
20%	845	546	270	86	68	65	527	2,297	2,621	2,611	2,130	633
30%	837	515	240	75	68	50	493	2,260	2,556	2,563	2,090	633
40%	823	478	224	75	68	35	467	2,245	2,483	2,538	2,040	630
50%	808	441	202	75	68	21	451	2,212	2,416	2,538	1,981	628
60%	790	420	181	75	68	20	427	2,153	2,339	2,537	1,928	612
70%	771	391	161	75	67	20	411	2,079	2,325	2,521	1,917	602
80%	745	354	158	75	66	20	391	2,007	2,271	2,446	1,862	569
90%	636	330	158	75	53	20	306	1,842	2,226	2,285	1,795	504
Long Term												
Full Simulation Period[a]	777	448	211	84	67	43	443	2,137	2,433	2,512	1,996	596
Water Year Types[b,c]												
Wet (32%)	811	460	227	81	67	32	402	2,119	2,261	2,565	2,141	614
Above Normal (16%)	796	461	207	76	65	28	432	2,098	2,359	2,537	2,023	616
Below Normal (13%)	781	466	212	98	73	63	472	2,170	2,561	2,534	1,994	583
Dry (24%)	807	435	218	85	66	43	447	2,200	2,645	2,532	1,910	605
Critical (15%)	630	415	166	84	66	65	512	2,086	2,413	2,313	1,799	530

Current Operations 011319 minus Without Action 011519

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	253	246	179	79	57	16	22	66	398	281	448	259
20%	252	242	173	60	57	18	21	72	360	492	545	264
30%	248	226	159	66	57	18	22	52	336	1,840	829	266
40%	240	210	159	66	57	18	22	73	308	2,268	971	266
50%	233	201	150	66	57	17	22	81	280	2,474	1,294	265
60%	225	200	148	66	57	16	22	134	325	2,537	1,545	255
70%	220	196	137	66	56	16	22	124	887	2,521	1,789	252
80%	208	191	145	66	55	16	21	200	1,324	2,446	1,862	233
90%	118	194	145	66	42	16	32	225	2,225	2,285	1,795	187
Long Term												
Full Simulation Period[a]	212	213	154	66	55	16	26	163	774	1,838	1,209	246
Water Year Types[b,c]												
Wet (32%)	244	226	162	67	57	17	22	117	154	877	832	258
Above Normal (16%)	240	228	157	64	54	17	47	64	234	2,049	1,158	264
Below Normal (13%)	222	218	154	72	58	17	22	135	1,173	2,285	1,433	254
Dry (24%)	243	221	160	66	53	17	22	93	1,261	2,418	1,273	264
Critical (15%)	52	148	124	64	53	14	18	513	1,522	2,313	1,767	160

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 48-2. Hamilton City Diversion - Glenn Colusa Canal, Monthly Diversion

Without Action 011519

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	598	318	113	48	11	69	530	2,264	2,307	2,336	1,793	374
20%	593	304	97	26	11	47	505	2,225	2,262	2,119	1,586	369
30%	589	289	81	9	11	32	471	2,208	2,220	723	1,261	367
40%	583	268	65	9	11	17	445	2,172	2,175	270	1,069	365
50%	575	240	52	9	11	4	429	2,131	2,137	64	687	363
60%	564	221	34	9	11	4	405	2,018	2,014	0	383	357
70%	551	195	24	9	11	4	389	1,955	1,439	0	128	350
80%	537	163	13	9	11	4	370	1,807	947	0	0	336
90%	517	136	13	9	11	4	274	1,617	1	0	0	317
Long Term												
Full Simulation Period[a]	565	235	56	18	12	27	418	1,974	1,659	674	787	350
Water Year Types[b,c]												
Wet (32%)	567	233	65	14	11	15	380	2,001	2,107	1,688	1,309	356
Above Normal (16%)	556	233	50	12	11	12	385	2,034	2,125	488	865	351
Below Normal (13%)	559	248	58	26	16	46	450	2,035	1,387	249	561	328
Dry (24%)	564	214	58	19	13	27	425	2,107	1,384	114	637	342
Critical (15%)	578	267	41	20	13	51	494	1,573	892	0	31	370

Proposed Action 011519

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	866	556	284	127	68	84	552	2,340	2,705	2,617	2,241	633
20%	846	535	268	86	68	65	527	2,305	2,621	2,607	2,131	633
30%	828	509	239	75	68	50	493	2,277	2,571	2,563	2,090	633
40%	810	470	224	75	68	35	467	2,250	2,483	2,538	2,040	630
50%	783	437	202	75	68	21	451	2,225	2,416	2,538	1,981	628
60%	763	417	181	75	68	20	427	2,173	2,347	2,525	1,928	613
70%	735	380	161	75	67	20	411	2,086	2,328	2,521	1,917	603
80%	709	338	158	75	66	20	391	2,013	2,277	2,468	1,862	585
90%	649	314	158	75	53	20	306	1,853	2,226	2,318	1,795	504
Long Term												
Full Simulation Period[a]	764	438	210	84	67	43	443	2,146	2,437	2,512	1,993	592
Water Year Types[b,c]												
Wet (32%)	797	450	227	81	67	32	402	2,123	2,267	2,558	2,143	617
Above Normal (16%)	783	448	202	76	65	28	432	2,101	2,365	2,528	2,023	616
Below Normal (13%)	772	454	212	98	73	63	472	2,184	2,568	2,569	1,995	583
Dry (24%)	785	424	218	85	66	43	447	2,215	2,644	2,532	1,910	605
Critical (15%)	630	411	166	84	66	65	510	2,095	2,418	2,313	1,772	501

Proposed Action 011519 minus Without Action 011519

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	268	238	171	79	57	16	22	76	398	281	448	259
20%	254	232	172	60	57	18	21	80	360	488	545	264
30%	239	221	157	66	57	18	22	69	351	1,840	829	266
40%	226	202	159	66	57	18	22	78	308	2,268	971	266
50%	209	197	150	66	57	17	22	94	280	2,474	1,294	265
60%	198	196	148	66	57	16	22	155	333	2,525	1,545	256
70%	184	185	137	66	56	16	22	131	890	2,521	1,789	253
80%	172	176	145	66	55	16	21	206	1,331	2,468	1,862	249
90%	132	179	145	66	42	16	32	236	2,225	2,318	1,795	187
Long Term												
Full Simulation Period[a]	199	203	154	66	55	16	25	172	778	1,839	1,206	242
Water Year Types[b,c]												
Wet (32%)	229	217	162	67	57	17	22	122	160	870	834	261
Above Normal (16%)	227	215	152	64	54	17	47	67	240	2,040	1,158	264
Below Normal (13%)	213	206	154	72	58	17	22	150	1,180	2,320	1,434	254
Dry (24%)	221	209	160	66	53	17	22	107	1,261	2,418	1,273	264
Critical (15%)	52	144	124	64	53	14	17	522	1,526	2,313	1,741	131

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 48-3. Hamilton City Diversion - Glenn Colusa Canal, Monthly Diversion

Current Operations 011319

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	851	564	292	127	68	84	552	2,331	2,705	2,617	2,241	633
20%	845	546	270	86	68	65	527	2,297	2,621	2,611	2,130	633
30%	837	515	240	75	68	50	493	2,260	2,556	2,563	2,090	633
40%	823	478	224	75	68	35	467	2,245	2,483	2,538	2,040	630
50%	808	441	202	75	68	21	451	2,212	2,416	2,538	1,981	628
60%	790	420	181	75	68	20	427	2,153	2,339	2,537	1,928	612
70%	771	391	161	75	67	20	411	2,079	2,325	2,521	1,917	602
80%	745	354	158	75	66	20	391	2,007	2,271	2,446	1,862	569
90%	636	330	158	75	53	20	306	1,842	2,226	2,285	1,795	504
Long Term												
Full Simulation Period[a]	777	448	211	84	67	43	443	2,137	2,433	2,512	1,996	596
Water Year Types[b,c]												
Wet (32%)	811	460	227	81	67	32	402	2,119	2,261	2,565	2,141	614
Above Normal (16%)	796	461	207	76	65	28	432	2,098	2,359	2,537	2,023	616
Below Normal (13%)	781	466	212	98	73	63	472	2,170	2,561	2,534	1,994	583
Dry (24%)	807	435	218	85	66	43	447	2,200	2,645	2,532	1,910	605
Critical (15%)	630	415	166	84	66	65	512	2,086	2,413	2,313	1,799	530

Proposed Action 011519

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	866	556	284	127	68	84	552	2,340	2,705	2,617	2,241	633
20%	846	535	268	86	68	65	527	2,305	2,621	2,607	2,131	633
30%	828	509	239	75	68	50	493	2,277	2,571	2,563	2,090	633
40%	810	470	224	75	68	35	467	2,250	2,483	2,538	2,040	630
50%	783	437	202	75	68	21	451	2,225	2,416	2,538	1,981	628
60%	763	417	181	75	68	20	427	2,173	2,347	2,525	1,928	613
70%	735	380	161	75	67	20	411	2,086	2,328	2,521	1,917	603
80%	709	338	158	75	66	20	391	2,013	2,277	2,468	1,862	585
90%	649	314	158	75	53	20	306	1,853	2,226	2,318	1,795	504
Long Term												
Full Simulation Period[a]	764	438	210	84	67	43	443	2,146	2,437	2,512	1,993	592
Water Year Types[b,c]												
Wet (32%)	797	450	227	81	67	32	402	2,123	2,267	2,558	2,143	617
Above Normal (16%)	783	448	202	76	65	28	432	2,101	2,365	2,528	2,023	616
Below Normal (13%)	772	454	212	98	73	63	472	2,184	2,568	2,569	1,995	583
Dry (24%)	785	424	218	85	66	43	447	2,215	2,644	2,532	1,910	605
Critical (15%)	630	411	166	84	66	65	510	2,095	2,418	2,313	1,772	501

Proposed Action 011519 minus Current Operations 011319

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	15	**-8**	**-7**	0	0	0	0	10	0	0	0	0
20%	2	**-11**	**-1**	0	0	0	0	8	0	**-4**	1	0
30%	**-10**	**-6**	**-2**	0	0	0	0	17	15	0	0	0
40%	**-13**	**-7**	0	0	0	0	0	5	0	0	0	0
50%	**-24**	**-4**	0	0	0	0	0	13	0	0	0	0
60%	**-27**	**-3**	0	0	0	0	0	21	7	**-12**	0	1
70%	**-35**	**-11**	0	0	0	0	0	7	3	**0**	0	1
80%	**-36**	**-15**	0	0	0	0	0	6	7	21	0	15
90%	14	**-15**	0	0	0	0	0	11	0	33	0	0
Long Term												
Full Simulation Period[a]	**-13**	**-10**	**-1**	0	0	0	**0**	9	4	1	**-3**	**-3**
Water Year Types[b,c]												
Wet (32%)	**-15**	**-10**	0	0	0	0	0	5	6	**-8**	2	3
Above Normal (16%)	**-13**	**-13**	**-5**	0	0	0	0	3	6	**-9**	0	0
Below Normal (13%)	**-9**	**-12**	0	0	0	0	0	15	7	35	1	0
Dry (24%)	**-22**	**-11**	0	0	0	0	0	14	**-1**	**0**	0	0
Critical (15%)	**0**	**-4**	0	0	0	0	**-1**	10	5	0	**-26**	**-29**

a Based on the 82-year simulation period.

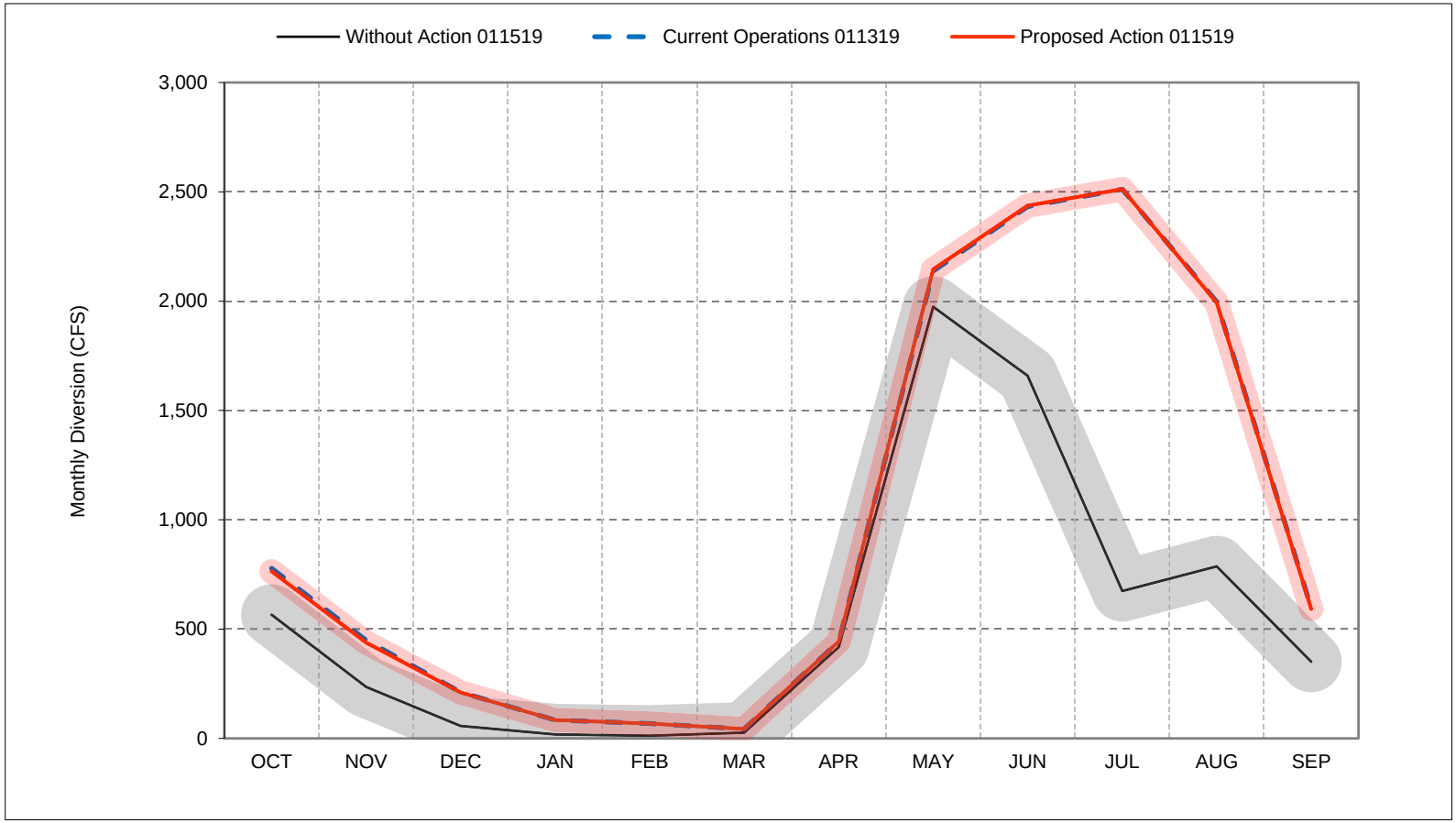
b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

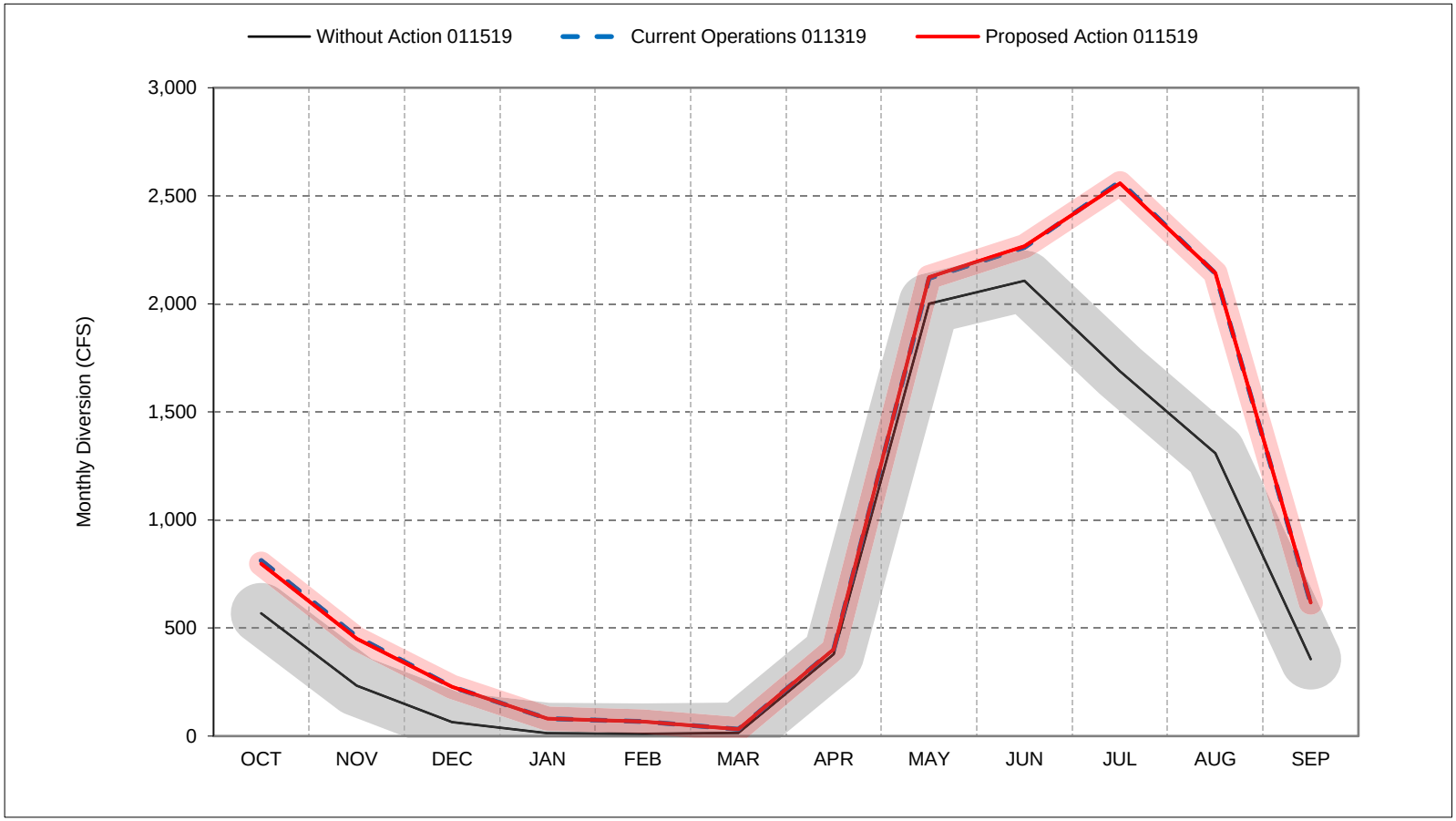
e These are draft results meant for qualitative analysis and are subject to revision.

Figure 48-1. Hamilton City Diversion - Glenn Colusa Canal, Long-Term Average Diversion



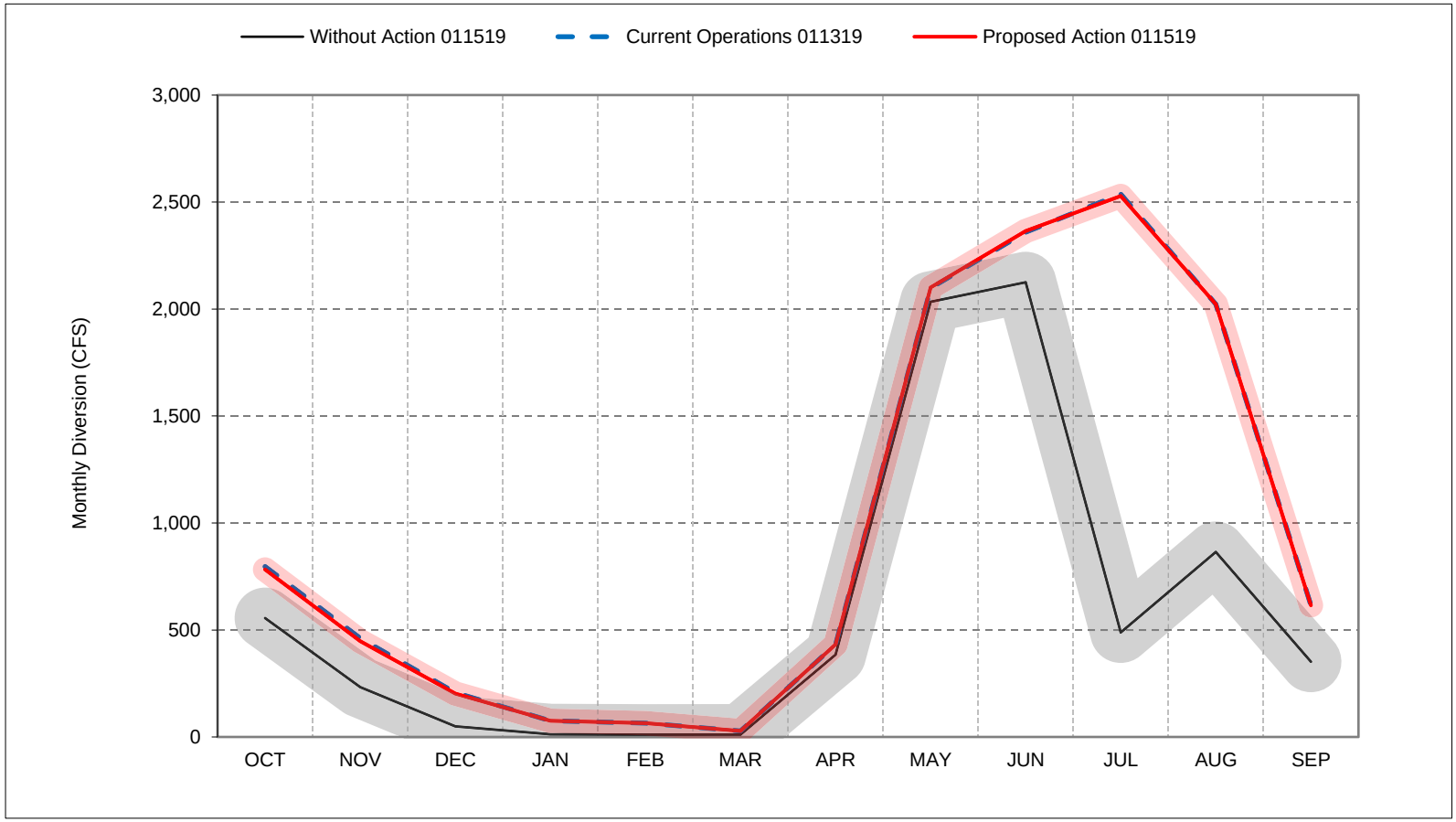
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 48-2. Hamilton City Diversion - Glenn Colusa Canal, Wet Year Average Diversion



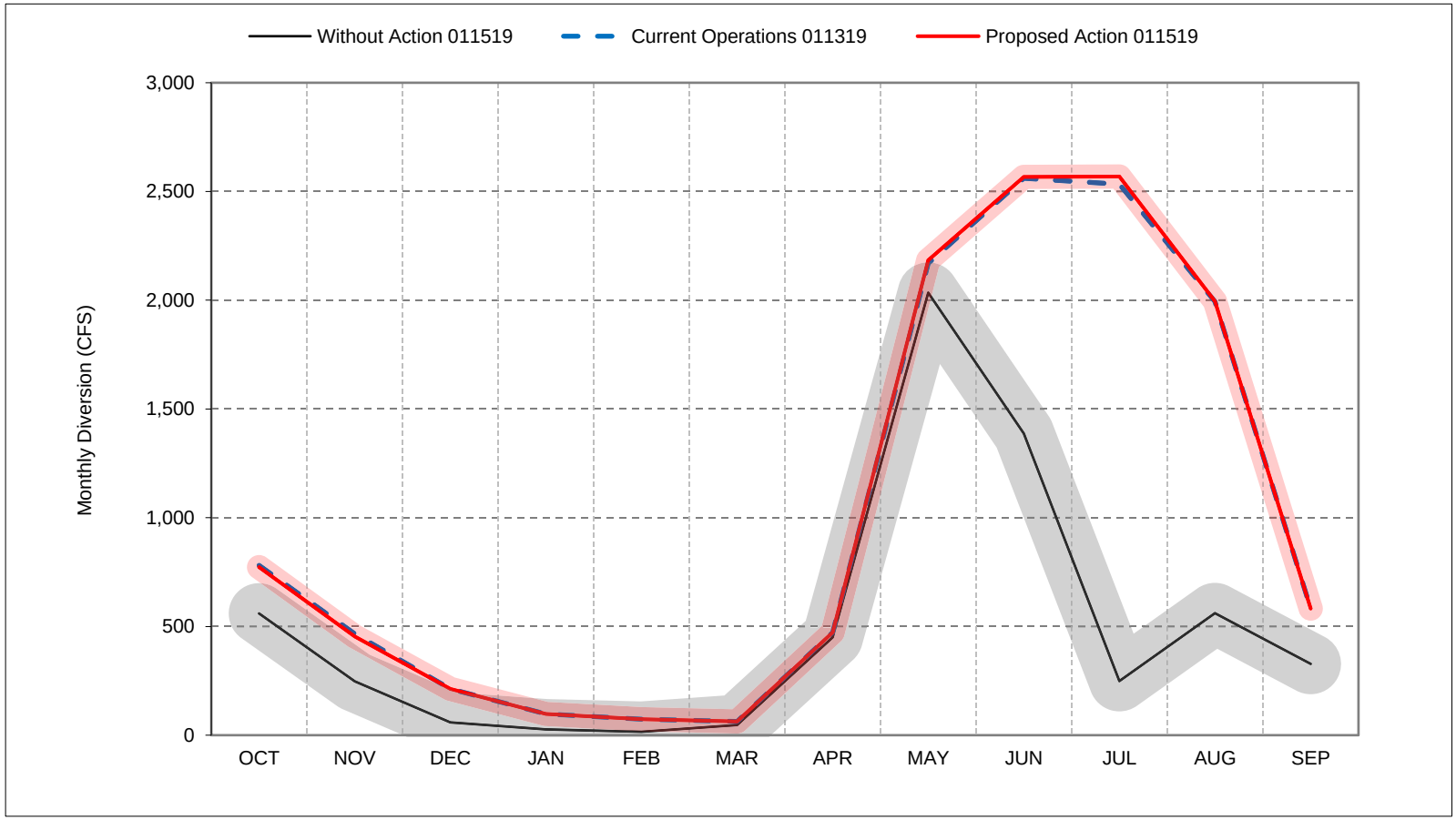
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 48-3. Hamilton City Diversion - Glenn Colusa Canal, Above Normal Year Average Diversion



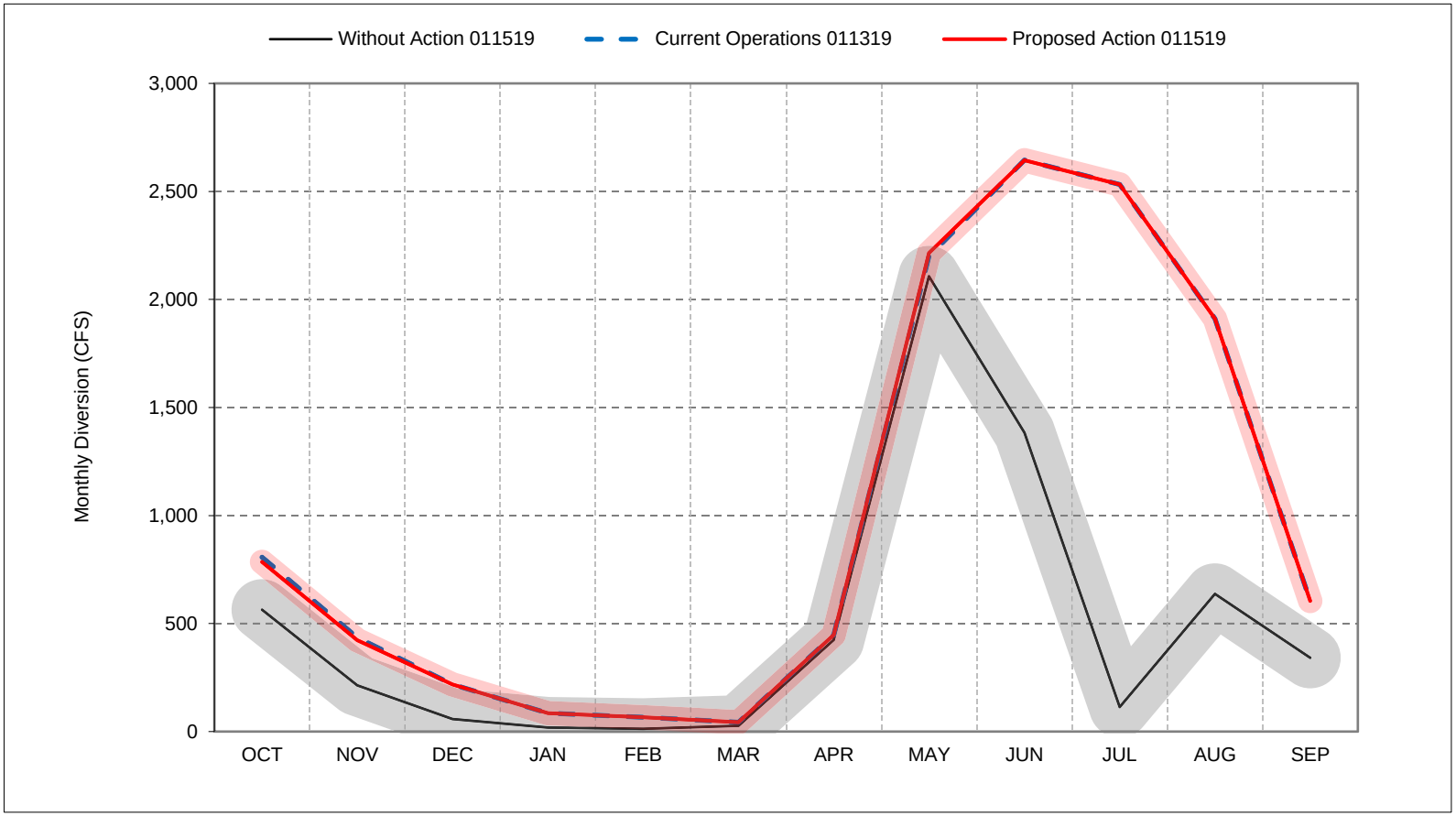
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 48-4. Hamilton City Diversion - Glenn Colusa Canal, Below Normal Year Average Diversion



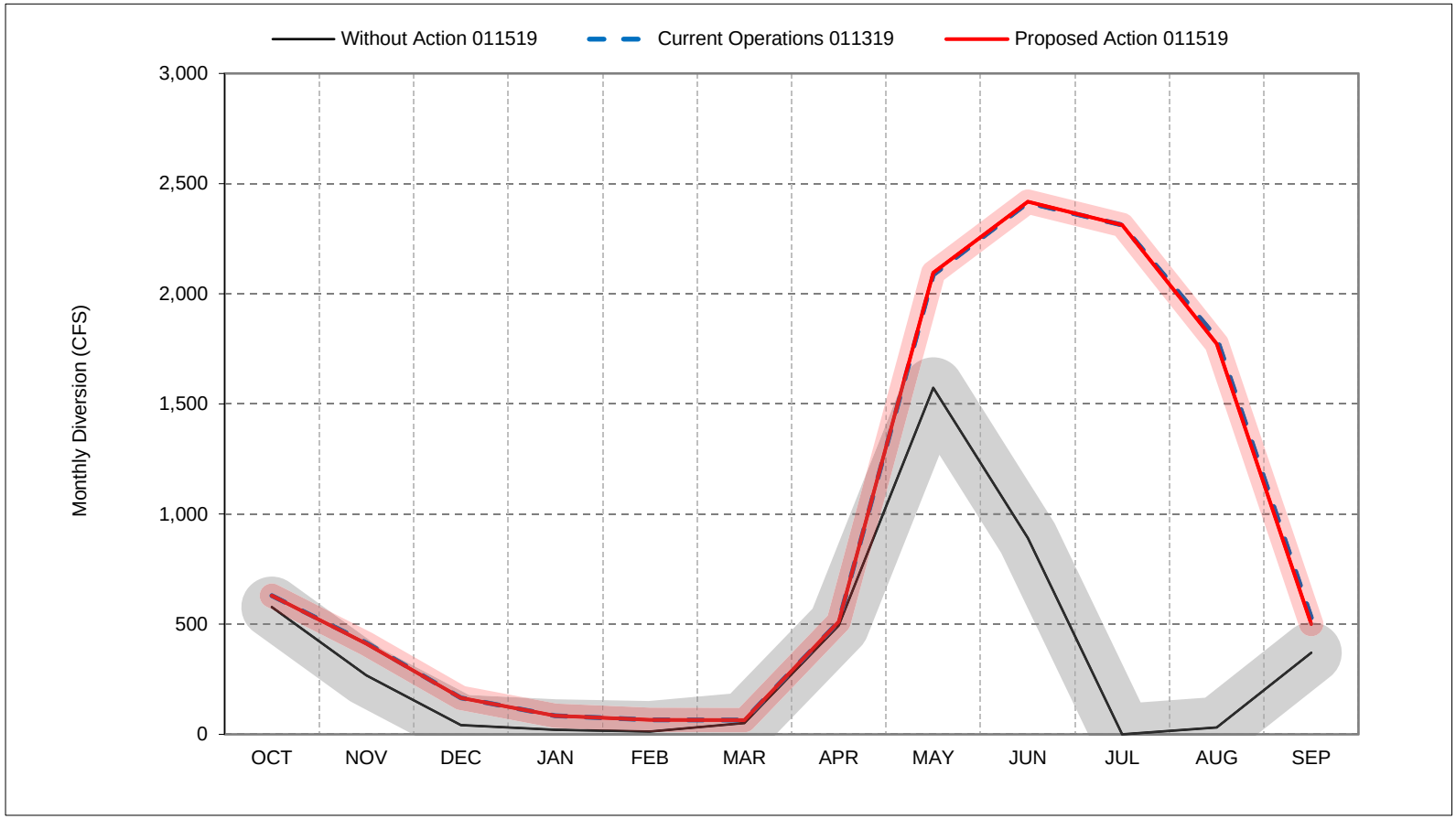
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 48-5. Hamilton City Diversion - Glenn Colusa Canal, Dry Year Average Diversion



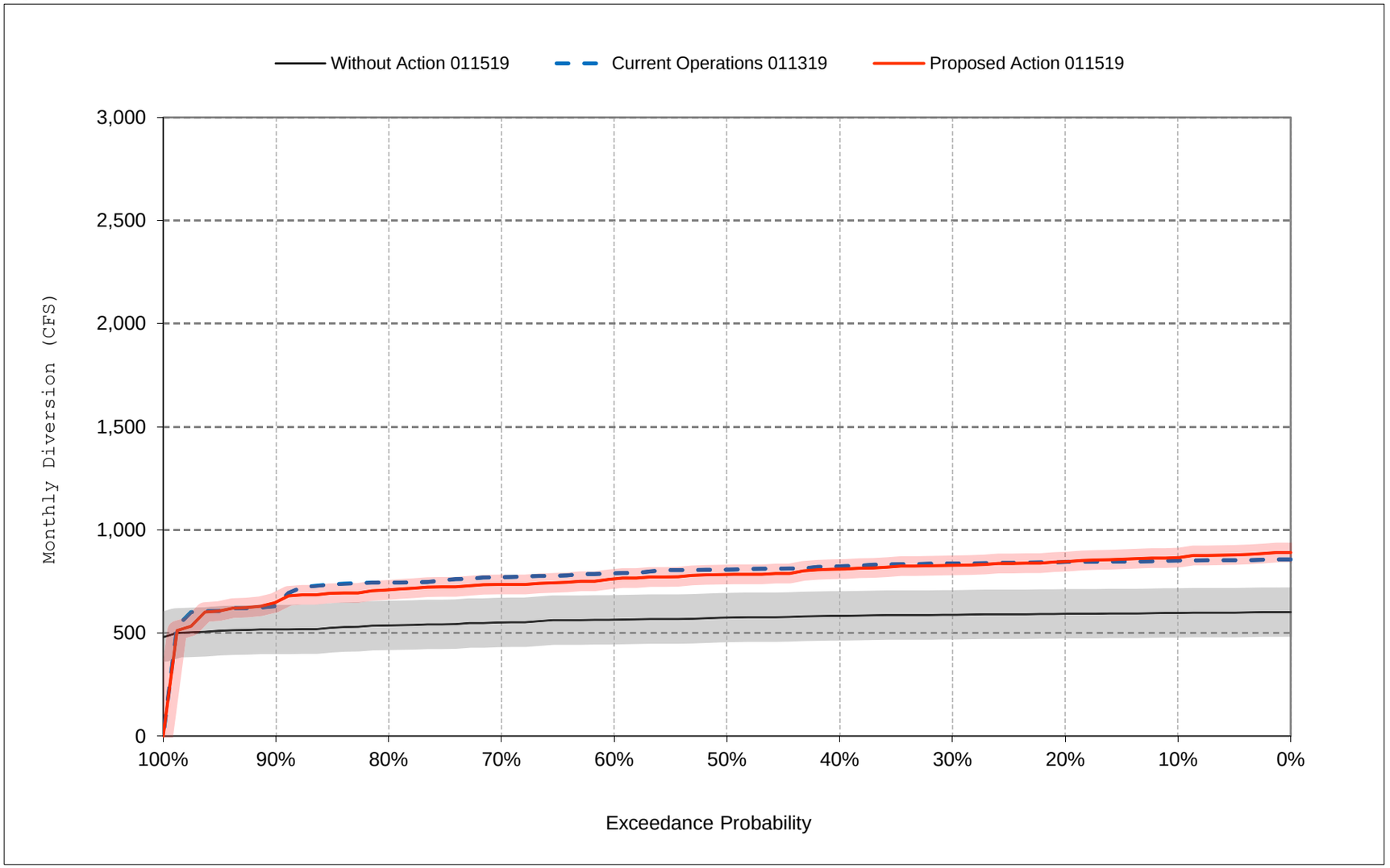
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 48-6. Hamilton City Diversion - Glenn Colusa Canal, Critical Year Average Diversion



*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

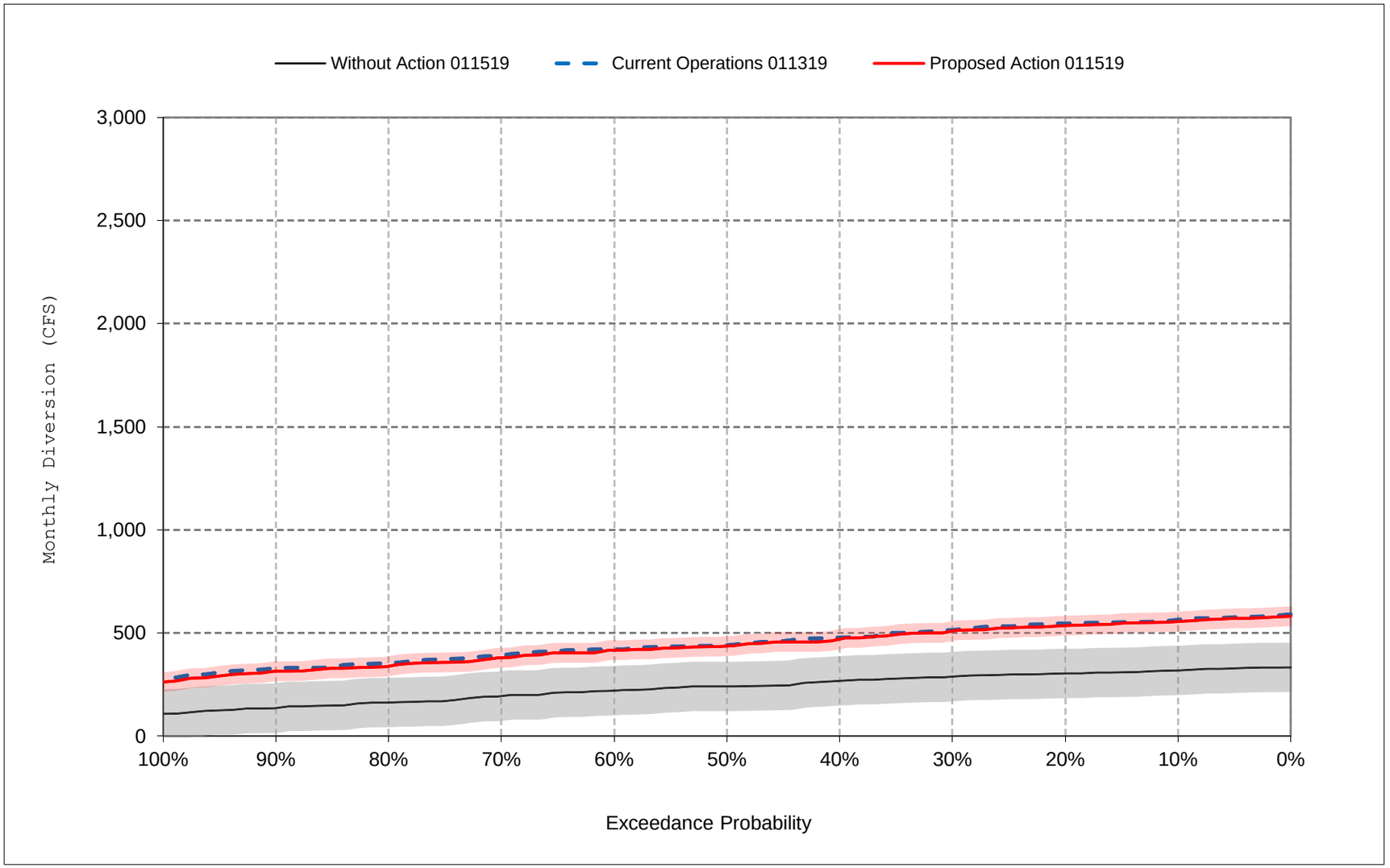
Figure 48-7. Hamilton City Diversion - Glenn Colusa Canal, October



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

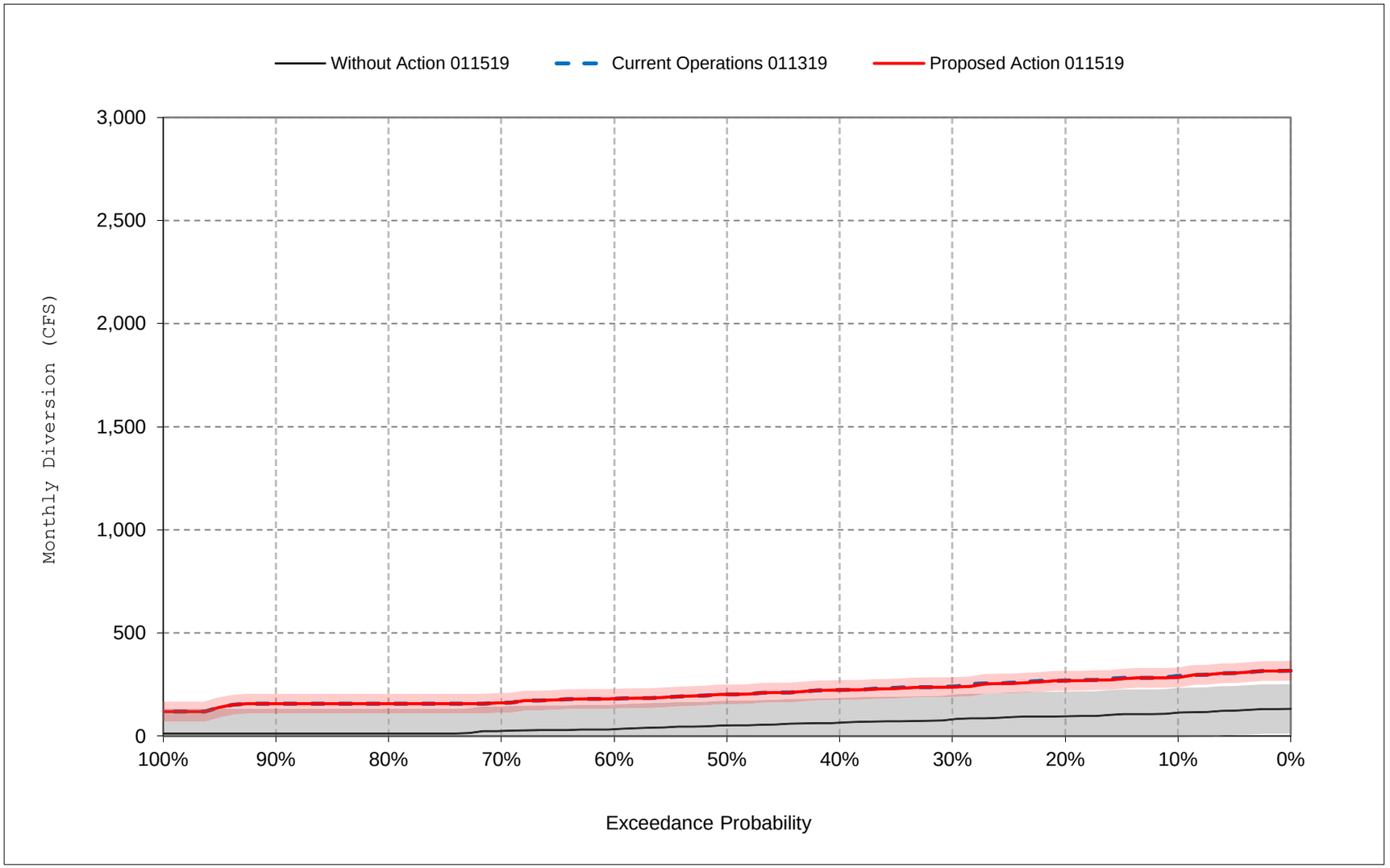
Figure 48-8. Hamilton City Diversion - Glenn Colusa Canal, November



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

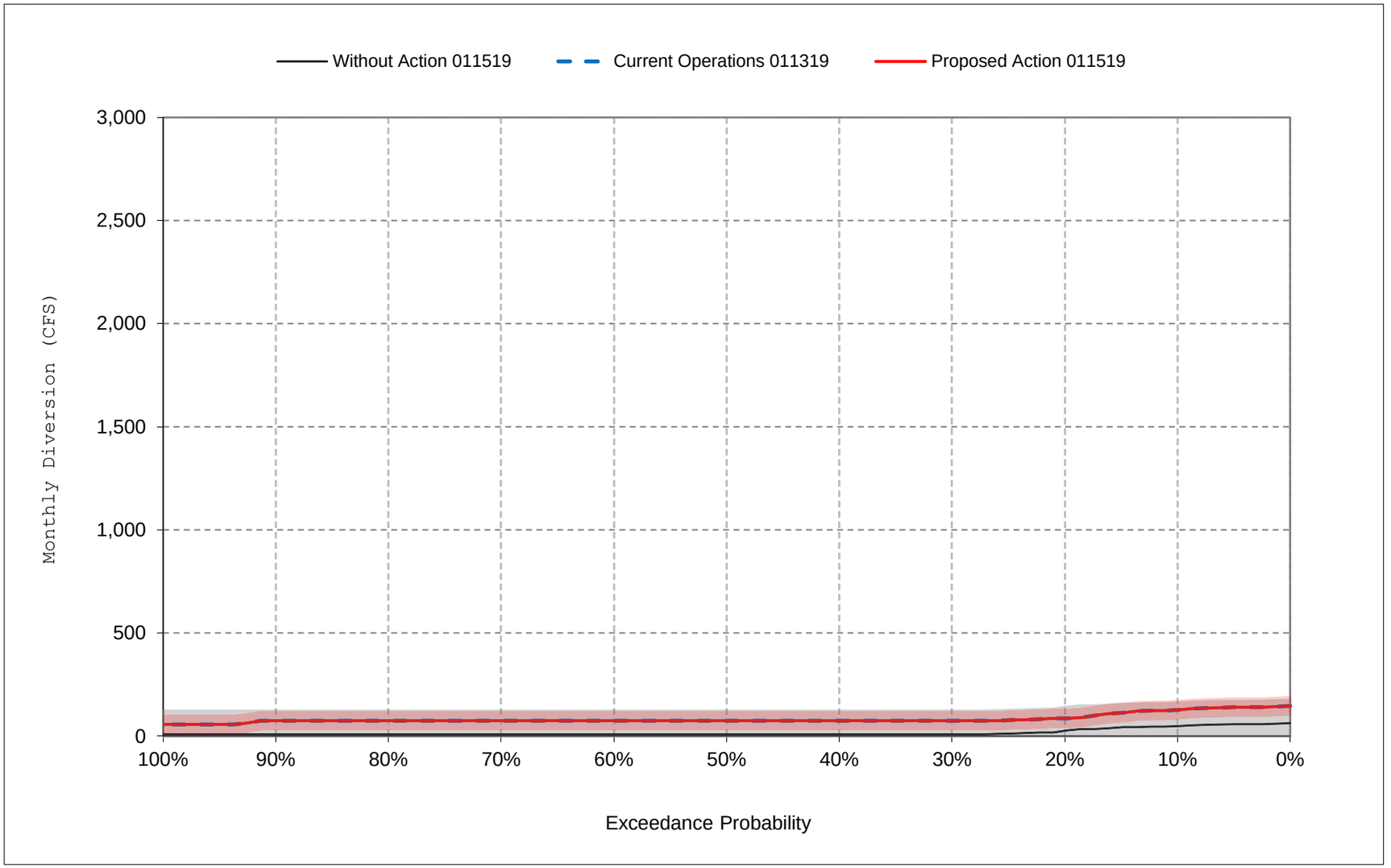
Figure 48-9. Hamilton City Diversion - Glenn Colusa Canal, December



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

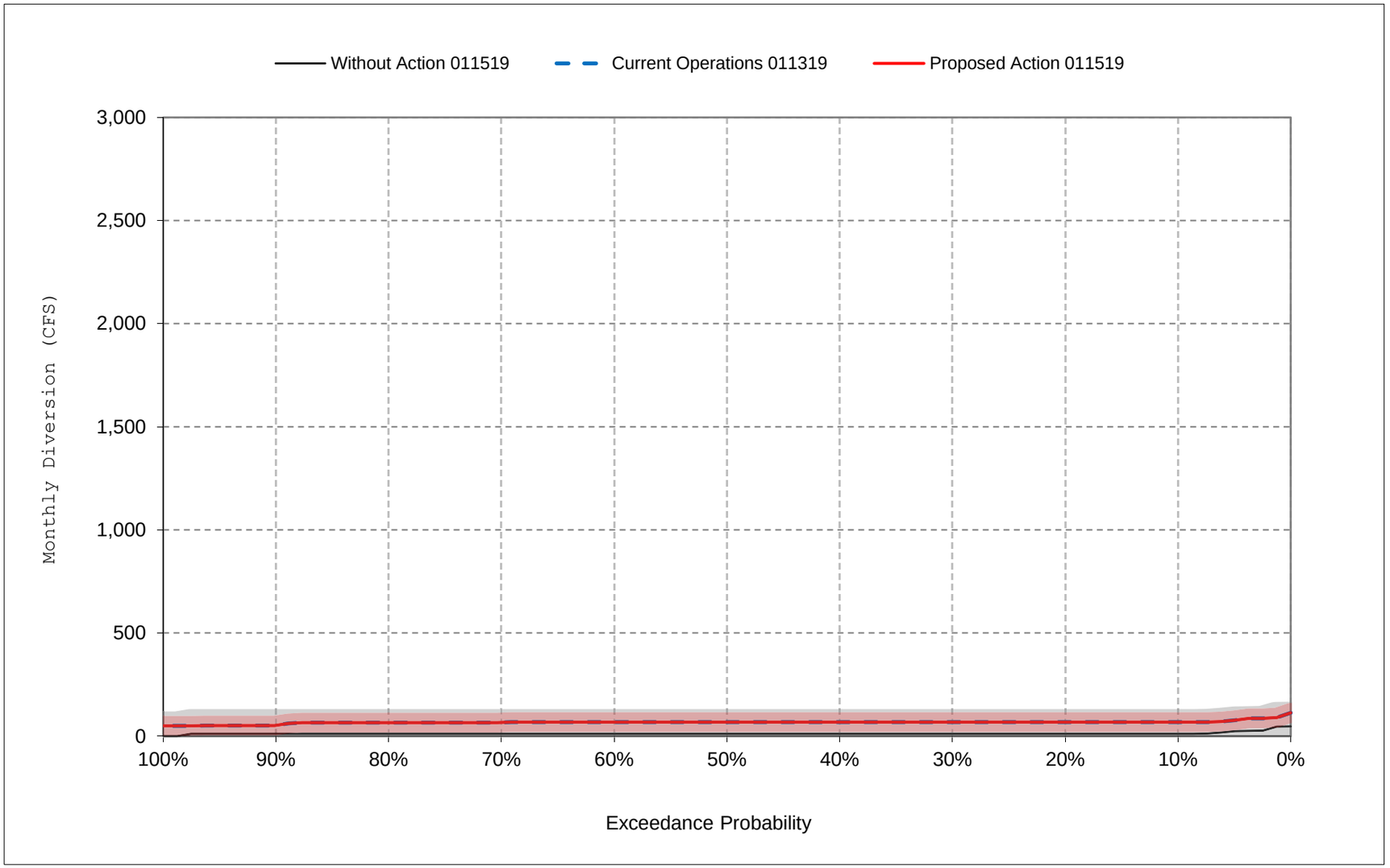
Figure 48-10. Hamilton City Diversion - Glenn Colusa Canal, January



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

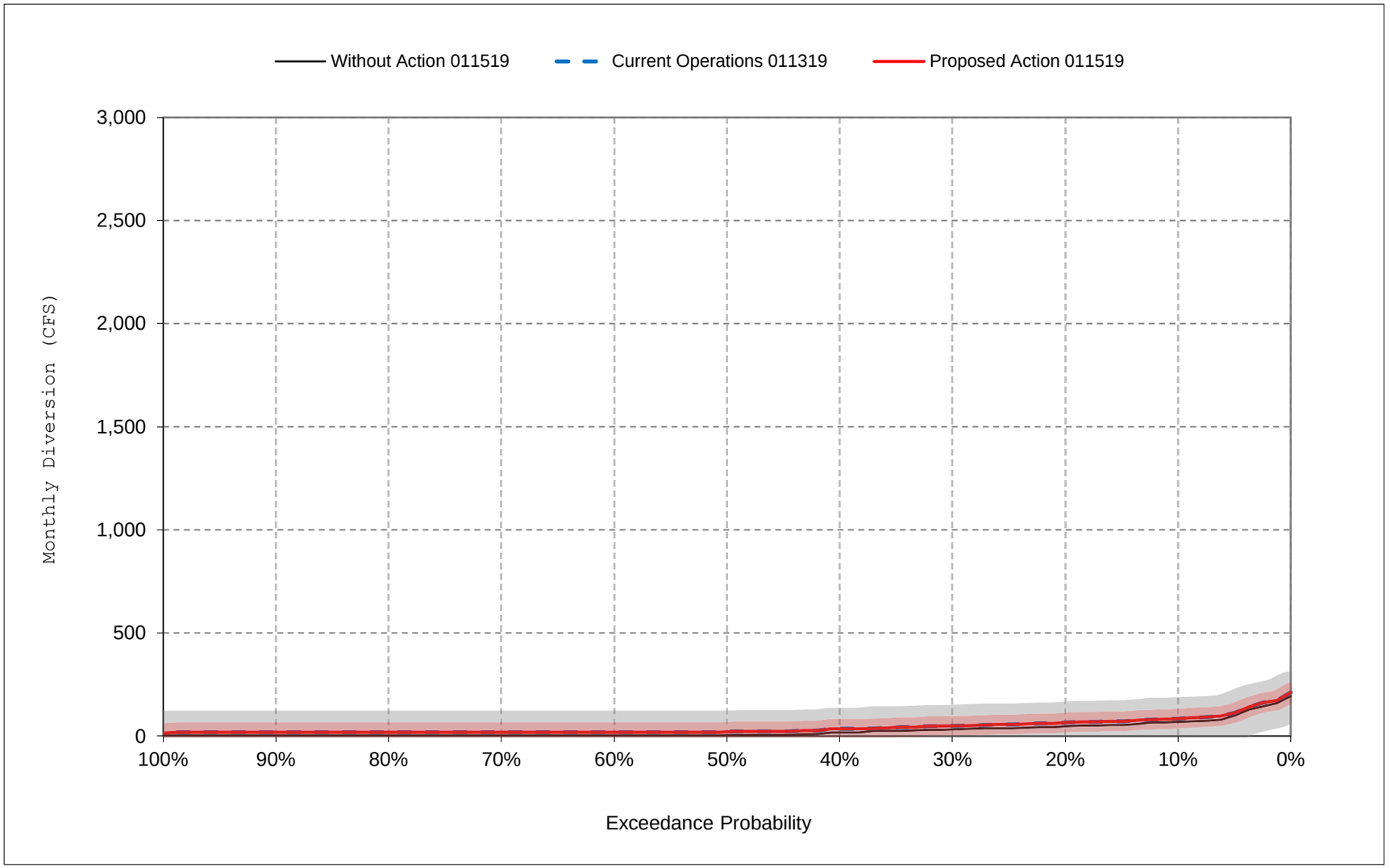
Figure 48-11. Hamilton City Diversion - Glenn Colusa Canal, February



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

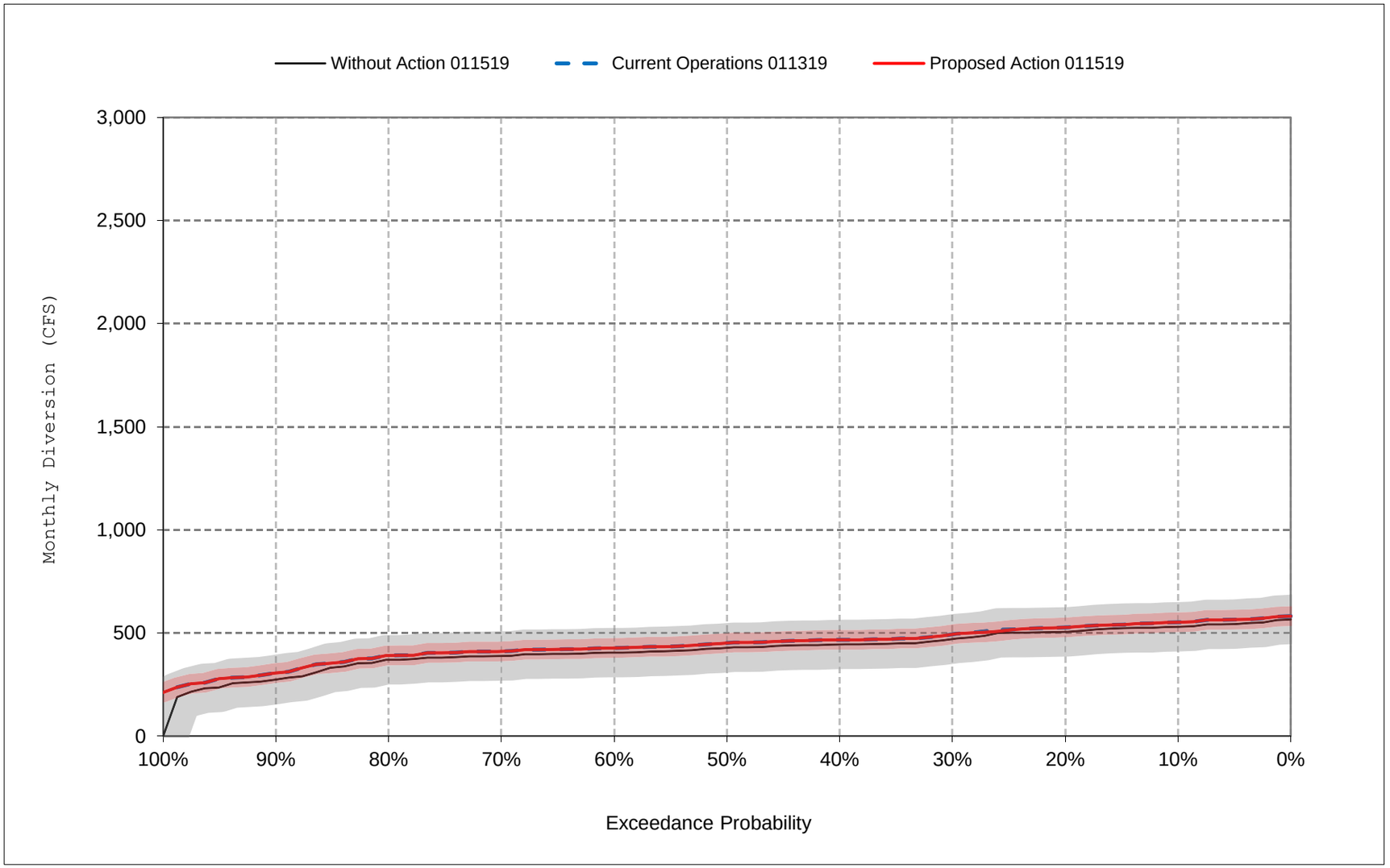
Figure 48-12. Hamilton City Diversion - Glenn Colusa Canal, March



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

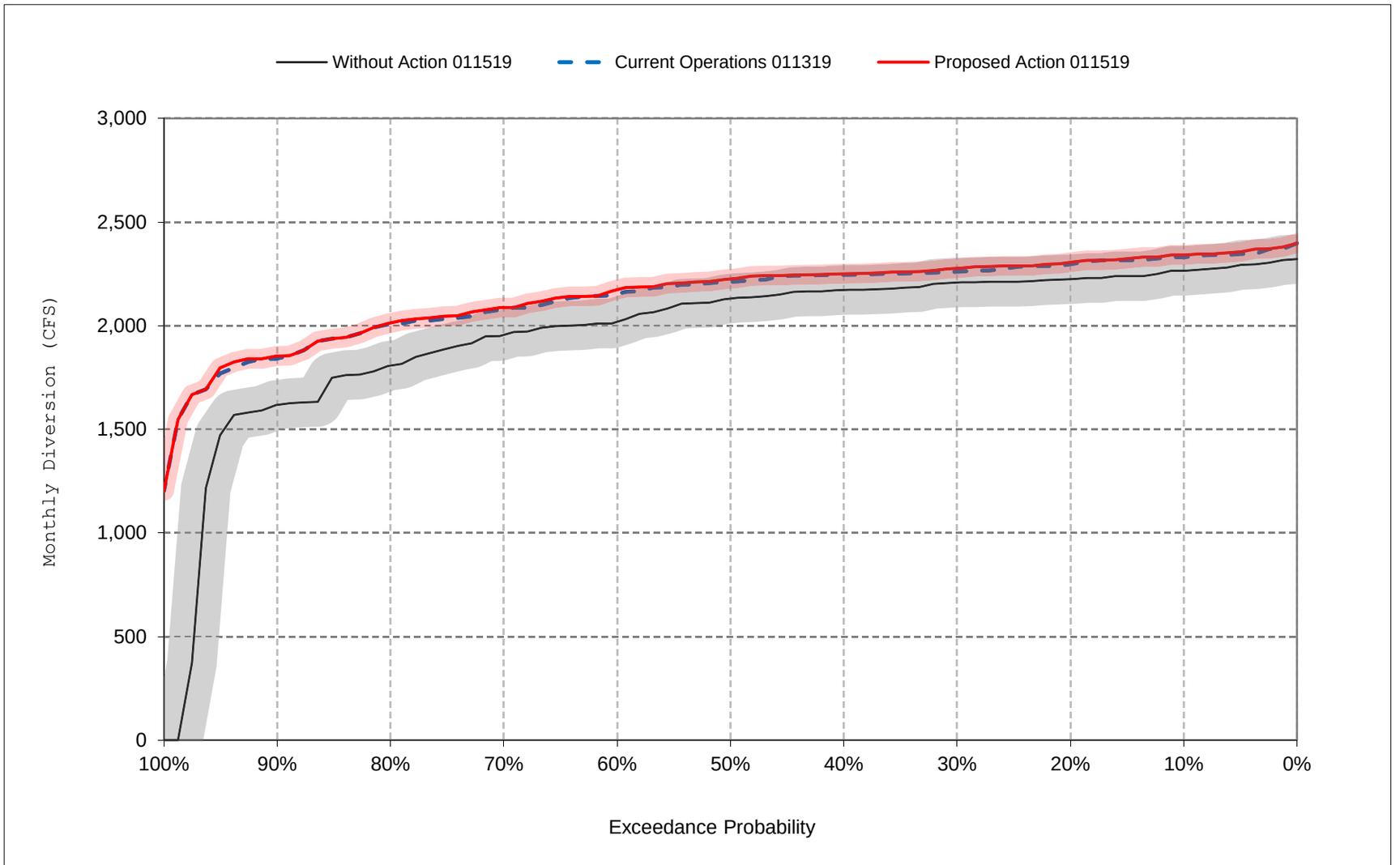
Figure 48-13. Hamilton City Diversion - Glenn Colusa Canal, April



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

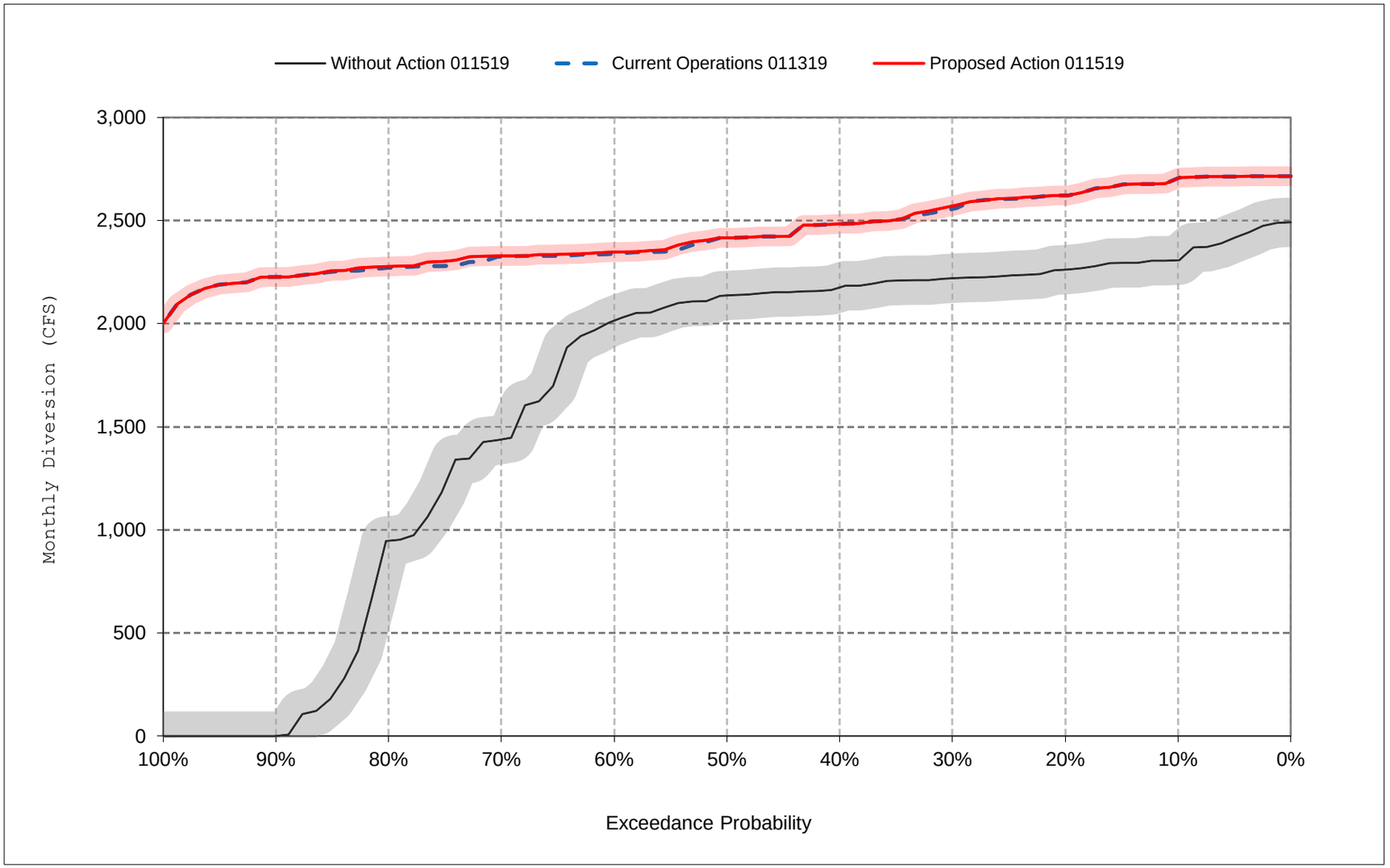
Figure 48-14. Hamilton City Diversion - Glenn Colusa Canal, May



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

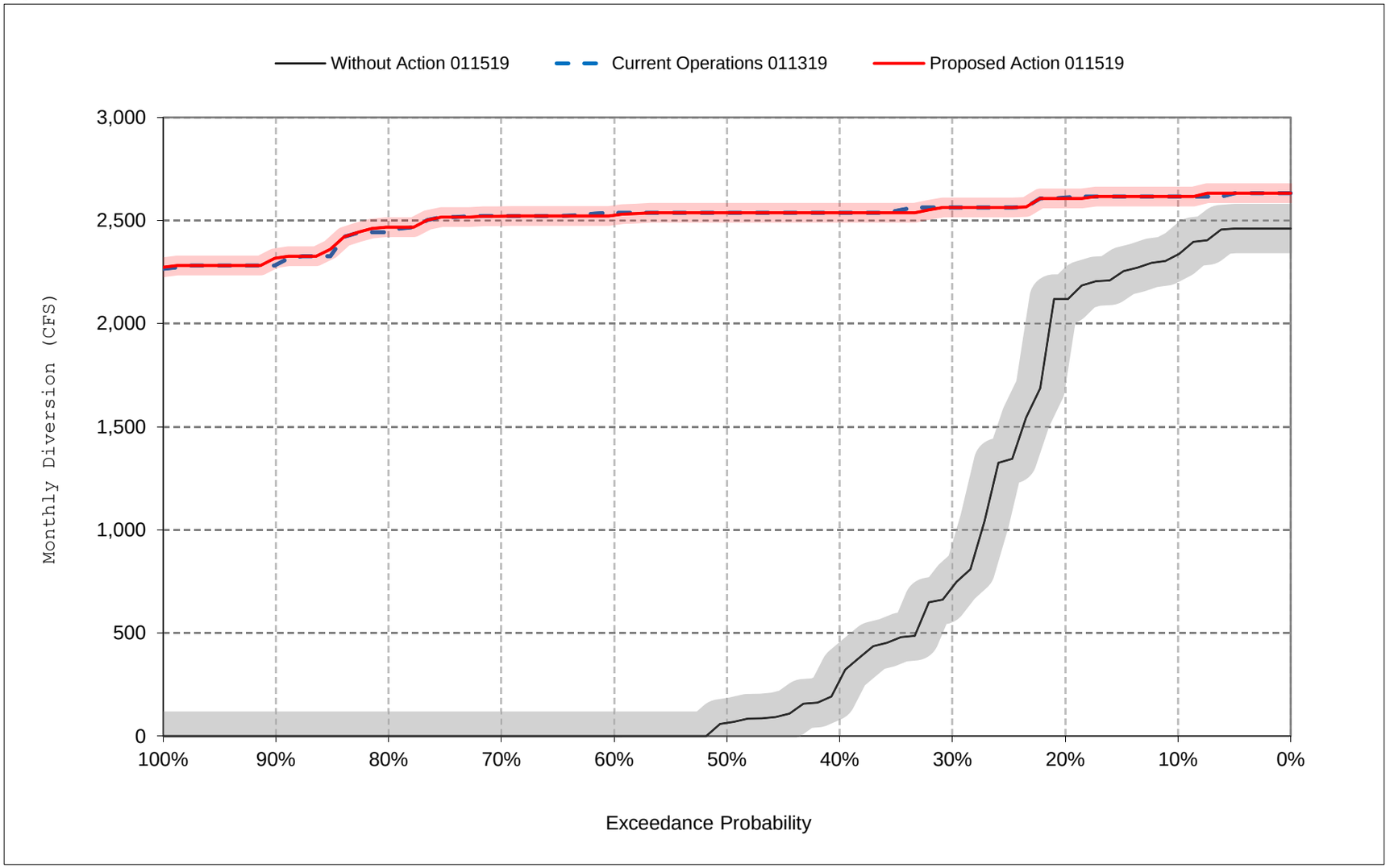
Figure 48-15. Hamilton City Diversion - Glenn Colusa Canal, June



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

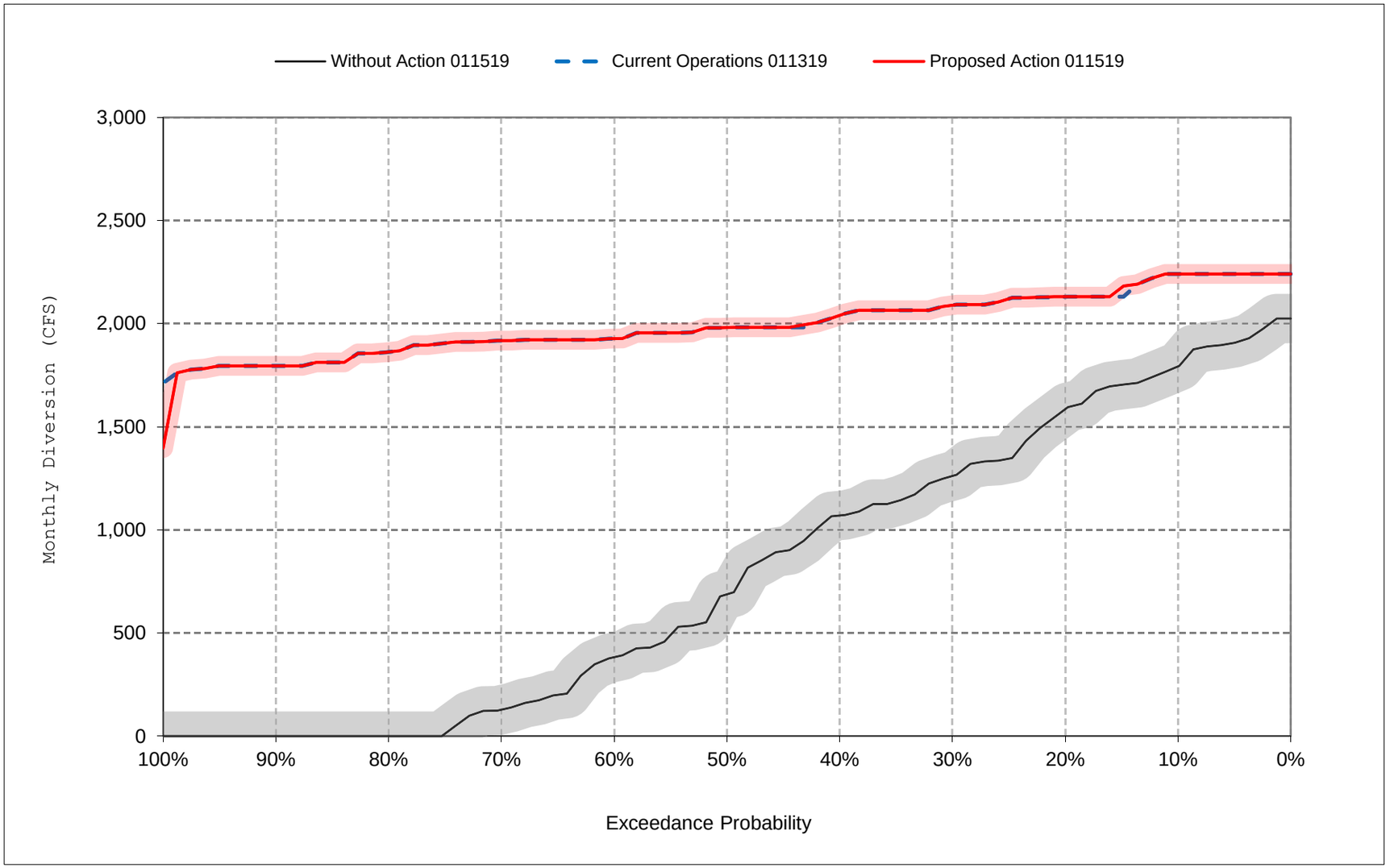
Figure 48-16. Hamilton City Diversion - Glenn Colusa Canal, July



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

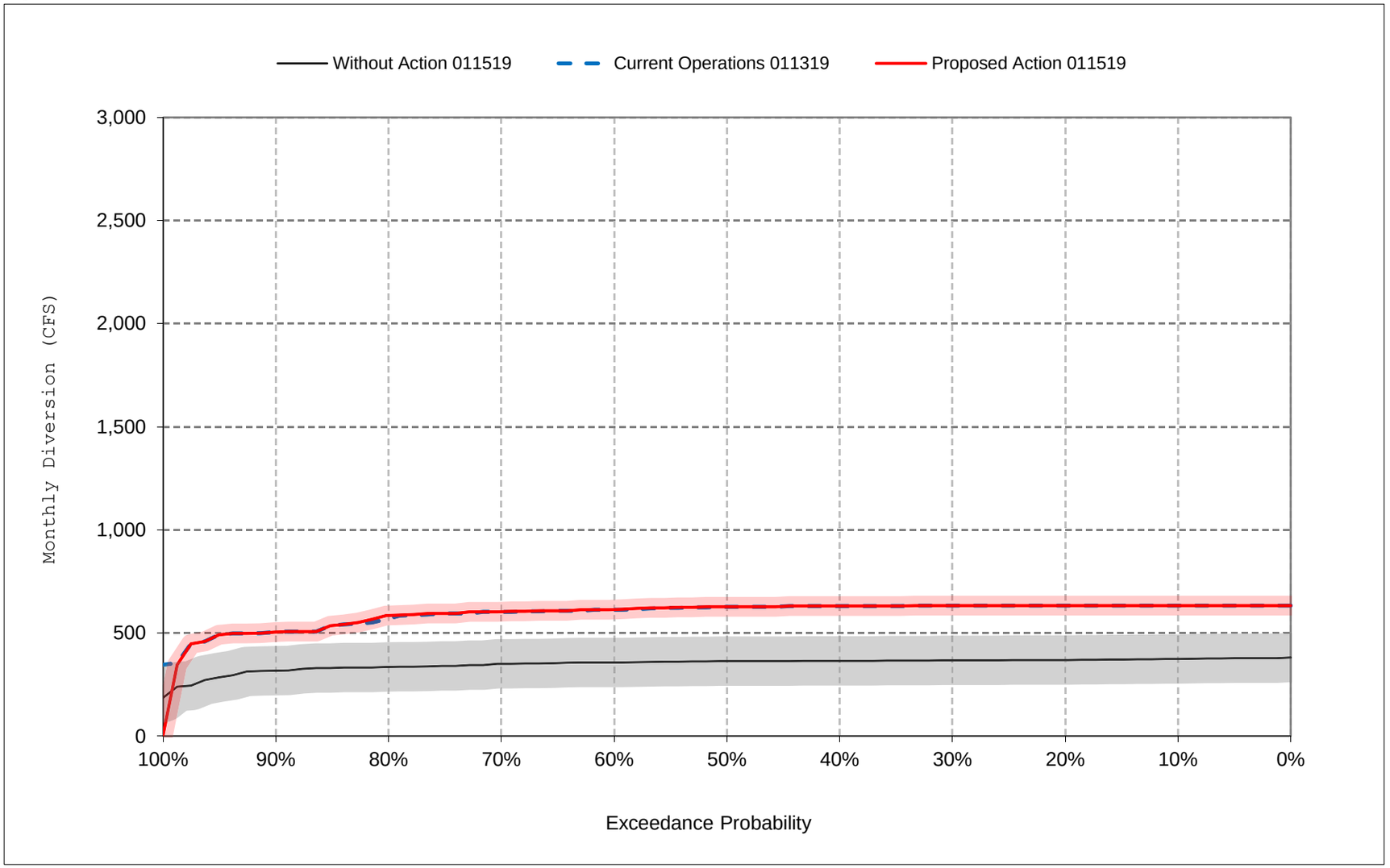
Figure 48-17. Hamilton City Diversion - Glenn Colusa Canal, August



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Figure 48-18. Hamilton City Diversion - Glenn Colusa Canal, September



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Table 49-1. Folsom South Canal Diversion, Monthly Diversion

Without Action 011519

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term Full Simulation Period[a]	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types[b,c]												
Wet (32%)	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal (16%)	0	0	0	0	0	0	0	0	0	0	0	0
Below Normal (13%)	0	0	0	0	0	0	0	0	0	0	0	0
Dry (24%)	0	0	0	0	0	0	0	0	0	0	0	0
Critical (15%)	0	0	0	0	0	0	0	0	0	0	0	0

Current Operations 011319

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	67	64	51	51	56	62	79	85	101	113	106	97
20%	67	64	51	51	56	61	77	85	100	113	105	97
30%	66	64	51	51	56	61	77	85	100	112	105	97
40%	65	63	51	51	55	58	75	84	99	111	104	96
50%	64	62	49	49	54	55	73	83	97	109	102	93
60%	60	57	46	46	51	53	68	77	89	100	94	86
70%	56	54	43	43	48	52	67	72	85	95	89	82
80%	55	54	43	43	47	52	66	72	84	95	88	81
90%	54	53	42	42	46	50	64	69	82	92	86	79
Long Term Full Simulation Period[a]	61	59	47	47	52	56	71	79	93	103	97	89
Water Year Types[b,c]												
Wet (32%)	66	63	51	49	55	61	75	84	100	112	104	96
Above Normal (16%)	66	63	50	46	51	59	77	84	99	111	104	96
Below Normal (13%)	61	59	47	48	52	54	71	79	92	104	97	89
Dry (24%)	57	55	44	47	52	51	66	74	86	97	91	83
Critical (15%)	55	52	42	43	47	51	65	69	82	88	86	79

Current Operations 011319 minus Without Action 011519

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	67	64	51	51	56	62	79	85	101	113	106	97
20%	67	64	51	51	56	61	77	85	100	113	105	97
30%	66	64	51	51	56	61	77	85	100	112	105	97
40%	65	63	51	51	55	58	75	84	99	111	104	96
50%	64	62	49	49	54	55	73	83	97	109	102	93
60%	60	57	46	46	51	53	68	77	89	100	94	86
70%	56	54	43	43	48	52	67	72	85	95	89	82
80%	55	54	43	43	47	52	66	72	84	95	88	81
90%	54	53	42	42	46	50	64	69	82	92	86	79
Long Term Full Simulation Period[a]	61	59	47	47	52	56	71	79	93	103	97	89
Water Year Types[b,c]												
Wet (32%)	66	63	51	49	55	61	75	84	100	112	104	96
Above Normal (16%)	66	63	50	46	51	59	77	84	99	111	104	96
Below Normal (13%)	61	59	47	48	52	54	71	79	92	104	97	89
Dry (24%)	57	55	44	47	52	51	66	74	86	97	91	83
Critical (15%)	55	52	42	43	47	51	65	69	82	88	86	79

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 49-2. Folsom South Canal Diversion, Monthly Diversion

Without Action 011519

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types[b,c]												
Wet (32%)	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal (16%)	0	0	0	0	0	0	0	0	0	0	0	0
Below Normal (13%)	0	0	0	0	0	0	0	0	0	0	0	0
Dry (24%)	0	0	0	0	0	0	0	0	0	0	0	0
Critical (15%)	0	0	0	0	0	0	0	0	0	0	0	0

Proposed Action 011519

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	67	64	51	51	56	62	79	85	101	114	106	97
20%	67	64	51	51	56	61	79	85	100	113	105	97
30%	67	64	51	51	56	61	78	85	100	113	105	97
40%	66	64	51	51	56	61	77	84	100	112	105	97
50%	65	64	51	51	55	58	74	84	100	112	105	96
60%	64	63	50	50	55	54	71	83	99	111	104	95
70%	57	54	43	43	48	53	67	73	86	96	90	82
80%	56	54	43	43	48	52	66	72	85	95	89	81
90%	55	54	43	43	46	51	65	71	83	94	88	81
Long Term												
Full Simulation Period[a]	62	60	48	48	53	57	72	80	94	105	99	91
Water Year Types[b,c]												
Wet (32%)	66	63	51	50	55	61	76	84	100	112	105	96
Above Normal (16%)	66	63	51	48	52	60	77	84	100	112	104	96
Below Normal (13%)	65	62	50	48	53	58	75	83	98	110	103	94
Dry (24%)	58	56	45	48	53	52	68	75	88	99	93	85
Critical (15%)	55	53	42	44	48	51	66	70	83	91	87	80

Proposed Action 011519 minus Without Action 011519

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	67	64	51	51	56	62	79	85	101	114	106	97
20%	67	64	51	51	56	61	79	85	100	113	105	97
30%	67	64	51	51	56	61	78	85	100	113	105	97
40%	66	64	51	51	56	61	77	84	100	112	105	97
50%	65	64	51	51	55	58	74	84	100	112	105	96
60%	64	63	50	50	55	54	71	83	99	111	104	95
70%	57	54	43	43	48	53	67	73	86	96	90	82
80%	56	54	43	43	48	52	66	72	85	95	89	81
90%	55	54	43	43	46	51	65	71	83	94	88	81
Long Term												
Full Simulation Period[a]	62	60	48	48	53	57	72	80	94	105	99	91
Water Year Types[b,c]												
Wet (32%)	66	63	51	50	55	61	76	84	100	112	105	96
Above Normal (16%)	66	63	51	48	52	60	77	84	100	112	104	96
Below Normal (13%)	65	62	50	48	53	58	75	83	98	110	103	94
Dry (24%)	58	56	45	48	53	52	68	75	88	99	93	85
Critical (15%)	55	53	42	44	48	51	66	70	83	91	87	80

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 49-3. Folsom South Canal Diversion, Monthly Diversion

Current Operations 011319

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	67	64	51	51	56	62	79	85	101	113	106	97
20%	67	64	51	51	56	61	77	85	100	113	105	97
30%	66	64	51	51	56	61	77	85	100	112	105	97
40%	65	63	51	51	55	58	75	84	99	111	104	96
50%	64	62	49	49	54	55	73	83	97	109	102	93
60%	60	57	46	46	51	53	68	77	89	100	94	86
70%	56	54	43	43	48	52	67	72	85	95	89	82
80%	55	54	43	43	47	52	66	72	84	95	88	81
90%	54	53	42	42	46	50	64	69	82	92	86	79
Long Term												
Full Simulation Period[a]	61	59	47	47	52	56	71	79	93	103	97	89
Water Year Types[b,c]												
Wet (32%)	66	63	51	49	55	61	75	84	100	112	104	96
Above Normal (16%)	66	63	50	46	51	59	77	84	99	111	104	96
Below Normal (13%)	61	59	47	48	52	54	71	79	92	104	97	89
Dry (24%)	57	55	44	47	52	51	66	74	86	97	91	83
Critical (15%)	55	52	42	43	47	51	65	69	82	88	86	79

Proposed Action 011519

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	67	64	51	51	56	62	79	85	101	114	106	97
20%	67	64	51	51	56	61	79	85	100	113	105	97
30%	67	64	51	51	56	61	78	85	100	113	105	97
40%	66	64	51	51	56	61	77	84	100	112	105	97
50%	65	64	51	51	55	58	74	84	100	112	105	96
60%	64	63	50	50	55	54	71	83	99	111	104	95
70%	57	54	43	43	48	53	67	73	86	96	90	82
80%	56	54	43	43	48	52	66	72	85	95	89	81
90%	55	54	43	43	46	51	65	71	83	94	88	81
Long Term												
Full Simulation Period[a]	62	60	48	48	53	57	72	80	94	105	99	91
Water Year Types[b,c]												
Wet (32%)	66	63	51	50	55	61	76	84	100	112	105	96
Above Normal (16%)	66	63	51	48	52	60	77	84	100	112	104	96
Below Normal (13%)	65	62	50	48	53	58	75	83	98	110	103	94
Dry (24%)	58	56	45	48	53	52	68	75	88	99	93	85
Critical (15%)	55	53	42	44	48	51	66	70	83	91	87	80

Proposed Action 011519 minus Current Operations 011319

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	0	0	0	0	1	1	0	0	0	0	0
20%	0	0	0	0	0	0	1	0	0	0	0	0
30%	1	0	0	0	1	0	1	0	0	0	0	0
40%	1	0	0	0	2	3	2	0	1	1	1	1
50%	1	1	2	2	1	3	1	0	3	3	3	3
60%	4	6	5	5	4	1	3	5	9	10	10	8
70%	0	1	0	0	0	1	1	1	1	1	1	1
80%	1	0	0	0	0	0	1	0	0	0	0	0
90%	1	1	1	1	0	1	1	2	1	2	2	2
Long Term												
Full Simulation Period[a]	1	1	1	1	1	1	1	1	1	2	2	1
Water Year Types[b,c]												
Wet (32%)	0	0	0	1	1	0	0	0	0	0	0	0
Above Normal (16%)	0	0	0	1	2	1	0	0	0	0	0	0
Below Normal (13%)	4	3	3	0	0	3	4	3	5	6	6	5
Dry (24%)	1	1	1	1	1	1	2	1	2	2	2	2
Critical (15%)	1	1	0	1	1	1	1	1	1	3	1	1

a Based on the 82-year simulation period.

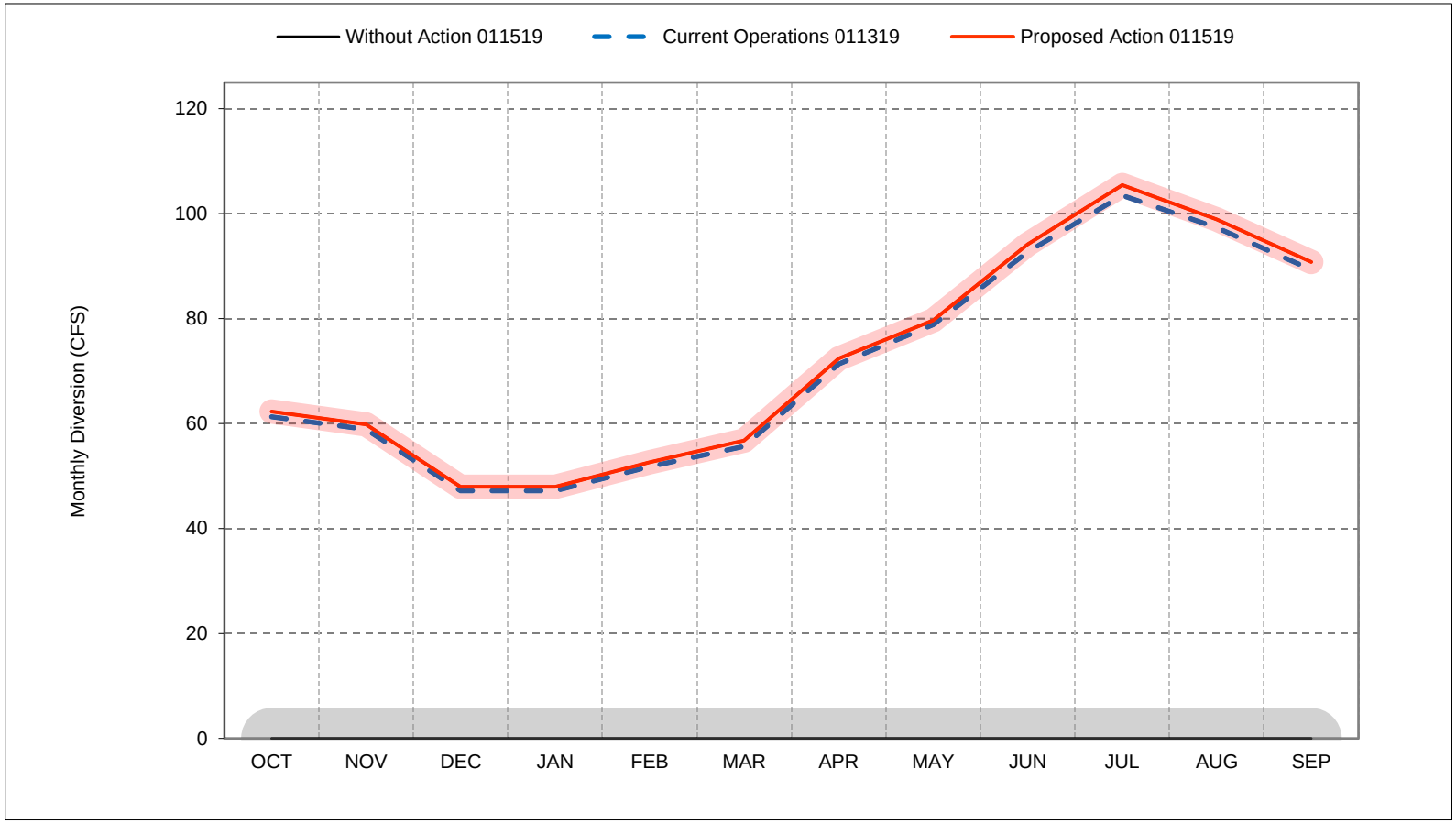
b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

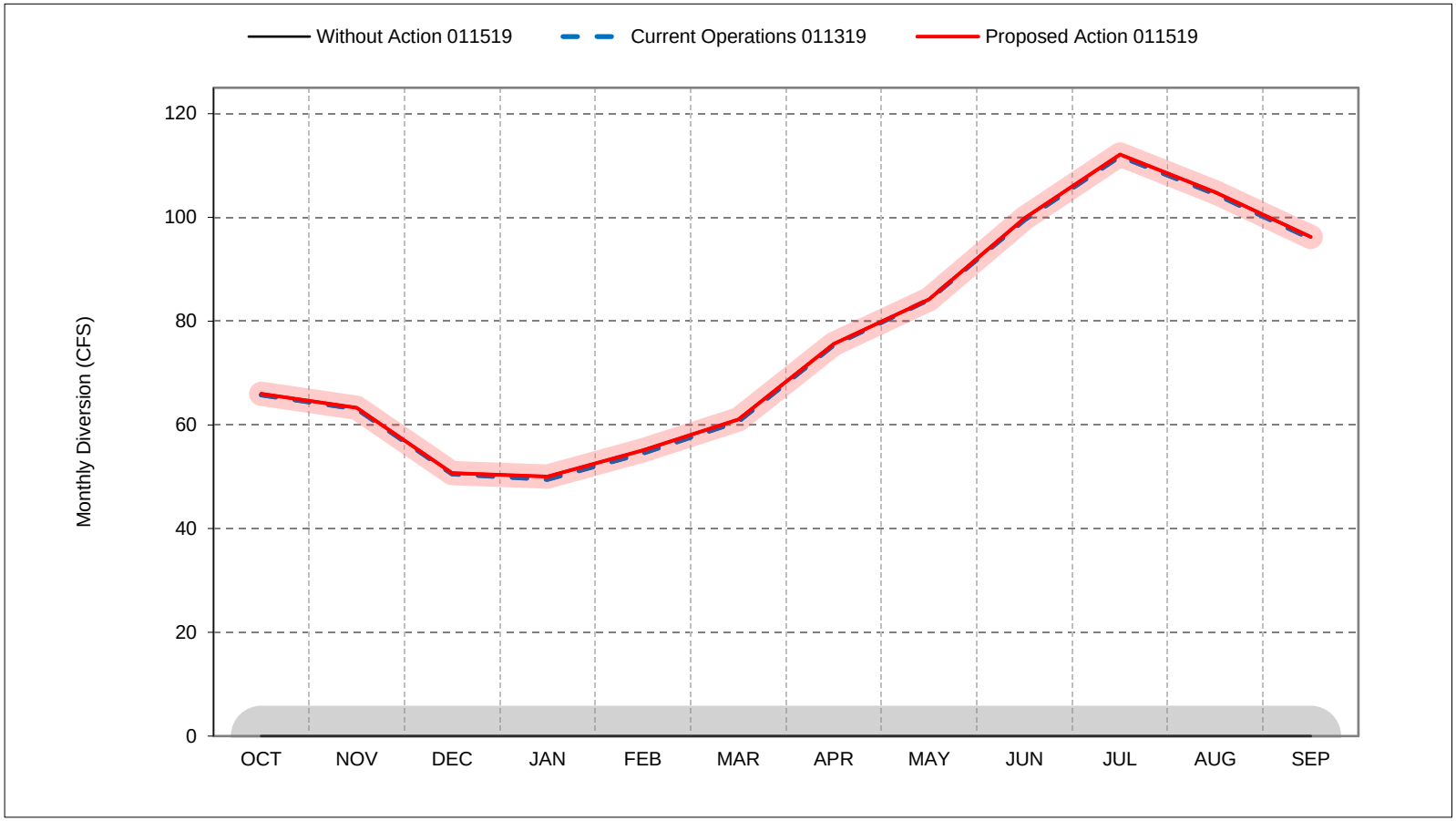
e These are draft results meant for qualitative analysis and are subject to revision.

