



SUPPLY & DEMAND

2025

ARAVAIPA CANYON

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2025 SUPPLY AND DEMAND ASSESSMENT ARAVAIPA CANYON 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	6
2.2.3 Effluent	6
2.2.4 Incidental Recharge	6
2.2.5 Transportation Water	7
2.2.6 Moved Water	7
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	10
2.3.5 Transportation Water	11
2.3.6 Moved Water	11
2.4 Demand Results	11
2.4.1 Agricultural	11
2.4.2 Municipal	12
2.4.3 Industrial	12
2.4.4 Environmental	13

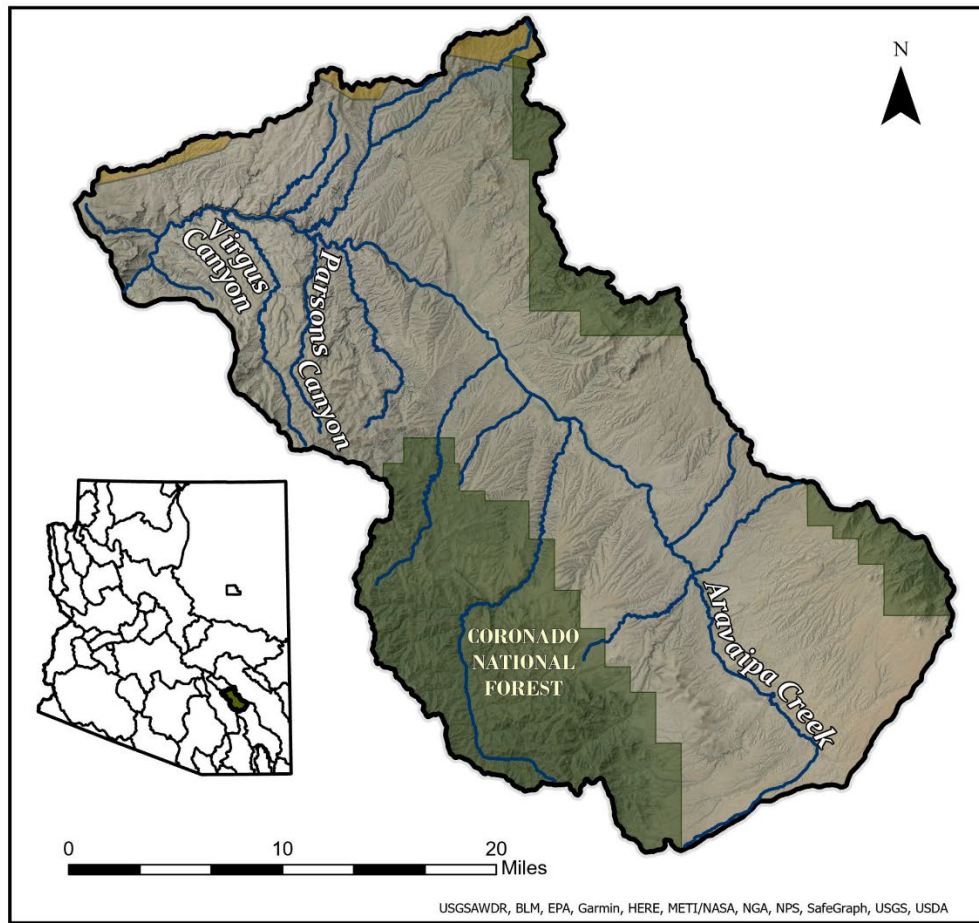


3 COMBINING SUPPLY AND DEMAND	13
4 RESULTS OF PROJECTION SCENARIOS	13
4.1 SUPPLY PROJECTION RESULTS	14
4.1.2 Surface Water	14
4.1.3 Groundwater Storage	14
4.1.4 Effluent	14
4.1.5 Incidental Recharge	15
4.1.6 Industrial Incidental Recharge	16
4.2 Demand Projection Results	17
4.2.1 Agricultural	17
4.2.2 Municipal	18
4.2.3 Industrial	19
4.2.4 Environmental	19
5 CONCLUSION	19
5.1 ATTACHMENTS	20



1 INTRODUCTION

ARAVAIPA CANYON BASIN



- River
- Groundwater Basin
- San Carlos Apache Reservation
- National Forest

Figure 1. Map of the Aravaipa Canyon 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

