



SUPPLY & DEMAND

2025

COCONINO PLATEAU

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2025 SUPPLY AND DEMAND ASSESSMENT COCONINO PLATEAU BASIN

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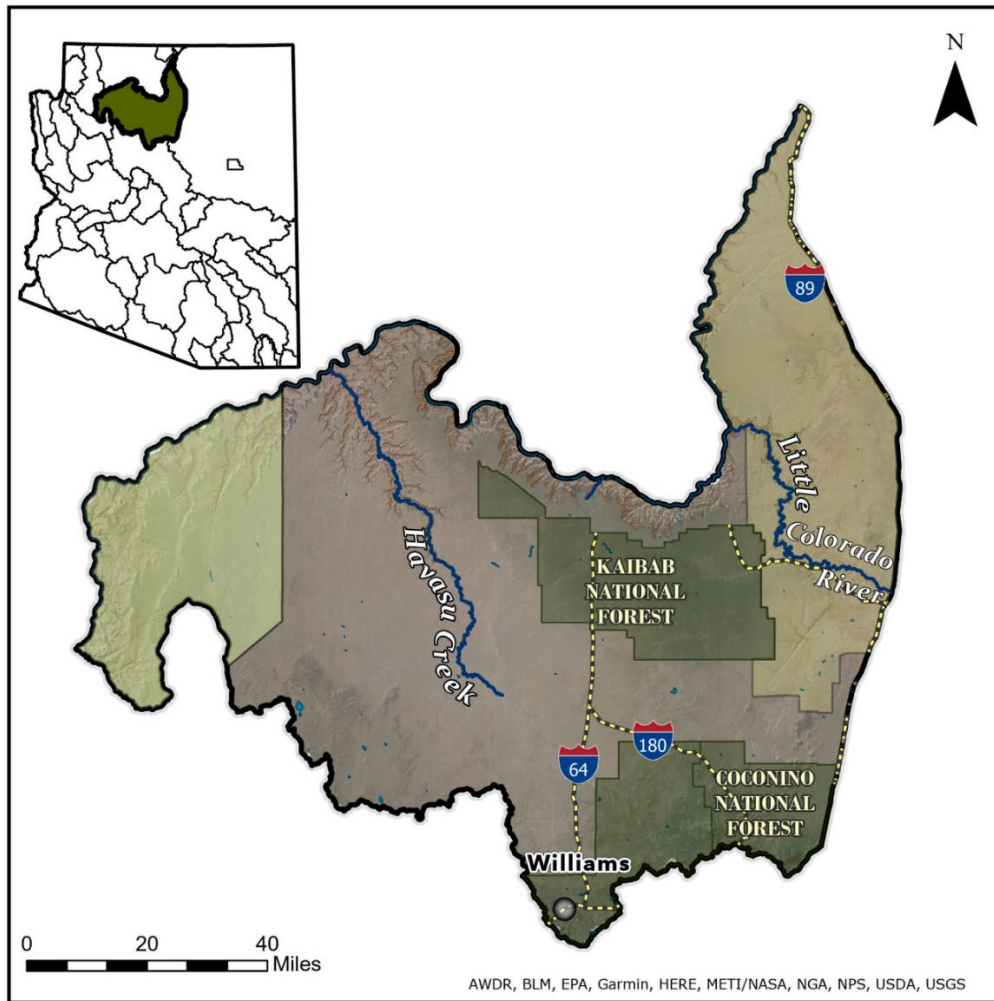


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1 INTRODUCTION

COCONINO PLATEAU BASIN



- Population Center
- Highway
- River
- Lake
- National Forest
- Hualapai Tribe Reservation
- Navajo Nation
- Groundwater Basin

Figure 1. Map of the Coconino Plateau 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). 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 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)¹). 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 § 49-1304(A)(14). <https://www.azleg.gov/ars/49/01304.htm>



