

MEETING FUTURE DEMANDS

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

INTRODUCTION

As described in the preceding chapters, water supply conditions and demands can be influenced by a number of factors that can change in unpredictable ways, including changes associated with economic conditions, water conservation progress and climate variability. As SNWA prepared its 2017 Water Resource Plan, the organization considered two overriding issues related to water supply and demands:

- 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.

To address these uncertainties, 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 to inform water resource planning and water resource development efforts, and demonstrates how the SNWA plans to meet future needs, even if conditions change significantly over time.

As described in the sections below, all of the planning scenarios presented in this chapter demonstrate SNWA's ability to meet the community's long-term projected water needs through adaptive use of its Water Resource Portfolio.

SUPPLY AND DEMAND

Water resource planning is based on two key factors: supply and demand. Supply refers to the amount of water that is available or that is expected to be available for use. Demand refers to the amount of water expected to be needed in a given year.

Water demand projections are typically based on population forecasts and include assumptions about future water use, such as expected achievements toward water conservation goals. Precise accuracy

from year to year rarely occurs in projecting demands, particularly during periods of significant social and economic changes. 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/or the implementation of new regulations can also influence water resource availability over time.

The scenarios presented in this chapter address these uncertainties by considering a wide-range of supply and demand possibilities. Rather than considering a single forecast, the scenarios bracket the range of reasonable conditions that may be experienced over the 50-year planning horizon. Key factors evaluated include possible shortages of Colorado River supplies, as well as variation in future demands. This is a conservative approach that reflects the uncertainties presented in the current planning environment.

The following describes the water demand projections and water supply conditions that were considered as part of scenario development.

Water Demand Projections

The planning scenarios developed as part of this plan include two water demand projections: an upper water demand projection and a lower water demand projection. The lower water demand projection (Figures 4.1 and 4.3) was derived from a population forecast and expected conservation achievements. The Clark County population forecast was obtained from the University of Nevada Las Vegas Center for Business and Economic Research (CBER). This forecast is also used in local transportation planning by the Regional Transportation Commission and is accepted by the Southern Nevada Regional Planning Coalition for use in regional planning. The forecast is based upon 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 2017 CBER population forecast through 2050 and trending through the year 2068. The historical share of

