New Mexico
Water Supply Outlook Report
April 1, 2025

Resource Soil Scientist Janella Cruz takes notes at the Taos Canyon Snow Course in Late March. NRCS Photo: Aaron Miller.

Basin Outlook Reports

and

Federal - State - Private
Cooperative Snow Surveys

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How forecasts are made

Most of the annual streamflow in the western United States originates as snowfall that has accumulated in the mountains during the winter and early spring. As the snowpack accumulates, hydrologists estimate the runoff that will occur when it melts. Measurements of snow water equivalent at selected manual snow courses and automated SNOTEL sites, along with precipitation, antecedent streamflow, and indices of the El Niño / Southern Oscillation are used in computerized statistical and simulation models to prepare runoff forecasts. These forecasts are coordinated between hydrologists in the Natural Resources Conservation Service and the National Weather Service. Unless otherwise specified, all forecasts are for flows that would occur naturally without any upstream influences.

Forecasts of any kind, of course, are not perfect. Streamflow forecast uncertainty arises from three primary sources: (1) uncertain knowledge of future weather conditions, (2) uncertainty in the forecasting procedure, and (3) errors in the data. The forecast, therefore, must be interpreted not as a single value but rather as a range of values with specific probabilities of occurrence. The middle of the range is expressed by the 50% exceedance probability forecast, for which there is a 50% chance that the actual flow will be above, and a 50% chance that the actual flow will be below this value. To describe the expected range around this 50% value, four other forecasts are provided, two smaller values (90% and 70% exceedance probability) and two larger values (30%, and 10% exceedance probability). For example, there is a 90% chance that the actual flow will be more than the 90% exceedance probability forecast. The others can be interpreted similarly.

The wider the spread among these values, the more uncertain the forecast. As the season progresses, forecasts become more accurate, primarily because a greater portion of the future weather conditions become known; this is reflected by a narrowing of the range around the 50% exceedance probability forecast. Users should take this uncertainty into consideration when making operational decisions by selecting forecasts corresponding to the level of risk they are willing to assume about the amount of water to be expected. If users anticipate receiving a lesser supply of water, or if they wish to increase their chances of having an adequate supply of water for their operations, they may want to base their decisions on the 90% or 70% exceedance probability forecasts, or something in between. On the other hand, if users are concerned about receiving too much water (for example, threat of flooding), they may want to base their decisions on the 30% or 10% exceedance probability forecasts, or something in between. Regardless of the forecast value users choose for operations, they should be prepared to deal with either more or less water. (Users should remember that even if the 90% exceedance probability forecast is used, there is still a 10% chance of receiving less than this amount). By using the exceedance probability information, users can easily determine the chances of receiving more or less water than predicted in the forecast.

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Additional Reading Hyperlinks:
Assessing the new NRCS water supply forecast model for the American West

A Machine Learning Metasystem for Robust Probabilistic Nonlinear Regression-Based Forecasting

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Key Online Resources Referenced:

[1] *https://nwcc-apps.sc.egov.usda.gov/basin-plots/#NM*

[2] *https://www.nohrsc.noaa.gov/interactive/html/map.html*

[3] *https://nwcc-apps.sc.egov.usda.gov/*

[4] *https://nwcc-apps.sc.egov.usda.gov/imap/*

[5] *https://www.wcc.nrcs.usda.gov/ftpref/nwcc/basin-rpt/*

[6] *https://nwcc-apps.sc.egov.usda.gov/forecast-plots/#state=NM*

April 1, 2025, Summary

Dry conditions persisted in New Mexico's forecast basins through the end of March. April 1 **snowpack** conditions continue to be challenging. Isolated higher snowpack levels in the San Juan Mountains pushed basin-wide snow water equivalent (SWE) values in the Rio Grande Headwaters and the San Juan basins to 56% - still far short of normal conditions. Other basins in the state ranged from 0 to 29% of normal with no-snow conditions in the Gila-San Francisco and far below average conditions in other basins. For sites that retained snow cover, record low SWE was set at 12 sites across the state. The second lowest SWE records were set at three additional locations. Statewide, New Mexico was 0.1 inch above our record low SWE of 4.6 inches on March 30th.

As the winter has progressed, the wetter-than-normal early water year has been overshadowed by a persistent lack of winter storm inputs. The lack of snow water inputs continuing throughout March has decreased cumulative **precipitation** as a percent of normal and further highlighted the difference between the current water year and that of more robust prior years throughout the monitoring record. Total precipitation accounts for both rain and snow accumulation measured across the NRCS monitoring network. Therefore, rainfall early in the water year during the fall season or rain occurring during warm cycles while snow persists on the landscape will interact with spring runoff volumes much differently than the accumulated water sitting on the ground surface as frozen snow, available for melt. Dry late winter conditions this year leave little new water available for melt and runoff in the spring and early summer when many of New Mexico's water users rely on surface water supplies most heavily.

Reservoir storage volumes again showed a significant increase over last year's totals in the Pecos and Canadian systems for April 1. However, the lower Rio Grande showed a significant decrease compared to last year, while others exhibited slight decreases.

