

# SNWA WATER RESOURCE PORTFOLIO

THIS CHAPTER DISCUSSES THE DIVERSE SET OF WATER RESOURCE OPTIONS ACQUIRED BY THE SNWA TO RELIABLY MEET THE COMMUNITY'S CURRENT AND FUTURE WATER RESOURCE NEEDS.

## INTRODUCTION

The SNWA has worked since 1991 to establish and manage a flexible portfolio of water resources, an approach commonly used in resource planning. Having a portfolio of resources allows the SNWA to assess its overall water resource options and make appropriate decisions regarding which resources to develop and use when needed. Key factors considered in determining acquisition, the priority of development, and resource use include availability, accessibility, cost and need.

The SNWA's water resource portfolio and associated facility planning and permitting efforts provide the SNWA with flexibility in adapting to changing supply and demand conditions. As detailed in Chapter 2, water resource conditions have changed significantly over the years for many western states, including Nevada.

During that time, the SNWA has worked to implement innovative water conservation and resource strategies that have increased the efficiency of Colorado River water use, bolstering the elevation of Lake Mead and maximizing the availability of this critical water supply. The organization has also created new temporary resources that provide flexibility in meeting current and future demands. These efforts have helped delay the need to develop costly water projects.

Adaptive management has played an increasingly significant role in the SNWA's water resource and facility planning efforts, helping reduce demands, bolster supplies and minimize risk associated with drought and climate change in the Colorado River Basin. These efforts have led to the development of new Lake Mead intake and pumping facilities and collaborative partnerships that significantly enhance the reliability of and access to Southern Nevada's Colorado River water supplies.

This chapter discusses the diverse set of water resource options acquired by the SNWA to reliably meet the community's current and future water

resource needs. Resources in the SNWA water resource portfolio are described in consumptive use volumes and are organized into the following categories:

- Permanent Resources
- Temporary Resources
- Future Resources

Consistent with prior plans, water conservation is a critical component of the SNWA's water resource management strategy. Reducing per capita water use remains a top priority, particularly in light of current Colorado River conditions and required response measures. This chapter highlights new and ongoing strategies the SNWA is pursuing to balance supply and demand, building upon the community's conservation success over the last two decades.

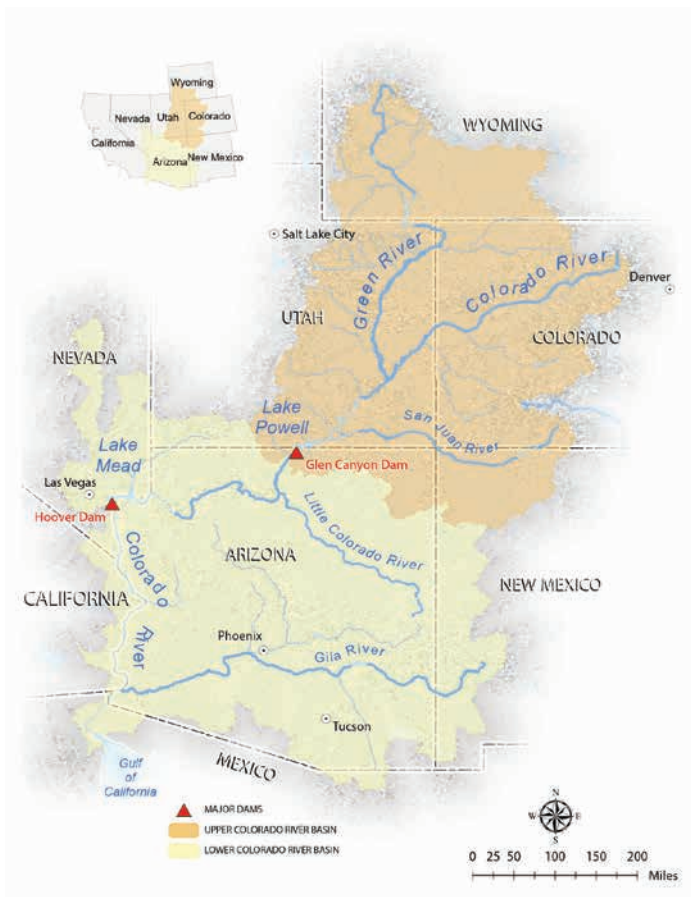
## PERMANENT RESOURCES

Permanent resources are resources anticipated to be available for use over the 50-year planning horizon. These resources make up a base of supplies and can be used during any Colorado River operating condition, including shortage (subject to certain restrictions).

Permanent resources include Colorado River supplies, Tributary Conservation Intentionally Created Surplus (ICS), permitted groundwater rights in the Las Vegas Valley and reuse, primarily through return-flow credits. The section below describes these resources and provides details about their availability and use.

### Colorado River—Nevada Basic Apportionment

Nevada's 300,000 AFY Colorado River apportionment continues to be Southern Nevada's largest and most critical permanent resource. Nevada's right to this water was established under the 1922 Colorado River Compact and the Boulder Canyon Project Act (BCPA), which together set forth where and how Colorado River water is used.



## The Colorado River Basin

Colorado River operations and water use are governed by a series of contracts, regulatory guidelines, federal laws, compacts, a treaty with Mexico, court decisions and decrees—collectively known as the “Law of the River.” The 1922 Colorado River Compact divided the Colorado River Basin into two divisions—the Upper Division and the Lower Division, allocating 7.5 million acre-feet per year (MAFY) to each. As part of the Boulder Canyon Project Act and the 1948 Upper Colorado River Basin Compact, the Upper and Lower Divisions divided their respective share amongst individual states within each division. In addition, 1.5 MAFY was allocated to Mexico as part of a 1944 treaty.<sup>3</sup>

The Compact was forged in a time of abundance, during one of the wettest periods in recorded history. While Colorado River Basin stakeholders have long recognized the potential for supply and demand imbalance. The federal government is working with the Colorado River Basin states to develop and implement measures to immediately and significantly reduce water use to protect critical elevations at Lake Mead and Lake Powell. Additional actions are under discussion and required to address long-term Colorado River operations.

Section 5 of the BCPA requires entities wishing to divert Colorado River water within the states of Arizona, California and Nevada to have a contract with the Secretary of the Interior for that water. Early on, the agencies that would form the SNWA contracted for most of Nevada’s Colorado River allocation.

With the creation of the SNWA in 1991, these agencies agreed to collaboratively manage Southern Nevada’s current and future water resources, representing a significant shift in the overall management of the region’s water supply. In the years that followed, the SNWA determined that additional Colorado River water was available and contracted with the Secretary of the Interior in 1992 and 1994 to acquire these resources.<sup>1</sup>

The SNWA’s total estimated Colorado River entitlement is 276,205 AFY of Nevada’s 300,000 AFY allocation. This volume includes 272,205 AFY for use by SNWA member agencies and 4,000 AFY that the SNWA delivers to Nellis Air Force Base. The SNWA also holds contracts for any surplus Colorado River water available to Nevada.

Nevada’s remaining apportionment is contracted to other users.<sup>2</sup> As part of its 1992 Colorado River contract, the SNWA has a right to the unused apportionment of other Nevada Colorado River contract holders.

The BCPA defines all Colorado River apportionments in terms of “consumptive use.” Consumptive use is water diversions minus any Colorado River water returned to the Colorado River. These returns are also called “return-flow credits.” With return-flow credits, Nevada can divert more than its full or reduced apportionment, as long as there are sufficient flows returned to the Colorado River to ensure consumptive use does not exceed the amount of water authorized for annual use.<sup>4</sup>

As described in Chapter 2, supply reductions under the Interim Guidelines and DCP will reduce the availability of Nevada’s Colorado River supply by up to 30,000 AFY through 2026. The SNWA anticipates that any of Nevada’s remaining available but unused allocation will be stored in Lake Mead or other banking programs.

Return-flow credits constitute a significant portion of Southern Nevada’s Colorado River resource, expanding the SNWA’s Colorado River supply. Nevada’s Colorado River return flows consist mostly of highly-treated wastewater returned to Lake Mead via the Las Vegas Wash.