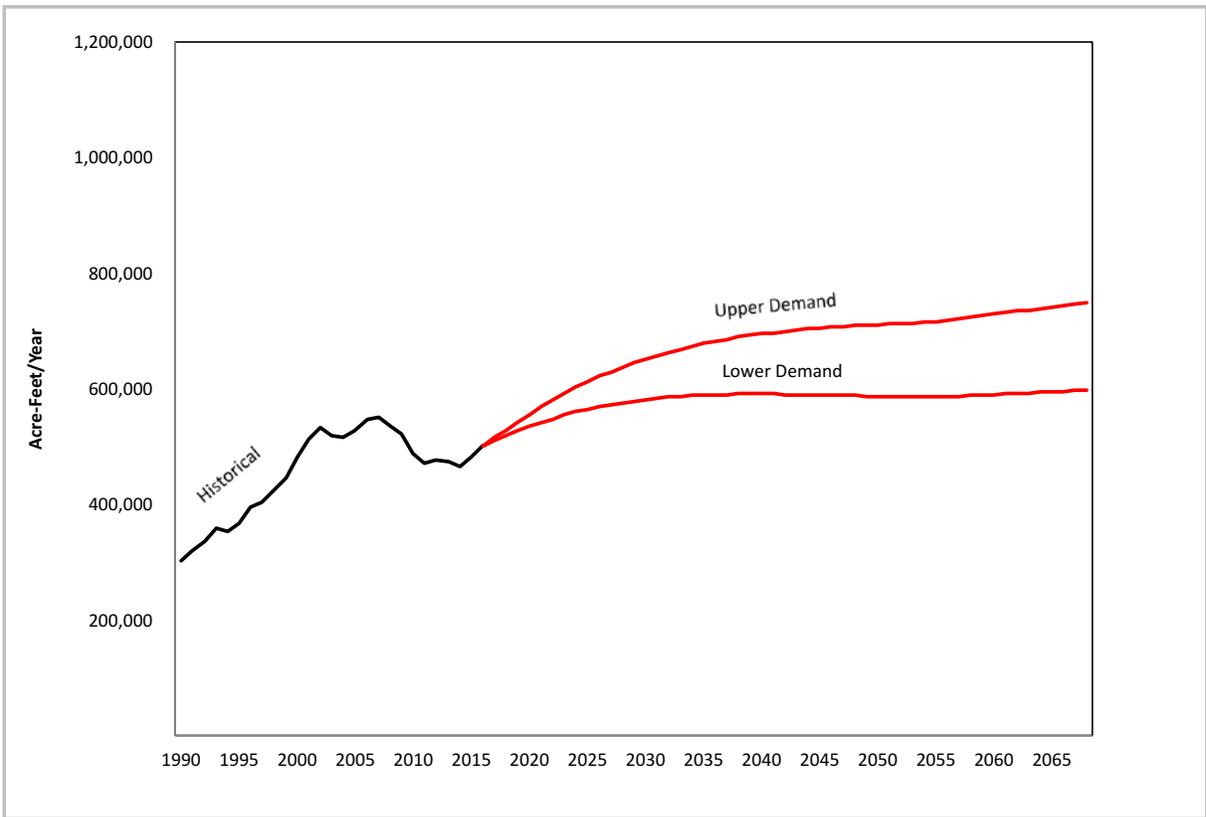


FIGURE 4.1 SNWA Historical and Projected SNWA Water Demand

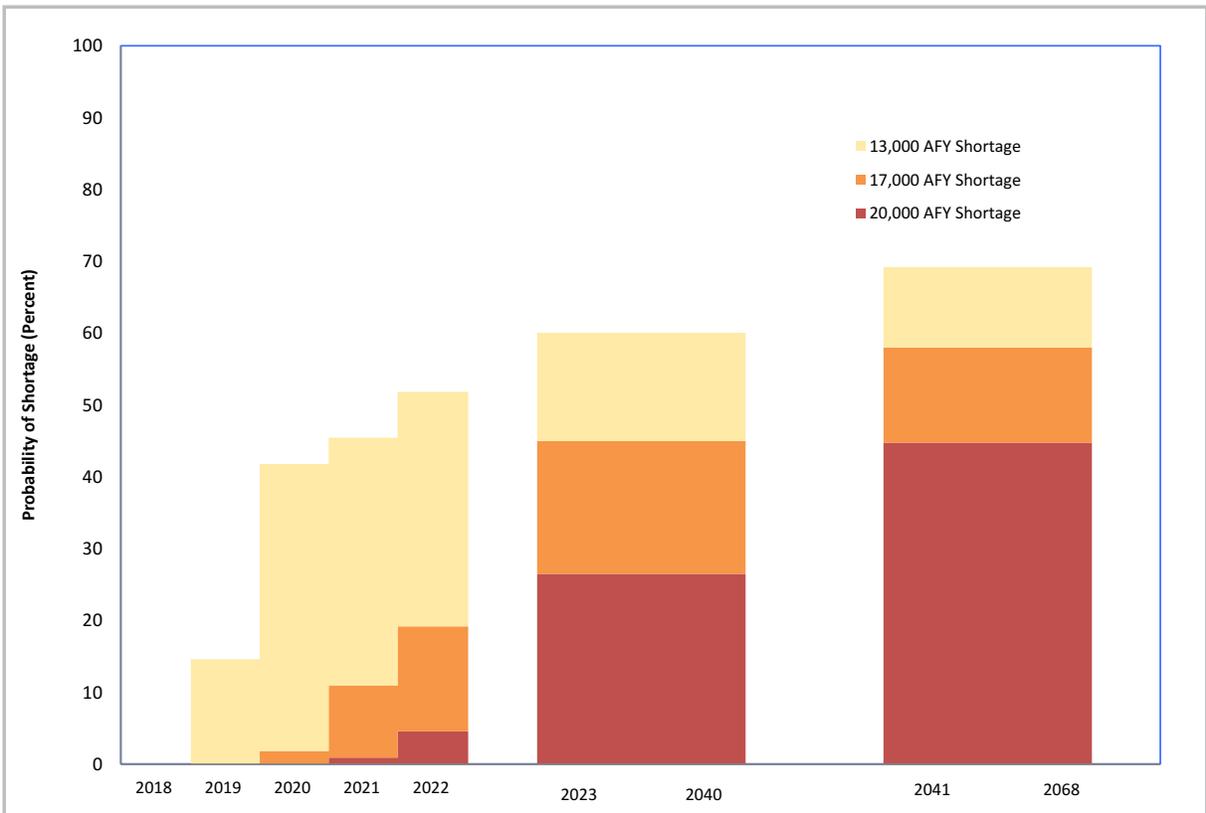


FIGURE 4.2 Probability of Colorado River Shortage Declarations¹

Clark County population attributable to the SNWA service area was multiplied by 2016 water-use levels and reduced over time to represent expected achievement of the community’s water conservation goal of 116 GPCD by 2035. The projection assumes a further reduction in total demand (111 GPCD) by 2055 to reflect the potential for additional conservation once the current goal has been met.