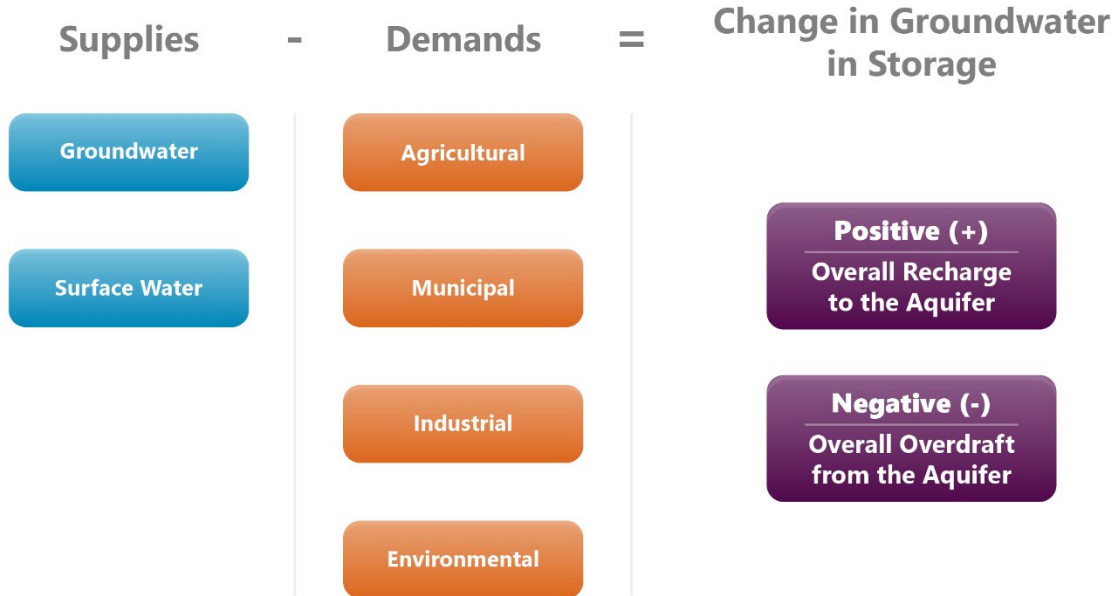


Figure 2. Depiction of the Aravaipa Canyon Basin water budget, including all available supplies and demands and how they contribute to changes in groundwater in storage.

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 Aravaipa Canyon Basin encompasses 517 square miles in the southeastern portion of the state. The basin is characterized by canyons, valleys, and medium-elevation mountain ranges such as the Galiuro Mountain range along the southwestern boundary, and the Santa Teresa Mountains along the northwestern boundary of the basin. The basin comprises of State Trust lands (38.3%), U.S. Forest Service (USFS) National Forest lands (25.6%), U.S. Bureau of Land Management (BLM) lands (20.6%), and the federally recognized San Carlos Apache Indian Reservation (1.3%). The



basin has an estimated population of 764 people, and 14.2% of land in the basin is privately owned. The aquifer system of Aravaipa Canyon consists mainly of younger and older alluvial deposits. There are two principal aquifers, separated by a layer of clay. The first is the unconfined stream alluvium, which is the major source of groundwater, and the second is a confined basin fill aquifer. Previous storage estimates range from 5,000,000 to 5,100,000 acre-feet (AF) to a depth of 1,200 feet.³ The basin's major stream reach, Aravaipa Creek, runs north-south through and curves west into Aravaipa Canyon. Perennial reaches are located along Aravaipa Creek, Parsons Creek, Turkey Creek, and Virgus Canyon.

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, streamgauge 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.

For this report, all subflow was accounted for as groundwater in storage. "Subflow" is subterranean or underground water, usually found bordering or beneath a stream, which is considered part of the surface stream and subject to the same laws and rules as other types of surface water, unlike groundwater. ADWR recognizes the extensive and complex interactions between surface water and groundwater. Although some of the estimated water in storage may be legally classified as part of the "subflow zone," ADWR did not differentiate subflow from groundwater in storage. ADWR also did not determine whether wells outside the subflow zone withdraw water from the subflow zone. Since the characteristics of subflow zone delineation are subject to change based on the adjudication of the San Pedro River and its tributaries (including Aravaipa Creek), ADWR considered the subflow zone as part of the basin-fill aquifer to accurately determine the overall hydrogeological status of the basin, allowing ADWR to complete a water budget analysis.