The spring **runoff** season based on snowmelt has essentially ended in New Mexico's southern and eastern basins. In northern basins, melt-out began days to weeks earlier than normal. Warm, dry conditions coupled with record low snowpack have led to challenging forecasts across the state. Water users are encouraged to manage resources conservatively. Technical assistance for private and tribal land managers is available from your local NRCS service center.

Snowpack

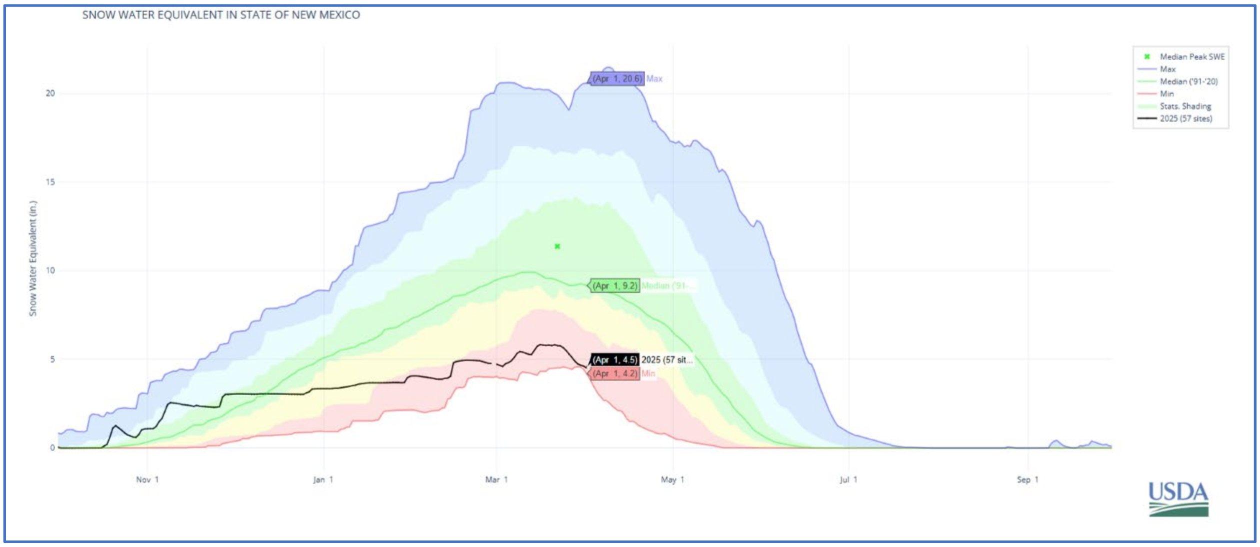

Figure 1: *This plot shows inclusive Snow Water Equivalent [SWE] trends throughout the Water Year (October 1 through September 30) for the aggregated State of New Mexico. The solid green line on this plot shows the reference period (1991-2020) median SWE values at all climate measurement sites indexed throughout the state. The solid black trace shows SWE accumulation for the current water year, 2025. Such statewide aggregations ignore many of the complexities presented by the climatic heterogeneity present in a vast and topographically variable state such as New Mexico. This statewide summary generally varies significantly from basin-wide or individual site values. Near record low snowpack at the end of March dominates conditions. Further data visualizations can be accessed online through NRCS near-real-time Air and Water Plots[1] produced by the NRCS.*

Mountain regions across the state again have not benefited from notable winter storm cycles, compounding early season snowpack deficits and landing many monitoring sites at or below the lowest 5th percentile for Snow Water Equivalent [SWE] accumulation as of April 1. Record low SWE values have persisted in the Gila- San Francisco, Zuni, Pecos and Lower Rio Grande basins as of April 1. This lack of snowpack accumulation since the onset of winter has landed statewide SWE retained in forecast basin watersheds at or near record lows (see ***Figure 1***). The statewide median peak for SWE occurred in mid-March. While there is still the potential for spring storms to increase snowpack, these conditions most likely will be offset by warm and windy conditions.

