

ARIZONA WATER FACTSHEET Coconino County

Get to know water in your county
March 2024



THE UNIVERSITY OF ARIZONA
COOPERATIVE EXTENSION

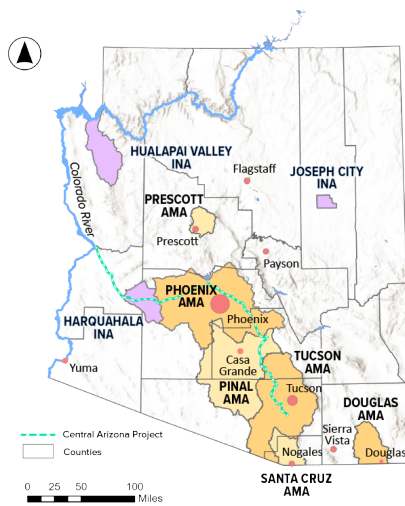
WATER RESOURCES RESEARCH CENTER

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Water in Arizona

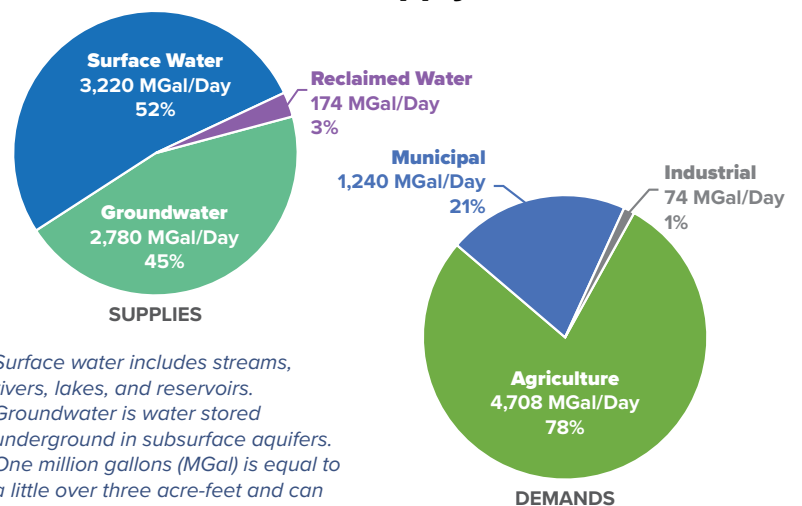
Arizona's future depends on sustainable water supplies, which in turn depend on vigilant and innovative management of those supplies. From low deserts to high mountains, counties and communities face different water challenges and take different approaches to addressing those challenges, while conforming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

Arizona Water Supply and Demand

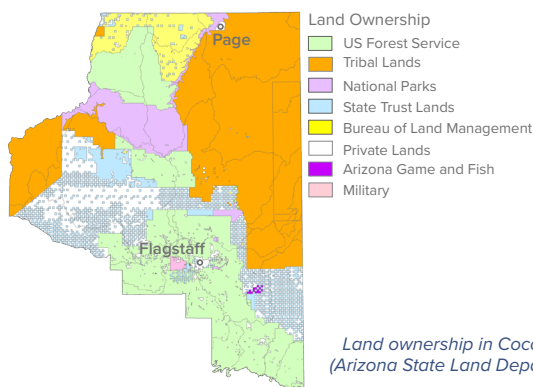


Surface water includes streams, rivers, lakes, and reservoirs. Groundwater is water stored underground in subsurface aquifers. One million gallons (MGal) is equal to a little over three acre-feet and can serve 13 Tucson households for a year (Tucson Water 2018, USGS 2015).