³ ADWR (2009). Arizona Water Atlas, Volume 3, Section 3.1, pg. 94, Table 3.1-3.

https://infoshare.azwater.gov/docushare/dsweb/Get/Document-10428/Volume_3_final.pdf

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



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 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.

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



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 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 Aravaipa Canyon Basin.

2.3.1 Surface Water

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

- Aravaipa Creek (09473000)
- Booger Canyon Stream
- Deer Creek
- Fourmile Creek
- Kennedy Falls Wash
- Long Hollow
- Parsons Canyon Stream
- Sheep Wash
- Rattlesnake Creek
- Telegraph Wash
- Turkey Creek
- Virgus Canyon

Flows on the Aravaipa Creek are measured with a streamgage (09473000). For streams without streamgage data, the DAR method was applied to estimate streamflow volumes. The streamflow volume estimates provided in the table below are composites of the streamgage and DAR estimation methods.

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

⁷ Arizona Revised Statutes Title 45, Chapter 2, Article 8.
<https://www.azleg.gov/arsDetail/?title=45>



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

Basin	Streamflow Minimum	Streamflow Maximum	Average Streamflow (Streamgauge Method)	Average Streamflow (DAR Method)	Total Average Streamflow	Median Streamflow
Aravaipa Canyon	6,337(2020)	93,896(1993)	18,143	5,206	23,349	15,939

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

Surface water is estimated to contribute 15,939 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 15,939 AF per year.

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

Year	Diverted Streamflow
1990	474
2007	474
2024	474
Average Annual Diverted Streamflow from 1990-2024	474

All values are shown in AF.

The estimated surface water volumes were diverted for storage in reservoirs in the Aravaipa Canyon Basin.

2.3.2 Groundwater

The following groundwater volumes were estimated in the Aravaipa Canyon Basin:

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

Basin	Average Annual Streamflow Infiltration (Perennial)	Average Annual Streamflow Infiltration (Intermittent & Ephemeral)	Total Average Annual Streamflow Infiltration
Aravaipa Canyon	1,825	1,874	3,699

All values are shown in AF.

- 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 2005 at approximately 6,920 AF and was lowest in 2020 at 446 AF.

Table 4. Estimated Groundwater Volumes in the Aravaipa Canyon 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
Aravaipa Canyon	-9,848	0	-200	8,456	321,449 ⁽¹⁹⁹¹⁾

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

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>

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



- 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 containing the most water level measurements at those wells. The estimated storage volume was calculated to the basin’s average well depth, 249 feet.

2.3.3 Effluent

None of the effluent produced in the Aravaipa Canyon Basin has been allocated for reuse, so no effluent is categorized as a water supply.

2.3.4 Incidental Recharge

Sources of incidental recharge in the Aravaipa Canyon Basin are agricultural and municipal.

Table 5. Estimated Incidental Recharge Volumes in the Aravaipa Canyon Basin for 1990-2024. (SDR 2025)

Sector	1990	2007	2024
Agricultural	231	229	175
Municipal	4	7	7
Industrial	0	0	0

All values are shown in AF.

- Agricultural Incidental Recharge: Agricultural incidental recharge is determined based on total irrigation withdrawals and irrigation efficiency within a basin. The estimated volume of agricultural incidental recharge has slightly decreased over the baseline period due to improvements in irrigation efficiency.
- 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. Between 1990 and 2024, municipal incidental recharge volumes stayed relatively constant.

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



- Industrial Incidental Recharge: Industrial incidental recharge occurs from the irrigation of turf facilities and is influenced by irrigation systems' total withdrawals and efficiency. There is no estimated industrial incidental recharge in the basin.

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 Aravaipa Canyon 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 Aravaipa Canyon 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 Aravaipa Canyon Basin.

Table 6. Estimated Demand Volumes for the Aravaipa Canyon Basin by Sector for 1990-2024. (SDR 2025)

Sector	Subsector/Water Type	Year		
		1990	2007	2024
Agricultural	Agriculture	-751	-751	-649
Municipal	Residential Provider	0	0	0
	Residential Non-Provider	-27	-41	-44
	Non-Residential	0	0	0
	L&U	0	0	0
Industrial	Grazing	-58	-58	-58
Environmental	Riparian	-1,437	-1,437	-1,437

Negative numbers indicate demands or waterflows 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.