Figure 49-1. Folsom South Canal Diversion, Long-Term Average Diversion



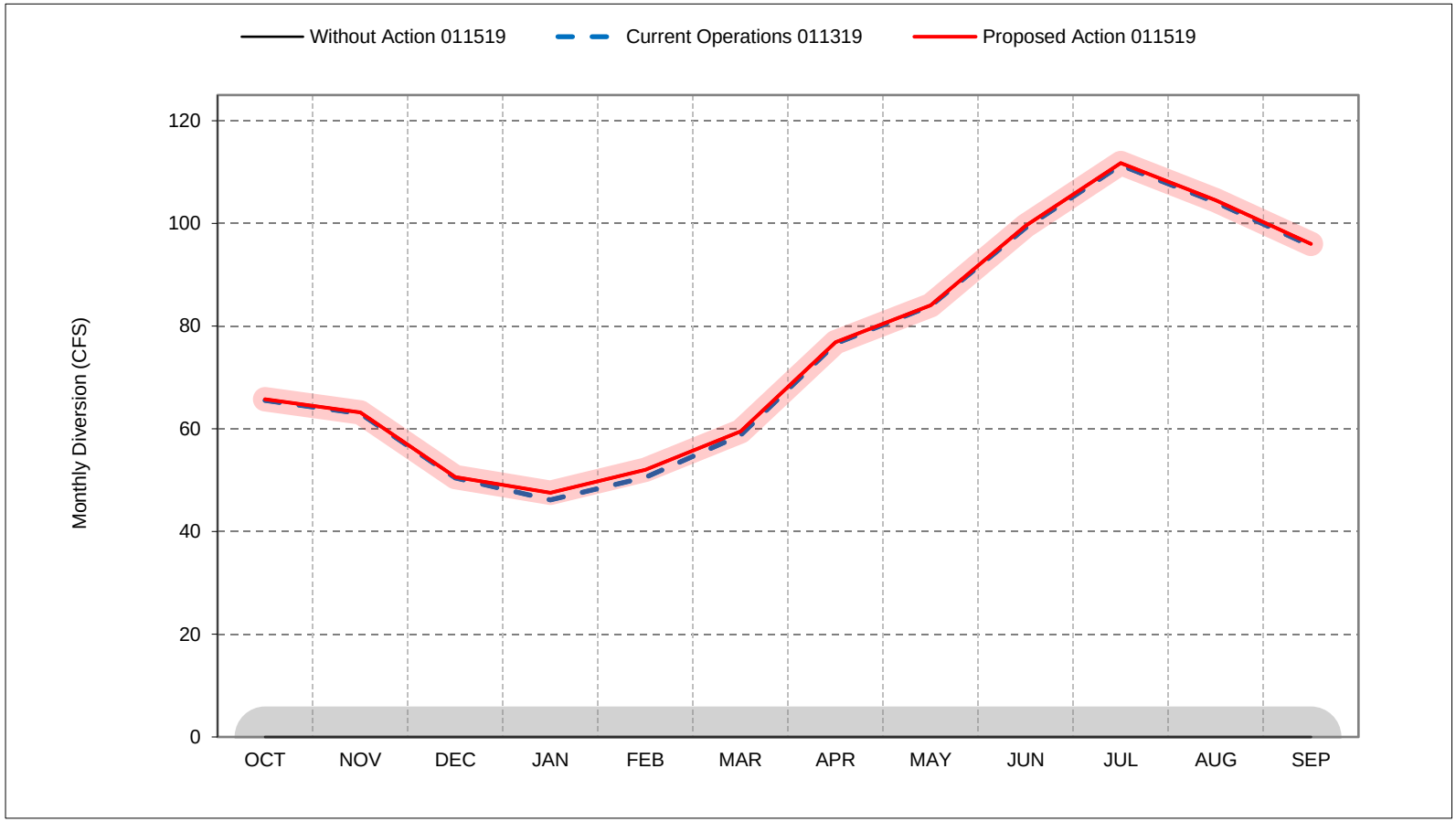
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 49-2. Folsom South Canal Diversion, Wet Year Average Diversion



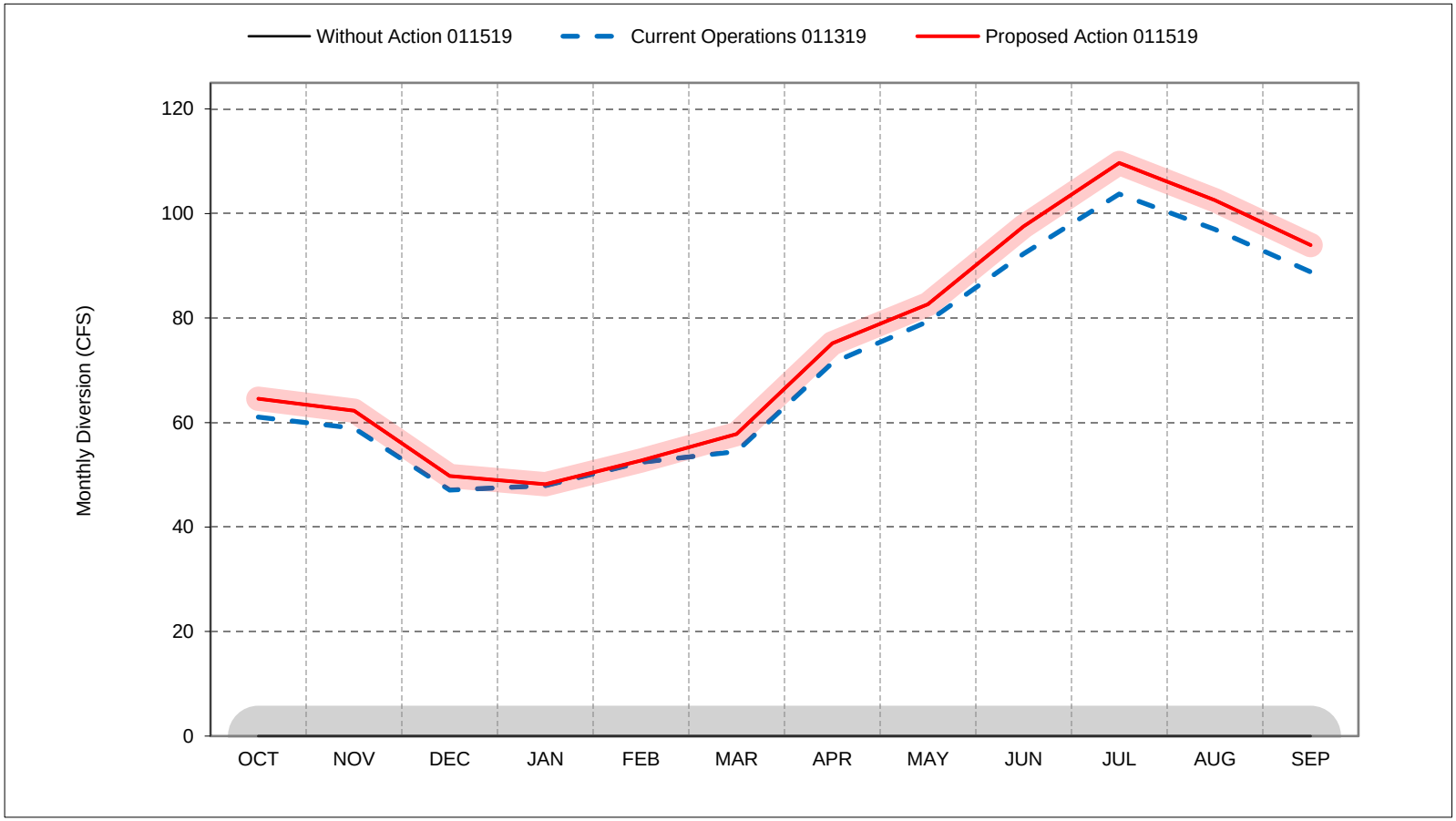
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 49-3. Folsom South Canal Diversion, Above Normal Year Average Diversion



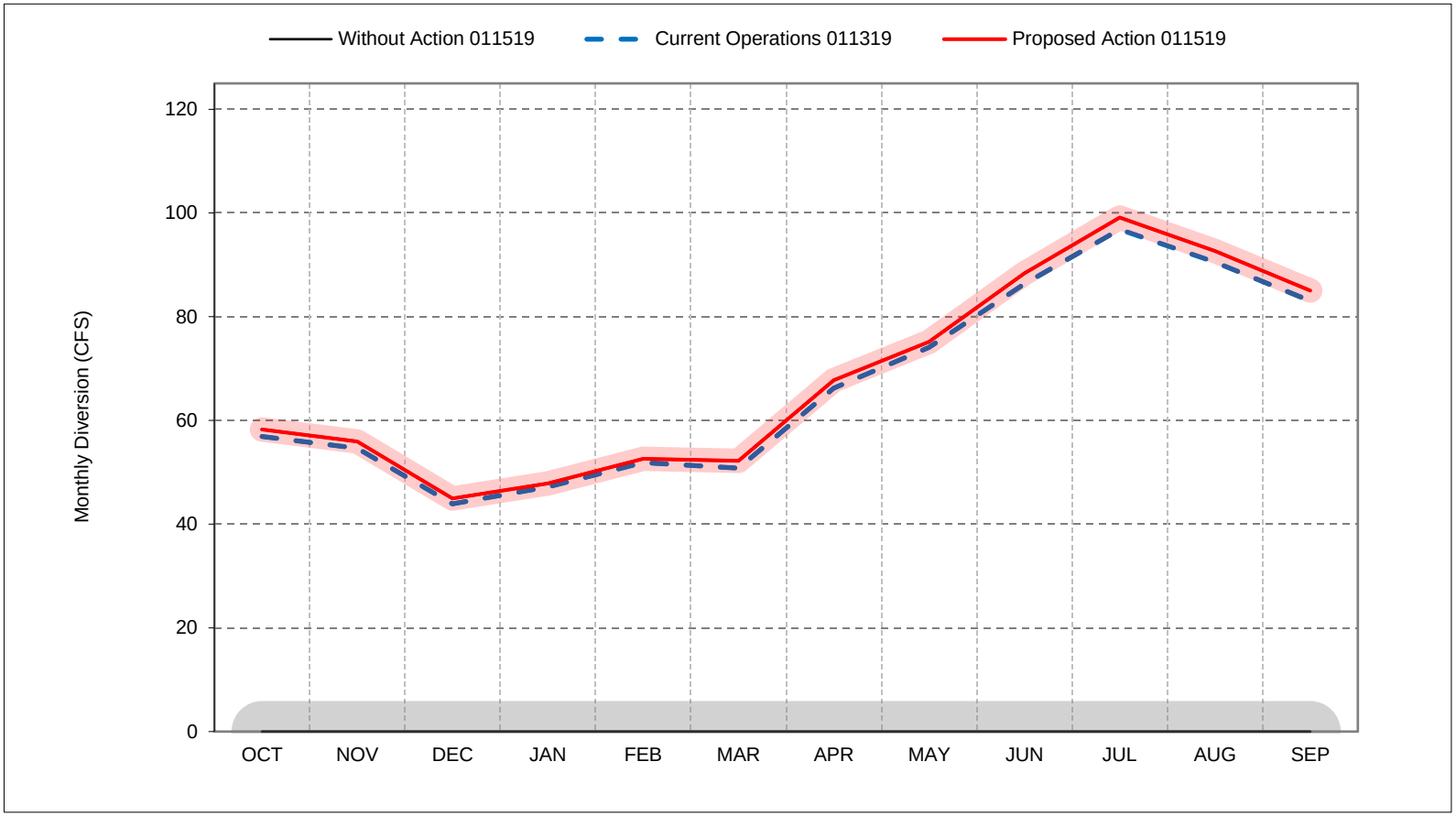
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 49-4. Folsom South Canal Diversion, Below Normal Year Average Diversion



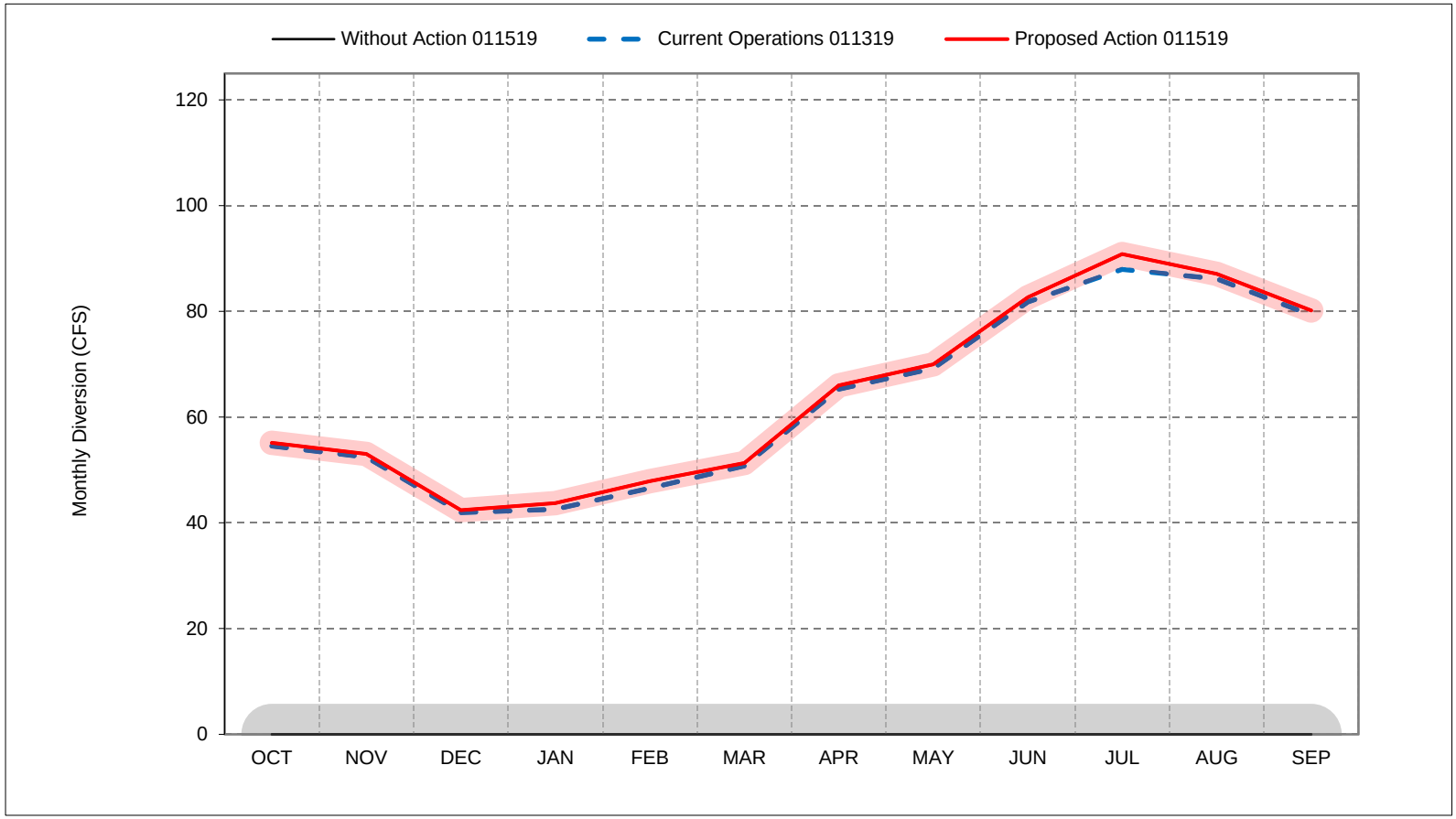
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 49-5. Folsom South Canal Diversion, Dry Year Average Diversion



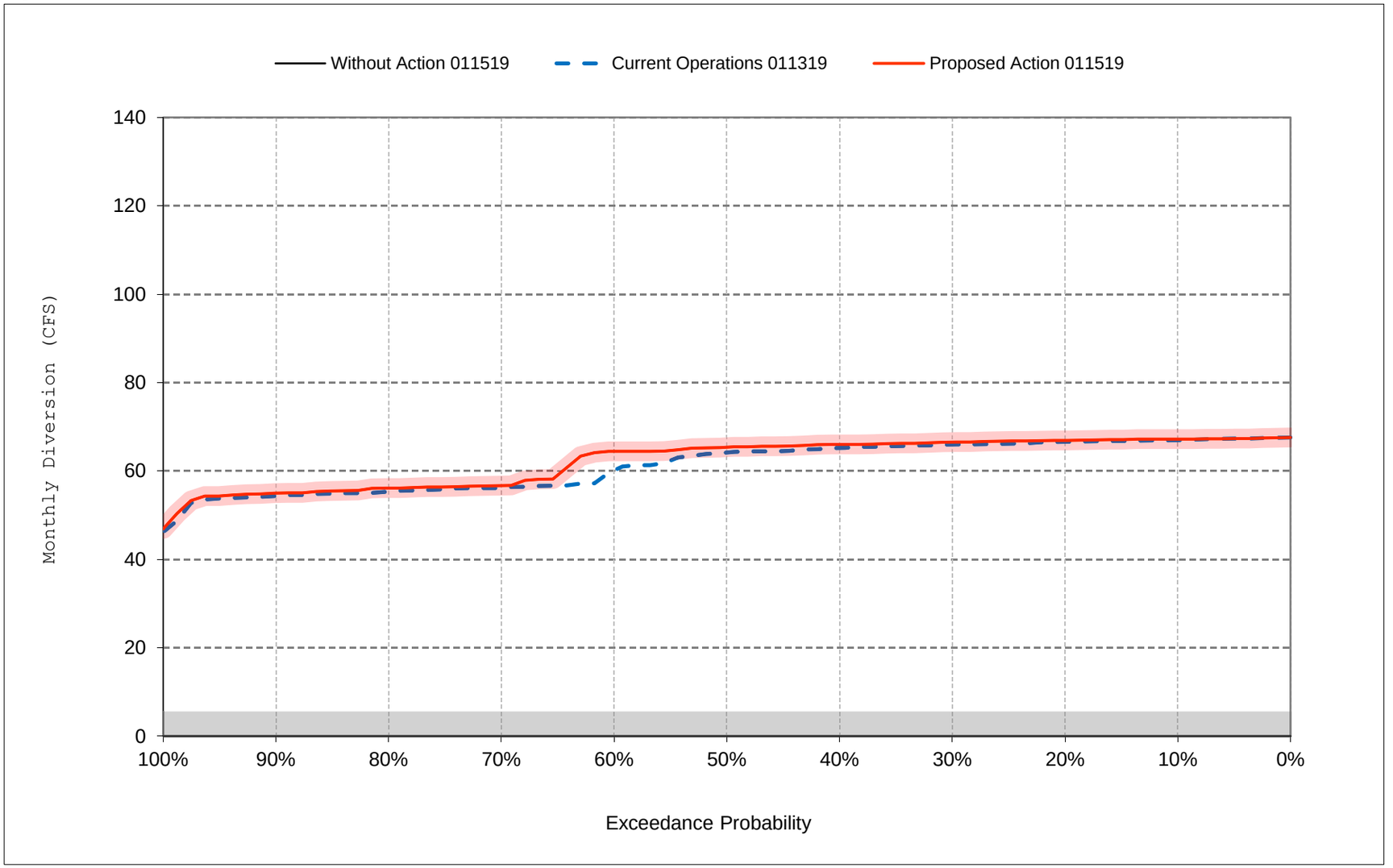
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 49-6. Folsom South Canal Diversion, Critical Year Average Diversion



*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

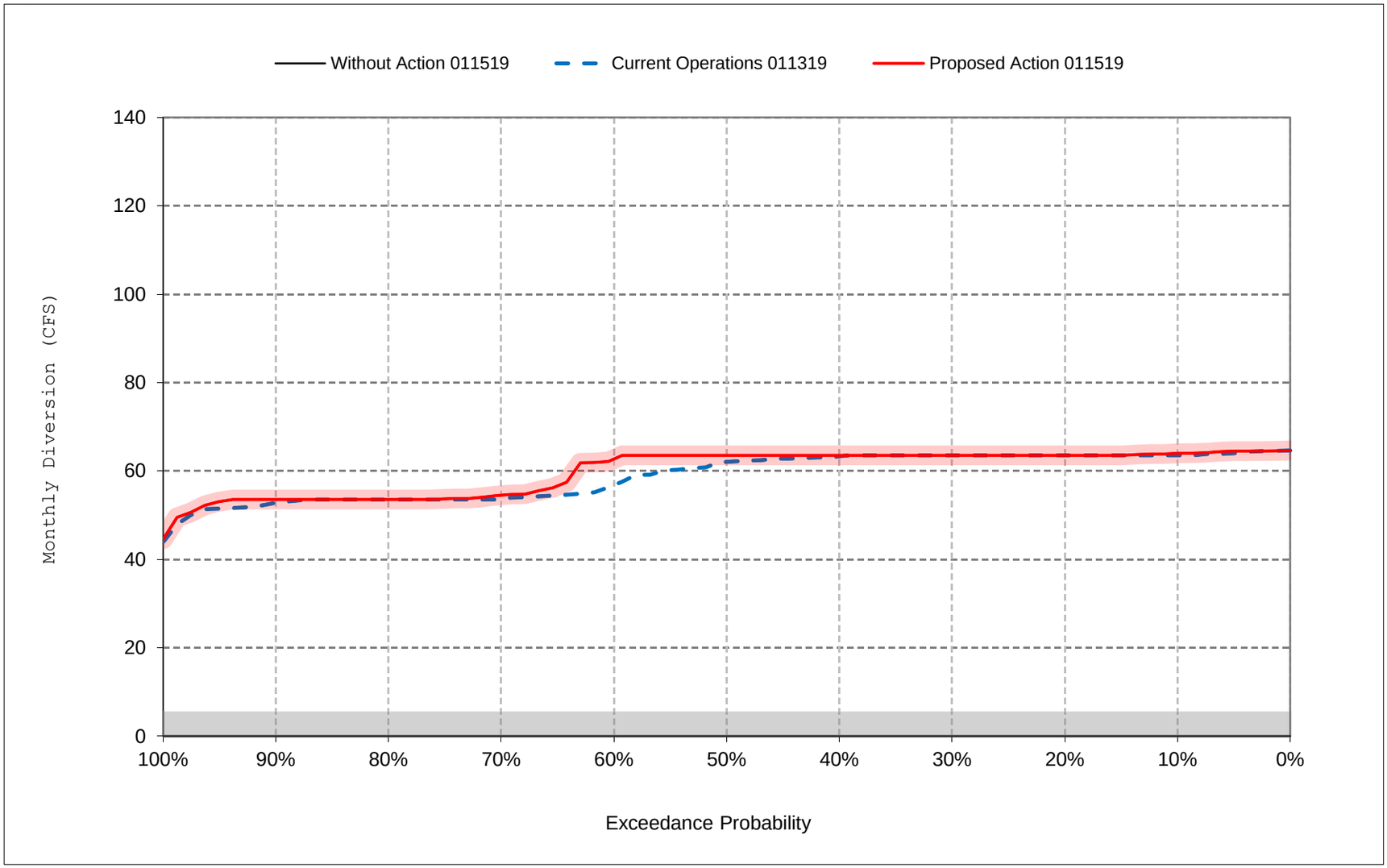
Figure 49-7. Folsom South Canal Diversion, October



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

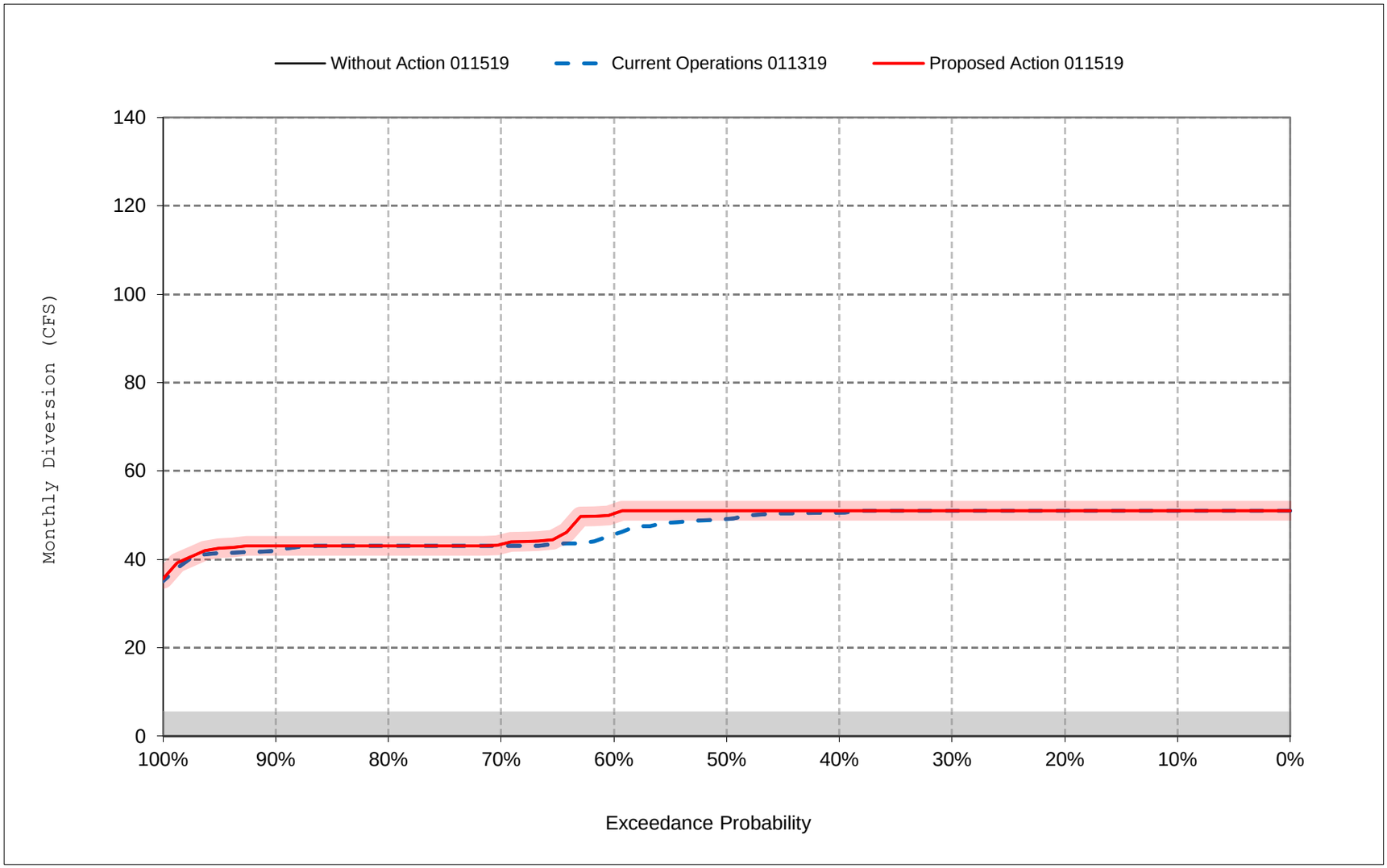
Figure 49-8. Folsom South Canal Diversion, November



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

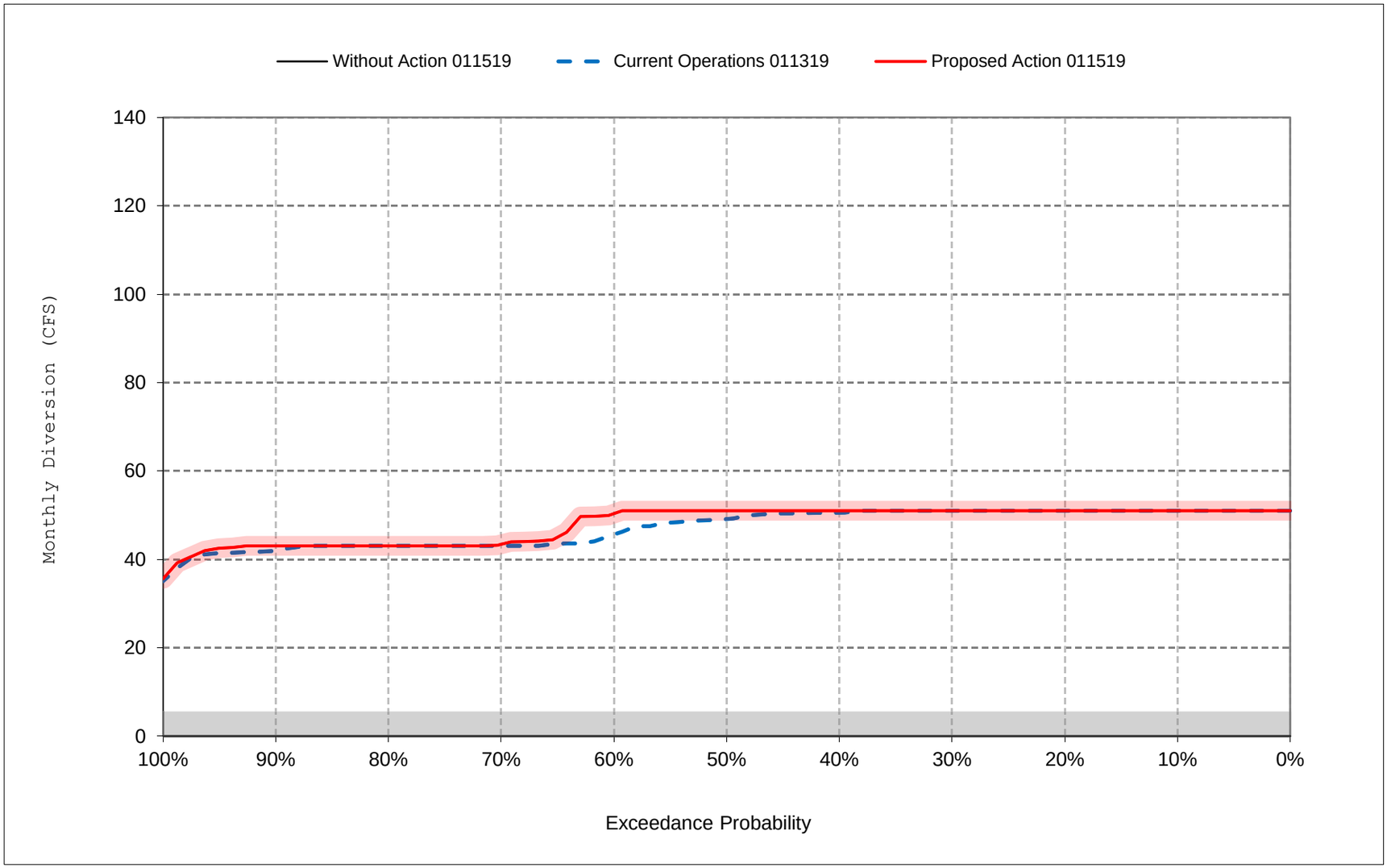
Figure 49-9. Folsom South Canal Diversion, December



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

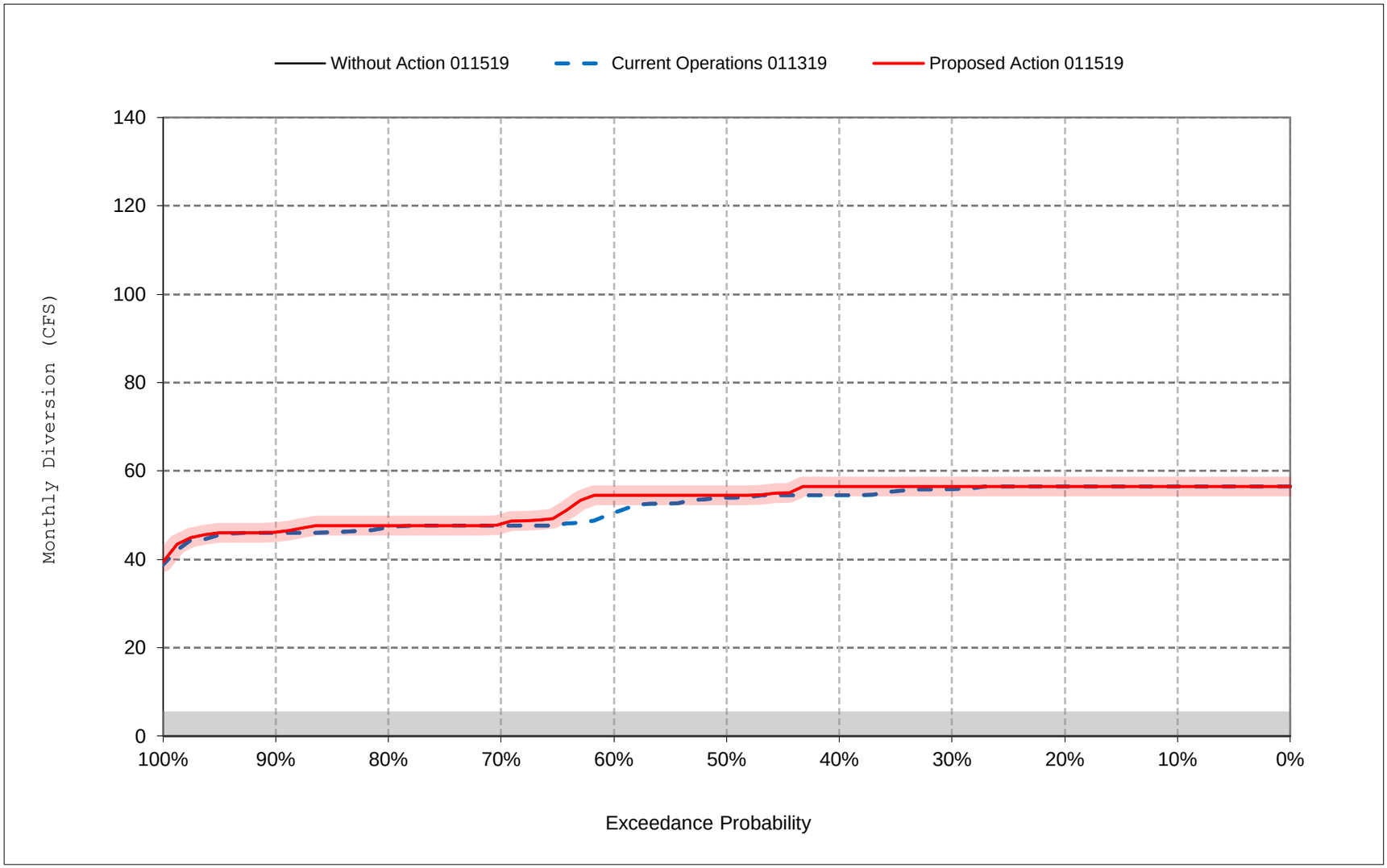
Figure 49-10. Folsom South Canal Diversion, January



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

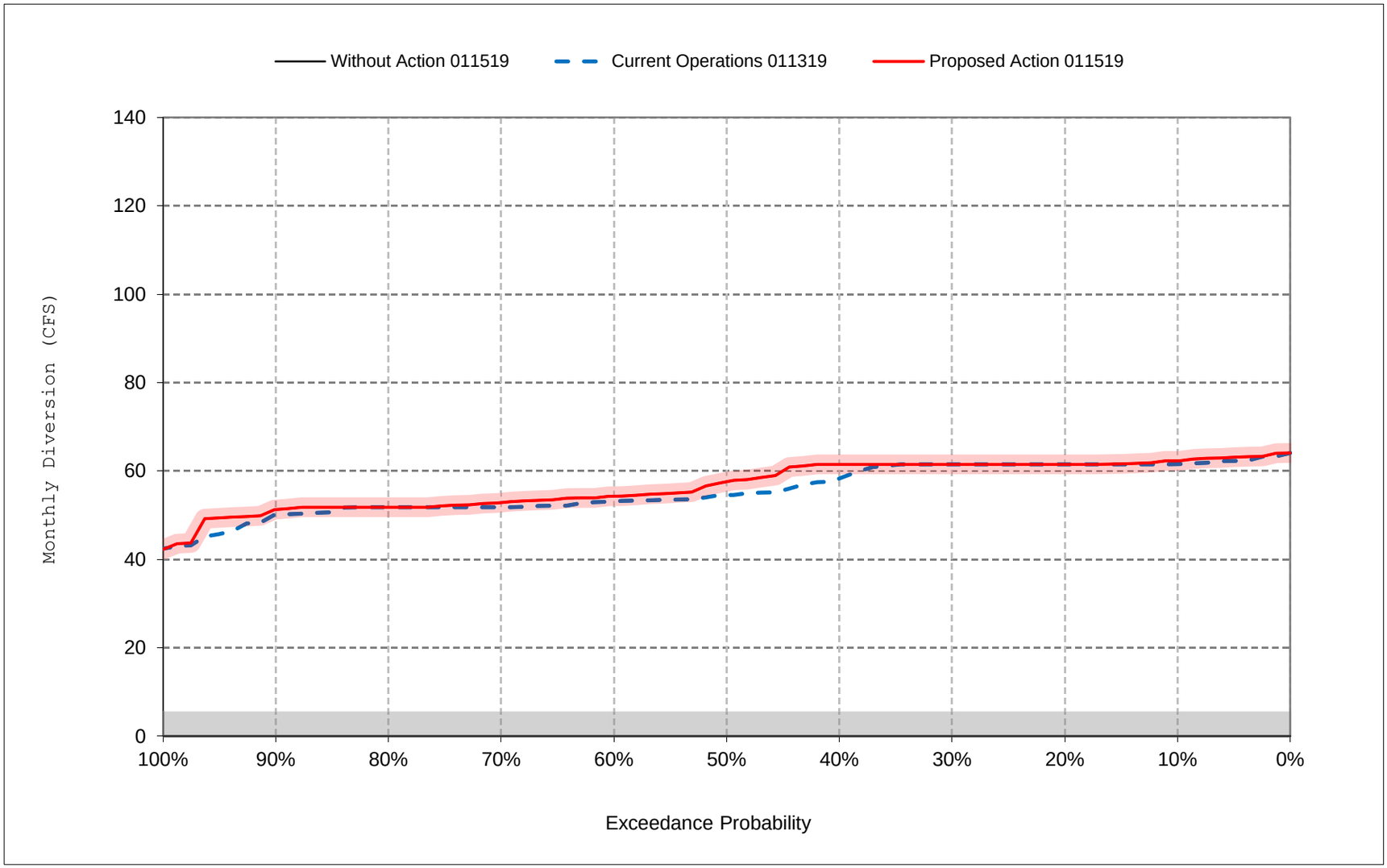
Figure 49-11. Folsom South Canal Diversion, February



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

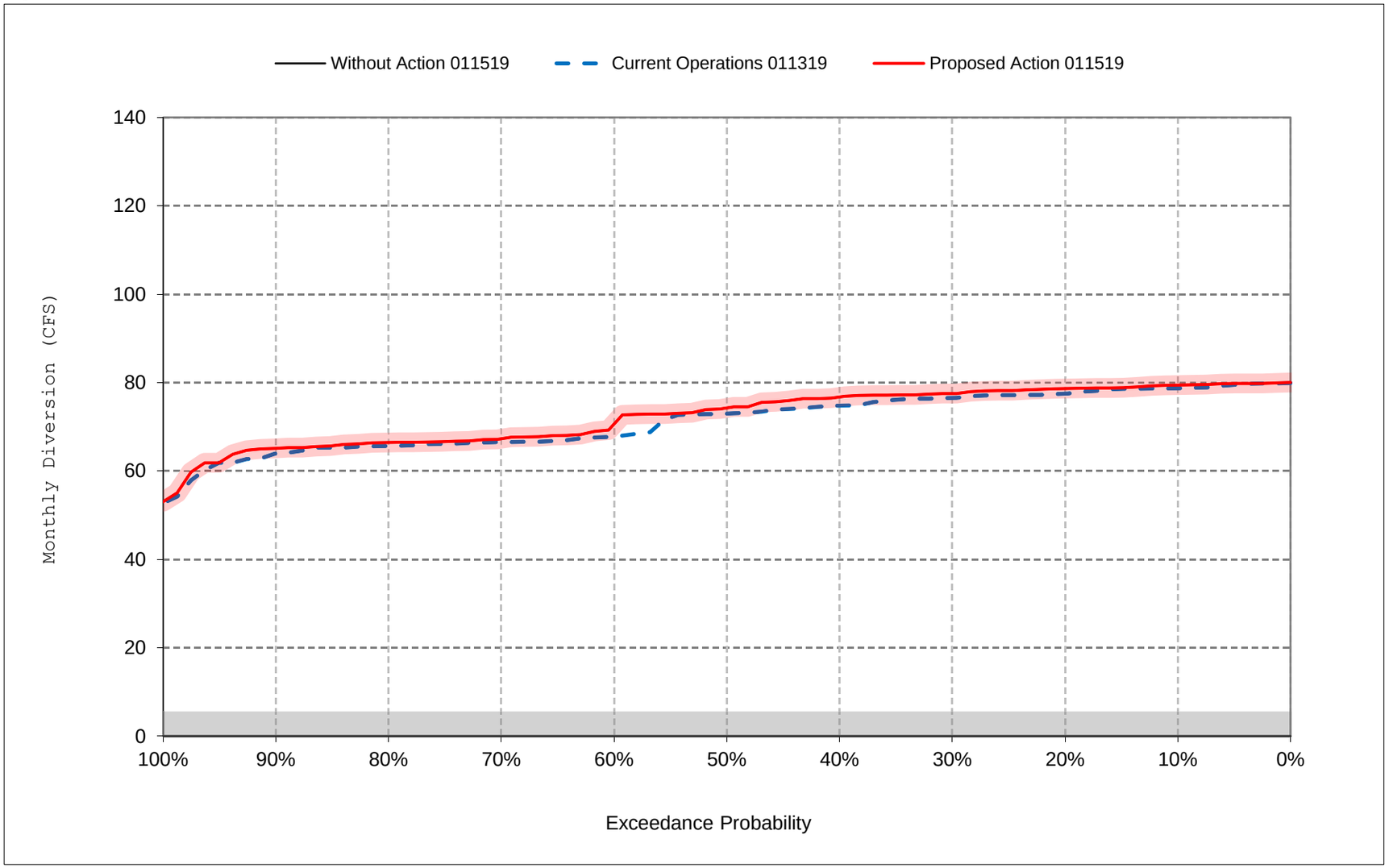
Figure 49-12. Folsom South Canal Diversion, March



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

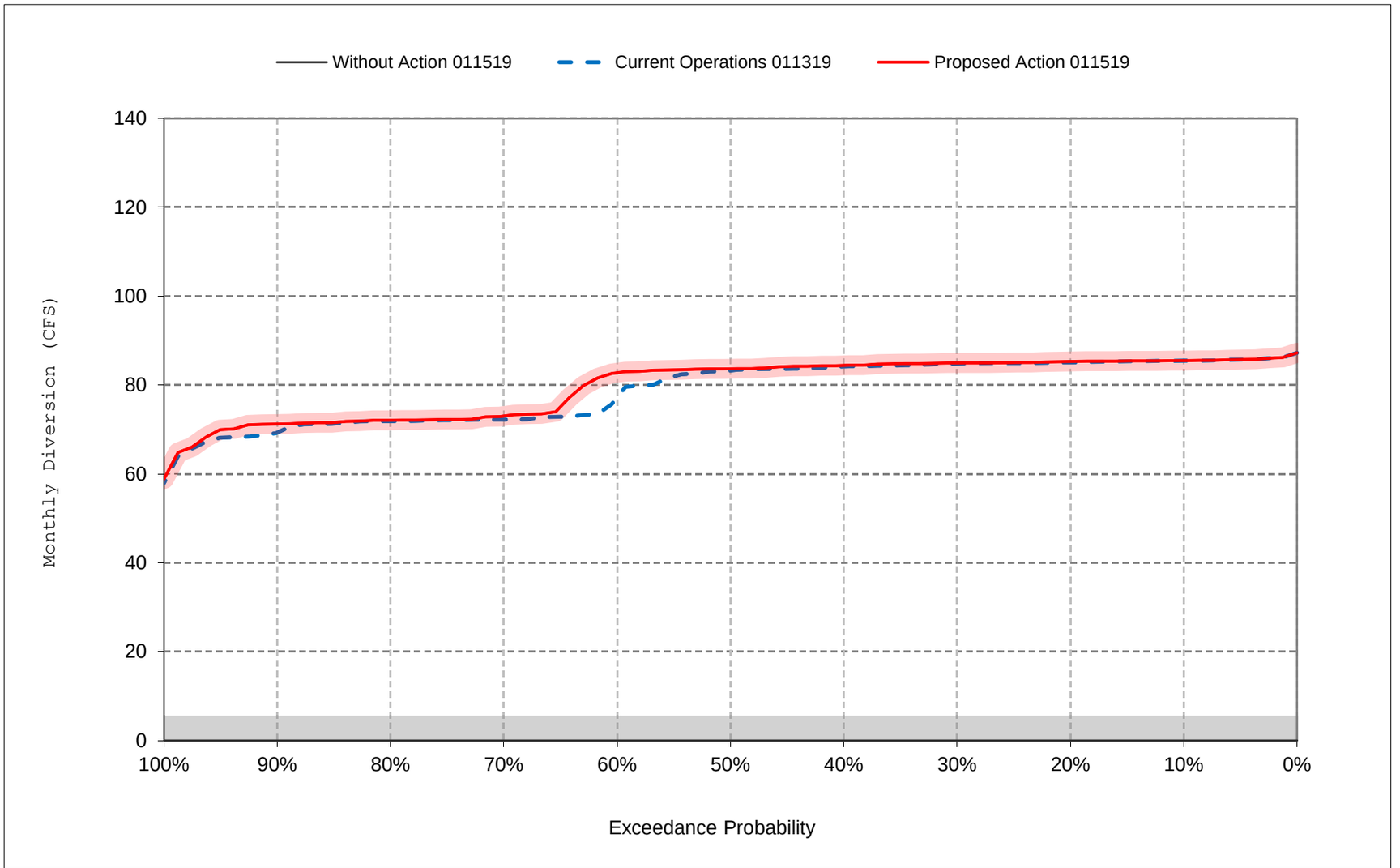
Figure 49-13. Folsom South Canal Diversion, April



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

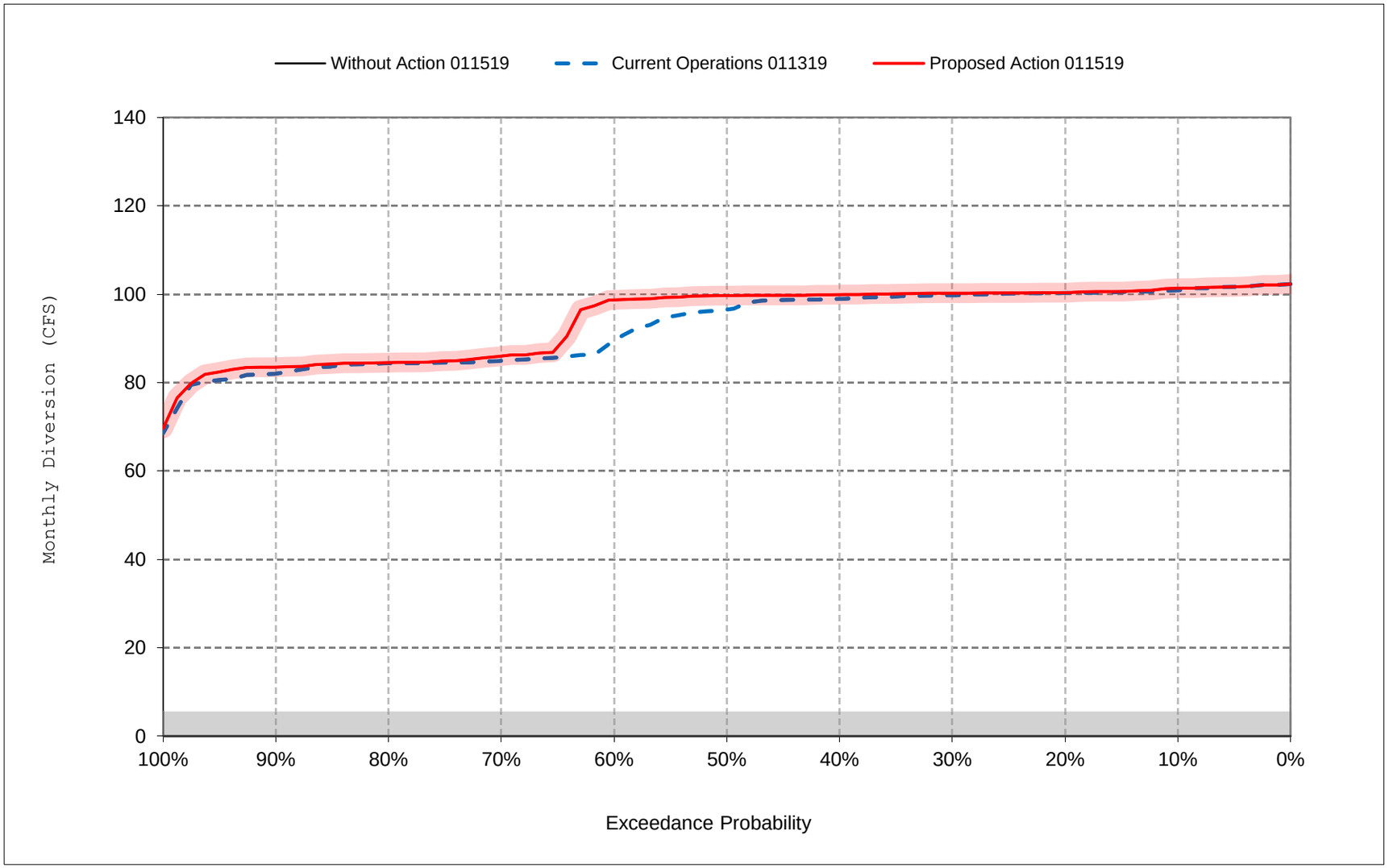
Figure 49-14. Folsom South Canal Diversion, May



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

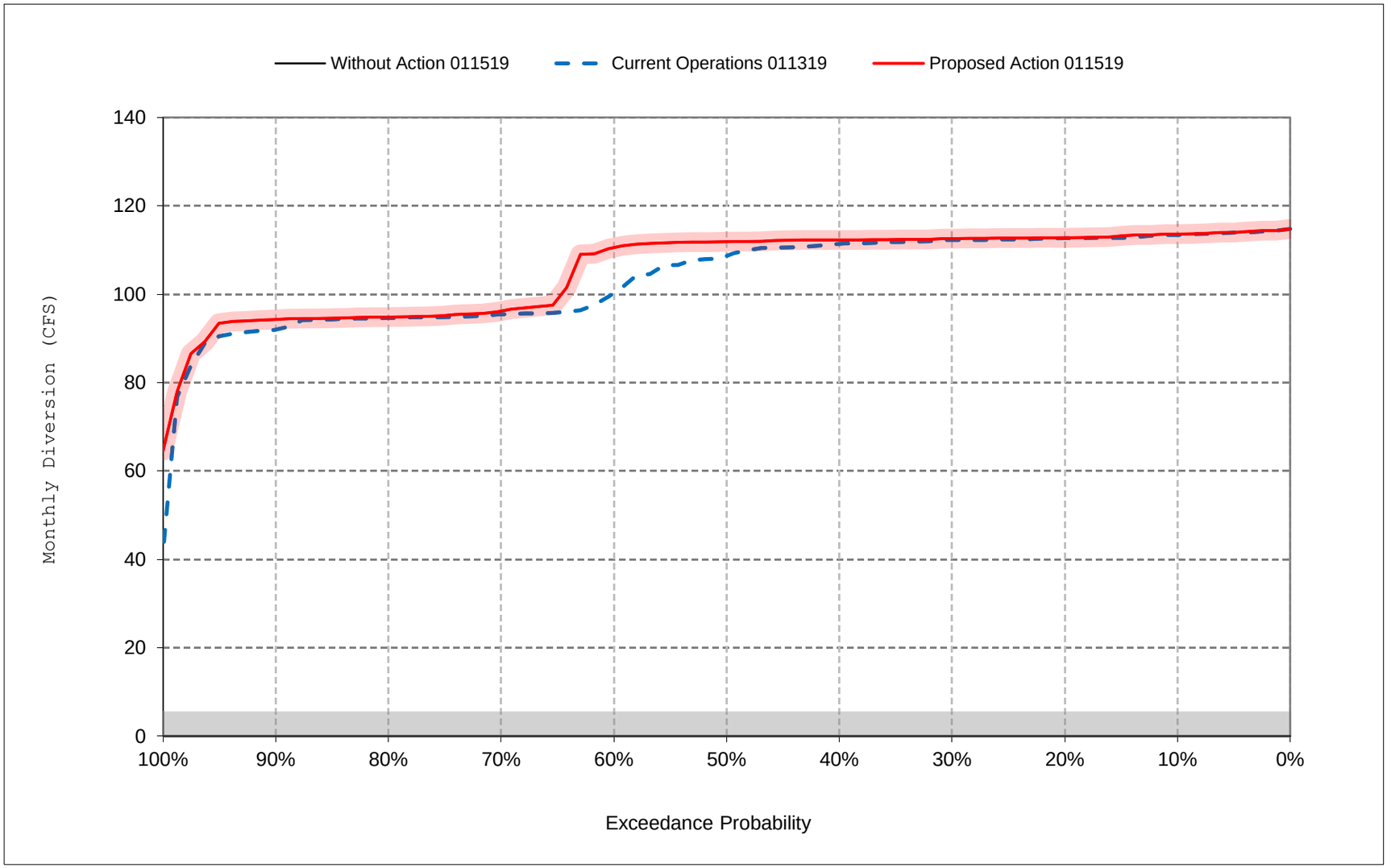
Figure 49-15. Folsom South Canal Diversion, June



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

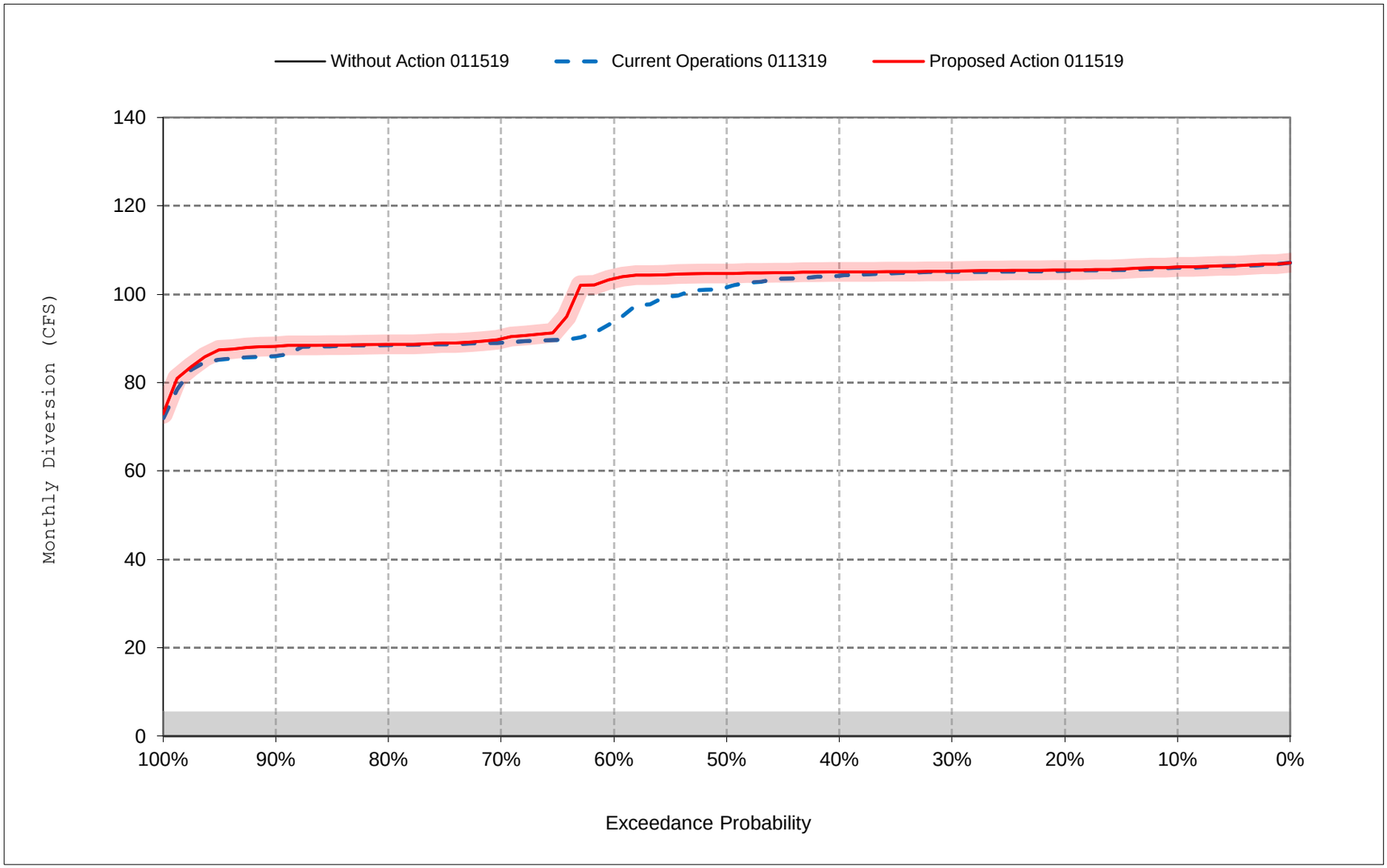
Figure 49-16. Folsom South Canal Diversion, July



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

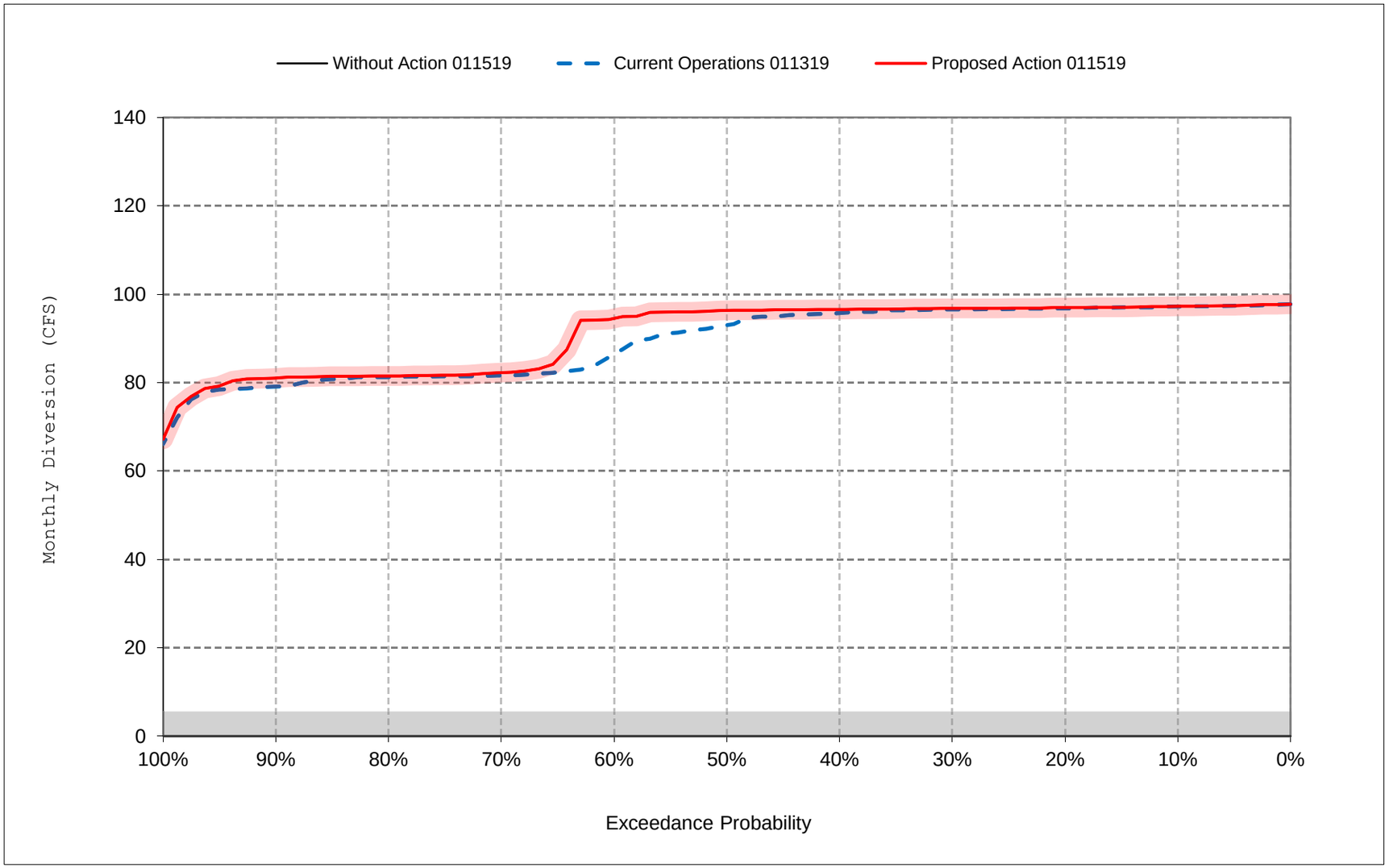
Figure 49-17. Folsom South Canal Diversion, August



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Figure 49-18. Folsom South Canal Diversion, September



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Table 50-1. Friant-Kern Canal Diversion, Monthly Diversion

Without Action 011519

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term Full Simulation Period[a]	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types[b,c]												
Wet (32%)	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal (16%)	0	0	0	0	0	0	0	0	0	0	0	0
Below Normal (13%)	0	0	0	0	0	0	0	0	0	0	0	0
Dry (24%)	0	0	0	0	0	0	0	0	0	0	0	0
Critical (15%)	0	0	0	0	0	0	0	0	0	0	0	0

Current Operations 011319

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	635	240	204	675	1,675	1,576	1,693	3,143	4,362	3,742	3,254	1,819
20%	575	203	98	108	1,199	865	1,593	2,278	3,958	3,162	2,772	1,555
30%	540	166	88	92	777	777	1,518	2,047	3,021	2,878	2,523	1,419
40%	506	150	82	86	654	634	1,363	1,748	2,590	2,705	2,373	1,329
50%	482	143	72	77	499	553	1,048	1,452	2,164	2,300	2,056	1,104
60%	436	137	65	66	389	532	966	1,346	1,986	2,204	1,878	1,018
70%	395	132	29	61	355	472	788	1,215	1,836	2,056	1,499	911
80%	377	119	16	16	301	392	493	731	1,593	1,873	1,197	698
90%	353	117	16	16	209	291	389	548	1,170	1,460	890	529
Long Term Full Simulation Period[a]	526	184	104	199	718	738	1,171	1,645	2,527	2,517	2,055	1,180
Water Year Types[b,c]												
Wet (32%)	719	250	144	400	1,168	1,080	1,630	2,236	3,427	3,332	2,839	1,658
Above Normal (16%)	471	140	86	235	586	859	1,567	2,200	2,991	2,766	2,422	1,353
Below Normal (13%)	489	166	88	91	597	666	1,075	1,600	2,339	2,418	1,873	1,075
Dry (24%)	421	154	120	71	497	507	794	1,144	1,881	1,979	1,549	867
Critical (15%)	376	158	23	39	362	320	466	635	1,322	1,467	967	574

Current Operations 011319 minus Without Action 011519

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	635	240	204	675	1,675	1,576	1,693	3,143	4,362	3,742	3,254	1,819
20%	575	203	98	108	1,199	865	1,593	2,278	3,958	3,162	2,772	1,555
30%	540	166	88	92	777	777	1,518	2,047	3,021	2,878	2,523	1,419
40%	506	150	82	86	654	634	1,363	1,748	2,590	2,705	2,373	1,329
50%	482	143	72	77	499	553	1,048	1,452	2,164	2,300	2,056	1,104
60%	436	137	65	66	389	532	966	1,346	1,986	2,204	1,878	1,018
70%	395	132	29	61	355	472	788	1,215	1,836	2,056	1,499	911
80%	377	119	16	16	301	392	493	731	1,593	1,873	1,197	698
90%	353	117	16	16	209	291	389	548	1,170	1,460	890	529
Long Term Full Simulation Period[a]	526	184	104	199	718	738	1,171	1,645	2,527	2,517	2,055	1,180
Water Year Types[b,c]												
Wet (32%)	719	250	144	400	1,168	1,080	1,630	2,236	3,427	3,332	2,839	1,658
Above Normal (16%)	471	140	86	235	586	859	1,567	2,200	2,991	2,766	2,422	1,353
Below Normal (13%)	489	166	88	91	597	666	1,075	1,600	2,339	2,418	1,873	1,075
Dry (24%)	421	154	120	71	497	507	794	1,144	1,881	1,979	1,549	867
Critical (15%)	376	158	23	39	362	320	466	635	1,322	1,467	967	574

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 50-2. Friant-Kern Canal Diversion, Monthly Diversion

Without Action 011519

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term Full Simulation Period[a]	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types[b,c]												
Wet (32%)	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal (16%)	0	0	0	0	0	0	0	0	0	0	0	0
Below Normal (13%)	0	0	0	0	0	0	0	0	0	0	0	0
Dry (24%)	0	0	0	0	0	0	0	0	0	0	0	0
Critical (15%)	0	0	0	0	0	0	0	0	0	0	0	0

Proposed Action 011519

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	635	240	204	675	1,675	1,576	1,693	3,143	4,362	3,742	3,254	1,819
20%	575	203	98	108	1,199	865	1,593	2,278	3,958	3,162	2,772	1,555
30%	540	166	88	92	777	777	1,518	2,047	3,021	2,878	2,523	1,419
40%	506	150	82	86	654	634	1,363	1,748	2,590	2,705	2,373	1,329
50%	482	143	72	77	499	553	1,048	1,452	2,164	2,300	2,056	1,104
60%	436	137	65	66	389	532	966	1,346	1,986	2,204	1,878	1,018
70%	395	132	29	61	355	472	788	1,215	1,836	2,056	1,499	911
80%	377	119	16	16	301	392	493	731	1,593	1,873	1,197	698
90%	353	117	16	16	209	291	389	548	1,170	1,460	890	529
Long Term Full Simulation Period[a]	526	184	104	199	718	738	1,171	1,645	2,527	2,517	2,055	1,180
Water Year Types[b,c]												
Wet (32%)	719	250	144	400	1,168	1,080	1,630	2,236	3,427	3,332	2,839	1,658
Above Normal (16%)	471	140	86	235	586	859	1,567	2,200	2,991	2,766	2,422	1,353
Below Normal (13%)	489	166	88	91	597	666	1,075	1,600	2,339	2,418	1,873	1,075
Dry (24%)	421	154	120	71	497	507	794	1,144	1,881	1,979	1,549	867
Critical (15%)	376	158	23	39	362	320	466	635	1,322	1,467	967	574

Proposed Action 011519 minus Without Action 011519

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	635	240	204	675	1,675	1,576	1,693	3,143	4,362	3,742	3,254	1,819
20%	575	203	98	108	1,199	865	1,593	2,278	3,958	3,162	2,772	1,555
30%	540	166	88	92	777	777	1,518	2,047	3,021	2,878	2,523	1,419
40%	506	150	82	86	654	634	1,363	1,748	2,590	2,705	2,373	1,329
50%	482	143	72	77	499	553	1,048	1,452	2,164	2,300	2,056	1,104
60%	436	137	65	66	389	532	966	1,346	1,986	2,204	1,878	1,018
70%	395	132	29	61	355	472	788	1,215	1,836	2,056	1,499	911
80%	377	119	16	16	301	392	493	731	1,593	1,873	1,197	698
90%	353	117	16	16	209	291	389	548	1,170	1,460	890	529
Long Term Full Simulation Period[a]	526	184	104	199	718	738	1,171	1,645	2,527	2,517	2,055	1,180
Water Year Types[b,c]												
Wet (32%)	719	250	144	400	1,168	1,080	1,630	2,236	3,427	3,332	2,839	1,658
Above Normal (16%)	471	140	86	235	586	859	1,567	2,200	2,991	2,766	2,422	1,353
Below Normal (13%)	489	166	88	91	597	666	1,075	1,600	2,339	2,418	1,873	1,075
Dry (24%)	421	154	120	71	497	507	794	1,144	1,881	1,979	1,549	867
Critical (15%)	376	158	23	39	362	320	466	635	1,322	1,467	967	574

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 50-3. Friant-Kern Canal Diversion, Monthly Diversion

Current Operations 011319

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	635	240	204	675	1,675	1,576	1,693	3,143	4,362	3,742	3,254	1,819
20%	575	203	98	108	1,199	865	1,593	2,278	3,958	3,162	2,772	1,555
30%	540	166	88	92	777	777	1,518	2,047	3,021	2,878	2,523	1,419
40%	506	150	82	86	654	634	1,363	1,748	2,590	2,705	2,373	1,329
50%	482	143	72	77	499	553	1,048	1,452	2,164	2,300	2,056	1,104
60%	436	137	65	66	389	532	966	1,346	1,986	2,204	1,878	1,018
70%	395	132	29	61	355	472	788	1,215	1,836	2,056	1,499	911
80%	377	119	16	16	301	392	493	731	1,593	1,873	1,197	698
90%	353	117	16	16	209	291	389	548	1,170	1,460	890	529
Long Term												
Full Simulation Period[a]	526	184	104	199	718	738	1,171	1,645	2,527	2,517	2,055	1,180
Water Year Types[b,c]												
Wet (32%)	719	250	144	400	1,168	1,080	1,630	2,236	3,427	3,332	2,839	1,658
Above Normal (16%)	471	140	86	235	586	859	1,567	2,200	2,991	2,766	2,422	1,353
Below Normal (13%)	489	166	88	91	597	666	1,075	1,600	2,339	2,418	1,873	1,075
Dry (24%)	421	154	120	71	497	507	794	1,144	1,881	1,979	1,549	867
Critical (15%)	376	158	23	39	362	320	466	635	1,322	1,467	967	574

Proposed Action 011519

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	635	240	204	675	1,675	1,576	1,693	3,143	4,362	3,742	3,254	1,819
20%	575	203	98	108	1,199	865	1,593	2,278	3,958	3,162	2,772	1,555
30%	540	166	88	92	777	777	1,518	2,047	3,021	2,878	2,523	1,419
40%	506	150	82	86	654	634	1,363	1,748	2,590	2,705	2,373	1,329
50%	482	143	72	77	499	553	1,048	1,452	2,164	2,300	2,056	1,104
60%	436	137	65	66	389	532	966	1,346	1,986	2,204	1,878	1,018
70%	395	132	29	61	355	472	788	1,215	1,836	2,056	1,499	911
80%	377	119	16	16	301	392	493	731	1,593	1,873	1,197	698
90%	353	117	16	16	209	291	389	548	1,170	1,460	890	529
Long Term												
Full Simulation Period[a]	526	184	104	199	718	738	1,171	1,645	2,527	2,517	2,055	1,180
Water Year Types[b,c]												
Wet (32%)	719	250	144	400	1,168	1,080	1,630	2,236	3,427	3,332	2,839	1,658
Above Normal (16%)	471	140	86	235	586	859	1,567	2,200	2,991	2,766	2,422	1,353
Below Normal (13%)	489	166	88	91	597	666	1,075	1,600	2,339	2,418	1,873	1,075
Dry (24%)	421	154	120	71	497	507	794	1,144	1,881	1,979	1,549	867
Critical (15%)	376	158	23	39	362	320	466	635	1,322	1,467	967	574

Proposed Action 011519 minus Current Operations 011319

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	**0**	**0**	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	**0**	0	0	0	**0**	**0**	**0**	**0**	0	0	**0**	**0**
Water Year Types[b,c]												
Wet (32%)	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal (16%)	0	0	0	0	0	0	0	0	**0**	0	**0**	0
Below Normal (13%)	0	0	0	0	0	0	0	0	0	0	0	0
Dry (24%)	0	0	0	0	0	**0**	**0**	**0**	0	**0**	**0**	0
Critical (15%)	**0**	0	0	0	**0**	0	0	**0**	**0**	0	0	**0**

a Based on the 82-year simulation period.

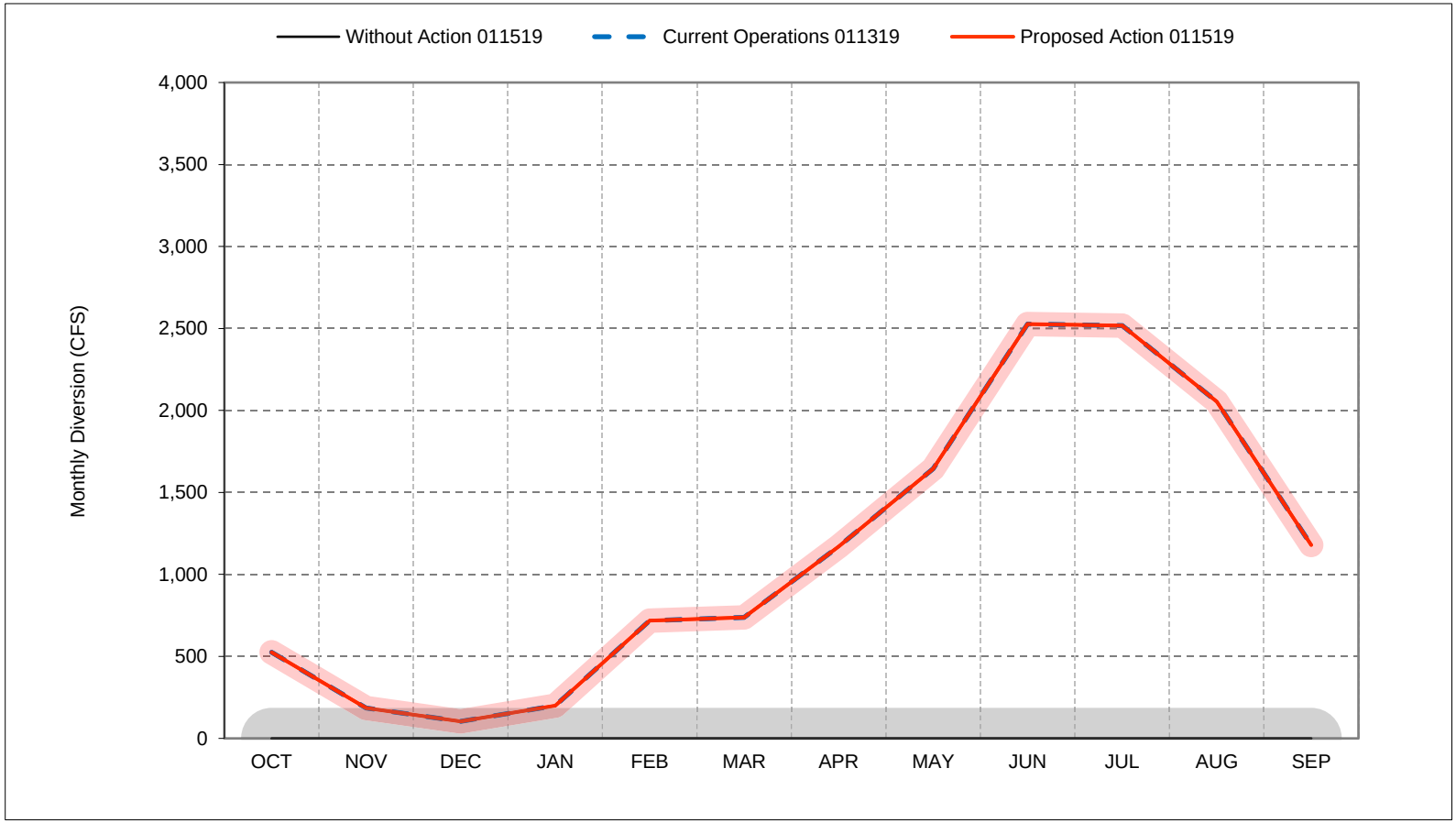
b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

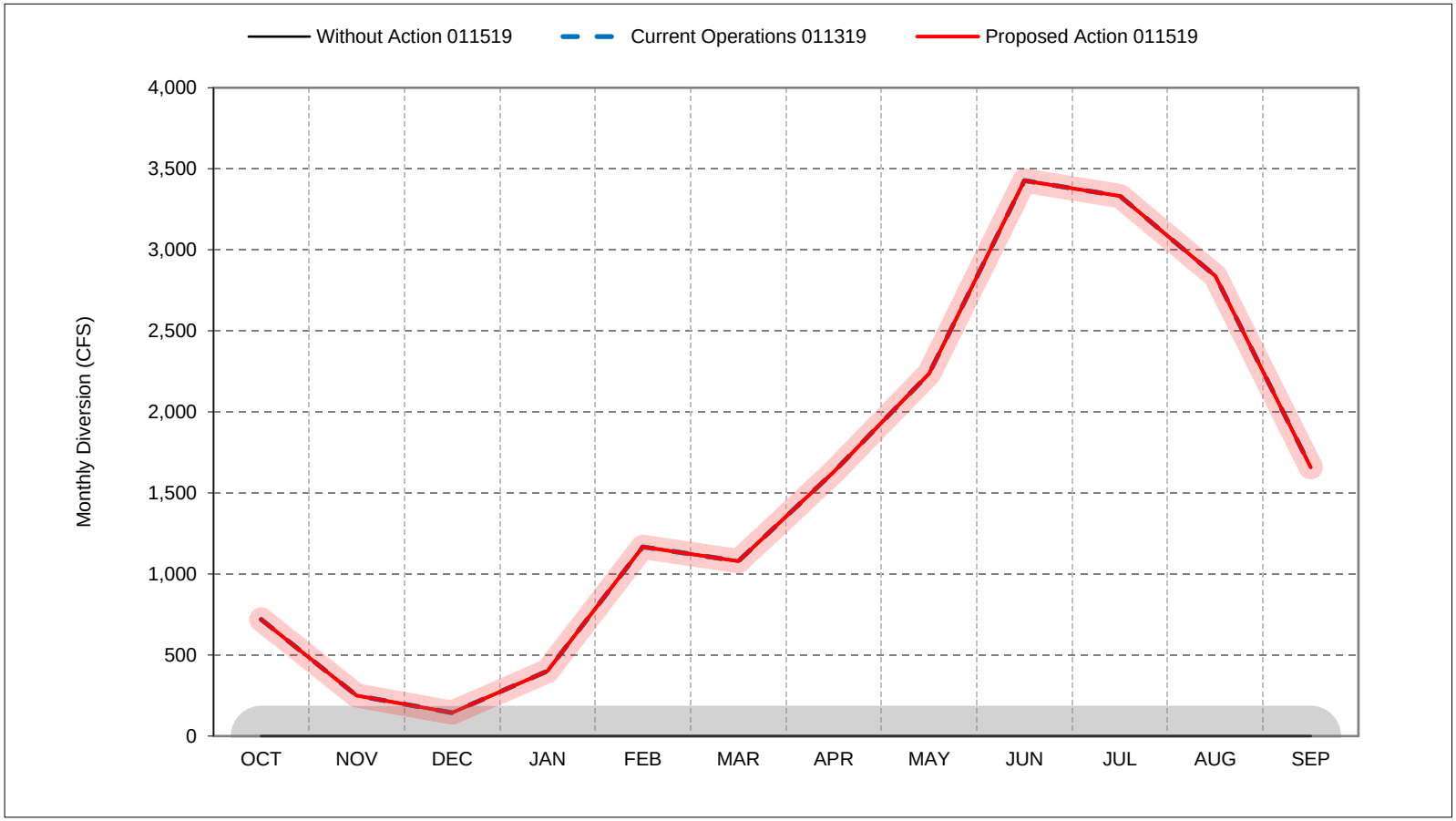
e These are draft results meant for qualitative analysis and are subject to revision.

Figure 50-1. Friant-Kern Canal Diversion, Long-Term Average Diversion



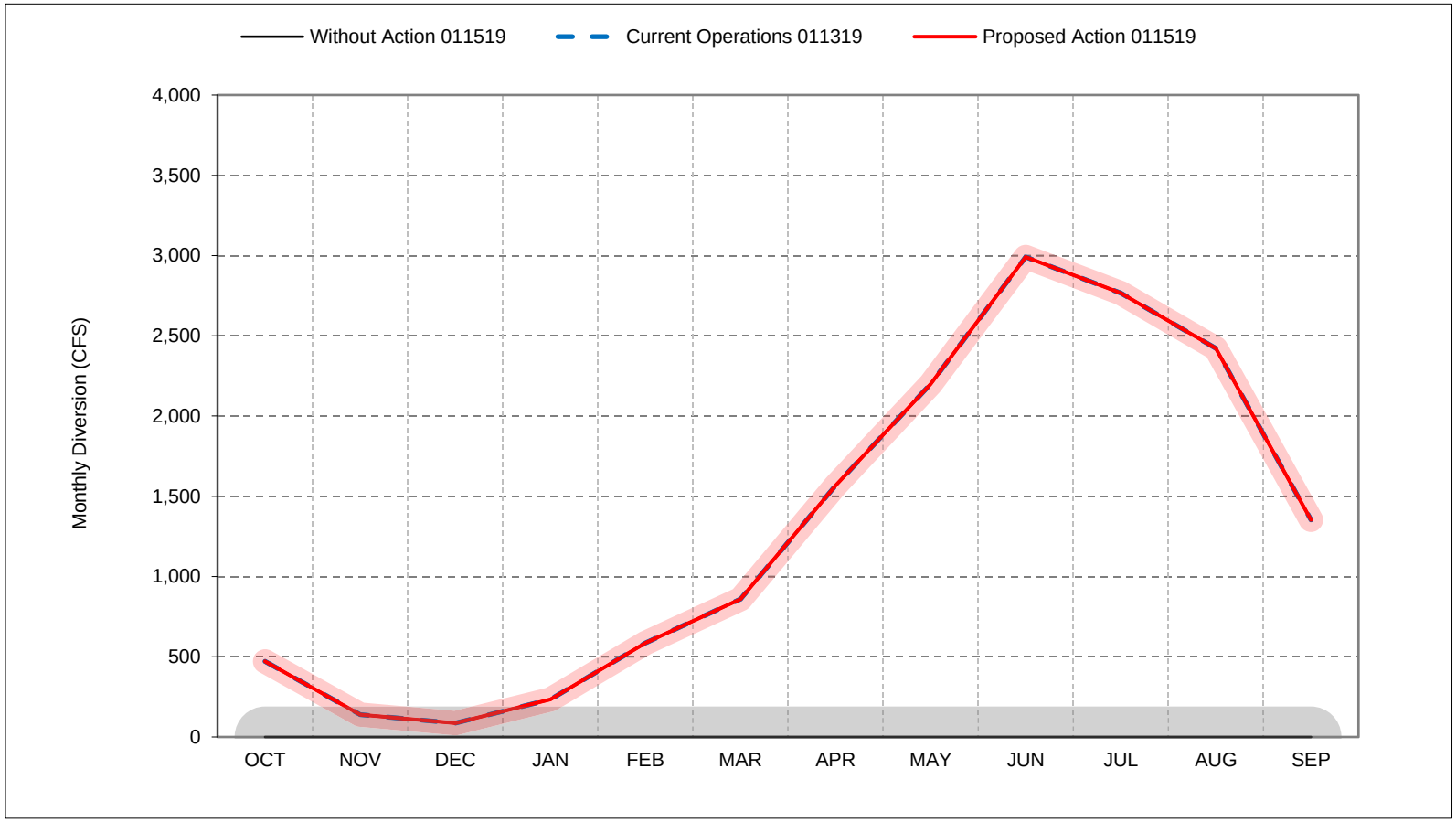
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 50-2. Friant-Kern Canal Diversion, Wet Year Average Diversion



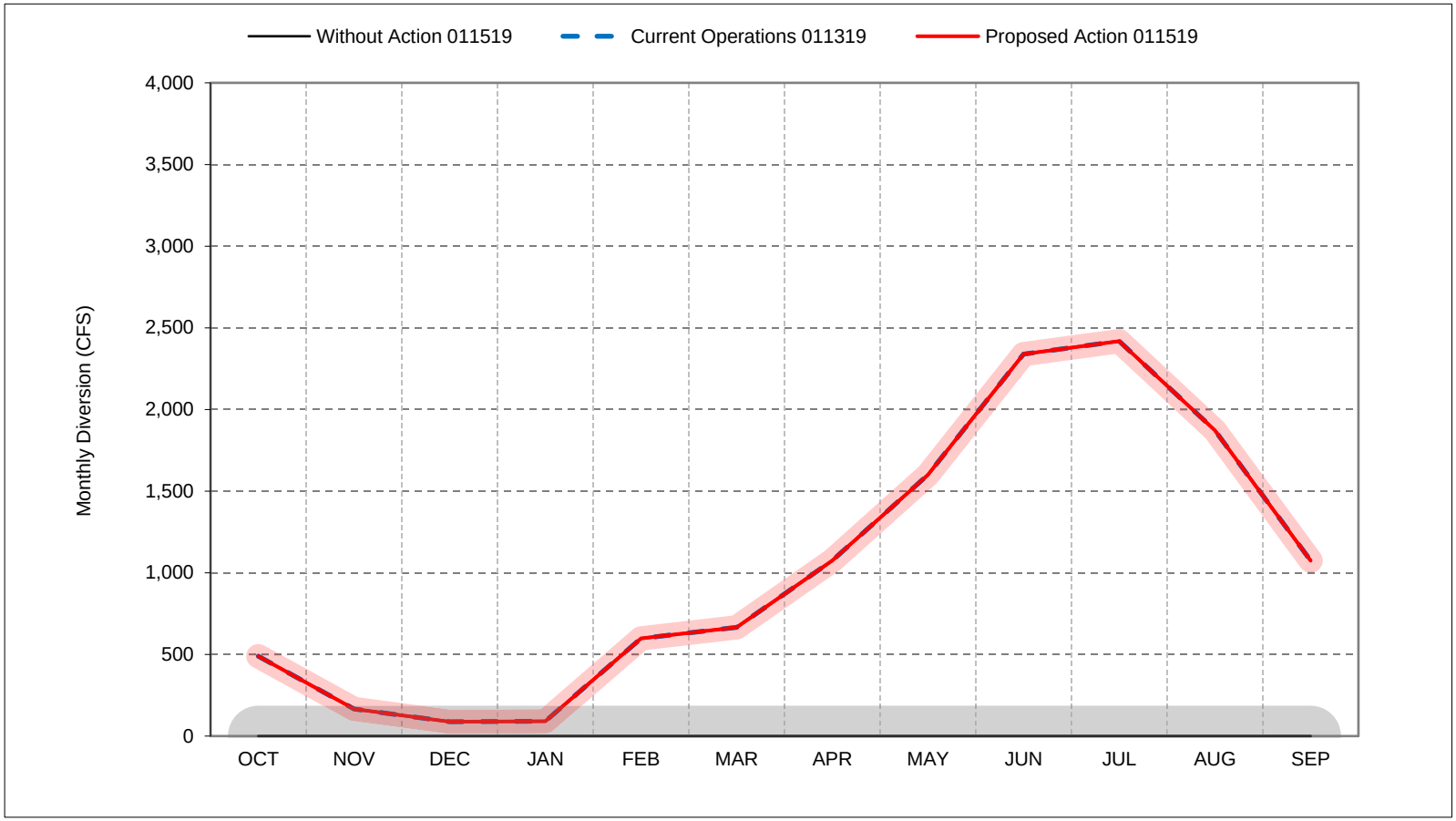
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 50-3. Friant-Kern Canal Diversion, Above Normal Year Average Diversion



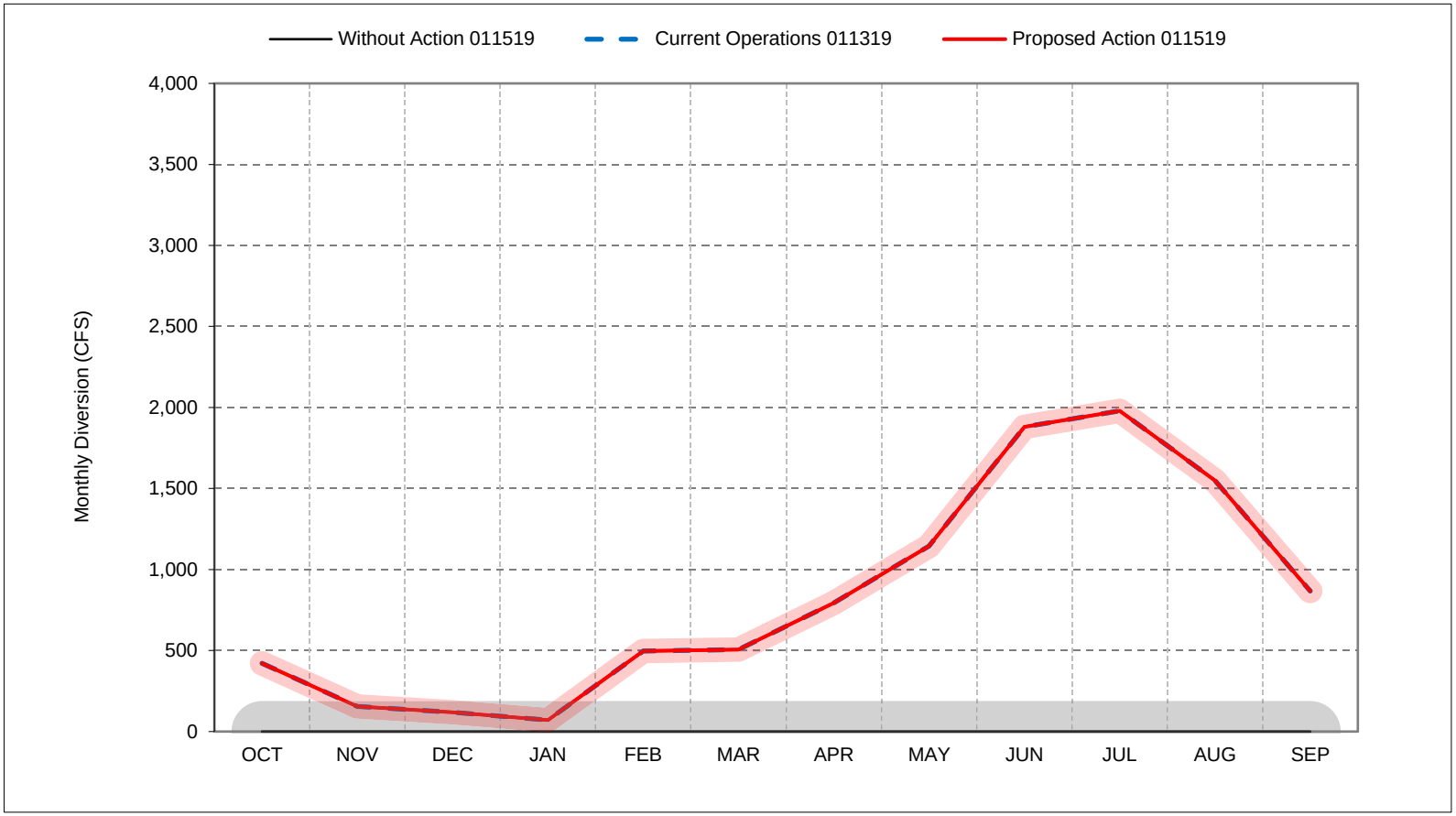
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 50-4. Friant-Kern Canal Diversion, Below Normal Year Average Diversion



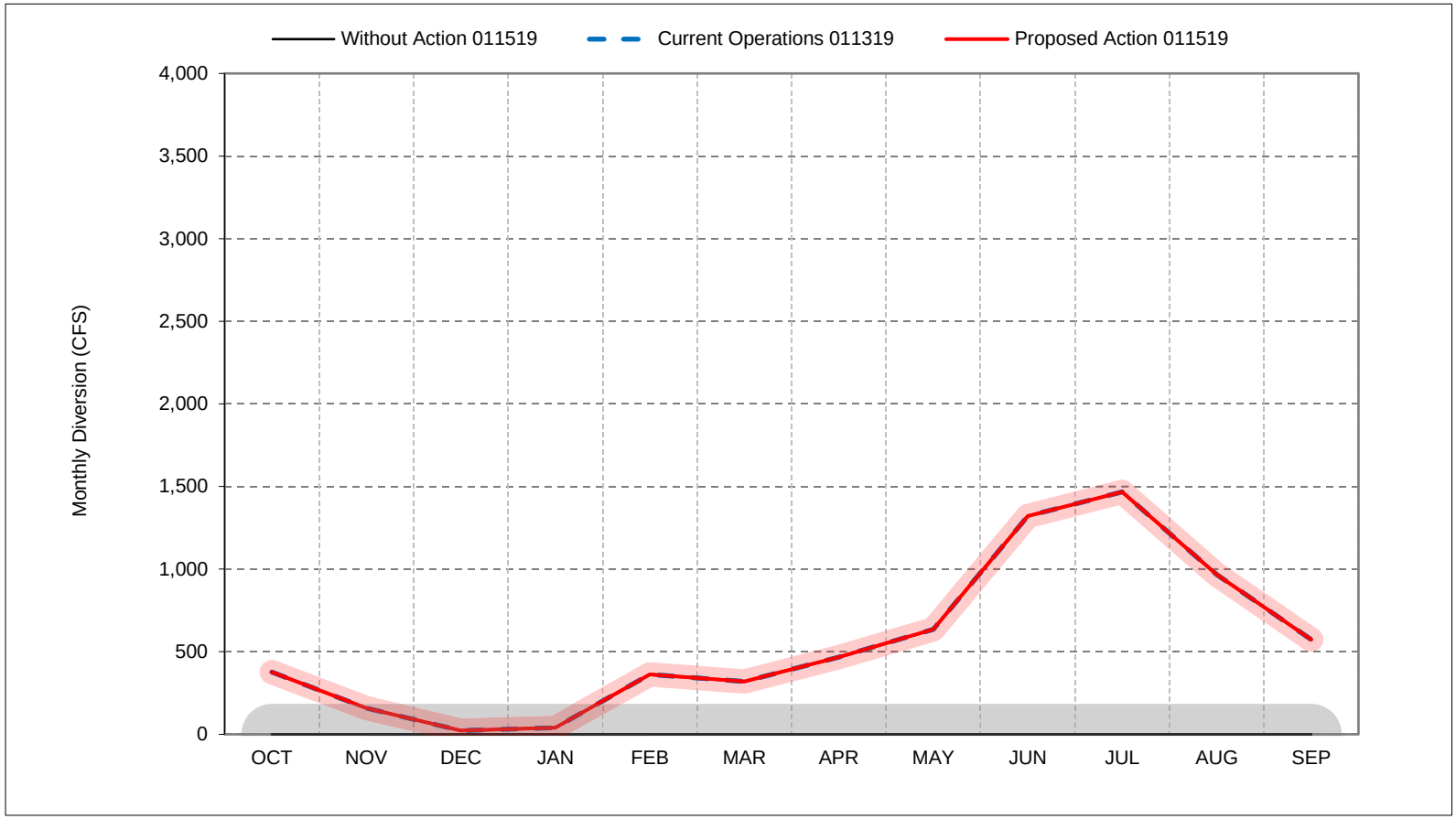
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 50-5. Friant-Kern Canal Diversion, Dry Year Average Diversion



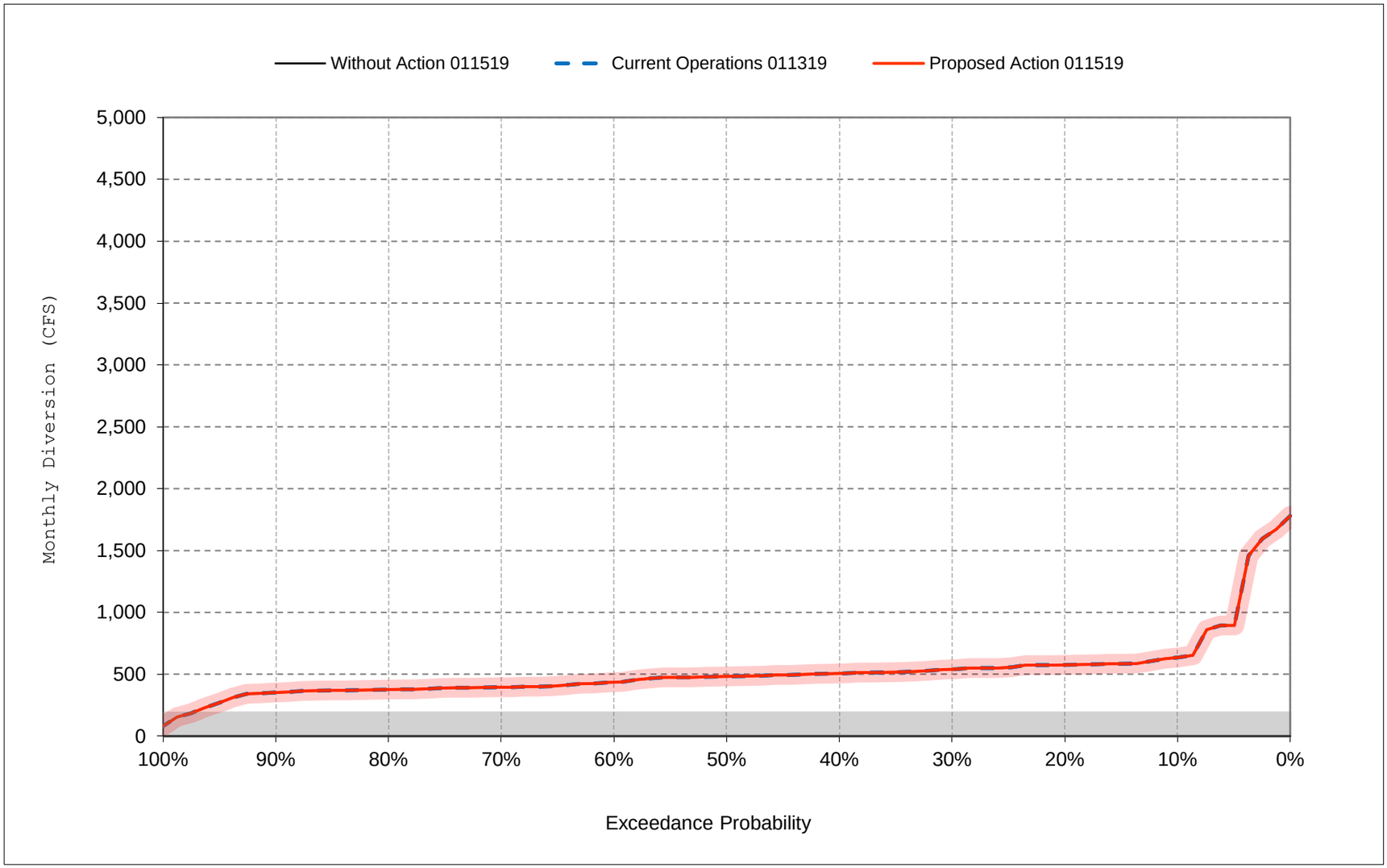
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 50-6. Friant-Kern Canal Diversion, Critical Year Average Diversion



*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

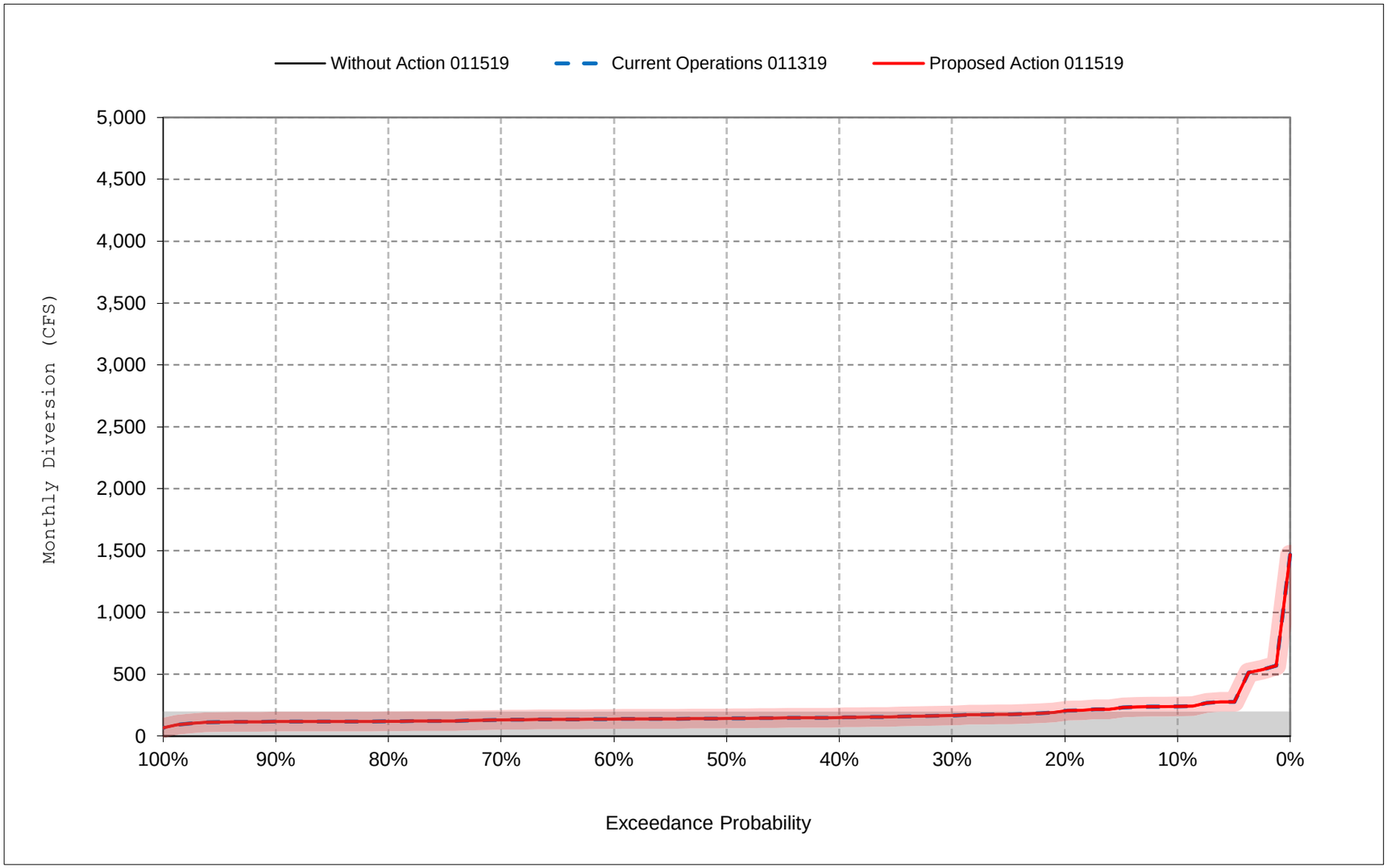
Figure 50-7. Friant-Kern Canal Diversion, October