**Flood Control Surplus.** If Lake Mead is full or nearly full, the Secretary of the Interior can declare a flood control

surplus. This designation allows Lower Basin States to use Colorado River water, in excess of their apportionment, that would have been released to control potential flooding along the Colorado River system.<sup>5</sup>

Based on current Lake Mead water levels and climate variability in the Colorado River Basin, the SNWA does not assume that flood control surplus water will be available during the planning horizon. However, the SNWA will utilize this resource as a priority when it is available.<sup>6</sup>

**Domestic Surplus.** As discussed in Chapter 2, the Interim Guidelines defined both surpluses and shortages and detailed provisions for water use during each condition. Under a “Domestic Surplus,” the SNWA can consumptively use up to 400,000 AFY of Colorado River water when Lake Mead is above 1,145 feet. The 2024 Plan does not assume the availability or use of domestic surplus water during the planning horizon. However, the SNWA will utilize this resource as a priority when it is available.

### Intentionally Created Surplus

In 2007, as part of the Interim Guidelines, the SNWA entered into a series of agreements that ensure the availability and delivery of water resources developed under provisions for ICS.<sup>7</sup> As discussed below, Tributary Conservation ICS and Imported ICS enable the SNWA to develop some of its surface and groundwater rights located in Nevada, near the Colorado River. The SNWA may develop these rights as needed by conveying them to Lake Mead in exchange for Tributary Conservation ICS and Imported ICS credits.

The SNWA can use its Tributary Conservation and Imported ICS credits during the year created and under any operating condition, including shortage (taken as Developed Shortage Supply or “DSS” during a declared shortage).<sup>8</sup> As required by the DCP, these resources are subject to a one-time deduction of 10 percent to offset evaporative loss and benefit Lake Mead system storage.

Water not used in the year it is created may be converted to Extraordinary Conservation ICS. As discussed in the “Temporary Resources” section on the following pages, the credits will be withdrawn as Colorado River water through SNWA facilities when needed and returned to the system for return-flow credits.

**Tributary Conservation ICS.** The SNWA is allowed to develop the portion of its Muddy and Virgin River surface water rights with a priority date that precedes the BCPA (pre-1929 rights) as Tributary Conservation ICS. The SNWA can develop up to 50,000 AFY of Tributary Conservation ICS credits.

To date, the SNWA has acquired approximately 17,000 AFY of permanent rights. In addition to these permanent rights, the SNWA also leases approximately 17,600 AFY of rights, with remaining terms through 2026. The SNWA anticipates developing and delivering a total of 36,000 AFY of Tributary Conservation ICS over the planning horizon.

**Imported ICS.** Under the Interim Guidelines, up to 15,000 AFY of Imported ICS can be created in an entitlement holder’s state by introducing non-Colorado River water into the main stem of the Colorado River.

The SNWA has 9,000 AFY of permitted non-Colorado River groundwater rights in Coyote Spring Valley that would qualify as Imported ICS. However, these and other groundwater rights within the Lower White River Flow System are under review, subject to an ongoing process initiated by the State Engineer in 2018 to evaluate the amount of water that can be pumped sustainably. For the 2024 Plan, the SNWA assumes no use of this resource.

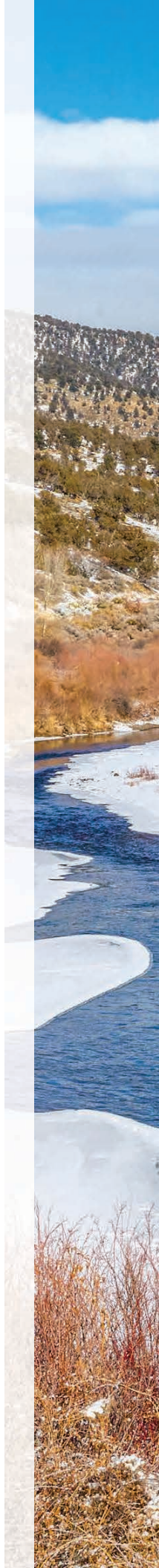
### Las Vegas Valley Groundwater Rights

All surface water and groundwater rights in the state of Nevada are administered by the Nevada State Engineer and fall under the purview of Nevada Water Law.<sup>9</sup>

Of the seven SNWA member agencies, the LVVWD and North Las Vegas have permanent groundwater rights totaling 40,760 and 6,201 AFY, respectively. These rights are among the most senior groundwater rights in the Las Vegas Valley. As such, they are protected even though new rights were granted to other users. Las Vegas Valley groundwater rights remain a critical component of SNWA’s Resource Portfolio.

### Water Reuse

The term water reuse generally means to recycle wastewater to support a secondary use. In the SNWA service area, nearly all water used indoors is recycled for either direct or indirect reuse. Direct



reuse involves capturing, treating and reusing wastewater flows for non-potable uses such as golf course and park irrigation, and other uses. Indirect reuse consists of recycling water through treatment and releases to the Colorado River for return-flow credits.

Boulder City, City of Las Vegas, Clark County Water Reclamation District, City of Henderson and City of North Las Vegas each operate wastewater treatment facilities that contribute to the region’s direct and/or indirect reuse.

As shown in Figure 3.1, approximately 41 percent of water used in the SNWA service area results in highly-treated wastewater. Of that, approximately 99 percent is recycled.

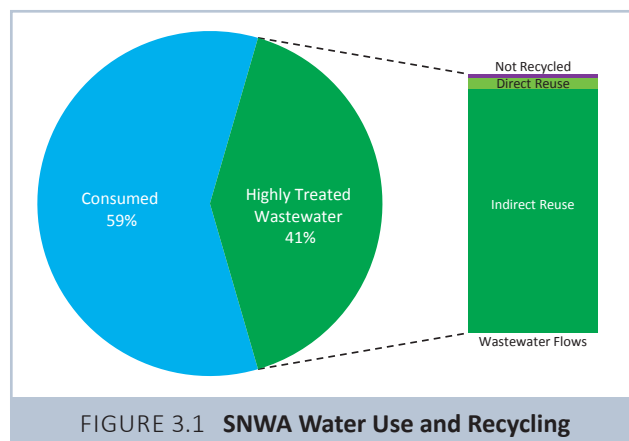


FIGURE 3.1 SNWA Water Use and Recycling

While direct reuse of Colorado River water may have advantages over indirect reuse in terms of lower pumping cost, additional direct reuse does not extend Southern Nevada’s Colorado River supply where return-flow credits are available. This is because an increase in direct reuse will reduce the amount of water available for indirect reuse through return-flow credits by a similar amount.

In 2017, SNWA adopted a policy to address water use outside the Las Vegas Valley, prioritizing the return of treated wastewater to Lake Mead for return-flow credits.<sup>10</sup> IRPAC 2020 further recommended that the SNWA require out-of-valley development to return wastewater to Lake Mead and further limit consumptive uses of water outside the Las Vegas Valley. The 2024 Plan assumes new non-consumptive water deliveries are treated and returned to the system for return-flow credits.

## TEMPORARY RESOURCES

Beginning in the early 1990s and continuing today, the SNWA has worked closely with other basin states to maximize opportunities for flexible use of Colorado River water. Through local and interstate arrangements, the SNWA has acquired a number of temporary resources that

serve as an important management tool—these resources can be used to meet potential short-term gaps between supply and demand, serving as a bridge to meet demands while other future resources are being developed. In some cases, temporary resources can be used to offset reductions in permanent supplies due to shortages and to meet DCP contributions. The SNWA will carefully consider future resource availability and the lead time for future resource development when accessing temporary resources.

Temporary resources are defined as banked resources. As part of its overall water resource strategy, the SNWA has reserved water in years when Nevada’s Colorado River allocation exceeds the community’s demands. To the extent possible, these resources are “banked” for future use in the form of storage credits. The volume of storage credits can change over time based on continued storage and use of supplies. As discussed below, the SNWA stores banked resources locally, as well as through banking agreements with other states.

