



SUPPLY & DEMAND

2025

SACRAMENTO VALLEY

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2025 SUPPLY AND DEMAND ASSESSMENT SACRAMENTO VALLEY BASIN

ACKNOWLEDGMENTS	i
1 INTRODUCTION	1
1.1 REPORT BACKGROUND AND PURPOSE	2
1.2 PROCEDURE AND SCOPE	3
1.3 METHODOLOGY AND LIMITATIONS	4
2 RESULTS	4
2.1 BASIN SUMMARY	4
2.2 SUPPLIES	5
2.2.1 Surface Water	5
2.2.2 Groundwater	5
2.2.3 Effluent	6
2.2.4 Incidental Recharge	6
2.2.5 Transportation Water	6
2.2.6 Moved Water	6
2.3 SUPPLY RESULTS	7
2.3.1 Surface Water	7
2.3.2 Groundwater	8
2.3.3 Effluent	10
2.3.4 Incidental Recharge	11
2.3.5 Transportation Water	11
2.3.6 Moved Water	11
2.4 DEMAND RESULTS	12
2.4.1 Agricultural	12
2.4.2 Municipal	12
2.4.3 Industrial	13
2.4.4 Environmental	14

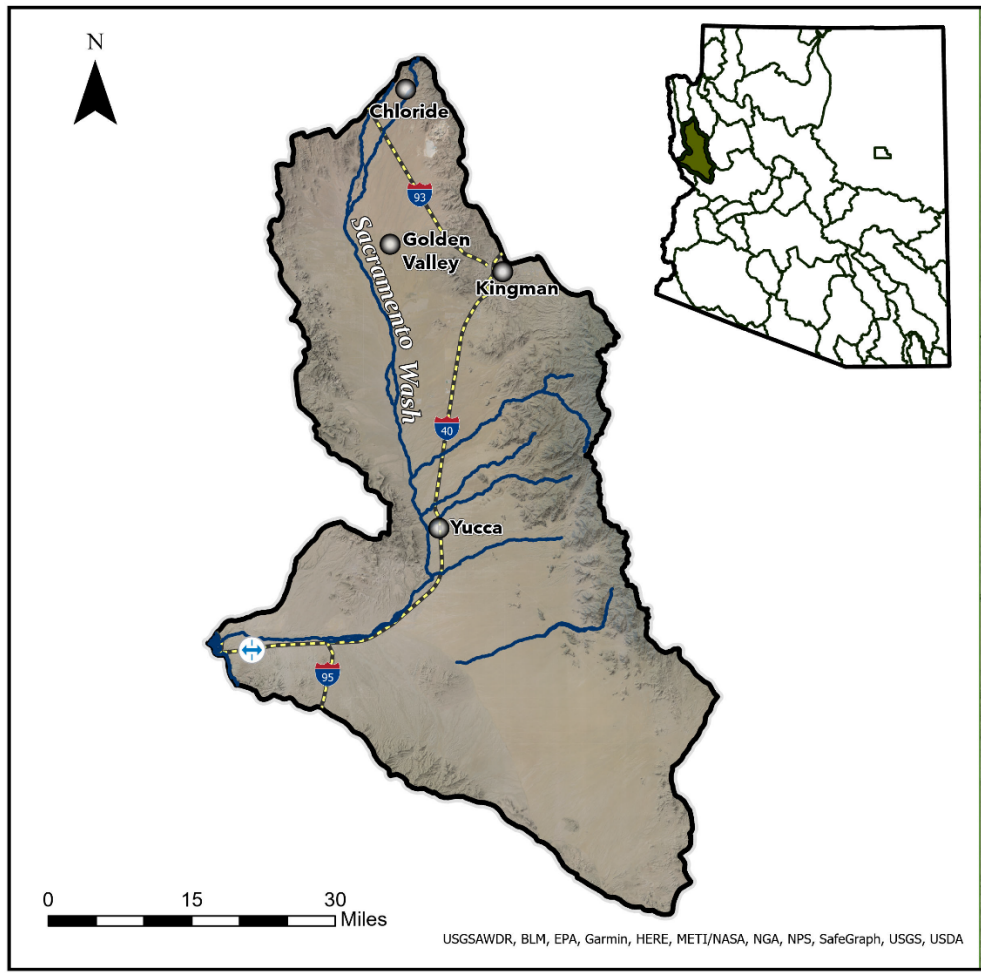


3 COMBINING SUPPLY AND DEMAND	15
4 RESULTS OF PROJECTION SCENARIOS	15
4.1 SUPPLY PROJECTION RESULTS	16
4.1.1 Surface Water	16
4.1.2 Groundwater Storage	16
4.1.3 Effluent	16
4.1.4 Incidental Recharge	17
4.2 DEMAND PROJECTION RESULTS	20
4.2.1 Agricultural	20
4.2.2 Municipal	21
4.2.3 Industrial	22
4.2.4 Environmental	24
5 CONCLUSION	24
5.1 ATTACHMENTS	25



1 INTRODUCTION

SACRAMENTO VALLEY BASIN



- Population Center
- ⊕ Port of Entry
- Highway
- River
- ▬ Groundwater Basin

Figure 1. Map of the Sacramento Valley Basin.



1.1 REPORT BACKGROUND AND PURPOSE

Preparing the Supply and Demand Reports (SDRs) is a duty of the Director of the Arizona Department of Water Resources (ADWR) required by statute, as stated in Arizona Revised Statutes (A.R.S.) § 45-105(B)(14).¹ Beginning in 2023, the Director must ensure that a water supply and demand assessment for at least six of Arizona's fifty-one groundwater basins are prepared and issued by December 1st of each year.

Although similar assessments have been completed periodically, 2023 was the first time ADWR was allocated dedicated funding and staff to conduct assessments of all of Arizona's groundwater basins on a recurring cycle. By the end of 2027, ADWR will complete assessments for all 51 groundwater basins throughout the state, and each basin will be reassessed at least every five years. The SDRs may be used to inform the Water Infrastructure Finance Authority on funding decisions in the future (see A.R.S. § 49-1304(A)(14)²). The SDRs may also be used as a planning tool for water resource management by ADWR, policymakers, community members, and other interested stakeholders.

The basins and subbasins assessed in 2025 include Aravaipa Canyon, Bill Williams (Alamo Reservoir, Burro Creek, Clara Peak, Santa Maria, and Skull Valley Subbasins), Bonita Creek, Coconino Plateau, Dripping Springs Wash, Duncan Valley, Hualapai Valley, Little Colorado River Plateau, Morenci, Sacramento Valley, Safford (San Carlos Valley, Gila Valley, and San Simon Valley Subbasins), Salt River (Black River, White River, Salt River Canyon, and Salt River Lakes Subbasins), and San Simon Wash.