The upper demand projection was developed for planning purposes to reflect increased uncertainties related to possible changes in demands that are associated with the economy, climate, population and water use variability. The upper demand projection represents a 15 percent increase over the lower projection at the midpoint of the planning horizon (2035), increasing to 25 percent in the latter part of the planning horizon (2068). The SNWA also considered one variant of the upper demand projection that includes assumptions about additional levels of conservation, using the 2017 CBER forecast as a baseline.

| YEAR | 2017 | 2035 | 2068 |
|--------------|------|------|------|
| LOWER DEMAND | 510 | 589 | 598 |
| UPPER DEMAND | 517 | 678 | 749 |

FIGURE 4.3
SNWA Demand Projection, in thousands (AFY)

Water Supply Conditions

The water supply conditions considered in the planning scenarios represent three Colorado River water-supply conditions: Normal Supply, Shortage and Increased Shortage (Figure 4.4). These supply conditions were developed to reflect current and likely conditions in the Colorado River Basin, as well as the potential for more significant water resource shortages than are currently prescribed by the Interim Guidelines.

| | |
|---------------------------|--|
| NORMAL SUPPLY | Nevada receives its full apportionment of 300,000 AFY |
| SHORTAGE | Nevada apportionment is incrementally reduced to a maximum shortage of 20,000 AFY according to the Interim Guidelines |
| INCREASED SHORTAGE | Nevada apportionment is reduced by 40,000 AFY, double the maximum shortage level established in the Interim Guidelines |

FIGURE 4.4 Water Supply Conditions

Under the Interim Guidelines, shortage volumes are defined for Lake Mead elevations between 1,075 and 1,025 feet. The Secretary of the Interior will consult with Colorado River Basin States to determine what additional measures are needed if Lake Mead drops below elevation 1,025 feet. If this were to occur, future negotiations and consultation with the Secretary of the Interior may establish additional shortage volumes. As a result, Nevada may be required to bear shortages greater than 20,000 AFY (currently Nevada’s maximum shortage volume under the Interim Guidelines).

Colorado River modeling performed by the Bureau of Reclamation in 2017 projects an approximate 15–50 percent probability of a Colorado River shortage in the years 2019 to 2022. The probability of shortage ranges between approximately 60–70 percent in the years following. (Figure 4.2)¹

SUPPLY AND DEMAND SCENARIOS

Figure 4.5 summarizes the water resources planned for development and use as part of the SNWA’s water resource portfolio. These resources were combined with the Supply and Demand Scenarios (Figures 4.6 – 4.10) to depict the volume and type of resources planned for use to meet the range of possible future demand projections under the three supply conditions. All planning scenarios use combinations of permanent, temporary and future resources as described in Chapter 3. Having a portfolio of resource options provides flexibility to adjust the use of some resources if development of other resources is delayed or revised, or if changes to demands occur. Likewise, if other options become a reality sooner rather than later, the priority and use of resources may change.

As previously described, some Permanent and Temporary resources are subject to restrictions for use during declared shortage, while other resources will require the development of facilities for use. Ultimately, the timing and need for resources will depend significantly on how supply and demand conditions materialize over the long-term planning horizon. For planning purposes, it is important to note that an estimated 10-year lead time is needed to secure remaining state and federal permits, and to design and construct facilities associated with in-state groundwater resources. Other future resources are likely to require lead time as well for the development of facilities and/or agreements for use.