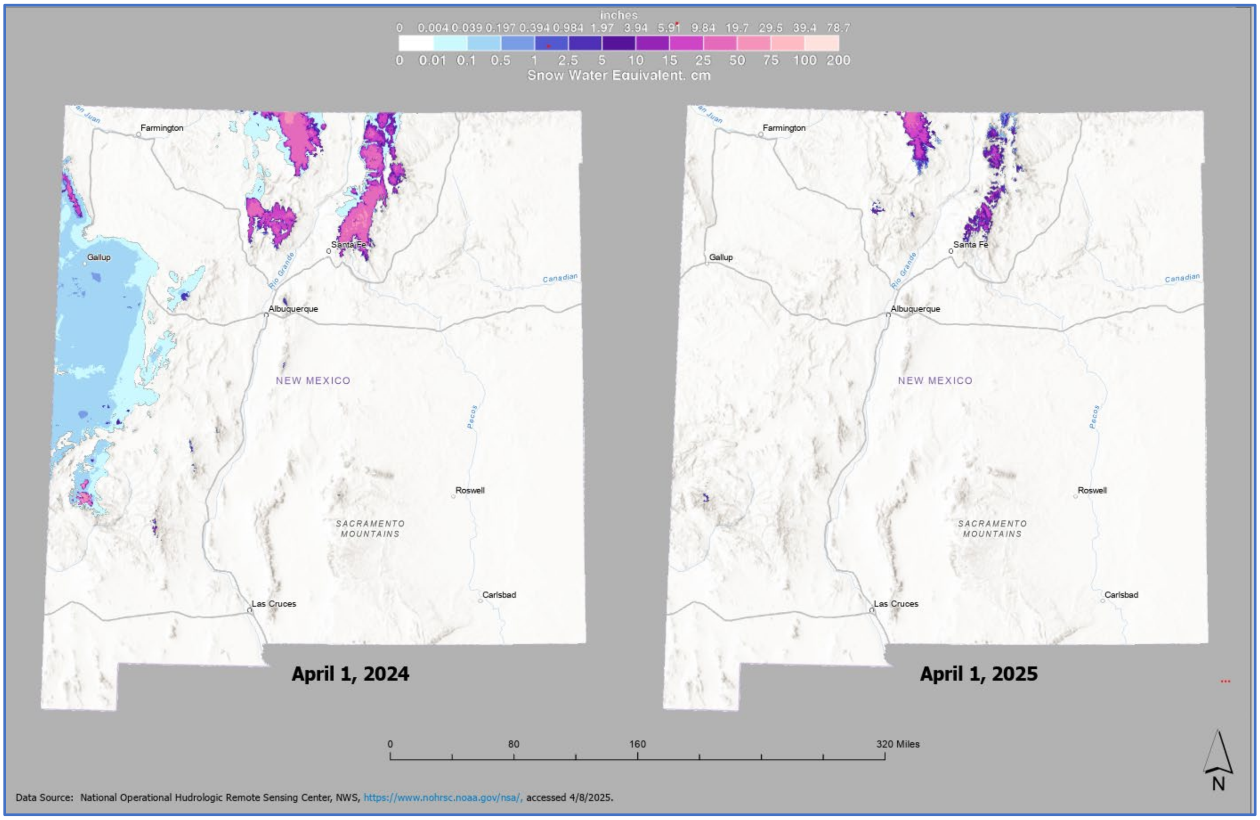

Figure 2: *This plot shows remotely sensed Snow Water Equivalent [SWE] across New Mexico as of April 1. Output for April 1, 2024, is on the left, while the current year is on the right. Such geographic products are available through NRCS partner agency, the National Oceanic and Atmospheric Administration [NOAA][2]*

Basin-wide April 1 SWE values showed decreased in-situ snow conditions from last year in *all* major New Mexico forecast basins (***Figures 2, 3 &4***). With such low totals of SWE measured across the NRCS monitoring network in New Mexico and contributing headwaters catchments in Colorado, the percent of median values can be quite sensitive to small changes in snow totals given that median values themselves are still quite small and the percent of median "normal" can thus change rapidly with even a single storm or melt event. Further complicating these statistical calculations, a zero value (bare ground, no measurable SWE present) cannot be represented as a percent of normal in the conventional sense. To end the past month, several snow measurement sites throughout New Mexico's forecast domain retained zero measurable snowpack. It can be informative to explore the time series data for individual Snowpack Telemetry [SNOTEL] stations or manual snow courses in an area of interest to compare SWE values reported at each site and how they relate to the median. These data are represented in a flagship NRCS visualization product known as the Air and Water Plots[1], such as that shown for the entire state of New Mexico in ***Figure 1***.

This publication represents a snapshot of snowpack conditions as of the end of March 2025 and therefore may not account for any additional climate events which have occurred since the start of April. Many of the products available through the suite of online NRCS Water and Climate Center Applications[3] [NWCC Apps] provide near real-time conditions updates as of the date of inquiry. This report provides context for the monthly publication of NRCS streamflow forecasts and is thereby constrained to a single date in time. The map graphic illustrating basin-wide SWE as of April 1 is included below, along with data tables providing totals by individual measurement sites grouped by forecast basin and sub-basin. For near real-time interactive versions of the associated online data products, refer to the Interactive Map[4]. Air and Water Plots[1] can also be accessed via the interactive map by clicking on the corresponding forecast basin or climate monitoring station icon within the map itself. Map controls will need to be set to the appropriate New Mexico basin parameters to replicate the statistics seen in this report. Monthly Basin Outlook Reports[5] showing data tables in the format provided here are available online as well.