¹ Arizona Revised Statutes § 45-105(B)(14). <https://www.azleg.gov/ars/45/00105.htm>

² Arizona Revised Statutes § 49-1304(A)(14). <https://www.azleg.gov/ars/49/01304.htm>



1.2 PROCEDURE AND SCOPE

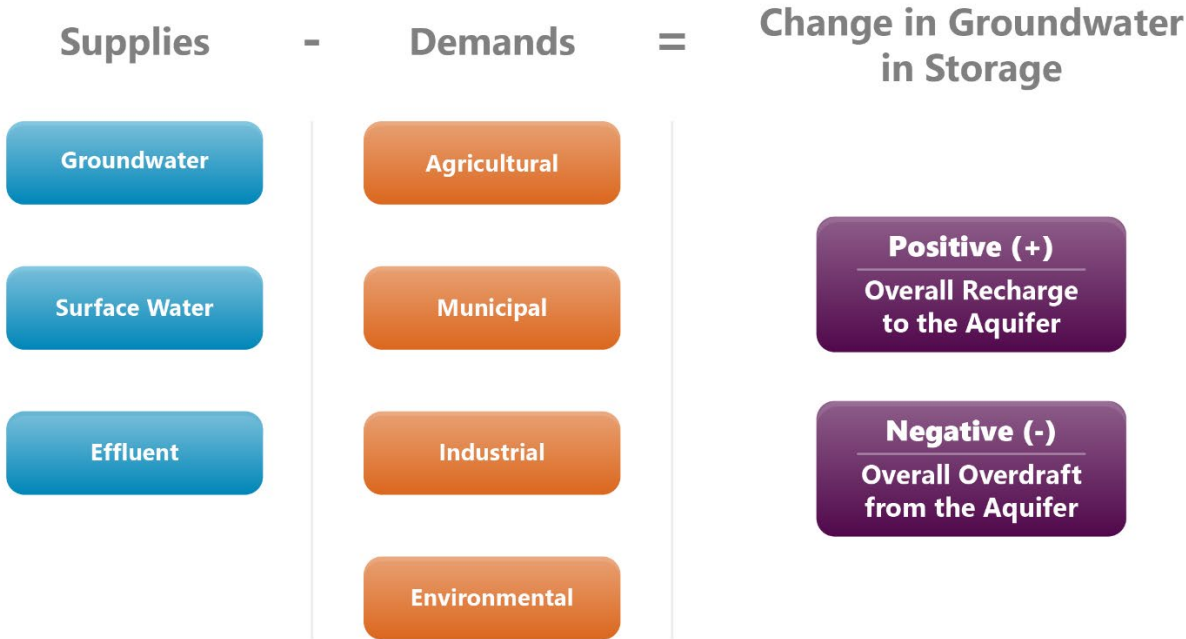


Figure 2. Depiction of the Sacramento Valley basin water budget, including all available supplies and demands and how they contribute to changes in groundwater in storage.

The SDRs are structured as water budgets, focusing on total inflows and outflows at the basin scale. The SDRs estimate the volumes of water demands from all uses (categorized into sectors of Agricultural, Industrial, Municipal, and Other) and the volumes of water supplies (Surface Water, Groundwater, Effluent, Incidental Recharge, Transportation Water, and Moved Water) available to meet those demands. The reports also include projected demands and supplies under various influences of future scenarios.

The SDRs are not groundwater flow models with finer geographic results. The development of regional groundwater flow models for each basin is an extensive technical process and is not feasible within the time constraints of this project. Outside of Arizona’s regulated Active Management Areas (AMAs) and Irrigation Non-Expansion Areas (INAs), data is much more limited. In instances where data does exist, the data may be outdated or lack reliability. ADWR has endeavored to acquire local and specific data to generate the SDRs. However, when such information was not obtainable, staff utilized scientific literature estimates, averages, or assumptions to formulate water usage estimates.

The SDRs attempt to answer the following questions:

1. What is the estimated annual volume of water demand?
2. What is the estimated annual volume of available water supply?
3. Is there sufficient available water supply to balance water demand annually?



The water budget was calculated by subtracting the estimated annual demand from the estimated annual available supply. If demand exceeds supply in a year, the difference is subtracted from the estimated aquifer storage. If supply exceeds demand, the difference is added to estimated aquifer storage. In this manner, the process is like balancing a checkbook, totaling the credits and debits made to the account through the year to understand how much estimated groundwater is available in storage.

The SDRs are designed to be understandable to the general public. The Methods Appendix includes specific technical information and additional details regarding data and methods: [[Methods Appendix](#)]. Additional SDRs and an interactive dashboard are available for further information: [[Dashboards](#)].

1.3 METHODOLOGY AND LIMITATIONS

This study reviewed and compiled data for two primary purposes:

1. Estimate supply and demand volumes in the basin.
2. Project changes in supply and demand from possible future scenarios.

ADWR developed and compiled baseline data for the period from 1990 to 2024. Staff then developed scenarios based on the most likely impacts on water demands and supplies over 51 years (from 2025 to 2075), and then projections were generated from the baseline data. The results from these scenarios and the combined baseline data were used to estimate whether supply could meet demand each year from 1990 to 2075. ADWR independently developed both the supply and demand estimates.

Due to the limited reported water data available outside Arizona's AMAs and INAs, the supplies and demands outlined in the SDRs are estimates only. When available, ADWR used high-quality data from credible sources. Due to the need to focus staff bandwidth on developing initial methods for analysis of all 51 groundwater basins by the December 1, 2027, statutory deadline, outreach was limited to major water users in the basin. When data could not be obtained, research into existing literature and the use of representative data were necessary to develop estimates.

Please see the Methods Appendix for an in-depth discussion of the methodologies and assumptions ADWR applied to create each estimate: [[Methods Appendix](#)].

2 RESULTS

2.1 BASIN SUMMARY

The Sacramento Valley Basin encompasses 1,587 square miles in the northwestern portion of the state and is characterized by broad valleys and mountains, such as the Cerbat Mountains on the northern basin boundary, the Black Mountains on the western basin boundary, and the Hualapai Mountains on the east central basin boundary. The basin is comprised of U.S. Bureau of Land Management (BLM) land (58.2%), and State Trust land (2.8%). The basin has an estimated population of 28,130, and (38.0%) of the basin is privately owned. The major aquifers in the



Sacramento Valley basin consist of basin fill and volcanic rock. Previous storage estimates have been from 3,600,000 to 14,000,000 acre-feet (AF) to a depth of 1,200 feet.³ The basin consists of the Sacramento Wash running north to south and then east to west near the unincorporated community of Yucca, Arizona. A small portion of the Colorado River also runs through the basin.