FIGURE 4.5 SNWA Water Resource Portfolio

| | SUPPLY | CONSUMPTIVE USE | DIVERSION EQUIVALENT | AVAILABLE IN SHORTAGE? |
|-----------|--|--------------------------------|--------------------------------|-------------------------------------|
| PERMANENT | Colorado River (SNWA) | 272,205 AFY | 476,359 AFY | Yes. Subject to shortage reductions |
| | Nevada Unused Colorado River (Non-SNWA) | 21,151 (2016) to 0 AFY in 2031 | 37,014 (2016) to 0 AFY in 2031 | Yes. Subject to availability |
| | Tributary Conservation/Imported ICS | 39,000 AFY | 68,250 AFY | Yes |
| | Las Vegas Valley Groundwater Rights | 46,961 AFY | Not applicable | Yes |
| | Direct Reuse | 21,800 AFY | Not applicable | Yes |
| TEMPORARY | Southern Nevada Groundwater Bank | 336,091 AF | Up to 588,159 AF | Yes |
| | Interstate Banks (Arizona and California) | 931,266 AF | 1,629,716 AF | Yes |
| | Intentionally Created Surplus (storage in Lake Mead) | 531,606 AF | 930,311 AF | No |
| FUTURE | Desalination | To be determined | To be determined | To be determined |
| | Garnet and Hidden Valleys | 2,200 AFY | Not applicable | Yes |
| | Delamar, Dry Lake, Cave and Spring Valleys | 91,988 AFY | 160,979 AFY | Yes |
| | Tikaboo and Three Lakes Valley North and South | 10,605 AFY | 18,559 AFY | Yes |
| | Snake Valley | 50,678 AFY | 88,687 AFY | Yes |
| | Virgin River/Colorado River Augmentation | Up to 108,000 AFY | Up to 189,000 AFY | To be determined |
| | Indian Springs Valley | 16,000 AFY | 28,000 AFY | Yes |
| | Railroad Valley | 111,496 AFY | 195,118 AFY | Yes |
| | Transfers/Exchanges | To be determined | To be determined | To be determined |

Water supplies are described in Chapter 3.²

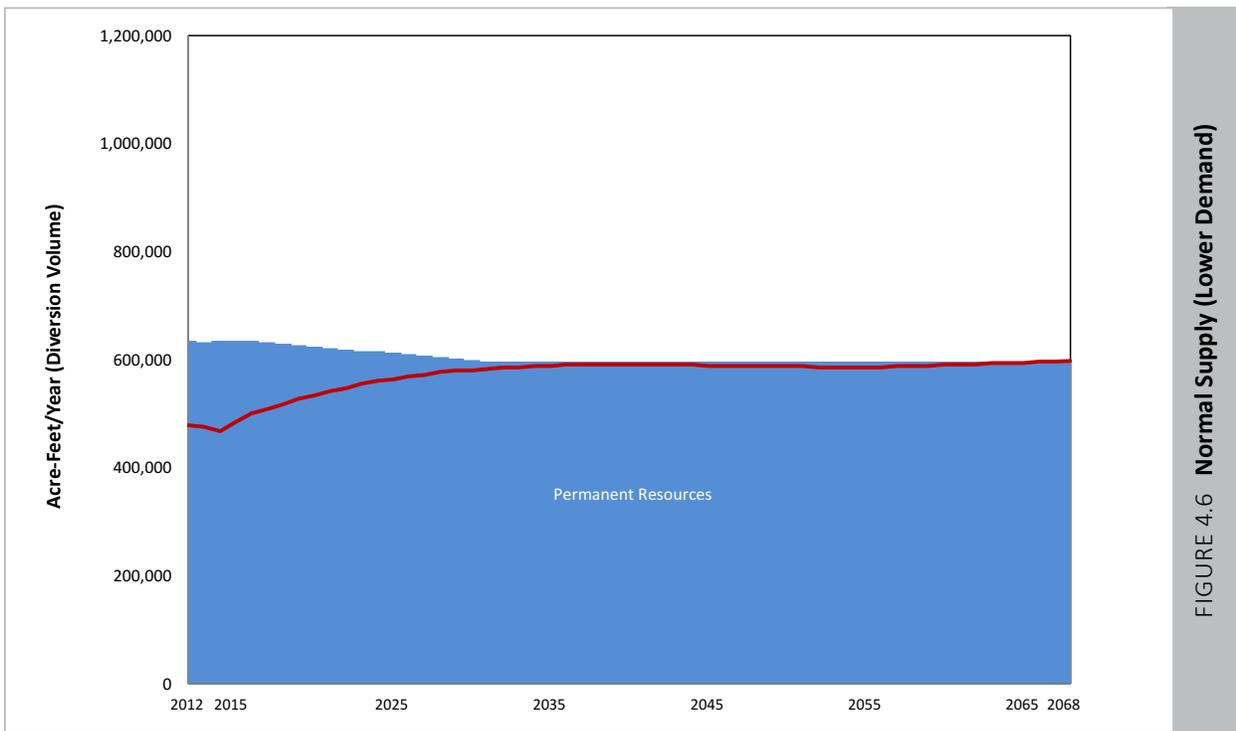


FIGURE 4.6 Normal Supply (Lower Demand)