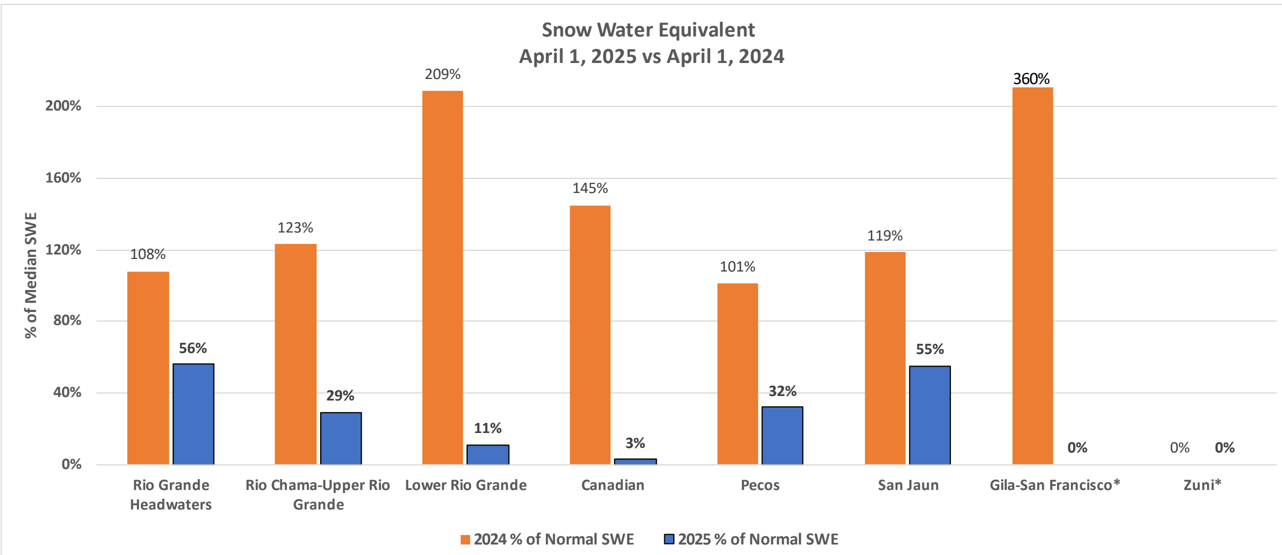

Figure 3: *Percent of reference period normal Snow Water Equivalent [SWE] by basin for April 1, 2025, compared to last year. Percent of median SWE calculations break down when the input is zero.*

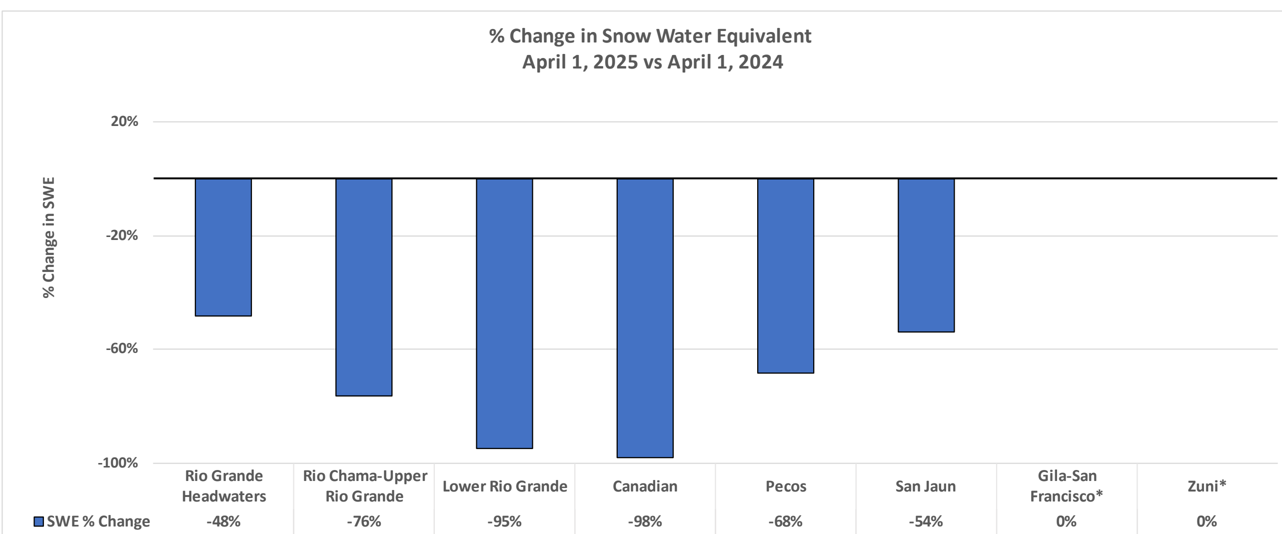

Figure 4: *Percent change in reference period normal Snow Water Equivalent [SWE] between April 1, 2024 and April 1, 2025. *Percent change is not available for basins that held zero snowpack at the end of March.*

