

ARIZONA WATER FACTSHEET Graham County

Get to know water in your county
May 2023



THE UNIVERSITY OF ARIZONA
COOPERATIVE EXTENSION

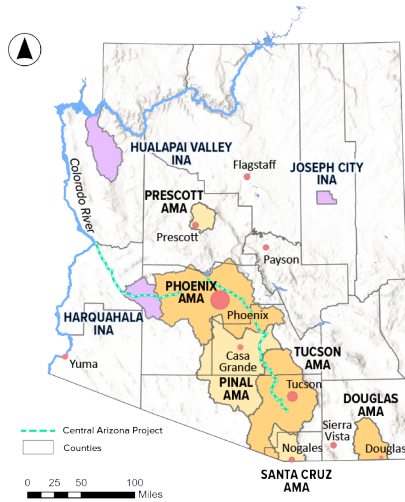
WATER RESOURCES RESEARCH CENTER

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Water in Arizona

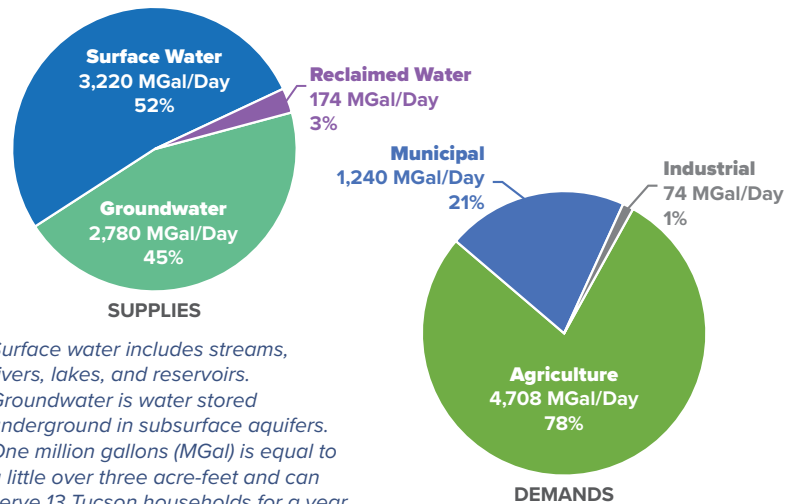
Arizona's future depends on sustainable water supplies, which in turn depend on vigilant and innovative management of those supplies. From low deserts to high mountains, counties and communities face different water challenges and take different approaches to addressing those challenges, while conforming with regional, state, and federal requirements. The Arizona Department of Environmental Quality (ADEQ) is responsible for water quality and tasked with enforcing federal environmental standards. The Arizona Department of Water Resources (ADWR) oversees the use of surface water and groundwater, which are legally distinct though physically interconnected. In general, ADWR regulates groundwater more strictly in Active Management Areas (AMAs) than in the rest of the state.

Statewide Context



County and AMA boundaries (WRRC 2021).

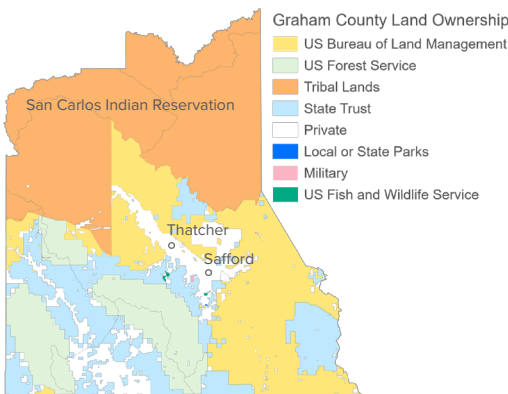
Arizona Water Supply and Demand



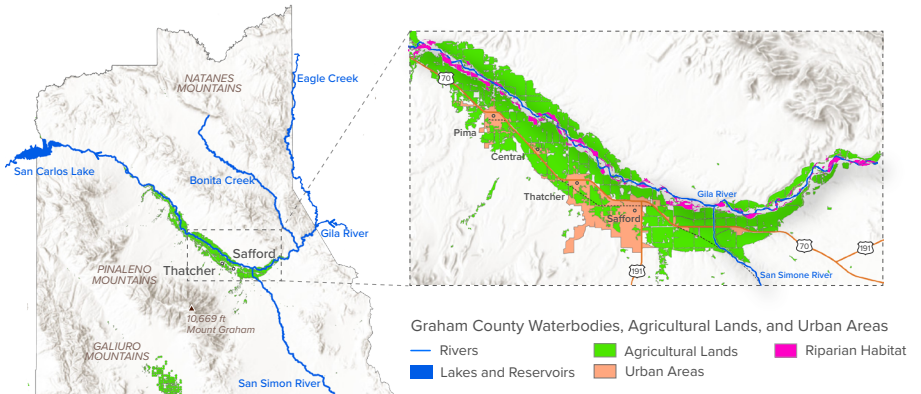
Surface water includes streams, rivers, lakes, and reservoirs. Groundwater is water stored underground in subsurface aquifers. One million gallons (MGal) is equal to a little over three acre-feet and can serve 13 Tucson households for a year (Tucson Water 2018, USGS 2015).

