



ARIZONA WATER FACTSHEET Apache County

Get to know water in your county
April 2024



THE UNIVERSITY OF ARIZONA
COOPERATIVE EXTENSION

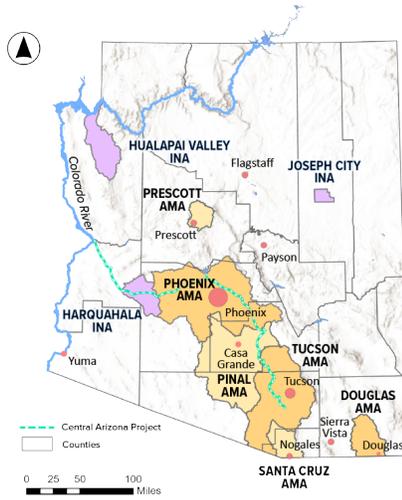
WATER RESOURCES RESEARCH CENTER

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Water in Arizona

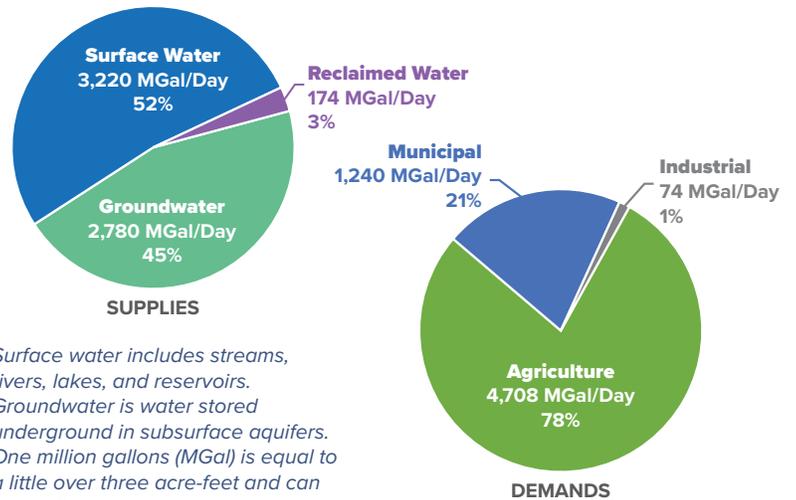
Arizona's future depends on sustainable water supplies, which in turn depend on vigilant and innovative management of those supplies. From low deserts to high mountains, counties and communities face different water challenges and take different approaches to addressing those challenges, while conforming 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, AMA, and INA boundaries (WRRC 2023).

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 Apache County

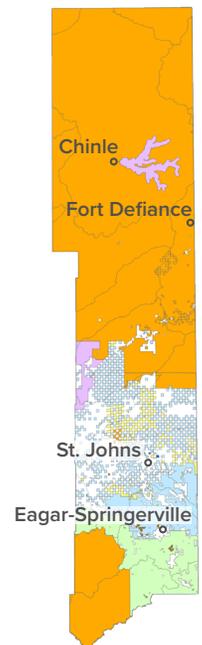
Apache County is Arizona's third-largest, spanning 11,216 square miles, and is located in the northeast corner of the state, within the Four Corners region. Coniferous forests cover the higher elevations, including the White Mountains in the south, where peaks rise above 10,000 feet, and the Defiance Plateau and Chuska Mountains in the north and east. Lower elevations contain a mosaic of pinon and juniper woodlands, short grass plains, and low mountains. Average annual precipitation varies widely across the county, ranging from 2 to 39 inches depending on elevation and location.

Major surface water sources in the county include the Black and White Rivers, which feed into the Salt River, and Chinle Creek and the Little Colorado River, both tributaries of the Colorado River. Population centers include Chinle, Fort Defiance, St. Johns, and Eagar-Springerville, while 75% of the county's population reside in rural areas. Water management within the county is influenced by land ownership (65% Tribal, 37% federal, 17% state, and 10% private).

Tribal lands of the White Mountain Apache, Zuni, and Navajo Nation are found within county borders, and the Tribes maintain autonomous systems of land and water management.