Normal Supply Scenario (Lower Demand)

Figure 4.6 assumes full availability of Southern Nevada’s 300,000 AFY Colorado River allocation. Under this scenario, permanent water resources are sufficient to meet water demands through the 50-year planning horizon.

This scenario also assumes continued banking of unused Colorado River supplies to the extent these resources are available. Given the high probability of Colorado River shortages, this scenario is unlikely to represent actual future supply conditions.

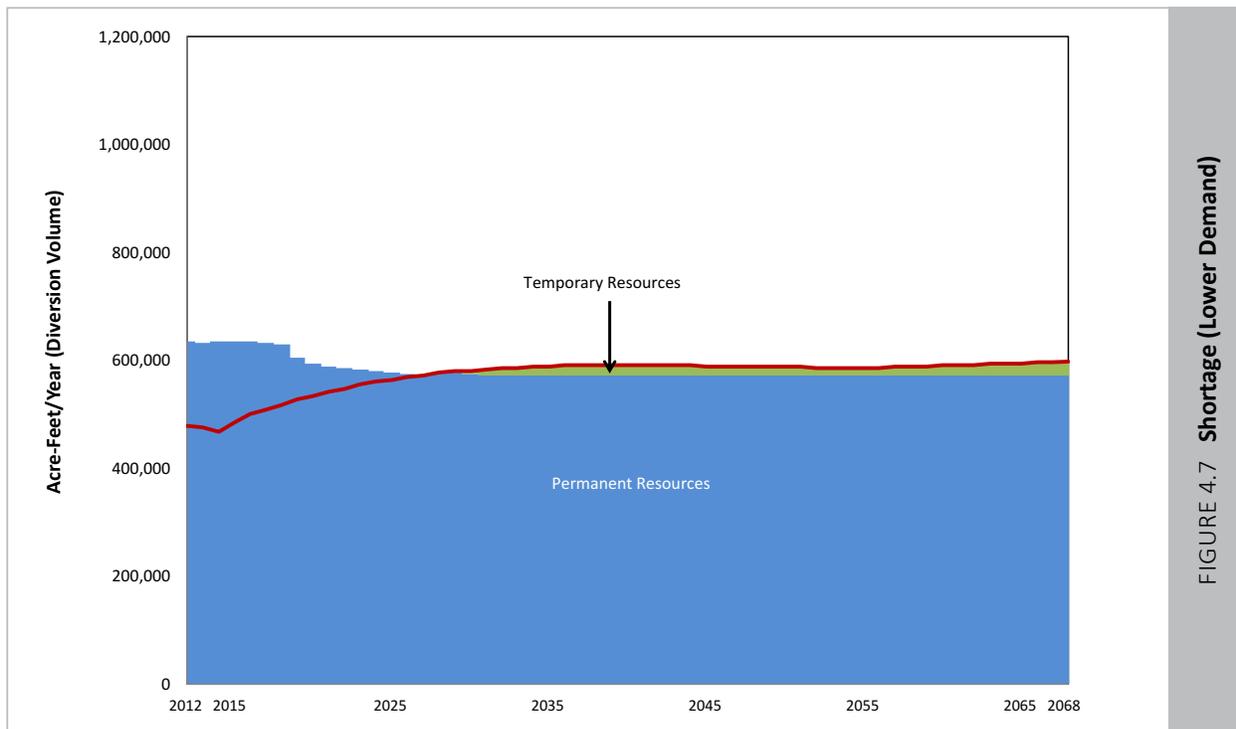


FIGURE 4.7 Shortage (Lower Demand)

Shortage Scenarios (Lower Demand)

Figure 4.7 assumes a staged reduction of Colorado River water up to 20,000 AFY based on a shortage declaration (reduction of 13,000 AFY in 2019, 17,000 AFY in 2020

and 20,000 AFY thereafter). Under this scenario, permanent and temporary water resources are sufficient to meet water demands through 2068.

