MEETING FUTURE DEMANDS

THIS CHAPTER ADDRESSES HOW SNWA PLANS TO RELIABLY MEET PROJECTED WATER DEMANDS UNDER A RANGE OF SUPPLY AND DEMAND CONDITIONS.

INTRODUCTION

Water resource planning is based on supply and demand. Supply refers to the amount of water available or expected to be available for use. Demand refers to the amount of water expected to be needed in a given year. As described in the preceding chapters, water supply and demand are influenced by several factors that can change in unpredictable ways. As the SNWA prepared its 2025 Plan, the organization carefully considered the following:

- The potential impact of continued drought and climate change on water resource availability, particularly for Colorado River supplies; and
- The potential impact of economic conditions, climate change and water use patterns on long-term water demands.

As with prior plans, the SNWA developed a series of planning scenarios that represent Southern Nevada's future water resource needs under variable supply and demand conditions. This approach helps inform water resource planning and development efforts and demonstrates how the SNWA plans to meet future needs, even if conditions change significantly over time.

Water demands and resource volumes are presented in consumptive use terms, consistent with the water resource descriptions in Chapter 3 and illustrating the supply-related impacts of SNWA shortage reductions and DCP contributions. As described in the following sections, all planning scenarios presented in this chapter demonstrate the SNWA's ability to meet the community's long-term projected water needs with additional conservation and adaptive use of its Water Resource Portfolio.

SUPPLY AND DEMAND

Water demand projections are based on population forecasts and include assumptions about future water use, such as planned achievements toward water conservation goals. Precise accuracy from year to year rarely occurs in projecting demands, particularly during periods of significant social and economic change. While making assumptions is a necessary part of the planning process, assumptions are unlikely to materialize exactly as projected. Likewise, climate variations, policy changes and new regulations can also influence water resource availability over time.

The scenarios presented in this chapter consider a wide range of supply and demand possibilities. Rather than focusing on a single forecast, the scenarios bracket the range of reasonable conditions our community may face over the 50-year planning horizon. Key factors evaluated include possible reductions of Colorado River supplies and variations in future demands. As further detailed below, this conservative approach reflects uncertainties presented in the current planning environment.

Water Supply

Figure 4.1 summarizes the water resources planned for development and use as part of the SNWA's Water Resource Portfolio. As previously described, some permanent and temporary resources are subject to restrictions for use based on Lake Mead water levels (when Lake Mead is at an elevation of 1,090 feet or lower). Other resources are subject to future agreements or will require the development of facilities. Ultimately, the timing and need for resources depend significantly on how supply and demand conditions materialize over the long-term planning horizon.

Water Demand Projections

The planning scenarios developed as part of this Plan include three water demand projections (Figure 4.2 and Figure 4.3). These include an upper and lower water demand projection that assumes expected conservation and an upper demand projection that assumes lower levels of conservation achievement. The lower water demand projection was derived from a population forecast and planned conservation achievements. The Clark County population forecast was obtained from CBER.

	SUPPLY	CONSUMPTIVE USE	AVAILABLE IN SHORTAGE
PERMANENT	Colorado River (SNWA and Nellis Air Force Base)	276,205 AFY	Yes. Subject to shortage reductions
	Nevada Unused Colorado River (Non-SNWA)	16,685 (2025) to 8,233 AFY in 2031+ [1]	Yes. Subject to availability
	Tributary Conservation ICS	31,320-36,000 AFY	Yes
	Las Vegas Valley Groundwater Rights	46,961 AFY	Yes
TEMPORARY	Southern Nevada Groundwater Bank	343,221 AF (20,000 AFY max.)	Yes
	Interstate Bank (Arizona)	613,846 AF (40,000 AFY max.)	Yes
	Interstate Bank (California)	330,225 AF (30,000 AFY max.)	Yes
	Intentionally Created Surplus (storage in Lake Mead)	955,543 AF (300,000 AFY max.)	Yes, varies by Lake Mead elevation
FUTURE	Colorado River Transfers/Exchanges Permanent Future Supply (Desalination and Colorado River Partnerships)	20,000-40,000 AFY	Yes
	Colorado River Transfers/Exchanges Virgin River/Colorado River Augmentation	Up to 108,000 AFY	To be determined
	Garnet and Hidden Valleys Groundwater	2,200 AFY	Yes
	Tikaboo and Three Lakes Valley North and South Groundwater	10,605 AFY	Yes

FIGURE 4.1 **SNWA Water Resource Portfolio**

The CBER forecast is also used in local planning, including transportation planning by the Regional Transportation Commission. The forecast is based on CBER's working knowledge of the economy and the nationally recognized Regional Economic Model Incorporated (REMI).

The lower water demand projection was derived using the 2024 CBER population forecast. The historical share of Clark County population attributable to the SNWA service area was multiplied by 2023 water-use levels and reduced over time to represent expected achievement of the community's water conservation goal of 86 GPCD by 2035.

YEAR	2025	2050	2074
LOWER DEMAND 86 GPCD IN 2035	253,000	297,000	333,000
UPPER DEMAND 86 GPCD IN 2035	257,000	351,000	416,000
UPPER DEMAND 92 GPCD IN 2055	261,000	378,000	445,000

FIGURE 4.2
SNWA Demand Projection, (AFY)

The upper demand projection was developed for planning purposes to reflect increased uncertainties related to possible changes in demands associated with the economy, climate, population and water use variability. It also reflects expected achievement of the community's water conservation goal of 86 GPCD by 2035.

The upper demand projection represents an approximate 15 percent increase over the lower projection at the midpoint of the planning horizon (2044), increasing to 25 percent in the latter part of the planning horizon (2074). The SNWA also considered one variant of the upper demand projection to illustrate how falling short of the current conservation goal will impact the anticipated timing and need for permanent, temporary and future resources. The projection assumes the community only reduces demands to 92 GPCD by 2055.

Water Supply Conditions

The SNWA also made assumptions about future water supply conditions as part of its long-range planning efforts. The average natural inflow of the Colorado River for the period of record (1906 to 2024) was 14.6 MAFY. However, the region has experienced warmer and drier conditions since the turn of the century. These conditions will likely persist and intensify due to drought and climate change.

In response to changing hydrology and growing uncertainty about possible impacts on Colorado River water supplies, the SNWA assumes reduced inflow conditions will persist. The 2025 Plan evaluates two Colorado River water supply conditions with inflows at 13.3 and 11.0 MAFY (Figure 4.4).