1.2 PROCEDURE AND SCOPE



Figure 2. Depiction of the Coconino Plateau 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 Coconino Plateau Basin encompasses 5,812 square miles in the northern portion of the state. The basin is characterized by the Coconino Plateau in the center of the basin, the Aubrey Cliffs in the western portion of the basin, and the San Francisco Peaks in the southeastern portion of the basin. The basin is comprised of the federally recognized Havasupai, Hualapai, and Navajo Indian Reservation lands (37.3%), National Forest land (17.8%), State Trust land (15.4%), and National Park Service (NPS) land (7.4%). The basin has an estimated population of 8,060 people, and 22.0% of



the basin is privately owned. The major aquifers in the Coconino Plateau Basin consist of volcanic rock, basin fill, and sedimentary rocks. Previous storage estimates have been 3,000,000 acre-feet (AF) to a depth of 1,200 feet.² The basin has numerous streams that flow into the Colorado River including the Diamond Creek, the Havasu Creek, and the Little Colorado River.

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).³ 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 Little Colorado River and its tributaries, 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.

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

² ADWR (2009). Arizona Water Atlas, Volume 6, Section 6.1, pg. 92, Table 6.1-6.

https://infoshare.azwater.gov/docushare/dsweb/Get/Document-10431/Volume_6_Final.pdf

³ Arizona Revised Statutes § 45-141. <https://www.azleg.gov/ars/45/00141.htm>



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 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.”⁴ 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.

⁴ 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 8.1⁵ 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 8.⁶

2.3 SUPPLY RESULTS

This subsection contains ADWR’s estimates of annual supplies available to the Coconino Plateau Basin.

2.3.1 Surface Water

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

- Albers Wash
- Bekihatso Wash
- Cataract Creek (09404104)
- Cedar Wash
- Coconino Wash
- Deadman Wash
- Garden Creek
- Havasu Creek (09404115)
- Heather Wash
- Lee Canyon
- Little Colorado River (09402000)
- Little Coyote Canyon
- Miller Wash
- Monument Wash
- Pasture Wash
- Prospect Creek
- Pump House Wash (09403013)
- Red Horse Wash
- Sandstone Wash
- Sheep Wash
- Shinumo Wash
- Spring Valley Wash
- Tappan Wash

⁵ Arizona Revised Statutes Title 45, Chapter 2, Article 8.1.
<https://www.azleg.gov/arsDetail/?title=45>

⁶ Arizona Revised Statutes Title 45, Chapter 2, Article 8.
<https://www.azleg.gov/arsDetail/?title=45>



Flows on the Little Colorado River are measured with a streamgage (09402000). Flows on Cataract Creek are measured with a streamgage (09404104). Flows on Havasu Creek are measured with a streamgage (09404115). Flows on Pump House Wash are measured with a streamgage (09403013). 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 Coconino Plateau Basin for 1990-2024. (SDR 2025)

Basin	Streamflow Minimum	Streamflow Maximum	Average Streamflow (Streamgage Method)	Average Streamflow (DAR Method)	Total Average Streamflow	Median Streamflow
Coconino Plateau	104,193 ⁽¹⁹⁹⁴⁾	384,850 ⁽²⁰¹⁰⁾	152,591	35,201	187,792	157,169

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

Surface water is estimated to contribute 157,169 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 157,169 AF per year.

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

Year	Diverted Streamflow
1990	4,633
2007	4,633
2024	4,633
Average Annual Diverted Streamflow from 1990-2024	4,633

All values are shown in AF.

The estimated surface water volumes were diverted for storage in reservoirs in the Coconino Plateau Basin.

2.3.2 Groundwater

The following groundwater volumes were estimated in the Coconino Plateau Basin:



**Table 3. Estimated Streamflow Infiltration Volumes
in the Coconino Plateau Basin for 1990-2024. (SDR 2025)**

Basin	Average Annual Streamflow Infiltration (Perennial)	Average Annual Streamflow Infiltration (Intermittent & Ephemeral)	Total Average Annual Streamflow Infiltration
Coconino Plateau	12,970	24,816	37,786

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.⁷ The predominant soil type was fine-loamy.⁸ The standard storm duration utilized was 1.5 hours.⁹ Total streamflow infiltration peaked in 2010 at approximately 59,664 and was lowest in 2002 at 20,364 AF.