- Tribal Lands
- State Trust Lands
- Bureau of Land Management
- Private Lands
- US Forest Service
- National Parks
- Arizona Game and Fish
- State and Local Parks

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



Frequently Asked Questions

Where Does Apache County's Water Come From?

Groundwater

The primary source of water in Apache County is groundwater (94%) with surface water (6%) making up the remaining supply.

Groundwater originates from underground aquifers— subsurface porous rock or sediment saturated with groundwater—found at varying depths. In Apache County, shallow aquifers, occurring chiefly in the county's central area and along the Colorado River, support surface flows and are some of the areas where natural recharge to aquifers is observed.

Groundwater use in Arizona is governed by a doctrine of reasonable use as defined by the Arizona Supreme Court. The **1980 Arizona Groundwater Management Act (GMA)** created **Active Management Areas (AMAs)**, which introduced additional regulation and conservation measures in areas with a history of heavy reliance on groundwater.

There are no areas of Apache County located within an AMA, but certain regulations of the GMA still apply:

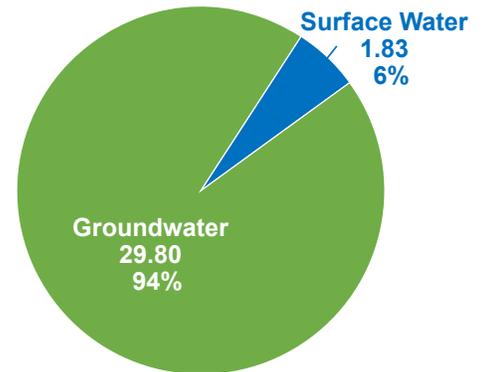
- The **Adequate Water Supply** program, administered by ADWR, applies to land subdivided into 5 or more lots. It requires a determination that water supplies of adequate quality will be physically, continuously, and legally available for 100 years. The determination of adequacy or inadequacy must be provided to buyers before subdivided lots can be sold.

Surface Water

In Arizona, surface water rights follow the "first in time, first in right" principle of prior appropriation, allowing the diversion and use of water from streams, lakes, and reservoirs.

Surface water in Apache County comes from the Little Colorado River, San Francisco River (a major tributary to the Gila River), along with other tributaries and reservoirs used for irrigation and storage.

- Distribution of these waters is regulated by a combination of court decrees, federal acts, Tribal settlements, and local governance structures.
- Irrigation districts serve an important role in Apache County, providing essential services like water distribution, infrastructure maintenance, and fair water access. These entities support agricultural productivity while balancing diverse water needs through established decrees and state laws.



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

It is estimated that \$422 million is generated annually from recreation on or along rivers, lakes, and streams in Apache County including natural and man made reservoirs, operated in coordination of local and state entities.

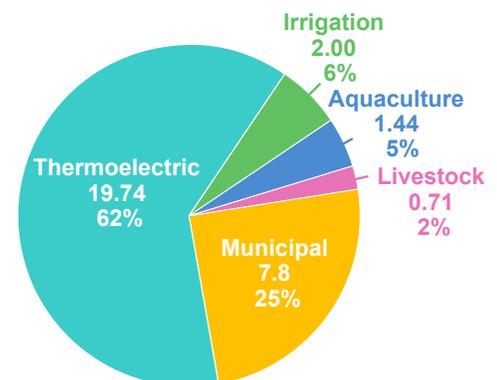
How Is Water Used in Apache County?

Most water in Apache County (62%) is used for thermoelectric power, followed by municipal uses (25%), irrigation (6%), aquaculture (5%), and livestock (2%).

Thermoelectric. Springerville Generating Station is the only remaining power plant in Apache County, using water for cooling and steam generation, essential for producing electricity and maintaining plant operations.

Agriculture. In Apache County, 77% of the land is used for farming and ranching, influenced by Tribal products and practices. Water is used for irrigation and maintaining stock ponds and reservoirs found on public and private lands and critical for both livestock and wildlife.

Aquaculture. The Alchesay-Williams Creek National Fish Hatchery Complex in Apache County annually breeds Apache, Brook, Brown, and Rainbow trout and releases them into tribal water bodies in the southwest. The facility uses a non-consumptive flow-through system for water.