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

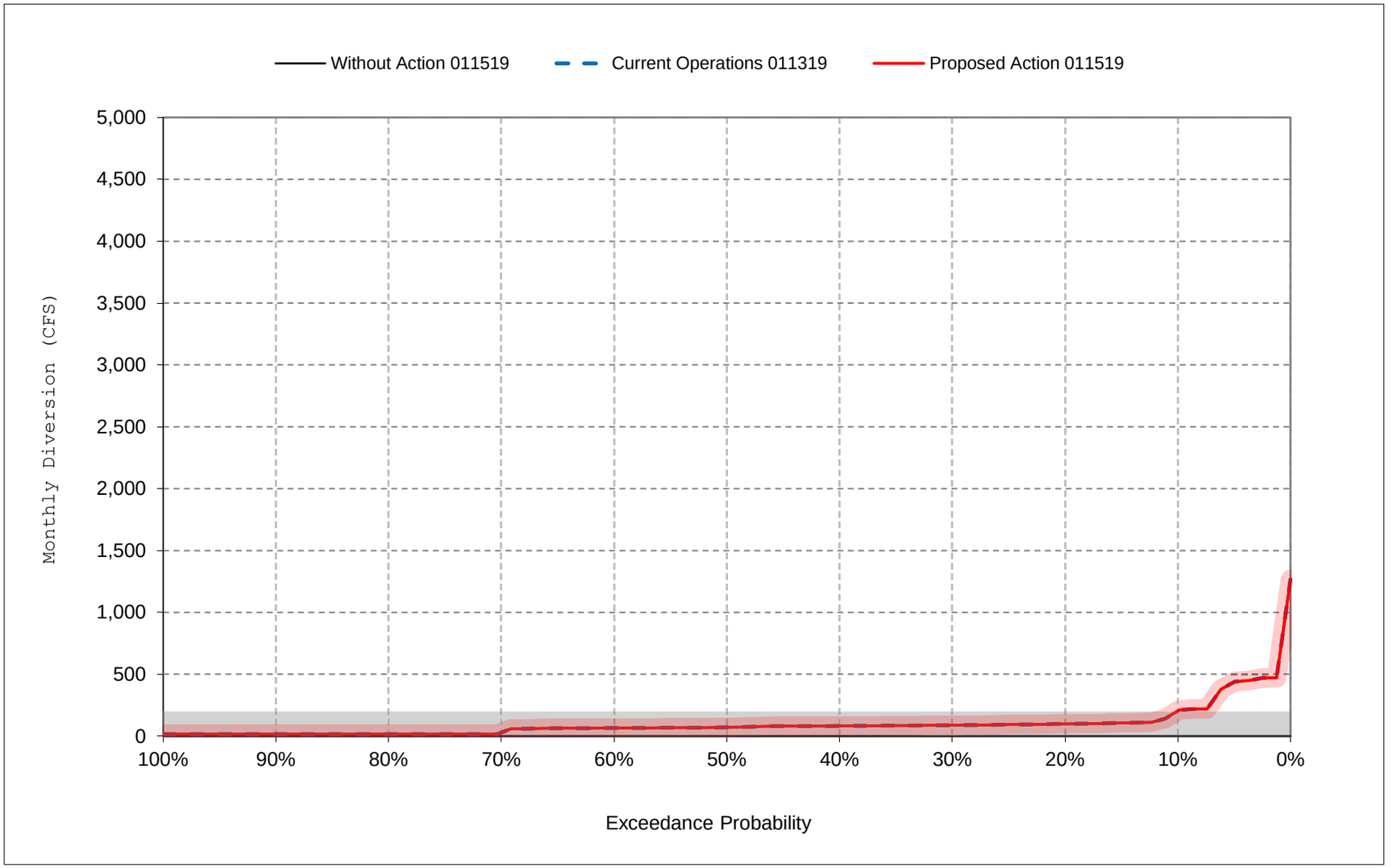
Figure 50-8. Friant-Kern Canal Diversion, November



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

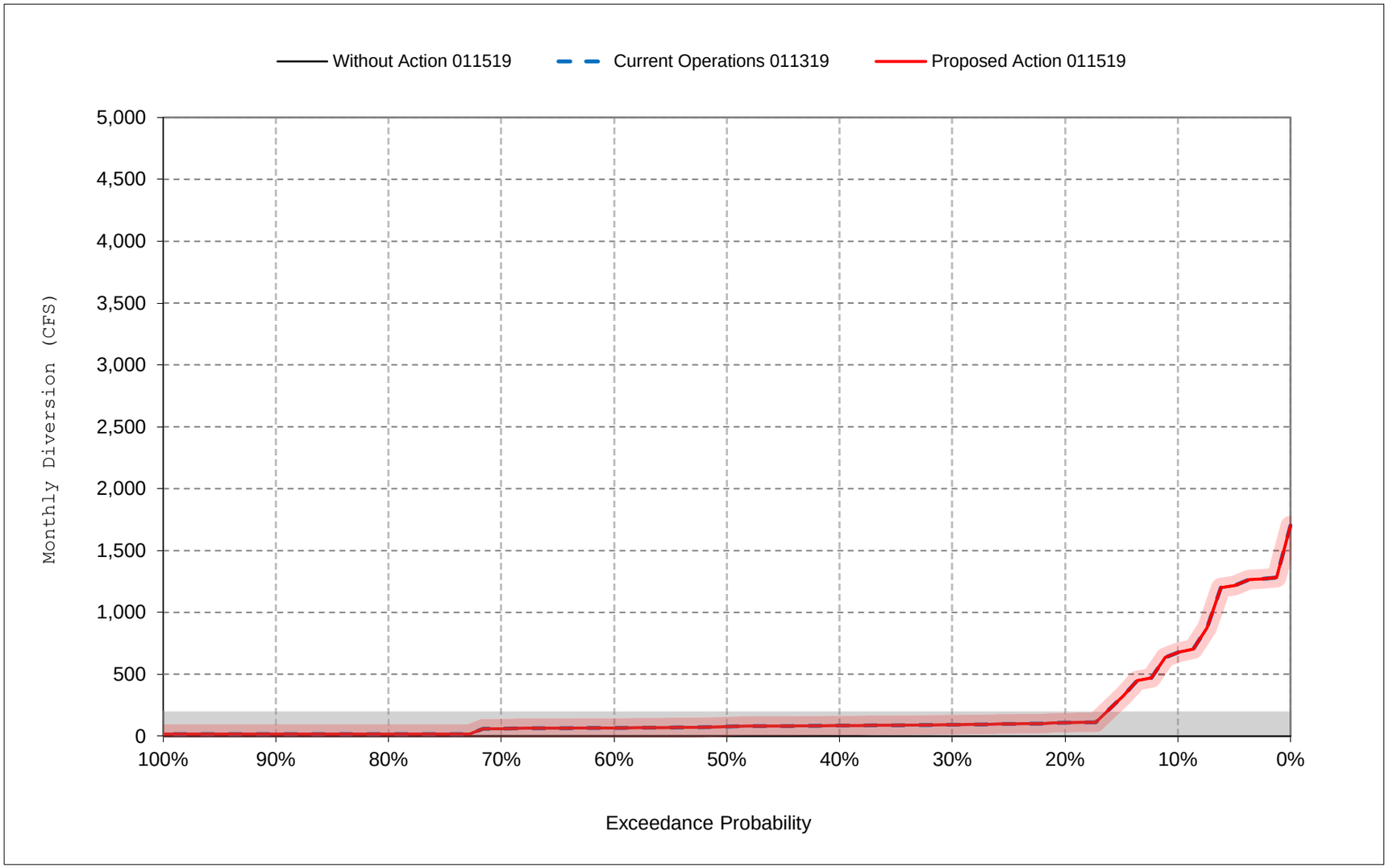
Figure 50-9. Friant-Kern Canal Diversion, December



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

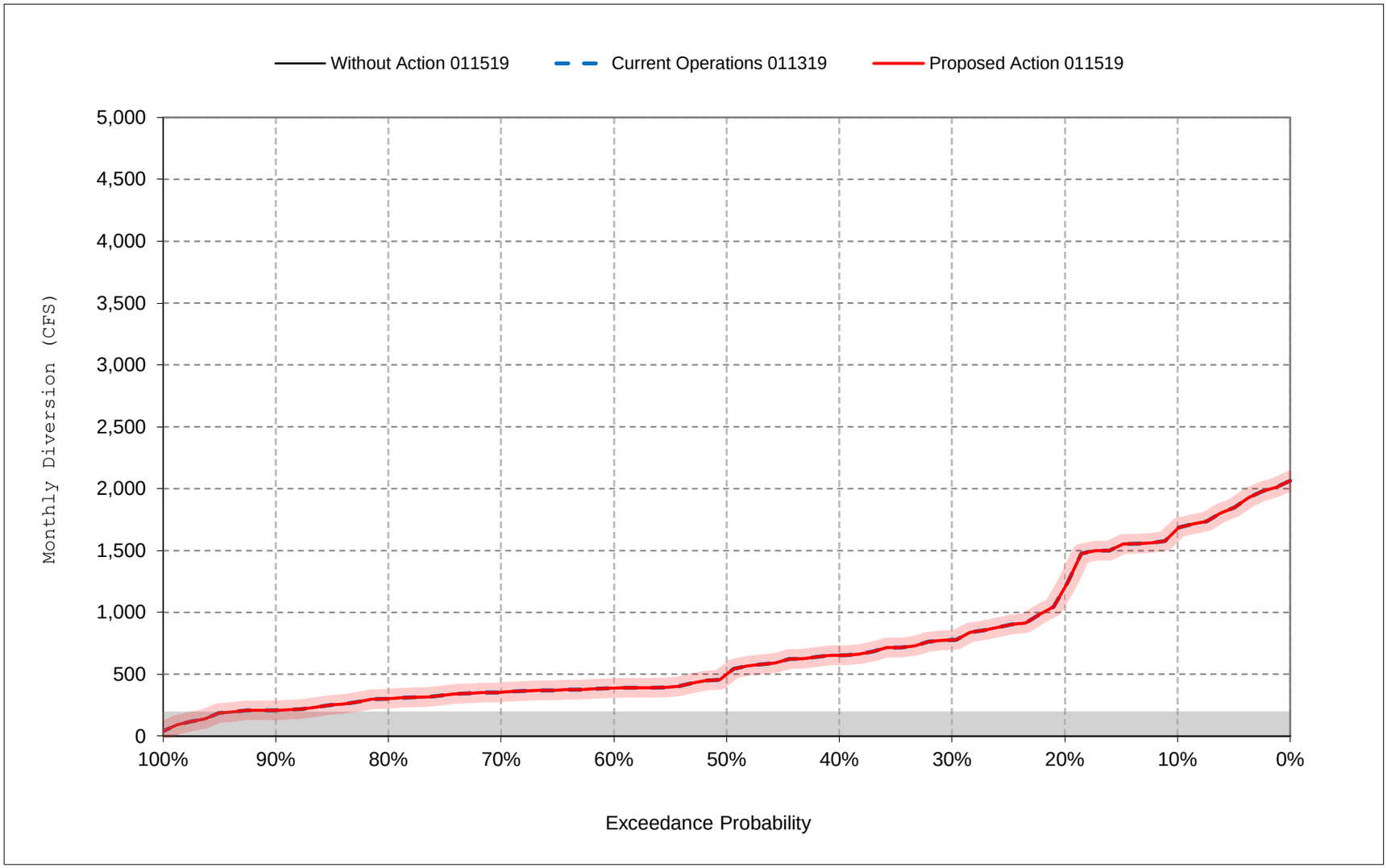
Figure 50-10. Friant-Kern Canal Diversion, January



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

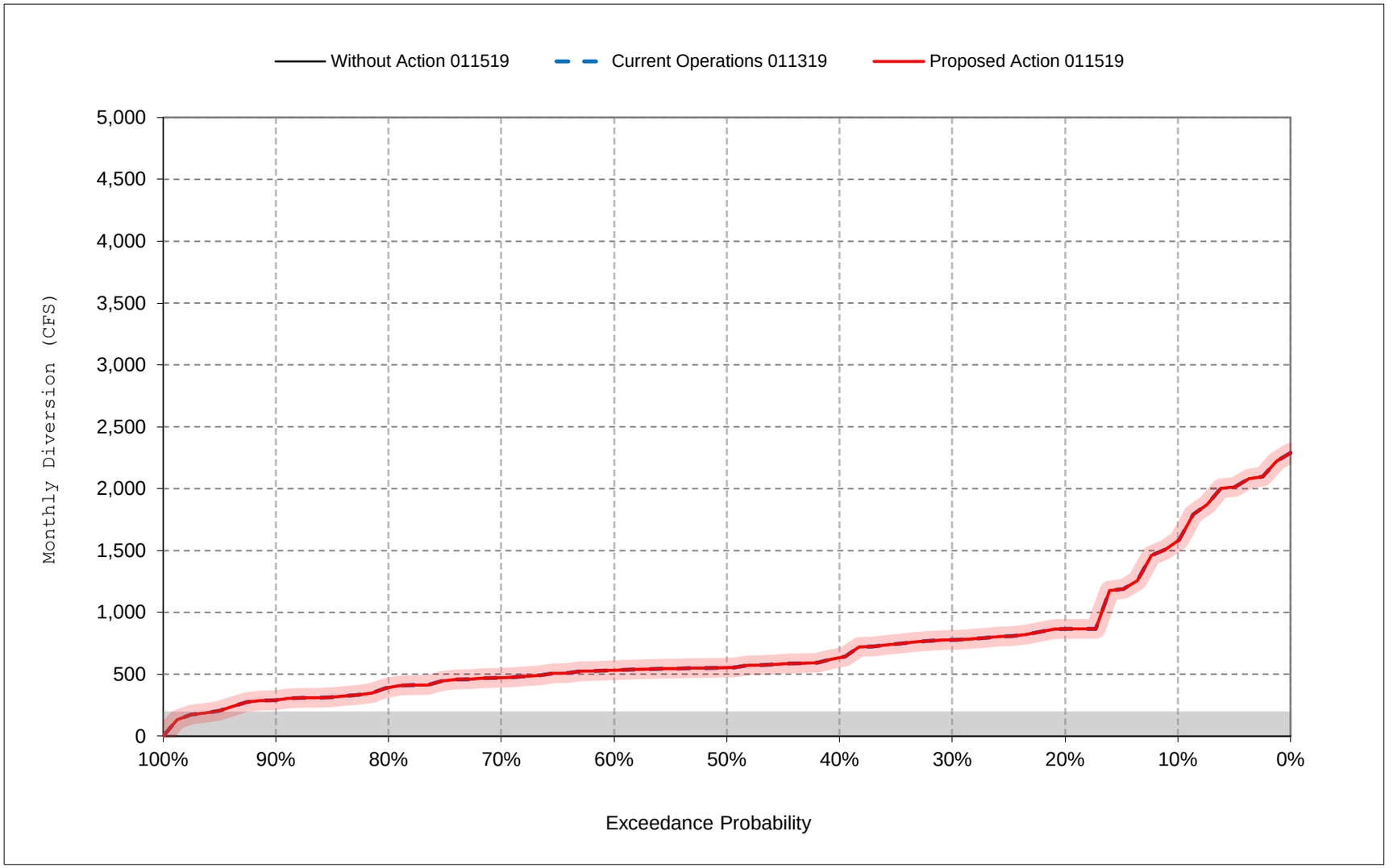
Figure 50-11. Friant-Kern Canal Diversion, February



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

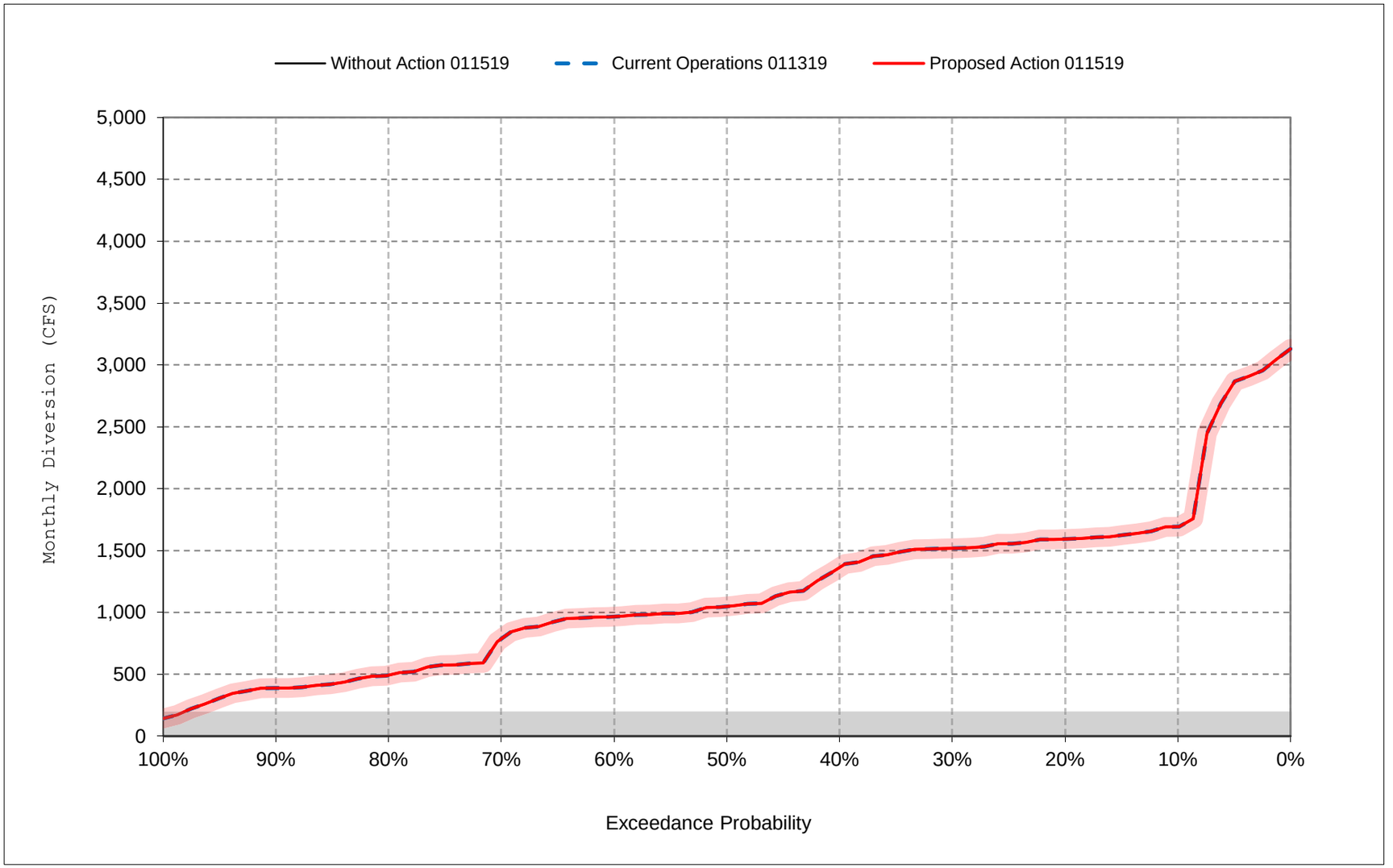
Figure 50-12. Friant-Kern Canal Diversion, March



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

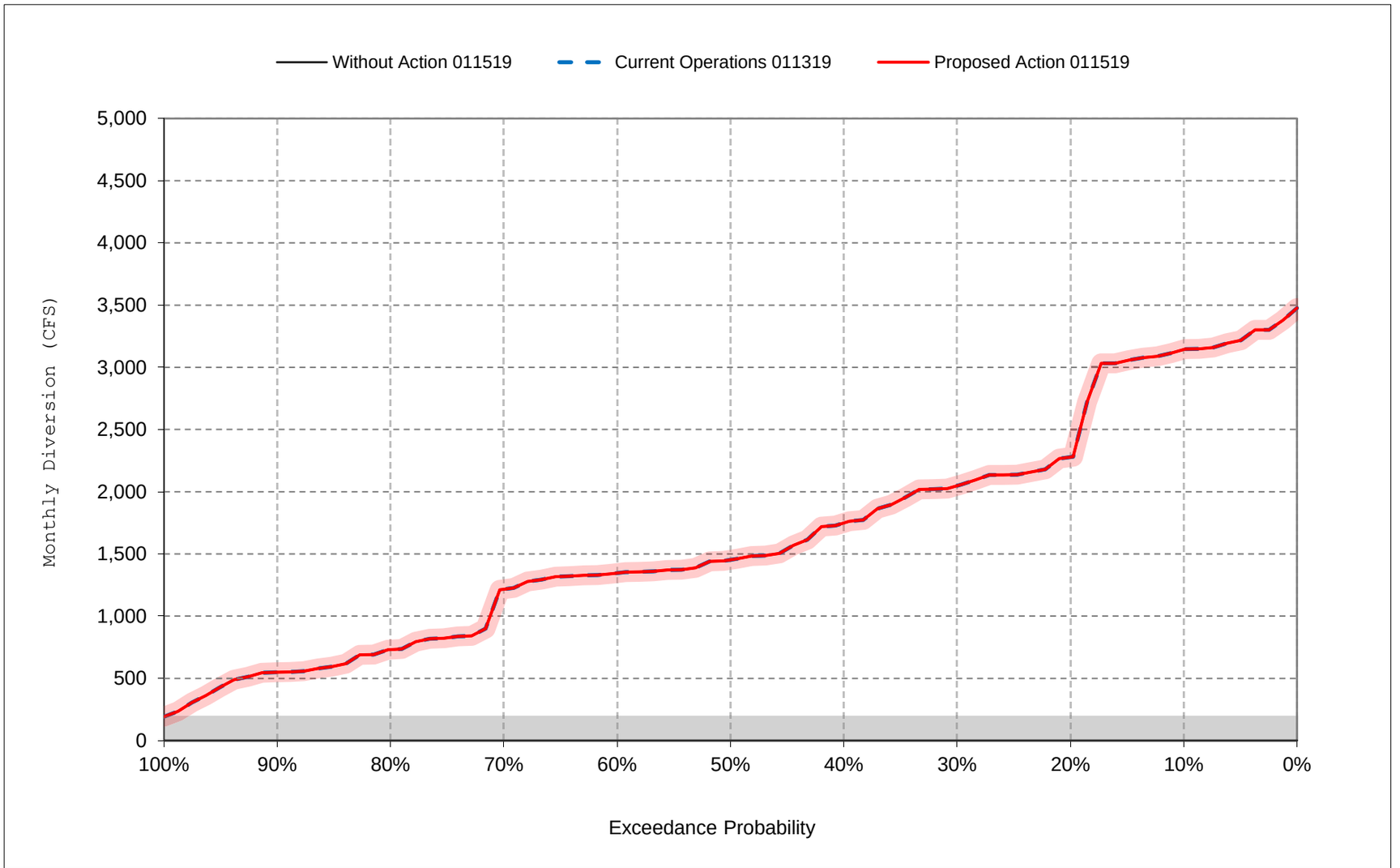
Figure 50-13. Friant-Kern Canal Diversion, April



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

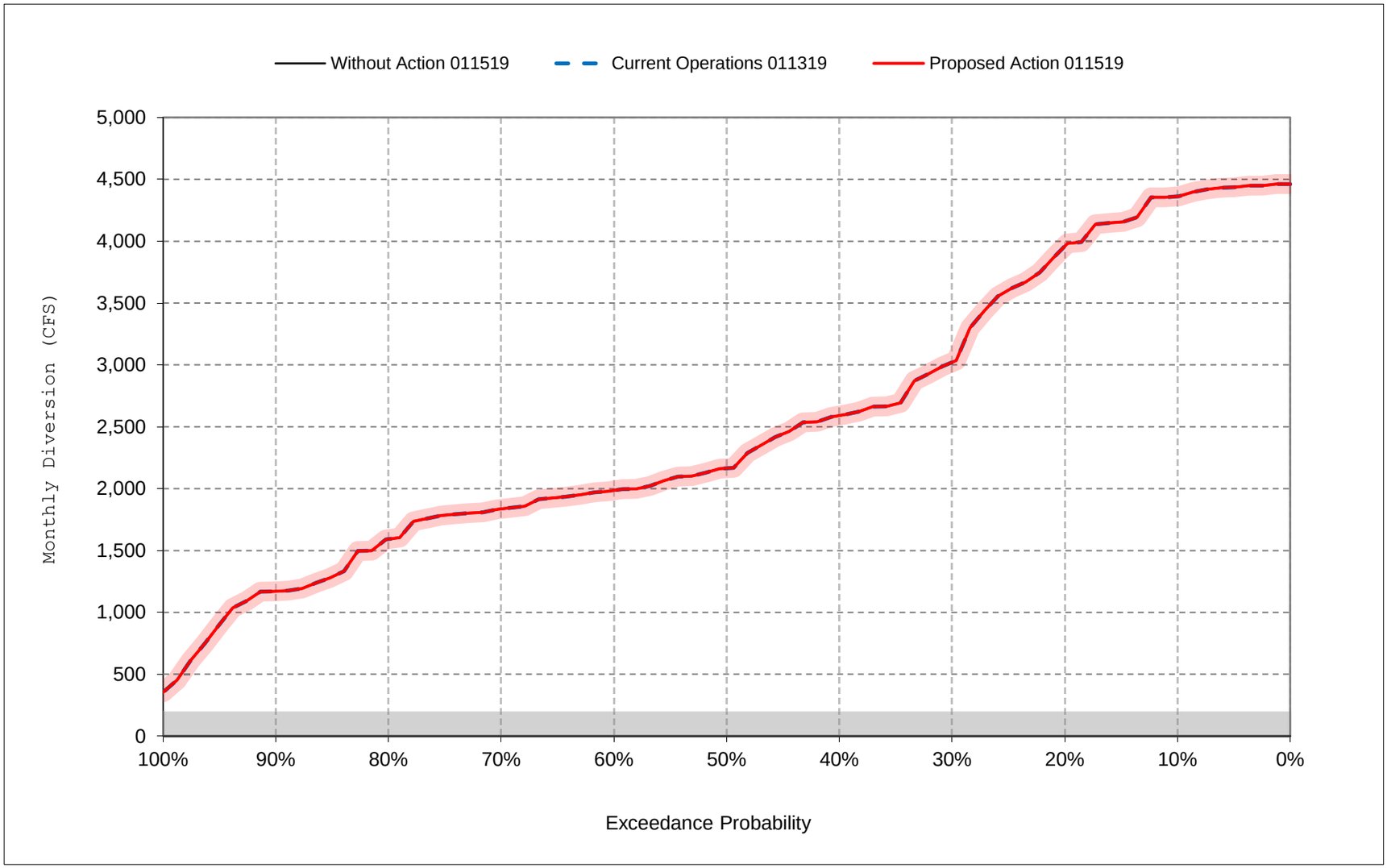
Figure 50-14. Friant-Kern Canal Diversion, May



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

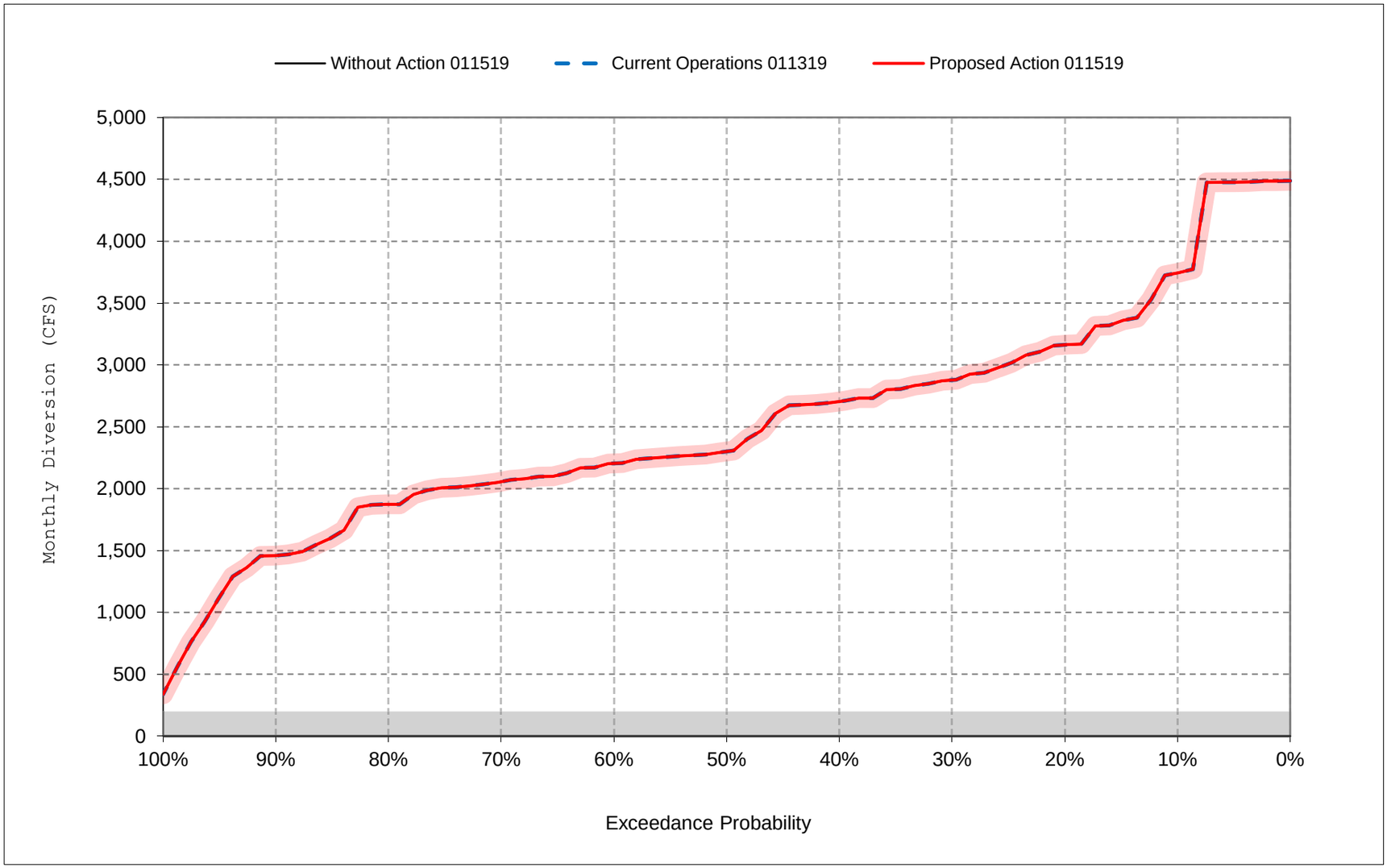
Figure 50-15. Friant-Kern Canal Diversion, June



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

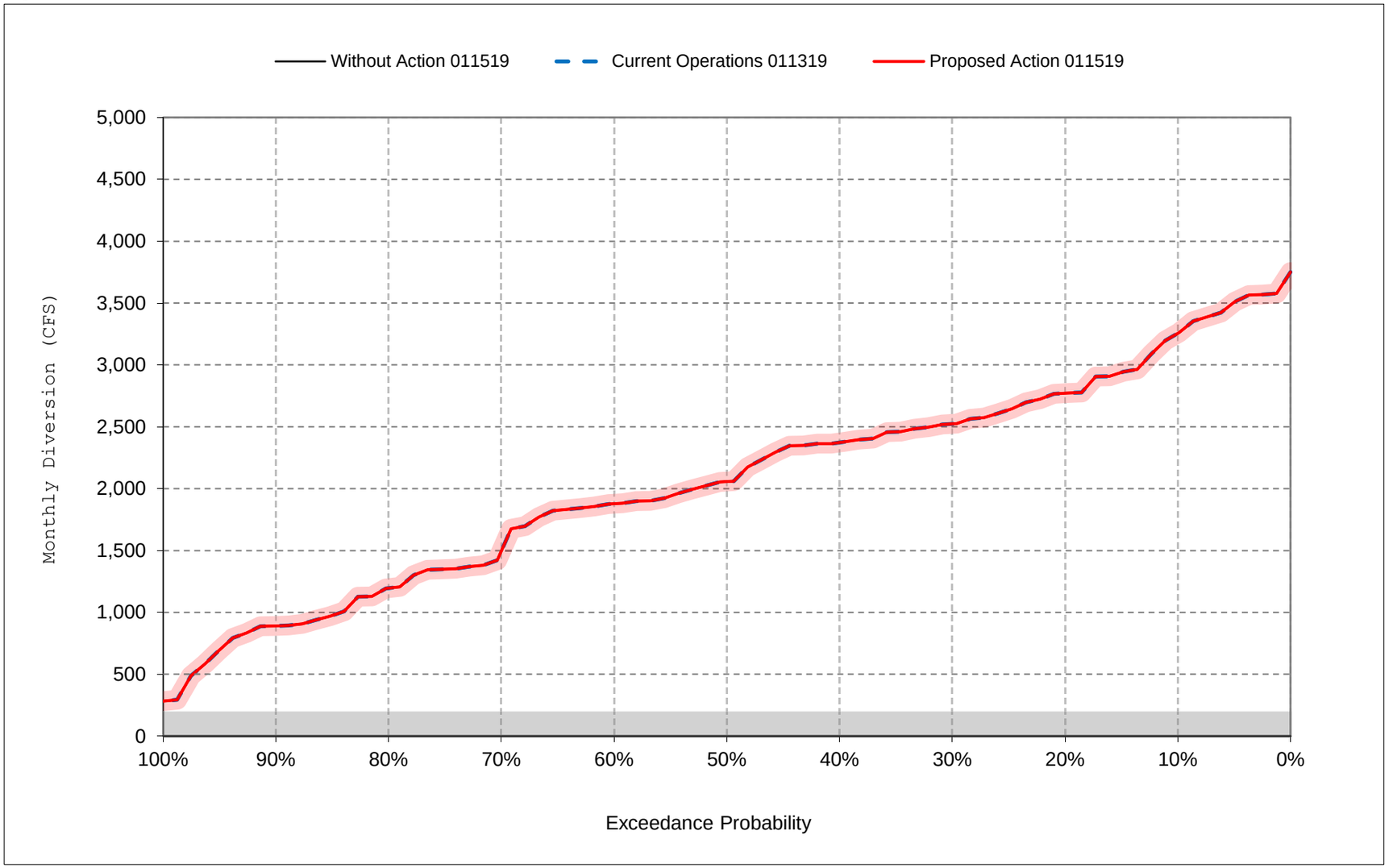
Figure 50-16. Friant-Kern Canal Diversion, July



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

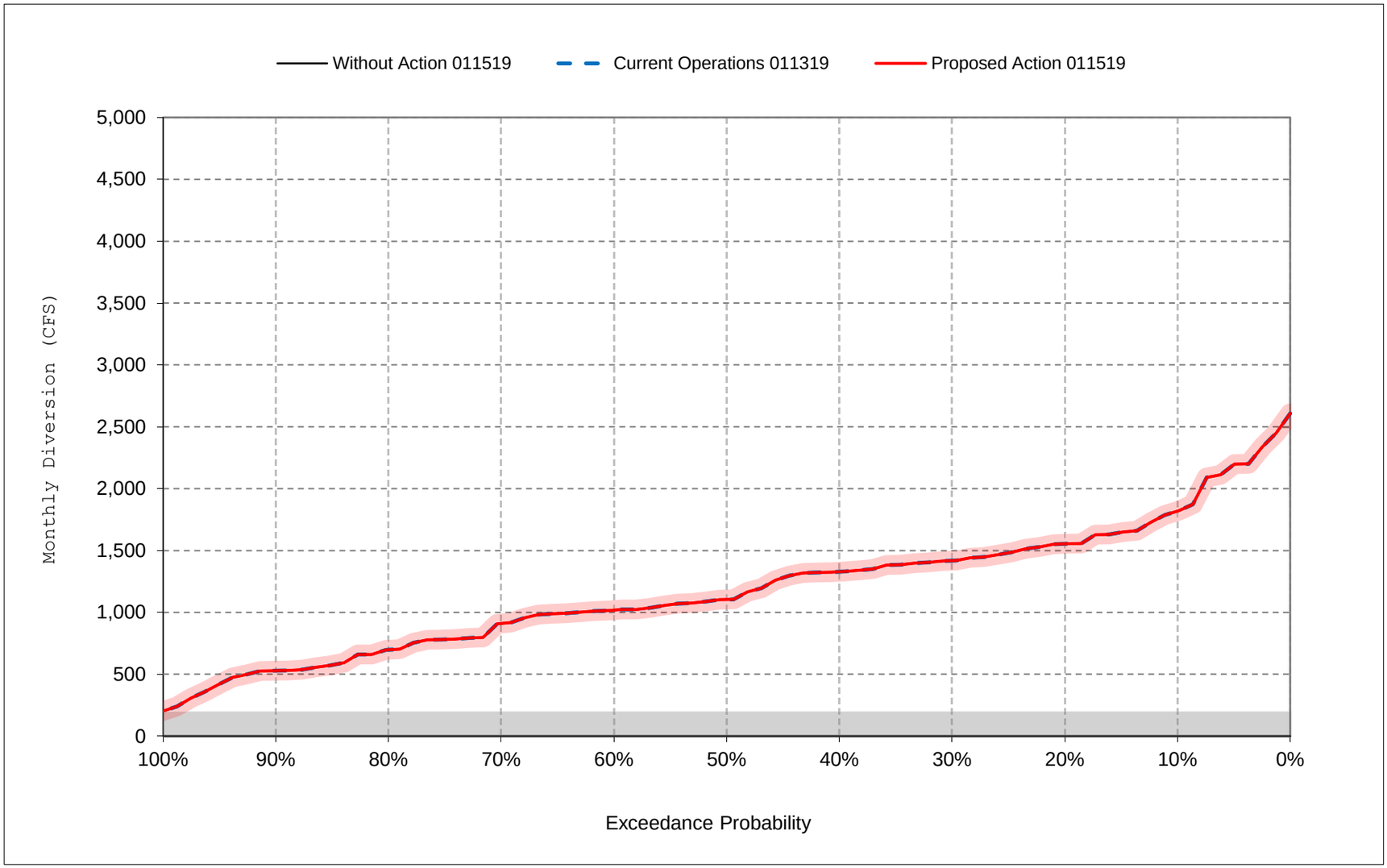
Figure 50-17. Friant-Kern Canal Diversion, August



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Figure 50-18. Friant-Kern Canal Diversion, September



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Table 51-1. Madera Canal Diversion, Monthly Diversion

Without Action 011519

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types[b,c]												
Wet (32%)	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal (16%)	0	0	0	0	0	0	0	0	0	0	0	0
Below Normal (13%)	0	0	0	0	0	0	0	0	0	0	0	0
Dry (24%)	0	0	0	0	0	0	0	0	0	0	0	0
Critical (15%)	0	0	0	0	0	0	0	0	0	0	0	0

Current Operations 011319

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	44	9	1	33	100	121	333	996	1,250	1,250	1,106	424
20%	38	1	0	1	48	89	299	823	1,161	1,233	924	332
30%	0	0	0	0	20	31	46	618	1,042	1,112	859	260
40%	0	0	0	0	3	0	0	558	953	1,009	807	134
50%	0	0	0	0	0	0	0	257	740	899	621	110
60%	0	0	0	0	0	0	0	227	677	823	565	91
70%	0	0	0	0	0	0	0	207	604	735	497	86
80%	0	0	0	0	0	0	0	175	509	620	410	74
90%	0	0	0	0	0	0	0	135	379	463	321	50
Long Term												
Full Simulation Period[a]	18	3	11	25	32	40	103	469	803	886	676	193
Water Year Types[b,c]												
Wet (32%)	46	9	21	68	63	89	202	800	1,077	1,130	950	333
Above Normal (16%)	14	1	0	19	47	38	108	535	937	1,030	784	193
Below Normal (13%)	7	0	0	0	26	25	90	366	749	869	586	178
Dry (24%)	0	0	19	0	4	4	25	234	627	738	510	79
Critical (15%)	3	0	0	0	2	9	28	167	406	465	325	94

Current Operations 011319 minus Without Action 011519

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	44	9	1	33	100	121	333	996	1,250	1,250	1,106	424
20%	38	1	0	1	48	89	299	823	1,161	1,233	924	332
30%	0	0	0	0	20	31	46	618	1,042	1,112	859	260
40%	0	0	0	0	3	0	0	558	953	1,009	807	134
50%	0	0	0	0	0	0	0	257	740	899	621	110
60%	0	0	0	0	0	0	0	227	677	823	565	91
70%	0	0	0	0	0	0	0	207	604	735	497	86
80%	0	0	0	0	0	0	0	175	509	620	410	74
90%	0	0	0	0	0	0	0	135	379	463	321	50
Long Term												
Full Simulation Period[a]	18	3	11	25	32	40	103	469	803	886	676	193
Water Year Types[b,c]												
Wet (32%)	46	9	21	68	63	89	202	800	1,077	1,130	950	333
Above Normal (16%)	14	1	0	19	47	38	108	535	937	1,030	784	193
Below Normal (13%)	7	0	0	0	26	25	90	366	749	869	586	178
Dry (24%)	0	0	19	0	4	4	25	234	627	738	510	79
Critical (15%)	3	0	0	0	2	9	28	167	406	465	325	94

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 51-2. Madera Canal Diversion, Monthly Diversion

Without Action 011519

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types[b,c]												
Wet (32%)	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal (16%)	0	0	0	0	0	0	0	0	0	0	0	0
Below Normal (13%)	0	0	0	0	0	0	0	0	0	0	0	0
Dry (24%)	0	0	0	0	0	0	0	0	0	0	0	0
Critical (15%)	0	0	0	0	0	0	0	0	0	0	0	0

Proposed Action 011519

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	44	9	1	33	100	121	333	996	1,250	1,250	1,106	424
20%	38	1	0	1	48	89	299	823	1,161	1,233	924	332
30%	0	0	0	0	20	31	46	618	1,042	1,112	859	260
40%	0	0	0	0	3	0	0	558	953	1,009	807	134
50%	0	0	0	0	0	0	0	257	740	899	621	110
60%	0	0	0	0	0	0	0	227	677	823	565	91
70%	0	0	0	0	0	0	0	207	604	735	497	86
80%	0	0	0	0	0	0	0	175	509	620	410	74
90%	0	0	0	0	0	0	0	135	379	463	321	50
Long Term												
Full Simulation Period[a]	18	3	11	25	32	40	103	469	803	886	676	193
Water Year Types[b,c]												
Wet (32%)	46	9	21	68	63	89	202	800	1,077	1,130	950	333
Above Normal (16%)	14	1	0	19	47	38	108	535	937	1,030	784	193
Below Normal (13%)	7	0	0	0	26	25	90	366	749	869	586	178
Dry (24%)	0	0	19	0	4	4	25	234	627	738	510	79
Critical (15%)	3	0	0	0	2	9	28	167	406	465	325	94

Proposed Action 011519 minus Without Action 011519

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	44	9	1	33	100	121	333	996	1,250	1,250	1,106	424
20%	38	1	0	1	48	89	299	823	1,161	1,233	924	332
30%	0	0	0	0	20	31	46	618	1,042	1,112	859	260
40%	0	0	0	0	3	0	0	558	953	1,009	807	134
50%	0	0	0	0	0	0	0	257	740	899	621	110
60%	0	0	0	0	0	0	0	227	677	823	565	91
70%	0	0	0	0	0	0	0	207	604	735	497	86
80%	0	0	0	0	0	0	0	175	509	620	410	74
90%	0	0	0	0	0	0	0	135	379	463	321	50
Long Term												
Full Simulation Period[a]	18	3	11	25	32	40	103	469	803	886	676	193
Water Year Types[b,c]												
Wet (32%)	46	9	21	68	63	89	202	800	1,077	1,130	950	333
Above Normal (16%)	14	1	0	19	47	38	108	535	937	1,030	784	193
Below Normal (13%)	7	0	0	0	26	25	90	366	749	869	586	178
Dry (24%)	0	0	19	0	4	4	25	234	627	738	510	79
Critical (15%)	3	0	0	0	2	9	28	167	406	465	325	94

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 51-3. Madera Canal Diversion, Monthly Diversion

Current Operations 011319

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	44	9	1	33	100	121	333	996	1,250	1,250	1,106	424
20%	38	1	0	1	48	89	299	823	1,161	1,233	924	332
30%	0	0	0	0	20	31	46	618	1,042	1,112	859	260
40%	0	0	0	0	3	0	0	558	953	1,009	807	134
50%	0	0	0	0	0	0	0	257	740	899	621	110
60%	0	0	0	0	0	0	0	227	677	823	565	91
70%	0	0	0	0	0	0	0	207	604	735	497	86
80%	0	0	0	0	0	0	0	175	509	620	410	74
90%	0	0	0	0	0	0	0	135	379	463	321	50
Long Term												
Full Simulation Period[a]	18	3	11	25	32	40	103	469	803	886	676	193
Water Year Types[b,c]												
Wet (32%)	46	9	21	68	63	89	202	800	1,077	1,130	950	333
Above Normal (16%)	14	1	0	19	47	38	108	535	937	1,030	784	193
Below Normal (13%)	7	0	0	0	26	25	90	366	749	869	586	178
Dry (24%)	0	0	19	0	4	4	25	234	627	738	510	79
Critical (15%)	3	0	0	0	2	9	28	167	406	465	325	94

Proposed Action 011519

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	44	9	1	33	100	121	333	996	1,250	1,250	1,106	424
20%	38	1	0	1	48	89	299	823	1,161	1,233	924	332
30%	0	0	0	0	20	31	46	618	1,042	1,112	859	260
40%	0	0	0	0	3	0	0	558	953	1,009	807	134
50%	0	0	0	0	0	0	0	257	740	899	621	110
60%	0	0	0	0	0	0	0	227	677	823	565	91
70%	0	0	0	0	0	0	0	207	604	735	497	86
80%	0	0	0	0	0	0	0	175	509	620	410	74
90%	0	0	0	0	0	0	0	135	379	463	321	50
Long Term												
Full Simulation Period[a]	18	3	11	25	32	40	103	469	803	886	676	193
Water Year Types[b,c]												
Wet (32%)	46	9	21	68	63	89	202	800	1,077	1,130	950	333
Above Normal (16%)	14	1	0	19	47	38	108	535	937	1,030	784	193
Below Normal (13%)	7	0	0	0	26	25	90	366	749	869	586	178
Dry (24%)	0	0	19	0	4	4	25	234	627	738	510	79
Critical (15%)	3	0	0	0	2	9	28	167	406	465	325	94

Proposed Action 011519 minus Current Operations 011319

Statistic	Monthly Diversion (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	**0**
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	**0**
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	0	0	0	0	0	0	0	**0**	0	**0**	0	**0**
Water Year Types[b,c]												
Wet (32%)	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal (16%)	0	0	0	0	0	0	0	**0**	0	**0**	0	**0**
Below Normal (13%)	0	0	0	0	**0**	0	0	0	0	0	0	0
Dry (24%)	0	0	0	0	0	0	0	**0**	0	**0**	0	**0**
Critical (15%)	0	0	0	0	0	0	0	**0**	**0**	0	0	**0**

a Based on the 82-year simulation period.

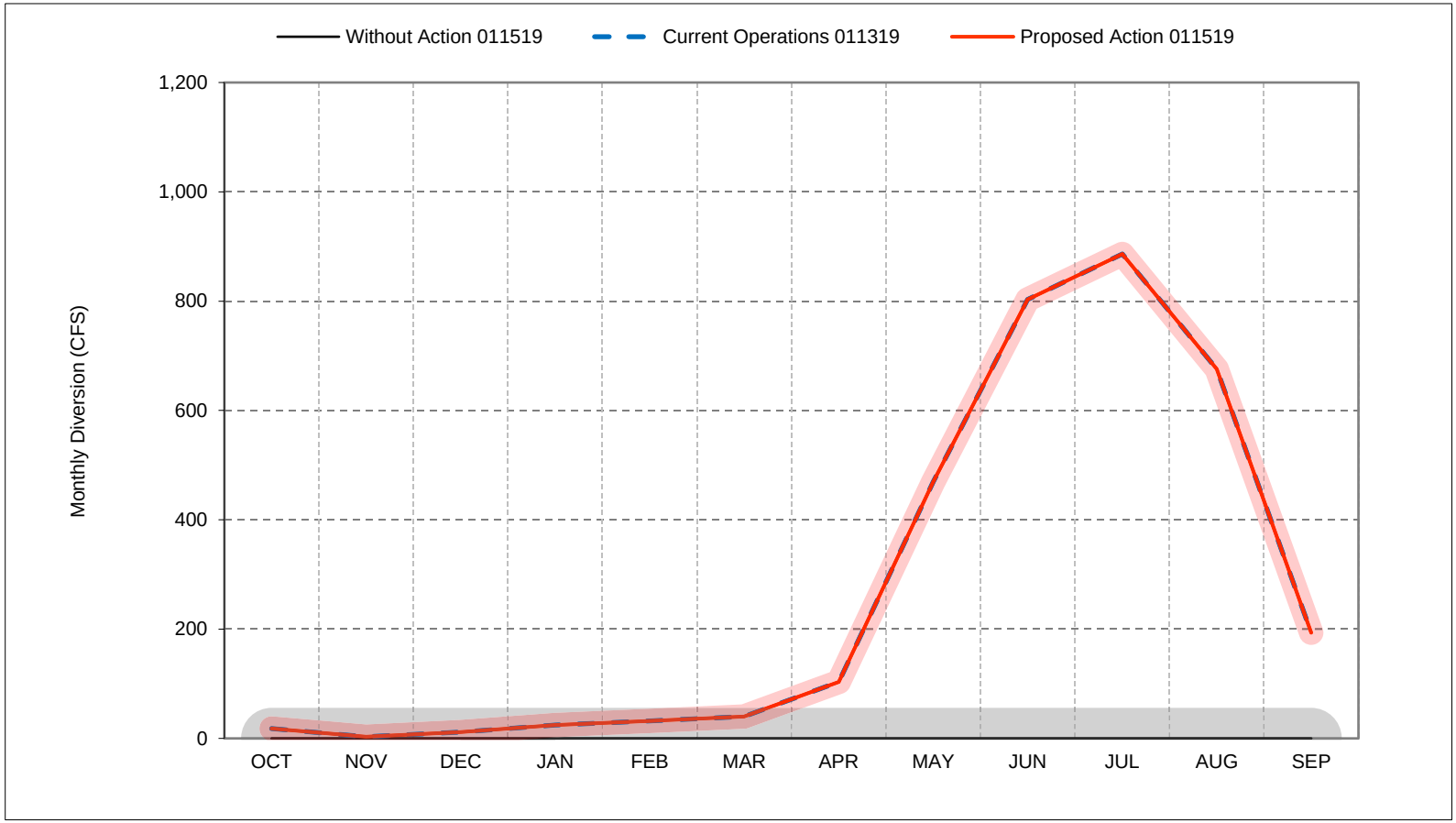
b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

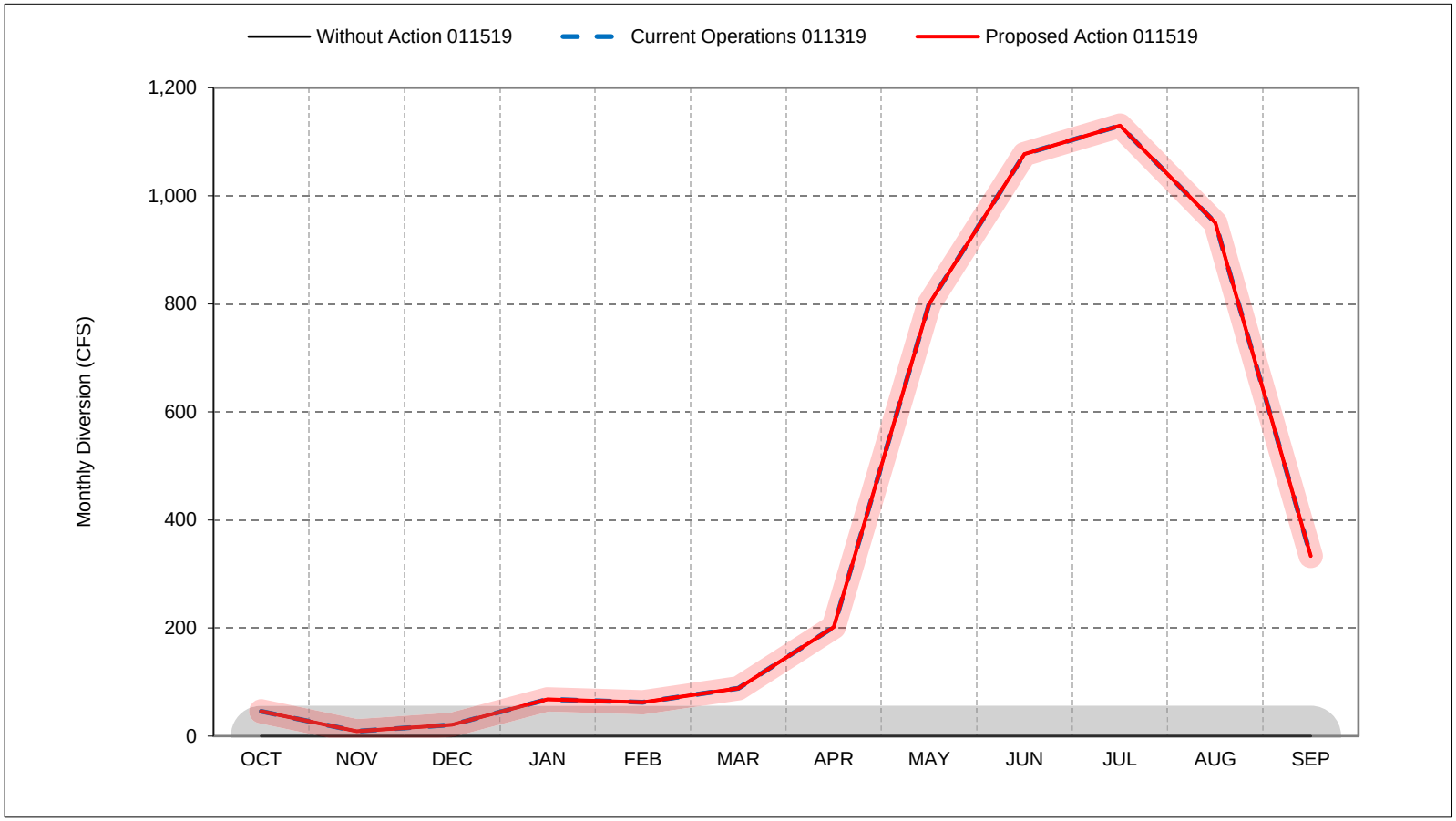
e These are draft results meant for qualitative analysis and are subject to revision.

Figure 51-1. Madera Canal Diversion, Long-Term Average Diversion



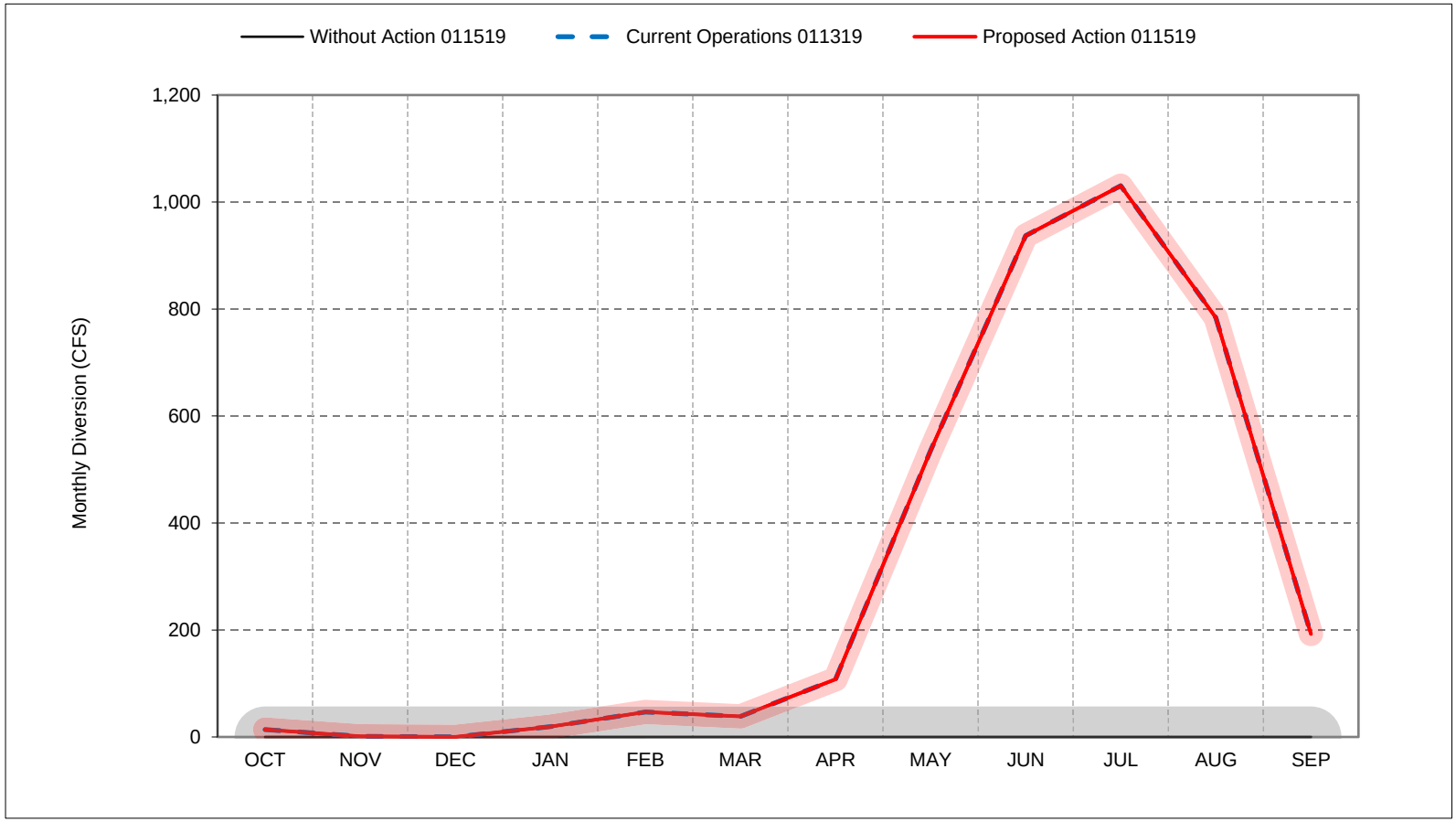
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 51-2. Madera Canal Diversion, Wet Year Average Diversion



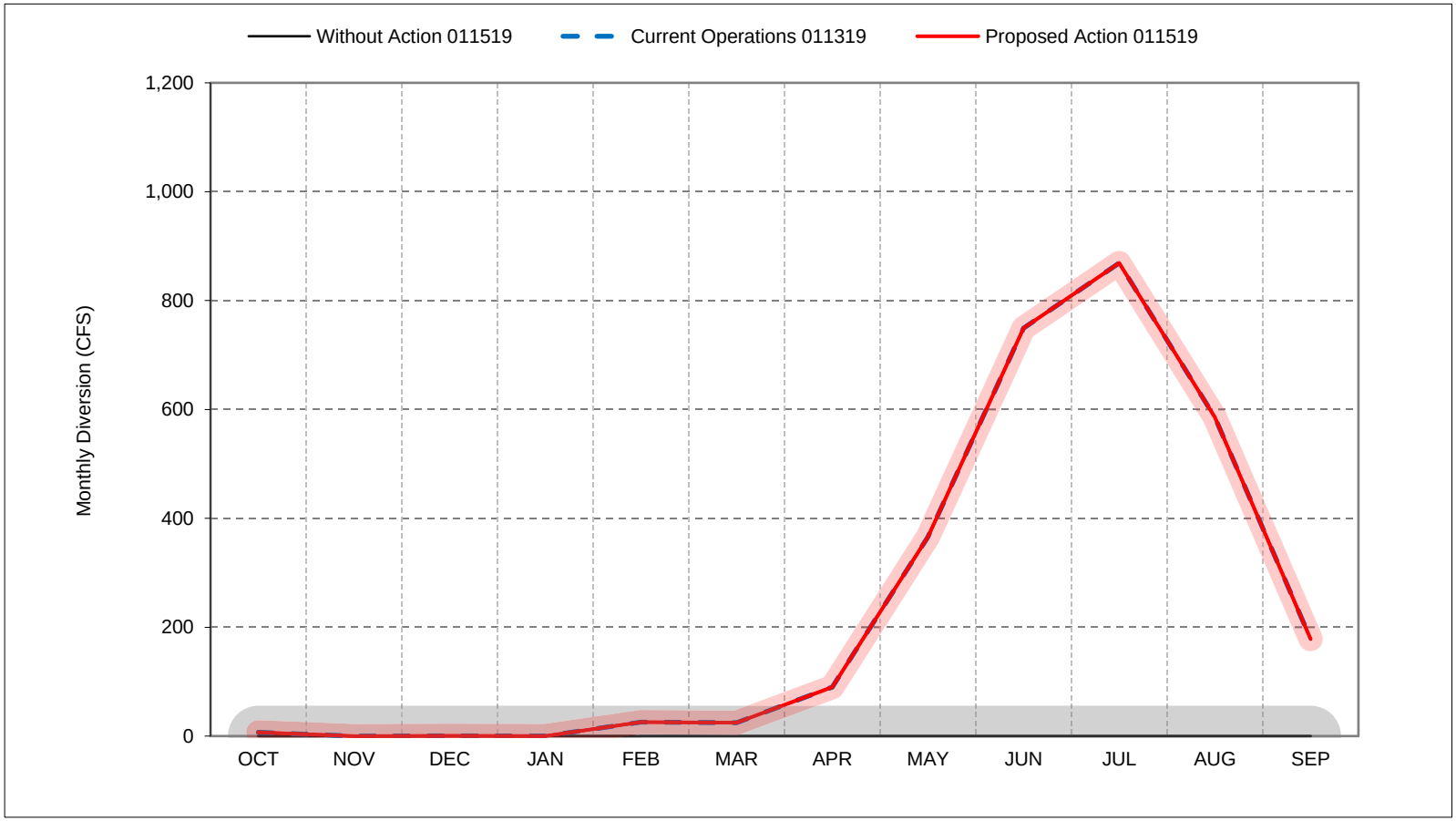
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 51-3. Madera Canal Diversion, Above Normal Year Average Diversion



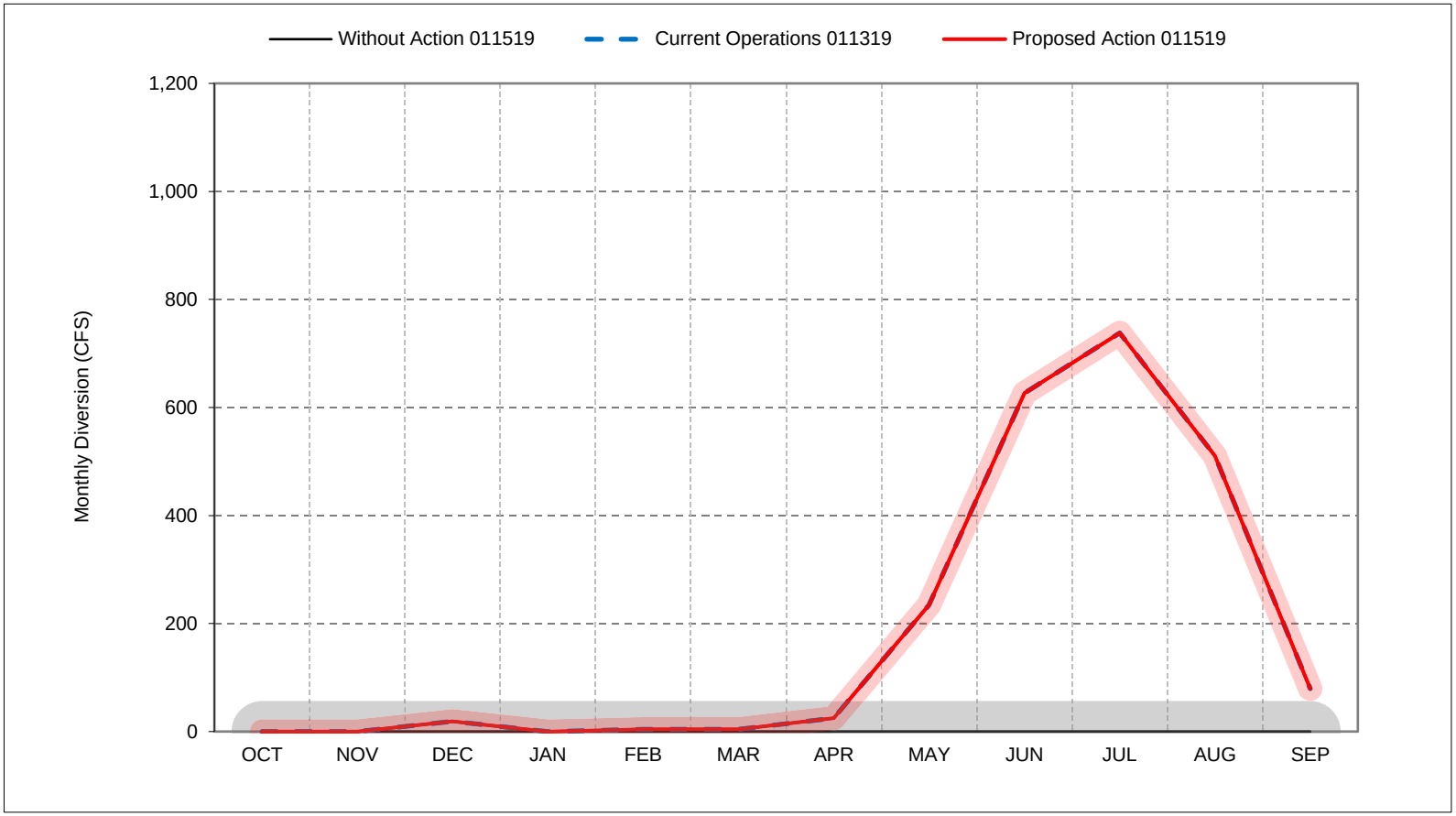
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 51-4. Madera Canal Diversion, Below Normal Year Average Diversion



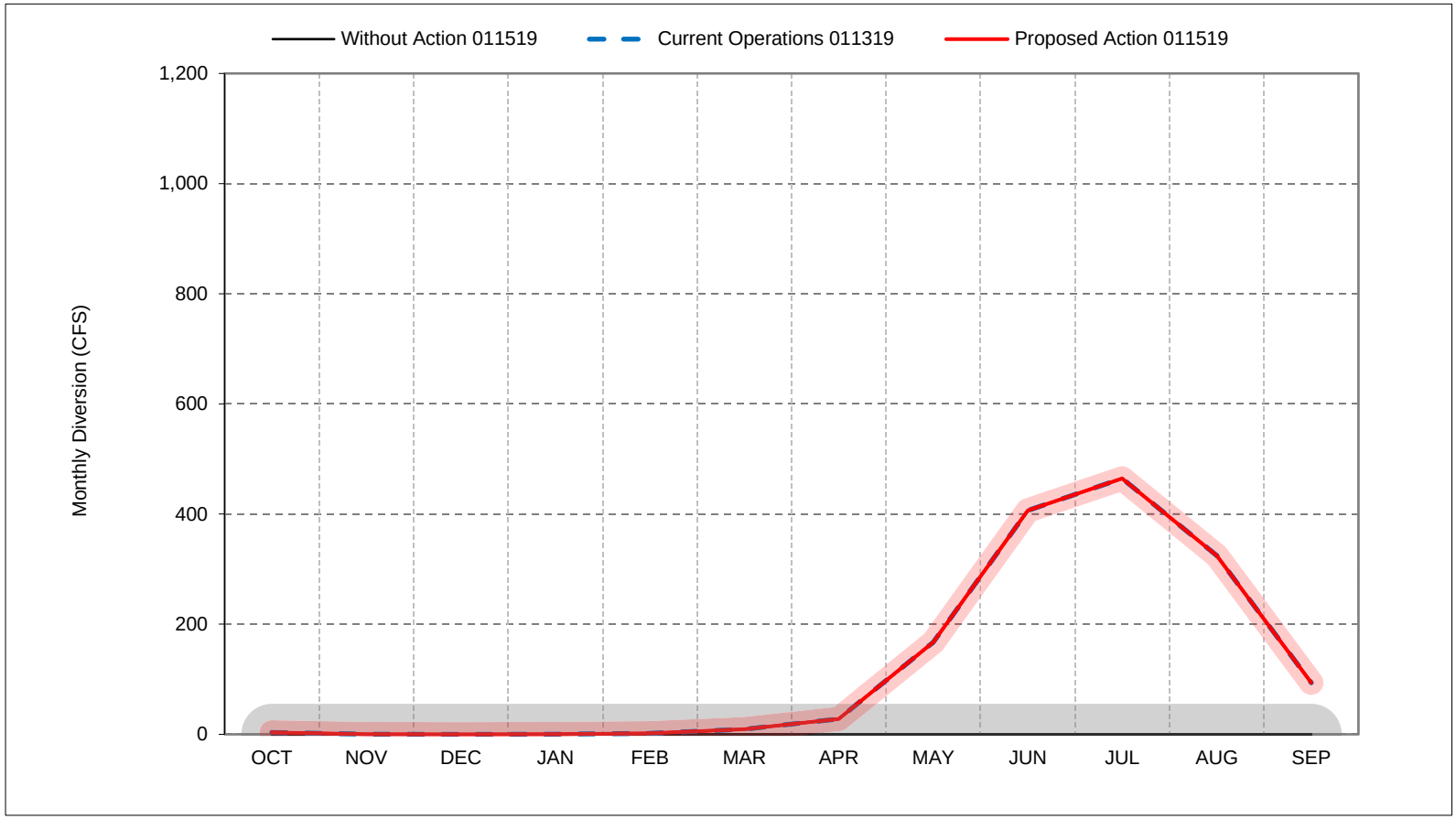
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 51-5. Madera Canal Diversion, Dry Year Average Diversion



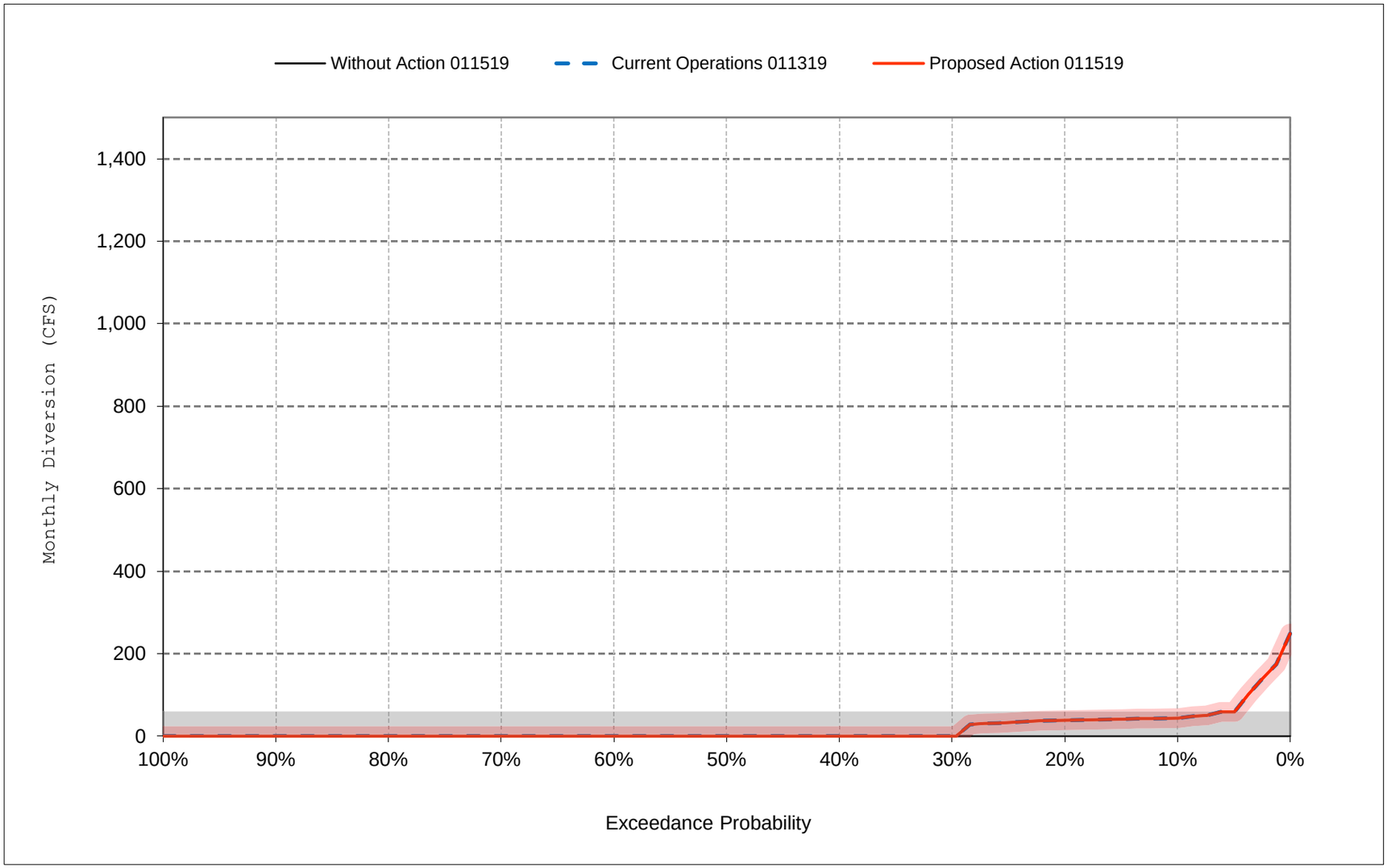
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 51-6. Madera Canal Diversion, Critical Year Average Diversion



*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

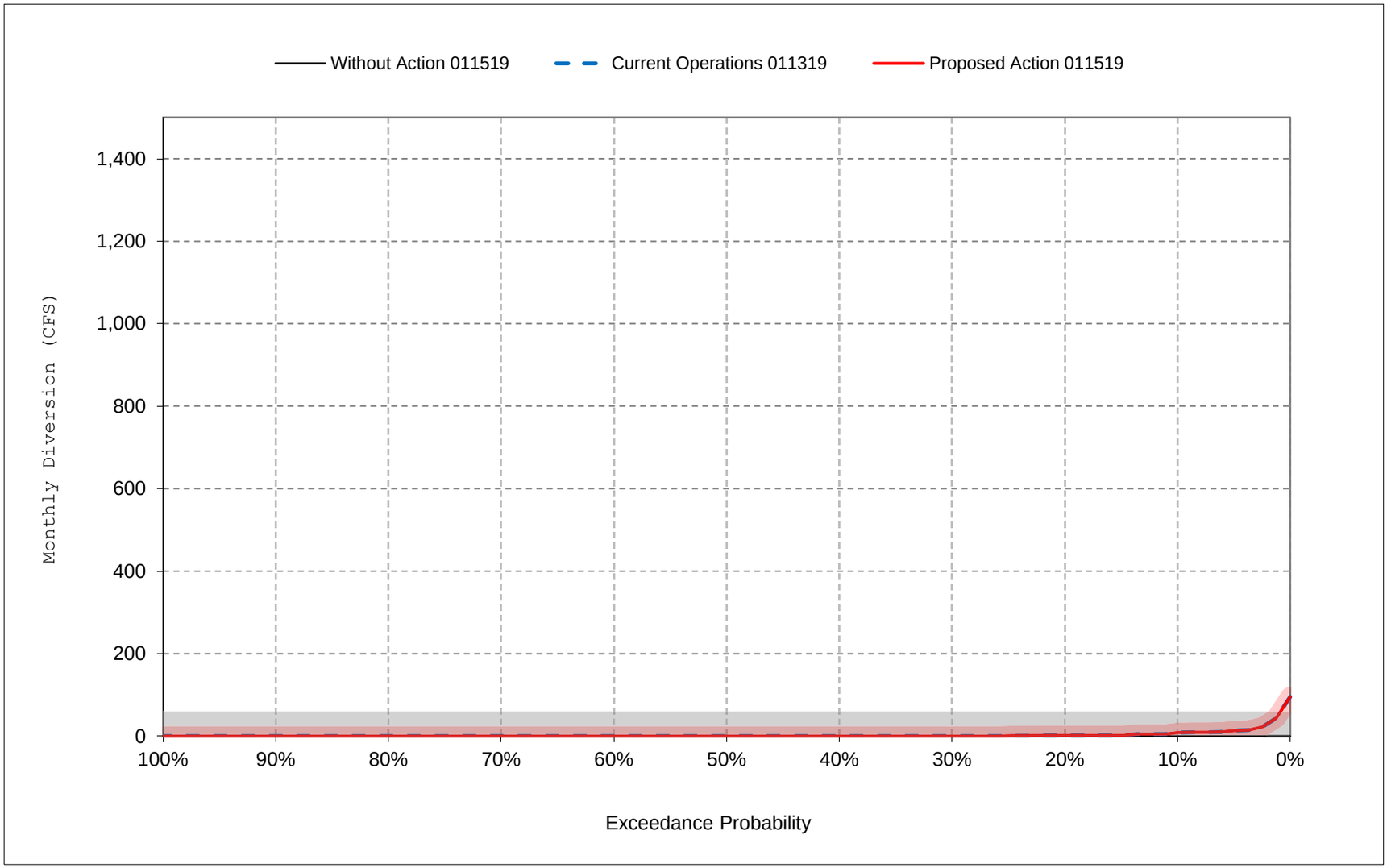
Figure 51-7. Madera Canal Diversion, October



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

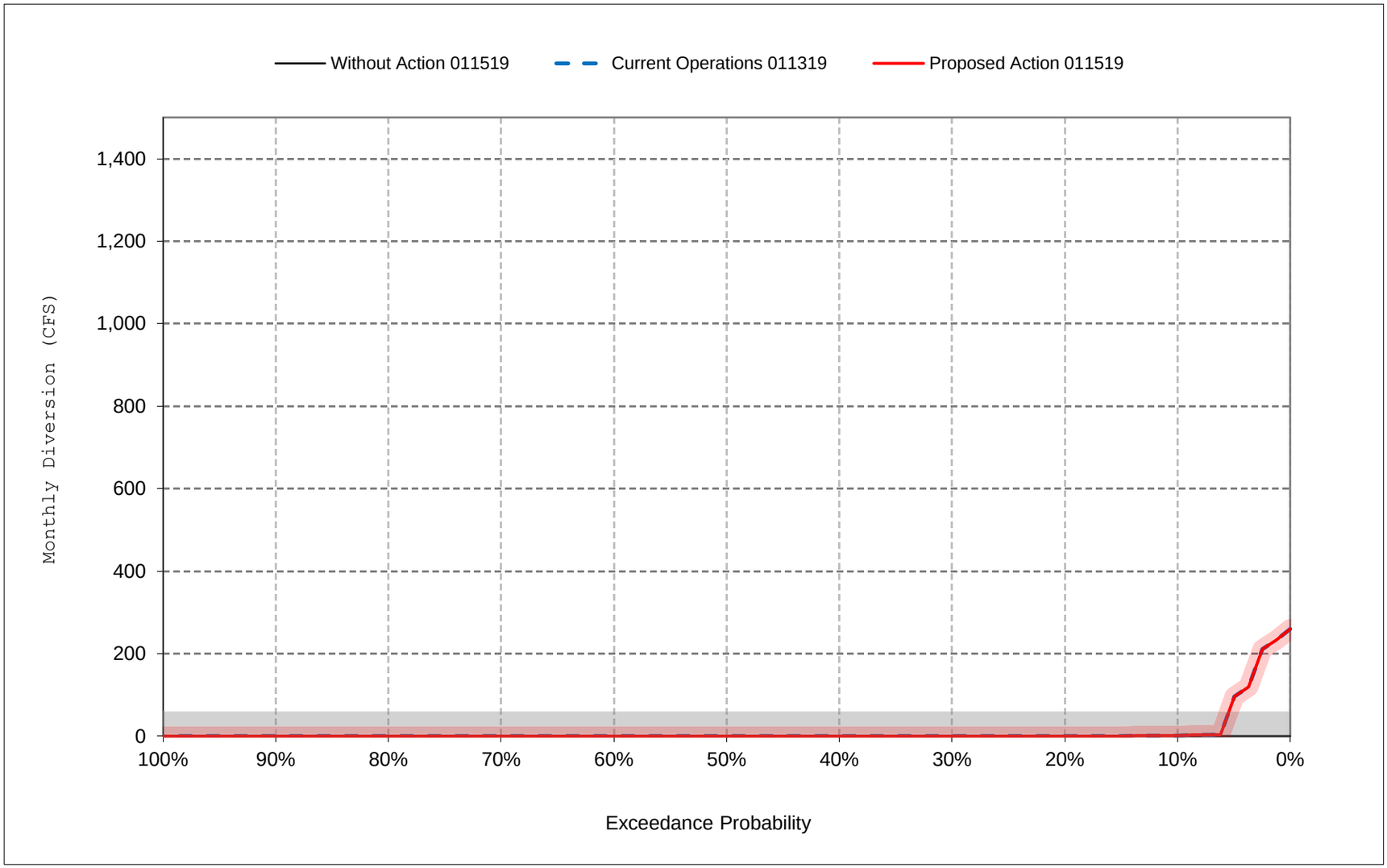
Figure 51-8. Madera Canal Diversion, November



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

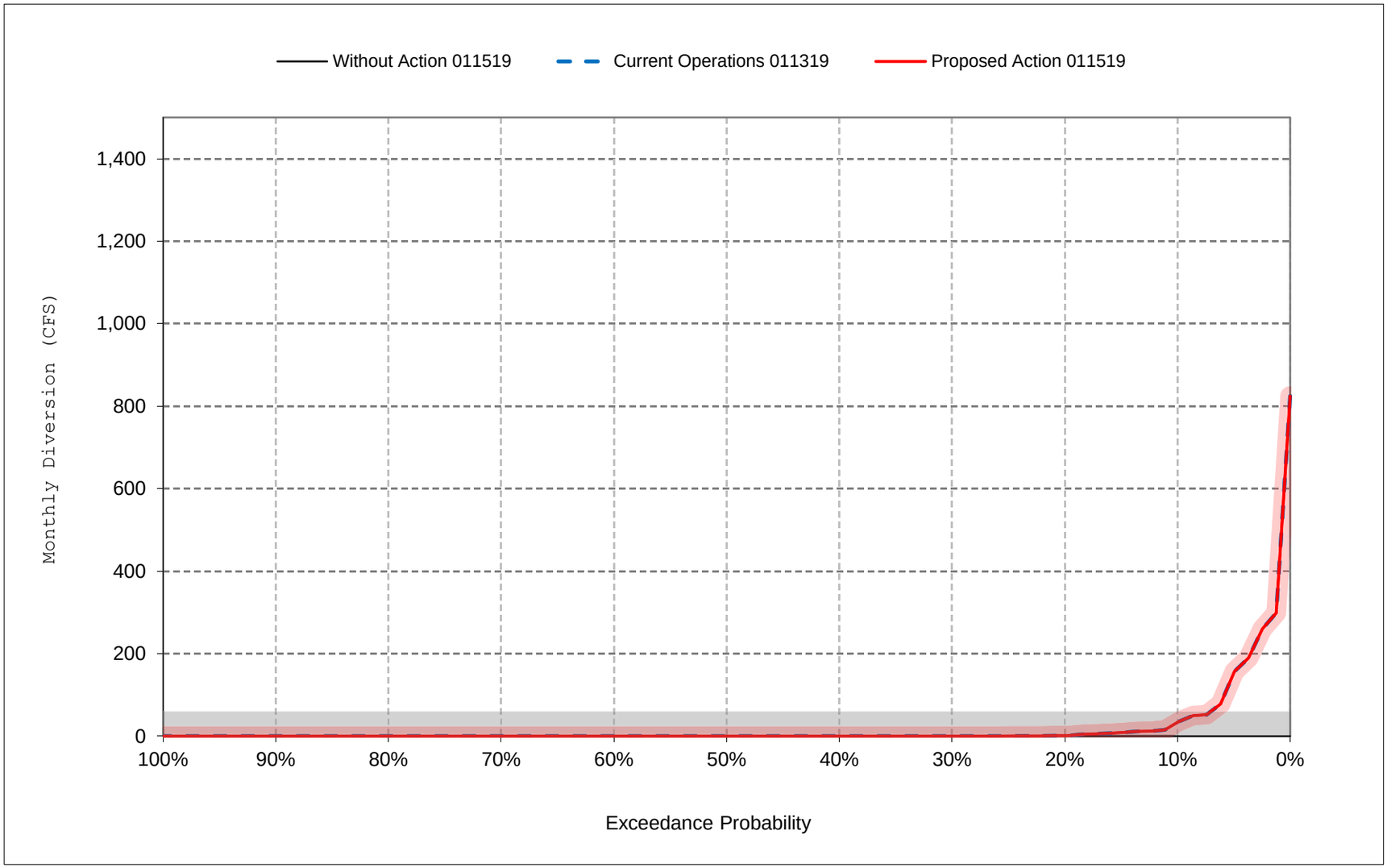
Figure 51-9. Madera Canal Diversion, December



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

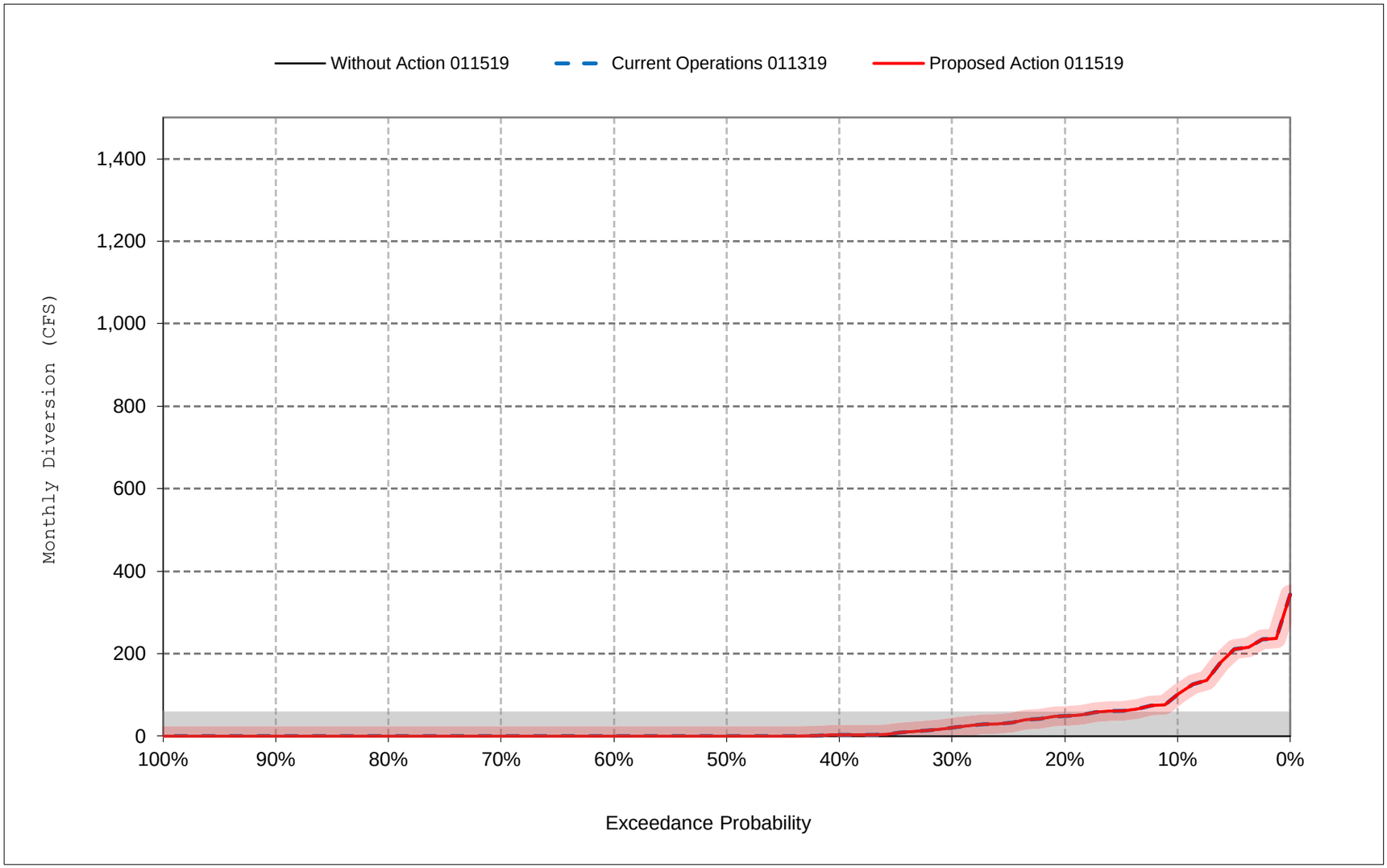
Figure 51-10. Madera Canal Diversion, January



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

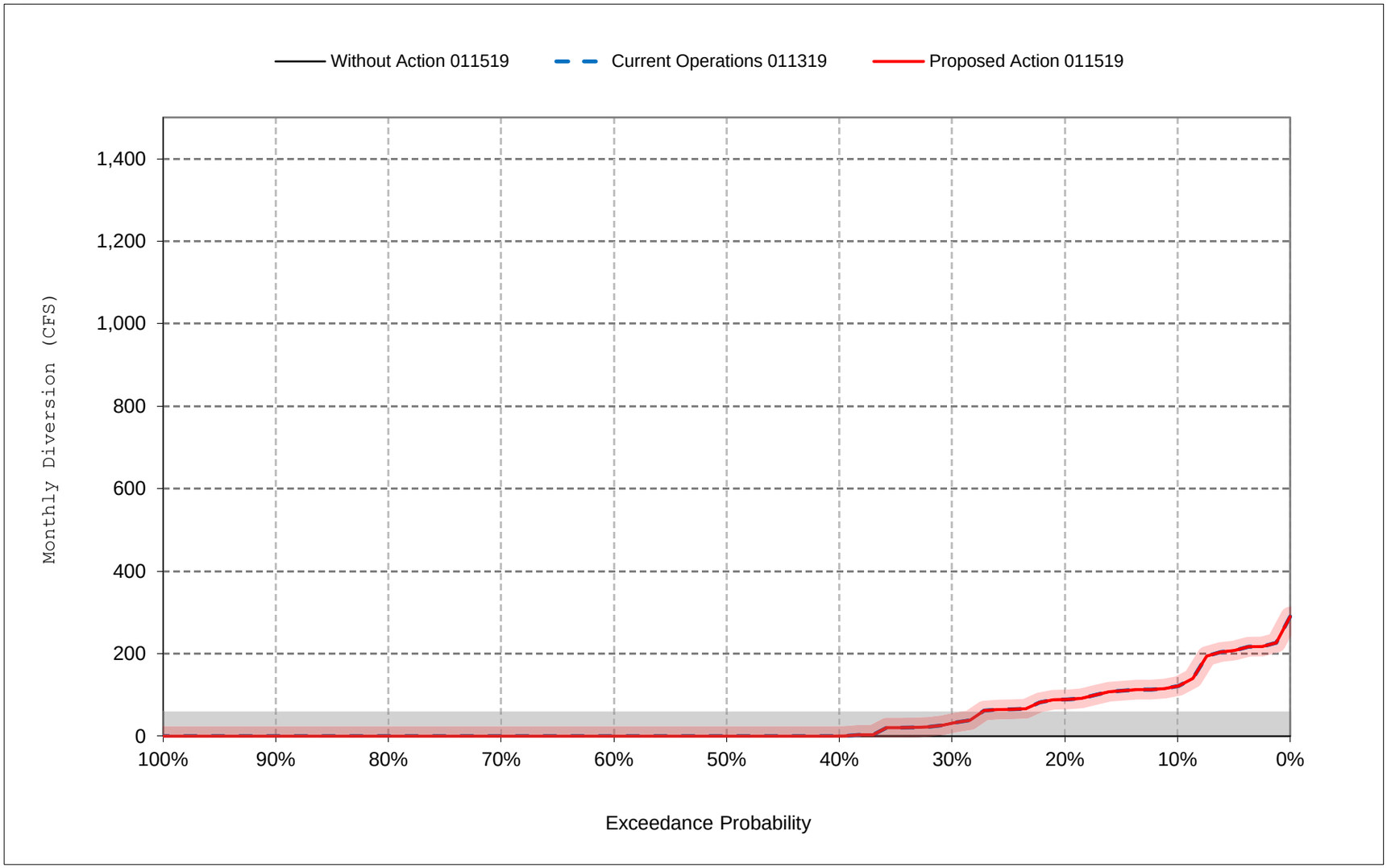
Figure 51-11. Madera Canal Diversion, February



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

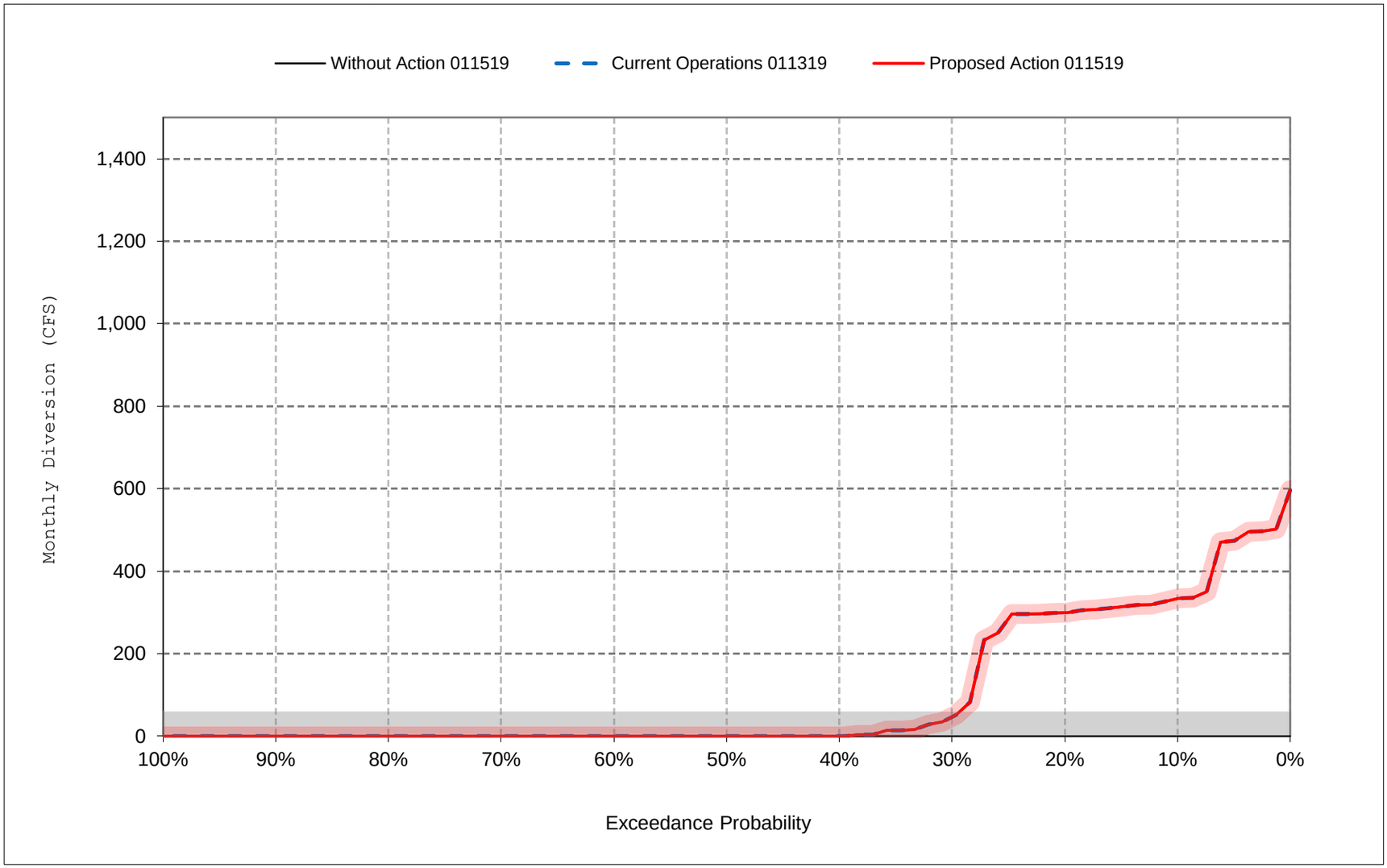
Figure 51-12. Madera Canal Diversion, March