### Southern Nevada Water Bank

The SNWA has stored approximately 344,000 acre-feet of water in the Southern Nevada Water Bank through 2022 for future use under an agreement with LVVWD. The SNWA may recover water banked under this agreement in any water supply condition. This plan assumes a maximum recovery rate of 20,000 AFY.<sup>11</sup>

### California Water Bank

Between 2004 and 2012, the SNWA entered into various agreements that allow for the storage of Nevada’s unused Colorado River water in California. This agreement allows for the recovery of 30,000 AFY during normal and shortage conditions and 50,000 AFY during shortage conditions.<sup>12</sup> This plan assumes a maximum recovery rate of 30,000 AFY.

### Arizona Water Bank

In 2013, the SNWA approved an amendment to the 2001 water banking agreement with the Arizona Water Banking Authority.<sup>13</sup> Through 2023, the SNWA stored approximately 614,000 acre-feet of Colorado River water underground in Arizona’s aquifers for the SNWA’s future use. The SNWA can bank additional water on a pay-as-you-go basis up to 1.25 million acre-feet.

For the SNWA to recover this stored water, Arizona will utilize the banked water and forgo a like amount of Colorado River water. The SNWA will then divert the water from facilities at Lake Mead. The SNWA can recover up to 40,000 AFY during any water supply condition and up to

60,000 AFY during a declared shortage. This plan assumes a maximum recovery of up to 40,000 AFY during normal and shortage conditions.

### Intentionally Created Surplus

The SNWA has participated in several efforts to expand its portfolio of temporary resources under provisions specified in the Interim Guidelines and DCP.

As discussed earlier in this chapter, the Interim Guidelines created several forms of ICS: Tributary Conservation ICS and Imported ICS (discussed under “Permanent Resources”), as well as System Efficiency ICS and Extraordinary Conservation ICS. Bi-National ICS is an additional form of ICS created in 2012 as part of an international pilot program. Provisions for Bi-National ICS were extended through 2026 with the approval of a new agreement between the U.S. and Mexico in late 2017.

Additional provisions for the creation and delivery of ICS were authorized and implemented in 2019 under the DCP. As further described in this chapter, DCP ICS was created to provide an incentive for additional water storage in Lake Mead and, in turn, to help slow the decline of Lake Mead water levels. The SNWA can use its DCP ICS credits without repayment obligations when Lake Mead is above an elevation of 1,110 feet. The SNWA can access up to 300,000 AFY of its combined System Efficiency ICS, Extraordinary Conservation ICS, Binational ICS and may “borrow” DCP ICS during a declared shortage and when the elevation of Lake Mead is above 1,025 feet. These resources are anticipated for use throughout the planning horizon and are further described below.

**System Efficiency ICS.** In 2007, the SNWA collaborated with the U.S. Department of the Interior and other project partners to fund construction of the Warren H. Brock Reservoir. This System Efficiency ICS project provides Southern Nevada with 400,000 acre-feet of ICS credits; no more than 40,000 acre-feet are available for consumptive use each year through 2036. These credits are stored in Lake Mead and are helping to bolster Lake Mead water levels.

In 2009, Nevada also collaborated with municipal water agencies in California, Arizona and the U.S. Bureau of Reclamation in a pilot operation of the Yuma Desalting Plant. The plant was constructed in 1992 to treat brackish agricultural drainage water in the United States for delivery to Mexico as part of its treaty obligation. Flood damage in 1993 caused the facility to cease operations.

As part of the 2009 collaborations, the facility was operated at one-third capacity to collect data on

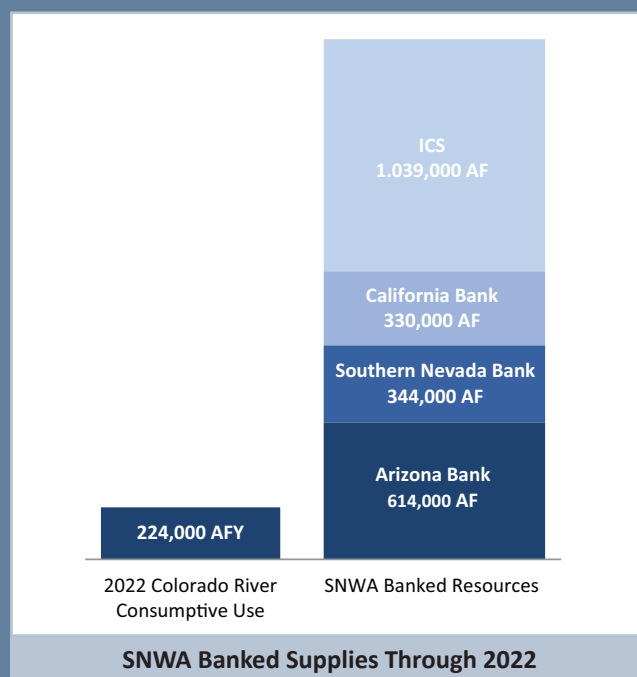
### Recharge & Banking

The LVVWD began storing or “banking” water in the Las Vegas Valley in the late 1980s. In Southern Nevada, banking is accomplished through artificial recharge or in-lieu recharge.<sup>14</sup> Artificial recharge involves direct injection of treated unused Colorado River water into the local groundwater aquifer; in-lieu recharge is accomplished by not pumping non-revocable groundwater rights to acquire storage credits that are available for future use. Through various programs and agreements, the SNWA has expanded banking efforts to include storage in the Arizona Water Bank and California Water Bank, and in Lake Mead in the form of ICS (see sidebar on page 32).

As described later in this chapter, the 2019 DCP and associated agreements expanded Lake Mead water banking opportunities for Southern Nevada with the authorization of a new SNWA Extraordinary Conservation ICS project that allows the SNWA to leverage its past and future conservation savings and forgone banking to obtain ICS credits.

Ongoing accruals are based on conservation achievements since 2002. Subject to certain conditions, provisions for the recovery of stored ICS credits also were expanded to allow for greater flexibility and use of ICS resources during a declared shortage.

Through 2022, the SNWA has accrued more than 2.3 million acre-feet of water. This amount is more than ten times Nevada’s 2022 consumptive Colorado River water use.



## Intentionally Created Surplus

The Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lake Powell and Lake Mead (Interim Guidelines) were adopted in 2007 by the Secretary of the Interior. Among other things, the Interim Guidelines established requirements for the creation, delivery and accounting for a new form of surplus called Intentionally Created Surplus.

Designed to help reduce the likelihood, magnitude and duration of shortages in the Lower Basin, ICS encourages the efficient use and management of Colorado River water to increase the water supply in Colorado River system reservoirs. Additional provisions for creating and recovering ICS were authorized and are implemented under the 2019 Drought Contingency Plan.

Efforts to help stabilize Lake Mead water levels are of key importance to the SNWA—the agency has made significant investments in new intake and pumping facilities that will allow for reliable access to community water supplies in the event of low lake level conditions (below 1,000 feet).



Tributary Conservation ICS Creation

operational viability for long-term use. In exchange for funding the pilot test, the states received System Efficiency ICS. The SNWA's share of 3,050 acre-feet is stored temporarily in Lake Mead as System Efficiency ICS.

**Extraordinary Conservation ICS.** With approval and implementation of the DCP in 2019, the SNWA can create up to 100,000 AFY of Extraordinary Conservation ICS under a newly authorized project.<sup>15</sup> Using an established methodology to determine water savings, the SNWA will accrue Extraordinary Conservation ICS credits through 2026 when it stores these water savings in Lake Mead as ICS. Water conservation initiatives have reduced Nevada's Colorado River water use below the state's apportionment and created the opportunity for the SNWA to store conserved water in one of its off-stream water banks. Tributary Conservation and Imported ICS credits are also converted to Extraordinary Conservation ICS credits if not used in the year they are created.

These ICS credits are banked in Lake Mead and are subject to a one-time deduction of 10 percent for system benefit and evaporative loss. As of 2022, the SNWA has stored approximately 556,000 acre-feet of Extraordinary Conservation ICS.

**DCP Contributions and ICS.** DCP contribution amounts vary by state and are based on Lake Mead water levels. Nevada's DCP contribution ranges from 8,000 to 10,000 AFY. This volume of water is in addition to any mandatory reductions associated with a federally declared shortage. Mandatory shortage reductions cannot be recovered.