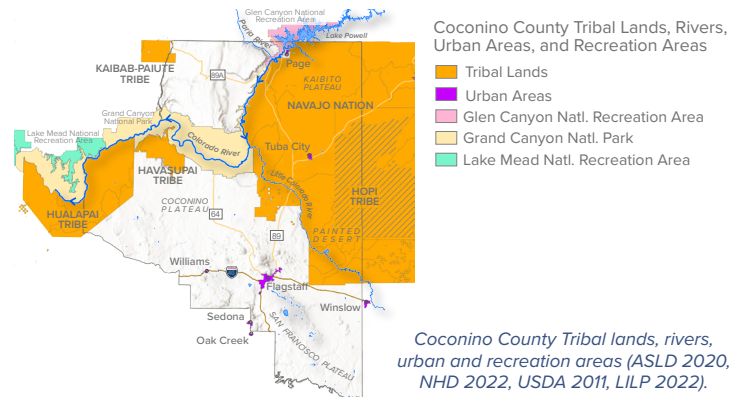
Water in Coconino County

Coconino County is the largest county in Arizona (second largest in the US), covering over 18,600 square miles. The county is renowned for the multiple national forests, parks, and monuments found within its borders, as well as critical water resources like the Colorado River, Lake Powell, and Lake Mead. Its diverse landscape is marked by rugged mountain plateaus, canyons, dense forests, and includes the rocky mesas and canyons of the Painted Desert to the east. Average annual precipitation varies from 5-39 inches depending on location and elevation.

Water management within Coconino County is influenced by land ownership (38% Tribal, 32% federal, 17% state, and 13% private). Tribal lands of the Havasupai, Hopi, Hualapai, Kaibab Paiute, and Navajo Nation are found within county borders and maintain autonomous systems of land and water management.



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



Coconino County Tribal lands, rivers, urban and recreation areas (ASLD 2020, NHD 2022, USDA 2011, LILP 2022).

Frequently Asked Questions

Where Does Coconino County's Water Come From?

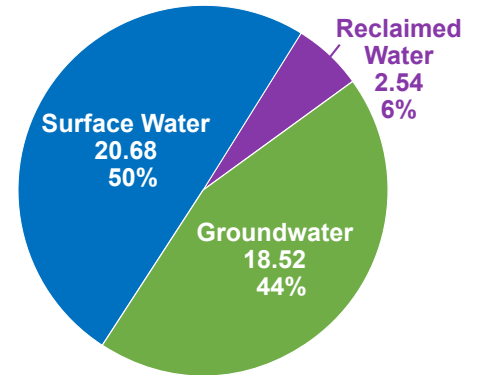
Groundwater

The most reliable groundwater resources in Coconino County occur in a series of layered aquifers within rock formations between 500 to 3,000 feet below the surface.

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 AMAs within or extending into Coconino County, but certain regulations of the GMA still apply, including:

- 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 Coconino 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.

Historically, in high elevation areas of the county, like Flagstaff, springs and snowmelt were captured for water supplies through infiltration galleries (horizontal drains) and reservoirs like Lower and Upper Lake Mary.

In northern and eastern Coconino County, the City of Page and two communities in the Navajo Nation draw water directly from the Colorado River or Lake Powell. Colorado River Water is managed by the US Bureau of Reclamation with input from ADWR regarding water rights.

Audubon Arizona estimates that \$2 billion is generated annually from recreation on or along rivers, lakes, and streams in Coconino County.

Reclaimed Water

Also known as recycled water or treated effluent, reclaimed water is a valuable resource that is being put to beneficial use in many communities within Coconino County.

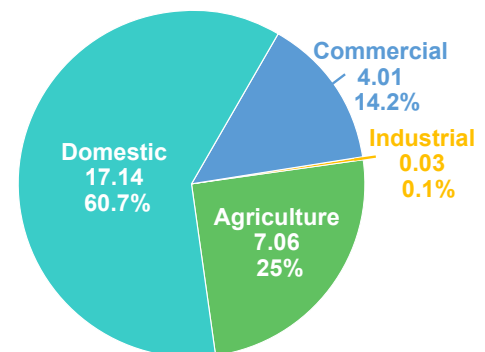
Reclaimed water for purposes such as irrigation of public parks, golf courses, snow making, and industrial uses reduces reliance on surface water and groundwater resources in the county. Reclaimed water is also used for groundwater recharge, which can help boost municipal water supplies for long term sustainability.