2.2 SUPPLIES

2.2.1 Surface Water

ADWR examined all water sources defined as surface water in each basin. Surface water includes all water flowing in streams, canyons, ravines, or other natural channels, or in definite underground channels, whether perennial or intermittent, floodwater, wastewater, or surplus water, and of lakes, ponds, and springs discharging to the surface (A.R.S. § 45-141).⁴ After examining these sources and deducting any existing surface water diversions (stockponds, reservoirs, and agricultural diversions) from the resulting volumes, ADWR generated a final estimate of the remaining water available for diversion or use. When possible, streamgage data were used to estimate surface water volumes. Where active streamgages were absent, which often applies to areas with intermittent and ephemeral streamflow, the Drainage-Area Ratio (DAR) method (see the Methods Appendix) was used to estimate surface water volume.

While Colorado River water is subject to a different legal framework, the term “surface water” necessarily encompasses Colorado River water, including Central Arizona Project (“CAP”) water. Therefore, Colorado River water, including CAP water, is incorporated in the estimates of available surface water supplies. The availability of Colorado River water in Arizona will be subject to operations to be determined by the Secretary of the Interior in an ongoing federal process. While significant uncertainty surrounds the reliability of Colorado River water supplies, particularly on the mainstem of the Colorado River in the Lower Basin, this report assumes that Non-Indian Agricultural (NIA) Priority CAP water will generally not be available during the projection period, but that all other Colorado River water and CAP water will be available.

2.2.2 Groundwater

This report refers to the “inflow to” and “outflow from” the aquifer each year as groundwater. This volume is distinct from the volume of groundwater considered to be available in storage. “Inflow to” represents the annual recharge or replenishment of groundwater through processes such as the percolation of precipitation or surface water into the subsurface, which is observed through processes such as streamflow infiltration, groundwater inflow, and mountain-front recharge. “Outflow from,” the movement of water leaving the system, is represented by such processes as baseflow and groundwater outflow. See the Methods Appendix for more information on how

³ ADWR (2009). Arizona Water Atlas, Volume 4, Section 4.9, pg. 373, Table 4.9-6.

https://infoshare.azwater.gov/docushare/dsweb/Get/Document-10429/Volume_4_final_web.pdf

⁴ Arizona Revised Statutes § 45-141. <https://www.azleg.gov/ars/45/00141.htm>



streamflow, baseflow, groundwater inflow/outflow, and mountain-front recharge estimates were obtained.

The total groundwater storage volume provided in this report reflects the volume of groundwater reasonably accessible at the average depth of the wells in the basin, rather than at the 1,200 feet groundwater storage depth used in previous ADWR reports. The water level falling below the basin's average well depth suggests that wells will have begun to go dry. Using this approach to estimate groundwater storage effectively illustrates the impact of declining water levels on the current existing infrastructure of property owners, residents, and other water users in each basin. Please note that this report does not address potential subsidence or permanent loss of aquifer storage that could occur if the estimated water volume in storage were to be removed from the basin. See the Methods Appendix for more information on how groundwater storage was estimated.

2.2.3 Effluent

Effluent is defined as "water that has been collected in a sanitary sewer for subsequent treatment in a facility that is regulated pursuant to Title 49, Chapter 2."⁵ ADWR used effluent data provided by the Arizona Department of Environmental Quality (ADEQ) to estimate the amounts of effluent available for reuse. These effluent estimates are based on effluent volumes produced from wastewater treatment plants designated for reuse. These volumes do not include wastewater discharged from the treatment plants. Effluent volumes also do not include septic tanks or other wastewater collection systems. Recharge from septic tanks is included in the Incidental Recharge estimation.

2.2.4 Incidental Recharge

Incidental recharge is defined as water from human use that replenishes groundwater supplies. Incidental recharge is associated with agricultural, industrial, and municipal water demands. ADWR used data derived from demand analyses to estimate incidental recharge volumes.

2.2.5 Transportation Water

Certain basins have been identified in A.R.S. Title 45, Chapter 2, Article 8.1⁶ as basins from which groundwater may be withdrawn for transportation to an AMA. Where such transportation has been authorized, that groundwater is referred to as "Transportation Water" in this report.

2.2.6 Moved Water

Any water that crosses basin boundaries through artificial means and that does not fall under the Transportation Water definition is referred to as "Moved Water" in this report. Moved Water

⁵ Arizona Revised Statutes § 45-101(4). <https://www.azleg.gov/ars/45/00101.htm>

⁶ Arizona Revised Statutes Title 45, Chapter 2, Article 8.1.
<https://www.azleg.gov/arsDetail/?title=45>



includes groundwater that is transported between basins that are not AMAs, pursuant to A.R.S. Title 45, Chapter 2, Article 8.⁷

2.3 SUPPLY RESULTS

This subsection contains ADWR’s estimates of annual supplies available to the Sacramento Valley Basin.

2.3.1 Surface Water

In the Sacramento Valley Basin, ADWR identified the following surface water conveyances (USGS streamgages in parentheses):

- Colorado River
- Cow Creek
- Happy Jack Wash
- Rock Creek
- Sacramento Wash
- Tennessee Wash
- Topock Marsh
- Walnut Creek
- Willow Creek

ADWR did not identify any surface water conveyances with active streamgages in the Sacramento Valley Basin. Perennial flow was measured using the Big Sandy River streamgage (09424450). For streams without streamgage data, the DAR method was applied to estimate streamflow volumes. The streamflow volume estimates provided in the table above are composites of the streamgage and DAR estimation methods.

Table 1. Estimated Surface Water Volumes in the Sacramento Valley Basin for 1990-2024. (SDR 2025)

Basin	Streamflow Minimum	Streamflow Maximum	Average Streamflow (Streamgage Method)	Average Streamflow (DAR Method)	Total Average Streamflow	Median Streamflow
Sacramento Valley	3,775 ⁽²⁰⁰²⁾	650,163 ⁽¹⁹⁹³⁾	62,897	34,783	97,680	31,970

All values are shown in AF. Parentheses indicate the year streamflow volume was recorded.

Surface water is estimated to contribute 31,970 AF to the supplies in the basin in a typical year. However, there are years with extremely high or low surface water inflows. Due to the extremely high flow years associated with floods, the average surface water supply in the basin is much higher than the median of 31,970 AF per year.

⁷ Arizona Revised Statutes Title 45, Chapter 2, Article 8.

<https://www.azleg.gov/arsDetail/?title=45>



Table 2. Estimated Surface Water Volumes Diverted for Use in the Sacramento Valley Basin for 1990-2024. (SDR 2025)

Year	Diverted Streamflow
1990	152
2007	152
2024	152
Average Annual Diverted Streamflow from 1990-2024	152

All values are shown in AF.