Nevada has made DCP contributions since 2020 and will continue to do so through the term of the agreement when Lake Mead water levels are below elevation 1,090. Nevada's 2024 DCP contribution amount is 8,000 AFY (see Appendix 4). Subject to the DCP agreement and storage limitations, Nevada's DCP ICS account will be credited each time the state makes a DCP contribution. The SNWA can utilize its DCP ICS credits with no penalty or repayment obligations when Lake Mead is above 1,110 feet. Below this elevation, the SNWA can access or borrow credits, subject to repayment.

As shown in Figure 3.2, access to DCP ICS credits is not available in years when the elevation of Lake Mead is projected to be at or below 1,025 feet. Borrowed DCP ICS credits must be replenished within one to five years, depending on Lake Mead water levels. The plan assumes any unused DCP ICS credits will be reduced by 3 percent annually beginning in 2027 to benefit the Colorado River system. As of 2022, the SNWA has stored approximately 14,400 acre-feet of DCP ICS.

YEAR	ABOVE 1,110 FT.	1,110 TO ABOVE 1,075 FT.	1,075 TO ABOVE 1,025 FT.	1,025 FT. OR BELOW
2024 - 2026	AVAILABLE	REPAY IN 1 YEAR		NOT AVAILABLE
2027 - 2057 *	AVAILABLE	REPAY IN 5 YEARS	REPAY IN 1 YEAR	NOT AVAILABLE

\*2024 Water Resource Plan assumes availability through 2073.

FIGURE 3.2 Availability of DCP ICS Credits

**Bi-National ICS.** The United States and Mexico finalized Minute 323 to the 1944 U.S./Mexico water treaty in 2017. Minute 323 extends and modifies key provisions of historic Minute 319, which enhanced Colorado River system sustainability by quantifying water deliveries to Mexico under high- and low-reservoir conditions. In addition, Minute 323 contains Mexico’s commitment to a Water Scarcity Plan that requires Mexico to store additional water in the United States as Lake Mead elevations drop. With approval and implementation of the DCP, Mexico will join Arizona, California and Nevada in required storage contributions designed to mitigate the impacts of ongoing drought and slow the decline of Lake Mead water levels.

Effective through the year 2026, Minute 323 authorizes Mexico to defer its Colorado River water deliveries and store water in the United States for later delivery to Mexico. The agreement will help maintain Lake Mead water levels, delay deeper level shortages and create additional certainty for all water users.

Like Minute 319, Minute 323 allows the SNWA to invest in conservation and infrastructure projects in Mexico in exchange for Bi-National ICS credits. Through Minutes 319 and 323 and the accompanying domestic agreements, the SNWA has agreed to fund projects yielding a minimum of 51,025 and a maximum of 78,300 acre-feet of Bi-National ICS credits. As of 2022, the SNWA has accrued 32,842 acre-feet of Bi-National ICS credits.

The DCP and associated agreements limit the maximum amount of Extraordinary Conservation ICS, Binational ICS and DCP ICS each Lower Basin state can store. California is limited to 1.7 million acre-feet of storage, and Nevada and Arizona are each limited to 500,000 acre-feet of storage. As allowed by the DCP, Lower Basin stakeholders—including SNWA, Arizona Department of Water Resources, Colorado River Commission of Nevada and Metropolitan Water District of Southern California—entered into an Additional Sharing Agreement in 2021.<sup>17</sup> The agreement establishes a mechanism and framework that allows the parties to pool their ICS storage capacity for possible use among Lower Basin states, subject to storage availability

## Drought Contingency Plan

In addition to the mandatory shortage reductions defined by the Interim Guidelines, the SNWA and other Colorado River users approved the Lower Basin DCP for Colorado River operations in 2019.<sup>16</sup> Authorized by Congress for immediate implementation, the agreement requires the Lower Basin states to make additional contributions designed to reduce the magnitude and likelihood of continued Lake Mead water level declines, and reduce the risks of potential water supply interruptions for Lower Basin water users.

The DCP:

- Keeps more water in the river for the benefit of all water users and the environment.
- Helps slow Lake Mead water level declines to preserve critical reservoir elevations.
- Authorizes new ICS projects and supplies that contributing states can access during a federally declared shortage and when Lake Mead water levels recover.
- Draws participation from new stakeholders, including California, and promotes continued collaboration.

Federal, state and municipal partners have worked collaboratively for years to reduce the risk of a Lake Mead water level decline below 1,000 feet, a critical elevation for Hoover Dam operations and Lower Basin water deliveries.

The DCP was a significant collaboration milestone but additional actions are needed to offset the drastic water level declines associated with recent hydrology. In 2022, federal, state and municipal partners engaged in another round of difficult decision-making to identify next steps. Additional detail is provided in Chapter 2.



DCP Signing Ceremony at Hoover Dam, Lake Mead



Colorado River, Devil's Elbow, California

and ongoing coordination. The agreement provides enhanced flexibility for Lower Basin stakeholders, including Nevada.

## FUTURE RESOURCES

Future resources are resources expected to be available to the SNWA at some point during the planning horizon. In some instances, water resources are quantified subject to water right permitting, while the availability and development of others require further research, analysis and agreement.

The development of most future resource options described in this Plan will require additional environmental permitting, as well as construction of water delivery infrastructure. Likewise, implementing some Colorado River options may require changes to the Law of the River to provide increased flexibility.

### Colorado River Transfers/Exchanges

In concept, water transfers involve moving water resources from willing sellers to willing buyers.

There are a variety of ways in which this can occur: interbasin, intrastate and interstate transfers. Full-scale transfers and exchanges among Colorado River water users could involve transfers/exchanges associated with participation in desalination or agricultural fallowing projects or participation in other conservation and reuse initiatives. As part of Colorado River negotiations that began in 2021, the SNWA will work with other Colorado River Basin states to create a more concrete framework for these types of exchanges.

**Desalination.** The SNWA is engaged with other Colorado River Basin states and water users, the U.S. Bureau of Reclamation and Mexico to actively explore and investigate potential seawater and brackish water desalination projects in the state of California and the country of Mexico.

The Binational Projects Work Group is considering other projects such as opportunities for seawater desalination and wastewater reuse facilities in Mexico. The latter are noted as areas of interest under Minute 323. To support these efforts, the SNWA and Basin State partners funded a feasibility



study to examine desalination opportunities along the Sonoran coast of the Sea of Cortez. The study was completed in 2020 and is available online.<sup>18</sup>

**Colorado River Partnerships.** The SNWA and other Lower Basin stakeholders are actively exploring future resource options that may involve financial participation in major capital projects under development in other states. For example, the SNWA, Central Arizona Project and the Arizona Department of Water Resources are exploring participation in a major reuse project by the Metropolitan Water District of Southern California (MWD).

MWD is planning for a full-scale regional recycled water program, also known as Pure Water Southern California, that would produce up to 150 million gallons of water daily (or about 168,000 AFY). An initial pilot project is currently underway to support planning and research efforts. While the project is still in an early development phase, the SNWA and MWD are collaborating to identify a path for the SNWA's participation and determine what approvals might be needed to implement the partnership. The SNWA anticipates that 20,000 - 40,000 AFY will be available to the SNWA in exchange for funding participation.

The SNWA has contributed funding to support environmental planning for the project and will continue to collaborate with MWD and other Colorado River water users to evaluate the potential for participation in this and other collaborative Colorado River partnerships of mutual benefit.

### Colorado River Augmentation

The SNWA was permitted 113,000 AFY of Virgin River water rights in 1994. Under an agreement, the SNWA transferred 5,000 AFY to the Virgin Valley Water District. In accordance with the 2007 Seven States' Agreement, the SNWA has agreed to suspend development of these Virgin River surface water rights in exchange for agreement with the other Colorado River Basin States to cooperatively pursue the development of 75,000 AFY of permanent water supplies to augment the Colorado River for Nevada.<sup>19</sup>

### In State Groundwater

The SNWA has permits and applications in southern and eastern Nevada based on applications filed by the LVVWD in 1989. As further described below, some of these applications have been permitted by the Nevada State Engineer in accordance with Nevada Water Law, while others require further review and analysis.