How Is Water Used in Coconino County?

Most water use Coconino County (60.7%) is domestic, followed by agricultural (25%), commercial (14.2%), and industrial (0.1%) uses.

Agriculture. Over 50% of Coconino County's land is dedicated to ranching (6,048,049 acres) and farming (716 acres) producing a mix of livestock and crops such as cattle, sheep, goats, horses, corn, vegetables, and hay.

Tourism. Tourism is a key economic industry in Coconino County, serving as the entry point to many national forests, parks, and monuments. Among its famous destinations are Grand Canyon National Park, Oak Creek Canyon, Sunset Crater National Monument, Navajo National Monument, San Francisco Peaks (Arizona's highest point at 12,633 feet), Lake Mead, and Lake Powell, which boasts 1,960 miles of shoreline.



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

What Water Challenges Does Coconino County Face?

Water Quality Challenges

Surface Water Pollution. Surface water is monitored by ADEQ. In Coconino County, the Colorado River, Paria River, Kanab Creek, Oak Creek, and multiple lakes are classified as impaired. Suspended sediment concentrations, heavy metals, *E. coli*, and pH imbalances at levels that exceed regulatory standards have been found in these waters. Camp Navajo is a Department of Defense (DOD) site with groundwater contamination concerns related to ammunition, waste management, and operational facilities. Uranium mining in the county and on Tribal lands has also led to concerns about abandoned mines, potential water contamination, and health effects.

Stormwater Runoff. Increased urbanization and construction in Coconino County have led to more impervious surfaces, elevating the risk of flooding, erosion, and sedimentation in waterways. Pollutants like dissolved chemicals, nutrients, plastics, bacteria, and finer sediments are also more easily carried to lakes and streams, posing threats to public and ecosystem health.

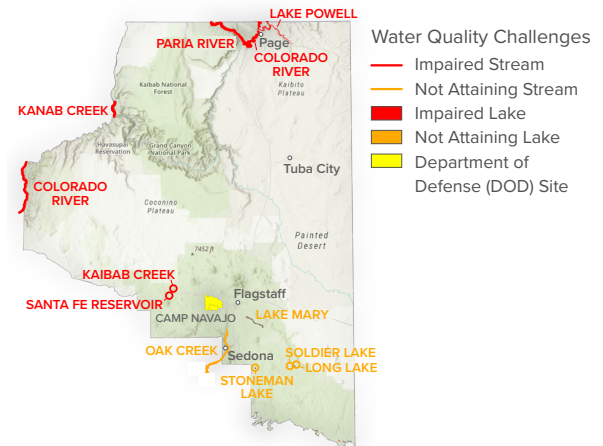
Wildfires. Wildfires alter a forest's natural storage and infiltration processes, impacting water quality. Melting snowpack and rain flow faster through burned forests, increasing erosion and carrying debris and sediment to waterways. Degraded landscapes and stream channels can also lead to decreased infiltration of water to aquifers.

Water Quantity Challenges

Drought. Climate change and ongoing drought conditions impact water quantity in the region in many ways: diminished surface water supplies for people, livestock, and local wildlife, stressed vegetation and brown hillsides, and increased fire danger. Some cities in Coconino County have become more reliant on groundwater sources since surface water reservoirs have experienced declines due to drought.

Water for the Environment. In addition to providing water to residents in Coconino County, groundwater aquifers supply the perennial flow of the region's major rivers, creeks, and springs. These waterbodies and their associated riparian areas are vital to supporting the region's wildlife and plant diversity. Climate change and increasing water demands, including increased uses of reclaimed water that currently is discharged into waterways, could reduce flows in these waters and jeopardize the species that rely on them.