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

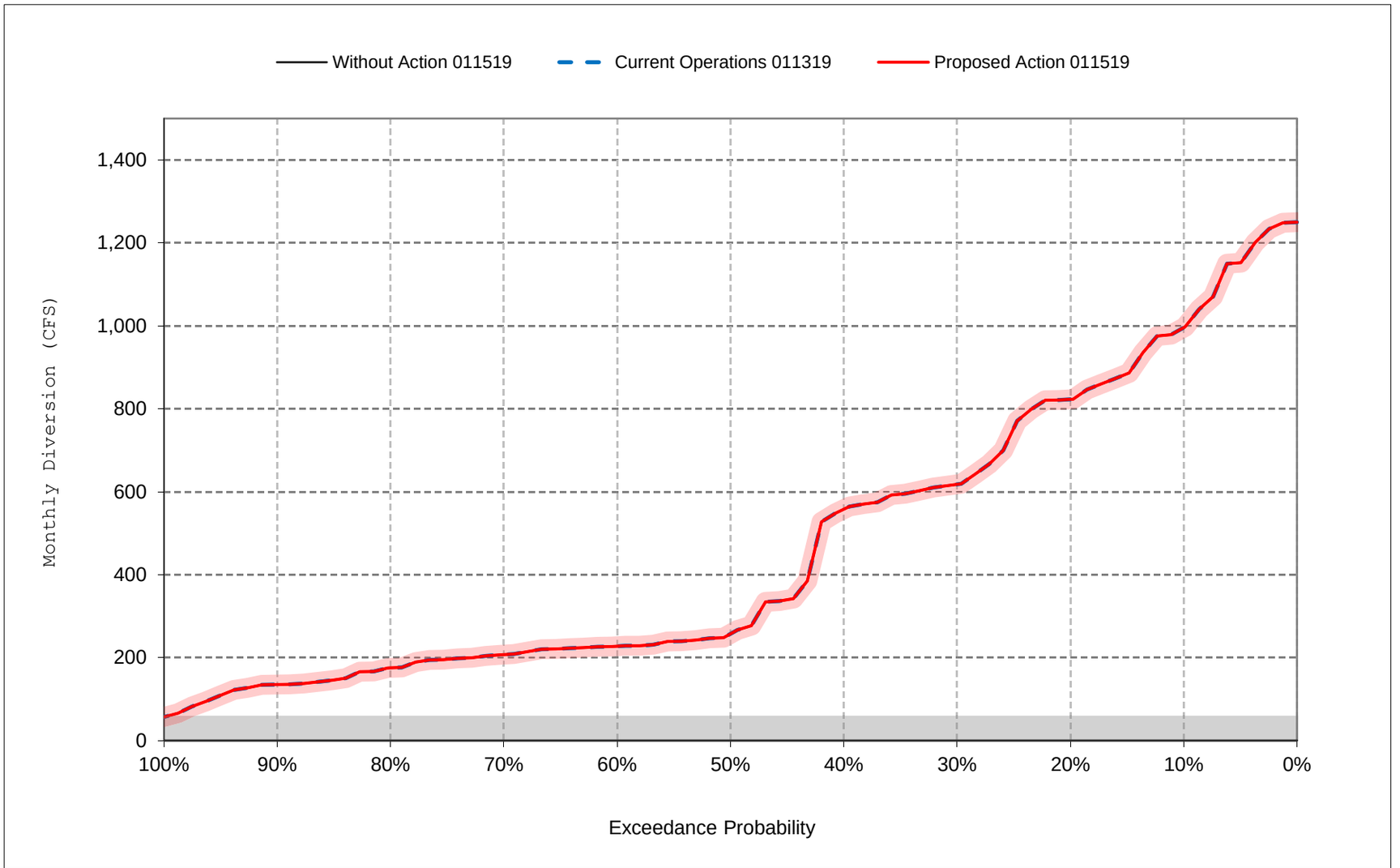
Figure 51-13. Madera Canal Diversion, April



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

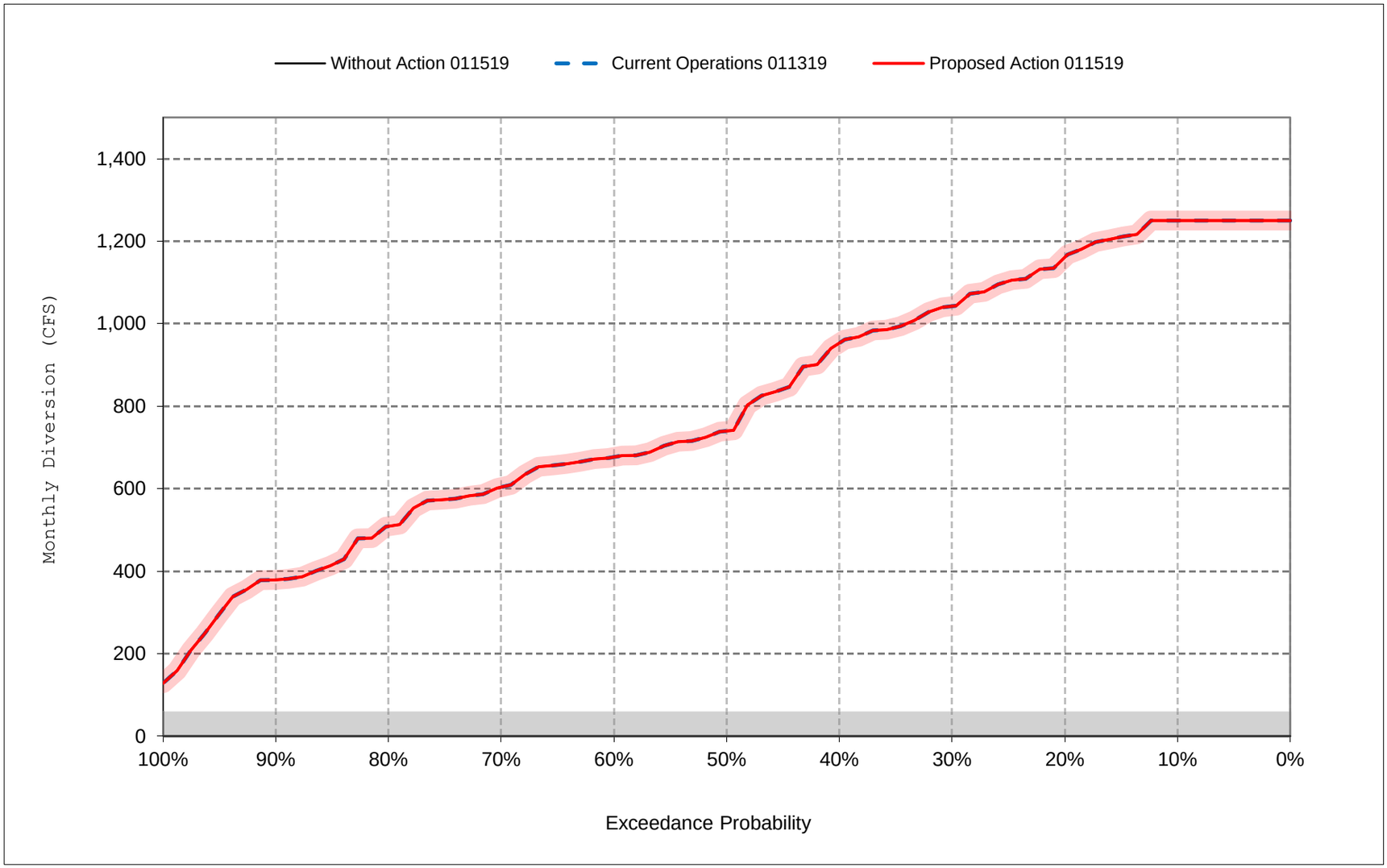
Figure 51-14. Madera Canal Diversion, May



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

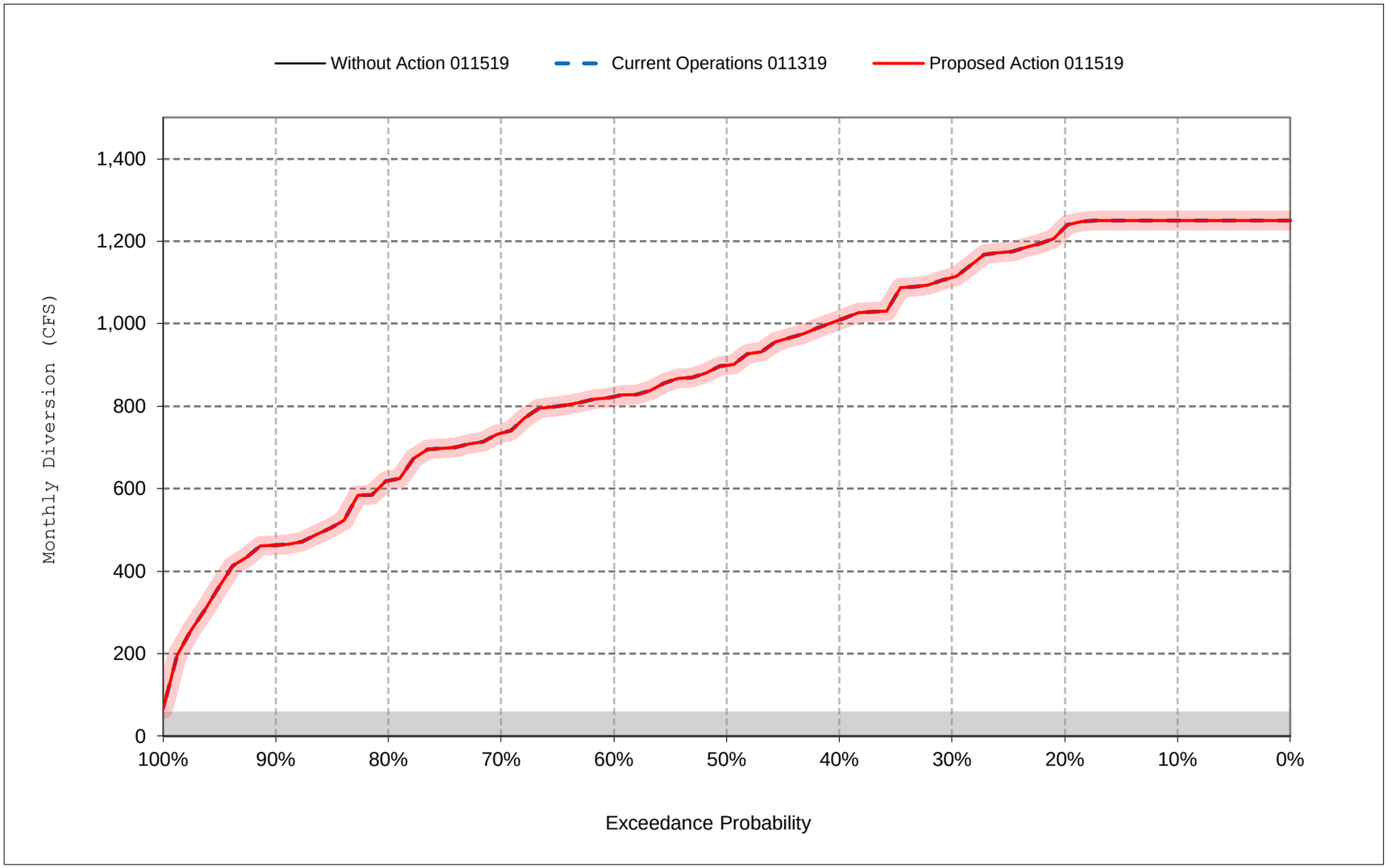
Figure 51-15. Madera Canal Diversion, June



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

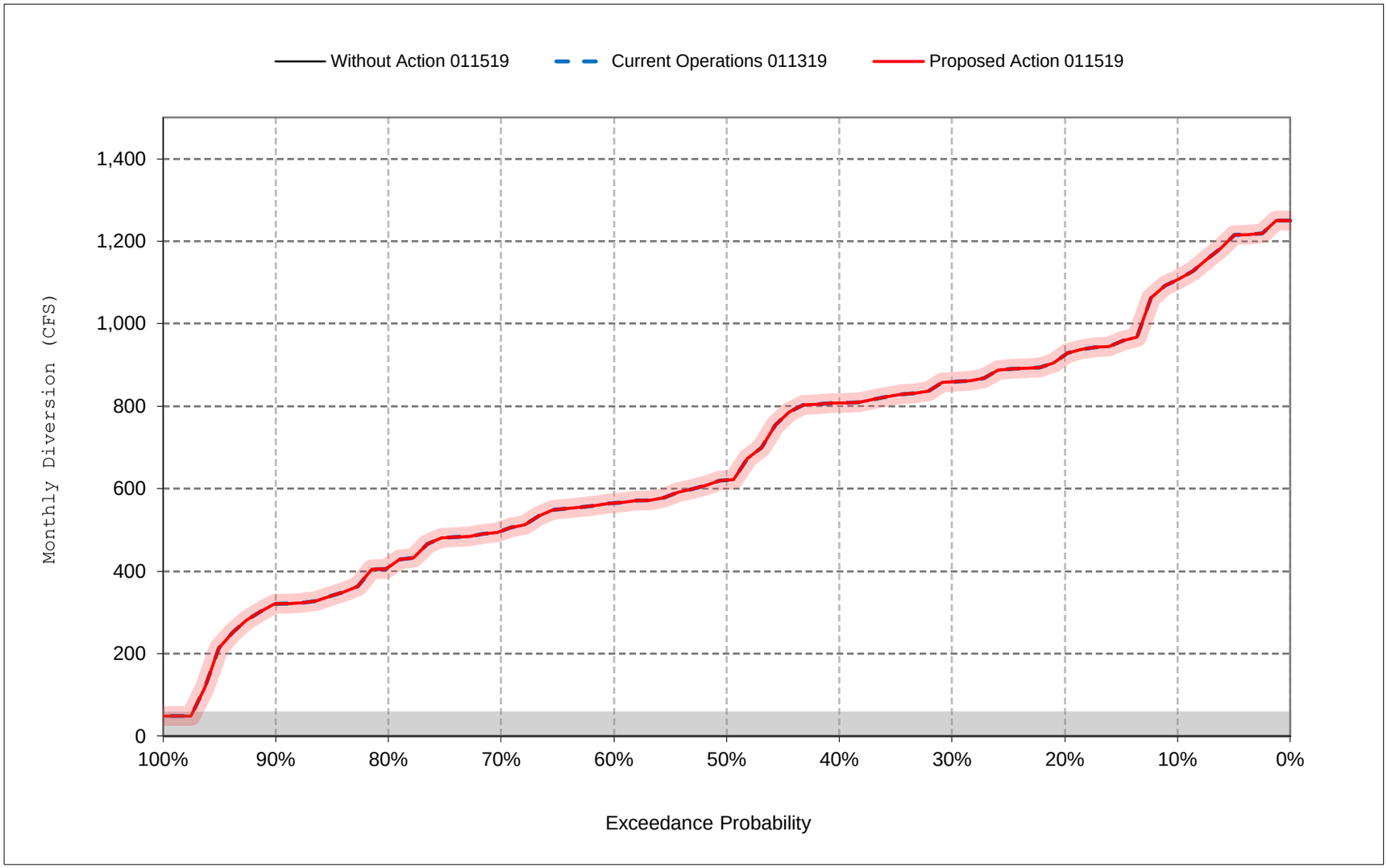
Figure 51-16. Madera Canal Diversion, July



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

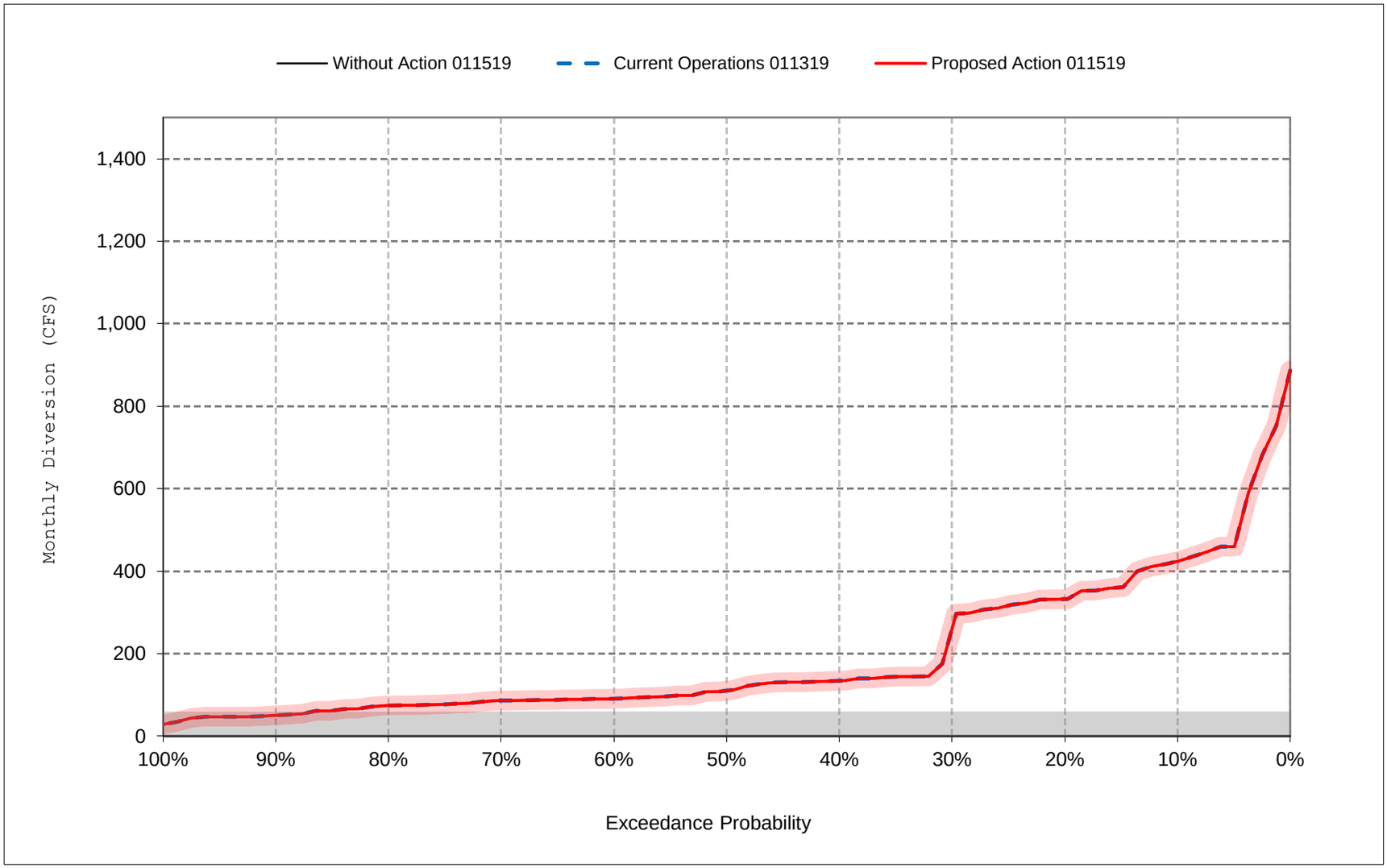
Figure 51-17. Madera Canal Diversion, August



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Figure 51-18. Madera Canal Diversion, September



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Table 52-1. DCC Flow, Monthly Flow

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types[b,c]												
Wet (32%)	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal (16%)	0	0	0	0	0	0	0	0	0	0	0	0
Below Normal (13%)	0	0	0	0	0	0	0	0	0	0	0	0
Dry (24%)	0	0	0	0	0	0	0	0	0	0	0	0
Critical (15%)	0	0	0	0	0	0	0	0	0	0	0	0

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	2,182	1,272	914	0	0	0	0	0	2,626	4,540	3,137	4,085
20%	1,841	1,084	829	0	0	0	0	0	2,264	4,485	3,064	3,687
30%	1,721	949	778	0	0	0	0	0	2,141	4,221	2,971	2,065
40%	1,596	813	689	0	0	0	0	0	2,085	3,646	2,917	1,864
50%	1,492	693	497	0	0	0	0	0	2,009	3,470	2,802	1,741
60%	1,466	411	0	0	0	0	0	0	1,893	3,162	2,533	1,523
70%	1,206	198	0	0	0	0	0	0	1,757	2,940	1,739	1,235
80%	1,196	0	0	0	0	0	0	0	1,630	2,604	1,588	0
90%	801	0	0	0	0	0	0	0	1,221	2,032	1,467	0
Long Term												
Full Simulation Period[a]	1,474	613	433	0	0	0	0	0	1,889	3,399	2,448	1,795
Water Year Types[b,c]												
Wet (32%)	1,483	265	506	0	0	0	0	0	1,725	3,737	2,963	669
Above Normal (16%)	1,713	577	464	0	0	0	0	0	2,147	4,245	3,104	4,063
Below Normal (13%)	1,504	1,012	450	0	0	0	0	0	2,061	4,002	2,752	2,173
Dry (24%)	1,448	733	282	0	0	0	0	0	2,057	2,992	1,780	1,803
Critical (15%)	1,211	840	475	0	0	0	0	0	1,529	1,872	1,459	1,416

Current Operations 011319 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	2,182	1,272	914	0	0	0	0	0	2,626	4,540	3,137	4,085
20%	1,841	1,084	829	0	0	0	0	0	2,264	4,485	3,064	3,687
30%	1,721	949	778	0	0	0	0	0	2,141	4,221	2,971	2,065
40%	1,596	813	689	0	0	0	0	0	2,085	3,646	2,917	1,864
50%	1,492	693	497	0	0	0	0	0	2,009	3,470	2,802	1,741
60%	1,466	411	0	0	0	0	0	0	1,893	3,162	2,533	1,523
70%	1,206	198	0	0	0	0	0	0	1,757	2,940	1,739	1,235
80%	1,196	0	0	0	0	0	0	0	1,630	2,604	1,588	0
90%	801	0	0	0	0	0	0	0	1,221	2,032	1,467	0
Long Term												
Full Simulation Period[a]	1,474	613	433	0	0	0	0	0	1,889	3,399	2,448	1,795
Water Year Types[b,c]												
Wet (32%)	1,483	265	506	0	0	0	0	0	1,725	3,737	2,963	669
Above Normal (16%)	1,713	577	464	0	0	0	0	0	2,147	4,245	3,104	4,063
Below Normal (13%)	1,504	1,012	450	0	0	0	0	0	2,061	4,002	2,752	2,173
Dry (24%)	1,448	733	282	0	0	0	0	0	2,057	2,992	1,780	1,803
Critical (15%)	1,211	840	475	0	0	0	0	0	1,529	1,872	1,459	1,416

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 52-2. DCC Flow, Monthly Flow

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types[b,c]												
Wet (32%)	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal (16%)	0	0	0	0	0	0	0	0	0	0	0	0
Below Normal (13%)	0	0	0	0	0	0	0	0	0	0	0	0
Dry (24%)	0	0	0	0	0	0	0	0	0	0	0	0
Critical (15%)	0	0	0	0	0	0	0	0	0	0	0	0

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	2,248	1,454	947	0	0	0	0	0	2,765	4,525	3,145	2,875
20%	1,973	1,347	821	0	0	0	0	0	2,476	4,367	3,110	2,758
30%	1,746	1,278	732	0	0	0	0	0	2,416	4,141	2,994	2,681
40%	1,666	1,128	644	0	0	0	0	0	2,365	3,635	2,933	2,642
50%	1,531	965	458	0	0	0	0	0	2,268	3,346	2,842	2,557
60%	1,448	831	0	0	0	0	0	0	2,192	3,196	2,591	2,081
70%	1,216	773	0	0	0	0	0	0	2,004	2,683	1,811	1,826
80%	1,199	304	0	0	0	0	0	0	1,887	2,286	1,645	1,684
90%	610	0	0	0	0	0	0	0	1,341	1,910	1,422	1,444
Long Term												
Full Simulation Period[a]	1,494	888	418	0	0	0	0	0	2,092	3,324	2,478	2,305
Water Year Types[b,c]												
Wet (32%)	1,346	977	479	0	0	0	0	0	1,805	3,672	2,954	2,853
Above Normal (16%)	2,071	980	437	0	0	0	0	0	2,303	4,245	3,094	2,739
Below Normal (13%)	1,499	983	447	0	0	0	0	0	2,411	4,046	2,964	2,300
Dry (24%)	1,478	689	283	0	0	0	0	0	2,374	2,799	1,820	1,837
Critical (15%)	1,213	841	466	0	0	0	0	0	1,725	1,786	1,433	1,435

Proposed Action 011519 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	2,248	1,454	947	0	0	0	0	0	2,765	4,525	3,145	2,875
20%	1,973	1,347	821	0	0	0	0	0	2,476	4,367	3,110	2,758
30%	1,746	1,278	732	0	0	0	0	0	2,416	4,141	2,994	2,681
40%	1,666	1,128	644	0	0	0	0	0	2,365	3,635	2,933	2,642
50%	1,531	965	458	0	0	0	0	0	2,268	3,346	2,842	2,557
60%	1,448	831	0	0	0	0	0	0	2,192	3,196	2,591	2,081
70%	1,216	773	0	0	0	0	0	0	2,004	2,683	1,811	1,826
80%	1,199	304	0	0	0	0	0	0	1,887	2,286	1,645	1,684
90%	610	0	0	0	0	0	0	0	1,341	1,910	1,422	1,444
Long Term												
Full Simulation Period[a]	1,494	888	418	0	0	0	0	0	2,092	3,324	2,478	2,305
Water Year Types[b,c]												
Wet (32%)	1,346	977	479	0	0	0	0	0	1,805	3,672	2,954	2,853
Above Normal (16%)	2,071	980	437	0	0	0	0	0	2,303	4,245	3,094	2,739
Below Normal (13%)	1,499	983	447	0	0	0	0	0	2,411	4,046	2,964	2,300
Dry (24%)	1,478	689	283	0	0	0	0	0	2,374	2,799	1,820	1,837
Critical (15%)	1,213	841	466	0	0	0	0	0	1,725	1,786	1,433	1,435

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 52-3. DCC Flow, Monthly Flow

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	2,182	1,272	914	0	0	0	0	0	2,626	4,540	3,137	4,085
20%	1,841	1,084	829	0	0	0	0	0	2,264	4,485	3,064	3,687
30%	1,721	949	778	0	0	0	0	0	2,141	4,221	2,971	2,065
40%	1,596	813	689	0	0	0	0	0	2,085	3,646	2,917	1,864
50%	1,492	693	497	0	0	0	0	0	2,009	3,470	2,802	1,741
60%	1,466	411	0	0	0	0	0	0	1,893	3,162	2,533	1,523
70%	1,206	198	0	0	0	0	0	0	1,757	2,940	1,739	1,235
80%	1,196	0	0	0	0	0	0	0	1,630	2,604	1,588	0
90%	801	0	0	0	0	0	0	0	1,221	2,032	1,467	0
Long Term												
Full Simulation Period[a]	1,474	613	433	0	0	0	0	0	1,889	3,399	2,448	1,795
Water Year Types[b,c]												
Wet (32%)	1,483	265	506	0	0	0	0	0	1,725	3,737	2,963	669
Above Normal (16%)	1,713	577	464	0	0	0	0	0	2,147	4,245	3,104	4,063
Below Normal (13%)	1,504	1,012	450	0	0	0	0	0	2,061	4,002	2,752	2,173
Dry (24%)	1,448	733	282	0	0	0	0	0	2,057	2,992	1,780	1,803
Critical (15%)	1,211	840	475	0	0	0	0	0	1,529	1,872	1,459	1,416

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	2,248	1,454	947	0	0	0	0	0	2,765	4,525	3,145	2,875
20%	1,973	1,347	821	0	0	0	0	0	2,476	4,367	3,110	2,758
30%	1,746	1,278	732	0	0	0	0	0	2,416	4,141	2,994	2,681
40%	1,666	1,128	644	0	0	0	0	0	2,365	3,635	2,933	2,642
50%	1,531	965	458	0	0	0	0	0	2,268	3,346	2,842	2,557
60%	1,448	831	0	0	0	0	0	0	2,192	3,196	2,591	2,081
70%	1,216	773	0	0	0	0	0	0	2,004	2,683	1,811	1,826
80%	1,199	304	0	0	0	0	0	0	1,887	2,286	1,645	1,684
90%	610	0	0	0	0	0	0	0	1,341	1,910	1,422	1,444
Long Term												
Full Simulation Period[a]	1,494	888	418	0	0	0	0	0	2,092	3,324	2,478	2,305
Water Year Types[b,c]												
Wet (32%)	1,346	977	479	0	0	0	0	0	1,805	3,672	2,954	2,853
Above Normal (16%)	2,071	980	437	0	0	0	0	0	2,303	4,245	3,094	2,739
Below Normal (13%)	1,499	983	447	0	0	0	0	0	2,411	4,046	2,964	2,300
Dry (24%)	1,478	689	283	0	0	0	0	0	2,374	2,799	1,820	1,837
Critical (15%)	1,213	841	466	0	0	0	0	0	1,725	1,786	1,433	1,435

Proposed Action 011519 minus Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	66	182	33	0	0	0	0	0	139	**-15**	8	**-1,210**
20%	132	263	**-7**	0	0	0	0	0	212	**-118**	46	**-929**
30%	25	329	**-46**	0	0	0	0	0	275	**-80**	24	616
40%	70	314	**-45**	0	0	0	0	0	280	**-12**	16	777
50%	39	272	**-39**	0	0	0	0	0	259	**-124**	40	816
60%	**-18**	420	0	0	0	0	0	0	299	35	58	558
70%	10	575	0	0	0	0	0	0	247	**-257**	72	591
80%	2	304	0	0	0	0	0	0	256	**-318**	57	1,684
90%	**-190**	0	0	0	0	0	0	0	120	**-122**	**-45**	1,444
Long Term												
Full Simulation Period[a]	20	275	**-14**	0	0	0	0	0	203	**-74**	30	511
Water Year Types[b,c]												
Wet (32%)	**-137**	711	**-27**	0	0	0	0	0	80	**-65**	**-8**	2,184
Above Normal (16%)	357	403	**-27**	0	0	0	0	0	156	0	**-10**	**-1,324**
Below Normal (13%)	**-4**	**-29**	**-3**	0	0	0	0	0	350	43	212	127
Dry (24%)	29	**-44**	0	0	0	0	0	0	317	**-193**	39	34
Critical (15%)	2	1	**-9**	0	0	0	0	0	196	**-86**	**-26**	19

a Based on the 82-year simulation period.

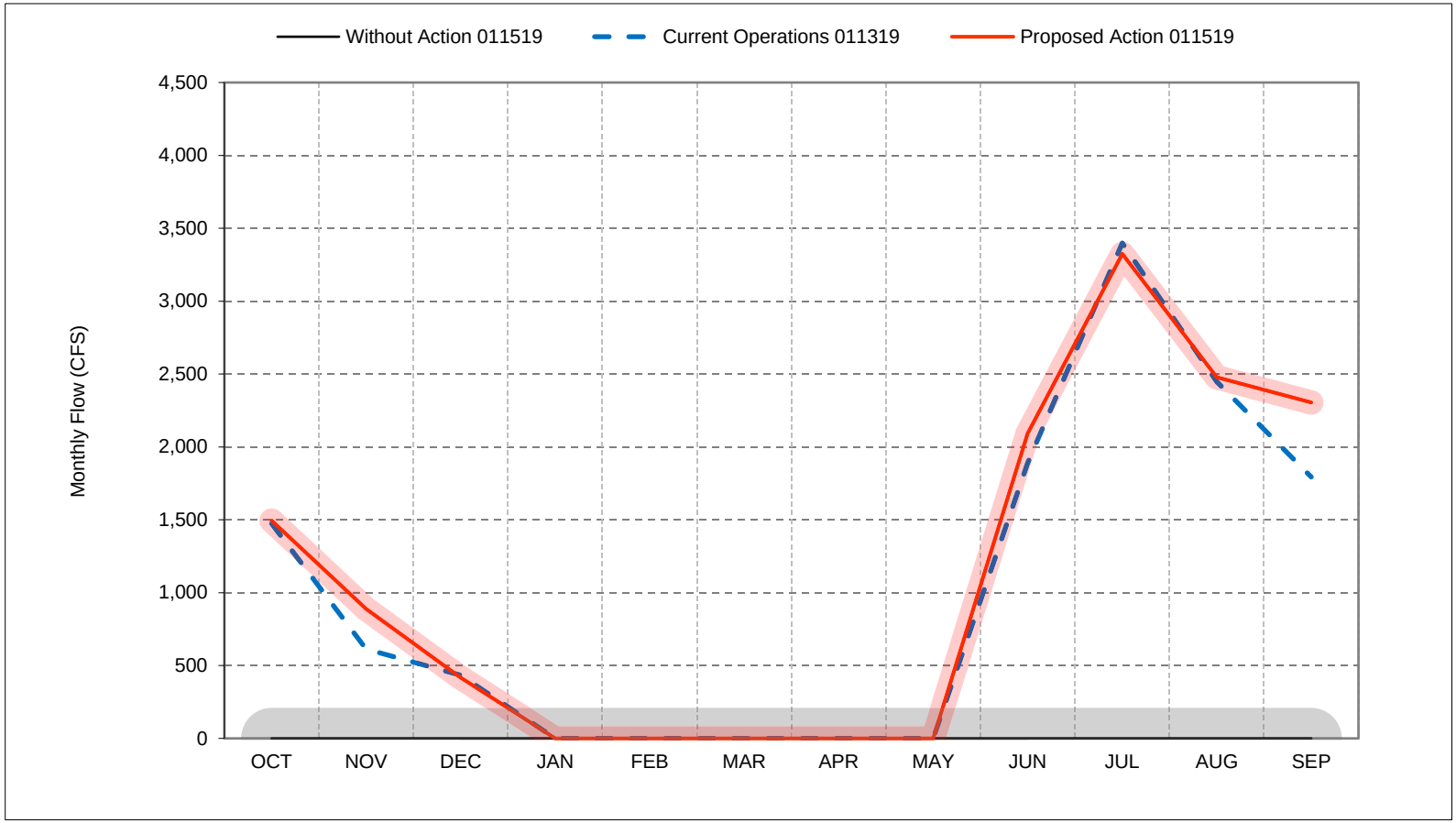
b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

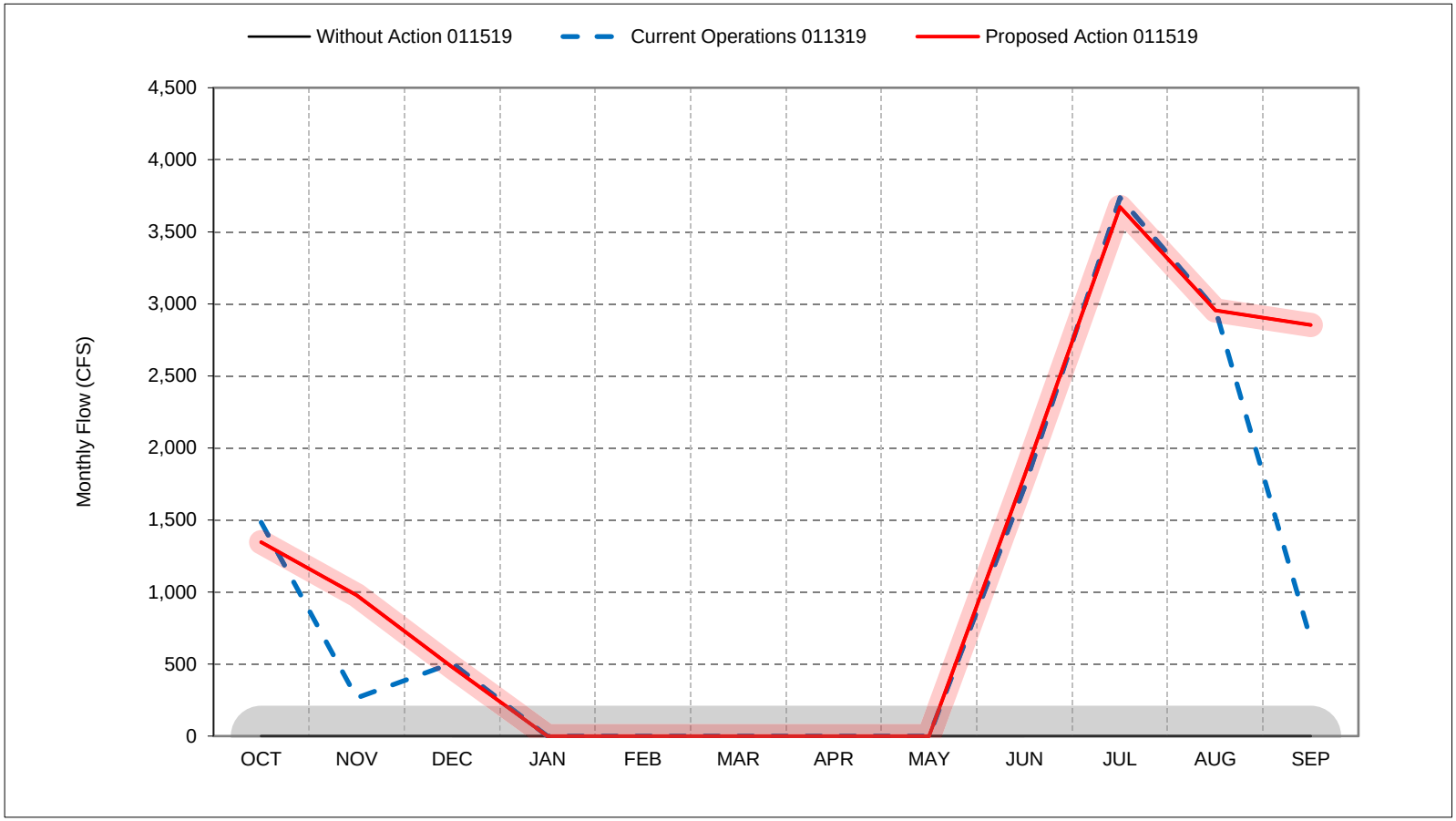
e These are draft results meant for qualitative analysis and are subject to revision.

Figure 52-1. DCC Flow, Long-Term Average Flow



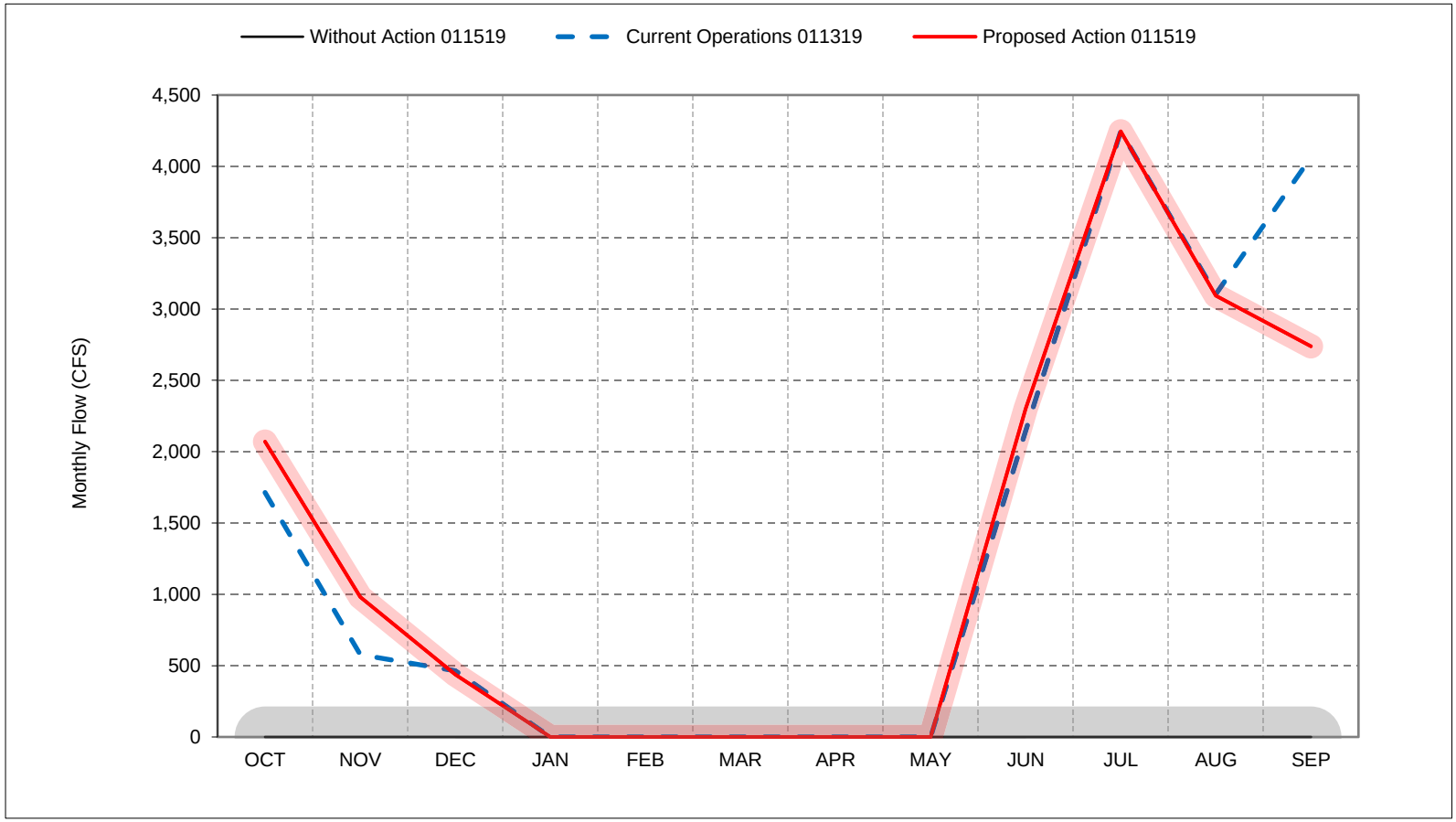
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 52-2. DCC Flow, Wet Year Average Flow



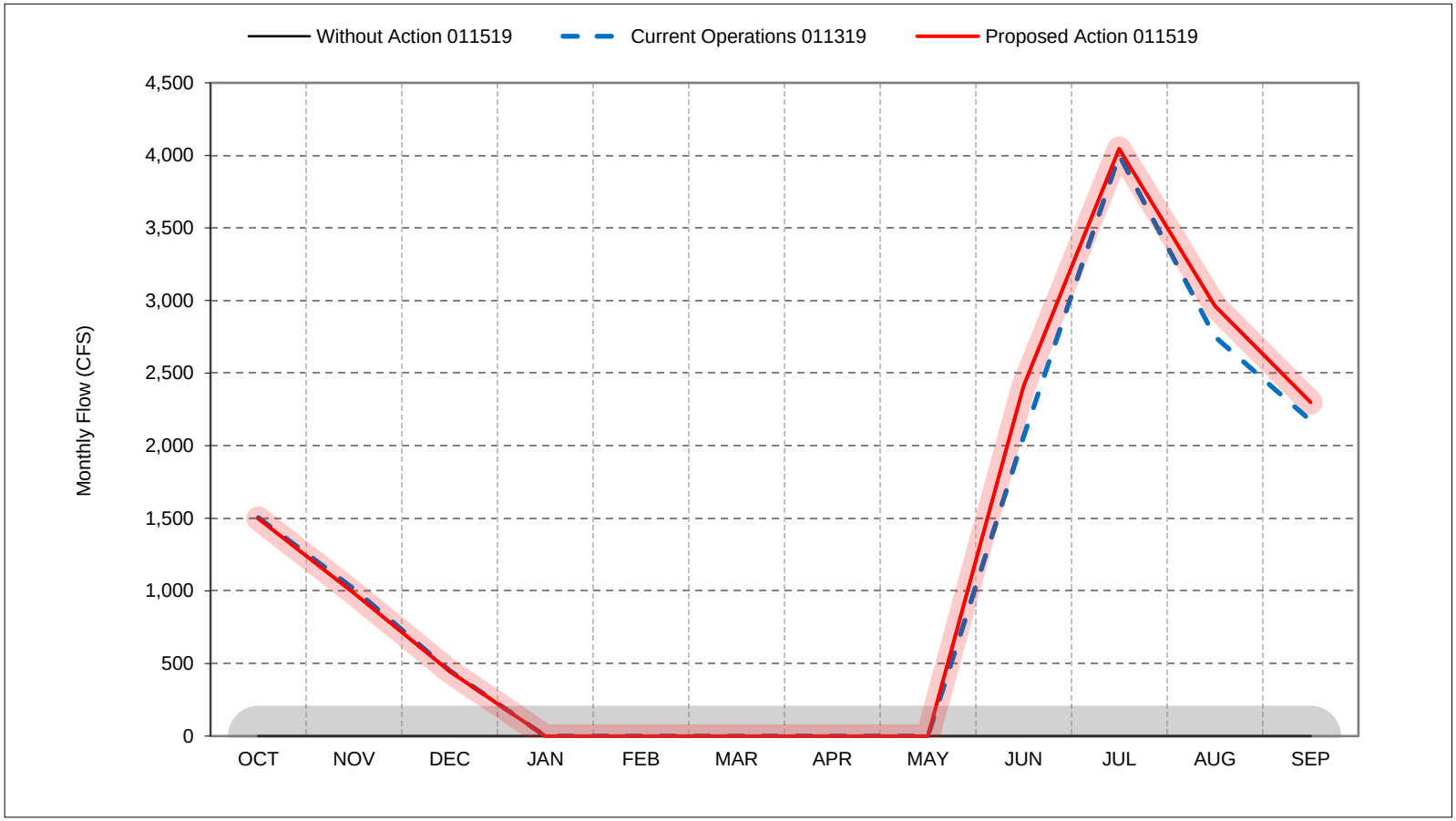
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 52-3. DCC Flow, Above Normal Year Average Flow



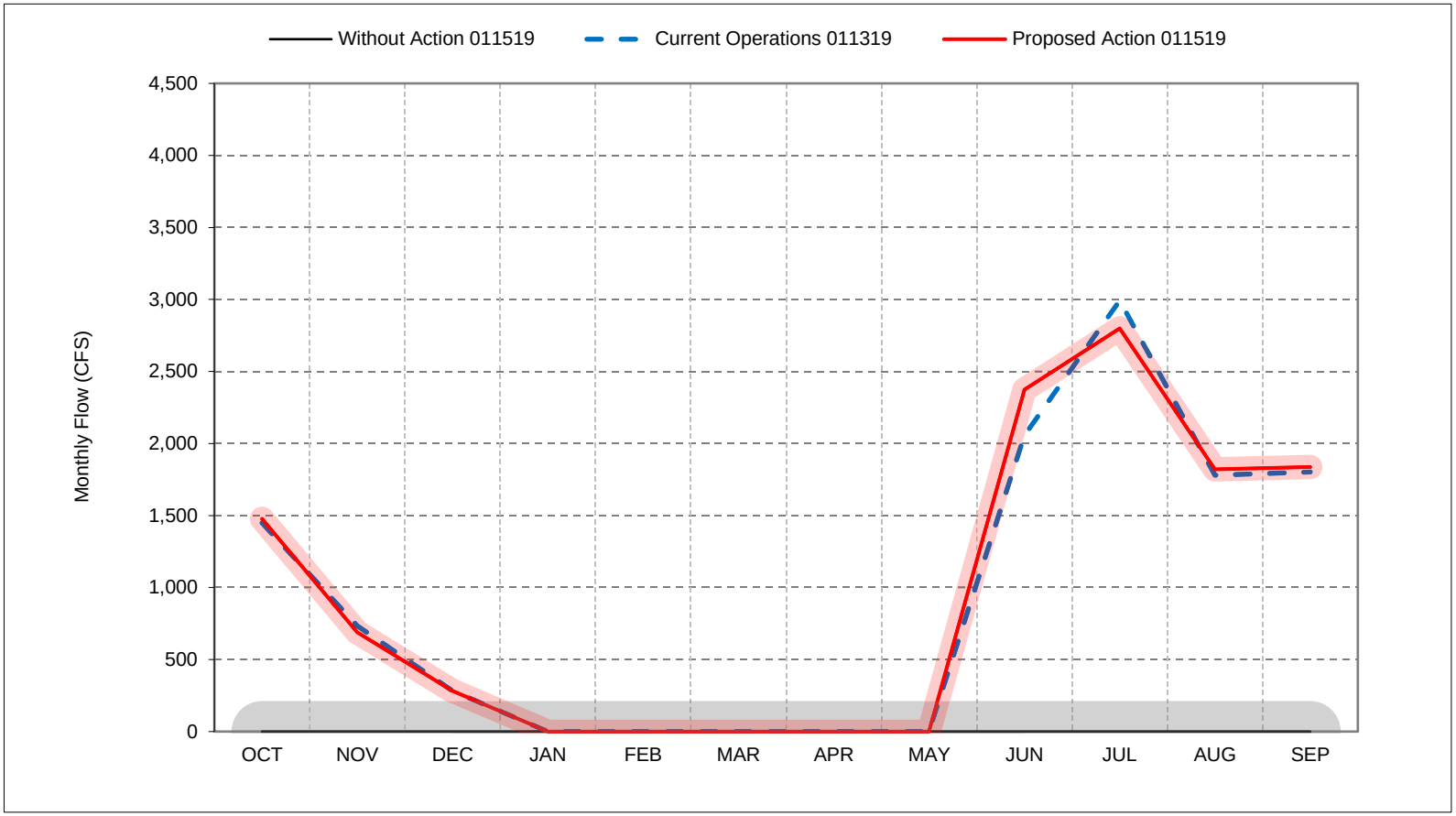
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 52-4. DCC Flow, Below Normal Year Average Flow



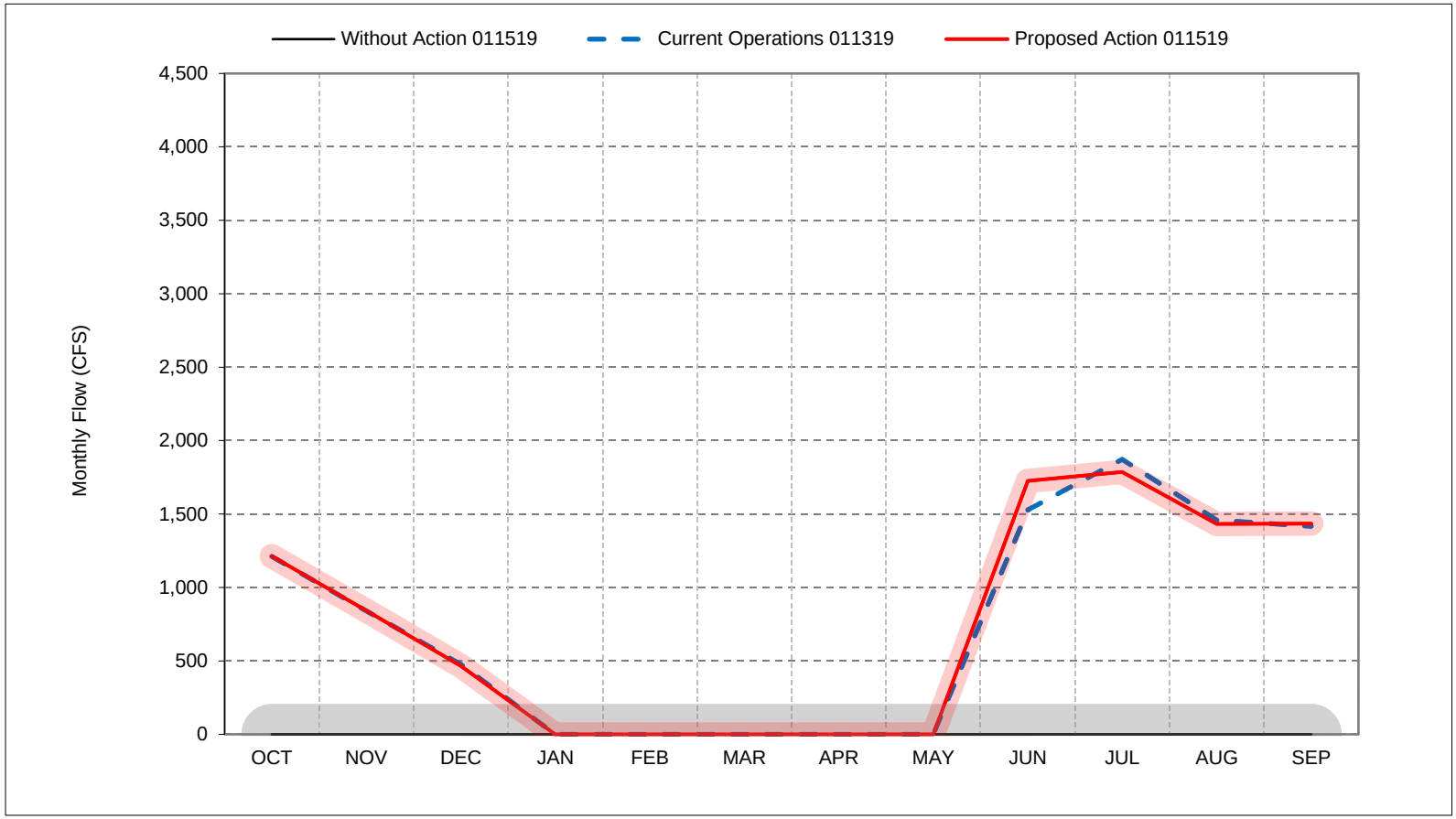
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 52-5. DCC Flow, Dry Year Average Flow



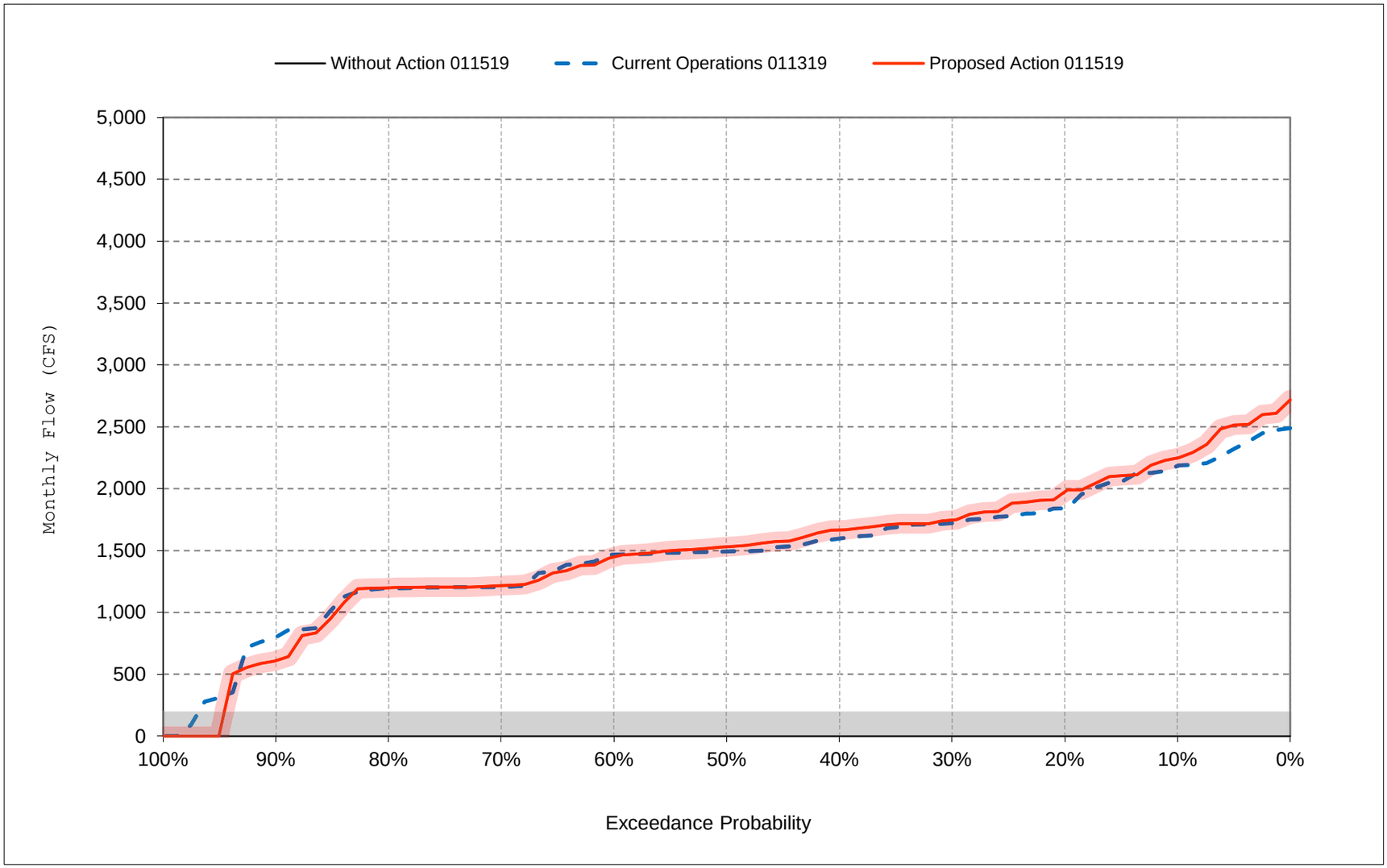
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 52-6. DCC Flow, Critical Year Average Flow



*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

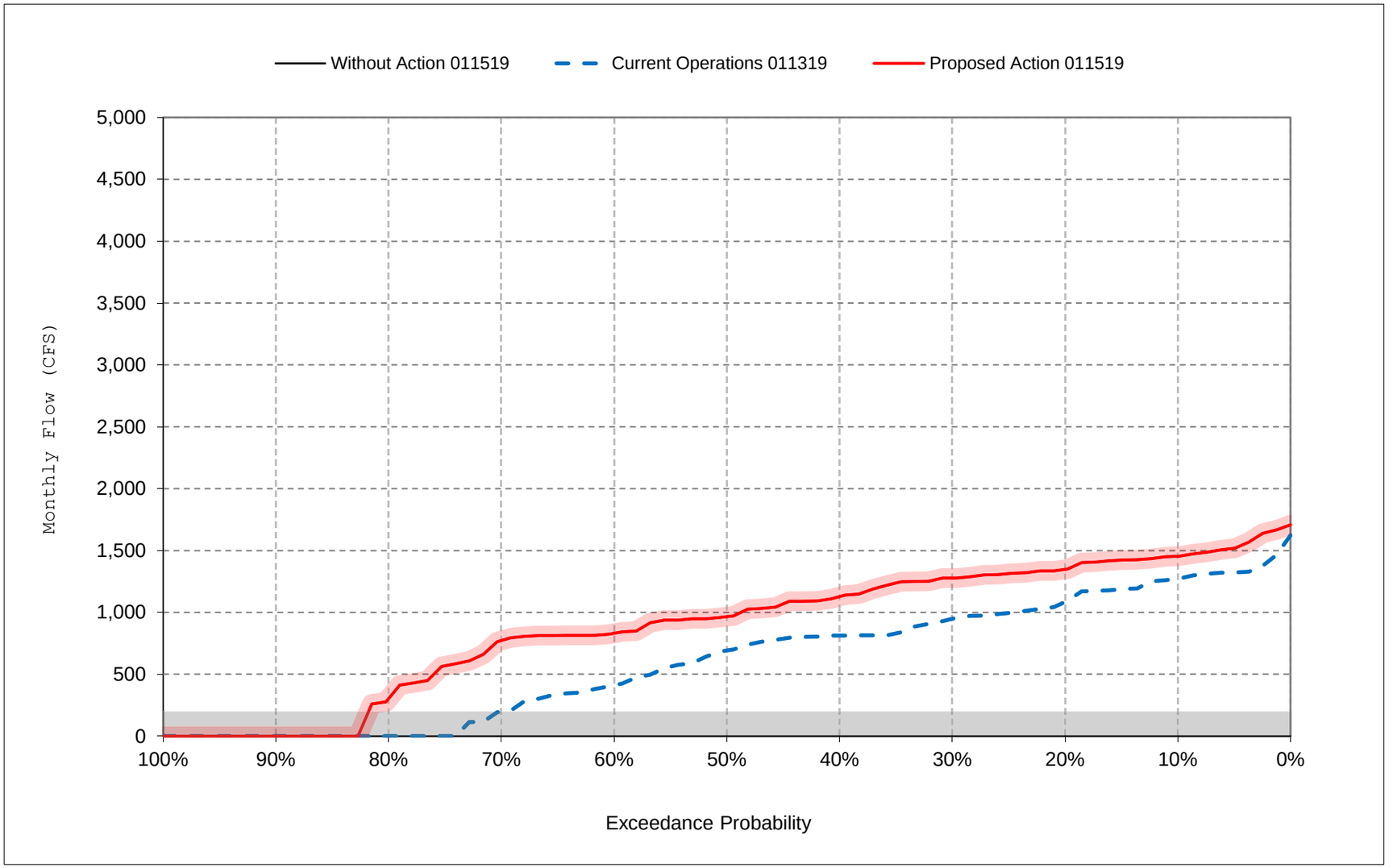
Figure 52-7. DCC Flow, October



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

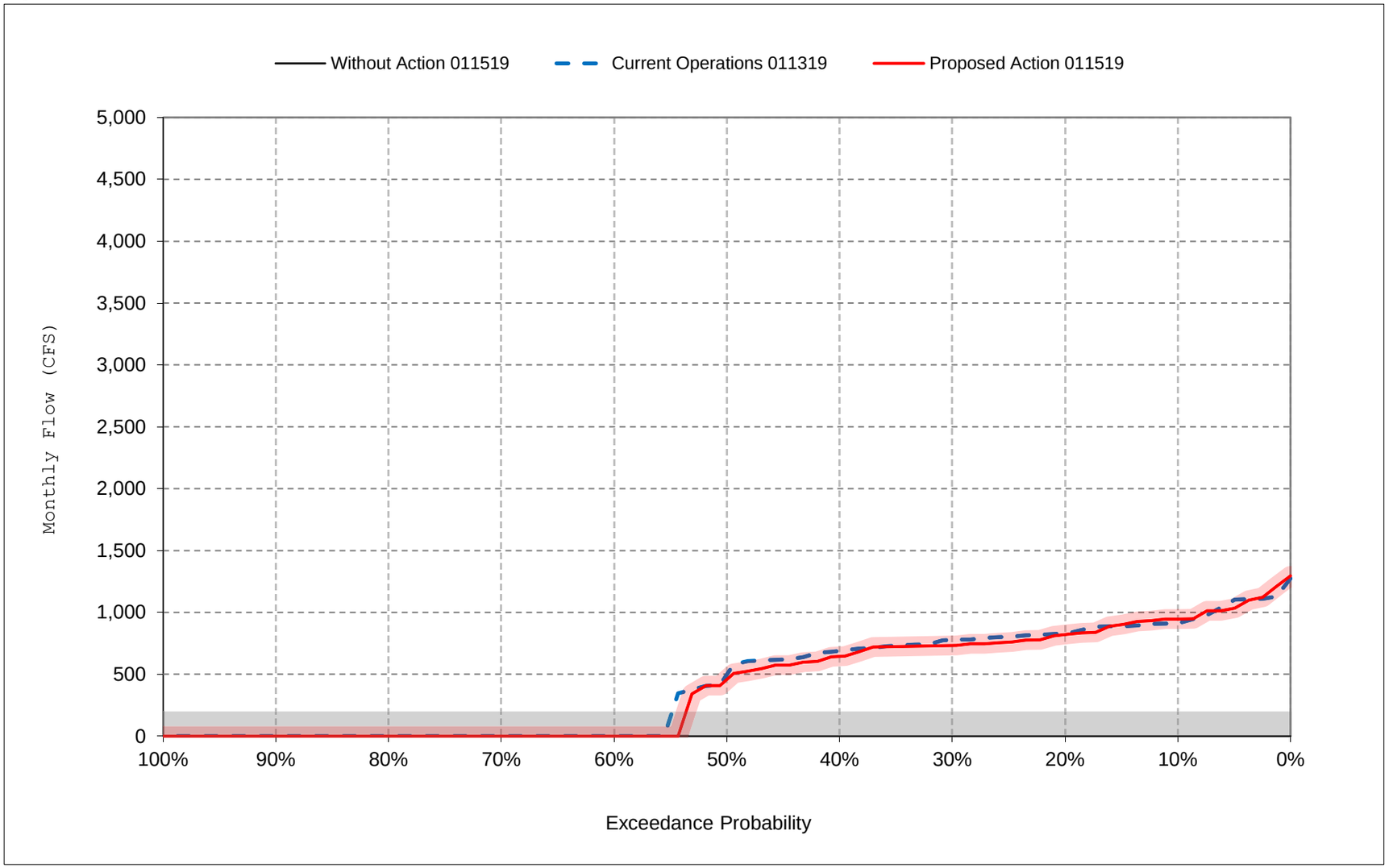
Figure 52-8. DCC Flow, November



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

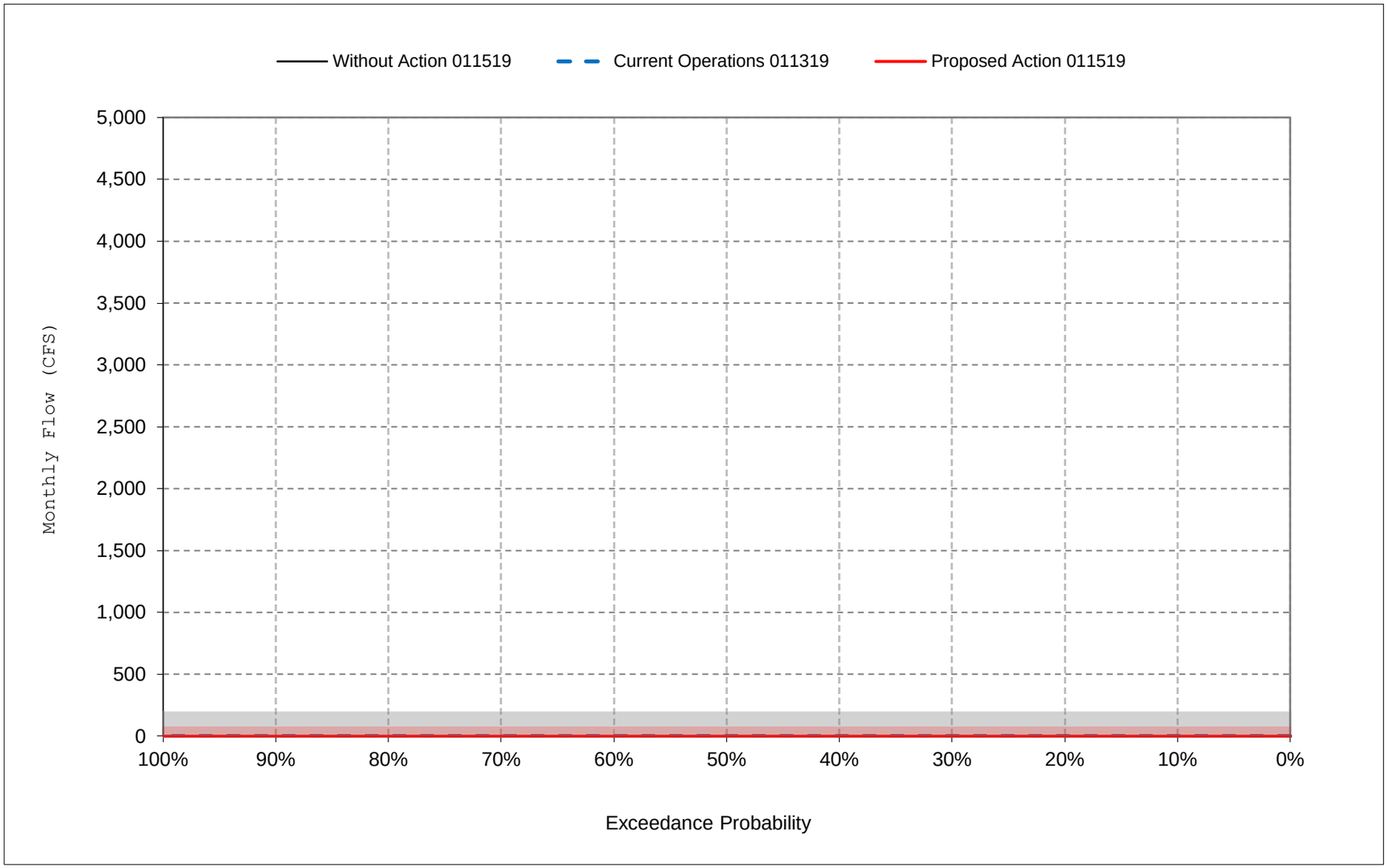
Figure 52-9. DCC Flow, December



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

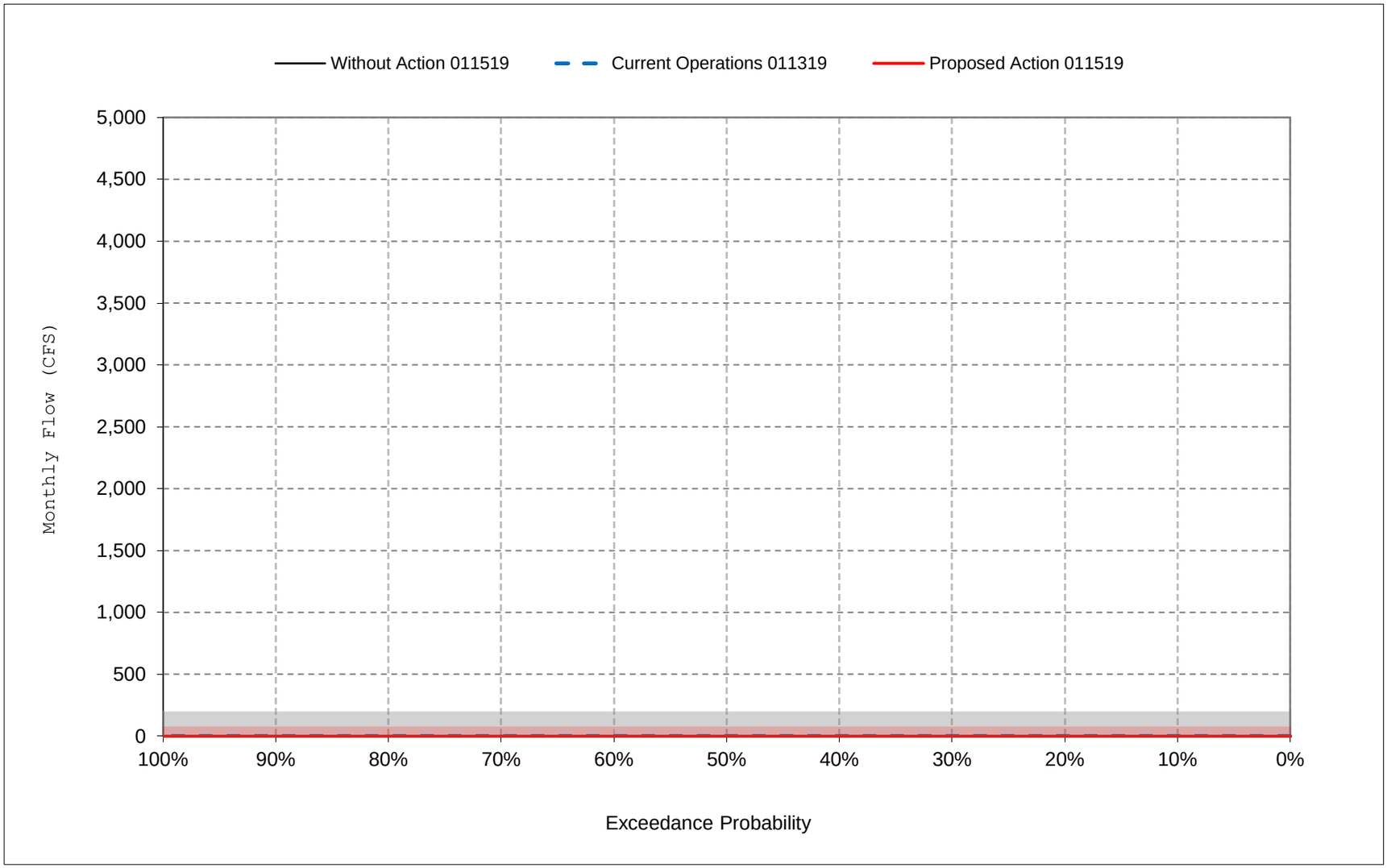
Figure 52-10. DCC Flow, January



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

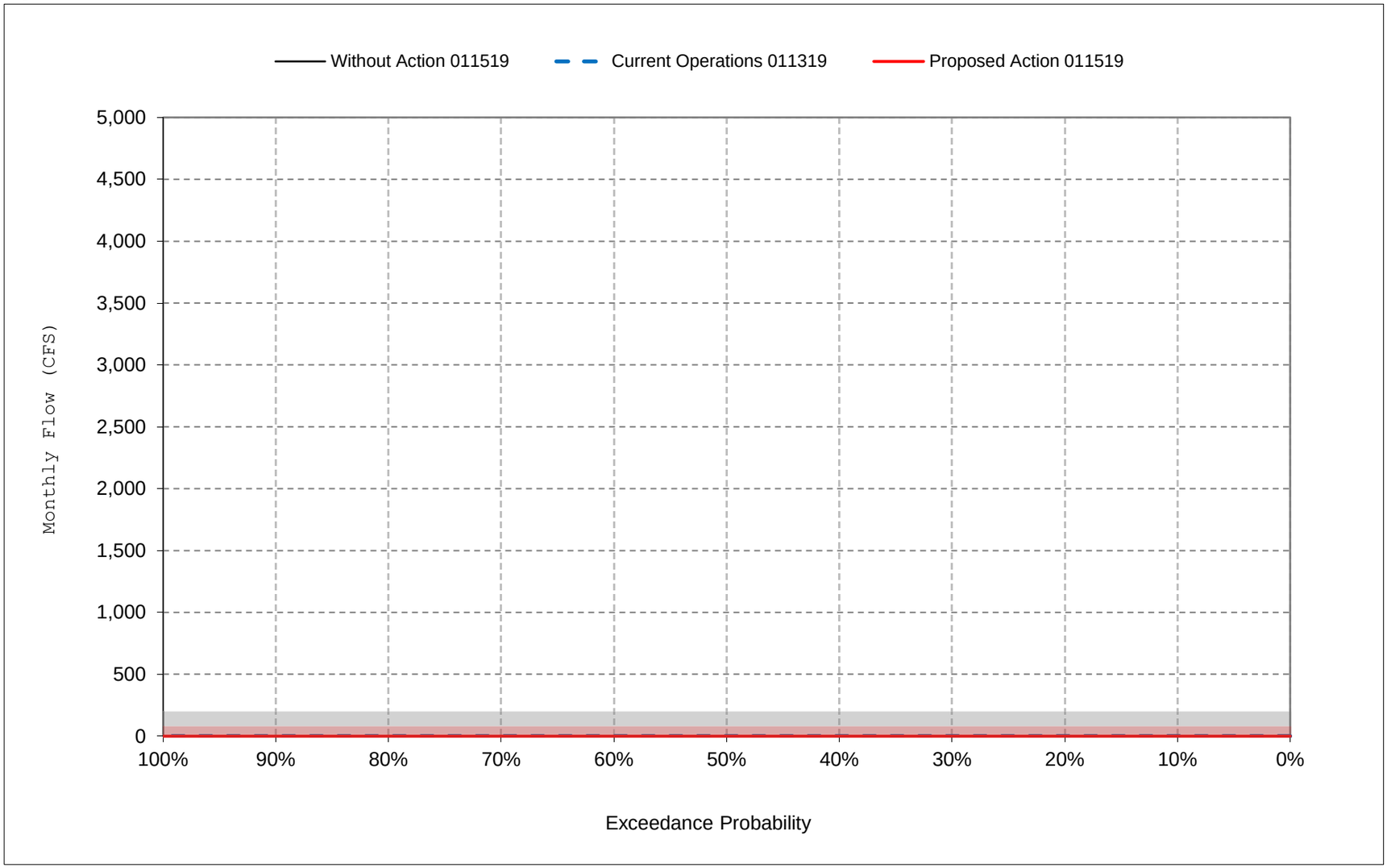
Figure 52-11. DCC Flow, February



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

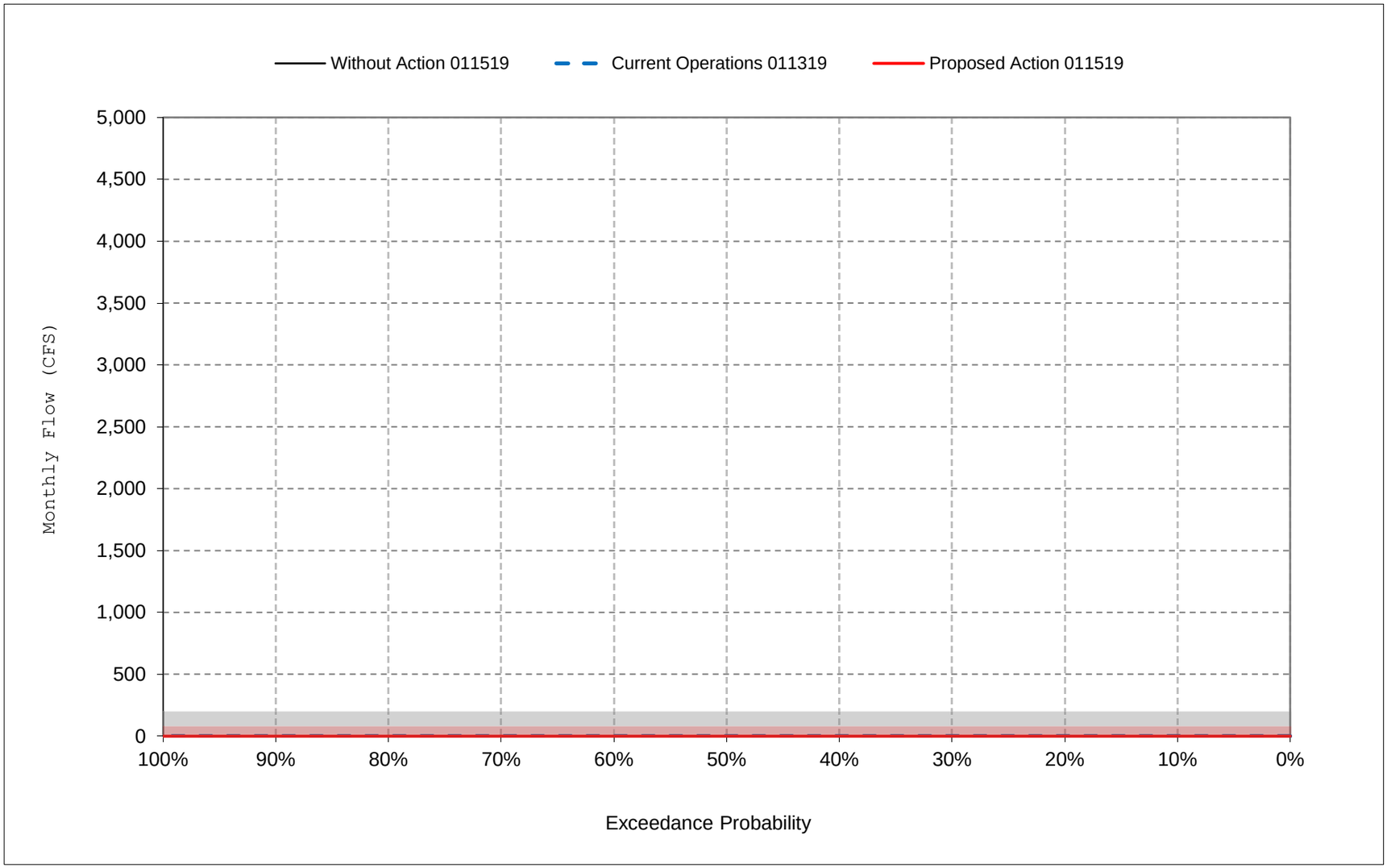
Figure 52-12. DCC Flow, March



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

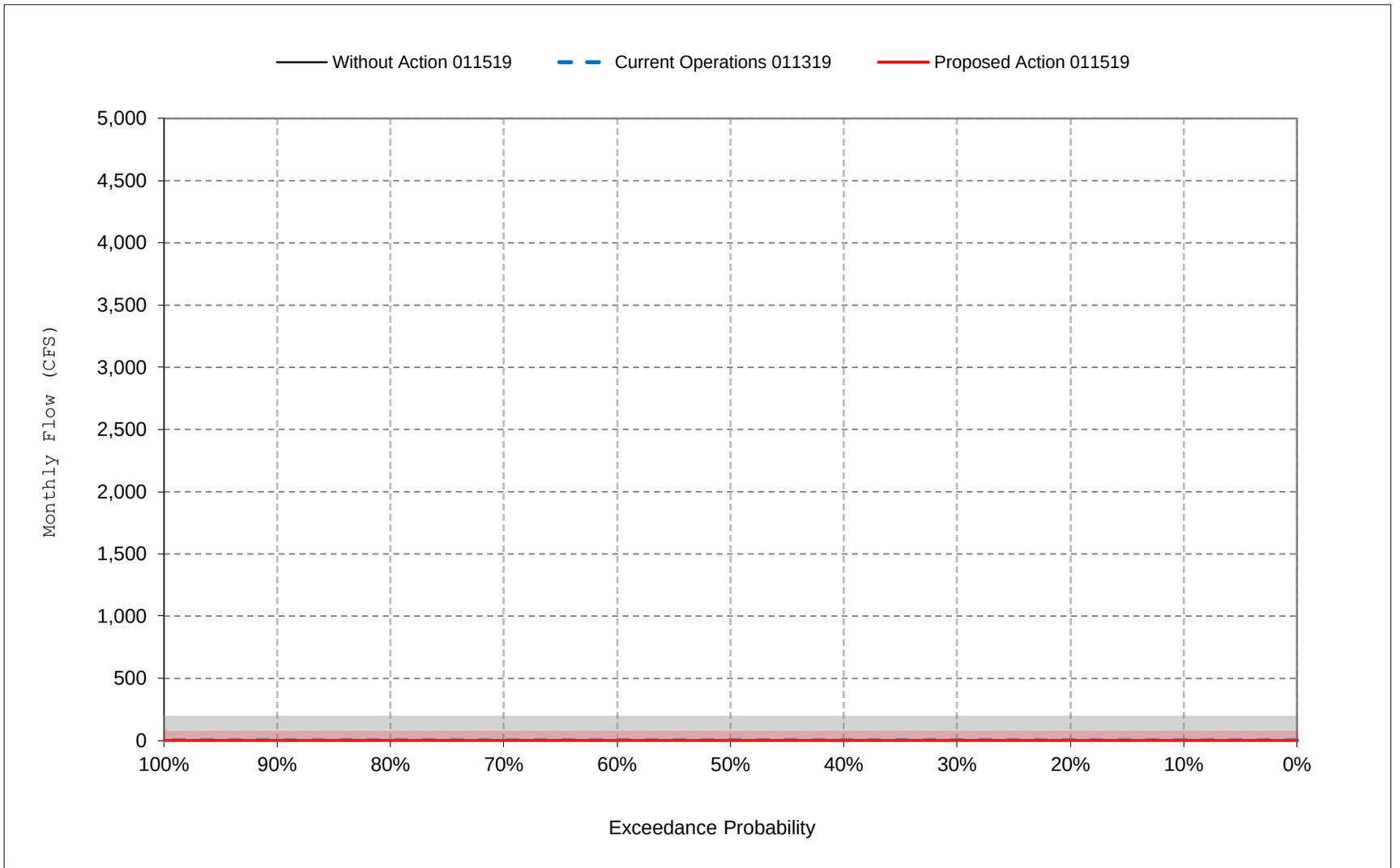
Figure 52-13. DCC Flow, April



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

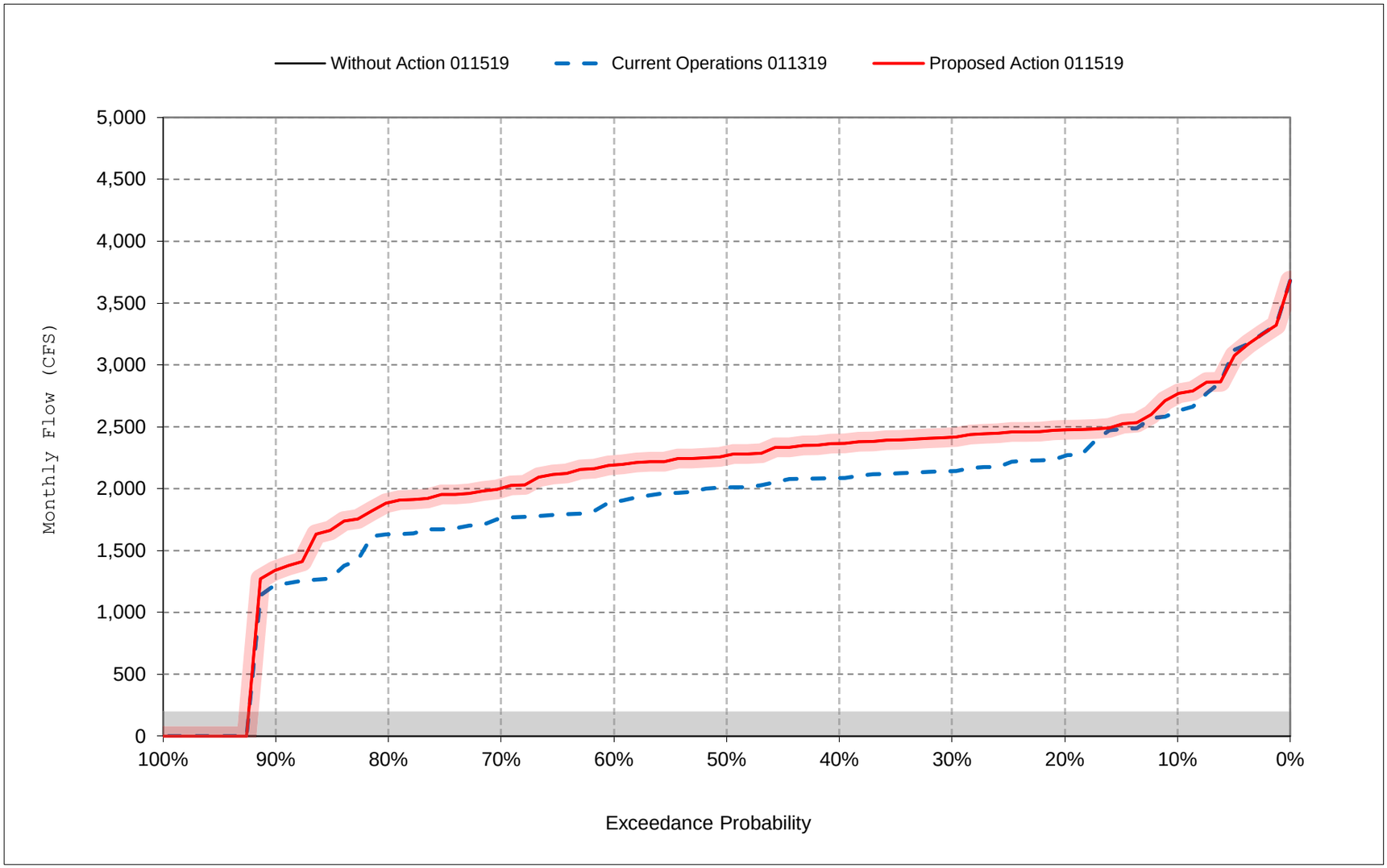
Figure 52-14. DCC Flow, May



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

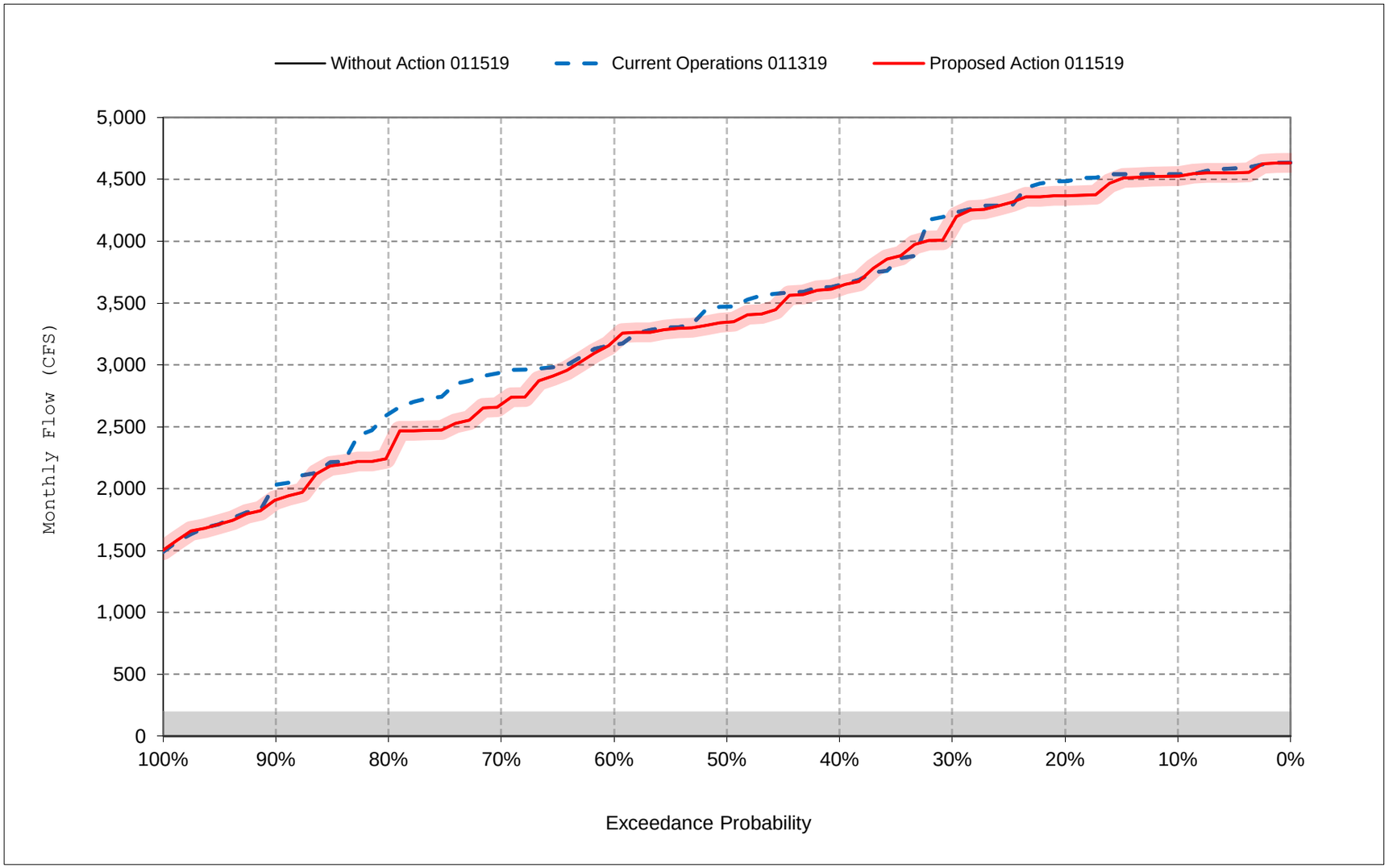
Figure 52-15. DCC Flow, June



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

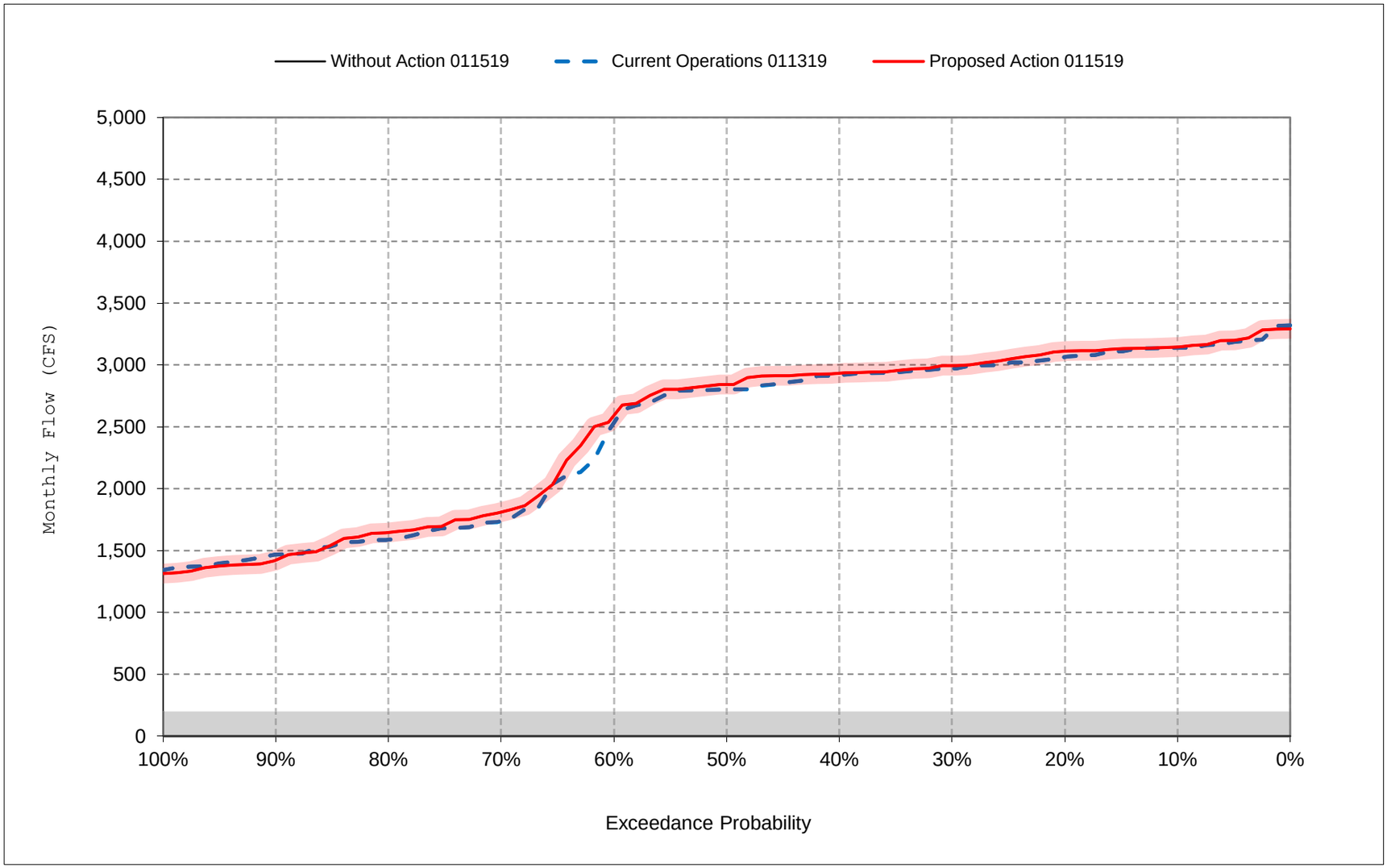
Figure 52-16. DCC Flow, July



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

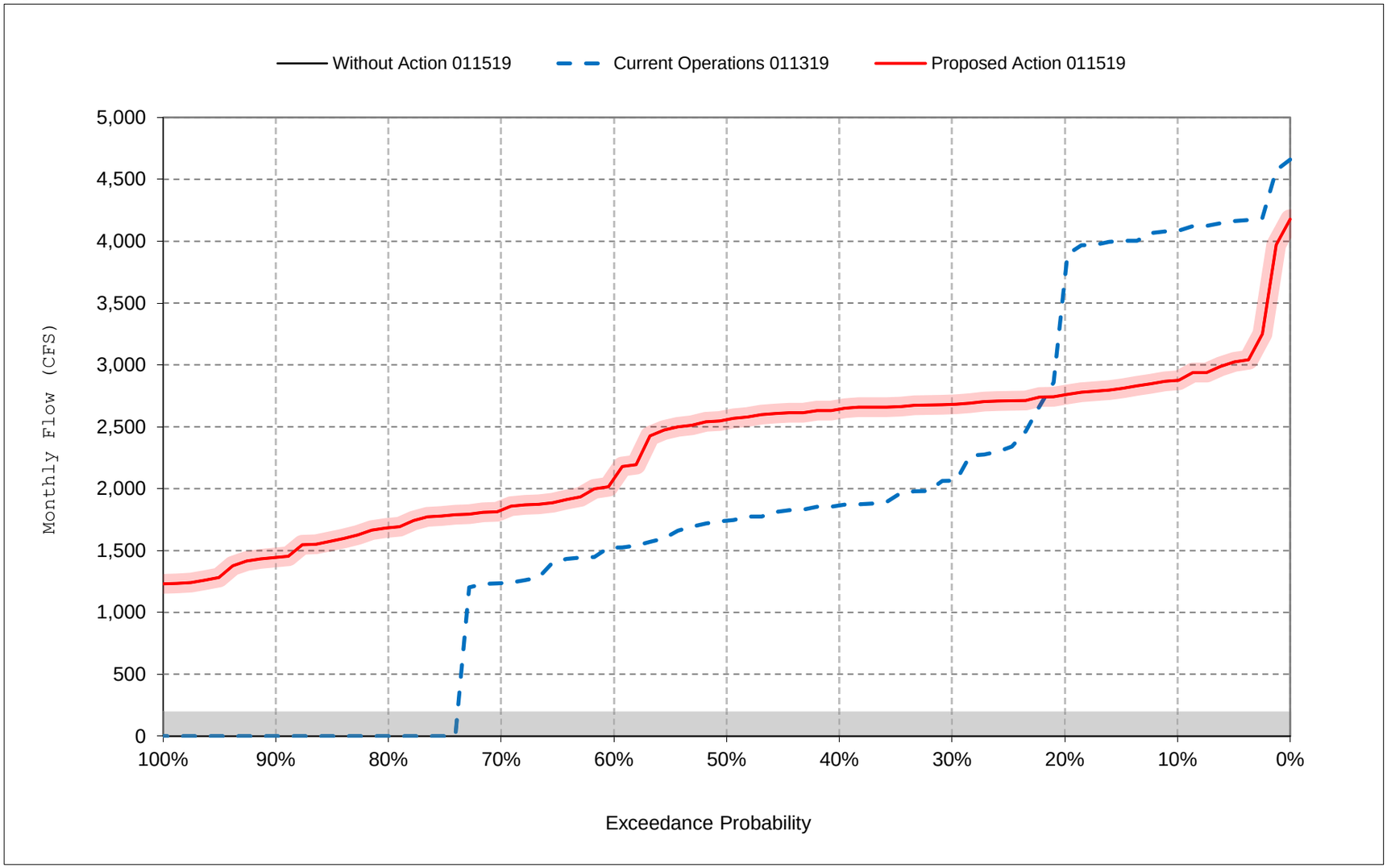
Figure 52-17. DCC Flow, August



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Figure 52-18. DCC Flow, September



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Table 53-1. Total Delta Exports, Monthly Delivery

Without Action 011519

Statistic	Monthly Delivery (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types[b,c]												
Wet (32%)	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal (16%)	0	0	0	0	0	0	0	0	0	0	0	0
Below Normal (13%)	0	0	0	0	0	0	0	0	0	0	0	0
Dry (24%)	0	0	0	0	0	0	0	0	0	0	0	0
Critical (15%)	0	0	0	0	0	0	0	0	0	0	0	0

Current Operations 011319

Statistic	Monthly Delivery (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	7,819	11,248	11,719	9,868	12,025	10,933	4,070	3,934	8,587	11,511	11,780	11,280
20%	7,553	9,335	11,653	7,982	9,886	10,082	3,046	2,488	6,033	11,280	11,780	11,280
30%	6,693	8,207	10,209	6,932	8,445	8,885	2,653	2,116	5,707	10,886	11,630	11,280
40%	6,237	7,573	8,872	6,792	7,458	7,598	2,336	1,720	5,344	10,413	11,280	11,150
50%	5,757	7,125	8,023	6,615	6,717	6,893	2,168	1,567	4,141	9,927	10,345	10,004
60%	5,415	6,669	7,733	6,513	6,386	6,479	2,069	1,500	3,485	8,524	8,485	7,744
70%	5,105	6,257	7,384	6,198	5,818	5,341	1,899	1,500	3,233	7,375	4,339	6,929
80%	4,708	5,370	6,346	5,659	4,561	4,813	1,813	1,500	2,191	5,931	3,232	6,075
90%	4,264	4,649	5,344	4,747	3,037	2,800	1,532	1,500	713	2,661	2,247	4,439
Long Term												
Full Simulation Period[a]	6,090	7,359	8,523	7,058	7,273	7,160	2,593	2,307	4,606	8,437	8,117	8,714
Water Year Types[b,c]												
Wet (32%)	6,698	7,714	10,288	8,533	9,784	9,931	3,377	3,410	7,533	10,642	11,658	10,986
Above Normal (16%)	6,731	8,709	9,689	6,637	7,894	8,032	2,193	1,712	5,248	9,215	11,451	11,135
Below Normal (13%)	7,078	7,458	7,770	6,309	6,523	6,552	2,248	1,633	3,468	10,232	9,338	8,807
Dry (24%)	5,458	7,609	7,380	6,431	5,712	5,790	2,633	2,068	3,170	7,661	4,131	6,779
Critical (15%)	4,228	4,622	6,035	6,050	4,450	3,051	1,576	1,575	1,004	2,467	2,357	4,309

Current Operations 011319 minus Without Action 011519

Statistic	Monthly Delivery (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	7,819	11,248	11,719	9,868	12,025	10,933	4,070	3,934	8,587	11,511	11,780	11,280
20%	7,553	9,335	11,653	7,982	9,886	10,082	3,046	2,488	6,033	11,280	11,780	11,280
30%	6,693	8,207	10,209	6,932	8,445	8,885	2,653	2,116	5,707	10,886	11,630	11,280
40%	6,237	7,573	8,872	6,792	7,458	7,598	2,336	1,720	5,344	10,413	11,280	11,150
50%	5,757	7,125	8,023	6,615	6,717	6,893	2,168	1,567	4,141	9,927	10,345	10,004
60%	5,415	6,669	7,733	6,513	6,386	6,479	2,069	1,500	3,485	8,524	8,485	7,744
70%	5,105	6,257	7,384	6,198	5,818	5,341	1,899	1,500	3,233	7,375	4,339	6,929
80%	4,708	5,370	6,346	5,659	4,561	4,813	1,813	1,500	2,191	5,931	3,232	6,075
90%	4,264	4,649	5,344	4,747	3,037	2,800	1,532	1,500	713	2,661	2,247	4,439
Long Term												
Full Simulation Period[a]	6,090	7,359	8,523	7,058	7,273	7,160	2,593	2,307	4,606	8,437	8,117	8,714
Water Year Types[b,c]												
Wet (32%)	6,698	7,714	10,288	8,533	9,784	9,931	3,377	3,410	7,533	10,642	11,658	10,986
Above Normal (16%)	6,731	8,709	9,689	6,637	7,894	8,032	2,193	1,712	5,248	9,215	11,451	11,135
Below Normal (13%)	7,078	7,458	7,770	6,309	6,523	6,552	2,248	1,633	3,468	10,232	9,338	8,807
Dry (24%)	5,458	7,609	7,380	6,431	5,712	5,790	2,633	2,068	3,170	7,661	4,131	6,779
Critical (15%)	4,228	4,622	6,035	6,050	4,450	3,051	1,576	1,575	1,004	2,467	2,357	4,309

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 53-2. Total Delta Exports, Monthly Delivery

Without Action 011519

Statistic	Monthly Delivery (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types[b,c]												
Wet (32%)	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal (16%)	0	0	0	0	0	0	0	0	0	0	0	0
Below Normal (13%)	0	0	0	0	0	0	0	0	0	0	0	0
Dry (24%)	0	0	0	0	0	0	0	0	0	0	0	0
Critical (15%)	0	0	0	0	0	0	0	0	0	0	0	0

Proposed Action 011519

Statistic	Monthly Delivery (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	11,280	11,280	11,684	9,742	11,885	10,485	8,598	8,505	8,066	11,522	11,780	11,280
20%	11,191	11,280	10,895	8,028	9,808	9,518	7,861	7,462	5,943	11,280	11,780	11,280
30%	9,908	10,288	8,539	7,465	8,460	8,526	7,150	6,351	5,343	11,029	11,610	11,280
40%	8,567	9,148	8,099	7,104	7,671	7,650	6,773	5,806	5,020	10,320	11,280	11,280
50%	7,056	8,297	7,323	7,013	7,120	7,104	6,006	5,260	4,889	9,421	10,888	11,023
60%	5,777	7,160	7,037	6,821	6,759	6,797	5,131	4,336	4,781	8,110	9,411	8,492
70%	5,287	6,087	6,684	6,578	6,547	6,486	3,606	3,711	4,634	6,592	4,459	6,793
80%	4,735	5,139	6,299	6,339	6,264	6,038	3,118	3,234	4,494	4,469	3,383	5,901
90%	4,091	4,627	5,225	6,128	5,988	4,997	2,486	2,377	2,154	1,996	2,279	4,334
Long Term												
Full Simulation Period[a]	7,487	8,086	7,975	7,451	8,015	7,564	5,564	5,284	5,266	8,165	8,265	8,929
Water Year Types[b,c]												
Wet (32%)	9,386	10,055	9,813	8,846	9,753	9,429	7,853	7,654	7,301	10,618	11,579	11,290
Above Normal (16%)	9,376	8,967	8,110	7,536	8,043	7,807	6,627	5,678	5,096	9,615	11,393	11,279
Below Normal (13%)	7,177	7,510	7,155	7,046	7,594	7,099	4,985	4,498	5,124	10,458	10,437	9,326
Dry (24%)	5,903	7,327	7,223	6,579	7,082	7,024	4,182	4,136	4,714	6,500	4,382	6,847
Critical (15%)	4,251	4,655	5,852	6,160	6,159	4,587	2,289	2,356	2,093	1,955	2,179	4,373

Proposed Action 011519 minus Without Action 011519

Statistic	Monthly Delivery (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	11,280	11,280	11,684	9,742	11,885	10,485	8,598	8,505	8,066	11,522	11,780	11,280
20%	11,191	11,280	10,895	8,028	9,808	9,518	7,861	7,462	5,943	11,280	11,780	11,280
30%	9,908	10,288	8,539	7,465	8,460	8,526	7,150	6,351	5,343	11,029	11,610	11,280
40%	8,567	9,148	8,099	7,104	7,671	7,650	6,773	5,806	5,020	10,320	11,280	11,280
50%	7,056	8,297	7,323	7,013	7,120	7,104	6,006	5,260	4,889	9,421	10,888	11,023
60%	5,777	7,160	7,037	6,821	6,759	6,797	5,131	4,336	4,781	8,110	9,411	8,492
70%	5,287	6,087	6,684	6,578	6,547	6,486	3,606	3,711	4,634	6,592	4,459	6,793
80%	4,735	5,139	6,299	6,339	6,264	6,038	3,118	3,234	4,494	4,469	3,383	5,901
90%	4,091	4,627	5,225	6,128	5,988	4,997	2,486	2,377	2,154	1,996	2,279	4,334
Long Term												
Full Simulation Period[a]	7,487	8,086	7,975	7,451	8,015	7,564	5,564	5,284	5,266	8,165	8,265	8,929
Water Year Types[b,c]												
Wet (32%)	9,386	10,055	9,813	8,846	9,753	9,429	7,853	7,654	7,301	10,618	11,579	11,290
Above Normal (16%)	9,376	8,967	8,110	7,536	8,043	7,807	6,627	5,678	5,096	9,615	11,393	11,279
Below Normal (13%)	7,177	7,510	7,155	7,046	7,594	7,099	4,985	4,498	5,124	10,458	10,437	9,326
Dry (24%)	5,903	7,327	7,223	6,579	7,082	7,024	4,182	4,136	4,714	6,500	4,382	6,847
Critical (15%)	4,251	4,655	5,852	6,160	6,159	4,587	2,289	2,356	2,093	1,955	2,179	4,373

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 53-3. Total Delta Exports, Monthly Delivery

Current Operations 011319

Statistic	Monthly Delivery (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	7,819	11,248	11,719	9,868	12,025	10,933	4,070	3,934	8,587	11,511	11,780	11,280
20%	7,553	9,335	11,653	7,982	9,886	10,082	3,046	2,488	6,033	11,280	11,780	11,280
30%	6,693	8,207	10,209	6,932	8,445	8,885	2,653	2,116	5,707	10,886	11,630	11,280
40%	6,237	7,573	8,872	6,792	7,458	7,598	2,336	1,720	5,344	10,413	11,280	11,150
50%	5,757	7,125	8,023	6,615	6,717	6,893	2,168	1,567	4,141	9,927	10,345	10,004
60%	5,415	6,669	7,733	6,513	6,386	6,479	2,069	1,500	3,485	8,524	8,485	7,744
70%	5,105	6,257	7,384	6,198	5,818	5,341	1,899	1,500	3,233	7,375	4,339	6,929
80%	4,708	5,370	6,346	5,659	4,561	4,813	1,813	1,500	2,191	5,931	3,232	6,075
90%	4,264	4,649	5,344	4,747	3,037	2,800	1,532	1,500	713	2,661	2,247	4,439
Long Term												
Full Simulation Period[a]	6,090	7,359	8,523	7,058	7,273	7,160	2,593	2,307	4,606	8,437	8,117	8,714
Water Year Types[b,c]												
Wet (32%)	6,698	7,714	10,288	8,533	9,784	9,931	3,377	3,410	7,533	10,642	11,658	10,986
Above Normal (16%)	6,731	8,709	9,689	6,637	7,894	8,032	2,193	1,712	5,248	9,215	11,451	11,135
Below Normal (13%)	7,078	7,458	7,770	6,309	6,523	6,552	2,248	1,633	3,468	10,232	9,338	8,807
Dry (24%)	5,458	7,609	7,380	6,431	5,712	5,790	2,633	2,068	3,170	7,661	4,131	6,779
Critical (15%)	4,228	4,622	6,035	6,050	4,450	3,051	1,576	1,575	1,004	2,467	2,357	4,309

Proposed Action 011519

Statistic	Monthly Delivery (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	11,280	11,280	11,684	9,742	11,885	10,485	8,598	8,505	8,066	11,522	11,780	11,280
20%	11,191	11,280	10,895	8,028	9,808	9,518	7,861	7,462	5,943	11,280	11,780	11,280
30%	9,908	10,288	8,539	7,465	8,460	8,526	7,150	6,351	5,343	11,029	11,610	11,280
40%	8,567	9,148	8,099	7,104	7,671	7,650	6,773	5,806	5,020	10,320	11,280	11,280
50%	7,056	8,297	7,323	7,013	7,120	7,104	6,006	5,260	4,889	9,421	10,888	11,023
60%	5,777	7,160	7,037	6,821	6,759	6,797	5,131	4,336	4,781	8,110	9,411	8,492
70%	5,287	6,087	6,684	6,578	6,547	6,486	3,606	3,711	4,634	6,592	4,459	6,793
80%	4,735	5,139	6,299	6,339	6,264	6,038	3,118	3,234	4,494	4,469	3,383	5,901
90%	4,091	4,627	5,225	6,128	5,988	4,997	2,486	2,377	2,154	1,996	2,279	4,334
Long Term												
Full Simulation Period[a]	7,487	8,086	7,975	7,451	8,015	7,564	5,564	5,284	5,266	8,165	8,265	8,929
Water Year Types[b,c]												
Wet (32%)	9,386	10,055	9,813	8,846	9,753	9,429	7,853	7,654	7,301	10,618	11,579	11,290
Above Normal (16%)	9,376	8,967	8,110	7,536	8,043	7,807	6,627	5,678	5,096	9,615	11,393	11,279
Below Normal (13%)	7,177	7,510	7,155	7,046	7,594	7,099	4,985	4,498	5,124	10,458	10,437	9,326
Dry (24%)	5,903	7,327	7,223	6,579	7,082	7,024	4,182	4,136	4,714	6,500	4,382	6,847
Critical (15%)	4,251	4,655	5,852	6,160	6,159	4,587	2,289	2,356	2,093	1,955	2,179	4,373

Proposed Action 011519 minus Current Operations 011319

Statistic	Monthly Delivery (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	3,461	32	**-35**	**-126**	**-140**	**-449**	4,529	4,571	**-521**	11	0	0
20%	3,638	1,945	**-758**	46	**-78**	**-565**	4,815	4,974	**-90**	0	0	0
30%	3,215	2,081	**-1,670**	533	15	**-359**	4,497	4,235	**-364**	144	**-20**	0
40%	2,330	1,575	**-773**	312	213	53	4,438	4,086	**-324**	**-93**	0	130
50%	1,299	1,172	**-700**	398	402	211	3,838	3,693	747	**-506**	543	1,019
60%	361	491	**-696**	308	373	318	3,062	2,836	1,296	**-415**	926	747
70%	182	**-170**	**-700**	380	729	1,145	1,707	2,211	1,401	**-783**	120	**-136**
80%	27	**-231**	**-47**	680	1,703	1,225	1,304	1,734	2,304	**-1,462**	151	**-173**
90%	**-174**	**-21**	**-118**	1,381	2,951	2,198	954	877	1,441	**-665**	32	**-105**
Long Term												
Full Simulation Period[a]	1,397	726	**-548**	393	742	404	2,971	2,977	660	**-272**	149	215
Water Year Types[b,c]												
Wet (32%)	2,688	2,341	**-474**	312	**-31**	**-502**	4,476	4,244	**-232**	**-24**	**-79**	304
Above Normal (16%)	2,645	258	**-1,579**	899	149	**-225**	4,433	3,966	**-152**	400	**-58**	144
Below Normal (13%)	99	52	**-615**	737	1,071	548	2,737	2,865	1,656	226	1,099	518
Dry (24%)	445	**-281**	**-157**	148	1,371	1,234	1,549	2,069	1,544	**-1,161**	252	69
Critical (15%)	24	34	**-183**	110	1,709	1,535	713	781	1,089	**-512**	**-178**	64

a Based on the 82-year simulation period.