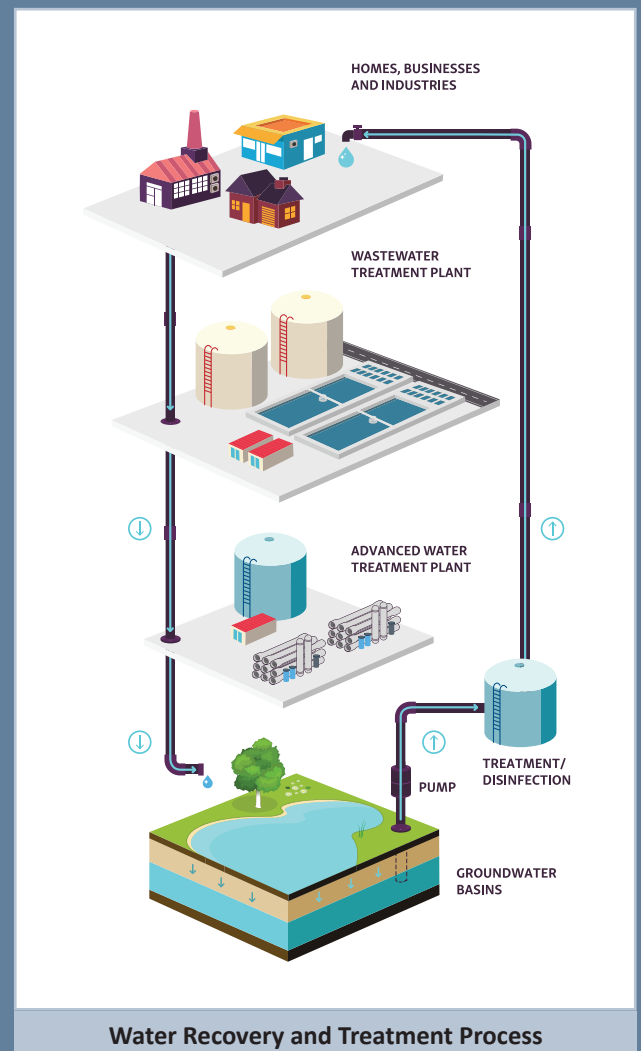
## MWD Pure Water Southern California

The Metropolitan Water District of Southern California is working with Sanitation Districts of Los Angeles County on the planned development of the Pure Water Southern California project. Planning efforts are currently underway, including the development and operation of a demonstration facility to inform project planning and test treatment processes.

As planned, the full-scale program will recover and treat up to 150 million gallons of water per day (or about 168,000 AFY) from homes, businesses and industries within MWD's service area. Water will be cleaned and treated as part of a three-step purification process involving membrane bioreactors, reverse osmosis and ultraviolet/advanced oxidation processes. Treated water will be stored in groundwater basins until it is needed to meet municipal demands.

The SNWA is pursuing opportunities with MWD for participation in this project. Any future agreement would likely involve a Colorado River water transfer/exchange in return for SNWA's financial involvement in the project.

The facility is expected to come online in 2032.



Water Recovery and Treatment Process

**Garnet and Hidden Valleys.** The SNWA has permitted rights to 2,200 AFY of groundwater in Garnet and Hidden valleys. The majority of these rights are leased to dry-cooled power plants located in Garnet Valley.<sup>20</sup> As noted earlier in this chapter, these and other groundwater rights within the Lower White River Flow System are subject to an ongoing process initiated by the State Engineer in 2018 to evaluate the amount of water that can be sustainably pumped from the system.

**Three Lakes Valley (North and South) and Tikaboo Valley (North and South).** Between 2003 and 2006, the Nevada State Engineer issued a series of rulings granting the SNWA rights to 10,605 AFY of groundwater in these basins. The SNWA is planning to develop options for delivery of 8,018 AFY of the groundwater rights from Three Lakes Valley North and South and Tikaboo Valley South into the northwest portion of the Las Vegas Valley. In 2020, the SNWA withdrew the remaining applications for groundwater not acted upon by the Nevada State Engineer.

## WATER CONSERVATION

Water conservation is a resource. However, unlike typical “wet” resources, which are acquired and conveyed to meet demands, conservation reduces current and future demands and extends available supplies.

Gallons Per Capita Per Day (GPCD) is a metric used by many communities to measure water use. It also is an effective tool to measure efficiency over time. GPCD varies across communities due to several factors, including differences in climate, demographics, water-use accounting practices and economic conditions.

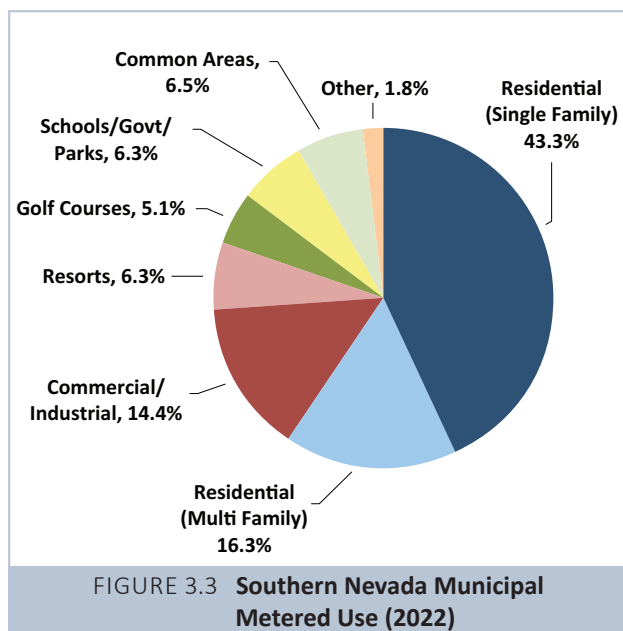


FIGURE 3.3 Southern Nevada Municipal Metered Use (2022)

The SNWA’s conservation progress and goal is stated in consumptive use terms. This approach reflects water resource implications associated with conservation progress. SNWA GPCD is calculated by dividing all SNWA water sources diverted (excluding off-stream storage less corresponding Colorado River return-flow credits by total SNWA resident population served per day (GPCD = water diverted - return- flow credits / resident population / 365 days). This approach recognizes that not all water that is delivered is consumed. This is because the SNWA recycles nearly all indoor water use, primarily through return-flow credits.

Approximately 60 percent of all water delivered by the SNWA is consumed, primarily for landscape irrigation and cooling. Unlike water used indoors, water used outdoors and for cooling is lost as it cannot be treated and reused. As a result, consumptive water uses continue to be a primary focus area for future conservation gains.

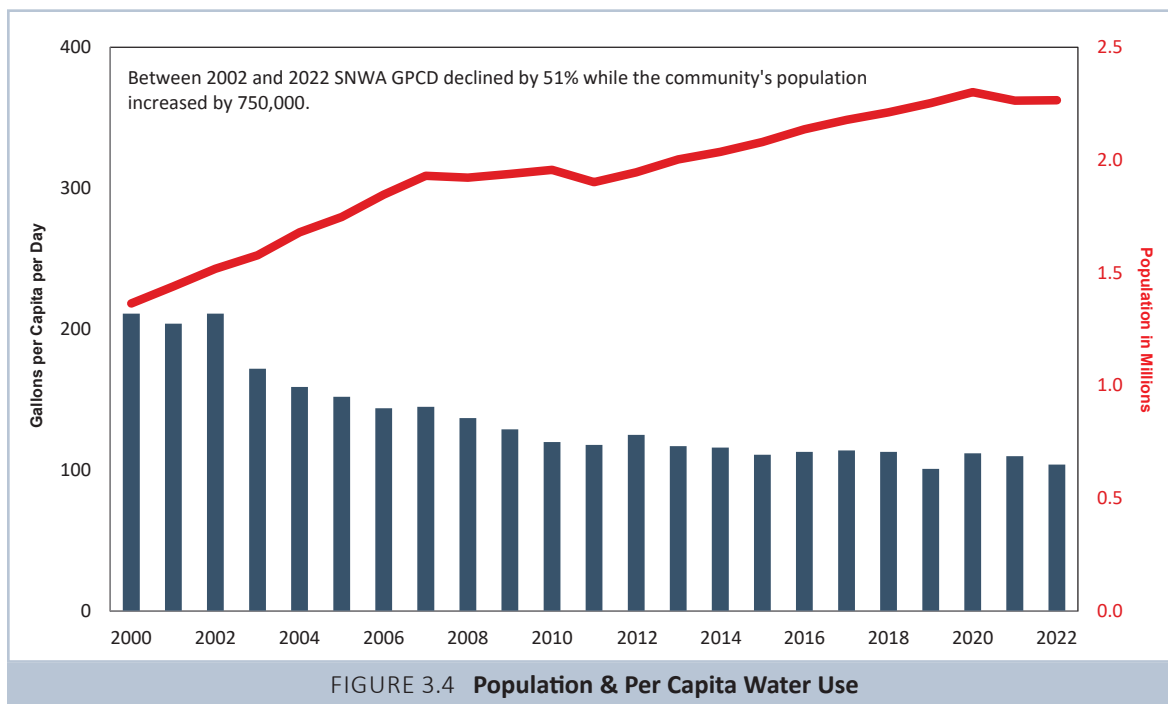
## Conservation Goals

As further described in Chapter 4, conservation progress underpins the community’s long-term water resource planning efforts. Ultimately, the community’s performance determines how much more or less water is needed and when.