This range considers better and worse hydrology than experienced in more recent years (the average inflow since 2000 is 12.4 MAFY). Incorporating a range of Colorado River conditions allows the SNWA to anticipate and prepare for factors that could impact the availability of Colorado River supplies over the long-term planning horizon. It also provides insight into the timing and volume of resources needed to meet future demands.

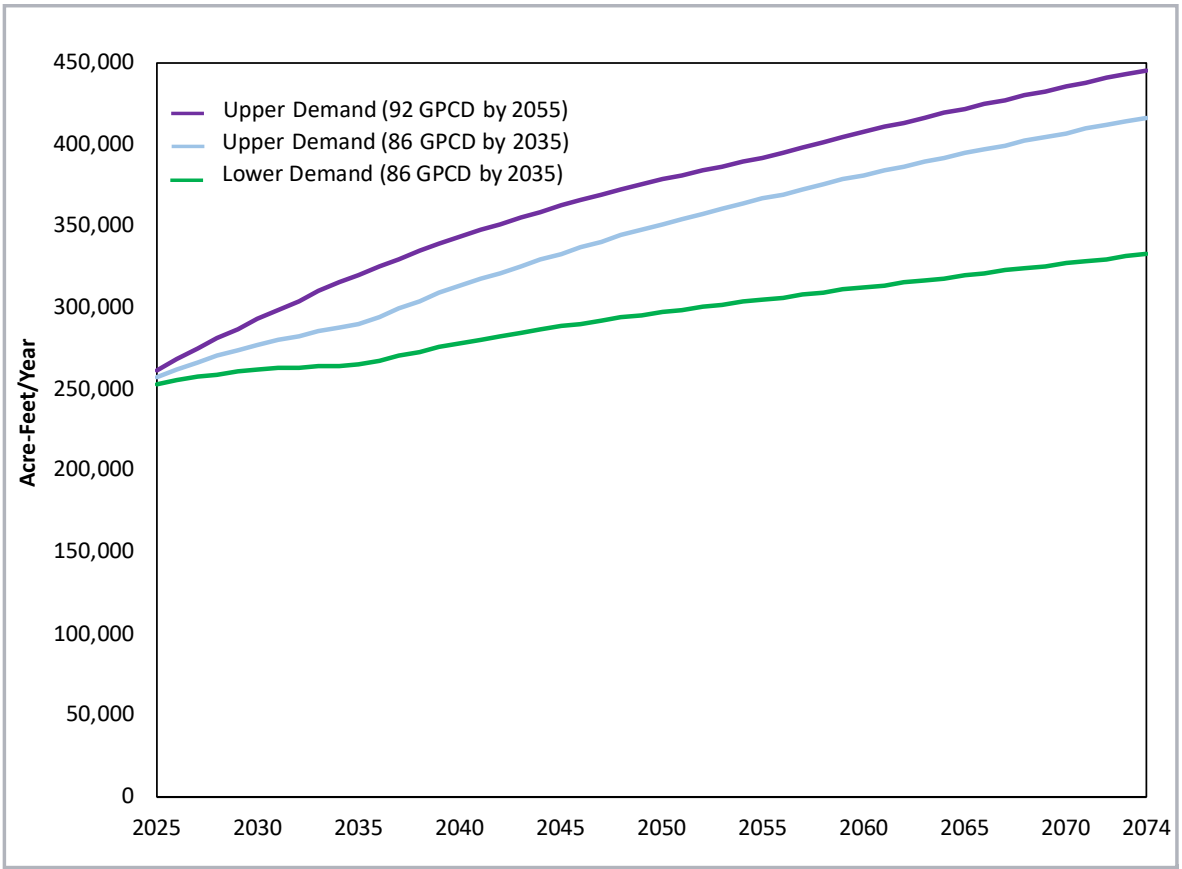

FIGURE 4.3 **SNWA Projected Water Demand**

Figure 4.5 details Colorado River inflows by year since 1906 (when record-keeping began) and highlights the period of hydrology used as a basis for the two water supply conditions used in SNWA planning (1996 to 2020). These hydrology inputs are important because they relate to Lake Mead water levels and, in turn, Colorado River supply availability. As detailed in Chapter 2, the DCP and Interim Guidelines reduce the availability of Colorado River resources to Nevada by between 8,000 and 30,000 AFY when Lake Mead is forecast to be at or below elevation 1,090 feet.

The U.S. Bureau of Reclamation's most recent August 24-Month Study forecasts the elevation of Lake Mead to be between 1,050 and 1,075 feet in January, resulting in a 21,000 AFY total supply reduction for Nevada in 2025. Continued Lake Mead water level declines are expected, and the risk of shortage remains high in future years. The DCP and Interim Guidelines expire in 2026. While some provisions extend further, operational certainty decreases with time.

The U.S. Secretary of the Interior and the Lower Basin States are consulting now to determine what additional measures are needed to protect against the potential Lake Mead water level decline below 1,020 feet. As described in Chapter 2, stakeholders throughout the basin are also focused on protecting critical elevations at Lake Powell. Given the rapid decline of Lake Mead and Lake Powell water levels and the potential for operational impacts, Nevada may be required to make shortage reductions and DCP contributions greater than 30,000 AFY or take reductions sooner. For planning purposes, the SNWA considered the potential for a combined shortage reductions and DCP contributions up to 40,000 AFY.

WATER SUPPLY CONDITION	SUMMARY
13.3 MAFY INFLOW	Based on the average Colorado River inflow for the 25-year period from 1996 to 2020 of 13.3 MAFY. The sequence was repeated twice to form the basis for the 50-year water supply condition. This hydrology is more optimistic than current conditions. Over the most recent 25-year period (2000 - 2024), Colorado River inflows averaged approximately 12.4 MAFY.
11.0 MAFY INFLOW	Based on Colorado River inflows for the period of 1996 to 2020 and adjusted to an average 25-year inflow of 11.0 MAFY. The adjusted sequence was repeated twice to form the basis for the 50-year supply condition. This hydrology is less optimistic than current conditions and reflects the recent downward trend in hydrology that is expected to continue in future years. Since 2000, there have been 11 years with inflow below 11.0 MAFY.