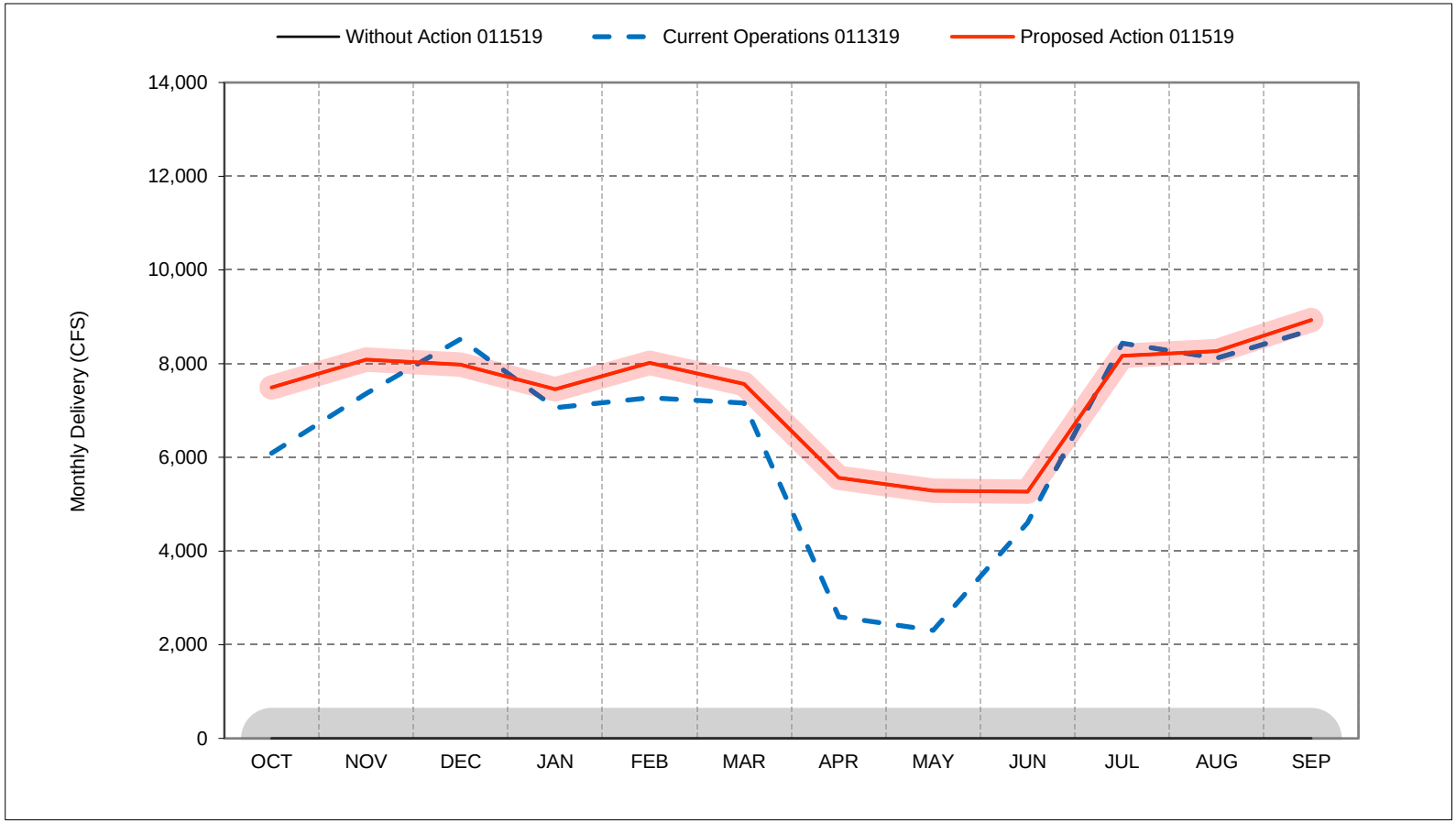
b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

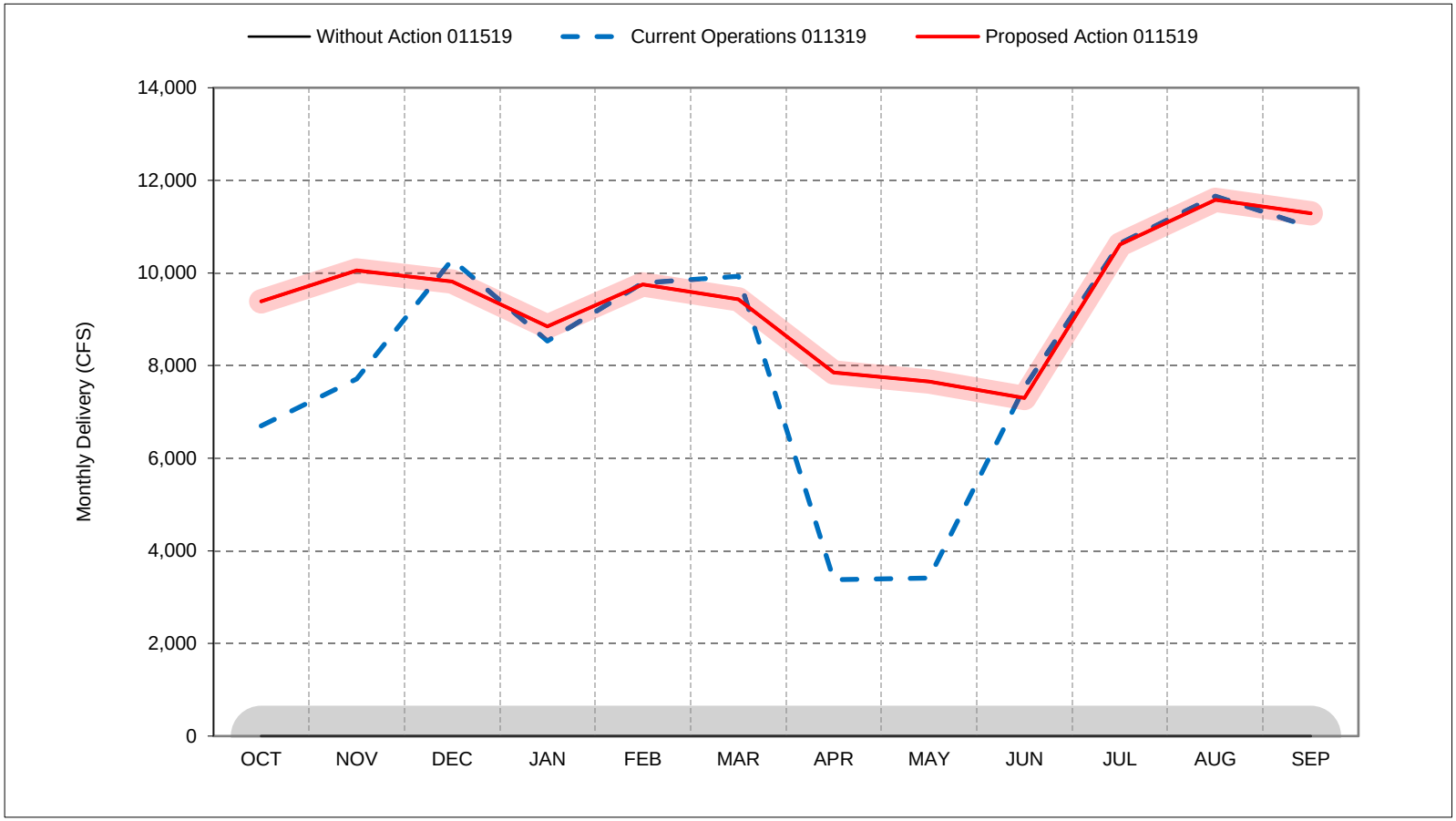
e These are draft results meant for qualitative analysis and are subject to revision.

Figure 53-1. Total Delta Exports, Long-Term Average Delivery



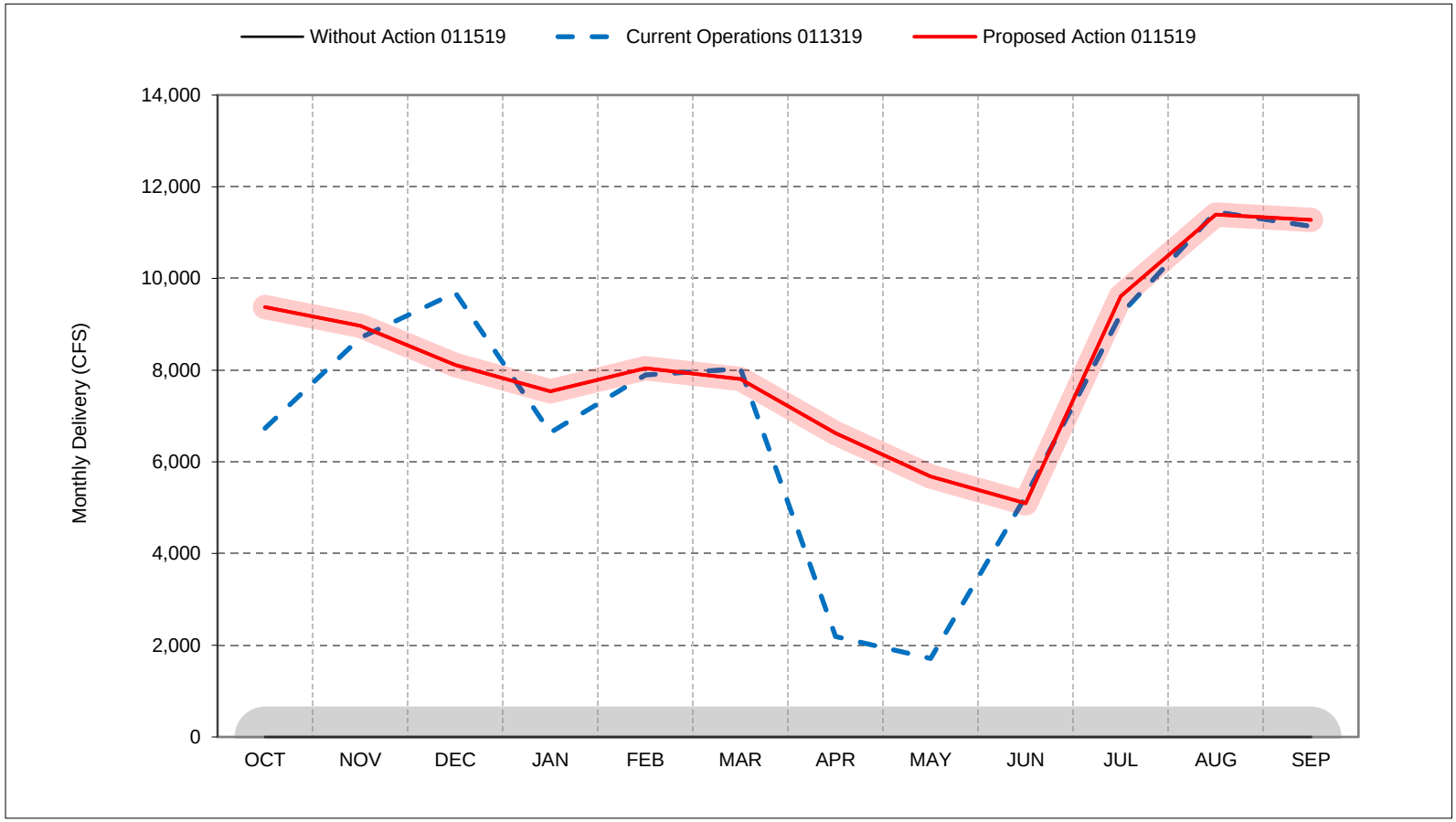
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 53-2. Total Delta Exports, Wet Year Average Delivery



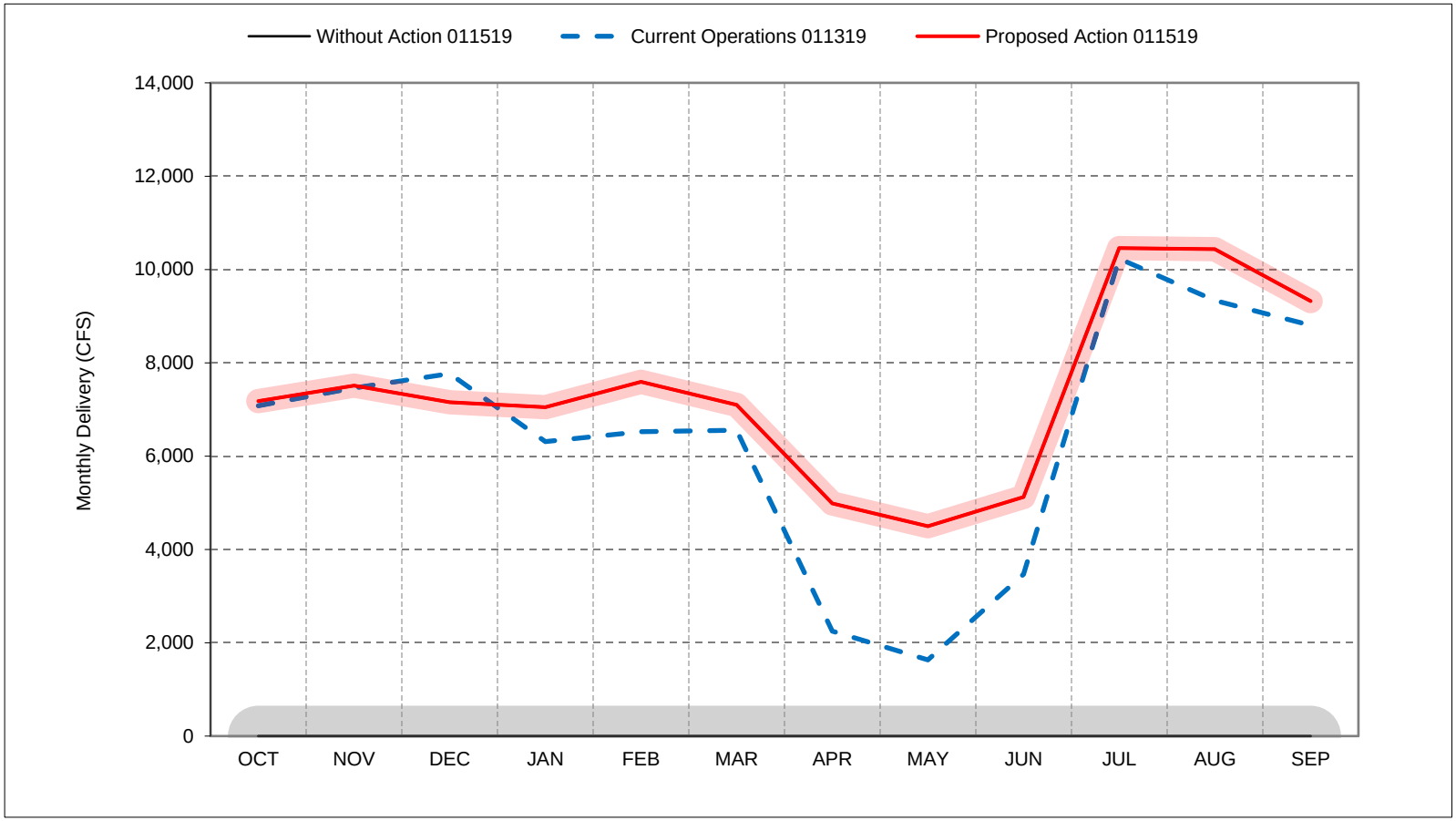
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 53-3. Total Delta Exports, Above Normal Year Average Delivery



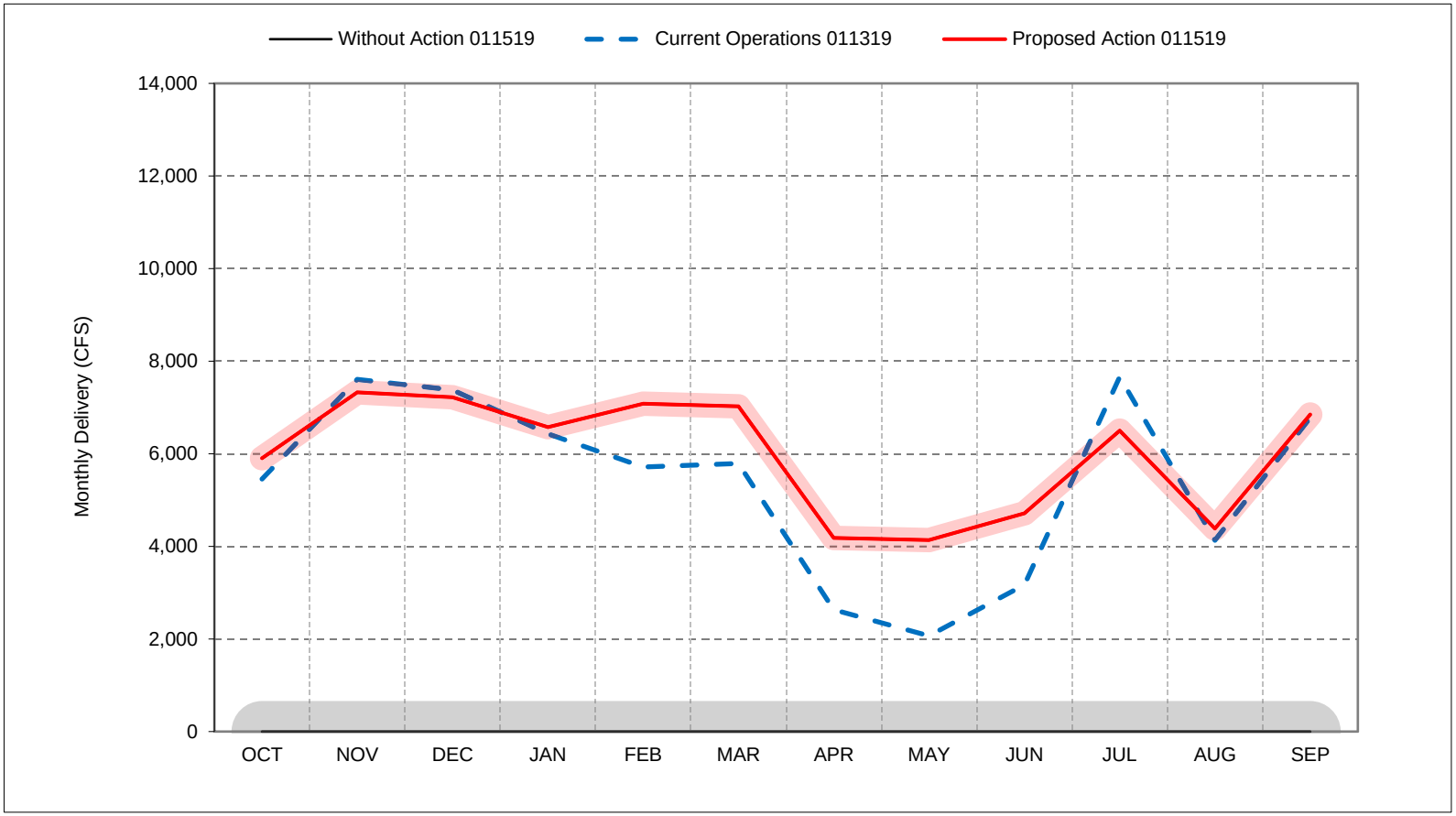
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 53-4. Total Delta Exports, Below Normal Year Average Delivery



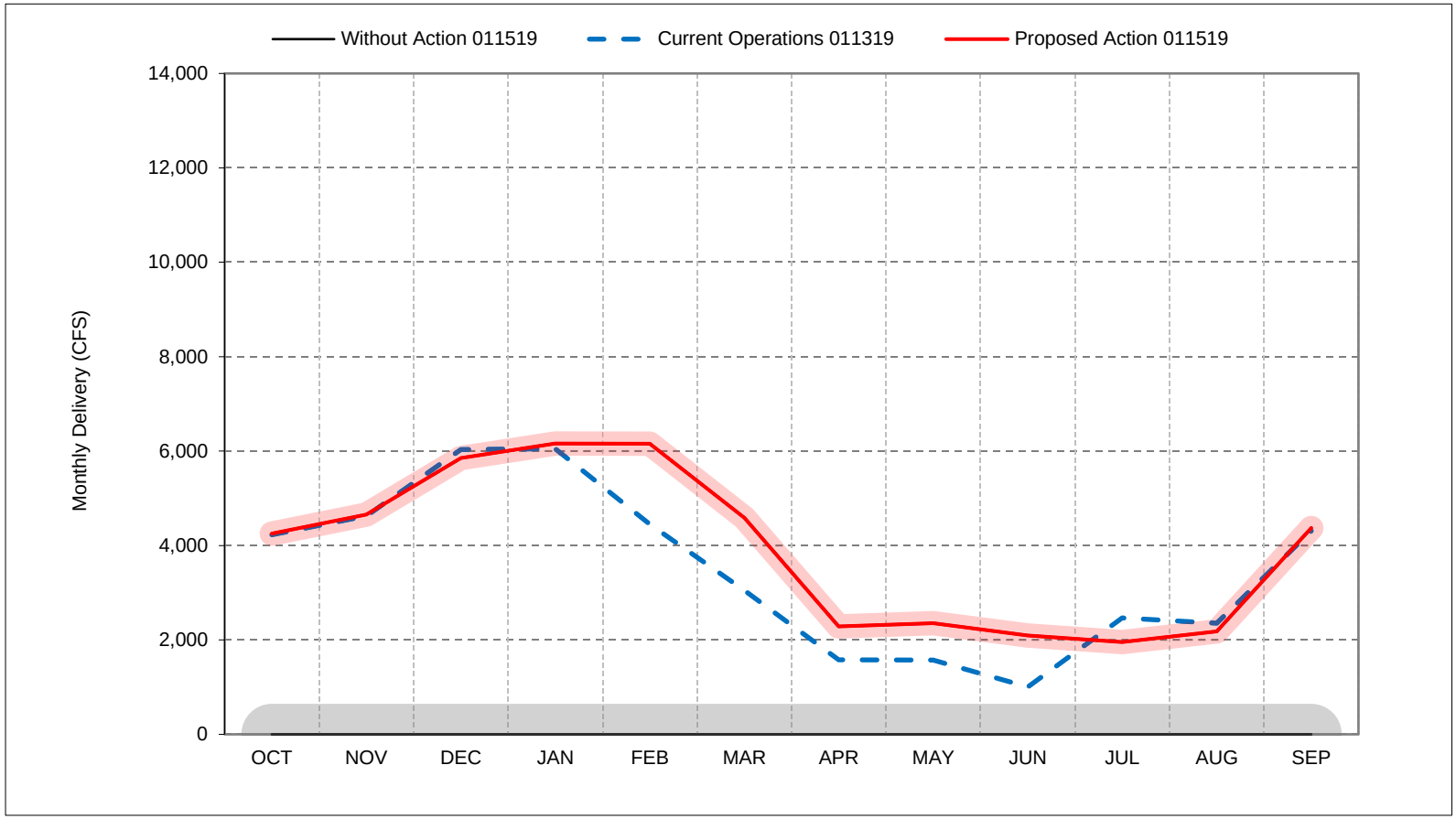
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 53-5. Total Delta Exports, Dry Year Average Delivery



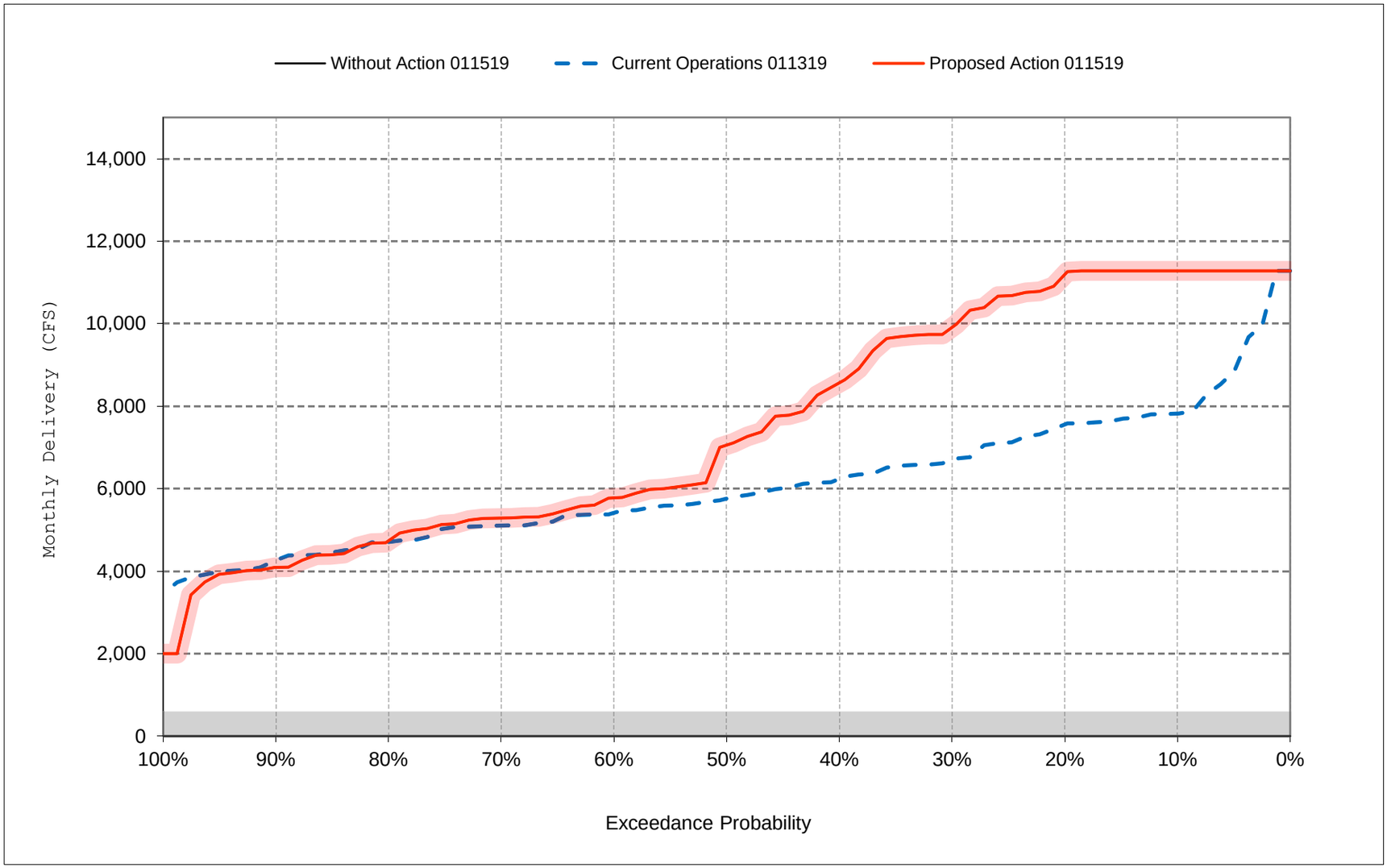
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 53-6. Total Delta Exports, Critical Year Average Delivery



*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

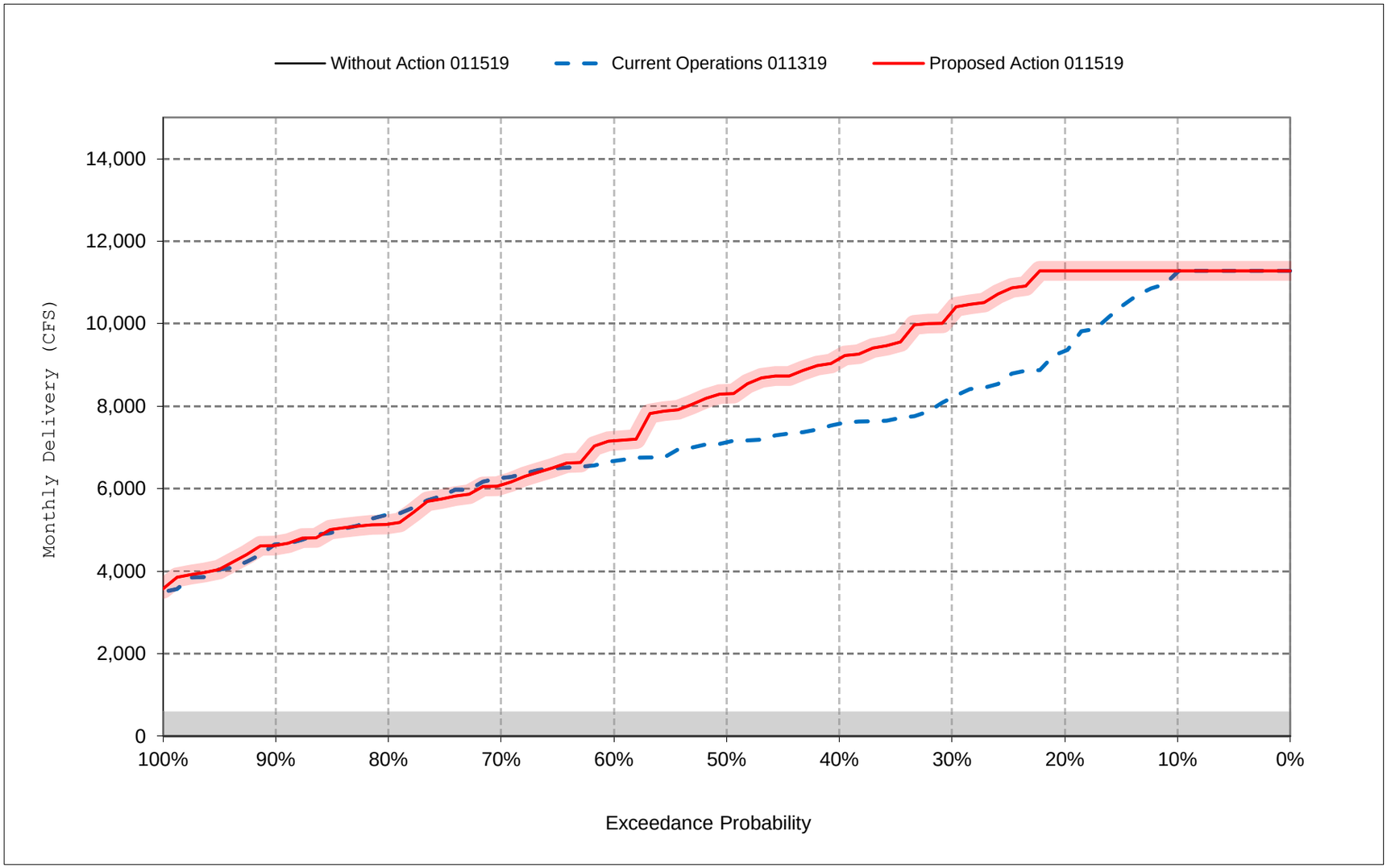
Figure 53-7. Total Delta Exports, October



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

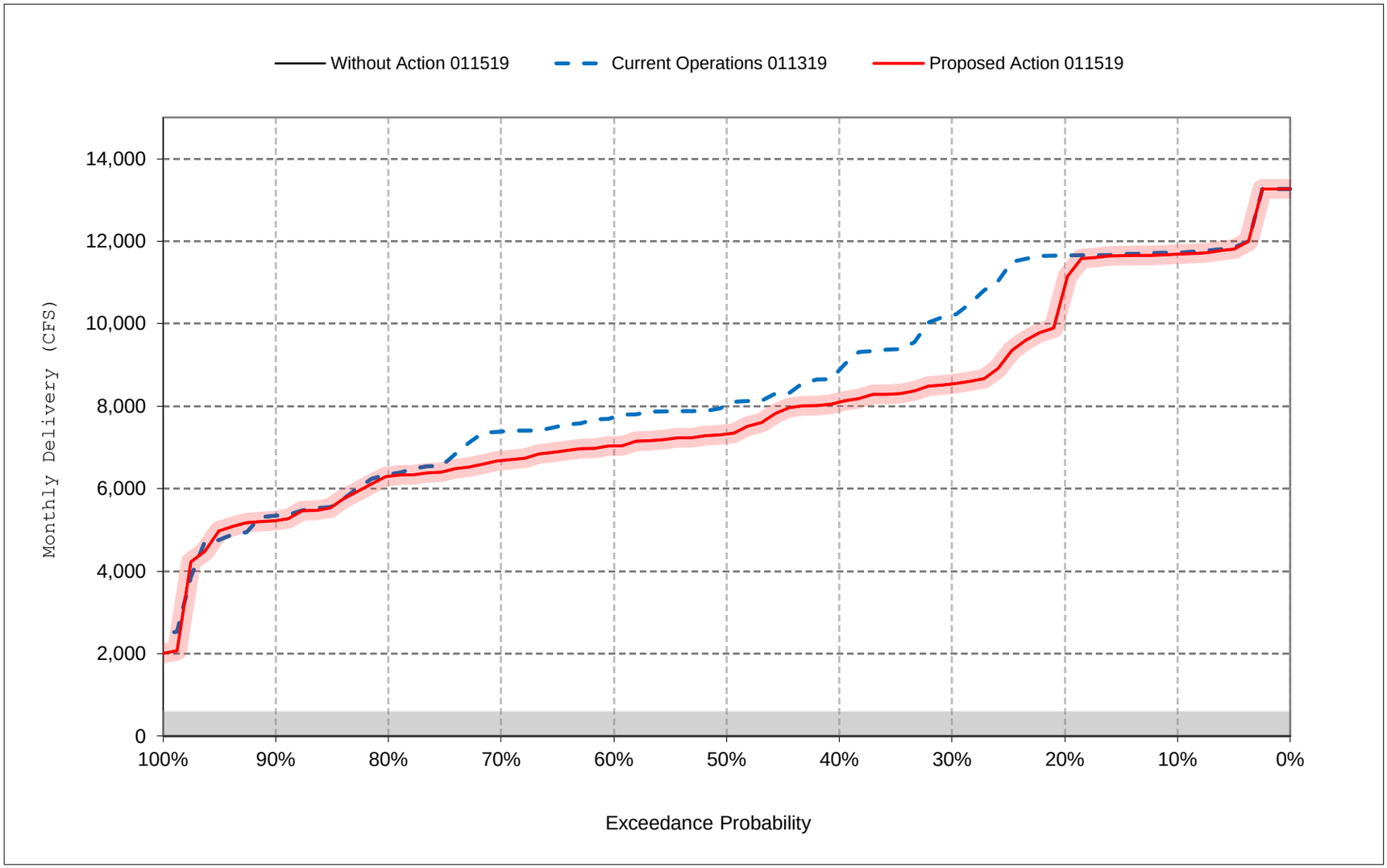
Figure 53-8. Total Delta Exports, November



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

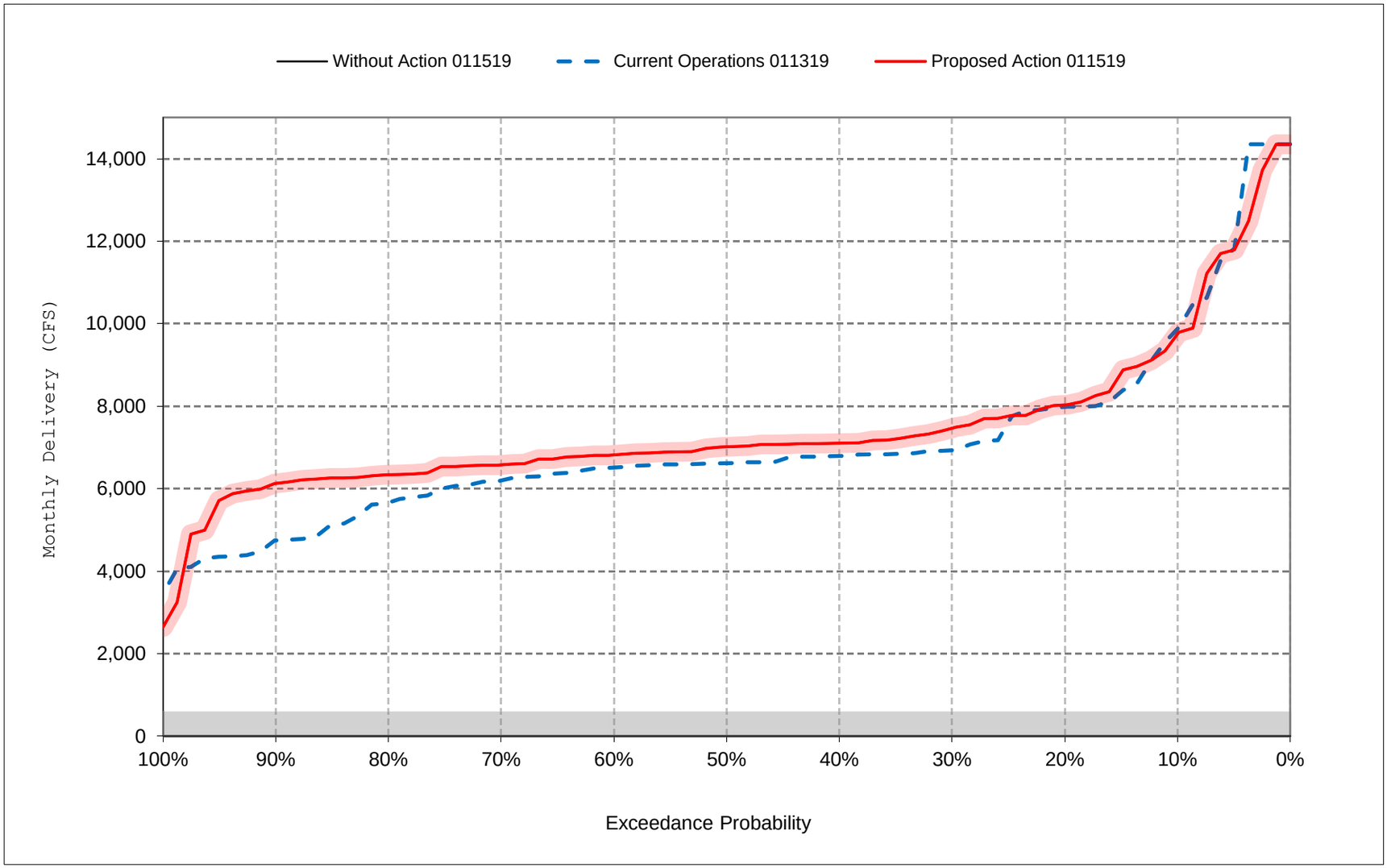
Figure 53-9. Total Delta Exports, December



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

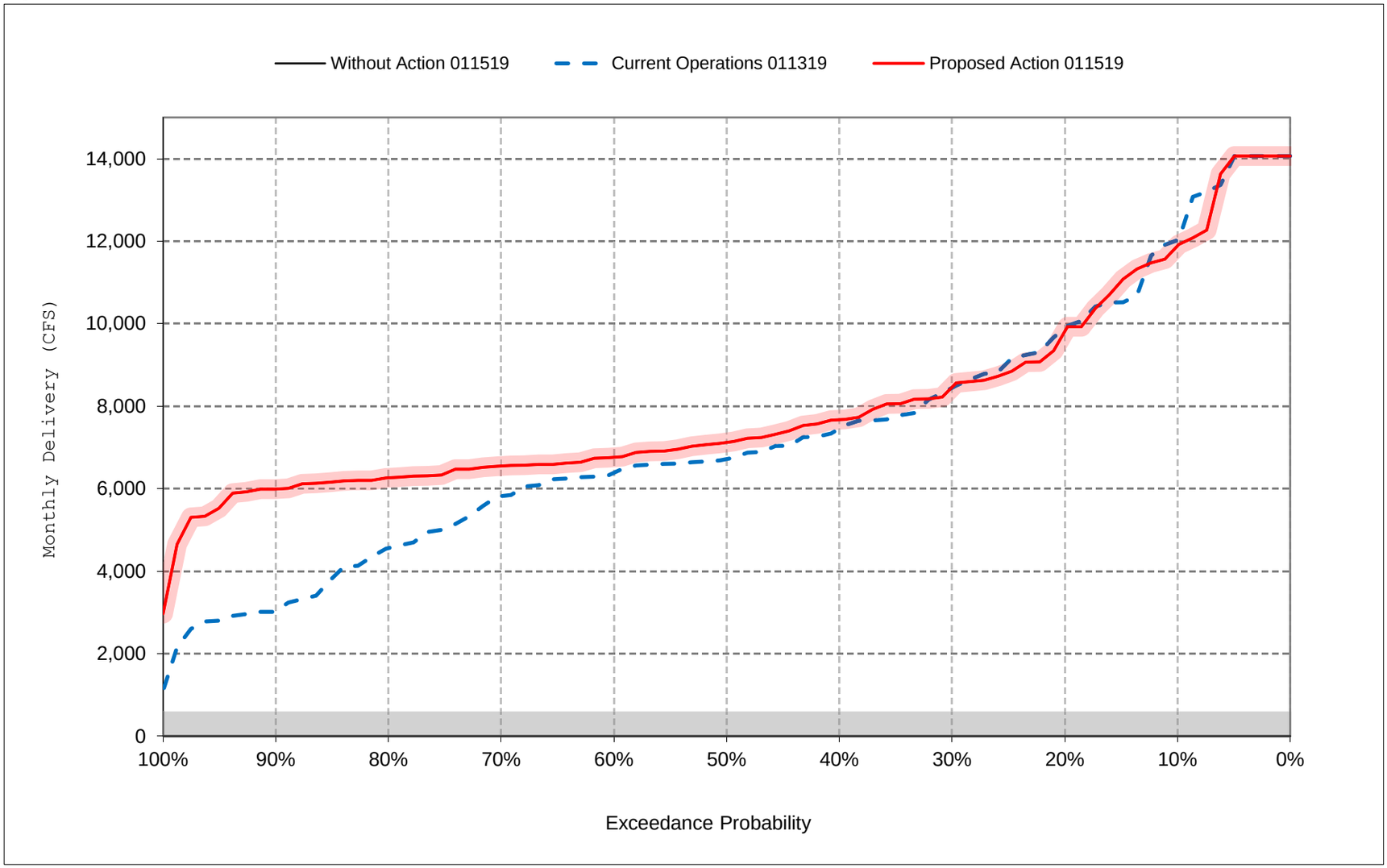
Figure 53-10. Total Delta Exports, January



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

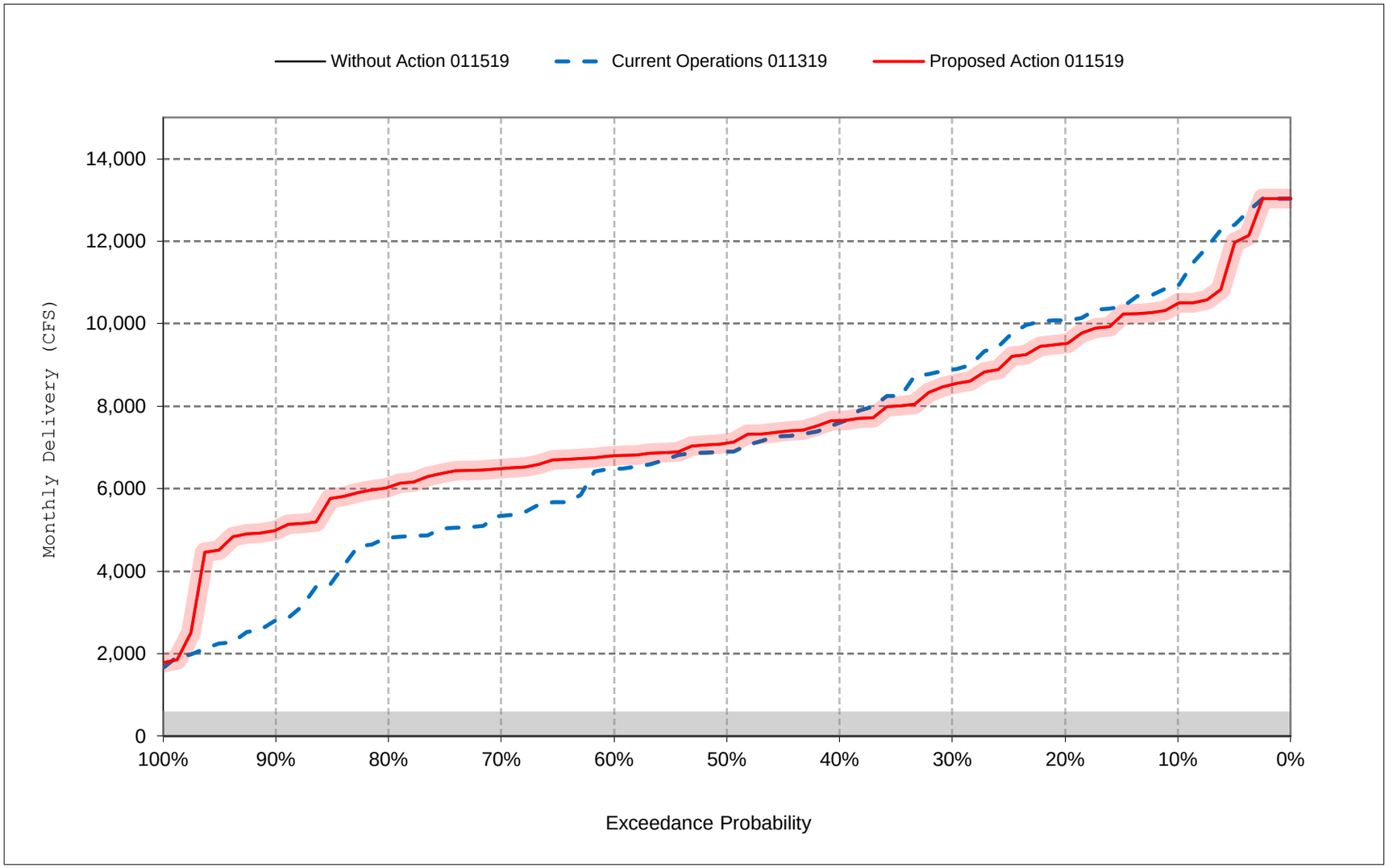
Figure 53-11. Total Delta Exports, February



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

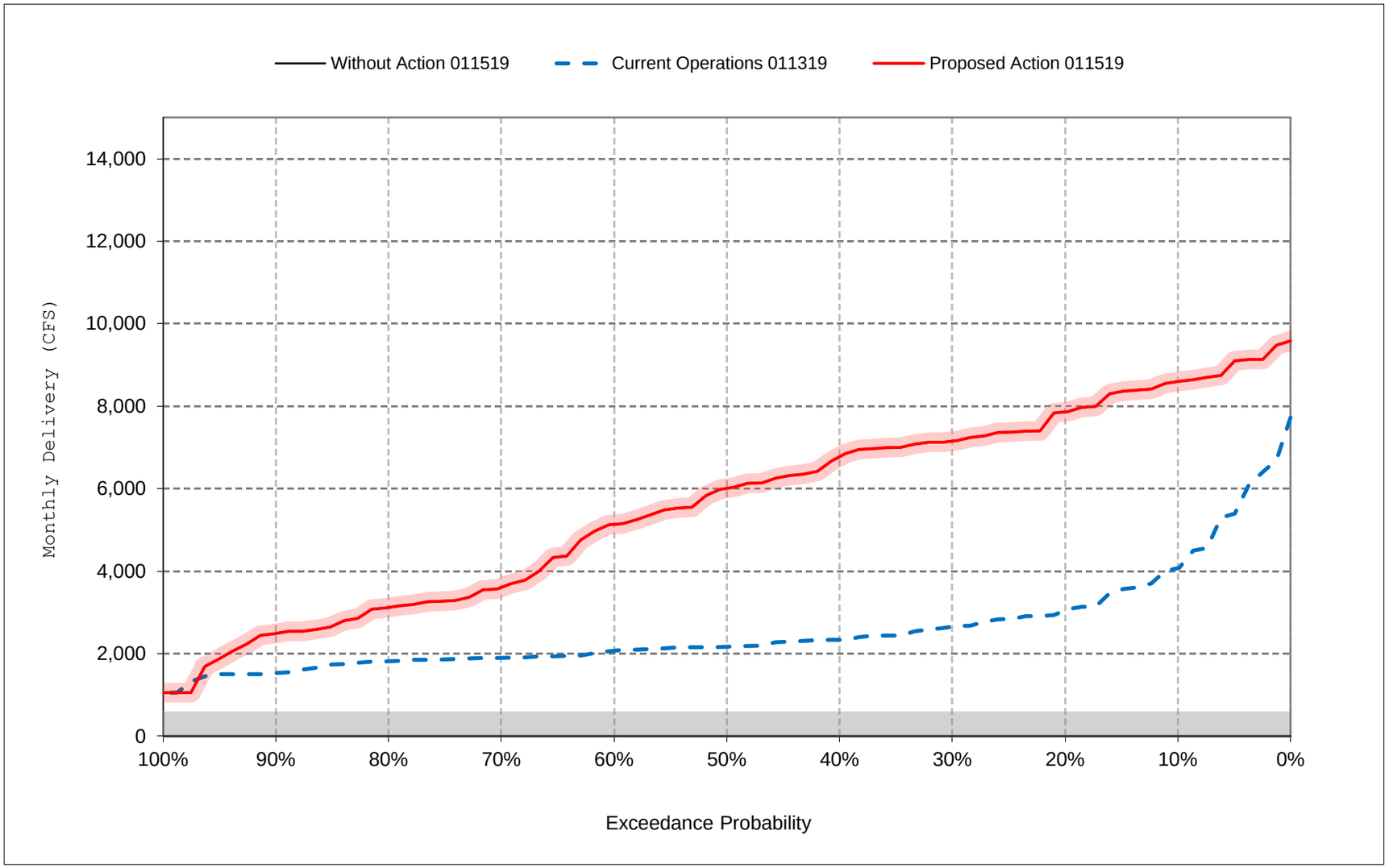
Figure 53-12. Total Delta Exports, March



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

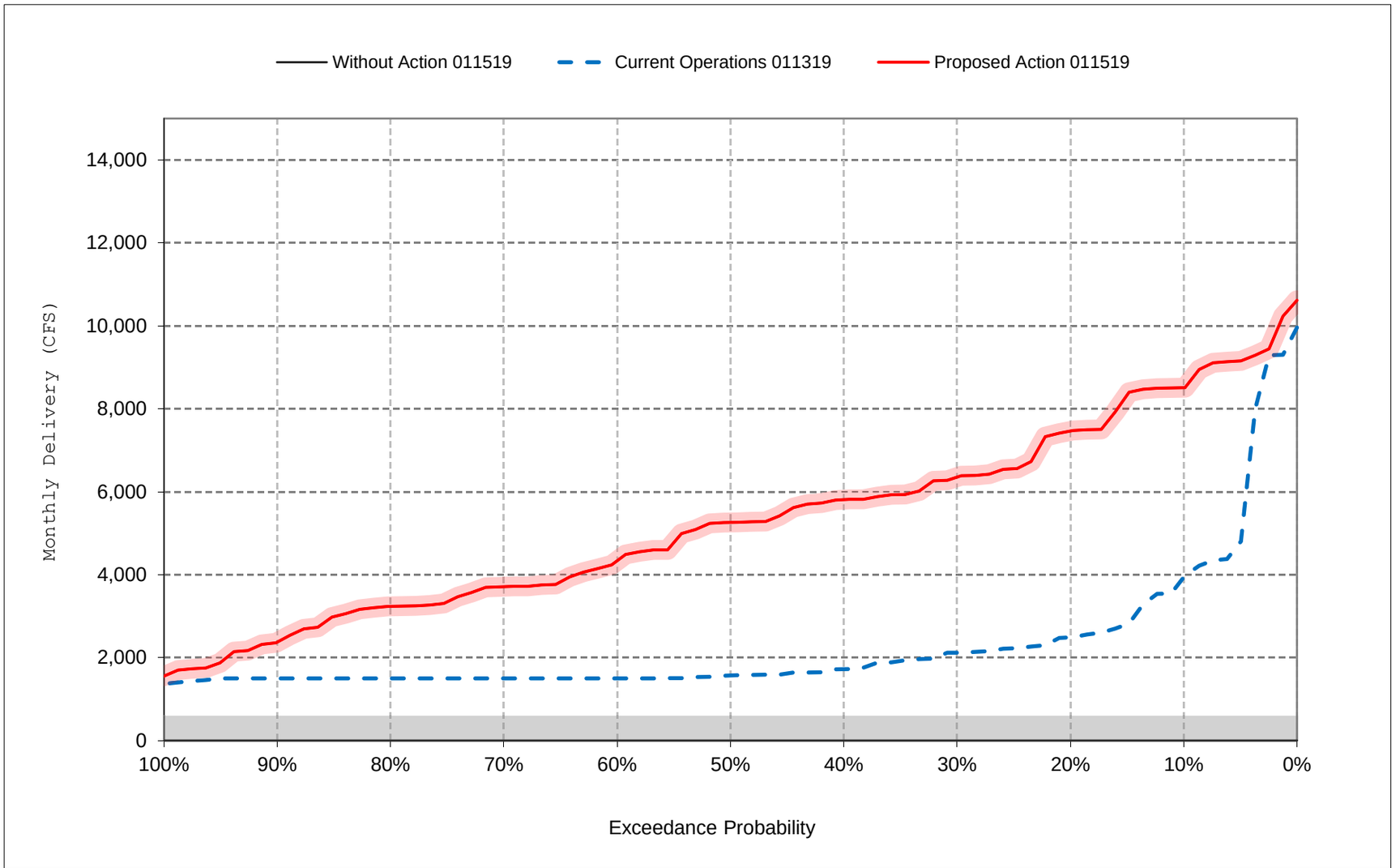
Figure 53-13. Total Delta Exports, April



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

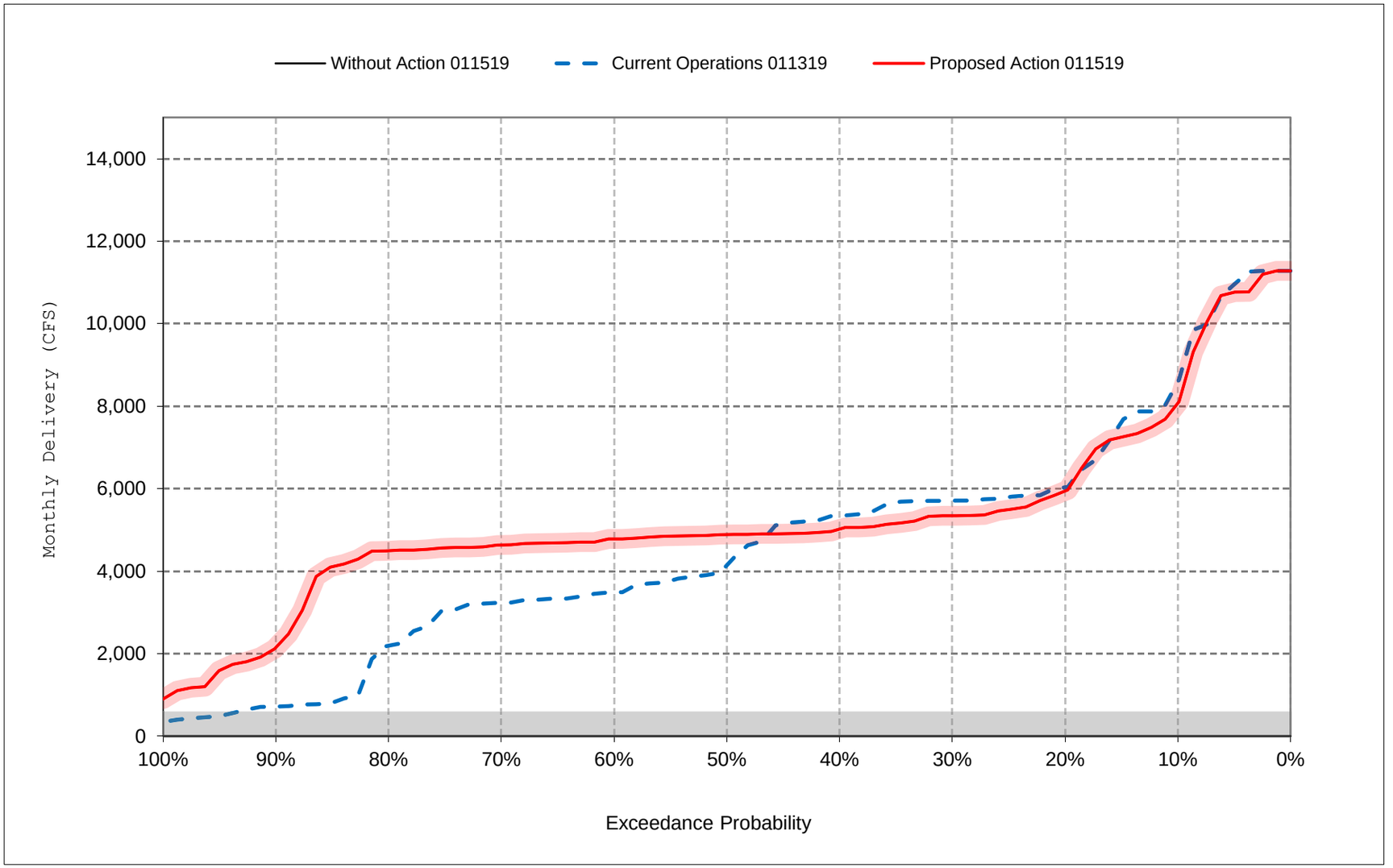
Figure 53-14. Total Delta Exports, May



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

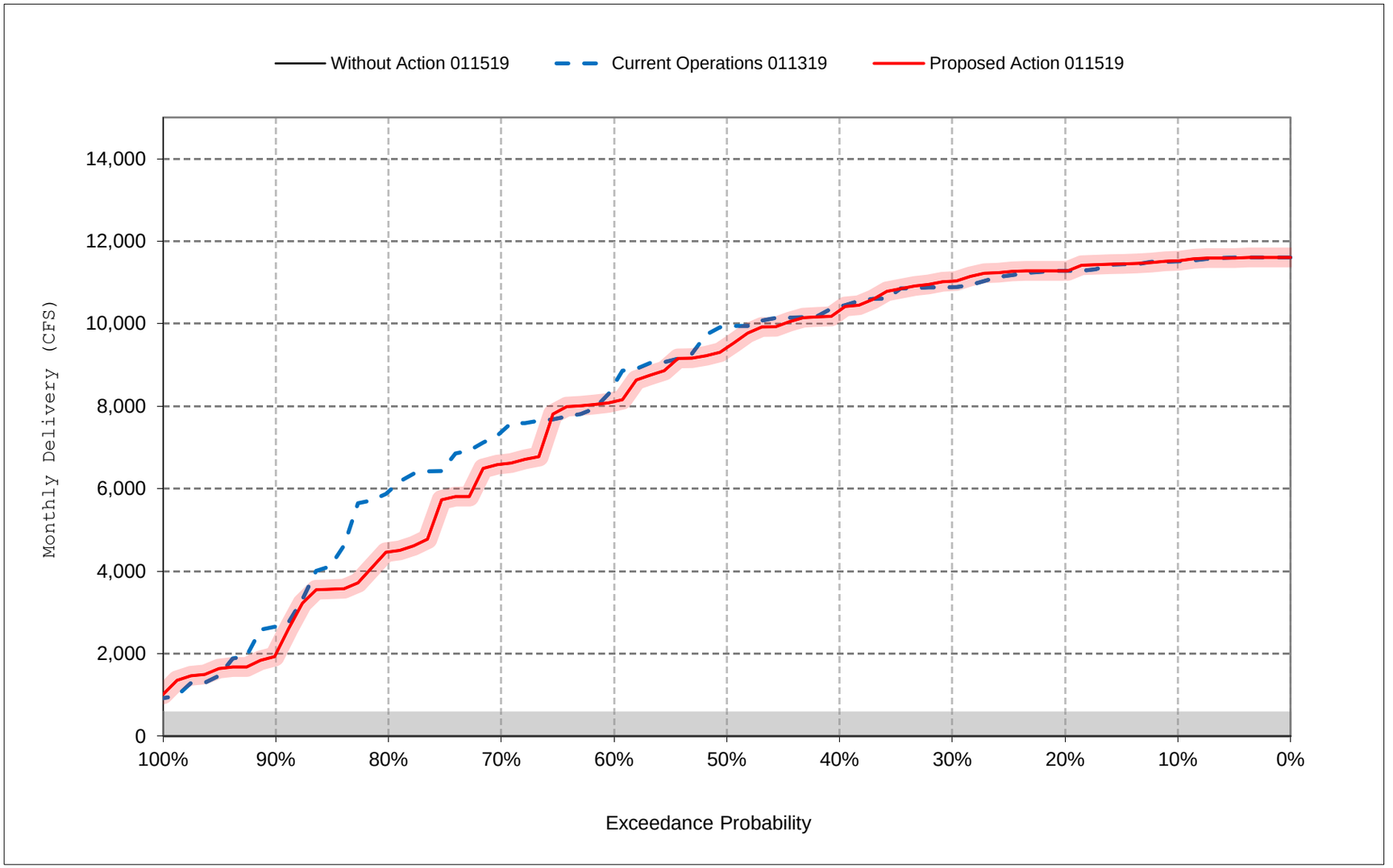
Figure 53-15. Total Delta Exports, June



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

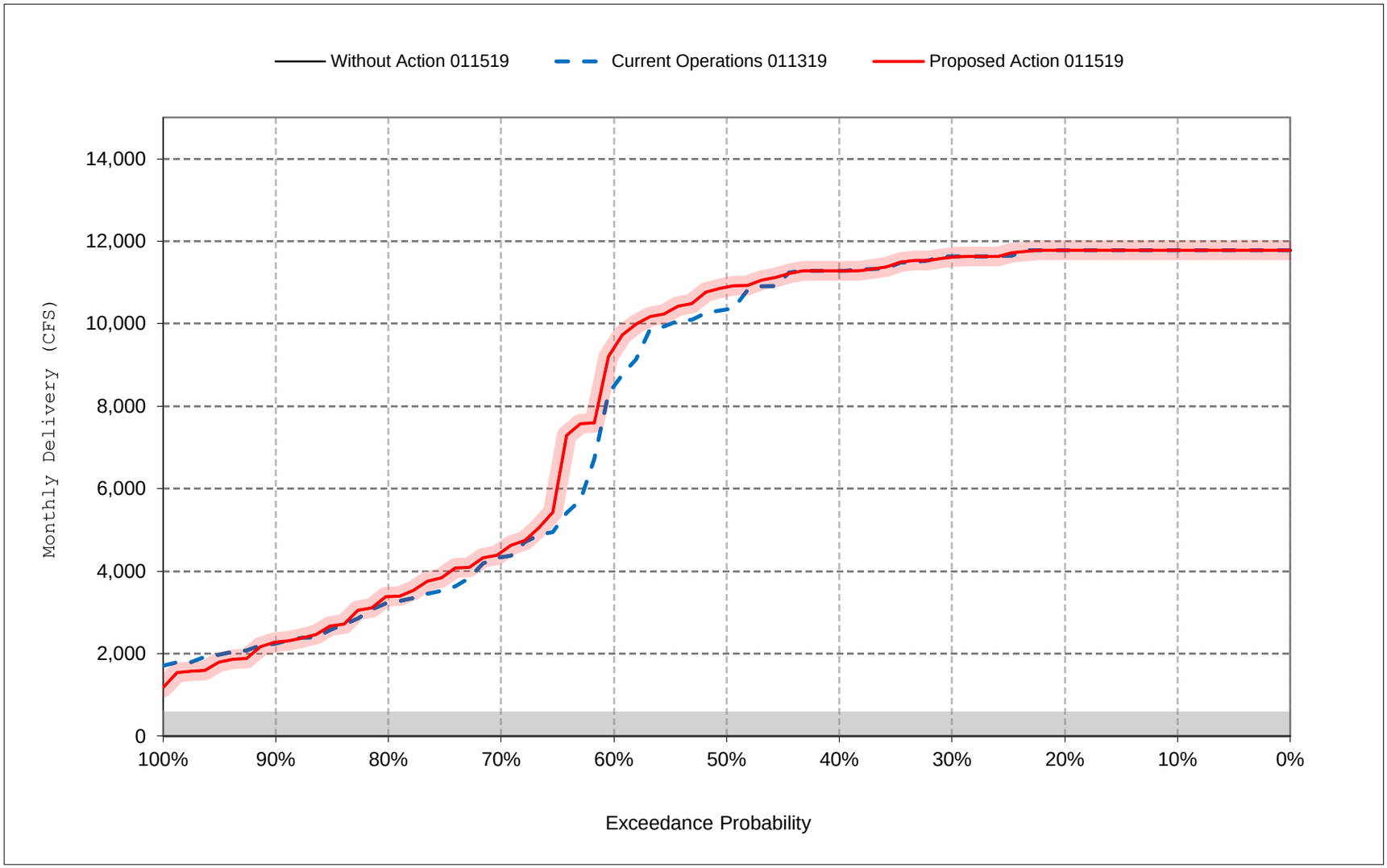
Figure 53-16. Total Delta Exports, July



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

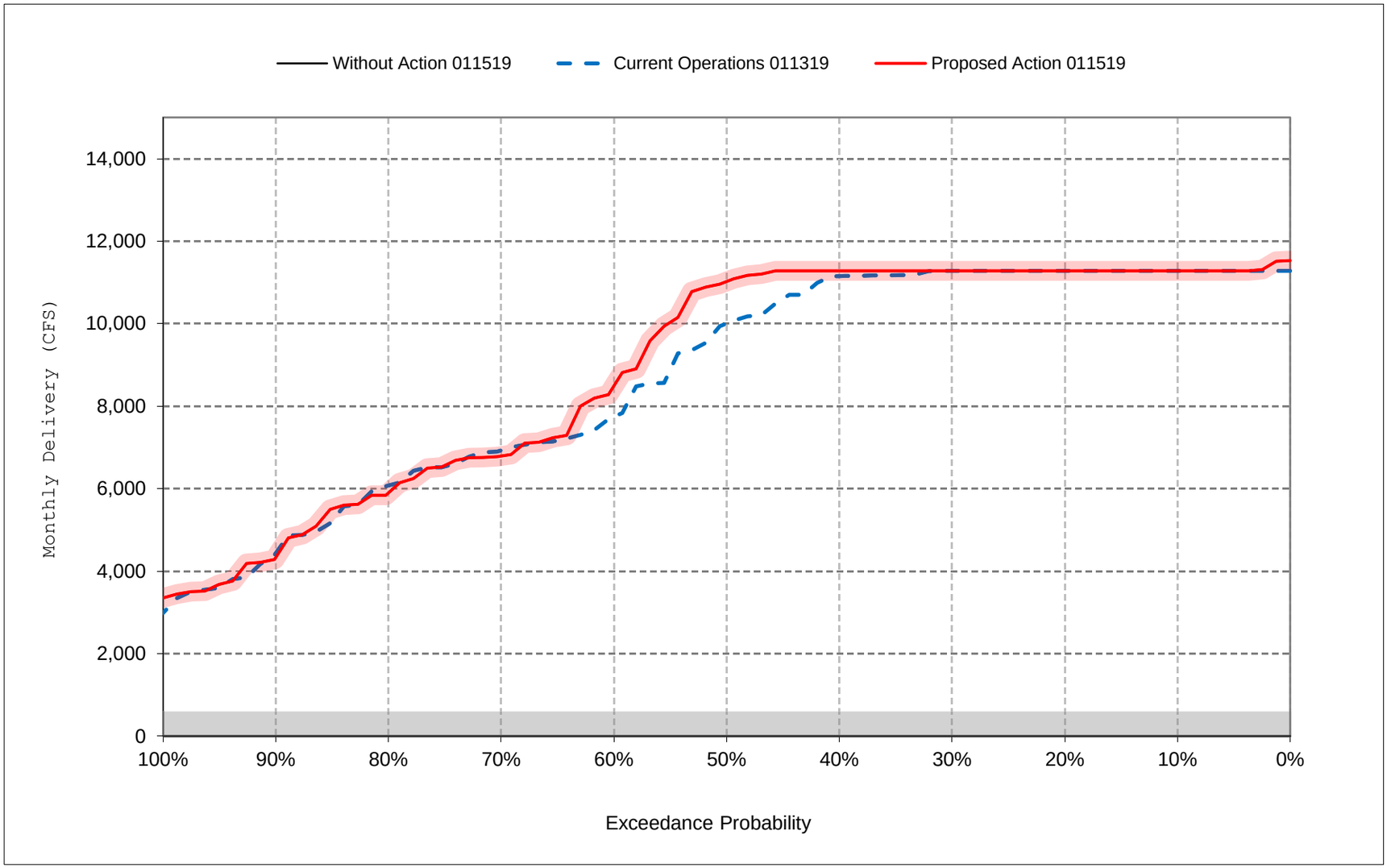
Figure 53-17. Total Delta Exports, August



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Figure 53-18. Total Delta Exports, September



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Table 54-1. Jones PP Exports, Monthly Delivery

Without Action 011519

Statistic	Monthly Delivery (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types[b,c]												
Wet (32%)	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal (16%)	0	0	0	0	0	0	0	0	0	0	0	0
Below Normal (13%)	0	0	0	0	0	0	0	0	0	0	0	0
Dry (24%)	0	0	0	0	0	0	0	0	0	0	0	0
Critical (15%)	0	0	0	0	0	0	0	0	0	0	0	0

Current Operations 011319

Statistic	Monthly Delivery (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	4,600	4,600	4,600	4,600	4,600	4,600	2,442	2,360	4,600	4,600	4,600	4,600
20%	4,084	4,600	4,600	4,600	4,600	4,426	1,831	1,493	3,977	4,600	4,600	4,600
30%	3,597	4,427	4,600	4,139	4,600	4,179	1,566	1,283	3,704	4,534	4,600	4,600
40%	3,433	4,105	4,600	4,070	4,353	3,962	1,394	1,149	3,318	4,152	4,496	4,600
50%	3,342	3,510	4,445	3,961	3,981	3,420	1,307	1,048	2,557	3,776	4,139	4,483
60%	3,177	3,156	4,189	3,875	3,742	3,085	1,241	975	2,217	3,183	3,553	4,153
70%	2,898	2,692	3,689	3,614	3,024	2,641	1,129	900	2,086	2,690	2,977	3,724
80%	2,730	2,184	2,882	3,107	2,519	2,262	1,023	900	1,371	1,729	2,427	3,311
90%	2,145	1,675	2,064	2,618	1,807	1,574	900	900	572	903	1,760	2,974
Long Term												
Full Simulation Period[a]	3,289	3,369	3,818	3,763	3,596	3,316	1,451	1,353	2,675	3,278	3,606	3,997
Water Year Types[b,c]												
Wet (32%)	3,609	3,732	4,331	4,027	4,190	3,696	1,822	1,834	4,028	4,162	4,556	4,434
Above Normal (16%)	3,283	3,772	4,490	3,654	4,018	3,927	1,316	1,039	3,460	2,940	4,448	4,482
Below Normal (13%)	3,458	3,320	3,500	3,748	3,611	3,618	1,246	1,001	2,209	3,799	3,551	4,071
Dry (24%)	3,077	3,249	3,571	3,779	3,211	3,250	1,479	1,263	1,770	3,017	2,865	3,780
Critical (15%)	2,799	2,393	2,678	3,299	2,482	1,663	935	1,124	830	1,685	1,922	2,822

Current Operations 011319 minus Without Action 011519

Statistic	Monthly Delivery (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	4,600	4,600	4,600	4,600	4,600	4,600	2,442	2,360	4,600	4,600	4,600	4,600
20%	4,084	4,600	4,600	4,600	4,600	4,426	1,831	1,493	3,977	4,600	4,600	4,600
30%	3,597	4,427	4,600	4,139	4,600	4,179	1,566	1,283	3,704	4,534	4,600	4,600
40%	3,433	4,105	4,600	4,070	4,353	3,962	1,394	1,149	3,318	4,152	4,496	4,600
50%	3,342	3,510	4,445	3,961	3,981	3,420	1,307	1,048	2,557	3,776	4,139	4,483
60%	3,177	3,156	4,189	3,875	3,742	3,085	1,241	975	2,217	3,183	3,553	4,153
70%	2,898	2,692	3,689	3,614	3,024	2,641	1,129	900	2,086	2,690	2,977	3,724
80%	2,730	2,184	2,882	3,107	2,519	2,262	1,023	900	1,371	1,729	2,427	3,311
90%	2,145	1,675	2,064	2,618	1,807	1,574	900	900	572	903	1,760	2,974
Long Term												
Full Simulation Period[a]	3,289	3,369	3,818	3,763	3,596	3,316	1,451	1,353	2,675	3,278	3,606	3,997
Water Year Types[b,c]												
Wet (32%)	3,609	3,732	4,331	4,027	4,190	3,696	1,822	1,834	4,028	4,162	4,556	4,434
Above Normal (16%)	3,283	3,772	4,490	3,654	4,018	3,927	1,316	1,039	3,460	2,940	4,448	4,482
Below Normal (13%)	3,458	3,320	3,500	3,748	3,611	3,618	1,246	1,001	2,209	3,799	3,551	4,071
Dry (24%)	3,077	3,249	3,571	3,779	3,211	3,250	1,479	1,263	1,770	3,017	2,865	3,780
Critical (15%)	2,799	2,393	2,678	3,299	2,482	1,663	935	1,124	830	1,685	1,922	2,822

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 54-2. Jones PP Exports, Monthly Delivery

Without Action 011519

Statistic	Monthly Delivery (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types[b,c]												
Wet (32%)	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal (16%)	0	0	0	0	0	0	0	0	0	0	0	0
Below Normal (13%)	0	0	0	0	0	0	0	0	0	0	0	0
Dry (24%)	0	0	0	0	0	0	0	0	0	0	0	0
Critical (15%)	0	0	0	0	0	0	0	0	0	0	0	0

Proposed Action 011519

Statistic	Monthly Delivery (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	4,600	4,600	4,600	4,600	4,600	4,600	4,433	4,455	4,600	4,600	4,600	4,600
20%	4,600	4,600	4,600	4,600	4,600	4,499	3,991	3,932	3,686	4,554	4,600	4,600
30%	4,594	4,600	4,477	4,325	4,599	4,147	3,498	3,665	3,272	4,232	4,600	4,600
40%	3,819	4,359	4,268	4,245	4,313	4,064	3,215	3,435	3,140	3,744	4,600	4,600
50%	3,392	3,839	4,033	4,118	4,160	3,915	2,813	3,084	3,027	3,176	4,169	4,600
60%	3,228	3,187	3,515	3,956	3,960	3,793	2,526	2,586	2,912	2,721	3,782	4,504
70%	3,101	2,664	3,081	3,792	3,792	3,217	1,956	2,325	2,634	1,952	3,149	4,125
80%	2,832	2,257	2,568	3,539	3,619	2,610	1,425	1,962	2,004	1,131	2,431	3,405
90%	2,234	1,611	1,806	2,811	2,815	1,978	1,001	1,613	1,322	807	1,778	2,961
Long Term												
Full Simulation Period[a]	3,526	3,435	3,550	3,876	3,938	3,555	2,738	2,981	2,916	2,948	3,648	4,139
Water Year Types[b,c]												
Wet (32%)	3,909	4,335	4,106	4,033	3,893	3,607	3,686	3,950	3,759	3,952	4,572	4,600
Above Normal (16%)	3,909	3,642	3,596	3,966	4,051	3,894	3,660	3,416	3,087	2,841	4,390	4,579
Below Normal (13%)	3,440	2,963	3,321	4,058	4,094	3,706	2,422	2,673	3,183	3,617	3,806	4,328
Dry (24%)	3,301	3,016	3,555	3,818	4,094	3,757	2,067	2,457	2,475	2,445	3,005	3,876
Critical (15%)	2,734	2,389	2,498	3,364	3,512	2,596	1,096	1,569	1,393	1,112	1,769	2,927

Proposed Action 011519 minus Without Action 011519

Statistic	Monthly Delivery (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	4,600	4,600	4,600	4,600	4,600	4,600	4,433	4,455	4,600	4,600	4,600	4,600
20%	4,600	4,600	4,600	4,600	4,600	4,499	3,991	3,932	3,686	4,554	4,600	4,600
30%	4,594	4,600	4,477	4,325	4,599	4,147	3,498	3,665	3,272	4,232	4,600	4,600
40%	3,819	4,359	4,268	4,245	4,313	4,064	3,215	3,435	3,140	3,744	4,600	4,600
50%	3,392	3,839	4,033	4,118	4,160	3,915	2,813	3,084	3,027	3,176	4,169	4,600
60%	3,228	3,187	3,515	3,956	3,960	3,793	2,526	2,586	2,912	2,721	3,782	4,504
70%	3,101	2,664	3,081	3,792	3,792	3,217	1,956	2,325	2,634	1,952	3,149	4,125
80%	2,832	2,257	2,568	3,539	3,619	2,610	1,425	1,962	2,004	1,131	2,431	3,405
90%	2,234	1,611	1,806	2,811	2,815	1,978	1,001	1,613	1,322	807	1,778	2,961
Long Term												
Full Simulation Period[a]	3,526	3,435	3,550	3,876	3,938	3,555	2,738	2,981	2,916	2,948	3,648	4,139
Water Year Types[b,c]												
Wet (32%)	3,909	4,335	4,106	4,033	3,893	3,607	3,686	3,950	3,759	3,952	4,572	4,600
Above Normal (16%)	3,909	3,642	3,596	3,966	4,051	3,894	3,660	3,416	3,087	2,841	4,390	4,579
Below Normal (13%)	3,440	2,963	3,321	4,058	4,094	3,706	2,422	2,673	3,183	3,617	3,806	4,328
Dry (24%)	3,301	3,016	3,555	3,818	4,094	3,757	2,067	2,457	2,475	2,445	3,005	3,876
Critical (15%)	2,734	2,389	2,498	3,364	3,512	2,596	1,096	1,569	1,393	1,112	1,769	2,927

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 54-3. Jones PP Exports, Monthly Delivery

Current Operations 011319

Statistic	Monthly Delivery (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	4,600	4,600	4,600	4,600	4,600	4,600	2,442	2,360	4,600	4,600	4,600	4,600
20%	4,084	4,600	4,600	4,600	4,600	4,426	1,831	1,493	3,977	4,600	4,600	4,600
30%	3,597	4,427	4,600	4,139	4,600	4,179	1,566	1,283	3,704	4,534	4,600	4,600
40%	3,433	4,105	4,600	4,070	4,353	3,962	1,394	1,149	3,318	4,152	4,496	4,600
50%	3,342	3,510	4,445	3,961	3,981	3,420	1,307	1,048	2,557	3,776	4,139	4,483
60%	3,177	3,156	4,189	3,875	3,742	3,085	1,241	975	2,217	3,183	3,553	4,153
70%	2,898	2,692	3,689	3,614	3,024	2,641	1,129	900	2,086	2,690	2,977	3,724
80%	2,730	2,184	2,882	3,107	2,519	2,262	1,023	900	1,371	1,729	2,427	3,311
90%	2,145	1,675	2,064	2,618	1,807	1,574	900	900	572	903	1,760	2,974
Long Term												
Full Simulation Period[a]	3,289	3,369	3,818	3,763	3,596	3,316	1,451	1,353	2,675	3,278	3,606	3,997
Water Year Types[b,c]												
Wet (32%)	3,609	3,732	4,331	4,027	4,190	3,696	1,822	1,834	4,028	4,162	4,556	4,434
Above Normal (16%)	3,283	3,772	4,490	3,654	4,018	3,927	1,316	1,039	3,460	2,940	4,448	4,482
Below Normal (13%)	3,458	3,320	3,500	3,748	3,611	3,618	1,246	1,001	2,209	3,799	3,551	4,071
Dry (24%)	3,077	3,249	3,571	3,779	3,211	3,250	1,479	1,263	1,770	3,017	2,865	3,780
Critical (15%)	2,799	2,393	2,678	3,299	2,482	1,663	935	1,124	830	1,685	1,922	2,822

Proposed Action 011519

Statistic	Monthly Delivery (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	4,600	4,600	4,600	4,600	4,600	4,600	4,433	4,455	4,600	4,600	4,600	4,600
20%	4,600	4,600	4,600	4,600	4,600	4,499	3,991	3,932	3,686	4,554	4,600	4,600
30%	4,594	4,600	4,477	4,325	4,599	4,147	3,498	3,665	3,272	4,232	4,600	4,600
40%	3,819	4,359	4,268	4,245	4,313	4,064	3,215	3,435	3,140	3,744	4,600	4,600
50%	3,392	3,839	4,033	4,118	4,160	3,915	2,813	3,084	3,027	3,176	4,169	4,600
60%	3,228	3,187	3,515	3,956	3,960	3,793	2,526	2,586	2,912	2,721	3,782	4,504
70%	3,101	2,664	3,081	3,792	3,792	3,217	1,956	2,325	2,634	1,952	3,149	4,125
80%	2,832	2,257	2,568	3,539	3,619	2,610	1,425	1,962	2,004	1,131	2,431	3,405
90%	2,234	1,611	1,806	2,811	2,815	1,978	1,001	1,613	1,322	807	1,778	2,961
Long Term												
Full Simulation Period[a]	3,526	3,435	3,550	3,876	3,938	3,555	2,738	2,981	2,916	2,948	3,648	4,139
Water Year Types[b,c]												
Wet (32%)	3,909	4,335	4,106	4,033	3,893	3,607	3,686	3,950	3,759	3,952	4,572	4,600
Above Normal (16%)	3,909	3,642	3,596	3,966	4,051	3,894	3,660	3,416	3,087	2,841	4,390	4,579
Below Normal (13%)	3,440	2,963	3,321	4,058	4,094	3,706	2,422	2,673	3,183	3,617	3,806	4,328
Dry (24%)	3,301	3,016	3,555	3,818	4,094	3,757	2,067	2,457	2,475	2,445	3,005	3,876
Critical (15%)	2,734	2,389	2,498	3,364	3,512	2,596	1,096	1,569	1,393	1,112	1,769	2,927

Proposed Action 011519 minus Current Operations 011319

Statistic	Monthly Delivery (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	0	0	0	0	0	1,991	2,094	0	0	0	0
20%	516	0	0	0	0	72	2,160	2,439	-291	-46	0	0
30%	998	173	-123	186	-1	-32	1,932	2,382	-432	-301	0	0
40%	386	254	-332	176	-40	102	1,820	2,286	-178	-408	104	0
50%	50	329	-412	157	179	495	1,506	2,035	470	-600	30	117
60%	51	30	-674	81	218	708	1,285	1,611	695	-462	229	351
70%	203	-28	-607	178	767	576	827	1,425	548	-738	172	401
80%	102	74	-314	432	1,099	347	402	1,062	633	-597	4	94
90%	89	-64	-258	193	1,008	405	101	713	750	-96	18	-14
Long Term												
Full Simulation Period[a]	237	66	-267	112	342	239	1,287	1,628	241	-330	42	141
Water Year Types[b,c]												
Wet (32%)	300	603	-225	6	-297	-88	1,864	2,116	-269	-210	16	166
Above Normal (16%)	626	-129	-894	312	33	-33	2,343	2,377	-373	-99	-58	97
Below Normal (13%)	-19	-357	-180	310	483	88	1,176	1,672	974	-182	255	257
Dry (24%)	224	-233	-16	39	883	508	588	1,194	705	-571	141	96
Critical (15%)	-65	-3	-179	65	1,029	933	161	445	563	-573	-153	105

a Based on the 82-year simulation period.

