

# ARIZONA WATER FACTSHEET

## Navajo County

Get to know water in your county  
June 2024



THE UNIVERSITY OF ARIZONA  
COOPERATIVE EXTENSION

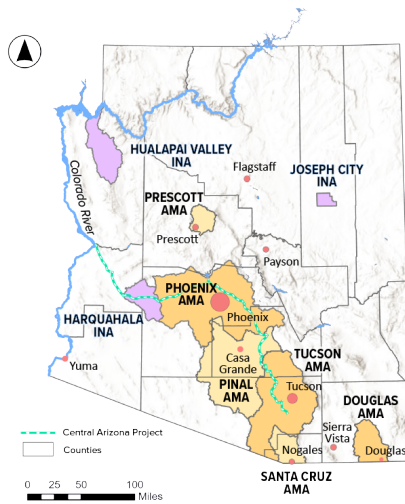
## WATER RESOURCES RESEARCH CENTER

wrrc.arizona.edu/arizona-water-factsheets

### Water in Arizona

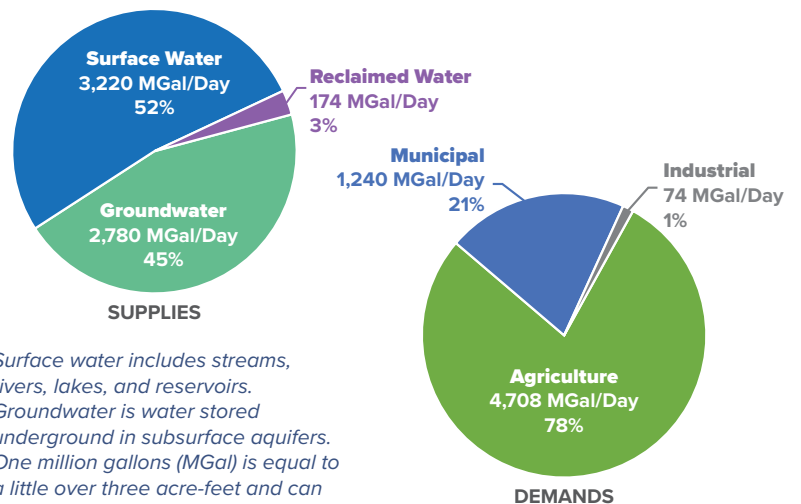
Arizona’s future depends on sustainable water supplies, which in turn depend on vigilant and innovative management of those supplies. From low deserts to high mountains, counties and communities face different water challenges and take different approaches to addressing those challenges, while conforming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



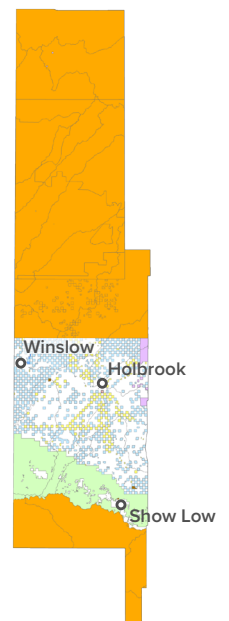
Surface water includes streams, rivers, lakes, and reservoirs. Groundwater is water stored underground in subsurface aquifers. One million gallons (MGal) is equal to a little over three acre-feet and can serve 13 Tucson households for a year (Tucson Water 2018, USGS 2015).

### Water in Navajo County

Navajo County is located in northeastern Arizona between Coconino and Apache counties with geography divided into two distinct regions by the Mogollon Rim. The northern region is arid and desert-like with flat-topped mesas, isolated buttes, valleys, and smaller plateaus. The southern region of the county has higher elevation piñon-juniper and ponderosa pine woodlands. Elevations range from 4,850 feet near Winslow to 7,575 feet at the Mogollon Rim. Average annual precipitation ranges from 7-25 inches, depending on location and elevation.

The Little Colorado River, a major tributary to the Colorado River, provides most of the county’s surface water. Water management within the county is largely influenced by land ownership (66% Tribal, 18% private, 9% federal, and 6% state) and water using entities, including the autonomous systems of land and water management of the Navajo Nation, the Hopi Indian Reservation, and the White Mountain Apache Reservation. Major population centers in the county include Winslow, Show Low, and Holbrook, with 54% of the county’s population residing in rural areas and depending on residential wells.