**Table 4. Estimated Groundwater Volumes in the Coconino Plateau 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
Coconino Plateau	-91,311	190,400	-25,100	NA	NA

All values are shown in AF.

Negative numbers indicate demands or water flows leaving the basin. NA, or Not Applicable, applies to fields without estimates.

⁷ 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>

⁸ Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture (NRCS, USDA). (2016). Web Soil Survey (STATSGO2).

<http://websoilsurvey.nrcs.usda.gov/>

⁹ 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>



- Baseflow: ADWR estimated baseflow using the USGS Hydrologic Toolbox in ArcGIS.¹⁰ Streamgauge data were utilized when available. Any gaps in the data were filled using precipitation data from PRISM¹¹ and the USGS StreamStats website.¹²
- Groundwater Inflow/Outflow: Inter-basin underflow volumes were based on USGS predevelopment maps and scientific literature estimates.¹³
- Mountain-Front Recharge: Mountain-front recharge was unable to be calculated. Please see the Methods Appendix for details on how mountain-front recharge is estimated.
- Groundwater Storage: Groundwater storage was unable to be calculated for Coconino Plateau Basin due to the low number of water level measurements available within aquifer boundaries. Please see the Methods Appendix for details on how groundwater storage is estimated.

2.3.3 Effluent

Effluent reuse began in the Coconino Plateau Basin in 2005 with the permitting of the Grand Canyon Inn Wastewater Treatment Facility, which was permitted for a relatively small amount at 20,000 gpd of maximum average flow. In 2006 the City of Williams was permitted for a Wastewater Treatment Plant and began reusing effluent. The following year the Grand Canyon National Park South Rim Wastewater Treatment Plant began reusing effluent, and most recently in 2011 Valle Airpark Wastewater Reclamation Facility began effluent reuse.

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

Year	Quantity
1990	0
2007	28
2024	126

All values are shown in AF.

The average estimated annual effluent reuse was 237 AF from 2005 to 2024.

¹⁰ 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>

¹¹ PRISM Climate Group. (2024). 30-Year Normals [dataset] <https://prism.oregonstate.edu/explorer/>

¹² USGS. (n.d.-b). StreamStats [dataset]. <https://www.usgs.gov/streamstats>

¹³ 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



2.3.4 Incidental Recharge

Sources of incidental recharge in the Coconino Plateau Basin are municipal and industrial.

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

Sector	1990	2007	2024
Agricultural	0	0	0
Municipal	110	129	150
Industrial	36	44	43

All values are shown in AF.

- **Agricultural Incidental Recharge:** Agricultural incidental recharge depends on the total irrigation withdrawals and irrigation efficiency within a basin. There is no agricultural water use in the Coconino Plateau Basin, so no agricultural incidental recharge occurs.
- **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 by 40 AF over the baseline period.
- **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 over the baseline period from 36 AF in 1990 to 43 AF in 2024. The increase in industrial incidental recharge can be attributed to the increase in irrigated acreage in the basin 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 Coconino Plateau 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 Coconino Plateau 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 Coconino Plateau Basin.

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

Sector	Subsector/Water Type	Year		
		1990	2007	2024
Agricultural	Agriculture	0	0	0
Municipal	Residential Provider	-425	-482	-579
	Residential Non-Provider	-98	-111	-133
	Non-Residential	-249	-315	-343
	L&U	-94	-112	-129
Industrial	Dairies	0	0	0
	Feedlots	0	0	0
	Grazing	-170	-170	-170
	Mining	0	0	-28
	Power	0	0	0
	Sand and Gravel	-82	-245	-271
	Turf	-328	-408	-426
	Other	0	0	0
Environmental	Riparian	-2,282	-2,282	-2,282

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.