FIGURE 4.4 **Water Supply Conditions Summary**

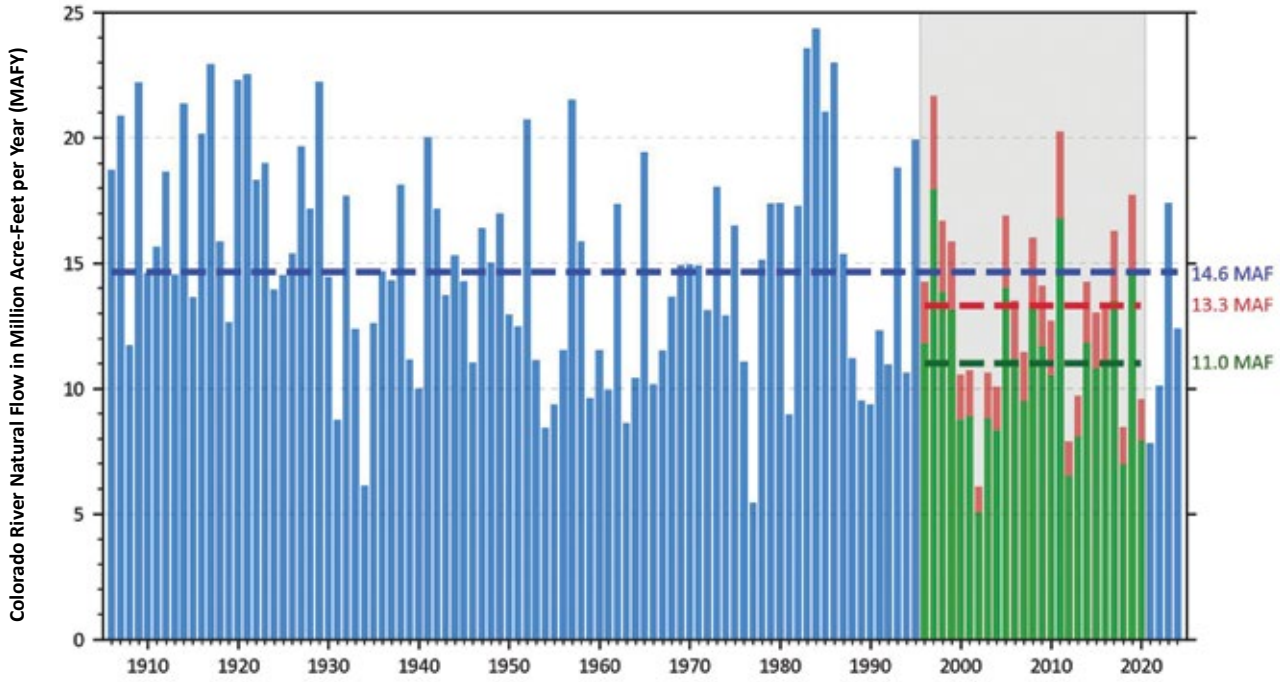

FIGURE 4.5 **Water Supply Conditions Evaluated in Planning Scenarios 1906 - 2024**

Hoover Dam and Mike O'Callaghan-Pat Tillman Memorial Bridge

SUPPLY AND DEMAND SCENARIOS

The SNWA used probabilistic modeling to develop planning scenarios that bracket the range of water supply and demand projections detailed on pages 47 and 48. The scenarios reflect the average volume and type of resources needed and available to meet projected demands throughout the planning horizon and are accompanied by detailed assumptions about Colorado River resource availability and use. This approach helps the SNWA to evaluate various possible outcomes related to Lake Mead water levels and associated supply reductions over the long-term planning horizon. It also helps to illustrate significant uncertainty within the current planning environment.

The SNWA used hydrology inputs for the two water supply conditions (13.3 and 11.0 MAFY) to project future Lake Mead water levels using the U.S. Bureau of Reclamation's Colorado River Simulation System (CRSS) model and index-sequential method (ISM). This approach preserves natural flow variability observed in the historical record by allowing the flow volume for any year in the 1996 to 2020 time sequence to occur at any point in the 50-year simulation period. In addition, the demand schedules for the Upper Basin States and the Lower Basin States of Arizona and California and Mexico, as provided in the U.S. Bureau of Reclamation's CRSS model, were used in the simulation of each planning scenario.

As shown in Figures 4.6 and 4.10, modeling results yield 50 corresponding outcomes or projections for each scenario. These results are represented by individual gray lines for each year in the planning horizon. A shaded area bounds the upper and lower projections, representing the range of uncertainty associated with the possible outcomes. The dark blue line represents the average outcome and overlays DCP and shortage thresholds, providing insight into possible Colorado River water supply limitations for Nevada. These projections are paired with other supply assumptions and incorporated into the water supply and demand scenarios.[2]

All planning scenarios (Figure 4.6 through Figure 4.15) consider combinations of permanent, temporary and future resources as described in Chapter 3. Having a portfolio of resource options allows the SNWA to prioritize and adjust the use of some resources if the development of other resources is delayed or revised or changes in demand occur. If other options become available sooner, the priority and use of resources may change. Resource volumes may vary within scenario groupings based on assumptions for how the SNWA meets its DCP commitments. The SNWA can meet this obligation by reducing Colorado River water use, utilizing other resources, or converting eligible forms of ICS to meet DCP contributions.

The planning scenarios assume the Interim Guidelines and DCP continue through the planning horizon. It further assumes a combined shortage reduction and DCP contribution of up to 40,000 AFY when Lake Mead water levels are below 1,020 feet.