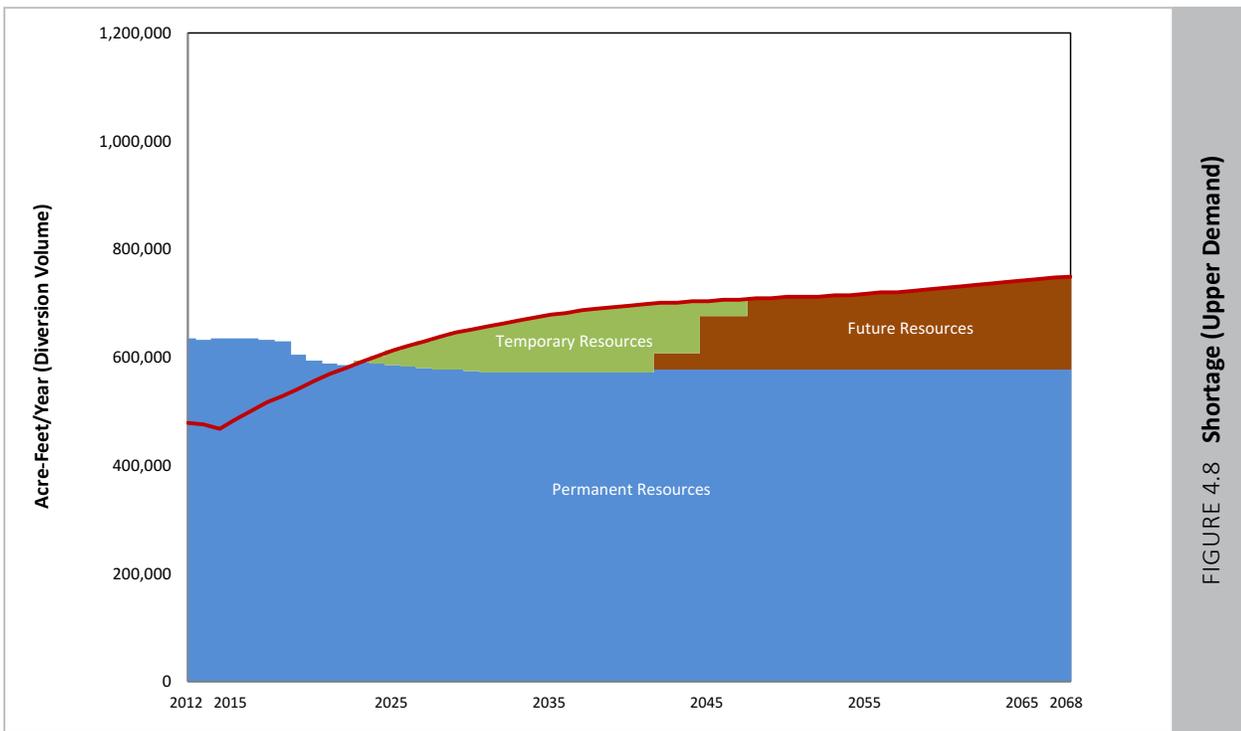


FIGURE 4.8 Shortage (Upper Demand)

Shortage Scenario (Upper Demand)

Figure 4.8 assumes a staged reduction of Colorado River water up to 20,000 AFY based on a shortage declaration (reduction of 13,000 AFY in 2019, 17,000 in 2020 and 20,000 AFY thereafter). Under this scenario, permanent

and temporary water resources are sufficient to meet water demands through 2041 before future resources are needed. In 2068, the need for future resources is estimated at 98,000 AFY (consumptive use volume).