There is no agricultural water use in the Coconino Plateau Basin.

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 Coconino Plateau Basin has an estimated 8,060 residents, with the most significant towns being Williams, Valle, and the unincorporated town of Supai. Water demand is influenced by visits to federally managed sites such as the Grand Canyon National Park, which draws nearly 5 million visitors annually, where water is used for visitor centers, lodging, the Grand Canyon airport, and recreational facilities. Transitory water use also occurs along major transportation corridors, including U.S. Route 180, Interstate 40, and State Route 64, which serve as vital corridors for regional travel and tourism.



- Residential Provider: Residential provider use is supplied by a municipal provider, or a Community Water System (CWS) as defined in A.R.S. § 45-341¹⁴. The Coconino Plateau Basin has approximately 6,553 residents served by a CWS. From 1990 to 2024, residential provider water demand in the basin increased by 36%, with a slower annual growth rate of approximately 3 AF. After 2007, the average annual growth rate doubled to approximately 6 AF, indicating a shift in service area population and water use patterns over time.
- 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 1,507 residents in the basin rely on self-supplied water resources. Between 1990 and 2024, residential water demand among non-provider users rose by 36% with a steady increase of approximately 1 AF annually.
- 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 38%, driven in part by increased tourism and other economic activities.
- 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 increased steadily at 1 AF annually, resulting in a 37% overall rise.

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 Coconino Plateau Basin come from grazing, the irrigation of turf facilities, mining, and sand and gravel operations.

- Grazing: Grazing demand is defined as the water used to maintain stock ponds for the sole purpose of watering livestock. An estimated 10,128 cattle graze in the Coconino Plateau Basin, consuming 170 AF of water annually.
- Mining: Mining demand is defined as water use that is consumed for the purposes of extracting or processing ore or minerals. The Pinyon Plain mine, historically known as the Canyon mine, is the only operational uranium mine in the state. The mine began dewatering in 2016 and became commercially operational in late 2023. From 2016 to 2023, the average annual water use at the mine was estimated to be 26 AF.

¹⁴ Arizona Revised Statutes § 45-341. <https://www.azleg.gov/ars/45/00341.htm>

- Sand and Gravel: Sand and gravel demand accounts for the water use of any facility or establishment that produces aggregates or quarried materials. Water demands for sand and gravel facilities increased over the baseline period from 82 AF in 1990 to 271 AF in 2024. The increase in water demand can be attributed to the addition of new facilities becoming operational in the basin.
- Turf: Turf demand is defined as the irrigation or maintenance of any area of landscaping that is not part of a private residence. From 1990 to 2024, the irrigation demands for turf facilities increased by 30% as new facilities were constructed 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 Coconino Plateau Basin is found in the Grand Canyon on the Colorado River and Havasu Creek. Small riparian zones are also found in forested areas near Williams in the southeast of the basin. 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 2,282 AF.

3 COMBINING SUPPLY AND DEMAND

Due to the lack of available water level measurements, ADWR has not estimated the amount of groundwater in storage for this basin. However, other water supply components have been assessed, such as streamflow, streamflow infiltration, and groundwater inflow, alongside various demand sectors. Despite these estimates, the lack of groundwater storage data prevents the complete combination of supply and demand results, limiting ADWR's ability to present a comprehensive picture of the basin's overall water budget.

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

4.1.2 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 Coconino Plateau Basin for 2025-2075. (SDR 2025)

Basin	Volume
Coconino Plateau	199,685

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

In the Coconino Plateau Basin, groundwater storage was not estimated due to a lack of available water level measurements. Therefore, no projection scenarios were applied for groundwater storage.

4.1.4 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 Coconino Plateau Basin for 2025-2075. (SDR 2025)

Scenario	Volume
Status Quo	174

All values are shown in AF.