Precipitation

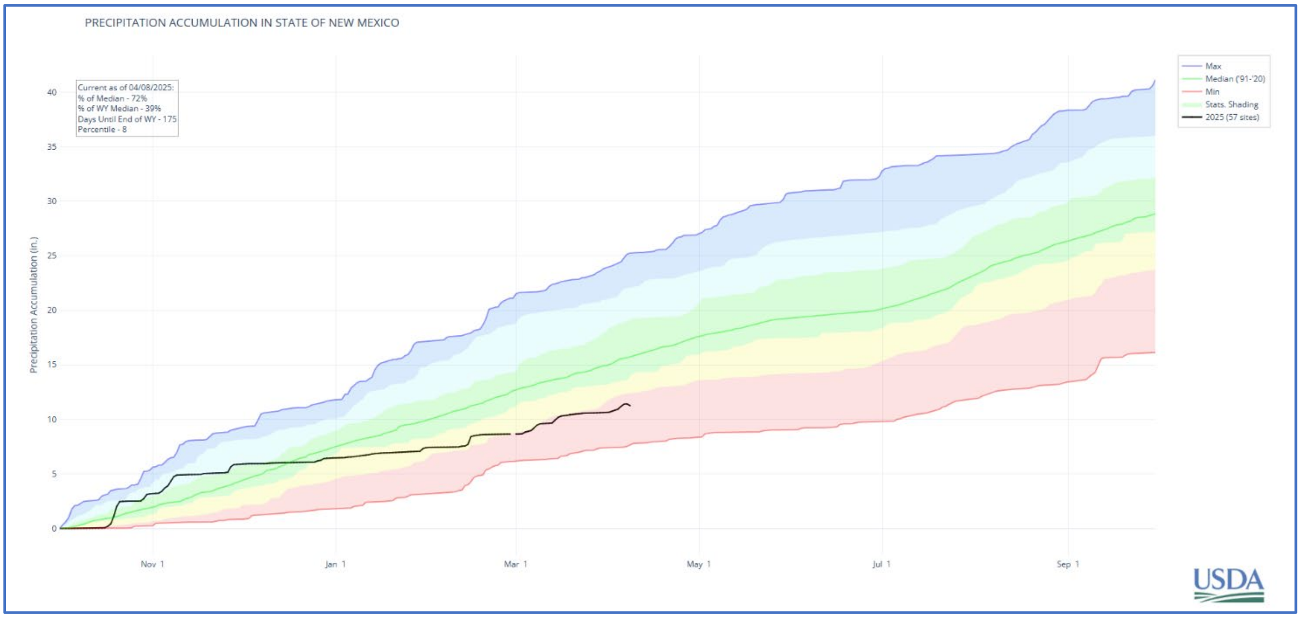

Figure 5: *This plot shows cumulative precipitation trends throughout the Water Year (October 1 through September 30) for the aggregated State of New Mexico. The solid green line on this plot shows the reference period (1991-2020) median precipitation values at all climate measurement sites indexed throughout the state. The solid black trace shows precipitation accumulation for the current water year, 2025.*

Relative to snowpack alone, total water year-to-date precipitation for 2025 has fared better as of April 1, boosted by robust rains prior to the winter season. Total precipitation accounts for rain as well as snowfall or other frozen water measured at SNOTEL sites within the NRCS network. Above-normal rainfall at the start of the current water year in October and November has proven insufficient to hold statewide precipitation totals near normal as the dry conditions of this winter season have dominated hydrometeorological patterns since December (***Figure 5***). Minimal winter water cycle inputs during the winter have left the Canadian basin as the only major New Mexico watershed having received near the reference period median total precipitation by as of April 1, with gains seen in that area over 2024 totals (***Figure 6***). Improvements over prior year precipitation totals have not occurred in the remaining New Mexico forecast basins, as the robust winter storms of 2024 outpaced the current year by a notable margin (***Figure 6; Figure 7***).

In mountainous regions throughout New Mexico, winter precipitation, particularly the water contained in accumulated snow plays a large role in runoff and streamflow during the spring and summer. This report and the streamflow forecast volumes herein reflect statewide conditions as they stood on April 1 and will not account for any additional precipitation that accumulated since the end of the prior month. The map graphic for spatially distributed basin-wide percent of normal water year-to-date precipitation as of April 1, 2025, is included below. Another format of the same data in considerably more detail is presented in the basin-wide precipitation summary tables provided below. A user friendly way to explore individual sub-basin or site-specific conditions is to refer to the summary tables or to access the interactive online version of the NRCS National Water and Climate Center [NWCC] [Interactive Map][4]. For near real-time precipitation data graphics, refer to the [Air and Water Plots][1], a product featured on the [NWCC Apps][3] page dedicated to visual data figures.