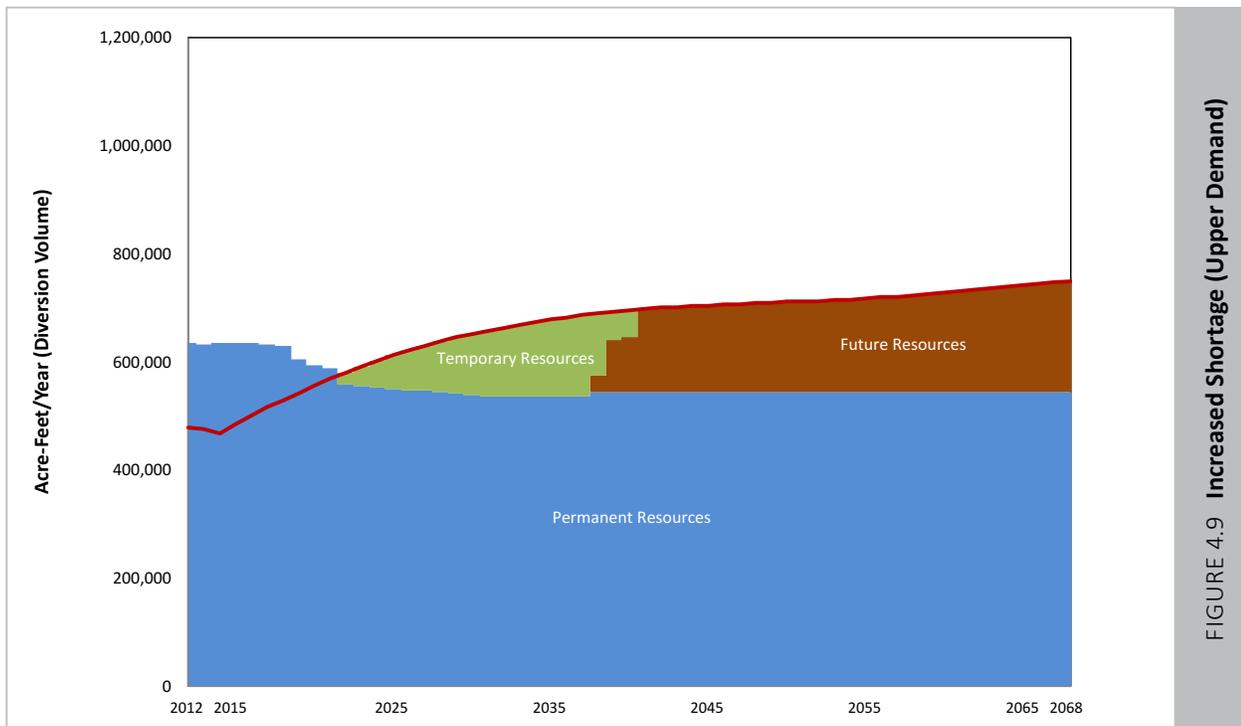


FIGURE 4.9 Increased Shortage (Upper Demand)

Increased Shortage Scenario (Upper Demand)

Figure 4.9 assumes a staged Colorado River shortage in years 2019–2021 and an increased shortage of 40,000 AFY thereafter. Under this scenario, SNWA's permanent and temporary water resources are sufficient to meet

water demands through 2037 before future resources are needed. In 2068, the need for future resources is estimated at 118,000 AFY. (consumptive use volume), demonstrating the need for a combination of future resources to meet projected demands.