Water in Graham County

Graham County is located at the crossroads of the Sierra Madre Occidental and Rocky Mountains, characterized by steep ranges and low-lying valleys. Mount Graham caps the Pinaleno Mountains at 10,669 feet - the third highest range in Arizona and sacred to the region's Indigenous communities. Annual precipitation ranges from 16-30 inches in these high woodland and conifer forests compared to 8-12 inches in surrounding low desert elevations. The Upper Gila River, which flows west through the county toward Phoenix, has important legal, economic, and cultural significance in the county. The Gila River provides water for farming, communities, and natural areas. Water and land are managed differently depending on ownership (36% Tribal, 17% state, 37% federal, and 10% private), with private land concentrated along the river.



Land ownership in Graham County (Arizona State Land Department 2020).



Graham County waterbodies, agricultural lands, riparian habitat and urban areas (USGS WBD 2022, US Census Bureau 2020, FWS 2022, USDA 2011).

Frequently Asked Questions

Where Does Graham County's Water Come From?

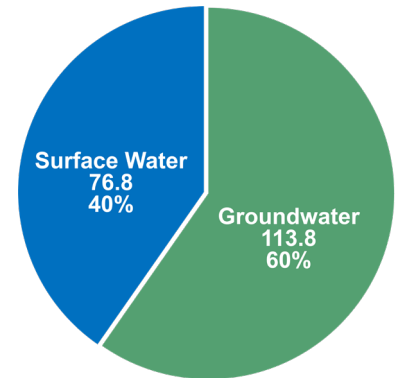
Water supplies in Graham County come from groundwater (60%) and surface water (40%).

Groundwater

Groundwater use is regulated by ADWR within **Active Management Areas (AMAs)**, areas with a history of heavy reliance on groundwater.

Graham County is not located within an AMA, but certain regulations of the **1980 Arizona Groundwater Management Act (GMA)** apply, including the **Assured and Adequate Water Supply Program (AAWS)**.

- An "Adequate Water Supply" means that enough clean water will be legally and continuously available for 100 years. This program requires a water adequacy report from ADWR before land may be subdivided into more than five lots, and potential buyers of subdivided lots must be informed of the result.
- The City of Safford, which also serves the Town of Thatcher and county residents, is the only water provider with a Designation of Adequate Water Supply.
- Additionally, the **Arizona Water Settlements Act (AWSA)** of 2004 limits groundwater pumping upstream of the Gila River Indian Community on lands subject to the 1935 Globe Equity Decree.



Sources (Million Gallons/Day) for Graham County's water (USGS 2015).

Shallow alluvial aquifers support Gila River flows in Graham County. Adequate rainfall can recharge these aquifers fairly quickly, but the groundwater reserves can otherwise be stressed by drought and extensive groundwater pumping by near-stream wells.

Surface Water

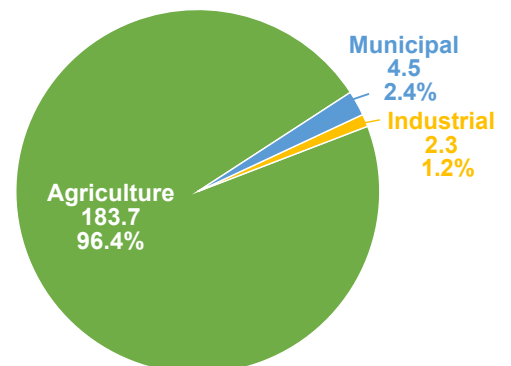
- The Gila River and its tributaries (Eagle Creek, Bonita Creek, and San Simon River) provide most surface water, fed by some seasonal snowmelt.
- Surface water rights in Arizona are determined by the doctrine of prior appropriation, otherwise known as "first in time, first in right."
- In the Gila River Watershed, surface water rights are also governed by several state and federal laws, court orders, and settlements, including the 1935 Globe Equity Decree, the AWSA, the 1992 San Carlos Apache Water Rights Settlements Act, and are subject to the ongoing Gila River General Stream Adjudication.

How Is Water Used in Graham County?