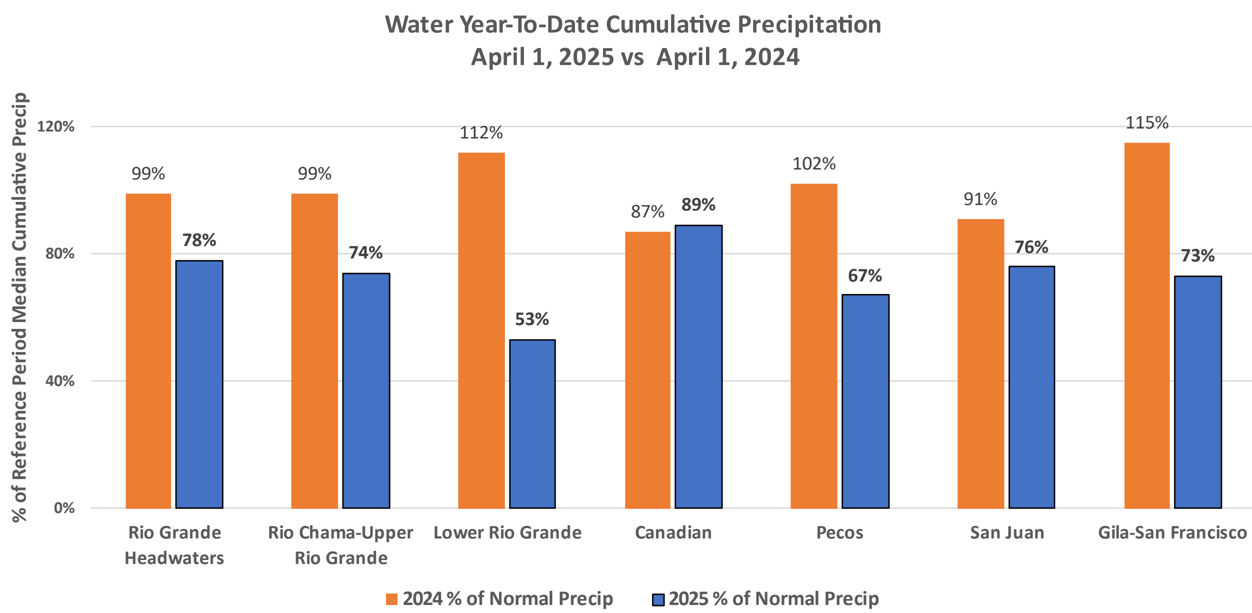

Figure 6: *Percent of normal water year-to-date precipitation: April 1, 2025, compared to last year.*

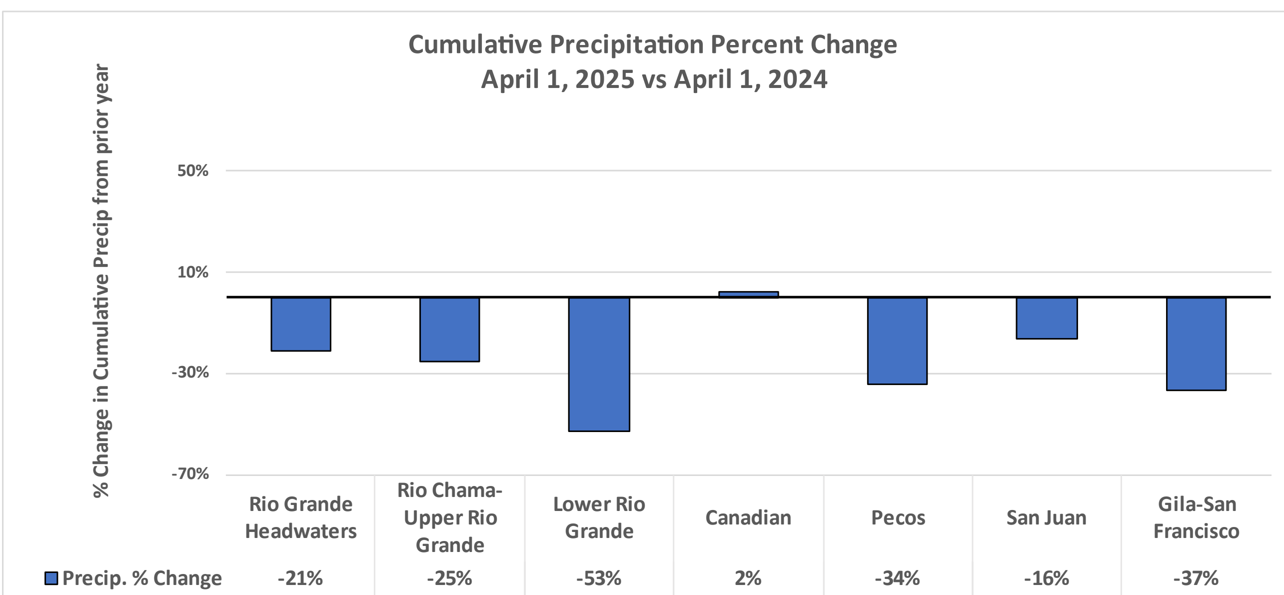

Figure 7: *Percent change in reference period normal water year-to-date precipitation between April 1, 2024, and April 1, 2025. November storms contributed to improved conditions in the Canadian.*

Reservoirs

New Mexico reservoir systems reflected in NRCS products have continued to show complete end-of-month reporting throughout the current water year. Accounting for managed storage water throughout the state shows a more optimistic aspect of the statewide water supply picture than that expected from snowpack and precipitation observations. This month, reservoir storage systems in the Canadian and Pecos basins reported increased retained volumes when compared to April 1 totals in 2024. The Rio Grande Headwaters retention systems again show at or above reference period median storage volumes for this month (***Table 1***; ***Figure 8***). Small decreases in storage volume from last year were reported for the Rio Grande Headwaters, San Juan and Rio Chama-Upper Rio Grande systems. The Lower Rio Grande reservoirs, accounting for much of the total storage volume within New Mexico, have seen more dramatic reductions with respect to April 1 totals when compared to last year (***Figures 8 & 9***).