The estimated surface water volumes were diverted for storage in reservoirs in the Sacramento Valley Basin.

2.3.2 Groundwater

The following groundwater volumes were estimated in the Sacramento Valley Basin:

Table 3. Estimated Streamflow Infiltration Volumes in the Sacramento Valley Basin for 1990-2024. (SDR 2025)

Basin	Average Annual Streamflow Infiltration (Perennial)	Average Annual Streamflow Infiltration (Intermittent & Ephemeral)	Total Average Annual Streamflow Infiltration
Sacramento Valley	5,346	14,857	20,203

All values are shown in AF. NA, or Not Applicable, applies to fields without estimates.

- Streamflow Infiltration: Infiltration for perennial streams was estimated using the fixed percentage listed in the Methods Appendix. Infiltration for intermittent and ephemeral streams, was estimated using infiltration rates from the United States Department of Agriculture Natural Resources Conservation Service (USDA NRCS) Soil Quality Indicators.⁸ The predominant soil type was sandy-skeletal.⁹ The standard storm duration utilized was 1.5 hours.¹⁰ Total streamflow infiltration peaked in 1993 at approximately 63,511 AF and was lowest in 1999 at 1,551 AF.

⁸ USDA NRCS. (2008). Soil Quality Indicators. United States Department of Agriculture Natural Resource Conservation Service. <https://www.nrcs.usda.gov/sites/default/files/2022-10/Infiltration.pdf>

⁹ Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture (NRCS, USDA). (2016). Web Soil Survey (STATSGO2). <http://websoilsurvey.nrcs.usda.gov/>

¹⁰ Food and Agriculture Organization of the United Nations (FAO). (2024). Annex 2 Infiltration Rate and Infiltration Test. <https://www.fao.org/4/s8684e/s8684e0a.htm>



**Table 4. Estimated Groundwater Volumes
in the Sacramento Valley Basin for 1990-2024. (SDR 2025)**

Basin	Average Annual Baseflow	Average Annual Groundwater Inflow	Average Annual Groundwater Outflow	Average Annual Mountain-Front Recharge	Calculated Initial Groundwater Storage
Sacramento Valley	-12,530	1,310	-5,600	4,021	5,264,719 ⁽²⁰⁰⁶⁾

All values are shown in AF.

Negative numbers indicate demands or water flows leaving the basin

Parentheses indicate the representative year chosen to calculate initial storage.

- Baseflow: ADWR estimated baseflow using the USGS Hydrologic Toolbox in ArcGIS.¹¹ Streamgauge data were utilized when available. Any gaps in the data were filled using precipitation data from PRISM¹² and the USGS StreamStats website.¹³
 - Groundwater Inflow/Outflow: Inter-basin underflow volumes were based on USGS predevelopment maps and scientific literature estimates.¹⁴
 - Mountain-Front Recharge: The mountain-front recharge estimates were calculated using precipitation data, model data, scientific literature estimates for groundwater inflows/outflows,¹⁵ and a water budget accounting for the inflows/outflows that affected the mountain-front recharge volume.
 - Groundwater Storage: Storage was calculated using either a model data plus water budget method, if model data were available for the basin, or a GIS-based geological data non-model method, if model data were unavailable for the basin (Section 2.5.4, Methods Appendix). Initial groundwater storage was calculated using wells located within alluvial aquifer boundaries in the basin. A representative year was selected

¹¹ Barlow, P.M. et al. (2022). U.S. Geological Survey Hydrologic Toolbox — A graphical and mapping interface for analysis of hydrologic data: U.S. Geological Survey Techniques and Methods, book 4, chap. D3, 23 p. <https://doi.org/10.3133/tm4D3>

¹² PRISM Climate Group. (2024). 30-Year Normals [dataset] <https://prism.oregonstate.edu/explorer/>

¹³ USGS. (n.d.-b). StreamStats [dataset]. <https://www.usgs.gov/streamstats>

¹⁴ Tillman, F. et al. (2011). Water Availability and Use Pilot: Methods Development for a Regional Assessment of Groundwater Availability, Southwest Alluvial Basins, Arizona (Scientific Investigations Report 2011–5071). United States Geological Survey. https://media.kjzz.org/s3fs-public/field/docs/2011/09/21/sir2011-5071_text.pdf

¹⁵ Tillman, F. et al. (2011). Water Availability and Use Pilot: Methods Development for a Regional Assessment of Groundwater Availability, Southwest Alluvial Basins, Arizona (Scientific Investigations Report 2011–5071). United States Geological Survey. https://media.kjzz.org/s3fs-public/field/docs/2011/09/21/sir2011-5071_text.pdf



containing the most water level measurements at those wells. The estimated storage volume was calculated to the basin’s average well depth, 450 feet.

2.3.3 Effluent

Effluent reuse began in Sacramento Valley in 2009 at Kingman Correctional & Rehabilitation Water Reclamation Facility. Reports to the Community Water Systems program in ADWR show a large amount of reuse in 2013 by the GEO Sacramento Road Wastewater Treatment Plant reportedly used for an unspecified lake, and no other reuse by that plant for the baseline period.

Table 5. Estimated Effluent Reuse Volumes in the Sacramento Valley Basin for 1990-2024. (SDR 2025)

Year	Quantity
1990	0
2007	0
2009	24
2010	44
2011	63
2013	315
2014	56
2020	207
2021	209
2022	152
2023	0
2024	0

All values are shown in AF.

Between 1990 and 2024, effluent reuse only occurred in the years 2009, 2010, 2011, 2013, 2014, 2020, 2021, and 2022 through the Kingman Correctional & Rehabilitation Water Reclamation Facility (WRF), as shown in the table above. The average estimated annual effluent reuse was 67 AF from 2009 to 2024.



2.3.4 Incidental Recharge

Sources of incidental recharge in the Sacramento Valley Basin are agricultural, municipal, and industrial.

Table 6. Estimated Incidental Recharge Volumes in the Sacramento Valley Basin for 1990-2024. (SDR 2025)

Sector	1990	2007	2024
Agricultural	0	0	103
Municipal	168	393	421
Industrial	18	35	37

All values are shown in AF.

- **Agricultural Incidental Recharge:** Agricultural incidental recharge depends on the total irrigation withdrawals and irrigation efficiency within a basin. The first year of recorded agricultural water use in the Sacramento Valley Basin was 2014. Therefore, agricultural incidental recharge only occurred beginning in 2014.
- **Municipal Incidental Recharge:** Municipal incidental recharge is a byproduct of lost and unaccounted for (L&U) water from water providers and seepage from septic tanks. The estimated volume of municipal incidental recharge has increased over the baseline period from 168 AF in 1990 to 421 AF in 2024. Between 1990 and 2007, the volumes rose sharply at an average of 13 AF annually. Following 2007, the growth rate decreased to 2 AF per year through 2075.
- **Industrial Incidental Recharge:** Industrial incidental recharge occurs from the irrigation of turf facilities and is influenced by irrigation systems' total withdrawals and efficiency. The estimated volume of industrial incidental recharge has increased by 19 AF over the baseline period.