13.3 MAFY NATURAL FLOW PLANNING SCENARIOS

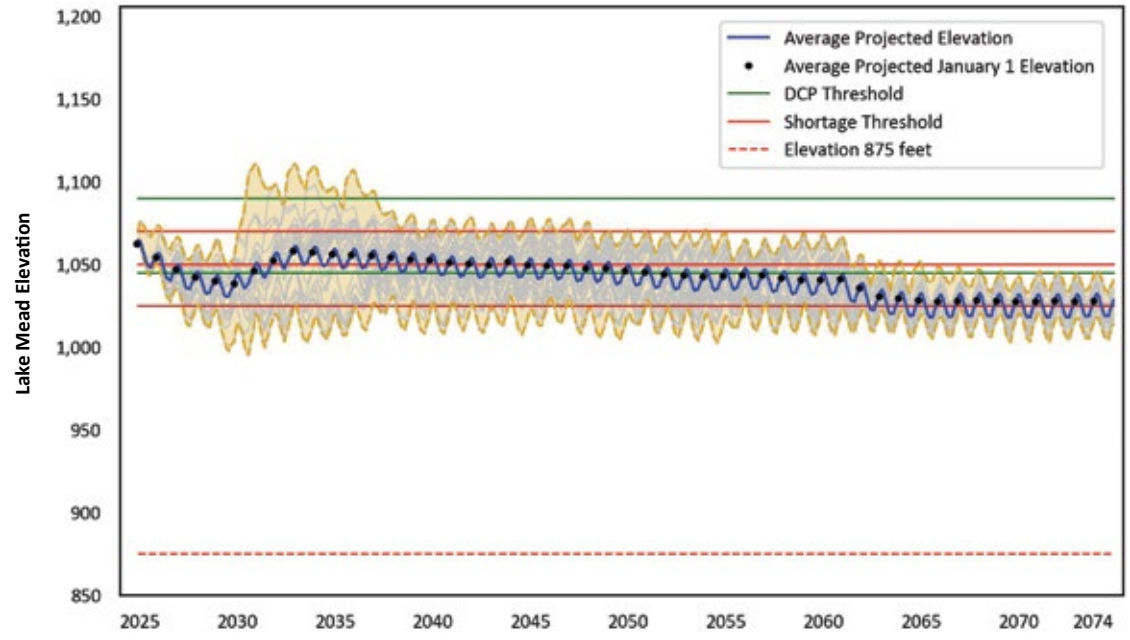

FIGURE 4.6 **Lake Mead Elevation, 13.3 MAFY Natural Flow**

Figure 4.6 depicts the projected range of Lake Mead elevations associated with the 13.3 MAFY water supply condition and variable inflow sequences.

Lake Mead's average projected elevation remains below 1,075 feet and consistently below 1,050 feet in the latter portion of the planning horizon (reaching a low of 1,018 feet).

For modeling purposes, the combined shortage reduction and DCP contribution is 40,000 AFY when Lake Mead water levels are below 1,020 feet.

Figures 4.7 - 4.9 reflect the average volume of water resources available to meet projected demands for this water supply condition.

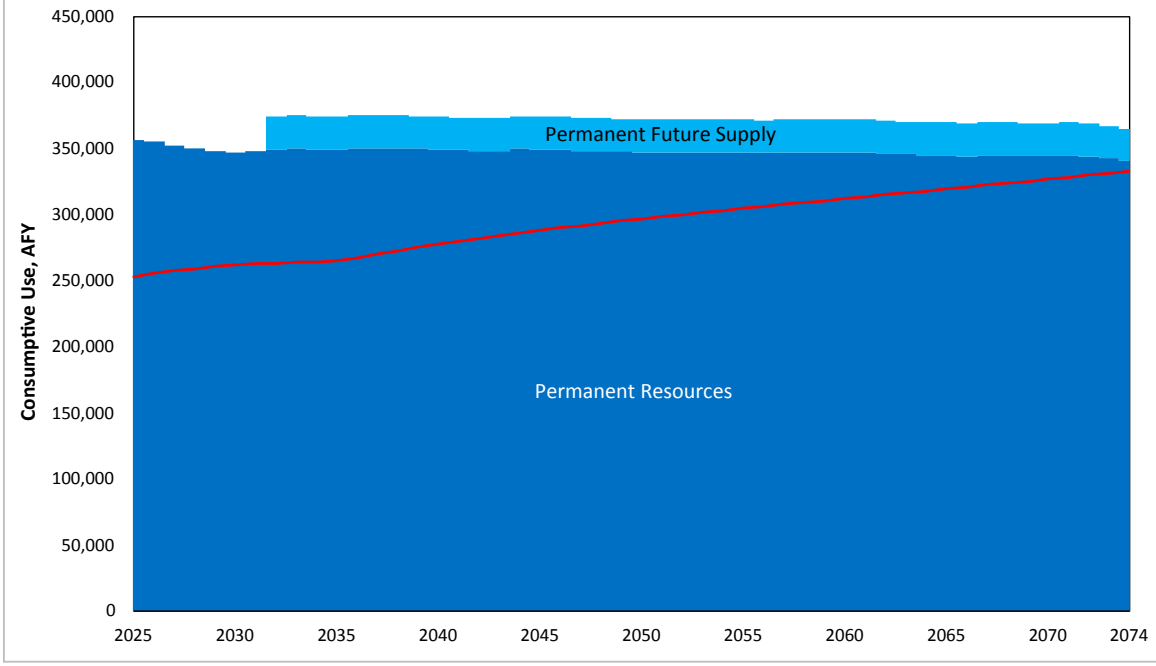

FIGURE 4.7 **13.3 MAFY Natural Flow, Lower Demand (86 GPCD)**

As shown in Figure 4.7, permanent resources are sufficient to meet demands through 2074. Permanent future supplies (25,000 AFY) are available in 2032 but are not needed under this scenario. Temporary and other future resources are not anticipated for use during the planning horizon.