Tribal Water Supplies. Tribal lands of the Havasupai, Hopi, Hualapai, Kaibab Paiute, and Navajo Nation are focusing on securing water rights, collaborative agreements, and sustainable management solutions for future water security. These steps are vital for their economic growth, conservation efforts, and cultural preservation amidst climate change and water scarcity challenges.



Impaired waterbodies and DOD site (ADEQ 2022).

How Is Coconino County Moving Toward Sustainable Water Management?

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

Forest Restoration for Watershed Health. Coconino County's Forest Restoration Initiative, which includes the Flagstaff Watershed Protection Project, prioritizes watershed health to reduce flooding risks and protect water supplies. Key strategies include forest thinning and comprehensive restoration efforts. These initiatives significantly decrease the likelihood of destructive floods and pollutant and sediment runoff to waterbodies.

Reclaimed Water Use. Use of reclaimed water is an integral part of the county's sustainable water management and conservation of groundwater supplies. In addition to using reclaimed water for irrigation and snow making, excess supplies are discharged into rivers to support riparian habitats and groundwater recharge.

Through voluntary programs, Flagstaff and other communities in Coconino County have cut their water use by 66% (from 120 gallons to 40-50 gallons per day), even with a 30% increase in population.

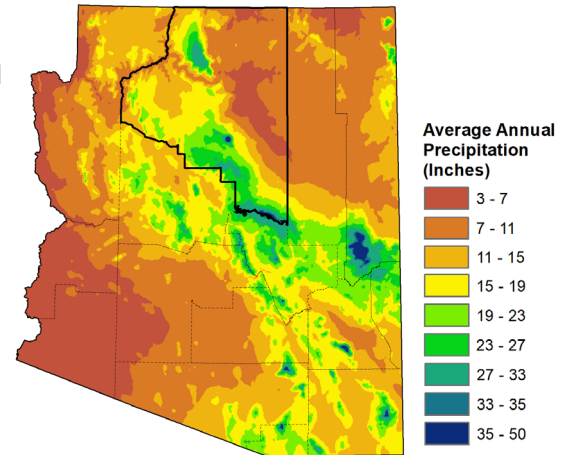
What Does Coconino County's Future Water Situation Look Like?

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 the County, including:

- Unpredictable and extreme weather patterns, including more severe storms and flooding, variable snowpack, increasing temperatures, and risk of wildfires create challenges for communities.
- Significant declines in the water levels in lakes and reservoirs have critical implications for water supplies and the water-related tourism that plays an important role in the local and state economy.

Coconino County faces rapid population growth and development, prompting concerns about future water demands and watershed health.

- Collaborative partnerships, like the Coconino Plateau Water Advisory Council & Watershed Partnership, can address the impacts of drought and growth on water resources.
- A state-supported framework that enables local management of groundwater, tailored to the unique needs and conditions of rural communities, would help protect Arizona's rural water into the future.



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

Tribal communities lack state groundwater protections and face declines and storage losses due to increasing demands in surrounding areas. Resolution of ongoing legal disputes over Tribal surface water entitlements, affecting lands within Coconino County's boundaries, would reduce uncertainties and allow Tribes to effectively manage water supply challenges and plan water infrastructure projects.

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:** Maps and information about the 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.
- **Colorado River Management:** Information on regulations and allocations of Colorado River Water from ADWR.
- **Confronting the Wildfire Crisis:** US Forest Service 10-year strategy to address the national wildfire crisis.
- **Four Forest Restoration Initiative:** Overview of 4FRI initiative as part of the Forest Service Wildfire Crisis Strategy.

County Specific Water Resources

- **Arizona County Agricultural Economy Profiles:** Agriculture, water use, and regional economic data by county.
- **Coconino County Comprehensive Plan:** Information on water resources and goals for land use within the county.
- **Coconino Plateau Water Advisory Council & Watershed Partnership:** Organization focused on research and advocacy for water resources impacted by drought and growth.