2.3.5 Transportation Water

Certain basins have been identified in A.R.S. Title 45, Chapter 2, Article 8.1 as basins from which groundwater may be withdrawn for transportation to an AMA. Where such transportation has been authorized, that groundwater is referred to as "Transportation Water" in this report.

The Sacramento Valley Basin was not identified as a transportation water basin.

2.3.6 Moved Water

Any water that crosses basin boundaries through artificial means and that does not fall under the Transportation Water definition is referred to as "Moved Water" in this report. Moved Water includes groundwater that is transported between basins that are not AMAs, pursuant to A.R.S. Title 45, Chapter 2, Article 8.

The Sacramento Valley Basin was not identified as a basin with moved water.



2.4 DEMAND RESULTS

The Demand subsection contains ADWR’s estimates of annual demands in the Sacramento Valley Basin.

Table 9. Estimated Demand Volumes for the Sacramento Valley Basin by Sector for 1990-2024. (SDR 2025)

Sector	Subsector/Water Type	Year		
		1990	2007	2024
Agricultural	Agriculture	0	0	-456
Municipal	Residential Provider	-876	-2,378	-2,548
	Residential Non-Provider	-24	-66	-71
	Non-Residential	-299	-351	-378
	L&U	-165	-382	-410
Industrial	Dairies	0	0	0
	Feedlots	0	0	0
	Grazing	-28	-28	-28
	Mining	-282	-708	0
	Power	0	-3,618	-7,163
	Sand and Gravel	0	-52	-78
	Turf	-143	-296	-332
	Other	-1,187	-1,187	-2,102
Environmental	Riparian	-1,178	-1,178	-1,178

Negative numbers indicate demands or water flows leaving the basin—all values in AF.

2.4.1 Agricultural

Agricultural demand is water applied to two or more acres of land to produce plants or parts of plants for sale for human consumption or use as feed for livestock, range livestock, or poultry.

The first year of recorded agricultural water use in the Sacramento Valley Basin was 2014. Total irrigation withdrawals reached a maximum of 1,966 AF in 2015 but have remained below 750 AF in all subsequent years. Currently, agriculture in the Sacramento Valley Basin consists of an estimated 205 acres of orchards and citrus groves. Over 90% of the acreage is drip irrigated, resulting in a high overall irrigation efficiency of approximately 85%.

2.4.2 Municipal

Municipal demand is defined as the non-agricultural and non-industrial uses of water supplied by a city, town, private water company, irrigation district, domestic water improvement district, water cooperative, or private domestic well.

The Sacramento Valley Basin has an estimated 28,130 residents, with the most significant towns being Kingman City and Golden Valley. Other smaller incorporated towns within the basin are Yucca, Oatman, Chloride. The basin also contains the unincorporated town of Franconia. Transitory



users are present due to Interstate I-40, and the Arizona Port of Entry alongside the Arizona and California border.

- Residential Provider: Residential provider use is supplied by a municipal provider, or a Community Water System (CWS) as defined in A.R.S. § 45-341.¹⁶ The Sacramento Valley Basin has approximately 27,371 residents served by a CWS. Between 1990 and 2024, residential provider water demand nearly tripled in volume, with the highest average annual growth of 88 AF occurring from 1990 to 2007 due to a shift in service area population. After 2007 the average yearly increase slowed to 10 AF.
- Residential Non-Provider: Residential non-provider use is any residential water use that is not supplied by a municipal provider but rather by a non-public water system or domestic well. An estimated 759 residents in the basin rely on self-supplied water resources. From 1990 to 2024, residential water demand among non-provider users almost tripled. The highest annual growth rate of approximately 3 AF occurred from 1990 to 2007. After 2007, the average annual growth rate slowed to 0.29 AF, indicating changes in water use among self-supplied households.
- Non-Residential: Non-residential use is defined as municipal water not used for residential purposes but instead used for commercial, institutional, recreational, or transitory uses. Between 1990 and 2024, non-residential water demand grew by 26% due to tourism, transportation services, and an increase in commercial development.
- Lost and Unaccounted for Water: Lost and Unaccounted for water is defined as the total quantity of water from any source that enters a water distribution system minus the total amount of authorized deliveries from the distribution system during the calendar year. During the baseline period, the volume of L&U water experienced a substantial increase of over two times its baseline value, with the highest increase of 13 AF annually occurring between 1990 and 2007. While increases in L&U slowed to 2 AF annually after 2007, they have continued to increase through the baseline period.

2.4.3 Industrial

Industrial demand is water used by an industrial facility, such as a golf course, dairy, feedlot, power plant, mine, or paper mill.

The current industrial water demands in the Sacramento Valley Basin come from grazing, power production, sand and gravel operations, the irrigation of turf facilities, manufacturing, and the operations of proving grounds.

- Grazing: Grazing demand is defined as the water used to maintain stock ponds for the sole purpose of watering livestock. An estimated 1,694 animals graze in the Sacramento Valley

¹⁶ Arizona Revised Statutes § 45-341. <https://www.azleg.gov/ars/45/00341.htm>

Basin, the majority of which are cattle. The annual water needs for the livestock are estimated to be 28 AF.

- Mining: Mining demand is defined as water use that is consumed for the purposes of extracting or processing ores or minerals. The Mineral Park mine, operated by Mercator Mineral Park Holdings, was operational in the basin until 2014. From 1990 to 2008, the mine used an average of 345 AF of water per year. Production increased from 2009 to 2014, and during this period, the average water use was estimated to be 3,728 AF per year.
- Power: Power demand is defined as the water use for the generation of power at thermal or renewable power plants. There are two natural gas power plants and two solar power plants located in the Sacramento Valley Basin. From 2002, when the first power plant became operational, to 2024, water use for power production increased. Water use peaked in 2024, with an estimated 7,163 AF.
- Sand and Gravel: Sand and gravel demand accounts for the water use of any facility or establishment that produces aggregates or quarried materials. Water use for sand and gravel operations increased over the baseline period as new facilities opened in the basin. In 1991, the first year with sand and gravel demand, water use was estimated to be 13 AF. By 2024, water use had increased by 65 AF, bringing the estimated annual total to 78 AF.
- Turf: Turf demand is defined as the irrigation or maintenance of any area of landscaping that is not part of a private residence. Irrigation water use for turf facilities increased from 1990 to 2020 and peaked at 347 AF in 2020. In 2024, water use was estimated to be 332 AF.
- Other
 - Other industrial demand is defined as water use consumed by any facility that does not fit into one of the preexisting subsectors of industrial demand. In the Sacramento Valley Basin, other industrial demand includes water use from proving grounds, chemical manufacturing, steel manufacturing, and compressor stations. During the baseline period, other subsector water use increased from 1,187 AF in 1990 to 2,102 AF in 2024. The increase in water use is largely due to a steel mill beginning operations in the basin.