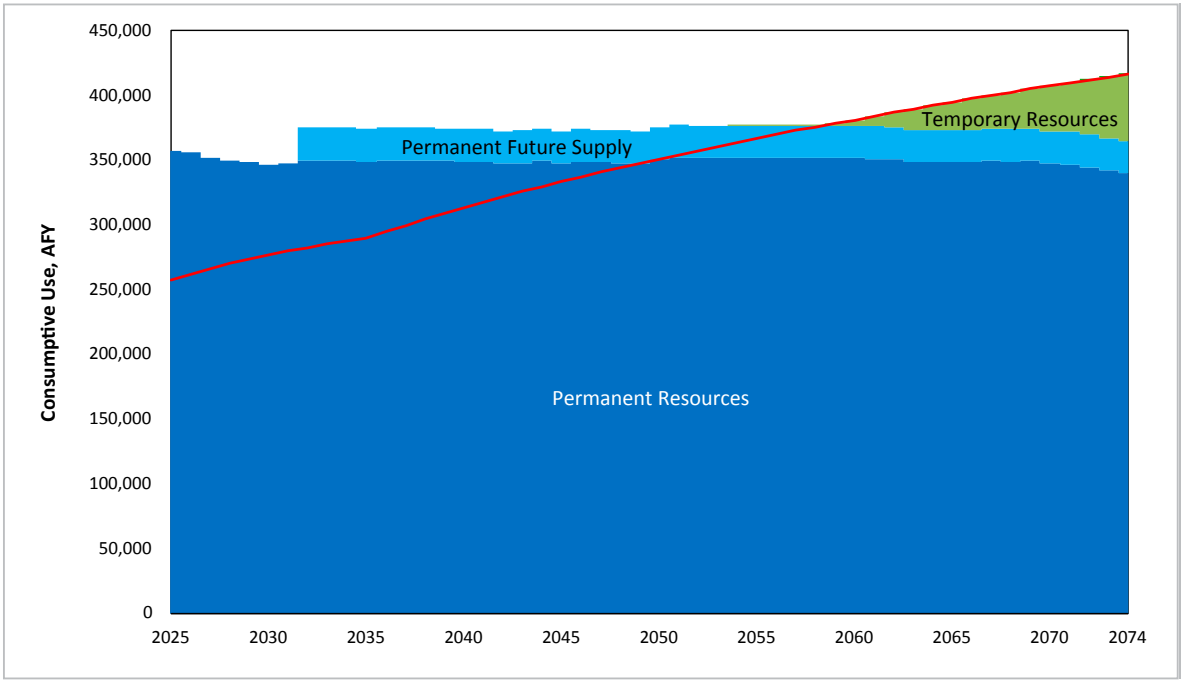

FIGURE 4.8 **13.3 MAFY Natural Flow, Upper Demand (86 GPCD)**

As shown in Figure 4.8, permanent and temporary resources are needed to meet demands through 2074. Permanent future supply (25,000 AFY) is available in 2032 and needed in 2049.

Temporary resources are needed in 2059 and through the remainder of the planning horizon. Other future resources are not anticipated for use during the planning horizon.

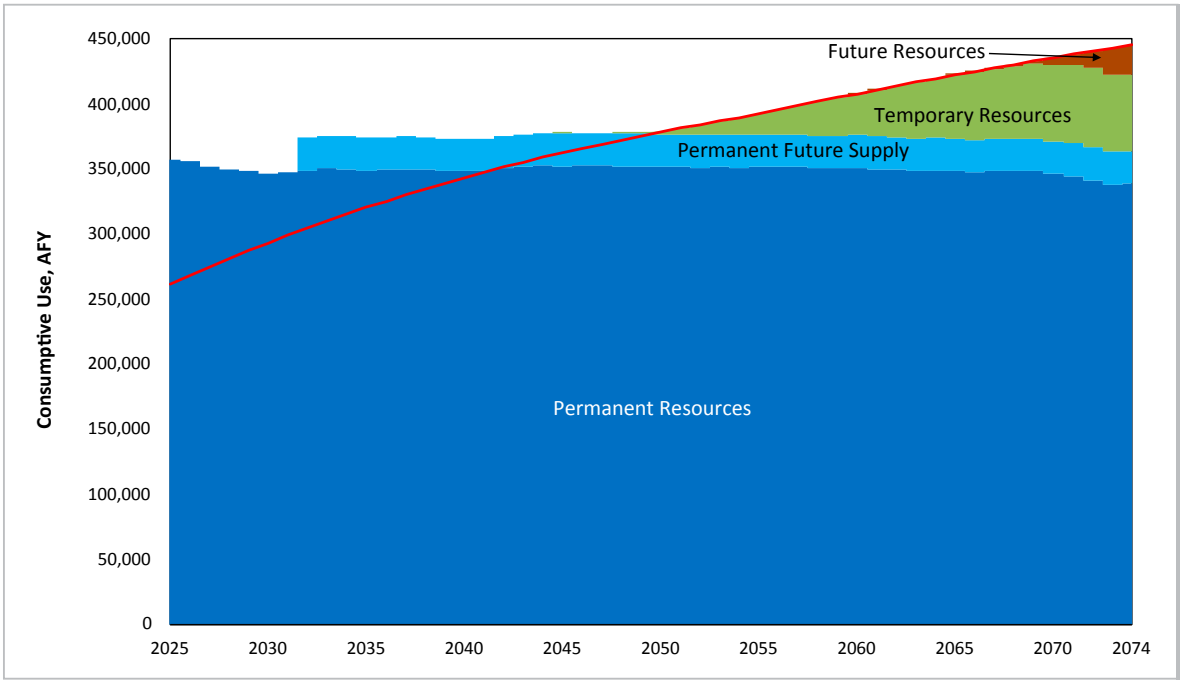

FIGURE 4.9 **13.3 MAFY Natural Flow, Upper Demand (92 GPCD by 2055)**

Figure 4.9 illustrates water resource needs if the community falls short of its conservation goal. This scenario assumes future water use at 92 GPCD by 2055. Permanent, temporary and future resources are needed to meet water demands through 2074. Temporary resources are needed in 2050. Permanent future supply is available in 2032 and needed in 2040. Other future resources are needed in 2068 (23,000 acre feet in 2074).

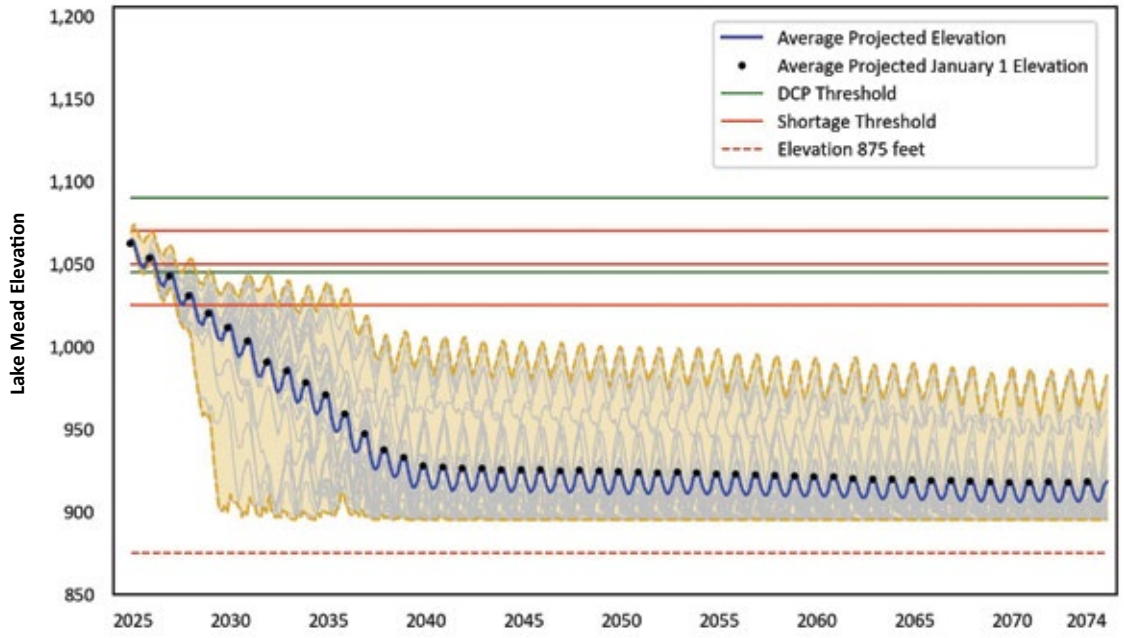

FIGURE 4.10 **Lake Mead Elevation, 11.0 MAFY Natural Flow**

Figure 4.10 depicts the projected range of Lake Mead elevations associated with the 11.0 MAFY water supply condition and variable inflow sequences.