There are an estimated 614 acres of cultivated land within the Aravaipa Canyon Basin. Alfalfa, pecans, and wheat are the predominant crop types, accounting for approximately 90% of the total acreage. The majority of acreage (approximately 70%) is sprinkler-irrigated, with the remainder flood-irrigated. Overall, irrigation efficiency is estimated at approximately 80% for recent years.



Agricultural withdrawals are estimated to have remained consistent between 1990 and 2018, before slowly decreasing. See the Methods Appendix for further details of the analysis.

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 Aravaipa Canyon Basin has an estimated 764 residents, with no incorporated towns or major institutions. A small portion of the San Carlos Indian Reservation lies along the northern boundary of the basin, with no significant population centers present.

- 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 There are no Community Water Systems or municipal providers in the Aravaipa Canyon Basin.
- 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. It is estimated that all residents in the basin rely on self-supplied water resources. Municipal water demand increased by approximately 63% between 1990 and 2024.
- 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. Non-residential water use is absent within the basin.
- Lost and Unaccounted for Water: Lost and Unaccounted for water (L&U) 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. L&U does not account for water loss from a non-public water system or domestic well. There are no residential providers in the basin, so there is no reported L&U water.

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.

Currently, grazing is the only industrial water demand in the Aravaipa Canyon Basin.

- Grazing: Grazing demand is defined as the water used to maintain stockponds for the sole purpose of watering livestock. An estimated 3,426 animals graze within the Aravaipa basin, the majority of which are cattle.

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

2.4.4 Environmental

Environmental demand is defined within this report as evapotranspiration along streams, rivers, lakes, and drainage ways. Most riparian habitat in the Aravaipa Canyon Basin is located along Aravaipa Creek and its tributary streams and washes. 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 be 1,437 AF.

3 COMBINING SUPPLY AND DEMAND

The water budget in the Aravaipa Canyon Basin shows a positive trend over the baseline period, with both supply and demand remaining relatively consistent. Supply values throughout the baseline period stayed near the average of 34,143 AF, with values from 1992 through 1998 ranging higher. There was a slight increase in demand between 2016 and 2019 before reverting back to the average values of the preceding baseline years. Groundwater storage has increased over time due to the fact that supply has consistently exceeded demand in the basin. This trend indicates that the basin's water resources are sufficient to meet present demand.

Table 7. Summary of Total Estimated Demand and Supply Values from 1990-2024 in the Aravaipa Canyon Basin. (SDR 2025)

	1990	2007	2024
Supply	10,264	8,251	275
Demand	-2,273	-2,286	-2,190
Balance	7,991	5,965	-1,915
Resulting Water Available in Storage	306,687	477,401	543,326

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.

4.1 SUPPLY PROJECTION RESULTS

4.1.2 Surface Water

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

Table 8. Estimated Surface Water Status Quo Projection Volumes for the Aravaipa Canyon Basin for 2025-2075. (SDR 2025)

Scenario	Volume
Status Quo	13,544

All values are shown in AF.

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

4.1.3 Groundwater Storage

For the Status Quo scenario, the estimated projected balance between Supply and Demand will remain constant at 4,832 AF through 2075. However, a limitation of the Non-Model Groundwater Storage Method is that a physical upper storage limit is not recognized. This results in projected groundwater storage calculations, if in a positive balance, to unnaturally increase indefinitely. This limitation will be explored in future Method improvements.

Table 9. Estimated Groundwater Storage Status Quo Projection Volumes for the Aravaipa Canyon Basin for 2025-2075. (SDR 2025)

Scenario	2025	2050	2075
Status Quo	546,082	617,475	688,869

All values are shown in AF.

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

4.1.4 Effluent

In the Aravaipa Canyon Basin, no effluent produced has been allocated for reuse. Therefore, no effluent is used as a water supply, and no supply projections were applied to the data.