2.4.4 Environmental

Environmental demand is quantified within this report as evapotranspiration along streams, rivers, lakes, and drainage ways. Most riparian habitat in the Sacramento Valley Basin is located along the Colorado River. The riparian demand values in the SDRs represent a high-end estimate of the potential water needs of riparian plants within a basin. In the absence of site-specific data, these estimates assume an average value for riparian plants' water needs, which does not consider local environmental conditions. Please see the Methods Appendix for an in-depth explanation of the methodologies.



- Annual net water requirements for the riparian plants are estimated to total 1,178 AF.

3 COMBINING SUPPLY AND DEMAND

The water budget in the Sacramento Valley Basin shows an overall positive trend during the baseline period with both supply and demand fluctuating. Demand values averaged 9,464 AF per year, with Industrial demand constituting a large majority, primarily power. Supply values varied greatly throughout the baseline period, contributing on average 13,805 AF per year, but ranging from 2,932 AF in 2002 to 61,072 AF in 1993. Groundwater storage overall increased throughout the period due to supply exceeding demand in the basin.

Table 10. Summary of Total Estimated Demand and Supply Values from 1990-2024 in the Sacramento Valley Basin. (SDR 2025)

	1990	2007	2024
Supply	3,307	14,185	3,878
Demand	-4,182	-10,245	-14,743
Balance	-875	3,939	-10,866
Resulting Water Available in Storage	5,097,468	5,286,858	5,250,282

Negative numbers indicate demands or water flows leaving the basin—all values in AF.

4 RESULTS OF PROJECTION SCENARIOS

Staff developed scenarios based on the most likely impacts on water demands and supplies over 51 years (from 2025 to 2075). Projections were then generated from the baseline data.

The projection scenarios developed are:

1. Status Quo: baseline volumes were carried forward through the projection period.
2. Growth: volumes were assumed to increase within specific parameters throughout the projection period.
3. Conservation: volumes were assumed to be influenced by specific conservation practices through the projection period.
4. Technology: volumes were assumed to be influenced by technological advancements through the projection period.
5. Climate: volumes were adjusted for three different climate scenarios, using a 1-degree Fahrenheit temperature increase in the mean annual temperature for the projection period, following a lower emissions pathway for Arizona; a 5-degree Fahrenheit temperature increase, following a medium emissions pathway; and a 10-degree Fahrenheit temperature increase, following a high emissions pathway.

While Colorado River water is subject to a different legal framework, the term “surface water” necessarily encompasses Colorado River water, including Central Arizona Project (“CAP”) water. Therefore, Colorado River water, including CAP water, is incorporated in the estimates of available



surface water supplies. The availability of Colorado River water in Arizona will be subject to operations to be determined by the Secretary of the Interior in an ongoing federal process. While significant uncertainty surrounds the reliability of Colorado River water supplies, particularly on the mainstem of the Colorado River in the Lower Basin, this report assumes that Non-Indian Agricultural (NIA) Priority CAP water will generally not be available during the projection period, but that all other Colorado River water and CAP water will be available.

4.1 SUPPLY PROJECTION RESULTS

4.1.1 Surface Water

For the Status Quo scenario, the estimated projected volume of surface water will remain constant until 2075.

Table 11. Estimated Surface Water Status Quo Projection Volumes for the Sacramento Valley Basin for 2025-2075. (SDR 2025)

Basin	Volume
Sacramento Valley	86,702

All values are shown in AF.

Due to ongoing projection scenario improvements, no other projection scenarios were applied to surface water for this report.

4.1.2 Groundwater Storage

For the Status Quo scenario, the estimated projected balance between Supply and Demand will remain constant at –100 AF through 2075.

Table 11. Estimated Groundwater Storage Status Quo Projection Volumes for the Sacramento Valley Basin for 2025-2075. (SDR 2025)

Scenario	2025	2050	2075
Status Quo	5,250,182	5,247,674	5,245,166

All values are shown in AF.

Due to ongoing projection scenario improvements, no other projection scenarios were applied to groundwater storage for this report.

4.1.3 Effluent

For the Status Quo scenario, the estimated projected volume of effluent for reuse will remain constant through 2075.



Table 12. Estimated Effluent Status Quo Projection Volumes for the Sacramento Valley Basin for 2025-2075. (SDR 2025)

Scenario	Volume
Status Quo	114

All values are shown in AF.

Table 13. Estimated Effluent Growth Projection Volumes for the Sacramento Valley Basin for 2025-2075. (SDR 2025)

Scenario	2025	2050	2075
Growth	116	142	153

All values are shown in AF.

For the Growth scenario, the estimated volume of effluent increases according to projected population change percentages by the Arizona Office of Economic Opportunity. 17

4.1.4 Incidental Recharge

Table 14. Estimated Agricultural Incidental Recharge Projection Volumes for the Sacramento Valley Basin for 2025-2075. (SDR 2025)

Sector	Scenario	2025	2050	2075
Agricultural	Status Quo	113	113	113
	Climate – Low	113	114	115
	Climate – Medium	113	117	121
	Climate - High	113	120	128
	Conservation	113	112	112
	Growth	113	13	1
	Technology	113	113	113

All values are shown in AF.

- Status Quo: The Status Quo scenario estimated projected volume will remain constant through 2075.
- Climate: The Climate scenario is expected to result in rising temperatures and increased evapotranspiration, leading to increased irrigation withdrawals. Incidental recharge would be expected to increase with irrigation withdrawals. The projected increase in incidental recharge is about one percent for a 1° F rise in average temperature, seven percent for a 5° F rise, and 13% for a 10° F rise.
- Conservation: The Conservation scenario implements requirements similar to those found in the AMAs’ 5th Management Plan. This has a minimal impact in the Sacramento Valley Basin because most agriculture in the basin already uses highly efficient drip irrigation.



- Growth: The Growth scenario considers historical growth trends and the land available for potential agricultural growth. In this scenario, incidental recharge is assumed to change proportionally to withdrawals. The total irrigated acreage in the basin has declined since its maximum in 2015. Projecting this trend to 2075 results in agriculture declining to a minimal amount.
- Technology: The Technology scenario does not project any changes to drip irrigation systems or to flood irrigated fields with crops other than alfalfa or cotton. In the Sacramento Valley Basin, all fields are either drip irrigated or flood irrigated with citrus crops. Therefore, the Technology scenario does not project any impact on agricultural water use or incidental recharge in the Sacramento Valley Basin.