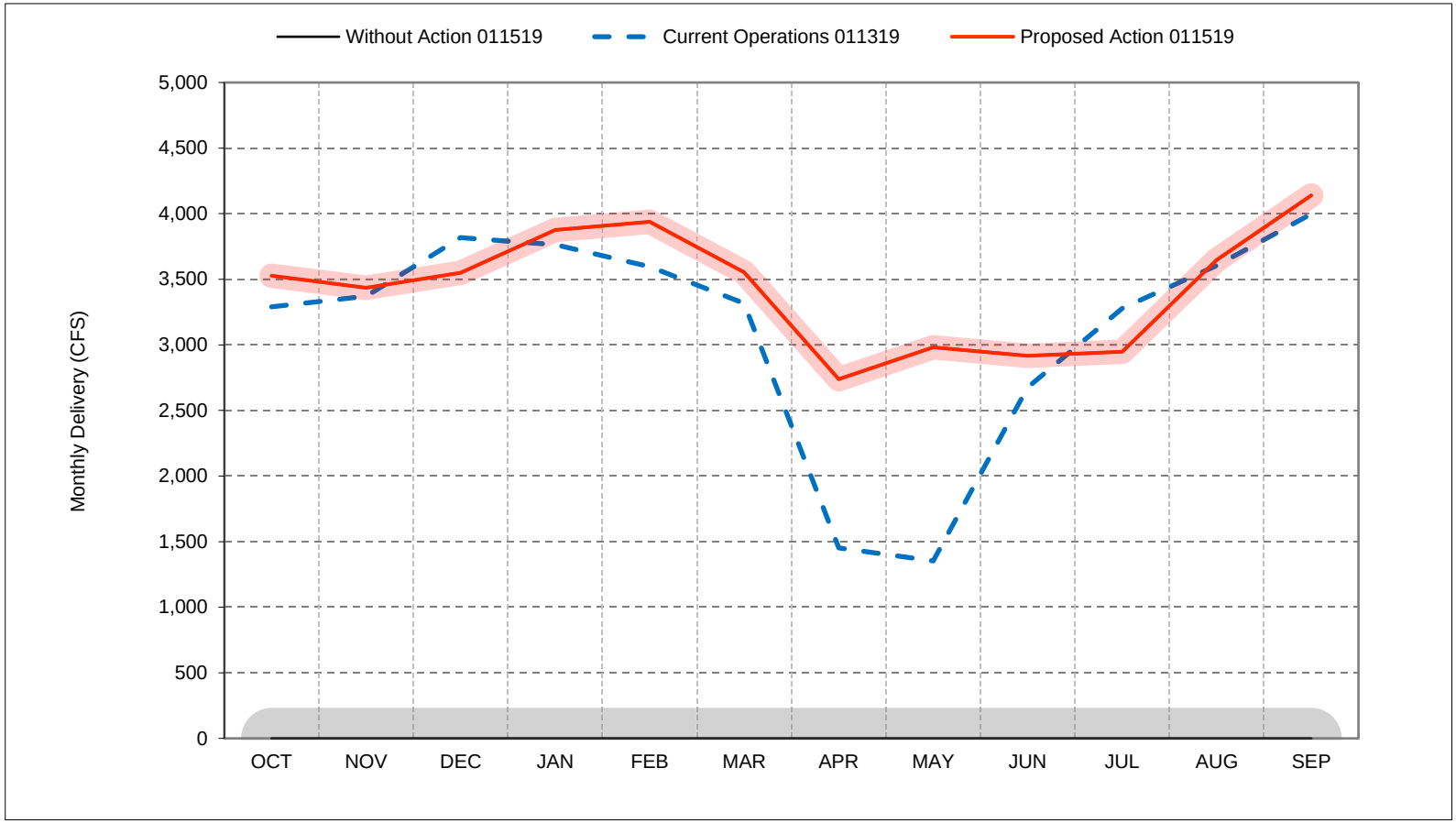
b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

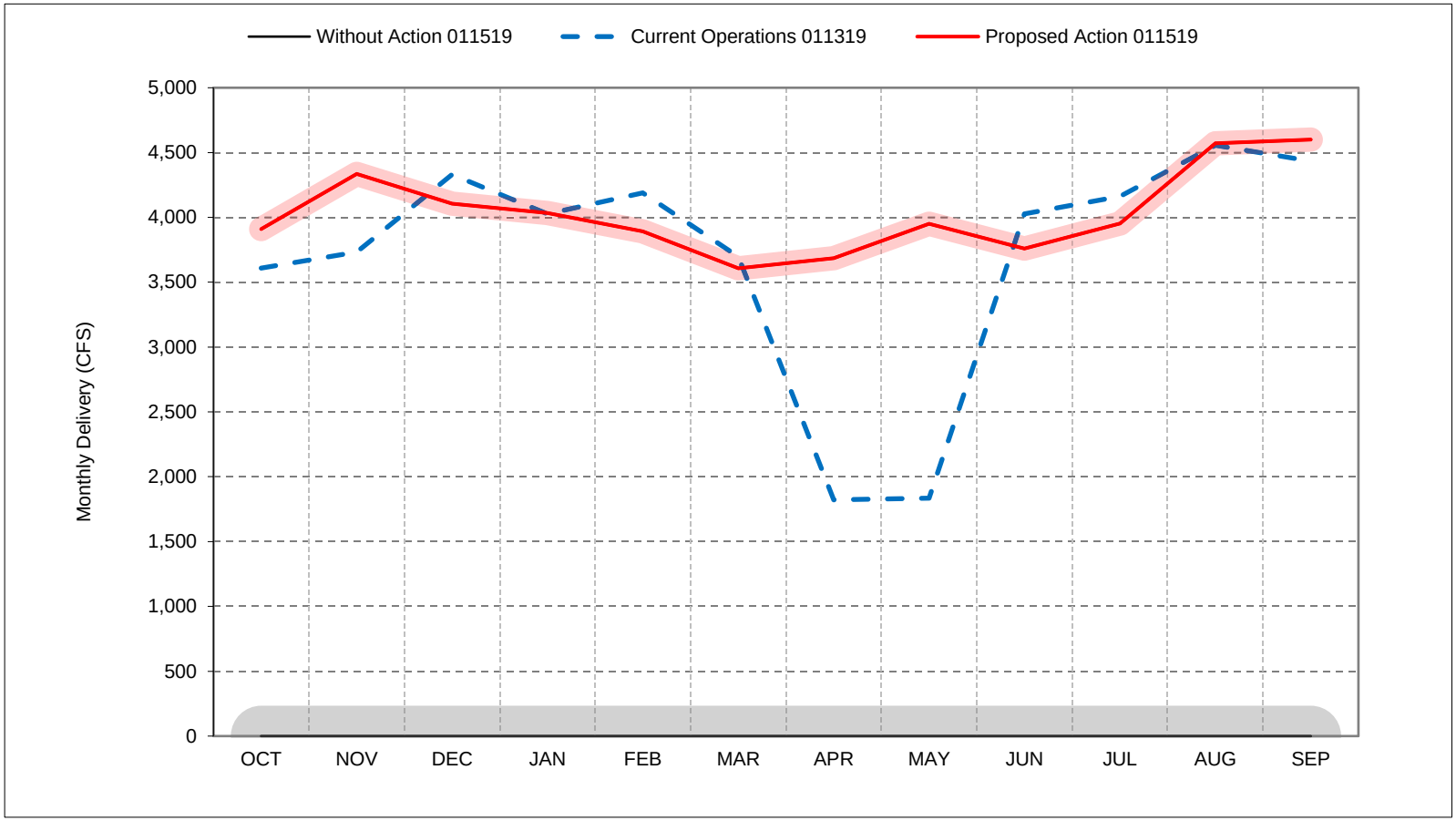
e These are draft results meant for qualitative analysis and are subject to revision.

Figure 54-1. Jones PP Exports, Long-Term Average Delivery



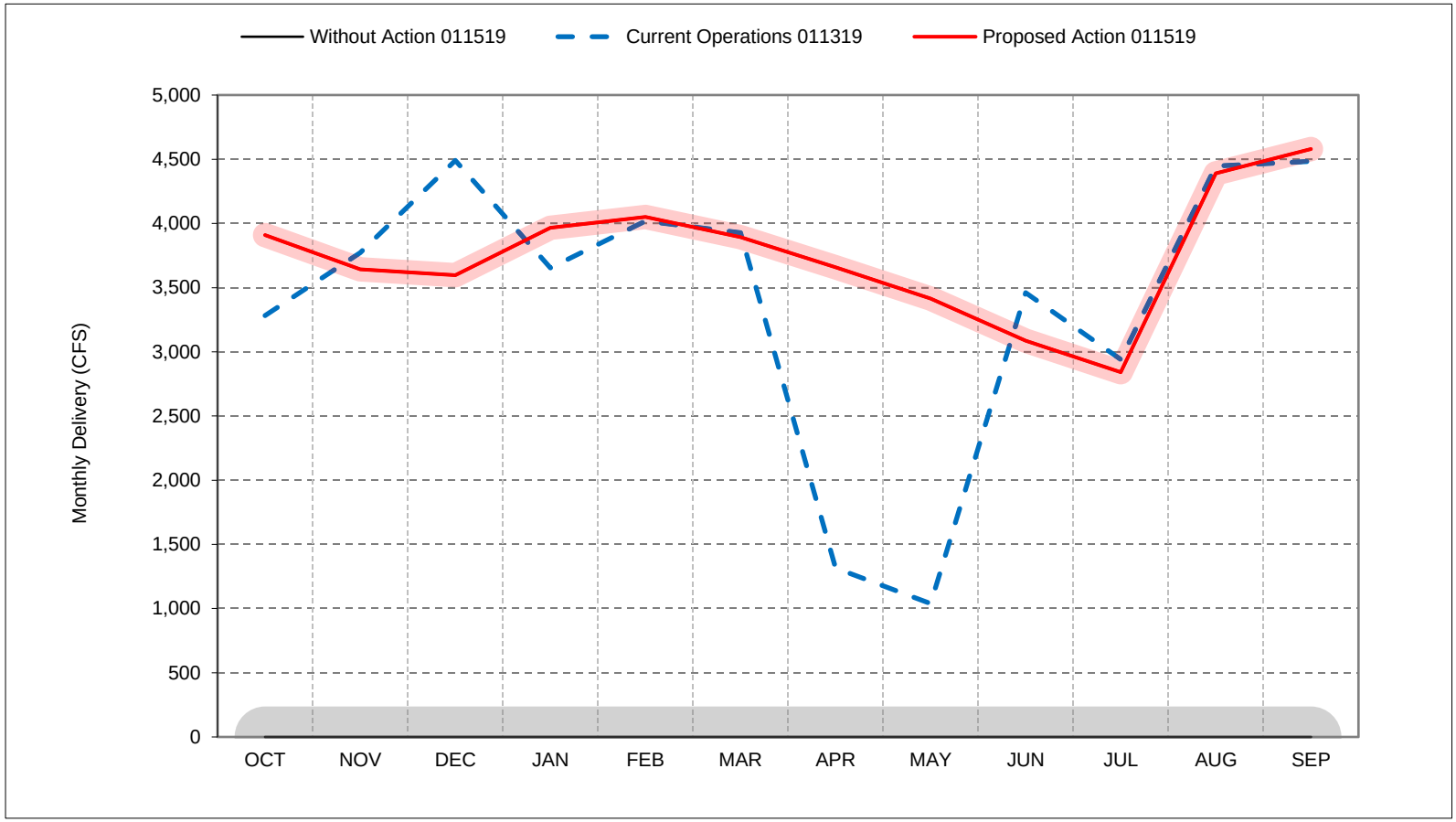
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 54-2. Jones PP Exports, Wet Year Average Delivery



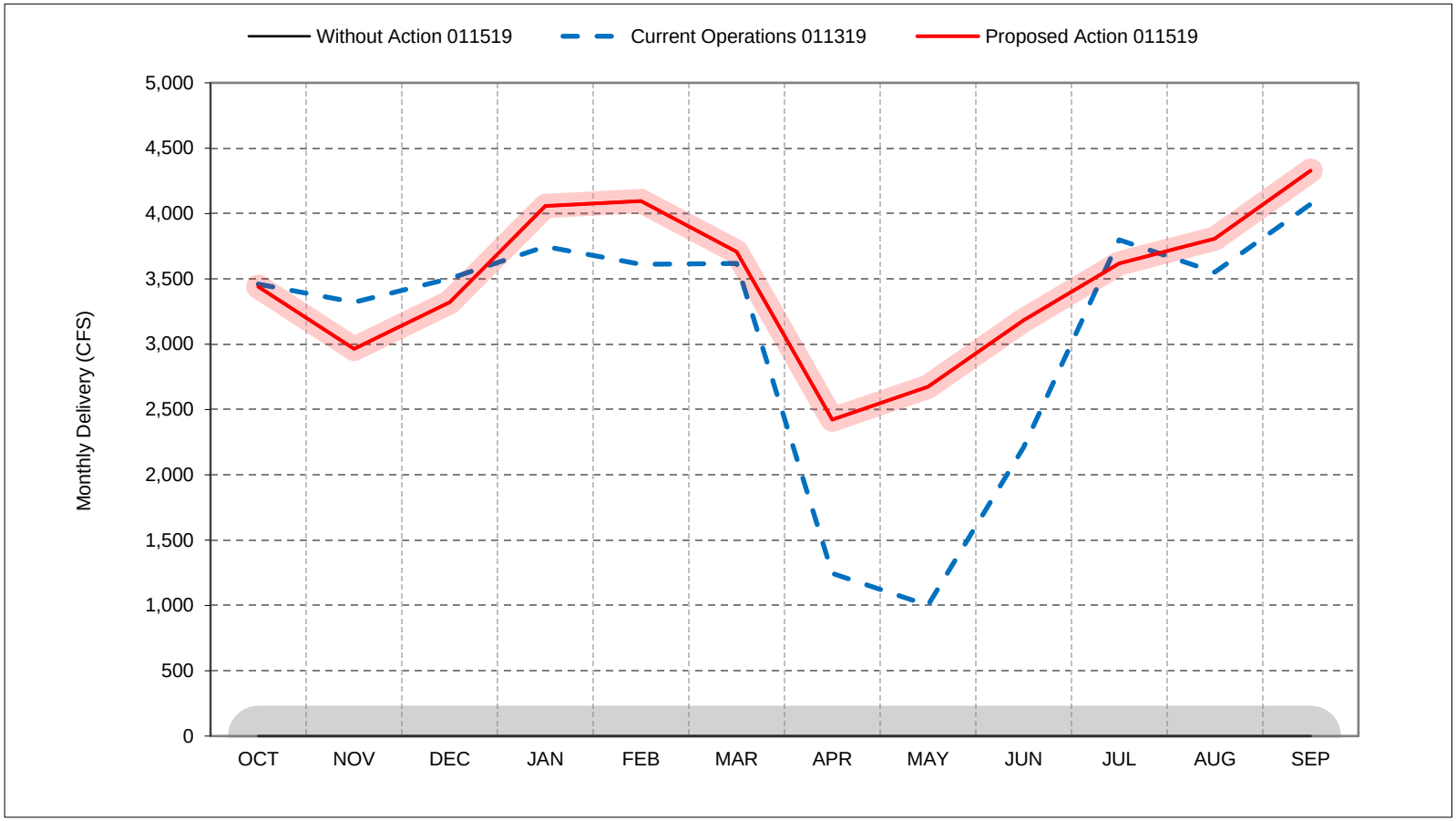
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 54-3. Jones PP Exports, Above Normal Year Average Delivery



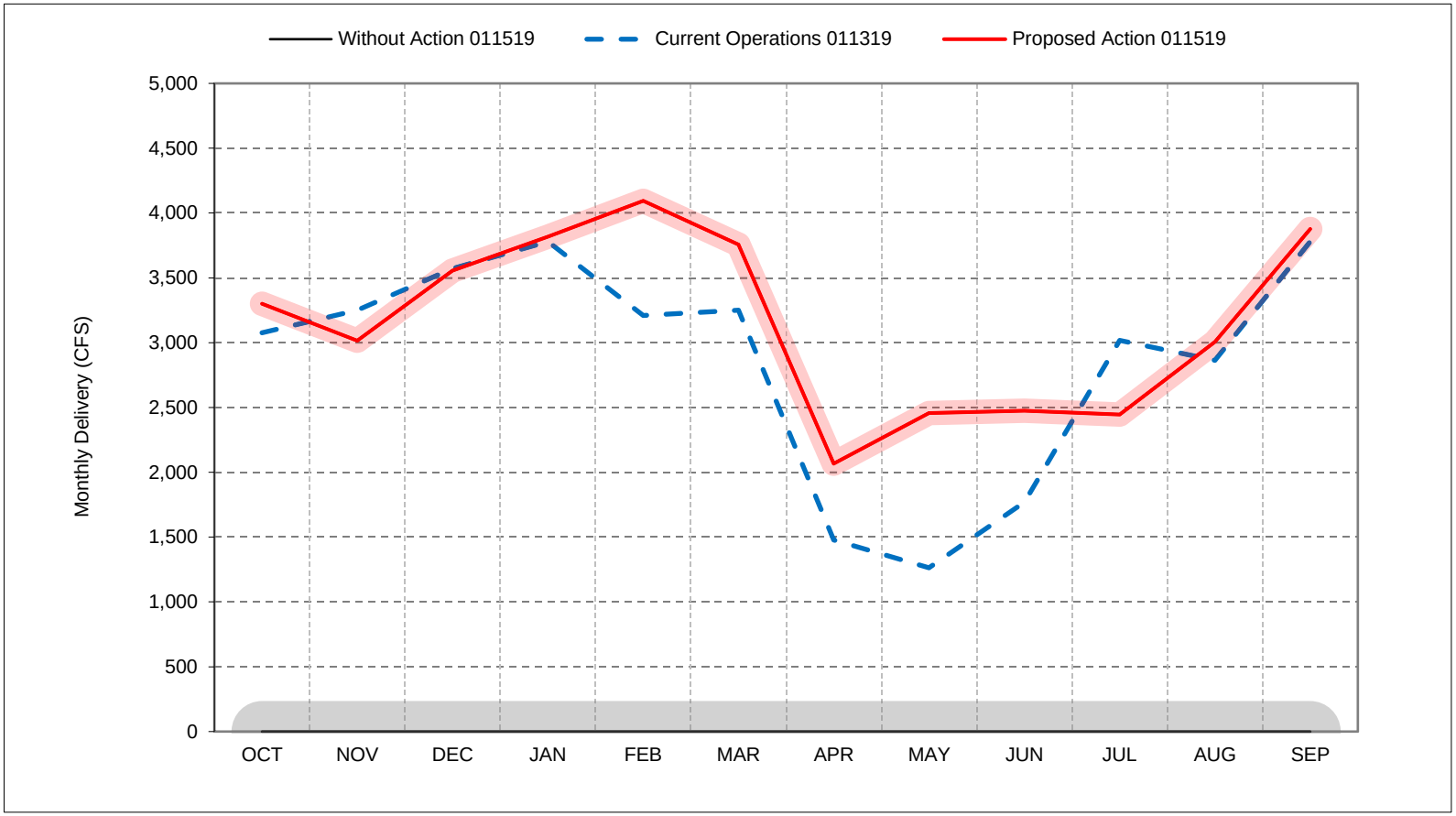
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 54-4. Jones PP Exports, Below Normal Year Average Delivery



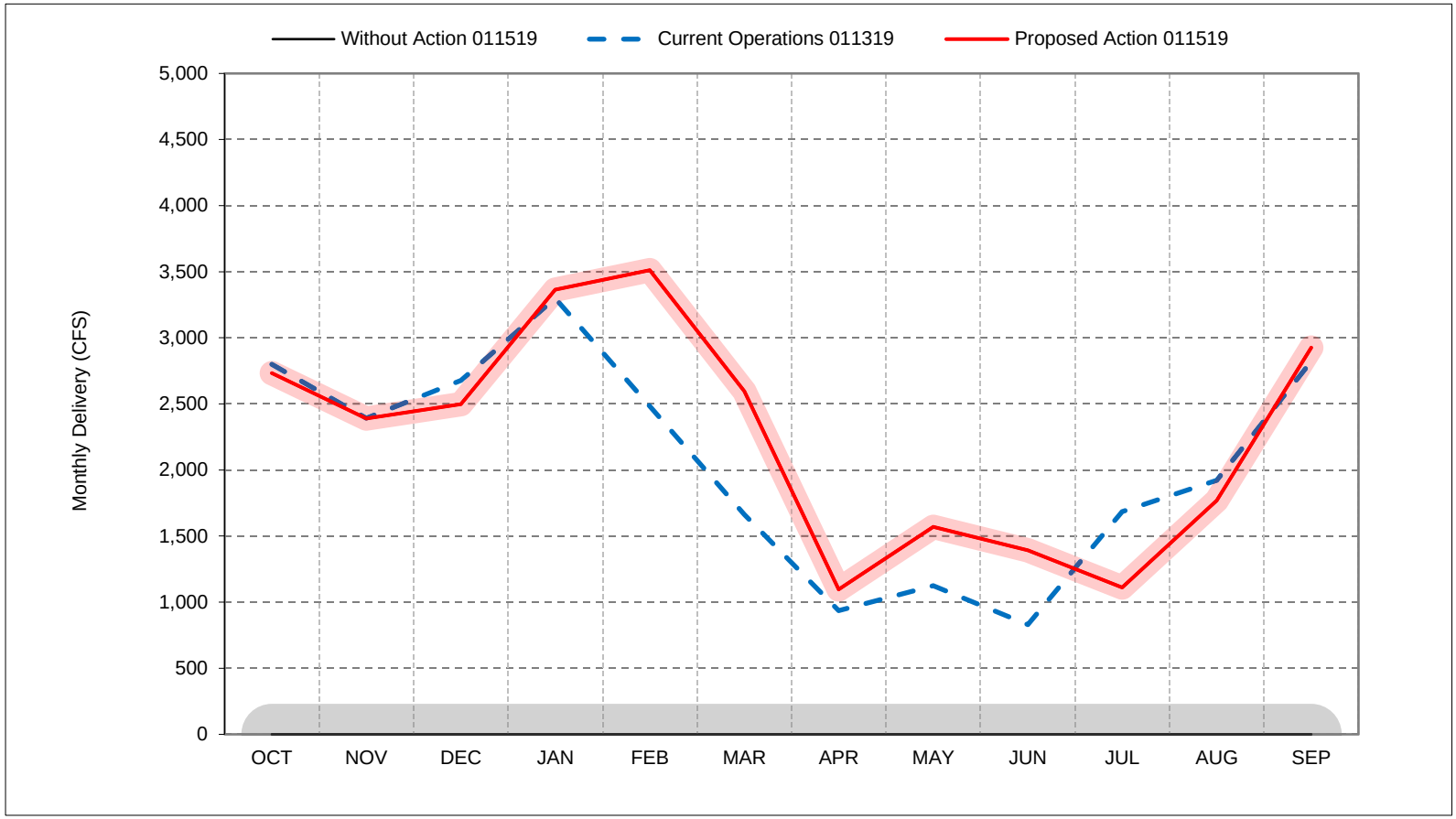
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 54-5. Jones PP Exports, Dry Year Average Delivery



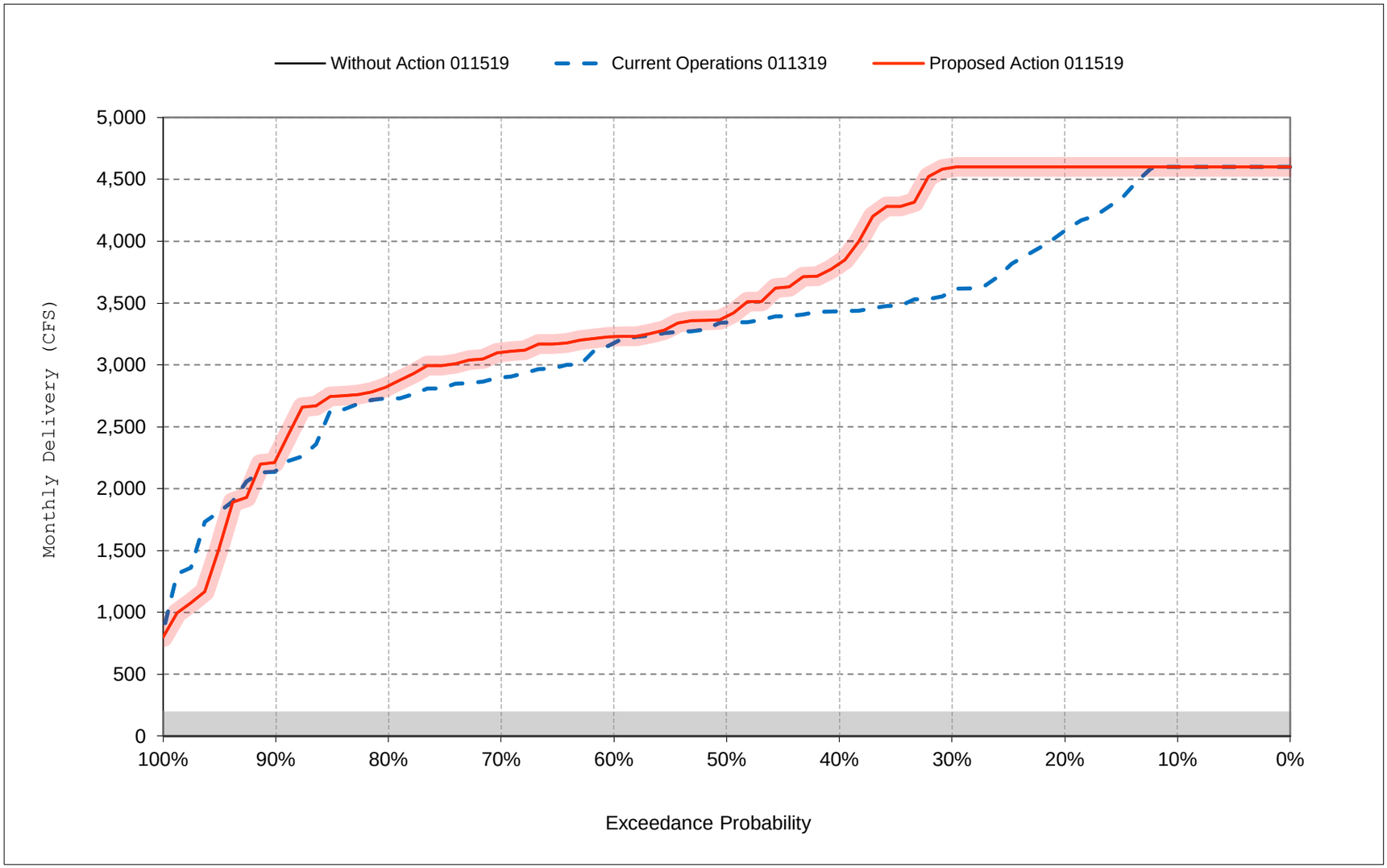
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 54-6. Jones PP Exports, Critical Year Average Delivery



*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

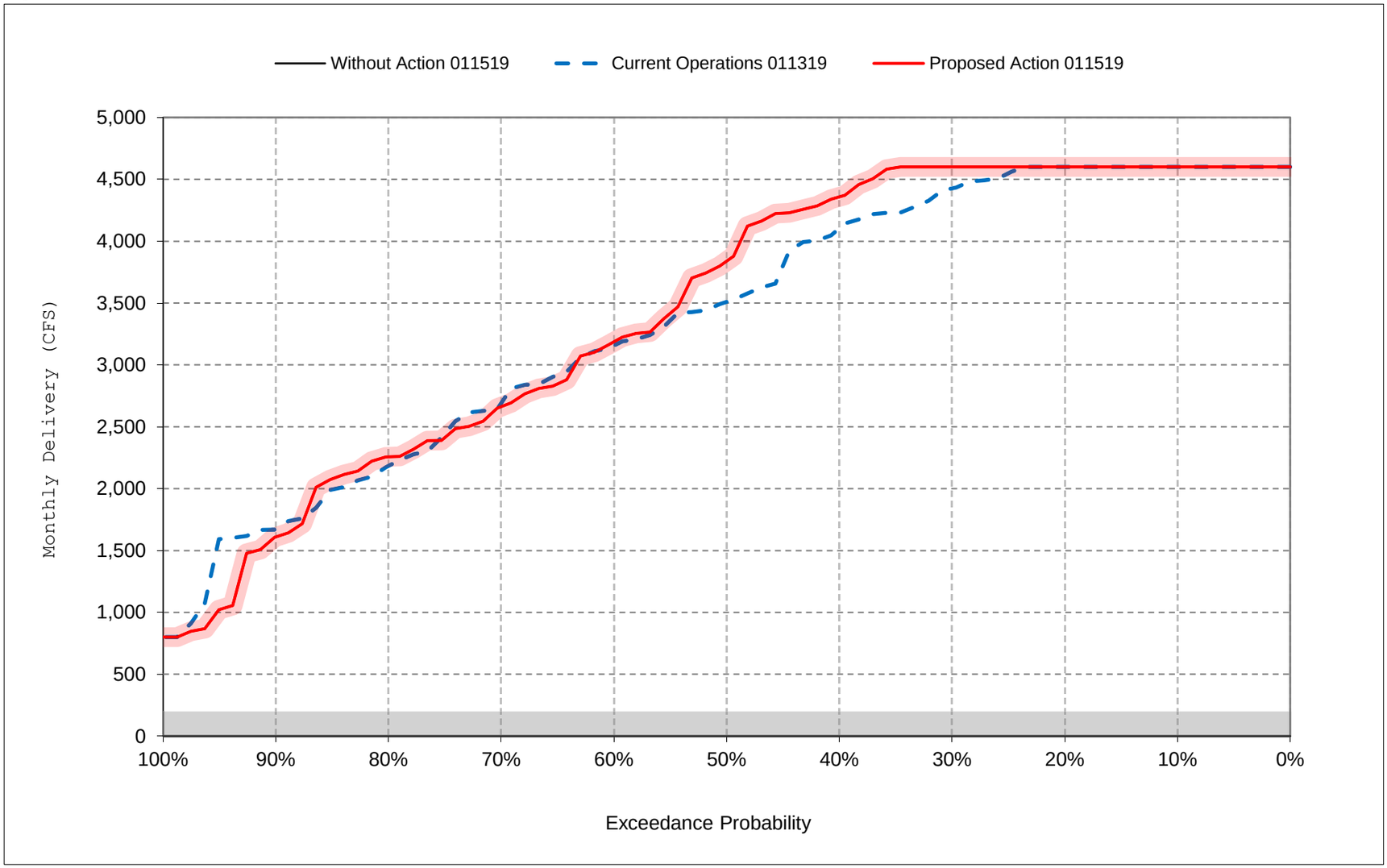
Figure 54-7. Jones PP Exports, October



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

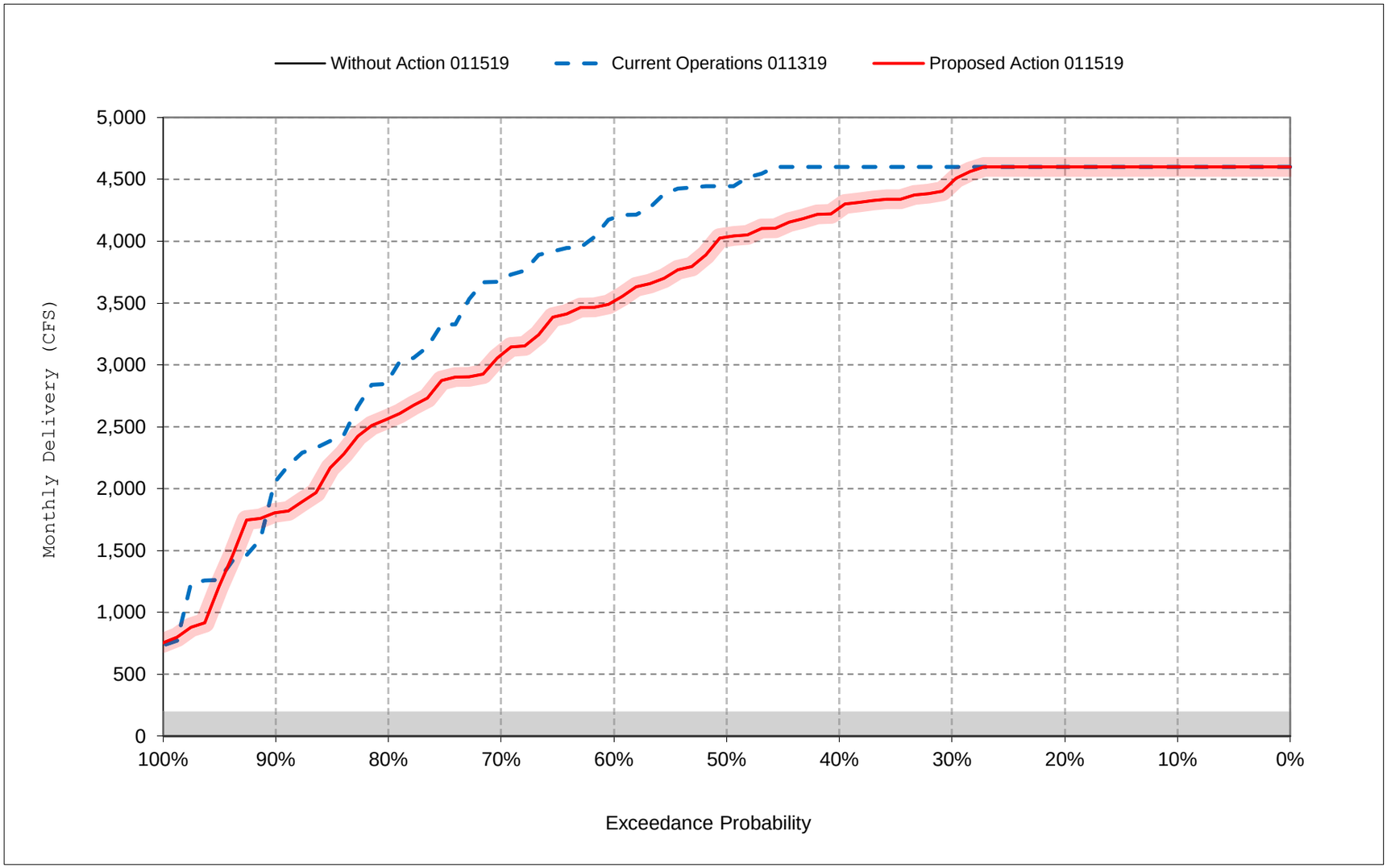
Figure 54-8. Jones PP Exports, November



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

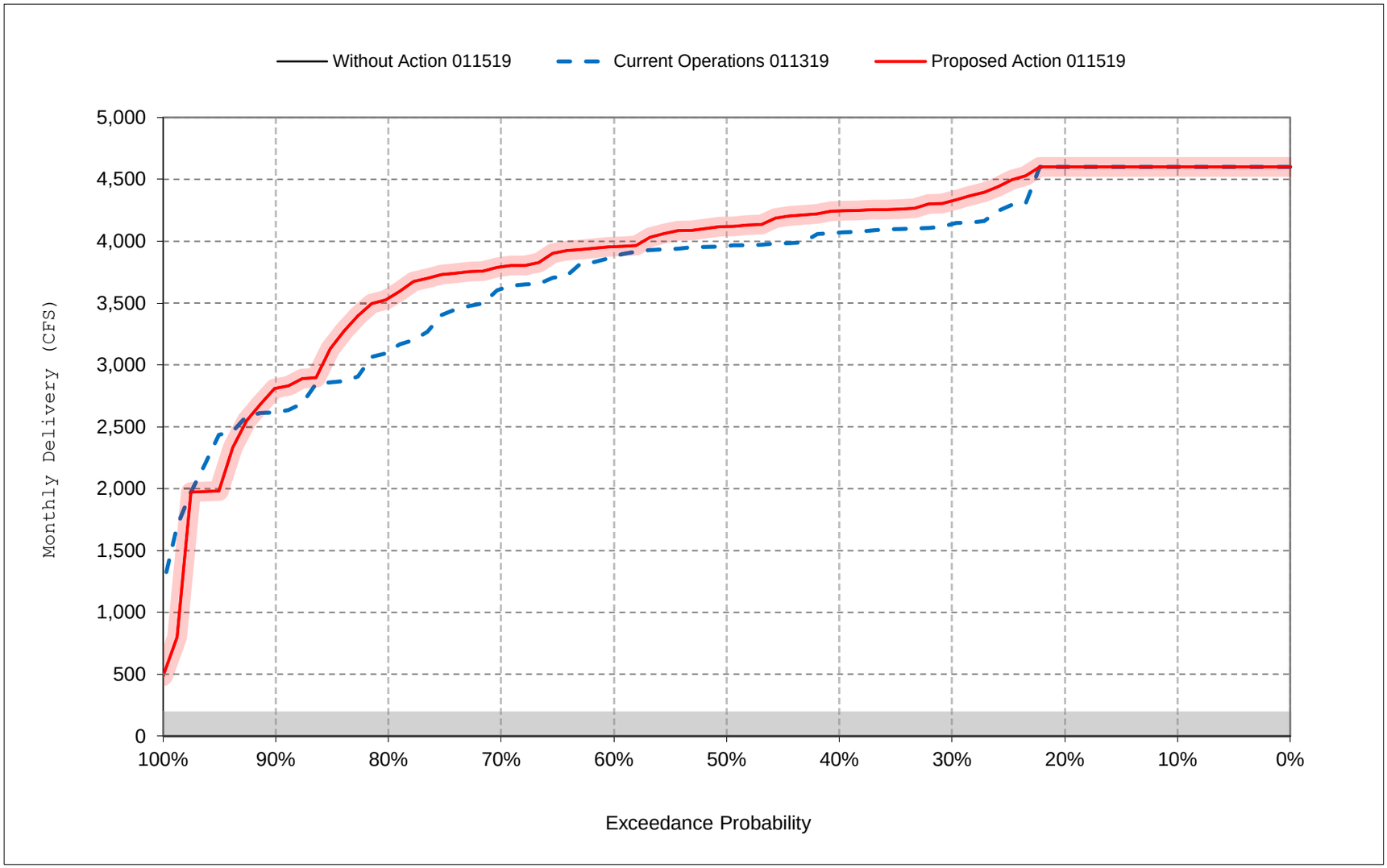
Figure 54-9. Jones PP Exports, December



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

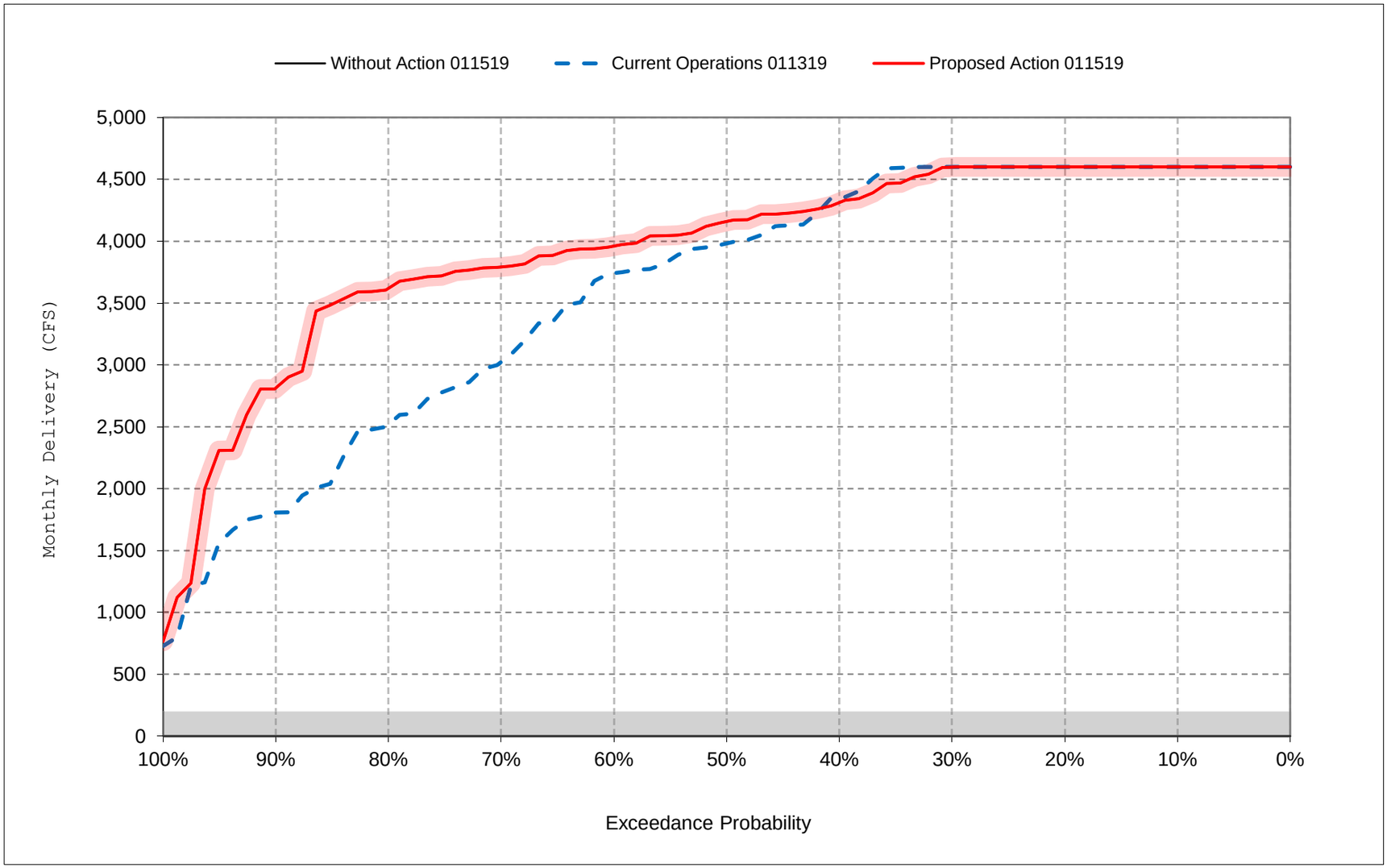
Figure 54-10. Jones PP Exports, January



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

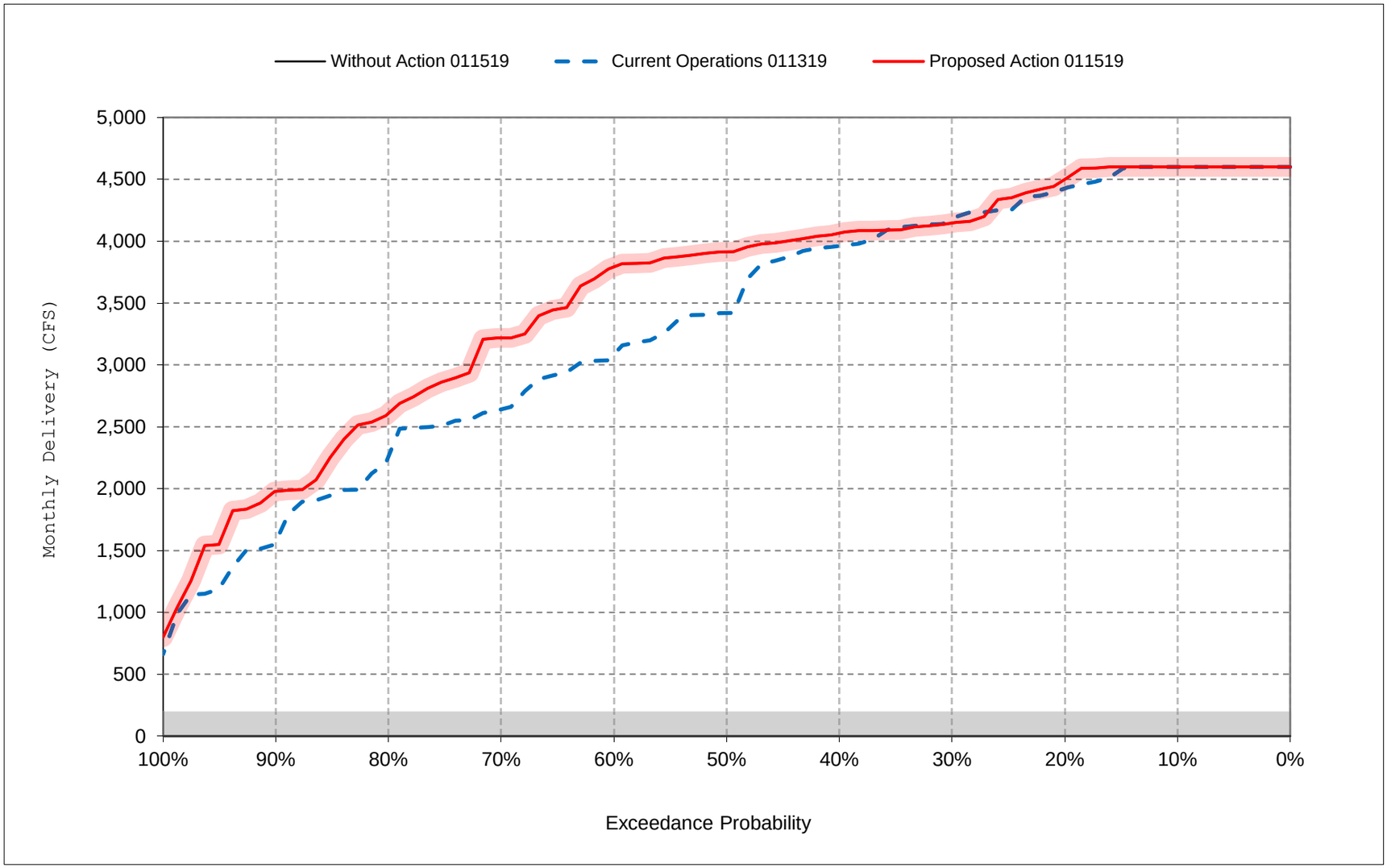
Figure 54-11. Jones PP Exports, February



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

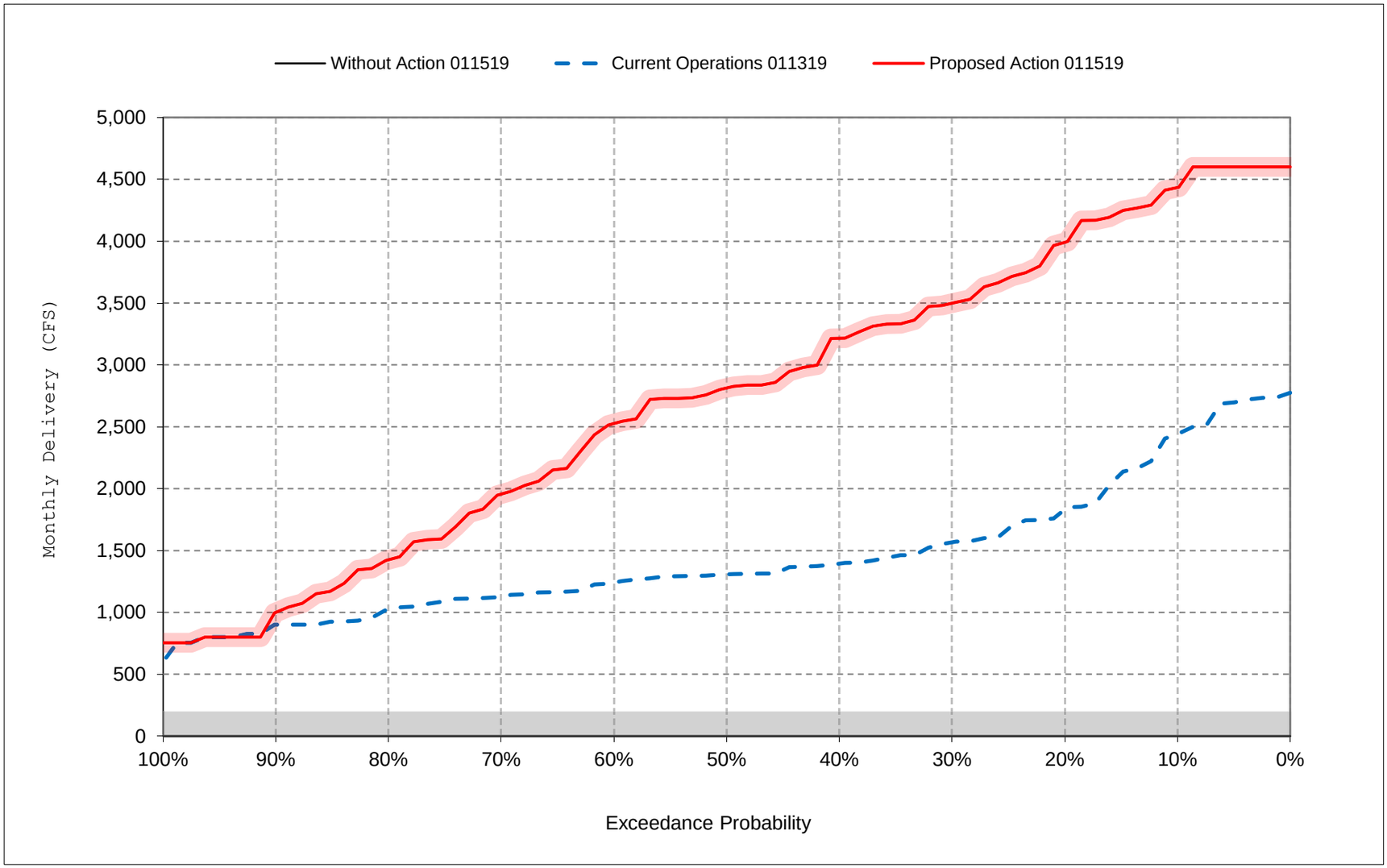
Figure 54-12. Jones PP Exports, March



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

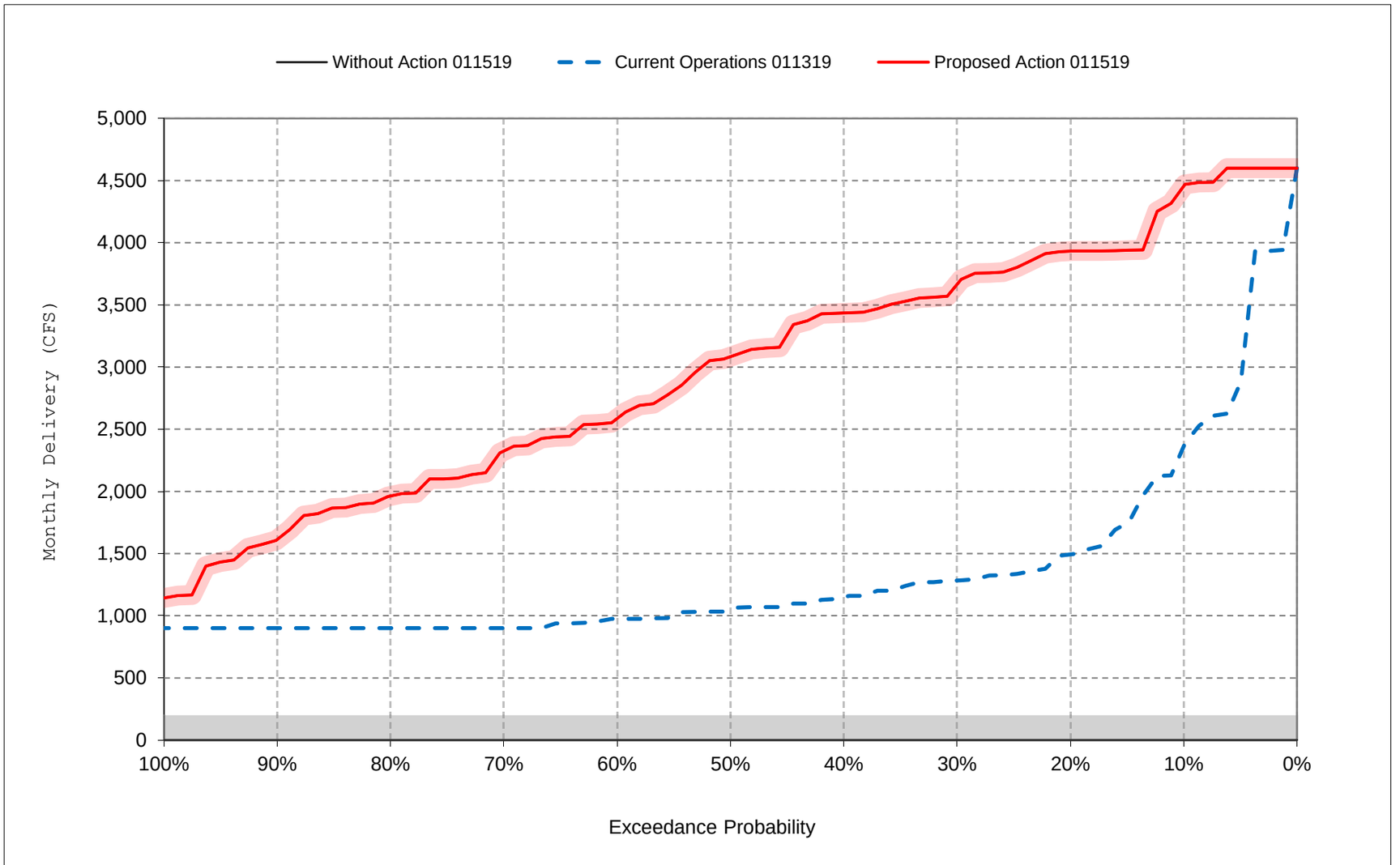
Figure 54-13. Jones PP Exports, April



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

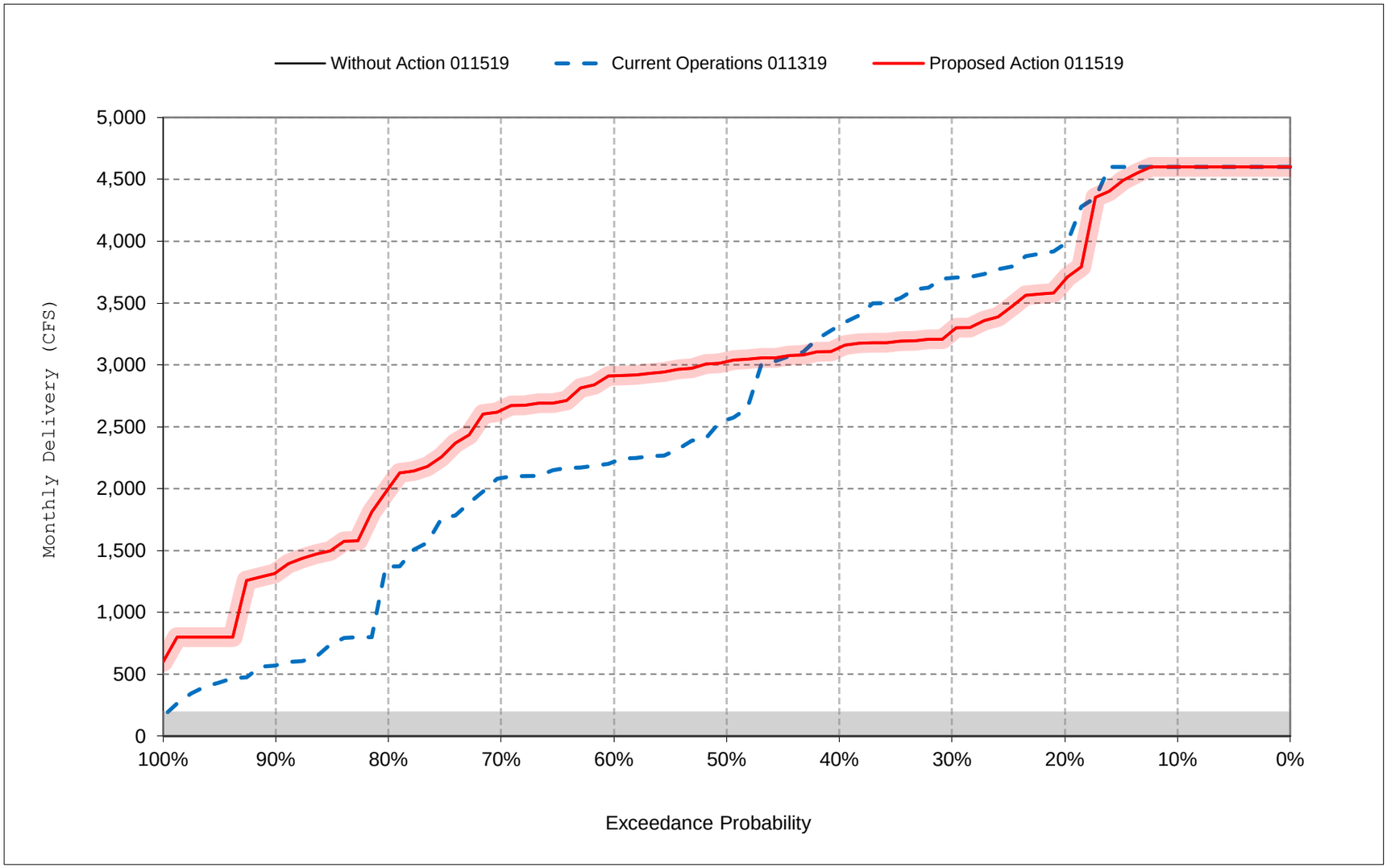
Figure 54-14. Jones PP Exports, May



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

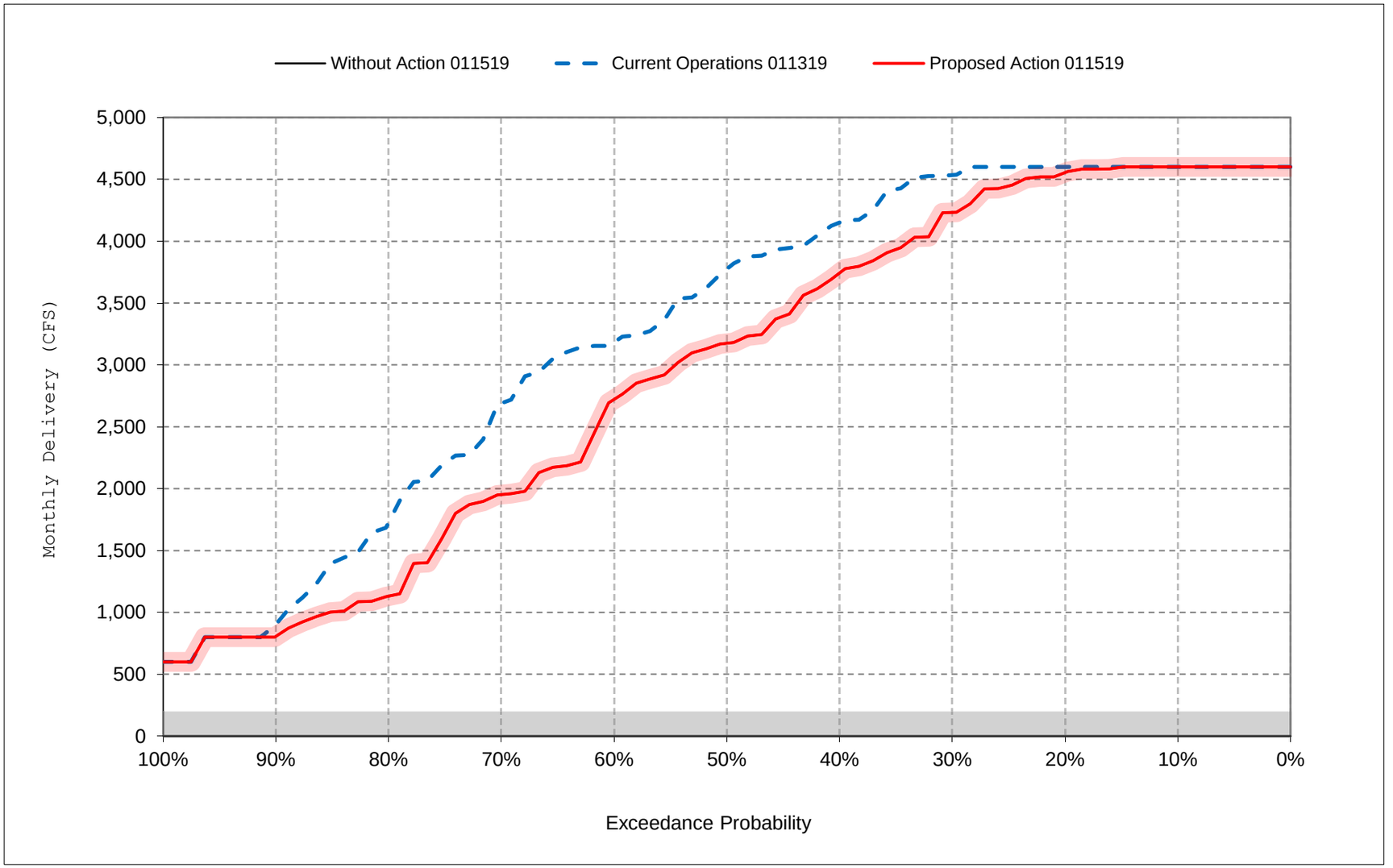
Figure 54-15. Jones PP Exports, June



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

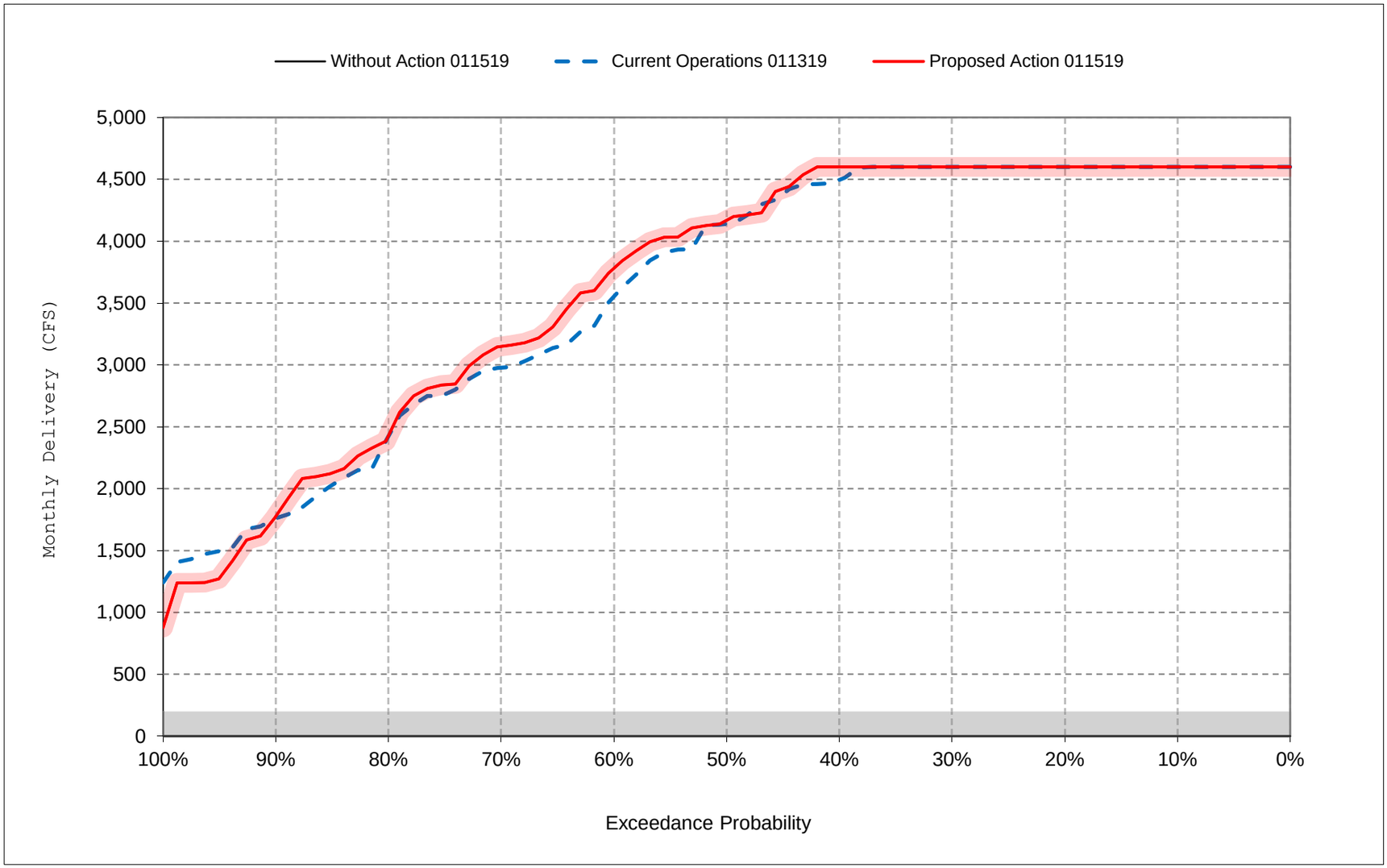
Figure 54-16. Jones PP Exports, July



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

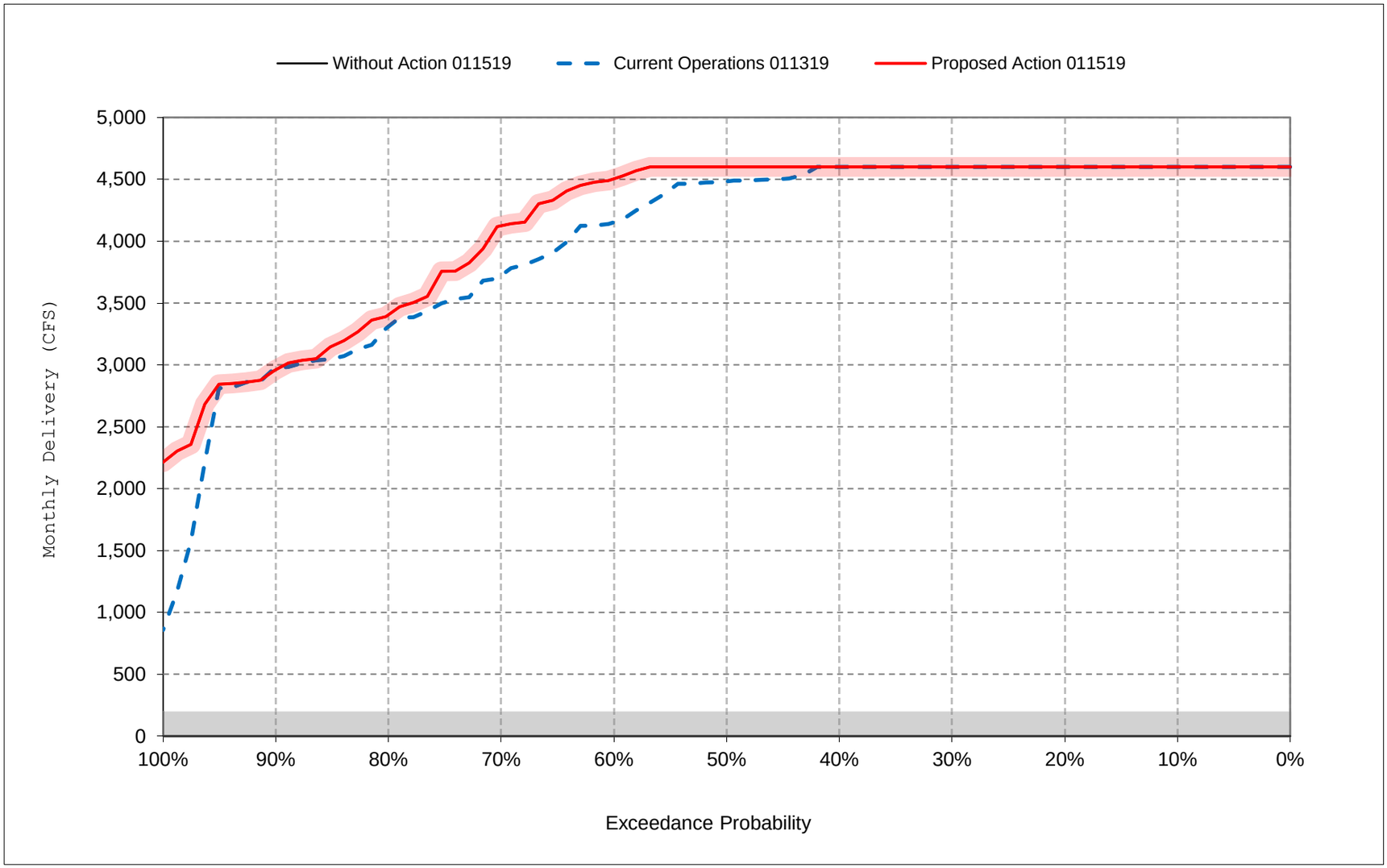
Figure 54-17. Jones PP Exports, August



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Figure 54-18. Jones PP Exports, September



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Table 55-1. CVP Banks PP Exports, Monthly Delivery

Without Action 011519

Statistic	Monthly Delivery (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types[b,c]												
Wet (32%)	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal (16%)	0	0	0	0	0	0	0	0	0	0	0	0
Below Normal (13%)	0	0	0	0	0	0	0	0	0	0	0	0
Dry (24%)	0	0	0	0	0	0	0	0	0	0	0	0
Critical (15%)	0	0	0	0	0	0	0	0	0	0	0	0

Current Operations 011319

Statistic	Monthly Delivery (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	1,867	0	0	0	0	0	0	0	861	339	0
20%	0	1,678	0	0	0	0	0	0	0	495	0	0
30%	0	1,235	0	0	0	0	0	0	0	78	0	0
40%	0	512	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	23	652	16	12	31	19	0	0	19	249	104	42
Water Year Types[b,c]												
Wet (32%)	0	1,421	40	38	96	2	0	0	60	50	0	0
Above Normal (16%)	0	1,255	22	0	0	0	0	0	0	0	0	0
Below Normal (13%)	173	0	0	0	0	0	0	0	0	92	449	317
Dry (24%)	0	10	0	0	0	76	0	0	0	757	178	0
Critical (15%)	0	0	0	0	0	0	0	0	0	246	0	0

Current Operations 011319 minus Without Action 011519

Statistic	Monthly Delivery (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	1,867	0	0	0	0	0	0	0	861	339	0
20%	0	1,678	0	0	0	0	0	0	0	495	0	0
30%	0	1,235	0	0	0	0	0	0	0	78	0	0
40%	0	512	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	23	652	16	12	31	19	0	0	19	249	104	42
Water Year Types[b,c]												
Wet (32%)	0	1,421	40	38	96	2	0	0	60	50	0	0
Above Normal (16%)	0	1,255	22	0	0	0	0	0	0	0	0	0
Below Normal (13%)	173	0	0	0	0	0	0	0	0	92	449	317
Dry (24%)	0	10	0	0	0	76	0	0	0	757	178	0
Critical (15%)	0	0	0	0	0	0	0	0	0	246	0	0

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 55-2. CVP Banks PP Exports, Monthly Delivery

Without Action 011519

Statistic	Monthly Delivery (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types[b,c]												
Wet (32%)	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal (16%)	0	0	0	0	0	0	0	0	0	0	0	0
Below Normal (13%)	0	0	0	0	0	0	0	0	0	0	0	0
Dry (24%)	0	0	0	0	0	0	0	0	0	0	0	0
Critical (15%)	0	0	0	0	0	0	0	0	0	0	0	0

Proposed Action 011519

Statistic	Monthly Delivery (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,415	404	0	0	0	0	0	0	0	903	633	548
20%	368	0	0	0	0	0	0	0	0	590	0	0
30%	29	0	0	0	0	0	0	0	0	193	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	296	128	28	15	65	28	0	0	19	250	179	204
Water Year Types[b,c]												
Wet (32%)	316	300	88	49	168	45	0	0	60	53	144	340
Above Normal (16%)	1,020	207	0	0	75	0	0	0	0	0	0	28
Below Normal (13%)	256	0	0	0	0	0	0	0	0	0	578	682
Dry (24%)	0	0	0	0	0	56	0	0	0	713	229	0
Critical (15%)	0	0	0	0	0	0	0	0	0	405	0	0

Proposed Action 011519 minus Without Action 011519

Statistic	Monthly Delivery (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,415	404	0	0	0	0	0	0	0	903	633	548
20%	368	0	0	0	0	0	0	0	0	590	0	0
30%	29	0	0	0	0	0	0	0	0	193	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	296	128	28	15	65	28	0	0	19	250	179	204
Water Year Types[b,c]												
Wet (32%)	316	300	88	49	168	45	0	0	60	53	144	340
Above Normal (16%)	1,020	207	0	0	75	0	0	0	0	0	0	28
Below Normal (13%)	256	0	0	0	0	0	0	0	0	0	578	682
Dry (24%)	0	0	0	0	0	56	0	0	0	713	229	0
Critical (15%)	0	0	0	0	0	0	0	0	0	405	0	0

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 55-3. CVP Banks PP Exports, Monthly Delivery

Current Operations 011319

Statistic	Monthly Delivery (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	1,867	0	0	0	0	0	0	0	861	339	0
20%	0	1,678	0	0	0	0	0	0	0	495	0	0
30%	0	1,235	0	0	0	0	0	0	0	78	0	0
40%	0	512	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	23	652	16	12	31	19	0	0	19	249	104	42
Water Year Types[b,c]												
Wet (32%)	0	1,421	40	38	96	2	0	0	60	50	0	0
Above Normal (16%)	0	1,255	22	0	0	0	0	0	0	0	0	0
Below Normal (13%)	173	0	0	0	0	0	0	0	0	92	449	317
Dry (24%)	0	10	0	0	0	76	0	0	0	757	178	0
Critical (15%)	0	0	0	0	0	0	0	0	0	246	0	0

Proposed Action 011519

Statistic	Monthly Delivery (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,415	404	0	0	0	0	0	0	0	903	633	548
20%	368	0	0	0	0	0	0	0	0	590	0	0
30%	29	0	0	0	0	0	0	0	0	193	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	296	128	28	15	65	28	0	0	19	250	179	204
Water Year Types[b,c]												
Wet (32%)	316	300	88	49	168	45	0	0	60	53	144	340
Above Normal (16%)	1,020	207	0	0	75	0	0	0	0	0	0	28
Below Normal (13%)	256	0	0	0	0	0	0	0	0	0	578	682
Dry (24%)	0	0	0	0	0	56	0	0	0	713	229	0
Critical (15%)	0	0	0	0	0	0	0	0	0	405	0	0

Proposed Action 011519 minus Current Operations 011319

Statistic	Monthly Delivery (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	1,415	**-1,463**	0	0	0	0	0	0	0	42	294	548
20%	368	**-1,678**	0	0	0	0	0	0	0	95	0	0
30%	29	**-1,235**	0	0	0	0	0	0	0	115	0	0
40%	0	**-512**	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	273	**-524**	12	3	35	9	0	0	0	1	75	161
Water Year Types[b,c]												
Wet (32%)	316	**-1,121**	48	11	72	43	0	0	0	3	144	340
Above Normal (16%)	1,020	**-1,048**	**-22**	0	75	0	0	0	0	0	0	28
Below Normal (13%)	83	0	0	0	0	0	0	0	0	**-92**	128	366
Dry (24%)	0	**-10**	0	0	0	**-20**	0	0	0	**-45**	51	0
Critical (15%)	0	0	0	0	0	0	0	0	0	159	0	0

a Based on the 82-year simulation period.

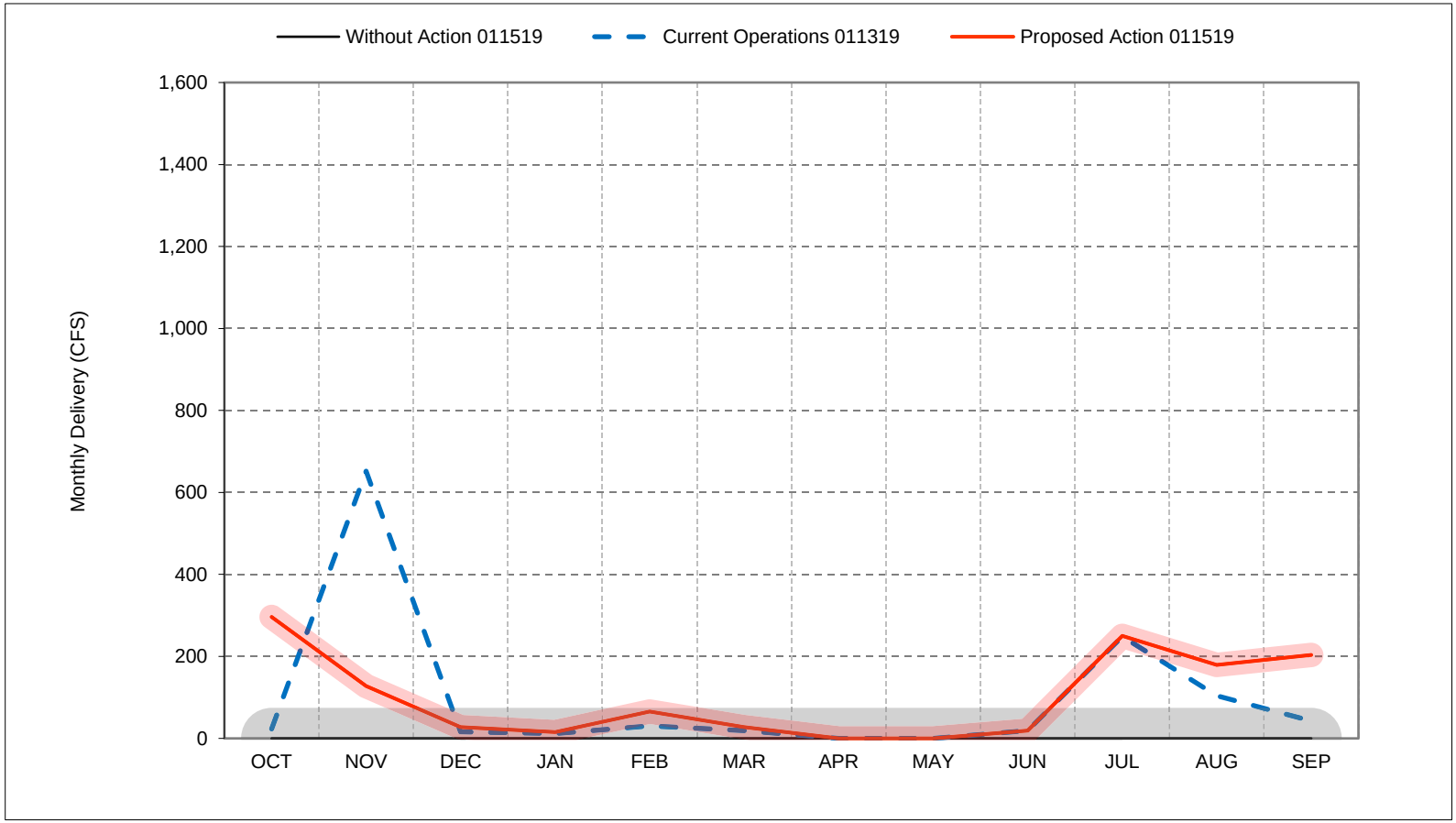
b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

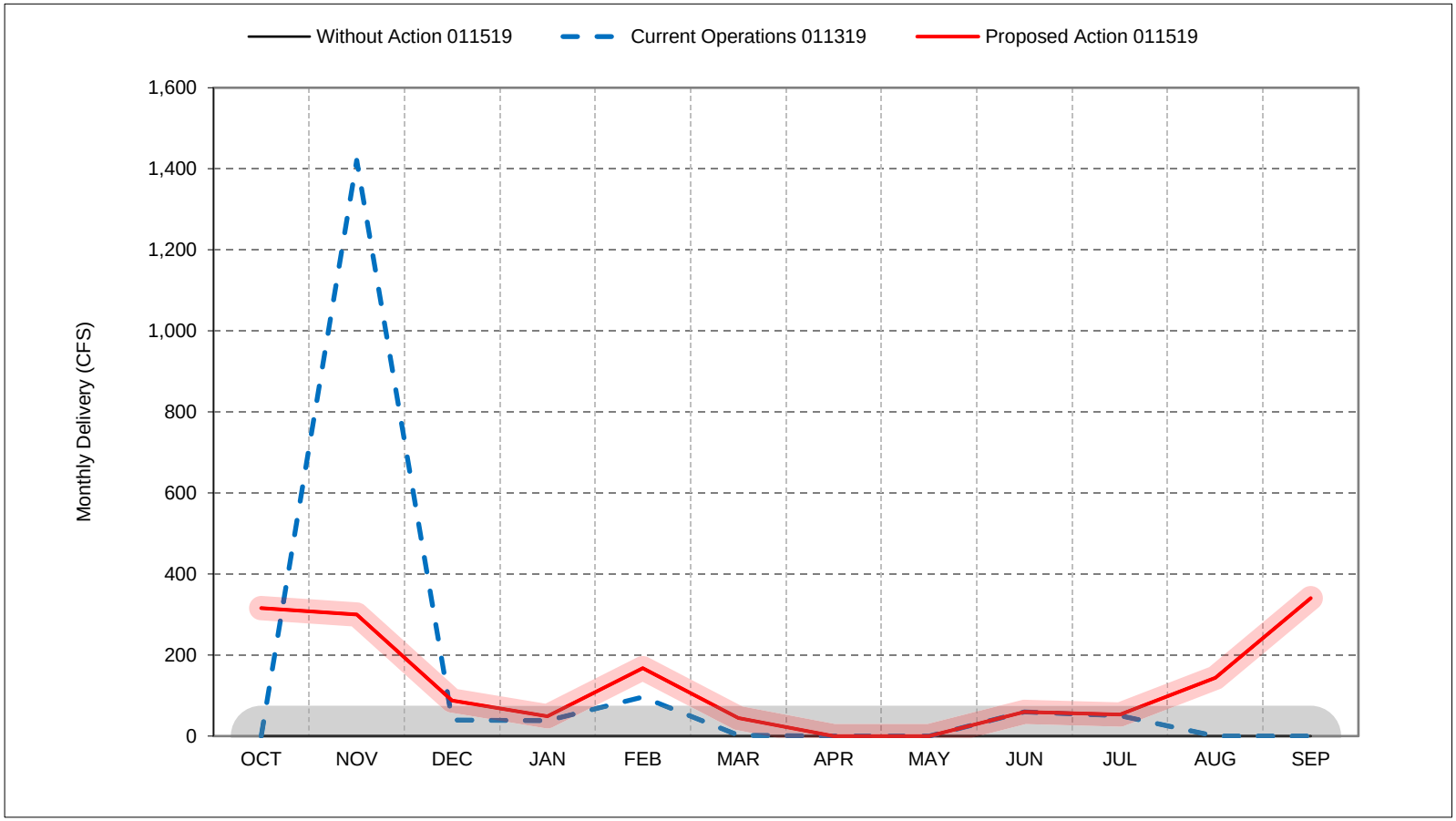
e These are draft results meant for qualitative analysis and are subject to revision.

Figure 55-1. CVP Banks PP Exports, Long-Term Average Delivery



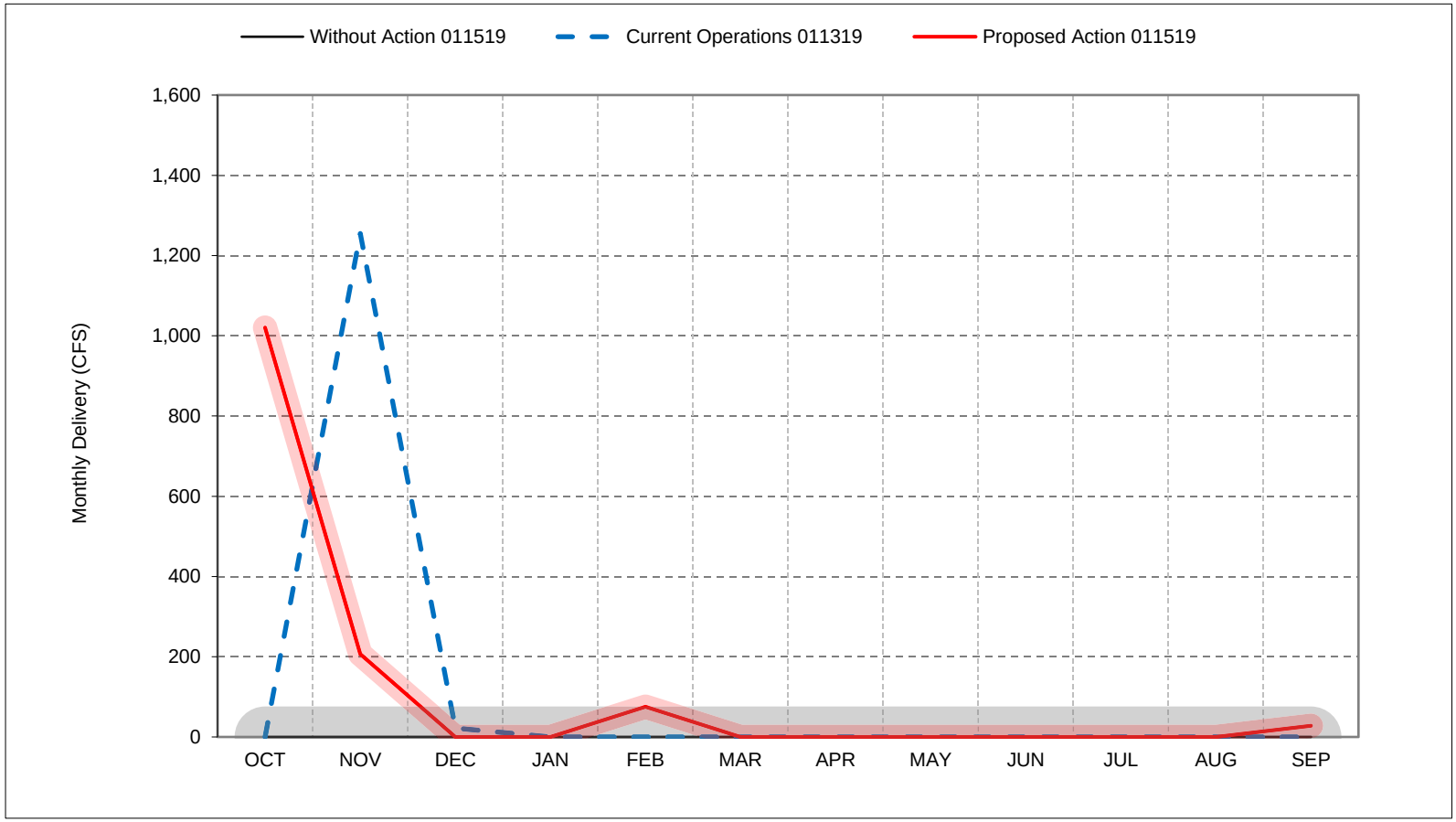
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 55-2. CVP Banks PP Exports, Wet Year Average Delivery



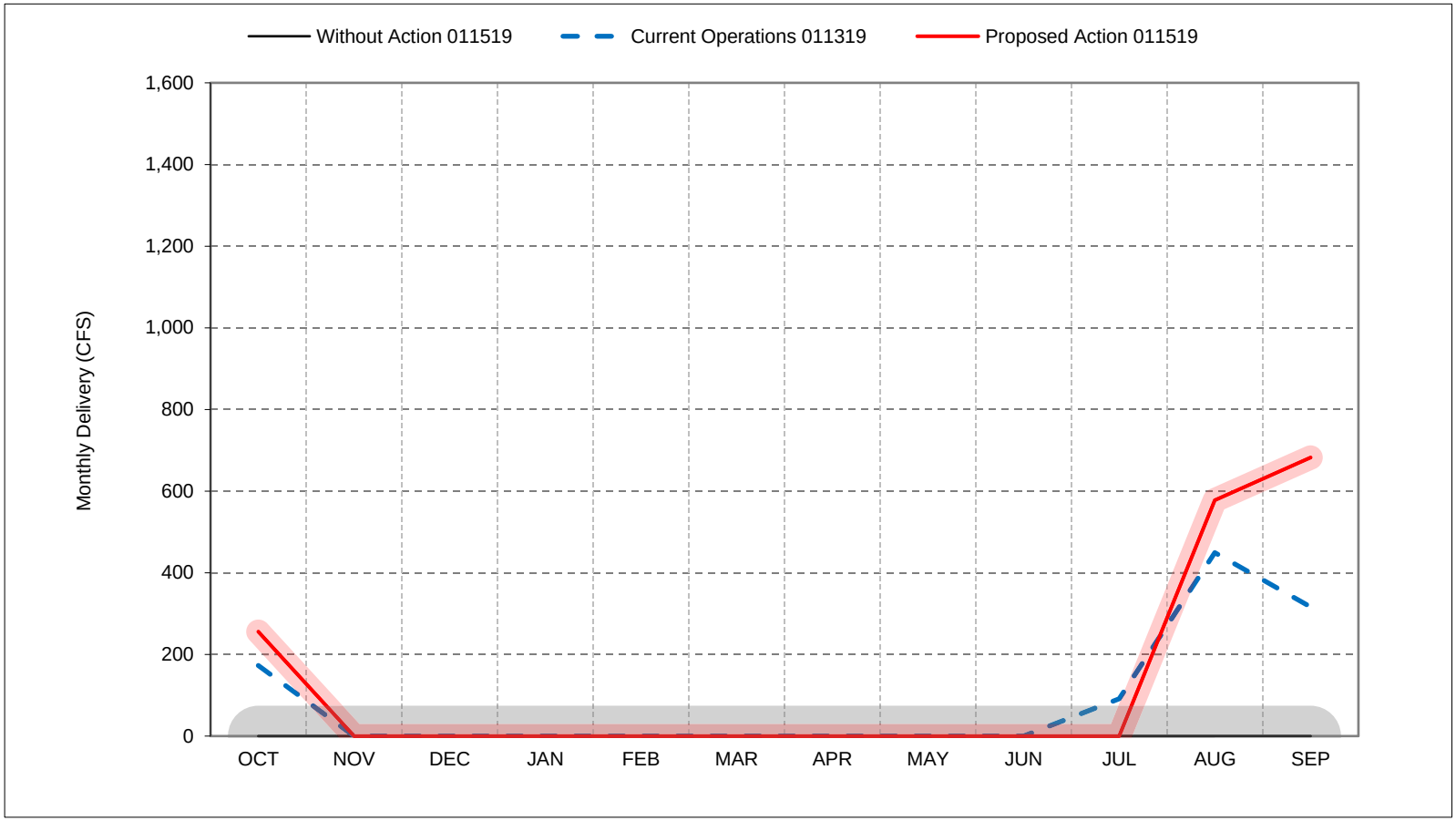
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 55-3. CVP Banks PP Exports, Above Normal Year Average Delivery



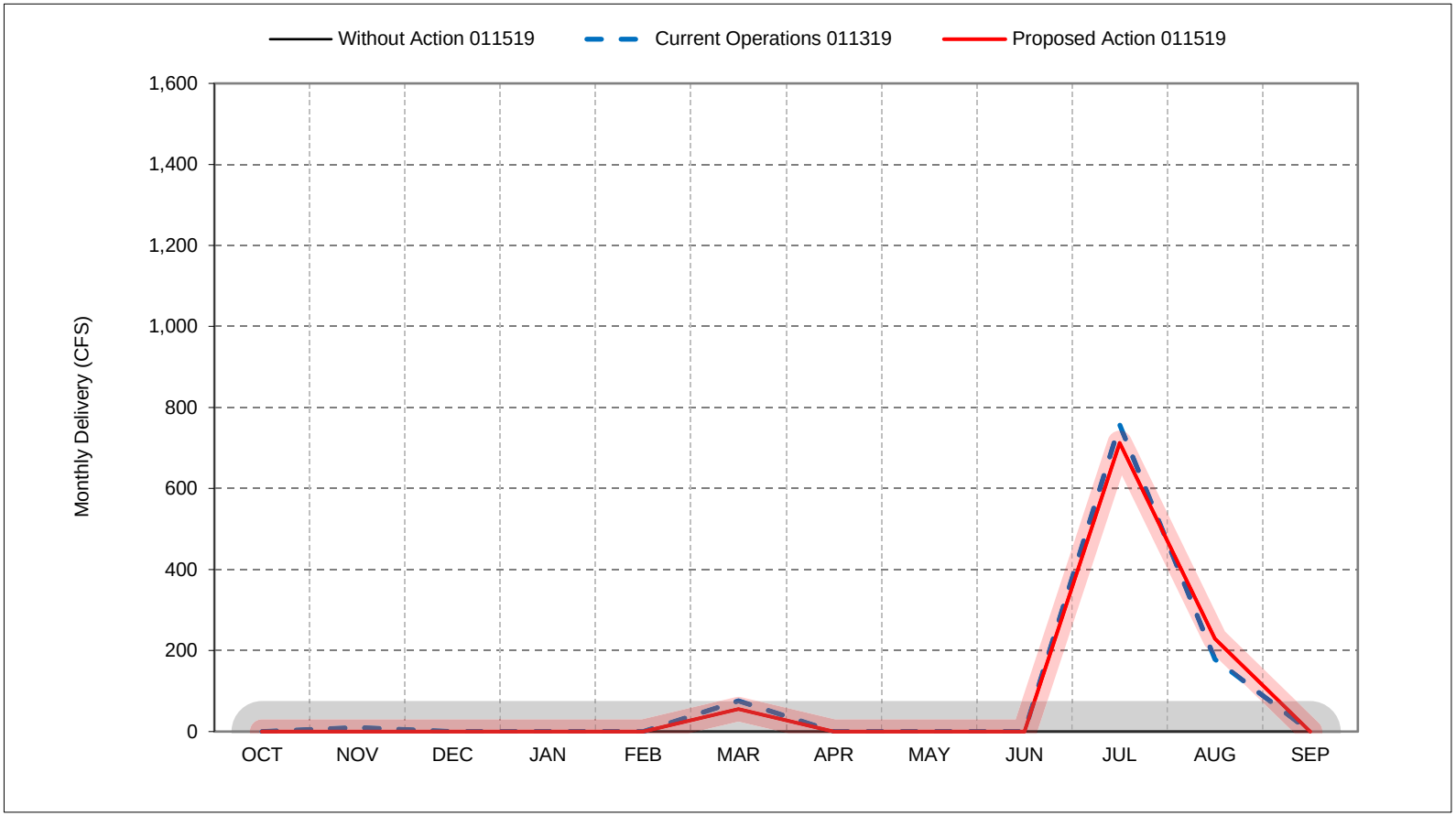
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 55-4. CVP Banks PP Exports, Below Normal Year Average Delivery



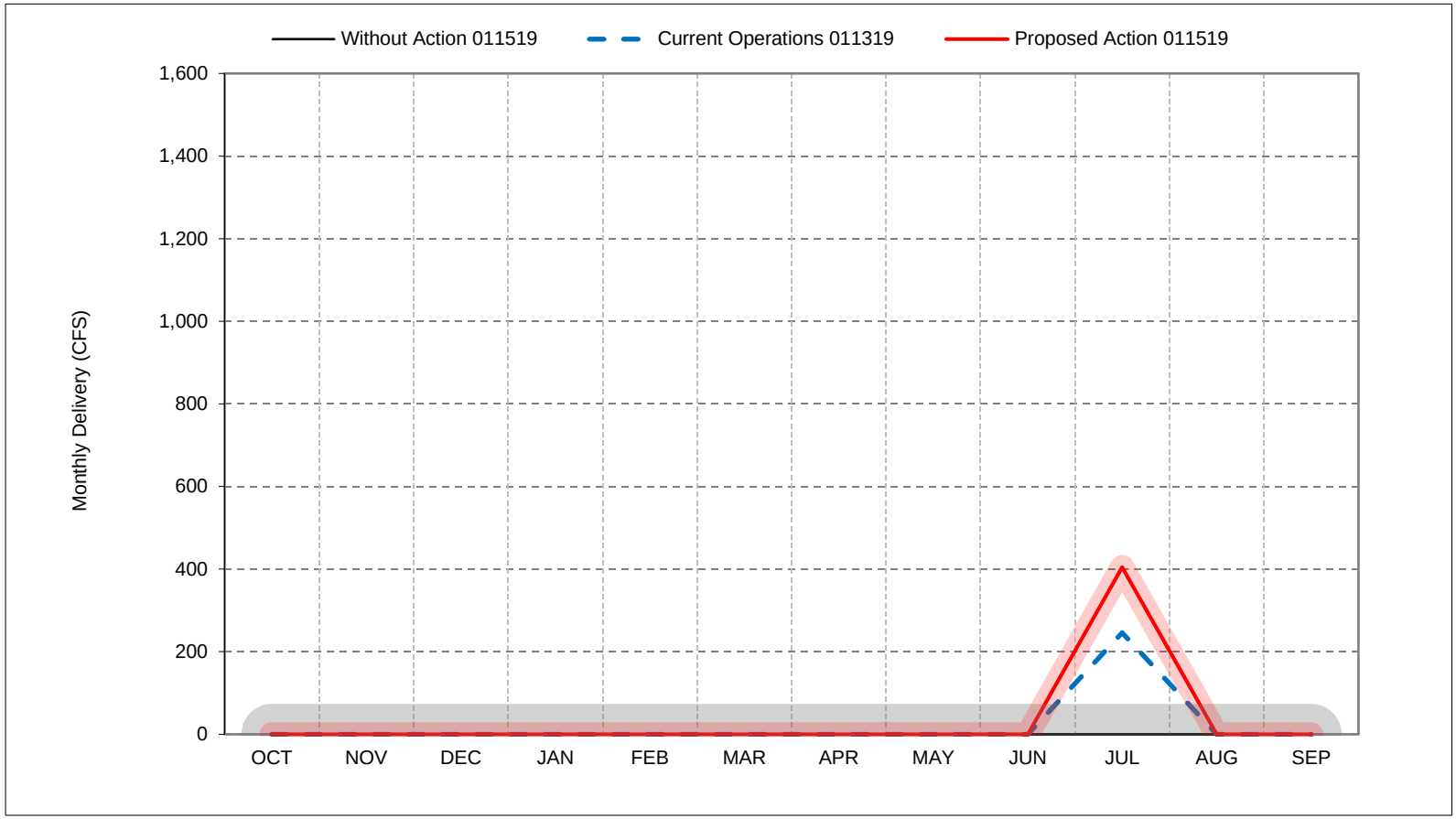
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 55-5. CVP Banks PP Exports, Dry Year Average Delivery



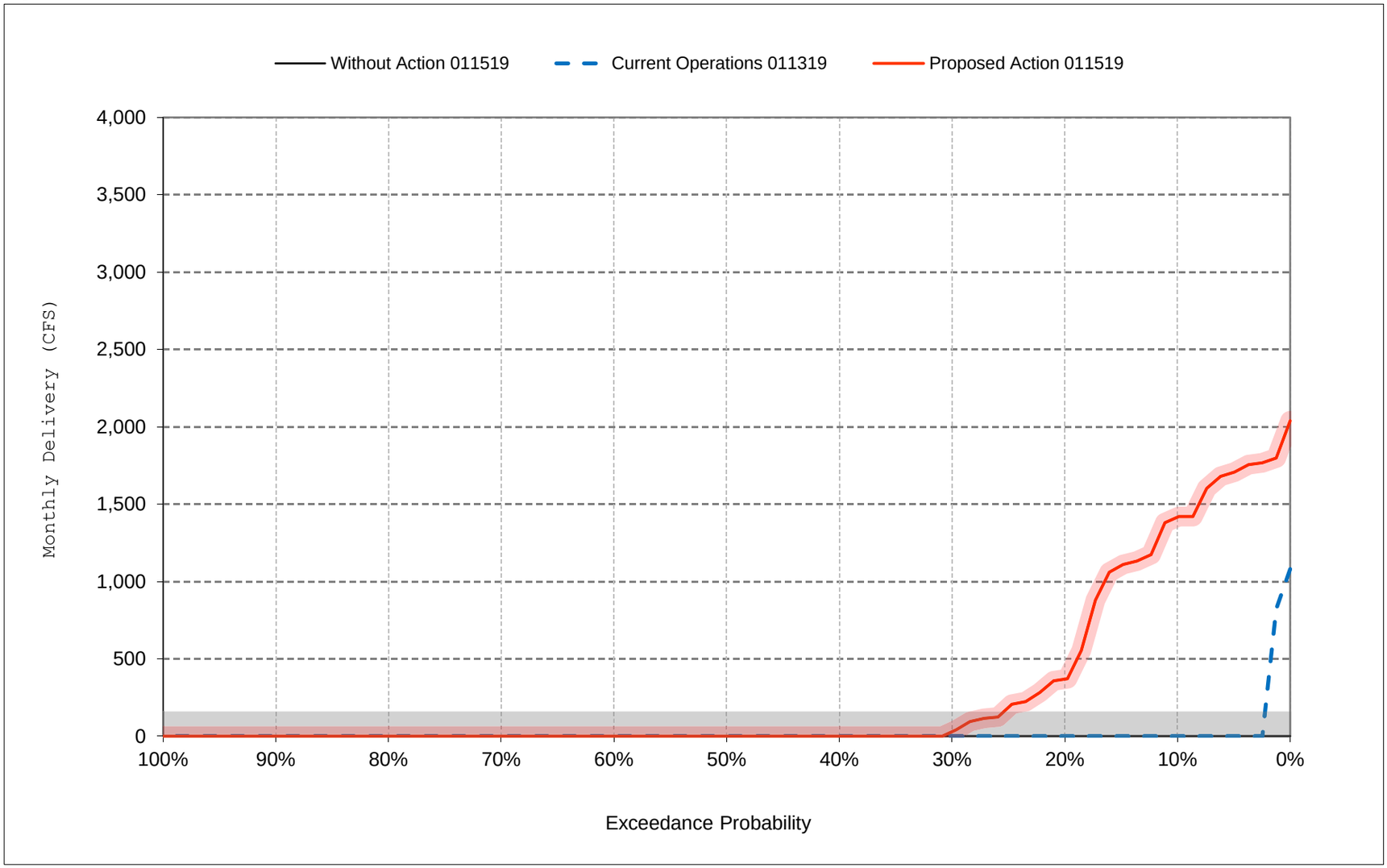
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 55-6. CVP Banks PP Exports, Critical Year Average Delivery