4.1.5 Incidental Recharge

Table 10. Estimated Agricultural Incidental Recharge Projection Volumes for the Aravaipa Canyon Basin for 2025-2075. (SDR 2025)

Sector	Scenario	2025	2050	2075
Agricultural	Status Quo	178	178	178
	Climate – Low	178	180	181
	Climate – Medium	178	185	191
	Climate - High	178	191	203
	Conservation	178	162	162
	Growth	178	192	206
	Technology	178	146	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 larger irrigation withdrawals. Incidental recharge would be expected to increase with irrigation withdrawals. This results in a projected increase in incidental recharge of about 1.4% for a 1° F rise in average temperature, an increase of seven percent for a 5° F rise, and 14% for a 10° F rise.
- Conservation: The Conservation scenario assumes implementation of requirements similar to those in the AMA 5th Management Plans. In this scenario, irrigation efficiency is expected to improve, which reduces the amount of incidental recharge from system losses. The reduction in agricultural incidental recharge is projected to be approximately nine percent in the Aravaipa Canyon Basin.
- Growth: The Growth scenario considers historical growth trends and the land available for potential agricultural growth. In this scenario, incidental recharge is assumed to increase proportionally to withdrawals. Remote sensing data shows a slight increasing trend in agricultural consumptive use from 2016 to 2023. Projecting this trend out to 2075 yields a 15% increase in incidental recharge, proportional to irrigation withdrawal.
- Technology: Irrigation systems are assumed to be upgraded with available technology to reduce overall water use. As in the Conservation scenario, this results in lower incidental recharge due to reduced system losses. Technology improvements are projected to reduce agricultural incidental recharge in the Aravaipa Canyon Basin by up to 37%.



Table 11. Estimated Municipal Incidental Recharge Projection Volumes for the Aravaipa Canyon Basin for 2025-2075. (SDR 2025)

Sector	Scenario	2025	2050	2075
Municipal	Status Quo	49	49	49
	Climate – Low	51	51	51
	Climate – Medium	51	51	51
	Climate - High	51	51	51
	Conservation	51	43	36
	Growth	51	60	67
	Technology	51	45	38

All values are shown in AF.

- Status Quo: The Status Quo scenario estimated projected volume will remain constant through 2075.
- Climate: The Climate scenario anticipates that rising temperatures and increased evaporation rates will elevate water usage demands. In the Aravaipa Canyon basin, under all scenarios, water demand is expected to remain unchanged.
- Conservation: The Conservation scenario assumes implementation of requirements similar to those in the AMA 5th Management Plans. In this scenario, incidental recharge in the Aravaipa basin is projected to decline 29% by 2075.
- Growth: Under the Growth scenario, population projections from the Arizona Commerce Authority Office of Economic Opportunity (ACA OEO)¹⁷ were used to estimate that incidental recharge will increase by approximately 24% by 2075, driven by anticipated population growth and rising municipal water demand.
- 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 26% decline in incidental recharge between 2025 and 2075.

4.1.6 Industrial Incidental Recharge

In the Aravaipa Canyon Basin, there is no estimated industrial incidental recharge. Therefore, no projection scenarios were estimated.

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



4.2 Demand Projection Results

4.2.1 Agricultural

Table 12. Estimated Projected Demand Volumes for the Agricultural Sector for the Aravaipa Canyon Basin for 2025-2075. (SDR 2025)

Scenarios	Year		
	2025	2050	2075
Status Quo	-664	-664	-664
Climate - Low	-664	-669	-674
Climate – Medium	-664	-690	-716
Climate - High	-664	-716	-769
Conservation	-664	-649	-649
Growth	-664	-715	-766
Technology	-664	-633	-603

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: The Climate scenario is expected to result in rising temperatures and increased evapotranspiration, leading to increased irrigation withdrawals. Irrigation needs in the Aravaipa Canyon Basin are estimated to rise by about two percent for a 1° F increase in average temperature, eight percent for a 5° F increase, and 16% for a 10° F increase.
- Conservation: The Conservation scenario assumes implementation of requirements similar to those in the AMA 5th Management Plans. This would decrease irrigation water use in the Aravaipa Canyon Basin by an estimated two percent by improving irrigation efficiency.
- Growth: The Growth scenario considers historical growth trends and the land available for potential agricultural growth. Remote sensing data shows a slight increasing trend in agricultural consumptive use from 2016 to 2023. Projecting this trend out to 2075 yields a 15% increase in irrigation withdrawals. Based on the analysis of land ownership and use in the basin, ADWR concluded that there is sufficient available land to accommodate the projected agricultural growth. See Methods Appendix for more information.
- Technology: Irrigation systems are assumed to be upgraded with available technology to reduce overall water use. For the Aravaipa Canyon Basin, technology upgrades may reduce irrigation water use by approximately nine percent.