Table 15. Estimated Municipal Incidental Recharge Projection Volumes for the Sacramento Valley Basin for 2025-2075. (SDR 2025)

Sector	Scenario	2025	2050	2075
Municipal	Status Quo	87	87	87
	Climate – Low	82	82	82
	Climate – Medium	82	83	84
	Climate - High	82	84	87
	Conservation	82	71	61
	Growth	84	103	122
	Technology	82	73	65

All values are shown in AF.

- Status Quo: The Status Quo scenario estimated projected volume will remain constant through 2075.
- Climate: Under the Climate scenario, rising temperatures and increased evaporation rates are expected to increase water demands. Projected incidental recharge volumes by 2075 are estimated to show no increase under the low emissions scenario, a two percent increase in the medium emissions scenario, and a six percent increase in the high emissions scenario.
- Conservation: Under the Conservation scenario, additional water-saving measures and requirements similar to those in the initial AMAs’ 5th Management Plan are implemented. Under the scenario, water demand is expected to decrease 26% by 2075.
- Growth: Under the Growth scenario, population projections produced by the Arizona Commerce Authority Office of Economic Opportunity (ACA OEO)¹⁷ were used to estimate

¹⁷ Arizona Commerce Authority (ACA). (2022a). Population Estimates. Arizona Commerce Authority. <https://www.azcommerce.com/o eo/population/population-estimates/>



the growth in the basin. The basin is projected to experience an increase in incidental recharge of 45% by 2075.

- **Technology:** The Technology scenario assumes widespread adoption of water monitoring technologies, such as advanced metering infrastructure (AMI) or home-based devices, with active leak detection and customer response. Estimated savings of 14,000 gallons per household per year reflect reductions from leaks and improved water use efficiency. This reduction is projected to result in a decrease in incidental recharge of 21% by 2075.

Table 16. Estimated Industrial Incidental Recharge Projection Volumes for the Sacramento Valley Basin for 2025-2075. (SDR 2025)

Sector	Scenario	2025	2050	2075
Industrial	Status Quo	37	37	37
	Climate – Low	37	38	38
	Climate – Medium	37	39	40
	Climate - High	37	40	43
	Conservation	37	36	36
	Growth	37	37	37
	Technology	37	36	36

All values are shown in AF.

- **Status Quo:** The Status Quo scenario estimated projected volume will remain constant through 2075.
- **Climate**
 - **Turf:** Increased temperatures and evapotranspiration are expected to raise overall turf irrigation requirements in the Climate scenarios. The volume of incidental recharge is estimated to increase by three percent in the low emissions scenario, eight percent in the medium emissions scenario, and 16% in the high emissions scenario.
- **Conservation**
 - **Turf:** Under the Conservation scenario, increased irrigation efficiency requirements are expected to have a modest impact on total water use. With all conservation measures implemented, the volume of incidental recharge is estimated to decrease by 1 AF by 2075.
- **Growth:** Status Quo volumes were applied in the absence of a defined Growth scenario.
- **Technology**
 - **Turf:** The Technology scenario assumes that eligible acres of natural turf will be replaced with synthetic turf. Synthetic turf requires less water to maintain than natural grass and reduces groundwater recharge. The conversion of natural turf to



synthetic turf is projected to decrease industrial incidental recharge volumes by 1 AF, or three percent, by 2075.

4.2 DEMAND PROJECTION RESULTS

4.2.1 Agricultural

Table 17. Estimated Projected Demand Volumes for the Agricultural Sector for the Sacramento Valley Basin for 2025-2075. (SDR 2025)

Scenarios	Year		
	2025	2050	2075
Status Quo	-537	-537	-537
Climate - Low	-537	-541	-545
Climate – Medium	-537	-557	-578
Climate - High	-537	-578	-618
Conservation	-537	-536	-536
Growth	-537	-62	-7
Technology	-537	-537	-537

Negative numbers indicate demands or waterflows leaving the basin—all values in AF.

- **Status Quo:** The Status Quo scenario estimated projected volume will remain constant through 2075.
- **Climate:** The Climate scenario is expected to result in rising temperatures and increased evapotranspiration, leading to increased irrigation withdrawals. Irrigation needs in the Sacramento Valley Basin are estimated to increase by 1.5% for a 1° F rise in average temperature, 7.5% for a 5° F rise, and 15.1% for a 10° F rise.
- **Conservation:** The Conservation scenario implements requirements similar to those found in the AMAs’ 5th Management Plan. This has a minimal impact in the Sacramento Valley Basin because most agriculture in the basin already uses highly efficient drip irrigation.
- **Growth:** The Growth scenario considers historical growth trends and the land available for potential agricultural growth. The total irrigated acreage in the basin has declined since its maximum in 2015. Projecting this trend to 2075 results in agriculture declining to a minimal amount.
- **Technology:** The Technology scenario does not project any changes to drip irrigation systems or to flood irrigated fields with crops other than alfalfa or cotton. In the Sacramento Valley Basin, all fields are either drip irrigated or flood irrigated with citrus crops. Therefore, the Technology scenario does not project any impact on agricultural demand in the Sacramento Valley Basin.



4.2.2 Municipal

Table 18. Estimated Projected Demand Volumes for the Municipal Sector for Sacramento Valley Basin for 2025-2075. (SDR 2025)

	Residential Provider			Residential Non-Provider		
	2025	2050	2075	2025	2050	2075
Status Quo	-2,699	-2,699	-2,699	-75	-75	-75
Climate – Low	-2,548	-2,555	-2,562	-71	-71	-71
Climate – Medium	-2,549	-2,584	-2,620	-71	-72	-73
Climate - High	-2,551	-2,621	-2,691	-71	-73	-75
Conservation	-2,535	-2,218	-1,900	-70	-62	-53
Growth	-2,598	-3,191	-3,778	-72	-89	-105
Technology	-2,538	-2,278	-2,018	-70	-63	-56

Negative numbers indicate demands or water flows leaving the basin—all values in AF.

	Non-Residential			L&U		
	2025	2050	2075	2025	2050	2075
Status Quo	-378	-378	-378	-429	-429	-429
Climate – Low	-378	-378	-378	-734	-735	-736
Climate – Medium	-378	-378	-378	-735	-740	-744
Climate - High	-378	-378	-378	-735	-745	-754
Conservation	-378	-378	-378	-408	-260	-228
Growth	-385	-473	-560	-418	-513	-607
Technology	-378	-378	-378	-408	-372	-335

Negative numbers indicate demands or water flows leaving the basin—all values in AF.