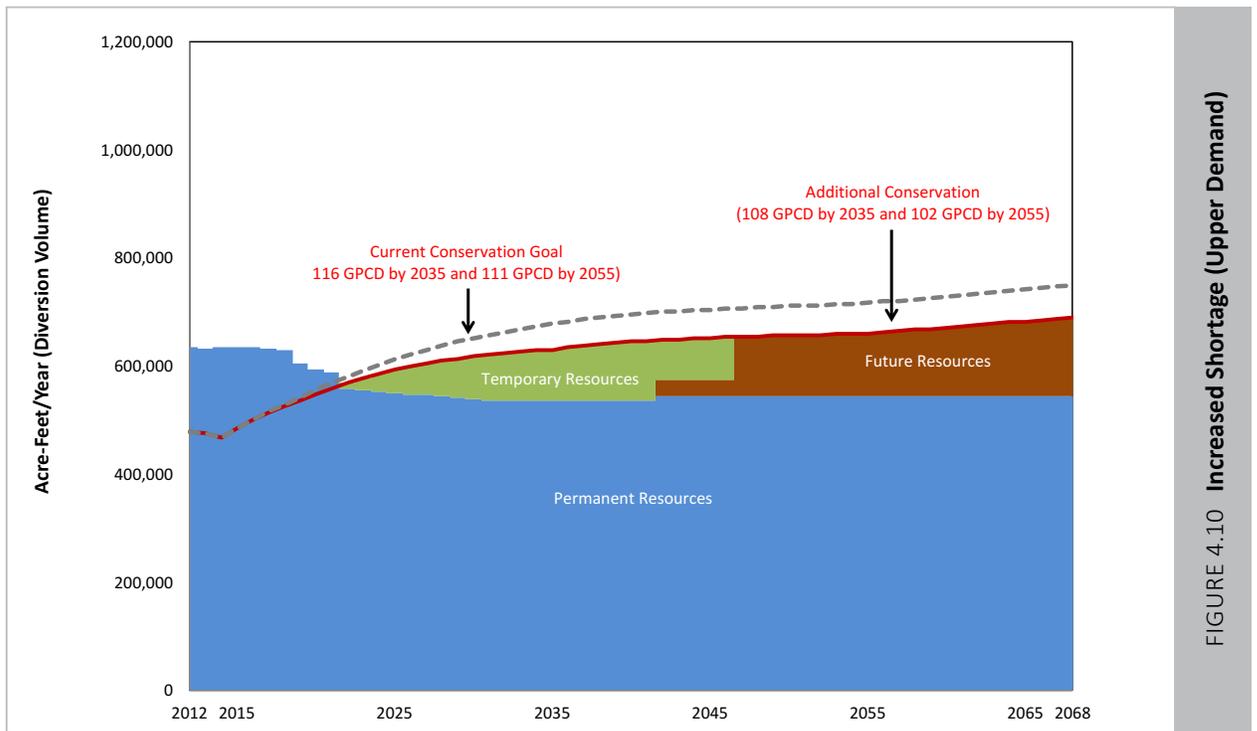


FIGURE 4.10 Increased Shortage (Upper Demand)

Additional Conservation Scenario

Figure 4.10 illustrates the timing and need for additional resources with the implementation of additional conservation. This scenario assumes future water use at 108 GPCD by 2035 and 102 GPCD by 2055. The scenario also assumes a staged Colorado River shortage in years

2019–2021 and an increased shortage of 40,000 AFY thereafter. Under this scenario, permanent and temporary water resources are sufficient to meet water demands through 2041 before future resources are needed. In 2068, the need for future resources is estimated at 84,000 AFY (consumptive use volume).

CONCLUSION

Water supply and demand conditions are influenced by a number of factors, including economic conditions, water use patterns, conservation progress and climate variability. To account for these variables, SNWA's 2017 Water Resource Plan considers several water supply and demand scenarios that bracket the range of plausible conditions to be experienced over the 50-year planning horizon.

The scenarios assume that Southern Nevada will continue to make progress towards its current water conservation goal, as well as achieve increased levels of efficiency over the long-term planning horizon. Likewise, the scenarios assume that unused Nevada Colorado River water will continue to be stored for future use and that this and other temporary resources will be used to meet demands until future resources are needed and developed.

Modeling efforts performed by the U.S. Bureau of Reclamation indicate a high probability of future shortage associated with Colorado River supplies (approximately 15–70 percent, beginning in 2019). The current maximum level of shortage prescribed to Nevada is 20,000 AFY; however, this level could potentially increase if Lake Mead water levels fall below an elevation of 1,025 feet.

The SNWA is not currently using its full Colorado River allocation and near-term shortage declarations are not anticipated to impact current customer use. Additionally, and as illustrated in the planning scenarios, SNWA is prepared to meet long-term demands and future shortages by adaptively managing its resource portfolio and by bringing future resources online when needed.

Subject to necessary authorizations, the amount of resources available for use as described in the SNWA Water Resource Portfolio is more than sufficient to meet the range of projected demands through the planning horizon. Maintaining this portfolio provides flexibility and enables SNWA to use an appropriate mix of resources as needed to meet demands. Through this and other adaptive management strategies, 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 assess its overall water resource options and make informed decisions on which resources to use when needed;
- Consider the factors of availability, accessibility, cost, need and supply diversification when determining priority of resources for use;
- 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; and
- Work proactively with other Colorado River water users on efforts that increase Lake Mead's elevation in order to reduce the likelihood and severity of shortages.

ENDNOTES

- 1 The U.S. Bureau of Reclamation developed the Colorado River Simulation System (CRSS), a long-term planning and operations model. The probabilities of shortage correspond with August 2017 CRSS results, applying historical Colorado River flows, provided by U.S. Bureau of Reclamation to Southern Nevada Water Authority, August, 2017.
- 2 Water supplies are described in Chapter 3. For this plan, SNWA estimates diversion volumes by multiplying the corresponding consumptive use volume by a factor of 1.75, which incorporates the estimated return-flow credit ratio, where applicable. This factor is also applied in this plan to estimate full consumptive use of future in-state water resources.

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Muddy River inflow to Lake Mead