

FACT SHEET

# Water Supply Methodology



This fact sheet summarizes methodologies that will be implemented during the SWSI Update to estimate current and future water supplies under the various planning scenarios

## Current and Future Water Supplies

Estimates of current water supplies are necessary to understand the amount of water that is physically and legally available to meet current demands and any additional water supplies that may be available to meet future demands.

Current water supply information consists primarily of estimates of “natural flow” at key locations as well as supplies available in reservoirs or conveyed across basins. “Natural flow” is the amount of native water in the river at a particular location absent the effects of man, and serves as the foundation of the Colorado Decision Support System (CDSS) surface water allocation models used in the SWSI Update.

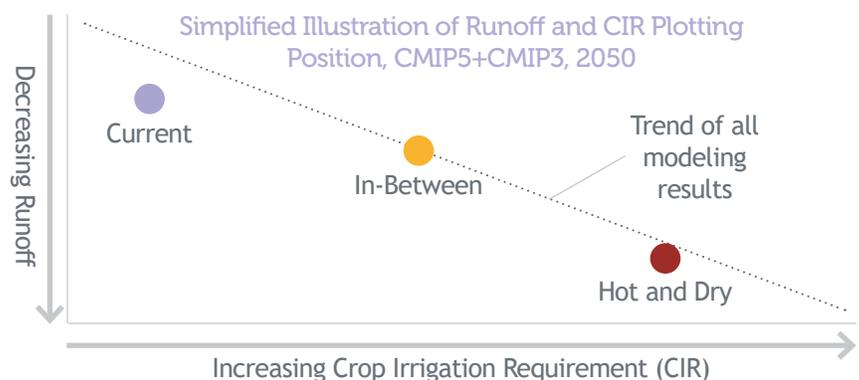
Colorado’s Water Plan included “Water Supply” as a key driver in each of its planning scenarios. Future water supplies are projected to be impacted by climate change in the Cooperative Growth, Adaptive Innovation, and Hot Growth planning scenarios.

## Impacts to Water Supplies from Climate Change

The CWCB has undertaken several studies and investigations on the impact of climate projections on the future of water use in Colorado. Most notably was the development of the Colorado Climate Plan (CCP), which focuses on observed climate trends, climate modeling, and climate and hydrology projections to assist with the planning and management of water resources in Colorado. The CCP discusses the most recent global climate projections (CMIP5) and recommends the integration of these results with the previous global climate projections (CMIP3) to provide a representative range of potential future climate and hydrological conditions.

Colorado’s Water Plan incorporates the impact of climate change and identifies two future potential climate projections for the planning scenarios. The projections reflect “Hot and Dry” conditions and conditions that are in between Current conditions and the Hot and Dry conditions (“In-between”). The climate projections are assigned to the planning scenarios as follows:

<b>A</b> Business as Usual	Current
<b>B</b> Weak Economy	Current
<b>C</b> Cooperative Growth	In-between
<b>D</b> Adaptive Innovation	Hot and Dry
<b>E</b> Hot Growth	Hot and Dry



The effort associated with processing the projected climate data and downscaling the information for use at the Water District level was completed through the Colorado River Water Availability Study Phase II (CRWAS-II) project. This effort resulted in a time series of climate-adjusted “natural flow” hydrology at over 300 streamflow gage locations statewide for each climate projection. Natural flow hydrology for the In-Between and Hot and Dry conditions differed from Current conditions in various degrees depending on location. In general, peak runoff tended to occur earlier than Current in some locations, average annual natural flows tended to be lower than Current in most locations, and frequency/duration of droughts tended to increase.

# Tools for Estimating Available Water Supplies

The bulk of the analysis for estimating current and future available water supplies will rely on surface water allocation models (StateMod) and data sets developed under the CDSS program. Historical and “baseline” input data sets with monthly time steps have been developed in most basins. Historical data sets include historical hydrology and reflect infrastructure, administration, and operating conditions as they have progressed over time. Baseline data sets include historical hydrology but reflect current infrastructure, administration, and operating conditions over the full time period. Baseline data sets are useful for simulating the impacts of new projects or operations, changed demands, or climate-impacted hydrology considering current administrative and operational practices and infrastructure over a long hydrological period.

In basins with CDSS surface water allocation models (StateMod), baseline data sets will be used to assess available water supplies under current conditions. In the South Platte basin, a historical data set exists (reflecting historical hydrology, infrastructure, administration, etc.), but a baseline data set will be developed during the SWSI Update.

Future available water supplies under the planning scenarios will also be estimated using the models. For the planning scenario modeling, future diversion demands for M&SSI and agriculture will be input into the models as well as climate-impacted hydrology. The models will be run assuming current infrastructure, administration, and operating conditions. The results of the modeling will be a time series of future water availability data at various locations in river basins. Output from the modeling will also characterize met diversion demands and gaps. Additional information on the modeling and gap analysis process can be found in the Scenario Planning & Gap Analysis Methodology fact sheet.

In basins where the CDSS program has not been fully implemented, the methodology will be modified using available tools and water supply information such as historical streamflow data. In the Republican, Arkansas, and Rio Grande River basins, it will be assumed that there are no unappropriated supplies to meet future demands (under both current conditions and the planning scenarios). Current water availability in the Cache La Poudre and Laramie basins will be based on analyses performed in support of planned storage projects, and various qualitative and quantitative methods will be used to evaluate available water supplies under the planning scenarios.



## FOR MORE INFORMATION

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<http://cwcb.state.co.us/water-management/water-supply-planning/Pages/SWSIUpdate.aspx>



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