*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

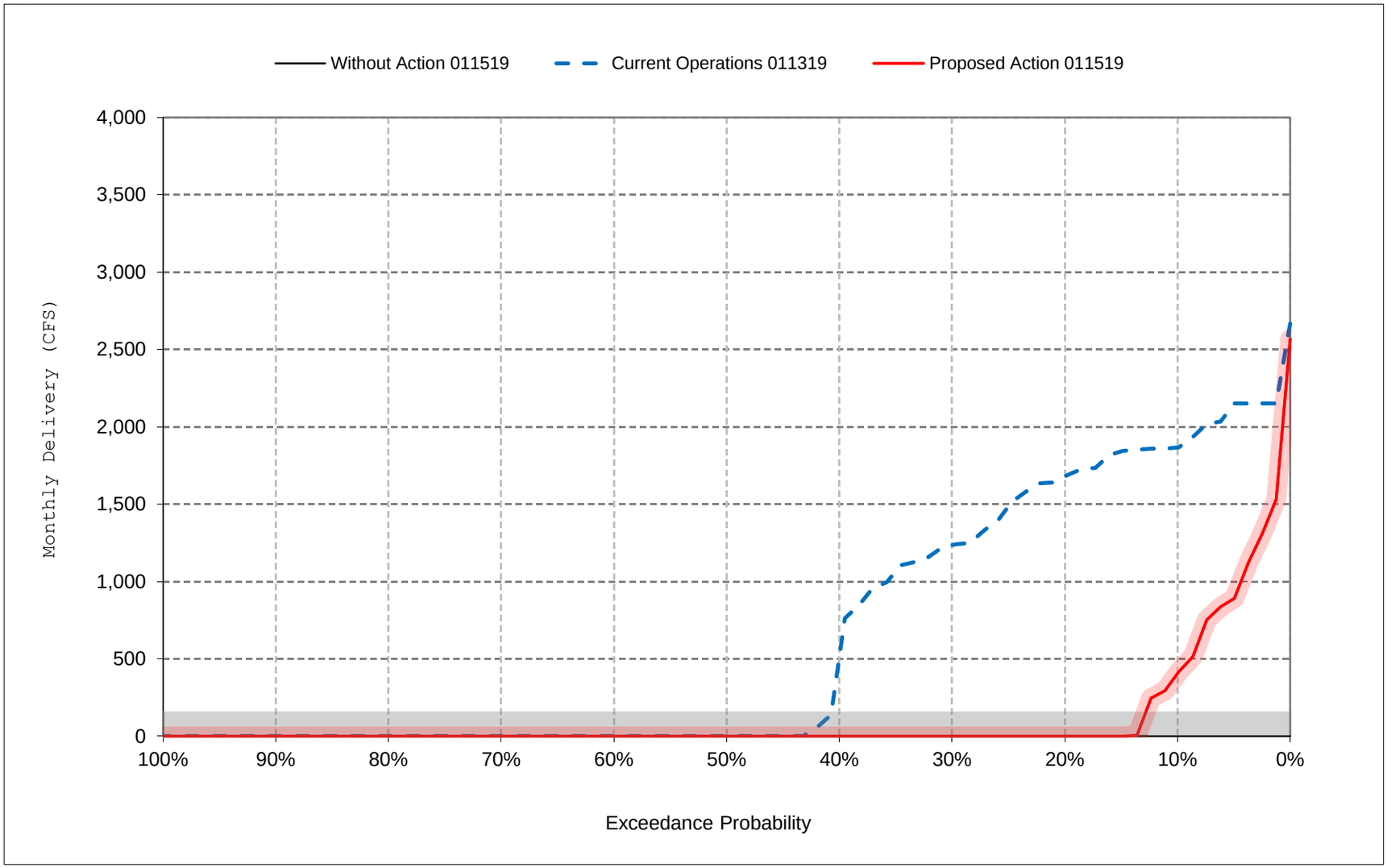
Figure 55-7. CVP Banks PP Exports, October



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

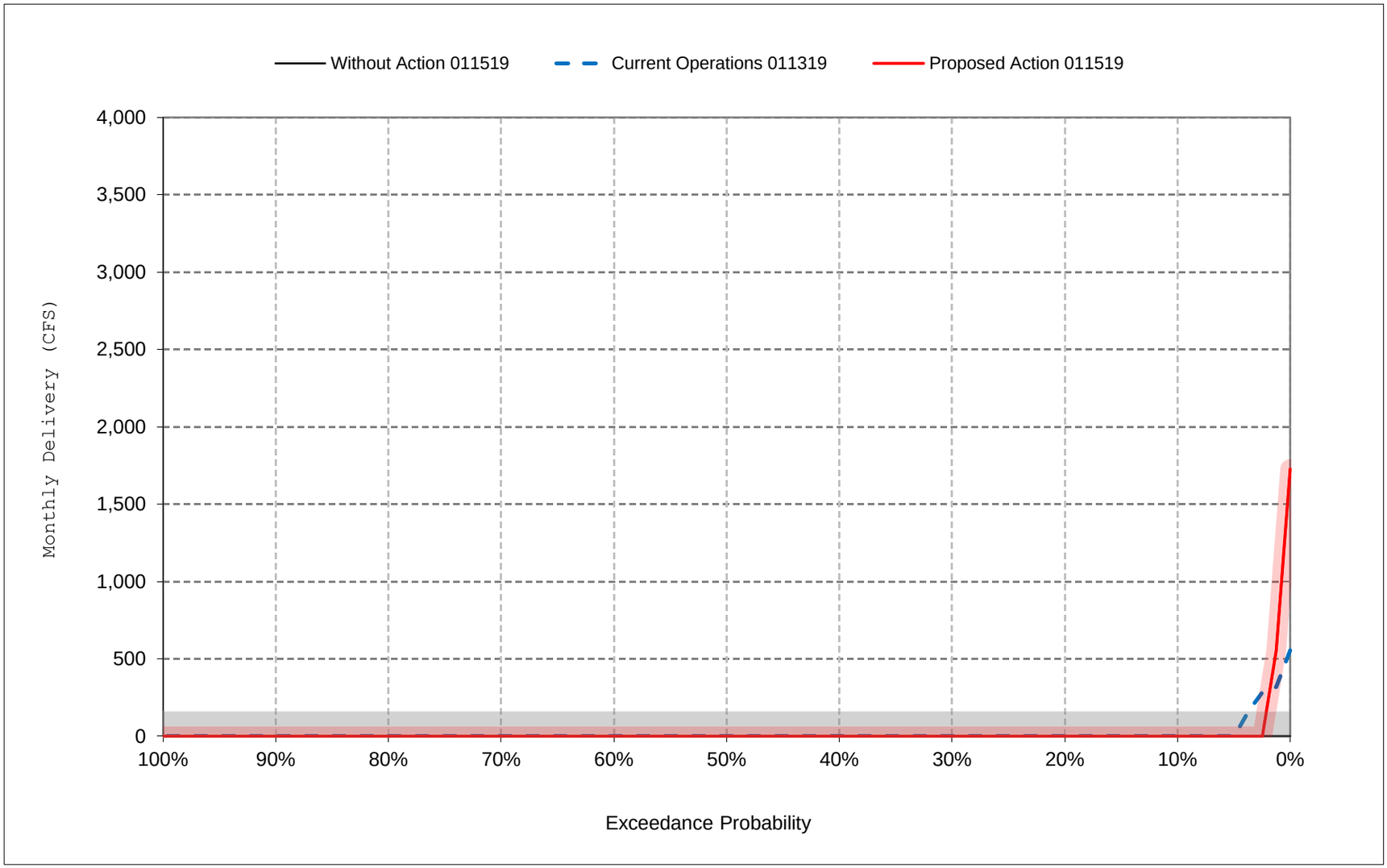
Figure 55-8. CVP Banks PP Exports, November



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

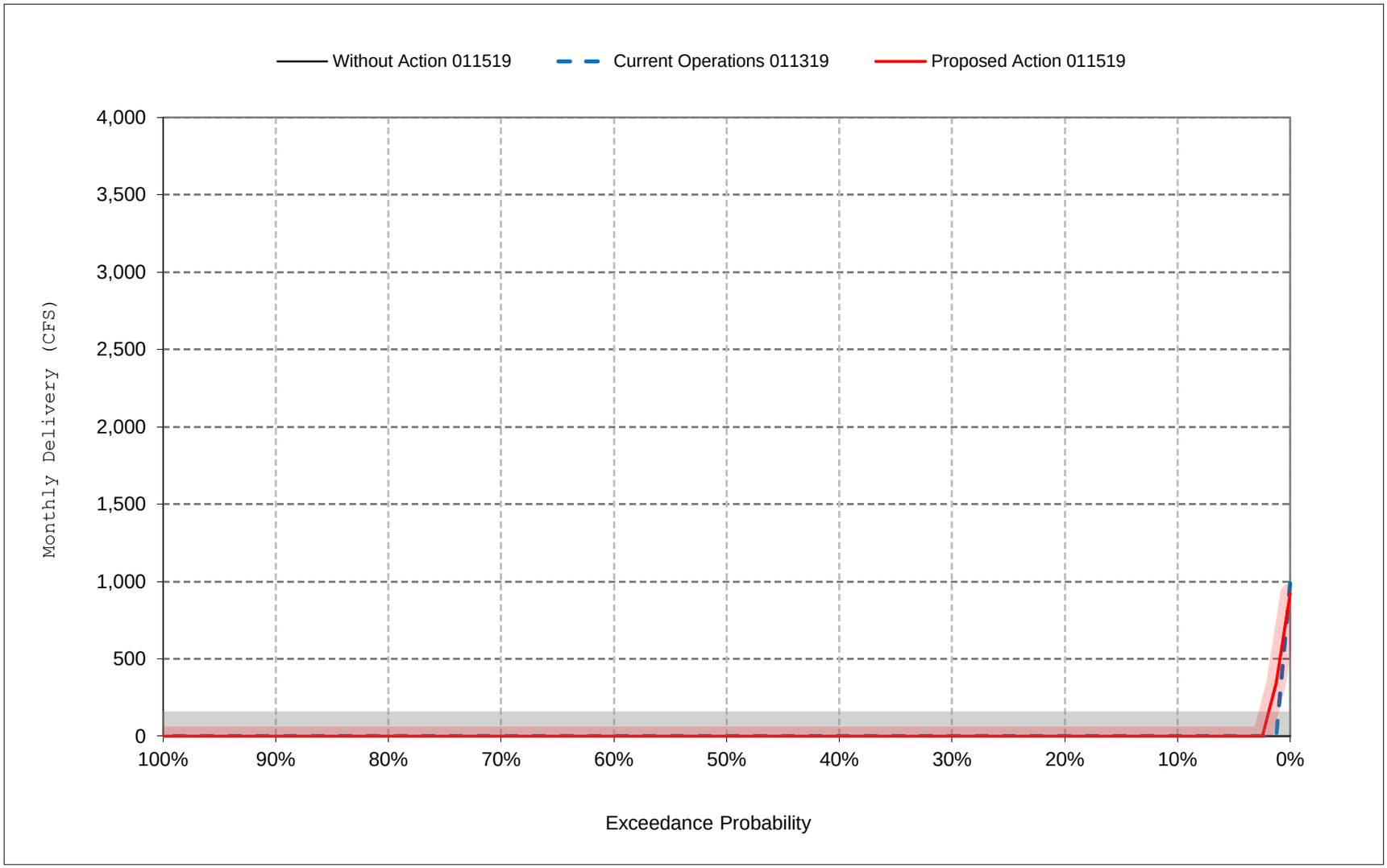
Figure 55-9. CVP Banks PP Exports, December



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

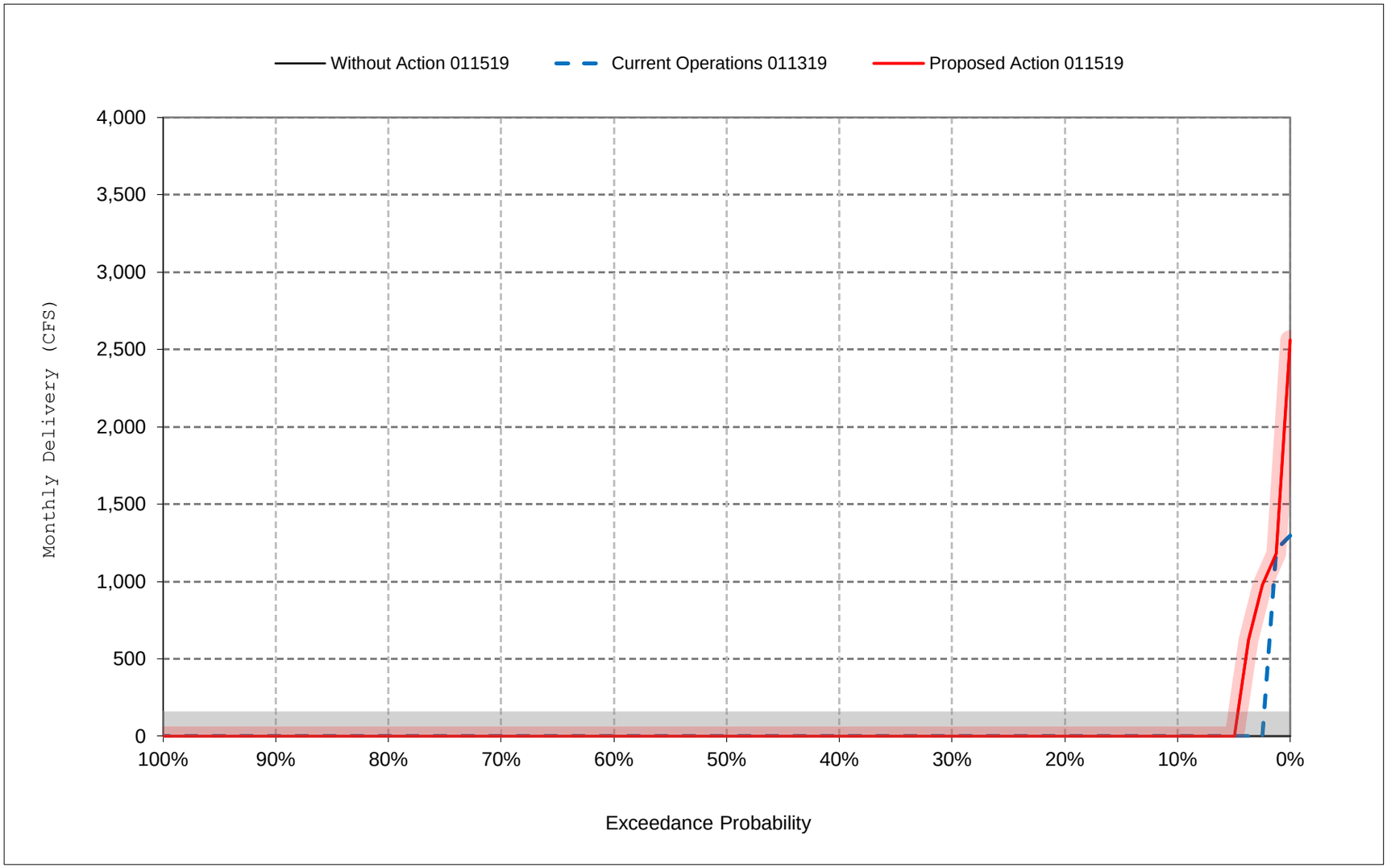
Figure 55-10. CVP Banks PP Exports, January



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

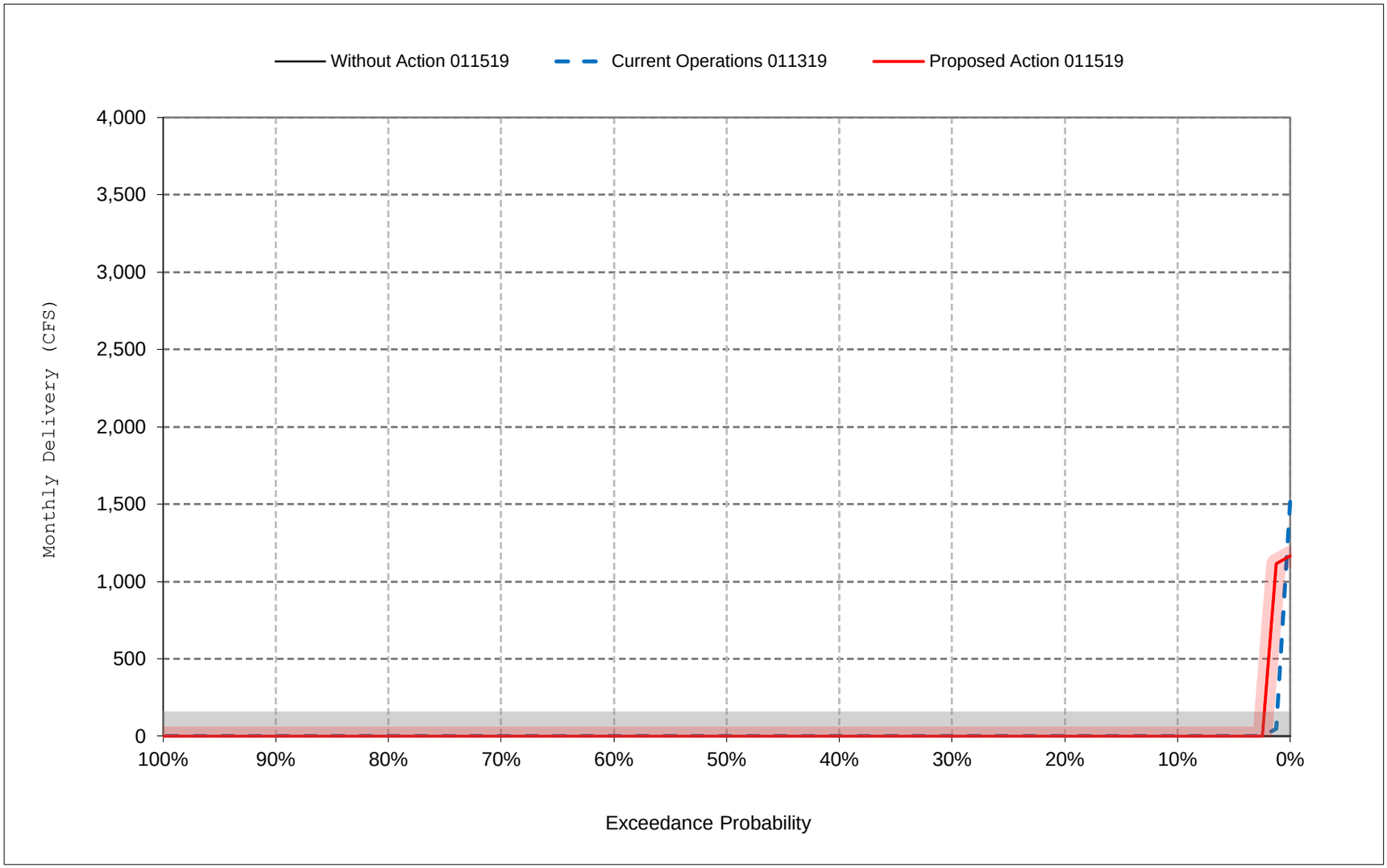
Figure 55-11. CVP Banks PP Exports, February



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

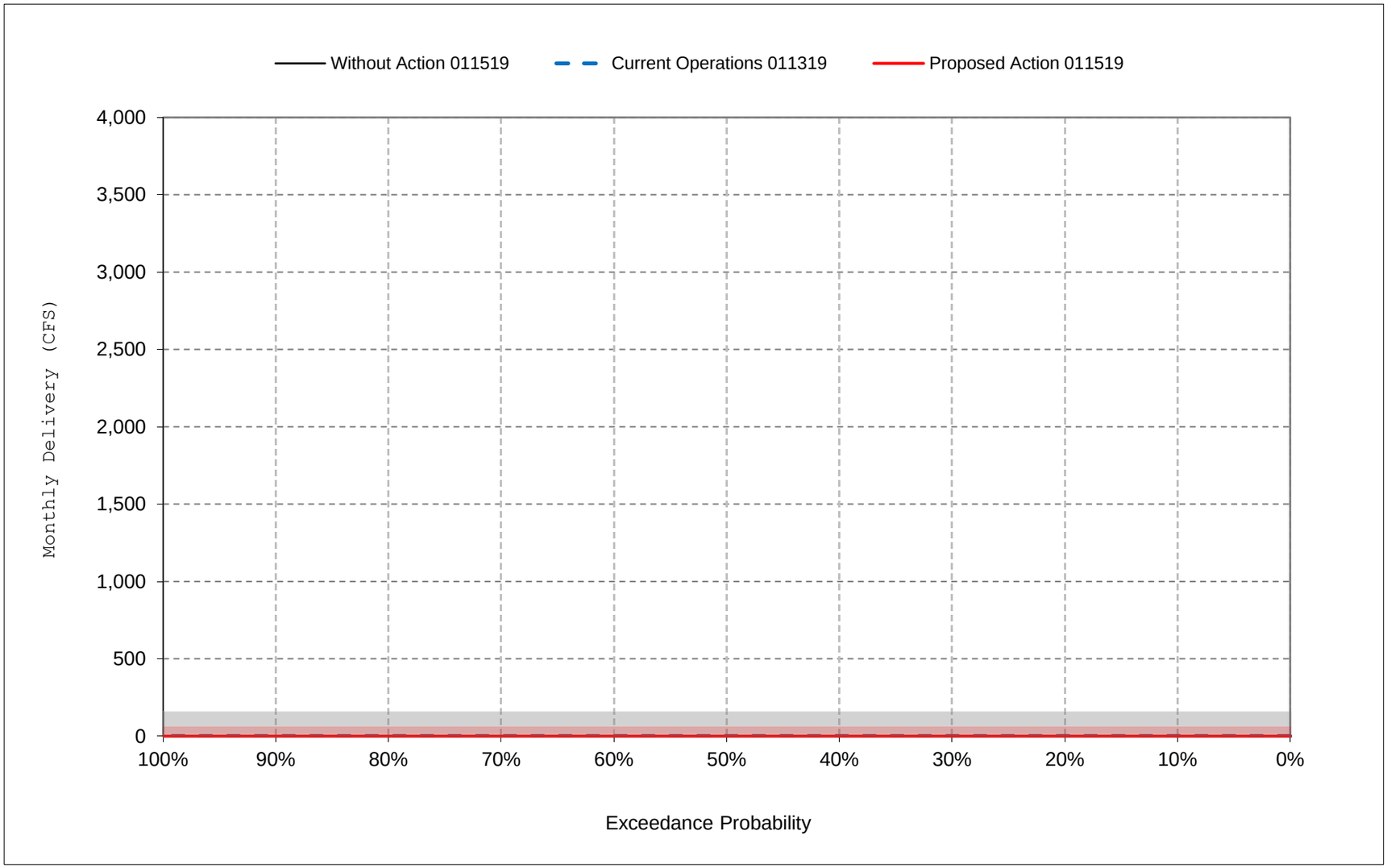
Figure 55-12. CVP Banks PP Exports, March



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

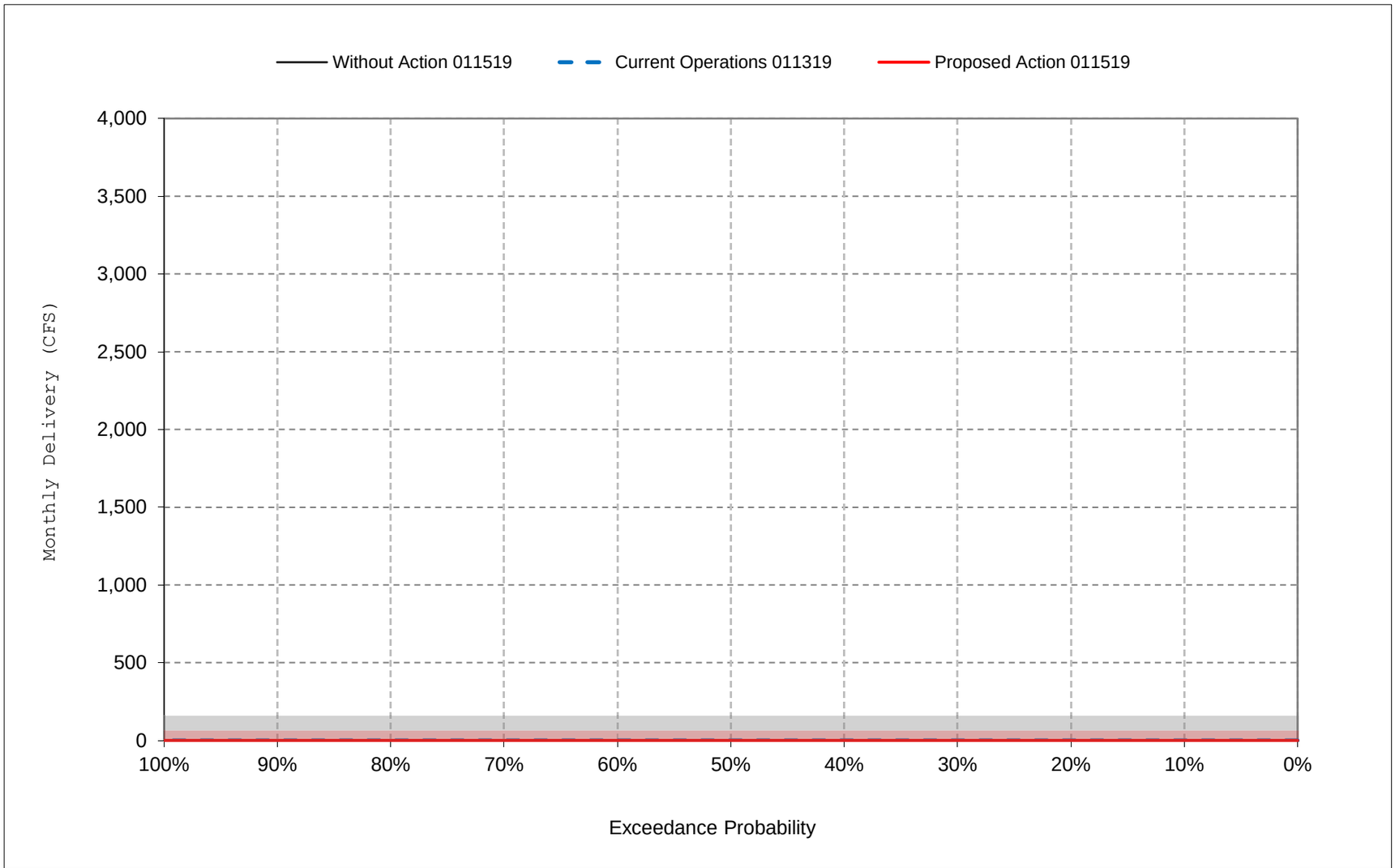
Figure 55-13. CVP Banks PP Exports, April



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

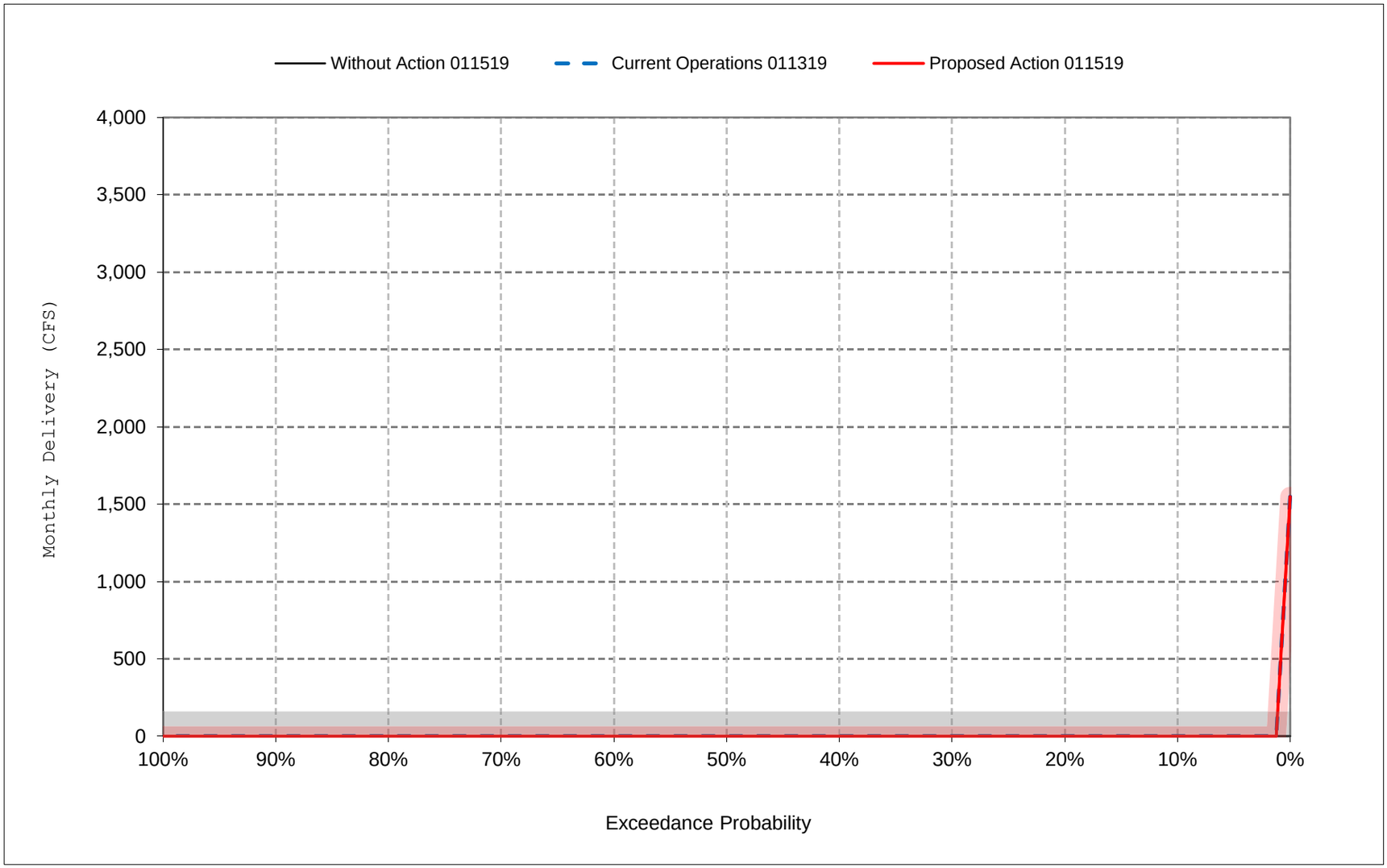
Figure 55-14. CVP Banks PP Exports, May



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

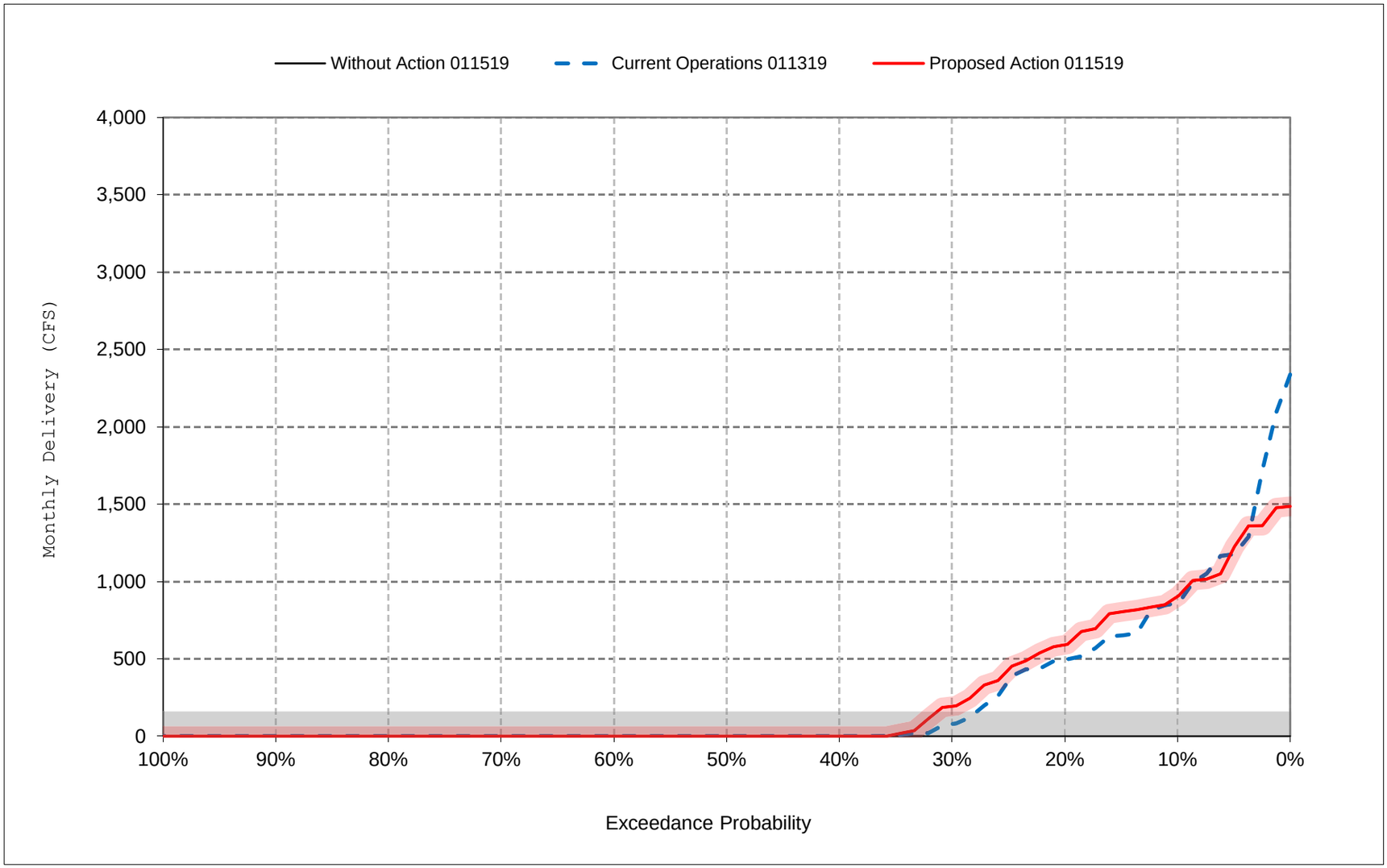
Figure 55-15. CVP Banks PP Exports, June



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

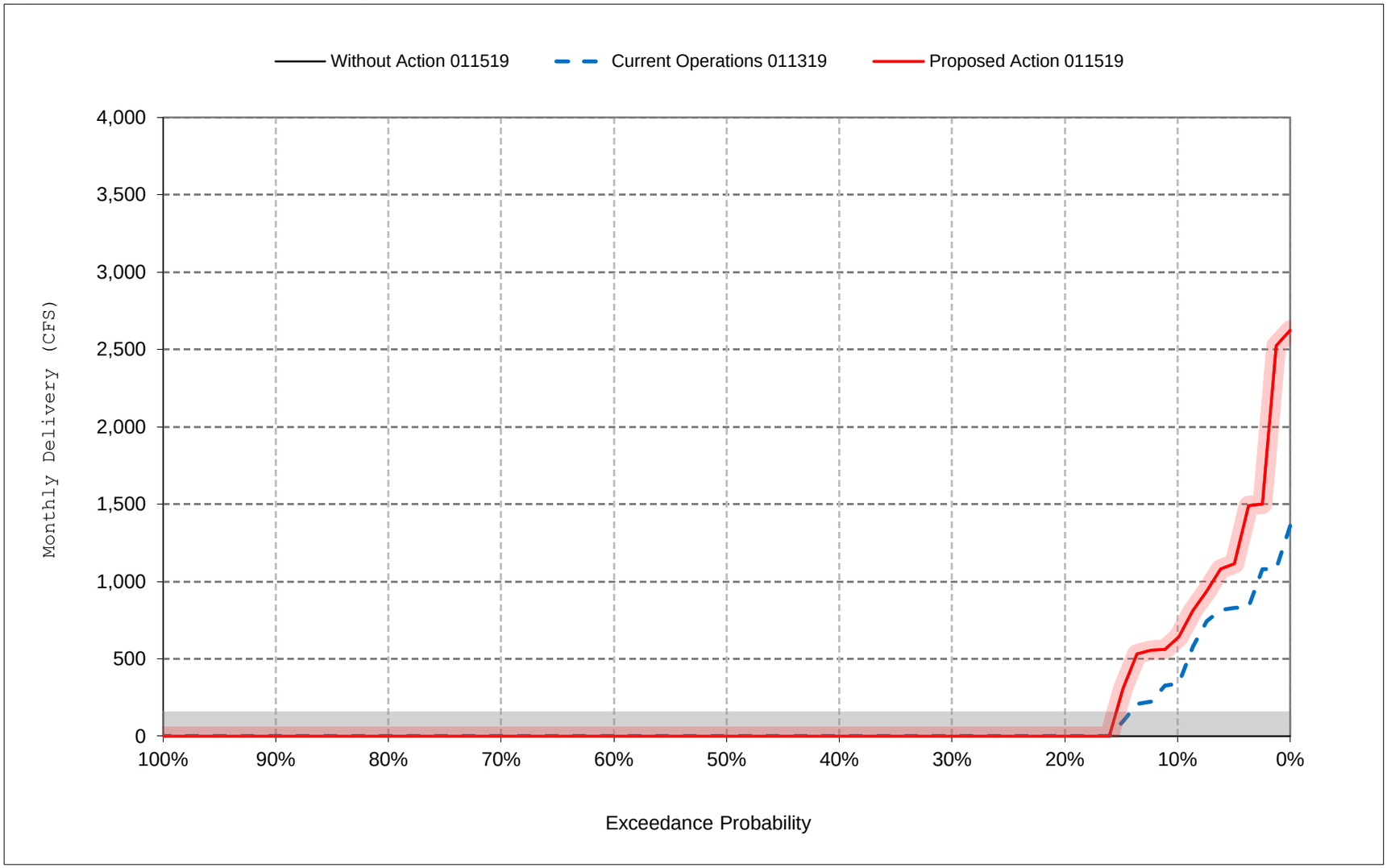
Figure 55-16. CVP Banks PP Exports, July



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

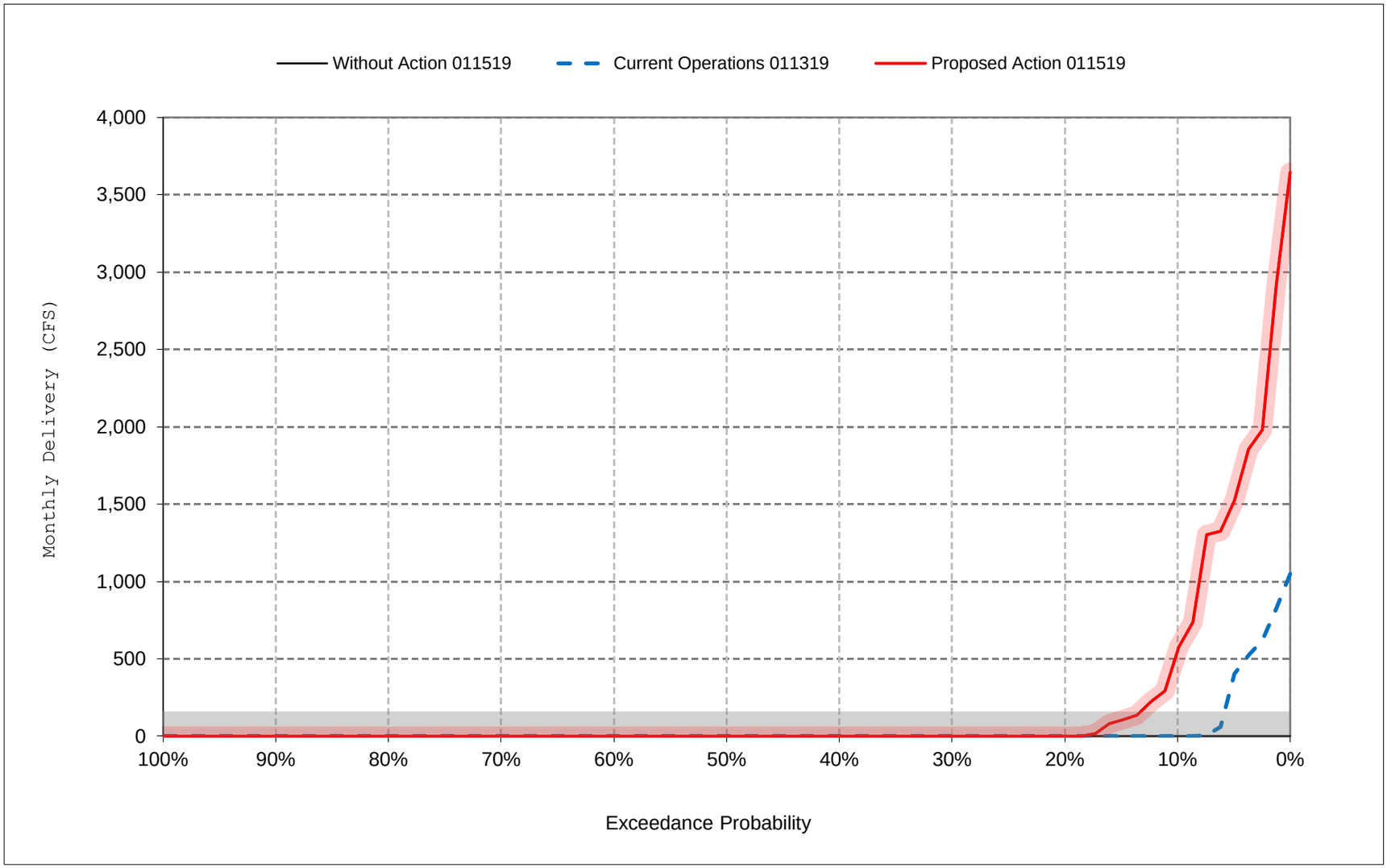
Figure 55-17. CVP Banks PP Exports, August



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Figure 55-18. CVP Banks PP Exports, September



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Table 56-1. SWP Banks PP Exports, Monthly Delivery

Without Action 011519

Statistic	Monthly Delivery (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types[b,c]												
Wet (32%)	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal (16%)	0	0	0	0	0	0	0	0	0	0	0	0
Below Normal (13%)	0	0	0	0	0	0	0	0	0	0	0	0
Dry (24%)	0	0	0	0	0	0	0	0	0	0	0	0
Critical (15%)	0	0	0	0	0	0	0	0	0	0	0	0

Current Operations 011319

Statistic	Monthly Delivery (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	4,251	6,680	7,119	5,838	8,359	7,950	1,788	1,574	4,948	6,680	6,680	6,680
20%	3,339	5,505	7,058	3,400	5,746	6,286	1,282	979	2,584	6,680	6,680	6,680
30%	3,094	4,470	6,264	2,952	3,845	5,473	1,070	846	2,040	6,680	6,680	6,680
40%	2,981	3,491	4,875	2,736	3,116	3,638	975	658	1,867	6,663	6,680	6,680
50%	2,692	2,809	4,108	2,658	2,858	2,921	893	600	1,540	6,230	6,649	5,542
60%	2,568	2,220	3,622	2,630	2,605	2,652	853	600	1,212	5,426	2,650	3,251
70%	2,262	1,808	3,279	2,492	2,206	2,137	767	600	1,132	4,218	324	2,639
80%	1,916	1,247	3,029	2,251	1,824	1,709	715	600	300	1,114	300	2,415
90%	1,166	741	2,572	1,899	1,214	1,273	600	525	164	300	300	1,743
Long Term												
Full Simulation Period[a]	2,777	3,265	4,687	3,283	3,645	3,825	1,142	953	1,902	4,693	4,041	4,596
Water Year Types[b,c]												
Wet (32%)	3,089	2,484	5,912	4,468	5,498	6,234	1,555	1,576	3,437	6,243	6,678	6,552
Above Normal (16%)	3,448	3,376	5,166	2,983	3,876	4,105	877	673	1,777	6,142	6,679	6,652
Below Normal (13%)	3,440	4,138	4,269	2,561	2,905	2,933	1,002	632	1,259	6,064	4,840	4,329
Dry (24%)	2,381	4,350	3,809	2,652	2,501	2,465	1,155	804	1,388	3,561	703	2,798
Critical (15%)	1,429	2,229	3,357	2,751	1,968	1,388	641	451	159	396	300	1,373

Current Operations 011319 minus Without Action 011519

Statistic	Monthly Delivery (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	4,251	6,680	7,119	5,838	8,359	7,950	1,788	1,574	4,948	6,680	6,680	6,680
20%	3,339	5,505	7,058	3,400	5,746	6,286	1,282	979	2,584	6,680	6,680	6,680
30%	3,094	4,470	6,264	2,952	3,845	5,473	1,070	846	2,040	6,680	6,680	6,680
40%	2,981	3,491	4,875	2,736	3,116	3,638	975	658	1,867	6,663	6,680	6,680
50%	2,692	2,809	4,108	2,658	2,858	2,921	893	600	1,540	6,230	6,649	5,542
60%	2,568	2,220	3,622	2,630	2,605	2,652	853	600	1,212	5,426	2,650	3,251
70%	2,262	1,808	3,279	2,492	2,206	2,137	767	600	1,132	4,218	324	2,639
80%	1,916	1,247	3,029	2,251	1,824	1,709	715	600	300	1,114	300	2,415
90%	1,166	741	2,572	1,899	1,214	1,273	600	525	164	300	300	1,743
Long Term												
Full Simulation Period[a]	2,777	3,265	4,687	3,283	3,645	3,825	1,142	953	1,902	4,693	4,041	4,596
Water Year Types[b,c]												
Wet (32%)	3,089	2,484	5,912	4,468	5,498	6,234	1,555	1,576	3,437	6,243	6,678	6,552
Above Normal (16%)	3,448	3,376	5,166	2,983	3,876	4,105	877	673	1,777	6,142	6,679	6,652
Below Normal (13%)	3,440	4,138	4,269	2,561	2,905	2,933	1,002	632	1,259	6,064	4,840	4,329
Dry (24%)	2,381	4,350	3,809	2,652	2,501	2,465	1,155	804	1,388	3,561	703	2,798
Critical (15%)	1,429	2,229	3,357	2,751	1,968	1,388	641	451	159	396	300	1,373

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 56-2. SWP Banks PP Exports, Monthly Delivery

Without Action 011519

Statistic	Monthly Delivery (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types[b,c]												
Wet (32%)	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal (16%)	0	0	0	0	0	0	0	0	0	0	0	0
Below Normal (13%)	0	0	0	0	0	0	0	0	0	0	0	0
Dry (24%)	0	0	0	0	0	0	0	0	0	0	0	0
Critical (15%)	0	0	0	0	0	0	0	0	0	0	0	0

Proposed Action 011519

Statistic	Monthly Delivery (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	6,584	6,680	7,100	6,278	6,961	7,421	4,391	4,555	4,483	6,680	6,680	6,680
20%	5,423	6,680	7,047	4,158	6,164	5,777	4,030	3,475	3,147	6,680	6,680	6,680
30%	4,757	5,784	5,191	3,138	4,364	5,232	3,884	2,739	2,587	6,680	6,680	6,680
40%	4,266	5,336	4,278	2,922	3,402	4,259	3,392	2,291	2,176	6,680	6,680	6,680
50%	3,128	4,740	3,663	2,834	2,970	3,113	2,916	2,099	1,885	6,668	6,660	4,984
60%	2,788	4,122	3,348	2,754	2,772	2,746	2,249	1,665	1,730	6,053	3,359	3,212
70%	2,387	3,551	2,979	2,673	2,625	2,650	1,931	1,354	1,673	3,934	381	2,613
80%	2,043	2,794	2,824	2,536	2,484	2,523	1,503	1,166	1,587	307	300	2,446
90%	1,198	1,927	2,684	2,401	2,361	1,738	993	923	300	300	300	1,627
Long Term												
Full Simulation Period[a]	3,633	4,518	4,396	3,560	4,012	3,982	2,826	2,303	2,318	4,724	4,107	4,506
Water Year Types[b,c]												
Wet (32%)	5,146	5,404	5,618	4,764	5,693	5,777	4,167	3,704	3,472	6,383	6,443	6,323
Above Normal (16%)	4,283	5,118	4,513	3,570	3,917	3,913	2,967	2,263	2,009	6,514	6,679	6,652
Below Normal (13%)	3,471	4,546	3,834	2,988	3,499	3,393	2,563	1,825	1,941	6,570	5,657	4,107
Dry (24%)	2,602	4,311	3,668	2,760	2,988	3,212	2,115	1,679	2,218	3,041	828	2,882
Critical (15%)	1,518	2,266	3,353	2,796	2,647	1,991	1,192	786	665	300	300	1,314

Proposed Action 011519 minus Without Action 011519

Statistic	Monthly Delivery (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	6,584	6,680	7,100	6,278	6,961	7,421	4,391	4,555	4,483	6,680	6,680	6,680
20%	5,423	6,680	7,047	4,158	6,164	5,777	4,030	3,475	3,147	6,680	6,680	6,680
30%	4,757	5,784	5,191	3,138	4,364	5,232	3,884	2,739	2,587	6,680	6,680	6,680
40%	4,266	5,336	4,278	2,922	3,402	4,259	3,392	2,291	2,176	6,680	6,680	6,680
50%	3,128	4,740	3,663	2,834	2,970	3,113	2,916	2,099	1,885	6,668	6,660	4,984
60%	2,788	4,122	3,348	2,754	2,772	2,746	2,249	1,665	1,730	6,053	3,359	3,212
70%	2,387	3,551	2,979	2,673	2,625	2,650	1,931	1,354	1,673	3,934	381	2,613
80%	2,043	2,794	2,824	2,536	2,484	2,523	1,503	1,166	1,587	307	300	2,446
90%	1,198	1,927	2,684	2,401	2,361	1,738	993	923	300	300	300	1,627
Long Term												
Full Simulation Period[a]	3,633	4,518	4,396	3,560	4,012	3,982	2,826	2,303	2,318	4,724	4,107	4,506
Water Year Types[b,c]												
Wet (32%)	5,146	5,404	5,618	4,764	5,693	5,777	4,167	3,704	3,472	6,383	6,443	6,323
Above Normal (16%)	4,283	5,118	4,513	3,570	3,917	3,913	2,967	2,263	2,009	6,514	6,679	6,652
Below Normal (13%)	3,471	4,546	3,834	2,988	3,499	3,393	2,563	1,825	1,941	6,570	5,657	4,107
Dry (24%)	2,602	4,311	3,668	2,760	2,988	3,212	2,115	1,679	2,218	3,041	828	2,882
Critical (15%)	1,518	2,266	3,353	2,796	2,647	1,991	1,192	786	665	300	300	1,314

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 56-3. SWP Banks PP Exports, Monthly Delivery

Current Operations 011319

Statistic	Monthly Delivery (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	4,251	6,680	7,119	5,838	8,359	7,950	1,788	1,574	4,948	6,680	6,680	6,680
20%	3,339	5,505	7,058	3,400	5,746	6,286	1,282	979	2,584	6,680	6,680	6,680
30%	3,094	4,470	6,264	2,952	3,845	5,473	1,070	846	2,040	6,680	6,680	6,680
40%	2,981	3,491	4,875	2,736	3,116	3,638	975	658	1,867	6,663	6,680	6,680
50%	2,692	2,809	4,108	2,658	2,858	2,921	893	600	1,540	6,230	6,649	5,542
60%	2,568	2,220	3,622	2,630	2,605	2,652	853	600	1,212	5,426	2,650	3,251
70%	2,262	1,808	3,279	2,492	2,206	2,137	767	600	1,132	4,218	324	2,639
80%	1,916	1,247	3,029	2,251	1,824	1,709	715	600	300	1,114	300	2,415
90%	1,166	741	2,572	1,899	1,214	1,273	600	525	164	300	300	1,743
Long Term												
Full Simulation Period[a]	2,777	3,265	4,687	3,283	3,645	3,825	1,142	953	1,902	4,693	4,041	4,596
Water Year Types[b,c]												
Wet (32%)	3,089	2,484	5,912	4,468	5,498	6,234	1,555	1,576	3,437	6,243	6,678	6,552
Above Normal (16%)	3,448	3,376	5,166	2,983	3,876	4,105	877	673	1,777	6,142	6,679	6,652
Below Normal (13%)	3,440	4,138	4,269	2,561	2,905	2,933	1,002	632	1,259	6,064	4,840	4,329
Dry (24%)	2,381	4,350	3,809	2,652	2,501	2,465	1,155	804	1,388	3,561	703	2,798
Critical (15%)	1,429	2,229	3,357	2,751	1,968	1,388	641	451	159	396	300	1,373

Proposed Action 011519

Statistic	Monthly Delivery (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	6,584	6,680	7,100	6,278	6,961	7,421	4,391	4,555	4,483	6,680	6,680	6,680
20%	5,423	6,680	7,047	4,158	6,164	5,777	4,030	3,475	3,147	6,680	6,680	6,680
30%	4,757	5,784	5,191	3,138	4,364	5,232	3,884	2,739	2,587	6,680	6,680	6,680
40%	4,266	5,336	4,278	2,922	3,402	4,259	3,392	2,291	2,176	6,680	6,680	6,680
50%	3,128	4,740	3,663	2,834	2,970	3,113	2,916	2,099	1,885	6,668	6,660	4,984
60%	2,788	4,122	3,348	2,754	2,772	2,746	2,249	1,665	1,730	6,053	3,359	3,212
70%	2,387	3,551	2,979	2,673	2,625	2,650	1,931	1,354	1,673	3,934	381	2,613
80%	2,043	2,794	2,824	2,536	2,484	2,523	1,503	1,166	1,587	307	300	2,446
90%	1,198	1,927	2,684	2,401	2,361	1,738	993	923	300	300	300	1,627
Long Term												
Full Simulation Period[a]	3,633	4,518	4,396	3,560	4,012	3,982	2,826	2,303	2,318	4,724	4,107	4,506
Water Year Types[b,c]												
Wet (32%)	5,146	5,404	5,618	4,764	5,693	5,777	4,167	3,704	3,472	6,383	6,443	6,323
Above Normal (16%)	4,283	5,118	4,513	3,570	3,917	3,913	2,967	2,263	2,009	6,514	6,679	6,652
Below Normal (13%)	3,471	4,546	3,834	2,988	3,499	3,393	2,563	1,825	1,941	6,570	5,657	4,107
Dry (24%)	2,602	4,311	3,668	2,760	2,988	3,212	2,115	1,679	2,218	3,041	828	2,882
Critical (15%)	1,518	2,266	3,353	2,796	2,647	1,991	1,192	786	665	300	300	1,314

Proposed Action 011519 minus Current Operations 011319

Statistic	Monthly Delivery (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	2,333	0	**-18**	440	**-1,398**	**-529**	2,603	2,981	**-465**	0	0	0
20%	2,085	1,175	**-11**	758	418	**-509**	2,749	2,496	563	0	0	0
30%	1,662	1,314	**-1,073**	186	519	**-241**	2,815	1,893	547	0	0	0
40%	1,285	1,845	**-597**	186	285	621	2,417	1,633	309	17	0	0
50%	436	1,931	**-446**	176	112	193	2,023	1,499	345	437	11	**-558**
60%	220	1,902	**-274**	125	167	94	1,396	1,065	518	627	709	**-39**
70%	126	1,743	**-300**	181	419	512	1,164	754	541	**-285**	57	**-25**
80%	127	1,547	**-204**	285	660	814	788	566	1,287	**-807**	0	31
90%	32	1,186	112	502	1,147	465	393	398	136	0	0	**-116**
Long Term												
Full Simulation Period[a]	856	1,253	**-290**	277	366	157	1,684	1,349	416	30	66	**-91**
Water Year Types[b,c]												
Wet (32%)	2,057	2,919	**-294**	296	195	**-457**	2,612	2,128	35	140	**-234**	**-229**
Above Normal (16%)	836	1,742	**-653**	586	41	**-192**	2,090	1,589	232	372	**0**	**0**
Below Normal (13%)	31	408	**-435**	427	594	460	1,561	1,193	681	505	818	**-221**
Dry (24%)	221	**-38**	**-141**	109	487	747	960	875	830	**-520**	125	83
Critical (15%)	89	37	**-4**	44	679	603	552	336	507	**-96**	0	**-59**

a Based on the 82-year simulation period.

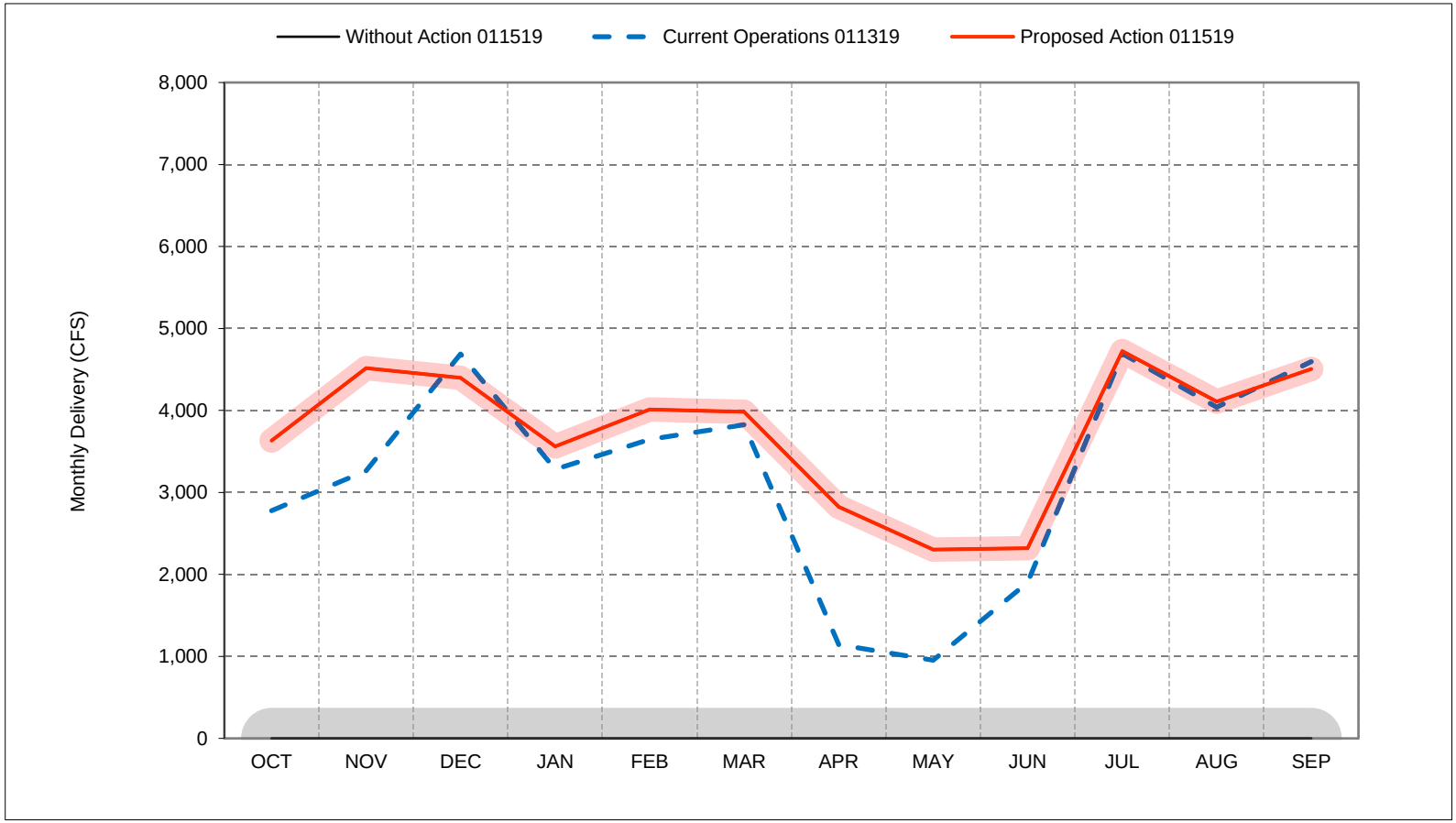
b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

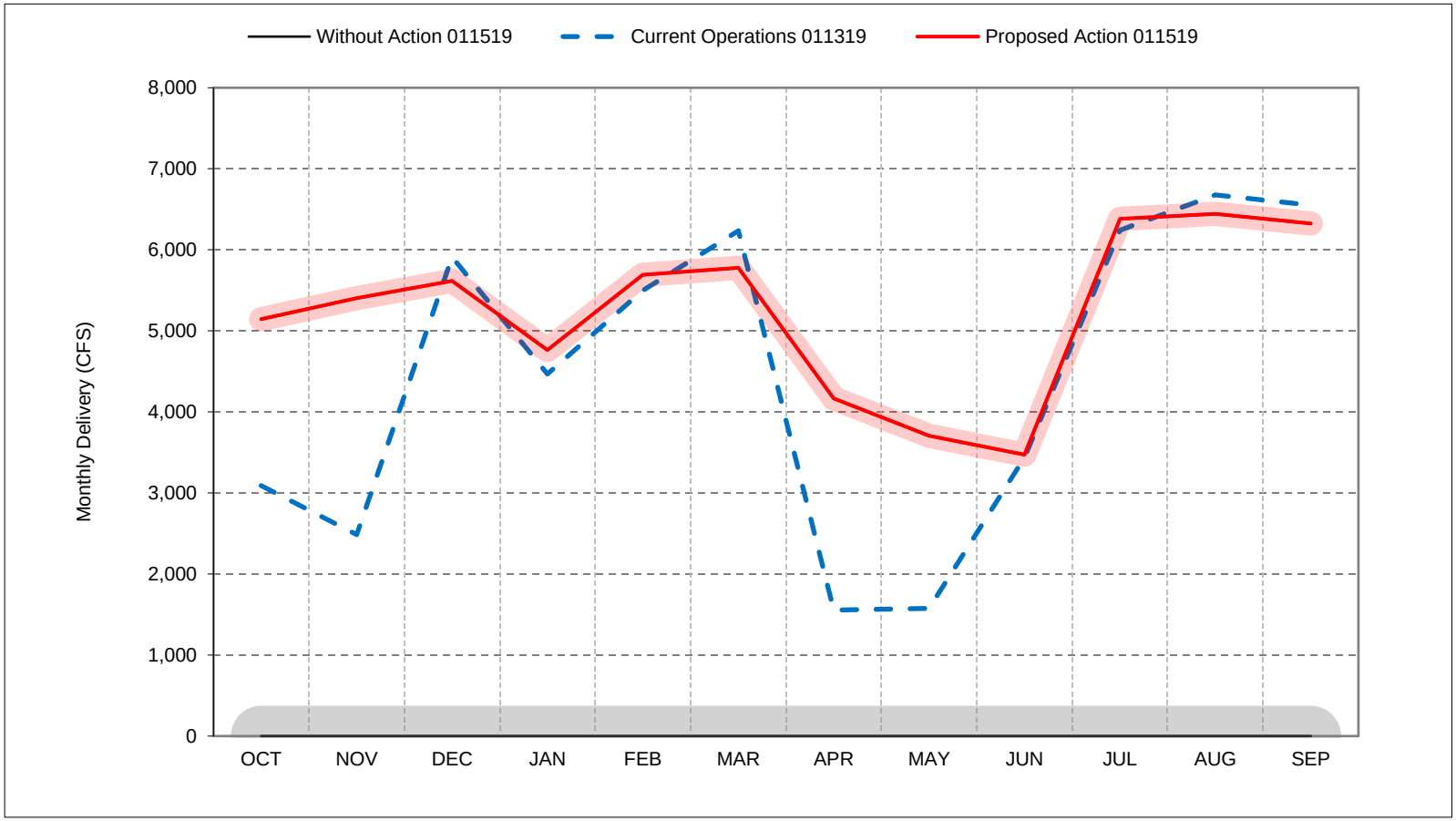
e These are draft results meant for qualitative analysis and are subject to revision.

Figure 56-1. SWP Banks PP Exports, Long-Term Average Delivery



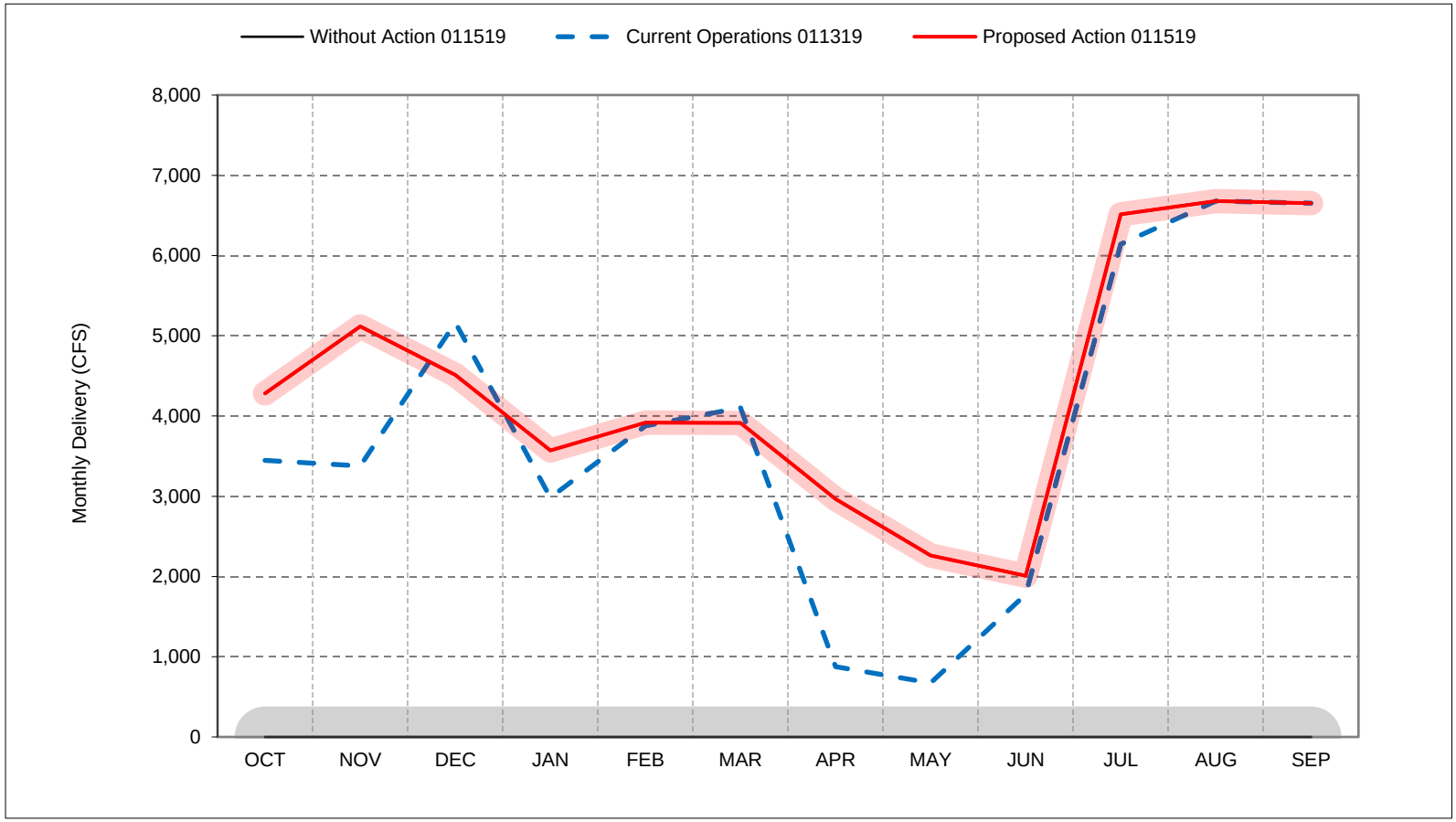
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 56-2. SWP Banks PP Exports, Wet Year Average Delivery



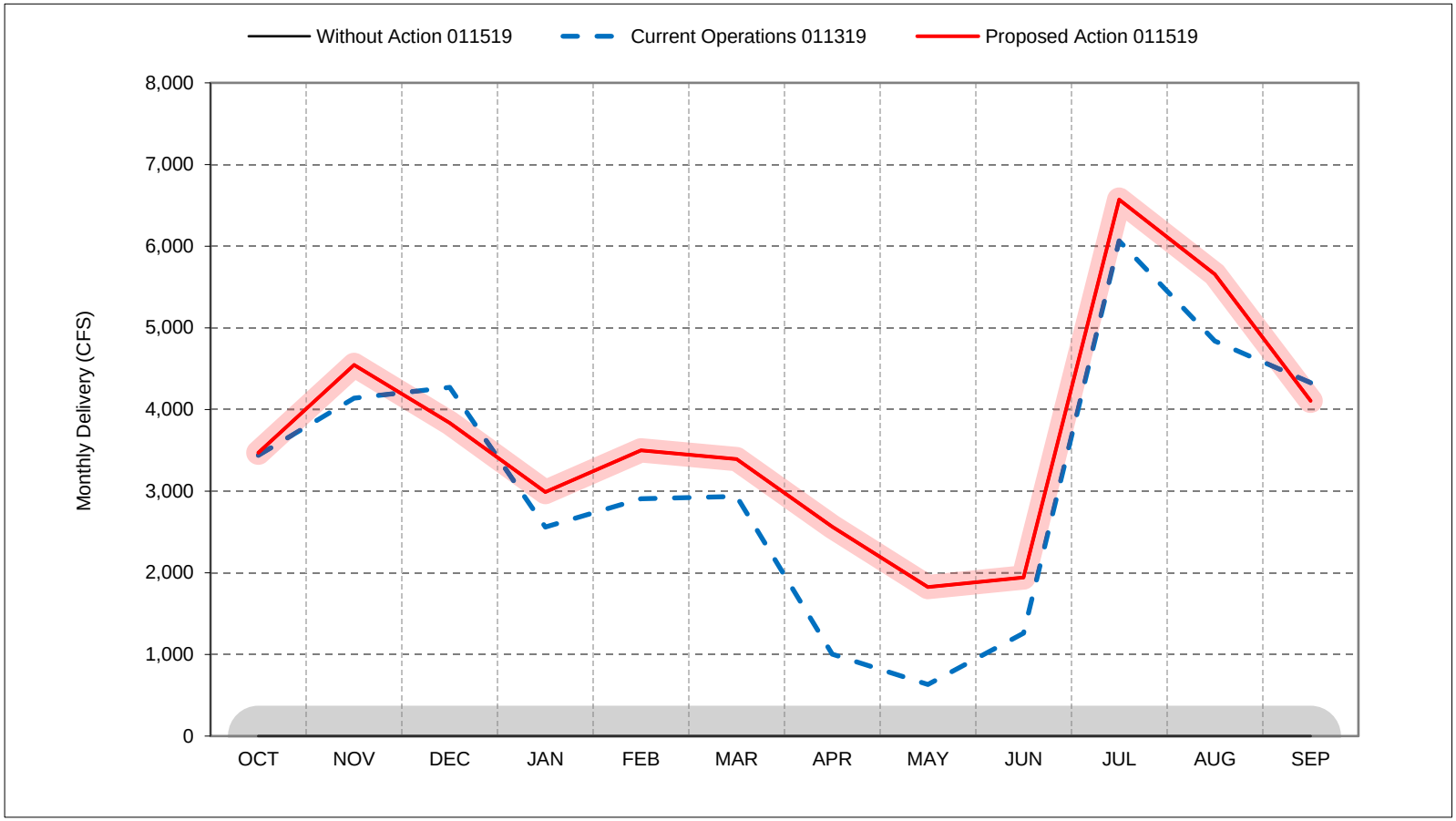
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 56-3. SWP Banks PP Exports, Above Normal Year Average Delivery



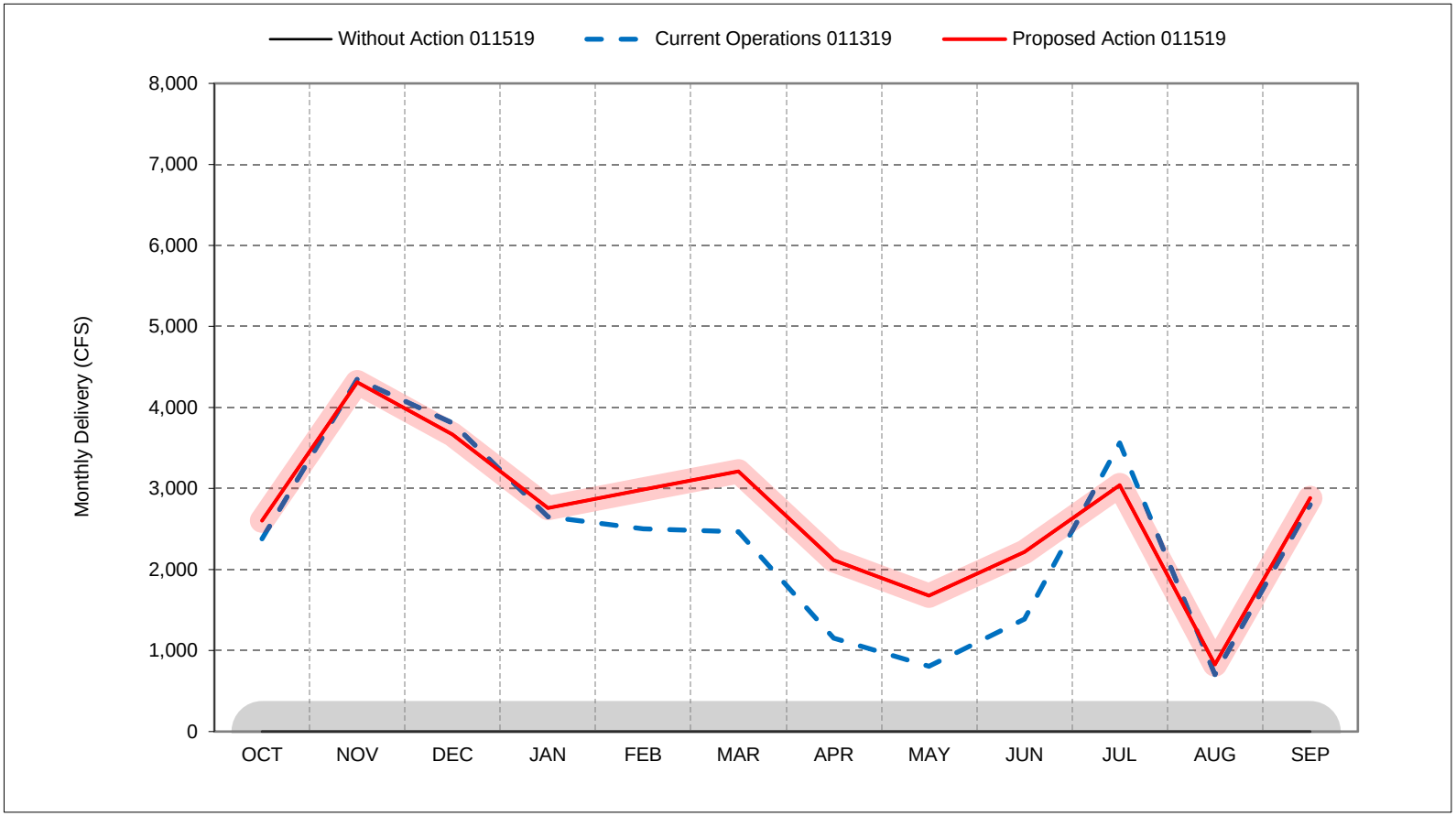
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 56-4. SWP Banks PP Exports, Below Normal Year Average Delivery



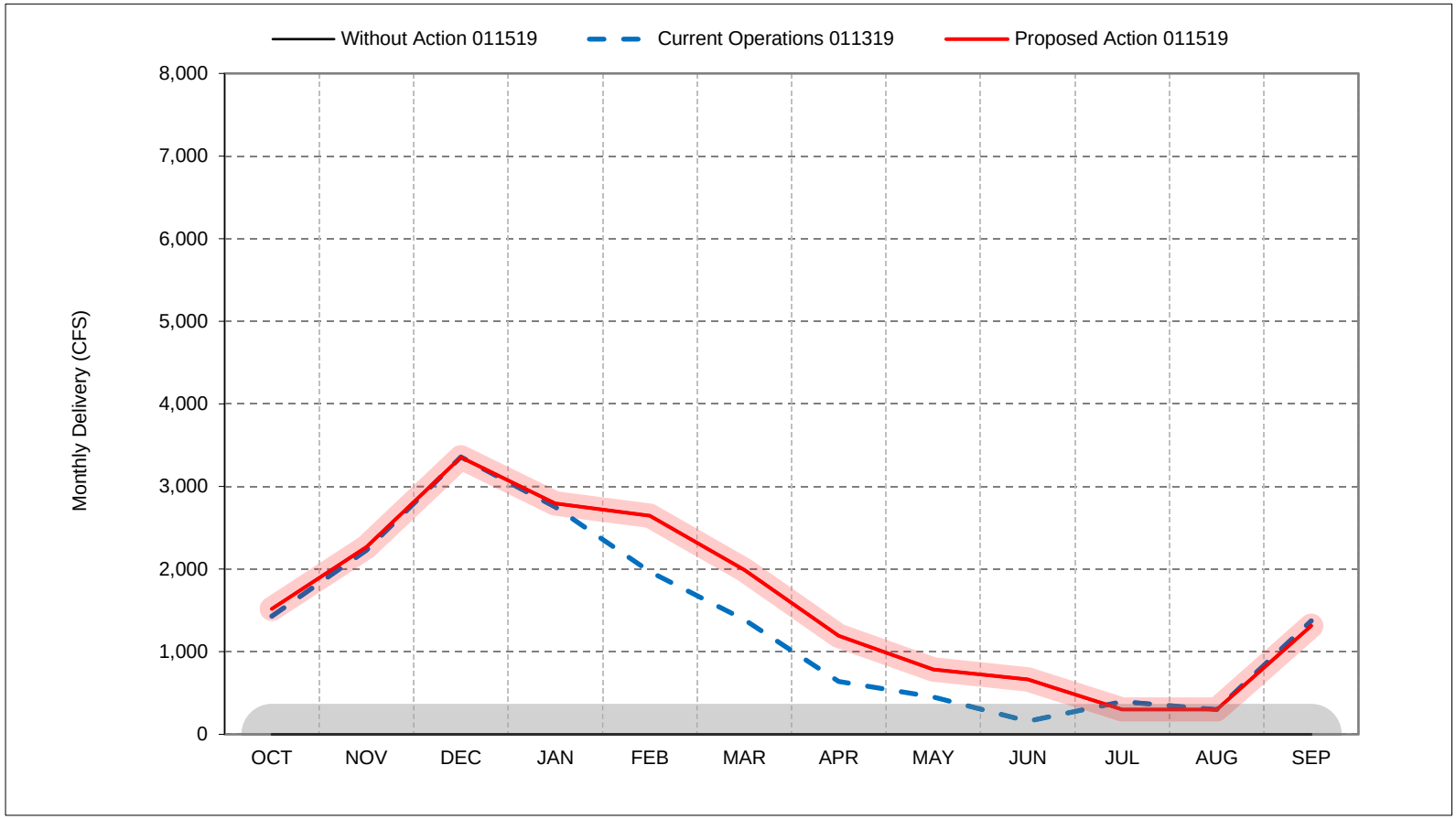
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 56-5. SWP Banks PP Exports, Dry Year Average Delivery



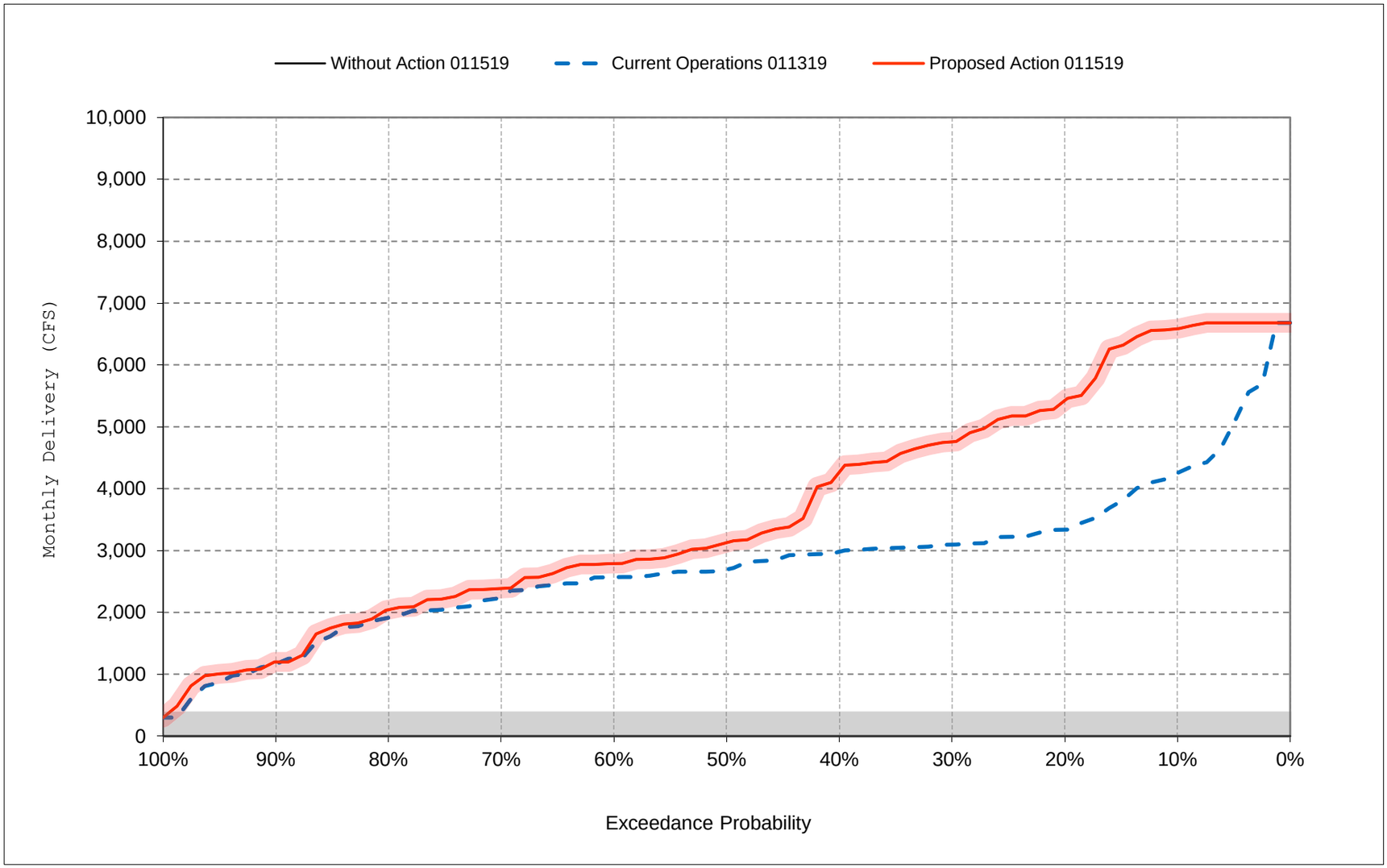
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 56-6. SWP Banks PP Exports, Critical Year Average Delivery



*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

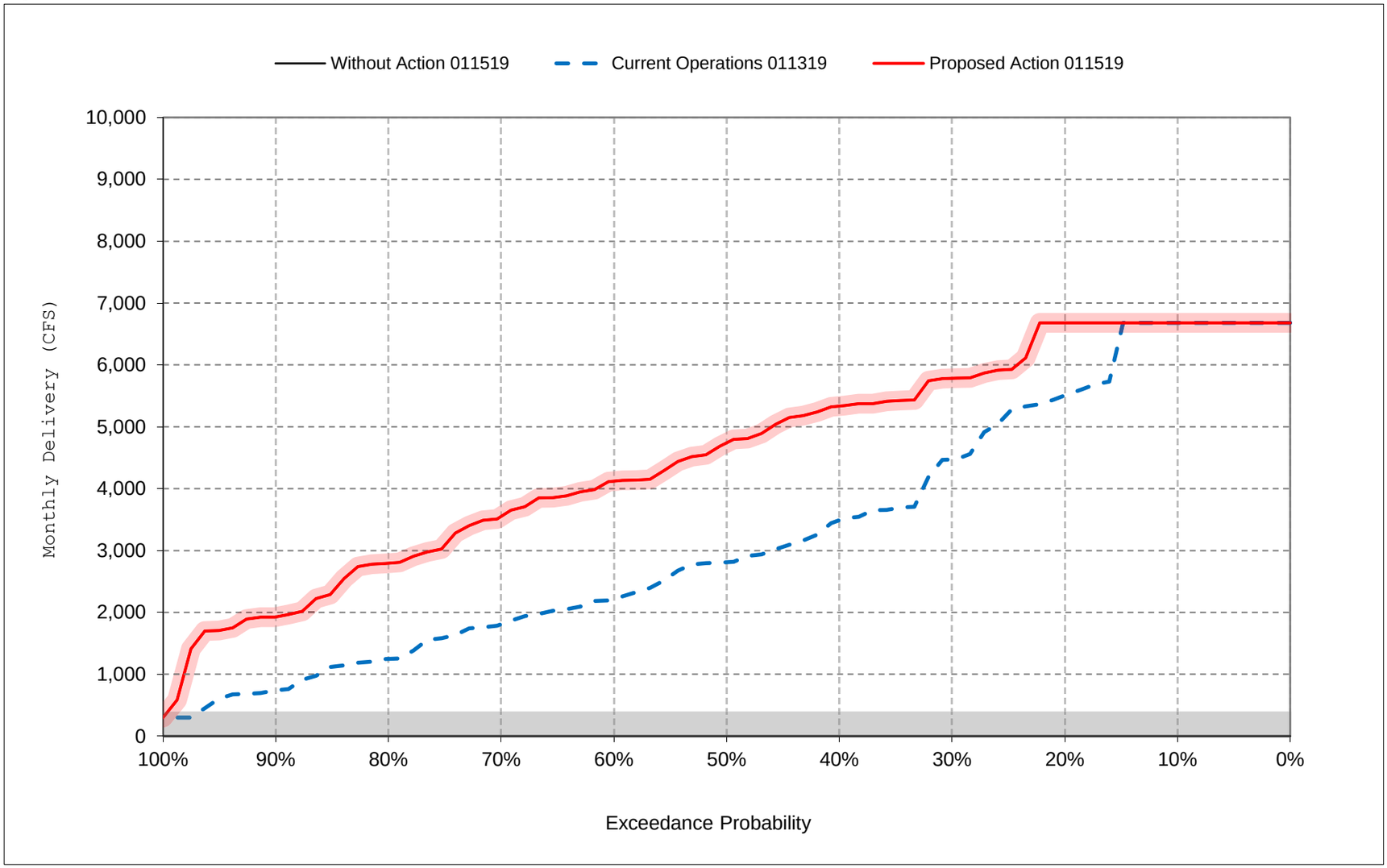
Figure 56-7. SWP Banks PP Exports, October



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

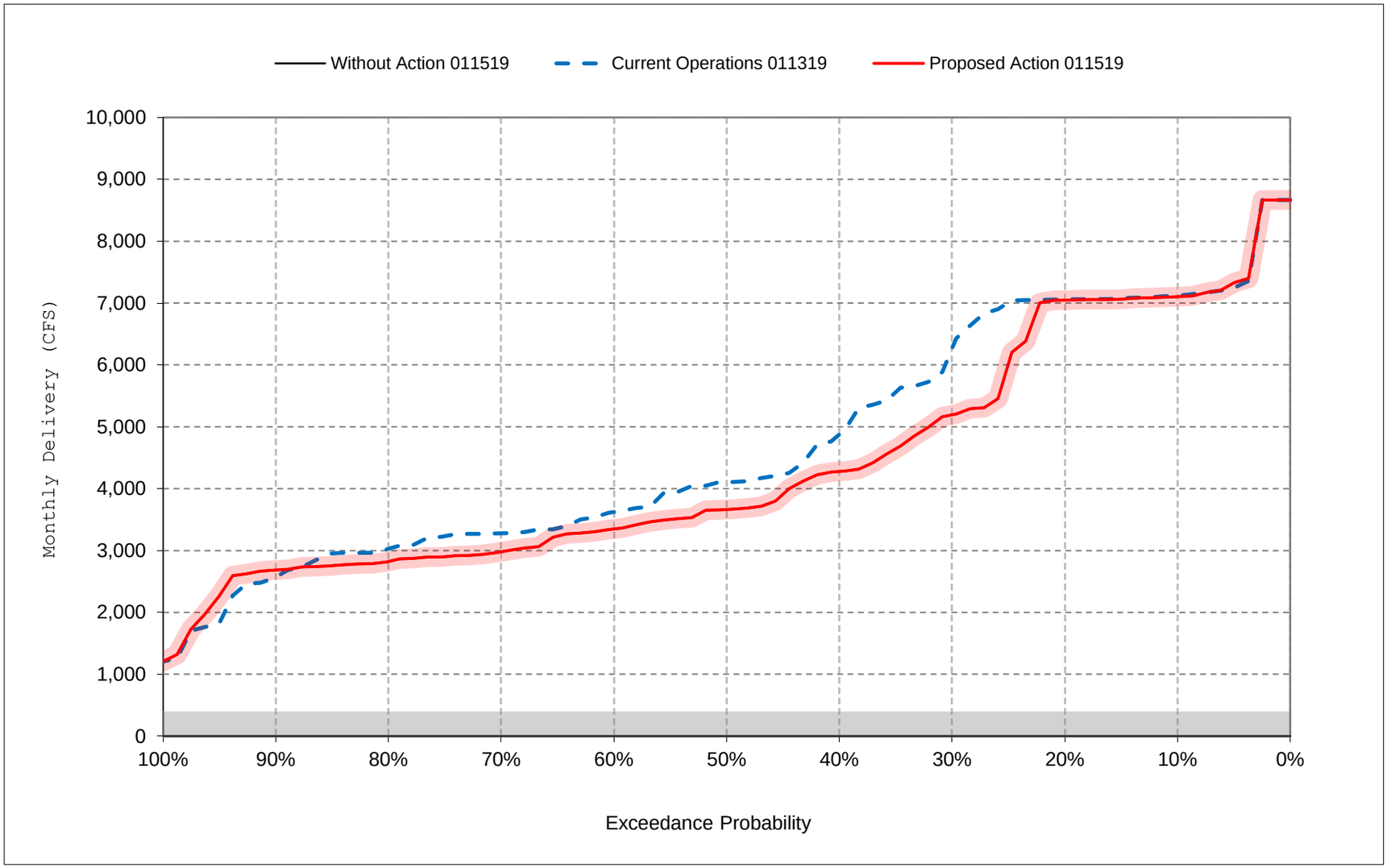
Figure 56-8. SWP Banks PP Exports, November



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

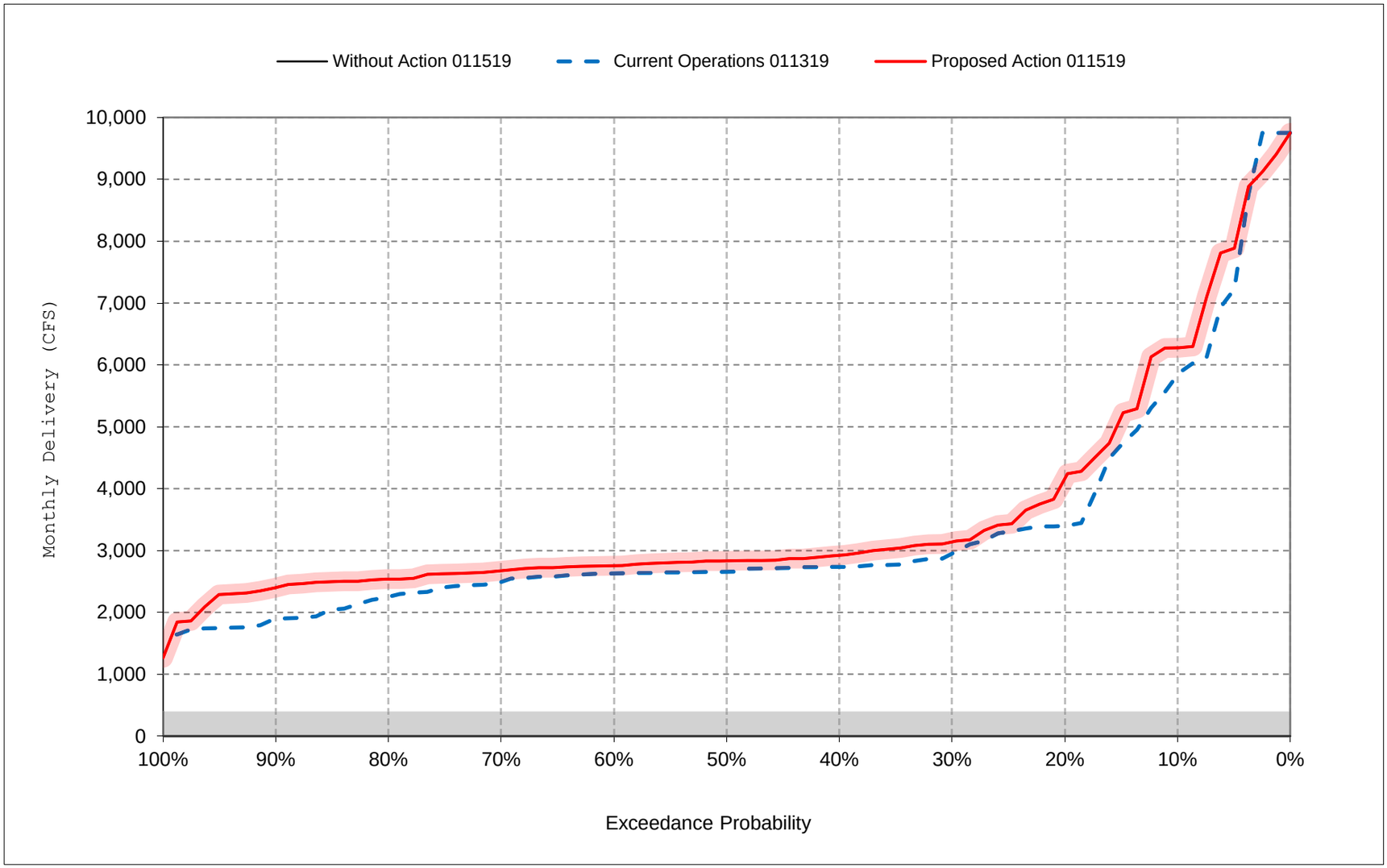
Figure 56-9. SWP Banks PP Exports, December



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

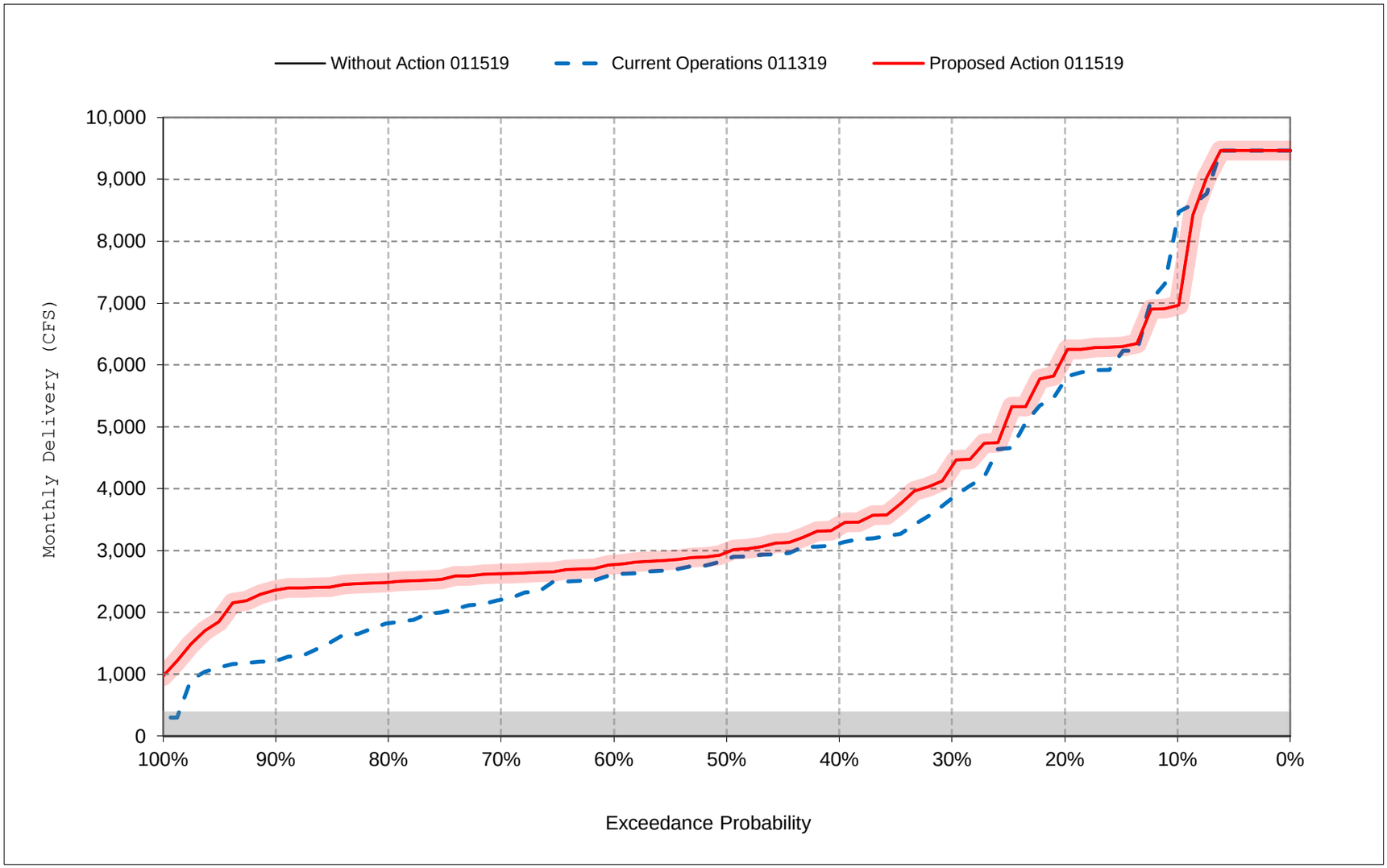
Figure 56-10. SWP Banks PP Exports, January