- Land Ownership
- 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 Navajo County (Arizona State Land Department 2020).

# Frequently Asked Questions

## Where Does Navajo County's Water Come From?

The primary source of water in Navajo County is groundwater (73.2%) with surface water (26.7%) and reclaimed water (0.1%) making up the remaining supply.

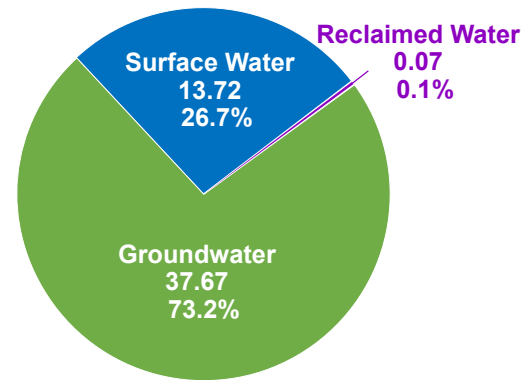
### Groundwater

Groundwater originates from underground aquifers— subsurface porous rock or sediment saturated with water—found at varying depths.

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 Navajo County located within an AMA, but certain requirements of the GMA still apply:

- In the **Joseph City Irrigation Non-Expansion Area (INA)**, the expansion of irrigated acreage is prohibited. ADWR requires irrigators to report their water use if they pump groundwater at a rate greater than 35 gallons per minute.
- 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.



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

### 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.

The Little Colorado River and its tributaries provide most of the surface water in Navajo County. In the Little Colorado River Watershed, surface water rights are governed by several state and federal laws, court orders, and settlements and are subject to the ongoing Little Colorado River General Stream Adjudication.

The state of Arizona has the most tribal agricultural producers of any state, the majority of whom are women. Navajo County is one of Arizona's three leading counties (Apache, Coconino, and Navajo) in female agricultural producers.

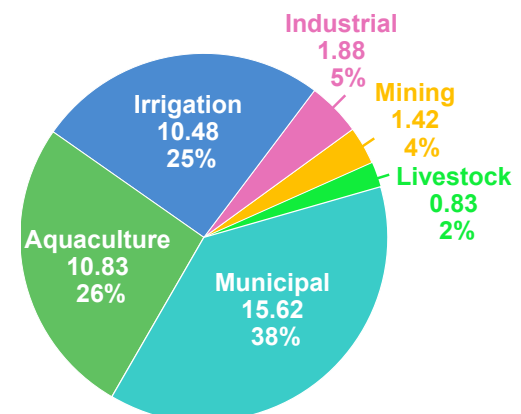
## How Is Water Used in Navajo County?

Most water use in Navajo County (38%) is municipal (domestic and commercial), followed by aquaculture (26%), irrigation (25%), industrial (5%), mining (4%), and livestock (2%).

**Agriculture.** Approximately 70% of the Navajo County's land area is used for agriculture (5,825 acres of cropland and 3,641,910 acres of pastureland), which is a top economic industry in the county. Much of the production occurs along the Little Colorado River in Tribal areas.

**Tourism.** It is estimated that \$240 million is generated annually from recreation on or along rivers, lakes, and streams in Navajo County. State and federally managed hatcheries in the county stock Arizona waterways with fish while providing native wildlife habitat and public outdoor recreation opportunities.

**Aquaculture.** Silver Creek and Alchesay-Williams hatcheries collectively raise three trout species (Apache, brown, and rainbow trout) utilizing a non-consumptive flow-through system for water.

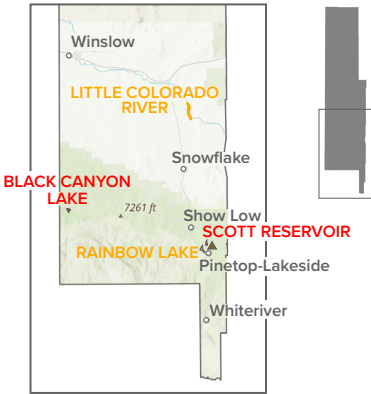


Water use (Million Gallons/Day) in Navajo County (USGS 2015).