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

What Water Challenges Does Apache County Face?

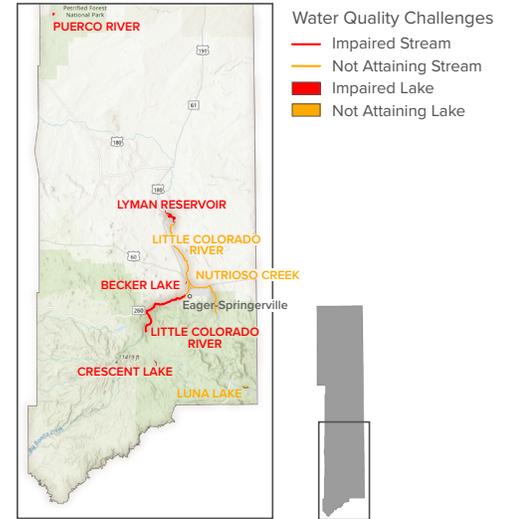
Water Quality Challenges

Surface Water Pollution. Surface water is monitored by ADEQ. In Apache County, sections of the Little Colorado River, Nutrioso Creek, and Puerco River, along with multiple lakes and reservoirs, are classified as impaired. Suspended sediment concentrations, heavy metals, nutrients, dissolved oxygen, and pH imbalances at levels that fail to meet regulatory standards have been found in these waters.

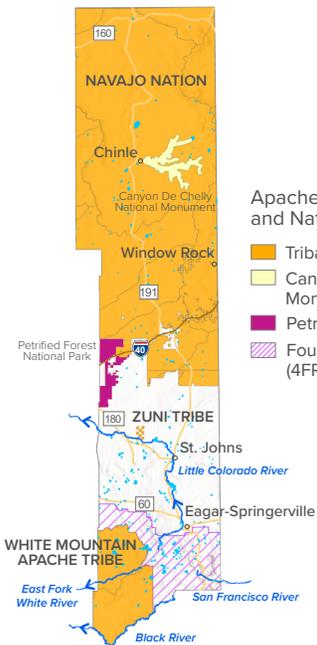
Wildfires. Wildfires can degrade water quality when rainfall events wash ash, debris, and contaminants from burned landscapes into rivers and streams. These water quality impacts can last for months or years, posing a threat to water supply resiliency through increased water treatment costs, decreased storage capacity in reservoirs, and degradation of aquatic habitats.

Water Quantity Challenges

Drought. Climate change and ongoing drought conditions impact water quantity in the region in many ways: diminishing surface water sources for people, livestock, and local wildlife, stressed vegetation and brown hillsides, and increased fire danger.



Impaired waterbodies (ADEQ 2022).



Apache County Tribal Lands, Rivers, and National Conservation Areas

- Tribal Lands
- Canyon De Chelly National Monument
- Petrified Forest National Park
- Four Forest Restoration Initiative (4FRI) Project Area

Apache County waterbodies, Tribal lands, and federal conservation areas. (NHD 2022, ASLD 2020 FWS 2022).

Tribal Water System Updates. The White Mountain Apache Tribe (WMAT) relies on the Black River, White River, and Salt River as primary surface water sources for their reservation – rivers that also contribute more than half of the streamflow to Roosevelt Lake, a major water source for the Phoenix area. In 2009, the WMAT Water Rights Quantification Agreement settled a century of dispute and included provisions for the WMAT Rural Water System to supply the Tribe's long-term water needs. This system, including

a dam, reservoir, treatment plant, and pipeline, will improve commercial water supply, recreational opportunities, flood control, and irrigation.

Legal Processes. The allocation and regulation of both surface water and groundwater in Apache County are subject to intricate legal and governance regulations, impacting water availability for various sectors including Tribal and non-Tribal communities, agriculture, and industry. Some of these governing laws, agreements, and court decrees include: the Norviel, Mineral Creek, Concho, and Globe Equity Decrees, Federal Land Policy Management Act, Zuni and WMAT Settlement Act, as well as the ongoing General Stream Adjudication for the Little Colorado and Gila Rivers.