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

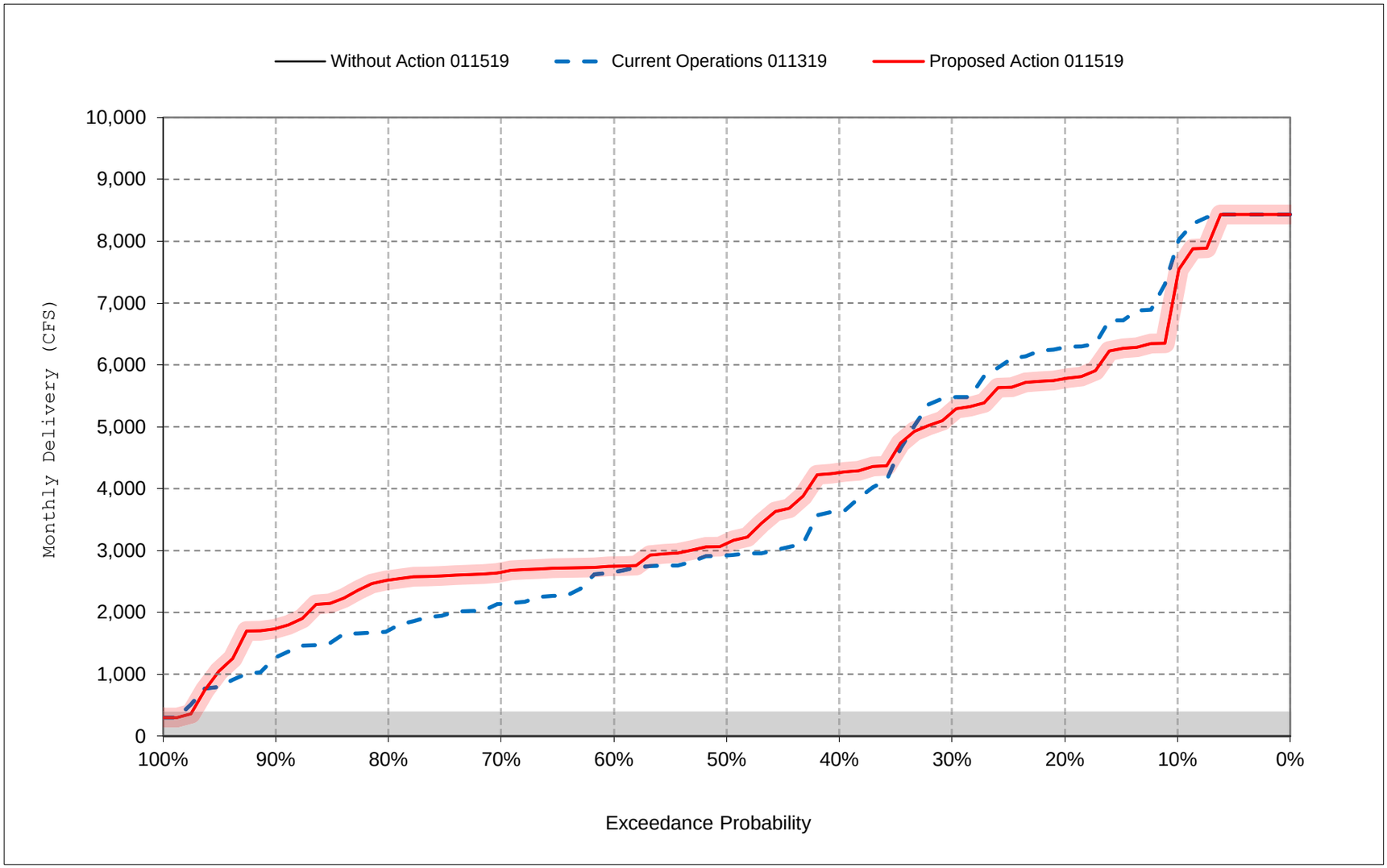
Figure 56-11. SWP Banks PP Exports, February



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

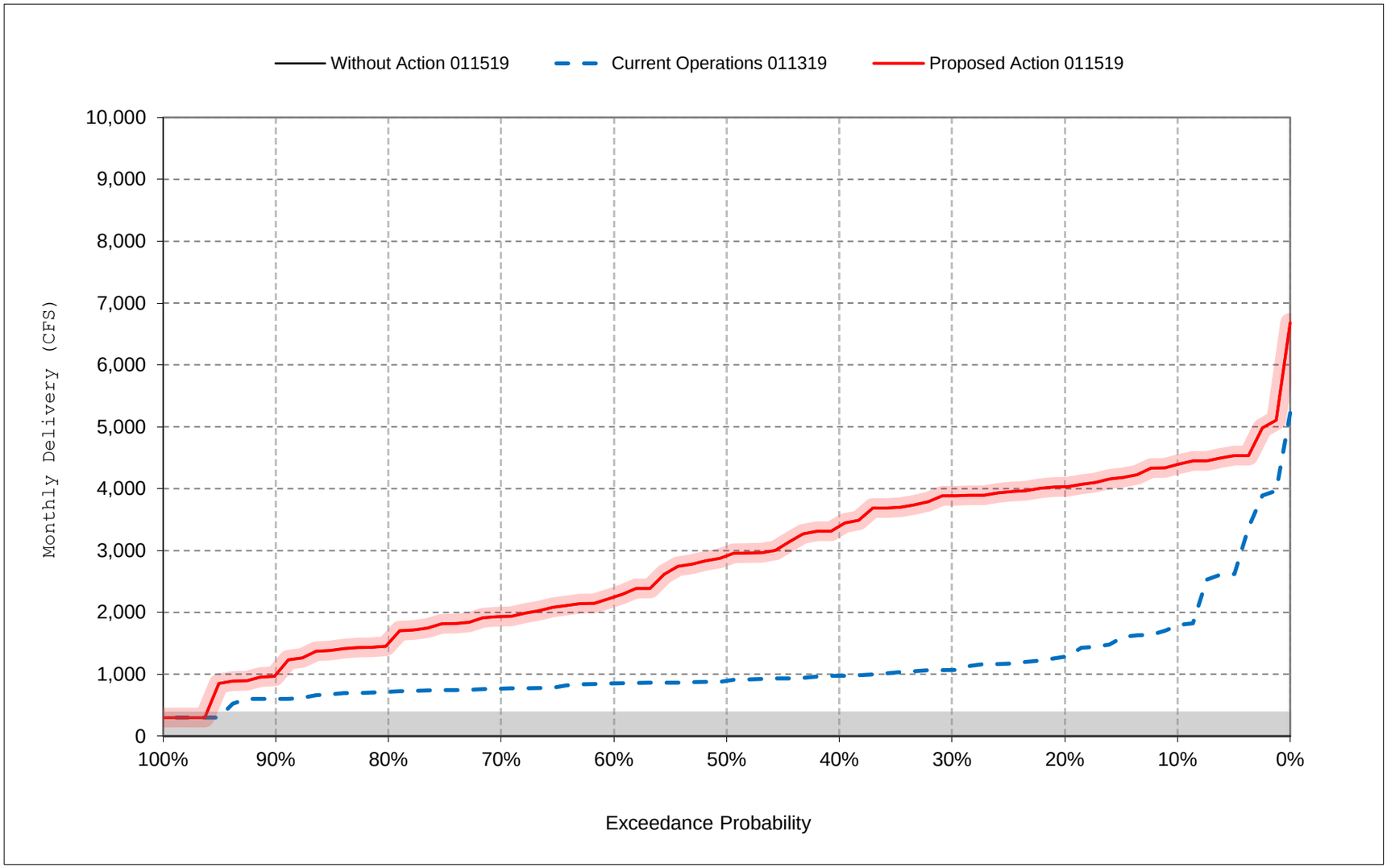
Figure 56-12. SWP Banks PP Exports, March



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Figure 56-13. SWP Banks PP Exports, April



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

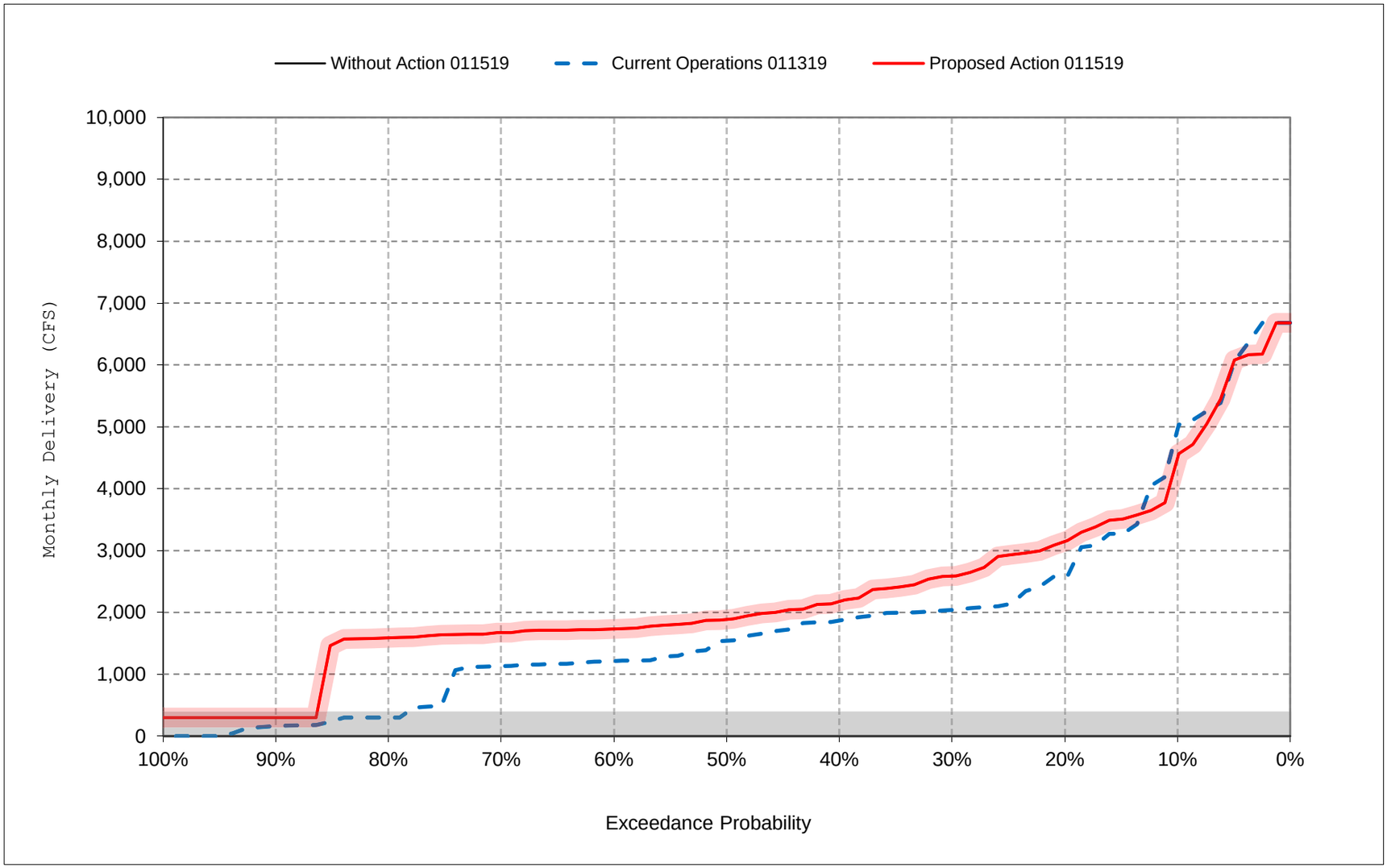
Figure 56-14. SWP Banks PP Exports, May



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

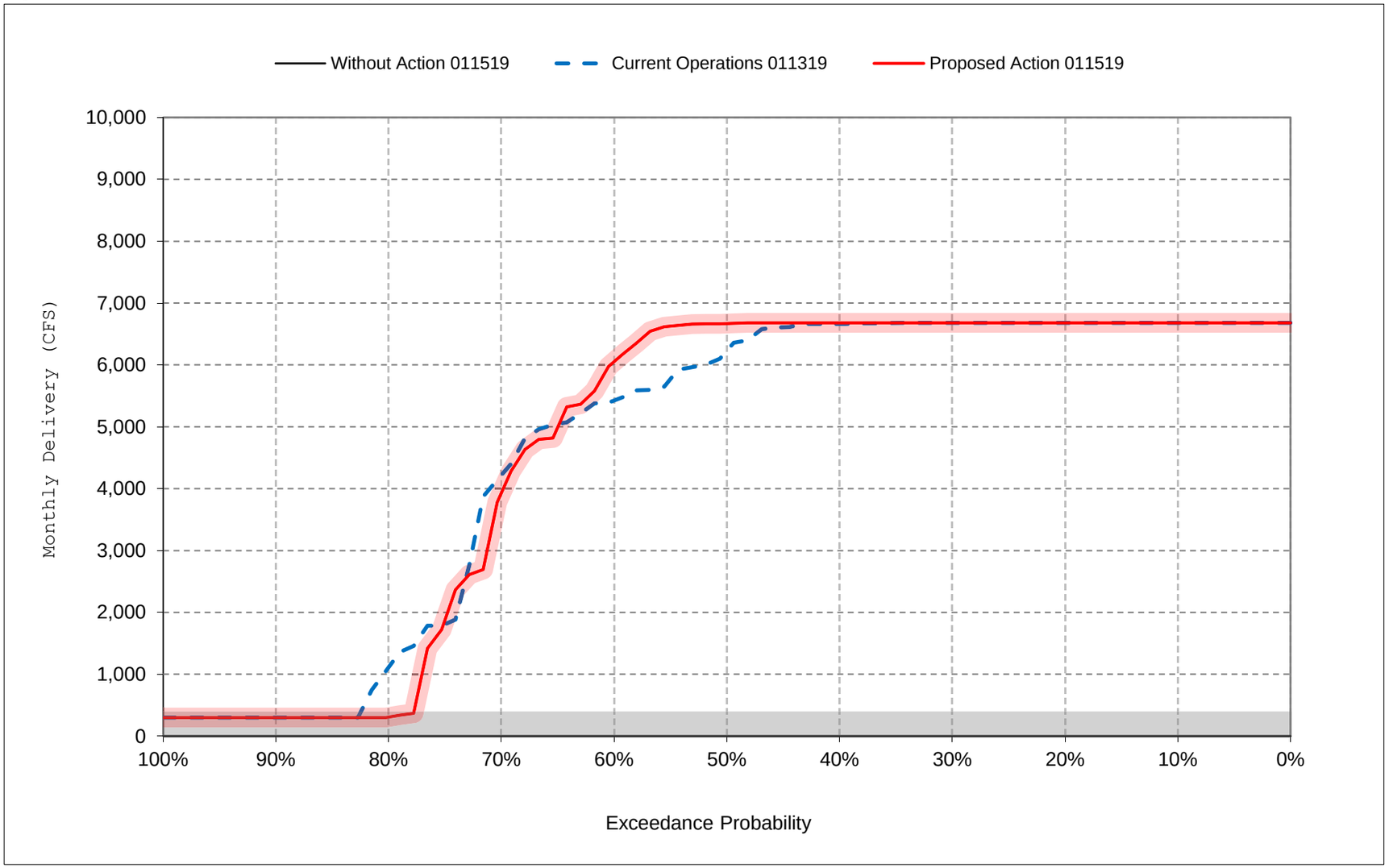
Figure 56-15. SWP Banks PP Exports, June



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

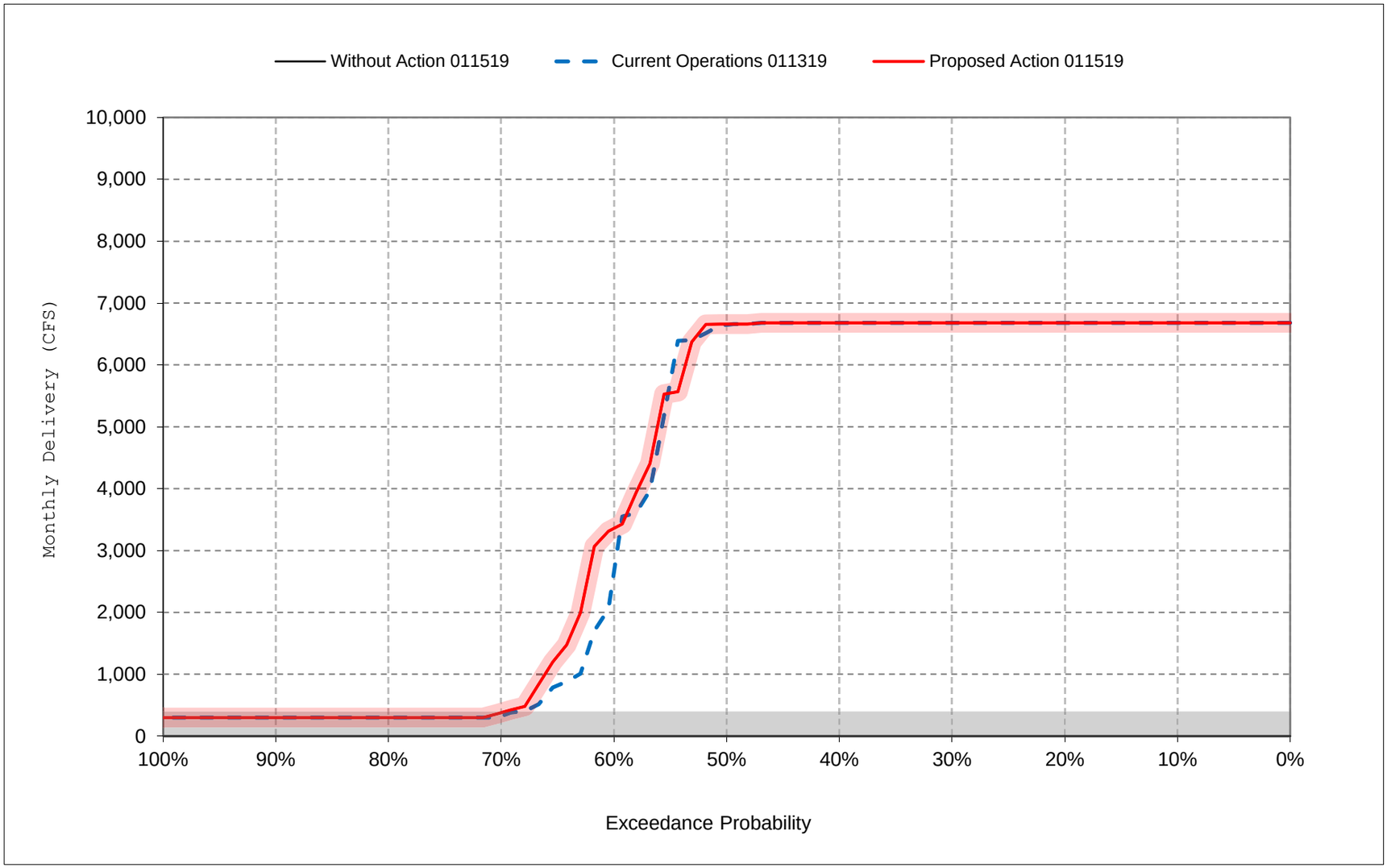
Figure 56-16. SWP Banks PP Exports, July



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

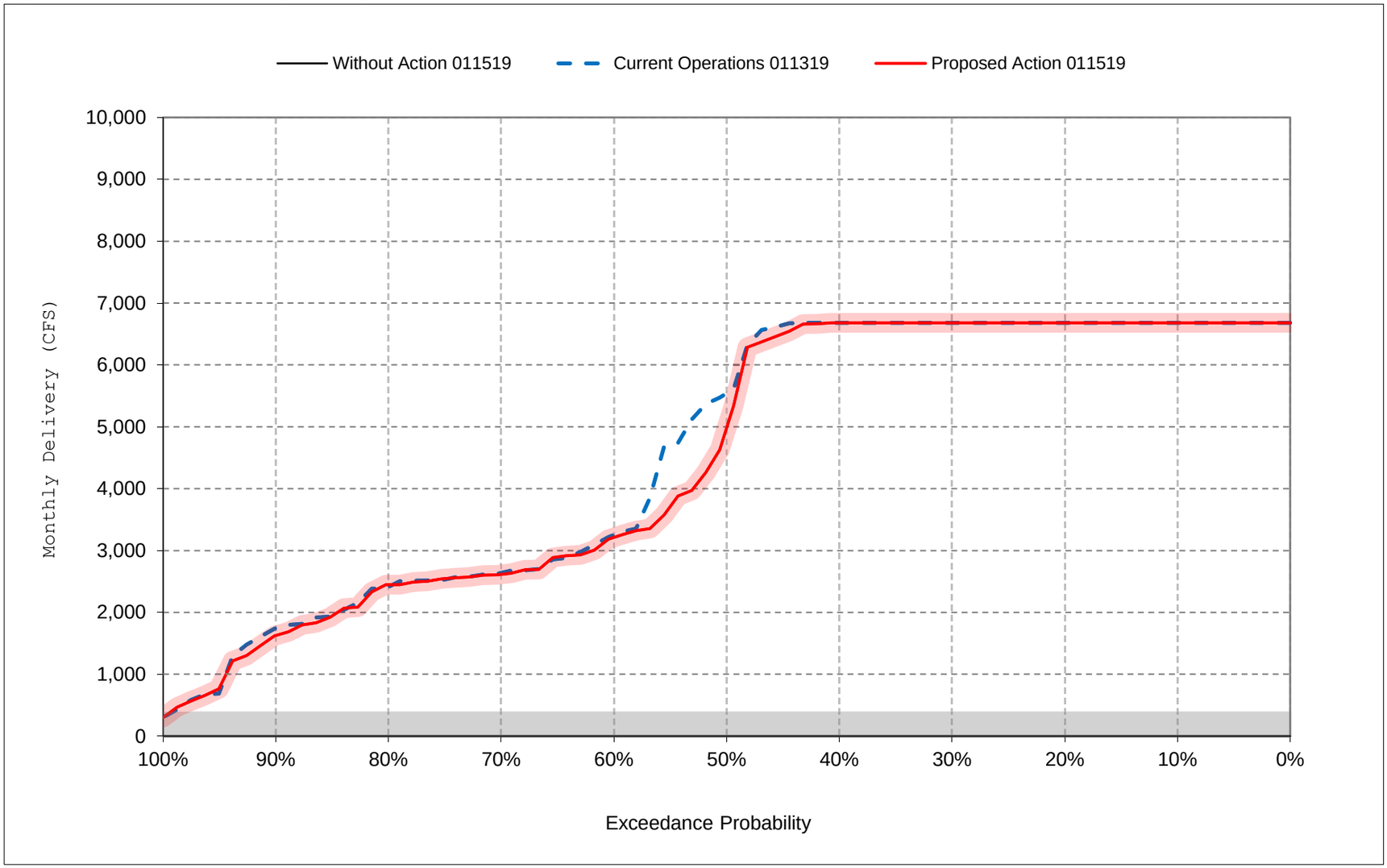
Figure 56-17. SWP Banks PP Exports, August



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Figure 56-18. SWP Banks PP Exports, September



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Table 57-1. DMC - CA Intertie Flow, Monthly Flow

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types[b,c]												
Wet (32%)	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal (16%)	0	0	0	0	0	0	0	0	0	0	0	0
Below Normal (13%)	0	0	0	0	0	0	0	0	0	0	0	0
Dry (24%)	0	0	0	0	0	0	0	0	0	0	0	0
Critical (15%)	0	0	0	0	0	0	0	0	0	0	0	0

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	213	354	383	375	369	328	0	0	36	63	83	160
20%	0	345	380	369	361	161	0	0	0	20	64	138
30%	0	182	377	0	350	0	0	0	0	0	29	130
40%	0	0	374	0	115	0	0	0	0	0	9	110
50%	0	0	229	0	0	0	0	0	0	0	0	4
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	36	105	199	89	140	67	0	1	8	14	26	71
Water Year Types[b,c]												
Wet (32%)	78	157	280	190	242	106	0	3	23	11	48	98
Above Normal (16%)	19	129	305	87	220	100	0	0	5	3	60	97
Below Normal (13%)	64	58	130	68	99	76	0	0	0	24	1	75
Dry (24%)	0	112	145	24	44	31	0	0	0	25	6	41
Critical (15%)	0	0	65	0	32	0	0	0	0	7	0	32

Current Operations 011319 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	213	354	383	375	369	328	0	0	36	63	83	160
20%	0	345	380	369	361	161	0	0	0	20	64	138
30%	0	182	377	0	350	0	0	0	0	0	29	130
40%	0	0	374	0	115	0	0	0	0	0	9	110
50%	0	0	229	0	0	0	0	0	0	0	0	4
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	36	105	199	89	140	67	0	1	8	14	26	71
Water Year Types[b,c]												
Wet (32%)	78	157	280	190	242	106	0	3	23	11	48	98
Above Normal (16%)	19	129	305	87	220	100	0	0	5	3	60	97
Below Normal (13%)	64	58	130	68	99	76	0	0	0	24	1	75
Dry (24%)	0	112	145	24	44	31	0	0	0	25	6	41
Critical (15%)	0	0	65	0	32	0	0	0	0	7	0	32

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 57-2. DMC - CA Intertie Flow, Monthly Flow

Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	0	0	0	0	0	0	0	0	0	0	0	0
Water Year Types[b,c]												
Wet (32%)	0	0	0	0	0	0	0	0	0	0	0	0
Above Normal (16%)	0	0	0	0	0	0	0	0	0	0	0	0
Below Normal (13%)	0	0	0	0	0	0	0	0	0	0	0	0
Dry (24%)	0	0	0	0	0	0	0	0	0	0	0	0
Critical (15%)	0	0	0	0	0	0	0	0	0	0	0	0

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	228	349	377	372	362	314	0	0	36	0	68	174
20%	213	336	374	369	350	243	0	0	0	0	40	131
30%	213	336	251	102	347	0	0	0	0	0	29	117
40%	0	111	47	19	74	0	0	0	0	0	29	110
50%	0	0	0	0	0	0	0	0	0	0	0	110
60%	0	0	0	0	0	0	0	0	0	0	0	57
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	75	135	126	106	131	72	13	5	5	1	21	82
Water Year Types[b,c]												
Wet (32%)	141	278	219	222	189	116	24	13	14	1	32	116
Above Normal (16%)	126	118	120	96	199	113	25	6	3	0	42	121
Below Normal (13%)	54	66	41	77	144	46	0	0	0	4	12	83
Dry (24%)	13	80	90	39	70	47	8	0	0	2	11	45
Critical (15%)	0	0	65	3	21	0	0	0	0	0	0	31

Proposed Action 011519 minus Without Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	228	349	377	372	362	314	0	0	36	0	68	174
20%	213	336	374	369	350	243	0	0	0	0	40	131
30%	213	336	251	102	347	0	0	0	0	0	29	117
40%	0	111	47	19	74	0	0	0	0	0	29	110
50%	0	0	0	0	0	0	0	0	0	0	0	110
60%	0	0	0	0	0	0	0	0	0	0	0	57
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	75	135	126	106	131	72	13	5	5	1	21	82
Water Year Types[b,c]												
Wet (32%)	141	278	219	222	189	116	24	13	14	1	32	116
Above Normal (16%)	126	118	120	96	199	113	25	6	3	0	42	121
Below Normal (13%)	54	66	41	77	144	46	0	0	0	4	12	83
Dry (24%)	13	80	90	39	70	47	8	0	0	2	11	45
Critical (15%)	0	0	65	3	21	0	0	0	0	0	0	31

a Based on the 82-year simulation period.

b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

e These are draft results meant for qualitative analysis and are subject to revision.

Table 57-3. DMC - CA Intertie Flow, Monthly Flow

Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	213	354	383	375	369	328	0	0	36	63	83	160
20%	0	345	380	369	361	161	0	0	0	20	64	138
30%	0	182	377	0	350	0	0	0	0	0	29	130
40%	0	0	374	0	115	0	0	0	0	0	9	110
50%	0	0	229	0	0	0	0	0	0	0	0	4
60%	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	36	105	199	89	140	67	0	1	8	14	26	71
Water Year Types[b,c]												
Wet (32%)	78	157	280	190	242	106	0	3	23	11	48	98
Above Normal (16%)	19	129	305	87	220	100	0	0	5	3	60	97
Below Normal (13%)	64	58	130	68	99	76	0	0	0	24	1	75
Dry (24%)	0	112	145	24	44	31	0	0	0	25	6	41
Critical (15%)	0	0	65	0	32	0	0	0	0	7	0	32

Proposed Action 011519

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	228	349	377	372	362	314	0	0	36	0	68	174
20%	213	336	374	369	350	243	0	0	0	0	40	131
30%	213	336	251	102	347	0	0	0	0	0	29	117
40%	0	111	47	19	74	0	0	0	0	0	29	110
50%	0	0	0	0	0	0	0	0	0	0	0	110
60%	0	0	0	0	0	0	0	0	0	0	0	57
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	75	135	126	106	131	72	13	5	5	1	21	82
Water Year Types[b,c]												
Wet (32%)	141	278	219	222	189	116	24	13	14	1	32	116
Above Normal (16%)	126	118	120	96	199	113	25	6	3	0	42	121
Below Normal (13%)	54	66	41	77	144	46	0	0	0	4	12	83
Dry (24%)	13	80	90	39	70	47	8	0	0	2	11	45
Critical (15%)	0	0	65	3	21	0	0	0	0	0	0	31

Proposed Action 011519 minus Current Operations 011319

Statistic	Monthly Flow (CFS)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Probability of Exceedance												
10%	15	-5	-6	-3	-6	-14	0	0	0	-63	-15	14
20%	213	-9	-6	0	-11	82	0	0	0	-20	-23	-8
30%	213	155	-126	102	-4	0	0	0	0	0	0	-13
40%	0	111	-327	19	-41	0	0	0	0	0	20	0
50%	0	0	-229	0	0	0	0	0	0	0	0	106
60%	0	0	0	0	0	0	0	0	0	0	0	57
70%	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0
Long Term												
Full Simulation Period[a]	39	30	-74	17	-10	5	13	4	-3	-13	-5	11
Water Year Types[b,c]												
Wet (32%)	64	120	-61	32	-54	10	24	10	-9	-10	-15	18
Above Normal (16%)	107	-12	-185	8	-21	13	25	6	-2	-3	-18	24
Below Normal (13%)	-10	8	-89	8	45	-30	0	0	0	-20	10	7
Dry (24%)	13	-32	-54	14	26	15	8	0	0	-23	5	3
Critical (15%)	0	0	0	3	-11	0	0	0	0	-7	0	-1

a Based on the 82-year simulation period.

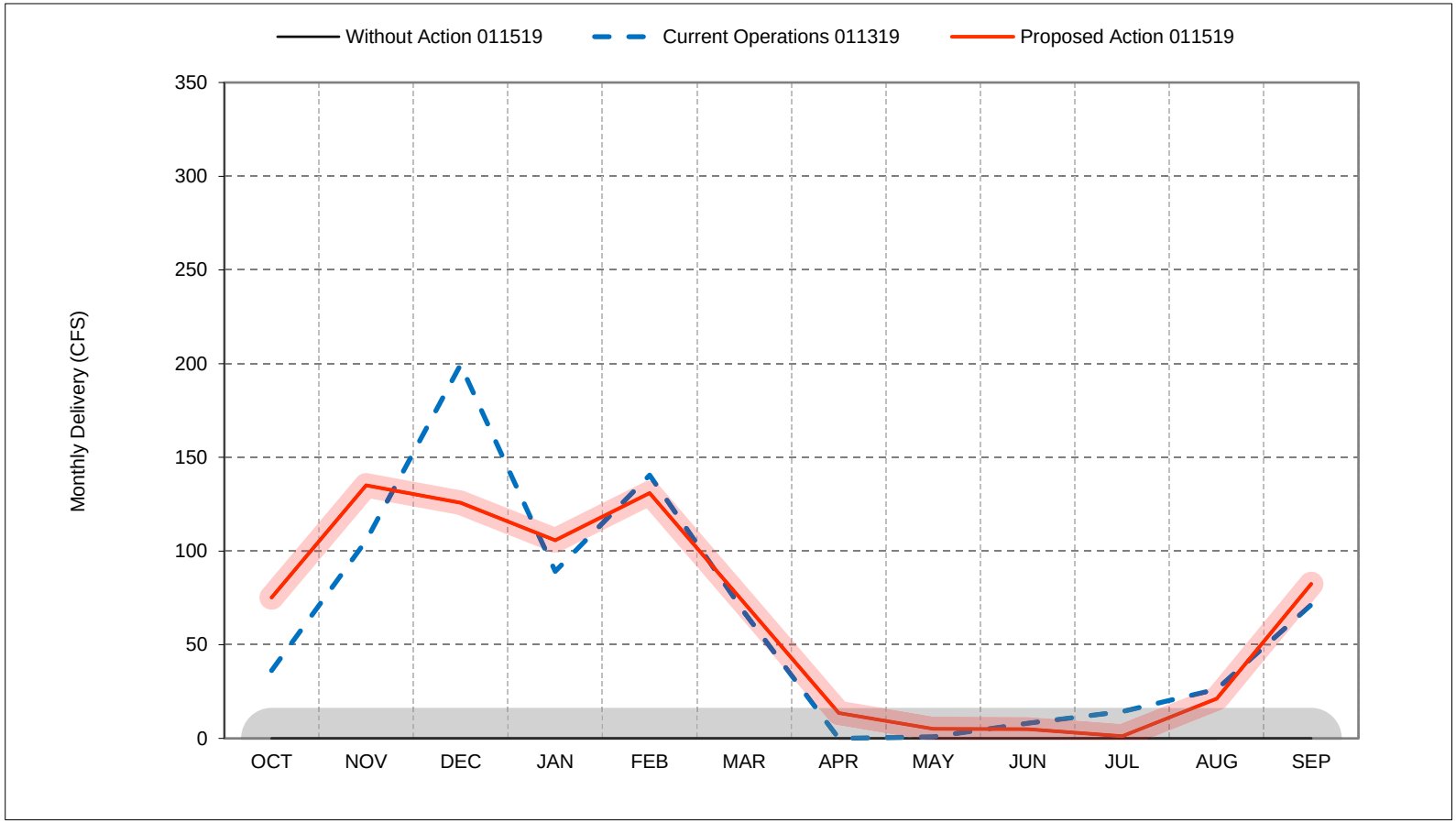
b As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).

c These results are displayed with calendar year - year type sorting.

d All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

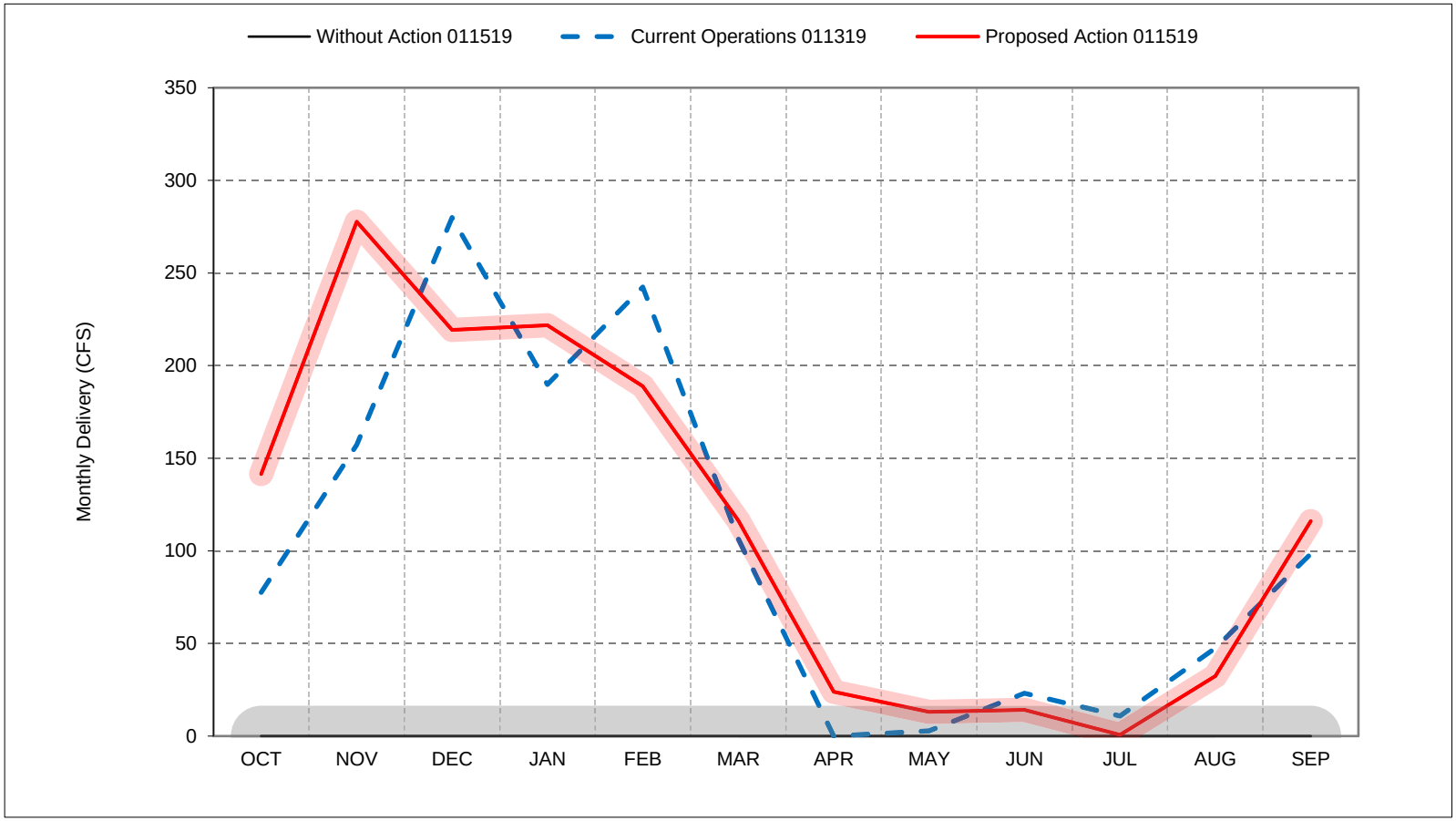
e These are draft results meant for qualitative analysis and are subject to revision.

Figure 57-1. DMC - CA Intertie Flow, Long-Term Average Delivery



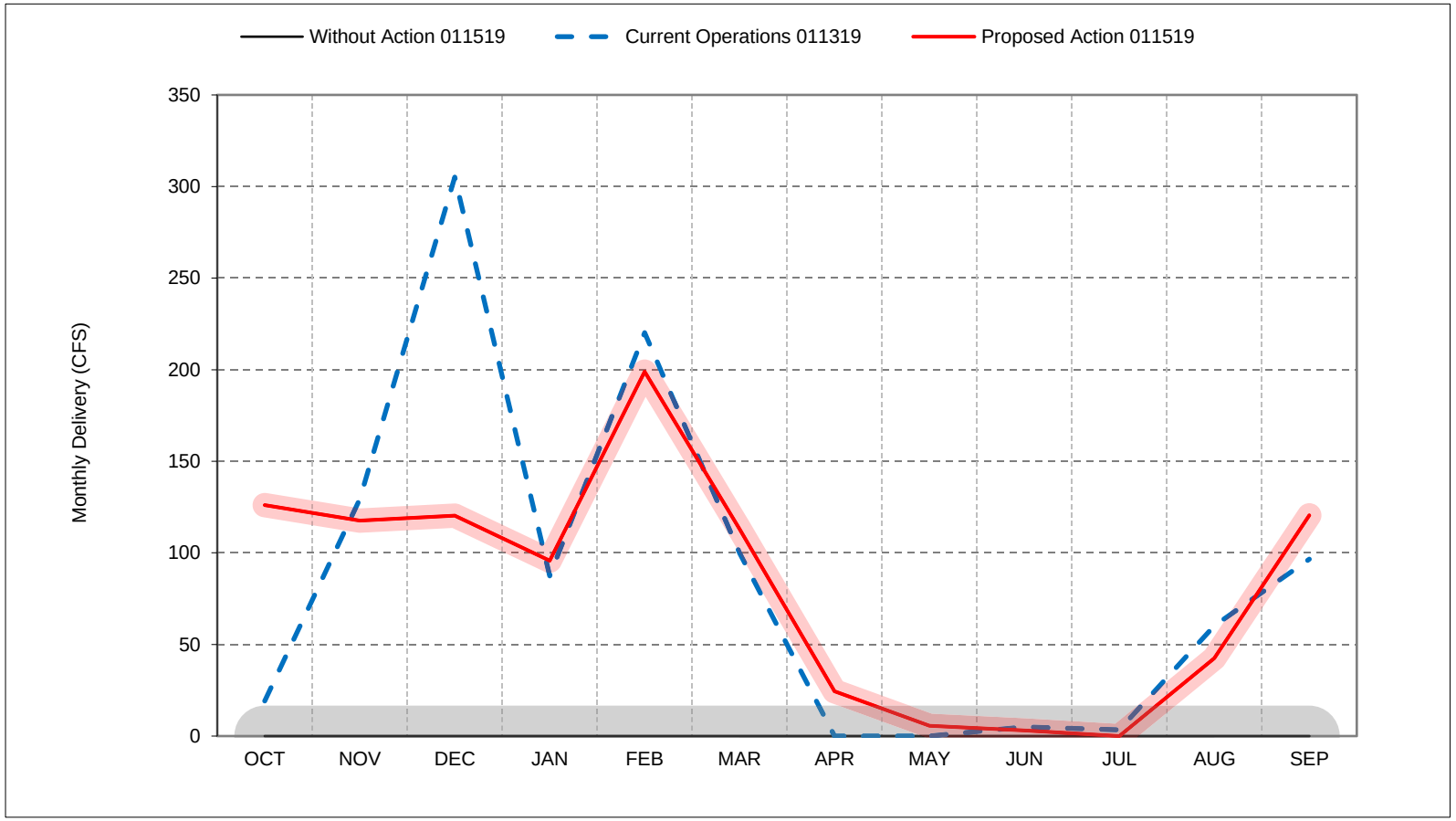
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 57-2. DMC - CA Intertie Flow, Wet Year Average Delivery



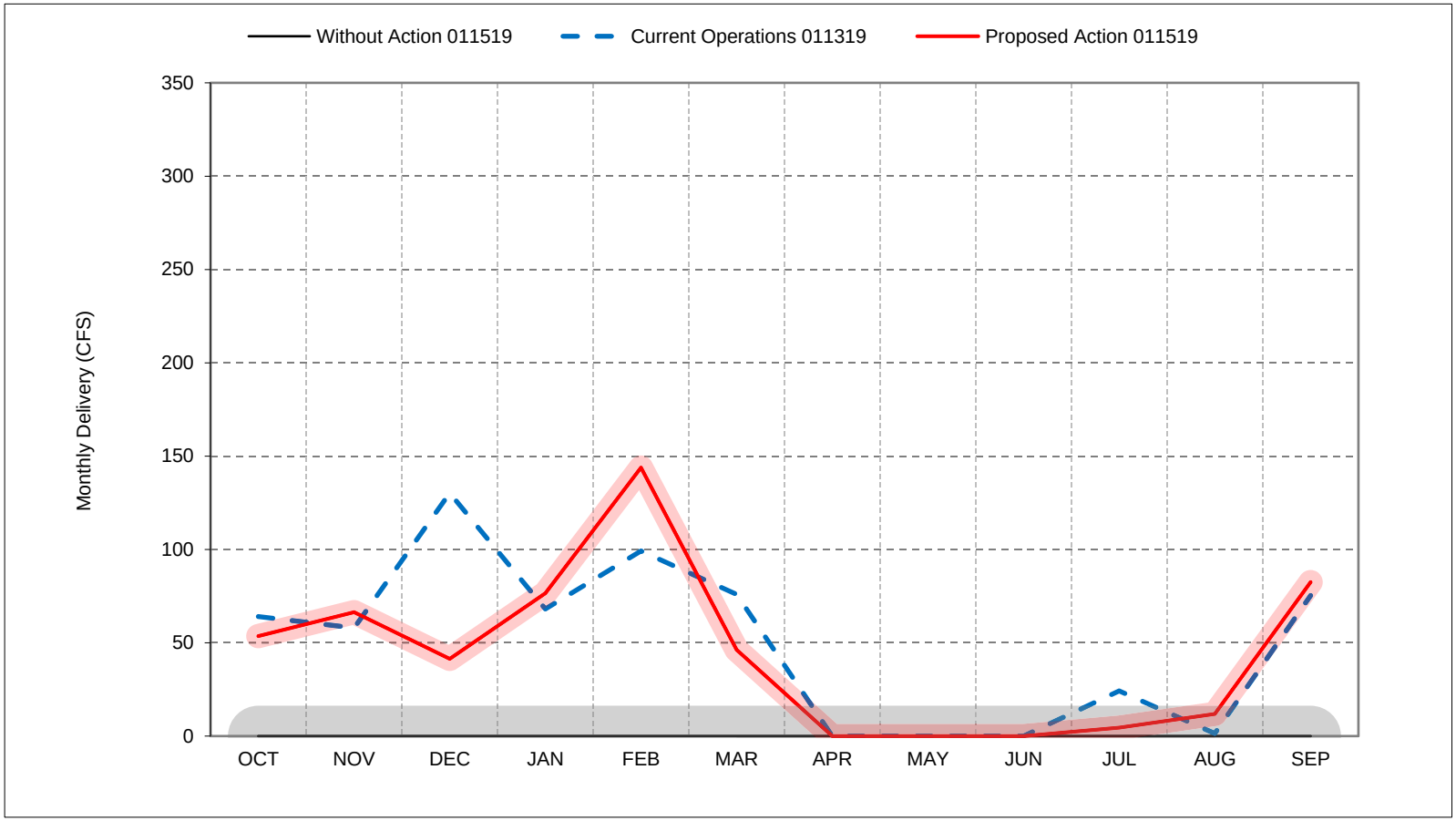
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 57-3. DMC - CA Intertie Flow, Above Normal Year Average Delivery



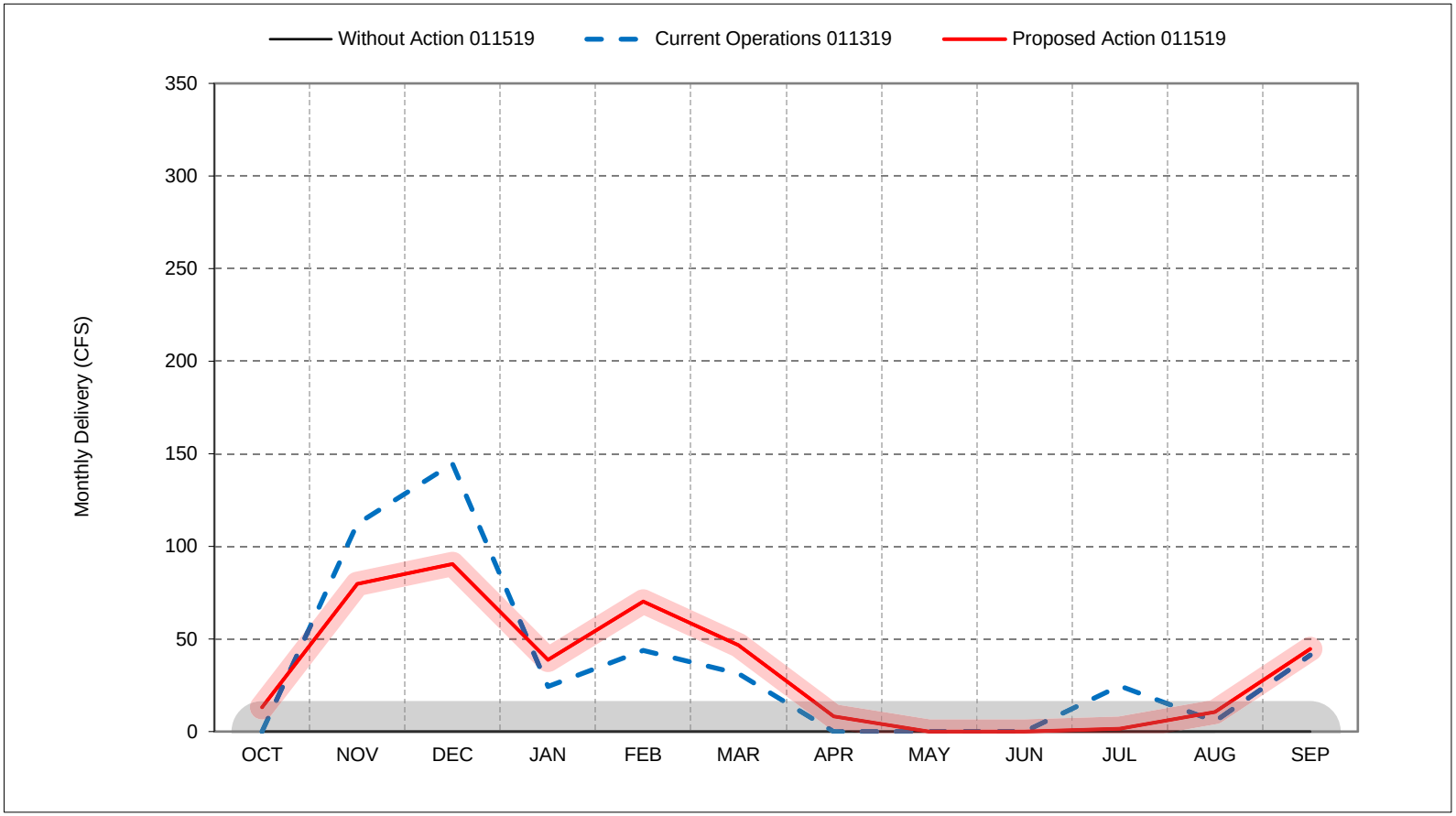
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 57-4. DMC - CA Intertie Flow, Below Normal Year Average Delivery



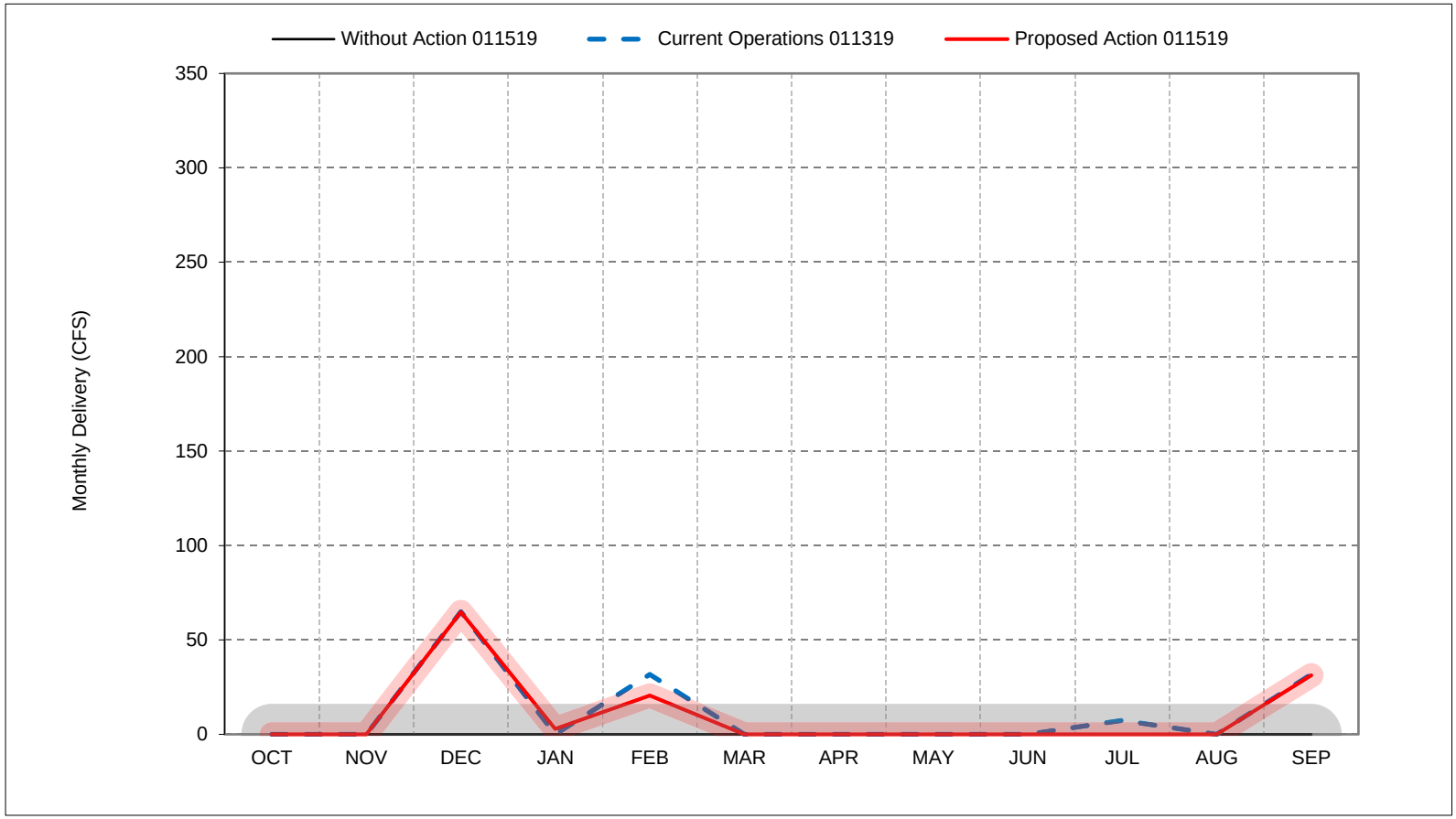
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 57-5. DMC - CA Intertie Flow, Dry Year Average Delivery



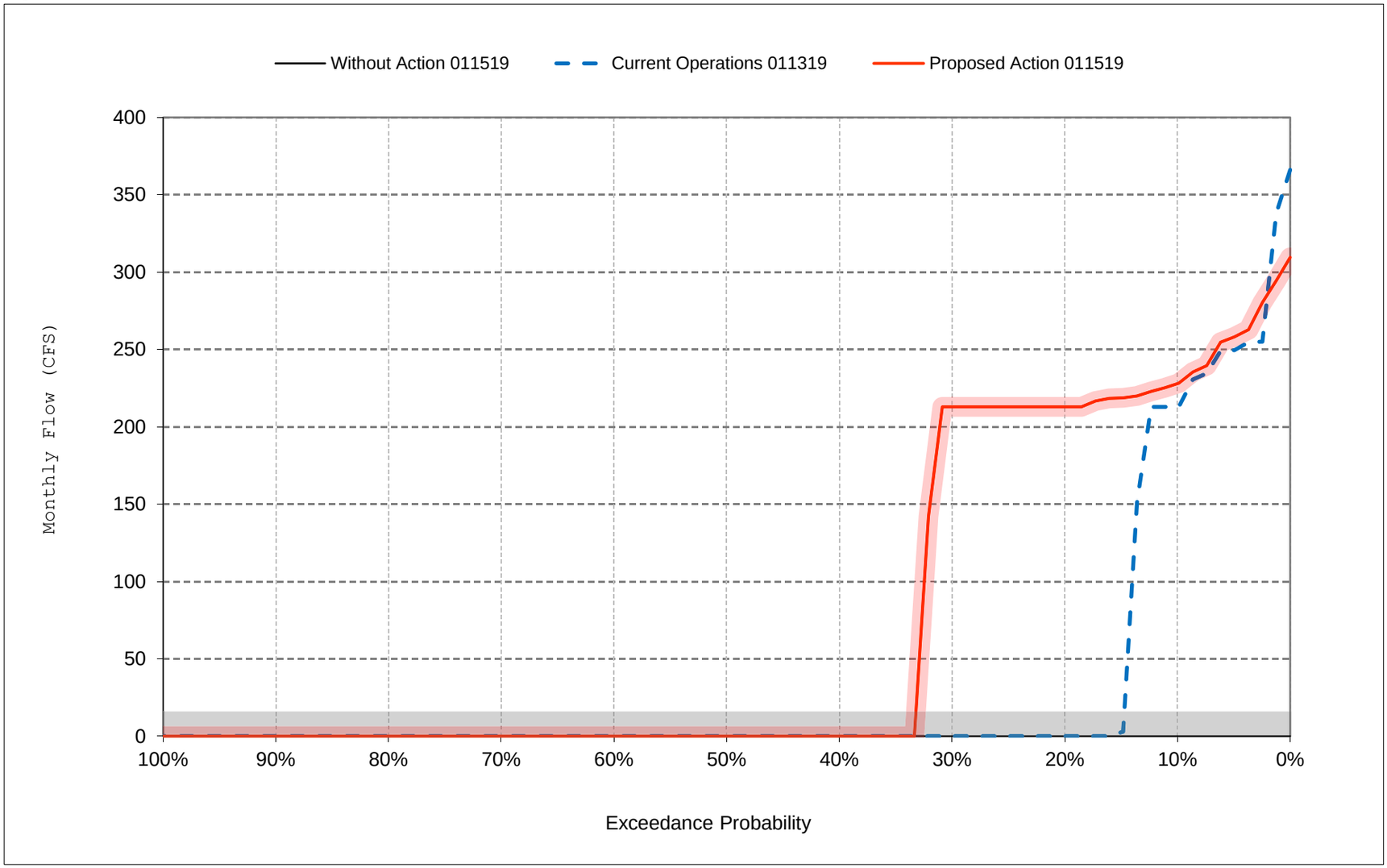
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

Figure 57-6. DMC - CA Intertie Flow, Critical Year Average Delivery



*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.
*These are draft results meant for qualitative analysis and are subject to revision.

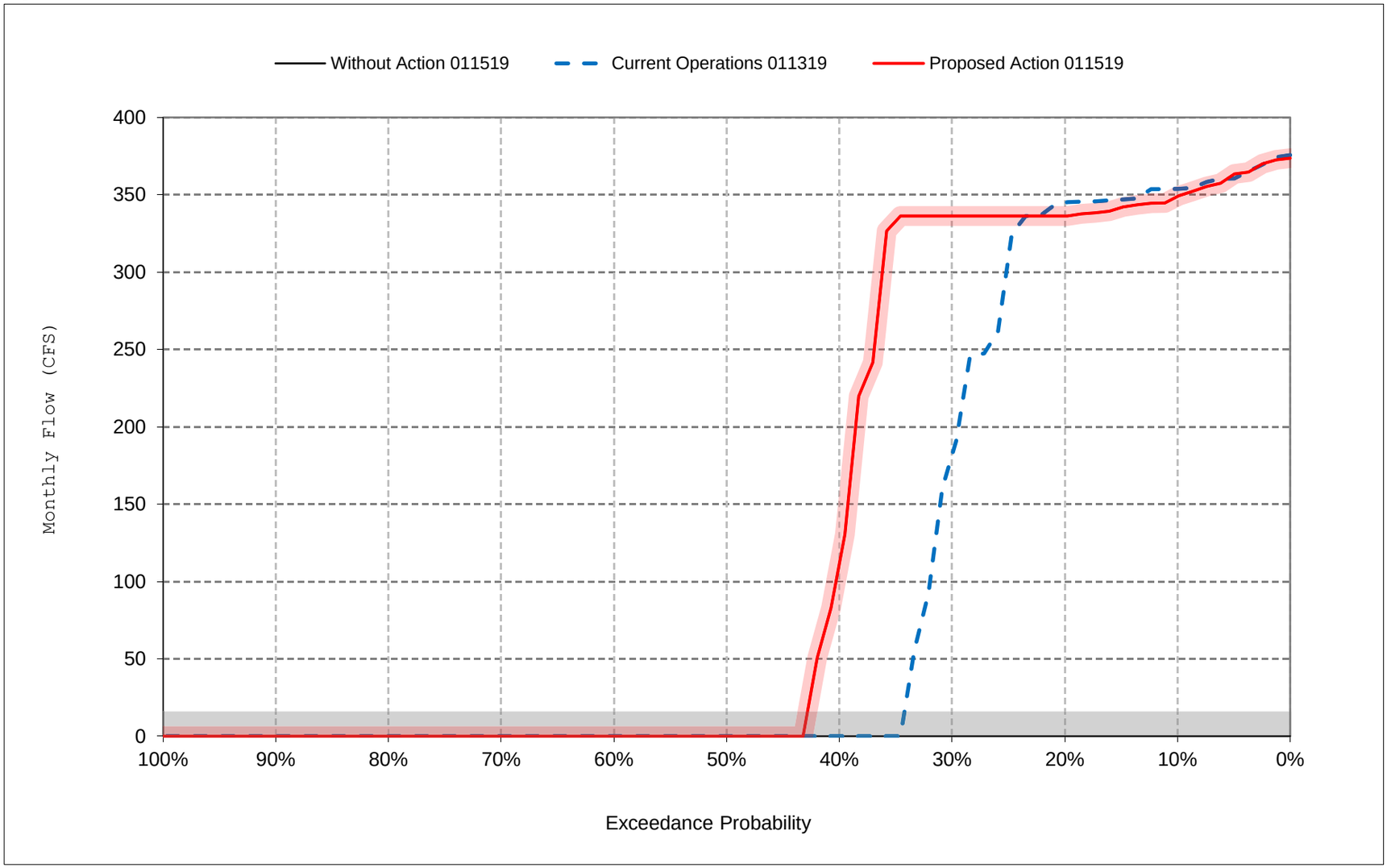
Figure 57-7. DMC - CA Intertie Flow, October



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

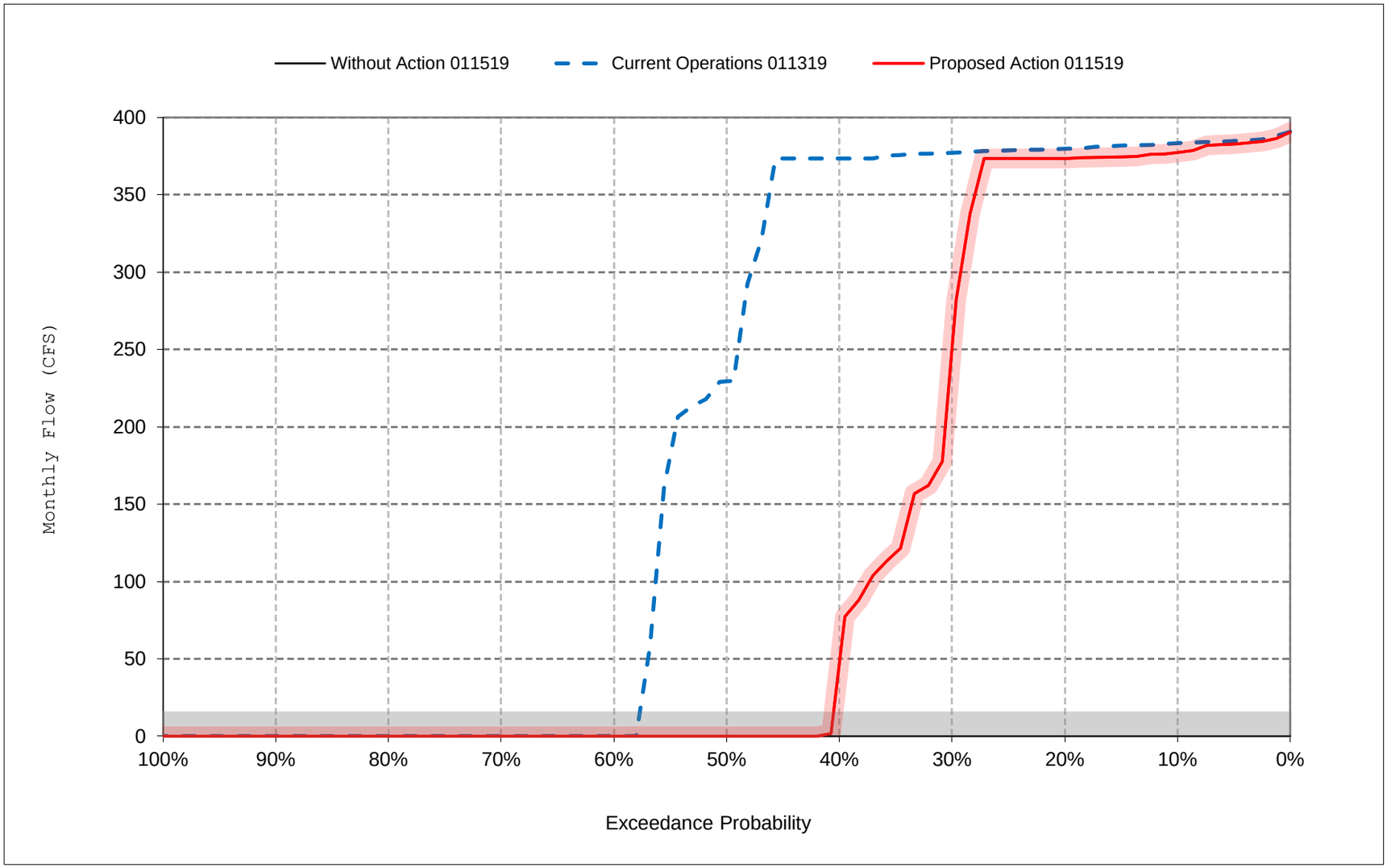
Figure 57-8. DMC - CA Intertie Flow, November



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

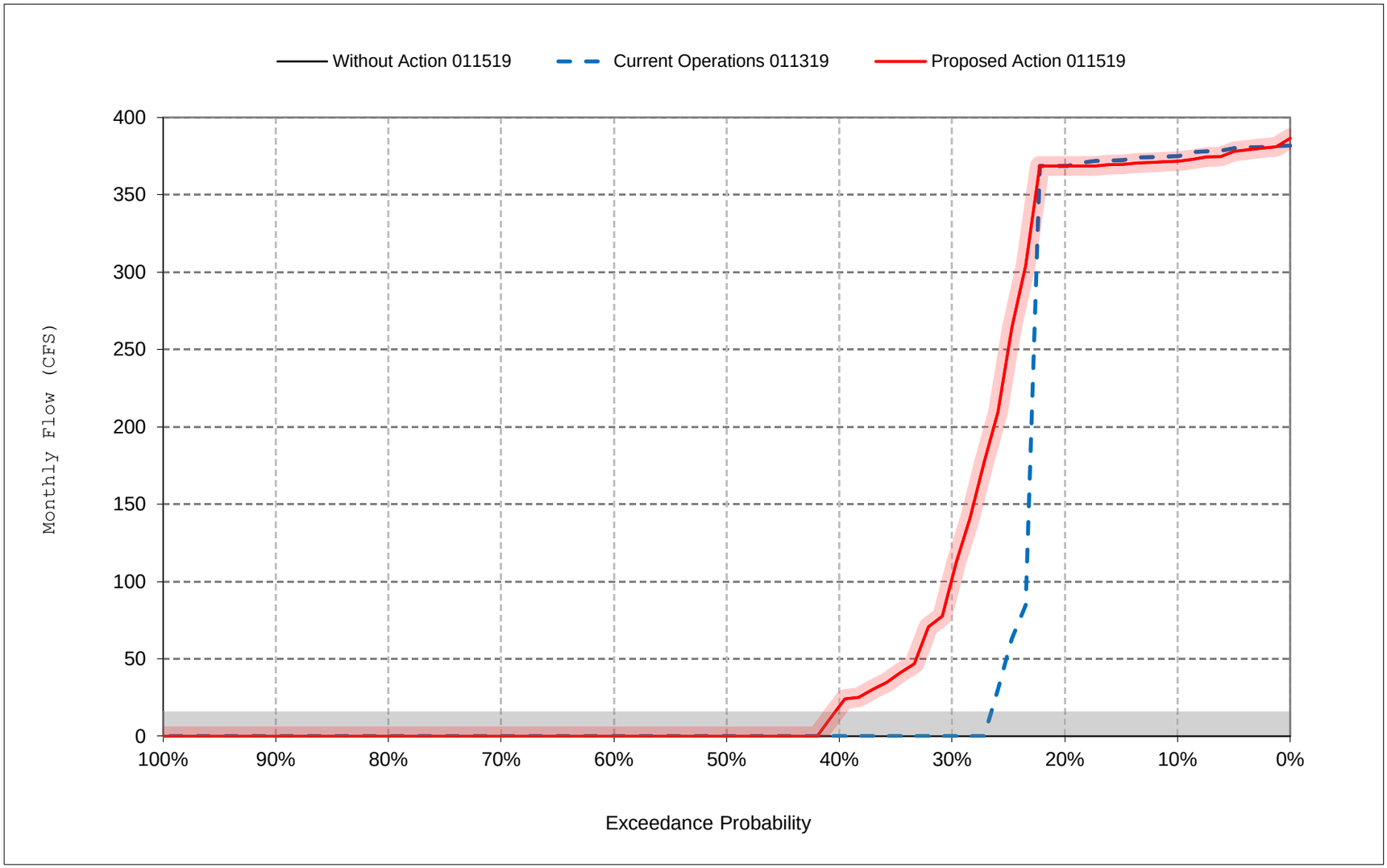
Figure 57-9. DMC - CA Intertie Flow, December



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

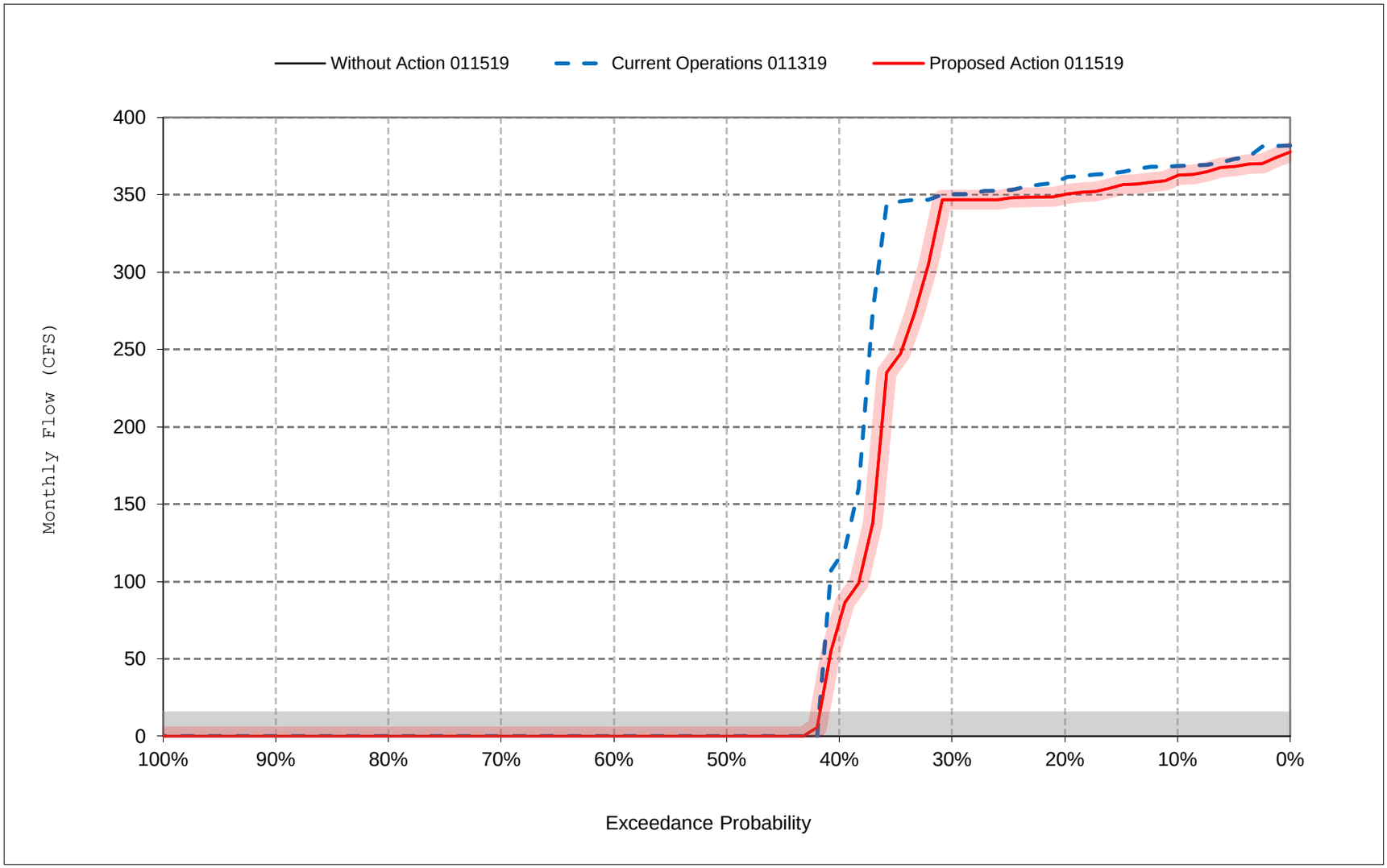
Figure 57-10. DMC - CA Intertie Flow, January



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

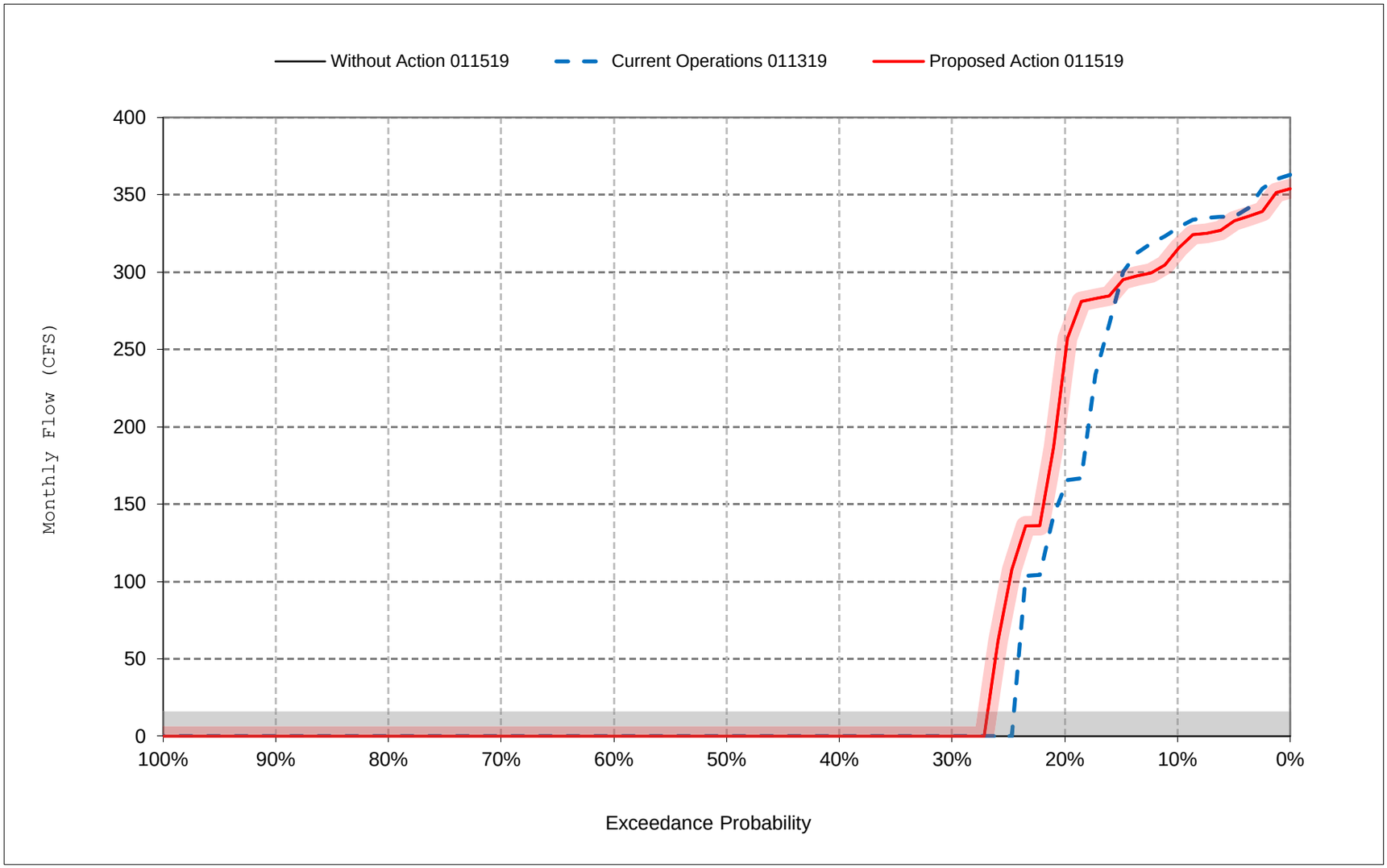
Figure 57-11. DMC - CA Intertie Flow, February



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

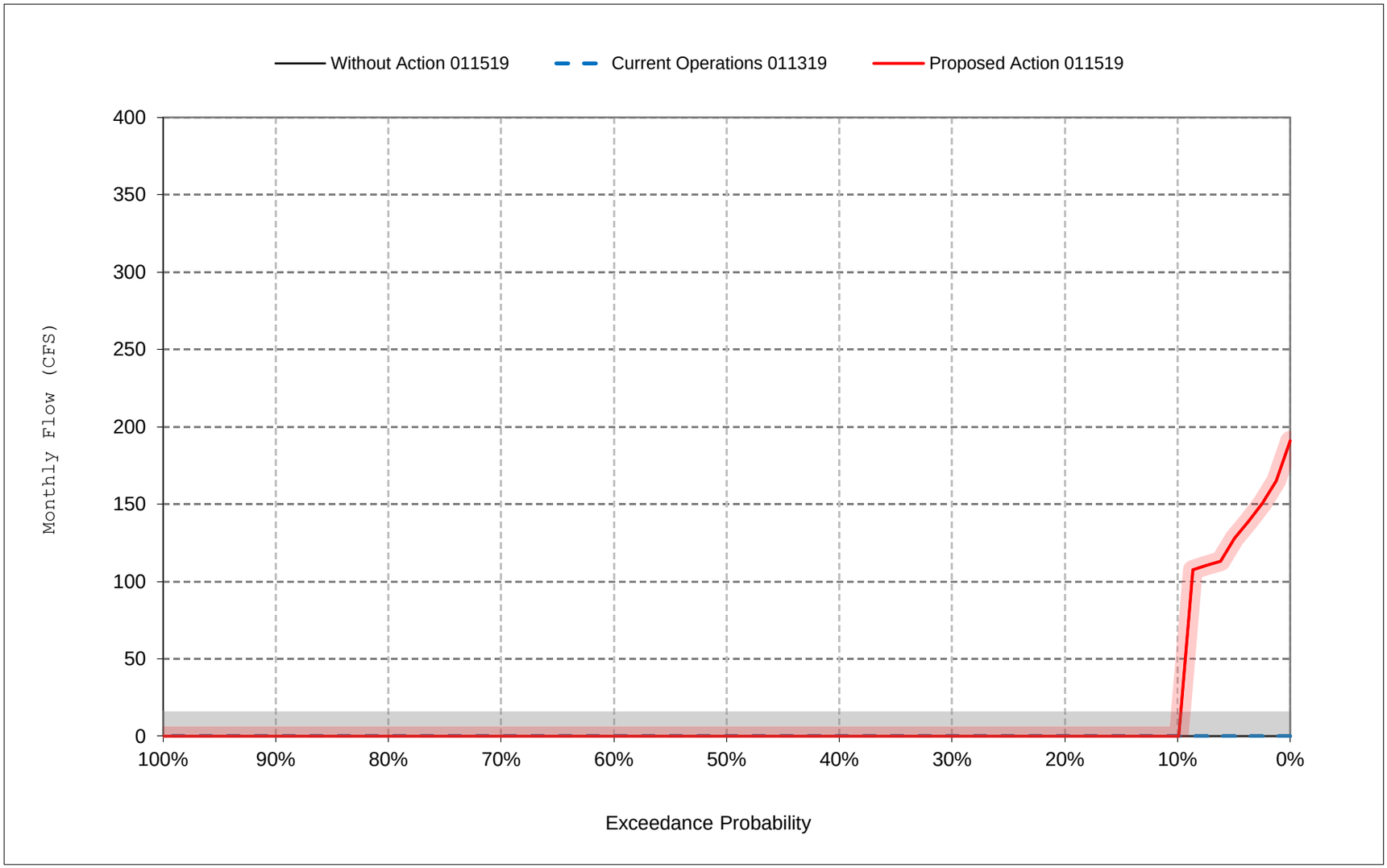
Figure 57-12. DMC - CA Intertie Flow, March



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

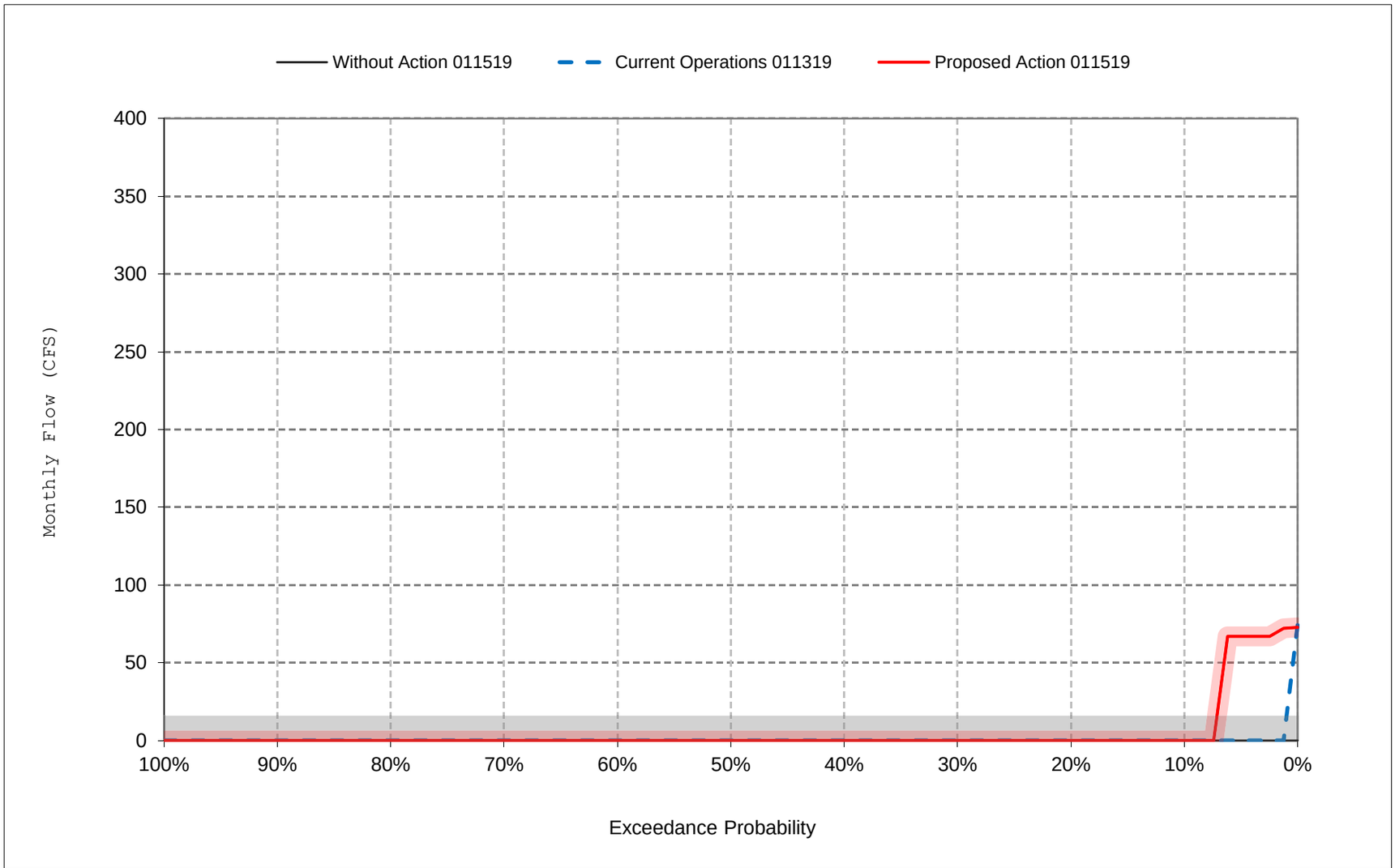
Figure 57-13. DMC - CA Intertie Flow, April



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

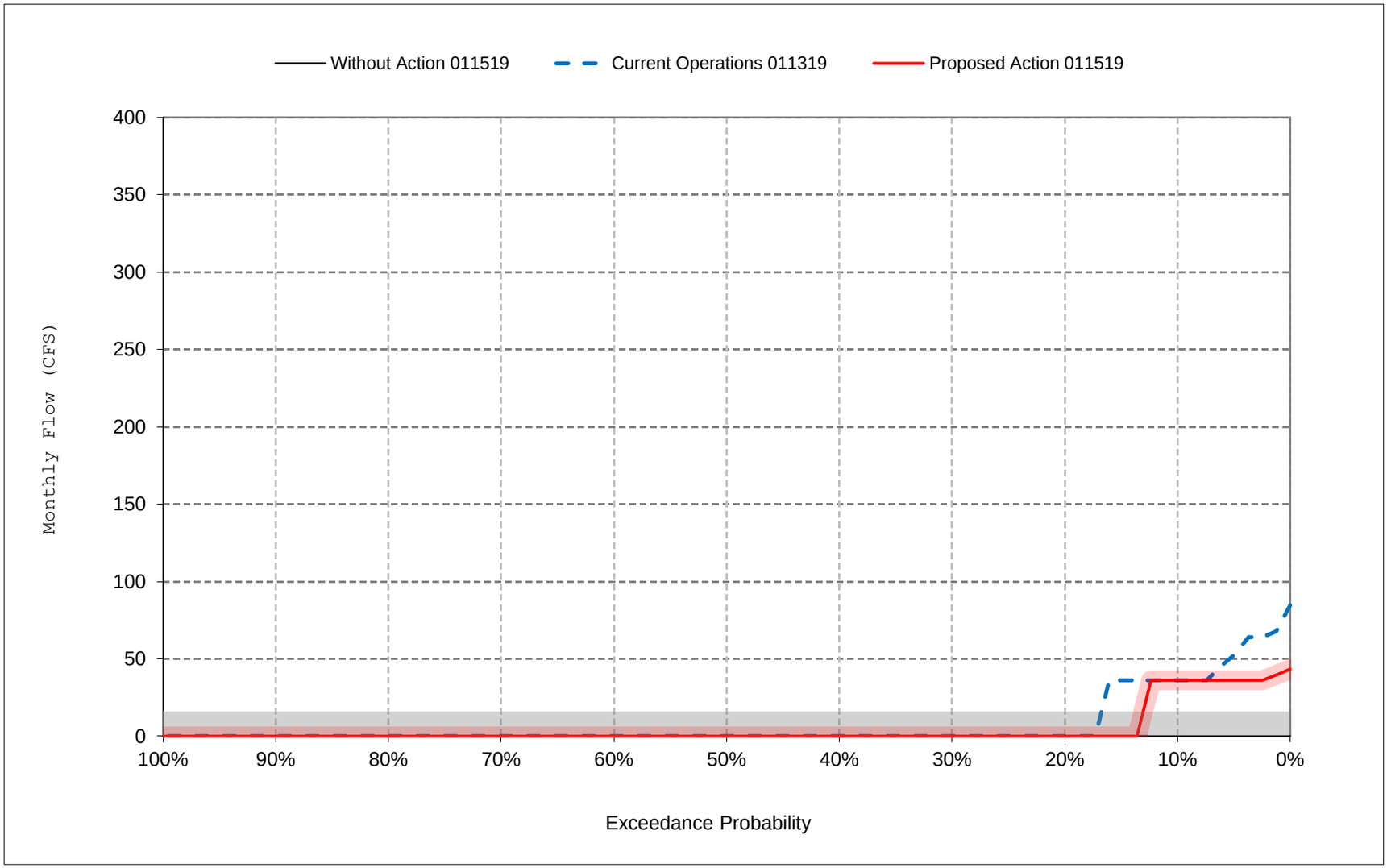
Figure 57-14. DMC - CA Intertie Flow, May



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

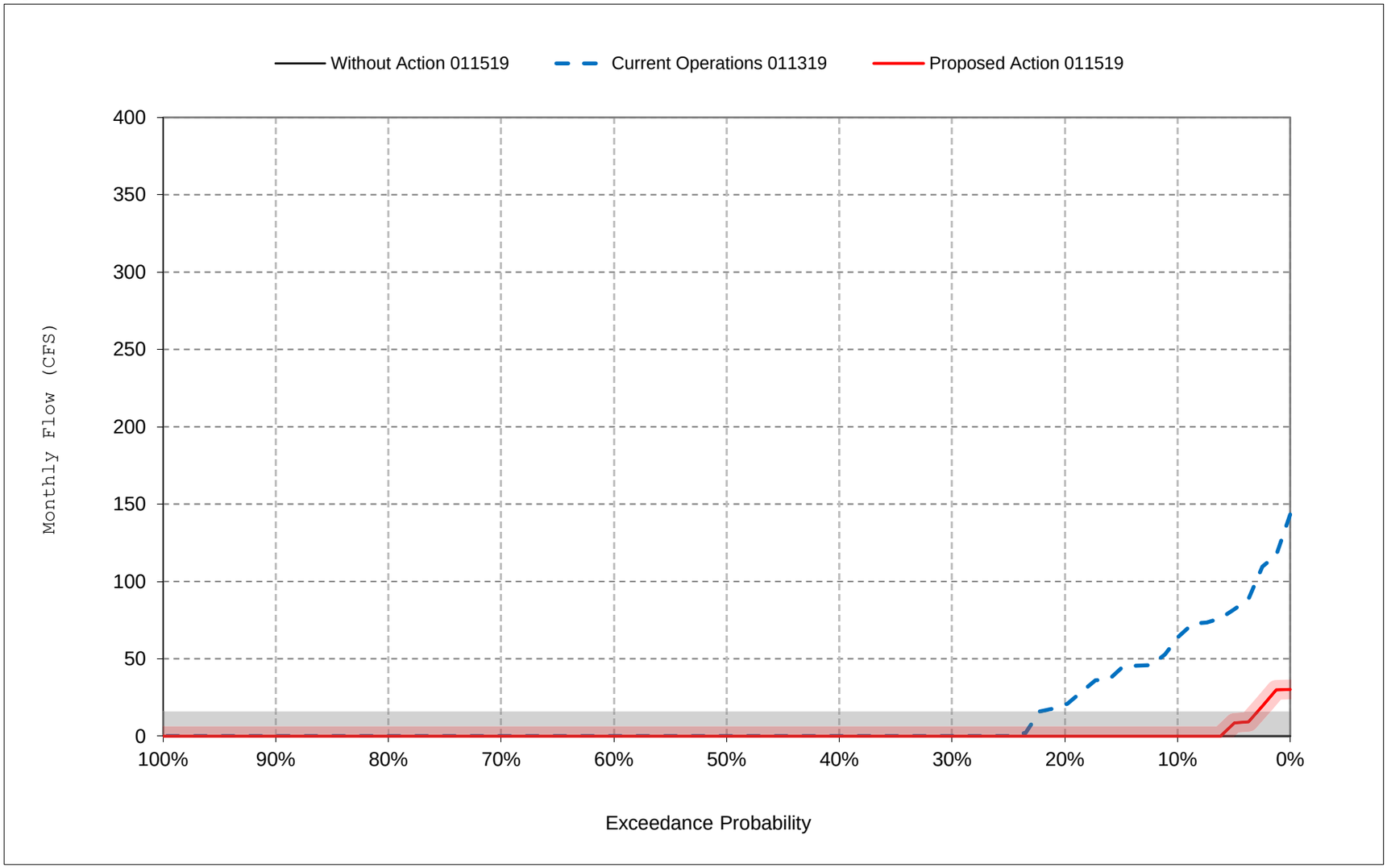
Figure 57-15. DMC - CA Intertie Flow, June



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

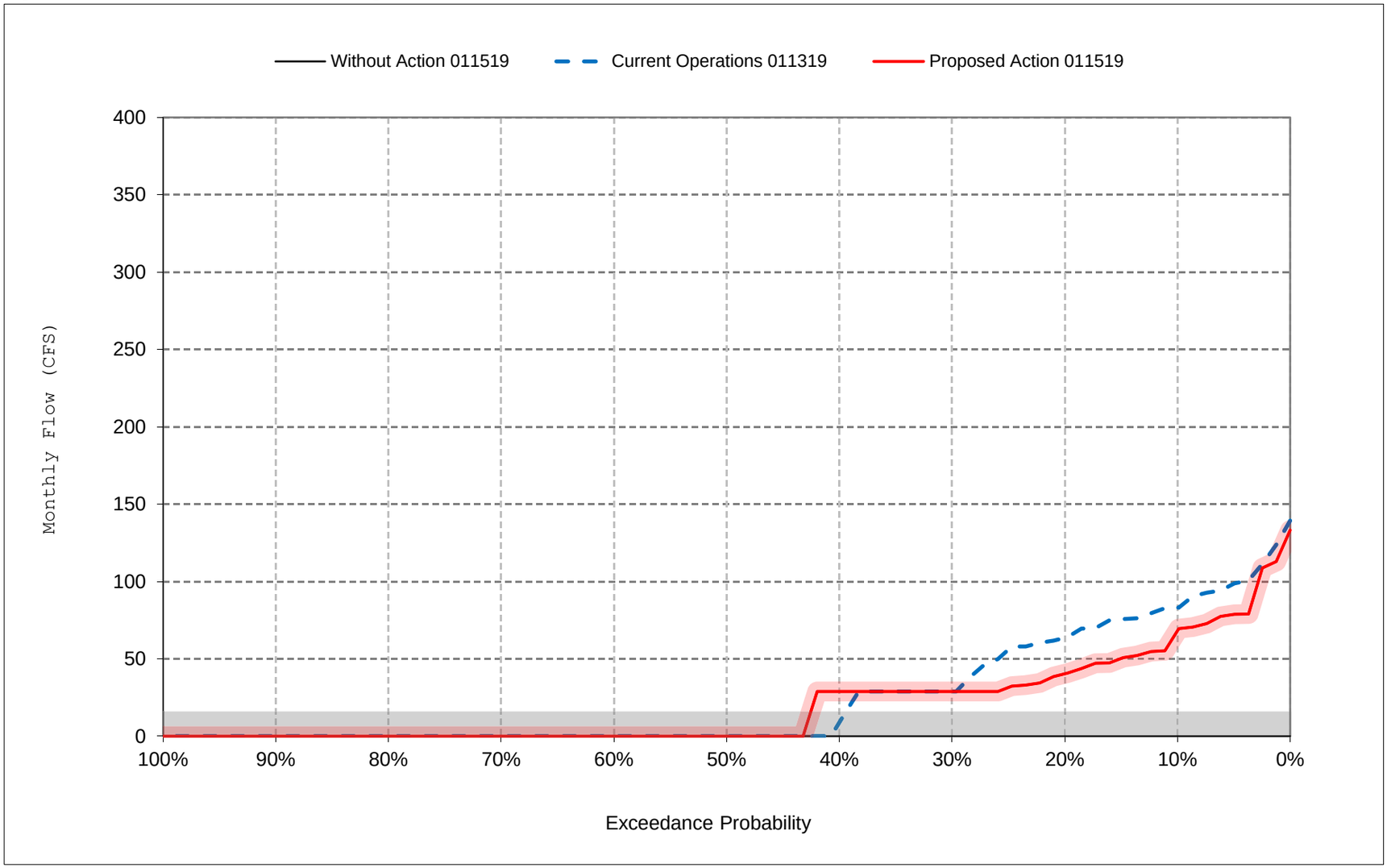
Figure 57-16. DMC - CA Intertie Flow, July



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

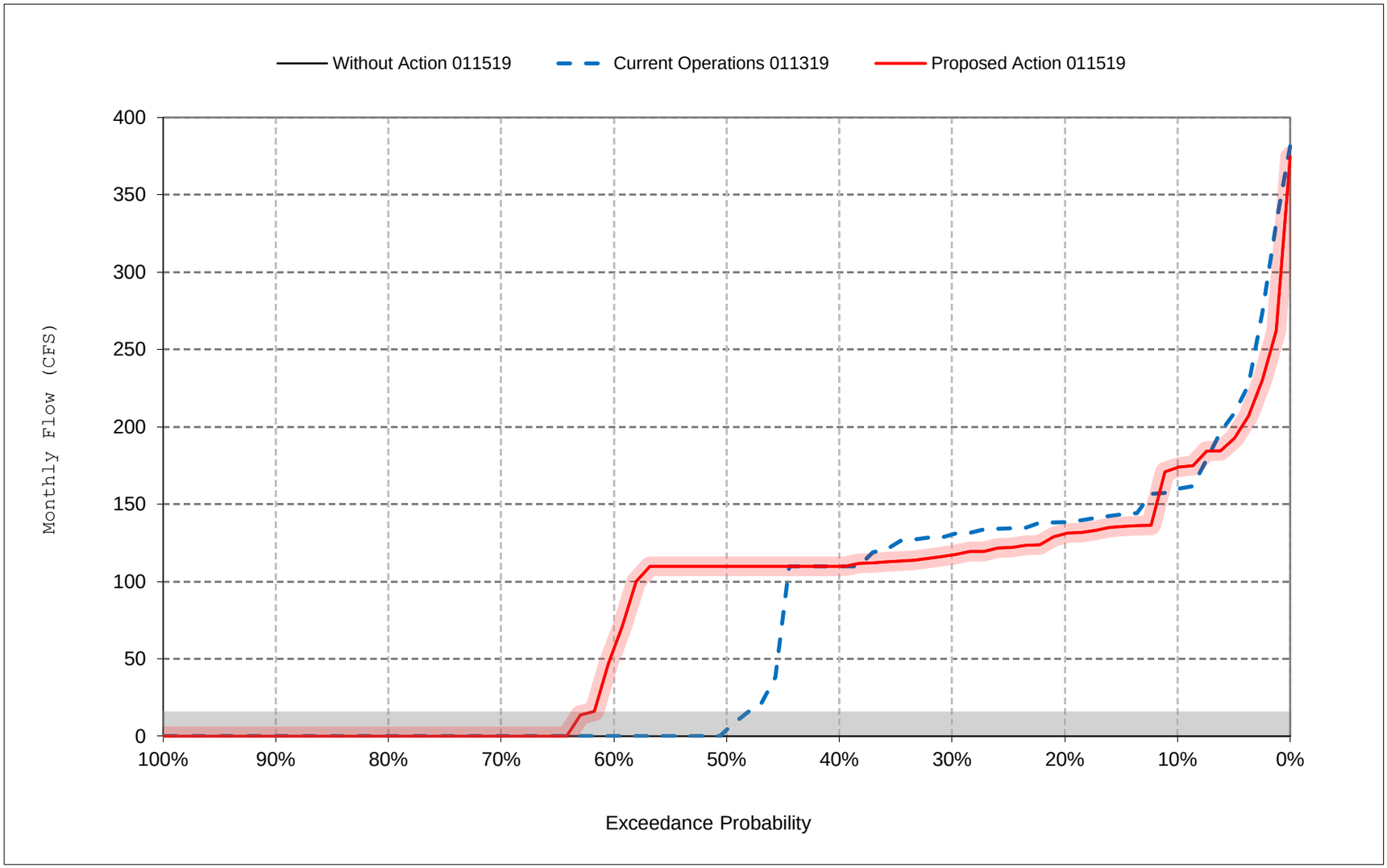
Figure 57-17. DMC - CA Intertie Flow, August



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.

Figure 57-18. DMC - CA Intertie Flow, September



*All scenarios are simulated at ELT (Early Long-Term) Q5 with 2025 climate change and 15 cm sea level rise.

*These are draft results meant for qualitative analysis and are subject to revision.