- Status Quo: The Status Quo scenario estimated projected volume will remain constant through 2075.
- Climate: Under the Climate scenario, rising temperatures and increased evaporation rates are expected to increase water demands. By 2075, residential provider demand is projected to increase by approximately one percent under the low emissions scenario, three percent under the medium emissions scenario, and six percent under the high emissions scenario. Residential non-provider demand is expected to remain unchanged under the low emissions scenario, while increasing by three percent under the medium scenario, and six percent under the high scenario. Non-residential demand is expected to remain unchanged across all scenarios. Lost and Unaccounted for (L&U) water is anticipated to show minimal change under the low emissions scenario, a one percent increase in the medium scenario, and three percent under the high scenario.



- Conservation: Under the Conservation scenario, additional water-saving measures and requirements similar to those in the initial AMAs’ 5th Management Plan are implemented. By 2075, residential provider demand is projected to decline by 25% and residential non-provider demand is expected to decrease by 44%. Non-residential demand is expected to remain constant throughout the projection period. The total volume of L&U water is projected to decline by 24%.
- Growth: Under the Growth scenario, population projections produced by the Arizona Commerce Authority Office of Economic Opportunity (ACA OEO)¹⁷ were used to estimate the growth in the basin. Projected demand for all sectors is expected to decline by approximately 45% due to decreasing population growth rates.
- Technology: The Technology scenario assumes widespread adoption of water monitoring technologies, such as AML or home-based devices, with active leak detection and customer response. Estimated savings of 14,000 gallons per household per year reflect reductions from leaks and improved water use efficiency. By 2075, the residential provider and residential non-provider demand is anticipated to decline by approximately 20%. Non-residential demand is expected to remain constant with no changes. The total volume of L&U water is projected to decrease by 18% by 2075.

4.2.3 Industrial

Table 19. Estimated Projected Demand Volumes for the Industrial Sector for the Sacramento Valley Basin for 2025-2075. (SDR 2025)

	Grazing	Mining	Sand and Gravel	Other
Status Quo	-28	0	-78	-2,102

Status Quo projections were the only projection scenarios that were applied to the grazing, mining, sand and gravel, and other industrial subsectors.

Negative numbers indicate demands or water flows leaving the basin—all values in AF.

Projections were not developed for the grazing, mining, or sand and gravel subsectors due to limited data or the limited expected impact of a given scenario on the subsectors.



	Power			Turf		
	2025	2050	2075	2025	2050	2075
Status Quo	-6,194	-6,194	-6,194	-329	-329	-329
Climate – Low	-7,172	-7,393	-7,613	-332	-334	-337
Climate – Medium	-7,175	-7,475	-7,775	-332	-345	-357
Climate - High	-7,185	-7,733	-8,281	-333	-358	-383
Conservation				-332	-318	-318
Growth	-7,165	-7,647	-7,776			
Technology	-6,904	-2,072	-578	-328	-322	-316

Status Quo projection values were applied in the absence of a defined scenario for a subsector. This is indicated by a gray cell. Negative numbers indicate demands or water flows leaving the basin—all values in AF.

- Status Quo: The Status Quo scenario estimated projected volume will remain constant through 2075.
- Climate
 - Power: The Climate scenario considers changes in consumer electrical demand and changes in power plant operations resulting from higher temperatures. Water use for power production is estimated to increase by 441 AF in the low emissions scenario, 600 AF in the medium emissions scenario, and 1,096 AF in the high emissions scenario.
 - Turf: Increased temperatures and evapotranspiration are expected to raise overall turf irrigation requirements in the Climate scenarios. Water use for turf facilities is estimated to increase by two percent in the low emissions scenario, eight percent in the medium emissions scenario, and 15% in the high emissions scenario.
- Conservation
 - Turf: Under the Conservation scenario, increased irrigation efficiency requirements are expected to reduce total irrigation requirements by four percent.
- Growth
 - Power: The Growth scenario considers the impact that population growth, planned decommissions of existing power plants, and additions of permitted power plants will have on water demand for power production. A planned expansion project for the Black Mountain generating station is projected to become operational in 2028. This expansion project, combined with population growth in the region, is estimated to increase water demand by nine percent by 2075.
- Technology
 - Power: The implementation of consumer-side and utility-side technologies is projected to substantially decrease water use in the power sector in the



Sacramento Valley Basin. By 2075, water use is estimated to decrease by 6,326 AF, or 92%. The large decrease in water use in this scenario is due to the projected shift to renewables, which are more water-efficient than traditional fossil fuel power sources.

- o Turf: In the Technology scenario, it is assumed that eligible acres of natural turf will be converted to synthetic turf. The conversion of natural turf to synthetic turf is projected to decrease irrigation demands by four percent.

4.2.4 Environmental

Table 20. Estimated Projected Environmental Demand Volumes for Sacramento Valley Basin for 2025-2075. (SDR 2025)

	Environmental		
	2025	2050	2075
Status Quo	-1,178	-1,178	-1,178
Climate – Low	-1,178	-1,186	-1,191
Climate – Medium	-1,178	-1,196	-1,211
Climate - High	-1,178	-1,212	-1,235

Negative numbers indicate demands or waterflows leaving the basin—all values in AF.

- Status Quo: The Status Quo scenario estimated projected volume will remain constant through 2075.
- Climate: The Climate scenarios for riparian use consider the impact of increased temperatures, increased evapotranspiration, and habitat transition. Under the set parameters of these scenarios, riparian use is expected to increase in the Sacramento Valley Basin as the higher temperatures increase evapotranspiration from riparian plants. Riparian water use is estimated to increase by one percent in the low emissions scenario, three percent in the medium emissions scenario, and five percent in the high emissions scenario.

5 CONCLUSION

The balance between water supply and demand in the Sacramento Valley Basin oscillated throughout the baseline period, with 18 years showing a negative balance and 17 years showing a positive balance. Supply values on average were greater than demand values, leading to an overall increase in storage volume. If groundwater levels were to drop below the basin’s average well depth of 450 feet, approximately 58% of existing wells would become dry. The average recorded water level of wells in Sacramento Valley Basin is 258 feet.

Streamflow infiltration is the largest contributor to supplies in the basin, with intermittent and ephemeral streams on average contributing three times as much as perennial streams. Mountain-front recharge was the next largest contributor to supplies, averaging just over 4,000 AF per year. Power was the largest demand value at the end of the baseline period, accounting for just under



half of the total demand estimated for 2024. Municipal residential provider saw the next largest increase during the baseline period, increasing almost three-fold.

Supply and demand in the Sacramento Valley Basin fluctuated between positive and negative over the baseline period, with supply values overall meeting and exceeding demand.

5.1 ATTACHMENTS

- [Acronyms and Definitions](#)
- [References \(Sources\) – general](#)