The basin-wide reservoir storage map graphic and associated summary tables included below will provide a broad picture of conditions across New Mexico during the midst of the winter. End-of-month reservoir storage volumes are provided by NRCS partner entities and can be explored further in the online Air and Water Plots[1] as well as in in geographic form in the Interactive Map[3] and in the data tables provided in each monthly Basin Outlook Report[4].

Table 1:

Basin-wide Summary: April 1, 2025 (Medians based On 1991-2020 reference period)	Reservoir Storage Summary For the End of April 2025				
	Current % Capacity	Last Year % Capacity	Median % Capacity	Current Year % Median Storage	Last Year % Median Storage
Rio Grande Headwaters	**30%**	**32%**	**26%**	**115%**	**119%**
Rio Chama-Upper Rio Grande	**10%**	**10%**	**28%**	**35%**	**37%**
Lower Rio Grande	**12%**	**18%**	**22%**	**54%**	**86%**
Canadian	**46%**	**29%**	**52%**	**88%**	**55%**
Pecos	**7%**	**4%**	**8%**	**89%**	**54%**
San Juan	**61%**	**62%**	**75%**	**81%**	**83%**

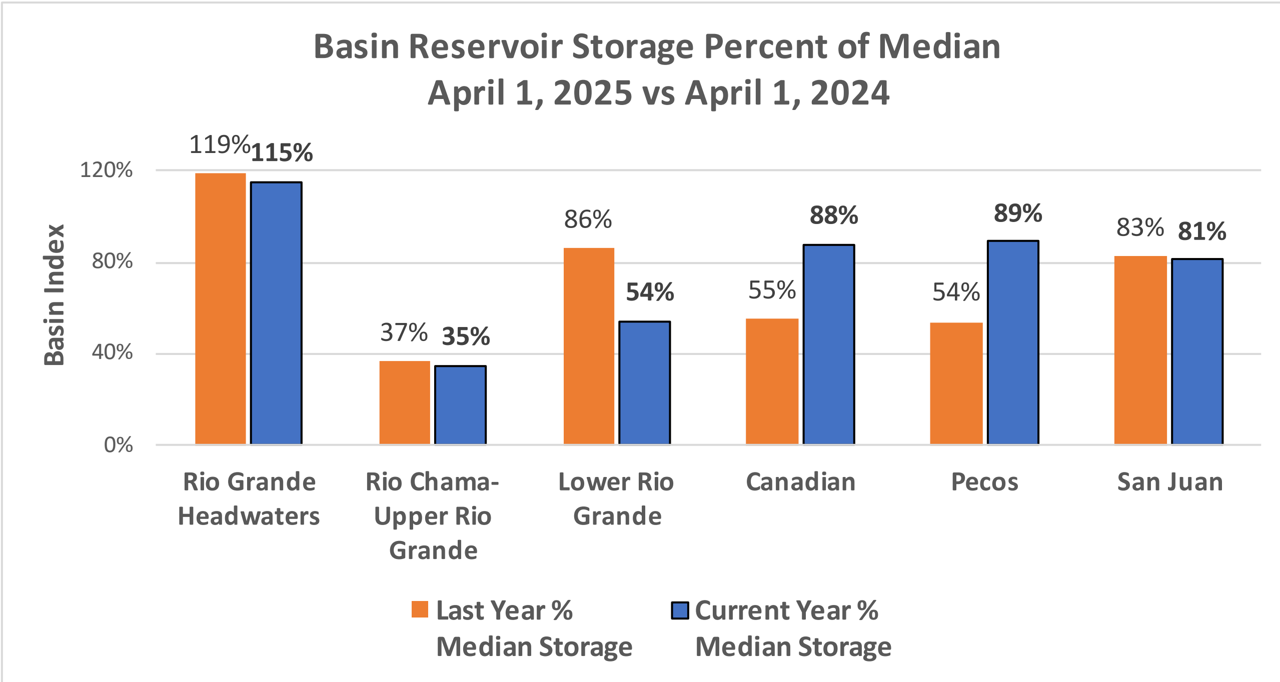

Figure 8: *Percent of reference period normal reservoir storage for April 1, 2025, as compared to last year. There is now an alternative version of this data graphic located online[1].*