Agriculture accounts for the largest water demand in Graham County (96.4%). Municipal use (residential and commercial) accounts for 2.4% of total demand, while industrial use, including mining, makes up the remaining 1.2%.

Gila River surface and subsurface water supplies are critical to agriculture in Graham County, as well as for Tribal entities and municipal supplies. Agriculture is an important cultural and economic mainstay of the region.

- While the Gila River Valley uses groundwater and surface water for agriculture, the southwest part of the county depends on groundwater exclusively.
- The dominant crops irrigated in the county include cotton, grains, oilseeds, dry beans, and dry peas. Cattle ranching accounts for the largest number of agricultural acres.
- Agricultural use within San Carlos Apache Tribal lands supports small scale agricultural production as well as cattle ranching



Water use (Million Gallons/Day) in Graham County (USGS 2015).

The continued use of water to support agriculture will need to be planned, taking into account the limits brought on by drought and climate change.

What Water Challenges Does Graham County Face?

Water Quantity Challenges

Climate Change. Climate and ongoing drought conditions impact the amount of water available for plants, animals, and human use. Groundwater pumping can intensify the decline of surface flows in natural channels by lowering water tables, disrupting flow among surface waterbodies. The long-term conservation of water and land is dependent on the connection between surface water and groundwater.

Drought. Long-term drought conditions stress water supplies, decreased and have historically resulted in fallowed farmland (acreage taken out of production) and conservation measures enacted by the City of Safford.

Legal Processes. Surface water and groundwater in Graham County are affected by complex legal proceedings and governance structures that influence the availability of water supplies for communities, Tribes, agriculture, and industry. Combined with increasing water scarcity, this complicated legal framework creates uncertainty about how water user groups will be impacted by a potentially increasing gap in water supply and demand.

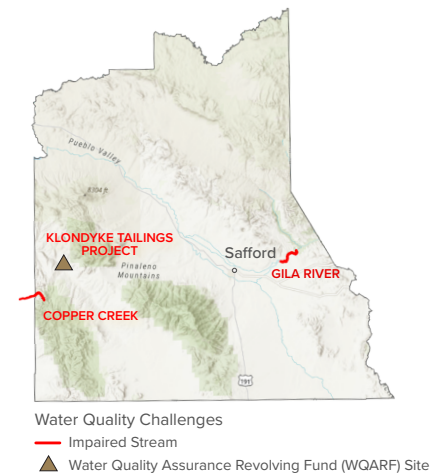
Water Quality Challenges

Geology. Because of the geology of the Gila River Valley, much of the groundwater in Graham County is high in dissolved minerals, like salts, and requires additional treatment for use in agricultural production.

Groundwater Contamination. The Klondyke Tailings Project site has been designated a Water Quality Assurance Revolving Fund (WQARF) site by ADEQ. WQARF sites pose public and environmental health risks due to hazardous substances found in nearby groundwater. Since 2008, there have been several remediation efforts that were completed successfully in 2018.

Surface Water Pollution. Portions of Copper Creek and the Gila River have been designated as impaired by ADEQ. Contaminants are derived from mining, road development, agriculture, grazing, and logging operations.

Emerging Contaminants. Contaminants of emerging concern are found throughout Arizona waterways. They include ingredients found in pharmaceuticals, household items, fire retardant fabrics, and personal care products. U.S. EPA has set legally enforceable limits on some PFAS and water systems are responsible for monitoring and finding ways to limit or eliminate exposure.



Impaired streams and WQARF site (ADEQ 2022).

How Is Graham County Moving Toward Sustainable Water Management?

As water resources become strained, different sectors apply various strategies to conserve or increase supplies.

Irrigation Efficiency. Limitations on the total amount of water available for irrigation (six acre-feet of water/acre per the 1935 Globe Equity Decree) has encouraged growers to practice a higher level of water efficiency. Some of these efficiencies have been achieved through general crop management and delaying irrigation events until a crop reaches the highest level of stress that can be tolerated without yield loss. The use of drip irrigation has increased efficiency dramatically but has introduced issues related to salinity management.

Watershed Restoration. The Gila Watershed Partnership, based in Safford, supports water-based tourism along the Gila River and its tributaries and is involved in regional watershed restoration and education efforts. These efforts focus on the removal of invasive species within the Upper Gila River Watershed, which benefits river flows and riparian habitat along with access to the river and water supplies.

Water Reuse. Reclaimed water, also known as recycled water or treated effluent, is an increasingly valuable water supply. Safford uses their reclaimed water for irrigation, discharging surplus supplies into to the Gila River, which benefit the plants and animals along the river and can recharge groundwater aquifers.

Audubon Arizona estimates \$100 million is generated annually from water-related recreation in Graham County.