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

Scenario	2025	2050	2075
Growth	175	184	172

All values are shown in AF.

For the Growth scenario, the estimated volume of effluent increases or decreases according to projected population change percentages by the Arizona Office of Economic Opportunity.¹⁵

4.1.5 Incidental Recharge

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

Sector	Scenario	2025	2050	2075
Municipal	Status Quo	132	132	132
	Climate – Low	140	141	141
	Climate – Medium	140	142	144
	Climate - High	140	144	148
	Conservation	139	121	103
	Growth	155	163	158
	Technology	140	125	111

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 increase by approximately one percent under the low emissions scenario, three percent in the medium emissions scenario, and six percent in the high emissions scenario.

¹⁵ Arizona Commerce Authority (ACA). (2022a). Population Estimates. Arizona Commerce Authority. <https://www.azcommerce.com/oeo/population/population-estimates/>



- Conservation: Under the Conservation scenario, additional water-saving measures and requirements similar to those in the initial AMAs' 5th Management Plan are implemented. Under this 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)¹⁶ were used to estimate the growth in the basin. The basin is projected to see a rise in water demand by approximately two percent overall, with a five percent increase occurring between 2025 to 2050. After 2050, the rate of growth decreases, reflecting a shift in service area population, resulting in an overall decline of three percent.
- Technology: The Technology scenario assumes widespread adoption of water monitoring technologies, such as advanced meter 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 Coconino Plateau Basin for 2025-2075. (SDR 2025)

Sector	Scenario	2025	2050	2075
Industrial	Status Quo	42	42	42
	Climate – Low	43	44	44
	Climate – Medium	43	46	48
	Climate - High	43	48	52
	Conservation	41	40	40
	Growth	42	42	42
	Technology	42	41	40

All values are shown in AF.

- Status Quo: The Status Quo scenario estimated projected volume will remain constant through 2075.
- Climate: The Climate scenario assumes that rising temperatures will increase irrigation needs for turf, which in turn will increase incidental recharge. Industrial incidental recharge is projected to increase by 1 AF in the low emissions scenario, 5 AF in the medium emissions scenario, and 9 AF in the high emissions scenario.
- Conservation: The Conservation scenario assumes that turf facilities will increase irrigation efficiency over time. Industrial incidental recharge is projected to decrease by 2.4% once all conservation practices are fully enacted.
- Growth: Status Quo projection volumes were applied in the absence of a defined Growth scenario.



- Technology: 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 reduce industrial incidental recharge by 2 AF, or 4.8%.

4.1.6 Agricultural Incidental Recharge

- There is no estimated agricultural incidental recharge in the Coconino Plateau Basin. Therefore, no projection scenarios were estimated.

4.2 DEMAND PROJECTION RESULTS

4.2.1 Agricultural

There is no estimated agricultural demand in the Coconino Plateau Basin. Therefore, no projection scenarios were estimated.

4.2.2 Municipal

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

	Residential Provider			Residential Non-Provider		
	2025	2050	2075	2025	2050	2075
Status Quo	-495	-495	-495	-114	-114	-114
Climate – Low	-121	-121	-121	-525	-527	-528
Climate – Medium	-121	-122	-124	-526	-532	-539
Climate - High	-121	-124	-127	-526	-540	-553
Conservation	-523	-455	-387	-120	-105	-89
Growth	-583	-612	-592	-134	-141	-136
Technology	-523	-469	-415	-120	-108	-95

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

	Non-Residential			L&U		
	2025	2050	2075	2025	2050	2075
Status Quo	-330	-330	-330	-115	-115	-115
Climate – Low	-343	-343	-343	-417	-417	-417
Climate – Medium	-343	-343	-343	-417	-418	-419
Climate - High	-343	-343	-343	-417	-419	-421
Conservation	-343	-343	-343	-121	-80	-73
Growth	-345	-363	-351	-130	-137	-132
Technology	-343	-343	-343	-121	-114	-106