4.2.2 Municipal

Table 13. Estimated Projected Demand Volumes for the Municipal Sector for Aravaipa Canyon Basin for 2025-2075. (SDR 2025)

Scenarios	Residential Non-Provider		
	2025	2050	2075
Status Quo	-42	-42	-42
Climate – Low	-44	-44	-44
Climate – Medium	-44	-44	-44
Climate - High	-44	-44	-44
Conservation	-44	-38	-31
Growth	-44	-52	-57
Technology	-44	-38	-33

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. Residential non-provider water usage under all Climate scenarios is projected to have little to no variation in the Aravaipa Canyon Basin.
- Conservation: The Conservation scenario assumes additional water-saving measures and requirements, similar to those in the AMA 5th Management Plans, are implemented. Expected reductions on residential non-provider demand will amount to an approximate 30% in water savings.
- Growth: Under the Growth scenario, population projections produced by the Arizona Commerce Authority Office of Economic Opportunity (ACA OEO)¹⁶ were used to estimate the growth in the basin. By 2075, residential non-provider demand is projected to increase by 30% compared to 2025 levels.
- Technology: The Technology scenario assumes widespread adoption of water monitoring technologies, such as 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. Residential non-provider water demand is projected to decline an estimated 25% by 2075.

In the Aravaipa Canyon Basin, there are no Community Water Systems, municipal providers, non-residential water use, or L&U. Therefore, no projection scenarios were estimated.



4.2.3 Industrial

Table 14. Estimated Projected Demand Volumes for the Industrial Sector for Aravaipa Canyon Basin for 2025-2075. (SDR 2025)

Scenario	Grazing
Status Quo	-58

Status Quo projections were applied across all scenarios for the grazing subsector. Negative numbers indicate demands or water flows leaving the basin—all values in AF.

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

Due to ongoing projection scenario improvements, no other projection scenarios were applied to the grazing subsector for this report.

No other industrial subsectors were present in the basin. Therefore, no projection scenarios were estimated.

4.2.4 Environmental

Table 15. Estimated Projected Environmental Demand Volumes for Aravaipa Canyon Basin for 2025-2075. (SDR 2025)

Scenarios	Environmental		
	2025	2050	2075
Status Quo	-1,437	-1,437	-1,437
Climate – Low	-1,436	-1,444	-1,447
Climate – Medium	-1,437	-1,464	-1,488
Climate - High	-1,438	-1,489	-1,532

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: 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 slightly in the Aravaipa Canyon Basin as the higher temperatures increase evapotranspiration from riparian plants. Riparian water use is estimated to increase by 1.5%, in the low emissions scenario, eight percent in the medium emissions scenario, and 16% in the high emissions scenario.

5 CONCLUSION

During the baseline period, the balance between water supply and demand in the Aravaipa Canyon Basin has been positive. Estimated groundwater storage consistently increased from 306,687 AF in 1990 to 543,326 AF in 2024. The largest contributor to supply has been mountain-



front recharge, averaging 8,456 AF per year. If groundwater levels were to drop below the basin's average well depth of 250 feet, approximately 69% of existing wells would become dry. The average recorded water level of wells in Aravaipa Canyon Basin is 110 feet.

Streamflow varies greatly throughout the baseline period, with the minimum of 6,337 AF occurring in 2020, and the maximum of 93,896 AF in 1993. The median of 15,939 AF and the average of 23,349 AF vary due to the extremely high flow years associated with floods. Infiltration from both perennial streams and intermittent and ephemeral streams contribute nearly the same amount per year on average, estimated at approximately 1,800 AF annually.

Demand has remained relatively stable over the baseline period, with Agricultural and Environmental as the largest components in the Aravaipa Canyon Basin. Environmental demand has remained consistent at 1,437 AF, while Agricultural demand slowly started to reduce in 2018, decreasing from 751 AF in 2007 to 649 AF in 2024. Smaller amounts of demand were also contributed from residential non-provider and grazing.

The Aravaipa Canyon Basin remains in a positive water balance.

5.1 ATTACHMENTS

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