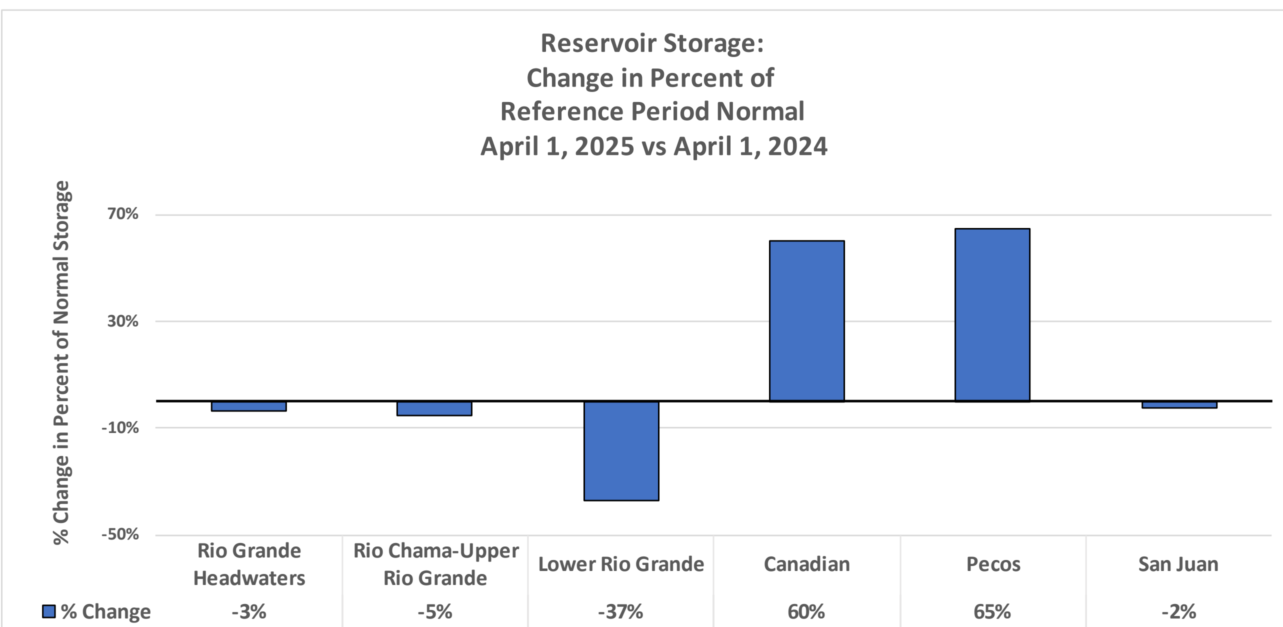

Figure 9: *Percent change in reference period normal reservoir storage between April 1, 2024, and April 1, 2025.*

Streamflow

Forecast model outputs have been updated for April 1, though results continue to uniformly project below to well below normal volumes across all forecast points within New Mexico at the 50% exceedance probability. As described in the Snowpack and Precipitation narratives, another important consideration with low-volume forecasts is that small changes in SWE added to or melted from the snowpack can have a proportionally large effect on overall runoff volumes during the forecast period, particularly when overall totals remain quite low. When incorporating the smaller season values for both seasonal SWE accumulation and depletion and total precipitation into forecast models, outcomes are more sensitive to lower magnitude differences in the input data (inches of SWE, as an example) than they would be in an environment receiving more robust water year totals.

As described above, March brought another month of well below median precipitation across the entire Rio Grande basin as well as the San Juan River system. As has been the case throughout the winter season, there remains a broad gap between current percent of median snowpack and water year precipitation. This is a result of a wet October and early November followed by several months of dry conditions. These persistent dry conditions have led to record lowest, or otherwise low rankings of snowpack compared to the period of record for April 1.

Basins across the state are forecast to receive far below normal streamflow volumes, even at the lowest exceedance probability range in many cases. Streamflow in extremely low-volume systems such as many tributary streams and seasonally intermittent waterways in the desert southwest is notoriously challenging to forecast. This uncertainty, reflected in lower skill forecast outputs, is represented by a wide range between the low and high bounds of the exceedance probability window at a given forecast point.

While the significant precipitation that came in the fall certainly helped bolster soil moisture conditions going into winter, dry and windy conditions have decreased soil moisture levels for most of the state. As always, water users are encouraged to consider the full suite of exceedance probabilities when analyzing and operationally accounting for NRCS volumetric streamflow forecasts. Closely monitoring real-time weather conditions and accounting for the full range of likely outcomes can help guide how water resource availability may be changing and what is to be expected over the coming months.

A graphic representation of the official April 1, 2025, NRCS Water Supply Forecast showing the primary forecast period for each forecast point is included below. These color-coded charts illustrate the range between the 90% (most likely to be exceeded, lower end volume) and 10% (least likely to be exceeded, higher end volume) exceedance probability forecasts for each point. These NWCC Seasonal Volume Forecast Plots[6] are available to query by publication month for all official streamflow forecasts produced by the NRCS National Water and Climate Center. The greater the range between the low and high probability flows, the more uncertainty exists for a given forecast. If the extremely low statewide snowpack and precipitation trends seen as of March 1 continue, the lower flow ranges at the 70% or even the 90% exceedance probability can be expected to more closely reflect streamflow outcomes during the runoff period. Even throughout the entire streamflow forecast season, future weather remains one of the largest sources of model uncertainty, so it is always valuable to consider the full range of possible outcomes for any given forecast point. Forecast certainty can be expected to improve and the associated range of statistically probable flow volumes should thereby decrease as seasonal conditions are accounted for in the forecast model throughout the winter. The final forecast, prior to runoff initiation for each forecast point, generally has the best forecast skill, as there is less uncertainty remaining in the forecast inputs.