Lake Mead's average projected elevation falls below 1,050 feet by 2026, reaching below 1,025 feet in 2028 and throughout the remainder of the planning horizon (reaching a low of 906 feet).

For modeling purposes, the combined shortage reduction and DCP contribution is 40,000 AFY when Lake Mead water levels are below 1,020 feet.

Figures 4.11 – 4.13 reflect the average volume of water resources available to meet projected demands for this water-supply condition.

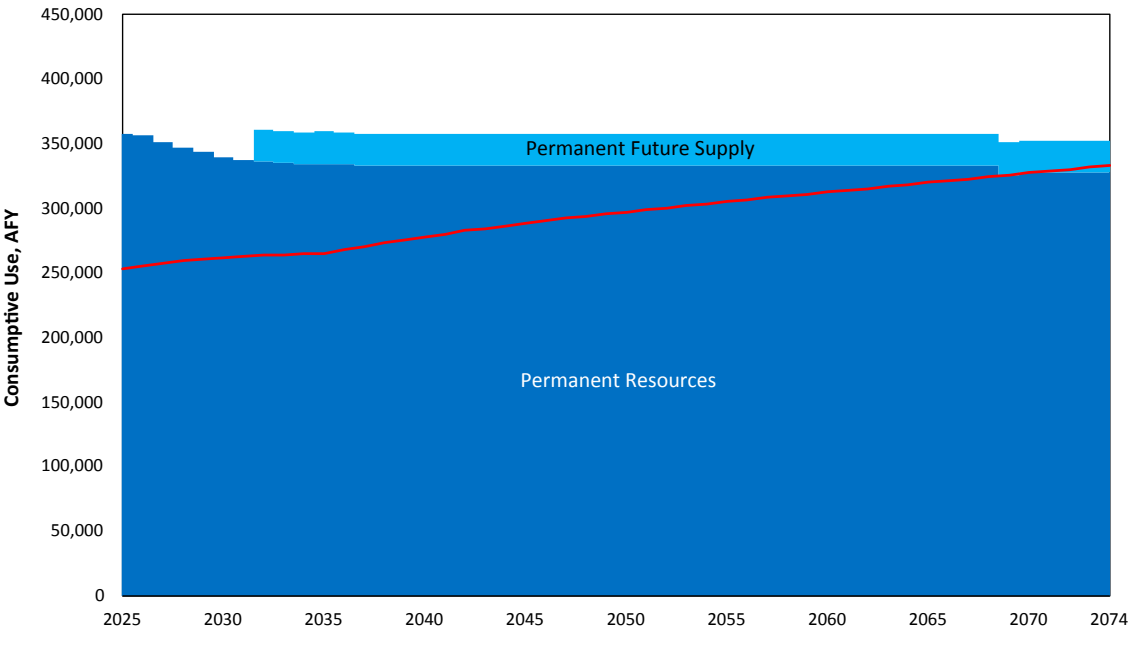

FIGURE 4.11 **11.0 MAFY Natural Flow, Lower Demand (86 GPCD)**

As shown in Figure 4.11, permanent and future resources are sufficient to meet demands through 2074. Permanent future supplies (25,000) are available in 2032 and needed in 2071.

Temporary and other future resources are not anticipated for use during the planning horizon.

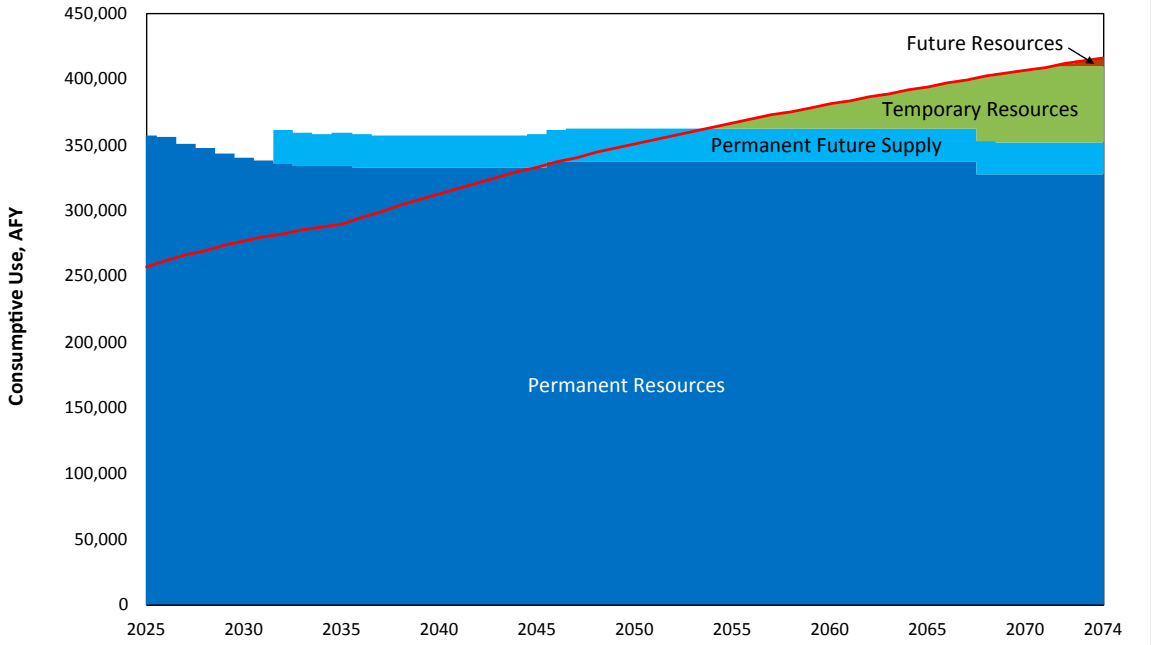

FIGURE 4.12 **11.0 MAFY Natural Flow, Upper Demand (86 GPCD)**

As shown in Figure 4.12, permanent, temporary and future resources are needed to meet demands through 2074. Permanent future supplies (25,000 AFY) are available in 2032 and needed in 2047. Temporary resources are needed in 2054. Other future resources are needed in 2072 (6,000 AF in 2074).