# What Water Challenges Does Navajo County Face?

## Water Quality Challenges

- Not Attaining Stream
- Impaired Lake
- Not Attaining Lake
- WQARF Site



Impaired waterbodies (ADEQ 2022).

## Water Quality Challenges

**Surface Water Pollution.** Surface water is monitored by ADEQ. In Navajo County, a section of the Little Colorado River, along with Scott Reservoir, Black Canyon Lake, and Rainbow Lake are classified as impaired. Mercury, nutrients, dissolved oxygen, *E. coli*, pH imbalances, and suspended sediments at levels that fail to meet regulatory standards have been found in these waters.

**Groundwater Contamination.** There is one Water Quality Assurance Revolving Fund (WQARF) site in the county near Highway 260 and Johnson Lane in Pinetop-Lakeside. The contaminant of concern at this site is trichloroethene (TCE), a solvent used in metal degreasing and cleaning. Cleanup is governed by ADEQ.

**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: diminished surface water sources for people, livestock, and local wildlife; stressed vegetation and brown hillsides; and increased fire danger.

**Legal Processes.** Surface water and groundwater in Navajo 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 the impacts on water users of a potentially increasing gap between water supply and demand.

**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, will improve commercial water supply, recreation, flood control, and irrigation.

## Navajo County Tribal Lands, Rivers, and Actively Managed Forest Areas

- Tribal Lands
- Areas Highly Impacted by Wildfire
- Four Forest Restoration Initiative (4FRI) Project Area



Apache County waterbodies, Tribal lands, and wildfire management and risk areas. (NHD 2022, ASLD 2020 FWS 2022).

# How Is Navajo 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 Navajo 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.

**Flood Control.** From its headwaters in the White Mountains to the Colorado River, the Little Colorado River experiences an elevation drop of more than 6,000 feet. The variable flow of the river causes channel migration, erosion, and flooding. The newly approved construction of the Winslow Levee will protect neighboring communities as well as vital infrastructure of Interstate 40 and the Burlington Northern and Santa Fe Railway, which carries \$4 million in freight every hour.

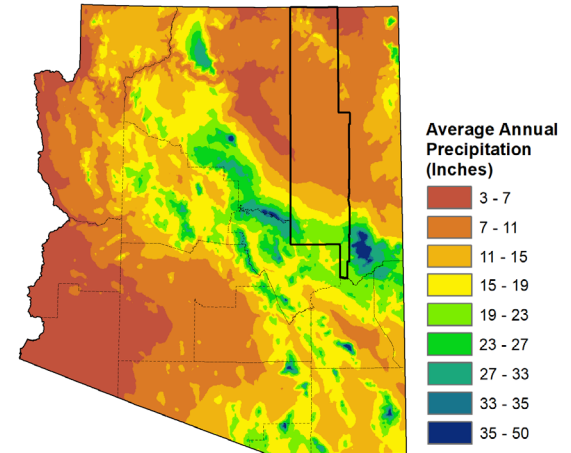
# What Does Navajo County's Future Water Situation Look Like?

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 Navajo County:

- 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 Navajo County have a high risk of being affected by wildfire.

Tribal communities in Navajo County face water management challenges due to groundwater declines and storage losses from increasing unregulated demands in surrounding areas. Legal agreements and Tribal settlements, such as with the WMAT, shape regional water distribution, but the surface water rights of the Navajo Nation and Hopi Tribe remain unquantified in Arizona, pending settlement or adjudication. Resolving these issues is crucial for planning and implementing Tribal water infrastructure projects to meet rising demands and address water scarcity and climate challenges.

As water resources in the state become increasingly strained, education will be essential to foster awareness of water sources and limitations, and to promote a culture of water conservation and watershed stewardship. Ongoing local and regional collaboration among key water users in the region is crucial to facilitate information sharing, form partnerships to address vulnerabilities to water shortages, and strive for comprehensive and sustainable water management.



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.