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: Under the Climate scenario, rising temperatures and increased evaporation rates are expected to increase water demands. By 2075, residential provider demand is projected to see no increase under the low emissions scenario, three percent under the medium scenario, and five percent under the high scenario. Residential non-provider demand by 2075 is estimated to rise one percent under the low emissions scenario, three percent under the medium scenario, and five percent under the high scenario. Non-residential demand is expected to remain unchanged across all scenarios. Lost and Unaccounted (L&U) for water is anticipated to show no change under the low emissions scenario, a minimal increase under one percent for the medium scenario, and a one percent increase 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 and residential non-provider demand is projected to decline by 26%. Non-residential demand is expected to remain constant throughout the projection period. The total volume of L&U water is projected to decrease by 40%.
- 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. Residential provider water demand is projected to increase overall by approximately two percent by 2075. Due to expected shifts in the service area population, the basin is estimated to experience an increase of five percent in demand by 2050, followed by a decline in growth resulting in a three percent reduction in demand by 2075. Residential non-provider demand is projected to follow a similar trajectory of an overall decrease of approximately one and a half percent by 2075, with a five percent increase from 2025 to 2050, followed by a gradual decline of three and a half percent by 2075. Non-residential demand is expected to rise approximately two percent over the projected period, with a rise in demand of five percent by 2050, followed by a decrease of three percent until 2075. The total volume of L&U water is projected to follow a similar trend with an overall increase in water demand of two percent by 2075, with an increase of five percent from 2025 to 2050, and a decline of four percent from 2050 to 2075.
- 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. By 2075, the residential provider and residential non-provider demand is anticipated to decline by 21%. Non-residential demand is expected to remain constant with no changes. The total volume of L&U water is projected to reach a decrease of 12% by 2075.



4.2.3 Industrial

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

	Grazing	Mining	Sand and Gravel
Status Quo*	-170	-28	-271

* Status Quo projections were the only projection scenarios that were applied to grazing, mining, and sand and gravel 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 limited expected impact of a given scenario on the subsectors.

	Turf		
	2025	2050	2075
Status Quo	-413	-413	-413
Climate – Low	-426	-430	-434
Climate – Medium	-427	-446	-465
Climate - High	-428	-466	-503
Conservation	-426	-400	-400
Growth			
Technology	-412	-404	-395

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
 - Turf: Increased temperatures and evapotranspiration are expected to raise overall turf irrigation requirements in the Climate scenarios. In the low emissions scenario, irrigation demands are estimated to increase by two percent. In the medium and high emissions scenarios, irrigation demands are estimated to increase by nine percent and 18%, respectively.
- Conservation
 - Turf: Under the Conservation scenario, increased irrigation efficiency requirements are expected to have a moderate impact on total water use. Conservation measures are projected to decrease irrigation demands by 26 AF, or six percent.
- Technology
 - Turf: The conversion of eligible natural turf acres to synthetic turf is projected to decrease irrigation demands by four percent.



4.2.4 Environmental

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

	Environmental		
	2025	2050	2075
Status Quo	-2,282	-2,282	-2,282
Climate – Low	-2,282	-2,291	-2,297
Climate – Medium	-2,282	-2,320	-2,351
Climate - High	-2,282	-2,352	-2,397

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 in the Coconino Plateau 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

ADWR assessed water supply components in the Coconino Plateau Basin, including streamflow infiltration, groundwater inflow, and incidental recharge. Demand values estimated remained constant or steadily increased throughout the baseline period. However, ADWR was unable to calculate a comprehensive water budget due to the lack of available water level measurements needed to estimate groundwater storage, limiting a complete assessment of the basin. No determination can be made about the percentage of wells that would become dry if the water elevation was lowered to the average well depth since no groundwater storage calculation is currently possible for the basin.

A comprehensive water budget for the Coconino Plateau Basin is unable to be completed at this time.

5.1 ATTACHMENTS

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