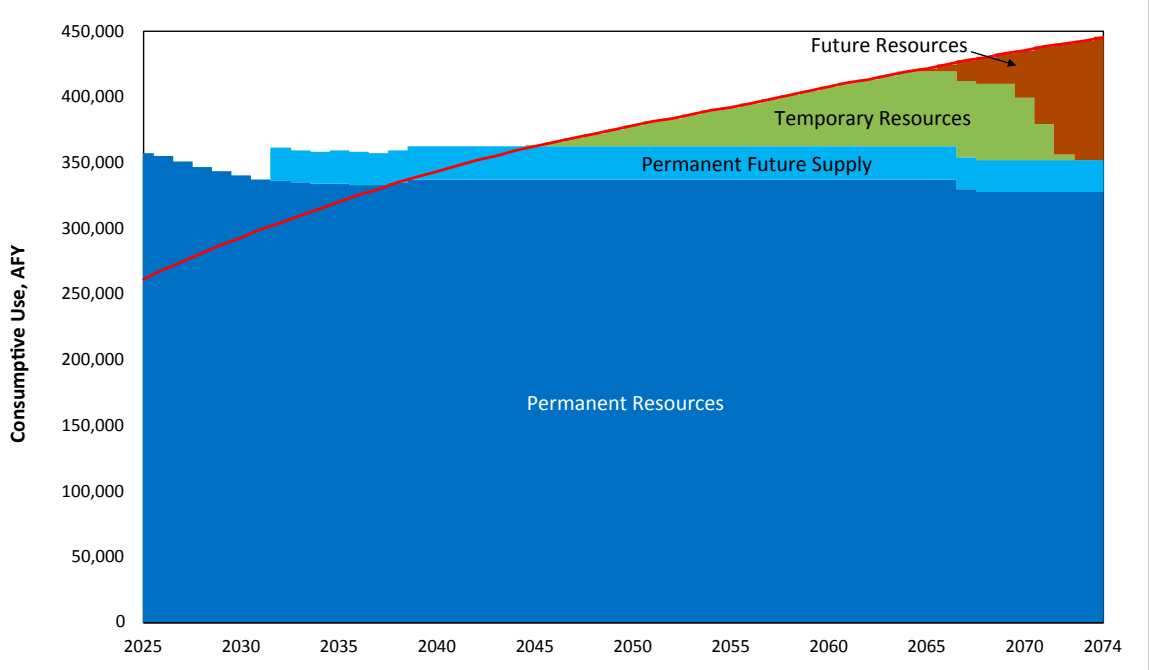

FIGURE 4.13 **11.0 MAFY Natural Flow, Upper Demand (92 GPCD by 2055)**

Figure 4.13 illustrates water resource needs if the community falls short of its conservation goal. This scenario assumes future water use at 92 GPCD by 2055. Permanent, temporary and future resources are needed to meet water demands through 2074. Permanent future supplies are available in 2032 and needed in 2039. Temporary resources are needed in 2045. Other future resources are needed by 2065 (93,000 AFY in 2074).

Figures 4.14 and 4.15 illustrate the timing and need for temporary and other future resources under the 11.0 MAFY inflow scenario if permanent future supply is delayed until 2039.

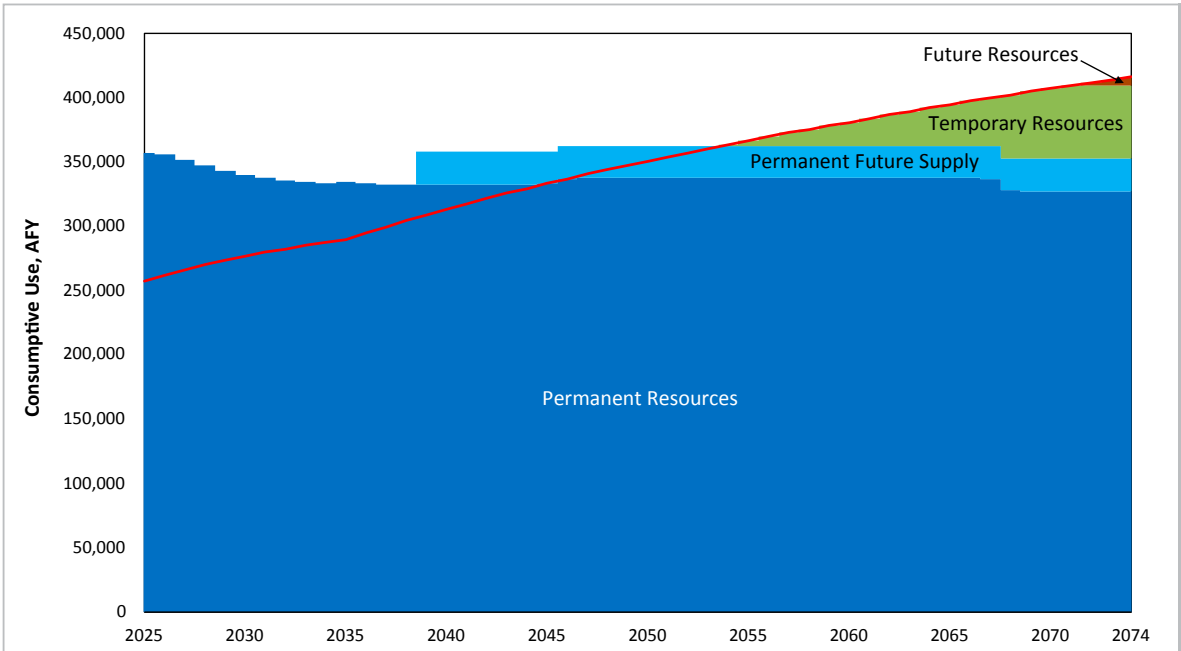

FIGURE 4.14 **11.0 MAFY Natural Flow, 2039 Upper Demand (86 GPCD by 2035)**

As shown in Figure 4.14, permanent, temporary and future resources are needed to meet demands through 2074. This planning scenario considers delaying timing for permanent future supply (25,000 AFY), which is available in 2039 and needed in 2047.

Temporary resources are needed in 2054, and other future resources are needed in 2072 (6,000 acre-feet in 2074).