Since its inception in 1991, the SNWA and its member agencies have worked collaboratively to set and achieve aggressive water conservation goals. Per capita water use in Southern Nevada decreased by 51 percent between 2002 and 2022, even as the population within the SNWA service area increased by approximately 49 percent during the same timeframe (Figure 3.4). However, the most significant conservation gains occurred between 2000 and 2010; until 2021, per capita water use was relatively flat. There are strong signs of renewed water conservation progress in Southern Nevada. Ongoing progress remains critical due to the potential for compounding influence due to upward pressure on water demands and water supply reductions.

Beyond projected population increases, which are expected to continue throughout the planning horizon, the SNWA anticipates that the upward pressures due to climate change and system age could increase demands by 10 GPCD or more by 2035.

Recognizing the paramount importance of the community’s water supply security, the SNWA Board of Directors in 2021 established a new conservation goal of 86 GPCD by 2035. The new goal addresses changing conditions and recognizes that additional progress is needed to maximize available supplies. Achieving the goal



will require significant and sustained conservation effort from all sectors of the community.

While the SNWA has expanded education, outreach and incentive programs to support water conservation and efficiency gains, meeting higher levels of efficiency will require the implementation of new strategies and tactics. The following sections detail conservation efforts currently underway and new initiatives that are now in planning to support continued water conservation and efficiency gains.

### Key Focus Areas

Above and beyond the continued implementation of existing measures (see sidebar on Page 38), the SNWA has identified additional actions that will support conservation goal achievement. Some actions are based on recommendations from IRPAC 2020 (see Appendix 3), while the SNWA identified others as part of ongoing strategic planning efforts. Together, these actions will help the SNWA achieve its current conservation goal while countering upward pressures associated with climate change and system age. Implementation requires continued support from SNWA’s member agencies.

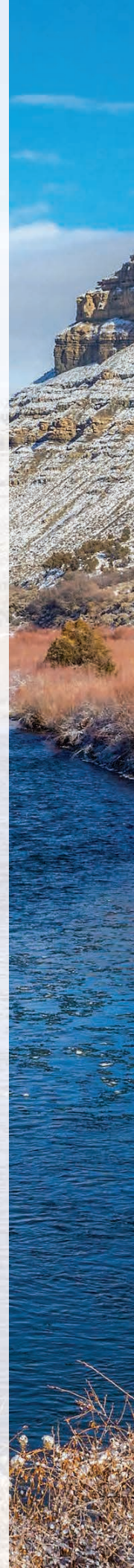
**Prohibit New Golf Course Development.** The LVVWD and the City of Henderson approved rule changes in 2021 that restrict the use of Colorado River water to irrigate new golf course developments. Other jurisdictions followed suit with rule and code changes in 2022, including Clark

County, City of Boulder City and the City of North Las Vegas. Restricting new course development will help to reduce per capita consumptive water use.

**Reduce Golf Course Water Budgets.** The SNWA approved a resolution in 2022 supporting the reduction of golf course water budgets from 6.3 to 4.0 acre-feet of water annually per irrigated acre. The LVVWD and other local jurisdictions adopted rule and code changes to implement water budget reductions that became effective in January 2024.

Not all golf courses will be affected. Many courses have participated in SNWA incentive programs to replace turf with water-efficient landscaping, and many are already using less water than allowed under the revised budget amount.

**Convert Cool Season Turf.** Limiting future installations of cool-season turf and expediting the conversions to warm-season turf at existing public facilities will help reduce consumptive use associated with turf irrigation while preserving functional turf in recreational spaces. The SNWA is working with its member agencies to identify conversion opportunities and provides support through its incentive programs. Future efforts to limit new cool-season turf installations may include changes to service rules, codes and ordinances. The estimated annual water savings is 21 gallons per square foot of turf converted.





## Conservation Tools

The SNWA uses several demand management tools to promote conservation and reduce overall water use, including water pricing, incentives, regulation and education. As described below, these measures are designed to work in conjunction with one another to promote efficient water use. Likewise, the SNWA has deployed new strategies to promote continued conservation and efficiency gains. These include increased water management measures, targeted education and outreach initiatives and increases to financial incentive programs. New incentives and offerings have also been introduced.

- **Education:** Education is an integral element of the SNWA's water conservation strategy. It includes both formal and informal education, from tips and tutorials to improve efficiency, to class offerings on water-smart landscaping practices for both residents and landscape professionals.
- **Incentives:** The SNWA operates one of the largest incentive programs in the nation. Since 2000, SNWA has invested more than \$327 million in incentive programs, reducing demand by about 15 billion gallons annually.
- **Regulation:** Through collaboration, SNWA member agencies and Clark County have adopted a suite of land use codes, ordinances and water use policies to ensure more efficient use of water in Southern Nevada. These include time-of-day and day-of-week watering restrictions, water waste restrictions and limitations on the use of turf in residential and commercial development.
- **Water Pricing:** SNWA member agencies implement conservation rate structures that charge higher rates for water as use increases. These rate structures encourage efficiency, without jeopardizing water affordability for essential uses.

**Implement Large Water User Policy.** While Southern Nevada has some of the nation's most progressive water efficiency standards, the implementation of additional policies, products and practices can significantly reduce consumptive water use in new development. Meaningful opportunities for efficiency gains exist within the commercial and industrial sectors, particularly for new development.

As recommended by IRPAC 2020, the SNWA has worked with its member agencies to embed the principles of the SNWA's Non-Functional Turf Resolution in municipal codes and service rules. Efforts include requiring out-of-valley development to return wastewater to Lake Mead for return-flow credits, and further limiting consumptive uses of water in out-of-valley areas.

Meanwhile, the SNWA continues to work with its member agencies to establish a water efficiency rating tool, including policies and processes to evaluate and incentivize water efficiency in new development. In concept, these efforts evaluate the economic benefits of new large water users and encourages them to take actions that will reduce consumptive water uses over initial planned usage.

**Implement AB356 (Non-Functional Turf Removal).** The Nevada Legislature passed AB356 in 2021, restricting the use of Colorado River water to irrigate non-functional turf in non-single family residential applications by the end of 2026. The new law targets turf found in streetscapes, medians, parking lots, traffic circles and other areas not used for recreation and play.

The SNWA convened an advisory committee as required to define functional and non-functional turf. The committee advanced its recommendations to the SNWA Board of Directors in early 2022. The Board adopted definitions for functional and non-functional turf (see Appendix 5) and the SNWA Nonfunctional Turf Removal Plan. The SNWA has also positioned itself to accommodate increased demand under its Water Smart Landscapes program, which provides incentives for commercial and residential turf conversions.

Water smart landscaping uses about 55.8 gallons less water per square foot annually than turf grass.