How Is Apache County Moving Toward Sustainable Water Management?

Forest Management. Ongoing collaboration supports the Four Forest Restoration Initiative (4FRI) which includes the Apache-Sitgreaves National Forest in southern Apache County. 4FRI is part of a national effort focused on landscape-scale restoration of fire-adapted forest ecosystems, reducing fuels, and managing the risk of severe wildfires to protect communities, improve watershed health, and enhance wildlife habitat.

Irrigation Efficiency. In Apache County, irrigation entities have secured grants for converting open canals into underground pipelines, a move aimed at enhancing irrigation efficiency. These upgrades, part of broader infrastructure improvements, are largely financed through state and federal grants, reflecting a strategic approach by the county's key water stakeholders toward sustainable water use and management.

The decline of coal energy poses economic challenges for coal-reliant communities, including Tribes, but water resources that were previously used for plant operations will become available. This water might then be used to settle Tribal water rights claims, restore groundwater levels, and support broader resilience against drought and climate change.

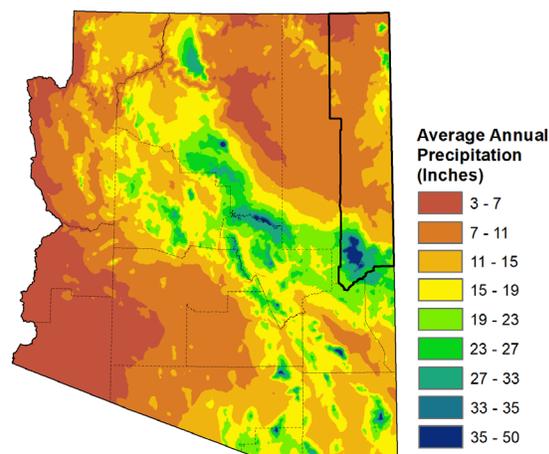
What Does Apache County's Future Water Situation Look Like?

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

- Reduced forage available for local wildlife and cattle, dry stock ponds and creeks, and increased likelihood of fire and flooding.
- According to the Arizona Department of Forestry and Fire Management, several communities within Apache County, Navajo Nation, and White Mountain Apache Tribal lands have a high risk of being affected by wildfire.

Legal frameworks and Tribal settlements, such as those with the Zuni and WMAT, play a crucial role in defining regional water allocation. However, the surface water rights of both the Navajo Nation and Hopi Tribe remain unquantified and pending settlement or adjudication in Arizona. The outcomes of these legal proceedings are critical to plan and implement Tribal water infrastructure projects that meet growing demands and address the challenges of water scarcity and climate variability.

In a sparsely populated county, stakeholder and their funding capacity can be strained by the need to coordinate among diverse entities to address aging infrastructure and landscape scale management issues. Collaboration among stakeholders and access to state and federal funding mechanisms are integral to a holistic approach to healthy and sustained water resources.



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

Additional Resources

The WRRC compiles 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:** Information about impaired surface waters in the state.
- **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.
- **Tribal Water Rights:** Information on Tribal water usage in the Colorado River basin and the barriers to that usage.

- **USGS Ground Water Atlas of the United States:** Information about aquifers throughout the US.

Regional Management and Planning

- **Arizona Groundwater Code:** 1980 Groundwater Management Act and resulting Groundwater Code.
- **Assured and Adequate Water Supply Programs:** Overview of the Assured and Adequate Water Supply programs.
- **Audubon Arizona:** Economic Impact of Arizona's rivers, lakes, and streams on statewide and local economies.
- **Four Forest Restoration Initiative:** Overview of 4FRI initiative as part of the Forest Service Wildfire Crisis Strategy.
- **General Stream Adjudication:** Ongoing legal proceedings of the Gila and Little Colorado Rivers.

County Specific Water Resources

- **Arizona County Agricultural Economy Profiles:** Agriculture, water use, and regional economic data by county.
- **Alchey-Williams Creek National Fish Hatchery Complex:** Information on hatchery operations and research.
- **Water Rights and Water Use of Coal Facilities in the Colorado River Basin:** Report on thermoelectric water rights and use, including facilities in Arizona.