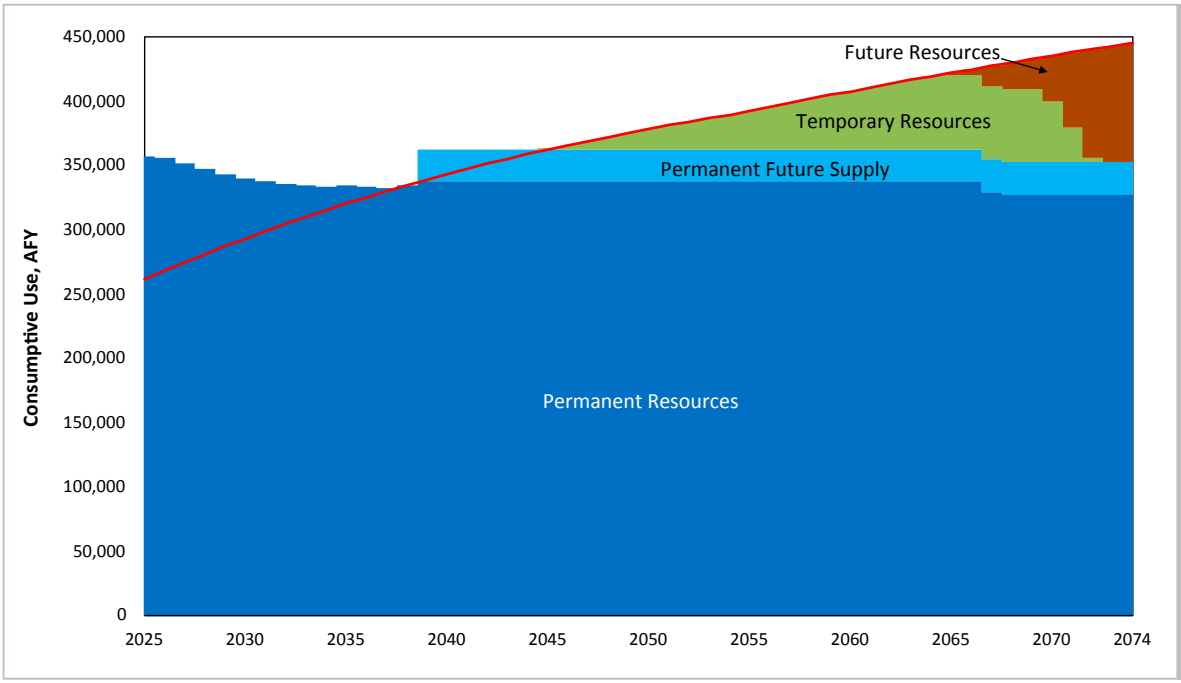

FIGURE 4.15 **11.0 MAFY Natural Flow, 2039 Upper Demand (92 GPCD by 2055)**

As shown in Figure 4.15, permanent, temporary and future resources are needed to meet demands through 2074. This planning scenario considers delaying timing for permanent future supply (25,000 AFY), which is available in and needed in 2039.

Temporary resources are needed in 2045, and other future resources are needed by 2065 (93,000 AFY in 2074).

CHAPTER SUMMARY

Several factors can influence water supply and demand, including changing economic conditions, water use patterns, conservation progress and climate variability. To account for these variables, the SNWA's 2025 Plan considers two water supply and demand scenarios that bracket a range of reasonable conditions over the 50-year planning horizon.

The scenarios assume that Southern Nevada will continue to make progress towards its new water conservation goal of 86 GPCD. They also demonstrate how falling short of the goal could impact water resource timing and need over the planning horizon. Likewise, the scenarios assume that conserved Nevada Colorado River water will continue to be stored for future use when available and that temporary resources will be used to meet demands until future resources are needed and developed.

Significant uncertainty exists within the current planning environment. Colorado River modeling performed by the U.S. Bureau of Reclamation projects that Lake Mead will end 2024 at an elevation between 1,050 and 1,075 feet, triggering a Tier 1 shortage declaration for 2025 operations. The risk of shortage remains high in subsequent years. Under the Interim Guidelines and DCP, the maximum supply reduction prescribed to Nevada is 30,000 AFY; however, this amount could potentially increase. For planning purposes, the SNWA's 2024 Plan considers 10,000 AFY of additional shortage when the elevation of Lake Mead falls below 1,020 feet.

As detailed in Chapter 3, the Secretary of the Interior and the Lower Basin States have taken additional actions to protect against lake level decline below elevation 1,020 feet through 2026.

The SNWA is not currently using its full Colorado River allocation, and near-term shortage declarations are not anticipated to impact current customer use. However, a return to normal or near-normal hydrology is unlikely to occur and the probability of shortage throughout the planning horizon remains high. Meanwhile, local water demands are projected to increase.

Meeting long-term projected demands will require the SNWA to continue to make significant and sustained progress toward its conservation goal. As demonstrated in the planning scenarios, lower levels of conservation achievement will impact the timing and need of temporary and future resources.

The 2025 Plan demonstrates the importance of conservation in extending the availability of Colorado River resources, minimizing the use of temporary resources, and delaying the timing and need for future resources. Subject to necessary authorizations and ongoing conservation progress, the amount of resources available for use as described in the SNWA Water Resource Portfolio is sufficient to meet the range of projected demands through the planning horizon.

Maintaining this portfolio provides flexibility and enables the SNWA to use an appropriate mix of resources as needed to meet demands. Through this and other adaptive management strategies, the SNWA is better prepared to address factors that can influence resource availability over time, such as permitting, policy changes, climate variability and/or new regulations.

As part of its long-term water planning efforts, the SNWA will:

- Continue to assess factors influencing water demands and the outlook for future demands;
- Continue to evaluate conservation progress and take steps necessary to achieve conservation goals;
- Maintain a diverse water resource portfolio to ensure future resources are available to meet projected long-term demands and to replace temporary supplies such as banked resources;
- Continue to assess its overall water resource options and make informed decisions on which resources to use when needed;
- Consider the factors of availability, accessibility, cost and need when determining the priority of resources for use;
- Support ongoing efforts to increase the elevation of Lake Mead and preserve system operations; and
- Work proactively with other Colorado River water users to explore emerging future resource options of mutual benefit.

ENDNOTES

1 Includes 8,208 AF of water rights from Basic Water Company and 25 AF of water from the Nevada Department of Fish and Game. The SNWA assumes use of these resources as needed throughout the planning horizon.

2 The December 31, 2024 reservoir and water supply conditions used to initialize the CRSS simulations correspond with the U.S. Bureau of Reclamation's Operation Plan for Colorado River System Reservoirs (24-Month Study) most-probable projection published on August 15, 2024.