**Implement Pool Development Standards.** Some private pools exceed 3,000 square feet and evaporate more than 145,000 gallons of water annually. The SNWA approved a resolution in July 2022 that supports a 600 square foot surface area limit on new residential pools. Each square foot of pool surface area avoided yields an estimated



**Non single-family residential turf conversion**

48.6 gallons of water annually. The LVVWD and other local jurisdictions approved this change shortly thereafter with rule and code changes. This measure will help reduce consumptive water use associated with evaporative water loss, targeting savings from the largest 25 percent of new pools constructed.

**Enhance Leak Resolution.** Customers are responsible for repairing leaks occurring on their property and the customer side of the utility's water meter. Residential leaks are typically due to damaged irrigation systems, cracked supply lines or faulty fixtures (such as faucets, toilets, appliances and water heaters). Slow leaks are not always visible and can generate significant water loss.

As recommended by IRPAC 2020, several SNWA member agencies are working to deploy advanced metering infrastructure (AMI). Other water purveyors, including LVVWD and Big Bend Water District, have already completed installations. AMI provides high-resolution data in near real time, significantly enhancing the ability of local water providers to notify their customers of suspected leaks for faster resolution. Other efforts include incentives for leak detection devices. The SNWA also developed and implemented a Water Smart Plumber program in 2023 to help customers find and fix leaks faster.

**Implement Park Efficiency Improvements.** Parks provide significant recreational value for our community's residents, offering active and programmed turf areas for a wide variety of uses. While turf is the predominant feature in most

parks, other amenities may include playgrounds, sewer-connected splash pads, sports courts and group use facilities. Water use per irrigated acre varies markedly within this sector, and many parks appear to be using significantly more water than needed. High water use could be the result of unaddressed leaks, inefficient irrigation practices or other factors.

The SNWA offers incentives to public parks to convert cool-season turf, install sewer-connected splash pads and develop alternate amenities (such as basketball courts, tennis courts and other turfless play areas). Future efforts may include creating awareness and tools for parks to manage water use consistent with their property features.

**Implement Cooling Efficiency Standards.** Evaporative cooling is the second-largest consumptive water use in Southern Nevada, predominantly used to cool commercial and industrial buildings. Deployment of alternative cooling technology represents a significant opportunity for water savings. Water consumption primarily occurs through evaporation and drift loss, which comprise about 70 percent of total cooling water demand.

In December 2021, the SNWA approved a resolution for a moratorium on cooling and heating mechanisms that consumptively use water. This action is supported by the 2020 IRPAC, which recommended the SNWA evaluate changes necessary to reduce current and future consumptive water losses associated with evaporative cooling technology.





**Cooling Tower**

The SNWA met with industry leaders to discuss implementation challenges and develop recommendations to advance this effort. Today, new developments seeking a building permit are prohibited from using evaporative cooling systems, and instead must rely on dry cooling technologies.

The SNWA continues to conduct research and pilot projects to inform best management practices, incentive programs and other policy changes. The SNWA also offers incentives to commercial and multifamily property owners who install water-efficient devices and technologies, including cooling system upgrades.

**Enhance Landscape Watering Compliance.** Improving compliance with landscape watering restrictions and preventing water waste is a high priority for reducing consumptive water use in Southern Nevada. Current rules allow customers to water on three assigned days per week in spring and fall, one assigned day per week in winter and six assigned days per week in summer. Sunday watering is prohibited year-round.

The SNWA maintains an active information and outreach campaign to promote landscape watering compliance. Likewise, the SNWA worked with some member agencies in 2023 to enhance water waste enforcement. The LVVWD, City of Henderson and City of North Las Vegas have expanded enforcement staffing. They also continue to conduct joint enforcement efforts that include pooling and concentrating staff within specific geographic areas for high visibility and results.

The SNWA also offers residential and non-residential customer incentives for smart irrigation controllers. A 2023 research study indicates that smart controllers reduce non-single family residential water use by 7,800 gallons per irrigation valve annually.

**Make Asset Management Investments.** IRPAC 2020 recommended that water agencies continue making investments to maintain and improve the current water loss rate among wholesale and retail water purveyors. Non-revenue water losses are typically associated with leaks in transmission or distribution pipelines, variations in meter accuracy and water theft. The SNWA and its member agencies implement several strategies to minimize water loss within their water distribution systems, but ongoing investment will be required as systems age. Other related efforts include deploying and testing innovative technologies that can improve leak detection and speed leak repairs, prioritizing system optimization and making proactive retrofits and repairs to system facilities.

The SNWA continues to work with its member agencies to establish water loss reduction goals and identify strategies to support goal achievement. These goals and strategies will be included in the 2024 update to the SNWA's Joint Conservation Plan.

**Limit New Turf Installations.** Southern Nevada has some of the most progressive development standards for new turf installation. In December 2021, the SNWA adopted a resolution supporting a prohibition on installing new irrigated turfgrass and installing and using spray irrigation systems in new development, excluding parks, schools and cemeteries. This measure includes prohibitions on turf in

new single-family and multi-family development. The LVVWD and local jurisdictions, including Clark County and the cities of Henderson, North Las Vegas, Boulder City and Las Vegas, considered and adopted rule and code changes to implement new turf restrictions in 2022 and 2023.

**Implement Pricing Changes.** While the SNWA's member agencies set water rates independently, they use similar conservation rate principles to manage water demand. Over the years, SNWA water purveyors have compressed tier thresholds and significantly increased upper-tier water rates. To maintain a strong pricing signal, the SNWA adopted the recommendation of a citizens committee in 2015 to promote water rates that sustain and advance conservation achievements by ensuring rates keep pace with inflation. Future efforts may include changes that further incentivize conservation among top water users. Actions under consideration by some agencies include implementation of seasonal rates, excessive use surcharges, new tiers and tier compression.

The LVVWD approved rate changes in 2022 that went into effect on January 1, 2023. These changes include implementation of seasonal excessive use surcharges and tier compression. The City of Henderson also approved conservation-based rate changes.

**Optimize Return-Flow Credit.** There are approximately 14,500 commercial and residential septic systems in the greater Las Vegas Valley.

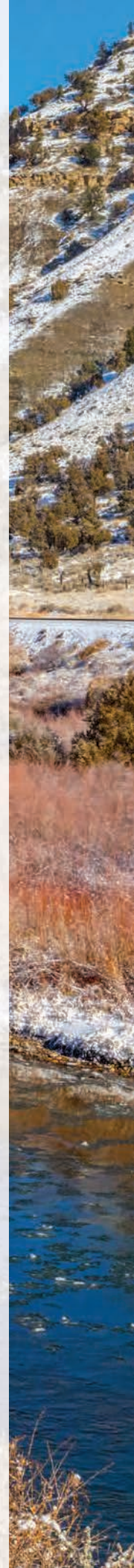
Many of the associated properties rely on Colorado River water that is delivered by municipal water providers. Water discharged to septic systems is lost as it cannot be recovered. The SNWA launched a Septic Conversion Pilot Program in 2023 that offers grant funding for septic users to abandon their septic systems and connect to the municipal wastewater system. Water discharged to the municipal wastewater system is collected, treated and released to the Las Vegas Wash for return-flow credit.

**2023 Legislative Changes.** In June 2023, Nevada's Governor signed Assembly Bill 220 into law, granting SNWA the ability to limit water use at single-family homes to about 163,000 gallons a year if conditions on the Colorado River worsen.<sup>21</sup> The restrictions would go into effect only if Nevada's Colorado River allocation is reduced to 270,000 acre-feet or less and the SNWA Board of Directors votes to implement the water use limit.

The legislation also requires water agencies to determine whether there is an adequate water supply for new development, prohibits new septic tanks for those connected to municipal water in the Las Vegas Valley and creates a financial assistance program to help existing septic users who want to convert to the sewer system. It requires new development to install water-efficient irrigation fixtures, prohibits grass in new development and requires large areas of functional grass to be watered efficiently.



**Residential front yard with water-smart landscaping.**



## CHAPTER SUMMARY

Several factors can influence the timing, use and availability of water resources. Having a diverse portfolio of resources allows the SNWA to assess its overall water resource options and make appropriate decisions regarding which resources to bring online when needed. This approach provides flexibility in adapting to changing supply and demand conditions and helps ensure that the SNWA can reliably meet community water demands.