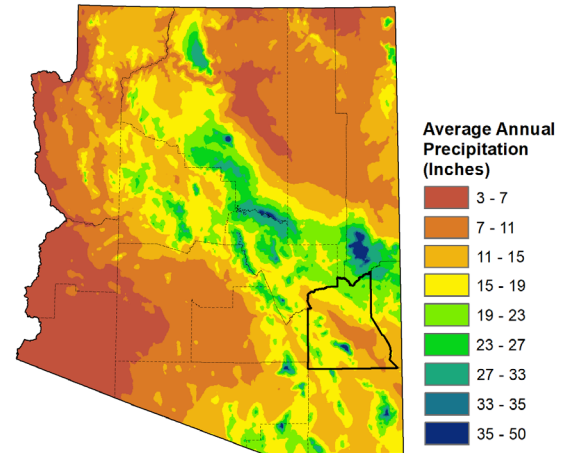
What Does Graham County's Future Water Situation Look Like?

The state of Arizona has been experiencing drought conditions for over 20 years. A hotter and drier future means increased pressure on water supplies for competing demands for county water resources. Drought and climate change pose significant risks to Graham County, including:

- Unpredictable weather patterns, more severe storms and flooding, as well as increasing temperatures create challenges for communities and agriculture.
- The lengthening of the growing season and number of frost-free days will also require agriculture to adjust to a changing climate.

The General Stream Adjudication has serious implications for the future of communities and industries reliant on water from the Gila River. The Adjudication will determine the nature, extent, and priority of water rights within the watershed. The question of who has the rights to access this water resource is a yet unresolved legal question.

As water resources in the state are stressed, education will be critical to promote an understanding of water sources and limitations, as well as encourage an ethic of water conservation and watershed stewardship. Continued local and regional cooperation is necessary among the region's key water users to encourage information sharing, create partnerships to address vulnerabilities to water shortages, and work toward comprehensive and sustainable water management.



Mean Precipitation 1981-2010 (PRISM Climate Group 2016).

Additional Resources

The WRRC compiled and periodically updates a list of additional resources related to water in Arizona. These resources range from statewide information to information available from local watershed groups and non-profits. Visit the [WRRC website](#) to see a complete list. The resources used for this factsheet are listed below.

WRRC Water Map

A reliable and concise visual representation of Arizona's water resources. This map includes information on land ownership, water use by groundwater basin, annual precipitation, subsidence and groundwater storage, annual water use by region, supply and demand, Colorado River apportionment, and more. [Map Info](#)

Statewide Water Resources

- **ADEQ Emerging Contaminants Report:** An assessment of the emerging contaminants in Arizona's water supplies.
- **ADEQ Impaired Water Information:** Maps and information about the impaired surface waters in the state.
- **ADEQ WQARF Registry:** A list of WQARF sites across the state with descriptions of the individual sites.
- **ADWR Community Water System Map:** A map of water providers and their service areas.
- **Cooperative Extension Water Wise:** Information on water saving techniques for Arizona relating to irrigation, gray water, and rainwater harvesting.
- **Desert Water Harvesting Initiative:** Resources for local water harvesting and Green Infrastructure.
- **PRISM database:** Data on historic and current climate patterns, used for the precipitation map of Arizona.
- **USGS Ground Water Atlas of the United States:** Information about aquifers throughout the US.
- **Tribal Water Rights:** Information on Tribal water usage in the Colorado River basin and the barriers to that usage.

Regional Management and Planning

- **Atlas of Upper Gila River Watershed:** Information on the natural, water, and cultural resources of the Upper Gila River Watershed
- **ADWR Supply and Demand Assessments:** Ongoing assessments of average well depths in every groundwater basin in the state.
- **Audubon Arizona:** Impact of recreation on Arizona's rivers, lakes, and streams on statewide and local economies.
- **General Stream Adjudication:** Ongoing legal proceedings of the Gila and Little Colorado Rivers.
- **Gila Watershed Partnership of Arizona:** A nonprofit organization focused on conservation, restoration, and education efforts within the Upper Gila River Watershed.
- **Water for Arizona:** A multi-stakeholder coalition focused on securing sustainable water supplies for the state.

County Specific Water Resources

- **A Guide for Landowners on the Upper Gila River:** Guide on activities legally allowable on land adjacent to the Gila River.
- **Agriculture in Graham and Greenlee Counties:** A summary of agricultural production and analysis of its economic contribution in Graham and Greenlee counties.
- **Arizona County Agricultural Economy Profiles:** Agriculture, water use, and regional economic data by county.
- **Wet Water and Paper Water in the Upper Gila River Watershed:** Overview of the legal framework governing water allocation and use in the Upper Gila River Watershed.