The SNWA Water Resource Portfolio includes a mix of resources that will be used in tandem with continued conservation efforts to meet demands over the 50-year planning horizon. Some of these resources can be used under any Colorado River operating condition, while others are subject to limitations.

The SNWA continues to make water conservation a priority, and the community is currently working to achieve its 86 GPCD conservation goal by 2035. The SNWA has taken several steps to increase conservation gains and is aggressively pursuing implementation of recommendations identified by the SNWA's 2020 Integrated Resource Planning Advisory Committee. The SNWA has identified additional actions that complement these efforts.

Moving from a higher projected GPCD that accounts for upward pressure due to climate change and system age to 86 GPCD by 2035 will require significant and sustained investments from all community sectors. Implementation

of the described measures will put the community on a path to achieving its conservation goal.

From a supply perspective, the SNWA continues to work with other Colorado River water users to pursue flexible use of Colorado River supplies. Efforts include augmentation and storage projects designed to bolster supplies and bolster Lake Mead water levels. The SNWA also continues to pursue other water resource initiatives that could provide permanent supply benefits to Southern Nevada.

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## ENDNOTES

- 1 "Contract with the Southern Nevada Water Authority, Nevada for the Delivery of Colorado River Water," effective March 2, 1992; between Secretary of Interior, Colorado River Commission and Southern Nevada Water Authority." The contract was amended in 1994: "Amended and Restated Contract with the Southern Nevada Water Authority, Nevada for the Delivery of Colorado River Water," effective November 17, 1994.
- 2 Nevada Colorado River consumptive use entitlement available for SNWA and the SNWA purveyor members is estimated to be 272,205 AFY plus 4,000 AFY for Nellis Air Force Base with 23,795 AFY allocated for use by Nevada non-SNWA contractors. "Listing of Individual Water Entitlements in the State of Nevada," listing as of September 2022, U.S. Bureau of Reclamation, <https://www.usbr.gov/lc/region/g4000/contracts/entitlements/NVentitlements.pdf>
- 3 The 1944 United States-Mexico Treaty for Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande. The treaty guarantees Mexico the delivery of 1.5 million AFY of Colorado River water plus 200,000 AFY of any surplus Colorado River water. In 1974, an international agreement interpreting the 1944 Treaty guaranteed Mexico water of the same quality as that being used in the United States.
- 4 Nevada receives credits for Colorado River return flows from the Las Vegas Wash based upon a procedure originally agreed to by the U.S. Bureau of Reclamation (BOR) and the Colorado River Commission of Nevada in 1984. This procedure has been updated periodically through consultation with the BOR, SNWA and Colorado River Commission of Nevada; the most recent update in 2007 allows full consumptive use of water imported to the Las Vegas Valley.
- 5 The 1964 Supreme Court Decree in *Arizona v. California* defines "surplus" as follows: "If sufficient mainstream water is available for release as determined by the Secretary, to satisfy annual consumptive use [in the Lower Division states of Arizona, California and Nevada] in excess of 7,500,000 acre-feet, such excess consumptive use is surplus."
- 6 Under the Interim Guidelines, Extraordinary Conservation ICS credits accumulated in ICS accounts will be reduced by the amount of the Flood Control Surplus on an acre-foot for acre-foot basis until no Extraordinary Conservation ICS remains. The reductions to the ICS accounts will be shared on a pro-rata basis among all contractors that have accumulated Extraordinary Conservation ICS credits.
- 7 According to the Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations of Lake Powell and Lake



- Mead (Interim Guidelines), Lower Basin States of Arizona, California and Nevada can create credits for Colorado River or non-Colorado River water that has been conserved by users in the Lower Basin (known as intentionally created surplus or ICS). ICS credits can be used in the year they are created or be stored in Lake Mead and made available for release from Lake Mead at a later time, subject to Operating (Shortage) conditions at the time of release.
- 8 “Developed Shortage Supply (“DSS”)” shall mean water available for use by a contractor under the terms and conditions of a Delivery Agreement and Section 4 of Interim Guidelines in a Shortage Condition, under Article III(B)(3) of the Consolidated Decree. During a year when the Secretary has determined a shortage condition, the Secretary shall deliver DSS available in a contractor’s DSS Account at the request of the contractor, subject to the provisions of Interim Guidelines’ Section 4.C.
  - 9 Nevada Revised Statutes, Chapters 532, 533, and 534.
  - 10 “Policy Regarding Out-of-Valley Water Reuse,” 2017, SNWA.
  - 11 “Cooperative Agreement for the Banking of Water in the Las Vegas Valley Groundwater Basin between the Southern Nevada Water Authority and the Las Vegas Valley Water District,” effective February 21, 2006. The artificial recharge program in the Las Vegas Valley was initiated in 1987 by the Las Vegas Valley Water District.
  - 12 “Third Amended Operational Agreement among the Metropolitan Water District of Southern California (Metropolitan), Colorado River Commission of Nevada and the Southern Nevada Water Authority (SNWA),” effective October 19, 2015 and “Storage and Interstate Release Agreement among the United States of America, the Metropolitan Water District of Southern California, the Southern Nevada Water Authority, and the Colorado River Commission of Nevada,” effective October 27, 2004. The amount of developed and released water stored in Metropolitan’s SNWA Interstate Account to SNWA depends on timing of SNWA’s request and Colorado River operating conditions at the time of such request.
  - 13 “Third Amended and Restated Agreement for Interstate Water Banking among the Arizona Water Banking Authority and the Southern Nevada Water Authority and the Colorado River Commission of Nevada,” effective May 20, 2013 and “Storage and Interstate Release Agreement among the United States of America, the Arizona Water Banking Authority, the Southern Nevada Water Authority, and the Colorado River Commission of Nevada,” effective December 18, 2002.
  - 14 “In-Lieu Recharge Order,” Order No. 1176, December 10, 2004, State of Nevada, Office of the Nevada State Engineer.
  - 15 “Lower Basin Drought Contingency Operations, ICS Exhibit W - Southern Nevada Water Authority – Extraordinary Conservation Intentionally Created Surplus using Municipal Conservation and Offstream Storage for implementation under the Lower Basin Drought Contingency Plan,” May 20, 2019.
  - 16 “Lower Colorado River Basin Drought Contingency Plan Agreement” among the U.S., State of Arizona, Metropolitan Water District of Southern California, Coachella Valley Water District, Palo Verde Irrigation District, City of Needles, Colorado River Commission of Nevada and SNWA. May 20, 2019.
  - 17 “Agreement for Additional Interim Sharing of Intentionally Created Surplus Accumulation Limits,” among Arizona Department of Water Resources, Metropolitan Water District of Southern California, U.S. Bureau of Reclamation, SNWA, and Colorado River Commission of Nevada, 2021. This agreement governs joint sharing of Lake Mead ICS storage of up to 2.7 million acre-feet and provides SNWA greater flexibility to store additional water in Lake Mead.
  - 18 Black & Veatch, “Binational Study of Water Desalination Opportunities in the Sea of Cortez,” 2000, prepared for Minute 323 Desalination Work Group, [https://www.ibwc.gov/Files/TMs\\_All\\_Portfolio.pdf](https://www.ibwc.gov/Files/TMs_All_Portfolio.pdf).
  - 19 “Agreement Concerning Colorado River Management and Operations,” effective April 23, 2007; between Arizona Department of Water Resources, Colorado River Board of California, Colorado Water Conservation Board, Governor’s Representative for the State of Colorado, Colorado River Commission of Nevada, Southern Nevada Water Authority, New Mexico Interstate Stream Commission, Utah Division of Water Resources, Utah Interstate Streams Commissioner, and Wyoming State Engineer.
  - 20 SNWA has 2,200 AFY of groundwater permits in Garnet and Hidden valleys as a combined duty. SNWA is currently leasing a maximum of 1,450 AFY, not to exceed 13,000 acre-feet over any ten year rolling period, for power generation in Garnet Valley. The leases therefore commit 1,300 AFY over a ten year rolling period. In addition, the City of North Las Vegas is permitted to divert 300 AFY from their wells in Garnet Valley, and the remaining 600 AFY is available for future uses.
  - 21 Nevada Revised Statutes, Chapter 220.



*Colorado River, Arizona*